Multijurisdictional
Natural Hazard Mitigation Plan
for the City of Nelsonville
and the Villages of
Albany, Buchtel, Chauncey,
Coolville, Glouster, and Jacksonville

Prepared by the
Multijurisdictional
Natural Hazard Planning
Committee

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Appendices

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Chapter 1
Introduction

Section 1 – Natural Hazard Mitigation Planning

A Natural Hazard Mitigation Plan provides the means for a region's population to live safely protected from the extremes of nature's forces. While life is not risk-free, good planning can help minimize the dangers posed by nature's extremes. The Federal Emergency Management Agency (FEMA) defines hazard mitigation as "any action taken to reduce or eliminate the long-term risk to human life and property from hazards." For purposes of this plan, hazards are limited to those events, such as earthquakes, tornadoes, or floods, not primarily activated by human activity. While human activity may be what turns a natural event into a disaster, Mother Nature, rather than human activity, is what initiates the natural event.

Natural hazard mitigation planning involves participation in a process that accomplishes the following:

- Natural hazards analysis – Previous natural hazard events are studied to determine which natural hazards should be given priority status in the Plan.
- Asset identification – Structures and utilities that are vulnerable to natural hazard events are identified.
- Loss estimation – The amount of loss from a given scale hazard event (such as the 1% chance flood[1]) is calculated.
- Mitigation strategy – Goals and actions that reduce risk from hazard events are proposed.
- Public input and information provision to the public – Citizen input is sought and information about the planning process is regularly provided.

The Disaster Mitigation Act of 2000 (DMA2K) requires that a natural hazard mitigation plan be developed before a community can be eligible for some forms of federal disaster relief funds. The Ohio Natural Hazard Mitigation Planning Handbook states, "The purpose of the plan is to ensure that the community has established goals and objectives, in addition to a well thought out process for mitigating future damages before approving projects." It also says that "a community or jurisdiction without a natural hazard mitigation plan will not be eligible for most sources of mitigation funding."

Section 2 – Information About the Participating Governments

[1] The 1% annual chance flood is the magnitude of flooding that has a statistical chance of occurring once every 100 years. This does not mean that a large magnitude flood won't happen more frequently than once in a great while. Because we are dealing with unpredictable weather patterns and statistical odds, it is possible to have several large floods within close proximity to one another. Also, a large flood that has a 1% chance of occurrence in any given year.

The participating governments are located in southeastern Ohio, Athens County, approximately 75 miles southeast of Columbus, the state capitol[2]. The following table shows some key statistics about each municipality. Additional 2000 census data is listed in Appendix 1.

Govern-mental Unit	Land Area (sq. mi.)	1920 Population	2000 Population	Housing Units	Population Density (res./sq. mi.)	Housing Density (units/sq. mi.)	Elevation Range(ft.) high/low	Major Arterial Roads
Albany	1.26	465	808	400	641	317	820/720	US50/ SR32
Buchtel	0.44	1178	574	247	1305	561	840/680	SR78
Chauncey	0.55	1178	1067	483	1940	878	700/660	SR13
Coolville	0.83	457	528	232	636	280	820/600	US50/S R7
Glouster	1.32	3140	1972	906	1494	686	920/680	SR13/S R78
Jacksonville	0.25	1046	544	246	2176	984	860/675	SR13
Nelsonville	4.03	6440	5230	2273	1298	564	940/660	SR33/ SR78/ SR278

The municipalities are located in a rural setting comprised of the rugged topography that makes up the unglaciated Allegheny Plateau region[3]. The landscape is comprised of hills, narrow ridges, and stream valleys. Underlying bedrock is composed of shales, siltstone, sandstone, limestone, and coal. The shales have weathered to produce many soils that are prone to instability. The narrow stream valleys have historically been chosen as settlements because they offer some of the flattest ground for building. Unfortunately, the same stream valleys are prone to flooding and have been the sites of flood disasters since people settled the area. Appendix 2 shows the location of Athens County in Ohio and Appendix 3 has base maps of Nelsonville and the villages.

The drainage pattern in Athens County is northwest to southeast. The Hocking River drains the county via a number of subwatersheds as shown in Appendix 4.

Athens County is located in in Ohio's Appalachian region. The Sunday Creek and Monday Creek watersheds witnessed extensive underground mining of coal. The

[2] Seven municipalities have agreed to work together to prepare this multijurisdicitional plan. Between municipalities, the majority of natural hazard mitigation planning issues are similar. It is therefore most efficient to prepare one plan under the umbrella of a committee represented by all the municipalities.

[3] The Village of Albany, located in the more level topography of southwestern Athens County, is an exception. Albany does not contain any floodplain areas and has minimal area subject to land slides.

populations of towns in the 1920's during the peak of the coal mining era is an indication of the economic boom that was characteristic of coal towns during that period. Economic decline and subsequent population loss resulted as the mines closed down during the last half century.

There is little industrial development in Athens County. The largest employer is Ohio University located in the City of Athens. Local and state government and Hocking College, located in Nelsonville, are also significant employers.

Section 3 – The Planning Process

The planning process used by the multijurisdictional committee followed guidelines set forth by the Federal Emergency Management Agency, the Ohio Department of Natural Resources, the Ohio Emergency Management Agency, and the Athens County Regional Planning Commission. The planning process involved the following general steps:

- Organizing to plan
  - Members of the planning committee were chosen from the communities and represented local government, the citizenry, business, a watershed organization, and the regional wastewater district. The Athens County Regional Planning Commission agreed to provide technical assistance and write the plan. Kevin Coey, a local business person was chosen as committee chair. It was determined by the committee to hold monthly meetings.
  - A total of four public meetings were planned at various stages during plan writing to allow citizens an opportunity to participate in the process. Local media was also given information about the process and some coverage was provided. Appendix 4 contains a sample advertisement and newspaper articles. In addition to the formal public meetings all plan committee meetings were advertised and open to the public.
  - Letters were sent to agencies and organizations that have an interest in this plan and may wish to offer comment. A list of letter recipients is shown in Appendix 5. Representatives from the United States Geological Survey and the Ohio Department of Transportation also attended one of our meetings in order to gather and provide information. Meeting facilitation and technical assistance was provided by the ODNR Division of Water, Floodplain Management Program as part of the AFRRI grant.
  - A review of existing plans and legislation insured that this mitigation plan would be woven into the Village's planning process. The Village does not have zoning, subdivision regulations, housing codes, a comprehensive plan or any land development or land use ordinances except for an ordinance to regulate the use of mobile homes. There is fairly strong opposition to increased governmental authority within the Village. The Village has a floodplain ordinance, enforced by the Mayor, which meets ODNR's and FEMA's minimum standards. Commercial buildings must meet state building codes. The Village lies in the Sunday Creek

Watershed which has an active watershed organization. The Sunday Creek Watershed Management Plan addresses the flooding issue and states that the focus of the watershed group will be on education about flooding and ways to reduce its impacts.

