



## 5.2 IDENTIFICATION OF HAZARDS OF CONCERN

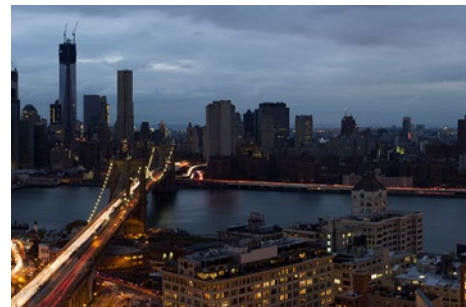
To provide a strong foundation for mitigation actions considered in Section 6 (Mitigation Strategy) and Section 9 (Jurisdictional Annexes), Erie County focused on considering a full range of hazards that could impact the area and then identified and ranked those hazards that presented the greatest concern. The hazard of concern identification process incorporated input from the county and participating jurisdictions; review of the New York State Hazard Mitigation Plan (NYS HMP 2019); review of the 2015 Erie County HMP (2015 Erie County Multi-Jurisdictional Hazard Mitigation Plan); research and local, state, and 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 (not man-made) 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. Specific hazards not identified as a hazard of concern for Erie County will not be further discussed in detail.

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

**Natural Hazards** are those hazards that are a source of harm or difficulty created by a meteorological, environmental, or geological event.

### 5.2.1 Changes from 2015 Hazard Mitigation Plan

The 2015 Erie County Hazard Mitigation Plan did not identify Cyber Security, Hazardous Materials, Pandemic, or Utility Failure as hazards of concern. Members of the Steering Committee and Planning Partnership identified all four of these hazards as hazards of concern for the 2022 Hazard Mitigation Plan Update.



Source: NYIS (2019)

The 2022 Erie County Hazard Mitigation Plan includes best available data throughout the plan to present an updated understanding of Erie County’s risk.

### 5.2.2 Hazard Groupings

The Steering Committee approved use of the following hazard event groupings which are the same as those provided by the Federal Emergency Management Agency (FEMA) guidance documents (*FEMA 386-2 Understanding Your Risks, Identifying Hazards and Estimating Losses; Multi-Hazard Identification and Risk Assessment – The Cornerstone of the National Mitigation Strategy; Local Mitigation Planning Handbook*), and with consideration of hazard grouping in the NYS HMP.



**Coastal Erosion** is one of the primary hazards leading to loss of lives or damage to property and infrastructure in coastal areas. Many natural factors affect erosion of the shoreline, including shore and near-shore morphology, shoreline orientation, and the response of these factors to storm frequency and sea-level rise.



A **Cyber Security** incident involves either the theft or modification of information on government agency computer systems or a system compromise with the potential to disrupt essential services.



An *Earthquake* is the sudden movement of the earth's surface caused by the release of stress accumulated within or along the edge of the earth's tectonic plates, a volcanic eruption, or a man-made explosion.



The *Expansive Soil* hazard involves soils and soft rock that tend to swell or shrink due to changes in moisture content are known as expansive soils. Expansive soils are often referred to as swelling clays because clay materials are most susceptible to swelling and shrinking. Changes in soil volume present a hazard primarily to structures built on expansive soils. The most extensive damage occurs to highways and streets.



The *Extreme Temperature* hazard includes both heat and cold events, which can have a significant impact to human health, commercial/agricultural businesses, and primary and secondary effects on infrastructure (e.g., burst pipes and power failure). What constitutes "extreme cold" or "extreme heat" can vary across different areas of the country based on what the population is accustomed to. The 2022 HMP considers the heat island effect that occurs within developed areas.



The *Flood* hazard includes riverine flooding, flash flooding, shallow flooding, ice jam flooding, urban drainage flooding, and dam failure flooding. Inclusion of the various forms of flooding under a general *Flood* hazard is consistent with that used in FEMA's *Multi-Hazard Identification and Risk Assessment* guidance and the NYS HMP.



The *Hazardous Materials* profile includes materials and wastes that are considered severely harmful to human health and the environment, as defined by the U.S. Environmental Protection Agency (EPA) Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (also known as Superfund). Many hazardous materials are commonly used substances, which are harmless in their normal uses but are quite dangerous if released.



