

# Natural Hazards Assessment

Chickasaw County, IA

Prepared by: NOAA / National Weather Service La Crosse, WI



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Prepared by NOAA / National Weather Service – La Crosse  
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# Natural Hazards Assessment

## Chickasaw County, IA

Prepared by National Weather Service – La Crosse

### Overview

Chickasaw County, IA is in the Upper Mississippi River Valley of the Midwest with relatively flat farm land and rolling hills.

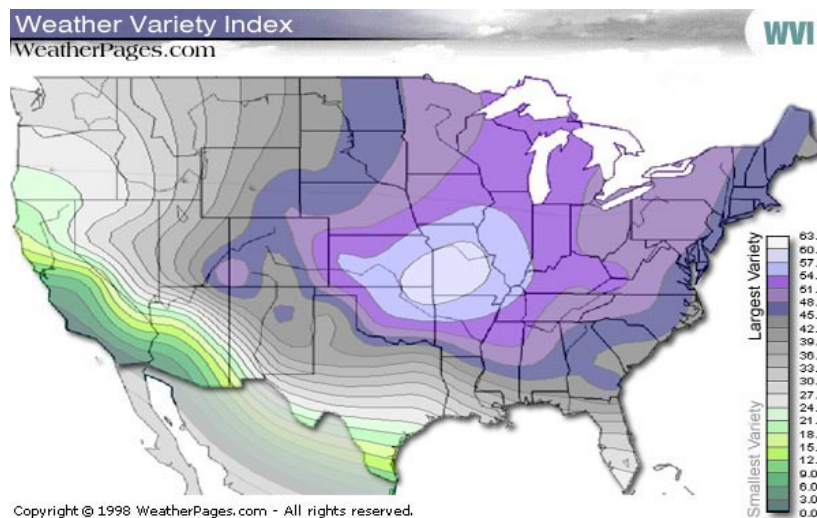
The area experiences a temperate climate with both warm and cold season extremes.

Winter months can bring occasional heavy snows, intermittent freezing precipitation or ice, and prolonged periods of cloudiness. While true blizzards are rare, winter storms impact the area on average about 4 times per season. Occasional arctic outbreaks bring extreme cold and dangerous wind chills.

Thunderstorms occur on average 30 to 50 times a year, mainly in the spring and summer months. The strongest storms can produce associated severe weather like tornadoes, large hail, or damaging wind. Both river flooding and flash flooding can occur. Heat and high humidity is occasionally observed in June, July, or August.

The autumn season usually has the quietest weather. High wind events can also occur occasionally, usually in the spring or fall.

The variability in weather can be seen in the following graphic, created by a private company (weatherpages.com) that rated each city on variations in temperature, precipitation, and other factors. The Waterloo, IA area ranked 10<sup>th</sup> highest in variability out of 277 cities.



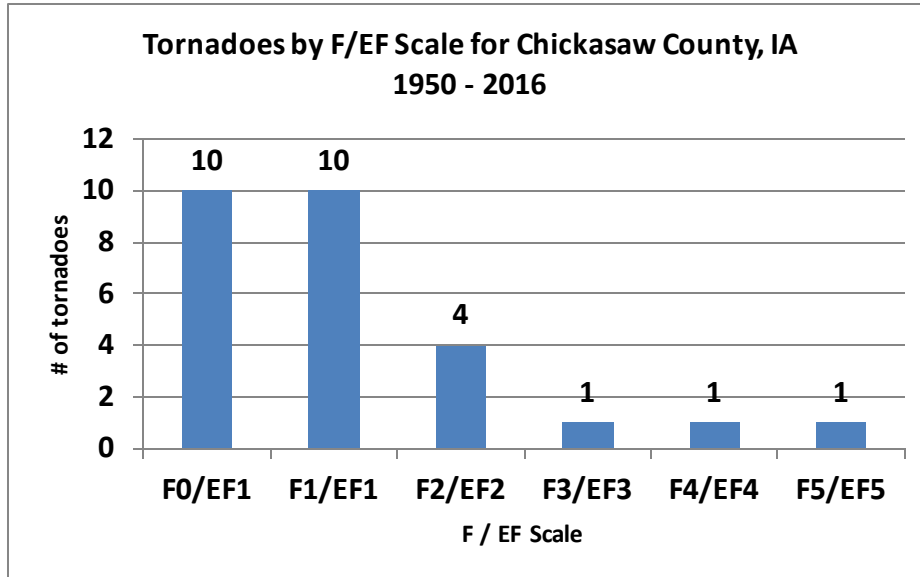
Since 1998, Chickasaw County has been included in a FEMA Federal Disaster Declaration 9 times:

