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Southcentral Michigan Regional Traffic Safety Plan

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Acknowledgements

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Table of Contents

List of Tables

List of Figures

Executive Summary

The Southcentral Regional Traffic Safety Plan is a framework for addressing the region's key safety needs and reducing fatalities and serious injuries on all applicable roads. The plan encompasses all counties served by the Southcentral Michigan Planning Council and includes Barry, Branch, Calhoun, Kalamazoo, and St. Joseph Counties. The framework is developed in conjunction with the State of Michigan Strategic Highway Safety Plan and is based on guidance provided in the Federal Highway Administration document "Developing Safety Plans: A Manual for Local Rural Road Owners". The development of the safety plan is a data-driven and coordinated multi-disciplinary effort involving multiple local, regional, and state agencies, and is guided by a cyclical six-step process which includes:

1. Establish Leadership
2. Analyze Safety Data
3. Determine Emphasis Areas
4. Identify Strategies
5. Prioritize and Incorporate Strategies
6. Evaluate and Update Regional Safety Plan

This report presents the first five steps of the process. In comparison, the final step consists of regular evaluation and plan updates. As such, the intent of this safety plan is to be a living and breathing document.

A key component of this safety plan is the identification of key emphasis areas which contribute to crashes in the region. Their identification is based on thorough analysis of regional and local safety conditions, historical trends, and stakeholder input. Four high priority and eleven additional emphasis areas were identified throughout this process. These include:

High priority emphasis areas

- Lane Departure
- Intersection Safety
- Pedestrian and Bicycle Safety
- Drivers Age 24 and Younger

Additional emphasis areas

- Access Management
- Commercial Motor Vehicle Safety
- Distracted Driving
- Impaired Driving
- Occupant Protection
- Motorcycle Safety
- Senior Mobility Age 65 and Older
- Speed Management
- Traffic Incident Management
- Traffic Records and Information Systems
- Traffic Safety Engineering

Potential countermeasures and strategies listed for each identified emphasis area are developed using the 4 E's of Safety approach (engineering, enforcement, education, and emergency services). Detailed information on select countermeasures can be found in the appendices listed at the end of this report.

Several statistical and geographic information systems techniques were additionally undertaken to assist in the prioritization and implementation process of this safety plan. This resulted in the identification of potential high risk areas, segments and intersections based on crash frequency and crash rate methods. Detailed information on each of these can be found in the accompanying appendices.

1.0 Introduction

1.1 Background

The purpose of the Southcentral Michigan Regional Traffic Safety Plan (RTSP) is to develop a framework for addressing the region's key safety needs and reduce fatalities and serious injuries on all applicable roads. The occurrence of these events is not only a personal tragedy, but also impacts the region's economy and wellbeing. According to the Michigan Traffic Crash Facts, in 2015, one out of 10,303 people in Michigan were killed in a traffic crash, and one out of every 132 was injured[1]. These numbers tend to occur disproportionately in rural areas despite the fact that approximately 25% of the Michigan population lives in rural regions[2]. The area under this plan encompasses all counties served by the Southcentral Michigan Planning Council (SMPC) and includes (Barry, Branch, Calhoun, Kalamazoo, and St. Joseph Counties). **Figure 1** illustrates the geographic extent of the study area. Because Barry County is also included in the West Michigan Regional Planning Commission RTSP, it is covered in a limited scope in this plan.

Figure 1: Southcentral Michigan Regional Traffic Safety Study Area

The Southcentral Michigan RTSP has been developed in concert with a comprehensive list of local and regional partners, in conjunction with the State of Michigan Strategic Highway Safety Plan (SHSP) and the U.S. Department of Transportation (DOT) Federal Highway Administration (FHWA) guidance on developing local safety plans. The region's key safety needs are data-driven and identified via coordination with local, regional, and state agencies. Safety needs are addressed by incorporating appropriate engineering, enforcement, education, and emergency services measures, also known as the 4 E's of Safety. The 4 E's of Safety represent the base framework of this study. The intent of the safety plan is to be a living document which is continuously evaluated and maintained to address the changing transportation safety needs of the region. Its proper implementation can be an effective tool for saving lives, reducing injuries and minimizing economic loss in the region's transportation network.

1.2 Mission, Vision, & Goals

The vision of the SMPC is to:

> *"…improve the economic, environmental, and fiscal health of member organizations through transportation, land use and environmental planning, economic development, and efficient local staffing. The SMPC serves local units of governments, the Michigan Department of Transportation, and Road Commissions/Departments. Regional efficiencies are realized through economies of scale, partnerships, and leveraging of resources."*
>
> - Source: Southcentral Michigan Planning Council, http://smpcregion3.org/about/

SMPC recognizes that transportation is critical to connecting and moving people, goods and services. In concert with this vision the SMPC provides regional transportation planning services by working closely with other regional agencies including the Kalamazoo Area Transportation Study (KATS) and the Battle Creek Area Transportation Study (BCATS).

This vision is consistent with MDOT's general mission to *"Provide the highest quality integrated transportation services for economic benefit and improved quality of life"* and the State of Michigan SHSP vision of moving *"Toward Zero Deaths on Michigan Roadways".*

2.0 Safety Partners/Stakeholders

The development of this safety plan was an effort involving local, regional, and state agencies. Throughout the course of a year meetings were held with interested stakeholders to identify the needs and develop the core foundation of this safety plan. The following is a list of the agencies which were consulted throughout the development process of this plan. This list is by no means exhaustive and should be updated throughout the implementation and maintenance of the safety plan.

- Battle Creek Area Transportation Study
- Calhoun County Road Department
- Charleston Township
- City of Kalamazoo
- City of Portage
- Comstock Township
- Kalamazoo Area Transportation Study
- Kalamazoo County Sheriff's Office
- MDOT Kalamazoo Transportation Service Center
- MDOT Local Agency Programs
- MDOT Marshall Transportation Service Center
- MDOT Southwest Region
- MDOT Traffic & Safety
- Michigan 26th State Senate District
- Michigan State Police Office of Highway Safety Planning
- Michigan State Police Traffic Crash Reporting Unit
- Road Commission of Kalamazoo County
- Southcentral Michigan Planning Council
- Southwest Michigan First
- St. Joseph County Road Commission
- Texas Township
- Village of Augusta

3.0 Methodology

The Southcentral Michigan RTSP is a data-driven and coordinated multi-disciplinary effort involving multiple local, regional, and state agencies. The process is guided by a six-step process as identified in the FHWA guide on developing safety plans (**Figure 2**). At the inception of this process lies the identification of the leadership to guide the safety plan process. This is followed by extensive safety data analysis, determination of regional emphasis areas, identification of countermeasures and strategies as it pertains to the identified emphasis area, prioritization of the strategies, and evaluation and updates to the regional safety plan. This development process is cyclical, thus following the evaluation of the safety plan the process reverts backs to the first step. This development process was followed throughout the creation of this report. The primary components were both data-driven and involved stakeholder input.

Figure 2: Southcentral Michigan Regional Traffic Safety Plan Development Process

In order to realize the intent of the data-driven section, traffic crash data was obtained from MDOT for 2010-2014 and was supplemented with data obtained from the Michigan Traffic Crash Facts. These five years represent the most recent years of available crash data during the beginning phases of the development of this report. Only non-deer, non-animal related crashes were considered in the analysis to minimize the element of randomness associated with these types of crashes. While these two animal categories are separate classifications in the crash years applicable to this study, 2016 changes to the Michigan State Police UD-10 forms have combined these two categories, thus future crash related updates must be conscious of this particular modification. Lastly, information obtained during the data analysis phase was supplemented with information and discussions occurring during the several meetings held with the various stakeholders of the multiple local, regional, and state agencies.

Several appropriate statistical and geographical techniques were used to assess traffic crashes in the Southcentral Michigan region. These included analyses of the region as a whole to develop baseline data, as well as a per county basis assessment of each of the five Southcentral Michigan counties to identify potential location specific trends in the data. Historical tendencies were also examined to assess any changes in the roadway safety in the region. In these

cases, moving rolling averages were utilized to minimize random yearly fluctuations in the traffic crashes. Geographical Information Systems (GIS) methods were also utilized to identify location specific patterns or hot spots, as well as to identify those segments or intersections most susceptible to traffic crashes. When applicable and/or feasible, crashes were assessed in terms of crash frequency, crash rate, and differentiated between the various types of crashes to present a holistic representation of transportation safety in the region.

Identification of potential safety countermeasures and strategies based on the data analysis and stakeholder involvement was established using the 4 E's of Safety as the base framework. The 4 E's of Safety include engineering, enforcement, education, and emergency services. Their definition is presented in **Figure 3**.

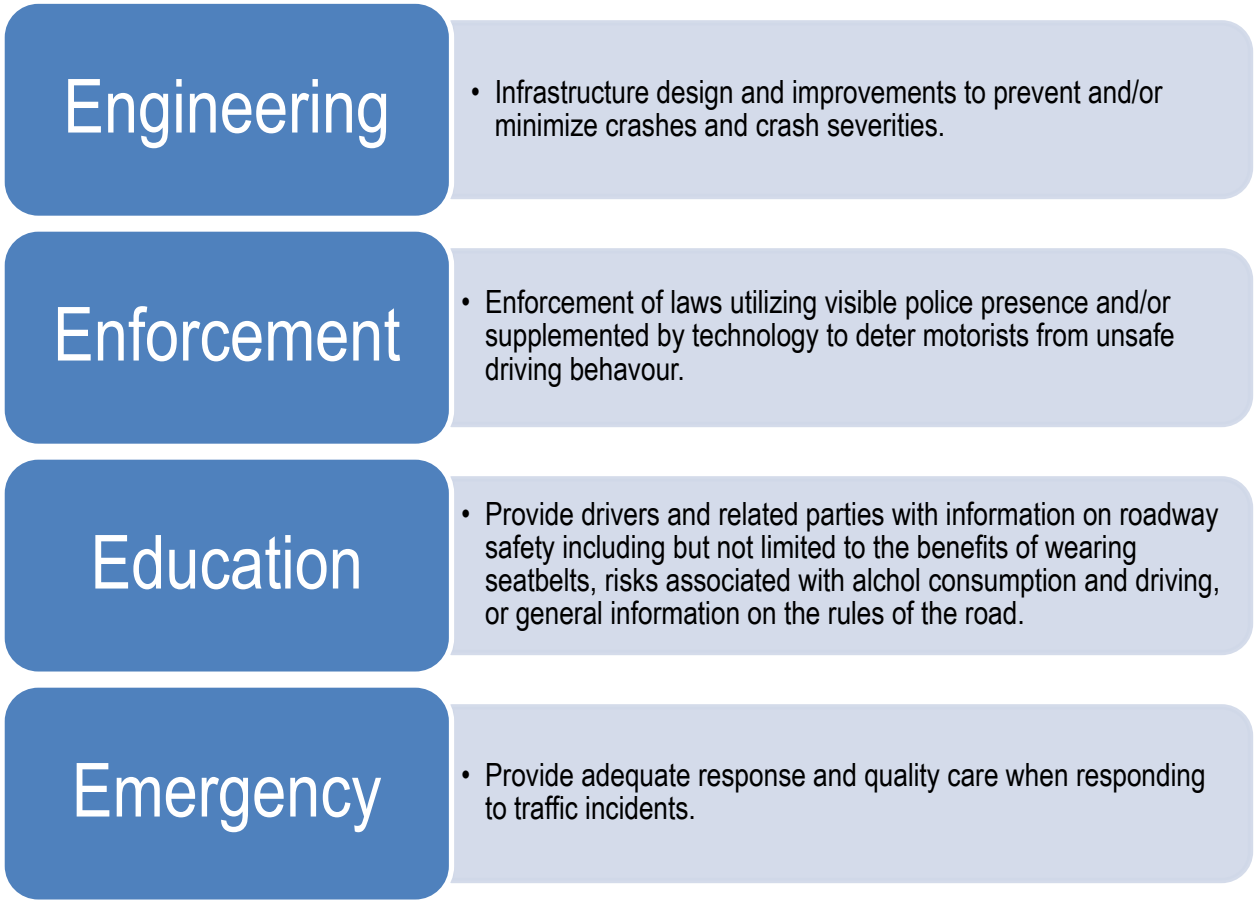


Figure 3: The 4 E's of Safety

It should be noted that this study does not differentiate between the pavement type (i.e. paved vs unpaved) in which these crashes occur. As a result separate countermeasures specific to unpaved roadways are not included and/or detailed as the majority of the countermeasures listed under each specific emphasis area are generally applicable to both paved and unpaved facilities.

The subsequent chapters present a regional traffic safety assessment, detailed description of the identified emphasis areas, safety plan implementation and evaluation, and next steps. Additional information is provided in the appendices at the end of this report. These include a regional crash type matrix, summary of select engineering countermeasures, lists of those segments and intersections most susceptible to traffic crashes, and county crash density maps of various crash patterns.

4.0 Regional Analysis

The regional analysis section is presented to provide historical context to the traffic crash characteristics in the region, as well as a baseline condition for the region as a whole. The former is of particular importance in order to allow agencies to track progress following the implementation of the identified countermeasures and/or strategies. Several traffic crash characteristics are provided under this section, several of which are presented as five-year rolling averages to smooth out and account for some of the random patterns within the annual traffic crashes. These include:

- Crash severity distribution
- Number of fatalities
- Number of serious injuries
- Rate of fatalities per 100 million vehicle mile traveled (VMT)
- Rate of serious injuries per 100 million VMT
- Number of non-motorized fatalities and non-motorized serious injuries
- Number of crashes, fatalities and serious injuries by County
- Rate of fatalities and serious injuries per 100 million VMT by County
- Number of single vehicle lane departure crashes

In addition to these regional measures, an urban and rural comparison is provided to distinguish and identify any potential patterns between these two categories. These were identified upon discussions with stakeholders at the various meetings held throughout this process. Similar to the data throughout this report, deer or animal involved crashes are excluded from the regional crash data assessment. In certain scenarios, historical crash data from 2005-2014 was included to provide a more holistic approach towards the historical trends.

4.1 Regional Crash Analysis

Figure 4 below illustrates the severity of the region's traffic crashes between 2010 and 2014. A total of 64,895 crashes occurred within the five year period in Southcentral Michigan. Of those crashes approximately 0.4% were fatal crashes, 2.0% were serious injury crashes, 18.5% were crashes involving other levels of injuries, while the remaining 79.1% were property damage only (PDO) crashes.

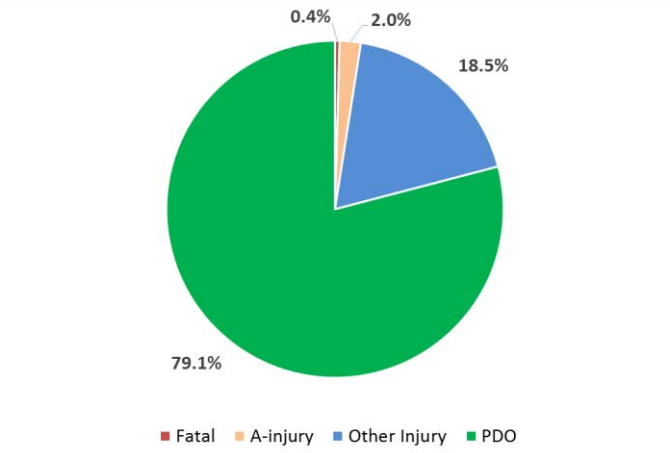


Figure 4: Southcentral Michigan Crash Severity Distribution, 2010-2014

Figure 5 presents the number of 2005-2014 fatal and injury crash frequencies in terms of five-year rolling averages for the Southcentral Michigan region. The data indicates that the region has experienced almost linear monotonic decreases in both fatal and serious injury crashes between 2005 and 2014. On average the five-year rolling average reductions were approximately 2.5% for fatal and 4.7% for serious injury crashes.