The *Landslide* hazard includes rock falls, rock topples, rotational slump, transitional slide, earth flows, creep, block slides, debris avalanche, and debris flows.



The *Pandemic* hazard exists when there are more cases of a particular disease than expected in a given area, or among a specific group of people, over a particular period of time. An aggregation of cases in a given area over a particular period, regardless of the number of cases, is called a cluster. In an outbreak or epidemic, it is presumed that the cases are related to one another or that they have a common cause.



The *Severe Storm* hazard includes windstorms that often entail a variety of other influencing weather conditions, including thunderstorms, hail, lightning, and tornadoes. Tropical disturbances (hurricanes, tropical storms, and tropical depressions) are often identified as a type of severe storm. For this HMP update, *Severe Storm* includes thunderstorms, hail, lightning, tornadoes, hurricanes, and tropical storms.



The *Severe Winter Storm* hazard includes blizzards, ice storms, snowstorms, sleet, and freezing rain.



The *Utility Failure* hazard is defined as any interruption or loss of electrical service caused by disruption of power transmission from accident, sabotage, natural hazards, or equipment failure (also referred to as a loss of power or power outage). A significant power failure is defined as any incident of a long duration, which would require the involvement of the local and/or state emergency management organizations to coordinate provision of food, water, heating, cooling, and shelter.



The *Wildfire* hazard can be defined as any non-structural fire that occurs in the wildland. Three distinct types of wildland fires have been defined and include naturally occurring wildfire, human-caused wildfire, and prescribed fire. They may be highly destructive and become difficult to control. Wildfires



result in the disturbance of forest and brush and destruction of real estate and personal property and have secondary impacts on other hazards, such as flooding, by removing vegetation and disturbing watersheds.

Other than the Utility Failure hazard profile, technological (e.g., hazardous material incidents) and man-made hazards (e.g., terrorism, man-made dam breaches/failures) are not being addressed in this planning process. The DMA 2000 regulations do not require consideration of such hazards, and due to limited funding, these were not chosen for inclusion in this plan by Erie County and planning participants. The county can expand the scope of this HMP to include other less frequent natural, technological, and man-made hazards as resources permit.



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Hazard	Is this a hazard that may occur in Erie County?	If yes, does this hazard pose a significant threat to Erie County?	Why was this determination made?	Source(s)
Avalanche	No	No	<ul style="list-style-type: none"> <li>The New York State Hazard Mitigation Plan (NYS HMP) identifies avalanche as a hazard of concern.</li> <li>Avalanches can occur in any situation where snow, slope, and weather conditions combine to create proper conditions. About 90 percent of all avalanches start on slopes of 30 to 45 degrees, and about 98 percent of all avalanches occur on slopes of 25 to 50 degrees. The topography of Erie County does not support the occurrence of an avalanche.</li> <li>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 1998 and 2018.</li> <li>Avalanche was identified as a hazard in the NYS HMP, and there have been occurrences in the state; however, there were no occurrences in Erie County. The Steering Committee and Planning Partnership do not consider the hazard to be a significant concern.</li> </ul>	<ul style="list-style-type: none"> <li>NYS DHSES</li> <li>NAC-AAA</li> </ul>
Coastal Erosion	Yes	Yes	<ul style="list-style-type: none"> <li>The NYS HMP identifies coastal erosion as a hazard of concern for New York State. Erosion can impact all of the state’s coastal counties along Lake Erie and the Niagara River, Lake Ontario and the St. Lawrence River, Atlantic Ocean and Long Island Sound, Hudson River south of the federal dam in Troy, the East River, the Harlem River, the Kill van Kull and Arthur Kill, and all connecting waterbodies, bays, harbors, shallows, and wetlands.</li> <li>Erie County is a coastal county, and the Steering Committee and Planning Partnership consider the hazard to be a significant concern.</li> </ul>	<ul style="list-style-type: none"> <li>NYS DHSES</li> <li>Input from Steering Committee and Planning Partnership</li> </ul>
Dam Failure	Yes	No	<ul style="list-style-type: none"> <li>The 2019 NYS HMP does not identify dam failure as a hazard of concern for New York State, though it is included in the Flood hazard profile.</li> <li>According to the NYS DEC, there are 248 dams within Erie County, as shown in Section 4. Of these 248 dams in Erie County: 164 low hazard, 6 intermediate hazard, 3 high hazard, 63 negligible or no hazard classification, and 12 with no classification code (NYSDEC 2020).</li> <li>Dam failure is included in the flood profile.</li> </ul>	<ul style="list-style-type: none"> <li>NYS DHSES</li> <li>Input from Steering Committee and Planning Partnership</li> <li>NYSDEC</li> <li>NYS GIS</li> </ul>
Pandemic	Yes	Yes	<ul style="list-style-type: none"> <li>The 2019 NYS HMP does not identify disease outbreak as a hazard of concern for New York State.</li> <li>The county has been impacted by various diseases (influenza, Lyme disease, COVID-19). The Steering Committee and Planning Partnership has identified disease outbreak as a hazard of concern for Erie County.</li> </ul>	<ul style="list-style-type: none"> <li>NYS DHSES</li> <li>NYS DEC</li> <li>Input from Steering Committee and</li> </ul>



