



5.3 HAZARD RANKING

After the hazards of concern were identified for Monroe County, the Planning Committee ranked the hazards to describe their probability of occurrence and their impact on population, property (general building stock including critical facilities), and the economy. Each participating borough, township, or city may have differing degrees of risk exposure and vulnerability compared to the County as a whole. Therefore, each jurisdiction ranked the degree of risk to each hazard as it pertains to their community using the same methodology as applied to the County-wide ranking. This process assured consistency in the overall risk ranking process. The hazard ranking for the County and each participating jurisdiction appear in their jurisdictional annexes in Volume II of this plan.

This section describes the hazard ranking methodology, hazard ranking results, and the hazard profiles and vulnerability assessment.

5.3.1 Hazard Ranking Methodology

The following sections describe the methodology used to rank the hazards of concern for Monroe County, and each step of the hazard ranking process. Estimates of risk for the County were developed by applying methodologies promoted by the Federal Emergency Management Agency’s (FEMA) hazard mitigation planning guidance, and generated by FEMA’s Hazards U.S. Multi-Hazard (HAZUS-MH) risk assessment tool.

Probability of Occurrence

Probability of occurrence is an estimate of the number of hazard incidents. A review of historical events assists with this determination. Each hazard of concern is rated in accordance with the numerical ratings and definitions listed in Table 5.3-1.

Table 5.3-1. Probability of Occurrence Ranking Factors

Rating	Probability Category	Definition
1	Rare	Hazard event is not likely to occur within 100 years (>1% chance of occurrence in any given year).
2	Occasional	Hazard event is likely to occur within 100 years (1% chance of occurrence in any given year).
3	Frequent	Hazard event is likely to occur within 25 years (4% chance of occurrence in any given year).

Impact

The impact of each hazard is considered in three categories: impact on population, impact on property (general building stock including critical facilities), and impact on the economy. Based on documented historical losses and a subjective assessment by the Planning Committee, an impact rating of high, medium, or low is assigned with a corresponding numeric value for each hazard of concern. In addition, a weighting factor is assigned to each impact category: factor of 3 for population, factor of 2 for property, and factor of 1 for the economy. The weighting factor number assignments give the greatest weight to the impact on population in evaluating the impact of a hazard. A numerical value of 0 is assigned if no impact is anticipated.

Table 5.3-2 presents the numerical rating, weighting factor, and description of each impact category.



Table 5.3-2. Numerical Values and Definitions for Impacts on Population, Property, and the Economy

Category	Weighting Factor	Low Impact (1)	Medium Impact (2)	High Impact (3)
Population*	3	14% or less of the population is exposed to a hazard with potential for measurable life safety impact due to its extent and location	15% to 29% of the population is exposed to a hazard with potential for measurable life safety impact due to its extent and location	30% or more of the population is exposed to a hazard with potential for measurable life safety impact due to its extent and location
Property*	2	Property exposure is 14% or less of the total replacement cost for the community	Property exposure is 15% to 29% of the total replacement cost for the community	Property exposure is 30% or more of the total replacement cost for the community
Economy	1	Loss estimate is 9% or less of the total replacement cost for the community	Loss estimate is 10% to 19% of the total replacement cost for the community	Loss estimate is 20% or more of the total replacement cost for the community

Note: A numerical value of 0 is assigned if no impact is anticipated.

* For the purposes of this exercise, “impacted” means exposed for population and property, and loss for the economy.

Risk Ranking Value

The risk ranking for each hazard is then calculated by multiplying the numerical value for probability of occurrence by the sum of the numerical values for impact. The equation is as follows:

$$\text{Weighting Factor (1, 2, or 3)} \times \text{Impact Value (6 to 18)} = \text{Hazard Ranking Value.}$$

Based on the total for each hazard, a priority ranking is assigned to each hazard of concern (high, medium, or low).

5.3.2 Hazard Ranking Results

Using the process described above, the Planning Committee determined the risk ranking for the identified hazards of concern for Monroe County. Based on the combined risk values for probability of occurrence and impact on the County, a priority ranking of high, medium, or low risk was assigned. The hazard ranking for the Monroe County planning area is detailed in the subsequent tables that present the step-by-step process for establishing the ranking. The Countywide risk ranking includes the entire planning area and may not reflect the highest risk indicated for any of the participating jurisdictions. The resulting ranks of each municipality indicate the differing degrees of risk exposure and vulnerability. The results support appropriate selection and prioritization of initiatives to reduce the highest levels of risk for each municipality. Both the County and the participating jurisdictions have applied the same methodology to develop the Countywide and local risk rankings to ensure consistency in the overall ranking of risk.