- 1998 – Severe storms / flooding
- 1999 – Severe storms / flooding
- 1999 – Severe storms / flooding
- 2004 – Severe storms / flooding
- 2007 – Winter Storms
- 2008 – Severe storms / flooding
- 2013 – Severe storms / flooding
- 2014 – Severe storms / flooding
- 2016 – Severe storms / flooding

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## Tornadoes

Even though Iowa averages about 47 tornadoes per year, Chickasaw County has only had 27 documented tornadoes since 1950, averaging about one tornado every 2-3 years. Most tornadoes are short-lived and small. May through July are the peak months and most occur between 3 and 9 p.m., but they can occur nearly any time of year and at all times of the day.



### Most recent tornadoes:

- Aug. 19, 2009 (EF0)
- July 7, 2003 (F0)
- June 21, 2002 (F0)
- May 8, 2002 (F0)
- June 13, 2000 (F0)
- July 20, 1999 (F1)
- July 5, 1995 (F1)
- July 19, 1994 (F0)
- July 19, 1994 (F0)
- July 7, 1994 (F2)
- Aug. 9, 1993 (F2)

One of the strongest tornadoes to impact Chickasaw County was in July 1971 when an F4 moved through eastern parts of the county and hit Lawler, IA. About 50 farms were hit and 8 people were injured. Another violent tornado (F4) hit in April 1948 when 5 people were killed in Ionia, IA. There were also 25 injuries after a three block long section of town was devastated. The large tornado that tore through Charles City, IA in 1968 also tracked across northwest parts of the county.

### Strongest tornadoes: (1850-2016)

- May 15, 1968 (F5) – 0 inj, 0 dead
- Apr. 23, 1948 (F4) – 25 inj, 5 dead
- May 9, 1918 (F4) – 15 inj, 7 dead
- July 12, 1971 (F4) – 8 inj, 0 dead
- June 22, 1892 (F3) – 8 inj, 1 dead

### Chickasaw County Tornado Facts:

- One F5 and three F4 tornadoes
- Last violent tornado - 1971
- 14 deaths and 115 injuries since 1850
- Tornadoes have occurred March – October
- Most have occurred in July (10)

Tornado Watches		Tornado Warnings	
Year		Year	
2016	0	2016	1
2015	0	2015	0
2014	1	2014	0
2013	3	2013	1
2012	1	2012	0
2011	2	2011	1
2010	5	2010	0
2009	4	2009	2
2008	7	2008	4
2007	6	2007	1

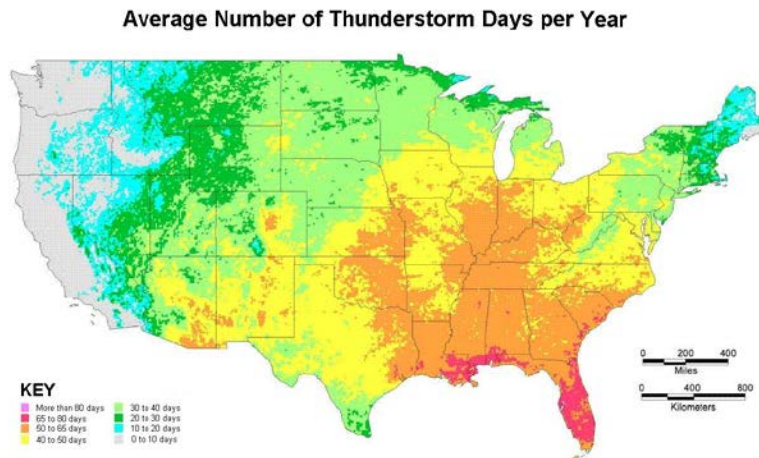
Enhanced Fujita (EF) Scale	
EF0	65-85 mph
EF1	86-110 mph
EF2	111-135 mph
EF3	136-165 mph
EF4	166-200 mph
EF5	>200 mph