- Identify natural hazards that affect the Village.
  - Previous natural hazard events were profiled to help determine levels of risk for each hazard.
  - Information from the profile in the previous step was quantified according to hazard probability and expected impact from the hazard. A high, medium, or low risk value was then assigned to each hazard.
- Vulnerability assessment
  - Asset identification – Residences, public buildings, critical facilities, and businesses were identified.
  - Potential loss estimation – Data from the County Auditor, utilities, and FEMA were utilized to calculate asset losses for hazards listed in the high risk categories.
  - Future land use as it relates to natural hazards was analyzed.
- The Plan
  - The current status and desired status of the Village's hazard vulnerability were analyzed.
  - Problem statements, or reasons why the Village was not achieving its desired status, were produced.
  - Goals, objectives, and activity steps were created.
  - Plan implementation and maintenance components of the Plan were developed.

Chapter 2
Natural Hazards that Affect the Village

Section 1 – Natural Hazard Assessment

With only a few exceptions, the various natural hazards that might impact the Village of Trimble at some future time have likely been the same natural hazards that have historically impacted the Village. Barring a major change in weather patterns, extreme weather events will likely occur in a similar fashion as the historic record indicates. There is a lively debate in scientific and policy-making communities about the causes and impacts of global warming. Because the variables are so many and the science about global warming is still in its infancy, this Plan will not attempt to predict future weather patterns different from those of the past.

When a hazard assessment is performed, it is important to realize that unique and extreme environmental conditions are necessary to create extreme hazards. For instance, widespread flooding conditions are the result of strong low pressure weather systems that bring in large quantities of moist air. The flooding can be made worse if the rain occurs on already frozen ground during a rapid period of snow melt. Occasionally several strong weather systems will pass through an area within days of each other and if each brings large rainfall amounts, the flooding can be made much worse. On a similar note, while highly unlikely in southeastern Ohio, should an earthquake occur when our slip prone soils are already highly saturated we could be faced with landslides that are larger and more frequent than those to which we are accustomed.

Generally speaking, the more severe or extreme the natural event, the less likely its occurrence because of the unique circumstances required for that extreme event to happen. While any scale tornado in Athens County is rare, a truly large and destructive tornado has never happened and its chances of happening are extremely remote due to topography and weather patterns. While flooding in the Village is not uncommon, large floods that cause significant damage are rare and the largest floods that can cause catastrophic damage are extremely rare. Because we are working with chance events however, large floods can occur in close sequence as happened to the Village of Amesville, in northeastern Athens County, when a record flood in 1997 was followed by a record flood in 1998 that measured six feet higher than the 1997 flood.

With the exception of earthquakes, natural hazards are associated with extreme events of weather. Even landslides require moisture and are more likely to occur after heavy rainfall events. Our climate has much to do with the type and severity of hazards that we face. An excellent book, Thunder in the Heartland, describes Ohio's climate and weather extremes as follows:

> "…Ohio is in the middle latitudes, at low elevations, in the eastern interior of North America, and south of the Great Lakes. This location in the Heartland

of North America gives Ohio a climate with four distinct seasons, large seasonal temperature ranges, frequent precipitation, and the wide variety of weather so typical of the middle latitudes.

Severe and extreme weather of various sorts are also typical of the Heartland. Temperatures in Ohio have ranged from 113 degrees to nearly –40 degrees. Frosts have blackened corn in July and shirtsleeves weather has prevailed at Christmas. Blizzards have isolated communities for days and flood waters have surged twenty feet deep through the main streets of Ohio's cities….Drought has withered crops, hail the size of baseballs has punched through roofs of homes, and winds have blown lake freighters through bridges, trains off tracks, and homes onto sleeping occupants."[4]

The first step of hazard identification is the production of a list of the natural hazards that could occur in the Village. Between the expertise provided by members of the planning committee and historical research from a variety of sources, the following list of hazards for the Village was compiled. The list[5] is alphabetical and not in any particular order of likelihood of occurrence or severity.

- Dam failure[6]
- Drought
- Earthquake
- Extreme heat
- Extreme cold
- Flooding (flash)
- Flooding (riverine)
- Hail
- High winds
- Ice Storms
- Landslides/Rockfall
- Land Subsidence
- Thunderstorms and lightning
- Tornado
- Winter storms/Blizzards
- Wildfire

[4] Schmidlin, Thomas W. and Jeanne Appelhans Schmidlin, *Thunder in the Heartland*, The Kent State University Press, Kent, Ohio, 1996, p.1.

[5] Pestilence is a natural hazard but the Ohio Department of Health is so equipped to deal with such hazards that pestilence was not included in the scope of this plan. Also ruled out because environmental conditions make the hazard's occurrence impossible are avalanche, coastal erosion, coastal storm, hurricane, tsunami, and volcano.

[6] Dam failure is included, even though it is an event caused by failure of a manmade structure, because such failure will most likely occur during or after a flood event.

Section 2 – Natural Hazard Profiles

The second step with hazard identification is profiling the hazards. Profiling uses historic documentation and currently available information and technology to assess the comparative degree of risk between the various hazards. The spreadsheet in Appendix 6 shows historical information about the previous natural hazards and helps to organize information so that the hazards that pose the greatest risk can be given the most attention in the Plan.

The table and chart in Appendix 7 show how the AFRRI planning committee ranked the various natural hazards according to each hazards relative risk. Risk was determined by multiplying a score for the probability of the hazard's occurrence by its possible impact. Probability and impact rating definitions are included.

Each hazard identified by the Planning Committee will be described below. The hazard will be defined, explanations about historical events involving the particular hazard will be provided, and sources of information will be described, if necessary.

Subsection 2a – Dam Failure

According to the ODNR, dams in Ohio have been divided into four classes; I, II, III, and IV based upon downstream threat potential. The failure of a class I dam will likely result in loss of life and pose a serious hazard to health and property in the inundation area. A class I dam has a volume capacity over five thousand acre-feet or a height greater than sixty feet. Exempt from Ohio's regulatory authority are dams less than six feet in height regardless of storage volume, dams less than 10 feet in height with not more than 50 acre-feet[7] of storage, or not more than 15 acre-feet of total storage regardless of height.

Dam failure is defined by the Army Corps of Engineers as "any condition resulting in the uncontrolled release of water other than over or through a spillway or outlet works."[8] While dam failure is a highly unlikely event it is still possible and any natural hazard plan needs to consider it. Information from the Corps of Engineers regarding its inundation maps states, "The attached maps indicate the area which would be flooded under the hypothesized conditions of: a) occurrence of a spillway design flood …; and b) occurrence of a failure of the dam concurrent with a spillway design flood. The possibility is extremely remote that either condition will occur." Failure of a dam will only occur during a major rainfall event when the impoundment has reached capacity and can no longer hold back the flow. Dams are designed with

[7] One acre-foot is the amount of water that covers one acre to a depth of one foot or about 326,000 gallons.

[8] Burr Oak Inundation Plan and Map, U.S. Army Corps of Engineers.

emergency spillways that allow for a controlled overtopping of the structure. In this way damage to the structure is non-existent or greatly reduced.

Severals class one dams are in Athens County and in the vicinity of or upstream of the municipalities in this NHMP. These include dams at Lake Logan in Hocking County above Nelsonville, Burr Oak Lake in Athens and Morgan Counties about Glouster, Jacksonville, and Chauncey, Lake Snowden in Athens County near Albany, and Dow Lake in Athens County upstream from Coolville. There are no dams on Snow Fork upstream from the Village of Buchtel.

The dam at Lake Logan is a class one dam. It is approximately 15 miles upstream from Nelsonville on the Hocking River. There are no inundation maps produced for Lake Logan but it is safe to assume that base flood elevations would be raised significantly (several feet or more) should dam failure occur in conjunction with a 1% chance flood.