This risk ranking exercise serves two purposes: (1) to describe the probability of occurrence of each hazard, and (2) to describe the impact each hazard would have on the people, property, and economy of Monroe County. Estimates of risk for the County were developed by application of methodologies promoted by FEMA’s hazard mitigation planning guidance, and generated by FEMA’s HAZUS-MH risk assessment tool.

Table 5.3-3 lists the probability ranking assigned for the likelihood of occurrence of each hazard.



Table 5.3-3. Probability of Occurrence Ranking for Hazards of Concern for Monroe County

Hazard of Concern	Probability	Numeric Value
Drought	Frequent	3
Earthquake	Frequent	3
Extreme Temperatures	Frequent	3
Flood	Frequent	3
Landslides	Frequent	3
Severe Storm	Frequent	3
Severe Winter Storm	Frequent	3
Wildfire	Frequent	3
Civil Unrest	Frequent	3
Infestation	Frequent	3
Hazardous Materials	Frequent	3
Terrorism	Frequent	3
Utility Failures	Frequent	3

Table 5.3-4 shows the impact evaluation results for each hazard of concern, including impact on property, structures, and the economy on the County level. The table indicates several hazards that would exert a high impact on the local jurisdictional level, but may exert a lower impact when analyzed for the County as a whole. Jurisdictional ranking results are presented in each local annex in Section 9 of this plan. The weighting factor results and total impact assessments for each hazard also are summarized.



Table 5.3-4. Impact Ranking for Hazards of Concern for Monroe County

Hazard of Concern	Population			Property			Economy			Total Impact Rating (Population + Property + Economy)
	Impact	Numeric Value	Multiplied by Weighing Factor (3)	Impact	Numeric Value	Multiplied by Weighing Factor (2)	Impact	Numeric Value	Multiplied by Weighing Factor (1)	
Drought	Low	1	3	None	0	0	Low	1	1	4
Earthquake	High	3	9	High	3	6	Low	1	1	16
Extreme Temperatures	High	3	9	Low	1	2	Low	1	1	12
Flood	Low	1	3	Low	1	2	Low	1	1	6
Infestation	High	3	9	Low	1	2	Low	1	1	12
Landslides	High	3	9	High	3	6	Low	1	1	16
Severe Storm	High	3	9	High	3	6	Low	1	1	16
Severe Winter Storm	High	3	9	Low	1	2	Low	1	1	12
Wildfire	Low	1	3	Low	1	2	Low	1	1	6
Civil Unrest	Low	1	3	Low	1	2	Low	1	1	6
Hazardous Materials	Low	1	3	Low	1	2	Low	1	1	6
Terrorism	Low	1	3	Low	1	2	Low	1	1	6
Utility Failures	High	3	9	Low	1	2	Medium	2	2	13



Table 5.3-5 presents the total ranking value of each hazard.

Table 5.3-5. Total Risk Ranking Value for Hazards of Concern for Monroe County

Hazard of Concern	Probability	Impact	Total = (Probability x Impact)
Earthquake	3	16	48
Landslides	3	16	48
Severe Storm	3	16	48
Utility Failures	3	13	39
Extreme Temperatures	3	12	36
Severe Winter Storm	3	12	36
Infestation	3	12	24
Flood	3	6	18
Wildfire	3	6	18
Civil Unrest	3	6	18
Hazardous Materials	3	6	18
Terrorism	3	6	18
Drought	3	4	12

Table 5.3-6 presents the hazard ranking category assigned for each hazard of concern by jurisdiction. The ranking categories are determined by an evaluation of the total risk ranking score into three categories (low, medium, and high) whereby a total score of 14 and below is categorized as low, 15 to 30 is medium, and 31 and over is considered a high risk.

