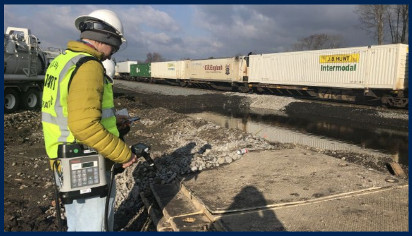
Emergency Service Access Along Class I Rail Corridors

MID-AMERICA FREIGHT COALITION



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About the Mid-America Freight Coalition (MAFC)

The industries and farms of the Mid-America region can compete in the marketplace only if their products can move reliably, safely and at reasonable cost to market.

State Departments of Transportation play an important role in providing the infrastructure that facilitates movement of the growing amount of freight. The Mid-America Freight Coalition was created to support the 10 states of the Mid America Association of State Transportation Officials (MAASTO) region in their freight planning, freight research needs and in support of multi-state collaboration across the region.

www.midamericafreight.org

Photo credits
Top: Ernest Perry, MAFC – Tankers at Wisconsin Port
Bottom (middle): CBS News, Big Lake, MN – 15 cars derailed
(right): EPA.gov – Air monitoring during evacuation in East Palestine, OH

TECHNICAL REPORT DOCUMENTATION

1. Report No. MAFC 34	2. Government Accession No.	3. Recipient's Catalog No. CFDA 20.701
4. Title and Subtitle Emergency Service Access Along Class I Rail Corridors.		5. Report Date December 2025 6. Performing Organization Code
7. Author/s Anupam Srivastava, Wissam Kontar, Peng Zhang, Ernest Perry, and Soyoung Ahn		8. Performing Organization Report No. MAFC 34
9. Performing Organization Name and Address Mid-America Freight Coalition University of Wisconsin–Madison 1415 Engineering Drive, 2205 EH Madison, WI 53706		10. Work Unit No. (TRAIS) 11. Contract or Grant No. TPF-5(509) PO# 395-0097-24-95
12. Sponsoring Organization Name and Address Wisconsin Department of Transportation Division of Transportation Investment Management PO Box 7913 Madison, WI 53707		13. Type of Report and Period Covered Final Report 04/01/2024 – 09/30/2025 14. Sponsoring Agency Code TPF-5(509) PO# 395-0097-24-95
15. Supplementary Notes		
This project provides a case study for three Class I Rail corridors in the region, with a focus on rural portions of these corridors and the emergency services available within a reasonable service area in rural communities. Study communities were picked along the major corridors to represent rural towns and cities from 9 MAASTO member states. Class I Rail incidents from the past 25 years are analyzed and mapped along with emergency responders in the region. Drive times are computed from responder stations to incident locations to assess vulnerability of rural areas and communities within the MAASTO region that contain freight rail corridors.		
17. Key Words Class I Railroads, Rail accidents / incidents, Emergency responders, HAZMAT incidents, Rural communities.	18. Distribution Statement No restrictions. This report is available to the public through the National Transportation Library Digital Repository.	

19. Security Classification (of this report)	20. Security Classification (of this page)	21. No. of Pages	22. Price
Unclassified	Unclassified	78	-0-

Form DOT F 1700.7 (8-72) Reproduction of form and completed page is authorized.

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1. INTRODUCTION

Rail borne freight contributes over 167,000 jobs to the economy directly and supports nearly 750,000 jobs indirectly through supply chains and consumer spending across the nation [1]. In terms of market share across modes, freight rail accounts for approximately 40% of the long-distance (≥ 250 miles) ton-miles, exceeding any other mode of transportation [1]. Additionally, rail carries roughly 27% of all freight volume moved by ton-mile, and an additional 19% by truck and rail combination [2].

Across the U.S., rail is an $80 billion industry that covers more than 140,000 route miles [3]. Freight rail is a significant component of freight movement in all 10 MAASTO states. In particular, three of the largest rail hubs in the nation, Chicago, Kansas City, and St. Louis, are all located within the MAASTO region. Rail is critical for agriculture, retail, natural resources, and manufacturing dependent economies across the region.

According to the Federal Railroad Administration (FRA), "the U.S. freight rail network is widely considered the largest, safest, and most cost-efficient freight system in the world [3]." While the system is statistically safer than other modes by comparison, incidents involving derailments, train-train and rail-roadway incidents still occur. According to USAFACTS [4], over the past decade, there have been on average 1,300 train derailments per year, accounting for 61% of all rail-related incidents. The FRA reported a total of 793 Class I railroad train derailments in 2024, with most of them (74%) occurring in rail yards [5]. The remaining 26% of derailments (209 in total) occurred on mainline tracks with four of these resulting in non-fatal injuries, six resulting in the release of hazardous materials (HAZMAT), and the remaining 199 not resulting in any injuries, fatalities or HAZMAT releases. Looking specifically at the MAASTO region, from 1975 to 2022, six of the 10 states ranked highest nationally in number of derailments are in the MAASTO region (Illinois, Iowa, Indiana, Minnesota, Missouri, Ohio).

The freight rail industry, like other transportation modes, focuses on safety. According to the Association of American Railroads, the train accident rate is down 33% since 2005, and down 43% since 2005 for Class I mainline accidents [6]. However, even with an industry-wide safety focus, the industry was shocked by the derailment in East Palestine, Ohio in February of 2023.

With persistent freight rail incidents resulting in fatalities as well as harm to the community and natural landscape, it is critical to identify the gaps in the MAFC region's emergency preparedness systems along Class I Rail corridors. Firefighting, chemical cleanup, and emergency services are allocated unequally along Class I Rail corridors/facilities. Rural areas have especially few rail emergency resources, while numerous communities along these rail corridors/facilities may not even have local emergency services, relying mainly on volunteer first-responders with limited hazmat response training. The issue is further complicated by distances to services in rural areas, communication barriers, and even policies regarding information sharing with shipments and cargos relevant to national security or perceived as sensitive by the carrier.

Scope of Work

This project provides a case study for three Class I Rail corridors in the region, with a focus on rural portions of these corridors and the emergency services available within a reasonable service area in rural communities. Study communities were picked along the major corridors to represent rural towns and cities from nine MAASTO member states. This project provides a look at the vulnerability of rural areas and communities within the MAASTO region that contain freight rail corridors.

The keys tasks performed through the study were:

- Analysis of historic Class I Rail incidents within the MAASTO region (2000 to 2023, 2011 to 2023 for mapping).
- Review, analysis and mapping of key emergency responders in the region.
- Selection of Class I Rail corridors and rural communities within MAASTO with the help of MAFC technical representatives for study.
- Analysis of rural communities for vulnerability to rail incidents through review of historic incidents, presence of emergency responders in the vicinity, and response times from responder locations to incidents through a measure of drive times.
- GIS mapping of incidents and responders for the region with a focus on mapping of selected rural communities.

Organization of the Report

The report is organized as follows:

- Chapter 2 presents an overview of the U.S. freight railroad network with a focus on Class I rails.
- Chapter 3 provides an overview of Class I rail incidents in the region, including description of the data sources, and summary analysis of historic incidents by carrier, state and type.
- Chapter 4 provides an overview of emergency responders.
- Chapter 5 presents the rail corridor selection process.
- Chapter 6 provides the studied community analyses including historic incidents, responders and response times.
- Chapter 7 provides a summary discussion and concluding remarks.

2. BACKGROUND – CLASS I RAILROADS

Freight Railroad Industry

The United States has the largest freight rail network in the world, with almost 140,000 route miles of rail network length [3]. The freight rail industry is a $80 billion industry that provides more than 167,000 jobs directly and supports over 750,000 jobs indirectly across the country. The U.S. rail industry is operated through six Class I railroads, 22 regional railroads, and 593 local/short line railroads. The rail network accounts for nearly 27 percent of freight movement by ton-miles, and up to 40% of long-distance[1] ton-miles of freight moved in the country [3].

Figure 1 shows a map of freight rail movement by tons across the country. On average, freight railroad hauls nearly 1.5 billion tons of raw materials and finished goods across the country. The average freight haul per train in 2023 was 3,948 tons, up from 2,923 tons in 2000 [1].

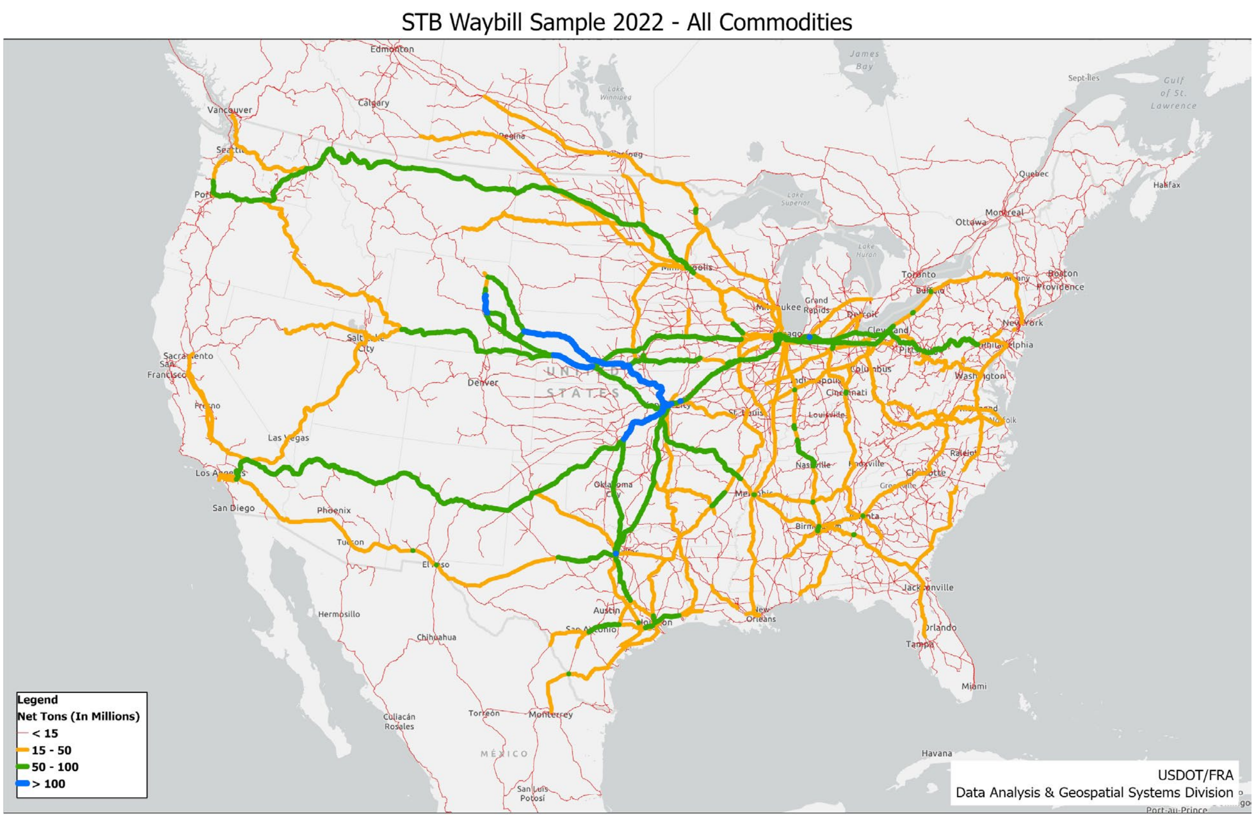

Figure 1: Rail freight movement by tonnage across the U.S. (Source: FRA [3]).

[1] Over 1,000 miles

Between 1980 and 2024, U.S. freight railroads have invested nearly $840 billion ($1.4 trillion in adjusted 2024 dollars) in capital expenditures on maintenance and upkeep of tracks, bridges, locomotives and freight cars, and other infrastructure and equipment. The freight rail sector generated over $200 billion in total economic output in 2023.

Depending on the goods being moved, freight moves on a variety of cars, including flatbed cars (for moving large machines and equipment), covered and open hoppers (for bulk loads such as grains, coal, and sand), tankers (for liquid and gaseous goods), refrigerated cars (for perishables), and well cars designed to accommodate intermodal containers. Modern freight trains average roughly 73 cars while top train length is 200 cars and growing, whereas the average freight train length in 1929 was 48 cars. [3]

Class I Railroads

Railroads are designated as Class I, Class II, or Class III based on revenue benchmarks established by the Surface Transportation Board. The 2019 benchmark set the threshold for Class I designation at $900 million, and for Class II designation at $40.4 million (49 C.F.R. Part 1201) [7]. This threshold is updated by the STB on a regular basis to account for inflation. The current threshold for Class I designation is $1,074,600,816 (effective as of 2024). [8]

In 1900, there were more than 100 Class I Railroads. However, through mergers, acquisitions, and bankruptcies, today there are only six Class I freight railroads and one Passenger railroad (Amtrak). The current Class I freight railroads are:

- BNSF Railway (BNSF)
- Canadian National Railway (CN)
- Canadian Pacific Kansas City (CPKC)
- CSX Transportation (CSX)
- Norfolk Southern Railway (NS)
- Union Pacific Railroad (UP)

These six railroads operate the vast majority of the country's freight rail traffic and goods movement, accounting for nearly 70% of total track miles in the country. One result of the mergers and acquisitions has been the emergence of regional duopolies in the U.S. CSX and NS dominate Class I freight rail coverage in the eastern part of the U.S., BNSF and UP dominate coverage in the western part, and CPKC and CN, two Canada-based railroads, dominate coverage along north-south corridors through the middle of the country, as well as east-west coverage in the northern states and with connections into Canada.

A synopsis of this distribution of networks is seen in the MAASTO region as well, with BNSF and UP having large networks in the western part of the region (Kansas, Minnesota, Iowa, and Missouri), CSX and NS operating largely in the eastern parts (Michigan, Indiana, Kentucky, and Ohio), and CPKC and CN having presence in most of the region. All railroads have a significant presence in Illinois due to Chicago being the nation's busiest rail hub.

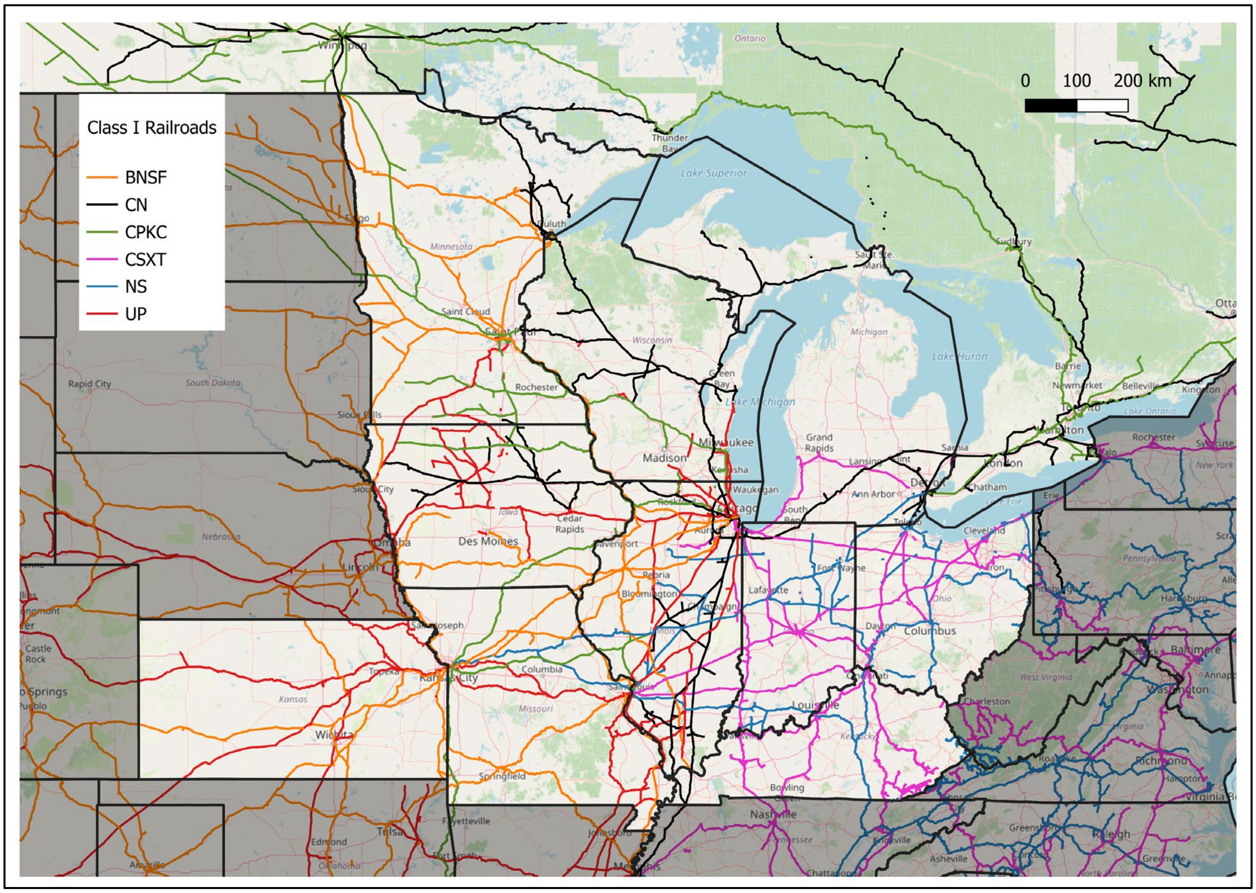

Figure 2: Class I Freight Railroads in the MAASTO region (Source: FRA [9]).

3. HISTORIC INCIDENTS AND CRASH REPORTS

Incident Reporting

FRA requires railroads operating with the U.S. to submit monthly report for all railroad accidents and incidents under three groupings (as defined in 49 CFR section 225.19):

- Highway-rail grade crossing accidents/incidents

  Each highway-rail grade crossing accident/incident is required to be reported to FRA through FRA Form 6180.57 regardless of the extent of damage or whether casualties occurred.

- Rail equipment accidents/incidents

  Each rail accident/incident that results in damage to railroad on-track equipment, signals, tracks, structures, or roadbed higher than a current reporting threshold is required to be reported to FRA through FRA Form 6180.54.

- Death, injury and occupational illness accidents/incidents

  Each death, injury, or occupational illness caused as a result of a railroad accident/incident is required to be reported to the FRA through FRA Form 6180.55a.

Form 54

FRA requires railroads operating within the U.S. to report all rail equipment accidents/incidents, including collisions, derailments, fires, explosions, and other events that involve operation of railroad on-track equipment (standing or moving), and that cause reportable damages greater than a reporting threshold through the form entitled FRA 6180.54 – Rail Equipment Accident/Incident, which is colloquially referred to as Form 54. FRA's dataset on Form 54 reported incidents forms the basis for rail incidents analyzed in this study due to its coverage of incidents that lead to either significant damages, or to injuries, thus requiring action from emergency responders. Readers could refer to the FRA's datasets on all highway-rail incidents and all incidents leading to injuries and illnesses if they wish to consider incidents that are not captured in this analysis.

A detailed guide for preparing and filing Form 54 accident reports can be found on FRA's website [10]. A sample filed Form 54 incident report can be found in Appendix A at the end of this report.

Incidents in the MAASTO region

While the FRA reporting dates back from 1975, the analyses presented in this report consider only incidents reported from 2011 to 2023. FRA made geolocation (latitude and longitude) mandatory for reporting incidents in 2011 and thus, all incident reports following 2011 carry accurate location information while those prior to 2011 do not (with the exception of 7 incidents) carry enough location information for accurate mapping.

There have been 7,912 Class I freight railroad incident reports in the MAASTO region since 2011. Figure 3 shows these incidents mapped within the MAASTO region, color-coded by parent Class I Railroad. Note that incidents reported by Kansas City Southern (KCS) and Canadian Pacific (CP) prior to their merger into CPKC in 2023 are included in the analysis and results are presented under the current CPKC banner. For the 7,912 incidents analyzed, there are very few instances of non-completion of fields in the reporting with only 6 instances where a track type was not reported, and no instances of dates, accident type, geolocation, visibility, track name, division, subdivision etc being not reported.

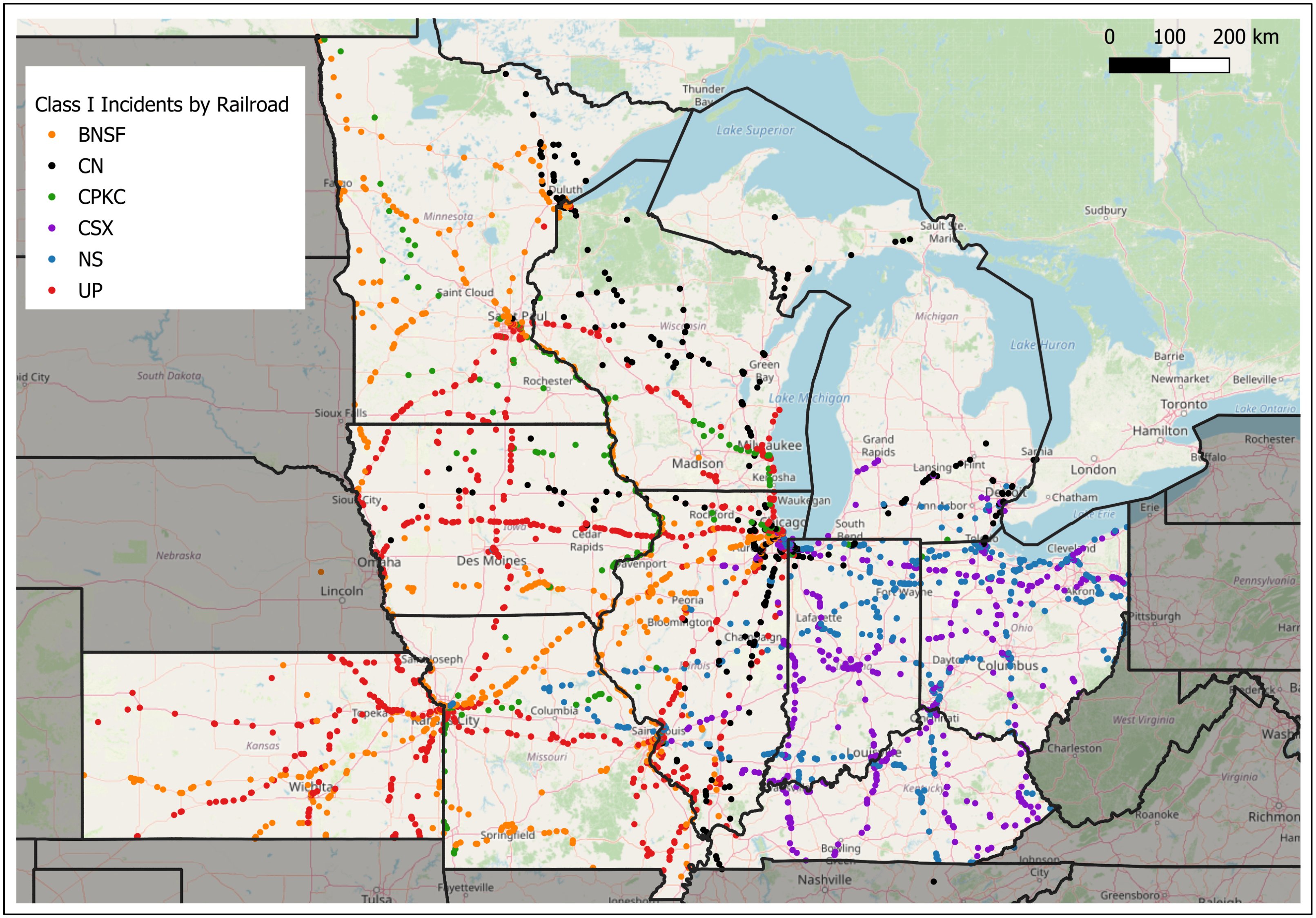

Figure 3: Class I Rail incidents within MAASTO region by railroad, 2011-2023. (Source: MAFC using FRA Train Accident data [11]).

Analysis of Incidents

This section presents an overview analysis of Class I Rail incidents studied at the regional level and classified by railroad and by state. It further explores the distribution of incidents by the type of track they occur on and the type of accident reported, and assesses trends of overall damages, injuries, and fatalities caused by the incidents.

Table 1 separates reported incidents by state and by parent Class I Railroad. Due to the operating territories of these railroads, Norfolk Southern and CSX are the primary Class I railroads in most of the states in the eastern part of the region (Michigan, Indiana, Ohio, and Kentucky), and almost all reported incidents in these states are through these two railroads. Canadian National also has operations between Chicago and Ontario across Indiana and Michigan, and between Chicago and Memphis through western Kentucky. Similarly, BNSF and Union Pacific account for the vast majority of railroad presence and of reported incidents in Kansas and Missouri (with Missouri also containing CPKC and some NS traffic). This separation also follows for Iowa and Minnesota. Wisconsin has the presence of four of the six railroads with only CSX and NS not having any presence in the state. As home state for the continent's rail hub at Chicago, Illinois has major corridors operated by each of the six Class I Railroads. This concentration of railroads, Chicago's importance as a hub for rail movement across the country, and the large number of freight movements routing to/from/or through Chicago, all contribute to the large volume of incidents reported in the state by each of the six railroads, and to the fact that there were nearly twice as many incidents reported in Illinois as any other MAASTO state.

State	BNSF	CN	CPKC	CSX	NS	UP	Total
IA	119	39	67	0	2	416	643
IL	464	233	82	153	273	865	2070
IN	0	137	2	431	418	0	988
KS	376	0	4	0	0	457	837
KY	0	7	0	239	123	1	370
MI	0	67	3	54	40	0	164
MN	357	56	67	0	0	173	653
MO	330	0	89	0	70	302	791
OH	0	8	2	533	504	0	1047
WI	74	113	30	0	0	132	349
Total	**1720**	**660**	**346**	**1410**	**1430**	**2346**	**7912**

Table 1: Class I Rail incidents in MAASTO region by parent railroad and state, 2011-2023 (Source: FRA Train Accident data [11]).

