

5.2. IDENTIFICATION OF NATURAL HAZARDS OF CONCERN

To provide a strong foundation for mitigation strategies considered in Sections 6 and 9, Cayuga County considered a full range of natural hazards that could impact the area, and then identified and ranked those hazards that presented the greatest concern. The natural hazard of concern identification process incorporated input from Cayuga County and participating jurisdictions; review of the 2011 New York State Hazard Mitigation Plan (NYS HMP); previous hazard identification efforts and research; and local, state, federal information on the frequency, magnitude, and costs associated with the various hazards that have previously, or could feasibly, impact the region; and qualitative or anecdotal information regarding natural hazards and the perceived vulnerability of the study area’s assets to them. Table 5.2-1 documents the process of identifying the natural hazards of concern for further profiling and evaluation.

Hazards of Concern is defined as those hazards that are considered most likely to impact a community. These are identified using available data and local knowledge.

For the purposes of this planning effort, the Planning Committee chose to group some natural hazards together, based on the similarity of hazard events, their typical concurrence or their impacts, consideration of how hazards have been grouped in Federal Emergency Management Agency (FEMA) guidance documents (FEMA 386-1, “Understanding Your Risks, Identifying Hazards and Estimating Losses; FEMA’s “Multi-Hazard Identification and Risk Assessment – The Cornerstone of the National Mitigation Strategy”), and consideration of hazard grouping in the NYS HMP.

The “Severe Storm” hazard includes windstorms that often entail a variety of other influencing weather conditions including thunderstorms, hail, lightning and tornadoes. Since tropical disturbances are identified as a type of severe storm event, this hazard also includes tropical cyclone events (hurricanes, tropical storms and tropical depressions). Tropical cyclones were not grouped as a separate hazard, because Cayuga County felt that these types of events do not directly impact Cayuga County on a frequent basis and that exposure and risk of such events are minimal in comparison to communities along the New York coastline.

The “Severe Winter Storm” hazard includes heavy snowfall, blizzards, freezing rain/sleet, ice storms and extra-tropical cyclones (Nor’Easters and severe winter low-pressure systems). Extra-tropical events generally occur during winter weather months; therefore, for the purpose of this HMP, all such events are to be grouped within this hazard. Although not all extra-tropical events, such as Nor’Easters, occur during the winter, they will remain grouped within this hazard category to avoid duplication of events in hazard profiles. This grouping is consistent with that used in the NYS HMP, as well as the “Severe Winter Storm” hazard used in FEMA’s “Multi-Hazard Identification and Risk Assessment” guidance.

These groupings do not change the definition of the included specific events/hazards, as defined within FEMA guidance and other risk assessment documents, and does not affect the hazard analysis conducted through the use of HAZUS-MH, either directly or as a risk assessment support tool.

Please note that, except for the transportation hazard, technological (for example, hazardous material incidents) and man-made hazards (for example, terrorism) are not being addressed in this planning process. The DMA 2000 regulations do not require consideration of such hazards, and the Steering Committee has elected to focus full attention only on transportation and the natural hazards that pose the greatest risk to Cayuga County. Further, the risks of man-made and technological hazards not addressed under the transportation hazard section of this plan are generally mitigated and/or managed through other regulatory programs and plans.

SECTION 5.2: RISK ASSESSMENT – IDENTIFICATION OF HAZARDS OF CONCERN

Table 5.2-1. Identification of Natural Hazards of Concern for Cayuga County, New York