These rankings have been used as one of the bases for identifying the jurisdictional hazard mitigation strategies included in Section 9 of this plan. The summary rankings for the County reflect results of the vulnerability analysis for each hazard of concern, and vary from specific results of each jurisdiction. For example, the flood hazard may be ranked high in one jurisdiction, but because of the exposure and impact Countywide, it is ranked as a medium hazard and is addressed in the County mitigation strategy accordingly.

The hazard rankings indicated in this plan update have been adjusted from the 2011 plan. The improved vulnerability assessment is based on structure-specific data available from the County rather than HAZUS default aggregate data, as discussed in Section 5.1, Methodology. Any changes to the ranking results, therefore, do not necessarily reflect significant changes in exposure, but a more refined vulnerability analysis methodology. The summary County-level values reflect County vulnerability data and do not represent an average of jurisdiction ranks or the highest rank indicated in the County. These designations are an element of the prioritization criteria, as detailed in Section 6 of this plan.



Table 5.3-6. Summary of Overall Ranking of Natural Hazards by Jurisdiction

Jurisdiction	Hazard Ranking								
	Drought	Earthquake	Extreme Temp.	Flood	Infestation	Landslide	Severe Storm	Severe Winter Storm	Wildfire
Monroe County	Low	High	High	Med.	Med.	High	High	High	Med.
Town of Brighton	Low	Med.	High	Med.	High	Med.	High	High	Med.
Village of Brockport	Low	Low	High	Med.	High	High	High	High	High
Town of Chili	Low	Med.	High	Med.	High	High	High	High	High
Village of Churchville	Low	Med.	High	Med.	High	High	High	High	Low
Town of Clarkson	Low	Med.	High	Med.	High	High	High	High	High
Town/Village of East Rochester	Low	Med.	High	Med.	High	Low	High	High	Med.
Village of Fairport	Low	Med.	High	Med.	High	Low	High	High	Low
Town of Gates	Low	Med.	High	Med.	High	High	High	High	Med.
Town of Greece	Low	Med.	High	Med.	High	High	High	High	High
Town of Hamlin	Low	Med.	High	Med.	High	High	High	High	High
Town of Henrietta	Low	Med.	High	Med.	High	High	High	High	Med.
Village of Hilton	Low	Med.	High	Med.	High	High	High	High	Med.
Village of Honeoye Falls	Low	Med.	High	Med.	High	Low	High	High	Med.
Town of Irondequoit	Low	Med.	High	Med.	High	Med.	High	High	Med.
Town of Mendon	Low	Med.	High	Med.	High	Low	High	High	Med.
Town of Ogden	Low	Med.	High	Med.	High	High	High	High	High
Town of Parma	Low	Med.	High	Med.	High	High	High	High	High
Town of Penfield	Low	Med.	High	Med.	High	High	High	High	Med.
Town of Perinton	Low	Med.	High	Med.	High	Low	High	High	Med.
Town of Pittsford	Low	Med.	High	Med.	High	Low	High	High	Med.
Village of Pittsford	Low	Low	High	Med.	High	Low	High	High	Med.
Town of Riga	Low	Med.	High	Med.	High	High	High	High	High
City of Rochester	Low	Med.	High	Med.	High	Med.	High	High	Med.
Town of Rush	Low	Med.	High	Med.	High	Low	High	High	Med.
Village of Scottsville	Low	Med.	High	Med.	High	High	High	High	Med.
Village of Spencerport	Low	Low	High	Med.	High	High	High	High	Med.
Town of Sweden	Low	Med.	High	Med.	High	High	High	High	Med.
Town of Webster	Low	Med.	High	Med.	High	High	High	High	High
Village of Webster	Low	Med.	High	Med.	High	High	High	High	Med.
Town of Wheatland	Low	Med.	High	Med.	High	High	High	High	Med.



5.3.3 Hazards Profiles and Vulnerability Assessment

The following sections profile and assess vulnerability for each hazard of concern. For each hazard, the profile includes the hazard description, its location and extent, previous occurrences and losses, and probability of future events. The vulnerability assessment for each hazard includes an overview of vulnerability; data and methodology used; impact on life, health, and safety; impact on general building stock; impact on critical facilities; impact on the economy; additional data needs and next steps; and overall vulnerability assessment finding. Hazards are presented in Section 5.4 in the order listed above, starting with the severe storm hazard and ending with the landslide hazard.