5.3 Hazard Ranking

After the hazards of concern were identified for Chenango County, the hazards were ranked to describe their probability of occurrence and their impact on population, property (general building stock including critical facilities) and the economy. Each participating city, township, or borough 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 assured consistency in the overall ranking of risk process. The hazard ranking for the County and each participating district can be found in their jurisdictional annex in Volume II of this plan.

5.3.1 Hazard Ranking Methodology

The methodology used to rank the hazards of concern for Chenango County is described below. Estimates of risk for the County were developed using methodologies promoted by FEMA's hazard mitigation planning guidance and generated by FEMA's HAZUS-MH risk assessment tool.

Probability of Occurrence

The probability of occurrence is an estimate of how often a hazard event occurs. A review of historic events assists with this determination. Each hazard of concern is rated in accordance with the numerical ratings and definitions 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 historic 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: three (3) for population, two (2) for property, and one (1) for economy. This gives the impact on population the greatest weight in evaluating the impact of a hazard. Table 5.3-2 presents the numerical rating, weighted factor and description for each impact category.

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

Category	Weighting Factor	Low Impact (1)	Medium Impact (2)	High Impact (3)
Population*	3	14% or less of your population is exposed to a hazard with potential for measurable life safety	15% to 29% of your population is exposed to a hazard with potential for measurable life safety	30% or more of your population is exposed to a hazard with potential for measurable life safety impact, due to its extent and location

Category	Weighting Factor	Low Impact (1)	Medium Impact (2)	High Impact (3)
		impact, due to its extent and location	impact, due to its extent and location	
Property*	2	Property exposure is 14% or less of the total replacement cost for your community	Property exposure is 15% to 29% of the total replacement for your community	Property exposure is 30% or more of the total replacement cost for your community
Economy	1	Loss estimate is 9% or less of the total replacement cost for your community	Loss estimate is 10% to 19% of the total replacement cost for your community	Loss estimate is 20% or more of the total replacement cost for your community

Note: A numerical value of zero is assigned if there is no impact.
**For the purposes of this exercise, "impacted" means exposed for population and property and loss for 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: Weighting Factor (1, 2, or 3) X Impact Value (6 to 18) = Hazard Ranking Value. Based on the total for each hazard, a priority ranking is assigned to each hazard of concern (high, medium, or low).

5.3.1 Hazard Ranking Results

Using the process described above, the risk ranking for the identified hazards of concern was determined for Chenango County. Based on the combined risk values for probability of occurrence and impact to Chenango County, a priority ranking of "high", "medium" or "low" risk was assigned. The hazard ranking for the Chenango County planning area is detailed in the subsequent tables that present the step-wise process for the ranking. The county–wide 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 the 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 county-wide risk and local rankings to ensure consistency in the overall ranking of risk.

This risk ranking exercise serves two purposes: 1) to describe the probability of occurrence for each hazard and, 2) to describe the impact each would have on the people, property and economy of Chenango County. Estimates of risk for Chenango County were developed using methodologies promoted by FEMA's hazard mitigation planning guidance and generated by FEMA's HAZUS-MH risk assessment tool. Table 5.3-3 shows the probability ranking assigned for likelihood of occurrence for each hazard.

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

Hazard of Concern	Probability	Numeric Value
Drought	Occasional	2
Extreme Temperature	Frequent	3
Flood	Frequent	3
Severe Storm	Frequent	3
Severe Winter Storm	Frequent	3
Wildfire	Occasional	2
Infestation	Frequent	3
Natural Gas	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. It is noted that several hazards that have a high impact on the local jurisdictional level, may have a lower impact when analyzed county-wide. Jurisdictional ranking results are presented in each local annex in Section 9 of this plan. The weighting factor results and a total impact for each hazard also are summarized.

Table 5.3-4. Impact Ranking for Hazards of Concern for Chenango 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	L	1	1 x 3 = 3	L	1	1 x 2 = 2	M	2	2 x 1 = 2	7
Extreme Temperature	M	2	2 x 3 = 6	L	1	1 x 2 = 2	M	2	2 x 1 = 2	10
Flood	L	1	1 x 3 = 3	M	2	2 x 2 = 4	L	1	1 x 1 = 1	8
Severe Storm	H	3	3 x 3 = 9	H	3	3 x 2 = 6	L	1	1 x 1 = 1	16
Severe Winter Storm	H	3	3 x 3 = 9	H	3	3 x 2 = 6	M	2	2 x 1 = 2	17
Wildfire	H	3	3 x 3 = 9	M	2	2 x 2 = 4	H	3	3 x 1 = 3	14
Infestation	H	3	3 x 3 = 9	L	1	1 x 2 = 2	M	2	2 x 1 = 2	13
Natural Gas	H	3	3 x 3 = 9	M	2	2 x 2 = 4	M	2	2 x 1 = 2	7

