



## 5.2 IDENTIFICATION OF HAZARDS OF CONCERN

To provide a strong foundation for mitigation actions considered in Sections 6 and 9, Dutchess 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); review of the previous HMPs prepared for municipalities within the County; 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 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** are 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 and Steering Committees chose to group some 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 386-2, "Understanding Your Risks, Identifying Hazards and Estimating Losses; FEMA's "Multi-Hazard Identification and Risk Assessment – The Cornerstone of the National Mitigation Strategy"; FEMA's Local Mitigation Planning Handbook), and consideration of hazard grouping in the NYS HMP.

The "Flood" hazard includes riverine flooding, coastal flooding, flash flooding, ice jam flooding and dam 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 "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; however, for the purpose of this HMP, tropical disturbances are being included under coastal hazards. This was based on input from the planning and steering committees.

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; however, for the purpose of this HMP, Nor'Easters are included under coastal hazards.

Geological hazards is currently not being addressed; however, this hazard may be profiled based on further input from the Planning Partnership. Additionally, please note that that technological (e.g. hazardous material incidents) and man-made hazards (e.g. terrorism) are not being addressed in this planning process. The DMA 2000 regulations do not require consideration of such hazards; these were not chosen for inclusion in this plan by the County and planning participants.



Table 5.2-1. Identification of Hazards of Concern for Dutchess County

Hazard	Is this a hazard that may occur in Dutchess County?	If yes, does this hazard pose a significant threat to the County?	Why was this determination made?	Source(s)
Avalanche	No	No	<ul style="list-style-type: none"> <li>Avalanches can occur in any situation where snow, slope and weather conditions combine to create proper conditions. About 90% of all avalanches start on slopes of 30 to 45 degrees and about 98% of all avalanches occur on slopes of 25 to 50 degrees. The topography of Dutchess 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 2014.</li> <li>Avalanche was identified as a hazard in the NYS HMP and there have been occurrences in the State; however, there have been no occurrences in Dutchess County.</li> </ul>	<ul style="list-style-type: none"> <li>NYS DHSES</li> <li>Input from Steering and Planning Committees</li> <li>Review of NAC-AAA database between 1998 and 2013.</li> </ul>
Coastal Erosion	Yes	No	<ul style="list-style-type: none"> <li>The NYSHMP identifies coastal erosion has 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>Dutchess County is bordered to the west by the Hudson River which is identified as coastal waters in New York State. This makes the County vulnerable to coastal erosion.</li> <li>The NYSHMP identified that the County has not been impacted by any coastal erosion events; however, based on input from the Steering and Planning Committees, coastal erosion is an identified hazard of concern for Dutchess County.</li> </ul>	<ul style="list-style-type: none"> <li>NYS DHSES</li> <li>Input from Steering and Planning Committees</li> </ul>
Coastal Hazards (hurricanes, tropical storms, Nor'Easters)	Yes	Yes	<ul style="list-style-type: none"> <li>The NYS HMP identifies hurricanes and Nor'Easters as hazards of concern for New York State.</li> <li>The location of Dutchess County makes is more susceptible to the direct and indirect impacts of coastal hazard events.</li> <li>The County has been included in seven coastal hazard-related FEMA disaster declarations:               <ul style="list-style-type: none"> <li>FEMA-EM-3107 (Blizzard/Nor'Easter) – March 1993</li> <li>FEMA-DR-1083 (Nor'Easter/Heavy Snow) – January 1996</li> <li>FEMA-DR-1296 (Hurricane Floyd) – September 16-18, 1999</li> <li>FEMA-DR-1957 (Severe Winter Storm and Snowstorm/Nor'Easter) – December 2010</li> <li>FEMA-DR-4020 (Hurricane Irene) – August 28, 2011</li> <li>FEMA-DR-4085 (Hurricane Sandy) – October 28, 2012</li> <li>FEMA-DR-4204 (Nor'Easter/Snowstorm) – November 2014</li> </ul> </li> <li>Based on the location of the County, previous occurrences and input from the Steering and Planning Committees, coastal hazards are a hazard of concern for the County.</li> </ul>	<ul style="list-style-type: none"> <li>NYS DHSES</li> <li>Input from Steering and Planning Committees</li> <li>FEMA</li> <li>NOAA-NCDC</li> </ul>
Drought	Yes	Yes	<ul style="list-style-type: none"> <li>The NYS HMP identifies drought as a hazard of concern for the State. Dutchess County has been impacted by several drought events that have occurred in New York State.</li> </ul>	<ul style="list-style-type: none"> <li>NYS DHSES</li> <li>FEMA</li> </ul>



