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EXECUTIVE SUMMARY

The Ashtabula County Emergency Management Agency/Office of Homeland Security spearheaded this effort to complete a comprehensive countywide All Natural Hazards Mitigation Plan (Mitigation Plan). Their dedication to this mitigation planning effort is seen in the results of having full participation from the County as well as the incorporated jurisdictions.

Ashtabula County is subject to natural hazards that threaten life and health as well as having caused extensive property damage. To better understand these natural hazards and their impacts on people and property and to identify ways to reduce those impacts, the County's Emergency Management Agency (EMA) undertook this countywide Mitigation Plan.

Most mitigation activities need funding. Under the Disaster Mitigation Act of 2000 (DMA2K, 42 USC 5165), a mitigation plan is a requirement for Federal mitigation funds. Therefore, a mitigation plan will both guide the best use of mitigation funding and meet the prerequisite for obtaining such funds from the Department of Homeland Security's Federal Emergency Management Agency (FEMA). This Mitigation Plan meets the criteria as set forth by FEMA in the DMA2K and provides a community with a "comprehensive guide" for future mitigation efforts as they relate to the hazards that affect their community.

This Mitigation Plan was developed under the guidance of a Core Group of individuals from communities and agencies throughout Ashtabula County. The Core Group met four separate times during the planning process to discuss the hazards that affect the County, the problems associated with these hazards, potential mitigation alternatives to minimize the effect of these hazards and goals that they would like to see achieved within the County.

Ashtabula County has experienced many natural disasters in the past one hundred years. The Core Group evaluated these hazards and chose to address the following hazards based on their impact on human health and property damage: winter storms (snow, ice and extreme cold), summer storms (thunderstorms, high wind, lightning and hail), flash flooding, lake erosion, tornadoes, 100-year flooding, droughts and wildland fires, earthquakes and water spouts. Other hazards the Core Group will be evaluating are dams, chemical plants, water quality of lakes, streams, etc., railroad crossings, port facilities, solar flares and power outages.

With the hazards identified, a vulnerability assessment was completed for Ashtabula County. This assessment reviews how vulnerable the County is to property damage, threats to public health and safety and adverse impact on the local economy. It also evaluates the location and likely damage to critical facilities and other structures from different scenarios of strikes by the five hazards. As part of this assessment, a multi-hazard map was produced to illustrate some of the hazard areas and locations of structures and critical facilities with respect to these hazard areas.

The end result of the Ashtabula County's Mitigation Plan was the creation of an Action Plan for the communities to use to track progress on the implementation of their mitigation alternatives.

LIST OF ACRONYMS

AEP	American Electric Power
AMP-Ohio	American Municipal Power of Ohio
ASA	Agricultural Service Areas
AOC	Area of Concern
ARC	American Red Cross
ARP	Ashtabula River Partnership
AT&T	American Telephone and Telegraph
BBC	British Broadcasting Corporation
BFE	Base Flood Elevation
BMPs	Best Management Practices
BSC	Black Swamp Conservancy
CAP	Conservation Action Program
CAUV	Current Agricultural Use Valuation
CEA	Coastal Erosion Area
CNMP	Comprehensive Nutrient Management Plan
CNN	Cable News Network
CRP	Conservation Reserve Program
CZMA	Coastal Zone Management Act
DCNR	Department of Conservation of Natural Resources
DMA2K	Disaster Mitigation Act of 2000
EMA	Emergency Management Agency
EOC	Emergency Operations Center
EOP	Emergency Operations Plan
EPA	Environmental Protection Agency
EQIP	Environmental Quality Incentive Program
FEMA	Federal Emergency Management Agency
FIRM	Federal Insurance Rate Map
FMA	Flood Mitigation Assistance
FRA	Federal Railroad Administration
gpd	gallons per day
GPRI	Grand River Partners, Incorporated
GPS	Global Positioning System
GIS	Global Information System
GIMS	Geographical Information Management Systems
HMGP	Hazard Mitigation Grant Program
HUD	Housing and Urban Development
LEPC	Local Emergency Planning Committee
mgd	million gallons per day
mi^2	square miles
Mitigation Plan	All Natural Hazards Mitigation Plan
mph	miles per hour
NCDC	National Climatic Data Center
NCEP	National Centers for Environmental Prediction
NEPA	National Environmental Protection Agency
NFIP	National Floodplain Insurance Program
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NRCS	National Resource Conservation Service

NRHP	National Register of Historic Places
NWS	National Weather Service
OCRM	Office of Ocean and Coastal Resource Management
ODNR	Ohio Department of Natural Resources
ODOD	Ohio Department of Development
ODOT	Ohio Department of Transportation
OEMA	Ohio Emergency Management Agency
ORDC	Ohio Rail Development Commission
OSU	Ohio State University
PAH	Polycyclic Aromatic Hydrocarbon
PDM	Pre-Disaster Mitigation
PUCO	Public Utilities Commission of Ohio
PWS	Public Water Supply
RAP	Remedial Action Plan
SEC	Space Environment Center
SOC	Secretary of Commerce
SWCD	Soil and Water Conservation District
TCLP	Toxicity Characteristic Leaching Procedure
USDA	United States Department of Agriculture
USGS	United States Geographical Survey
WCT	Wind Chill Temperature
WMSC	Water Management and Sediment Control
WRRSP	Water Resource Restoration Sponsor Program

1.0 INTRODUCTION

A mitigation plan addresses natural disasters that could affect a local community, whether it is flooding, tornadoes, high winds, winter storms, landslides or some other natural disaster. A mitigation plan is an administrative document that is created to establish activities that should reduce or, when possible, eliminate long-term risk to human-life and property. The plan will also provide a community with a "comprehensive guide" for future mitigation efforts as they relate to the hazards that affect their county. By developing a mitigation plan, a community can identify their areas of risk, assess the magnitude of the risk and develop strategies and priorities to identify projects for reducing risk.

The Ashtabula County Commissioners supported developing their All Natural Hazards Mitigation Plan (Mitigation Plan) with grant funds received from Ohio Emergency Management Agency (OEMA) and the Federal Emergency Management Agency (FEMA). In order for the County to receive these grant funds, they had to agree to come up with either matching dollars or to support this effort with an in-kind match; Ashtabula County chose the latter. Although this planning effort was specifically designed to address the creation of a Pre-Disaster Mitigation (PDM) compliant plan, there has been an on-going effort in publicizing the County's activities in relation to mitigation and how the public can continue to get involved and support the County's mitigation efforts.

The State of Ohio completed an analysis in 1998 that determined the hazards that affect the state as a whole. Ashtabula County used this analysis for guidance when choosing their hazards. They include but are not limited to:

- Flooding
- Tornadoes
- Severe Storms
- Erosion (Stream Bank and Landslides)
- Earthquakes
- Droughts

As part of the Disaster Mitigation Act (DMA2K,42 USC 5165), communities that desire to remain eligible for Federal and State mitigation funds must have an approved mitigation plan in place.

According to the DMA2K, incorporated jurisdictions within a county must participate as well as representatives from the unincorporated areas. Townships are not required to participate because the County Commissioners can represent them on mitigation projects. However, if a township would like to take an active part by submitting a hazard mitigation project, then their participation in the planning effort is crucial. Local participation is "key" to the successful implementation of these mitigation plans.

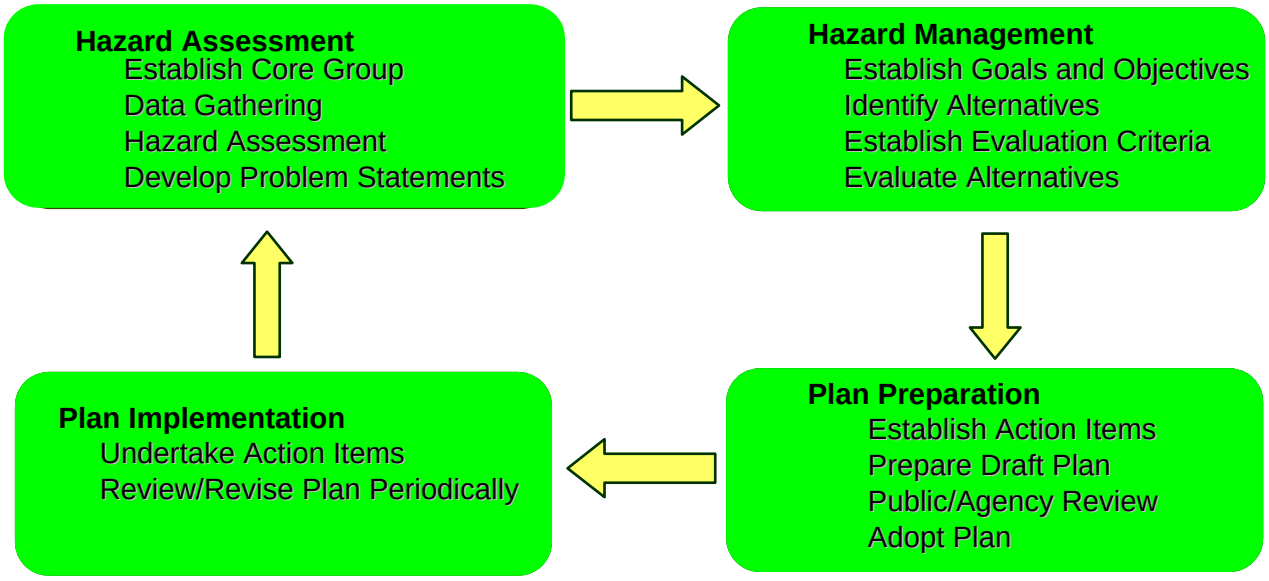
If a community chooses not to participate in the mitigation planning effort, the community becomes ineligible for any future federal or state mitigation money. This mitigation money usually comes in the form of a grant such as the Hazard Mitigation Grant Program (HMGP), Flood Mitigation Assistance (FMA) or the PDM Grant Program, which is to be used to implement mitigation strategies and activities. Examples of eligible activities that could be supported by mitigation dollars include: relocation, acquisitions, elevation, dry-floodproofing, wet-floodproofing, lightning prediction systems, interoperable siren systems, stream restorations or any other activity potentially funded with mitigation dollars.

The mitigation planning process that Ashtabula County followed was adapted from the State of Ohio's Guidance Book, 2001, and the DMA2K Federal Guidelines. The planning process also

involved evaluating several approved FEMA mitigation planning efforts from around the country that the Core Group approved for their content and set-up, which met the needs of Ashtabula County as well as satisfied the requirement of the reviewers, OEMA and FEMA.

The following flow diagram shows the typical Natural Hazards Mitigation Planning Process that was followed:

NATURAL HAZARDS MITIGATION PLANNING PROCESS



In addition to the aforementioned process, the Core Group and the designated leaders of the group made sure that every community that participated in this planning effort was aware of their responsibilities as well as how they could represent their community the best. Some suggestions that were incorporated into the initial invitation to participate in the natural hazard mitigation planning effort included:

- Participate in the Core Group planning meetings representing your community's interests
- Supply any historic information (background) on natural disasters for your community to the Core Group
- Review and comment on the Draft Mitigation Plan
- Review and select mitigation activities developed by the Core Group for your community to implement
- Be an advocate for Final Adoption of the Mitigation Plan by your community

1.1 Planning Approach

In an effort to continue to meet the mission of protecting lives, property, economic viability and quality of life for the people of Ashtabula County, the County Commissioners desired to create the Ashtabula County Mitigation Plan for their community and its residents. Ashtabula County authorized the engineering firm EMH&T, Inc. to help them fulfill this task.

The approach undertaken in the creation of the Mitigation Plan for the county can be described as both comprehensive and collaborative. The comprehensive approach includes following the

interim final rule guidelines enacted under the DMA2K and FEMA suggested guidelines for the creation of a mitigation plan. Any additional items that Ashtabula County and the Core Group chose to address as part of the comprehensive analysis of their community were addressed as well.

The collaborative portion of creating the plan included working with the different agencies within Ashtabula County and coordinating with all participating jurisdictions. The County could not have a comprehensive plan without the coordination of several other agencies. Information was collected from numerous agencies such as the Ashtabula County Emergency Management Agency (EMA).

1.2 Participating Communities

Ashtabula County has 10 incorporated areas within its borders. All 10 incorporated communities chose to participate in this planning effort as well as three townships. See Appendix A for a copy of the list of attendees from each community as well as the initial concept of how the groups would interact.

The process to create the Mitigation Plan started with the creation of a "Mitigation Core Group" (Core Group) of decision makers and implementers. In order to lead the planning efforts effectively and on a countywide basis, other representatives were added. The Core Group included individuals from the following departments and agencies:

- Ashtabula County EMA
- Ohio State University (OSU) Extension
- Ashtabula Soil and Water Conservation District (SWCD)
- Ashtabula County Commissioner's Office
- Ashtabula Township Fire Department
- City of Ashtabula
- City of Conneaut
- City of Geneva
- Village of Andover
- Village of Geneva-on-the-Lake
- Village of Jefferson Police Department
- Village of North Kingsville Police Department
- Village of Orwell
- Village of Roaming Shores
- Village of Rock Creek
- Township of Austinburg
- Township of Richmond
- Township of Saybrook

2.0 COMMUNITY INFORMATION

As required by DMA2K, a community profile must be developed for the county and any jurisdictions participating in this effort. Because of the multiple jurisdictions involved in this plan, this section presents a demographical as well as historical description, if available, of each jurisdiction that will be adopting this plan. This brief profile of each jurisdiction gives some insight as to what types of communities exist in the County and provides a better understanding of the effect natural hazards, to be discussed in later sections, may have on this population. In numerous cases, the communities themselves provided the information that follows.

2.1 County Profile

Ashtabula County is located in the northeastern portion of Ohio and is named after the Ashtabula River meaning "river of many fish." The County Seat is the Village of Jefferson. Ashtabula County is 689 feet above sea level. Its climate is varied with an average temperature of 57.4 degrees Fahrenheit. Ashtabula County receives lake effect snow and is considered part of the Southeastern Lake Erie Snowbelt.

Ashtabula County is the largest county by area in the State of Ohio. The County has a total area of 1,368 square miles (mi²). Of this amount, 709 mi² of it is land and 666 mi² of it is water. The total area is 49% water.

As of the 2000 Census, there are 102,728 people, 39,397 households and 27,774 families residing in the County. The population density is 146 people/mi². There are 43,792 housing units at an average density of 62 units/mi².

There are five counties surrounding Ashtabula County, with Lake Erie comprising the northern boundary. Two of these counties, Erie and Crawford counties, are located in Pennsylvania and form the northeastern and eastern boundaries of Ashtabula, respectively. The three remaining counties are located in Ohio. Trumbull County borders the south, Geauga County borders the west and Lake County borders the northwest of Ashtabula County.

Three cities are located in Ashtabula County. These cities, Ashtabula, Conneaut and Geneva, are the areas of highest population density in the County. The remaining incorporated jurisdictions are designated as villages and are Andover, Geneva-on-the-Lake, Jefferson, North Kingsville, Orwell, Roaming Shores and Rock Creek.

There are 27 townships in Ashtabula County: Andover, Ashtabula, Austinburg, Cherry Valley, Colebrook, Denmark, Dorset, Geneva, Harpersfield, Hartsgrove, Jefferson, Kingsville, Lenox, Monroe, Morgan, New Lyme, Orwell, Pierpont, Plymouth, Richmond, Rome, Saybrook, Sheffield, Trumbull, Wayne, Williamsfield and Windsor.

Economy in Ashtabula County is generated from the manufacturing industry, specifically fiberglass, plastics and related chemical industries. The County has over 350 manufacturing and industrial firms, and 2,800 businesses employing 43,000 people. There are 17 Fortune 500 Companies located in the County.

A significant portion of the economy in Ashtabula County is due to the agricultural industry. Dairy production, cattle and grain commodities are the major source of agricultural economic strength. Vineyards, nurseries, tree farms, orchards and other specialty agricultural production add to that strength. The unique microclimate produced by Lake Erie allows the orchard and vineyard crops to retain a longer growing season. From this specialty agricultural production, the local economy has benefitted through increased tourism due to festivals and special events held at wineries and farm markets.

The tourism industry is growing in Ashtabula County. The cities of Conneaut and Geneva and the village of and Geneva-on-the-Lake are popular tourist destinations during the summer months. Tourists also visit the 16 covered bridges within the county limits, along with some of the 37 buildings listed on the National Register of Historic Places (NRHP) as seen in Table 2-1.

Table 2-1
National Register of Historic Places in Ashtabula County

Location	Name
Ashtabula Township	Francis E. Harmon House
Ashtabula Township	Michael Cahill House
Ashtabula Township	Col. William Hubbard House
Ashtabula Township	Mother of Sorrows Church
Austinburg Township	Congregational Church of Austinburg
Austinburg Township	Eliphalet Austin House
Austinburg Township	L. W. Peck House
Harpersfield Township	Harpersfield Covered Bridge
Harpersfield Township	Shandy Hall
Jefferson Township	Lake Shore and Michigan Southern Railroad Station
Jefferson Township	Griggs Grange No. 1467
Jefferson Township	Ashtabula County Courthouse
Lenox Township	Col. Erastus House
New Lyme Township	New Lyme Institute
New Lyme Township	New Lyme Town Hall
Plymouth Township	Blakeslee Log Cabin
Wayne Township	Fort Boice and Village Site
Windsor Township	Windsor Corners District
Windsor Township	Windsor Mills Christ Episcopal Church
Windsor Township	Windsor Mills Fort and Village Site
Windsor Township	Wiswell Road Covered Bridge
Andover	John Henderson House
Ashtabula City	Ashtabula Harbor Light
Ashtabula City	Ashtabula Harbor Commercial District
Ashtabula City	Hotel Ashtabula
Ashtabula City	Park Avenue High School
Ashtabula City	West Fifth Street Bridge
Conneaut	Conneaut Harbor West Breakwater Light
Conneaut	Conneaut Light Station Keeper’s Dwelling

Conneaut	Conneaut Works
Conneaut	David Cummins Octagon House
Conneaut	Harwood Block
Conneaut	Kilpi Hall
Conneaut	Lake Shore and Michigan Southern Passenger Station
Geneva-on-the-Lake	Eagle Cliff Hotel
Jefferson Village	Jefferson Town Hall
Jefferson Village	Joshua Reed Giddings Law Office

2.2 County History

Ashtabula County was formed June 7, 1807, from Trumbull and Geauga counties, and organized January 22, 1811. Ashtabula County is part of the area known as the Connecticut Western Reserve, a land grant given to Connecticut extending from its eastern boundary westward with no limit.

In 1796, the first white settlers to arrive in the County were a party of surveyors that arrived and built a log house along the mouth of Conneaut Creek. It was first occupied by themselves, then by Judge Kingsbury and his family during the winter of 1796 to 1797 and finally by Robert and Thomas Montgomery in 1799.

In 1800, the first sawmill in the County was constructed in Windsor Township by Solomon Griswold and the first gristmill was constructed on the Grand River, in Austinburg, by Ambrose Humphrey, in 1801.

By 1837, signs of progress could be seen. The harbor had been improved and steamboats were introduced with many being built in the County. The Lake Shore and Michigan Southern Railroad was built in 1852. Along with transportation advantages, it introduced the first group of foreign settlers, the Irish. They were soon followed by the Italians, Finns and Swedes.

In 1873, the Pittsburgh, Youngstown and Ashtabula Railroad laid tracks to the Harbor. Ashtabula Harbor was on its way to becoming one of the largest ore and coal ports in the world. In 1892, Ashtabula was incorporated into a city. It boasted a modern hospital, an electric rapid transit system and a telephone company. At the turn of the century, its population had reached 12,949.

http://www.solomonspalding.com/SRP/saga2/1878Ast3.htm

2.3 Jurisdictions

Village of Andover

Andover is located in Andover Township. It is situated in the southeastern portion of the County along State Route 7 and US Route 6. The Village has a total land area of 1.4 mi^2. As of the Census of 2000, there are 1,269 people, 427 households and 271 families residing in Andover. The population density is 929 people/mi^2. There are 463 housing units at an average density of 339 units/mi^2.

On June 4, 1883, 500 residents signed a petition to incorporate the mile square area of Andover Village. J.S. Morley and Clarence Darrow submitted the petition to the County Commissioners and the permission was granted on August 7, 1883.

One of the first businesses in the Village was the Andover Bank, started by Byron Morley in 1884. In 1885, F.W. and C.H. Sargent opened a dry goods store. In 1900, F.W. bought his brother's share of the bank and continued to be in business for 53 years.

In 1890, a disastrous fire occurred and destroyed the northwest corner of the Square. The only item left intact was the bank vault. The fire originated in a shoe store on Sunday night. Church bells rang to summon help along with a telegram sent to the Jefferson Fire Department. They loaded a hand pumper on a flat car and arrived in Andover in 14 minutes. The Jefferson Fire Department's efforts saved the rest of the town. After the fire, wells were drilled, three large cisterns were made and a steam engine was bought to help fight fires.

In 1891, three large brick buildings were erected on the Square. The Andover Bank moved in the one on the northwest corner. In 1894, a two story frame school building was erected that faced Chestnut Street. Main Street divided the Square into four parks with a road circling the Square. The roads had a gravel base and on each side there was a stone sidewalk. Areas around the Square had a hitching rail of iron pipe to tie the horses. Water was available at the pump.

Nearing the turn of the century, natural gas from Northeastern Oil and Gas Company in Pennsylvania became the Village's provider. In 1898, telephone service was provided by the Jefferson-Warren Telephone Company. Kerosene lamps were used as light and heat was provided from coal and wood.

Ashtabula County History; Then and Now; A History of the People of the County, By the People of the County, 1985, Ashtabula County Genealogical Society, Taylor Publishing Company, Dallas, Texas.

City of Ashtabula

Ashtabula is located in Ashtabula and Saybrook townships. It is situated in the north-central portion of the County along State Routes 11 and 531. The City has a total land area of 7.6 mi^2. According to the 2000 Census, there are 20,962 people, 8,435 households and 5,423 families residing in Ashtabula. The population density is 2,776 people/mi^2. There are 9,151 housing units at an average density of 1,212 units/mi^2.

In 1801, the first settler, Thomas Hamilton, arrived in the area later to become known as Ashtabula. He erected a log house on the west side of the mouth of Ashtabula River. In 1803, the first family, the George Beckwith Family, arrived in the area from Austinburg. The earliest known mill to have been built in the Village was owned and operated by Henry Gillman in 1806. It was located near the bottom of the Spring Street banks. In 1809, the first grist mill was constructed by Manoa Hubbard. In 1816, Hall Smith donated land for the north square and the first public meeting place was built.

On February 28, 1831, Ashtabula was incorporated into a village. R.W. Griswold was elected as mayor. The Village consisted of Main, Prospect, Lake and Division (West 44th) streets with various roads leading in and out of town.

Between 1840 and 1841, a house was erected by William and Catharine Hubbard. This house became a termination point along the Underground Railroad. Ex-slaves would reside in the basement of the house adjacent to the lake and then leave on the next safe boat to Canada, gaining their freedom once they arrived in Ontario. The Hubbard House is listed on the NRHP.

William Hubbard House

Photo courtesy of: Christine J. Peters, former Hubbard House Director

http://www.ashtcohs.com/ashtabula.html

http://www.solomonspalding.com/SRP/saga2/1878Ast3.htm

City of Conneaut

Conneaut is located in Lakeview Township. It is situated in the northeastern portion of the County along State Route 531, US Route 20 and Interstate 90. The City has a total land area of 26.4 mi². As of the Census of 2000, there are 12,485 people, 5,038 households and 3,410 families residing in Conneaut. The population density is 473 people/mi². There are 5,710 housing units at an average density of 217 units/mi².

Conneaut Lighthouse

Photo courtesy of: Conneaut Port Authority

On July 4, 1796, Moses Cleaveland and his party of surveyors first landed in what later would become Conneaut as they began their development work in the newly established Western Reserve of Connecticut. He and his men erected a log cabin near the point at which they landed and called it Port Independence, which is now Conneaut.

Conneaut was incorporated in 1834. An exact date cannot be found because village records have been lost. The first mayor of Conneaut was Dr. Samuel L. Fenton, who was elected in the spring of 1834. In 1837, a survey was performed by William W. Wallace. At that time, the village limits extended as far north as to the lake, was bounded on the south and east by Conneaut Creek and on the west by a line running along the center of the road and extended north to the lake and south to the creek. The village limits were extended again in 1842. The first tavern in

Conneaut was a log building situated on the corner of the Main and Harbor streets. In 1815, the first village physician was Dr. John Venen.

http://www.conneaut.net/

City of Geneva

Geneva is located in Geneva and Harpersfield townships. It is situated in the northwestern portion of the County along State Route 534 and US Route 20. The City has a total land area of 4.0 mi². According to the 2000 Census, there are 6,595 people, 2,515 households and 1,607 families residing in Geneva. The population density is 1,650 people/mi². There are 2,660 housing units at an average density of 666 units/mi².

Photo courtesy of: http://www.genevaohio.com/city_history.htm

In 1816, a group of settlers gave the name of Geneva to their community, after a settlement of the same named located in New York. In 1820, the completion of the Erie Canal attracted settlers to Geneva. In 1821, the first school house was erected and in 1829, the first post office was erected. A hotel was opened by S.S. Tuller on West Main Street in 1834. In 1849, Norman S. Caswell manufactured scythes, fork handles and various other tools which he sold from the back of his wagon. This business grew to later become the Geneva Tool Works. In 1866, Geneva was incorporated as a village with a population of 1,000. Dennis Thorp was the first mayor.

In the 1900s, Geneva became known for its automobile industry. The first car to be manufactured here was the "Geneva Steamer" in 1901. It was a steam driven horseless carriage, one of which is still on display at the Henry Ford Museum in Dearborn, Michigan. This company also made a racing model, named the "Turtle." Three years later, the company was sold to the Colonial Brass Company. The second attempt at automobile manufacturing in Geneva began in 1908. E.L. Ewing began production of the Ewing Taxi with a plant crew of fifty men. This company was in business just two years and was sold to General Motors who moved the business to Flint, Michigan.

By 1920, 3,081 people were living in Geneva Village. By 1953, with a population of over 5,000, Geneva officially became a city. A new charter system of government was established and a city manager was elected to office. In the 1980s, the economy was affected negatively by the steel industry. However, several important national companies supply the local economy, assuring a high-quality standard of life. Today, tourism plays a role in Geneva and draws visitors with its wine industry and covered bridges.

http://www.genevaohio.com/city_history.htm

Village of Geneva-on-the-Lake

Geneva-on-the-Lake is located in Geneva Township. It is situated in the northwestern portion of the County along State Routes 531 and 534. The Village has a total land area of 2.0 mi². As of the Census of 2000, there are 1,545 people, 665 households and 395 families residing in the Village. The population density is 761 people/mi². There are 1,167 housing units at an average density of 575 units/mi².

Photo courtesy of: http://www.genevaonthelake.net/

The Village of Geneva-on-the Lake is known as the first Ohio summer resort. On July 4th, 1869, Cullen Spencer and Edwin Pratt cleared a bluff overlooking Lake Erie and opened a public picnic grounds which they named Sturgeon Point. A few years later, Spencer and Pratt added a horse-powered carousel to the picnic grounds. By 1905, over 50 cottages and 20 boarding houses were filled each summer as affluent visitors arrived from Cleveland, Youngstown and Pittsburgh. John D. Rockefeller, Harvey Firestone and Henry Ford were among those who visited frequently.

The economy generated by tourism continued until the 1970s when families decided to travel further to their vacation destinations. However, Geneva-on-the-Lake underwent restoration efforts in the middle of the 1980s. Old cottages were torn down or renovated, condos were built and hotels and motels expanded. The Geneva State Park expanded and created new camping, hiking and bathing facilities west of the "Strip". These changes were successful in encouraging families to once again return to the area.

http://www.visitgenevaonthelake.com/history.htm

Village of Jefferson

Jefferson is located in Jefferson Township and is the County Seat of Ashtabula County. It is situated in the north central portion of the County along State Routes 46, 167 and 307. The Village has a total land area of 2.3 mi^2. According to the Census of 2000, there are 3,572 people, 1,357 households and 933 families residing in Jefferson. The population density is 1,567 people/mi^2. There are 1,425 housing units at an average density of 625 units/mi^2.

Jefferson Court House

Photo courtesy of: www.relocateamerica.com/

Jefferson was officially founded by Gideon Granger and Oliver Phelps in 1795. Gideon Granger was Postmaster General and named the area Jefferson in honor of President Thomas Jefferson. Although Granger never lived here, he devised the detailed plans for its development with its many village greens, streets with wide tree lawns and donated land for the first jail and courthouse. Thus, when Ashtabula County was formed in 1807, Jefferson became its County Seat.

The Village of Jefferson incorporation occurred on July 5, 1836. In 1811, the original Court House was built and Baptist and Methodist churches were organized. The Congregational Church was founded in 1831. The first library was organized in 1817, the Gazette newspaper began in 1828 and the Town Hall was built in 1879. In 1823, Joshua Reed Giddings, a lawyer and statesman, had built his law office on North Chestnut Street. There he practiced law with Senator Benjamin Wade and wrote the first draft of the first Republican Party platform. Before the Civil War, they were among the nation's leaders in the anti-slavery movement.

Jefferson is home to the following buildings on the NRHP: Lawyers Row, Old Court House, Joshua Giddings Law Office, County Commissioners Offices, Jefferson Village Hall, Railroad Depot and various Century Homes in the Village. Jefferson is now home of the County Fairgrounds, a former civil war training camp. The Victorian Perambulator Museum is the only one of its kind in the world.

http://www.jeffersonchamber.com/

Village of North Kingsville

North Kingsville is located in Kingsville Township. It is situated in the northeastern portion of the County along State Route 531 and US Route 20. The Village has a total area of 8.9 mi². As of the 2000 Census, there are 2,658 people, 1,029 households and 807 families residing in Kingsville. The population density is 299 people/mi². There are 1,127 housing units at an average density of 127 units/mi².

The first settler of the township, who also was a proprietor in Kingsville, was Captain Walter Fobes, who arrived in the fall of 1805 from Norwich, Massachusetts. Here he purchased about 500 acres of land, and an equal amount in Madison Township, Lake County. The County infirmary farm and the north village were included in his Kingsville purchase. He donated lands to the public to be used for burial purposes and was the first to be buried there. In August 1806, Captain Rodger Nettleton moved from Austinburg Township to Kingsville and purchased 300 acres adjoining Mr. Fobes on the west. He remained here until his death in 1854.

The Village of Kingsville was established in 1810. The town was originally known as Norwich, named after the town in Connecticut from where Captain Walter Fobes came. The name was changed to Kingsville when a man in Conneaut with the last name of King offered four gallons of whiskey if they changed the name.

By 1920, there was a blacksmith shop, a drug store, two grocery stores, a general store, a feed and grist mill and hardware store. The Kingsville Post Office was established in 1820. In the fall of 1821, the first frame school house was built at North Kingsville Corners and continued for 53 years.

In 1890, the Kingsville Telephone Company began and continued to serve the Kingsville area until purchased by the Western Reserve Telephone Company in 1981. In 1905, the Kingsville Water System which was initiated by Chap. Hawkins provided water until 1959 when it was acquired by the Conneaut Water System. Natural gas was brought to the area at the turn of the century by Lake Shore Gas Company, which was sold in 1957 to East Ohio Gas Company who serves the area today. In 1924, electricity was introduced to the Kingsville area and continues today through the services of the Cleveland Electric Illuminating Company.

http://www2.ashtabula.com/detail.asp?id=2206

Ashtabula County History; Then and Now; A History of the People of the County, By the People of the County, 1985, Ashtabula County Genealogical Society, Taylor Publishing Company, Dallas, Texas.

Village of Orwell

Orwell is located in Orwell Township. It is situated in the southwestern portion of the County along State Route 45 and US Route 322. The Village has a total land area of 1.7 mi². According to the Census of 2000, there are 1,519 people, 618 households and 378 families residing in Orwell. The population density is 913 people/mi². There are 660 housing units at an average density of 397 units/mi².