Incidents by Track Type

Form 54 reporting requires for the track type to be filled in for each reported incident as one of four options [10]:

- **<u>Main</u>**: Mainline tracks are the main length of tracks between stations and form the backbone of railroad systems.
- **<u>Yard</u>**: Yard tracks are tracks found in rail yards and stations. Yard tracks are typically used for sorting, parking, assembly, or for maintenance, upkeep and cleaning of trains.
- **<u>Siding</u>**: Sidings are found in rail yards and stations as side-tracks used by trains wanting to pull out from the mainline track or are located at points along mainline tracks to allow another train to pass.
- **<u>Industry</u>**: Industry tracks are portions of tracks used to provide access to factories, ports and mines to load and unload goods.

Incidents on mainline tracks are of special importance to the study as they are more likely to happen away from railway yards and stations and pose a more likely risk to residential populations in rural areas. Operating speeds on mainline tracks are usually high, so when incidents occur they are likely to cause greater volumes and degrees of damage. These incidents are also likely to be further away from the presence of the railroad's own facilities, equipment and personnel equipped for emergency response to incidents, thus requiring higher and more immediate participation from public emergency responders.

Railroad	Mainline	Siding	Yard	Industry	Total
BNSF	456	28	1095	141	**1720**
CN	204	14	390	52	**660**
CPKC	134	11	170	25	**346**
CSX	308	17	982	103	**1410**
NS	313	27	995	95	**1430**
UP	626	31	1519	170	**2346**
Total	**456**	**28**	**1095**	**141**	**1720**

Note: The total number of incidents reported for CPKC includes 6 incidents where a track type was not reported properly (labeled other).

Table 2: Class I Rail incidents in MAASTO region by track type and parent railroad, 2011-2023 (Source: FRA Train Accident data [11])

Table 2 shows Class I Rail incidents in the MAASTO region by track type that the incident occurred on and by parent railroad and Figure 4 shows incidents by track type in percentage values. **Of the over roughly 7,600 incidents reported, a majority (65%) happened on tracks within a rail yard, with roughly 26% of incidents on mainline tracks** and the remaining 9% on either industry tracks or sidings, with only a handful cases where track type was not reported. This was compared to and found to be consistent with incidents spanning a longer period of time between 2000 and 2023 as well.

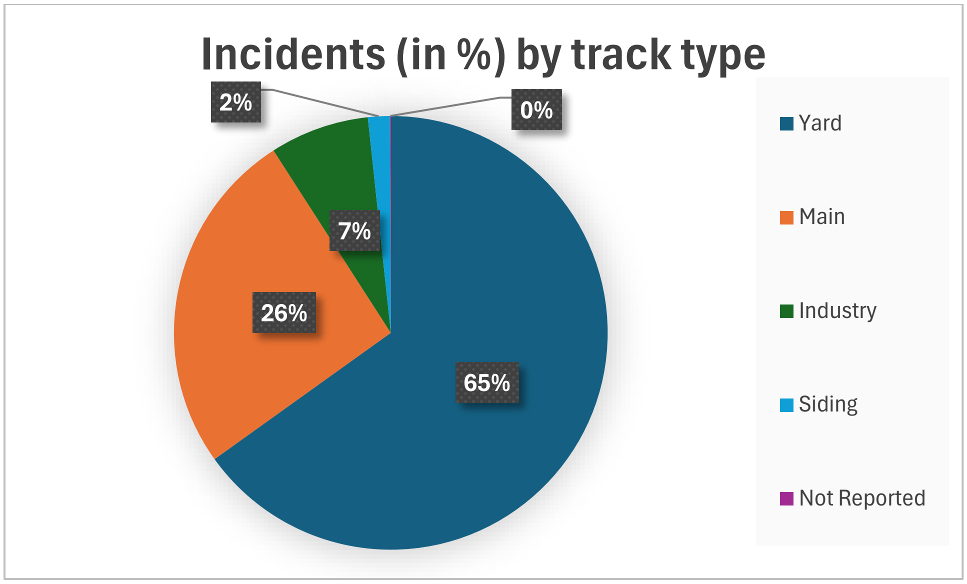

Figure 4: Class I Rail incidents in MAASTO region by track type, 2011 - 2023 (Source: MAFC using FRA Train Accident data [11]).

Accident Type

There are 13 options on Form 54 to select which accident type applies to the incident. The 13 accident types are:

- Derailment
- Head on collision
- Rear end collision
- Side collision
- Raking collision
- Broken train collision
- Highway-rail crossing
- Railroad grade crossing
- Obstruction
- Explosion-detonation
- Fire/violent rupture
- Other impacts
- Other

Figure 5 and Figure 6 show the breakdown of incidents by accident type for all studied incidents and for all incidents reported on mainline tracks respectively. Nearly half of all mainline incidents are reported as derailments (compared to an even larger share of 58% across all track types); 25% of incidents are reported as highway-rail crossing accidents; and 4% are rear end collisions between trains. Another 4% of incidents are classified as other forms of collisions. 6% of all incidents are marked as “Other” and don’t fall under the 12 specifically listed accident types on the incident reporting form. Railroads report the exact nature of the accident through a descriptive section of the form for such incidents. Accident types reporting fewer than 3% of all incidents together make up the remaining 13% of incidents. These distributions for incidents by accident type for all tracks and for mainline tracks were also compared to and found to be consistent with incidents spanning a longer period of time between 2000 and 2023.

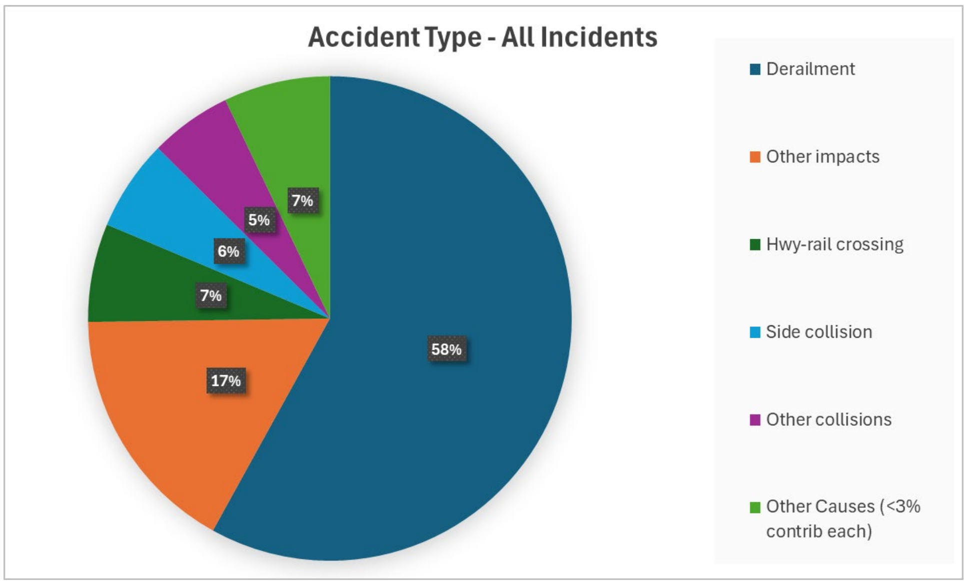

Figure 5: Class I Rail incident distribution by accident type for all incidents, 2011-2023 (Source: MAFC using FRA Train Accident data [11]).

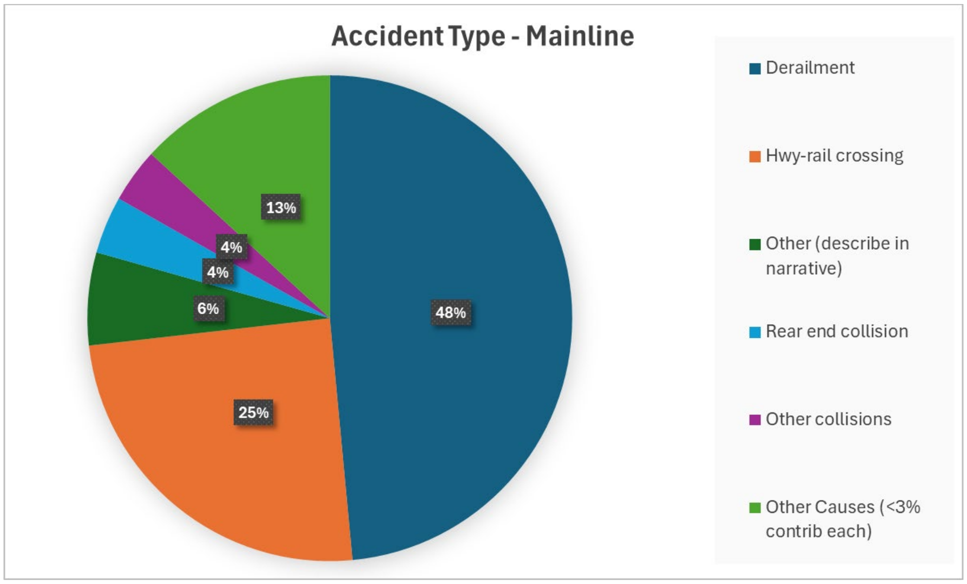

Figure 6: Class I Rail incident distribution by accident type for mainline incidents, 2011-2023 (Source: MAFC using FRA Train Accident data [11]).

Incident Damages Analysis

The FRA incident reporting system also requires railroads to report damages to railroad equipment and track in dollars, for each incident, separated as equipment damage and track damage. Note that the damage reported is only the assessed damage to locomotive, caboose, track, and rail equipment and does not include any damages borne by non-railroad entities or the public. In addition to reporting damages, number of derailed cars (if any), and any injuries or fatalities caused by the incident are also required to be reported. Table 3 shows a synopsis of damages, injuries and fatalities due to all Class I Rail incidents in the MAASTO region for the study period. In total, there have been over 7,900 incidents reported, with cumulative damage costs reported since 2011 of over $1.2 billion. These records also report 105 fatalities as a result of a Class I Rail incident, and more than 850 injuries.

Figure 7 through Figure 9 further classifies the damages, injuries and fatalities by year. The costs of reported damage have not been adjusted for inflation and are the precise numbers reported through Form 54. The costs of damage have changed little over the years; however, the injury and fatality numbers have seen a downward trend, with exceptions in 2022 and 2023.

State	No. of Incidents	Total Damages	Avg Damage Per Incident	Total no. of Cars Derailed	Total no. of Injuries	Total no. of Fatalities
IA	643	$ 145,930,610	$ 226,953	2774	58	10
IL	2070	$ 217,265,636	$ 104,959	5226	143	31
IN	988	$ 107,192,293	$ 108,494	2083	92	14
KS	837	$ 171,497,743	$ 204,896	2887	108	9
KY	370	$ 58,940,787	$ 159,299	1056	59	5
MI	164	$ 16,127,152	$ 98,336	494	45	1
MN	653	$ 122,137,788	$ 187,041	2214	56	9
MO	791	$ 204,305,997	$ 258,288	2810	177	14
OH	1047	$ 128,404,225	$ 122,640	2876	70	6
WI	349	$ 56,666,496	$ 162,368	911	51	6
Total	**7912**	**$ 1,228,468,727**	**$ 155,267**	**23331**	**859**	**105**

Table 3: Class I Rail incident damages, derailments, and injuries by MAASTO state, 2011-2023 (Source: FRA Train Accident data [11]).

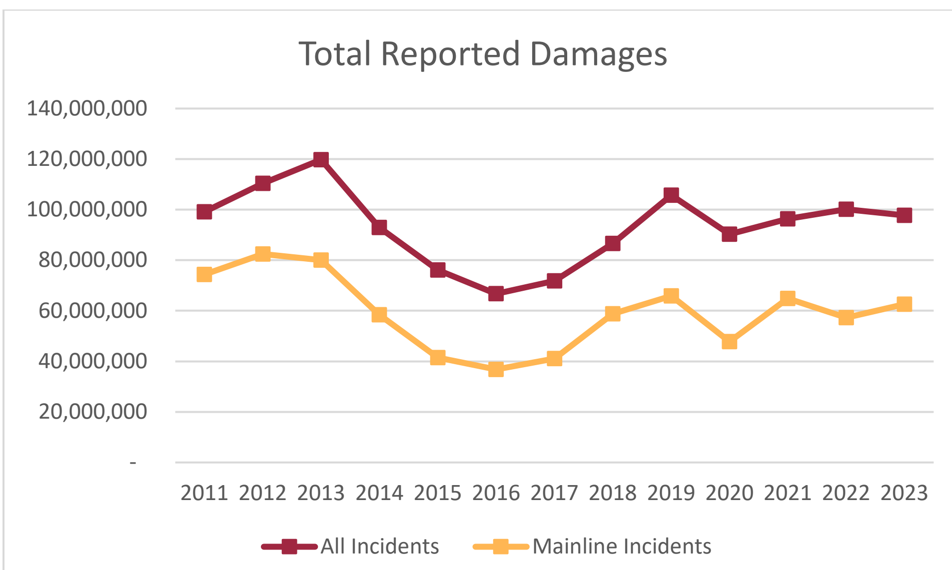

Figure 7: Total reported damages from Class I Rail incidents within the MAASTO region, 2011-2023 (Source: MAFC using FRA Train Accident data [11]) .

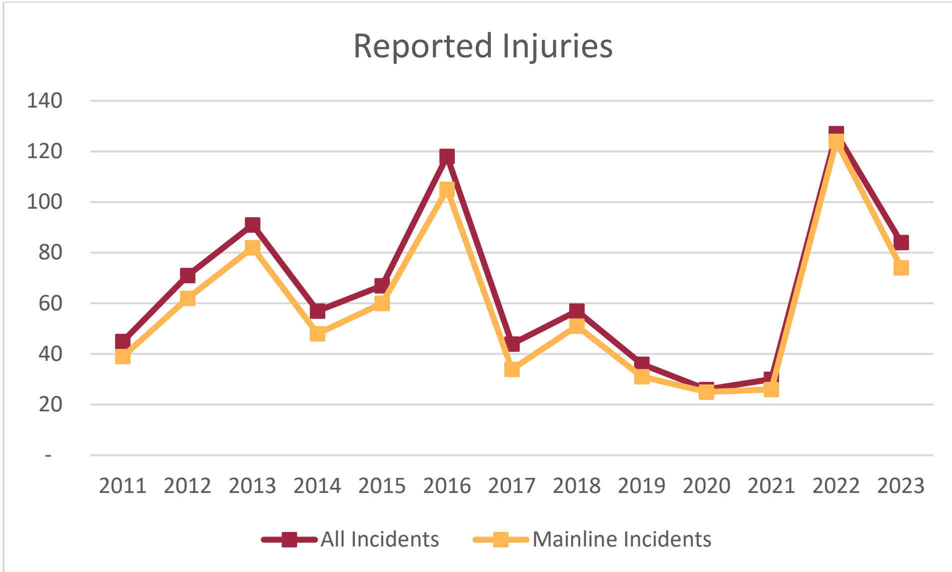

Figure 8: Total reported injuries by year from Class I Rail incidents within the MAASTO region, 2011-2023 (Source: MAFC using FRA Train Accident data [11]).

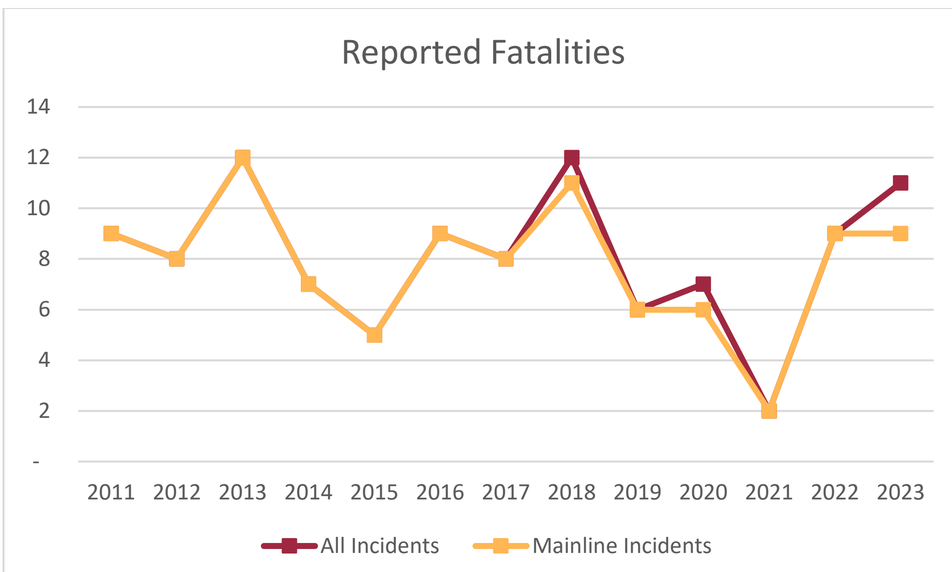

Figure 9: Total reported fatalities by year from Class I Rail incidents within the MAASTO region, 2011-2023 (Source: MAFC using FRA Train Accident data [11]).

HAZMAT Incidents

Railroads must report the number of cars on the train carrying HAZMAT, the number of cars carrying HAZMAT that were damaged or derailed, the number of cars carrying HAZMAT that released any amount of hazardous material (including fumes), and the number of people that were evacuated from the area due to the incident. In situations where an incident led to release of hazardous materials, the railroad is typically required to describe what material was released and an estimate on the amount of material released.

HAZMAT incidents pose a uniquely important threat to communities both in terms of direct exposure of the community to the material released, as well as any potential long-term impact on the surrounding environment (soil, water sources etc.). This section provides an overview of HAZMAT related incidents in the MAASTO region for the study period. Chapter 6 takes a more focused look at HAZMAT incidents near the communities studied. Recommendations provided towards the end of this report also draw on the findings related to HAZMAT incidents both at the regional and studied community levels.

Out of the 7,912 reported incidents studied, 62 incidents resulted in reported release of hazardous materials through damages to a total of 182 cars carrying HAZMAT. There were six such incidents in 2023. All but 10 of the 62 incidents were derailment related incidents, 1 was due to a rail-highway crossing incident with a semi colliding with the train, and the remaining being a combination of collisions. There was an incident caused evacuation performed for 35 of the studied rail incidents, leading to a total of 10,182 people being evacuated as a result of Class I Rail incidents in the region. The trends for incidents by year that led to HAZMAT releases and that led to evacuations are shown in Figure 10 and Figure 11.

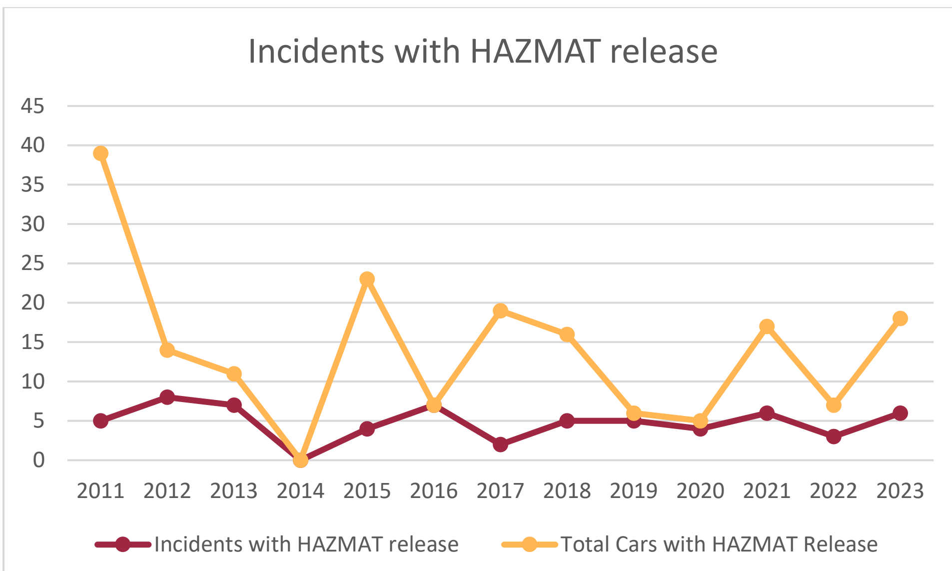

Figure 10: Trend of Class I Rail incidents that resulted in HAZMAT release within the MAASTO region, 2011-2023 (Source: MAFC using FRA Train Accident data [11]).

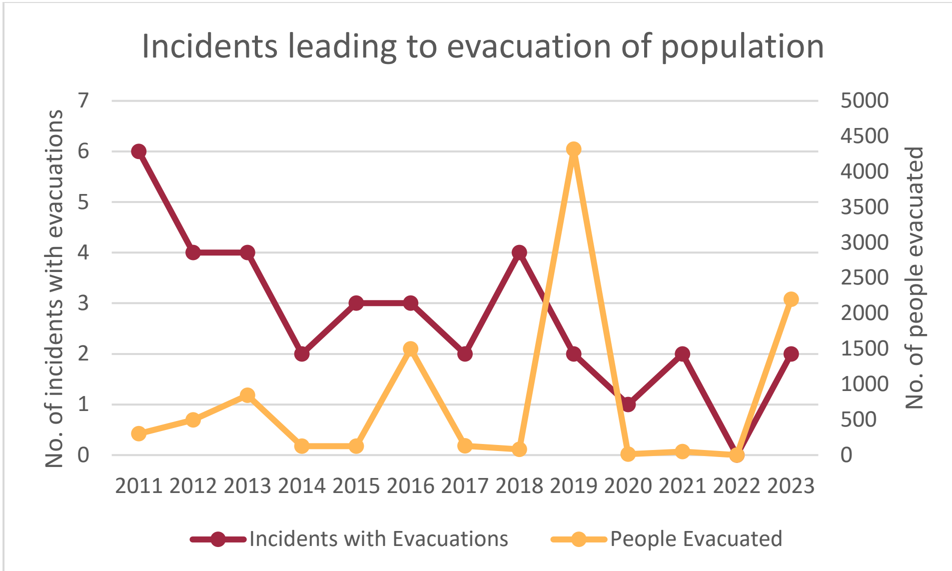

Figure 11: Trend of Class I Rail incidents that resulted in evacuation of population from the area within the MAASTO region, 2011-2023 (Source: MAFC using FRA Train Accident data [11]).

Incidents Leading to Injuries, Fatalities, or HAZMAT Releases - Factors

This section focuses on incidents that led to either injuries, fatalities, or HAZMAT releases and explores factors that may be associated with such incidents. Out of the 7,912 incidents analyzed, 88 led to at least one fatality, 409 incidents resulted in at least one injury, and 62 led to HAZMAT releases. See Appendix B for mappings of incidents leading to death, injuries, and HAZMAT releases.

A large majority of incidents leading to death or injury occur at highway-rail crossings, and are associated with a highway user being inattentive, or deliberately disregarding crossing warning devices. Nearly all incidents leading to fatalities (82 out of 88 such incidents) occurred at a highway-railroad crossing (Table 4). Roughly half of the incidents leading to injuries can also be attributed to highway-railroad crossing incidents (206 out of 409), with another 12% (49 incidents) attributed to derailments, and 11% (43 incidents) due to other impacts. These incidents also typically happen on mainline rail tracks. While weather can be a factor in some instances leading to injuries or death, more than 67% of reported incidents leading to injuries and more than 70% leading to fatalities occurred under clear weather conditions. Further, roughly 60% of such incidents happened with daytime visibility conditions.

Incidents leading to HAZMAT releases in the region were found to have a very strong correlation with derailments as can be expected, with roughly two-thirds happening on mainline tracks and one-third on yard tracks. 52 out of the 62 incidents that led to HAZMAT releases were derailment incidents with the remaining 10 attributed to various collisions (Table 4). The leading causes of such incidents were reported to be either broken or damaged rails (37%), or other types of equipment malfunction or damage (40%) (Table 6). The remaining 23% of incidents were attributed to a combination of weather-related factors (including 4 such incidents due to flooding and 1 due to high winds) and human errors (including 4 due to failure to apply hand brakes, 2 more due to operating at higher than suggested speeds, 1 due to highway user inattentiveness).

	Incidents Leading to:		
Accident Type	**Fatalities**	**Injuries**	**HAZMAT Releases**
Hwy-rail crossing	82	206	1
Derailment	1	49	52
Rear end collision	4	38	2
Obstruction	1	22	0
Side collision	0	31	0
Head on collision	0	7	0
Broken train collision	0	2	1
Other impacts	0	43	5
Fire/violent rupture	0	3	0
RR grade crossing	0	2	0
Other (describe in narrative)	0	6	1
Total	**88**	**409**	**62**

Table 4: Incidents Leading to Fatalities, Injuries, or HAZMAT Releases by Accident Type in MAASTO Region, 2011-2023 (Source: FRA Train Accident data [11]).

Accident Cause	# Incidents Causing Fatalities	# Incidents Causing Injuries
Highway user inattentiveness	38	91
Highway user deliberately disregarded crossing warnings	33	61
Highway user cited for violation of highway-rail grade laws	1	23
Highway user misjudgment under normal weather	8	21
Motor car or other rules - Failure to Comply.	2	30
Signal displaying a stop indication - failure to comply.*	0	16
Failure to comply with restricted speed	0	13
Shoving movement, absence of man on or at leading end of movement	0	10

Table 5: Leading Accident Causes for Class I Incidents Leading to Fatalities and Injuries in the MAASTO region, 2011-2023 (Source: FRA Train Accident data [11]).

Accident Cause	# Incidents Causing HAZMAT Release
Broken Rail - Detail fracture from shelling or head check	5
Other rail and joint bar defects	5
Extreme environmental condition - FLOOD	4
Broken Rail - Transverse/compound fissure	4
Broken Rail - Head and web separation (outside joint bar limits)	3
Journal (roller bearing) failure from overheating	2
Buffing or slack action excessive, train make-up	2
Dynamic brake, too rapid adjustment (H011)	2
Wide gage (due to defective or missing crossties)	2
Failure to apply hand brakes on car(s) (railroad employee)	2
Broken Rail - Base	2

Table 6: Leading Accident Causes for Class I Incidents Leading to HAZMAT Releases in the MAASTO region, 2011-2023 (Source: FRA Train Accident data [11]).

4. EMERGENCY RESPONDERS

Homeland Infrastructure Foundation-Level Data Program

The Homeland Infrastructure Foundation-Level Data (HIFLD) is a program and a dataset platform maintained by the U.S. Department of Homeland Security (DHS) [12] [13]. The HIFLD provides a comprehensive set of high-quality geospatial data and tools for infrastructure assets across the U.S. The dataset includes information on a wide range of infrastructure assets including airports, law enforcement stations, fire stations, schools, hospitals, dams, etc.