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

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

Hazard of Concern	Probability	Impact	Total = (Probability x Impact)
Drought	Occasional	14	Medium
Extreme Temperature	Frequent	30	Medium
Flood	Frequent	24	Medium
Severe Storm	Frequent	48	High
Severe Winter Storm	Frequent	51	High
Wildfire	Occasional	28	Medium
Infestation	Frequent	39	Low
Natural Gas	Frequent	21	Medium

Table 5.3-6 presents the hazard ranking category by jurisdiction assigned for each hazard of concern. 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 category.

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 the results of the vulnerability analysis for each hazard of concern and vary from the specific results of each jurisdiction. For example the severe storm hazard may be ranked high in one jurisdiction, but due to the exposure and impact county-wide, it is ranked as a medium hazard and is addressed in the county mitigation strategy accordingly.

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

Chenango County Municipalities	Hazard Ranking							
	Drought	Extreme Temp	Flood	Severe Storm	Severe Winter Storm	Wildfire	Infestation	Natural Gas
Afton (T)	Medium	Medium	Medium	High	Medium	Medium	Low	Medium
Afton (V)	Medium	Medium	High	High	Medium	Medium	Low	Medium
Bainbridge (T)	Medium	Medium	Medium	High	Medium	Medium	Low	Medium
Bainbridge (V)	Medium	Medium	Medium	High	High	Medium	Low	Medium
Columbus (T)	Medium	High	Medium	High	High	Medium	Low	Low
Coventry (T)	Medium	Medium	Medium	High	High	Medium	Low	Medium
Earlville (V)	Medium	Medium	Medium	High	High	Medium	Low	Low
German (T)	Medium	High	Medium	High	High	Medium	Low	Low
Greene (T)	Medium	Medium	Medium	High	High	Medium	Low	Medium
Greene (V)	Medium	Medium	Medium	High	High	Medium	Low	Medium
Guilford (T)	Medium	Medium	Medium	High	High	Medium	Low	Low
Lincklaen (T)	Medium	Medium	Medium	High	High	Medium	Low	Low
McDonough (T)	Medium	Medium	Medium	High	High	Medium	Low	Low
New Berlin (T)	Medium	Medium	High	High	High	Medium	Low	Medium
New Berlin (V)	Medium	High	High	High	High	Medium	Low	Medium
North Norwich (T)	Medium	Medium	Medium	High	High	Medium	Low	Low
Norwich (C)	Medium	High	High	High	High	Medium	Low	Medium
Norwich (T)	Medium	Medium	Medium	High	High	Medium	Low	Medium
Otselic (T)	Medium	Medium	Medium	High	High	Medium	Low	Low
Oxford (T)	Medium	High	Medium	High	High	Medium	Low	Medium
Oxford (V)	Medium	High	High	High	High	Medium	Low	Medium
Pharsalia (T)	Medium	High	Medium	High	High	Medium	Low	Low
Pitcher (T)	Medium	Medium	Medium	High	High	Medium	Low	Low
Plymouth (T)	Medium	Medium	Medium	High	High	Medium	Low	Medium
Preston (T)	Medium	Medium	Medium	High	High	Medium	Low	Medium
Sherburne (T)	Medium	High	High	High	High	Medium	Low	Low
Sherburne (V)	Medium	High	High	High	High	Medium	Low	Low
Smithville (T)	Medium	Medium	Medium	High	High	Medium	Low	Low
Smyrna (T)	Medium	Medium	Medium	High	High	Medium	Low	Medium
Smyrna (V)	Medium	Medium	Medium	High	High	Medium	Low	Medium

The hazard rankings indicated in this plan update have been adjusted from the 2008 plan due to the improved vulnerability assessment 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 the vulnerability data on the county level and do not represent an average of jurisdiction ranks or the highest rank indicated in Chenango County. These designations are an element of the prioritization criteria as detailed in Section 6 of this plan.

5.4 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 the probability of future events. The vulnerability assessment for each hazard includes: an overview of vulnerability; the data and methodology used; the 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 the overall vulnerability assessment finding. Hazards are presented as listed above, starting with the severe storm hazard and ending with the earthquake hazard.