Photo courtesy of:
http://www.orwellvillage.org/

The Village of Orwell was incorporated in 1817. In 1836, efforts were made to build a railroad through the area to help stimulate the economy of the Village. Between the years 1872 and 1873, a line was completed from Ashtabula to Niles. The railroad passed Orwell about a mile east of the Village center and many businesses developed in that area. On October 16, 1904, a group of people met and formed the Citizens Telephone Association to provide telephone service to Orwell. The Association was incorporated into the Orwell Telephone Company on January 24, 1910. In 1960, the system was converted to dial. The company today provides service to Orwell, Colebrook, Windsor and North Bloomfield townships in the area, and service is also provided to Leipsic, Ohio.

In 1920, electricity was brought to the Orwell area when Robert Gross started a plant to generate power in East Orwell in 1920. The plant was aquired by a stock company which was later brought by the Cleveland Electric Illuminating Company. Sometime later the plant burned to the ground.

The Village of Orwell is the birthplace of General Adna Chaffee, a General in the US Army. Chaffee participated in the Indian Wars, played a key role in the Spanish-American War, and was instrumental at crushing the Boxer Rebellion in China. He was the Army Chief of Staff from 1904 to 1906, overseeing far-reaching transformation of organization and doctrine in the US Army.

http://www.orwellvillage.org/

Ashtabula County History; Then and Now; A History of the People of the County, By the People of the County, 1985, Ashtabula County Genealogical Society, Taylor Publishing Company, Dallas, Texas.

Village of Roaming Shores

Roaming Shores is located in Rome and Morgan townships. It is situated in the southwestern portion of the County along State Route 45. The Village has a total land area of 2.1 mi². As of the 2000 Census, there are 1,239 people, 486 households and 386 families residing in Roaming Shores. The population density is 596 people/mi². There are 641 housing units at an average density of 308 units/mi².

Photo courtesy of:
www.roamingshores.org

In 1967, a gigantic new project was being undertaken in northeastern Ohio by Development Services, Incorporated. Initial steps were taken to dam up Rock, Plum and Sugar creeks. By 1968, the lake area was cleared of stumps and the dams

constructed and closed. Three weeks after they sealed the dam, creek and rainwater formed the lake.

The community was first governed by the property owners' organization called the Rome-Rock Association, established by the developers. This association still exists today and members are entitled to use 21 miles of access roads, facilities of the large clubhouse, two beaches, four swimming pools and a number of reserve lots. They also have access to a privately owned marina and boat ramp.

In 1979, Roaming Shores was incorporated and became Roaming Shores Village. A zoning ordinance was established in September 1982. If a resident purchases land and/or builds a home within the jurisdiction, they automatically become a member of the Rome-Rock Association and a resident of the Village of Roaming Shores.

The Village's responsibilities include Police, Water and Sewers, Zoning, Building Codes, Lake Patrol, maintenance of the Lake Roaming Rock Dam and other duties involved in administering a municipality. The Rock-Creek Association provides a security system, which includes three policemen and the Volunteer Fire Departments of both Morgan and Rome townships.

Lakeside Utilities was acquired and purchased for $1.8 million by the Village to provide water to the residents of the Village. Prior to purchase, a study was completed to determine the amount of water that could be safely drawn from Rome-Rock Lake for domestic use without endangering recreational facilities for the lake community.

Ashtabula County History; Then and Now; A History of the People of the County, By the People of the County, 1985, Ashtabula County Genealogical Society, Taylor Publishing Company, Dallas, Texas.

Village of Rock Creek

Rock Creek is located in Morgan Township. It is situated in the southwestern portion of the County along State Route 45. The Village has a total land area of 0.9 mi². According to the 2000 Census, there are 584 people, 195 households and 146 families residing in Rock Creek. The population density is 646 people/mi². There are 201 housing units at an average density of 222 units/mi².

The Riverdale Road Covered Bridge is located on the Grand River. Photo courtesy of: http://bridgepcs.iespana.es

The Village of Rock Creek was named for the winding and rocky creek around which it developed by settlers from Connecticut. Timothy Hawley, from Hartford County, Connecticut, was commissioned by the Torringford Land Company to survey the township into lots. The company, in return, gave Mr. Hawley a deed to lots 5, 87 and 123, along with the mill site on Rock Creek. It was stipulated that he settle the township and build a sawmill on the mill site.

In the fall of 1801, Nathan Gillet and his family were the next to arrive, emigrating from Farmington, Connecticut. They built a log cabin on Lot 77 measuring 18 feet square and eight logs high. The log cabin was made of round logs and split timbers and reinforced with mud and clay.

Historically, Morgan Township and Rock Creek played a large part in the Underground Railroad. The Church of Christ in Morgan Township passed a resolution on March 28, 1839 denouncing slavery as a great sin. That resolution further pledged church members to cooperate in all proper ways to secure abolition.

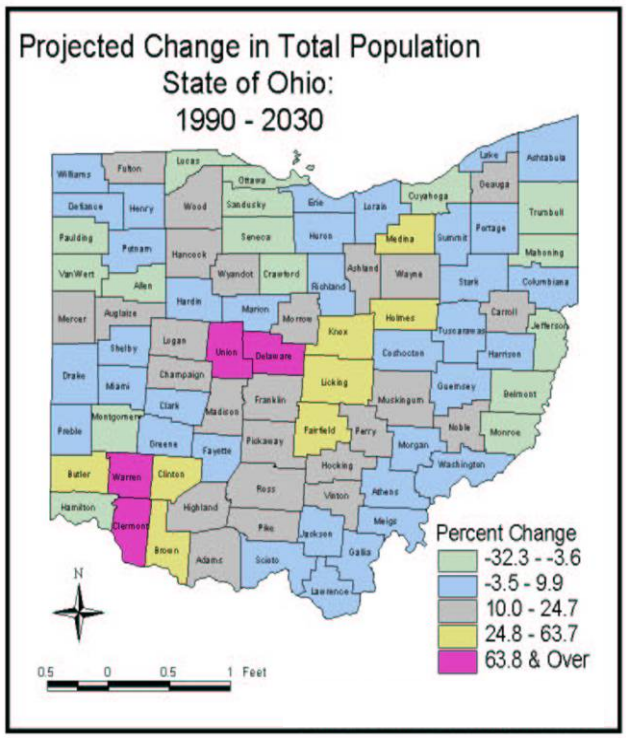
In 1832, the first two lane covered bridge was situated on a stone foundation in southern Rock Creek. It was erected by George Crowell and Samuel Ackley at the request of the Trumbull-Ashtabula Turnpike Company. The Village was incorporated in 1849.

http://www.ashtcohs.com/morgan.html

2.4 Census Information

2.4.1 State Population

The State of Ohio's population in 2000 was 11,353,140 and it is projected to climb to 12,317,613 by 2030, an increase of 8.5%. However, it appears that the rate of Ohio's population is diminishing.



Several factors may be contributing to this decline. The birth to death ratio is much smaller than in faster growing states, with Ohio expected to have 4.4 million births and 3.6 million deaths. Net migration is a factor as well. Ohio may gain approximately 247,000 people through in-migration but may lose about 758,000 people through out-migration.

The projected percentage of population change by county in Ohio from 1990 to 2030 is reflected on the map in this section. Counties surrounding a major metropolitan area, Cincinnati, Columbus, and Cleveland, generally will experience higher growth rates. Counties in the north central and eastern region of the state are projected to experience a decline.

2.4.2 County Population Projection

According to 2000 Census figures, the total population of Ashtabula County is 102,728. Ashtabula County is moderately rural in nature, which is shown by comparing their inhabitants per square mile to the State's inhabitants per square mile, 146 inhabitants versus 277 inhabitants, respectively. Residential areas comprise approximately 8% of acreage in Ashtabula County. The area of highest population density is the City of Ashtabula with 20,962 people.

The population of Ashtabula County has increased over the last 100 years. The most dramatic increase in population occurred between 1950 and 1960 with a net change of 14,372 people, equivalent to an 18.3% change. The only recorded decline in population in Ashtabula's history occurred from 1980 to 1990, with a 4,394 decline. The highest population decade in the last 100 years was in 1980 when there were 104,215 residents recorded in the County. The County is expected to keep growing over the next 30 years, with an expected increase in population to 106,420. See Table 2-2 for additional demographical information.

Table 2-2
Historical Population of Ashtabula County

Year	Total Population	Year	Total Population
1800	NA	1910	59,547
1810	NA	1920	65,545
1820	7,382	1930	68,361
1830	14,584	1940	68,674
1840	23,724	1950	78,695
1850	28,767	1960	93,067
1860	31,814	1970	98,237
1870	32,517	1980	104,215
1880	37,139	1990	99,821
1890	43,655	2000	102,728
1900	51,448		

An Ashtabula County demographic profile is also available on the Ohio Department of Development's (ODOD) website and provides more specific information for Ashtabula County and its political jurisdictions. (http://www.odod.state.oh.us/osr/profies/pdf/.)

2.5 County Land Use and Future Land Use

2.5.1 Topography

Ashtabula County is composed of two different ecoregion types. The northern shoreline is composed of Erie Lake Plain. This ecoregion is a nearly level coastal strip of lacustrine deposits punctuated by beach ridges and swales. Its lake-modified climate sets it apart from other nearby ecoregions and its annual growing season is often several weeks longer than inland areas. Urban-industrial sites, ports, fruit-vegetable farms and nurseries have developed on the plain. The rest of Ashtabula County is composed of Mosquito Creek/Pymatuning Lowlands. This ecoregion is characterized by poor drainage, wetland, low-gradient streams and moisture tolerant woodlands. It is nearly flat and is underlain by clayey till and fine lacustrine deposits. Originally, beech forests were commonly seen in this area but today dairy farms and woodlots occur.

2.5.1.1 Watersheds

Ashtabula County has four major drainage basins: the Ashtabula River, Conneaut Creek/River, Grand River Watershed and Pymatuning Creek. The major streams that drain into the Ashtabula River are the East and West Branches. Larger streams that drain into the Grand River watershed include Mill, Rock and Three Brothers creeks. The Pymatuning River flows to the larger Shenango and Mosquito creeks. See Table 2-3 for additional demographical information concerning each watershed.

Ashtabula River

The Ashtabula River lies in extreme northeast Ohio, flowing into Lake Erie's central basin at the City of Ashtabula. Its drainage basin covers an area of 137 mi^2 (87,680 acres), with 8.9 mi^2 located in western Pennsylvania. Major tributaries include Fields Brook, Hubbard Run and Ashtabula Creek. The City of Ashtabula is the only significant urban center in the watershed. The remaining portions of the drainage basin are predominantly rural and agricultural.

Conneaut Creek/River

The Conneaut watershed is located in northeast Ashtabula County. It begins as a creek in Conneaut from Lake Erie and turns into a river as it flows east into Pennsylvania. It is comprised of 195 mi^2 (124,685 acres).

Grand River Watershed

The Grand River Watershed is located in northeast Ohio and starts in southeastern Geauga County, flowing through Trumbull and Ashtabula counties before circling back around into Lake County to drain into Lake Erie near Fairport Harbor. The watershed occupies the western half of Ashtabula County. It is 98 miles long and drains 712 mi^2 (455,680 acres).

Pymatuning River

The Pymatuning/Shenango watershed is comprised of 1,065 mi^2 (682,310 acres) in Trumbull and Ashtabula counties, in Ohio and in Mercer, Lawrence and Crawford counties, in Pennsylvania. Conservation Districts in each county formed the Interstate Pymatuning/Shenango Watershed Project to address the conservation issues that face the two-state watershed. In Ashtabula County, the Pymatuning Creek begins west of Andover and flows south to Pymatuning Reservoir, where it joins the Shenango River.

Table 2-3
Major and Minor Watersheds in Ashtabula County*

Watershed	Total Watershed Acreage	Acres Drained Within Ashtabula	Area in Square Miles	Population Within Ashtabula	Persons per acre within Ashtabula
Ashtabula	87,698	52,787	82.5	30,180	0.38
East Branch		13,493	21.1		
West Branch		17,535	27.4		
Conneaut	124,685	25,430	39.7	11,666	0.46
Grand River	455,680	104,323	163	26,447	0.12
Mill Creek		66,771	104.3		
Rock Creek		35,943	56.1		
Three Brothers		12,700	19.8		
Pymatuning	182,520	34,461	53.8	5,663	0.08
Shenango		25,765	40.3		
Mosquito		11,257	17.6		
Total		**454,849**	**710.9**	**102,728**	**Average 0.32**

* Data table prepared by the Ashtabula County Department of Planning and Community Services.

2.5.2 County Land Use

The County contains approximately 454,000 land acres, of which 45% is woodland and 31% is farmland. The County water acreage consists of 6,981 acres of water bodies, streams and rivers. These include the two state parks, Pymatuning Lake and Geneva State Park, which total 4,198 land acres and are used for recreation.

Over 22% of the land in Ashtabula County is described as prime farmland. The County has 189,510 acres (42%) enrolled in the Current Agricultural Use Valuation (CAUV) program and 116,958 acres (26%) enrolled in agricultural districts. According to the 2002 United States Department of Agriculture (USDA) Agricultural Census, there are 1,090 farms in Ashtabula County, with the average farm containing 166 acres. A net loss of land in farms of approximately 15,000 acres has occurred since 1980.

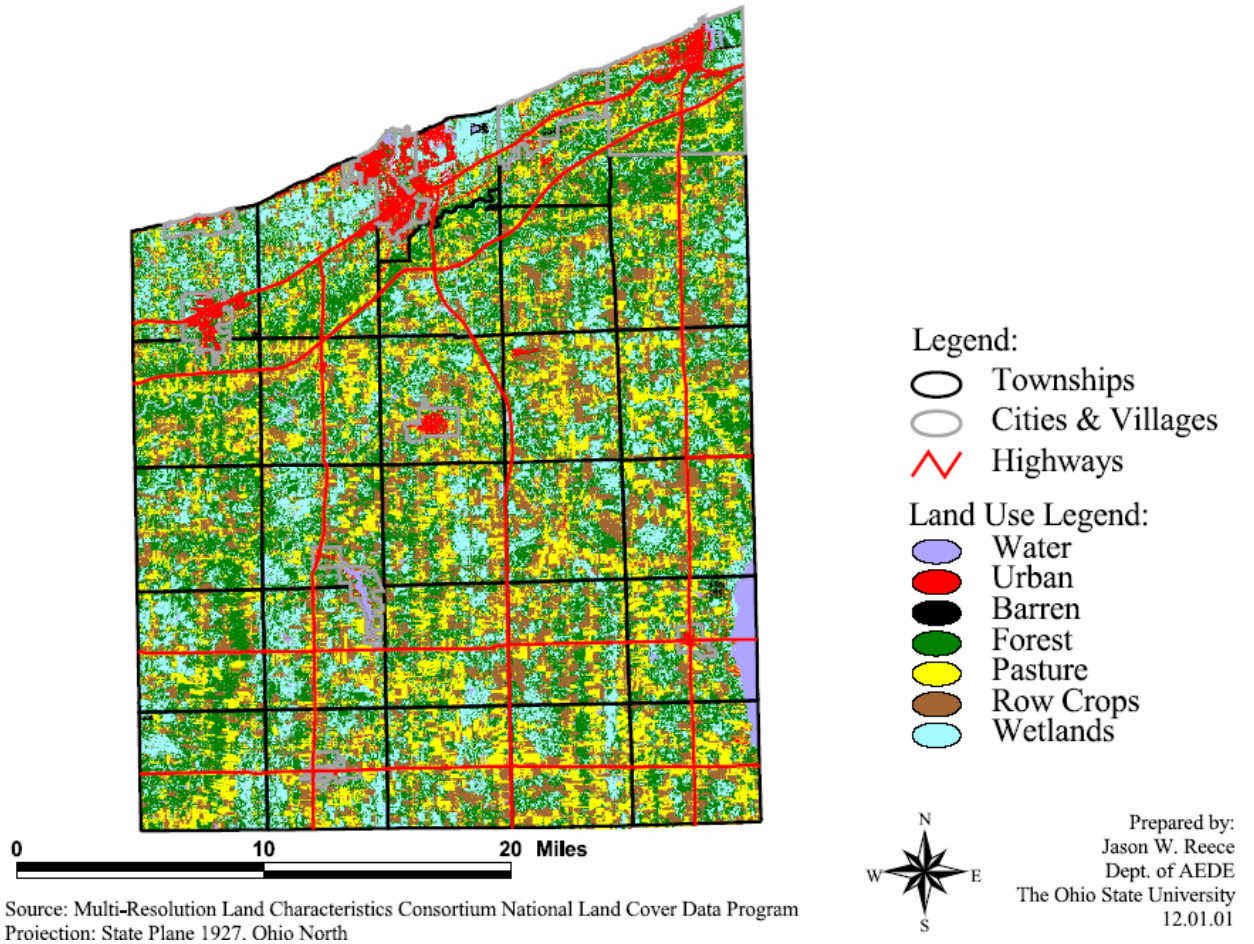
In the 1990s, Ashtabula County underwent industrial expansion. Ten industrial parks were created and are located throughout the County. A total of 917 acres are devoted to the parks, with 265 developed industrial park acreage and 420 available industrial park acreage. There is a total of 128 acres of restricted acreage.

Table 2-4 describes the various land uses in Ashtabula County, including acreage and percentage of total acreage in the County.

Table 2-4
Land Use/Land Cover

Land Use Category	Acreage	Percentage of total acreage of Ashtabula County
Residential	34,702.60	7.64 %
Commercial	3,371.31	0.74 %
Industrial	1,734.54	0.38 %
Recreational	3,030.63	0.67 %
Agricultural	141,821.04	31.23 %
Fruit/Nurseries	3,385.55	0.75 %
Woodland	203,792.52	44.9 %
Shrub/Brushland	31,273.96	6.89 %
Wetlands	15,907.33	3.48 %
Water Bodies	6,011.26	1.32 %
Streams/Rivers	969.74	0.21 %
Quarries/Pits/Landfills	1,454.96	0.32 %
Transportation	4,266.29	0.94 %
Utilities	1,142.24	0.25 %
Religious/Health	585.20	0.13 %
Education	665.76	0.15 %
Total	**454,114.93**	**100.00%**

The following map illustrates Ashtabula County's land use from the early 1990s.



Source: Multi-Resolution Land Characteristics Consortium National Land Cover Data Program
Projection: State Plane 1927, Ohio North

2.5.3 Future Land Use

Future land use and areas of concern are discussed in *The Ashtabula County Comprehensive Plan.* Specific growth areas such as the Ashtabula Mall District, all Interstate 90 interchanges, State Route 20 and several town centers are mentioned. These areas are under great pressure for economic development and require proper planning. Failure to implement a comprehensive, long-range planning process in these areas could harm the economic and social structure of the County.

The areas of concern mentioned in the comprehensive plan include appropriate areas, sewer and water infrastructure capacities, telecommunication services and urban sprawl. The County is limited in the number of areas that offer sufficient land with proper zoning, available infrastructure and access to suitable transportation systems for successful economic development projects. Existing sewer capacity is stressed by current growth in some areas. Lack of competition in the telecommunication services has created an uneven provision of telecommunication services. In addition, new retail, residential and industrial development that occurred in the 1990s has created concerns within the County regarding urban sprawl.

Some of the solutions to the areas of concern discussed in the comprehensive plan will help in land use in the future. They include the following:

- Develop a regional master water and sewer plan showing specific tributary area relationships to the existing trunk lines and indicating the capacity for each one.
- Work with the telecommunication providers to develop countywide full spectrum communication services.
- Encourage, through local zoning, higher density development in those areas already zoned for development. The County should discourage rezoning of vacant land without planned or available infrastructure and other services to support development.

2.6 County Utilities

2.6.1 Electric, Gas and Telecommunications Utilities

The electric power for Ashtabula County is provided by two utilities, First Energy/Ohio Edison and CEI Electric. Natural and bottled gas is provided by Dominion East Ohio Natural Gas, Eastern Natural Gas and Orwell Natural Gas Company. Telecommunication providers are Alltell Communications, Conneaut Telephone Company, Orwell Cable Television, Orwell Telephone Company and Sprint. See Maps B-1, B-2 and B-3 in Appendix B for areas served by each utility in Ashtabula County.

2.6.2 Water and Wastewater

The unincorporated areas of Ashtabula County are serviced by the County through a distribution system previously owned by Aqua Ohio. The City of Conneaut and the villages of Andover and Orwell all have their own water treatment facilities. Ohio American has a large treatment plant located in the City of Ashtabula. The City of Geneva bought their distribution system in 2004. The villages of Jefferson and Roaming Shores are supplied by Aqua Ohio. However, the City of Geneva and Aqua Ohio buy their water from Ashtabula County because the County operates the transmission lines. Ashtabula County buys bulk water from Ohio American.

Rock Creek Village has a water treatment plant and supplies water to parts of Rome and Morgan townships in an agreement made with Ashtabula County. However, Ashtabula County will be building a line in the near future to supply both Rock Creek Village and the townships of Morgan and Rome with the County Water System. Rock Creek will be decommissioning their water treatment plant when that line is completed.

Public Utilities Commission of Ohio (PUCO) regulated water companies are Camplands Water Company, LLC., Consumers Ohio Water and Lake Shore Division of Ohio American Ashtabula.

Village of Andover

Andover Village Public Water Supply (PWS), 134 Maple St., Andover, 44003

Camplands Water Company LLC, 4270 Rt. 7 N., Andover, 44003

The water plant design capacity is 240,000 gallons per day (gpd) and the wastewater plant design capacity is 500,000 gpd.

City of Ashtabula

Ashtabula Public Works, 501 W. 24th St., Ashtabula, 44004

Ashtabula Water Pollution Control, 303 Woodland Ave., Ashtabula, 44004

Ohio American Water Co, Ashtabula, 2905 N. Bend Rd., Ashtabula, 44004

The water capacity is unknown and is provided by Ohio American. The wastewater plant design capacity is 12.0 million gallons per day (mgd).

City of Conneaut

Conneaut City Water Works, 770 Lake Road, Conneaut, 44030

Conneaut City Sewerage Treatment 1206 Broad St. Ex., Conneaut, 44030

The water plant design capacity is 3.0 mgd and the wastewater plant design capacity is 7.5 mgd.

City of Geneva

Geneva City PWS, 141 North Ave., Geneva, 44041

The water plant design capacity is unknown and is provided by Consumers Ohio. The wastewater plant design capacity is 2.0 mgd.

Village of Geneva-on-the-Lake

The water plant design capacity is unknown and is provided by Consumers Ohio. The wastewater plant design capacity is 450,000 gpd. It reaches design capacity on holiday weekends.

Village of Jefferson

DFC Mobile Home Park, 1600 Lenox-New Lyme Road, Jefferson, 44047

Ashtabula County Water System, 25 West Jefferson Street, Jefferson, 44047

Village of Jefferson Sewage Treatment, 225 N. Elm St., Jefferson, 44047,

The water plant capacity is unknown and is provided by Consumers Ohio. The wastewater plant design capacity is 1.0 mgd.

Village of North Kingsville

The water plant capacity is unknown and is provided by Ohio American. There is no sanitary sewer system available.

Village of Orwell

Orwell Village PWS, 179 W. Main St., Orwell, 44076

The water plant design capacity is 460,000 gpd. The water plant does reach the capacity limits during peak times of the year. The wastewater plant design capacity is 260,000 gpd. The Village plans to expand their wastewater plant's capacity to 550,000 gpd.

Village of Roaming Shores

Roaming Shores Village PWS, PO Box 237, 2500 Hayford Road, Roaming Shores, 44084

The water plant design capacity is unknown and is provided by Consumers Ohio. The wastewater plant design capacity is 120,000 gpd. There are plans to expand the capacity to 160,000 gpd.

Village of Rock Creek

Rock Creek Village PWS, 2600 Stiles Ave., Rock Creek, 44084

The water plant design capacity is 100,000 gpd and the wastewater plant design capacity is 70,000 gpd.

3.0 COUNTYWIDE ALL NATURAL HAZARDS MITIGATION PLANNING PROCESS

3.1 Mission Statement

At the beginning of the planning process, a mission statement was drafted to establish a clear goal for the Core Group. The Core Group reviewed and approved the following as its Mission Statement:

"The mission of the Core Group is to develop a working document that fulfills the mandates of the Federal Disaster Mitigation Act of 2000, and satisfies the requirements of FEMA and the Ohio Emergency Management Agency (OEMA), as well as meets the needs of all of Ashtabula County.

Further, by researching and planning for future natural hazards and implementing appropriate mitigation techniques, all of Ashtabula County can save lives and protect property, reduce the cost of disasters and provide for a rapid and efficient recovery by coordinating response efforts, and increasing the educational awareness of natural hazard events and their effects on the people, property, and resources of all of Ashtabula County."

3.2 Notification Process

The incorporated jurisdictions of the County, as well as other agencies that work within the County, were notified of the mitigation planning process. The Ashtabula County EMA Office created a master list of jurisdictions they felt necessary to participate in this planning effort. The comprehensive list was reviewed to ensure that all the appropriate agencies as well as jurisdictions would be invited to participate in this effort. A Core Group representing a wide array of political subdivisions, as well as agency and private businesses, was notified of the mitigation planning process.

Prior to commencing this planning process, in addition to contacting the Core Group, Ashtabula County notified adjacent counties as well as the general public regarding this mitigation planning process. The Ashtabula County EMA sent letters to adjacent counties with contact information for learning more about the planning effort. Ashtabula County also issued a press release dated May 13, 2005 inviting concerned citizens in all jurisdictions of the County. The Ashtabula County EMA Director was the contact source and his contact information was provided. See Appendix A for copies of these correspondences.

3.3 Groups

The Core Group is the original planning unit for this project. All Core Group members are involved for the entire planning process. They are the decision makers and implementers. The purpose of the Core Group is to provide information to the various entities of Ashtabula County that have a stake, either directly or indirectly, in the Mitigation Plan. They provide feedback, input, and review as the process of the Mitigation Plan development is completed, leading to a better quality and more inclusive scope of the Mitigation Plan that everyone can acknowledge and adopt, truly implementing a countywide plan.

Obtaining support from the whole community required a comprehensive approach to preparing the Mitigation Plan. Identifying those persons, community leaders and government agencies

with the knowledge and authority to help the community organize a plan was key to the planning effort. Establishing a group of leaders was necessary to give this task validity. The Core Group included individuals from multiple agencies, County departments and incorporated jurisdictions as previously listed in Section 1.2. Please see Appendix A for a complete list of participants.

3.4 Core Group Meetings

There were four Core Group meetings, and one community meeting for public comment on the Draft Mitigation Plan.

3.4.1 Determination of Hazards - Meeting 1-Kick-Off Meeting

The kick-off meeting presented the Core Group with the process to be followed in the creation of the Mitigation Plan. Overall goals of the plan for Ashtabula County were discussed and the Core Group decided upon which hazards to focus. By the end of the first meeting, Core Group members had exchanged contact information, organized and scheduled several interviews to be conducted, established a priority list of hazards and discussed the general process and timeline of the project.

The list of prioritized hazards was established looking at the National Climatic Data Center (NCDC) tables that illustrated which hazards in Ashtabula County had produced the largest amount of damage based on human or monetary losses. The Core Group also used the collective knowledge they had coupled with the vast amount of local experience and history to determine which hazards to address in their Mitigation Plan. The hazards were prioritized as follows:

1. Winter Storms – Snow, Ice, Extreme Cold
2. Summer Storms – Thunderstorms, Lightning, Hail and High Winds
3. Flash Flooding
4. Lake and Stream Bank Erosion
5. Tornadoes
6. 100-year Flooding
7. Droughts and Wildland Fires
8. Earthquakes
9. Water Spouts

Other hazards the Core Group is evaluating are dams, chemical plants, water quality of lakes and streams, railroad crossings, port facilities, solar flares and power outages.

Please see Appendix C for Meeting 1 Minutes.

3.4.2 Determination of Problem Statements and Overall Goals – Meeting 2

The second meeting focused on the discussion of the problems within the County as it related to the hazards that were identified at the first meeting. Prior to the second meeting, each Core Group member received several documents to facilitate the discussion during the meeting. During this meeting, the Core Group developed problem statements for each community hazard that was identified at the first meeting. Please see Appendix C for the Meeting 2 Minutes.

In order to determine the issues associated with the hazards in Ashtabula County and to establish the problem statements associated with the hazards, the group first decided on an

overall “state of the hazard” and how it has affected the community in the past. The Core Group reviewed the draft problem statements in the time period between the second and third meeting, to be revised or approved as noted at the third Core Group meeting.

In addition to developing the problem statements, the Core Group determined overall mitigation goals with respect to each hazard. Goals were defined as general guidelines that explain mitigation activities that a community wants to implement in the future. The goals were then used to prioritize mitigation activities for each community. Please see Appendix D for a complete list of problem statements and overall goals.

3.4.3 Determination of Alternatives and Evaluation Criteria – Meeting 3

At the commencement of the third meeting, the problem statements and goals developed at the second meeting were approved as drafted or revised by the Core Group. The third meeting focused the Core Group’s discussion on developing possible mitigation alternatives and solutions to problems with respect to each hazard. The draft problem statements were used as a reference guide in discussing these possible solutions. The Core Group received several guidance documents at this meeting to facilitate discussion. Alternatives were discussed among the Core Group members and noted for the Mitigation Plan when all were in agreement. These alternatives were then transposed into a rating matrix with specific evaluation criteria to be discussed in following sections of this report.

In addition to the selected evaluation criteria, the Core Group discussed and evaluated the potential costs and benefits of each of the mitigation alternatives at this meeting. By evaluating “No Action” as an alternative, the Core Group was encouraged to analyze the feasibility that each alternative could be implemented. A detailed benefit/cost analysis was not conducted due to the impracticality of this analysis since mitigation projects were not yet evaluated. When funds are available, the County (or State) will do a cost-benefit review prior to the request of funds.

See Appendix C for Meeting 3 Minutes.

3.4.4 Wrap-Up – Meeting 4

The final meeting with the Core Group focused on the discussion of the final mapping products, as well as the mitigation alternatives and completed matrices. The multi-hazard maps were reviewed for any errors or omissions. The results of the matrices were then reviewed by the Core Group for approval. Each individual community then chose which alternative or alternatives they wanted to support and implement within their community. Please see Appendix C for Meeting 4 minutes.

The remaining steps in the mitigation planning process were reviewed, which included setting a date for a public meeting.

3.4.5 Public Meeting

Public input was necessary to gauge the opinion of the community and build support for the Mitigation Plan. A public meeting was held on December 6, 2005 to review the planning process with the general public. This meeting gave the public an opportunity to comment on the plan. This meeting was also used to address comments and questions concerning the Draft Mitigation Plan.

3.5 Matrix Development

Once the mitigation alternatives were created for each hazard, the Core Group established evaluation criteria to rank each of the alternatives. The criteria included: benefit outweighs risk, frequency of hazard risk, funding available and socially acceptable.

To determine how the County evaluated each of the developed mitigation alternatives as a whole, the mitigation alternatives that the Core Group selected for each hazard were transposed into a matrix. This matrix was sent to each Core Group member, along with directions for completing the matrix. Each Core Group member was asked to rate each mitigation alternative against the selected evaluation criteria in the order of importance for their specific community. This rating was used to tabulate the overall County rating to evaluate the importance of each alternative on a countywide basis.

Utilizing a matrix allowed the community to systematically review all alternatives, identifying which mitigation method(s) were appropriate based on the specified criteria. The combined results of all the Core Group members were tabulated and the matrix comparison was complete. Each of the activities was given an averaged number based on all the Core Group scores, which helped Ashtabula County focus their mitigation strategies on the highest rating activities.

The matrix results will be discussed in a later section of this report.

3.6 Public Review and Involvement

Since public participation was crucial for implementation of the draft mitigation plan, four draft professionally bound copies were mailed to the Ashtabula County EMA Director for posting at several key locations around the County for public comment. Suggested locations for posting the draft plan were local libraries, the County Commissioners Office, the local EMA office and other publicly accessible facilities.

