

SECTION 1

INTRODUCTION AND PROFILE

EXECUTIVE SUMMARY

Generally, the first question asked when communities begin the process of preparing a Local Hazard Mitigation Plan is very simply, “What is a Local Hazard Mitigation Plan and what is its intended purpose?” First, it is imperative to define precisely what the term mitigation entails. On definition of the term is stated most effectively by the Federal Emergency Management Agency (FEMA) and is as follows: “Mitigation is defined as any sustained action taken to reduce or eliminate long-term risk to human life and property from a hazard event. Mitigation, also known as prevention (when done before a disaster), encourages long-term reduction of hazard vulnerability. The goal of mitigation is to decrease the need for response as opposed to simply increasing the response capability.” (www.fema.gov).

The Benton County Multi-jurisdictional Hazard Mitigation Plan was prepared for the incorporated and unincorporated areas of Benton County in response to the Disaster Mitigation Act of 2000 (DMA 2000). DMA 2000 requires states and local governments to prepare hazard mitigation plans in order to remain eligible to receive federal funds made available in the wake of a Presidential Disaster declaration. It is important to remember that mitigation funds are distinct from response and recovery funds available from state and federal sources intended for immediate disaster relief. To produce a DMA 2000 compliant plan, municipalities must document their hazard mitigation planning process and identify hazards, potential losses, and mitigation needs, goals and strategies.

With that definition in mind, a mitigation plan is a document that is intended to accomplish several things. First, through the planning process, the hazards that pose a risk to the community are identified. Second, hazards will be assessed based on their historic patterns of occurrence, the number of people that could be impacted, the area of the community that could be affected, the potential costs that the County, individuals and organizations may incur, the likelihood of future occurrence, and the amount of warning time before that hazard event occurs.

Once the assessment is completed, a list of current and historic mitigation efforts is compiled and discussed. Through this discussion, areas that can be improved upon are identified and developed into “action steps.” Early in the planning process, meeting attendees will identify broad goals that briefly state what the plan should attempt to accomplish. Every action step should, if implemented, work toward one of more of the goals of the plan. An action step may suggest continuing a current mitigation effort or propose an entirely new project.

When implemented appropriately, mitigation projects can save lives, reduce property damage, and are both cost effective and environmentally sound. This, in turn, can reduce the enormous cost of disasters to property owners and all levels of government. In addition, mitigation can protect critical community facilities, reduce exposure to liability, and minimize community disruption.

The original Benton County Multi-Jurisdictional Hazard Mitigation Plan prepared by Emergency Management Consultant Steve Meyer in 2011. The plan included the Unincorporated Benton County area, the City of Atkins, the City of Belle Plaine, the City of Blirstown, the City of Garrison, the City of Keystone, the City of Luzerne, the City of Mt. Auburn, the City of Newhall, the City of Norway, the City of Shellsburg, the City of Urbana, the City of Van Horne, the City of Vinton, the Benton Community School District, the Center Point-Urbana School District, the Vinton-Shellsburg School District and the Vinton Municipal Electric Utility. All of these jurisdictions participated in the planning process for the 2016 revision to the Benton County Multi-Jurisdictional Hazard Mitigation Plan. In addition, a special appendix (Appendix E, page 693) was added to address the mitigation needs of the Vinton Municipal Electric Utility.

The Mitigation Strategy section of this plan details the 21 action items that were determined by the planning committee. These action items were incorporated into each individual jurisdictions mitigation strategy as detailed in the Mitigation Strategy section.

A table summarizing changes made to the plan can be found in Appendix G, page 719.

This update to the 2016 revision was completed by Consultant Steve Meyer of Steve Meyer Consulting LLC in 2021. As noted in the preface, the 2021 update has the following data limitations:

- 1) The timing for completion of the update fell before release of the 2020 US Census Data which was scheduled for mid-year 2021. Iowa Dept. of Homeland Security officials advised to use the 2010 Census Data information. Hence, unless otherwise noted, the only census data that could be used was the 2010 data used in the 2016 revision.
- 2) Revision of this plan also occurred during the time period when the COVID 19 Pandemic was impacting the country. Due to social distancing recommendations face-to-face meetings were not held and other means of public input were solicited via e-mail and phone consultations
- 3) Benton County sustained severe and devastating property damage in the August 10, 2020 Derecho Wind Disaster (DR-4552) that has went down as the costliest wind related disaster in United States history. The Benton County Assessor has stated that assessed property values in Benton County that were determined earlier in 2020 are invalid and inaccurate due to the damages incurred. Updated property values will not be available until mid to late 2021.

As a general observation, populations and population dynamics of the county have not changed substantially from 2010-2020 with the exception of the ongoing residential development in the eastern communities of the county.

PLANNING AREA PROFILE AND CAPABILITIES

An important step in the planning process was to develop a community profile for each city and the unincorporated area participating in the multi-jurisdictional planning process. This required the planning team to research climate and weather, geography, land use, and other conditions that impact the jurisdictions or can be influenced by hazards present in the planning area. This information is utilized throughout the plan to identify hazard risk areas and other vulnerabilities. This section provides a general profile of Benton County followed by descriptions of each of the jurisdictions participating in this plan and their existing mitigation capabilities.

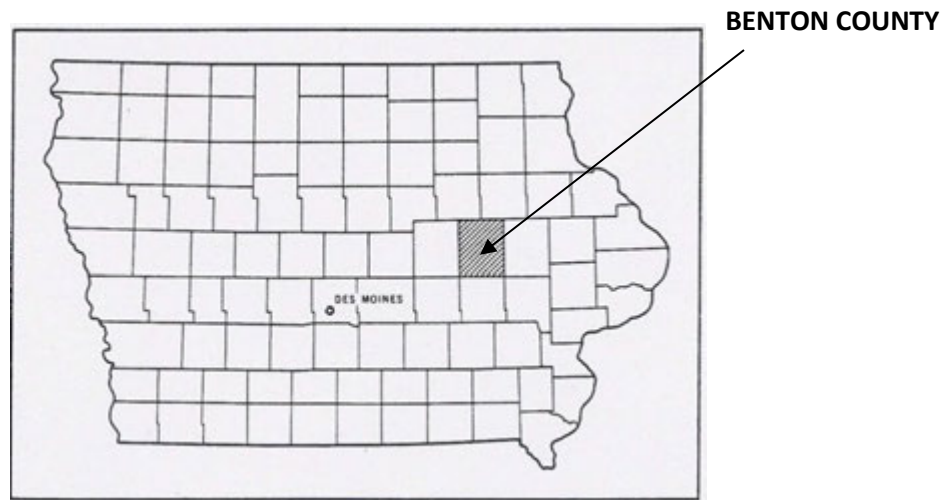


Figure 1: Benton County planning area

Incorporated communities of Benton County include: Atkins, Belle Plaine, Blairstown, Garrison, Keystone, Luzerne, Mt. Auburn, Newhall, Norway, Shellsburg, Urbana, Van Horne, Vinton and Walford. The county also includes 20 townships: Bruce, Cedar, Harrison, Polk, Benton, Taylor, Jackson, Monroe, Homer, Big Grove, Eden, Canton, Kane, Union, Eldorado, Fremont, Florence, St. Clair, Leroy and Iowa.

Counties contiguous to Benton County include Black Hawk County (northwest), Buchanan County (northeast), Linn County (east), Iowa County (south), Tama County (west).

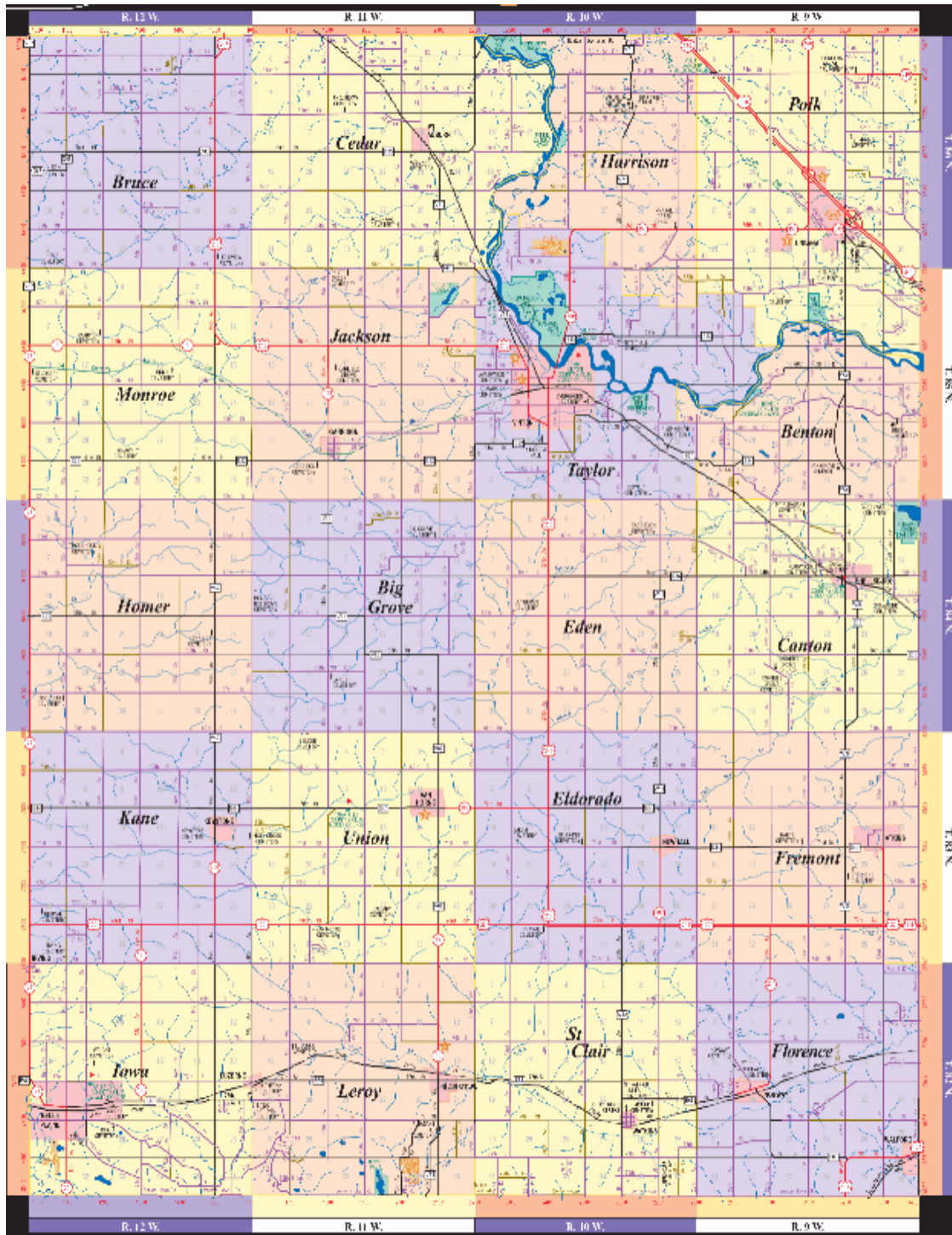


Figure 2: Map of Benton County

GEOGRAPHY

Benton County is in east-central Iowa (fig. 1). It is rectangular and is about 30 miles from north to south and 24 miles from east to west. According to the US Census Bureau, Benton County has a total area of 459,520 acres, or 720 square miles of which 718 square miles is land and 2 square miles (0.29%) is water.

The county is about 65 percent cropland, 15 percent pastureland, 15 percent woodland, wasteland, and idle land, and 5 percent urban land. Corn for grain and seed, soybeans, cattle, and hogs are the principal farm products.

Benton County is on a loess-covered glacial till plain. The soils in the dominantly gently sloping and moderately sloping areas formed in loess and till under prairie vegetation. The soils in the steeper areas formed in loess and till under trees. The county has some of the richest agricultural soils in the world.

The highest areas in the county are located in Polk and Jackson townships and are 1,050 feet to 1,100 feet above sea level. The lowest areas are on bottom land along the Cedar River at the Benton-Linn County line and on the Iowa River bottom. The elevation of these areas is 700 feet to 750 feet above sea level. The relief is stronger along the Cedar River and in the southern part of the county. It is less pronounced in the west-central part of the county.

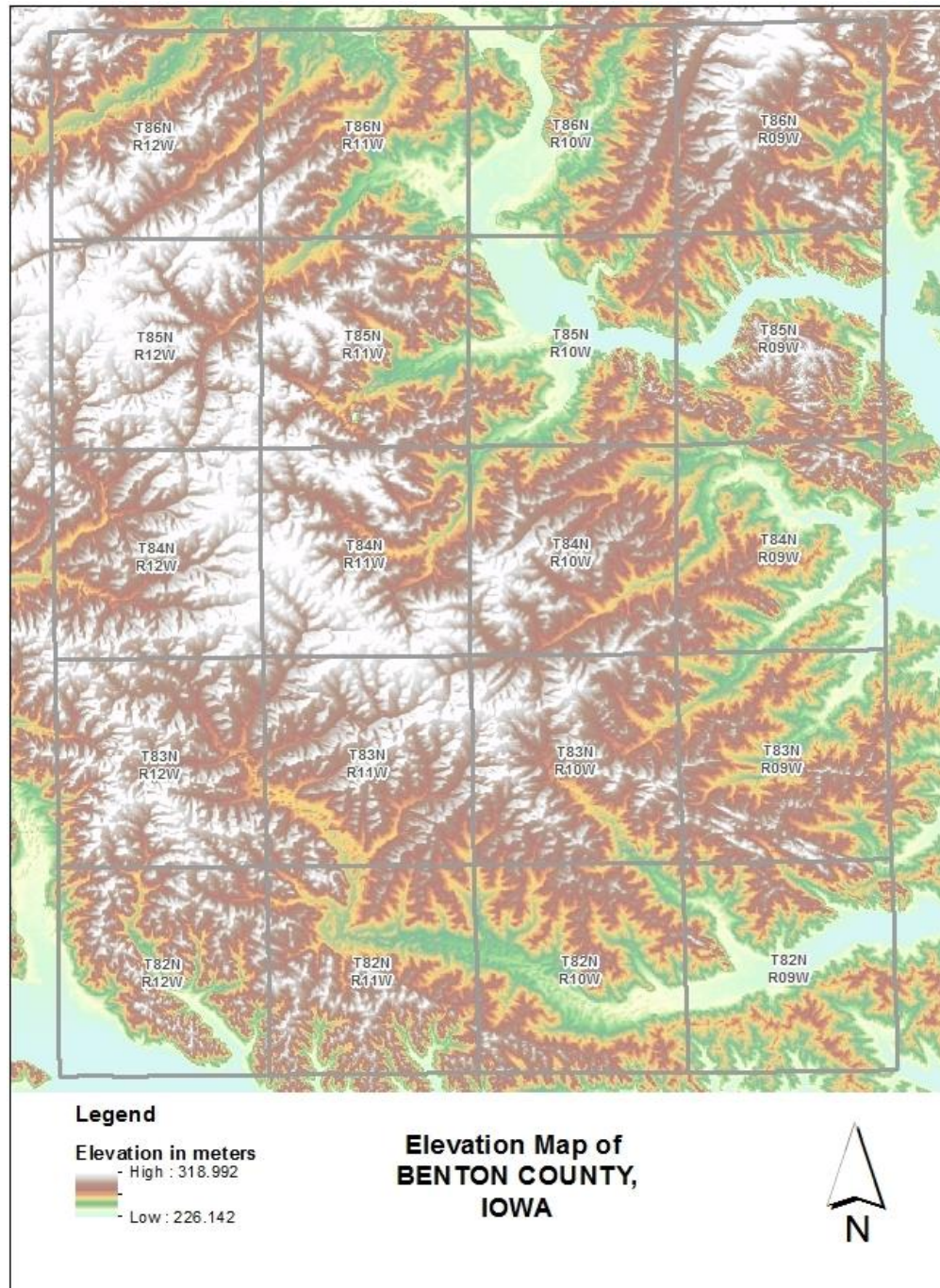


Figure 3: Benton County elevations

Atkins

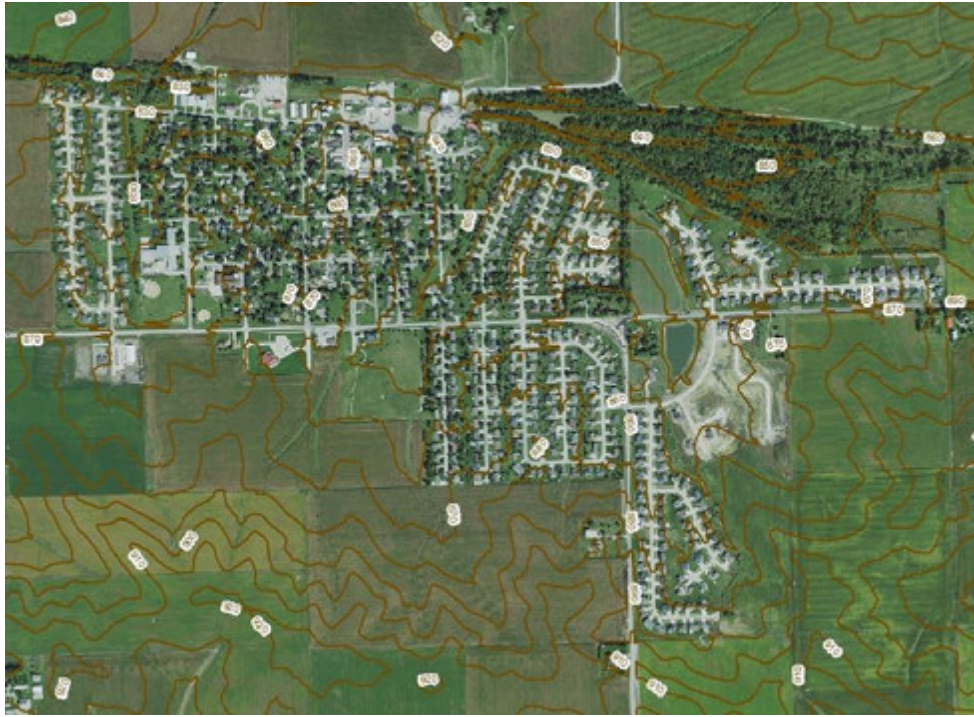


Figure 4: Atkins elevations

Atkins is located at 41°59'41"N 91°51'40"W. According to the United States Census Bureau, the city has a total area of 1.09 square miles (2.82 km²), all of it land in sections 13 and 14 of Fremont Township. Atkins is located on land that is generally flat, with the lowest elevation being 830 feet above sea level and highest elevation 880 feet above sea level.

Belle Plaine



Figure 5: Belle Plaine elevations

Belle Plaine is a city in southern Benton County located at 41°53'48"N 92°16'39"W. According to the United States Census Bureau, the city has a total area of 3.23 square miles (8.37 km²), of which, 3.22 square miles (8.34 km²) is land and 0.01 square miles (0.03 km²) is water. The city is located on land that is flat to the south at an elevation of 770 feet above sea level and gently slopes to 890 feet above sea level on the city's north side.

Blairstown



Figure 6: Blairstown elevations

Blairstown is located at 41°54'25"N 92°5'0"W in sections 13, 14, 23 and 24 of Leroy Township in Benton County, Iowa. According to the United States Census Bureau, the city has a total area of 0.52 square miles (1.35 km²), all of it land. The city is on relatively flat ground with elevations ranging from 820 to 880 feet above sea level. The highest elevations in the city are located in its southwest corner.

Garrison



Figure 7: Garrison elevations

Garrison, in central Benton County, is located at 42°8'37"N 92°8'35"W. According to the United States Census Bureau, the city has a total area of 0.25 square miles (0.65 km²), all of it land. The elevation at its lowest point is at the west end of the city at 840 feet above sea level. The land gently slopes upward to 930 feet above sea level at the city's northeast corner.

Keystone



Figure 8: Keystone elevations

Keystone is located at 42°00'03"N 92°11'55"W in sections 13 and 14 of Kane Township in Benton County, Iowa. According to the United States Census Bureau, the city has a total area of 0.45 square miles (1.17 km²), all of it land. The city is relatively flat with a change in elevation of 50 feet from 870 feet above sea level on the south side of the city limits to 920 feet above sea level on the north side of the city limits.

Luzerne



Figure 9: Luzerne elevations

Luzerne is located at 41°54'22"N 92°10'49"W. According to the United States Census Bureau, the city has a total area of 0.12 square miles (0.31 km²), all of it land. The city is the smallest incorporated city in Benton County and is located in sections 13 and 24 of Iowa Township and sections 18 and 19 of Leroy Township. Luzerne is essentially flat, with a variance of only 20 feet in elevation from 890 feet to 910 feet above sea level throughout the city.

Mount Auburn



Figure 10: Mount Auburn elevations

Mount Auburn is located at 42°15'26"N 92°5'34"W in Cedar Township in northern Benton County. According to the United States Census Bureau, the city has a total area of 0.28 square miles (0.73 km²), all of it land. The city is relatively flat with a change in elevation of 40 feet from 860 feet above sea level on the southwest side of the city limits to 900 feet above sea level on the northeast side of the city limits.

Newhall



Figure 11: Newhall elevations

Newhall is located at 41°59'38"N 91°57'59"W. According to the United States Census Bureau, the city has a total area of 0.32 square miles (0.83 km²), all of it land in sections 13, 14, 23 and 24 of Eldorado Township in Benton County. The city is relatively flat with a rolling change in elevation of 30 feet from 860 feet above sea level to 890 feet above sea level.

Norway



Figure 12: Norway elevations

Norway is located at 41°54'12"N 91°55'24"W in sections 17, 19, and 20 of Florence Township in Benton County. According to the United States Census Bureau, the city has a total area of 0.45 square miles (1.17 km²), all of it land. The southern portions of Norway are on flat ground at 790 feet above sea level. The city has a large hill sloping to the north that peaks at 890 feet above sea level on the city's north side.

Shellsburg



Figure 13: Shellsburg elevations

Shellsburg is located at 42°5'35"N 91°52'13"W in sections 10, 11, 14 and 15 of Canton Township, Benton County. According to the United States Census Bureau, the city has a total area of 0.77 square miles (1.99 km²), all of it land. The lowest elevation in Shellsburg is 700 feet above sea level along Wildcat creek which runs through the center of the city. The land slopes upward on both sides of the creek to the highest elevation of 840 feet above sea level at the city's northeast corner.

Urbana



Figure 14: Urbana elevations

Urbana is located at 42°13'27"N 91°52'41"W in sections 22, 26, 27, 33, 34 and 35 of Polk Township. According to the United States Census Bureau, the city has a total area of 2.20 square miles (5.70 km²), all of it land. The lowest elevation of the city is 860 feet above sea level at the southwest corner. From there the terrain gradually rises to 950 feet above sea level at the city's northeast corner.

Van Horne



Figure 15: Van Horne elevations

Van Horne is located at 42°0'32"N 92°5'20"W in sections 11, 12, 13 and 14 of Union Township in Benton County. According to the United States Census Bureau, the city has a total area of 0.63 square miles (1.63 km²), all of it land. The city is relatively flat with elevations ranging from 930 to 960 feet above sea level.

Vinton



Figure 16: Vinton elevations

Vinton is located in Taylor Township in Benton County at longitude and latitude 42.164144, -92.026077. According to the United States Census Bureau, the city has a total area of 4.83 square miles (12.51 km²), of which, 4.74 square miles (12.28 km²) is land and 0.09 square miles (0.23 km²) is water. The city is bordered by the Cedar River to the north where the city's lowest elevation of 770 feet above sea level occurs. The highest ground is in the northeast corner at 840 feet above sea level. Henkle Creek also runs through the city.

Walford



Figure 17: Walford elevations

Walford is located at 41°52'41"N 91°50'6"W, on the county line in southeast Benton County. 75% of the city is located in Benton County and 25% is in Linn County. The lowest point of the city is 770 feet above sea level at the southwest corner. The highest point is 840 feet above sea level at the city's northwest corner.

RIVERS, STREAMS AND WATERSHEDS OF BENTON COUNTY

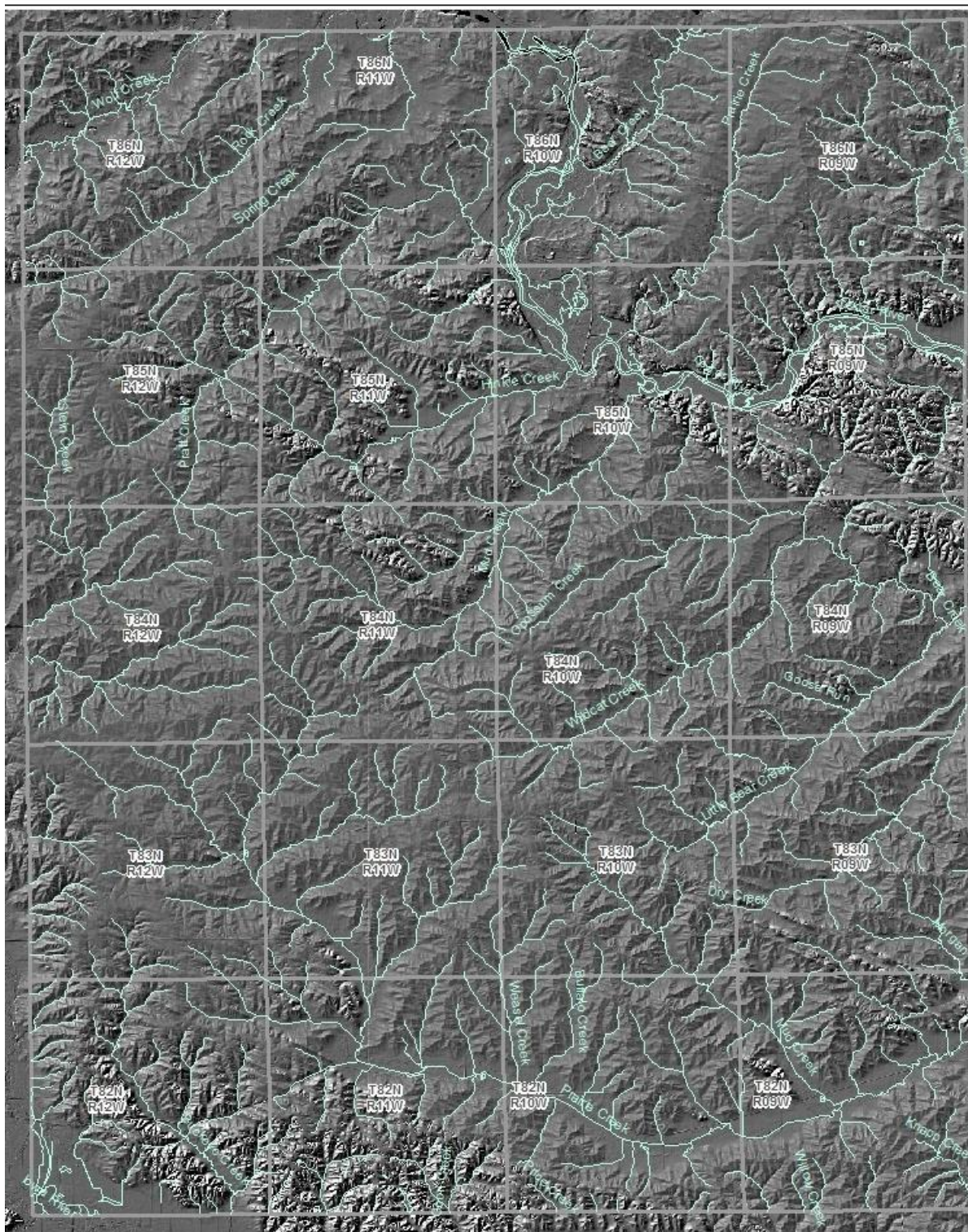


Figure: 18 Rivers and streams of Benton County. Provided by the Benton County NRCS

Two major drainage systems, the Iowa River and the Cedar River, receive runoff from Benton County. The Cedar River and its tributaries drain nearly 90 percent of the county. Prairie Creek, a major tributary of the Cedar River, drains much of the southern part of the county. The Iowa River, which flows across the southwest corner, drains about 10 percent of the county. The total acres drained in the Middle Cedar Watershed that either includes Benton County or affects Benton County is 397,715 acres. The total acres of drainage in the Middle Iowa Watershed that either includes Benton County or affects Benton County is 104,545 acres.

Watersheds of Benton County are shown in the following three figures .



Figure 19: Major watersheds of Benton County

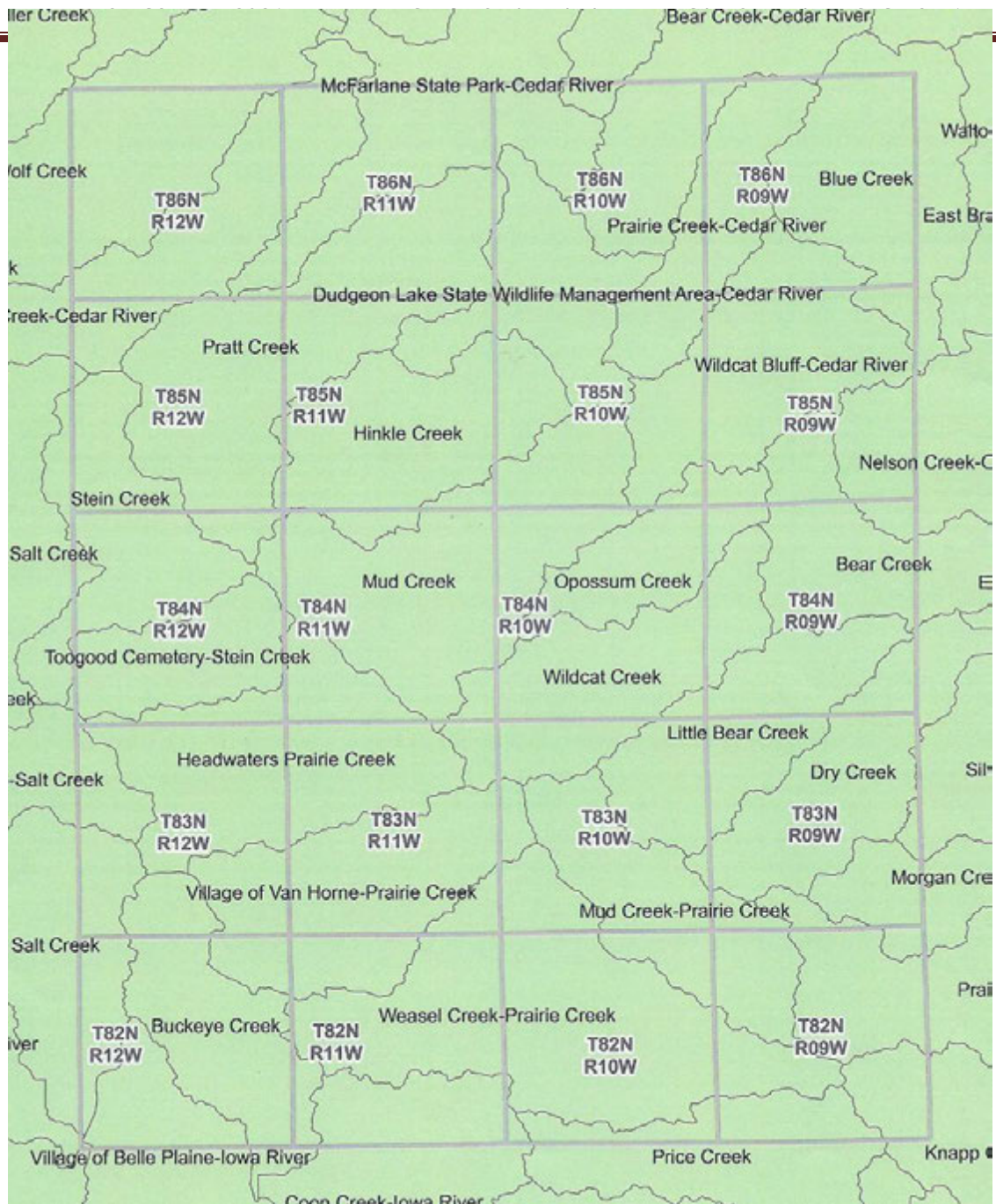


Figure 20: Watersheds of the Middle Cedar Watershed and Middle Iowa Watershed in Benton County.
Map provided by Benton County NRCS

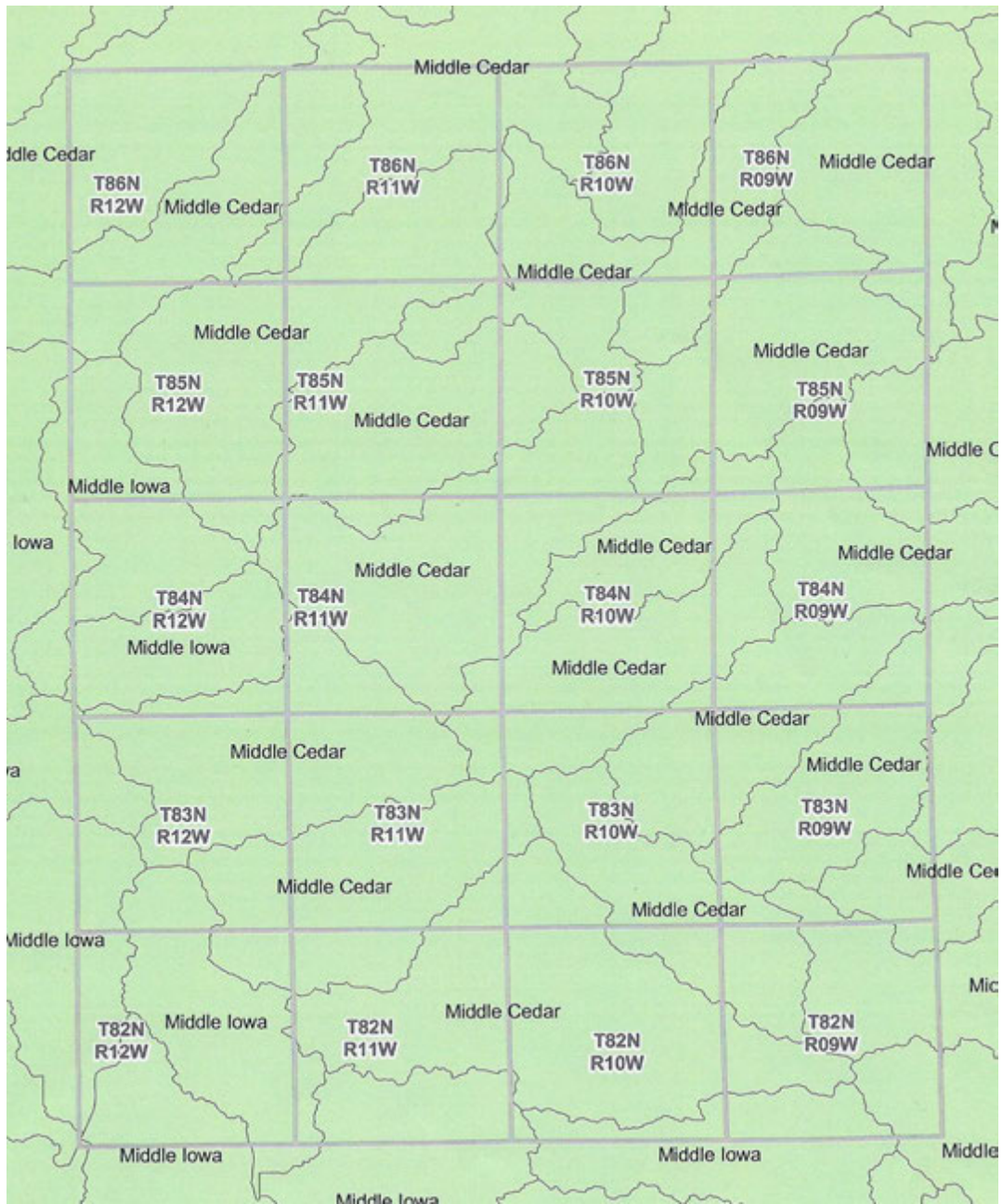


Figure 21: Middle Cedar and Middle Iowa Watershed in Benton County. Map provided by Benton County NRCS

HISTORY

The area that became Benton County was acquired by the United States as a part of the Louisiana Purchase in 1803. The county was named after US Senator Thomas Hart Benton and was organized as Benton County in 1846. The area was first settled in 1839 by two adventurous young men, George Wright and John Smith who built a cabin in Canton Township and cleared some land. Hoosier's Point was the first settlement in Benton County. It eventually became known as Marysville and is today the City of Urbana. The county's first post office was established in Vinton in 1846 and Vinton was selected as the county seat. The county's current court house is the third that the county has had and was constructed in 1905. The first courthouse was razed by a fire in 1853. The second courthouse, which was built in the southeastern corner of the current courthouse square, was dedicated in 1856. It was torn down to make room for the current courthouse. In 1865 the population of Benton County had risen to 11,245. By 1900 it was 25,177. In 1970 the population of the county was 22,885, and the population of Vinton, the county seat, was 4,845. In 1990 the county's population stood at 22,429. In 2000 it stood at 25,308, at 26,076 in 2010 and is estimated at 25,680 in 2014. The county seat of Vinton's population stood at 5,103 in 1990, 5,102 in 2000, 5,257 in 2010 and is estimated at 5,157 in 2014.

CLIMATE

Benton County lies in east central Iowa and the climate is of the continental type. The climate is marked by a great variation in temperature, humidity and precipitation with warm, generally moist summers and cold winters. Temperatures vary considerably from season to season and, at times, from day to day.

In winter the average temperature is 22 degrees F, and the average daily minimum temperature is 14 degrees. The lowest temperature on record, which occurred at Vinton on March 1, 1962, is -34 degrees. In summer the average temperature is 72 degrees, and the average daily maximum temperature is 84 degrees. The highest recorded temperature, which occurred at Vinton on July 30, 1955, is 105 degrees.

The total annual precipitation is 32.38 inches. Of this, 23 inches, or 72 percent, usually falls in April through September, which includes the growing season for most crops. In 2 years out of 10, the rainfall in April through September is less than 19 inches. The heaviest 1-day rainfall during the period of record was 5.80 inches at Vinton on August 5, 1968. Thunderstorms occur on about 41 days each year, and most occur in summer.

Average seasonal snowfall is 32 inches. The greatest snow depth at anyone time during the period of record was 21 inches. On an average of 24 days, at least 1 inch of snow is on the ground. The number of such days varies greatly from year to year.

The average relative humidity in mid-afternoon is about 60 percent. Humidity is higher at night, and the average at dawn is about 84 percent. The sun shines 70 percent of the time possible in summer and 50 percent in winter. The prevailing wind is from the northwest. Average wind speed is highest, 13 miles per hour, in April.

Table 1: Monthly Record Average Temperatures and Precipitation for Cedar Rapids, Iowa the nearest National Weather Reporting Service for Benton County

(Source: National Weather Service, Quad Cities)

<u>Month</u>	<u>Degrees Fahrenheit</u>		<u>Precipitation</u>	<u>Snowfall</u>
	<u>Low</u>	<u>High</u>	<u>Inches</u>	<u>Inches</u>
January	9.6	27.1	1.05	7.2
February	16.0	33.3	1.10	6.6
March	26.8	46.1	2.23	3.5
April	38	60.2	3.22	1.7
May	49.8	72.4	3.85	Trace
June	59.2	81.7	4.47	0
July	63.4	85.3	4.06	0
August	61.0	82.8	4.23	0
September	52	75.2	3.27	0
October	40.4	63.1	2.21	.1
November	27.9	45.7	2.24	3.0
December	15.3	31.8	1.48	7.3

POPULATION DEMOGRAPHICS AND HOUSING INFORMATION INCLUDING SPECIAL NEEDS POPULATIONS

According to the US Census Bureau, the 2010 population estimate for Benton County was 26,076. Population density based on this estimate is 36 people per square mile (718 total square miles in the county). 33 percent of the county's population resides in the rural un-incorporated area of the county and 67 percent resides in the 14 incorporated cities of Benton County. Populations, population changes, and housing units and housing unit changes for each of the incorporated cities and the unincorporated area of Benton County are provided in Table 2.1.4.1.

Table 2: Population and housing demographics for Benton County and Benton County incorporated cities.

LOCATION	2000 POPULATION	2010 POPULATION	PERCENT CHANGE 1990- 2008	2000 HOUSING UNITS	2010 HOUSING UNITS	PERCENT CHANGE
ATKINS	977	1,670	70.9	369	666	80.0
BELLE PLAINE	2,878	2,534	-12.0	1,314	1,281	-2.5
BLAIRSTOWN	682	692	1.5	310	299	-3.5
GARRISON	413	371	-10.2	175	150	-14.3
KEYSTONE	687	622	-3.5	287	285	-.7
LUZERNE	105	96	-8.6	39	34	-12.8
MT. AUBURN	160	150	-6.3	61	56	-8.2
NEWHALL	886	875	-1.0	365	356	-2.5
NORWAY	601	545	-9.3	251	260	3.6
SHELLSBURG	938	983	4.8	367	467	27.2
URBANA	1,019	1,458	43.1	390	487	24.5
VAN HORNE	716	682	-4.7	312	340	9.0
VINTON	5,102	5,257	2.8	2,224	2,248	1.1
WALFORD	1,224	1,463	19.6	407	494	21.4
Benton County UNINCORPORATED	8,920	8,678	-2.7	3,506	3,656	4.3
Benton County—All	25,308	26,076	3.0	10,377	11,079	+6.8

Families make up 72 percent of the households in Benton County. This includes both married-couple families (60 percent) and other families (11 percent). Non-family households make up 28 percent of all households in Benton County. Most of the non-family households were people living alone, but some were composed of people living in households in which no one was related to the householder.

In 2013, 6.3 percent of the people residing in Benton County were in poverty. Twelve percent of related children under 18 were below the poverty level, compared with 5 percent of people 65 years old and over. Five percent of all families and 25 percent of families with a female householder and no husband present had incomes below the poverty level.

For people reporting one race alone, 99 percent was White; less than 0.5 percent was Black or African American; less than 0.5 percent was American Indian and Alaska Native; less than 0.5 percent was Asian; less than 0.5 percent was Native Hawaiian and Other Pacific Islander, and less than 0.5 percent was Some other race. Less than 0.5 percent reported two or more races. One percent of the people in Benton County was Hispanic. Ninety-eight percent of the people in Benton County was White non-Hispanic. People of Hispanic origin may be of any race.

In 2013, Benton County had a total of 11,079 housing units, 9 percent of which were vacant. Of the total housing units, 87 percent was in single-unit structures, 8 percent was in multi-unit structures, and 6 percent was mobile homes. Twenty-four percent of the housing units were built since 1990. Of the occupied housing units 8,200 (81 percent) were owner occupied and 1,900 (19 percent) were renter occupied. Three percent of the households did not have telephone service and 3 percent of the households did not have access to a car, truck, or van for private use. Multi Vehicle households were not rare. Forty percent had two vehicles and another 34 percent had three or more. The median monthly housing costs for mortgaged owners was \$1,238, non-mortgaged owners \$425, and renters \$603. Twenty-seven percent of owners with mortgages, 13 percent of owners without mortgages, and 34 percent of renters in Benton County spent 30 percent or more of household income on housing.

Table 3: House Construction by Decade for Benton County Cities

	1939 or Earlier	1940 to 1949	1950 to 1959	1960 to 1969	1970 to 1979	1980 to 1989	1990 to 1999	2000 to 2009	2010 or later	Total Housing Units
Atkins	97	25	36	33	88	11	101	275	0	666
Belle Plaine	572	144	78	84	272	68	56	7	0	1281
Blairstown	122	23	35	30	33	38	9	9	0	299
Garrison	105	8	8	10	11	1	2	5	0	150
Keystone	121	10	28	23	41	17	24	19	2	285
Luzerne	28	0	0	0	4	0	2	0	0	34
Mt. Auburn	35	0	1	3	9	5	2	1	0	56
Newhall	78	23	43	50	83	6	51	21	0	356
Norway	107	13	46	19	14	19	38	4	0	260
Shellsburg	112	8	21	59	85	15	99	65	0	467
Urbana	137	43	21	29	26	34	115	179	3	487
Van Horne	131	15	25	55	39	36	29	10	0	340
Vinton	723	115	233	411	449	102	96	119	0	2248
Walford	50	3	9	18	30	2	268	114	0	494

Source: US Census Bureau 2013

As shown on the above table, a majority of Benton County Cities experienced significant growth during the decade of the 1970's. Three cities: Atkins, Urbana and Walford, have experience dramatic growth beginning in the decade of the 1990's. In the county's smaller communities more than half of the housing stock is 80 years old or older.

Table 4: Summary of Housing Values for Benton County as Provided by the US Census Bureau

	MEDIAN VALUE FOR ALL HOUSES
ATKINS	\$187,100
BELLE PLAINE	\$82,300
BLAIRSTOWN	\$93,900
GARRISON	\$59,600
KEYSTONE	\$93,200
LUZERNE	\$107,800
MT. AUBURN	\$58,500
NEWHALL	\$125,800
NORWAY	\$101,200
SHELLSBURG	\$119,300
URBANA	\$145,800
VAN HORNE	\$116,700
VINTON	\$103,100
WALFORD	\$214,800
BENTON COUNTY UNINCORPORATED	\$131,500

INCOME

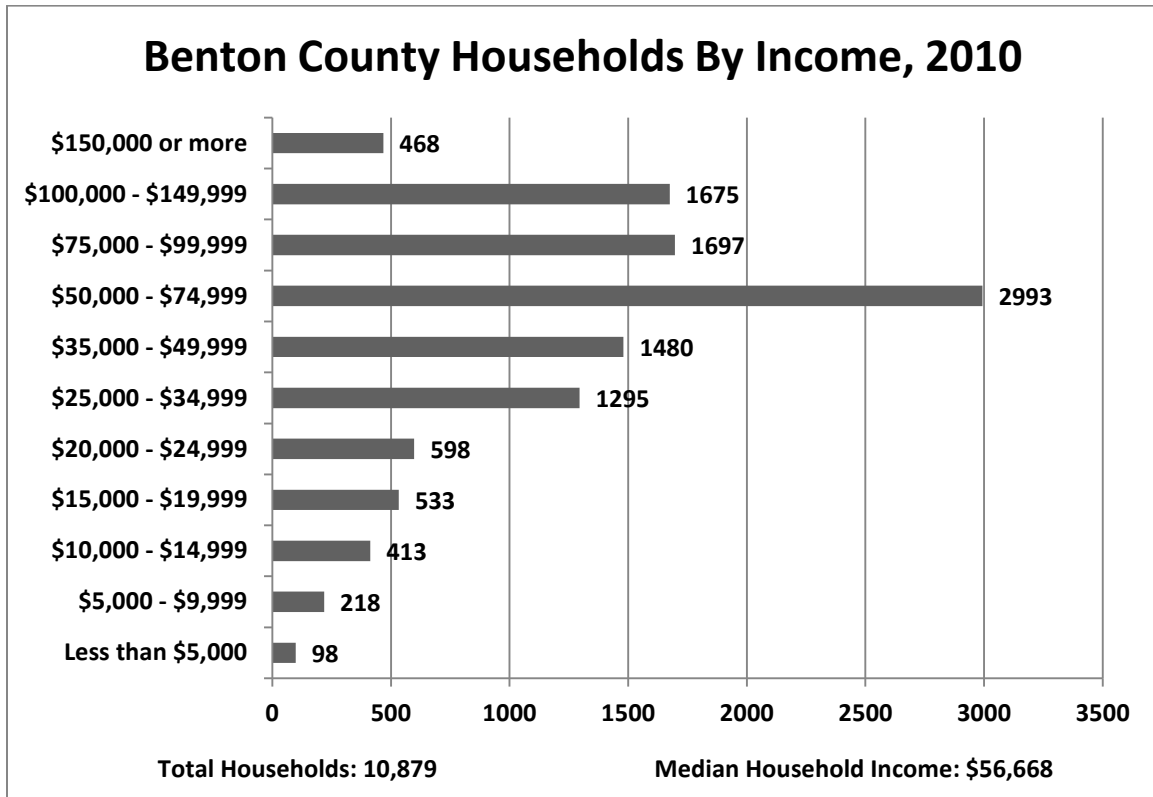
According 2013 US Census Bureau information, in 2013, the median household income for all occupied housing units in Benton County was \$56,669, an increase of \$14,242 (33%) over 2000 and \$4,826 (9.38%) higher than the state average of \$51,843. Owner occupied median household income in 2013 for Benton County averaged \$69,014 while renter occupied household median household income averaged \$32,210. The mean household income for Benton County was \$66,970 in 2013, \$834 (1.2%) more than the state average of \$66,136. The average per capita income for Benton County in 2013 was \$26,624, \$403 (1.5%) less than the state average of \$27,027. It is important that this statistic is recognized in the context of hazard mitigation as it may directly correlate to certain segments of the community to recover from a devastating hazard event.

Table 5: Benton County 2013 Household Income

INCOME	OWNER OCCUPIED HOUSING UNITS (8,102 TOTAL)	RENTER OCCUPIED HOUSING UNITS (1,977 TOTAL)	ALL HOUSING UNITS (10,079 TOTAL)
LESS THAN \$5,000	48	43	91
\$5,000 TO \$9,999	98	104	202
\$10,000 TO \$14,999	219	158	387
\$15,000 TO \$19,999	316	178	494
\$20,000 TO \$24,999	341	215	554
\$25,000 TO \$34,999	801	398	1,199
\$35,000 TO \$49,999	1,028	344	1,372
\$50,000 TO \$74,999	1,888	330	2,218
\$75,000 TO \$99,999	1,450	129	1,579
\$100,000 TO \$149,999	1,490	65	1,555
\$150,000 OR MORE	421	14	435
MEDIAN HOUSEHOLD INCOME	\$65,014	\$32,210	\$56,669

Source: US Census Bureau 2013

Table 6: Benton County Households by Income



According to US Census Bureau Statistics there are a total of 3,193 people with disabilities in Benton County (12.4% of the county's population). The Benton County Home Health Agency has records of 30 individuals with mobility special needs. Benton County Social Services has records of individuals with mental and other disabilities as well as a Hispanic population in the Blirstown area that has language barriers. The Benton County Emergency Management Agency has a database of voluntary registrants with special needs. The one concentrated area of special needs residents in Benton County is the Cedar Valley Ranch Inc., a privatized care facility for up to 46 special needs people that is located at 2591 61st Street Lane, Vinton.

Table 7: People with disabilities in Benton County

COMMUNITY	NUMBER OF PEOPLE WITH DISABILITIES	% OF POPULATION
Atkins	117	6.2%
Belle Plaine	550	20.9%
Blairstown	34	2.7%
Garrison	47	15.2%
Keystone	92	14.7%
Luzerne	6	7.1%
Mt. Auburn	9	6.5%
Newhall	89	11.1%
Norway	46	7.2%
Shellsburg	134	13.7%
Urbana	81	5.8%
Van Horne	70	9.7%
Vinton	925	18.1%
Walford	52	3.4%
Benton County Unincorporated	941	11.7%
Benton County Total	3,193	12.4%

Source: US Census Bureau statistics

OCCUPATIONS AND EMPLOYMENT OF BENTON COUNTY RESIDENTS

In 2013 Census Bureau Statistics state that 13,809 residents of Benton County aged 16 years and over were in the labor force. Of these, 13,095 were employed and 724 were unemployed. Among the most common occupations were: Management, professional, and related occupations, 31 percent; Sales and office occupations, 25 percent; Production, transportation, and material moving occupations, 20 percent; Service occupations, 15 percent; Natural resources, construction and maintenance occupations, 12 percent; and Construction, extraction, maintenance and repair occupations, 17 percent. Eighty one percent of the people employed were private wage and salary workers; 13 percent was Federal, state, or local government workers; and 6 percent was self-employed. In 2013, for the employed population 16 years and older, the leading industries in Benton County were Manufacturing, 16 percent, and Educational services, and health care, and social assistance, 21 percent.

Table 8: Occupations engaged in by those in the Labor Force in Benton County

OCCUPATION		
Civilian employed population 16 years and over	13,085	%
Management, business, science, and arts occupations	4,082	31.2%
Service occupations	1,914	14.6%
Sales and office occupations	3,298	25.2%
Natural resources, construction, and maintenance occupations	1,585	12.1%
Production, transportation, and material moving occupations	2,206	16.9%
INDUSTRY		
Civilian employed population 16 years and over	13,085	%
Agriculture, forestry, fishing and hunting, and mining	701	5.4%
Construction	924	7.1%
Manufacturing	2,155	16.5%
Wholesale trade	601	4.6%
Retail trade	1,605	12.3%
Transportation and warehousing, and utilities	726	5.5%
Information	386	2.9%
Finance and insurance, and real estate and rental and leasing	933	7.1%
Professional, scientific, and management, and administrative and waste management services	657	5.0%
Educational services, and health care and social assistance	2,725	20.8%
Arts, entertainment, and recreation, and accommodation and food services	725	5.5%
Other services, except public administration	536	4.1%
Public administration	411	3.1%

Eighty-one percent of Benton County workers drove to work alone in 2013, 8 percent carpooled, less than 0.5 percent took public transportation, and 3 percent used other means. The remaining 5 percent worked at home. Among those who commuted to work, it took them on average 23.7 minutes to get to work.

ECONOMIC DEVELOPMENT

For the past decade the primary area of development in Benton County has been residential along the eastern side of the county which is close to the Cedar Rapids metropolitan area and along the I-380 corridor. Beginning in the late 1990's this area began to experience dramatic population growth and new housing construction. This boom began to slow beginning in 2008 with the housing and economic crisis of the time.

Benton County funds and maintains the Benton Development Group (BDG) headquartered in Vinton, the County Seat of Benton County. The BDG has one staff person, a full-time director. The BDG is governed by a board of directors consisting of a representative from every community in the county and the Benton County Supervisors. Other community development entities in Benton County with full-time directors include Vinton Unlimited (VU) with the City of Vinton and Belle Plaine Community Development Corporation with the City of Belle Plaine.

BENTON COUNTY PROPERTY VALUES AND INVENTORY OF ASSETS

The total value of all property in Benton County on July 1, 2020 was \$2,406,707,376. This figure was ascertained using data provided by the Benton County Assessor's Office and the individual municipal jurisdictions of Benton County. Included in this figure are 8,454 residential properties valued at \$1,044,878,600; 924 commercial enterprises valued at \$123,121,600; 43 industries valued at \$23,265,500; 419,219 acres of agricultural land and structures valued at \$1,117,596,200; 224 municipal and county owned properties valued at \$97,845,476. Property located in the incorporated cities was valued at \$885,436,604 and property located in the rural townships was valued at \$1,521,270,772. Detailed data by jurisdiction relative to these property values and assets is summarized in tables 2.1.6.1 to 2.1.6.6.

Table 9: Number of Residential Properties and Total Value of Residential Properties in Benton County by City and Township Jurisdiction

	NUMBER OF RESIDENTIAL PROPERTIES JULY 1, 2020	VALUE OF RESIDENTIAL PROPERTIES JULY 1, 2020
ATKINS	574	\$105,009,400
BELLE PLAINE	1,073	\$73,028,600
BLAIRSTOWN	283	\$26,198,600
GARRISON	154	\$6,222,000
KEYSTONE	247	\$22,270,700
LUZERNE	42	\$2,344,000
MT. AUBURN	66	\$3,483,200
NEWHALL	350	\$42,191,600
NORWAY	233	\$24,849,300
SHELLSBURG	371	\$45,641,500
URBANA	501	\$67,472,400
VAN HORNE	275	\$31,578,500
VINTON	1,8070	\$179,228,500
WALFORD	333	\$56,487,300
CITIES TOTAL	6,309	\$688,003,600
BENTON	359	\$49,528,900
BIG GROVE	36	\$5,146,000
BRUCE	53	\$7,661,100
CEDAR	117	\$12,608,900
CANTON	188	\$39,185,100
EDEN	44	\$7,227,000
ELDORADO	50	\$7,936,900
FLORENCE	99	\$19,523,300
FREMONT	177	\$40,935,600
HARRISON	81	\$12,362,700
HOMER	47	\$5,853,400
IOWA	110	\$15,819,900
JACKSON	50	\$7,396,499
KANE	40	\$6,219,000
LEROY	85	\$14,487,000
MONROE	39	\$5,083,900
POLK	190	\$37,345,400
ST. CLAIR	95	\$12,572,400
TAYLOR	225	\$41,844,400
UNION	50	\$8,137,700
TOWNSHIPS TOTAL	2,145	\$356,875,000
COUNTY TOTAL	8,454	\$1,044,878,600

Table 10: Number of Commercial Enterprises and Total Value of Commercial Enterprises in Benton County by City and Township Jurisdiction

	NUMBER OF COMMERCIAL ENTERPRISES JULY 1, 2020	TOTAL VALUE JULY 1, 2020
ATKINS	27	\$2,858,400
BELLE PLAINE	156	\$14,085,200
BLAIRSTOWN	50	\$3,520,400
GARRISON	23	\$482,100
KEYSTONE	35	\$7,530,400
LUZERNE	8	\$474,700
MT. AUBURN	9	\$167,800
NEWHALL	43	\$2,953,400
NORWAY	23	\$1,623,100
SHELLSBURG	39	\$5,110,600
URBANA	47	\$14,224,400
VAN HORNE	42	\$3,573,200
VINTON	284	\$45,639,400
WALFORD	20	\$3,069,900
CITIES TOTAL	806	\$105,312,700
BENTON	2	\$166,800
BIG GROVE	1	\$1,101,400
BRUCE	2	\$72,700
CEDAR	2	\$155,800
CANTON	4	\$1,129,300
EDEN	2	\$123,100
ELDORADO	5	\$463,300
FLORENCE	6	\$438,500
FREMONT	18	\$4,500,700
HARRISON	0	0
HOMER	2	\$177,000
IOWA	5	\$411,000
JACKSON	10	\$452,900
KANE	6	\$1,409,700
LEROY	8	\$1,244,100
MONROE	2	\$86,100
POLK	19	\$3,456,000
ST. CLAIR	6	\$368,300
TAYLOR	9	\$1,037,800
UNION	4	\$1,014,400
TOWNSHIPS TOTAL	118	\$17,808,900
<i>COUNTY TOTAL</i>	<i>924</i>	<i>\$123,121,600</i>

Table 11: Number of Industrial Enterprises and Total Value of Industrial Enterprises in Benton County by City and Township Jurisdiction

	NUMBER OF INDUSTRIAL ENTERPRISES JULY 1, 2020	VALUE INDUSTRIAL ENTERPRISES VALUE JULY 1, 2020
ATKINS	0	0
BELLE PLAINE	12	\$6,550,500
BLAIRSTOWN	1	\$26,200
GARRISON	0	0
KEYSTONE	0	0
LUZERNE	0	0
MT. AUBURN	0	0
NEWHALL	0	0
NORWAY	0	0
SHELLSBURG	0	0
URBANA	4	\$1,425,000
VAN HORNE	1	\$113,000
VINTON	12	\$8,552,200
WALFORD	0	0
CITIES TOTAL	36	\$16,667,700
BENTON	1	\$358,000
BIG GROVE	0	0
BRUCE	0	0
CEDAR	0	0
CANTON	0	0
EDEN	0	0
ELDORADO	0	0
FLORENCE	3	\$2,940,400
FREMONT	1	\$2,083,600
HARRISON	0	0
HOMER	0	0
IOWA	1	\$1,800
JACKSON	0	0
KANE	0	0
LEROY	1	\$1,214,000
MONROE	0	0
POLK	0	0
ST. CLAIR	0	0
TAYLOR	0	0
UNION	0	0
TOWNSHIPS TOTAL	7	\$6,597,800
COUNTY TOTAL	43	\$23,265,500

Table 12: Taxable Values of Agricultural Land and Structures in Benton County

	NUMBER OF AGRICULTURAL TAXABLE ACRES JULY 1, 2020	VALUE OF LAND ONLY JULY 1, 2020	TOTAL ACTUAL VALUE LAND AND STRUCTURES JULY 1, 2020
BENTON	12,290	\$19,369,200	\$20,229,300
BIG GROVE	22,396	\$59,882,600	\$62,682,900
BRUCE	22,105	\$58,160,100	\$61,207,800
CEDAR	26,056	\$65,050,800	\$69,198,600
CANTON	20,542	\$51,949,800	\$55,016,100
EDEN	21,898	\$59,731,600	\$62,447,900
ELDORADO	21,689	\$57,137,900	\$60,248,600
FLORENCE	21,524	\$52,681,200	\$56,045,200
FREMONT	20,994	\$53,972,700	\$56,897,100
HARRISON	15,338	\$30,347,700	\$32,421,400
HOMER	21,997	\$63,272,300	\$65,814,000
IOWA	18,532	\$41,670,100	\$42,952,300
JACKSON	21,794	\$54,964,600	\$57,640,300
KANE	21,344	\$60,251,400	\$64,231,800
LEROY	21,211	\$47,615,700	\$53,209,000
MONROE	21,986	\$61,730,100	\$64,638,100
POLK	25,475	\$56,852,500	\$50,914,700
ST. CLAIR	22,019	\$56,468,200	\$59,105,300
TAYLOR	18,556	\$38,184,800	\$39,891,300
UNION	21,617	\$59,604,300	\$63,437,900
TOWNSHIPS TOTAL	419,219	\$1,048,988,600	\$1,108,229,600
CITIES TOTAL	3,419	\$8,582,800	\$9,366,600
COUNTY TOTAL	422,638	\$1,057,571,400	\$1,117,596,200

Table 13: Insured Values of Municipal Properties in Benton County on July 1, 2014

	MUNICIPAL PROPERTIES JULY 1, 2020	TOTAL PROPERTY VALUE
ATKINS	11	\$5,798,226
BELLE PLAINE	25	\$15,927,890
BLAIRSTOWN	6	\$3,483,511
GARRISON	6	\$1,525,000
KEYSTONE	15	\$3,105,836
LUZERNE	2	\$309,067
MT. AUBURN	4	\$1,110,000
NEWHALL	22	\$3,850,051
NORWAY	3	\$611,655
SHELLSBURG	6	\$4,104,365
URBANA	16	\$6,549,209
VAN HORNE	11	\$5,087,963
VINTON	48	\$18,982,937
WALFORD	6	\$5,006,294
BENTON COUNTY	43	\$22,392,872
COUNTY & MUNICIPAL OWNED TOTAL	224	\$97,845,476

Table 14: Tax Exempt Properties of Benton County
 These properties do not have a value assigned to them.

CITIES	NUMBER OF EXEMPT PROPERTIES JULY 1, 2020
ATKINS	30
BELLE PLAINE	55
BLAIRSTOWN	20
GARRISON	17
KEYSTONE	17
LUZERNE	6
MT. AUBURN	11
NEWHALL	24
NORWAY	23
SHELLSBURG	22
URBANA	31
VAN HORNE	37
VINTON	139
WALFORD	15
TOWNSHIPS	
BENTON	6
BIG GROVE	4
BRUCE	2
CEDAR	8
CANTON	13
EDEN	2
ELDORADO	7
FLORENCE	6
FREMONT	10
HARRISON	26
HOMER	4
IOWA	15
JACKSON	17
KANE	10
LEROY	14
MONROE	28
POLK	4
ST. CLAIR	5
TAYLOR	38
UNION	10
TOTAL EXEMPT PROPERTIES	676
BENTON COUNTY	\$22,392,872

Table 15 Summary Values of All Properties in Benton County by Jurisdiction

TOTAL PROPERTY VALUES ALL PROPERTY JULY 1, 2020	
ATKINS	\$203,666,026
BELLE PLAINE	\$109,592,190
BLAIRSTOWN	\$32,228,711
GARRISON	\$8,229,100
KEYSTONE	\$32,906,956
LUZERNE	\$3,127,767
MT. AUBURN	\$4,761,000
NEWHALL	\$48,995,051
NORWAY	\$27,084,055
SHELLSBURG	\$54,856,465
URBANA	\$89,671,009
VAN HORNE	\$40,352,663
VINTON	\$252,403,037
WALFORD	\$64,563,494
CITIES TOTAL	\$885,436,604
BENTON	\$90,283,000
BIG GROVE	\$68,930,300
BRUCE	\$68,941,600
CEDAR	\$81,963,300
CANTON	\$95,330,500
EDEN	\$64,298,000
ELDORADO	\$68,648,800
FLORENCE	\$78,509,340
FREMONT	\$104,416,400
HARRISON	\$44,784,100
HOMER	\$71,844,400
IOWA	\$59,185,000
JACKSON	\$65,489,700
KANE	\$73,074,500
LEROY	\$70,154,100
MONROE	\$69,808,100
POLK	\$91,716,100
ST. CLAIR	\$72,046,000
TAYLOR	\$82,773,500
UNION	\$72,590,000
TOWNSHIPS TOTAL	\$1,498,877,900
BENTON COUNTY	\$22,392,872
COUNTY TOTAL ALL PROPOERTIES	\$2,406,707,376

BENTON COUNTY HISTORICAL PROPERTIES

Benton County has 15 properties that are on the National Register of Historic Places. The only structure located in any flood hazard area is the Shellsburg Pearl Street Bridge over Wildcat Creek. Following is a listing of the 15 properties

Table 16: Benton County properties on the National Register of Historic Places

Property	Address	City	Date Listed
Belle Plaine Historic District	Belle Plaine, Iowa	Belle Plaine	10/16/2013
Central Vinton Residential Historic District	Roughly bounded by 2nd & D Avenues, W. 13th & W. 6th Streets	Vinton	11/21/2012
County Courthouse	E. 4th Street	Vinton	10/08/1976
Burlington Cedar Rapids & Northern Passenger Station	612 Second Ave.	Vinton	12/06/1990
Herring Hotel	718 13th St.	Belle Plaine	12/31/08
Iowa Canning Company Seed House Building	201 1st Ave.	Vinton	03/12/2012
McQuilkin James Greer Round Barn	CR D56	Eagle Center	06/30/1986
Ray Frank G. House & Carriage House	912 1st Ave.	Vinton	12/10/1982
Round Barn	Bruce Township Section 3 Off US 218	Eagle Center	06/30/1986
Sankot Motor Company	807 13th Street	Belle Plaine	07/28/1995
Shellsburg Bridge	Pearl Street over Bear Creek	Shellsburg	6/25/98
Upper Stone Schoolhouse	E of Vinton	Vinton vicinity	07/07/1983
Vinton Public Library	510 2nd Ave.	Vinton	05/23/1983
Youngville Café	2409 73rd Street	Watkins	02/01/2007
Zalesky, Frank E. and Katie (Cherven House)	802 9th Ave.	Belle Plaine	04/10/2012

BENTON COUNTY BUSINESSES, INDUSTRIES AND COMMERCE

According to statistics provided by the US Census Bureau, in Benton County there was 1,817 business and industrial enterprises in Benton County in 2013. These enterprises generated a total of \$47,093,000 in commerce according the US Census Bureau. Table 2.1.8.1 summarizes these enterprises.

Table 17: Business and Industrial Enterprises in Benton County in 2013

Commercial or Business Enterprise Type	Number of establishments	Receipts (\$1,000)
Utilities	7	123
Construction	284	11,701
Manufacturing	23	595
Wholesale trade	36	1,388
Retail trade	280	8,356
Transportation and warehousing	115	11,462
Information	14	759
Finance and insurance	63	2,055
Real estate and rental and leasing	117	3,891
Professional, scientific, and technical services	131	2,057
Administrative and Support and Waste Mgt. and Remediation Svcs	145	1,992
Educational services	26	170
Health care and social assistance	203	2,895
Arts, entertainment, and recreation	79	908
Accommodation and food services	17	613
Other services (except public administration)	277	5,648

AGRICULTURE IN BENTON COUNTY

Because of the capability of the soils in Benton County and the climatic conditions, agricultural crops and livestock are the backbone of the economy of Benton County and have been since it became a county in 1846.

United States Department of Agriculture Statistics indicates that in 2017 the county had 1,148 farms totaling 420,639 acres or 91% of the land area of the county. The average size of a Benton County Farm is 366 acres. The average age of Benton County farmers is 56. The average value of a farm including land and buildings was \$3,555,324 in 2017.

For farm commodities in Benton County the following statistics are found for 2017:

Market value of all crops	\$218,375,000
Market value of all livestock	\$129,349,000
Market value greenhouse & nursery	\$186,000
Total market value of all farm products	\$347,910,000

No. of all cattle and calves in Benton County	52,900
No. of beef cows in Benton County	12,000
No. of milk cows in Benton County	4,400
All hogs and pigs in Benton County	83,051

Corn acres in Benton County	182,420
Soybean acres in Benton County	165,099
Hay acres in Benton County	9,491

BENTON COUNTY TRANSPORTATION SYSTEMS

Highways and Roads

Interstate 380/Iowa Highway 27 crosses the northeastern corner of Benton County. Two major highways extend across the county. U.S. Highway No. 30 traverses the southern half of the county. U.S. Highway No. 218 extends east and north across the county. Several state highways and hard surfaced county roads connect these major highways to the smaller communities. Most other roads are hard surfaced or are surfaced with crushed limestone or gravel. State Highways in Benton County include Iowa Highway 8, Iowa Highway 21 and Iowa Highway 150. Benton County has 1,330 miles of rural roads maintained by Benton County Secondary Roads including 97 miles of rural primary, 216 miles of paved/hard surface secondary roads, 924 miles of rock surface secondary roads, 93 miles of earth (dirt) surface secondary roads.

Figure 22: Benton County Farm to Market Roads. Map provided by Iowa DOT.

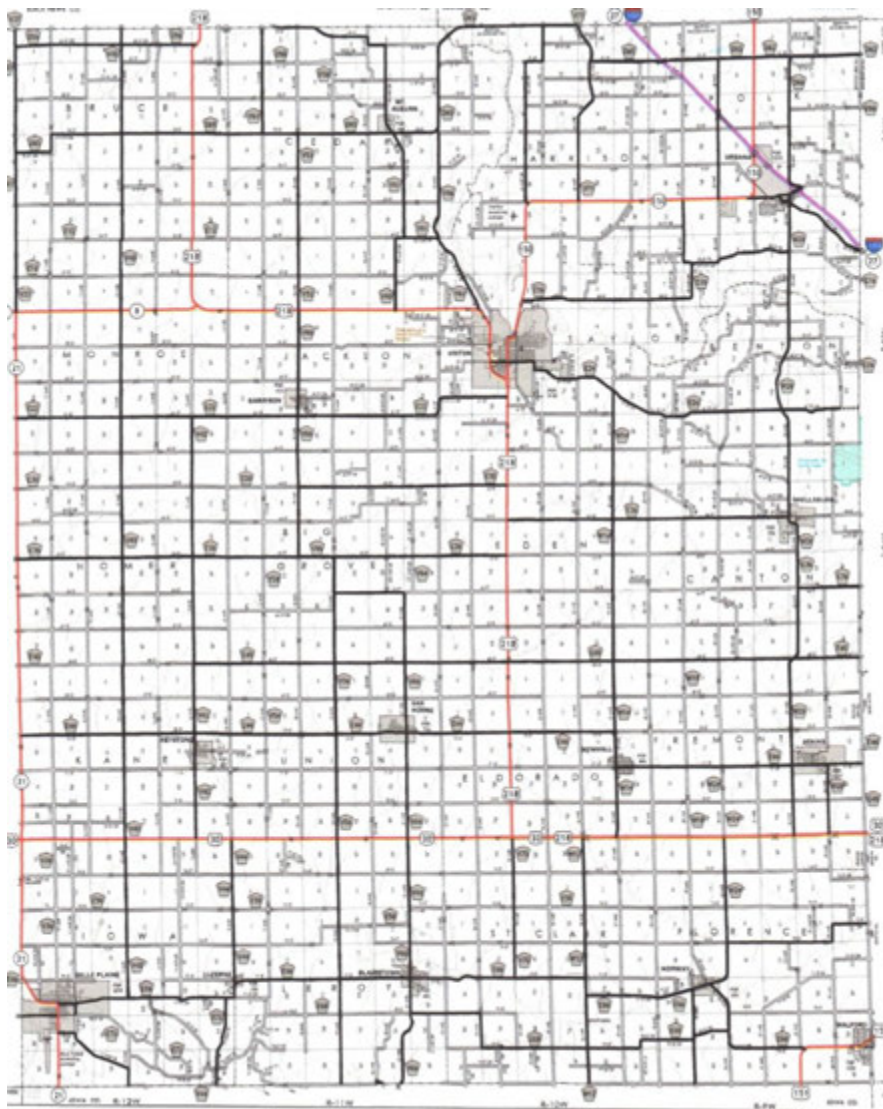
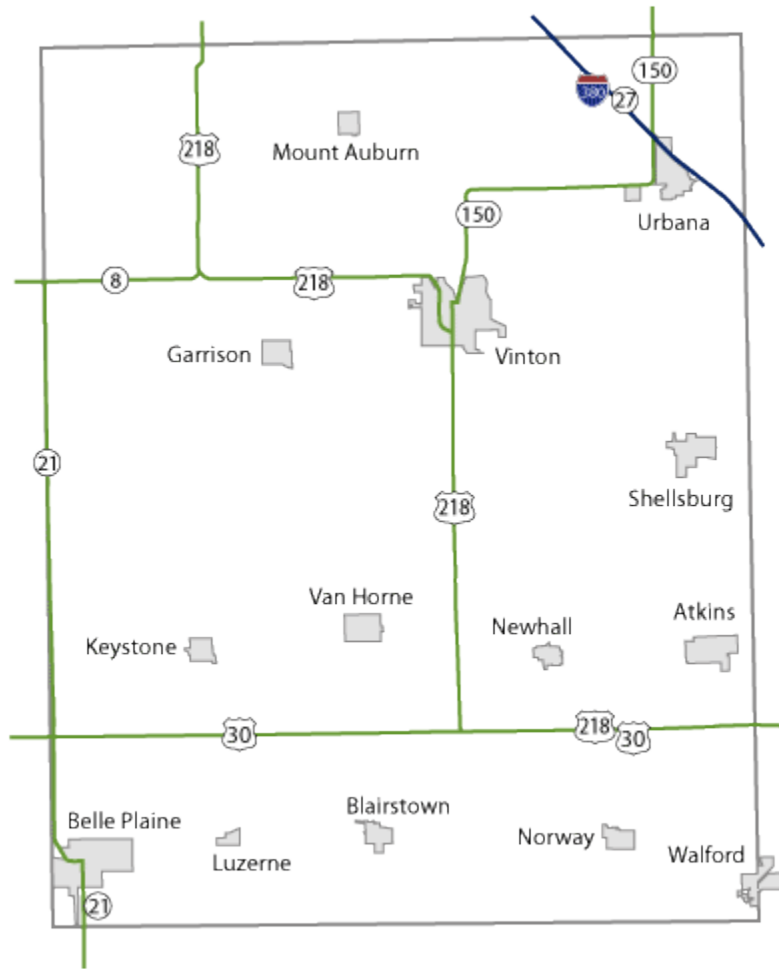


Figure 23: Major Highways and Interstates of Benton County. Map provided by Iowa DOT.



Railroads

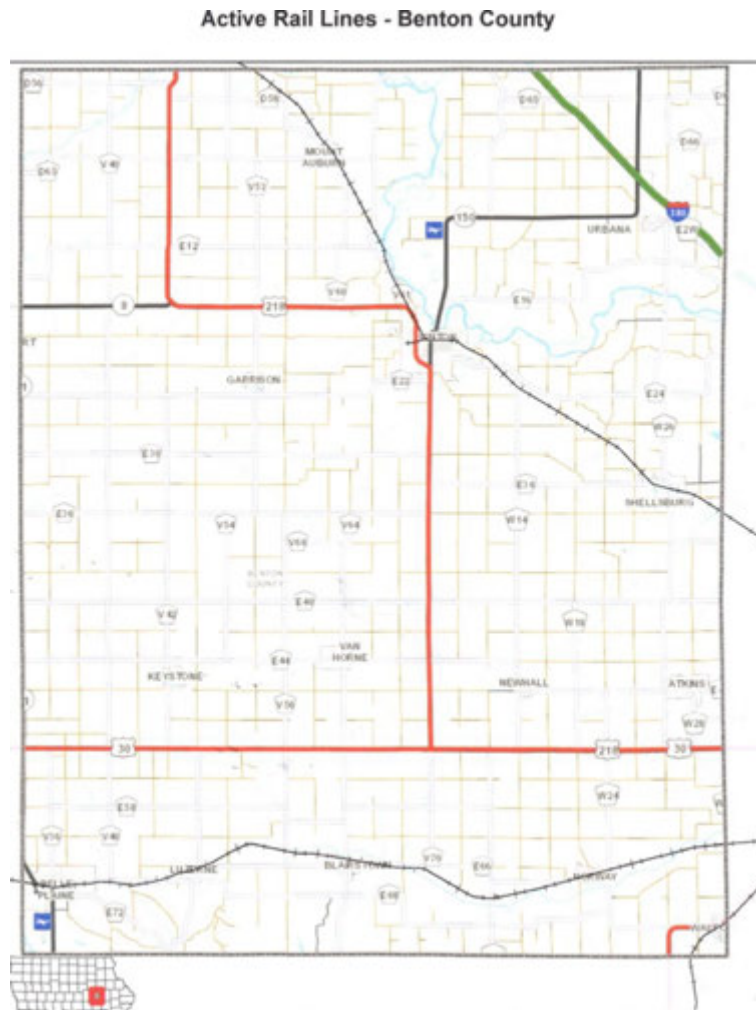


Figure24: Rail lines of Benton County. Image provided by the Iowa DNR.

Benton County has three railroads. Nearly 100 trains per day cross the county from east to west on 24 miles of track through the cities of Belle Plaine, Blainstown and Norway on a busy double rail line operated by the Union Pacific Railroad. The Iowa Northern Railroad passes two trains daily over 25 miles of track through Mt. Auburn, Vinton and Shellsburg. Two miles of track operated by the Cedar Rapids—Iowa City Railroad pass through Walford in the southeast corner of the county.

Airports

Benton County has two airports domiciled within the county's boundaries, the Belle Plaine Airport near Belle Plaine and the Vinton Veterans Memorial Airport near Vinton. Both have 4,000 feet long runways.

EMERGENCY SERVICES OF BENTON COUNTY

Emergency Management Agency

The Benton County Emergency Management Agency, headquartered in the Benton County Courthouse in Vinton, is governed by a board of commissioners comprised of the Mayors from each of the incorporated jurisdictions in the County or their delegates, a representative of the Benton County Sheriff's Department and the Benton County Board of Supervisors. The agency currently has one full-time staff person, the Emergency Management Coordinator and one volunteer who assists in the office. The Emergency Management Agency works in conjunction with local fire, rescue, police, and government officials to draft and implement workable emergency action plans in the community. Furthermore, the Agency is responsible for the monthly testing of all outdoor warning sirens in the County.

Law Enforcement

Four communities in Benton County maintain their own police departments: Belle Plaine, Shellsburg, Urbana and Vinton. The remainder of the communities contract with the Benton County Sheriff's Office for law enforcement services. The office is headquartered in Vinton and maintains a staff of 48 people, 16 of whom are actively engaged in law enforcement activities as patrol officers.

HAZMAT Services

A regional Hazardous Materials Team is on hand to assist Benton County with a Hazard Materials event or catastrophe. The Team is located within fifteen minutes of Atkins and is operated by the Linn County Hazardous Materials Response Team headquartered in Cedar Rapids. The Team assists Benton County fire departments with hazard materials emergency procedures and training, thus reducing the possibility of additional contamination in a hazardous materials emergency. An evacuation plan is also in place in the Benton County Multi-Hazard Emergency Operations Plan. The plan is intended to be used in conjunction with activities of the HAZMAT team and community emergency responders.

Fire Departments

Benton County receives fire protection from 14 domiciled fire departments in Atkins, Belle Plaine, Blainstown, Garrison, Keystone, Luzerne, Mount Auburn, Newhall, Norway, Shellsburg, Urbana, Van Horne, Vinton and Fairfax/Walford. Staffing of these departments is entirely volunteer. The fire departments of Benton County are all signatory to a county-wide mutual aid agreement making the services of all departments in the county available to each other in the event of a major fire or emergency. Fire departments in neighboring counties with territory in Benton County include Brandon, Dysart, Fairfax, La Porte City and Walker.

Emergency Medical Services

Emergency Medical Services in Benton County include first responder services in Atkins, Garrison, Keystone, Newhall, Norway and Van Horne. Ambulance services include Blairstown, Belle Plaine, North Benton and Urbana. Emergency medical service providers in neighboring counties that also provide service to Benton County include the Brandon First Responders, Dysart Ambulance Service, Elberon Ambulance Service, Hiawatha Ambulance Service, La Porte City Ambulance Service and Area Ambulance Service from Cedar Rapids.

BENTON COUNTY EDUCATION SYSTEMS

In Benton County in 2019, 92 percent of people 25 years and older had at least graduated from high school and 19 percent had a bachelor's degree or higher. Eight percent were dropouts; they were not enrolled in school and had not graduated from high school.

The total public school enrollment in Benton County was 6,800 from 2017-2019. Nursery school and kindergarten enrollment was 830 and college or graduate school enrollment was 1,300.

K-12 Education

Table 2.1.12.1 lists the school systems and schools in Benton County for the 2018/2019 school year. The information was provided by the secretary for each school district. Additionally, there are students which reside in Benton County but attend schools in adjacent counties which are not accounted for in this table.

The public school systems of Benton County include the Belle Plaine Community School District with 4 schools, 627 students and 50 classroom teachers; Benton Community School District with 4 schools, 1,451 students and 115 classroom teachers; Vinton-Shellsburg Community School District with 4 schools, 1,557 students and 137 teachers; the Center Point-Urbana School District Middle School in Urbana with 362 students and 31 teachers; of those located at the Center Point-Urbana Middle School in Urbana. The Central Lutheran School in Newhall is the county's only private school. The school system has only one building and has 171 students.

Schools in Benton County, Iowa			
School	Students	Teachers	Grades
Belle Plaine Community School District			
Belle Plaine Senior High School	256	17	9-12
Lincoln Junior High School	97	6	7-8
Central Elementary School	186	20	2-6
Longfellow Elementary School	88	7	PK-KG
Benton Community School District			
Atkins Elementary School	285	18	KG-4
Keystone Elementary School	141	14	3-6
Norway Elementary School	323	28	PK-6
Middle School/High School—Van Horne	702	55	7-12
Center Point-Urbana Community School District			
Center Point-Urbana Middle School	362	281	5-8
Central Lutheran School			
Central Lutheran School	171	8	2-13
Vinton-Shellsburg Community School District			
Tilford Elementary School	508	39	PK-4
Shellsburg Elementary	269	29	K-5
Vinton-Shellsburg Middle School	3250	29	6-8
Vinton-Shellsburg High School	455	40	9-12

Table 18: Benton County School Systems

Higher Education

Kirkwood Community College is a community college serving seven counties in Iowa. The college is named for Samuel J. Kirkwood, an Iowa governor and U.S. Senator in the late 19th century. Kirkwood's main campus is located east of Kirkwood Boulevard in Cedar Rapids. In Benton County, Kirkwood maintains a building in Belle Plaine and Vinton. Students at the Benton County facility can take high school GED classes, college credit classes and other classes via the ICN, on line, or from in person instructors at these facilities.

Note: The Hazard Analysis/Risk Assessment and Mitigation Strategy for Benton County's public school districts are found in Appendix D, page 685.

FLOOD AND NATIONAL FLOOD INSURANCE PROGRAM (NFIP) INFORMATION

The Benton Assessor's Office using the most recent (December 20, 2019) DFIRM flood plain maps for Benton County has determined the following data regarding properties within the 100-year flood plain for all watersheds in Benton County.

- Total number of agricultural properties in flood plain areas = 2,688 with a total assessed value of \$667,873,800 including land, agricultural outbuildings and dwellings. The dwelling value on these properties is \$71,170,200 for 616 dwellings. Agricultural outbuildings on these properties have an assessed value of \$12,588,200.
- Residential properties in flood plain areas of the county are 858 with a value of \$49,188,100 for the structures only and \$66,031,200 for the dwelling structures and land.
- There are 114 commercial properties with an assessed value of \$23,474,900 and 13 industrial properties with an assessed value of \$7,827,800 within the floodplain areas of Benton County.
- Additionally, there are 213 properties that are tax exempt, municipally or county owned within Benton County floodplain areas.
- All of Benton County has been mapped for flood plains with DFIRMS developed on December 20, 2019.

CID numbers for the communities of Benton County are as follows:

190548 Atkins
190015 Belle Plaine
190845 Benton County
190320 Blainstown
190321 Garrison
190602 Keystone
190281 Luzerne
190785 Mount Auburn
190626 Newhall
190632 Norway
190319 Shellsburg
190672 Urbana
190673 Van Horne
190016 Vinton
190820 Walford

The City of Vinton is the only area of Benton County with a delineated 500-year flood zone. The area contains 1 agricultural property valued at \$173,900; 8 commercial properties valued at \$263,200 and 37 residential properties valued at \$474,499.

NFIP Status: In Benton County, the jurisdictions of Atkins, Belle Plaine, Blairstown, Garrison, Newhall, Norway, Shellsburg, Urbana, Vinton, Walford and Benton County belong to the NFIP. The communities of Keystone, Luzerne, Mt. Auburn, and Van Horne do not belong to the NFIP.

According to NFIP (National Flood Insurance Program) statistics there were a total of 155 flood insurance policies in force in all of Benton County on April 30, 2015. These policies were as follows:

Community Name	Policies In-force	Insurance In-force	Written Whole \$ Premium In-force
Benton County	35	\$5,765,000	\$23,562
Atkins	2	\$560,000	\$850
Belle Plaine	9	\$472,300	\$3,741
Blairstown	4	\$207,000	\$2,378
Newhall	1	\$70,000	\$851
Norway	4	\$560,000	\$1,351
Shellsburg	10	\$2,126,400	\$10,045
Urbana	1	\$210,000	\$356
Vinton	78	\$10,280,200	\$66,413
Walford	11	\$2,022,000	\$5,800
County Total	155	\$22,292,900	\$115,347

As of April 30, 2015, NFIP statistics show that 75 claims for flood insurance losses had been filed in Benton County with 58 of those claims occurring in Vinton, 10 in the unincorporated areas of the county, 5 in Shellsburg, 1 in Urbana and 1 in Belle Plaine. The Belle Plaine loss resulted in no payments. Unincorporated area losses resulted in \$127,592 in payments. The Urbana loss resulted in a payment of \$24,797. Shellsburg losses resulted in \$92,070 in payments. The 58 Vinton claims resulted in \$1,229,865 in payments made on 50 of the claims. The total payment for all claims was \$1,474,324. These claims have occurred since 1978.

REPETITIVE LOSS PROPERTIES

Officials of the Homeland Security and Emergency Management Division of Iowa (HSEMD) report that there are two repetitive loss structures in Benton County. Both are residential. One is located in Vinton and one is located in Mt. Auburn. This is the only information that could be obtained.

BENTON COUNTY GOVERNMENT

There are 99 counties in Iowa ranging in population from about 4,400 residents (Adams County) to approximately 380,000 residents (Polk County). All 99 counties operate under the board of supervisor form of government. Historically, the role of counties has been to serve as an administrative arm of the state - maintaining records, providing courts and law enforcement, building roads, assisting the mentally ill, immunizing children, assessing property and collecting taxes, and conducting elections. Counties still perform these functions, as well as others.

In Benton County the elected officials are three county supervisors, the sheriff, recorder, treasurer, attorney, and auditor.

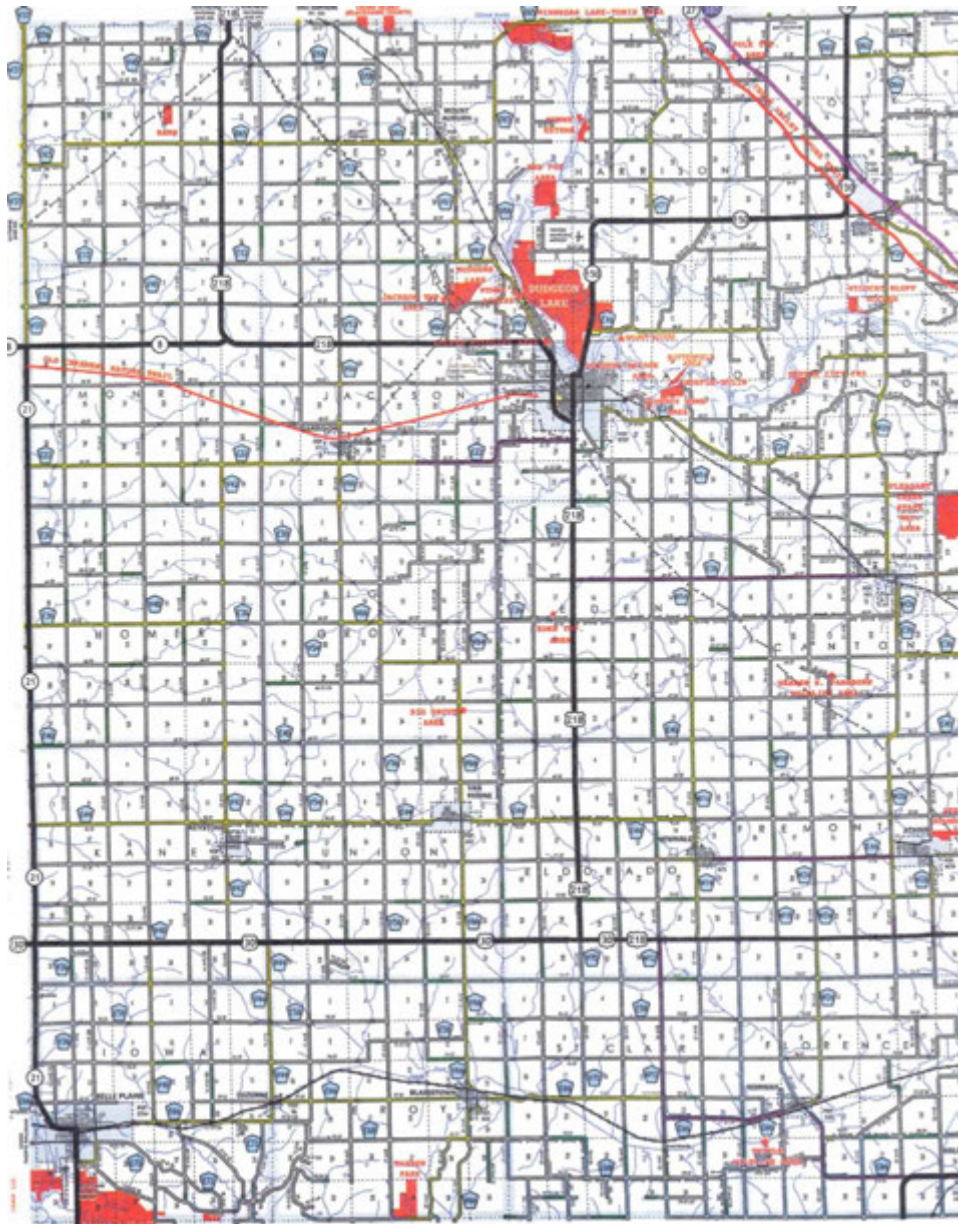
All totaled Benton County has 108 full-time and 46 part time employees of its departments and services. The breakdown is as follows:

	Full-time	Part-time
Supervisors	3	
Auditor	4	1
Treasurer	7	
Attorney	7	1
Sheriff	30	18
Recorder	3	
Assessor	4	
Sanitarian/LandUse Admin	2	
Transportation	3	14
Social Services	2	
Secondary Roads	33	4
Veteran's Affairs	1	
Conservation	7	7
Emergency Management	1	1
Maintenance	2	

BENTON COUNTY PARKS AND RECREATION AREAS

Benton County has an extensive system of municipal, county and state parks that provide a broad array of outdoor recreational opportunities. Every community in the county has at least one park area of some sort. Some communities such as Atkins, Belle Plaine, Newhall and Vinton have two or more parks. Periods of heaviest use for the parks is during the summer months. On weekends of heaviest use, several thousand people county-wide will be using the parks and campgrounds of the county.

Figure 25: Park and recreation areas of Benton County



Benton County Conservation has a nature center, the Rodgers Park Nature Center located at 5718 20th Avenue Drive, Vinton.

The major Parks and Recreation areas managed by the Benton County Conservation Commission include:

Benton City-Fry Recreation Area (River Park)

5899 29th Ave. Dr.

Vinton, IA 52349

- 39 acre river park
- 21 Campsites (16 with electric; 5 without electric)
- Pit Toilet
- Drinking water
- Boat ramp
- Fishing
- Fishing shore and river
- Picnic areas
- Shelters/pavilion
- Playground
- Hunting access during season (excluding campground)

Cedar Valley Nature Trail

10-mile Walking/biking trail in Northeast Benton County on abandoned railway. The trail connects with other trails in Black Hawk, Buchanan and Linn Counties.

Cumberland's Recreation Area:

Hwy 150 (1 mile north of Vinton)

Vinton, IA 52349

- 20 acre Recreation Area
- Shoreline fishing on oxbow lakes
- Nature appreciation
- Bird watching
- Hunting (in season)

Hannen Park

1949 Benton Iowa Rd

Blairstown, IA 52209

- 180 acre park
- 96 Campsites
- Shower facilities
- Rustic Cabin
- 50 acre fishing/boating lake
- Boat ramp

- Fishing piers and jetties
- Swimming beach
- Picnic areas
- Shelters

Hoefle-Dulin Recreation Area (River Park)

5901 27th Ave.

Vinton, IA 52349

- 62 acre river park
- 16 Campsites
- Pit toilets
- Drinking water
- Boat Ramp
- Fishing
- Picnic areas
- Hiking trails

Minne Estema Park

5261 24th Ave. Drive

Vinton, Iowa 52349

- 63 acre park
- 12 Campsites
- Pit toilet
- Drinking water
- Boat ramp
- Shelter/Pavilion
- Picnic areas
- Playground
- Hiking

Winnegar Lake Area (aka: Mt. Auburn Boat Launch)

5033 22nd Avenue

Brandon, IA 52210

- 467 acre Game Management Area
- Boat ramp
- Picnic areas
- Hiking trails
- Equestrian trail use area

Old Creamery Nature Trail

15 mile walking/hiking/biking train from Vinton to Garrison located on an abandoned Rock Island Rail Line.

Polk Township Wildlife Area

2819 51st Street

Brandon, IA 52210

- 12 acre park: Day use (no overnight camping)
- 7 acre lake
- Boat ramp
- Fishing (shoreline and boat)
- Picnic areas
- Nature appreciation (native wildflowers)
- No swimming

Rodgers Park

2113 57th Street Trail

Vinton, IA 52349-9434

- 186 peaceful acres
- 50 full-service campsites, overlooking the scenic lake
- 5 Walk-in Tent sites
- Shower house)
- 21 acre lake
- Swimming beach
- Fishing piers
- Boat ramp
- Picnic areas
- New Playground
- Enclosed and open shelter facilities
- Quiet hiking trails

Wildcat Bluff Recreation Area

57th Street Trail

Urbana, Iowa 52345

- 131 recreational area
- 30 Campsites
- 5 walk-in tent campsites
- 18 hole Disc Golf Course
- Miles of wooded, peaceful hiking trails
- Boat launch
- Picnic areas
- Playground

Other wildlife and recreational areas managed by Benton County Conservation include: Atkins Round House area (83 acres, 7051 Ben/Linn Road, Atkins), Big Grove Township Wildlife Area (1 acre, 67th St & 21st Ave., Van Horne), Cherveny Wildlife Area (7 acres, 19th Avenue Van Horne), County Care Facility Wildlife Area (25th Ave. Drive, Vinton), Eden Township Wildlife Area (1 acre, 65th St. and 23rd Avenue,

Vinton), Jackson Township Wildlife Area (1 acre, 20th Ave. Drive and 57th St., Vinton), Pangborn Wildlife Area (15 acres, Shellsburg), Polk Township Wildlife Area (12 acres, 2819 51st St., Urbana), Selken Wildlife Area (2.5 acres, Vinton), Tuttle Wildlife Area (2 acres, Norway), Vinton Boat Ramp (2 acres, Vinton), Wyman Memorial Park (5 acres, 5702 22nd Ave., Mt. Auburn).

State Parks and Recreation Areas:

Dudgeon Lake Game Area: North of Vinton along Cedar River. 1,257 acres owned by the Iowa DNR. Hunting, fishing, hiking, and a boat ramp access are among the features. Target range available.

Pleasant Creek State Recreation Area: East of Shellsburg. 410 acre lake with its surrounding area developed as a multi-use recreational activity. Swimming, beach, picnicking, hiking, camping, horseback and snowmobile trails are available. This lake is an emergency coolant reservoir for the Duane Arnold Nuclear Power Plant.

CRITICAL ASSETS OF BENTON COUNTY

The State of Iowa Homeland Security and Emergency Management Division (HSEMD) lists 34 facilities in Benton County as critical assets. For security reasons, HSEMD does not release information the location or nature of these facilities.

LAND USE

Benton County does not have a GIS person. Hence the county and none of its jurisdictions not have any land use maps. A search of other entities such as the East Central Iowa Council of Governments did not find any land use maps for the county either. Community profiles in this section of the plan and the hazard analysis/risk assessment section of this plan contain information on population and development trends in Benton County.

COMMUNITY PROFILES

ATKINS



Figure 26: Atkins in 2018

Atkins is located at 41°59'41"N 91°51'40"W. According to the United States Census Bureau, the city has a total area of 1.09 square miles (2.82 km²), all of it land in sections 13 and 14 of Fremont Township in Benton County, Iowa. The first Atkins Town Council meeting was held May 17, 1917. A petition for Incorporation of the town of Atkins was filed on May 31, 1917. Atkins was once an important railroad town, as it was exactly half-way between Omaha and Chicago. In 1882 the railroad came to Atkins. In 1969, passenger service was halted by the railroad and on December 8, 1978, the last freight train passed through. The City is part of the Benton Community School District. It has a public library, a volunteer fire department and a first responder EMS service. Benton County Road E44 passes through the community and connects it to US Highway 30 just two miles south of the city.

As of the census of 2010, there were 1,670 people, 592 households, and 480 families residing in the city. The population density was 1,532.1 inhabitants per square mile (591.5/km²). There were 610 housing units at an average density of 559.6 per square mile (216.1/km²). The racial makeup of the city was 98.9% White, 0.1% African American, 0.3% Native American, 0.1% Asian, and 0.7% from two or more races. Hispanic or Latino of any race were 0.7% of the population.

There were 592 households of which 45.6% had children under the age of 18 living with them, 72.8% were married couples living together, 4.1% had a female householder with no husband present, 4.2% had a male householder with no wife present, and 18.9% were non-families. 14.7% of all households

were made up of individuals and 6% had someone living alone who was 65 years of age or older. The average household size was 2.82 and the average family size was 3.14.

The median age in the city was 35.7 years. 31.3% of residents were under the age of 18; 5% were between the ages of 18 and 24; 30.5% were from 25 to 44; 23.1% were from 45 to 64; and 9.9% were 65 years of age or older. The gender makeup of the city was 51.0% male and 49.0% female.

In 2010 the median income for a household in the city was \$81,525, and the median income for a family was \$84,554. The per capita income for the city was \$30,021.

The community has a new library and city hall built in 2012, a new water treatment plant built in 2016, a new wastewater treatment facility built in 2017, a city park with soccer fields, a volunteer fire department and first responder EMS contingent. Stoneridge 1st Addition, a 53 lot residential development was opened in 2019.

The City of Atkins has 12 facilities valued at a total of \$11,575,012, none of which are located in a flood zone.

Due to its proximity to Cedar Rapids, the City of Atkins has undergone substantial development in recent times. The 1990 census placed the city's population at 637. In 2000 it stood at 977, and in 2010 it stood at 1,670.

Figure 27: Atkins Population Change 1960-2013

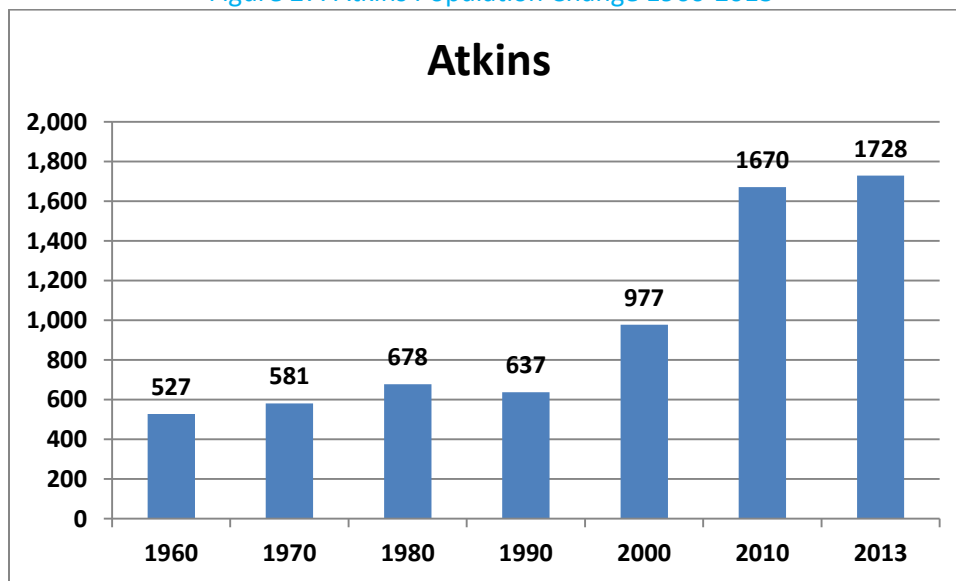


Table 19: Atkins Population Change Statistics 1960-2010

Year	Population	Number Change (Linear Method)	Growth/Decline Rate (Geometric Method)
1960	527	n/a	n/a
1970	581	54	10.2%
1980	678	97	16.7%
1990	637	-41	-6.0%
2000	977	340	53.4%
2010	1,670	693	70.9%
Average (1960 - 2010)		1,143/5 =229	145.2%/5 =29%

Table 20: Atkins Projected Population Change 2020-2050

Year	Linear Projections	Geometric Projections
2020	1,899	2,154
2030	2,128	2,779
2040	2,357	3,585
2050	2,586	4,625

Table 21: Vulnerable Populations in the City of Atkins; 2000 and 2010

Area	2000				2010			
	<18	%	>64	%	<18	%	>64	%
Atkins	306	31	108	11	522	31	166	10
Benton County	6,924	27	3,902	15	5,781	22	4,015	15
Iowa	733,629	25	436,213	15	716,011	24	466,169	15

Government

The city is governed by a Mayor/Council form of government with five council members and a mayor, all of whom are elected. The city also has one full time city clerk, two full time public works employees, one full time librarian and one part time building Inspector.

Codes, Ordinances and Plans

The City of Atkins has various ordinances regulating development and building construction in the city. Chapters of the city's code relative to development and building construction include:

- Chapter 94 – Public Water Well Protection
- Chapter 145 – Dangerous Buildings
- Chapter 150 – Building Numbering

Chapter 151 – Trees
Chapter 155 – Building Code
Chapter 157 – Storm Drainage
Chapter 158 – Sign Code
Chapter 165 –Zoning Regulations, including the Sign Code
Chapter 166 – Subdivision Regulations
Chapter 160 – Flood Plain Regulations (added in 2019)

The City of Atkins also has a Comprehensive plan that was developed in 2006 and a Capital Improvements Plan that is under development.

Streets

The City of Atkins has approximately 81 blocks and 13.5 miles of streets. The street surfaces are seal coated, asphalt or concrete. The city's two public works employees take care of street maintenance for the city.

Water And Water Treatment

Water supply for the City of Atkins is supplied by two active wells with a total capacity of 660 gallons per minute. The city has two above ground water storage towers holding a maximum of 200,000 gallons of water. The city constructed a new 500 gallon per minute reverse osmosis water treatment plant at 400 Main Avenue. The plant will have an emergency electrical power generator. Average daily water usage for the City of Atkins is 120,000 gallons. The City of Atkins two public works employees are the city's Water Department. The City of Atkins is in compliance with Iowa DNR Well field protection requirements.

Wastewater Treatment

The City of Atkins has an Aero-mod Mechanical Plant located at 50 Railroad Street that was constructed in 2017. The wet weather design flow of the facility is 990,000 gallons of water per day. The City of Atkins' two public works employees are the city's Wastewater Department.

Emergency Services

Law Enforcement

The City of Atkins contracts for law enforcement services with the Benton County Sheriff's Office for coverage that is not to exceed 18 hours per week, or 936 hours per year. The Benton County Sheriff's Office, headquartered in Vinton, 25 miles away, maintains a staff of 43 people, 16 of whom are actively engaged in law enforcement activities.

Fire Department

The City of Atkins receives fire protection from the Atkins Fire Department. The department is staffed with a maximum of 30 volunteers and maintains a fleet of four vehicles for firefighting and rescue operations. The department averages 35 alarms per year in the city and the surrounding rural district. The fire departments in Benton County and neighboring Linn County

have formed a county-wide mutual aid agreement, making the services of an additional 25 fire departments available to the city in the event of a major fire or emergency.

Emergency Medical Services

Emergency medical service for the City of Atkins is provided by the Atkins First Responders. The service is the initial primary emergency medical service provider for the 32 square mile area Atkins Fire District. The EMT non-transport level service is staffed with 16 volunteers trained to the First Responder, Emergency Medical Technicians or Paramedic level. The service responds to an average of 80 calls a year. Emergency Medical Transport service for the City of Atkins is provided by the Area Ambulance Service headquartered at Mercy Hospital in Cedar Rapids.

Utilities

Natural Gas Provider: Mid America Energy
Electricity: Alliant Energy
Telecommunications: Atkins Telephone Co. 9ATC)
Cable TV: Atkins Telephone Co. (ATC)

Business and Industry

The City of Atkins is home to fifteen businesses and no industries. The Benton Community School District, Atkins Elementary School is the city's largest employer with 21 employees. The other two largest employers in the city are the Atkins Savings Bank with 9 employees and the Atkins Lumber Company with 8 employees.

Employment

Employed civilian population 16 years and over		
OCCUPATION	Number	%
Civilian employed population 16 years and over	1,061	1,061
Management, business, science, and arts occupations	392	36.9%
Service occupations	126	11.9%
Sales and office occupations	301	28.4%
Natural resources, construction, and maintenance occupations	108	10.2%
Production, transportation, and material moving occupations	134	12.6%
INDUSTRY		
Civilian employed population 16 years and over	1,061	1,061
Agriculture, forestry, fishing and hunting, and mining	3	0.3%
Construction	86	8.1%
Manufacturing	148	13.9%
Wholesale trade	42	4.0%
Retail trade	132	12.4%
Transportation and warehousing, and utilities	48	4.5%
Information	42	4.0%
Finance and insurance, and real estate and rental and leasing	129	12.2%
Professional, scientific, and management, and administrative and waste management services	37	3.5%
Educational services, and health care and social assistance	275	25.9%
Arts, entertainment, and recreation, and accommodation and food services	42	4.0%
Other services, except public administration	36	3.4%
Public administration	41	3.9%

Table 22: Atkins Civilian Population Employment 2010. From the US Census Bureau.

