

Composite of Brown County

The National Weather Service (NWS) estimates that over 100,000 thunderstorms occur each year on the U.S. mainland. Approximately 10 percent are classified as “severe.” Thunderstorms can produce deadly and damaging tornadoes, hailstorms, intense downburst and microburst winds, lightning and flash floods. Since 1975, severe thunderstorms were involved in more than 327 Federal disaster declarations.¹¹ Every thunderstorm produces lightning, which kills more people each year than tornadoes.

Severe thunderstorms, lightning and hail can pose a threat to life and property in any part of Brown County by creating conditions that disrupt essential services. High winds have destructive impacts to trees, power lines and other utilities, which ultimately impacts residents. In March 2002, extraordinarily high winds downed numerous trees throughout Brown County, resulting in power outages. Downed trees also blocked roadways throughout the county and had to be cleared quickly to ensure emergency response vehicles continued to have access. The damage and potential impacts from severe thunderstorms and high winds should not be underestimated.

This chapter of the Brown County Natural Hazard Mitigation Plan will focus on historical information, severe weather forecasting and vulnerability.

History

During the period from January 1950 to April 2004, there were more than 80 weather events involving severe thunderstorms and high winds resulting in property damage estimates totaling over \$1.9 million in Brown County. The majority of damage resulting from these events is trees and power lines being knocked down. Based on the information compiled, two deaths have occurred from these weather events. More than 14 people have been injured during the period as a result of high winds and thunderstorms.¹¹

Damage from severe thunderstorms, high winds, hail and lightning has occurred throughout Brown County. As the population increases and more development occurs, more damage to property will occur and more lives may be at risk from severe thunderstorms.



Ohio Disaster History

FEMA Region V provides information regarding the types and frequency of disasters in Ohio. The following chart supports the Brown County Natural Hazard Mitigation Plan's heavy emphasis on flooding and severe storms in Brown County.

Ohio Disaster History

Year	Date	Disaster Types	Disaster Number
Major Disaster Declarations			
2004	06/03	Severe Storm, Flooding	1519
2004	01/26	Landslide, Severe Storm, Flooding	1507
2003	08/01	Flooding, High Winds, Severe Storm, Tornado	1484
2003	07/15	Flooding, Severe Storm	1478
2003	03/14	Winter Storm	1453
2002	11/18	Severe Storm, Tornado	1444
2001	08/27	Flooding, Severe Storm	1390
2000	09/26	Tornado, Severe Storm	1343
2000	08/21	Flooding, Severe Storm	1339
2000	03/07	Flooding, Severe Storm	1321
1998	06/30	Flooding, Severe Storm, Tornado	1227
1997	03/04	Severe Storm, Flooding	1164
1996	06/24	Flooding	1122
1996	01/27	Severe Storm, Flooding	1097
Emergency Declarations			
2003	09/23	Power Outage	3187

Weather Forecasting

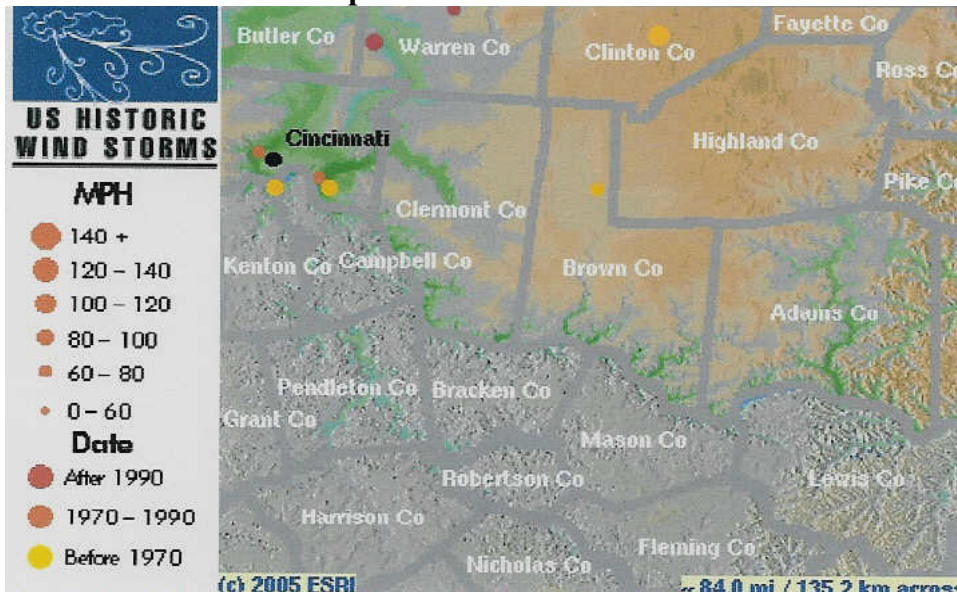
The Wilmington, Ohio office of the National Weather Service provides weather watches and warnings for Brown County. In relation to storms, the most common advisories relate to severe thunderstorm watches and warnings, and high wind warnings and advisories. Tornado and flood related advisories are also common.

