

# Appendix A: Historical Hazard Events

## APPENDIX A: HISTORICAL HAZARD EVENTS

Hazard Priority	Hazard	Date	Magnitude	Deaths	Injuries	Property Damage	Crop Damage	Description	Source
1	Flood	1/17/1996	N/A	0	0	30000	0	<p>The combination of significant prior snow cover, warm temperatures, and rainfall produced widespread tributary flooding in the Ohio river basin. Some ice jam flooding also occurred in the northern Scioto basin. Snow water equivalents of nearly 4 inches in portions of the Maumee and St. Mary's basins kept the St. Mary's river out of its banks through the 19th and 20th. Several rescues were made early on the 20th along the St. Mary's when at least 3 feet of flowing water was on a nearby road on the Mercer-Van Wert county line.</p> <p>Most of the tributaries were back within their banks by the 21st, but points along the Ohio river were now in flood. Some of the tributaries which experienced significant flooding were the Scioto, Great Miami and Blanchard rivers, as well as Ohio Brush Creek.</p>	N/A
1	Flood	1/23/1996	N/A	0	0	1000000	0	<p>By the 23rd many tributaries to the Ohio river had already crested and were receding back within their banks. However, a significant rain event occurred on the 23rd bringing over 2 inches of rain to South Central areas with lesser amounts to the north. Many tributaries were pushed back into flood on the 24th, and the flood crest moved downstream on the Ohio river. While most tributaries only experienced minor to moderate flooding, backwater flooding from the Ohio resulted in major flooding along some of the tributaries. The Little Miami river was flooded particularly bad just east of Cincinnati. Evacuations took place near the confluence of the Ohio and Little Miami rivers on the 24th as the Ohio river crest travelled through Cincinnati. Cincinnati eventually crested during the evening of the 24th at 57.3 feet, while flood stage is 52 feet. This was the highest crest in Cincinnati since March, 1979.</p>	N/A

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1	Flood	4/29/1996	N/A	0	0	5000	0	Flooding occurred along the Little Miami river. At both Kings Mill and Milford, the flood stage was 17 and the crest reached 19 feet. Numerous roads were closed along the river due to high water. High water also caused evacuations in a mobile home park in Clermont county.	N/A
1	Flood	5/11/1996	N/A	0	0	0	0	Heavy rainfall pushed the Little Miami river at Kings Mills to 20 feet. Flood stage is 17 feet. Farther downstream at Milford, the river level reached 19.3 feet where flood stage is 17 feet. Lower Kings Mills road had some of the worst flooding. Water topped street signs in some places. Five people were rescued from their homes in Foster at 5 am on the 11th as the river rose at a rate of 2 feet per hour. There was some flooding near the west end of McKinley street in South Lebanon near Turtle creek. There was also considerable flooding at the mouth of the river due to backwater flooding from the Ohio river. The hardest hit areas at the mouth of the river were Anderson Township, California, and New Richmond where numerous basements and streets flooded.	N/A
1	Flood	5/15/1996	N/A	0	0	0	0	Record spring rainfall caused rare May flooding on the Ohio river. The river stage at Cincinnati reached 53.7 feet on the 16th. Flood stage is 52 feet. The flooding closed restaurant barges along the river as well as the horse track on the east side of Cincinnati. The famous American Queen showboat remained stranded in Cincinnati for a few weeks due to the high water. The boat's smokestacks were unable to get underneath the bridges. Marina parking lots were also flooded on the east side of town. Some of the worst flooding was on the east side of town, where backwater flooding occurred at the confluence of the Little Miami river.	N/A

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1	Flood	3/2/1997	N/A	0	0	3000000	0	Heavy rainfall occurred across Southern Ohio and Northern Kentucky on the 1st and 2nd with areas along the Ohio river receiving up to 12 inches of rainfall. The river rose rapidly reaching a crest of 59.8 feet at Portsmouth at 1000 pm on the 4th. Flood stage is 50.0 feet. Further downstream at Meldahl Dam, the river crested at 61.3 feet at 700 pm on the 6th. Flood stage is 51.0 feet. In Cincinnati, the river crested at 64.7 feet at 1100 pm on the 5th. Many towns were flooded from Portsmouth to Cincinnati and thousands of people were evacuated from their homes for several days.	N/A
1	Flood	6/1/1997	N/A	0	0	0	0	N/A	N/A
1	Flood	4/16/1998	N/A	0	0	0	0	The Little Miami River rose out of its banks from Kings Mills to Milford. At Kings Mills, the river crested at 24.0 feet around 100 pm EST on the 16th. Flood stage is 17.0 feet. Some flooding occurred in South Lebanon and Morrow in Warren county. A police car was submerged by the rising flood water. At Milford, the river crested at 21.3 feet around noon on the 16th. Flood stage is 17.0 feet.	N/A
1	Flood	1/4/2000	N/A	0	0	0	0	N/A	OFFICIAL NWS OBS.
1	Flood	2/14/2000	N/A	0	0	0	0	Heavy rainfall caused the Little Miami River at Milford to rise out of its banks. The river crested at 17.5 feet around 3:00 A.M. on the 14th. Flooding was limited to areas immediately along the river.	OFFICIAL NWS OBS.
1	Flood	2/18/2000	N/A	0	0	0	0	N/A	OFFICIAL NWS OBS.
1	Flood	2/18/2000	N/A	0	0	0	0	Heavy rain caused the Little Miami River at Milford to flood for the second time in 5 days. The river crested at 18.2 feet at 900 pm on the 18th. Flood stage is 17.0 feet. Flooding was limited to lowland areas along the river in Clermont and Hamilton counties.	OFFICIAL NWS OBS.
1	Flood	2/21/2000	N/A	0	0	0	0	Heavy rainfall caused the Ohio River at Meldahl Dam to exceed flood stage. The river crested at 51.8 feet around 1100 pm on the 21st. Flood stage is 51 feet. Flooding was limited to low lying areas close to the river.	OFFICIAL NWS OBS.

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1	Flood	7/18/2001	N/A	0	0	0	0	The Little Miami River overflowed its banks at Milford reaching a crest of 21.5 feet at 400 am EST on the 18th. Flood stage is 17.0 feet. Flooding occurred in low areas between Main Street and the river and along portions of Roundbottom Road in Anderson Township.	OFFICIAL NWS OBS.
1	Flood	4/19/2002	N/A	0	0	0	0	Scattered strong thunderstorms with hard downpours affected portions of southwest, south central and west central Ohio during the early evening. There were several reports of high water on roadways and flooded basements.	LAW ENFORCEMENT
1	Flood	4/21/2002	N/A	0	0	0	0	N/A	LAW ENFORCEMENT
1	Flood	4/28/2002	N/A	0	0	0	0	N/A	LAW ENFORCEMENT
1	Flood	5/28/2002	N/A	0	0	0	0	Isolated, slow moving thunderstorms produced two to four inches in some locations across central and southwest Ohio. There were several reports of high water on roadways and basement flooding in the Cincinnati and Columbus metro areas. In Whitehall in Franklin County, several people had to be rescued when their cars became trapped in two to three feet of water.	LAW ENFORCEMENT
1	Flood	6/6/2002	N/A	0	0	0	0	Thunderstorms producing heavy rain moved across portions of southwest, south central and central Ohio during the morning hours. Many locations received two to three inches of rain, causing creeks to rise out of their banks and high water on roadways.	LAW ENFORCEMENT
1	Flood	11/10/2002	N/A	0	0	0	0	A line of severe thunderstorms with torrential rainfall moved across southwest and central Ohio during the early evening hours. Rainfall amounts within the squall line ranged from one and a half to four inches in only three hours. The heavy rain caused high water on many roadways and in low-lying areas.	LAW ENFORCEMENT
1	Flood	2/22/2003	N/A	0	0	0	0	Thunderstorms producing heavy rains developed during the afternoon ahead of a strong cold front. The rains combined with snowmelt caused numerous high water problems across southern Ohio. Several creeks went out of their banks, and numerous roads were closed due to high water.	LAW ENFORCEMENT

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1	Flood	5/10/2003	N/A	0	0	0	0	A stalled out warm front along the Ohio River provided the focus for several clusters of thunderstorms to move across southern Ohio beginning in the morning and continuing through late afternoon. Total rainfall amounts from the thunderstorms generally ranged from three to six inches. The copious amounts of rain caused creeks and streams to rise out of their banks, and many roads were flooded and impassible.	LAW ENFORCEMENT
1	Flood	5/10/2003	N/A	0	0	0	0	A stalled out warm front along the Ohio River provided the focus for several clusters of thunderstorms to move across southern Ohio beginning in the morning and continuing through late afternoon. Total rainfall amounts from the thunderstorms generally ranged from three to six inches. The copious amounts of rain caused creeks and streams to rise out of their banks, and many roads were flooded and impassible.	LAW ENFORCEMENT
1	Flood	7/10/2003	N/A	0	0	0	0	Strong thunderstorms along a cold front moved across southwest and south central Ohio during the afternoon and evening. Two to three inches fell, causing localized flooding. Numerous roads were flooded and closed, and a few streams came out of their banks. The Great Miami River came out of its banks in Warren county, causing large areas of lowland flooding near Franklin. Several homes north of Dayton were evacuated when high water flowed into the Eldorado neighborhood. High water caused a culvert to collapse on State Route 41 near Peebles, leaving a large sinkhole in the road.	AMATEUR RADIO
1	Flood	7/13/2003	N/A	0	0	0	0	An isolated thunderstorm dropped between two to three inches of rain across the southeast portion of the county, causing a few roads to flood.	LAW ENFORCEMENT
1	Flood	7/15/2003	N/A	0	0	0	0	Scattered severe thunderstorms developed along a cold front during the evening hours. The storms produced locally heavy rainfall of two to three inches in the Cincinnati metro area east into south central Ohio. The heavy rain caused numerous roads to flood.	LAW ENFORCEMENT

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1	Flood	8/8/2003	N/A	0	0	0	0	Scattered thunderstorms with heavy rain caused localized flooding of roads in the Cincinnati metro area, and across portions of south central Ohio.	LAW ENFORCEMENT
1	Flood	7/31/2004	N/A	0	0	0	0	Waves of thunderstorms moved along a stalled frontal boundary during the early morning hours. As much as four to five inches of rain fell across Brown and Clermont counties, causing several roads to become impassable due to high water.	LAW ENFORCEMENT
1	Flood	10/18/2004	N/A	0	0	0	0	A low pressure system tracking through the Ohio Valley brought heavy rain southwest Ohio. Two to three inches of rain fell across the Cincinnati metro area east into Clermont County. This produced flooding of some roads. There were a few evacuations along Duck Creek in Fairfax.	LAW ENFORCEMENT
1	Flood	1/5/2005	N/A	0	0	20000	0	A stationary frontal boundary draped across the Ohio Valley was the focusing mechanism for an extended period of heavy rain across much of central and southern Ohio. Many locations received two to four inches of rain in a 24-hour period, which increased flooding problems as the ground was already saturated from recent snowmelt. Widespread flooding of roads and low lying areas occurred across the region, with numerous creeks and streams rising out of their banks. Several evacuations occurred near Buckeye Lake, and Interstate 70 was closed as the lake spilled across the eastbound lanes near the State Route 79 interchange in southern Licking county. Lake Saint Marys also rose out of its banks, flooding businesses in the southern part of Celina in Mercer county. Big Walnut Creek rose out of its banks in eastern Franklin county, causing significant flooding across the eastern Columbus suburbs, and specifically in the city of Gahanna.	LAW ENFORCEMENT
1	Flood	3/28/2005	N/A	0	0	0	0	A low pressure system tracked through the Tennessee Valley, spreading a large area of moderate to heavy rain across southwest Ohio. Two to three inches fell, producing widespread flooding of roads and causing creeks to rise out of their banks.	LAW ENFORCEMENT
1	Flood	4/22/2005	N/A	0	0	0	0	N/A	LAW ENFORCEMENT
1	Flood	6/14/2005	N/A	0	0	0	0	Thunderstorms produced some flooding of roads across portions of southwest and southern Ohio during the afternoon.	BROADCAST MEDIA

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1	Flood	11/15/2005	N/A	0	0	0	0	A large area of heavy rain ahead of a warm front moved across southwest Ohio during the morning. Several roads were flooded across eastern portions of the Cincinnati metro area as a result of two to three inches of rain.	LAW ENFORCEMENT
1	Flood	3/4/2008	N/A	0	0	2000	0	County Line Road was flooded and closed. Burdsell Road was also flooded. An area of low pressure tracking along a frontal boundary brought two to four inches of rainfall and widespread areas of flooding.	Law Enforcement
1	Flood	3/19/2008	N/A	0	0	5000	0	Several waves of low pressure moved along a stationary front located across the Ohio Valley. The waves of low pressure brought an extended period of heavy rain, with three to six inches of rainfall across southwest and central Ohio. Numerous roads were flooded and closed across the county.	Law Enforcement
1	Flood	6/9/2010	N/A	2	0	3000	0	Heavy rain allowed for some creeks to rise out of their banks. Heavy rain allowed for Bullskin Creek to rise. Two boys, ages 8 and 11, were killed when they were swept away in the rising water after they went to look at the high water.	Broadcast Media
1	Flood	4/19/2011	N/A	0	0	1000	0	An area of storms moved through during the morning hours of April 19th bringing hail to the region. Streets were flooded due to heavy rainfall.	Public
1	Flood	6/21/2011	N/A	0	0	1000	0	An approaching shortwave trough combined with ample instability in a warm and moist air mass across Ohio and Northern Kentucky during the afternoon. This led to the development of severe thunderstorms that also produced flash flooding across central Ohio and Northern Kentucky into the evening hours. The main severe weather threats were large hail, damaging winds, and flash flooding. Water continued over roadways due to previous flash flooding.	Public



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1	Flood	6/21/2011	N/A	0	0	1000	0	An approaching shortwave trough combined with ample instability in a warm and moist air mass across Ohio and Northern Kentucky during the afternoon. This led to the development of severe thunderstorms that also produced flash flooding across central Ohio and Northern Kentucky into the evening hours. The main severe weather threats were large hail, damaging winds, and flash flooding. Water was reported over roadways due to previous flash flooding.	Fire Department/Rescue
1	Flood	12/5/2011	N/A	0	0	1000	0	A low pressure system combined with a slow moving cold front to produce widespread rain across the Ohio Valley. The result of the heavy rain was numerous reports of flooding in the area. Some of the flooding lingered into the morning hours of December 6. High water due to heavy rain was reported to be causing some road closures in the area.	Law Enforcement
1	Flood	7/23/2013	N/A	0	0	0	0	Thunderstorms developed in an unstable air mass ahead of a cold front during the afternoon. These storms began to organize and became severe. The main threat from these storms was damaging wind and large hail. Some locations were hit by multiple storms over a short period of time. This caused very heavy rainfall that resulted in flooding and flash flooding. Zachary Drive in Williamsburg was closed due to high water caused by heavy rainfall.	Law Enforcement
1	Flood	12/22/2013	N/A	0	0	0	0	Low pressure drew an unseasonably warm and moist air mass across the region. Convection organized ahead of the low and brought heavy rainfall and damaging winds to the area from the evening of the 21st into the morning of the 22nd. Some of the flooding lingered into December 25th. High water was reported over a few roads across the county due to heavy rainfall.	Public
1	Flood	4/4/2014	N/A	0	0	0	0	Heavy rainfall occurred along and ahead of a cold front moving across the region. Flooding and flash flooding occurred as a result of the heavy rain. High water was reported over Wolfpen- Pleasant Hill Road at Kimberly Drive due to heavy rainfall.	Fire Department/Rescue

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1	Flood	4/16/2017	N/A	0	0	5000	0	Thunderstorms with very heavy rain developed ahead of a cold front. Garage of a home was flooded by high water.	Public
1	Flood	4/16/2017	N/A	0	0	0	0	Thunderstorms with very heavy rain developed ahead of a cold front. High water was reported over Beechwood and Summerside Roads.	Public
1	Flood	6/8/2018	N/A	0	0	20000	0	Scattered thunderstorms developed ahead of an upper level disturbance in a moist and unstable air mass. Some of the storms produce torrential rainfall with amounts as high as 4 to 5 inches. High water was covering the road along U.S. Route 50 near Milford Parkway.	Trained Spotter
1	Flood	6/8/2018	N/A	0	0	0	0	Scattered thunderstorms developed ahead of an upper level disturbance in a moist and unstable air mass. Some of the storms produce torrential rainfall with amounts as high as 4 to 5 inches. Water was over the road near the intersection of State Route 131 and U.S. 50. Some minor debris was deposited on the road.	State Official
2	Severe Storm - Thunderstorm Wind	11/26/1965	55	0	0	0	0	N/A	N/A
2	Severe Storm - Thunderstorm Wind	7/13/1966	0	0	0	0	0	N/A	N/A
2	Severe Storm - Thunderstorm Wind	5/18/1969	0	0	0	0	0	N/A	N/A
2	Severe Storm - Thunderstorm Wind	4/1/1974	0	0	0	0	0	N/A	N/A
2	Severe Storm - Thunderstorm Wind	7/15/1976	0	0	0	0	0	N/A	N/A
2	Severe Storm - Thunderstorm Wind	10/1/1977	0	0	0	0	0	N/A	N/A
2	Severe Storm - Thunderstorm Wind	5/12/1980	57	0	0	0	0	N/A	N/A
2	Severe Storm - Thunderstorm Wind	6/2/1980	52	0	0	0	0	N/A	N/A
2	Severe Storm - Thunderstorm Wind	5/2/1983	0	0	0	0	0	N/A	N/A
2	Severe Storm - Thunderstorm Wind	7/18/1983	0	0	0	0	0	N/A	N/A
2	Severe Storm - Thunderstorm Wind	7/23/1983	0	0	0	0	0	N/A	N/A
2	Severe Storm - Thunderstorm Wind	6/11/1985	0	0	0	0	0	N/A	N/A

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2	Severe Storm - Thunderstorm Wind	5/7/1986	0	0	0	0	0	N/A	N/A
2	Severe Storm - Thunderstorm Wind	8/6/1986	0	0	0	0	0	N/A	N/A
2	Severe Storm - Thunderstorm Wind	7/26/1987	0	0	0	0	0	N/A	N/A
2	Severe Storm - Thunderstorm Wind	4/23/1988	0	0	0	0	0	N/A	N/A
2	Severe Storm - Thunderstorm Wind	8/5/1988	0	0	0	0	0	N/A	N/A
2	Severe Storm - Thunderstorm Wind	4/29/1989	0	0	0	0	0	N/A	N/A
2	Severe Storm - Thunderstorm Wind	7/12/1989	0	0	0	0	0	N/A	N/A
2	Severe Storm - Thunderstorm Wind	7/27/1989	0	0	0	0	0	N/A	N/A
2	Severe Storm - Thunderstorm Wind	7/27/1989	0	0	0	0	0	N/A	N/A
2	Severe Storm - Thunderstorm Wind	8/5/1989	0	0	0	0	0	N/A	N/A
2	Severe Storm - Thunderstorm Wind	6/6/1990	0	0	0	0	0	N/A	N/A
2	Severe Storm - Thunderstorm Wind	7/5/1990	0	0	0	0	0	N/A	N/A
2	Severe Storm - Thunderstorm Wind	7/9/1990	0	0	0	0	0	N/A	N/A
2	Severe Storm - Thunderstorm Wind	7/11/1990	0	0	0	0	0	N/A	N/A
2	Severe Storm - Thunderstorm Wind	7/20/1990	0	0	0	0	0	N/A	N/A
2	Severe Storm - Thunderstorm Wind	8/22/1990	0	0	0	0	0	N/A	N/A
2	Severe Storm - Thunderstorm Wind	8/28/1990	0	0	0	0	0	N/A	N/A
2	Severe Storm - Thunderstorm Wind	9/14/1990	0	0	0	0	0	N/A	N/A
2	Severe Storm - Thunderstorm Wind	4/9/1991	0	0	0	0	0	N/A	N/A
2	Severe Storm - Thunderstorm Wind	4/23/1991	0	0	0	0	0	N/A	N/A
2	Severe Storm - Thunderstorm Wind	5/16/1991	0	0	0	0	0	N/A	N/A
2	Severe Storm - Thunderstorm Wind	5/16/1991	0	0	0	0	0	N/A	N/A
2	Severe Storm - Thunderstorm Wind	5/17/1991	0	0	0	0	0	N/A	N/A

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2	Severe Storm - Thunderstorm Wind	7/2/1991	0	0	0	0	0	N/A	N/A
2	Severe Storm - Thunderstorm Wind	8/3/1991	0	0	0	0	0	N/A	N/A
2	Severe Storm - Thunderstorm Wind	8/8/1991	0	0	0	0	0	N/A	N/A
2	Severe Storm - Thunderstorm Wind	4/10/1992	0	0	0	0	0	N/A	N/A
2	Severe Storm - Thunderstorm Wind	6/18/1992	0	0	0	0	0	N/A	N/A
2	Severe Storm - Thunderstorm Wind	6/18/1992	0	0	0	0	0	N/A	N/A
2	Severe Storm - Thunderstorm Wind	7/9/1992	0	0	0	0	0	N/A	N/A
2	Severe Storm - Thunderstorm Wind	7/11/1992	0	0	0	0	0	N/A	N/A
2	Severe Storm - Thunderstorm Wind	7/18/1992	0	0	0	0	0	N/A	N/A
2	Severe Storm - Thunderstorm Wind	9/21/1992	0	0	0	0	0	N/A	N/A
2	Severe Storm - Thunderstorm Wind	8/28/1993	0	0	0	50000	0	Trees downed, some on roads and power lines.	N/A
2	Severe Storm - Thunderstorm Wind	4/15/1994	0	0	0	500000	0	Trees were downed in Amelia and a mobile home was blown over. Several other mobile homes received minor damage. Spotters in the are reported a wind gust to 61 mph. Trees were also downed in Washington Township and other locations with several reports of minor roof damage.	N/A
2	Severe Storm - Thunderstorm Wind	6/7/1994	0	0	0	50000	0	Trees were downed.	N/A
2	Severe Storm - Thunderstorm Wind	6/16/1994	0	0	0	5000	0	Large trees were downed.	N/A
2	Severe Storm - Thunderstorm Wind	6/17/1994	0	0	0	5000	0	Trees were downed, some on power lines.	N/A
2	Severe Storm - Thunderstorm Wind	6/21/1994	0	0	0	5000	0	N/A	N/A
2	Severe Storm - Thunderstorm Wind	8/4/1994	0	0	0	5000	0	N/A	N/A
2	Severe Storm - Thunderstorm Wind	5/29/1995	0	0	0	7000	0	Trees were downed. In Goshen, some fell into power lines.	N/A
2	Severe Storm - Thunderstorm Wind	4/20/1996	50	0	0	2000	0	Trees and power lines downed.	N/A
2	Severe Storm - Thunderstorm Wind	4/23/1996	50	0	0	1000	0	Trees downed.	N/A
2	Severe Storm - Thunderstorm Wind	4/29/1996	50	0	0	2000	0	Trees downed.	N/A

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2	Severe Storm - Thunderstorm Wind	5/4/1996	50	0	0	2000	0	Trees and electrical lines downed.	N/A
2	Severe Storm - Thunderstorm Wind	5/4/1996	50	0	0	3000	0	Trees and electrical lines downed.	N/A
2	Severe Storm - Thunderstorm Wind	5/8/1996	50	0	0	10000	0	Numerous trees downed. Trailer and barn destroyed.	N/A
2	Severe Storm - Thunderstorm Wind	5/24/1996	50	0	0	3000	0	Numerous trees downed.	N/A
2	Severe Storm - Thunderstorm Wind	6/14/1996	50	0	0	5000	0	Numerous large trees downed.	N/A
2	Severe Storm - Thunderstorm Wind	6/24/1996	50	0	0	3000	0	Numerous trees and power lines downed.	N/A
2	Severe Storm - Thunderstorm Wind	11/7/1996	50	0	0	10000	0	Numerous trees downed. Trailer damaged and a shed blown over.	N/A
2	Severe Storm - Thunderstorm Wind	1/5/1997	50	0	0	5000	0	Numerous large tree branches downed.	N/A
2	Severe Storm - Thunderstorm Wind	3/28/1997	52	0	0	0	0	Spotter reported a gust to 60 mph.	N/A
2	Severe Storm - Thunderstorm Wind	5/19/1997	60	0	0	10000 0	0	Numerous trees downed with some falling on residences and a church.	N/A
2	Severe Storm - Thunderstorm Wind	7/22/1997	50	0	0	5000	0	Numerous trees downed.	N/A
2	Severe Storm - Thunderstorm Wind	7/27/1997	50	0	0	10000	0	N/A	N/A
2	Severe Storm - Thunderstorm Wind	8/17/1997	50	0	0	15000	0	Numerous trees downed across the county including one that fell on a truck. The two passengers were not injured.	N/A
2	Severe Storm - Thunderstorm Wind	8/27/1997	50	0	0	5000	0	Several large limbs and power lines downed.	N/A
2	Severe Storm - Thunderstorm Wind	5/13/1998	50	0	0	5000	0	Trees and power lines downed.	N/A
2	Severe Storm - Thunderstorm Wind	5/19/1998	50	0	0	3000	0	Numerous trees downed.	N/A
2	Severe Storm - Thunderstorm Wind	6/10/1998	50	0	0	3000	0	Trees downed.	N/A
2	Severe Storm - Thunderstorm Wind	6/10/1998	50	0	0	3000	0	Trees downed.	N/A
2	Severe Storm - Thunderstorm Wind	6/11/1998	50	0	0	3000	0	Trees downed.	N/A
2	Severe Storm - Thunderstorm Wind	6/12/1998	50	0	0	10000	0	Trees downed across the county.	N/A
2	Severe Storm - Thunderstorm Wind	6/16/1998	50	0	0	3000	0	Numerous trees downed.	N/A

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2	Severe Storm - Thunderstorm Wind	6/19/1998	50	0	0	10000	0	Numerous trees downed.	N/A
2	Severe Storm - Thunderstorm Wind	6/22/1998	50	0	0	5000	0	Trees downed.	N/A
2	Severe Storm - Thunderstorm Wind	6/29/1998	50	0	0	3000	0	Trees downed.	N/A
2	Severe Storm - Thunderstorm Wind	7/19/1998	60	0	0	20000	0	N/A	LAW ENFORCEMENT
2	Severe Storm - Thunderstorm Wind	11/10/1998	50	0	0	3000	0	N/A	TRAINED SPOTTER
2	Severe Storm - Thunderstorm Wind	4/9/1999	50	0	0	10000	0	Several large trees were downed in the northern section of the county.	LAW ENFORCEMENT
2	Severe Storm - Thunderstorm Wind	5/6/1999	50	0	0	3000	0	Several trees were knocked down.	LAW ENFORCEMENT
2	Severe Storm - Thunderstorm Wind	6/10/1999	57	0	0	50000 0	0	Numerous large trees were reported down. In Miami Township, a roof was torn off of a house causing extensive damage. One of the trees that fell landed on a mobile home.	LAW ENFORCEMENT
2	Severe Storm - Thunderstorm Wind	6/11/1999	50	0	0	16000	0	A tree fell on a mobile home, a shed was blown over, and numerous trees were downed.	LAW ENFORCEMENT
2	Severe Storm - Thunderstorm Wind	6/13/1999	52	0	0	6000	0	A large tree fell on a house. Also, numerous trees were downed in Miami Township causing several power outages.	LAW ENFORCEMENT
2	Severe Storm - Thunderstorm Wind	7/9/1999	50	0	0	3000	0	Trees knocked down.	LAW ENFORCEMENT
2	Severe Storm - Thunderstorm Wind	4/20/2000	50	0	0	5000	0	Trees downed.	LAW ENFORCEMENT
2	Severe Storm - Thunderstorm Wind	4/20/2000	50	0	0	5000	0	Trees and power lines knocked down.	LAW ENFORCEMENT
2	Severe Storm - Thunderstorm Wind	6/2/2000	52	0	0	4000	0	Several trees and powerlines were reported down throughout the county.	LAW ENFORCEMENT
2	Severe Storm - Thunderstorm Wind	6/2/2000	55	0	0	15000	0	Ten homes in Jackson Township were damaged by strong winds. Several trees were snapped in half.	LAW ENFORCEMENT
2	Severe Storm - Thunderstorm Wind	6/26/2000	52	0	0	3000	0	A barn was destroyed off of State Route 50.	LAW ENFORCEMENT
2	Severe Storm - Thunderstorm Wind	8/17/2000	50	0	0	5000	0	Trees were knocked down across roads around New Richmond.	LAW ENFORCEMENT
2	Severe Storm - Thunderstorm Wind	9/20/2000	50	0	0	5000	0	Numerous trees downed by thunderstorm winds.	LAW ENFORCEMENT
2	Severe Storm - Thunderstorm Wind	9/20/2000	50	0	0	5000	0	Numerous trees downed.	LAW ENFORCEMENT