Hazard	Step 1	Step 2	Step 3	
	Is this a hazard that may occur in Cayuga County?	If yes, does this hazard pose a significant threat to Cayuga County?	Why was this determination made?	Source(s)
Avalanche	No	No	<ul style="list-style-type: none"> The NYS HMP does not identify avalanche as a hazard of concern for New York State. The topography and climate of Cayuga County does not readily support the occurrence of an avalanche event. New York State in general has a very low occurrence of avalanche events based on statistics provided by National Avalanche Center – American Avalanche Association (NAC-AAA) between 1950 and 2006. 	<ul style="list-style-type: none"> NYSDPC Review of NAC-AAA database between 1950 and 2006
Coastal Erosion / Coastal Storm	Yes	No	<ul style="list-style-type: none"> Cayuga County is bounded on the north by Lake Ontario; therefore, it may be directly impacted by coastal storms that result in coastal erosion. However, since Cayuga County has only a few miles of shoreline on Lake Ontario, coastal erosion was not identified as a separate hazard of concern for Cayuga County but was covered under the ground failure hazard. The impact of coastal storms is also discussed under the Severe Storm and/or Severe Winter Storm hazards, accordingly. 	<ul style="list-style-type: none"> NYSDPC
Drought	Yes	No	<ul style="list-style-type: none"> The NYS HMP identifies drought as a hazard of concern for New York State. Cayuga County is located within the Great Lakes and Central Lakes Climate Divisions. Between 1895 and 2002, 40 severe or extreme drought events occurred in these climate divisions. Various sources indicated that many drought events or periods impacted large regions of New York State, including Cayuga County. Such events include: <ul style="list-style-type: none"> July 1998 – Cayuga County had approximately \$21K in property damage and \$217K in crop damage. September 1999 – A dry spring and summer caused major crop failures and some wells to run dry. Many streams and rivers were brought to their lowest recorded levels. Cayuga County had approximately \$2.9 M in crop damages. 	<ul style="list-style-type: none"> NYSDPC NOAA-NCDC Drought Impact Reporter SHELDUS
Earthquake	Yes	No	<ul style="list-style-type: none"> The NYS HMP identifies earthquake as a hazard of concern for New York State. Areas within the State with a higher seismic risk include; The North and Northeast third (1/3) of the State (The North Country/Adirondack Region including a portion of the Greater Albany-Saratoga region), the Southeast corner (including the greater New York City area and western Long Island), and the Northwest corner (including the City of Buffalo and vicinity) of the 	<ul style="list-style-type: none"> NYSDPC USGS

SECTION 5.2: RISK ASSESSMENT – IDENTIFICATION OF HAZARDS OF CONCERN

Hazard	Step 1	Step 2	Step 3	
	Is this a hazard that may occur in Cayuga County?	If yes, does this hazard pose a significant threat to Cayuga County?	Why was this determination made?	Source(s)
			<p>State, in that order from higher to lower.</p> <ul style="list-style-type: none"> According to the USGS online seismic hazard maps, the peak ground acceleration with a 10% probability of exceedance over 50 years for Cayuga County is between 2 and 3% g. FEMA guidance recommends earthquakes are evaluated further if an area has a 3% g peak acceleration or more. 	
Expansive Soils	No	No	<ul style="list-style-type: none"> The NYS HMP identifies expansive soils as a hazard of concern for New York State. USGS indicated that Cayuga County’s soils consist of clay have slight to moderate swelling potential or little to no swelling clay. Due to the fact that this hazard has no known historical occurrences, Cayuga County decided not to analyze the expansive soils hazard for the purpose of this Plan. 	<ul style="list-style-type: none"> NYSDPC USGS
Extreme Temperature	No	No	<ul style="list-style-type: none"> Extreme temperature was not identified as a hazard in the NYS Plan. NOAA’s NCDC storm events database indicates that Cayuga County was impacted by approximately 14 extreme events between 1950 and 2012. However, most events are of a regional extent rather than localized to just one county or community. 	<ul style="list-style-type: none"> NYSDPC NOAA-NCDC
Flood (Riverine, Flash, Ice Jam Flooding)	Yes	Yes	<ul style="list-style-type: none"> The NYS HMP identifies flooding as the main hazard of concern for New York State. Cayuga County has been issued five FEMA Disaster Declarations for flood-related events, each event resulting in extensive damages. <ul style="list-style-type: none"> FEMA-DR-338- 1972 – Severe storms, flooding (remnants of Tropical Storm Agnes) FEMA-DR-367 – 1973 – High winds, wave action, flooding FEMA-DR-487 – 1975 – Severe storms, heavy rain, landslides, flooding FEMA-DR-1095 – 1996 – Severe storms and flooding FEMA-DR-1589 – 2005 – Severe storms and flooding NOAA’s NCDC storm events database indicates that Cayuga County was impacted by approximately 27 flood events between 1950 and 2012. This includes flash flooding. The 2011 NYS HMP indicated that Cayuga County has been ranked as the 36th most flood vulnerable county in New York State based on potential flood exposure and vulnerability to loss. 	<ul style="list-style-type: none"> NYSDPC NYSOEM FEMA SHELDUS NOAA-NCDC NFIP

