



## SECTION 4. RISK ASSESSMENT

A risk assessment is the process of measuring the potential loss of life, personal injury, economic and property damage resulting from identified hazards. It allows planning personnel to address and reduce hazard impacts and emergency management personnel to establish early response priorities by identifying potential hazards and vulnerable assets. Results of the risk assessment are used to inform mitigation planning processes, including determining and prioritizing mitigation actions that reduce a community’s risk to a specified hazard. Past, present, and future conditions must be evaluated to most accurately assess risk for each jurisdiction. The Hunterdon County risk assessment is presented in Section 4 and outlined as follows:

- Identification of hazards of concern that impact Hunterdon County
- Methodology and tools used to conduct the risk assessment
- Hazards of concern profiles and vulnerability assessment
- Hazard ranking

### 4.1 IDENTIFICATION OF HAZARDS OF CONCERN

#### 2021 HMP Changes

- The 2016 HMP ‘Hazard Identification’ was presented in subsection 5.2. For the 2021 HMP update, it is presented in subsection 4.1 (Identification of Hazards of Concern).
- The 2021 HMP flood hazard includes additional discussion of urban flooding and two new hazards of concern: disease outbreak and infestation and invasive species.

To provide a strong foundation for mitigation strategies considered in Section 6 (Mitigation Strategy) and Section 9 (Jurisdictional Annexes), Hunterdon County considered a full range of 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 the County and participating jurisdictions; review of the State of New Jersey Hazard Mitigation Plan (NJ HMP) and previous hazard identification efforts; 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 4.1-1 documents the process of identifying the natural hazards of concern for further profiling and evaluation.

**Hazards of Concern** are 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 Partnership 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 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 NJ HMP. With the exception of hazardous substance release (fixed and in-transit), Hunterdon County chose to focus on natural hazards in this plan as non-natural hazards (technological and intentional hazards) are covered in other local and State plans.



Table 4.1-1. Identification of Natural Hazards of Concern for Hunterdon County

Hazard	Is this a hazard that may occur in Hunterdon 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>The NJ HMP does not identify avalanche as a hazard of concern for New Jersey.</li> <li>The topography and climate of Hunterdon County does not support the occurrence of an avalanche event.</li> <li>New Jersey in general has a very low occurrence of avalanche events based on statistics provided by the American Avalanche Association (AAA) between 1950 and 2014.</li> </ul>	<ul style="list-style-type: none"> <li>NJ HMP</li> <li>Review of NAC-AAA database</li> <li>Steering and Planning Committee Input</li> </ul>
Coastal Erosion	No	No	<ul style="list-style-type: none"> <li>The NJ HMP identifies coastal erosion as a hazard of concern for New Jersey. Counties bounded by coastal waters are most affected by coastal erosion.</li> <li>Hunterdon County is not bounded by coastal waters or located in the Coastal Erosion Hazard Area (CEHA).</li> </ul>	<ul style="list-style-type: none"> <li>NJ HMP</li> <li>NOAA</li> <li>Steering and Planning Committee Input</li> </ul>
Coastal Storm	Yes	Yes	See Hurricane and Nor'Easter	
Dam Failure	Yes	Yes	<ul style="list-style-type: none"> <li>The NJ HMP identifies dam failure as a hazard of concern for New Jersey.</li> <li>According to NJDEP, Hunterdon County has 10 high hazard dams, 8 significant hazard dams, and 71 low hazard dams.</li> </ul>	<ul style="list-style-type: none"> <li>NJ HMP</li> <li>NJ DEP</li> <li>Steering and Planning Committee Input</li> </ul>
Disease Outbreak	Yes	Yes	<ul style="list-style-type: none"> <li>The NJ HMP identifies pandemic as a hazard of concern for New Jersey.</li> <li>According to the NJ HMP, New Jersey’s geographic and demographic characteristics make it particularly vulnerable to importation and spread of infectious diseases. All 21 counties in New Jersey have experienced the effects of a pandemic or disease outbreak.</li> <li>Hunterdon County has been impacted by mosquito and tick-borne diseases, food-borne illness and most recently the COVID-19 pandemic.</li> <li>Hunterdon County was part of a statewide emergency declaration for West Nile Virus in 2000 (EM-3156) and the DR-4488/EM-3451 for COVID-19.</li> </ul>	<ul style="list-style-type: none"> <li>NJ HMP</li> <li>FEMA</li> <li>Steering and Planning Committee Input</li> </ul>
Drought	Yes	Yes	<ul style="list-style-type: none"> <li>The NJ HMP identifies drought as a hazard of concern for New Jersey.</li> <li>The drought hazard is a concern for Hunterdon County because the County’s water is supplied by both surface water and groundwater. Surface water supplies are affected more quickly during droughts than groundwater sources.</li> <li>The USDA has declared disasters for Hunterdon County in 2015 (excessive heat and drought).</li> </ul>	<ul style="list-style-type: none"> <li>NJ HMP</li> <li>USGS</li> <li>NRCC</li> <li>NOAA</li> <li>NOAA-NCEI Storm Database</li> <li>Steering and Planning Committee Input</li> </ul>