HIFLD provides the source for emergency responders data used in this study through three of its modules: HIFLD Fire Department Data, HIFLD Local Law Enforcement Dataset, and HIFLD Hospitals Dataset. As of writing this report, the dataset is available through either HIFLD Open or HIFLD Secure. HIFLD Open is a public data portal allowing open access to various public domain data maintained within the dataset. HIFLD Secure is a restricted-access data portal that allows access to a larger portion of the HIFLD to users within the Homeland Security Enterprise (HSE). The access to HIFLD Secure is limited to DHS mission partners with a DHS Geospatial Information Infrastructure (GII) account and requires an approved Data Use Agreement (DUA).

In October 2025, HIFLD Open will be discontinued and access to HIFLD will no longer be available to the general public after this time. However, there are third party mirror servers available that currently host a variety of the HIFLD datasets outside of DHS.

Fire

The HIFLD Fire Department Data contains point geolocations of fire stations across the U.S. The dataset is intended for emergency response planning, hazard analysis, and reference mapping purposes.

Each entry in the dataset represents a fire station and carries field information for name, address, city, state, zip code, and location (X and Y coordinates in Web-Mercator, EPSG:3857 format). Operational attributes such as staffing information are sometimes also included.

There are nearly 52,000 fire responder entries in the HIFLD Fire Dataset across the U.S., and 12,718 within the MAASTO states.

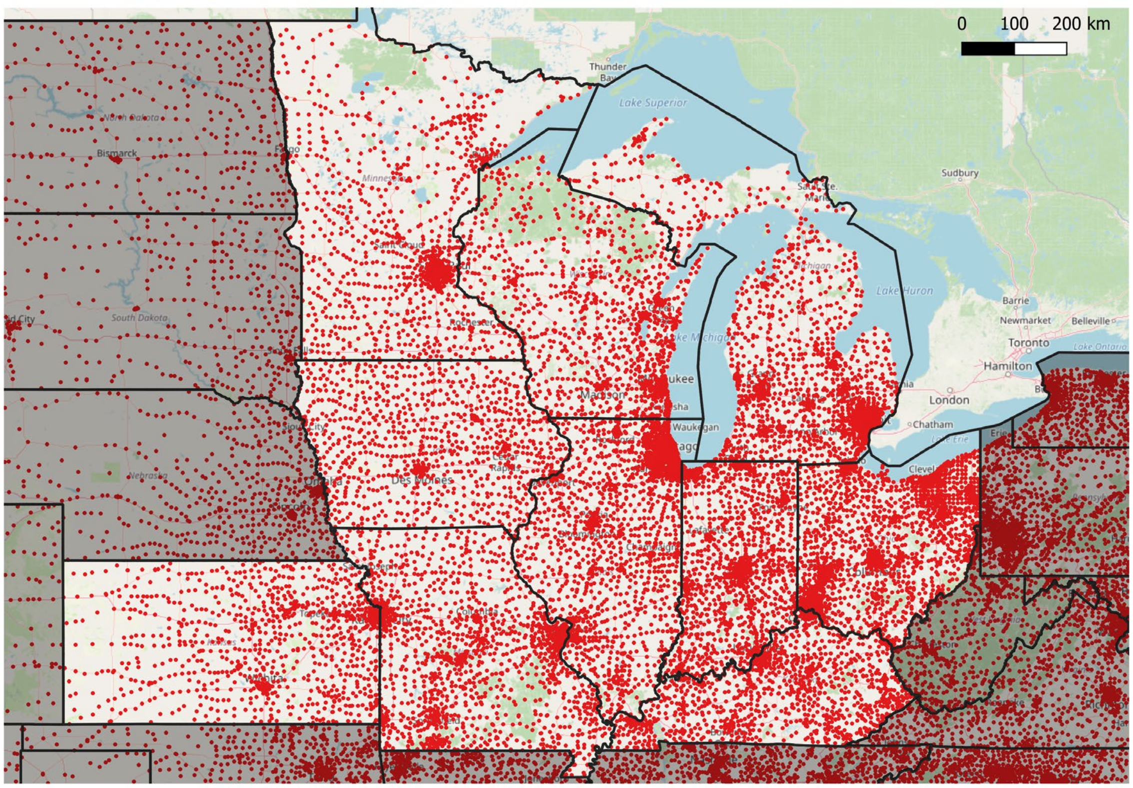

Figure 12: Fire Department / EMT Stations in the MAASTO Region (Source: HIFLD [14]).

Law

The HIFLD Local Law Enforcement Locations Dataset contains point geolocations of local law-enforcement facilities across the U.S. These include city police departments, county sheriff's offices, tribal police offices, and other special jurisdiction agencies. The dataset is intended for emergency response planning and coordination, and public safety analyses purposes.

Each entry in the dataset represents a unique law enforcement location and carries field information for name, address, city, state, zip code, and location (latitude and longitude in WGS-84 coordinates). Operational attributes such as staffing information are sometimes also included.

There are nearly 23,500 law responder entries in the HIFLD Law Dataset across the U.S., and 6,820 within the MAASTO states.

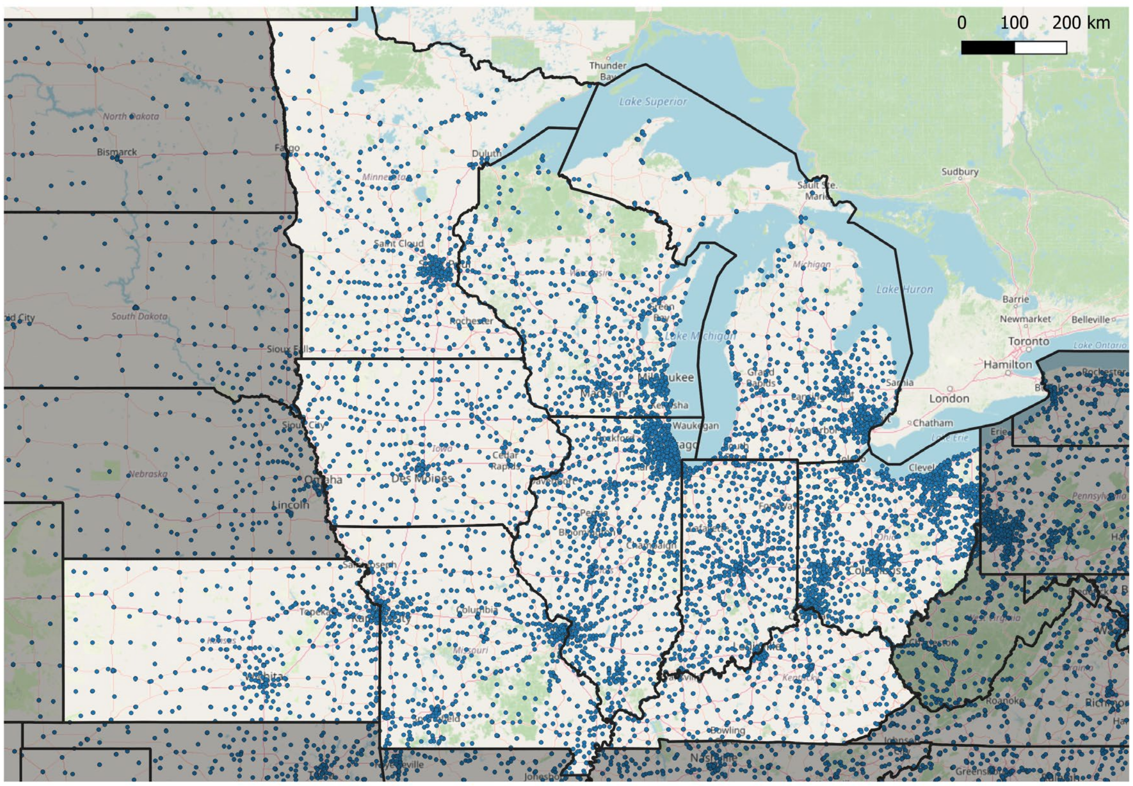

Figure 13: Police Stations in the MAASTO Region (Source: HIFLD [14]).

Hospitals

The HIFLD Hospitals Dataset contains point geolocations of local hospital facilities across the U.S.

Each entry in the dataset represents a unique law enforcement location and carries field information for name, address, city, state, zip code, and location (latitude and longitude in WGS-84 coordinates). Each hospital entry also lists its trauma designation and may also include information on staffing, number of beds, special categories (children's, critical access, psychiatric, rehabilitation, women's, military etc.), and whether the hospital has a helipad or not.

There are 8,340 hospitals listed in the HIFLD Law Dataset across the U.S., and 2,034 within the ten MAASTO states.

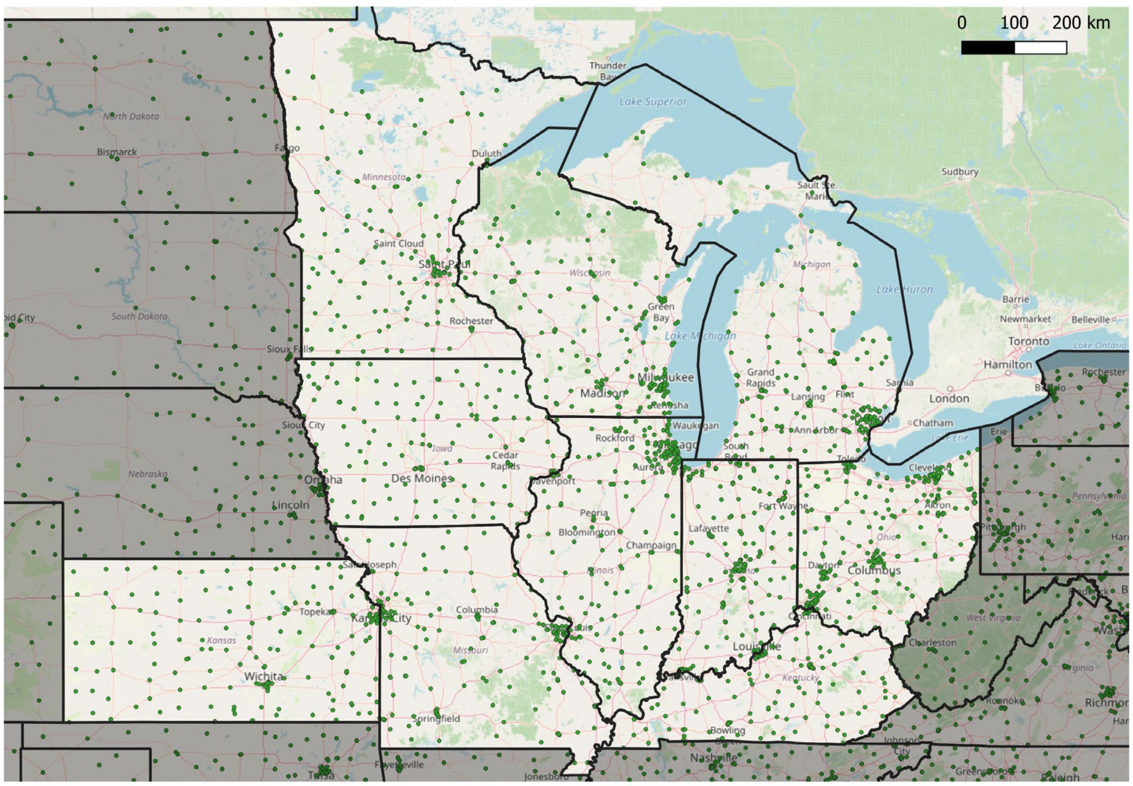

Figure 14: Hospitals in the MAASTO Region (Source: HIFLD [14]).

General Aviation Airports

In addition to the HIFLD data listed above, data on General Aviation (GA) Airports was collected. GA Airports offer an alternate perspective to emergency response to rural communities through Advanced Air Mobility Emergency preparedness [15] [16]. FAA identifies GA Airports as public-use airports that do not have scheduled service or have scheduled services with less than 2,500 passenger boardings every year [17]. Of the approximately 5,000 public-use airports in the US, a little over 3,300 are included in the National Plan of Integrated Airport Systems (NPIAS). Nearly 3,000 of these (88% of all airports in NPIAS) are GA airports [18].

Data on GA airports was collected through Koordinates [19], a mirror to U.S. GA Airports data from the Bureau of Transportation Statistics. This source includes the 3,000 GA airports within the U.S. as well as some in the U.S. territories, Canada, and Mexico. There were a total of 4,525 airports listed in the source, with 1,211 being within the then MAASTO states.

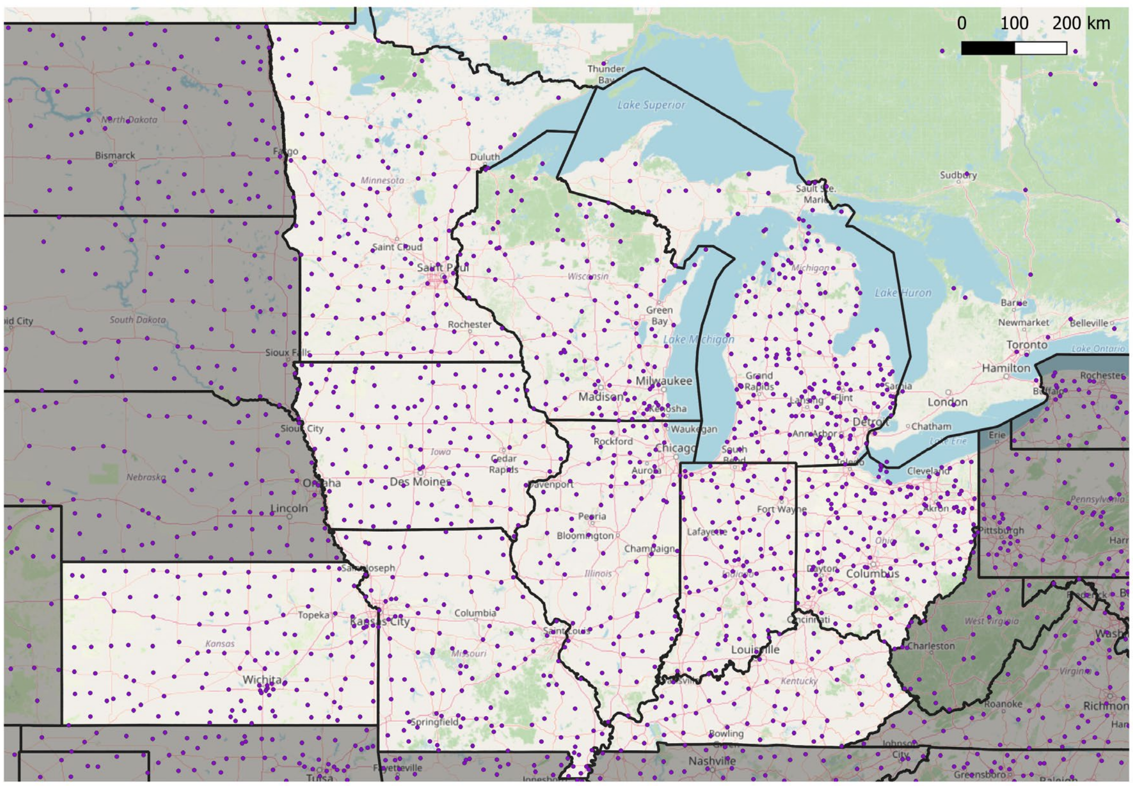

Figure 15: General Aviation (GA) Airports in the MAASTO Region (Source: [19]).

Responder Training and Resources

SERTC

Resource Page: https://sertc.org/

The Security and Emergency Response Training Center (SERTC), serves as one of the most recognized facilities offering training in handling hazardous materials for railway personnel as well as public and private sector responders. Established in 1985, SERTC is operated by MxV Rail, a subsidiary of the Association of American Railroads. Based in Pueblo, CO, SERTC offers a variety of on-site and online courses. In addition to a team of dedicated instructors, SERTC also regularly partners with railroads for its training programs.

On-site trainings currently offered at SERTC include FEMA funded courses: Highway Emergency Response Specialist (HERS), Alternative Fuels and Flammable Incident Response and Management (AFFIRM), Leadership and Management of Surface Transportation Incidents (LMSTI), HAZMAT / WMD Technician for Surface Transportation (HWMDTST), and Tank Car Specialist (TCS) courses and range from 5-day long to 10-day long training.

TransCAER

Resource Pages: https://www.transcaer.com/ and https://www.pathlms.com/transcaer/courses

Transportation Community Awareness and Emergency Response (TransCAER) is a volunteer North American outreach organization that assists communities and responders for HAZMAT transportation incidents. Established in 1986, the organization has volunteer members from industry sectors including chemical manufacturing, transportation, emergency responders, and governments. TransCAER offers free HAZMAT and emergency response training through a variety of hands-on on-site training courses, and through online training. TransCAER Learning Management System (LMS) is a great resource for online course on HAZMAT response including numerous courses sponsored by or offered through Class I railroads. In addition to training and teaching programs, TransCAER also offers planning assistance for HAZMAT transportation emergencies to communities, planning drill exercises for local communities, and awards programs to encourage awareness and preparedness for emergencies.

BNSF

Resource Pages:

https://www.bnsf.com/in-the-community/environment/environmental-protection.page

https://www.bnsfhazmat.com/community-responders/community-responders-home/

BNSF offers free railroad HAZMAT response training to an average of 8,000 emergency responders each year and has provided training to more than 125,000 responders since 1996.

Training services offered by BNSF include:

- On-site training: BNSF provides no-cost railroad hazardous materials familiarization courses to community emergency responders at community locations.
- Online training: Online training is offered through a variety of recorded webinars, training videos and virtual reality simulations to responders.
- Emergency response equipment: BNSF deployed emergency response equipment (foam trailers, spill emergency trailers, capping kits, wildland trailers etc.) can be located across BNSF network through its resource page.
- BNSF System Hazardous Materials Emergency Response Plan: BNSF's emergency response plan for hazardous materials can be accessed through its resource page.

CN

Resource Page: https://www.cn.ca/en/safety/moving-dangerous-goods/

CN's webpage on moving dangerous goods lists a number of online courses offered for free by CN ranging from training for incidence response, understanding and safe handling of railroad equipment, and dangerous goods training, and a list of in-person trainings available by date and location. The webpage also offers guides for first responders, and links to additional training resources (such as TransCAER courses), and maps and contacts for CN's emergency responder resources across its network.

CPKC

Resource Page: https://www.cpkcr.com/en/safety/hazmat-safety/HazMat-Training

CPKC offers first responder training through a variety of ways:

- Online Training - CPKC offers a free online course on CPKC's operations in North America, identifying CPKC locomotives and rolling stocks, locating and contacting CPKC's emergency response officers, and CPKC safety processes.
- Virtual Classrooms – CPKC offers virtual classrooms with CPKC Emergency Response Officers coaching on responding to derailments and HAZMAT releases. CPKC also offers Virtual Reality training simulations for various scenarios related to leaks and spills.
- On location training – CPKC offers practical training with life-like equipment for responders wishing to take on-location training. These include their training rail car for training on responding to derailments and dangerous goods releases, training trailer that can be transported to locations for first-hand experience with various rail equipment (valves, housings, pressure tank car appliances etc.), and their locomotive training prop for training on locomotive shutdown procedure, electric system and fuel shut offs and rescuing crew trapped in a locomotive cab.
- Sponsoring SERTC Courses

CSX

Resource Page: https://www.csx.com/index.cfm/about-us/safety/community/emergency-responder-training-and-education/

CSX hosts free online training programs for emergency personnel on safe response to incidents on and around railroad property. Online training is provided primarily through TransCAER LMS. CSX also provides in person training and planning assistance to local communities and responders and offers numerous guides and training materials for responders.

NS

Resource Page: https://www.norfolksouthern.com/en/commitments/safety/first-responder-training

NS Operation Awareness and Response (OAR) is a dedicated effort to strengthen NS's relationships with first responders across its network. NS offers training to responders through classroom and online training resources and through partnership with TransCAER and SERTC. NS trains more than 5,000 responders annually.

- Online courses: Online courses currently offered through NS include courses on Railroad 101, Tank Car Identification, Locomotive Fires, and Tank Car Valves and Fittings
- Safety Train Events: NS hosted 17 Safety Train events across its network (6 in MAASTO region: Argos, IN, Champaign, IL, Mt. Vernon, IL, Danville, KY, Macedonia, OH, and Coneaut, OH) offering hands-on training with working locomotives, tank cars, and service equipment.
- Manuals and Documents: NS offers a range of manuals including emergency response planning guides and field guides on railway equipment and tank cars.

UP

Resource Page: https://www.up.com/communities/rail-safety/hmm/training-resources

Public first responders have access to free online and in-person training through UP's HAZMAT training resource.

- Online: UP Hazardous Materials Management Team offers a Railroad 101 course through TransCAER. UP also partners with TransCAER and SERTC to sponsor a number of other training programs.
- In-person: UP offers in-person railroad emergency response and hazardous materials awareness training in addition to offering hands-on simulation training and first arriving officer guidance.
- Emergency response equipment: The resource page also carries information and locations for UP's emergency response equipment deployed across its network (capping

kits, fire trailers, foam coaches, transfer equipment, oil spill response trailers, and boom trailers).

5. RAIL CORRIDOR SELECTION

The MAFC technical representatives were presented preliminary analysis of historic incidents reported around all Class I Rail corridors in the 10-state region. Each state was asked to vote on selection of major corridors for analysis, with the understanding that rural communities around the selected study corridors would be selected for further analysis.

Due to the nature of how Class I Rails are distributed within the region, with duopolies of railroads dominated network presence in different parts of the region, the technical representatives decided to pick three corridors to capture coverage in all ten member states.

Selected Class I corridors:

- Union Pacific Corridor from Minnesota to Kansas spanning the western states of MAASTO.
- Norfolk Southern Corridor from Illinois to Ohio spanning across Illinois, Indiana, and Ohio.
- CSX Transportation Corridor running north-south connecting the states of Michigan, Ohio, and Kentucky.

Together, these three corridors cover representation of Class I freight network coverage through all 10 MAASTO member states. The corridors also represent major corridor connections to some of the biggest cities in the region including Chicago, Kansas City, Detroit, Cleveland, Minneapolis, and Columbus. Figure 16 shows Class I Rail network map for the MAASTO region with the three corridors selected for study highlighted.

Union Pacific Corridor

This corridor traverses north-south across the states of Minnesota, Wisconsin, Iowa, Missouri, and Kansas. The study corridor includes BNSF and UP tracks connecting UP's presence near Duluth, MN in the north to Minneapolis, MN; a UP line connecting Minneapolis to Milwaukee, WI; one of UP's main corridors named the 'Spine Line' from Minneapolis to Kansas City, MO through Des Moines, IA; and UP lines from Kansas City through Kansas heading towards Texas in the south.

The corridor sees a variety of freight movement including coal, grains, chemicals and allied products, farm products, construction and forestry products, petroleum, non-metallic minerals, and consumer goods.

Norfolk Southern Corridor

The NS corridor running east-west from Chicago, IL through Indiana into Cleveland, OH is a major corridor that connects the Midwest to Pittsburgh, PA and to the east coast. While the main corridor roughly follows along US-30 connecting Chicago to Cleveland through Fort Wayne, IN, and Bellevue, OH, a branch line that runs slightly north loosely along US-20 that connects through Elkhart, IN and Toledo, OH is also included.

Called NS's 'Chicago Line', the main corridor is part of the old Lake Shore and Michigan Southern system that connected Chicago to Buffalo, NY, which was split in 1998 between NS and CSX with NS owning the western part of the corridor (the Chicago Line) and CXS owning the eastern part of the corridor from Cleveland to Buffalo. The Chicago Line is now part of NS's 'Premier Corridor', NS's most critical freight artery, that connects from Chicago to New York City, NY.

NS's Premier Corridor is a vital passageway for steel manufacturers (such as those in northern Indiana). In addition to steel, the corridor also carries substantial movements of chemicals, construction materials, metals, and automotive parts. Other freight movements include lumber, cement and consumer goods.

CSX Transportation Corridor

The CSX corridor running north-south connecting Detroit, MI through Toledo and Columbus, OH to Russell, KY follows former Chesapeake and Ohio (C&O) lines that the corridor originated as. The corridor starts in central Michigan in the north near Midland, MI and continues south through Ohio and Kentucky and on towards Florida. The corridor falls under CSX's Chicago Division (north of Toledo), Great Lakes Division (through most of Ohio), and Louisville Division (south Ohio, and Kentucky)

The line is used to transport a variety of commodities, primarily including agricultural products, automotive products, chemicals, coal, food, machinery, metals, minerals, paper, pulp, and transportation equipment.

