

Section IV Hazard Profiles

Schoharie County Hazard Profiles

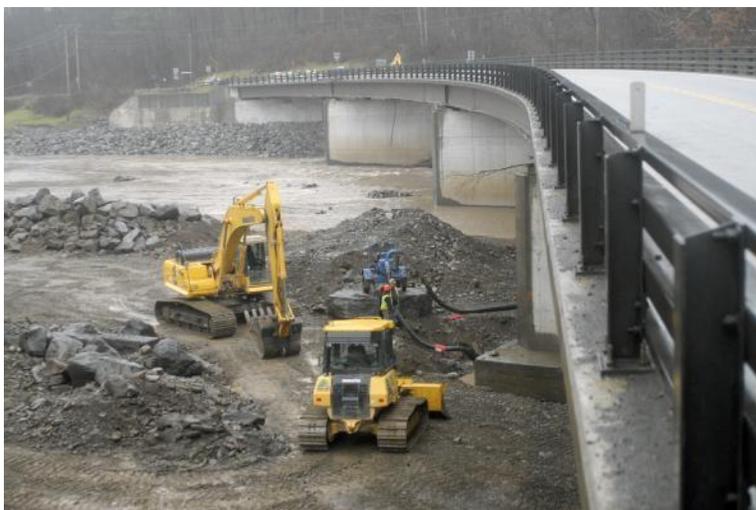
A hazard profile follows for each of the six (6) natural hazards identified in Section III that were designated as ‘Hazards of Concern’. A hazard profile is also included for one man-made hazard, Dam Failure, because it is a factor of potential risk and vulnerability for the County and could have dramatic flood consequences.

Profiled Hazards of Concern	
Flood	Tornado
Ice Storm	Dam Failure
Winter Storm	Severe Storm
Earthquake	

The risk assessment determined that these hazards pose a significant risk, or a serious occurrence could have major impacts for Schoharie County. The unique characteristics of each community have a significant influence on the severity or impacts of a particular hazard and how it will affect the area. For example, because Schoharie County is not densely populated and has abundant open space with modest development, hazards such as transportation accidents or winter storms have a largely different profile and impact than they would in an urban setting. In addition, hazards produce different kinds of effects as they vary in magnitude, duration or intensity. In the past, tornados in Schoharie County have been infrequent and of minimal impact, but Schoharie County could just as likely experience the kind of devastating tornados that have affected other New York communities. Geography, demographics, development, environmental, economic and other factors all impact how a hazard will affect Schoharie County. The hazard profiles examine these features to determine in what ways, and to what extent the hazard can impact Schoharie County.

Hazard Profile – Flood

Hazard	Previous Events	Likely Impacts	Probability of Future Event
<p><u>Flood</u></p> <p><i>Definition:</i> When water bodies, channels and natural drainage pathways overflow their capacities and cause significant damage and disruption.</p> <p><i>Impact Area:</i> Countywide</p>	<p>29 Flood events since 1996</p> <p>13 had major and/or significant community impacts</p>	<p>Death and Injuries Property and structural damage Damage to roads, utilities, bridges, infrastructure Evacuations of residents and stranded victims Water rescue and other high risk response Breakdown of emergency communications Disruption of transportation Delayed access for emergency services Alteration of natural drainage patterns Damage to designed drainage systems Damage to flood protection systems Shelter, feeding and temporary housing Economic impacts, property value and tax losses Employment and business disruption and losses Damage to natural features and habitat Increased health risks Contamination and disease Water supply contamination Secondary hazardous materials exposure Threat to dams and secondary flooding Power outages Increased demand for health/medical services Increased need for human and social services Disruption of home medical and care services Disrupted access for pharmacy and health needs Crisis counseling and mental health services Institutional threats; prisons, nursing homes, etc.</p>	<p>Average is 1 to 2 flood events each year in Schoharie County</p> <p>There is a 72% chance each year of having a flood with significant community impacts</p> <p>There is a 56% chance each year of a flood that will result in federal disaster declaration</p> <p>As many 6 separate flood events occurred in a single year (1996), and there were 4 flood events in 2003</p> <p>Some type of flooding has occurred in 14 of the past 18 years. No flooding was recorded in only 4 of these years (1997, 1999, 2002 and 2012)</p>



Rebuilding Schoharie Creek bridge in the Town of Blenheim after the 2011 flooding

Photo: fema.gov

The National Climatic Data Center (NCDC) reports that twenty-nine (29) flood events have occurred in Schoharie County from 1996 to 2013. Thirteen (13) of these floods had damage and losses that were significant in scope, resulting in the organization of damage assessments and a major community response. Ten (10) resulted in federal disaster declarations. Seven (7) of the eleven (11) most serious floods on record were influenced by late winter snowmelt in combination with heavy precipitation.

29 Flood event(s) were reported in **Schoharie County** between **1/01/1996** and **2/28/2013**

Source: NOAA National Climatic Data Center

Mag: Magnitude

Dth: Deaths

Inj: Injuries

PrD: Property Damage

County / Zone	Date(s)	Mag	Dth	Inj	PrD*
SCHOHARIE (ZONE)	01/19/1996	Flood		2	12.0 Million
SCHOHARIE (ZONE)	01/27/1996	Flood		0	100.00K
SCHOHARIE (ZONE)	07/14/1996	Flood		0	5.00K
SCHOHARIE (ZONE)	10/20/1996	Flood		0	5.00K
SCHOHARIE (ZONE)	11/09/1996	Flood		0	1.00K
SCHOHARIE (ZONE)	12/02/1996	Flood		0	3.00K
SCHOHARIE (ZONE)	01/08/1998	Flood		0	0.00K
SCHOHARIE (ZONE)	03/10/1998	Flood		0	0.00K
SCHOHARIE (ZONE)	06/14/1998	Flood		0	5.00K
SCHOHARIE (ZONE)	02/28/2000	Flood		0	40.00K
SCHOHARIE (ZONE)	04/08/2001	Flood		0	100.00K
SCHOHARIE (ZONE)	03/21/2003	Flood		0	0.00K
SCHOHARIE (ZONE)	10/29/2003	Flood		0	0.00K
SCHOHARIE (ZONE)	11/20/2003	Flood		0	0.00K
SCHOHARIE (ZONE)	12/12/2003	Flood		0	0.00K
SCHOHARIE (ZONE)	09/18/2004	Flood		0	400.00K
SCHOHARIE (ZONE)	01/14/2005	Flood		0	0.00K
SCHOHARIE (ZONE)	04/02/2005	Flood		0	19.94K
SCHOHARIE (ZONE)	11/30/2005	Flood		0	0.00K
SCHOHARIE (ZONE)	01/18/2006	Flood		0	0.00K

County / Zone	Date(s)	Mag	Dth	Inj	PrD*
COBLESKILL	06/28/2006	Flood		0	160.00K
CHARLOTTEVILLE					
GILBOA					
WARNERVILLE					
RICHMONDVILLE					
GILBOA					
BROOME CENTER					
WARNERVILLE	03/15/2007	Flood		0	0.00K
NORTH BLENHEIM	04/16/2007	Flood		0	0.00K
FULTONHAM	03/05/2008	Flood		0	1.00K
CHARLOTTEVILLE	01/25/2010	Flood		0	0.00K
WEST CONESILLE	03/30/2010	Flood		0	0.00K
BREAKABEEN	03/11/2011	Flood		0	0.00K
LIVINGSTONVILLE	Hurricane Irene and Tropical Storm Lee 08/26/2011 to 09/11/2011	Flood		0	140.0 million
WEST CONESVILLE					
GALLUPVILLE					
COBLESKILL					
MIDDLEBURG					
SCHOHARIE					
FULTON					
GILBOA					
BROOME					
JEFFERSON					
BLENHEIM					
ESPERANCE					

* Note: Where property damage estimates are 0.00K, local flooding occurred and was reported to NWS, but the overall scope of flooding was limited and an assessment that would summarize costs was not performed or reported.

* Note: The NOAA/NCDC database summarizes flood losses by county through January 2006, and later in 2006 began identifying flood occurrences by community, but costs are still summarized as a county total, except where only a single community was impacted.



Schoharie County homeowners talk with a FEMA representative in 2011 about flood hazard mitigation improvements they can make to their property

Photo: fema.gov

Disaster Declarations for Flooding

As noted in Section III, Schoharie County has received ten (10) federal disaster declarations for flooding since 1954; the most recent in 2011. A federal disaster declaration is requested by the Governor and only available when there are extraordinary disaster impacts and the ability to recover from the disaster exceeds the resources and capabilities of the state and local government.

Only four (4) counties in New York State have received more federal disaster declarations for flooding than Schoharie.

Delaware (15)	Allegany (11)
Ulster (12)	Sullivan (11)

Four (4) other counties in New York have received the same number of federal disaster declarations (10) for flooding.

Broome	Steuben
Montgomery	Tioga

Schoharie County is among 15% of New York's 62 counties that have received the highest number of federal disaster declarations for flooding. 53 other counties (85%) have received fewer declarations for flooding.

About 3 in 10 of all recorded flood events in Schoharie County, or 34%, were eligible to receive a federal disaster assistance declaration. Of the 13 most significant flood events where damage assessments were performed, 10 of the 13 resulted in approved federal disaster declarations for flooding.



Post-flood streambank stabilization work on Schoharie Creek – 2011 photo: fema.gov

Areas of Flood Risk

This is a general description of areas of greatest concern and at risk for flooding. This section provides a broad view of areas of the County most susceptible to flooding and is included to assist with hazard planning. It does not include all high-hazard flood zones and does not provide the kind of detail needed to determine if any particular site or property is at risk to flooding. Refer to FEMA Flood Insurance Rate Maps (FIRM) available online at fema.gov, or at local town and village planning office, to determine if specific sites or properties are in a flood zone. This list addresses flood threats associated with recognized creeks, streams and waterways and does not include areas susceptible to landslide or steep slope failure during heavy rains.