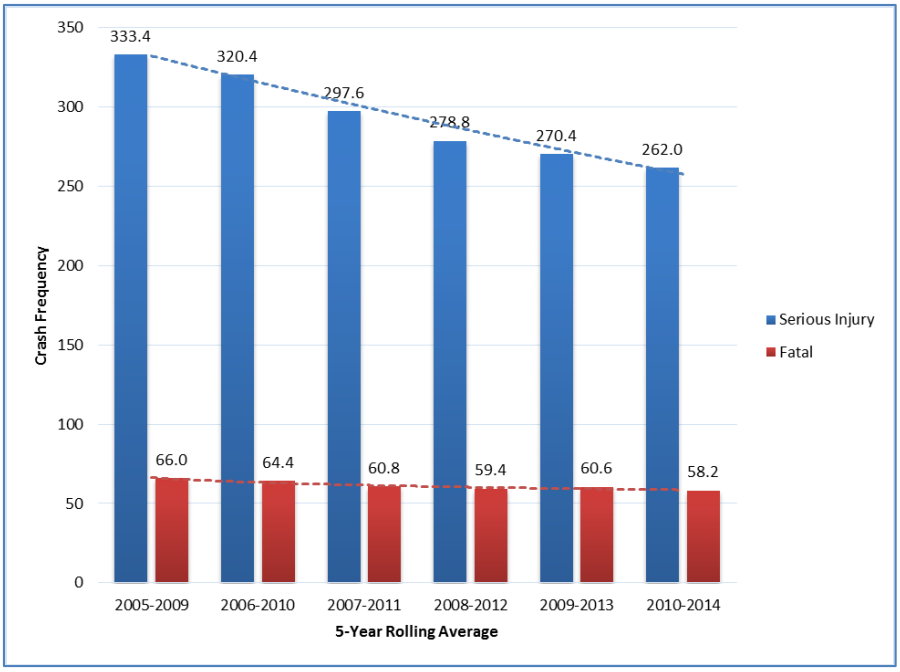


Figure 5: Number of Fatal and Injury Crashes for Southcentral Michigan, 2005-2014 Five-Year Rolling Average

The crash rate of the fatal and serious injury crashes in Southcentral Michigan between 2005 and 2014 is presented in **Figure 6**. Crash rate is a measure of safety which normalizes crashes data by taking into account traffic volumes. The crash rate is expressed in terms of 100 million Vehicle Miles Traveled (VMT) and is presented as five-year rolling averages. Similar to the regional crash frequencies, serious injury crashes per 100 million VMT declined linearly between 2005 and 2014 with an average reduction of approximately 3.8%. Fatal crashes per 100 million VMT followed a similar though less linear relationship with an average reduction of approximately 1.6%.

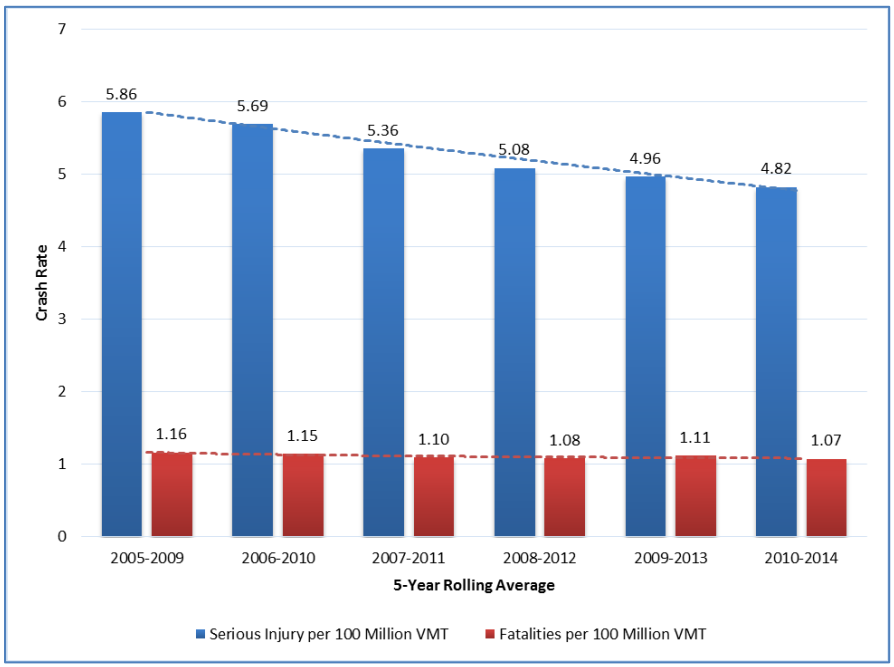


Figure 6: Fatal and Injury Crashes per 100 Million VMT for Southcentral Michigan, 2005-2014 Five-Year Rolling Average

Figure 7 illustrates the frequency of non-motorized fatal and serious injury crashes in the Southcentral Michigan region. Comparable to the crash frequency and crash rate per 100 million VMT figures, non-motorized fatal and injury crashes have overall declined between 2005 and 2014, albeit via a logarithmic trend. These crashes declined with an average rate of 3.8% between the historical time period, with the largest drop occurring between the 2005-2009 and 2006-2010 rolling average.

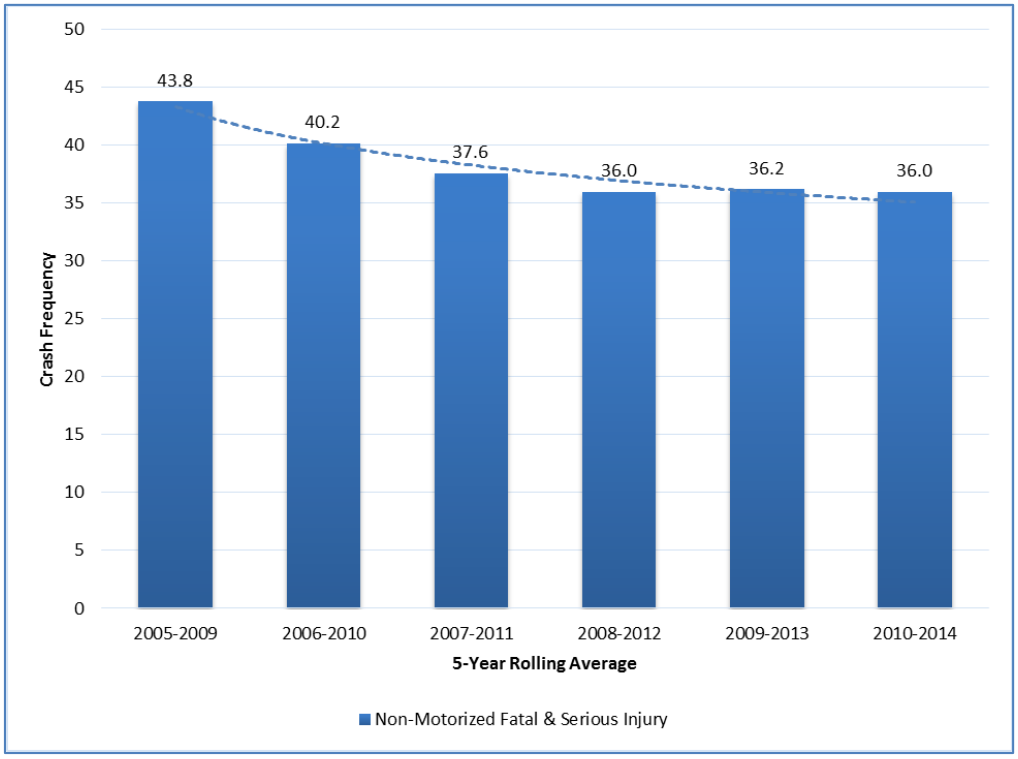


Figure 7: Non-Motorized Fatal and Injury Crashes for Southcentral Michigan, 2005-2014 Five-Year Rolling Average

In terms of crash distribution within the region, the data illustrates variability between each county (**Table 1**). As expected, counties with the higher VMT on their roadway network generally share the highest proportion of total, fatal, and/or serious injury crashes. Of the five counties, Kalamazoo and Calhoun Counties comprised almost 80% of the total crashes, 60% of the fatalities, and 65% of the serious injuries occurring in the region between 2010 and 2014.

Table 1: Southcentral Michigan Crash Distribution by County, 2010-2014

County	Total Crashes		Fatal Crashes (K)		Serious Injury Crashes (A)	
	No.	Percent	No.	Percent	No.	Percent
Barry	4,050	6.2%	46	15.8%	156	11.9%
Branch	3,919	6.0%	22	7.6%	120	9.2%
Calhoun	17,115	26.4%	64	22.0%	312	23.8%
Kalamazoo	34,524	53.2%	112	38.5%	547	41.8%
St. Joseph	5,287	8.1%	47	16.2%	175	13.4%
Southcentral MI (compared to State)	**64,895**	**5.5%**	**291**	**6.9%**	**1,310**	**6.0%**
Michigan	**1,174,503**	**na**	**4,214**	**na**	**21,836**	**na**

Note: Percentages are based on the regional or state totals for that particular category.

The distribution of the crashes by county within the Southcentral Michigan region can be best illustrated by crash rates. This measure of safety normalizes crash data by taking into account exposure variables such as traffic volumes, thus providing a more effective comparison between the various locations. Similar to the previous primary crash rate measures, crash rates on a by county basis are presented in terms of 100 million VMT. Values are presented for both fatal and serious injury crashes combined. **Figure 8** illustrates the fatal and serious injury crashes by county for 100 million VMT between 2010 and 2014. The regional Southcentral Michigan and statewide average crash rate are indicated in the figure as well for comparative purposes.

The data illustrates that the average county-based regional crash rate for fatal and serious injuries is slightly higher than the statewide average. On a per county basis, three of the five Counties exceed the regional and statewide average. Among these, Barry and St. Joseph Counties reported the highest combined fatal and serious injury crash rate.

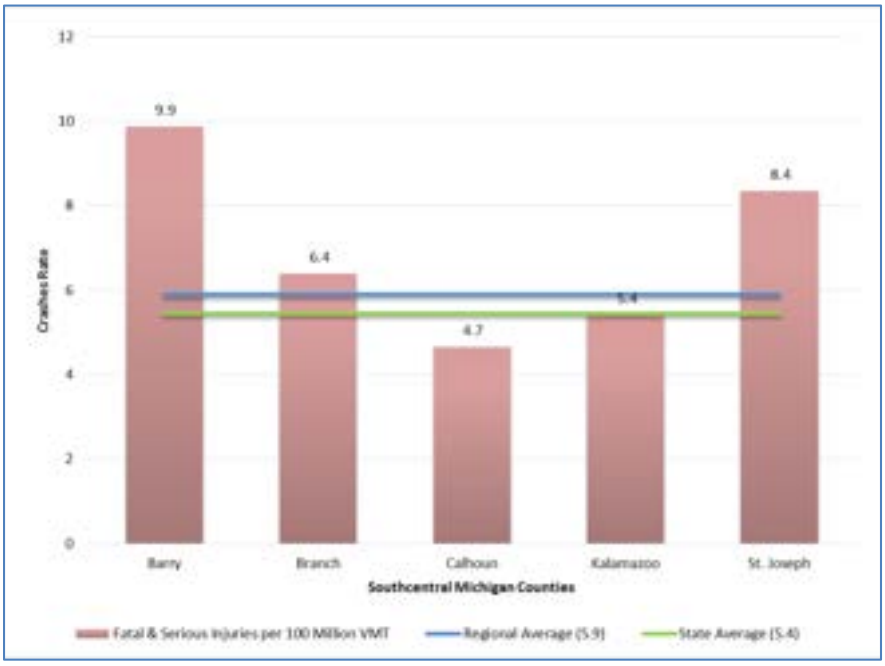


Figure 8: Fatal and Injury Crashes per 100 Million VMT for Southcentral Michigan Counties, 2010-2014

In addition to the overall fatal and serious injury crashes and distributions, regional single vehicle lane departure crashes were examined based on comments and discussions from the several stakeholder meetings. **Figure 9** illustrates single vehicle lane departure crashes for the Southcentral Michigan region between 2005 and 2014.

The data illustrates that single vehicle lane departure crashes (or so called run-off-the-road crashes) have generally fluctuated year to year between the 2005 and 2014 time period, with certain trends of decline evident towards the more recent years. While overall tendencies for single vehicle lane departure crashes as well as overall fatal and serious injury crashes generally indicate positive trends, caution should be used when projecting the future results, in particular for the single vehicle lane departure crashes which are characterized by significant yearly variations.

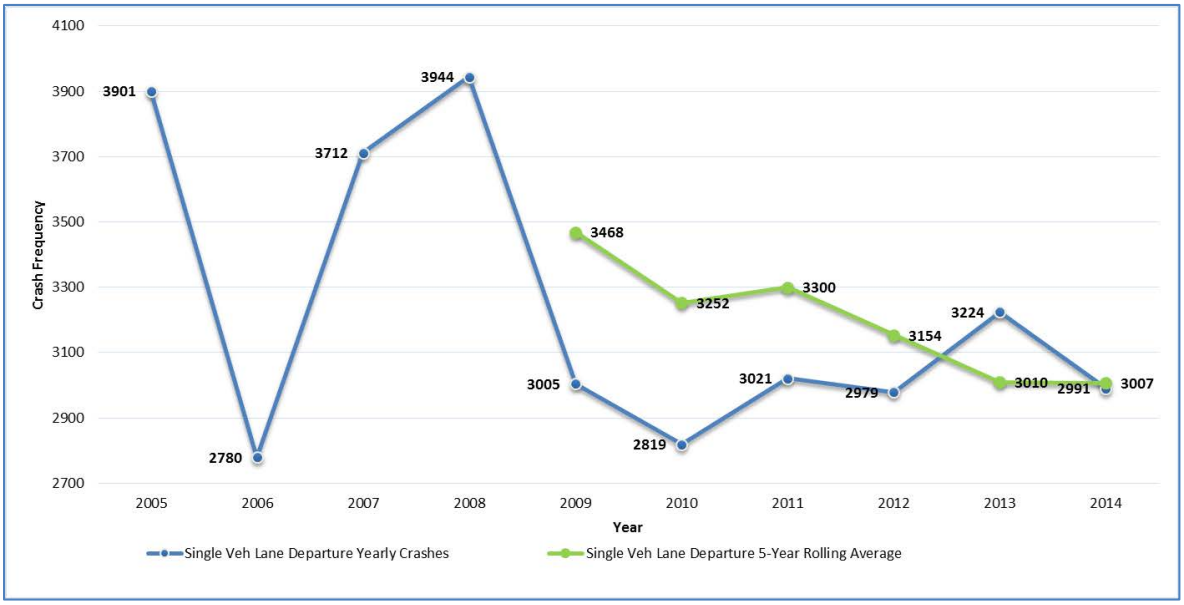


Figure 9: Single Vehicle Lane Departure Crashes for Southcentral Michigan, 2005-2014

4.2 Urban and Rural Regional Crash Analysis

In addition to the primary regional measures, the urban and rural regional crash analysis section presents additional benchmark statistics to help provide context to the current urban and rural traffic safety conditions in the Southcentral Michigan region. These include regional distributions and historical trends on crash severities for both urban and rural crashes within the region. Urban crashes are defined as those crashes which occur within an Adjusted Census Urban Boundary (ACUB). Comparatively rural crashes are defined as those crashes occurring outside of an ACUB.