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Hazard	Is this a hazard that may occur in Erie County?	If yes, does this hazard pose a significant threat to Erie County?	Why was this determination made?	Source(s)
Drought	Yes	No	<ul style="list-style-type: none"> <li>• The NYS HMP identifies drought as a hazard of concern for the state. Erie County has been impacted by several drought events that have occurred in New York State.</li> <li>• Drought conditions can cause shortages in water for human consumption, impact agricultural production, and lead to reduced local firefighting capabilities. A majority of Erie County relies on groundwater for their potable water, and droughts can impact groundwater resources significantly, limiting the availability of drinking water to county residents.</li> <li>• New York State was included in one FEMA drought-related disaster declaration, which did not include Erie County.</li> <li>• Erie County was included in five recent drought-related U.S. Department of Agriculture (USDA) disaster declarations:               <ul style="list-style-type: none"> <li>○ S3441 – Drought – 2012</li> <li>○ S3427 – Drought / Excessive Heat – 2012</li> <li>○ S4023 – Drought / Excessive Heat – 2016</li> <li>○ S4031 – Drought / Excessive Heat – 2016</li> <li>○ S4037 – Drought / Excessive Heat – 2016</li> </ul> </li> <li>• According to the Northeast Regional Climate Center (NRCC), Erie County is in the Western Plateau Climate Division. This division has been impacted by periods of severe and extreme drought, including the following events:               <ul style="list-style-type: none"> <li>○ October – November 1985</li> <li>○ November 1908 – January 1909</li> <li>○ October 1930 – June 1931</li> <li>○ November – December 2001</li> </ul> </li> <li>• Despite the occurrence of certain drought events in the county, the Steering Committee and Planning Partnership did not identify drought as a hazard of concern for Erie County.</li> </ul>	Planning Partnership <ul style="list-style-type: none"> <li>• NYS DHSES</li> <li>• FEMA</li> <li>• USDA</li> <li>• Input from Steering Committee and Planning Partnership</li> <li>• NOAA-NCEI</li> <li>• NRCC</li> </ul>