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Hazard	Is this a hazard that may occur in Dutchess County?	If yes, does this hazard pose a significant threat to the County?	Why was this determination made?	Source(s)
			<ul style="list-style-type: none"> <li>• According to the NOAA-NCDC Storm Events Database, between 1950 and 2015, Dutchess County has experienced four drought events.</li> <li>• New York State has been included in one FEMA drought-related disaster declaration. Dutchess County was included in this declaration:               <ul style="list-style-type: none"> <li>○ FEMA-DR-204 – Water Shortage – August 1965</li> </ul> </li> <li>• Dutchess County has been included in two drought-related USDA disaster declarations:               <ul style="list-style-type: none"> <li>○ S3427 – Drought/Excessive Heat – June 2012</li> <li>○ S3759 – Drought – August 2014</li> </ul> </li> <li>• According to the NRCC, Dutchess County is located within the Hudson Valley Climate Division, which has been impacted by periods of severe and extreme drought and include the following events:               <ul style="list-style-type: none"> <li>○ November – December 1908</li> <li>○ May – July 1911</li> <li>○ October 1930 – April 1931</li> <li>○ December 1939 – January 1940</li> <li>○ November 1941 – February 1942</li> <li>○ November – December 1949</li> <li>○ September – November 1957</li> <li>○ June 1964 – August 1966</li> <li>○ April – May 1985</li> <li>○ August – September 1995</li> <li>○ July – August 1999</li> <li>○ November 2001 – April 2002</li> </ul> </li> <li>• Based on previous occurrences and input from the Steering and Planning Committees, drought was identified as a hazard of concern for Dutchess County.</li> </ul>	<ul style="list-style-type: none"> <li>• USDA</li> <li>• Input from Steering and Planning Committees</li> <li>• NOAA-NCDC</li> <li>• NRCC</li> </ul>
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>• USGS indicates that the 2014 PGA for Dutchess County is between 3 and 5%. According to FEMA, any jurisdiction that has a PGA of 3% or greater is required to fully profile the earthquake hazard.</li> <li>• According to the NYS HMP, between 1973 and 2012, there have been 189 earthquakes epicentered in the State. Of those 189 events, only six had an epicenter in Dutchess County.</li> <li>• Since 2008, no earthquakes have been epicentered in Dutchess County; however, many earthquakes occurred in surrounding areas and residents of the County reported having felt those events.</li> <li>• Dutchess County is located near numerous fault lines.</li> </ul>	<ul style="list-style-type: none"> <li>• NYS DHSES</li> <li>• Input from Steering and Planning Committees</li> <li>• USGS – Earthquake Hazards Program, Review of USGS Seismic Maps</li> </ul>



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Hazard	Is this a hazard that may occur in Dutchess County?	If yes, does this hazard pose a significant threat to the County?	Why was this determination made?	Source(s)
			<ul style="list-style-type: none"> <li>Based on previous occurrences and input from the Steering and Planning Committees, earthquakes were identified as a hazard of concern for Dutchess County.</li> </ul>	
Expansive Soils	No	No	<ul style="list-style-type: none"> <li>The NYS HMP identified expansive soils has a hazard of concern for New York State. However, a majority of Dutchess County is underlain by soils with little to no swelling potential and contains areas with less than 50% of the area is underlain by soils with abundant clays of slight to moderate swelling potential.</li> <li>The Steering and Planning Committees did not identify expansive soils as a hazard of concern for Dutchess County.</li> </ul>	<ul style="list-style-type: none"> <li>NYS DHSES</li> <li>Input from Steering and Planning Committees</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 identified extreme temperatures as a hazard of concern for New York State.</li> <li>According to the NOAA-NCDC database, between 1950 and 2015, there have been 60 extreme temperature events in Dutchess County.</li> <li>Dutchess County has not been included in any FEMA disaster declarations for extreme temperature-related events; however, the County has been included in one USDA disaster declaration.</li> <li>The Steering and Planning Committees identified extreme temperatures as a hazard of concern for the County.</li> </ul>	<ul style="list-style-type: none"> <li>NYS DHSES</li> <li>Input from Steering and Planning Committees</li> <li>NOAA-NCDC</li> </ul>
Flood (riverine, coastal, ice jam, dam failure and flash)	Yes	Yes	<ul style="list-style-type: none"> <li>The NYS HMP identified flooding as a hazard of concern for New York State.</li> <li>The County has been included in nine flood-related FEMA disaster declarations:               <ul style="list-style-type: none"> <li>FEMA-DR-311 (Severe Storms and Flooding) – September 11-14, 1971</li> <li>FEMA-DR-401 (Severe Storms and Flooding) – July 20, 1973</li> <li>FEMA-DR-1095 (Severe Storms and Flooding) – January 19-20, 1996</li> <li>FEMA-DR-1296 (Hurricane Floyd) – September 16-18, 1999</li> <li>FEMA-DR-1335 (Severe Storms and Flooding) – May-August 2000</li> <li>FEMA-DR-1534 (Severe Storms and Flooding) – May 13-June 17, 2004</li> <li>FEMA-DR-1692 (Severe Storms and Inland/Coastal Flooding – April 14-18, 2007</li> <li>FEMA-DR-4020 (Hurricane Irene) – August 28, 2011</li> <li>FEMA-DR-4085 (Hurricane Sandy) – October 28, 2012</li> </ul> </li> <li>Between 1780 and 2015, there have been nine ice jams in the County that have occurred along Wappinger Creek, Fall Kill, Fishkill Creek, and Tenmile River.</li> <li>According to the NFIP statistics, 498 flood-related claims have been made between 1978 and 2014 by Dutchess County, with over \$10 million in flood related losses paid to the Towns and</li> </ul>	<ul style="list-style-type: none"> <li>NYS DHSES</li> <li>Input from Steering and Planning Committees</li> <li>FEMA</li> <li>NOAA-NCDC</li> <li>USACE CRREL Ice Jam Database</li> </ul>