Figures 10 and 11 illustrate the crash severity distribution for Southcentral Michigan between 2010 and 2014 for both urban and rural areas. The data illustrates that while urban areas experienced 77% of the total crashes for the five year period of 2010-2014, they were the safest in terms of crash severity with approximately 1.8% of the urban crashes resulting in a fatality or serious injury. Comparatively fatal and serious injury crashes were 2.5 times higher and comprised approximately 4.7% of the total rural crashes.

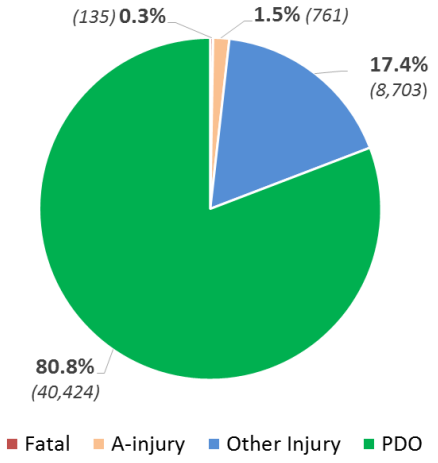


Figure 10: Southcentral Michigan Urban Crash Severity Distribution, 2010-2014

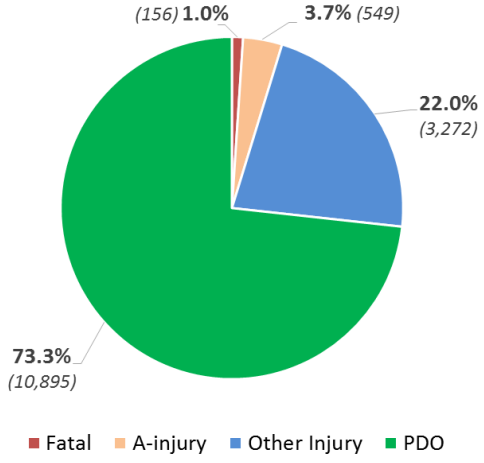


Figure 11: Southcentral Michigan Rural Crash Severity Distribution, 2010-2014

Figure 12 presents the number of 2005-2014 urban and rural fatal crash frequencies in terms of five-year rolling averages in Southcentral Michigan. The data indicates that while rural fatal crashes have declined between 2005 and 2014, they are on average 32% higher as opposed to urban crashes. This difference is despite the fact that rural crashes comprised only 24% of the total crashes during the same time period. Comparatively urban crashes have generally remained the same between 2005 and 2014.

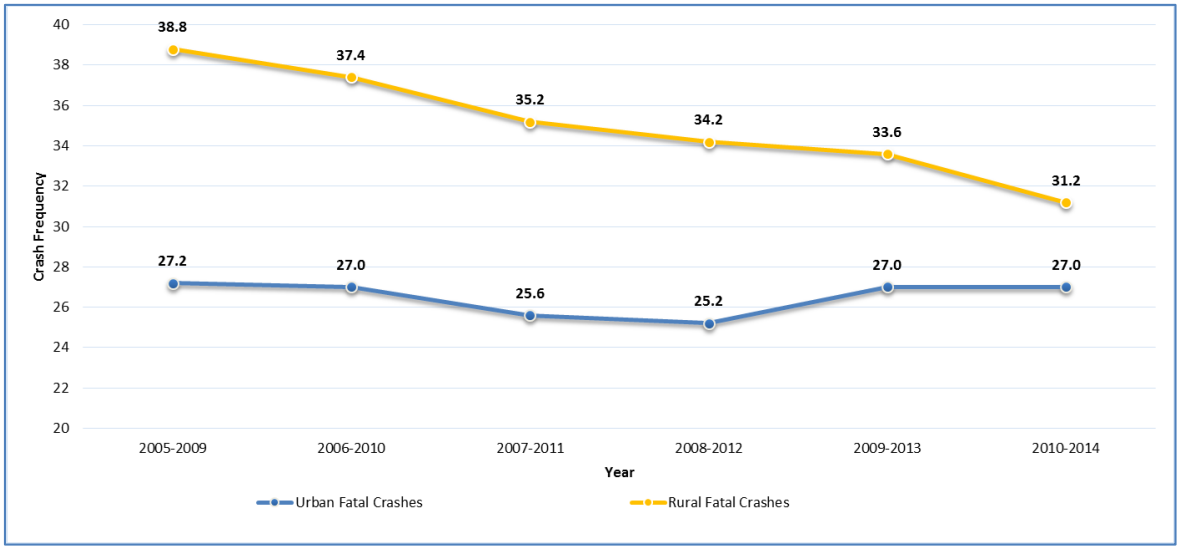


Figure 12: Number of Urban and Rural Fatal Crashes for Southcentral Michigan, 2005-2014 Five-Year Rolling Average

Figure 13 illustrates the number of 2005-2014 urban and rural serious injury crashes presented as five-year rolling averages in Southcentral Michigan. Unlike the fatal crashes presented above, serious injury crashes are highest for urban crashes by an average of 20%. In both cases, trends indicate an almost monotonic linear decline between 2005 and 2014, albeit at a steeper rate for rural crashes.

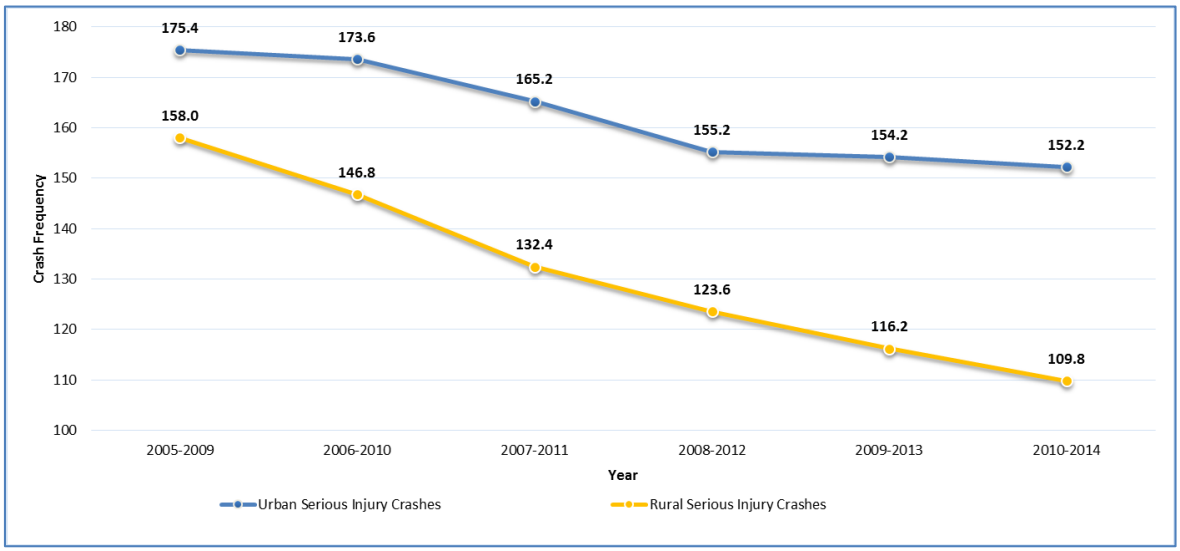


Figure 13: Number of Urban and Rural Serious Injury Crashes for Southcentral Michigan, 2005-2014 Five-Year Rolling Average

5.0 Emphasis Areas

A key component of this traffic safety plan is to identify key emphasis areas in relation to crashes in the region. An emphasis area is an area of opportunity to improve safety through comprehensive strategies using the 4-Es approach (engineering, enforcement, education, and emergency services) [3]. The emphasis areas for this RTSP were identified based on an inclusive process which consisted of information collected at stakeholder meetings, crash data analysis (**Table 2**), as well as coordination with the emphasis areas identified in the existing Michigan Strategic Highway Safety Plan (SHSP).

Four high priority and 11 additional emphasis areas were identified throughout this process, all of which are also included in the Michigan SHSP [4]. This chapter presents a list of the identified high priority and additional emphasis areas the latter of which are presented in alphabetical order. Each subsection provides additional information for each emphasis area along with specific applicable countermeasures, which if implemented can have a positive impact on safety and further the objectives outlined within this plan. Additional information for each of the potential countermeasures is provided in **Appendix B**. It should be noted that countermeasures listed under an emphasis area are not exclusive to a particular emphasis area, but may also have an impact on additional ones. To limit the repetitiveness of information, those countermeasures applicable to multiple emphasis areas are defined initially and are only listed in subsequent mentions throughout this chapter.

High priority emphasis areas:

- Lane Departure
- Intersection Safety
- Pedestrian and Bicycle Safety
- Drivers Age 24 and Younger

Additional emphasis areas:

- Access Management
- Commercial Motor Vehicle Safety
- Distracted Driving
- Impaired Driving
- Occupant Protection
- Motorcycle Safety
- Senior Mobility Age 65 and Older
- Speed Management
- Traffic Incident Management
- Traffic Records and Information Systems
- Traffic Safety Engineering

Table 2: Southcentral Michigan Emphasis Area Crash Percentages, 2010-2014

Involvement	Total Crashes	Fatal Crashes (K)	Serious Injury Crashes (A)
Alcohol	5%	31%	18%
Bicycle	1%	2%	4%
Distracted Driving	2%	3%	2%
Driveway Related	11%	3%	7%
Drugs	0.5%	2%	1%
Intersection	40%	27%	35%
Intersection - Signal	19%	8%	13%
Intersection - Stop-controlled	10%	12%	15%
Intersection - Yield	1%	0.0%	0.4%
Lane departure	27%	51%	42%
Lane departure - Multi Vehicle	3%	11%	6%
Lane departure - Parked Vehicle	1%	0.0%	1%
Lane departure - Single Vehicle	23%	40%	35%
Motorcycle	2%	12%	12%
Pedestrian	1%	12%	6%
Senior driver (65 and older)	15%	23%	14%
Speeding	15%	20%	17%
Truck/Bus	5%	13%	6%
Young driver (24 and younger)	39%	33%	35%

Note: Percentages are based on the corresponding Table 1 total crashes for that particular category.

5.1 Lane Departure

Background

A lane departure crash, also known as a roadway departure crash, is defined as a crash which occurs after a vehicle crosses an edge line, center line, or otherwise leaves the travel away. While lane departure crashes generally comprise a relatively moderate number crashes, they result in a disproportionate percentage of fatalities and severe injuries. As of 2015, lane departure crashes comprised more than half of all traffic fatalities in the United States. The most severe types occur when a vehicle crosses into the opposing lane and strikes an oncoming vehicle [5]. The severity is further compounded given the vehicle speeds at the time of the collision. **Tables 3, 4 and 5** provide the lane departure, single vehicle lane departure, and multiple vehicle lane departure crashes respectively occurring in the Southcentral Michigan region by county between 2010 and 2014.

Table 3: Lane Departure Crashes by County, 2010-2014

Location	Total		Fatal (K)		Serious Injury (A)	
	No.	Percent	No.	Percent	No.	Percent
Barry	1,847	46%	30	65%	78	50%
Branch	1,515	39%	13	59%	66	55%
Calhoun	5,042	29%	36	56%	128	41%
Kalamazoo	6,979	20%	45	40%	190	35%
St. Joseph	2,094	40%	24	51%	83	47%
Southcentral MI	17,477	27%	148	51%	545	42%
Michigan	264,683	23%	1,994	47%	8,579	39%

Note: Percentages are based on the corresponding Table 1 total crashes for that particular category.

Table 4: Single Vehicle Lane Departure Crashes by County, 2010-2014

Location	Total		Fatal (K)		Serious Injury (A)	
	No.	Percent	No.	Percent	No.	Percent
Barry	1,661	41%	22	48%	65	42%
Branch	1,411	36%	11	50%	58	48%
Calhoun	4,433	26%	31	48%	111	36%
Kalamazoo	5,693	16%	33	29%	157	29%
St. Joseph	1,836	35%	18	38%	72	41%
Southcentral MI	15,034	23%	115	40%	463	35%
Michigan	222,710	19%	1,448	34%	7,076	32%

Note: Percentages are based on the corresponding Table 1 total crashes for that particular category.

Table 5: Multiple Vehicle Lane Departure Crashes by County, 2010-2014

Location	Total		Fatal (K)		Serious Injury (A)	
	No.	Percent	No.	Percent	No.	Percent
Barry	159	4%	8	17%	12	8%
Branch	94	2%	2	9%	8	7%
Calhoun	415	2%	5	8%	16	5%
Kalamazoo	791	2%	12	11%	29	5%
St. Joseph	183	3%	6	13%	10	6%
Southcentral MI	1,642	3%	33	11%	75	6%
Michigan	30,970	3%	514	12%	1,365	6%

Note: Percentages are based on the corresponding Table 1 total crashes for that particular category.

Key observations:

- Lane departure crashes account for more than ½ of the fatalities in the Southcentral Michigan region.

- 40% and 35% of all fatal and serious injuries in Southcentral Michigan are a result of single vehicle lane departures.
- Nearly ½ of all fatal crashes in Barry, Branch, and Calhoun Counties involve a single vehicle lane departure.
- Nearly ½ of all serious injury crashes in Branch County involve a single vehicle lane departure.
- With the exception of Kalamazoo County, the proportion of single vehicle lane departure crashes, resulting fatalities and serious injuries in the region are on average greater than the overall statewide average.
- Nearly 1 in 5 fatal crashes in Barry County is a result of a multiple vehicle lane departure crash.
- Approximately 77% of single vehicle lane departure crashes involve a fixed-object.

Countermeasures and Strategies

Advanced curve warning signs: Horizontal curves are part of the roadway geometry. However depending on the sharpness of the curve and other associative conditions they can be correlated with a disproportionate number of crashes. To improve the safety of these curves, advanced warning signs are typically placed prior to the horizontal curve to alert drivers of a sudden change in geometry which may not be expected or visible, thus prevent potential lane departures. Typical advanced curve warning signage includes the W1-1, W12, W1-3, W1-4, and W1-5.

Centerline and shoulder rumble strips: Rumble strips are a road safety countermeasure which warn drivers of potential danger via vibration and noise transmitted from the wheel of the vehicle to the vehicle's interior. They are particularly useful in reducing lane departure crashes. They can be installed over centerlines or on the shoulder. When installed over a centerline, rumble strips alert drivers that they are crossing on the opposing direction lane and thus help avoid head-on or sideswipe opposite collisions. When installed on a shoulder, rumble strips alert drivers that they have drifted from the travel way and thus help reduce run-off-the-road crashes.

Clear zone: Clear zones are unobstructed and traversable areas following the edge of the traveled way designed to provide drivers with adequate room to regain control of a vehicle that has left the roadway. Examples include shoulders or recoverable slope areas. Fixed objects that may be found in the suggested clear zone include utility poles, pillars, non-breakaway mailboxes, wall/barriers, dangerous landscaping and non-breakaway fence posts. Arguably however, the primary issue for local agencies involve trees. By creating and maintaining clear zones along the roadway the likelihood that a roadway departure results in a collision, and/or high severity collision is reduced.

Fluorescent yellow sheeting on warning signs: The use of fluorescent yellow sheeting in place of the standard yellow sheeting on warning signs is a relatively inexpensive method to increase the luminance and visibility of the applicable traffic signs on the roadway. Thus drivers may be better informed and alerted of potential hazardous conditions along the roadway. The improved visibility is applicable in both daytime and particularly nighttime conditions, and for drivers of all ages.

Paved shoulders: Paved shoulders provide additional room for vehicle recovery along a roadway. They allow the driver to correct the vehicle's path after leaving the lane but before the vehicle runs off the road.

Pilot Areas: Pilot areas consist of potential countermeasure or strategies still in the research stage.