Schoharie Creek Watershed

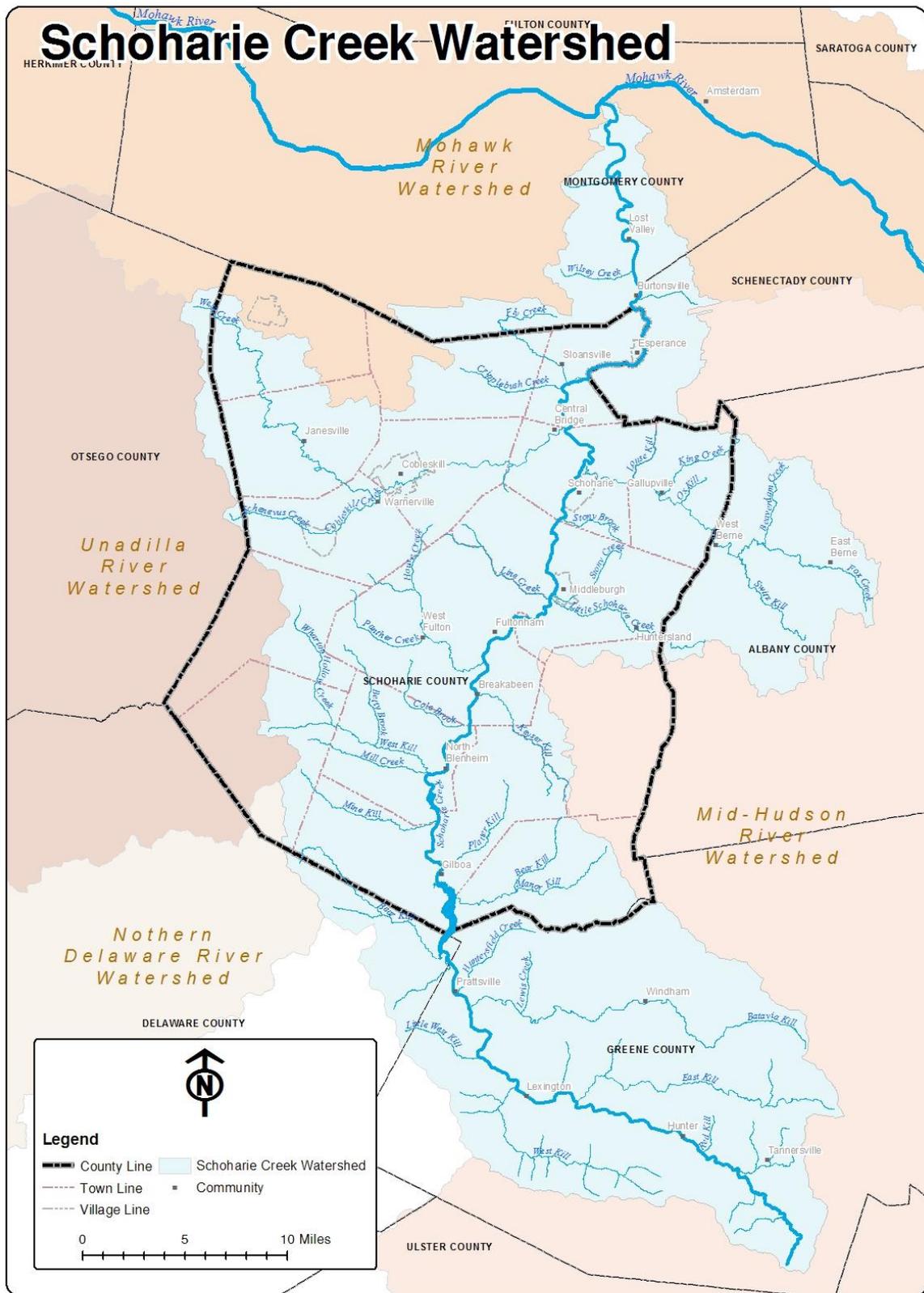
The following map outlines the area and boundary of the Schoharie Creek watershed, which is the largest and highest profile flood threat range in Schoharie County. The Schoharie Creek watershed spans approximately 950 square miles and includes portions of both Schoharie and Greene counties. The watershed drains a portion of the Catskill Mountains, with headwaters in Greene County that flow northward into Schoharie; then it collects more runoff along the way as the creek travels the south to north length of the county before exiting to the Mohawk River through Montgomery County. The Schoharie Creek valley and basin are the area most frequently exposed to flooding, and the villages and hamlets along the course of the creek – including Gilboa, Blenheim, Fulton, Middleburgh, Schoharie and Esperance - are most vulnerable to flood impacts and losses.

The southern portion of the Schoharie Creek includes two reservoir-dam systems; the Blenheim-Gilboa dam and reservoir maintained by the New York Power Authority (NYPA), where they operate a hydro-electric power generation facility; and the Schoharie Reservoir, which is maintained by the City of New York, Department of Environmental Protection (NYC DEP) as part of the City's public water supply system. The dams and reservoirs are not operated or used as flood control

structures and all excess flow exceeding peak capacities are passed downstream into the Schoharie Creek. The reservoir-dam systems do play an important role in aiding flood forecasting and warning for downstream areas of the Schoharie Creek. Schoharie County emergency officials work closely with NYPA and NYC DEP to monitor water levels and rates of rising water at the reservoirs to evaluate potential flood threats and downstream impacts. Minor flooding will occur in the floodplains downstream when flows at the Blenheim-Gilboa pump station are approximately 10,000 cubic feet per second (cfs), evacuations are usually initiated at 14,000 cfs and major flooding will occur when flows exceed 20,000 cfs.

As demonstrated by the Schoharie Creek flood-of-record in 2011, widespread flooding in the Schoharie watershed can also occur on many of the feeder streams and tributaries that flow to the main creek channel. The supply from these tributaries is also a significant additional source of watershed runoff that adds to downstream flood risks. The After-Action Report and Improvement Plan prepared after the 2011 flooding identified Fox Creek-Warner's Lake, West, Cobleskill, Fly, Little Schoharie, Manner Kill and Line Creeks as areas where tributary flooding occurred and should be targeted for future monitoring.

The higher elevations and steep slopes across the southern and western portions of Schoharie County are generally characterized by sparse population, less development and dense natural growth -- but property owners at some scattered sites, even far above the creek basins and floodplains, must still be mindful that heavy rains can sometimes result in hillside flooding where sheets of water from intense storms wash down steep embankments. Even when the heavy rains do not prompt erosion and landslides, a wall of swiftly moving water can severely damage hillside structures, particularly where there are open spaces, ridges and natural collection swales or gullies above.



Other Schoharie County Areas of Flood Risk

The map on the next page outlines floodplain risk zones in various areas of Schoharie County, including those outside the Schoharie watershed. In 2001, floods and inadequate stormwater drainage caused flooding in the Village of Sharon Springs resulting in flooding along route 20 and approximately \$20,000 in property damage. A small area in the southeast of the County is drained by Charlotte Creek which flows west to the Susquehanna River, although population densities are low and intermittent flooding in this sector results in fewer problems. In the eastern part of the County, the Catskill Creek drains east to the Hudson River and flood problems sometimes occur near Franklinton in the Town of Broome. Fox Creek can cause flooding in the Town of Wright.

Cobleskill and West Creeks are tributaries to the Schoharie Creek, but extend into the central-northwest area of the County where they run through Sharon and Seward and can result in flooding in the more densely populated communities near Richmondville and Cobleskill.



West Creek floods Main St., Cobleskill – Hurricane Irene 2011

Photo: Episcopal Diocese of Albany

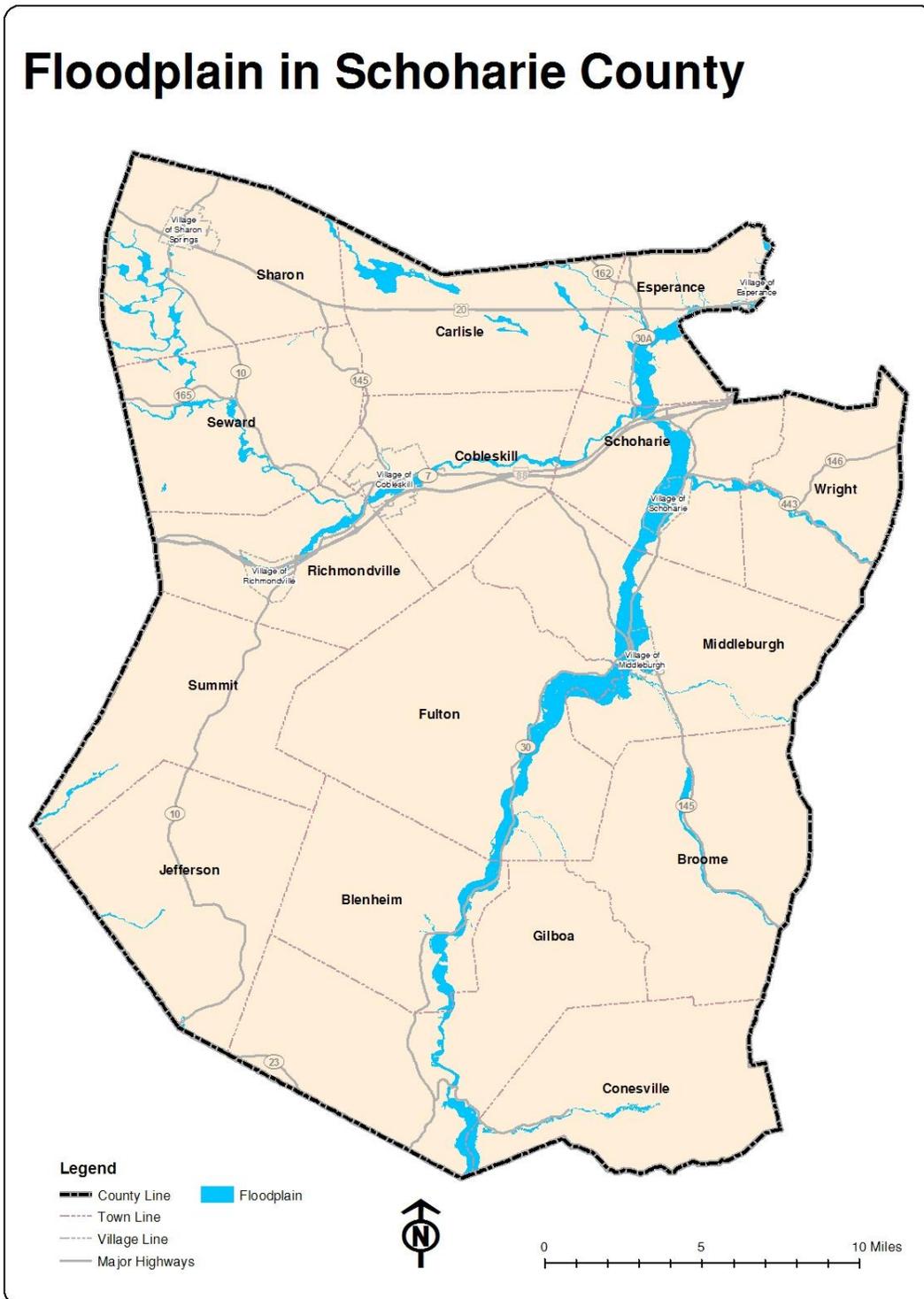


Catskill Creek Watershed flows to the Hudson River from the Towns of Broome and Conesville



Flood debris on bridge over Fox Creek in the Town of Wright

Photo: Schoharie County Sheriff



Hazard Profile – Tornado

Hazard	Previous Events	Likely Impacts	Probability of Future Event
<p><u>Tornado</u></p> <p><i>Definition:</i> F1 or greater, confirmed by NWS</p> <p><i>Impact Area:</i> Countywide</p> <p>Greater vulnerability for villages and populated areas</p>	<p><u>4 Tornadoes</u> 1950-2013</p> <p>2 F1 1 F3*</p>	<p>Property damage Infrastructure, utility damage Deaths, injuries Power outages, electrical hazards Debris – flying, dense accumulation Transportation disruption Strain on medical services Disruption of services Temporary housing School and business closings Economic impacts Mental health/crisis counseling</p>	<p>There is a 6% chance each year of an F1 or greater tornado <u>in Schoharie County</u></p> <p>There is a 1% to 2 % chance each year of an F3 tornado <u>in Schoharie County</u></p> <p><u>Statewide</u>; it can be expected that 1 or 2 F2 tornadoes will occur each year somewhere in the state</p> <p>There is a 10% chance each year that an F4 tornado will occur somewhere <u>in upstate New York</u></p>

Tornado – Fujita Scale

Enhanced Fujita Scale			
Source: NOAA National Climatic Data Center			
Scale	Wind Speed	Description	Typical Damages
F0	40-72 mph	- Gale - Light Damage	Some damage to chimneys; branches broken off trees; shallow-rooted trees pushed over; signboards damaged.
F1	73-112 mph	- Weak - Moderate Damage	Peels surface off roofs, mobile homes pushed off foundations or overturned, moving autos blown off roads.
F2	113-157 mph	- Strong - Considerable Damage	Peels surface off roofs; mobile homes pushed off foundations or overturned, moving autos blown off roads.
F3	158-206 mph	Severe Damage	Roofs and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted; heavy cars lifted off the ground and thrown.
F4	207-260 mph	Devastating Damage	Well-constructed houses leveled; structures with weak foundations blown away some distance; cars thrown and large missiles generated.
F5	261-318 mph	Incredible Damage	Strong frame houses leveled off foundations and swept away; automobile-sized missiles fly through the air in excess of 100 meters (109 yds); trees debarked; incredible phenomena will occur.