Watches & Warnings

A Severe Thunderstorm Watch is issued by the National Weather Service when wind gusts reach 58 mph or more, or hail $\frac{3}{4}$ of an inch in diameter or greater, is likely to develop. A Severe Thunderstorm Warning is issued when a severe thunderstorm has been sighted or can be seen on weather radar.

Severe thunderstorms can be a prelude to flooding, hail, lightning and tornadoes, and should be taken very seriously.

Historic Wind Storm Map



source: www.esri.com/hazards

The historic wind storm data displayed on this site was collected by the National Weather Service. The maps indicate the relative intensity of the historic wind as measured by miles per hour (MPH).

Lightning

On the average, a thunderstorm at maximum intensity will produce between 15 and 30 lightning strikes every 15 minutes. Lightning is the number one killer among weather phenomena. During a typical year, lightning kills more people than hurricanes, tornadoes and winter storms combined. Lightning can electrocute on contact, vaporize anything in its path, rip trees apart, set off forest fires and cause electrical failures.

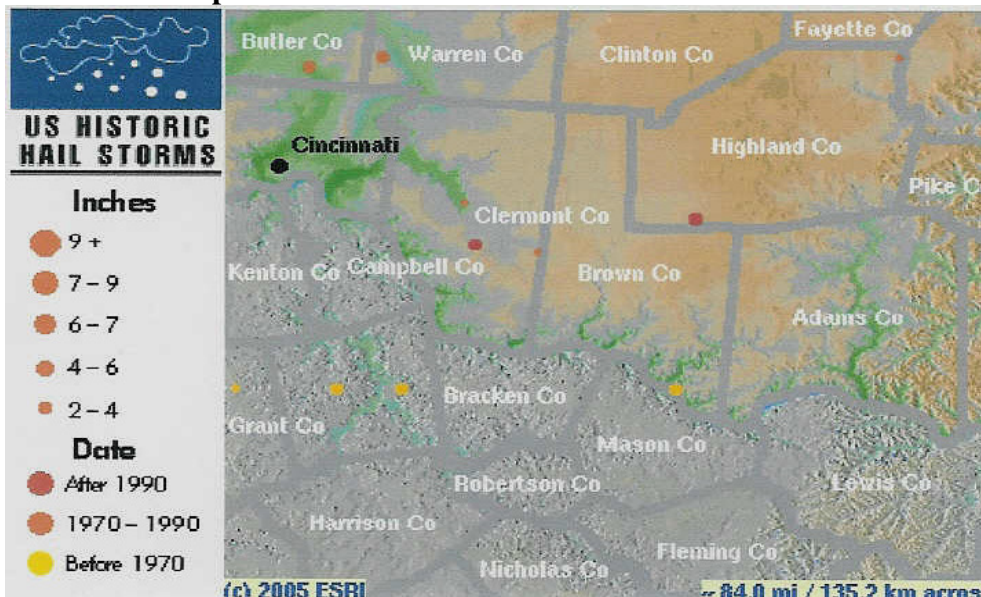
Farmers have one of the highest fatality rates from lightning, often from exposure in open fields. In urban areas, golfers are most at risk. Ohio averages four deaths and fifteen injuries from lightning per year.