Cable barrier on shoulder: Cable barriers consist of high-tension steel cables supported by a weak post which prevent vehicles from departing the travel way. While traditionally cable barriers are installed along medians to prevent median crossover accidents, they may be also installed along shoulders to protect vehicles

from colliding with fixed objects and/or avoiding steep slopes in the clear zone. Unlike rigid barriers or semi-rigid barriers such as guardrails, cable barriers include low installation and maintenance costs, and allow for a soft impact upon collision with adequate redirection capabilities. While situational, depending on the type, speed, and force of impact the cable barrier may not be able to fully prevent a lane departure crash and may become ineffective following a high speed, high force impact. Thus the installation of cable barriers along a shoulder may still require adequate offsets from a fixed object or steep slopes.

Connected vehicle technologies:

Connected vehicle technology is arguably the most promising technology advancement with the potential to revolutionize all elements of the transportation system. By making use of innovations in technology such as wireless communications, advanced sensors, GPS navigation, and smart infrastructure elements, connected vehicles will have the capability to identify threats on the roadway and disseminate the information not only to the driver, but also share the information among all vehicles occupying a specific space in the roadway so that every vehicle would be aware of the location of other nearby vehicles. While connected vehicle technology is still in the early phases of implementation, the National Highway Traffic Safety Administration (NHTSA) estimates that's connected vehicles may reduce up to 80% of crashes not involving an impaired driver [6], and could be particularly effective in reducing crashes associated with human error.

Safety edge pavement treatments: Safety edge is the reshaping of the edge of the pavement into a 30 degree angle during installation. The angled safety edge avoids vertical drop offs if the granular shoulder shifts from the pavement edge. Safety edges are a simple and effective way to reduce fatal crashes on high speed roadways as the angle makes it safer and easier for drivers to reenter the roadway following a roadway departure.

Wet reflective pavement markings: Water can significantly reduce pavement marking retroflectivity which affects the ability of the drivers to stay in their lane or on the roadway. The effect is particularly exacerbated during nighttime. To rectify or ameliorate this condition, wet reflective pavement markings are applied as opposed to standard pavement marking materials. These markings can be applied as paint, tape, or thermoplastic material and are designed to provide improved retroreflectivity during wet road surface conditions.

5.2 Intersection Safety

Background

Intersections are planned points of conflict in a transportation network where motorized and non-motorized users cross paths as they use the facility or turn from one route to another. While intersections comprise a minor portion of the physical roadway network, they account for more than 25% of all crashes in the United States [7]. Since intersections are also a major cause for user delay among other roadway characteristics, they are a critical point in terms of roadway operations in addition to safety. **Table 6** and **Table 7** provide descriptive statistics on intersection related crashes for the Southcentral Michigan region by county.

Table 6: Intersection Crashes by County, 2010-2014

Location	Total		Fatal (K)		Serious Injury (A)	
	No.	Percent	No.	Percent	No.	Percent
Barry	1,320	33%	11	24%	55	35%
Branch	1,161	30%	4	18%	28	23%
Calhoun	6,484	38%	18	28%	121	39%
Kalamazoo	15,439	45%	38	34%	207	38%
St. Joseph	1,824	34%	7	15%	62	35%
Southcentral MI	26,228	40%	78	27%	463	35%
Michigan	420,766	36%	1,096	26%	7,428	34%

Note: Percentages are based on the corresponding Table 1 total crashes for that particular category.

Table 7: Crashes by Intersection Types, 2010-2014

Location		Total		Fatal (K)		Serious Injury (A)	
		No.	Percent	No.	Percent	No.	Percent
Southcentral MI	Total Intersection	26,228	40%	78	27%	463	35%
	Signalized Intersection	12,272	19%	23	8%	166	13%
	Stop-controlled Intersection	6,630	10%	34	12%	190	15%
Michigan	Total Intersection	420,766	36%	1,096	26%	7,428	34%
	Signalized Intersection	205,923	18%	375	9%	3,129	14%
	Stop-controlled Intersection	96,150	8%	403	10%	2,337	11%

Note: Percentages are based on the corresponding Table 1 total crashes for that particular category.

Key observations:

- Nearly 1 in 3 fatal crashes in Southcentral Michigan are intersection related.
- 1 in 3 serious injury crashes in Southcentral Michigan are intersection related.
- Intersection crashes and resulting fatalities and serious injuries for Kalamazoo County are greater than the regional and statewide average.
- Nearly 1/2 of all fatal intersection crashes in Southcentral Michigan occur at stop-controlled intersections.

Countermeasures and Strategies

Connected vehicle technologies (refer to page 16)

Intersection signage: Intersection signs can inform drivers of what lies downstream of particular location, conditions of a downstream intersection, or additional information related to the intersection location. Consequently, depending on the information the signs are relaying and physical aspects of the site, intersection signage can play an important safety role.

Advanced intersection signage: Advanced intersection signs provide advance warnings to drivers of an upcoming intersection downstream of the roadway. They can consist of static signs (i.e. stop ahead or signal ahead signs) or dynamic signs such as advance warning flashers typically mounted on a

warning sign to further alert drivers of upcoming conditions. The latter can flash regardless of the status of the downstream signal, or alert drivers of a potential signal change in the downstream signal.

Double up stop signs: Stop signs at stop-controlled intersections are generally installed on the right side of the road within the cone of vision of the driver. Certain safety conditions can be improved by installing a secondary stop sign on the left side of the road as well. When a median is present, a stop sign within the median can similarly improve the visibility and compliance within the stop-controlled intersection in addition to acting as a form of gateway. Certain intersection configurations may not be ideal for this treatment as there may be driver confusion associated with the installation of a stop sign on the opposing roadway.

Flashing beacons and stop signs: Driver compliance within an intersection is vital to its safety operations. This is particularly challenging for stop-controlled intersections which are generally located in low volume rural areas and which tend to be characterized by higher speeds. Depending on geometrics or operational characteristics of the roadway, stop-controlled intersections can also present an additional challenge as they can be unexpected or not clearly visible to the driver. To improve visibility and driver compliance, flashing beacons can be installed either on top of the sign or overhead. Flashing beacons can further be actuated so they flash when vehicles approach the intersection.

Overhead street name signs: Overhead street name signs at an intersection provide the driver with information regarding the intersection's cross streets. While existing literature has examined the safety impacts of advanced street name signs upstream of an intersection, there is currently no literature available examining the impact of these types of signs on safety. Nonetheless, given the very low cost involved in implementing this strategy and the potential to further enhance way-finding, their use could be warranted.

Oversized stop signs: Similar to flashing beacon improvements at stop-controlled intersections, oversized signs aim to improve the driver visibility and compliance of stopped-controlled intersections. While the size of the stop sign is generally dictated in the Manual on Uniform Traffic Control Devices (MUTCD) and is a factor of speed, the installation of larger stop signs can improve the safety of un-signalized intersections.

Cross traffic does not stop: "Cross traffic does not stop" signs alert drivers that vehicles crossing an upstream intersections have the right-of-way and do not stop, thus informing and warning the driver to stop in advance of the intersection. The sign is generally installed in those locations where drivers may misinterpret the intersection as a four-way stop. A survey of 2,100 drivers by the Texas Department of Transportation indicated that 90% of the responses received preferred this type of sign as opposed to a double-headed arrow sign [8].

Road Safety Audits: A Road Safety Audit (RSA) is a comprehensive safety performance examination of an existing or future roadway location by an independent and multidisciplinary team. The objective of the RSA is to identify opportunities for safety improvements on the subject location for all potential road users. RSA's contribute to road safety by providing an unbiased assessment of a segment or intersection to identify safety concerns and potential countermeasures. Continuous screening of the network can help ensure that a proactive approach is taken to identify and alleviate any problem safety areas.

Roundabout (mini or standard): Roundabouts reduce vehicle speeds as well as the number of conflict points found in a typical intersection. In terms of crashes, roundabouts reduce head-on, left-turn and angle type crashes which frequently result in serious or fatal injuries. They also create a safer environment for pedestrians using the facility by slowing vehicles and dividing the crossing into two stages. The design of a roundabout is crucial to fostering a safe environment for drivers and pedestrians alike. When the design and geometry force traffic to enter and circulate slowly, roundabouts operate safely and effectively handle turning traffic.

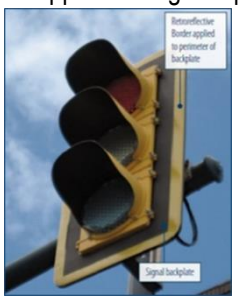
While the number of roundabouts is steadily increasing in Michigan, in certain regions of the state they are still a relatively new design feature. Consequently education on roundabout usage is a key component of their success. MDOT and other communities often hold informational sessions during which they have shown feeds of existing roundabouts and traffic simulation models, hand out brochures, and display posters. MDOT has the following information available to aid in educating the public on roundabouts:

- http://www.michigan.gov/documents/mdot/MDOT_RoundaboutBrochure_312721_7.pdf
- https://www.youtube.com/watch?v=ONacAiKXe-8

When educating the public on new roadway features, the following could be taken into consideration:

- Explain why this fix is needed in this location by using criteria and/or warrants
- Show video on how a roundabout works
- Post videos on web sites to educate public
- Use social media
- Know the audience
- Visual aids are critical

Signal upgrades: While each intersection is unique, general signal improvements and upgrades can result in significant improvement in terms of not only safety but also the operations of the subject intersection. The following is a list of applicable signal upgrades.



Backplates: MDOT has found that traditional traffic signals can be difficult for drivers to see. By adding either a black backplate or a backplate with a reflectorized border, signal visibility is increased. The combination of a black backplate and all black face has increased signal visibility during the day by 33 percent. By making the backplate reflective, visibility increased even more, especially at night. Both backplates and retroreflective borders are low-cost safety treatments that can be easily added systematically to existing span and mast arm assemblies as long as the structural capacity of the supports is evaluated.

Box span and Mast arm: Box span and mast arm signal layouts provide safety improvements over diagonal span, pedestal, or post mounted signal displays. The safety benefits are associated with factors such as increased signal visibility and decreases in the angle of collision. While safety benefits are applicable for both cases, the use of one over the other is dependent on the existing intersection conditions and proposed layout configuration. Box span layouts can typically accommodate larger intersections, are more flexible in the placement of span wire poles, and have a lower overall cost as opposed to mast arms. Mast arm layouts in comparison are characterized by a higher overall cost and are more aesthetically pleasing than box span layouts. Maintenance on mast arms is also expected to be lower as opposed to box span layouts [9].

Left turn signal phasing: Left turn movements represent a high risk intersection movement. Thus when a left

turn phase is warranted it must be provided. This decision is not only a function of through volumes and left-turn volumes and delay, but it may also be based on left-turn crash frequency. The addition of a left turn signal phasing can significantly reduce left-turn crashes.

Signal optimization: While intersections by their nature increase stop and go traffic, a poorly optimized intersection can increase driver aggression, and result in unsafe acceleration and deceleration maneuvers. Thus optimizing the signal not only improves the intersection operational efficiency, but can also reduce crashes.

5.3 Pedestrian and Bicycle Safety

Background

While pedestrian and bicycle related crashes comprise a relatively small percentage of the total crashes in the Southcentral Michigan region, these non-motorized users are a vulnerable group in the transportation system as the likelihood of the crash resulting in an injury or fatality is high. These numbers have also been on the rise recently in the United States, which stresses the need to prioritize the safety of non-motorized users as a high emphasis area. Descriptive statistics for the Southcentral Michigan region for pedestrians and bicycles are displayed in **Table 8** and **Table 9**.

Table 8: Pedestrian Crashes by County, 2010-2014

Location	Total		Fatal (K)		Serious Injury (A)	
	No.	Percent	No.	Percent	No.	Percent
Barry	33	1%	2	4%	4	3%
Branch	52	1%	2	9%	7	6%
Calhoun	146	1%	7	11%	23	7%
Kalamazoo	345	1%	15	13%	51	9%
St. Joseph	64	1%	9	19%	6	3%
Southcentral MI	640	1%	35	12%	75	6%
Michigan	11,267	1%	702	17%	1,855	8%

Note: Percentages are based on the corresponding Table 1 total crashes for that particular category.

Table 9: Bicycle Crashes by County, 2010-2014

Location	Total		Fatal (K)		Serious Injury (A)	
	No.	Percent	No.	Percent	No.	Percent
Barry	23	1%	0	0%	5	3%
Branch	34	1%	0	0%	4	3%
Calhoun	145	1%	0	0%	6	2%
Kalamazoo	347	1%	3	3%	26	5%
St. Joseph	59	1%	3	6%	7	4%
Southcentral MI	608	1%	6	2%	48	4%
Michigan	9,436	1%	125	3%	788	4%

Note: Percentages are based on the corresponding Table 1 total crashes for that particular category.

Key observations:

- Approximately 20% of all fatal crashes in St. Joseph County involve a pedestrian.
- 6% of all fatal crashes in St. Joseph County involve a bicyclist.
- The proportion of fatal or serious injury crashes for non-motorized users in Southcentral Michigan is equal to or below the statewide average.

Countermeasures and Strategies

Pedestrian and bicycle education programs: Historically, pedestrian and bicyclist crashes have been disproportionate relative to their share of the use of the road. Recent trends however have seen an increased focus on improving not only the safety of non-motorized users but also increasing the number of non-motorized dedicated pathways as a goal for improving connectivity and accessibility along with other benefits associated with non-motorized travel. While engineering countermeasures play an important role in both improving safety and accessibility, the role that educational programs play in this area is significant and widely recognized across Michigan. As a result, a number of pedestrian and bicycle educational programs are implemented throughout the state. These include but are not limited to:

- Safe Routes to School (SRTS) http://saferoutesmichigan.org/ – The SRTS is a federal program whose primary goal is to provide a safe, convenient and fun environment for children to walk and/or bike to school. The program achieves this goal through the coordination of various aspects of safety including education, encouragement, enforcement, engineering, evaluation, and equity. Funding for educational programs is available as well as funding for infrastructure improvements.
- Safe Kids Michigan https://www.safekids.org/coalition/safe-kids-michigan – Safe Kids Michigan is a program under the Michigan Department of Community Health whose primary goal is keeping children safe. Based on this premise, the program provides services such as care-seat checkups and safety workshops aimed at parents and caregivers. A number of these services are focused on traffic crash prevention.

A number of additional educational initiatives are undertaken throughout the state with the purpose of improving pedestrian and bicycle safety, accessibility and connectivity (i.e. Complete Streets). The State of Michigan has also developed a Pedestrian and Bicycle Safety Action Team (PBSAT) to support the vision of the Michigan SHSP as it related to pedestrian and bicycle safety. Placement of advertisements on busses and at buses stops can further help to reinforce educational safety messages. Close cooperation with local transit agencies are advisable in order to create and disseminate educational material on pedestrian and bicycle safety procedures. Additional initiative to improve the safety of non-motorized users could include purchasing vests and reflectors and disseminate them at locations including but not limited to schools, homeless shelters, and bicycle clubs.

Pedestrian bump outs: Pedestrian bump outs or bulb outs are extensions of the sidewalk and curb towards the roadway. In addition to shortening the roadway crossing distance, pedestrian bump outs also enhance pedestrian safety by increasing pedestrian visibility, and potentially reducing speeds by narrowing the roadway. Pedestrian bump outs are typically appropriate only in the presence of on-street parking lanes. When the extension is in proximity of an intersection, the turning needs of the larger vehicles using the facility must be assessed.

Pedestrian countdown timer: Pedestrian countdown timers provide pedestrians or bicyclists with the remaining time in seconds for them to cross the roadway or the pedestrian phase to end. They can be passive or active (i.e operate via a push-button). They can be installed with auditory warnings to alert pedestrians whose vision may be limited. Because of the additional information that countdown timers provide, they are associated with increased crossing compliance and may also have an impact on motorized users. They are most common in urban and suburban areas.