Critical Facilities

Critical facilities are those structures and infrastructure that the community places a priority on protecting. Damage to these facilities can impact the delivery of vital services, cause greater damages to other sections of the community, or can put special, vulnerable populations at risk. The Planning Committee identified the following critical facilities:

Facilities essential to the health and welfare of the entire population, especially following a hazard event:

Atkins City Hall/Library, 480 3rd Ave, Atkins, IA 52206
Atkins Fire Station, 91 Railroad St, Atkins, IA 52206
Emergency Shelters
Atkins American Legion Hall, 89 Main Ave, Atkins, IA 52206
Atkins Fire Station, 91 Railroad St, Atkins, IA 52206
Atkins City Hall/Library 480 3rd Ave, Atkins, IA 52206

Transportation Systems

County Roads E-44

Lifeline Utility Systems

City of Atkins Water Treatment Plant 400 Main Ave, Atkins, IA 52206
City of Atkins City Wells 105 2nd Ave & 400 Main Ave, Atkins, IA 52206
City of Atkins Wastewater Treatment Plant, 50 Railroad Street, Atkins, IA 52206
City of Atkins Public Works Department 111 1st St, Atkins, IA 52206
City of Atkins Lift Station, 11 Northview Avenue, Atkins, IA 52206
City of Atkins Water Tower, 404 Main Avenue, Atkins, IA 52206
City of Atkins Water Tower-Pump Control Station, 174 1st Street, Atkins, IA 52206

Vulnerable Population Centers

Benton Community Schools Atkins Elementary Center 217 4th Ave, Atkins, IA 52206
Early Beginnings Daycare 402 Cardinal Ave, Atkins, IA 52206
Atkins Senior Housing, Parkview Apartments, 323 2nd Avenue, Atkins, IA 52206

Financial Institutions

Atkins Savings Bank & Trust 97 Main Ave

Food Supplier

Bobby T's 96 Main Ave, Atkins, IA 52206
The Depot Express 88 Parkridge Road, Atkins, IA 52206

Hardware Stores

Atkins Lumber Co. 81 First Ave, Atkins IA 52206

Gas & Fuel

The Depot Express 88 Parkridge Road, Atkins, IA 52206

Healthcare Facilities

Atkins Family Medical Clinic 401 Cardinal Ave, Atkins, IA 52206
Atkins Pharmacy 401 Cardinal Ave, Atkins, IA 52206

BELLE PLAINE

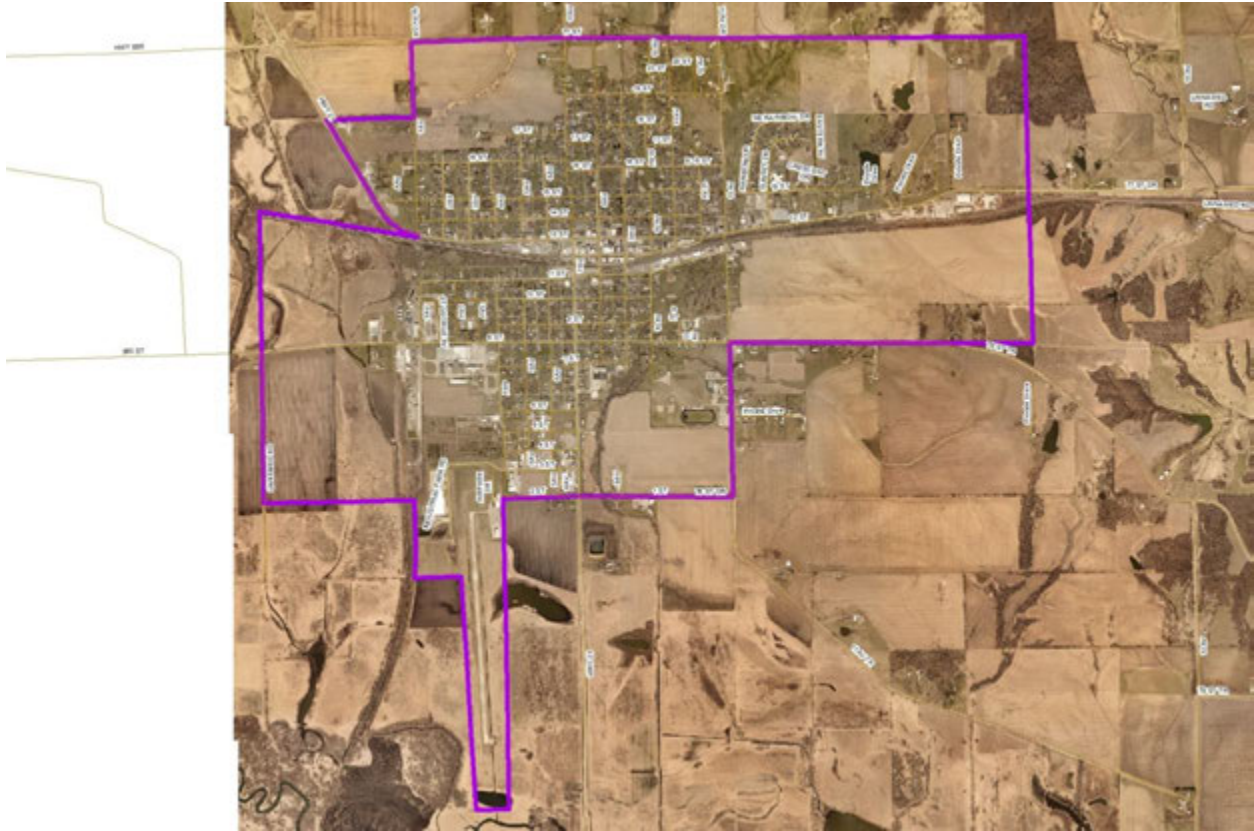


Figure 28: Belle Plaine in 2018

Belle Plaine is a city in southern Benton County located at 41°53'48"N 92°16'39"W. According to the United States Census Bureau, the city has a total area of 3.23 square miles (8.37 km²), of which, 3.22 square miles (8.34 km²) is land and 0.01 square miles (0.03 km²) is water. The City is located two miles north of the Iowa River on both the historic Lincoln Highway and the cross country tracks of the Union Pacific Railroad. According to the United States Census Bureau, the city has a total area of 3.2 square miles.

The railroad was very important to Belle Plaine's rapid growth in the late 1800's, bringing mail, supplies and passengers; as the railroad grew, so did Belle Plaine. Land was purchased so quickly that a town square, typical in most towns of this era, was never put into place

Belle Plaine was in the world spotlight around the turn of the century, with the accidental discovery of Jumbo Well. An attempt at digging a new well erupted into an untamable geyser spewing 3,400 gallons per minute. Many claimed the water's unique mixture of minerals had medicinal uses

In 1894, a devastating fire destroyed most of the business district. The community united and within five months celebrated the reconstructed Belle Plaine with the theme "From Ashes To Elegance" showing true community spirit.

As of the census of 2010, there were 2,534 people, 1,101 households, and 659 families residing in the city. The population density was 787.0 inhabitants per square mile (303.9/km²). There were 1,258 housing units at an average density of 390.7 per square mile (150.9/km²). The racial makeup of the city was 97.8% White, 0.3% African American, 0.4% Asian, 0.7% from other races, and 0.8% from two or more races. Hispanic or Latino of any race were 1.7% of the population.

There were 1,101 households of which 27.2% had children under the age of 18 living with them, 45.9% were married couples living together, 10.0% had a female householder with no husband present, 4.0% had a male householder with no wife present, and 40.1% were non-families. 34.5% of all households were made up of individuals and 16.1% had someone living alone who was 65 years of age or older. The average household size was 2.26 and the average family size was 2.90.

The median age in the city was 42.8 years. 23.5% of residents were under the age of 18; 7% were between the ages of 18 and 24; 22.5% were from 25 to 44; 28.2% were from 45 to 64; and 19.1% were 65 years of age or older. The gender makeup of the city was 48.9% male and 51.1% female

In 2010 the median income for a household in the city was \$36,071, and the median income for a family was \$48,382. The per capita income for the city was \$20,844.

The City of Belle Plaine has 25 facilities worth a combined total of \$15,927,890. None of these structures are in a flood zone.

Today the City of Belle Plaine has its own police department, ambulance service and a volunteer fire department. It has 7 parks, a walking trail, baseball diamonds, swimming pool, tennis courts, park shelters, camping spaces, basketball court, disc golf a 9-hole golf course, a city owned airport, community center, library and a museum.

Figure 29: Belle Plaine Population Change 1960-2013

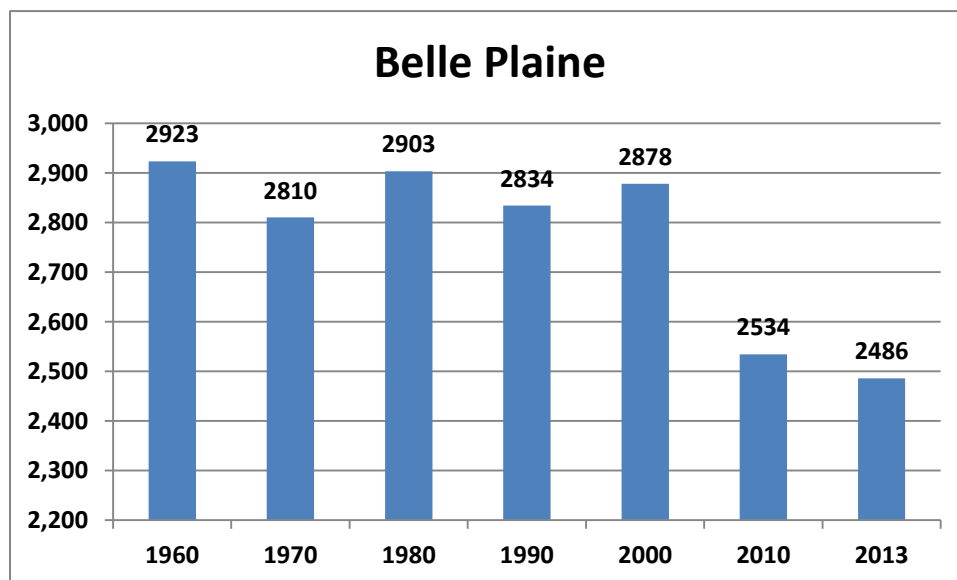


Table 23: Belle Plaine Population Change Statistics 1960-2010

Year	Population	Number Change (Linear Method)	Growth/Decline Rate (Geometric Method)
1960	2,923	n/a	n/a
1970	2,810	-113	-3.8%
1980	2,903	93	3.3%
1990	2,834	-69	-2.3%
2000	2,878	44	1.6%
2010	2,534	-344	-12%
Average (1960 - 2010)		-489/5 = -98	-13.2/5 = -2.6%

Table 24: Belle Plaine Projected Population Change 2020-2050

Year	Linear Projections	Geometric Projections
2020	2,436	2,468
2030	2,338	2,404
2040	2,240	2,341
2050	2,142	2,280

Table 25: Vulnerable Populations in the City of Belle Plaine; 2000 and 2010

Area	2000				2010			
	<18	%	>64	%	<18	%	>64	%
Belle Plaine	741	26	599	21	595	23	483	19
Benton County	6,924	27	3,902	15	5,781	22	4,015	15
Iowa	733,629	25	436,213	15	716,011	24	466,169	15

Government

The City of Belle Plaine is governed by a Mayor/Council form of government with five council members and a mayor, all of whom are elected. The City has a full-time city administrator and 13 other full-time staff and 6 part-time employees.

Building Regulations

The City of Belle Plaine currently has a Development Ordinance, which included provisions for the establishment and enforcement of both Zoning and Subdivision Ordinance regulations. In addition, the City also has and enforces a local Floodplain Ordinance and has a floodplain management plan and drainage ordinance. The City of Belle Plaine has adopted and enforces the 2000 edition of the International Residential Building code. The city has updated its Comprehensive Plan and does have a Capital improvements Plan.

Streets

The City of Belle Plaine has approximately 150 blocks and 30 miles of streets. The street surfaces are concrete, seal coated and black top. The city's public works employee manages street care for the city.

Water And Water Treatment

The Belle Plaine water system has a capacity of 750,000 gallons per day (GPD). This is the elevated storage capacity for the one municipal water tower. Average daily consumption of water has ranged from 350,000 GPD in the winter to 400,000 GPD in the summer. Peak demand at anyone time is less than 450,000 GPD. Average daily use per capita is approximately 150 gallons per day.

Waste Water Treatment

The City's wastewater treatment plant has excess capacity for future growth. The current average daily load is approximately 350,000 thousand gallon daily (GPD). Projected loads based on the expected population growth should not reach 500,000 thousand GPD. The projected total may increase if the industrial park is fully developed within the life of this plan. However, the treatment facility has a capacity of 1.75 million GPD. A flow equalization basin was added in 2019 with a capacity of 4.6 million gallons.

Emergency Services

Law Enforcement

The City of Belle Plaine has its own police department. The department has five full time officers which includes a full-time Chief of Police, four full-time officers and one reserve officer.

Fire Department

The City of Belle Plaine receives fire protection from the Belle Plaine Fire Department. The department is staffed with 38 volunteers and maintains a fleet of six vehicles for firefighting and rescue operations. The department averages 55 alarms per year in the city and the surrounding rural district comprising 75 square miles.

Emergency Medical Services

Emergency medical service for the City of Belle Plaine is provided by the Belle Plaine Area Ambulance Service. The service is the initial primary emergency medical service provider for the 75 square mile area Belle Plaine Fire District. The provisional paramedic level service is staffed with 2 full-time and 22 part-time EMS providers trained to the Emergency Medical Technicians or Paramedic level. The service has two full-time directors and responds to an average of 450 calls for service a year.

Utilities

Natural Gas Provider: Alliant Energy

Electricity: Alliant Energy

Telecommunications: Windstream, USA Communications, Mediacom, Xtreme

Cable TV: Mediacom, Coon Creek, Dish & Direct TV

Business And Industry

The City of Belle Plaine is home to 150 businesses and industries. Belle Plaine Community Schools is the city's largest employer.

Employment

Employed civilian population 16 years and over		
OCCUPATION	Number	%
Civilian employed population 16 years and over	1,193	1,193
Management, business, science, and arts occupations	240	20.1%
Service occupations	149	12.5%
Sales and office occupations	382	32.0%
Natural resources, construction, and maintenance occupations	76	6.4%
Production, transportation, and material moving occupations	346	29.0%
INDUSTRY		
Civilian employed population 16 years and over	1,193	1,193
Agriculture, forestry, fishing and hunting, and mining	43	3.6%
Construction	54	4.5%
Manufacturing	251	21.0%
Wholesale trade	66	5.5%
Retail trade	227	19.0%
Transportation and warehousing, and utilities	33	2.8%
Information	0	0.0%
Finance and insurance, and real estate and rental and leasing	101	8.5%
Professional, scientific, and management, and administrative and waste management services	36	3.0%
Educational services, and health care and social assistance	254	21.3%
Arts, entertainment, and recreation, and accommodation and food services	67	5.6%
Other services, except public administration	44	3.7%
Public administration	17	1.4%

Table 26: Belle Plaine Civilian Population Employment 2010. From the US Census Bureau

Critical Facilities

Critical facilities are those structures and infrastructure that the community places a priority on protecting. Damage to these facilities can impact the delivery of vital services, cause greater damages to other sections of the community, or can put special, vulnerable populations at risk. The Planning Committee identified the following critical facilities:

Facilities essential to the health and welfare of the entire population, especially following a hazard event:

Belle Plaine City Hall – 1207 8th Avenue

Belle Plaine Fire Station – 504 13th Street
Belle Plaine Area Ambulance Service Building – 1310 13th Street
Belle Plaine Police Station – 1207 8th Avenue
Belle Plaine Community Center – 1309 5th Avenue
Emergency Shelters
Belle Plaine Community Center – 1309 5th Avenue

Transportation Systems

Highway 21
County Road E-66

Lifeline Utility Systems

City of Belle Plaine Water Treatment Plant – don't have one (treatment completed at the wells)
City of Belle Plaine City Wells (6 wells)
City of Belle Plaine Wastewater Treatment Plant – 7874 11th Avenue
City of Belle Plaine Public Works Department – 806 3rd Avenue

Vulnerable Population Centers (Schools, nursing homes, childcare facilities)

Belle Plaine Schools: High School/Junior High School (610 13th Avenue), and Longfellow Elementary School (707 7th Street)
Belle Plaine Nursing and Rehab – 1505 Sunset Drive

Financial Institutions

Chelsea Savings Bank – 601 13th Street
MidWestOne Bank – 802 13th Street

Food Supplier

Country Foods – 1206 7th Avenue
Dollar General – 1406 Sunset Drive
Town & Country Wholesale – 1102 12th Street

Hardware Stores

True Value Hardware – 827 12th Street

Gas & Fuel

Grieder Standard – 701 13th Street
Zip Mart – 702 13th Street
Casey's General Store – 606 13th Street

Prescription Drug Suppliers

Hartig Drug – 810 12th Street
Cornerstone Apothecary – 731 12th Street

Healthcare facilities

Belle Plaine Family Medicine/Unity Point Clinic – 105 9th Avenue
Accelerated Rehab Center – 509 13th Street, Suite D
Walter Family Chiropractic, 502 8th Street
Belle Plaine Chiropractic, 732 12th Street
Belle Plaine Dental: Bryon Palmer, DDS, 804 12th Street
DDS Iowa Valley Eye care, Dr. Patrick Fleming, 1010 8th Avenue

BLAIRSTOWN

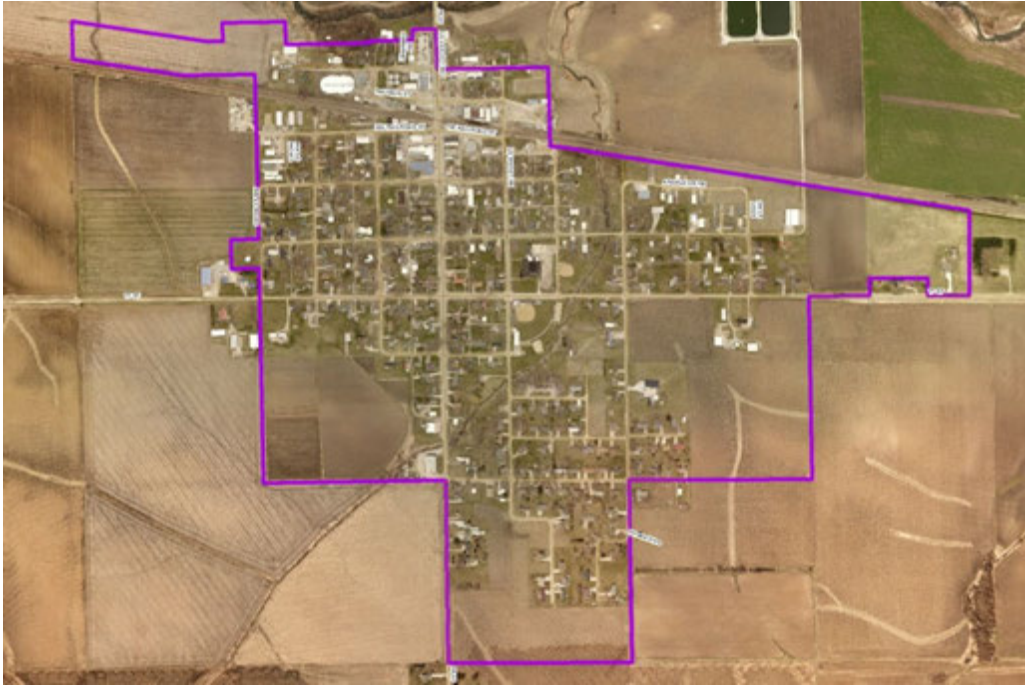


Figure 30: Blairstown in 2018

Blairstown is located at 41°54'25"N 92°5'0"W in sections 13, 14, 23 and 24 of Leroy Township in Benton County, Iowa. According to the United States Census Bureau, the city has a total area of 0.52 square miles (1.35 km²), all of it land.¹

Blairstown was established in 1860 when millionaire John I. Blair laid a railroad track for the Chicago, Iowa and Nebraska Railroad to the location that would become Blairstown. The first plat for the city was filed with the Benton County Recorder on May 13, 1862. At the close of that year the population of the city was 10 families. By the end of the Civil War in 1865 the city's population had swelled to 1,100.

As of the census of 2010, there were 692 people, 295 households, and 199 families residing in the city. The population density was 1,330.8 inhabitants per square mile (513.8/km²). There were 314 housing units at an average density of 603.8 per square mile (233.1/km²). The racial makeup of the city was 97.8% White, 0.7% African American, 0.1% Native American, 0.1% Asian, 1.0% from other races, and 0.1% from two or more races. Hispanic or Latino of any race were 4.3% of the population.

There were 295 households of which 33.2% had children under the age of 18 living with them, 53.2% were married couples living together, 7.1% had a female householder with no husband present, 7.1% had a male householder with no wife present, and 32.5% were non-families. 28.1% of all households were made up of individuals and 14.3% had someone living alone who was 65 years of age or older. The average household size was 2.35 and the average family size was 2.79. The median age in the city was 39 years. 25.7% of residents were under the age of 18; 7.1% were between the ages of 18 and 24; 25.6% were from 25 to 44; 24.7% were from 45 to 64; and 17.1% were 65 years of age or older. The gender makeup of the city was 50.1% male and 49.9% female.

In 2010 the median income for a household in the city was \$48,500, and the median income for a family was \$52,750. The per capita income for the city was \$22,858.

The City of Blirstown has 6 facilities worth a combined total of \$3,483,511. None of these structures are in a flood zone.

The City of Blirstown is part of the Benton Community School System. The city has a library, community center, volunteer fire department and its own ambulance service. The Union Pacific Railroad passes nearly 100 trains a day through the city. The city is served by Iowa Highway 82 and county roads E66 and V66 with traffic loads of 2,500 vehicles daily according to Iowa DOT statistics.

Figure 31: Blirstown Population Change 1960-2013

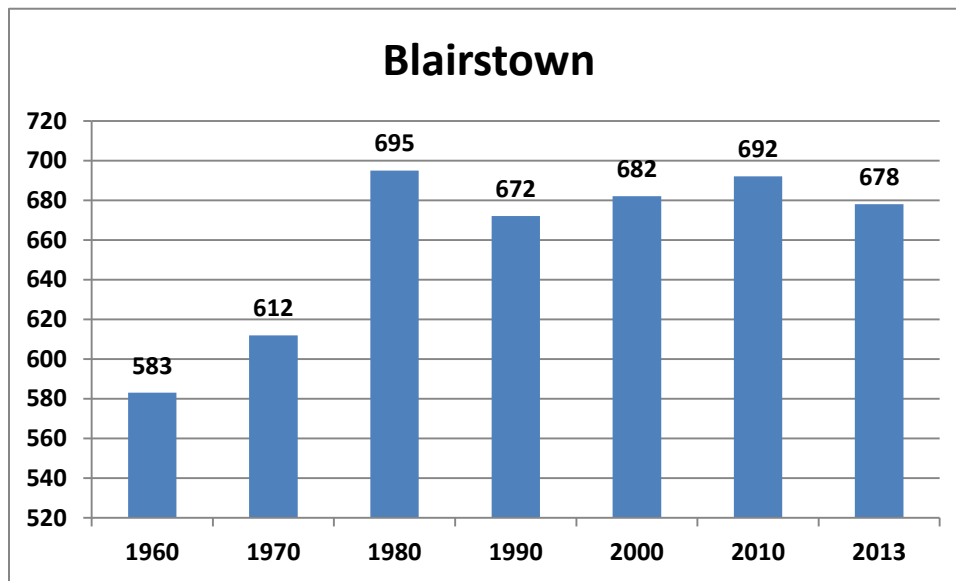


Table 27: Blirstown Population Change Statistics 1960-2010

Year	Population	Number Change (Linear Method)	Growth/Decline Rate (Geometric Method)
1960	583	n/a	n/a
1970	612	29	5%
1980	695	83	13.6%
1990	672	-23	-3.3%
2000	682	10	1.5%
2010	692	10	1.5%
Average (1960 - 2010)		109/5 = 22	18.3/5 = 3.7%

Table 28: Blirstown Projected Population Change 2020-2050

Year	Linear Projections	Geometric Projections
2020	714	718
2030	736	745
2040	758	773
2050	780	802

Table 29: Vulnerable Populations in the City of Blirstown; 2000 and 2010

Area	2000				2010			
	<18	%	>64	%	<18	%	>64	%
Blirstown	169	25	153	22	178	26	118	17
Benton County	6,924	27	3,902	15	5,781	22	4,015	15
Iowa	733,629	25	436,213	15	716,011	24	466,169	15

Government

The City of Blirstown is governed by a Mayor/Council form of government with five council members and a mayor, all of whom are elected. The city also has one part time city clerk, one full time public works employee, a part-time ambulance director, a librarian and assistant librarian.

Building Regulations

The City of Blirstown has various ordinances regulating development and building construction in the city. Chapters of the city's code relative to development and building construction include:

- Chapter 94 – Public Water Well Protection
- Chapter 145 – Dangerous Buildings
- Chapter 150 – Building Numbering
- Chapter 151 – Trees
- Chapter 155 – Building Code
- Chapter 157 – Storm Drainage
- Chapter 158 – Sign Code
- Chapter 160 – Flood Plain Regulations
- Chapter 165 –Zoning Regulations, including the Sign Code
- Chapter 166 – Subdivision Regulations

Streets

The City of Blainstown has approximately 40 blocks and 8 miles of streets. The street surfaces are seal coated and black top. The city's public works employee manages street care for the city.

Water And Water Treatment

Water supply for the City of Blainstown is supplied by two active wells with a capacity of 150 gallons per minute each. The wells are located at 106 ½ West Street. The city has one above ground water storage tower built in 2002 which holds a maximum of 150,000 gallons of water. The city's water treatment plant is also located at 106 ½ West Street and is a iron removal and chlorination system that has a capacity of 220,000 gallons per day. The City of Blainstown's public works employee is the city's Water Department.

Wastewater Treatment

The City of Blainstown has a three cell aerated lagoon system on the northeast corner of the city. The system was constructed in 1970 and has a capacity of 400,000 gallons per day. There is one lift station for the lagoon. The lift station has no emergency backup electrical power generator. The City of Blainstown's public works employee is the city's Wastewater Department.

Emergency Services

Law Enforcement

The City of Blainstown contracts for law enforcement services with the Benton County Sheriff's Office for coverage that is not to exceed 18 hours per week, or 936 hours per year. The Benton County Sheriff's Office, headquartered in Vinton, 25 miles away, maintains a staff of 43 people, 16 of whom are actively engaged in law enforcement activities.

Fire Department

The City of Blainstown receives fire protection from the Blainstown Fire Department. The department is staffed with 18 volunteers and maintains a fleet of five vehicles for firefighting and rescue operations. The department averages 25 alarms per year in the city and the surrounding rural district comprising 70 square miles. The fire departments in Benton County have formed a county-wide mutual aid agreement, making the services of an additional 13 fire departments available to the city in the event of a major fire or emergency.

Emergency Medical Services

Emergency medical service for the City of Blainstown is provided by the Blainstown Ambulance Service. The service is the initial primary emergency medical service provider for the 70 square mile area Blainstown Fire District. The service also provides emergency medical response to neighboring communities and surrounding rural areas for the communities of Norway, Watkins, Luzerne and Newhall in southern Benton County. The provisional paramedic level service is staffed with 25 volunteers trained to the Emergency Medical Technicians or Paramedic level. The service has a part-time paid director and responds to an average of 175 calls for service a year.

Utilities

Natural Gas Provider: Alliant Energy
 Electricity: Alliant Energy
 Telecommunications: Coon Creek Telephone Co.
 Cable TV: Coon Creek Telephone Co.

Business And Industry

The City of Blainstown is home to fifteen (15) businesses and no industries. Rabe Hardware is the city's largest employer with 15 employees. Other largest employers in the city are Heartland Coop Feed and Grain, O'grady Chemical and Fertilizer and Stoney Creek Marble Products

Employment

Employed civilian population 16 years and over		
OCCUPATION	Number	%
Civilian employed population 16 years and over	390	390
Management, business, science, and arts occupations	52	13.3%
Service occupations	46	11.8%
Sales and office occupations	86	22.1%
Natural resources, construction, and maintenance occupations	89	22.8%
Production, transportation, and material moving occupations	117	30.0%
INDUSTRY		
Civilian employed population 16 years and over	390	390
Agriculture, forestry, fishing and hunting, and mining	62	15.9%
Construction	21	5.4%
Manufacturing	121	31.0%
Wholesale trade	13	3.3%
Retail trade	46	11.8%
Transportation and warehousing, and utilities	15	3.8%
Information	1	0.3%
Finance and insurance, and real estate and rental and leasing	19	4.9%
Professional, scientific, and management, and administrative and waste management services	25	6.4%
Educational services, and health care and social assistance	31	7.9%
Arts, entertainment, and recreation, and accommodation and food services	14	3.6%
Other services, except public administration	19	4.9%
Public administration	3	0.8%

Table 30: Blainstown Civilian Population Employment 2010. From the US Census Bureau

Critical Facilities

Critical facilities are those structures and infrastructure that the community places a priority on protecting. Damage to these facilities can impact the delivery of vital services, cause greater damages to other sections of the community, or can put special, vulnerable populations at risk.

Facilities essential to the health and welfare of the entire population, especially following a hazard event:

Blairstown City Hall: 305 Locust St NW

Blairstown Fire Station: 109 Spruce St NW

Emergency Shelters

Blairstown Community Building: 305 Locust St NW

Blairstown American Legion Hall: 102 Benton St NE

Blairstown Fire Station: 109 Spruce St NW

Transportation Systems

Highway 82

County Roads E-66 and V-66

Lifeline Utility Systems

City of Blairstown Water Treatment Plant: 106 1/2 West St

City of Blairstown City Wells: 106 1/2 West St

City of Blairstown Wastewater Treatment Plant: NE of town

City of Blairstown Public Works Department

Financial Institutions

Benton County State Bank: 212 Locust ST NE

Food Supplier

Blairstown Quick Stop: 321 Locust ST NW

Hardware Stores

Rabe Hardware: 317 Locust St NW

Gas & Fuel

Kimm Oil Company: 604 Locust St NE

GARRISON

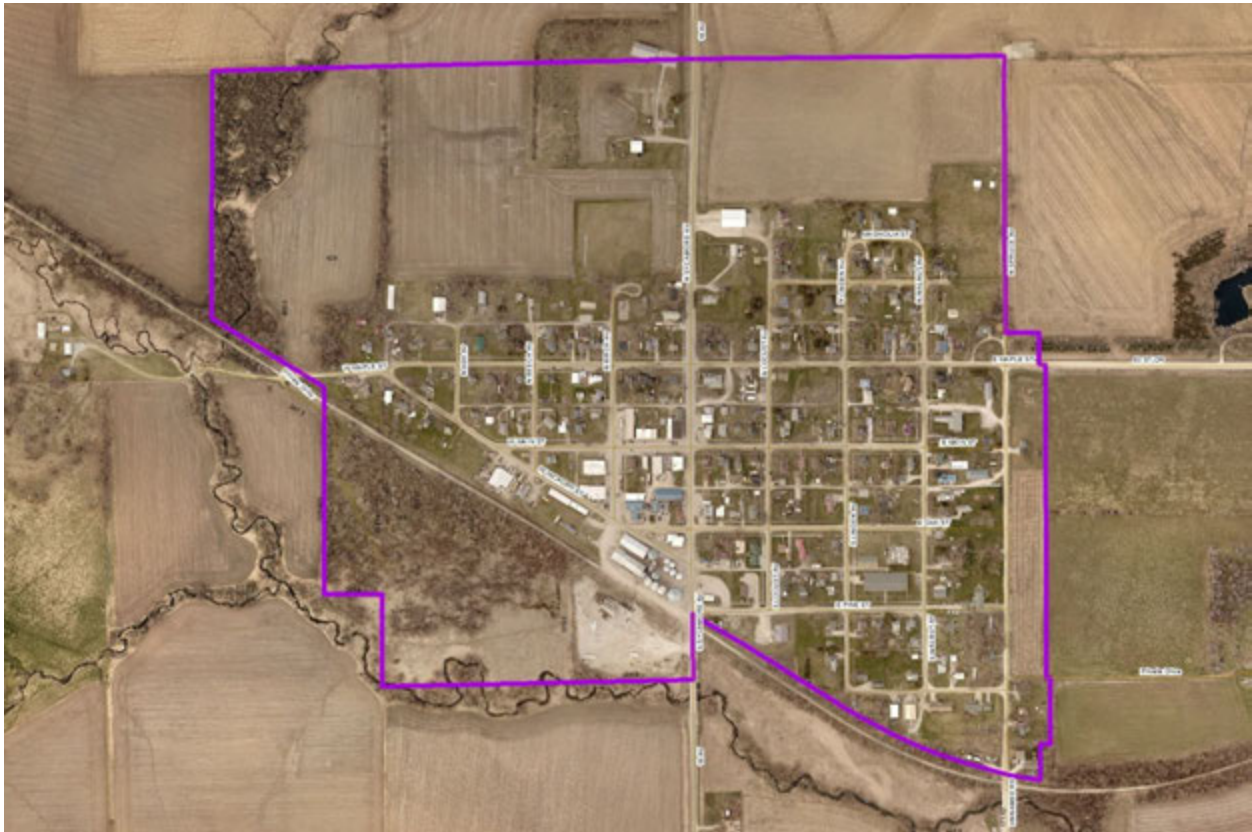


Figure 32: Garrison in 2018

Garrison, in central Benton County, is located at 42°8'37"N 92°8'35"W. According to the United States Census Bureau, the city has a total area of 0.25 square miles (0.65 km²), all of it land. The City of Garrison had its beginnings in 1873 when the town of Benton was laid out on the farm of Jonathon and Susan Barkdoll. In 1877 the town's name was changed to Garrison, in 1873 the railroad reached Garrison and the city was incorporated in 1880. In 1911 a three block area, nearly the entire business district of the city was destroyed by fire and in 1961 a tornado struck the city and killed two people at the Methodist Church. On July 11, 2011 a Derecho Wind Storm caused extensive damage to the entire city, destroying city's library and Emergency Services Building. Both the library and the Emergency Services Building have been rebuilt.

Garrison had a population of 371 people as of the census of 2010. According to the Census Bureau, the city has 145 households, and 99 families living in a total area of 0.25 square miles. The population density was 1,484.0 inhabitants per square mile (573.0/km²). There were 166 housing units at an average density of 664.0 per square mile (256.4/km²). The racial makeup of the city was 96.2% White, 1.1% African American, 0.3% from other races, and 2.4% from two or more races. Hispanic or Latino of any race were 1.6% of the population.

There were 145 households of which 34.5% had children under the age of 18 living with them, 50.3% were married couples living together, 11.7% had a female householder with no husband present, 6.2%

had a male householder with no wife present, and 31.7% were non-families. 22.8% of all households were made up of individuals and 11% had someone living alone who was 65 years of age or older. The average household size was 2.56 and the average family size was 2.90.

The median age in the city was 40.3 years. 24.5% of residents were under the age of 18; 8.7% were between the ages of 18 and 24; 24.3% were from 25 to 44; 29.1% were from 45 to 64; and 13.5% were 65 years of age or older. The gender makeup of the city was 47.4% male and 52.6% female

In 2010 the median income for a household in the city was \$55,000, and the median income for a family was \$47,083. The per capita income for the city was \$21,581.

The City of Garrison has 6 facilities worth a combined total of \$1,525,000. None of these structures are in a flood zone.

Figure 33: Garrison Population Change 1960-2013

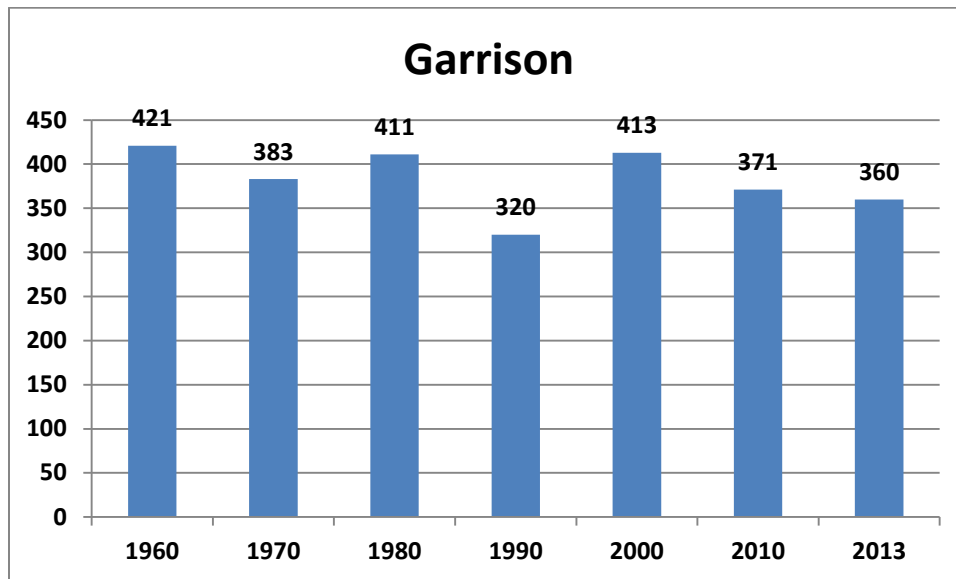


Table 31: Garrison Population Change Statistics 1960-2010

Year	Population	Number Change (Linear Method)	Growth/Decline Rate (Geometric Method)
1960	421	n/a	n/a
1970	383	-38	-9%
1980	411	28	7.3%
1990	320	-91	-22.1%
2000	413	93	29.1%
2010	371	-42	-10.2%
Average (1960 - 2010)		-50/5 = -10	-4.9/5 = 1%

Table 32: Garrison Projected Population Change 2020-2050

Year	Linear Projections	Geometric Projections
2020	361	367
2030	351	363
2040	341	359
2050	331	355

Table 33: Vulnerable Populations in the City of Garrison; 2000 and 2010

Area	2000				2010			
	<18	%	>64	%	<18	%	>64	%
Garrison	118	29	48	12	91	24	50	13
Benton County	6,924	27	3,902	15	5,781	22	4,015	15
Iowa	733,629	25	436,213	15	716,011	24	466,169	15

Government

The City of Garrison is governed by a Mayor/Council form of government with five council members and a mayor, all of whom are elected. The city also has one part time city clerk, one part-time public works employee and a part-time librarian.

Building Regulations

The City of Garrison has various ordinances regulating development and building construction in the city. Chapters of the city's code relative to development and building construction include:

- Chapter 145 – Dangerous Buildings
- Chapter 147 – Public Water Well Protection
- Chapter 150 – Building Numbering
- Chapter 151 – Trees
- Chapter 155 – Building Code
- Chapter 157 – Storm Drainage
- Chapter 158 – Sign Code
- Chapter 165 –Zoning Regulations, including the Sign Code

Streets

The City of Garrison has approximately 20 blocks and 6 miles of streets. The street surfaces are gravel, seal coated and black top. The city's public works employee manages street care for the city.

Water And Water Treatment

Water supply for the City of Garrison is supplied by one active well with a capacity of 120 gallons per minute. The well is located on North Locust Street. There is another reserve well which can be used in an emergency. The city has one above ground water storage tower built in 1940 which holds a maximum of 40,000 gallons of water. The city's water treatment plant is also located on North Locust Street and is an iron removal and chlorination system that has a capacity of 120 gallons per minute. The City of Garrison's public works employee is the city's Water Department.

Wastewater Treatment

The City of Garrison has an aerated lagoon system located southeast of the city along County Road E22. The City of Garrison's public works employee is the city's Wastewater Department.

Emergency Services

Law Enforcement

The City of Garrison contracts for law enforcement services with the Benton County Sheriff's Office for coverage that is not to exceed 2 hours per week, or 104 hours per year. The Benton County Sheriff's Office, headquartered in Vinton, 25 miles away, maintains a staff of 43 people, 16 of whom are actively engaged in law enforcement activities.

Fire Department

The City of Garrison receives fire protection from the Garrison Volunteer Fire Department. The department is staffed with 25 volunteers and maintains a fleet of three vehicles for firefighting and rescue operations. The department averages 20 alarms per year in the city and the surrounding rural district comprising 54 square miles. The fire departments in Benton County have formed a county-wide mutual aid agreement, making the services of an additional 13 fire departments available to the city in the event of a major fire or emergency. The Garrison Fire Department also has an automatic aid agreement with the Cedar/Mt. Auburn Fire Department to the north.

Emergency Medical Services

Emergency medical service for the City of Garrison is provided by the Garrison First Responders. The service is the initial primary emergency medical service provider for the 54 square mile area Garrison Fire District. The service is non-transport and averages 30 calls per year. It is staffed with 10 volunteers variously trained from first responder through paramedic levels. Transport services are provided by the Dysart and North Benton Ambulance Services.

Utilities

Natural Gas Provider: Northern Natural Gas
 Electricity: Alliant Energy
 Telecommunications: Keystone Communications
 Cable TV: Keystone Communications

Business And Industry

The City of Garrison is home to 5 businesses and industries. J&R Enterprises with 5 employees is the city's largest employer.

Employment

Employed civilian population 16 years and over		
OCCUPATION	Number	%
Civilian employed population 16 years and over	169	169
Management, business, science, and arts occupations	30	17.8%
Service occupations	33	19.5%
Sales and office occupations	26	15.4%
Natural resources, construction, and maintenance occupations	27	16.0%
Production, transportation, and material moving occupations	53	31.4%
INDUSTRY		
Civilian employed population 16 years and over	169	169
Agriculture, forestry, fishing and hunting, and mining	8	4.7%
Construction	13	7.7%
Manufacturing	29	17.2%
Wholesale trade	8	4.7%
Retail trade	19	11.2%
Transportation and warehousing, and utilities	8	4.7%
Information	3	1.8%
Finance and insurance, and real estate and rental and leasing	6	3.6%
Professional, scientific, and management, and administrative and waste management services	6	3.6%
Educational services, and health care and social assistance	51	30.2%
Arts, entertainment, and recreation, and accommodation and food services	5	3.0%
Other services, except public administration	8	4.7%
Public administration	5	3.0%

Table 34: Garrison Civilian Population Employment 2010. From the US Census Bureau

Critical Facilities

Critical facilities are those structures and infrastructure that the community places a priority on protecting. Damage to these facilities can impact the delivery of vital services, cause greater damages to other sections of the community, or can put special, vulnerable populations at risk. The Planning Committee identified the following critical facilities:

Facilities essential to the health and welfare of the entire population, especially following a hazard event:

Garrison Emergency Service's Building	205 North Sycamore Avenue
Garrison City Office	201 East Pine Street
Garrison Public Works Building	109 South Birch Street
Emergency Shelters	
Garrison Emergency Service's Building—205 N. Sycamore Avenue	
St. Mark's Lutheran Church—101 N. Walnut St.	

Transportation Systems

Highway 198

Lifeline Utility Systems

City of Garrison Water Treatment Plant—204 N. Locust St.
City of Garrison City Wells—204 N. Locust St.
City of Garrison Wastewater Treatment Plant—500 South Spruce Ave.
City of Garrison Public Works Department—109 South Birch St.
City of Garrison Lift Station 6085 18th Avenue Drive

Vulnerable Population Centers

Kozy Kountry--Apartments 300 E. Pine St.

Financial Institutions

None

Food Supplier

Hitchin Post—202 S. Sycamore Avenue

Hardware Stores

None

Gas & Fuel

FS Fuel Stop—Highway 198 South

KEYSTONE

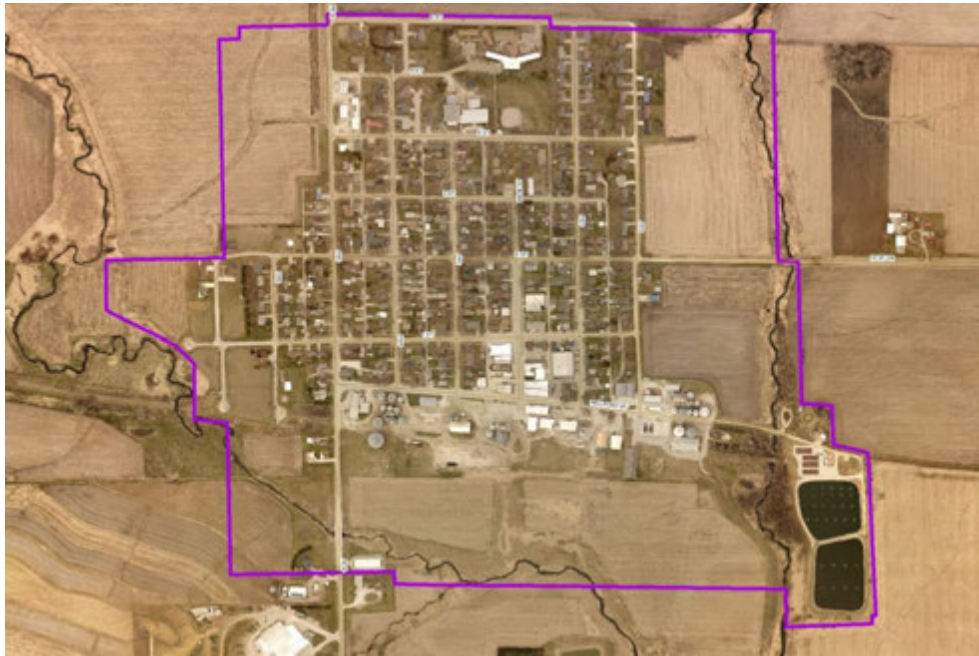


Figure 34: Keystone in 2018

Keystone is located at 42°00'03"N 92°11'55"W in sections 13 and 14 of Kane Township in Benton County, Iowa. According to the United States Census Bureau, the city has a total area of 0.45 square miles (1.17 km²), all of it land. The City was established in 1881 with the arrival of the Milwaukee and St. Paul Railroad that brought supplies to a pioneer settlement at the location. The city was incorporated in January, 1884.

As of the census of 2010, there were 622 people, 250 households, and 165 families residing in the city. The population density was 1,382.2 inhabitants per square mile (533.7/km²). There were 280 housing units at an average density of 622.2 per square mile (240.2/km²). The racial makeup of the city was 99.2% White, 0.5% Native American, 0.2% Asian, and 0.2% from two or more races. Hispanic or Latino of any race were 0.6% of the population.

There were 250 households of which 30.8% had children under the age of 18 living with them, 53.2% were married couples living together, 8.8% had a female householder with no husband present, 4.0% had a male householder with no wife present, and 34.0% were non-families. 32.0% of all households were made up of individuals and 20.4% had someone living alone who was 65 years of age or older. The average household size was 2.34 and the average family size was 2.93.

The median age in the city was 42.8 years. 24% of residents were under the age of 18; 5.9% were between the ages of 18 and 24; 23% were from 25 to 44; 22.7% were from 45 to 64; and 24.4% were 65 years of age or older. The gender makeup of the city was 45.0% male and 55.0% female

The median income for a household in the city was \$58,030, and the median income for a family was \$67,500. The per capita income for the city was \$27,620.

The City of Keystone has 15 facilities worth a combined total of \$3,224,919. None of these structures are in a flood zone.

As of the development of this plan the City of Keystone has a vibrant business climate and strong sense of community amongst its citizens. The Keystone Turners is a very prominent faction of the community. The community has a public library, volunteer fire department and a first responder EMS contingent.

Figure 35: Keystone Population Change 1960-2013

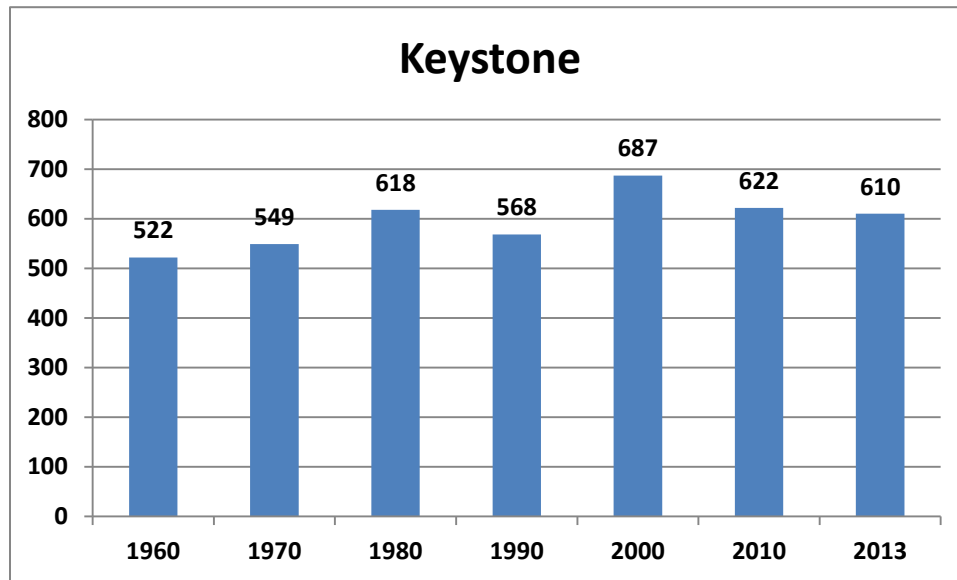


Table 35: Keystone Population Change Statistics 1960-2010

Year	Population	Number Change (Linear Method)	Growth/Decline Rate (Geometric Method)
1960	522	n/a	n/a
1970	549	27	5.2%
1980	618	69	12.6%
1990	568	-50	-8.1%
2000	687	119	21%
2010	622	-65	-9.5%
Average (1960 - 2010)		$100/5 = 20$	$21.2/5 = 4.2\%$

Table 36: Keystone Projected Population Change 2020-2050

Year	Linear Projections	Geometric Projections
2020	642	648
2030	662	675
2040	682	703
2050	702	732

Table 37: Vulnerable Populations in the City of Keystone; 2000 and 2010

Area	2000				2010			
	<18	%	>64	%	<18	%	>64	%
Keystone	193	28	170	25	149	24	152	24
Benton County	6,924	27	3,902	15	5,781	22	4,015	15
Iowa	733,629	25	436,213	15	716,011	24	466,169	15

Government

The City of Keystone is governed by a Mayor/Council form of government with five council members and a mayor, all of whom are elected. The city also has one part time city clerk, one full time public works employee, a librarian and assistant librarian.

Building Regulations

The City of Keystone has various ordinances regulating development and building construction in the city. Chapters of the city's code relative to development and building construction include:

- Chapter 145 – Dangerous Buildings
- Chapter 147 – Public Water Well Protection
- Chapter 150 – Trees
- Chapter 155 – Building and Land Use Regulations
- Chapter 97 – Storm Drainage—Use of public sewers

Streets

The City of Keystone has approximately 28 blocks and 8 miles of streets. The street surfaces are seal coated and black top. The city's public works employee manages street care for the city.

Water And Water Treatment

Water supply for the City of Keystone is supplied by two active wells with a capacity of 120 gallons per minute each. The wells are located at 403 2nd Street and 111 6th Avenue. The city has one above ground water storage tower built in 2007 which holds a maximum of 150,000 gallons of water. The city's water treatment plant is also located at 403 2nd Street and is an iron removal and chlorination system that has

a capacity of 120 gallons per minute. The City of Keystone's public works employee is the city's Water Department.

Wastewater Treatment

The City of Keystone has an aerated lagoon system at 90 Railroad Street. The system was constructed in 2003 and has a capacity of 400,000 gallons per day. The City of Keystone's public works employee is the city's Wastewater Department.

Emergency Services

Law Enforcement

The City of Keystone contracts for law enforcement services with the Benton County Sheriff's Office for coverage that is not to exceed 5 hours per week, or 260 hours per year. The Benton County Sheriff's Office, headquartered in Vinton, 25 miles away, maintains a staff of 43 people, 16 of whom are actively engaged in law enforcement activities.

Fire Department

The City of Keystone receives fire protection from the Keystone Volunteer Fire Department. The department is staffed with 14 volunteers and maintains a fleet of five vehicles for firefighting and rescue operations. The department averages 30 alarms per year in the city and the surrounding rural district comprising 70 square miles. The fire departments in Benton County have formed a county-wide mutual aid agreement, making the services of an additional 13 fire departments available to the city in the event of a major fire or emergency.

Emergency Medical Services

Emergency medical service for the City of Keystone is provided by the Keystone First Responders. The service is the initial primary emergency medical service provider for the 70 square mile area Keystone Fire District. The service is non-transport and averages 100 calls per year. Transport services are provided by the Belle Plaine Ambulance Service.

Utilities

Natural Gas Provider: Alliant Energy

Electricity: Alliant Energy

Telecommunications: Keystone Communications

Cable TV: Keystone Communications

Business And Industry

The City of Keystone is home to 25 businesses and industries. The Keystone Nursing Care Center is the city's largest employer with 125 employees. Other large employers in the city are ADM, O'Grady Chemical, P & K Midwest and Benton Community Schools Keystone Elementary Center.

Employment

Employed civilian population 16 years and over		
OCCUPATION	Number	%
Civilian employed population 16 years and over	336	336
Management, business, science, and arts occupations	86	25.6%
Service occupations	73	21.7%
Sales and office occupations	90	26.8%
Natural resources, construction, and maintenance occupations	24	7.1%
Production, transportation, and material moving occupations	63	18.8%
INDUSTRY		
Civilian employed population 16 years and over	336	336
Agriculture, forestry, fishing and hunting, and mining	17	5.1%
Construction	21	6.3%
Manufacturing	45	13.4%
Wholesale trade	9	2.7%
Retail trade	38	11.3%
Transportation and warehousing, and utilities	22	6.5%
Information	18	5.4%
Finance and insurance, and real estate and rental and leasing	19	5.7%
Professional, scientific, and management, and administrative and waste management services	28	8.3%
Educational services, and health care and social assistance	82	24.4%
Arts, entertainment, and recreation, and accommodation and food services	27	8.0%
Other services, except public administration	6	1.8%
Public administration	4	1.2%

Table 38: Keystone Civilian Population Employment 2010. From the US Census Bureau

Critical Facilities

Critical facilities are those structures and infrastructure that the community places a priority on protecting. Damage to these facilities can impact the delivery of vital services, cause greater damages to other sections of the community, or can put special, vulnerable populations at risk. The Planning Committee identified the following critical facilities:

Facilities essential to the health and welfare of the entire population, especially following a hazard event:

Keystone City Hall 208 1st Street
 Keystone Fire Station 208 1st Street
 Emergency Shelters
 Keystone Turner Hall 91 2nd Avenue
 St. John's Lutheran Church 201 4th Avenue

Transportation Systems
 County Road V42

Lifeline Utility Systems

City of Keystone Water Treatment Plant 403 4th Avenue
City of Keystone City Wells 403 2nd Street and 111 6th Avenue
City of Keystone Wastewater Treatment Plant 90 Railroad Street
City of Keystone Public Works Department 214 Railroad Street

Vulnerable Population Centers

Benton Community Elementary School—Keystone Center 280 4th Street
Keystone Care Center 250 5th Street
Keystone Care Center—Senior Suites 250 5th Street
Parkview Apartments 300 5th Street

Financial Institutions

Keystone Savings Bank 81 Main Street

Food Supplier

Keystone Mini Mart 407 5th Avenue
Keystone Turner Hall 91 2nd Avenue

Hardware Stores

Pippert Hardware 91 Main Street

Gas & Fuel

Keystone Mini Mart 407 5th Avenue

LUZERNE



Figure 36: Luzerne in 2018

Luzerne is located at 41°54'22"N 92°10'49"W. According to the United States Census Bureau, the city has a total area of 0.12 square miles (0.31 km²), all of it land. The city is the smallest incorporated city of Benton County and is located in sections 13 and 24 of Iowa Township and sections 18 and 19 of Leroy Township. The city traces its first records of settlement to 1856. Its plat was recorded and the city was officially incorporated on April 17, 1868. By 1869 the town had grown to 40 buildings, including a church and school house. The city's "parentage" is owed to the Chicago and Northwestern Railway Company which struck a line through the area in the 1867. The rail line today is a very active line of the Union Pacific Railroad that passes through the center of the city.

As of the census of 2010, there were 96 people, 34 households, and 26 families residing in the city. The population density was 800.0 inhabitants per square mile (308.9/km²). There were 38 housing units at an average density of 316.7 per square mile (122.3/km²). The racial makeup of the city was 91.7% White, 2.1% African American, 4.2% from other races, and 2.1% from two or more races. Hispanic or Latino of any race was 5.2% of the population.

There were 34 households of which 47.1% had children under the age of 18 living with them, 47.1% were married couples living together, 20.6% had a female householder with no husband present, 8.8% had a male householder with no wife present, and 23.5% were non-families. 20.6% of all households were made up of individuals and 8.8% had someone living alone who was 65 years of age or older. The average household size was 2.82 and the average family size was 3.08.

The median age in the city was 28.5 years. 32.3% of residents were under the age of 18; 9.5% were between the ages of 18 and 24; 25% were from 25 to 44; 25% were from 45 to 64; and 8.3% were 65 years of age or older. The gender makeup of the city was 53.1% male and 46.9% female.

The median income for a household in the city was \$52,500, and the median income for a family was \$53,500. The per capita income for the city was \$24,129.

The City of Luzerne has 2 facilities worth a combined total of \$309,067. Neither of these structures is in a flood zone.

Figure 37: Luzerne Population Change 1960-2013

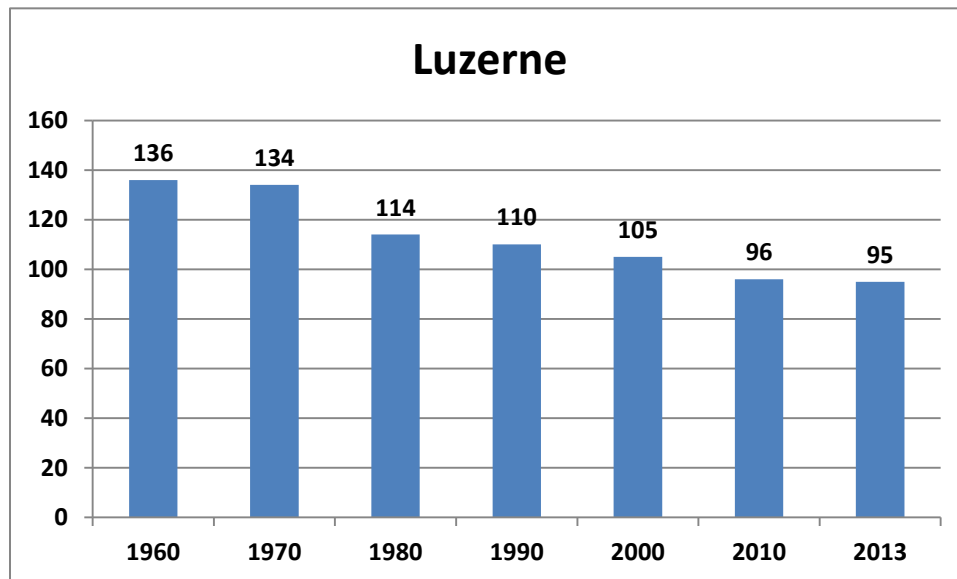


Table 39: Luzerne Population Change Statistics 1960-2010

Year	Population	Number Change (Linear Method)	Growth/Decline Rate (Geometric Method)
1960	135	n/a	n/a
1970	134	-1	-1%
1980	114	-20	-14.9%
1990	110	-4	-3.5%
2000	105	-5	-4.5%
2010	96	-9	-8.6%
Average (1960 - 2010)		$-39/5 = -8$	$-32.5/5 = 6.5\%$

Table 40: Luzerne Projected Population Change 2020-2050

Year	Linear Projections	Geometric Projections
2020	88	90
2030	80	84
2040	72	79
2050	64	74

Table 41: Vulnerable Populations in the City of Luzerne; 2000 and 2010

Area	2000				2010			
	<18	%	>64	%	<18	%	>64	%
Luzerne	35	33	17	16	18	19	8	8
Benton County	6,924	27	3,902	15	5,781	22	4,015	15
Iowa	733,629	25	436,213	15	716,011	24	466,169	15

Government

The City of Luzerne is governed by a Mayor/Council form of government with five council members and a mayor, all of whom are elected. The city also has a part-time city clerk, which is an appointed position. General operation of city services is conducted by one part-time public works employee and volunteer assistance when needed.

Building Regulations

The City of Luzerne has various ordinances regulating development and building construction in the city. Chapters of the city's code relative to development and building construction include:

Chapter 146 – Manufactured, Mobile and Modular Homes

Chapter 50 – Code for the Abatement of Unsafe Buildings and Equipment

The City of Luzerne also has a zoning ordinance

Streets

The City of Luzerne covers approximately a 10 block area and has 1.5 miles of streets all of which are seal coated. The city's part-time public works employee takes care of street maintenance for the city.

Water And Water Treatment

The City of Luzerne has no water treatment facility. All residents either have their own wells or receive water from the Poweshiek Rural Water Association headquartered at 125 Industrial Drive, Brooklyn, IA.

Wastewater Treatment

The City of Luzerne has no wastewater treatment facility. All residents have their own private septic systems.

Emergency Services

Law Enforcement

Law enforcement for the City of Luzerne contracts law enforcement services with the Benton County Sheriff's Office for coverage that is not to exceed .5 hours per week, or 26 hours per year. The Benton County Sheriff's Office, headquartered in Vinton, 25 miles away, maintains a staff of 43 people, 16 of whom are actively engaged in law enforcement activities.

Fire Department

The City of Luzerne receives fire protection from the Luzerne Fire Department. The department is staffed with 12 volunteers and maintains a fleet of three vehicles for firefighting and rescue operations. The department averages 3 alarms per year in the city and has no surrounding rural district. The fire departments in Benton County have formed a county-wide mutual aid agreement, making the services of an additional 13 fire departments available to the city in the event of a major fire or emergency.

Emergency Medical Services

Emergency medical service for the City of Luzerne is provided by the Belle Plaine and Blirstown Ambulance Services located four and five miles from the city respectively. Both services maintain a staff of volunteer EMS responders along with a paid director. The Belle Plaine service maintains two ambulances. The Blirstown ambulance service has one ambulance.

Utilities

There is no natural gas service to the City of Luzerne.

Electricity is provided by Alliant Energy.

Telephone, Cable TV and Internet provider is provided by resident's personal choice.

Business and Industry

The City of Luzerne is home to six (6) businesses. The Heartland Co-Op headquartered in West Des Moines, Iowa is the city's largest employer with 3 employees.

Employment

Employed civilian population 16 years and over		
OCCUPATION	Number	%
Civilian employed population 16 years and over	45	45
Management, business, science, and arts occupations	2	4.4%
Service occupations	16	35.6%
Sales and office occupations	6	13.3%
Natural resources, construction, and maintenance occupations	8	17.8%
Production, transportation, and material moving occupations	13	28.9%
INDUSTRY		
Civilian employed population 16 years and over	45	45
Agriculture, forestry, fishing and hunting, and mining	0	0.0%
Construction	3	6.7%
Manufacturing	12	26.7%
Wholesale trade	6	13.3%
Retail trade	0	0.0%
Transportation and warehousing, and utilities	1	2.2%
Information	0	0.0%
Finance and insurance, and real estate and rental and leasing	0	0.0%
Professional, scientific, and management, and administrative and waste management services	0	0.0%
Educational services, and health care and social assistance	10	22.2%
Arts, entertainment, and recreation, and accommodation and food services	0	0.0%
Other services, except public administration	10	22.2%
Public administration	3	6.7%

Table 42: Luzerne Civilian Population Employment 2010. From the US Census Bureau

CRITICAL FACILITIES

Critical facilities are those structures and infrastructure that the community places a priority on protecting. Damage to these facilities can impact the delivery of vital services, cause greater damages to other sections of the community, or can put special, vulnerable populations at risk. The Planning Committee identified the following critical facilities:

Facilities essential to the health and welfare of the entire population, especially following a hazard event:

St. Paul's Lutheran Church 107 Maple Street
 Luzerne Fire Station and City Hall 114 East Iowa Street
 Emergency Shelters
 St. Paul's Lutheran Church 107 Maple Street
 Luzerne Fire Station and City Hall 114 East Iowa Street

Transportation Systems

County Roads E66
 Union Pacific Rail Line

Lifeline Utility Systems

Poweshiek Rural Water Association 125 Industrial Drive, Brooklyn, IA
 City of Luzerne Public Works Department 114 East Iowa Street

Vulnerable Population Centers

Happy House Day Care 111 West Iowa Street

Financial Institutions None

Food Supplier None

Hardware Stores None

Gas & Fuel None

MOUNT AUBURN



Figure 38: Mount Auburn in 2018

Mount Auburn is located at 42°15'26"N 92°5'34"W in Cedar Township in northern Benton County. According to the United States Census Bureau, the city has a total area of 0.28 square miles (0.73 km²), all of it land. The first plat for town was recorded on June 19, 1871. In 1875 there were 400 residents.

As of the census of 2010, there were 150 people, 64 households, and 44 families residing in the city. The population density was 535.7 inhabitants per square mile (206.8/km²). There were 68 housing units at an average density of 242.9 per square mile (93.8/km²). The racial makeup of the city was 98.0% White, 1.3% Native American, and 0.7% from two or more races. Hispanic or Latino of any race were 0.7% of the population.

There were 64 households of which 31.3% had children under the age of 18 living with them, 60.9% were married couples living together, 4.7% had a female householder with no husband present, 3.1% had a male householder with no wife present, and 31.3% were non-families. 26.6% of all households were made up of individuals and 12.6% had someone living alone who was 65 years of age or older. The average household size was 2.34 and the average family size was 2.89.

The median age in the city was 35 years. 24% of residents were under the age of 18; 9.3% were between the ages of 18 and 24; 22% were from 25 to 44; 28.7% were from 45 to 64; and 16% were 65 years of age or older. The gender makeup of the city was 54.0% male and 46.0% female.

The median income for a household in the city was \$40,000, and the median income for a family was \$57,500. The per capita income for the city was \$29,462.

The City of Mt. Auburn has 4 facilities worth a combined total of \$1,110,000. None of these structures is in a flood zone.

Figure 39: Mt. Auburn Population Change 1960-2013

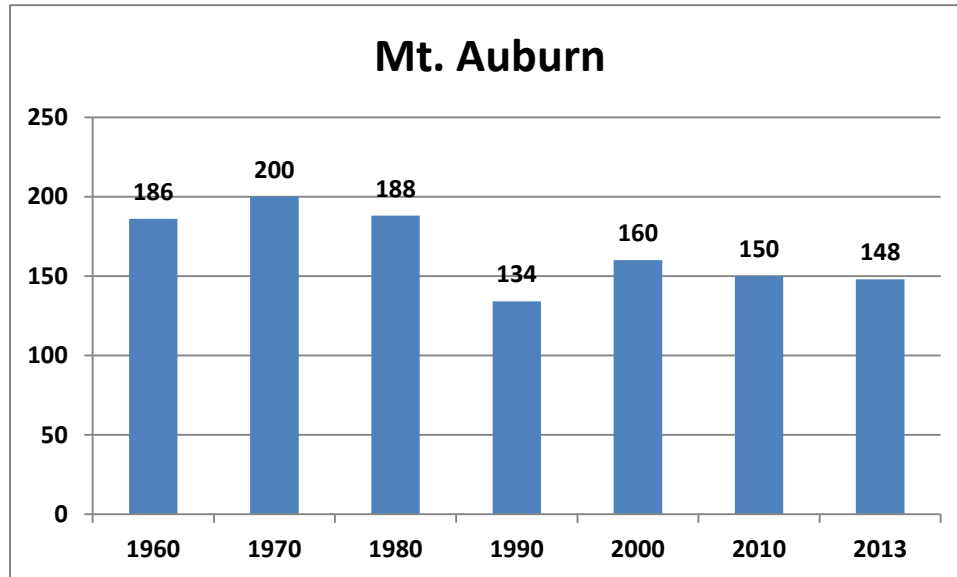


Table 43: Mt. Auburn Population Change Statistics 1960-2010

Year	Population	Number Change (Linear Method)	Growth/Decline Rate (Geometric Method)
1960	186	n/a	n/a
1970	200	14	7.5%
1980	188	-12	-6%
1990	134	-54	-28.7%
2000	160	26	19.4%
2010	150	-10	-6.3%
Average (1960 - 2010)		-36/5 = -7	-14.1/5 = -2.8%

Table 44: Mt. Auburn Projected Population Change 2020-2050

Year	Linear Projections	Geometric Projections
2020	143	146
2030	136	142
2040	129	138
2050	122	134

Table 45: Vulnerable Populations in the City of Mt. Auburn; 2000 and 2010

Area	2000				2010			
	<18	%	>64	%	<18	%	>64	%
Mt. Auburn	39	24	31	19	36	24	24	16
Benton County	6,924	27	3,902	15	5,781	22	4,015	15
Iowa	733,629	25	436,213	15	716,011	24	466,169	15

Government

The City of Mt. Auburn is governed by a Mayor/Council form of government with five council members and a mayor, all of whom are elected. The city also has one part time city clerk and one part time public works employee.

Building Regulations

The City of Mt. Auburn has various ordinances regulating development and building construction in the city. Chapters of the city's code relative to development and building construction include:

- Chapter 94 – Public Water Well Protection
- Chapter 145 – Dangerous Buildings
- Chapter 150 – Building Numbering
- Chapter 151 – Trees
- Chapter 155 – Building Code
- Chapter 157 – Storm Drainage
- Chapter 158 – Sign Code
- Chapter 165 –Zoning Regulations, including the Sign Code
- Chapter 166 – Subdivision Regulations

Streets

The City of Mt. Auburn has approximately 15 blocks and 3 miles of streets. The street surfaces are seal coated, black top and gravel. The city's public works employee manages street care for the city.

Water And Water Treatment

Water supply for the City of Mt. Auburn is supplied by two active wells with a capacity of 150 gallons per minute each. The city has one above ground water storage tower built in the 1980's which holds a maximum of 50,000 gallons of water. The city's water treatment plant is located on Hall Street and is a iron removal and chlorination system that has a capacity of 100,000 gallons per day. The City of Mt. Auburn's public works employee is the city's Water Department.

Wastewater Treatment

The City of Mt. Auburn has an aerated gravity fed lagoon system southeast of the city. The system was upgraded to add another cell in 2008 and has a capacity of 200,000 gallons per day. The City of Mt. Auburn's public works employee is the city's Wastewater Department.

Emergency Services

Law Enforcement

The City of Mt. Auburn contracts for law enforcement services with the Benton County Sheriff's Office for coverage that is not to exceed 2 hours per week, or 104 hours per year. The Benton County Sheriff's Office, headquartered in Vinton, 25 miles away, maintains a staff of 43 people, 16 of whom are actively engaged in law enforcement activities.

Fire Department

The City of Mt. Auburn receives fire protection from the Cedar/Mt. Auburn Fire & EMS Department. The department is staffed with 20 volunteers and maintains a fleet of three vehicles for firefighting, rescue and EMS operations. The department averages 12 alarms per year in the city and the surrounding rural district comprising 36 square miles. The fire departments in Benton County have formed a county-wide mutual aid agreement, making the services of an additional 13 fire departments available to the city in the event of a major fire or emergency.

Emergency Medical Services

Emergency medical service for the City of Mt. Auburn is provided by the North Benton Ambulance Service in Vinton, 8 miles away. The provisional paramedic level service is staffed with 15 volunteers and a full-time director trained to the Emergency Medical Technicians or Paramedic level. The service responds to over 1,000 calls for service a year.

Utilities

Natural Gas Provider: Alliant Energy

Electricity: Alliant Energy

Cable TV & internet is provided by the La Porte City Phone Company

Business And Industry

The City of Mt. Auburn is home to 1 business, Hendryx Electric. The business employs 5 part and full-time employees.

Employment

Employed civilian population 16 years and over		
OCCUPATION	Number	%
Civilian employed population 16 years and over	64	64
Management, business, science, and arts occupations	17	26.6%
Service occupations	6	9.4%
Sales and office occupations	17	26.6%
Natural resources, construction, and maintenance occupations	15	23.4%
Production, transportation, and material moving occupations	9	14.1%
INDUSTRY		
Civilian employed population 16 years and over	64	64
Agriculture, forestry, fishing and hunting, and mining	4	6.3%
Construction	9	14.1%
Manufacturing	3	4.7%
Wholesale trade	2	3.1%
Retail trade	7	10.9%
Transportation and warehousing, and utilities	10	15.6%
Information	0	0.0%
Finance and insurance, and real estate and rental and leasing	5	7.8%
Professional, scientific, and management, and administrative and waste management services	9	14.1%
Educational services, and health care and social assistance	9	14.1%
Arts, entertainment, and recreation, and accommodation and food services	4	6.3%
Other services, except public administration	2	3.1%
Public administration	0	0.0%

Table 46: Mt. Auburn Civilian Population Employment 2010. From the US Census Bureau

CRITICAL FACILITIES

Critical facilities are those structures and infrastructure that the community places a priority on protecting. Damage to these facilities can impact the delivery of vital services, cause greater damages to other sections of the community, or can put special, vulnerable populations at risk. The Planning Committee identified the following critical facilities:

Facilities essential to the health and welfare of the entire population, especially following a hazard event:

Mt. Auburn City Hall—203 2nd St.

Mt. Auburn Fire Station—203 2nd St.

Emergency Shelters

Mt. Auburn American Legion Hall—200 2nd St.

Cedar/Mt. Auburn Fire Station—203 2nd St.

Transportation Systems

County Road V-65

Lifeline Utility Systems

City of Mt. Auburn Water Treatment Plant—300 Hall St.

City of Mt. Auburn City Wells—300 Hall St.

City of Mt. Auburn Wastewater Treatment Plant

City of Mt. Auburn Public Works Department—301 2nd St.

Vulnerable Population Centers---None

Financial Institutions--None

Food Supplier--None

Hardware Stores--None

Gas & Fuel--None

NEWHALL

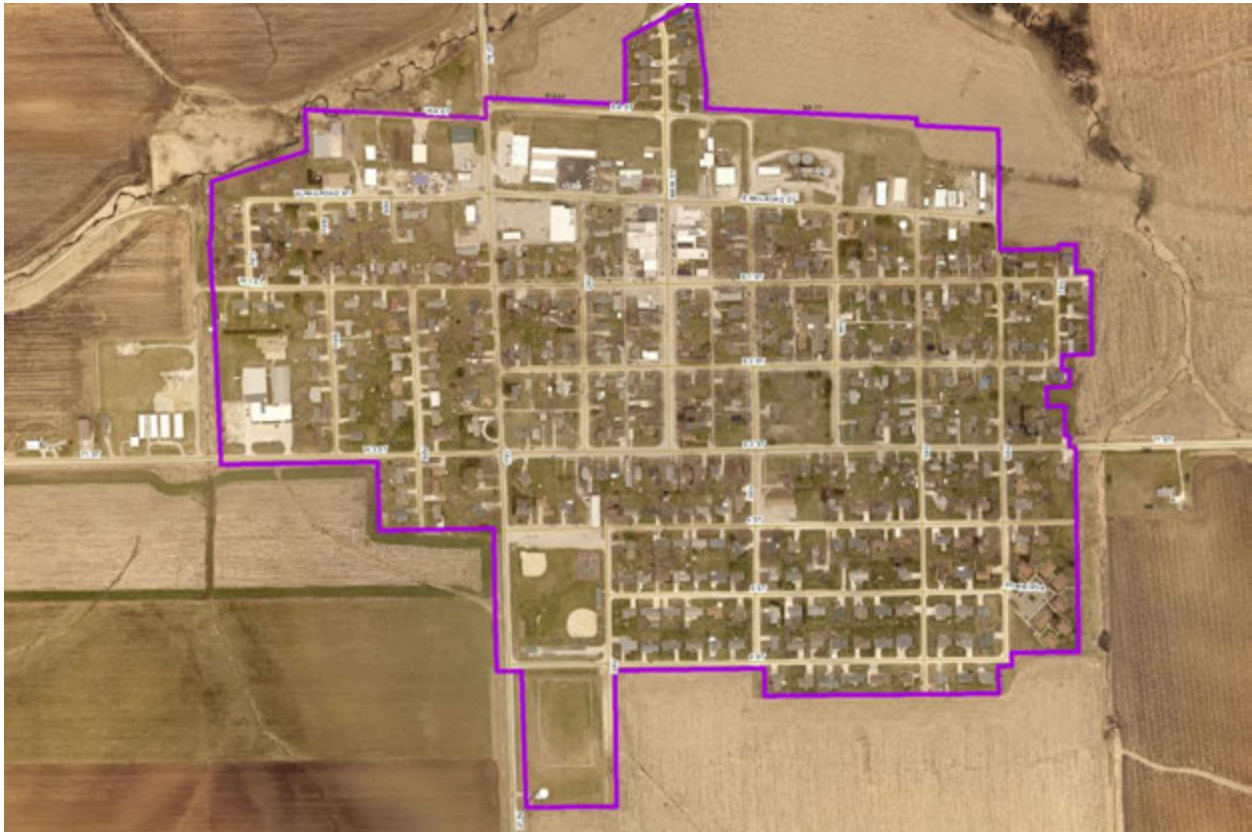


Figure 40: Newhall in 2018

Newhall is located at 41°59'38"N 91°57'59"W. According to the United States Census Bureau, the city has a total area of 0.32 square miles (0.83 km²), all of it land in sections 13, 14, 23 and 24 of Eldorado Township in Benton County. The town site of Newhall was settled in the summer of 1881 with the building of the Chicago, Milwaukee and St. Paul Railroad west from Marion, Iowa. Newhall grew rapidly and by March 1882 the town had four general stores, two blacksmith shops, lumberyards, one hardware store, an implement dealer, a hotel with a saloon and about 150 residences. The town was incorporated in 1912.

As of the census of 2010, there were 875 people, 353 households, and 254 families residing in the city. The population density was 2,734.4 inhabitants per square mile (1,055.8/km²). There were 376 housing units at an average density of 1,175.0 per square mile (453.7/km²). The racial makeup of the city was 98.3% White, 1.0% African American, 0.1% Native American, 0.3% Asian, and 0.2% from two or more races. Hispanic or Latino of any race were 1.0% of the population.

There were 353 households of which 33.7% had children under the age of 18 living with them, 60.6% were married couples living together, 7.9% had a female householder with no husband present, 3.4% had a male householder with no wife present, and 28.0% were non-families. 25.5% of all households were made up of individuals and 13.6% had someone living alone who was 65 years of age or older. The average household size was 2.48 and the average family size was 2.98.

The median age in the city was 39.7 years. 25.6% of residents were under the age of 18; 5.8% were between the ages of 18 and 24; 25.6% were from 25 to 44; 25.5% were from 45 to 64; and 17.5% were 65 years of age or older. The gender makeup of the city was 48.0% male and 52.0% female.

The median income for a household in the city was \$57,361, and the median income for a family was \$64,432. The per capita income for the city was \$27,073.

The City of Newhall has 22 facilities worth a combined total of \$3,850,051. None of these structures is in a flood zone.

Figure 41: Newhall Population Change 1960-2013

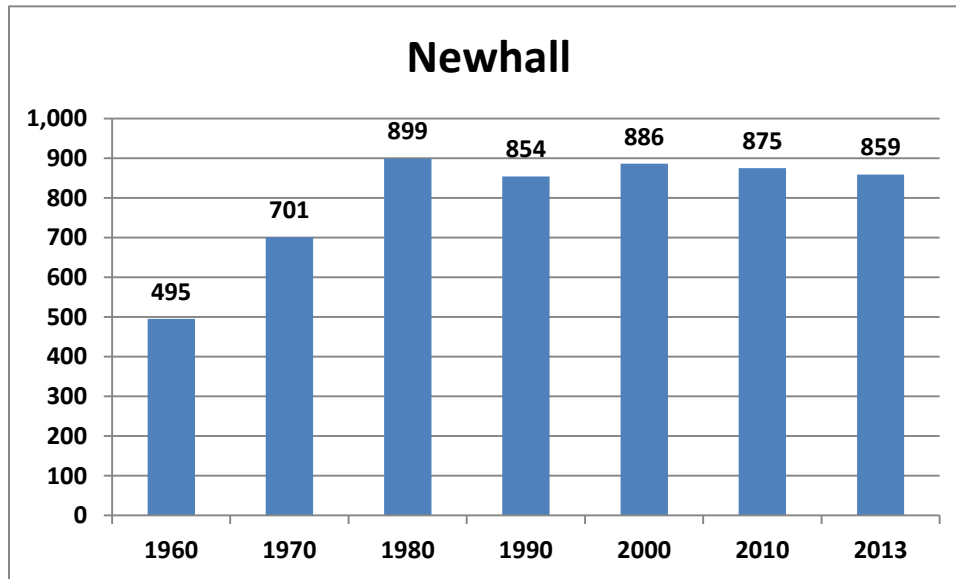


Table 47: Newhall Population Change Statistics 1960-2010

Year	Population	Number Change (Linear Method)	Growth/Decline Rate (Geometric Method)
1960	495	n/a	n/a
1970	701	206	41.6%
1980	899	198	28.2%
1990	854	-45	-5%
2000	886	32	3.7%
2010	875	-9	-1%
Average (1960 - 2010)		$380/5 = 76$	$67.5/5 = 13.5\%$

Table 48: Newhall Projected Population Change 2020-2050

Year	Linear Projections	Geometric Projections
2020	951	993
2030	1027	1127
2040	1103	1279
2050	1179	1452

Table 49: Vulnerable Populations in the City of Newhall; 2000 and 2010

Area	2000				2010			
	<18	%	>64	%	<18	%	>64	%
Newhall	241	27	186	21	224	26	153	17
Benton County	6,924	27	3,902	15	5,781	22	4,015	15
Iowa	733,629	25	436,213	15	716,011	24	466,169	15

Government

The City of Newhall is governed by a Mayor/Council form of government with five council members and a mayor, all of whom are elected. The city also has one full-time city clerk and two full time public works employees.

Building Regulations

The City of Newhall has various ordinances regulating development and building construction in the city. Chapters of the city's code relative to development and building construction include:

- Chapter 145 – Dangerous Buildings
- Chapter 150 – Building Numbering
- Chapter 151 – Trees
- Chapter 165 –Zoning Regulations, including the Sign Code
- Chapter 166 – Subdivision Regulations
- Building Code

Streets

The City of Newhall has approximately 57 blocks and 32 miles of streets. The street surfaces are seal coated, black top and gravel. The city's public works employees manage street care for the city.

Water And Water Treatment

Water supply for the City of Newhall is supplied by three active wells with a capacity of 105-135 gallons per minute each. The city has two above ground water storage tower tanks (one tower and one ground)

which holds a maximum of 250,000 gallons of water. The city's water treatment plant is located at 11 Fifth Avenue and has a capacity of 140,000 gallons per day. The City of Newhall's public works employees are the city's Water Department.

Wastewater Treatment

The City of Newhall has an aerated gravity fed lagoon system west of the city. The system has 6 cells with a capacity of up to 6 million gallons each. The City of Newhall's public works employees are the city's Wastewater Department.

Emergency Services

Law Enforcement

Law enforcement for the City of Newhall contracts law enforcement services with the Benton County Sheriff's Office for coverage that is not to exceed 15 hours per week. The Benton County Sheriff's Office, headquartered in Vinton, 15 miles away, maintains a staff of 43 people, 16 of whom are actively engaged in law enforcement activities.

Fire Department

The City of Newhall receives fire protection from the Newhall Fire and Rescue Department. The department is staffed with 27 volunteers and maintains a fleet of four vehicles for firefighting and rescue operations. The department averages 30 alarms per year in the city and the surrounding rural district. The fire departments in Benton County have formed a county-wide mutual aid agreement, making the services of an additional 12 fire departments available to the city in the event of a major fire or emergency.

Emergency Medical Services

Emergency medical service for the City of Newhall is provided by the Newhall First Responders, headquartered in the Newhall Fire and Rescue Department. The service is the initial primary emergency medical service provider for the 66 square mile area of the Newhall First Responder District. The service is staffed with fifteen volunteers all certified as emergency medical technician B's. The service responds to an average of 40 calls for service a year. Ambulance service to the Newhall First Responder District is provided by the Blainstown Ambulance Service in Blainstown and North Benton Ambulance Service in Vinton.

Utilities

Natural Gas: Alliant

Electricity: Alliant

Telephone: South Slope Cooperative Communications Company located in North Liberty, Iowa and Mediacom.

Cable TV: South Slope Cooperative Communications Company located in North Liberty, Iowa and Mediacom.

Business And Industry

The City of Newhall is home to 44 businesses and industries. The Central Lutheran School is the largest employer in the city.

Employment

Employed civilian population 16 years and over		
OCCUPATION	Number	%
Civilian employed population 16 years and over	388	388
Management, business, science, and arts occupations	113	29.1%
Service occupations	58	14.9%
Sales and office occupations	103	26.5%
Natural resources, construction, and maintenance occupations	59	15.2%
Production, transportation, and material moving occupations	55	14.2%
INDUSTRY		
Civilian employed population 16 years and over	388	388
Agriculture, forestry, fishing and hunting, and mining	6	1.5%
Construction	32	8.2%
Manufacturing	62	16.0%
Wholesale trade	26	6.7%
Retail trade	40	10.3%
Transportation and warehousing, and utilities	16	4.1%
Information	19	4.9%
Finance and insurance, and real estate and rental and leasing	38	9.8%
Professional, scientific, and management, and administrative and waste management services	18	4.6%
Educational services, and health care and social assistance	67	17.3%
Arts, entertainment, and recreation, and accommodation and food services	13	3.4%
Other services, except public administration	20	5.2%
Public administration	31	8.0%

Table 50: Newhall Civilian Population Employment 2010. From the US Census Bureau.

CRITICAL FACILITIES

Critical facilities are those structures and infrastructure that the community places a priority on protecting. Damage to these facilities can impact the delivery of vital services, cause greater damages to other sections of the community, or can put special, vulnerable populations at risk. The Planning Committee identified the following critical facilities:

Facilities essential to the health and welfare of the entire population, especially following a hazard event:

Newhall City Hall 11--2nd Avenue
 Newhall Fire Station 220 Railroad St
 Newhall Public Works Building 13—2nd Avenue
 Emergency Shelters
 Newhall Park Pavilion 206 3rd Avenue
 Newhall Fire Station 220 Railroad St

Transportation Systems

County Road E44
County Road W14
State Highway 287

Lifeline Utility Systems

Water Treatment Plant
City Wells
Wastewater Treatment Plant
Public Works Department

Vulnerable Population Centers

Country View Apartments 500 6th Avenue
Central Lutheran School 10 3rd Street W
Privatized child care providers

Financial Institutions

Wells Fargo Bank- 32 Main Street

Food Supplier

Newhall First Stop 211 1st Street E
Newhall Locker -19 Main Street
Whisky Tavern, 26 Main Street

Hardware Stores

None

Gas & Fuel supplier

Newhall First Stop 211 1st Street E
Linn County Co-op 2851 71st Street

NORWAY



Figure 42: Norway in 2018

Norway is located at 41°54'12"N 91°55'24"W in sections 17, 19, and 20 of Florence Township in Benton County. According to the United States Census Bureau, the city has a total area of 0.45 square miles (1.17 km²), all of it land. The city was surveyed in 1863 on ground given for the city by Osmond Tuttle. The city was originally known as Florence. In 1865 the city had its first post office. The city was officially incorporated on December 29, 1894.

As of the census of 2010, there were 545 people, 243 households, and 146 families residing in the city. The population density was 1,211.1 inhabitants per square mile (467.6/km²). There were 256 housing units at an average density of 568.9 per square mile (219.7/km²). The racial makeup of the city was 98.0% White, 0.6% African American, 0.4% Native American, 0.2% Asian, 0.2% from other races, and 0.7% from two or more races. Hispanic or Latino of any race were 0.4% of the population.

There were 243 households of which 26.3% had children under the age of 18 living with them, 45.7% were married couples living together, 8.6% had a female householder with no husband present, 5.8% had a male householder with no wife present, and 39.9% were non-families. 36.2% of all households were made up of individuals and 11.9% had someone living alone who was 65 years of age or older. The average household size was 2.24 and the average family size was 2.92.

The median age in the city was 41.2 years. 23.1% of residents were under the age of 18; 5% were between the ages of 18 and 24; 25.6% were from 25 to 44; 26.8% were from 45 to 64; and 19.6% were 65 years of age or older. The gender makeup of the city was 49.9% male and 50.1% female.

The median income for a household in the city was \$55,000, and the median income for a family was \$66,500. The per capita income for the city was \$29,921.

The City of Norway has 3 facilities worth a combined total of \$611,655. None of these structures is in a flood zone.

Figure 43: Norway Population Change 1960-2013

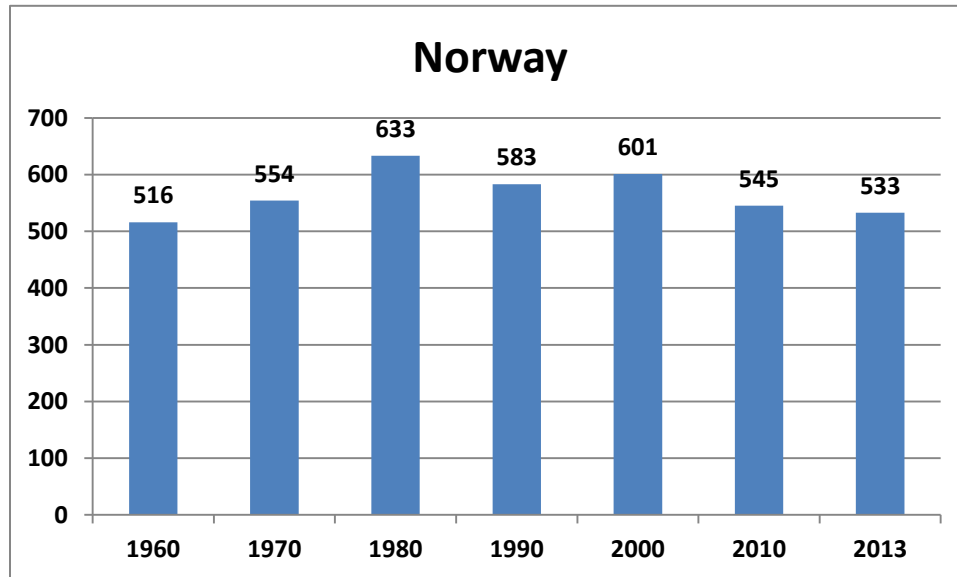


Table 51: Norway Population Change Statistics 1960-2010

Year	Population	Number Change (Linear Method)	Growth/Decline Rate (Geometric Method)
1960	516	n/a	n/a
1970	554	38	7.4%
1980	633	79	14.3%
1990	583	-50	-7.9%
2000	601	18	3.1%
2010	545	-56	-9.3%
Average (1960 - 2010)		29/5 = 6	7.6/5 = 1.5%

Table 52: Norway Projected Population Change 2020-2050

Year	Linear Projections	Geometric Projections
2020	551	553
2030	557	561
2040	563	569
2050	569	578

Table 53: Vulnerable Populations in the City of Norway; 2000 and 2010

Area	2000				2010			
	<18	%	>64	%	<18	%	>64	%
Norway	157	26	83	14	126	23	107	20
Benton County	6,924	27	3,902	15	5,781	22	4,015	15
Iowa	733,629	25	436,213	15	716,011	24	466,169	15

Government

The City of Norway is governed by a Mayor/Council form of government with five council members and a mayor, all of whom are elected. The city also has a full-time city clerk, which is a hired position. General operation of city services is conducted by one full-time and one part-time public works employees.

Building Regulations

The City of Norway has various ordinances regulating development and building construction in the city. Chapters of the city's code relative to development and building construction include:

- Chapter 165 –Zoning Regulations
- Chapter 146 – Manufactured, Mobile and Modular Homes
- Chapter 145—Dangerous Buildings
- Chapter 155—Building Regulations

Certain provisions of the Iowa State Building Code promulgated by the State Building Code Commissioner or State Fire Marshall as provided by Iowa Code, Chapters 100 and 103A, are mandatory and supersede the above standards when they conflict.

Streets

The City of Norway has approximately 44 blocks, or 7.5 miles of streets. All streets of the city are seal coated. The city's two public works employees take care of street maintenance for the city.

Water And Water Treatment

Water supply for the City of Norway is supplied by the Poweshiek Rural Water Association. Water usage averages 48,000 gallons of water per day. The city has one above ground water storage tower holding a maximum of 100,000 gallons of water. The city has one sand point well that is not hooked up to the city's water supply system.

Wastewater Treatment

The City of Norway's wastewater treatment facility is located at 7684 30th Avenue. The facility was completely rebuilt in 2018 and has a maximum capacity of 1,014,300 gallons per day and uses one lift station with a Nitrox disinfection system.

Emergency Services

Law Enforcement

Law enforcement for the City of Norway contracts law enforcement services with the Benton County Sheriff's Office for coverage that is not to exceed 10 hours per week. The Benton County Sheriff's Office, headquartered in Vinton, 25 miles away, maintains a staff of 43 people, 16 of whom are actively engaged in law enforcement activities.

Fire Department

The City of Norway receives fire protection from the Norway Fire and Rescue Department. The department is staffed with 15 volunteers and maintains a fleet of four vehicles for firefighting and rescue operations. The department averages 20 alarms per year in the city and the surrounding rural district. The fire departments in Benton County have formed a county-wide mutual aid agreement, making the services of an additional 12 fire departments available to the city in the event of a major fire or emergency.

Emergency Medical Services

Emergency medical service for the City of Norway is provided by the Norway First Responders, headquartered in the Norway Fire and Rescue Department. The service is the initial primary emergency medical service provider for a 50 square mile area of the Norway First Responder District. The service is staffed with fifteen volunteers all certified as emergency medical technician B's. The service responds to an average of 40 calls for service a year. Ambulance service to the Norway First Responder District is provided by the Blairstown Ambulance Service in Blairstown.

Utilities

Natural Gas Provider: Alliant Energy

Electricity: Alliant Energy

Telephone and Internet provider is the South Slope Cooperative Communications Company located in North Liberty, Iowa. Mediacom located in Cedar Rapids.

Business And Industry

The City of Norway is home to sixteen (16) businesses and industries. The Benton Community Schools Norway Elementary Center and Frontier Natural Products Coop located on the city's boundary are the largest employers in the city. Frontier Natural Products employs 250 people.

Employment

Employed civilian population 16 years and over		
OCCUPATION	Number	%
Civilian employed population 16 years and over	342	342
Management, business, science, and arts occupations	53	15.5%
Service occupations	46	13.5%
Sales and office occupations	97	28.4%
Natural resources, construction, and maintenance occupations	67	19.6%
Production, transportation, and material moving occupations	79	23.1%
INDUSTRY		
Civilian employed population 16 years and over	342	342
Agriculture, forestry, fishing and hunting, and mining	0	0.0%
Construction	36	10.5%
Manufacturing	97	28.4%
Wholesale trade	28	8.2%
Retail trade	27	7.9%
Transportation and warehousing, and utilities	15	4.4%
Information	13	3.8%
Finance and insurance, and real estate and rental and leasing	18	5.3%
Professional, scientific, and management, and administrative and waste management services	10	2.9%
Educational services, and health care and social assistance	38	11.1%
Arts, entertainment, and recreation, and accommodation and food services	19	5.6%
Other services, except public administration	35	10.2%
Public administration	6	1.8%

Table 55: Norway Civilian Population Employment 2010. From the US Census Bureau.

Critical Facilities

Critical facilities are those structures and infrastructure that the community places a priority on protecting. Damage to these facilities can impact the delivery of vital services, cause greater damages to other sections of the community, or can put special, vulnerable populations at risk. The Planning Committee identified the following critical facilities:

Facilities essential to the health and welfare of the entire population, especially following a hazard event:

Norway City Hall	108 E. Railroad St.
Norway Fire Station	105 W. Railroad St.
Emergency Shelters	
Benton Community Schools Norway Elementary Center	100 School Dr.
Norway Fire Station	105 W. Railroad St.

Transportation Systems

County Road E66

Lifeline Utility Systems

City Well 302 Line St.
Wastewater Treatment Plant 7684 30th Avenue
Street Department 105 South St.

Vulnerable Population Centers

Frontier Natural Products Coop Day Care Center 3021 78 St.
Benton Community Schools, Norway Elementary Center 100 School Dr.

Financial Institutions

Bank Iowa 102 Railroad St. West

Food Supplier

Depot Express 117 Railroad St. East
Prairie Creek Saloon 116 Railroad St. East

Hardware Stores

None

Gas & Fuel

Depot Express 117 Railroad St. East

SHELLSBURG



Figure 44: Shellsburg in 2018

Shellsburg is located at 42°5'35"N 91°52'13"W in sections 10, 11, 14 and 15 of Canton Township, Benton County. According to the United States Census Bureau, the city has a total area of 0.77 square miles (1.99 km²), all of it land. The city was surveyed in 1854, the third city surveyed in Benton County. In 1856 the city had its first post office and rail service was established to the city in 1869. The city was officially incorporated in 1870

As of the census of 2010, there were 983 people, 428 households, and 276 families residing in the city. The population density was 1,276.6 inhabitants per square mile (492.9/km²). There were 455 housing units at an average density of 590.9 per square mile (228.1/km²). The racial makeup of the city was 96.7% White, 0.7% African American, 1.0% Native American, 0.1% Asian, 0.1% Pacific Islander, and 1.3% from two or more races. Hispanic or Latino of any race were 0.5% of the population.

There were 428 households of which 27.8% had children under the age of 18 living with them, 51.9% were married couples living together, 8.9% had a female householder with no husband present, 3.7% had a male householder with no wife present, and 35.5% were non-families. 30.1% of all households were made up of individuals and 15.4% had someone living alone who was 65 years of age or older. The average household size was 2.24 and the average family size was 2.74.

The median age in the city was 44.6 years. 20.9% of residents were under the age of 18; 6.2% were between the ages of 18 and 24; 23.5% were from 25 to 44; 30.1% were from 45 to 64; and 19.3% were 65 years of age or older. The gender makeup of the city was 48.5% male and 51.5% female

The median income for a household in the city was \$63,015 and the median income for a family was \$59,000. The per capita income for the city was \$27,357.

The City of Shellsburg has 6 facilities worth a combined total of \$4,104,365. None of these structures is in a flood zone.

Figure 45: Shellsburg Population Change 1960-2013

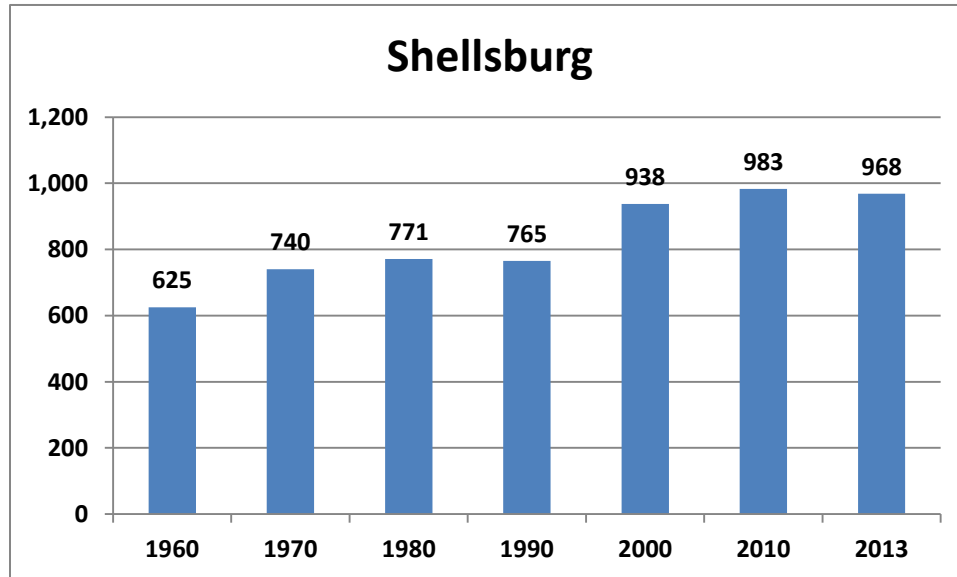


Table 56: Shellsburg Population Change Statistics 1960-2010

Year	Population	Number Change (Linear Method)	Growth/Decline Rate (Geometric Method)
1960	625	n/a	n/a
1970	740	115	18.4%
1980	771	31	4.2%
1990	765	-6	-.7%
2000	938	173	22.6%
2010	983	45	4.8%
Average (1960 - 2010)		358/5 = 72	49.3/5 = 9.9%

Table 57: Shellsburg Projected Population Change 2020-2050

Year	Linear Projections	Geometric Projections
2020	1055	1080
2030	1127	1187
2040	1199	1305
2050	1271	1434

Table 58: Vulnerable Populations in the City of Shellsburg; 2000 and 2010

Area	2000				2010			
	<18	%	>64	%	<18	%	>64	%
Shellsburg	258	28	123	13	205	21	190	19
Benton County	6,924	27	3,902	15	5,781	22	4,015	15
Iowa	733,629	25	436,213	15	716,011	24	466,169	15

Government

The City of Shellsburg is governed by a Mayor/Council form of government with five council members and a mayor, all of whom are elected. The city also has a full-time city clerk, which is a hired position. General operation of city services is conducted by two full-time public works employees. The city contracts with the Benton County Sheriff's Office for law enforcement.

Building Regulations

The City of Shellsburg has various ordinances regulating development and building construction in the city. Chapters of the city's code relative to development and building construction include:

- Chapter 155 – Zoning Regulations
- Chapter 160 – Flood Plain Regulations
- Chapter 165 – Subdivision Control – General Provisions
- Chapter 165 – Subdivision Control – Procedures
- Chapter 166 – Subdivision Control – Improvements and Design Standards
- Chapter 146 – Manufactured, Mobile and Modular Homes
- Chapter 147 – Water Supply Well Field Regulations
- Chapter 155 – Building Code and Building and Housing Board of Appeals
- Chapter 131 – Sign Code
- Chapter 50 – Code For the Abatement of Unsafe Buildings and Equipment

Codes adopted by reference as per Chapter 130 are:

- The International Building Code, 2003 edition
- The International Mechanical Code, 2003 edition
- The International Code Council Electrical Code, 2003 edition
- The International Residential Code for One-and Two-Family Dwellings, 2003 edition, published by the International Code Council
- The State Plumbing Code for Iowa promulgated by the Iowa Department of Public Health

Certain provisions of the Iowa State Building Code promulgated by the State Building Code Commissioner or State Fire Marshall as provided by Iowa Code, Chapters 100 and 103A, are mandatory and supersede the above standards when they conflict.

Streets

The City of Shellsburg has approximately 70 blocks, or 12 miles of streets. The majority of the street surfaces are seal coated with the rest being cement and asphalt. The city's two public works employees take care of street maintenance for the city.

Water And Water Treatment

Water supply for the City of Shellsburg is supplied by two wells, one that is active and the other is inactive and used as a reserve. Water usage averages 90,000 gallons of water per day. The city has one above ground water storage towers holding a maximum of 75,000 gallons of water. Well field protection has been established to a distance of 2,640 feet in circumference for the city's wells. Each well is surrounded by an eight feet tall chain link fence with barbed wire across the top and are illuminated by security lights at night. The city's water treatment plant is located at 107 Taylor Street. The plant has stand-by power generation capabilities but has no security systems in place. The City of Shellsburg's two public works employees are the city's Water Department.

Wastewater Treatment

The City of Shellsburg's wastewater treatment facility is located at 1100 Homer Street on the city's southeast side. The new mechanical system constructed in 2004 at a cost of \$2.3 million has a maximum capacity of 395,000 gallons of wastewater per day and uses a system of two lift stations. The system also provides wastewater treatment service to the Timber Ridge Trailer Court with an estimated population of 300 people three miles south of Shellsburg. The new plant is surrounded by an eight foot tall security fence. The City of Shellsburg's two public works employees are the city's Wastewater Department.

Emergency Services

Law Enforcement

The city contracts with the Benton County Sheriff's Office for law enforcement. The Benton County Sheriff's Office, headquartered in Vinton, 10 miles away, maintains a staff of 43 people, 16 of whom are actively engaged in law enforcement activities.

Fire Department

The City of Shellsburg receives fire protection from the Shellsburg Fire Department. The department is staffed with 20 volunteers and maintains a fleet of four vehicles for firefighting and rescue operations. The department averages 50 alarms per year in the city and the surrounding rural district. The fire departments in Benton County have formed a county-wide mutual aid agreement, making the services of an additional 12 fire departments available to the city in the event of a major fire or emergency.

Emergency Medical Services

Emergency medical service for the City of Shellsburg is provided by the Shellsburg First Responders, headquartered in Shellsburg, Iowa. The private-non profit service is the initial primary emergency medical service provider for a 77 square mile area of the Shellsburg First Responder District. The service is staffed with thirteen volunteers including one paramedic, five emergency medical technician B's and seven first responders. The service responds to an average of 175 calls for service a year. Ambulance service to the Shellsburg First Responder District is provided by the North Benton Ambulance Service in Vinton, the Urbana Ambulance Service and the Area Ambulance Service in Cedar Rapids.

Utilities

Natural Gas Provider: Alliant Energy

Electricity: Alliant Energy

Telephone, Cable TV and Internet provider is USA Communications based in Shellsburg.

Business And Industry

The City of Shellsburg is home to twenty eight (28) businesses and industries. The Rock Ridge Care Center, Shellsburg Center of the Vinton-Shellsburg Schools and USA Communications are the largest employers in the city.

Employment

Employed civilian population 16 years and over

OCCUPATION

	Number	%
Civilian employed population 16 years and over	526	526
Management, business, science, and arts occupations	149	28.3%
Service occupations	115	21.9%
Sales and office occupations	119	22.6%
Natural resources, construction, and maintenance occupations	48	9.1%
Production, transportation, and material moving occupations	95	18.1%

INDUSTRY

Civilian employed population 16 years and over	526	526
Agriculture, forestry, fishing and hunting, and mining	2	0.4%
Construction	44	8.4%
Manufacturing	69	13.1%
Wholesale trade	12	2.3%
Retail trade	70	13.3%
Transportation and warehousing, and utilities	64	12.2%
Information	16	3.0%
Finance and insurance, and real estate and rental and leasing	77	14.6%
Professional, scientific, and management, and administrative and waste management services	57	10.8%
Educational services, and health care and social assistance	54	10.3%
Arts, entertainment, and recreation, and accommodation and food services	48	9.1%
Other services, except public administration	8	1.5%
Public administration	5	1.0%

Table 59: Shellsburg Civilian Population Employment 2010. From the US Census Bureau

CRITICAL FACILITIES

Critical facilities are those structures and infrastructure that the community places a priority on protecting. Damage to these facilities can impact the delivery of vital services, cause greater damages to other sections of the community, or can put special, vulnerable populations at risk. The Planning Committee identified the following critical facilities:

Facilities essential to the health and welfare of the entire population, especially following a hazard event:

Shellsburg City Hall	108 Main St. SW
Shellsburg Fire Station	101 Pearle St. SE
USA Communications	124 Main St. SW
Emergency Shelters	
Shellsburg Masonic Hall	100 Grove St. NW
Shellsburg American Legion	114 Main Street SW

Transportation Systems

County Roads E36 and W26.

Lifeline Utility Systems

Water Treatment Plant	106 Taylor St.
City Wells	106 Taylor St.
Wastewater Treatment Plant	1100 Homer St. SE
Street Department	108 Main St. SW

Vulnerable Population Centers

Rock Ridge Care Center	401 Canton St. NW
Vinton-Shellsburg Schools, Shellsburg Center	203 Cottage St.

