

SEWRPC Community Assistance Planning Report No. 266 (3rd edition)

RACINE COUNTY HAZARD MITIGATION PLAN UPDATE: 2016-2020

Summary of Hazard and Vulnerability Assessment Tool Results

Methods

The assessment tools were completed at the June 2, 2015, meeting of the Racine County Hazard Mitigation Plan Local Planning Team, with 40 surveys being returned and analyzed. For each of 45 hazards in each survey, a risk was computed using the formula:

$$\text{Risk(in \%)} = [(\text{Probability}/3) \times (\text{Human impact} + \text{Property impact} + \text{Business impact} + \text{Preparedness})/(4*3)] * 100$$

Where Probability (likelihood that an event would occur), Human impact (possibility of death or injury), Property impact (physical losses and damages), and Business impact (interruption of services) were each assigned a number from 0 to 3, with 0 indicating “not applicable”, 1 indicating low, 2 indicating moderate, and 3 indicating high. For Preparedness (preplanning), the scale is reversed. A number was assigned from 0 to 3, with 0 indicating “not applicable”, 1 indicating high, 2 indicating moderate, and 3 indicating low preparedness or none.

The interpretation of the result returned by this formula is that the perceived threat increases with increasing percentage risk.

For each hazard, an average risk was calculated using the results of all the returned surveys. The hazards were then ranked by average risk, with a rank of 1 indicating the highest perceived risk. For each hazard, minimum and maximum risks were calculated. The results from the assessment tool were analyzed for 45 hazards.

In order to assess the degree of agreement among Local Planning Team members in the assessment of average risk, the interquartile range was calculated for each hazard. This quantity indicates the range of the half of the responses that are in middle. A smaller interquartile range indicates greater agreement among Local Planning Team members as to the level of risk, while a larger interquartile range indicates less agreement. In those instances where two or more hazards had the same average risk, the higher perceived risk (lower rank number) was assigned to the hazard with the smaller interquartile range.

Results

The results from the assessment tool are summarized in Table IV-2. The average level of risk for hazards ranged from 9.4 percent for the lowest ranked hazard (dust storms) to 54.0 percent for the highest ranked hazard (heavy snow storms), with a mean value of 32.6 percent. Interquartile values ranged between 8.3 and 41.7, with a mean value of 25.1.

Eight of the 10 highest average perceived risks belonged to natural hazards related to meteorological causes, mostly associated with either winter weather or severe storms (Table IV-2). The two hazards with average perceived risks in the top 10 that were not weather related were roadway accidents and large structure fires. The interquartile ranges for most of the 10 hazards with the highest average risks tended to be relatively large, with all but two being above the mean range, indicating a diversity of opinion among Local Planning Team members as to the level of risk posed by each of these hazards. For example, the second highest perceived risk was associated with tornadoes, which had an interquartile range of 35. This indicates there was general agreement among Local Planning Team members that the risk was relatively high from tornadoes, but disagreement as to just how high. The hazard in the top ten perceived risk with the highest degree of agreement among the Local Planning Team (the lowest interquartile range) was lightning.

A grouping of three hazards related to hazardous materials incidents fell just outside of the top ten. A mixture of weather related hazards, transportation related hazards, and utility related hazards round out the top half of perceived risks.

The 10 lowest average perceived risks belonged to hazards related to a large variety of causes, including hazards related to public health, such as large-scale food contamination; hazards related to meteorological events such as dust storms, drought, lake flooding, wild fires; natural hazards related to geological events, such as earthquake, land subsidence, and landslides; hazards related to infrastructure, such as dam failures; and hazards related to human behavior, such as correctional center incidents. The interquartile ranges for the 10 lowest average perceived risks were relatively low, especially compared to those of the 10 hazards with the highest average perceived risks. This indicates a stronger agreement among Local Planning Team members as to the low level of risk posed by these bottom ten hazards.

Table IV-2

PERCEIVED RISKS OF HAZARDS AS DETERMINED BY HAZARD AND VULNERABILITY ASSESSMENT TOOL: 2015

Event	Minimum (percent) ^a	Maximum (percent) ^a	Average (percent) ^a	Rank	Interquartile Range (percent) ^b
Heavy Snow Storm	13.9	91.7	54.0	1	29
Tornado	13.9	100.0	52.2	2	35
Blizzard	8.3	83.3	50.1	3	28
Extreme Cold	13.9	91.7	47.6	4	28
Thunderstorm	11.1	91.7	46.7	5	25
Ice Storm	8.3	83.3	46.3	6	28
Roadway Transportation Accidents	0.0	91.7	45.6	7	39
Lightning	5.6	100.00	43.8	8	17
Riverine Flooding	11.1	83.3	43.8	9	36
Large Structure Fire	0.0	100.0	42.5	10	35
Stormwater Flooding	0.0	91.7	42.4	11	26
High Straight-Line Wind	0.0	91.7	41.5	12	26
Hazardous Materials Roadway Incident	0.0	91.7	41.3	13	30
Hazardous Materials Railroad Incident	0.0	100.0	40.6	14	35
Hazardous Materials Fixed Facilities	0.0	91.7	39.2	15	41
Hail	11.1	83.3	39.2	16	29
Railway Transportation Accidents	0.0	100.0	38.4	17	42
Electrical System Outage	0.0	75.0	38.1	18	27
Fog	0.0	91.7	35.6	19	31
Computer System Incident/Cyber Attack	0.0	75.0	34.0	20	25
Mass Casualty Incident	0.0	91.7	33.5	21	31
Extreme Heat	8.3	91.7	33.1	22	21
Explosion	0.0	91.7	32.7	23	24
Civil Unrest	0.0	91.7	30.6	24	31
Workplace Violence	8.3	83.3	30.1	25	26
Building Collapse or Cave-In	0.0	75.0	30.0	26	13
Terrorism Incident	0.0	91.7	28.9	27	16
Loss of Telecommunication	0.0	66.7	28.4	28	24
School Violence	0.0	66.7	27.7	29	31
Aviation Accidents	0.0	75.0	27.2	30	15
Communicable Disease Outbreak or Epidemic	0.0	91.7	26.1	31	15
Lake Michigan Coastal Erosion	0.0	66.7	25.7	32	42
Hazardous Materials Pipeline Incident	0.0	75.0	24.3	33	22
Contamination or Loss of Water Supply	0.0	61.1	23.5	34	8
Loss of Sewerage System	0.0	61.1	23.4	35	10
Large-scale Food Contamination	0.0	75.0	22.6	36	13
Drought	0.0	66.7	22.6	37	18
Dam Failure	0.0	61.1	22.6	38	19
Lake Flooding	0.0	75.0	22.1	39	24

Event	Minimum (percent) ^a	Maximum (percent) ^a	Average (percent) ^a	Rank	Interquartile Range (percent) ^b
Wildfire	0.0	66.7	20.9	40	16
Earthquake	0.0	33.3	18.8	41	18
Correctional Center Incident	0.0	58.3	17.1	42	26
Land Subsidence	0.0	44.4	13.0	43	19
Landslide	0.0	30.6	10.7	44	19
Dust Storm	0.0	22.2	9.4	45	17

NOTE: Two events that do not appear in Table IV-2 were written in on one survey. Electromagnetic pulse and climate change had a perceived risk of 61.1 and 50 percent, respectively.

Events in **bold** are hazards that were profiled in the first update to the Racine County Hazard Mitigation Plan.

^aPerceived threat increases with percentage.

^bInterquartile range acts as a measure of agreement upon the perceived level of threat with a smaller interquartile range indicating stronger agreement and a larger interquartile range indicating weaker agreement.

Source: SEWRPC.