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Hazard	Is this a hazard that may occur in Erie County?	If yes, does this hazard pose a significant threat to Erie County?	Why was this determination made?	Source(s)
Earthquake	Yes	Yes	<ul style="list-style-type: none"> <li>• The NYS HMP identified earthquake as a hazard of concern for the state.</li> <li>• Erie County has a peak ground acceleration (PGA) below 3%g. According to the FEMA document “Understanding Your Risks: Identifying Hazards and Estimating Losses”, areas with 3%g should conduct a risk assessment for earthquakes.</li> <li>• New York State was included in one FEMA earthquake-related disaster declaration (DR-1415); Erie County was not included in this declaration.</li> <li>• According to the NYS HMP, between 1737 and 2016, there were 550 earthquakes epicentered in the state and numerous earthquakes outside of the state that were felt within the state. From 1996 to 2017, there have been no significant earthquakes epicentered in Erie County.</li> <li>• Based on input from the Steering Committee and Planning Partnership, earthquake has been identified as a hazard of concern for Erie County.</li> </ul>	<ul style="list-style-type: none"> <li>• NYS DHSES</li> <li>• Input from Steering Committee and Planning Partnership</li> <li>• U.S. Geological Survey (USGS) – Earthquake Hazards Program, Review of USGS Seismic Maps</li> </ul>
Expansive Soils	Yes	Yes	<ul style="list-style-type: none"> <li>• The NYS HMP does not identify expansive soils as a hazard of concern for New York State. While a majority of Erie County is underlain by soils with little to no swelling potential, and less than 50% of the area is underlain by soils with abundant clays of slight to moderate swelling potential. The Town of Amherst and certain other areas, however, are potentially significantly by this hazard.</li> <li>• The Steering Committee and Planning Partnership identified expansive soils as a hazard of concern for Erie County.</li> </ul>	<ul style="list-style-type: none"> <li>• NYS DHSES</li> <li>• Input from Steering Committee and Planning Partnership</li> <li>• Review of USGS 1989 Swelling Clays Map of the Conterminous United States</li> </ul>
Extreme Temperature	Yes	Yes	<ul style="list-style-type: none"> <li>• The NYS HMP identifies Coldwaves and Heatwaves as hazards of concern for New York State.</li> <li>• Erie County was included in four recent USDA disaster declarations related to extreme temperature events:               <ul style="list-style-type: none"> <li>○ S3249 – March 2012 – Frosts and Freezes</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• NYS DHSES</li> <li>• Input from Steering Committee and Planning Partnership</li> </ul>





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			<ul style="list-style-type: none"> <li>○ S3250 – March 2012 – Frosts and Freezes, Unseasonably Warm Temperatures, and Excessive Heat</li> <li>○ S3427 – June 2012 – Excessive Heat (also included Drought)</li> <li>○ S3886 – January 2015 – Frosts and Freezes</li> <li>● The Steering Committee and Planning Partnership identified extreme temperature as a hazard of concern for Erie County.</li> </ul>	<ul style="list-style-type: none"> <li>● NOAA-NCEI</li> <li>● USDA</li> </ul>
Flood (riverine, ice jam, dam failure, urban flooding, and flash flooding)	Yes	Yes	<ul style="list-style-type: none"> <li>● The NYS HMP identifies flooding as a hazard of concern for New York State.</li> <li>● Between 1956 and 2020, Erie County was included in 7 FEMA flood-related declarations.               <ul style="list-style-type: none"> <li>○ FEMA DR 494 March 19, 1976 Severe Ice Storm</li> <li>○ FEMA DR 1233 June 25, 1998 - July 10, 1998 Severe Storm(s)</li> <li>○ FEMA DR 1335 May 3, 2000 - August 12, 2000 Severe Storm(s)</li> <li>○ FEMA DR 1534 May 13, 2004 - June 17, 2004 Severe Storm(s)</li> <li>○ FEMA DR 1665 October 12, 2006 - October 25, 2006 Severe Storm(s)</li> <li>○ FEMA DR 1857 August 8, 2009 - August 10, 2009</li> <li>○ FEMA DR 4472 October 31, 2019 - November 1, 2019 Severe Storm(s)</li> </ul> </li> </ul> <p>Based on the history of flooding and its impacts on Erie County and input from the Steering Committee and Planning Partnership, flooding has been identified as a hazard of concern for the county.</p>	<ul style="list-style-type: none"> <li>● NYS DHSES</li> <li>● Input from Steering Committee and Planning Partnership</li> <li>● FEMA</li> <li>● NOAA-NCEI</li> <li>● USACE CRREL Ice Jam Database</li> </ul>
Hailstorm	Yes	Yes	Please see Severe Storm Profile	
Hurricane	Yes	Yes	Please see Severe Storm Profile	
Ice Jams	Yes	Yes	Please see Flood Profile	
Ice Storm	Yes	Yes	Please see Severe Winter Storm Profile	
Invasive Species/Infestation	Yes	No	<ul style="list-style-type: none"> <li>● The 2019 NYS HMP does not identify invasive species as a hazard of concern for New York State.</li> <li>● New York State has been affected by various instances of invasive ticks and mosquitos.</li> <li>● The NYS DEC has identified Erie County to be located within the emerald ash borer restricted zone and identified several known locations of the emerald ash borer within the county.</li> <li>● The Erie County Steering Committee and Planning Partnership did not identify invasive species or infestation as a hazard of concern within Erie County.</li> </ul>	<ul style="list-style-type: none"> <li>● NYS DEC</li> <li>● Input from Steering Committee and Planning Partnership</li> </ul>