The formal public notification process as defined in the Federal Code occurred prior to approval and/or adoption of the plan. A press release informing residents of status of the mitigation process, the locations the plan was posted for review, as well as the public meeting date, was published in the local media. The public was notified of their opportunity to review and comment on the draft plan during a 30 day review period. Comments were to be forwarded to the EMA Director for inclusion in the final plan. Please see Appendix A for a copy of the draft plan press release. Please see Appendix A for public comments received.

The draft mitigation plan was submitted concurrently to OEMA and FEMA for review and approval.

3.7 Finalization

Upon incorporation of all comments into the Draft Mitigation Plan, the Final Mitigation Plan will be prepared and submitted to Ashtabula County in hard copy and digital form. Each incorporated jurisdiction, as well as any township choosing to adopt this Mitigation Plan as a separate entity from the County, will also receive a digital copy of the plan.

Each community that participates in this planning effort is responsible for administering the various aspects of the Mitigation Plan including how the plan will be implemented within their particular community.

Implementation of the Mitigation Plan is crucial. The Core Group must strategize effectively to put the Mitigation Plan into action. Ashtabula County must follow up to translate the goals and objectives, developed during the planning process, into action steps. It is recommended that a monitoring program be included in the Mitigation Plan.

4.0 HAZARD PROFILE

Ashtabula County has experienced many natural disasters in the past one hundred years. These disasters have ranged from tornadoes and blizzards, to flooding and droughts. The purpose of this document is to identify the number and frequency of disasters in Ashtabula County to better prepare and deal with them when they do occur. The following sections describe the process of determining upon which hazards to focus, general background information on each hazard as well as hazard events that have occurred in Ashtabula County.

4.1 Initial Hazard Assessment

In order to properly evaluate the natural hazards to which Ashtabula County may be susceptible, a three-step process was utilized. This three-step process was completed in order to "narrow-down" the hazards for which Ashtabula County should prepare, and potentially mitigate, in the future. The three steps are described in the following paragraphs.

Step 1 – FEMA's database was researched to determine which hazards FEMA had documented as possible natural hazards, including future threats, for the State of Ohio. Several hazards that are listed on FEMA's website include flooding, severe storms, tornadoes and winter storms.

Step 2 - The NCDC was contacted and historic hazard information was reviewed all the way down to the county level. The NCDC website presented each type of hazard and the historic information associated with it for each county, offering several hazard search parameters. These parameters included: droughts, dust storm, flooding, fog, hail, hurricanes, lightning, tornadoes, wild/forest fires, ocean/lake surf, precipitation, snow and ice, temperature extremes and thunderstorms and high winds.

Because NCDC information did not address earthquakes, other sources were contacted for this data. The information pertaining to earthquake susceptibility was attained from United States Geographical Survey (USGS) data and the Ohio Earthquake Program Manager at OEMA.

Step 3 - The *Ohio Hazard Analysis and Risk Assessment,* which is a document created in 1998 by OEMA for local and state emergency preparedness officials was reviewed. The *Ohio Hazard Analysis and Risk Assessment* documented both natural and non-natural (technological) hazard event information.

4.2 Risk Assessment Ranking

The research compiled during the initial hazard assessment was provided to the Core Group for their review and assessment. The Core Group evaluated all the hazards being considered and ranked them based on the number of historic events and cumulative damage that has occurred. The following list shows the Core Group's ranking of hazards with number one being the hazard of the most concern:

1. Winter Storms – Snow, Ice, Extreme Cold
2. Summer Storms – Thunderstorms, Lightning, Hail and High Winds
3. Flash Flooding
4. Lake and Stream Bank Erosion
5. Tornadoes
6. 100-year Flooding
7. Droughts and Wildland Fires
8. Earthquakes
9. Water Spouts

Other hazards the Core Group is evaluating are dams, chemical plants, water quality of lakes and streams, railroad crossings, port facilities, solar flares and power outages.

4.3 Winter Storms – Snow, Ice and Extreme Cold

A winter storm encompasses several types of storm systems that develop during the late fall to early spring. It deposits any of the following types of precipitation: snow, freezing rain, or ice. Blizzards, ice storms and lake effect snow are subcategories of winter storms. A winter storm watch indicates that severe winter weather may affect an area. A winter storm warning indicates that severe winter weather conditions are definitely on the way.

4.3.1 Blizzards

A blizzard warning signifies that large amounts of falling or blowing snow, and sustained winds of at least 35 mph, are expected for several hours. In order to be classified as a blizzard, as opposed to merely a winter storm, the weather must meet several conditions. The storm must decrease visibility to a quarter of a mile for three consecutive hours, include snow or ice as precipitation, and have wind speeds of at least 35 mph. A blizzard is also characterized by low temperatures.

4.3.2 Ice Storms

An ice storm is defined as a weather event containing liquid rain that falls upon cold objects creating 1/4 inch thick or more accumulation of ice buildup. This ice accumulation creates serious damage such as downed trees and power lines, leaving people without power and communication. It also makes for extremely treacherous road conditions.

Occasionally, snow will fall after an ice storm has occurred. With the ice covered, it is nearly impossible to determine which travel areas to avoid. When traveling by car, this snow covered ice causes accidents and when walking it causes people to fall, possibly sustaining injuries.

4.3.3 Lake Effect Snow and the Southeastern Lake Erie Snowbelt

Lake effect snow is produced in the winter when cold winds move across long expanses of warmer lake water, picking up water vapor which freezes and is deposited on the lee shores. This effect is enhanced when the moving air mass is uplifted by the orograhic effect of higher elevations on the downwind shores. This uplifting can produce narrow, but very intense bands of precipitation, which deposit at a rate of many inches of snow per hour. The areas affected by lake effect snow are called snowbelts.

The snowbelt is an area, typically downwind of the Great Lakes, where Lake effect snow is particularly common. There are seven distinct snowbelts associated with the Great Lakes. The southeastern Lake Erie snowbelt stretches roughly from Ashtabula County, Ohio to South Buffalo, New York.

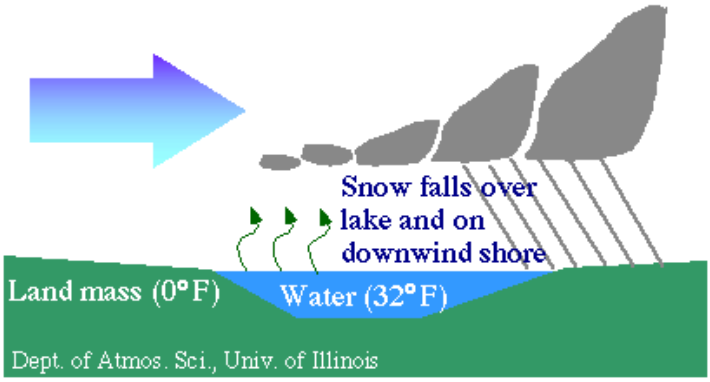


Diagram illustrating lake effect snow

Photo courtesy of: http://web.syr.edu/~wrt405/normal/Lake_Effect.html

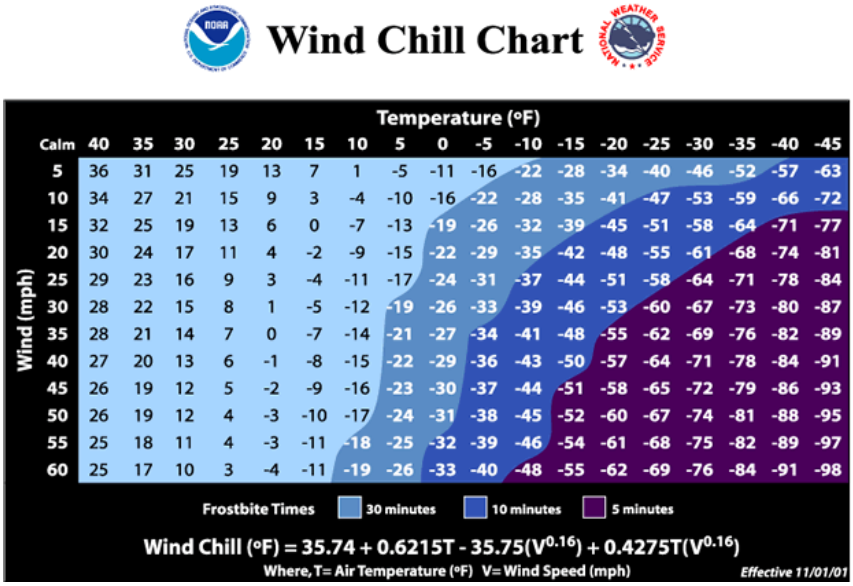
In Ashtabula County, there were 88 recorded snow and ice storm events on the NCDC website from 1993 to 2005. Of these 88 events, 69 were recorded as having caused $191.8 million worth of property damage, no deaths and 76 injuries. An ice storm event from January 2005 caused $124.9 million worth of the total property damage.

4.3.4 Extreme Cold

Extreme cold can immobilize an entire region. Even areas that normally experience mild winters can be hit with extreme cold with a wind chill. The impacts include frostbite and hypothermia.

The wind chill temperature is how cold people and animals feel when outside. Wind chill is based on the rate of heat loss from exposed skin caused by wind and cold. As the wind increases, it draws heat from the body, driving down skin temperature and eventually the internal body temperature. On November 1, 2001, the National Weather Service (NWS) implemented a replacement Wind Chill Temperature (WCT) index for the 2001/2002 winter season. The reason for the change was to improve upon the current WCT Index which was based on the 1945 Siple and Passel Index. For more on the new index, please visit www.nws.noaa.gov/om/windchill/index.shtml.

Therefore, the wind makes it feel much colder. If the temperature is 0 degrees Fahrenheit and the wind is blowing at 15 mph, the wind chill is -19 degrees Fahrenheit. At this wind chill temperature, exposed skin can freeze in 30 minutes. The following chart estimates wind chill temperatures based on wind speed.



Frostbite is a severe reaction to cold exposure that can permanently damage its victims. A loss of feeling and a white or pale appearance in fingers, toes, or nose and ear lobes are symptoms of frostbite.

Hypothermia is a condition brought on when the body temperature drops to less than 90 degrees Fahrenheit. Symptoms of hypothermia include uncontrollable shivering, slow speech, memory lapses, frequent stumbling, drowsiness and exhaustion.

According to the NCDC, there have been nine extreme cold events recorded between 1950 and 2005. These events occurred between 1993 and 2002, causing $4.4 million worth of property damage, $4.0 million in crop damage, 13 deaths and one injury.

4.3.5 Frequency/Probability of Future Occurrence

Winter storms in Ashtabula County have a significant chance of occurring on a yearly basis. According to the NCDC, there have been 88 winter storms and nine extreme cold events documented for Ashtabula County since 1950. However, no events were recorded prior to 1993, which means the County has had major winter events affect their County every year for the past 12 years. Winter storms and extreme cold events in Ashtabula County have caused cumulative property and crop damage estimated at $200.2 million, or approximately $16.7 million per year. Based on historical information, Ashtabula County can expect to endure eight winter storms and/or extreme cold events in any given year.

4.4 Summer Storms — Thunderstorms, Lightning, Hail and High Winds

Hazards that fit into the summer storm category include lightning, hail and high winds. One of the biggest problems associated with severe summer weather is the lack of public education and awareness. Summer storms can do damage, but are often the precursor for much more severe weather to follow. One example is the direct association of tornadoes with thunderstorms.

4.4.1 Thunderstorms

A severe thunderstorm watch is issued by the NWS when the weather conditions are such that damaging winds of 58 mph or more, or hail 3/4 of an inch in diameter or greater, are likely to develop. Citizens should locate a safe place in the home and tell family members to watch the sky and listen to the radio or television for more information. A severe thunderstorm warning is issued when a severe thunderstorm has been sighted or indicated by weather radar. At this point, danger is imminent and citizens should move to a safe place, turn on a battery-operated radio or television, and wait for the "all clear" by the authorities.

Severe storms are also associated with other hazards such as tornadoes and severe flooding. Since tornadoes and flash flooding are spawned by thunderstorms, people should review what action to take under a tornado warning or a flash flood warning when a "severe thunderstorm warning" is issued. When thunderstorms are forecasted to bring heavy rains (which can cause flash flooding), strong winds, hail, lightning and tornadoes, people should get inside a sturdy building and stay tuned to a battery-operated radio for weather information. People should also be aware that lightning and high winds are also major threats during thunderstorms.

Data retrieved from FEMA shows that the frequency of recorded severe storm events are increasing year after year as shown in Table 4-1.

Table 4-1
Ohio Disaster History

Year	Disaster Type	# of Storm Events
1989	Severe Storms & Flooding	831
1990	Severe Storms, Tornadoes & Flooding	870
1992	Severe Storms, Tornadoes & Flooding	951
1995	Severe Storms & Flooding	1,065
1996	Severe Storms & Flooding	1,097
1996	Flooding & Severe Storms	1,122
1997	Severe Storms & Flooding	1,164
1998	Severe Storms	1,227
2000	Severe Storms & Tornadoes	1,343
2001	Severe Storms & Flooding	1,390
2002	Severe Storms & Tornadoes	1,444
2003	Severe Storms & Flooding	1,478
2004	Severe Storms & Flooding	1,556

The NCDC combines high wind events with thunderstorms when recording data. According to the NCDC, there were 209 thunderstorm and high wind events that caused $36.9 million worth of property damage and $2.5 million worth of crop damage between 1962 and 2005. There were six deaths and 28 injuries recorded.

4.4.2 Lightning

Lightning kills between 75 to 100 people a year. It is the second largest killer of natural hazard events, exceeded only by floods. Lightning strikes can happen anywhere and affect anyone. Only 10% of lightning strikes result in death, leaving the rest with various degrees of disability, most being central nervous system issues.

According to the NCDC, seven lightning events were recorded between 1995 and 2005 in Ashtabula County. These lightning events caused $207,000 in property damage, no deaths and four injuries.

4.4.3 Hail

Hail is a type of precipitation composed of balls or irregular lumps of ice. It occurs when supercooled water droplets (remaining in a liquid state despite being below the freezing point, 0 °C/32 °F) in a storm cloud collide with some solid object, such as a dust particle or an already-forming hailstone.

Hail often forms in strong thunderstorms, often along a cold front, where the layer of air on top is much colder than that on the bottom. The smaller hailstones can bounce up and down between the warm and cold layers due to updrafts and gravity. The longer the stones bounce around, the larger they grow. These strong, severe, or even supercell thunderstorms can also produce hail in the summer months, even without a cold front.

Hailstones, while most commonly only a few millimeters in diameter, can sometimes grow to several inches or occasionally even bigger. Such large hailstones can do serious damage, notably to automobiles, skylights, and glass-roofed structures. Pea or golf ball-size hailstones are not uncommon in severe storms. Rarely, massive hailstones have been known to cause concussions or to kill people by causing head trauma.

Sixty four hail events were recorded from 1972 to 2004 on the NCDC's website for Ashtabula County. Property damage totaled $112,000 for events that occurred in 2002. There were no deaths or injuries reported.

4.4.4 High Winds

Straight-line winds are often responsible for most of the wind damage associated with a thunderstorm. These winds are often confused with tornadoes because of similar damage and wind speeds. However, the strong and gusty winds associated with straight-line winds blow roughly in a straight line unlike the rotating winds of a tornado.

Property damage and loss of life from windstorms are increasing due to a variety of factors. According to the Ohio Manufactured Housing Association, the use of manufactured housing is on an upward trend, and this type of structure provides less resistance to wind than conventional construction. Uniform building codes for wind resistant construction are not adopted by all states, and population trends show rapid growth in the highly exposed areas.

The NCDC combines high wind events with thunderstorms when recording data. According to the NCDC, there were 209 thunderstorm and high wind events that caused $36.9 million worth of property damage and $2.5 million in crop damage between 1962 and 2005. There were six deaths and 28 injuries recorded. In addition, the NCDC recorded 39 strong/high wind events, without the classification of thunderstorm, within the combined list of high wind and

thunderstorm events. The property damage totaled $33.1 million and three deaths and 17 injuries were reported for these wind events.

4.4.5 Frequency/Probability of Future Occurrence

Summer storms for Ashtabula County quantitatively have the highest likelihood of occurring on a yearly basis. According to the NCDC, 280 storm events including thunderstorms, lightning, high winds and hail were documented for Ashtabula County since 1962. Severe summer storms in Ashtabula County have caused property and crop damage with estimated total losses of $37.3 million over a 43-year period. Based on historical information, Ashtabula County can expect to endure six to seven severe summer storms in any given year.

4.5 Flash or Localized Flooding

Flash floods occur within a few minutes or hours of heavy amounts of rainfall, from a dam or levee failure, or from a sudden release of water held by an ice jam. Flash floods can destroy buildings and bridges, uproot trees, and scour out new drainage channels. Heavy rains that produce flash floods can also trigger mudslides. Most flash flooding is caused by slow-moving thunderstorms, repeated thunderstorms in a local area, or by heavy rains from hurricanes and tropical storms. Although flash flooding occurs often along mountain streams, it is also common in urban areas where much of the ground is covered by impervious surfaces. Roads and buildings generate greater amounts of runoff than typical forested land. Fixed drainage channels in urban areas may be unable to contain the runoff that is generated by relatively small, but intense, rainfall events.

Diagram illustrating how flash floods occur. Photo courtesy of British Broadcasting Corporation (BBC) News.

Flash flooding can be intensified by:

- Changing land use such as the development in catchments (increasing the rate and volume of run-off; sediment movement that has changed river cross-sections and affected flood levels).
- Lacking proper maintenance of flood defense systems, watercourses, culverts (including the flood relief areas around them) and road gullies, particularly where this leads to channel blockage.

- Increasing the rate of flow and decreasing the time taken for water to travel within a catchment by means of canalization, modification and diversion of rivers and watercourses.
- Building of structures (such embankments) which restrict flows over historical flood plains and thereby create additional flood risks both upstream and downstream.

4.5.1 Frequency/Probability of Future Occurrence

Past floods are indications of what can happen in the future, but mitigation plans are based on the risk of future flooding. Flood studies interpret historical records to determine the statistical potential that storms and floods of certain magnitude will recur. Such events are measured by their recurrence interval.

According to the NCDC, Ashtabula County has experienced 26 flash flood events over a 12-year period with damage estimates totaling approximately $3.3 million. The earliest recorded flooding event was documented in 1993. The Core Group concluded that since most of Ashtabula County is rural in nature, estimated losses were based on just a few higher populous areas, where significant property damage was likely to occur. Based on historical information, Ashtabula County can expect to endure two flash flooding events in any given year.

4.6 Lake and Stream Bank Erosion

Erosion is defined as the removal and transport of earth materials by natural agents. Some of these agents include glaciers, wind, water, earthquakes, volcanoes, tornadoes, hurricanes, mud flows, and avalanches.

4.6.1 Lake Erosion

Lake erosion is the gradual wearing and carrying away of land or beach materials by wave action, water, wind, general weather conditions and tidal currents. It is a process which affects the landmass of an area as a consequence of the sea or lake acting upon it. It is usually caused by a relative rise in sea level and the fact that the amount of sediment removed by wave energy exceeds that supplied to the beach by longshore currents.

In 1994, according to a study conducted by the H. John Heinz III Center for Science, Economics and the Environment, it was estimated that coastal erosion will destroy 87,000 buildings within 500 feet of the US shoreline over the next 60 years, including the Great Lakes. Factors contributing to this erosion include rising sea levels, large storms, flooding, and powerful ocean waves. Other study findings indicated that those who live along the coast face as large a risk of damage from erosion as they do from flooding. Roughly 1,500 homes and the land on which they were built will be lost to erosion each year, with losses averaging $530 million per year.

In Ohio, a Coastal Erosion Area (CEA) is a designated land area along Lake Erie’s shore that is anticipated to be lost due to Lake Erie related erosion if preventative measures are not taken. More specifically, a CEA begins at the top of a bluff, bank or beach ridge and includes all land predicted to erode within a 30-year period if that distance totals nine or more feet. In June 1998, the Ohio Department of Natural Resources (ODNR) finalized its official designation of CEAs, including those portions of property along Ohio's 262-mile Lake Erie coast which appear most threatened by erosion. They totaled 2,234 parcels, which represents about 37% of Ohio's Lake Erie coastline. The following diagram illustrates the affects of coastal erosion over a 30-year

period of time and is taken from ODNR's Office of Coastal Management. Table 4-2 lists Ohio counties that lie along Lake Erie and describes the erosion distances and rates over long-term and short-term periods of time.

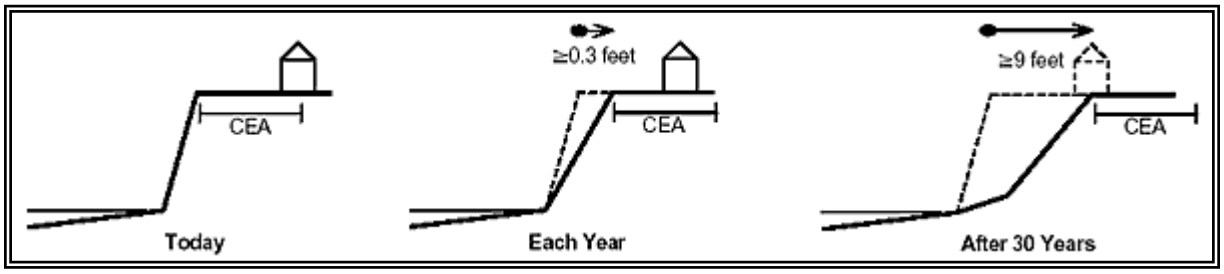


Table 4-2
Ohio Lake Erie Erosion Statistics by County

County	Long-term Distance in feet	Long-term Rate in feet per year (1877-1973)	Short-term Distance in feet	Short-term Rate in feet per year (1973-1990)
Ashtabula	**82**	**0.9**	**28**	**1.6**
Lake	**160**	**1.7**	**32**	**1.9**
Cuyahoga	**60**	**0.6**	**8**	**0.4**
Lorain	**80**	**0.8**	**12**	**0.7**
Erie (lake)	**103**	**1.6**	**42**	**2.5**
Ottawa (lake)	**208**	**2.0**	**27**	**1.6**
Lucas	**520**	**5.4**	**46**	**2.7**
Erie (bay)	**241**	**2.8**	**32**	**1.9**
Ottawa (Bay)	**61**	**2.0**	**21**	**1.2**

The coastal areas of Lorain, Cuyahoga, Lake and Ashtabula counties extend inland on average from about 1/8 mile to 1/4 mile, but continues to incorporate lake-influenced tributaries, embayments, wetlands and estuarine areas. In urban areas, the coastal boundary is generally less than 1/2 mile from the shore.

Lake Erie's shoreline encompasses approximately 27 miles in Ashtabula County. The cities of Ashtabula and Geneva, villages of Conneaut, Geneva-on-the-Lake and North Kingsville and communities of Camp Cavalry, East Ashtabula Harbor, Kingsville-on-the-Lake, Lakeville and Saybrook-on-the-Lake are all located within this shoreline.

The ODNR Office of Coastal Management has taken measures to lessen erosion and flood damage to new development by locating new development out of harm's way. They office has:

- Developed final maps of the CEAs as required by Ohio law and initiated a permit system for new conservation easements within the CEA.
- Developed a consolidated permit application to streamline the shoreline project permit processes.
- Initiated projects to address cumulative and secondary impacts of development in state and local permit decisions.

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4.6.2 Stream Bank Erosion

Deposited stream sediment following erosion event

Stream bank erosion is the direct removal of banks and beds by flowing water. Typically, it occurs during periods of high stream flow. It is sometimes confused with gully erosion because it has similarities with seasonal or ephemeral streams.

Erosion of stream or river banks through lateral (side) erosion and collapse often causes high sediment loads in creeks and rivers. The problem is often initiated by heavy rain falls in catchments with poor vegetation cover, causing excess run off. The resultant high volume and velocity runoff concentrates in the lower drainage lines or streams within catchments. When the stress applied by these stream flows exceeds the resistance of the local soil material, stream bank erosion occurs. As the sediment load increases, fast-flowing streams grind and excavate their banks lower in the landscape. Later, the stream becomes overloaded or velocity is reduced, and deposition of sediment takes place further downstream or finally in dams and reservoirs. Stream bank erosion is exacerbated by the lack of riparian zone vegetation and by direct stock access to streams.

In addition to loss of productive land due to bank erosion, dramatic changes in the course of a river or creek often restrict access on properties. Subsequent deposition of soil causes problems on productive land downstream and sedimentation in reservoirs. Other problems include reduction in water quality due to high sediment loads, loss of native aquatic habitats, damage to public utilities (roads, bridges and dams) and maintenance costs associated with trying to prevent or control erosion sites.

Soil that has eroded and washed into the water is the chief cause of pollution in the waters of Ohio, according to the ODNR. This soil is carried along with the water. When the water's velocity decreases, the soil settles out of the water. This sediment reduces the capacity of creeks, rivers, ponds, and streams, which leads to loss of habitat for insects and fish in that waterway.

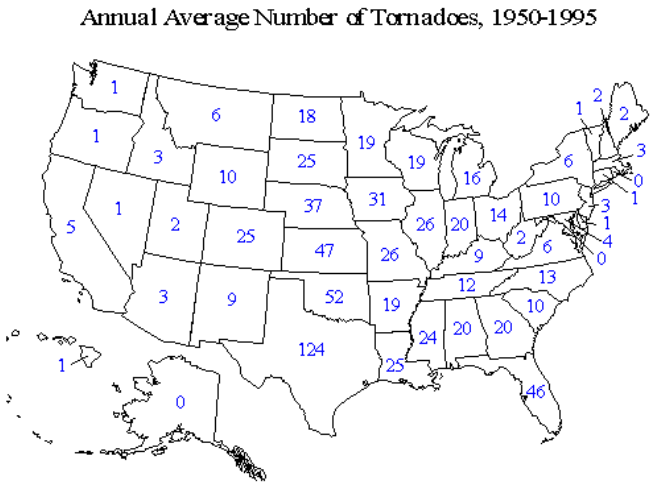
According to the Grand River Partners, Incorporated (GPRI), the valleys of the Grand River are slowly widening due to the erosion of their banks. This widening is the result of natural occurrences such as ice and water, as well as human causes such as channelization and destruction of riparian areas.

4.6.1 Frequency/Probability of Future Occurrence

Historical information for erosion prone areas within Ashtabula County was not readily available or well documented. However, the Core Group thought that the probability of having more erosion in the future in Ashtabula County was significant based on the conditions along the coastline of Lake Erie. However, by evaluating the previous development and erosion problems in the County, the Core Group decided upon mitigation alternatives that would help educate residents and local officials on how to avoid future structural and erosion problems associated with construction. These mitigation alternatives will be discussed in a later section of this report.

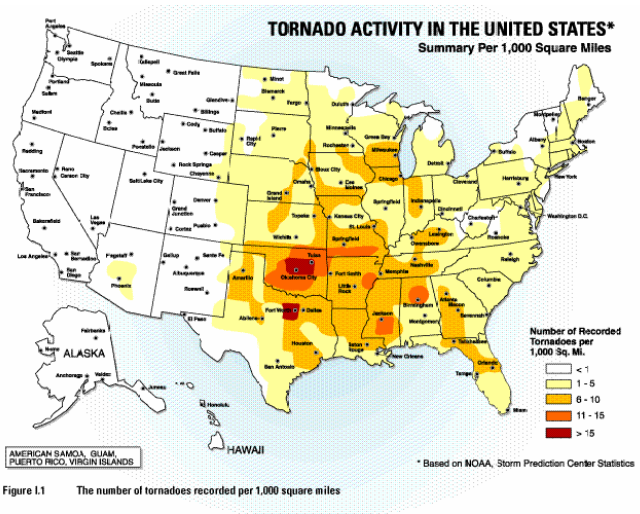
4.7 Tornadoes

Tornadoes are produced from the energy released during a thunderstorm, but account for only a tiny fraction of the overall energy generated. What makes them particularly dangerous is that the energy is concentrated in a small area, perhaps only 100 yards across. Not all tornadoes are the same and science does not yet completely understand how a portion of a thunderstorm's energy becomes focused into something as small as a tornado.



Tornadoes occur mostly in the central plains of North America, east of the Rocky Mountains and west of the Appalachian Mountains. They occur primarily during the spring and summer – the tornado season comes early in the south and later in the north according to the seasonal changes in relation to latitude – usually during the late afternoon and early evening. They have been known to occur in every state in the United States and every continent on the earth, any day of the year, and at any hour.

The damaging strong winds generated from tornadoes can reach 300 mph in the most violent tornadoes, causing automobiles to become airborne, ripping ordinary homes to shreds, and turning broken glass and other debris into lethal missiles. The biggest threat to living creatures, including humans, during tornadoes is flying debris and being tossed about in the wind. Contrary to previous belief, it is not true that the pressure in a tornado contributes to damage by making buildings "explode."



Based on NOAA Storm Prediction Center Statistics

According to the NWS, the development of Doppler radar has made it possible, under certain circumstances, to detect tornadic winds with radar. However, spotters remain an important part of the system to detect tornadoes, because not all tornadoes occur in situations where the radar can "see" them. Citizen volunteers comprise what is called the SKYWARN (*www.skywarn.org*) network of storm spotters, who work with their local communities to watch out for approaching tornadoes to ensure that appropriate action is taken during tornado events. Spotter information is relayed to the NWS, who operates the Doppler radars and issues warnings, usually relayed to the public by radio and TV, for communities ahead of the storms. The NWS utilizes all the information they can obtain from weather maps, modern weather radars, storm spotters, monitoring power line breaks, as well as additional sources for issuing tornado warnings.

Although the process by which tornadoes form is not completely understood, scientific research has revealed that tornadoes usually form under certain types of atmospheric conditions. Those

conditions can be predicted, but it is not yet possible to predict in advance exactly when and where they will develop, how strong they will be, or precisely what path they will follow. According to the NWS, there are some "surprises" every year, when tornadoes form in situations that do not look like the right conditions in advance, but these are becoming less frequent. Once a tornado is formed and has been detected, warnings can be issued based on the path of the storm producing the tornado, but even these cannot be perfectly precise regarding who will, or will not, be struck.

Table 4-3 shows that although the State of Ohio may not have the most tornadoes, those that do hit Ohio are significant in damage and have other indication factors of a large scale tornado.

Table 4-3
State Tornado Ranking

Rank	Total Number of Tornadoes	Deaths per 10,000 sq. miles	Number of Killer Tornadoes	Total Tornado Path Length per 10,000 sq. miles	Killer Tornadoes as a % of all Tornadoes	Annual Tornadoes per 10,000 sq. miles
1	Texas	Massachusetts	Texas	Mississippi	Tennessee	Florida
2	Oklahoma	Mississippi	Oklahoma	Alabama	Kentucky	Oklahoma
3	Florida	Indiana	Arkansas	Oklahoma	Arkansas	Indiana
4	Kansas	Alabama	Alabama	Iowa	**Ohio**	Iowa
5	Nebraska	**Ohio**	Mississippi	Illinois	Alabama	Kansas
6	Iowa	Michigan	Illinois	Louisiana	Mississippi	Delaware
7	Missouri	Arkansas	Missouri	Kansas	North Carolina	Louisiana
8	Illinois	Illinois	Indiana	Indiana	Michigan	Mississippi
9	S Dakota	Oklahoma	Louisiana	Nebraska	New York	Nebraska
10	Louisiana	Kentucky	Tennessee	Wisconsin	Massachusetts	Texas

Although the number of tornadoes in Ohio does not rank high compared to other states in the United States, the State does average around 14 tornadoes a year. Ohio's peak tornado season runs from April through July, with most tornadoes occurring between 2 p.m. and 10 p.m. Even though June has been the month with the most tornado occurrences, many of the State's major tornado outbreaks have taken place in April and May. However, history has shown that tornadoes can occur during any month of the year and at any time of the day or night.

Tornadoes are considered the most violent atmospheric phenomenon on the face of the earth with their strength being measured by the Fujita Scale as described in Table 4-4. This scale is the mechanism used to determine the potential type of tornado that may have affected a particular community. It is based on velocity of wind and the type of damage the tornado caused. Many F0 and F1 tornadoes have touched down in Ohio, but Ohio has also been struck by some of the most destructive (F5) tornadoes ever, including the April 3, 1974 tornado which devastated Xenia, killing over 30 people and destroying 2,000 buildings.