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Hazard	Is this a hazard that may occur in Dutchess County?	If yes, does this hazard pose a significant threat to the County?	Why was this determination made?	Source(s)
			Villages of the County. The County has 58 repetitive loss properties and 13 severe repetitive loss properties. <ul style="list-style-type: none"> <li>The Steering and Planning Committees identified flooding as a hazard of concern for the County.</li> </ul>	
Hailstorm	Yes	Yes	Please see Severe Storm	
Hurricane	Yes	Yes	Please see Coastal Hazards	
Ice Jams	Yes	Yes	Please see Flood	
Ice Storm	Yes	Yes	Please see Severe Winter Storm	
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.”</li> <li>NYS HMP does not identify Dutchess County as a county that has experienced land subsidence in the past. In general, moderate to low land subsidence susceptibility exists for New York State, however, it was identified that this hazard has a very low risk to population or property.</li> <li>Sinkholes often occur in areas underlain by carbonate rock, limestone, salt beds or rocks that naturally dissolve by groundwater circulating through them. The eastern half and portions of western Dutchess County have bands of carbonate rock.</li> <li>According to USGS, Dutchess County is not made up of unconsolidated aquifer systems.</li> <li>The Steering and Planning Committees did not identify land subsidence as a hazard of concern for Dutchess County.</li> </ul>	<ul style="list-style-type: none"> <li>NYS DHSES</li> <li>Input from Steering and Planning Committees</li> <li>USGS</li> </ul>
Landslide	Yes	No	<ul style="list-style-type: none"> <li>The NYS HMP includes landslide as a hazard of concern for New York State. According to the NYS HMP, 157,726 people in Dutchess County live within a high incidence of landslide area. The remainder of the population lives within a low incidence area.</li> <li>Karst landscapes exist from carbonate rock in Dutchess County. Having this increases the County’s risk of land subsidence and sinkholes.</li> <li>Between 1954 and 2014, New York State was included in one landslide-related disaster declaration; however, Dutchess County was not included in the declaration.</li> <li>The Steering and Planning Committees did not identify landslide as a hazard of concern for Dutchess County.</li> </ul>	<ul style="list-style-type: none"> <li>NYS DHSES</li> <li>Input from Steering and Planning Committees</li> <li>FEMA</li> </ul>
Nor’Easters	Yes	Yes	Please see Coastal Hazards	
Severe Storm (windstorms, thunderstorms, hail and	Yes	Yes	<ul style="list-style-type: none"> <li>The NYS HMP identified severe storm as a hazard of concern for New York State. However, for the State HMP, the hazards were profiled in individual sections: hailstorm, high wind, and hurricane. For the purpose of this County HMP, the hazards were combined into one profile,</li> </ul>	<ul style="list-style-type: none"> <li>NYS DHSES</li> <li>FEMA</li> <li>NOAA-NCDC</li> </ul>