## Severe Thunderstorms / Lightning

Chickasaw County averages 44 thunderstorm days per year. The National Weather Service (NWS) considers a thunderstorm severe when it produces wind gusts of 58 mph (50 knots) or higher, 1 inch diameter hail or larger, or a tornado.

Downdraft winds from a severe thunderstorm can produce local or widespread damage, even tornado-like damage if strong enough. Most severe thunderstorm winds occur in June or July and between the hours of 4 and 8 p.m., but can occur at other times. Most damage involves blown down trees, power lines, and damage to weaker structures (i.e. barns, outbuildings, garages) with

occasional related injuries. In June 1998, a “downburst” from a thunderstorm produced estimated wind gusts approaching 120 mph, which knocked roofs off a few homes and blew down many trees in Nashua, IA (see photos below). In May 1996, strong thunderstorm winds left a wind damage path 10 miles wide through the community of Alta Vista leaving many homes without power. There have been 66 damaging wind reports since 1982 in the county.



Large hail can also occur in a severe thunderstorm. May and June are the peak months with the most common time between 1 and 9 p.m., but it can occur in other warm season months and at any time of day. Hail is typically a crop damaging hazard but can damage roofs, windows, and vehicles if large enough (>1”). Expenses can be high. Injuries or fatalities are rare for hail. On May 18, 1996 baseball sized hail hit Ionia, Saude, North Washington, and Lawler, IA with widespread property damage. There have been 84 large hail ( $\geq 3/4$ ”) reports in the county since 1982.

Non-severe thunderstorms still pose a lightning risk. According to the Vaisala Group, an average of 674,486 cloud-to-ground strikes hit Iowa each year based on data from 2006 to 2015. Nationally, Iowa ranks 29<sup>th</sup> in lightning related fatalities with 3 deaths reported between 2006 and 2015. Two people were killed in Iowa in 2015 from lightning.



Severe Thunderstorm Watches		Severe Thunderstorm Warnings	
Year		Year	
2016	8	2016	4
2015	3	2015	0
2014	10	2014	9
2013	7	2013	6
2012	7	2012	8
2011	7	2011	3
2010	12	2010	9
2009	8	2009	5
2008	10	2008	7
2007	13	2007	7

## Flooding and Hydrologic Concerns

On occasion intense, heavy rain producing thunderstorms or consecutive thunderstorms (“training”) can bring excessive rainfall leading to flash flooding in Chickasaw County.

June is the most common month for flash floods, but they can occur from May through September. They are most common in the evening hours, between 8-10 p.m., but can occur at other times and typically last from 3-6 hours. Since 1995, there have been 9 deaths from flooding in Iowa.

In June 2008, widespread 5-7” rainfall totals over a two-day period led to significant flash flooding and eventual river flooding. Numerous roads were damaged and closed from high water, including Highways 18 and 63.

River basins or watersheds that impact the county include the Cedar, Wapsipinicon, and Little Turkey Rivers. Flooding often stems from heavy rain patterns, but spring snowmelt can also create problems.