Burr Oak Lake, impounded by the Tom Jenkins Dam located in Athens County, will have an affect on downstream areas should the dam fail. The Tom Jenkins Dam is a Class I dam managed by the Corps of Engineers. Inundation maps were produced for the Burr Oak Lake. The Burr Oak Flood Emergency Plan for the Tom Jenkins Dam calculated floodwater arrival times, peak flood times, and water elevations at various cross sections on the Sunday Creek in the events of a spillway design flood and dam failure. The studied area of the Sunday Creek is from Corning flowing south to Chauncey where it empties into the Hocking River. The spillway design flood is defined by the Corps of Engineers as "the maximum flow which a dam's spillway is designed to pass safely." At cross section #15 of the Sunday Creek in Glouster, the following data was provided:

Spillway Design Flood

Cross section 15
Distance from Dam (miles): 4.6

	Without Dam Failure	With Dam Failure
Arrival Time	12 hrs. 00 mins.	--- ---
Peak Flood Tim	22 hrs. 00 mins	5 hrs. 30 mins.
Peak Elevation	693.0 feet	708.0 feet

For Comparison, FEMA's flood insurance rate map shows the 1% chance flood to reach an elevation of 690 feet at this location in Glouster. In the highly unlikely occurrence of a spillway design flood and dam failure of the Tom Jenkins Dam, the peak water elevation would be 18 feet above the 1% chance flood elevation. Cross section 17, adjacent to the Village of Jacksonville, has the following data:

Spillway Design Flood

Cross section 17
Distance from Dam (miles): 7.1

	Without Dam Failure	With Dam Failure
Arrival Time	15 hrs. 00 mins.	--- ---
Peak Flood Tim	24 hrs. 30 mins	6 hrs. 00 mins.
Peak Elevation	688.0 feet	701.0 feet

The Village of Jacksonville does not have detailed flood elevation data except for one creek section near Cross section 17. The base flood elevation near this location is 678 feet or 13 feet below the flood elevation that would occur should the dam fail.

Cross section 27 was shown in the Village of Chauncey with the following data:

Spillway Design Flood

Cross section 27
Distance from Dam (miles): 17.4

	Without Dam Failure	With Dam Failure
Arrival Time	23 hrs. 30 mins.	6 hrs. 30 mins.
Peak Flood Time	35 hrs. 30 mins	15 hrs. 30 mins.
Peak Elevation	658.5 feet	665.5 feet

The base flood elevation is 661 feet so that a dam failure will create flood elevations 4.5 feet higher than this large flood.

Lake Snowden lies due north and downstream from the Village of Albany. The inundation maps available for Lake Snowden indicate that the Village will not be affected in the event of a dam failure at Lake Snowden.

The Village of Coolville lies adjacent to the Hocking River and approximately 22 miles downstream from the Dow Lake Dam. There are no inundation maps available for the Dow Lake dam. It is anticipated that catastrophic dam failure at Dow Lake could cause flood levels to rise several feet above base flood elevations in the vicinity of Coolville. There are no residences in the floodplain in the Village of Coolville so that the impact of such a dam failure would be minimal.

Subsection 2b – Drought

Drought is a normal, recurrent feature of climate. In general, a drought originates from a deficiency of precipitation over an extended period of time, resulting in a water shortage for some activity, group, or environmental sector. This deficiency is often the result of a persistent high pressure that lowers humidity, precipitation and cloud cover and blocks moisture form entering the region. Droughts are slow, coming without warning over several weeks. They can effect vegetation, crops, and the water supply and can contribute to Extreme Heat events and Wildfires.

Predicting drought is difficult because it relies on forecasting so many variables, primarily temperature and precipitation. Drought in Ohio has been recorded since 1895 using the Palmer Hydrological Drought Index (PHDI). Since then, six great Ohio droughts have occurred in 1895, 1930-31, 1934, 1953-54, 1963-64, and 1988.[9] Droughts are usually widespread phenomena so that a drought elsewhere in Ohio or even nationally will affect southeastern Ohio. Additional information about droughts can be found at http://www.drought.unl.edu/index.htm.

Subsection 2c - Earthquake

Trimble Village has a relatively low susceptibility to severe and damaging earthquakes. According to the United States Geological Survey, Athens County has a Peak Ground Acceleration (PGA) of 2.537786 %g with a 10% chance of being exceeded over 50 years. The PGA is a measurement of the strength of ground movements and is used to determine the maximum severity of an earthquake. The PGA for Athens County means that the maximum severity of an earthquake will be relatively small (2.6%) with a 10 % chance of an earthquake exceeding this severity over 50 years. Both a low PGA and only a single recorded earthquake occurring in Athens County in 1886 characterize this as a low risk hazard. The USGS Peak Acceleration map (see Appendix 8) also shows Athens County to have dark gray shading, coinciding with a PGA between 2 and 3%g with 10% chance of exceedance in 50 years.

Athens County's low PGA is consistent with the history of earthquakes in the county. Using the ESRI/FEMA Project Impact Hazard Site (http://data.esri.com/hazards/makemap.html), a Historic Earthquake Map for Athens County was produced. This map shows one earthquake occurring in Athens County prior to 1930 with a magnitude between 2 and 3.

Geo Facts, by the Ohio Department of Natural Resources, Division of Geological Survey identifies Southeast Ohio as "particularly susceptible to seismic activity." Ten earthquakes have occurred in the area, with minor to moderate damage occurring in Scioto, Meigs, and Perry County. A map also identifies the previously mentioned Athens County earthquake as occurring in 1886. It shows the earthquake's intensity to be between IV and VI on the Modified Mercalli Scale. A level VI earthquake, the most extreme possible level of the 1886 earthquake is characterized as follows: "Felt by all, many frightened and run outdoors; falling plaster and chimneys, damage small."

Subsection 2d – Extreme Heat

According to FEMA, extreme heat is defined as temperatures that hover 10 degrees or more above the average high temperature for the region, last for prolonged periods of time, and are often accompanied by high humidity that the body cannot

[9] Schmidlin, p. 147.

tolerate. Extreme heat in Ohio, with temperatures of 110 degrees or more can have a disastrous effect on the state.

A necessary condition for extreme heat in Ohio is a Midwest drought. Soils and vegetation are dry during these droughts, allowing the hot, dry air from the Southwest to enter Ohio without the cooling effects of evaporation. Ohio heat waves are most severe in Southern Ohio, while the Northeast is tempered by the cooler waters of Lake Erie.[10]

Extreme heat in Southeastern Ohio can have widespread effects on human health, energy use, vegetation and crops, and the behavior of materials. In addition to the high temperatures, the duration of a heat wave plays an important role in how people are affected. When extreme heat periods last more than two days, an increase in these effects occurs. Specific populations in the Village of Trimble that are at a high health risk during periods of extreme heat include the elderly, young children, isolated individuals, people without access to air-conditioning, and those with respiratory difficulties.