Pedestrian refuge islands: Pedestrian refuge islands are raised sections of pavement placed on streets at an intersection or midblock to provide pedestrians with a protected resting place as they generally wait for a gap in traffic to finish crossing the road. They are generally installed on wide roadways to make crossing easier by allowing pedestrians to identify gaps one approach at a time.

Installation & maintenance of bicycle lanes: The American Association of State Highway and Transportation Officials (AASHTO) defines a bike lane as the "portion of a roadway which has been designated by striping, signing, and pavement markings for the preferential or exclusive use of bicyclists". They are typically located on the right side of the roadway with pavement markings which direct bicyclists toward the direction of travel. Bicycle lane design standards vary depending upon the location and operational and geometric roadway conditions, the premise is to provide bicyclists with a safe travel path by minimizing potential conflicts with vehicles which are generally traveling at much higher speeds.

Land use planning/Transit stop planning: The relationship between land use and the transportation infrastructure is a complex but at times linear one. As land use becomes less dense the environment tends to be more conducive to vehicles. Whereas high density land uses tend to be more conducive to non-motorized users. Thus it is natural to suggest that land use planning activities can have a direct impact upon pedestrian and bicycle safety. The list of potential land use planning or transit stop planning activities conducive to non-motorized is significantly large, however it should be guided by the communities' long term vision on the built environment. Examples of possible planning activities include forms of zoning ordinances which restrict developments to pedestrian and/or bicycle scale or design; provide continuous non-motorized pathways throughout the community; require prospective developments to incorporate pedestrian/bicycle friendly designs within the proposed development; incentivize mixed-used developments to establish an environment that is safe and friendly for non-motorized users and which encourages the use of the facilities via short and walkable origin-destination trips.

R1-6 In-Street & Gateway Treatment: The R1-6 (In-Street Pedestrian Crossing) treatment involves the use of these in-street signs to remind drivers to yield to pedestrians within the crosswalk. This treatment is particularly useful at signalized pedestrian crosswalks. The use of R1-6 signs has been shown to significantly increase pedestrian yield rates. While the use of a single in-street R1-6 sign on the centerline can lead to increased yield rates, a gateway treatment has been shown to be more effective due to the fact that the increase yielding compliance is related to the narrowness created by the gap between the sings. One advantage to the use of such treatments, in addition to its low cost, corresponds to the fact that this treatment does not require any action from the pedestrian crossing the street. Disadvantages include signs being struck by vehicles and/or snow plow trucks.

Rectangular Rapid Flash Beacon (RRFB): RRFBs are pedestrian activated LED lights which supplement pedestrian warning signs at un-signalized intersections or midblock crossings. Once activated the lights flash in rapid successions to alert drivers of oncoming pedestrian crossings. Their installation is generally a factor of traffic volumes and pedestrian crossing volumes and can be installed on two-lane or multi-lane roadways. They are less costly as opposed to traffic signals or pedestrian HAWK signals, and have been shown to significantly increase driver yielding rates for pedestrians.

Safety path, sidewalk and crosswalk improvements: According to NHTSA and the FHWA, an average of 4,500 pedestrians are killed each year in traffic crashes in the United States. Almost 8% of these are a result of pedestrians walking along the roadway where there is a lack of delineation between pedestrian pathways and vehicles. Consequently, providing safe and separate walkways can significantly reduce these types of crashes by almost 88% [10]. Safe walkways can include sidewalks or widening and paving the shoulder so that there is more space between pedestrian or bicycle paths and the vehicle travel way. These facilities benefit the drivers and the non-motorists as they are visible reminders of both road users. Similarly, providing and/or improving crosswalks is associated with significant benefits for non-motorized users including comfort, health and recreation using these facilities.

"Share the Road" sign: A "Share the Road" (W16-1) sign is a low cost method used to warn drivers of bicycles traveling and sharing the road with other vehicles. The intent is to make the driver conscious of a slower moving vehicle in its path. It is generally used in combination with a W11-1 "Bicycle" sign. Recently however, the use of the sign has received criticism in its effectiveness to achieve its purpose and improve safety for the non-motorized users, as the sign message could be ambiguous and open to interpretation.

5.4 Drivers Age 24 and Younger

Background

Drivers age 24 and younger represent a high-risk age group in the transportation system as they have a higher likelihood of being involved in a collision. These users have decision making characteristics which differ from those of more mature drivers including but not limited to driving attitude, perception of risk, hazard detection, and driving skills which are reinforced with increasing driving experience. As a result many drivers in this category may undertake risky driver behaviors such as speeding, maintaining shorter headways, using mobile devices which contribute to distracted driving conditions, and making improper responses to hazardous conditions. For these particular reasons, educational and enforcement approaches are most suitable in minimizing the risk of collisions for this particular age group. Descriptive statistics for drivers 24 and younger for Southcentral Michigan are presented in **Table 10**, while **Tables 11 and 12** presents a breakdown for younger drivers by age group.

Table 10: Young Driver (24 and younger) Crashes by County, 2010-2014

Location	Total		Fatal (K)		Serious Injury (A)	
	No.	Percent	No.	Percent	No.	Percent
Barry	1,499	37%	10	22%	60	38%
Branch	1,428	36%	14	64%	44	37%
Calhoun	5,700	33%	14	22%	105	34%
Kalamazoo	14,969	43%	45	40%	201	37%
St. Joseph	1,880	36%	13	28%	55	31%
Southcentral MI	25,476	39%	96	33%	465	35%
Michigan	430,120	37%	1,243	29%	7,662	35%

Note: Percentages are based on the corresponding Table 1 total crashes for that particular category.

Table 11: Young Driver (16-17) Crashes by County, 2010-2014

Location	Total		Fatal (K)		Serious Injury (A)	
	No.	Percent	No.	Percent	No.	Percent
Barry	396	10%	4	9%	18	12%
Branch	322	8%	3	14%	10	8%
Calhoun	987	6%	1	2%	15	5%
Kalamazoo	2,185	6%	7	6%	34	6%
St. Joseph	401	8%	1	2%	12	7%
Southcentral MI	4,291	7%	16	5%	89	7%
Michigan	80,475	7%	172	4%	1,318	6%

Note: Percentages are based on the corresponding Table 1 total crashes for that particular category.

Table 12: Young Driver (18-24) Crashes by County, 2010-2014

Location	Total		Fatal (K)		Serious Injury (A)	
	No.	Percent	No.	Percent	No.	Percent
Barry	1,092	27%	6	13%	42	27%
Branch	1,100	28%	11	50%	34	28%
Calhoun	4,682	27%	13	20%	90	29%
Kalamazoo	12,709	37%	38	34%	167	31%
St. Joseph	1,467	28%	12	26%	41	23%
Southcentral MI	21,050	32%	80	27%	374	29%
Michigan	349,645	30%	1,071	25%	6,344	29%

Note: Percentages are based on the corresponding Table 1 total crashes for that particular category.

Key observations:

- 64% of fatal crashes in Branch County involve drivers 24 and younger.
- The proportion of fatal crashes involving drivers 24 and younger for Branch and Kalamazoo Counties exceed the regional and statewide average.
- Crashes involving drivers of age 16-17 in Barry County disproportionally result in fatal and serious injury crashes.

Countermeasures and Strategies

Publicize and enforce laws pertaining to young drivers: Proper enforcement can deter young drivers from undertaking hazardous maneuvers which may increase the risk of crashes. Publicizing enforcement measures is also of particular importance for this age group, to not only inform the drivers of the measures, but also provide the information to parents to allow for proactive parent engagement. Given the current trends in how young individuals obtain information, dissemination of information should also include the use of various social media formats.

Improve driver's education programs: The driver education program is typically the first time younger drivers are exposed to driving. Consequently it is important that the information presented during driver's education programs is consistently improved. Potential steps which could be undertaken to ensure continuous improvement include but are not limited to the review of current programs to ensure existing standards are met or that any new requirements are implemented and improvements in the dissemination of the information to teen drivers by advocating that teaching instructors go beyond the minimum standards.

Improve graduated driving licensing systems: The graduated driver licensing system is a tiered approach designed to teach driving to teens by gradually increasing their privileges as they move through the education system. Maintaining a proactive graduated driving licensing system can be key in reducing traffic crashes involving drivers age 24 and younger. Due to the general characteristics of younger drivers, recommendations should be developed by involving various parties including parents and members of the education systems among others.

5.5 Access Management

Background

It is well established that crashes along a segment can increase with improper placement and driveway design, and increasing driveway density. Consequently in order to mitigate any potential impacts from the former, access management techniques are generally implemented. Access management consists of a set of tools established to control vehicle access into various types of roadways in order to improve the operational characteristics of the roadway and reduce the number of possible conflict points in a segment thus reducing crashes. While several crash reduction methods of access management exist, they are highly dependent on the physical and traffic conditions of the subject area. Descriptive statistics for driveway related crashes are listed in **Table 13**.

Table 13: Driveway Related Crashes by County, 2010-2014

Location	Total		Fatal (K)		Serious Injury (A)	
	No.	Percent	No.	Percent	No.	Percent
Barry	406	10%	2	4%	10	6%
Branch	423	11%	0	0%	8	7%
Calhoun	1,924	11%	3	5%	23	7%
Kalamazoo	3,850	11%	5	4%	40	7%
St. Joseph	479	9%	0	0%	7	4%
Southcentral MI	7,082	11%	10	3%	88	7%
Michigan	104,596	9%	182	4%	1,403	6%

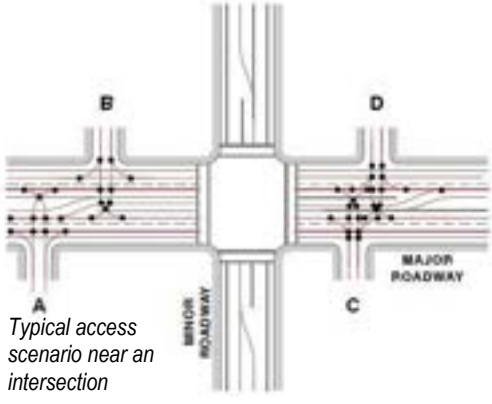
Note: Percentages are based on the corresponding Table 1 total crashes for that particular category.

Key observations:

- Driveway related crashes in Southcentral Michigan are generally similar in proportion to the statewide averages.

Countermeasures and Strategies

Existing literature on the impacts of driveways on crashes indicates that crashes increase with increasing driveway density. As the spacing among driveways increases, the overall number of conflict points is reduced thus providing drivers with improved merging capabilities and less risky maneuvers. The placement of the driveways is also as important as driveway density. Increasing the distance of a driveway from an intersection reduces the risk of crashes since the number of potential conflict points is reduced. This effect is particularly true for angle and rear-end crashes. Similarly, limiting the number of access point on the major roadway and shifting them to the minor can help reduce the risk of crashes. A secondary aspect of access management is also the management of turning movements in and out of the driveway.



Typical access scenario near an intersection

Arguably the majority of crashes at a driveway are a result of left-turning vehicles. Thus minimizing or eliminating left turns can help reduce crashes as well. One method to manage, limit, or eliminate left turning movements is through the installation of medians which can include non-traversable medians, two-way left turn lanes (TWLTL). Additionally dedicated left-turn or right-turn lanes can help further control the flow of traffic.

5.6 Commercial Vehicle Safety

Background

Traffic crashes involving larger commercial vehicles such as trucks and/or buses tend to be more damaging due to trip or mechanistic characteristics associated with these types of vehicles. For example larger vehicles require greater stopping distances due to their size, weight, and lower deceleration rate in addition to the force of impact associated with a larger mass. These effects are further magnified during inclement weather conditions that result in reduced visibility and pavement friction performance. Limitations during these conditions are associated not only with the physical aspects of these vehicles, but also due to trip characteristics. For example, drivers tend to perceive inclement weather conditions as dangerous and may avoid or cancel trips during such conditions. In comparison, commercial trips are business oriented thus less flexible in route time and choice. Descriptive statistics for truck and/or bus crashes for Southcentral Michigan are presented in **Table 14**.

Table 14: Truck/Bus Crashes by County, 2010-2014

Location	Total		Fatal (K)		Serious Injury (A)	
	No.	Percent	No.	Percent	No.	Percent
Barry	134	3%	2	4%	3	2%
Branch	219	6%	3	14%	10	8%
Calhoun	1,093	6%	7	11%	20	6%
Kalamazoo	1,528	4%	16	14%	25	5%
St. Joseph	318	6%	9	19%	18	10%
Southcentral MI	3,292	5%	37	13%	76	6%
Michigan	51,852	4%	406	10%	1,095	5%

Note: Percentages are based on the corresponding Table 1 total crashes for that particular category.

Key observations:

- The percentage of crashes involving a truck or bus for Southcentral Michigan, including fatal or serious injuries, is slightly higher than the statewide average.
- Nearly 1 in 5 fatal crashes in St. Joseph County involves a truck and/or bus.
- 1 in 10 serious injury crashes in St. Joseph County involves a truck and/or bus.

Countermeasures and Strategies

The 2017-2018 Michigan SHSP lists strategies which may be utilized in reducing crashes involving commercial motor vehicles. Through the leadership of the Michigan Truck Safety Commission, a combination of education and enforcement measures were developed and implemented with the aim of crash mitigation and minimization. These include training programs available through the Michigan Center for Truck Safety on topics such as hazard recognition, preventable collisions, the driving environment, and related. Additional strategies include improving commercial motor vehicle driver performance through both education and enforcement, strengthening of commercial driver license programs, identification and correction of unsafe roadway conditions, improving maintenance of heavy trucks, deployment of truck safety initiatives and best practices, and related [4].

5.7 Distracted Driving

Background

Distracted driving refers to non-driving activities undertaken by drivers while behind the wheel. These include visual distractions, manual distractions, and cognitive distractions. Arguably because of the widespread use of communication devices in everyday life, cell phones and smart phones have become the primary reason for distracted driving. Among the uses of cell phones, texting is of particular concern because it involves all three types of distractions combined together. Depending on the speed of the vehicle, even the shortest distraction time can be of concern. According to a 2015 Eire Insurance survey, one in three drivers admitted to texting while driving. Descriptive statistics on known distracted driving crashes are presented in **Table 15**.

Table 15: Distracted Driving Crashes by County, 2010-2014

Location	Total		Fatal (K)		Serious Injury (A)	
	No.	Percent	No.	Percent	No.	Percent
Barry	77	2%	0	0%	5	3%
Branch	58	1%	1	5%	1	1%
Calhoun	146	1%	1	2%	7	2%
Kalamazoo	790	2%	4	4%	13	2%
St. Joseph	111	2%	2	4%	4	2%
Southcentral MI	1,182	2%	8	3%	30	2%
Michigan	25,203	2%	93	2%	628	3%

Note: Percentages are based on the corresponding Table 1 total crashes for that particular category.

Key observations:

- Distracted driving crashes in Southcentral Michigan are generally similar to the statewide average.

Countermeasures and Strategies

In response to the increasing rates of cell phone usage while driving, the State of Michigan banned texting while operating a motor vehicle. In this regards, highly visible enforcement of the existing texting ban law can be a successful deterrence toward the use of cell phones while driving. Dissemination of educational information on the risks of cell phone usage could further help curb cell phone use behind the wheel. Engineering countermeasures can also be useful in decreasing the number of injuries and fatalities resulting from distracted driving. This includes countermeasures applicable to roadway departures such as centerline and shoulder rumble strips and cable barriers.