**Section 4.1: Risk Assessment – Identification of Hazards of Concern**

Hazard	Is this a hazard that may occur in Hunterdon County?	If yes, does this hazard pose a significant threat to the County?	Why was this determination made?	Source(s)
Earthquake	Yes	Yes	<ul style="list-style-type: none"> <li>The NJ HMP identifies earthquake as a hazard of concern for New Jersey. Although they are known to occur on a regular basis, records indicate that no major earthquakes have struck the state since the establishment of historical record-keeping (1500’s).</li> <li>Hunterdon County is located in the Piedmont Physiographic Provinces and near the Ramapo Fault line.</li> <li>Since 2015, there have been two earthquakes felt in Hunterdon County. The November 2017 earthquake had a magnitude of 1.7 with the epi-center located in the Borough of Frenchtown.</li> </ul>	<ul style="list-style-type: none"> <li>NJ HMP</li> <li>NJDEP</li> <li>NJGS</li> <li>Steering and Planning Committee Input</li> </ul>
Expansive Soils	Yes	No	<ul style="list-style-type: none"> <li>The NJ HMP does not identify expansive soils as a hazard of concern for New Jersey.</li> <li>Soils that expand (swell) as they become wet and contract (shrink) as they dry are called expansive soils. This change can cause the ground to move up and down several inches during a cycle of wetting and drying. Expansive soils that are predominately clay minerals have the ability to absorb water.</li> <li>According to the USGS 1989 Swelling Clays Map of the Conterminous United States, Hunterdon County soils have slight to moderate swelling potential. Based on the soil type and no history of expansive soil incidence occurring in the County, expansive soils are not a hazard of concern for Hunterdon County.</li> </ul>	<ul style="list-style-type: none"> <li>NJ HMP</li> <li>USGS 1989 Swelling Clays Map of the Conterminous U.S.</li> <li>Steering and Planning Committee Input</li> </ul>
Extreme Temperature	Yes	Yes	Please see Severe Weather	
Flood (Riverine, Flash Flooding, Urban Flooding and Sea Level Rise)	Yes	Yes	<ul style="list-style-type: none"> <li>The NJ HMP identifies flooding as a hazard of concern in New Jersey.</li> <li>The County has 92 NFIP policies and 766 Write-Your-Own policies.</li> <li>There has been a total of over \$23.8 million paid claims in Hunterdon County.</li> <li>There are 228 repetitive and severe repetitive loss properties in the County.</li> </ul>	<ul style="list-style-type: none"> <li>NJ HMP</li> <li>FEMA</li> <li>FEMA FIS</li> <li>NFIP</li> <li>NOAA-NCEI Storm Database</li> <li>Steering and Planning Committee Input</li> </ul>
Geological Hazards	Yes	Yes	<ul style="list-style-type: none"> <li>The NJ HMP identifies geological hazards as a hazard of concern for New Jersey.</li> <li>There have been historic debris flow, rockfall and rockslide landslide events in Hunterdon County.</li> <li>Carbonate rock formations are found in the County which are susceptible to natural subsidence.</li> </ul>	<ul style="list-style-type: none"> <li>NJHMP</li> <li>NJGWS</li> <li>NJDEP</li> <li>Steering and Planning Committee Input</li> </ul>