Southeast Ohio has a history of both high temperatures and prolonged heat waves. On August 6, 1918 Amesville (Athens County) recorded 110 degrees. Excluding a suspicious 113-degree reading in Gallia County, Amesville exceeded the previous highest Ohio temperature of 108 degrees in Pomeroy, Ohio.[11]

The summer of 1934 again brought extreme heat to Southeast Ohio. It was preceded by the driest May in history. It is estimated that 160 Ohioans died from heat during the 1934 summer heat wave. On July 21, 1934 Gallipolis recorded a temperature of 113 degrees, the hottest temperature ever recorded in Ohio. Southeast Ohio also experienced extreme heat periods in July of 1936, August of 1947, August of 1983, and June of 1988.[12]

FEMA provides information on Extreme Heat at http://www.fema.gov/rrr/talkdiz/heat.shtm. This site has tips on how individuals can plan for extreme heat, and what to do during a period of extreme heat.

Subsection 2e – Extreme Cold

The lowest temperatures in the wintertime come with arctic air masses from Canada. The coldest temperatures occur after a low pressure storm system has passed and left a fresh covering of snow. Arctic air follows as a high pressure system and centers itself in the midwest. Clear skies will allow heat to radiate to space and the snow cover serves as an insulator between the warmer earth and the colder air.[13]

[10] Schmidlin, p. 129.
[11] Schmidlin, p. 131.
[12] Schmidlin, pp. 133-146.
[13] Schmidlin,

The state's coldest temperatures are not in the north, but in the valleys of southern and central Ohio. The hilly topography allows cold air to settle in valleys and some of these areas are far enough away from the temperature moderating effects of the Ohio River. The official record cold temperature for Ohio was –37° set in 1912 near New Lexington in Perry County. January 19, 1994 was the greatest cold wave in Ohio when a greater part of the state registered –25° or less than at any previous time on record. There were unofficial temperature readings of –40° in Athens County.[14]

Subsection 2f - Flooding

The flood hazard is broken into two types of flooding, flash and riverine.[15] Before discussing the particulars of each type of flooding, some background information about flooding, in general, is warranted. Flooding is the phenomenon of drainageways (creeks, runs, streams, tributaries, branches, forks, and rivers) receiving more water runoff than they can contain within their banks. As water flows over the waterway's banks it occupies low lying areas, known as floodplains, adjacent to the waterway. The magnitude of floods is measured by their frequency interval or how often they occur, at that magnitude, on average. A large flood that only occurs, on average, once every 100-years is known as a 1% annual chance flood. A flood of this magnitude has a 1% chance of occurring in any given year.

It takes unique climatic circumstances to create large-scale flooding on major streams and rivers. Contributing factors can include already saturated soils, snowmelt, and intense rainfall. The intense rainfall comes from strong, low pressure weather systems that can occur in quick succession.

Larger waterways on more gently sloped land have larger watersheds and it takes longer for the flood to reach its peak level. This leads to what this Plan terms riverine flood. Smaller watersheds in steeper terrain will drain faster and the streams will therefore rise more quickly and fall more quickly. Water velocity will also be greater on more steeply sloped terrain. The rapid rise of high velocity water leads to what is termed a flash flood. These floods can be dangerous because of the force of the rushing water and because there is little to no warning before they hit.

The largest natural disaster to impact the state of Ohio was a flood in the spring of 1913. While no part of the state was spared, the greatest impact was felt in the southwestern and west-central portions of the state. Two strong storm systems came through the same geographic areas only two days apart. According to Thunder in the Heartland, a total of 467 persons lost their lives. "Never before 1913, and

[14] Schmidlin,

[15] In its Hazard Analysis and Risk Assessment, the Ohio EMA breaks floods into four categories: riverine, flash, urban and small stream, and coastal. For simplicity, this Plan will combine flash flooding with urban and small stream flooding under the title of "flash flooding." Since Athens County does not have a Lake Erie coastline, coastal flooding is not an issue.

never since, has so much rain fallen over so much of the state in such a short time." The Flood of 1913 set the record water levels on many Ohio streams. [16]

Southeastern Ohio and Athens County were spared the worst of the flooding from the storms of March 1913. While flooding was severe in 1913, other storms have brought higher flood levels. The largest flood on the Hocking River occurred in March 1907 with other large floods occurring in 1873, 1884, 1937, 1945, 1963, 1964, and 1968. The 1968 flood is considered to be the 1% annual chance flood for the Hocking River and is the second largest historic flood that the Hocking River valley has seen.[17]

Historically, damages from flooding in Athens County have amounted to well over six million dollars.[18] This places flooding as The Village of Trimble's most costly hazard for property damage.

Subsection 2g - Flash Flooding

The Village of Trimble witnesses flash flooding frequently. Intense thunderstorms will bring creek water out of streambanks on an annual basis. Fortunately, the majority of these incidents are inconvenient nuisances, at worst. Occasionally, such as occurred in 1997 and 1998, intense thunderstorms will drop significant rainfall amounts in subwatersheds of the Hocking River. These Hocking River tributaries, including Sunday Creek can rise quickly and with little to no warning. On tributaries as large as Federal Creek, east of Trimble Village, and on many smaller tributaries there were reports of "a wall of water" advancing on the homes and towns. Congress Run rose very quickly in the 1998 flood and caused severe damage in the Village.

Subsection 2h – Riverine Flooding

The flood of 1907 was the highest flood on the Hocking River. "Fire bells began ringing in the Hocking Valley to warn of the impending flood on Wednesday, 13 March. The Athens Journal reported a great flood along the Hocking with several lives lost and a wide disruption of communication and transportation. Dozens of homes in Athens were swept away, overturned, or lifted off foundations. Telephone and telegraph wires were down and the waterworks and electric lights plants were flooded. Rail lines all along the Hocking were cut by the raging river. Large areas of Athens were inundated, causing large losses among business and railroads……Several commercial buildings at Gloucester (Glouster) were lifted and washed away by Sunday Creek, including three grocery stores, a restaurant, and Will Reese's poolroom, according to the Athens Journal. Many homes and other businesses were damaged. The coal mines around Gloucester suffered heavy losses.

[16] Schmidlin, p. 172.
[17] U.S. Army Corps of Engineers, *Floodplain Information, Hocking River, Athens, Ohio,* January, 1972, p. 20.
[18] National Climatic Data Center, a summary of severe weather events.

Mine 256 was flooded, resulting in the loss of thirteen horses, machines, motors, cars, and other equipment. All homes in Trimble were flooded."[19]

As much as 8 inches of rain fell in the Hocking River watershed between March 4-10, 1964 and brought major flooding to Athens County. The Hocking River crested in Athens on March 11 at 24.15 feet. The flood level was the highest since 1907.[20]

Two heavy rain periods within five days of each other brought flooding to the Hocking River valley between May 23rd and May 27th 1968. Three to six inches of rain fell on already saturated soils on 23-24 May. The Hocking River reached flood stage on May 24th.[21]

Subsection 2i – Hail

Hail forms in thunderstorm clouds as water drops are cooled to form ice pellets and additional water is frozen onto the small pellets in ever larger concentric circles. Strong updrafts allow the pellets to stay aloft for long periods and grow into hailstones. While all thunderstorms contain hail, few thunderstorms produce hail that reaches the ground because it melts back to rain before reaching the earth.[22]

A thunderstorm can produce hail for several minutes leaving a "hailstreak" one-half mile or more wide and several miles long. A slow moving thunderstorm can produce hail for twenty minutes leaving hail to a depth of one foot. Any location in Ohio can expect hail on an average of two days per year. Most hail is small and causes no damage except bruising of fruits and vegetables. Hail one inch or more in

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[19] Schmidlin, pp. 170-171.