Financial Institutions

Wells Fargo Bank	114 Pearl St. SW
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Food Supplier

Roys Foodland	105 Pearl St. SE
Shellsburg Quick Stop	101 Main St. NE
Pearl Street Social Club	110 Pearl St. SE
Divine Decadents	109 Pearl St.
Wildcat Golf Course	100 Wildcat Trail

Gas & Fuel

Shellsburg Quick Stop	101 Main St. NE
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Healthcare facilities

Shellsburg Family Medicine	131 Main Street
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URBANA

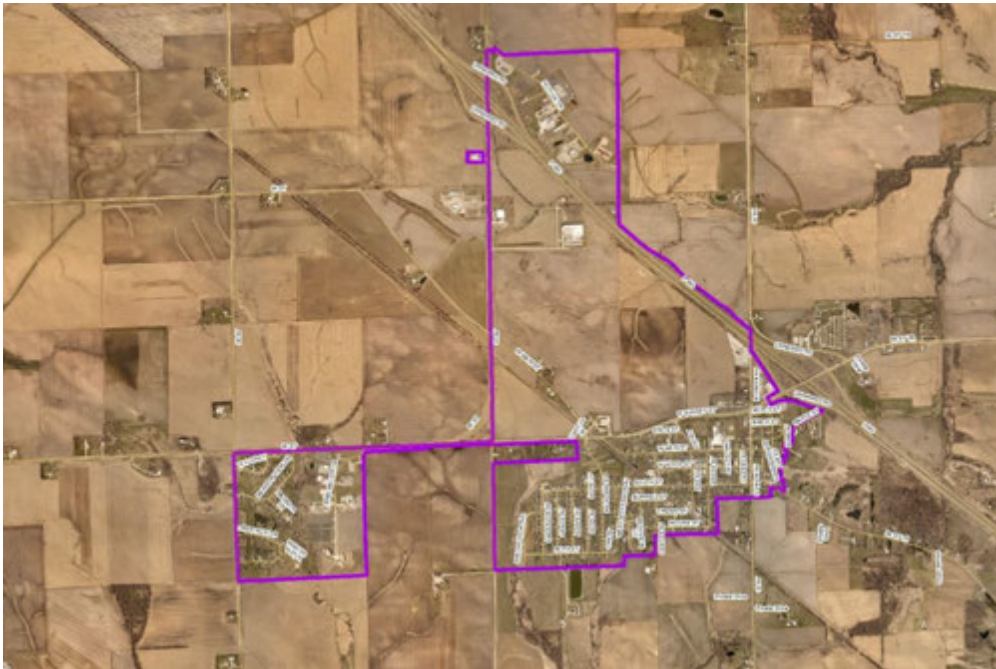


Figure 47: Urbana in 2018

Urbana is located at 42°13'27"N 91°52'41"W in sections 22, 26, 27, 33, 34 and 35 of Polk Township. According to the United States Census Bureau, the city has a total area of 2.20 square miles (5.70 km²), all of it land. Urbana is roughly midway between Cedar Rapids and Waterloo. Interstate 380 and Iowa Highway 150 intersect here.

Urbana is one of the oldest communities in the county. The first recorded incidence of settlers in the area is 1839. The first name of a community in the area was Hoosier's Point in 1840. That name was changed in 1847 when a town named Marysville was laid out. The first post office was established in the community in 1848. In 1857 the name of the community was changed to Urbana and in 1895 the city was incorporated. In 1887 the city was noted as having a population of 200 people.

As of the census of 2010, there were 1,458 people, 520 households, and 412 families residing in the city. The population density was 662.7 inhabitants per square mile (255.9/km²). There were 543 housing units at an average density of 246.8 per square mile (95.3/km²). The racial makeup of the city was 97.5% White, 0.3% African American, 0.3% Asian, 0.2% from other races, and 1.7% from two or more races. Hispanic or Latino of any race was 1.0% of the population.

There were 520 households of which 48.3% had children under the age of 18 living with them, 64.8% were married couples living together, 9.0% had a female householder with no husband present, 5.4% had a male householder with no wife present, and 20.8% were non-families. 15.6% of all households were made up of individuals and 6.5% had someone living alone who was 65 years of age or older. The average household size was 2.80 and the average family size was 3.14.

The median age in the city was 32.1 years. 32.2% of residents were under the age of 18; 5.5% were between the ages of 18 and 24; 35% were from 25 to 44; 19.6% were from 45 to 64; and 7.6% were 65 years of age or older. The gender makeup of the city was 50.5% male and 49.5% female.

The median income for a household in the city was \$69,408 and the median income for a family was \$81,700. The per capita income for the city was \$28,678.

The City of Urbana has 16 facilities worth a combined total of \$6,549,209. None of these structures is in a flood zone.

Figure 48: Urbana Population Change 1960-2013

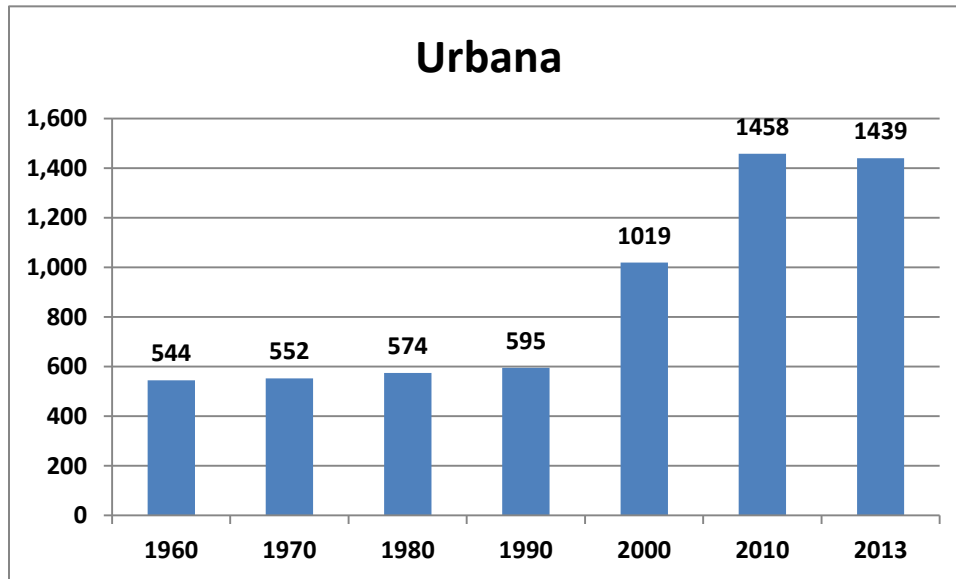


Table 60: Urbana Population Change Statistics 1960-2010

Year	Population	Number Change (Linear Method)	Growth/Decline Rate (Geometric Method)
1960	544	n/a	n/a
1970	552	8	1.5%
1980	574	18	3.3%
1990	595	21	3.7%
2000	1019	424	71.3%
2010	1458	439	43.1%
Average (1960 - 2010)		914/5 = 183	122.9/5 = 24.6%

Table 61: Urbana Projected Population Change 2020-2050

Year	Linear Projections	Geometric Projections
2020	1641	1817
2030	1824	2264
2040	2007	2821
2050	2190	3515

Table 62 Vulnerable Populations in the City of Urbana; 2000 and 2010

Area	2000				2010			
	<18	%	>64	%	<18	%	>64	%
Urbana	311	31	95	9	470	32	111	8
Benton County	6,924	27	3,902	15	5,781	22	4,015	15
Iowa	733,629	25	436,213	15	716,011	24	466,169	15

Government

The City of Urbana is governed by a Mayor/Council form of government with five council members and a mayor, all of whom are elected. The city also has a full-time city clerk/treasurer and an administrative director/deputy city clerk/treasurer, which are hired positions. General operation of city services is conducted by three full-time public works employees. The city also has a part-time police chief plus three part-time reserve police officers and an on call/as needed building inspector.

Building Regulations

The City of Urbana has various ordinances regulating development and building construction in the city. Chapters of the city's code relative to development and building construction include:

- Chapter 94 – Public Water Well Protection
- Chapter 145 – Dangerous Buildings
- Chapter 150 – Building Numbering
- Chapter 151 – Trees
- Chapter 155 – Building Code
- Chapter 156 – Fences
- Chapter 157 – Storm Drainage
- Chapter 158 – Sign Code
- Chapter 165 – Zoning Regulations
- Chapter 166 – Subdivision Regulations
- Chapter 168 – Storm Water Management

Codes adopted by reference as per Chapter 155 are:

The International Building Code, 2003 edition

The International Mechanical Code, 2003 edition

The International Residential Code for One-and Two-Family Dwellings, 2003 edition,
published by the International Code Council

The International Plumbing Code, 2003 Edition

The National Electrical Code, 2002 Edition

Certain provisions of the Iowa State Building Code promulgated by the State Building Code Commissioner or State Fire Marshall as provided by Iowa Code, Chapters 100 and 103A, are mandatory and supersede the above standards when they conflict.

Streets

The City of Urbana has approximately 200 blocks and 20 miles of streets. The street surfaces are seal coated, asphalt or concrete. The city's three public works employees take care of street maintenance for the city.

Water And Water Treatment

Water supply for the City of Urbana is supplied by four active wells. Water usage averages 100,000 gallons of water per day. The city has two above ground water storage towers holding a maximum of 100,000 gallons of water in each. Well field protection has been established to a distance of 2,640 feet in circumference for the city's wells. Each well is surrounded by an eight feet tall chain link fence with barbed wire across the top. Only one is illuminated by security lights at night. The city's two water treatment plants are located at 507 West Wood Street and 5398 31st Avenue. The plant has stand-by power generation capabilities. The City of Urbana's three public works employees are the city's Water Department.

Wastewater Treatment

The City of Urbana's wastewater treatment facility is located at 2101 ½ Faith Street. The facility uses a combination of lagoons and a mechanical activated sludge plant. The lagoons are capable of handling a maximum of 101,000 gallons of wastewater per day and the mechanical system is capable of processing 50,000 gallons of wastewater per day. The City of Urbana's three public works employees are the city's Wastewater Department.

Emergency Services

Law Enforcement

Law enforcement for the City of Urbana is provided by the Urbana Police Department. The department maintains a part-time Chief of Police plus a contingent of 3 part-time hourly officers. With this staff the department is capable of providing 24-hour coverage for the city. A 28E agreement between the Urbana Police Department and Benton County Sheriff's Office allows for cross coverage between the two entities as situations dictate. The Benton County Sheriff's Office, headquartered in Vinton, 10 miles away, maintains a staff of 43 people, 16 of whom are actively engaged in law enforcement activities.

Fire Department

The City of Urbana receives fire protection from the Urbana Fire Department. The department is staffed with 35 volunteers and maintains a fleet of four vehicles for firefighting and rescue operations. The department averages 70 alarms per year in the city and the surrounding rural district. The fire departments in Benton County have formed a county-wide mutual aid agreement, making the services of an additional 12 fire departments available to the city in the event of a major fire or emergency.

Emergency Medical Services

Emergency medical service for the City of Urbana is provided by the North Benton Ambulance Service, headquartered in Vinton, Iowa. The private-non profit service is the primary emergency medical service provider for a 200 square mile area encompassing the communities of Vinton, Garrison, Mt. Auburn, Brandon, Newhall and Urbana with supplemental coverage to the communities of Shellsburg, and Van Horne. The service is staffed with one full-time director and 24 volunteers with varying levels of certification ranging from emergency medical technician to paramedic specialist. In 2014 the service responded to 686 calls for service ranging from medical transfers to multiple casualty incidents.

Utilities

Natural Gas Provider: Alliant Energy

Electricity: Alliant Energy and the East Central Iowa REC.

Telephone, Cable TV and Internet provider is USA Communications based in Urbana.

Business And Industry

The City of Urbana is home to 38 businesses and industries. The Center Point-Urbana Middle School, with 43 employees, is the city's largest employer.

Employment

Employed civilian population 16 years and over		
OCCUPATION	Number	%
Civilian employed population 16 years and over	800	800
Management, business, science, and arts occupations	282	35.3%
Service occupations	127	15.9%
Sales and office occupations	139	17.4%
Natural resources, construction, and maintenance occupations	86	10.8%
Production, transportation, and material moving occupations	166	20.8%
INDUSTRY		
Civilian employed population 16 years and over	800	800
Agriculture, forestry, fishing and hunting, and mining	17	2.1%
Construction	46	5.8%
Manufacturing	178	22.3%
Wholesale trade	19	2.4%
Retail trade	93	11.6%
Transportation and warehousing, and utilities	51	6.4%
Information	20	2.5%
Finance and insurance, and real estate and rental and leasing	56	7.0%
Professional, scientific, and management, and administrative and waste management services	53	6.6%
Educational services, and health care and social assistance	174	21.8%

Arts, entertainment, and recreation, and accommodation and food services	32	4.0%
Other services, except public administration	22	2.8%
Public administration	39	4.9%

Table 63: Urbana Civilian Population Employment 2010. From the US Census Bureau.

Critical Facilities

Critical facilities are those structures and infrastructure that the community places a priority on protecting. Damage to these facilities can impact the delivery of vital services, cause greater damages to other sections of the community, or can put special, vulnerable populations at risk. The Planning Committee identified the following critical facilities:

Facilities essential to the health and welfare of the entire population, especially following a hazard event:

- Urbana City Hall 102 Capitol Avenue
- Urbana Emergency Services Building 102 Capitol Avenue
- Urbana Family Practice Clinic 1002 W Main Street
- Emergency Shelters (School/Churches)
 - Urbana Community Center 102 Capitol Avenue
 - Don Bosco Hall 402 Ash Avenue

Transportation Systems

- Interstate 380
- Highways 150
- County Roads E2W and W26
- Sunset Street (former Hwy 363).

Lifeline Utility Systems

- City Wells 205 E Main Street, 507 W Wood Street and 5398 31st Avenue
- Wastewater Treatment Plant 2101 ½ Faith Street
- Public Works Department 400 Velvas Street

Vulnerable Population Centers

- Day care providers
 - Center Point-Urbana Schools Middle School 202 W Main Street

Financial Institutions

- Security State Bank 205 Union Avenue North
- Wells Fargo Bank 320 W Wood Street

Food Supplier

- None

Hardware Stores

- None

Gas & Fuel supplier

- Casey's General Store 5350 Hutton Drive
- Casey's General Store 201 Sunset Street

Healthcare facilities

- Urbana Family Practice Clinic 1002 W Main Street

VAN HORNE



Figure 49: Van Horne in 2018

Van Horne is located at 42°0'32"N 92°5'20"W in sections 11, 12, 13 and 14 of Union Township in Benton County. According to the United States Census Bureau, the city has a total area of 0.63 square miles (1.63 km²), all of it land. The community of Van Horne was named after Sir William Cornelius Van Horne (1843-1915), Chicago-Milwaukee Railroad Superintendent. Van Horne was described as the "New Village" in 1883 and was to be an active business center, which it remains today.

As of the census of 2010, there were 682 people, 297 households, and 198 families residing in the city. The population density was 1,082.5 inhabitants per square mile (418.0/km²). There were 322 housing units at an average density of 511.1 per square mile (197.3/km²). The racial makeup of the city was 99.0% White, 0.3% Native American, 0.1% Asian, and 0.6% from two or more races. Hispanic or Latino of any race were 0.9% of the population.

There were 297 households of which 32.7% had children under the age of 18 living with them, 51.2% were married couples living together, 11.4% had a female householder with no husband present, 4.0% had a male householder with no wife present, and 33.3% were non-families. 29.3% of all households were made up of individuals and 14.5% had someone living alone who was 65 years of age or older. The average household size was 2.30 and the average family size was 2.82.

The median age in the city was 39.5 years. 25.7% of residents were under the age of 18; 6.7% were between the ages of 18 and 24; 23.9% were from 25 to 44; 27.1% were from 45 to 64; and 16.6% were 65 years of age or older. The gender makeup of the city was 48.8% male and 51.2% female.

The median income for a household in the city was \$54,250 and the median income for a family was \$63,482. The per capita income for the city was \$23,411.

The City of Van Horne has 11 facilities worth a combined total of \$5,087,963. None of these structures is in a flood zone.

Figure 50: Van Horne Population Change 1960-2013

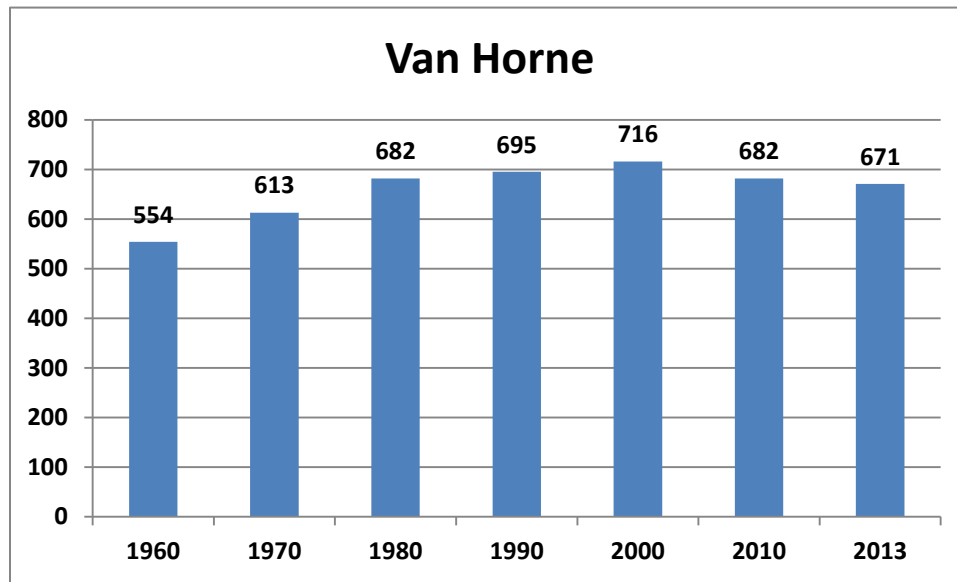


Table 64: Van Horne Population Change Statistics 1960-2010

Year	Population	Number Change (Linear Method)	Growth/Decline Rate (Geometric Method)
1960	554	n/a	n/a
1970	613	59	10.6%
1980	682	69	11.3%
1990	695	13	1.9%
2000	716	21	3.0%
2010	682	-34	-4.7%
Average (1960 - 2010)		128/5 = 26	22.1/5 = 4.4%

Table 65: Van Horne Projected Population Change 2020-2050

Year	Linear Projections	Geometric Projections
2020	708	712
2030	734	743
2040	760	776
2050	786	810

Table 66: Vulnerable Populations in the City of Van Horne; 2000 and 2010

Area	2000				2010			
	<18	%	>64	%	<18	%	>64	%
Van Horne	204	28	127	18	175	26	113	17
Benton County	6,924	27	3,902	15	5,781	22	4,015	15
Iowa	733,629	25	436,213	15	716,011	24	466,169	15

Government

The City of Van Horne is governed by a Mayor/Council form of government with five council members and a mayor, all of whom are elected. The city also has a full-time city clerk, public works director, assistant public works director, library director and 2 library employees.

Building Regulations

The City of Van Horne has various ordinances regulating development and building construction in the city. Chapters of the city's code relative to development and building construction include:

- Chapter 94 – Wells & Private Wells
- Chapter 151 – Trees
- Chapter 155 – Building Code (Permits)
- Chapter 156 – Sign Code
- Chapter 165 –Zoning Regulations
- Chapter 166 – Subdivision Regulations

Codes adopted by reference as per Chapter 155 are:

- The International Building Code, 2003 edition
- The International Mechanical Code, 2003 edition
- The International Residential Code for One-and Two-Family Dwellings, 2003 edition, published by the International Code Council
- The International Plumbing Code, 2003 Edition
- The National Electrical Code, 2002 Edition

Certain provisions of the Iowa State Building Code promulgated by the State Building Code Commissioner or State Fire Marshall as provided by Iowa Code, Chapters 100 and 103A, are mandatory and supersede the above standards when they conflict.

Streets

The City of Van Horne has approximately 40 blocks and 6 miles of streets. The street surfaces are gravel, seal coated, asphalt or concrete. The city's two public works employees take care of street maintenance for the city.

Water And Water Treatment

The City of Van Horne purchases water from the Poweshiek Rural Water Association. The city has one above ground water tower with a capacity of 500,000 gallons.

Wastewater Treatment

Wastewater Treatment for the City of Van Horne is accomplished with a 6-year old extended aeration activated sludge plant located on 11th St.

Emergency Services

Law Enforcement

Law enforcement for the City of Van Horne contracts law enforcement services with the Benton County Sheriff's Office for coverage that is not to exceed 15 hours per week. The Benton County Sheriff's Office, headquartered in Vinton, 20 miles away, maintains a staff of 43 people, 16 of whom are actively engaged in law enforcement activities.

Fire Department

The City of Van Horne receives fire protection from the Van Horne Fire Department (VHFD). The VHFD is staffed with 25 volunteer firefighters. The department maintains a fleet of four vehicles; two pumper/tankers plus a personnel rescue/mobile command vehicle and a wildland firefighting rig. The department responds to an average of 30 fire and emergency alarms annually. The City has an ISO rating of 7 for Fire Protection.

Emergency Medical Services

Emergency medical service for the City of Van Horne is provided by the Van Horne First Responders, headquartered in the Van Horne Emergency Services Building. The service is the initial primary emergency medical service provider for the 51 square mile area of the Van Horne First Responder District. The service is staffed with fifteen volunteers all certified as emergency medical technician B's. The service responds to an average of 50 calls for service a year. Ambulance service to the Van Horne First Responder District is provided by the North Benton Ambulance Service in Vinton.

Utilities providers

Gas—Alliant Energy

Electric provider—Alliant Energy

Telecommunications—Van Horne Cooperative Telephone

Cable TV—Van Horne Cooperative Telephone

Business and Industry

The City of Van Horne is home to 30 businesses and industries. The Benton Community Schools are the city's largest employer.

Employment

Employed civilian population 16 years and over		
OCCUPATION	Number	%
Civilian employed population 16 years and over	378	378
Management, business, science, and arts occupations	102	27.0%
Service occupations	58	15.3%
Sales and office occupations	112	29.6%
Natural resources, construction, and maintenance occupations	40	10.6%
Production, transportation, and material moving occupations	66	17.5%
INDUSTRY		
Civilian employed population 16 years and over	378	378
Agriculture, forestry, fishing and hunting, and mining	12	3.2%
Construction	45	11.9%
Manufacturing	56	14.8%
Wholesale trade	23	6.1%
Retail trade	63	16.7%
Transportation and warehousing, and utilities	26	6.9%
Information	10	2.6%
Finance and insurance, and real estate and rental and leasing	22	5.8%
Professional, scientific, and management, and administrative and waste management services	7	1.9%
Educational services, and health care and social assistance	93	24.6%
Arts, entertainment, and recreation, and accommodation and food services	13	3.4%
Other services, except public administration	6	1.6%
Public administration	2	0.5%

Table 67: Urbana Civilian Population Employment 2010. From the US Census Bureau.

Critical Facilities

Critical facilities are those structures and infrastructure that the community places a priority on protecting. Damage to these facilities can impact the delivery of vital services, cause greater damages to other sections of the community, or can put special, vulnerable populations at risk. The Planning Committee identified the following critical facilities:

Facilities essential to the health and welfare of the entire population, especially following a hazard event:

Van Horne City Hall 114 Main St.
Van Horne Emergency Services Building 98 Main St.
Emergency Shelters
 Van Horne Emergency Services Building 98 Main St.
 Van Horne Community Building 508 1st Avenue
Van Horne City Shed 700 1st Avenue

Transportation Systems

County Roads V66 and E44

Lifeline Utility Systems

Van Horne Sewer Plant—Section 11, Township 83N, R11 W
Van Horne Water Plant – not currently in operation

Vulnerable Population Centers

Van Horne Elementary School 101 3rd Avenue
Benton Community Middle School 600 1st Street
Benton Community High School 600 1st Street
Early Beginnings Day Care 98 3rd Avenue

Medical Facilities

Van Horne Family Medical Service 205 Main St.
Cornerstone Apothecary 122 Main St.

Financial Institutions

Chelsea Savings Bank 101 1st St.

Food Supplier

Benton Quick Stop 100 1st St.
Crooked Antler 107 Main St.

Hardware Stores

None

Gas & Fuel supplier

New Century Farm Service 806 1st Avenue
Benton Quick Stop 100 1st St.
O'grady Chemical 200 1st Avenue

Healthcare facilities

Van Horne Family Practice Clinic 205 Main St.

VINTON



Figure 51: Vinton in 2018

Vinton is located in Taylor Township in Benton County at longitude and latitude 42.164144, -92.026077. According to the United States Census Bureau, the city has a total area of 4.83 square miles (12.51 km²), of which, 4.74 square miles (12.28 km²) is land and 0.09 square miles (0.23 km²) is water.

Vinton is located on U.S. Route 218 and the Cedar River, which has flooded parts of the city, most recently in 2008. The town's extensive tree cover was damaged by a Derecho wind storm on July 11, 2011. The city traces its origins to 1846, the same year Iowa was granted statehood. In that year a portion of the current city site, an area known as Northport, was designated as the County Seat of Justice by the General Assembly of the State of Iowa. Not a single house was erected on the site for three years; then in 1849 several families settled in an area nearby known as Fremont. As time progressed over the next decade, three communities occupied the area: Northport, Fremont and Vinton, with Vinton eventually becoming the name of the entire community. Vinton was officially incorporated as a city in 1869. Over the next century the city grew to a population of over 5,000 people with all of the necessary infrastructure necessary to support its population along with various business and industrial operations.

As of the census of 2010, there were 5,257 people, 2,187 households, and 1,397 families residing in the city. The population density was 1,109.1 inhabitants per square mile (428.2/km²). There were 2,299 housing units at an average density of 485.0 per square mile (187.3/km²). The racial makeup of the city was 97.8% White, 0.3% African American, 0.2% Native American, 0.3% Asian, 0.2% from other races, and 1.2% from two or more races. Hispanic or Latino of any race were 1.0% of the population.

There were 2,187 households of which 30.4% had children under the age of 18 living with them, 47.9% were married couples living together, 11.3% had a female householder with no husband present, 4.6% had a male householder with no wife present, and 36.1% were non-families. 31.0% of all households were made up of individuals and 16.1% had someone living alone who was 65 years of age or older. The average household size was 2.33 and the average family size was 2.91.

The median age in the city was 40.3 years. 24.7% of residents were under the age of 18; 8.1% were between the ages of 18 and 24; 23.1% were from 25 to 44; 24.5% were from 45 to 64; and 19.5% were 65 years of age or older. The gender makeup of the city was 47.3% male and 52.7% female.

The median income for a household in the city was \$50,351 and the median income for a family was \$56,271. The per capita income for the city was \$21,250.

The City of Vinton has 48 facilities worth a combined total of \$36,959,842. Four facilities, the Vinton Fire Station, Electrical Generation Plant and two line distribution buildings are located within the flood zone. The value of these four facilities is \$4,328,594.

Figure 52: Vinton Population Change 1960-2013

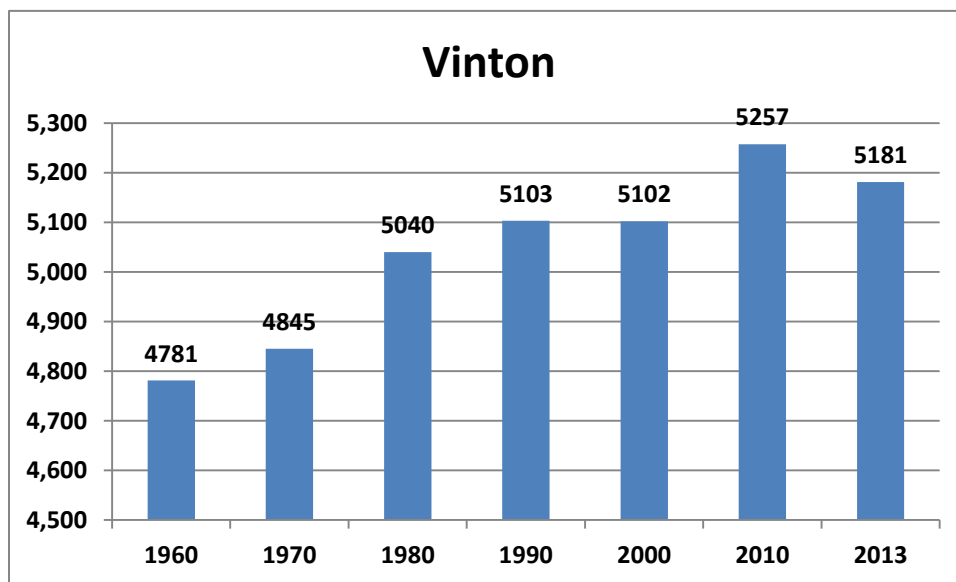


Table 68: Vinton Population Change Statistics 1960-2010

Year	Population	Number Change (Linear Method)	Growth/Decline Rate (Geometric Method)
1960	4781	n/a	n/a
1970	4845	64	1.3%
1980	5040	195	4.0%
1990	5103	63	1.3%
2000	5102	-1	0%
2010	5247	145	2.8%
Average (1960 - 2010)		466/5 = 93	9.4/5 = 1.9%

Table 69: Vinton Projected Population Change 2020-2050

Year	Linear Projections	Geometric Projections
2020	5340	5347
2030	5433	5449
2040	5526	5552
2050	5619	5657

Table 70: Vulnerable Populations in the City of Vinton; 2000 and 2010

Area	2000				2010			
	<18	%	>64	%	<18	%	>64	%
Vinton	1276	25	1030	20	1299	25	1027	20
Benton County	6,924	27	3,902	15	5,781	22	4,015	15
Iowa	733,629	25	436,213	15	716,011	24	466,169	15

GOVERNMENT

The City of Vinton is governed by a Mayor/Council form of government with six council members and a mayor, all of whom are elected. General operation of the city is directed by a full-time city administrator. Council members serve on various standing committees concerned with aspects of the city's government, including: Public Safety; Public Works; Culture, Recreation, Health & Social Services; General Government, Community & Economic Development, Business Type Activities and the Electric Utility Board. Both the City Attorney and City Clerk/Treasurer are appointed by the council. The city has a total of 40 full-time employees and 107 part-time employees including volunteer firefighters who are paid on-call.

Building Regulations

The City of Vinton has various ordinances regulating development and building construction in the city. Chapters of the city's code relative to development and building construction include:

- Chapter 23 – Planning and Zoning Commission
- Chapter 165 –Zoning Regulations
- Chapter 160 – Flood Plain Regulations
- Chapter 27 – Airport Zoning Regulations
- Chapter 170 – Subdivision Control – General Provisions
- Chapter 171 – Subdivision Control – Procedures
- Chapter 172 – Subdivision Control – Improvements and Design Standards
- Chapter 145 – Manufactured, Mobile and Modular Homes
- Chapter 94 – Well Field Protection
- Chapter 155 – Building Code and Building and Housing Board of Appeals
- Chapter 156 – Sign Code
- Chapter 157 –Abatement of Unsafe Buildings and Equipment

Codes adopted by reference as per Chapter 155 are:

- The International Building Code, 2006 edition
- The International Mechanical Code, 2006 edition
- The International Code Council Electrical Code, 2006 edition
- The International Residential Code for One-and Two-Family Dwellings, 2006 edition, published by the International Code Council
- The State Plumbing Code for Iowa promulgated by the Iowa Department of Public Health

Certain provisions of the Iowa State Building Code promulgated by the State Building Code Commissioner or State Fire Marshall as provided by Iowa Code, Chapters 100 and 103A, are mandatory and supersede the above standards when they conflict.

The City of Vinton developed a Comprehensive SMART Plan in 2012

Highway/Interstate

The City of Vinton is served by two major Highways, Highway 150 and 218. County Road E24 provides another paved route from the city.

Air

Vinton has its own airport; the Vinton Veterans Memorial Airport located three miles north of the city on Highway 150. The airport has two runways: Runway 9/27 measuring 4,000 feet long by 60 feet wide and Runway 16/34 measuring 2,500 feet long by 50 feet wide. The airport is staffed by a fixed base operator (FBO). Management of the airport is overseen by the Vinton Veterans Memorial Airport Commission.

Rail

Rail service is provided to the City of Vinton by the Iowa Northern Railroad. The railroad averages two trains daily through the city.

Streets

The City of Vinton has approximately 622 blocks, or 35 miles of streets. Surfaces of the city's streets include 33 percent concrete; 21 percent asphalt; 2 percent brick; 40 percent seal coat and 4 percent gravel. The City of Vinton's Street Department has 6 employees and is headquartered at 901 West 3rd Street.

Water And Water Treatment

Water supply for the city of Vinton is supplied by four wells, three that are active and one this is an inactive well used as a reserve. Water usage averages 550,000 gallons of water per day. The city has two above ground water storage towers holding a maximum of 1,250,000 gallons of water. Well field protection has been established to a distance of 1,000 feet in circumference of all four of the city's wells. Each well is surrounded by an eight feet tall chain link fence with barbed wire across the top and are illuminated by security lights at night. The city's water treatment plant is located at the West Well at 903 West 1st Street. Security systems in place at the water treatment plant include alarm systems for any window breakage or unauthorized door opening and security cameras. The City of Vinton's Water Department has 4 employees and is headquartered at 903 West 1st Street.

Wastewater Treatment

The City of Vinton's wastewater treatment facility is located at 6026 25th Avenue Drive on the city's southeast side. The activated sludge system constructed in 1982 has a maximum capacity of 1.8 million gallons of wastewater per day and uses a system of seven lift stations. The average use, as of May, 2005, was 800,000 gallons per day. The City of Vinton's Wastewater Department has 3 employees.

Emergency Services

Law Enforcement

Law enforcement for the City of Vinton is provided by the Vinton Police Department. The department maintains a staff of 5 full-time patrol officers, a full-time Chief of Police, Police Captain and Police Lieutenant plus a contingent of 3 reserve officers. The department also has a canine unit with one police dog. With this staff the department is capable of providing 24-hour coverage for the city. The Benton County Sheriff's Office and Benton County Jail are also headquartered in Vinton. The office maintains a staff of 43 people, 16 of whom are actively engaged in law enforcement activities. A 28E agreement between the Vinton Police Department and Benton County Sheriff's Office allows for cross coverage between the two entities as situations dictate.

Fire Department

The City of Vinton receives fire protection from the Vinton Fire Department. The department is staffed with 25 volunteers and maintains a fleet of six vehicles for firefighting and rescue operations. The department averages 80 alarms per year in the city and the surrounding rural district. The fire departments in Benton County have formed a county-wide mutual aid agreement, making the services of an additional 12 fire departments available to the city in the event of a major fire or emergency.

Ambulance

Emergency medical service for the City of Vinton is provided by the North Benton Ambulance Service (NBA), headquartered in Vinton, Iowa. The private-non profit service is the primary emergency medical service provider for a 200 square mile area encompassing the communities of Vinton, Garrison, Mt. Auburn, Brandon and Newhall with supplemental coverage to the communities of Shellsburg, Urbana and Van Horne. The service is staffed with one full-time director and 24 volunteers with varying levels of certification ranging from emergency medical technician to paramedic specialist. In 2014 the service responded to 686 calls for service ranging from medical transfers to multiple casualty incidents.

Utilities

Natural Gas Provider: Alliant Energy

Electricity: Purchased by the Vinton Municipal Electric Utility from the Resale Power Group. The Vinton Municipal Electric Utility is its own entity with its own governing body. The Utility has seven generators capable of generating 17.675 megawatts of power and can power the entire community. A separate hazard mitigation plan has been developed for the utility. It is found in Appendix E, page 693 of this plan.

Telephone, Cable TV and Internet providers: Local telephone is provided by a new municipal communications utility that provides high speed internet, cable TV and telephone services.

BUSINESS AND INDUSTRY

The City of Vinton is home to numerous businesses and industries. A downtown area along Fourth Street encompassing approximately ten square blocks is the main area of commerce with approximately 100 retail and service businesses. Ideal Industries, located in the Industrial Park on the city's west side, is the largest industry in the city, employing 30 people.

Employment

Employed civilian population 16 years and over		
OCCUPATION	Number	%
Civilian employed population 16 years and over	2,202	2,202
Management, business, science, and arts occupations	602	27.3%
Service occupations	501	22.8%
Sales and office occupations	636	28.9%
Natural resources, construction, and maintenance occupations	281	12.8%
Production, transportation, and material moving occupations	182	8.3%
INDUSTRY		
Civilian employed population 16 years and over	2,202	2,202
Agriculture, forestry, fishing and hunting, and mining	22	1.0%
Construction	148	6.7%
Manufacturing	189	8.6%
Wholesale trade	54	2.5%
Retail trade	311	14.1%
Transportation and warehousing, and utilities	40	1.8%
Information	87	4.0%
Finance and insurance, and real estate and rental and leasing	236	10.7%
Professional, scientific, and management, and administrative and waste management services	85	3.9%
Educational services, and health care and social assistance	611	27.7%
Arts, entertainment, and recreation, and accommodation and food services	198	9.0%
Other services, except public administration	99	4.5%
Public administration	122	5.5%

Table 71: Vinton Civilian Population Employment 2010. From the US Census Bureau.

CRITICAL FACILITIES

Critical facilities are those structures and infrastructure that the community places a priority on protecting. Damage to these facilities can impact the delivery of vital services, cause greater damages to other sections of the community, or can put special, vulnerable populations at risk. The Planning Committee identified the following critical facilities:

Facilities essential to the health and welfare of the entire population, especially following a hazard event:

Vinton City Hall & Police Station 110 W 3rd Street 310 A Avenue

Benton County Court House & Governor Sherman Building

111 E 4th Street 303 1st Avenue

Vinton Fire Station 109 E 2nd Street

North Benton Ambulance Headquarters 704 W 4th Street

Emergency Shelters

Iowa Braille School 1002 G Avenue

Vinton Skate and Activity Center 1703 C Avenue

Transportation Systems

Highway 218

Highway 150

Cedar River Bridge

Lifeline Utility Systems

Water Treatment Plant 903 W 1st Street

City Wells 903 W 1st Street
Wastewater Treatment Plant 6026 25th Avenue Drive
Vinton Electric Utility Plant 214 E 2nd Street & 201 E 2nd Street
Vinton Street Department 901 W 3rd Street

Vulnerable Population Centers

Virginia Gay Annex 502 N 9th Avenue
Vinton Lutheran Home 1301 2nd Avenue
Happy Time Child Care 1310 W 1st Street
Head Start Day Care and Preschool 202 E 4th Street
Vinton-Shellsburg Schools:
 Tilford Elementary 308 E 13th Street
 Washington Middle School 212 W 15th Street
 Vinton-Shellsburg High School 210 W 21st Street
Iowa Braille and Sight Savings School 1002 G Avenue
Windsor Assisted Living Manor 1807 W 5th Street

Medical Facilities

Virginia Gay Hospital 502 N 9th Avenue
Vinton Family Medical Clinic 504 N 9th Avenue
St. Luke's Clinic 1803 C Avenue
Vinton Family Practice 1803 C Avenue
Hy-Vee Dollar Fresh 911 South K Avenue
LaGrange Pharmacy 111 W 4th Street

Financial Institutions

US Bank 110 W 4th Street
Farmer's Savings Bank & Trust 401 B Avenue
Cedar Valley Bank and Trust 405 W 3rd St
Regions Bank 510 A Avenue

Food Supplier

Fareway Stores 501 A Avenue
Casey's General Store 402 W 4th Street
Hy-Vee Dollar Fresh 911 South K Avenue
John's Qwik Stop 814 C Avenue
The Ron-Da-Voo 414 1st Avenue
Vinton Family Restaurant 310 W 21st Street
Tootsie's 210 North K Avenue
Pizza Ranch 219 W 4th Street
Pizza Hut 303 North K Avenue
Lotus Chinese Restaurant 102 W 4th Street
McDonalds 308 South K Avenue
Subway 309 South K Avenue

Hardware Stores

Thiesens	1405 Hwy 218 South
McDowell's	420 2nd Avenue
Rabe Hardware	112 W 4 th St.

Gas & Fuel supplier

Casey's General Store	1112 West 4 th Street
John's Qwik Stop	814 C Avenue
Henkle's Service and Repair	319 W 4th Street
Ehlinger's	310 South K Avenue
Hy-Vee Dollar Fresh	911 South K Avenue

Source of labor

AmeriCorps	1002 G Avenue
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Hotels

Cobblestone Inn	1202 W 11th Street
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WALFORD

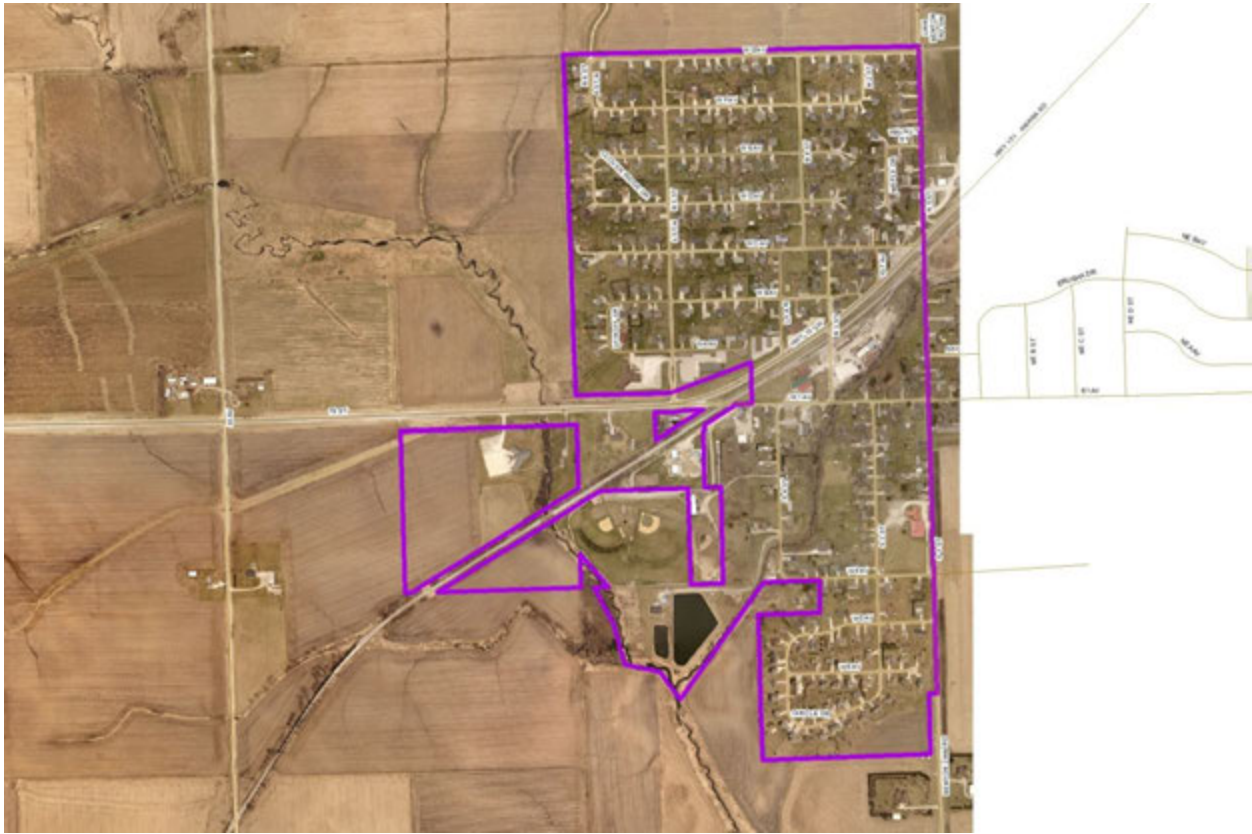


Figure 53: Walford in 2018

Walford is located at 41°52'41"N 91°50'6"W, on the county line in southeast Benton County. 75% of the city is located in Benton County and 25% is in Linn County. Walford promotes diversity in economic growth, planning and sound strategies for future community changes, a broad local business base, and an excellent quality of life. According to the United States Census Bureau, the city has a total area of 1.11 square miles (2.87 km²), all of it land. In 2018 the city annexed an additional 21 acres in Benton County.

As of the census of 2010, there were 1,463 people, 479 households, and 414 families residing in the city. The population density was 1,318.0 inhabitants per square mile (508.9/km²). There were 492 housing units at an average density of 443.2 per square mile (171.1/km²). The racial makeup of the city was 98.6% White, 0.1% African American, 0.1% Native American, 0.3% Asian, 0.1% from other races, and 0.8% from two or more races. Hispanic or Latino of any race were 0.6% of the population.

There were 479 households of which 52.0% had children under the age of 18 living with them, 75.6% were married couples living together, 7.3% had a female householder with no husband present, 3.5% had a male householder with no wife present, and 13.6% were non-families. 10.0% of all households were made up of individuals and 2.8% had someone living alone who was 65 years of age or older. The average household size was 3.05 and the average family size was 3.29.

The median age in the city was 35.1 years. 33.4% of residents were under the age of 18; 5.6% were between the ages of 18 and 24; 30.4% were from 25 to 44; 25.3% were from 45 to 64; and 5.3% were 65 years of age or older. The gender makeup of the city was 51.4% male and 48.6% female.

The median income for a household in the city was \$92,105 and the median income for a family was \$105,139. The per capita income for the city was \$30,356.

The City of Walford has 6 facilities worth a combined total of \$5,006,294. None of the facilities are located within a flood zone.

Figure 54: Walford Population Change 1960-2013

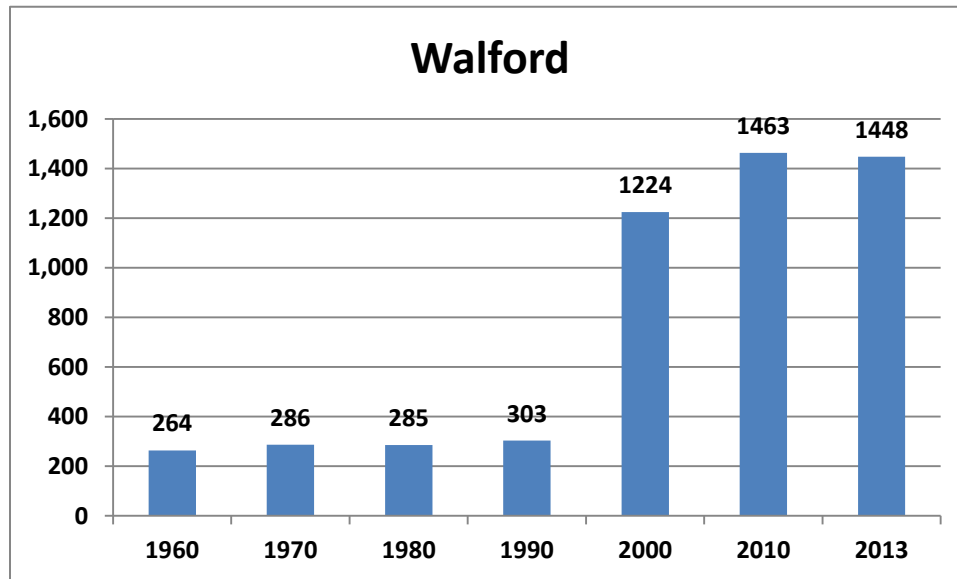


Table 72: Walford Population Change Statistics 1960-2010

Year	Population	Number Change (Linear Method)	Growth/Decline Rate (Geometric Method)
1960	264	n/a	n/a
1970	286	22	8.3%
1980	285	-1	0%
1990	303	18	6.3%
2000	1224	921	303.9%
2010	1463	239	19.6%
Average (1960 - 2010)		1199/5 = 240	338.1/5 = 67.6%

Table 73: Walford Projected Population Change 2020-2050

Year	Linear Projections	Geometric Projections
2020	1703	2452
2030	1943	4110
2040	2183	6888
2050	2423	11544

Table 74: Vulnerable Populations in the City of Walford; 2000 and 2010

Area	2000				2010			
	<18	%	>64	%	<18	%	>64	%
	445	36	53	4	488	33	77	5
Benton County	6,924	27	3,902	15	5,781	22	4,015	15
Iowa	733,629	25	436,213	15	716,011	24	466,169	15

Government

The City of Walford is governed by a Mayor/Council form of government with five council members and a mayor, all of whom are elected. The city also has a full-time city clerk and two full-time public works employees.

Building Regulations

The City of Walford has various ordinances regulating development and building construction in the city. Chapters of the city's code relative to development and building construction include:

- Chapter 145 – Dangerous Buildings
- Chapter 146 – Sign Code
- Chapter 147 – Wind Energy Conversions
- Chapter 148 – Geothermal Well Standards
- Chapter 149 – Solar Energy
- Chapter 165 – Zoning Regulations, including the Sign Code
- Chapter 166 – Subdivision Regulations
- Chapter 37 – Floodplain Management
- Chapter 36 – Emergency Management Plan

Streets

The City of Walford has approximately 77 blocks, or 9 miles of streets. Surfaces of the city's streets are concrete and seal coat. The city's two public works employees take care of street maintenance for the city.

Water And Water Treatment

The City of Walford does not have a water treatment system. Walford residents all maintain their own private wells.

Wastewater Treatment

Wastewater treatment for the City of Walford is accomplished with an extended air activated sludge treatment plant located on 4th Street South. The plant has a capacity of 430,000 gallons per day

Emergency Services

Law Enforcement

Law enforcement for the City of Walford contracts law enforcement services with the Linn County Sheriff's Department headquartered in Cedar Rapids.

Fire Department

The City of Walford receives fire protection from the Fairfax Fire Department (FFD). The department has two stations, one in Fairfax and one in Walford. The FFD is staffed with 37 volunteer firefighters, 11 of whom reside in Walford. The department maintains a fleet of 8 vehicles; 2 pumpers, 1 tanker, 1 pumper/tanker, 2 medical response units, 1 rescue unit and 1 wildland/grass firefighting rig, plus a personnel rescue/mobile command vehicle and a wildland firefighting rig. The department responds to an average of 175 fire and medical alarms annually.

Emergency Medical Services

Immediate emergency medical service for the City of Walford is provided by the Fairfax Fire Department which maintains a medical first response unit in Walford. EMS transport service is provided by Area Ambulance Service, a paramedic level service headquartered at Mercy Hospital in Cedar Rapids. The Fairfax Fire Department responds to an average of 150 medical calls annually.

Utilities providers

Natural Gas – Alliant Energy

Electricity – Alliant Energy

Telephone - South Slope Cooperative Communications Company located in North Liberty, Iowa.

Cable TV - South Slope Cooperative Communications Company located in North Liberty, Iowa.

Business and Industry

Walford is home to 27 commercial and industrial enterprises. GSTC Trucking and Midwest Computer Broker are the city's largest employers.

Employment

Employed civilian population 16 years and over		
OCCUPATION	Number	%
Civilian employed population 16 years and over	914	914
Management, business, science, and arts occupations	363	39.7%
Service occupations	107	11.7%
Sales and office occupations	216	23.6%
Natural resources, construction, and maintenance occupations	72	7.9%
Production, transportation, and material moving occupations	156	17.1%
INDUSTRY		
Civilian employed population 16 years and over	914	914
Agriculture, forestry, fishing and hunting, and mining	12	1.3%
Construction	45	4.9%
Manufacturing	151	16.5%
Wholesale trade	47	5.1%
Retail trade	79	8.6%
Transportation and warehousing, and utilities	95	10.4%
Information	15	1.6%
Finance and insurance, and real estate and rental and leasing	32	3.5%
Professional, scientific, and management, and administrative and waste management services	52	5.7%
Educational services, and health care and social assistance	266	29.1%
Arts, entertainment, and recreation, and accommodation and food services	45	4.9%
Other services, except public administration	36	3.9%
Public administration	39	4.3%

Table 75: Walford Civilian Population Employment 2010. From the US Census Bureau.

CRITICAL FACILITIES

Critical facilities are those structures and infrastructure that the community places a priority on protecting. Damage to these facilities can impact the delivery of vital services, cause greater damages to other sections of the community, or can put special, vulnerable populations at risk. The Planning Committee identified the following critical facilities:

Facilities essential to the health and welfare of the entire population, especially following a hazard event:

Walford City Hall 120 5th Street N.
 Fairfax Fire Department—Walford Station 120 5th Street N.
 Emergency Shelters
 Clover Ridge United Methodist Church 125 5th Street N.
 Walford Community Center 120 5th Street N.
 Walford Public Works Building 800 G Street

Transportation Systems
 US Highway 151

Lifeline Utility Systems
 Walford wastewater treatment plant 195 4th St. S.

Vulnerable Population Centers

None

Financial Institutions

Central State Bank 345 Highway 151

Food Supplier

Wild Hogs Saloon & Eatery 350 Commercial Drive

Bully's Angle Inn 505 Highway 151

Hardware Stores

None

Gas & Fuel supplier

Walford BP 200 US 151

Fausser Oil 100 US 151

BENTON COUNTY UNINCORPORATED

The area that became Benton County was acquired by the United States as a part of the Louisiana Purchase in 1803. The county was named after US Senator Thomas Hart Benton and was organized as Benton County in 1846. The area was first settled in 1839 by two adventurous young men, George Wright and John Smith who built a cabin in Canton Township and cleared some land. Hoosier's Point was the first settlement in Benton County. It eventually became known as Marysville and is today the City of Urbana. The county's first post office was established in Vinton in 1846 and Vinton was selected as the county seat. The county's current court house is the third that the county has had and was constructed in 1905. The first courthouse was razed by a fire in 1853. The second courthouse, which was built in the southeastern corner of the current courthouse square, was dedicated in 1856. It was torn down to make room for the current courthouse. In 1865 the population of Benton County had risen to 11,245. By 1900 it was 25,177. In 1970 the population of the county was 22,885

Benton County has 43 facilities worth a combined total of \$22,392,872. None of the facilities are located within a flood zone.

The US Census Bureau estimated the population of Benton County's unincorporated area at 9,742 living in 3,743 housing units in 2010.

Government

Benton County is governed by a three-member Board of Supervisors. Elected officials of the county are three county supervisors, the sheriff, recorder, treasurer, attorney, and auditor.

All totaled Benton County has 107 full-time and 47 part time employees of its departments and services. The breakdown is as follows:

		Full-time	Part-time
Supervisors	3		
Auditor	4		
Treasurer	7		
Attorney	4		2
Sheriff	24		22
Recorder	2		
Assessor	4		
Sanitarian/LandUse Admin	2		
Transportation	2		11
Social Services	2	1	
Secondary Roads	38		2
Landfill	4		
Veteran's Affairs			1
Conservation	6		6
Emergency Management	1		1
Maintenance	2		1
Data Processing	2		
LEC Project Coordinator		1	

Regulations

The following ordinances relative to hazard mitigation are in force in Benton County. In addition to these regulations there are various regulations that are covered under the Code of Iowa.

<u>Ordinance Number</u>	<u>Title</u>
11	Collection and Disposal of Waste Matter
15	Airport Tall Structure Zoning Ordinance
16	Issuing Siting Permits
17	Prohibiting Creation or Maintenance of a Nuisance within Benton County
29	Snow removal
31	On-site Wastewater Treatment and Disposal System
32	Well Field Protection
33	Rural Address System
47	Class "C" Roads
48	Quarantine and Isolation
58	Floodplain Management
60	Private Sewage Disposal System

Roads & Transportation Systems

Roads: Benton County has 1,330 miles of rural roads maintained by Benton County Secondary Roads including 97 miles of rural primary, 216 miles of paved/hard surface secondary roads, 924 miles of rock surface secondary roads, 93 miles of earth (dirt) surface secondary roads. Interstate 380/Iowa Highway 27 crosses the northeastern corner of Benton County. Two major highways extend across the county. U.S. Highway No. 30 traverses the southern half of the county. U.S. Highway No. 218 extends east and north across the county. Several state highways and hard surfaced county roads connect these major highways to the smaller communities. Most other roads are hard surfaced or are surfaced with crushed limestone or gravel. State Highways in Benton County include Iowa Highway 8, Iowa Highway 21 and Iowa Highway 150.

Figure 55: Benton County Farm to Market Roads. Map provided by Iowa DOT.

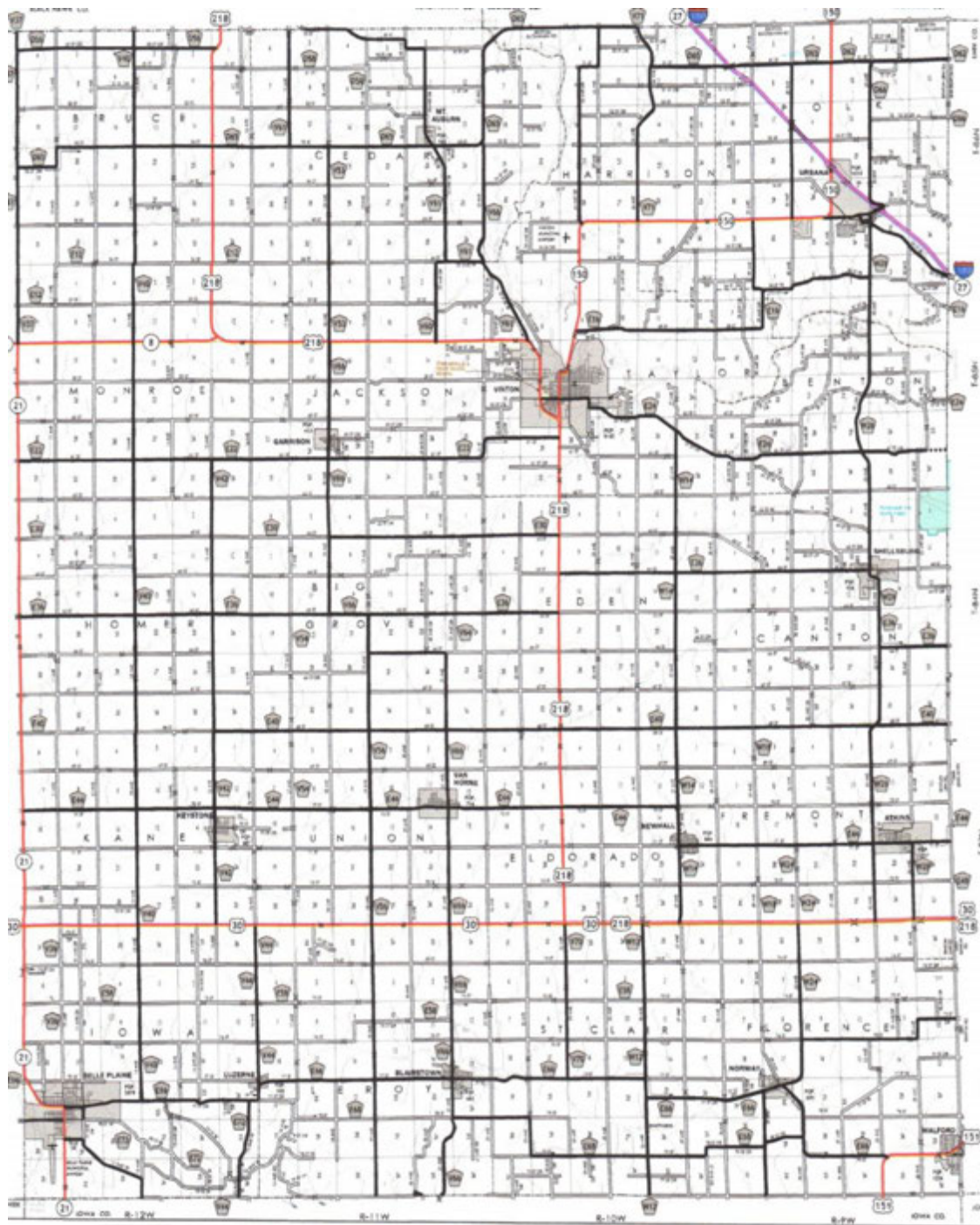
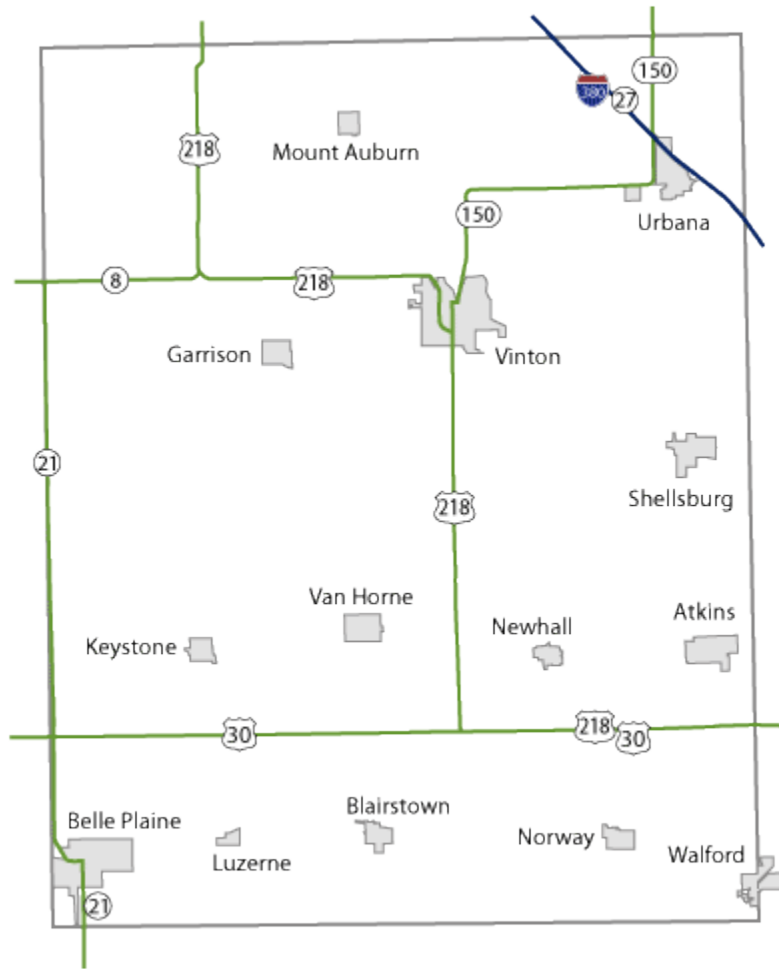


Figure 56: Major highways and interstates of Benton County. Map provided by Iowa DOT.



Railroads: Benton County has three railroads. Nearly 100 trains per day travel 24 miles of track through the cities of Belle Plaine, Blirstown and Norway on a busy double rail line operated by the Union Pacific Railroad. The Iowa Northern Railroad passes two trains daily over 25 miles of track through Mt. Auburn, Vinton and Shellsburg. Two miles of track operated by the Cedar Rapids—Iowa City Railroad pass through Walford in the southeast corner of the county.

Airports: Benton County has two airports domiciled within the county's boundaries, the Belle Plaine Airport near Belle Plaine and the Vinton Veterans Memorial Airport near Vinton. Both have 4,000 feet long runways.

Water And Water Treatment

Benton County unincorporated does not have a water treatment system. The only organized means of water supply in the county is rural water that is supplied by the Poweshiek Rural Water Association headquartered at 125 Industrial Drive, Brooklyn, Iowa. The association has 1,050 clients in the townships of Bruce, Cedar, Eldorado, Fremont, Florence, Iowa, Jackson, Leroy, Monroe, St. Claire and Union. All of the remaining Residents of Benton the rural Benton County maintain their own private wells.

Wastewater Treatment

Wastewater treatment for Benton County Unincorporated areas is accomplished through private septic systems.

Emergency Services

Emergency Management

Emergency Management for the unincorporated area of Benton County is provided by the Benton County Emergency Management Agency, headquartered in the Benton County Courthouse in Vinton, is governed by a board of commissioners comprised of the Mayors from each of the incorporated jurisdictions in the County or their delegates, a representative of the Benton County Sheriff's Department and the Benton County Board of Supervisors. The agency currently has one full-time staff person, the Emergency Management Coordinator and one volunteer who assists in the office. The Emergency Management Agency works in conjunction with local fire, rescue, police, and government officials to draft and implement workable emergency action plans in the community. Furthermore, the Agency is responsible for the monthly testing of all outdoor warning sirens in the County.

Law Enforcement

Law Enforcement for the unincorporated area of Benton County is provided by the Benton County Sheriff's Office. The office is headquartered in Vinton and maintains a staff of 43 people, 16 of whom are actively engaged in law enforcement activities as patrol officers.

HAZMAT Services

A regional Hazardous Materials Team is on hand to assist Benton County with a Hazard Materials event or catastrophe. The Team is located within fifteen minutes of Atkins and is operated by the Linn County Hazardous Materials Response Team headquartered in Cedar Rapids. The Team assists Benton County fire departments with hazard materials emergency procedures and training, thus reducing the possibility of additional contamination in a hazardous materials emergency. An evacuation plan is also in place in the Benton County Multi-Hazard Emergency Operations Plan. The plan is intended to be used in conjunction with activities of the HAZMAT team and community emergency responders.

Fire Departments

Benton County unincorporated areas receive fire protection from 14 domiciled fire departments in Atkins, Belle Plaine, Blairstown, Garrison, Keystone, Luzerne, Mount Auburn, Newhall, Norway, Shellsburg, Urbana, Van Horne, Vinton and Watkins. Staffing of these departments is entirely volunteer. The fire departments of Benton County are all signatory to a county-wide mutual aid agreement making the services of all departments in the county available to each other in the event of a major fire or emergency. Fire departments in neighboring counties with territory in Benton County include Brandon, Dysart, Fairfax, La Porte City and Walker.

Emergency Medical Services

Emergency Medical Services in Benton County include first responder services in Atkins, Garrison, Keystone, Newhall, Norway and Van Horne. Ambulance services include Blainstown, Belle Plaine, North Benton and Urbana. Emergency medical service providers in neighboring counties that also provide service to Benton County include the Brandon First Responders, Dysart Ambulance Service, Elberon Ambulance Service, Hiawatha Ambulance Service, La Porte City Ambulance Service and Area Ambulance Service from Cedar Rapids.

Utilities providers

Natural Gas – Alliant Energy, Northern Natural Gas

Electricity – Alliant Energy, East Central Iowa REC

Telephone – South Slope Cooperative Communications Company located in North Liberty, Iowa; Van Horne Cooperative Telephone, Van Horne; USA Communications, Shellsburg; Coon Creek Telephone Co., Blainstown; Atkins Telephone Co., Atkins.

Cable TV – South Slope Cooperative Communications Company located in North Liberty, Iowa; Van Horne Cooperative Telephone, Van Horne; USA Communications, Shellsburg; Coon Creek Telephone Co., Blainstown; Atkins Telephone Co., Atkins.

Cell Phone – numerous providers

Business and Industry

Agriculture is the predominant business in the unincorporated area of Benton County. Census Data indicates that in 2009 the county had 1,250 farms totaling 402,000 acres or 86% of the land area of the county. The average size of a Benton County Farm is 322 acres. The average age of Benton County farmers is 56. The average value of a farm and its buildings is \$1,446,850.

According to information provided by the Benton County Assessor's Office there are 132 non-farming business and industries located in the unincorporated areas of Benton County. Data could not be obtained regarding the type of business or industry or the employment at the various businesses and industries.

CRITICAL FACILITIES

Critical facilities are those structures and infrastructure that the community places a priority on protecting. Damage to these facilities can impact the delivery of vital services, cause greater damages to other sections of the community, or can put special, vulnerable populations at risk. The Planning Committee identified the following critical facilities:

Facilities essential to the health and welfare of the entire population, especially following a hazard event:

Road maintainer sheds of Benton County Secondary Roads located in or near Belle Plaine, Blainstown, Bruce Township, Garrison, Keystone, Mt. Auburn, Newhall, Norway, Shellsburg, Urbana and Vinton

Transportation Systems

Interstate 380/Iowa Highway 27

U.S. Highway No. 30

U.S. Highway No. 218

Iowa Highway 8

Iowa Highway 21

Iowa Highway 150.

1,330 miles of rural roads maintained by Benton County Secondary Roads including 97 miles of rural primary, 216 miles of paved/hard surface secondary roads, 924 miles of rock surface secondary roads, 93 miles of earth (dirt) surface secondary roads.

24 miles of Union Pacific Railroad line

Lifeline Utility Systems

None

Vulnerable Population Centers

None

Financial Institutions

Watkins Savings Bank

Food Supplier

Ced Rel Supper Club

Tara Hills Country Club

Hardware Stores

Professional Ag Supplies

Gas & Fuel supplier

New Century FS

Communications Systems

Channel 28 FOX Tower

Benton County Communications Tower

US Cellular Communications Towers

Mediacom Communications Tower

TV-6 LLC Communications Tower

RACOM Communications Tower

BENTON COUNTY TOTALS

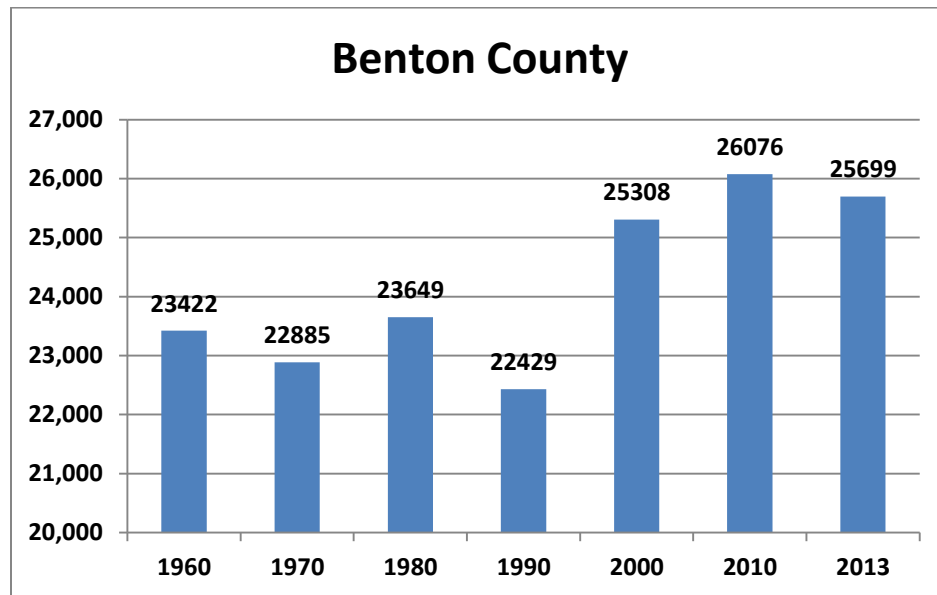


Figure 57: Benton County Population Change Statistics 1960-2010

Table 76: Benton County Population Change Statistics 1960-2010

Year	Population	Number Change (Linear Method)	Growth/Decline Rate (Geometric Method)
1960	23,422	n/a	n/a
1970	22,885	-537	-2.3
1980	23,649	764	3.4%
1990	25,308	1,659	7%
2000	26,076	768	3%
2010	25,699	-377	-1.4%
Average (1960 - 2010)		2277/5 = 455	9.7/5 = 1.9%

Table 77: Benton County Projected Population Change 2020-2050

Year	Linear Projections	Geometric Projections
2020	26,531	26,570
2030	26,986	27,075
2040	27,441	27,589
2050	27,896	28,113

Table 78: Vulnerable Populations in Benton County; 2000 and 2010

Area	2000				2010			
	<18	%	>64	%	<18	%	>64	%
Benton County	6,924	27	3,902	15	5,781	22	4,015	15
Iowa	733,629	25	436,213	15	716,011	24	466,169	15

Employment—Total for County

Employed civilian population 16 years and over			
OCCUPATION		Total	%
Civilian employed population 16 years and over		13,085	13,085
Management, business, science, and arts occupations		4,082	31.2%
Service occupations		1,914	14.6%
Sales and office occupations		3,298	25.2%
Natural resources, construction, and maintenance occupations		1,585	12.1%
Production, transportation, and material moving occupations		2,206	16.9%
INDUSTRY			
Civilian employed population 16 years and over		13,085	13,085
Agriculture, forestry, fishing and hunting, and mining		701	5.4%
Construction		924	7.1%
Manufacturing		2,155	16.5%
Wholesale trade		601	4.6%
Retail trade		1,605	12.3%
Transportation and warehousing, and utilities		726	5.5%
Information		386	2.9%
Finance and insurance, and real estate and rental and leasing		933	7.1%
Professional, scientific, and management, and administrative and waste management services		657	5.0%
Educational services, and health care and social assistance		2,725	20.8%
Arts, entertainment, and recreation, and accommodation and food services		725	5.5%
Other services, except public administration		536	4.1%
Public administration		411	3.1%

Table 79: Benton County Civilian Population Employment 2010. From the US Census Bureau.

PAST DISASTERS AND DISASTER DECLARATIONS

Declaration	Date Declared	Incident Period	Type
DR-4552	August 17, 2020	August 10, 2020	Sever Storm
DR-4483	March 23, 2020	January 20, 2020—Continuing	Iowa COVID-19 Pandemic
DR-4299	October 31, 2016	September 21 to October 3, 2016	Severe Storms and Flooding
DR-4135	July 31, 2013	June 21, 2013 to June 28, 2013	Severe Storms, Tornadoes, and Flooding
DR-4126	July 2, 2013	May 19, 2013 to June 15, 2013	Severe Storms, Tornadoes, and Flooding
DR-4016	August 24, 2011	July 9, 2011 to July 14, 2011	Severe Storms, Straight-Line Winds, and Flooding
DR-1705	May 25, 2007	May 5, 2007 to May 7, 2007	Severe Storms, Flooding, and Tornadoes
DR-1688	March 14, 2007	February 23, 2007 to March 2, 2007	Severe Winter Storms
DR-1518	May 25, 2004	May 19, 2004 to June 24, 2004	Severe Storms, Tornadoes, and Flooding
DR-1420	June 19, 2002	June 3, 2002 to June 25, 2002	Severe Storms and Flooding
DR-1230	July 2, 1998	June 13, 1998 to July 15, 1998	Severe Weather, Tornadoes and Flooding
DR-996	July 9, 1993	April 13, 1993 to October 1, 1993	Flooding, Severe Storm
DR-986	April 26, 1993	March 26, 1993 to April 12, 1993	Flooding, Severe Storm
DR-443	June 24, 1974	June 24, 1974	Severe Storms, Flooding
DR-269	August 14, 1969	August 14, 1969	Heavy Rains, Flooding
DR-193	April 22, 1965	April 22, 1965	Flooding
DR-996	July 9, 1993	April 13, 1993 to October 1, 1993	Flooding, Severe Storm
DR-879	September 6, 1990	July 25, 1990 to August 31, 1990	Flooding, Severe Storm
DR-868	May 26, 1990	May 18, 1990 to July 6, 1990	Flooding, Severe Storm
DR-443	June 24, 1974	June 24, 1974	Severe Storms, Flooding
DR-269	August 14, 1969	August 14, 1969	Heavy Rains, Flooding

Table 80: Past Presidential Disasters declared fir Benton County

Throughout the history of Benton County there have been numerous disaster incidents of smaller proportions and influence that did not receive Presidential or Agricultural Disaster Declarations. Some of these events have been documented, some have not. Where appropriate and when information is available, these incidents are noted in this plan.

PREVIOUS HAZARD MITIGATION PLANNING

Hazard Mitigation Planning in Benton County has previously been undertaken at the individual community level. Plans developed, who they were developed by and the year they received FEMA approval are as follows:

Atkins	2009	Steve Meyer Consulting LLC.
Belle Plaine	2007	East Central Iowa Council of Governments (ECICOG)
Blairstown	2009	Steve Meyer Consulting LLC.
Keystone	2009	Steve Meyer Consulting LLC.
Luzerne	2006	Steve Meyer Consulting LLC.
Mt. Auburn	2009	Steve Meyer Consulting LLC.
Norway	2006	Steve Meyer Consulting LLC.
Shellsburg	2006	Steve Meyer Consulting LLC.
Urbana	2007	Steve Meyer Consulting LLC.
Vinton	2005	Steve Meyer Consulting LLC.

Benton County Countywide Multijurisdictional Hazard Mitigation Plan 2011
Steve Meyer Consulting LLC.

Benton County Countywide Multijurisdictional Hazard Mitigation Plan 2016 Revision
Steve Meyer Consulting LLC.

CURRENT AND HISTORIC MITIGATION ACTIVITIES AND MEASURES

A. Benton County (rural areas only)

- All of rural Benton County is covered with Law Enforcement provided by the Benton County Sheriffs office, Fire Service provided by the various municipal fire departments, and Emergency Medical Service provided by Fire Department First Responders and various Ambulance Services. Air ambulances are available from St. Luke's Hospital in Cedar Rapids, Covenant Medical Center in Waterloo and U of Iowa Hospitals in Iowa City.
- Benton County EMA offers annual weather spotter training to all emergency responders, amateur radio club members, and citizens.
- A 100 square mile portion of eastern Benton County is covered by 37 outdoor warning sirens with message capability as part of the Duane Arnold Energy Center nuclear power plant system. These sirens are utilized for severe weather warnings and any other life threatening situation which may occur in this portion of the county.
- Benton County is covered by contract with the Linn County Hazardous Materials team. This team is Technician Level trained. Benton County has a cost recovery ordinance in place and offers Haz-mat Operations Level classes annually to our emergency responders.
- In 2004 Benton County was recognized by the National Weather Service as the second county in Iowa to achieve StormReady status. One part of achieving the recognition was the purchase of 92 NOAA Tone Alert Weather Radios by the Benton County Emergency Management Commission. The radios were installed in key government buildings and care facilities in all Benton County communities.
- The Benton County Emergency Management Agency has plans in place outlining Emergency Operations, Hazard Mitigation, Recovery and FEMA approved plans for a radiological incident at the Duane Arnold Energy Center. The Agency also has a current Hazard Analysis, Emergency Management Accreditation Program Assessment, Homeland Security Needs Assessment, 5 year Strategic Plan and participates annually in the Emergency Management Performance Grant program.
- The Benton County Emergency Management Agency participates in four training drills and two full scale exercises per year in support of the Duane Arnold Energy Center nuclear power plant. The Agency also conducts other hazards drills and exercises throughout the year, with various county officials and volunteers participating at the EOC and on scene.
- Various training opportunities covering a variety of topics are offered to Benton County emergency responders throughout the year.

- FEMA approved county-wide Multi-Jurisdictional Hazard Mitigation Plan adopted in 2011

B. Atkins

- Emergency Services:
 - Law: Benton County Sheriff's Department
 - Fire: Atkins Fire Department
 - EMS: Atkins First Responders and Hiawatha Ambulance
 - Haz-mat: Linn County Hazardous Materials Team- Technician Level
- StormReady community
- Battery backup outdoor warning siren with message capability
- EMA Indoor Warning System receiver in elementary school building
- Various Ordinances for community safety and cleanliness

C. Belle Plaine

- Emergency Services:
 - Law: Belle Plaine Police Department
 - Fire: Belle Plaine Fire Department
 - EMS: Belle Plaine Ambulance
 - Haz-mat: Linn County Hazardous Materials Team - Technician Level
- StormReady community
- Electricity required outdoor warning siren
- EMA Indoor Warning System receiver in all school buildings and extended care facility
- Various Ordinances for community safety and cleanliness

D. Blainstown

- Emergency Services:
 - Law: Benton County Sheriff's Department
 - Fire: Blainstown Fire Department
 - EMS: Blainstown Ambulance
 - Haz-mat: Linn County Hazardous Materials Team - Technician Level
- StormReady community
- Battery outdoor warning siren with message capability
- Various Ordinances for community safety and cleanliness

E. Garrison

- Emergency Services:
 - Law: Benton County Sheriff's Department
 - Fire: Garrison Fire Department
 - EMS: Garrison First Responders and North Benton Ambulance
 - Haz-mat: Linn County Hazardous Materials Team - Technician Level
- StormReady community
- Battery backed up outdoor warning siren installed in 2011
- Various Ordinances for community safety and cleanliness

F. Keystone

- Emergency Services:
 - Law: Benton County Sheriff's Department
 - Fire: Keystone Fire Department
 - EMS: Keystone First Responders and Elberon Ambulance
 - Haz-mat: Linn County Hazardous Materials Team - Technician Level
- StormReady community
- Battery backed up outdoor warning siren
- EMA Indoor Warning System receiver in elementary school building and extended care facility
- Various Ordinances for community safety and cleanliness

G. Luzerne

- Emergency Services:
 - Law: Benton County Sheriff's Department
 - Fire: Luzerne Fire Department
 - EMS: Belle Plaine Ambulance
 - Haz-mat: Linn County Hazardous Materials Team - Technician Level
- StormReady community
- Electricity required outdoor warning siren
- Various Ordinances for community safety and cleanliness

H. Mt. Auburn

- Emergency Services:
 - Law: Benton County Sheriff's Department
 - Fire: Mt. Auburn Fire Department
 - EMS: Mt. Auburn First Responders and North Benton Ambulance
 - Haz-mat: Linn County Hazardous Materials Team - Technician Level
- StormReady community
- Electricity required outdoor warning siren
- Various Ordinances for community safety and cleanliness

I. Newhall

- Emergency Services:
 - Law: Benton County Sheriff's Department
 - Fire: Newhall Fire Department
 - EMS: Newhall First Responders and North Benton Ambulance
 - Haz-mat: Linn County Hazardous Materials Team - Technician Level
- StormReady community
- Electricity required outdoor warning siren
- Various Ordinances for community safety and cleanliness

J. Norway

- Emergency Services:
 - Law: Benton County Sheriff's Department
 - Fire: Norway Fire Department
 - EMS: Norway First Responders and Blirstown Ambulance
 - Haz-mat: Linn County Hazardous Materials Team - Technician Level
- StormReady community
- Battery outdoor warning siren with message capability
- EMA Indoor Warning System receiver in elementary school building
- Various Ordinances for community safety and cleanliness

K. Shellsburg

- Emergency Services:
 - Law: Shellsburg Police Department
 - Fire: Shellsburg Fire Department
 - EMS: Shellsburg First Responders and Hiawatha Ambulance
 - Haz-mat: Linn County Hazardous Materials Team - Technician Level
- StormReady community
- Battery outdoor warning siren with message capability
- EMA Indoor Warning System receiver in elementary school building and extended care facility
- Various Ordinances for community safety and cleanliness

L. Urbana

- Emergency Services:
 - Law: Urbana Police Department
 - Fire: Urbana Fire Department
 - EMS: Urbana Ambulance
 - Haz-mat: Linn County Hazardous Materials Team - Technician Level
- StormReady community
- Battery outdoor warning siren with message capability
- EMA Indoor Warning System receiver in middle school building
- Adopted Uniform Building Code, National Electric Code, Uniform Plumbing Code and has a building inspector

M. Van Horne

- Emergency Services:
 - Law: Benton County Sheriff's Department
 - Fire: Van Horne Fire Department
 - EMS: Van Horne First Responders and Blainstown Ambulance
 - Haz-mat: Linn County Hazardous Materials Team - Technician Level
- StormReady community
- Battery outdoor warning siren with message capability
- EMA Indoor Warning System receiver in all school buildings
- Various Ordinances for community safety and cleanliness

N. Vinton

- Emergency Services:
 - Law: Vinton Police Department
 - Fire: Vinton Fire Department
 - EMS: North Benton Ambulance
 - Haz-mat: Linn County Hazardous Materials Team - Technician Level
- StormReady community.
- Battery outdoor warning sirens (3) with message capability
- EMA Indoor Warning System receiver in all school buildings
- Adopted Uniform Building Code, National Electric Code, Uniform Plumbing Code and has a building inspector
- Various Ordinances for community safety and cleanliness
- Safe room constructed in low-to-moderate income subdivision
- Refurbished all 4 outdoor warning sirens to have voice-messaging and battery back-up
- Currently buying out flood-damaged properties

O. Walford

- Emergency Services:
 - Law: Benton County Sheriff's Department
 - Fire: Fairfax/Walford Fire Department
 - EMS: Norway First Responders and Area Ambulance
 - Haz-mat: Linn County Hazardous Materials Team - Technician Level
- StormReady community
- Electricity required outdoor warning siren
- Various Ordinances for community safety and cleanliness

P. County-wide mitigation activity and measures

- Stockpiles of sandbags located at strategic locations throughout the county
- Iowa One Call—800-292-8989—Contractors and citizens can call before they dig.
- An epidemiology plan was developed and adopted by the Benton County Public Health Department in 2004.
- The Benton County Office of Emergency Management Developed a Mass Casualty/Mass Fatality plan for the county in 2004.
- In 2004 the Benton County Emergency Management Commission purchased 92 NOAA weather radios and distributed them free of charge to every county and city office, library, school and care facility in Benton County.
- The Benton County EMA and Benton County Health Department have established procedures for radiological monitoring in Benton County.
- A Quarantine and Isolation Ordinance for all of Benton County was adopted by Benton County in 2005.
- A Multi Hazard Operations Plan for Benton County that is maintained and updated as required by the Benton County Emergency Management Agency. This includes a part B which is mitigation.
- The Benton County EMS Association undertook the project of developing a mass casualty response trailer in 2004.
- A new emergency operations center (EOC) was constructed along with the new Benton County Law Enforcement Center. It became operational in 2011 and is one foot above the 500 year flood level.
- Existence of a comprehensive land use plan for Benton County.
- The establishment of Public Information Officer (PIO) policies and procedures documented in Benton County's Multi Hazards Operations Plan for use during emergency situations.
- The existence of a Public Health Department and a County Sanitarian for Benton County
- The Benton County Sheriff's Office has developed a Rapid Response system intended to be used in incidents involving threats at schools and other public as well as private locations.
- Benton County Emergency Management has an Emergency Shelter Trailer with equipment and supplies for up to 50 people and a 13 kw emergency electrical power generator.

- In 2009 Benton County implemented an emergency shelter program that identified shelter locations and procedures for opening and operating shelters in every city in the county
- Benton County Emergency Management now has an 8 KW and a 6.5 KW generator for operating community shelters.
- Benton County Emergency Management and Sheriff's Office /SO now have a 60 KW 3 phase generator that can operate most well/water tower pumps and sewage treatment systems
- In 2020 all school districts in Benton County completed state approved Emergency Response Plans

SECTION 2

RESOLUTIONS ADOPTING THE PLAN

Plan development actions were participated in by every jurisdiction involved in this plan. All jurisdiction involved adopted this plan by resolution. The resolutions of adoption are on the following pages.

BENTON COUNTY

ATKINS

BELLE PLAINE

CITY OF BELLE PLAINE

RESOLUTION #20-11-05

A RESOLUTION ADOPTING THE 2021 BENTON COUNTY MULTI-JURISDICTIONAL LOCAL HAZARD MITIGATION PLAN

WHEREAS, the City of Belle Plaine recognizes the threat that natural hazards pose to people and property within our community; and

WHEREAS, undertaking hazard mitigation actions will reduce the potential for harm to people and property from future hazard occurrences; and

WHEREAS, the U.S Congress passed the Disaster Mitigation Act of 2000 ("Disaster Mitigation Act") emphasizing the need for pre-disaster mitigation of potential hazards;

WHEREAS, the Disaster Mitigation Act made available hazard mitigation grants to state and local governments; and

WHEREAS, an adopted Local Hazard Mitigation Plan is required as a condition of future funding for mitigation projects under multiple FEMA pre- and post-disaster mitigation grant programs; and

WHEREAS, the City of Belle Plaine fully participated in the hazard mitigation planning process to prepare this Multi-Jurisdictional Local Hazard Mitigation Plan; and

WHEREAS, the City of Belle Plaine desires to comply with the requirements of the Disaster Mitigation Act and to augment its emergency planning efforts by formally adopting the Benton County Multi-Jurisdictional Local Hazard Mitigation Plan; and

WHEREAS, adoption by the governing body for the City of Belle Plaine demonstrates the jurisdiction's commitment to fulfilling the mitigation goals outlined in this Multi-Jurisdictional Local Hazard Mitigation Plan; and

WHEREAS, adoption of this legitimizes the plan and authorizes responsible agencies to carry out their responsibilities under the plan.

NOW, THEREFORE, BE IT RESOLVED, that the City of Belle Plaine adopts the Benton County Multi-Jurisdictional Local Hazard Mitigation Plan as an official plan; and

BE IT FURTHER RESOLVED, that the City of Belle Plaine will submit this Adoption Resolution to the Iowa Homeland Security and Emergency Management Division and Federal Emergency Management Agency Region VII officials to enable the plan's final approval.

Passed and approved the 18th day of November, 2020.

Signed: 

David Fish, Mayor

Attest: 

Jacki McDermott, City Clerk

BLAIRSTOWN

GARRISON

KEYSTONE

CITY OF KEYSTONE

RESOLUTION NO. 12-01-20

A RESOLUTION ADOPTING THE 2021 BENTON COUNTY MULTI-JURISDICTIONAL LOCAL HAZARD MITIGATION PLAN

WHEREAS, the City of Keystone recognizes the threat that natural hazards pose to people and property within our community; and

WHEREAS, undertaking hazard mitigation actions will reduce the potential for harm to people and property from future hazard occurrences; and

WHEREAS, the U.S Congress passed the Disaster Mitigation Act of 2000 ("Disaster Mitigation Act") emphasizing the need for pre-disaster mitigation of potential hazards;

WHEREAS, the Disaster Mitigation Act made available hazard mitigation grants to state and local governments; and

WHEREAS, an adopted Local Hazard Mitigation Plan is required as a condition of future funding for mitigation projects under multiple FEMA pre- and post-disaster mitigation grant programs; and

WHEREAS, the City of Keystone fully participated in the hazard mitigation planning process to prepare this Multi-Jurisdictional Local Hazard Mitigation Plan; and

WHEREAS, the City of Keystone desires to comply with the requirements of the Disaster Mitigation Act and to augment its emergency planning efforts by formally adopting the Benton County Multi-Jurisdictional Local Hazard Mitigation Plan; and

WHEREAS, adoption by the governing body for the City of Keystone demonstrates the jurisdictions' commitment to fulfilling the mitigation goals outlined in this Multi-Jurisdictional Local Hazard Mitigation Plan; and

WHEREAS, adoption of this legitimizes the plan and authorizes responsible agencies to carry out their responsibilities under the plan.

NOW, THEREFORE, BE IT RESOLVED, that the City of Keystone adopts the Benton County Multi-Jurisdictional Local Hazard Mitigation Plan" as an official plan; and

BE IT FURTHER RESOLVED, that the City of Keystone will submit this Adoption Resolution to the Iowa Homeland Security and Emergency Management Division and Federal Emergency Management Agency Region VII officials to enable the plan's final approval.

Passed and approved the 3rd day of December, 2020.

Signed: Erin G. Janss
Erin G. Janss, Mayor

Attest: Angie Hagen
Angie Hagen, City Clerk

LUZERNE

MOUNT AUBURN

NEWHALL

NORWAY

CITY OF NORWAY RESOLUTION NO. 20-08

A RESOLUTION ADOPTING THE 2021 BENTON COUNTY MULTI-JURISDICTIONAL LOCAL HAZARD MITIGATION PLAN

WHEREAS, the City of Norway recognizes the threat that natural hazards pose to people and property within our community; and

WHEREAS, undertaking hazard mitigation actions will reduce the potential for harm to people and property from future hazard occurrences; and

WHEREAS, the U.S Congress passed the Disaster Mitigation Act of 2000 ("Disaster Mitigation Act") emphasizing the need for pre-disaster mitigation of potential hazards;

WHEREAS, the Disaster Mitigation Act made available hazard mitigation grants to state and local governments; and

WHEREAS, an adopted Local Hazard Mitigation Plan is required as a condition of future funding for mitigation projects under multiple FEMA pre- and post-disaster mitigation grant programs; and

WHEREAS, the City of Norway fully participated in the hazard mitigation planning process to prepare this Multi-Jurisdictional Local Hazard Mitigation Plan; and

WHEREAS, the City of Norway desires to comply with the requirements of the Disaster Mitigation Act and to augment its emergency planning efforts by formally adopting the Benton County Multi-Jurisdictional Local Hazard Mitigation Plan; and

WHEREAS, adoption by the governing body for the City of Norway demonstrates the jurisdictions' commitment to fulfilling the mitigation goals outlined in this Multi-Jurisdictional Local Hazard Mitigation Plan; and

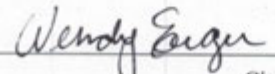
WHEREAS, adoption of this legitimizes the plan and authorizes responsible agencies to carry out their responsibilities under the plan.

NOW, THEREFORE, BE IT RESOLVED, that the City of Norway adopts the Benton County Multi-Jurisdictional Local Hazard Mitigation Plan" as an official plan; and

BE IT FURTHER RESOLVED, that the City of Norway will submit this Adoption Resolution to the Iowa Homeland Security and Emergency Management Division and Federal Emergency Management Agency Region VII officials to enable the plan's final approval.

Passed and approved the 16th day of November, 2020.

Signed: 
Mayor

Attest: 
City Clerk

SHELLSBURG

URBANA

CITY OF URBANA RESOLUTION NO. 2020-35

A RESOLUTION ADOPTING THE 2021 BENTON COUNTY MULTI-JURISDICTIONAL LOCAL HAZARD MITIGATION PLAN

WHEREAS, the City of Urbana recognizes the threat that natural hazards pose to people and property within our community; and

WHEREAS, undertaking hazard mitigation actions will reduce the potential for harm to people and property from future hazard occurrences; and

WHEREAS, the U.S Congress passed the Disaster Mitigation Act of 2000 ("Disaster Mitigation Act") emphasizing the need for pre-disaster mitigation of potential hazards;

WHEREAS, the Disaster Mitigation Act made available hazard mitigation grants to state and local governments; and

WHEREAS, an adopted Local Hazard Mitigation Plan is required as a condition of future funding for mitigation projects under multiple FEMA pre- and post-disaster mitigation grant programs; and

WHEREAS, the City of Urbana fully participated in the hazard mitigation planning process to prepare this Multi-Jurisdictional Local Hazard Mitigation Plan; and

WHEREAS, the City of Urbana desires to comply with the requirements of the Disaster Mitigation Act and to augment its emergency planning efforts by formally adopting the Benton County Multi-Jurisdictional Local Hazard Mitigation Plan; and

WHEREAS, adoption by the governing body for the City of Urbana demonstrates the jurisdictions' commitment to fulfilling the mitigation goals outlined in this Multi-Jurisdictional Local Hazard Mitigation Plan; and

WHEREAS, adoption of this legitimizes the plan and authorizes responsible agencies to carry out their responsibilities under the plan.

NOW, THEREFORE, BE IT RESOLVED, that the City of Urbana adopts the Benton County Multi-Jurisdictional Local Hazard Mitigation Plan" as an official plan; and

BE IT FURTHER RESOLVED, that the City of Urbana will submit this Adoption Resolution to the Iowa Homeland Security and Emergency Management Division and Federal Emergency Management Agency Region VII officials to enable the plan's final approval.

Passed and approved the 9th day of December, 2020.

Signed: _____

Mayor

Attest: _____

City Clerk

VAN HORNE

VINTON

WALFORD

SECTION 3

PLANNING PROCESS

PARTICIPANTS

As noted this 2021 update of the Benton County Multijurisdictional Hazard Mitigation Plan, the development of this plan was hindered by COVID-19 which prevented face-to-face meetings and relegated collection of information, input and updates to the plan to e-mail and phone consultation. The impact of the August 10, 2020 Derecho Wind disaster on the county and its cities also impeded participation in the process by city and county officials. From that day forward to the end of the year, city and county officials were overwhelmed with the enormous task of disaster recovery. In spite of those encumbrances, every city and the county did participate and provide input into the update of the plan. The 2016 plan was posted to the Benton County website in February 2020 and press releases were sent out asking for public input into the plan's update. No input was received.

The following people were on the list of contacts for the plan.

Table 81: Benton County Hazard Mitigation Planning Committee Participants

		Position	Representing
Ron	Tippett	Sheriff	Benton County Sheriff's Office
Kristopher	Hudson	Police Chief	Belle Plaine Police Dept.
Jerry	Michael	Police Chief	Urbana Police Dept.
Ted	Paxton	Police Chief	Vinton Police Dept.
Mindy	Fisher		Blairstown Ambulance Service
Jamey	Clemann		Keystone First Responders
Marge	Becker		Norway First Responders
Mike	Techau		Center Point Ambulance
Dan	Johnson		Belle Plaine Ambulance
Mike	McElmeel		North Benton Ambulance
Mark	Lint		Garrison First Responders
Jeremy	Hlas		Van Horne First Responders
Amanda	Vanatti		Shellsburg First Responders
Ben	Kurka		Atkins First Responders
Trent	Claeys		Newhall First Responders
Dan	Rammelsburg	Fire Chief	Atkins Fire Dept.
Jason	Kaplan	Fire Chief	Belle Plaine Fire Dept.
Dave	Manternach	Fire Chief	Blairstown Fire Dept.
Jake	Isbell	Fire Chief	Garrison Fire Dept.
Jamey	Clemann	Fire Chief	Keystone Fire Dept.
Dan	Martin	Fire Chief	Luzerne Fire Dept.
Dean	Vrba	Fire Chief	Mount Auburn Fire Dept.

Patrick	Butz	Fire Chief	Newhall Fire Dept.
Roy	Becker	Fire Chief	Norway Fire Dept.
David	Charlier	Fire Chief	Shellsburg Fire Dept.
Trent	Kramer	Fire Chief	Urbana Fire Dept.
Jeremy	Hlas	Fire Chief	Van Horne Fire Dept.
Charlie	Garwood	Fire Chief	Vinton Fire Dept.
Mike	Sankot	Fire Chief	Faifax/Walford Fire Dept.
Scott	Hansen	Coordinator	Benton County EMA
Amber	Bell	City Clerk	City of Atkins
Sandy	Walton	City Clerk	City of Belle Plaine
Brian	McNulty	City Clerk	City of Blirstown
Angela	Dague	City Clerk	City of Garrison
Angie	Hagen	City Clerk	City of Keystone
Jan	Kendall	City Clerk	City of Luzerne
Craig	Mahood	City Clerk	City of Mt. Auburn
Keri	Touro	City Clerk	City of Newhall
Wendy	Chesness	City Clerk	City of Norway
Barb	Tracey	City Clerk	City of Shellsburg
Tracey	Wilson	City Clerk	City of Urbana
Linda	Klopping	City Clerk	City of Van Horne
Melissa	Schwann	City Clerk	City of Vinton
Janet	Gann	City Clerk	City of Walford
Bruce	Visser	Mayor	City of Atkins
David	Fish	Mayor	City of Belle Plaine
Corrine	Kimm	Mayor	City of Blirstown
Garrett	Flickinger	Mayor	City of Garrison
Erin	Janss	Mayor	City of Keystone
John	Brandt	Mayor	City of Luzerne
Jeff	Whitson	Mayor	City of Mt. Auburn
Jan	Mattson	Mayor	City of Newhall
Bruce	Volz	Mayor	City of Norway
Lonnie	Speckner	Mayor	City of Shellsburg
Mitch	McDonough	Mayor	City of Urbana
Martin	Junge	Mayor	City of Van Horne
Bud	Maynard	Mayor	City of Vinton
William	Voss	Mayor	City of Walford
Chad	Straight	Superintendent	Belle Plaine Community Schools
Stacey	Skolars		
Mary Jo	Hainstock	Superintendent	Vinton-Shellsburg Community Schools
Karrie	Bartling		
Pamela	Ewell	Superintendent	Benton Community Schools
Doug	Embray		
Matt	Berninghaus	Superintendent	Center Point-Urbana Schools
		Board Secretary	Central Lutheran Schools
			Heartland Coop
			Farmers 4 County Cooperative
Denny	McLeod		USA Communications
Curt	Eldred		Keystone Communications
Bryan	Kimm		

Matt	Becker		Linn Coop
Steve	Gerard		New Century FS
Unicall	Emergency Center		Centurylink
Mike	McGowan		Tama-Benton Coop
Ron	Schnor	Manager	Van Horne Coop Telephone Co
Tom	Richtsmeier		Vinton Municipal Electric Dist. Bldg.
Harry	Ruth	CEO	East Central Iowa REC
Casey	Frame		Frontier Natural Products COOP
Steve	Haman		Union Pacific Council Bluffs Service Center
Joshua	Sabin		Iowa Northern Railroad
Rebecca	Palmer	EP Manager	Duane Arnold Energy Center
Jerry	Spright	Manager	Atkins Telephone Co.
Duane	Andrew	Manager	Coon Creek Telephone Co.
Dave	Powell	Manager	La Porte City Telephone Co.
Rick	Anderson	Distribution Manager	Poweshiek Water Association
			Northern Natural Gas Company
			Alliant Energy
Hayley	Rippel	Auditor	Benton County Auditor
Marc	Greenlee		Benton County Health Department
Rick	Primmer		Benton County Supervisors
Kate	Robertson	Director	Benton Development Group
Katie	Cox	Director	Benton County Public Health Dept.
Karen	Phelps	Director	Benton County Conservation
Myron	Parizek	Engineer	Benton County Engineer
Larry	Andreeson	Assessor	Benton County Assessor
Ron	Geisser		IA. DOT
Jessica	Turba	State Mitigation Officer	Iowa HSEMD
			USDA Farm Service Agency
Mindy	Benson	Coordinator	Tama County EMA
Rick	Wulfekuhle	Coordinator	Buchanan County EMA
Lori	Glover	Coordinator	Black Hawk County EMA
Josh	Humphrey	Coordinator	Iowa County EMA
Steve	O'Konek	Coordinator	Linn County EMA
Brian	Paul	Coordinator	Poweshiek County EMA

BACKGROUND

On October 30, 2000, the President signed into law the Disaster Mitigation Act of 2000, also known as DMA 2000, which amended the Stafford Act. DMA 2000 streamlines the delivery and utilization of disaster recovery assistance and places increased emphasis on local mitigation planning. It requires local governments to develop and submit mitigation plans as a condition of receiving Pre-Disaster Mitigation (PDM) and Hazard Mitigation Grant Program (HMGP) project grants.

Title 44 of the Code of Federal Regulations (44 CFR) Section 201.6 describes requirements of DMA 2000 for single jurisdictional plans, but includes options for multi-jurisdictional plans. This is called the Interim Final Rule and was first published in the Federal Register on February 26th, 2002. Because deadlines were subsequently modified, relevant sections of the Rule were again published in the Federal Register on October 1, 2002, and again on October 28, 2003, when one section was reworded.

PURPOSE

The purpose of the Benton County Multi-Jurisdictional Hazard Mitigation Plan is to decrease risk of property damage, injury and/or loss of life due to natural or manmade hazards by undertaking comprehensive mitigation strategies prior to a hazard event. The Benton County Multi-Jurisdictional Hazard Mitigation Plan also allows the participating jurisdictions to access sources of funding for mitigation projects made available under the DMA 2000.

This local hazard mitigation plan covers all municipal and governmental jurisdictions of Benton County; specifically the cities of Atkins, Belle Plaine, Blairstown, Garrison, Keystone, Luzerne, Mt. Auburn, Newhall, Norway, Shellsburg, Urbana, Van Horne, Vinton and Walford and the unincorporated areas of Benton County. The 2011 Benton County plan was revised in 2016. The 2016 plan was updated in 2021 and thus stands, at the time of completion of this document in 2016, as the only DMA compliant mitigation plan for Benton County. Included in this plan are the Benton County School Districts of Belle Plaine Community School; District, Benton Community School District, Vinton/Shellsburg School District. These are the public school districts of Benton County. Also included is the Vinton Municipal Electric Utility.

Hazard mitigation is any sustained action taken to reduce or eliminate the long-term risk to human life and property from hazards. Mitigation activities may be implemented prior to, during, or after an incident. However, it has been demonstrated that hazard mitigation is most effective when based on an inclusive, comprehensive, long-term plan that is developed before a disaster occurs.

With that definition in mind, a mitigation plan is a document that is intended to accomplish several things. First, through the planning process, the hazards that pose a risk to the community are identified. Second, hazards will be assessed based on their historic patterns of occurrence, the number of people that could be impacted, the area of the community that could be affected, the potential costs that the participating jurisdictions, individuals and organizations may incur, the likelihood of future occurrence, and the amount of warning time before that hazard event occurs.

Several key concepts are reflected throughout the mitigation planning regulations at 44 CFR

Part 201, and are reflected in each of the State, Tribal and Local Mitigation Plan requirements and corresponding guidance. The most successful of mitigation plans — where practical, meaningful mitigation actions resulted — have two common elements:

- Comprehensive risk and capability assessments that form a solid foundation for decision making
- Participation by a wide range of stakeholders who play a role in identifying and implementing mitigation actions

A Local Mitigation Plan as defined in 44 CFR §201.6 is required for local jurisdictions that elect to participate in FEMA hazard mitigation assistance programs as a sub-applicant or sub-grantee. The Stafford Act authorizes up to 7 percent of available HMGP funds for State, Tribal, or local mitigation planning purposes. Also, funds from the PDM program may be used to develop mitigation plans, and the FMA program provides annual grant funds for flood mitigation planning. The original 2010 Benton County HMP was funded by an HMGP grant awarded to the East Central Iowa Council of Governments as the sub-grantee. The 2021 update was not funded by any FEMA awarded grant. It was entirely funded by Benton County.

The Local Mitigation Plan requirements encourage agencies at all levels, local residents, businesses, and the nonprofit sector to participate in the mitigation planning and implementation process. This broad public participation enables the development of mitigation actions that are supported by these various stakeholders and reflect the needs of the community. Private sector participation, in particular, may lead to identifying local funding that would not otherwise have been considered for mitigation activities.

The purpose of this revision is to make any changes to demographic and community profile information that is necessary; update the hazard analysis to note any disaster or emergency events from 2010-2014 that have occurred any influence these events would have on hazards ranking; document any changes in mitigation actions. This is done in order to comply with FEMA required periodic revisions every 5 years.

SCOPE

This plan applies to all municipal jurisdictions of Benton County: Atkins, Belle Plaine, Blainstown, Garrison, Keystone, Luzerne, Mt. Auburn, Newhall, Norway, Shellsburg, Urbana, Van Horne, Vinton and Walford and the unincorporated areas of Benton County. Also included are the public school districts of Benton County: Belle Plaine Community School; District, Benton Community School District, Vinton/Shellsburg School District and Vinton Electrical Municipal Utility. This plan shall be effective until 5 years after the approval date or when replaced by an updated DMA 2000 compliant plan for the participating jurisdictions, whichever is sooner.