SECTION 5.2: RISK ASSESSMENT – IDENTIFICATION OF HAZARDS OF CONCERN

Hazard	Step 1	Step 2	Step 3	
	Is this a hazard that may occur in Cayuga County?	If yes, does this hazard pose a significant threat to Cayuga County?	Why was this determination made?	Source(s)
			<ul style="list-style-type: none"> NFIP identifies that there are 498 NFIP in-force policies in Cayuga County, with over \$862 K in claims (structure and contents) paid as of 7/31/2012. Ice Jams are mentioned separately in this Table but are grouped with the Flood hazard in this plan (see below). 	
Hailstorm	Yes	Yes	Please see Severe Storm	
Hurricane (and other Tropical Cyclones)	Yes	Yes	Please see Severe Storm	
Ice Jams (categorized as a Flood hazard in this HMP)	Yes	Yes	<ul style="list-style-type: none"> The NYS HMP identifies ice jam flooding as a hazard of concern for New York State (grouped as a type of flood). New York State ranks 2nd in the Nation for total number of ice jam events, with over 1,500 incidents documented between 1857 and 2010. The USACE CRREL Ice Jam Database, NYS HMP and various other sources, indicates that nine reported ice jam events have occurred within Cayuga County between 1857 and 2011. 	<ul style="list-style-type: none"> NYS DPC Review of USACE CRREL Ice Jam Database
Ice Storm	Yes	Yes	Please see Severe Winter Storm	
Infestation	Yes	No	<ul style="list-style-type: none"> The NYS HMP does not identify infestation as a hazard of concern for New York State. Based on all sources reviewed, no known significant occurrences are reported for Cayuga County 	<ul style="list-style-type: none"> NYS DPC USGS NYS DEC
Land Subsidence	Yes	No	<ul style="list-style-type: none"> The NYS HMP identifies land subsidence as a hazard of concern for New York State. The NYS HMP indicates that New York State is vulnerable to land subsidence; however, this hazard is “extremely localized” and poses a “very low risk to population and property.” The NYS HMP does not identify Cayuga County as a County that has experienced land subsidence in the past. According to USGS, Cayuga County is not made up of unconsolidated aquifer systems, hence it is unlikely that there will be permanent subsidence and related ground failures. 	<ul style="list-style-type: none"> NYS DPC USGS
Landslide	Yes	Yes	<ul style="list-style-type: none"> The NYS HMP identifies landslide as a hazard of concern for New York State, with Cayuga County mainly having low landslide incidence 	<ul style="list-style-type: none"> NYS DPC USGS

SECTION 5.2: RISK ASSESSMENT – IDENTIFICATION OF HAZARDS OF CONCERN

Hazard	Step 1	Step 2	Step 3	
	Is this a hazard that may occur in Cayuga County?	If yes, does this hazard pose a significant threat to Cayuga County?	Why was this determination made?	Source(s)
			<p>susceptibility, with the northern part of Cayuga County having a moderate susceptibility/low incidence, and a small portion in the central part of Cayuga County having moderate landslide incidence.</p> <ul style="list-style-type: none"> The NYS HMP indicates that Cayuga County has not had any federally declared landslide or land subsidence disasters from 1837 to 2007. However, there have been at least two areas impacted in Cayuga County and three documented cases of land subsidence/sinkholes with significant damage over the past 20 to 40 years in Cayuga County. 	
Nor'Easters	Yes	Yes	Please see Severe Winter Storm	
Severe Storm (Windstorms, Thunderstorms, Hail, Lightning, Tornadoes and Hurricanes)	Yes	Yes	<ul style="list-style-type: none"> The NYS HMP identifies all types of severe storms as hazards of concern for New York State. Cayuga County has experienced two tornado events. NYS HMP listed Cayuga County as the 27th county in the State most threatened by and vulnerable to extreme wind and wind losses. The NYS HMP, NYSOEM, FEMA indicate that Cayuga County has been issued six FEMA Disaster Declarations for severe storm events (some also identified as flooding events). <ul style="list-style-type: none"> FEMA-DR-338 – 1972 – Tropical Storm Agnes FEMA-DR-367 – 1973 – High winds, wave action, flooding FEMA-DR-487 – 1975 – Severe storms, heavy rain, landslides, flooding FEMA-DR-1095 – 1996 – Severe storms, flooding FEMA-DR-1244 – 1998 – Severe Storms FEMA-DR-1589 – 2005 – Severe storm and flooding NOAA's NCDC storm events database indicates that Cayuga County was impacted by approximately 268 severe storm events between 1950 and 2012. SHELDUS indicates that Cayuga County was impacted by approximately 302 severe storm events between 1960 and 2011. 	<ul style="list-style-type: none"> NYSDPC FEMA National Atlas SHELDUS NOAA-NCDC
Severe Winter Storm (Heavy Snow, Blizzards, Freezing Rain/Sleet, Ice Storms, and Nor'Easters)	Yes	Yes	<ul style="list-style-type: none"> The NYS HMP identifies all types of severe winter storms as hazards of concern for New York State. The NYS HMP listed Cayuga County as the 34th county in the State most threatened by and vulnerable to snow and snow loss, with an annual average snowfall 81.6 inches. Cayuga County is also listed as the 10th county in New York State most threatened by and vulnerable to ice storms and ice storm loss. The NYS HMP, NYSOEM, FEMA indicate that Cayuga County has been issued two FEMA Disaster Declarations for winter storm events (some also 	<ul style="list-style-type: none"> NYSDPC NYSOEM FEMA NOAA-NCDC SHELDUS