[20] "Athens County schools dismissed early to allow buses to deliver children home before roads were flooded by rising rivers, and Ohio University students removed their cars from basement garages at West Green dormitory. National Guard troops, firemen, and police worked through the night to evacuate residents of Rockbridge and South Logan upstream along the Hocking River…..All schools and main highways were closed in the region on Wednesday, mail delivery was curtailed, fifteen hundred Ohio University students were evacuated, and 380 Athens homes were flooded, according to the *Athens Messenger*." (from Thunder in the Heartland).

[21] "The Hocking River reached 24.63 feet at Athens, more than 7 feet above flood stage and the highest since 1907. All communities along the Hocking were flooded, and roads, schools, businesses, and factories were closed throughout the river basin. Amesville businesses were flooded and for the first time in memory, there was water on the floor of the First National Bank Building. Three feet of water in Amesville Nursing Home forced residents to the second floor. The *Athens Messenger* reported that a helicopter delivered food to the stranded nursing-home residents. Homes were evacuated and highways blocked in Nelsonville, Murray City, Logan, Rockbridge, and Chauncey. The quick overnight arrival of the flood prevented residents from moving household goods to higher positions and, even when goods had been moved, they often had not been raised high enough.

The flood came at a time of tension on university campuses as students protested the Vietnam War. Ohio National Guardsmen were on duty at Ohio University as a precaution against civil unrest, but instead they saw duty in the flood. The *Athens Messenger* reported that 'it was strange to see the Guardsmen and students working together in the flood' when only days before they had been antagonists."

[22] Thunder in the Heartland, p. 303.

diameter can cause dents in cars and aluminum siding, break windows, tear awnings, strip leaves from trees, and destroy crops. Animals have been killed by large hail and persons have sustained injuries from large hail. Hail in Ohio has been recorded at up to three inches in diameter.[23] According to the NCDC report, hail caused $230,000 damage in Athens County in 2002 and a total of $285,000 damage in the years 1982 to 2002.

Subsection 2j – High Wind

The Village of Trimble has a similar susceptibility to damaging winds as does Athens County. On countywide and regional levels, these events have been found to damage trees, utilities, houses, and vehicles. These same items are most at risk of damage caused by high winds in the Village of Trimble.

According to Thunder in the Heartland, minor damage to property and vegetation begins with winds at speeds as low as 45-50 mph. Trees are uprooted or snapped off by winds at 60-70 mph. Additionally, shingles are blown from roofs, windows are broken, electric and telephone lines are blown down, and mobile homes may be pushed off foundations or overturned. At wind speeds greater than 100 mph, large trees are uprooted or snapped off, moving cars are blown off roads, mobile homes are demolished, and roofs are blown from frame houses. Winds of more than 150 mph tear roofs and walls from well-built frame homes, toss cars through the air, and topple entire forests.[24]

Besides tornadoes there are two types of damaging winds in Ohio, large-scale and microburst. Large scale winds with speeds greater than 50 mph may occur behind a cold front associated with an intense low pressure system. Such winds may cover an extensive area and last for several hours. Microbursts are strong downdrafts, associated with thunderstorms. They can be as large as one mile wide and two to three miles long. The winds descend from a thunderstorm, strike the ground, and spread out in a fan shape.[25]

Athens County has had a number of high wind events according to the NCDC Storm Events Report. The report showed that a severe high wind event occurred on August 9, 2000 in which eight people were injured. The Athens Messenger reported "a powerful thunderstorm caused the collapse of a tent covering the swine show ring at the Athens County Fairgrounds…At least eight people were treated by O'Bleness Memorial Hospital for personal injuries."[26]

Subsection 2k – Ice Storm

[23] Ibid., pp. 303-304.
[24] Schmidlin, p. 227.
[25] Thunder in the Heartland, p. 227.
[26] The Athens Messenger, *Storm collapses tent; 8 injured*, August 10, 2000

An ice storm occurs when precipitation occurs as rain but below-freezing temperatures on the ground cause the rain to freeze onto any objects with which it comes in contact. Ice storms create hazardous driving and walking conditions and can add significant weight to overhead utility cables and tree branches.

The average air temperature at ground level is 30 degrees during freezing rain but this phenomenon can occur at temperatures as low as 15 degrees. Freezing rain occurs in bands 25 to 100 miles wide, oriented west to east as a low pressure system and accompanying warm front approach from the south or southwest. Freezing rain only lasts an hour or two because the weather systems move through at thirty to fifty miles an hour. Prediction of ice storms is difficult because a slight temperature change at the ground surface can move the location of the ice storm more than 100 miles. Forecasting of the location and amount of ice accumulation is not precise.[27]

Two ice storms in early 1994 created havoc in southeastern and southern Ohio as electric utility lines were damaged from the weight of ice and from tree limbs falling on them. Widespread power outages occurred. Falling tree limbs damaged automobiles and houses. According to the NCDC, forty people were injured and damages were estimated at $10 million for these two events. The President's Day Storm of 2003 dropped up to two feet of snow in Athens County but counties south of Athens, where temperatures aloft were warmer, had significant ice accumulation that knocked out electrical power for over one week in some situations.

Subsection 2l – Landslide/Rockfall

Landslide is the "…downward and outward movements of slopes due to rains or melting snow with accompanying damage and debris deposition."[28] As used in this section, landslide is the term that will describe all downslope movement of earth with the exception of rockfall which is the relative free-fall of rocks down a vertical or very steep slope. Downslope movement of earth has been grouped into several categories based on rate of movement and the type of geologic material associated with the movement. The types common to the Athens County area are rockfall, debris fall, slump, earthflow, and creep.[29]

There are many causes of slope movements, but they can be grouped into two general categories, geologic conditions and triggering actions. The geologic conditions are steep slopes, angle of rock layers, highly fractured rock, abundance of ferric oxides (red colors) in clay or clay shales, porous or permeable rock, soluble rock, water soluble cementing agents associated with certain rocks such as sandstone, presence of clay seams, clay soils, or clay shales subject to groundwater lubrication, and an influx of water from rain or drainage. The triggering actions are vibrations either natural or manmade, oversteepening of slopes, removal of lateral support at the toe of a slope, the collapse of drift mine workings, the weighting of the upper portion

[27] Thunder in the Heartland, p.7.
[28] Hazard Analysis and Risk Assessment, OEMA, p. 19.
[29] The Prediction of Unstable Slopes in Southeastern Ohio, John W. Sowers, August, 1975, P. 16.

of a slope with fill or buildings, removal of vegetation from a slope, and water in excess that adds weight, dissolves rock, lubricates clay seams and increases pore water pressure in the soil.[30]

Records of landslide on state highways are kept by ODOT at the District level. District 10, which includes Athens County, lists 180 – 200 landslides per year compared with 15 for District 8 (southwestern Ohio), 12 for District 9 (southern Ohio), and 20 for District 11 (eastern). County, township, and municipal highway departments also spend considerable resources trying to prevent and having to repair landslides.

In addition to expenses for the maintenance and repair of streets and roads impacted by landslide, building foundations and utility lines are also affected. Buildings can be rendered useless and worthless if negatively impacted by landslide to a great enough extent. Landslides and rockfall can also be dangerous if they destroy a house that is occupied or destroy a roadway giving no advance warning to an unsuspecting motorist.