Section 4.1: Risk Assessment – Identification of Hazards of Concern

Hazard	Is this a hazard that may occur in Hunterdon 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>Between January 2015 and May 2019, there have been no identified geological hazard events in Hunterdon County.</li> </ul>	
Hailstorm	Yes	Yes	Please see Severe Weather	
Hurricane (and other Tropical Cyclones)	Yes	Yes	<ul style="list-style-type: none"> <li>The NJ HMP identifies hurricanes/tropical storms as hazards of concern for New Jersey.</li> <li>Due to its proximity to the Atlantic Ocean, Hunterdon County is susceptible to hurricanes and tropical storms.</li> <li>In 2020, 2 tropical storms tracked within 65 nautical miles of Hunterdon County.</li> </ul>	<ul style="list-style-type: none"> <li>NJ HMP</li> <li>FEMA</li> <li>NOAA</li> <li>NOAA-NCEI Storm Database</li> <li>Steering and Planning Committee Input</li> </ul>
Ice Storm	Yes	Yes	Please see Severe Winter Weather	
Infestation and Invasive Species	Yes	Yes	<ul style="list-style-type: none"> <li>Hunterdon County has a diverse landscape with development woven through natural areas.</li> <li>Pests in Hunterdon County that compete for natural resources or transmit diseases to humans, livestock and the environment include insects and invasive plants.</li> <li>Due to large forested areas, pests that damage trees have become an increased focus.</li> <li>Hunterdon County has experienced harmful algal blooms in the past causing impacts to natural systems and the local economy.</li> <li>Infestation and invasive species have been added as a new hazard of concern to the 2021 HMP update.</li> </ul>	<ul style="list-style-type: none"> <li>Steering and Planning Committee Input</li> </ul>
Land Subsidence	Yes	No	Please see Geological Hazards	
Landslide	Yes	No	Please see Geological Hazards	
Nor'Easters	Yes	Yes	<ul style="list-style-type: none"> <li>The NJ HMP identifies Nor'easters as a hazard of concern for New Jersey.</li> <li>Due to its proximity to the Atlantic Ocean, Hunterdon County is susceptible to Nor'Easters.</li> <li>Between 2015 and 2020, Hunterdon County experienced several impactful Nor'easter events.</li> </ul>	<ul style="list-style-type: none"> <li>NJ HMP</li> <li>FEMA</li> <li>NOAA</li> <li>NOAA-NCEI Storm Database</li> <li>Steering and Planning Committee Input</li> </ul>
Radon	Yes	No	<ul style="list-style-type: none"> <li>Radon is a naturally-occurring radioactive gas, which has always been a part of our environment. It's a natural decay product of uranium and is found in soil everywhere in varying concentrations and is a serious health risk.</li> <li>The NJ HMP does not identify radon as a hazard of concern for New Jersey.</li> </ul>	<ul style="list-style-type: none"> <li>NJDEP: <a href="https://www.njradon.org/radonin.htm">https://www.njradon.org/radonin.htm</a></li> </ul>