Schoharie County Tornado History

4 Tornadoes were reported in Schoharie County, New York between 01/01/1950 and 12/31/2013

Source: NOAA National Climatic Data Center

Mag: Magnitude
Dth: Deaths
Inj: Injuries
PrD Property Damage

Location or County	Date	Type	Mag	Dth	Inj	PrD
1 SCHOHARIE	No Data	Tornado	F1	0	0	0
2 Carlisle and Schoharie	07/10/1989	Tornado	F4*	0	20	25 Million
3 SCHOHARIE	05/2/1992	Tornado	F1	0	0	250K
4 Jefferson	05/29/2013	Tornado	F1	0	0	Minor

The most destructive tornado in Schoharie County was an F3 on July 10, 1989 that made a 12-mile path through Carlisle and Schoharie. It caused \$25 million in damages to 20 homes and local facilities and injured 20 people. An F1 tornado occurred on May 2, 1992, causing \$250,000 in damages, and another F1 tornado on May 29, 2013 in the Town of Jefferson damaged trees in rural areas near Dutch Hill and Wharton Hollow Roads, but no property losses were reported.

* Note: The July 1989 tornado was originally classified as an F3 tornado and later reassigned an F4. Tornadoes are largely classified by wind speed, which may vary over the course of the storm, and there is also some variation in transitioning data from the original Fujita Scale to the current 'Enhanced' Fujita Scale. NWS and the NYS Hazard Mitigation Plan both list the 1989 tornado as an F4, but most local observers and many reports note that the impacts on the ground were more consistent with the description used for an F3 tornado.

Tornadoes are the most violent storms on earth and wind speeds can exceed 200 mph. Tornadoes are usually associated with thunderstorms, but it is common for tornadoes to form and strike with little or no warning. New York State ranks 30th in tornado frequency compared to other states; over 350 tornadoes have occurred in New York since 1952 and averages of five (5) tornadoes occur every year. And contrary to most beliefs, hills and mountains offer no protection from tornadoes.

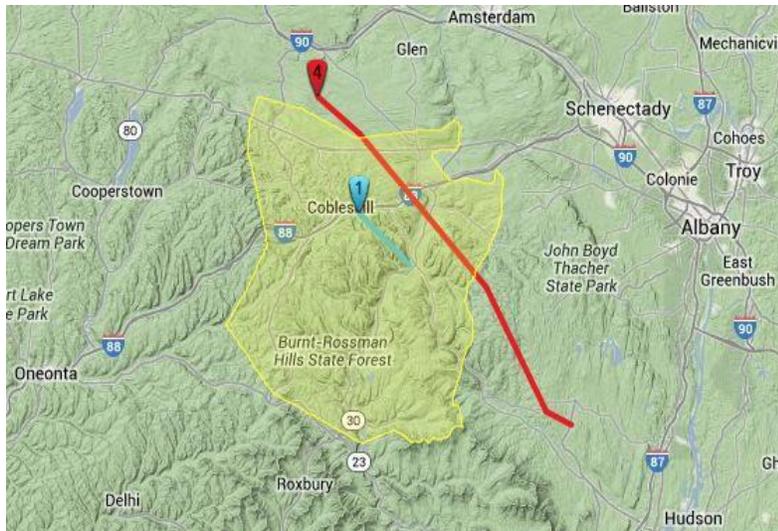
Early warning capabilities and moving people to well-designed shelters are important for tornado preparedness, and improved structural standards and building practices are essential for effective tornado resistance. The NYS Building Code requires that structures be built to withstand 90 mph winds, and beginning in 2003, structures that pose a higher hazard to human life were required to meet a more stringent standard.

F2 and Greater Tornadoes in New York State

Tornadoes in New York State – F2 and Greater – 1950 thru 2009		
Scale	Number	Location
F2	78	Statewide
F3	24	Statewide
F4*	6	Columbia, Chautauqua, Montgomery, Schoharie , Albany, Green
F5	0	

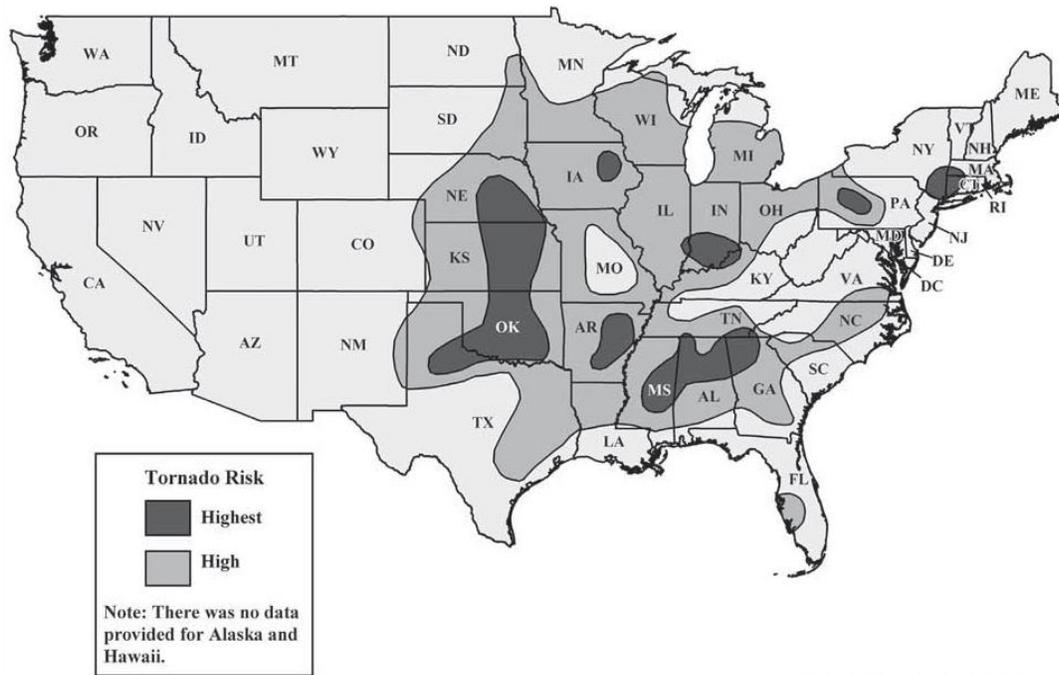
Source: NOAA National Climatic Data Center

Residential damage in Schoharie County from the 1989 tornado



Path of the July 1989 F3 Tornado
Source: TornadoHistoryProject.com

Tornado Risk Areas in the Continental United States



Source: United States Geological Survey

ITS Mapping and Analysis Center
Washington, DC

Tornados in NY 1950 - 2005



Hazard Profile - Severe Winter Storm

Hazard	Previous Events	Likely Impacts	Probability of Future Event
<p><u>Severe Winter Storm</u></p> <p><i>Definition:</i> Severe and/or sustained hazardous winter weather that poses a threat to life and/or property; including any, or a combination of the following: heavy snow, blowing snow, blizzard, freezing rain, sleet, and strong winds.</p> <p><i>Impact Area:</i> Countywide</p>	<p>50 events from 1996 to 2013</p> <p>15 had reported property damage</p>	<p>Transportation and road disruption/closings School, business and government disruption/closings Increased traffic accidents, including injuries and deaths Health and medical injuries, emergencies and deaths Disruptions/delays in fire, medical, and safety services Delays/disruption in scheduled medical services Difficulties and disruption with pharmaceutical Supplies Roof and structural damage, collapse Stranded motorists, citizens, travelers Power outages and heating disruptions Need for shelters, warming centers, food and transportation Food, lodging and services for critical workers Downed/suspended/unsafe trees, limbs and wires Abandoned vehicles Public access hazards for schools, medical facilities, etc. Generator and power support issues Carbon monoxide hazards Extended snow and ice maintenance, operations and materials</p>	<p>Average 3 severe winter storms each year</p>



Weather Channel forecast map for the December 2008 Snowstorm

From 1996 to 2013, the National Weather Service has recorded fifty (50) winter storm events in Schoharie County. Fifteen (15) of these winter storms were of notable significance and prompted a community-wide response and resulted in property damage. The most severe damage was reported in the winter storm of March 31, 1997, when \$500,000 in property damage was reported. Repeated severe snow storms in December 2002 through January 2003 resulted in Schoharie County and local governments receiving \$380,000 in federal snow emergency assistance to help with the cost of snow removal. Reports of private property damage in each of the 13 other most severe storms averaged approximately \$10,000, although local government snow removal expenses were not included in these figures.

Eastern New York is vulnerable to storms known as “Nor’easters”. These storms usually form off the East Coast near the Carolinas then follow a track northward along the coast until they blow out to sea, hence the term “Nor’easter”. Occasionally these storms are large enough to encompass almost the entire state. One such storm was the Blizzard of 1993. Most often, however, Nor’easters affect primarily eastern and southern New York. Nor’easters are most notable for snow accumulations in excess of nine (9) inches, accompanied by high, sometimes gale force, winds. Major property damage and power outages are not uncommon.