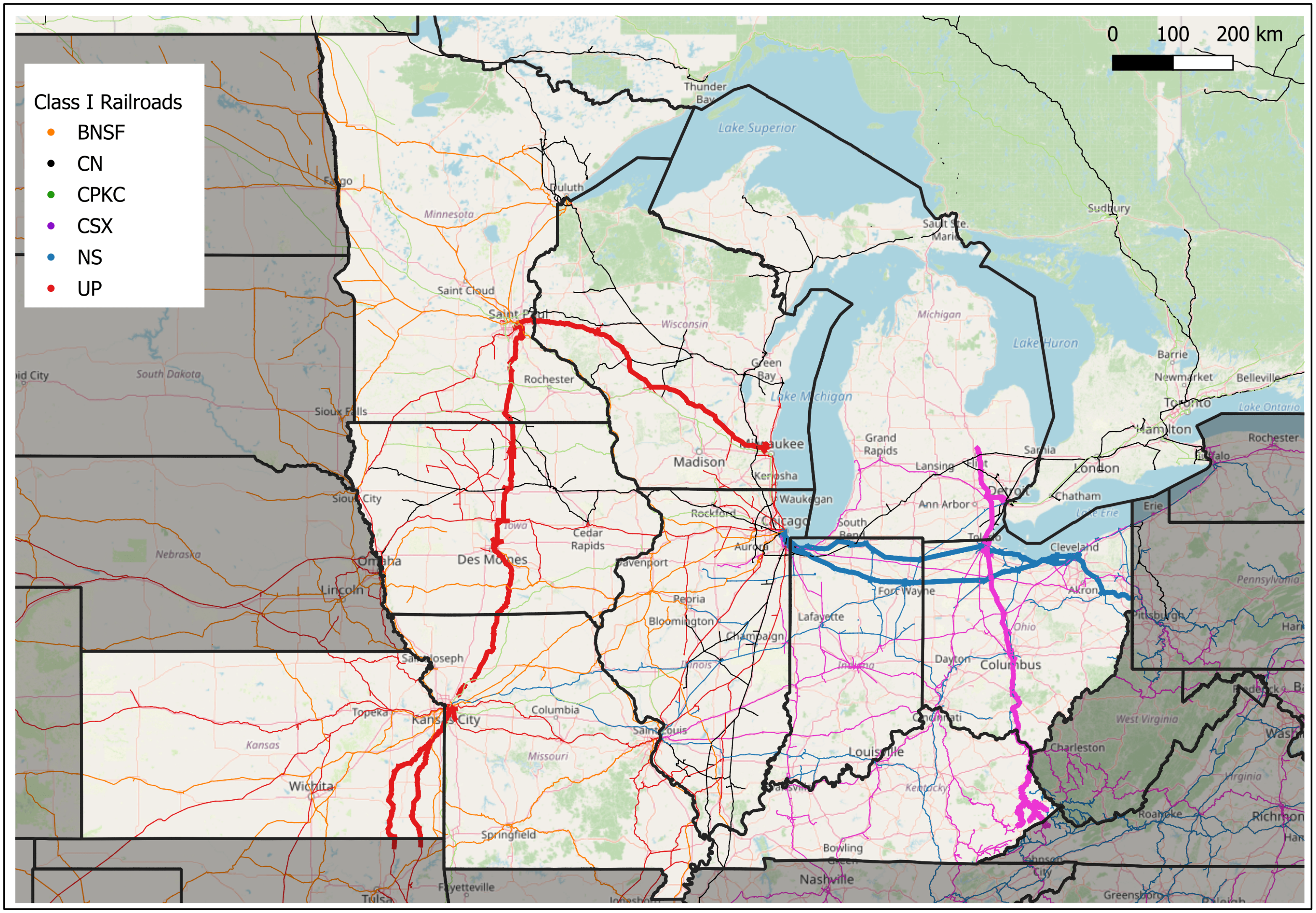

Figure 16: Class I Rail networks in MAASTO with study corridors highlighted in bold.

6. ANALYSIS – INCIDENTS AND RESPONSE TIMES IN RURAL AREAS

Case Study Location Selection

The MAFC technical representatives were asked to select up to 10 rural communities to evaluate further. The communities were chosen to represent rural locations with relatively low populations, that have one of the selected Class I Rail line running through, or close by, with a history of Class I rail incidents within a 20-mile buffer region from the community. These communities would represent rural communities that might be affected by Class I rail incidents while not having infrastructure comparable to bigger cities and metropolitan regions with quick access to resources.

For selecting study communities, the following considerations were used:

1. Each MAASTO state willing to participate should be included.
2. Community should be small and rural in nature. For this selection criteria, city population was considered as the metric with the intent being to choose cities with <30,000 population, and ideally with <15,000 population. This ensures that the locations picked represent rural regions with fewer emergency responders nearby / potentially slowed response time (higher distance) compared to urban areas.
3. Community should be close in vicinity to a Class I rail line. An important criterion for community selection was proximity to Class I rail lines as the mode being studied. While Class II and Class III railroads are also at risk of having incidents and derailments, these typically carry lower quantities and thus pose lower risks compared to Class I railroads. Further, incident, commodity, freight volume and value data are more readily available for analysis for Class I railroads compared to others.
4. There should be at least a few cases of Class I rail incidents within a buffer around the chosen community. A 20-mile buffer (straight line distance) was used to capture rail incidents that happened in the vicinity of the community.

The technical representatives decided to select one rural community per state; Ohio did not nominate a community for the project. As a result, nine rural communities were selected for analysis of emergency response times.

Table 7 lists the nine rural communities selected for further study of emergency response times along with the size of each study city selected, and the number of Class I Rail incidents reported within a 20-mile buffer around the city (decided through discussion with technical committee).

The study cities are mapped within the MAASTO region along with emergency responders noted within a 20-mile buffer around each city in Figure 17.

City	State	Pop.	Area (sq-mi)	Geo-Location	Num of Incidents	Num of Mainline Incidents
Kankakee	Illinois	24,000	15.62	41°07'12"N 87°51'40"W	20	7
Warsaw	Indiana	15,800	14.75	41°15'26"N 85°50'49"W	12	12
Mason City	Iowa	27,300	28.16	43°08'55"N 93°12'07"W	24	10
Paola	Kansas	5,800	5.53	38°34'45"N 94°51'42"W	24	20
Pikeville	Kentucky	7,800	20.99	37°28'37"N 82°31'27"W	14	7
Monroe	Michigan	20,500	10.21	41°54'59"N 83°23'52"W	34	11
Cloquet	Minnesota	12,600	36.01	46°43'18"N 92°27'34"W	79	18
Trenton	Missouri	5,600	6.74	40°4'44"N 93°37'00"W	4	2
Menomonie	Wisconsin	16,800	15.44	44°52'45"N 91°55'5"W	5	4

Table 7: List of rural cities selected for study of incidents and responder access.

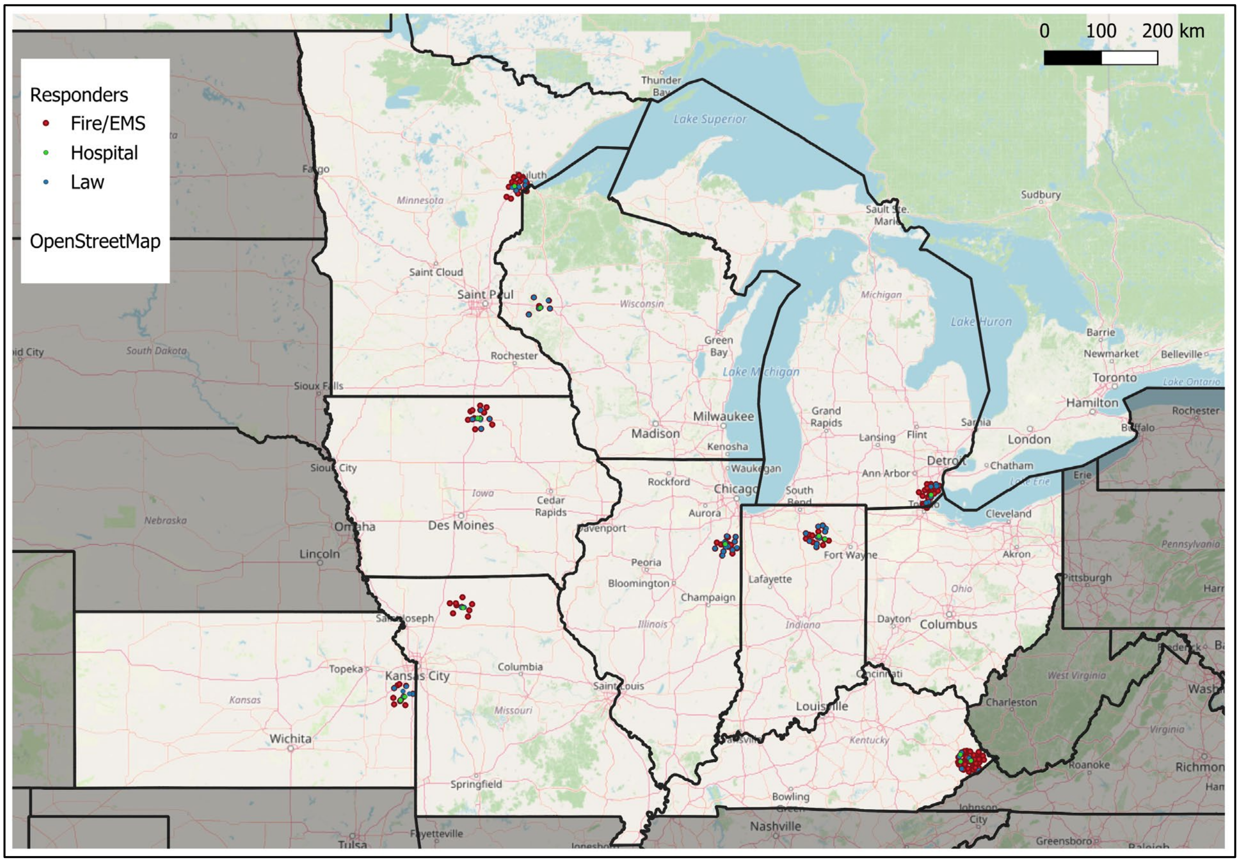

Figure 17: Emergency Responders nearest to selected rural communities (Source: HIFLD [14]).

Illinois

City	**Kankakee, IL**
Main Class I Railroad	CN, NS
Number of mainline incidents within 20-miles (2011 – 2023)	7
Number of Fire/EMS Centers	22
Number of Law Enforcement Locations	13
Number of Hospitals	2

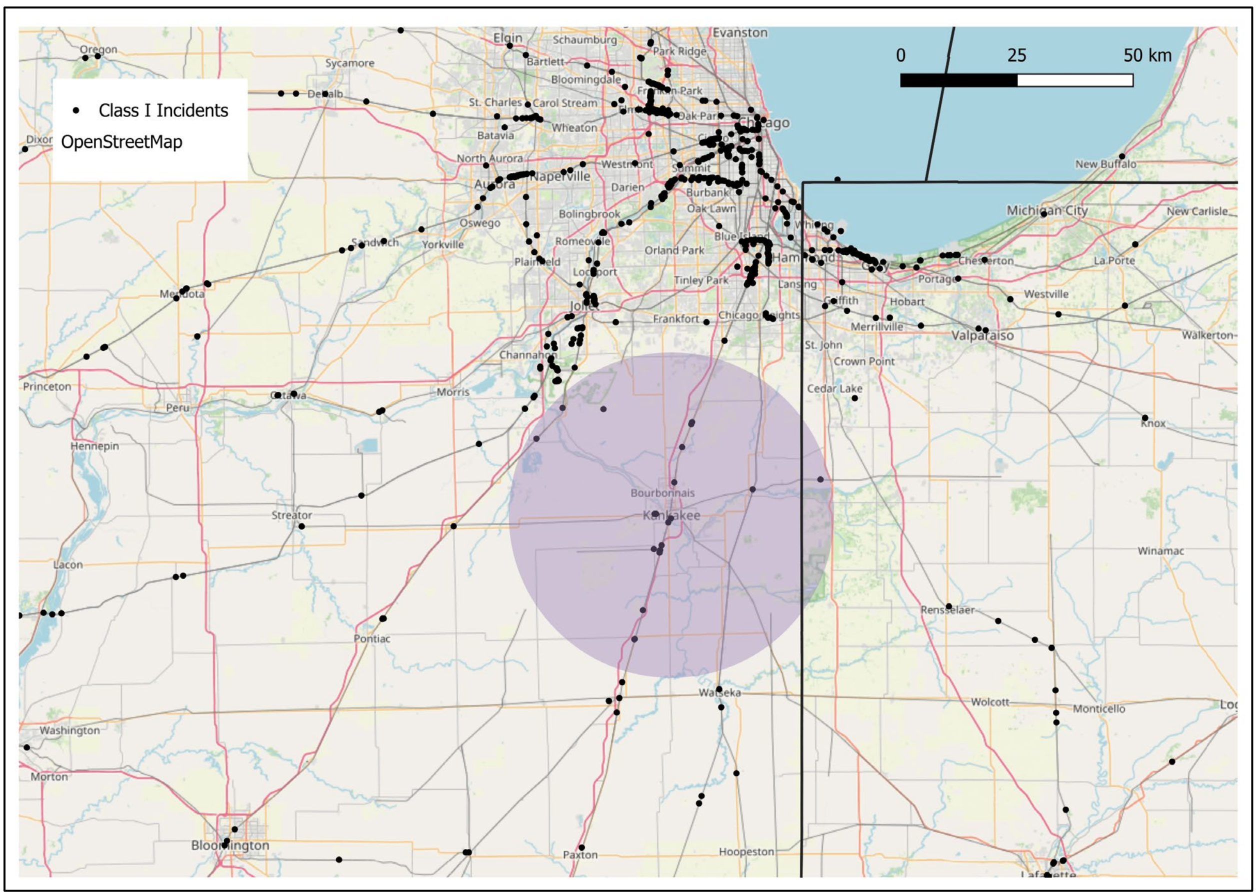

Figure 18: Kankakee, Illinois - Class I Rail incidents in vicinity (Mapped using [11]).

Kankakee is a city in Kankakee County, Illinois about 60 miles south of Chicago (see Figure 18 and Figure 19). With a population of nearly 24,000, Kankakee serves as an anchor city in the rural plains outside Chicago. The Canadian National line running along I-57 in the region is the major Class I corridor traversing through the city with a Norfolk Southern line running in the east-west direction also operating in the region.

There was a total of 20 incidents reported within the 20-mile buffer around the city. Seven of these incidents were mainline incidents, nine happened on yard tracks, three on siding tracks, and one on an industrial track. The 20 incidents in the buffer area resulted in total reported damage of $1.3 million and led to one fatality and three injuries. Note that reported damages are the same as was mentioned in Chapter 3 and only account for costs assessed for damages to rail equipment and track (and do not include other direct costs such as medical costs, legal costs, damages to communities and ecology, cleanup costs, lost wages from injuries etc. as well as indirect costs such as those associated with delay and damage/loss of freight). There were two accidents in 2013 on CN run mainlines that each resulted in an injury. Another injury happened in 2017 on a CN siding track. The fatality happened in 2021 on a CN mainline track due to a highway-rail crossing incident.

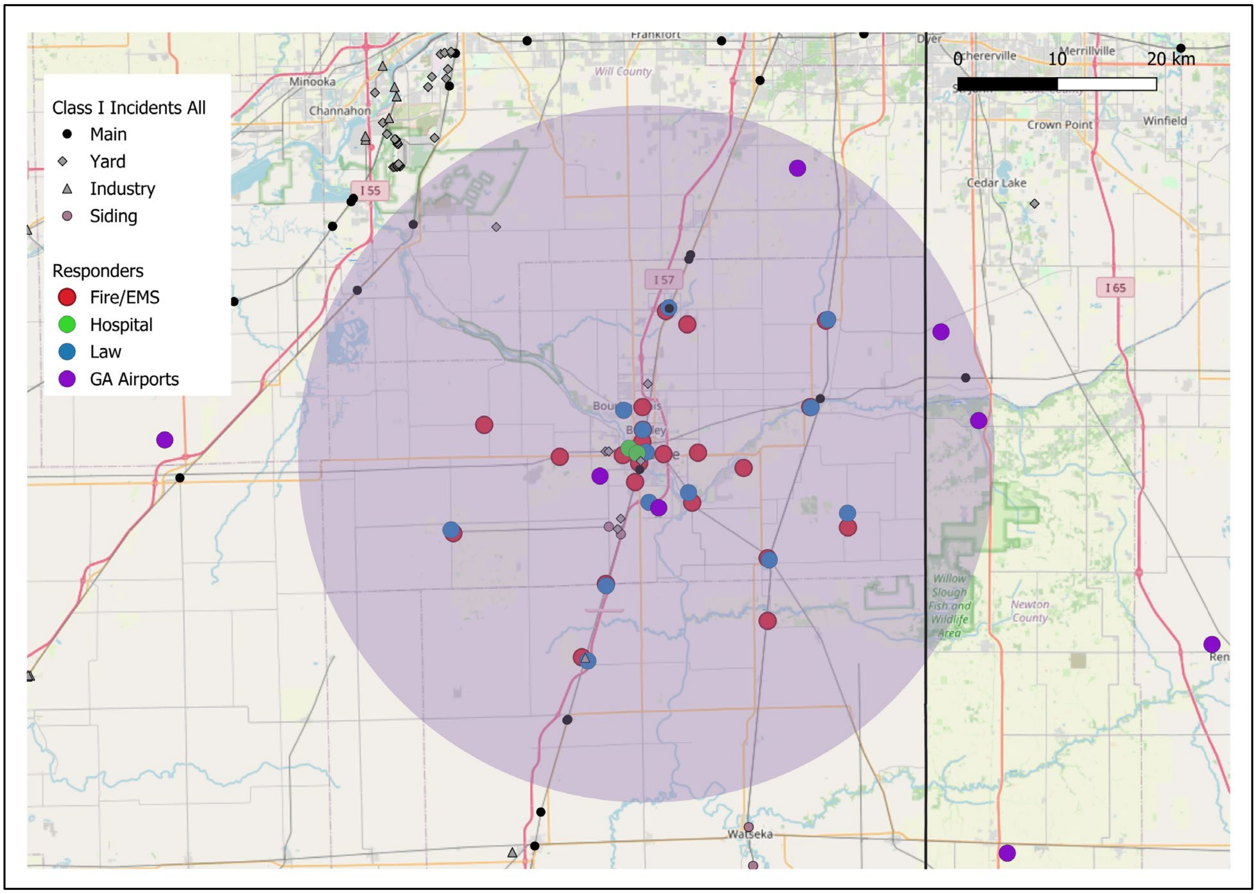

Figure 19: Map focus: Kankakee, Illinois, showing responders and incidents within buffer zone (Mapped using [11], [14], and [19]).

Indiana

City	**Warsaw, IN**
Main Class I Railroad	NS
Number of mainline incidents within 20-miles (2011 – 2023)	12
Number of Fire/EMS Centers	19
Number of Law Enforcement Locations	12
Number of Hospitals	3

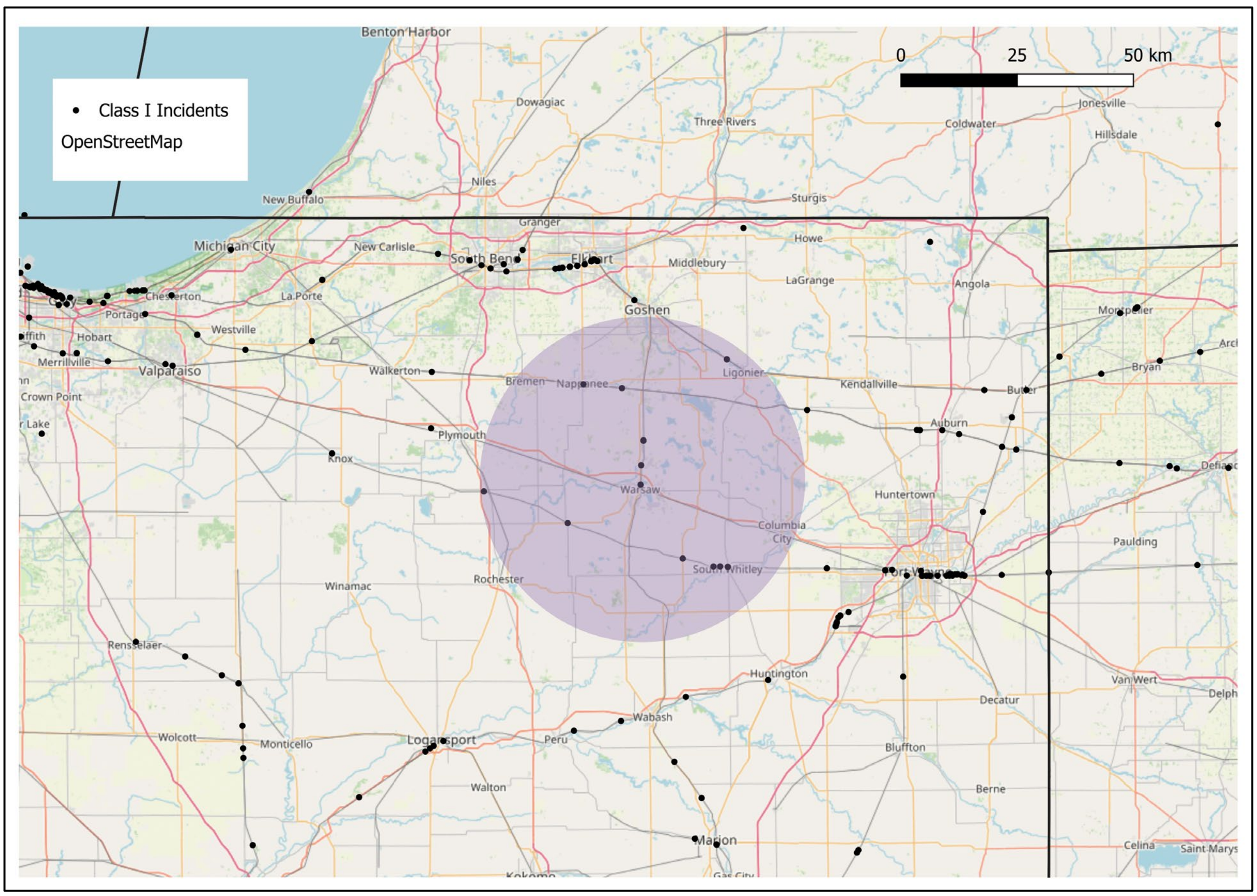

Figure 20: **Warsaw, Indiana- Class I Rail incidents in vicinity (Mapped using [11]).**

Warsaw is a city in Kosciusko County, Indiana, lying between Pike Lake, Hidden Lake, and Center Lake to its north, and Winona Lake to its southeast (see Figure 20 and Figure 21). The city has a population of nearly 16,000. US-30 and Indiana-15 both pass through the city. The Norfolk Southern line running east-west across the state is the major Class I corridor operating near the city, with a north-south branch of the railroad also functional in the vicinity, and a CSX east-west corridor towards the north of the buffer area.

There were a total of 12 incidents reported within the 20-mile buffer around the city, all of which were on mainline tracks. The 12 incidents in the buffer area resulted in total reported damage of $3.5 million and led to three fatalities and four injuries. There was one incident in 2018 on a CSX track due to a derailment that was attributed to extreme winds that resulted in two injuries and $800,000 in damage to equipment and track. Two more derailments on NS operated tracks that happened in 2012 and in 2016 happened due to equipment damage/malfunction and resulted in over $1 million in damage each. The incident in 2012 also involved release of hazardous materials (an unspecified amount of molten Sulphur) from one car (of the 11 HAZMAT cars that got damaged), and evacuation of 54 people from the area as a result of the incident. The remaining two injuries and the three fatalities resulted from incidents on highway-rail crossings (two in 2013, one in 2016, and one in 2018).

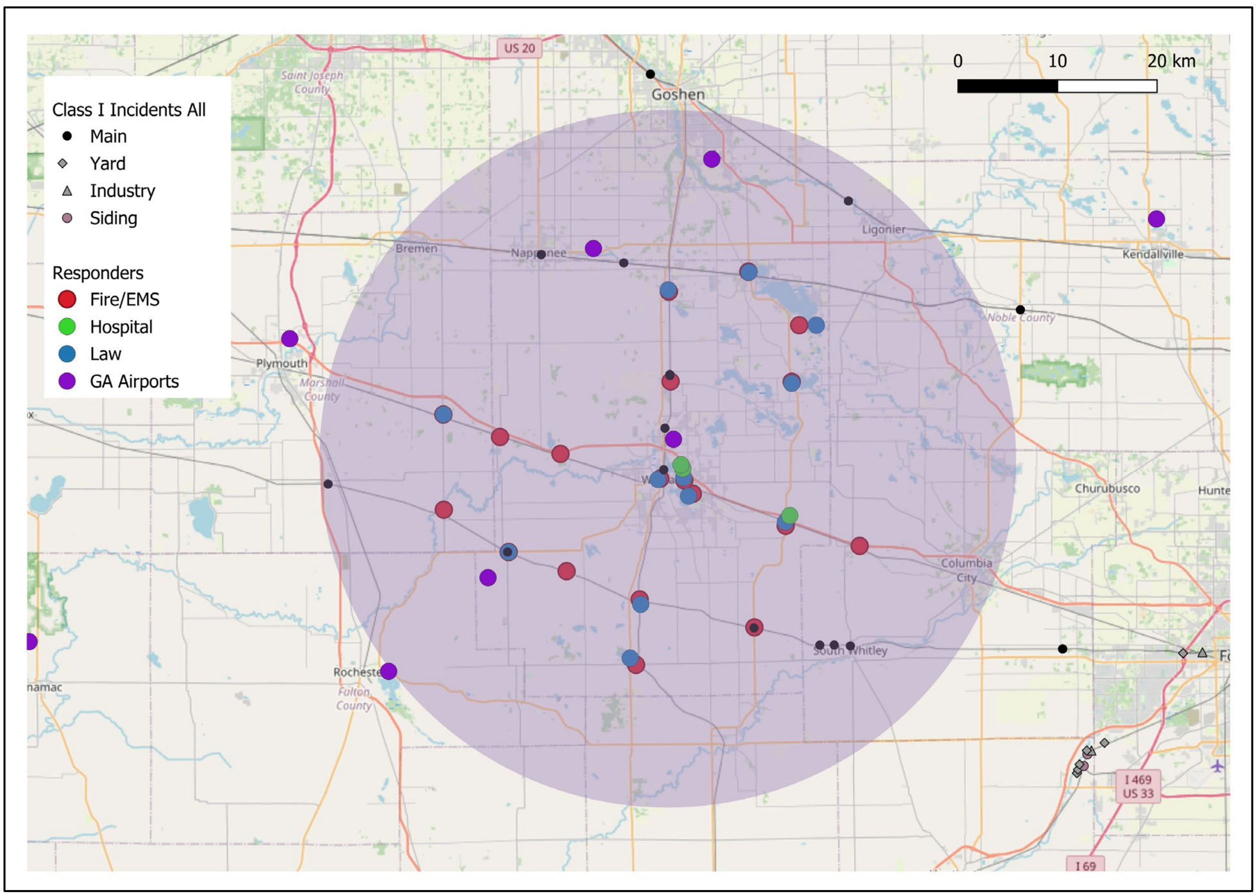

Figure 21: Map focus: Warsaw, Indiana, showing responders and incidents within buffer zone (Mapped using [11], [14], and [19]).