Table 4-4
Fujita Scale for Tornadoes

Scale	Wind Speed	Typical Damage
F-0 Weak	40-72 miles per hour (mph)	Light Damage: Some chimneys damaged, twigs and branches broken off trees, shallow-rooted trees pushed over, signboards damages, some windows broken.
F-1 Weak	73-112 mph	Moderate Damage: Surface of roofs peeled off, mobile homes pushed off foundations or overturned, outbuildings demolished, moving autos pushed off the roads, trees snapped or broken; beginning of hurricane speed winds.
F-2 Strong	113-157 mph	Considerable Damage: Roofs torn off frame houses, mobile homes demolished, frame houses with weak foundations lifted and moved, large trees snapped or uprooted, light-object missiles generated.
F-3 Strong	158-206 mph	Severe Damage: Roofs and some walls torn off well-constructed houses; trains overturned; most trees in forecast uprooted, heavy cars lifted off the ground and thrown, weak pavement blown off the roads.
F-4 Violent	207-260 mph	Devastating Damage: Well-constructed houses leveled, structures with weak foundations blown off the distance, cars thrown and disintegrated, trees in forest uprooted and carried some distance away.
F-5 Violent	261-318 mph	Incredible Damage: Strong frame houses lifted off foundations and carried considerable distance to disintegrate, automobile-sized missiles fly through the air in excess of 300 feet, trees debarked, incredible phenomena will occur.

Ashtabula County has had 12 tornadoes from 1956 to 2004, according to the NCDC. These tornadoes caused $6.4 million worth of property damage and injured 29 people. Two tornadoes that occurred on May 31, 1985 were responsible for $5.0 million of the total property damage and 25 injuries incurred.

4.7.1 Frequency/Probability of Future Occurrence

Ashtabula County has had a noticeable history of tornado occurrences. According to the NCDC, there have been 12 tornadic events recorded in Ashtabula County over the past 49 years. On average, tornadoes occur in the County every 4 years. The probability of future occurrences for tornadoes to occur in Ashtabula County is relatively low.

4.8 Floods

Floods are a naturally recurring event for a river or stream, and are caused by weather phenomena and events that deliver more precipitation to a drainage basin that can be readily absorbed or stored within the basin. Flooding is a localized hazard that is a result of heavy or continuous rainfall exceeding the absorptive capacity of soil and the flow capacity of rivers and streams. Floods can be generally considered in two categories: flash floods, the product of heavy localized precipitation in a short time period over a given location; and riverine floods, caused by precipitation over a longer time period and over a given river basin.

Riverine flooding refers to periodic flooding of lands adjacent to non-tidal rivers and streams. It is a natural and inevitable occurrence. When stream flow exceeds the capacity of the normal watercourse, some of the above-normal stream flow spills over onto adjacent lands within the floodplain. Riverine flooding is a function of precipitation levels and water runoff volumes within the watershed of the stream or river. The recurrence interval of a flood is defined as the average time interval, in years, expected to take place between the occurrence of a flood of a particular magnitude and an equal or larger flood. Flood magnitude increases with increasing recurrence interval.

4.8.1 Special zone flood (100-year Floodplain)

Flood Insurance Rate Maps (FIRM) show areas delineated to be special flood hazards. The Base Flood Elevation (BFE) refers to the elevation associated with a special flood zone, or a flood with a 1% chance of occurring in any given year. Areas within a special flood zone area, also known as the 100-year floodplain, have an elevation lower than the BFE and are categorized into zones. Zone “A” is the flood insurance rate zone that corresponds to a special flood zone area that is determined in the Federal Flood Insurance Study by approximate methods. Because detailed hydraulic analyses are not performed for such areas, no BFEs or depths are shown within this zone. Zone “AE” is the flood insurance rate zone that corresponds to a special flood zone area that is determined in the Federal Flood Insurance Study by detailed methods. In most instances, BFEs derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Ashtabula County has special zone floodplains identified within the County. The best way to combat a disaster happening within these special zone flood hazard areas is through public awareness. The following list gives the incorporated jurisdictions that are in compliance with state floodplain management standards and participate in the National Floodplain Insurance Program (NFIP), and the date in which they entered the program.

- Ashtabula February 2, 1981
- Conneaut February 15, 1980
- Geneva February 1, 1980
- Geneva-on-the-Lake December 4, 1979
- Jefferson August 1, 1979
- North Kingsville August 4, 1988
- Roaming Shores September 16, 1988

Ashtabula County has been participating in the NFIP since January 2, 1981. The villages of Andover, Orwell and Rock Creek do not have hazard areas identified by FEMA and do not participate in the NFIP.

The most current floodplain maps are dated to the late 1970s and early 1980s for all jurisdictions in the County. The County map was prepared in 1981. Consequently, Ashtabula Township is currently participating in the FEMA Multi-Hazard Map Modernization Project which will update their maps, making them more accurate and effective.

4.8.2 Repetitive Loss

In most counties there are areas that periodically suffer damages from floods. They are known as “Repetitive Loss” properties. Repetitive loss properties are defined as properties with structures that have had two or more insurance claims within a 10-year period. There are seven properties that have suffered from repeated flooding occurrences in Ashtabula County.

4.8.3 Frequency/Probability of Future Occurrence

Past floods are indications of what can happen in the future, but mitigation plans are based on the risk of future flooding. Flood studies interpret historical records to determine the statistical potential that storms and floods of certain magnitude will recur. Such events are measured by their recurrence interval.

Recurrence interval, or frequency of occurrence, is defined as the average number of years between storms of a given intensity. Recurrence intervals commonly used in technical studies and design are 2, 10, 25, 50 and 100 years. Recurrence interval addresses how often a flood of a specific depth will be expected to occur. Structures located within areas considered at higher risk should be prioritized higher as it relates to mitigation.

According to the NCDC, Ashtabula County has experienced nine floods over a 54-year period with damage estimates totaling approximately $7.1 million. The Core Group evaluated this information and determined that it was only partially correct since the earliest flood documented was in 1993. Based on historical information, Ashtabula County can expect to endure one riverine flood in any given year.

4.9 Droughts and Excessive Heat

A drought is a period of abnormally dry weather that persists long enough to produce a serious hydrologic imbalance (i.e., crop damage, water supply shortage, etc.) The severity of the drought depends upon the degree of moisture deficiency, the duration and the size of the affected area.

The worst drought in 50 years affected 35 states during the long, hot summer of 1988, when some areas had been suffering from lack of rainfall since 1984. Rainfall totals in 1988 throughout the mid-west, Northern Plains and the Rockies were 50% to 85% below normal. Crops and livestock died, and some areas became desert. Forest fires began over the Northwest that left 4,100,000 acres destroyed by autumn.

A heat wave or excessive heat event is defined as a prolonged period of excessive heat and humidity. Medical conditions that a population could suffer from during a heat wave are heat exhaustion and heat stroke.

According to the NCDC, there have been four droughts that have occurred in Ashtabula County since 1995. The Drought of 1999 is the only drought that recorded crop damage, with loss amounts totaling $200 million.

There were three heat waves and two excessive heat events that occurred from 1993 to 2005, according to the NCDC. These events occurred during the summers of 1995 and 1999, causing $1.1 million in property damage, 18 deaths and 75 injuries.

4.9.1 Droughts-Precursor to Other Disasters

Rural counties are susceptible to wild land fires especially during drought conditions. When most people think of wild fires, the first thing that comes to mind is the devastating and disastrous western fires that are quite prevalent during the summer months.

With more people than ever living, working, traveling and recreating in the urban/urban interface, the odds of wild land fires are increasing. Causes of wild land fires include the careless burning of debris, household trash and cigarettes, lightning, equipment and vehicles, railroad accidents, electrical fires, and arson.

Fire fighters talk of the fire triangle in terms of the heat of combustion, fuel and oxygen all being necessary for fire to occur. Wild land fire fighters are concerned with the wild land fire triangle of fuel (grass, brush, forests, crops, etc.), terrain (open flat lands, steep slopes and everything conducive to wild land fire spread) and weather (hot, dry, windy conditions are typical wild land fire weather).

During an average year in Ohio, an estimated 15,000 wildfires and natural fuel fires occur. Typically, a reported 1,000 wild land fires burn an average between 4,000 to 6,000 acres in Ohio each year.

According to the NCDC, there were no recorded wild and forest fire events recorded in Ashtabula County from 1950 to 2004.

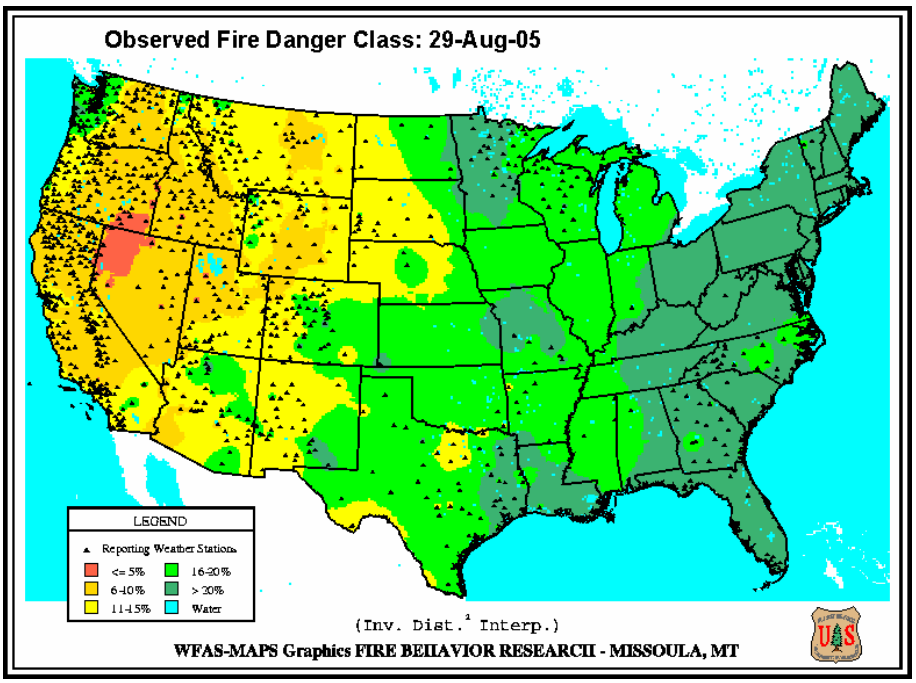
4.9.2 Urban/Rural Fire Interface

The wildland-urban interface can be defined as the zone where structures and other human developments meet or intermingle with undeveloped lands.

Topography plays a major role in how fast a wildfire spreads. Steep slopes are the greatest topographical influence on fire behavior. As the steepness of a slope increases, fires spread more quickly. A fire will spread twice as fast on a 30% slope than it will on level ground. This fast speed is due to the fact that a fire starting at the bottom of a slope has a longer upslope run with more available fuel in its path.

Unlike most hazards, the threat of a drought tends to be dismissed because of the relatively long time a drought takes to have damaging effects.

The current US Forest Service forecasts a low fire danger potential for Ashtabula County.



4.9.3 Frequency/Probability of Future Occurrence

According to the NCDC, Ashtabula County has experienced four droughts of significance in the past 12 years. Based on this information, Ashtabula County can expect to endure a drought every three years. In addition, Ashtabula County is largely agricultural and suffers varying amounts of crop damage during severe heat and dry conditions that may not be categorized as a drought. The Core Group concluded that this damage is not always recorded but still has a detrimental effect on the County. The Core Group also realized that, unlike other hazards such as flooding or tornadoes, there is little mitigation that can be preplanned to reduce the amount of agricultural damage caused by a drought. However, the Core Group wanted to evaluate providing an alternate potable water source in the event that existing water supplies are disrupted or run dry.

There is a moderate probability of excessive heat events occurring on a yearly basis in Ashtabula County. Excessive heat events were recorded in two years, 1995 and 1999. Based on historical information, Ashtabula County can expect to endure one excessive heat event every four years.

4.10 Earthquakes

4.10.1 Earthquakes in Ohio

The problem with earthquakes are major earthquakes are a low probability, high consequence event. It is because of the potential high consequences that geologists, emergency planners and other government officials have taken a greater interest in understanding the potential for earthquakes in some of the areas of the eastern United States and educating the population as to the risk in their areas. Although there have been great strides in increased earthquake awareness in the eastern United States, the low probability of such events makes it difficult to convince most people that they should be prepared.

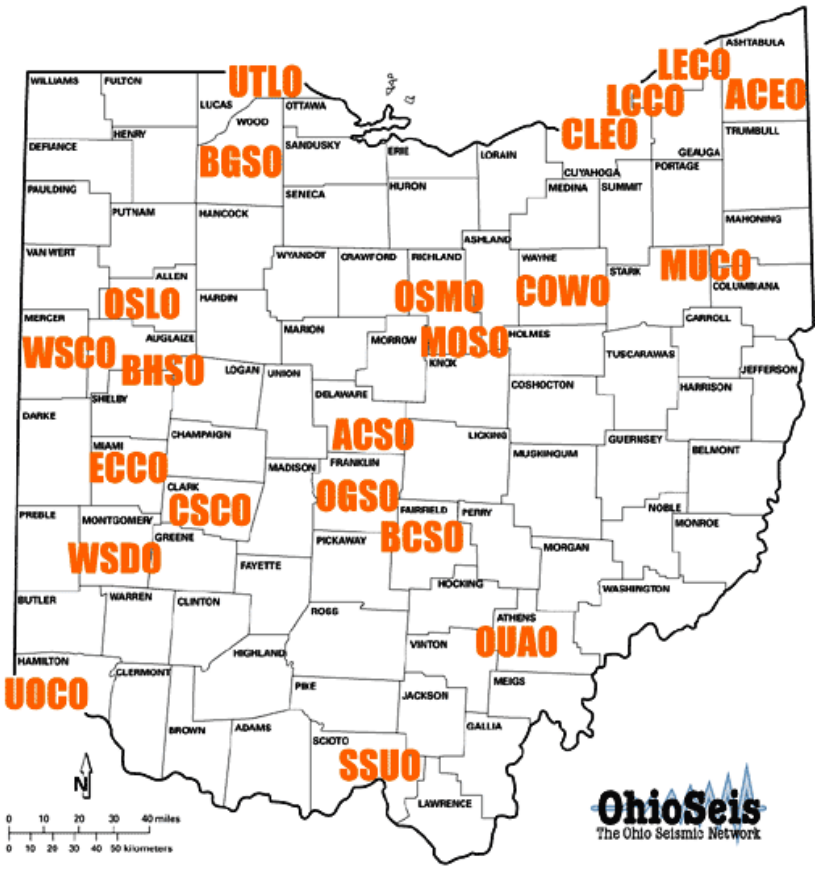
It is surprising to many Ohioans that the State has experienced more than 120 earthquakes since 1776, and that 14 of these events have caused minor to moderate damage. The largest historic earthquake in Ohio was centered in Shelby County in 1937. This event, estimated to have had a magnitude of 5.5 on the Richter scale, caused considerable damage in Anna and several other western Ohio communities, where at least 40 earthquakes have been felt since 1875. Northeastern Ohio, east of Cleveland, is the second most active area of the state. At least 20 earthquakes have been recorded in the area since 1836, including a 5.0 magnitude event in 1986 that caused moderate damage. A broad area of southern Ohio has experienced more than 30 earthquakes.

Although the New Madrid Line is in close proximity to the State of Ohio, there has not been an earthquake of any significance since 1875 caused by this fault line. An earthquake on June 18, 1975 caused damage in western Ohio, and affected a total area estimated at over 40,000 square miles. Walls were cracked and chimneys thrown down in Sidney and Urbana. The shock was felt sharply at Jeffersonville, Indiana. The affected area included parts of Illinois, Indiana, Kentucky and Missouri.

4.10.2 Monitoring of Earthquakes

The ODNR Division of Geological Survey has established a 23 station cooperative network of seismograph stations throughout the State in order to continuously record earthquake activity. The network, which went on line in January 1999, ended a five-year gap during which there was only one operating station in Ohio. The State was dependent on seismographs in Kentucky and Michigan to record Ohio earthquakes.

The 23 stations of the new seismograph network, which is called OhioSeis, are distributed across the State, but are concentrated in the most seismically active areas or in areas that provide optimal conditions for detecting and locating very small earthquakes that are below the threshold of human notice. These small micro earthquakes are important because they occur more frequently and help to identify the location of faults that may periodically produce larger, potentially damaging earthquakes.



The OhioSeis seismograph stations are located at colleges, universities and other institutions, employing new technology that not only makes them very accurate, but also relatively inexpensive and easy to operate and maintain. In contrast to the old technology, in which a pen made a squiggly line on a paper drum, the new system is entirely

digital and uses a desktop computer to continuously record and display data. Two other innovations have made the system unique. An inexpensive Global Positioning System (GPS) receiver is used to keep very precise time on the continuously recorded seismogram, and each station's computer is connected to the Internet for rapid data transfer.

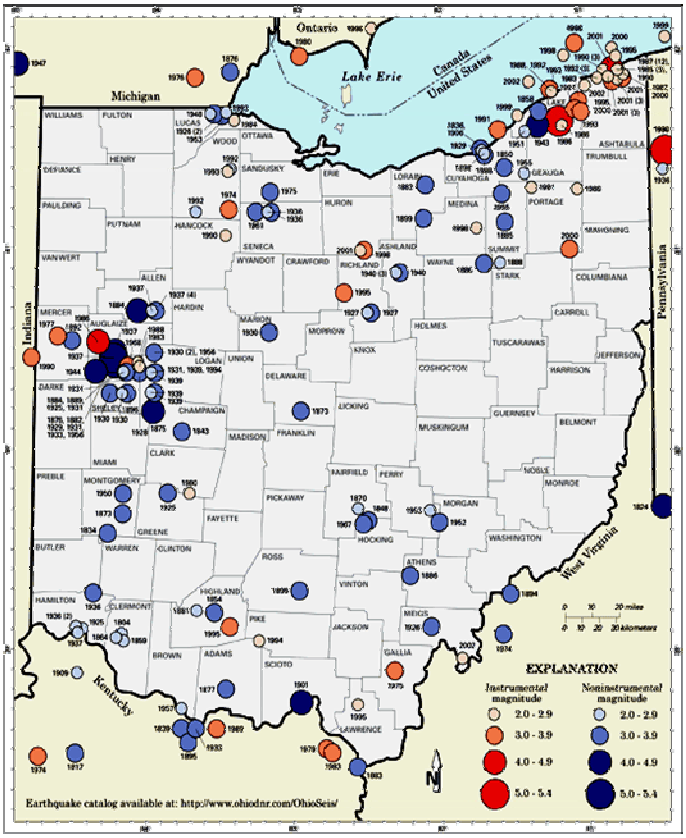
Each OhioSeis station is a cooperative effort. Seismometers, the instrument that detects Earth motions and other seismic components were purchased by the Division of Geological Survey with funds provided by FEMA through the OEMA, as part of the National Earthquake Hazards Reduction Program. The computers and Internet connection were purchased and provided by the cooperating institutions.

The Division of Geological Survey is coordinating the seismic network and has established the Ohio Earthquake Information Center at the Horace R. Collins Laboratory at Alum Creek State Park, north of Columbus. This facility functions as a repository and laboratory for rock core and well cuttings, but has a specially constructed room for earthquake recording. The seismograph system allows for very rapid location of the epicenter and calculation of the magnitude of any earthquake in the State. The earthquake records, or seismograms, from at least three seismograph stations are needed to determine earthquake locations (epicenters). These records can be downloaded from the internet at any station on the network, and location and magnitude can be determined. Small earthquakes were in many cases not even detected by distant, out-of-date seismograph stations.

The OhioSeis network provides a whole new dimension of understanding about the pulse of the Earth beneath Ohio. Although the new seismograph network will not predict earthquakes or provide an alert prior to an event, it will provide insight into earthquake risk in the State so that intelligent decisions about building and facility design and construction, insurance coverage and other planning decisions can be made by individuals, business and industry, and governmental agencies.

There is an OhioSeis station located at the Ashtabula County EMA office in Jefferson, Ohio. The station is operated independently by volunteers as part of a cooperative agreement. It is also connected to the Internet for rapid access and transfer of data.

The northeastern portion of Ohio is the second most seismically active area in the State. Northeastern Ohio has experienced more than 60 felt earthquakes since 1836; most have been small and caused little or



Epicenters of past earthquakes in Ohio.

no damage. Some geologists have suggested that some of these earthquakes occurred on an extensive north-south linear feature in Precambrian basement rocks known as the Akron magnetic boundary.

Ashtabula County has had a total of 41 recorded epicenters within its boundaries as shown on the epicenter map in this section. Many of the smaller magnitude earthquakes that have occurred since 1987 can be associated with a deep, now abandoned, Class I injection well located in the City of Ashtabula. The well injected about 215 cubic yards per day of waste fluid into the 5,906 feet deep basal sandstone with about 100 bars of wellhead pressure from May 1986 to June 1994. A yearly high pore-pressure anomaly is expected to expand along this hydraulically confined horizon at the top of the basement, even after injection ends and pressure drops near the well. Over 16 years, seismicity has shifted southward from less than one mile to 3 to 5 miles from the point of injection. It seems to initiate when and where a significant pore-pressure rise intersects pre-existing faults. Table 4-5 below describes the number of smaller magnitude earthquakes that have occurred and are attributed to the well injection anomaly.

Table 4-5
Ashtabula County Earthquakes of 2.0-2.9 Magnitude from 1987 to 2005

Year	Number of Earthquakes
1987	13
1989	3
1990	3
1992	4
1995	2
2000	3
2001	3
2002	1
2005	2

In 2001, there were four epicenters with magnitudes of 3.0-3.9 on the Richter scale located in central northern Ashtabula County. In 1983 and 1993, there were two epicenters with magnitudes of 3.0-3.9 on the Richter scale located in northwestern Ashtabula County. Lastly, in 2001, there was one epicenter recorded with magnitudes of 4.0-4.9 on the Richter scale located in central northern Ashtabula County.

Although not located in Ashtabula County, an earthquake occurred in Jamestown, Pennsylvania on September 25, 1998 that affected parts of Ashtabula County. It measured 5.2 on the Richter scale and caused rattling in Jefferson as well as causing some wells in southeastern Ashtabula County to become dry.

4.10.3 Frequency/Probability of Future Occurrence

Based on historical occurrences of earthquakes in the County, Ashtabula County can expect to endure one earthquake per year. However, the magnitude of these is expected to be of a smaller magnitude with minimal damage.

4.11 Water Spouts

2000 Waterspout over Lake Erie

Photo courtesy of: www.msc-smc.ec.gc.ca/.../bigwtrspout10_e.cfm

A waterspout is a tornado that occurs over water, usually not in association with a supercell thunderstorm. Although waterspouts are always tornadoes by definition, they are not counted in official tornado records unless they hit land. They are smaller and weaker than the most intense Great Plains tornadoes, but still can be quite dangerous. Waterspouts can overturn small boats, damage ships, do significant damage when hitting land and kill people.

Tornados over water are usually quite dangerous, posing threats to ships, planes and swimmers. It is recommended to keep a considerable distance from either of these phenomena, and to always be on alert through weather reports. The NWS will often issue special marine warnings when waterspouts are likely or have been sighted over coastal waters or tornado warnings when waterspouts can move onshore.

Though they mostly occur in the tropics, they can seasonally appear in temperate areas. They are more frequent within 62 miles from the coast than out in the open sea. Waterspouts are common along the southeast US coast, especially off southern Florida and the Keys, and can happen over seas, bays and lakes worldwide.

In the fall of 2003, a record waterspout outbreak occurred over the Great Lakes. According to Environment Canada, 66 waterspouts occurred between late September and early October over the Great Lakes. It was the largest waterspout occurrence that has ever been recorded. The outbreak was attributed to a cold air mass, and associated major upper trough, which remained entrenched over the Great Lakes for a week. Above normal lake temperatures also contributed to this unusual event.

According to the ODNR Division of Watercraft, certain measures can be taken if a boater is caught in the path of a waterspout or tornado. The best way to avoid them is by moving the vessel and traveling at a 90-degree angle away from its apparent directional movement.

4.11.1 Frequency/Probability of Future Occurrence

According to the NCDC, seven waterspouts occurred in Ashtabula County from 1995 to 2001. There were no deaths, injuries or monetary damage reported for these events. Based on historical information, Ashtabula County can expect to endure one to two waterspouts a year.

4.12 Other Hazards

4.12.1 Dams and Dam Safety

Dam failures are often referred to as disasters. By definition, a disaster is any event that causes great harm or damage, serious or sudden misfortune. Because of the rapid and unexpected manner in which dam failures can occur, they are classified in the same general magnitude as earthquakes and tornadoes.

Because of the many dams existing in Ashtabula County, the Core Group chose to discuss dam safety in this Mitigation Plan. The Core Group is especially concerned with the development occurring downstream of these dams.

4.12.1.1 Dams in Ohio

A dam is an artificial barrier usually constructed across a stream channel to impound water. Timber, rock, concrete, earth, steel or a combination of these materials may be used to build the dam. In Ohio, most dams are constructed of earth. Dams must have spillway systems to safely convey normal stream and flood flows over, around, or through the dam. Spillways are commonly constructed of non-erosive materials such as concrete. Dams also have a drain or other water-withdrawal facility to control the pool or lake level and to lower or drain the lake for normal maintenance and emergency purposes.

Most dams in Ohio are small and are constructed by farmers and other private individuals for water supply, recreation, swimming and fishing. Numerous other, usually larger, dams are built by cities and industry to form reservoirs for water supply or liquefied waste storage. Ownership of dams is diverse and maintained by both public and private interests. The federal government owns and operates over 30 dams for flood control, recreation and water supply. The state of Ohio has more than 100 dams, primarily located instate park and wildlife areas for recreational purposes. Flood control and some water supply are provided by dams owned by watershed conservancy districts.

The oldest dams in Ohio were constructed over 150 years ago to create water supply reservoirs for a network of navigational canals. Buckeye Lake Dam, built in about 1825 as part of the canal system and located in Licking and Fairfield counties, is the oldest dam in the state. The highest dam in Ohio is located in Jefferson County and is 240 feet high.

4.12.1.2 History of Dam Safety in Ohio

Construction of dams in Ohio dates back to the early 1800 when reservoirs such as Buckeye Lake and Grand Lake St. Marys were built to supply water to the canal system, which provided a means of transportation for agricultural trade and commerce. Dam construction continued at a modest pace for about the next 100 years with relatively few dams built by private entities. In the early part of the nineteenth century, several large municipally-owned dams and reservoirs were built for public water supply. Severe floods also prompted the formation of conservancy districts which constructed dams for flood control.

Although the true forerunner of current dam safety laws in Ohio was enacted in 1963, legislation pertaining to the construction of dams was enacted as early as 1937. This early set of laws

aimed to encourage construction of dams for the storage of water in response to recent drought periods in Ohio and the "dust bowl" days on the Great Plains. The regulatory agency responsible for the enforcement of these early laws was the Division of Conservation and Natural Resources in the State Department of Agriculture.

Due to the availability of large earthmoving equipment after World War II, Ohio saw a significant increase in the number of dams built by individuals and private companies. Although the water storage and recreational capabilities provided by these dams were important benefits, concern about the adequacy of design and construction was prompted by the loss of life and property damage resulting from dam failures, which led to a greater interest in dam safety.

The ODNR's Division of Water has been involved in dam safety since 1963. During this year, the first Ohio law requiring construction permits for building new dams was enacted. In addition, following the failure of several dams in northeast Ohio during the severe flood of 1969, the General Assembly revised the law to include periodic inspections of existing structures. Inspections were required to help assure that the continued operation and use of a dam, dike or levee does not pose a hazard to life, health, or property. In 1972, the failure of Buffalo Creek Dam in West Virginia, which caused great loss of life and severe property damage, led to the enactment of the National Dam Safety Act. This law, administered by the Corp of Engineers, called for an inventory of dams in the United States and the inspection of those dams that could create the most hazards if they failed. The Corps contracted with the Division of Water to inventory roughly 4,500 non-federal dams in Ohio.

4.12.1.3 Classification of Dams in Ohio

According to Ohio Administrative Code Rule 1501:21-13-01, dams are classified as follows:

Class I: A dam shall be placed in Class I when failure of the dam would result in probable loss of human life. Dams having a storage volume greater than 5,000 acre-feet or a height of greater than 60 feet shall be placed in Class I.

Class II: Dams having a storage volume greater than 500 acre-feet or a height of greater than 40 feet shall be placed in Class II. A dam shall be placed in Class II when failure of the dam would result in at least one of the following conditions, but loss of human life is not envisioned:

(a) Possible health hazard, including but not limited to, loss of a public water supply or wastewater treatment facility.

(b) Probable loss of high-value property, including but not limited to, flooding of residential, commercial, industrial, publicly owned, and/or valuable agricultural structures, structural damage to downstream Class I, II, or III dams, dikes or levees, or other dams, dikes or levees of high value.

(c) Damage to major roads, including but not limited to, interstate and state highways and roads which provide the only access to residential or other critical areas such as hospitals, nursing homes or correctional facilities as determined by the Chief of ODNR's Division of Water.

(d) Damage to railroads, or public utilities.

Class III: Dams having a height of greater than 25 feet, or a storage volume of greater than 50 acre-feet, shall be placed in Class III. A dam shall be placed in Class III when failure of the dam would result in at least one of the following conditions, but loss of human life or hazard to health is not envisioned.

(a) Property losses, including but not limited to, rural buildings not otherwise listed as high-value property in paragraph (A) of this Rule and Class IV dams, dikes and levees not otherwise listed as high-value property in paragraph (A) of this Rule. At the request of the dam owner, the Chief of ODNR's Division of Water may exempt dams from the criterion of this paragraph if the dam owner owns the potentially affected property.

(b) Local roads including but not limited to roads not otherwise listed as major roads in paragraph (A) of this rule.

Class IV: When failure of the dam would result in property losses restricted mainly to the dam and rural lands, and not loss of human life or hazard to health is envisioned, the dam may be placed in Class IV. Dams which are twenty-five feet or less in height and have a storage volume of fifty acre-feet or less, may be placed in Class IV. No proposed dam shall be placed in Class IV unless the applicant has submitted the preliminary design report required by Rule 1501:21-5-02 of the Administrative Code. Class IV dams are exempt from the permit requirements of Section 1521.06 of the Revised Code pursuant to paragraph (A) of Rule 1501:21-19-01 of the Administrative Code. (www.dnr.ohio.gov/water/dsafety/whatdam.htm)

There are more than 50,000 dams identified in Ohio. A great majority of these dams are small and do not fall under the jurisdiction of Ohio's Dam Safety Laws. The number of dams, which fall under state law jurisdiction number as of April 2000 and their classifications are as follows:

- Class I Dams - 499
- Class II Dams - 539
- Class III Dams - 704
- Class IV Dams - 952

According to the ODNR, Ashtabula County has 125 dams within its boundaries. The number of dams and their classifications are as follows:

- Class I - 5
- Class II - 18
- Class III - 15
- Class IV - 22

In addition, Ashtabula County has 17 unclassified dams, 44 exempt dams and four abandoned dams which have been determined by the ODNR's Chief of the Division of Water to not constitute a hazard to life, health or property in the event of a failure.

According to the Ashtabula County Emergency Operations Plan (EOP), there are six dams in the County that could cause flooding in populated areas downstream if they were to fail. Specific location information was not given.

4.12.2 Chemical Plants

Chemical plants could potentially be targets for terrorism. According to the Brookings Institute, US chemical plants represent the third highest risk of fatalities from possible terrorist attacks. There are 15,000 facilities located across the United States that produce or store deadly chemicals. According to the chemical companies' worst case scenarios found in each company's risk management plan, there are more than 100 chemical plants where a catastrophic accident or an act of sabotage by terrorists could endanger more than a million people.