In July 1999, over a three day period, nearly 12 inches (11.85”) of rain fell in the New Hampton, IA area. Nearly every creek, stream, and river in the county flooded. In Nashua, IA water topped the dam at Cedar Lake, flooding nearby homes. Some water backed up into the downtown area where sand bagging efforts had been started. Highways 18, 63, and 346 were all closed from high water. Damage was well over \$2 million. (Photos below: Flooding in Chickasaw County, July 1999)

In March 2010, a 13-year old girl was injured when she was swept into a flooded creek in rural Alta Vista as snow melt flooding began. And in August 2016 a man drove into flash flooding near Saude.

Flash Flood Warnings	
Year	
2016	13
2015	0
2014	2
2013	3
2012	0
2011	0
2010	2
2009	1
2008	1
2007	1
2006	0

**Little Cedar River @ Ionia, IA  
Crest History  
(Flood Stage: 10 feet)**

Stage	Date
21.32'	6/9/2008
18.99'	8/16/1993
18.41'	5/21/2013
17.52'	7/21/1999
16.00'	4/13/2001





## Winter Storms and Extreme Cold

Hazardous winter weather can bring a variety of conditions to Chickasaw County. Since 1982, an average of 4 winter storms impact the area each season. The relatively flat terrain in parts of the county does lead to blizzard conditions every few years. Heavy snow, blowing snow, ice, and sleet also occur. There have been a total of 13 documented deaths and 25 injuries as a direct result from winter storms in Iowa since 1993.

The 30-year average seasonal snowfall at New Hampton is 39.2 inches. The highest one-day snowfall is 15.0 inches set on November 30, 1934 and December 26, 1909. The bulk of snow falls between December and March. The largest winter storms tend to form over the central or southern Plains, and then move northeast towards the western Great Lakes.

A large winter storm and blizzard hit northeast Iowa on February 23-25, 2007. Freezing rain and sleet led to ice accumulations of 1 to 2 inches, in addition to heavy snow and blizzard conditions. New Hampton, IA reported 9" of snow but locations in northeast part of the county had closer to a foot. Travel was nearly impossible across the county. Thousands of power poles were knocked down and power outages were widespread across northeast Iowa.

New Hampton has reached 30 or more inches of snow during a month a total of four times on record. In December 1909, over a three day period, 29" of snow fell which led to the snowiest month on record.

March can often be a snowy month. Even though snowfall may be less frequent, heavy wet snow can form from large spring storms. Several of the largest one-day snowfalls have occurred in March, with 12.5" snow falling on March 15, 1959 and a total of 32" of snow in March of 1951.

Ice storms (1/4" of ice or more) can occur but are relatively rare with only 7 occurrences since 1993.



colder than -25°F most days. The all-time record low is -34°F set in 1963.

In late January and early February 1996, New Hampton, IA went 6 consecutive days with temperatures at or below zero degrees (F) following a blizzard a few days earlier. In January and February 1936, the area went 16 straight days and 34 of 36 days with low temperatures below 0°F.

Since 1993 there have been 5 fatalities in Iowa from cold weather.

The La Crosse National Weather Service issues Wind Chill Advisories when wind chill readings of -20°F to -34°F are expected. Wind Chill Warnings are issued when wind chill values at or below -35°F are expected or occurring. In late January 2008, a wind chill of -37°F was reported at New Hampton, IA.

Top 5 Seasonal Snowfalls at New Hampton, IA	
Years	Snowfall
1915-16	103.1"
1950-51	81.5"
2013-14	79.6"
1974-75	71.7"
1961-62	70.5"

Arctic cold outbreaks can occur in the upper Midwest as well. Snow depth can modify these cold temperatures leading to sub-zero readings on average 26 times a winter. Occasionally strong northwest winds will combine with arctic outbreaks to create dangerous wind chill conditions as well.