STAKEHOLDERS

Stakeholders who participated in the planning process include:

Municipal Jurisdictions:

Benton County	Ongoing Participant
City of Atkins	Ongoing Participant
City of Belle Plaine	Ongoing Participant
City of Blainstown	Ongoing Participant
City of Garrison	Ongoing Participant
City of Keystone	Ongoing Participant
City of Luzerne	Ongoing Participant
City of Mt. Auburn	Ongoing Participant
City of Newhall	Ongoing Participant
City of Norway	Ongoing Participant
City of Shellsburg	Ongoing Participant
City of Urbana	Ongoing Participant
City of Van Horne	Ongoing Participant
City of Vinton	Ongoing Participant
City of Walford	Ongoing Participant

School Districts

Belle Plaine Community School; District	Ongoing Participant
Benton Community School District	Ongoing Participant
Vinton/Shellsburg School District	Ongoing Participant

Vinton Municipal Electrical Utility	New Participant
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Additional Stakeholders who were invited to participate in the planning process include:

Neighboring Counties

Black Hawk County
Buchanan County
Iowa County
Linn County
Poweshiek County

Major Business or Other Entities in Benton County

Farmers 4 County Cooperative--Blainstown
Linn Coop--Newhall
New Century FS--Vinton
Tama-Benton Coop—Vinton
Ideal Manufacturing—Vinton
Duane Arnold Energy Center—Palo
East Central Iowa REC—Urbana
Frontier Natural Products COOP—Norway
Virginia Gay Hospital--Vinton

AUTHORITY

Section 322 of the Robert T Stafford Disaster Relief and Emergency Assistance Act (Stafford Act) 42 U.S.C. 5165, as amended by the DMA 2000, provides for States, Tribes and local governments to undertake a risk-based approach to reducing risks to natural hazards through mitigation planning. The National Flood Insurance Act of 1968, as amended, 42 U.S.C 4001 *et seq*, reinforced the need and requirement for mitigation plans, linking flood mitigation to assistance programs to State, tribal and Local Mitigation Plans. Under this authority, the City of Atkins, the City of Belle Plaine, the City of Blainstown, the City of Garrison, the City of Keystone, the City of Luzerne, the City of Mt. Auburn, the City of Newhall, the City of Norway, the City of Shellsburg, the City of Urbana, the City of Van Horne, the City of Vinton, the City of Walford, Benton County, The Belle Plaine Community Schools, Benton Community Schools, Vinton-Shellsburg Community Schools and Vinton Municipal Electric Utility are participating in this plan as a multi-jurisdictional hazard mitigation plan.

The Benton County Multi-Jurisdictional Plan has been adopted by each participating jurisdiction (see Resolutions page 166) and will be approved by FEMA.

FUNDING

The original Benton County Multi-jurisdictional Hazard Mitigation Plan and 2016 revision were funded under an HMGP planning grant made available after presidential disaster declaration DRA-1998-IA.

Funding for the 2021 update to the Benton County Multi-jurisdictional Hazard Mitigation Plan was provided entirely by Benton County—there was no federal grant assistance.

PLANNING PROCESS

2016 REVISION

The planning process followed in revising the 2016 Benton County Multi-Jurisdictional Hazard Mitigation plan generally followed the outlined scope of services provided by Homeland Security and Emergency Management Division on the HMGP grant application that funded this project. The consultant working on this project found that since the plan was originally developed and approved by FEMA in 2011 that there was no effort by any jurisdiction to revisit the plan, review the plan or update the status of any community's implementation strategy. The only review that occurred was when the consultant initiated the revision process. The recommended review process is detailed in Section 7, Plan Maintenance, page 547.

Kickoff meetings for revision of the plan were held on January 27, 28, February 3 and 5, 2015 at four different locations in the county (See Appendix C, page 568). Consultant Meyer also presented the same kickoff information at the Benton County Emergency Management Commission on January 26, 2015 and the Benton County Firefighters Association on January 29, 2015. Participating jurisdictions selected a planning committee that met to review the plan and provide Planning Consultant Steve Meyer with any recommended changes. Additional planning committees were then formed within each community to discuss the specific details of the plan as it related to situations within each jurisdiction.

At these initial meetings Consultant Meyer outlined the planning process and reviewed components of the 2011 plan. All stakeholders had previously been provided with a digital copy of the plan. Additionally, any attendee who requested a copy of the plan was provided one. The assignment given to the stakeholders was to review those portions of the plan that were particular to their jurisdiction and provide any necessary revisions to Consultant Meyer. When necessary, due to lack of input and participation, Consultant Meyer conferred directly with the appropriate officials in order to derive the appropriate information.

A survey was conducted to gain public input into the plan. Surveys were left with every municipal jurisdiction in the county and were returned to the Benton County EMA. Results of the survey are found in Appendix B, page 560.

Once Consultant Meyer had finished revisions of the community profiles and hazard profiles, electronic copies were sent to the participating jurisdictions for their review. A second round of meetings was then held at four locations in the county on July 14, 15, 20 and 23 (See Appendix C, page 568). The information from these meetings was also presented at the July 27, 2015 Benton County Emergency Management Commission Meeting. The purpose of these meetings was to:

- 1) Review of community profiles and progress with the Benton County MJHMP
- 2) Review of Hazard Profiles developed for the hazard and instructions for scoring the hazards by Benton County communities
- 3) Review of potential mitigation actions
- 4) Review of Benton County Hazard Mitigation Survey results

A special meeting was also held with representatives from Benton County School Districts on October 14, 2015 in order to facilitate inclusion of the districts in the plan (See Appendix C, page 568).

After the mitigation measures meetings were held, Consultant Meyer revised the strategies and then worked with the individual jurisdictions to facilitate them in determining their mitigation strategy. Throughout the planning and revision process Consultant Meyer conferred with Mitigation Planning specialists at Iowa HSEMD and FEMA Region VII in Kansas City in order to facilitate completion of an acceptable plan.

After the planning committee had completed the steps outlined by the State, the consultant compiled a draft of the revised plan. This draft was submitted to the individual jurisdictions for their review and to the state to determine whether it was approvable. Consultant Meyer addressed every issue brought forth by the individual communities and the state. The plan entered into a public comment period on

October 14, 2015. Comments were received by the consultant, comments were addressed and a final draft was presented to the Cities and County for review. CD's of the draft were mailed to all jurisdictions, and the draft was published on the consultant's website so that the public, school districts and neighboring governments and agencies could download a copy of the plan for review. Two final meeting were held on November 17 and 18 to allow the public the opportunity to comment on the plan in person.

This revised plan was created by primarily following FEMA's Authorized Representation Model for Multi-Jurisdictional Planning; however some aspects of direct representation were also involved. This approach is sometimes referred to as the Combination Model. The revision was completed by Planning Consultant Steve Meyer. Consultant Meyer coordinated with the Scott Hansen, of the Benton County EMA, to coordinate planning meetings. The steering committee reviewed hazards for inclusion in the plan, provided the preliminary scoring for the hazard analysis, analyzed mitigation steps and reviewed mitigation steps for multi-jurisdictional coordination. All meetings were open to the public, with notices posted on local and in local newspapers. Invitations were sent to city clerks and county and city officials as well as all other applicable entities as documented in the stakeholders section. Meetings were held in each community to further refine the risk assessment and mitigation actions, and also to identify critical facilities. Public notices of meetings were posted in newspapers of Benton County and a special survey (See Appendix B, page 560) was distributed to gain even more public input into the plan.

In order to be considered a participant in revision of this plan, the planning committee recognized any jurisdiction that attended one or more planning meetings, cooperated in providing information for revision of the plan or reviewed the completed plan and gave their approval of the plan. All jurisdictions that are a part of this plan provided written confirmation that they approved the final plan. Events associated with revision of this plan are shown in Table 82, page 290. Appendix F, page 700 provides signed copies of the final approval by each jurisdiction.

All totaled, there were 10 publicly announced meetings held in conjunction with revision of this plan.

Benton County EMA Commission Meeting—January

Benton County Firefighters Association Meeting—January 29, 2015

EMA Commission Meetings—January 26, 2015

All meeting agendas and minutes can be found in Appendix C, page 568, of this plan.

Table 82 outlines the nature of each jurisdiction's participation.

2021 UPDATE

As noted in several other places in this plan the 2021 update out of necessity due to the influence of the COVID-19 Pandemic was conducted via e-mail and telephone consultations with constituents of the plan. Benton County city and county officials were involved in every aspect of the update from updating community profile information to identification of mitigation strategies. Participation was inhibited by

the overwhelming disaster recovery efforts required following the August 10, 2020 Derecho windstorm disaster that heavily influenced Benton County, but in the end enough participation was elicited that all cities and the county provided updated mitigation strategies and approved the plan by resolution. Consultant Steve Meyer from Steve Meyer Consulting LLC completed the editing and update of the 2021 plan.

Table 82: Participation in Planning Process

MITIGATION PLANNING ACTIVITY PERFORMED	Benton County Unincorporated	Atkins	Belle Plaine	Blairtown	Garrison	Keystone	Luzerne	Mt. Auburn	Newhall	Norway	Shellsburg	Urbana	Van Horne	Vinton	Watkins	Benton Community School District	Belle Plaine Community School District	Vinton Shellsburg School District	Vinton Municipal Electric Utility
Provide updated profile, hazard analysis and risk assessment information for plan	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Review draft of profile, hazard analysis and risk assessment	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Provide information for updated mitigation measures	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Develop mitigation strategy	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Review and approve completed plan (Appendix F page 700)																			

During the planning process, the existing programs, policies and technical documents for the participating jurisdictions were reviewed. In addition to the documents listed below, the jurisdictions also reviewed the FEMA's 2013 Mitigation Ideas Booklet to provide an overview of the types of mitigation actions appropriate to include in this plan. The Mitigation Strategies booklet provides a wealth of mitigation ideas and was provided to the Planning Committee to provide them with a background on the various types of mitigation projects, strategies and actions that are possible. Due to the length of this document, the Mitigation Strategies booklet was not included as an appendix, however interested parties should contact FEMA or the consultant to receive a copy of this booklet.

The following table displays the results of this review as applied in the 2016 and 2021 updates:

Table 83: Record of Review/Summary

Existing Program / Policy / Technical Documents	Applicable Jurisdictions	Method of incorporation into the plan
Comprehensive Plan	Benton County, but out of date; Atkins, Belle Plaine, Vinton	Used for assessing development trends and future vulnerabilities
Growth Management Plan	None	
Capital Improvements Plan/Program	Atkins, Belle Plaine	Implementing Mitigation Strategies
Flood Damage Prevention Ordinance	None	
Floodplain Management Plan	Belle Plaine, Blainstown, Shellsburg, Vinton, Walford	Incorporated Actions
Flood Insurance Studies or Engineering Studies for Streams	None	Incorporated Actions
Hazard Vulnerability Analysis	None	Incorporated flood and hazardous materials maps into plan to assess risk areas
Emergency Management Plan	Benton County	No up to date, stand alone emergency operations plans could be located

Existing Program / Policy / Technical Documents	Applicable Jurisdictions	Method of incorporation into the plan
Zoning Ordinance	Atkins, Belle Plaine, Blainstown, Keystone, Luzerne, Mt. Auburn, Newhall, Norway, Shellsburg, Urbana, Van Horne, Vinton, Walford	Used for assessing development trends and future vulnerabilities
Building Code	Atkins, Belle Plaine, Blainstown, Garrison, Keystone, Mt. Auburn, Norway, Shellsburg, Urbana, Van Horne, Vinton	
Drainage Ordinance		Storm water management ordinances exist per state regulations regarding on-site treatment of storm water runoff
Critical Facilities Maps	All Jurisdictions	Incorporated into plan
Existing Land Use Maps	Atkins	Used for assessing development trends and future vulnerabilities
Elevation Certificates		Elevation Certificates only required for compliance with floodplain ordinances, but not required for property transfer or outright development of a property.
State Plan		Incorporated risk assessment data

SECTION 4

HAZARD ANALYSIS

IDENTIFYING HAZARDS

Owing to the time and data constraints detailed in the preface of this plan, the 2021 Benton County MJHMP Hazard Analysis is condensed for simplicity and consistency with the State of Iowa 2018 Hazard Mitigation Plan to the following hazards:

- Drought
- Extreme Heat
- Flooding (Flash and Riverine)
- Grass Fire or Wildland Fire
- Severe Winter Storms
- Thunderstorms: Lightning and Hail
- Tornado/Windstorm
- Other Hazards: Animal/Plant/Crop Disease, Hazardous Materials, Human Disease, Infrastructure Failure, Structural Fire, Terrorism, Transportation Incident

The historic hazard determination used in the 2011 and 2016 BC MJHMP is detailed verbatim below as found in those plans.

From 2011 BCHMP

In 2011 the planning team worked from the following list of hazards:

Natural Hazards (16): Thunderstorms/Lightning, Tornadoes, Windstorms, Hailstorms, Severe Winter Storms, Extreme Heat, Expansive Soils, Earthquakes, Landslide, River Flood, Flash Flood, Drought, Grass or Wildland fire, Sink Holes, Dam Failure, Levee Failure

Human-Caused/Combination Hazards (24): Fixed Hazardous Materials Incident, Transportation Hazardous Materials Incident, Radiological Transportation Incident, Air Transportation Incident, Communications Failure, Energy Failure, Highway Transportation Incident, Pipeline Transportation Incident, Rail Transportation Incident, Waterway Incident; Enemy Attack, Public Disorder, Bio-Terrorism; Agro-Terrorism, Chemical Terrorism, Radiological Terrorism, Conventional Terrorism, Cyber Terrorism; Human Disease Incident; Human Disease Pandemic, Animal/Plant/Crop Disease, Structural Fire, Structural Failure

After considering all relevant factors, the planning team decided not to include the following hazards in the 2011 Benton County MJHMP: Drought, Levee Failure, Dam Failure, Sink Holes, Expansive Soils, Earthquake, Landslide, Fixed Radiological Incident, Radiological Transportation Incident, Waterway/Waterbody Incident, Enemy Attack, Public Disorder, Radiological Terrorism, Human Disease Incident.

This left 26 hazards which were profiled and rated as follows:

HAZARD	RANKING
Energy Failure	1
Transportation Hazardous Materials Incident	2
Highway Transportation Incident	3
Rail Transportation Incident	4
Structural Failure	5
Structural Fire	6
Communications Failure	7
Tornado	8
Thunderstorm & Lightning	9
Flash Flood	10
Grass/Timber/Wildland fire	11
River Flooding	12
Fixed Facility Hazardous Materials Incident	13
Windstorm	14
Severe Winter Storm	15
Air Transportation Incident	16
Cyber terrorism	17
Human Disease Pandemic	18
Pipeline Transportation Incident	19
Hailstorms	20
Animal/plant/crop disease	21
Agro-terrorism	22
Bio-terrorism	23
Conventional terrorism	24
Extreme Heat	25
Chemical terrorism	26

The 2016 Benton County MJHMP planning team began with the following 21 hazards from the 2013 State of Iowa Hazard Mitigation Plan,

Natural Hazards

- Animal/Crop/Plant Disease
- Drought
- Earthquake
- Expansive Soils
- Extreme Heat
- Flash Flood
- Grass or Wildland Fire
- Human Disease
- River Flooding
- Severe Winter Storm
- Sinkholes
- Landslide
- Thunderstorms/Lightning/Hail

Tornado/Windstorm

Technological Hazards

Hazardous Materials
Infrastructure Failure
Transportation Incident
Dam/Levee Failure
Radiological Incident

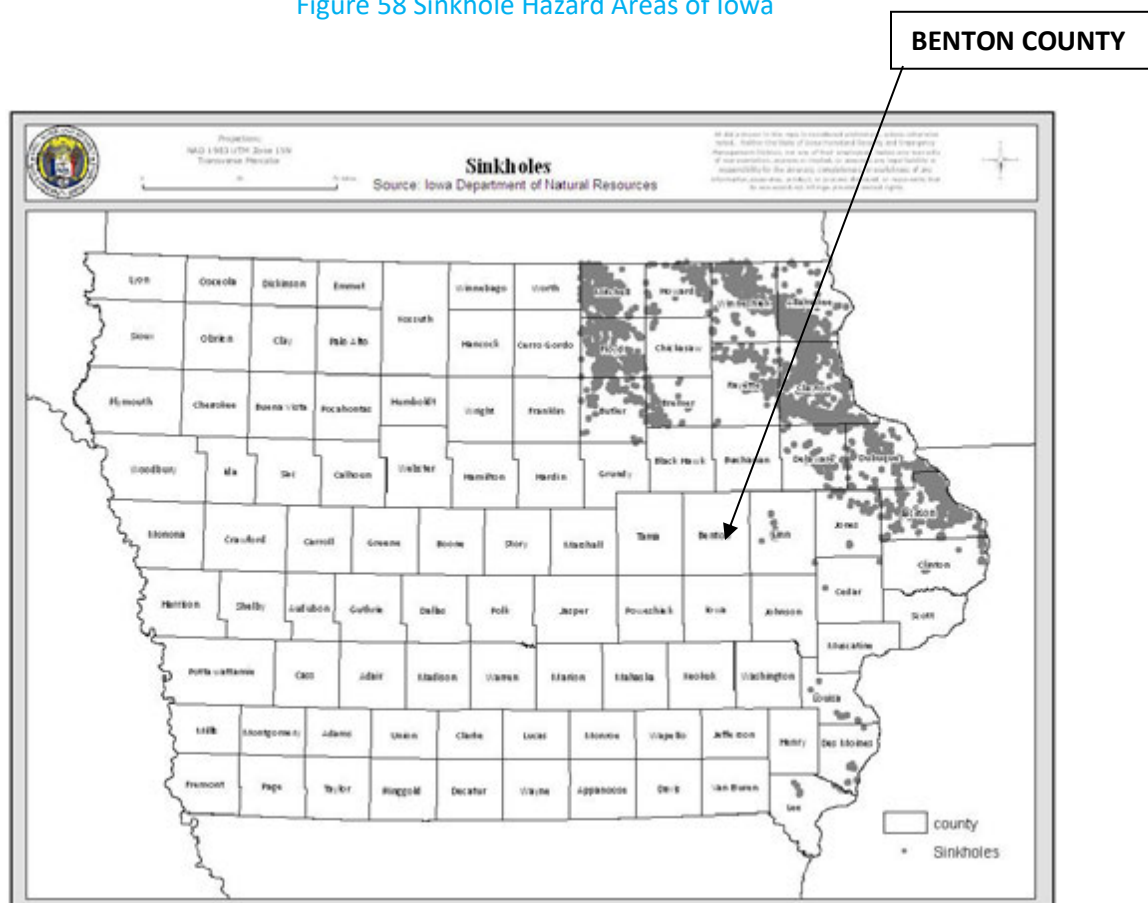
Human Caused Hazards

Terrorism
Structural Fire

After reviewing the above list of hazards, the planning team narrowed the list of hazards to those best suited for Benton County. This included the removal of some hazards explained as follows:

Sinkholes: the only data on sinkholes that could be found is that there are reputedly some in remote areas of southern Benton County. Records maintained by the Iowa DNR do not show any in Benton County. There have never been any documented incidents or accidents or property loss due to sinkholes in Benton County.

Figure 58 Sinkhole Hazard Areas of Iowa



Landslide: There has never been a documented incident of a landslide in Benton County and no damage ever attributed to a landslide. The Benton County USDA-NRCS office does document some soil types in the county on slopes that have a small probability of creating a landslide, but they are in rural sparsely populated areas that are not near any critical infrastructure.

Expansive Soils: The Benton County USDA-NRCS office does document some soil types in the county that have shrink-swell potential but there has never been a single documented incidence of property damage due to the presence of these soil types. A US Geological survey map shows the majority of Benton County being in an area that has little or no swelling clay and the remainder being an area that has clay with moderate swelling potential.

Earthquake: There has been no history of an earthquake that caused any damage to any location in Benton County. It is improbable that one may occur as shown in the following earthquake probability chart.

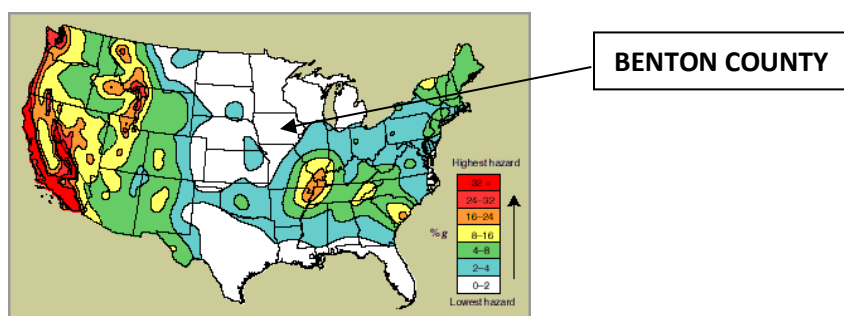


Figure 59: United States Earthquake Zones

Dam/Levee Failure: There is one dam in Benton County that is considered a moderate hazard by the Iowa DNR, the Rodgers Park Lake Dam in northern Benton County. The dam is for a recreational lake that is on a tributary of the Cedar River, located five miles north and east of Vinton. The tributary runs from south to north before it joins with the Cedar River which flows south toward Vinton. The major hazard is that a dam failure would be capable of causing property damage to the two roads before it joins the Cedar River. The Benton County Hazard Mitigation Planning Committee determined that neither of these dams posed a hazard to the county that was significant enough to warrant any mitigation efforts. The only levee system known in Benton County is remnants of an antiquated levee built by the railroad in 1917 near Atkins. The railroad discontinued service to the community in 1978. Local officials indicate the levee has no effect on local water movement or flash flooding.



Figure 60: Benton County Dams

Radiological Incident: Though the Duane Arnold Nuclear Plant (DAEC) neighbors Benton County, the Hazard Mitigation Planning Committee determined that adequate planning and preparation for a fixed radiological incident involving the facility is already being conducted by the plant itself, Benton County Emergency Management and HLSEM. There is no facility within Benton County that has an amount of radiological materials that would pose a significant threat. Also, it could not be determined if any amounts of radiological material was being transported through Benton County.

Post Note The DAEC ceased operations in August 2020 as a result of damages to its cooling system caused by the August 10 2020 Derecho windstorm disaster. Permanent shutdown of the plant had been planned for October 2020. After June 2021 there will no longer be any planning or exercise related activities for this facility as it will then be officially decommissioned.

CRITERIA AND INFORMATION USED TO IDENTIFY HAZARDS

The following table summarizes how the 15 hazards profiled in the 2011 and 2016 plans were identified and why the Planning Committee selected them for further analysis.

Hazard	How Identified	Why Identified
Extreme Heat	<ul style="list-style-type: none"> Planning Committee HSEMD NCDC records FEMA publications 2011 and 2016 BCHMP 	<ul style="list-style-type: none"> History of extreme heat events Potential impact on citizens and agricultural base Benton County location and climate 2011 and 2016 BCHMP
Flash Flood	<ul style="list-style-type: none"> Flood Insurance Rate Map (FIRM) Planning Committee HSEMD NCDC records 2011 and 2016 BCHMP 	<ul style="list-style-type: none"> Identified Special Flood Hazard Area (SFHA) Properties located in the SFHA Flash Flood history in Benton County, in particular recent flash flood events in 2008 and 2009 2011 and 2016 BCHMP
Severe Winter Storm	<ul style="list-style-type: none"> HSEMD NCDC records FEMA publications National Weather Service Planning Committee 2011 and 2016 BCHMP 	<ul style="list-style-type: none"> Benton County location and climate History of annual winter events Potential impact on citizens 2011 and 2016 BCHMP
Thunderstorm/ Lightning/Hail	<ul style="list-style-type: none"> Planning Committee NCDC records FEMA publications NOAA probability maps HSEMD National Weather Service 2011 and 2016 BCHMP 	<ul style="list-style-type: none"> Benton County experiences several thunderstorms annually, some of which produce lightning that damages structures Benton County experiences several hailstorms annually, some of which cause damage to structures, autos and agricultural crops 2011 and 2016 BCHMP
Tornado/Windstorm	<ul style="list-style-type: none"> Planning Committee NCDC records FEMA publications NOAA probability maps HSEMD 2011 and 2016 BCHMP 	<ul style="list-style-type: none"> Benton County has a history of tornados Straight line winds with a velocity of 60 miles-per-hour or more frequently strike Benton County 2011 and 2016 BCHMP

Hazard	How Identified	Why Identified
Grass/Timber/ Wildland Fire	<ul style="list-style-type: none"> • Planning Committee • HLSEM • Fire Departments of Benton County • State Fire Marshall's Office records • 2011 and 2016 BCHMP 	<ul style="list-style-type: none"> • Importance of protecting city properties • Annual fire incidents • History of grass and wildland fire incidents in Benton County • Benton County Fire Department wildland firefighting equipment deficits and concerns • 2011 and 2016 BCHMP
River Flood	<ul style="list-style-type: none"> • Flood Insurance Rate Map (FIRM) • Planning Committee • HSEMD • NCDC records • Flood and watershed studies by Army Corps of Engineers • 2011 and 2016 BCHMP 	<ul style="list-style-type: none"> • Identified Special Flood Hazard Area (SFHA) • Properties located in the SFHA • Flood history in Benton County, particularly along the Cedar River • Disaster declarations • 2011 and 2016 BCHMP
Drought	<ul style="list-style-type: none"> • HSEMD • NCDC records • FEMA publications • National Weather Service • Planning Committee • 2011 and 2016 BCHMP 	<ul style="list-style-type: none"> • History of drought and dry conditions • Potential impact on citizens and agricultural base • Benton County location and climate • 2011 and 2016 BCHMP
Transportation Incident Under Other Hazards in 2021 BCMJHMP	<ul style="list-style-type: none"> • Planning Committee • HSEMD • Benton County EMA • NTSB records • Benton County Sheriff's Office accident records • Federal Railroad Office of Safety Analysis Reports • History of rail transportation incidents in Benton County • 2011 and 2016 BCHMP 	<ul style="list-style-type: none"> • History of air, rail and vehicular transportation incidents in Benton County • Airports in Benton County managed by the cities of Belle Plaine and Vinton • Benton County position relative to the Eastern Iowa Airport • NTSB records • Highway systems going through Benton County • Benton County Secondary roads system • Benton County has three railroads: the Union Pacific Railroad, the Iowa Northern Railroad and the Cedar Rapids—Iowa City Railroad • 2011 and 2016 BCHMP

Hazard	How Identified	Why Identified
<p>Infrastructure Failure</p> <p>Under Other Hazards in 2021 BCMJHMP</p>	<ul style="list-style-type: none"> • Planning Committee • Benton County EMA • Local utility providers, Alliant Utility and REC • History of electrical power outages in Benton County • History of bridge failures in Benton County • Benton County Emergency Management Coordinator • History of communications difficulties in Benton County • 2011 and 2016 BCHMP 	<ul style="list-style-type: none"> • Health and welfare of Benton County residents • Critical infrastructure, business and residential properties are dependent upon energy for sustenance • Importance of maintaining communications--particularly during hazard events • 2011 and 2016 BCHMP
<p>Hazardous Materials Incident</p> <p>Under Other Hazards in 2021 BCMJHMP</p>	<ul style="list-style-type: none"> • Benton County EMA • Planning Committee • HSEMD • EPA website • History of hazardous materials incidents in Benton County • Iowa DNR hazmat spill records • Energy providers and pipeline companies with lines in Benton County • 2011 and 2016 BCHMP 	<ul style="list-style-type: none"> • Presence of facilities having hazardous materials on site in Benton County • Potential for incidents in Benton County • Benton County Highways • Agricultural and motor freight transportation of hazardous materials in Benton County • Benton County has three energy providers with transmission pipelines passing through the county: Alliant Energy Interstate Power and Light; Mid American Energy Corp. and Northern Natural Gas Co. • 2011 and 2016 BCHMP

Hazard	How Identified	Why Identified
<p>Terrorism</p> <p>Under Other Hazards in 2021 BCMJHMP</p>	<ul style="list-style-type: none"> • HSEMD • Planning Committee • FEMA publications • Benton County EMA • Benton County agricultural organizations • Benton County government entities concern • Benton County commercial enterprise concern • Benton County Emergency Management Coordinator • Benton County Law Enforcement agencies • 2011 and 2016 BCHMP 	<ul style="list-style-type: none"> • Awareness following 9/11 • Potential for terrorism event involving the water supply systems of Benton County • Agri-producer concern • Benton County emergency responders and local agri-producer efforts related to terrorism • Benton County law enforcement agencies, school districts and emergency responders efforts related to terrorism • Conventional terrorism events in Benton County School Districts • 2011 and 2016 BCHMP
<p>Human Disease</p> <p>Under Other Hazards in 2021 BCMJHMP</p>	<ul style="list-style-type: none"> • Planning Committee • HLSEM • CDC • Benton County Department of Public Health • 2011 and 2016 BCHMP 	<ul style="list-style-type: none"> • Potential for human disease epidemic outbreak • Health and welfare of Benton County residents • 2020 COVID-19 Pandemic • 2011 and 2016 BCHMP
<p>Animal/Plant/Crop Disease</p> <p>Under Other Hazards in 2021 BCMJHMP</p>	<ul style="list-style-type: none"> • Planning Committee • HLSEM • CDC • Benton County Department of Public Health • 2011 and 2016 BCHMP 	<ul style="list-style-type: none"> • Potential for animal disease epidemic outbreak, particularly the prevalent threat of Avian Flu and a potential pandemic • Potential for animal or crop disease that would affect livestock and agricultural crops and the food supply • Health and welfare of Benton County residents • 2011 and 2016 BCHMP

Hazard	How Identified	Why Identified
Structural Fire Under Other Hazards in 2021 BCMJHMP	<ul style="list-style-type: none"> • Planning Committee • HLSEM • Fire Departments of Benton County • State Fire Marshall's Office records • 2011 and 2016 BCHMP 	<ul style="list-style-type: none"> • Importance of protecting city properties • Annual fire incidents • Age and condition of structures in Benton County • Benton County fire departments apparatus and firefighting equipment condition concerns • Lack of building/fire inspection ordinances in Benton County • 2011 and 2016 BCHMP

HAZARD SCORING METHODOLOGY

For the sake of continuity, the 2021 update of the Benton County HMP used the same methodology used in the 2016 Benton County HMP, explained as follows.

The hazard scoring methodology used for 2016 revision of the Benton County HMP differed from the methodology used in the original 2011 plan. The methodology employed in the 2016 plan was concurrent with the methodology used in the 2013 State of Iowa HMP.

Information from the 2011 plan was updated with new information. Each community in the county then scored each hazard individually. An average score was then compiled for each hazard which in turn allowed the hazards to be ranked.

The assessment of the risk to people and property in Benton County from a variety of hazards requires a tremendous amount of data from all levels of government and the private sector. To accomplish the hazard scoring objectively, four factors were taken into account for scoring purposes:

1. Probability of occurrence in any given year
2. Magnitude and Severity of impact
3. Amount of warning time before the hazard occurs
4. Duration of the hazard's impact

The economic impact of disasters is generally restricted to major disasters involving both state and federal funding. Smaller, less significant events often do not get the economic impact of the incident captured effectively. For these smaller events, there is a greater reliance on local information and records of impacts.

Members of the planning team in each community were asked to review and discuss each of the hazards. They were also asked with respect to the agency's goals and mission for their expertise and input as to applicable hazards considered in the hazard mitigation plan using the updated methodology for scoring.

Like the State of Iowa 2013 Hazard Mitigation plan HARA, the Benton County 2016 HARA seeks to strike a balance between disparate evaluation criteria by using a scoring system. This means the evaluation of

low probability-high impact events versus high probability-low impact events using a systematic approach. Each category of a particular hazard is rated on a scale of one (1) through four (4). It was important to score each hazard as a single event. Impacts from that particular hazard were considered in the analysis, and possible cascading was discussed. The effects of applying an additional methodology to analyze the effects of cascading hazards was determined to have little significant effect on the overall scoring of hazards and analysis of vulnerability to individual hazards, and was not included. The scale of one (1) through four (4) was used in all of the scoring guide tables outlined on pages 205 and 206 of this section because of the large variation in historical occurrences, probabilities, percentages of vulnerabilities, spatial extent, the number of casualties, or the value of property damaged. Often this data is either not available or would have been impossible to extract from aggregate data. Using this scale provides an intuitive option for comparison of vastly different types of threats and hazards. Using a quantifiable system gives detail and still allows for adjustments where necessary.

Using the four elements described above, the formula the SHMT determined to be the most effective for the Iowa HARA in the 2013 State of Iowa Hazard Mitigation plan was determined with the justification that Iowa's priorities in criteria considers the probability and historical occurrence of a hazard is the highest priority for mitigation with the duration that the hazard affects Iowa being the lowest. The formula used for this risk assessment as determined by the SHMT is as follows:

$$\begin{aligned} &(\text{Probability} \times .45) + (\text{Magnitude/Severity} \times .30) + \\ &(\text{Warning Time} \times .15) + (\text{Duration} \times .10) = \\ &\text{Final Hazard Assessment Score} \end{aligned}$$

HAZARDS SCORING SYSTEM

- A Probability--** Reflects the likelihood of the hazard occurring again in the future, considering both the hazard's historical occurrence and the projected likelihood of the hazard occurring in any given year

Scoring

- 1** Unlikely
Less than 10% probability in any given year (below 1 in 10 chance of occurring), history of events is less than 10% likely or the event is unlikely but there is a possibility of its occurrence
- 2** Occasional
Between 10% and 19% probability in any given year (less than 1 in 5 chance of occurring), history of events is greater than or equal to 10% but less than 20% for the event could possibly occur
- 3** Likely
Between 20% and 33% probability in any given year (up to 1 in 3 chance of occurring), history of events if greater than or equal to 20% and not more than 33% the event is likely to occur
- 4** Highly Likely

More than 33% probability in any given year (event has up to a 1 in 1 chance of occurring), history of events is greater than 33% likely or the event is highly likely to occur

- B Warning Time**--The speed of onset reflects the amount of warning time available before the hazard occurs. This should be taken as an average warning time. For many of the atmospheric natural hazards there is a considerable amount of warning time as opposed to the human caused or accidental hazards that occur instantaneously or without any significant warning time.

Scoring

- 1 More than 24 hours warning time
- 2 More than 12 to 24 hours warning time
- 3 6 to 12 hours warning time
- 4 Minimal or no warning (Less than 6 hours warning)

- C Magnitude/Severity** The impact severity of a hazard event (past and perceived) is related to the vulnerability. Relevant factors include when the event occurs (year-round, seasonal), the location affected, community resilience, and the effectiveness of the emergency response and disaster recovery efforts. Quantifying impact severity is difficult to address at multiple levels simultaneously. The scale for this plan is statewide.

Scoring

- 1 Negligible
Less than 10% of property severely damaged, shutdown of facilities and services for less than 24 hours, and/or injuries/illnesses treatable with first aid.
- 2 Limited
10% to 25% of property severely damaged, shutdown of facilities and services for more than a week, and/or injuries/illnesses that do not result in permanent disability
- 3 Critical
More than 25% and up to 50% of property severely damaged, shutdown of facilities and services for a least 2 weeks, and/or injuries/illnesses that result in permanent disability
- 4 Catastrophic
More than 50% of property severely damaged, shutdown of facilities and services for more than 30 days, and/or multiple deaths

- D Duration**--This consists of the typical amount of time that the jurisdiction is impacted by the hazard. As an example, a snowstorm will likely last several hours, whereas a lightning strike would last less than a second.

Scoring

- 1 Less than 6 hours
- 2 Less than 1 day
- 3 Less than 1 week
- 4 More than 1 week

Hazard Analysis scores determined by the Benton County Hazard Mitigation Planning Committee using the above guidelines are found with each hazard discussed in the Hazard Profiles.

HAZARD PROFILES

DROUGHT

Definition

Drought refers to an extended period of time (usually months, sometimes even years) when a region experiences a deficiency in its water supply. The most typical cause for drought is below average precipitation, although changes in human development patterns can also have a strong impact on water supply. Although recent droughts in the United States have caused environmental damage resulting in agricultural and associated economic losses, droughts can and have caused mass migrations and humanitarian crises.

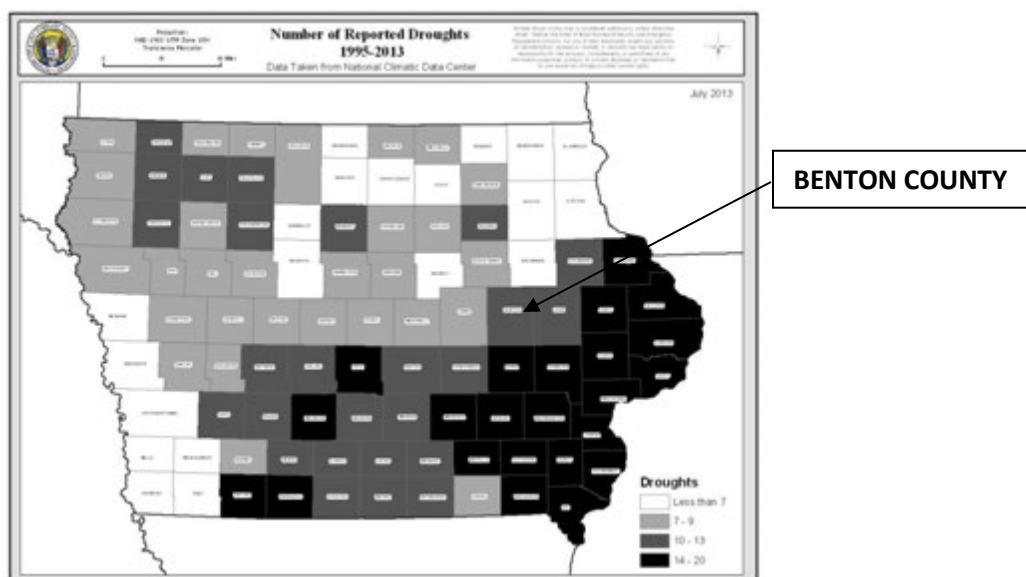
Description

There are three main types of drought. Meteorological drought is the most well-known form of drought, and is triggered by a prolonged period with less than average precipitation. Meteorological drought usually leads to other forms of drought. Agricultural droughts are droughts that affect crop production. This condition can also arise independently from Meteorological drought with the presence of extreme erosion triggered by poorly planned agricultural, development or deforestation, which washes away top soils capable of retaining moisture. The third type of drought is hydrological, which is caused when water reserves (such as aquifers, lakes and reservoirs) fall below the statistical average. In most cases, hydrological drought occurs very slowly over a period of many years as more water is taken from the reserve than is replenished. Although hydrological drought can also be triggered or supported by meteorological drought, human development also frequently has a hand in causing hydrological drought.

Probability

During the 20th Century, two severe droughts impacted the Midwest (the Dust Bowl of the 1930s and the 1976-1977 drought). Winter droughts have also occurred, the most recent of which was the winter of 2005/2006. NCDC records indicate 4 droughts were reported in Iowa that involved Benton County between 8/1/2003 to 10/1/2013. These droughts are shown as occurring in 2003, 2005, 2012 and 2013. Using these statistics plus the information from Figure 61 taken from the State of Iowa 2013 Hazard Mitigation plan, it is reasonable to expect Benton County will have a drought year every three to four years.

Figure 61: Drought Frequency in Iowa



Warning Time

Droughts are typically the cumulative result of a combination of factors that occur over weeks, months or even years. As such, the speed of onset of this hazard is very slow.

Magnitude and Severity

A severe drought would impact an entire community or county. The agricultural sector would be most severely impacted, and due to the planning area's rural setting, impact on the agricultural sector would have a larger than average impact on the rest of the county. Agricultural production could be damaged by loss of crops or livestock, and severe drought can lead to erosion and decrease the long-term productivity of the soils. Increased demand for water and electricity could result in shortages and rationing. Residents in Benton County tend to have an income below the state average, so an increase in demand for electricity or water could cause more than average economic hardship for the county.

Severe droughts generally impact large geographical areas; a drought would likely affect most of Iowa and certainly Benton County as a whole. Because of the dependence on precipitation and water, the agricultural community would be impacted the most. The agricultural areas would be most adversely impacted, but the entire state would likely feel at least some impact.

Drought more directly affects agricultural crops, livestock, natural vegetation, wildlife, and wetlands (fish and aquatic vegetation). Impacts are costly economically, environmentally, and socially, especially in agriculturally based communities such as those in Benton County. Drought in the U.S. seldom results directly in the loss of life. Deaths associated with drought are usually related to a heat wave.

A drought in 1995 caused half a billion dollars in crop damages across Iowa, while the total damage to crops alone was \$312.5M in 2003.

The 10 droughts that occurred in Benton County between 8/1/2003 to 10/1/2013 caused a total of \$17,730,000 million in crop damages in the County. The worst of these was a drought in 2003 which caused an estimated \$14,880,000 in crop damages.

Duration

Droughts are not short term events. A drought can linger for weeks, months, and as evidenced by such situations as the ongoing drought occurring in areas of California, years. Information on the duration of droughts that included Benton County could not be found.

Table 85: Hazard Scoring for Drought

JURISDICTION	PROBABILITY	WARNING TIME	MAGNITUDE/ SEVERITY	DURATION	TOTAL SCORE	Weighted Score
ATKINS	2	1	3	4	10	2.35
BELLE PLAINE	3	1	4	4	12	3.10
BLAIRSTOWN	2	1	2	4	9	2.05
GARRISON	1	1	3	4	9	1.90
KEYSTONE	2	1	1	4	8	1.75
LUZERNE	2	1	1	4	8	1.75
MT. AUBURN	1	1	3	4	9	1.90
NEWHALL	2	1	1	4	8	1.75
NORWAY	1	1	2	4	8	1.60
SHELLSBURG	2	1	1	1	5	1.45
URBANA	3	1	3	4	11	2.80
VAN HORNE	3	1	3	4	11	2.80
VINTON	2	1	3	4	10	2.45
WALFORD	2	1	2	2	7	1.85
BENTON COUNTY UNINCORPORATED	2	1	2	4	9	2.05
AVERAGE	2.00	1.00	2.06	3.67	8.93	2.10

AVERAGE SCORE = 2.10

RANGE = 1.45 to 3.10

Vinton Municipal Electric Utility risk assessment and hazard scoring is shown in Appendix E. The school districts of Benton County (Appendix D) accepted the scoring of their respective municipal jurisdictions.

EXTREME HEAT

Definition

Temperatures (including heat index) in excess of 100 degrees Fahrenheit or 3 successive days of 90+ degrees Fahrenheit constitute an extreme heat event. A heat advisory is issued when temperatures reach 105 degrees and a warning is issued at 115 degrees.

Description

Extreme heat can be described as a prolonged period of excessive heat and humidity. The heat index is a number in degrees Fahrenheit that tells how hot it really feels when relative humidity is added to the actual air temperature. Exposure to full sunshine can increase the heat index by at least 15 degrees. Extreme heat can impose stress on humans and animals. Heatstroke, sunstroke, cramps, exhaustion, and fatigue are possible with prolonged exposure or physical activity due to the body's inability to dissipate the heat. Urban areas are particularly at risk because of air stagnation and large quantities of heat absorbing materials such as streets and buildings. Extreme heat can also result in distortion and failure of structures and surfaces such as roadways and railroad tracks.

Probability

Temperatures of 90 degrees or more occur in Benton County every summer, sometimes for several days in a row. In Iowa, the record high temperature of 110 for Des Moines was recorded in 1936. During July 1936, 12 record setting days topped 100 degrees in Des Moines. The record high temperatures for Des Moines are above 90 degrees Fahrenheit beginning in March and lasting through October. During the summers of 1997 and 1998, there were a combined total of 31 days when the high temperature was 90 degrees Fahrenheit or higher. Extreme heat conditions, when they occur, are broad based. Therefore, events which occurred in Des Moines would have impacted Benton County. National Climatic Data Center records indicate 4 incidents of heat waves or excessive heat conditions that affected Benton County since January 1, 1994.

Based on historical information, Iowa will likely experience about 26 days a year with temperatures above 90 degrees. There is a very good chance that there will also be a period of 3 consecutive days or more with temperatures in the 90s. It is also common for the temperature to hit 100 degrees or more once every three years during the summer months. Given these facts, Benton County will almost certainly experience extreme heat situations of various duration every other year.

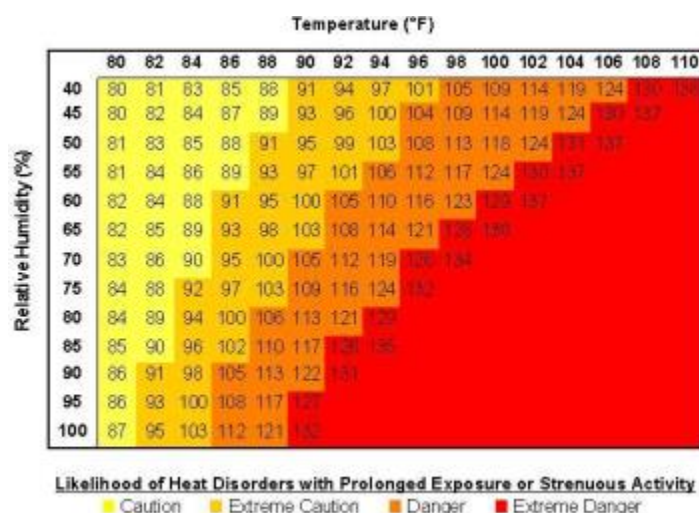
Warning Time

As with other weather phenomena, periods of extreme heat are predictable within a few degrees within 3 days or so, and are almost expected during the summer months in Iowa. Variations in local conditions can affect the actual temperature within a matter of hours or even minutes. The National Weather Service will initiate alert procedures when the heat index is expected to exceed 105 degrees Fahrenheit for at least two consecutive days.

Magnitude and Severity

Most of the Iowa would likely be impacted by extreme heat. The stagnant atmospheric conditions of the heat wave trap fertilizers and other agricultural chemicals in the air and add to the stresses of hot weather. The entire Benton County jurisdiction would experience the heat event. People, livestock, crops and even infrastructure can be affected by extreme heat. The extent of illness or damage depends on a variety of factors, but is highly depended on the heat index. Exposure to full sunshine can increase the heat index by at least 15 degrees.

Figure 62: Heat Index



The following table (source: Wikipedia) notes the effects of the heat index when observed in the shade:

Table 86: Extreme Heat Effects

Fahrenheit	Celsius	Notes
80–90 °F	27–32 °C	Caution — fatigue is possible with prolonged exposure and activity
90–105 °F	32–41 °C	Extreme caution — sunstroke, heat cramps, and heat exhaustion are possible
105–130 °F	41–54 °C	Danger — sunstroke, heat cramps, and heat exhaustion are likely; heat stroke is possible
over 130 °F	over 54 °C	Extreme danger — heat stroke or sunstroke are likely with continued exposure

While temperatures over 118 degrees Fahrenheit (air temperature only, not heat index) have never been recorded in Iowa, the average temperature throughout the summer months does put people at risk of anything from fatigue to heat exhaustion on a regular basis during the months of June, July and August.

Extreme heat can impose stress on humans and animals. Heatstroke, sunstroke, cramps, exhaustion, and fatigue are possible with prolonged exposure or physical activity due to the body's inability to dissipate the heat. Extreme heat can also result in distortion and failure of structures and surfaces such as roadways and railroad tracks.

Hyperthermia is one of the most common ailments associated with extreme heat. Those at greatest risk of experiencing heat exhaustion are the very young, the very old, people without access to air conditioning, people who work outside throughout the summer months, and athletes who practice outside during the summer months.

Heat exhaustion, heatstroke and sunstroke are common names for what is usually an advanced form of hyperthermia, which is an acute condition that occurs when the body produces or absorbs more heat than it can dissipate. It is typically caused by prolonged exposure to high temperatures and exacerbated by high humidity, physical exertion or certain medical conditions. Hyperthermia is unique from a fever because a fever is activated by the body's own temperature control mechanisms while hyperthermia is related to an external cause. Hyperthermia symptoms generally start with confusion or psychological changes, dizziness, low blood pressure, red skin and in children, convulsions may occur. As the body temperature continues to rise, the prolonged low blood pressure may result in a pale or oxygen-deprived appearance to the skin, and vomiting and blindness may also occur. Body temperatures above 104 degrees Fahrenheit are considered life threatening, and brain death begins to occur at 106 degrees Fahrenheit. Generally, humans cannot survive sustained body temperatures over 113 degrees Fahrenheit and death is almost immediate at body temperatures in excess of 122 degrees Fahrenheit.

As with many health-related concerns, the very young and the very old are at greatest risk, as are people with disabilities and certain conditions that limit the ability of the body to regulate its temperature, and people under the influence of drugs or alcohol or who otherwise may be more likely to experience dehydration or impaired judgment. Additionally, people at lower incomes are less likely to have access to or the ability to pay for temperature regulation such as air conditioning. The following numbers are people who are at risk by age, because of disabilities or potentially at risk due to their income level:

Table 87: Vulnerability by age in Benton County

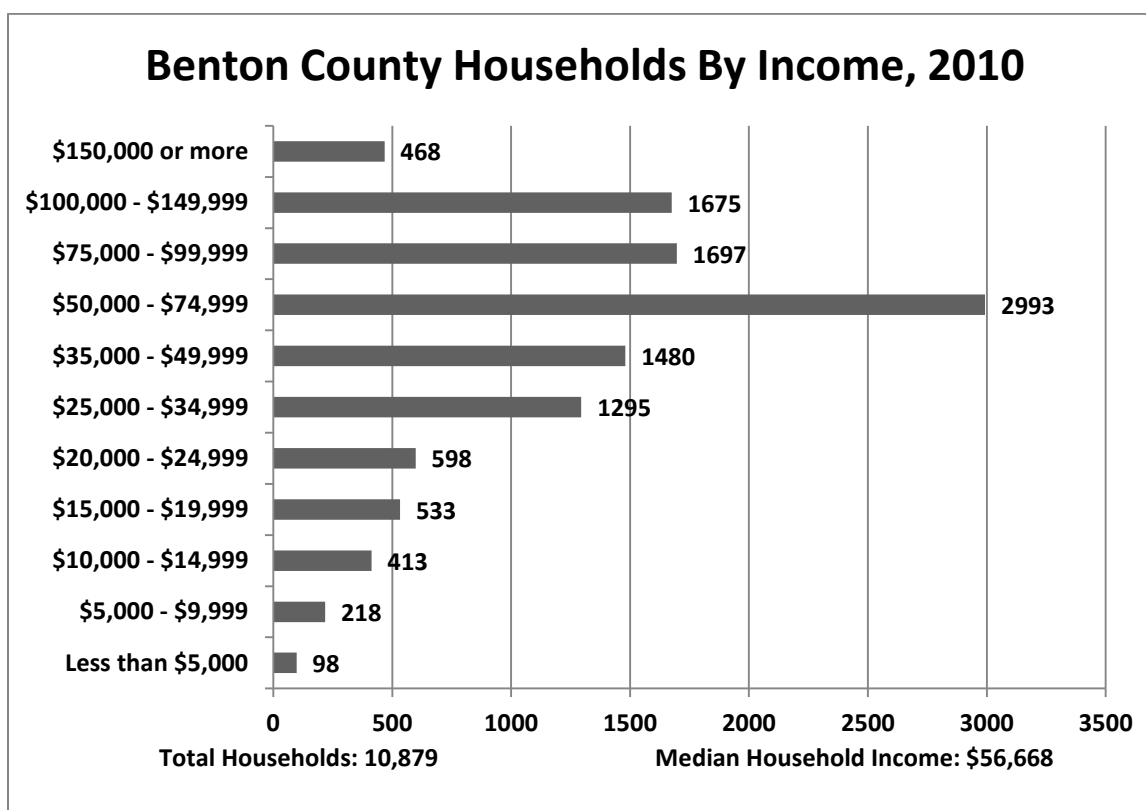
Area	2000				2010			
	<18	%	>64	%	<18	%	>64	%
Atkins	306	31	108	11	522	31	166	10
Belle Plaine	741	26	599	21	595	23	483	19
Blairstown	169	25	153	22	178	26	118	17
Garrison	118	29	48	12	91	24	50	13
Keystone	193	28	170	25	149	24	152	24
Luzerne	35	33	17	16	18	24	8	8
Mt. Auburn	39	24	31	19	36	24	34	16
Newhall	241	27	186	21	224	26	153	17
Norway	157	26	83	14	126	23	107	20
Shellsburg	258	28	123	13	205	21	190	19

Urbana	311	31	95	9	470	32	111	8
Van Horne	204	28	127	18	175	26	113	17
Vinton	1276	25	1030	20	1299	25	1027	20
Walford	445	36	53	4	488	33	77	5
Unincorporated	4493	18	2832	11	4576	18	2789	11
Benton County Total	6124	27	3902	15	5781	22	4015	15
Iowa	733628	25	436213	15	7716011	24	466169	15

Table 88: People with disabilities in Benton County

COMMUNITY	NUMBER OF PEOPLE WITH DISABILITIES	% OF POPULATION
Atkins	117	6.2%
Belle Plaine	550	20.9%
Blairstown	34	2.7%
Garrison	47	15.2%
Keystone	92	14.7%
Luzerne	6	7.1%
Mt. Auburn	9	6.5%
Newhall	89	11.1%
Norway	46	7.2%
Shellsburg	134	13.7%
Urbana	81	5.8%
Van Horne	70	9.7%
Vinton	925	18.1%
Walford	52	3.4%
Benton County Unincorporated	941	11.7%
Benton County Total	3,193	12.4%

Figure 63: Benton County Households by Income



Extreme heat has broad and far-reaching impacts. These include significant loss of life and illness, economic costs in transportation, agriculture, production, energy, and infrastructure. Nationally, over the last 30 years, excessive heat accounts for more reported deaths annually than hurricanes, floods, tornadoes, and lightning combined. Transportation impacts include the loss of lift for aircrafts, softening of asphalt roads, buckling of highways and railways, and stress on automobiles and trucks (increase in mechanical failures). Livestock and other animals are adversely impacted by extreme heat. High temperatures at the wrong time inhibit crop yields as well. Electric transmission systems are impacted when power lines sag in high temperatures. High demand for electricity also outstrips supply, causing electric companies to have rolling black outs. The demand for water also increases sharply during periods of extreme heat. This can contribute to fire suppression problems for both urban and rural fire departments.

Research efforts could not determine any estimates of damages Benton County due to extreme heat conditions. An excessive heat incident which impacted Benton County on July 19, 1999 is shown as having caused 12 heat related injuries or illnesses in the county.

The 2010 State of Iowa Hazard Mitigation Plan estimates that Benton County has an annual loss of \$3,000 due to Extreme Heat

Duration

Extreme heat events are not of short duration. In their least circumstance their duration would be for one day. It is likely that an extreme heat event could last two or more days and in its most extreme circumstance, a week or more.

Table 89: Hazard Scoring for Extreme Heat

JURISDICTION	PROBABILITY	WARNING TIME	MAGNITUDE/ SEVERITY	DURATION	TOTAL SCORE	Weighted Score
ATKINS	4	1	2	3	10	1.85
BELLE PLAINE	3	1	3	3	10	2.70
BLAIRSTOWN	2	1	2	4	9	2.05
GARRISON	4	1	2	3	10	1.95
KEYSTONE	3	1	1	2	7	2.00
LUZERNE	2	1	2	3	8	2.05
MT. AUBURN	4	1	2	3	10	1.95
NEWHALL	4	1	1	3	9	2.55
NORWAY	1	1	2	4	8	1.60
SHELLSBURG	2	1	1	1	5	1.45
URBANA	3	2	1	3	9	2.25
VAN HORNE	4	2	2	3	11	3.00
VINTON	2	1	3	4	10	2.45
WALFORD	4	2	2	2	10	2.90
BENTON COUNTY UNINCORPORATED	2	1	1	3	7	1.65
AVERAGE	2.93	1.20	1.80	2.93	8.86	2.16

AVERAGE SCORE = 2.16

RANGE = 1.45 to 3.00

Vinton Municipal Electric Utility risk assessment and hazard scoring is shown in Appendix E. The school districts of Benton County (Appendix D) accepted the scoring of their respective municipal jurisdictions.

FLOODING--FLASH AND RIVERINE

Definition

Flooding in Iowa takes on two forms: flash flooding and river flooding, both of which occur in Benton County. Flash flooding is a flood event occurring with little or no warning where water levels rise at an extremely fast rate. River flooding is a rising or overflowing of a tributary or body of water that covers adjacent land not usually covered by water when the volume of water in a stream exceeds the channel's capacity.

Description

Floods are the most common and widespread of all natural disasters, except fire. Most communities in the United States can experience some kind of flooding after spring rains, heavy thunderstorms, winter snow thaws, waterway obstructions, or levee or dam failures. Often it is a combination of these elements that causes damaging floods. Floodwaters can be extremely dangerous. The force of six inches of swiftly moving water can knock people off their feet and two feet of water can float a car. Floods can be slow-, or fast-rising but generally develop over a period of days. Flooding is a natural and expected phenomenon that occurs annually, usually restricted to specific streams, rivers or watershed areas.

A flash flood is an event that occurs with little or no warning where water levels rise at an extremely fast rate. Flash flooding results from intense rainfall over a brief period, sometimes combined with rapid snowmelt, ice jam release, frozen ground, saturated soil, or impermeable surfaces. Most flash flooding is caused by slow-moving thunderstorms or thunderstorms repeatedly moving over the same area. Even with information on soil saturation and predicted rainfalls, flash floods can still catch people by surprise. Flash flooding is an extremely dangerous form of flooding which can reach full peak in only a few minutes and allows little or no time for protective measures to be taken by those in its path. Flash flood waters move at very fast speeds and can move boulders, tear out trees, scour channels, destroy buildings, and obliterate bridges. Flash flooding often results in higher loss of life, both human and animal, than slower-developing river and stream flooding.

A riverine flood is a temporary condition of partial or complete inundation of normally dry land areas from the overflow of stream banks. Flooding results when the flow of water is greater than the normal carrying capacity of the stream channel. Floodwaters can be extremely dangerous; the force of 6 inches of swiftly moving water can knock people off their feet and 2 feet of water can float a car. Floods can be slow or fast-rising but generally develop over a period of days. Flooding is a natural and expected phenomenon that occurs annually, usually restricted to specific streams, rivers, or watershed areas

Riverine flooding can also be caused by ice jams. Ice jam flooding generally occurs when warm weather and rain break up frozen rivers or any time there is a rapid cycle of freezing and thawing. The broken ice floats downriver until it is blocked by an obstruction such as a bridge or shallow area, where an ice jam forms, blocking the channel and causing flooding upstream.

Probability

Floods are the most common and widespread of all-natural disasters except fire. In Iowa, as much as 21 inches of rain has fallen in a 24 hour period. The latest significant event to affect Iowa occurred in July of 2011 when Dubuque got more than 12 inches of rain within a 24 hour period. This event resulted in a Presidential Disaster Declaration due to widespread personal and physical property losses. Many other flash flood events have occurred across Iowa though mostly localized events. The National Climatic Data Center lists over 500 flash flooding events in Iowa from 2000-2020. In that span of time there have been two deaths and eight injuries reported as related to flash flooding in Iowa.

The Floods of 2008 are still fresh in the minds of many Iowans. Flooding has been a regular and frequent hazard in Iowa. The Iowa flood of 2008 was a [hydrological](#) event involving most of the rivers in eastern Iowa beginning around June 8, 2008 and ending about July 1. Estimates are that it caused in excess of \$10,000,000 in Benton County. Historically this flood was one of the most if not the most devastating natural disaster to impact Benton County.

Since 1993, there have been 2,429 river flooding events in Iowa according to the National Climatic Data Center (NCDC). NCDC records show a total of 32 major flood events impacting Benton County since 1993. In addition, there are 18 other floods that are documented as flash floods.

For Benton County floods represent both the most widespread and most devastating natural disaster. Riverine Flooding occurs along the Cedar River, which runs through the Northeast corner of Benton County including the City of Vinton and the Iowa River which touches on the southern border of the county. The county is also networked with a number of major streams and their tributaries, some of which are known to have Riverine Flooding conditions.

The City of Vinton, on the banks of the Cedar River, has the only flood gauge in Benton County. The top five flood events that have been recorded since 1960 at the Vinton Staff Gauge are:

- 1) 24.7 feet, June 12, 2008
- 2) 19.3 feet, March 30, 1961
- 3) 19.2 feet, April 4, 1993
- 4) 18.4 feet, May 26, 2004
- 5) 18.05 feet, April 9, 1965

Since 2001 there have been 5 river flood events in Benton County, all of them involving the City of Vinton and along the Cedar River. Approximately once every three years a river flood will occur in Benton County.

In Benton County, NCDC records indicate 22 flood events since 1998 that are documented as flash floods. Most notable are flash flooding events that occurred in the county during the months of May and June of 2008. During this time the cities of Atkins, Belle Plaine, Blairstown, Newhall, Norway, Shellsburg and extensive rural areas of the county experienced flash flooding. On August 25, 2009, rainfalls in excess of 10 inches caused flash flooding again in Atkins, Newhall, Norway and Shellsburg.

Based on historical occurrences, Benton County can expect to incur a flash flood event nearly once annually.

Warning Time

Flash floods are somewhat unpredictable, but there are factors that can point to the likelihood of a flood's occurring in the area. 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. Warnings may not always be possible for these sudden flash floods. Predictability of flash floods depends primarily on the data available on the causal rain. Individual basins react differently to precipitation events. Weather surveillance radar is being used to improve monitoring capabilities of intense rainfall. Knowledge of the watershed characteristics, modeling, monitoring, and warning systems increase the predictability of flash floods. Depending on the location in the watershed, warning times can be increased. The National Weather Service forecasts the height of flood crests, the data, and time the flow is expected to occur at a particular location.

Gauges along streams and rain gages throughout the state provide for an early flood warning system. River flooding usually develops over the course of several hours or even days depending on the basin characteristics and the position of the particular reach of the stream. The National Weather Service provides flood forecasts for Iowa. Flood warnings are issued over emergency radio and television messages as well as the NOAA Weather Radio. People in the paths of river floods may have time to take appropriate actions to limit harm to themselves and their property.

The Benton County EMA monitors potential flood severity by using reports and warnings issued by the National Weather Service and flood gauge maintained on the Cedar River in Vinton. There is one river level gauge in Benton County that is maintained by the USGS on the Cedar River in Vinton. The gauge continually monitors the level of the river and sends the information to the National Weather Service. The website with the current river level can be seen at <http://waterdata.usgs.gov/nwis/uv?05464315>. Officials at the National Weather Service in Davenport, IA, state that the gauge is able to provide them enough information that they can give a lead time averaging 37 hours for any river flooding that may occur in the area.

The Benton County EMA and Benton County Sheriff's office dispatch center notifies Benton County emergency responders in the event that flooding may affect or is affecting the county. In most circumstances citizens do have some lead time in notification.

Four types of warnings are issued which include:

Flood Watch:

Flooding is possible. The public should continue to monitor TV, radio or NOAA Weather Radio for additional updates.

Flash Flood Watch:

Flash Flooding is possible. The public should make preparations to move to higher ground and continue to monitor TV, radio or NOAA Weather Radio for additional updates.

Flood Warning:

Flooding is occurring or will occur soon; evacuations may be issued.

Flash Flood Warning:

Flash flooding is occurring; persons in low-lying areas should move to higher ground and avoid the use of automobiles.

Magnitude and Severity

Flash floods are the number 1 weather-related killer in the United States. They can quickly inundate areas thought not to be flood-prone. Iowa ranked number 1 in the United States for average annual flood damage for 1983 through 1997.

NCDC records document 22 flash flood events in Benton County from 10/17/1998 to 4/30/2019. These floods caused estimated property damage of \$560,000. The table below summarizes these flash flood events.

JURISDICTION	NUMBER	TOTAL LOSS
County Wide	1	None Reported
Atkins	0	0
Belle Plaine	4	None Reported
Blairstown	1	None Reported
Garrison	3	\$500,000
Keystone	2	0
Luzerne	1	None Reported
Mt. Auburn	0	0
Newhall	0	0
Norway	0	0
Shellsburg	2	0
Urbana	1	None Reported
Van Horne	0	0
Vinton	5	\$60,000
Walford	0	0

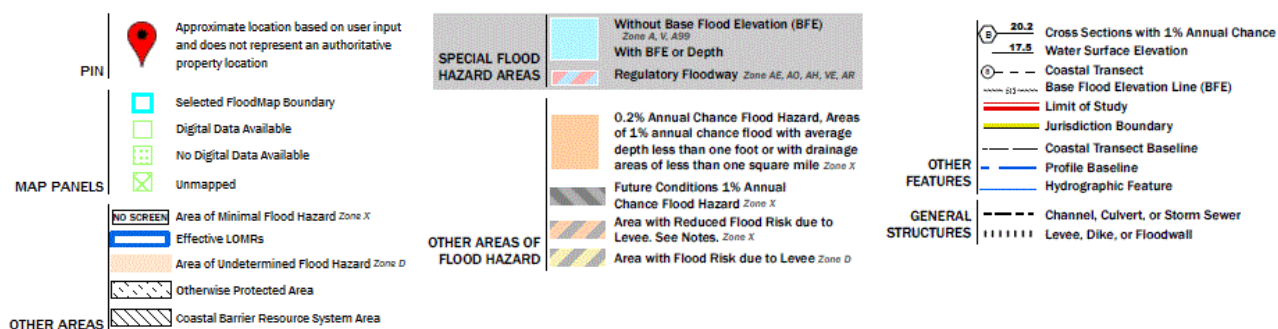
Table 90: Benton County Flash Flood events and losses

The Federal Emergency Management Agency has delineated the probable extent of the 100-year flood hazard areas in most areas. These Flood Insurance Rate Maps (D-FIRMs) show properties affected by the floods that have at least a 1% chance of occurring in any particular year. Generally, these areas are in the floodplain or adjacent areas. Much of these areas are parkland, agricultural areas, or conservation land, but residential and commercial areas are impacted by river flooding as well. The Benton County Assessor's Office has determined that a 14 percent of the properties county-wide have the potential of being impacted by riverine or flash flooding. Following are flood maps showing the potential 100 year and 500 year flood zones for Benton County as well as a synopsis of the properties within the zones.

BENTON COUNTY FLOOD HAZARD AREAS

Benton County was last mapped on 6/20/2019. The CID number is 180845. The cities of Luzerne and Mt. Auburn do not have any delineated flood hazard areas. The cities of Atkins, Belle Plaine, Blainstown, Garrison, Keystone, Newhall, Norway, Shellsburg, Urbana, Van Horne, Vinton and Walford have delineated 100-year flood hazard areas. The City of Vinton is the only area of the county that has a 500-year delineated flood hazard area. The Benton County Assessor provided information on the number of structures and agricultural properties within delineated flood hazard areas.

Figure __: Legend for all Flood Maps



BENTON COUNTY UNINCORPORATED



Figure 64: Benton County Unincorporated 100-year Flood Hazard Areas

Benton County was last mapped on 12/20/2019. The CID number is 180845. The rural unincorporated areas of the county has 2,688 agricultural properties, 213 exempt properties, 114 commercial properties, 13 industrial properties and 858 residential properties in the 100 year flood hazard area.

ATKINS



Figure 65: Atkins 100-year Flood Hazard Areas

The CID for Atkins is 190548. FIRMS are 19011C0500D dated 12/20/2019 and 19113C0380D dated 12/20/2019. An area running through the city from north to south and a small area on the northwest side of the city are within the 100 year flood hazard area. There are 14 agricultural properties, 10 exempt properties, and 66 residential properties in the 100 year flood hazard area.

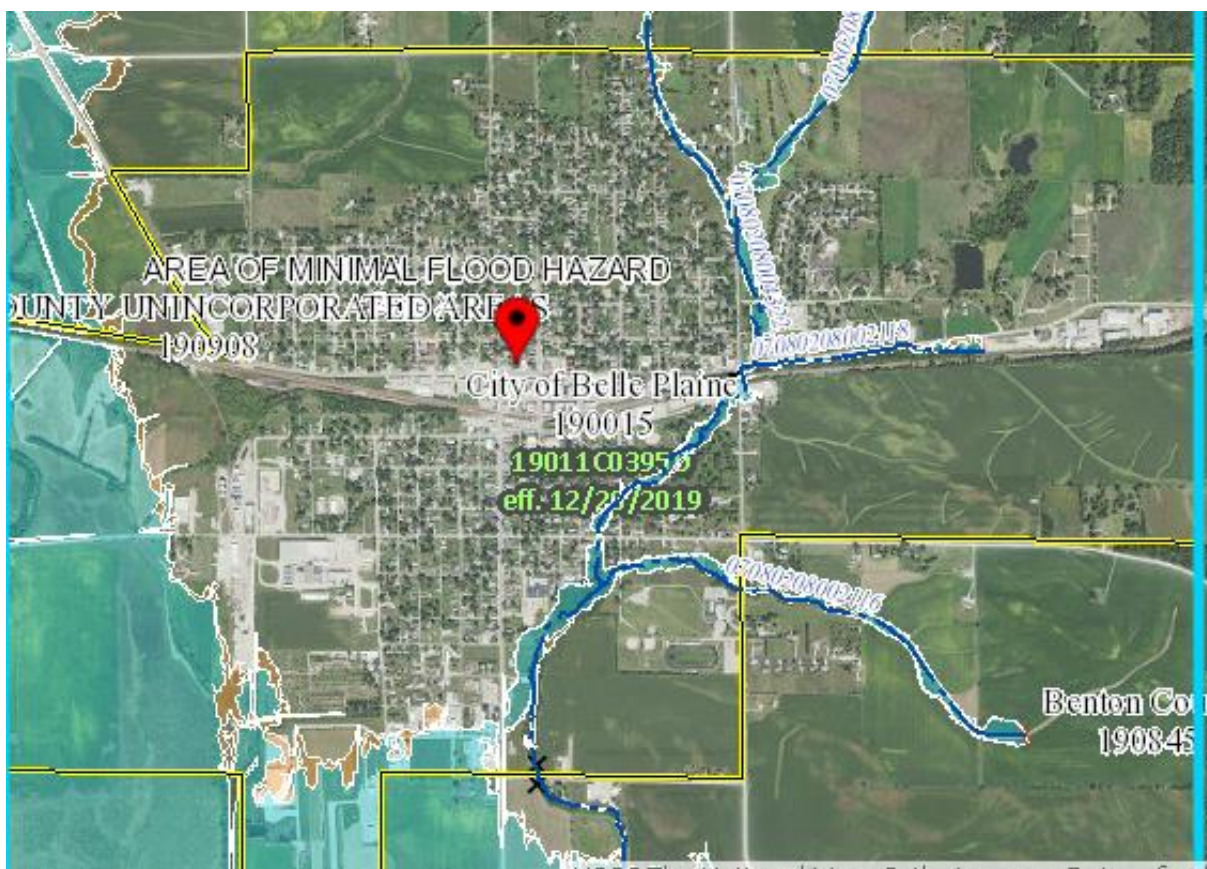
BELLE PLAINE

Figure 66: Belle Plaine 100-year Flood Hazard Areas

The CID for Belle Plaine is 190015. FIRMS 19022C0395D and 19171C0500CD are dated 12/20/2019. The city is flanked on its east and west sides by areas in the 100 year flood hazard area. There are 11 agricultural properties, 15 commercial properties, 10 exempt properties, 3 commercial properties and 84 residential properties within the hazard areas.

BLAIRSTOWN

Figure 67: Blairstown 100-year Flood Hazard Areas

The CID for Blairstown is 190320. FIRM 19011C0437D and 19011C0439D date are 12/20/2019. A small area on the north side of the corporate city limits and an area running through the city from north to south are within the 100 year flood hazard area. There are 4 agricultural properties, 2 commercial properties, 10 exempt properties, 2 commercial properties and 44 residential properties within the hazard areas.

GARRISON

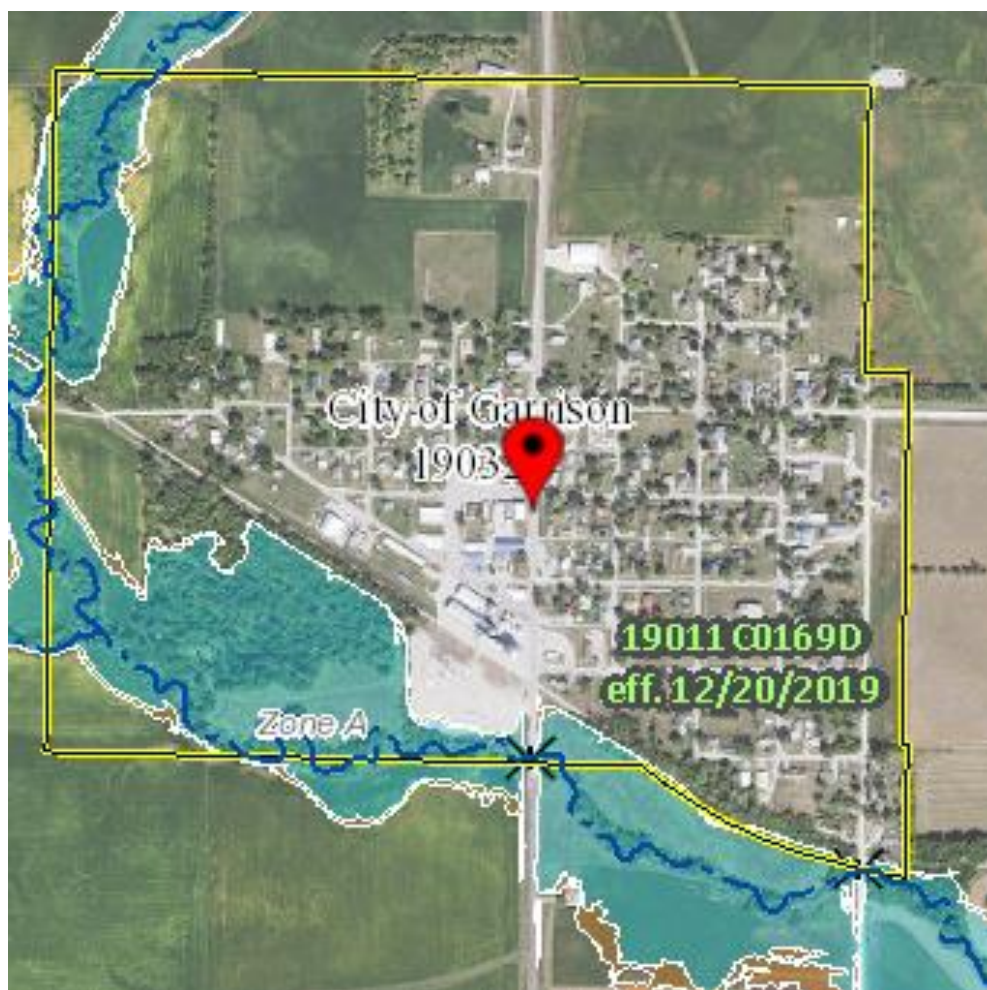


Figure 68: Garrison 100-year Flood Hazard Areas

The CID for Garrison is 190321. FIRM 19011C0169D date is 12/20/2019. The city is flanked by 100 year flood hazard areas along the cities south and west side. There are 3 agricultural properties and 2 commercial properties within the hazard areas.

KEYSTONE



Figure 69: Keystone 100-year Flood Hazard Areas

The CID for Keystone is 190602. FIRM 19011C0300 date is 12/20/2019. A small area in the southeast corner of the corporate city limits is within the 100 year flood hazard area. There are 9 agricultural properties, 6 commercial properties, 2 exempt properties and 2 residential properties within the hazard areas.

Luzerne

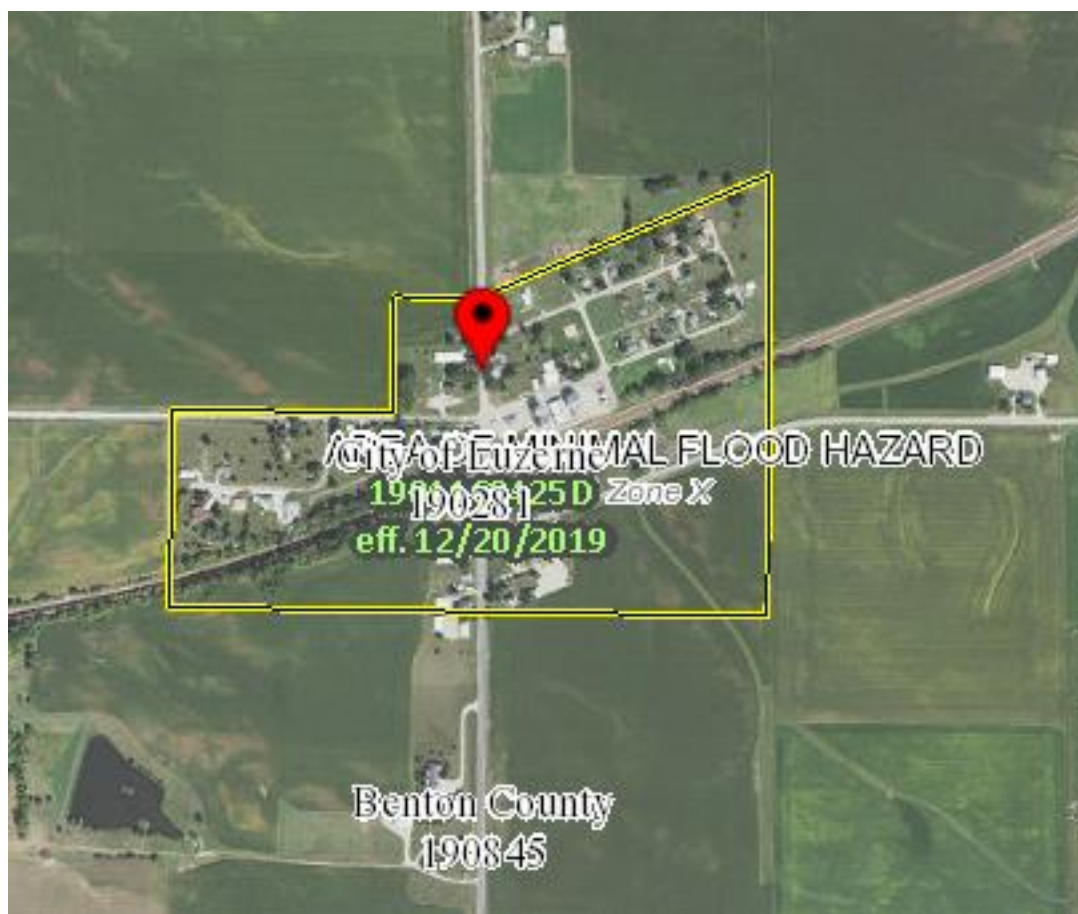


Figure 70: Luzerne 100-year Flood Hazard Areas

The CID for Luzerne is 190281. FIRM 19011C0425D date is 12/20/2019. There appears to be no delineated special flood hazard area within the corporate limits of Luzerne.

MT. AUBURN

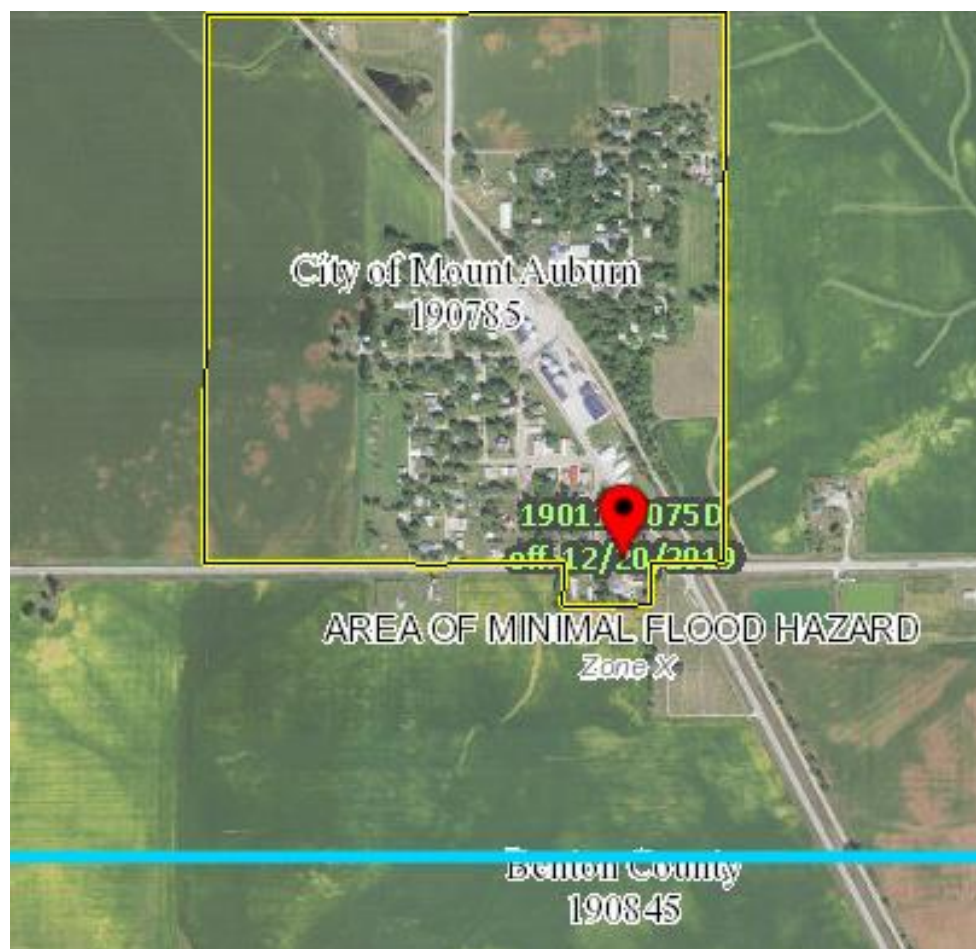


Figure 71: Mt. Auburn 100-year Flood Hazard Areas

The CID for Mt. Auburn is 190785. FIRM 19011C0075D date is 12/20/2019. There appears to be no delineated special flood hazard area within the corporate limits of Mt. Auburn.

NEWHALL

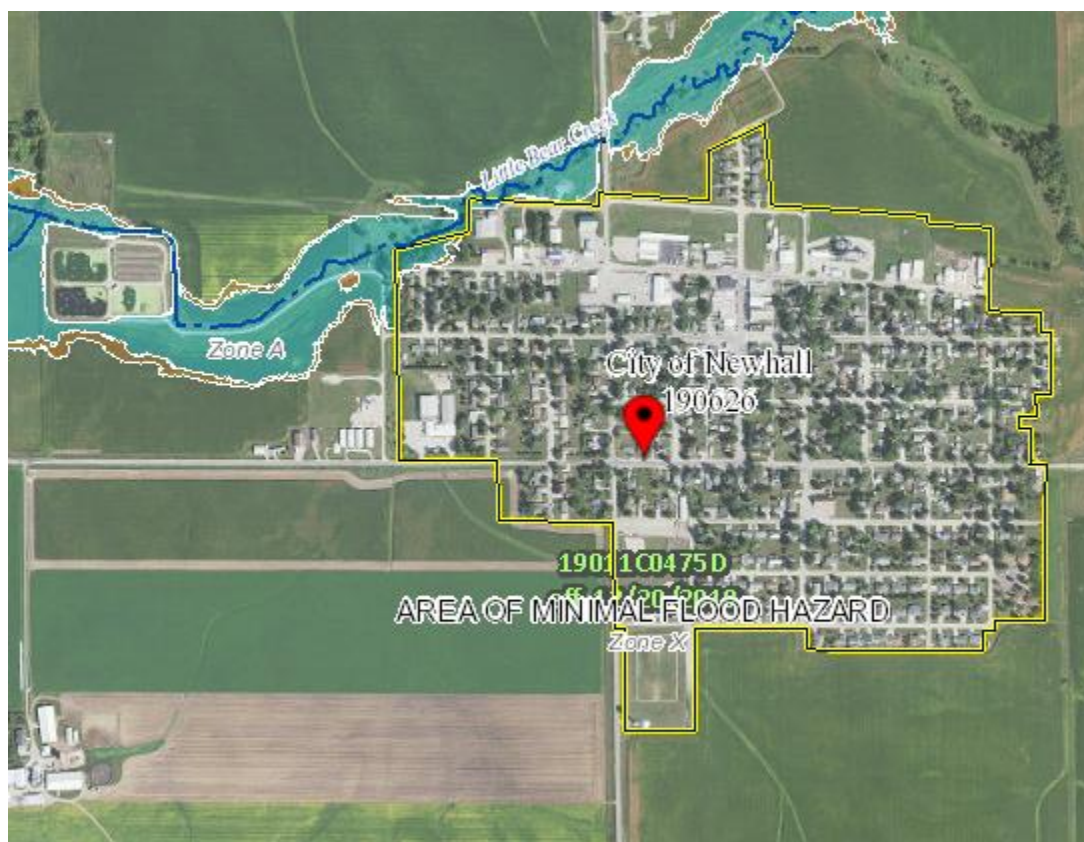


Figure 72: Newhall 100-year Flood Hazard Areas

The CID for Newhall is 190626. FIRM 19011C0475D date is 12/20/2019. A small area in the north side of the corporate city limits is within the 100 year flood hazard area. There are 2 commercial properties, 1 exempt property and 6 residential properties within the hazard areas.

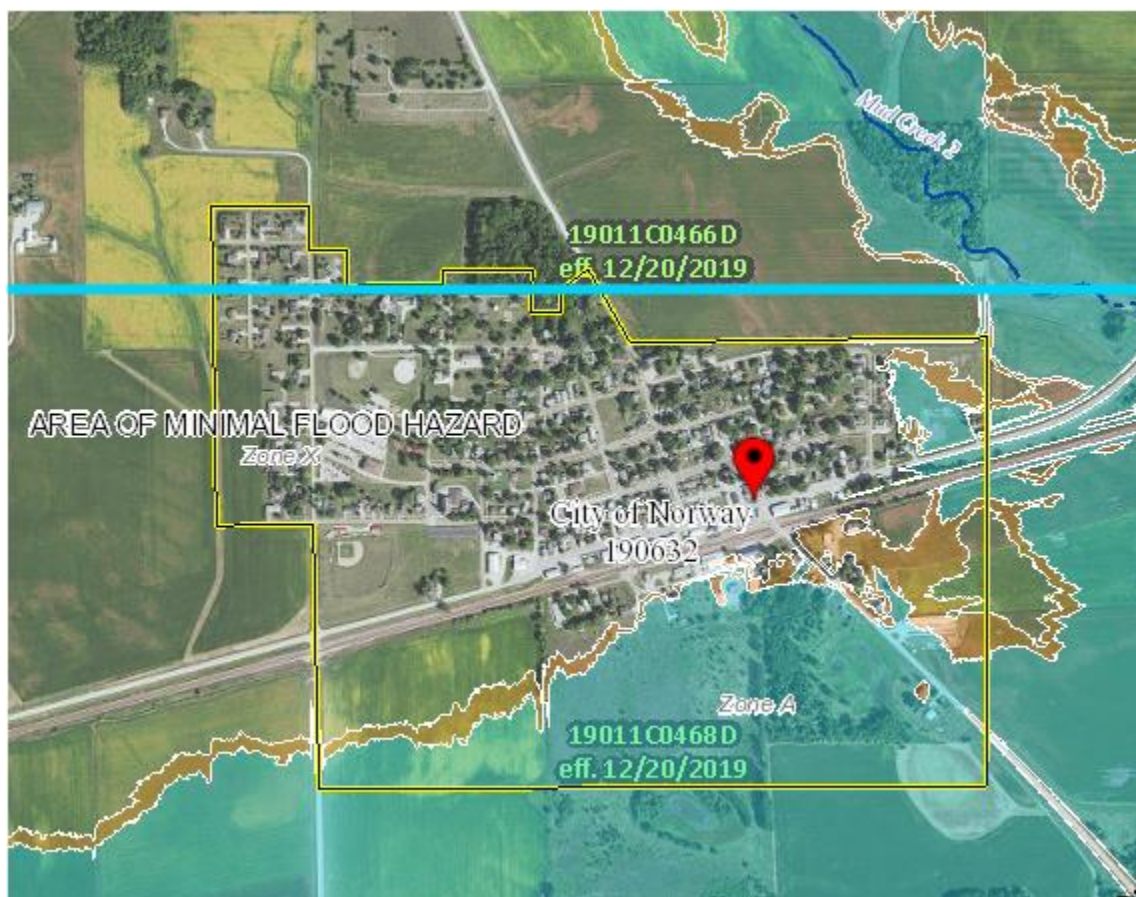
NORWAY

Figure 73: Norway 100-year Flood Hazard Areas

The CID for Norway is 190632. FIRMS 19011C0466D and 19011C0468D dated 12/20/2019. There is only a small corner of special flood hazard area in the northeast corner of the corporate limits of Norway. There are 4 agricultural properties and 2 residential properties within the hazard area.

SHELLSBURG

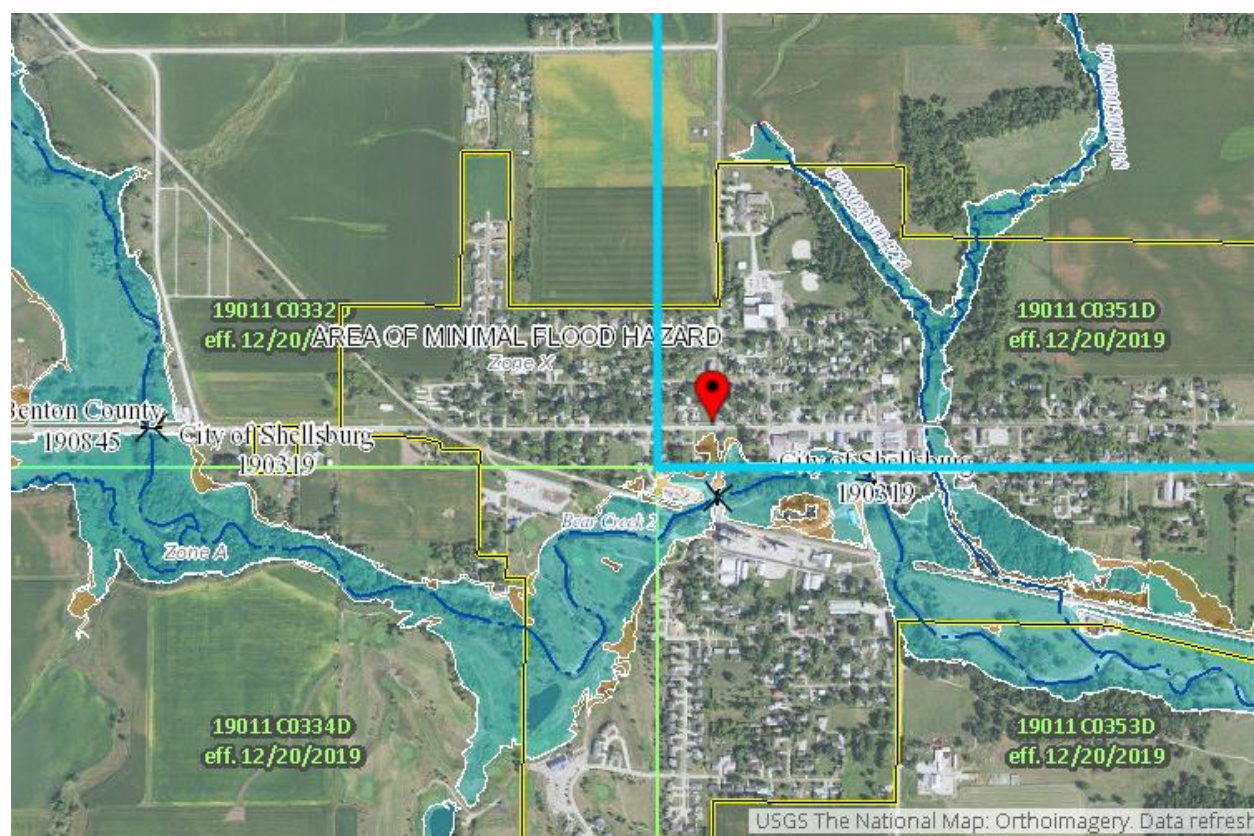


Figure 74: Shellsburg 100-year Flood Hazard Areas

The CID for Shellsburg is 190319. FIRMS are 19011C0332D, 19011C0351D, 19011C0353D and 19011C0334D all dated 12/20/2019. An expansive 100 year flood hazard area runs through the city from east to west along Wildcat Creek with tributaries running to the north and the south. There are 4 agricultural properties, 16 commercial properties, 13 exempt properties and 91 residential properties within the hazard areas.

URBANA

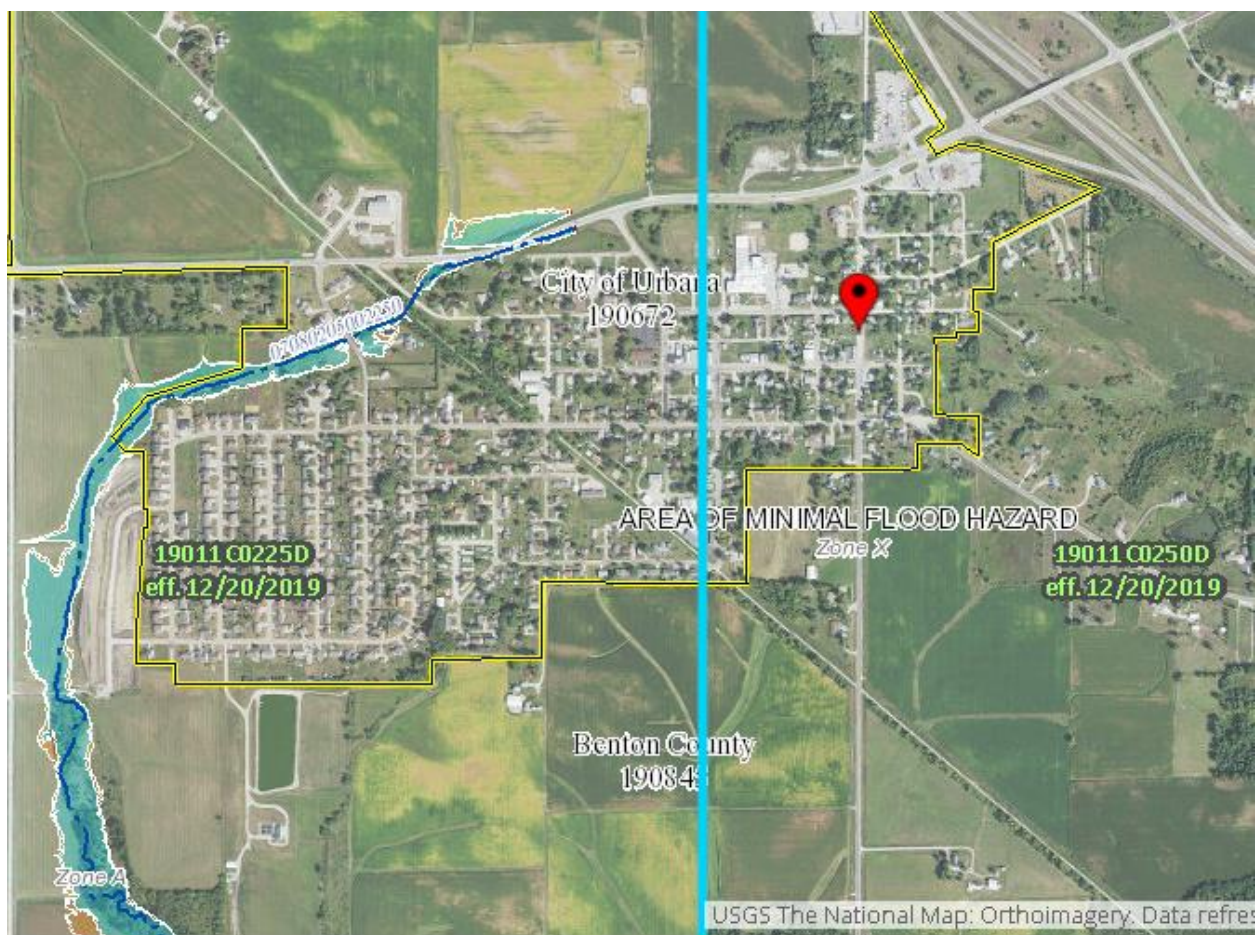


Figure 75: Urbana 100-year Flood Hazard Areas

The CID for Urbana is 190672. FIRMS 19011C0225D and 19011C0250D dated 12/20/2019. A 100 year flood hazard area runs along the west and north side of the city. There are 12 agricultural properties, 2 commercial properties, 1 exempt property and 1 residential property within the hazard areas.

VAN HORNE



Figure 76: Van Horne 100-year Flood Hazard Areas

The CID for Urbana is 190673. FIRM 19011C0325D date is 12/20/2019. A small area in the northwest corner of the corporate city limits is within the 100 year flood hazard area. There are 1 agricultural property and 1 exempt property within the hazard area.

Vinton

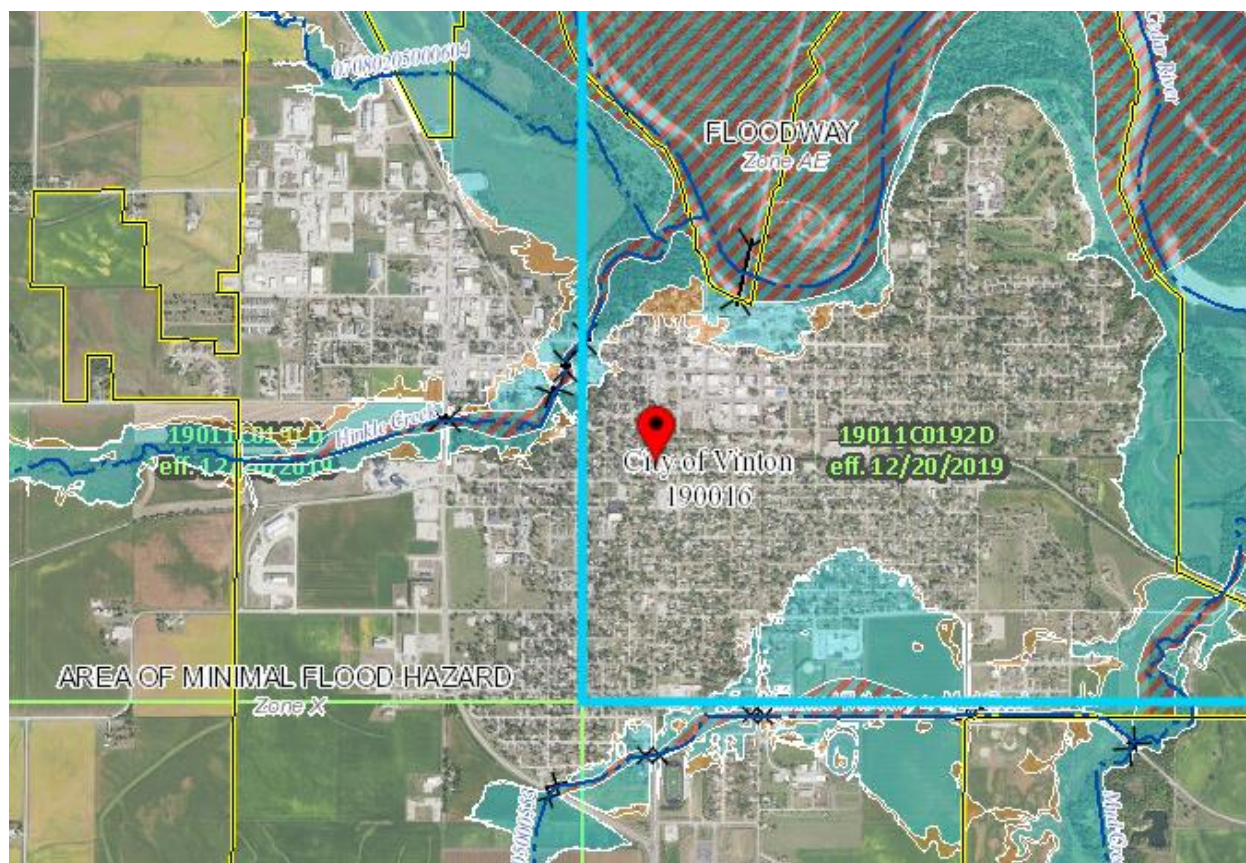


Figure 77: Vinton 100 and 500-year Flood Hazard Areas

The CID for Vinton is 190673. FIRMs are 19011C0191D, 19011C0192D, 19011C0193D and 19011C0194D date is 12/19/2020. Vinton is the only area of Benton County that has identified 100 year and 500 year flood hazard areas. The 2019 FIRM mapping did identify additional properties that would be affected by flooding in the Frog Flats area in the southeast corner of the city. There are 11 agricultural properties, 45 commercial properties, 58 exempt properties, 5 industrial properties and 318 residential properties within the 100 year flood hazard area. Also within this area are the Vinton Fire Station, Vinton Electrical Generation Plant and Benton County Transportation offices. There are an additional 1 agricultural property, 8 commercial properties, 9 exempt properties and 32 residential properties within the 500 year flood hazard area. Also within this area are the Benton County Law Enforcement and Communications Center, the Benton County Emergency Operations Center and the Vinton Electrical Utility Building.

WALFORD

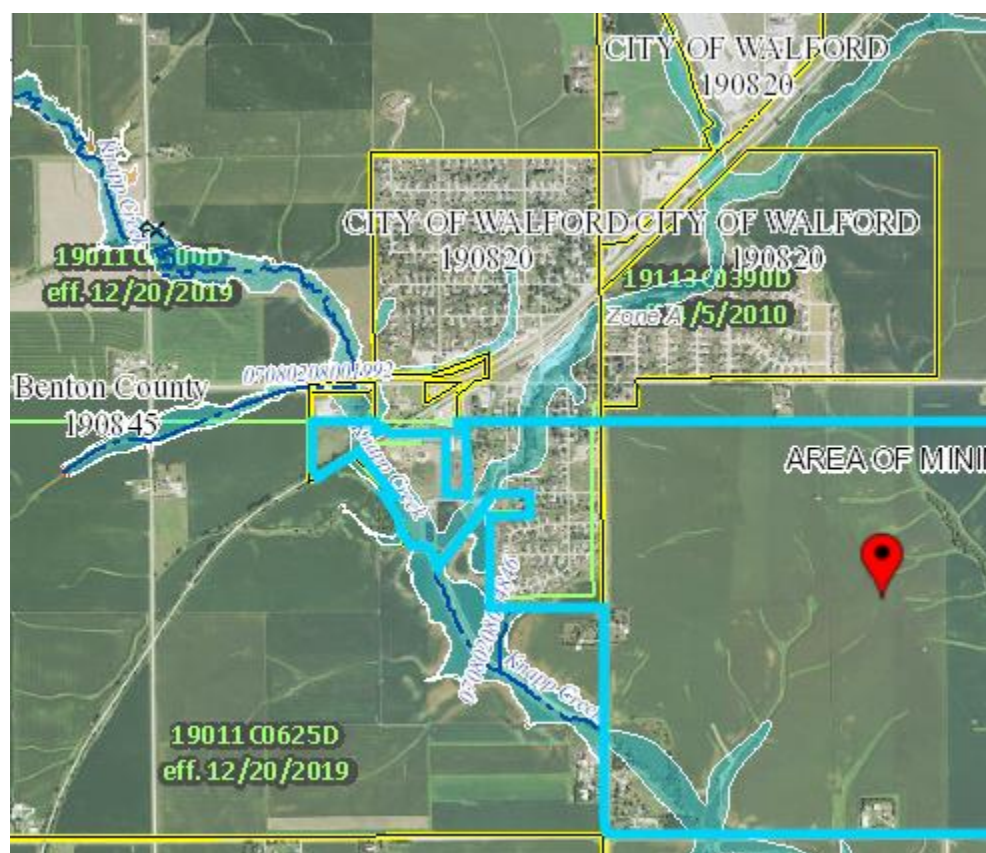


Figure 78: Walford 100-year Flood Hazard Areas

The CID for Walford is 190820. FIRMS are 19011C0390D and 19011C0625D dated 12/20/2019. Several 100 year flood hazard areas run through the city. There are 1 agricultural property, 1 commercial property, 3 exempt properties and 5 residential properties within the area of Walford that is within Benton County.

After researching all available sources, the only information that could be found regarding flood losses in Benton County was that in the record setting floods of 2008, an estimated 110 properties were damaged county-wide from actual flooding that caused an estimated \$10 million in damages. In the City of Vinton, 29 residential properties qualified for FEMA flood buyouts following the floods of 2008. Also flooded during the floods of 2008 were the Vinton Fire Station, City of Vinton Electrical Utility Plant and the Benton County Law Enforcement Center. Benton County also qualified for FEMA funding to replace the flood damaged Benton County Jail at a cost of \$5.9 million.

Using FEMA generated Flood Plain Maps (D-Firms) the Benton County Assessor, has determined that 1218 structures (14% of county total) are located within the 100-year flood plain areas of Benton County. These structures include 858 (10% of county total) classified as residential with an assessed value of \$71,170,200 (7% of county total) 114 classified as commercial (12% of county total) with an

assessed value of \$19,774,400 (2% of county total) 13 classified as industrial (30% of county total) with an assessed value of \$7,827,800 (30% of county total) and 213 properties that are tax exempt municipal or county owned properties within Flood Zone A. Using an average of 2.5 people per household as found in the 2015 census, the potential number of people who could be affected is 3,045, or 12 percent of the Benton County population.

Of the 20 Presidential Disaster Declarations that have been declared for Benton County since 1969, 18 have involved flooding.

The 2008 Iowa floods resulted in 86 of the State's 99 counties included in Governor's disaster declarations, and 84 being declared presidentially. The event resulted in 18 fatalities and 106 injuries, the evacuation of approximately 38,000 Iowans and impacting 21,000 housing units. Iowa had 2 presidentially declared disasters in 2010, both of which included flooding and severe storms. Over half of Iowa's 99 counties were included in one (or both) of these declarations. In 2011 Iowa had 3 separate presidentially declared disasters due to flooding (as well as severe storms and straight-line winds). Counties covered in the 2011 disasters ranged from the western borders due to flooding on the Missouri River to eastern counties along the Mississippi River. Crop losses in Iowa alone from Missouri River flooding were an estimated \$162 million. Iowa has been involved in 36 Presidential Declarations for major disasters related to flooding since 1953. Given the history of river flooding in Iowa, it is likely that there will be many minor events in any given year and a high likelihood that a major flooding event requiring federal assistance will occur in the next five years. While hundreds of homes and businesses have been removed from the floodplain over the last decade, many opportunities for mitigation remain.

Duration

A flash flood is an event that occurs within 6 hours following the end of the causative event (such as rains, ice jams, or dam breaks) which result in fatalities, injuries, and/or significant damage to property. Examples of Flash Floods include damage to buildings, roads, gravel shoulders, bridges, railways or other landscape features including soil erosion. Generally, flash flooding events develop rapidly and can occur anywhere water collects, especially areas of steep terrain, and water runoffs. Flash Floods rarely last more than 12 hours.

A river flood occurs after 6 hours following the end of the causative event (rains, ice jam, dam breaks) which results in fatalities, injuries, and/or significant damage to property. Examples of Floods include damage to buildings, roads, gravel shoulders, bridges, railways or other landscape features including soil erosion. Generally, river flooding events usually take longer to develop and they may extend longer than 24 hours, perhaps several days.

Table 91: Hazard Scoring for Flooding

JURISDICTION	PROBABILITY	WARNING TIME	MAGNITUDE/ SEVERITY	DURATION	TOTAL SCORE	Weighted Score
ATKINS	3	3	2	3	10	2.60
BELLE PLAINE	4	4	3	4	15	3.70
BLAIRSTOWN	2	4	2	2	10	2.30
GARRISON	1	2	1	2	6	1.05
KEYSTONE	3	2	2	2	9	2.45
LUZERNE	1	1	1	1	4	1.00
MT. AUBURN	1	1	1	1	4	1.00
NEWHALL	2	3	1	2	8	1.85
NORWAY	3	4	2	3	12	2.85
SHELLSBURG	3	4	2	1	10	2.65
URBANA	2	4	2	3	11	2.40
VAN HORNE	3	4	2	2	11	2.75
VINTON	3	1	3	4	11	2.80
WALFORD	1	4	1	1	7	1.45
BENTON COUNTY UNINCORPORATED	4	3	1	3	11	2.85
AVERAGE	2.33	2.93	1.73	2.26	8.53	2.23

AVERAGE SCORE = 2.23

RANGE = 1.00 to 3.70

Vinton Municipal Electric Utility risk assessment and hazard scoring is shown in Appendix E. The school districts of Benton County (Appendix D) accepted the scoring of their respective municipal jurisdictions.