SECTION 5.2: RISK ASSESSMENT – IDENTIFICATION OF HAZARDS OF CONCERN

Hazard	Step 1	Step 2	Step 3	
	Is this a hazard that may occur in Cayuga County?	If yes, does this hazard pose a significant threat to Cayuga County?	Why was this determination made?	Source(s)
			identified as flooding events). <ul style="list-style-type: none"> ○ FEMA-DR-1467 – 2003 – Ice Storm ○ FEMA-EM-3195 – 2004 - Snow • NOAA’s NCDC storm events database indicates that Cayuga County was impacted by approximately 100 winter storm events between 1950 and 2012. However, most events are of a regional extent rather than localized to just one county or community. SHELDUS indicates that Cayuga County was impacted by approximately 289 winter storm events between 1960 and 2011. 	
Tornado	Yes	Yes	Please see Severe Storm	
Tsunami	No	No	• Tsunami is not identified as a hazard of concern in the NYS HMP	• NYSDPC
Volcano	No	No	• Volcanoes are not identified as a hazard of concern in the NYS HMP, because there are no known volcanoes located in the state.	• NYSDPC
Wildfire	Yes	No	<ul style="list-style-type: none"> • The NYS HMP identifies wildfires as hazards of concern for New York State. • GeoMac indicates that portions of Cayuga County are located within the Wildland-Urban Interface. • USGS indicates that no wildfires greater than 250 acres were experienced in Cayuga County between 1980 and 2003. • GeoMAC indicates that no wildfires were experienced in Cayuga County between 2002 and 2012. • Cayuga County is located in the Lake Ontario Plains Fire Danger Rating Area. 	<ul style="list-style-type: none"> • NYSDPC • USGS • GeoMAC • NYSDEC
Windstorm	Yes	Yes	Please see Severe Storm	

CRREL Cold Regions Research and Engineering Laboratory
 DPC Disaster Preparedness Commission
 DR Presidential Disaster Declaration Number
 EM Presidential Emergency Declaration
 FEMA Federal Emergency Management Agency
 HMP Hazard Mitigation Plan
 NCDC National Climatic Data Center
 NOAA National Oceanic and Atmospheric Administration
 NYCDEP New York City Department of Environmental Protection
 NYS New York State
 NYSDPC New York State Disaster Preparedness Commission

NYSDEC New York State Department of Environmental Conservation
 NYSOEM New York State Office of Emergency Management
 SHELDUS Spatial Hazard Events and Losses Database for the United States
 USACE U.S. Army Corp of Engineers
 USGS U.S. Geologic Survey



SECTION 5.2: RISK ASSESSMENT – IDENTIFICATION OF HAZARDS OF CONCERN

Other natural hazards of concern have occurred within Cayuga County, but typically have a low potential to result in significant impacts. Cayuga County deemed other natural hazards as minor in comparison to those bulleted above; therefore, additional natural hazards will not be further addressed within this version of the Plan. However, if deemed necessary by Cayuga County, these hazards may be considered in future versions of the Plan.