Hail

Hail is an exclusive by-product of thunderstorms. It is small layered ice balls formed in violent updrafts of thunderstorm clouds. Hail can range from pea size to the size of a grapefruit. Hail is generally not a direct threat to life, but can cause significant economic losses. Each year in the United States, hailstorms cause over \$1 billion in damage to crops, livestock and structures.

Although thunderstorms almost always generate hailstones, most of it melts before it hits the ground. This has been the general rule in Brown County, with the exception of April 1994 and May 1995 when hail caused minimal damage to property and crops.

Hail Storm Map



source: www.esri.com/hazards

The historic hail storm data displayed on this site was collected by the National Weather Service. The maps indicate the relative severity of the historic hail storms as measured by inch diameter of the hail collected.

NOAA Weather Radio (NWR)

NOAA Weather Radio (NWR) is a nationwide network of radio stations broadcasting continuous weather information direct from a nearby National Weather Service office. NWR broadcasts National Weather Service warnings, watches, forecasts and other hazard information 24 hours a day. Working with the Federal Communications Commission's new Emergency Alert System, NWR is an "all hazards" radio network, making it the

single source for the most comprehensive weather and emergency information available to the public. NWR now broadcasts warning and post-event information for all types of hazards - both natural (such as tornado activity) and technological (such as chemical releases or oil spills). Known as the "Voice of the National Weather Service," NWR is provided as a public service by the Department of Commerce's National Oceanic & Atmospheric Administration. The NWR network has more than 450 transmitters, covering the 50 states, adjacent coastal waters, Puerto Rico, the U.S. Virgin Islands, and the U.S. Pacific Territories. NWR requires a special radio receiver or scanner capable of picking up the signal. Broadcasts are found in the public service band between 162.400 and 162.550 megahertz (MHz).

NOAA weather radios are recommended for every home and office. The radios automatically broadcast weather watch and warning information within a chosen coverage area.

Safe Rooms

The safe room concept was developed by the Federal Emergency Management Agency (FEMA) and the Wind Engineering Research Center at Texas Tech University. A severe thunderstorm with 60 MPH winds may not cause significant structural damage to a home, but few buildings are designed to withstand extreme straight-line wind speeds or a violent tornado. A basement offers protection from damaging winds, however the level of protection can be increased by building a reinforced shelter area in a basement, or an above-ground room such as an interior closet.

Receiving advance warning regarding severe storms, and seeking out sturdy shelter, help protect lives from wind and tornado damage. More information about safe rooms can be obtained at <http://www.fema.gov/mit/saferoom/>.

StormReady Program

The StormReady Program is sponsored by the National Weather Service. To be certified as StormReady, communities must meet guidelines established by the National Weather Service in partnership with federal, state and local emergency management officials.

To become StormReady a community or county must:

- Establish a 24-hour warning point and Emergency Operations Center
- Have more than one way to receive severe weather warnings and forecasts and to alert the public
- Create a system that monitors weather conditions locally
- Promote the importance of public readiness through community seminars
- Develop a formal hazardous weather plan, which includes training severe weather spotters and holding emergency exercises.

Brown County is in the process of receiving the StormReady designation.

Existing Mitigation Activities

Some activities already occur that can mitigate the effects of high winds and severe thunderstorms. In most new subdivisions, power lines are buried underground which protects wires from falling tree limbs and high winds. Also, communities sponsor tree-trimming programs to keep tree branches away from over-hanging power lines, and remove dead trees in public right-of-ways.

Vulnerability and Risk

Not all thunderstorms are hazards. Most are beneficial by bringing needed rain to farmlands and reservoirs. No place in the United States is completely immune to the threats of severe thunderstorms. Thunderstorms produce several severe weather conditions that are harmful to life and property including flash flooding, lightning, hail, high winds and tornadoes.

History tells us that Brown County has always experienced thunderstorms and always will. Storm severity cannot be predicted, but improved weather radar and public warnings may lessen the impacts of these storms.