5.8 Impaired Driving

Background

Impaired driving refers to the condition of operating a vehicle while under the influence of alcohol and/or drugs. According to NHTSA, drivers with an alcohol level of 0.08 percent are four times more likely to be involved in a collision as opposed to sober drivers. The safety risk increases with increasing alcohol levels. Similarly, marijuana users are 25% more likely to be involved in a collision as opposed to drivers with no evidence of marijuana use [11]. These conditions are more common among young male drivers and during weekends. **Tables 16** and **17** present descriptive statistics of alcohol and drug related crashes for the Southcentral Michigan region.

Table 16: Alcohol-related Crashes by County, 2010-2014

Location	Total		Fatal (K)		Serious Injury (A)	
	No.	Percent	No.	Percent	No.	Percent
Barry	303	7%	17	37%	25	16%
Branch	220	6%	6	27%	17	14%
Calhoun	881	5%	19	30%	65	21%
Kalamazoo	1,505	4%	28	25%	96	18%
St. Joseph	309	6%	20	43%	35	20%
Southcentral MI	3,218	5%	90	31%	238	18%
Michigan	48,526	4%	1,248	30%	9,674	44%

Note: Percentages are based on the corresponding Table 1 total crashes for that particular category.

Table 17: Drug-related Crashes by County, 2010-2014

Location	Total		Fatal (K)		Serious Injury (A)	
	No.	Percent	No.	Percent	No.	Percent
Barry	29	1%	0	0%	5	3%
Branch	28	1%	0	0%	2	2%
Calhoun	96	1%	2	3%	11	4%
Kalamazoo	117	0%	3	3%	5	1%
St. Joseph	28	1%	0	0%	4	2%
Southcentral MI	298	0%	5	2%	27	2%
Michigan	8,717	1%	111	3%	604	3%

Key observations:

- The proportion of crashes involving alcohol, including fatalities and serious injuries for Southcentral Michigan are on average equal to or lower than the statewide average.
- The proportion of fatal crashes involving alcohol in Barry and St. Joseph Counties exceed the regional and statewide average.
- Nearly 1 in 2 fatal crashes in St. Joseph County involve alcohol.

Countermeasures and Strategies

Countermeasures and strategies used to address impaired driving are primarily enforcement and education related. Continuation of high visibility enforcement can help deter alcohol and/or drug use while driving. Coordination with nationwide enforcement periods can help maximize results across a larger region. A few of the effective tools under the enforcement umbrella include sobriety checkpoints and use of alcohol ignition interlocks. Public informational and educational campaigns also play an important role in addressing the issue. A successful campaign can raise awareness on the effects of driving while under the influence of alcohol and/or drugs. Information should be targeted in particular to younger and underage drivers. Given the predominant demographics of

impaired drivers, parents should be included in the process as well. Because impaired drivers tend to be recurring offenders, assessment and treatment can be effective in minimizing repeated offenses. Additional countermeasures and strategies include improved training among the criminal justice community including law enforcement, judges, prosecutors, and probation officers and a proactive approach to improving legislation related to impaired driving.

5.9 Occupant Protection

Background, Countermeasures and Strategies.

Increased rate of proper passenger restraints is a national priority in the United States and the State of Michigan due to the significant role it plays in reducing fatalities or injuries in traffic collisions. In the most recent safety belt usage study for 2016 for the state of Michigan, the statewide safety belt usage among drivers and front seat passengers was reported at 94.5%, with fluctuations existing among various regions of the state [4]. While this rate is higher than the nationwide use, it is imperative that its enforcement continues due to the important role proper usage of safety restraints plays in protecting passengers. In line with this statement, in 2008, Michigan enacted a booster seat law for children under 8 years of age and/or up to 4 feet and 9 inches in height. To ensure and improve the proper use of passenger restraints, potential strategies include [4]:

- Enforcement of safety belt usage.
- Support public info and education campaigns educating individuals on safety belt and child restraint use.
- Evaluate the effectiveness of occupant protection programs throughout the implementation process.

5.10 Motorcycle Safety

Background

Motorcycles are an important transportation mode in the United States as they can provide effective transportation as well as recreational use. However, motorcycles are significantly more vulnerable in a crash, with motorcycle fatal crashes occurring 27 times more often than those involving other vehicles [12]. Recent trends indicate motorcycle ridership is increasing, ridership demographics are changing, and many states are repealing their helmet laws. These facts directly relate to motorcycle safety. According to MDOT, the number of fatal crashes of motorcyclists not wearing a helmet increased by 11 times between 2011 and 2015. **Table 18** provides a summary of motorcycle related crashes in the Southcentral Michigan region.

Table 18: Motorcycle Crashes by County, 2010-2014

Location	Total		Fatal (K)		Serious Injury (A)	
	No.	Percent	No.	Percent	No.	Percent
Barry	94	2%	11	24%	22	14%
Branch	75	2%	2	9%	16	13%
Calhoun	259	2%	4	6%	40	13%
Kalamazoo	437	1%	12	11%	62	11%
St. Joseph	113	2%	7	15%	16	9%
Southcentral MI	978	2%	36	12%	156	12%
Michigan	14,343	1%	559	13%	2,463	11%

Note: Percentages are based on the corresponding Table 1 total crashes for that particular category.

Key observations:

- 1 in 4 fatal crashes in Barry County involve a motorcycle.

Countermeasures and Strategies

Given the recent trends affecting motorcycle safety, strategies and countermeasures are critical to ensure that crashes and in particular fatalities involving motorcycles are minimized. Potential mitigation measures currently also proposed under Michigan's SHSP include but are not limited to [4]:

- Encourage motorcyclist safety through training, use of protective and high visibility gear to help mitigate potential crashes and minimize crash severities.
- Evaluate and implement engineering countermeasures in high risk areas more prone to motorcycle crashes. Improve existing roadway conditions for motorcycle users.
- Disseminate educational material and information on motorcycle safety.
- Provide recommendations on legislation related to motorcycle safety.
- Explore educational and training opportunities for emergency personal as it relates to motorcycle involved crashes.

5.11 Senior Mobility Age 65 and Older

Background

The proportion of the population in the United States over 65 of age is growing significantly. Not surprisingly, as the population is getting older and life expectancy continues to increase, the proportion of drivers age 65 and older is expected to increase as well. This particular user group represents a high-risk age group similar to younger drivers. The increased risk is associated with reductions in perception and cognitive and motor skills which may make them more prone to collisions. Descriptive statistics of drivers 65 and older for the Southcentral Michigan region are presented in **Table 19**.

Table 19: Senior Driver (Age 65 and Older) Crashes by County, 2010-2014

Location	Total		Fatal (K)		Serious Injury (A)	
	No.	Percent	No.	Percent	No.	Percent
Barry	623	15%	13	28%	28	18%
Branch	646	16%	5	23%	21	18%
Calhoun	2,746	16%	13	20%	43	14%
Kalamazoo	4,892	14%	26	23%	72	13%
St. Joseph	864	16%	9	19%	23	13%
Southcentral MI	9,771	15%	66	23%	187	14%
Michigan	178,264	15%	911	22%	3,406	16%

Note: Percentages are based on the corresponding Table 1 total crashes for that particular category.

Key observations:

- The proportion of crashes, fatalities and serious injuries involving senior drivers in Southcentral Michigan is similar to the statewide average.
- 1 in 4 fatal crashes in Barry County involve a senior driver.
- Nearly 1 in 5 serious injury crashes in Barry and Branch Counties involve a senior driver.

Countermeasures and Strategies

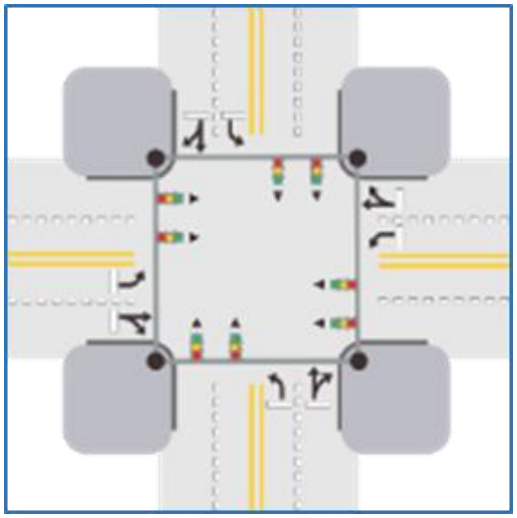
Advance guide and street name signs: Advance guide and street name signs inform drivers of their location, potential destinations, and locations of interest along the roadway. The advanced placement of the signs provides drivers with additional time to make the necessary adjustments toward their lane position or any other required response relative to the presented sign information. Advance guide and street name signs are particularly important for older drivers who may require additional time to process and respond appropriately to the information.

Advance warning signs: Advance warning signs provide drivers with information on potential hazardous conditions on a roadway prior to the hazardous site. Such signs could include advisory speed signs, signal ahead signs, upcoming work zone areas, or other maneuvers which may present a risk to the driver. While advance warnings signs are beneficial to all drivers, they are particularly important for older drivers in order to provide adequate time to process and respond appropriately to the information.

All-red clearance intervals: The all-red clearance interval is the portion of the traffic signal cycle where a red signal is displayed for all approaches of an intersection. Its purpose is to allow adequate time for vehicles which entered the intersection during a yellow interval to clear the intersection prior to the conflicting approach receiving a green. It is typically a function of the distance from the approach stop bar to the far side where a conflict does not exist, the length of a vehicle assumed at 20 feet, and the speed of approaching vehicles. Consequently, if a vehicle enters an intersection and an all-red clearance interval is not available or is inadequate in time, the risk for collisions increases. The all-red clearance interval can be particularly useful in accommodating different perception-reaction times associated with age differences. Not surprisingly studies have shown that the presence of an all-red interval has a positive effect on intersection safety. While currently signals are typically expected to operate with an all-red clearance interval, the provision of adequate all-red clearance timing also has a positive effect on intersection safety. One drawback to increasing the all-red clearance time is the increase in total intersection delay as vehicles on all approaches are experiencing a lower amount of the green interval.

Backplates (refer to page 19)

Convert traffic signals from diagonal to box span configuration: An adequate number and the proper placement of signal heads at an intersection are a recognized safety benefit. It improves the visibility of the traffic signals by providing drivers with the opportunity to quickly view the signal as opposed to searching the vicinity while approaching the intersection. This concern is magnified among older drivers to compensate for decreased head motion range and limited peripheral vision. In a diagonal span configuration the adequate number and placement of the signal heads cannot be addressed properly. Switching to a box span configuration mitigates this issue as it provides flexibility relative to the signal head's location and allows for the signal head to be placed over each lane of travel. While diagonal span configurations can still be found throughout Michigan, the box span layout is currently the preferred signal head configuration in Michigan.



Educational Programs: Additional educational programs and dissemination of information pertaining to senior drivers can assist in improving safety for this demographic. Examples include but are not limited to programs under carfit.org which offers older adults the opportunity to check how the personal vehicle fits their needs; Michigan aging driver guide which provides information with the purpose of promoting safe mobility; and the AAA aging driver course.

Fluorescent yellow sheeting on warning signs (refer to page 15)

Pedestrian countdown timer (refer to page 22)

Protected left turn phases: Left turn movements are high risk movements at an intersection. Thus when a left turn phase is warranted it must be provided. This decision is not only a function of through volumes, left-turn volumes, and delay, but it may also be based left-turn crash frequency. The addition of a left turn signal phasing can significantly reduce left-turn crashes. Depending on existing traffic and physical conditions of the intersection however, left-turn related crashes can still occur frequently. This could occur when left turns are permissive and conflicts are occurring with through traffic in the same direction and non-motorized crossing traffic. Older drivers may be more prone to these conflicts due to impaired judgment, decreased head motion range movements and limited peripheral vision. A protected left turn phase can mitigate such potential conflicts by providing left-turning vehicles with the right of way.

5.12 Speed Management

Background

Speeding is defined as driving too fast for existing conditions or in excess of the posted speed limit. Included among the adverse effects of speeding are increased likelihood of loss of vehicle control, increased stopping distance, reduced effectiveness of vehicle safety features, and greater risk for a collision that results in a serious injury or fatality. According to the FHWA, speeding is a contributing factor in nearly one in three fatal crashes [13]. **Table 20** provides descriptive statistics for speeding related crashes in Southcentral Michigan.

Table 20: Speeding-related Crashes by County, 2010-2014

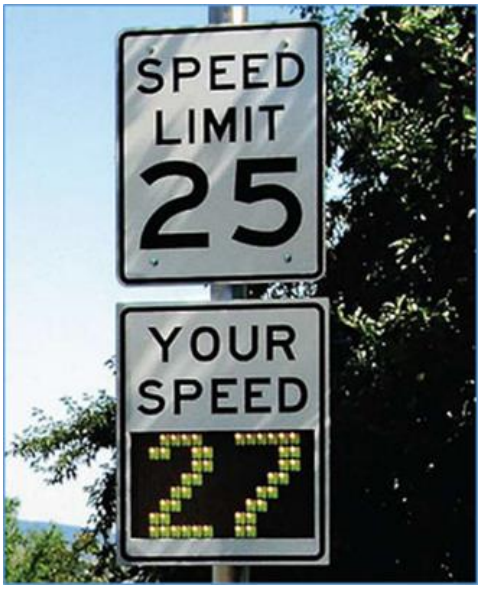
Location	Total		Fatal (K)		Serious Injury (A)	
	No.	Percent	No.	Percent	No.	Percent
Barry	805	20%	7	15%	29	19%
Branch	726	19%	2	9%	28	23%
Calhoun	3,089	18%	17	27%	52	17%
Kalamazoo	4,199	12%	22	20%	77	14%
St. Joseph	1,227	23%	9	19%	31	18%
Southcentral MI	10,046	15%	57	20%	217	17%
Michigan	104,596	9%	182	4%	1,403	6%

Note: Percentages are based on the corresponding Table 1 total crashes for that particular category.

Key observations:

- The proportion of crashes involving speeding, including fatal and serious injury crashes, is highest for Southcentral Michigan as opposed to the State of Michigan.
- 1 in 5 fatal crashes in Southcentral Michigan involved speeding.
- 1 in 4 fatal crashes in Calhoun County involved speeding.
- Nearly 1 in 4 serious injury crashes in Branch County involved speeding.

Countermeasures and Strategies



Speeding is a complex and widespread issue which is best addressed through a comprehensive process which can include engineering, enforcement, education, and emergency services countermeasures. Because of the prevalence of speeding, there is a large body of research dedicated to managing speeding. Engineering measures can be grouped into three primary categories. These include traffic controlling devices, roadway design, and traffic calming measures. Examples are:

- Advisory speeds
- Speed feedback signs
- Lane width reduction
- Road diet
- Raised medians or islands
- Roundabout
- Vertical traffic calming (i.e. speed humps, speed tables)
- Horizontal traffic calming (i.e. traffic circle, chicanes, chokers)
- Gateway treatments

Continuing enforcement of existing speed limits is also a powerful tool in deterring speeding behaviors. Educational programs and campaigns can also help inform drivers of the risks of speeding. The material should fit local needs and can target those demographics which are most prone to speeding.