Soils with moderate and severe landslide potential are indicated on the hazard maps for each municipality. While it is often possible to build structures within these areas, extra engineering and construction precautions are necessary, particularly with the control of drainage in and around the site.

Subsection 2m – Land Subsidence

Land subsidence is the settling of the earth's surface due to the loss of underground geologic support. In Trimble Village and the Athens County area, this loss of support is usually associated with past underground coal mining activity. Old coal mines used the room and pillar mining technique whereby the majority of coal was removed creating large "rooms". Enough coal was left as "pillars" in an attempt to support the overburden or roof of the mine. Pillars were often removed at a later time or pillars that remained have deteriorated and lost strength. In these cases or if the roof rock above the mine is weak and fractured, the weight of the rock and earth above the mine will collapse them into the mine and cause settling at the ground surface.

Land subsidence can destroy buildings, roads, and infrastructure. While Trimble Village has not had a subsidence that has destroyed a major highway or caused extensive damage to any buildings, the presence of abandoned underground mines is a threat to be recognized. Residents of Trimble Village are required to purchase mine subsidence insurance at a cost of $1 per year. Coverage is the lesser of $50,000 or the actual cost of repairs to the home. The ODNR Division of Mineral Resources Management tracks subsidences and subsidence complaints. Some complaints of ground settling or foundation damage to homes are not actually caused by underground mines and this must be determined by the Division of Mineral

[30] Ibid., pp. 21-22.

Resources before a claim can be paid since only subsidence from abandoned mines is eligible for insurance reimbursement.

An engineering report prepared for a site approximately one mile south of Trimble indicated a thick sandstone seam overlying the underground mines. This thick rock layer has prevented subsidence in the area in and immediately adjacent to the Village. The Hazard Risk Map (Appendix 9) shows the areas in Trimble Village that are susceptible to subsidence. The ODNR Division of Mineral Resource Management can provide information about subsidences that have occurred in any given area of the state. The Division has also produced a booklet, Ask Before You Build, that serves as "a guide for landowners, developers and local officials to better assess abandoned mine lands before building."

Subsection 2n – Thunderstorm and Lightning

Thunderstorms and lightning are mentioned as a separate category even though the subsections entitled High Wind and Flash Flooding cover some of the hazard issues. A thunderstorm often brings all three hazards; high winds, lightning, and intense rainfall. Two deaths and one injury were caused by lightning in Athens County in the mid 1990's. Damages from lightning in 1995 and 2001 totaled $81,000 in Athens County.[31]

Subsection 2o - Tornado

Trimble Village, Athens County, is located in the Wind Zone IV, and has a high risk of extreme winds rating. One tornado and varying levels of windstorms have been recorded in Athens County, all resulting in limited damages. Predicting what parts of Athens County have a greater chance of being struck by a tornado, however, is difficult. Tornadoes can strike with very little warning.

Maps obtained from *FEMA's Taking Shelter from the Storm: Building a Saferoom in Your House* (http://www.fema.gov/fima/tsfs13.shtm) were used to determine the wind speed zone and tornado activity of Athens County. According to the map *Wind Zones in the United States*, Athens County is in the Zone IV (250 mph) wind zone. The map, *Tornado Activity in the United States*, shows that between 1 and 5 tornadoes were recorded per 1,000 square miles from Athens County. By using FEMA's *Assessing Your Risk* chart, Athens County is calculated to be in the high level of risk from extreme winds.

[31] National Climatic Data Center, a summary of severe weather events.

A search done through Tornado Project Online at http://www.tornadoproject.com found one recorded tornado occurring between 1950 and 1995 in Athens County. The May 12, 1980 tornado had no recorded deaths or injuries. It measured F1 on the Fujita Tornado Measurement Scale. F1 tornadoes are classified as moderate tornadoes (73-112 mph winds) causing moderate damages.

The Historic Tornado Touchdown Map (Appendix 10) was produced using the ESRI/FEMA Project Impact Hazard Site. This map shows the May 12, 1980 tornado occurring in Athens County with a severity level of 1 on the Fujita scale.

Subsection 2p – Winter Storm/Blizzard

Winter storm and blizzard are combined into one hazard. Winter storms are typically associated with heavy snowfall and windy conditions. Blizzards are extreme winter storms that have snowfall, high winds, and extreme cold. The high winds in blizzard conditions create poor visibility and dangerous driving conditions even if snowfall is not heavy because dry snow can be blown around giving the effect of heavy snowfall. Some of the dangers associated with winter storms and blizzards are falling tree limbs, dangerous driving, utility outages, extreme cold, and collapsed roofs.

There are several storm systems that can bring snow to southeastern Ohio. Those originating in the Canadian prairies are known as Alberta Clippers. Other places of origin are the Southern Plains, the Gulf of Mexico, and the Atlantic Coast. Very heavy snowfall can occur if moisture from the Gulf is drawn up into cold air sitting over Ohio. The heaviest snowfall occurs in a band less than one hundred miles wide so less than half of Ohio is usually affected by any single storm. Snowfall of six inches or more is considered a heavy snowfall in Ohio. This depth is expected once or twice a year in northern Ohio and only once every two or three years in extreme southern Ohio. Ohio's greatest snowfall amounts from a single storm have occurred in Ohio's eastern counties where storms moving along the Appalachian mountains bring in moisture from the Atlantic Coast. Twenty to thirty inches of snow can fall during these events.[32]

Trimble Village is on the edge of this area and can receive large quantities of snow if conditions are appropriate. The Thanksgiving snowstorm of 1950 is an example. Athens County received between twenty and twenty-five inches of snowfall during the storm.[33]

Subsection 2q - Wildfire

[32] Thunder in the Heartland, p.6.
[33] "At Marietta, where weather records extend back to the early 1800's, the *Marietta Daily Times* reported the twenty-seven inches in this storm was the greatest in any known record here…..The press reported up to seventy persons were killed in Ohio by the storm, mostly from overexertion and heart attacks.", Thunder in the Heartland, pp. 39-40.

The peak seasons for Wildfires in Southeastern Ohio are March, April and May, before vegetation "greens-up" and October and November, after leaf drop. These are the months when warm, windy, low humidity conditions are prevalent and vegetation is more susceptible to burning. Other factors that determine an area's susceptibility to wildfires include topography and fuel. Slopes greater than 60 degrees have a high vulnerability to wildfires, slopes between 40 and 60 degrees are considered moderate and slopes less than 40 degrees have low wildfire susceptibility. Ground fuel is vegetation and woody debris that is found underneath the forest canopy. Areas with a large amount of fuel are more at risk of damaging wildfires than areas relatively clean of undergrowth. A fuel model map of the U.S was found at (www.fs.fed.us/land/wfas/nfdr_map.htm), but at this time the accompanying data information is unavailable.

Research on the occurrence of previous wildfires in Athens County indicated that southeastern Ohio was plagued with forest fires in 1999. There were a reported 31 wildfires in Athens County which burned 112 acres. No significant structural damage occurred. By comparison, Athens County experienced 22 fires which burned only 49 acres in year 2001. These statistics can be found at (www.ohiodnr.com/forestry/Fire/wildstats.htm). Other extensive internet and library research produced no evidence of devastating wildfires in Athens County which caused significant human injury or structural damage.