## APPENDIX A: HISTORICAL HAZARD EVENTS

Hazard Priority	Hazard	Date	Magnitude	Deaths	Injuries	Property Damage	Crop Damage	Description	Source
2	Severe Storm - Thunderstorm Wind	9/23/2000	50	0	0	10000	0	Thunderstorm winds knocked down trees, some of which fell on cars.	LAW ENFORCEMENT
2	Severe Storm - Thunderstorm Wind	11/9/2000	50	0	0	100000	0	Thunderstorm winds knocked down trees across the county. A 100 foot tower was blown over in Felicity.	LAW ENFORCEMENT
2	Severe Storm - Thunderstorm Wind	4/6/2001	50	0	0	3000	0	A few trees were knocked down.	LAW ENFORCEMENT
2	Severe Storm - Thunderstorm Wind	6/12/2001	55	0	0	5000	0	Trees were knocked down throughout Miami, Goshen and Jackson Townships	LAW ENFORCEMENT
2	Severe Storm - Thunderstorm Wind	7/8/2001	50	0	0	10000	0	N/A	AMATEUR RADIO
2	Severe Storm - Thunderstorm Wind	7/8/2001	50	0	0	5000	0	N/A	TRAINED SPOTTER
2	Severe Storm - Thunderstorm Wind	7/8/2001	50	0	0	3000	0	N/A	LAW ENFORCEMENT
2	Severe Storm - Thunderstorm Wind	7/17/2001	50	0	0	3000	0	Trees and powerlines were knocked down across town.	LAW ENFORCEMENT
2	Severe Storm - Thunderstorm Wind	7/17/2001	50	0	0	3000	0	Trees were knocked down across the southern part of the county.	LAW ENFORCEMENT
2	Severe Storm - Thunderstorm Wind	7/17/2001	50	0	0	50000	0	Thousands of trees were knocked down near Batavia.	LAW ENFORCEMENT
2	Severe Storm - Thunderstorm Wind	8/11/2001	50	0	0	0	0	Trees knocked down in several locations across the county.	LAW ENFORCEMENT
2	Severe Storm - Thunderstorm Wind	10/24/2001	50	0	0	5000	0	Trees and powerlines were blown down across the county.	LAW ENFORCEMENT
2	Severe Storm - Thunderstorm Wind	5/7/2002	50	0	0	25000	0	Ten trees ranging from two to two and a half feet in diameter were uprooted. Several homes sustained minor structural damage and a small shed was destroyed.	LAW ENFORCEMENT
2	Severe Storm - Thunderstorm Wind	7/29/2002	51	0	0	3000	0	Trees were blown down.	LAW ENFORCEMENT
2	Severe Storm - Thunderstorm Wind	8/11/2002	50	0	0	5000	0	Trees were downed across portions of Union and Miami Townships.	LAW ENFORCEMENT
2	Severe Storm - Thunderstorm Wind	7/4/2003	50	0	0	7000	0	Several trees and powerlines were downed.	LAW ENFORCEMENT
2	Severe Storm - Thunderstorm Wind	7/9/2003	50	0	0	3000	0	Trees and powerlines were downed.	LAW ENFORCEMENT
2	Severe Storm - Thunderstorm Wind	7/9/2003	50	0	0	2000	0	Three trees were knocked down.	LAW ENFORCEMENT
2	Severe Storm - Thunderstorm Wind	7/15/2003	50	0	0	3000	0	Trees were downed.	LAW ENFORCEMENT
2	Severe Storm - Thunderstorm Wind	7/15/2003	50	0	0	3000	0	Numerous trees and powerlines were knocked down.	EMERGENCY MANAGER

## APPENDIX A: HISTORICAL HAZARD EVENTS

Hazard Priority	Hazard	Date	Magnitude	Deaths	Injuries	Property Damage	Crop Damage	Description	Source
2	Severe Storm - Thunderstorm Wind	7/21/2003	50	0	0	2000	0	Three trees were knocked down.	NEWSPAPER
2	Severe Storm - Thunderstorm Wind	5/27/2004	50	0	0	3000	0	Trees were downed.	DEPT OF HIGHWAYS
2	Severe Storm - Thunderstorm Wind	5/30/2004	50	0	0	2000	0	Two trees were knocked down.	DEPT OF HIGHWAYS
2	Severe Storm - Thunderstorm Wind	5/30/2004	50	0	0	8000	0	Numerous trees were knocked down.	LAW ENFORCEMENT
2	Severe Storm - Thunderstorm Wind	7/9/2004	50	0	0	5000	0	Trees were downed.	LAW ENFORCEMENT
2	Severe Storm - Thunderstorm Wind	7/10/2004	50	0	0	3000	0	Trees were downed.	LAW ENFORCEMENT
2	Severe Storm - Thunderstorm Wind	7/10/2004	50	0	0	3000	0	Trees were downed.	LAW ENFORCEMENT
2	Severe Storm - Thunderstorm Wind	4/22/2005	50	0	0	3000	0	Several trees and large limbs were downed.	LAW ENFORCEMENT
2	Severe Storm - Thunderstorm Wind	6/14/2005	50	0	0	3000	0	Several trees were knocked down around Eastgate.	TRAINED SPOTTER
2	Severe Storm - Thunderstorm Wind	8/20/2005	50	0	0	8000	0	Siding was peeled off a house in Miami Township. Powerlines were downed as well.	LAW ENFORCEMENT
2	Severe Storm - Thunderstorm Wind	9/23/2005	50	0	0	3000	0	Several trees were downed.	LAW ENFORCEMENT
2	Severe Storm - Thunderstorm Wind	3/31/2006	50	0	0	6000	0	Part of a roof was peeled off a house. Power lines were also downed in the area.	LAW ENFORCEMENT
2	Severe Storm - Thunderstorm Wind	4/2/2006	60	0	0	10000	0	A large tree fell onto a house on Hill Station Road. Additional trees were downed in the area.	EMERGENCY MANAGER
2	Severe Storm - Thunderstorm Wind	4/2/2006	60	0	0	60000	0	Over 100 trees were downed at the Cincinnati Nature Center.	NEWSPAPER
2	Severe Storm - Thunderstorm Wind	5/25/2006	50	0	0	2000	0	Two trees were knocked down.	TRAINED SPOTTER
2	Severe Storm - Thunderstorm Wind	5/25/2006	50	0	0	3000	0	Trees were downed.	LAW ENFORCEMENT
2	Severe Storm - Thunderstorm Wind	6/22/2006	50	0	0	3000	0	Several trees were downed in Miami Township.	LAW ENFORCEMENT
2	Severe Storm - Thunderstorm Wind	7/4/2006	50	0	0	3000	0	Trees were knocked down.	NEWSPAPER
2	Severe Storm - Thunderstorm Wind	7/14/2006	50	0	0	3000	0	One large tree was knocked down near Milford High School. Two more trees were downed near Williamsburg.	LAW ENFORCEMENT
2	Severe Storm - Thunderstorm Wind	7/18/2006	50	0	0	3000	0	Trees were downed throughout Goshen Township.	LAW ENFORCEMENT
2	Severe Storm - Thunderstorm Wind	7/21/2006	50	0	0	3000	0	Trees were knocked down along Blue Sky Park Road.	LAW ENFORCEMENT



## APPENDIX A: HISTORICAL HAZARD EVENTS

Hazard Priority	Hazard	Date	Magnitude	Deaths	Injuries	Property Damage	Crop Damage	Description	Source
2	Severe Storm - Thunderstorm Wind	12/1/2006	50	0	0	3000	0	A thin convective line moved across the forecast area during the early morning ahead of a strengthening low pressure system. Three trees were knocked down.	Law Enforcement
2	Severe Storm - Thunderstorm Wind	4/11/2007	50	0	0	2000	0	A line of thunderstorms moved across southern and western Ohio during the evening ahead of a cold front. Large tree limbs were downed.	Law Enforcement
2	Severe Storm - Thunderstorm Wind	6/8/2007	50	0	0	2000	0	Scattered severe thunderstorms developed during the afternoon ahead of an approaching cold front. A few trees and power lines were knocked down along Cole Road.	Law Enforcement
2	Severe Storm - Thunderstorm Wind	7/15/2007	50	0	0	4000	0	Severe thunderstorms developed over southern Ohio ahead of a cold front during the afternoon. Numerous trees and power lines were knocked down.	Public
2	Severe Storm - Thunderstorm Wind	8/16/2007	50	0	0	3000	0	Clusters of strong to severe thunderstorms developed during the afternoon along outflow boundaries from the early morning thunderstorms. Several trees and power lines were downed.	Law Enforcement
2	Severe Storm - Thunderstorm Wind	9/26/2007	55	0	0	12000	0	A few strong to severe thunderstorms developed during the afternoon ahead of a cold front. An estimated thirty trees were knocked down in the Crooked Run Nature Preserve. Numerous large limbs and several sixteen inch diameter sycamore trees were downed along the north bank of the Ohio River.	County Official
2	Severe Storm - Thunderstorm Wind	2/6/2008	70	0	0	70000	0	A line of severe thunderstorms developed during the late evening ahead of a strong cold front. Persistent heavy rain caused flooding, especially across west central Ohio. A 25-foot block wall was blown into a grocery store. A plate glass window was blown out and the porch of an adjacent home was severely damaged. Several barns were destroyed and a large number of trees and power poles were knocked down. Damage was determined to be caused by straight-line winds estimated at 80 to 100 mph.	NWS Storm Survey
2	Severe Storm - Thunderstorm Wind	6/3/2008	50	0	0	3000	0	Thunderstorms developed in the afternoon along a northward moving warm front. Additional thunderstorms developed during the evening as the front moved north. Trees were downed.	Law Enforcement

## APPENDIX A: HISTORICAL HAZARD EVENTS

Hazard Priority	Hazard	Date	Magnitude	Deaths	Injuries	Property Damage	Crop Damage	Description	Source
2	Severe Storm - Thunderstorm Wind	6/4/2008	74	0	0	40000	0	Strong thunderstorms continued to develop and track along a warm front that was stalled over the region. Training storms caused excessive rainfall in some areas. Significant straight-line wind damage occurred to homes with a number of trees downed or uprooted near the intersection of Branch Hill-Guinea and Cook Roads in Miami Township. Winds were estimated at 80 to 90 mph.	Broadcast Media
2	Severe Storm - Thunderstorm Wind	6/4/2008	61	0	0	40000	0	Strong thunderstorms continued to develop and track along a warm front that was stalled over the region. Training storms caused excessive rainfall in some areas. Several homes sustained roof damage, and numerous trees were knocked down across Goshen Township. The damage was determined to be caused by straight-line winds estimated at 70 mph.	NWS Storm Survey
2	Severe Storm - Thunderstorm Wind	6/4/2008	61	0	0	20000	0	Strong thunderstorms continued to develop and track along a warm front that was stalled over the region. Training storms caused excessive rainfall in some areas. Several large trees were either split open or completely uprooted near and just north of Stonelick State Park in Wayne Township. A large moveable sign was also thrown across a road and into a house, causing minor damage. Damage was determined to be caused by straight-line winds, estimated at 70 mph.	NWS Storm Survey
2	Severe Storm - Thunderstorm Wind	6/28/2008	50	0	0	3000	0	A cold front crossed the region overnight on the 28th with numerous reports of damaging winds, large hail, and measured strong wind gusts. Large tree limbs were knocked down.	Public
2	Severe Storm - Thunderstorm Wind	7/8/2008	50	0	0	3000	0	Strong to severe thunderstorms developed during the afternoon and evening as a cold front moved through the region. Numerous trees and power lines were knocked down.	Law Enforcement
2	Severe Storm - Thunderstorm Wind	7/20/2008	50	0	0	3000	0	A complex of severe thunderstorms moved across the region during the evening. Trees were knocked down along Frank Willis Memorial Drive.	Law Enforcement
2	Severe Storm - Thunderstorm Wind	7/22/2008	50	0	0	3000	0	A severe mesoscale convective system moved across the southern half of the forecast area during the early morning. Trees were downed.	Public

## APPENDIX A: HISTORICAL HAZARD EVENTS

Hazard Priority	Hazard	Date	Magnitude	Deaths	Injuries	Property Damage	Crop Damage	Description	Source
2	Severe Storm - Thunderstorm Wind	2/11/2009	50	0	0	10000	0	Scattered severe thunderstorms developed during the afternoon and evening. Trees and power poles were downed along State Route 133. One tree fell on a house, causing minor structural damage.	Law Enforcement
2	Severe Storm - Thunderstorm Wind	6/14/2009	53	0	0	9000	0	Scattered showers and thunderstorms developed throughout the day. Some of them became severe when a mid level short wave tracked through the region and gave additional lift to already existing storms. Two large trees and nine power poles were blown down across route 50 approximately 4 miles south of Newtonsville. Two vehicles were trapped between the poles and under the lines for a period of time.	Law Enforcement
2	Severe Storm - Thunderstorm Wind	6/26/2009	52	0	0	1000	0	A weak boundary along the Ohio River provided a focus for thunderstorm activity ahead of a cold front. This translated to a weak trough axis that extended from northern Kentucky to central Ohio later in the day, also providing a focus for strong storms. Large limbs and small trees were blown down by winds that were estimated to be 60 mph.	Amateur Radio
2	Severe Storm - Thunderstorm Wind	6/2/2010	52	0	0	0	0	The atmosphere eventually recovered from the passage of an outflow boundary in the morning. Storms developed along a convergent axis ahead of a surface trough. Lift was aided by an enhanced short wave moving across Indiana. A trained spotter estimated the wind gust.	Trained Spotter
2	Severe Storm - Thunderstorm Wind	6/12/2010	50	0	0	1000	0	A severe Mesoscale Convective System tracked from Indiana into much of Ohio during the late evening hours. A few trees were reported down due to damaging thunderstorm winds.	Law Enforcement
2	Severe Storm - Thunderstorm Wind	6/12/2010	50	0	0	1000	0	A mid-level impulse on the northern periphery of a ridge resulted in scattered thunderstorms during the evening. A large complex of thunderstorms over Indiana weakened as it pushed into Ohio, but still managed to produce a strong outflow boundary which raced out ahead of the storms. The strongest winds occurred where the outflow rushed out fastest, despite a lack of high velocity and sometimes a lack of storms on radar. Several large tree limbs were reported down due to damaging thunderstorm winds.	Law Enforcement

## APPENDIX A: HISTORICAL HAZARD EVENTS

Hazard Priority	Hazard	Date	Magnitude	Deaths	Injuries	Property Damage	Crop Damage	Description	Source
2	Severe Storm - Thunderstorm Wind	6/21/2010	50	0	0	2000	0	Severe weather occurred during the morning and into the early afternoon hours of June 21st. The main threat was damaging thunderstorm winds. Numerous trees were reported down across the southern part of the county.	Law Enforcement
2	Severe Storm - Thunderstorm Wind	6/27/2010	50	0	0	1000	0	Severe weather developed during the day of June 27th. The main threats were damaging winds and flash flooding. Trees were reported down due to damaging thunderstorm winds.	Law Enforcement
2	Severe Storm - Thunderstorm Wind	8/4/2010	50	0	0	1000	0	A very unstable air mass was in place with temperatures in the 90s and dew points in the upper 70s. While forcing was weak, there was enough lift ahead of a mid-level impulse to spark widespread convection in the form of a mesoscale convective system. Trees were reported down due to damaging thunderstorm winds.	Law Enforcement
2	Severe Storm - Thunderstorm Wind	8/15/2010	50	0	0	2000	0	Isolated severe weather developed during the afternoon hours of August 15th. The main threat was damaging winds. Several trees were reported down due to damaging thunderstorm winds.	Law Enforcement
2	Severe Storm - Thunderstorm Wind	9/7/2010	50	0	0	1000	0	A cold front pushed into a thin area of instability that had developed due to the strong surface heating during the day. Convection never organized into complete lines, but some individual cells became strong to severe. Moisture had advected northward into the area in advance of the front. Motion of the storms was fairly quick and towards the east. Trees were reported down due to damaging thunderstorm winds.	Law Enforcement
2	Severe Storm - Thunderstorm Wind	9/7/2010	55	0	0	6000	0	A cold front pushed into a thin area of instability that had developed due to the strong surface heating during the day. Convection never organized into complete lines, but some individual cells became strong to severe. Moisture had advected northward into the area in advance of the front. Motion of the storms was fairly quick and towards the east. Shingles, trim, and gutters were blown off of a house due to damaging thunderstorm winds.	Public

## APPENDIX A: HISTORICAL HAZARD EVENTS

Hazard Priority	Hazard	Date	Magnitude	Deaths	Injuries	Property Damage	Crop Damage	Description	Source
2	Severe Storm - Thunderstorm Wind	10/26/2010	60	0	0	2000	0	A historically deep low pressure system sent a very strong cold front into a marginally unstable, but very sheared environment. A line of storms formed west of the area overnight and moved into the region during the peak heating hours of the day. Severe wind gusts occurred along the entire line with multiple tornadoes occurring around the region as well. Trees were reported down due to damaging thunderstorm winds.	Law Enforcement
2	Severe Storm - Thunderstorm Wind	2/28/2011	50	0	0	2000	0	A line of severe storms moved through during the morning hours of February 28th. The main threats were damaging winds and flash flooding, however one tornado also occurred with this event. Trees and power lines were reported down due to damaging thunderstorm winds.	Law Enforcement
2	Severe Storm - Thunderstorm Wind	3/23/2011	50	0	0	1000	0	An upper level jet stream tracking through the Ohio Valley combined with low pressure at the surface to produce severe thunderstorms during the afternoon of March 23rd. Several supercells developed producing large hail. There were also a few thunderstorm line segments with damaging wind gusts ahead of drier air rapidly advancing from the west. A second round of thunderstorms occurred closer to the main cold front during the evening of March 23rd to just after midnight on March 24th. Large branches were broken due to damaging thunderstorm winds.	Public
2	Severe Storm - Thunderstorm Wind	4/27/2011	50	0	0	2000	0	A line of storms moved through during the morning hours of April 27th. Two trees fell on power lines due to damaging thunderstorm winds.	Law Enforcement
2	Severe Storm - Thunderstorm Wind	5/23/2011	50	0	0	3000	0	A quasi-linear convective system moved across an unstable airmass and produced widespread severe weather. Several trees were blown down due to damaging thunderstorm winds.	Trained Spotter

## APPENDIX A: HISTORICAL HAZARD EVENTS

Hazard Priority	Hazard	Date	Magnitude	Deaths	Injuries	Property Damage	Crop Damage	Description	Source
2	Severe Storm - Thunderstorm Wind	5/25/2011	50	0	0	3000	0	A strong low pressure system west of the Ohio Valley approached during peak heating on May 25th. This resulted in the development of widespread severe thunderstorms with large hail and damaging winds during the afternoon and evening hours. Later in the evening, a quasi-linear convective system swept west to east across the area. The result was straight line wind damage and a few tornadoes. Multiple trees were reported down due to damaging thunderstorm winds.	Public
2	Severe Storm - Thunderstorm Wind	6/21/2011	50	0	0	3000	0	An approaching shortwave trough combined with ample instability in a warm and moist air mass across Ohio and Northern Kentucky during the afternoon. This led to the development of severe thunderstorms that also produced flash flooding across central Ohio and Northern Kentucky into the evening hours. The main severe weather threats were large hail, damaging winds, and flash flooding. Multiple trees were reported down due to damaging thunderstorm winds.	Law Enforcement
2	Severe Storm - Thunderstorm Wind	6/21/2011	50	0	0	2000	0	An approaching shortwave trough combined with ample instability in a warm and moist air mass across Ohio and Northern Kentucky during the afternoon. This led to the development of severe thunderstorms that also produced flash flooding across central Ohio and Northern Kentucky into the evening hours. The main severe weather threats were large hail, damaging winds, and flash flooding. Two trees were reported down due to damaging thunderstorm winds.	Law Enforcement
2	Severe Storm - Thunderstorm Wind	7/19/2011	50	0	0	10000	0	Weak low level convergence combined with a very unstable air mass to produce strong to severe thunderstorms across southern Ohio and northern Kentucky. The slow movement of these storms also produced flash flooding. The severe weather threats during the afternoon were damaging thunderstorm winds and flash flooding. Several trees were reported down. A healthy tree was broken and thrown 15 feet into a car and pole barn, both of which were damaged. Numerous power outages were also reported in the area. These occurrences were due to damaging thunderstorm winds.	Law Enforcement

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Hazard Priority	Hazard	Date	Magnitude	Deaths	Injuries	Property Damage	Crop Damage	Description	Source
2	Severe Storm - Thunderstorm Wind	8/8/2011	50	0	0	15000	0	Thunderstorms developed along a dewpoint boundary extending from central Illinois, through southern Indiana, and into central Kentucky. Some of these storms produced severe weather. The main threats from these storms were large hail and damaging thunderstorm winds. Trees were uprooted and there was structural damage to a roof due to damaging thunderstorm winds.	Public
2	Severe Storm - Thunderstorm Wind	11/14/2011	50	0	0	3000	0	An approaching cold front combined with moderate instability and high shear to produce severe thunderstorms across central and southern Ohio during the late afternoon and evening hours. The main threats from these storms were large hail, damaging thunderstorm winds, and locally heavy rain. Power lines were down along a road and a large tree branch was blocking a road due to damaging thunderstorm winds.	Law Enforcement
2	Severe Storm - Thunderstorm Wind	3/23/2012	50	0	0	1000	0	An approaching upper level low pressure system combined with daytime heating to produce scattered thunderstorms across the Ohio Valley during the afternoon and evening. An environment with moderate instability and strong low level shear allowed thunderstorms to become severe, leading to the possibility of large hail, damaging winds, and weak tornadoes. Trees were reported down on Beechwood and Baldwin Roads due to damaging thunderstorm winds.	Law Enforcement
2	Severe Storm - Thunderstorm Wind	5/1/2012	50	0	0	5000	0	A warm front lifting across the Ohio Valley during the morning brought into the area a very unstable airmass. Numerous thunderstorms developed during the afternoon and evening. The environment was favorable for large hail and damaging winds. However, a few boundaries helped to produce localized favorable conditions for tornadoes. In addition, some storms occurred repeatedly over the same areas, causing an increased risk for flash flooding and flooding to occur. A tree fell on the roof of a house due to damaging thunderstorm winds.	Law Enforcement

## APPENDIX A: HISTORICAL HAZARD EVENTS

Hazard Priority	Hazard	Date	Magnitude	Deaths	Injuries	Property Damage	Crop Damage	Description	Source
2	Severe Storm - Thunderstorm Wind	6/29/2012	50	0	0	1000	0	A very hot and potentially unstable airmass interacted with northwesterly flow aloft to produce a derecho across northern Illinois. This derecho then moved rapidly east southeast across the Ohio Valley producing widespread straight line wind damage. This rare derecho affected nearly every county in southeast Indiana, northern Kentucky, and southwestern Ohio with severe winds. This caused widespread power outages that lasted several days in some locations. Isolated large hail also occurred with the stronger portions of the system. One tree was uprooted due to damaging thunderstorm winds.	Broadcast Media
2	Severe Storm - Thunderstorm Wind	6/29/2012	50	0	0	3000	0	A very hot and potentially unstable airmass interacted with northwesterly flow aloft to produce a derecho across northern Illinois. This derecho then moved rapidly east southeast across the Ohio Valley producing widespread straight line wind damage. This rare derecho affected nearly every county in southeast Indiana, northern Kentucky, and southwestern Ohio with severe winds. This caused widespread power outages that lasted several days in some locations. Isolated large hail also occurred with the stronger portions of the system. Large trees were downed due to damaging thunderstorm winds.	Trained Spotter
2	Severe Storm - Thunderstorm Wind	6/29/2012	50	0	0	10000	0	A very hot and potentially unstable airmass interacted with northwesterly flow aloft to produce a derecho across northern Illinois. This derecho then moved rapidly east southeast across the Ohio Valley producing widespread straight line wind damage. This rare derecho affected nearly every county in southeast Indiana, northern Kentucky, and southwestern Ohio with severe winds. This caused widespread power outages that lasted several days in some locations. Isolated large hail also occurred with the stronger portions of the system. A stretch of highway several miles long, just north of Felicity had numerous trees down along it due to damaging thunderstorm winds.	Trained Spotter



## APPENDIX A: HISTORICAL HAZARD EVENTS

Hazard Priority	Hazard	Date	Magnitude	Deaths	Injuries	Property Damage	Crop Damage	Description	Source
2	Severe Storm - Thunderstorm Wind	7/1/2012	52	0	0	5000	0	An upper level disturbance combined with daytime heating to produce numerous thunderstorms during the afternoon and evening. The main threats from these storms were large hail and damaging winds. Trees and power lines were downed on Gaskins Road due to thunderstorm winds.	Trained Spotter
2	Severe Storm - Thunderstorm Wind	7/18/2012	50	0	0	1000	0	A very moist and unstable air mass combined with a cold front dropping south into the Ohio Valley to produce numerous areas of convection. The threats from these storms included large hail, damaging thunderstorm winds, and flash flooding. A large section of a tree was snapped off its base off of Glen Este-Withamsville Road due to damaging thunderstorm winds.	Public
2	Severe Storm - Thunderstorm Wind	7/18/2012	50	0	0	3000	0	A very moist and unstable air mass combined with a cold front dropping south into the Ohio Valley to produce numerous areas of convection. The threats from these storms included large hail, damaging thunderstorm winds, and flash flooding. Trees and limbs were downed north of Amelia due to damaging thunderstorm winds.	Trained Spotter
2	Severe Storm - Thunderstorm Wind	7/24/2012	50	0	0	5000	0	An organized thunderstorm complex moved southeastward into the Ohio Valley ahead of a cold front during the morning hours and pushed through the area into the early afternoon. The main threats from the storms in this complex were damaging thunderstorm winds and sub severe hail. Scattered trees were reported down in northern Clermont County due to damaging thunderstorm winds.	Law Enforcement
2	Severe Storm - Thunderstorm Wind	7/24/2012	50	0	0	2000	0	An organized thunderstorm complex moved southeastward into the Ohio Valley ahead of a cold front during the morning hours and pushed through the area into the early afternoon. The main threats from the storms in this complex were damaging thunderstorm winds and sub severe hail. A few trees were reported down in the area including along 9 Mile Road due to thunderstorm winds.	Law Enforcement

## APPENDIX A: HISTORICAL HAZARD EVENTS

Hazard Priority	Hazard	Date	Magnitude	Deaths	Injuries	Property Damage	Crop Damage	Description	Source
2	Severe Storm - Thunderstorm Wind	7/24/2012	50	0	0	5000	0	An organized thunderstorm complex moved southeastward into the Ohio Valley ahead of a cold front during the morning hours and pushed through the area into the early afternoon. The main threats from the storms in this complex were damaging thunderstorm winds and sub severe hail. Trees and power lines were downed near Highway 133 and Clark Street due to damaging thunderstorm winds.	Public
2	Severe Storm - Thunderstorm Wind	7/24/2012	50	0	0	2000	0	An organized thunderstorm complex moved southeastward into the Ohio Valley ahead of a cold front during the morning hours and pushed through the area into the early afternoon. The main threats from the storms in this complex were damaging thunderstorm winds and sub severe hail. A few trees were reported down in the area including near the intersection of Highway 133 and 774 due to damaging thunderstorm winds.	Law Enforcement
2	Severe Storm - Thunderstorm Wind	7/26/2012	50	0	0	3000	0	Strong upper level winds combined with an unstable airmass to produce widespread convection during the afternoon hours. The primary threats from these storms were damaging winds and large hail. Trees and large branches were downed due to damaging thunderstorm winds.	Law Enforcement
2	Severe Storm - Thunderstorm Wind	7/26/2012	50	0	0	3000	0	Strong upper level winds combined with an unstable airmass to produce widespread convection during the afternoon hours. The primary threats from these storms were damaging winds and large hail. Trees and large branches were downed due to damaging thunderstorm winds.	Law Enforcement
2	Severe Storm - Thunderstorm Wind	7/27/2012	50	0	0	1000	0	A surface low moving through the area helped to trigger the development of clusters of thunderstorms during the afternoon and evening. Some of these storms became organized, increasing the threat of damaging winds. A few large limbs were downed due to damaging thunderstorm winds.	Trained Spotter
2	Severe Storm - Thunderstorm Wind	8/9/2012	50	0	0	1000	0	Disorganized convection developed ahead of a shortwave trough during the afternoon and evening hours. Some of these storms became severe with damaging winds and isolated large hail the primary threats. A tree was downed near the intersection of Walnut and Minor Streets due to damaging thunderstorm winds.	Law Enforcement

## APPENDIX A: HISTORICAL HAZARD EVENTS

Hazard Priority	Hazard	Date	Magnitude	Deaths	Injuries	Property Damage	Crop Damage	Description	Source
2	Severe Storm - Thunderstorm Wind	9/7/2012	50	0	0	40000	0	A strong trough helped to produce a quasi linear convective system that moved across the Ohio Valley during the late evening hours into the early morning hours. The main threats from this system were damaging winds, sub severe hail, and isolated weak tornadoes. Damage occurred to several homes on Taylor Pike due to thunderstorm winds. The damage occurred to roofing shingles and flashing as well as four different garages all blown outward.	NWS Storm Survey
2	Severe Storm - Thunderstorm Wind	9/7/2012	50	0	0	1000	0	A strong trough helped to produce a quasi linear convective system that moved across the Ohio Valley during the late evening hours into the early morning hours. The main threats from this system were damaging winds, sub severe hail, and isolated weak tornadoes. Large branches were broken near Goshen due to damaging thunderstorm winds.	Public
2	Severe Storm - Thunderstorm Wind	6/13/2013	50	0	0	5000	0	A complex of thunderstorms developed in the morning ahead of an approaching cold front. The main threat from these storms was damaging winds. A large tree fell and destroyed a wooden deck due to thunderstorm winds.	Broadcast Media
2	Severe Storm - Thunderstorm Wind	6/13/2013	50	0	0	3000	0	A complex of thunderstorms developed in the morning ahead of an approaching cold front. The main threat from these storms was damaging winds. Trees were downed east of Owensville due to thunderstorm winds.	Public
2	Severe Storm - Thunderstorm Wind	7/19/2013	50	0	0	1000	0	Scattered thunderstorms developed in a very unstable air mass during the afternoon. Some of these storms became severe with damaging winds being the primary threat. A couple of large limbs were downed near Summerside due to Thunderstorm winds.	Trained Spotter
2	Severe Storm - Thunderstorm Wind	7/23/2013	50	0	0	1000	0	Thunderstorms developed in an unstable air mass ahead of a cold front during the afternoon. These storms began to organize and became severe. The main threat from these storms was damaging wind and large hail. Some locations were hit by multiple storms over a short period of time. This caused very heavy rainfall that resulted in flooding and flash flooding. One tree was downed on Shiloh Road near Goshen due to thunderstorm winds.	Law Enforcement