**Section 4.1: Risk Assessment – Identification of Hazards of Concern**

Hazard	Is this a hazard that may occur in Hunterdon 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>The revised building code requires radon control measures be installed for new construction.</li> <li>Testing is required at time of real estate transactions.</li> <li>The Hunterdon County Department of Health has information regarding the hazard posted on their website. <a href="https://www.co.hunterdon.nj.us/health/environmental/radon.html">https://www.co.hunterdon.nj.us/health/environmental/radon.html</a></li> <li>Free radon kits are available to New Jersey residents at the Hunterdon County Health Department.</li> <li>This hazard was not evaluated further in the 2021 HMP.</li> </ul>	
Severe Weather (Extreme Temperatures, Windstorms, Thunderstorms, Hail, Lightning, and Tornadoes)	Yes	Yes	<ul style="list-style-type: none"> <li>The NJ HMP identifies severe weather as a hazard of concern for New Jersey.</li> <li>Severe weather events occur annually in Hunterdon County causing a range of impacts from property damage, flooding and loss of power.</li> <li>NOAA’s NCEI storm events database indicates that Hunterdon County was impacted by roughly 50 Severe Weather events between 2015 and 2020.</li> <li>The largest hailstone on record in Hunterdon County was 1.75 inches.</li> <li>The strongest tornado on record in Hunterdon County was an F-2.</li> <li>The NJ HMP identifies extreme temperature as a hazard of concern for New Jersey as a type of severe weather.</li> <li>Hunterdon County has experienced excessive heat and extreme cold temperature events.</li> </ul>	<ul style="list-style-type: none"> <li>NJ HMP</li> <li>NOAA – NCEI</li> <li>FEMA</li> <li>NJ OEM</li> <li>ONJSC</li> <li>Steering and Planning Committee Input</li> </ul>
Severe Winter Weather (Heavy Snow, Blizzards, Freezing Rain/Sleet, Ice Storms)	Yes	Yes	<ul style="list-style-type: none"> <li>The NJ HMP identifies severe winter weather as a hazard of concern for New Jersey.</li> <li>Normal seasonal snowfall in Hunterdon County ranges between 40 to 50 inches.</li> <li>Between 2015 and 2019, Hunterdon County was included in one FEMA declaration related to severe winter weather: January 22-24, 2016 – FEMA-DR-4264 – Severe Winter Storm and Snowstorm</li> <li>NOAA-NCEI has indicated that Hunterdon County has experienced the impacts of roughly 15 winter storm events between 2015 and 2020.</li> </ul>	<ul style="list-style-type: none"> <li>NJ HMP</li> <li>FEMA</li> <li>NOAA – NCEI Storm Database</li> <li>ONJSC</li> <li>Steering and Planning Committee Input</li> </ul>
Tornado	Yes	Yes	Please see Severe Weather	
Tsunami	No	No	<ul style="list-style-type: none"> <li>The NJ HMP does identify tsunami as a hazard of concern for New Jersey.</li> <li>None of Hunterdon County is bounded by coastal waters; therefore, tsunami is not identified as a hazard of concern by Hunterdon County.</li> </ul>	<ul style="list-style-type: none"> <li>NJ HMP</li> <li>Steering and Planning Committee Input</li> </ul>
Volcano	No	No	<ul style="list-style-type: none"> <li>The NJ HMP does not identify volcano as a hazard of concern for New Jersey.</li> </ul>	<ul style="list-style-type: none"> <li>NJ HMP</li> </ul>



*Section 4.1: Risk Assessment – Identification of Hazards of Concern*

Hazard	Is this a hazard that may occur in Hunterdon County?	If yes, does this hazard pose a significant threat to the County?	Why was this determination made?	Source(s)
Wildfire	Yes	Yes	<ul style="list-style-type: none"> <li>• The NJHMP identifies as wildfire as a hazard of concern for New Jersey.</li> <li>• In Hunterdon County, 8,453 acres are located in the extreme and very high wildfire fuel zones according to the New Jersey Forest Fires Service.</li> <li>• In 2015, one wildfire resulted in damages to homes and injured two firefighters.</li> <li>• Based on input from the Planning Committee, wildfire is considered a hazard of concern for Hunterdon County due to the large areas of State forests and development proximate to these areas.</li> </ul>	<ul style="list-style-type: none"> <li>• NOAA – NCEI Storm Events Query</li> <li>• USGS</li> <li>• NJ HMP</li> <li>• NJFFS</li> <li>• Steering and Planning Committee Input</li> </ul>
Windstorm	Yes	Yes	Please see Severe Weather	