While many conditions which are associated with wildfire vulnerability are found in Athens County, based on the history of wildfires in the County the risk of a devastating wildfire event occurring appears to be relatively low. Vegetation is fairly sparse within most of the municipalities, however, with the exception of the Village of Albany, there are scattered, steeply wooded areas that grow up to the edges of the towns. In some cases steep ravines or hillsides within the municipalities have thick vegetation growing on them. A drought year could bring the threat of wildfire to portions of most of the municipalities.

The Ohio University Cartographic Center and the Ohio Deparment of Natural Resources, Division of Forestry, are developing a four-county wildfire risk map. This work will analyze various factors such as slope, vegetation, structure placement and defensible space to assign a risk value to structures and locations in Athens County. This will greatly assist fire fighters with assessment of at-risk structures. The analysis and mapping are due to be completed in 2006.

Chapter 3
Vulnerability Assessment

Section 1 – Asset Identification

The purpose of asset identification is to make Village leaders and residents aware of the extent of vulnerability to natural hazards. Numbers of residents and numbers of structures and their values are analyzed to arrive at potential loss estimates. With a 2000 census population of 466 and a residence count of 195 from the census, it was determined that the Village is small enough that the entire population of assets could be analyzed rather than using statistical tools on a sample

of the entire population of assets. Using 2000 census figures, the average number of residents per household is 2.39. Actual field work indicated that the total number of residences is slightly larger than that indicated by the census. Field work found a total of 211 residences, with 10 vacant, for a net total of 201 occupied residential structures.

Residences

The County Auditor listed 151 structures as residential real estate. This does not include mobile homes that do not have permanent foundations. These structures are licensed and counted separately from real estate. The 151 structures in the Auditor's data included three singlewide mobile homes, one double wide mobile home, and three commercial properties that also serve as a residence. Actual field counts indicated there are 147 residences that should be listed as real estate and 64 residences that should be listed as mobile homes for a total of 211 residential structures.

Data from the County Auditor was used to determine real estate values. The 151 properties listed as residential real estate total 186,035 square feet with an average structure replacement value of $59,605 or $48/SF. Three properties that appeared to be predominantly commercial were removed from the list of 151 and added to the list of commercial properties. The Village Hall was also removed from the list of 151 and listed as a public structure. The resulting 147 residences have a total replacement cost of $8,512,980 or an average replacement cost of $57,911.

The replacement value for a mobile home was determined by contacting a local mobile home dealer.[34] The replacement value of a single-wide mobile home is $25.97 per square foot based on a sale price of $24,000 for a home measuring 66'X14'. The replacement value of a double-wide mobile home is $36.46 per square foot based on a sales price of $35,000 for a home measuring 40'X24'. The total value of the 45 singlewide and 19 doublewide mobile homes, utilizing the square foot prices determined above and actual floor area data from the County Auditor's office, is $1,709,132.

FEMA lists four residential properties in a repetitive loss category. Properties in this category have sustained at least $1,000 damage on each of two separate natural hazard incidents. Repetitive loss structures should be the first targeted for buyouts as part of a mitigation strategy since they are the costliest and most at risk.

Owners and addresses of the repetitive loss structures are not included for privacy reasons. All the losses were related to flooding.

[34] Brian Call, salesman, at Dupler's Homes on US Rt 33, Nelsonville, OH.

Property #	Date of Loss	Bldg. Payment	Contents Payment
1	6/28/1998	$ 13,272.83	$ -
1	3/1/1997	$ 4,033.64	$ -
2	6/28/1998	$ 7,776.48	$ -
2	3/1/1997	$ 16,633.57	$ -
3	6/28/1998	$ 7,000.00	$ 3,400.00
3	3/2/1997	$ 3,676.31	$ 660.57
4	6/28/1998	$ 13,000.00	$ 8,600.00
4	3/2/1997	$ 4,443.18	
4	5/29/1990	$ 7,974.91	
TOTALS		$ 77,810.92	$ 12,660.57

Commercial Property

There are 17 commercial properties, with one vacant, in the Village of Trimble. The Auditor's data indicated a value for the commercial property of $1,467,265. A list of the commercial properties follows:

Abandoned School
Grocery Store[35]
West Side Church Of Christ
Church of Christ
Car Wash
Kasler's Country Kitchen
Car Port dealer/Grey Commercial Building
Irwin's Auto – used cars
Trimble Carry-out
Mason's Hall
Darbyland Builder's Supply
Chainsaw Warehouse
Rural Action – Non profit
Auto Body Shop
Post Office
CPA/Apts
Lisa's Beauty & Tanning

Public Property

Only one structure, the Village Hall, is listed as public property with a replacement value of $51,070.

Other

[35] The Kroger Company opened a grocery in an existing structure in the Village. Research for this Plan occurred before the store was renovated so the replacement cost figures are low by a substantial amount. Updated Auditor's data is not yet available.

It is assumed that 25% of the residential dwellings (real estate plus mobile homes) have an accessory building with them and that the average replacement value of these accessory buildings is $5,000. There are an estimated 53 such structures and it is estimated that their total replacement cost is $265,000.

Critical Facilities

The Village of Trimble has the critical facilities with associated replacement costs and hazards listed in Appendix 14. The replacement cost for the AEP substation is a very rough estimate based on a conversation with an engineer employed with the utility. The remaining cost estimates are based on unit replacement costs of $100 per square foot for bridges and $2.50 per gallon for water tanks. Bridge areas were estimated utilizing aerial photography and ARCVIEW software.

The following table summarizes the replacement values of the Village's assets:

Asset Type	Total Number	Average Replacement Value	Total Replacement Value	Total Contents Value
Residential				
Real Estate	147	$57,911	$8,512,980	$4,256,490
Mobile Homes	64	$26,827	$1,716,946	$858,473
Commercial	17	$86,310	$1,467,265	$1,467,265
Public	1	$51,070	$51,070	$51,070
Other	53	$5,000	$265,000	$132,500
Critical Facilities	9	$159,333	$1,434,000	
TOTALS	291		$13,447,261	$6,765,798

Section 2 - Potential Loss Estimates

The Trimble Village Planning Committee decided to analyze the potential losses for those village assets that are impacted by natural hazards that fall in the high risk categories (see Appendix 7). With limited time and planning resources it was determined that the most effective approach would be to focus on the blizzard and flooding problems and devote less time to those hazards with a more remote chance of occurrence. Of the identified hazards, flooding, landslide, subsidence, wildfire, and dam failure are geography-specific, meaning these hazards do not occur everywhere but are tied to specific locations due to elevation, soil type, slope, underground mine presence, or vegetation type. Of these geography-specific hazards only flooding falls in the moderate or high risk categories.

The non-geography-specific hazards in the medium and high risk categories are blizzard, high winds, thunderstorm/ lightning, extreme cold, heat wave, and ice storm. With the exception of high winds, these hazards are much more likely to endanger human life than they will endanger structures. High winds do not have a history of doing much damage to structures in Trimble Village.

Several non-geography-specific hazards, tornado and earthquake, in the low risk category, have the potential for devastating lives and structures. However, their possibility of occurrence is extremely remote and it is impossible to predict the extent of impact from them. No attempt is made to guess what may be the impact. The total value of assets in the Village is estimated at $13,447,261 and, if necessary loss estimates for the various hazards with a medium or low probability of occurrence could be made based upon a certain percentage of the total assets being destroyed or impacted.