## APPENDIX A: HISTORICAL HAZARD EVENTS

Hazard Priority	Hazard	Date	Magnitude	Deaths	Injuries	Property Damage	Crop Damage	Description	Source
2	Severe Storm - Thunderstorm Wind	7/23/2013	50	0	0	1000	0	Thunderstorms developed in an unstable air mass ahead of a cold front during the afternoon. These storms began to organize and became severe. The main threat from these storms was damaging wind and large hail. Some locations were hit by multiple storms over a short period of time. This caused very heavy rainfall that resulted in flooding and flash flooding. One tree two feet in diameter was downed due to thunderstorm winds.	Public
2	Severe Storm - Thunderstorm Wind	7/23/2013	50	0	0	10000	0	Thunderstorms developed in an unstable air mass ahead of a cold front during the afternoon. These storms began to organize and became severe. The main threat from these storms was damaging wind and large hail. Some locations were hit by multiple storms over a short period of time. This caused very heavy rainfall that resulted in flooding and flash flooding. Numerous trees were downed near Edenton and in Wayne Township due to thunderstorm winds. Trees were also reported down near State Route 131 and the Clermont and Brown County border.	Law Enforcement
2	Severe Storm - Thunderstorm Wind	8/31/2013	50	0	0	0	0	A disturbance moving along a stalled frontal boundary produced thunderstorms during the morning. Some of these storms became severe with damaging winds and large hail being the primary threats.	AWOS
2	Severe Storm - Thunderstorm Wind	8/31/2013	50	0	0	3000	0	A disturbance moving along a stalled frontal boundary produced thunderstorms during the morning. Some of these storms became severe with damaging winds and large hail being the primary threats. Trees and limbs were downed near Batavia due to thunderstorm winds.	Broadcast Media
2	Severe Storm - Thunderstorm Wind	8/31/2013	50	0	0	15000	0	A disturbance moving along a stalled frontal boundary produced thunderstorms during the morning. Some of these storms became severe with damaging winds and large hail being the primary threats. Power poles were downed in Williamsburg Township due to thunderstorm winds.	Broadcast Media

## APPENDIX A: HISTORICAL HAZARD EVENTS

Hazard Priority	Hazard	Date	Magnitude	Deaths	Injuries	Property Damage	Crop Damage	Description	Source
2	Severe Storm - Thunderstorm Wind	11/17/2013	50	0	0	1000	0	A strong low pressure system combined with an unseasonably warm airmass to produce organized storms across the region. These storms were tornadic across Illinois and western Indiana, and began to transition to non-tornadic storms as they entered eastern Indiana. The main threat from these storms when they arrived across southwestern Ohio was damaging thunderstorm winds. A tree was downed in Owensville due to thunderstorm winds.	Public
2	Severe Storm - Thunderstorm Wind	11/17/2013	50	0	0	15000	0	A strong low pressure system combined with an unseasonably warm airmass to produce organized storms across the region. These storms were tornadic across Illinois and western Indiana, and began to transition to non-tornadic storms as they entered eastern Indiana. The main threat from these storms when they arrived across southwestern Ohio was damaging thunderstorm winds. A roof was blown off of a barn and scattered trees were reported down across Clermont County due to thunderstorm winds.	Emergency Manager
2	Severe Storm - Thunderstorm Wind	12/21/2013	50	0	0	1000	0	Low pressure drew an unseasonably warm and moist air mass across the region. Convection organized ahead of the low and brought heavy rainfall and damaging winds to the area from the evening of the 21st into the morning of the 22nd. Some of the flooding lingered into December 25th. Two trees were downed due to thunderstorm winds.	Law Enforcement
2	Severe Storm - Thunderstorm Wind	4/29/2014	50	0	0	5000	0	Thunderstorms developed along and south of a warm front during the afternoon. Some of these storms had the potential to become severe. The main threats from these storms were damaging winds and sub severe hail. Trees and utility wires were reported down in Bethel due to thunderstorm winds.	Law Enforcement
2	Severe Storm - Thunderstorm Wind	4/29/2014	50	0	0	10000	0	Thunderstorms developed along and south of a warm front during the afternoon. Some of these storms had the potential to become severe. The main threats from these storms were damaging winds and sub severe hail. Several power poles were downed east of Milford due to thunderstorm winds.	Law Enforcement

## APPENDIX A: HISTORICAL HAZARD EVENTS

Hazard Priority	Hazard	Date	Magnitude	Deaths	Injuries	Property Damage	Crop Damage	Description	Source
2	Severe Storm - Thunderstorm Wind	6/10/2014	55	0	0	20000	0	A disturbance interacted with a moist airmass across the region, producing thunderstorms across the area. Some of these storms were capable of producing damaging winds, heavy rain, and minor flooding. Dozens of trees and power poles downed along Highway 52 due to thunderstorm winds.	Emergency Manager
2	Severe Storm - Thunderstorm Wind	6/10/2014	50	0	0	2000	0	A disturbance interacted with a moist airmass across the region, producing thunderstorms across the area. Some of these storms were capable of producing damaging winds, heavy rain, and minor flooding. A couple of trees and utility wires were downed in Felicity due to thunderstorm winds.	Law Enforcement
2	Severe Storm - Thunderstorm Wind	12/24/2014	50	0	0	1000	0	A deepening low pressure system moved north and dragged a strong cold front across the region. A line of convection developed along the advancing cold front. One tree was knocked down.	Public
2	Severe Storm - Thunderstorm Wind	4/9/2015	50	0	0	1000	0	Severe thunderstorms developed when an upper level disturbance interacted with a moist and unstable air mass over the region. A construction fence was blown onto a car.	Public
2	Severe Storm - Thunderstorm Wind	5/11/2015	50	0	0	0	0	Scattered thunderstorms developed during the mid afternoon hours ahead of an approaching cold front. Several large limbs were downed.	Amateur Radio
2	Severe Storm - Thunderstorm Wind	5/11/2015	50	0	0	2000	0	Scattered thunderstorms developed during the mid afternoon hours ahead of an approaching cold front. A couple of trees were downed.	Law Enforcement
2	Severe Storm - Thunderstorm Wind	5/26/2015	50	0	0	2000	0	Scattered thunderstorms developed as an upper level disturbance moved through the Ohio Valley. Trees were downed on State Route 133 and State Route 756.	Law Enforcement
2	Severe Storm - Thunderstorm Wind	6/18/2015	50	0	0	1000	0	Severe thunderstorms developed ahead of a cold front dropping south from the Great Lakes. A tree was knocked down at Branch-Hill Road and Little River Lane.	County Official
2	Severe Storm - Thunderstorm Wind	6/18/2015	50	0	0	1000	0	Severe thunderstorms developed ahead of a cold front dropping south from the Great Lakes. A power pole was knocked down at the corner of Branch-Hill Road and Guinea Pike.	County Official

## APPENDIX A: HISTORICAL HAZARD EVENTS

Hazard Priority	Hazard	Date	Magnitude	Deaths	Injuries	Property Damage	Crop Damage	Description	Source
2	Severe Storm - Thunderstorm Wind	6/18/2015	50	0	0	2500	0	Severe thunderstorms developed ahead of a cold front dropping south from the Great Lakes. Several limbs were knocked down and were blocking the road at the 18000 block of Grog Run Road.	County Official
2	Severe Storm - Thunderstorm Wind	6/30/2015	50	0	0	500	0	Severe thunderstorms developed ahead of a surface low pressure system and were enhanced by energy from an upper level shortwave. A very large branch was knocked down across a backyard deck.	Public
2	Severe Storm - Thunderstorm Wind	6/30/2015	45	0	0	250	0	Severe thunderstorms developed ahead of a surface low pressure system and were enhanced by energy from an upper level shortwave. Several tree limbs knocked down, approximately 1.25 inches in diameter.	Public
2	Severe Storm - Thunderstorm Wind	6/30/2015	50	0	0	500	0	Severe thunderstorms developed ahead of a surface low pressure system and were enhanced by energy from an upper level shortwave. Large tree limbs were knocked down.	Broadcast Media
2	Severe Storm - Thunderstorm Wind	6/30/2015	50	0	0	2000	0	Severe thunderstorms developed ahead of a surface low pressure system and were enhanced by energy from an upper level shortwave. A few trees knocked down.	Department of Highways
2	Severe Storm - Thunderstorm Wind	6/30/2015	50	0	0	3000	0	Severe thunderstorms developed ahead of a surface low pressure system and were enhanced by energy from an upper level shortwave. Several Trees knocked down in Neville.	Fire Department/Rescue
2	Severe Storm - Thunderstorm Wind	7/13/2015	50	0	0	3000	0	Showers and thunderstorms associated with an upper level disturbance pushed down into the Ohio Valley during the early afternoon hours. A tree fell onto a garage in the Eastgate area.	Public
2	Severe Storm - Thunderstorm Wind	7/13/2015	50	0	0	0	0	Showers and thunderstorms associated with an upper level disturbance pushed down into the Ohio Valley during the early afternoon hours. A small tree was uprooted.	Public

## APPENDIX A: HISTORICAL HAZARD EVENTS

Hazard Priority	Hazard	Date	Magnitude	Deaths	Injuries	Property Damage	Crop Damage	Description	Source
2	Severe Storm - Thunderstorm Wind	12/27/2015	60	0	0	10000	0	A squall line developed ahead of an ejecting upper system over the lower Ohio Valley and raced northeast into the region. A second squall line developed and trailed the first one by an hour or so. Numerous trees were reported knocked down in Felicity, Moscow and Bethel.	Law Enforcement
2	Severe Storm - Thunderstorm Wind	3/31/2016	50	0	0	5000	0	Showers and thunderstorms developed during the afternoon and evening hours ahead of a cold front moving through the Ohio Valley region. Numerous ash trees were knocked down.	Public
2	Severe Storm - Thunderstorm Wind	4/26/2016	50	0	0	15000	0	A slow moving cold front pushed slowly south across the region during the afternoon and early evening hours. Thunderstorms developed along the I-70 corridor during the early to mid afternoon hours and then sagged slowly south through early evening. A tree fell on a home on Creekwood Bluffs Road.	Law Enforcement
2	Severe Storm - Thunderstorm Wind	4/26/2016	50	0	0	3000	0	A slow moving cold front pushed slowly south across the region during the afternoon and early evening hours. Thunderstorms developed along the I-70 corridor during the early to mid afternoon hours and then sagged slowly south through early evening. A large tree about one foot in diameter was knocked down.	Public
2	Severe Storm - Thunderstorm Wind	7/8/2016	50	0	0	500	0	An area of showers and thunderstorms moved east across the Ohio Valley during the late morning and early afternoon hours. A tree was downed along Cherry Street.	Law Enforcement
2	Severe Storm - Thunderstorm Wind	7/8/2016	50	0	0	2000	0	An area of showers and thunderstorms moved east across the Ohio Valley during the late morning and early afternoon hours. Several trees were downed in Batavia Township.	Law Enforcement
2	Severe Storm - Thunderstorm Wind	7/13/2016	50	0	0	10000	0	Thunderstorms developed in an unstable air mass during the late afternoon hours and pushed east across the region through the evening. Several trees and power lines were downed in the Goshen area and across portions of Miami Township. A tree fell onto a house on Dry Run Road.	Law Enforcement
2	Severe Storm - Thunderstorm Wind	8/17/2016	50	0	0	4000	0	Severe thunderstorms with heavy rain developed ahead of a weak cold front. A large tree was knocked down on a shed.	Public



## APPENDIX A: HISTORICAL HAZARD EVENTS

Hazard Priority	Hazard	Date	Magnitude	Deaths	Injuries	Property Damage	Crop Damage	Description	Source
2	Severe Storm - Thunderstorm Wind	9/10/2016	50	0	0	8000	0	Showers and thunderstorms developed during the afternoon hours as a cold front moved through the region. Numerous trees were downed across west central portions of Clermont County. A tree fell onto a car, blocking Bradbury Road between 9 Mile Road and 10 Mile Road.	Broadcast Media
2	Severe Storm - Thunderstorm Wind	9/10/2016	50	0	0	2000	0	Showers and thunderstorms developed during the afternoon hours as a cold front moved through the region. Several trees were downed near Sodom and Patterson Roads.	Law Enforcement
2	Severe Storm - Thunderstorm Wind	10/19/2016	50	0	0	1000	0	Severe thunderstorms developed along a slow moving frontal boundary and ahead of an upper level disturbance. One tree was knocked down near Point Pleasant.	Law Enforcement
2	Severe Storm - Thunderstorm Wind	1/10/2017	45	0	0	5000	0	A broken line of thunderstorms developed across the region ahead of a strong upper level disturbance moving through the Ohio Valley. A tree was downed onto a car.	Public
2	Severe Storm - Thunderstorm Wind	2/24/2017	50	0	0	1000	0	Severe thunderstorms developed ahead of a cold front that moved up the Ohio Valley after a day of record setting February heat. A tree was knocked down along U.S. Route 52.	Law Enforcement
2	Severe Storm - Thunderstorm Wind	2/24/2017	50	0	0	1000	0	Severe thunderstorms developed ahead of a cold front that moved up the Ohio Valley after a day of record setting February heat. A tree was knocked down near the intersection of State Route 232 and Big Indian Road.	Law Enforcement
2	Severe Storm - Thunderstorm Wind	3/1/2017	60	0	0	10000	0	An unseasonably warm and moist air mass was in place across the region during the morning hours of March 1st. Showers and thunderstorms developed across the Ohio Valley during the early morning hours as a strong low pressure system lifted northeast into the Great Lakes region. These storms produced heavy rain, large hail and several tornadoes. A squall line then moved through the region during the mid morning hours ahead of an approaching cold front. These storms resulted in damaging winds and additional heavy rain. Numerous trees were reported downed throughout the county.	Law Enforcement

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Hazard Priority	Hazard	Date	Magnitude	Deaths	Injuries	Property Damage	Crop Damage	Description	Source
2	Severe Storm - Thunderstorm Wind	3/1/2017	50	0	0	4000	0	An unseasonably warm and moist air mass was in place across the region during the morning hours of March 1st. Showers and thunderstorms developed across the Ohio Valley during the early morning hours as a strong low pressure system lifted northeast into the Great Lakes region. These storms produced heavy rain, large hail and several tornadoes. A squall line then moved through the region during the mid morning hours ahead of an approaching cold front. These storms resulted in damaging winds and additional heavy rain. Several trees were downed.	Trained Spotter
2	Severe Storm - Thunderstorm Wind	3/1/2017	70	0	0	30000	0	An unseasonably warm and moist air mass was in place across the region during the morning hours of March 1st. Showers and thunderstorms developed across the Ohio Valley during the early morning hours as a strong low pressure system lifted northeast into the Great Lakes region. These storms produced heavy rain, large hail and several tornadoes. A squall line then moved through the region during the mid morning hours ahead of an approaching cold front. These storms resulted in damaging winds and additional heavy rain. The village of Chilo experienced numerous trees downed from straight-line winds and also some structural damage to buildings and homes on Market Street, Washington Street and Warren Street, as well as the Chilo Lock 34 Park area. Based on the damage, the winds were estimated to be in the 70 to 80 mph range.	NWS Storm Survey
2	Severe Storm - Thunderstorm Wind	3/1/2017	50	0	0	4000	0	An unseasonably warm and moist air mass was in place across the region during the morning hours of March 1st. Showers and thunderstorms developed across the Ohio Valley during the early morning hours as a strong low pressure system lifted northeast into the Great Lakes region. These storms produced heavy rain, large hail and several tornadoes. A squall line then moved through the region during the mid morning hours ahead of an approaching cold front. These storms resulted in damaging winds and additional heavy rain. Several trees were downed on Meisman Lane.	Trained Spotter

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Hazard Priority	Hazard	Date	Magnitude	Deaths	Injuries	Property Damage	Crop Damage	Description	Source
2	Severe Storm - Thunderstorm Wind	4/5/2017	50	0	0	5000	0	Showers and thunderstorms developed ahead of a strengthening surface low which moved from the Middle Mississippi Valley into Northwest Ohio. Numerous trees were knocked down throughout the county, especially in the Williamsburg area.	Law Enforcement
2	Severe Storm - Thunderstorm Wind	2/25/2018	55	0	0	10000	0	Strong to severe thunderstorms, with very heavy rainfall, developed ahead of a cold front. Numerous trees were damaged along with some outbuildings.	NWS Storm Survey
2	Severe Storm - Thunderstorm Wind	5/20/2018	50	0	0	2000	0	Scattered thunderstorms developed across the area in an unstable air mass, south of a lingering stationary boundary. A few trees were downed in Goshen Township.	Law Enforcement
2	Severe Storm - Thunderstorm Wind	5/26/2018	50	0	0	5000	0	Isolated thunderstorms developed during the afternoon hours in an unstable air mass that was in place across the region. Several trees were downed in the Loveland area. Some of the trees fell onto power lines.	Fire Department/Rescue
2	Severe Storm - Thunderstorm Wind	5/31/2018	50	0	0	1000	0	A complex of thunderstorms pushed east across the Ohio Valley during the afternoon hours. Several of the thunderstorms produced damaging wind gusts. A tree was downed.	Trained Spotter
2	Severe Storm - Thunderstorm Wind	5/31/2018	50	0	0	5000	0	A complex of thunderstorms pushed east across the Ohio Valley during the afternoon hours. Several of the thunderstorms produced damaging wind gusts. Several trees were downed throughout Pierce and Batavia Townships, including trees downed along State Route 125.	State Official
2	Severe Storm - Thunderstorm Wind	6/1/2018	48	0	0	1000	0	Scattered thunderstorms developed ahead of an upper level disturbance. One tree was knocked down.	Public
2	Severe Storm - Thunderstorm Wind	7/20/2018	50	0	0	250	0	Scattered thunderstorms developed through the afternoon as an upper level disturbance pushed southeast into the region. A few of the storms produced damaging winds. Several large branches were downed.	Trained Spotter

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Hazard Priority	Hazard	Date	Magnitude	Deaths	Injuries	Property Damage	Crop Damage	Description	Source
2	Severe Storm - High Wind	12/11/2000	58	1	0	0	0	A strong low pressure system dragged a sharp cold front across the region dropping temperatures by 30 degrees. Very strong winds occurred along and behind the front with numerous locations receiving gusts over 58 mph. The highest recorded gust was 69 mph in Ostrander in Delaware county. Numerous trees, large limbs, and power lines were knocked down across the region. Some of the trees fell on cars and homes. A motel sign was blown onto a truck in Warren county. A church that was under construction collapsed due to the winds. One woman was killed in Clermont county when a 200 foot tree fell through her mobile home and landed on her.	LAW ENFORCEMENT
2	Severe Storm - High Wind	3/9/2002	52	0	0	12000	0	A widespread area of high winds blew down trees, power poles, and various other smaller structures and signs. At one time, approximately 100,000 people were without power. One man was killed when his semi tractor overturned, and several others were injured in automobile accidents, and when trees fell on the buildings that they were in. Two people were briefly trapped in a mobile home when a tree fell on it. The hardest hit area was just southwest of Columbus in Grove City where an 84 mph wind was recorded and several structures at the high school were damaged or destroyed.	LAW ENFORCEMENT
2	Severe Storm - High Wind	4/28/2002	50	0	0	25000	0	N/A	NEWSPAPER
2	Severe Storm - High Wind	12/1/2006	36	0	0	5000	0	A deep low pressure system tracked through the northern Ohio Valley during the morning of Friday December 1st. This system produced gradient winds that were sustained at 40 to 45 mph, and gusts in excess of 50 mph for much of the region. Trees and powerlines were blown down countywide.	County Official

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Hazard Priority	Hazard	Date	Magnitude	Deaths	Injuries	Property Damage	Crop Damage	Description	Source
2	Severe Storm - High Wind	9/14/2008	54	0	0	22600000	0	The remnants of hurricane Ike raced northeast through the midwest and merged with a frontal boundary across the lower Ohio Valley Sunday morning. Abundant sunshine promoted deep mixing of the atmosphere, and warm, dry air aloft translated down to the surface. Gusty winds in excess of 70 mph persisted for a period of several hours, causing significant damage and widespread power outages. Strong winds of 40 to 50 miles per hour were sustained for several hours. Wind gusts over 60 mph were common. Widespread damage occurred across the region, from trees being blown down on powerlines, to significant crop losses and structural damage.	Law Enforcement
2	Severe Storm - High Wind	2/11/2009	52	0	0	0	0	A cold front crossed the Ohio Valley on the evening of the 11th. A very tight pressure gradient behind this front in the cold air created damaging winds during the late evening of the 11th. Shingles were blown off of a roof in Milford.	Trained Spotter
2	Severe Storm - High Wind	12/9/2009	50	0	0	0	0	A strong center of low pressure tracked out of the plains states to the Great Lakes region. Ahead of this low in the Ohio Valley, southwest winds of 30 to 40 mph with gusts to 50 and 60 mph were common throughout the day. These strong winds peaked in the early afternoon with the passage of a cold front, and diminished later in the evening. A few trees were blown down, some landing on power lines.	Trained Spotter
2	Severe Storm - High Wind	4/3/2016	50	0	0	2000	0	A strong cold front crossed the Ohio Valley in the afternoon of Saturday, April 2nd. The highest gusts following the passage of the front came in the early evening for much of the region. A large tree was blown down 4 miles southeast of Loveland. Another large tree fell on a car in Milford. A home weather station 2 miles south-southeast of Pleasant Plain recorded a 51 mph gust. Two days after the winds, there were still over 100 power outages in the county.	NWS Employee
2	Severe Storm - Strong Wind	3/9/2006	45	0	0	5000	0	Strong winds peeled a roof off of a barn near Felicity.	BROADCAST MEDIA

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Hazard Priority	Hazard	Date	Magnitude	Deaths	Injuries	Property Damage	Crop Damage	Description	Source
2	Severe Storm - Strong Wind	2/19/2016	43	0	0	25000	0	Strong winds were found across the area on Friday, February 19th. Numerous power outages occurred when trees were blown down. At one point in time, over 7400 power outages were reported in southwest Ohio. A large tree fell on a house, damaging a garage on Weber Road northeast of Milford. Another house with a tree blown onto it was uninhabitable on Willnean Drive. Trees blew down and knocked over power lines closing Cook Road near Branch Hill Guinea. A tree was also knocked over onto a car in Miami Township.	Fire Department/Rescue
2	Severe Storm - Strong Wind	11/18/2017	43	0	0	8000	0	Low pressure tracked northeast through the Great Lakes region. Ahead of an associated cold front, a low level jet brought strong and gusty winds to much of the Ohio Valley. Several instances of trees being blown down were noted, but were generally widely scattered about the area and not in any one particular location. A large tree fell onto a house in Williamsburg.	Broadcast Media
2	Severe Storm - Lightning	5/15/1996	N/A	0	0	5000	0	Lightning struck a house opening a hole in the roof.	N/A
2	Severe Storm - Lightning	5/16/1996	N/A	0	0	5000	0	Lightning struck a home and church where bricks were knocked off the bell tower.	N/A
2	Severe Storm - Lightning	5/24/1996	N/A	0	0	50000	0	Lightning struck a 48-unit apartment building leaving half of the residents with damaged residences.	N/A
2	Severe Storm - Lightning	6/6/1996	N/A	0	0	1000	0	Lightning struck the pumphouse of an apartment complex.	N/A
2	Severe Storm - Lightning	6/10/1999	N/A	0	2	0	0	In Miami Township, two children were reported as being slightly injured by a lightning strike.	NEWSPAPER
2	Severe Storm - Lightning	8/18/2002	N/A	0	3	0	0	Three people were injured when lightning struck in Miami Meadows Park.	NEWSPAPER
2	Severe Storm - Hail	8/21/1977	2	0	0	0	0	N/A	N/A
2	Severe Storm - Hail	5/2/1983	1	0	0	0	0	N/A	N/A
2	Severe Storm - Hail	5/7/1986	0.75	0	0	0	0	N/A	N/A
2	Severe Storm - Hail	5/7/1986	2	0	0	0	0	N/A	N/A
2	Severe Storm - Hail	5/7/1986	0.75	0	0	0	0	N/A	N/A

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Hazard Priority	Hazard	Date	Magnitude	Deaths	Injuries	Property Damage	Crop Damage	Description	Source
2	Severe Storm - Hail	5/7/1986	0.75	0	0	0	0	N/A	N/A
2	Severe Storm - Hail	7/27/1989	1	0	0	0	0	N/A	N/A
2	Severe Storm - Hail	5/16/1990	0.75	0	0	0	0	N/A	N/A
2	Severe Storm - Hail	5/16/1990	0.75	0	0	0	0	N/A	N/A
2	Severe Storm - Hail	7/8/1991	0.75	0	0	0	0	N/A	N/A
2	Severe Storm - Hail	4/12/1994	0.75	0	0	0	0	N/A	N/A
2	Severe Storm - Hail	7/29/1994	1.75	0	0	0	50000	Large hail damaged crops. Large hail (0.75) also fell in Batavia and Williamsburg.	N/A
2	Severe Storm - Hail	6/9/1995	0.75	0	0	0	0	N/A	N/A
2	Severe Storm - Hail	6/21/1995	0.75	0	0	0	0	N/A	N/A
2	Severe Storm - Hail	6/22/1995	0.75	0	0	0	0	N/A	N/A
2	Severe Storm - Hail	5/21/1996	0.75	0	0	0	0	N/A	N/A
2	Severe Storm - Hail	5/24/1996	0.75	0	0	0	0	N/A	N/A
2	Severe Storm - Hail	5/24/1996	0.75	0	0	0	0	N/A	N/A
2	Severe Storm - Hail	3/28/1997	0.75	0	0	0	0	N/A	N/A
2	Severe Storm - Hail	4/8/1998	0.75	0	0	0	0	N/A	N/A
2	Severe Storm - Hail	5/13/1998	0.75	0	0	0	0	N/A	N/A
2	Severe Storm - Hail	5/13/1998	1	0	0	0	0	N/A	N/A
2	Severe Storm - Hail	5/23/1998	1	0	0	0	0	Hail covered the ground in Milford.	N/A
2	Severe Storm - Hail	5/24/1998	0.75	0	0	0	0	N/A	N/A

## APPENDIX A: HISTORICAL HAZARD EVENTS

Hazard Priority	Hazard	Date	Magnitude	Deaths	Injuries	Property Damage	Crop Damage	Description	Source
2	Severe Storm - Hail	10/13/1999	0.75	0	0	0	0	A cold front pushed east from Illinois and Indiana during the afternoon hours and combined with a vigorous upper level disturbance that dropped into the Ohio Valley from the lower Great Lakes region. These factors prompted a squall line to develop ahead of the cold front that moved southeast through the Wilmington Ohio (ILN) county warning area before entering northeast Kentucky and southeast Ohio.	TRAINED SPOTTER
2	Severe Storm - Hail	7/14/2000	0.75	0	0	0	0	N/A	TRAINED SPOTTER
2	Severe Storm - Hail	7/14/2000	2.5	0	0	100000	500000	A supercell dropped hail for more than 10 minutes around Felicity. The largest hail during that period was the size of tennis balls. Significant damage occurred to tobacco and corn crops in the area. Also, some damage occurred to both car windows and house windows.	NEWSPAPER
2	Severe Storm - Hail	8/9/2000	1	0	0	25000	0	Two clusters of thunderstorms caused significant damage on the 9th. During the morning hours, a large bow echo raced across the area causing widespread wind damage. During the afternoon and evening hours, a large cluster of storms formed causing widespread wind damage and hail along with some flooding. A thunderstorm remained over the county for nearly two hours producing quarter size hail in Amelia and Batavia, nickel size in Felicity, and hail large enough to knock out windows of a school building in Williamsburg. Trees were also knocked down in various locations across the county.	TRAINED SPOTTER
2	Severe Storm - Hail	5/11/2001	0.75	0	0	0	0	N/A	LAW ENFORCEMENT
2	Severe Storm - Hail	5/17/2001	0.75	0	0	0	0	N/A	TRAINED SPOTTER
2	Severe Storm - Hail	2/20/2002	0.75	0	0	3000	0	N/A	LAW ENFORCEMENT
2	Severe Storm - Hail	4/19/2002	1	0	0	2500000	0	Hail damage to homes, barns, and cars occurred across the northwest part of the county, from Loveland and Miami Township to Goshen.	TRAINED SPOTTER
2	Severe Storm - Hail	4/19/2002	0.75	0	0	10000	0	N/A	TRAINED SPOTTER
2	Severe Storm - Hail	5/1/2003	0.75	0	0	0	0	N/A	TRAINED SPOTTER



## APPENDIX A: HISTORICAL HAZARD EVENTS

Hazard Priority	Hazard	Date	Magnitude	Deaths	Injuries	Property Damage	Crop Damage	Description	Source
2	Severe Storm - Hail	5/5/2003	0.88	0	0	0	0	N/A	TRAINED SPOTTER
2	Severe Storm - Hail	5/10/2003	1	0	0	0	0	N/A	LAW ENFORCEMENT
2	Severe Storm - Hail	5/17/2004	0.88	0	0	0	0	N/A	TRAINED SPOTTER
2	Severe Storm - Hail	6/9/2004	0.75	0	0	0	0	N/A	LAW ENFORCEMENT
2	Severe Storm - Hail	6/9/2004	0.75	0	0	0	0	N/A	TRAINED SPOTTER
2	Severe Storm - Hail	8/19/2004	1	0	0	0	0	N/A	TRAINED SPOTTER
2	Severe Storm - Hail	6/14/2005	0.75	0	0	0	0	N/A	TRAINED SPOTTER
2	Severe Storm - Hail	4/7/2006	0.88	0	0	0	0	N/A	TRAINED SPOTTER
2	Severe Storm - Hail	4/7/2006	0.88	0	0	0	0	N/A	TRAINED SPOTTER
2	Severe Storm - Hail	4/11/2007	0.75	0	0	2000	0	A line of thunderstorms moved across southern and western Ohio during the evening ahead of a cold front.	Law Enforcement
2	Severe Storm - Hail	4/26/2007	0.88	0	0	2000	0	Scattered thunderstorms developed across south central Ohio ahead of a cold front during the evening. An intense supercell developed in northeast Kentucky and crossed the Ohio River into south central Ohio. The supercell traversed Brown, Adams, Pike and Ross counties and produced three tornadoes.	Public
2	Severe Storm - Hail	8/16/2007	1	0	0	5000	0	Clusters of strong to severe thunderstorms developed during the afternoon along outflow boundaries from the early morning thunderstorms.	Public
2	Severe Storm - Hail	11/5/2007	1.25	0	0	3000	0	Scattered severe thunderstorms developed during the afternoon ahead of a cold front.	Public
2	Severe Storm - Hail	11/5/2007	1	0	0	2000	0	Scattered severe thunderstorms developed during the afternoon ahead of a cold front.	Trained Spotter
2	Severe Storm - Hail	11/5/2007	0.75	0	0	1000	0	Scattered severe thunderstorms developed during the afternoon ahead of a cold front.	Public
2	Severe Storm - Hail	6/4/2008	0.88	0	0	3000	0	Strong thunderstorms continued to develop and track along a warm front that was stalled over the region. Training storms caused excessive rainfall in some areas.	Public