50 Winter Storm event(s) were reported in **Schoharie County** between **1/01/1996** and **2/28/2013**

Source: NOAA National Climatic Data Center

Dth: Deaths

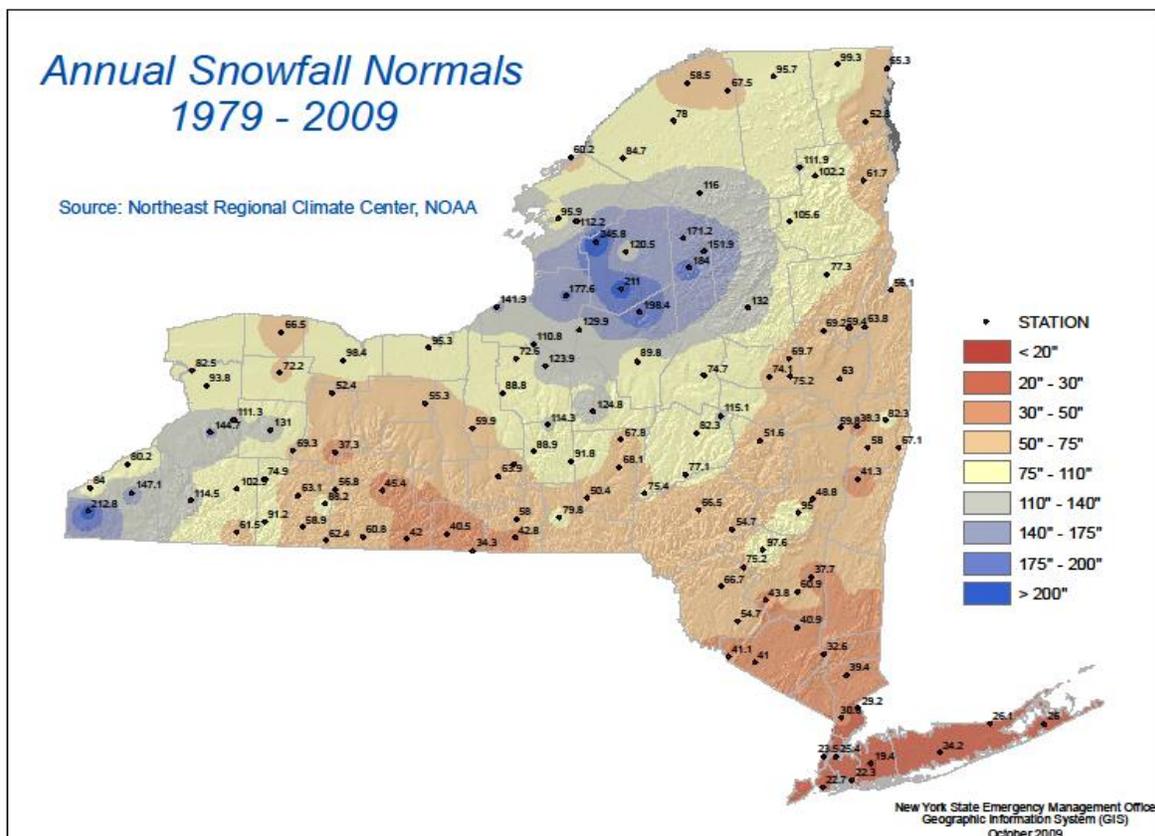
Inj: Injuries

PrD: Property Damage

Date(s)	Type	Dth	Inj	PrD*
12/06/1996	Winter Storm	0	0	15.00K
03/31/1997	Winter Storm	0	0	500.00K
04/01/1997	Winter Storm	0	0	0.00K
11/14/1997	Winter Storm	0	0	0.00K
12/29/1997	Winter Storm	0	0	15.00K
01/15/1998	Winter Storm	0	0	0.00K
02/23/1998	Winter Storm	0	0	0.00K
03/21/1998	Winter Storm	0	0	0.00K
01/02/1999	Winter Storm	0	0	1.00K
01/14/1999	Winter Storm	0	0	1.10K
03/06/1999	Winter Storm	0	0	2.00K
01/13/2000	Winter Storm	0	0	6.00K
01/25/2000	Winter Storm	0	0	11.00K

Date(s)	Type	Dth	Inj	PrD*
01/31/2000	Winter Storm	0	0	16.00K
02/18/2000	Winter Storm	0	0	1.00K
04/09/2000	Winter Storm	0	0	14.00K
12/30/2000	Winter Storm	0	0	0.00K
02/05/2001	Winter Storm	0	0	0.00K
03/05/2001	Winter Storm	0	0	0.00K
03/21/2001	Winter Storm	0	0	15.00K
03/30/2001	Winter Storm	0	0	25.00K
01/06/2002	Winter Storm	0	0	0.00K
01/31/2002	Winter Storm	0	0	0.00K
03/26/2002	Winter Storm	0	0	15.00K
05/18/2002	Winter Storm	0	0	0.00K
11/17/2002	Winter Storm	0	0	10.00K
12/11/2002	Winter Storm	0	0	0.00K
12/25/2002	Winter Storm	0	0	0.00K
01/01/2003	Winter Storm	0	0	0.00K
01/03/2003	Winter Storm	0	0	0.00K
02/17/2003	Winter Storm	0	0	0.00K
04/04/2003	Winter Storm	0	0	0.00K
04/04/2003	Winter Storm	0	0	0.00K
12/06/2003	Winter Storm	0	0	0.00K
12/14/2003	Winter Storm	0	0	0.00K
03/16/2004	Winter Storm	0	0	0.00K
01/06/2005	Winter Storm	0	0	0.00K
01/22/2005	Winter Storm	0	0	0.00K
04/15/2007	Winter Storm	0	0	0.00K
12/16/2007	Winter Storm	0	0	0.00K
01/28/2009	Winter Storm	0	0	0.00K

Date(s)	Type	Dth	Inj	PrD*
12/05/2010	Winter Storm	0	0	0.00K
12/26/2010	Winter Storm	0	0	0.00K
01/11/2011	Winter Storm	0	0	0.00K
02/01/2011	Winter Storm	0	0	0.00K
02/25/2011	Winter Storm	0	0	0.00K
03/06/2011	Winter Storm	0	0	0.00K
02/29/2012	Winter Storm	0	0	0.00K
03/01/2012	Winter Storm	0	0	0.00K
02/08/2013	Winter Storm	0	0	0.00K



The NYS Hazard Mitigation rated local snow storm vulnerability by assigning factors and data for average snowfall, the potential for extreme snowfall events, federally declared snow emergencies and population density.

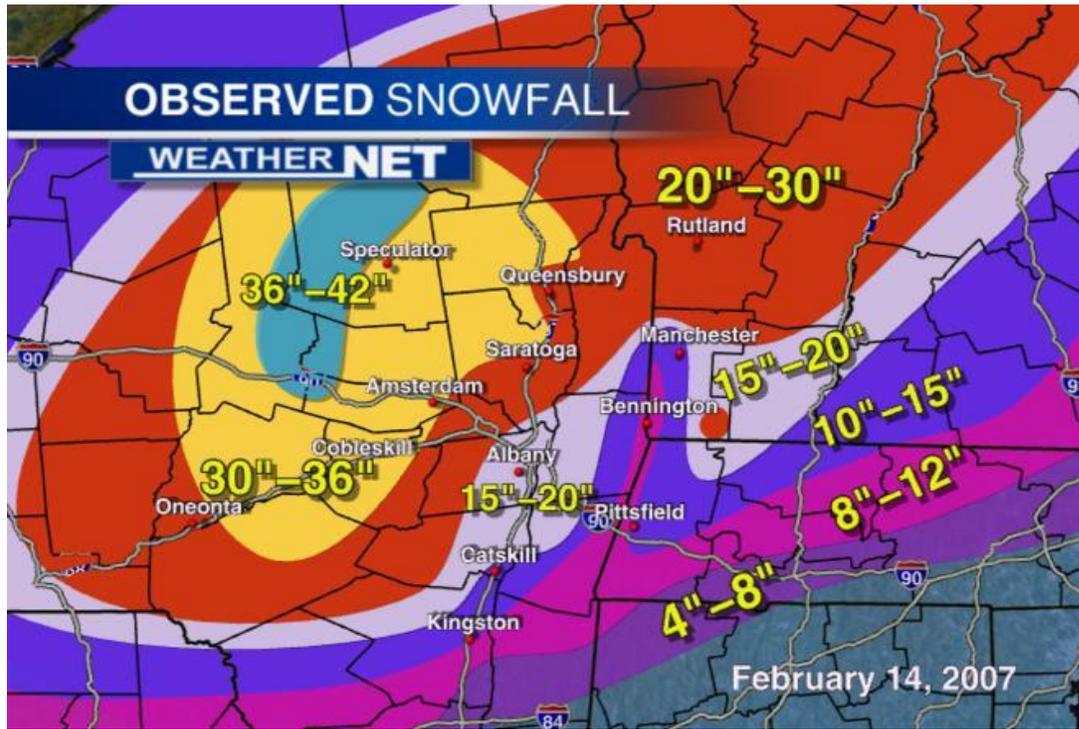
Jurisdictions Most Threatened by Snow and Vulnerable to Snow Loss - South Central NY

County	Rating Score (Max 25)	Annual Average Snowfall (inches)	*Extreme Snowfall Potential (no/yes)	# of Snow Related Disasters	Population Density (per square mile)	Total # of Structures (HAZUS)
Warren	9	75.6	no	1	68	26234
Herkimer	9	140.4	yes	2	44.2	22928
Montgomery	9	87.1	no	2	121.2	14829
Otsego	9	85.5	no	2	60.8	21815
Schoharie	9	71.3	no	3	56.1	12026
Steuben	8	54.8	no	1	70.3	34710
Washington	8	62.5	no	2	72.6	20361
Cortland	7	95	no	1	97	13599
Essex	7	87.7	no	1	21.2	17157
Hamilton	7	129.2	yes	1	3	6252
Schuyler	7	53.9	no	1	85.4	7378
Tioga	7	61.5	no	1	99.1	17232
Allegany	6	68.4	no	1	48.2	18096
Yates	6	56.5	no	1	65.5	9542
Seneca	5	58.7	no	1	40.6	11423

	Rating Score	Annual Average Snowfall (inches)	Extreme Potential (no/yes)	# of Snow Related Emergencies or Disasters	Population Density (per square mile)	Total # of Structures
Rating Score – Variables Distributions and Point Values	score value 1	1-40 inches		1	1 – 49	1-17K
	score value 2	41-70 inches	Yes	2	50 – 99	18-24K
	score value 3	71-100 inches		3	100 –299	25-40K
	score value 4	101-140 inches		4	300 – 1999	41-80K
	score value 5	141 + inches		5+	2000 – 67,000	81-462K

***Extreme snowfall potential areas:** The analysis identified counties with extreme snowfall potential as they fit into 2 general categories as follows; 1. Those areas that are historically vulnerable to persistent heavy Lake Effect/Enhanced snow from Lakes Erie and Ontario and those with elevation and latitude snow vulnerability. Counties in these classification include; Erie, Cattaraugus, and Chautauqua counties lee of Lake Erie. Oswego, Jefferson Lewis, Onondaga, Madison, Oneida, and Herkimer, lee of Lake Ontario. Hamilton, also lee of Lake Ontario, is also in an area categorized as potentially vulnerable to extreme snow enhanced by elevation and/or latitude as are St. Lawrence and Franklin counties.

*Sources: National Climatic Data Center NCDC average snowfall data, FEMA disaster declaration data, and HAZUS. Analysis supported by GIS technology.



Snow Totals - February 2007 Winter Storm

Source: cbs6albany.com

Hazard Profile - Severe Storm

Hazard	Previous Events	Likely Impacts	Probability of Future Event
<p><u>Severe Storm</u></p> <p><i>Definition:</i> A thunderstorm that can produce tornados, lightning and hail with winds of 58 mph or more</p> <p><i>Impact Area:</i> Countywide</p>	<p>50 storms from 1996 to 2013</p>	<p>Flash Flooding Drainage systems over-capacity Structural damage Downed trees, limbs, wires and utility poles Power outages Scattered, dense debris Deaths and injuries Electrical hazards Transportation and road disruption/closings Increased traffic accidents and injuries Health and medical injuries, emergencies and deaths Disruptions/delays in fire, medical, and safety services Food, lodging and services for critical workers Generator and power support issues Carbon monoxide exposure and chain saw injuries</p>	<p>Average is 2 to 3 severe storms each year in Schoharie County</p> <p>Chances are about one-half (50%) that a severe storm will result in multiple property damage reports</p>

The NOAA National Climatic Data Center reports that fifty (50) severe storms have occurred in Schoharie County from 1996 to 2013. Property damage was reported in 24 (about one-half) of these storms. The most severe were a July 3, 1997 storm that affected Charlotteville and Middleburgh, an August 13, 1999 storm in Esperance and May 18, 2000 storms in Schoharie, Jefferson and Gilboa, where reported private property damage approached or exceeded \$100,000 in each storm. Thunderstorms across Schoharie County on June 15, 2013 produced flash flooding, stranded motorists and forced school children to remain at school. Three (3) inches of heavy rain in a short time overwhelmed drainage systems, damaged culverts and roads and a State of Emergency was declared for the villages of Middleburgh and Schoharie.