Iowa

City	Mason City, IA
Main Class I Railroad	UP
Number of mainline incidents within 20-miles (2011 – 2023)	10
Number of Fire/EMS Centers	15
Number of Law Enforcement Locations	7
Number of Hospitals	2

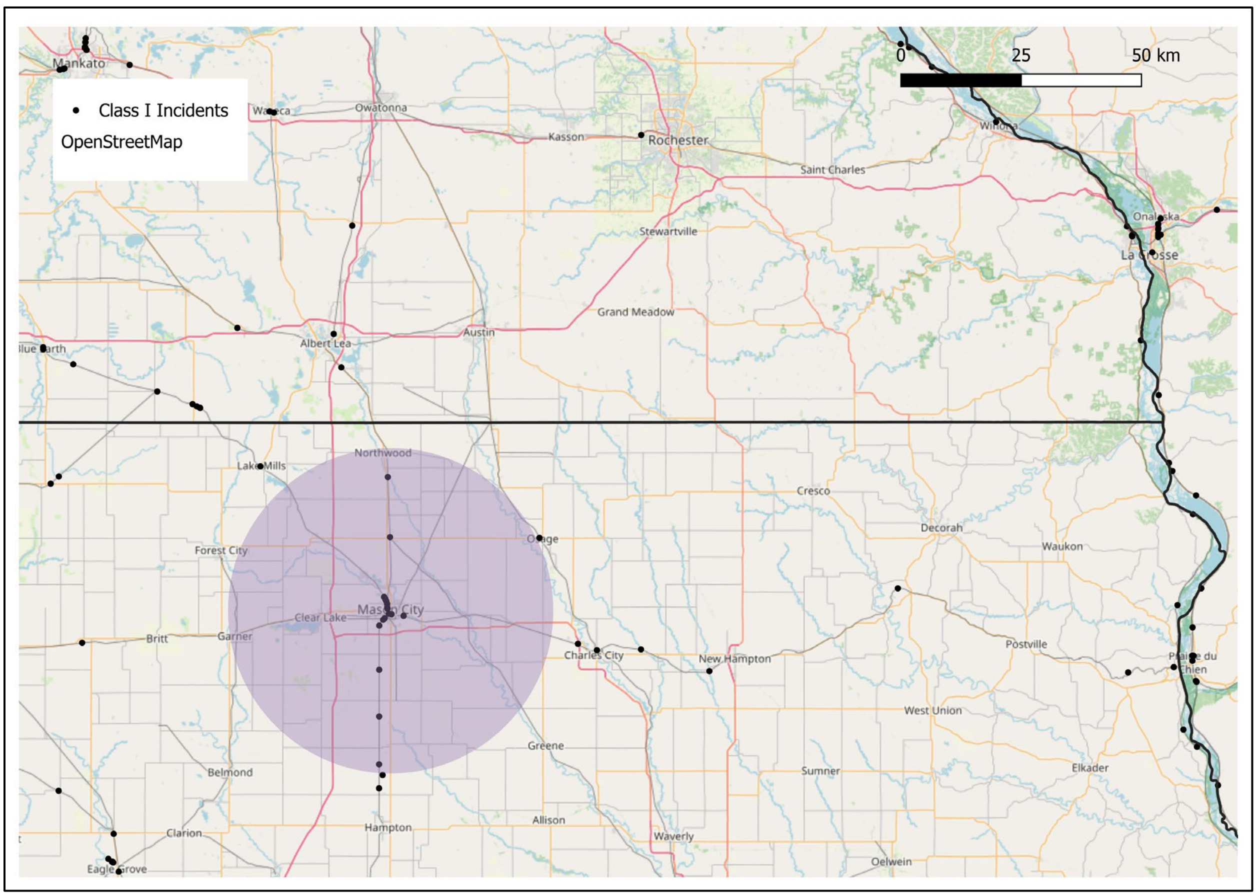

Figure 22: Mason City, Iowa - Class I Rail incidents in vicinity (Mapped using [11]).

Mason City is a city in Cerro Gordo County, Iowa (see Figure 22 and Figure 23). With a population of nearly 27,000, Mason City lies in the north of Iowa roughly 25 miles south of the Iowa-Minneapolis border. The Union Pacific corridor running north-south, to the east of I-35 is the major Class I corridor operating through the city. There is also a smaller CPCK line running east-west along US-18 in the region.

There was a total of 24 incidents reported within the 20-mile buffer around the city. 10 of these incidents were mainline incidents, 12 happened on yard tracks, one on siding tracks and one on an industrial track. The 24 incidents in the buffer area resulted in total reported damage of $8.6 million and led to two injuries. The injuries came from two incidents, both on CPKC yard tracks in 2013 that were attributed to trains operating at higher than designed speeds. The damages primarily came through four derailments on mainline UP tracks: two incidents with roughly $1.95 million damage each in 2017 and 2022, a derailment in 2019 resulting in $1.45 million in damage, and one in 2021 resulting in $1.74 million in damage.

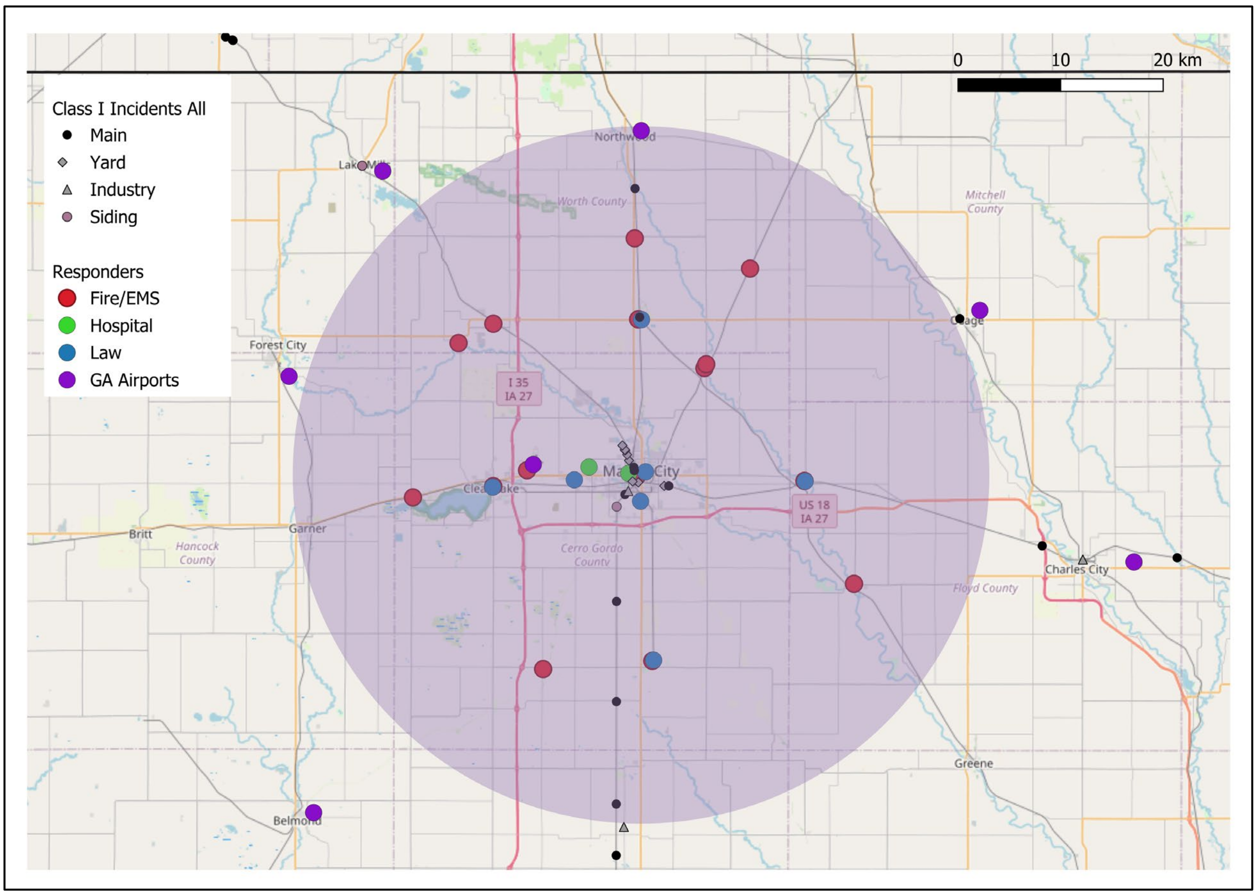

Figure 23: Map focus: Mason City, Iowa, showing responders and incidents within buffer zone (Mapped using [11], [14], and [19]).

Kansas

City	**Paola, KS**
Main Class I Railroad	UP
Number of mainline incidents within 20-miles (2011 – 2023)	20
Number of Fire/EMS Centers	11
Number of Law Enforcement Locations	8
Number of Hospitals	3

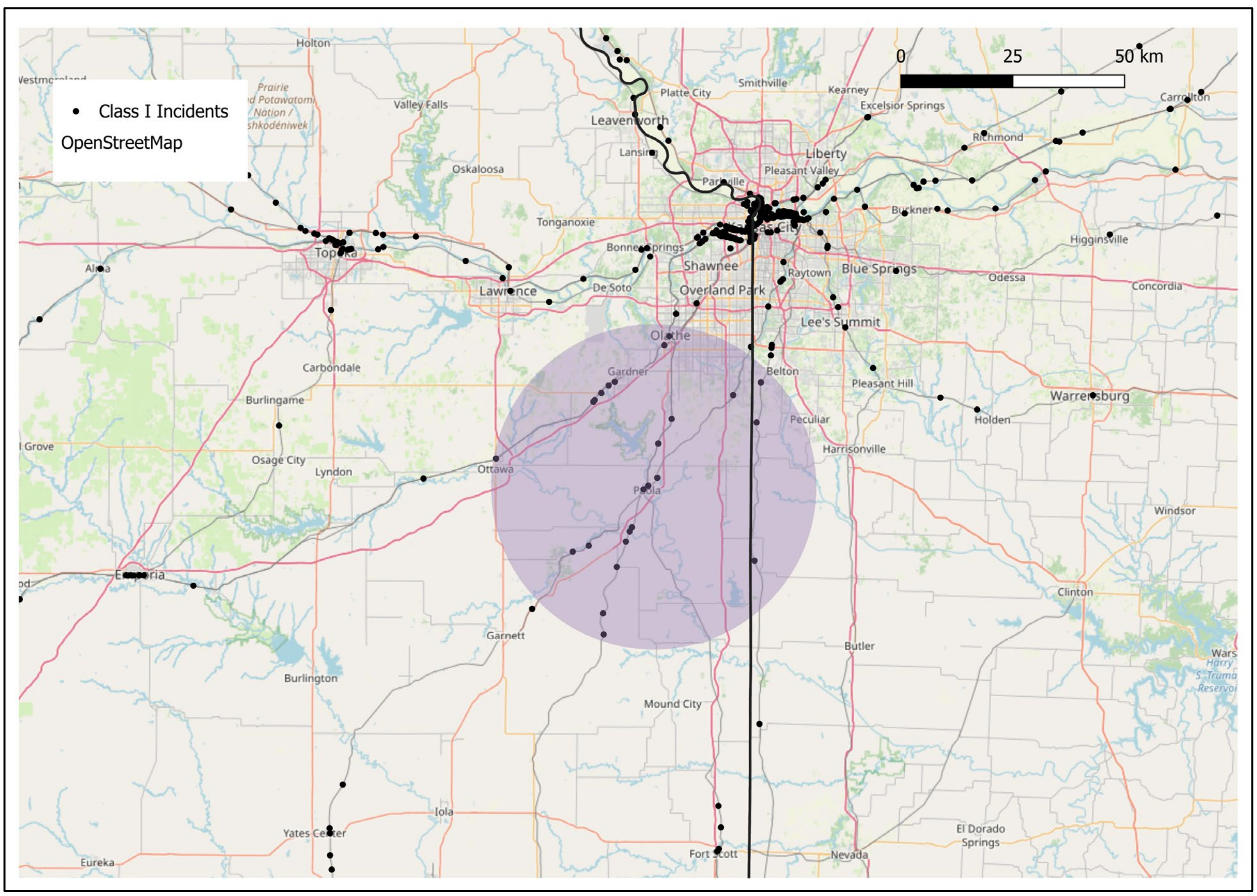

Figure 24: Paola, Kansas - Class I Rail incidents in vicinity (Mapped using [11]).

Paola is a city in Miami County, Kansas, with a population of nearly 6,000 (see Figure 24 and Figure 25). Residing along the eastern border of Kansas, Paola is roughly 45 miles southwest of Kansas City and roughly 15 miles to the west of the Kansas-Missouri border. The Union Pacific corridor running north-south, along I-35 is the major Class I corridor operating through the city along with a CPCK corridor connecting Kansas City and Wichita.

There was a total of 24 incidents reported within the 20-mile buffer around the city. 20 of these incidents were mainline incidents, three happened on yard tracks and one on an industrial track. The 24 incidents in the buffer area resulted in total reported damage of $12.7 million and led to one injury. The incident leading to an injury occurred in 2017 on a UP mainline track highway-rail crossing. A majority of the damages can be attributed to derailments in 2011 ($1.23 million on UP track in KS), 2012 ($5.2 million on UP track in KS), 2016 ($1.5 million on UP track in KS), and 2021 ($1.9 million on CPKC track in Missouri). The incident in 2011 also resulted in damage to two HAZMAT cars, and release of hazardous materials (3000 gallons of fuel oil) from one of the damaged cars.

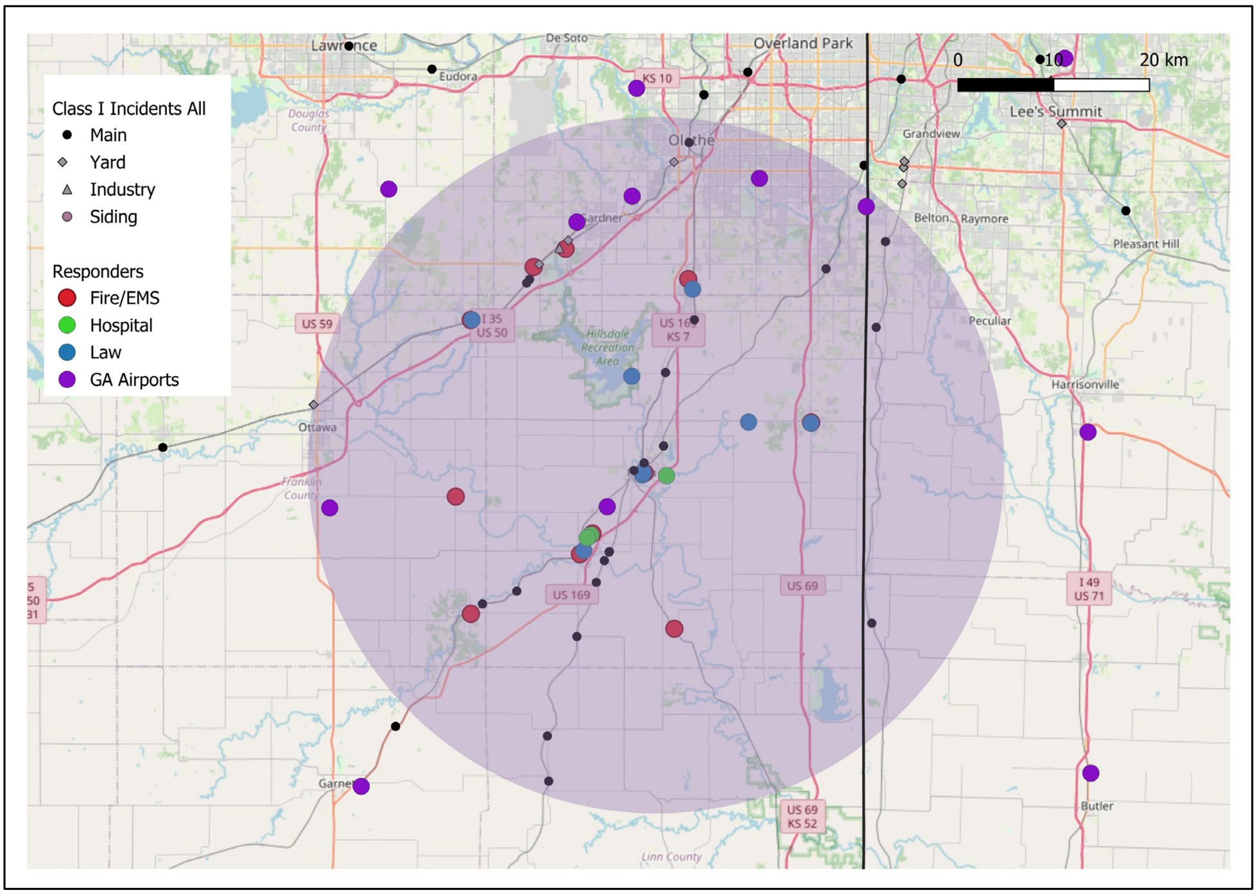

Figure 25: Map focus: Paola, Kansas, showing responders and incidents within buffer zone (Mapped using [11], [14], and [19]).

Kentucky

City	**Pikeville, KY**
Main Class I Railroad	CSX
Number of mainline incidents within 20-miles (2011 – 2023)	7
Number of Fire/EMS Centers	49
Number of Law Enforcement Locations	9
Number of Hospitals	3

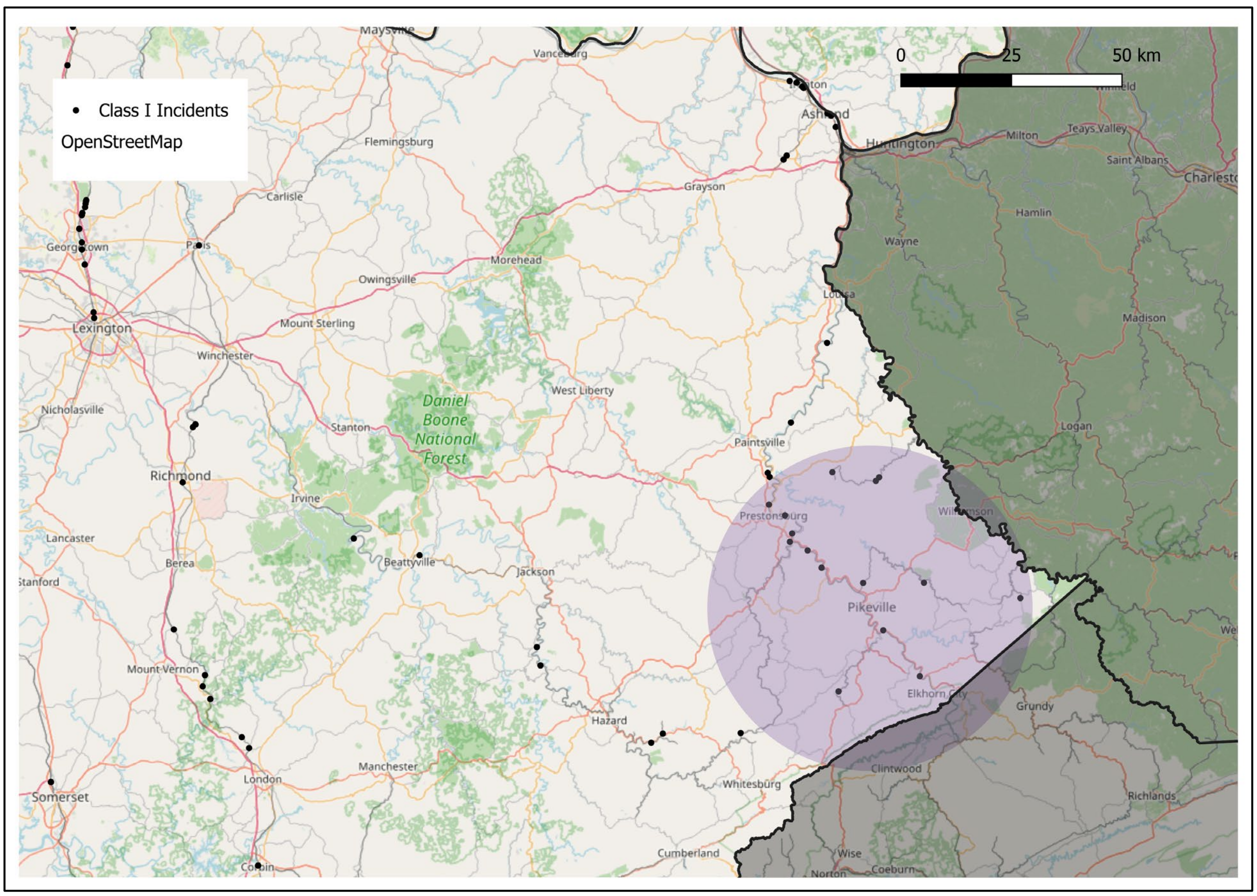

Figure 26: Pikeville, Kentucky - Class I Rail incidents in vicinity (Mapped using [11]).

Pikeville is a city in Pike County (Kentucky's easternmost county), Kentucky (see Figure 26 and Figure 27). With a population of roughly 7,700, Pikeville serves as a regional economic, educational, and entertainment hub for the surrounding areas of eastern Kentucky, Virginia and West Virginia. The CSX corridor running north-south from Detroit to Pikeville through Columbus along US-23 in the region is the major Class I corridor traversing through the city with a few Norfolk Southern branch lines also operating in the region.

There was a total of 14 incidents reported within the 20-mile buffer around the city. Seven of these incidents were mainline incidents, one happened on a yard track, one on a siding track and five on industrial tracks. The 14 incidents in the buffer area resulted in total reported damage of $3 million and led to two injuries. A large portion of the damages, and both the injuries were attributed to a derailment incident in 2020 on a CSX mainline that happened due to extreme flooding event. Four of the 96 HAZMAT cars on the train involved in the incident were damaged and two cars resulted in release of hazardous materials (28,800 and 9,680 gallons of unspecified flammable alcohol, STTC #4909152) due to the incident. A total of 15 people were evacuated from the area and the total reported damage to equipment and track due to the incident was $2.3 million.

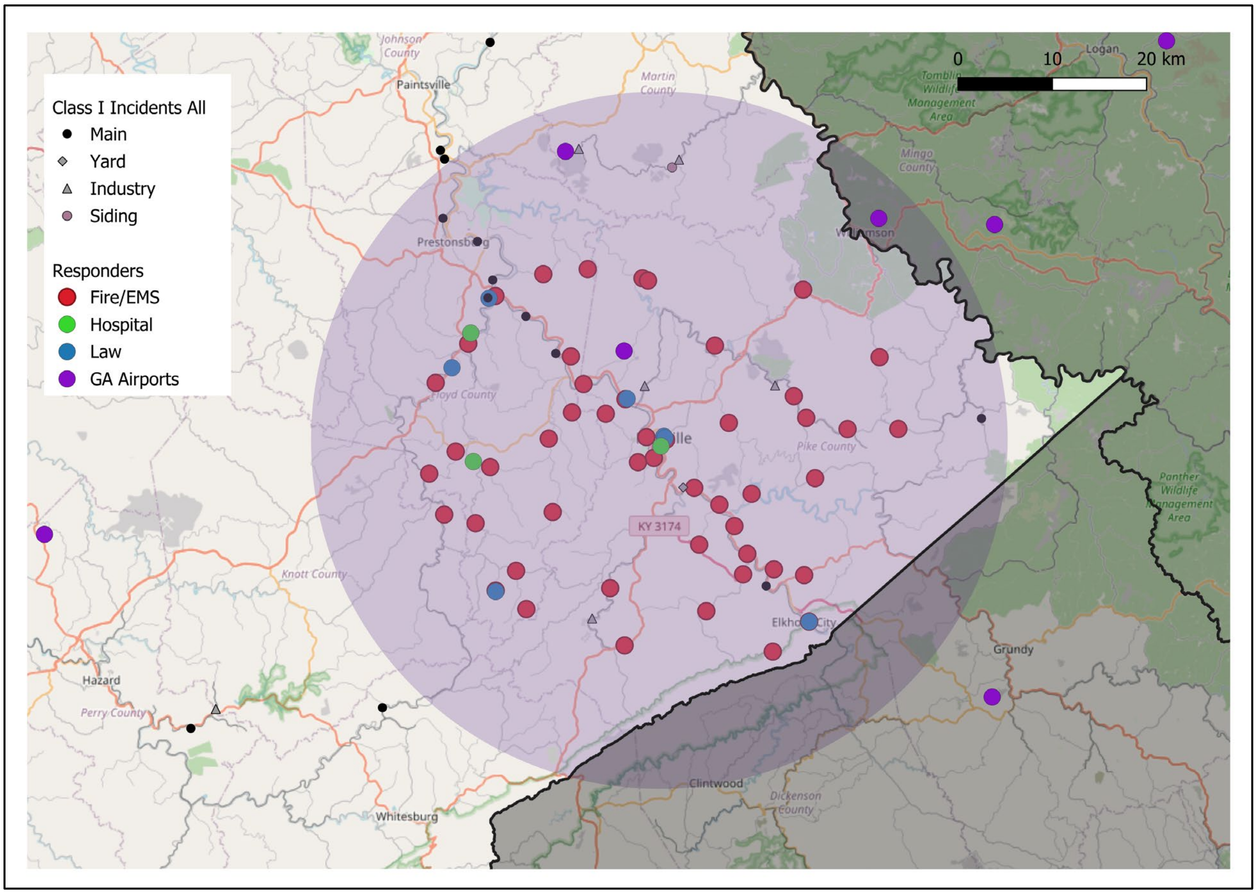

Figure 27: Map focus: Pikeville, Kentucky, showing responders and incidents within buffer zone (Mapped using [11], [14], and [19]).