One plant in Chicago could affect almost three million people. In California, the chemicals at one site have the potential to kill, injure or displace more than eight million people. Up to 29 of the plants were located in Texas, more than twice as many than in any other state. Illinois and California each had up to 13 such plants, Ohio had eight, and Florida and New Jersey had seven each. The report also tallied the numbers of chemical plants in smaller and rural areas. About one-fifth of the nation's chemical facilities, which exceed 10,000, are close to population centers.

Security issues have been a major concern since the September 11, 2001 terrorist attacks. In the following weeks and months, the White House and Congress enacted new laws and regulations to tighten security at airports, nuclear power plants, and places where public water supplies are stored.

Ashtabula County does contain chemical plants that could be considered vulnerable to a terrorist attack. However, locations of these plants will not be mapped given due to the sensitivity of this information.

4.12.3 Water Quality of Lakes and Streams

Water quality is constantly threatened by many different sources and types of pollution. Under the Clean Water Act, every state must adopt water quality standards to protect, maintain and improve the quality of the nation's surface waters. These standards represent a level of water quality that will support the goal of "swimmable/fishable" waters. Water quality standards are ambient standards as opposed to discharge-type standards. These ambient standards, through a process of back calculation procedures known as total maximum daily loads or wasteload allocations form the basis of water quality based permit limitations that regulate the discharge of pollutants into surface waters under the National Pollutant Discharge Elimination System (NPDES) permit program.

Ohio's water quality standards, set forth in Chapter 3745-1 of the Ohio Administrative Code, include four major components: beneficial use designations, narrative "free froms", numeric criteria and antidegradation provisions.

4.12.3.1 Beneficial Use Designations

Beneficial use designations describe existing or potential uses of waterbodies. They take into consideration the use and value of water for public water supplies, protection and propagation of aquatic life, recreation in and on the water, agricultural, industrial and other purposes. The Ohio Environmental Protection Agency (EPA) assigns beneficial use designations to waterbodies in the State. There may be more than one use designation assigned to a waterbody. Examples of

beneficial use designations include: public water supply, primary contact recreation, and aquatic life uses (warmwater habitat, exceptional warmwater habitat, etc.)

4.12.3.2 Narrative "Free Froms"

Narrative "free froms" are general water quality criteria that apply to all surface waters. These criteria state that all waters shall be free from sludge, floating debris, oil and scum, color and odor producing materials, substances that are harmful to human, animal or aquatic life and nutrients in concentrations that may cause algal blooms.

Much of the Ohio EPA's present strategy regarding water quality based permitting is based upon the narrative free from, "no toxics in toxic amounts." The Ohio EPA developed its strategy based on an evaluation of the potential for significant toxic impacts within the receiving waters. Very important components of this evaluation are the biological survey program and the biological criteria used to judge aquatic life use attainment.

4.12.3.3 Numeric Criteria

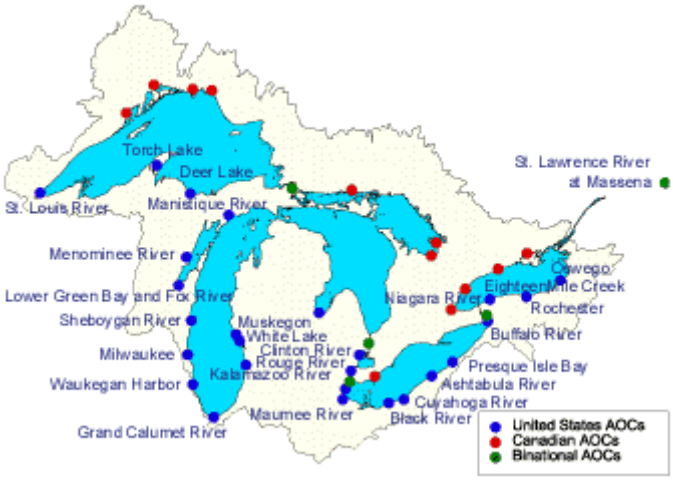
Numeric criteria are estimations of concentrations of chemicals and degree of aquatic life toxicity allowable in a waterbody without adversely impacting its beneficial uses. Although numeric criteria are applied to waterbodies, they primarily are used to regulate dischargers through NPDES permits.

4.12.3.4 Antidegradation Provisions

The antidegradation provisions describe the conditions under which water quality may be lowered in surface waters. Existing beneficial uses must be maintained and protected. Further, water quality better than that needed to protect existing beneficial uses must be maintained unless lower quality is deemed necessary to allow important economic or social development (existing beneficial uses must still be protected).

4.12.3.5 Areas of Concern

Area of Concerns (AOCs) are severely polluted areas in the Great Lakes watershed. In Ohio, the four AOCs are the lower Maumee, Black, Cuyahoga and Ashtabula rivers and the corresponding areas contributing to the pollution of coastal waters and sediments. ODNR included portions of these AOCs within the coastal area boundary, recognizing the potential for direct and significant impacts on coastal waters of present and future activities and remedial actions. The State of Ohio is committed to restoring and protecting water quality and beneficial uses in these coastal waters.



Great Lakes AOCs

In an effort to clean the most polluted areas in the Great Lakes, the US and

Canada, in Annex 2 of the Great Lakes Water Quality Agreement, committed to cooperate with State and Provincial Governments to ensure that Remedial Action Plans (RAPs) are developed and implemented for all designated AOCs in the Great Lakes basin.

Local water quality planning agencies, the Ohio EPA and other agencies were also developing RAPs for each of four AOCs designated under the 1987 Protocol Amending the Great Lakes Water Quality Agreement.

In Ashtabula County, the Ashtabula River is designated as a Great Lakes AOC as can be seen on the illustration in this section. The Ashtabula River lies in extreme northeast Ohio, flowing into Lake Erie's central basin at the City of Ashtabula. Its drainage basin covers an area of 137 mi^2, with 8.9 mi^2 located in western Pennsylvania. Major tributaries include Fields Brook, Hubbard Run and Ashtabula Creek. The City of Ashtabula is the only significant urban center in the watershed, the rest of the drainage basin being predominantly rural and agricultural. There is concentrated industrial development around Fields Brook and east of the river mouth.

From the 1940s through the late 1970s, unregulated discharges and mismanagement of hazardous waste caused the river's sediments to become seriously contaminated and thus degraded its biological communities. Regular dredging is being prevented due to the contaminated sediments, seriously impeding both commercial and recreational navigation. Since 1983, a fish consumption advisory has been posted for the AOC. In 1988, the Ashtabula River RAP Advisory Council agreed to focus upon an AOC defined as the lower two miles of the Ashtabula River, Ashtabula Harbor and the adjacent Lake Erie nearshore. A variety of agencies and organizations contribute to the Ashtabula River RAP including the Ashtabula River Partnership, Ohio Sea Grant, Ashtabula SWCD, US Army Corps of Engineers, United States US EPA, angler groups, local businesses and industries, marinas, port industries, local governments, economic development offices, Kent State University and unaffiliated citizens.

4.12.4 Railroad Crossings

Blocked railroad crossings can impede the movement of emergency response vehicles, be an inducement to crossing violations and trespassing and adversely affect the quality of life in communities. With the growth of rail traffic and continued railroad mergers concentrating that traffic on fewer lines, the problem will persist. Additionally, the funding of infrastructure improvements, such as grade separations and rail relocation projects, has not kept pace with the growth of rail and road traffic.

The Federal Railroad Administration (FRA) has instituted regulations that provide an environment for the safe movement of trains. They cover track, equipment, operating practices, signal systems, the transporting of hazardous materials and the maintenance of automated warning devices (flashing lights and/or gates) at highway-rail crossings. The FRA, however, does not regulate the length of time a railroad may block a crossing.

In Ohio, the PUCO is responsible for evaluating Ohio’s public grade crossings to determine the need for installing active warning devices. In 2003, the PUCO ordered railroad companies servicing Ohio to perform safety upgrades at 48 crossings throughout the state. Crashes at Ohio’s railroad crossings are down 12% from 2002 and fatalities have dropped by 47%.

In Ashtabula County, the PUCO recently approved upgrading warning devices at various County railroad crossings. On June 15, 2004, the PUCO approved construction authorization from the Ohio Rail Development Commission (ORDC) directing Norfolk Southern Railway to

install flashing lights and roadway gates at the Tower Road/Township Road 281 (503-118F) highway-rail grade crossing in Dorset Township, Ashtabula County. Funding for this upgrade will be provided through federal funds. Norfolk Southern was responsible for completing construction of the upgrade by June 16, 2005.

In addition, to increase public safety during the construction of this upgrade, the PUCO assisted the local government with the cost of improvements such as rumble strips, illumination, improved signage and other safety enhancements at the project location. Funding for these improvements will come from the State Grade Crossing Safety Fund, and will not exceed $3,000.

In 2001, four areas in Ashtabula County were requested to undergo a railroad separation project. See Table 4-6. The Rail Grade Separation Program, developed under the direction of Governor Taft, is a 10 year and $200 million program led by the Ohio Department of Transportation (ODOT) and the ORDC. The program addresses safety, mobility and economic development concerns for Ohio's local communities. Funding for this initiative is provided by ODOT, the Ohio Rail Development Commission, the Ohio Legislature, Federal Highway Administration, CSX and Norfolk Southern railroads and the local project sponsors.

Table 4-6
2001 Requested Railroad Grade Separation Projects in Ashtabula County

County	Route/Road Name	AARDOT #	Rail Carrier	Sponsor	Description/Comments	Rough Cost
Ashtabula	Austin Rd.	523886T	CSXT	Geneva	1978 engineering study needs updated.	High
Ashtabula	West Ave.	471989W	NS	Ashtabula	Construct overpass to open city's main artery.	Medium
Ashtabula	Parrish Rd.	471960Y, 523911Y	NS, CSXT	Conneaut	Construct one bridge over NS and CSX tracks.	High
Ashtabula	S.R. 193	523902A	CSXT	North Kingsville	Applicant may request SIB Loan to finance the 5% local share.	Low

According to the *Ashtabula County Comprehensive Draft Plan*, priorities regarding the transportation of the rail system have been identified. They are as follows:

- Participate with other jurisdictions to facilitate safe and efficient rail systems.
- Promote cooperation with railroads to develop traffic safety and convenience, including grade separations (e.g., over/under passes), improving crossings and citing passenger rail stations.
- Establish land use types and densities along rail corridors that support and are conducive to freight and commuter rail transportation.
- Advance the continuation of rail service that fosters the viability of local economies.
- Encourage consolidation of operating rail lines and corridors to facilitate safety, improve cost effectiveness and reduce impacts on surrounding lands.

4.12.5 Port Facilities

US seaports could be tempting targets for terrorists. Port, ferry and cruise-ship terminals are often located in highly congested areas where large numbers of people live and work. Refineries that produce highly volatile petrochemicals and convert crude oil into gasoline and heating oil are also often nearby. Given the importance of foreign trade to the US economy, an attack that shut down a major American port for even a few days could devastate the regional economy that it serves.

There are more than 100 major ports in the United States and many other harbors, piers and ferry landings. Some 7,500 ships with foreign flags make 51,000 calls on US ports each year. They carry the bulk of the approximately 890 million tons of goods that come into the country, including 7.8 million containers, 175 billion gallons of oil and other fuels and hundreds of thousands of cruise-ship passengers and crew members. The volume of traffic gives terrorists opportunities to smuggle themselves or their weapons into the United States with little risk of detection.

US ports are mostly guarded by a state's port authority, which often leases pier and terminal space to private companies. These firms generally rely on low-paid contract guards to patrol the facilities and staff the entrances and exits. The captain of the port, an officer in the US Coast Guard, is responsible for inspecting and regulating ships coming in and out. The Bureau of Customs and Border Protection, which has absorbed the personnel and the border inspection functions of both the Immigration and Naturalization Service and Customs, is responsible for inspecting foreign vessels' cargoes and clearing crews and passengers.

Before the September 11, 2001 terrorist attacks, the Coast Guard devoted not more than 2% of its operations to port security. In the months immediately following September 11, it spent 50% to 60% of its time and effort defending US ports. Since then, that figure has fallen to between 20% to 30% because of other commitments and mounting costs.

To prevent hijackings, sea marshals board ships when they enter US ports. Customs agents screen more cargo and use more high-tech tools, such as X-ray and gamma-ray scanners. Ships must provide electronic information about cargoes 24 hours before they embark for US ports so US agents can target ships and shipments that might be dangerous.

In Ohio, there are 716 miles of navigable waters on the US Inland Waterway System. Ohio's strategic location provides its businesses and industries with an inexpensive and effective means for goods movement; opportunities for passenger travel on ferries, cruises, and recreation; and commercial and recreational opportunities for fishing. Water transportation also provides a needed global gateway for military mobility and national security.

Every year, more than 188 million tons of goods valued at close to $19.9 billion, move along the 265 miles of Lake Erie shoreline and 451 miles of the Ohio River. Ohio's 209 port terminals provide a competitive advantage to the State by their ability to provide access to foreign trade and a low-cost means for shipping bulky items, such as coal, to and from distant regions.

In Ashtabula County, the major port facilities are located in the City of Conneaut and the City of Ashtabula. They offer both dry bulk and container capabilities with ocean access through the St. Lawrence Seaway. At the ports, cargo can be transferred from fresh and salt water ships and transported easily to markets in the Midwest and Northeast via a significant railroad network and major highway system. This system includes Interstate 90 and State Route 11, which connects Ashtabula County to Youngstown-Warren, the Pittsburgh area and the Ohio River.

Ariel View of Ashtabula Harbor

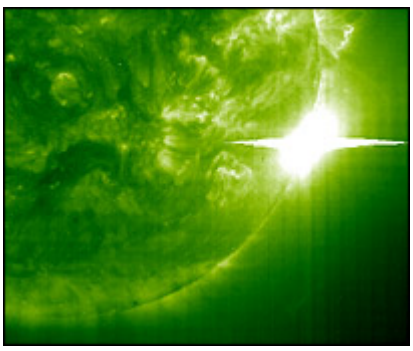
Photo courtesy of: web.ulib.csuohio.edu/.../ hulett/cpcphoto.html

The City of Conneaut Port Authority oversees 500 docks that are strictly for recreational purposes. Discussion with the Department of Homeland Security has begun concerning terrorism and the effects it would have on the area. The eastern side of the harbor is owned by the Canadian National Railroad. They have a hazard response document in place that discusses proper measures that should be taken in the event of a natural disaster or terrorist attack. They work closely with the Coast Guard to help ensure the safety of the area.

According to the City of Ashtabula Port Authority, the authority works in conjunction with the US Coast Guard to ensure the safety of the residents of the County if a terrorist attack were to occur. The US Coast Guard is currently expanding their office space and will house seven to eight additional personnel that will be trained to effectively respond to a terrorist attack or natural disaster.

12.4.6 Solar Flares

Solar flares are tremendous explosions on the surface of the Sun. In a matter of just a few minutes they heat material to many millions of degrees and release as much energy as a billion megatons of dynamite. They occur near sunspots, usually along the dividing line (neutral line) between areas of oppositely directed magnetic fields.



The 2003 Solar Flare

Photo courtesy of: www.daviddarling.info/.../ 2003/archiveNov03.html

Flares release energy in many forms, including electro-magnetic (Gamma rays and X-rays), energetic particles (protons and electrons) and mass flows. Flares are characterized by their brightness in X-rays. The biggest flares are X-Class flares. The National Oceanic and Atmospheric Administration (NOAA) monitors the X-Ray flux from the Sun with detectors on some of its satellites.

On November 5, 2003, the sun produced its largest recorded solar flare, measuring well above X20, capping 10 days of unprecedented activity for the star. The blast sent billions of tonnes of superhot gas into space, some of it directed toward the earth. Scientists say the Sun's current spate of activity has produced the most dramatic events seen on the solar surface since regular monitoring began. Space weather forecasters have been kept busy tracking the impact of geomagnetic storms on the earth.

Solar flares can have potentially damaging effects on the technology the US uses. Satellites and other communication systems, including power grids on Earth, are among these technologies. Some orbiting satellites could be in the firing line, too. The mass of electrons contained in these surges can damage onboard microchips. High energy radiation hitting our atmosphere could also interrupt short-wave radio transmissions and cause errors in navigation systems.

On March 6, 1989, a solar flare tripped a power grid in Quebec, Canada. In 1997, an AT&T Telestar 401 satellite used to broadcast television shows from networks to local affiliates was knocked out during a solar storm. Lastly, in May 1998, a solar blast disabled PanAmSat's Galaxy IV which affected automated teller machines, gas station credit card handling services, 80% of all pagers in the United States, news wire service feeds, CNN's airport network and some airline weather tracking services.

Preventative measures engineers take include putting some satellites into hibernation modes and reducing the operations of others to reduce the risk of electrical disruption. The storm, however, can swell Earth's upper atmosphere, creating drag that can pull a satellite out of orbit. Power grid operators arrange for less switching and fewer large-scale power swaps.

The NOAA's Space Environment Center (SEC) is the national and the lead international warning center for disturbances in the space environment that can affect people and equipment. Within the NOAA, the SEC is one of the NWS's National Centers for Environmental Prediction (NCEP). The SEC conducts research to understand the space environment, and performs critical space weather operations, jointly staffed by NOAA and the US Air Force, to provide forecasts and warnings of solar and geomagnetic activity to users in government, industry, the private sector and the public. The SEC is located in Boulder, Colorado. The SEC is able to predict, based on various models, the probability of an M-class or X-class solar flare occurring within 24 to 48 hours. The satellite that produces the forecasts also has the capability to give a one hour warning to large power facilities.

If a solar flare was to occur and proper warning time was not given, Ashtabula County's power grid infrastructure could be affected.

4.12.7 Power Outages

Examples of electrical transmission lines include wires, coaxial cables, dielectric slabs, optical fibers and circular or rectangular closed waveguides. Electrical transmission lines can be classified into high-frequency and low-frequency types depending on the type of current they are designed to carry.

Low-frequency electrical transmission lines are most commonly used to transmit main electrical power, as either direct current or low-frequency alternating current, over long distances. High-frequency transmission lines can be defined as transmission lines that are designed to carry electromagnetic waves whose wavelengths are shorter than or comparable to the length of the line. Under these conditions, the electrical behavior of the line is more complex than that of a

low-frequency transmission line. This frequency often occurs with radio, microwave and optical signals, and with the signals found in high-speed digital circuits.

During a natural hazard such as an ice storm or tornado, low-frequency electrical transmission lines may be damaged, leaving residents without power for several days, if not weeks. This compromises their safety and may indirectly cause property damage. Often times, if a severe thunderstorm and flooding occur and cause power outages, basement flooding can occur because residents rely on electricity for the operation of their sump pumps. If businesses cannot be open because they do not have electricity, a negative impact on a county's economy can be felt.

Blackouts and voltage collapses may also negatively affect a community. A blackout is a condition where a major portion or all of an electrical network is de-energized with much of the system tied together through closed breakers. Any area whose tie-lines to the high voltage grid cannot support reasonable contingencies is a candidate for a blackout. System separations are possible at all loading levels and all times in the year. Changing generation patterns, scheduled transmission outages and rapid weather changes can all lead to blackouts.

Voltage collapse is the process by which voltage instability leads to the loss of voltage in a significant part of the system. This condition results from reactive losses significantly exceeding the reactive resources available to supply them. Circuits loaded above surge impedance loadings and reduced output of shunt capacitors as voltages decline can lead to accelerating voltage drops. Voltage collapse can look like both a steady-state problem with time to react and a problem where no effective operator intervention is possible. It is very hard to predict the area that will be affected or electrically isolated from the grid.

According to the Ashtabula County EMA, there have been no significant historical hazard problems relating to downed electrical transmission lines or voltage collapses in Ashtabula County. However, from August 14 to August 17, 2003, a blackout occurred throughout eight states in northeastern United States, including Ashtabula County. The power outage affected 50 million people in eight states and Canada. It shut down more than 100 power plants and caused the water supply in Cleveland to operate off line. No amounts of property damage, deaths or injuries were available.

In the hours before the blackout, several transmission lines in Ohio were carrying massive amounts of power "well above" emergency summer standards before automatically shutting down. American Electric Power (AEP), who owns or co-owns the power lines with First Energy Corporation, operates throughout the County. According to AEP, control systems detected "abnormal operating conditions" and disconnected from linked First Energy lines. The region where investigators suspect the eight-state blackout began August 14 had become a black hole, sucking electricity from generators and threatening to burn transmission lines because of the overload, power company officials said. Many power lines automatically shut down to prevent burnout as the blackout spread.

4.13 Significant Events

Significant events pertaining to Ashtabula County were chosen by evaluating the NCDC tables that listed hazards in Ashtabula County that have produced the largest amount of damage based on human or monetary measures. The Core Group also used the collective knowledge they had coupled with the vast amount of local experience and history to determine which events they considered significant. Refer to Appendix E for descriptions of significant events affecting this County for each type of hazard.

5.0 VULNERABILITY ASSESSMENT

Ashtabula County is susceptible to many different kinds of natural hazards as reviewed in the previous section of this plan. If a hazard event struck vacant land, there would not be much cause for concern. However, since Ashtabula County has close to 40,000 residents and thousands of homes, businesses and critical facilities, the potential for damage and injury could be high, especially in higher populous areas such as the cities of Ashtabula, Conneaut and Geneva.

This chapter reviews how vulnerable Ashtabula County is to property damage and threats to public health and safety. This chapter also reviews how hazards may have an adverse impact on the economy. The potential for property damage is measured in dollars based on historical events of the past and damage incurred from those events.

A four-step process was followed to estimate the cost to Ashtabula County of the hazards reviewed in the Hazard Profile section (Section 4.0) of this report. This process was documented on a per hazard basis. The steps that were used are as follows:

Step 1: Inventory critical facilities and structures susceptible to property damage.
Step 2: Determine potential dollars lost based on various levels of damage on different categories of structures.
Step 3: Evaluate the impact on infrastructure and general population.
Step 4: Evaluate property damage, loss of life and economic losses.

5.1 Critical Facilities

Members of the Core Group from each of the communities were asked to compile a list of critical facilities pertaining to their community. All the critical facilities within Ashtabula County (schools, hospitals, water treatment plants, airports, police and fire stations, nursing homes, entertainment facilities, and any other facility deemed a critical facility for their county) are shown on the map entitled ‘Ashtabula County Multi-Hazard Map’ in Appendix F. See the Table 5-1 for a summary of critical facilities by facility type. Please refer to Appendix G for a complete list of these critical facilities.

Table 5-1
Critical Facilities in Planning Area

Property	Count
Utilities	19
Hospitals/Health Care	16
EMS/Fire/Police	36
Schools/Churches	48
Water/Wastewater	35
Government	48
Extended Care Facilities	17
Bridges	16
Neighborhood Resource Centers	19
Airport	1
Commercial	19
Total Critical Facilities	**274**

The Multi-Hazard Map will also be made available in digital form so that the table associated with the critical facilities shape file will be accessible. This accessibility will allow the attributed information for the critical facilities to be viewed by simply clicking on the critical facility on the map and viewing the information for that facility. This accessibility will also allow for easy facilitation of updates to the critical facilities list when the Mitigation Plan is updated.

5.2 Potential Dollars Lost

The second step of the vulnerability assessment was to calculate the impact of the given hazards in terms of property damage and loss of property use. Averages and typical situations were used for various categories of facilities. This approach did not predict which facilities will be hit by which hazard, but it instead provided a general estimate of the level of damage that would be expected based upon available data.

First, the value of the property being damaged was determined based on average value of a facility within that category. Typical values of the structures, except residential, were determined using data received from the County's Auditor's Office. Facility types were chosen if they had a location address and if they contained a market value. Cemeteries and parks owned by municipalities or townships were not included in the average.

Contents value was calculated as a percentage of the structure's value. Table 5-2 shows the relative value of the typical contents to the typical structure type. These ratios were taken from FEMA guidance documents.

Table 5-2
Contents Value as a Percentage of Structure Value

Occupancy Class	Value (%)
Residential	50%
Commercial	100%
Industrial	150%
Medical Facilities	150%
Emergency Services	150%
General Government	100%
Schools/Libraries	100%
Colleges/Universities	150%
Religion/Non-profit	100%
Shelters	100%

Second, three levels of physical damage were evaluated for each category of structure. These levels have a percentage of damage associated with each. The dollars lost for each level, however, may be underestimated since there may be downtime associated with closing a business for an extended period of time.

- **Minor damage:** Many structures exposed to a storm or other hazard will suffer only minor to moderate damage. For example, a tornado may just damage the roof and windows of some structures. For this calculation, 5% of the structure's value was used. Because the structure stays substantially intact, no contents losses were considered.

- **Moderate damage:** This category represents more serious damage, such as a collapsed wall or floodwater over the first floor of a building. Moderate damage is calculated as 40% of the structure's value plus 40% of the content's value.

- **Major damage:** This category is used when a building is demolished or heavily damaged. An example of the former is a house leveled by a tornado. An example of the latter is floodwater more than 1.5 feet over the lowest floor (i.e., over the electrical outlets). The average dollar figure for this category is 75% of the structure's value and 75% of the contents' value.

Table 5-3 shows the calculated dollar losses for each level of damage per facility type. The type of facility as listed was limited to that information available from the County Auditor's Office and the ODOD.

Table 5-3
Physical Potential Dollar Losses

Property	Average Value	Minor Damage	Moderate Damage	Major Damage
Residential*	$85,300	$4,265	$51,180	$95,963
Medical (Hospitals)	$575,352	$28,768	$575,352	$1,078,785
Emergency facilities (fire stations)	$94,590	$4,730	$94,590	$177,356
Municipal Govt.(bldgs, town halls, etc)	$232,694	$11,635	$186,155	$349,041
Township Govt.(bldgs, town halls, etc)	$66,428	$3,321	$53,142	$99,642
Schools/Libraries	$1,523,784	$76,189	$1,219,027	$2,285,676

* *Please note: Residential information taken from the ODOD*.

5.3 Vulnerability Data Collection

Prior to beginning an assessment of a community's vulnerability to hazards, local sources of information were researched including comprehensive plans, land use plans, land development regulations and flood regulations, to determine if the county previously addressed its vulnerability to any particular hazard. In most cases, local plans and regulations did not yet exist or were very minimal in addressing natural hazard situations and building parameters.

Therefore, other state and national sources were researched for detailed information. One of these resources was the NCDC. The NCDC is the world's largest active archive of weather data. The NCDC produces numerous climate publications and responds to data requests from all over the world. The NCDC supports a three-tier national climate services support program that includes partners such as the NCDC, Regional Climate Centers, and State Climatologists. The NCDC has long served as a national resource for climate information. The NCDC's data is used to address issues that span the breadth of this nation's interests. As climate knows no boundaries, the NCDC works closely with scientists and researchers world-wide to develop both national and global data sets that have been used by both government and the private sector to maximize the resources provided by our climate and minimize the risks of climate variability and weather extremes. The NCDC has a statutory mission to describe the climate of the United States and acts as the nation's scorekeeper regarding the trends and anomalies of weather and climate. The NCDC's climate data have been used in a variety of applications including agriculture, air quality, construction, education, energy, engineering, forestry, health, insurance, landscape design, livestock management, manufacturing, recreation and tourism, retailing, transportation, and water resources management among other areas. The NCDC's data and products fulfill needs ranging from building codes to power plant and space shuttle design.

Another source of hazard information that was explored was the Ohio Seismic Network as described in previous sections of this report. The Division of Geological Survey of the ODNR coordinates a 23-station cooperative network of seismograph stations throughout the state in order to continuously record earthquake activity. OEMA's Ohio Earthquake Program Manager was also contacted to discuss the risks associated with each county to determine if the type of geology lends itself to increased damage.

Because the state and national agencies are not always privy to the local knowledge, some information extracted from their libraries may not be comprehensive or complete. Therefore, the

Core Group used their experience and knowledge with verification from the local EMA directors to prioritize the hazards determined to affect the county the most and assess them according to local concerns.

5.4 Vulnerability Assessment by Hazard

5.4.1 Winter Storms-Snow, Ice, Extreme Cold

Ashtabula County is located in the northeast portion of the State and is susceptible to winter storms, which encompass snow, ice and lake effect snow. See Appendix H for tables extracted from the NCDC that show the number of reported events since 1950.

5.4.1.1 Infrastructure Impact

Because the area receives a moderate amount of snowfall and can be stricken by ice storms, all of the structures erected in the County are susceptible to damage if not designed to the proper snow loading parameters.

5.4.1.2 Population Impact

Because snow and ice storms and periods of extreme cold occur countywide, the entire County population is susceptible and should be prepared. Motorists should be aware of declared snow emergencies and seek safety before becoming stranded. Motorists should also be educated on the presence of black ice on roadways and bridges. The sensitive populations will be the most susceptible to periods of extreme cold and should prepare for such events prior to the winter months.

5.4.1.3 Property Damage

According to the NCDC, there have been 88 winter storm events and nine extreme cold events in Ashtabula County reported since 1993, with total property losses of $11.3 million. Winter storms and extreme cold events in Ashtabula County have caused cumulative property and crop damage estimated at $200.2 million, or approximately $16.7 million per year. A single ice storm that occurred in January 2005 accounted for $124.9 million in property damage.

5.4.1.4 Loss of Life

Since 1993, there have been no recorded deaths and 76 recorded injuries due to winter storms. Regarding periods of extreme cold, 13 deaths and one injury have been reported. Because the number of winter events affecting Ashtabula County is high and the intensity of the storms is strong, the potential for death and injury is high. As the population of the County continues to grow there is more potential for loss of life and/or injury. One of the biggest problems associated with winter storms and extreme cold is the lack of public education and awareness. Citizens are not aware of the warnings and dangers associated with severe weather, such as driving on ice and snow. They also do not realize the importance of not exposing their skin to extremely cold temperatures because it could lead to cases of frostbite. Also, when a citizen remains outside for an extended period of time, they may be at risk for hypothermia.

5.4.1.5 Economic Losses

The economic losses a community suffers during a winter storm event, which can leave behind snow and thick layers of ice, can be high. In communities with hazard trees, these trees have the potential to destroy homes and businesses if uprooted. Fallen branches may also cause severe damage. If power lines become burdened with snow and snap, prolonged power outages may cause some businesses to close for an extended period of time leading to loss of revenue.

With the average house value at $85,300 and one third of the houses in the County built prior to 1939, damage costs from snow and ice begin to accumulate quickly due primarily to the age of the house and its susceptibility to damage. Residents often cannot rely on federal assistance for the total damages incurred. Since January 1, 1964, the President of the United States has declared Ashtabula County a federal disaster area on five occasions. One of these five declarations was a blizzard that occurred on January 26, 1978. If a Presidential Disaster Declaration is granted to the County, federal money may not cover the entire amount of damage. Therefore, the County and local governments must find the additional money needed to complete the clean up process.

5.4.2 Summer Storms-Thunderstorms, Lightning, Hail, High Winds and Erosion as a result

Ashtabula County is highly susceptible to summer storms, which encompasses thunderstorms, lightning, hail and high winds. See Appendix H for tables extracted from the NCDC that show the number of reported events since 1950.

5.4.2.1. Infrastructure Impact

Since summer storms are random in nature, the impact on Ashtabula County's infrastructure is not limited to a certain area as with river flooding. Homes and businesses all throughout the County are susceptible to high winds, lightning and hail. Shingles are blown from rooftops and hail may dent siding or break windows. Lightning strikes may be more damaging to structures that are not grounded with lightning rods. Trees may become uprooted and limbs detached and blown into structures. High winds may also cause severe damage to mobile home parks and campgrounds if units are not properly tied down to permanent concrete pads or structures. On occasion, a structure may be destroyed completely but a high frequency of this extent of damage will not be expected.

Utilities and municipal plants may also be damaged during summer storms. Debris, such as tree limbs, blown into utility lines may cause downed power lines. Wastewater plants may also be adversely affected with blown limbs and debris clogging the tanks and filters.

5.4.2.2 Population Impact

Because summer storms are random in nature, the entire County population is susceptible and should be prepared. All citizens should become familiar with locations of shelters in which they can seek safety in the event of severe weather. The populations located in mobile home parks and campgrounds should take particular care to seek adequate permanent shelter with approaching severe weather.