*Thunderstorm Flash Flooding in Schoharie County, June 15, 2013
Photo Credit: Cindy Schultz / Times Union; examiner.com*

Strong and violent winds in thunderstorms are referred to by several different names depending on the storm's features; including straight-line winds, downbursts, microbursts and derecho. Strong winds in thunderstorms often originate high in the atmosphere and are carried to the earth's surface in downdrafts of rain-cooled air. Thunderstorm winds can exceed 100 mph and cause damage equal to a tornado.

Thunderstorm Wind and Damage Characteristics	
<i>Straight-Line Winds</i>	High velocity winds in a single direction across a wide area. High wind warnings are issued when winds reach 58 mph.
<i>Downburst</i>	Local currents of air that blast down from thunderstorms and shear or change direction near the ground, producing outward bursts of violent winds extending in all directions. The sharp downward and outward wind pattern differs from the linear path and circular pattern associated with tornado winds. Downburst winds can exceed 150 mph.
<i>Microburst</i>	A term used to describe the size of a downburst. Microbursts are downbursts where the damaging wind extends out to 2.5 miles from the downburst; a macro-burst extends more than 2.5 miles from the downburst.
<i>Derecho</i>	A derecho is a widespread, long-lived storm associated with a band of rapidly moving thunderstorms that produce strong straight-line winds. To be classified a derecho, a storm must have a wind damage swath that extends more than 240 miles and wind gusts of 58 mph or greater along most of its length.
<i>Supercell Thunderstorm</i>	Supercell thunderstorms are a special kind of highly organized single cell thunderstorm that can persist for many hours. Supercells are characterized by veering and turning updraft winds that produce storm-scale rotation that can reach more than 100 mph. They are responsible for nearly all of the significant tornadoes produced in the U.S. and for most of the hailstones larger than golf ball size. Supercells are known to produce extreme winds and flash flooding.
<i>Tornado</i>	A violent column of rotating air extending from a storm cloud that makes contact with the surface of the earth. Usually associated with severe thunderstorms, tornados are the most destructive of all atmospheric phenomena. Multiple tornados can form in a single storm; some might touch ground only briefly, while the most damaging can leave a destructive path for miles. Tornado winds can exceed 200 mph and the damage pattern affecting trees and debris on the ground will show its circular rotation.

50 Severe Storm event(s) were reported in **Schoharie County** between **1/01/1996** and **2/28/2013**

Source: NOAA National Climatic Data Center

Mag: Magnitude

Dth: Deaths

Inj: Injuries

PrD: Property Damage

Location	Date(s)	Type	Mag	Dth	Inj	PrD*
COUNTYWIDE	01/19/1996	Thunderstorm Wind		0	0	10.00K
LAWYERSVILLE	05/10/1996	Thunderstorm Wind		0	0	5.00K
SUMMIT				0	0	10.00K
SCHOHARIE				0	0	10.00K
ESPERANCE				0	0	10.00K
COBLESKILL	07/26/1996	Thunderstorm Wind		0	0	2.00K
COBLESKILL				0	0	2.00K
JEFFERSON	02/22/1997	Thunderstorm Wind		0	0	4.00K
CHARLOTTEVILLE	07/03/1997	Thunderstorm Wind		0	5	100.00K
MIDDLEBURG				0	0	4.00K
MIDDLEBURG	07/15/1997	Thunderstorm Wind		0	0	2.00K
CENTRAL BRIDGE	05/29/1998	Thunderstorm Wind		0	0	2.00K
SCHOHARIE	05/31/1998	Thunderstorm Wind		0	0	10.00K
NORTH BLENHEIM				0	0	8.00K
MIDDLEBURG				0	0	10.00K
RICHMONDVILLE				0	0	20.00K
BREAKABEEN				0	0	15.00K
SCHOHARIE				0	0	15.00K
COBLESKILL	06/29/1998	Thunderstorm Wind		0	0	4.00K
MIDDLEBURG	07/20/1998	Thunderstorm Wind		0	0	5.00K
CARLISLE	09/07/1998	Thunderstorm Wind		0	0	10.00K
SHARON				0	0	2.00K
COBLESKILL	09/26/1998	Thunderstorm Wind		0	0	1.00K
COBLESKILL	07/03/1999	Thunderstorm Wind		0	0	1.00K
SUMMIT	07/04/1999	Thunderstorm Wind		0	0	3.00K
COBLESKILL	07/06/1999	Thunderstorm Wind		0	0	2.00K
COBLESKILL				0	0	3.00K
ESPERANCE	08/13/1999	Thunderstorm Wind		0	0	100.00K
GILBOA	05/18/2000	Thunderstorm Wind		0	0	15.00K
JEFFERSON				0	0	22.00K
CONESVILLE				0	0	55.00K
ESPERANCE	06/02/2000	Thunderstorm Wind		0	0	35.00K
CHARLOTTEVILLE	09/21/2000	Thunderstorm Wind		0	0	13.00K
RICHMONDVILLE	05/31/2002	Thunderstorm Wind		0	0	17.00K
COBLESKILL				0	0	15.00K
MIDDLEBURG				0	0	9.00K
CHARLOTTEVILLE	06/05/2002	Thunderstorm Wind		0	0	22.00K
COBLESKILL				0	0	7.00K
GALLUPVILLE	08/16/2002	Thunderstorm Wind		0	0	5.00K
MIDDLEBURG	07/21/2003	Thunderstorm Wind	60 kts. ES	0	0	1.00K

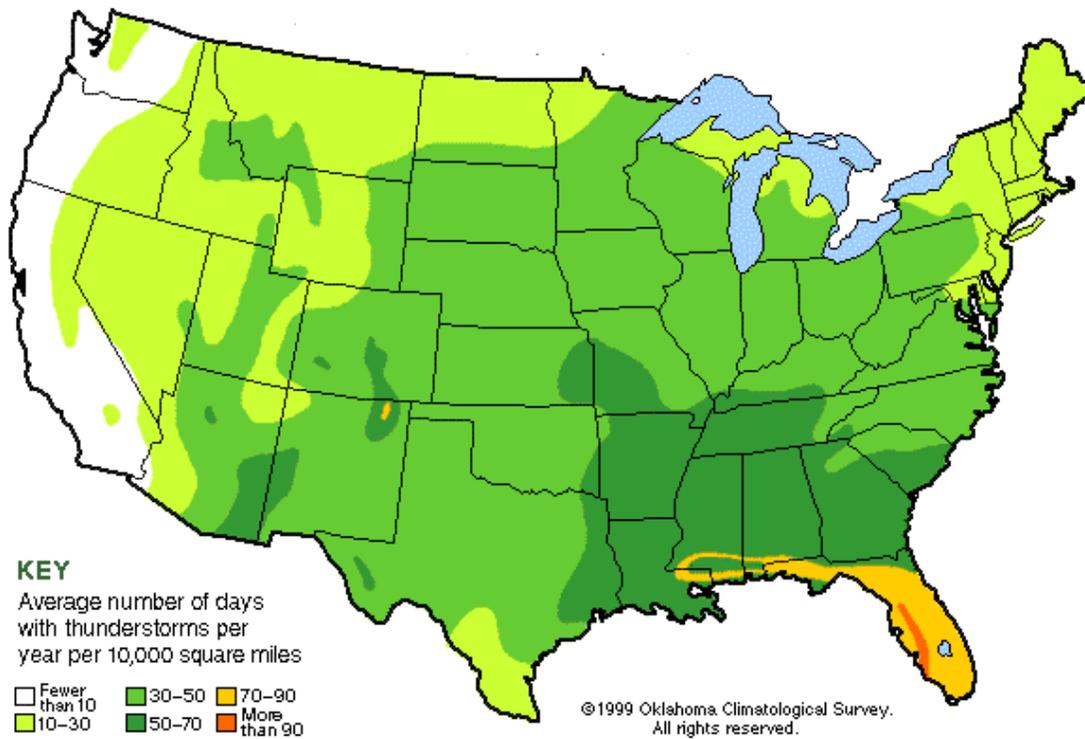
Location	Date(s)	Type	Mag	Dth	Inj	PrD*
SCHOHARIE				0	0	1.00K
RICHMONDVILLE	04/18/2004	Thunderstorm Wind	60 kts. EG	0	0	0.00K
MIDDLEBURG	05/23/2004	Thunderstorm Wind	60 kts. EG	0	0	0.00K
MIDDLEBURG	05/24/2004	Thunderstorm Wind	60 kts. EG	0	0	0.00K
DORLOO				0	0	0.00K
JEFFERSON	06/09/2004	Thunderstorm Wind	60 kts. EG	0	0	0.00K
MIDDLEBURG	08/20/2004	Thunderstorm Wind	60 kts. EG	0	0	0.00K
JEFFERSON	06/06/2005	Thunderstorm Wind	60 kts. EG	0	0	0.00K
NORTH BLENHEIM				0	0	10.00K
NORTH BLENHEIM	07/22/2005	Thunderstorm Wind	60 kts. EG	0	0	0.00K
SHARON	09/29/2005	Thunderstorm Wind	60 kts. EG	0	0	0.00K
MIDDLEBURG				0	0	0.00K
MIDDLEBURG	02/17/2006	Thunderstorm Wind	71 kts. MG	0	0	0.00K
CARLISLE	05/30/2006	Thunderstorm Wind	60 kts. EG	0	0	0.00K
NORTH BLENHEIM				0	0	0.00K
MIDDLEBURG	07/03/2006	Thunderstorm Wind	60 kts. EG	0	0	0.00K
MIDDLEBURG	09/24/2006	Thunderstorm Wind	60 kts. EG	0	0	0.00K
JEFFERSON	06/27/2007	Thunderstorm Wind	50 kts. EG	0	0	0.00K
CHARLOTTEVILLE	08/25/2007	Thunderstorm Wind	50 kts. EG	0	0	0.00K
JEFFERSON				0	0	0.00K
SHARON				0	0	0.00K
MIDDLEBURG	09/09/2007	Thunderstorm Wind	50 kts. EG	0	0	0.00K
JEFFERSON	05/31/2008	Thunderstorm Wind	50 kts. EG	0	0	0.00K
SCHOHARIE	06/10/2008	Thunderstorm Wind	50 kts. EG	0	0	0.00K
LIVINGSTONVILLE				0	0	0.00K
SCHOHARIE	07/18/2008	Thunderstorm Wind	50 kts. EG	0	0	0.00K
CENTRAL BRIDGE				0	0	0.00K
RICHMONDVILLE	05/04/2010	Thunderstorm Wind	50 kts. EG	0	0	0.00K
MIDDLEBURG	06/06/2010	Thunderstorm Wind	50 kts. EG	0	0	0.00K
COBLESKILL				0	0	0.00K
GILBOA	06/06/2010	Thunderstorm Wind	50 kts. EG	0	0	0.00K
CARLISLE				0	0	0.00K
JEFFERSON	07/17/2010	Thunderstorm Wind	50 kts. EG	0	0	0.00K
SLOANSVILLE	08/19/2010	Thunderstorm Wind	50 kts. EG	0	0	0.00K
				0	0	0.00K
MIDDLEBURG	04/28/2011	Thunderstorm Wind	50 kts. EG	0	0	0.00K
SUMMIT	05/26/2011	Thunderstorm Wind	50 kts. EG	0	0	0.00K
SHARON SPGS				0	0	0.00K
MIDDLEBURG				0	0	0.00K
SCHOHARIE				0	0	0.00K
LEESVILLE	07/26/2011	Thunderstorm Wind	50 kts. EG	0	0	0.00K
SEWARD				0	0	0.00K
MIDDLEBURG				0	0	0.00K
RICHMONDVILLE	09/08/2012	Thunderstorm Wind	50 kts. EG	0	0	0.00K
SCHOHARIE				0	0	0.00K