Michigan

City	**Monroe, MI**
Main Class I Railroad	CSX
Number of mainline incidents within 20-miles (2011 – 2023)	11
Number of Fire/EMS Centers	30
Number of Law Enforcement Locations	10
Number of Hospitals	2

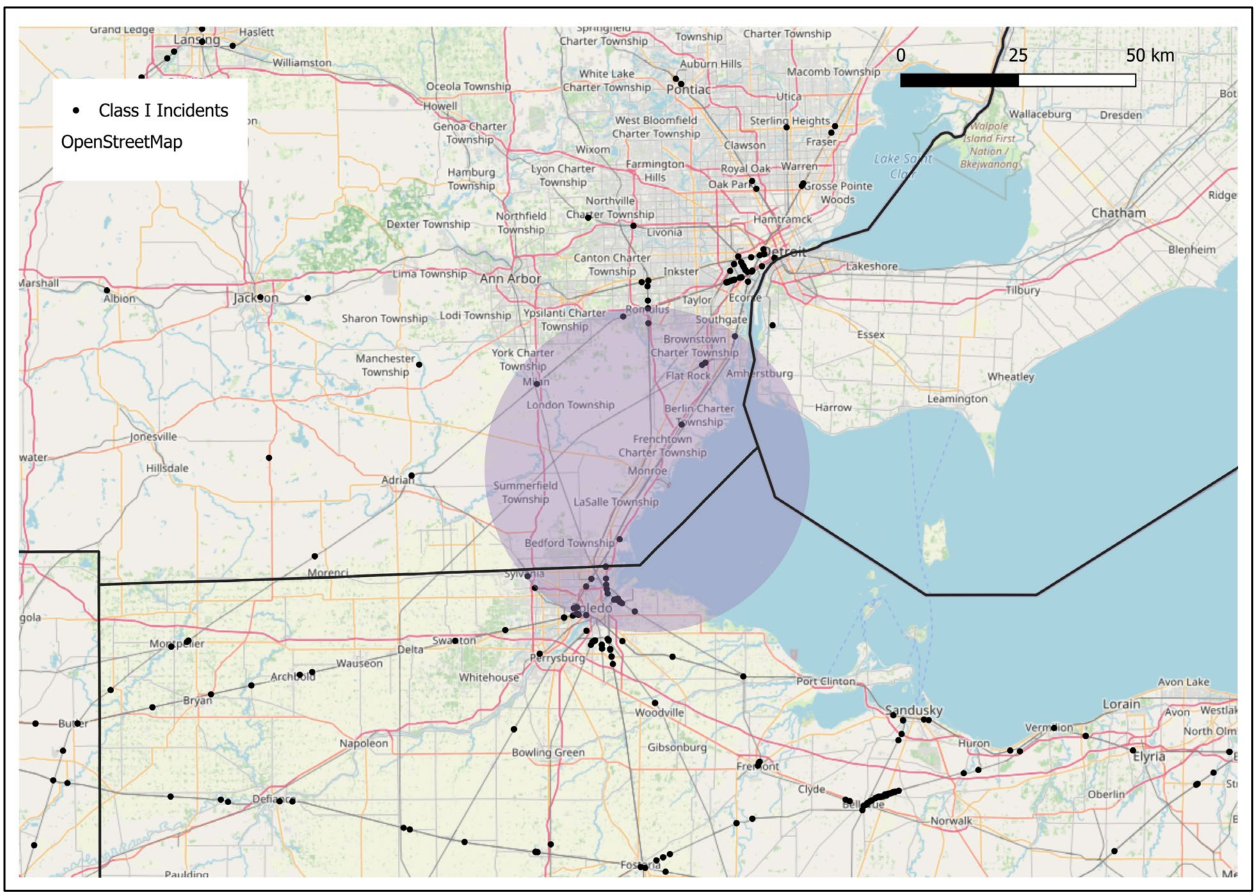

Figure 28: Monroe, Michigan - Class I Rail incidents in vicinity (Mapped using [11]).

Monroe is a city in Monroe County, Michigan about 40 miles southwest of Detroit and 20 miles northeast of Toledo (see Figure 28 and Figure 29). With a population of over 20,000, Monroe is the largest city in Monroe County and is part of the Detroit - Ann Arbor - Flint combined statistical area. The CSX and Canadian National lines running north-south connecting Detroit and Toledo are the major Class I corridors traversing through the city. The NS corridor running east-west through Toledo also falls within the 20-mile buffer around Monroe.

There was a total of 34 incidents reported within the 20-mile buffer around the city. 11 of these incidents were mainline incidents, 20 happened on yard tracks, one on a siding track and two on industrial tracks. The 34 incidents in the buffer area resulted in total reported damage of $3.6 million and led to one injury. A highway-rail crossing related incident in 2021 on NS mainline track in Ohio led to the one injury reported. There was also a derailment incident in 2022 on CSX mainline track in Michigan that was attributed to a broken plate, resulted in $1.2 million in damage reported.

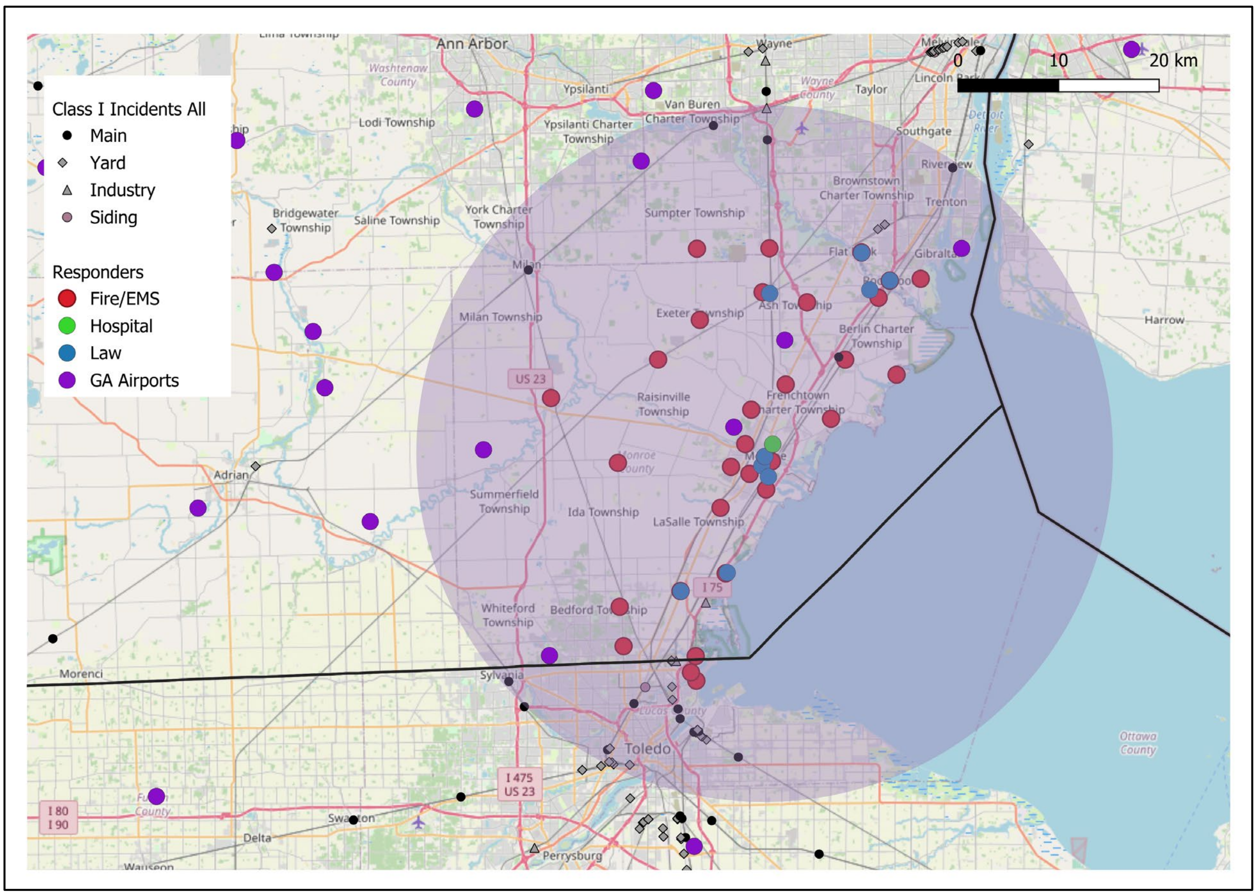

Figure 29: Map focus: Monroe, Michigan, showing responders and incidents within buffer zone (Mapped using [11], [14], and [19]).

Minnesota

City	**Cloquet, MN**
Main Class I Railroad	CN
Number of mainline incidents within 20-miles (2011 – 2023)	18
Number of Fire/EMS Centers	20
Number of Law Enforcement Locations	7
Number of Hospitals	1

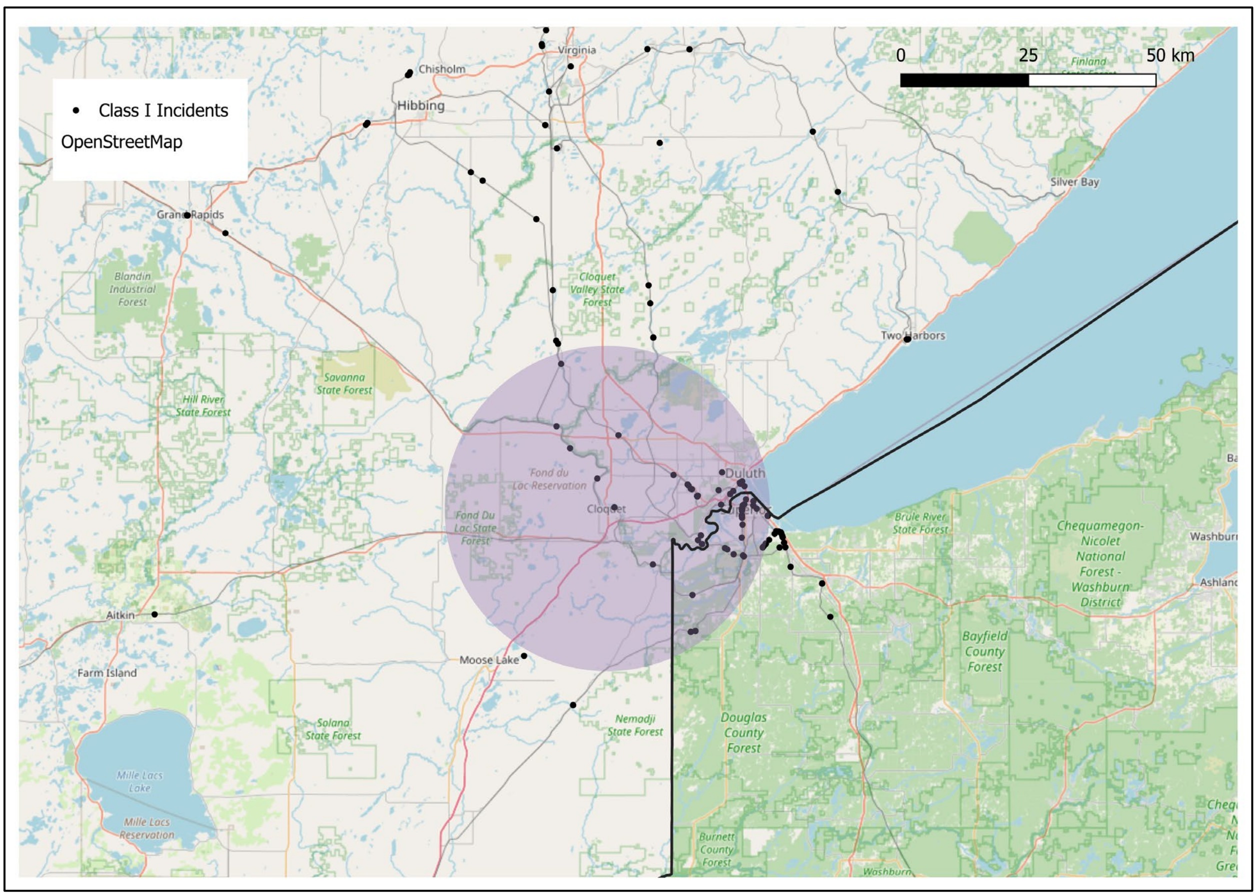

Figure 30: Cloquet, Minnesota - Class I Rail incidents in vicinity (Mapped using [11]).

Cloquet is a city in Carlton County, Minnesota. Lying at the junction of I-35 and Minnesota State Highway 33, about 20 miles southwest of Duluth, the city is next to the Saint Louis River (see Figure 30 and Figure 31). Cloquet has a population of nearly 12,500. The city resides partly in the Fond Du Lac Indian Reserve. CN and BNSF have important corridors running through the city buffer zone, along with presence of Union Pacific as well.

There was a total of 79 incidents reported within the 20-mile buffer around the city. 18 of these incidents were mainline incidents, 54 happened on yard tracks, and seven on industrial tracks. 4 of the 18 incidents on mainline track occurred within the Fond Du Lac Indian reservation on tracks running along the St. Louis River. The majority of the yard track and industrial track incidents happened in the Duluth-Superior urban area. The 79 incidents in the buffer area resulted in total reported damage of $10.2 million and led to one injury. The reported injury was due to an incident in 2021 on CN owned and Wisconsin Central operated mainline track attributed to an electrical fire. There was one major derailment related incident due to a broken rim in 2019 on a BNSF operated mainline track that resulted in $2.3 million in damage. There were two derailment incidents due to broken rails in railyards that led to release of hazardous materials. An incident in 2016 with a UP train resulted in damage of four HAZMAT cars, one of which ended up releasing 15,000 gallons of octene. Another incident in 2018 involving a CN train resulted in damage to eight HAZMAT cars, including one car that released roughly one quart of liquid NOS-1 decene.

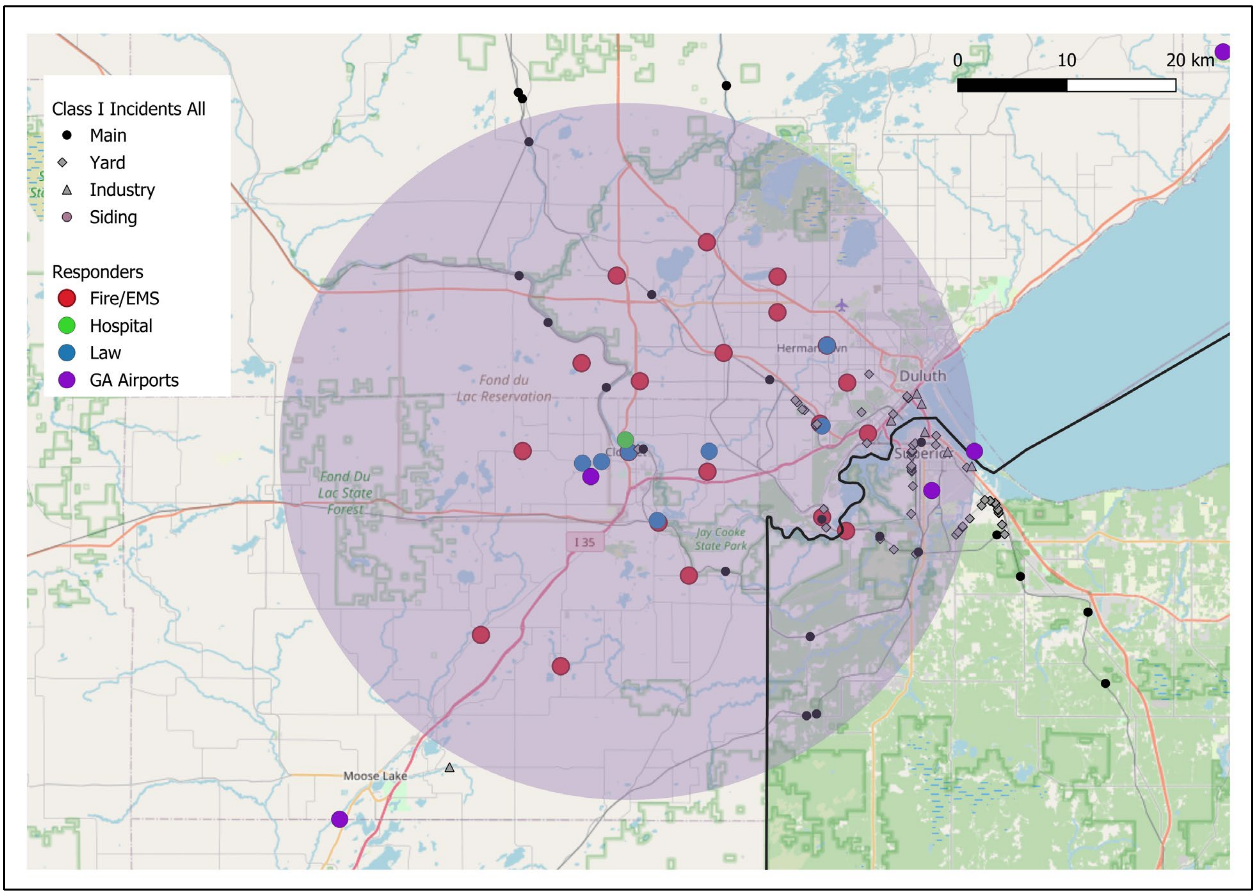

Figure 31: Map focus: Cloquet, Minnesota, showing responders and incidents within buffer zone (Mapped using [11], [14], and [19]).

Missouri

City	**Trenton, MO**
Main Class I Railroad	UP
Number of mainline incidents within 20-miles (2011 – 2023)	2
Number of Fire/EMS Centers	10
Number of Law Enforcement Locations	4
Number of Hospitals	1

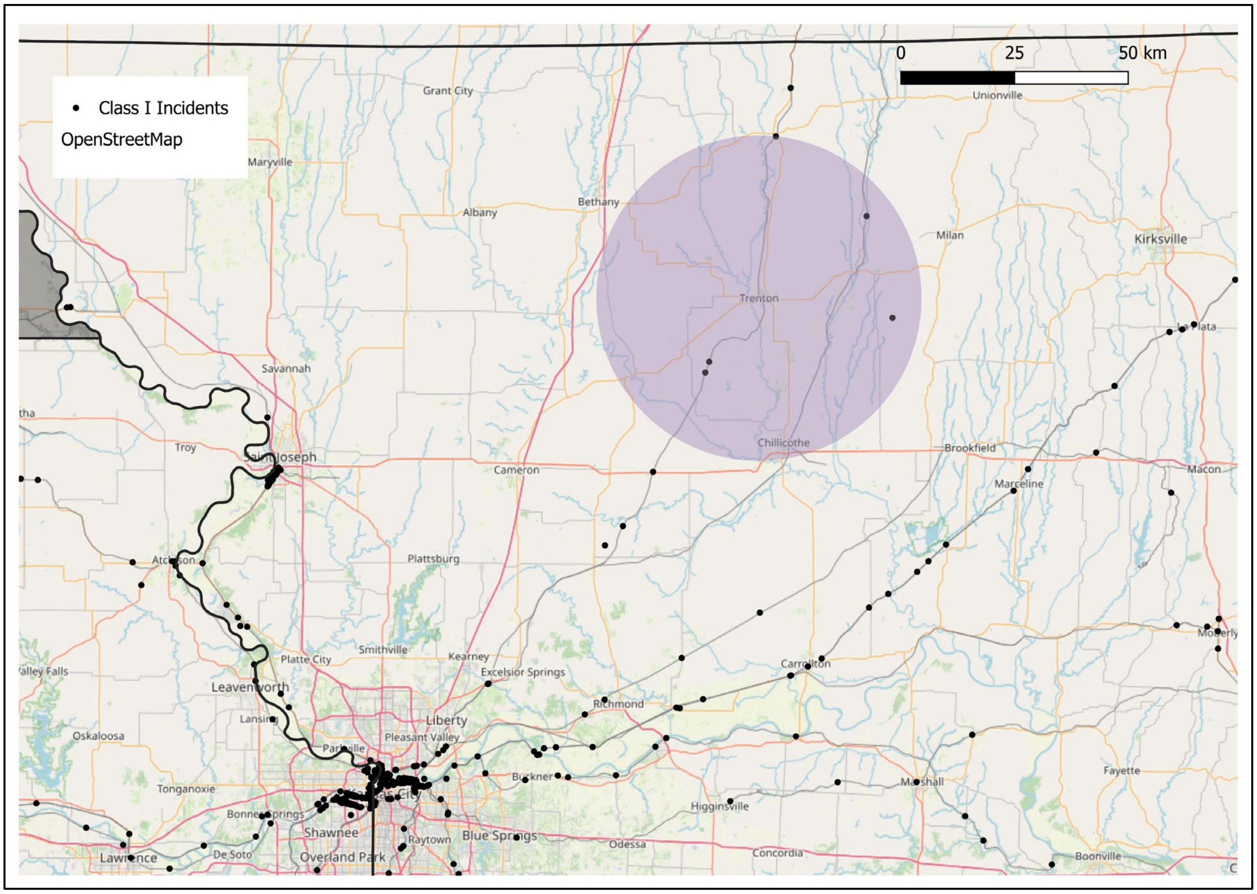

Figure 32: Trenton, Missouri - Class I Rail incidents in vicinity (Mapped using [11]).

Trenton is a city in Grundy County, Missouri (see Figure 32 and Figure 33). Trenton has a population of roughly 5,600. Trenton is in the north of Missouri, roughly 40 miles south of the Missouri-Iowa border and is about 95 miles northeast of Kansas City. The city lies to the east of the Thompson River, on its floodplains. The north-south running UP corridor is the major Class I Rail corridor through the city.

There were a total of four incidents reported within the 20-mile buffer around the city. Two of these incidents were mainline incidents, and one each happened on yard and siding tracks. The four incidents in the buffer area resulted in total reported damage of $283,000. There were no reported injuries or fatalities due to incidents in the buffer area.

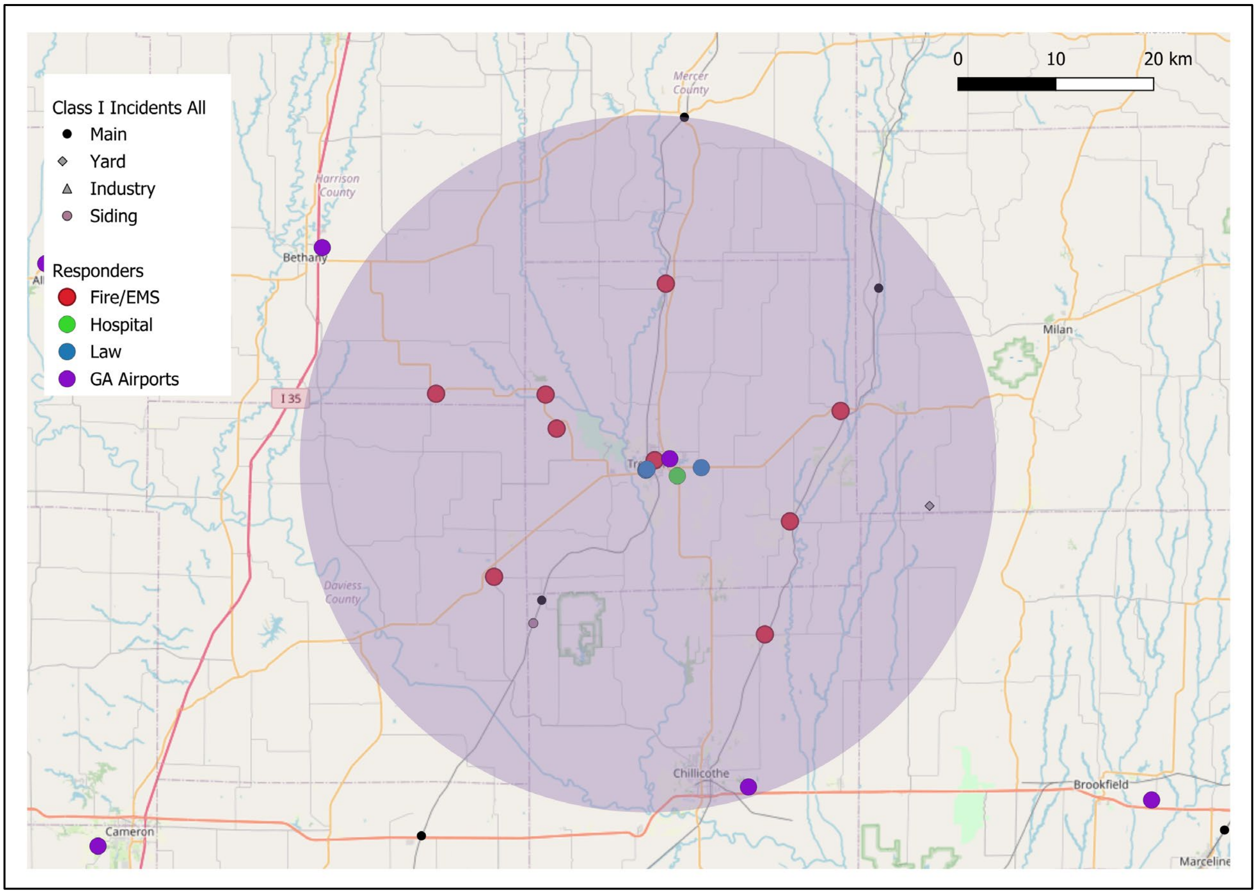

Figure 33: Map focus: Trenton, Missouri, showing responders and incidents within buffer zone (Mapped using [11], [14], and [19]).