## APPENDIX A: HISTORICAL HAZARD EVENTS

Hazard Priority	Hazard	Date	Magnitude	Deaths	Injuries	Property Damage	Crop Damage	Description	Source
2	Severe Storm - Hail	5/30/2009	0.88	0	0	3000	0	Supercells developed across southwest and south central Ohio during the evening as a warm front moved across the region, producing large hail and two tornadoes. The hail covered the ground.	Trained Spotter
2	Severe Storm - Hail	5/30/2009	0.75	0	0	1000	0	Supercells developed across southwest and south central Ohio during the evening as a warm front moved across the region, producing large hail and two tornadoes.	Trained Spotter
2	Severe Storm - Hail	5/30/2009	1.25	0	0	12000	0	Supercells developed across southwest and south central Ohio during the evening as a warm front moved across the region, producing large hail and two tornadoes.	Public
2	Severe Storm - Hail	5/30/2009	1.5	0	0	20000	0	Supercells developed across southwest and south central Ohio during the evening as a warm front moved across the region, producing large hail and two tornadoes. Hail sizes ranged between 1 inch and 1.50 inches.	Trained Spotter
2	Severe Storm - Hail	5/30/2009	1	0	0	5000	0	Supercells developed across southwest and south central Ohio during the evening as a warm front moved across the region, producing large hail and two tornadoes.	Public
2	Severe Storm - Hail	5/30/2009	0.88	0	0	3000	0	Supercells developed across southwest and south central Ohio during the evening as a warm front moved across the region, producing large hail and two tornadoes.	Trained Spotter
2	Severe Storm - Hail	6/2/2009	0.88	0	0	0	0	A frontal boundary stalled over the Ohio Valley and combined with an upper level short wave to produce damaging storms across the region.	Trained Spotter
2	Severe Storm - Hail	6/25/2009	0.88	0	0	0	0	A weak boundary along the Ohio River provided a focus for thunderstorm activity ahead of a cold front. This translated to a weak trough axis that extended from northern Kentucky to central Ohio later in the day, also providing a focus for strong storms.	Public
2	Severe Storm - Hail	6/25/2009	0.75	0	0	0	0	A weak boundary along the Ohio River provided a focus for thunderstorm activity ahead of a cold front. This translated to a weak trough axis that extended from northern Kentucky to central Ohio later in the day, also providing a focus for strong storms.	Trained Spotter
2	Severe Storm - Hail	5/13/2010	1	0	0	0	0	Thunderstorms developed during the early afternoon hours of May 13th.	Trained Spotter

## APPENDIX A: HISTORICAL HAZARD EVENTS

Hazard Priority	Hazard	Date	Magnitude	Deaths	Injuries	Property Damage	Crop Damage	Description	Source
2	Severe Storm - Hail	5/21/2010	0.75	0	0	0	0	Severe thunderstorms developed on May 21st as an upper level low moved across the area and encountered an unstable air mass. Surface winds were from the southeast which helped to add to low level shear and tornado development. Thunderstorms redeveloped over some of the same areas. Training of storms led to flash flooding across the region.	Public
2	Severe Storm - Hail	6/2/2010	1	0	0	0	0	The atmosphere eventually recovered from the passage of an outflow boundary in the morning. Storms developed along a convergent axis ahead of a surface trough. Lift was aided by an enhanced short wave moving across Indiana.	Trained Spotter
2	Severe Storm - Hail	6/2/2010	1	0	0	0	0	The atmosphere eventually recovered from the passage of an outflow boundary in the morning. Storms developed along a convergent axis ahead of a surface trough. Lift was aided by an enhanced short wave moving across Indiana.	Trained Spotter
2	Severe Storm - Hail	9/7/2010	1	0	0	0	0	A cold front pushed into a thin area of instability that had developed due to the strong surface heating during the day. Convection never organized into complete lines, but some individual cells became strong to severe. Moisture had advected northward into the area in advance of the front. Motion of the storms was fairly quick and towards the east.	Trained Spotter
2	Severe Storm - Hail	9/7/2010	0.88	0	0	0	0	A cold front pushed into a thin area of instability that had developed due to the strong surface heating during the day. Convection never organized into complete lines, but some individual cells became strong to severe. Moisture had advected northward into the area in advance of the front. Motion of the storms was fairly quick and towards the east.	Public
2	Severe Storm - Hail	4/19/2011	0.88	0	0	0	0	An area of storms moved through during the morning hours of April 19th bringing hail to the region.	Public

## APPENDIX A: HISTORICAL HAZARD EVENTS

Hazard Priority	Hazard	Date	Magnitude	Deaths	Injuries	Property Damage	Crop Damage	Description	Source
2	Severe Storm - Hail	6/10/2011	1	0	0	0	0	Non-severe early morning convection over the Ohio River produced a deep outflow boundary across northern Kentucky, southeast Indiana, and southern Ohio. This boundary triggered the development of severe thunderstorms during the late morning through the afternoon in that area. By the mid afternoon, an approaching mesoscale convective vortex produced severe storms north of the Ohio River. Cold pools from these storms produced additional severe storms into the early evening across much of the area. The primary threat was large hail and damaging winds.	Public
2	Severe Storm - Hail	7/20/2011	1	0	0	0	0	Isolated to scattered thunderstorms developed during the heating of the day. Some of these storms became severe during the late afternoon. The severe weather threats from these storms were large hail and damaging thunderstorm winds.	Public
2	Severe Storm - Hail	8/8/2011	0.75	0	0	0	0	Thunderstorms developed along a dewpoint boundary extending from central Illinois, through southern Indiana, and into central Kentucky. Some of these storms produced severe weather. The main threats from these storms were large hail and damaging thunderstorm winds.	Trained Spotter
2	Severe Storm - Hail	8/8/2011	0.75	0	0	0	0	Thunderstorms developed along a dewpoint boundary extending from central Illinois, through southern Indiana, and into central Kentucky. Some of these storms produced severe weather. The main threats from these storms were large hail and damaging thunderstorm winds.	Public
2	Severe Storm - Hail	3/2/2012	0.88	0	0	0	0	Thunderstorms developed during the afternoon in a high wind shear environment ahead of a strengthening low pressure system. Many of these storms became severe, with large hail, damaging thunderstorm winds, and tornadoes all being the main threats.	Public
2	Severe Storm - Hail	3/2/2012	1.5	0	0	0	0	Thunderstorms developed during the afternoon in a high wind shear environment ahead of a strengthening low pressure system. Many of these storms became severe, with large hail, damaging thunderstorm winds, and tornadoes all being the main threats.	Public

## APPENDIX A: HISTORICAL HAZARD EVENTS

Hazard Priority	Hazard	Date	Magnitude	Deaths	Injuries	Property Damage	Crop Damage	Description	Source
2	Severe Storm - Hail	3/2/2012	1.25	0	0	0	0	Thunderstorms developed during the afternoon in a high wind shear environment ahead of a strengthening low pressure system. Many of these storms became severe, with large hail, damaging thunderstorm winds, and tornadoes all being the main threats.	Trained Spotter
2	Severe Storm - Hail	3/30/2012	0.75	0	0	0	0	Thunderstorms developed ahead of a cold front, with modest shear and instability in place. The severe weather threat from these storms was large hail and damaging thunderstorm winds.	Public
2	Severe Storm - Hail	5/1/2012	1	0	0	0	0	A warm front lifting across the Ohio Valley during the morning brought into the area a very unstable airmass. Numerous thunderstorms developed during the afternoon and evening. The environment was favorable for large hail and damaging winds. However, a few boundaries helped to produce localized favorable conditions for tornadoes. In addition, some storms occurred repeatedly over the same areas, causing an increased risk for flash flooding and flooding to occur.	Public
2	Severe Storm - Hail	7/1/2012	1.75	0	0	0	0	An upper level disturbance combined with daytime heating to produce numerous thunderstorms during the afternoon and evening. The main threats from these storms were large hail and damaging winds.	Public
2	Severe Storm - Hail	7/1/2012	1	0	0	0	0	An upper level disturbance combined with daytime heating to produce numerous thunderstorms during the afternoon and evening. The main threats from these storms were large hail and damaging winds.	Amateur Radio
2	Severe Storm - Hail	7/1/2012	0.88	0	0	0	0	An upper level disturbance combined with daytime heating to produce numerous thunderstorms during the afternoon and evening. The main threats from these storms were large hail and damaging winds.	Trained Spotter
2	Severe Storm - Hail	7/1/2012	0.75	0	0	0	0	An upper level disturbance combined with daytime heating to produce numerous thunderstorms during the afternoon and evening. The main threats from these storms were large hail and damaging winds.	Amateur Radio

## APPENDIX A: HISTORICAL HAZARD EVENTS

Hazard Priority	Hazard	Date	Magnitude	Deaths	Injuries	Property Damage	Crop Damage	Description	Source
2	Severe Storm - Hail	7/4/2012	0.88	0	0	0	0	A weak disturbance moving across the Ohio Valley combined with a convergent zone and lingering evening instability to produce thunderstorms across central Ohio. The main threats from these storms were large hail and damaging thunderstorm winds.	Public
2	Severe Storm - Hail	7/18/2012	1	0	0	0	0	A very moist and unstable air mass combined with a cold front dropping south into the Ohio Valley to produce numerous areas of convection. The threats from these storms included large hail, damaging thunderstorm winds, and flash flooding. The hail lasted for 15 minutes.	Amateur Radio
2	Severe Storm - Hail	7/26/2012	1	0	0	0	0	Strong upper level winds combined with an unstable airmass to produce widespread convection during the afternoon hours. The primary threats from these storms were damaging winds and large hail.	Trained Spotter
2	Severe Storm - Hail	8/9/2012	0.88	0	0	0	0	Disorganized convection developed ahead of a shortwave trough during the afternoon and evening hours. Some of these storms became severe with damaging winds and isolated large hail the primary threats.	Public
2	Severe Storm - Hail	4/16/2013	0.75	0	0	0	0	Thunderstorms developed in the vicinity of a cold front during the afternoon. Some of these storms became severe. The main threat from these storms was large hail, with isolated threats for damaging winds.	Amateur Radio
2	Severe Storm - Hail	5/21/2014	0.75	0	0	0	0	Thunderstorms developed in an unstable air mass ahead of a cold front. These thunderstorms were capable of producing large hail, damaging winds, heavy rainfall, flooding, and flash flooding. Some of the flooding lingered into the morning of May 22.	Public
2	Severe Storm - Hail	5/21/2014	0.88	0	0	0	0	Thunderstorms developed in an unstable air mass ahead of a cold front. These thunderstorms were capable of producing large hail, damaging winds, heavy rainfall, flooding, and flash flooding. Some of the flooding lingered into the morning of May 22.	Public

## APPENDIX A: HISTORICAL HAZARD EVENTS

Hazard Priority	Hazard	Date	Magnitude	Deaths	Injuries	Property Damage	Crop Damage	Description	Source
2	Severe Storm - Hail	10/6/2014	0.88	0	0	0	0	A strong upper level shortwave digging into the base of an expansive large scale trough from southern Canada into the Great Lakes, combined with diurnal heating to produce a line of thunderstorms. These thunderstorms produced large hail and damaging winds.	Trained Spotter
2	Severe Storm - Hail	6/30/2015	1	0	0	0	0	Severe thunderstorms developed ahead of a surface low pressure system and were enhanced by energy from an upper level shortwave.	Trained Spotter
2	Severe Storm - Hail	8/3/2015	1.5	0	0	0	0	Thunderstorms developed ahead of an advancing cold front over eastern Indiana. Additional storms developed on outflows of the mature storms.	Amateur Radio
2	Severe Storm - Hail	8/3/2015	1.5	0	0	0	0	Thunderstorms developed ahead of an advancing cold front over eastern Indiana. Additional storms developed on outflows of the mature storms.	Amateur Radio
2	Severe Storm - Hail	8/3/2015	1.25	0	0	0	0	Thunderstorms developed ahead of an advancing cold front over eastern Indiana. Additional storms developed on outflows of the mature storms.	Trained Spotter
2	Severe Storm - Hail	4/26/2016	1	0	0	0	0	A slow moving cold front pushed slowly south across the region during the afternoon and early evening hours. Thunderstorms developed along the I-70 corridor during the early to mid afternoon hours and then sagged slowly south through early evening.	Amateur Radio
2	Severe Storm - Hail	2/24/2017	0.88	0	0	0	0	Severe thunderstorms developed ahead of a cold front that moved up the Ohio Valley after a day of record setting February heat.	Public
2	Severe Storm - Hail	3/1/2017	0.75	0	0	0	0	An unseasonably warm and moist air mass was in place across the region during the morning hours of March 1st. Showers and thunderstorms developed across the Ohio Valley during the early morning hours as a strong low pressure system lifted northeast into the Great Lakes region. These storms produced heavy rain, large hail and several tornadoes. A squall line then moved through the region during the mid morning hours ahead of an approaching cold front. These storms resulted in damaging winds and additional heavy rain.	Public

## APPENDIX A: HISTORICAL HAZARD EVENTS

Hazard Priority	Hazard	Date	Magnitude	Deaths	Injuries	Property Damage	Crop Damage	Description	Source
2	Severe Storm - Hail	4/5/2017	0.75	0	0	0	0	Showers and thunderstorms developed ahead of a strengthening surface low which moved from the Middle Mississippi Valley into Northwest Ohio.	Trained Spotter
2	Severe Storm - Hail	4/16/2017	1	0	0	0	0	Thunderstorms with very heavy rain developed ahead of a cold front.	Trained Spotter
2	Severe Storm - Hail	5/6/2018	0.75	0	0	0	0	Scattered thunderstorms developed during the afternoon hours in association with an upper level disturbance moving through the region.	Trained Spotter
3	Tornado	4/15/1953	F1	0	0	25000	0	N/A	N/A
3	Tornado	4/23/1968	F4	1	29	250000	0	N/A	N/A
3	Tornado	8/9/1969	F3	0	7	25000	0	N/A	N/A
3	Tornado	6/24/1976	F0	0	0	25000	0	N/A	N/A
3	Tornado	6/12/1978	F0	0	0	25000	0	N/A	N/A
3	Tornado	6/12/1978	F1	0	0	25000	0	N/A	N/A
3	Tornado	4/8/1980	F1	0	2	25000	0	N/A	N/A
3	Tornado	6/2/1990	F2	0	0	25000	0	N/A	N/A
3	Tornado	8/5/1995	F1	0	0	30000	0	A tornado touched down near U.S. Highway 52 and destroyed a 100 by 40-foot metal barn. Debris of the barn was found one-half mile away. Several large trees were also downed.	N/A
3	Tornado	5/8/1996	F0	0	0	30000	0	A tornado destroyed a mobile home and downed many trees, some of which fell on a log cabin. A barn was leveled, power lines were downed, and several roads were closed for 90 minutes due to debris.	N/A
3	Tornado	7/2/1997	F3	0	0	200000	0	N/A	N/A
3	Tornado	8/24/1999	F0	0	0	25000	0	A weak tornado affected the northwest part of the county before tracking into Warren county. Trees were downed and some homes and barns were damaged.	NWS STORM SURVEY
3	Tornado	7/11/2006	F0	0	0	0	2000	A tornado briefly touched down in an open field to the east of Milford.	NWS STORM SURVEY



## APPENDIX A: HISTORICAL HAZARD EVENTS

Hazard Priority	Hazard	Date	Magnitude	Deaths	Injuries	Property Damage	Crop Damage	Description	Source
3	Tornado	7/11/2006	F1	0	0	100000	0	A tornado carved a path extending about a mile to the southwest of Goshen. Significant damage occurred near the intersection of State Routes 28 and 48. Numerous healthy trees, some to three feet in diameter, were uprooted and fell in various directions along the tornado path. In a nearby cemetery, tombstones were knocked down in different directions. Several homes in the vicinity of the cemetery sustained structural damage to roofs. The tornado produced F1 damage in this area. Additional damage occurred just outside of Goshen. A trailer was shifted a few inches off of its foundation along Deerfield Road. Two businesses sustained minor damage near Phoenix Drive and Snider Road. One of the businesses had a large door blown out with heavy inventory shifted inside the building. The second building sustained roof damage with some shingles removed. This damage just outside of Goshen was classified as F0.	NWS STORM SURVEY
3	Tornado	5/30/2009	EFO	0	0	1000	0	Supercells developed across southwest and south central Ohio during the evening as a warm front moved across the region, producing large hail and two tornadoes. A tornado briefly touched down over the southwest portion of Bethel, near Fossyl Drive and the baseball diamonds at Burke Park. The tornado moved east-southeast and downed a tree limb on South Ash Street. It lifted shortly thereafter as it passed just south of downtown Bethel. The tornado was rated an EFO with maximum winds at 65 to 70 mph.	NWS Storm Survey
3	Tornado	5/23/2011	EFO	0	0	30000	0	A quasi-linear convective system moved across an unstable airmass and produced widespread severe weather. The tornado blew down two high voltage towers along the Taylor Pike Road and destroyed a metal barn. The debris from the barn was deposited 300 to 400 feet across a field and into a tree line. A couple pieces of debris from the frame of the barn were impaled into the field. There were also some snapped trees and branches down along the tree line. The maximum estimated wind speed based on damage was 85 miles per hour.	NWS Storm Survey

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Hazard Priority	Hazard	Date	Magnitude	Deaths	Injuries	Property Damage	Crop Damage	Description	Source
3	Tornado	3/2/2012	EF3	3	13	5660000	0	Thunderstorms developed during the afternoon in a high wind shear environment ahead of a strengthening low pressure system. Many of these storms became severe, with large hail, damaging thunderstorm winds, and tornadoes all being the main threats. The tornado initially touched down in south central Campbell County at 1639 EST near Peach Grove Road and crossed Fisher Road northwest of Peach Grove. The tornado then crossed into Pendleton County at 1641 EST after producing high end EF3 damage along Reid Ridge Road near the Campbell and Pendleton County line. The tornado then moved across Mays Road producing significant and widespread EF2 to low end EF3 damage. The tornado then crossed AA highway and eventually the Ohio River, after crossing Kentucky Highway 8. Based on the damage surveyed, the maximum wind speed of the tornado was estimated to be 160 miles per hour in Campbell County and 140 miles per hour in Pendleton County. The tornado traveled a total of 2.68 miles in Campbell County, and 4 miles in Pendleton County. The tornado then moved into Clermont County Ohio at 1646 EST, where it hit the town of Moscow, causing EF3 damage. The tornado continued on the ground across Clermont County, crossing into Brown County at 1658 EST. The tornado then lifted south of Hamersville in western Brown County at 1702 EST. This tornado caused extensive damage to structures and trees along its entire path on both sides of the Ohio River. Numerous homes were very heavily damaged or destroyed. Many homes lost their roofs, having complete exterior wall failure. Some modular homes were completely removed from their foundations, lifted, and thrown in excess of 100 yards where they were destroyed. The damage in Ohio from this tornado was consistent with maximum winds estimated at 160 miles per hour in Clermont County, and 100 miles per hour in Brown County. The tornado traveled a total	NWS Storm Survey

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Hazard Priority	Hazard	Date	Magnitude	Deaths	Injuries	Property Damage	Crop Damage	Description	Source
3	Tornado	9/7/2012	EFO	0	0	40000	0	A strong trough helped to produce a quasi linear convective system that moved across the Ohio Valley during the late evening hours into the early morning hours. The main threats from this system were damaging winds, sub severe hail, and isolated weak tornadoes. The tornado touched down near the intersection of Route 131 and Belfast-Owensville Road. Three homes and a barn with a garage sustained anywhere from minor to major roof damage. A porch was lifted from a home and thrown several yards. Based on the damage surveyed, the maximum wind speed of this tornado was estimated at 70 to 75 miles per hour.	NWS Storm Survey

## APPENDIX A: HISTORICAL HAZARD EVENTS

Hazard Priority	Hazard	Date	Magnitude	Deaths	Injuries	Property Damage	Crop Damage	Description	Source
3	Tornado	3/1/2017	EF1	0	0	400000	0	An unseasonably warm and moist air mass was in place across the region during the morning hours of March 1st. Showers and thunderstorms developed across the Ohio Valley during the early morning hours as a strong low pressure system lifted northeast into the Great Lakes region. These storms produced heavy rain, large hail and several tornadoes. A squall line then moved through the region during the mid morning hours ahead of an approaching cold front. These storms resulted in damaging winds and additional heavy rain. The first sign of tornadic damage was observed on Locust Corner Road in Pierce Township near the Pierce Township Nature Area where several trees were snapped. A power pole was also snapped on the corner of Locust Corner Road and Wagner Road. <b>  </b> Damage continued on Locust Corner Road near the Pierce Township Park. Damage was mostly in the form of snapped trees and downed tree branches. Several evergreen trees were also uprooted. <b>  </b> Further east, beginning at the intersection of Lewis Road and Locust Lake Road, tree damage continued and was more significant. Structural damage was also observed at the 1300 block of Locust Lake Road. The most significant damage occurred to a home which had its roof completely lifted off and displaced into the backyard. Damage here was estimated to be EF1 in nature, with maximum winds near 110 MPH. Other homes further east on Locust Lake Road also suffered damage, including shingles ripped off and several instances of siding partially or completely removed from multiple sides of several structures. Multiple trees also fell onto one of the homes, resulting in roof damage. <b>  </b> To the east of Locust Lake Road, any structural damage was more sporadic and primarily consisted of shingles torn from a few homes on Maple Avenue and South Klein Avenue. A few trees were snapped as far east as Amelia Park Drive and Mount Holly Road.	NWS Storm Survey

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Hazard Priority	Hazard	Date	Magnitude	Deaths	Injuries	Property Damage	Crop Damage	Description	Source
3	Tornado	3/26/2017	EF1	0	0	30000	0	An upper level low pressure system produced showers with embedded thunderstorms during the afternoon and early evening hours. A weak tornado briefly touched down just in front of a tree line south of Concord Hennings Mill Road. Initial damage from the tornado consisted of an overturned small barn with an overturned camper. The tornado then headed northeast and caused structural damage to a residence on Concord Hennings Mill Road. The garage door walls were collapsed inwards with the roof blown off and debris scattered into a field north of Concord Hennings Mill Road. The tornado then lifted in a field north of Concord Hennings Mill Road.	NWS Storm Survey
3	Tornado	2/25/2018	EF1	0	0	85000	0	Strong to severe thunderstorms, with very heavy rainfall, developed ahead of a cold front. The tornado is believed to have first touched down on Neville Penn Schoolhouse Road about halfway between Felicity and Neville. Tree damage in this area was very extensive, with many trees uprooted and others snapped. In addition, a mobile home was destroyed. Damage continued further northeast on Neville-Penn Schoolhouse Road, with debris from one damaged structure observed blown against a fence line and into the nearby trees. A few other structures on Neville-Penn Schoolhouse Road suffered roof damage, including two barns which had partial roof removal. Additional tree damage was observed further northeast, with a few trees snapped north of OH-756.	NWS Storm Survey
4	Hazardous Materials	s list of hazardous material spills.							
5	Utility Failure	1/2/2018	N/A	N/A	N/A	N/A	N/A	County lost telephone service to Administration, Heritage, Corcoran, and Carriage House Buildings; Service restored on 1/19/2018	County

## APPENDIX A: HISTORICAL HAZARD EVENTS

Hazard Priority	Hazard	Date	Magnitude	Deaths	Injuries	Property Damage	Crop Damage	Description	Source
6	Winter Storm	1/6/1996	N/A	0	0	500000	0	<p>The Blizzard of '96 developed near the Gulf Coast and moved up the East Coast. This massive system produced the greatest total and 24 hour snowfall at Greater Cincinnati/Northern Kentucky airport. This one storm brought 14.3 inches of snowfall to the airport which normally receives 23 inches for an entire season. The heaviest snow fell near the Ohio river in the extreme south.</p> <p>The worst blizzard conditions occurred over West Central areas as dry and powdery snow was blown around by high winds causing whiteouts. Some areas had more than 30 continuous hours of snowfall, and many people in Southern Ohio felt this was the worst winter storm since the Blizzard of '78. In Fayette county, the airport reported a wind gust to 56 mph during the height of the storm. By the end of the storm many homes and businesses had their roof collapse or partially collapse from the weight of the new snow, and snow from a storm earlier in the week. By late in the day on the 7th arctic air was pouring into the region. A 47 year old man died of exposure under an overpass in Miami county. A 76 year old man died of exposure on his front porch in Montgomery county.</p>	N/A

## APPENDIX A: HISTORICAL HAZARD EVENTS

Hazard Priority	Hazard	Date	Magnitude	Deaths	Injuries	Property Damage	Crop Damage	Description	Source
6	Winter Storm	3/19/1996	N/A	0	0	0	0	On the first day of spring a major winter snow storm struck the region. Low pressure moving ever so slowly across Pennsylvania was responsible for the snow, and this low also brought strong winds with gusts up to 40 mph. It was a heavy wet snow which ripped down power lines and trees. Highways became snow covered and slippery causing numerous traffic accidents. With temperatures near freezing, the snow amounts were dependent to some degree on minor changes in elevation, with the least amount of snow falling in the low lying areas near the Ohio river. Snow amounts ranged between 4 and 8 inches across most locations. Some areas near the Ohio river only had 2 to 3 inches of snow as the relatively warmer ground resulted in more melting. Over 10,000 customers were without power at times in the Cincinnati metropolitan area as power lines went down. One 38 year old male died of hypothermia in a suburb outside of Cincinnati.	N/A
6	Winter Storm	2/3/1998	N/A	0	0	0	0	A powerful East coast storm brought significant moisture west of the Appalachians and by the time it was over, from 8 to 24 inches of snow had accumulated over southern Ohio. The Cincinnati- Northern Kentucky airport received 18.5 inches for the storm total, which set a record amount for any snowstorm in Cincinnati history. Numerous traffic accidents occurred as the snow fell too quickly for road crews to keep the roads clear.	N/A
6	Winter Storm	1/1/1999	N/A	0	0	0	0	A major winter storm affected much of Ohio beginning late on the 1st and continuing through much of the 2nd. Heavy snow fell initially with some areas receiving greater than 1 inch an hour rates. Some thunder was reported with some of the heaviest snow around Cincinnati and Dayton. By early afternoon on the 2nd, much of the snow had changed to a mixture of sleet and freezing rain. However, by that point the snow had accumulated from 6 to 8 inches with local 10 inch amounts around and north of Dayton and Columbus. Accumulations around Cincinnati generally ranged from 4 to 6 inches.	LAW ENFORCEMENT

## APPENDIX A: HISTORICAL HAZARD EVENTS

Hazard Priority	Hazard	Date	Magnitude	Deaths	Injuries	Property Damage	Crop Damage	Description	Source
6	Winter Storm	1/7/1999	N/A	0	0	0	0	A weak low pressure system brought an area of wintry precipitation to parts of central and southern Ohio. The precipitation began as a period of snow with 2 to 4 inches of accumulation occurring. After a period with no precipitation, freezing rain began with some significant ice accumulation occurring.	LAW ENFORCEMENT
6	Winter Storm	12/5/2002	N/A	0	0	0	0	Low pressure tracked across the Tennessee Valley overnight on the 4th into the morning of the 5th. North of this low, a large swath of snow moved across southern Ohio and produced 3 to 5 inches of accumulation.	LAW ENFORCEMENT
6	Winter Storm	1/16/2003	N/A	0	0	0	0	Low pressure tracking across the upper Tennessee valley, produced a swath of snow across the southern half of Ohio. Two to three inches fell across the region, with isolated amounts up to four inches.	LAW ENFORCEMENT
6	Winter Storm	2/16/2003	N/A	0	0	0	0	Warm, moist air on southerly winds were brought to the Ohio River valley during the early morning hours. Cold air in place at the surface allowed most of this precipitation to fall as freezing rain. Most areas received a quarter to a half inch of ice accumulation.	LAW ENFORCEMENT
6	Winter Storm	1/25/2004	N/A	0	0	0	0	Low pressure overspread the Ohio Valley and produced significant icing along and south of the Ohio River. North of the river, snowfall totals averaged 4 to 6 inches.	LAW ENFORCEMENT



## APPENDIX A: HISTORICAL HAZARD EVENTS

Hazard Priority	Hazard	Date	Magnitude	Deaths	Injuries	Property Damage	Crop Damage	Description	Source
6	Winter Storm	12/22/2004	N/A	0	0	0	0	<p>A surface and upper level low pressure center tracked northeast across the Ohio Valley on Wednesday, December 22nd and exited the region on the 23rd. A swath of heavy snow cut through southeast Indiana and into the Miami Valley of Ohio. 24 hour storm totals in this narrow band exceeded 2 feet in Preble and Darke counties. Snowfall totals of 20 inches or more were found along a line generally running from Eaton to Greenville, Piqua, Sidney, and Bellefontaine. Along and west of the I-71 corridor between Cincinnati and Columbus...over 8 inches of snow fell.</p> <p>East of this line, warm air infiltrated the lower layers of the atmosphere and brought periods of freezing rain and sleet during the evening and overnight hours. A quarter inch or more of ice occurred along a line from Batavia to Hillsboro, to Circleville and Newark. Several communities in south central and central Ohio were crippled by power outages. Up to 236,000 electric customers were without power for several hours, some lasting up to a week before it was restored. At one point in time, 90% of Highland county was without power, and parts of Adams county were without water for a week. The Ohio Insurance Agency estimated the damage to all of Ohio from this storm to be on the order of 85 million dollars, including over 25 million dollars in property damage.</p>	LAW ENFORCEMENT
6	Winter Storm	1/20/2005	N/A	0	0	0	0	<p>A clipper system passed through the Ohio Valley on the evening of the 20th. By the morning of the 21st, there was a swath of 6 to 7 inches of snow extending from Greenville...through Dayton...Xenia...and Wilmington...to Scioto county in south central Ohio. Outside of this line...most areas received from 4 to 5 inches of snowfall.</p>	LAW ENFORCEMENT