Supercell thunderstorm with tornados approaches Schoharie County in July 2003

Source: NWS

Average Number of Thunderstorms Days Per Year



Hazard Profile – Ice Storm

Hazard	Previous Events	Likely Impacts	Probability of Future Event
<p><u>Ice Storm</u></p> <p><i>Definition:</i> A winter storm event where 0.25 inches of freezing rain accumulates on exposed surfaces</p> <p><i>Impact Area:</i> Countywide</p>	<p>3 ice storms from 1996 to 2013</p>	<p>Structural damage Downed trees, limbs, wires and utility poles Power outages Scattered, dense debris Deaths and injuries Electrical hazards Disrupted heating Shelters and food services for disaster victims Transportation and road disruption/closings Increased traffic accidents and injuries Health and medical injuries, emergencies and deaths Disruptions/delays in fire, medical, and safety services Food, lodging and services for critical workers Generator and power support issues Carbon monoxide exposure and chain saw injuries Hazards from hanging broken limbs and debris</p>	<p>There is a 17 % chance of an ice storm each year</p> <p>There is approximately an 8% chance each year of an ice storm that results in historically significant damages and costs</p>

Three (3) ice storms are included in the National Climatic Data Center records for Schoharie County from 1996 to 2013. Although power and services were disrupted, overall damages and impacts for these three (3) storms were not reported to be significant. In earlier reports, however, it is noted that a severe ice storm occurred in eastern New York and Schoharie County on December 4-5, 1964 when freezing rain caused ice accumulations up to 1.5 inches, which crippled the region and resulted in widespread power outages, downed wires and tree limbs.

Ice storm was not ranked as a high hazard for Schoharie County when the risk assessment was performed countywide, but as noted in Section III, there is a history of severe ice storms occurring in upstate New York, particularly the 1991 ice storm in the Genesee Valley and Finger Lakes and the 1998 North Country ice storm – plus, ten (10) of the Schoharie town and village risk assessments determined that ice storms posed a significant risk and vulnerability.

Photos of 2008 ice storm in Richmondville, NY



Photos: Sue & Gary Buhl



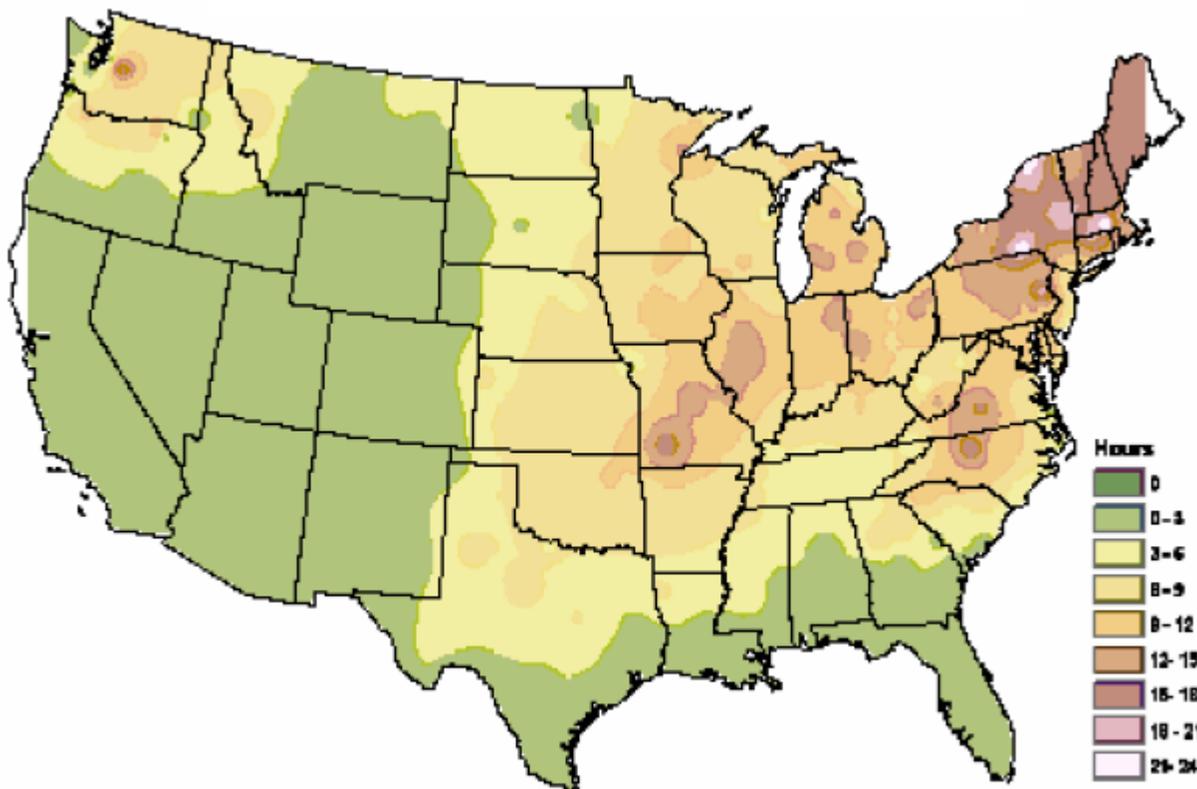
3 Ice Storm event(s) were reported in **Schoharie County** between **1/01/1996** and **2/28/2013**

Source: NOAA National Climatic Data Center

Mag: Magnitude
Dth: Deaths
Inj: Injuries
PrD: Property Damage

<u>County/Zone</u>	<u>Date</u>	<u>Type</u>	<u>Mag</u>	<u>Dth</u>	<u>Inj</u>	<u>PrD</u>
SCHOHARIE	01/15/2007	Ice Storm		0	0	0.00K
SCHOHARIE	03/04/2008	Ice Storm		0	0	0.00K
SCHOHARIE	12/11/2008	Ice Storm		0	0	0.00K

Average Hours per Year with Freezing Rain



Source: "FREEZING RAIN EVENTS IN THE UNITED STATES", National Climatic Data Center, Asheville, North Carolina

Hazard Profile – Earthquake

Hazard	Previous Events	Likely Impacts	Probability of Future Event
<p><u>Earthquake</u></p> <p><i>Definition:</i> An earthquake occurs when two of the earth's geologic plates or layers shift, causing vibrations, and/or shaking to at and below the earth's surface</p> <p><i>Impact Area:</i> Countywide</p>	None	<p>Death and Injuries</p> <p>Property and structural damage</p> <p>Damage to roads, utilities, bridges, infrastructure</p> <p>Stranded or trapped residents and victims</p> <p>Rescue operations and other high risk response</p> <p>Breakdown of emergency communications</p> <p>Disruption of transportation</p> <p>Delayed access for emergency services</p> <p>Fire risks from ruptured gas lines</p> <p>Damage to flood protection systems</p> <p>Shelter, feeding and temporary housing</p> <p>Economic impacts, property value and tax losses</p> <p>Employment and business disruption and losses</p> <p>Damage to natural features and habitat</p> <p>Increased health risks</p> <p>Contamination and disease</p> <p>Water supply contamination</p> <p>Secondary hazardous materials exposure</p> <p>Threat to dams and secondary flooding</p> <p>Power outages</p> <p>Increased demand for health/medical services</p> <p>Increased need for human and social services</p> <p>Disruption of home medical and care services</p> <p>Disrupted access for pharmacy and health needs</p> <p>Crisis counseling and mental health services</p> <p>Institutional threats; prisons, nursing homes, etc.</p>	<p>There is a 10% chance over 50 years of a minor earthquake occurring in Schoharie County that would produce noticeable shaking but no damages</p> <p>There are no reliable or accurate methods for predicting the probability of a severely damaging earthquake in Schoharie County</p> <p>The NYS Hazard Mitigation Plan calculates that a damaging earthquake will occur somewhere in the state on average once every 22 years; and that a damaging earthquake is most likely to occur in the North Country, NYC/Long Island or Western NY regions of the state</p>

There has not been any recorded earthquake occurrence or reports of earthquake damage in Schoharie County. Local residents have felt tremors and shaking from earthquakes that have occurred elsewhere in the northeast, and other counties in upstate New York have had damaging earthquakes.

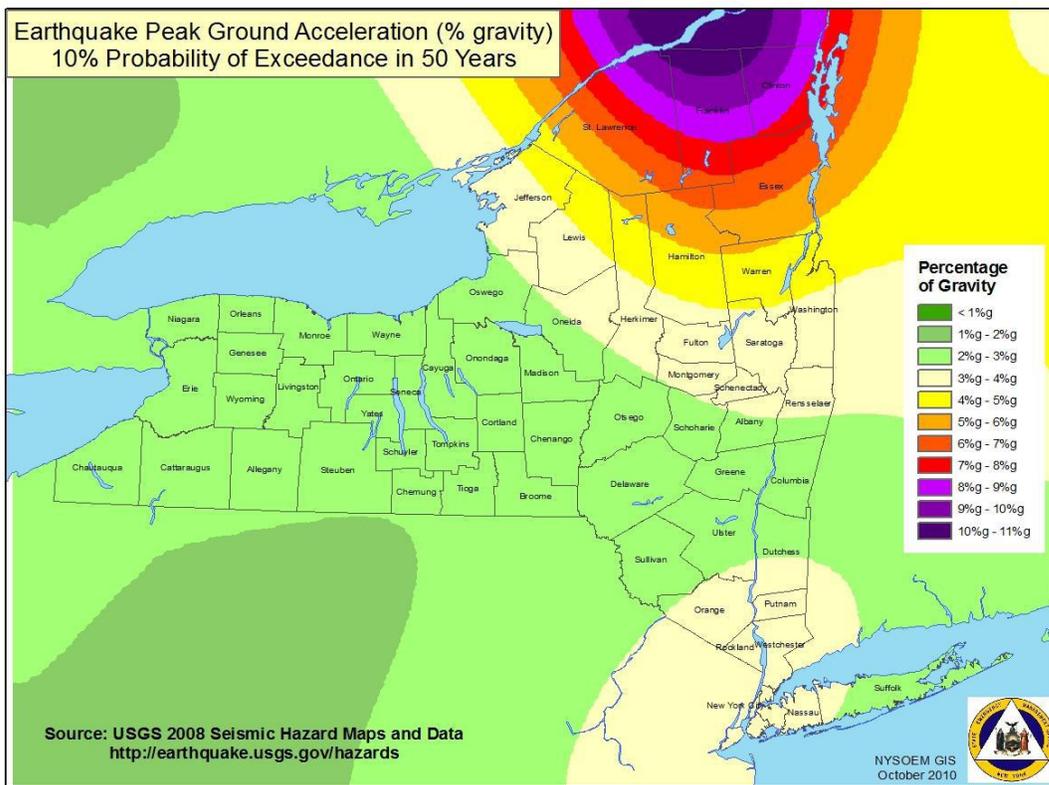
The earthquake risk in New York State is often misunderstood and underestimated. While other natural hazards occur more frequently and result in higher awareness, earthquakes have the potential to cause widespread damage that few hazards can match. The State's history of building construction has only recently begun to incorporate seismic provisions, which presents vulnerability for even moderate size events throughout New York.