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Hazard	Is this a hazard that may occur in Dutchess County?	If yes, does this hazard pose a significant threat to the County?	Why was this determination made?	Source(s)
tornados)			<p>excluding hurricane.</p> <ul style="list-style-type: none"> <li>The NOAA-NCDC Storm Events Database indicated that Dutchess County was impacted by 500 severe storm-related events between 1950 and 2015.</li> <li>According to the SPC, 11 tornadoes have impacted Dutchess County between 1950 and 2014.</li> <li>FEMA included Dutchess County in nine severe storm-related disaster declarations:               <ul style="list-style-type: none"> <li>FEMA-DR-311 (Severe Storms and Flooding) – September 11-14, 1971</li> <li>FEMA-DR-401 (Severe Storms and Flooding) – July 20, 1973</li> <li>FEMA-DR-1095 (Severe Storms and Flooding) – January 19-20, 1996</li> <li>FEMA-DR-1296 (Hurricane Floyd) – September 16-18, 1999</li> <li>FEMA-DR-1335 (Severe Storms and Flooding) – May-August 2000</li> <li>FEMA-DR-1534 (Severe Storms and Flooding) – May-June 2004</li> <li>FEMA-DR-1692 (Severe Storms and Inland/Coastal Flooding) – April 14-18, 2007</li> <li>FEMA-DR-4020 (Hurricane Irene) – August 28, 2011</li> <li>FEMA-DR-4085 (Hurricane Sandy) – October 28, 2012</li> </ul> </li> <li>The Steering and Planning Committees identified severe storms as a hazard of concern for Dutchess County.</li> </ul>	<ul style="list-style-type: none"> <li>SPC</li> <li>Input from Steering and Planning Committees</li> </ul>
Severe Winter Storm (heavy snow, blizzards, ice storms)	Yes	Yes	<ul style="list-style-type: none"> <li>The NYS HMP identified severe winter storm as a hazard of concern for New York State.</li> <li>The NOAA-NCDC Storm Events Database indicated that Dutchess County was impacted by 199 winter storm events between 1950 and 2015.</li> <li>FEMA included Dutchess County in five winter storm-related disaster declarations:               <ul style="list-style-type: none"> <li>FEMA-EM-3107 (Severe Blizzard) – March 14-17, 1993</li> <li>FEMA-DR-1083 (Blizzard of 1996) – January 6-12, 1996</li> <li>FEMA-EM-3299 (Severe Winter Storm) – December 11-31, 2008</li> <li>FEMA-DR-1957 (Severe Winter Storm and Snowstorm) – December 26-27, 2010</li> <li>FEMA-DR-4204 (Nor'Easter/Snowstorm) – November 26-27, 2014</li> </ul> </li> <li>The Planning and Steering Committees identified severe winter storm as a hazard of concern for Dutchess County.</li> </ul>	<ul style="list-style-type: none"> <li>NYS DHSES</li> <li>FEMA</li> <li>NOAA-NCDC</li> <li>Input from Steering and Planning Committees</li> </ul>
Tornado	Yes	Yes	Please see Severe Storm	
Tsunami	No	No	<ul style="list-style-type: none"> <li>Tsunami is not identified as a hazard of concern in the NYS HMP.</li> <li>The Planning and Steering Committees does not consider tsunami to be a significant concern to the planning area.</li> </ul>	<ul style="list-style-type: none"> <li>NYS DHSES</li> <li>Input from Steering and Planning Committees</li> </ul>
Volcano	No	No	<ul style="list-style-type: none"> <li>The NYS HMP did not identify volcano as a hazard of concern for New York State.</li> <li>The Planning and Steering Committees does not consider volcano to be a hazard of concern for</li> </ul>	<ul style="list-style-type: none"> <li>NYS DHSES</li> <li>Input from Steering</li> </ul>



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			the planning area.	and Planning Committees
Wildfire	Yes	Yes	<ul style="list-style-type: none"> <li>The NYS HMP identified wildfire as a hazard of concern for New York State.</li> <li>Approximately 532 square miles (64.5%) of Dutchess County is located in the wildland urban interface.</li> <li>Between 2000 and 2012, Dutchess County has had between zero and over 200 natural vegetation fires.</li> <li>The Planning and Steering Committees identified wildfire as a hazard of concern for Dutchess County.</li> </ul>	<ul style="list-style-type: none"> <li>NYS DHSES</li> <li>Input from Steering and Planning Committees</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*
- NCDC *National Climatic Data Center*
- NOAA *National Oceanic and Atmospheric Administration*
- NRCC *Northeast Regional Climate Center*
- NYS DHSES *New York State Division of Homeland Security and Emergency Services*
- NYS HMP *New York State Hazard Mitigation Plan*
- SPC *Storm Prediction Center*
- USGS *United States Geologic Survey*



## *Section 5.2: Identification of Hazards of Concern*

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

- Coastal Hazards (hurricane/tropical storm, coastal erosion, Nor'Easter)
- Drought
- Earthquake
- Extreme Temperature
- Flood (riverine, coastal, dam failure, flash, ice jam)
- Severe Storm (thunderstorm, hail, wind, tornado)
- Severe Winter Storm
- Wildfire

Other natural hazards of concern that have occurred within Dutchess County, but have a low potential to occur and/or result in significant impacts, may be considered in future versions of the Plan.