5.13 Traffic Incident Management

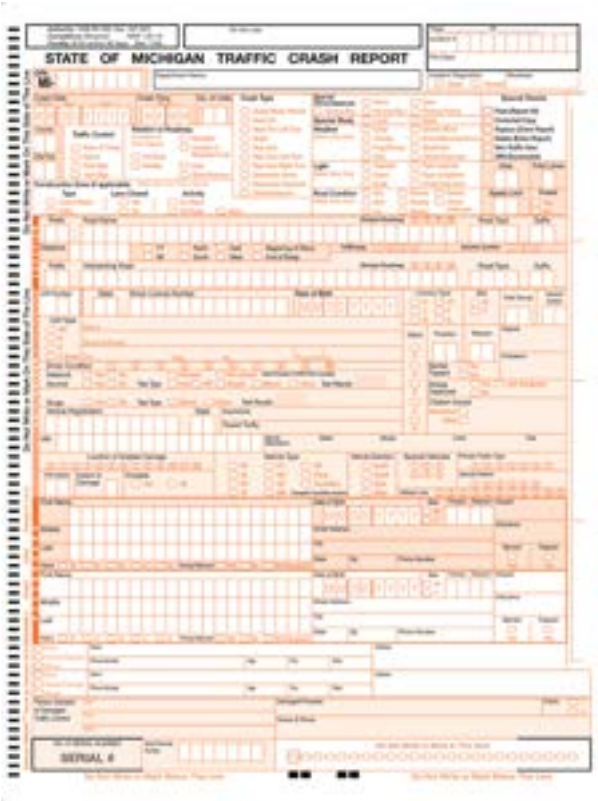
Background, Countermeasures and Strategies

Traffic incident management (TIM) is a multi-disciplinary approach to detect, respond, and clear traffic incidents on the roadway or roadside so that traffic flow is returned to normal and safe operations in a quick, safe and efficient manner. At the core of this initiative is the safety of not only the individuals affected by the incident, but also of secondary crashes and emergency responders. Given the complexity and situational characteristics of traffic crashes, a properly implemented TIM requires coordination among a wide variety of professions and parties including but not limited to law enforcement, fire, medical services, transportation, public safety communications, emergency management, towing and recovery, and hazardous material services. The coordination and identification of the proper traffic incident response in Michigan is typically facilitated through transportation operation centers which act as a central coordination and support center. In addition to these facilities, legislation such as the Hold Harmless and Steer it, Clear it law are designed to assist in the Traffic Incident Management Effort (TIME) process. The National Traffic Incident Management Responder Training Program (Mi-TIME) and Michigan TIME also provide training to help improve and strengthen the TIM coordination among the various parties involved.

5.14 Traffic Records and Information Systems

Background, Countermeasures and Strategies

Traffic records and information systems are critical to maintain and improve safety on the transportation system. Accurate and timely traffic records allow the users to provide data-driven decisions in order to identify problems, develop and implement countermeasures, evaluate methods, and efficiently allocate resources throughout the network. The primary elements of a traffic records and information systems include data collection, data management, and data analysis. While the U.S. DOT has developed guidance material on establishing and maintaining adequate traffic records and information systems such as the Model Minimum Uniform Crash Criteria (MMUCC) and Model Inventory of Roadway Elements (MIRE), the state of Michigan has long been in the forefront of this particular area. In the most recent traffic records and information systems strategic plan, Michigan has identified eight areas to support and realize the mission of this emphasis area. These areas include:



- Crash, citation/adjudication,
- Vehicle/driver
- Injury surveillance system components
- Roadway
- Data use & integration
- Traffic Records Coordinating Committee (TRCC)
- Strategic planning.

At the core of these areas is their broad integration into a single usable system. Additional strategies to improve this emphasis area can include but are not limited to recommendation for changes on UD-10 crash reports, training to improve accuracy on UD-10 crash reports and other datasets, increase coordination and communication among the various agencies involved in this topic, and integration of various datasets to improve decision making capabilities.

5.15 Traffic Safety Engineering

Background, Countermeasures and Strategies

Traffic safety engineering encompasses the area of transportation where engineering applications are used to reduce crashes and improve safety. The Michigan SHSP identifies key objectives to further traffic safety engineering. A number of these are also applicable to local agencies. These include:

- Promote safe infrastructure through outreach and communication
- Identify and resolve issues related to safety data
- Promote and support research on safety
- Broaden the use of proven countermeasures
- Develop, research, and pilot new countermeasures
- Collaborate with various parties to identify and promote funding opportunities

6.0 Prioritization

Given the geographical extent of the Southcentral Michigan region and vehicle miles traveled on its transportation network, the realization of the safety goals are reliant upon a well-planned prioritization system. The limited resources available to address the concerns presented in the emphasis areas also stress the importance of prioritizing high risk segments and/or intersections.

There are two components to the prioritization process. First it should be understood that certain countermeasures have the ability to simultaneously address different emphasis areas. Examples include low cost treatments such as advance warning signs, or the more variable cost methods such as RSA's which depending on the location can help mitigate multiple safety issues within a location. Thus implementing countermeasures which can address several safety issues represents an efficient use of resources.

The second component in the prioritization stage is the identification of the more high risk areas, roadway segments, or intersections in the region. Several statistical and GIS related methods are applied to the 2010-2014 crashes to identify high risk candidates within the Southcentral Michigan region. High risk areas are identified via crash pattern GIS analysis in order to pinpoint hot spots or regions which experience a high concentration of crashes. Crash pattern analysis is conducted for:

- All crashes
- Pedestrian crashes
- Bicycle crashes
- Fatal crashes (K)
- Serious injury crashes (A)
- Single vehicle lane departure crashes

High risk roadway segments are identified via a combination of statistical and GIS relationship methods which uses both crash rates and crash frequencies. In order to identify high crash rate segments, 2010-2014 crashes are applied to the road network based on the Physical Road (PR) number and mile point in which these crashes occur throughout the network. Non-deer and non-animal crashes are omitted from this list. Similarly omitted from this list are crashes coded as intersection crashes. Crash rates are then calculated for those segments where Annual Average Daily Traffic (AADT) volumes are available. AADT volumes are based on the FHWA Highway Performance Monitoring System (HPMS) 2014 data. The latter also defines the endpoints of each roadway segments. Crash rates are calculated based on the following equation:

$$CR = \frac{C * 100{,}000{,}000}{V * L * N * 365}$$

Where, CR = Segment crash rate per 100 million vehicle-miles of travel
C = Total number of non-animal crashes occurring in the segment for 2010-2014
V = 2014 AADT segment volumes
L = Segment length in miles
N = Number of years of data (5)

These results are presented in tabular and map form, where the tabular form provides several lists on a by county basis including:

- Total crashes
- Fatal crashes
- Injury crashes

Because AADT volumes are only available for a select number of segments, high risk segments are also identified in terms of crash frequencies. The segment crash frequencies aim to primarily supplement the segment crash rate method and provide a measure of safety for those segments in this region where traffic volumes cannot be obtained. Crash frequencies for this method are calculated for each segment in the road network by assigning the 2010-2014 non-deer and non-animal related crashes based on the PR number and mile point in which these crashes occur. Similar to the crash rate method, crashes coded as intersection crashes are omitted from the dataset. The All Road v14 file is used

as the network framework, thus segment endpoints are based upon this dataset. Akin to the crash rate methods, results are presented in tabular and map form, where the tabular form presents a comparable list of segments on a per county basis as the crash rate method.

The last form of prioritization identification includes high risk intersections. This method is based on crash frequencies. In the first step of this method intersections are identified in GIS Space for the entire Southcentral Michigan roadway network. An intersection in this case is defined as any node where two or more roads intersect. Intersections are then assigned a rural or urban designation depending on their spatial relationship to the Adjusted Census Urban Boundary (ACUB). Crashes are assigned to each intersection based on their proximity to the intersection and whose spatial buffer distance is defined by the urban and rural designation of the intersection. For urban intersections, non-deer non-animal related crashes are assigned to intersections if they occur within 150 feet of an urban node and are identified as intersection related crashes in the dataset. For rural intersections, non-deer non-animal related crashes are assigned to intersections if they occur within 250 feet of a rural node and are identified with similar codes as the ones in the urban intersection list in the crash database. Results are presented in tabular and map form, where the tabular form presents several lists of high crash frequency intersections for both rural and urban intersections including:

- Total crashes
- Fatal crashes
- Injury crashes

The tabular high risk segments and intersections are presented in **Appendix C**, while the crash pattern maps and related images are presented in **Appendix D**. It should be noted that for each dataset, emphasis is placed on the local road network whenever feasible.

7.0 Implementation and Evaluation

The last step of the Southcentral Michigan RTSP is the implementation phase. While the state, regional, and local agencies continue to improve traffic safety conditions within the transportation infrastructure, the occurrence of fatalities and serious injuries continues to be a significant safety issue. The emphasis areas outlined in this report, along with the identified countermeasures and strategies can assist in further improving safety for the region. The identified high risk areas, segments, and intersections can help prioritize treatment areas throughout the region. Based on this premise it is the intent of this report to be used as a tool in addressing safety issues of concern for the communities in the Southcentral Michigan region.

The SMPC will lead the coordination of the RTSP for the Southcentral Michigan region. Ongoing communications with all interested stakeholders are expected to foster stronger relationship and consequently help promote and provide solutions to the regional safety issues as outlined in the emphasis areas. Solutions should incorporate all of the 4 E's of Safety (engineering, enforcement, education, and emergency services) to provide a holistic approach to today's traffic safety needs.

Implementation of this report along with the appropriate countermeasures and strategies should be evaluated on a continued basis to ensure that treatments are working as expected. The evaluation process should be a coordinated effort involving various levels of public and private agencies from all applicable counties. The evaluation process should build on the level of detail and robust traffic crash reporting systems available in the state. The implementation and evaluation process should also strive to promote innovation in not only the implementation and evaluation of countermeasures and strategies, but also in the data collection, analysis, and reporting systems. Sources such as the crash modification factor (CMF) clearing house (www.cmfclearinghouse.org) and CMFs provided by the MDOT provide additional information portals which could be examined to identify, implement, and evaluate other types of countermeasures and strategies in addition to the ones provided throughout this report.

Several transportation related funding sources are also available which could be pursued to realize the safety objectives of the Southcentral region and this RTSP. Potential funding sources include:

- **Fixing America's Surface Transportation Act (FAST**) – Enacted in 2015, the FAST Act grant program under the U.S. Department of Transportation provides funding for infrastructure planning and investment related projects encompassing all modes of transit. The Act is authorized for funding for five years between fiscal year (FY) 2016 and 2020. Recent changes to the legislation introduced the Infrastructure for Rebuilding America (INFRA) grant which replaces and introduces new criteria as opposed to the prior FASTLANE grants. Awards under the INFRA grant are available for both large ($25 million) and small projects ($5 million). Eligible costs include but are not limited to reconstruction, rehabilitation, acquisition of property, environmental mitigating, construction contingencies, equipment acquisition, and operational improvements. Calls for projects are currently underway with an application deadline of November 2nd, 2017.
- **General Local Highway Safety Improvement Program (HSIP) –** The general local HSIP administered by MDOT provides safety funding for both rural and urban designated areas. The funds are available for all locally controlled public roadways regardless of National Functional Class (NFC) and are available solely for Act 51 agencies. Local agencies can submit multiple projects for consideration.
- **High Risk Rural Road (HRRR) Program –** The HRRR program provides safety funding for rural major or minor collectors, or rural local roads where crash rates for fatalities (K) and incapacitating injuries (A) exceed statewide average, or where these facilities will experience an increase in volumes likely to increase these rates to where they exceed the statewide average. Local agencies can submit multiple for consideration.
- **Rural Task Force Program –** The Rural Task Force Program provides funding for transportation projects in rural counties in Michigan with a population of 400,000 or less. Funding is provided through the Surface Transportation Program Rural (STP) and Transportation Economic Development Fund (TEDF) Category D sources. The program is administered through a regional task force comprised of representatives from each

applicable county road commission, representatives from cities or villages with a population of 5,000 or less, and representatives of each regional transit provider.

- **Safe Routes to School (SRTS)** – The Michigan SRTS program administered by the FHWA provides funding for projects or programs whose goal is to enable and encourage children, including those with disabilities to walk and bike to school; make walking and bicycling to school safer and more appealing thus encourage healthy and active lifestyles; and facilitate the planning, development, and implementation of projects which improve safety, reduce traffic, fuel consumption and emissions in proximity to schools. The SRTS program offers federal funding structured in two ways, a mini grant and major grant. The mini grant is primarily program related, while the major grant is infrastructure improvement and program related.
- **Small Urban Program** – The Small Urban Program administered by MDOT provides funding for transportation projects within small urban areas of population of 5,000 to 50,000. Funding can be utilized only for construction costs or capital purchases of transit vehicles. Proposed projects must be within approved federal-urbanized areas and/or located on the federal highway system.
- **State Infrastructure Bank (SIB) Loan Program** – The Michigan SIB loan program is available to Act 51 public entities for eligible transportation projects. Its primary aim is to complement traditional funding sources and address urgent project financing demands. The program priorities include accelerating the delivery of transportation projects by providing financial assistance otherwise not available in the short term; increase the financial viability of transportation projects by reducing borrowing costs; and attract new public and private investments in transportation infrastructure.
- **Transportation Alternatives Program (TAP)** – TAP is a competitive grant which funds projects which enhance intermodal transportation options and provide safe alternative transportation choices. Examples include bike paths, streetscapes, historic preservation of transportation facilities, or projects which promote walkability and improve the quality of life.
- **Transportation Economic Development Fund (TEDF)** – The TEDF provides funding opportunities for agencies with immediate transportation needs relating to economic development issues. The mission of the TEDF is to enhance the ability of the state to compete in the international economy, serve as a catalyst for economic growth in the state, and improve the quality of life of its residents. There are five categories under the TEDF program. These include economic development road projects, urban congestion relief, secondary all-season roads, forest roads, and urban areas in rural counties.

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Appendix A – Crash Type Matrix