The New York State Emergency Management Office and New York Geological Survey report there have been four earthquakes in New York State with magnitudes greater than 5.0 in the last 100 years, the largest was a 5.8 in Massena in 1944. Earthquakes of these magnitudes are considered "moderate size," falling in the range between magnitudes 5.0 to 6.0 on the Richter scale. A magnitude 5.0 earthquake in June 2010 was centered north of Ottawa, Canada and felt through all of New York State, but did not result in any damage. In contrast, minor earthquakes with magnitudes less than 3.0 are common in New York State and occur on average, about one a week. These low magnitude earthquakes often go unfelt, or are only felt by citizens in the immediate vicinity of the epicenter. Soil type can substantially increase earthquake risk. For instance, amplification or strengthened shaking and ground motion occurs in softer soils. The predominant soil classifications in Schoharie County are sedimentary rock or firm ground at higher elevations and soft to medium clay or sand in the valleys and basins.

Even in a moderate size earthquake, there is a relatively low probability of building collapse for typical structures, but a moderate earthquake could cause significant damage, particularly to poorly maintained masonry walls, chimneys, foundations, plaster, as well as compounding problems such as gas and water line leaks and falling objects. Damages can easily run to tens of thousands of dollars for affected structures.

According to USGS maps, the probability of a serious earthquake in Schoharie County is less than most other areas of New York State and there is no record of a serious earthquake occurring in Schoharie County.

Peak Ground Acceleration (PGA), as mapped by the United States Geological Survey (USGS) below, is a common earthquake measurement that shows three things; the geographic area affected (all colored areas on the map), the probability of an earthquake of each given level of severity (10% chance in 50 years), and the strength of ground movement (severity). The PGA for Schoharie of 2-3 percent gravity, when compared with the next table showing damage intensities associated with PGA levels, indicates there is a 10% probability over 50 years that an earthquake will occur in Schoharie County that exceeds peak acceleration – but even then, the impact of such an earthquake would be limited to light shaking and is not likely to result in any damage.

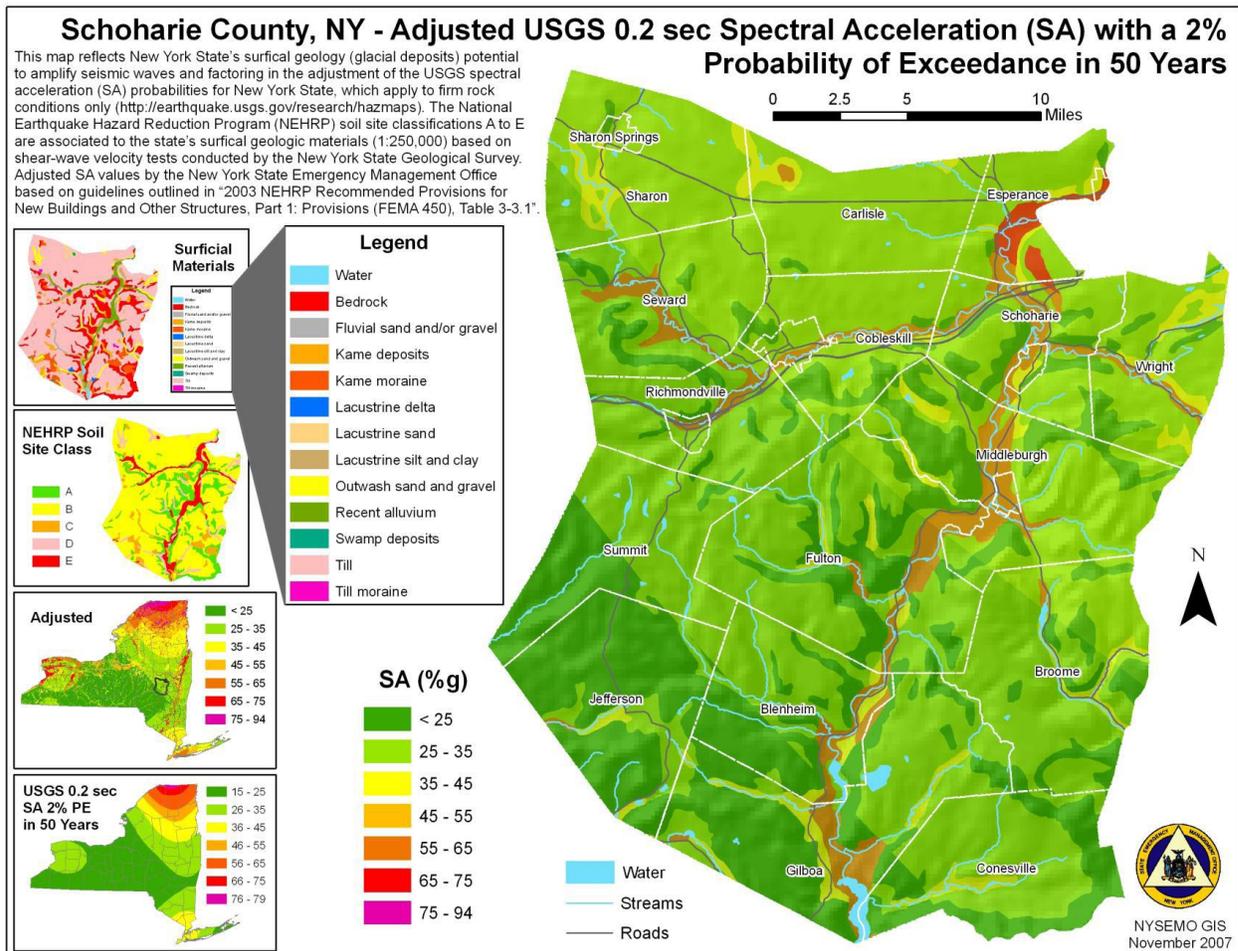


**Table 3-53
Modified Mercalli Intensity (MMI) and PGA Equivalents**

MMI	Acceleration (%g) (PGA)	Perceived Shaking	Potential Damage
I	< .17	Not Felt	None
II	.17 – 1.4	Weak	None
III	.17 – 1.4	Weak	None
IV	1.4 – 3.9	Light	None
V	3.9 – 9.2	Moderate	Very Light
VI	9.2 - 18	Strong	Light
VII	18 – 34	Very Strong	Moderate
VIII	34 – 65	Severe	Moderate to Heavy
IX	65 – 124	Violent	Heavy
X	> 124	Extreme	Very Heavy
XI	> 124	Extreme	Very Heavy
XII	> 124	Extreme	Very Heavy

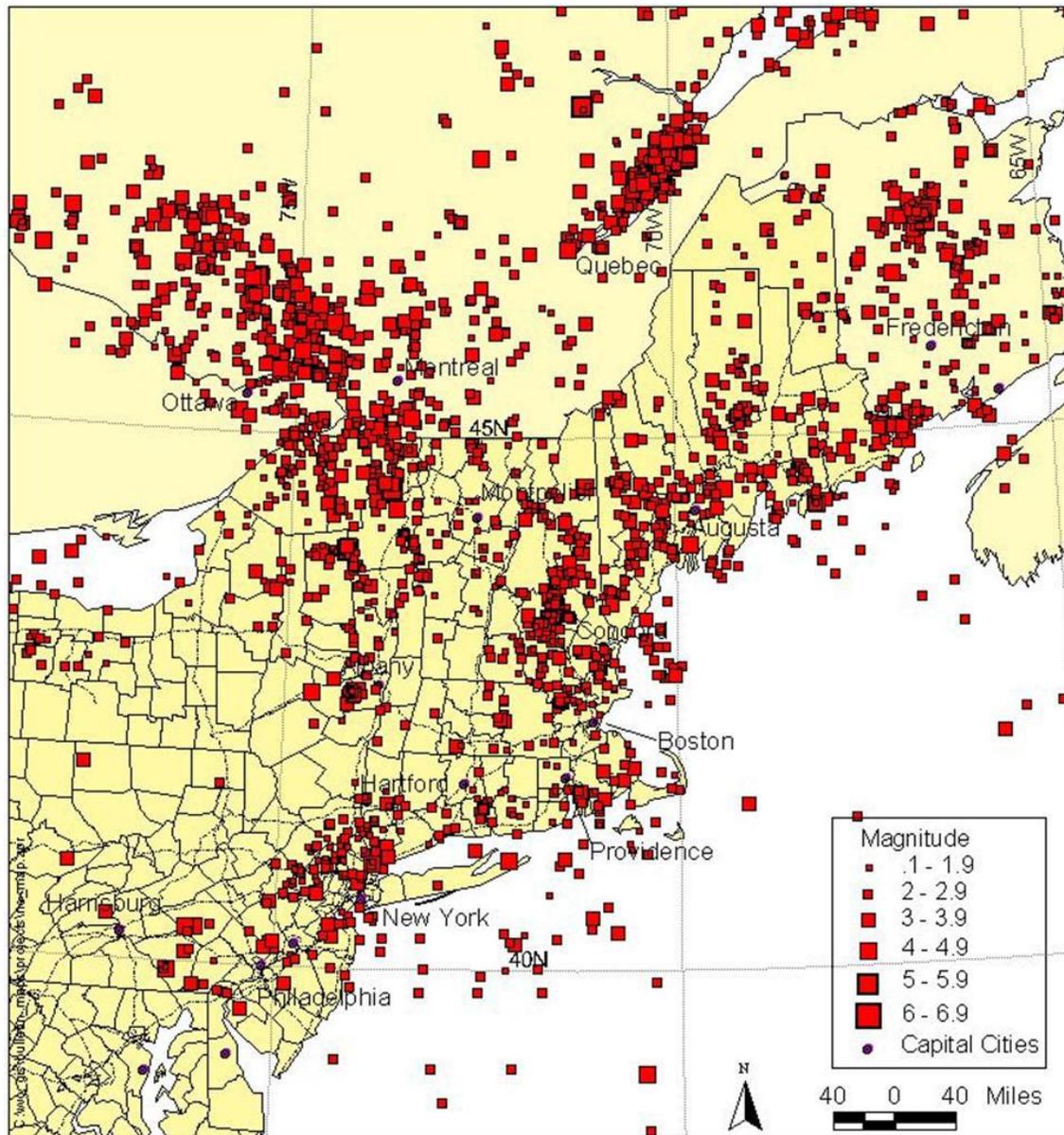
Source: FEMA mitigation planning "how to" guide 386-2.

Adjusted spectral acceleration was mapped below for Schoharie County in the NYS Hazard Mitigation Plan (2011), which adjusts earthquake probability by factoring local soil conditions for their ability to amplify or transfer seismic activity. Most areas of sedimentary rock outside the valleys and basins are more resistant to seismic amplification.