Wisconsin

City	**Menomonie, WI**
Main Class I Railroad	UP
Number of mainline incidents within 20-miles (2011 – 2023)	4
Number of Fire/EMS Centers	6
Number of Law Enforcement Locations	7
Number of Hospitals	1

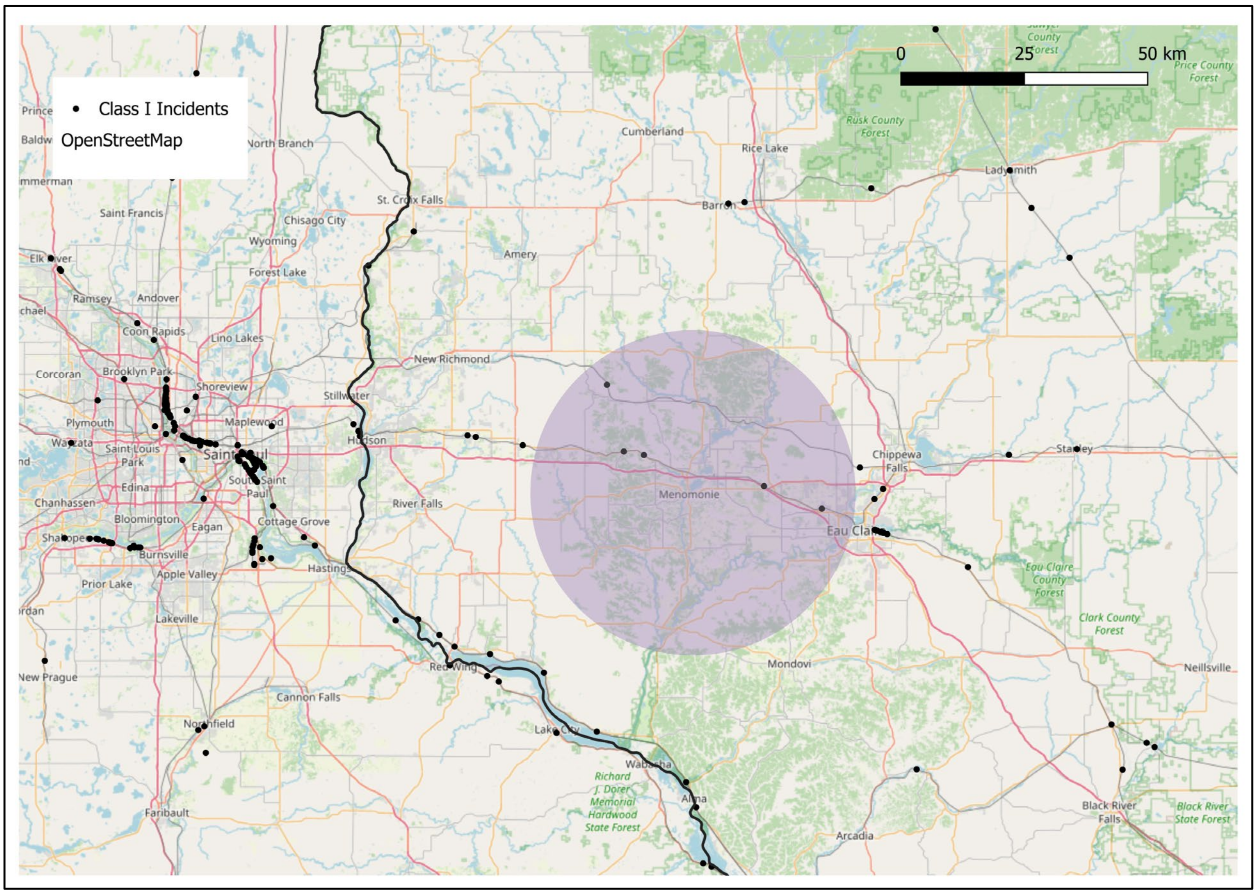

Figure 34: Menomonie, Wisconsin - Class I Rail incidents in vicinity (Mapped using [11]).

Menomonie is a city in Dunn County, Wisconsin about 60 miles east of Minneapolis-St Paul, MN (see Figure 34 and Figure 35). With a population of nearly 17,000, Menomonie serves as the core of the Menomonie Micropolitan Statistical Area. The UP branch line running east-west (branching off of a main north-south UP corridor) is the major Class I corridor traversing through the city.

There was a total of five incidents reported within the 20-mile buffer around the city. Four of these incidents were mainline incidents, and one happened on an industrial track. The five incidents in the buffer area resulted in total reported damage of $2.7 million and led to two injuries. Two incidents (CN track in 2013, and UP track in 2014) resulted in a person getting injured each time. Both the incidents were reported to be due to highway-rail crossing conflicts with drivers not paying attention. There was also a derailment in 2020 on UP operated mainline track due to broken rail that led to $2.4 million reported damage.

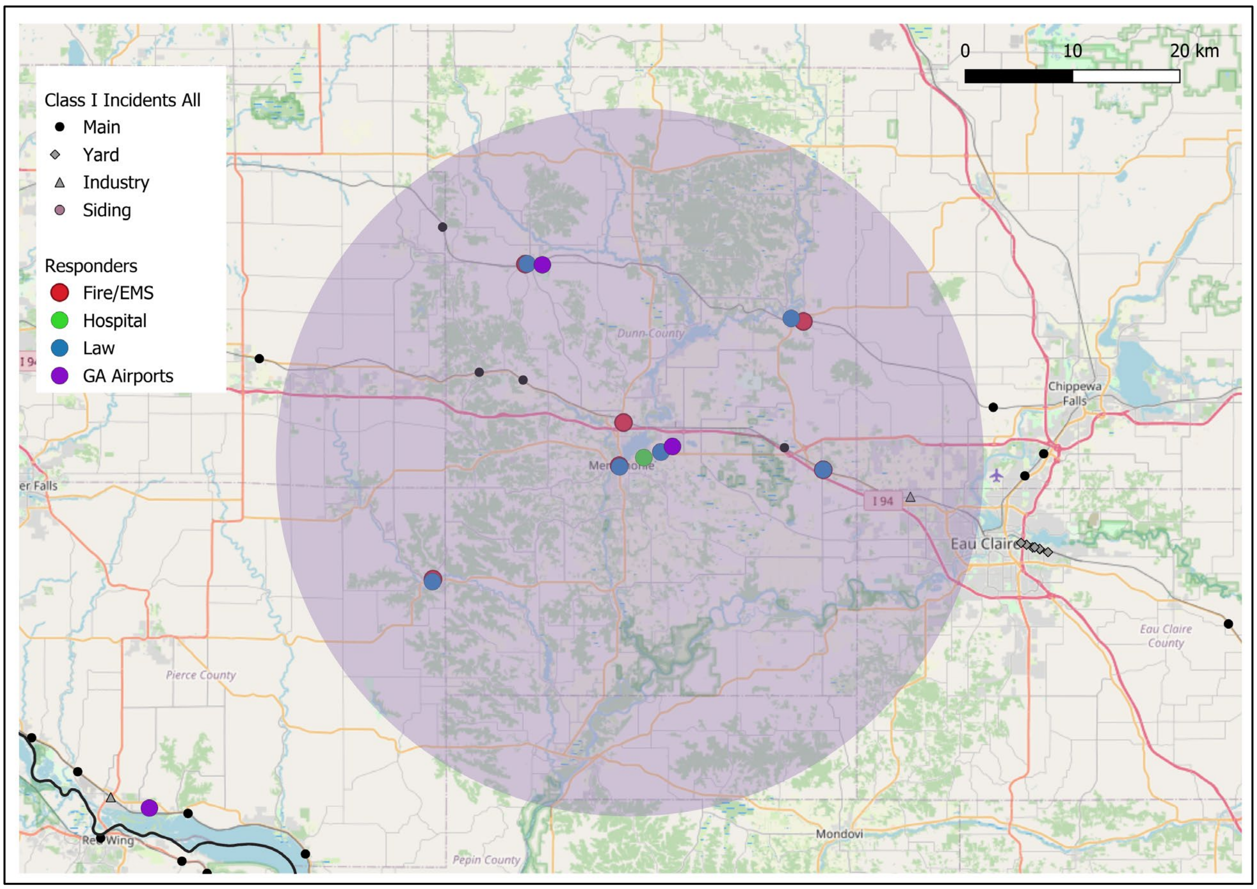

Figure 35: Map focus: Menomonie, Wisconsin, showing responders and incidents within buffer zone (Mapped using [11], [14], and [19]).

Incidents Leading to Death or Injury – Causes

This section takes a look at the typical types of accidents that lead to higher damages, and to injuries and fatalities considering the incidents studied within the rural community buffers selected for study.

Of the 216 incidents studied (incidents that fell within the study city buffers), three resulted in fatalities (total 4 deaths) and 14 resulted in injuries (total 16 people injured). Table 8 and Table 9 show summaries of incidents that led to fatalities and to injuries. By far the leading cause of incidents with deaths or injuries happens at highway-rail crossings (11 out of total 17 incidents) and are attributed to either the driver deliberately disregarding crossing warning devices (six incidents), driver inattentiveness (three incidents), or a misjudgment by the driver (two incidents). In a couple of cases, a derailment incident due to an extreme weather event led to injuries, in another two incidents equipment failure caused a fire or an explosion that led to injuries and yet another couple of incidents occurred with train speed being a factor (both within a rail yard).

Incidents that lead to the highest damages to equipment and tracks are, unsurprisingly, typically associated with derailments. There were a total of 86 incidents in the study area where damage higher than $50,000 was reported. Of these, 18 incidents were reported to have caused over $500,000 in damage, with all 18 due to derailments and all but four of these being a result of either a malfunctioning equipment or a track alignment issue. The four that could not be attributed to equipment or track were results of severe weather events (one due to flooding, and three due to extreme wind velocities).

Year	RR	City	Death	Injury	Track	Accident Type	Primary Cause
2013	NS	Warsaw	2	0	Main	Hwy-rail crossing	Highway user deliberately disregarded crossing warning devices
2016	NS	Warsaw	1	0	Main	Hwy-rail crossing	Highway user misjudgment under normal weather and traffic conditions
2021	CN	Kankakee	1	0	Main	Hwy-rail crossing	Highway user deliberately disregarded crossing warning devices

Table 8: Summary of incidents that resulted in fatality (Source: FRA [11]).

Year	RR	City	Death	Injury	Track	Accident Type	Primary Cause
2013	CN	Kankakee	0	1	Main	Hwy-rail crossing	Highway user deliberately disregarded crossing warning devices
2013	CN	Kankakee	0	1	Main	Fire/violent rupture	Other locomotive defects (Provide detail description in narrative)
2013	CPKC	Mason City	0	1	Yard	Other impacts	Speed, other (Provide detailed description in narrative)
2013	CPKC	Mason City	0	1	Yard	Other impacts	Speed, other (Provide detailed description in narrative)
2013	CN	Menomonie	0	1	Main	Hwy-rail crossing	Highway user inattentiveness
2013	NS	Warsaw	0	1	Main	Hwy-rail crossing	Highway user inattentiveness
2014	UP	Menomonie	0	1	Main	Hwy-rail crossing	Highway user inattentiveness
2017	UP	Paola	0	1	Main	Hwy-rail crossing	Highway user misjudgment under normal weather and traffic conditions
2017	CN	Kankakee	0	1	Siding	Hwy-rail crossing	Highway user deliberately disregarded crossing warning devices
2018	CSX	Warsaw	0	2	Main	Derailment	Extreme environmental condition - EXTREME WIND VELOCITY
2018	NS	Warsaw	0	1	Main	Hwy-rail crossing	Highway user deliberately disregarded crossing warning devices
2020	CSX	Pikeville	0	2	Main	Derailment	Extreme environmental condition - FLOOD
2021	CN	Cloquet	0	1	Main	Fire/violent rupture	Electrically caused fire (LOCOMOTIVE)
2021	NS	Monroe	0	1	Main	Hwy-rail crossing	Highway user deliberately disregarded crossing warning devices

Table 9: Summary of incidents that resulted in injury (Source: FRA [11]).

Response Times

The drive times were calculated from each incident reported within the city buffer to each responding fire, law, and hospital dispatch center identified within the city buffer. The drive times were computed using the Open Source Routing Machine (OSRM) API that allows for open source access to computing drive times between geolocations of choice. The results were also compared with a second routing service, OpenRouteService (ORS) for select candidates and found to be consistent. Drive times from each emergency responder to an incident was sorted to find the fastest arrivals possible. In addition to noting the fastest drive times from a fire, law and hospital responder, an analysis was also performed to note the drive time for the fifth nearest fire responder for each incident. For any major incidents, it is a reasonable assumption that more than one fire station would respond to the incident and would be needed for their service and equipment.

Once the fastest drive times are noted, the average first response drive times (and fifth responder drive time in case of fire stations) was calculated across all incidents within a study city to determine the likely emergency response times for incidents in the region. Table 10 below summarizes the number of responding stations by type for each study city along with the corresponding average fastest drive-time.

City	Number of Stations			Average Responder Drive Time (minutes)			
	Fire/ EMS	Law	Hospital	Nearest Fire/EMS	Nearest Law	Nearest Hospital	5th Nearest Fire
Kankakee, IL	22	13	2	5	5	21	19
Warsaw, IN	19	12	3	9	13	21	24
Mason City, IA	15	7	2	6	7	15	24
Paola, KS	11	8	3	11	12	19	28
Pikeville, KY	49	9	3	4	7	15	13
Monroe, MI	30	10	2	11	18	30	18
Cloquet, MN	20	7	1	17	27	36	29
Trenton, MO	10	4	1	15	30	35	44
Menomonie, WI	6	7	1	13	15	26	36

Table 10: Average minimum responder drive times for study cities.

Among the studied cities, average drive times from the nearest fire responder to a recorded incident was under 10 minutes for four out of nine cities, and 17 minutes or under for all cities. Average drive time for the nearest law enforcement station response was very similar, with the drive time being less than 10 minutes for three out of the nine cities and 30 minutes or less for all studied cities. The drive time to the nearest hospital was considerably higher than those for fire and law responders. The National Fire Protection Association (NFPA) (a non-profit organization) Standard 1710 offers a consensus standard used by career professional responders to measure level of response. While the standard is not mandated by law at federal or state level, it is generally accepted as a national standard in court cases and is a benchmark that many responders across the country strive for. The standard aims to have first-responding engine drive time to scene of incident at four minutes or under for all fire incidents (not specific to rail incidents) [20]. While it is challenging to determine a critical drive time for fire responders, NFPA 1710 offers one benchmark to measure responder times. Using the NFPA 1710 metric, only 23 of the 91 incidents studied had first arrival drive time under four minutes.

Similarly, of the 91 incidents that fall within the buffer zones for the nine selected study cities, the nearest responding fire station had a drive time of 10 minutes or less in 51 cases, and a drive time of five minutes or less in 27 cases. For law enforcement responders, the number of incidents with a drive time shorter than 10 minutes was 37, and for 17 of these incidents, the drive time was shorter than five minutes. While the drive times for nearest hospitals were generally higher than fire and law enforcement responders (as would be expected with fire and law enforcement responders typically expected to be first on scene), there was a shorter than 10-minute drive time noticed for 18 of the 91 incidents studied suggesting a relatively quick access to hospitals for these instances. It is important to also note that a number of hospitals do have helipad and helicopters for faster response when needed so the drive time numbers should be treated differently than for fire and law enforcement responders.

7. CONCLUDING REMARKS

This report provides a review of historic Class I Rail incidents within the MAASTO region, with a focused look at candidate rural communities along such corridors, and availability of emergency services to respond to rail incidents within these communities. The study highlights and assesses data sources both for studying historic rail incidents, and emergency responders, and maps incidents and responder locations in the region with a focus on rural communities picked for case studies. This project provides a look at the vulnerability of rural areas and communities within the MAASTO region that contain freight rail corridors.

Five major areas of recommendations were developed based on this project and are detailed below:

1. Create state level datasets that expand upon the HIFLD dataset

With HIFLD Open being shut down in October 2025, this puts a similar future study, as well as other studies that require analysis and planning around emergency responders, at risk. The HIFLD dataset served as the most comprehensive source of emergency responder information used in this study. While currently there exist sources that maintain access to key datasets under HIFLD (including those used in this study), their continued existence into the future is not guaranteed.

Creating and maintaining state-level / region-level emergency responder data would be a great asset to MAASTO states for any such future study. The HIFLD data offers seeding information that can be used to initially populate a state level resource. Over time, this could be improved by adding more comprehensive details on capacities and capabilities available to each emergency responder location, including but not limited to:

- Number of full-time professionals employed, and number of volunteering personnel for fire and law enforcement stations.
- Number of fire engines, ladder trucks, ambulances, HAZMAT equipment kits available to fire responders.
- Number of dispatchable battalions for fire stations.
- HAZMAT training information (number of firefighters certified).
- Number of dispatchable units for law enforcement.
- Number of ambulances and helicopters available for hospitals.
- Trauma center designation for hospitals.

2. Maintain and improve rail incident reporting

a. Maintaining public access to FRA Incident Reporting

Form 54 reporting served as the source for Class I Rail incidents analyzed for this study. This proved to be an invaluable resource that covers a vast range of information for each reported incident. The inclusion of latitude and longitude reporting as mandatory fields starting 2011 enabled precise mapping of each incident. Other fields that were crucial to this study were: date of incident, reporting railroad and parent railroad information, track type, accident type, accident cause, hazmat cars on vehicle, damaged hazmat cars, hazmat release, number of fatalities and injuries, cost of incurred damages, and mandatory reporting of hazardous materials and quantities released when applicable (through the descriptive field). It is crucial to continue allowing public access to this resource in its current form.

Current reporting includes a 'Narrative description' field that is used to detail any additional notes related to the incident, including cause of accident, nature of damage incurred, and details on HAZMAT releases. A suggested improvement would be to **add standardized fields for specific reporting of HAZMAT release substances (such as through STCC code, or name of chemical) and quantities outside of narrative description**. This would allow easier analysis of historical HAZMAT releases. Another field that could be included in the form would be to indicate whether the incident resulted in a fire or explosion.

b. Supplement incident reporting with damages borne by public, responder involvement

FRA rail incident database is aggregated using reporting performed by railroads and thus offer a railways perspective to incidents. Railroads are required to report details on cause of incident, damage to railroad and tracks, and injuries and fatalities among other things. This reporting, however, overlooks other information of interest to the public. States should consider **supplementing the FRA incidents database with state-maintained records for major incidents**. Such a dataset can link to reports and records within the FRA resource by including the FRA accident number.

While FRA Form 54 reporting requires damages to be reported by the railroad for each incident, this only includes damage to track and to equipment. However, there might be other damages incurred to the public due to rail incidents, such as damage to non-rail infrastructure (roadways, bridges, retaining walls etc.), damage to soil, water, and other natural resources in the vicinity, damages due to release of freight being transported (hazardous materials and otherwise), and costs of any additional resources used for mitigation and repair. This information on **cost of damages to public and links to any state-initiated studies and assessment reports for impact** of incident should be included in the state rail incident record.

Additionally, states should also keep **records of public emergency responder service reaction to incidents**. This should include details on dispatched units (such as number of battalions or squads, number of vehicles, time of arrival on scene) and actions performed (such as putting out fire, containing contamination, evacuation of population etc.).

3. Establish responder stations and improve staffing

While estimating accurate emergency response times is extremely challenging (due to factors such as preparation time required before dispatch from responding location, and vehicle and personnel being deployed at existing incidents or on patrol), this study uses drive times estimated through a GIS routing API as an approximate indicator for response times. As would be expected, the study found that in most situations, the fastest responder from a dispatch location would be fire and EMT responders, followed by law enforcement, followed next by hospital units. On the ground, law enforcement on patrol in the area might be able to respond faster than fire responders. While incident response times for the studied cities were found to be short on average, there were incidents where the fastest responder had a drive time of 30 or more minutes (7 out of 91 incidents for fire responders, 11 for law enforcement, and 28 for hospitals). With a tighter threshold of 20 minutes or higher, the corresponding number of incidents failing to meet the threshold go up to 8 for fire, 20 for law enforcement, and 50 for hospitals.

Establishing a critical distance or critical response time for emergency responders is extremely challenging, especially for railroad incidents in rural communities. NFPA 1710 Standard reads "... the fire department shall establish a time objective of four minutes (240 seconds) or less for the arrival of the first arriving engine company at a fire suppression incident …" [20]. Only 23 of the 91 incidents studied in the rural communities studied met this target. Having short drive times for responders can be extremely challenging for rural communities where fire stations are sparse and full time employed responders are few due to smaller population centers, and where roadway infrastructure may be limited. Assessing whether new fire stations should be established at critical locations along Class I Rail corridors currently not within a 4-minute drive time window from existing responder stations, could be beneficial, but also challenging in terms of costs and staffing.

States should aim to address areas where the first responder time is high (over 20 minutes) and consider the **feasibility of establishing new fire stations** in such locations to decrease the response time. This is a challenging endeavor that would need concerted efforts to direct funding to set up such stations, and even more challengingly, ensure adequate staffing through career professionals ideally, or through volunteer firefighters. Efforts should also be made towards solving **staffing issues at existing stations** that are either understaffed or operate through only volunteer firefighters. Interviewing local responder stations on challenges they face in general and specifically in staffing could be extremely helpful.

States should also study use of **drones and emergency Advanced Air Mobility (AAM) as an alternative** to establishing new stations and to staffing issues. Drones are being widely considered as a cost-effective way of providing emergency services in hard-to-reach areas for their potential to aid in disaster relief, assist in firefighting, deliver supplies, and even transport passengers.

4. Encourage responder training and cross border coordination

In addition to emergency responder coverage and response times, a key additional factor is responder training. This is especially important when considering rail incidents such as derailments and HAZMAT releases that require specialized effort beyond regular responder duties. This includes evacuation procedures, and assessment, containment and mitigation of spills (HAZMAT or otherwise).

States and counties should maintain and publish information on responder readiness through responder training and certifications at each responding station. States should actively encourage responders to take advanced and specialized training and should keep a statewide record of certifications earned.

This study also highlights situations where the closest available responders to an incident could be across a county, or even across a state border (such as in the case of Monroe, MI, Paola, KS, and Cloquet, MN. **Counties should consider setting up cross border emergency responder coordination plans** that leverage the specific training and equipment availability at each responder station elaborating on roles and responsibilities for various coordinating teams based on the type of incident being responded to. Counties could also conduct coordination drills for responders across borders to ensure responders stay aware of guidelines and plans for coordination.

5. Conduct statewide vulnerability analysis for communities and locations at risk

While this study offers a perspective on vulnerability of select rural communities towards rail incidents, states should consider conducting larger and more comprehensive studies to identify all vulnerable communities along major rail corridors and lines. Identifying key locations susceptible to rail incidents, corridors frequented by HAZMAT transportation, rail-road crossings with history of incidents, and incident locations with high responder response times across the state can offer a great insight into priority issues to be solved and can illustrate need for fundings support in certain locations. A large majority of incidents leading to injuries and death occur at rail-highway crossings and are attributed to highway user being inattentive or intentionally ignoring warnings and rules. Efforts should be undertaken to evaluate rail-highway crossings for history of incidents and condition of warning devices and gating equipment installed.

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9. APPENDIX A – SAMPLE FRA FORM 54: INCIDENT REPORT

DEPARTMENT OF TRANSPORTATION
FEDERAL RAILROAD ADMINISTRATION

RAIL EQUIPMENT ACCIDENT/INCIDENT REPORT

OMB Approval No: 2130-0500

1. Name of Reporting Railroad: Marquette Rail LLC [MQT]	1a. Alphabetic Code: MQT	1b. Railroad Accident/Incident No.: MQT389023D
2. Name of Other Railroad or Other Entity with Consist Involved	2a. Alphabetic Code	2b. Railroad Accident/Incident No.
3. Name of Railroad or Other Entity Responsible for Track Maintenance *(single entry)*: Marquette Rail LLC [MQT]	3a. Alphabetic Code: MQT	3b. Railroad Accident/Incident No.: MQT389023D
4. U. S. DOT Grade Crossing Identification Number	5. Date of Accident/Incident: month 0 4, day 1 4, year 2023	6. Time of Accident/Incident: 9:15 AM [X] PM [ ]

7. Type of Accident/Incident *(single entry in code box)*: 1. Derailment 2. Head on collision 3. Rear end collision 4. Side collision 5. Raking collision 6. Broken train collision 7. Hwy-rail crossing 8. RR grade crossing 9. Obstruction 10. Explosion-detonation 11. Fire/violent rupture 12. Other impacts 13. Other *(describe in narrative)* — Code: 01

8. Cars Carrying HAZMAT	9. HAZMAT Cars Damaged/Derailed	10. Cars Releasing HAZMAT	11. People Evacuated	12. Subdivision
N/A	N/A	N/A	N/A	MANISTEE

13. Nearest City/Town	14. Milepost *(to nearest tenth)*	15. State Abbr.	Code	16. County
MANISTEE	112.7	MI	26	MANISTEE

17. Temperature (F) *(specify if minus)*: 78 °F

18. Visibility (single entry): 1. Dawn 2. Day 3. Dusk 4. Dark — Code: 2

19. Weather *(single entry)*: 1. Clear 2. Cloudy 3. Rain 4. Fog 5. Sleet 6. Snow — Code: 1

20. Type of Track: 1. Main 2. Yard 3. Siding 4. Industry — Code: 1

21. Track Name/Number: SINGLE MAIN TRACK

22. FRA Track Class (1-9, X) — Code: 1

23. Annual Track Density *(gross tons in millions)*: 30.95

24. Time Table Direction: 1. North 2. South 3. East 4. West — Code: 1

25. Type of Equipment Consist *(single entry)*: 1. Freight train 2. Passenger train-Pulling 3. Commuter train-Pulling 4. Work train 5. Single car 6. Cut of cars 7. Yard/switching 8. Light loco(s). 9. Maint./inspect. car A. Spec. MoW Equip. B. Passenger Train-Pushing C. Commuter Train-Pushing D. EMU E. DMU — Code: 7

26. Was Equipment Attended? 1. Yes 2. No — Code: Y

27. Train Number/Symbol: MANI

28. Speed *(recorded speed if available)* R - Recorded E - Estimated: 011 MPH — Code: R

29. Trailing Tons (gross tonnage, excluding power units): 939

30. Type of Territory *(enter codes that apply)*
Signalization *(Mandatory)*: 1. Signaled 2. Not Signaled — 2
Method of Operation/Authority for Movement *(Mandatory)*: 1. Signal Indication 2. Direct Train Control 3. Yard/Restricted Limits 4. Block Register Territory 5. Other Than Main Track — 3
Supplemental/Adjunct Codes *(Mandatory*)*
* Mandatory to the extent that all applicable codes are entered

30a. Remotely Controlled Locomotive? 0 = Not a remotely controlled operation 1 = Remote control portable transmitter 2 = Remote control tower operation 3 = Remote control portable transmitter - more than one remote control transmitter — Code: 0

31. Principal Car/Unit	a. Initial and Number	b. Position in Train	c. Loaded *(yes/no)*
(1) First involved *(derailed, struck, etc)*	AEX026612	002	N
(2) Causing *(if mechanical, cause reported)*		000	

32. If any railroad employee(s) tested for drug/alcohol use, enter the number that were positive in the appropriate box. Alcohol: — Drugs: —

33. Was this consist transporting passengers? *(y/n)*: No

34. Locomotive Units (Exclude EMU, DMU, and Cab Car Locomotives.)	a. Head End	Mid Train b. Manual	Mid Train c. Remote	Rear End d. Manual	Rear End e. Remote
(1) Total in Train	3	0	0	0	0
(2) Total Derailed	0	0	0	0	0

35. Cars (Include EMU, DMU, and Cab Car Locomotives.)	Loaded a. Freight	Loaded b. Pass.	Empty c. Freight	Empty d. Pass.	e. Caboose
(1) Total in Equipment Consist	3	0	17	0	0
(2) Total Derailed	0	0	2	0	0

36. Equipment Damage This Consist	37. Track, Signal, Way, & Structure Damage	38. Primary Cause Code	39. Contributing Cause Code
$ 13,684	$ 0	M204	

Number of Crew Members / Length of Time on Duty

40. Engineers/Operators	41. Firemen	42. Conductors	43. Brakemen	44. Engineer/Operator	45. Conductor
1		1		Hrs: 01 Mins: 15	Hrs: 01 Mins: 15

Casualties to:	46. Railroad Employees	47. Train Passengers	48. Others	49a. Special Study Block A	49b. Special Study Block B
Fatal	0	0	0	OTH	000-000-000
Nonfatal	0	0	0		

50. Latitude: 44.260757

51. Longitude: -86.3197

52. Narrative Description *(Be specific, and continue on separate sheet if necessary)*

TRAIN CREW WAS PULLING NORTH AT 11 MPH WHEN THE ENGINEER LOOKED BACK AND NOTED THE 2ND CAR NOT TRAVERSING CORRECTLY. UPON INVESTIGATION, THE CREW FOUND 2 CARS DERAILED AS A RESULT OF THE EVENT. ALSO DISCOVERED THE CUSTOMER HAD RELEASED RAILCAR AEX 26612 AS AN EMPTY, HOWEVER, IT WAS DETERMINED THAT THE RAILCAR WAS PARTIALLY LOADED WITH THE PRODUCT CAKED HEAVILY TO ONE SIDE, CAUSING AN UNBALANCED LOAD WHICH WAS THE CAUSE OF THE DERAILMENT.