## APPENDIX A: HISTORICAL HAZARD EVENTS

Hazard Priority	Hazard	Date	Magnitude	Deaths	Injuries	Property Damage	Crop Damage	Description	Source
6	Winter Storm	1/22/2005	N/A	0	0	0	0	Low pressure tracked across west central and central Ohio during the morning hours. Ahead of the low...snow overspread the region...but the track went significantly further north. Enough warm air mixed in with the system that freezing rain occurred over south central and central Ohio...generally along and 30 miles east of the I-71 corridor between Cincinnati and Columbus. A quarter to a half inch of ice accumulation occurred in this region.	LAW ENFORCEMENT
6	Winter Storm	12/8/2005	N/A	0	0	0	0	An upper level low pressure tracked through Ohio on Thursday. In response to the upper low...surface low pressure moved from Kentucky into Ohio during the afternoon and evening. Colder temperatures from the upper low combined with moisture from the surface low to bring a snow...sleet...and freezing rain combination for much of the Ohio Valley. The temperatures in much of the Scioto Valley were warm enough to cut snowfall totals here...but the majority of western Ohio received 5 to 6 inches of snowfall from this system.	LAW ENFORCEMENT
6	Winter Storm	3/21/2006	N/A	0	0	0	0	A low pressure system tracked from the southern plains into the northern Tennessee and southern Ohio valleys during the overnight hours of Monday, March 20th. A wintry mix occurred over the Cincinnati metro area with heaviest snowfall occurring in southeast Indiana. Over portions of southcentral Ohio, freezing rain accumulated to a quarter inch. The system tracked quickly through the area and snowfall turned off from west to east on the afternoon of Tuesday, March 21st. Due to the brunt of the system striking the metropolitan area during rush hour...significant delays occurred in the tri-state area.	LAW ENFORCEMENT
6	Winter Storm	2/12/2008	N/A	0	0	0	0	A low pressure system in the southern plains moved east into the Ohio Valley, bringing snow that changed to sleet and freezing rain as warmer temperatures were pulled into the region. A half inch of ice and seven tenths of an inch of snow was measured in Miami township.	Trained Spotter

## APPENDIX A: HISTORICAL HAZARD EVENTS

Hazard Priority	Hazard	Date	Magnitude	Deaths	Injuries	Property Damage	Crop Damage	Description	Source
6	Winter Storm	2/21/2008	N/A	0	0	0	0	Low pressure tracked to the Ohio Valley as cold air at the surface was already entrenched. This resulted in snow and significant ice accumulations over much of the region. A spotter in Batavia reported 1.5 inches of snow and a quarter inch of ice. Another in Milford reported 1.8 inches of snow and a quarter inch of ice.	Trained Spotter
6	Winter Storm	3/7/2008	N/A	0	0	0	0	Surface low pressure tracked from the southern Appalachians to western Virginia by Saturday March 8th. A deepening upper level trough worked into the Ohio Valley overnight, combining with the surface low and strengthening the entire system. The surface pressure gradient tightened in response to the upper low, and gusts of 30 to 40 mph brought blizzard-like conditions to the region. In Bethel, a foot of snow was measured.	Trained Spotter
6	Winter Storm	12/16/2010	N/A	0	0	0	0	Low pressure tracked from the southern plains eastward through the Tennessee Valley on Thursday, December 16th. A significant amount of moist air was pulled into the Ohio Valley ahead of this surface low, diminishing significantly as it went further north past the Ohio River. Three inches of snow was measured in Goshen, northwest of Amelia, and 5 miles south of Milford. The far southeastern part of the county along the Ohio River was estimated to have received over 5 inches of snowfall.	Unknown
6	Winter Storm	1/20/2012	N/A	0	0	0	0	Low pressure tracked northeast through the Tennessee Valley late Friday evening, January 20th, 2012. It combined with another low pressure system over the Great Lakes to produce precipitation across the Ohio Valley. Along and north of the I-70 corridor in Ohio, the precipitation was primarily snow. South of the I-70 corridor, snow mixed with sleet and freezing rain. closer to the Ohio River in south central Ohio, warmer air was pulled in and significantly cut the amount of freezing rain found there. A tenth of an inch of ice accumulation was measured 3 miles east of Batavia. It is estimated that the northern portion of the county received up to a quarter inch of icy accumulations.	Trained Spotter

## APPENDIX A: HISTORICAL HAZARD EVENTS

Hazard Priority	Hazard	Date	Magnitude	Deaths	Injuries	Property Damage	Crop Damage	Description	Source
6	Winter Storm	12/28/2012	N/A	0	0	0	0	A low pressure system moved across the Tennessee Valley and into the Appalachians Friday Night through Saturday, December 29th and snow overspread the Ohio Valley. The heaviest snow generally fell along and southeast of Interstate 71, where 4 to 5 inches of accumulation was common. Northwest of the interstate, snowfall amounts were in the 2 to 4 inch range. The county garage northwest of Amelia measured 3.5 inches of snow. A public report out of Goshen had 4.5 inches.	Department of Highways
6	Winter Storm	3/5/2013	N/A	0	0	0	0	Low pressure tracked through Kentucky towards southeast Ohio and brought a round of winter weather to much of the region. The county garage near Amelia measured 5 inches of snow, while a Cocorahs observer near Goshen measured 4 inches.	Department of Highways
6	Winter Storm	12/6/2013	N/A	0	0	0	0	A cold front crossed the Ohio Valley during the day. Rainfall over the area briefly changed to freezing rain and sleet before transitioning to heavy snowfall. Accumulations of 4 to 6 inches were common across southwest Ohio, tapering off slightly to around 4 inches in central Ohio. Four to five inches of snow fell across the county. A spotter in Batavia measured 4.1 inches, while a public report from Neville indicated 5 inches had fallen.	Trained Spotter
6	Winter Storm	1/2/2014	N/A	0	0	0	0	Snow began during the early morning hours and became moderate at times before ending in the afternoon. Based on surrounding reports, the northern half of the county received 3.5 to 4 inches of snow.	Unknown
6	Winter Storm	1/20/2014	N/A	0	0	0	0	During the overnight of January 20th, arctic air moved through the Ohio Valley with a strengthening surface low crossing east through the Tennessee Valley. An upper level disturbance crossed the region at the same time, creating a narrow band of higher intensity snowfall over the region. The county garage northwest of Amelia measured 4 inches of snow. A report from the local media indicated 3.5 inches in Amelia.	Department of Highways

## APPENDIX A: HISTORICAL HAZARD EVENTS

Hazard Priority	Hazard	Date	Magnitude	Deaths	Injuries	Property Damage	Crop Damage	Description	Source
6	Winter Storm	2/4/2014	N/A	0	0	0	0	A fast moving winter storm moved across the Ohio Valley on Tuesday evening, February 4th. Locations across northern Kentucky and southern Ohio started with heavy snow and transitioned to sleet and freezing rain. Significant ice accumulations caused tree damage and power outages to 5- 10,000 people. Further north, snow mixed briefly with sleet, before changing to freezing rain as precipitation tapered off. The resulting 5 to 10 inches of snow and sleet accumulation in west-central and central Ohio. This storm brought widespread travel impacts with many schools and businesses being closed on Wednesday, February 5th. Trees were downed due to icy buildup in the Amelia area. Three inches of snow was measured in Summerside.	Law Enforcement
6	Winter Storm	2/14/2014	N/A	0	0	0	0	A strong upper-level disturbance moved through the Ohio Valley Friday evening, February 14th, ending on Saturday morning, February 15th. Surface low pressure crossed east across the state of Kentucky at the same time, allowing for an extended period of snow to develop. A report from two miles of Batavia indicated that 4.7 inches of snow had fallen. The county garage two miles northwest of Amelia measured 4.5 inches, as did another public report from the east side of Batavia.	Public
6	Winter Storm	11/16/2014	N/A	0	0	0	0	A surge of cold air worked into the Ohio Valley with an upper level disturbance pivoting through the region on Sunday night, November 16th. This cold surge changed any rain that was in the area to snow during the evening hours for western Ohio, by Monday morning in central and south-central Ohio. A report from west of Batavia showed that 5 inches of snow fell there. The highway department measured 4.5 inches northwest of Amelia, and 4.2 inches was reported by a member of the public in Summerside.	Public

## APPENDIX A: HISTORICAL HAZARD EVENTS

Hazard Priority	Hazard	Date	Magnitude	Deaths	Injuries	Property Damage	Crop Damage	Description	Source
6	Winter Storm	2/15/2015	N/A	0	0	0	0	A strong surface low pressure system tracked from the southern plains to the gulf states on Monday, February 16th. A northward push of the system clipped the southern Ohio Valley, and significant snow fell along and particularly south of the Ohio River. The county garage 2 miles northwest of Amelia measured 4 inches of snow, as did a public report from near the Clermont County Airport. Another close-by report from the public near Amelia showed 3.9 inches of snow had fallen.	Department of Highways
6	Winter Storm	2/21/2015	N/A	0	0	0	0	Southerly flow behind a departing arctic front pulled a significant amount of moisture over the Ohio Valley Friday night, February 20th into Saturday the 21st. As the low level jet encountered a mid level disturbance, snowfall rates of 1 to 2 inches per hour were noted over much of the region. A social media post northwest of the county airport measured 4.7 inches of snow and reported some sleet mixed in with it.	Social Media
6	Winter Storm	3/4/2015	N/A	0	0	0	0	A slow moving cold front changed an area of moderate rain to heavy snow as it crossed from northwest to southeast Wednesday afternoon and overnight. An upper level wave of energy translated east along the front and increased snowfall rates to 1 to 2 inches per hour over much of the region along and south of the Ohio River. Nine inches of snow fell in Moscow and 8.3 inches fell south of Felicity. The county garage south of Amelia and a nearby social media post both had 6 inches of snow. In Goshen, 4.5 inches of snow was measured.	Social Media

## APPENDIX A: HISTORICAL HAZARD EVENTS

Hazard Priority	Hazard	Date	Magnitude	Deaths	Injuries	Property Damage	Crop Damage	Description	Source
6	Winter Storm	2/8/2016	N/A	0	0	0	0	An upper level low pressure system centered in northwest Ohio saw disturbances rotate through it in the afternoon of Monday, February 8th. Snow showers in the region saw some accumulations in the afternoon and evening. Rain and snow mixed in the lower Scioto Valley had a changeover in the evening. A narrow band of moderate to heavy snow set up overnight along route 22 between Cincinnati and Lancaster, producing notably higher snowfall amounts. A public report from southeast of Loveland showed that 6 inches of snow fell there. The CoCoRaHS observer near Goshen measured 5 inches, with a NWS employee in Goshen measuring 4.5 inches. A public report from Milford indicated that 3.5 inches of snow accumulated there.	Public
6	Winter Storm	2/14/2016	N/A	0	0	0	0	A quick moving band of moderate to occasionally heavy snow impacted the area during the afternoon and early evening hours on Sunday, February 14, 2016. The snow fell in a 4 to 6 hour period, producing 2 to 4 inches of snowfall across southwest and far southern Ohio. The CoCoRaHS observer southwest of Bethel measured 5 inches of snow. A spotter north of Williamsburg measured 4.5 inches of snow. A NWS employee in Goshen had 4 inches of accumulation, while the ODOT county garage near Amelia had 3.5 inches.	CoCoRaHS
6	Winter Storm	2/6/2018	N/A	0	0	0	0	A low pressure system with warm moist air aloft moved through the region producing a wintry mix of freezing rain, sleet, and snowfall. The most accumulating snow fell between Dayton and Columbus, while areas to the southeast had more ice accumulations and areas to the northwest had lesser snow amounts. Based on surrounding observations, significantly adverse travel conditions for the morning commute occurred due to icy accumulations on area roadways.	Unknown
6	Winter Storm - Heavy Snow	1/11/1996	N/A	0	0	1000	0	A fast moving low pressure system tracked from the Mid-Mississippi Valley to the Kentucky-Tennessee border. This storm brought a fairly wet snow to the state. Total snow accumulations were near 4 inches.	N/A

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Hazard Priority	Hazard	Date	Magnitude	Deaths	Injuries	Property Damage	Crop Damage	Description	Source
6	Winter Storm - Heavy Snow	3/9/1999	N/A	0	0	0	0	Low pressure brought abundant moisture northward into an arctic air mass producing very heavy snow. The heaviest snow fell between midnight and 800 am with snowfall rates of 1 to 2 inches an hour at times. The snow continued into the daylight hours but it was generally much lighter. Accumulations ranged from 5 to 10 inches with the highest amounts occurring on a line from Hamilton to Wilmington to Chillicothe.	LAW ENFORCEMENT
6	Winter Storm - Heavy Snow	3/13/1999	N/A	0	0	0	0	A strong low pressure system brought a narrow band of heavy snow into southern Ohio. The snow fell faster than 1 inch an hour at times and thunder and lightning occurred in spots. A general area of 4 to 8 inches fell from Cincinnati northeastward to around Chillicothe. Within that band, parts of Adams and Scioto counties received from 14 to 20 inches.	LAW ENFORCEMENT
6	Winter Storm - Heavy Snow	1/19/2001	N/A	0	0	0	0	A slow moving mid level low pressure system brought 2 rounds of snow to south-central Ohio. The first round of snow occurred on the evening of the 19th but the snow tapered off overnight. The second round occurred on the morning and afternoon of the 20th. Snowfall totals of 4-6 inches were common across the region with some 7 inch amounts occurring in the higher elevations.	LAW ENFORCEMENT
6	Winter Storm - Heavy Snow	2/6/2007	N/A	0	0	0	0	A clipper system tracked northwest to southeast through the Ohio Valley and brought a quarter to a third of an inch of precipitation. Cold air in place over the region allowed for significant snow accumulation due to a high snow to water ratio. Three and a half inches of snow was recorded in Batavia.	Trained Spotter



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Hazard Priority	Hazard	Date	Magnitude	Deaths	Injuries	Property Damage	Crop Damage	Description	Source
6	Winter Storm - Heavy Snow	1/27/2009	N/A	0	0	0	0	A frontal boundary was stalled over the Tennessee Valley for the early part of the week. Upper level disturbances crossed through the Ohio Valley during this time and accumulating snowfall began on Tuesday. Warmer air aloft on Tuesday afternoon brought a significant amount of freezing rain to areas south of I-70 and especially near the Ohio River. Significant snowfall occurred on the back side of this system with snowfall rates on Wednesday morning approaching two inches per hour along the I-71 corridor between Cincinnati and Columbus. Eight and a half inches of snow was measured in Miami Township, with over a half inch of ice accumulation. In Amelia, the county garage measured ten inches of snow with .8 inches of ice accumulation.	Trained Spotter
6	Winter Storm - Heavy Snow	2/3/2009	N/A	0	0	0	0	Low pressure tracked east through the Ohio Valley during the afternoon. This set up a boundary extending from just west of Richmond, Indiana, through eastern Cincinnati, to Maysville, Kentucky. A mid level disturbance created a very strong source of localized lift, which produced snowfall rates exceeding two inches per hour. Nine inches of snow fell in Goshen, seven inches fell in Milford.	NWS Employee
6	Winter Storm - Heavy Snow	2/5/2010	N/A	0	0	0	0	Low pressure tracked from the Gulf of Mexico to the southern Appalachians on Friday, February 5th. A wintery mix overspread much of the region early on Friday and transitioned to all snow, bringing significant snowfall to the area on Saturday, February 6th. A spotter in Batavia reported 4.8 inches of snow. The highway garage in Amelia reported 4.5 inches, while an observer in Goshen measured 4 inches.	Trained Spotter

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Hazard Priority	Hazard	Date	Magnitude	Deaths	Injuries	Property Damage	Crop Damage	Description	Source
6	Winter Storm - Heavy Snow	2/9/2010	N/A	0	0	0	0	Low pressure in the Mississippi Valley strengthened as it moved into the Ohio Valley early on Tuesday, February 9th. Snow began on Monday night and spread northeast early on Tuesday. Later in the afternoon, this snow mixed with rain south of the Ohio River. As the system pulled out of the region Tuesday night, colder air on strong winds changed the precipitation back to snow, with additional accumulations noted in blowing and drifting snow. The highway department measured 5.5 inches of snow in Amelia. Spotters reported higher amounts with 5.8 inches in Batavia, 6 inches in Goshen, and 8 inches in Milford.	Department of Highways
6	Winter Storm - Heavy Snow	2/15/2010	N/A	0	0	0	0	A center of low pressure tracked south of the Ohio Valley on Monday, February 15th. As it approached the area, snow overspread the region, accumulating from 4 to 8 inches, with the heaviest amounts found along the I-71 corridor between Cincinnati and Columbus. In Goshen, 5.5 inches of snow was measured. Eight and a half inches was measured in Batavia, with 9 inches by another spotter in Bethel.	Trained Spotter
6	Winter Storm - Heavy Snow	1/20/2011	N/A	0	0	0	0	A low pressure system moved across the Tennessee Valley during the day of Thursday, January 20th. Widespread snow developed across the region in the morning and continued through the afternoon, tapering off in the evening. Snow became heavy at times during the afternoon. The ODOT county garage located 2 miles northwest of Amelia measured 4.5 inches of snowfall, while a spotter in Goshen measured 4.	Department of Highways

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Hazard Priority	Hazard	Date	Magnitude	Deaths	Injuries	Property Damage	Crop Damage	Description	Source
6	Winter Storm - Ice Storm	3/6/1996	N/A	0	0	0	0	North winds behind a cold front sagging across the region caused a shallow layer of below freezing air to penetrate deep into the Ohio Valley. Precipitation falling over the region changed from rain and drizzle to freezing rain and freezing drizzle, and then eventually to sleet and snow from north to south. Total snow accumulations were light, ranging from less than an inch in Western Ohio to up to 3 inches in South Central and Central Ohio. The roadways became coated with a layer of ice, and then light snow fell on the ice making it difficult for drivers to see the ice in many locations. Numerous accidents occurred over a large area. An eight car and truck pileup occurred on a bridge in Warren county, closing the bridge for a few hours.	N/A
6	Winter Storm - Ice Storm	1/24/1997	N/A	0	0	0	0	A strong surge of moisture moved north into the Ohio valley during the morning hours. Temperatures were at or just below the freezing mark for several hours while rain fell. Roads quickly became icy during the morning rush hour causing numerous traffic accidents. Several roads were closed due to one-quarter inch of ice accumulation. In Montgomery county alone, over 80 accidents were reported.	N/A
6	Winter Storm - Ice Storm	1/27/1997	N/A	0	0	0	0	Freezing rain occurred during the morning rush icing over roads, bridges, and overpasses. Numerous accidents occurred across the region.	N/A
6	Winter Storm - Ice Storm	12/13/2000	N/A	0	0	0	0	A weak low pressure system brought freezing rain to the region. Widespread ice accumulations of one-quarter to one-half inch occurred.	LAW ENFORCEMENT

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Hazard Priority	Hazard	Date	Magnitude	Deaths	Injuries	Property Damage	Crop Damage	Description	Source
6	Winter Storm - Ice Storm	2/13/2007	N/A	1	1	0	0	Low pressure tracked through the Ohio Valley, bringing a variety of winter weather conditions to the region. In west central Ohio, a blizzard dumped around a foot of snow and the resulting winds produced 3 to 4 feet drifts. In the I-71 corridor from Cincinnati to Columbus...a swath of significant icing brought down countless trees and power lines. Duke Energy had peak outages at 125,000 with over 330,000 customers losing power at some point in time and dubbed this the worst wintertime outage locally in 18 years for Hamilton and Clermont counties. Thousands of trees were downed. Four tenths of an inch of ice accumulation was observed in Williamsburg. Several thousand people were without power. Power was still out 4 days later in some locations. A nine year old girl, Natalie Fossier, was killed by a falling ice covered branch while walking her dog. The accident occurred at approximately 2:20 pm.	Newspaper
6	Winter Storm - Winter Weather	12/4/2007	N/A	0	0	0	0	An Alberta Clipper moved southeast through the Ohio Valley, producing 3 to 5 inches of snowfall along the I-70 corridor in Ohio and Indiana. The heaviest snowfall came in behind the clipper system as cloud tops cooled in central Ohio, dynamically adding lift to the back edge of the precipitation before ending west to east across the region. In Williamsburg, 2.4 inches of snow was measured.	Trained Spotter
6	Winter Storm - Winter Weather	12/7/2007	N/A	0	0	0	0	A quick moving upper level disturbance tracked east through the Ohio valley and produced 1 to 3 inches of snowfall. Enough warm air was pulled into the region to change some of this snow to light freezing rain and drizzle before ending. A few isolated spots got up to 4 inches of snow but this was not indicative of the rest of these counties. In Miami Township, a spotter measured a half inch of snow.	Trained Spotter

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Hazard Priority	Hazard	Date	Magnitude	Deaths	Injuries	Property Damage	Crop Damage	Description	Source
6	Winter Storm - Winter Weather	1/1/2008	N/A	0	0	0	0	A strong synoptic low passed over Ohio on January 1st. Snowfall started in the wrap around moisture with this system, and by daybreak of the 2nd there was significant blowing and drifting that made the snow difficult to measure. During the daytime hours of January 1st, a lake effect snow band set up through Richmond and southern Dayton to Wilmington. Scattered snow showers were found throughout the region through the afternoon and evening. During the overnight, a heavy band of snow produced 2 to 3 inches of snow in a very short period of time. This caused a heavier snowfall of 4 to 6 inches in a band between Dayton, Xenia, Waynesville, and Wilmington. In Williamsburg, 2.3 inches of snow was measured.	Trained Spotter
6	Winter Storm - Winter Weather	2/22/2008	N/A	0	0	0	0	A clipper system produced a narrow band of heavy snow that fell along the I-70 corridor from the Indiana border to just southeast of Columbus. In Williamsburg, there was 3.1 inches of snow measured. The county garage in Amelia and a spotter in Milford both measured three inches.	Trained Spotter
6	Winter Storm - Winter Weather	12/16/2008	N/A	0	0	0	0	A strong cold front crossed the Ohio Valley on Monday, December 15th. On Tuesday the 16th, an upper level low pressure system tracked to the northeast, bringing a quick shot of snow to northern Kentucky and south central Ohio. In Point Pleasant, seven tenths of an inch of snow fell.	Law Enforcement
6	Winter Storm - Winter Weather	1/7/2010	N/A	0	0	0	0	An Alberta clipper tracked southeast through the Ohio Valley on Thursday, January 7th. Very cold air was in place, which allowed for a very fluffy snow to accumulate over a prolonged period of time. Snow totals from this event ranged from two to five inches. Three inches of snow fell in Amelia.	Department of Highways

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Hazard Priority	Hazard	Date	Magnitude	Deaths	Injuries	Property Damage	Crop Damage	Description	Source
6	Winter Storm - Winter Weather	2/26/2010	N/A	0	0	0	0	A strong low pressure system over the northeastern portion of the country pushed cold air into the Ohio Valley, resulting in a period of snow showers. Gusty northwest winds of 15 to 20 mph with gusts to 30 mph caused some blowing and drifting through the early morning hours of the 27th. One to two inches of snow fell on average, with a few 4 inch or higher amounts being recorded due to localized drifting. Snowfall in Batavia was measured to be 1.5 inches.	Trained Spotter
6	Winter Storm - Winter Weather	12/12/2010	N/A	0	0	0	0	Snow developed across the region during the morning hours of Sunday, December 12th as a strong low pressure system moved through the Great Lakes. The snow continued into Sunday night before tapering off during the morning hours of Monday, December 13th. Much of the area saw 2 to 4 inches. Heavier amounts of up to 6 inches fell between Dayton and Cincinnati. Additionally, westerly winds of 10-20 mph with higher gusts caused blowing and drifting of the snow. One mile southwest of Goshen, 6 inches of snow was measured. Four and a half inches was reported 5 miles southeast of Loveland.	Trained Spotter
6	Winter Storm - Winter Weather	1/11/2011	N/A	0	0	0	0	Low pressure in the lower Mississippi Valley developed during the evening of Monday, January 10th and tracked into the Ohio Valley overnight. Early on Tuesday this low strengthened as it crossed the region into the Mid Atlantic. Police in Batavia measured 5 inches of snow, while a spotter southwest of Goshen measured 4 inches.	Law Enforcement

## APPENDIX A: HISTORICAL HAZARD EVENTS

Hazard Priority	Hazard	Date	Magnitude	Deaths	Injuries	Property Damage	Crop Damage	Description	Source
6	Winter Storm - Winter Weather	2/1/2011	N/A	0	0	0	0	An ice storm hit the Ohio Valley, beginning late in the evening of January 31st. Low pressure traced from Texas to the lower Great Lakes region, and strengthened as it crossed the Ohio Valley. The precipitation over northern portions of the region began as a snow and sleet mix and changed over to freezing rain, while along and immediately south of the I-70 corridor was all freezing rain. An estimated quarter million power outages were blamed on the storm which brought upwards of a half inch to inch of ice, along with several inches of sleet accumulation to central and west central Ohio and the Whitewater Valley of Indiana. Warmer temperatures southeast of the I-71 corridor led to little if any freezing precipitation. Overnight, ice melted east of I-75 as temperatures in the warm sector ahead of the cold front rose well into the 40s and reached 50 degrees in some locations. Two tenths of an inch of ice was measured in Batavia, and was noted to not be forming on roadways.	Department of Highways
6	Winter Storm - Winter Weather	1/2/2012	N/A	0	0	0	0	On the morning of January 2, 2012, lake enhanced snow bands caused travel problems for much of the Ohio Valley. While less than an inch of snow fell for most of the region, numerous accidents were reported and traffic was at a standstill in some spots. Numerous accidents and delays occurred in the area with less than an inch of snowfall measured. A spotter three miles east of Batavia measured a half inch.	Broadcast Media
6	Winter Storm - Winter Weather	2/8/2012	N/A	0	0	0	0	A weak upper level disturbance brought a half inch to an inch of snow to portions of the Ohio Valley. An inch of snow was measured three miles east of Batavia.	Trained Spotter
6	Winter Storm - Winter Weather	2/10/2012	N/A	0	0	0	0	Light snow overspread the Ohio Valley ahead of an Arctic cold front. A spotter 5 miles southwest of Bethel measured an inch and a half of snow.	Trained Spotter
6	Winter Storm - Winter Weather	3/5/2012	N/A	0	0	0	0	A low pressure system tracked from the Midwest and crossed south of the region...bringing a quick shot of accumulating snowfall to the southern Ohio Valley. An inch of snow fell two miles northwest of Amelia and southwest of Goshen.	Department of Highways

## APPENDIX A: HISTORICAL HAZARD EVENTS

Hazard Priority	Hazard	Date	Magnitude	Deaths	Injuries	Property Damage	Crop Damage	Description	Source
6	Winter Storm - Winter Weather	1/31/2013	N/A	0	0	0	0	Snow showers across the Ohio Valley brought one to two inches of accumulating snowfall. Cold air funneled into the region and numerous roadways were closed due to accidents from icy buildups, particularly in the Cincinnati metropolitan area. The Cocorahs observer near Goshen measured an inch of snow.	CoCoRaHS
6	Winter Storm - Winter Weather	2/21/2013	N/A	0	0	0	0	A significant winter storm system over the Plains moved into the mid-Mississippi Valley, spreading a wintry mix of precipitation across the Ohio Valley during the evening hours of February 21 into the morning hours of February 22. With sub-freezing temperatures near the surface, the precipitation started off as a mix of sleet/snow early on and then transitioned to mainly freezing rain as warmer air aloft nosed into the region. Snow and sleet accumulations were generally less than an inch, and ice accumulations from freezing rain generally ranged from one to two tenths of an inch. The observer southwest of Goshen measured an eighth of an inch of ice accumulation (.13 inches).	CoCoRaHS
6	Winter Storm - Winter Weather	3/24/2013	N/A	0	0	0	0	On Sunday and Monday March 24th and 25th, snow and sleet along with some rain spread through the region, with significant snow found over metropolitan Dayton and to the northwest. Surface low pressure moved from the Tennessee Valley to Ohio during the overnight. This low got added influence with an upper low tracking east through Kentucky during the late night and early part of Monday. The system occluded over the state and large snowfall amounts were recorded north and west of Dayton. Drier air in the occlusion was pulled into central Ohio, limiting snowfall totals significantly in this area. Much of the early part of the event started as rain in the southern portion of the CWA and snow totals were notably lower in southern Ohio, southeast Indiana, and northern Kentucky. The observer located 1 mile southwest of Goshen measured 1.5 inches of snow.	CoCoRaHS



## APPENDIX A: HISTORICAL HAZARD EVENTS

Hazard Priority	Hazard	Date	Magnitude	Deaths	Injuries	Property Damage	Crop Damage	Description	Source
6	Winter Storm - Winter Weather	11/26/2013	N/A	0	0	0	0	A surface low tracked east of the Appalachians during the afternoon of November 26th. At the same time, a mid-level trough crossed the great lakes and helped squeeze out rain and snow showers over portions of the Ohio Valley, which quickly changed to snow showers in the evening. Accumulations southeast of the I- 71 corridor were generally 1 to 3 inches, with some higher amounts. The observer in Amelia measured 2.3 inches of snow.	CoCoRaHS
6	Winter Storm - Winter Weather	12/10/2013	N/A	0	0	0	0	A heavy band of snow fell south and southwest of metropolitan Dayton, associated with an upper level disturbance and a weak surface trough of low pressure. The observer in Willowville measured 3.5 inches of snow. A public report from Day Heights came in at 3 inches, while the highway department in Georgetown measured 1.5 inches.	CoCoRaHS
6	Winter Storm - Winter Weather	12/16/2013	N/A	0	0	0	0	A clipper system brought a brief period of snow for the morning hours of December 16th. An inch to an inch and a half of snow was common across much of the region. The CoCoRaHS observer near Willowville measured 1.5 inches of snow, while the county garage measured an inch in Amelia.	CoCoRaHS
6	Winter Storm - Winter Weather	2/2/2014	N/A	0	0	0	0	Low pressure moving northeast from the Gulf states into the Mid- Atlantic pushed abundant moisture into the Ohio Valley on February 2nd, allowing a band of moderate to occasionally heavy snow to develop southeast of the Interstate 71 corridor during the overnight hours of February 2-3. The snow tapered off the following morning, with a tight gradient of snowfall amounts reported across parts of south-central Ohio and northeast Kentucky. The county garage near Amelia measured 1.5 inches of snow.	Department of Highways