Flooding (Riverine and Flash)

Flooding is considered a high risk hazard in the Village of Trimble. Asset loss estimates were obtained by utilizing a Geographic Information System (GIS). The Village of Trimble has the FEMA flood zone digitally mapped for use with GIS. Structures within the flood area were analyzed for elevation and replacement value. Elevations were determined by using a field survey technique that involved obtaining point elevations from the ODNR flood mapping project.[36] A surveyor's level was used in conjunction with a handheld level to determine the level of the lowest floor (see Appendix 15 for details on this technique). Since this technique could only measure the height of the lowest floor above grade, nine feet was subtracted from this at-grade elevation to determine basement floor elevations.

Tables from FEMA's State and Local Mitigation Planning were used to determine percent losses for building structures and contents. A total of 75 structures are located in the floodplain. The following table shows the numbers and losses associated with various structure types (see Appendix 12 for Trimble's structure loss table):

[36] As part of the AFRRI project, ODNR performed a hydraulic and hydrologic analysis of Sunday Creek within the Village's corporate limits. Spot elevations from the H&H analysis were utilized.

Structure Type	Total #	Replacement Cost New	Structure Loss	Contents Value	Contents Loss
Full or Partial Basement	16	$828,482	$422,526	$414,241	$316,894
Manufactured Home	6	$254,310	$158,774	$127,155	$50,119
Crawl Space	42	$2,012,823	$459,446	$1,006,412	$344,584
Slab On Grade	11	$935,330	$335,370	$467,665	$251,527
TOTALS	75	$4,030,945	$1,376,116	$2,015,473	$963,124
As % of Total			34.14%		47.79%

TOTAL STRUCTURE + CONTENTS LOSS **$2,339,240**

Additionally, there were 1,958 downtime days and 14,548 displacement days with these losses.

Eight of the nine critical facilities in the Village are located in a flood hazard area. Seven of these facilities are bridges or culverts and while it is doubtful that all of these would be destroyed in a flood event, heavy damage could be sustained. The total value of critical facilities in the flood hazard area is $1,184,000. The loss of all critical facilities combined with the total structure plus contents loss is estimated at $3,523,240.

Blizzard

Blizzard is considered a high risk hazard in the Village of Trimble. The losses from a blizzard are not geographically predictable within the Village of Trimble. Severe blizzard conditions have caused loss of life in Ohio but it is also difficult to predict such an occurrence. For purposes of calculating potential loss from a blizzard, an economic indicator will be used. It is assumed that a severe blizzard will effectively shut down all but emergency and essential operations within the Village of Trimble for a one week period.

Trimble Village has a population of 466 and 139 households with job earnings.[37] These 139 households earn a total of $4,598,537 in annual income or $88,433 each week. If we assume that 95% of the work force will be away from work for one week in the event of a severe blizzard, Trimble Village will lose the productive equivalent of $84,011 in wages.

Section 3 - Development Trend Analysis

The population for the Village of Trimble is only expected to increase slightly over the next decade. There is very limited space for expansion of the Village and the economy of the Sunday Creek valley is depressed. The Sunday Creek valley was in the heart of Ohio's early coal mining region and has suffered from the boom and bust

[37] Data from 2000 U.S. Census. The other 1,537 households have income from social security, supplemental security, public assistance, and retirement.

of extractive economies. The following table shows population figures in the 1900's for the Village of Trimble:

Population Profile for Trimble Village 1900 - 2000

Place	1900	1910	1920	1930	1940	1950
Trimble Village	625	711	806	680	686	566
Athens County	38,730	47,798	50,430	44,175	46,166	45,839
State of Ohio	4,157,545	4,767,121	5,759,394	6,646,697	6,907,612	7,946,627
29 Appalachian Counties	971,844	1,017,030	1,056,812	1,075,512	1,130,970	1,133,978

	1960	1970	1980	1990	2000
Trimble Village	481	542	579	441	466
Athens County	46,998	54,889	56,399	59,549	62,223
State of Ohio	9,706,397	10,652,017	10,797,630	10,847,115	11,353,140
29 Appalachian Counties	1,226,559	1,237,660	1,376,130	1,372,893	1,455,313

The rugged topography and extensive flood hazard areas make additional development in Trimble very difficult. There is limited potential for additional housing in the western portion of the Village (Main, Terrace, and Center Streets), adjacent to the Congress Run Valley, and with infill development provided that floodplain regulations are adhered to strictly and that attention is paid to good drainage and foundation systems where landslip potential exists. Areas of severe landslip potential should be avoided.

The Village of Trimble has one maintenance employee. There is no planning or development staff. The Village does not have subdivision regulations and is not zoned. An ordinance regulating mobile homes is in effect since 1998. It provides standards for the use and placement of manufactured housing.

There are no residential or commercial property development plans for the Village.

Chapter 4
The Plan

Section 1 – Goals, Objectives, and Activities

The Plan Committee followed a process of identifying a desired state or a series of desirable conditions of reduced risk to natural hazards. With good planning and a will to achieve, the Village could better survive a natural hazard than they have previously. In addition to the list of desired conditions, a second list of problem statements, or reasons why the desired state could not be achieved, was developed (see Appendix 13 for a list of as-is, desired state conditions, and problem statements).

The desired state and problem statements were then used to formulate an overarching goal and a series of eight objectives. Subsequently, activities to meet the objectives were developed. The activities each have a time frame, a cost, and an individual or group who is responsible for implementing the activity. Trimble Village has no planning staff and no revenue to implement major components of the Plan on its own. However, because Athens County and the City of Athens are also preparing natural hazard mitigation plans and because there is significant overlap on many of the activities, the Village of Trimble will be able to piggyback on many of these efforts and thus achieve its goal and objectives.

Section 2 – Implementation

The table in Appendix 15 shows the goals, objectives, and activities adopted for the natural hazard mitigation plan. One of the key activities is the continuation of the natural hazard planning committee. Working in conjunction with the Athens County natural hazard mitigation committee, the Trimble committee will be able to receive necessary assistance and duplication of effort can be avoided. Many of the activities require that a larger governmental unit such as the County take the lead. The Village of Trimble will have to contribute a total of 408 hours of time and the Regional Planning Commission will contribute 260 hours of time over a five year period.

The Village of Trimble does not have many planning mechanisms in place. The Village has a process for establishing its budget and for planning some of the capital improvements needed. There is no comprehensive plan and no capital improvements plan. The Village and its natural hazards planning committee will rely on several county programs to see that many of its activities are carried out. The County's Regional Planning Commission, Emergency Management Agency, and 9-1-1 Office will implement or continue many of the planning activities mentioned in the Implementation Table.

Section 3 – Maintenance

It is the intent of the Village of Trimble to update the Natural Hazard Mitigation Plan every five years. This will be an ongoing process that includes the following:

- Quarterly meetings of the natural hazard plan committee. More meetings or subcommittee meetings will be held as needed (this may be required in the first year in order to get the program off the ground).
- An annual report to the Village Council by the natural hazard planning committee will keep the elected officials updated and be an opportunity to publicize the committee's work. The report will focus on accomplishments, the next year's work plan, and recommended changes to the Plan. This will serve as an opportunity for public participation as the meeting will be announced in the media. A written report will also be available and accompany the meeting presentation.