GRASS OR WILDLAND FIRE

Definition

A grass or wild-land fire is an uncontrolled fire that threatens life and property in a rural or a wooded area. Grass and wild-land fires are more likely to occur when conditions are favorable, such as during periods of drought when natural vegetation is drier and more combustible

Description

Wildfire risk is frequently associated with specific types of terrain and groundcover. Areas with the least amount of development are generally where wildfires will occur, and groundcover in these areas typically includes forests, ditches, prairie remnants, poorly maintained lots or fields. The situation can be made worse by the addition of steep slopes, which make any fire that does occur more likely to spread and more difficult to maintain. The likelihood of a wildfire occurring is exacerbated by dry conditions and high winds.

Probability

According to the National Interagency Fire Center, not counting prescribed fires, there were 2,438 wildfires spanning 69,583 acres from 2013 to 2017 in Iowa. Peak years were during and after the drought experienced in 2012-2013. There were 1,817 wildfires spanning 33,122 acres and 1,884 prescribed fires spanning 14,079 acres from 2002 to 2012 in Iowa. No event reported in the state has been a historically significant wildfire. While this may seem like a large number of fires, when compared to other states, it is very small. As an example of how the state ranks versus other states, Iowa ranked 44th in number of wildfires for the decade from 2002 to 2012, and 40th in number of acres burned²⁴. For the period 2013 to 2017 (inclusive) Iowa was 34th in number of fires. Most of the states that had fewer fires were much smaller states like Hawaii, Delaware, Rhode Island, and Vermont.

Rural settings are more vulnerable to wildfires, and the value of exposed property is increasing at a faster rate than population. Development trends indicate that it is indeed in the rural, unincorporated areas of Benton County where new homes are being constructed on small acreages that are either contingent to or located on tracts of land that are vulnerable to grassland, wildland or timber fires. Grass fires are often more easily contained and extinguished before there is damage to people or developed property. Fires often burn large portions of field crops in the fall when the crops are dry and the harvesting equipment overheats or throws sparks. This can be quite costly to the farmer in terms of lost production.

Most grass fires are contained to highway right-of-way and rail right-of-way ditches and are less than a few acres in size. However, in Benton County the potential threat is more acute due to the expanses of grassland, cropland, wild lands and timber. High winds can turn a small flame into a multi-acre grassfire within a matter of minutes. The extent is dependent upon conditions such as land use/land cover, moisture, and wind.

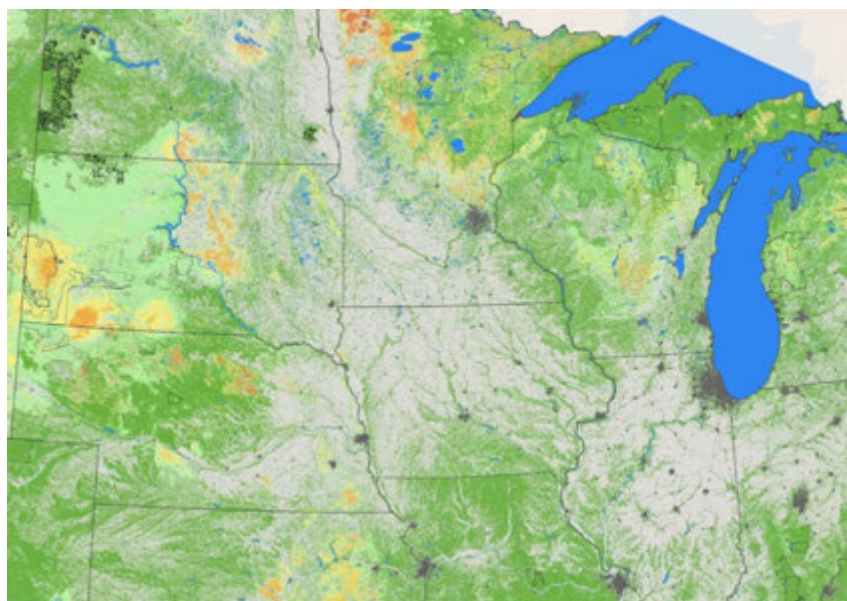
Most grassfires burn only the grasses, crops, or other low land cover. Injuries and deaths from fighting the fire most often occur by natural causes such as heart attack or stroke. Property damage is usually

limited to grass, small trees, etc. Occasionally a house or outbuilding can be damaged or destroyed as could be the case in the rural, unincorporated areas of Benton County where development is occurring.

While wildfires in the form of grass, brush and field fires do occur throughout Benton County, they are more likely to occur in the rural unincorporated areas of the county or on the outskirts of cities town where people are more likely to have a greater number of combustible materials in their yards.

Wildfires in Benton County are not typically beyond the response capabilities of the local fire departments, and thus people or property are more likely to be directly affected by a wildfire than indirectly affected. This would typically include property losses to whatever was burned, which might include crop losses, loss or damage to homes and/or accessory structures, and possible infrastructure damage if the fire reaches a roadway, propane tank, electricity lines or similar. The most common indirect effect of a grass, timber or wildfire is excessive smoke, which could potentially cause visibility issues for drivers depending on the location of the wildfire and weather conditions such as wind direction and humidity.

Figure 79: Wildfire Hazard Potential, 2014. Source: USDA Forest Service, Fire Modeling Institute. <https://www.firelab.org/document/classified-2014-whp-gis-data-and-maps>



Duration

The duration of a grass or wildland fire is dependent upon several factors: response time and capabilities of fire departments; size of the fire; weather, terrain and vegetation conditions. Fire reports submitted in Benton County fire departments to the National Fire Incident Report System (NFIRS) indicate that grass and wildland fires are usually extinguished within 30 minutes of first arrival of a fire department. In a few extreme circumstances grass and wildland fires have taken responding fire departments up to two hours to control.

Table 93: Hazard Scoring for Grass or Wildland Fire

JURISDICTION	PROBABILITY	WARNING TIME	MAGNITUDE/ SEVERITY	DURATION	TOTAL SCORE	Weighted Score
ATKINS	4	4	1	1	10	2.60
BELLE PLAINE	3	3	3	2	11	2.90
BLAIRSTOWN	1	4	1	1	10	1.45
GARRISON	4	4	1	1	10	2.80
KEYSTONE	4	4	2	2	12	3.20
LUZERNE	1	2	1	1	5	1.15
MT. AUBURN	4	4	1	1	10	2.80
NEWHALL	4	4	1	1	10	2.80
NORWAY	3	1	1	1	6	1.80
SHELLSBURG	3	4	1	1	9	2.35
URBANA	4	4	2	2	10	3.20
VAN HORNE	4	4	1	1	10	2.75
VINTON	1	4	1	1	7	1.55
WALFORD	1	4	1	1	7	1.45
BENTON COUNTY UNINCORPORATED	4	4	1	1	10	2.80
AVERAGE	3.00	3.60	1.27	1.20	9.13	2.73

AVERAGE SCORE = 2.73

RANGE = 1.15 to 3.20

*2021 MJHMP revision note: The State of Iowa Fire Marshall's Office was contacted for current and updated statistics on wildfires in Benton County for this 2021 MJHMP revision, but stated that due to personnel changes it is unable to provide those statistics at this time. In general, there has not been any substantial change in land use or agricultural practices in Benton County that has or will cause any change in wildfire risk in the county.

SEVERE WINTER STORM

Definition

Severe winter weather conditions that affect day-to-day activities. These can include blizzard conditions, heavy snow, blowing snow, freezing rain, heavy sleet, and extreme cold.

Description

Winter storms are most likely to occur between late October and Late March. Blizzards, the most dangerous of winter storms, combine low temperatures, heavy snowfall, and high winds that blow the snow into drifts and reduce visibility. The National Weather Service describes a blizzard as large amounts of falling or blowing snow and winds of at least 35 miles per hour that are expected to last for several hours. A severe blizzard is characterized by considerable falling or blowing snow, winds of at least 45 miles per hour, and temperatures of 10 degrees Fahrenheit or lower lasting for several hours.

A heavy snowstorm is one that drops four or more inches of snow in a 12-hour period or six or more inches in a 24-hr period. Often high winds accompany the storm, blowing the snow into drifts and causing poor visibility.

Warning Time

Public address systems, television, radio, NOAA Weather Alert Radios, cell phone and text messages, and social media such as facebook are used to disseminate emergency messages about severe winter weather. Benton County residents may also receive advance warnings of severe winter weather via their cell phones or other electronic devices.

The National Weather Service (NWS) has developed effective winter weather advisories that are promptly and widely distributed. Radio, TV, and Weather Alert Radios provide the most immediate means to do this. Accurate information is made available to public officials and the public up to days in advance. Several notifications made by the National Weather Service include winter storm watch, winter storm warning, blizzard warning, winter weather advisory, and a frost/freeze advisory. The Benton Office of Emergency Management and Benton County Sheriff's office dispatch center notifies the county's emergency responders of all-weather warnings, including severe winter storms.

Probability

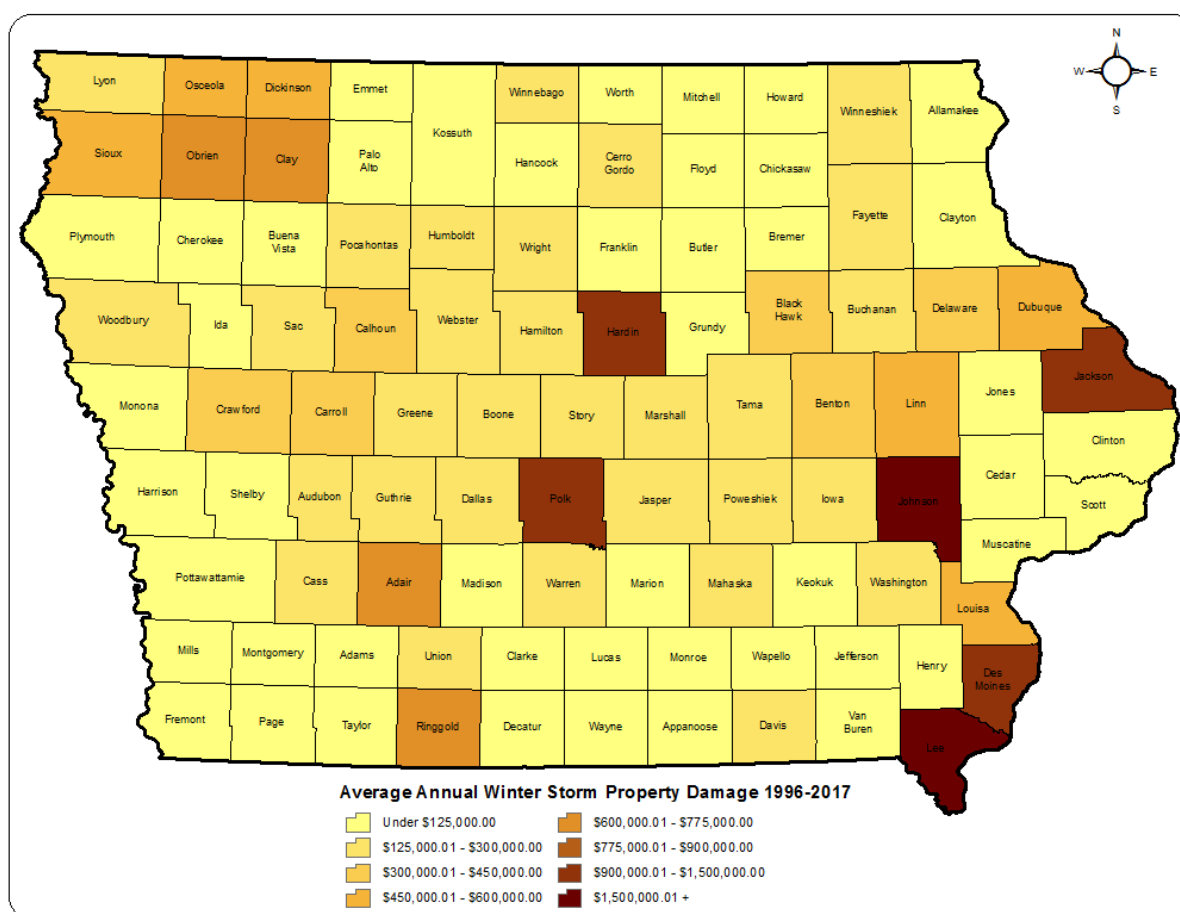
Iowa has had a plethora of winter storm related events cataloged in the National Climactic Data Center. The National Centers for Environmental Information (NCEI) database included these winter-type events for Iowa for 2013-2017:

- 50 winter weather
- 23 winter storm
- Nine blizzard
- Four ice storm
- 20 heavy snow
- 17 cold/extreme cold/wind chill events.

Some of these events may overlap, but it is clear that in Iowa a variety of winter weather-related hazards are commonplace. In Iowa, there are cases where deaths have been attributed to cold temperatures or blizzards.

The National Climatic Data Center documents 52 severe winter storm events that have been reported to impact Benton County from 1950 to 2020. This is an average of slightly less than one event per year. There were no deaths and one injury attributed to the winter storms.

Figure 80: Average Annual Winter Storm Property Damage 1996-2017



A snowfall of six inches or more from one storm only occurs in 49% of Iowa winters, while a large winter storm event of 10 inches or more will occur about once every 3 years. The winter of 2007 – 2008 saw very high snowfall totals for much of eastern Iowa, and many areas had multiple storm events in excess of 10 inches.

Winter storms regularly move easterly and use both the southward plunge of arctic cold air from Canada and the northward flow of moisture from the Gulf of Mexico to produce heavy snow and sometimes

blizzard conditions in Iowa and other parts of the Midwest. From 1983 to 1998, Des Moines averaged nearly 50 days a year with falling snow. The cold temperatures, strong winds, and heavy precipitation are the ingredients of winter storms. Most counties, including Benton County can usually expect 2 or 3 winter storms a season with an extreme storm every 3 to 5 years on average (more in the northwest, fewer in the southeast).

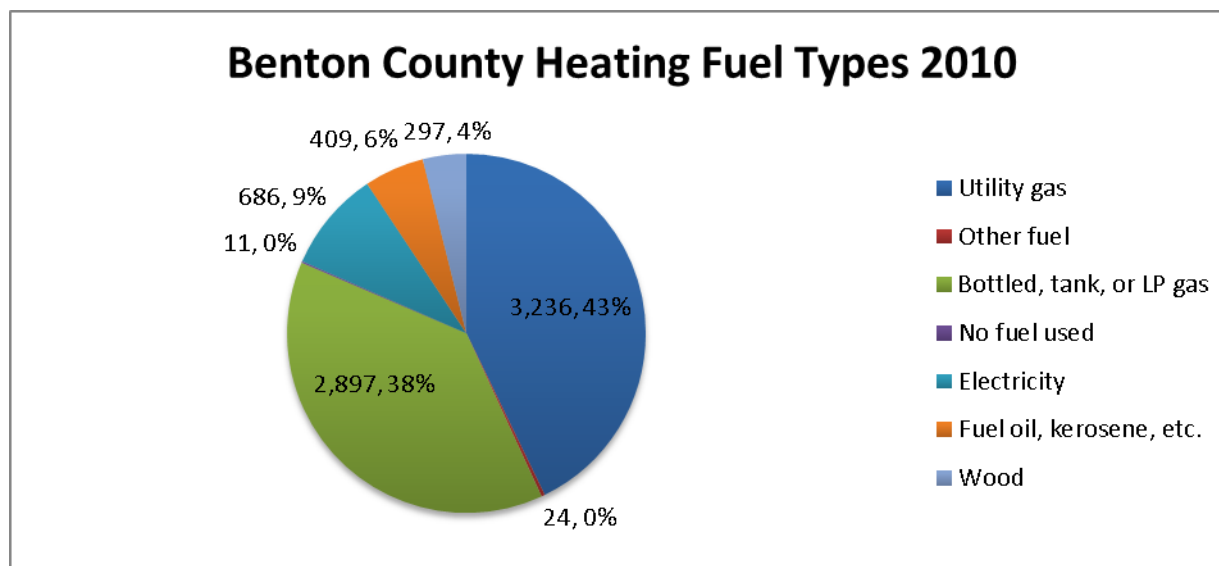
Based on the state's geographic location, personal knowledge, and historical data; the SHMT has evaluated the probability on winter storms and determined that a winter storm event is highly likely to occur in any given year. Due to the historical frequency of severe winter storms and Benton County's geographical location, it is a near 100 percent certainty the county will be impacted by winter storms in the future.

Eight winter-storm-related Presidential Disaster Declarations for major disaster have been declared in Iowa since 1991. The first declaration related to winter storms which occurred in 1991 resulting from an ice storm that affected 16 counties. Extensive damage occurred to power lines, including the collapse of numerous high-tension towers in north-central Iowa. The second declaration occurred in 1997 resulting from a severe winter storm that affected 13 counties. In 2007, the third declaration on March 14 affected 48 counties and the fourth declaration on March 30 affected 23 counties with five counties included in both declarations. These declarations resulted from a major winter storm with ice and heavy snow combined with strong winds gusting to 50-55 mph causing blizzard conditions. Some areas in Iowa received 16 inches of snow, and coupled with the strong winds, it caused already weakened ice-covered power lines to crumble and interstate highways to be closed due to drifting snow. This situation left approximately 250,000-plus Iowa citizens without electricity for more than 10 days. In central Iowa, one county had 20 miles of downed power poles that snapped due to the power lines being coated with inches of ice coupled with the strong winds, with high-tension towers also collapsing. Due to the severity of the winter blizzard, the governor signed a governor's proclamation of disaster emergency for all 99 counties in Iowa. Another disaster was declared in January of 2008, affecting 30 counties in southern Iowa. The remaining two Presidential Disaster Declarations occurred in late February 2010, impacting 27 counties, and in early March of 2010, impacting 27 counties in western Iowa. Most recently Iowa had a Presidential Disaster Declaration for a winter storm that occurred in April of 2013 in five northwestern counties.

Magnitude and Severity

Severe winter storms always affect the entire jurisdiction, although specific areas may experience heavier damage. The main complications from severe winter storms are hazardous driving conditions and extreme cold. Sometimes severe winter storms are also accompanied by significant ice, which can accumulate on power lines and cause widespread outages. People who are at greatest risk are those who must travel a significant distance on a regular basis and portions of the population who are less able to accommodate extreme cold or power outages. The following types of heating fuel are used in Benton County, according to the 2010 Census (shown as households, percentage of total):

Figure 81: Benton County Heating Fuel Types



Also at risk are people who live in homes that are not well maintained (leaky windows and doors, lack of insulation, older heating systems, etc.), people who may have existing medical conditions that make them less able to tolerate temperature extreme, the very old and the very young. The following table documents the percentage of the population in each participating jurisdiction most likely to be at risk due to age alone.

Table 94: Vulnerability by Age (2010 US Census Bureau data—the most recent data available)

Area	2000				2010			
	<18	%	>64	%	<18	%	>64	%
Atkins	306	31	108	11	522	31	166	10
Belle Plaine	741	26	599	21	595	23	483	19
Blairstown	169	25	153	22	178	26	118	17
Garrison	118	29	48	12	91	24	50	13
Keystone	193	28	170	25	149	24	152	24
Luzerne	35	33	17	16	18	24	8	8
Mt. Auburn	39	24	31	19	36	24	34	16
Newhall	241	27	186	21	224	26	153	17
Norway	157	26	83	14	126	23	107	20
Shellsburg	258	28	123	13	205	21	190	19
Urbana	311	31	95	9	470	32	111	8
Van Horne	204	28	127	18	175	26	113	17
Vinton	1276	25	1030	20	1299	25	1027	20
Walford	445	36	53	4	488	33	77	5
Unincorporated	4493	18	2832	11	4576	18	2789	11
Benton County Total	6124	27	3902	15	5781	22	4015	15
Iowa	733628	25	436213	15	7716011	24	466169	15

Table 95: People with disabilities in Benton County (2010 US Census Bureau data—the most recent data available)

COMMUNITY	NUMBER OF PEOPLE WITH DISABILITIES	% OF POPULATION
Atkins	117	6.2%
Belle Plaine	550	20.9%
Blairstown	34	2.7%
Garrison	47	15.2%
Keystone	92	14.7%
Luzerne	6	7.1%
Mt. Auburn	9	6.5%
Newhall	89	11.1%
Norway	46	7.2%
Shellsburg	134	13.7%
Urbana	81	5.8%
Van Horne	70	9.7%
Vinton	925	18.1%
Walford	52	3.4%
Benton County Unincorporated	941	11.7%
Benton County Total	3,193	12.4%

Hazardous driving conditions due to snow and ice on highways and bridges lead to many traffic accidents. The leading cause of death during winter storms is transportation accidents. About 70% of winter-related deaths occur in automobiles and about 25% are people caught out in the storm. The majority of these are males over 40 years of age. Emergency services such as police, fire, and ambulance are unable to respond due to road conditions. Emergency needs of remote or isolated residents for food or fuel, as well as for feed, water and shelter for livestock are unable to be met. People, pets, and livestock are also susceptible to frostbite and hypothermia during winter storms. Those at risk in Benton County are primarily either engaged in outdoor activity (shoveling snow, digging out vehicles, or assisting stranded motorists), or are the elderly or very young (9,796 or 27 percent of the total Benton County population). The schools systems of Benton County often close during extreme cold or heavy snow conditions to protect the safety of children and bus drivers. Citizens' use of

kerosene heaters and other alternative forms of heating may create other hazards such as structural fires and carbon monoxide poisoning.

Figure 82: Winter Weather Transportation Incidents in Benton County



Winter storms are quite vast and would likely impact multiple counties. Certain areas may experience local variations in storm intensity and quantity of snow or ice. The Iowa Department of Transportation, Benton County Secondary Roads and city public works departments are responsible for the removal of snow and treatment of snow and ice with sand and salt on Benton County's 1,330 miles of hard surfaced, secondary, rock and dirt roads in the county and on any street of the county's 14 incorporated cities. Travelers using any of the county's roads stranded in a severe winter storm and may be forced to seek refuge in a shelter.

Immobilized transportation (including emergency vehicles), downed trees and electrical wires, building and communication tower collapse, and bodily injury/death are just a few of the impacts of a severe winter storm. Vehicle batteries and diesel engines are stressed and the fuel often gels in extreme cold weather. This impacts transportation, trucking, and rail traffic. Rivers and lakes freeze and subsequent ice jams threaten bridges and can close major highways. Ice jams can also create flooding problems when temperatures begin to rise. An ice coating at least one-fourth inch in thickness is heavy enough to

damage trees, overhead wires, and similar objects and to produce widespread power outages. Buried water pipes can burst causing massive ice problems, loss of water and subsequent evacuations during sub-zero temperatures. Fire during winter storms presents a great danger because water supplies may freeze, and firefighting equipment may not function effectively or personnel and equipment may be unable to get to the fire. If power is out, interiors of homes become very cold, causing pipes to freeze and possibly burst. Cold temperature impacts on agriculture are frequently discussed in terms of frost and freeze impacts early or late in growing seasons and on unprotected livestock. The cost of snow removal, repairing damage, and loss of business can have large economic impacts on the community. Since 1950, Iowa has had 15 injuries related to winter storms and 5 deaths.

Duration

Severe Winter Weather events are not short term events. Generally, a severe winter storm will last at least a day and in some case two or more days.

Table 96: Hazard Scoring for Severe Winter Storm

JURISDICTION	PROBABILITY	WARNING TIME	MAGNITUDE/ SEVERITY	DURATION	TOTAL SCORE	Weighted Score
ATKINS	4	2	2	3	11	3.00
BELLE PLAINE	4	4	2	2	12	3.00
BLAIRSTOWN	2	4	3	1	10	2.50
GARRISON	4	2	1	3	10	2.70
KEYSTONE	4	2	1	3	10	2.70
LUZERNE	3	2	3	2	10	2.75
MT. AUBURN	4	2	1	3	10	2.70
NEWHALL	2	1	2	3	8	2.05
NORWAY	2	1	2	3	8	2.05
SHELLSBURG	3	3	2	3	11	2.70
URBANA	4	1	2	4	11	2.95
VAN HORNE	4	4	2	2	10	2.90
VINTON	3	1	2	3	9	2.40
WALFORD	2	3	3	3	11	2.55
BENTON COUNTY UNINCORPORATED	4	1	1	2	8	2.45
AVERAGE	3.27	2.20	1.93	2.67	9.93	2.63

AVERAGE SCORE = 2.63

RANGE = 2.05 to 3.00

Vinton Municipal Electric Utility risk assessment and hazard scoring is shown in Appendix E. The school districts of Benton County (Appendix D) accepted the scoring of their respective municipal jurisdictions.

THUNDERSTORM/LIGHTNING/HAIL

Definition

Thunderstorms are weather systems resulting in heavy rains. Severe thunderstorms have winds reaching or exceeding 58 mph, tornadoes, or surface hail at least 0.75 inches in diameter.

Hail is an outgrowth of a severe thunderstorm in which balls or irregularly shaped lumps of ice greater than 1 inch in diameter fall with rain

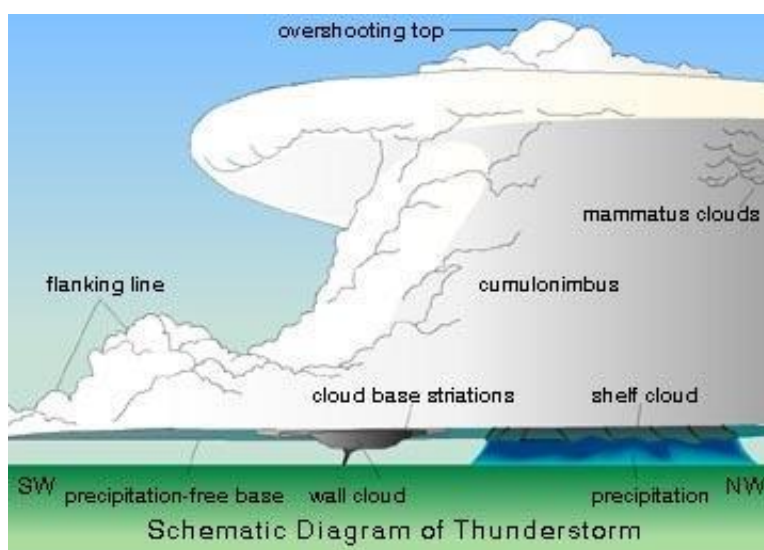
Lightning is an electrical discharge that results from the buildup of positive and negative charges within a thunderstorm. When the buildup becomes strong enough, lightning appears as a “bolt.” This flash of light usually occurs within the clouds or between the clouds and the ground. A bolt of lightning reaches temperatures approaching 50,000 degrees F in a split second. This rapid heating, expansion, and cooling of air near the lightning bolt creates thunder.

Description

Thunderstorms are formed from a combination of moisture, rapidly raising warm air, and a lifting mechanism such as clashing warm and cold air masses. Most thunderstorms produce only thunder, lightning, and rain. Severe storms however, can produce tornadoes, high straight-line winds above 58 mph, microbursts, lightning, hailstorms, and flooding. High straight-line winds, which can often exceed 60 mph, are common occurrences and are often mistaken for tornadoes.

Thunderstorms are common in Iowa and can occur singly, in clusters, or in lines. Compared to other atmospheric hazards such as hurricanes and winter storms, they tend to affect relatively small areas. A typical thunderstorm is 15 miles in diameter and lasts an average of 30 minutes, but may travel distances in excess of 600 miles.

Figure 83: Thunderstorm Diagram



The NWS considers a thunderstorm severe if it produces hail at least 1 inch in diameter, wind 58 mph or higher, or tornadoes. High straight-line winds, which can often exceed 60 mph, are common occurrences and are often mistaken for tornadoes. Lightning is an electrical discharge that results from the buildup of positive and negative charges within a thunderstorm. When the buildup becomes strong enough, lightning appears as a “bolt.” This flash of light usually occurs within the clouds or between the clouds and the ground. A bolt of lightning reaches temperatures approaching 50,000 degrees F in a split second. This rapid heating, expansion, and cooling of air near the lightning bolt creates thunder.

Most thunderstorms produce thunder, lightning, and rain. Severe storms can also produce tornadoes, straight-line winds with microburst above 58 mph, hailstorms, and flooding. The National Weather Service (NWS) considers a thunderstorm severe if it produces hail at least 1-inch in diameter, wind 58 mph or higher, or tornadoes. Straight-line winds that exceed 60 mph are often mistaken for tornadoes. Thunderstorms are hazards unto themselves, but can cause other hazards such as flash flooding, river flooding, and tornadoes/windstorms.

Hail is produced by many strong thunderstorms. Strong rising currents of air within a storm carry water droplets to a height where freezing occurs. Ice particles grow in size until they are too heavy to be supported by the updraft. Hail can be smaller than a pea or as large as a softball and can be very destructive to plants and crops. Pets and livestock are particularly vulnerable to hail.

PROBABILITY

There have been five Presidential Declarations for Major Disaster since 2010 related to severe storms in Iowa. From 2010 to April 2013, the NCDC lists 370 hail events, 37 lightning events, and 68 heavy rain events that have impacted Iowa. The NCDC lists events by county, and one storm can be listed as multiple events. Thunderstorms also may occur singly, in clusters, or in lines, so it is possible that several thunderstorms may affect the same area in the course of a few hours.

Iowa, experiences between 30 and 50 thunderstorm days per year on average. Benton County and is impacted by these events also. With Iowa's location in the interior of the U.S., there is a very high likelihood that a few of these summer storms will become severe and cause damage. Because of the humid continental climate that Iowa experiences, ingredients of a severe thunderstorms are usually available (moisture to form clouds and rain, relatively warm and unstable air that can rise rapidly, and weather fronts and convective systems that lift air masses).

National Climatic Data Center statistics document 290 thunderstorm events in Benton County Between 1/1/1950 and 6/1/2020. The cumulative total of all damages caused by these storms is \$4,987,000 in property damages and \$15,257,000 in agricultural crop damages. The largest property loss was \$2,677,000 on 7/11/2011. The largest reported crop damage was \$15,100.000 in the Garrison area on 8/10/2006. Seven injuries are also recorded as having occurred due to these storms.

Table 97: Historical Thunderstorms by Jurisdiction as reported by the NCDC

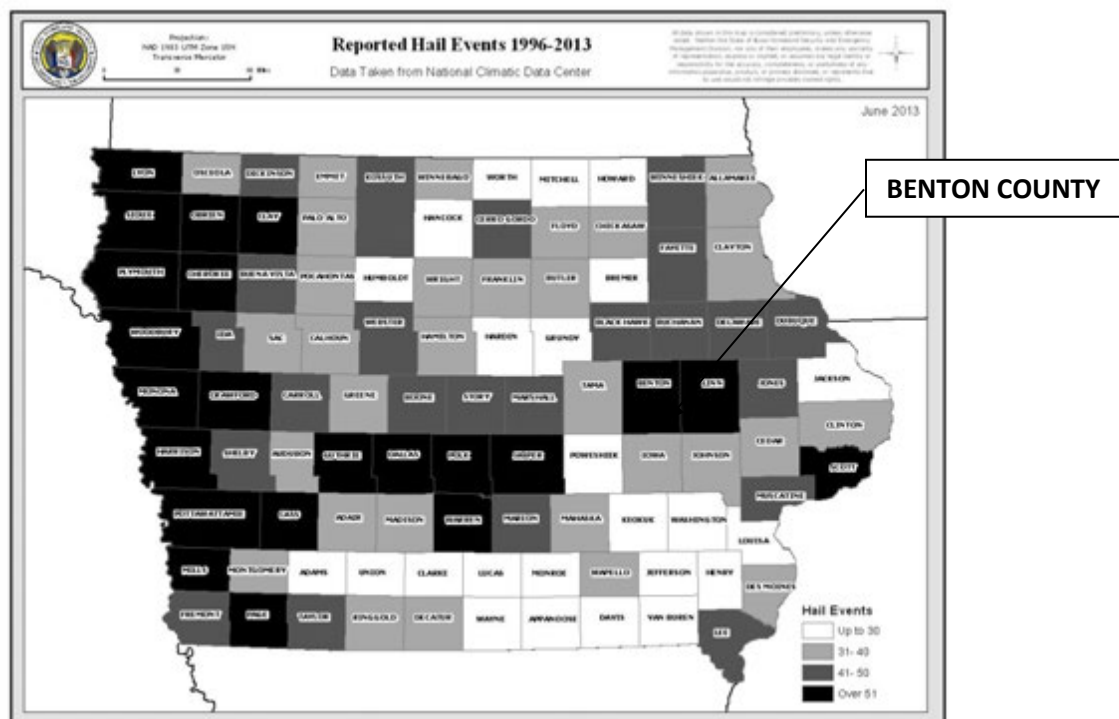
JURISDICTION	NUMBER	TOTAL PROPERTY LOSS
Unincorporated Areas	67	\$1,293,000
Atkins	20	\$127,000
Belle Plaine	34	\$186,000
Blairstown	3	0
Garrison	26	\$1,134,000
Keystone	28	\$128,000
Luzerne	3	\$1,000
Mt. Auburn	19	\$324,000
Newhall	13	\$30,000
Norway	14	\$9,000
Shellsburg	16	\$100,000
Urbana	11	\$930,000
Van Horne	21	\$262,000
Vinton	35	\$435,000
Walford	1	\$7,000

NCDC records indicate 223 hailstorm events in Benton County from 1/1/1950 to 6/1/2018 causing a reported \$2,888,000 in property damages and \$799,000 in crop damages. One hailstorm had hail 4 inches in diameter; two--3 inches in diameter; three--2 $\frac{3}{4}$ inches in diameter; one—2 inches in diameter and 31—1 $\frac{3}{4}$ inches in diameter.

Table 98: Historical Hailstorms by Jurisdiction as reported by the NCDC

JURISDICTION	NUMBER	TOTAL PROPERTY LOSS
Unincorporated Areas	28	
Atkins	13	\$16,000
Belle Plaine	22	0
Blairstown	6	\$3,000
Garrison	16	\$515,000
Keystone	20	\$559,000
Luzerne	2	0
Mt. Auburn	7	\$55,000
Newhall	9	\$32,000
Norway	12	\$7,000
Shellsburg	18	\$13,000
Urbana	17	\$1,504,000
Van Horne	24	\$22,000
Vinton	26	\$74,000
Walford	7	\$78,000

Figure 84: Reported Hail Events in Iowa 1996-2013
From State of Iowa 2013 Hazard Mitigation Plan



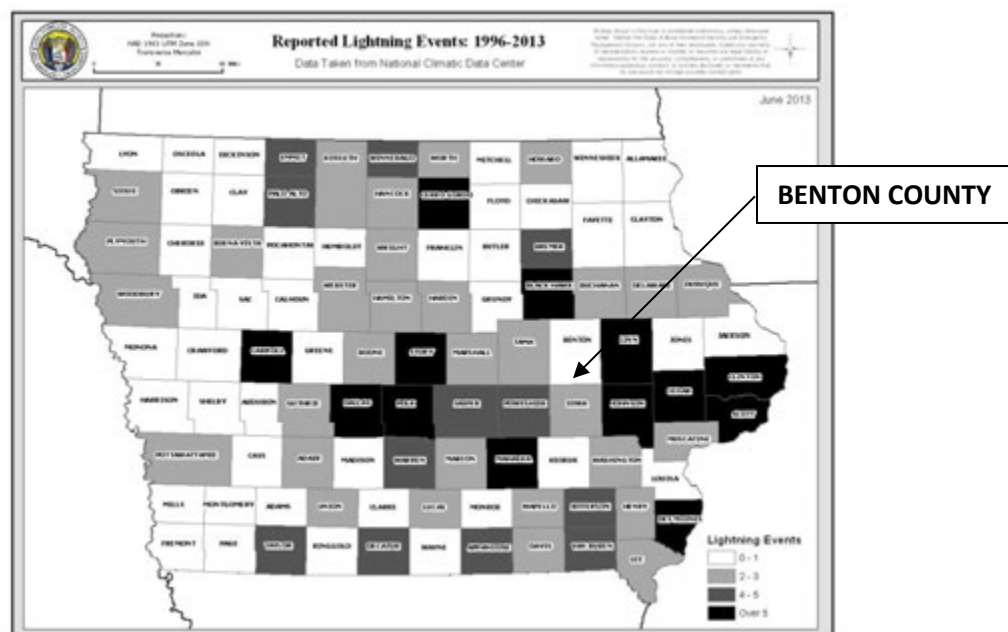
The map above depicts a geographic breakdown of the number of hailstorms in Iowa 1996. According to the National Climatic Data Center (NCDC), Iowa experienced 370 hail events from 2010-2013 (April 1 data cutoff). Five injuries and zero deaths resulted from these hailstorms in Iowa. NCDC website data shows more than \$4.75 million in property damage and over \$4.5 million in crop damage over that time period. NCDC lists events by county and one event may be counted several times if the event affects a large region in the state.

Data on probability and frequency of occurrence of hailstorms is limited, but research indicates that any given point in Iowa can expect on average two to three hailstorms in a year. The historical occurrence of hail storms in Benton County supports this conclusion. Due to the historical frequency of thunderstorm/hail/lightning in Benton County it is a near 100 percent certainty the county will be impacted by thunderstorms and lightning in the future.

Lightning can cause fires and ignite explosive materials. Especially during dry conditions, lightning is a common cause of grass, forest and wildfires. Lightning can also cause house fires and other types of structural or urban fire. Perhaps the most common forms of property damage relating to lightning are downed trees and damage to electronic devices. Several different types of devices have been designed to prevent or reduce lightning damage by redirecting current away from a structure. These types of protection generally fall into the category of either lightning rods (also referred to as lightning finials or air terminals) or lightning protection systems (also referred to as lightning conductors, arrestors or dischargers). Lightning rods are relatively common devices that use a strip or rod of conductive metal material placed on or above the highest point of a structure to direct the current of a lightning strike to a grounding network. Lightning rods are typically used as part of a lightning protection system that may

also include metal conductors and ground electrodes designed to provide a low resistance path to the ground for potential strikes.

Figure 85: Reported Lightning Events in Iowa 1996-2013.
From State of Iowa 2013 Hazard Mitigation Plan



The cost of lightning damage is difficult to determine as the event appears to be significantly under-recorded on NOAA. 1 lightning event on 8/10/2006 in Vinton caused \$500 in damages. According to the 2013 State of Iowa Hazard Mitigation Plan, Benton County will experience an average of \$163,000 in property damage by lightning annually.

WARNING TIME

Some thunderstorms can be seen approaching, while others hit without warning. The National Weather Service issues severe thunderstorm watches and warnings as well as statements about severe weather and localized storms. These messages are broadcast over NOAA Weather Alert Radios and area TV and radio stations. Advances in weather prediction and surveillance have increased warning times. The resolutions of radar and Doppler radar have increased the accuracy of storm location and direction. Weather forecasting and severe weather warnings issued by the National Weather Service usually provide residents and visitors alike adequate time to prepare. Isolated problems arise when warnings are ignored.

Benton County has an established system of trained weather spotters. These individuals are called out on an as needed basis when severe weather threatens the county. The Benton County Office of Emergency Management and Benton County Sheriff's office dispatch center notifies applicable Benton County emergency responders in the event that a tornado or funnel cloud is sighted in Benton County. Those residents and facilities of the county that have NOAA weather radios will receive notice of

tornadoes and severe weather events from the National Weather Service. All cities of Benton County plus rural areas of the county that is within the 10 mile Emergency Planning Zone for the Duane Arnold Nuclear Power Plant have siren warning systems to alert residents of an approaching tornado or dangerous winds.

Forecasting hailstorms – as with their parent thunderstorms – is becoming quite accurate due to the advancement in NEXRAD Doppler Radar and analysis of reflectivity data at multiple angles, specifically the Vertically Integrated Liquid (VIL), operated by the National Weather Service and many television-weather departments.

Authorities at the National Weather Service in Davenport state that the average warning time they are able to provide for severe thunderstorms is 22 minutes.

Warnings in the 20 to 30 minute range are usually available prior to the occurrence of the storm. Additionally, hailstorms may be identifiable by their characteristic greenish hue.

Benton County residents may also receive advance warnings of thunderstorm/hail or lightning events via their cell phones or other electronic devices.

MAGNITUDE/SEVERITY

Severe thunderstorms can be quite expansive with areas of localized severe conditions. Most severe thunderstorm cells are 5 to 25 miles wide with a larger area of heavy rain and strong winds around the main cell. Most non-severe thunderstorms have a lifespan of 20 to 30 minutes, while severe thunderstorms last longer than 30 minutes. A lightning strike would most likely affect only a single structure or person whereas a thunderstorm would affect broader areas of Benton County.

Like tornadoes, thunderstorms and lightning can cause death, serious injury, and substantial property damage. Severe thunderstorms can bring a variety of associated hazards with them including straight-line winds in excess of 100 mph. Straight-line winds are responsible for most thunderstorm damage. High winds can damage trees, homes (especially mobile homes), and businesses and can knock vehicles off of the road. The power of lightning's electrical charge and intense heat can electrocute people and livestock on contact, split trees, ignite fires, and cause electrical failures. Thunderstorms can also bring large hail that can damage homes and businesses, break glass, destroy vehicles, and cause bodily injury to people, pets and livestock. One or more severe thunderstorms occurring over a short period (especially on saturated ground) can lead to flooding and cause extensive power and communication outages as well as agricultural damage. Damages caused by thunderstorms would likely impact an entire city or several cities as occurred on July 11, 2011 when as NCDC reports detail, a severe thunderstorm/windstorm caused \$2,627,000 in property damages to the cities of Garrison, Shellsburg, Urbana and Vinton.

The 2010 State of Iowa Hazard Mitigation Plan estimates that Benton County has an annual loss of \$1,024,529.30 due to Thunderstorm & Lightning. The 2013 and 2018 State of Iowa Hazard Mitigation Plans did not provide any updated estimates.

The land area affected by individual hail events is not much smaller than that of a parent thunderstorm, an average of 15 miles in diameter around the center of the storm. A majority of the hail storms recorded as affecting Benton County are shown to have only affected 1, 2 or 3 communities at a time. A hailstorm that struck the county on 4/13/2006 affected 8 of the county's 14 communities and the surrounding rural areas. This is equivalent to over one half of the county's land area. This storm is shown to have caused \$55,000 in property damages.

In the United States, Hail is commonly measured by comparison to round objects of various sizes. The chart below lists the approximate size comparison between the objects hail is compared to and their actual size.

Table 99: Hail Size Chart

Object	Diameter
Pea	6.4 millimeters (0.25 in)
Dime	17.9 millimeters (0.70 in)
Penny	19 millimeters (0.75 in)
Nickel	21.2 millimeters (0.83 in)
Quarter	24.26 millimeters (0.955 in)
Half dollar	30.6 millimeters (1.20 in)
Walnut	38 millimeters (1.5 in)
Golf ball	44 millimeters (1.7 in)
Tennis ball	64 millimeters (2.5 in)
Cricket ball	71 millimeters (2.8 in)
Baseball	73 millimeters (2.9 in)
Softball	114 millimeters (4.5 in)

In the United Kingdom, the TORRO institute has a scale for measuring hail that associates hail size with damage. Although not widely used in this country, the comparison is still useful in determining the risk associated with various sizes of hailstones.

Table 100: TORRO Hail Scale

Intensity Category	Typical Hail Diameter mm	Typical Damage Impacts
Hard Hail	5	No damage
Potentially Damaging	10-15	Slight general damage to plants, crops
Significant	10-20	Significant damage to fruit, crops, vegetation
Severe	20-30	Severe damage to fruit and crops, damage to glass and plastic structures, paint and wood scored
Severe	25-40	Widespread glass damage, vehicle bodywork damage
Destructive	30-50	Wholesale destruction of glass, damage to tiled roofs, significant risk of injuries
Destructive	40-60	Bodywork of grounded aircraft dented, brick walls pitted
Destructive	50-75	Severe roof damage, risk of serious injuries

Destructive	60-90	(Severest recorded in the British Isles) Severe damage to aircraft bodywork
Super Hailstorms	75-100	Extensive structural damage. Risk of severe or even fatal injuries to persons caught in the open
Super Hailstorms	>100	Extensive structural damage. Risk of severe or even fatal injuries to persons caught in the open

Agricultural crops such as corn and beans are particularly vulnerable to hailstorms stripping the plant of its leaves. Hail can also do considerable damage to vehicles and buildings. Hail only rarely results in loss of life directly although injuries can occur.

Hailstorms cause nearly \$1 billion dollars annually in property and crop damage in the United States. The peak hail activity coincides with the Midwest's peak agricultural season. Financial impacts resulting from damage to property is in the millions of dollars every year, most of which is covered by crop and hazard insurance. The 2010 State of Iowa Hazard Mitigation Plan estimates that Benton County has an annual loss of \$230,500 due to Hail. The 2013 State of Iowa Hazard Mitigation Plan did not provide any updated estimates. The 200 hailstorm events that occurred in Benton County from 7/19/1963 to 5/20/2014 caused a reported \$2,888,000 in property damages and \$799,000 in crop damages. The largest incidence of property damage due to hail was \$1 million on 5/10/2003 in Urbana and largest reported incident of crop damage was \$500,000 in a swath from Keystone to Norway on 6/7/1994.

Those in unprotected areas, mobile homes, or automobiles during a storm are at risk. US Census Bureau statistics for Benton County from 2013 state that there were 312 mobile homes in Benton County. These mobile homes are distributed as follows: Atkins, 0; Belle Plaine, 33; Blainstown, 3; Garrison, 7; Keystone, 0; Luzerne, 3; Mounty Auburn, 5; Newhall, 0; Norway, 4; Shellsburg, 28; Urbana, 24; Van Horne, 3; Vinton, 48; Walford, 0; Benton County unincorporated, 154.

Also at risk are vulnerable populations such as the young, the old and the disabled. Every resident and structure in Benton County is vulnerable to the effect of thunderstorms and lightning.

Table 101: Vulnerable populations of Benton County

Area	2000				2010			
	<18	%	>64	%	<18	%	>64	%
Atkins	306	31	108	11	522	31	166	10
Belle Plaine	741	26	599	21	595	23	483	19
Blairstown	169	25	153	22	178	26	118	17
Garrison	118	29	48	12	91	24	50	13
Keystone	193	28	170	25	149	24	152	24
Luzerne	35	33	17	16	18	24	8	8
Mt. Auburn	39	24	31	19	36	24	34	16
Newhall	241	27	186	21	224	26	153	17
Norway	157	26	83	14	126	23	107	20
Shellsburg	258	28	123	13	205	21	190	19
Urbana	311	31	95	9	470	32	111	8
Van Horne	204	28	127	18	175	26	113	17
Vinton	1276	25	1030	20	1299	25	1027	20
Walford	445	36	53	4	488	33	77	5
Unincorporated	4493	18	2832	11	4576	18	2789	11
Benton County Total	6124	27	3902	15	5781	22	4015	15
Iowa	733628	25	436213	15	7716011	24	466169	15

Table 102: People with disabilities in Benton County (2010 US Census Bureau data—the most recent data available)

COMMUNITY	NUMBER OF PEOPLE WITH DISABILITIES	% OF POPULATION
Atkins	117	6.2%
Belle Plaine	550	20.9%
Blairstown	34	2.7%
Garrison	47	15.2%
Keystone	92	14.7%
Luzerne	6	7.1%
Mt. Auburn	9	6.5%
Newhall	89	11.1%
Norway	46	7.2%
Shellsburg	134	13.7%
Urbana	81	5.8%
Van Horne	70	9.7%
Vinton	925	18.1%
Walford	52	3.4%
Benton County Unincorporated	941	11.7%
Benton County Total	3,193	12.4%

DURATION

The duration of a thunderstorm is dependent upon a variety of environmental factors. Authorities with the National Weather Service in Davenport state that the average duration of a severe thunderstorm is 45 minutes. Any lightning or hail would also occur within that same time frame. It is possible that a single location could be subjected to more than one severe thunderstorm within a 24 hour time period.

Table 103: Hazard Scoring for Thunderstorm/Lightning/Hail

JURISDICTION	PROBABILITY	WARNING TIME	MAGNITUDE/ SEVERITY	DURATION	TOTAL SCORE	Weighted Score
ATKINS	4	3	2	1	10	2.95
BELLE PLAINE	4	4	2	1	11	3.10
BLAIRSTOWN	3	4	3	1	11	2.95
GARRISON	4	3	1	1	9	2.65
KEYSTONE	4	2	1	1	8	2.50
LUZERNE	2	4	3	1	10	2.50
MT. AUBURN	4	3	1	1	9	2.65
NEWHALL	4	2	1	2	9	2.60
NORWAY	4	1	4	1	10	3.25
SHELLSBURG	3	4	1	2	10	2.45
URBANA	4	4	3	1	12	3.40
VAN HORNE	3	2	2	1	8	2.35
VINTON	4	3	2	1	10	2.95
WALFORD	4	4	2	1	11	3.10
BENTON COUNTY UNINCORPORATED	4	4	1	1	10	2.80
AVERAGE	3.67	3.13	1.93	1.13	9.87	2.81

AVERAGE SCORE = 2.81

RANGE =2.35 to 3.40

Vinton Municipal Electric Utility risk assessment and hazard scoring is shown in Appendix E. The school districts of Benton County (Appendix D) accepted the scoring of their respective municipal jurisdictions.

TORNADO/WINDSTORM

Definition

A tornado is a violent, destructive, rotating column of air taking the shape of a funnel-shaped cloud in contact with the ground that progresses in a narrow, erratic path. Rotating wind speeds can exceed 200 mph and travel across the ground at average speeds of 25 to 30 mph.

High speed winds (windstorm) of 50 mph or higher are often associated with severe winter storms, severe thunderstorms, downbursts and very steep pressure gradients usually accompanying frontal systems.

Description

A tornado is characteristically accompanied by a funnel shaped cloud extending down from a cumuliform cloud. A tornado can be a few yards to a mile wide where it touches the ground. The funnel is made visible by the dust sucked up and by condensation of water droplets in the center of the funnel.

Figure 86: Tornado Diagram

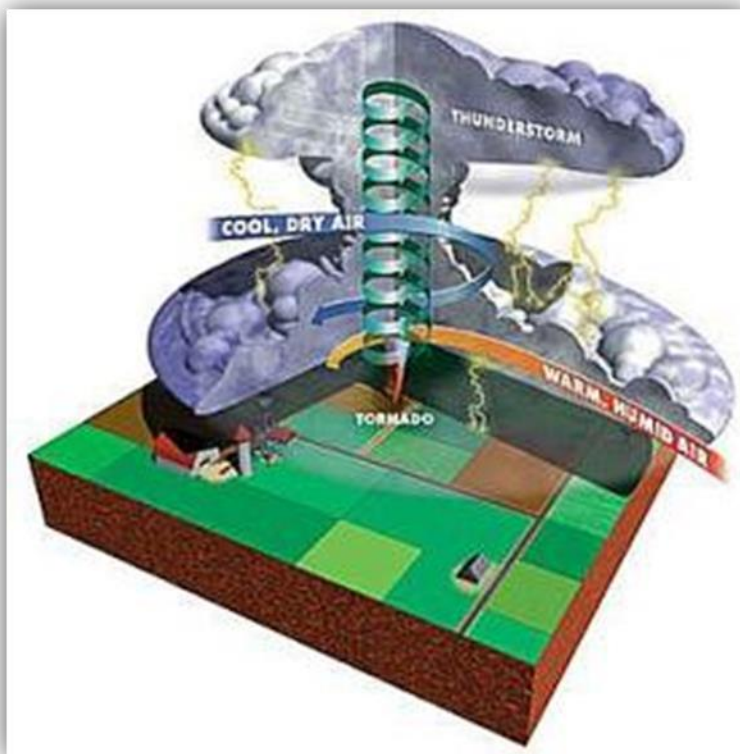


Image Source: NASA

An average tornado, however, is a few hundred yards or approximately 500 feet wide. It can move over land for distances ranging from short hops to many miles (the Tri-State tornado of 1925 was on the ground for 219 miles), causing great damage wherever it descends.

The original rating scale used to rate tornado intensity was called the Fujita Scale. Introduced in 1971, the scale was retroactively applied to tornado reports from 1950 onward. The Fujita scale originally ranged from F0 (the weakest) to F12 (the most devastating). However, later research proved that the original Fujita scale overestimated wind speeds, and this was addressed somewhat in the 1992 Modified Fujita Scale. On February 1, 2007, the Fujita scale was officially replaced by the Enhanced Fujita Scale, which provides rankings of EF0 through EF5.

Table 104: Fujita Scale

FUJITA SCALE			DERIVED EF SCALE		OPERATIONAL EF SCALE	
F Number	Fastest 1/4-mile (mph)	3 Second Gust (mph)	EF Number	3 Second Gust (mph)	EF Number	3 Second Gust (mph)
0	40-72	45-78	0	65-85	0	65-85
1	73-112	79-117	1	86-109	1	86-110
2	113-157	118-161	2	110-137	2	111-135
3	158-207	162-209	3	138-167	3	136-165
4	208-260	210-261	4	168-199	4	166-200
5	261-318	262-317	5	200-234	5	Over 200

Extreme winds are often associated with severe winter storms, severe thunderstorms, downbursts, and very steep pressure gradients. Extreme winds other than tornados are experienced in all regions of the United States. It is difficult to separate the various wind components that cause damage from other wind-related natural events that often occur with or generate windstorms.

The standard measurement for windstorm classification is the Beaufort Scale. The Beaufort Scale can be used on water or on land, but as there are no coastal areas near Benton County, the costal equivalents have been omitted from the following table sourced from NOAA:

Table 105: Beaufort Scale

	(Knots)	Classification	On Land
0	Less than 1	Calm	Calm, smoke rises vertically
1	1-3	Light Air	Smoke drift indicates wind direction, still wind vanes
2	4-6	Light Breeze	Wind felt on face, leaves rustle, vanes begin to move
3	7-10	Gentle Breeze	Leaves and small twigs constantly moving, light flags extended
4	11-16	Moderate Breeze	Dust, leaves, and loose paper lifted, small tree branches move
5	17-21	Fresh Breeze	Small trees in leaf begin to sway
6	22-27	Strong Breeze	Larger tree branches moving, whistling in wires
7	28-33	Near Gale	Whole trees moving, resistance felt walking against wind
8	34-40	Gale	Whole trees in motion, resistance felt walking against wind
9	41-47	Strong Gale	Slight structural damage occurs, slate blows off roofs
10	48-55	Storm	Seldom experienced on land, trees broken or uprooted, "considerable structural damage"
11	56-63	Violent Storm	Severe structural damage
12	64+	Hurricane	Extensive destruction

Warning Time

Tornadoes strike with an incredible velocity. Wind speeds may approach 300 miles per hour and the storm can travel across the ground at more than 70 mph. These winds can uproot trees and structures and turn harmless objects into deadly missiles, all in a matter of seconds. Advancements in weather forecasting have allowed watches to be delivered to those in the path of these storms up to hours in advance. The best lead-time for a specific severe storm and tornado is about 30 minutes. Tornadoes have been known to change paths very rapidly, thus limiting the time in which to take shelter. Tornadoes may not be visible on the ground due to blowing dust or driving rain and hail.

With windstorms, wind speeds may approach 120 miles per hour and the storm can travel across the ground at more than 60 mph. These winds can uproot trees and structures and turn harmless objects into deadly missiles, all in a matter of seconds. The advancement in weather forecasting allows watches to be delivered to those in the path of these storms up to hours in advance. The best lead-time for a specific severe storm is about 30 minutes. According to NOAA, the current average lead-time for tornado warnings is 13 minutes. NOAA Research is working to increase tornado warning lead-times much further. Authorities at the National Weather Service in Davenport state that the average warning time they are able to provide for tornados and windstorms is 12 minutes.

Benton County has an established system of trained weather spotters. These individuals are called out on an as needed basis when severe weather threatens the county. The Benton County Office of Emergency Management and Benton County Sheriff's office dispatch center notifies applicable Benton County emergency responders in the event that tornado or funnel cloud is sighted in Benton County or if weather situations threaten tornado development. Those residents and facilities of the county that have NOAA weather radios or cellular notification systems will receive notice of tornadoes and severe weather events from the National Weather Service. All Benton County Cities and that area of the county within the 10 mile Emergency Planning Zone (EPZ) of the Duane Arnold Nuclear Power Plant have warning sirens to notify them of an approaching tornado or dangerous winds.

Public address systems, television, radio, NOAA Weather Alert Radios, cell phone and text messages, and social media such as facebook are used to disseminate emergency messages about a tornado or windstorm. Benton County residents may also receive advance warnings of tornadoes or windstorms via their cell phones or other electronic devices.

Probability

Benton County is located within Wind Zone 4, the highest wind zone in the country. The Uniform Building Code wind risk map shows 80 miles per hour as the planning area's 50-year return period fastest mile per hour speed. According to NOAA records, Benton County is in an area experiencing 25-30 significant (EF2 or greater) tornadoes per 100-year period, providing an average of 1 event every 4 years.

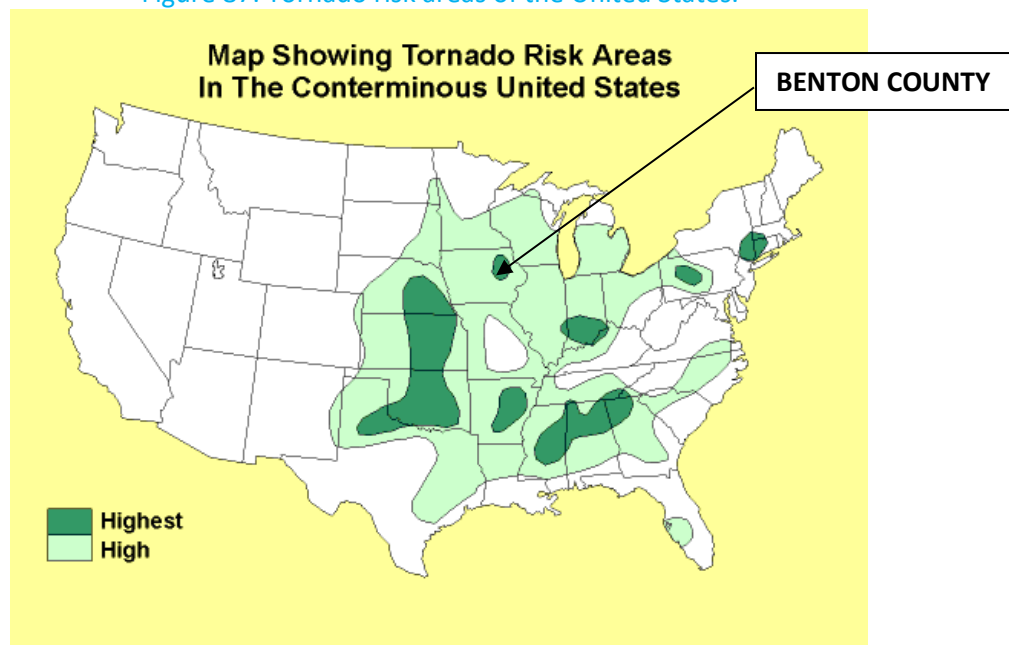
The NCDC recorded 33 tornado events in Benton County between 1965 and 2018. These tornadoes caused 1 Death, 17 Injuries and total property losses of \$3,956,000. The most devastating tornado was an F4 that occurred on August 8, 1965 in rural Benton County. The tornado caused \$2,500,000 in damages and one death. Tornadoes by type included F0-12, F1-6, F3-3, F4-1, EF0-2, EF1-2.

Table 106: Historical Tornadoes by Jurisdiction

JURISDICTION	NUMBER	TOTAL LOSS
Unincorporated Areas	12	\$3,577,500
Atkins	3	\$50,000
Blairstown	1	\$0
Garrison	1	\$0
Keystone	1	\$0
Mt. Auburn	2	\$18,000
Newhall	1	\$0
Norway	1	\$25,000
Urbana	1	\$0
Van Horne	3	\$110,000
Vinton	6	0

Historically, 30-40 tornadoes are confirmed in Iowa per year. Included in these statistics is Benton County which history has shown will have a tornado touch down somewhere in county every other year. Figure 104 shows tornado risk areas for the United States. As shown in the diagram, geographically Benton County is located in one of the highest risk areas. Based on historical occurrences Benton County will probably experience 1 tornado every two years. The 2013 State of Iowa Hazard Mitigation Plan estimates that Benton County has an annual loss of \$63,300 due to Tornado.

Figure 87: Tornado risk areas of the United States.



NCDC records document 16 windstorm events in Benton County from October 29, 1996 to Jul 11, 2011. These events caused an estimated \$10,200,000 in property damage and no deaths or injuries. The most devastating event was the July 11, 2011 Derecho Windstorm which had winds of more than 130 miles per hour for 30 minutes. The path of the storm was ten miles wide across the 24 mile width of the county. Communities most affected were Garrison, Vinton and Urbana.

Based on historical averages, Iowa would expect to have about 7 to 10 wind events each year in which wind speeds exceed 70 knots (80.5 mph). Due to the historical frequency of windstorms in Benton County it is a near 100 percent certainty the county will be impacted by a windstorm on the average of once annually.

Those most at risk from tornadoes and windstorms include people living in mobile homes, campgrounds, and other dwellings without secure foundations or basements. People in automobiles are also very vulnerable to tornadoes and windstorms. US Census Bureau statistics for Benton County from 2013 state that there were 312 mobile homes in Benton County. These mobile homes are distributed as follows: Atkins, 0; Belle Plaine, 33; Blainstown, 3; Garrison, 7; Keystone, 0; Luzerne, 3; Mounty Auburn, 5; Newhall, 0; Norway, 4; Shellsburg, 28; Urbana, 24; Van Horne, 3; Vinton, 48; Walford, 0; Benton County unincorporated, 154.

The elderly, very young, and the physically and mentally handicapped are most vulnerable because of the lack of mobility to escape the path of destruction. People who may not understand watches and warnings due to language barriers are also at risk. According to 2010 US Census Bureau estimates there was 9.317 (35.7 percent of the total population) young, old and disabled people living in Benton County.

Though the description of “tornado alley” varies slightly, Iowa is generally considered to be included in, or on the edge of, the geographic area. Iowa averages 35 tornadoes per year. In Iowa, most tornadoes occur in the spring and summer months, but can also occur in the fall and winter seasons. Tornadoes tend to be the most common in the late afternoon or evening, but they can occur at any time of day. The NCEI identifies 308 tornado events in Iowa from 2000-2017. Iowa has received 21 Presidential Disaster Declarations that include tornadoes in the description since 1968, which is when Iowa had its first Presidential Disaster Declaration that included tornadoes.

Since April 2013 Iowa has experienced three fatalities, 23 injuries, \$28.32 million in property damage, and \$1.15 million in crop damage due to tornadoes. On June 24, 2013, an EF-1 tornado struck the city of Muscatine killing one person. The tornado caused damage of approximately \$500,000 dollars. The other tornado since 2013 that caused fatalities in Iowa occurred on April 27, 2014, when an EF-1 tornado struck the city of Martinsburg killing two people. This tornado crossed five counties and caused an aggregate of \$25,000 in damage. On March 6, 2017, 18 tornadoes were spotted throughout Iowa, the most tornadoes for a single day in March since records started in 1950. Just a week before that, the state saw its first February tornado in many years when one briefly touched down near the Village of Folletts in eastern Iowa.

Between 2013 and 2017 Iowa experienced more than 1,500 windstorm events including wind associated with thunderstorms, straight-line winds, and funnel clouds (tornado-like events which do not have contact with the ground). From April-December 2013 property damage from wind events exceeded \$109 million, while crop damage climbed to over to \$1 billion. These events caused two fatalities and seven injuries. In 2014 Iowa experienced the highest fatality rate (six) and highest number of injuries (20) that were directly attributed to thunderstorms and straight-line winds. That year Iowa had three presidentially-declared disasters that included straight-line winds in the disaster description.

The NCEI shows Iowa has experienced four instances where recorded wind speeds equaled or exceeded 100 knots since 2009. Since 2000 Iowa has had 78 instances of wind speeds at or exceeding 70 knots.

On August 10, 2020, Benton County was at the epicenter of a multi-state Derecho windstorm disaster that resulted in a minimum of \$7.5 billion in damages according to data from the National Oceanic and Atmospheric Administration. The storm, which hit Iowa the hardest and also impacted Illinois, Ohio, Minnesota and Indiana, was the most costly windstorm in U.S. history according to the Washington Post. Total damage estimates for Benton County will not be available until sometime in 2021. In summary, though, the storm caused severe to total damage to ¾ of the land mass of Benton County. Thousands of structures were damaged or destroyed. Hundreds of thousands of acres of crops were severely damaged or destroyed. Parts of the county were without power for up to two weeks. The storm was Federally Declared Disaster DR-4557. Both public and individual assistance was provided. At the time of the update process for this 2021 Benton County MJHMP Benton County is still deeply in the midst of recovery operations.

Table 107: Vulnerable populations of Benton County (2010 US Census Bureau data—the most recent data available)

Area	2000				2010			
	<18	%	>64	%	<18	%	>64	%
Atkins	306	31	108	11	522	31	166	10
Belle Plaine	741	26	599	21	595	23	483	19
Blairstown	169	25	153	22	178	26	118	17
Garrison	118	29	48	12	91	24	50	13
Keystone	193	28	170	25	149	24	152	24
Luzerne	35	33	17	16	18	24	8	8
Mt. Auburn	39	24	31	19	36	24	34	16
Newhall	241	27	186	21	224	26	153	17
Norway	157	26	83	14	126	23	107	20
Shellsburg	258	28	123	13	205	21	190	19
Urbana	311	31	95	9	470	32	111	8
Van Horne	204	28	127	18	175	26	113	17
Vinton	1276	25	1030	20	1299	25	1027	20
Walford	445	36	53	4	488	33	77	5
Unincorporated	4493	18	2832	11	4576	18	2789	11
Benton County Total	6124	27	3902	15	5781	22	4015	15
Iowa	733628	25	436213	15	7716011	24	466169	15

Table 108: People with disabilities in Benton County (2010 US Census Bureau data—the most recent data available)

COMMUNITY	NUMBER OF PEOPLE WITH DISABILITIES	% OF POPULATION
Atkins	117	6.2%
Belle Plaine	550	20.9%
Blairstown	34	2.7%
Garrison	47	15.2%
Keystone	92	14.7%
Luzerne	6	7.1%
Mt. Auburn	9	6.5%
Newhall	89	11.1%
Norway	46	7.2%
Shellsburg	134	13.7%
Urbana	81	5.8%
Van Horne	70	9.7%
Vinton	925	18.1%
Walford	52	3.4%
Benton County Unincorporated	941	11.7%
Benton County Total	3,193	12.4%

People most at risk are also those who do not have access to early warning capabilities such as are available through siren systems, cellular communication or NOAA Weather Radio.

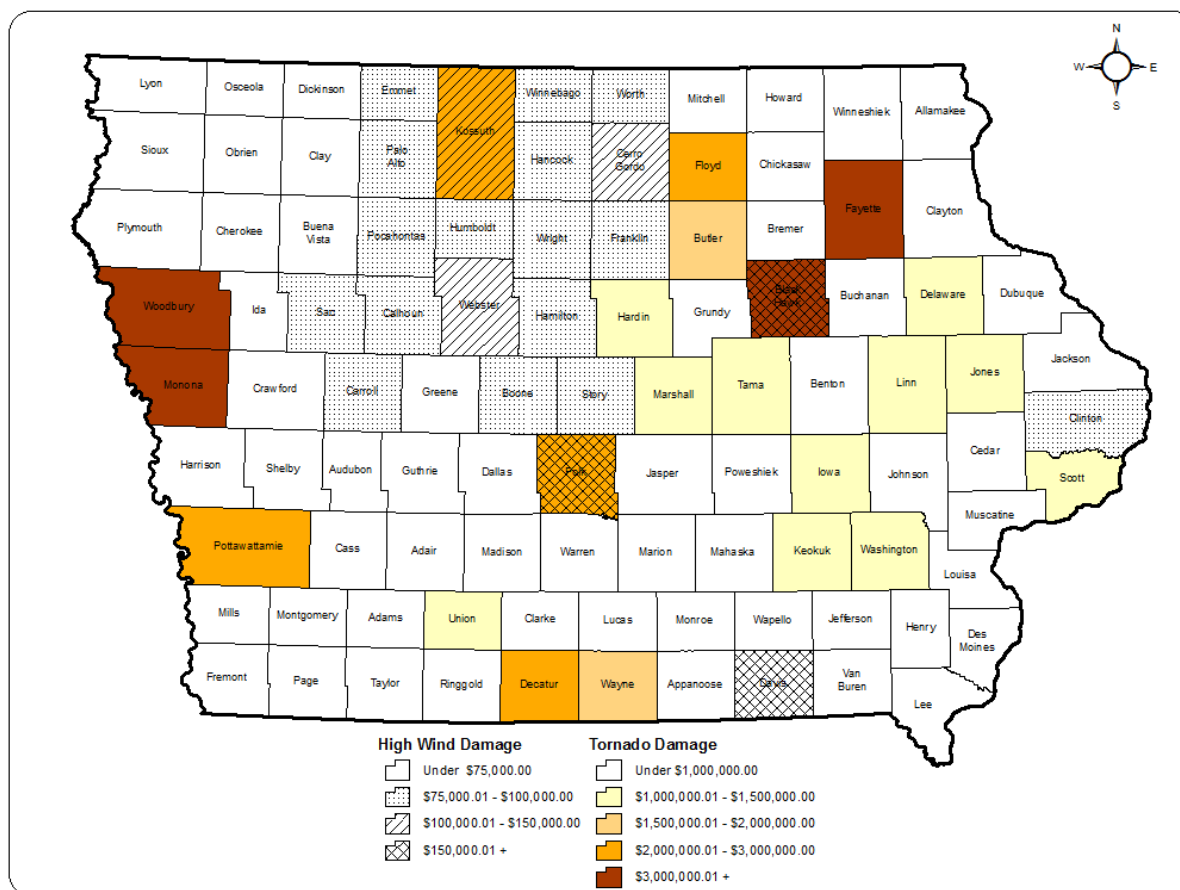
Generally the destructive path of a tornado is only a couple hundred feet in width, but stronger tornadoes can leave a path of devastation up to a mile wide. Normally a tornado will stay on the ground for no more than 20 minutes; however, one tornado can touch ground several times in different areas. Large hail, strong straight-line winds, heavy rains, flash flooding, and lightning are also associated with severe storms and may cause significant damage to a wider area. It is feasible that a tornado of EF4 magnitude or larger could destroy an entire city. In Iowa, on May 25, 2008 an EF5 Tornado struck the City of Parkersburg, totally destroying 290 homes, killing 7 people and causing tens of millions of dollars in property damage.

Total devastation of any city in Benton County could entail losses of all properties as summarized in Tables 137-151 on pages 329-334 of this document.

Unlike tornadoes, windstorms may have a destructive path that is tens of miles wide. Large hail, strong straight-line winds, heavy rains, flash flooding, and lightning are also associated with severe storms and may cause significant damage to a wider area. A windstorm can, as is evident from the damage caused by Benton County's July 11, 2011 Derecho windstorm disaster, affect several communities and a land area encompassing half the county or more. The 2010 State of Iowa Hazard Mitigation Plan estimates that Benton County has an annual loss of \$12,832.21 due to Windstorm.

The severity of damage from tornadoes and windstorms can be very high. Impacts can range from broken tree branches, shingle damage to roofs, and some broken windows; all the way to complete destruction and disintegration of well-constructed structures, infrastructure, and trees. Injury or death related to tornadoes most often occurs when buildings collapse; people are hit by flying objects or are caught trying to escape the tornado in a vehicle.

Figure 88: Average Annual Property Damage from Tornado and High-Wind Events. Tornado damage figures based on estimates provided for events 1950-2017, adjusted for inflation, then averaged per year. High-wind damage figures based on estimates provided for events 1996-2017, adjusted for inflation, then averaged per year. Source: NCEI.



Duration

According to the Encyclopedia Britannica, the lifetime of a tornado is directly related to its intensity, with more intense tornadoes tending to last longer. On average, a tornado is on the ground for about 15 minutes, but this value is misleading because the average is heavily weighted by the rare but long-lived violent tornadoes. Most tornadoes are weak, lasting only about two to three minutes on average. A typical lifetime for strong tornadoes is about 8 minutes, while for violent events it is about 25 minutes. In exceptional cases, violent events can last more than three hours. Windstorms may last for just a few minutes when caused by downbursts from [thunderstorms](#), or they may last for hours (and even several days) when they result from large-scale weather systems

Table 109: Hazard Scoring for Tornado/Windstorm

JURISDICTION	PROBABILITY	WARNING TIME	MAGNITUDE/ SEVERITY	DURATION	TOTAL SCORE	Weighted Score
ATKINS	3	4	3	4	14	3.25
BELLE PLAINE	4	4	3	4	15	3.70
BLAIRSTOWN	3	4	3	4	14	3.25
GARRISON	3	4	3	4	14	3.25
KEYSTONE	3	4	3	4	14	3.25
LUZERNE	3	4	3	4	14	3.25
MT. AUBURN	3	4	2	2	11	2.55
NEWHALL	3	4	3	4	14	3.25
NORWAY	3	2	3	4	12	2.95
SHELLSBURG	3	4	3	4	14	3.25
URBANA	3	4	3	4	14	3.25
VAN HORNE	3	2	3	4	12	2.95
VINTON	3	4	4	4	15	3.55
WALFORD	4	4	3	4	15	3.70
BENTON COUNTY UNINCORPORATED	3	3	3	4	13	3.10
AVERAGE	3.13	3.67	3.00	3.87	13.67	3.23

AVERAGE SCORE = 3.23

RANGE = 2.55 to 3.70

Vinton Municipal Electric Utility risk assessment and hazard scoring is shown in Appendix E. The school districts of Benton County (Appendix D) accepted the scoring of their respective municipal jurisdictions.

OTHER HAZARDS

ANIMAL/PLANT/CROP DISEASE

Definition

A medical, health, or sanitation threat to wildlife or domestic animals such as contamination, epidemics, plagues, and insect infestation. An outbreak of disease transmitted from animal to animal or plant to plant represents an animal/crop/plant disease.

Description

Infectious diseases introduced onto an operation can have a devastating effect on cash flow and equity. Major animal diseases include foot and mouth disease, rinderpest, African swine fever, classical swine fever, brucellosis, lumpy skin disease, bird flu, and others. Adverse effects of infectious diseases can occur at the farm or industry level. Some diseases may severely limit or eliminate animal marketing options (for example: to slaughter only). Negative effects may be short- or long-term, depending on the nature of the pathogen and level of concern among producers and consumers. Presence of some pathogens can also affect market access for larger portions of the industry. With the stakes so high, biosecurity should be a very high priority in day-to-day management decisions.

Probability

As the nation's number one producer of corn, soybeans, eggs, and hogs, Iowa farmers and producers know the importance of securing America's food supply. With hundreds of thousands of head of livestock produced and transported in Iowa each year, Iowa could be a rich environment for a disease epidemic to take hold if precautions such as vaccinations and handling procedures are not rigorously followed.

USDA National Agricultural Statistics Service Data for 2017 (the most recent statistics available) indicate that in 2017 Benton County had 1,148 farms totaling 420,639 acres or 92% of the land area of the county. The average size of a Benton County Farm is 366 acres. The following statistics are also pertinent to the prevalence of crop acres and livestock in Benton County.

No. of all cattle and calves in Benton County	36,500
No. of beef cows in Benton County	12,000
No. of milk cows in Benton County	4,400
All hogs and pigs in Benton County	254,733
Corn acres in Benton County	191,500
Soybean acres in Benton County	154,500
Hay acres in Benton County	10,200
Oats acres in Benton County	1,700

Current animal disease epidemics that threaten the United States include the West Nile Virus (WNV) and The Bird Flu (H5N1). First identified in New York City and carried by birds and mosquitoes, the disease spread to four states in 1999 and to 12 states and the District of Columbia in 2000. A H5N2 bird flu

outbreak in 2015 in Iowa resulted in destruction of over 20 million chickens (25% of Iowa's poultry stock). WNV causes severe neurologic infections in humans, horses, and other mammal species. As of early 2003, the disease has been found in nearly all states east of the Rocky Mountains, including Iowa where 15 confirmed human cases, 113 birds and 1039 horses have tested positive. These are only two recent examples of animal diseases of major concern in Iowa in the recent past.

Because of security and privacy issues, the Iowa Department of Agriculture does not release details of specific animal or crop disease incidents or their location, including any that have occurred in Benton County.

Warning Time

The private practitioner is the first line of defense and will undoubtedly be the first to witness the symptoms of animal disease epidemics. The United States Department of Agriculture monitors reports submitted by veterinarians and labs to identify patterns. The department is proactive in providing information to the agricultural community on medical concerns. Conditions related to scope and magnitude can escalate quickly and area resources can be drained of vets, medications, and vaccinations rather quickly.

Magnitude and Severity

Animal health emergencies can take many forms: disease epidemics, large-scale incidents of feed or water contamination, extended periods without adequate water, harmful exposure to chemical, radiological or biological agents, and large-scale infestations of disease-carrying insects or rodents, to name a few. One of the principal dangers of disease outbreaks is that they can rapidly overwhelm the local animal care system. Perhaps the greatest animal health hazard would be the intentional release of a foreign animal disease agent to adversely impact a large number of animals. Such a release would likely be an act of terrorism.

State and federal animal health programs have been very successful in preventing or limiting the scope and magnitude of animal emergencies. However, because threats to animal health are always changing and because the animal population is mobile, the possibility always exists for a local, regional, or statewide animal health emergency to occur.

U.S. agriculture is very vulnerable to the introduction of a foreign animal disease. Outbreaks can be inadvertently introduced by contaminated material carried by an international traveler or by the importation of infected animals and animal products. Foreign animal diseases could enter the U.S. vectored by wild animals, insects, or migratory birds or they could be intentionally introduced to cause severe economic problems or to target human health.

An outbreak will have wide spread economic and societal implications for Benton County. Response and recovery to infectious animal disease outbreaks will be lengthy, and many producers may never be able to return to business. There would also be many indirect effects on the county's economy.

Rumors of an infectious animal disease outbreak could cause significant damage to the markets as was evidenced in an incident in Kansas in 2003 where just the rumor of a Foot and Mouth Disease outbreak caused the market to plummet. Further evidence of this occurred in the 2009 H1N1 (Swine Flu)

influenza outbreak where lack of understanding about the transmission of the virus caused market loss in Iowa's pork markets.

A disease outbreak will likely have a severe economic implication and/or public health impact well beyond the borders of Benton County, even beyond the borders of Iowa. A crop/plant pest infestation will likely have severe economic implications, cause significant production losses, or significant environmental damage.

Duration

Animal or crop diseases infections and epidemics are not over within a matter of minutes as is the case with many other types of disasters. Even if an epidemic disease is discovered early enough and contained, it could be weeks before threats of the contagion are eliminated. As evidenced by the 2015 H5N2 bird flu outbreak in Iowa, mitigation of the disaster could take months.

A high impact animal/plant/crop disease event would cause major disruption or shut down statewide processing sectors, halt international trade, and last multiple years. Benton County is a productive agricultural county producing both crop and livestock with large portion of the Iowa economy related to agriculture. Due to the severity of potential economic agricultural losses this hazard is of particular concern to Benton County.

HAZARDOUS MATERIALS

Definition

Accidental release of chemical substances or mixtures that presents danger to the public health or safety during production or handling at a fixed facility or transportation of a chemical or other hazardous substance. This also includes a break in a pipeline creating a potential for an explosion or leak of a dangerous substance (oil, gas, etc.) possibly requiring evacuation.

Description

A hazardous substance is one that may cause damage to persons, property, or the environment when released to soil, water, or air. Chemicals are manufactured and used in ever increasing types and quantities. As many as 500,000 products pose physical or health hazards and can be defined as “hazardous chemicals.” Each year, over 1,000 new synthetic chemicals are introduced. These substances are both stored in and transported through Benton County via trucks and train. Hazardous substances are categorized as toxic, corrosive, flammable, irritant, or explosive. Hazardous materials incidents generally affect a localized area and the use of planning and zoning can minimize the area of impact.

Pipelines present another exposure for hazardous materials incidents. Iowa is served by many high pressure pipelines to residents and industries. An underground pipeline incident can be caused by environmental disruption, accidental damage, or sabotage. Incidents can range from a small slow leak that is not ignited to a large rupture in which the gas is ignited. Inspection and maintenance of the pipeline system along with marked gas line locations and an early warning and response procedure can lessen the risk to those in proximity to the pipelines.

Probability

During the period 2010-2017 there were 5,533 hazardous materials incidents in Iowa, 3,237 of these incidents (58.5%) were fixed facility incidents according to the Iowa Department Natural Resources. Fixed facility releases accounted for 58.5 percent of total releases. (Note: the number of trips to drug-related operations has risen sharply in the state.) There are 4,361 sites in Iowa that, because of the volume or toxicity of the materials on site, are designated as Tier Two facilities under the federal Superfund Amendments and Reauthorization Act.

In Benton County the Iowa DNR reports 13 hazardous materials incidents during 2015-2019. Four of these incidents were transportation related and eight were fixed facility.

Of the 13 incidents that occurred, eight involved petroleum products that were spills of 1 gallon to 60 gallons in size; one was 400 pounds of flour and three were electrical transformer oil (PCB) spills of one to eight gallons.

A new hazardous materials incident exposure that has a presence in Benton County is transportation of Bakken Crude on the Union Pacific Railroad across southern Benton County. A derailment of 6 cars on the Burlington Northern Santa Fe railroad near Galena, Illinois in 2015 burned for over a week and caused an evacuation of nearly two miles.

According to the State of Iowa 2013 Hazard Mitigation Plan there are 4,057 sites in Iowa that, because of the volume or toxicity of the materials on site, are designated as Tier Two facilities under the Superfund Amendments and Reauthorization Act. Despite increasing safeguards, more and more potentially hazardous materials are being used in commercial, agricultural, and domestic activities.

The Benton County Emergency Management Agency has records of 26 Tier Two facilities in Benton County. No records are maintained by the county or any of its communities pertaining to the types and quantities of other hazardous materials maintained at any other sites in the county. It is known that agricultural chemical companies, automotive service centers and light manufacturing and industrial facilities are among those who periodically have hazardous materials on their premises. Historical occurrences and the presence of hazardous materials in multiple locations throughout the county lend credibility to an estimated probability of a fixed facility hazardous materials incident at least once every five years.

Benton County has three energy providers with transmission pipelines passing through the county: Alliant Energy Interstate Power and Light; Mid American Energy Corp. and Northern Natural Gas Co. For security reasons none of the providers would release information regarding any incidents that have occurred with their lines in Benton County. The Iowa Utilities Board reports that there were no pipeline incidents during this time period.



Figure 89: Pipelines of Benton County

According to the Iowa Utilities Board, there have not been any pipeline incidents in Benton County in the last five years.

Given the history of hazardous materials incidents in Benton County, the county can reasonably expect to experience an average of three hazardous materials incidents of various types annually.

Warning Time

When managed properly under regulations, hazardous materials pose little risk. However, when handled improperly or in the event of an accident, hazardous materials can pose a significant risk to the population. Hazardous materials incidents usually occur very rapidly with little or no warning. Even if reported immediately, people in the area of the release have very little time to be warned and evacuated. During some events, sheltering in-place is the best alternative to evacuation because the material has already affected the area and there is no time to evacuate safely. Public address systems, television, radio, NOAA Weather Alert Radios, cell phone and text messages, and social media such as facebook are used to disseminate emergency messages about hazardous materials incidents.

The Benton County Office of Emergency Management and Benton County Sheriff's office dispatch center notifies applicable Benton County emergency responders about hazardous material incidents. Benton County has an agreement with the Linn County Hazardous Materials team for assistance at hazardous materials incidents. (See Figure 80, page 247)

Magnitude and Severity

A hazardous materials accident can occur almost anywhere due to a fixed facility, transportation or pipeline incident, so any area is considered vulnerable to an accident. People, pets, livestock, and vegetation in close proximity to facilities producing, storing, or transporting hazardous substances are at higher risk. Populations downstream, downwind, and downhill of a released substance are particularly vulnerable. Depending on the characteristics of the substance released, a larger area may be in danger from explosion, absorption, injection, ingestion, or inhalation. Occupants of areas previously contaminated by a persistent material may also be harmed either directly or through consumption of contaminated food and water. Facilities are required to have an off-site consequence plan that addresses the population of the surrounding area. Responding personnel are required to be trained to HAZMAT Operations Level to respond to the scene, and those personnel that come into direct contact with the substances released are required to have HAZMAT Technician level training.

The most vulnerable people in Benton County to health effects from a fixed facility hazmat incident are workers associated with hazardous materials at the facilities, emergency responders and people living in close proximity to fixed facilities having hazardous materials. Because of the wide array of variables associated with a hazardous materials release, vulnerability estimates are difficult to determine. Some releases may have virtually no affect, while two to three square miles of the county could be affected in the case of an anhydrous ammonia or LP gas leak.

Most of the hazardous materials incidents are localized and are quickly contained or stabilized by trained fire departments and hazardous materials teams. Depending on the characteristic of the hazardous material or the volume of product involved, the affected area can be as small as a room in a building or as large as 5 square miles or more. Many times, additional regions outside the immediately affected area are evacuated for precautionary reasons. More widespread effects occur when the product contaminates the municipal water supply or water system such as a river, lake, or aquifer.

A gas release such as anhydrous ammonia or LP could affect portions of Benton County as large as two to three square miles. The unpredictable nature of hazardous materials coupled with climatic and geographic variables and the unknown effects of different hazardous materials reacting together creates a situation where the maximum extent of damage from a hazardous material release is unpredictable.

Immediate dangers from hazardous materials include fires and explosion. The release of some toxic gases may cause immediate death, disablement, or sickness if absorbed through the skin, injected, ingested, or inhaled. Contaminated water resources may be unsafe and unusable, depending on the amount of contaminant. Some chemicals cause painful and damaging burns to skin if they come in direct contact with your body. Contamination of air, ground, or water may result in harm to fish, wildlife, livestock, and crops. The release of hazardous materials into the environment may cause debilitation, disease, or birth defects over a long period of time. Loss of livestock and crops may lead to economic hardships within the community.

Transportation routes that would be the most prone to Transportation Hazardous Materials Incidents would naturally be those that are the most frequently traveled and those that carry the heaviest load of motor freight transports carrying hazardous materials. In Benton County this would be Interstate 380 and US Highways 30, 150 and 218. A Transportation Hazardous Materials Incident could, however, occur on any of Benton County's 1,330 miles of hard surfaced, secondary, rock and dirt roads and on any street of the county's 14 incorporated cities. Property adjacent to these transportation routes is vulnerable to damage from a hazardous materials release and people living or traveling near an incident are vulnerable to physical harm from any release that may occur.

Petroleum and natural gas pipelines can leak or erupt and cause property damage, environmental contamination, injuries, and even loss of life. Accidents may be caused by internal or external corrosion, defective welds, incorrect operation, outside damage, or other defective pipeline or equipment. Most incidents involve crude oil, gasoline, or natural gas pipelines. All petroleum liquids pose dangers from fire or explosion, and the fire may produce poisonous or irritating gasses. Toxic fumes and direct contact can cause health hazards. Vapor clouds can travel a distance and settle in low-lying areas where the fumes may overcome people and animals. Released products should be treated as any other hazardous material. Large areas may need to be evacuated to remove people from the threat of fire, explosion, or exposure. These evacuations potentially save lives and limit injury, but they also disrupt businesses and inconvenience residents. A break in water pipelines may impact fire protection and continuity of operations at business and industry and may affect the area by saturating the soil and causing rapid erosion.

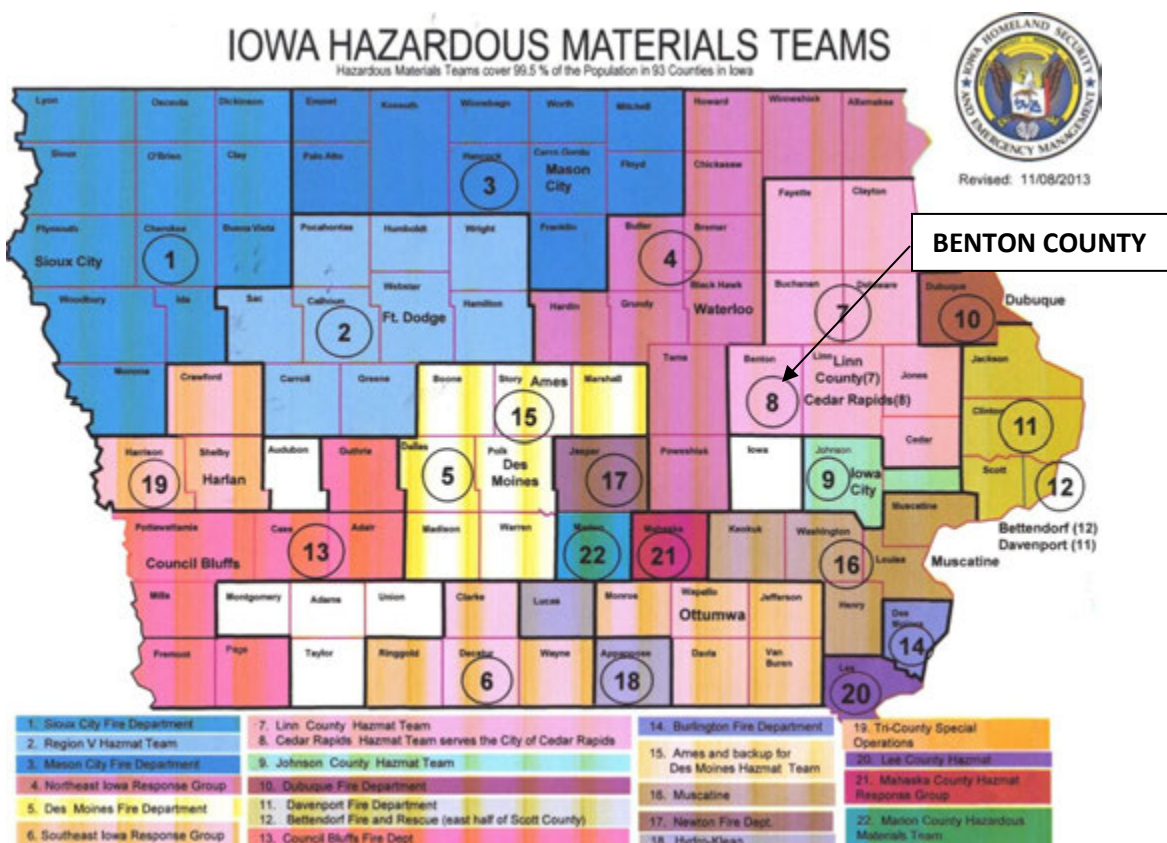
Alliant Energy IPL has approximately 68 miles of natural gas transmission pipelines in Benton County. The transmission pipeline size ranges from ½" to 6" plastic pipe and 2" to 4" steel pipe. Northern Natural Gas has 39 miles of natural gas transmission pipelines in Benton County. The lines are 2", 3", 4", 6", 12" and 16" Pipe.

Records maintained and provided by the Iowa Department of Natural resources regarding reported release of hazardous materials in Benton County do not mention any injuries or fatalities. The records do not mention any costs associated with cleanup or control of the chemicals or any costs associated with damages caused by the chemicals.

Duration

Though a majority of hazardous materials incidents may be controlled within a matter of hours, larger releases and those releases that require a large resource commitment or special resources for control and containment can require days to control.

Figure 90: Iowa Hazardous Materials Response Teams



HUMAN DISEASE

Definition

An incident related to human disease is defined as a medical, health, or sanitation threat to the general public including contamination, epidemics, plagues, or infestations

Description

Public health action to control infectious diseases in the 21st century is based on the 19th century discovery of microorganisms as the cause of many serious diseases (e.g., cholera and TB). Disease control has resulted from improvements in sanitation and hygiene, the discovery of antibiotics, and the implementation of universal childhood vaccination programs. Scientific and technologic advances have played a major role in each of these areas and are the foundation for today's disease surveillance and control systems. Scientific findings also have contributed to a new understanding of the evolving relation between humans and microbes.

As of January 1, 2000, a total of 60 infectious diseases were designated as notifiable at the national level. A notifiable disease is one for which regular, frequent, and timely information regarding individual cases is considered necessary for the prevention and control of the disease. Notifiable diseases vary by country (as the determinations are made by the Center of Disease Control or equivalent body in each nation). In the United States, notifiable diseases are generally classified as bacterial, viral, or other (a classification which primarily includes small organisms and fungal infections). The following are the notifiable diseases for the U.S. by type:

Bacterial

Anthrax

Botulism

Chlamydia trachomatis

Chancroid

Cholera

Diphtheria

Ehrlichiosis

Escherichia coli O157:H7

Gonorrhea

Hemolytic uremic syndrome

Bacterial

Legionellosis

Hansen's disease (Leprosy)

Listeriosis

Lyme disease

Meningococcal disease

Pertussis

Plague (bubonic, septicemic, pneumonic and pharyngeal)

Poliomyelitis, paralytic

Psittacosis

Bacterial

Q Fever

Rocky Mountain spotted fever

Salmonellosis

Shigellosis

Group A Streptococcal disease

Streptococcus pneumoniae

Syphilis

Tetanus

Toxic shock syndrome (Streptococcal and other than Streptococcal)

Bacterial

Tuberculosis

Tularemia

Bacterial

Typhoid fever

**VancomycinIntermediate Staph
Aureus, Vancomycin Resistant
Staph Aureus**

Viral

**Acquired immunodeficiency
syndrome**

California encephalitis virus

Eastern equine encephalitis

Haemophilus influenzae

Hantavirus

Hepatitis A

Hepatitis B

Viral

Hepatitis, C/non-A, non-B

HIV infection

Measles

Mumps

Rabies

Rubella

**Severe Acute Respiratory
Syndrome**

Viral

Smallpox

St. Louis encephalitis

West Nile virus

Western equine encephalitis

Varicella (deaths only)

Yellow fever

Other

Coccidioidomycosis

Cryptosporidiosis

Cyclospora

Malaria

Giardiasis

Trichinosis

Probability

The Iowa Department of Public Health tracks epidemiological statistics in Iowa. Their data indicate no major epidemics of diseases that have high percentages of loss of life or severe illness. Each year, there are many cases of the diseases on the national notification list. There has been no human disease epidemic other than the usual outbreaks of common flu and cold that has affected Benton County since the 1800's or early 1900's such as the Spanish Flu outbreak in 1918.

Public health agencies work to protect Iowans from infectious diseases and preserve the health and safety of Iowans through disease surveillance; investigation of acute outbreaks; education and consultation to county, local, and private health agencies on infectious diseases; immunization and vaccine guidelines; treatment after animal bites; and vaccines for international travel. While this reduces the number of cases, it does not eliminate them. The Benton County Public Health Department is the local public health agency with jurisdiction over Benton County.

Although the entire jurisdiction is at risk of being affected by a human disease epidemic, certain segments of the population are at greater risk than others. In a general sense, the very old, the very young and people with certain health conditions that either suppress the immune system or whose medical treatment suppresses the immune system are at greatest risk. However, specific diseases may be more likely to impact other segments of the population. For example, meningitis outbreaks are most common in older teens and young adults, who are normally the most likely to be in good health and capable of fighting off or surviving other diseases. The difference in this case is related to specific behavioral practices and a tendency to live in close quarters, such as dormitories or apartment blocks. Others may be at an elevated risk of certain diseases due to their line of work, and given the statistically significant number of healthcare workers in the Benton County area, it is possible that, in the event of a human disease epidemic, infected people would come to facilities in Anamosa and workers at these facilities could also be at an elevated risk. However, health care workers generally have the advantage of understanding the methods of transmission of diseases and methods of avoiding transmission and limiting exposure.

For most diseases, the very young and the very old are the primary age groups of particular concern, although the entire population would be at risk also.

In March of 2020 the COVID-19 Pandemic spread throughout the United States including Iowa and Benton County.

Table 110: Benton County Vulnerability by Age (2010 US Census Bureau data—the most recent data available)

Area	2000				2010			
	<18	%	>64	%	<18	%	>64	%
Atkins	306	31	108	11	522	31	166	10
Belle Plaine	741	26	599	21	595	23	483	19
Blairstown	169	25	153	22	178	26	118	17
Garrison	118	29	48	12	91	24	50	13
Keystone	193	28	170	25	149	24	152	24
Luzerne	35	33	17	16	18	24	8	8
Mt. Auburn	39	24	31	19	36	24	34	16
Newhall	241	27	186	21	224	26	153	17
Norway	157	26	83	14	126	23	107	20
Shellsburg	258	28	123	13	205	21	190	19
Urbana	311	31	95	9	470	32	111	8
Van Horne	204	28	127	18	175	26	113	17
Vinton	1276	25	1030	20	1299	25	1027	20
Walford	445	36	53	4	488	33	77	5
Unincorporated	4493	18	2832	11	4576	18	2789	11
Benton County Total	6124	27	3902	15	5781	22	4015	15
Iowa	733628	25	436213	15	7716011	24	466169	15

An additional segment of the population may also be at an elevated level of risk because they do not have employer-provided health insurance but have incomes high enough to disqualify them from receiving government supported health care. This would be most likely to include people who have recently become unemployed and people who are self-employed, but likely includes other people as well.

The 2013 State of Iowa Hazard Mitigation Plan evaluated the probability of a serious human disease incident at less than 10% in any given year.

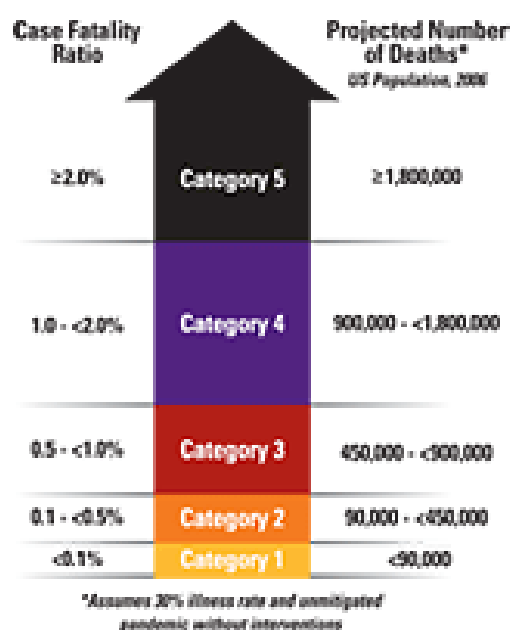
Warning Time

The private practitioner is the first line of defense and will undoubtedly be the first to witness the symptoms of human disease epidemics. The Iowa Department of Public Health and the U.S. Centers for Disease Control monitor reports submitted by local doctors, hospitals, and labs serving Benton County to identify patterns. Local Public Health Agencies such as the Benton County Public Health Department complete the follow up for reportable diseases to prevent future spread. The Department and CDC are proactive in providing information to the health care community on medical concerns. Conditions related to scope and magnitude can escalate quickly and area resources can be drained of personnel, medications, and vaccinations rather quickly.

Magnitude and Severity

A pandemic human disease is a disease that is prevalent over a whole country, region, continent, or world. Many diseases throughout the history of the world have been pandemic. The 1918 influenza pandemic killed an estimated 50 million people. More than 25% of United States population was afflicted and in one calendar year average life expectancy dropped by 12 years! Influenza pandemics in 1957 and 1968 killed 70,000 and 34,000 people respectively worldwide. The H1N1 pandemic flu may have killed as many as 18,000 people in 2009-2010. A pandemic will have wide spread economic and societal implications for Iowa. Response and recovery to a pandemic will likely be lengthy if Iowa is severely infected. The Death Rate of a pandemic depends on the number of people infected, the virulence of the virus, characteristics and vulnerability of the population, and availability and effectiveness of preventative measures. Future pandemics will be assigned to one of five discrete categories of increasing severity that correspond with appropriate steps to take.

Figure 81: Pandemic Severity Index



The Pandemic Severity Index chart from the Center for Disease Control shows fatality rates and projected deaths for each category. An example of the corresponding steps to take would be if the case-fatality rate during a pandemic is less than 1 percent (with estimated deaths nationwide under 90,000), the pandemic would be considered a category 1 and the only recommended community measure would be voluntary isolation of ill persons. However, communities could choose to take additional measures. In contrast, a category 5 pandemic (i.e., case fatality rate of 2 percent or higher and estimated deaths nationwide of nearly 2 million) would warrant recommendation of all of the community mitigation strategies.

Because of our highly mobile society, diseases can move rapidly across the state and across the nation with days, weeks, or months. Because of the small size of many of the communities in the planning area, if an outbreak were to occur, the entire town could easily be impacted. Additionally, many residents frequently travel between towns in the planning area for employment, shopping or recreation, and disease could easily be spread.

Many of the diseases on the national notification list result in serious illness if not death. Some are treatable, for others only the symptoms are treatable.

At the time of this plan update, Benton County is in the midst of an ongoing Federally Declared Disaster DR-4483-Iowa for the COVID-19 Pandemic. The disaster was declared on March 23, 2020. On November 16, 2020, Benton County had 1,362 COVID-19 cases and 10 COVID-19 deaths thus far in 2020. The State of Iowa on November 16, 2020, had incurred 188,395 COVID-19 cases and 1,991 COVID-19 deaths thus far in 2020.

Duration

A human disease incident of any kind is going to last for several days and as evidenced by such events as the 2014/2015 Ebola epidemic in Africa, it can take months to bring the epidemic under control. **The 2020 COVID-19 Pandemic has been ongoing for 9 months and shows no sign of abatement yet as of November 16, 2020.**

The school districts of Benton County (Appendix D) accepted the scoring of their respective municipal jurisdictions.

INFRASTRUCTURE FAILURE

Definition

This hazard encompasses a variety of occurrences including communication failure, energy failure, and structural failure.

Description

Energy failure includes extended interruption, widespread breakdown, or collapse (part or all) of any public or private infrastructure that threatens life and property. One potential cause of infrastructure failure is space weather/solar flare.

Communication failure is the widespread breakdown or disruption of normal communication capabilities. Major telephone outages, loss of local government radio facilities, long-term interruption of electronic broadcast services, emergency 911, law enforcement, fire, emergency medical services, public works, and emergency warning systems are just a few of the vital services which rely on communication systems to effectively protect citizens. Business and industry rely heavily on various communication media as well. Mechanical failure, traffic accidents, power failure, line severance, solar flares, and severe weather can affect communication systems and disrupt service. Disruptions and failures can range from localized and temporary to widespread and long-term.

The collapse (partial or total) of any structure including roads, bridges, towers, and buildings is considered a structural failure. A road, bridge, or building may collapse due to the failure of the structural components or because the structure was overloaded. Natural events such as heavy snow may also cause the roof of a building to collapse (under the weight of snow). Heavy rains and flooding can undercut and washout a road or bridge. The age of the structure is sometimes independent of the cause of the failure.

Probability

Energy disruptions have occurred regularly in Benton County since the advent of electrical power and natural gas energy. Local records and electrical energy provider records document at least one electrical power outage annually somewhere in the county. There are no records of any natural gas outages. In recent times the most devastating outages have been those associated with the ice storms of February 24, 2007, the floods of June 12, 2008 and the July 11, 2011 Derecho Wind Storm. Shortages, especially electrical shortages, can be unpredictable with immediate effects. Natural events, human destruction, price escalation, and national security energy emergencies can cause unavoidable energy shortages. Recent severe winter storms that caused extensive long-term power outages in states like Kansas and Missouri in 2006 and 2007 add more credibility to the probability similar events that some events will impact Benton County. Given the history of energy failure events in Benton County it is a near 100 percent probability that the county will experience an energy failure incident somewhere in the county at least once annually. The State Hazard Mitigation Team in 2013 evaluated the probability an energy transportation failure will occur in Iowa is less than 10% in any given year.

No major widespread communication failures have occurred in Iowa. Local incidents; due to weather conditions, equipment failure, excavation incidents, or traffic accidents have been reported, but the outages were usually resolved in a timely manner. Widespread communication losses are unlikely due to

backup systems and redundant system designs. Local communication failures are likely to affect only small areas of a county. According to Benton County officials, there have been communications failures including failures of the county's E911 system, but due to the back-up systems and procedures in place, they have always been resolved in no more than a few hours. The State Hazard Mitigation Team evaluated the probability that a serious communication failure in Iowa at less than 10% probability in any given year.

The only incidence of structural failures in Benton County that were of any significance could only be determined from local records. One incident in June of 1993 near Garrison involved the washout of a box culvert on Benton County Highway E22 due to heavy rains. A car drove off into the washout and resulted in a triple fatality accident. Another incident that occurred the same summer on Benton County Highway D65 north of Mt. Auburn again involved heavy rains that washed out a bridge which a car drove off into and resulted in another fatality. During the floods of June, 2008 a portion of Highway 150 north of Vinton was washed out. No records of any structural failure to a building of any significant circumstance could be determined, though it is acknowledged by local county and municipal officials across the county that the potential for such incidence does exist.

The State Hazard Mitigation Team analysis has evaluated the probability that structural failures will occur in Iowa is less than 10% in any given year.

Warning Time

The Iowa Department of Natural Resources Energy Bureau monitors domestic and international energy situations and has developed a plan to deal with an energy crisis. Signs that an energy shortage may be developing can be recognized even months in advance, but energy shortages/emergencies can rise suddenly and unexpectedly. Supply distribution problems in other countries and local weather situations can lead to low supply coupled with high demand in a matter of a day or two.

A communications failure would likely occur with little or no warning. It is usually impossible to predict a communications failure. Some communications may be shut down for a short while for improvements or maintenance. These disruptions are usually made during periods of low demand and those who rely on them are given previous notice that the system will be out of service.

Failure of a structure would likely occur suddenly with little or no warning but it may have advanced warning as signs of structural deterioration and weaknesses become apparent with age or from damages due to environmental and use factors.

Magnitude and Severity

An extended interruption of electric, petroleum, or natural gas service, which by an actual or impending acute shortage of usable energy, could create a potential health problem for the population and possibly even mass panic. International events could potentially affect supplies of energy producing products while local conditions could affect distribution of electricity, petroleum, or natural gas. The magnitude and frequency of energy shortages are associated with international markets. Local and state events such as ice storms can disrupt transportation and distribution systems; if disruptions are long lasting, public shelters may need to be activated to provide shelter from extreme cold or extreme heat.

Stockpiles of energy products eliminate short disruptions but can increase the level of risk to the safety of people and property near the storage site.

Because Iowa is almost entirely dependent on out-of-state resources for energy, Iowans must purchase oil, coal, and natural gas from outside sources. World and regional fuel disruptions are felt in Iowa. Nearly all citizens of Benton County depend on energy sources for their living needs, therefore nearly all citizens, businesses and industries in the county are vulnerable to an energy failure. Energy failure incidents that have occurred elsewhere in the U.S. have involved geographical areas as large as or larger than a county. It is conceivable that all of Benton County and its 26,076 residents could be affected by an energy failure situation.

The effects of an energy shortage would be felt throughout the state. Because electrical and natural gas distribution systems are very developed, local shortages can usually quickly be covered. A natural gas or electrical energy disruption in Benton County usually affects only a portion of the county such as an individual community, though it is not improbable that the entire county could be affected. Effects could range from minor heating and air conditioning disruptions to transportation limitations all the way to civil unrest due to the high demand, low supply, and subsequent high price. Business disruption and increased cost of business would have far-reaching financial implications across many sectors of the economy. The February 24, 2007 winter storm and associated power outage which impacted nearly all of Benton County caused an estimated \$10,000,000 in damages in the county.