## APPENDIX A: HISTORICAL HAZARD EVENTS

Hazard Priority	Hazard	Date	Magnitude	Deaths	Injuries	Property Damage	Crop Damage	Description	Source
6	Winter Storm - Winter Weather	3/2/2014	N/A	0	0	0	0	A low pressure system moving through the Tennessee Valley combined with a cold front dropping down across the Ohio Valley to produce widespread freezing rain, sleet and snow across the area. The precipitation remained mainly snow along and north of Interstate 70. However, to the south, the precipitation began as rain and freezing rain before changing to sleet and then snow through the afternoon and evening hours of March 2nd. Snow then continued along and south of the Ohio River through much of the night and on into the morning hours of March 3rd. The highway department near Owensville measured 2 inches of snow. Across the county, icy accumulations cut snowfall totals to average 2 to 3 inches.	Department of Highways
6	Winter Storm - Winter Weather	11/22/2014	N/A	0	0	0	0	A warm front passed over the Ohio Valley. Due to a very cold ground, the rain showers in the wake of this warm front created a slushy layer of ice on road surfaces. While temperature sensors climbed above freezing in most locations, the rain still froze on area roadways. Numerous accidents and road closures were the result of this wintry weather. Rain overspread a cold ground and created a slushy accumulation of ice on area roadways.	Unknown
6	Winter Storm - Winter Weather	1/5/2015	N/A	0	0	0	0	Low pressure tracked east along the Ohio River and interacted with an upper level disturbance to wring out 4 to 5 inches of snow. A distinct southern edge due to the track of the surface low produced little to no snow in the immediate Ohio River valley in southern Ohio. An employee in Goshen measured 1.2 inches of snow.	NWS Employee
6	Winter Storm - Winter Weather	1/25/2015	N/A	0	0	0	0	A clipper system brought accumulating snow to the northern Ohio Valley. The CoCoRaHS observer near Goshen measured 0.7 inches of snow.	CoCoRaHS
6	Winter Storm - Winter Weather	2/4/2015	N/A	0	0	0	0	A cold front crossed the region and produced an inch or two of snow across the Ohio Valley as it passed. The county garage near Amelia measured 0.3 inches of snow.	Department of Highways

## APPENDIX A: HISTORICAL HAZARD EVENTS

Hazard Priority	Hazard	Date	Magnitude	Deaths	Injuries	Property Damage	Crop Damage	Description	Source
6	Winter Storm - Winter Weather	2/14/2015	N/A	0	0	0	0	An arctic cold front crossed the area and produced snow squalls. Whiteout conditions with wind gusting to between 40 and 60 mph created extremely hazardous driving conditions. Numerous accidents and road closures were noted across the region. Numerous snow squalls and strong wind gusts negatively impacted the region with whiteout conditions at times.	Unknown
6	Winter Storm - Winter Weather	2/20/2015	N/A	0	0	0	0	An arctic cold front crossed the region during the afternoon. It produced a weak surface low pressure center that tracked east along the Ohio River. Accumulating snow of 1 to 3 inches were found throughout the region, with some higher readings grouped along or near the Ohio River. A report from northwest of the county airport measured 4 inches of snow. The county garage near Amelia measured 3 inches, while the CoCoRaHS observer southwest of Bethel measured 2.2 inches.	Public
6	Winter Storm - Winter Weather	1/10/2016	N/A	0	0	0	0	A strengthening low pressure system approached the region from the southwest on Saturday, January 9th and passed through overnight. Rain changed over to snow as cold air worked in behind the departing low on Sunday morning. Near Cherry Grove, 0.8 inches of snow was reported.	Public
6	Winter Storm - Winter Weather	1/20/2016	N/A	0	0	0	0	An upper level atmospheric disturbance brought some accumulating snow to the region on Wednesday, January 20th. Near Amelia, 1.5 inches of snow was measured.	Department of Highways
6	Winter Storm - Winter Weather	1/22/2016	N/A	0	0	0	0	A low pressure system strengthened over the southern Ohio Valley as it tracked to the East Coast. The deepening system brought significant snow to the region, with a sharp cutoff of no snowfall found near the I-71 corridor. Two and a half inches of snow fell in Bethel. Around an inch and a half fell in Amelia according to ODOT and the public.	Broadcast Media

## APPENDIX A: HISTORICAL HAZARD EVENTS

Hazard Priority	Hazard	Date	Magnitude	Deaths	Injuries	Property Damage	Crop Damage	Description	Source
6	Winter Storm - Winter Weather	3/3/2016	N/A	0	0	0	0	A low pressure system crossed well south of the Ohio Valley early in the morning on Thursday, March 3rd. An upper level wave of energy passed over the region during the day. Snow and rain changed over to snow early and remained primarily snow through the morning, with a heavier snow band found along the Ohio River in the afternoon. An inch of snow fell in less than an hour 4 miles south of Milford.	Trained Spotter
6	Winter Storm - Winter Weather	4/8/2016	N/A	0	0	0	0	A cold front crossed the region on the evening of the 8th, producing the last accumulating snowfall for the region early on the 9th. The observer located southwest of Goshen measured a half inch of snow.	CoCoRaHS
6	Winter Storm - Winter Weather	1/5/2017	N/A	0	0	0	0	A clipper system crossed south of the region during the morning of January 5th. Snowfall was generally on the order of one to three inches and ended by evening. A social media post from Williamsburg showed that 3.5 inches of snow had fallen. Another report in Goshen, coupled with the CoCoRaHS observer in Amelia and the county garage near Amelia all measured 2 inches.	Social Media
6	Winter Storm - Winter Weather	2/8/2017	N/A	0	0	0	0	Accumulating snow fell over the region due to a rapidly moving upper level disturbance. A narrow band set up where heavier accumulations were found in west central Ohio. The CoCoRaHS observer near Goshen measured 0.7 inches of snow.	CoCoRaHS
6	Winter Storm - Winter Weather	12/29/2017	N/A	0	0	0	0	A clipper system tracked through southern Ohio late in the day of the 29th. The highest snowfall totals were located along the I-70 corridor and south of Columbus. The CoCoRaHS observer east of Mount Repose measured 1.3 inches of snow. A spotter from Summerside measured 1.2 inches.	CoCoRaHS

## APPENDIX A: HISTORICAL HAZARD EVENTS

Hazard Priority	Hazard	Date	Magnitude	Deaths	Injuries	Property Damage	Crop Damage	Description	Source
6	Winter Storm - Winter Weather	1/12/2018	N/A	0	0	0	0	Strong low pressure at the surface tracked towards West Virginia. At the same time, a strong upper level low pressure system strengthened as it crossed east through Kentucky. The combination of the two and an onslaught of colder air brought significant snow accumulations to areas east of Wilmington, Ohio, with light accumulations found along and west of the I-75 corridor. A NWS employee 5 miles southeast of Loveland measured 3 inches of snow. The CoCoRaHS observer located 3 miles west of Bethel measured 2.5 inches.	NWS Employee
6	Winter Storm - Winter Weather	1/15/2018	N/A	0	0	0	0	An upper level disturbance moved through the Ohio Valley on the morning of January 15th producing light snowfall. Afterwards, a clipper system moved through the region producing more snowfall into the overnight hours. The CoCoRaHS observer northeast of Batavia measured 2 inches of snow.	CoCoRaHS
6	Winter Storm - Winter Weather	2/17/2018	N/A	0	0	0	0	A mixed precipitation event quickly changed over to a heavy, wet snowfall over portions of the region. The county garage in Amelia measured 1.5 inches of snow.	Department of Highways
6	Winter Storm - Winter Weather	3/20/2018	N/A	0	0	0	0	An upper level low interacted with a surface low in southeast Ohio. A band of heavy snowfall set up northwest of this stacked system, producing 2 to 5 inches of snow along and west of the I-75 corridor. A NWS employee 5 miles southeast of Loveland measured 2.5 inches of snow. The CoCoRaHS observer 3 miles west-southwest of Bethel measured 2 inches.	NWS Employee
6	Winter Storm - Winter Weather	3/24/2018	N/A	0	0	0	0	A narrow band of snow developed in the Ohio Valley, stretching from Central Illinois through southeast Indiana, then through northern Kentucky. Very rapid accumulations occurred, though major troubles on area roadways were inhibited by a relatively warm ground which significantly held back the accumulations on the roads. A NWS employee 5 miles southeast of Loveland measured 2 inches of snow. The CoCoRaHS observer in Amelia measured 1.5 inches.	NWS Employee

## APPENDIX A: HISTORICAL HAZARD EVENTS

Hazard Priority	Hazard	Date	Magnitude	Deaths	Injuries	Property Damage	Crop Damage	Description	Source
6	Winter Storm - Winter Weather	4/6/2018	N/A	0	0	0	0	A cold front crossed south through the region during the evening of the 6th. In the cold air behind it, rain changed over to snow with some light accumulations occurring across the region. The observers in 3 miles west of Bethel measured 1.1 inches of snow.	CoCoRaHS
7	Dam Failure	6/22/1905	N/A	N/A	N/A	N/A	N/A	According to the ODNR, White Lake Dam experienced a piping failure (internal erosion caused by seepage) in 2000. This is the only known dam failure event in Clermont County.	ODNR
8	Terrorism	0 reported events							
9	Landslides	N/A	N/A	N/A	N/A	N/A	N/A	Felicity Cedron Slide: Length 300', repair cost \$125,900. Repair was using drilled shafts into bedrock.	County
9	Landslides	N/A	N/A	N/A	N/A	N/A	N/A	Nine Mile Slide: Length 400', repair cost \$168,200. Repair was drilled shafts and "t-wall"	County
9	Landslides	N/A	N/A	N/A	N/A	N/A	N/A	Benton Road Slide: Length 300', repair cost \$240,600. Repair was drilled shafts into bedrock.	County
9	Landslides	N/A	N/A	N/A	N/A	N/A	N/A	Clermontville Laurel Slide: Length 400', repair cost \$459,000. Repair using drilled shafts into bedrock (uphill and downhill side)	County
10	Harmful and Invasive Species	09/2017	N/A	N/A	N/A	N/A	N/A	Reports of Brown Marmorated Stink Bug in Clermont County	OSU Extension
10	Harmful and Invasive Species	09/2017	N/A	N/A	N/A	N/A	N/A	Reports of Brown Marmorated Stink Bug in Clermont County	OSU Extension
10	Harmful and Invasive Species	09/2017	N/A	N/A	N/A	N/A	N/A	Reports of Brown Marmorated Stink Bug in Clermont County	OSU Extension
10	Harmful and Invasive Species	09/2017	N/A	N/A	N/A	N/A	N/A	Reports of Brown Marmorated Stink Bug in Clermont County	OSU Extension
10	Harmful and Invasive Species	11/2018	N/A	N/A	N/A	N/A	N/A	Reports of the Asian Longhorn Beating impacting Tate Township, East Fork State Park, and portions of Monroe, Stonelick, and Batavia Townships in Fall of 2018. Quarantines are in effect in these areas.	OSU Extension
11	Extreme Temperatures - Excessive Heat	8/7/2007	N/A	0	0	0	0	Oppressively hot and humid conditions with heat indices near 105 degrees impacted southern Ohio August 7 through August 10.	ASOS
11	Extreme Temperatures - Excessive Heat	8/23/2007	N/A	0	0	0	0	Oppressively hot and humid conditions with heat indices near 105 degrees impacted the Cincinnati and Dayton metro areas August 22 through August 24.	ASOS

## APPENDIX A: HISTORICAL HAZARD EVENTS

Hazard Priority	Hazard	Date	Magnitude	Deaths	Injuries	Property Damage	Crop Damage	Description	Source
1 1	Extreme Temperatures - Cold/Wind Chill	2/1/1996	N/A	0	0	20000	0	Arctic high pressure brought the coldest air of the season to the Ohio Valley. Cincinnati broke its record low on the 4th with a temperature of 11 below zero. Cincinnati also experienced its record low maximum temperatures of 7 and 6 degrees on the 3rd and 4th respectively. The extreme cold was entrenched for 5 days, freezing and bursting numerous water pipes. There were at least 2 house fires indirectly related to the cold weather, as space heaters, which were thawing frozen water lines, caught on fire. On the 5th, six thousand customers were without power near Portsmouth as overusage caused outages. AAA motor club had an extremely high number of calls during this cold wave when cars would not start.	N/A
1 2	Drought	7/1/1999	N/A	0	0	0	0	A significant drought was recorded in Clermont County. No injuries, deaths, property, or crop damages were reported.	NEWSPAPER
1 2	Drought	8/1/1999	N/A	0	0	0	0	A significant drought was recorded in Clermont County. No injuries, deaths, property, or crop damages were reported.	NEWSPAPER
1 2	Drought	07/2012	N/A	0	0	0	0	Widespread drought occurred throughout the lower 48 states, including Ohio and Clermont County. The Secretary of Agriculture made a disaster declaration from Drought and Excessive Heat, which provided Small Business Administration Economic Injury Disaster loans to Ohio. No injuries, deaths, property, or crop damages were reported as a result of this drought.	N/A
1 3	Wildfire	o reported events							
1 4	Earthquakes	12/8/1904	2.0-2.9	N/A	N/A	N/A	N/A	N/A	ODNR
1 4	Earthquakes	2/1/1905	2.0-2.10	N/A	N/A	N/A	N/A	N/A	ODNR
1 4	Earthquakes	2/6/1905	2.0-2.11	N/A	N/A	N/A	N/A	N/A	ODNR

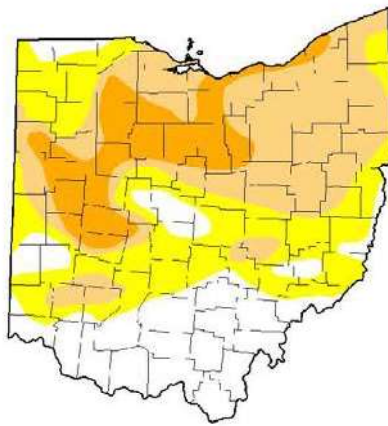
## APPENDIX A: HISTORICAL HAZARD EVENTS

### State of Ohio – Ohio Emergency Management Agency Weekly Drought Report – August 12, 2016

#### U.S. Drought Monitor Maps

This week's U.S. Drought Monitor is indicating that three-fourths of the state is experiencing drought conditions, with nearly half of the state experiencing at least Moderate Drought conditions, and nearly fifteen percent of the state is experiencing Severe Drought conditions (see U.S. Drought Monitor maps and chart, below). Areas that are shaded yellow are in a D0 condition – Abnormally Dry, and areas that are shaded brown are in a D1 condition – Moderate Drought. At this time, Ohio's drought can be classified as an Agricultural/Meteorological drought. An Agricultural Drought is a moisture deficiency that can be seriously injurious to crops, livestock, or other agricultural commodities. In an Agricultural Drought, moisture deficiency can persist for over a month resulting in a significant shortfall of rain during the growing season. A Meteorological Drought occurs after a dry spell, defined with respect to local climate normals, producing dry soils and stress on crops and vegetation. The maps' color coding scheme follows the chart on the following page.

This Week



Previous Week

Week	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current <a href="#">2016-08-09</a>	25.56	74.44	46.01	14.60	0.00	0.00
Last Week <a href="#">2016-08-02</a>	29.99	70.01	42.89	0.00	0.00	0.00
3 Months Ago <a href="#">2016-05-10</a>	100.00	0.00	0.00	0.00	0.00	0.00
Start of Calendar Year <a href="#">2015-12-29</a>	49.91	50.09	3.83	0.00	0.00	0.00
Start of Water Year <a href="#">2015-09-29</a>	77.24	22.76	0.00	0.00	0.00	0.00
One Year Ago <a href="#">2015-08-11</a>	100.00	0.00	0.00	0.00	0.00	0.00



## APPENDIX A: HISTORICAL HAZARD EVENTS



### OHIO DROUGHT INCIDENT ANNEX - DROUGHT SEVERITY INDEX

PALMER DROUGHT SEVERITY INDEX	
ABOVE +4	EXTREME MOIST SPELL
3.0 to 3.9	VERY MOIST SPELL
2.0 to 2.9	UNUSUAL MOIST SPELL
1.0 to 1.9	MOIST SPELL
0.5 to 0.9	INCIPIENT MOIST SPELL
0.4 to -0.4	NEAR NORMAL
-0.5 to -0.9	INCIPIENT DROUGHT
-1.0 to -1.9	MILD DROUGHT
-2.0 to -2.9	MODERATE DROUGHT
-3.0 to -3.9	SEVERE DROUGHT
BELOW -4.0	EXTREME DROUGHT

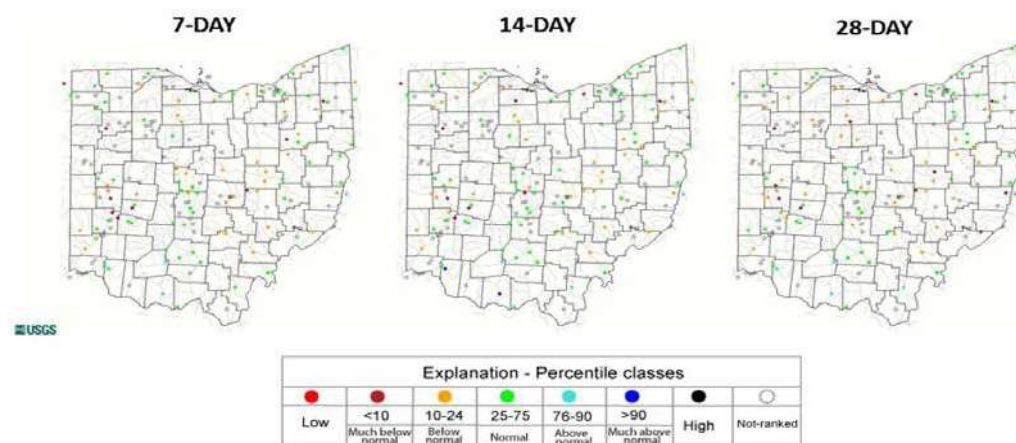
## APPENDIX A: HISTORICAL HAZARD EVENTS

### State Climate Office of Ohio

The State Climate Office is providing access to the United States Geological Survey's weekly streamflow maps that provide a 7-day, 14-day and 28-day percent-of-normal streamflow outlooks that chart average period streamflow compared to historical streamflow. The USGS Streamflow maps can be accessed at:

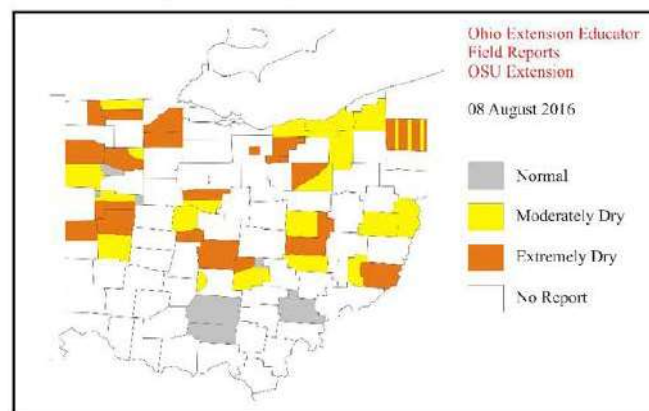
[http://waterwatch.usgs.gov/index.php?m=pa14d\\_dry&r=oh&w=map](http://waterwatch.usgs.gov/index.php?m=pa14d_dry&r=oh&w=map).

## USGS Streamflow



Average streamflow compared to historical streamflow for the day of the year

The State Climate Office's Weekly Ohio Hydrologic Outlook is available at <http://bpcrc.osu.edu/hydro>. The State Climate Office is also providing access to this week's Ohio State University Extension Office's *Ohio Extension Educator Field Reports'* drought conditions map.



## APPENDIX A: HISTORICAL HAZARD EVENTS

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### **Ohio Department of Agriculture**

The Ohio Department of Agriculture is providing links to the United States Department of Agriculture's National Agricultural Statistics Service Ohio Field Office. USDA's weekly Crop Progress and Condition Report includes degree days, temperature, precipitation, crop planting progress, crop development and harvesting progress.

The USDA's National Agricultural Statistics Service Ohio Field Office web page can be accessed at:

[https://www.nass.usda.gov/Statistics\\_by\\_State/Ohio/Publications/Crop\\_Progress\\_&\\_Condition/](https://www.nass.usda.gov/Statistics_by_State/Ohio/Publications/Crop_Progress_&_Condition/)

This week's Crop Progress and Condition Report reports that "rain is needed to help crops and livestock", and provides crop-specific condition information. The report can be accessed at:

[https://www.nass.usda.gov/Statistics\\_by\\_State/Ohio/Publications/Crop\\_Progress\\_&\\_Condition/2016/cw3216oh.pdf](https://www.nass.usda.gov/Statistics_by_State/Ohio/Publications/Crop_Progress_&_Condition/2016/cw3216oh.pdf)

# Appendix B: Matrix Scoring Spreadsheet

## APPENDIX B: MATRIX SCORING SPREADSHEET

Matrix Scoring Table, by Hazard											
#	Mitigation Action	Community	Cost Effective	Technically Feasible	Environmentally Sound	Immediate Need	Total Risk Reduction	Raw Score	Hazard Priority	Action Score	Action Priority
All Hazards											
1	Installation of Emergency Generators for the PUB WTP and PUB Well Fields.	County-wide,	3.00	3.00	3.00	3.00	3.00	15.00	1	1515.00	15
2	Tornado/Storm Shelters.	Pierce Township,	2.00	2.00	3.00	2.00	2.00	11.00	1	1511.00	19
3	Currently using County EOP. We are in process of developing our township specific EOP.	All Jurisdictions, Pierce Township,	3.00	3.00	3.00	2.00	2.00	13.00	1	1513.00	18
4	Public education through whatever medium(s) on how to prepare and protect their interests (web, seminars).	All Jurisdictions, Pierce Township,	5.00	5.00	5.00	3.00	2.00	20.00	1	1520.00	5
5	Green Address Signs for all residential homes.	Washington Township,	5.00	5.00	5.00	1.00	1.00	17.00	1	1517.00	14
6	Develop/update back-up power generation capabilities at critical government facilities (e.g. temporary storm safe locations, community EOCs).	County-wide, All Jurisdictions,	3.24	3.76	3.59	3.12	3.47	17.18	1	1517.18	13
7	Develop/update Continuity of Operations Plan.	County-wide, All Jurisdictions,	3.82	4.29	4.35	3.18	3.29	18.94	1	1518.94	11
8	Provide public education and outreach on disaster preparedness including websites, newsletters, social media, Preparedness Month events, etc.	County-wide, All Jurisdictions,	4.00	4.57	4.52	2.95	3.29	19.33	1	1519.33	9
9	Develop or update Emergency Operations Plans.	County-wide, All Jurisdictions,	3.68	4.42	4.61	3.16	3.47	19.35	1	1519.35	8

## APPENDIX B: MATRIX SCORING SPREADSHEET

Matrix Scoring Table, by Hazard											
#	Mitigation Action	Community	Cost Effective	Technically Feasible	Environmentally Sound	Immediate Need	Total Risk Reduction	Raw Score	Hazard Priority	Action Score	Action Priority
10	Maintain an all-hazard outdoor warning siren system, including repairing, replacing, and upgrading.	County-wide, All Jurisdictions,	3.53	4.16	4.11	3.58	3.53	18.89	1	1518.89	12
11	Continue fire code, building code, zoning, and floodplain management enforcement activities.	County-wide, All Jurisdictions,	4.33	4.44	4.39	3.72	4.00	20.89	1	1520.89	4
12	Schedule and participate in Table Top exercises of COOP & DR plans.	Wayne Township,	2.00	3.00	3.00	3.00	4.00	15.00	1	1515.00	15
13	Add preparedness month activities to public calendar.	Wayne Township,	5.00	5.00	3.00	3.00	3.00	19.00	1	1519.00	10
14	Implement public education via new township website, becoming viewer, mobile-friendly, and informative of hazard mitigation, disaster preparedness, safe locations, township policies, etc.	Wayne Township,	3.00	5.00	3.00	5.00	4.00	20.00	1	1520.00	5
15	Establish safe locations within the township for residents seeking help during/after hazardous conditions.	Wayne Township,	5.00	5.00	5.00	5.00	5.00	25.00	1	1525.00	1
16	Purchase cots for designated shelters to be stored at sites.	Wayne Township,	2.00	5.00	5.00	3.00	5.00	20.00	1	1520.00	5
17	Purchase generator for community center.	Wayne Township,	4.00	5.00	4.00	5.00	3.00	21.00	1	1521.00	3

## APPENDIX B: MATRIX SCORING SPREADSHEET

Matrix Scoring Table, by Hazard											
#	Mitigation Action	Community	Cost Effective	Technically Feasible	Environmentally Sound	Immediate Need	Total Risk Reduction	Raw Score	Hazard Priority	Action Score	Action Priority
18	Review cooperative agreements with county/gas companies/Sheriffs' Department regarding DR plans.	Wayne Township,	5.00	5.00	5.00	3.00	5.00	23.00	1	1523.00	2
19	Promote the installation of community safe rooms.	County-wide,	2.00	3.00	2.00	4.00	3.00	14.00	1	1514.00	17
Severe Storms											
20	Purchase weather radios for residents (Monroe Twp).	Monroe Township,	4.00	5.00	4.00	3.00	3.00	19.00	2	1419.00	25
21	Build a new Town Hall to include a Storm Shelter (Amelia Village).	Amelia Village,	4.00	3.00	5.00	2.00	4.00	18.00	2	1418.00	27
22	Purchase back-up generator for current Village Hall (Amelia Village).	Amelia Village,	4.00	3.00	5.00	3.00	4.00	19.00	2	1419.00	25
23	A public education campaign on having multiple means to receive severe weather notifications, such as weather radios, smart phone apps, social media feeds, and/or registration for mass notification systems.	County-wide, All Jurisdictions,	3.95	4.25	4.50	3.70	3.65	20.05	2	1420.05	23
24	Create a Standard Operating Guideline for the timely clearing of roads from debris caused by severe storms.	County-wide, All Jurisdictions,	4.07	4.21	3.93	3.50	3.50	19.21	2	1419.21	24
25	Maintain StormReady Certification.	County-wide, All Jurisdictions,	4.56	4.56	4.11	3.56	3.67	20.44	2	1420.44	22

## APPENDIX B: MATRIX SCORING SPREADSHEET

Matrix Scoring Table, by Hazard											
#	Mitigation Action	Community	Cost Effective	Technically Feasible	Environmentally Sound	Immediate Need	Total Risk Reduction	Raw Score	Hazard Priority	Action Score	Action Priority
26	Identify safe locations for residents to seek shelter during tornado events through mutual cooperation with local municipalities and organizations.	Wayne Township,	5.00	5.00	3.00	4.00	4.00	21.00	2	1421.00	21
27	Start discussions with neighboring townships regarding dead, fallen tree responsibilities at cemeteries.	Wayne Township,	5.00	5.00	5.00	5.00	5.00	25.00	2	1425.00	20
Tornadoes											
28	Shelter for Tornadoes and Cold Weather (Monroe Twp).	Monroe Township,	4.00	5.00	5.00	5.00	4.00	23.00	3	1323.00	28
29	Install additional tornado sirens.	Pierce Township,	3.00	4.00	4.00	1.00	3.00	15.00	3	1315.00	31
30	Promote the Ohio Safe Room Rebate Program for the construction and installation of residential safe rooms.	County-wide, All Jurisdictions,	3.31	3.69	3.77	2.54	2.54	15.85	3	1315.85	30
31	Identify tornado safe locations for residents to seek shelter during tornadoes/high wind events, through coordination with local municipalities.	County-wide, All Jurisdictions,	4.33	4.17	4.50	3.67	3.50	20.17	3	1320.17	29
Flooding											
32	Replace or correct culvert pipes along SR-222 in Nicholasville to control flooding (Monroe Twp).	Monroe Township,	3.00	3.00	3.00	3.00	4.00	16.00	4	1216.00	41



## APPENDIX B: MATRIX SCORING SPREADSHEET

Matrix Scoring Table, by Hazard											
#	Mitigation Action	Community	Cost Effective	Technically Feasible	Environmentally Sound	Immediate Need	Total Risk Reduction	Raw Score	Hazard Priority	Action Score	Action Priority
33	Ditching/Culvert Upgrades of Washington Township roads.	Washington Township,	3.00	4.00	4.00	1.00	2.00	14.00	4	1214.00	42
34	Improve stormwater management system.	County-wide, All Jurisdictions,	2.67	3.47	4.00	3.60	3.67	17.40	4	1217.40	39
35	Identify and study poor draining areas to control flooding.	County-wide, All Jurisdictions,	3.44	3.69	4.00	3.75	3.75	18.63	4	1218.63	35
36	Repair or replace ditching and culverts to control flooding.	County-wide, All Jurisdictions,	2.94	3.88	3.69	3.50	3.50	17.50	4	1217.50	37
37	Continue to identify and study riverbank stabilization opportunities.	County-wide, All Jurisdictions,	3.00	3.42	3.42	3.17	3.25	16.25	4	1216.25	40
38	Provide mitigation option guidance to property owners of flood-prone structures, such as acquisition, relocation, elevation, dry flood proofing, and wet flood proofing. Guidance may include applying for federal mitigation dollars when possible.	County-wide, All Jurisdictions,	3.58	3.83	3.67	3.08	3.25	17.42	4	1217.42	38
39	Encourage residents in flood-prone areas to purchase flood insurance.	County-wide, All Jurisdictions,	3.92	4.38	4.00	2.85	3.00	18.15	4	1218.15	36
40	Identify vulnerabilities, deteriorations of ditches and culverts on township roads.	Wayne Township,	5.00	5.00	5.00	5.00	3.00	23.00	4	1223.00	33
41	Start ditching & culvert upgrades of township roads.	Wayne Township,	2.00	5.00	5.00	5.00	5.00	22.00	4	1222.00	34