The coldest temperatures are usually in January and February with average lows in the single digits and record lows

Coldest Lows at New Hampton, IA	
Low	Date
-34°F	1/15/1963
-34°F	1/12/1912
-33°F	2/9/1899
-32°F	2/2/1996
-32°F	2/13/1905

## Heat, Drought, and Wildfires

On occasion the weather pattern across the upper Midwest favors prolonged heat and humidity, leading to heat waves. June through August are the warmest months with average high temperatures in the 80s and record highs above 100°F most days. The warmest temperature on record at New Hampton, IA is 110°F set on July 13<sup>th</sup> and 14<sup>th</sup> in 1936.

In Chickasaw County there have 7 heat waves since 1993. During that same time period, there were 5 fatalities directly related to heat waves in Iowa.

One of the worst heat waves ever to hit the Midwest occurred in July 1936. Many daily all-time record high temperatures were set during this period. In the New Hampton area, high temperatures hit 100°F or warmer 14 straight days. In July 1901, high temperatures hit 100°F or higher for 7 consecutive days. In more recent years, heat waves struck in 1995, 1999, and 2001. In mid July 2011, the heat index values topped 105 for 5-straight days in the region, hitting 117 twice (July 18-19) at Charles City, IA.

Warmest Highs at New Hampton, IA	
High	Date
110°F	7/14/1936
110°F	7/13/1936
108°F	7/12/1936
108°F	7/24/1901
107°F	7/23/1901



Prolonged dry spells can also lead to drought causing extreme damage to crops. Droughts vary in length and intensity but abnormally dry to moderate drought conditions can occur quite frequently. Severe to extreme droughts occur far less frequently.

The last drought in Chickasaw County was 2012 when the USDA declared a drought disaster, but droughts have hit parts of Iowa in 1999, 2000, 2001, 2003, 2005, 2006, and 2011.

Dry weather can also lead to a wildfire threat, especially in the spring before foliage has emerged (i.e. before green up) or in the fall after vegetation has started to die off. Warm, dry (i.e. lower relative humidities), and windy conditions all favor higher fire danger and can lead to sporadic grass or cropland field fires in Chickasaw County. Thick, wooded areas also pose a threat for wildfires under extremely dry conditions but occur far less frequently.





## Local Climatology

Here are some basic climatology figures for the Chickasaw County area. Data is valid for New Hampton, IA based on normals from a 30-year period (1981-2010).

Month	Normal Maximum Temperature	Normal Minimum Temperature	Average Temperature	Precipitation	Snowfall
JAN	25.1	8.5	16.8	1.07"	9.5"
FEB	29.9	13.5	21.7	1.16"	7.2"
MAR	42.8	24.9	33.8	2.12"	5.0"
APR	58.6	36.8	47.7	4.11"	1.9"
MAY	69.9	48.1	59.0	4.66"	0.0"
JUN	79.2	57.8	68.5	5.54"	0.0"
JUL	82.5	61.8	72.2	4.87"	0.0"
AUG	80.4	59.8	70.1	4.78"	0.0"
SEP	73.4	50.9	62.1	3.24"	0.0"
OCT	60.1	39.0	49.5	2.55"	0.2"
NOV	43.5	26.3	34.9	2.38"	3.7"
DEC	28.2	12.7	20.5	1.57"	10.7"
Year	56.1	36.6	46.4	38.40"	39.2"

### Miscellaneous facts:

- Warmest year on record – 1931 (51.1°F)
- Warmest month on record – July 1936 (80.4°F)
- Warmest day(s) on record – July 13/14, 1936 (110°F)
- Greatest number of days with 90°F or warmer – 1936 (51 times)
- Coldest year(s) on record – 2014 and 1928 (41.4°F)
- Coldest month on record – January 1912 (-2.2°F)
- Coldest day(s) on record – January 15, 1963 and January 12, 1912 (-34°F)
- Greatest number of days at 0°F or colder – 1929 (54 times)
- Wettest year on record – 2016 (52.57" thru 11/3/16)
- Wettest month on record – July 1999 (17.75")
- Wettest day on record – July 21, 1999 (7.10")
- Driest year on record – 1910 (16.69")
- Driest month(s) on record – November 2007, Nov./Dec. 2002 (0.00")
- Highest seasonal snowfall on record – 1950/51 (81.5")
- Highest monthly snowfall on record – December 2000 (34.0")
- Highest one-day snowfall on record – November 30, 1934 and December 26, 1909 (15.0")
- Least seasonal snowfall on record – 2001/02 (9.8")