Emergency 911, law enforcement, fire, emergency medical services, public works, and emergency warning systems are just a few of the vital services which rely on communication systems to effectively protect citizens. Business and industry rely heavily on various communication media as well. Mechanical failure, traffic accidents, power failure, line severance, and weather can affect communication systems and disrupt service. Disruptions and failures can range from localized and temporary to widespread and long-term. Citizens of the county would be impacted only indirectly. Phone and data transmission could be impacted. Most communication systems that are highly necessary have backup and redundant designs to provide continuity of service.

Most communications failures would be limited to localized areas. In the event of a widespread communications failure, only portions of Iowa would be impacted, but this is highly unlikely due to the support of other jurisdictions and secondary communication devices.

A communications failure would not directly result in injuries or fatalities. Most financial losses would be incurred due to the direct damage to electronic equipment and the communication system infrastructure. If 911 systems were to fail due to phone communication disruption, secondary impacts could occur by the inability of citizens to alert responders of their needs. Inter-agency and intra-agency communications would be limited. Data transmission could also be affected. This could disrupt business and financial transactions resulting in potential loss of business.

There are many buildings in Iowa that are very old or which may become hazardous in the event of an earthquake, fire, high winds, or other natural events. All bridges are vulnerable to the effects of the elements and the deterioration that results. Increases in the amount and weight of traffic they are expected to support increase their vulnerability to failure. No assessment could be obtained regarding the probability of collapse of any structure—building or transportation related—in Benton County. Even though collapses have occurred with devastating result in Benton County, the proportion of the county's population that would be affected by such an incident is minute.

Bridge failures and debris in the streets and sidewalks would interrupt normal routes of travel. Functional purpose of the building would be terminated or suspended until the integrity of the structure could be restored. Personal injury, death, and property damage may occur in the collapse itself or by falling debris from nearby structures. There would also be a considerable price tag to replace or fix the structure, not to mention the loss of revenue that would occur because the structure could not be used. Utilities may be cut off to surrounding areas and communication transmissions may be lost for a period of time. In Benton County the severity of impact any structural collapse would be minimal.

The impacts of the failed structure would be contained to the immediate area and adjacent properties. This could be as small as the house and yard of a fallen chimney, or the area could be relatively extensive if the structure that failed was a multi-story building of a downtown high-rise or a tall communication tower. Even though collapses have occurred with devastating result in Benton County, the proportion of the county's population that would be affected by such an incident is minute.

Duration

The majority of communications and energy failures are short term, in fact less than an hour. There have been circumstances in Benton County, however, such as following disasters such as the July 11, 2011 Derecho Windstorm when entire communities were without electrical power for more than a week.

Vinton Municipal Electric Utility risk assessment and hazard scoring is shown in Appendix E. The school districts of Benton County (Appendix D) accepted the scoring of their respective municipal jurisdictions.

STRUCTURAL FIRE

Definition

An uncontrolled fire in populated area that threatens life and property and is beyond normal day-to-day response capabilities.

Description

Structural fires present a far greater threat to life and property and the potential for much larger economic losses. Modern fire codes and fire suppression requirements in new construction and building renovations, coupled with improved firefighting equipment, training, and techniques, lessen the chance and impact of a major urban fire. Most structural fires occur in residential structures, but the occurrence of a fire in a commercial or industrial facility could affect more people and pose a greater threat to those near the fire or fighting the fire because of the volume or type of the material involved.

Probability

Structural fires are almost a daily occurrence in some communities. Nearly all are quickly extinguished by on-site personnel or local fire departments. According to records provided by the State of Iowa Fire Marshall's Office, the 13 fire departments of Benton County reported 216 structural fires from 2010 through 2014, or an average of 43 structural fire alarms per year. Approximately 30 percent of these alarms require mutual aid and the combined efforts of two or more fire departments to extinguish, particularly in rural areas where there is no water supply. In the past 5 years, structural fires have accounted for \$1,428,703 in fire losses, 1 civilian fire death, 7 civilian fire injuries and 10 firefighter injuries in Benton County.

Given the history of structural fire incidents in the Benton County, it is a near certainty that the county will experience numerous structural fires annually. Even with Benton County department's focus on fire prevention effort, both residential and nonresidential structural fires, fires will continue to occur. During colder months, clogged chimneys and faulty furnaces and fire places can increase the probability of structural fires.

Warning Time

While fires usually start with little or no warning time, alert devices such as smoke and heat detectors can allow time for responders to contain the fire and allow occupants to evacuate the area.

Magnitude and Severity

All areas of cities and rural areas in Benton County that have structures are at risk of structural fire. The central areas of cities are most densely built, and these areas are at greatest risk. The entire population of the jurisdiction is at some risk of being directly affected by a structural fire. However, certain situations may make properties more prone to structural fire. Particular buildings that are more prone to structural fire are those with older wiring systems or electrical wiring that for whatever reason does not meet code, and manufacturing facilities that use heat to process materials. Property maintenance (including cleaning chimneys and maintaining gas connections) can also reduce risk. Structural fires can

also result from user-error or negligence, and people can put themselves at greater risk through certain activities. Leaving sources of heat or flame unattended can result in a fire, which would include cigarettes, candles, fireplaces, small heaters, hair styling tools, or various food-preparation related heat sources. Storing combustible items near a heat source can also cause a fire. Children who are allowed access to flammable materials may cause a structural fire. People who manufacture methamphetamine are also at an unusually high risk for causing a structural fire.

Particularly vulnerable in Benton County are older structures with outdated electrical systems not built to current fire codes are particularly vulnerable to fire. Combustible building materials obviously are more vulnerable than structures constructed of steel or concrete. Structures without early detection devices are more likely to be completely destroyed before containment by response agencies. Structures in areas served by older, smaller, or otherwise inadequate water distribution infrastructure such as water mains and hydrants are also at significant risk. Problems vary from region to region, often as a result of climate, poverty, education, and demographics, but Iowa has about 13.4 fire deaths per million population. The fire death risk for the elderly is more than two times that of the average population. The fire death risk is nearly two times that of the average population for children 5 years of age or less. In Benton County this accounts for 5,770 people or 23 percent of the county's population. The average fire loss in Benton County for the years 2010-2014 was \$51,152 per structural fire incident. This includes both structural losses and building contents losses.

With modern training, equipment, fire detection devices, and building regulations and inspections, most fires can be quickly contained and limited to the immediate structure involved. Certain circumstances, such as the involvement of highly combustible materials or high winds, can threaten a larger area. The age and density of a particular neighborhood can also make it more vulnerable to fire due to the spreading of fire from neighboring structures.

Duration

Ninety percent of structural fires are extinguished in one hour or less. In Benton County, large scale conflagrations lasting a day or more such as destroyed the business districts of Belle Plaine on July 24, 1894 and Garrison on September 11, 1911 have not occurred in recent times. National Fire Incident Reporting System (NFIRS) reports document that with contemporary firefighting equipment all structural fires in Benton County are successfully brought under control within six hours.

<p>*2021 MJHMP revision note: The State of Iowa Fire Marshall's Office was contacted for current and updated statistics on structural fires in Benton County for this 2021 MJHMP revision, but stated that due to personnel changes it is unable to provide those statistics at this time. In general, there has not been any substantial change in construction in Benton County that has or will cause any change in structural fire risk in the county.</p>

TERRORISM

Definition

This hazard encompasses a wide variety of human caused threats including enemy attack, biological terrorism, agro-terrorism, chemical terrorism, conventional terrorism, cyber terrorism and radiological terrorism.

Description

Terrorism includes the use of multiple outlets to demonstrate unlawful force, violence, and/or threat against persons or property causing intentional harm for purposes of intimidation, coercion or ransom in violation of the criminal laws of the United States. These actions may cause massive destruction and/or extensive casualties.

Probability

Iowa has not been immune to acts of terrorism or sabotage. The state has experienced many bomb threats in the distant and recent past. During the spring of 2002, 18 pipe bombs were found in mailboxes in five states stretching from Illinois to Texas, including Iowa. Six people were injured in the bombings in Iowa and Illinois.

According to the Benton County Sheriff's Office, there have been four bomb threats in the last 15 years in Benton County, all of them at the Benton Community High School in Van Horne on 4/20/1998; 2/24/1999; 9/29/1999 and 12/16/2005. On all occasions a search of the school found no bomb.

The most likely targets of a conventional terrorism attack in Benton County include school system facilities of the Belle Plaine Community School District; Benton Community School District; Center Point-Urbana School District; Central Lutheran School; Vinton-Shellsburg School District; The Benton County Courthouse and Benton County Law Enforcement Center.

No incidents of agro-terrorism in Benton County could be documented. Because of security and privacy issues, the Iowa Department of Agriculture does not release details of specific incidents or their location, including any that have occurred in Benton County. In Iowa, intentional incidents have involved feed poisoning causing livestock deaths, contamination of raw milk, vandalism and arson to production facilities, and destruction of research and laboratory facilities. Because Iowa serves as the breadbasket to the world, there is an increased risk of agro-terrorist activity. Benton County is at the heart of Iowa's agriculture industry and is surrounded by farmland and livestock operations. Vacant buildings and remote areas in Benton County offer opportunities for renegade terrorists to carry out clandestine activities.

Biological terrorism history, fortunately, has been limited to threats and hoaxes only. While these acts have caused terror, they have not resulted in injuries or deaths. There have been no incidents of bioterrorism in Benton County. The most probable target for a bioterrorism attack in Benton County is a city's water supply system. The probability that Benton County may be affected by an act of bioterrorism terrorism is also somewhat enhanced due to the presence of Highway 30 to the south and I-380 to the north and the county's proximity to the major metropolitan cities such as Cedar Rapids and Waterloo.

Cyber-security and critical infrastructure protection are among the most important national security issues facing our country today. There have been no documented incidents of cyber-attack in Benton County. Security experts describe the threat as eminent. Intrusion detection systems log thousands of attempts in a single month.

The probability that Benton County could be affected by an act of chemical terrorism is somewhat enhanced due to the presence of Interstate 380 and Highway 30 as well as the county's proximity to the major metropolitan cities of Cedar Rapids and Waterloo. No known acts of chemical terrorism have occurred in Iowa or Benton County, only threats and hoaxes.

The State Hazard Mitigation Team analysis evaluated the probability that agro-terrorism, biological, chemical, radiological and conventional terrorism incident terrorism will occur in Iowa as unlikely in any given year. The State Hazard Mitigation Team also determined that while targeted local cyberterrorism attacks could be becoming more common a serious impact intrusion in Iowa was determined to be unlikely to occur in any given year.

Mass demonstrations, or direct conflict by large groups of citizens, as in marches, protest rallies, riots, and non-peaceful strikes, are examples of public disorder. These are groups of people assembling together to substantially interfere with public peace and constitute a threat. Use of unlawful force or violence against another person, causing property damage, or attempting to interfere with, disrupt, or destroy the government, political subdivision, or group of people, are potential methods employed. Labor strikes and work stoppages are not considered in this hazard unless they escalate into a threat to the community. Vandalism is usually initiated by a small number of individuals and limited to a small target group or institution. Most events are within the capacity of local law enforcement.

Large-scale civil disturbances rarely occur, but when they do they are usually an offshoot or result of one or more of the following events: labor disputes where there is a high degree of animosity between the participating parties; high-profile/controversial laws or other governmental actions; resource shortages caused by a catastrophic event; disagreements between special interest groups over a particular issue or cause; or a perceived unjust death or injury to a person held in high esteem or regard by a particular segment of society. There have been numerous labor disputes and protests in Iowa, but these have remained fairly nonviolent. Other non-peaceful incidents have occurred in the state, but within the response capabilities of local law enforcement.

Although large-scale destructive civil disturbances are rare, the potential is always there for an incident to occur. This is even more true today, where television, radio, and the Internet provide the ability to instantly broadcast information (factual or not) in real time to the entire community. Often times that coverage helps to spread the incident to other, uninvolved or unaffected areas, exacerbating an already difficult situation. This also allows people who are prone to inciting others to engage in violent or unlawful behavior, and previously not involved, to participate in the disturbance for no other reason than to riot, loot, burn, and destruct property. Alcohol is often involved in public disorder, especially related to college campuses, sporting events, and concerts.

In 2020 there were numerous acts of civil unrest and disturbance in Iowa as a result of the George Floyd incident in Minneapolis. Benton County did not experience any of these acts.

Electronic attack using one computer system against another in order to intimidate people or disrupt other systems is a cyber attack. For the purposes of delineating the hazard of terrorism, we will not

consider as cyber terrorism a cyber crime committed for the sole purpose of financial gain. While cyber crime of that nature is very serious, we are interested in the context of emergency management only the type of terrorist attacks that cause disruption to other sectors, such as electrical or other utilities, or which attacks result in the deployment of rolling response equipment, such as police and fire vehicles. With that definition in mind, cyber terrorism may last from minutes to days depending upon the type of intrusion, disruption, or infection. Inadequate security can facilitate access to critical computer systems, allowing them to be used to conduct attacks.

Cybersecurity and critical infrastructure protection are among the most important national security issues facing our country today, and they will only become more challenging in the years to come. In 2019 the Benton County Sheriff's office incurred a cyber security attack.

Warning Time

Acts of terrorism can be immediate and often come after little or no warning. There are occasions when terrorists have warned the targeted organization beforehand, but often the attack comes without previous threat. Terrorists threaten people and facilities through threats and other scare tactics. Even if it is a shallow threat, precautions must be taken to ensure the safety of the people and property involved.

Explosions are usually instantaneous; additional secondary devices may be used, lengthening the duration of the hazard until the attack site is determined to be clear.

Because of our highly evolved computer networks and data sharing, bugs, viruses, and worms can proliferate rapidly. Effects of hacking can be instantaneous.

Magnitude and Severity

Property damage and injuries are almost certain outcomes if a conventional bomb is detonated in a developed or populated area. Threats and scares have psychological impacts and disrupt activities at a cost to productivity. Extent of damage is determined by type and quantity of explosive. Effects are generally static other than cascading consequences, incremental structural failure, etc.

An agro-terrorism incident would likely result in livestock deaths or contaminated agricultural commodities that could impact food supplies. Economic impacts from an agro-terrorism incident would be far-reaching and severely damaging because of loss of production and long-term disruption of commodity flows. Depending on the agent used and the effectiveness with which it is deployed, contamination can be spread via wind and water. Infections can be spread via human or animal vectors.

Depending on the bioterrorism agent used and the effectiveness with which it is deployed, contamination can be spread via wind and water. Infections can be spread via human or animal vectors. Because of the variables described above, the geographic extent can become quite broad before the incident is recognized as a terrorist act. A bioterrorism attack on a Benton County city's water supply system holds the potential for afflicting the entire population of the city. Based on the method of delivery, the general public is vulnerable to bio-terrorism. The American public is not vaccinated for many of the agents used as weapons by terrorist groups. A bio-terrorism incident would likely result in illness at a minimum, with multiple deaths and long-term health problems as a worst-case.

The extent of a chemical terrorism incident is largely determined by the type of chemical, the method of dispersal, and the conditions at the time it is released. It is indeed probable that entire cities within Benton County could be affected by an act of chemical terrorism.

A cyberattack could be launched from anywhere on earth and could cause impacts as small as a computer lab to as large as the world-wide-web. At its fullest extent a cyberattack could involve all of Benton County and its associated municipal jurisdictions. Impacts can range from annoyance to complete shutdown of critical infrastructures due to infiltration of supervisory control and data acquisition (SCADA) systems. Secondary impacts could affect welfare of people and property by denying service or providing false readings. Our infrastructure components have taught us that security has been a relatively low priority in the development of computer software and Internet systems.

Duration

Terrorism incidents cover a broad range of time frames. A terrorism incident can occur instantaneously as in the case of an explosive device being set off. At the other end of the spectrum is a biological incident which could take weeks to contain such as the hypothetical situation of a terrorist implanting a cow herd with hoof and mouth disease which has the potential for rapid expansion across broad geographical areas such as occurred in England in 2007.

Vinton Municipal Electric Utility risk assessment and hazard scoring is shown in Appendix E. The school districts of Benton County (Appendix D) accepted the scoring of their respective municipal jurisdictions.

TRANSPORTATION INCIDENT

Definition

This hazard encompasses air transportation, highway transportation, railway transportation, and waterway incidents. A transportation incident is described as an accident involving any mode of transportation that directly threatens life, property damage, injury, or adversely impacts a community's capabilities to provide emergency services.

Description

A highway transportation incident can be single or multi-vehicle requiring responses exceeding normal day-to-day capabilities. An extensive surface transportation network exists in Iowa; local residents, travelers, business, and industry rely on this network on a daily basis. Hundreds of thousands of trips a day are made on the streets, roads, highways, and interstates in the state. If the designed capacity of the roadway is exceeded, the potential for a major highway incident increases. Weather conditions play a major factor in the ability of traffic to flow safely in and through the state as does the time of day and week. Incidents involving buses and other high-occupancy vehicles could trigger a response that exceeds the normal day-to-day capabilities of response agencies.

Air transportation is playing a more prominent role in transportation as a whole. Airplanes, helicopters, and other modes of air transportation are used to transport passengers for business and recreation as well as thousands of tons of cargo. A variety of circumstances can result in an air transportation incident. Mechanical failure, pilot error, enemy attack, terrorism, weather conditions, and on-board fire can all lead to an incident at or near the airport. Air transportation incidents can occur in remote unpopulated areas, residential areas, or downtown business districts. Incidents involving military, commercial, or private aircraft can also occur while the aircraft is on the ground.

A railway transportation incident is a train accident that directly threatens life, property, or adversely impacts a community's capabilities to provide emergency services. Railway incidents may include derailments, collisions, and highway/rail crossing accidents. Train incidents can result from a variety of causes including human error, mechanical failure, faulty signals, or problems with the track. Results of an incident can range from minor "track hops" to catastrophic hazardous material incidents with human/animal casualties.

A waterway incident is an accident involving any water vessel that threatens life, property, or adversely affects a community's capability to provide emergency services. Waterway incidents primarily involve pleasure craft on rivers and lakes. In the event of an incident involving a water vessel, the greatest threat would be drowning, fuel spillage, and/or property damage.

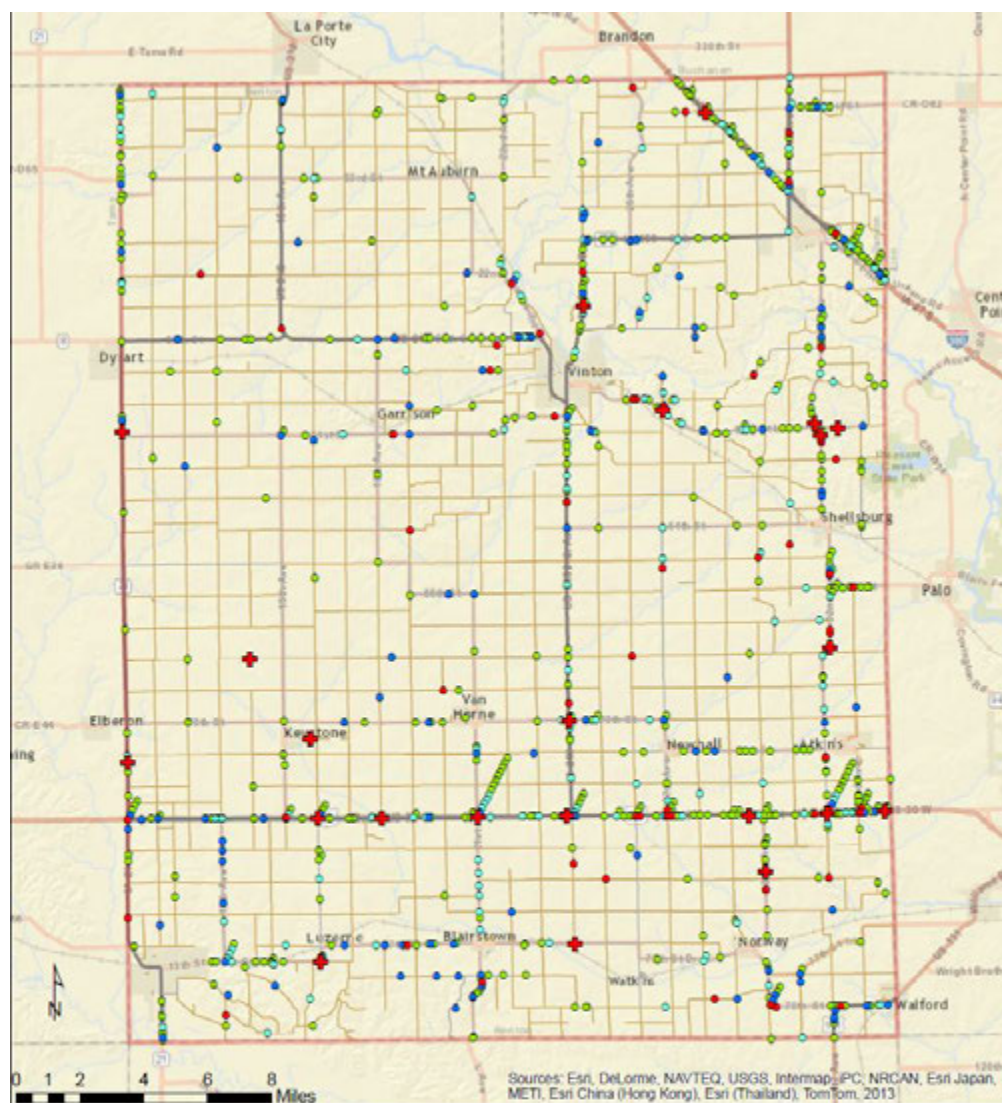
Probability

Although traffic engineering, inspection of traffic facilities, land use management of areas adjacent to roads and highways, and the readiness of local response agencies have increased, highway incidents continue to occur. As the volume of traffic on the state's streets, highways, and interstates increases, the number of traffic accidents will likely also increase. The combination of large numbers of people on

the road, unpredictable weather conditions, potential mechanical problems, and human error always leaves open the potential for a transportation accident.

DOT reports indicate that over 50,000 vehicles travel on the primary, secondary, rock and dirt roads, highways and interstate of Benton County daily. Given this amount of traffic and the historical occurrence of highway transportation incidents in the county; future traffic accidents with death and major injuries annually are a near 100 percent probability.

Figure 92: Rural accidents in Benton County 2010-2014



All Rural Crashes in Benton County, Iowa 2010-2014

Crash Severity

- Fatal (22)
- Major Injury (62)
- Minor Injury (126)
- Possible/Unknown Injury (150)
- Property Damage Only (523)

- County Border
- Primary Roads
- Other Paved Roads
- Unpaved Roads



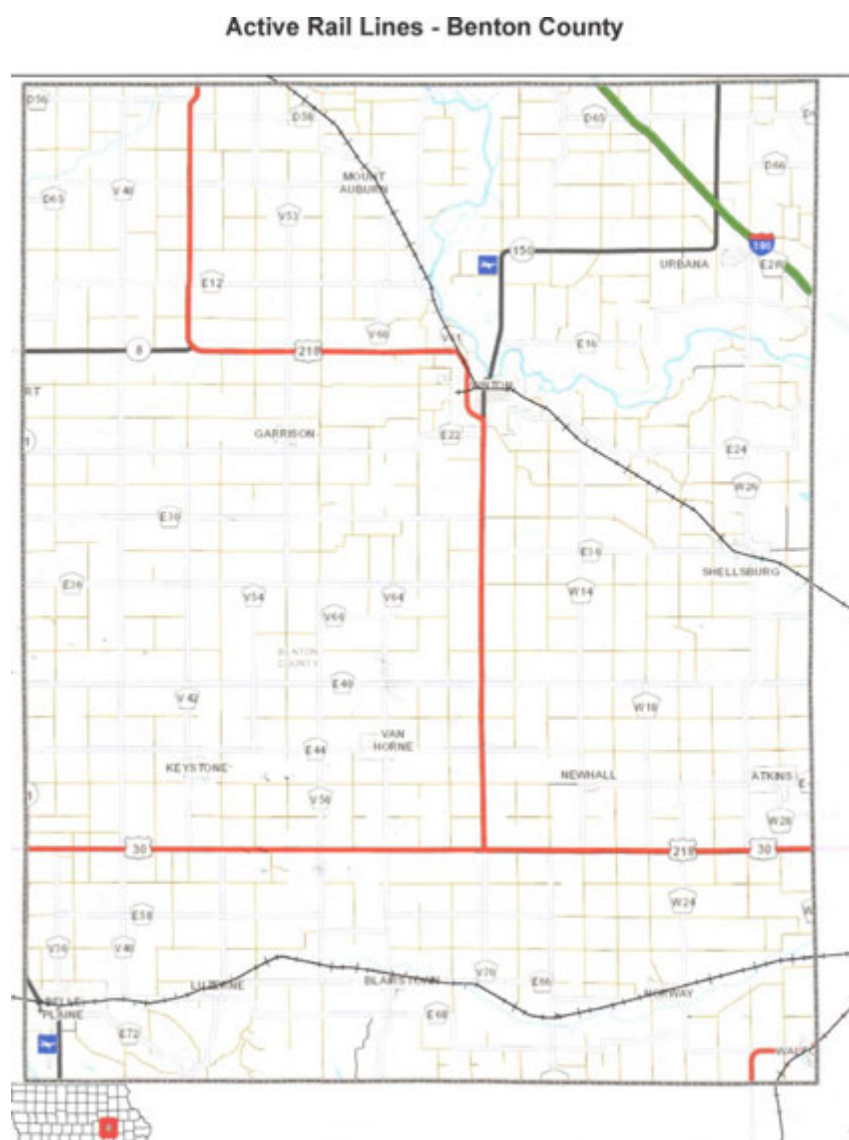
Disclaimer:

The information contained in this report was derived from the April 15, 2015 Iowa Department of Transportation crash database. If errors or odd cases are found, please communicate the case number or send a printed crash report to Michael Paelevich, Iowa DOT, Office of Traffic and Safety, Michael.Paelevich@dot.iowa.gov, 515.236.1426. Since the database is actively being updated, edited, and reviewed, some of the fatality totals may differ from the Fatality Analysis Reporting System (FARS).

As detailed on the map above, most fatalities occur on major county roads or highways, with highway 30 having the bulk of incidents. This is not unexpected as injuries are typically more severe at higher speeds. Accidents in general appear to occur more often along major thoroughfares and in the central portions of the larger communities where there is generally more traffic.

Benton County has three railroads. Nearly 100 trains per day travel 24 miles of track through the cities of Belle Plaine, Blainstown, Luzerne and Norway on a busy double rail line operated by the Union Pacific Railroad. The Iowa Northern Railroad passes two trains daily over 25 miles of track through Mt. Auburn, Vinton and Shellsburg. Two miles of track operated by the Cedar Rapids—Iowa City Railroad pass through Walford in the southeast corner of the county.

Figure 93: Benton County Rail Lines. Image provided by the Iowa DNR.



The Federal Railroad Administration Office of Safety Analysis reports 6 railway incidents in Benton County from January 1, 2005 through June 30, 2015. These incidents caused a total of \$50,050 in damages and caused one injury. Five of these incidents occurred on the Union Pacific Railway in Belle Plaine, Blainstown, Norway and Walford and one occurred on the Iowa Northern Railway in Vinton. Not showing up in the reports was a 23 car derailment that occurred on May 23, 2015 in the City of Belle Plaine.

Benton County has two airports domiciled within the county's boundaries, the Belle Plaine Airport near Belle Plaine and the Vinton Veterans Memorial Airport near Vinton. Both have 4,000 feet long runways. Both airports are used by smaller aircraft primarily locally owned, though a 4,000 foot long runway is long enough to land a commercial aircraft as large as a 727.

National Transportation Safety Board Aviation accident reports show 3 air transportation accidents as having occurred in Benton County between January 1, 2009 and December 31, 2014. All of these incidents involved small aircraft at the Vinton Veterans Municipal Airport. There were no fatalities or injuries and only minor injuries reported..

Benton County has had 5 fatal aircraft accidents over the past 30 years:

- A Beech C90 crashed near Blainstown on January 3, 1973 and killed all five people on board.
- A Bellanca 17-31A crashed near Garrison on December 20, 1975 and killed all three persons on board.
- A Cessna T210L crashed and killed all three people on board near Atkins on March 17, 1977.
- A Beech C23 crashed near Belle Plaine on December 29, 1989 and killed one person.
- A Bell 206B crashed near Walford on June 30, 2006 and killed one person.

With five fatal aircraft accidents occurring in the Benton County over the past 30 years and the county's proximity to the Eastern Iowa Airport, it is predictable that a fatal aircraft accident will occur on the average of once every 5 years in Benton County.

Benton County does not have any waterways that are navigated by anything other than recreational water craft. There is no history or record of any type of water body incident in the county.

Warning Time

Transportation incidents are accidents that occur without warning. In rare circumstances operators of vehicles, aircraft, trains or watercraft may be experience a mechanical malfunction that provides them with advanced knowledge that they may experience an accident or tragedy.

Magnitude and Severity

Highway incidents threaten the health and lives of people in the vehicles, pedestrians, and citizens of the community if hazardous materials are involved. Mass casualty events can occur if mass transit vehicles are involved. Community bus lines, metro transit buses, and school buses have a good safety record, but accidents can and do occur. Numerous injuries are a very real possibility in situations involving mass transit vehicles. Property damage would be limited to vehicles and cargo involved; roads,

bridges, and other infrastructure; utilities such as light and power poles; and third-party property adjacent to the accident scene such as buildings and yards.

Those who use the surface transportation system primary, secondary, rock and dirt roads, highways and interstate of Benton County are most vulnerable. Travelers, truckers, delivery personnel, and commuters are at risk at all times that they are on the road. During rush hours and holidays the number of people on the road in Iowa is significantly higher. This is also true before and after major gatherings such as sporting events, concerts, and conventions. Pedestrians and citizens of Benton County are less vulnerable but still not immune from the impacts of a highway incident. Intersections on Highway 30 and inclement weather conditions such as winter weather conditions add to the vulnerability of transportation accidents in Benton County.

Table 111: Summary data for Highway Transportation Incidents in Benton County

All Crashes Benton County, Iowa 2010-2014														
Year	Crash Severity					Total Crashes	Fatalities	Injury Severity					Estimated Property Damage	Number of Vehicles
	Fatal	Major Injury	Minor Injury	Possible/U nknown	Property Damage Only			Total Injuries	Major Injury	Minor Injury	Possible Injury	Unknown Injury		
2010	6	13	26	47	176	268	7	119	18	31	70		\$1,855,875	402
2011	5	12	22	35	137	211	5	97	15	31	48	3	\$1,328,602	315
2012	3	16	33	37	156	245	3	124	17	46	59	2	\$1,625,226	340
2013	6	9	39	42	121	217	8	127	11	55	59	2	\$1,611,977	294
2014	6	18	40	43	171	278	7	142	21	60	60	1	\$2,068,214	401
Total	26	68	160	204	761	1,219	30	609	82	223	296	8	\$8,489,894	1,752

As the above table provided by the Iowa DOT shows, in Benton County from 2010-2014 there were 1,219 total traffic accidents that caused 26 deaths, 609 injuries, involved 1,752 vehicles and caused a total of \$8,489,894 in property damages. These incidents account for an average of 24 major injuries and 5 fatalities annually on Benton County's 1,330 miles of primary, secondary, rock and dirt roads, highways and interstate due to highway transportation incidents.

At its maximum extent in the Benton County a highway transportation incident could involve multiple vehicles, including mass transit vehicles and have multiple casualties, but it would still be localized in nature. Such a situation could overwhelm the response capabilities of local emergency responders and also the medical treatment capabilities of Benton County and City of Cedar Rapids hospitals. The area of impact can extend beyond the localized area if the vehicle(s) involved are transporting hazardous materials and could impact several square miles.

According to records maintained by the Benton County Sheriff's Office and local emergency responders, during the years of 2000-2015, the largest number of vehicles involved in accidents in Benton County was four and the largest number of people injured in an accident was six. On April 10, 2015 five people were killed at the intersection of Highway 150 and 55th Street west of Urbana

Railway incidents can result in death, injury, and property damage. Deaths and injuries can range from those directly involved, to citizens in the community affected by hazardous materials. Depending on the materials involved, evacuations may occur, moving residents away from dangerous products and the possibility of explosion. Gases, liquids, and solids can contaminate air, soil, and water in and near the incident scene. If a railway incident occurred in Belle Plaine, Vinton or other densely populated areas of Benton County, the health and welfare of thousands of people could be put in jeopardy. Damage may be limited to the train, railcars, and cargo involved, but it can also include loss of production, business

disruption due to evacuations, and business disruptions of those served by the railroad. Business and traffic disruptions could last several days until the clean-up efforts are complete.

People and property in close proximity to the railway lines, crossings, sidings, switching stations, and loading/unloading points are most at risk. Those away from railroad tracks and facilities are vulnerable only to large-scale incidents including those in which hazardous materials are involved.

Numerous railways crisscross Iowa. Vehicle/train collisions are usually limited to areas in and near intersections. Rarely, the incident will result in widespread effects. The direct area of impact is usually quite small, but depending on the products and materials involved, the area could become extensive. If hazardous materials are involved, the effects could reach areas up to 1.5 miles from the scene. Harmful products may contaminate streams, rivers, water distribution systems, and storm water systems. If this occurs, a large portion of the community could be affected. The ability of response agencies to contain the product on-scene usually limits the area affected. In Benton County the maximum threat occurs where rail lines pass through cities.

Duration

The majority of transportation accidents are over within a short period of time, usually less than two hours. In extreme circumstances such as the crash of a major airliner or derailment of a train laden with hazardous materials, the ensuing clean up and investigation could take several days.

Vinton Municipal Electric Utility risk assessment and hazard scoring is shown in Appendix E. The school districts of Benton County (Appendix D) accepted the scoring of their respective municipal jurisdictions.

HAZARD ANALYSIS SUMMARY

Representatives of the jurisdictions of Benton County scored all of the hazards considered to be relevant for their community. Following is the scoring by jurisdiction.

Table 112: Hazard Scoring for City Of Atkins

HAZARD	PROBABILITY	WARNING TIME	MAGNITUDE/ SEVERITY	DURATION	TOTAL SCORE	WIGHTED SCORE	RANKING
DROUGHT	2	1	3	4	10	2.35	6
EXTREME HEAT	4	1	2	3	10	1.85	7
FLOOD—FLASH AND RIVERINE	3	3	2	3	10	2.60	5
GRASS OR WILDLAND FIRE	4	4	1	1	10	2.80	4
SEVERE WINTER STORM	4	2	2	3	11	3.00	2
TUNDERSTORM/LIGHTNING/HAIL	4	3	2	1	10	2.95	3
TORNADO/WINDSTORM	3	4	4	1	10	3.25	1

Table 113: Hazard Scoring for City of Belle Plaine

HAZARD	PROBABILITY	WARNING TIME	MAGNITUDE/ SEVERITY	DURATION	TOTAL SCORE	WIGHTED SCORE	RANKING
DROUGHT	3	1	4	4	12	3.10	2
EXTREME HEAT	3	1	3	3	10	2.70	5
FLOOD—FLASH AND RIVERINE	4	4	3	4	15	2.05	12
GRASS OR WILDLAND FIRE	3	3	3	2	11	2.90	4
RIVER FLOODING	4	2	2	4	12	2.60	6
SEVERE WINTER STORM	4	4	2	2	12	3.00	3
TUNDERSTORM/LIGHTNING/HAIL	4	4	2	1	11	3.10	2
TORNADO/WINDSTORM	4	4	4	2	14	3.70	1

Table 114: Hazard Scoring for City of Blirstown

HAZARD	PROBABILITY	WARNING TIME	MAGNITUDE/ SEVERITY	DURATION	TOTAL SCORE	WIGHTED SCORE	RANKING
DROUGHT	2	1	2	4	9	2.05	5
EXTREME HEAT	2	1	2	4	9	2.05	5
FLOOD--FLASH OR RIVERINE	2	4	2	2	10	2.30	4
GRASS OR WILDLAND FIRE	1	4	1	1	7	1.45	6
SEVERE WINTER STORM	2	4	3	1	10	2.50	3
TUNDERSTORM/LIGHTNING/HAIL	3	4	3	1	11	2.95	2
TORNADO/WINDSTORM	3	4	4	4	15	3.25	1

Table 115: Hazard Scoring for City of Garrison

HAZARD	PROBABILITY	WARNING TIME	MAGNITUDE/ SEVERITY	DURATION	TOTAL SCORE	WIGHTED SCORE	RANKING
DROUGHT	1	1	3	4	9	1.90	6
EXTREME HEAT	4	1	2	3	10	1.95	5
FLOOD—FLASH OR RIVERINE	1	2	1	1	6	1.05	7
GRASS OR WILDLAND FIRE	4	4	1	1	10	2.80	2
SEVERE WINTER STORM	4	2	1	3	10	2.70	3
TERRORISM	1	4	2	2	9	1.85	9
TUNDERSTORM/LIGHTNING/HAIL	4	3	1	1	9	2.65	4
TORNADO/WINDSTORM	2	4	2	1	9	3.25	1

Table 116: Hazard Scoring for City of Keystone

HAZARD	PROBABILITY	WARNING TIME	MAGNITUDE/ SEVERITY	DURATION	TOTAL SCORE	WIGHTED SCORE	RANKING
DROUGHT	2	1	1	4	8	1.75	7
EXTREME HEAT	3	1	1	2	7	2.00	6
FLOOD—FLASH OR RIVERINE	3	2	2	2	9	2.45	5
GRASS OR WILDLAND FIRE	4	4	2	2	12	3.20	2
SEVERE WINTER STORM	4	2	1	3	10	2.70	3
TUNDERSTORM/LIGHTNING/HAIL	4	2	1	1	8	2.50	4
TORNADO/WINDSTORM	3	4	2	1	10	3.25	1

Table 117: Hazard Scoring for City of Luzerne

HAZARD	PROBABILITY	WARNING TIME	MAGNITUDE/ SEVERITY	DURATION	TOTAL SCORE	WIGHTED SCORE	RANKING
DROUGHT	2	1	1	4	8	1.75	5
EXTREME HEAT	2	1	2	3	8	2.05	4
FLOOD—FLASH OR RIVERINE	1	1	1	1	4	1.00	7
GRASS OR WILDLAND FIRE	1	2	1	1	5	1.15	6
SEVERE WINTER STORM	3	2	3	2	10	2.75	2
TUNDERSTORM/LIGHTNING/HAIL	2	4	3	1	10	2.50	3
TORNADO/WINDSTORM	2	4	4	1	11	3.25	1

Table 118: Hazard Scoring for City of Mt. Auburn

HAZARD	PROBABILITY	WARNING TIME	MAGNITUDE/ SEVERITY	DURATION	TOTAL SCORE	WIGHTED SCORE	RANKING
DROUGHT	1	1	3	4	9	1.90	5
EXTREME HEAT	4	1	2	3	10	1.95	6
FLOOD--FLASH OR RIVERINE	1	1	1	1	4	1.00	7
GRASS OR WILDLAND FIRE	4	4	1	1	10	2.80	1
SEVERE WINTER STORM	4	2	1	3	10	2.70	2
TUNDERSTORM/LIGHTNING/HAIL	4	3	1	1	9	2.65	3
TORNADO/WINDSTORM	2	4	2	1	9	2.55	4

Table 119: Hazard Scoring for City of Newhall

HAZARD	PROBABILITY	WARNING TIME	MAGNITUDE/ SEVERITY	DURATION	TOTAL SCORE	WIGHTED SCORE	RANKING
DROUGHT	2	1	1	4	8	1.75	7
EXTREME HEAT	4	1	1	3	9	2.55	5
FLOOD--FLASH OR RIVERINE	2	3	1	2	8	1.85	6
GRASS OR WILDLAND FIRE	4	4	1	1	10	2.80	3
SEVERE WINTER STORM	4	2	2	3	11	3.00	2
TUNDERSTORM/LIGHTNING/HAIL	4	2	1	2	9	2.60	4
TORNADO/WINDSTORM	2	4	3	3	12	3.25	1

Table 120: Hazard Scoring for City of Norway

HAZARD	PROBABILITY	WARNING TIME	MAGNITUDE/ SEVERITY	DURATION	TOTAL SCORE	WIGHTED SCORE	RANKING
DROUGHT	1	1	2	4	8	1.60	6
EXTREME HEAT	1	1	2	4	8	1.60	6
FLOOD—FLASH OR RIVERINE	3	4	2	3	12	2.85	3
GRASS OR WILDLAND FIRE	3	1	1	1	6	1.80	4
SEVERE WINTER STORM	2	1	2	3	8	2.05	5
TUNDERSTORM/LIGHTNING/HAIL	4	1	4	1	10	3.25	1
TORNADO/WINDSTORM	3	2	4	4	13	2.95	2

Table 121: Hazard Scoring for City of Shellsburg

HAZARD	PROBABILITY	WARNING TIME	MAGNITUDE/ SEVERITY	DURATION	TOTAL SCORE	WIGHTED SCORE	RANKING
DROUGHT	2	1	1	1	5	1.45	6
EXTREME HEAT	2	1	1	1	5	1.45	6
FLOOD-- FLASH OR RIVERINE	3	4	2	1	10	2.65	3
GRASS OR WILDLAND FIRE	3	4	1	1	9	2.35	5
SEVERE WINTER STORM	3	3	2	3	11	2.70	2
TUNDERSTORM/LIGHTNING/HAIL	3	4	1	2	10	2.45	4
TORNADO/WINDSTORM	2	4	2	2	10	3.25	1

Table 122: Hazard Scoring for City of Urbana

HAZARD	PROBABILITY	WARNING TIME	MAGNITUDE/ SEVERITY	DURATION	TOTAL SCORE	WIGHTED SCORE	RANKING
DROUGHT	3	1	3	4	11	2.80	5
EXTREME HEAT	3	2	1	3	9	2.25	7
FLOOD-- FLASH OR RIVERINE	2	4	2	3	11	2.40	6
GRASS OR WILDLAND FIRE	4	4	2	2	10	3.20	3
SEVERE WINTER STORM	4	1	2	4	11	2.95	4
TUNDERSTORM/LIGHTNING/HAIL	4	4	3	1	12	3.40	2
TORNADO/WINDSTORM	3	4	4	4	15	3.25	1

Table 123: Hazard Scoring for City of Van Horne

HAZARD	PROBABILITY	WARNING TIME	MAGNITUDE/ SEVERITY	DURATION	TOTAL SCORE	WIGHTED SCORE	RANKING
DROUGHT	3	1	3	4	11	2.80	4
EXTREME HEAT	4	2	2	3	11	3.00	1
FLASH -- FLASH OR RIVERINE	3	4	2	2	11	2.75	5
GRASS OR WILDLAND FIRE	4	4	1	1	10	2.80	4
SEVERE WINTER STORM	4	2	2	2	10	2.90	3
TUNDERSTORM/LIGHTNING/HAIL	3	2	2	1	8	2.35	6
TORNADO/WINDSTORM	3	2	2	2	9	2.95	2

Table 124: Hazard Scoring for City of Vinton

HAZARD	PROBABILITY	WARNING TIME	MAGNITUDE/ SEVERITY	DURATION	TOTAL SCORE	WIGHTED SCORE	RANKING
DROUGHT	2	1	3	4	10	2.45	4
EXTREME HEAT	2	1	3	4	10	2.45	4
FLOOD -- FLASH OR RIVERINE	3	1	3	4	11	2.80	3
GRASS OR WILDLAND FIRE	1	4	1	1	7	1.55	6
SEVERE WINTER STORM	3	1	2	3	9	2.40	5
TUNDERSTORM/LIGHTNING/HAIL	4	3	2	1	10	2.95	2
TORNADO/WINDSTORM	1	4	4	4	13	3.55	1

Table 125 Hazard Scoring for City of Walford

HAZARD	PROBABILITY	WARNING TIME	MAGNITUDE/ SEVERITY	DURATION	TOTAL SCORE	WIGHTED SCORE	RANKING
DROUGHT	2	1	2	2	7	1.85	5
EXTREME HEAT	4	2	2	2	10	2.90	3
FLOOD -- FLASH OR RIVERINE	1	4	1	1	7	1.45	6
GRASS OR WILDLAND FIRE	1	4	1	1	7	1.45	6
SEVERE WINTER STORM	2	3	3	3	11	2.55	4
TUNDERSTORM/LIGHTNING/HAIL	4	4	2	1	11	3.10	2
TORNADO/WINDSTORM	4	4	3	4	15	3.70	1

Table 126: Hazard Scoring for Benton County Unincorporated

HAZARD	PROBABILITY	WARNING TIME	MAGNITUDE/ SEVERITY	DURATION	TOTAL SCORE	WIGHTED SCORE	RANKING
DROUGHT	2	1	2	4	9	2.05	5
EXTREME HEAT	2	1	1	3	7	1.65	6
FLASH FLOOD	4	3	1	2	12	2.75	3
GRASS OR WILDLAND FIRE	4	4	1	1	10	2.80	2
SEVERE WINTER STORM	4	1	1	2	8	2.45	4
TUNDERSTORM/LIGHTNING/HAIL	4	4	1	1	10	2.80	2
TORNADO/WINDSTORM	2	1	1	4	8	3.10	1

RANKING OF HAZARDS

Following the hazard scoring per jurisdiction a composite score was determined for each hazard which resulted in ranking of hazards that could influence Benton County is as follows.

Table 127: Ranking of Benton County Hazards by Score

	<i>Benton County Unincorporated</i>	<i>Atkins</i>	<i>Belle Plaine</i>	<i>Blairstown</i>	<i>Garrison</i>	<i>Keystone</i>	<i>Luzerne</i>	<i>Mt. Auburn</i>	<i>Newhall</i>	<i>Norway</i>	<i>Shellsburg</i>	<i>Urbana</i>	<i>Van Horne</i>	<i>Vinton</i>	<i>Walford</i>	<i>Average Score</i>	<i>Ranking</i>
Drought	2.05	2.35	3.10	2.05	1.90	1.75	1.75	1.90	1.75	1.60	1.45	2.80	2.80	2.45	1.85	2.10	12
Extreme Heat	1.65	1.85	2.70	2.05	1.95	2.00	2.05	1.95	2.55	1.60	1.45	2.25	3.00	2.45	2.90	2.16	10
Flood—Flash or Riverine	2.75	2.60	2.05	2.30	1.05	2.45	1.00	1.00	1.85	2.85	2.65	2.40	2.75	2.80	1.45	2.13	11
Grass or Wildland Fire	2.80	2.60	2.90	1.45	2.80	3.20	1.15	2.80	2.80	1.80	2.35	3.20	2.75	1.55	1.45	2.73	3
Severe Winter Storms	2.45	3.00	3.00	2.50	2.70	2.75	2.70	2.05	2.05	2.70	2.95	2.90	2.40	2.55	2.45	2.63	6
Thunderstorm/ lightning/Hail	2.80	2.95	3.10	2.95	2.65	2.50	2.50	2.65	2.60	3.25	2.45	3.40	2.35	2.95	3.10	2.81	2
Tornado/ Windstorm	3.10	3.25	3.70	3.25	3.25	3.25	3.25	2.55	3.25	2.95	3.25	3.25	2.95	3.55	3.70	3.23	1

Vinton Municipal Electric Utility risk assessment and hazard scoring is shown in Appendix E. The school districts of Benton County (Appendix D) accepted the scoring of their respective municipal jurisdictions.

HAZARD PRIORITIZATION

Once the Benton County Hazard Mitigation Planning Committee had identified and scored the hazards, they examined each hazard in relation to the risk that hazard presented to the community. All of the identified hazards were then given a priority state. The Committee defined high-risk hazards to be those hazards that caused substantial damage to the community in the past and/or have a high probability of occurring in the future, and/or have the potential to affect a large proportion of the community. High-risk hazards were also considered to be the hazards for which immediate planning and mitigation activities are to be focused.

The Committee considered medium-risk hazards to be those hazards that should be addressed by the community in the future; however, the need for mitigation activities for these hazards was not considered to be as immediate. Finally, the Committee defined low risk hazards as hazards that, at present time, have an acceptable level of risk. The hazards are listed below by priority.

Table 128 Prioritization of Benton County Hazards

HAZARD	PRIORITY
Severe Winter Storm	HIGH
Tornado/Windstorm	HIGH
Flooding (Flash and Riverine)	HIGH
Thunderstorm/Lightning/Hail	MEDIUM
Extreme Heat	MEDIUM
Drought	LOW
Grass or Wildland Fire	LOW
Other Hazards	LOW

SECTION 5

RISK ASSESSMENT

ASSESSING VULNERABILITY

Overview

An overview of the planning area's vulnerability is a summary of the hazard's impact on the community and its vulnerable structures. To determine what populations or properties could be lost to a particular hazard event, the hazard locations discussed in the hazard profiles section are classified below. Some hazards do have defined risk areas, i.e. they will only occur in certain places, while other hazards could affect the entire town, or any smaller portion of the town.

Hazards with well-defined risk areas with risk of structural damage:

Flood—Flash and Riverine

The majority of these areas have been identified as best as currently possible within the hazard profiles. People living, working, or otherwise being present inside these risk areas, as well as structures inside these risk areas, are most vulnerable to the effects of these hazards. While these hazards may have an extremely detrimental impact on lives and property in their path, the typical occurrences of these hazards will not impact other people or property within the jurisdiction, except when a critical facility is impacted. An example of this would be flooding of the sewer plants, which could be caused by flash flooding, riverine flooding or a dam failure, which would in-turn impact larger areas of town outside of the defined hazard area.

Hazards with well-defined risk areas and little to no risk of structural damage:

None

Hazards with specific areas of elevated risk with risk of structural damage:

Wildfire

Hazards with specific areas of elevated risk are those that are more likely to occur in a certain identified location. However they are not guaranteed to be limited to that location. Wildfires normally only impact areas with enough vegetative, fuel, and slopes necessary to sustain a fire. Other factors may impact the spread of a wildfire, such as materials stored in specific areas that may ignite and spread a fire over a greater area than might have been predicted by vegetation and terrain alone. Transportation events as well as hazardous materials events can almost always be expected to occur in specific areas: transportation events will likely originate on or near roadways, railroads or other transportation infrastructure; many hazardous materials sights are well known to first responders and have federal and state reporting requirements. However, it is difficult to predict the magnitude of any specific event because these types of events are accidental, and thus the circumstances surrounding these events will impact the extent of damage or injuries that occur.

Hazards without defined areas of elevated risk with risk of structural damage:

Thunderstorms/Lightning/Hail, Severe Winter Storm, Tornado, Windstorm

These hazards have no defined area in which they are known to occur, and could occur in either limited sections of the jurisdiction or over the entire jurisdiction at once. These hazards are also able to directly cause substantial structural losses, and potentially loss of life.

Hazards without defined areas of elevated risk, without high risk of structural damage:

Extreme Heat, Drought

These types of hazards are those that could occur anywhere within the jurisdiction, or could occur throughout the entire jurisdiction and for which it is not possible to determine beforehand where the hazard is most likely to occur. Additionally, any of these hazards could occur without causing damage to the structures in the jurisdiction. While this does not indicate that any of these events could not be combined with other hazards or circumstances to create property damage, rather they were determined to be least likely to directly cause structural damage. However, these hazards will still create losses, which are likely to be economic, either due to a disruption in the provision of an essential service or to a loss of some type of product such as crop failure.

Table 129: Overall Summary of Vulnerability by Jurisdiction

Key:

L	= Low to no risk; little damage potential
M	= Medium risk; moderate damage potential or infrequent occurrence
H	= High risk; significant risk or major damage potential or frequent hazard occurrence

Hazard Identified	Benton County Unincorporated	Atkins	Belle Plaine	Blairtown	Garrison	Keystone	Luzerne	Mt. Auburn	Newhall	Norway	Shellsburg	Urbana	Van Horne	Vinton	Walford
DROUGHT	M	M	L	L	M	L	H	M	L	L	L	L	L	L	L
EXTREME HEAT	M	L	M	M	M	L	H	M	L	M	M	M	M	M	M
FLOOD—FLASH OR RIVERINE	L	L	H	L	L	L	L	L	L	H	H	L	L	H	M
GRASS OR WILDLAND FIRE	M	L	L	M	L	M	L	M	L	M	M	M	L	L	L
SEVERE WINTER STORM	H	H	M	H	H	M	H	H	H	M	M	M	M	H	M
STRUCTURAL FIRE	L	M	M	M	L	M	H	H	M	M	M	M	M	H	M
THUNDERSTORM/LIGHTNING/HAIL	M	M	M	M	H	H	M	M	M	M	M	M	M	M	M
TORNADO/WINDSTORM	H	H	M	H	H	M	H	H	M	H	H	H	H	H	M

Those hazards in the Other Hazards Category include:**Hazards with specific areas of elevated risk with risk of structural damage:**

Transportation Incident, Hazardous Materials Incident

Hazards without defined areas of elevated risk with risk of structural damage:

Structural Fire, Terrorism, Transportation Incident

Hazards without defined areas of elevated risk, without high risk of structural damage:

Infrastructure failure, Animal-Plant-Crop Disease, Human Disease

REPETITIVE LOSS PROPERTIES

Repetitive loss properties are those for which two or more losses of at least \$1,000 each have been paid under the National Flood Insurance Program (NFIP) within any 10-year period since 1978. Local governments may obtain information on repetitive loss properties within their jurisdiction by contacting

their State NFIP Coordinator. Use of the flood insurance claim and disaster assistance information is subject to The Privacy Act of 1974, as amended, which prohibits public release of the names of policy holders or recipients of financial assistance and the amount of the claim payment or assistance.

For the purposes of preparing this plan, the consultant requested information from the Iowa Department of Homeland Security and Emergency Management about repetitive loss structures in Benton County. Officials of the Homeland Security and Emergency Management Division of Iowa (HSEMD) report that there are two repetitive loss structures in Benton County. Both are residential. One property is located in Vinton and one property is located in Mt. Auburn. This is the only information that could be obtained.

IDENTIFYING STRUCTURES

Hazard mitigation plans should describe vulnerability in terms of the types and numbers of existing and future buildings, infrastructure and critical facilities located in the identified hazard areas. Thus, the next step in the planning process was to determine who and what is at risk in the event that any of the selected hazards do occur. To determine this, the consultant provided an overview of the potential property losses by assessment classification to provide a sense of what property could be lost in addition to the populations detailed in the community profile.

Building Stock

This data represents the 2020 assessed values and 2013 population estimate based on where people live rather than where they work (or attend school). The source for this data is the Benton County Assessor's office and the 2013 population estimate from the US Census Bureau. This was the most recent and up-to-date information available at the time this section was developed. Values for tax-exempt structures are not available. Additional, more specific building type classifications are also not available. When interpreting the data above to provide loss estimates for the jurisdiction in a worst-case scenario event, it is also useful to keep in mind that the assessed value of the property is presented, which may not directly correlate to the fair market or replacement value of that property. A common method used in Iowa to adjust from assessed value to fair market value is to increase the assessed value by 110%, however every property is unique and this may not be accurate in all cases.

As previously discussed in the vulnerability overview section, only certain hazards have well defined risk areas, and only some of those hazards pose a risk of structural losses. Thus, the hazard of riverine flooding and flash flooding, are the only hazards examined in this document where it is possible to identify the structures that are at risk should one of these hazards occur. The hazards of expansive soils and landslide are not examined because the mitigation planning committee decided not to include them in the plan based on information provided by the USDA NRCS which showed low or no hazard for the county for these two hazards. For the purpose of reviewing riverine and flash flooding, the two hazards were combined and properties were reviewed for overlap with the boundaries of the identified special flood hazard area.

All Properties

Table 130: Potential Structural Losses, Unincorporated Benton County

Use Type	Properties	Average Value	Land Value	Building Value	Dwelling Value	Total Value	Population
Agricultural	1,541	\$719,162	\$1,048,988,600	\$59,241,000	N/A	\$1,108,229,600	0
Commercial	118	\$150,923	\$2,640,500	\$15,168,400	N/A	\$17,808,900	0
Exempt	229	N/A	N/A	N/A	N/A	N/A	N/A
Industrial	7	\$942,543	\$196,700	\$6,401,100	\$0	\$6,597,800	
Residential	2,145	\$166,375	\$59,332,400	\$0	\$297,542,600	\$356,875,000	8,495
Total	4,040	\$368,690	\$1,111,158,200	\$80,810,500	\$297,542,600	\$1,489,511,300	8,495

Table 131: Potential Structural Losses, Atkins

Use Type	Properties	Average Value	Land Value	Building Value	Dwelling Value	Total Value	Population
Agricultural	N/A	N/A	\$754,700	\$3,400	\$0	\$758,100	N/A
Commercial	27	\$130,385	\$423,700	\$2,434,300	N/A	\$3,520,400	0
Exempt	30	N/A	N/A	N/A	N/A	N/A	N/A
Industrial	0	0	0	0	0	0	0
Residential	574	\$182,943	\$14,675,000	\$	\$90,334,400	\$105,009,400	1,728
Total	631	\$173,184	\$15,853,400	\$2,437,700	\$90,334,400	\$109,278,900	1,728

Table 132: Potential Structural Losses, Belle Plaine

Use Type	Properties	Average Value	Land Value	Building Value	Dwelling Value	Total Value	Population
Agricultural	4	\$581,200	\$1,913,200	\$112,900	\$298,700	\$2,324,800	0
Commercial	156	\$90,290	\$2,499,500	\$11,585,700	N/A	\$14,085,200	0
Exempt	55	N/A	N/A	N/A	N/A	N/A	N/A
Industrial	12	\$545,875	\$378,300	\$6,172,200	N/A	\$6,550,500	0
Residential	1,073	\$68,060	\$8,663,100	\$0	\$64,365,500	\$73,028,500	2,486
Total	1,300	\$73,838	\$13,454,100	\$17,870,800	\$64,664,200	\$95,989,100	2,486

Table 133: Potential Structural Losses, Blairstown

Use Type	Properties	Average Value	Land Value	Building Value	Dwelling Value	Total Value	Population
Agricultural	1	\$438,800	\$175,900	\$77,300	\$185,600	\$438,800	0
Commercial	50	\$70,408	\$570,400	\$2,950,000	N/A	\$3,520,400	0
Exempt	20	N/A	N/A	N/A	N/A	N/A	N/A
Industrial	1	\$26,200	\$6,000	\$20,200	N/A	\$26,200	0
Residential	283	\$99,642	\$3,644,400	\$0	\$25,554,200	\$28,198,600	678
Total	355	\$93,476	\$4,396,700	\$3,047,500	\$25,739,800	\$33,184,000	678

Table 134: Potential Structural Losses, Garrison

Use Type	Properties	Average Value	Land Value	Building Value	Dwelling Value	Total Value	Population
Agricultural	2	\$233,900	\$220,500	\$226,600	\$21,300	\$467,800	0
Commercial	23	\$20,961	\$139,600	\$342,500	N/A	\$482,100	0
Exempt	17	N/A	N/A	N/A	N/A	N/A	N/A
Industrial	0	0	0	0	N/A	0	0
Residential	154	\$40,402	\$856,000	\$0	\$5,366,500	\$6,222,000	360
Total	196	\$36,591	\$1,216,100	\$569,100	\$5,387,800	\$7,171,900	360

Table 135: Potential Structural Losses, Keystone

Use Type	Properties	Average Value	Land Value	Building Value	Dwelling Value	Total Value	Population
Agricultural	1	\$447,000	\$274,100	\$47,900	\$125,000	\$447,000	0
Commercial	35	\$215,154	\$495,700	\$7,034,700	N/A	\$7,530,400	0
Exempt	17	N/A	N/A	N/A	N/A	N/A	N/A
Industrial	0	0\$	0	0	0	0	0
Residential	247	\$90,165	\$2,772,100	\$0	\$19,498,600	\$22,270,700	610
Total	300	\$100,827	\$3,541,900	\$7,082,600	\$19,623,600	\$30,248,100	610

Table 136: Potential Structural Losses, Luzerne

Use Type	Properties	Average Value	Land Value	Building Value	Dwelling Value	Total Value	Population
Agricultural		\$63,000	\$63,000	\$0	N/A	\$63,000	0
Commercial	8	\$59,300	\$47,300	\$427,400	N/A	\$474,700	0
Exempt	6	N/A	N/A	N/A	N/A	N/A	N/A
Industrial	0	0	0	0	N/A	0	0
Residential	42	\$24,674	\$366,700	\$0	\$2,007,300	\$2,344,000	95
Total	50	\$57,634	\$477,000	\$427,400	\$2,007,300	\$2,881,700	95

Table 137: Potential Structural Losses, Mt. Auburn

Use Type	Properties	Average Value	Land Value	Building Value	Dwelling Value	Total Value	Population
Agricultural		\$	\$187,900	\$167,900	N/A	\$355,800	0
Commercial	9	\$18,644	\$34,600	\$133,200	N/A	\$167,800	0
Exempt	11	N/A	N/A	N/A	N/A	N/A	N/A
Industrial	0	0	0	0	N/A	0	0
Residential	66	\$52,776	\$415,800	\$0	\$3,066,400	\$3,483,200	148
Total	86	\$46,591	\$638,300	\$301,100	\$3,066,400	\$4,006,800	148

Table 138: Potential Structural Losses, Newhall

Use Type	Properties	Average Value	Land Value	Building Value	Dwelling Value	Total Value	Population
Agricultural	0	0	0	0	N/A	0	0
Commercial	43	\$68,684	\$526,300	\$2,427,100	N/A	\$2,953,400	0
Exempt	24	N/A	N/A	N/A	N/A	N/A	N/A
Industrial	0	0	0	0	N/A	0	0
Residential	350	\$120,547	\$5,515,700	\$0	\$36,675,900	\$42,191,600	859
Total	417	\$108,261	\$6,042,000	\$2,427,100	\$36,675,900	\$45,145,000	859

Table 139: Potential Structural Losses, Norway

Use Type	Properties	Average Value	Land Value	Building Value	Dwelling Value	Total Value	Population
Agricultural	0	\$302,700	\$269,700	\$33,000	N/A	\$302,700	0
Commercial	23	\$70,570	\$225,400	\$1,397,700	N/A	\$1,623,100	0
Exempt	23	N/A	N/A	N/A	N/A	N/A	N/A
Industrial	0	0	0	0	N/A	0	0
Residential	233	\$106,649	\$3,213,700	\$0	\$21,635,600	\$24,849,300	533
Total	279	\$95,968	\$3,708,800	\$1,430,700	\$21,635,600	\$26,775,100	533

Table 140: Potential Structural Losses, Shellsburg

Use Type	Properties	Average Value	Land Value	Building Value	Dwelling Value	Total Value	Population
Agricultural	1	\$437,900	\$269,700	\$33,000	\$135,200	\$437,900	0
Commercial	39	\$131,038	\$565,100	\$4,545,400	N/A	\$5,110,500	0
Exempt	22	N/A	N/A	N/A	N/A	N/A	N/A
Industrial	0	0	0	0	N/A	0	0
Residential	371	\$123,023	\$7,165,200	\$0	\$38,476,300	\$45,641,500	968
Total	433	\$118,221	\$7,999,823	\$4,578,400	\$38,611,500	\$51,189,900	968

Table 141: Potential Structural Losses, Urbana

Use Type	Properties	Average Value	Land Value	Building Value	Dwelling Value	Total Value	Population
Agricultural	1	\$1,113,900	\$460,792	\$1,099,600	0	\$1,113,900	0
Commercial	47	\$302,651	\$2,480,900	\$11,743,700	N/A	\$14,224,600	0
Exempt	31	N/A	N/A	N/A	N/A	N/A	N/A
Industrial	10	\$	\$455,400	\$969,600	N/A	\$1,425,000	0
Residential	501	\$134,675	\$10,316,700	\$0	\$57,155,700	\$67,472,400	1,439
Total	590	\$142,773	\$13,713,792	\$13,812,900	\$57,155,700	\$84,235,900	1,439

Table 142: Potential Structural Losses, Van Horne

Use Type	Properties	Average Value	Land Value	Building Value	Dwelling Value	Total Value	Population
Agricultural	1	\$991,100	\$852,500	\$37,400	\$101,200	\$991,100	0
Commercial	42	\$85,076	\$608,500	\$2,964,700	N/A	\$3,573,200	0
Exempt	37	N/A	N/A	N/A	N/A	N/A	N/A
Industrial	1	\$113,800	\$19,000	\$94,800	N/A	\$113,800	0
Residential	275	\$114,831	\$4,334,300	\$0	\$27,244,200	\$31,578,500	671
Total	356	\$101,844	\$5,814,300	\$3,096,900	\$27,345,400	\$36,256,600	671

Table 143: Potential Structural Losses, Vinton

Use Type	Properties	Average Value	Land Value	Building Value	Dwelling Value	Total Value	Population
Agricultural	2	\$1,395,100	\$2,563,200	\$36,700	\$190,300	\$2,790,200	0
Commercial	284	\$160,702	\$7,398,800	\$38,240,600	N/A	\$45,639,400	0
Exempt	139	N/A	N/A	N/A	N/A	N/A	N/A
Industrial	12	\$712,683	\$825,700	\$7,726,500	N/A	\$8,552,200	0
Residential	1,807	\$99,185	\$22,015,800	\$0	\$157,210,700	\$179,226,500	5,181
Total	2,244	\$105,262	\$32,803,500	\$46,003,800	\$157,401,000	\$236,208,300	5,181

Table 144: Potential Structural Losses, Walford

Use Type	Properties	Average Value	Land Value	Building Value	Dwelling Value	Total Value	Population
Agricultural		\$21,600	\$10,300	\$11,300	0	\$21,600	0
Commercial	20	\$153,495	\$601,600	\$2,468,300	N/A	\$3,069,900	0
Exempt	15	N/A	N/A	N/A	N/A	N/A	N/A
Industrial	0	0	0	0	N/A	0	0
Residential	333	\$169,632	\$7,790,800	\$0	\$48,696,500	\$56,487,300	1,448
Total	368	\$161,899	\$8,402,700	\$2,479,600	\$48,696,500	\$59,578,800	1,448

Potential Flood Losses

Table 145: Atkins Potential 100 year flood Losses

Use Type	Properties	% in Hazard Area	Structural Value	Land Value	Total Value	Population	%Population
Agricultural	14	60%	0	\$456,700	\$456,700	0	0%
Commercial	0	0%	0	0	\$0	0	0%
Exempt	10	33%	N/A	N/A	N/A	0	0%
Industrial	0	%	0	0	\$	0	0%
Residential	66	11%	\$9,205,800	\$1,680,700	10,886,500\$	165	10%
Total	91	14%	\$9,205,800	\$2,137,400	\$11,343,200	165	10%

Table 146: Belle Plaine Potential 100 year flood Losses

Use Type	Properties	% in Hazard Area	Structural Value	Land Value	Total Value	Population	%Population
Agricultural	11	41%	0	\$960,400	\$960,400	0	0%
Commercial	15	10%	\$1,862,700	\$422,200	\$2,284,900	0	0%
Exempt	10	18%	N/A	N/A	N/A	0	0%
Industrial	3	25%	\$333,500	\$76,400	\$409,900	0	0%
Residential	84	8%	\$3,190,000	\$821,700	\$4,011,700	210	8%
Total	123	9%	\$5,386,200	\$2,280,700	\$7,666,900	210	8%

Table 147: Blainstown Potential 100 year flood Losses

Use Type	Properties	% in Hazard Area	Structural Value	Land Value	Total Value	Population	%Population
Agricultural	4	40%	0	\$81,100	\$81,100	0	0%
Commercial	2	4%	\$217,000	\$21,900	\$238,900	0	0%
Exempt	5	25%	N/A	N/A	N/A	0	0%
Industrial	0	0%	0	\$0	\$0	0	0%
Residential	44	16%	\$1,444,500	\$408,100	\$1,852,600	110	16%
Total	55	15%	\$1,661,500	\$511,100	\$2,172,600	110	16%

Table 148: Garrison Potential 100 year flood Losses

Use Type	Properties	% in Hazard Area	Structural Value	Land Value	Total Value	Population	%Population
Agricultural	2	100%	0	\$67,700	\$67,700	0	0%
Commercial	2	9%	31,400	\$51,600	\$83,000	0	0%
Exempt	0	0	N/A	N/A	N/A	0	0%
Industrial	0	%0	0	0	\$0	0	0%
Residential	0	%0	\$0	\$0	\$0	0	0%
Total	0	%0	\$31,400	\$119,300	\$150,700	0	0%

Table 149: Keystone Potential 100 year flood Losses

Use Type	Properties	% in Hazard Area	Structural Value	Land Value	Total Value	Population	%Population
Agricultural	9	80%	0	\$215,900	\$215,900	0	0%
Commercial	6	17%	\$320,600	\$191,200	\$511,800	0	0%
Exempt	2	12%	N/A	N/A	N/A	0	0%
Industrial	0	%	0	0	\$0	0	0%
Residential	7	3%	\$66,600	\$57,200	\$123,800	18	3%
Total	24	8%	\$387,200	\$464,300	\$851,500	18	3%

Table 150: Luzerne Potential 100 year flood Losses--No flood hazard area

Use Type	Properties	% in Hazard Area	Structural Value	Land Value	Total Value	Population	%Population
Agricultural	0	0%	0	\$0	\$0	0	0%
Commercial	0	0%	0	\$0	\$	0	0%
Exempt	0	0%	N/A	N/A	N/A	0	0%
Industrial	0	0%	0	0	\$0	0	0%
Residential	0	0%	\$0	\$0	\$0	0	0%
Total	0	0%	0	0	\$0	0	0%

Table 151: Mt. Auburn Potential 100 year flood Losses--No flood hazard area

Use Type	Properties	% in Hazard Area	Structural Value	Land Value	Total Value	Population	%Population
Agricultural	0	0%	0	0	0	0	0%
Commercial	0	0%	0	0	0	0	0%
Exempt	0	0%	0	0	0	0	0%
Industrial	0	0%	0	0	0	0	0%
Residential	0	0%	0	0	0	0	0%
Total	0	0%	\$0	\$0	\$0	0	0%

Table 152: Newhall Potential 100 year flood Losses

Use Type	Properties	% in Hazard Area	Structural Value	Land Value	Total Value	Population	%Population
Agricultural	0	0%	0	0	\$0	0	0%
Commercial	2	5%	\$135,100	\$34,700	\$169,800	0	0%
Exempt	1	4%	N/A	N/A	N/A	0	0%
Industrial	0	0%	0	0	\$0	0	0%
Residential	6	2%	\$822,100	\$131,800	\$953,900	15	2%
Total	9	3%	\$957,200	\$166,500	\$1,123,700	15	2%

Table 153: Norway Potential 100 year flood Losses

Use Type	Properties	% in Hazard Area	Structural Value	Land Value	Total Value	Population	%Population
Agricultural	4	39%	0	\$100,700	\$100,700	0	0%
Commercial	0	0%	0	0	0	0	0%
Exempt		0%	N/A	N/A	N/A	0	0%
Industrial	0	9%	0	0	0	0	0%
Residential	2	1%	\$100,700	\$52,500	\$153,200	5	1%
Total	6	2%	\$100,700	\$153,200	\$253,900	5	1%

Table 154: Shellsburg Potential 100 year flood Losses

Use Type	Properties	% in Hazard Area	Structural Value	Land Value	Total Value	Population	%Population
Agricultural	4	12%	0	\$33,200	\$33,200	0	0%
Commercial	16	41%	\$1,653,300	\$288,900	\$1,942,200	0	0%
Exempt	13	60%	N/A	N/A	N/A	0	0%
Industrial	0	%	0	0	\$0	0	0%
Residential	91	25%	\$3,617,500	\$781,700	\$4,399,200	228	24%
Total	129	29%	\$5,270,800	\$1,103,800	\$6,374,600	228	24%

Table 155: Urbana Potential 100 year flood Losses

Use Type	Properties	% in Hazard Area	Structural Value	Land Value	Total Value	Population	%Population
Agricultural	2	50%		\$228,500	\$228,500	0	0%
Commercial	2	4%	\$103,200	\$67,700	\$170,900	0	0%
Exempt	1	3%	N/A	N/A	N/A	0	0%
Industrial	0	%	0	0	\$0	0	0%
Residential	1	.2%	\$166,300	\$20,700	\$187,000	3	.2%
Total	6	1%	\$269,500	\$316,900	\$586,400	3	.2%

Table 156: Van Horne Potential 100 year flood Losses

Use Type	Properties	% in Hazard Area	Structural Value	Land Value	Total Value	Population	%Population
Agricultural	1	11%	0	\$92,100	\$92,100	0	0%
Commercial	0	0%	0	0	0	0	0%
Exempt	1	3%	N/A	N/A	N/A	0	0%
Industrial	0	0%	0	0	0	0	0%
Residential	0	0%	0	0	0	0	0%
Total	1	.3%	0	\$92,100	\$92,100	0	0%

Table 157: Vinton Potential 100 year flood Losses

Use Type	Properties	% in Hazard Area	Structural Value	Land Value	Total Value	Population	%Population
Agricultural	21	61%	0	\$1,556,700	\$1,556,700	0	0%
Commercial	45	16%	\$8,078,900	\$1,363,400	\$9,442,300	0	0%
Exempt	58	42%	N/A	N/A	N/A	0	0%
Industrial	5	42%	\$666,200	\$5,845,300	\$6,511,500	0	0%
Residential	318	18%	\$15,220,500	\$2,874,100	\$18,094,600	795	15%
Total	447	20%	\$23,965,600	\$11,639,500	\$35,605,100	795	15%

Table 158: Vinton Potential 500 year flood Losses

Use Type	Properties	% in Hazard Area	Structural Value	Land Value	Total Value	Population	%Population
Agricultural	1	7%		\$173,900	\$173,900	0	0%
Commercial	8	3%	\$476,900	\$263,200	\$740,100	0	0%
Exempt	9	6%	N/A	N/A	N/A	0	0%
Industrial	0	0%	0	0	0	0	0%
Residential	37	2%	\$2,719,900	\$474,499	\$3,194,399	138	3%
Total	55	2%	\$3,196,900	\$911,599	\$4,108,399	138	3%

Table 159: Walford Potential 100 year flood Losses

Use Type	Properties	% in Hazard Area	Structural Value	Land Value	Total Value	Population	%Population
Agricultural	1	100%	0	\$108,000	\$108,000	0	0%
Commercial	1	5%	\$85,500	\$34,700	\$120,200	0	0%
Exempt	3	2%	N/A	N/A	N/A	0	0%
Industrial	0	0%	0	0	0	0	0%
Residential	5	2%	\$1,017,900	\$155,400	\$1,173,300	13	4%
Total	10	%3	\$1,103,400	\$298,100	\$1,401,500	13	4%

Table 160: Benton County Unincorporated Potential 100 year flood Losses

Use Type	Properties	% in Hazard Area	Structural Value	Land Value	Total Value	Population	%Population
Agricultural	603	39%	\$71,170,200	\$561,462,900	\$632,633,100	0	0%
Commercial	23	19%	\$7,372,200	\$1,224,200	\$8,596,400	0	0%
Exempt	97	42%	N/A	N/A	N/A	0	0%
Industrial	5	43%	\$7,827,800	\$974,100	\$8,801,900	0	0%
Residential	233	11%	\$9,336,200	\$9,858,200	\$19,194,400	583	7%
Total	961	24%	\$95,706,400	\$573,519,400	\$670,325,800	583	7%

Table 161: Benton County Total Potential 100 year flood Losses

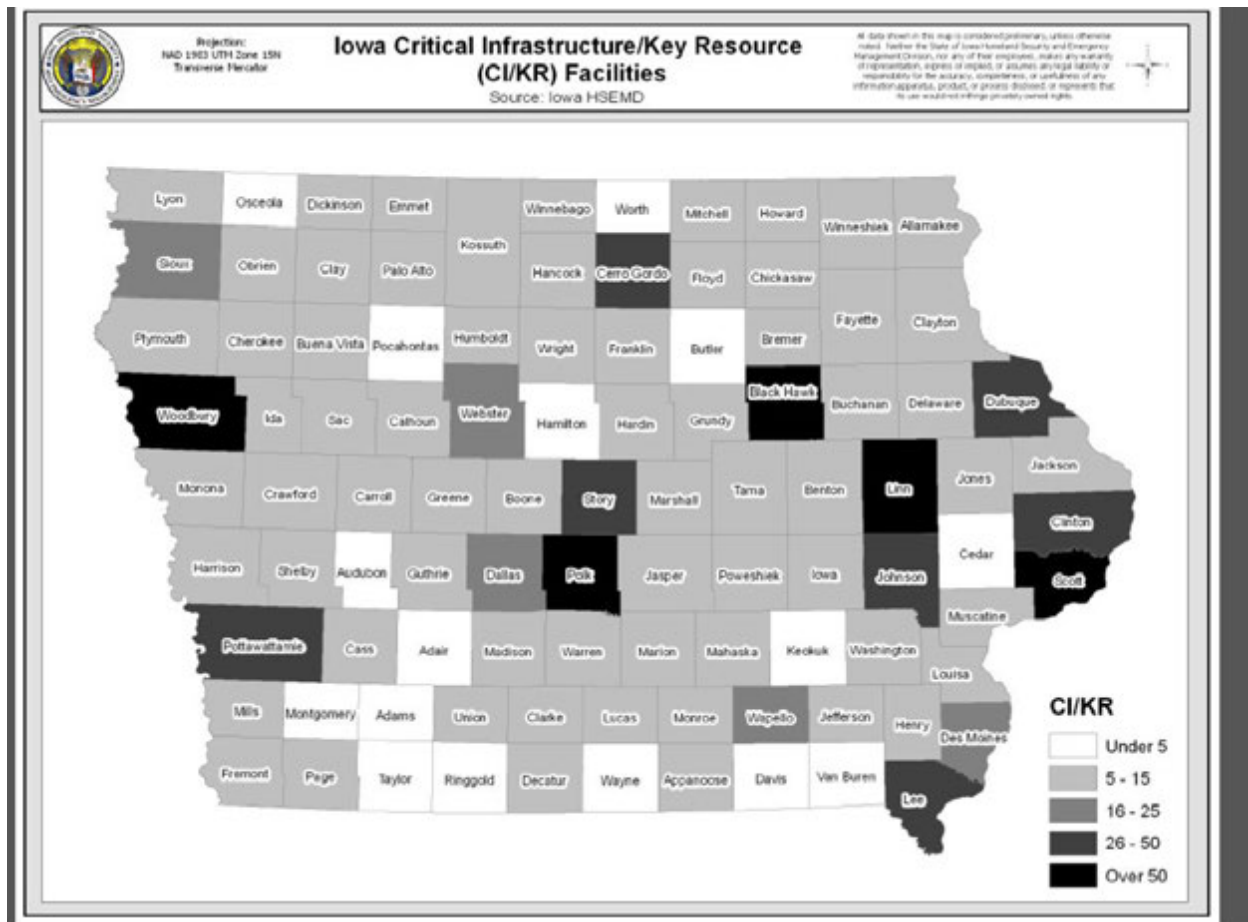
Use Type	Properties	% in Hazard Area	Structural Value	Land Value	Total Value	Population	%Population
Agricultural	652	42%	\$71,170,200	\$586,363,900	\$667,873,800	0	0%
Commercial	114	12%	\$19,774,400	\$3,700,500	\$23,474,900	0	0%
Exempt	213	31%	N/A	N/A	N/A	0	0%
Industrial	13	30%	\$7,827,800	\$974,100	\$7,827,800	0	0%
Residential	858	10%	\$49,188,100	\$16,843,100	\$66,031,200	4625	19
Total	1,850	16%	\$147,960,500	\$607,881,600	\$765,207,800	4625	19%

CRITICAL FACILITIES

Critical Facilities are essential to the health and welfare of the whole population and are especially important following hazard events. Since vulnerability is based on service losses as well as building structure integrity and contents value, loss of the following structures would have an unusually large effect on the community. For purposes of this mitigation planning guidance, critical facilities may include emergency service facilities such as hospitals and other medical facilities, jails, police and fire stations, emergency operations centers, police and fire stations, public works facilities, evacuation shelters, schools, other centers that house special needs populations, and facilities that provide necessary services, such as provision of food, or pharmaceutical supplies.

The State of Iowa Homeland Security and Emergency Management Division (HSEMD) lists 34 facilities in Benton County as critical assets. For security reasons, HSEMD does not release information the location or nature of these facilities.

Figure 94: Iowa Critical Infrastructure/Key Resources
From the 2017 State of Iowa Hazard Mitigation Plan



Facilities critical to the incorporated and unincorporated areas or Benton County as a whole, as identified at the time this plan was created include, but are not limited to, the following locations. The maps and figured were provided by the Benton County Assessor and Benton County Emergency Management Agency.

Figure 95: Atkins Critical Facilities January 1, 2020

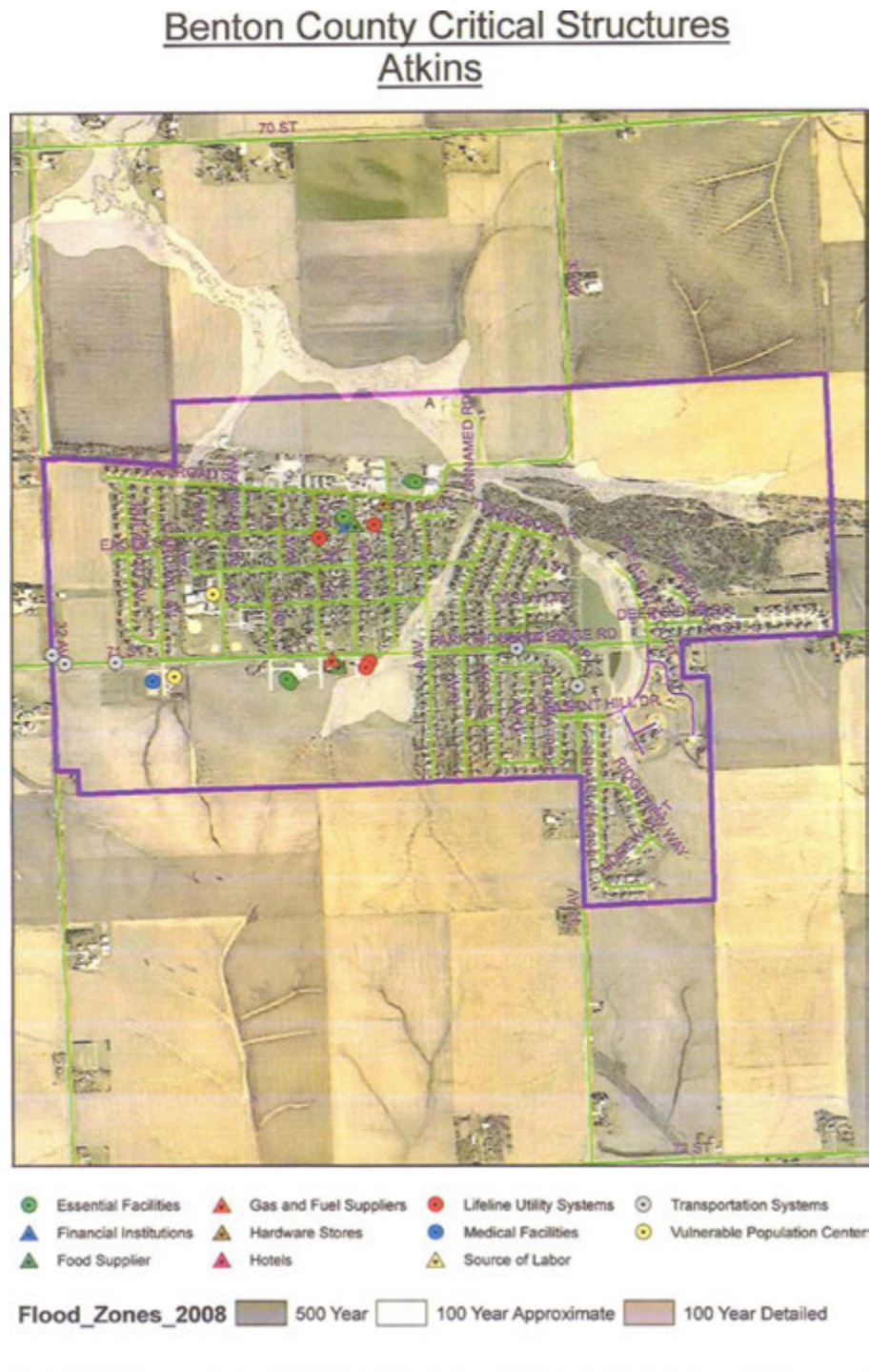


Figure 96: Belle Plaine Critical Facilities January 1, 2020

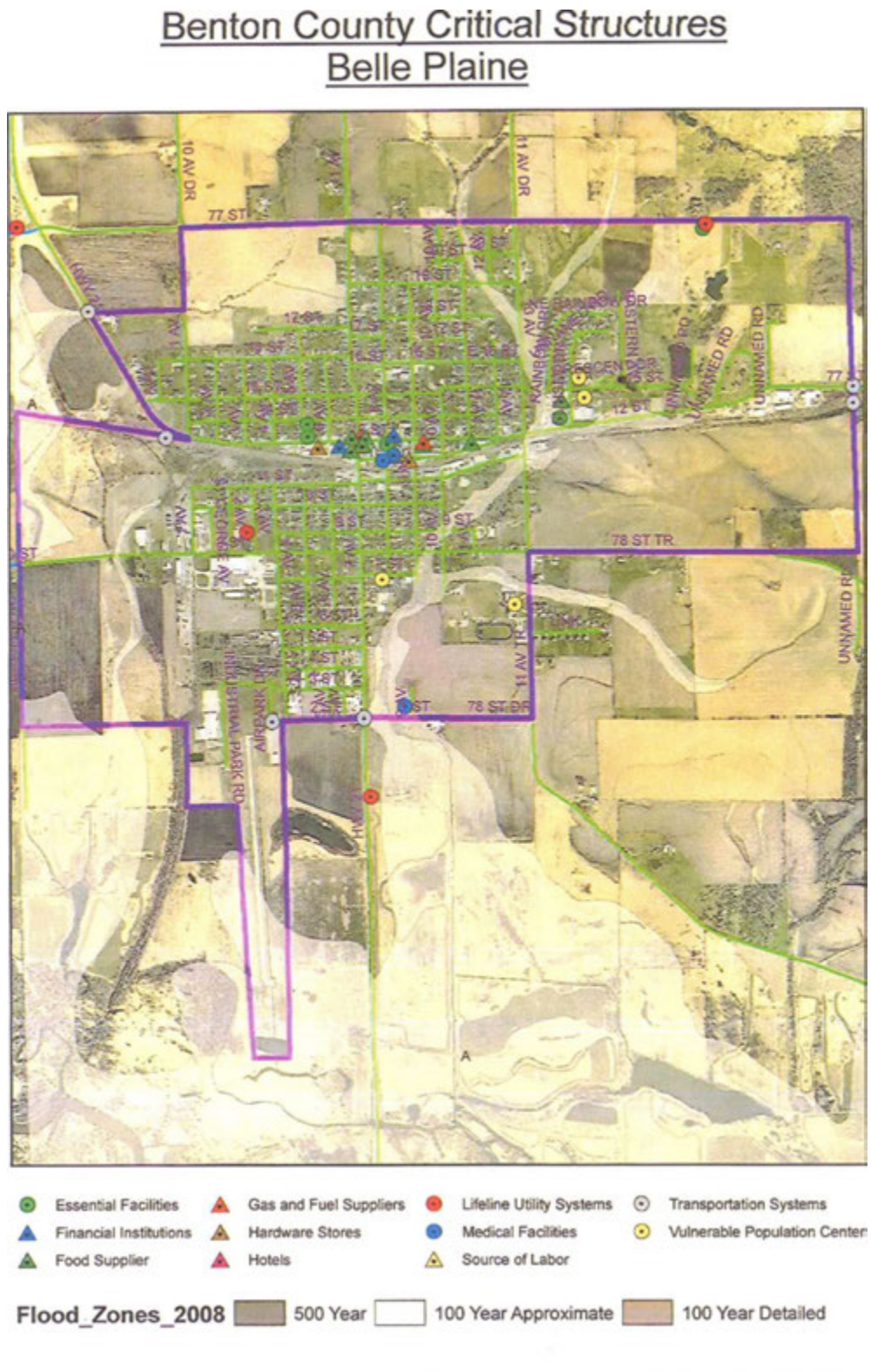


Figure 97: Blairstown Critical Facilities January 1, 2020

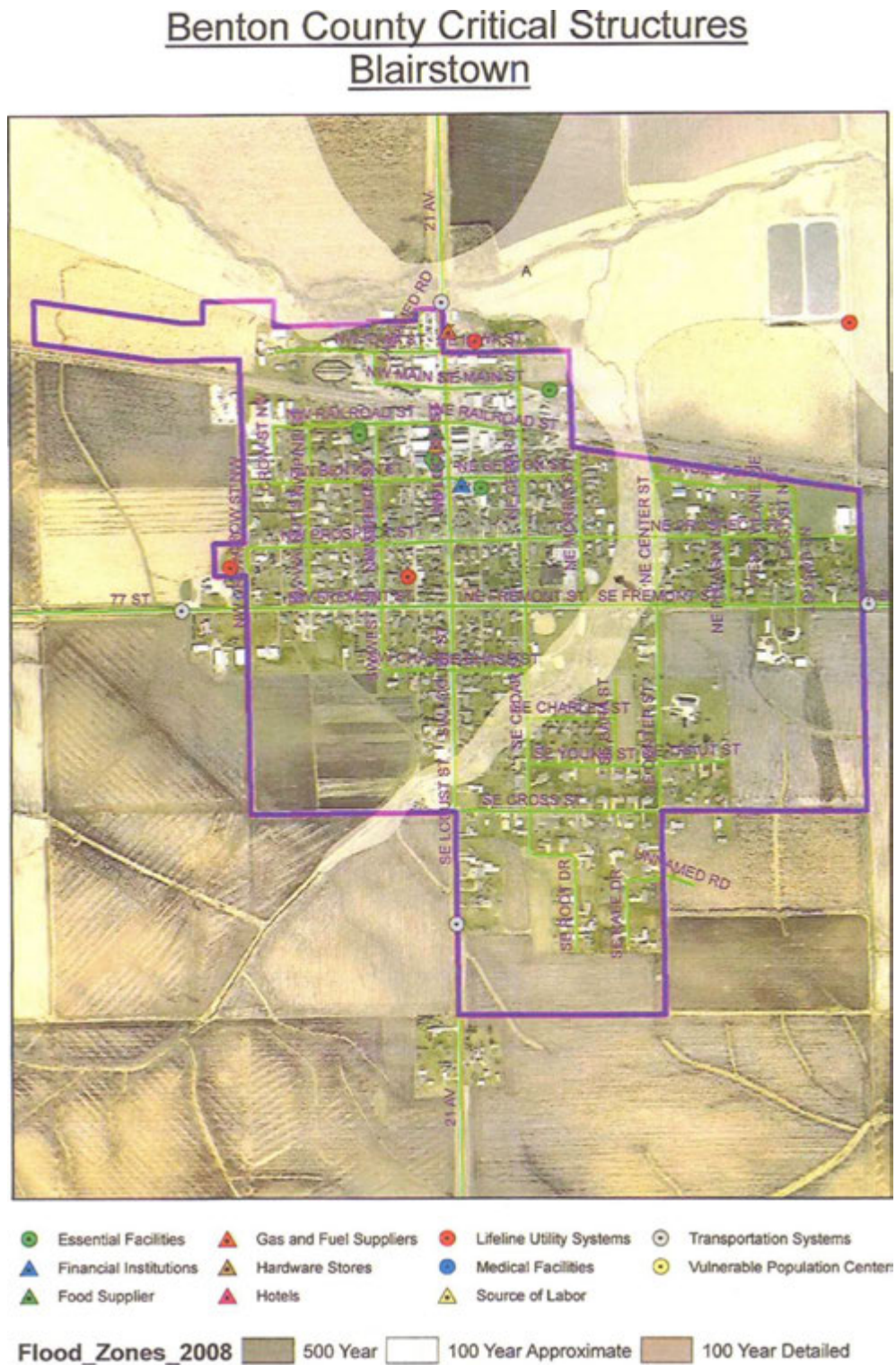


Figure 98: Garrison Critical Facilities January 1, 2020

Benton County Critical Structures Garrison

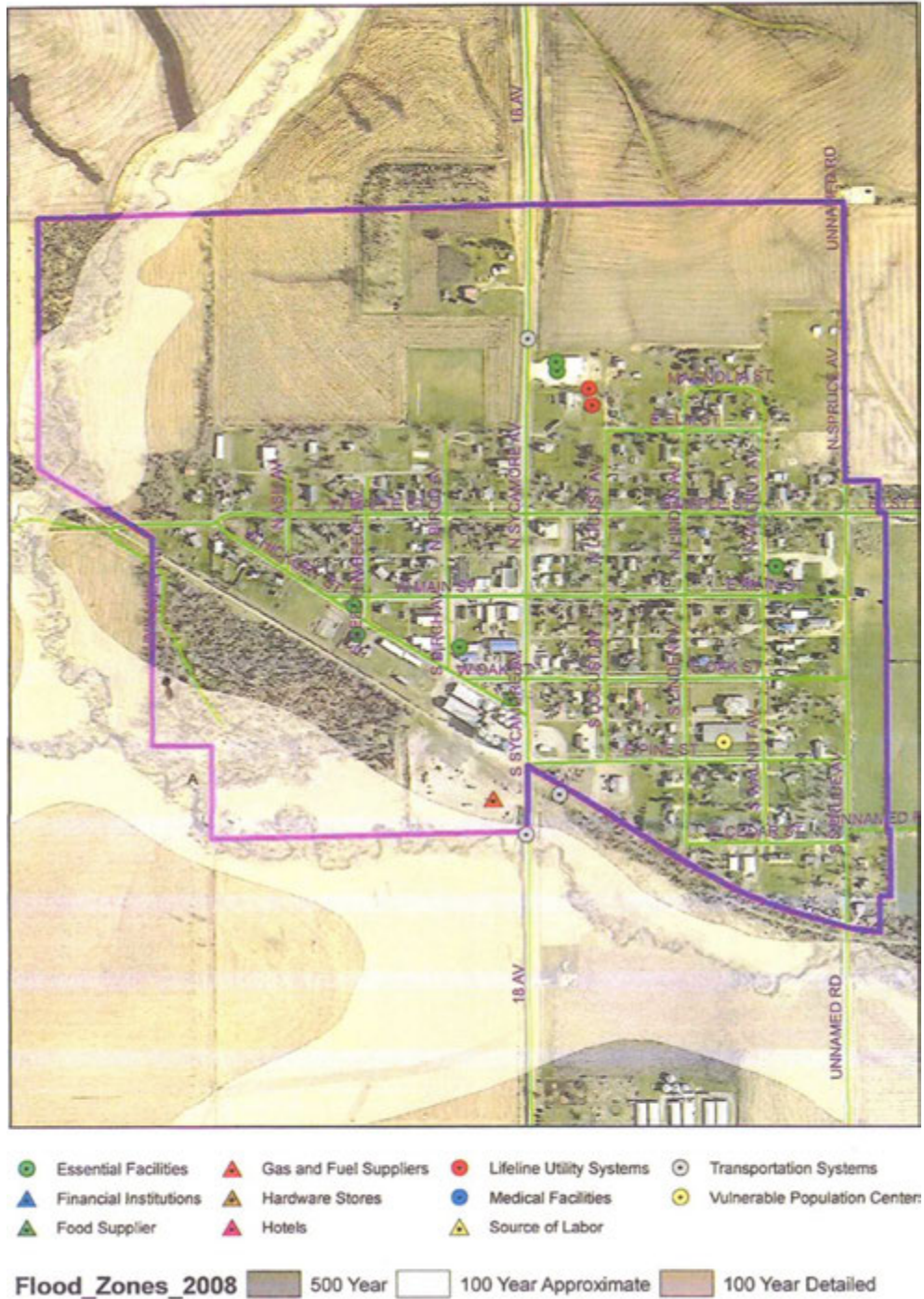


Figure 99: Keystone Critical Facilities January 1, 2020

Benton County Critical Structures Keystone

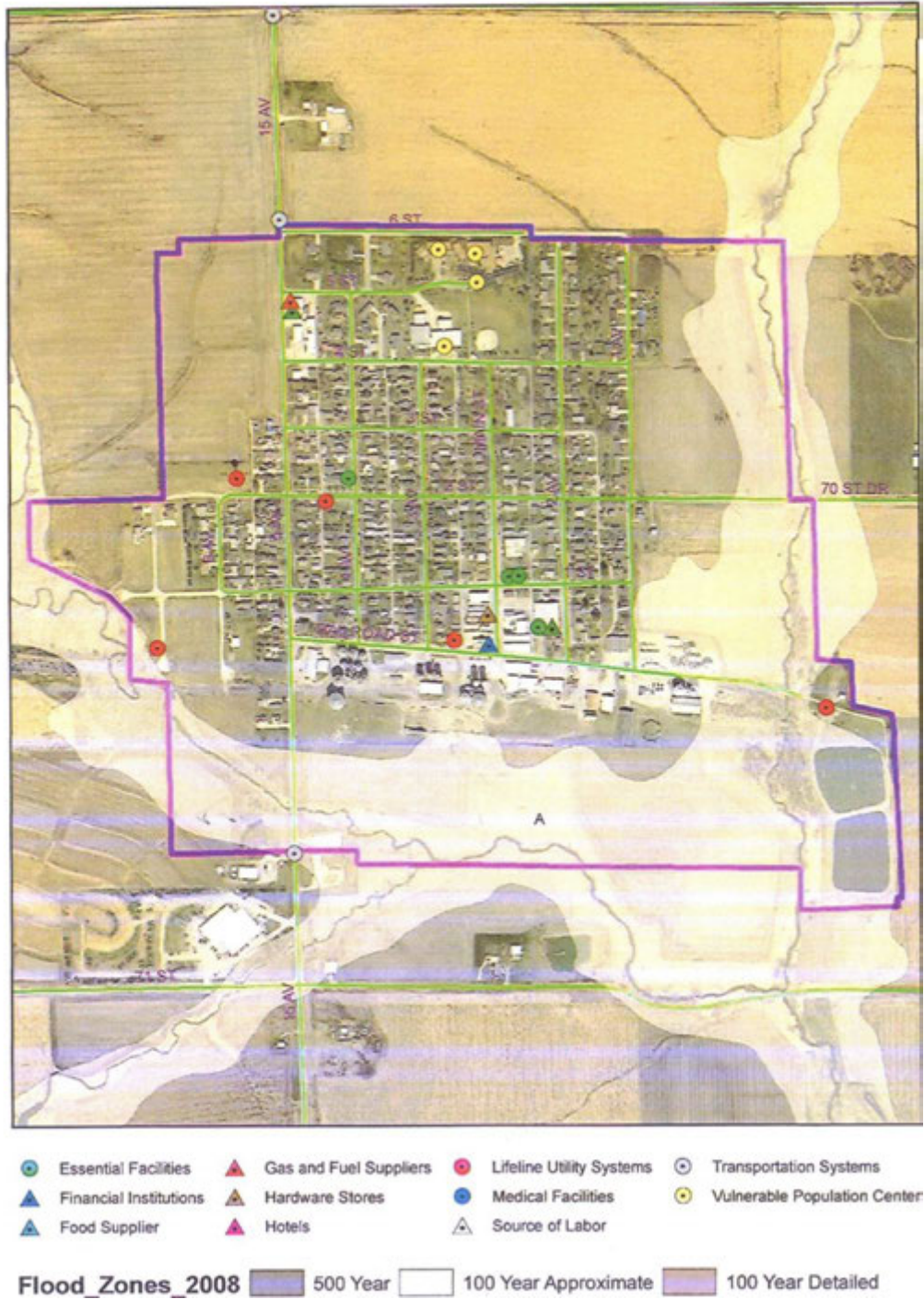
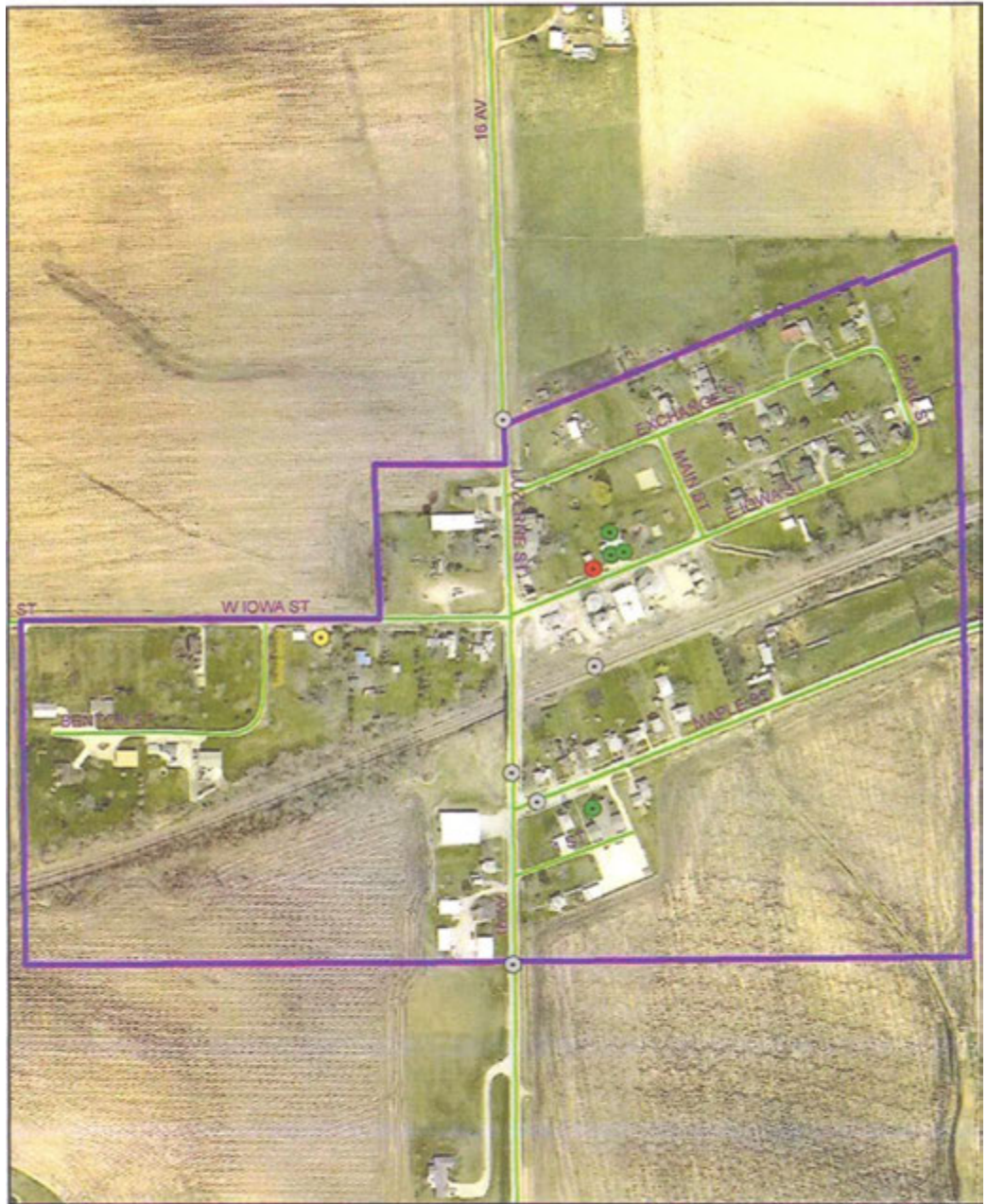


Figure 100: Luzerne Critical Facilities January 1, 2020

Benton County Critical Structures Luzerne



- | | | | |
|------------------------|------------------------|--------------------------|------------------------------|
| Essential Facilities | Gas and Fuel Suppliers | Lifeline Utility Systems | Transportation Systems |
| Financial Institutions | Hardware Stores | Medical Facilities | Vulnerable Population Center |
| Food Supplier | Hotels | Source of Labor | |