## APPENDIX B: MATRIX SCORING SPREADSHEET

Matrix Scoring Table, by Hazard											
#	Mitigation Action	Community	Cost Effective	Technically Feasible	Environmentally Sound	Immediate Need	Total Risk Reduction	Raw Score	Hazard Priority	Action Score	Action Priority
42	Stormwater management in Newtonsville - identify, document issues.	Wayne Township,	5.00	5.00	5.00	5.00	5.00	25.00	4	1225.00	32
Utility Failure											
43	Tree trimming of township roads in right of ways along utility lines.	County-wide, All Jurisdictions,	3.41	4.12	3.47	3.47	3.53	18.00	5	1118.00	46
44	Identify vulnerabilities on township roads with power lines.	Wayne Township,	5.00	5.00	5.00	5.00	2.00	22.00	5	1122.00	43
45	Tree trimming of township roads.	Wayne Township,	1.00	3.00	5.00	3.00	5.00	17.00	5	1117.00	48
46	Implement zoning regarding location of, planting of trees near power lines.	Wayne Township,	5.00	5.00	5.00	1.00	3.00	19.00	5	1119.00	45
47	Implementation of Source Water Protection Plans and Drinking Water Contingency Plans.	County-wide, All Jurisdictions,	3.00	4.00	4.00	4.00	5.00	20.00	5	1120.00	44
48	Implement actions necessary for the proper closure and management of the former Beckjord facility and associated coal ash ponds.	County-wide, All Jurisdictions,	2.00	3.00	5.00	3.00	5.00	18.00	5	1118.00	46
Hazardous Materials											
49	Develop/Update Wellhead Protection Plan	County-wide, All Jurisdictions,	3.67	4.33	4.00	4.00	3.50	19.50	6	1019.50	49
50	Organize an annual drill to prepare for a disaster involving hazardous materials.	County-wide, All Jurisdictions,	3.00	3.73	3.64	2.64	2.45	15.45	6	1015.45	52

## APPENDIX B: MATRIX SCORING SPREADSHEET

Matrix Scoring Table, by Hazard											
#	Mitigation Action	Community	Cost Effective	Technically Feasible	Environmentally Sound	Immediate Need	Total Risk Reduction	Raw Score	Hazard Priority	Action Score	Action Priority
51	Report what hazardous materials are being handled on-site and amounts according to regulation.	County-wide, All Jurisdictions,	3.83	3.92	4.17	3.25	3.00	18.17	6	1018.17	50
52	Update commodity flow study to identify types and volume of hazardous materials transported via river, pipeline, truck, rail, and plane.	County-wide, All Jurisdictions,	2.55	3.36	4.09	3.18	2.82	16.00	6	1016.00	51
53	Public outreach regarding disposal of household hazardous waste.	County-wide, All Jurisdictions,	3.00	3.00	3.00	3.00	3.00	15.00	6	1015.00	53
Winter Storms											
54	Provide public education and outreach on winter weather safety, which may include family and traveler emergency preparedness, driver safety, and animal protection.	County-wide, All Jurisdictions,	3.71	4.14	3.93	2.93	2.93	17.64	7	917.64	54
Landslides											
55	Develop a map of landslide prone areas.	County-wide, All Jurisdictions,	3.11	3.44	3.56	2.89	2.75	15.75	8	815.75	56
56	Enforce slide-prone area ordinance to limit fill or dumping and address drainage or other landslide related problems.	County-wide, All Jurisdictions,	2.67	2.67	3.00	3.00	3.00	14.33	8	814.33	62
57	Enforce drainage control regulations to reduce risk of landslides resulting from saturated soils.	County-wide, All Jurisdictions,	2.67	2.67	3.00	3.33	3.33	15.00	8	815.00	58

## APPENDIX B: MATRIX SCORING SPREADSHEET

Matrix Scoring Table, by Hazard											
#	Mitigation Action	Community	Cost Effective	Technically Feasible	Environmentally Sound	Immediate Need	Total Risk Reduction	Raw Score	Hazard Priority	Action Score	Action Priority
58	Develop grading ordinances which require developers and landowners to obtain permits prior to filling or regrading.	County-wide, All Jurisdictions,	3.25	3.25	3.25	3.00	3.00	15.75	8	815.75	56
59	Implement Sanitary System Codes to reduce the effect of drainage on landslides by limiting the type and location of sanitary systems.	County-wide, All Jurisdictions,	3.50	3.00	2.50	2.50	3.00	14.50	8	814.50	61
60	Provide mitigation option guidance to property owners on site stabilization, energy dissipation, and flow control measures.	County-wide, All Jurisdictions,	3.67	3.33	3.67	3.00	3.00	16.67	8	816.67	55
61	Implement Restraining Structures to hold soil in place.	County-wide, All Jurisdictions,	2.25	2.50	2.50	3.75	3.75	14.75	8	814.75	60
62	Implement Debris-Flow Measures, such as stabilization, energy dissipation, and flow control measures, to reduce damage in sloping areas.	County-wide, All Jurisdictions,	2.67	2.67	2.67	2.67	2.67	13.33	8	813.33	64
63	Implement grading to increase slope stability.	County-wide, All Jurisdictions,	3.00	2.67	2.67	2.67	2.67	13.67	8	813.67	63
64	Consider Vegetation Placement and Management Plans to increase soil stability.	County-wide, All Jurisdictions,	3.17	3.00	3.50	2.67	2.67	15.00	8	815.00	58
65	Consider placement of utilities. (Placing utilities outside of landslide areas decreases the risk of service disruption.)	County-wide, All Jurisdictions,	2.50	2.75	2.75	2.25	3.00	13.25	8	813.25	65

## APPENDIX B: MATRIX SCORING SPREADSHEET

Matrix Scoring Table, by Hazard											
#	Mitigation Action	Community	Cost Effective	Technically Feasible	Environmentally Sound	Immediate Need	Total Risk Reduction	Raw Score	Hazard Priority	Action Score	Action Priority
Dam Failure											
66	Coordinate with ODNR to implement Dam Safety Program.	County-wide, All Jurisdictions,	3.13	3.25	3.50	3.25	3.43	16.55	9	716.55	71
67	Encourage dam owners develop/update their dam safety plans.	County-wide, All Jurisdictions,	3.67	3.44	3.78	3.22	3.22	17.33	9	717.33	68
68	Encourage dam owners to be prepared to respond should their dam fail, including a notification plan for the appropriate response agencies.	County-wide, All Jurisdictions,	3.75	3.63	3.75	3.50	3.25	17.88	9	717.88	67
69	Identify downstream risk should dam failure occur.	County-wide, All Jurisdictions,	3.55	3.64	3.82	3.00	2.64	16.64	9	716.64	70
70	Coordinate with local communities to ensure they understand risk to dam failures and the impact it would have on their community.	County-wide, All Jurisdictions,	3.82	3.64	4.00	2.91	2.64	17.00	9	717.00	69
71	Review Disaster Recovery Plan	Wayne Township,	5.00	5.00	3.00	3.00	4.00	20.00	9	720.00	66
72	Add to Continuity of Operations Plan.	Wayne Township,	2.00	1.00	3.00	2.00	4.00	12.00	9	712.00	73
73	Coordinate with dam owners/operators to rehabilitate high hazard dams that have the potential for failure	County-wide,	2.00	1.00	4.00	3.00	4.00	14.00	9	714.00	72

## APPENDIX B: MATRIX SCORING SPREADSHEET

Matrix Scoring Table, by Hazard											
#	Mitigation Action	Community	Cost Effective	Technically Feasible	Environmentally Sound	Immediate Need	Total Risk Reduction	Raw Score	Hazard Priority	Action Score	Action Priority
Harmful & Invasive Species											
74	Implement an invasive species education program that covers associated hazards, identification, behavior, and quarantine procedures.	County-wide, All Jurisdictions,	3.45	3.73	4.00	3.27	2.91	17.36	10	617.36	76
75	Share information with the public that explains the importance of not importing or exporting firewood.	County-wide, All Jurisdictions,	3.25	3.92	4.08	3.42	2.83	17.50	10	617.50	75
76	Work with agricultural producers to monitor and minimize nutrient runoff in order to prevent Harmful Algal Blooms.	County-wide, All Jurisdictions,	2.88	3.38	3.38	3.75	2.75	16.13	10	616.13	77
77	Public education on property owner responsibility for the removal of dead/dying vegetation affected by invasive species.	County-wide, All Jurisdictions,	3.00	3.00	3.00	4.00	3.00	16.00	10	616.00	78
78	Increase protection efforts for public infrastructure that may be affected by dead/dying vegetation due to invasive species (e.g. tree removal).	County-wide, All Jurisdictions,	2.00	1.00	2.00	3.00	2.00	10.00	10	610.00	79
79	Identify and establish policy and procedure to deal with falling dead ash trees within the township.	Wayne Township,	5.00	5.00	5.00	4.00	3.00	22.00	10	622.00	74

## APPENDIX B: MATRIX SCORING SPREADSHEET

Matrix Scoring Table, by Hazard											
#	Mitigation Action	Community	Cost Effective	Technically Feasible	Environmentally Sound	Immediate Need	Total Risk Reduction	Raw Score	Hazard Priority	Action Score	Action Priority
<b>Terrorism</b>											
80	Encourage critical infrastructure to implement protective measures at their facilities.	County-wide, All Jurisdictions,	3.44	3.50	3.56	3.13	2.94	16.56	11	516.56	82
81	Coordinate with local law enforcement to ensure the safety of large public gathering events.	County-wide, All Jurisdictions,	4.06	4.28	4.22	3.83	3.83	20.22	11	520.22	80
82	Provide guidance to schools, churches, government agencies, health care facilities, and other critical facilities on improving protection, preparedness, response, and recovery activities to an active aggressor threat.	County-wide, All Jurisdictions,	3.82	4.00	4.12	3.65	3.76	19.35	11	519.35	81
<b>Extreme Temperatures</b>											
83	Provide guidance and resources for vulnerable populations during extreme temperature events.	County-wide, All Jurisdictions,	3.50	3.40	3.70	2.50	2.30	15.40	12	415.40	83
84	Provide guidance and resources on utility assistance programs.	County-wide, All Jurisdictions,	3.40	3.40	3.00	2.80	2.60	15.20	12	415.20	84
<b>Drought</b>											
85	Encourage all property owners to prepare for droughts by installing equipment that reduces the use of water.	County-wide, All Jurisdictions,	3.11	3.89	4.00	2.00	2.00	15.00	13	315.00	85

## APPENDIX B: MATRIX SCORING SPREADSHEET

Matrix Scoring Table, by Hazard											
#	Mitigation Action	Community	Cost Effective	Technically Feasible	Environmentally Sound	Immediate Need	Total Risk Reduction	Raw Score	Hazard Priority	Action Score	Action Priority
86	Develop water storage plans, water use ordinances, contingency plans, and water delivery systems in water utility operating plans.	County-wide, All Jurisdictions,	2.67	3.50	3.50	2.50	2.50	14.67	13	314.67	86
87	Encourage farmers to purchase crop insurance and drought insurance.	County-wide, All Jurisdictions,	2.25	3.25	3.25	1.75	1.50	12.00	13	312.00	88
88	Develop map of sensitive areas, population, wildfire possibilities. Look into Dry Hydrants.	Wayne Township,	5.00	2.00	3.00	2.00	1.00	13.00	13	313.00	87
Wildfire											
89	Promote public education on smoking hazards and the risks of recreational fires.	County-wide, All Jurisdictions,	3.88	3.88	3.75	3.13	3.00	17.63	14	217.63	90
90	Provide public education on extreme fire danger and red flag warnings, including what it means and what actions to take when it is issued.	County-wide, All Jurisdictions,	3.78	4.11	4.00	3.44	3.00	18.33	14	218.33	89
Earthquakes											
91	Use community outreach activities to foster an awareness of earthquake mitigation activities in homes, schools, and businesses.	County-wide, All Jurisdictions,	3.08	3.23	3.31	2.46	2.54	14.62	15	114.62	91
92	Work with insurance industry representatives to increase public awareness of the importance of earthquake insurance for home owners and other building owners.	County-wide, All Jurisdictions,	2.40	2.40	2.40	2.40	2.20	11.80	15	111.80	92



2014 Hazard Mitigation Actions Status			
Hazard & Mitigation Action	Community	Start/End	Status
All Hazards			
Installation of Emergency Generators for the PUB WTP and PUB Well Fields	Clermont County	1/1/19-12/31/24	Deferred; Priorities with limited funding.
Replace backup generation for the Goshen Twp Fire Station. This facility is a temporary storm shelter for residents and the community EOC.	Goshen Twp	1/1/19-12/31/24	Unchanged
Developed Township Continuity of Operations Plan 2011; Now in training and exercise phase.	Miami Twp	1/1/14-12/31/19	Complete; Plan was completed and some training was done, but with a relatively new Township staff, revisions are needed and more training will be required
Preparedness Month Activities 2013	Miami Twp	12/31/2013	Complete in 2013
Preparedness Month Activities 2014	Miami Twp	12/31/2014	Deleted; Did not occur due to retirement of Chief Whitworth.

## APPENDIX B: MATRIX SCORING SPREADSHEET

2014 Hazard Mitigation Actions Status			
Hazard & Mitigation Action	Community	Start/End	Status
Periodic articles in Township newsletter and local weekly newspaper on fire/life safety and preparedness	Miami Twp	1/1/14-12/31/19	Complete; will continue to put safety and planning information to the community in quarterly newsletters and via social media.
Tornado/Storm Shelters	Pierce Twp	1/1/15-12/31/16	Deferred; logistics and legalities of personnel.
Currently using County EOP. We are in process of developing our Township specific EOP.	Pierce Twp	1/1/14-12/31/19	Deferred
Public education through whatever medium(s) on how to prepare and protect local interests (web, seminars).	Pierce Twp	1/1/14-12/31/16	Ongoing; use website, availability of education materials.
Repair/Replacement/Upgrade of All-Hazard/Tornado Sirens in Union Twp on an as-needed basis.	Union Twp	1/1/19-12/31/24	Unchanged; continue to update.
Green Address Signs for all residential homes.	Washington Twp	1/1/19-12/31/24	Ongoing; 90% complete
Purchase ATV for Disaster Assistance.	Washington Twp	41639	Complete
Expanding Rope & Water Rescue Capabilities	Washington Twp	1/1/19-12/31/24	Unchanged due to staffing & training.
MOU: Task Force One to House Rescue Boat for Region	Washington Twp	1/1/14-12/31/19	Complete in 2014
Fire & EMS Prevention Program	Washington Twp	1/1/19-12/31/24	Ongoing; 80% Complete
Newsletter mailed 2 times a year to all residents.	Washington Twp	1/1/14-12/31/19	Deleted; Discontinued newsletter due to upgrading website.

## 2014 Hazard Mitigation Actions Status

Hazard & Mitigation Action	Community	Start/End	Status
Township & Fire Department Website	Washington Twp	1/1/14-12/31/19	Complete in 2018
Review Emergency Action Plan in 2013 and update when necessary	Village of Moscow	1/1/19-12/31/24	Complete; Plan was reviewed and will continue to be monitored.
Policy for Emergency Shelter and Assistance during a disaster - coordination with Township and School District.	Village of Williamsburg	1/1/14-12/31/19	Complete in 2018
<b>Severe Storms</b>			
Fire code enforcement activities	Miami Twp	1/1/14-12/31/19	Ongoing; Continual activity for Fire & EMS; discussed removing code references through at group work session.
Purchase weather radios for residents.	Monroe Twp	1/1/19-12/31/24	Deferred; Applied for grant (unsuccessful). Have changed plan to a notification system like Nixel or Code Red.
Purchase generator for Fire Station 68	Washington Twp	12/31/2015	Deleted; no longer fire station.
Build a new Town Hall to include a Storm Shelter.	Amelia Village	1/1/19-12/31/24	Unchanged
Purchase back-up generator for current Village Hall.	Amelia Village	1/1/19-12/31/24	Unchanged

2014 Hazard Mitigation Actions Status			
Hazard & Mitigation Action	Community	Start/End	Status
<b>Tornadoes</b>			
Purchased/installed all-hazards (tornado) warning sirens to cover 95%+ of Twp. 33 sq. miles in 2001. Now being maintained.	Miami Twp	1/1/14-12/31/19	Ongoing; Many sirens will require extensive maintenance or replacement through 2024.
Shelter for Tornadoes and Cold Weather	Monroe Twp	1/1/19-12/31/24	Ongoing; grants so far unsuccessful; looking for funding.
We have 8 sirens currently. We are in process of adding 5 additional sirens at this time.	Pierce Twp	1/1/15-12/31/16	Ongoing; continue to monitor development and growth for additional locations.
Replace two (2) tornado sirens in the Township that are antiquated.	Washington Twp	12/31/2015	Complete in 2015
<b>Flooding</b>			
Storm water management system improvements.	Miami Twp	5/1/19-12/31/24	Ongoing; Continual activity for County Water Resources and Township Service Department.
Replace or correct culvert pipes along SR-222 in Nicholasville to control flooding.	Monroe Twp	1/1/19-12/31/24	Ongoing; 90% complete; culvert has been replaced. ODOT still works on ditching in this area.
Ditching/Culvert Upgrades of township roads.	Washington Twp	1/1/19-12/31/24	Ongoing, 90% complete.
Big Indian Road (off 222) Embankment Stabilization	Washington Twp	12/31/2015	Complete in 2015
Ireton Trees Road Embankment Stabilization Pavement Restoration	Washington Twp	12/31/2015	Complete in 2018

<b>2014 Hazard Mitigation Actions Status</b>			
<b>Hazard &amp; Mitigation Action</b>	<b>Community</b>	<b>Start/End</b>	<b>Status</b>
Big Indian Road (off 232) Embankment Stabilization Pavement Restoration	Washington Twp	12/31/2015	Complete in 2018
Bear Creek Road (near house #424) Embankment Stabilization Pavement Restoration.	Washington Twp	12/31/2018	Complete in 2018
Bear Creek Road (End) Embankment Stabilization Pavement Restoration.	Washington Twp	12/31/2018	Complete in 2018
Boat Ramp - Retrofitting docks to protect against damages by barges during high water/flood event.	Washington Twp	1/1/19-12/31/24	Deferred due to cost.
Purchase generator for Township Hall/R&B Department	Washington Twp	1/1/2014	Complete in 2015
Implementation of the Storm Water Relief Plan - Received funding for Phase 1 to redirect storm water from surface ditches and alley junctions away from private property.	Village of Owensville	1/1/14-12/31/19	Complete; 100%
<b>Utility Failure</b>			
Tree Trimming of Township Roads.	Washington Twp	12/31/2015	Ongoing; 70% Complete

2014 Hazard Mitigation Actions Status			
Hazard & Mitigation Action	Community	Start/End	Status
<b>Hazardous Materials</b>			
Wellhead Protection Plan	City of Milford	1/1/14- 12/31/19	Completed in 2012; The Wellhead protection was approved by the Ohio EPA in 2010. The plan was completed in 2012 when we installed four signs identifying the Wellhead protection area. These signs include an emergency phone number to call in case of a spill.
MOU: House De-con/HazMat Trailer for Region.	Washington Twp	1/1/14- 12/31/19	Deleted; no longer applicable.

## APPENDIX B: MATRIX SCORING SPREADSHEET

Risk Assessment Survey Summary													
Community/ Organization	Severe Storms	Tornadoes	Flood	Utility Failure	Hazardous Materials	Landslides	Dam Failure	Invasive Species	Terrorism	Extreme Temps	Wildfire	Drough t	Earthquak e
Duke Energy	3.00	4.43	3.00	4.14	3.14	3.57	4.29	2.43	4.14	2.43	4.00	2.71	3.86
Clermont County Water Resources	3.14	3.14	2.29	3.43	3.14	1.71	2.57	1.86	4.00	3.00	2.29	2.86	3.71
Washingto n Township Fire/Rescu e	3.00	3.00	3.00	2.00	2.86	2.00	5.00	2.00	2.71	2.00	2.14	2.00	1.00
Wayne Township	2.71	3.57	2.43	3.00	3.14	1.00	4.14	2.14	1.00	1.71	2.86	1.00	1.00
Clermont County Auditor's Office	3.29	3.86	3.57	4.00	2.29	1.43	4.14	1.29	3.57	1.57	1.86	2.57	2.71
OSU Extension	2.57	3.00	2.71	2.86	1.57	1.57	1.57	3.86	1.00	3.00	1.00	2.29	1.00
Clermont EMA	2.29	3.29	2.86	2.43	1.71	2.00	3.43	2.00	2.57	1.86	2.29	2.29	3.43
Pierce Township Fire Department	1.00	1.00	1.43	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

## APPENDIX B: MATRIX SCORING SPREADSHEET

Risk Assessment Survey Summary													
Community/ Organization	Severe Storms	Tornadoes	Flood	Utility Failure	Hazardous Materials	Landslides	Dam Failure	Invasive Species	Terrorism	Extreme Temps	Wildfire	Drough t	Earthquak e
Clermont County Parks District	2.14	2.71	1.86	2.00	1.00	1.00	1.00	2.43	1.00	1.00	1.00	1.00	1.00
Clermont County Sherriff's Office	2.57	2.86	2.29	2.14	1.86	1.57	1.00	1.43	1.00	2.57	1.00	1.00	1.00
Miami Township Police	2.29	1.71	1.43	2.29	1.43	1.43	1.43	1.43	1.43	1.00	1.00	1.00	1.43
Milford Police	1.00	1.00	1.00	1.14	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Union Township	1.43	1.00	1.43	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Miami Township Fire and EMS	2.29	1.86	1.57	2.00	1.71	1.00	1.00	1.71	2.00	1.86	1.71	1.29	1.00
Village of Moscow / New Richmond	1.00	1.00	1.43	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
<b>Average</b>	<b>2.25</b>	<b>2.50</b>	<b>2.15</b>	<b>2.30</b>	<b>1.86</b>	<b>1.49</b>	<b>2.24</b>	<b>1.77</b>	<b>1.90</b>	<b>1.73</b>	<b>1.68</b>	<b>1.60</b>	<b>1.68</b>



## APPENDIX B: MATRIX SCORING SPREADSHEET

Hazards	Frequency	Average Duration of Response	Average Speed of Onset	Average Magnitude	Impact on Businesses	Impact on People	Impact on Property
Flood	2.11	2.92	2.22	2.00	2.06	1.97	2.19
Severe Storms	2.11	2.42	2.47	2.64	2.14	2.06	2.28
Tornadoes	1.67	2.42	2.94	2.72	2.97	2.36	2.56
Landslides	1.11	1.61	2.19	1.75	1.25	1.25	1.33
Hazardous Materials	1.33	1.44	2.61	2.33	1.75	1.72	2.08
Dam Failure	1.00	1.64	3.00	2.86	2.58	2.42	2.53
Invasive Species	1.33	2.14	1.92	1.81	1.83	1.58	1.86
Utility Failure	1.78	2.53	2.86	2.69	2.28	2.36	2.00
Drought	1.56	1.76	2.07	1.53	2.20	2.05	1.56
Earthquake	1.00	1.22	1.58	1.69	2.08	2.00	1.94
Wildfire	1.00	1.56	1.94	1.89	1.78	1.72	1.81
Terrorism	1.11	1.25	2.17	1.97	2.19	2.31	2.22

# Appendix C: Critical Facilities List

## APPENDIX C: CRITICAL FACILITIES LIST

The following table provides a summary of the number of critical facilities categorized by each type. Clermont County maintains a complete list of all critical facilities.

Type	Count
911 Comm Center	4
Airport/Heliport	11
Assisted Living	17
Daycare	49
Dialysis Center	6
Educational Facilities	79
Fire & EMS Stations	31
Gas Station	95
Grocery	18
Hospitals	1
Hotels	15
Nursing Home	15
Pharmacy	31
Place of Worship	175
Police Stations	21
Power Stations	2
Urgent Care	10

# Appendix D:

# Sources

## APPENDIX D: SOURCES

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### Introduction

<http://www.dot.state.oh.us/maps/RailMap/RailMapbackside.pdf>  
[https://www.faa.gov/airports/airport\\_safety/airportdata\\_5010/](https://www.faa.gov/airports/airport_safety/airportdata_5010/)  
<http://www.dot.state.oh.us/Divisions/Planning/TechServ/TIM/Pages/default.aspx>  
<https://clermontcountyohio.gov//planning/comprehensive-plan/>  
<http://clermont-county-history.org/clermont-county-museums.html>  
<http://clermont-county-history.org/historical-articles/harmony-hill.html>

### History and Demographics:

<https://factfinder.census.gov>  
<http://www.ameliavillage.com/a-brief-history-of-amelia.html>  
<http://www.bataviavillage.org/>  
<http://www.bethel-oh.gov/>  
<https://lovelandoh.gov/235/History-of-Loveland>  
[http://www.milfordohio.org/visitors/discover\\_milford/history.php](http://www.milfordohio.org/visitors/discover_milford/history.php)  
<https://villageofmoscow.org/>  
<http://www.newrichmond.org/history.html>  
<https://villageofowensville.org/>  
<https://www.williamsburgohio.org/about.html>

### Dam Failure:

<https://www.fema.gov/dam-safety-concepts>  
<http://codes.ohio.gov/oac/1501:21-13-01>  
<https://gis2.ohiodnr.gov/MapView/?config=ohiodams>

### Drought

<https://droughtmonitor.unl.edu/CurrentMap/StateDroughtMonitor.aspx?OH>  
<https://droughtmonitor.unl.edu/>  
<https://quickstats.nass.usda.gov/#FDD404A5-0CC3-333C-9EA5-5F85A5677CB4>  
[https://www.nass.usda.gov/Publications/AgCensus/2012/Online\\_Resources/County\\_Profiles/Ohio/cp39025.pdf](https://www.nass.usda.gov/Publications/AgCensus/2012/Online_Resources/County_Profiles/Ohio/cp39025.pdf)  
[https://www.nass.usda.gov/Statistics\\_by\\_State/Ohio/Publications/Annual\\_Statistical\\_Bulletin/Ohio%20bulletin%202016-2017.pdf](https://www.nass.usda.gov/Statistics_by_State/Ohio/Publications/Annual_Statistical_Bulletin/Ohio%20bulletin%202016-2017.pdf)

## APPENDIX D: SOURCES

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### Earthquakes:

<http://geosurvey.ohiodnr.gov/earthquakes-ohioseis/maps-charts/epicenters-page-size>  
<http://geosurvey.ohiodnr.gov/earthquakes-ohioseis/maps-charts/ohios-deep-structures>  
<http://geosurvey.ohiodnr.gov/earthquakes-ohioseis/maps-charts/helicorder-charts>  
<https://earthquake.usgs.gov/hazards/induced/index.php#2018>  
[https://earthquake.usgs.gov/hazards/hazmaps/conterminous/2014/images/HazardMap2014\\_Ig.jpg](https://earthquake.usgs.gov/hazards/hazmaps/conterminous/2014/images/HazardMap2014_Ig.jpg)

### Extreme Temperatures:

<https://www.weather.gov/oun/safety-winter-windchill>  
<https://www.weather.gov/oun/safety-winter-definitions>  
<https://www.weather.gov/media/unr/heatindex.pdf>

### Flood:

<https://www.ncdc.noaa.gov/stormevents/>  
<https://www.fema.gov/flood-or-flooding>  
<https://www.fema.gov/cis/OH.html>

### Harmful and Invasive Species:

<https://clermont.osu.edu/program-areas/agriculture-and-natural-resources/invasive-pests-including-asian-longhorned-beetle#Gypsy%20Moth>  
<https://www.aphis.usda.gov/aphis/resources/pests-diseases/asian-longhorned-beetle/About-ALB>  
[https://clermont.osu.edu/sites/clermont/files/imce/Program\\_Pages/ANR/ALB/EAB%20101.pdf](https://clermont.osu.edu/sites/clermont/files/imce/Program_Pages/ANR/ALB/EAB%20101.pdf)  
<https://www.stopbmsb.org/where-is-bmsb/state-by-state/>  
[https://www.nass.usda.gov/Statistics\\_by\\_State/Ohio/Publications/Annual\\_Statistical\\_Bulletin/Ohio%20bulletin%202016-2017.pdf](https://www.nass.usda.gov/Statistics_by_State/Ohio/Publications/Annual_Statistical_Bulletin/Ohio%20bulletin%202016-2017.pdf)  
<http://ohiodnr.gov/invasivespecies>  
[https://www.eddmaps.org/county.cfm?sub=9328&id=us\\_OH\\_39025](https://www.eddmaps.org/county.cfm?sub=9328&id=us_OH_39025)  
<https://bygl.osu.edu/node/974> (Kudzu)  
<https://www.scribd.com/document/371086026/Kudzu-in-Ohio>  
<https://www.kudzubug.org/images/>  
<http://ohiodnr.gov/feralswine>  
<https://epa.ohio.gov/Portals/28/documents/HABs/Publications/HABBrochure.pdf>

### Landslides:

[https://ema.ohio.gov/Documents/OhioMitigationPlan/2011/Section%202\\_HIRA%20Part%205.pdf](https://ema.ohio.gov/Documents/OhioMitigationPlan/2011/Section%202_HIRA%20Part%205.pdf)  
<https://geosurvey.ohiodnr.gov/portals/geosurvey/PDFs/GeoFacts/geof08.pdf>  
[https://ema.ohio.gov/Documents/OhioMitigationPlan/SOHMP\\_Sec\\_2\\_5.pdf](https://ema.ohio.gov/Documents/OhioMitigationPlan/SOHMP_Sec_2_5.pdf)  
<http://www.timesreporter.com/article/20140102/NEWS/140109934>

## APPENDIX D: SOURCES

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### Severe Storms:

<https://www.weather.gov/bgm/severedefinitions>

<https://www.noaa.gov/explainers/severe-storms>

[https://www.weather.gov/media/owlie/lightning3\\_050714.pdf](https://www.weather.gov/media/owlie/lightning3_050714.pdf)

### Tornadoes:

<https://www.spc.noaa.gov/faq/tornado/index.html#The%20Basics>

<https://www.weather.gov/bgm/severedefinitions>

<https://www1.ncdc.noaa.gov/pub/data/extremeevents/specialreports/enhanced-fujita-tornado-scale.pdf>

### Wildfire:

[https://ema.ohio.gov/Documents/OhioMitigationPlan/2011/Section%202\\_HIRA%20Part%204.pdf](https://ema.ohio.gov/Documents/OhioMitigationPlan/2011/Section%202_HIRA%20Part%204.pdf)

<https://www.ncdc.noaa.gov/stormevents/listevents.jsp?eventType=%28Z%29+Wildfire&beginDate mm=08&beginDate dd=01&beginDate yyyy=1950&endDate mm=10&endDate dd=31&endDate yyyy=2018&county=CLERMONT%3A25&hailfilter=0.00&tornfilter=0&windfilter=000&sort=DT&submitbutton=Search&statefips=39%2COHIO>

### Winter Storms:

<https://www.nssl.noaa.gov/education/svrwx101/winter/>

# **Appendix E:**

# **FEMA Flood Maps**



## APPENDIX E: FEMA FLOOD MAPS

### National Flood Hazard Layer FIRMette



#### Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS	Without Base Flood Elevation (BFE) Zone A, Y, AO, D
	With BFE or Depth: Zone AE, AO, AH, VE, AR
	Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD	0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
	Future Conditions 1% Annual Chance Flood Hazard Zone X
	Area with Reduced Flood Risk due to Levee: See Notes, Zone X
	Area with Flood Risk due to Levee Zone D
OTHER AREAS	Area of Minimal Flood Hazard Zone X
	Effective LOMRs
	Area of Undetermined Flood Hazard Zone D
GENERAL STRUCTURES	Channel, Culvert, or Storm Sewer
	Levee, Dike, or Floodwall
OTHER FEATURES	Cross Sections with 1% Annual Chance Water Surface Elevation 26.2 17.6
	Coastal Transect
	Base Flood Elevation Line (BFE)
	Limit of Study
OTHER FEATURES	Jurisdiction Boundary
	Coastal Transect Base line
	Profile Baseline
	Hydrographic Feature
MAP PANELS	Digital Data Available
	No Digital Data Available
	Unmapped

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards.