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Hazard	Is this a hazard that may occur in Erie County?	If yes, does this hazard pose a significant threat to Erie County?	Why was this determination made?	Source(s)
Land Subsidence	Yes	No	<ul style="list-style-type: none"> <li>NYS HMP indicates New York State is vulnerable to land subsidence; however, this hazard is “extremely localized” and poses a “very low risk to population and property”, according to the 2019 NYS HMP.</li> <li>The Steering Committee and Planning Partnership did not identify land subsidence as a hazard of concern for Erie County.</li> </ul>	<ul style="list-style-type: none"> <li>NYS DHSES</li> <li>Input from Steering Committee and Planning Partnership</li> <li>USGS</li> </ul>
Landslide	Yes	Yes	<ul style="list-style-type: none"> <li>The 2019 NYS HMP includes landslide as a hazard of concern for New York State.</li> <li>Between 1954 and 2020, New York State has included in one landslide-related disaster declaration, which included Erie County.</li> <li>Based on previous occurrences and input from the Steering Committee and Planning Partnership, the landslide hazard was identified as a hazard of concern for Erie County.</li> </ul>	<ul style="list-style-type: none"> <li>NYS DHSES</li> <li>Input from Steering Committee and Planning Partnership</li> <li>FEMA</li> </ul>
Nor’Easters	No	No	<ul style="list-style-type: none"> <li>The Steering Committee and Planning Partnership do not consider Nor’Easters to be a hazard of concern for Erie County.</li> </ul>	<ul style="list-style-type: none"> <li>NYS DHSES</li> <li>FEMA</li> <li>NOAA-NCEI</li> </ul>
Severe Storm (windstorms, thunderstorms, hurricanes / tropical storms, hail, and tornadoes)	Yes	Yes	<p>The NYS HMP identifies severe storm as a hazard of concern for New York State; however, for the state HMP, the hazards were profiled in individual sections lightning, hail, tornadoes, high winds, and hurricanes/tropical storms. For the Erie County HMP, the hazards were combined into one profile.</p> <p>Between 1954 and 2020, Erie County was included in seven FEMA severe storm-related declarations.</p> <ul style="list-style-type: none"> <li>○ FEMA DR 4472 2019-10-31 Severe Storm(s)</li> <li>○ FEMA DR 1857 2009-08-08 Severe Storm(s)</li> <li>○ FEMA DR 1665 2006-10-12 Severe Storm(s)</li> <li>○ FEMA DR 1534 2004-05-13 Severe Storm(s)</li> <li>○ FEMA DR 1335 2000-05-03 Severe Storm(s)</li> <li>○ FEMA DR 1233 1998-06-25 Severe Storm(s)</li> <li>○ FEMA DR 494 1976-03-19 Severe Ice Storm</li> </ul> <ul style="list-style-type: none"> <li>Erie County was included in two severe storm-related U.S. Department of Agriculture (USDA) disaster declarations:               <ul style="list-style-type: none"> <li>○ S3593 – 2013 Excessive rain and related flooding, high winds, and hail</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>NYS DHSES</li> <li>FEMA</li> <li>NOAA-NCEI</li> <li>SPC</li> <li>Input from Steering Committee and Planning Partnership</li> </ul>