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|--------------|--|--------------|--|
| <i>DIR</i>   | <i>Drought Impact Reporter</i>   | <i>NJDOH</i> | <i>New Jersey Department of Health</i>                     |
| <i>DR</i>    | <i>Presidential Disaster Declaration Number</i>                                      | <i>NJFFS</i> | <i>New Jersey Forest Fire Service</i>                      |
| <i>EM</i>    | <i>Presidential Disaster Emergency Number</i>  | <i>NJGS</i>  | <i>New Jersey Geological Survey (as part of the NJDEP)</i> |
| <i>FEMA</i>  | <i>Federal Emergency Management Agency</i>   | <i>NOAA</i>  | <i>National Oceanic and Atmospheric Administration</i>     |
| <i>HMP</i>   | <i>Hazard Mitigation Plan</i>  | <i>NRCC</i>  | <i>Northeast Regional Climate Center</i>                   |
| <i>K</i>     | <i>Thousands (\$)</i>  | <i>NWS</i>   | <i>National Weather Service</i>                            |
| <i>M</i>     | <i>Millions (\$)</i>   | <i>OEM</i>   | <i>Office of Emergency Management</i>                      |
| <i>NCEI</i>  | <i>National Oceanic and Atmospheric Administration National Climatic Data Center</i> | <i>ONJSC</i> | <i>Office of New Jersey State Climatologist</i>            |
| <i>NJ</i>    | <i>New Jersey</i>  | <i>SPC</i>   | <i>Storm Prediction Center</i>                             |
| <i>NJDEP</i> | <i>New Jersey Department of Environmental Protection</i>                             | <i>USGS</i>  | <i>U.S. Geologic Survey</i>                                |