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 3/7/2019 at 4:22:03 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

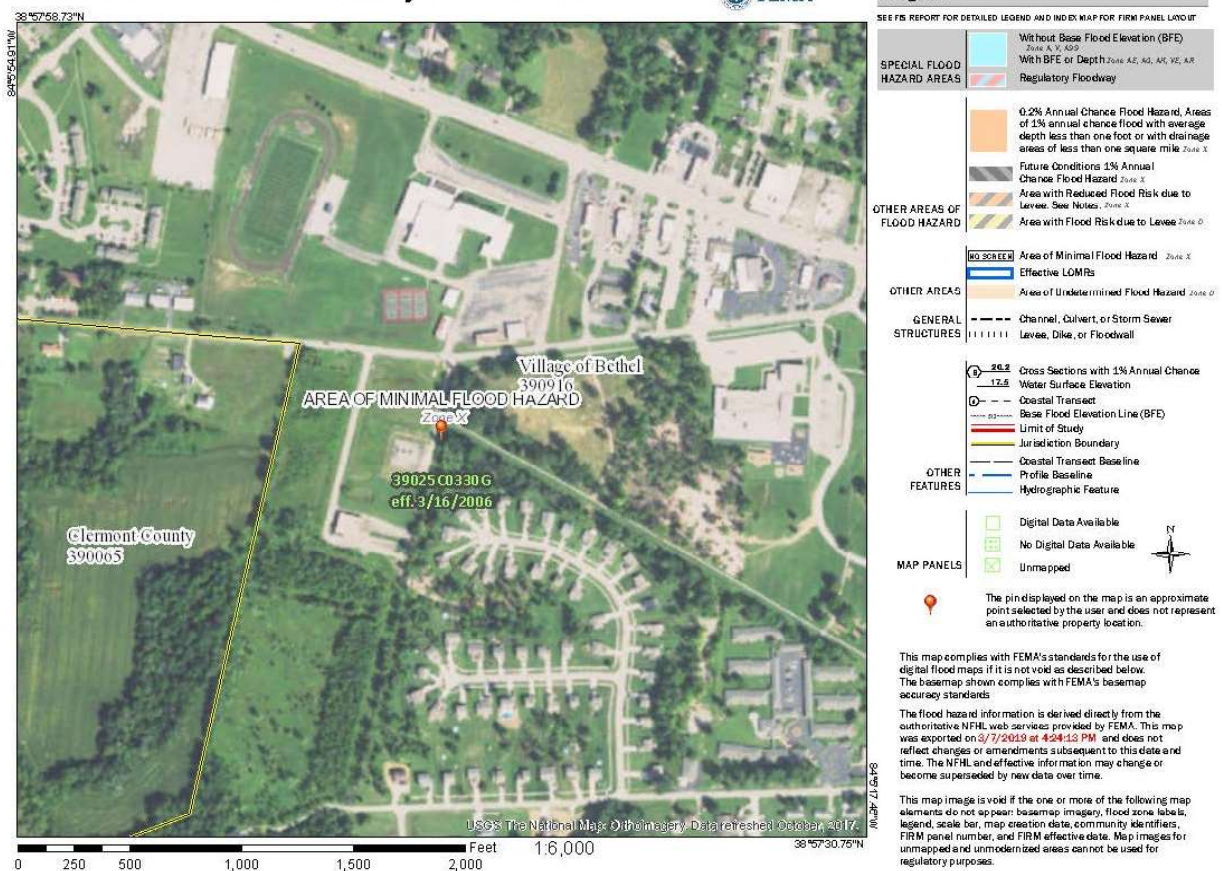
This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

## Clermont County EMA | All-Hazards Mitigation Plan

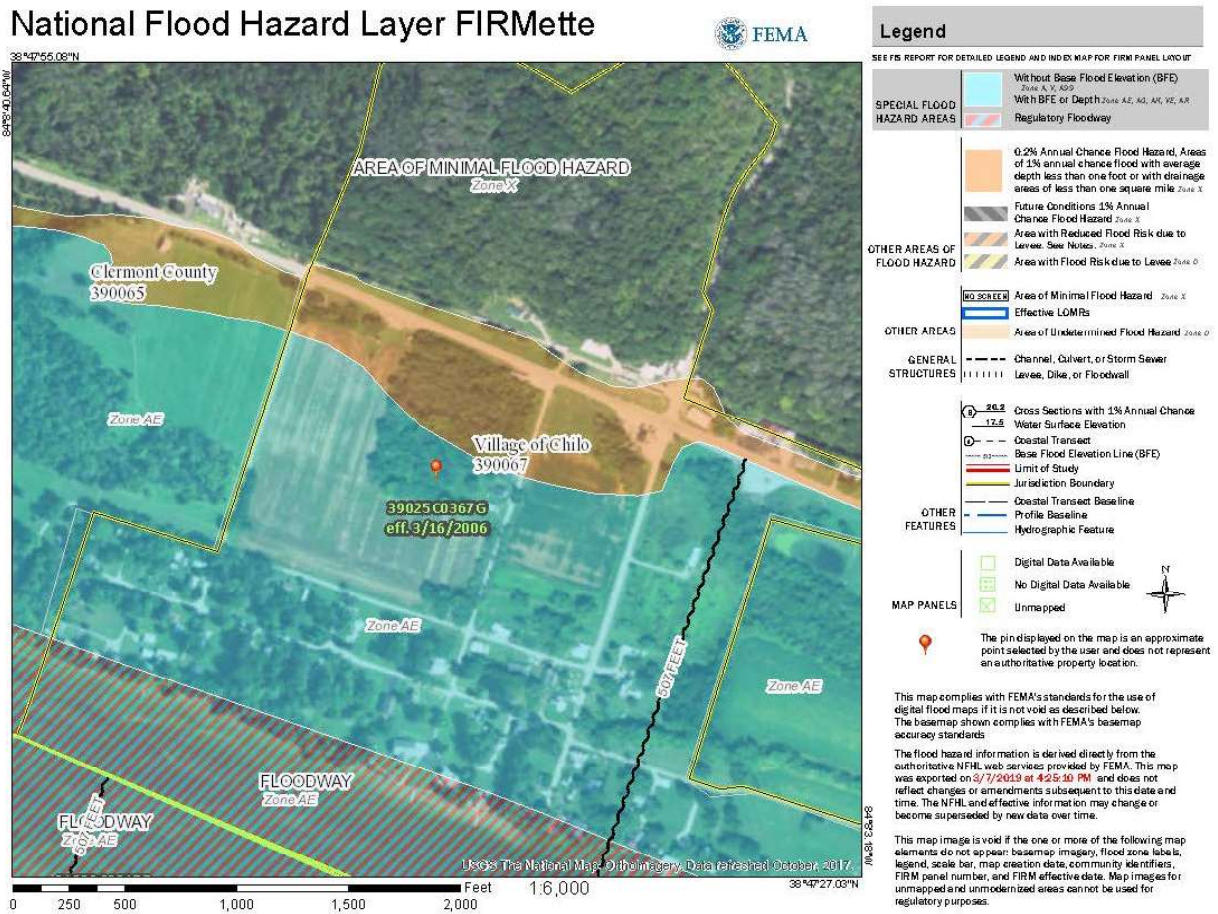




## National Flood Hazard Layer FIRMette



## APPENDIX E: FEMA FLOOD MAPS





## APPENDIX E: FEMA FLOOD MAPS

### National Flood Hazard Layer FIRMette



#### Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS	Without Base Flood Elevation (BFE) Zone A, Y, AO, D
	With BFE or Depth Zone A2, AE, AO, AH, VE, AR
	Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD	0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
	Future Conditions 1% Annual Chance Flood Hazard Zone X
	Area with Reduced Flood Risk due to Levee. See Notes. Zone X
	Area with Flood Risk due to Levee Zone D
OTHER AREAS	Area of Minimal Flood Hazard Zone X
	Effective LOMRs
	Area of Undetermined Flood Hazard Zone D
GENERAL STRUCTURES	Channel, Culvert, or Storm Sewer
	Levee, Dike, or Floodwall
OTHER FEATURES	Cross Sections with 1% Annual Chance Water Surface Elevation 26.2 12.6
	Coastal Transect
	Base Flood Elevation Line (BFE)
	Limit of Study
	Jurisdiction Boundary
OTHER FEATURES	Coastal Transect Base Line
	Profile Base Line
	Hydrographic Feature
MAP PANELS	Digital Data Available
	No Digital Data Available
	Unmapped

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards.

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 3/7/2019 at 4:26:20 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

## APPENDIX E: FEMA FLOOD MAPS

### National Flood Hazard Layer FIRMette



#### Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS	Without Base Flood Elevation (BFE)
	Zone A, Y, AO, D
SPECIAL FLOOD HAZARD AREAS	With BFE or Depth
	Zone A2, AE, AO, AH, VE, AR
SPECIAL FLOOD HAZARD AREAS	Regulatory Floodway
	Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD	0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile
	Zone X
	Future Conditions 1% Annual Chance Flood Hazard
	Zone X
OTHER AREAS OF FLOOD HAZARD	Area with Reduced Flood Risk due to Levee. See Notes.
	Zone X
OTHER AREAS OF FLOOD HAZARD	Area with Flood Risk due to Levee
	Zone D
OTHER AREAS	Area of Minimal Flood Hazard
	Zone X
	Effective LOMRs
OTHER AREAS	Area of Undetermined Flood Hazard
	Zone D
GENERAL STRUCTURES	Channel, Culvert, or Storm Sewer
	Levee, Dike, or Floodwall
OTHER FEATURES	Cross Sections with 1% Annual Chance Water Surface Elevation
	Zone X
	Coastal Transect
	Base Flood Elevation Line (BFE)
OTHER FEATURES	Limit of Study
	Jurisdiction Boundary
	Coastal Transect Base Line
	Profile Base Line
MAP PANELS	Hydrographic Feature
	Digital Data Available
	No Digital Data Available
MAP PANELS	Unmapped
	Unmapped

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards.

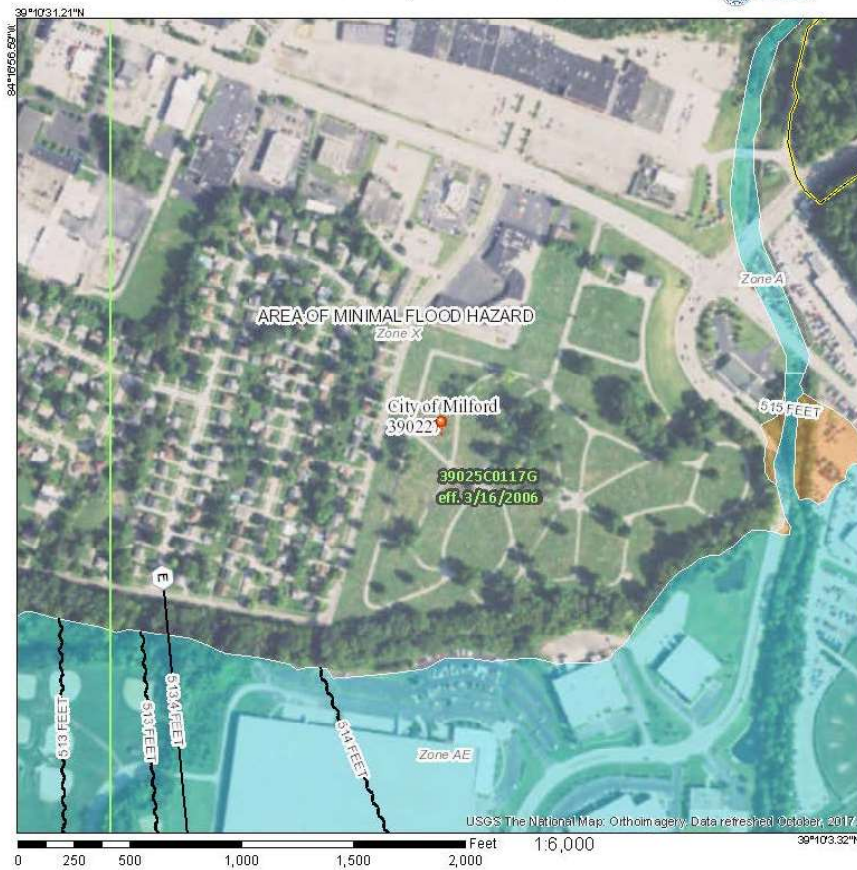
The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 3/7/2019 at 4:17:09 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.



## APPENDIX E: FEMA FLOOD MAPS

### National Flood Hazard Layer FIRMette



#### Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

<b>SPECIAL FLOOD HAZARD AREAS</b>	Without Base Flood Elevation (BFE) Zone A, X, AE, D
	With BFE or Depth: Zone AE, AD, AO, AH, VE, AR
	Regulatory Floodway
<b>OTHER AREAS OF FLOOD HAZARD</b>	0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X Future Conditions 1% Annual Chance Flood Hazard Zone X Area with Reduced Flood Risk due to Levee: See Notes, Zone X Area with Flood Risk due to Levee Zone D
<b>OTHER AREAS</b>	Area of Minimal Flood Hazard Zone X Effective LOMRs Area of Undetermined Flood Hazard Zone D
<b>GENERAL STRUCTURES</b>	Channel, Culvert, or Storm Sewer Levee, Dike, or Floodwall
<b>OTHER FEATURES</b>	Cross Sections with 1% Annual Chance Water Surface Elevation Coastal Transect Base Flood Elevation Line (BFE) Limit of Study Jurisdiction Boundary Coastal Transect Base Line Profile Baseline Hydrographic Feature
<b>MAP PANELS</b>	Digital Data Available No Digital Data Available Unmapped

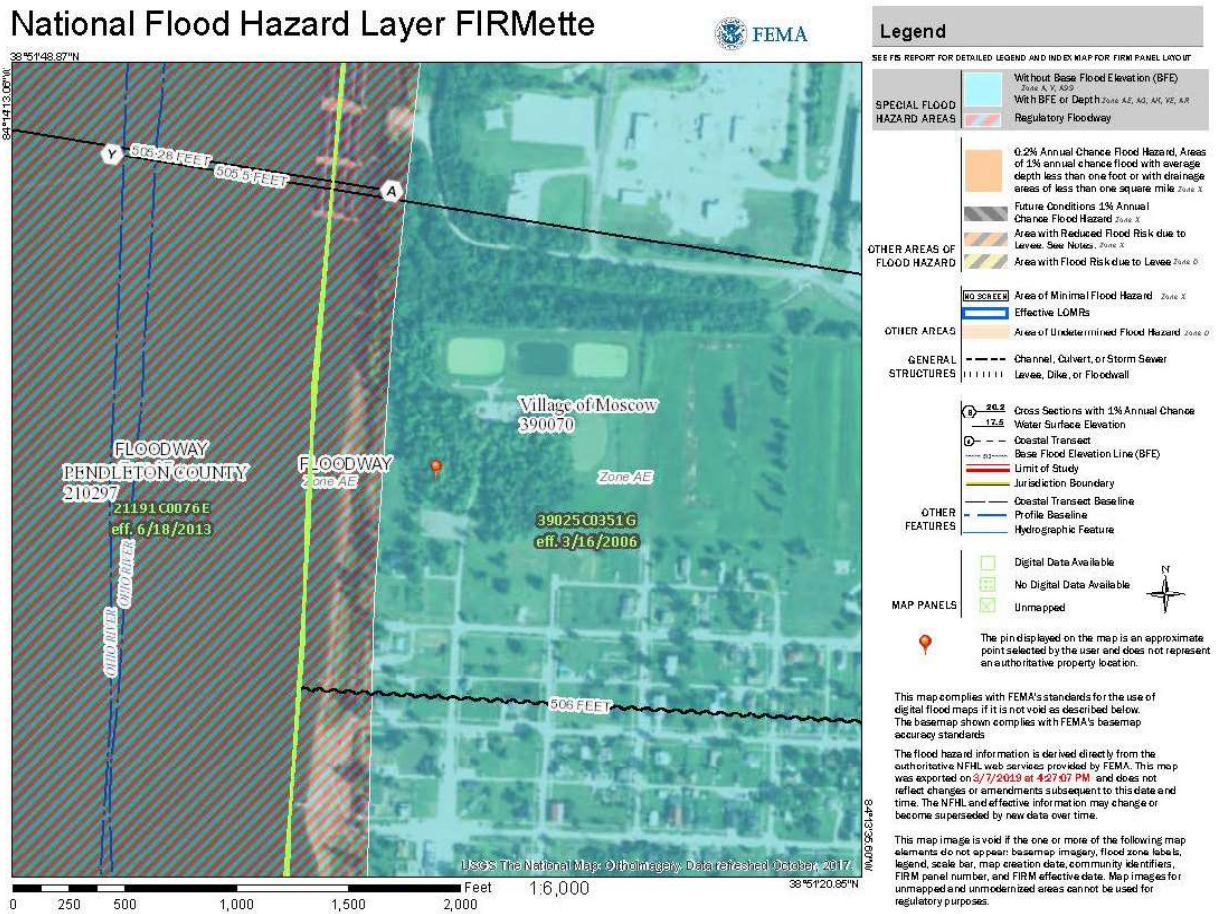
The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards.

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 3/7/2019 at 4:20:34 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

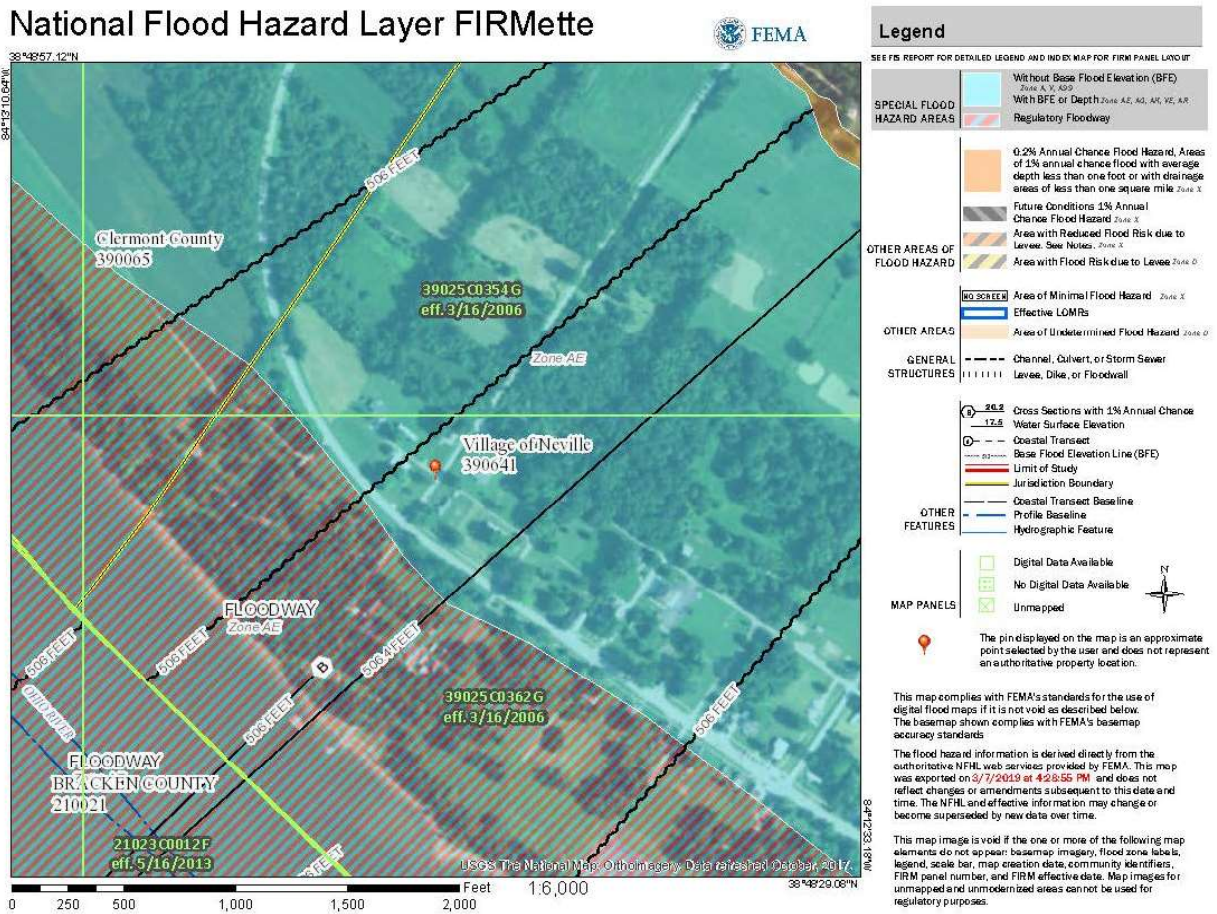
This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

## APPENDIX E: FEMA FLOOD MAPS



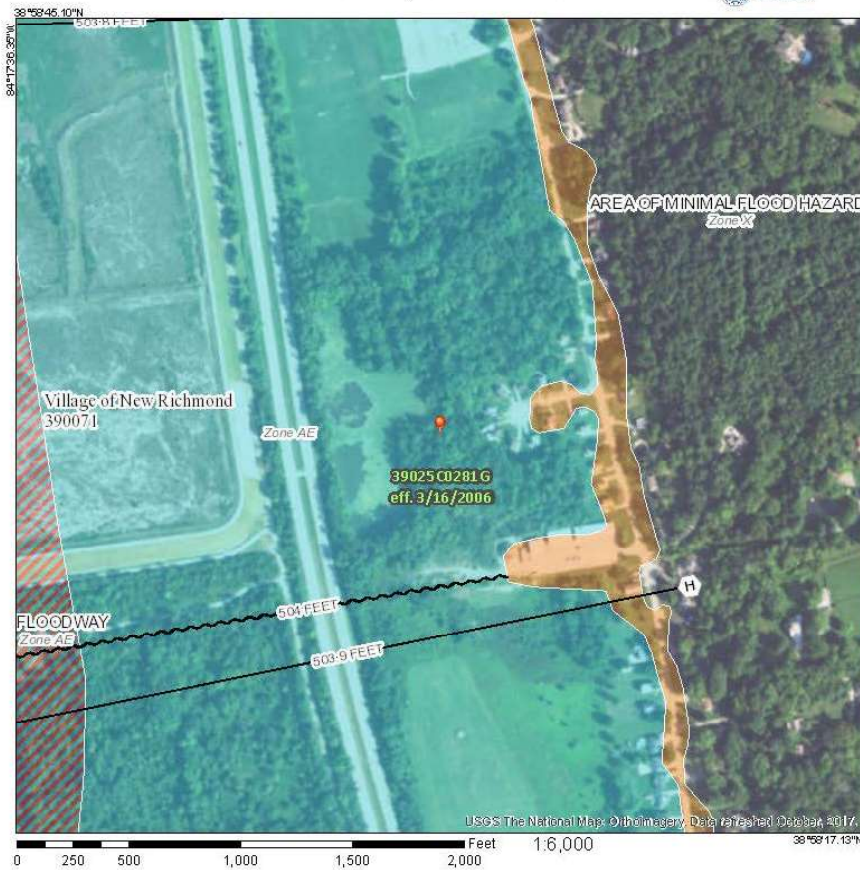


## APPENDIX E: FEMA FLOOD MAPS



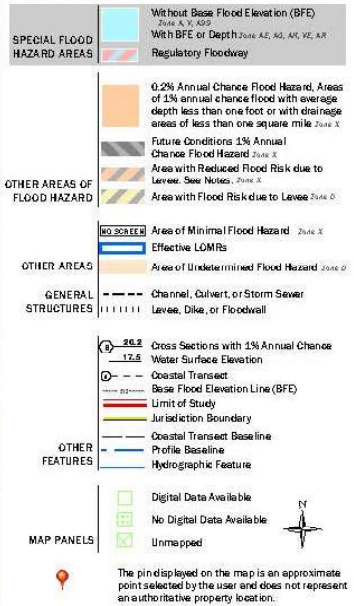
## APPENDIX E: FEMA FLOOD MAPS

### National Flood Hazard Layer FIRMette



#### Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT



This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards.

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 3/7/2019 at 4:22:37 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.



## APPENDIX E: FEMA FLOOD MAPS

### National Flood Hazard Layer FIRMette



**Legend**

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

**SPECIAL FLOOD HAZARD AREAS**

- Without Base Flood Elevation (BFE) Zone A, X, AG, AD
- With BFE or Depth Zone AE, AO, AH, VE, AR
- Regulatory Floodway

**OTHER AREAS OF FLOOD HAZARD**

- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
- Future Conditions 1% Annual Chance Flood Hazard Zone X
- Area with Reduced Flood Risk due to Levee: See Notes, Zone X
- Area with Flood Risk due to Levee Zone D

**OTHER AREAS**

- Area of Minimal Flood Hazard Zone X
- Effective LOMRs
- Area of Undetermined Flood Hazard Zone D

**GENERAL STRUCTURES**

- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

**CROSS SECTIONS**

- 26.2 Cross Sections with 1% Annual Chance Water Surface Elevation
- 12.6 Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary

**OTHER FEATURES**

- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

**MAP PANELS**

- Digital Data Available
- No Digital Data Available
- Unmapped

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards.

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 3/7/2019 at 4:33:28 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

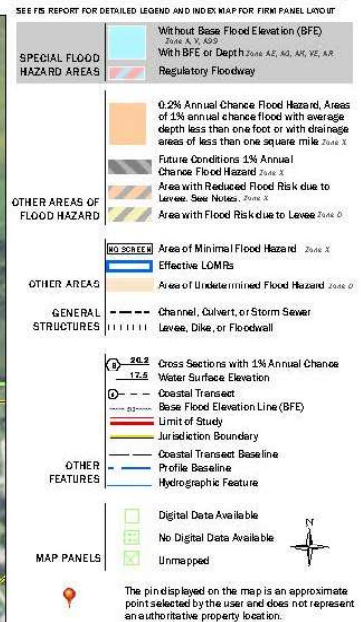
This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

## APPENDIX E: FEMA FLOOD MAPS

### National Flood Hazard Layer FIRMette



#### Legend



This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards.

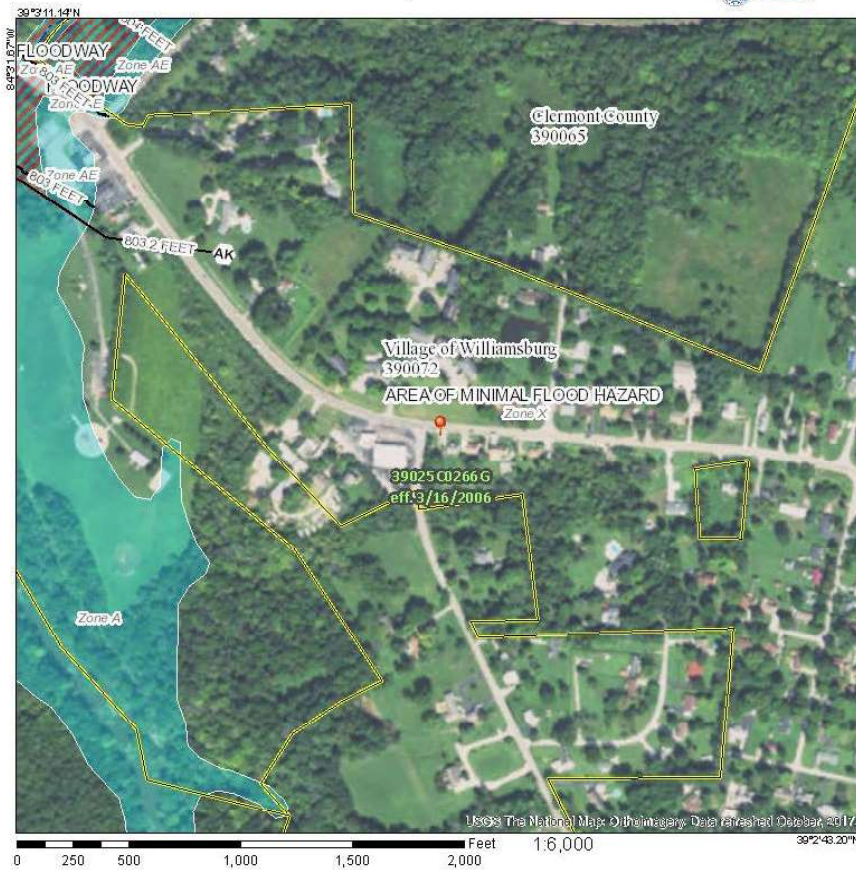
The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 3/7/2019 at 4:34:21 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

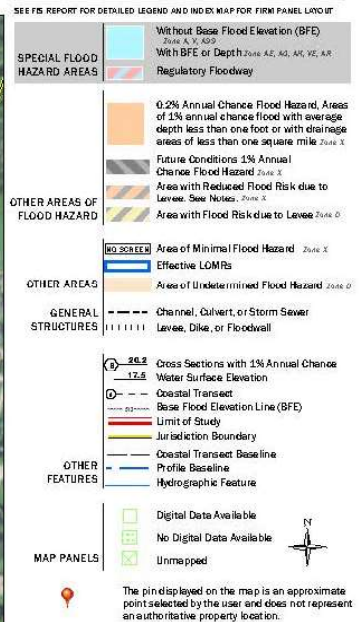


## APPENDIX E: FEMA FLOOD MAPS

### National Flood Hazard Layer FIRMette



#### Legend



This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards.

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 3/7/2019 at 4:26:04 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.