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			<ul style="list-style-type: none"> <li>○ S3885 – 2015 Excessive Rain, High Winds, Hail, Lightning, and Tornado</li> </ul> <p>According to the National Environmental Information Center, storm events database indicates that Erie County was impacted by approximately 22 tornado events between 1950 and 2020, causing a total of 6 injuries and approximately \$4.7 million in property damage.</p> <ul style="list-style-type: none"> <li>• Based on previous occurrences and input from the Steering Committee and Planning Partnership, severe storms are identified as a hazard of concern for Erie County.</li> </ul>	
Severe Winter Storm (heavy snow, blizzards, ice storms)	Yes	Yes	<ul style="list-style-type: none"> <li>• The NYS HMP identifies ice storms and snow storms as hazards of concern for New York State. According to the 2019 NYS HMP, Erie County has an annualized count of 6 Severe Winter Storm events, and their annualized winter storm losses are \$8 million.</li> <li>• FEMA included Erie County in 22 winter storm-related disaster declarations:               <ul style="list-style-type: none"> <li>○ DR-494 March 19, 1976 Severe Ice Storm</li> <li>○ DR-527 February 5, 1977 Snow</li> <li>○ EM-3027 January 29, 1977 Snow</li> <li>○ EM-3107 March 13-17, 1993 Snow</li> <li>○ EM-3136 January 1-15, 1999 Snow</li> <li>○ EM-3157 November 19-21, 2000 Snow</li> <li>○ DR-1404/EM-3170 December 24-29, 2001 Snow</li> <li>○ EM-3268 October 12-25, 2006 Snow</li> <li>○ DR-4204 November 17-26, 2014 Snow</li> </ul> </li> <li>• Based on previous occurrences and input from the Steering Committee and Planning Partnership, severe winter storms are identified as a hazard of concern for Erie County.</li> </ul>	<ul style="list-style-type: none"> <li>• NYS DHSES</li> <li>• FEMA</li> <li>• NOAA-NCEI</li> <li>• Input from Steering Committee and Planning Partnership</li> </ul>
Tornado	Yes	Yes	Please see Severe Storm	
Tsunami	No	No	<ul style="list-style-type: none"> <li>• Tsunami is identified as a hazard of concern in the NYS HMP.</li> <li>• The Steering Committee and Planning Partnership do not consider tsunami to be a hazard of concern for Erie County.</li> </ul>	<ul style="list-style-type: none"> <li>• NYS DHSES</li> <li>• Input from Steering Committee and Planning Partnership</li> </ul>
Volcano	No	No	<ul style="list-style-type: none"> <li>• The NYS HMP identifies volcano as a hazard of concern for New York State. However, the the Steering Committee and Planning Partnership do not consider volcano to be a hazard of concern for Erie County.</li> </ul>	<ul style="list-style-type: none"> <li>• NYS DHSES</li> <li>• Input from Steering</li> </ul>





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				Committee and Planning Partnership
Wildfire	Yes	Yes	<ul style="list-style-type: none"> <li>The NYS HMP identifies wildfire as a hazard of concern for New York State.</li> <li>Erie County was not included in any FEMA wildfire-related disaster declarations.</li> <li>NYS DEC records indicate the possibility that there have been hundreds of wildfires or brush fires in Erie County between 2003–2017.</li> <li>Based on available data and the nature of the county, the Steering Committee and Planning Partnership identified Wildfire as a hazard of concern.</li> </ul>	<ul style="list-style-type: none"> <li>NYS DHSES</li> <li>Input from Steering Committee and Planning Partnership</li> <li>FEMA</li> </ul>
Windstorm	Yes	Yes	Please see Severe Storm	

- CRREL Cold Regions Research and Engineering Laboratory
- DR Presidential Disaster Declaration Number
- EM Presidential Disaster Emergency Number
- FEMA Federal Emergency Management Agency
- NCEI National Centers for Environmental Information
- NRCC Northeast Regional Climate Center
- NYS DEC New York State Department of Environmental Conservation
- NYS DHSES New York State Division of Homeland Security and Emergency Services
- NYS HMP New York State Hazard Mitigation Plan
- PGA Peak ground acceleration
- SPC Storm Prediction Center
- USDA U.S. Department of Agriculture
- USGS United States Geologic Survey





### **5.2.3 Summary of Hazards of Concern**

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In summary, a total of 13 hazards of concern were identified as significant hazards affecting the entire county, to be addressed at the county level in this plan (shown here in alphabetical order):

- Coastal Erosion
- Cyber Security
- Earthquake
- Expansive Soils
- Extreme Temperature
- Flood
- Hazardous Materials
- Landslide
- Pandemic
- Severe Storm
- Severe Winter Storm
- Utility Failure
- Wildfire

Other hazards of concern that might have occurred in Erie County but have a low potential to occur or result in significant impacts can be considered in future updates to this plan.