5.4.2.3 Property Damage

According to the NCDC, there have been 280 summer storm events including thunderstorms, lightning, high winds and hail in Ashtabula County reported since 1962, with total property losses of $37.3 million. Between 1993 and 2004, the average annual losses reported for the County have been approximately $3.4 million. The year 2002 proved to be the most costly with losses totaling $10.4 million in property damage. The remaining $26.9 million in property damage was scattered over the other years.

This information shows that summer storms, namely high winds, are extremely costly to the County.

5.4.2.4 Loss of Life

Since 1950, there have been six deaths and 32 recorded injuries due to summer storms, wind, lightning and hail. One death and nine of these injuries were associated with a thunderstorm and high wind event that occurred in July 1995. Two deaths and eight injuries were associated with a high wind event that occurred in March 2002. Because the number of summer storms affecting Ashtabula County is large, the potential for death and injury is high. As the population of the County is expected to increase over the next 10 years, as forecasted by the 2000 Census, there is more potential for loss of life and/or injury. One of the biggest problems associated with summer storms is the lack of public education and awareness. Citizens are not aware of the warnings and dangers associated with severe weather and thus may not be prepared.

5.4.2.5 Economic Losses

The economic losses a community suffers during a summer storm event can be high. In communities with hazard trees, these trees have the potential to destroy homes and businesses if uprooted. Fallen branches may also cause severe damage. Residents and business owners then turn their efforts from work and running a business to clean up efforts.

With the average house value at $85,300 and one third of the houses built prior to 1939, damage costs from summer storms begin to accumulate quickly due primarily to the age of the house and its susceptibility to damage. Residents often cannot rely on federal assistance for the total damages incurred. Since January 1, 1964, the President of the United States has not declared Ashtabula County a disaster area due to damage suffered by severe storms. If a Presidential Disaster Declaration is granted to the County, federal money may not cover the entire amount of damage. Therefore, the County and local governments must find the additional money needed to complete the clean up process.

5.4.3 Flash Flooding

Flash flooding is difficult to categorize as a site-specific or non site-specific hazard. A flash flood occurs when heavy rain collects in a stream or gully, turning the normally calm area into an instant rushing current. So, it is likely a flash flood will occur near a water source, however, the path the current may take is unknown. Flash floods occur within a few minutes or hours of excessive rainfall, a dam or levee failure or a sudden release of water held by an ice jam. There is much less warning time compared to riverine floods.

5.4.3.1 Infrastructure Impacts

It is very difficult to determine at-risk structures in flash flooding areas due to the unpredictable direction the water's current takes during this type of event. Houses and businesses that are closer to watersheds and are not highly elevated will be most susceptible to receive damage. These areas were not identified by the ODNR's GIMS project and consequently, have not been mapped.

5.4.3.2 Population Impacts

Based on the NCDC data published for the 1950 through March 2004 time period, Ashtabula County's citizens have had to endure multiple flooding situations, including flash floods. There were no deaths or injuries reported for flash flood events for Ashtabula County. See Appendix H for tables extracted from the NCDC that show the number of reported events since 1950. Flash floods affect a specific area over a short period of time and a smaller population than river floods. The quick change from calm to raging river is what catches people unaware, making flash floods very dangerous. On occasion, a life may be lost because of water rising very quickly in this short time.

5.4.3.3 Property Damage

Based on information retrieved from the NCDC, flash flooding in Ashtabula County has accounted for $3.3 million in property damage from 1993 through 2004. On average, the County suffered $275,000 per year in total damage. This average also includes the years 2000 and 2001 in which no property damage losses were recorded. Since the flash flood areas have not been mapped, it is difficult to assess the number of impacted structures and potential future dollars lost due to this hazard.

5.4.3.4 Loss of Life

According to the NCDC, there have been no recorded deaths or injuries due to flash flooding from 1993 through 2004. Because there has been no loss of life from these events, the potential for loss of life is low. During flash floods, water rises very quickly and may catch citizens by surprise. Homeowners may not be prepared for the rising waters and the need to seek safety quickly. Motorists often think that they can drive through ponded water and risk getting stuck in the flooded area. The risk to human life can be reduced by educating the residents of the County.

5.4.3.5 Economic Losses

The economic losses a community suffers during a flood event can be high. Productivity decreases as residents miss work to tend to the damage incurred at their homes. Some inventory within a business itself may be lost if the owner is not prepared and the facility not flood proofed prior to a flood event. Small businesses may suffer so much damage that they are unable to reopen. Contractors and clean up companies may reap the benefits of the damage but not enough to offset the overall losses to the economy.

Since January 1, 1964 Ashtabula County has not been declared a federal disaster area due to damage suffered by flash flooding. If a Presidential Disaster Declaration is granted to the County, federal money may not cover the entire amount of damage. Therefore, the County and local governments must find the additional money needed to complete the clean up process.

5.4.4 Lake and Stream Bank Erosion

As seen in the hazard profiles and as determined by the Core Group, Ashtabula County has a countywide risk of incurring damage from lake and stream bank erosion. The coastal area of Ashtabula County extends inland on average from about 1/8 mile to 1/4 mile on average, but continues to incorporate lake-influenced tributaries, embayments, wetlands and estuarine areas. In urban areas, the coastal boundary is generally less than 1/2 mile from the shore.

If property protection measures are not taken to avoid coastal erosion along Lake Erie, Rock Creek and Pymatuning Lake, the risk of damage to or loss of property, possessions, infrastructure and life are greatly increased.

5.4.4.1 Infrastructure Impact

Erosion left untreated may cause damage to roadways along stream banks and public piers and marinas along Lake Erie, Rock Creek and Pymatuning Lake. Undermining of pavement may cause roadways to crumble and slip down the bank, creating hazards for motorists. Public piers and marinas that are affected by erosion could be potentially dangerous, especially near recreational areas or public parks.

5.4.4.2 Population Impact

Since the threat of coastal erosion is typically localized, the County's population living near the coast of Lake Erie needs to be aware of erosion hazards, namely Camp Cavalry, East Ashtabula, Geneva-on-the-Lake, Harbor, Kingsville-on-the-Lake, Lakeville and Saybrook-on-the-Lake. In addition, communities such as Roaming Shores and Andover, living along the shores of Rock Creek and Pymatuning Lake also need to be aware of erosion hazards. Motorists traveling on roads that closely parallel stream banks also need to be aware of the damage that erosion can cause to pavement.

5.4.4.3 Property Damage

Factors that cause shoreline erosion include bluff recession, high lake levels, high winds and human activities. These cause many problems to the coastal communities located in Ashtabula County. Property erosion results in accumulation of sediment and debris along the shores of Lake Erie.

Manmade shoreline structures that lie within a designated CEA along Lake Erie's coastline are susceptible to property damage over a 30-year period. Because of the large number of residential properties located within a CEA along the shoreline, property damages are expected to be high. Due to the lack of available data, estimated losses for erosion damage were not quantified.

5.4.4.4 Loss of Life

Lake and stream bank erosion are not considered to be life threatening. Some injuries may result from flooding but none have been recorded. Other injuries may be caused by motorists being unaware of damaged pavement and possibly driving off the road. However, damaged roads that may cause traffic accidents are typically closed for repairs to minimize the number of motorists traveling through that area. Therefore, the potential for death or injury is minimal.

5.4.4.5 Economic Losses

Based on the property damage expected from lake and stream bank erosion, the impact on the local economy and local government expenditures is considered to be high. Manmade shoreline structures built along the Lake Erie shoreline trap sand supply, causing beachless shores. Lack of beaches may have an adverse effect upon tourism in Ashtabula County. County roadways may be affected and in need of repair but this repair does not typically have an adverse effect on the economy as motorists will find an alternate route.

5.4.5 Tornadoes

As seen in the hazard profile and as determined by the Core Group, Ashtabula County is moderately susceptible to tornadoes. See Appendix H for tables extracted from the NCDC that show the number of reported events since 1950.

5.4. 5.1. Infrastructure Impact

Since tornadoes are random in nature, the impact on Ashtabula County's infrastructure is not limited to a certain area as with river flooding. Homes and businesses all throughout the county are susceptible to the effects of a tornado. Trees may become uprooted and limbs detached and blown into structures. Tornadoes may also cause severe damage to mobile home parks and campgrounds if units are not properly tied down to permanent concrete pads or structures. On occasion, a structure may be destroyed completely but a high frequency of this extent of damage will not be expected.

Utilities and municipal plants may also be damaged during a tornado. Debris, such as tree limbs, blown into utility lines may cause downed power lines. Wastewater plants may also be adversely affected with blown limbs and debris clogging the tanks and filters.

5.4.5.2 Population Impact

Because tornadoes are random in nature, the entire County population is susceptible and should be prepared. All citizens should become familiar with locations of shelters in which they can seek safety in the event of severe weather.

Since tornadoes typically present localized hazards, several homes may need repair, but typically homeowners will have insurance to cover these expenses and will not suffer any long term financial hardship. The populations located in mobile home parks and campgrounds should take particular care to seek adequate permanent shelter with approaching severe weather.

5.4.5.3 Property Damage

According to the NCDC, there have been 12 tornadoes in Ashtabula County reported since 1956, with total property losses of $6.4 million. Annual losses for the County have been approximately $131,000 per year. Two tornadoes occurring on the same day in 1985, proved to be the most costly with losses totaling $5.0 million in property damage. The remaining $1.4 million in property damage was scattered over the other years.

This information shows that tornadoes are of a moderate cost to Ashtabula County.

5.4.5.4 Loss of Life

Since 1965, there have been no deaths and 29 recorded injuries due to tornadoes. Twenty-five of these injuries were associated with the two tornadoes that occurred in 1985. Because the number of tornadoes affecting Ashtabula County is not that large, the potential for death and injury is moderate. As the population of the County continues to grow over the next 10 years, as forecasted by the 2000 Census, there is more potential for loss of life and/or injury. One of the biggest problems associated with tornadoes is the lack of public education and awareness. Citizens are not aware of the warnings and dangers associated with severe weather and tornadoes and thus may not be prepared.

5.4.5.5 Economic Losses

The economic losses a community suffers during a tornado can be high. In communities with hazard trees, these trees have the potential to destroy homes and businesses if uprooted. Fallen branches may also cause severe damage. Residents and business owners then turn their efforts from work and running a business to clean up efforts.

With the average house value at $85,300 and one third of the houses built prior to 1939, damage costs from severe storms begin to accumulate quickly due primarily to the age of the house and its susceptibility to damage. Residents often cannot rely on federal assistance for the total damages incurred. Since January 1, 1964, the President of the United States has declared Ashtabula County a disaster area once due to damage suffered by tornadoes. Therefore, the County and local governments must find the money needed to complete the clean up process.

5.4.6 Flooding - 100 Year Flooding (associated with NFIP map)

Flooding is a site-specific hazard. Therefore, floodplains are an important planning consideration. A floodplain is any land area susceptible to inundation by floodwaters from any source. Floodplains are measured in terms of the amount of storm water that it takes to cover a given area of land. These storm events are measured in frequency of occurrence, such as 5-year, 100-year and 500-year, with the standard measurement being the 100-year storm or floodplain. The 100-year floodplain is the land area having a 1 in 100 chance of flooding in any given year, but the statistics can be misleading. In reality, the 100-year storm or flood could occur two, three, or several years in a row (unlikely but possible), because the 100-year flood is a statistical probability and not a predictable recurrence. Statistically, the 100-year flood has a 25% chance of occurring during the typical 30-year lifespan of a home mortgage.

Any development within floodplains can impact the direction, flow and level of the watercourse during periods of high water or flooding. In other words, if fill material is placed or a house constructed in a floodplain, it will alter the boundaries of the floodplain downstream of that area. This alteration happens because structures or fill utilize valuable space that would otherwise act as a natural retaining area for floodwaters to spread and slow. Not only does development in the floodplain increase dangers downstream, developments within the floodplain are at higher risk of damage due to flooding. This damage includes fill material and debris from destroyed structures upstream colliding with structures in the floodplain downstream of an affected area. Many bridges are washed out in floods because river borne debris clog their free-flow area.

5.4.6.1 Infrastructure Impacts

There are a total of 438 structures in Ashtabula County considered to be at-risk due to flooding. Of this total number, 279 of the structures are located in the unincorporated areas of the County. (This information was collected from the ODNR's Division of Water Floodplain Geographical Information Management System (GIMS) Project.) All the at-risk structures are located on the maps in Appendix F. These at-risk structures are located within the 100-year floodplain and are therefore susceptible to damage during a flood.

5.4.6.2 Population Impacts

Based on the NCDC data published for the 1950 through March 2004 time period, Ashtabula County's citizens have had to endure multiple riverine flooding situations. See Appendix H for tables extracted from the NCDC that show the number of reported events since 1950.

Unlike flash flooding, the 100-year river flood has a less likelihood of occurring but will impact a larger population. The streams and rivers within the floodplain will flood their 100-year floodplains on an average of once every 100 years. This flood will affect the populations occupying at-risk structures located in the floodplain area shown on the Multi-hazard Map. See Appendix F for the Multi-hazard Map.

5.4.6.3 Property Damage

Based on information retrieved from the NCDC, river flooding in Ashtabula County has accounted for $7.1 million in property damage from 1993 through 2005. On average, the County suffered $592,000 per year in total damage. This average also includes the year 2001 in which no property damage losses were recorded.

Approximately 10% of Ashtabula County is in the 100-year floodplain as shown on the Multi-Hazard Map in Appendix F. There are an estimated 438 at-risk structures in the 100-year floodplain. Of this number of at-risk structures, 20% are assumed to be commercial buildings with the rest of the buildings being residential. According to the County Auditor's Office, the average value of a residential housing unit in Ashtabula County is $85,300. With 352 of the at-risk structures being residential, the County's average potential dollars lost due to residential property complete destruction is $30,025,600 not including contents replacement.

5.4.6.4 Loss of Life

According to the NCDC, there have been no recorded deaths and injuries due to flooding from 1993 through 2005. During riverine flooding events, residents that live in a floodway are usually aware of the dangers associated with these events. Most residents will closely monitor the level of the water and will know when it is time to evacuate. However, residents that are new to the area may be unaware of these dangers and it is important to educate these residents so that risk to human life can be reduced.

5.4.6.5 Economic Losses

The economic losses a community suffers during a flood event can be high. Productivity decreases as residents miss work to tend to the damage incurred at their homes. Some inventory within a business itself may be lost if the owner is not prepared and the facility not flood proofed prior to a flood event. Small businesses may suffer so much damage that they are

unable to reopen. Contractors and clean up companies may reap the benefits of the damage but not enough to offset the overall losses to the economy.

The County's infrastructure will also suffer damage to be repaired. Some roads and bridges may wash out. Ashtabula County has several areas that suffer repeated flooding. These areas are mapped on the Multi-Hazard Map in Appendix F.

Residents often cannot rely on federal assistance for the damages incurred. Since January 1, 1964 Ashtabula County has been declared a federal disaster area on three occasions due to damage suffered by flooding. If a Presidential Disaster Declaration is granted to the County, federal money may not cover the entire amount of damage. Therefore, the County and local governments must find the additional money needed to complete the clean up process.

5.4.7 Droughts and Excessive Heat

As seen in the hazard profile and as determined by the Core Group, Ashtabula County has a high risk of incurring damage from droughts and periods of excessive heat. Due to the non-site specific nature of this hazard, the best way to deal with preparing for future events is to consider historical occurrences. This information was obtained from the NCDC, and is shown in Appendix H.

5.4.7.1 Infrastructure Impact

Because droughts and excessive temperatures are a non-site specific hazard, the effects of a drought should be evaluated countywide. There are no documented critical facilities that are considered at-risk as it relates to droughts.

By itself, a drought does not damage developed property. However, over a long period of time, certain soils can expand and contract resulting in some structural damage to buildings. A small percentage of buildings in areas with such soils suffer minor damage during their "useful lives." Therefore, the overall impact on the County's infrastructure will be very low.

5.4.7.2 Population Impact

Since drought and periods of excessive heat are non-site specific, the entire County population could be affected by hot and dry conditions. The overall impact that droughts and periods of excessive heat have on the Ashtabula County population is low based on the number of events recorded by the NCDC since 1950. However, the County's residents, especially the sensitive populations, should still be aware of the dangers of periods of excessive heat, such as heat stroke.

5.4.7.3 Property Damage

According to the NCDC, there have been four droughts in Ashtabula County, occurring in 1995, 1996, 1997 and 1999. None of these droughts caused any type of property damage per NCDC. The drought that occurred during the summer of 1999 caused $200 million worth of crop damage.

The periods of excessive heat recorded during the summer of 1995 caused $1.1 million in property damage.

Overall, the County has suffered moderate property damage due to a few periods of excessive heat and high crop damage due to a few periods of drought. Therefore, there is a low impact relative to property damage based on frequency of events and a moderate impact relative to crop damage based on frequency of events.

5.4.7.4 Loss of Life

Since 1995, there have been 18 deaths and 75 injuries due to periods of excessive heat. No deaths or injuries were recorded during drought conditions. Because the number of deaths and injuries occurred only in one year, 1995, the County's overall potential for death and injury is expected to be low. However, the intensity of these excessive heat events is high, as seen when looking at the number of people affected by one event. When considering this information, the overall potential for death and injury should then be considered moderate. As the population of the County continues to grow over the next 10 years, as forecasted by the 2000 Census, there is more potential for loss of life and/or injury.

One of the biggest problems associated with excessive heat is the lack of public education and awareness. Citizens are not aware of the warnings and dangers associated with droughts or medical conditions like heat exhaustion and heat stroke.

5.4.7.5 Economic Losses

Due to the high amount of damage recorded for drought and excessive heat in Ashtabula County, namely crop damage from the drought of 1999, the overall impact on the economy is high. The economic losses of the drought could be felt countywide, affecting the farming community the most. Tourism could also be adversely affected if the crop that was damaged during a drought condition was grapes for the wine industry. It is very unlikely that a Presidential Disaster Declaration would occur when considering drought conditions; therefore all mitigation costs would be funded locally.

5.4.8 Earthquakes

As seen in the hazard profile and as determined by the Core Group, Ashtabula County has a moderate risk of incurring damage from earthquakes. The County has had 41 epicenters within its boundaries.

5.4.8.1 Infrastructure Impact

Due to the frequency of earthquakes occurring in Ashtabula County factored with the low magnitude of these earthquakes, the impact on the County's infrastructure is low to moderate. However, if the frequency of these occurring earthquakes remains steady and/or increases, over time structural engineering elements of roadways or gas lines as well as foundations to critical facilities could be compromised.

5.4.8.2 Population Impact

Since the threat of an earthquake is expected annually, the overall impact on the County's population will be moderate to high, especially those living within a five to 10 mile radius of the City of Ashtabula. However, all citizens within the County need to be aware of the threat of potential earthquakes. As discussed in the hazard profile, the main reasons for the earthquakes occurrence is from a Class I injection well located in the City of Ashtabula. The area of

seismicity has expanded from one to five miles over the last 16 years. If this trend continues, more of the population will be affected by these earthquakes.

5.4.8.3 Property Damage

The level of damage expected from an earthquake in Ashtabula County is moderate. It would be expected to be on the order of a 3.0-3.9 magnitude quake, or lower, as registered on the Richter scale. The maximum extent of a quake of this magnitude would be felt by most people and include some breakage of dishes, windows and plasters.

There has been one earthquake recorded higher than a 3.0-3.9 magnitude. This 4.5 magnitude earthquake occurred on January 25, 2001 and had more than 50 damage reports filed at the Ashtabula County EMA. Most of the reports indicated minor damage, such as cracks in plaster.

5.4.8.4 Loss of Life

The level of an expected earthquake in Ashtabula County is not considered to be life threatening. Some minor injuries may result from falling objects. Because the likelihood of an earthquake occurring is high but the magnitude of an earthquake causing death or injury is low, the potential for death or injury is moderate.

5.4.8.5 Economic Losses

Based on the very limited property damage expected from a 3.0-3.9 magnitude earthquake, the impact on the local economy and local government expenditures is considered to be minimal. However, effects on the economy were felt during the January 25, 2001 earthquake which measured 4.5 in magnitude. Two gas lines were ruptured, resulting in the temporary evacuation of 40 local residents.

5.4.9 Water spouts

As seen in the hazard profile and as determined by the Core Group, Ashtabula County has a low risk of incurring damage from water spouts. The County has had seven water spouts recorded along Lake Erie from 1995 to 2005.

5.4.9.1 Infrastructure Impact

Waterspouts, by definition, will not affect land-based infrastructure. However, damage could be incurred to ports, locks and dams, lighthouses or marinas that are situated along the coastline. Because the intensity of the water spouts recorded in Ashtabula County was low, the impact on the County's infrastructure is low.

5.4.9.2 Population Impact

Populations that have occupations requiring them to devote a majority of their time on the water, such as fisherman, will be more vulnerable to suffer death or injury from a water spout. However, these workers are probably familiar with steps to take to increase their safety if a water spout were to occur within their vicinity. Educating recreational boaters about safety precautions should be encouraged.

5.4.9.3 Property Damage

No property damages have been reported in past historical occurrences. Therefore, the level of damage expected from a water spout in Ashtabula County is very low. Personal property items such as boats and yachts would be most vulnerable to damage.

5.4.9.4 Loss of Life

Water spouts are not considered to be a life threatening hazard for Ashtabula County. There have been no deaths or injuries reported from past occurrences. Based on these occurrences, the potential for death or injury is minimal.

5.4.9.5 Economic Losses

The economy of Ashtabula County could be affected if a water spout were to damage port facilities, locks and dams or marinas. Import/export business may be affected as well as tourism. Based on the limited property damage expected from a water spout, the impact on the local economy and local government expenditures is considered to be minimal.

6.0 GOALS

Goals were needed for this planning effort to guide the review of the possible mitigation measures. The recommended actions of this plan are consistent with what is appropriate for Ashtabula County. Mitigation goals reflected community priorities and should be consistent with other plans for the county.

After the determination of the draft problem statements, the Core Group agreed to goals that they wanted to achieve for each hazard. These goals are listed in the following section.

6.1 County Goals

Severe Storms

Overall Goal: To educate the County's citizens to increase awareness of severe storms and where to seek safety during storm events, to provide adequate shelters where citizens can seek safety from severe weather, to improve the warning system and radio communications throughout the County, to expedite the clean up process through coordination and equipment acquisition, to maintain operations of critical facilities and emergency services and to reduce property damage caused by severe weather.

Tornadoes

Overall Goal: To educate the County's citizens to increase awareness of severe storms and tornadoes and where to seek safety during storm events, to provide adequate shelters where citizens can seek safety from severe weather, to improve the warning system and radio communications throughout the County, to expedite the clean up process through coordination and equipment acquisition, to maintain operations of critical facilities and emergency services and to reduce property damage caused by severe weather.

Winter Storms

Overall Goal: To educate the County's citizens to increase awareness of winter storms and where to seek safety during storm events, to provide adequate shelters where citizens can seek safety from severe weather, to improve the warning system and radio communications throughout the County, to expedite the clean up process through coordination and equipment acquisition, to maintain operations of critical facilities and emergency services and to reduce property damage caused by severe weather.

Flooding

Overall Goal: To educate the County's citizens to increase awareness of flooding and where to seek safety during flood events, to provide adequate shelters where citizens can seek safety from severe weather and flooding, to improve the warning system and radio communications throughout the County, to expedite the clean up process through coordination and equipment acquisition, to maintain operations of critical facilities and emergency services and to reduce property damage caused by severe weather and flooding.

Droughts

To educate the general public of the hazards associated with drought and excessive temperatures, to establish contingency plans for alternate water supply and to reduce potential damage through preplanning.

Earthquakes

Overall Goal: To increase awareness of the hazards of an earthquake event, to maintain operations of critical facilities and emergency services, to improve the warning system and radio communications throughout the County and to expedite the clean up process through coordination and equipment acquisition.

7.0 HAZARD MITIGATION PRACTICES

As required by the DMA2K, this Mitigation Plan summarizes policies, plans, regulations, programs and projects that Ashtabula County has implemented or is planning to implement in the future that affect growth and how the county can achieve and maintain sustainability and disaster resiliency. These administrative controls and activities are separated into six categories as determined by FEMA which are referred to as hazard mitigation activities. The following sections describe these general categories, as well as plans and activities that the communities are implementing now or plan to implement in the future.

7.1 Property Protection

Protection measures are usually undertaken by property owners on a building-by-building or parcel basis. They help reduce a building's susceptibility to flood damage.

7.1.1 Acquisition

Acquisition of a property and removing any structures eliminates the potential for harm to residents and businesses. After any structures are removed, the land is usually converted to public use, such as a park, or allowed to revert to natural conditions.

7.1.2 Relocation

Relocation is moving a building to higher ground, either within the same property boundary or to a separate property. The building should always be moved to an area not susceptible to flooding.

7.1.3 Retrofitting

Retrofitting a flood-prone structure entails installing flood protective measures on a specific structure or group of structures. Some of the more common examples of retrofitting and floodproofing are elevating a flood-prone building above the flood level, creating barriers around a flood-prone structure, dry floodproofing a structure to make it water-tight and wet floodproofing to intentionally allow flood waters to enter and yet reduce water pressure on the structure.

Retrofitting structures for other hazards is also possible. Structures affected by high winds can possibly be mitigated by securing a roof structure with adequate fasteners or tie downs to

mitigate damage that may occur. Other retrofits are to strengthen garage doors, windows and other large openings. For tornadoes, constructing underground shelters or safe rooms can save lives. Burying power lines is a retrofit measure that addresses the winds from tornadoes, thunderstorms and ice that accompany winter storms.

According to the Ashtabula County EMA, there have been no property protection measures enacted within Ashtabula County.

7.2 Preventive Measures

7.2.1 Planning and Zoning

7.2.1.1 Comprehensive Planning

Comprehensive plans and land use plans specify how a community should be developed (and where development should not occur). Through these plans, uses of land can be tailored to match the land's hazards. Comprehensive planning reflects what a community wants to see happen to their land in the future. A comprehensive plan can look 5, 10, or even 20 years into the future to help a community plan and shape how they envision their community. However, planning is only one part of the puzzle and usually has limited authority. Tied with zoning, comprehensive planning can be more effective.

Ashtabula County Comprehensive Plan

On December 11, 2003, the Ashtabula County Comprehensive Plan was adopted. The Comprehensive Plan draft is divided into seven chapters. They are Chapter 1: The Planning Process, Chapter 2: Greenspace Preservation, Chapter 3: Farmland Preservation, Chapter 4: Transportation, Chapter 5: Economic Development, Chapter 6: Heritage and Chapter 7: Recreation.

The chapter entitled *Chapter 1: The Planning Process* discusses the different committees and agencies that were involved in the local planning process.

Specific areas of concern or focus in *Chapter 2: Greenspace Preservation* included threats to the watershed, greenspace preservation tools and programs. The following are some of the recommendations included in the comprehensive plan related to greenspace preservation.

- Establish protection for all rivers and watersheds by encouraging the use of vegetative buffers and other tools.
- Promote the Wild and Scenic River designations for the Ashtabula River, Conneaut Creek and the Grand River.
- Seek funding for the creation of educational materials to educate the public on the greenspace preservation tools available, and the many advantages to preserving local ecological features.

- Encourage vegetative buffer requirements for any development in or adjacent to the following land areas: riparian corridors, isolated wetlands/lakes, ponds and unique land forms (e.g., beaches/sand barrens, old growth forests, etc.)
- Update zoning codes to support soil conservation and "significant area" preservation and consider encouraging townships, cities and villages to update their zoning codes to encourage conservation developments/cluster zoning.

The areas of concern and focus located within *Chapter 3: Farmland Preservation* include an understanding and awareness for residents to recognize the unique and prime farmland in Ashtabula County and the economic benefits these areas provide to the community. The key agricultural areas that were determined to be given the highest priority in regard to preservation are the Harpersfield Grape Region, Pymatuning Region and the Grand River Corridor. A separate farmland preservation plan was written and included in the comprehensive plan.

Ashtabula County Farmland Preservation Plan

On December 19, 2000, the *Ashtabula County Farmland Preservation Plan* was adopted by the Ashtabula County Commissioners. It was prepared by the Farmland Preservation Committee and was incorporated into the adopted *Ashtabula County Comprehensive Plan.* The mission statement determined by the committee is to maintain and enhance the rural character of prime and unique farmland balanced with commercial and residential development and the important areas of natural resources. The following are some of the general concepts offered for consideration and guidance to voluntarily preserve farmland in Ashtabula County.

- Work to maintain a viable agricultural presence in Ashtabula County that is mindful of individual private property rights and has community-wide support through positive relationship building and education among residents, farmers and public officials.
- Encourage public officials to utilize a mix of tools to preserve prime and unique farmland in Ashtabula County. Officials should seek opportunities to tie local resources with state and national resources.
- Promote the establishment of Agricultural Security Areas (ASAs) where farmland preservation activities are encouraged. Criteria to consider for proposed ASA areas are parcels currently in CAUV program, agricultural districts, forestry tax program, prime farmland soils, concentration of contiguous agricultural lands and unique microclimates.
- Continue to promote an understanding of the importance of the agricultural community to Ashtabula County through support of voluntary methods such as CAUV and agricultural districts.
- Support the Ohio Department of Agriculture, the Ashtabula County Commissioners or any other entity to finance conservation easements in Ashtabula County.
- Establish a local farmland preservation office. Encourage the Ashtabula County Commissioners to hire a coordinator who will be responsible for the farmland preservation initiative. This coordinator would be responsible for education of agricultural and non-agricultural communities.
- Support the designation of countywide resources to help increase the appreciation and awareness of the importance of agriculture among the residents of Ashtabula County.
- Distribute the pamphlet "Good Neighbor Relations" to all landowners with land enrolled in CAUV and develop a packet of information to be given to realtors, builders, new residents, social and community organizations to inform them about the industry of agriculture in Ashtabula County.

The chapter entitled *Chapter 4: Transportation* evaluated the County's transportation needs. Goals were developed as follows:

- Develop transportation plans that complement, support, and are consistent with land use plans from other jurisdictions and within multi-jurisdictional agencies.
- Provide transportation system improvements concurrent with development and consistent with adopted land use, corridor and transportation plans.
- Provide a range of transportation choices within the Ashtabula County Region.
- Provide a safe, convenient and economical public transportation system.
- Encourage land uses that will support a high capacity transportation system.
- Promote pedestrian and bicycle transportation countywide and increase safety, mobility, and convenience for non-motorized modes of travel.
- Support and advocate for the continued viability of the passenger and freight rail system as existing or proposed in the region.
- Assure future land uses are compatible with airport operations, to protect and preserve the airport and the public investment in the airport.

The areas of concern and focus located within *Chapter 5: Economic Development* include identifying sufficient land for economic development projects, ensuring proper sewer and water infrastructure capacities, working with telecommunication providers to develop countywide full spectrum communication services and ensuring checked development as it relates to urban sprawl. Some of the following action/priority items were developed as follows:

- Seek to develop data indicating existing and planned capacities for water and wastewater; storm water management, telecommunications, electric and natural gas.
- Collect data for soil types (suitability), current land use and local zoning.
- Encourage orderly sequencing of growth in targeted areas in order to efficiently invest public and private development funds; seek to leverage development projects for state and federal funds that will enhance/expand infrastructure, and hence opportunities, in targeted areas.
- View financial inducements (e.g. tax abatements, TIF, etc.) as tools to encourage development to occur in targeted areas as defined previously.
- Encourage all agencies involved in economic development to pursue these goals.
- Expand and market programs that assist and encourage entrepreneurs and small businesses.
- Encourage public lending programs to consider a business's neighborhood and community contributions in addition to the formal lending guidelines.

The areas of concern and focus located within *Chapter 6: Heritage* include, but are not limited to, continuing to protect and preserve sites listed on the NRHP and with the Ohio Historic Preservation Office, to encourage private property owners to apply to have their homes or businesses recognized as significant at the local, state and federal level and creating a repository for historical data and a historical advisory board.

In *Chapter 7: Recreation,* a list of priorities were established focusing on improving recreation for Ashtabula County in the future. The following are some of these priorities.