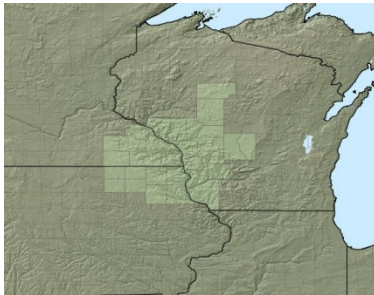


## NOAA/National Weather Service Support and Weather Monitoring



NOAA's National Weather Service (NWS) forecast office at La Crosse, WI serves Chickasaw County with weather information and support on a continuous basis. Operating 24 hours a day, a staff of 23 issues routine and non-routine informational products for the area, including all watches, warnings, and advisories related to natural hazards. Doppler radar (WSR-88D) is co-located with the La Crosse NWS office and covers the region.

NWS La Crosse has a web site at: [www.weather.gov/lacrosse](http://www.weather.gov/lacrosse)



Normal communication during hazardous weather scenarios is via telephone.

NOAA Weather Radio coverage in Chickasaw County includes three stations:

- KXI68 (St. Ansgar) on 162.450 MHz
- KXI60 (Decorah) on 162.525 MHz
- WXL94 (Waterloo) on 162.550 MHz

Storm spotter groups consist of almost entirely volunteer fire department personnel, with some involvement with law enforcement and the general public. Spotter training is held every year with an average attendance in the past 5 years of 58.

There are a variety of weather monitoring sources in or near Chickasaw County, including:

Automated weather station(s):

- None, but automated observations are available from Charles City, Decorah, and Waterloo.

River Gauge(s):

- Little Cedar River @ Ionia, IA
- Little Cedar River @ Nashua, IA

Cooperative Observers

- Ionia 2W
- Nashua 2SW
- New Hampton



In addition, numerous volunteer reports from around the county are received at the La Crosse NWS office including rainfall, snowfall, and temperatures, on a routine basis.

## Resources

National Weather Service – La Crosse	<a href="http://www.weather.gov/lacrosse">www.weather.gov/lacrosse</a>
NWS La Crosse Tornado Database	<a href="http://www.weather.gov/arx/tornadomain">www.weather.gov/arx/tornadomain</a>
NWS La Crosse River Monitoring	<a href="http://www.crh.noaa.gov/ahps2/index.php?wfo=arx">http://www.crh.noaa.gov/ahps2/index.php?wfo=arx</a>
NWS La Crosse Climate	<a href="http://www.weather.gov/climate/index.php?wfo=arx">www.weather.gov/climate/index.php?wfo=arx</a>
NWS La Crosse Drought information	<a href="http://www.weather.gov/arx/drought">www.weather.gov/arx/drought</a>
NWS La Crosse Storm Summaries	<a href="http://www.weather.gov/arx/events">www.weather.gov/arx/events</a>
NWS La Crosse NOAA Weather Radio page	<a href="http://www.weather.gov/arx/nwr">www.weather.gov/arx/nwr</a>
NWS La Crosse Severe Weather Climatology	<a href="http://www.weather.gov/arx/svr_climate">www.weather.gov/arx/svr_climate</a>
NWS Storm Prediction Center	<a href="http://www.spc.noaa.gov/">http://www.spc.noaa.gov/</a>
SPCOnline Severe Weather Climatology	<a href="http://www.spc.nssl.noaa.gov/climo/online/grids/">http://www.spc.nssl.noaa.gov/climo/online/grids/</a> <a href="http://www.spc.noaa.gov/climo/online/rda/ARX.html">http://www.spc.noaa.gov/climo/online/rda/ARX.html</a>

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