Northeast seismic activity from October, 1975 - March, 2010

Source: USGS



Hazard Profile – Dam Failure

Hazard	Previous Events	Likely Impacts	Probability of Future Event
<p><u>Dam Failure</u></p> <p><i>Definition:</i> The uncontrolled release of impounded water resulting in downstream flooding and hazards</p> <p><i>Impact Area:</i> Primarily the Schoharie Valley below the Schoharie and Blenheim-Gilboa dams; including Gilboa, Blenheim, Fulton, Middleburg, Schoharie and Esperance. Also the low-lying downstream vicinities of dams in Summit and Cobleskill</p>	None	<p>Death and Injuries</p> <p>Property and structural damage</p> <p>Damage to roads, utilities, bridges, infrastructure</p> <p>Evacuations of residents and stranded victims</p> <p>Water rescue and other high risk response</p> <p>Breakdown of emergency communications</p> <p>Disruption of transportation</p> <p>Delayed access for emergency services</p> <p>Damage to flood protection systems</p> <p>Shelter, feeding and temporary housing</p> <p>Economic impacts, property value and tax losses</p> <p>Employment and business disruption and losses</p> <p>Damage to natural features and habitat</p> <p>Increased health risks</p> <p>Secondary hazardous materials exposure</p> <p>Increased demand for health/medical services</p> <p>Increased need for human and social services</p> <p>Disruption of home medical and care services</p> <p>Disrupted access for pharmacy and health needs</p> <p>Crisis counseling and mental health services</p>	<p>A probability estimate is not available because there is no history for this type of event, plus regular design improvements and increased protection at these facilities continually reduces the probability and scope of a failure</p>

There have been no dam failures in Schoharie County. There are reports that agricultural levees have failed or breached, but these are not dams and even these breaks did not pose a threat to the community or have any impact beyond the farm property. It was long rumored that a 1939 flood in the Town of Cobleskill was the result of a dam failure, but this has been proven false and there are no records to substantiate that a dam failure was involved.

Dam failures can occur as a result of structural deterioration, progressive erosion of an embankment or footing that supports dam walls, a natural disaster such as a flood or earthquake; and actions caused by man such as a maintenance or construction accident, criminal activity or terrorism, and overtopping and breaching by a severe flood. According to the International Commission on Large Dams (ICOLD), the three major causes of dam failure are overtopping by a flood, foundation defects and piping.

The NYS Department of Environmental Conservation (DEC) Hazard Classifications for dams are assigned based on the particular physical characteristics of a dam, its location and potential hazards and is not necessarily related to the size of the dam. The hazard classification represents the consequences of a dam failure and is not a representation of a dam's condition.

Class "A" or "Low Hazard" A dam failure is unlikely to result in damage to anything more than isolated or unoccupied buildings, undeveloped lands, minor roads such as town or county roads; is unlikely to result in the interruption of important utilities, including water supply, sewage treatment, fuel, power, cable or telephone infrastructure; and/or is otherwise unlikely to pose the threat of personal injury, substantial economic loss or substantial environmental damage.

Class "B" or "Intermediate Hazard" A dam failure may result in damage to isolated homes, main highways, and minor railroads; may result in the interruption of important utilities, including water supply, sewage treatment, fuel, power, cable or telephone infrastructure; and/or is otherwise likely to pose the threat of personal injury and/or substantial economic loss or substantial environmental damage. Loss of human life is not expected.

Class "C" or "High Hazard" A dam failure may result in widespread or serious damage to home(s); damage to main highways, industrial or commercial buildings, railroads, and/or important utilities, including water supply, sewage treatment, fuel, power, cable or telephone infrastructure; or substantial environmental damage; such that the loss of human life or widespread substantial economic loss is likely.

Class "D" or "Negligible or No Hazard" A dam that has been breached or removed, or has failed or otherwise no longer materially impounds waters, or a dam that was planned but never constructed. Class "0" dams are considered to be defunct dams posing negligible or no hazard. The department may retain pertinent records regarding such dams.

Schoharie County Dam Inventory

There are approximately one hundred thirty-two (132) dams that could impact Schoharie County, including dams in Greene and Albany counties. In Schoharie County, there are a total of seventy-eight (78) dams registered and classified by the NYS Department of Environmental Conservation. There are seven (7) Class C High Hazard dams, nineteen (19) Class B Intermediate Hazard dams, forty-nine (49) Class A Low-Hazard dams and four (4) Class 0 Negligible/No Hazard dams. Records and information about these dams is contained in the NYS Inventory of Dams maintained by DEC and available online at the DEC website. Class C High Hazard Dams in Schoharie County include the following.

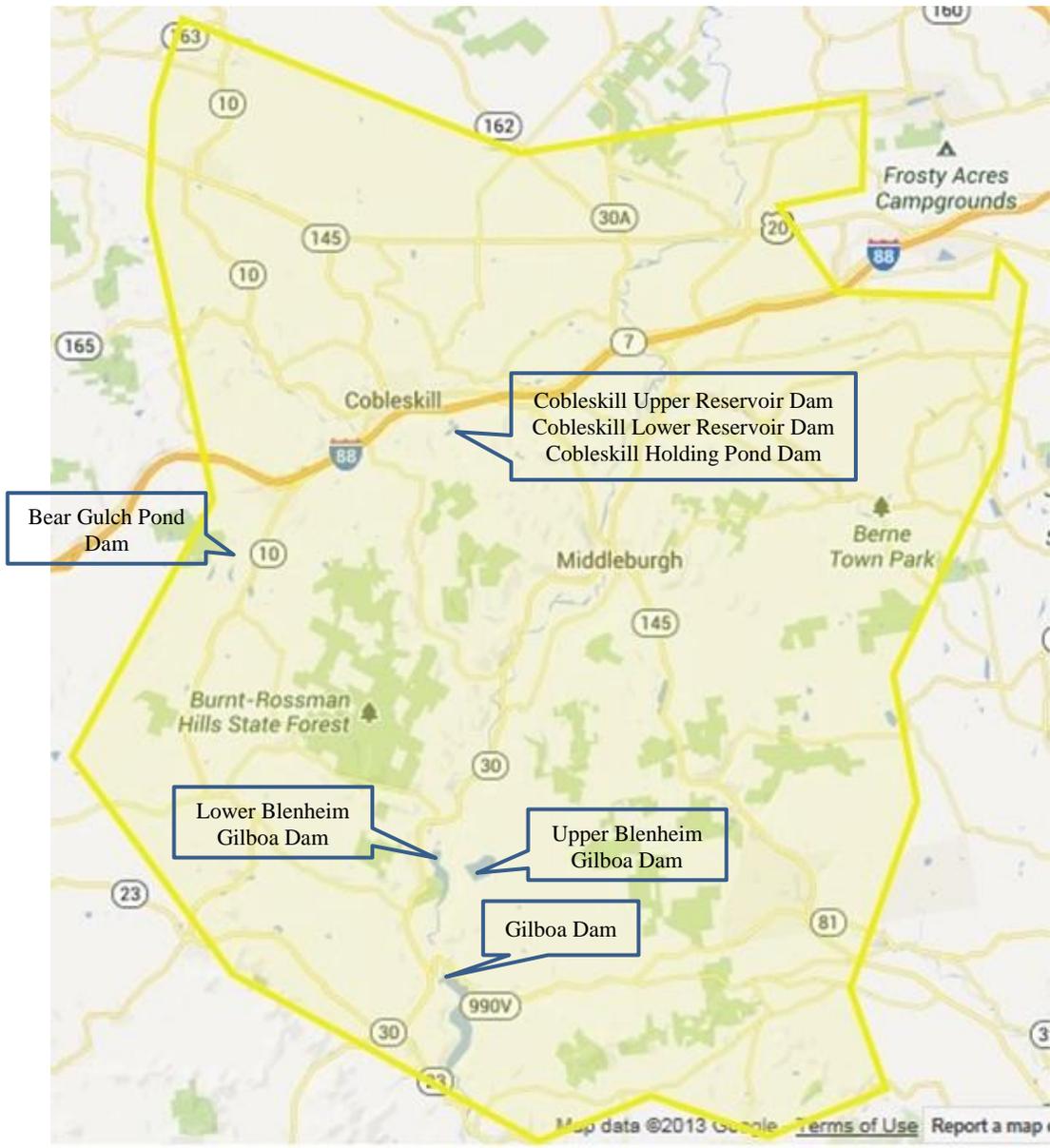
Class C High Hazard Dams in Schoharie County

Dam	Location	Type	Storage Capacity (acre-feet)	River/Creek	Purpose
Gilboa Dam	Gilboa	Masonry, Earth	64,000	Schoharie Creek	NYC Water Supply
Blenheim-Gilboa Upper Reservoir Dam	Gilboa	Earth, Rockfill	15,000	Schoharie Creek	Hydroelectric Generation
Blenheim-Gilboa Lower Reservoir Dam	Blenheim	Earth, Rockfill	8,600	Schoharie Creek	Hydroelectric Generation and Recreation
Bear Gulch Pond Dam	Summit	Earth	214	Bear Gulch Brook	Recreation
Cobleskill Upper Reservoir Dam	Cobleskill	Earth	239	Smith Brook	Municipal Water Supply
Cobleskill Lower Reservoir Dam	Cobleskill	Earth	272	Dow Brook	Municipal Water Supply
Village of Cobleskill Holding Pond Dam	Cobleskill	Earth	311	Cobleskill Creek	Municipal Water Supply

**Gilboa Dam Stabilization Project**

Commissioner Emily Lloyd was in Gilboa on December 14 to mark the end of the Gilboa Dam stabilization project. In the span of one year, the DEP completed a \$24 million project to make the dam safe by installing 80 anchoring cables that pin the dam down to the bedrock below.

Class C High Hazard Dams in Schoharie County



NYS DEC Dam Safety Requirements by Class**Owners of Class C - High Hazard dams are required to:**

- Submit an Annual Certification to DEC
- Have an Emergency Action Plan (EAP) prepared by a Professional Engineer and submit the Plan to DEC.
- Develop and implement an Inspection and Maintenance Plan.
- Have an Engineering Assessment (EA) conducted by a Professional Engineer and submit the Report to DEC every ten (10) years.
- Have a Safety Inspection conducted by a Professional Engineer on a regular schedule as defined in the Inspection and Maintenance Plan.
- Report flows in erodible auxiliary spillways to DEC within five (5) days.

Owners of Class B - Intermediate Hazard dams are required to:

- Submit an Annual Certification to the DEC.
- Develop and submit to DEC an Emergency Action Plan (EAP).
- Develop and implement an Inspection and Maintenance Plan.
- Have an Engineering Assessment (EA) conducted by a Professional Engineer and submit the Report to DEC every ten (10) years.
- Have a Safety Inspection conducted by a Professional Engineer on a regular schedule as defined in the Inspection and Maintenance Plan.
- Report flows in erodible auxiliary spillways to DEC within five (5) days.

All Class C High Hazard Dams and Class B Intermediate Hazard Dams are required to have an Emergency Action Plan (EAP). Each of the dam operators works with Schoharie County Emergency Management, local government and public safety officials on preparedness measures. The Gilboa and Blenheim-Gilboa facility managers regularly coordinate plans, training and exercises with local officials because these high-profile dams and reservoirs hold significantly higher quantities of water than other dams in the region. In fact, the NYC Gilboa dam and reservoir retains almost 75% of the water held behind all seven (7) High-Hazard dams in the county. Detailed safety precautions and procedures are maintained – including evacuation planning and early warning systems - to protect downstream interests on the Schoharie Creek.

Dam failure flood inundation maps have been prepared that outline potential flood risk areas along the Schoharie Creek floodplains for the Gilboa and Blenheim-Gilboa dams. These inundation maps are part of the Emergency Action Plans for these facilities and are available at the Schoharie County Emergency Management Office. The downstream Schoharie Valley villages and hamlets of North Blenheim, Breakabeen, Middleburg, Schoharie, Central Bridge and Esperance are exposed to the greatest risk and vulnerability for a dam failure at these facilities.