Flood_Zones_2008 500 Year 100 Year Approximate 100 Year Detailed

Figure 101: Mt. Auburn Critical Facilities January 1, 2020



Figure 102: Newhall Critical Facilities January 1, 2020

Benton County Critical Structures Newhall

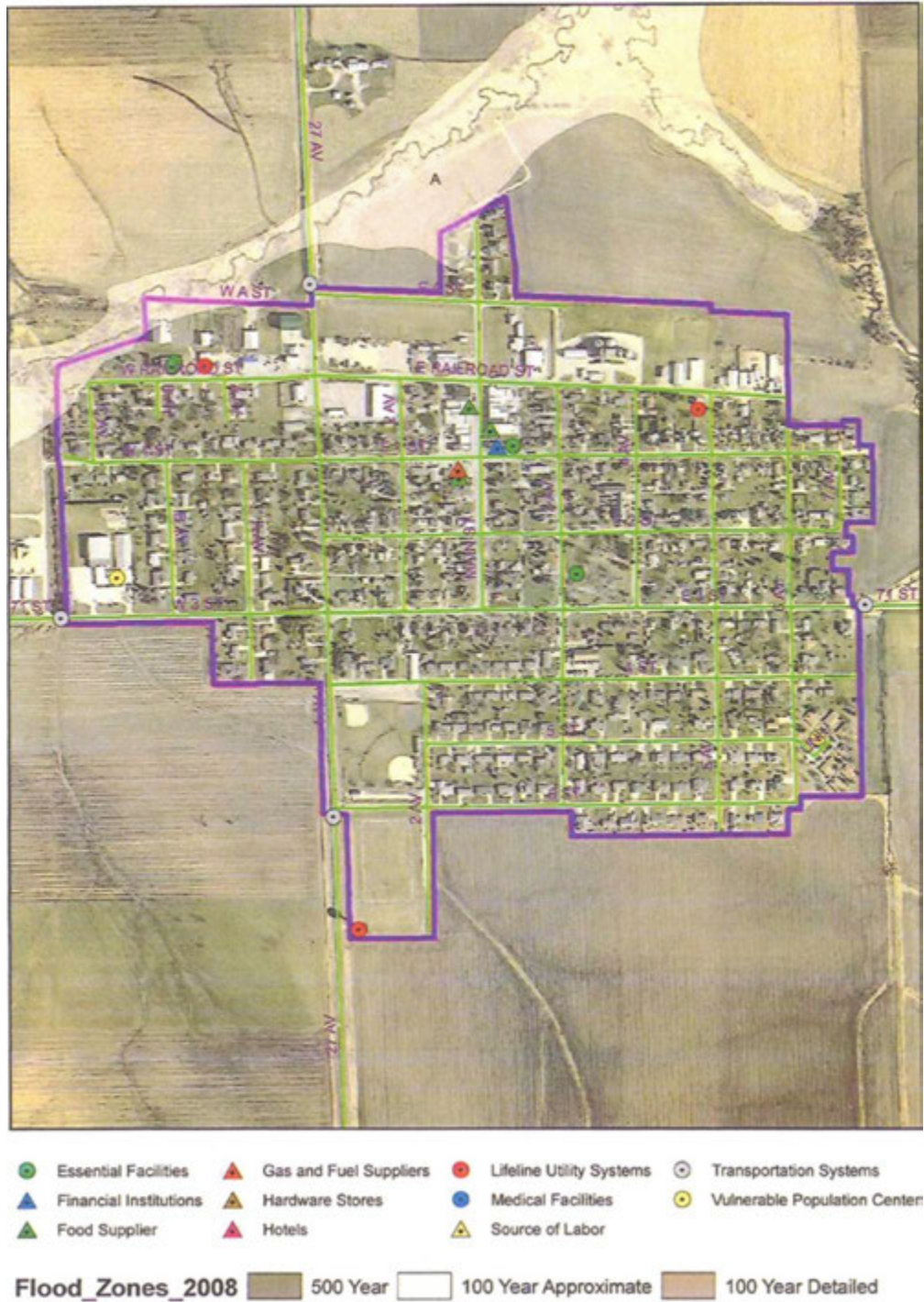


Figure 103: Norway Critical Facilities January 1, 2020

Benton County Critical Structures Norway

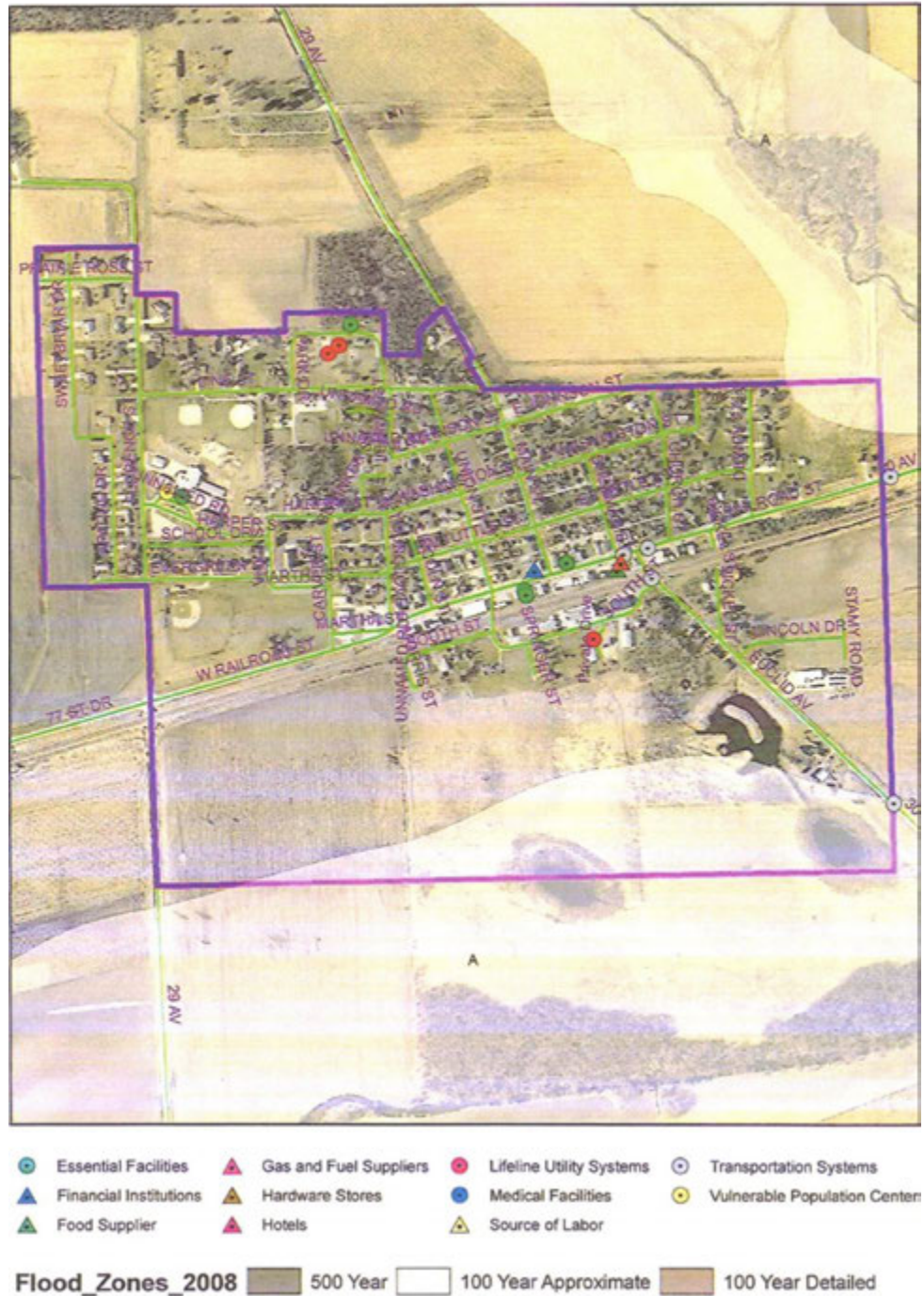


Figure 104: Shellsburg Critical Facilities January 1, 2020

Benton County Critical Structures Shellsburg

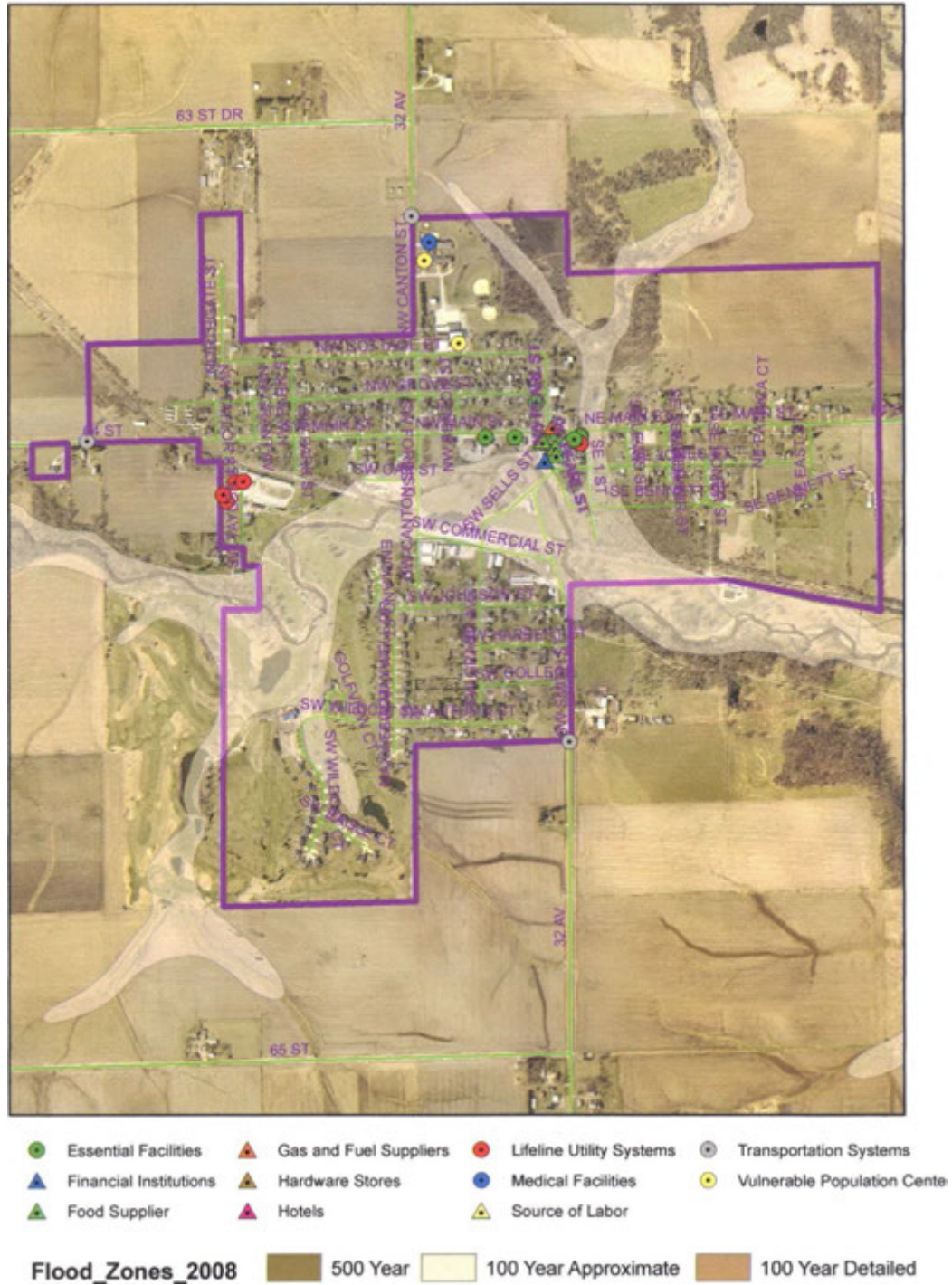


Figure 105: Urbana Critical Facilities January 1, 2020

Benton County Critical Structures Urbana

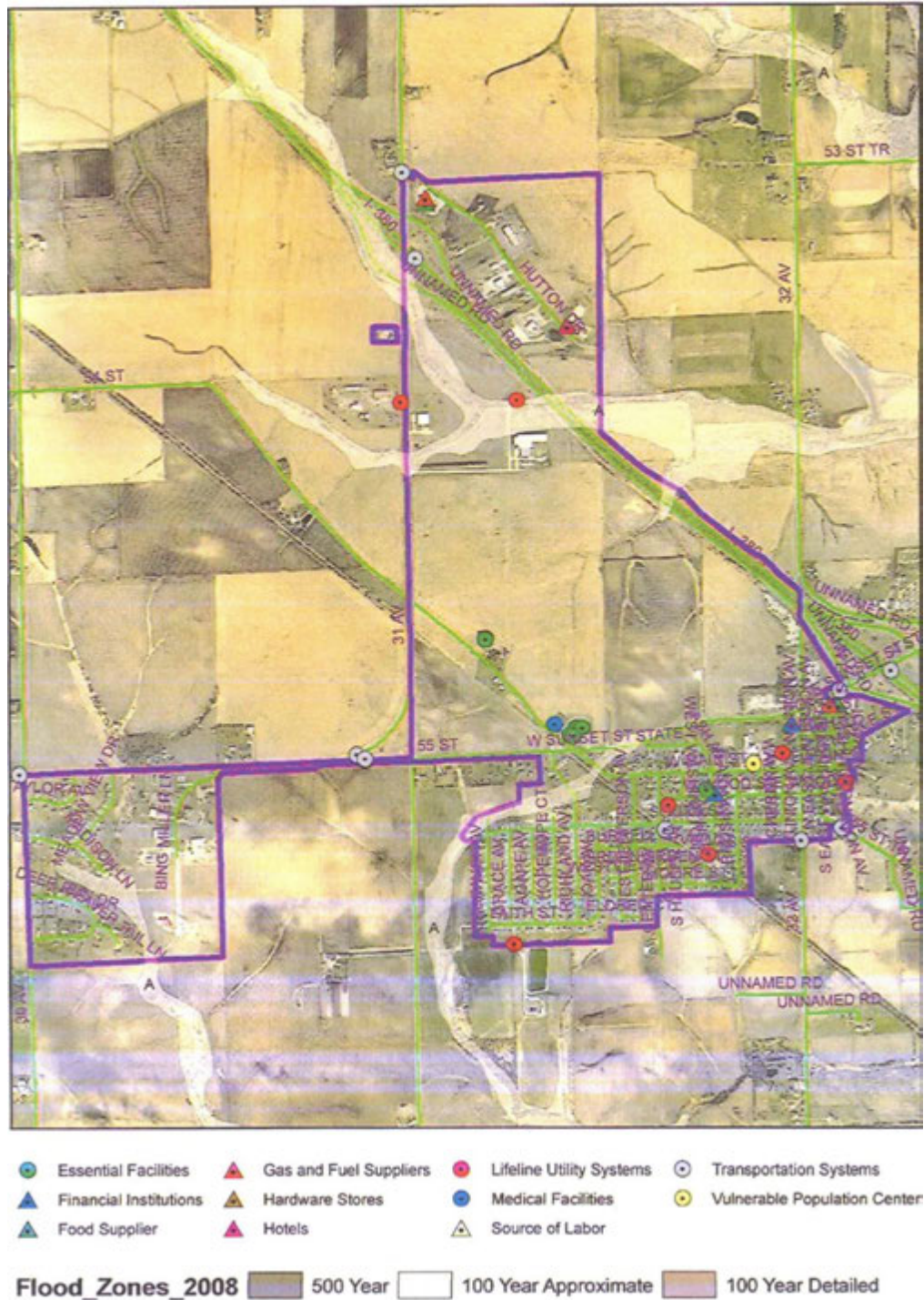


Figure 106: Van Horne Critical Facilities January 1, 2020



Figure 107: Vinton Critical Facilities January 1, 2020

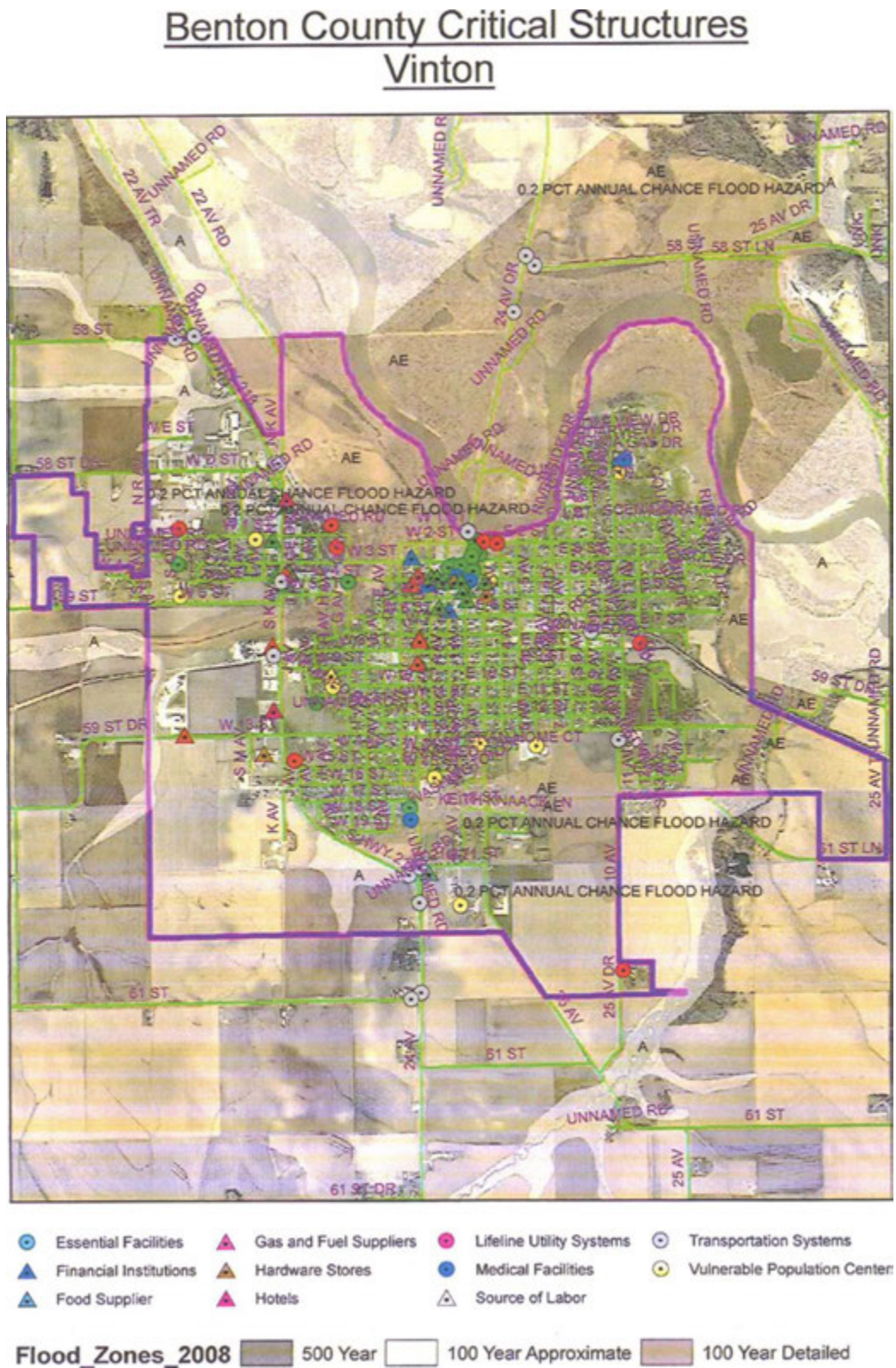
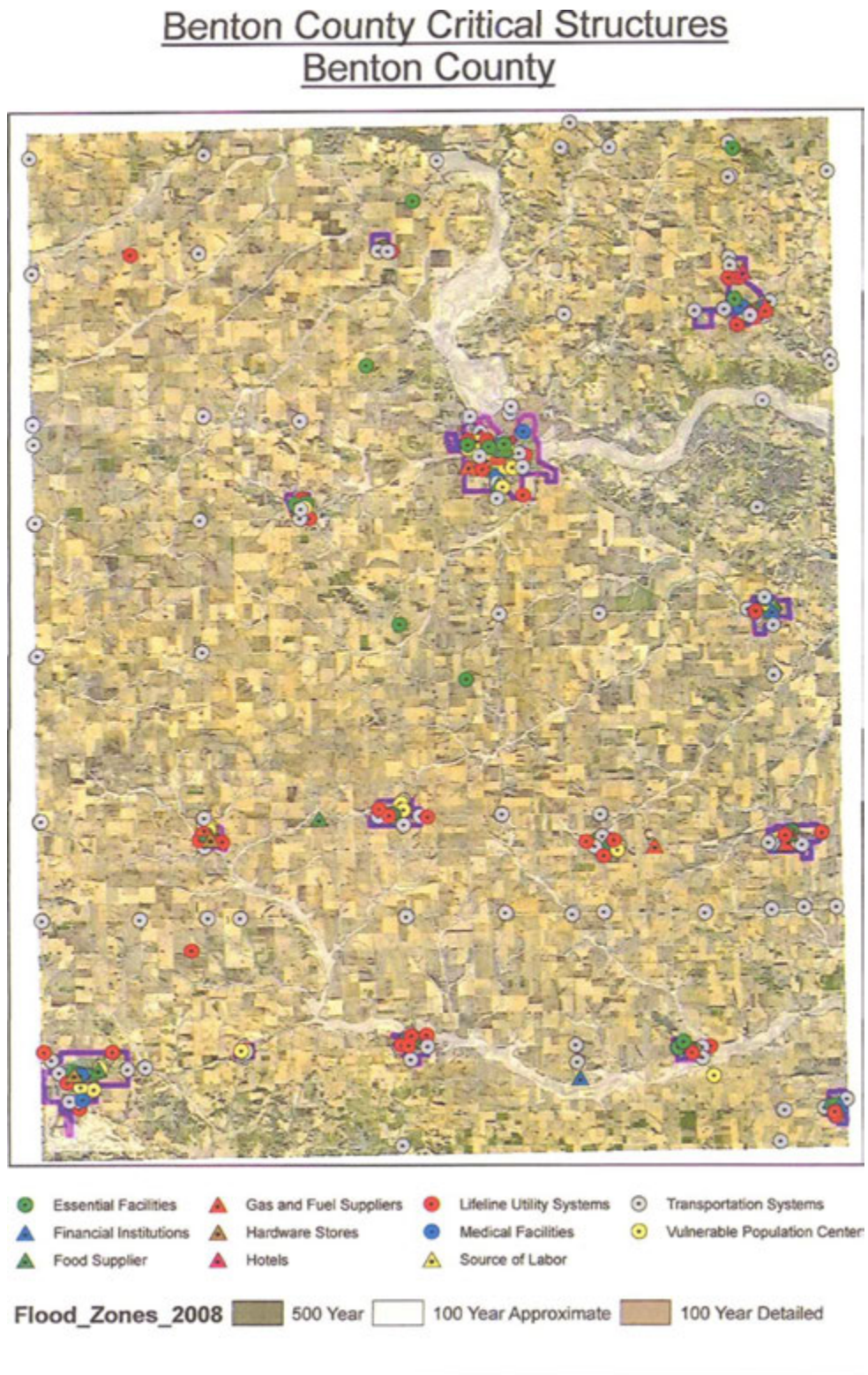


Figure 108: Walford Critical Facilities January 1, 2020

Benton County Critical Structures Walford



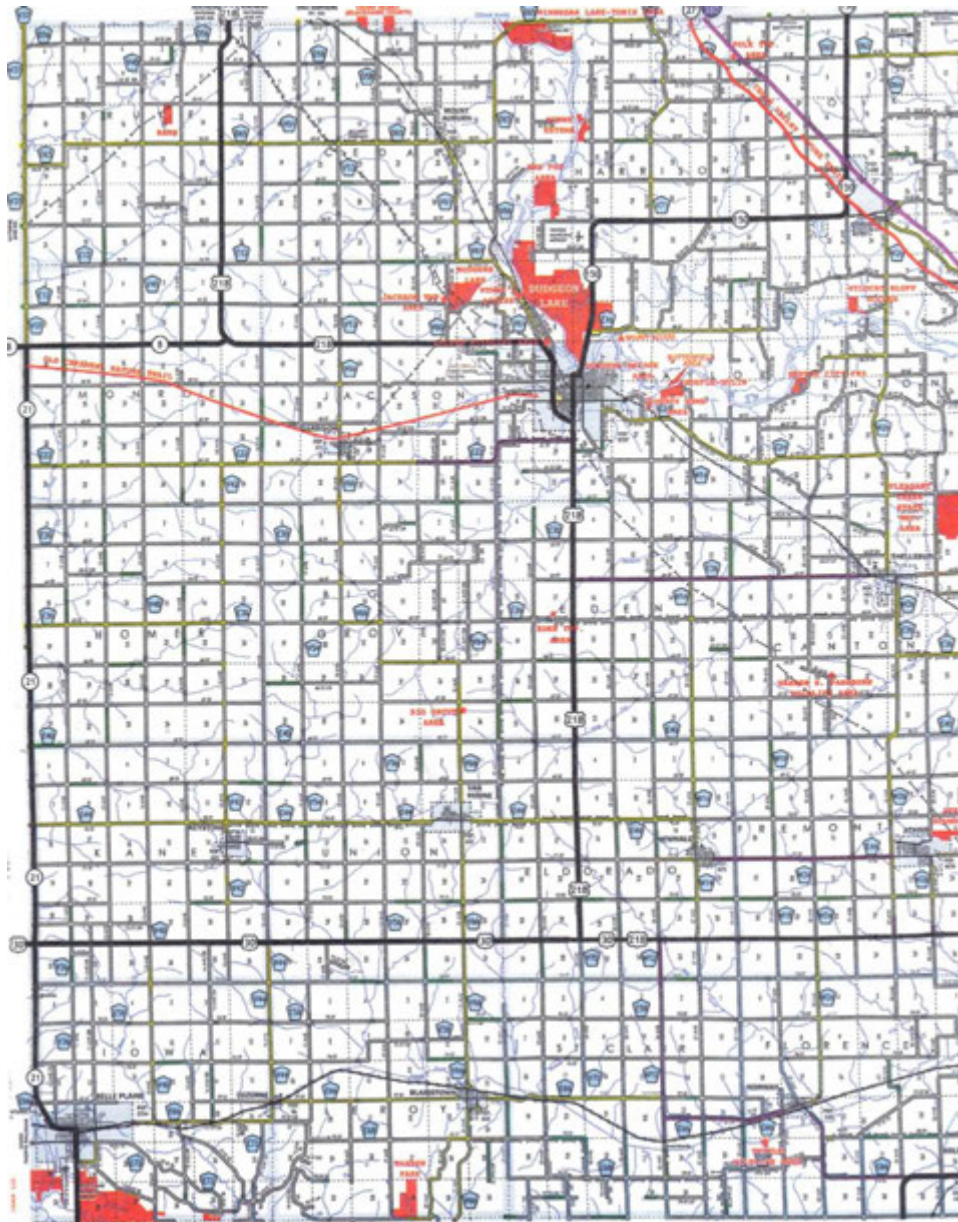
Figure 109: Benton County Unincorporated Critical Facilities January 1, 2020



PARKS AND RECREATION AREAS IN BENTON COUNT

Benton County has an extensive system of municipal, county and state parks that provide a broad array of outdoor recreational opportunities. Every community in the county has at least one park area of some sort. Some communities such as Atkins, Belle Plaine, Newhall and Vinton have two or more parks. Periods of heaviest use for the parks is during the summer months. On weekends of heaviest use, several thousand people county-wide will be using the parks and campgrounds of the county.

Figure 110: Park and recreation areas of Benton County



The map above shows the conservation and recreation areas in Benton County that are maintained by the Benton County Conservation Commission. Because Benton County is located in an area of the country where tornado risk is fairly high, people in these locations may be at an elevated risk in the event of a tornado or high wind event because of a lack of shelter. As the locations identified on the map above are all publically owned, they are all viable locations for a FEMA 361 compliant tornado safe room, and are thus considered critical facilities from that regard.

Parks and Recreation areas managed by the Benton County Conservation Commission include the following (thorough descriptions of each park are found in the profile section of this plan):

Benton City-Fry Recreation Area (River Park)

5899 29th Ave. Dr.
Vinton, IA 52349

- 39 acre river park
- 21 Campsites (16 with electric; 5 without electric)
- Pit Toilet
- Drinking water
- Boat ramp
- Fishing
- Fishing shore and river
- Picnic areas
- Shelters/pavilion
- Playground
- Hunting access during season (excluding campground)

Cedar Valley Nature Trail

10-mile Walking/biking trail in Northeast Benton County on abandoned railway. The trail connects with other trails in Black Hawk, Buchanan and Linn Counties.

Cumberland's Recreation Area:

Hwy 150 (1 mile north of Vinton)
Vinton, IA 52349

- 20 acre Recreation Area
- Shoreline fishing on oxbow lakes
- Nature appreciation
- Bird watching
- Hunting (in season)

Hannen Park

1949 Benton Iowa Rd
Blairstown, IA 52209

- 180 acre park
- 96 Campsites
- Shower facilities
- Rustic Cabin
- 50 acre fishing/boating lake
- Boat ramp
- Fishing piers and jetties
- Swimming beach
- Picnic areas
- Shelters

Hoefle-Dulin Recreation Area (River Park)

5901 27th Ave.

Vinton, IA 52349

- 62 acre river park
- 16 Campsites
- Pit toilets
- Drinking water
- Boat Ramp
- Fishing
- Picnic areas
- Hiking trails

Minne Estema Park

5261 24th Ave. Drive

Vinton, Iowa 52349

- 63 acre park
- 12 Campsites
- Pit toilet
- Drinking water
- Boat ramp
- Shelter/Pavilion
- Picnic areas
- Playground
- Hiking

Winnegar Lake Area (aka: Mt. Auburn Boat Launch)

5033 22nd Avenue

Brandon, IA 52210

- 467 acre Game Management Area
- Boat ramp
- Picnic areas
- Hiking trails
- Equestrian trail use area

Old Creamery Nature Trail

15 mile walking/hiking/biking train from Vinton to Garrison located on an abandoned Rock Island Rail Line.

Polk Township Wildlife Area

2819 51st Street

Brandon, IA 52210

- 12 acre park: Day use (no overnight camping)
- 7 acre lake
- Boat ramp
- Fishing (shoreline and boat)
- Picnic areas
- Nature appreciation (native wildflowers)
- No swimming

Rodgers Park

2113 57th Street Trail

Vinton, IA 52349-9434

- 186 peaceful acres
- 50 full-service campsites, overlooking the scenic lake
- 5 Walk-in Tent sites
- Shower house)
- 21 acre lake
- Swimming beach
- Fishing piers
- Boat ramp
- Picnic areas
- New Playground
- Enclosed and open shelter facilities
- Quiet hiking trails

Wildcat Bluff Recreation Area

57th Street Trail

Urbana, Iowa 52345

- 131 recreational area
- 30 Campsites
- 5 walk-in tent campsites
- 18 hole Disc Golf Course
- Miles of wooded, peaceful hiking trails
- Boat launch
- Picnic areas
- Playground

BENTON COUNTY HISTORICAL PROPERTIES

Benton County has 15 properties that are on the National Register of Historic Places. The only structure located in any flood hazard area is the Shellsburg Pearl Street Bridge over Wildcat Creek. Following is a listing of the 15 properties

Table 162: Benton County properties on the National Register of Historic Places

Property	Address	City	Date Listed
Central Vinton Residential Historic District	Roughly bounded by 2nd & D Avenues, W. 13th & W. 6th Streets	Vinton	11/21/2012
Belle Plaine Historic District	Belle Plaine, Iowa	Belle Plaine	10/16/2013
County Courthouse	E. 4th Street	Vinton	10/08/1976
Burlington Cedar Rapids & Northern Passenger Station	612 Second Ave.	Vinton	12/06/1990
Herring Hotel	718 13th St.	Belle Plaine	12/31/08
Iowa Canning Company Seed House Building	201 1st Ave.	Vinton	03/12/2012
McQuilkin James Greer Round Barn	CR D56	Eagle Center	06/30/1986
Ray Frank G. House & Carriage House	912 1st Ave.	Vinton	12/10/1982
Round Barn	Bruce Township Section 3 Off US 218	Eagle Center	06/30/1986
Round Barn	Bruce Township Section 6 W of US 218	La Porte	06/30/1986
Sankot Motor Company	807 13th Street	Belle Plaine	07/28/1995
Shellsburg Bridge	Pearl Street over Bear Creek	Shellsburg	6/25/98
Upper Stone Schoolhouse	E of Vinton	Vinton vicinity	07/07/1983
Vinton Public Library	510 2nd Ave.	Vinton	05/23/1983
Youngville Café	2409 73rd Street	Watkins	02/01/2007
Zalesky, Frank E. and Katie (Cherveny House)	802 9th Ave.	Belle Plaine	04/10/2012

TRANSPORTATION SYSTEMS

Highways and Roads

Interstate 380/Iowa Highway 27 crosses the northeastern corner of Benton County. Two major highways extend across the county. U.S. Highway No. 30 traverses the southern half of the county. U.S. Highway No. 218 extends east and north across the county. Several state highways and hard surfaced county roads connect these major highways to the smaller communities. Most other roads are hard surfaced or are surfaced with crushed limestone or gravel. State Highways in Benton County include Iowa Highway 8, Iowa Highway 21 and Iowa Highway 150. Benton County has 1,330 miles of rural roads maintained by Benton County Secondary Roads including 97 miles of rural primary, 216 miles of paved/hard surface secondary roads, 924 miles of rock surface secondary roads, 93 miles of earth (dirt) surface secondary roads.

Figure 111: Benton County Farm to Market Roads. Map provided by Iowa DOT.

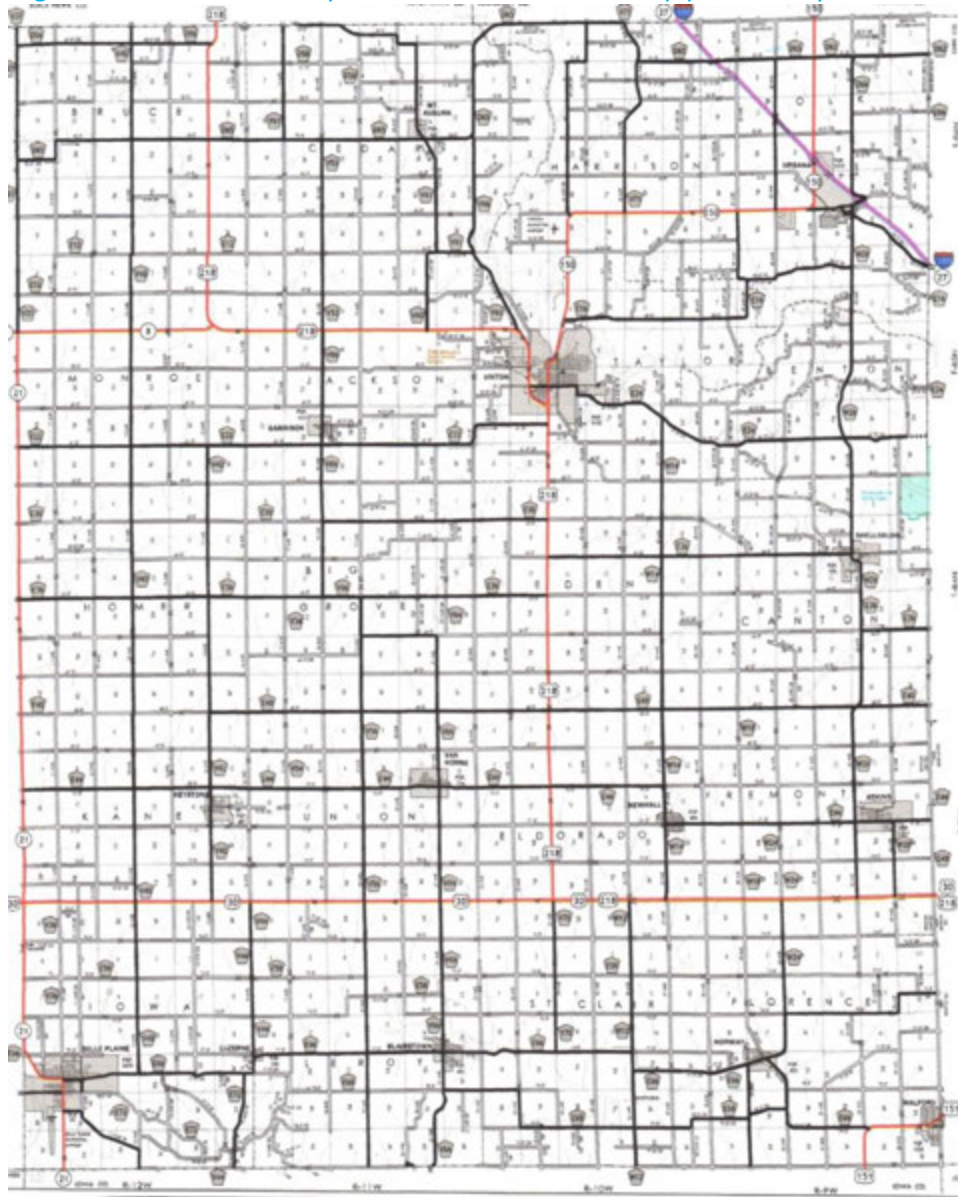
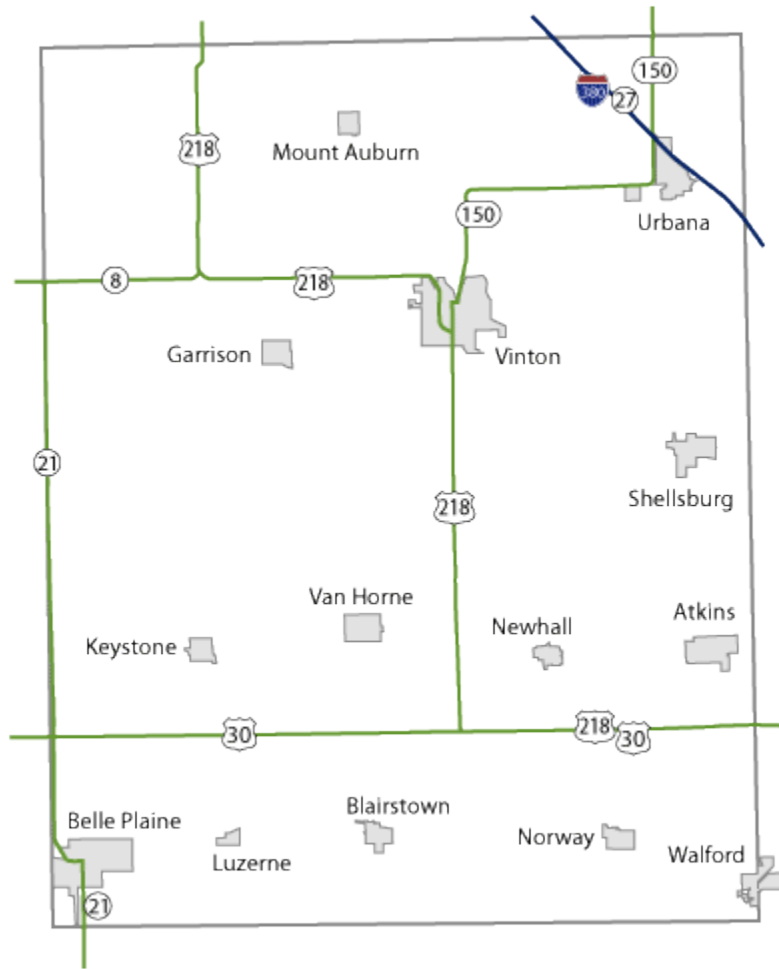
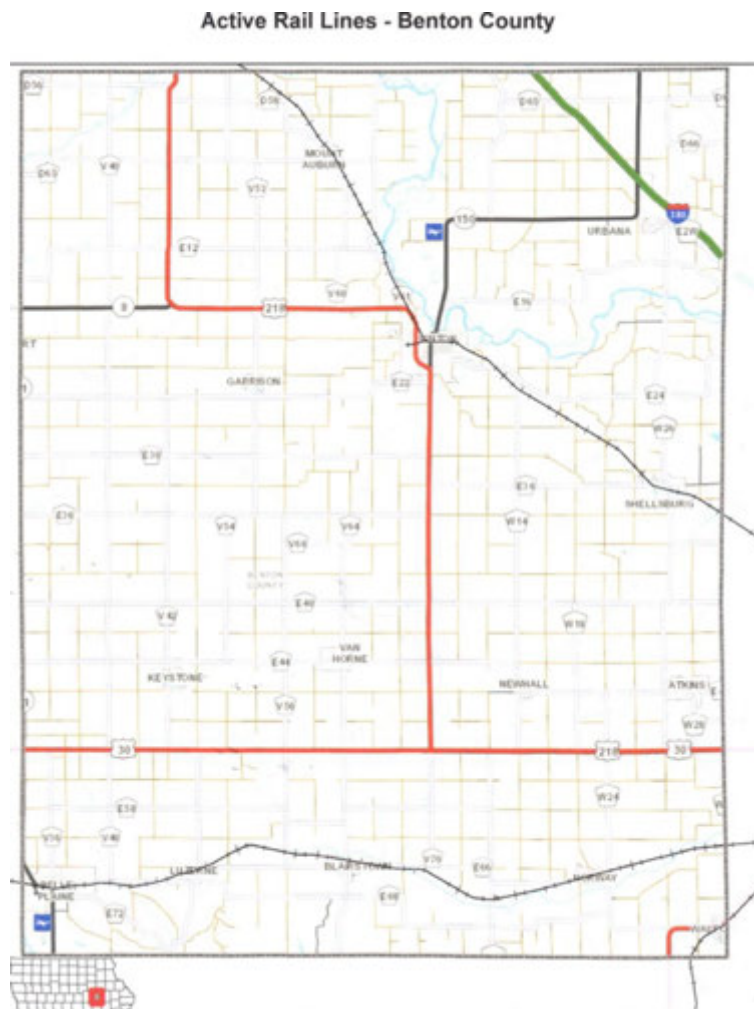


Figure 112: Major highways and interstates of Benton County. Map provided by Iowa DOT.



Railroads

Figure 113: Rail lines of Benton County. Image provided by the Iowa DNR



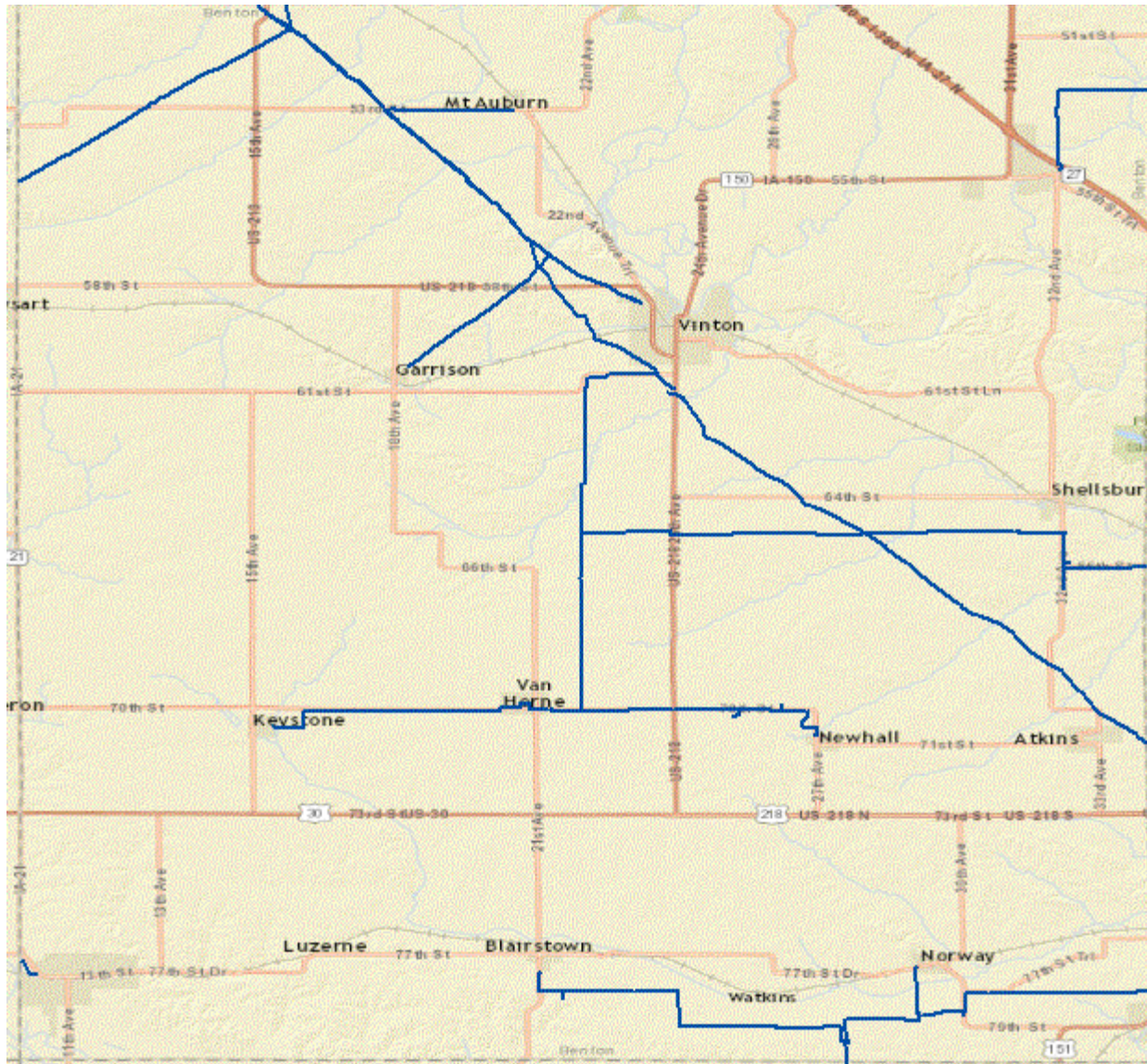
Benton County has three railroads. Nearly 100 trains per day cross the county from east to west on 24 miles of track through the cities of Belle Plaine, Blainstown and Norway on a busy double rail line operated by the Union Pacific Railroad. The Iowa Northern Railroad passes two trains daily over 25 miles of track through Mt. Auburn, Vinton and Shellsburg. Two miles of track operated by the Cedar Rapids—Iowa City Railroad pass through Walford in the southeast corner of the county.

Airports

Benton County has two airports domiciled within the county's boundaries, the Belle Plaine Airport near Belle Plaine and the Vinton Veterans Memorial Airport near Vinton. Both have 4,000 feet long runways.

LIFELINE UTILITY SYSTEMS

Figure 114: Pipelines of Benton County



ESTIMATING POTENTIAL LOSSES

Describing vulnerability in terms of dollar losses provides the communities and the State with a common framework in which to measure the effects of hazards on vulnerable structures. Plans are encouraged to include an estimate of losses for the identified vulnerable structures. This is intended to be a monetary estimate for each hazard including the value of the structure, contents and loss of function to present a full picture of the total loss for each asset.

As a guide, FEMA's Plan Review Guide and Planning Handbook recommends that structure loss is defined as a percentage of the Replacement Value x Percentage of Damage. Content loss is defined as a percentage of the Replacement Value x Percentage of Damage. Functional Losses are indirect effects that usually involve interruptions in asset operations. Because the majority of mitigation projects fundable under the Stafford Act require a detailed Benefit Cost Analysis (BCA), FEMA does have standard values available for calculating replacement value of contents and functional losses based on the type and use of the structure in question.

Where data are limited, the guidance allows planning teams to select the most likely event for each hazard and estimate the potential losses for that event. Because detailed historical records of loss values associated with many hazards were unavailable, loss estimations have only been performed for the natural hazards identified in this plan.

In addition to data collected during the planning process, this plan also references the loss estimations completed for the 2018 Iowa Hazard Mitigation Plan. The State's plan contains loss estimations completed by HSEMD for the 5 most common natural hazards: flooding, tornados, windstorms, hailstorms and winter storms. These loss estimates were categorized by type of damage where data was available. The primary source of data relating to weather patterns was the NCDC, and data associated with flooding primarily came from the previous plan and information provided by the Iowa DNR.

Also of note is that according to the 2018 Iowa Hazard Mitigation Plan, there are no state owned buildings in Benton County.

Flooding—River and Flash Flooding

According to the 2013 Iowa Hazard Mitigation plan, annual losses from flooding in Benton County (both river and flash flooding) are estimated at \$7,830,000 or \$305 per person (2013 Census estimate). Due to changes in data collection methodology, no comparative data could be found for the 2021 plan, though the 2018 State of Iowa Hazard Mitigation Plan did state that between 1991 and 2017 there were 2 riverine flood events in Benton County that caused between \$500,000 to \$600,000 in damages. Flash flooding damage for the county was less than \$250,000 annually.

For values of property located in identified flood hazard areas broken down by jurisdiction, please see the tables in the section Assessing Vulnerability: Building Stock; Flood, pages 334-340. Additionally, multiple jurisdictions reported loss of all or part of their wastewater service during flood events due to floodwaters inundating components of their wastewater treatment systems. Based on the current FEMA BCA loss of service values of \$45/person/day for the population of each community, the following economic losses could apply on a per-day basis for disruption of wastewater services:

Table 163: Economic Impact of Loss of Wastewater Services

Atkins	\$43,965
Belle Plaine	\$129,510
Blairstown	\$31,140
Garrison	\$16,695
Keystone	\$27,990
Luzerne	No Flood Hazard Area
Mt. Auburn	No Flood Hazard Area
Newhall	\$39,375
Norway	\$24,525
Shellsburg	\$44,235
Urbana	\$65,610
Van Horne	\$30,690
Vinton	\$236,565
Walford	\$65,835
Benton County Unincorporated	\$390,510

Regarding Benton County Unincorporated area residents, the majority of them rely on private septic systems for their wastewater management. Of these residents, as documented on page 223 of this plan, only 11% are within a flood hazard area, meaning that the most realistic economic impact of flooding would be a maximum of \$93,722.

An additional statistic that can be looked at to estimate potential flood losses is flood insurance that is in force. According to NFIP (National Flood Insurance Program) statistics there were a total of 155 flood insurance policies in force in all of Benton County on April 30, 2015. These policies were as follows:

Table 164: Benton County Flood Insurance in Force

Community Name	Policies In-force	Insurance In-force	Written Whole \$ Premium In-force
Benton County	35	\$5,765,000	\$23,562
Atkins	2	\$560,000	\$850
Belle Plaine	9	\$472,300	\$3,741
Blairstown	4	\$207,000	\$2,378
Newhall	1	\$70,000	\$851
Norway	4	\$560,000	\$1,351
Shellsburg	10	\$2,126,400	\$10,045
Urbana	1	\$210,000	\$356
Vinton	78	\$10,280,200	\$66,413
Walford	11	\$2,022,000	\$5,800
County Total	155	\$22,292,900	\$115,347

It is also significant to note that of the 18 Presidentially Declared Disasters that have occurred in Benton County, eight have involved flooding.

Extreme Heat

National Climatic Data Center records indicate 4 incidents of heat waves or excessive heat conditions that affected Benton County since January 1, 1994. The most damaging extreme heat event on record for the area occurred in July of 1995, causing \$3.8 million in property damage state wide. Three deaths were also attributed to the heat, though none occurred in Benton County. Livestock damages were estimated at \$31 million statewide for 1995, comprising the deaths of an estimated 4,000 cattle, 370 hogs, 1,250,000 chickens and 250,000 turkeys. Little crop damage was reported. Although statewide damages are difficult to scale appropriately to the planning area, dividing the totals reported equally by county would yield property damages of approximately \$40,000 and agricultural losses of \$50,000 to \$60,000 for an extreme heat event. This information was taken from the 2013 State of Iowa Hazard Mitigation Plan, the most up-to-date information that could be found.

An excessive heat incident which impacted Benton County on July 19, 1999 is shown as having caused 12 heat related injuries or illnesses in the county.

Planning committees also noted that extreme heat often results in high use of electricity, which can occasionally cause outages or brownouts. Based on the current FEMA BCA loss of service values of \$131/person/day for the population of each community, the following economic losses could apply on a per-day basis for disruption of electrical services:

Table 165: Economic Impact of Loss of Electrical Services per day

Atkins	\$219,700
Belle Plaine	\$331,954
Blairstown	\$90,652
Garrison	\$48,601
Keystone	\$81,482
Luzerne	\$12,576
Mt. Auburn	\$19,650
Newhall	\$114,625
Norway	\$71,395
Shellsburg	\$128,773
Urbana	\$190,998
Van Horne	\$89,342
Vinton	\$688,667
Walford	\$191,653
Benton County Unincorporated	\$1,136,818

A disruption of electrical services may not affect an entire community or all of the rural area and may be isolated to areas with aged or inadequate electrical infrastructure that is more vulnerable to the influence of extreme heat.

As with many health-related concerns, the very young and the very old are at greatest risk, as are people with disabilities and certain conditions that limit the ability of the body to regulate its temperature, and people under the influence of drugs or alcohol or who otherwise may be more likely to experience dehydration or impaired judgment. Additionally, people at lower incomes are less likely to have access

to or the ability to pay for temperature regulation such as air conditioning. The following numbers are people who are at risk by age, because of disabilities or potentially at risk due to their income level:

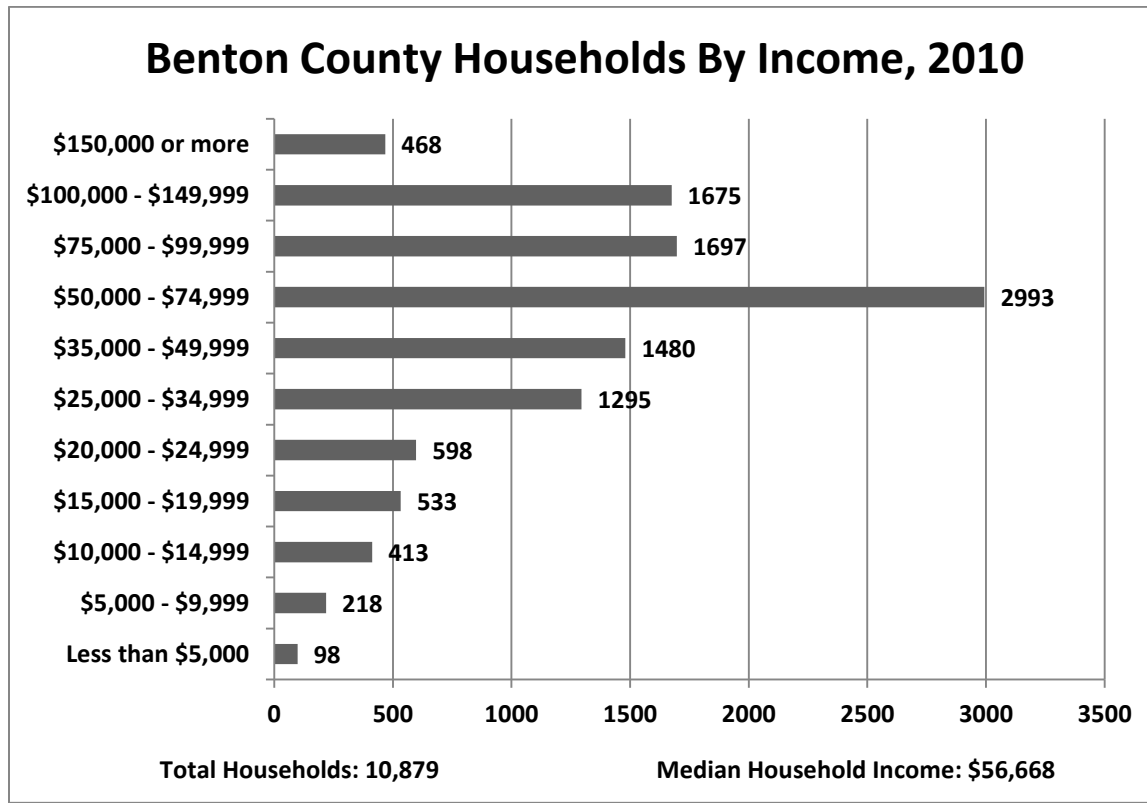
Table 166: Vulnerability by age in Benton County

Atkins	522	31	166	10
Belle Plaine	595	23	483	19
Blairstown	178	26	118	17
Garrison	91	24	50	13
Keystone	149	24	152	24
Luzerne	18	24	8	8
Mt. Auburn	36	24	34	16
Newhall	224	26	153	17
Norway	126	23	107	20
Shellsburg	205	21	190	19
Urbana	470	32	111	8
Van Horne	175	26	113	17
Vinton	1299	25	1027	20
Walford	488	33	77	5
Unincorporated	4576	18	2789	11
Benton County Total	5781	22	4015	15
Iowa	7716011	24	466169	15

Table 167: People with disabilities in Benton County

COMMUNITY	NUMBER OF PEOPLE WITH DISABILITIES	% OF POPULATION
Atkins	117	6.2%
Belle Plaine	550	20.9%
Blairstown	34	2.7%
Garrison	47	15.2%
Keystone	92	14.7%
Luzerne	6	7.1%
Mt. Auburn	9	6.5%
Newhall	89	11.1%
Norway	46	7.2%
Shellsburg	134	13.7%
Urbana	81	5.8%
Van Horne	70	9.7%
Vinton	925	18.1%
Walford	52	3.4%
Benton County Unincorporated	941	11.7%
Benton County Total	3,193	12.4%

Figure 115: Households by Income



No record of the value of structural losses could be located. Losses to structures such as buildings are highly unlikely in an extreme heat event. However, transportation infrastructure can be damaged by extreme heat conditions, especially when combined with very wet conditions. Roadways can buckle and pop during the heat, and the result of this would be costs associated with fixing the road, as well as potential travel delays and possible damage to vehicles if motorists drive over damaged roadways or if vehicles are hit by debris in the road. The 2010 State of Iowa Hazard Mitigation Plan estimates that Benton County has an annual loss of \$3,000 due to Extreme Heat. The 2013 State of Iowa Hazard Mitigation Plan did indicate any losses.

Thunderstorm/Lightning/Hail

Thunderstorm and lightning events are quite common throughout the summer months in the planning area; yet do not normally cause reportable damage. When damage does occur, it may be caused by high winds, heavy rainfall or lightning striking an object. The damaging effects of heavy rainfall typically results in flash flooding, a hazard that is addressed separately.

Thunderstorms can vary substantially in scale, which means that losses associated with thunderstorms are also variable. National Climatic Data Center statistics document 290 thunderstorm events in Benton County Between 8/4/1961 and 6/3/2014. The cumulative total of all damages caused by these storms is \$4,962,000 in property damages and \$15,257,000 in agricultural crop damages. This is an average of \$17,110 in property damage and \$52,610 in crop damages per storm. The largest property loss was \$2,677,000 county-wide on 7/11/2011. The largest reported crop damage was \$15,100,000 in the Garrison area on 8/10/2006. Seven injuries are also recorded as having occurred due to these storms.

Table 168: Historical Thunderstorms by Jurisdiction in Benton County as reported by the NCDC

JURISDICTION	NUMBER	TOTAL PROPERTY LOSS
Unincorporated Areas	63	\$1,293,000
Atkins	18	\$127,000
Belle Plaine	29	\$186,000
Blairstown	1	0
Garrison	24	\$1,134,000
Keystone	24	\$128,000
Luzerne	3	\$1,000
Mt. Auburn	18	\$324,000
Newhall	12	\$5,000
Norway	12	\$9,000
Shellsburg	13	\$100,000
Urbana	11	\$930,000
Van Horne	17	\$262,000
Vinton	\$35	\$435,000
Walford	1	\$7,000

Considering that the \$2,677,000 loss incurred from the 7/11/2011 windstorm represented .2% of the property value in Benton County at the time, applying the same level of loss when to Benton County jurisdictions using current property values would yield the following potential losses:

Table 169: Potential Thunderstorm Loss Estimates

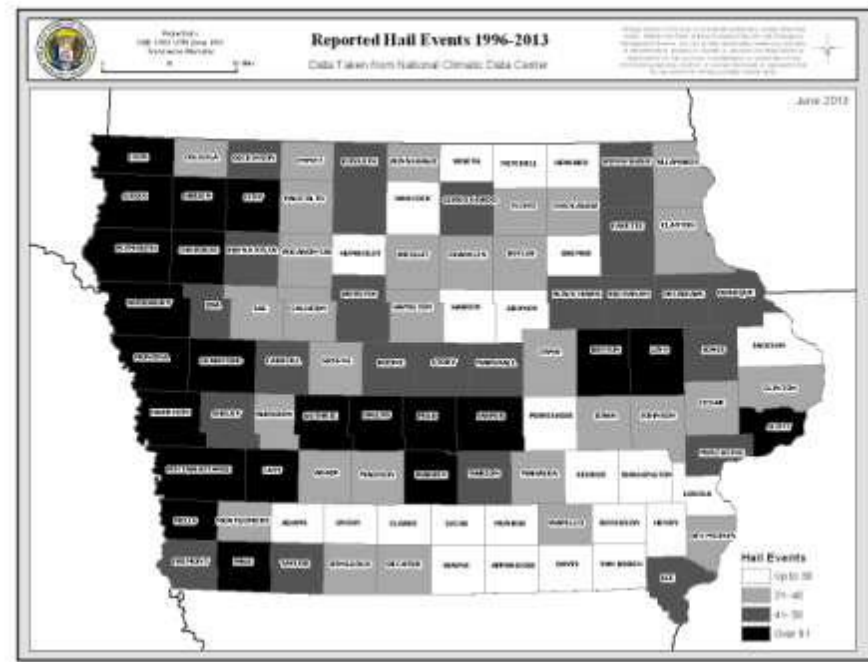
JURISDICTION	THUNDER STORM LOSS ESTIMATE
Unincorporated Areas	\$2,997,756
Atkins	\$407,332
Belle Plaine	\$219,164
Blairstown	\$74,457
Garrison	\$24,587
Keystone	\$65,814
Luzerne	\$6,255
Mt. Auburn	\$9,522
Newhall	\$97,990
Norway	\$54,168
Shellsburg	\$109,712
Urbana	\$179,342
Van Horne	\$80,705
Vinton	\$504,806
Walford	\$129,127

NCDC records indicate 200 hailstorm events in Benton County from 7/19/1963 to 5/20/2014 causing a reported \$2,888,000 in property damages and \$799,000 in crop damages. This is an average of \$14,400 in property damage and \$3,995 in crop damage per storm. One hailstorm had hail 4 inches in diameter; two--3 inches in diameter; three--2 ¾ inches in diameter; one—2 inches in diameter and 31—1 ¾ inches in diameter.

Table 170: Historical Hailstorms by Jurisdiction as reported by the NCDC

JURISDICTION	NUMBER	TOTAL PROPERTY LOSS
Unincorporated Areas	26	
Atkins	12	\$16,000
Belle Plaine	15	0
Blairstown	6	\$3,000
Garrison	15	\$515,000
Keystone	18	\$559,000
Luzerne	2	0
Mt. Auburn	6	\$55,000
Newhall	6	\$32,000
Norway	11	\$7,000
Shellsburg	14	\$13,000
Urbana	11	\$1,504,000
Van Horne	24	\$22,000
Vinton	25	\$74,000
Walford	7	\$78,000

Figure 116: Reported Hail Events in Iowa 1996-2013 from the State of Iowa 2013 Hazard Mitigation Plan



Because the unincorporated areas of the county are much less densely populated, applying the damage rate found in Urbana to the total value of structures in the unincorporated areas would not provide an accurate picture of possible damages. Instead, a more likely scenario is that damages in the unincorporated areas would occur in a localized area not the entire county and would approximate those found in one of the smaller Benton County cities.

According to the 2013 Iowa Hazard Mitigation Plan, the annual expected hailstorm related losses in Benton County are \$163,000. This equates to \$6.34 per person per year in hail related damages.

Damage associated with lightning occurs much less frequently than damage from high winds. Only one damaging lightning event is recorded by the NCDC as having occurred in Benton County. This event took place in Vinton on 8/10/2006 and caused \$500 in property damage. A review of lightning events recorded in neighboring counties revealed that damages in the \$10,000 to \$20,000 range are common when lightning does not cause a fire, and only damages the electrical system of the affected building. However, when a fire does occur, damages are much higher, and records show that the complete loss of one building has occurred multiple times, and in some cases neighboring structures were also damaged. Based on average property values in the participating communities, and the FEMA standard contents value of a home as 50% of the total building replacement value, the following losses could be expected if lightning were to cause a structural fire:

Table 172: Potential Lightning Loss Estimates

	STRUCTURAL LIGHTNING LOSS ESTIMATES
ATKINS	\$93,550
BELLE PLAINE	\$41,150
BLAIRSTOWN	\$46,950
GARRISON	\$29,800
KEYSTONE	\$46,600
LUZERNE	\$53,900
MT. AUBURN	\$29,250
NEWHALL	\$62,900
NORWAY	\$50,600
SHELLSBURG	\$59,650
URBANA	\$72,900
VAN HORNE	\$58,350
VINTON	\$51,550
WALFORD	\$107,400
BENTON COUNTY UNINCORPORATED	\$65,750

Grass or Wildland Fire

Wildfires in Iowa are tracked through the NFIRS reporting system maintained by the State of Iowa Fire Marshall's Office. Due to terrain and vegetation features, wildfires in Iowa generally are not as severe as those experienced in western states, though when dry or windy conditions prevail, wildfires that burn several hundred acres can occur. The major threat of a wildfire is spread to structures as evidenced by a 4/10/2014 wildfire involving crops and wildlands near Vinton that caused structural damages of \$200,000.

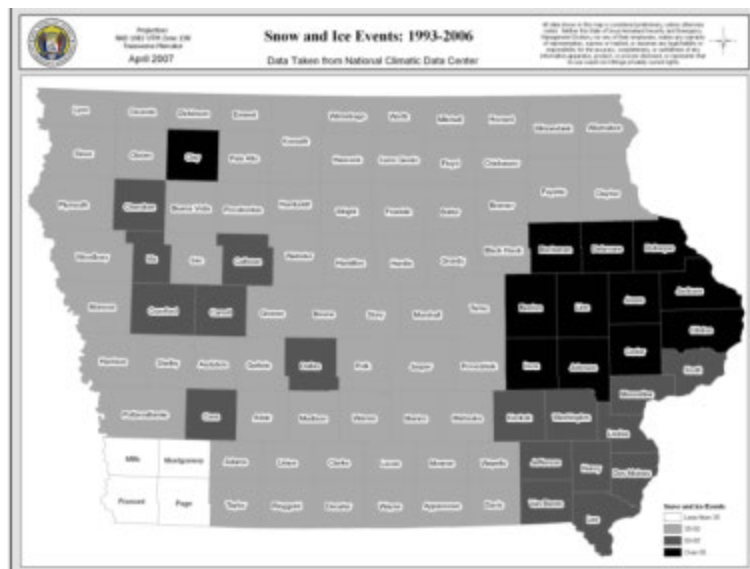
In Benton County grass and wildfires reported to the State of Iowa Fire Marshall's Office by Benton County fire departments include 60 in 2014 that caused \$220,000 in property damage, 24 in 2013 that caused \$21,000 in property damages, 93 in 2012 that caused \$32,500 in property damages; 66 in 2010 that caused \$5,600 in property damages and 27 in 2009 that caused \$1,000 in property damages. Based on this data, the average wildfire in Benton County will cause \$962 in damages and will burn 18.2 acres.

Severe Winter Storm

The National Climatic Data Center documents 89 severe winter storm events that have been reported to impact Benton County from 1996 to 2014. All events were documented as county-wide. This is an average of five events per year. These events caused \$2,123,500 in damages. There were no deaths, injuries; property or crop damages attributed to the winter storms. Eight winter storm related Presidential Declarations for Major Disaster have been declared in Iowa since 1991. All of these events were recorded as county-wide.

According to the State Hazard Mitigation Plan, the planning area (central eastern portion of the state) receives more winter storms than most other parts of the state, as detailed on the following map.

Figure 117: Snow and Ice Storms Across the State



The 2010 State of Iowa Hazard Mitigation Plan estimated that Benton County has an annual loss of \$202,438 due to Severe Winter Storms. This would be an average of \$8 per person. The 2013 State of Iowa Hazard Mitigation Plan did not provide an estimate for Benton County. Damages reported by NOAA per storm ranged from \$0 to \$2,100,000 for a February 24, 2007, ice storm, which equates to \$82 per person.

According to the 2007 Iowa Hazard Mitigation Plan, annual losses associated with severe winter storms in Benton County amount to \$88,164, or \$4 per person, which is also the median per-person value figured by county in the state. The most recent Iowa Hazard Mitigation Plan (2013) does not contain any information about the annual losses associated with winter storms for Benton County.

The planning committees determined that power outages and traffic accidents were the two most common problematic events resulting from a severe winter storm event. According to the DOT, the following winter weather related traffic accidents occurred in Benton County from 2010 to 2014:

Table 173: 2010 - 2014 Reportable Crash History for Rural, Icy, Snowy, Slushy Surface Condition-related accidents in Benton County.

YEAR	TOTAL CRASHES	FATAL	MAJOR	MINOR	POSSIBLE/ UNKNOWN	PROPERTY DAMAGE ONLY	TOTAL INJURIES	FATALITIES	MAJOR	MINOR	POSSIBLE	UNKNOWN	ESTIMATED PROPERTY DAMAGE	NUMBER OF VEHICLES
2010	29	0	1	0	7	21	10	0	1	0	9	0	\$254,600	38
2011	23	0	2	2	5	14	10	0	2	2	6	0	\$118,500	28
2012	22	0	1	3	4	14	9	0	1	4	4	0	\$182,950	26
2013	26	1	0	3	6	16	17	1	1	7	8	0	\$224,450	34
2014	44	0	1	8	12	22	31	0	1	12	18	0	\$397,700	65
Totals	144	1	5	17	34	87	77	1	6	25	45	0	\$1,178,200	191

Information provided by the Iowa DOT.

These figures show an average of \$6,201 in property losses per incident, an injury in an average of one out of every two incidents and one death in every 144 incidents.

Based on the current FEMA BCA loss of service values of \$131/person/day for the population of each community, the following economic losses could apply on a per-day basis for disruption of electrical services:

Table 174: Economic Impact of Loss of Electrical Services per day

Atkins	\$219,700
Belle Plaine	\$331,954
Blairstown	\$90,652
Garrison	\$48,601
Keystone	\$81,482
Luzerne	\$12,576
Mt. Auburn	\$19,650
Newhall	\$114,625
Norway	\$71,395
Shellsburg	\$128,773
Urbana	\$190,998
Van Horne	\$89,342
Vinton	\$688,667
Walford	\$191,653
Benton County Unincorporated	\$1,136,818

A disruption of electrical services may not affect an entire community or all of the rural area and may be isolated to areas with aged or inadequate electrical infrastructure that is more vulnerable to the influence of severe winter weather.

Certain populations, the young and old and those with disabilities in particular, are more vulnerable to the effects of cold weather that accompanies severe winter storms. Those populations in Benton County are as follows:

Table 175: Vulnerable populations of Benton County

Atkins	522	31	166	10
Belle Plaine	595	23	483	19
Blairstown	178	26	118	17
Garrison	91	24	50	13
Keystone	149	24	152	24
Luzerne	18	24	8	8
Mt. Auburn	36	24	34	16
Newhall	224	26	153	17
Norway	126	23	107	20
Shellsburg	205	21	190	19

Urbana	470	32	111	8
Van Horne	175	26	113	17
Vinton	1299	25	1027	20
Walford	488	33	77	5
Unincorporated	4576	18	2789	11
Benton County Total	5781	22	4015	15
Iowa	7716011	24	466169	15

Table 176: People with disabilities in Benton County

COMMUNITY	NUMBER OF PEOPLE WITH DISABILITIES	% OF POPULATION
Atkins	117	6.2%
Belle Plaine	550	20.9%
Blairstown	34	2.7%
Garrison	47	15.2%
Keystone	92	14.7%
Luzerne	6	7.1%
Mt. Auburn	9	6.5%
Newhall	89	11.1%
Norway	46	7.2%
Shellsburg	134	13.7%
Urbana	81	5.8%
Van Horne	70	9.7%
Vinton	925	18.1%
Walford	52	3.4%
Benton County Unincorporated	941	11.7%
Benton County Total	3,193	12.4%

Drought

The monetary values of losses that could be associated with a severe drought are difficult to estimate. Most documented losses are to agricultural crops. According to the State of Iowa Hazard Mitigation Plan, the National Climatic Data Center (NCDC) lists 23 periods of drought in Iowa from 1995-2011. During that period there was \$2.010 billion in crop damages resulting from drought periods and over \$645 million in property damage. In 2012 alone crop damages from drought were \$4.992 billion. Only limited data on a smaller scale could be retrieved. NCDC records indicate 10 droughts were reported in Iowa that involved Benton County between 8/1/2003 to 10/1/2013. These droughts are shown as occurring in 2003 (1), 2005 (4), 2012(3) and 2013 (2). These 10 droughts caused a total of \$17,730,000 million in crop damages in the County. The worst of these was a drought in 2003 which caused an estimated \$14,880,000 in crop damages. Based on the above figures the average loss per drought would be \$1,773,000.

Drought conditions also bring the possibility of loss of drinking water supply. According to the Iowa DNR, all of the public water sources in Benton County are groundwater (rather than surface water from a river, or similar). Generally, groundwater sources experience less fluctuation in levels associated with climate than would a surface water source. If a drought were to occur that affected a drinking water source, it would likely initially be on a well-by-well basis, then escalating into exhaustion of sections of aquifers. The economic impact of a loss of drinking water on a per-day basis is a rate of \$103 per person per day as per FEMA guidelines. The following table documents the potential financial impact of loss of water supply per Benton County community.

Table 177: Economic Impact of Loss of Water Supply

Atkins	\$172,010
Belle Plaine	\$261,002
Blairtown	\$71,276
Garrison	\$38,213
Keystone	\$64,066
Luzerne	\$9,888
Mt. Auburn	\$15,450
Newhall	\$90,125
Norway	\$56,135
Shellsburg	\$101,249
Urbana	\$150,174
Van Horne	\$70,246
Vinton	\$541,471
Walford	\$150,689

In addition to the above populations, numerous homes and properties and commercial businesses in the rural and unincorporated areas have private wells. This is also true for the City of Luzerne. However the exact number of homes and businesses utilizing private wells could not be determined. An estimate of the number of private wells could be the number of rural residencies and commercial enterprises which is 4,580. A loss of drinking water to the unincorporated residents would result in an economic impact of \$471,740 per day according to FEMA's standard values. It is unlikely, however, that all of the private wells in Benton County would be affected.

Tornado/Windstorm

Benton County is located within Wind Zone 4, the highest wind zone in the country. The Uniform Building Code wind risk map shows 80 miles per hour as the planning area's 50-year return period fastest mile per hour speed. According to NOAA records, Benton County is in an area experiencing 25-30 significant (EF2 or greater) tornadoes per 100-year period, providing an average of 1 event every 4 years.

The NCDC recorded 33 tornado events in Benton County between 1965 and 2018. These tornadoes caused 1 Death, 17 Injuries and total property losses of \$3,931,000. The most devastating tornado was an F4 that occurred on August 8, 1965 in rural Benton County. The tornado caused \$2,500,000 in damages and one death. Tornadoes by type included F0-12, F1-6, F3-3, F4-1, EF0-2, EF1-2.

Table 178: Historical Tornadoes by Jurisdiction

JURISDICTION	NUMBER	TOTAL LOSS
Unincorporated Areas	11	\$3,577,500
Akins	3	\$50,000
Garrison	1	\$0
Keystone	1	\$0
Mt. Auburn	2	\$18,000
Newhall	1	\$0
Urbana	1	\$0
Van Horne	2	\$110,000
Vinton	3	0

Historically, 30-40 tornadoes are confirmed in Iowa per year. Included in these statistics is Benton County which history has shown will have a tornado touch down somewhere in county every other year. Based on historical occurrences Benton County will probably experience 1 tornado every two years.

The 2013 State of Iowa Hazard Mitigation Plan estimates that Benton County has an annual loss of \$63,300 due to Tornado and \$0 due to wind storm.

NCDC records document 16 windstorm events in Benton County from October 29, 1996 to Jul 11, 2011. These events caused an estimated \$10,200,000 in property damage and no deaths or injuries. The most devastating event was the July 11, 2011 Derecho Windstorm which had winds of more than 70 miles per hour for thirty minutes with peak winds in excess of 130 miles per hour for five to seven minutes. The path of the storm was ten miles wide across the 24 mile width of the county. Communities most affected were Garrison, Vinton and Urbana. The August 10, 2020 Derecho windstorm that devastated

2/3 of Benton County has not yet entered into any NCDC data base. Damages have as of yet to be completely defined, but the event was definitely the most devastating windstorm in the history of Benton County and the State of Iowa.

Based on historical averages, Iowa would expect to have about 7 to 10 wind events each year in which wind speeds exceed 70 knots (80.5 mph). Due to the historical frequency of windstorms in Benton County it is a near 100 percent certainty the county will be impacted by a windstorm on the average of once annually.

Those most at risk from tornadoes and windstorms include people living in mobile homes, campgrounds, and other dwellings without secure foundations or basements. People in automobiles are also very vulnerable to tornadoes and windstorms. US Census Bureau statistics for Benton County from 2013 state that there were 312 mobile homes in Benton County. These mobile homes are distributed as follows: Atkins, 0; Belle Plaine, 33; Blainstown, 3; Garrison, 7; Keystone, 0; Luzerne, 3; Mount Auburn, 5; Newhall, 0; Norway, 4; Shellsburg, 28; Urbana, 24; Van Horne, 3; Vinton, 48; Walford, 0; Benton County unincorporated, 154.

The elderly, very young, and the physically and mentally handicapped are most vulnerable because of the lack of mobility to escape the path of destruction. People who may not understand watches and warnings due to language barriers are also at risk. According to 2010 US Census Bureau estimates there was 9.317 (35.7 percent of the total population) young, old and disabled people living in Benton County.

Table 179: Vulnerable populations of Benton County

Area	2000				2010			
	<18	%	>64	%	<18	%	>64	%
Atkins	306	31	108	11	522	31	166	10
Belle Plaine	741	26	599	21	595	23	483	19
Blainstown	169	25	153	22	178	26	118	17
Garrison	118	29	48	12	91	24	50	13
Keystone	193	28	170	25	149	24	152	24
Luzerne	35	33	17	16	18	24	8	8
Mt. Auburn	39	24	31	19	36	24	34	16
Newhall	241	27	186	21	224	26	153	17
Norway	157	26	83	14	126	23	107	20
Shellsburg	258	28	123	13	205	21	190	19
Urbana	311	31	95	9	470	32	111	8

Van Horne	204	28	127	18	175	26	113	17
Vinton	1276	25	1030	20	1299	25	1027	20
Walford	445	36	53	4	488	33	77	5
Unincorporated	4493	18	2832	11	4576	18	2789	11
Benton County Total	6124	27	3902	15	5781	22	4015	15
Iowa	733628	25	436213	15	7716011	24	466169	15

Table 180: People with disabilities in Benton County

COMMUNITY	NUMBER OF PEOPLE WITH DISABILITIES	% OF POPULATION
Atkins	117	6.2%
Belle Plaine	550	20.9%
Blairstown	34	2.7%
Garrison	47	15.2%
Keystone	92	14.7%
Luzerne	6	7.1%
Mt. Auburn	9	6.5%
Newhall	89	11.1%
Norway	46	7.2%
Shellsburg	134	13.7%
Urbana	81	5.8%
Van Horne	70	9.7%
Vinton	925	18.1%
Walford	52	3.4%
Benton County Unincorporated	941	11.7%
Benton County Total	3,193	12.4%

People most at risk are also those who do not have access to early warning capabilities such as are available through siren systems, cellular communication or NOAA Weather Radio.

Generally the destructive path of a tornado is only a couple hundred feet in width, but stronger tornadoes can leave a path of devastation up to a mile wide. Normally a tornado will stay on the ground for no more than 20 minutes; however, one tornado can touch ground several times in different areas. Large hail, strong straight-line winds, heavy rains, flash flooding, and lightning are also associated with severe storms and may cause significant damage to a wider area. It is feasible that a tornado of EF4 magnitude or larger could destroy an entire city. In Iowa, on May 25, 2008 an EF5 Tornado struck the City of Parkersburg, totally destroying 290 homes, killing 7 people and causing tens of millions of dollars in property damage.

Total devastation of any city in Benton County could entail losses of all properties as summarized in Tables 137 to 151 on pages 329-334 of this document.

Unlike tornadoes, windstorms may have a destructive path that is tens of miles wide. Large hail, strong straight-line winds, heavy rains, flash flooding, and lightning are also associated with severe storms and may cause significant damage to a wider area. A windstorm can, as is evident from the damage caused by Benton County's July 11, 2011 Derecho windstorm disaster, affect several communities and a land area encompassing half the county or more. The 2010 State of Iowa Hazard Mitigation Plan estimates that Benton County has an annual loss of \$12,832.21 due to Windstorm.

The severity of damage from tornadoes and windstorms can be very high. Impacts can range from broken tree branches, shingle damage to roofs, and some broken windows; all the way to complete destruction and disintegration of well-constructed structures, infrastructure, and trees. Injury or death related to tornadoes most often occurs when buildings collapse; people are hit by flying objects or are caught trying to escape the tornado in a vehicle.

ANALYZING DEVELOPMENT TRENDS

As detailed in FEMA's guidance, hazard mitigation plans should provide a general overview of land uses and types of development occurring within each community participating in the plan. This can include existing land uses and development densities in the identified hazard areas, as well as any anticipated future/proposed land uses, including anticipated new development, and redevelopment, and anticipated annexation areas. This information is recommended for mitigation plans because an analysis of development trends provides a basis for making decisions on the type of mitigation approaches to consider, and the locations where these approaches can be implemented. This information can also be used to influence decisions regarding future development in hazard areas.

FEMA suggests consideration of the following areas when analyzing development trends, and where possible, relevant data was presented in the same order for each of the participating jurisdictions listed below.

- ✓ Development trends, described both by amount and location of development
- ✓ Differentiation of distinct land uses with unique densities
- ✓ Location of future development
- ✓ Expected growth

Benton County is limited in available resources for analyzing development trends. The county's comprehensive plan, which includes the county's land use plan was adopted in 1986. Minor revisions were made to the land use plan in 1994, but nothing else has been done to revise or update the plan. Also, Benton County does not have a strategic plan and there has not been any kind of formal analysis conducted concerning growth trends. Hence, resources used in developing this analysis was limited to information from City-data.com, interviews with city and county officials and information provided by the Benton Development Group, which is the county's office for economic development.

Benton County has seen modest population growth since the 1950's, with an average growth per decade of 1.9%. Most recently, according to the U.S. Census, Benton County did have a population decline of 1.4% from 2000-2010, bringing the county's population to 25,699. Growth that has occurred in Benton County has been predominantly in the communities and rural areas of the county that are along the eastern side. This is due to the proximity of that part of the county to the metropolitan Cedar Rapids areas and the I-380 corridor. With an average growth of 1.9% per decade, the county's population is projected to reach 26,531 in 2020 and 26,986 in 2030. With an average of 2.5 persons per household in Benton County, this equates to a need for 514 more homes in the county by 2030. All indications are that the county's growth will continue to be on the county's eastern side.

Following is the development information for the 14 incorporated cities of Benton County. More detailed information on the cities can be found in the profiles section of this plan.

Atkins



Figure 118: Atkins in 2018

The City of Atkins is one of those cities along eastern side of Benton County where the county's growth is occurring. The city's population has more than doubled since 1990 when the city's population stood at 637 to 1,670 in 2010. Projections are that the city's population could reach 1,899 in 2020 and 2,128 in 2030. Primary growth areas have been in developments on the city's east, south and west side.

The City of Atkins does not report any plans to annex more land for the city at this time. In the last five years the city has constructed a new public works building, a new City Hall/Community Center and a new library.

Single-family new house construction in Atkins Iowa (www.city-data.com):

1997: 14 buildings, average cost: \$11,000
 1998: 16 buildings, average cost: \$105,000
 1999: 11 buildings, average cost: \$145,000
 2000: 17 buildings, average cost: \$185,000
 2001: 14 buildings, average cost: \$186,900
 2002: 18 buildings, average cost: \$182,200
 2003: 23 buildings, average cost: \$183,000
 2004: 37 buildings, average cost: \$200,300
 2005: 36 buildings, average cost: \$188,600
 2006: 37 buildings, average cost: \$212,600
 2007: 18 buildings, average cost: \$163,600
 2008: 12 buildings, average cost: \$223,800
 2009: 10 buildings, average cost: \$212,300

2010: 5 buildings, average cost: \$215,000
2011: 10 buildings, average cost: \$245,100
2012: 13 buildings, average cost: \$232,700
2013: 13 buildings, average cost: \$229,300
2014: 7 buildings, average cost: \$315,100
2015: 15 buildings, average cost: \$250,000
2016: 16 buildings, average cost: \$255,300
2017: 19 buildings, average cost: \$241,200

Belle Plaine

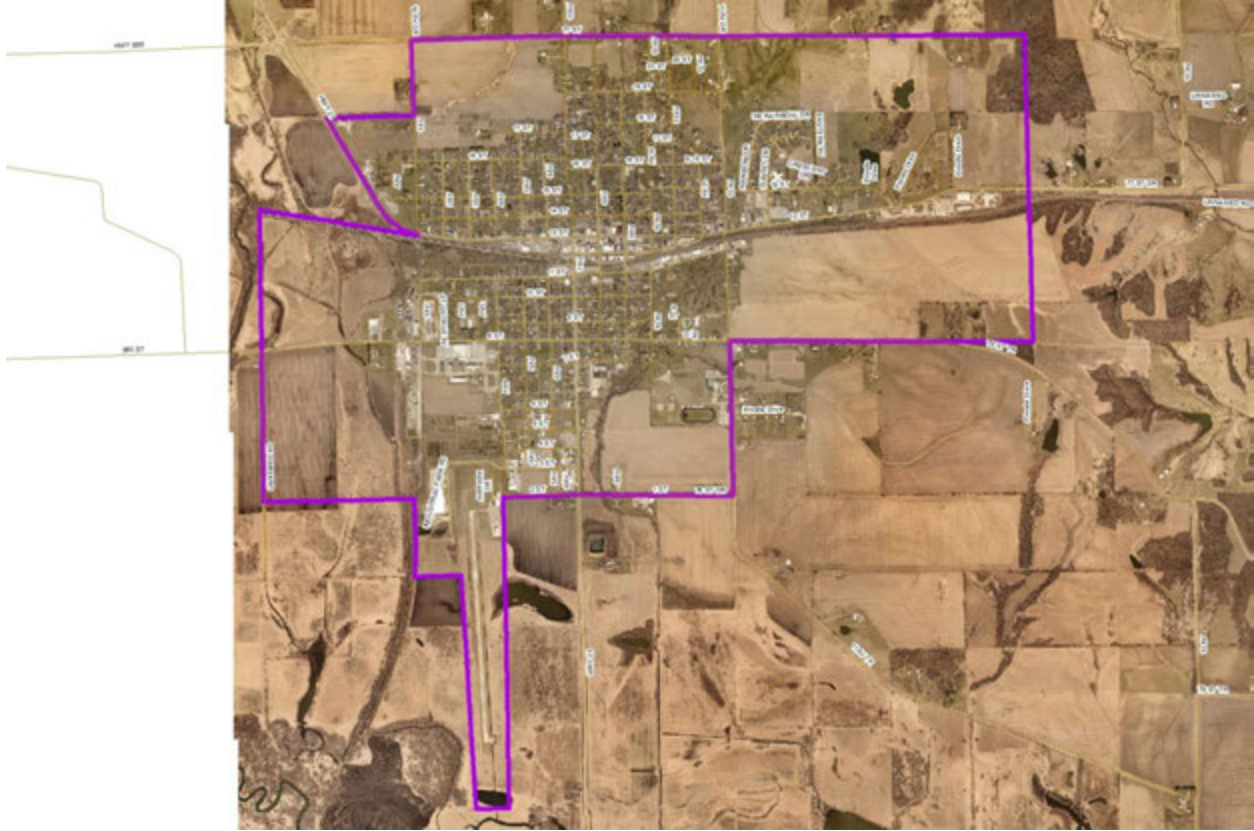


Figure 119: Belle Plaine in 2018

The City of Belle Plaine has been experiencing a slow decline in population since 1960. Though there have been ups and downs in the population during that time period, the general trend has been downward, with a 15% overall decline since 1960. There is nothing that indicates a reversal of this trend. The population is projected to be at 2,436 in 2020 and 2,338 in 2030.

The City of Belle Plaine does not report any plans to annex more land for the city at this time. In the last five years the city and its downtown businesses have undertaken a downtown renovation project which has improved the city's main street and commercial area.

The City of Belle Plaine does have its own development organization, the Belle Plaine Community Development Corporation.

Single-family new house construction in Belle Plaine (www.city-data.com):

1997: 6 buildings, average cost: \$83,000
1998: 6 buildings, average cost: \$83,000
1999: 6 buildings, average cost: \$90,000
2000: 5 buildings, average cost: \$95,000
2001: 5 buildings, average cost: \$95,000
2002: 4 buildings, average cost: \$95,000
2003: 1 building, cost: \$60,000
2004: 2 buildings, average cost: \$112,000
2005: 4 buildings, average cost: \$110,300
2006: 1 building, cost: \$100,000
2007: 1 building, cost: \$110,000
2008: 2 buildings, average cost: \$110,000
2009: 1 building, cost: \$110,000
2010: 3 buildings, average cost: \$110,000
2011: 3 buildings, average cost: \$110,000
2012: 3 buildings, average cost: \$110,000
2013: 4 buildings, average cost: \$110,000
2014: 4 buildings, average cost: \$110,000
2015: 4 buildings, average cost: \$110,000
2016: 4 buildings, average cost: \$110,000
2017: 4 buildings, average cost: \$110,000

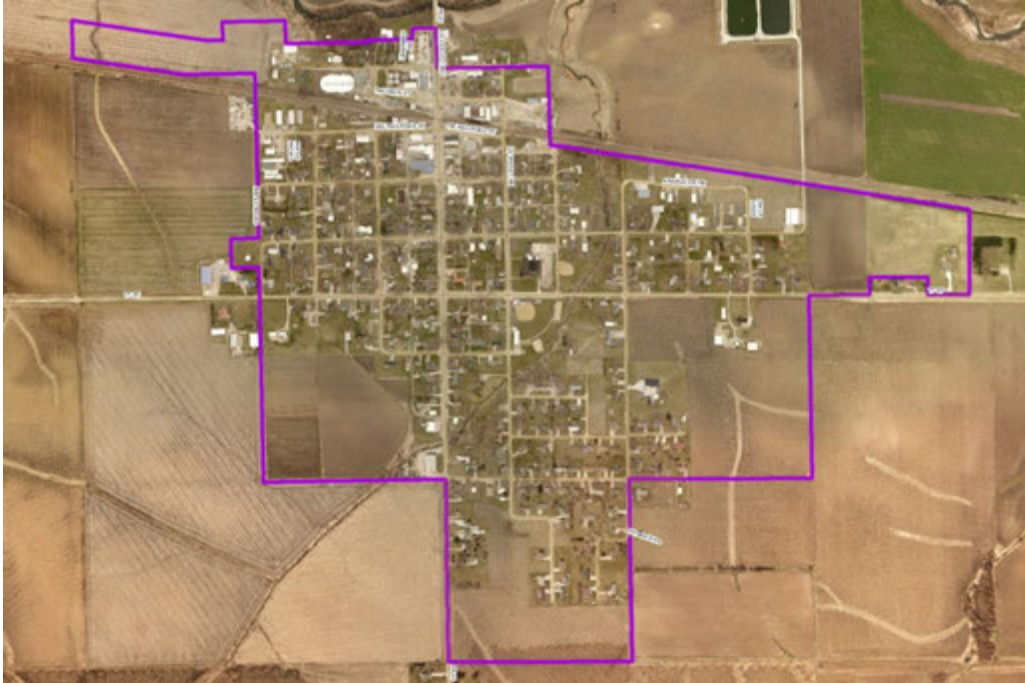
Blairstown

Figure 120: Blairstown in 2018

The population of the City of Blairstown has remained relatively stable over the past 30 years, with only a slight decrease of 3 people from 695 in 1980 to 692 in 2010. The City of Blairstown does not report any plans to annex more land for the city at this time.

Single-family new house construction in Blairstown (www.city-data.com):

1997: 2 buildings, average cost: \$90,300
1998: 3 buildings, average cost: \$96,000
1999: 3 buildings, average cost: \$136,700
2000: 1 building, cost: \$175,000
2001: 4 buildings, average cost: \$88,800
2002: 2 buildings, average cost: \$87,500
2003: 2 buildings, average cost: \$125,000
2004: 1 building, cost: \$129,600
2005: 1 building, cost: \$150,000
2007: 1 building, cost: \$100,000
2009: 1 building, cost: \$70,000

Garrison



Figure 121: Garrison in 2018

The population of the City of Garrison has been in a state of decline since 2000 when the city's population stood at 413. In 2010 it stood at 371. The City of Garrison does not report any plans to annex more land for the city at this time. There have been no building permits issued by the city in the last 10 years. The city did construct a new library and emergency services building after both were blown down in the 7/11/2011 Derecho Wind Storm disaster.

Keystone



Figure 122: Keystone in 2018

Keystone is relatively unchanged since 1980 when the city's population stood at 618. The city did have a peak in its population at 687 in 2000, but since that time it has declined to its current level of 622. There has been some development of new homes on the city's northwest side. The City of Keystone does not report any plans to annex more land for the city at this time.

Single-family new house construction in Keystone (www.city-data.com):

1997: 2 buildings, average cost: \$90,300
1999: 1 building, cost: \$101,700
2001: 1 building, cost: \$150,000
2002: 1 building, cost: \$156,800
2003: 1 building, cost: \$200,000
2004: 1 building, cost: \$125,000
2005: 1 building, cost: \$250,000
2010: 2 buildings, average cost: \$250,000

Luzerne



Figure 123: Luzerne in 2018

Luzerne is the smallest incorporated city in Benton County. The population of the city has declined steadily every decade since 1960 when its population stood at 136 to 95 in 2010. The City of Luzerne does not report any plans to annex more land for the city at this time and the city has not issued any building permits for the last 10 years.

Mt. Auburn



Figure 124: Mt. Auburn in 2018

Mt. Auburn is the second smallest incorporated city in Benton County. The population of the city has gone up and down between 134 people to 200 people in the last 50 years. The city's current population is 150. The City of Mt. Auburn does not report any plans to annex more land for the city at this time and the city has not issued any building permits for the last 10 years.

Newhall

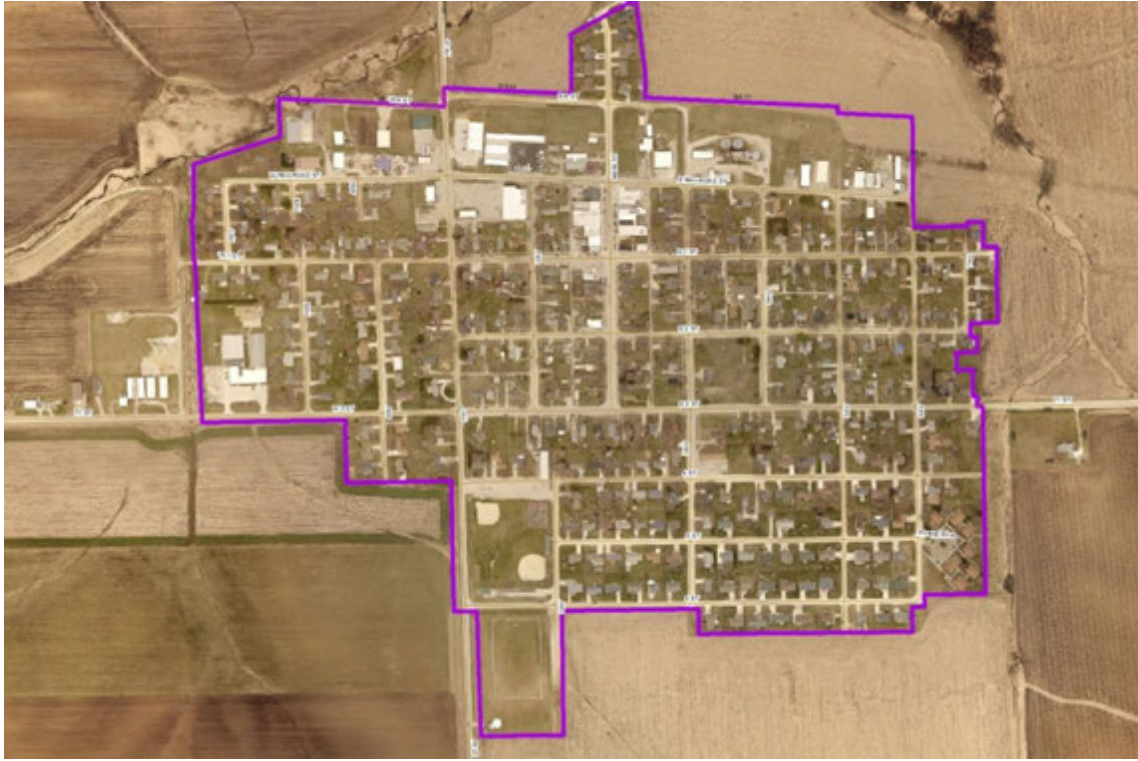


Figure 125: Newhall in 2013

The City of Newhall experienced a population growth surge from 1960 to 1980 when the city's population grew from 495 to 899. Since that time the population has remained relatively steady and in 2010 it stood at 875. The average growth rate has been 13.5% per decade. If this rate is sustained in the future, the city's population will reach 951 in 2020 and 1027 in 2030.

One small development of new homes has occurred on the city's north side. The city is in the process of creating a new combination city hall/library/public works building in an auto dealership building that was donated to the city.

The City of Newhall does not report any plans to annex more land for the city at this time.

Single-family new house construction (www.city-data.com):

1997: 3 buildings, average cost: \$66,200
1998: 3 buildings, average cost: \$66,200
1999: 7 buildings, average cost: \$100,000
2000: 5 buildings, average cost: \$108,200
2001: 8 buildings, average cost: \$111,900
2002: 5 buildings, average cost: \$30,000
2003: 2 buildings, average cost: \$122,900
2004: 4 buildings, average cost: \$129,600

Norway



Figure 126: Norway in 2018

Since 1960 the City of Norway's population increased to its peak of 633 in 1980 and since then has decreased until now it sits at 545. The only area of the city where any new home construction has been occurring is in the city's northwest corner.

The City of Norway does not report any plans to annex more land for the city at this time.

Single-family new house construction in Norway (www.city-data.com):

1997: 4 buildings, average cost: \$104,800
 1998: 4 buildings, average cost: \$148,800
 2000: 3 buildings, average cost: \$129,600
 2001: 1 building, cost: \$126,000
 2002: 1 building, cost: \$192,000
 2003: 1 building, cost: \$125,000
 2004: 1 building, cost: \$100,000
 2005: 1 building, cost: \$118,200
 2006: 1 building, cost: \$118,200
 2007: 1 building, cost: \$118,200
 2008: 1 building, cost: \$118,200
 2009: 1 building, cost: \$118,200

Shellsburg



Figure 127: Shellsburg in 2018

The City of Shellsburg's population took a 23% jump from 765 to 938 from 1990 to 2000 and a 5% jump to 983 in the next decade. Development trends project the city's population to increase to 1,055 in 2020 and 1,127 in 2030. A majority of the development that has occurred in the city has been along its southwest corner.

The City of Shellsburg does not report any plans to annex more land for the city at this time.

Single-family new house construction in Norway (www.city-data.com):

1997: 2 buildings, average cost: \$45,000
 1998: 6 buildings, average cost: \$102,300
 1999: 4 buildings, average cost: \$104,000
 2000: 4 buildings, average cost: \$68,800
 2001: 2 buildings, average cost: \$82,500
 2002: 6 buildings, average cost: \$202,500
 2003: 6 buildings, average cost: \$139,200
 2004: 10 buildings, average cost: \$2,000,000
 2005: 7 buildings, average cost: \$185,700
 2006: 4 buildings, average cost: \$150,000
 2007: 4 buildings, average cost: \$175,000
 2008: 1 building, cost: \$300,000
 2009: 2 buildings, average cost: \$75,000
 2010: 1 building, cost: \$90,000
 2013: 1 building, cost: \$150,000
 2015: 2 buildings, average cost: \$125,000
 2016: 4 buildings, average cost: \$100,000
 2017: 2 buildings, average cost: \$100,000

Urbana



Figure 128: Urbana in 2018

Urbana is one of the cities in eastern Benton County that has seen the hugest growth spurt, with its population surging from 595 to 1,458 from 1990 to 2010. This is attributed to the city's location along I-380 and its unique location between two of Iowa's major metropolitan areas, Cedar Rapids and Waterloo. Residential development in Urbana has been mostly of the city's west side. The city also has a business and industrial development a half mile west of the city's residential area. Projected growth for the area shows a population of 1,641 people in 2020 and 1,824 people in 2030.

The City of Urbana does not report any plans to annex more land for the city at this time.

Single-family new house construction in Urbana (www.city-data.com):

1997: 21 buildings, average cost: \$90,300
 1998: 30 buildings, average cost: \$101,700
 1999: 25 buildings, average cost: \$101,700
 2000: 25 buildings, average cost: \$108,200
 2001: 26 buildings, average cost: \$108,200
 2002: 19 buildings, average cost: \$116,300
 2003: 24 buildings, average cost: \$122,900
 2004: 20 buildings, average cost: \$128,700
 2005: 25 buildings, average cost: \$136,700
 2006: 13 buildings, average cost: \$143,900
 2007: 14 buildings, average cost: \$154,300
 2008: 5 buildings, average cost: \$173,300
 2009: 3 buildings, average cost: \$180,000
 2010: 1 building, cost: \$120,000
 2012: 1 building, cost: \$275,000
 2013: 5 buildings, average cost: \$146,500
 2015: 1 building, cost: \$200,000
 2016: 3 buildings, average cost: \$160,000
 2017: 5 buildings, average cost: \$250,000

Van Horne



Figure 129: Van Horne in 2018

The population of Van Horne has increased by 21% from 554 in 1960 to 671 in 2010 with most of this development occurring before 2000. Residential development in the city has not occurred in any specific area, but rather has been throughout the city. In the last five years the city has also developed a new city hall, library and community center. Projections show the city's population rising to 708 in 2020 and 734 in 2030.

The City of Van Horne does not report any plans to annex more land for the city at this time.

Single-family new house construction in Van Horne (www.city-data.com):

1999: 1 building, cost: \$105,000
 2000: 1 building, cost: \$150,000
 2001: 1 building, cost: \$123,000
 2002: 3 buildings, average cost: \$111,700
 2003: 1 building, cost: \$120,000
 2004: 1 building, cost: \$120,000
 2005: 1 building, cost: \$120,000
 2006: 1 building, cost: \$120,000
 2007: 175 buildings, average cost: \$205,600
 2008: 156 buildings, average cost: \$203,300
 2009: 168 buildings, average cost: \$212,000
 2010: 153 buildings, average cost: \$208,800
 2011: 126 buildings, average cost: \$225,100
 2012: 223 buildings, average cost: \$193,100
 2013: 219 buildings, average cost: \$211,900
 2014: 226 buildings, average cost: \$241,200
 2015: 151 buildings, average cost: \$239,600
 2016: 263 buildings, average cost: \$248,100
 2017: 213 buildings, average cost: \$236,600

Vinton

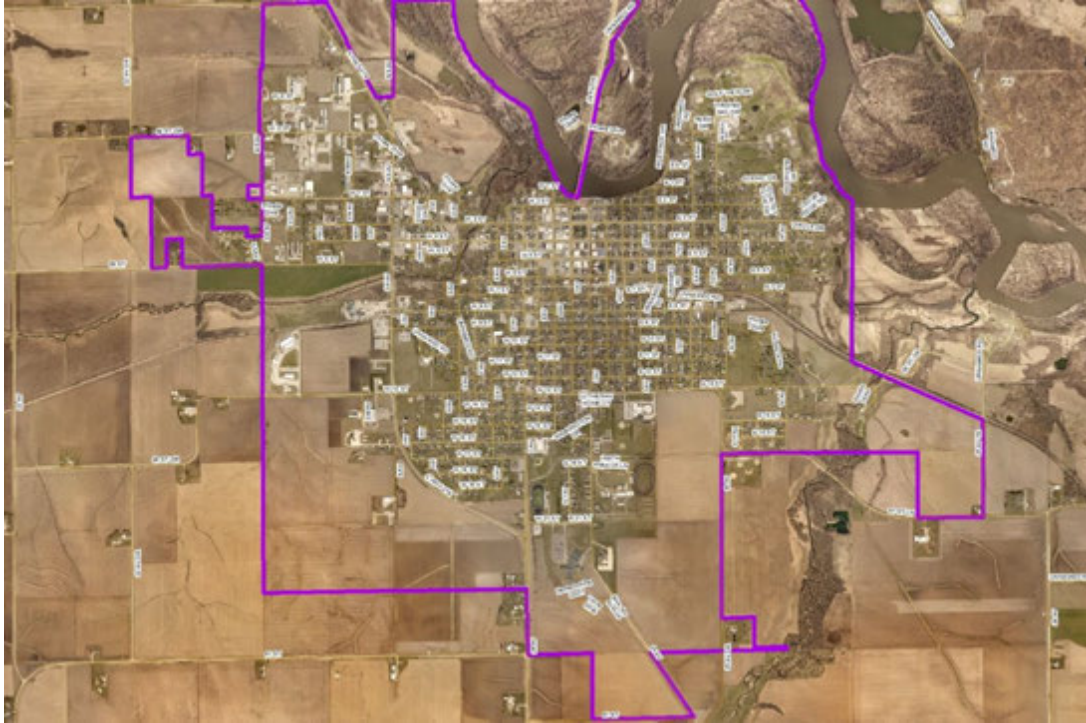


Figure 130: Vinton in 2018

Vinton is the county seat of Benton County and the county's most populous city. From 1960 to 2010 the city's population rose by 10% from 4,781 to 5,257 people. Most of the residential development in the city is occurring on the city's southeast and northeast corners. During this same time period the city lost several major industries but has recovered mostly by serving as a bed room community for people working in Waterloo and Cedar Rapids, both of which are less than 50 miles away. Projections are that the city's population will continue to grow to 5,340 in 2020 and 5,433 in 2030.

In the last five years a new law enforcement center and emergency management agency office have been built in the city by Benton County.

The City of Vinton does not report any plans to annex more land for the city at this time.

Single-family new house construction in Vinton (www.city-data.com):

1997: 9 buildings, average cost: \$116,000
 1998: 11 buildings, average cost: \$166,400
 1999: 8 buildings, average cost: \$206,000
 2000: 7 buildings, average cost: \$185,000
 2001: 6 buildings, average cost: \$162,200
 2002: 9 buildings, average cost: \$150,000
 2003: 5 buildings, average cost: \$149,000
 2004: 5 buildings, average cost: \$138,400
 2005: 6 buildings, average cost: \$140,400
 2006: 4 buildings, average cost: \$139,400

2007: 3 buildings, average cost: \$139,400
2008: 1 building, cost: \$139,400
2009: 3 buildings, average cost: \$199,300
2010: 2 buildings, average cost: \$234,800
2011: 5 buildings, average cost: \$240,900
2012: 4 buildings, average cost: \$300,000
2013: 1 building, cost: \$400,000
2014: 3 buildings, average cost: \$366,700
2015: 2 buildings, average cost: \$190,000
2016: 1 building, cost: \$190,000
2017: 1 building, cost: \$190,000

Walford

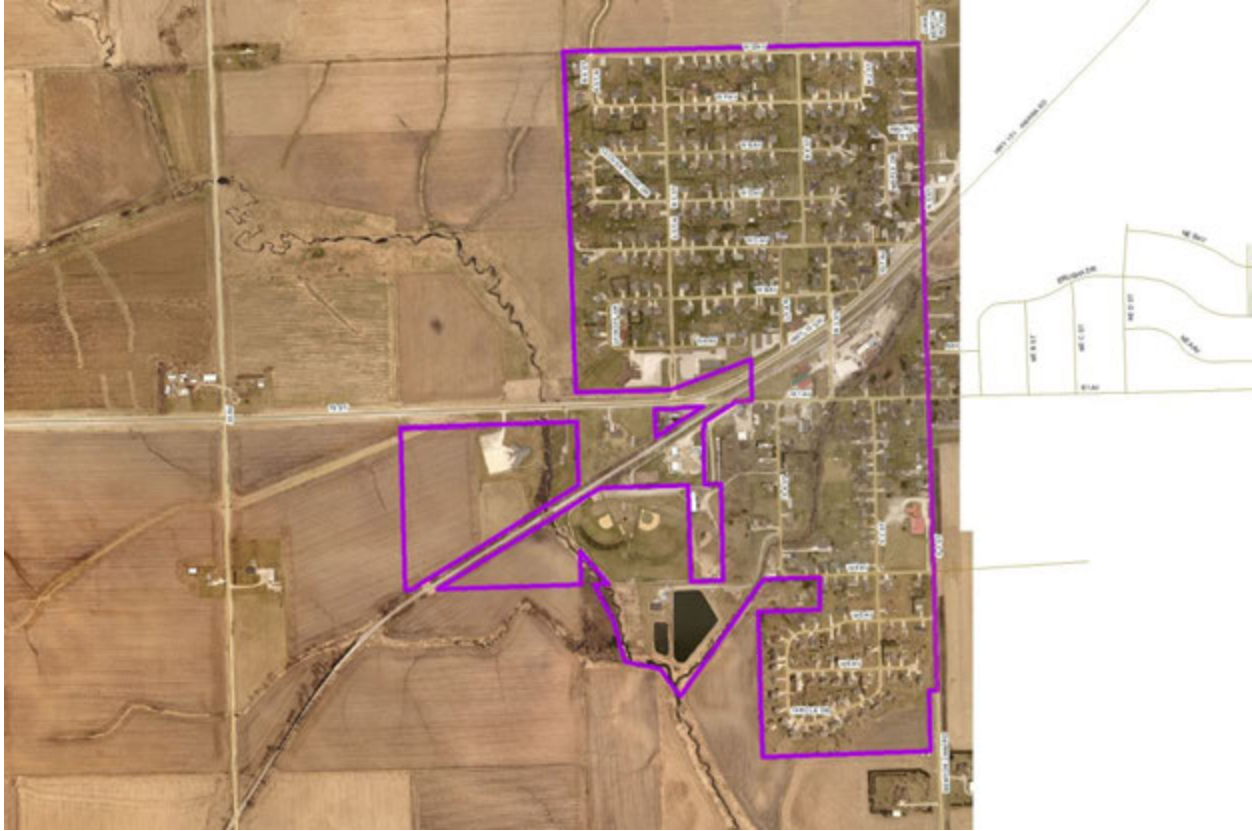


Figure 131: Walford in 2018

Walford is located on the county line between Benton County and Linn County and is only five miles south of Cedar Rapids. Being so located, it was in a position that allowed it to experience a 300% growth surge from 303 people to 1,224 people during the decade of 1990 to 2000. Another 239 people moved into the city in the decade from 2000 to 2010. Residential development has occurred on all side of the city, but is particularly heavy on the city's southeast and northeast side. Projections are for the city's population to reach 1,703 people in 2020 and 1,943 people in 2030. There has also been some business and industrial expansion in the city.

