



## 5.3 Hazard Ranking

After hazards of concern were identified for Genesee County, the Planning Partnership ranked the hazards to describe their probability of occurrence and their impacts on population, property (general building stock [GBS] including critical facilities), and the economy. Each participating city, town, or village may differ from the County as a whole in degrees of risk exposure and vulnerability. Therefore, the Steering Committee ranked the degree of risk to each community from each hazard by application of the same methodology applied to the countywide ranking. This process ensured consistency in the overall risk ranking process. This ranking was used as an input into each jurisdiction’s determination of the hazards of most concern to that jurisdiction. That information is provided in the jurisdictional annexes in Volume II of this HMP.

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 applied to rank hazards of concern for Genesee County, and all steps of the hazard ranking process for estimating risks to 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 percent chance of occurrence in any given year).
2	Occasional	Hazard event is likely to occur within 100 years (1 percent chance of occurrence in any given year).
3	Frequent	Hazard event is likely to occur within 25 years (4 percent chance of occurrence in any given year).

#### Impacts

Impacts of each hazard are considered in three categories: impact on population, impact on property (GBS including critical facilities), and impact on the economy. Based on documented historical losses and a subjective assessment by the Planning Partnership, 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 three (3) for population, factor of two (2) for property, and factor of one (1) for the economy. The weighting factor number assignments give greatest weight to the impact on population in evaluation of impacts 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 percent 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 percent of the population is exposed to a hazard with potential for measurable life safety impact due to its extent and location	30 percent 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 percent or less of the total replacement cost for the community	Property exposure is 15 to 29 percent of the total replacement cost for the community	Property exposure is 30 percent or more of the total replacement cost for the community
Economy	1	Loss estimate is nine (9) percent or less of the total replacement cost for the community	Loss estimate is 10 to 19 percent of the total replacement cost for the community	Loss estimate is 20 percent 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 calculated by multiplying the numerical value for probability of occurrence by the sum of the numerical values for impact. The equation is as follows:

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

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

Applying the process described above, the Planning Partnership determined the risk ranking for the identified hazards of concern for Genesee 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 Genesee County planning area is detailed in 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. Resulting ranks of each municipality indicate differing degrees of risk exposure and vulnerability. Results support appropriate selection and prioritization of initiatives to reduce the highest levels of risk for each municipality. Both the County and participating jurisdictions have applied the same methodology to develop the countywide and local risk rankings to ensure consistency in overall ranking of risk.

This risk ranking exercise serves two purposes: (1) to determine probability of occurrence of each hazard, and (2) to describe the impact each hazard would have on people, property, and economy of Genesee County. Estimates of risk to 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 Genesee County

Hazard of Concern	Probability	Numeric Value
Civil Unrest	Frequent	3
Drought	Frequent	3
Earthquake	Rare	1
Epidemic	Occasional	2
Extreme Temperature	Frequent	3
Flood	Frequent	3
Hazmat	Frequent	3
Severe Storm	Frequent	3
Severe Winter Storm	Frequent	3
Terrorism	Rare	1
Transportation Accident	Frequent	3
Utility Failure	Frequent	3
Wildfire	Occasional	2

Table 5.3-4 lists impact evaluation results for each hazard of concern, including impacts on property, structures, and the economy on the County level. This table indicates several hazards that may exert high impact on the local jurisdictional level but may exert lower impact on the County as a whole, and vice versa. Weighting factor results and total impact from each hazard are listed.



Table 5.3-4. Impact Ranking for Hazards of Concern for Genesee 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)	
Civil Unrest	Low	1	3	Low	1	2	Low	1	1	6
Drought	Low	1	3	Low	1	2	Medium	2	1	7
Earthquake	High	3	3	High	3	2	High	3	1	18
Epidemic	High	3	3	Low	1	2	Low	1	1	12
Extreme Temperature	High	3	3	Low	1	2	Low	1	1	12
Flood	Low	1	3	Low	2	2	Low	1	1	8
Hazmat	Medium	2	3	Low	1	2	Low	1	1	9
Severe Storm	High	3	3	High	3	2	High	3	1	18
Severe Winter Storm	High	3	3	High	3	2	High	3	1	18
Terrorism	High	3	3	High	3	2	High	3	1	18
Transportation Accident	Low	1	3	Low	1	2	Low	1	1	6
Utility Failure	High	3	3	Low	1	2	High	3	1	14
Wildfire	Medium	3	2	Low	1	2	Medium	2	1	10



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

Table 5.3-5. Total Risk Ranking Values of Hazards of Concern for Genesee County

Hazard of Concern	Probability	Impact	Total = (Probability x Impact)
Civil Unrest	3	6	18
Drought	3	7	21
Earthquake	1	18	18
Epidemic	2	12	24
Extreme Temperature	3	12	36
Flood	3	8	24
Hazmat	3	9	27
Severe Storm	3	18	54
Severe Winter Storm	3	18	54
Terrorism	1	18	18
Transportation Accident	3	6	18
Utility Failure	3	14	42
Wildfire	2	10	20

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

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

Hazard rankings indicated in this HMP have been adjusted from the 2008 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 ranking results, therefore, do not necessarily reflect significant changes in exposure, but application of 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 HMP.



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

Jurisdiction	Hazard Ranking											
	Civil Unrest	Drought	Earthquake	Epidemic	Flood	HazMat	Severe Storm	Severe Winter Storm	Terrorism	Transportation Accident	Utility Failure	Wildfire
Alabama (T)	24	33	32	39	18	42	48	51	14	42	45	36
Alexander (T)	24	33	24	39	27	42	48	51	14	42	45	30
Alexander (V)	24	21	26	39	30	42	48	51	14	42	45	20
Attica (V)	24	27	20	39	18	42	48	51	14	42	45	32
Batavia (C)	24	21	26	39	36	42	48	51	14	42	45	20
Batavia (T)	24	21	20	39	24	42	48	51	14	42	45	20
Bergen (T)	24	27	32	39	18	42	48	51	14	42	45	36
Bergen (V)	24	21	16	39	21	42	48	51	14	42	45	20
Bethany (T)	24	21	16	39	18	42	48	51	14	42	45	20
Byron (T)	24	33	24	39	18	42	48	51	14	42	45	36
Corfu (V)	24	27	32	39	18	42	48	51	14	42	45	30
Darien (T)	24	33	16	39	18	42	48	51	14	42	45	36
Elba (T)	24	21	18	39	30	42	48	51	14	42	45	20
Elba (V)	24	21	16	39	18	42	48	51	14	42	45	20
Le Roy (T)	24	21	16	39	18	42	48	51	14	42	45	20
Le Roy (V)	24	21	16	39	18	42	48	51	14	42	45	28
Oakfield (T)	24	27	16	39	18	42	48	51	14	42	45	30
Oakfield (V)	24	21	16	39	18	42	48	51	14	42	45	20
Pavilion (T)	24	21	24	39	18	42	48	51	14	42	45	20
Pembroke (T)	24	33	32	39	18	42	48	51	14	42	45	36
Stafford (T)	24	21	18	39	18	42	48	51	14	42	45	20
<b>Genesee County</b>	24	21	26	39	21	42	48	51	14	42	45	28



### **5.3.3 Hazards Profiles and Vulnerability Assessment**

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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 GBS; 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 civil unrest hazard and ending with the wildfire hazard.