- Develop a master recreational plan for the County. This plan would promote the development and improvements to existing facilities of all park systems throughout the County. It could be coordinated by the Ashtabula County Metropark District.
- Promote connecting parks and greenways. The Western Reserve Greenway Trail is being built and will connect with other trails or parks to create a inter-connected recreational system unique to Northeast Ohio.
- Complete the construction of the 27-mile Western Reserve Greenway Trail. The clearing of the land for the construction of the Western Reserve Greenway Trail began in 1999. The construction is progressing in phases and has a target completion date of 2005.

City of Conneaut, Ohio Comprehensive Plan Update 2002

The overall purpose of the *City of Conneaut, Ohio Comprehensive Plan Update 2002* is to prepare for and encourage new development. The plan builds upon ongoing and completed development efforts, sets realistic new targets for the future and proposes a sequenced plan for action. It was approved in 2002 by the Conneaut Planning Commission and City Council.

The update is comprised of four sections: General Development Policies, Land Use Plan, Transportation Element and Infrastructure Element. The General Development Policies section discusses the overall goals of the comprehensive plan. The Land Use Plan is a guide for the long-term planning, zoning and development activites of the City. It recommends priority locations for development through the 20-year planning period (2002-2022) as well as the land use pattern at buildout (a time projected to be well beyond the 20-year planning period). The Transportation Element recommends an improved transportation network which serves the needs of local residents and businesses in concert with the Land Use Plan. Particular emphasis is given to improving accessibility to the two industrial development corridors. The Infrastructure Element's purpose is to identify and plan for utility improvements deemed necessary to support the planned land uses.

As described in the General Development Policies, the elements of the plan are focused on are the following:

- Promote industrial development – and industrial job creation – in the proposed East Industrial Corridor and in the Parrish Road area supported by improved access and utility extensions.
- Promote the growth of service business – and jobs in the Downtown and Gateway North areas.
- Promote new commercial development in the interchange area while maintaining and upgrading existing commercial areas including downtown, harbor commercial and east and west side commercial districts on US 20.
- Promote new residential development in three areas, with priority given to the Dorman-Middle area surrounding the planned new schools.
- Promote infill and redevelopment in older residential areas of the community.
- Promote conservation and new recreation facilities in the Conneaut Creek floodplain, giving priority to the section between Parrish Road and the CSX bridge. Promote conservation in the remainder of the floodplain and in the tributary areas.

7.2.1. 2 Zoning Ordinance and Building Codes

A zoning ordinance regulates development by dividing the community into zones or districts and establishing the type of development allowed within each district. The floodplain can be designated as one or more separate zoning districts in which development is prohibited or allowed only if it is not susceptible to flood damage. Some districts that are appropriate for floodplains are those designated for public use, conservation or agriculture. Zoning works best in conjunction with a comprehensive plan or "road map" for future development and building codes.

Building codes provide some of the best methods of addressing all the hazards in this plan. They are the prime measure to protect new property from damage by high winds, tornadoes, earthquakes, hail, and winter storms. When properly designed and constructed according to code, the average building can withstand the impact of most of these forces.

Currently, Ashtabula County has zoning regulations in place for the unincorporated areas of the County. There are zoning regulations and building codes in place for 25 of the 28 townships in the County. The three townships that do not have building codes established are Monroe, Richmond and Windsor townships. All of the incorporated jurisdictions have their own zoning regulations and building codes in place.

7.2.1.3 Open Space Preservation

Open space preservation is a technique that can be used to not only preserve floodplains but to preserve lands that may be crucial to controlling runoff that adds to flood problems. Existing undeveloped areas can be preserved as open space through zoning ordinances. Lands that ought to be set aside as open space but are already being put to other uses can be converted to public ownership (acquisition) or to public use (easement). Once the land is owned by the county, municipality, or state, buildings and other development that are subject to flood damage can be removed or prohibited. Open space lands and easements do not always have to be purchased outright. Developers can be required to dedicate land to the public for a park and/or to provide easements for flood flow, drainage, or maintenance.

There are several agencies that promote greenspace by preserving large tracts of land throughout Ashtabula County. They include but are not limited to:

- Township Park Commissions
- Ashtabula County Metropolitan Parks District
- Ashtabula SWCD
- Cleveland Museum of Natural History
- GRPI
- The Nature Conservancy
- ODNR

In 2003, The Ashtabula County Metropolitan Park was awarded $199,999 for a project involving the Pymatuning Valley Greenway under the Green Space Conservation Program. This program helps to fund preservation of open spaces, sensitive ecological areas and stream corridors.

In March 2005, the Ashtabula Township Park Commission was awarded $130,000 for the Indian Trails Project under the Clean Ohio Trails Fund. This grant will allow for the engineering and construction of a new trail that is 2,980 linear feet long.

In the 2002 *Codified Ordinances of Conneaut*, Chapter 1129 reserves certain areas of Conneaut for existing or future park development and to preserve certain unique areas and resources such as natural land, waterways and beaches for present and future generations to enjoy. These areas are designated as open space districts and zoned for public parks or semi-public use areas.

7.2.1.4 Subdivision Regulations

Subdivision Regulations govern how land will be broken up into individual lots. These regulations set construction and location standards for the infrastructure built by the developer, including roads, sidewalks, utility lines, storm sewers, storm water retention or detention basins, and drainage ways.

Currently, Ashtabula County has subdivision regulations in place for the residential, commercial and industrial subdivisions of land located within the unincorporated areas of the County. They were prepared by the Ashtabula County Department of Planning and Community Services and adopted by the Ashtabula County Commissioners on February 25, 1999. All of the unincorporated areas in Ashtabula County are subject to the *Ashtabula County Subdivision Regulations* as provided in Section 711.09 of the Ohio Revised Code.

The Subdivision Regulations contain four articles and exhibits. The first article describes the provisions of the regulations, the second article is devoted to definitions, the third article discusses procedures and the fourth article contains improvement procedures. The exhibits list minimum standards required for roads and illustrate typical street occupations and typical subdivision layout sections.

In regard to hazard mitigation planning, the fourth article contains environmental site design features such as requirements for wetlands, floodplains or coastal zones as well as site management issues such as storm water management and erosion and sediment control.

7.2.1.5 Manufactured Homes

Previously, the location and installation of manufactured and mobile homes were regulated at the local level of government, with the construction and fabrication standards being set by the United States Department of Housing and Urban Development (HUD). All mobile type homes constructed after 1976 must comply with HUD's National Manufactured Home Construction and Safety Standards. These standards apply uniformly across the country and it is illegal for a local unit of government to require additional construction requirements.

The installation of manufactured homes in Ashtabula County is currently regulated by Senate Bill 102, which became effective on August 6, 2004. This bill created the Ohio Manufactured Homes Commission to regulate the installation of manufactured housing, which includes mobile and manufactured homes, and vests it with the exclusive authority to regulate manufactured housing installers, the installation of manufactured housing and manufactured housing foundations and support systems. The bill set forth that municipal corporations and other political subdivisions are preempted from regulating and licensing installers and regulating and inspecting the installation of manufactured housing and manufactured housing foundations and

support systems. The Commission has exclusive power to adopt rules of uniform application throughout the state to govern the installation of manufactured housing, the inspection of manufactured housing, the inspection of manufactured housing foundations and support systems, the training and licensing of manufactured housing installers, and the investigation of complaints concerning manufactured housing installers. No political subdivision of the state or any other department or agency of the state may establish any other standards.

The Commission must establish standards by rule that govern the installation of manufactured housing, with the minimum standards being the model standards the Secretary of the United States Department of HUD adopts. The standards established by the Commission must be consistent with, and not less stringent, than the standards adopted by the Department of HUD. The Commission has the exclusive authority to make rules regarding “blocking” and “tiedowns” of mobile and manufactured homes. The Commission must also approve permanent foundations to which a mobile or manufactured home may be affixed.

The Ashtabula County Building Department has guidelines that must be followed for manufactured home installation and can be viewed on the County website (http://www.co.ashtabula.oh.us/AshCtyWebR53.nsf/Building%20Department!OpenFrameSet). A detailed description of anchoring the ties is given. It stresses anchorage requirements with a holding power of at least 5,700 pounds. The guidelines also discuss protection against the wind such as positioning, windbreaks and tiedowns.

The City of Ashtabula’s Codified Ordinances require manufactured homes be anchored to prevent flotation, collapse or lateral movement of the structure resulting from hydrodynamic and hydrostatic loads, including the effects of buoyancy. Methods of anchoring may include, but are not limited to, use of over-the-top or frame ties to ground anchors. The City of Ashtabula also requires manufactured homes be elevated on a permanent foundation such that the lowest floor of the manufactured home is at the base flood elevation.

The City of Conneaut’s Codified Ordinances require new mobile homes equipped with tiedowns to be secured within 30 days after the placement of the mobile home on the lot. The tiedowns must be in accordance with the requirements of the individual mobile home manufacturer or the Northern Zone of National Fire Protection Association 1977 Standard National Environmental Protection Agency (NEPA) 501A.

7.2.1.6 Floodplain Regulations

Communities that adopt and enforce a floodplain management ordinance, to regulate new and existing development within the floodplains, can significantly reduce the effects of flood damage. Communities typically adopt minimum standards that are recommended by FEMA. The objective of these regulations is to ensure that development will not aggravate existing flooding conditions and that new buildings will be protected from flood damage. Zoning and open space preservation work to keep damage-prone development out of hazardous or sensitive areas while floodplain development regulations impose construction standards on what is allowed to be built in the floodplain.

On March 30, 1998, Ashtabula County adopted Flood Damage Prevention Regulations pursuant to authorization contained in Section 307 of the Ohio Revised Code. An additional resolution, *Resolution Number 99-1379 Adopting the Ashtabula County Floodplain Regulations*, was added on November 22, 1999. These regulations apply to all areas of special flood hazard within the jurisdiction of Ashtabula County. The purpose of the implementation of these flood regulations is

to protect human life and health, minimize public money expenditure for flood control projects, minimize need for rescue and relief efforts associated with flooding, minimize prolonged business interruptions, minimize damage to public facilities and utilities, maintain a stable tax base by providing for the proper development in flood prone areas to minimize future flood blight areas, ensure potential buyers are aware that property lies in a floodplain and to ensure that those who occupy flood hazard areas assume responsibility for their actions. The regulations consist of five sections that outline definitions; general provisions, such as which lands need to comply; administration, such as permitting and general and specific standards; general standards, such as construction materials and methods; and floodways. The Ashtabula County Floodplain Regulations adhere to the minimum standards required by the State of Ohio.

7.2.1.7 Drainage Regulations

In order to protect a county's natural resources a community can implement regulations such as County Water Management and Sediment Control Regulations. The purposes of these regulations are to protect the county's water resources by ensuring that the proper storm water and erosion and sediment control measures are in place. Erosion and sediment control measures are called Best Management Practices (BMPs), and when installed and maintained correctly, they help prevent soil from leaving the site. Storm water control measures ensure that the volume of storm water runoff remains the same as before development occurs.

Some examples of what can go into a County Water Management and Sediment Control Ordinance are as follows:

- Submit a Water Management and Sediment Control (WMSC) Plan for proposed commercial, industrial, or residential development sites on parcels greater than five acres.
- Submit an abbreviated plan for sites on parcels less than five acres and part of a larger plan of development.
- Submit a plan for residential dwellings only if a village, township, or city zoning requires them to do so. They must check with the appropriate community for this information.
- Comply with the regulations whether or not a plan is required. All county residents are responsible for being familiar and complying with the regulations.

A designated agency should inspect sites to ensure that the regulations are being followed correctly. The designated agency should also work diligently to review plans and perform site inspections to ensure that these erosion and sediment control measures are in place.

Ashtabula currently does not have drainage regulations enacted within the County. However, one of the long range plans of the Ashtabula County SWCD is to improve countywide storm water management and farm drainage systems throughout the County. This planning includes assisting the Ashtabula County Planning Commission in developing storm water standards within the *Ashtabula County Subdivision Regulations*.

In the *Codified Ordinances of the City of Ashtabula*, all necessary improvements in new subdivisions within the city limits, including storm sewers or open drainage ditches, are required to provide for the adequate disposal of storm water and any natural drainage course should be preserved and maintained.

7.2.1.8 Coastal Zone Regulations

In recognition of the increasing pressures of over-development upon the nation's coastal resources, Congress enacted the Coastal Zone Management Act (CZMA) in 1972. The CZMA encourages states to preserve, protect, develop, and, where possible, restore or enhance valuable natural coastal resources such as wetlands, floodplains, estuaries, beaches, dunes, barrier islands and coral reefs, as well as the fish and wildlife using those habitats. A unique feature of the CZMA is that participation by states is voluntary. To encourage states to participate, the act makes federal financial assistance available to any coastal state or territory, including those on the Great Lakes, that is willing to develop and implement a comprehensive coastal management program.

The Secretary of Commerce (SOC) delegated the administration of the CZMA to the NOAA. The Office of Ocean and Coastal Resource Management (OCRM) administers individual state programs. Currently, OCRM oversees programs in all coastal states except Georgia, Illinois, Indiana, Minnesota, Texas and Ohio. With the exception of Indiana and Illinois, these non-participating states are currently developing coastal programs. In addition to resource protection, the CZMA specifies that coastal states may manage coastal development. A state with an OCRM-approved program can deny or restrict any development that is inconsistent with its coastal zone management program. The CZMA does not apply to states that are not CZMA participants or have not yet received OCRM approval.

The City of Conneaut's Codified Ordinances contains coastal zone management regulations that include setback requirements along the blufflines of the coast. The bluffline setback is calculated from the average annual recession rate, expressed in feet per year (1.5) and multiplied by 30 years. This process yields a minimum required setback distance of 45 feet from the bluffline for permanent structures. This requirement alerts the owner of shoreline property to the potential erosion hazard and provides protection for a period of time roughly corresponding to the mortgage life of the new structure.

7.3 Natural Resource Protection

7.3.1 Riparian Buffer/Wetland Protection

Riparian area refers to the vegetated area next to a watercourse often thought of as the floodplain and its connected uplands. Riparian buffers can protect water resources from non-point source pollution and provide bank stabilization, flood storage and aquatic wildlife habitat. They can be a natural resource management tool used to limit disturbance within a certain distance of a water course to maintain streamside vegetation. Some communities in the State of Ohio have proceeded to adopt riparian buffer overlays and zoning ordinances to reap the benefits of such protection.

Ashtabula County, nor its villages and townships have codes for the development and protection of wetlands. However, the Ashtabula County SWCD recognizes the importance of promoting the development of new wetlands, enhancing existing and preserving significant wetlands. The Ashtabula County SWCD uses the State and Federal programs as they become available for issues associated with wetlands protection.

In the *Ashtabula County Subdivision Regulations*, the Planning Commission may require a subdivider to submit a wetlands study for a proposed subdivision that contains a wetland determined by the US Army Corps of Engineers and/or the Ohio EPA. The Planning Commission may require adjustments in design to compensate for wetland conditions.

7.3.2 Urban Forestry

Eighty percent of Ohioans live and/or work within urban areas. The quality of life for them and their families is dependent upon the urban environment. Healthy trees enhance this environment by promoting clean air and water, increasing property values, reducing erosion and storm water runoff, providing wildlife habitat, moderating temperature, lessening energy demands, and offering year-round enjoyment.

Ohio's Urban Forestry Program was created in 1979 within the ODNR to promote trees and other vegetation as tools to enhance the quality of life within cities and villages. The purpose of the Urban Forestry Program is to provide community officials and allied agencies with the organizational and technical ability to effectively manage the trees along streets, within parks, and on public grounds. Through a statewide network of regional urban foresters, the program helps communities manage their urban forest resources to meet their local needs.

Trees are particularly subject to damage by tornadoes, wind, ice and snow storms. Downed trees and branches break utility lines and damage buildings, parked vehicles, and anything else beneath them. An urban forestry program can reduce the damage potential of trees. A properly written and enforced urban forestry plan can reduce liability, alleviate the extent of fallen trees and limbs caused by wind and ice build-up, and provide guidance on repairs and pruning after a storm. Such a plan helps a community qualify to be a Tree City USA.

Ohio has been the Tree City USA national leader for the past 23 years. There are 233 Tree Cities USA in Ohio. Counties are not eligible for the program but can implement the credited activities.

In Ashtabula County, the City of Conneaut has been a Tree City USA designated city for 19 years. In 2004, a partial tree survey was performed by the ODNR's Regional Urban Forester in which hazard trees were identified.

According to Chapter 917 of *the Codified Ordinances of Conneaut*, the Tree Commission of Conneaut can determine whether or not a tree on private property represents a nuisance or hazard to public health or safety and may order the pruning or removal of the tree. The owner of the tree has 30 days to comply with the Commission's request and rectify the hazard. This ordinance has been in place since November 2002.

According to Chapter 913 of *the Codified Ordinances of Ashtabula*, the City of Ashtabula Director has the authority to trim any tree existing on any public place in the City that threatens the public safety and may remove any such tree which is in an unsafe condition by reason of its location or nature, is injurious or detrimental to other public improvements in the City or is infected with any injury, fungus, insect or other pest or disease which cannot otherwise be controlled.

According to Chapter 268 of *the Geneva Code of Ordinances*, the Shade Tree Commission of Geneva has the authority and jurisdiction to regulate the planting, maintenance and removal of trees on streets and other publicly owned property to ensure safety or to preserve the aesthetics of such public sites, in accordance with the permit system provided in this chapter.

The Village of Jefferson relies on the expertise and knowledge of the Village Administrator who acts as the Village Arborist. The Administrator administers tree training seminars and performs a hazard tree identification yearly. Hazard trees are removed on an as-needed basis.

The remaining jurisdictions of the County do not have tree planning or trimming ordinances enacted within their limits.

7.3.3 Flood Compensation Banking

A flood compensation bank is a detention basin that is used for floodplain encroachment compensation or for flood storage in which the basin's volume may be purchased to mitigate the effects of new development. A development may purchase storage volume from a bank to compensate for floodplain encroachment or to satisfy storm water detention requirements provided the basin is within the appropriate zone of influence.

Ashtabula County currently has nothing enacted within the County dealing with flood compensation banking.

7.3.4 Watershed Planning Efforts

Cities and counties carry out many of the decisions that result from watershed planning efforts. Participation and cooperation with state agencies is also an important component to quality watershed planning. Currently, Ashtabula County does not have a watershed management plan enacted for the County.

However, there are three watershed groups that work actively with officials in Ashtabula County. The Grand River Advisory Council's work includes reviewing projects the ODNR has established that fall within 1,000 feet of the Grand River. The GRPI watershed group focuses on preserving the open space, natural, recreational, agricultural and scenic resources of the Grand River Watershed in Ashtabula, Geauga, Lake, Portage and Trumbull counties. GRPI's goals are achieved by uniting residents, landowners, businesses and communities in the stewardship and permanent protection of the Grand River Watershed. The Pennsylvania Ohio Watershed Association is devoted to the Pymatuning/Shenango watershed and educates residents about the watershed, conducts water quality monitoring, initiates litter cleanups and riparian plantings. Both GRPI and the Pennsylvania Ohio Watershed Association have completed watershed plans that are awaiting approval from OEPA.

In addition, the Ashtabula River Partnership (ARP) was created in 1994 as an effort to get the river dredged and to prevent the impending designation of the river as an extension of the Fields Brook Superfund site. An oversight coordinating committee was established as well as several technical committees and a local coordinator was hired. The ARP conducts extensive sediment characterization studies, that include mapping of pollutant concentrations (particularly Polychlorinated Biphenyls), estimation of sediment volume to be removed, delineation of Polycyclic Aromatic Hydrocarbon (PAH) distribution, Toxicity Characteristic Leaching Procedure (TCLP) testing to ensure sediments did not qualify as hazardous waste, screening for low level radioactive waste and modeling sediment transport, scouring and deposition rates. In 2002, a

final comprehensive management plan/environmental impact statement was completed but was not available for review.

Lower Grand River Watershed Plan

The Lower Grand River Watershed Plan is a requirement of the OEPA. It is currently in draft form and will be sent to OEPA for review and approval. The plan concentrates on the Lower Grand River, which extends from Austinburg Township to Lake Erie. The plan essentially is a water inventory that lists everything from number of different species found in the river as well as number of hydraulic dams. In addition, the plan has a section devoted to problem statements that have been developed and goals and objectives relating to these problem statements. Once the plan has been approved, members of the Grand River Partners, Incorporated plan to review and reevaluate the plan every two to five years to ensure the goals and objectives of the plan are being met. Some of the goals developed with this watershed plan include the following:

- Develop Erosion and Sediment Control Regulations for individual lot construction.
- Adopt Erosion and Sediment Control Regulations for individual lot construction adopted by the Ashtabula County Commissioners.
- Hire an Erosion and Sediment Control Administrator.
- Assist Ashtabula County Commissioners with obtaining a Water Pollution Control Loan for the community of Austinburg's sewer project.
- Secure Water Resource Restoration Sponsor Program (WRRSP) funding for implementing components of Coffee/Center Creek stream restoration plan.
- Work with Austinburg, Hambden, Harpersfield, Montville, Plymouth, Thompson and Trumbull Township Trustees to develop riparian setback ordinances.
- Work with Austinburg, Hambden, Harpersfield, Montville, Plymouth, Thompson and Trumbull Township Trustees to develop conservation zoning.
- Establish 21,183.45 acres of permanent land protection in Lower Grand River (17.98% of total project area).
- Work to secure funding to preserve pristine water quality by protecting 4,119.73 (17.32% of the watershed) additional acres of riparian buffers, core forest areas and pristine wildlife habitat and 1,477.19 acres of identified Core Forest Areas of the Big Creek subwatershed.
- Work to secure funding to protect 223.30 additional acres, or a total of 2.67% of the Kellogg Creek subwatershed.
- Work to secure funding to protect 1,498.21 acres of watershed and 2,179.10 acres of Core Forest located in the Paine Creek subwatershed.
- Develop a stream restoration plan for the channelized portions and the impaired riparian portions of the subwatershed that extends from Grand River below Mill Creek to below Coffee Creek.
- Restore 50% of the channelized portions and 50% of the impaired riparian portions of the subwatershed that extends from Grand River below Mill Creek to below Coffee Creek.
- Establish Comprehensive Nutrient Management Plans (CNMP) with 75% of the agricultural producers in the subwatershed that extends from Grand River below Mill Creek to below Coffee Creek.
- Work to secure funding to preserve pristine water quality by protecting 3,591.51 (25.53%) acres of riparian buffers and pristine wildlife habitat of subwatershed and

389.46 acres of Core Forest in the subwatershed that extends from Grand River below Mill Creek to below Coffee Creek.

Interstate Pymatuning/Shenango Watershed Plan

The Interstate Pymatuning/Shenango Watershed Plan was completed in 2001 and focuses on the water resources within the Pymatuning/Shenango Watershed. It has been sent to OEPA and is awaiting approval. The goals, policies and initiatives were derived from the public forums and the Penn Ohio Watershed Association (and any associated groups). A separate plan has been completed that focuses on the Pennsylvania portion of the watershed. The main impacts occurring on the Ohio side of the watershed include sediment, nutrients, metals, hydromodification and habitat changes.

The short term priorities, from 2001 until 2006, include, but are not limited to the following:

- Determine how to provide long-term funding and support and begin securing long-term funds.
- Establish and maintain a website.
- Initiate a study of causes, locations and affordable solutions for septic system failures.
- Arrange for at least one land use conference.

The long term priorities, beyond 2006, include, but are not limited to the following:

- Work with planners and others to make available guidance on land use and easements.
- Consider coordinating and supervising development of stream restoration plans.
- Work with groups in outreach promoting agricultural BMPs.
- Work with appropriate groups to identify current land use practices and recommend measures to improve resource protection.

7.3.4.1 Habitat Restoration

In urbanized watersheds, some stream and/or rivers suffer the effects of increased erosion and water quality problems because of the amount of development that is occurring in a given area. Bioengineering techniques can help prevent further degradation and also provide water quality and habitat benefits.

Biotechnical practices use vegetative or other natural materials to achieve stream management objectives, usually erosion control. One of the chief advantages of biotechnical practices is that they help restore natural stream features, like in-stream habitat and streambank vegetation. The materials used for biotechnical practices are generally less expensive than for more traditional approaches, but installation is more labor intensive and they may require more frequent maintenance.

The Ashtabula SWCD currently promotes several habitat restoration programs and projects.

Conservation Easements

To understand how a conservation easement works, it is important for the landowner to understand they own more than the land itself, including certain rights to the land. These rights may include the right to farm, harvest timber, subdivide, extract minerals or develop.

Landowners also have the right to place limits on the types of land uses that may occur on their property through a conservation easement. The primary objective of conservation easements is to eliminate development as a potential future land use. Conservation easements are rather flexible agreements that can be tailored to each individual's needs. Conservation easements allow the property owner to maintain ownership of the land and continue to use the property as they always have. Some examples of these practices the landowner may be permitted to do are hunt, fish, maintain existing trails, collect firewood, farm and even allow limited timber harvest. For establishing a conservation easement, the landowner may receive a fee or a tax benefit. Conservation easements are permanent agreements that are recorded on the properties deed and do not grant public access.

There are several conservation easements located in Ashtabula County. They are Barthels Easement, Suawa Easement, Nye Agricultural Easement, Nye Old Growth Woods, Nye Easement, Camp Whitewood and County Line Road Easement.

Conservation Reserve Program (CRP)

The Conservation Reserve Program (CRP) provides technical and financial assistance to eligible farmers and ranchers to address soil, water and related natural resource concerns on their lands in an environmentally beneficial and cost-effective manner. The program provides assistance to farmers and ranchers in complying with Federal, State and tribal environmental laws, and encourages environmental enhancement. CRP is administered by the Farm Service Agency, with the National Resource Conservation Service (NRCS) providing technical land eligibility determinations, conservation planning and practice implementation.

The CRP reduces soil erosion, protects the ability to produce food and fiber, reduces sedimentation in streams and lakes, improves water quality, establishes wildlife habitat and enhances forest and wetland resources. The program encourages farmers to convert highly erodible cropland or other environmentally sensitive acreage to vegetative cover, such as tame or native grasses, wildlife plantings, trees, filterstrips or riparian buffers. Farmers receive an annual rental payment for the term of the multi-year contract. Cost sharing is provided to establish the vegetative cover practices. The cost share for establishing vegetative cover is 50%. In Ashtabula County, announcements concerning the amount of funding available are made annually. See Table 7-1 for a summary of conservation practices by acreage for Ashtabula County.

Table 7-1
Summary of Practices Acreages for Ashtabula County's
Active Contracts from 1987 to 2007

Type	Acreage
Introduced Grasses	220
Native Grasses	261.7
Tree Planting	2.2
Hardwood Tree Planting	2.5
Wildlife Habitat Corridor	4
Wildlife Habitat	9.5
Grass Waterways	13.7
Established Grass	1,147.5
Established Trees	37
Wildlife Food Plots	5.4
Filter Strips	37.4
Riparian Buffers	3.7
Total	**1,744.6**

In 1982, total phosphorous loading into Lake Erie was 13,665 tons, prompting many northwest Ohio counties to participate in the CRP initiative to reduce phosphorous loading to the lake. Ashtabula County's share of the phosphorus reduction goal of 2,200 metric tons is 34.4 metric tons per year. That goal was exceeded in 1992 due mainly to the changes in tillage systems used by farmers. In 1992, out of a total of 122,938 acres of corn and soybeans in Ashtabula County, 60,876 acres or almost 50% were farmed using conservation tillage. From 1990 to 1992, the percent of conservation tillage acreage increased 148%. In 1992, Ashtabula County also had 33,065 acres (12.3% of its land base) enrolled in the CRP, the highest number of acres for any county in Ohio. These changes have reduced soil erosion in Ashtabula County and helped protect the quality of the water resource.

Environmental Quality Incentive Program (EQIP)

The Environmental Quality Incentive Program (EQIP) was established in the 1996 Farm Bill, and reauthorized in the 2002 Farm Bill, to provide a voluntary conservation program to assist farmers and ranchers who are faced with serious threats to soil, water and related natural resource concerns. The EQIP provides educational assistance to landowners and promotes agricultural production and environmental quality as compatible national goals. The EQIP also offers financial and technical help to assist eligible participants install or implement structural and management conservation practices on eligible agricultural land. Eligible practices include waste storage structures, pasture water supply and fencing practices, erosion control practices and others.

EQIP assisted farmland

In November 2004, $155,392 in EQIP funding was awarded to Ashtabula County.

7.4 Emergency Services

Emergency services protect people before, during, and after a disaster. A good emergency management program addresses all hazards, natural and man-made. It involves the active participation and involvement of all county departments and municipalities. Emergency services include:

- Threat Recognition
- Warning
- Response
- Evacuation and Sheltering
- Post-Disaster Recovery and Mitigation

7.4.1 Threat Recognition

The first step in responding to a hurricane, flood, tornado, or other natural hazard is knowing when weather conditions are such that an event could occur. With a proper and timely threat recognition system, adequate warnings can be disseminated.

7.4.2 Warning

After there is a potential hazard recognized following steps must be taken to notify the public of its possible onset. Early and specific warnings allow more people the ability to set protection procedures in motion.

The NWS issues notices to the public using two levels of notification:

Watch: conditions are right for flooding, thunderstorms, tornadoes or winter storms.
Warning: a flood, tornado, etc. has started or has been observed.

A more specific warning may be disseminated by the community in a variety of ways. The following are the more common methods:

- Commercial or public radio or TV stations
- The Weather Channel
- Cable TV emergency news inserts
- Telephone trees/mass telephone notification
- NOAA Weather Radio
- Tone activated receivers in key facilities
- Outdoor warning sirens
- Sirens on public safety vehicles
- Door-to-door contact
- Mobile public address systems
- E-mail notifications

Ashtabula County has 14 outdoor warning systems located throughout the County. The County also has activated 22 tone alert radios alert monitors in place in all of the area schools, in seven nursing homes, in three hospitals and in one university. See Table 7-2.

Table 7-2
Location Table of Warning Sirens in Ashtabula County

Decibel Rating	Siren No.	Location
115	A-1	Lake Road, Geneva Township
123	A-2	South Warner Street, Geneva-on-the-Lake Township
115	A-3	Myers Road, Geneva Township
123	A-4	Maple Road, Geneva Township
123	A-5	Padanarum Road, Geneva Township
123	A-6	Depot Street, City of Geneva
109	A-7	Barnum Road, Geneva Township
115	A-8	Tuttle Road, Geneva Township
123	A-9	State Route 534 and Route 90, Harpersfield Township
123	A-10	State Route 307, Harpersfield Township
109	A-11	State Route 534, Harpersfield Township
109	A-12	County Line Road, Harpersfield Township
123	A-13	Cork Cold Springs Road, Harpersfield Township
109	A-14	Cork Cold Springs Road, Harpersfield Township

Three NOAA Weather Radio Stations that broadcast continuous weather information direct from a nearby NWS Office are located in Ashtabula County. They broadcast NWS watches, warnings, forecasts and other hazard information 24 hours a day. The following is a list of these radio stations with their call numbers and location information:

- KHB59, Cleveland, Ohio
- KEC58, Erie, Pennsylvania
- KZZ32, Meadville, Pennsylvania

In addition, local print and broadcast media will be relied upon to assist in the dissemination of warning to the general public. Operational telephone and radio communications will be utilized to notify public officials, emergency operations center (EOC) staff and emergency personnel.

7.4.3 Response

The protection of life and property is the most important task of emergency responders. Concurrent with threat recognition and issuing warnings, a community should respond with actions that can prevent or reduce damage and injuries.

Typical actions and responding parties include the following:

- Activate the emergency operations center (emergency preparedness)
- Close streets or bridges (sheriff or public works)
- Shut off power to threatened areas (utility company)
- Pass out sand and sandbags (public works)
- Hold children at school/releasing children from school (school superintendent)
- Open evacuation shelters (Red Cross)
- Monitor water levels (engineering)
- Establish security and other protection measures (police/sheriff)

An emergency operations plan ensures that all bases are covered and that the response activities are appropriate for the expected threat. These plans are developed in coordination with the agencies or offices that are given various responsibilities.