The City of Walford does not report any plans to annex more land for the city at this time.

Single-family new house construction (www.city-data.com):

1997: 43 buildings, average cost: \$124,100
 1998: 48 buildings, average cost: \$136,000
 1999: 30 buildings, average cost: \$137,600
 2000: 17 buildings, average cost: \$141,500
 2001: 6 buildings, average cost: \$150,800
 2002: 9 buildings, average cost: \$168,300
 2003: 13 buildings, average cost: \$196,800
 2004: 17 buildings, average cost: \$199,900
 2005: 12 buildings, average cost: \$212,400

2006: 9 buildings, average cost: \$218,200
2007: 6 buildings, average cost: \$259,500
2008: 5 buildings, average cost: \$261,200
2009: 1 building, cost: \$130,000
2010: 2 buildings, average cost: \$250,000
2012: 1 building, cost: \$200,000
2013: 4 buildings, average cost: \$221,300
2016: 1 building, cost: \$200,000

PAST DISASTERS AND DISASTER DECLARATIONS

Declaration	Date Declared	Incident Period	Type
DR-4552	August 17, 2020	August 10, 2020	Sever Storm
DR-4483	March 23, 2020	January 20, 2020—Continuing	Iowa COVID-19 Pandemic
DR-4299	October 31, 2016	September 21 to October 3, 2016	Severe Storms and Flooding
DR-4135	July 31, 2013	June 21, 2013 to June 28, 2013	Severe Storms, Tornadoes, and Flooding
DR-4126	July 2, 2013	May 19, 2013 to June 15, 2013	Severe Storms, Tornadoes, and Flooding
DR-4016	August 24, 2011	July 9, 2011 to July 14, 2011	Severe Storms, Straight-Line Winds, and Flooding
DR-1705	May 25, 2007	May 5, 2007 to May 7, 2007	Severe Storms, Flooding, and Tornadoes
DR-1688	March 14, 2007	February 23, 2007 to March 2, 2007	Severe Winter Storms
DR-1518	May 25, 2004	May 19, 2004 to June 24, 2004	Severe Storms, Tornadoes, and Flooding
DR-1420	June 19, 2002	June 3, 2002 to June 25, 2002	Severe Storms and Flooding
DR-1230	July 2, 1998	June 13, 1998 to July 15, 1998	Severe Weather, Tornadoes and Flooding
DR-996	July 9, 1993	April 13, 1993 to October 1, 1993	Flooding, Severe Storm
DR-986	April 26, 1993	March 26, 1993 to April 12, 1993	Flooding, Severe Storm
DR-443	June 24, 1974	June 24, 1974	Severe Storms, Flooding
DR-269	August 14, 1969	August 14, 1969	Heavy Rains, Flooding
DR-193	April 22, 1965	April 22, 1965	Flooding
DR-996	July 9, 1993	April 13, 1993 to October 1, 1993	Flooding, Severe Storm
DR-879	September 6, 1990	July 25, 1990 to August 31, 1990	Flooding, Severe Storm
DR-868	May 26, 1990	May 18, 1990 to July 6, 1990	Flooding, Severe Storm
DR-443	June 24, 1974	June 24, 1974	Severe Storms, Flooding
DR-269	August 14, 1969	August 14, 1969	Heavy Rains, Flooding

Throughout the history of Benton County there have been numerous disaster incidents of smaller proportions and influence that did not receive Presidential or Agricultural Disaster Declarations. Some of these events have been documented, some have not. Where appropriate and when information is available, these incidents are noted in this plan.

SECTION 6

MITIGATION STRATEGY

HAZARD MITIGATION PLAN GOALS

In 2011 the Benton County Hazard Mitigation Planning Committee set as a priority the development of broad-based goals that would address a multitude of hazards and encompass a variety of mitigation activities. By identifying these goals the Committee was able to develop mitigation action steps that would work toward the broader goal. The hazard mitigation plan goals identified were as follows:

1. Improve the quality of life for Benton County residents by mitigating potential hazards.
2. Take steps to mitigate the probable negative consequences that may occur in Benton County as a result of natural and human caused/combination disasters.
3. Identify potential funding sources needed to accomplish identified mitigation projects.
4. Protect the health and welfare of Benton County residents and properties in Benton County by enhancing the training and capabilities of all first responder organizations.
5. Developing capabilities to return to pre-disaster or improved conditions as soon as possible after a disaster occurs.
6. Assist businesses and industries to reduce the impact of hazards in order to ensure economic viability of Benton County.
7. Compliance with NFIP requirements.

Both the planning committee for the 2016 revision to the Benton County Multi-jurisdictional Hazard Mitigation Plan and those involved in the 2021 update determined that there was not a need to change the seven original goals.

Each of the mitigation activities identified as a “Future Hazard Mitigation Activity” in the following section can be related to at least one of the hazard mitigation plan goals.

MITIGATION STRATEGY OVERVIEW

Benton County hazard mitigation goals are directly connected to the seven hazards determined by the Benton County Hazard Mitigation Planning Committee to be of planning importance to the county. The mitigation measures (activities) listed are arranged into six broad categories.

1. **Preventive Measures.** Government administrative or regulatory actions or processes are developed and implemented that influence the way land and buildings are developed and built. These actions also include public activities to reduce hazard losses. Preventive measures are used to keep problems from getting started or getting worse. Mitigation measures that fall into this group include planning and zoning, building codes, conducting technical studies, inspection, enforcement, implementation, hazard analysis risk assessment, security, capital improvement programs, open space preservation, and storm water management regulations. Community participation in the National Flood Insurance Program (NFIP) also protects both individuals and the community as a whole from devastating losses.
2. **Property Protection.** These are measures that involve the modification of existing buildings or structures to protect them from a hazard(s), or removal from the hazard area. They are implemented in order to remove people, property, and businesses permanently out of unsafe areas where, in terms of wise disaster planning, they shouldn't have been in the first place. Property protection measures include acquisition, elevation, relocation, structural retrofits, and security.
3. **Public Education and Awareness.** These measures help to inform and educate citizens, elected officials, and property owners about the hazards and potential ways to mitigate them. These measures include outreach projects, real estate disclosure, hazard information centers, and school age and adult education programs.
4. **Natural Resource Protection.** These are actions that, in addition to minimizing hazard losses, also preserve or restore the functions of natural systems. These actions include sediment and erosion control, stream corridor protection and restoration, watershed management, forest and vegetation management, and wetland restoration and preservation.
5. **Emergency Services.** These actions protect people and property during and after a disaster or hazard event in order to minimize its impact and preserve the community's health and safety. Emergency services include warning systems, monitoring systems, response and recovery planning, emergency response services, evacuations, protection of critical facilities, acquisition of equipment to facilitate the delivery of these services, and training for responders in emergency situations.
6. **Structural Projects.** These projects involve the construction and maintenance of structures to reduce or redirect the impact of a hazard away from at-risk populations and facilities. Such structures include, but are not limited to, dams, levees, floodwalls, seawalls, retaining walls, and safe rooms.

MITIGATION MEASURES (Action Steps)

In 2011 Potential mitigation measures for Benton County were developed using a combination of sources as follows:

- Existing community hazard mitigation plans
- The Benton County Strategic Plan maintained by the Benton County Emergency Management Agency
- Consultation and meetings with city and county officials and representatives

The 69 measures that were developed in 2011 were reviewed at planning committee meetings and individual community planning meetings. The consensus of all attendees was to retain all mitigation measures from 2011 in the 2016 Benton County MJHMP revision. For the 2021 update, the 69 measures were refined to the following 21 measures. All jurisdictions were asked to review the measures and document any measures that were accomplished. They were also asked to review the measures and determine if there were any measures that they wanted to be included in that they previously had not been, or if there were measures they were previously included in but did not want to be a part of in the 2021 update.

Action Step 1	Public awareness
Applicable Hazards	All Hazards
Applicable Communities	All communities Benton County unincorporated
Analysis	<p>Public awareness of the dangers inherent in a disaster and what they can do to prevent or minimize threats to their personal safety and the integrity of their property from a disaster is one of the keystones of disaster mitigation. Awareness covers a broad spectrum of possibilities. Following are some specific examples cited by Benton County jurisdictions.</p> <ol style="list-style-type: none"> 1) Maintain and publicize a list of sites that could be used as cooling shelters for public retreats during extreme heat events The American Red Cross would if requested open cooling shelters to be used by the general public in the event of a severe heat wave or extreme heat event. These locations would act as retreats for individuals throughout the community who do not have personal access to any other cool location. Identification of all facilities that could function as shelters during heat wave and extreme heat events is necessary in order to fulfill this action step. 2) Maintain awareness of pipeline locations and proper locating procedures to use before digging: Many of the pipeline incidents that occur are the result of digging activities that strike an underground pipeline. Preventing such incidents requires an awareness of where pipelines are located and having locations where digging is to occur scanned for any underground pipelines or other hazards that may be present. 3) Improve awareness of animal disease hazard risks. Animal disease poses a substantial risk to any population, the severity of which can vary tremendously. Recent fears about pandemic flu outbreaks such as the Avian Flu have heightened awareness and concern about animal disease outbreaks. The Benton County Department of Public Health will monitor and respond to the outbreak of any disease. Education about any potential animal disease outbreak will be contingent upon circumstances. Once an animal or plant disease is detected and determined to be a threat to the community a proper response must occur in order to reduce risk of sickness and/or death. In order for this response to be effective it is important for several first responder organizations to work cooperatively. This type of response requires coordination not only during a response, but also planning for the response in advance of an event. Reporting and monitoring standard operating procedures are in place

	throughout the community, state, and nation. These efforts and the cooperation it takes to make them effective are deemed as crucial toward mitigating the risk of disease.
Timeline	Completion by December 31, 2026
Estimated Cost	Costs will be variable depending upon the particular project and the form of media used. Maximum of \$25,000.
Mitigation Measure Category	Prevention
Responsible Party	American Red Cross, Benton County municipal jurisdictions, Benton County EMA
Funding Sources	Benton County Cities, Companies owning and operating underground pipelines in Benton County, Iowa Pipeline Association (IPA), Benton County Public Health, Benton County EMA, USDA
Related Goal	1, 2
Priority	1
Accomplished since 2011	<ul style="list-style-type: none"> • The City of Urbana has established its Community Center as a cooling center and has publicized its use for that function • The City of Belle Plaine has established its Community Center as a cooling center and has publicized its use for that function • There has been a pipeline education class sponsored by the IPA for Benton County Emergency Responders every year since 2011 • The Norway Fire/Rescue Dept. was presented a class on Avian Influenza in 2015 • In 2019 the City of Keystone set up an email list that residents can sign up to be on and receive monthly newsletter and any “emergency” notices via email as soon as possible

Action Step 2	Develop and enhance local emergency operations plans
Applicable Hazards	All hazards
Applicable Communities	All communities, Benton County Unincorporated
Analysis	<p>The Benton County Emergency Management Agency has a full scope of Emergency Operations Plans. Some cities in Benton County have rudimentary Emergency Operations Plans while most have nothing at all. Development or enhancement of existing plans is essential in order to provide an organized local response to all disasters and to provide the guidelines necessary for incident and resource management in disaster and emergency situations that may influence any city in Benton County. Priority items for planning include but are not limited to:</p> <ul style="list-style-type: none"> • Develop and enhance local emergency operations plans • Develop plans to address utility outages and emergencies • Continuity of Government/Continuity of Operations Planning • Develop city evacuation plans • Develop plans for public health emergencies and pandemics • Develop a written flood plans
Timeline	Completion by May 2026
Estimated Cost	Up to \$15,000 per plan for contract planner
Mitigation Measure Category	Emergency Services
Responsible Party	The City councils and emergency response entities of individual Benton County communities; Benton County EMA
Funding Source	City Councils of Benton County Municipalities
Related to Goals	1, 2, 4
Priority	1
Accomplished since 2011	<ul style="list-style-type: none"> • In 2015 the City of Atkins began the process of developing an emergency operations plan • In 2015 the City of Norway began working with Benton County Emergency Management to enhance current plans

Action Step 3	Establish community emergency response teams (CERT)
Applicable Hazards	All hazards
Applicable Communities	All communities, Benton County unincorporated
Analysis	The Community Emergency Response Team (CERT) Program educates people about disaster preparedness for hazards that may impact their area and trains them in basic disaster response skills, such as fire safety, light search and rescue, team organization, and disaster medical operations. Using the training learned in the classroom and during exercises, CERT members can assist others in their neighborhood or workplace following an event when professional responders are not immediately available to help. CERT members also are encouraged to support emergency response agencies by taking a more active role in emergency preparedness projects in their community. Currently none of the Benton County Communities have established CERT teams. Establishing CERT teams in every community in Benton County is integral to successful disaster and emergency management.
Timeline	Implementation by May 2026
Estimated Cost	\$5,000 per community
Responsible Party	Benton County EMA, City Councils, Emergency Services and citizens of Benton County Communities
Funding Source	The Dept. of Homeland Security has grant funds available to establish CERT Teams.
Mitigation Measure Category	Emergency Services
Related Goal	2,3,4,5,6
Priority	2
Accomplished since 2011	No community in Benton County has established a CERT Team, though several have expressed an interest in establishing the teams

Action Step 4	Improve public awareness of hazard risks and educate the public about measures they can take to protect themselves and their property from these hazards
Applicable Hazards	All hazards
Applicable Communities	All communities, Benton County unincorporated
Analysis	There are many measures that can be taken to prepare citizens for disaster and sustaining themselves for a prolonged period of time. Crucial to preparing citizens for disasters is education and awareness. Several publications to distribute to citizens and public announcements for news media have been produced by such entities as FEMA and the American Red Cross that describe the hazards and what people can do to prepare themselves for disaster. Placing copies of this information in the hands of Benton County residents and news media and encouraging them to take the necessary steps to prepare themselves is a critical step in disaster preparedness for Benton County. Social media is also a growing platform to use for informing the public about hazards and their risks.
Timeline	Education on this topic is an ongoing process that will continue past May 2021
Estimated Cost	The cost of this project can vary substantially based on what type of educational effort is made. For purposes of this plan, the cost estimate will assume that the county and individual communities of the county will contact every household by mail. According to 2010 Census estimates there are 26,076 residents living in 10,377 households in Benton County. Assuming \$1.00 cost per household (copies, postage and handling) it would cost the county and/or its individual communities \$25,000 annually for the educational effort. Use of social media could cost nothing other than the time it takes someone to post the information.
Mitigation Measure Category	Public Awareness and Education
Responsible Party	The City councils and emergency response entities of individual Benton County communities; Benton County EMA, Benton County, American Red Cross, FEMA
Funding Source	Individual Benton County communities; Benton County EMA, Benton County, American Red Cross, FEMA
Related to Goals	1, 2, 5
Priority	1
Accomplished since 2011	<ul style="list-style-type: none"> This is an ongoing mitigation activity. Since 2011 the Benton County EMA and local media have posted information concerning hazard risks and what Benton County residents can do to safeguard themselves from disasters and their impacts. The City of Atkins is also undertaking some efforts on its own to improve public awareness of hazard risks. The Norway Fire Department conducts an October Safety day at schools and daycare, plus promotes information on ALICE training, Elderly cooking hazards, CO Poisoning, Flooding and disaster preparation annually The Keystone Nursing Care Center is educated yearly by Benton EMA Coordinator on Weather, Fire and Emergency procedures

Action Step 5	Emergency/disaster response training and exercises for emergency responders and key county and community leaders
Applicable Hazards	All hazards
Applicable Communities	All communities, Benton County unincorporated
Analysis	Critical to effective response operations at a disaster or emergency incident is the training and knowledge of emergency responders, governing body officials, and others with expertise who have the potential of becoming involved. This training covers many aspects, including NIMS, incident management, actual strategic and tactical considerations. In Benton County a great deal of effort has already been expended in this area, but there is more to be done, particularly in regards to training new people who come into the system, continuing NIMS compliance requirements and the evolution of new equipment and guidance for response to disaster and emergency incidents of any magnitude and any potential hazard.
Timeline	Education on this topic is an ongoing process that will continue past May 2026
Estimated Cost	Much of the training can be obtained for free. In other cases depending upon the complexity and time commitment of the educational opportunity costs of up to \$5,000 or more per session could be incurred.
Mitigation Measure Category	Emergency Services
Responsible Party	The City councils and emergency response entities of individual Benton County communities; Benton County EMA, Benton County, the Duane Arnold Energy Center (DAEC)
Funding Source	Individual Benton County communities; Benton County EMA, Benton County, FEMA
Related to Goals	1,2,4
Priority	1
Accomplished since 2011	<ul style="list-style-type: none"> This is an ongoing mitigation activity. The Benton County EMA annually provides training to governing body officials, emergency responders and the general public about disaster management, Benton County EMA and disaster preparedness. In conjunction with the DAEC Nuclear Power Plant the Benton County EMA holds exercises annually concerning a potential incident at the plant. Various city and county officials participate in the exercise. The EMA and NWS service also provides severe weather spotter training annually that is attended by representatives of the county's emergency services as well as members of the general public. In 2014 representatives from the Norway Fire and Rescue Department and Blairstown Fire Department attended Bakken Crude Oil railcar disaster training in Pueblo, Colorado

Action Step 6	Maintain and support Community and County Public Safety and Emergency Service Departments
Applicable Hazards	All hazards
Applicable Communities	All Benton County communities, Benton County un-incorporated
Analysis	It is incumbent that the emergency response services of Benton County maintain adequate rosters of properly trained and equipped personnel in order to respond to disaster and emergencies anywhere in Benton County. Every disaster or emergency situation that can occur in Benton County has the potential for property loss, personal injury, multiple casualties and increased injuries and losses if consequences of the disaster are unabated. Benton County law enforcement, fire and EMS departments are the county's first line of defense and first responders to any disaster situation. These services require adequate personnel, training, PPE, equipment, communications capabilities, vehicles and apparatus and facilities and stations in order to fulfill their missions. In many instances local resources cannot provide adequate funding for these needs and outside assistance is needed.
Timeline	This is an ongoing need that will continue past 2031
Estimated Cost	This is project dependent and can range from \$0 for some training opportunities up through several million dollars for a new fire or emergency services station.
Mitigation Measure Category	Emergency Services
Responsible Party	Emergency service providers of Benton County.
Funding Source	Community and County emergency service providers; County, State, Federal and private grant sources
Related to Goals	1,2,4
Priority	1
Accomplished since 2011	<ul style="list-style-type: none"> • In 2011 the Garrison Fire Dept purchased all new PPE for every member of the department • Since 2011 the Urbana Fire Dept. has provide new PPE for all of its firefighters • Since 2011 the Urbana Police Dept. has provide new PPE for all of its officers • The Atkins FD has purchased new PPE for some of its members every year since 2011 • The Vinton Fire Dept. replaced PPE for half of the department's firefighters in 2013 • In 2013 the Atkins Fire Department placed a new first responder unit in service • In 2015 The Belle Plaine Ambulance Service initiated an effort to purchase a new ambulance • The Norway Fire/Rescue Department purchase a new Ambulance/First Responder unit in 2014 • In 2011 the Garrison Fire Protection Agency constructed a new Emergency Services Building

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- **The Vinton Fire Department purchased a new Engine in 2014**
 - **The Belle Plaine Fire Department purchased a new Engine in 2015**
 - **The Norway Fire Department purchased a new Engine in 2011**
 - **City of Keystone purchased a new first responder vehicle in 2019**
 - **In 2019 the City of Belle Plaine purchased a new brush truck and a used 1995 Freightliner pumper for the fire department.**
 - **Since 2016 the City of Belle Plaine has purchased 3 police vehicles.**
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Action Step 7	Obtain equipment to help mitigate effects of a disaster
Applicable Hazards	All hazards
Applicable Communities	All communities, Benton County unincorporated
Analysis	<p>The effects of some disasters can be mitigated with proper equipment. One such item is Standby (trash) pumps that are needed by municipalities in order to deal with flooded basements, sanitary and storm sewer systems and flood prone areas of the respective jurisdictions. Some communities of the county have trash pump capabilities that are inadequate. In some cities this mitigation capability is non-existent. Another item is snow removal equipment. Maintaining clear streets during winter driving conditions is vital to maintaining clear routes of travel for emergency equipment and safe travel for city residents. Cities of Benton County and the Benton County Secondary Roads Department have snow removal equipment, but there are inadequacies in some cities and at the county level that jeopardize removal of snow, a winter time safety measure.</p> <p>Other potential equipment needs are sandbagging machines, portable flood walls such as Hesco barriers,</p>
Timeline	Ongoing
Estimated Cost	\$5,000 to \$100,000 depending upon the item sought.
Mitigation Measure Category	Prevention
Responsible Party	Benton County communities and their respective public works departments, Benton County Board of Supervisors.
Funding Source	Local communities, FEMA Hazard Mitigation Project Grant
Related Goal	1, 2, 5
Priority	2
Accomplished since 2011	In 2014 the City of Garrison purchased a trash pump capable of handling the city's sanitary sewage system

Action Step 8	Encourage citizen disaster preparedness
Applicable Hazards	All hazards
Applicable Communities	All communities, Benton County unincorporated
Analysis	<p>Having citizens that are well prepared for a disaster could help to speed recovery after a disaster event occurs and may provide some peace of mind prior to and during and event.</p> <p>Some things that can be done to help citizens prepare themselves for a disaster include but are not limited to:</p> <p>Encourage residents to have Disaster Supply Kits on hand to be used in the event of a disaster event</p> <p>Promote NOAA weather radio use and encourage purchase of NOAA weather radios by vulnerable populations</p> <p>Promote use of disaster alerts and notifications via electronic media and devices</p> <p>Establish Good Neighbor programs for winter storms.</p>
Timeline	This is an ongoing mitigation effort that will continue until past 2026.
Mitigation Measure Category	Prevention
Estimated Cost	\$100-\$5,000 per household depending on the quality and quantity of items purchased or stored.
Responsible Party	The City councils and emergency response entities of individual Benton County communities; Benton County EMA, Private citizens
Funding Source	Individual citizens and households of Benton County
Related Goal	1, 2, 5
Priority	2
Accomplished since 2011	<ul style="list-style-type: none"> • Informational classes on citizen disaster preparedness were provided to the Benton County Disaster Recovery Coalition by the Benton County EMA in 2014. There has not been an organized effort to promote assembling Disaster Supply Kits, though individuals in the county have undertaken such efforts on their own. • The Norway Fire and Rescue Department provides information to residents about the kits each October and spring annually • Since 2016 the Benton County EMA and Benton County Disaster Recovery coalition present information about disaster supply kits at the Benton County-county-wide health fair sponsored by Virginia Gay Hospital. • Since 2015 over 1,000 backpacks with initial supplies for a disaster kit have been given away to Benton County citizens.

Action Step 9	Maintain electronic resource directory of local resources
Applicable Hazards	All hazards
Applicable Communities	All communities, Benton County Unincorporated
Analysis	In order to effectively manage any disaster or emergency situation, municipal and emergency management officials need to know what resources are available and where they can obtain the necessary resources for management of the situation. An electronic resource directory with lists of contact information for implementing the response of necessary resources is necessary in order to accomplish this objective. In 2009 the Benton County EMA was able to have such a resource directory developed with the use of DHS funds. It is now necessary to revise the directory annually in order to maintain accuracy.
Timeline	This is an ongoing mitigation activity that will continue past May 2026
Estimated Cost	This is a job function of Benton County EMA Coordinator or designee
Mitigation Measure Category	Emergency Services
Funding Source	Benton County EMA
Responsible Party	Benton County EMA
Funding Source	
Related to Goals	1, 2, 4
Priority	1
Accomplished since 2011	<ul style="list-style-type: none"> • The Benton County EMA Coordinator updates the directory as resources change • The Norway Fire and Rescue Department maintains a list of available resources that is updated annually

Action Step 10	Improve Benton County Radio Communications System Capabilities
Applicable Hazards	All hazards
Applicable Communities	All Benton County communities, Benton County un-incorporated
Analysis	Response to and mitigation of any disaster is reliant upon good communications between responding emergency service providers and other agencies. In Benton County all radio communications are managed through the Benton County Sheriff's Office Communications Center. The system in operation is outdated and in need of several upgrades. This situation frequently contributes to communications difficulty between the county's emergency responders and other agencies during day-to-day operations, emergency and disaster situation. The technology and equipment exists to correct these problems but the costs exceed the fiscal resources of Benton County's municipal jurisdictions and emergency response agencies.
Timeline	This is an ongoing need that will continue past 2026
Estimated Cost	Up to \$10 million for a complete system renovation.
Mitigation Measure Category	Emergency Services
Responsible Party	Benton County E911 Board, Emergency service providers of Benton County.
Funding Source	Community and County government, emergency service providers; County, State, Federal and private grant sources
Related to Goals	1,2,4
Priority	1
Accomplished since 2011	In 2020 the Benton County E911 Board purchased new pagers for all Benton County emergency responders and is in the process of engineering and obtaining costs for a county-wide 800 MHz radio system In 2020 the City of Keystone erected a new communications tower for communication with Benton County

Action Step 11	Install back-up power sources that will keep critical infrastructure and critical facilities operational during prolonged power outages
Applicable Hazards	Extreme Heat, Severe Winter Storm, Thunderstorm/Lightning/Hail, Tornado/Windstorm, Other Hazards
Applicable Communities	All communities Benton County unincorporated
Analysis	Emergency back-up electrical power generators are essential for keeping critical facilities and infrastructure operational during prolonged power outage situations. Facilities where generators are necessary include but are not limited to: public works facilities, city halls, municipal wells, water and wastewater treatment facilities, lift stations, emergency services buildings, emergency shelters; park, camp and recreational facilities. In Benton County only a small percentage of these facilities have generators.
Timeline	Installation by May 2026
Estimated Cost	Up to \$75,000 per generator
Mitigation Measure Category	Prevention
Responsible Party	The city councils and emergency response entities of individual Benton County communities; Benton County
Funding Source	Local communities, FEMA Hazard Mitigation Project Grants
Related to Goals	1,2,4
Priority	2
Accomplished since 2011	<ul style="list-style-type: none"> • In 2011 the City of Garrison and Garrison Fire Department installed a generator that will operate its Emergency Services Building, City Well and Water Treatment Plant • In 2014 the City of Mt. Auburn installed a generator that will operate its City Well and Water Treatment Plant • In 2012 the City of Urbana installed a generator that will operate its City Hall, Community Center and Emergency Services Building • In 2013 and 2104 the City of Blainstown installed a 4 generators, one each at the Water Treatment Plant, Wastewater Treatment Plant, Fire Station and Ambulance Garage • In 2013 the City of Belle Plaine installed a generator at the Belle Plaine Community Center which functions as an emergency shelter • A generator was retrofitted to run critical station functions at the Norway Fire/Rescue station in 2011 • Keystone Communications in 2012 installed a backup power generator to operate its phone and internet services during power outages • Since 2011 the Keystone Nursing and Care Center has added a second backup power generator • In 2011 the Van Horne Fire Department installed a backup power generator at the Van Horne Emergency Services Building • In 2018 the City of Norway installed a back-up power generator at its wastewater treatment facility

Action Step 12	Develop Community Emergency Shelters
Applicable Hazards	Extreme Heat, Severe Winter Storm, Thunderstorm/Lightning/Hail, Tornado/Windstorm, Other Hazards
Applicable Communities	All communities, Benton County Incorporated
Analysis	In 2009 the Benton County EMA, working with a consultant, undertook the project of identifying Community Emergency Shelters for every city of Benton County and developing policies and procedures for activating, operating and demobilizing these shelters. Every community participated in the process and has its own plan for shelter operations. The designation of such facilities is necessary in order to provide for the health, safety and sustenance needs of people displaced by disasters or suffering from such incidents as extreme heat, severe winter weather or energy disruption situations. Most of the shelters are not equipped with emergency power generators. The shelters are also without supplies and provisions. Equipping the shelters with emergency electrical power generators and stocking the shelters with provisions for feeding and other human needs is the next step in completing preparation of the shelters.
Timeline	As funding becomes available from each entity designated as a primary shelter, or as funding becomes available through grants or other sources up through May 2026.
Estimated Cost	This will be determined by the specific shelter. Costs could be as high as \$100,000 per shelter, particularly for those in need of a generator.
Mitigation Measure Category	Prevention
Responsible Party	The city councils of individual Benton County communities; Benton County, Benton County EMA, American Red Cross
Related to Goals	1,2,5,6
Priority	2
Accomplished since 2011	<ul style="list-style-type: none"> • In 2011 the City of Garrison designated the Garrison Emergency Services Building as the city's emergency shelter. The shelter has an emergency electrical power generator • In 2014 the Benton County Health Department provided six emergency cots plus bedding to every community in the county. • The City of Walford has designated its Community Center as an emergency shelter • In 2013 the Benton County Emergency Management Agency and Benton County Health Department provided a cart with provisions to shelter 25 people to the Belle Plaine Community Center • The Norway Fire Station was designated as a community shelter in 2012 • The Van Horne Emergency Services Building was designated as a community shelter in 2011

Action Step 13	Improve outdoor warning siren system
Applicable Hazards	Tornado/Windstorm, Infrastructure Failure, Thunderstorm/Lightning/Hail, Structural Fire, Grass and Wildland Fire
Applicable Communities	Atkins, Belle Plaine, Keystone, Luzerne, Mt. Auburn, Norway, Urbana, Van Horne, Benton County unincorporated
Analysis	Vulnerability to natural and manmade hazards can affect a variety of resident and transient populations in Benton County. Having the capability to avert personal harm and damage to property in the event of a natural or man-made disaster relies upon early warning capabilities. Establishing alert systems to address this need requires an audio capable siren warning system with a battery backup so the siren system remains functional during electrical power outages. Some cities of Benton County are in need of updating their siren warning system to have this capability. Additionally, this capability is needed in Benton County parks and rural areas.
Timeline	Installation or improvements by May 2026.
Estimated Cost	Costs per siren warning system is estimated at \$25,000 maximum.
Mitigation Measure Category	Emergency Services
Responsible Party	The city councils and emergency response entities of individual Benton County communities; Benton County
Funding Source	Local communities, FEMA Hazard Mitigation Project Grants
Related to Goals	1,2,3,4
Priority	2
Accomplished since 2011	<ul style="list-style-type: none"> • In 2011 the City of Garrison installed a new siren warning system • In 2014 the Cedar/M. Auburn Fire Department installed a new siren warning system for the City of Mt. Auburn • Since 2005 the City of Walford has updated its entire system of outdoor warning sirens • In 2015 the City of Belle Plaine upgraded the city's entire siren warning system • The City of Norway repaired its siren warning system in 2013 and 2014 • The City of Newhall installed a new siren warning system in 2019

Action Step 14	Construct public tornado safe rooms at vulnerable points
Applicable Hazards	Tornado/Windstorm, Thunderstorm/Lightning/Hail
Applicable Communities	Atkins, Keystone, Newhall, Norway, Shellsburg, Urbana, Van Horne, Vinton, Walford, Benton County unincorporated
Analysis	Users of parks and recreational areas are out in the open and could find themselves exposed to severe weather conditions, most notably the effects of a tornado or windstorm. Places of mass assembly or congregational living such as schools, daycare centers and senior citizen centers also present an area of vulnerability. Another area of vulnerability is mobile home parks and areas with homes that do not have basements. In Benton County there are a number of areas that have such exposures. The only resolution that protects the health and welfare of park and recreational area users from extreme weather is construction of a storm shelter. The shelter can be used as multi-purpose structures that can be used for more than just a severe weather retreat. There are occasionally funding opportunities for such a project through the Federal Emergency Management Agency. In order to be eligible for these funds, the proposed structure must meet certain design standards established by FEMA, must be readily accessible to the general public, and must be maintained. Benton County Schools Mitigation Measures are detailed in Appendix D, Page 685.
Timeline	The likelihood of accomplishing this goal hinges on the ability to secure outside funding assistance. No date for completion has been established for completion of such a project in any community.
Estimated Cost	\$300 per square foot
Mitigation Measure Category	Property protection
Responsible Party	City councils of Atkins, Keystone, Newhall, Norway, Shellsburg, Urbana, Van Horne, Vinton, Walford, Benton County EMA, Benton County, FEMA
Funding Source	Benton County Cities, FEMA Hazard Mitigation Project Grant
Related to Goals	1,2,3
Priority	2
Accomplished since 2011	In 2012 the City of Urbana installed a generator that allowed its City Hall to be designated as a safe room

Action Step 15	Encourage construction of tornado safe rooms
Applicable Hazards	Tornado/Windstorm, Thunderstorm/Lightning/Hail
Applicable Communities	All communities, Benton County unincorporated
Analysis	<p>The construction of tornado safe rooms in private residences, businesses, schools, municipal and government facilities and recreational areas in Benton County would likely be an educational process. The County EMA would work with private property and business owners, day care and senior citizen centers, municipal and school district officials to help them identify resources to help them successfully design and complete the construction of a safe room.</p> <p>Tornado safe rooms are, like tornado shelters are intended to provide a place of retreat for those individuals in a structure. The rooms are constructed to withstand very severe tornadic winds.</p> <p>Private property owners, business owners, municipal and school district officials of Benton County are encouraged to consider incorporating safe room into any new construction and considering retrofits into existing construction.</p> <p>Benton County Schools Mitigation Measures are detailed in Appendix D, Page 685.</p>
Timeline	<p>There is no timeline established for this particular action step.</p> <p>Accomplishment of this step will be contingent upon securing the necessary funding through personal or corporate finance or grant sources up through May 2026</p>
Mitigation Measure Category	Public Awareness and Education
Estimated Cost	<p>The cost of this project can vary substantially based on what type of educational effort is made. For purposes of this plan, the cost estimate will assume that the County will contact every household by mail or local access television. Estimates for this component are \$15,000 for the entire county. Construction costs for a tornado safe room are estimated at \$250 per square foot.</p>
Responsible Party	<p>Private property owners of Benton County, business owners of Benton County, municipal and school district officials of Benton County, Benton County Conservation, Benton County EMA, FEMA, Communities of Atkins, Keystone, Newhall, Norway, Shellsburg, Urbana, Van Horne, Walford, Benton County unincorporated</p>
Funding Sources	<p>Private property and business owners, School Districts, Municipal governments of Atkins, Keystone, Newhall, Norway, Shellsburg, Urbana, Van Horne, Walford, Benton County unincorporated; FEMA Hazard Mitigation Project Grant</p>
Related Goal	1,2.
Priority	1
Accomplished since 2011	<ul style="list-style-type: none"> There has not been any Tornado Safe Rooms constructed in Benton County since 2011. The new Benton County EOC which opened in 2011 is a FEMA P=361 rated Tornado Safe Room

Action Step 16	Flash Flood and River Flood preparation
Applicable Hazards	Flash Flood, River Flood
Applicable Communities	Atkins, Blainstown, Newhall, Norway, Shellsburg, Urbana, Vinton, Benton County Unincorporated
Analysis:	<p>Adequate preparation for flash flooding or river flooding requires a broad range of activities including but not limited to everything from training and education through having staged resources such as sandbags and Hesco barriers. Within this scope of activities, the following are some specific actions:</p> <ol style="list-style-type: none"> 1) Sandbags and sandbagging equipment: A supply of at least 20,000 sandbags strategically positioned around the county along with the necessary sandbag filling equipment readily available is necessary in order to prevent flood damage in those cities and areas of Benton County that experience river and flash flooding problems. Cities of the county that are most prone to flooding in the county include Blainstown, Newhall, Norway, Shellsburg, Vinton, Benton County Unincorporated. Also necessary is a stockpile of 500 tons of sand for filling at least 20,000 sandbags. 2) Floodplain Manager Training: Cities of Benton County and Benton County have designated floodplain managers. None of them have had formal training in this capacity. Formal training is necessary in order for the Floodplain manager to fully understand all of the regulations and intricacies of floodplain management. 3) Compliance with National Flood Insurance Program (NFIP) regulations: All municipal jurisdictions are required to address NFIP requirements. Membership in the National Flood Insurance Program is necessary to enable property owners to purchase flood insurance. Membership carries the responsibility for cities and the county to have and enforce a local floodplain ordinance. 4) Acquisition of portable flood barriers such as Hesco Barriers. In many situations use of portable flood barriers is financially more feasible than permanent solutions such as dikes and property buyouts. In those situations, rapid deployment of portable flood barriers is a necessity in preventing flood damage. 5) Movement of critical infrastructure out of flood plain areas. This is particularly applicable in the City of Vinton where the Fire Station, Electrical Generation Plant, North Benton Ambulance, Police Department headquarters and Vinton City Hall are located within the flood plain.
Timeline:	Ongoing mitigation effort that will continue until May 2026.
Estimated Cost:	Variable, from \$0 for NFIP compliance up to over \$100,000 for Hesco barriers

Mitigation Measure Category	Prevention
Responsible Party	Public works departments of Atkins, Blairstown, Newhall, Norway, Shellsburg, Urbana, Vinton, Benton County, Benton County Secondary Roads, Benton County EMA.
Funding Sources	Cities of Atkins, Blairstown, Newhall, Norway, Shellsburg, Urbana, Vinton; Benton County
Related Goal #:	1, 2, 6, 7
Priority	2
Accomplished since 2011	<ul style="list-style-type: none"> • In 2014 the City of Blairstown established a supply of sand bags and sand • Since 2012 the City of Norway has maintained a readily available supply of sand bags and sand • Since 2011 the City of Shellsburg has maintained a readily available supply of sand bags and sand • Since 2011 the City of Vinton has purchased Hesco barriers to protect a critical area of the city within the floodplain. The barriers have been deployed three times • All Benton County communities are in compliance with flood manager training

Action Step 17	Flood proofing private property and public infrastructure
Applicable Hazards	Flash Flood, River Flood
Applicable Communities	Newhall, Norway, Urbana, Vinton, Benton County unincorporated
Analysis:	<p>1) Continue to identify, purchase, and remove structures, critical assets and populations in danger of being flooded. The only sure method of totally eliminating a structure from the threat of damage by flooding is to totally remove the structure from the floodplain. The FEMA Flood Buy Out program is one method of accomplishing this mission. Under the auspices of the program, the U.S. government purchases the property and residents relocate to a safe location out of the flood plain. The City of Vinton and Benton County have been progressive in identifying, structures that are in the flood plain that are good candidates for removal because of repetitive loss problems due to flooding. Following the floods of June, 2008, 31 residential structures in the City of Vinton qualified for FEMA flood buyout funding.</p> <p>2) Elevate structures above flood plain level. According to information provided by the Benton County Assessor and GIS department in 2016 there were an estimated 1,477 structures in Benton County that lie within floodplains or flood prone areas of the county. One strategy for alleviating or minimizing the impact of flooding on any of these structures is to raise the structure above the flood plain level.</p> <p>3) Continue to evaluate critical public utilities (i.e. lift stations, wells, etc.) for ways they can be further flood proofed. Protecting infrastructure and critical public utilities from floodwaters can require several remedies including but not limited to erection of berms, construction of floodwalls, installation of generators and trash pumps, even relocation of a facility. Some engineering studies have been undertaken in Benton County to determine what can be done to protect some facilities and infrastructure such as the City of Vinton Electrical Utility plant which would require construction of a floodwall estimated at costing \$12 million.</p> <p>4) Raise road grades to eliminate backup flooding damage. Some roads in Benton County become impassable due to river and flash flooding situations when they occur. Such a situation is an impediment to traffic flow in the county. In some instances the resolution to this problem lies in raising the road above the level of the 100 or 500 year flood plain.</p> <p>5) Infrastructure development and landscaping to alleviate surface water problems and flash flooding. Some areas of Benton County incur flash flooding issues due to lack of appropriate infrastructure and unfavorable terrain.</p>
Timeline:	This is an ongoing mitigation effort. As funding becomes available through FEMA, grants or property owner investment through May 2031

Estimated Cost:	Unknown. Costs are subject to approval for funding and values of the individual structures and magnitude of the particular project.
Mitigation Measure Category	Prevention, Property Protection
Responsible Party	City of Newhall, Norway, Urbana, Vinton, Benton County, FEMA
Funding Sources	Private funds, Benton County cities, CDBG Grant, FEMA Hazard Mitigation Project Grants
Related Goal #:	1, 2, 3, 5, 6, 7
Priority	2
Accomplished since 2011	In 2011 the Benton County Sheriff Office and Benton County EMA moved into a new facility that was constructed with a ground floor level one foot above the 500 year flood level There were two property buyouts in the City of Vinton following the floods of 2016

Action Step 18	Continue HAZMAT agreements and support regional HAZMAT teams
Applicable Hazards	Other Hazards
Applicable Communities	All Communities, Benton County unincorporated
Analysis	Benton County maintains a 28E agreement with the Linn County Hazardous Material Response Team for hazmat response assistance anywhere in Benton County. It is incumbent that the agreement be maintained.
Timeline	Indefinite, the agreement will continue past May 2021 and can be discontinued only upon the agreement of both parties, Benton County and the Linn County HazMat. Team.
Mitigation Measure Category	Emergency Services
Estimated Cost:	\$4,500 annually from Benton County, \$1,500 annually from grants
Responsible Party	Benton County Board of Supervisors
Funding Source	Benton County, FEMA
Related Goal	1, 2, 5
Priority	1
Accomplished since 2011	Benton County has maintained the agreement with the Linn County Hazardous Materials Response Team as agreed by contract.

Action Step 19	Improve safety at rail crossings
Applicable Hazards	Other Hazards
Applicable Communities	Belle Plaine, Blirstown, Luzerne, Mt Auburn, Norway, Shellsburg, Vinton, Benton County unincorporated
Analysis	Benton County has three railroads. Nearly 100 trains per day travel 24 miles of track through the cities of Belle Plaine, Blirstown and Norway on a busy double rail line operated by the Union Pacific Railroad. The Iowa Northern Railroad passes two trains daily over 25 miles of track through Mt. Auburn, Vinton and Shellsburg. Two miles of track operated by the Cedar Rapids—Iowa City Railroad pass through Walford in the southeast corner of the county. Every intersection of these rail lines with county and city roads requires annual maintenance. Individual communities and Benton County Secondary Roads have identified crossings that require additional improvements and safety enhancements which can include the installation of signals and cross arms.
Timeline	Ongoing through May 2021
Estimated Cost	\$1,000 annually per crossing for maintenance. Up to \$150,000 per crossing for upgrading including installation of signals and cross arms.
Mitigation Measure Category	Prevention
Responsible Party	Cities of Belle Plaine, Blirstown, Luzerne, Mt. Auburn, Norway, Shellsburg, Vinton, Benton County unincorporated, Iowa Northern Railroad, Iowa City Railroad, Union Pacific Railroad
Funding Sources	Cities of Belle Plaine, Blirstown, Luzerne, Mt. Auburn, Norway, Shellsburg, Vinton, Benton County unincorporated, Iowa Northern Railroad, Iowa City Railroad, Union Pacific Railroad
Related Goal	1, 2, 3
Priority	1
Accomplished since 2011	There have not been any railroad crossings that have been improved or upgraded since 2011. They have all, however been adequately maintained

Action Step 20	Planning and medical equipment to support human disease and pandemic response
Applicable Hazards	Other Hazards--Human Disease Pandemic
Applicable Communities	All Benton County communities, Benton County un-incorporated
Analysis	The 2020 COVID-19 Pandemic created financial, medical equipment, PPE and personnel needs challenges for Benton County municipalities, Benton County government, the county's emergency services, the county's school systems and the county's medical facilities. Successfully meeting the challenges of this pandemic disaster and any future pandemics may require resources beyond the county's current capabilities. These resources may include but are not limited to development of pandemic prevention and response plans, PPE needs, medical equipment needs, emergency services responder and health care provider needs.
Timeline	This is an ongoing need that will continue past 2026
Estimated Cost	This is project dependent and can range from \$0 for some training opportunities up through several million dollars for new health care facilities.
Mitigation Measure Category	Emergency Services
Responsible Party	Emergency service providers of Benton County.
Funding Source	Community and County government, county health care providers, emergency service providers; County, State, Federal and private grant sources
Related to Goals	1,2,4
Priority	1
Accomplished since 2011	In 2020 the City of Belle Plaine purchased PPE for Covid-19 and sanitizer for cleaning city hall and police vehicles. The city also purchased Plexiglass for the window at city hall and the desk at the library, UV lights for the four furnaces in city hall that sanitize the air four times per hour and Chrome Books so that city council meetings could be conducted remotely if needed. Benton County Public Health and EMA developed a reserve supply of PPE in 2020. All medical facilities, schools, nursing homes and extended care facilities in Benton County and Benton County government buildings implemented COVID-19 control policies and procedures in 2020.

Action Step 21	Continue to cooperate with local medical facilities and Health Department officials to increase the likelihood of detection and proper response to animal/plant/crop disease incidents
Applicable Hazards	Other Hazards
Applicable Communities	All communities, Benton County unincorporated
Analysis	Once an animal or plant disease is detected and determined to be a threat to the community a proper response must occur in order to reduce risk of sickness and/or death. In order for this response to be effective it is important for several first responder organizations to work cooperatively. This type of response requires coordination not only during a response, but also planning for the response in advance of an event. Reporting and monitoring standard operating procedures are in place throughout the community, state, and nation. These efforts and the cooperation it takes to make them effective are deemed as crucial toward mitigating the risk of disease.
Timeline	This is an ongoing process, led by the Benton County Public Health Department through May 2026
Estimated Cost	N/A—ongoing process
Mitigation Measure Category	Prevention
Responsible Party	Benton County Public Health Department, Virginia Gay Hospital in Vinton
Funding Sources	Benton County Public Health Department, USDA
Related to Goals	1,2
Priority	1
Accomplished since 2011	No known activity

Benton County Schools Mitigation Measures are profiled in Appendix D, Page 685.

Vinton Municipal Electric Utility (VMEU) Mitigation Measures are profiled in Appendix E, Page 693.

ANALYSIS OF MITIGATION ACTIVITIES—STAPLEE CRITERIA

The Benton County Hazard Mitigation Planning Committee used the STAPLEE evaluation criteria (Social, Technical, Administrative, Political, Legal, Economic and Environmental) in narrowing the list of potential mitigation measures to the future hazard mitigation activities accepted by the committee. The Committee identified a time line for each activity, identified the responsible party or parties for each activity and finally related each activity to at least one of the five Hazard Mitigation Plan Goals. Each activity was also categorized with a ranking of 1, 2 or 3 according to the criteria described on page 476.

Below is a summary of the STAPLEE evaluation criteria applied to each mitigation activity: Each of the evaluation criteria was given a ranking of +3, +2, +1, 0, -1, -2, -3 with +3 being the most positive impact, 0 being no impact and -3 being the most negative impact.

Social

Evaluates public support of the overall implementation strategy and specific mitigation actions. Factors the Committee considered were:

- Will the action adversely affect one segment of the population?
- Will the action disrupt established neighborhoods or cause the relocation of lower income people?
- Is the action compatible with present and future community values?

Technical

Evaluates the technical feasibility of the proposed action. Factors the Committee considered were:

- How effective is the action in avoiding or reducing future losses?
- Will it create more problems than it solves?
- Does it solve the problem?

Administrative

Evaluates the community's staffing, funding, and maintenance capabilities. Factors the Committee considered were:

- Does the community have the staff, technical experts, and/or funding to implement the action?
- Can the community provide the necessary maintenance?
- Can it be accomplished in a timely manner?

Political.

Evaluates the political acceptability of the action. Factors the Committee considered were:

- Is there political support to implement and maintain the action?
- Have political leaders participated in the planning process?
- Have all stakeholders been provided with an opportunity to participate in the planning process?

Legal

Evaluates the community's legal authority to implement the action. Factors the Committee considered were:

- Does the city have authority to implement the action?
- Are the proper laws, ordinances and resolution in place to implement the action?

NOTE: The City has the legal authority to implement all alternatives selected for consideration.

Economic

Evaluates economic feasibility and cost-effectiveness of the action. Factors the Committee considered were:

- Are there current sources of funds to implement the action?
- What benefits will the action provide?
- Does the cost seem reasonable for the size of the problem and likely benefits?
- What burden will be placed on the tax base or local economy to implement the action?
- Does the action contribute to other community economic goals?
- What proposed actions should be considered but be "tabled" for implementation until outside sources of funding are available?

Environmental

Evaluates the impact on the environment. Factors the Committee considered were:

- How will the action affect the environment (land, water, endangered species)?
- Will the action comply with local, state, and federal environmental laws or regulations?

CATEGORIZING MITIGATION MEASURES

Following is the criteria applied to categorizing the mitigation activities.

- 1: Those mitigation activities that are ongoing in the community and need to be sustained. Those activities that would have the largest and most immediate mitigation impact on threats to the lives of Benton County residents and property in Benton County. Mitigation activities Benton County can undertake with the resources the city has available. Mitigation activities that are required in order to satisfy regulation or compliance issues.
- 2: Those mitigation activities that are beyond the resources of Benton County and are only achievable with an infusion of resources such as a grant.
- 3: Those mitigation activities that are of the lowest impact. Mitigation activities that address hazards that are the remotest nature in their possibility of occurrence.

BENTON COUNTY MITIGATION MEASURES								
STAPLEE CRITERIA APPLICATION	Social	Technical	Administrative	Political	Legal	Economical	Environmental	TOTAL VALUE
Public awareness	+3	+1	+1	+3	+2	-1	0	+9
Develop and enhance local emergency operations plan	+2	+1	+1	+1	+1	+1	+1	+8
Establish community emergency response teams (CERT)	+3	0	0	+1	+1	-1	+2	+6
Improve public awareness of hazard risks and educate the public about measures they can take to protect themselves and their property from these hazards	+2	+1	+1	+1	+1	0	0	+6
Emergency/disaster response training for emergency responders and key county and community leaders	+2	+1	+1	+1	+1	0	0	+6
Maintain and support Community and County Public Safety and Emergency Service Departments	+3	+1	-2	+2	+1	0	0	+5
Obtain equipment to help mitigate effects of a disaster	+2	0	+1	0	0	-1	+1	+3
Encourage citizen disaster preparedness	+3	0	-1	+2	0	-2	0	+2
Maintain electronic resource directory of local resources	+3	-1	-2	+1	+2	0	+1	+2
Improve Benton County Radio Communications System Capabilities	+1	+1	-1	0	+2	-2	0	+1
Install back-up power sources that will keep critical infrastructure and critical facilities operational during prolonged power outages	+3	+1	0	+2	+2	-2	0	+6
Develop community emergency shelters	+3	0	-1	+1	+1	0	0	+5
Improve outdoor warning siren system	+2	+1	0	+1	+2	-2	0	+4
Construct public tornado safe rooms at vulnerable points	+3	+1	0	+1	+1	-3	0	+3
Flood proofing private property and public infrastructure	+2	0	0	+1	+1	-2	+2	+4
Encourage construction of tornado safe rooms	+2	0	-1	0	0	-1	+1	+1
Flash Flood and River Flood preparation	+2	0	0	0	+1	+2	+2	+7
Continue Hazmat agreements and support Regional Hazmat Team	+1	+2	0	+1	+2	-1	+3	+8
Improve safety at rail crossings	+3	-1	-1	+2	+3	-1	0	+5
Planning and medical equipment to support human disease and pandemic response	+3	0	-1	-1	+2	0	0	+3
Continue to cooperate with local medical facilities and Health Department officials to increase the likelihood of detection and proper response to animal/plant/crop disease incidents	+1	0	-1	+1	+1	0	0	+2

PRIORITIZING MITIGATION MEASURES

In an effort to establish a prioritization of mitigation actions the Benton County Hazard Mitigation Planning Committee conducted an analysis to determine which of the mitigation actions listed above are “high pay-off” actions. These “high pay-off” actions are generally actions that are technically feasible and cost-effective while also providing for multiple benefits or risk reduction related to multiple hazards. Additionally, actions that are prioritized are associated with mitigation of higher priority hazards from the hazard analysis and risk assessment process.

For this analysis, actions were weighted according to the hazard priority group classification (see page 325) of the hazards the action is designed to address. A priority I hazard receives a score of 3; priority group II a score of 2 and priority group III a score of 1. The scores of the hazards correlated with each mitigation action were then summed for each action. The highest score possible was 16, ($3 \times 3 + 2 \times 2 + 3 \times 1 = 16$) for a mitigation action that correlated with all hazards. The lowest possible score was 1. Next considered was the STAPLEE score (pages 477-480).

Ranking of Action Steps	Mitigation Action	Hazard Priority Score	STAPLEE Score
1	Public awareness	16	9
2	Develop and enhance local emergency operations plan	16	8
3	Establish community emergency response teams (CERT)	16	6
4	Improve public awareness of hazard risks and educate the public about measures they can take to protect themselves and their property from these hazards	16	6
5	Emergency/disaster response training and exercises for emergency responders and key county and community leaders	16	6
6	Maintain and support Community and County Public Safety and Emergency Service Departments	16	5
7	Obtain equipment to help mitigate effects of a disaster	16	3
8	Encourage citizen disaster preparedness	16	2
9	Maintain electronic resource directory of local resources	16	2
10	Improve Benton County Radio Communications System Capabilities	16	1
11	Install back-up power sources that will keep critical infrastructure and critical facilities operational during prolonged power outages	13	6
12	Develop community emergency shelters	14	5

Ranking of Action Steps	Mitigation Action	Hazard Priority Score	STAPLEE Score
13	Improve outdoor warning siren system	7	4
14	Construct public tornado safe rooms at vulnerable points	6	3
15	Encourage construction of tornado safe rooms	6	1
16	Flash Flood and River Flood preparation	3	7
17	Flood proofing private property and public infrastructure	3	4
18	Continue Hazmat agreements and support Regional Hazmat Team	1	8
19	Improve safety at rail crossings	1	5
20	Planning and medical equipment to support human disease and pandemic response	1	3
21	Continue to cooperate with local medical facilities and Health Department officials to increase the likelihood of detection and proper response to animal/plant/crop disease incidents	1	2

BENEFIT COST ANALYSIS OF MITIGATION MEASURES

The following table depicts financial considerations of Benton County Mitigation Measures. The measures are presented in their prioritized order. Estimated costs and potential funding sources are shown where known. In those cases where a potential funding source could not be identified, none are indicated. Estimated costs are based on a variety of sources including other documents, previous or other planning documents; known costs of other projects already undertaken by the city; estimates or bids obtained from subject matter experts. Estimates of ongoing actions are based on the Hazard Mitigation Committee's knowledge of the activity in question.

Feasibilities for each action are listed as good, fair or poor. Projects that are ongoing or already budgeted for completion are defined as good. Projects that have an identified funding source without funding secured are defined as fair. Projects with no identified funding source are defined as poor. Though committee members did take STAPLEE criteria, Hazard Priority Score and Mitigation Measure Priorities under consideration, it was the observation of the committee that the availability of funding for mitigation measures would be the best determinant of whether a project is completed or not.

MITIGATION MEASURE	Estimated Cost	Federal Funds	State Funds	Local Funds	Feasibility
1. Public awareness	0-Up to \$25,000				Good
2. Develop and enhance local emergency operations plan	Up to \$15,000 per plan for contract planner	\$75%		\$25%	Fair
3. Establish community emergency response teams (CERT)	\$5,000 per community	100%			Fair
4. Improve public awareness of hazard risks and educate the public about measures they can take to protect themselves and their property from these hazards	\$25,000 annually				Poor
5. Emergency/disaster response training and exercises for emergency responders and key county and community leaders	Up to \$5,000 per class	75%		25%	Fair
6. Maintain and support Community and County Public Safety and Emergency Service Departments	Variable—depends on need and project	Up to 95%			Fair

BENTON COUNTY 2021 MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN SECTION 6

MITIGATION MEASURE	Estimated Cost	Federal Funds	State Funds	Local Funds	Feasibility
7. Obtain equipment to help mitigate effects of a disaster	Up to \$100,000				Fair
8. Encourage citizen disaster preparedness	Up to \$5,000				Fair
9. Maintain electronic resource directory of local resources	0				Good
10. Improve Benton County Radio Communications System Capabilities	Up to \$10 million				Fair
11. Install back-up power sources that will keep critical infrastructure and critical facilities operational during prolonged power outages	Up to \$75,000 per generator	75%		25%	Fair
12. Develop community emergency shelters	Up to \$100,000 per shelter	75%		25%	Fair
13. Improve outdoor warning siren system	Up to \$35,000 per system	75%		25%	Fair
14. Construct public tornado safe rooms at vulnerable points	Minimum of \$250,000 per facility	75%		25%	Fair
15. Encourage construction of tornado safe rooms	\$250 per square foot	75%		25%	Fair
16. Flash Flood and River Flood preparation	Up to over \$100,000	75%		25%	Fair
17. Flood proofing private property and public infrastructure	Variable--unknown				Fair
18. Continue Hazmat agreements and support Regional Hazmat Team	\$6,000 annually			100%	Good
19. Improve safety at rail crossings	Up to \$150,000 per crossing				Poor
20. Planning and medical equipment to support human disease and pandemic response	Up to several million dollars				Fair

MITIGATION MEASURE	Estimated Cost	Federal Funds	State Funds	Local Funds	Feasibility
21. Continue to cooperate with local medical facilities and Health Department officials to increase the likelihood of detection and proper response to animal/plant/crop disease incidents	Ongoing program			100%	Good

IMPLEMENTATION STRATEGY

A requirement of mitigation plans is that they include an action plan (in this case, referred to as the implementation strategy). This section describes how the mitigation strategies identified in the previous section will be prioritized, implemented and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs. Jurisdictions were asked to identify their top 10-15 (or so) mitigation actions. While these actions will be priorities for implementation, this does not mean that the other actions identified in the previous section will not be pursued; in the event that unanticipated funding becomes available, a jurisdiction may change their prioritization and pursue one option ahead of their anticipated schedule. These actions were identified by the committees as actions that were believed to be cost effective and were well supported by the community

CITY OF ATKINS MITIGATION STRATEGY 2021

Rank	Mitigation Action/ Program/ Project	Hazard Addressed	Applies to Existing or New Assets	Existing Local Implementation Mechanism	Primary Responsible Agency	Years	Estimated Cost	Funding Source	Related Goals
1	Develop and enhance local emergency operations plan	All hazards	Existing	Atkins City Council	City of Atkins	5	\$15,000	See Action Step 2	1, 2, 4
2	Maintain and support Community and County Public Safety and Emergency Service Departments	All Hazards	Existing	Atkins Fire Department Benton County Sheriff's Office Benton County EMA	City of Atkins Atkins Benefitted Fire District Benton County	Ongoing	\$0 to multi million. Project dependent	See Action Step 6	1, 2, 4
3	Develop community emergency shelters	Extreme Heat, Severe Winter Storm, Thunderstorm /Lightning/Hail Tornado/Wind storm, Other Hazards	New	Capital Improvement Program	City of Atkins	5	\$100,000	See Action Step 12	1,2,5,6

BENTON COUNTY 2021 MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN SECTION 6

Rank	Mitigation Action/ Program/ Project	Hazard Addressed	Applies to Existing or New Assets	Existing Local Implementation Mechanism	Primary Responsible Agency	Years	Estimated Cost	Funding Source	Related Goals
4	Install backup power sources that will keep critical infrastructure and critical facilities operational during prolonged power outages	Extreme Heat, Severe Winter Storm, Thunderstorm/Lightning/Hail, Tornado/Windstorm,	New	Capital Improvement Program	City of Atkins	3	\$75,000	See Action Step 11	1, 2, 4
5	Improve public awareness of hazard risks and educate the public about measures they can take to protect themselves and their property	All hazards	Existing	Atkins Fire Department Benton County EMA	City of Atkins	5	\$2,000	See Action Step 4	1, 2, 5

BENTON COUNTY 2021 MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN SECTION 6

Rank	Mitigation Action/ Program/ Project	Hazard Addressed	Applies to Existing or New Assets	Existing Local Implementation Mechanism	Primary Responsible Agency	Years	Estimated Cost	Funding Source	Related Goals
6	Emergency/disaster response training and exercises for emergency responders and key county and community leaders	All hazards	Existing	Benton County EMA	Benton County EMA	3	\$1,000	See Action Step 5	1, 2, 4
7	Maintain electronic resource directory of local resources	All hazards	Existing	City of Atkins Atkins Fire Department	City of Atkins Atkins Fire Department	2	\$2,500	See Action Step 9	1, 2, 4
8	Encourage construction of tornado safe rooms	Tornado/Winds torm, Thunderstorm/Lightning/Hail	New	Capital Improvement Plan	City of Atkins	5	\$5,000 for 4 person unit	See Action Step 15	1, 2
9	Planning and medical equipment to support human disease and pandemic response	Other hazards— Human disease pandemic	Existing	City of Atkins Benton County Public Health	City of Atkins Benton County Public Health	2	\$25,000	See Action Step 20	1, 2, 4

CITY OF BELLE PLAINE MITIGATION STRATEGY 2021

Rank	Mitigation Action/ Program/ Project	Hazard Addressed	Applies to Existing or New Assets	Existing Local Implementation Mechanism	Primary Responsible Agency	Years	Estimated Cost	Funding Source	Related Goals
1	Maintain and support Community and County Public Safety and Emergency Service Departments	All Hazards	Existing	Belle Plaine Fire Department Belle Plaine Ambulance Belle Plaine Police Department Benton County EMA	City of Belle Plaine Belle Plaine Ambulance Belle Plaine Police Department	Ongoing	\$0 to multi million. Project dependent	See Action Step 6	1, 2, 4
2	Continue HAZMAT agreements and support regional HAZMAT teams	Other Hazards-- Hazardous Materials Incidents, Terrorism	Existing	Benton County EMA	Benton County Supervisors	5	\$6,000 annually	See Action Step 18	1, 2, 5
3	Encourage citizen disaster preparedness	All hazards	Existing	Benton County Media & Educational Classes	Benton County EMA	5	\$3,000	See Action Step 8	1, 2, 50

BENTON COUNTY 2021 MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN SECTION 6

Rank	Mitigation Action/ Program/ Project	Hazard Addressed	Applies to Existing or New Assets	Existing Local Implementation Mechanism	Primary Responsible Agency	Years	Estimated Cost	Funding Source	Related Goals
4	Install backup power sources that will keep critical infrastructure and critical facilities operational during prolonged power outages	Extreme Heat, Severe Winter Storm, Thunderstorm /Lightning/Hail, Tornado/Windstorm, Other Hazards	New	Capital Improvement Program	City of Belle Plaine	3	\$75,000	See Action Step 11	1, 2, 4
5	Public Awareness	All Hazards	Existing	Belle Plaine City Council Benton County EMA	City of Belle Plaine	1	\$3,000	See Action Step 1	1
6	Develop and enhance local emergency operations plan	All hazards	Existing	Belle Plaine City Council	City of Belle Plaine	3	\$15,000	See Action Step 2	1, 2, 4
7	Improve public awareness of hazard risks and educate the public about measures they can take to protect themselves and their property	All hazards	Existing	Belle Plaine City Council Benton County EMA	City of Belle Plaines Benton County EMA	5	\$2,000	See Action Step 4	1, 2, 5

BENTON COUNTY 2021 MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN SECTION 6

Rank	Mitigation Action/ Program/ Project	Hazard Addressed	Applies to Existing or New Assets	Existing Local Implementation Mechanism	Primary Responsible Agency	Years	Estimated Cost	Funding Source	Related Goals
8	Emergency/disaster response training and exercises for emergency responders and key county and community leaders	All hazards	Existing	Benton County EMA	Benton County EMA	5	\$5,000	See Action Step 5	1,2,4
9	Improve outdoor warning system	Tornado/Wind storm, Infrastructure Failure, Thunderstorm /Lightning/Hail Structural Fire	Existing	Belle Plaine City Council	City of Belle Plaine	3	\$35,000	See Action Step 13	1, 2, 3, 4
10	Planning and medical equipment to support human disease and pandemic response	Other hazards— Human disease pandemic	Existing	City of Belle Plaine Benton County Public Health	City of Belle Plaine Benton County Public Health	2	\$25,000	See Action Step 20	1, 2, 4

CITY OF BLAIRSTOWN MITIGATION STRATEGY 2021

Rank	Mitigation Action/ Program/ Project	Hazard Addressed	Applies to Existing or New Assets	Existing Local Implementation Mechanism	Primary Responsible Agency	Years	Estimated Cost	Funding Source	Related Goals
1	Maintain and support Community and County Public Safety and Emergency Service Departments	All Hazards	Existing	Blairstown Fire Department Blairstown Ambulance Service Benton County Sheriff's Office Benton County EMA	City of Blairstown Blairstown Fire Department Blairstown Ambulance Service Benton County	Ongoing	\$0 to multi million. Project dependent	See Action Step 6	1, 2, 4
2	Improve public awareness of hazard risks and educate the public about measures they can take to protect themselves and their property	All hazards	Existing	Blairstown City Council Benton County EMA	City of Blairstown Benton County EMA	5	\$2,000	See Action Step 4	1, 2, 5

BENTON COUNTY 2021 MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN SECTION 6

Rank	Mitigation Action/ Program/ Project	Hazard Addressed	Applies to Existing or New Assets	Existing Local Implementation Mechanism	Primary Responsible Agency	Years	Estimated Cost	Funding Source	Related Goals
3	Encourage citizen disaster preparedness	All hazards	Existing	Benton County Media & Educational Classes	City of Blainstown Benton County EMA	5	\$100 to \$5,000 per household	See Action Step 8	1, 2, 5
4	Develop community emergency shelters	Extreme Heat, Severe Winter Storm, Thunderstorm /Lightning/Hail Tornado/Wind storm, Other Hazards	New	Capital Improvement Program	City of Blainstown	5	\$50,000	See Action Step 12	1,2,5,6
5	Install backup power sources that will keep critical infrastructure and critical facilities operational during prolonged power outages	Extreme Heat, Severe Winter Storm, Thunderstorm /Lightning/Hail Tornado/Wind storm, Other Hazards	New	Capital Improvement Program	City of Blainstown	3	\$75,000	See Action Step 11	1, 2, 4
6	Planning and medical equipment to support human disease and pandemic response	Other hazards— Human disease pandemic	Existing	City of Blainstown Benton County Public Health	City of Blainstown Benton County Public Health	2	\$25,000	See Action Step 20	1, 2, 4

BENTON COUNTY 2021 MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN SECTION 6

Rank	Mitigation Action/ Program/ Project	Hazard Addressed	Applies to Existing or New Assets	Existing Local Implementation Mechanism	Primary Responsible Agency	Years	Estimated Cost	Funding Source	Related Goals
7	Emergency/ disaster response training and exercises for emergency responders and key county and community leaders	All hazards	Existing	Benton County EMA	Benton County EMA	5	\$5,000	See Action Step 5	1,2,4

CITY OF GARRISON MITIGATION STRATEGY 2021

Rank	Mitigation Action/ Program/ Project	Hazard Addressed	Applies to Existing or New Assets	Existing Local Implementation Mechanism	Primary Responsible Agency	Years	Estimated Cost	Funding Source	Related Goals
1	Develop and enhance local emergency operations plan	All hazards	Existing	Garrison City Council	City of Garrison	3	\$15,000	See Action Step 2	1, 2, 4
2	Maintain and support Community and County Public Safety and Emergency Service Departments	All Hazards	Existing	Garrison Fire Department Garrison First Responders Benton County Sheriff's Dept. Benton County EMA	City of Garrison Benton County	Ongoing	\$0 to multi million. Project dependent	See Action Step 6	1, 2, 4
3	Improve public awareness of hazard risks and educate the public about measures they can take to protect themselves and their property	All hazards	Existing	Garrison Fire Department Benton County EMA	City of Garrison	5	\$2,000	See Action Step 4	1, 2, 5

BENTON COUNTY 2021 MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN SECTION 6

Rank	Mitigation Action/ Program/ Project	Hazard Addressed	Applies to Existing or New Assets	Existing Local Implementati on Mechanism	Primary Responsible Agency	Years	Estimated Cost	Funding Source	Related Goals
4	Emergency/disaster response training and exercises for emergency responders and key county and community leaders	All hazards	Existing	Benton County EMA	Benton County EMA	5	\$5,000	See Action Step 5	1,2,4
5	Encourage citizen disaster preparedness	All hazards	Existing	Benton County Media & Educational Classes	Benton County EMA	5	Up to \$5,000	See Action Step 8	1, 2, 50
6	Continue HAZMAT agreements and support regional HAZMAT teams	Hazardous Materials Incidents, Terrorism	Existing	Benton County EMA	Benton County Supervisors	5	\$6,000 annually	See Action Step 21	1, 2, 5
7	Install backup power sources that will keep critical infrastructure and critical facilities operational during prolonged power outages	Extreme Heat, Severe Winter Storm, Thunderstorm /Lightning/Hail Tornado/Wind storm, Other Hazards	New	Capital Improvement Program	City of Garrison	3	\$75,000	See Action Step 11	1, 2, 4
8	Planning and medical equipment to support human disease and pandemic response	Other hazards— Human disease pandemic	Existing	City of Garrison Benton County Public Health	City of Garrison Benton County Public Health	2	\$25,000	See Action Step 20	1, 2, 4

CITY OF KEYSTONE MITIGATION STRATEGY 2021

Rank	Mitigation Action/ Program/ Project	Hazard Addressed	Applies to Existing or New Assets	Existing Local Implementati on Mechanism	Primary Responsible Agency	Years	Estimated Cost	Funding Source	Related Goals
1	Maintain and support Community and County Public Safety and Emergency Service Departments	All Hazards	Existing	Keystone Fire Department Keystone First Responders Benton County Sheriff's Dept. Benton County EMA	City of Keystone Benton County	Ongoing	\$0 to multi million. Project dependent	See Action Step 6	1, 2, 4
2	Develop and enhance local emergency operations plan	All hazards	Existing	Keystone City Council	City of Keystone	3	\$15,000	See Action Step 2	1, 2, 4
3	Improve public awareness of hazard risks and educate the public about measures they can take to protect themselves and their property	All hazards	Existing	Keystone Fire Department	City of Keystone	5	\$2,000	See Action Step 4	1, 2, 5
4	Emergency/disaster response training and exercises for emergency responders and key county and community leaders	All hazards	Existing	Benton County EMA	Benton County EMA	5	\$5,000	See Action Step 5	1,2,4

BENTON COUNTY 2021 MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN SECTION 6

Rank	Mitigation Action/ Program/ Project	Hazard Addressed	Applies to Existing or New Assets	Existing Local Implementation Mechanism	Primary Responsible Agency	Years	Estimated Cost	Funding Source	Related Goals
5	Encourage citizen disaster preparedness	All hazards	Existing	Benton County Media & Educational Classes	Benton County EMA	5	Up to \$5,000	See Action Step 8	See Action Step 8
6	Install backup power sources that will keep critical infrastructure and critical facilities operational during prolonged power outages	Extreme Heat, Severe Winter Storm, Thunderstorm/Lightning/Hail, Tornado/Windstorm, Terrorism. Other Hazards	New	Capital Improvement Program	City of Keystones	3	\$75,000	See Action Step 11	1, 2, 4
7	Improve outdoor warning system	Tornado/Windstorm, Infrastructure Failure, Thunderstorm/Lightning/Hail, Structural Fire	Existing	Keystone City Council	City of Keystone	3	\$35,000	See Action Step 13	1, 2, 3, 4
8	Planning and medical equipment to support human disease and pandemic response	Other hazards—Human disease pandemic	Existing	City of Keystone Benton County Public Health	City of Keystone Benton County Public Health	2	\$25,000	See Action Step 20	1, 2, 4

CITY OF LUZERNE MITIGATION STRATEGY 2021

Rank	Mitigation Action/ Program/ Project	Hazard Addressed	Applies to Existing or New Assets	Existing Local Implementation Mechanism	Primary Responsible Agency	Years	Estimated Cost	Funding Source	Related Goals	
1	Develop and enhance local emergency operations plan	All hazards		Existing	Luzerne City Council	City of Luzerne	3	\$15,000	See Action Step 2	1, 2, 4
2	Maintain and support Community and County Public Safety and Emergency Service Departments	All Hazards		Existing	Luzerne Fire Department Benton County Sheriff’s Dept. Benton County EMA	City of Luzerne Benton County	Ongoing	\$0 to multi million. Project dependent	See Action Step 6	1, 2, 4
3	Establish community emergency response teams (CERT)	All hazards	Existing	Luzerne City Council	City of Luzerne	3	\$5,000	See Action Step 3	2, 3, 4, 5, 6	
4	Improve public awareness of hazard risks and educate the public about measures they can take to protect themselves and their property	All hazards		Existing	Luzerne Fire Department	City of Luzerne	5	\$1,000	See Action Step 4	1, 2, 5

BENTON COUNTY 2021 MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN SECTION 6

Rank	Mitigation Action/ Program/ Project	Hazard Addressed	Applies to Existing or New Assets	Existing Local Implementation Mechanism	Primary Responsible Agency	Years	Estimated Cost	Funding Source	Related Goals
5	Encourage citizen disaster preparedness	All hazards	Existing	Benton County Media & Educational Classes	Benton County EMA	5	Up to \$5,000	See Action Step 8	1, 28
6	Improve outdoor warning system	Tornado/Windstorm, Infrastructure Failure, Thunderstorm/Lightning/Hail, Structural Fire	Existing	Luzerne City Council	City of Luzerne	3	\$35,000	See Action Step 13	1, 2, 3, 4
7	Obtain equipment to help mitigate effects of a disaster	Severe Winter Storm	Existing	Luzerne City Council	City of Luzerne	3	\$5,000	See Action Step 7	2
8	Planning and medical equipment to support human disease and pandemic response	Other hazards—Human disease pandemic	Existing	City of Luzerne Benton County Public Health	City of Luzerne Benton County Public Health	2	\$25,000	See Action Step 20	1, 2, 4

CITY OF MT. AUBURN MITIGATION STRATEGY 2021

Rank	Mitigation Action/ Program/ Project	Hazard Addressed	Applies to Existing or New Assets	Existing Local Implementation Mechanism	Primary Responsible Agency	Years	Estimated Cost	Funding Source	Related Goals
1	Maintain and support Community and County Public Safety and Emergency Service Departments	All Hazards	Existing	Mt. Auburn Fire Department Benton County Sheriff's Dept. Benton County EMA	City of Mt Auburn Benton County	Ongoing	\$0 to multi million. Project dependent	See Action Step 6	1, 2, 4
2	Develop and enhance local emergency operations plan	All hazards	Existing	Mt. Auburn City Council	City of Mt. Auburn	3	\$15,000	See Action Step 2	1, 2, 4
3	Encourage citizen disaster preparedness	All hazards	Existing	Benton County Media & Educational Classes	Benton County EMA	5	Up to \$5,000	See Action Step 8	1, 2
4	Emergency/ disaster response training and exercises for emergency responders and key county and community leaders	All hazards	Existing	Benton County EMA	Benton County EMA	3	\$3,000	See Action Step 5	1, 2, 4
5	Develop community emergency shelters	Extreme Heat, Severe Winter Storm, Thunderstorm/Lightning/Hail, Tornado/Windstorm. Other Hazards	New	Capital Improvement Program	City of Mt. Auburn	5	\$50,000	See Action Step 12	1,2,5,6

BENTON COUNTY 2021 MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN SECTION 6

Rank	Mitigation Action/ Program/ Project	Hazard Addressed	Applies to Existing or New Assets	Existing Local Implementation Mechanism	Primary Responsible Agency	Years	Estimated Cost	Funding Source	Related Goals
6	Planning and medical equipment to support human disease and pandemic response	Other hazards— Human disease pandemic	Existing	City of Luzerne Benton County Public Health	City of Mt. Auburn Benton County Public Health	2	\$25,000	See Action Step 20	1, 2, 4
7	Improve outdoor warning system	Tornado/Windstorm, Infrastructure Failure, Thunderstorm/Lightning/Hail, Structural Fire	Existing	Mt. Auburn City Council	City of Mt. Auburn	3	\$35,000	See Action Step 13	1, 2, 3, 4
8	Install backup power sources that will keep critical infrastructure and critical facilities operational during prolonged power outages	Extreme Heat, Severe Winter Storm, Thunderstorm/Lightning/Hail, Tornado/Windstorm, Terrorism. Other Hazards	New	Capital Improvement Program	City of Mt. Auburn	3	\$35,000	See Action Step 11	1, 2, 4

CITY OF NEWHALL MITIGATION STRATEGY 2021

Rank	Mitigation Action/ Program/ Project	Hazard Addressed	Applies to Existing or New Assets	Existing Local Implementati on Mechanism	Primary Responsible Agency	Years	Estimated Cost	Funding Source	Related Goals
1	Maintain and support Community and County Public Safety and Emergency Service Departments	All Hazards	Existing	Newhall Fire & Rescue Dept. Benton County Sheriff's Dept. Benton County EMA	City of Newhall Benton County	Ongoing	\$0 to multi million. Project dependent	See Action Step 6	1, 2, 4
2	Install backup power sources that will keep critical infrastructure and critical facilities operational during prolonged power outages	Infrastructure Failure, Extreme Heat, Severe Winter Storm, Thunderstorm Lightning/Hail, Tornado/Windstorm, Terrorism	New	Capital Improvement Program	City of Newhall	3	\$75,000	See Action Step 16	1, 2, 4
3	Develop community emergency shelters	Extreme Heat, Severe Winter Storm, Thunderstorm Lightning/Hail, Tornado/Windstorm, Other Hazards	New	Capital Improvement Program	City of Newhall	5	\$50,000	See Action Step 12	1,2,5,6
4	Construct public tornado safe rooms at vulnerable points	Tornado/ Windstorm, Thunderstorm/ Lightning/Hail,	New	Capital Improvement Program	City of Newhall	5	\$250 per square foot	See Action Step 14	1, 2, 3

BENTON COUNTY 2021 MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN SECTION 6

Other Hazards

Rank	Mitigation Action/ Program/ Project	Hazard Addressed	Applies to Existing or New Assets	Existing Local Implementatio n Mechanism	Primary Responsible Agency	Years	Estimated Cost	Funding Source	Related Goals
5	Develop and enhance local emergency operations plan	All hazards	Existing	Newhall City Council	City of Newhall	3	\$14,000	See Action Step 2	1, 2, 4
6	Encourage citizen disaster preparedness	All hazards	Existing	Benton County Media & Educational Classes	Benton County EMA	5	Up to \$5,000	See Action Step 8	1, 2
7	Emergency/ disaster response training and exercises for emergency responders and key county and community leaders	All hazards	Existing	Benton County EMA	Benton County EMA	3	\$3,000	See Action Step 5	1, 2, 4
8	Planning and medical equipment to support human disease and pandemic response	Other hazards— Human disease pandemic	Existing	City of Newhall Benton County Public Health	City of Newhall Benton County Public Health	2	\$25,000	See Action Step 20	1, 2, 4

CITY OF NORWAY MITIGATION STRATEGY 2021

Rank	Mitigation Action/ Program/ Project	Hazard Addressed	Applies to Existing or New Assets	Existing Local Implementation Mechanism	Primary Responsible Agency	Years	Estimated Cost	Funding Source	Related Goals
1	Maintain and support Community and County Public Safety and Emergency Service Departments	All Hazards	Existing	Norway Fire & Rescue Dept. Benton County Sheriff's Dept. Benton County EMA	City of Norway Benton County	Ongoing	\$0 to multi million. Project dependent	See Action Step 6	1, 2, 4
2	Develop and enhance local emergency operations plan	All hazards	Existing	Norway City Council	City of Norway	3	\$14,000	See Action Step 2	1, 2, 4
3	Continue HAZMAT agreements and support regional HAZMAT teams	Hazardous Materials Incidents, Terrorism	Existing	Benton County EMA	Benton County Supervisors	5	\$6,000 annually	See Action Step 18	1, 2, 5
4	Install backup power sources that will keep critical infrastructure and critical facilities operational during prolonged power outages	Extreme Heat, Severe Winter Storm, Thunderstorm/Lightning/Hail, Tornado/Windstorm, Terrorism. Other Hazards	New	Capital Improvement Program	City of Newhall	3	\$35,000	See Action Step 11	1, 2, 4
5	Improve outdoor warning system	Tornado/Windstorm, Infrastructure Failure, Thunderstorm/Lightning/Hail, Structural Fire	Existing	Norway City Council	City of Norway	3	\$35,000	See Action Step 13	1, 2, 3, 4

BENTON COUNTY 2021 MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN SECTION 6

Rank	Mitigation Action/Program / Project	Hazard Addressed	Applies to Existing or New Assets	Existing Local Implementation Mechanism	Primary Responsible Agency	Years	Estimated Cost	Funding Source	Related Goals
6	Encourage citizen disaster preparedness	All hazards	Existing	Benton County Media & Educational Classes	Benton County EMA	5	\$100 to \$5,000 per household	See Action Step 8	1, 2, 5
7	Improve public awareness of hazard risks and educate the public about measures they can take to protect themselves and their property	All hazards	Existing	Norway Fire and Rescue Department	City of Norway	5	\$1,000	See Action Step 4	1, 2, 5
8	Develop community emergency shelters	Extreme Heat, Severe Winter Storm, Thunderstorm/Lightning/Hail, Tornado/Windstorm, Other Hazards	New	Capital Improvement Program	City of Norway	5	\$50,000	See Action Step 12	1,2,5, 6
9	Construct public tornado safe rooms at vulnerable points	Tornado/Windstorm, Thunderstorm/Lightning/Hail, Other Hazards	New	Capital Improvement Program	City of Norway	5	\$250 per square foot	See Action Step 14	1, 2, 3
10	Planning and medical equipment to support human disease and pandemic response	Other hazards— Human disease pandemic	Existing	City of Norway Benton County Public Health	City of Norway Benton County Public Health	2	\$25,000	See Action Step 20	1, 2, 4

CITY OF SHELLSBURG MITIGATION STRATEGY 2021

Rank	Mitigation Action/ Program/ Project	Hazard Addressed	Applies to Existing or New Assets	Existing Local Implementation Mechanism	Primary Responsible Agency	Years	Estimated Cost	Funding Source	Related Goals
1	Maintain and support Community and County Public Safety and Emergency Service Departments	All Hazards	Existing	Shellsburg Fire Department Shellsburg First Responders Benton County Sheriff's Dept. Benton County EMA	City of Shellsburg Benton County	Ongoing	\$0 to multi million. Project dependent	See Action Step 6	1, 2, 4
2	Develop community emergency shelters	Infrastructure Failure, Extreme Heat, Severe Winter Storm, Thunderstorm/ Lightning/Hail, Tornado/Windstorm	New	Capital Improvement Program	City of Shellsburg	5	\$50,000	See Action Step 12	1,2,5,6
4	Install backup power sources that will keep critical infrastructure and critical facilities operational during prolonged power outages	Extreme Heat, Severe Winter Storm, Thunderstorm Lightning/Hail, Tornado/Windstorm, Terrorism. Other Hazards	New	Capital Improvement Program	City of Shellsburg	3	\$35,000	See Action Step 11	1, 2, 4

BENTON COUNTY 2021 MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN SECTION 6

Rank	Mitigation Action/ Program/ Project	Hazard Addressed	Applies to Existing or New Assets	Existing Local Implementation Mechanism	Primary Responsible Agency	Years	Estimated Cost	Funding Source	Related Goals
5	Emergency/ disaster response training and exercises for emergency responders and key county and community leaders	All hazards	Existing	Benton County EMA	Benton County EMA	3	\$1,000	See Action Step 5	1, 2, 4
6	Develop community emergency shelters	Extreme Heat, Severe Winter Storm, Thunderstorm/ Lightning/Hail, Tornado/ Windstorm, Other Hazards	New	Capital Improvement Program	City of Shellsburg	5	\$50,000	See Action Step 12	1,2,5,6
7	Develop and enhance local emergency operations plan	All hazards	Existing	Shellsburg City Council	City of Shellsburg	3	\$15,000	See Action Step 2	1, 2, 4
8	Planning and medical equipment to support human disease and pandemic response	Other hazards— Human disease pandemic	Existing	City of Shellsburg Benton County Public Health	City of Shellsburg Benton County Public Health	2	\$25,000	See Action Step 20	1, 2, 4
9	Encourage citizen disaster preparedness	All hazards	Existing	Benton County Media & Educational Classes	Benton County EMA	5	\$100 to \$5,000 per household	See Action Step 8	1, 2, 5

BENTON COUNTY 2021 MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN SECTION 6

Rank	Mitigation Action/ Program/ Project	Hazard Addressed	Applies to Existing or New Assets	Existing Local Implementat ion Mechanism	Primary Responsible Agency	Years	Estimated Cost	Funding Source	Related Goals
10	Improve public awareness of hazard risks and educate the public about measures they can take to protect themselves and their property	All hazards	Existing	Shellsburg Fire Department City of Shellsburg Benton County EMA	City of Shellsburg Benton County EMA	5	\$1,000	See Action Step 4	1, 2, 5

CITY OF URBANA MITIGATION STRATEGY 2021

Rank	Mitigation Action/ Program/ Project	Hazard Addressed	Applies to Existing or New Assets	Existing Local Implementati on Mechanism	Primary Responsible Agency	Years	Estimated Cost	Funding Source	Related Goals
1	Maintain and support Community and County Public Safety and Emergency Service Departments	All Hazards	Existing	Urbana Fire Department North Benton Ambulance Benton County EMA	City of Urbana Benton County Urbana/Polk Township Fire Protection Agency	Ongoing	\$0 to multi million. Project dependent	See Action Step 6	1, 2, 4
2	Emergency/disaster response training and exercises for emergency responders and key county and community leaders	All hazards	Existing	Benton County EMA	Benton County EMA	5	\$5,000	See Action Step 5	1,2,4
3	Continue HAZMAT agreements and support regional HAZMAT teams	Hazardous Materials Incidents, Terrorism	Existing	Benton County EMA	Benton County Supervisors	5	\$6,000 annually	See Action Step 18	1, 2, 5
4	Develop and enhance local emergency operations plan	All hazards	Existing	Urbana City Council	City of Urbana	3	\$15,000	See Action Step 2	1, 2, 4

BENTON COUNTY 2021 MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN SECTION 6

Rank	Mitigation Action/ Program/ Project	Hazard Addressed	Applies to Existing or New Assets	Existing Local Implementati on Mechanism	Primary Responsible Agency	Years	Estimated Cost	Funding Source	Related Goals
5	Develop community emergency shelters	Extreme Heat, Severe Winter Storm, Thunderstorm/Lightning/Hail, Tornado/Windstorm, Other Hazards	New	Capital Improvement Program	City of Urbana	5	\$50,000	See Action Step 12	1,2,5,6
6	Flood proofing private property and public infrastructure	Flash Flood, River Flood	Existing	Urbana Public Works Dept.	City of Urbana	2	\$100,000	See Action Step 42	1, 2, 5
7	Planning and medical equipment to support human disease and pandemic response	Other hazards— Human disease pandemic	Existing	City of Urbana Benton County Public Health	City of Urbana Benton County Public Health	2	\$25,000	See Action Step 20	1, 2, 4
8	Install backup power sources that will keep critical infrastructure and critical facilities operational during prolonged power outages	Extreme Heat, Severe Winter Storm, Thunderstorm/Lightning/Hail, Tornado/Windstorm, Terrorism. Other Hazards	New	Capital Improvement Program	City of Urbana	3	\$35,000	See Action Step 11	1, 2, 4
9	Encourage citizen disaster preparedness	All hazards	Existing	Benton County Media & Educational Classes	Benton County EMA	5	\$100 to \$5,000 per household	See Action Step 8	1, 2, 5

BENTON COUNTY 2021 MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN SECTION 6

Rank	Mitigation Action/ Program/ Project	Hazard Addressed	Applies to Existing or New Assets	Existing Local Implementati on Mechanism	Primary Responsible Agency	Years	Estimated Cost	Funding Source	Related Goals
10	Improve public awareness of hazard risks and educate the public about measures they can take to protect themselves and their property	All hazards	Existing	Urbana Fire Department City of Urbana Benton County EMA	City of Urbana Benton County EMA	5	\$1,000	See Action Step 4	1, 2, 5

CITY OF VAN HORNE MITIGATION STRATEGY 2021

Rank	Mitigation Action/ Program/ Project	Hazard Addressed	Applies to Existing or New Assets	Existing Local Implementation Mechanism	Primary Responsible Agency	Years	Estimated Cost	Funding Source	Related Goals
1	Maintain and support Community and County Public Safety and Emergency Service Departments	All Hazards	Existing	Van Horne Fire Department Van Horne First Responders Benton County Sheriff's Department Benton County EMA	City of Van Horne	Ongoing	\$0 to multi million. Project dependent	See Action Step 6	1, 2, 4
2	Emergency/ disaster response training and exercises for emergency responders and key county and community leaders	All hazards	Existing	Benton County EMA	Benton County EMA	3	\$1,000	See Action Step 5	1, 2, 4
3	Develop and enhance local emergency operations plan	All hazards	Existing	Van Horne City Council	City of Van Horne	3	\$15,000	See Action Step 2	1, 2, 4
4	Continue HAZMAT agreements and support regional HAZMAT teams	Hazardous Materials Incidents, Terrorism	Existing	Benton County EMA	Benton County Supervisors	5	\$6,000 annually	See Action Step 18	1, 2, 5
5	Encourage construction of tornado safe rooms	Tornado/Windstorm, Thunderstorm/ Lightning/Hail	New	Capital Improvement Plan	City of Van Horne	5	\$5,000 for 4 person unit \$250 per square foot for larger facilities	See Action Step 15	1, 2

BENTON COUNTY 2021 MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN SECTION 6

Rank	Mitigation Action/ Program/ Project	Hazard Addressed	Applies to Existing or New Assets	Existing Local Implementation Mechanism	Primary Responsible Agency	Years	Estimated Cost	Funding Source	Related Goals
6	Develop community emergency shelters	Extreme Heat, Severe Winter Storm, Thunderstorm/ Lightning/Hail, Tornado/ Windstorm, Other Hazards	New	Capital Improvement Program	City of Van Horne	5	\$50,000	See Action Step 12	1,2,5,6
7	Planning and medical equipment to support human disease and pandemic response	Other hazards— Human disease pandemic	Existing	City of Van Horne Benton County Public Health	City of Van Horne Benton County Public Health	2	\$25,000	See Action Step 20	1, 2, 4
8	Install backup power sources that will keep critical infrastructure and critical facilities operational during prolonged power outages	Extreme Heat, Severe Winter Storm, Thunderstorm/ Lightning/Hail, Tornado/ Windstorm, Terrorism. Other Hazards	New	Capital Improvement Program	City of Van Horne	3	\$35,000	See Action Step 11	1, 2, 4
10	Improve public awareness of hazard risks and educate the public about measures they can take to protect themselves and their property	All hazards	Existing	Van Horne Fire Department City of Van Horne Benton County EMA	City of Van Horne Benton County EMA	5	\$1,000	See Action Step 4	1, 2, 5

CITY OF VINTON MITIGATION STRATEGY 2021

Rank	Mitigation Action/ Program/ Project	Hazard Addressed	Applies to Existing or New Assets	Existing Local Implementation Mechanism	Primary Responsible Agency	Years	Estimated Cost	Funding Source	Related Goals
1	Maintain and support Community and County Public Safety and Emergency Service Departments	All Hazards	Existing	Vinton Fire Department North Benton Ambulance Service Vinton Police Department Benton County EMA	City of Vinton	Ongoing	\$0 to multi million. Project dependent	See Action Step 6	1, 2, 4
2	Develop and enhance local emergency operations plan	All hazards	Existing	Vinton City Council	City of Vinton	3	\$15,000	See Action Step 2	1, 2, 4
3	Improve public awareness of hazard risks and educate the public about measures they can take to protect themselves and their property	All hazards	Existing	Vinton Fire Department City of Vinton Benton County EMA	City of Vinton Benton County EMA	5	\$5,000	See Action Step 4	1, 2, 5
4	Continue HAZMAT agreements and support regional HAZMAT teams	Hazardous Materials Incidents, Terrorism	Existing	Benton County EMA	Benton County Supervisors	5	\$6,000 annually	See Action Step 18	1, 2, 5

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Rank	Mitigation Action/ Program/ Project	Hazard Addressed	Applies to Existing or New Assets	Existing Local Implementation Mechanism	Primary Responsible Agency	Years	Estimated Cost	Funding Source	Related Goals
5	Encourage citizen disaster preparedness	All hazards	Existing	Benton County Media & Educational Classes	Benton County EMA	5	\$100 to \$5,000 per household	See Action Step 8	1, 2, 5
6	Continue to cooperate with local medical facilities and Public Health Department officials to increase the likelihood of detection and proper response to animal/plant/crop disease incidents	Animal/Plant /Crop Disease	Existing	USDA Benton County Public Health	Benton County Public Health Department, Virginia Gay Hospital in Vinton	5	\$5,000	See Action Step 21	1, 2
7	Encourage construction of tornado safe rooms	Tornado/Wind storm, Thunderstorm /Lightning/Hail	New	Capital Improvement Plan	City of Vinton	5	\$5,000 for 4 person unit \$250 per square foot for larger facilities	See Action Step 15	1, 2
8	Install backup power sources that will keep critical infrastructure and critical facilities operational during prolonged power outages	Extreme Heat, Severe Winter Storm, Thunderstorm /Lightning/Hail Tornado/Wind storm, Terrorism. Other Hazards	New	Capital Improvement Program	City of Vinton	3	\$35,000	See Action Step 11	1, 2, 4

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Rank	Mitigation Action/ Program/ Project	Hazard Addressed	Applies to Existing or New Assets	Existing Local Implementation Mechanism	Primary Responsible Agency	Years	Estimated Cost	Funding Source	Related Goals
9	Develop community emergency shelters	Extreme Heat, Severe Winter Storm, Thunderstorm /Lightning/Hail Tornado/Wind storm, Other Hazards	New	Capital Improvement Program	City of Vinton	5	\$50,000	See Action Step 12	1,2,5,6
10	Planning and medical equipment to support human disease and pandemic response	Other hazards— Human disease pandemic	Existing	City of Vinton Benton County Public Health	City of Vinton Benton County Public Health	2	\$25,000	See Action Step 20	1, 2, 4
11	Public Awareness	All Hazards	Existing	Vinton City Council Benton County EMA	City of Vinton	1	\$3,000	See Action Step 1	1
12	Flood proofing private property and public infrastructure	Flash Flood, River Flood	Existing	Vinton Public Works Dept.	City of Vinton	2	\$100,000	See Action Step 42	1, 2, 5
12	Flash Flood and River Flood preparation	Flash Flood, River Flood	Existing	Vinton Public Works Dept.	City of Vinton	2	\$100,000	See Action Step 42	1, 2, 5

CITY OF WALFORD MITIGATION STRATEGY 2021

Rank	Mitigation Action/ Program/ Project	Hazard Addressed	Applies to Existing or New Assets	Existing Local Implementation Mechanism	Primary Responsible Agency	Years	Estimated Cost	Funding Source	Related Goals	
1	Maintain and support Community and County Public Safety and Emergency Service Departments	All Hazards	Existing	Fairfax/Walford Fire Department Cedar Rapids Area Ambulance Linn County Sheriff's Department Benton County Sheriff's Department Benton County EMA	City of Walford	Ongoing	\$0 to multi million. Project dependent	See Action Step 6	1, 2, 4	
2	Develop and enhance local emergency operations plan	All hazards	Existing	Walford City Council	City of Walford		3	\$15,000	See Action Step 2	1, 2, 4
3	Improve public awareness of hazard risks and educate the public about measures they can take to protect themselves and their property	All hazards	Existing	Fairfax/Walford Fire Department City of Walford Benton County EMA	City of Walford Benton County EMA		5	\$5,000	See Action Step 4	1, 2, 5

BENTON COUNTY 2021 MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN SECTION 6

Rank	Mitigation Action/ Program/ Project	Hazard Addressed	Applies to Existing or New Assets	Existing Local Implementation Mechanism	Primary Responsible Agency	Years	Estimated Cost	Funding Source	Related Goals
4	Maintain electronic resource directory of local resources	All hazards	Existing	Fairfax/Walford Fire Department	Fairfax/Walford Fire Department City of Walford	2	\$2,500	See Action Step 9	1, 2, 4
5	Encourage citizen disaster preparedness	All hazards	Existing	Benton County Media & Educational Classes	Benton County EMA	5	\$100 to \$5,000 per household	See Action Step 8	1, 2, 5
6	Install backup power sources that will keep critical infrastructure and critical facilities operational during prolonged power outages	Extreme Heat, Severe Winter Storm, Thunderstorm/Lightning/Hail, Tornado/Windstorm, Terrorism. Other Hazards	New	Capital Improvement Program	City of Walford	3	\$35,000	See Action Step 11	1, 2, 4
7	Develop community emergency shelters	Extreme Heat, Severe Winter Storm, Thunderstorm/Lightning/Hail, Tornado/Windstorm, Other Hazards	New	Capital Improvement Program	City of Walford	5	\$50,000	See Action Step 12	1,2,5,6
8	Planning and medical equipment to support human disease and pandemic response	Other hazards—Human disease pandemic	Existing	City of Walford Benton County Public Health	City of Walford Benton County Public Health	2	\$25,000	See Action Step 20	1, 2, 4

BENTON COUNTY 2021 MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN SECTION 6

Rank	Mitigation Action/ Program/ Project	Hazard Addressed	Applies to Existing or New Assets	Existing Local Implementation Mechanism	Primary Responsible Agency	Years	Estimated Cost	Funding Source	Related Goals
9	Flood proofing private property and public infrastructure	Flooding—Flash and Riverine	Existing	City of Walford FEMA	City of Walford FEMA		5 \$250,000	See Action Step 17	1, 2, 5

BENTON COUNTY HAZARD MITIGATION STRATEGY 2021

Rank	Mitigation Action/ Program/ Project	Hazard Addressed	Applies to Existing or New Assets	Existing Local Implementation Mechanism	Primary Responsible Agency	Years	Estimated Cost	Funding Source	Related Goals
1	Develop and enhance local emergency operations plan	All hazards	Existing	Benton County EMA	Benton County EMA	5	\$14,000	See Action Step 2	1, 2, 4
2	Improve public awareness of hazard risks and educate the public about measures they can take to protect themselves and their property from these hazards	All hazards	Existing	Benton County Media & Educational Classes	Benton County EMA	5	\$11,000	See Action Step 4	1, 2, 5
3	Emergency/disaster response training and exercises for emergency responders and key county and community leaders	All hazards	Existing	Benton County EMA	Benton County EMA	5	\$5,000	See Action Step 5	1,2,4
4	Maintain and support Community and County Public Safety and Emergency Service	All Hazards	Existing	Benton County Sheriff's Department Benton County EMA	Benton County	Ongoing	\$0 to multi million. Project dependent	See Action Step 6	1, 2, 4

BENTON COUNTY 2021 MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN SECTION 6

Departments

Rank	Mitigation Action/ Program/ Project	Hazard Addressed	Applies to Existing or New Assets	Existing Local Implementation Mechanism	Primary Responsible Agency	Years	Estimated Cost	Funding Source	Related Goals
5	Encourage citizen disaster preparedness	All hazards	Existing	Benton County Media & Educational Classes	Benton County EMA		5 \$100 to \$5,000 per household	See Action Step 8	1, 2, 5
6	Continue HAZMAT agreements and support regional HAZMAT teams	Hazardous Materials Incidents, Terrorism	Existing	Benton County EMA	Benton County Supervisors		5 \$6,000 annually	See Action Step 21	1, 2, 5
7	Continue to cooperate with local medical facilities and Public Health Department officials to increase the likelihood of detection and proper response to animal/plant/crop disease incidents	Animal/Plant/Crop Disease	Existing	USDA Benton County Public Health	Benton County Public Health Department, Virginia Gay Hospital in Vinton		5 \$5,000	See Action Step 21	1, 2
8	Improve outdoor warning system	Tornado/Windstorm, Infrastructure Failure, Thunderstorm/Lightning/Hail, Structural Fire	Existing	Benton County EMA	Benton County Board of Supervisors		3 \$35,000	See Action Step 13	1, 2, 3, 4
9	Planning and medical equipment to support human disease and pandemic	Other hazards—Human disease pandemic	Existing	City of Walford Benton County Public Health	City of Walford Benton County Public Health		2 \$25,000	See Action Step 20	1, 2, 4

BENTON COUNTY 2021 MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN SECTION 6

response

Rank	Mitigation Action/ Program/ Project	Hazard Addressed	Applies to Existing or New Assets	Existing Local Implementation Mechanism	Primary Responsible Agency	Years	Estimated Cost	Funding Source	Related Goals
10	Install backup power sources that will keep critical infrastructure and critical facilities operational during prolonged power outages	Extreme Heat, Severe Winter Storm, Thunderstorm/ Lightning/Hail, Tornado/Windstorm, Terrorism. Other Hazards	New	Benton County Supervisors	Benton County	3	\$35,000	See Action Step 11	1, 2, 4
11	Encourage construction of tornado safe rooms	Tornado/Windstorm, Thunderstorm/Lightning/Hail	New	Benton County EMA	Benton County Supervisors FEMA	5	\$5,000 for 4 person unit \$250 per square foot for larger facilities	See Action Step 15	1, 2
12	Continue to cooperate with local medical facilities and Health Department officials to increase the likelihood of detection and proper response to animal/plant/crop disease incidents	Animal/Plant/Crop Disease, Terrorism	Existing	Benton County Media & Educational Classes	Benton County Supervisors Benton County FSA	4	\$10,000	See Action Step 21	1, 2
13	Flood proofing private property and public infrastructure	Flash Flood, River Flood	Existing	Benton County EMA	Benton County Supervisors FEMA	2	Up to \$100,000	See Action Step 17	1, 2, 5

BENTON COUNTY 2021 MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN SECTION 6

Rank	Mitigation Action/ Program/ Project	Hazard Addressed	Applies to Existing or New Assets	Existing Local Implementation Mechanism	Primary Responsible Agency	Years	Estimated Cost	Funding Source	Related Goals
14	Flash Flood and River Flood preparation	Flash Flood, River Flood	Existing	Benton County EMA	Benton County Supervisors FEMA	2	Up to \$100,000	See Action Step 16	1, 2, 5

SECTION 7

PLAN MAINTENANCE

MONITORING, EVALUATING AN UPDATING THE PLAN

The agency ultimately responsible for evaluating and updating the plan is the Benton County Board of Supervisors. The plan will be monitored by the Benton County Emergency Management Agency. The plan will be evaluated using the worksheets in the attached appendix after every completed action step with a cost level of medium, and will be updated every five (5) years unless the Planning Committee or EMA determines that an update is needed sooner. To ensure that an update is completed on time, the EMA will reconvene the Planning Committee a maximum of four (4) years after plan adoption to begin the review and update process.

Between updates, the lead departments should make note of any completed mitigation action steps, and the date by which those steps were completed in a publically available copy of the adopted Local Multi-Hazard Mitigation Plan. Any member of City or County staff or any member of the community may submit suggestions to the EMA for aspects of the plan that may need to be changed. Additionally, a second opinion regarding monitoring or updates may be sought by contacting the planning consultant or the East Central Iowa Council of Governments. The planning agency may also provide advice and assistance in any grant projects that may result from implementation of the mitigation action steps.

During the review process, available representatives of the current Planning Committee and/or any additional interested residents or new City or County staff will serve as the reviewing committee to retain as much institutional knowledge about the planning process as possible. The review process should include an evaluation of the following:

- The effectiveness of the planning process
- The effectiveness of the City's (or County's) actions
- Progress made toward implementing the mitigation action steps
- Determination of the relative success of any implemented action steps

Additionally, the plan updates should include a discussion of the following items, to be completed by the Planning Committee and/or a consultant selected by the EMA:

- The goals and objectives address current and expected conditions.
- The nature, magnitude, and/or type of risks have changed.
- The current resources are appropriate for implementing the plan.
- There are implementation problems, such as technical, political, legal, or coordination issues with other agencies.
- The outcomes have occurred as expected (a demonstration of progress).
- The agencies and other partners participated as originally proposed.

The updated plan will also include a reviewed and/or revised recommendation on the method and schedule of plan maintenance. After the above considerations are addressed by the Planning Committee and/or the selected consultant, the EMA or the selected consultant resubmit the plan for approval.

INCORPORATION INTO EXISTING PLANNING MECHANISMS

Benton County officials cannot document any incorporation of information from the original 2010 Benton County Multijurisdictional HMP into any existing, revised or new plans of any Benton County jurisdiction. This is attributed to the fact that the plan was not reviewed during the years that intervened between the plans approval and the beginning of the plan revision process. The 2011 Benton County Multijurisdictional HMP was as reference material by the Cities of Garrison, Newhall and Urbana in applying for Hazard Mitigation Project Grants.

Updates of this planning document will include a summary of any mitigation items that were incorporated into other planning mechanisms. The Planning Committee or the selected consultant should particularly examine the following when incorporating this document into existing planning mechanisms:

- Updates to the floodplain maps or floodplain regulations.
- Updates of the zoning code that may include additional regulations on building near identified hazard areas, which may include steep slopes, unstable soils, special flood hazard areas, proximity of residential areas to transportation, HAZMAT, flooding and other hazards.
- Updates to the comprehensive plan that include the goals of the mitigation strategy or mitigation related goals.
- Updates to the subdivision ordinance relating to setbacks on properties that pose a higher than average risk from structural failure, hazardous materials incident or fire.
- Updates to the building code that may include adoption of a full set of building codes or adoption of more stringent building codes.
- Any new additions to the City/County Code or administrative policies that may include but are not limited to: solid waste regulations, landscape codes, evacuation plans, response plans, fire mitigation programs; and construction or retrofit programs.
- An overview of how the information contained in the HARA was used in any other planning documents.

The above considerations and any others deemed appropriate will constitute part of the required explanation of how the Cities and the County incorporated the mitigation plan into other planning mechanisms.

CONTINUED PUBLIC INVOLVMENT

Upon review and update of the plan, the participating jurisdictions will host a public strategic meeting to analyze public opinion about the past mitigation plan and determine what additions may need to be made to the update. The exact details of public involvement will be determined at the time the involvement is sought based on the number of jurisdictions participating in the planning process at that time, growth trends and new facilities that may be constructed between now and that time. However, appropriate methods of public involvement would include posting notices on public buildings and other community facilities, circulating flyers, and posting proposed changes on the appropriate City/County website. This information will be used by the Planning Committee and/or the selected consultant to

guide the update of the plan. Upon completion of a final draft of the plan update, the final draft will be made publically available at the participating jurisdictions city halls or the County office for review and comment by the public, with a specifically noted end date for the public comment period. Public comment shall be submitted to the EMA in writing before the end of the public comment period or shall be delivered in person to the public meeting of the City Councils and County Board of Supervisors for formal adoption of the revised plan.