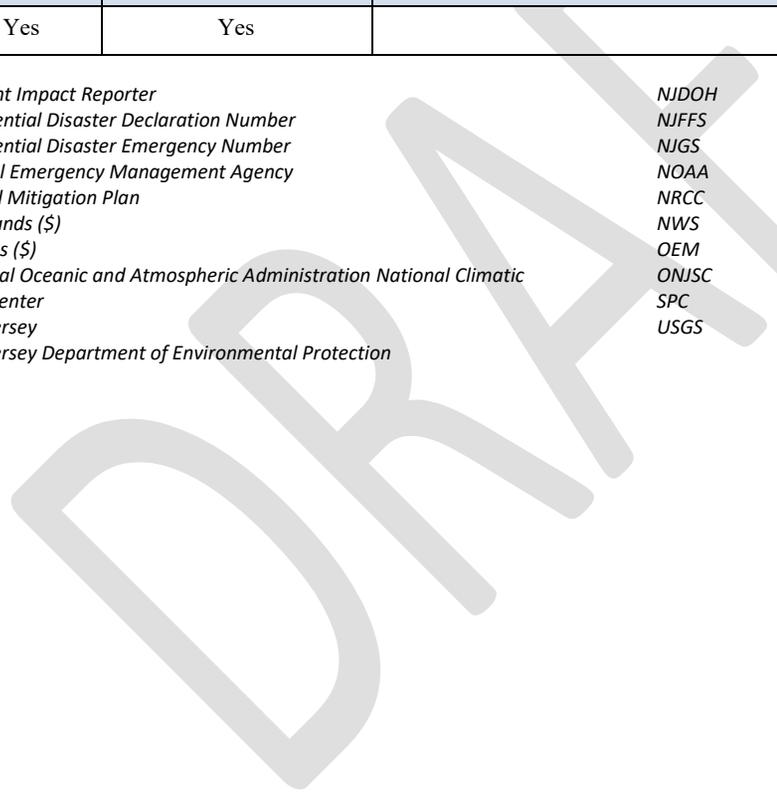


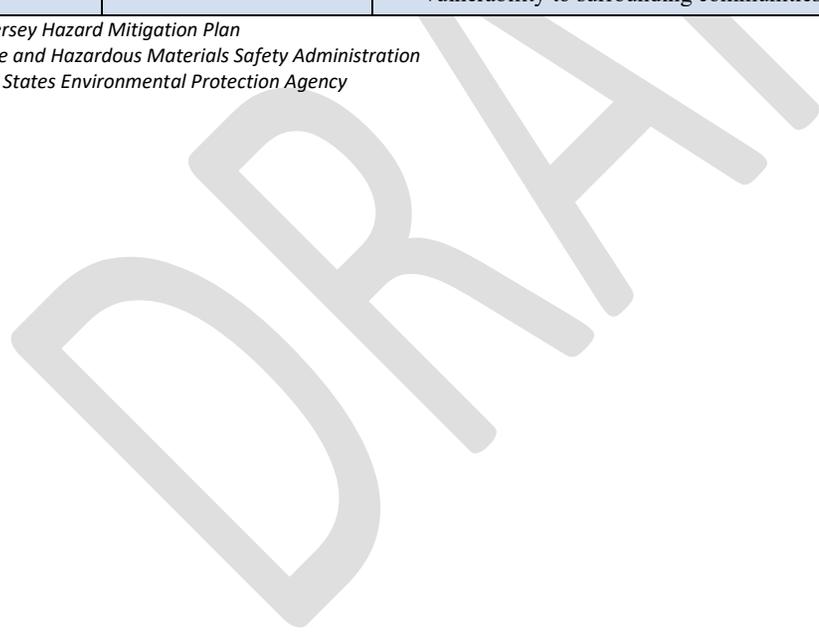


Table 4.1-2. Identification of Non-Natural Hazards of Concern for Hunterdon County

Hazard	Is this a hazard that may occur in Hunterdon County?	If yes, does this hazard pose a significant threat to the County?	Why was this determination made?	Source(s)
Hazardous Substances	Yes	Yes	<ul style="list-style-type: none"> <li>• The NJ HMP identifies hazardous substances as a hazard of concern for New Jersey.</li> <li>• Roadways that are considered major transit routes for hazardous materials, thus most at risk for closure, include Interstate 78, State 29 and 31, US 202, and all 500-series County roads. Hazardous substances may also be transported via rail or pipeline in the County.</li> <li>• Between 2014 and 2018, Hunterdon County had a total of 123,714.8 pounds of chemicals released on-site and a total of 8,717 pounds of chemicals released off-site (USEPA 2020).</li> <li>• The Planning Committee identified hazardous substances as a hazard of concern for Hunterdon County due to its extensive transportation network and vulnerability to surrounding communities if there is a release.</li> </ul>	<ul style="list-style-type: none"> <li>• NJ HMP</li> <li>• NJ.com</li> <li>• US EPA</li> <li>• PHMSA</li> <li>• Steering and Planning Committee Input</li> </ul>

NJ HMP  
PHMSA  
USEPA

New Jersey Hazard Mitigation Plan  
Pipeline and Hazardous Materials Safety Administration  
United States Environmental Protection Agency





According to input from the County, and review of all available resources, a total of 12 natural hazards and one human-caused hazard of concern were identified as significant hazards affecting the entire planning area, to be addressed at the county level in this plan:

### Natural Hazards of Concern

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- Dam Failure
- Disease Outbreak
- Drought
- Earthquake
- Flood (including riverine, flash, urban flooding)
- Geologic (landslide, subsidence, and sinkholes)
- Hurricane and Tropical Storm
- Infestations and Invasive Species
- Nor'Easter
- Severe Weather (high winds, tornadoes, thunderstorms, hail, extreme temperature)
- Severe Winter Weather (heavy snow, blizzards, ice storms)
- Wildfire

### Human-Caused Hazards of Concern

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- Hazardous Materials (Fixed Sites and Transportation)

There are other natural and human-caused hazard events that have occurred within Hunterdon County; however, they have a low potential or are covered in other plans that specifically address technological and intentional hazards. Therefore, these hazards will not be further addressed within this version of the plan. However, if deemed necessary by the County, these hazards may be considered in future versions of the HMP.