The Ashtabula County Emergency Operations Plan was developed pursuant to the Ohio Revised Code, Section 5915. It was adopted by the Ashtabula County Board of Commissioners on November 25, 2003. This EOP provides Ashtabula County and its political jurisdictions the basis for a systematic approach to the solution of problems created by the threat or the occurrence of disasters. It identifies the responsibilities, functions, operational procedures and working relationship between and within the governmental entities and their various departments; private support groups and individual citizens.

The EOP is designed to work for all types of natural and man-made disasters. The document has a Basic Plan which outlines Ashtabula County's approach to emergency operations. It is a relatively broad conceptual framework and describes the approach to an integrated emergency operations system. It relates information relevant to the entire plan. It explains the concept of operation for emergency management in Ashtabula County and describes the organization and responsibilities for emergency planning and operations.

The Basic Plan is augmented with annexes that contain specific functional responsibilities, tasks and operations actions that pertain to the function being covered. They are action oriented and written to guide personnel charged with execution of the plan.

The appendices are hazard specific and support annexes. They are required when the subject of an annex requires operational procedures prior to, or during an occurrence that must be implemented differently because of its unique aspect (i.e., an evacuation plan for a hazardous materials incident would be different from crises relocation in an attack related situation). Hazard specific appendices are used to address each such hazard that has unique operational procedures (i.e., a slow build emergency such as a flood would require different increased readiness procedures and alert and warning actions than those hazards that happen without predictability).

The Ashtabula County Board of Commissioners is responsible for the policy making, coordination, direction and control over all emergency management activities within Ashtabula County that occurs outside of municipal jurisdiction. If more than one municipality is affected, the County will coordinate the operation and manage the resources for the affected areas.

The Ashtabula County Board of Commissioners will assume direction and control of emergency activities from the primary EOC located at the Ashtabula County Courthouse in Jefferson, Ohio. An alternate EOC will be designated at the time of an emergency if needed.

7.4.4 Evacuation and Sheltering

7.4.4.1 Evacuation

There are five key components to a successful evacuation:

1. Adequate warning
2. Adequate routes
3. Traffic control

4. Knowledgeable travelers
5. Care for special populations (i.e. handicapped, prisoners, school children)

In Ashtabula County, the decision to recommend evacuation in and around the area of an incident site rests with the Ashtabula County Board of Commissioners.

7.4.4.2 Shelter

Shelter is required for those who cannot get out of harm's way. Typically, the American Red Cross (ARC) will staff a shelter and ensure that there is adequate food, bedding and washing facilities. Shelter management is a specialized skill. Managers must deal with problems like scared children, families that want to bring their pets and the potential for an overcrowded facility.

The ARC has been chartered under federal law to provide mass care to victims of natural disasters. Hence, the efforts of sheltering are coordinated with the ARC, which operates shelter and mass care operations as its capabilities permit. The Ashtabula County EMA and ARC jointly sign agreements with local governments, school districts, churches and other organizations to use their facilities for shelter and mass care operations.

All aspects of activating, staffing and running of care centers in the County will be coordinated through the Red Cross Liason. In addition, the Ashtabula County Chapter of the ARC, Department of Job and Family Services, Salvation Army and Health and Medical Organizations all have specific responsibilities regarding the operation of shelters.

7.4.5 Post-Disaster Recovery and Mitigation

After a disaster, communities should undertake activities to protect public health and safety and facilitate recovery. Appropriate measures include:

- Patrol evacuated areas to prevent looting
- Provide safe drinking water
- Monitor for diseases
- Vaccinate residents for tetanus
- Clear streets
- Clean up debris and garbage

Throughout the recovery phase, everyone wants to return to their daily routines. The problem is when recovery efforts are being instituted, people may be performing a quick fix that returns them to their daily routines faster. However, it is imperative that during this recovery phase every effort should be made to think about how to prevent repeated damage from happening if another disaster were to strike. Some efforts include:

- Advise residents through public information activities about mitigation measures they can incorporate into their reconstruction work.
- Evaluate damaged public facilities to identify mitigation measures that can be included during repairs.
- Acquire substantially or repeatedly damaged properties from willing sellers.
- Plan for long term mitigation activities.
- Apply for post-disaster mitigation funds.

In Ashtabula County, responsibility for damage assessment ultimately lies with local government. Damage assessment personnel must be trained in order to provide fast and accurate information to the EOC so that effective response and recovery efforts may be utilized. Many financial assistance programs at the State and Federal levels require extensive damage assessment information.

In order to provide for the collection and analysis of disaster related damages, an assessment section will be formed within the EOC during an emergency/disaster. This section will coordinate all personnel involved in damage assessment activities and shall forward the most current information to the EOC Executive Group for use in coordinating response. This information is also needed by the Operations Group to direct proper response and recovery efforts.

It is necessary to obtain information from a number of sources to gain an accurate and complete assessment of the emergency situation. The EOC Operations Group will provide the Assessment Section with reports and messages from field emergency forces. The Assessment Section may perform onsite surveys as required.

7.5 Flood Control

Flood control projects have traditionally been used by communities to control or manage floodwaters. They are also known as “structural” projects that keep flood waters away from an area as opposed to “non-structural” projects, like retrofitting, that do not rely on structures to control flows.

7.5.1 Flood Control Measures

The most common type of measures that keep flood waters away from an area are reservoirs and dams, diversion channels and levees and floodwalls.

7.5.1.1 Reservoirs and Dams

Reservoirs and dams impound water to reduce the amount of water that reaches an area at one time. A reservoir holds high flows behind a dam or in a storage basin. Water is released at a controlled rate. Reservoirs and dams are generally perpendicular to a stream or river.

Pymatuning Reservoir and State Park

In 1933, the dam which impounded Pymatuning Reservoir was constructed to regulate the flow of the Shenango and Beaver rivers. Land on the western shore of the reservoir was acquired by the State of Ohio in 1935, and in 1950 the Division of Parks and Recreation began developing Pymatuning State Park.

The park includes a major impoundment, Pymatuning Lake, which is operated by the Pennsylvania Department of Conservation of Natural Resources (DCNR) Bureau of State Parks. Pymatuning Lake is the largest man-made Reservoir in Pennsylvania, totaling about 17,000 acres of water. There are 1,407 acres of water and 3,512 acres of land devoted to the reservoir and state park in the State of Ohio. Pymatuning State Park provides extensive opportunities for swimming, fishing, boating, hunting, camping, biking and hiking. The northwestern section of the lake, Sanctuary Lake, is set aside for fish and waterfowl propagation.

As previously mentioned in Section 4.12.1, Ashtabula County has 45 dams within its boundaries. The number of dams and their classifications are as follows:

- Class I - 1
- Class II - 2
- Class III - 5
- Class IV - 14

In addition, Ashtabula County has one unclassified dam and 22 exempt dams, which have been determined by the ODNR's Chief of the Division of Water to not constitute a hazard to life, health or property in the event of a failure.

7.5.1.2 Diversion Channels

A diversion is a new channel or overflow weir that sends floodwater to a different location, thereby reducing flooding along a watercourse. During normal flows, the water stays in the old channel. During flood flows, the stream spills over to the diversion channel.

According to the Ashtabula County SWCD, there are no diversion channels located in Ashtabula County.

7.5.1.3 Levees and Floodwalls

Levees and floodwalls restrain the flow of the stream or river. During a flood, the stream or river flow is not reduced; only confined. Levees and floodwalls are generally parallel to the flow of the stream.

According to the Ashtabula County SWCD, there are no levees or floodwalls located in Ashtabula County.

7.5.2 Drainage Maintenance

Man-made ditches and storm sewers help drain areas where the surface drainage system is inadequate, or where underground drainageways may be safer or more practical. Particularly appropriate for depressions and low spots that will not drain naturally, drainage and storm sewer improvements are designed to carry the runoff from smaller, more frequent storms. There are three types of drainage improvements that are usually pursued to reduce storm water flooding: putting drainageways in underground pipes, channelization, and removing obstructions caused by stream crossings, such as culverts and bridges with small openings. Because drainage ditches and storm sewers convey water faster to other locations, improvements are only recommended for small local problems where the receiving stream or river has sufficient capacity to handle the additional volume and flow of water. To reduce the cumulative downstream flood impacts of numerous small drainage projects, additional detention or run-off reduction practices should be provided in conjunction with the drainage system improvements.

The Ashtabula County Engineer is responsible for the maintenance and repair of 354 miles of County roads and 895 County bridges and culverts. The Engineer's staff makes itself readily available to address public concerns regarding the County's roads and bridges.

7.6 Public Information

A successful hazard mitigation plan program involves both the public and private sectors. Public information activities advise property owners, renters and businesses about hazards and ways to protect people and property from these hazards. These activities can motivate people to take the steps necessary to protect themselves and others. Information can initiate voluntary mitigation activities at little or no cost to the government. Property owners mitigated their flooding problems long before there were government funding programs.

7.6.1 Outreach Projects

Outreach projects are the first step in the process of orienting property owners to the hazards they face and the concept of property protection. They are designed to encourage people to seek out more information in order to take steps to protect themselves and their properties. Research has proven that outreach projects work. However, awareness of the hazard is not enough; people need to be told what they can do about the hazard, so projects should include information on safety, health and property protection measures. Research has also shown that a properly run local information program is more effective than national advertising or publicity campaigns. Therefore, outreach projects should be locally designed and tailored to meet local conditions.

The Ashtabula County EMA participates in the Local Emergency Planning Committee (LEPC). The LEPC is a volunteer board under the Commissioners that organizes and implements hazardous materials planning under section 3750 of the Ohio Revised Code.

7.6.2 Real Estate Disclosure

Many times after a natural disaster, people say they would have taken steps to protect themselves if only they had known they had to purchase a property that is exposed to a natural hazard. By reaching out to residents in a community to become informed as to what hazards are a potential in the community, the community has armed them with information that they did not have previously. This knowledge allows them to make an informed decision on purchasing insurance to cover their potential losses.

7.6.2.1 Federal law

Federally regulated lending institutions must advise applicants for a mortgage or other loan that is to be secured by an insurable building whether the property is in a floodplain as shown on the FIRM. If so, flood insurance is required for buildings located within the floodplain if the mortgage or loan is federally insured. However, because this requirement has to be met only 10 days before closing, often the applicant is already committed to purchasing the property when he or she first learns of the flood hazard.

7.6.2.2 State law

The state of Ohio’s Department of Commerce has a Residential Property Disclosure Form pursuant to section 5302.30 of the Revised Code and rule 1301:1-4-10 of the Administrative Code. It is to be completed by the owners who want to sell their property. Under a good faith stipulation, they are to note any areas of the house that may be dangerous which include being

in a floodplain/Lake Erie Coastal Erosion Area, whether there are drainage/erosion problems, and if there are zoning/code violations.

Ashtabula County's and surrounding areas' multiple listing service does not include a listing of whether a property is in a flood zone or wetland. Disclosure practices are left up to the individual broker or agent.

8.0 MATRIX RESULTS

8.1 Matrix Results

The Core Group chose a total of 75 potential mitigation activities. Of those 75 activities, 27 were labeled as "prioritized" activities and are listed in the following sections. The Core Group evaluated the activities by first taking into account the risk assessment ranking of hazards located in Section 4.0 of this report. The various hazards had been ranked according to past historical events and the cumulative costs of each potential disaster.

The following matrices' results show the average rating for all the Core Group members. Each member filled out an individual matrix, and then the results for each hazard were averaged. The hazard of flooding had the most activities associated with it. The three top rated activities have been highlighted; however the other activities are important and should be re-evaluated during the monitoring process of the Mitigation Plan for Ashtabula County. To see the complete list of mitigation alternatives for each hazard please see the complete matrix in Appendix I.

8.1.1 Matrix Results for Winter and Summer Storms

Ashtabula County Matrix Totals	Matrix Totals	Matrix Totals	Matrix Totals	Total
Severe Storms - Winter/Summer				
Develop a mapping system to identify existing shelters, where residents can go to seek safety in the event of severe weather. Coordinate with the American Red Cross (ARC) on identifying existing shelters.	20	20	14	16.2
Develop a public education program for informing residents about the benefits of having NOAA radios and Family Disaster Plans, which will help them better respond to an emergency situation.	20	16	14	15.7
Provide back-up generators for critical facilities, including shelters, which need to maintain continuous power to protect human health and life.	19	20	14	15.2
Provide an alternate potable water source in the event that existing water supplies are disrupted or contaminated.	20	12	14	14.4

The four highest prioritized activities within the winter and summer storms hazard category include:

- Develop a mapping system to identify existing shelters, where residents can go to seek safety in the event of severe weather. Coordinate with the American Red Cross (ARC) on identifying existing shelters.
- Develop a public education program for informing residents about the benefits of having NOAA radios and Family Disaster Plans, which will help them better respond to an emergency situation.
- Provide back-up generators for critical facilities, including shelters, which need to maintain continuous power to protect human health and life.
- Provide an alternate potable water source in the event that existing water supplies are disrupted or contaminated.

8.1.2 Matrix Results for 100- year Flooding and Flash Flooding

Ashtabula County Matrix Totals	Matrix Totals	Matrix Totals	Matrix Totals	Total
Flooding - 100-year flooding and flash flooding				
Develop a mapping system to identify existing shelters, where residents can go to seek safety in the event of severe weather. Coordinate with the ARC on identifying existing shelters.	20	20	14	15.3
Seek funding to coordinate with the ARC to develop a warehousing network for storing essential disaster supplies (food, clothing and medical supplies), as well as processing donations, that would be distributed to shelters during and after an event.	18	20	14	14.7
Provide NOAA weather radios for all critical facilities within the County.	20	16	14	14.6
Provide an alternate potable water source in the event that existing water supplies are disrupted or contaminated.	20	12	14	14.6

The four highest prioritized activities within the 100-year and flash flooding hazard categories include:

- Develop a mapping system to identify existing shelters, where residents can go to seek safety in the event of severe weather. Coordinate with the ARC on identifying existing shelters.
- Seek funding to coordinate with the ARC to develop a warehousing network for storing essential disaster supplies (food, clothing and medical supplies), as well as processing donations, that would be distributed to shelters during and after an event.
- Provide NOAA weather radios for all critical facilities within the County.
- Provide an alternate potable water source in the event that existing water supplies are disrupted or contaminated.

8.1.3 Matrix Results for Lake and Stream Bank Erosion

Ashtabula County Matrix Totals	Matrix Totals	Matrix Totals	Matrix Totals	Total
Lake and Stream Bank Erosion				
Evaluate runoff (surface drainage) problems in the County and how these problems affect erosion.	16	12	14	12.2
Develop an outreach program to work with private properties along the shoreline to give them direction and resources on what is available to them as it relates to help with their erosion problems.	18	12	14	12.0
Seek funding to evaluate Lake Erie shore erosion in Ashtabula County.	16	15	14	11.9
Provide an alternate potable water source in the event that existing water supplies are disrupted or contaminated.	0	0	0	N/A

The four highest prioritized activities within the lake and stream bank erosion hazard category include:

- Evaluate runoff (surface drainage) problems in the County and how these problems affect erosion.
- Develop an outreach program to work with private properties along the shoreline to give them direction and resources on what is available to them as it relates to help with their erosion problems.
- Seek funding to evaluate Lake Erie shore erosion in Ashtabula County.
- Provide an alternate potable water source in the event that existing water supplies are disrupted or contaminated.

8.1.4 Matrix results for Tornadoes

Ashtabula County Matrix Totals	Matrix Totals	Matrix Totals	Matrix Totals	Total
Tornadoes				
Evaluate the school systems within Ashtabula County to ensure proper awareness and ability to the reaction of tornadoes.	20	16	14	16.2
Develop a mapping system to identify existing shelters, where residents can go to seek safety in the event of severe weather. Coordinate with the ARC on identifying existing shelters.	20	16	14	15.7
Provide back-up generators for critical facilities, including shelters, which need to maintain continuous power to protect human health and life.	20	20	14	15.5
Provide an alternate potable water source in the event that existing water supplies are disrupted or contaminated.	0	0	0	N/A

The four highest prioritized activities within the tornadoes hazard category include:

- Evaluate the school systems within Ashtabula County to ensure proper awareness and ability to the reaction of tornadoes.
- Develop a mapping system to identify existing shelters, where residents can go to seek safety in the event of severe weather. Coordinate with the ARC on identifying existing shelters.
- Provide back-up generators for critical facilities, including shelters, which need to maintain continuous power to protect human health and life.
- Provide an alternate potable water source in the event that existing water supplies are disrupted or contaminated.

8.1.5 Matrix results for Droughts and Wildland Fires

Ashtabula County Matrix Totals	Matrix Totals	Matrix Totals	Matrix Totals	Total
Droughts - Excessive Heat and Extreme Cold				
Coordinate with the GIS Department and develop a mapping project of all the dry hydrants located within the County.	20	12	14	15.4
Develop a public education program concerning the hazards associated with droughts and the water restrictions that should be followed during drought conditions.	20	16	14	15.3
Establish an enforceable open burning ban to be implemented during droughts.	20	0	14	14.6
Create a public education and awareness of droughts and what to do during one. Educate residents on the proper use of air conditioners etc and how they cause brown outs.	20	16	14	14.6
Provide an alternate potable water source in the event that existing water supplies are disrupted or contaminated.	0	0	0	N/A

The five highest prioritized activities within the droughts and wildland fires hazard category include:

- Coordinate with the GIS Department and develop a mapping project of all the dry hydrants located within the County.
- Develop a public education program concerning the hazards associated with droughts and the water restrictions that should be followed during drought conditions.
- Establish an enforceable open burning ban to be implemented during droughts.
- Create a public education and awareness of droughts and what to do during one. Educate residents on the proper use of air conditioners etc and how they cause brown outs.
- Provide an alternate potable water source in the event that existing water supplies are disrupted or contaminated.

8.1.6 Matrix results for Earthquakes

Ashtabula County Matrix Totals	Matrix Totals	Matrix Totals	Matrix Totals	Total
Earthquakes				
Provide an alternate potable water source in the event that existing water supplies are disrupted or wells run dry.	20	16	14	13.4
Provide back-up generators for critical facilities, including shelters, which need to maintain continuous power to protect human health and life.	20	20	14	13.2
Seek funding to develop a Volunteer Reception Center for coordinating volunteers who are willing to help with the mitigation of an earthquake.	20	12	14	12.7

The three highest prioritized activities within the earthquake hazard category include:

- Provide an alternate potable water source in the event that existing water supplies are disrupted or wells run dry.
- Provide back-up generators for critical facilities, including shelters, which need to maintain continuous power to protect human health and life.
- Seek funding to develop a Volunteer Reception Center for coordinating volunteers who are willing to help with the mitigation of an earthquake.

8.1.7 Matrix results for Water Spouts

Ashtabula County Matrix Totals	Matrix Totals	Matrix Totals	Matrix Totals	Total
Water Spouts				
Develop an educational outreach program about severe storms on the lake which would include waterspouts.	18	20	14	13.0
Coordinate with Lake Erie Coastal Communities on lake safety for tourists.	20	12	14	12.3
Promote existing educational opportunities about waterspouts.	20	20	14	12.2

The three highest prioritized activities within the waterspouts hazard category include:

- Develop an educational outreach program about severe storms on the lake which would include waterspouts.
- Coordinate with Lake Erie Coastal Communities on lake safety for tourists.
- Promote existing educational opportunities about waterspouts.

8.2 Mitigation Alternatives for Each Participating Community

Each of the participating communities was required to select a mitigation alternative or alternatives for their community to support. Please see Appendix A for a copy of the letter sent to communities for mitigation alternatives selection. Individual communities are responsible for implementing these activities. The alternatives chosen by each community are as follows:

Andover – The jurisdiction felt comfortable with the Core Group results and the highest prioritized mitigation alternatives are what they would like to have as their selected mitigation alternatives.

Ashtabula – The jurisdiction felt comfortable with the Core Group results and the highest prioritized mitigation alternatives are what they would like to have as their selected mitigation alternatives.

Conneaut – The jurisdiction felt comfortable with the Core Group results and the highest prioritized mitigation alternatives are what they would like to have as their selected mitigation alternatives.

Geneva – The jurisdiction felt comfortable with the Core Group results and the highest prioritized mitigation alternatives are what they would like to have as their selected mitigation alternatives.

In addition, they wanted to add the following two alternatives:

- Provide designated locations/facilities to house displaced animals after severe storm events.
- Upgrade the radio communications system throughout the County for all public safety services.

Geneva felt the hazard category of Water Spouts did not pertain to their jurisdiction.

Geneva-on-the-Lake – The jurisdiction felt comfortable with the Core Group results and the highest prioritized mitigation alternatives are what they would like to have as their selected mitigation alternatives. In addition, they wanted to add the following two alternatives:

- Provide designated locations/facilities to house displaced animals after severe storm events.
- Upgrade the radio communications system throughout the County for all public safety services.

Jefferson – The jurisdiction felt comfortable with the Core Group results and the highest prioritized mitigation alternatives are what they would like to have as their selected mitigation alternatives.

North Kingsville – The jurisdiction felt comfortable with the Core Group results and the highest prioritized mitigation alternatives are what they would like to have as their selected mitigation alternatives. In addition, they wanted to add the following two alternatives:

- Provide designated locations/facilities to house displaced animals after severe storm events.
- Upgrade the radio communications system throughout the County for all public safety services.

Orwell – The jurisdiction felt comfortable with the Core Group results and the highest prioritized mitigation alternatives are what they would like to have as their selected mitigation alternatives. In addition, Orwell felt Lake and Stream Bank Erosion did not pertain to their jurisdiction.

Roaming Shores – The jurisdiction felt comfortable with the Core Group results and the highest prioritized mitigation alternatives are what they would like to have as their selected mitigation alternatives. In addition, they wanted to add the following two alternatives:

- Designate existing structures that could be potentially used as shelters during a hazard event.
- Provide back-up generators for critical facilities, including shelters, which need to maintain continuous power to protect human health and life.

Rock Creek – The jurisdiction felt comfortable with the Core Group results and the highest prioritized mitigation alternatives are what they would like to have as their selected mitigation alternatives. In addition, they wanted to their attention and efforts on flooding alternatives first.

Austinburg Township - The Township felt comfortable with the Core Group results and the highest prioritized mitigation alternatives are what they would like to have as their selected mitigation alternatives. In addition, they wanted to add the following alternative:

- Upgrade the radio communications system throughout the County for all public safety services.

Richmond Township – The township felt comfortable with the Core Group results and the highest prioritized mitigation alternatives are what they would like to have as their selected mitigation alternatives.

Saybrook Township – The township felt comfortable with the Core Group results and the highest prioritized mitigation alternatives are what they would like to have as their selected mitigation alternatives.

8.3 Action Plan

The culmination of Ashtabula County's Mitigation Plan is an Action Plan. The general direction of the overall program is outlined in this document. Specific activities pursuant to the general direction are detailed in the Action Plan that is placed in Appendix J for ease of access. The overall direction of the Action Plan is to give the Core Group an easily accessible document to check their status on implementing their chosen mitigation alternatives. A more detailed benefit/cost analysis will be conducted once the Mitigation Plan alternatives are evaluated more critically and turned into actual implemental mitigation projects.

8.4 Mitigation Plan Maintenance and Schedule

The Core Group, in conjunction with the Ashtabula County EMA, will establish methods for monitoring and evaluating the Mitigation Plan for the County and its participating incorporated jurisdictions on a five-year cycle. The Core Group will initially meet on a yearly basis, as determined by the Ashtabula County EMA/Office of Homeland Security's Director, once the Mitigation Plan has been approved by the State of Ohio and FEMA. At these initial yearly meetings it will be decided whether the Mitigation Plan needs to be updated immediately or to wait and collective do the updates on the five-year cycle. The Core Group will evaluate the Mitigation Plan and act as a forum for hazard mitigation issues. The Core Group's detailed Action Plan will act as a guide in evaluating the Mitigation Plan. The Action plan will also provide a method for monitoring the Mitigation Plan, as well as a schedule for the implementation of the mitigation alternatives. The success of the Mitigation Plan depends upon the efforts of the Core Group to become involved with other planning efforts in the community. Communities will be able to use the plan for a variety of activities, including implementing specific mitigation projects, as well as implementing changes in the daily operation of the local government. To ensure the success of an ongoing program, it is critical that the plan remains relevant to the County's growth and development. Thus, it is important for the County to conduct periodic evaluations and make revisions as needed, as well as incorporate changes into other planning documents in the County.

The Core Group will review the goals and action items on a yearly basis, as needed, to determine their relevance to changing situations in Ashtabula County and ensure that they are addressing current and expected conditions. They will also review the risk assessment portion of the mitigation plan to determine if this information should be updated or modified, given any new available data.
The public will be involved on a continuous basis. The Core Group is considering establishing a website to accomplish public involvement whereby the mitigation action items that are slated for development that current year will be highlighted, and the public will be encouraged to participate in the continued development of the Mitigation Plan. In addition, the Core Group is considering continued efforts of press releases to accomplish effective public participation. There will also be a formalized press release developed for their annual review process.

8.5 Local Planning Mechanisms

There are several local planning mechanisms in place within the County, which are described in detail, in **Section 7.2 Preventive Measures**. This section of the Mitigation Plan describes existing plans and efforts in the community, when they were adopted and what the document does for the community.

Within three years of the formal adoption of the Mitigation Plan, the Core Group will strive to incorporate into the process of existing planning mechanisms any local policies recommended for revision by the Action Plan developed as part of this effort. The County utilizes comprehensive land use planning, development standards and building codes, as well as various other regulatory mechanisms to guide and control development in the community. Since the County has autonomy over these various tools, the County can augment them as necessary to address applicable hazard mitigation requirements. However, as a community that exists in a rural area, many of these processes may also affect neighboring communities and development. To ensure that altering these standards does not negatively affect adjacent communities, Ashtabula County will seek consistency and collaboration with its counterpart regulatory documents from surrounding jurisdictions. After adoption of the *Ashtabula County All Natural Hazards Mitigation Plan*, the Core Group should encourage its incorporated jurisdictions to be aware of the hazards that are affected by the planning and development decisions they may make and implement. The Ashtabula County All Natural Hazards Mitigation Core Group will conduct periodic reviews of the planning documents described in Section 7.2. The Core Group will also analyze any plan amendments, and provide technical assistance if needed to any incorporated jurisdiction participating in this effort.

8.6 Resolution of Adoption

The Ashtabula County Commissioners as well as the incorporated areas of Andover, Ashtabula, Conneaut, Geneva, Geneva-on-the-Lake, Jefferson, North Kingsville, Orwell, Roaming Shores and Rock Creek will be passing a Resolution or Ordinance of Support for the Ashtabula County countywide Mitigation Plan after contingent approval from the State of Ohio EMA as well as FEMA.

Examples of the Resolution of Adoption that will be presented to the Commissioners, as well as the Ordinance that the participating incorporated jurisdictions will pass, are provided on the following pages.

RESOLUTION NO._____

ADOPTION OF THE ASHTABULA COUNTY COUNTYWIDE ALL NATURAL HAZARDS MITIGATION PLAN COUNTY NATURAL HAZARDS MITIGATION PLAN AND ESTABLISHMENT OF A ASHTABULA COUNTY COUNTYWIDE ALL NATURAL HAZARDS MITIGATION PLAN COUNTY HAZARD MITIGATION CORE GROUP

WHEREAS, on_____, the Ashtabula County Commissioners passed Resolution No._____adopting the ASHTABULA COUNTY COUNTYWIDE ALL NATURAL HAZARDS MITIGATION PLAN (the Mitigation Plan) pursuant to The Disaster Mitigation Act of 2000 which established goals to minimize and reduce storm water damages to existing structures and land use in order to maximize the protection of public health, safety, and welfare, and identify and develop revenue sources to complete the goals and objectives; and

WHEREAS, the mission of the Ashtabula County Countywide All Natural Hazards Mitigation Plan Core Group is: "To develop a working document that fulfills the mandates of the Federal Disaster Mitigation Act of 2000, and satisfies the requirements of FEMA and the Ohio EMA, as well as meets the needs of all of Ashtabula County. Further, by researching and planning for future natural hazards and implementing appropriate mitigation techniques, all of Ashtabula County can save lives and protect property, reduce the cost of disasters and provide for a rapid and efficient recovery by coordinating response efforts, and increasing the educational awareness of natural hazard events and their effects on the people, property, and resources of all Ashtabula County."; and

WHEREAS, on June 2, 2005, the Ashtabula County Emergency Management Agency Director approved the development of a Mitigation Plan on behalf of the Ashtabula County Board of County Commissioners; and

WHEREAS, a Mitigation Plan for Ashtabula County will be required beginning in November 1st, 2004 to receive any state or federal mitigation funding such as flood prone property improvement or buyout funds; and

WHEREAS, the County of Ashtabula County is subject to flooding, tornadoes, winter storms, and other natural hazards that can damage property, close businesses, disrupt traffic, and present a public health and safety hazard; and

WHEREAS the Mitigation Planning Core Group, comprised of representatives from the County, municipalities and stakeholder organizations, has prepared a recommended Mitigation Plan that reviews the options to protect people and reduce damage from these natural hazards; and

WHEREAS, the recommended Mitigation Plan has been widely circulated for review by the County's residents and federal, state and regional agencies and has been supported by those reviewers.

NOW, THEREFORE BE IT RESOLVED by the Ashtabula County Commissioners that:

1. ASHTABULA COUNTY COUNTYWIDE ALL NATURAL HAZARDS MITIGATION PLAN is hereby adopted as an official plan of Ashtabula County.

2. The Mitigation Planning Core Group is hereby established as a permanent advisory body. It shall be composed of representatives from the existing Mitigation Planning Core Group, as recommended by the Ashtabula County Emergency Management and Homeland Security Office. This includes those municipalities that pass a resolution to adopt for the Mitigation Plan.

3. The Core Group shall meet as often as necessary to prepare or review mitigation activities and progress toward implementing the Mitigation Plan. It shall meet at least once each year to review the status of ongoing projects.

4. The schedule of Core Group meetings shall be posted in appropriate places. All meetings of the Core Group shall be open to the public.

5. By November 30 each year, the Core Group shall prepare an annual evaluation report on the Mitigation Plan for the County Board of Commissioners and the municipalities.

The report will cover the following points:

a. A review of the original plan.

b. A review of any natural disasters that occurred during the previous calendar year.

c. A review of the action items in the original plan, including how much was accomplished during the previous year.

d. A discussion of why any action items were not completed or why implementation is behind schedule.

e. Recommendations for new projects or revised action items. Such recommendations shall be subject to approval by the County Board of Commissioners and the affected municipality's governing boards as amendments to the adopted plan.

6. The director of each County office identified as "responsible agency" for the Mitigation Plan's action items shall ensure that the action item is implemented by the listed deadline subject to fiscal and staff time constraints.

Passed by the Ashtabula County Board of Commissioners on

Vote:

Yes ____

No ____

ORDINANCE NO._____

AN ORDINANCE APPROVING AND ADOPTING THE COUNTYWIDE ALL NATURAL HAZARDS MITIGATION PLAN PREPARED BY EMH&T, INC.

WHEREAS, the _____ County Commissioners have approved the aforementioned plan by resolution, and

WHEREAS, the Plan will fulfill the mandates of the Federal Disaster Mitigation Act of 2000, satisfies the requirements of FEMA and Ohio EMA, and meets the needs of _____ County,

NOW, THEREFORE, Be it ordained by the Council of the City/Village of _____, State of Ohio:

SECTION 1: That the Countywide All Natural Hazards Mitigation Plan as prepared by EMH&T, Inc., and approved by the _____ County Commissioners, is hereby approved and adopted.

SECTION 2: That this Ordinance shall take effect and be enforced from and after the earliest period allowed by law.

ADOPTED: _____, 2005.

ATTEST: _____ _____

Clerk of Council President of Council

Date filed with Mayor: _____, 2005.

Date approved by Mayor: _____, 2005.

_____

Mayor

Approved as to form: _____

Director of Law