53. Typed/Printed Name & Title of Preparer	54. Signature	55. Date

NOTE: **This report is part of the reporting railroad's accident report pursuant to the accident reports statute and, as such shall not "be admitted as evidence or used for any purpose in any suit or action for damages growing out of any matter mentioned in said report...." 49 U.S.C. 20903. See 49 C.F.R. 225.7 (b).**

This collection of information is mandatory under 49 CFR 225, and is used by FRA to monitor national rail safety. Public reporting burden is estimated to average 2 hours per response, including the time for reviewing instructions, searching existing databases, gathering and maintaining the data needed, and completing and reviewing the collection of information. The information collected is a matter of public record, and no confidentiality is promised to any respondent. Please note that an agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a currently valid OMB control number. The OMB control number for this collection is 2130-0500.

FORM FRA F 6180.54 (Rev. 08/10) OMB approval expires 07/30/2023

10. APPENDIX B – MAASTO REGION MAPS OF CLASS I RAIL INCIDENTS

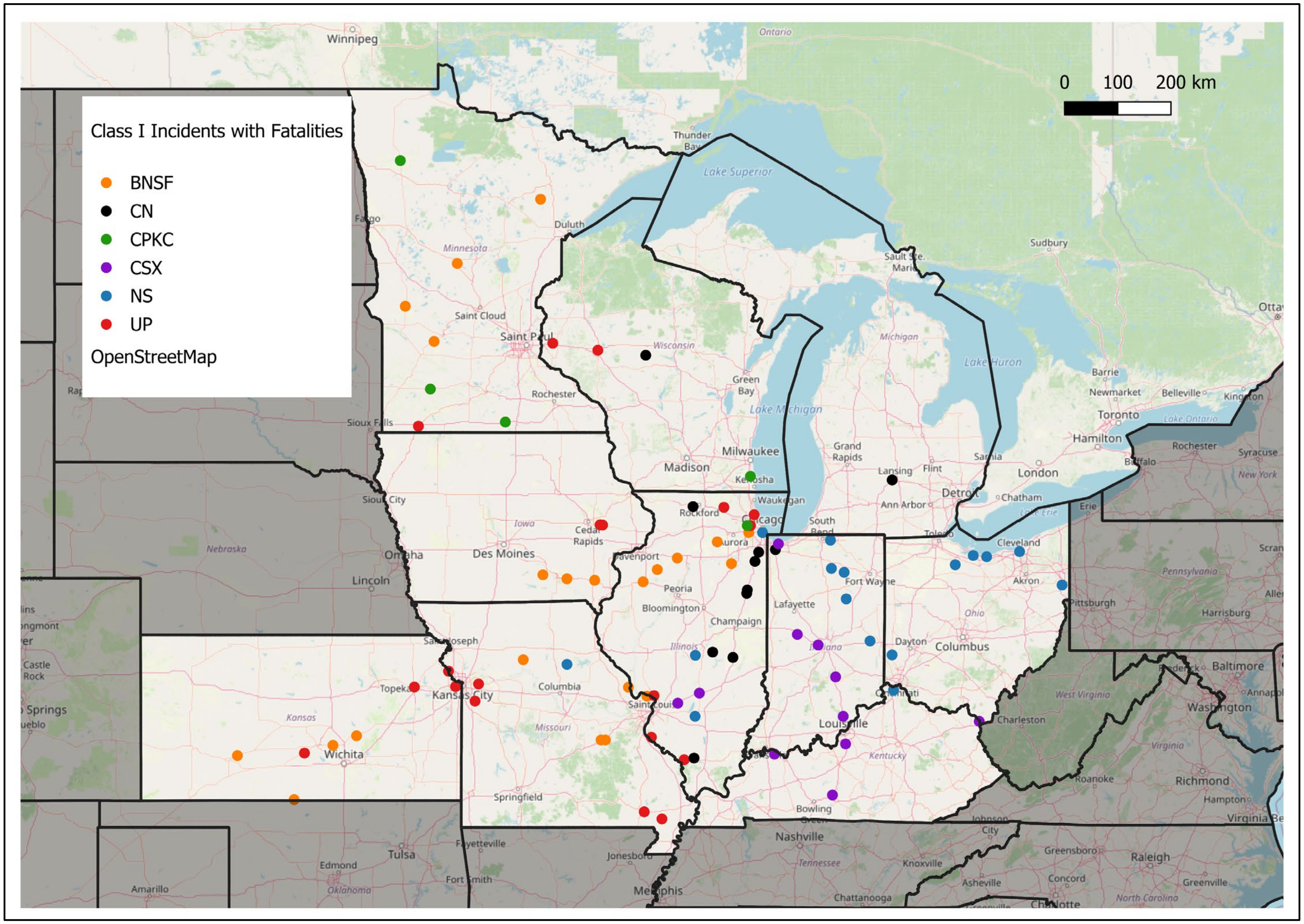

Figure 36: Class I Incidents Leading to Fatalities, 2011-2023. (Source: MAFC using FRA Train Accident data [11]).

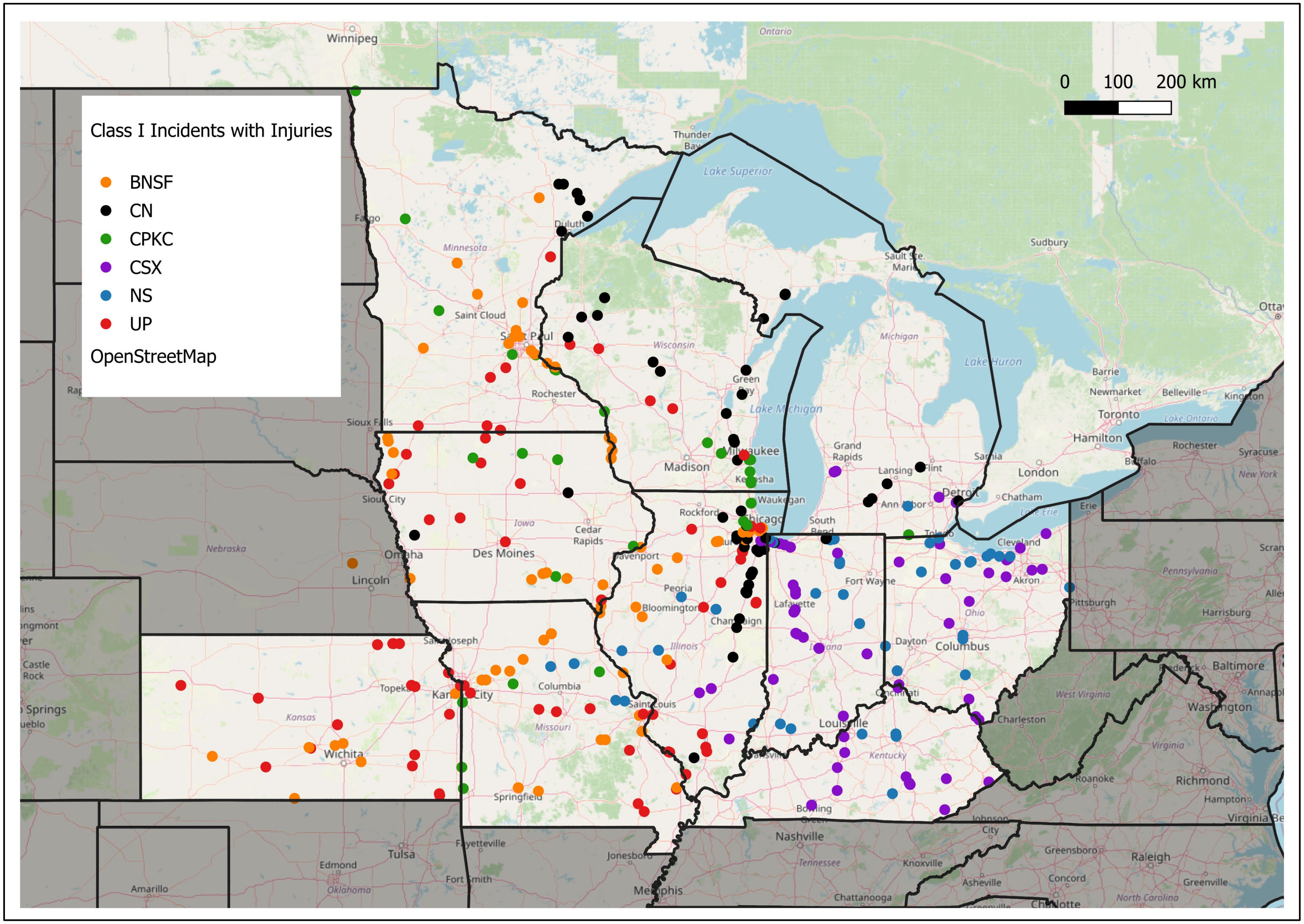

Figure 37: Class I Incidents Leading to Injuries, 2011-2023. (Source: MAFC using FRA Train Accident data [11]).

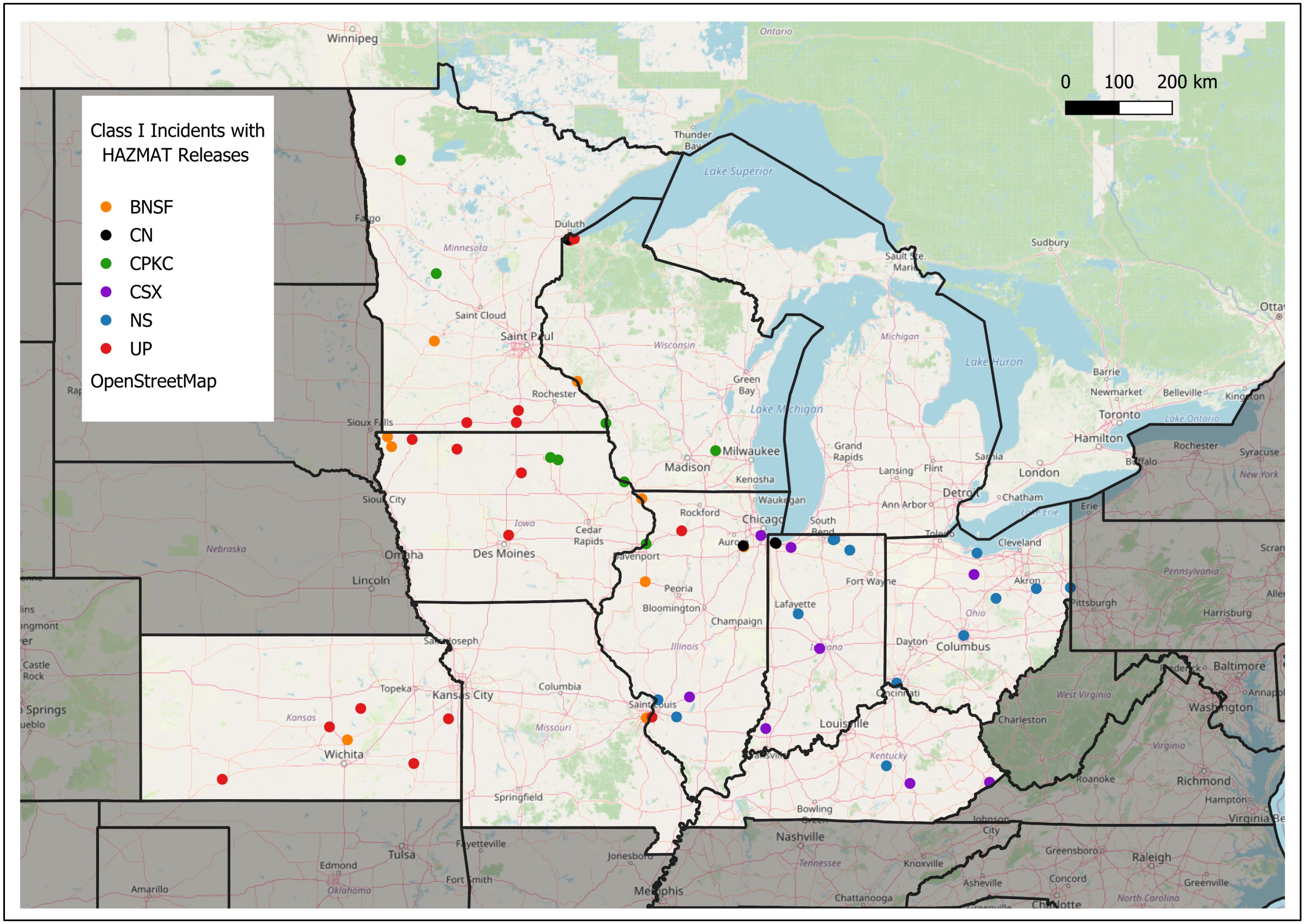

Figure 38: Class I Incidents Leading to HAZMAT Releases, 2011-2023. (Source: MAFC using FRA Train Accident data [11]).

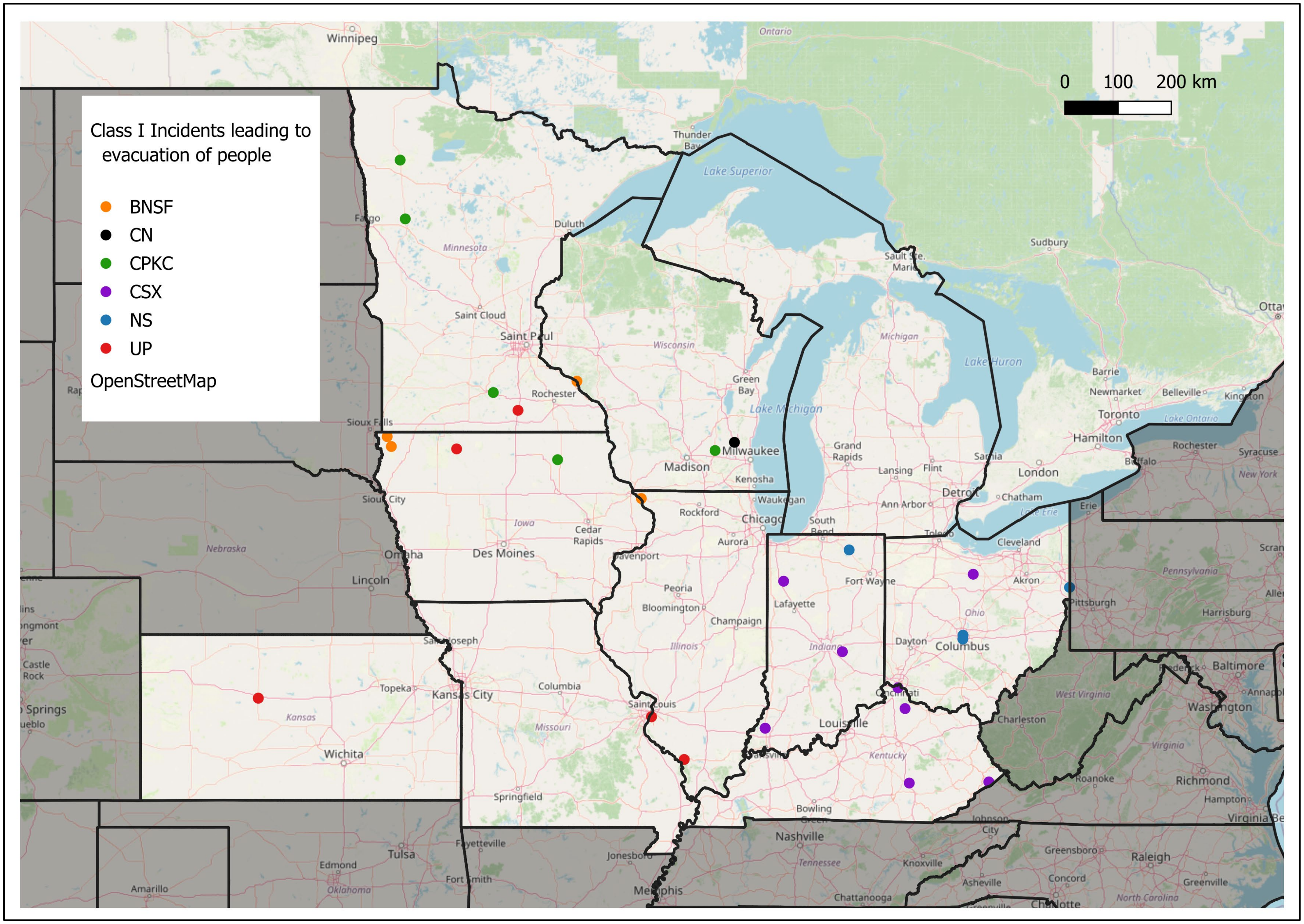

Figure 39: Class I Incidents Leading to Evacuations, 2011-2023. (Source: MAFC using FRA Train Accident data [11]).

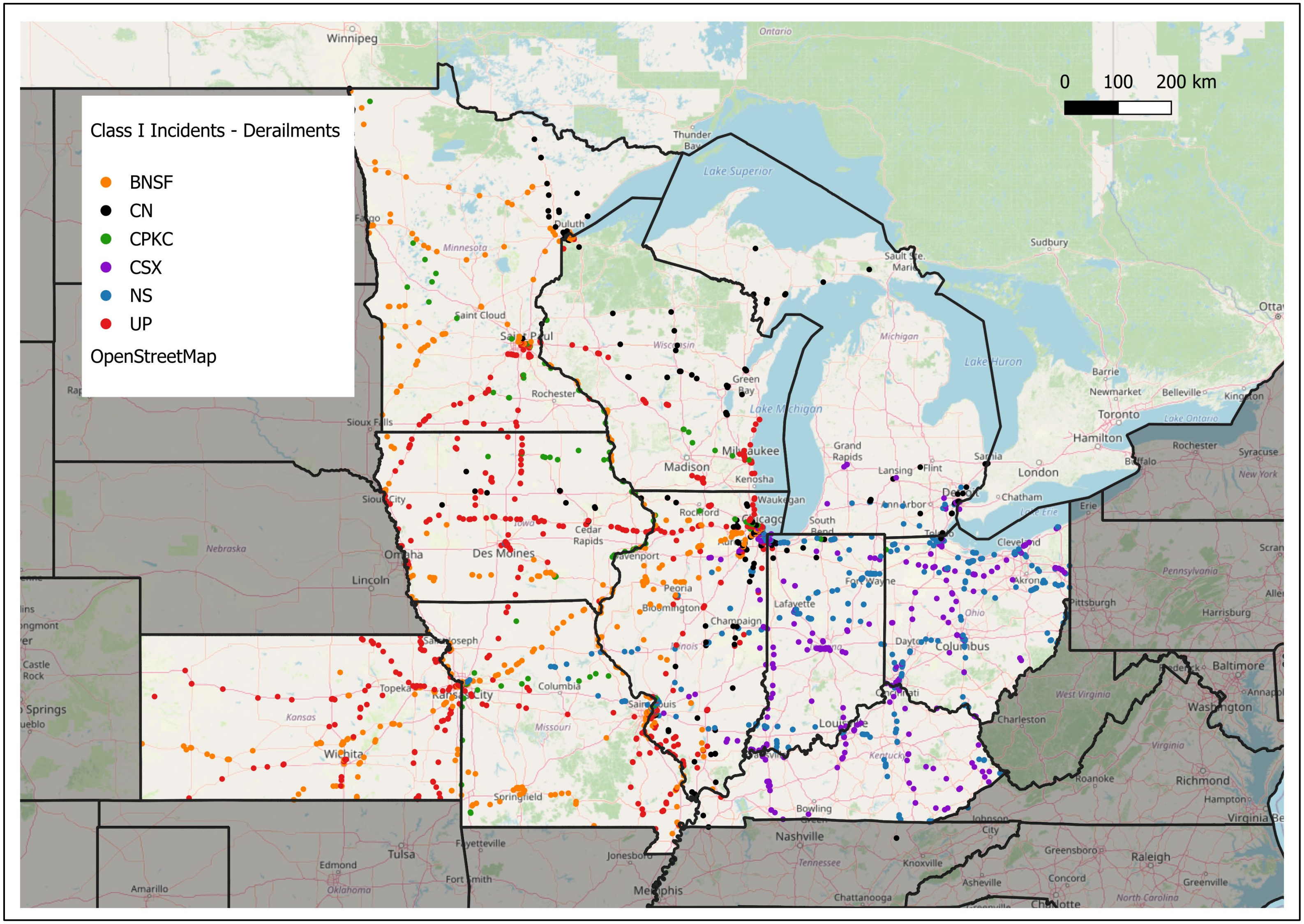

Figure 40: Class I Derailment Incidents, 2011-2023. (Source: MAFC using FRA Train Accident data [11]).

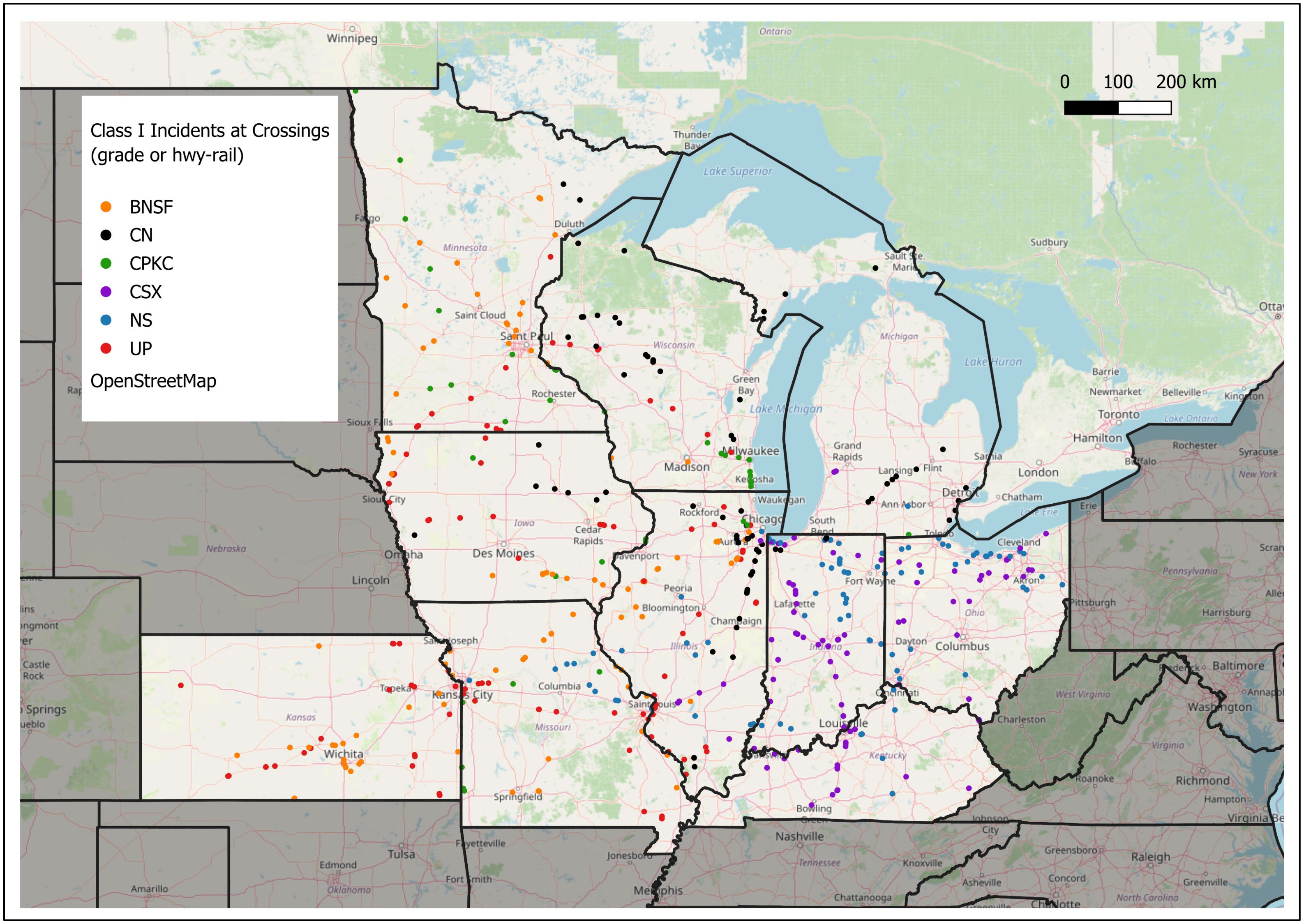

Figure 41: Class I Incidents at Rail-Highway Crossings, 2011-2023. (Source: MAFC using FRA Train Accident data [11]).

MID-AMERICA FREIGHT COALITION

www.midamericafreight.org

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