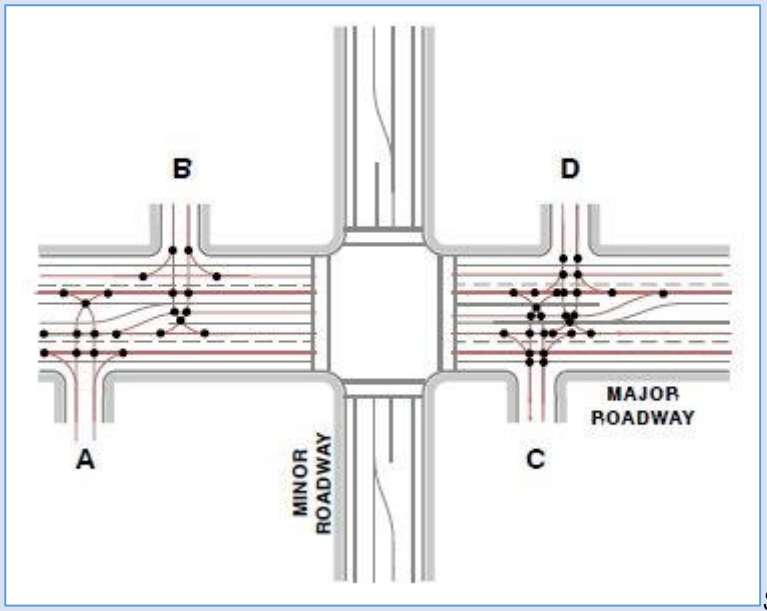
Crash Type	All Crashes	Fatal	A-injury	Single Vehicle Lane Departure	Multiple Vehicle Lane Departure	Intersection	Intersection Signalized	Intersection Stop Controlled	Pedestrian	Bicycle
Overturn	3.3%	9.3%	8.2%	13.2%	0.0%	0.4%	0.1%	0.3%	0.0%	0.0%
Hit Train	0.0%	1.0%	0.2%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Pedestrian	1.0%	12.0%	6.8%	0.5%	0.2%	1.0%	1.0%	0.9%	96.6%	0.0%
Bicycle	0.9%	2.1%	3.7%	0.3%	0.0%	1.4%	1.2%	2.0%	0.0%	97.7%
Fixed Object	21.0%	29.2%	26.6%	77.6%	0.0%	7.2%	2.8%	10.0%	0.0%	0.0%
Other Object	1.4%	0.0%	0.6%	1.1%	0.0%	0.2%	0.1%	0.2%	0.0%	0.0%
Hit Parked Vehicle	0.5%	0.0%	0.1%	0.1%	0.0%	0.1%	0.0%	0.0%	0.2%	0.7%
Misc Single Vehicle	2.1%	3.8%	4.1%	6.1%	0.0%	0.7%	0.5%	0.7%	0.0%	0.0%
Misc Multiple Vehicle	3.4%	1.7%	3.0%	0.0%	0.0%	2.7%	2.3%	3.7%	0.0%	0.0%
Angle Straight	10.7%	15.1%	15.1%	0.0%	0.0%	21.1%	17.9%	41.5%	0.0%	0.0%
Angle Turn	3.7%	1.4%	3.4%	0.0%	0.0%	7.3%	6.3%	12.1%	0.0%	0.0%
Head On Left Turn	2.2%	4.1%	4.5%	0.0%	0.0%	4.5%	6.6%	2.7%	0.0%	0.0%
Rear End Straight	23.4%	4.8%	9.0%	0.0%	0.0%	26.2%	41.1%	10.1%	0.0%	0.0%
Rear End Left Turn	1.3%	0.3%	0.8%	0.0%	0.0%	1.9%	1.4%	0.7%	0.0%	0.0%
Rear End Right Turn	1.1%	0.0%	0.2%	0.0%	0.0%	1.5%	1.4%	1.1%	0.0%	0.0%
Dual Left Turn	0.3%	0.0%	0.0%	0.0%	0.0%	0.6%	0.8%	0.2%	0.0%	0.0%
Dual Right Turn	0.4%	0.0%	0.0%	0.0%	0.0%	0.6%	0.9%	0.5%	0.0%	0.2%
Head On	1.4%	12.0%	5.3%	0.0%	39.8%	0.9%	0.8%	0.9%	0.0%	0.0%
Side-Swipe Same	9.7%	1.4%	2.2%	0.0%	0.0%	7.1%	6.7%	3.5%	0.0%	0.0%
Side-Swipe Opposite	2.1%	0.7%	1.4%	0.0%	54.5%	1.5%	1.5%	2.0%	0.0%	0.0%
Angle Drive	3.1%	1.0%	2.5%	0.0%	0.0%	4.0%	0.7%	2.5%	0.0%	0.0%
Rear End Drive	2.3%	0.0%	0.5%	0.0%	0.0%	4.3%	4.3%	1.2%	0.0%	0.0%
Other Drive	1.2%	0.0%	1.2%	0.0%	2.8%	1.7%	0.3%	0.6%	0.0%	0.0%
Backing	3.1%	0.0%	0.2%	0.8%	2.0%	2.8%	1.2%	2.4%	2.5%	0.2%
Parking	0.6%	0.0%	0.2%	0.2%	0.7%	0.4%	0.1%	0.2%	0.8%	1.3%

2010-2014 Southcentral Michigan Crash Matrix (Deer or Animal crashes are excluded)

Crash Type	Motorcycle	Truck/Bus	Young Driver <24	Senior Driver >65	Driveway Related	Distracted Driving	Alcohol Involved	Drug Involved	Speeding
Overturn	9.3%	1.8%	3.1%	1.1%	0.3%	4.2%	7.4%	7.0%	12.6%
Hit Train	0.0%	0.1%	0.0%	0.0%	0.0%	0.1%	0.1%	0.3%	0.0%
Pedestrian	0.4%	0.4%	0.5%	0.7%	0.6%	0.6%	2.8%	0.3%	0.1%
Bicycle	0.6%	0.3%	0.3%	0.7%	1.2%	0.8%	0.7%	0.3%	0.0%
Fixed Object	19.6%	10.6%	17.8%	8.1%	5.6%	20.4%	49.5%	56.0%	59.7%
Other Object	1.1%	0.9%	0.7%	0.8%	0.3%	0.1%	1.0%	0.7%	0.9%
Hit Parked Vehicle	0.1%	0.3%	0.2%	0.3%	0.0%	0.3%	0.3%	0.3%	0.3%
Misc Single Vehicle	15.1%	2.8%	1.5%	0.6%	0.6%	1.1%	4.4%	3.4%	3.9%
Misc Multiple Vehicle	4.0%	5.9%	3.1%	3.5%	0.0%	1.2%	1.4%	2.3%	1.9%
Angle Straight	8.5%	9.3%	11.6%	15.9%	0.0%	9.6%	5.9%	4.4%	3.3%
Angle Turn	3.7%	2.7%	4.2%	6.4%	0.0%	1.0%	0.9%	0.7%	1.1%
Head On Left Turn	4.3%	0.7%	2.7%	3.4%	0.0%	1.2%	1.1%	1.0%	0.1%
Rear End Straight	13.6%	21.5%	28.2%	24.6%	0.0%	39.6%	10.6%	11.7%	5.7%
Rear End Left Turn	1.5%	1.1%	1.7%	1.8%	2.7%	2.3%	0.5%	0.3%	0.3%
Rear End Right Turn	0.4%	0.8%	1.1%	1.0%	2.1%	1.4%	0.3%	0.3%	0.3%
Dual Left Turn	0.0%	1.0%	0.2%	0.5%	0.3%	0.2%	0.1%	0.3%	0.1%
Dual Right Turn	0.3%	0.9%	0.2%	0.4%	0.3%	0.0%	0.1%	0.0%	0.0%
Head On	1.4%	1.5%	1.6%	1.5%	0.8%	1.9%	3.2%	2.7%	2.1%
Side-Swipe Same	4.8%	24.5%	9.2%	12.1%	9.2%	5.6%	3.5%	4.4%	3.8%
Side-Swipe Opposite	1.3%	3.9%	1.8%	2.4%	0.0%	1.6%	2.1%	2.0%	2.6%
Angle Drive	4.1%	2.2%	3.6%	4.9%	28.1%	1.2%	0.9%	0.0%	0.5%
Rear End Drive	2.2%	1.0%	2.8%	2.5%	21.1%	3.8%	0.8%	0.0%	0.4%
Other Drive	2.1%	1.2%	1.3%	1.6%	11.1%	0.4%	0.7%	0.7%	0.2%
Backing	1.1%	4.3%	2.0%	4.1%	13.2%	1.5%	1.4%	0.3%	0.1%
Parking	0.2%	0.4%	0.6%	1.0%	2.5%	0.2%	0.3%	0.3%	0.0%

2010-2014 Southcentral Michigan Crash Matrix (Deer or Animal crashes are excluded)

Appendix B – Countermeasures

Access Management	
4 E's Area of Focus:	Engineering
Description:	Existing literature on the impacts of driveways on crashes indicates that crashes increase with increasing driveway density. As the spacing among driveways increases, the overall number of conflict points is reduced thus providing drivers with improved merging capabilities and less risky maneuvers. The placement of the driveways is also as important as driveway density. Increasing the distance of a driveway from an intersection reduces the risk of crashes since the number of potential conflict points is reduced. This effect is particularly true for angle and rear-end crashes. Similarly, limiting the number of access point on the major roadway and shifting them to the minor can help reduce the risk of crashes. A secondary aspect of access management is also the management of turning movements in and out of the driveway. Arguably the majority of crashes at a driveway are a result of left-turning vehicles. Thus minimizing or eliminating left turns can help reduce crashes as well. One method to manage, limit, or eliminate left turning movements is through the installation of medians which can include non-traversable medians, two-way left turn lanes (TWLTL). Additionally dedicated left-turn or right-turn lanes can help further control the flow of traffic.
Photo:	 *Source: FHWA*
Affected Crashes:	Driveway related crashes
Location:	High concentration of driveway related accidents
Estimated Safety Benefit:	15% overall crash reduction with access management improvement [14]. Benefits are dependent on the treatment type.
Estimated Cost:	Medium - High

Advanced Curve Warning Signs	
4 E's Area of Focus:	Engineering
Description:	Horizontal curves are part of the roadway geometry. However depending on the sharpness of the curve and other associative conditions they can be correlated with a disproportionate number of crashes. To improve the safety of these curves, advanced warning signs are typically placed prior to the horizontal curve to alert drivers of a sudden change in geometry which may not be expected or visible, thus prevent potential lane departures. Typical advanced curve warning signage includes the W1-1, W12, W1-3, W1-4, and W1-5. An extensive list of such signs can be found under Section 2C.06 "Horizontal Alignment Warning Signs" of the Michigan Manual on Uniform Traffic Control Devices (MMUTCD) (http://mdotcf.state.mi.us/public/tands/Details_Web/mmutcdpart2c_2011.pdf)
Photo:	 *Source: FHWA*
Affected Crashes:	Single Vehicle Lane Departure, Sideswipe, Head-on, Fixed-Objects, Overturn
Location:	Unmarked roadway segments experiencing a sharp change in the horizontal curvature or a combination of horizontal and vertical curves.
Estimated Safety Benefit:	18% reduction in fatal and injury crashes [15]. 27.5% reduction in crashing occurring during dark conditions [15]. 25% reduction in lane departure crashes occurring during dark conditions [15]. 20% overall reductions in head-on, sideswipe, fixed-objects, or overturn crashes [14].
Estimated Cost:	Low

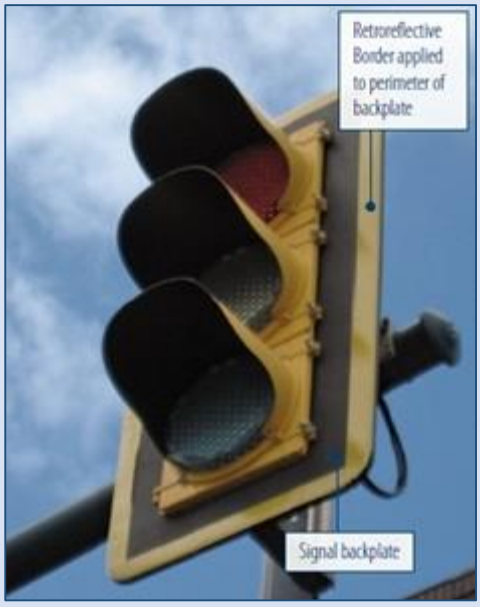
Advanced Guide and Street Name Signs	
4 E's Area of Focus:	Engineering
Description:	Advance guide and street name signs inform drivers of their location, potential destinations, and locations of interest along the roadway. The advanced placement of the signs provides drivers with additional time to make the necessary adjustments toward their lane position or any other required response relative to the presented sign information. Similar to advance warning signs, advance guide and street name signs are particularly important for older drivers who may require additional time to process and respond appropriately to the information.
Photo:	
Affected Crashes:	All types of crashes (location dependent)
Location:	Placement in advance of locations requiring route selection decisions.
Estimated Safety Benefit:	1.6% overall crash reduction [16]. Benefits can be location dependent.
Estimated Cost:	Low

Advanced Intersection Signs	
4 E's Area of Focus:	Engineering
Description:	Advanced intersection signs provide advance warnings to drivers of an upcoming intersection downstream of the roadway. They consist of static signs (i.e. stop ahead or signal ahead signs) or dynamic signs such as advance warning flashers typically mounted on a warning sign to further alert drivers of upcoming conditions. The latter can flash regardless of the status of the downstream signal, or alert drivers of a potential signal change in the downstream signal.
Photo:	
Affected Crashes:	Intersection related crashes, Angle, Rear-end
Location:	Placement in advance of intersections characterized by a high frequency of rear-end and/or angle crashes, and/or affected by a limited sight distance.
Estimated Safety Benefit:	35% reduction in angle crashes when adding an advance signal warning sign ahead of a signalized intersection [17]. 36% and 62% reduction in rear-end and angle crashes respectively when installing flashing beacons on advance warning signs [18].
Estimated Cost:	Low

Advanced Warning Signs	
4 E's Area of Focus:	Engineering
Description:	Advance warning signs provide drivers with information on potential hazardous conditions on a roadway prior to the hazardous site. Such signs could include advisory speed signs, signal ahead signs, upcoming work zone areas, or other maneuvers which may present a risk to the driver. While advance warnings signs are beneficial to all drivers, they are particularly important for older drivers in order to provide adequate time to process and respond appropriately to the information.
Photo:	
Affected Crashes:	All types of crashes (location dependent)
Location:	Placement in advance of locations requiring change in speeds, hazardous geometric conditions, changes in the operational and geometric characteristics of the roadway, potential conflict areas, work zones, and other roadway or roadside hazards affecting the area.
Estimated Safety Benefit:	Benefits are location dependent.
Estimated Cost:	Low

Advisory Speeds	
4 E's Area of Focus:	Engineering
Description:	Advisory speed signs inform drivers of the appropriate speed under existing roadway conditions. They are installed upstream of the subject location. While advisory speeds are generally used to inform drivers of an upcoming lateral shift in the roadway, they can be applicable on a number of situations including to alert drivers of adverse weather conditions.
Photo:	
Affected Crashes:	Speeding related crashes
Location:	Locations where current posted speed limit is too high for existing roadway conditions.
Estimated Safety Benefit:	29% reduction in property damage only crashes when installing a horizontal alignment with advisory speed sign [19]. 13% reduction in crashes resulting injuries when installing a horizontal alignment with advisory speed sign [19].
Estimated Cost:	Low

All-Red Clearance Interval	
4 E's Area of Focus:	Engineering
Description:	The all-red clearance interval is the portion of the traffic signal cycle where a red signal is displayed for all approaches of an intersection. Its purpose is to allow adequate time for vehicles which entered the intersection during a yellow interval to clear the intersection prior to the conflicting approach receiving a green. It is typically a function of the total traversed width from the approach stop bar to the far side where a conflict does not exist, the length of a vehicle assumed at 20 feet, and the speed of approaching vehicles. Consequently, if a vehicle enters an intersection and an all-red clearance interval is not available or is inadequate in time, the risk for collisions increases. Not surprisingly studies have shown that the presence of an all-red interval has a positive effect on intersection safety. While currently signals are typically expected to operate with an all-red clearance interval, the provision of adequate all-red clearance timing also has a positive effect on intersection safety. One drawback to increasing the all-red clearance time is the increase in total intersection delay as vehicles on all approaches are experiencing a lower amount of the green interval.
Photo:	
Affected Crashes:	Intersection related crashes, Angle, Rear-end, sideswipe, Head-on
Location:	Signalized intersections with no or inadequate all-red clearance interval.
Estimated Safety Benefit:	20.2% reduction in intersection related crashes [20].
Estimated Cost:	Low

Backplates	
4 E's Area of Focus:	Engineering
Description:	MDOT has found that traditional traffic signals can be difficult for drivers to see. By adding either a black backplate or a backplate with a reflectorized border, signal visibility is increased. The combination of a black backplate and all black face has shown increased signal visibility during the day by 33 percent. By making the backplate reflective, visibility has increased even more, especially at night. Both backplates and retroreflective borders are low-cost safety treatments that can be easily added systematically to existing span and mast arm assemblies as long as the structural capacity of the supports is evaluated.
Photo:	 *Source: FHWA*
Affected Crashes:	Intersection related crashes
Location:	Intersections with traditional traffic signal with no black backplate or reflectorized sheeting on backplate. Particularly those intersections where signal visibility is poor.
Estimated Safety Benefit:	15% reductions in intersection related crashes when reflective sheeting is installed to signal backplates [21].
Estimated Cost:	Low

Box Span and Mast Arm	
4 E's Area of Focus:	Engineering
Description:	Box span and mast arm signal layouts provide safety improvements over diagonal span, pedestal, or post mounted signal displays. The safety benefits are associated with factors such as increased signal visibility and decreases in the angle of collision. While safety benefits are applicable for both cases, the use of one over the other is dependent on the existing intersection conditions and proposed layout configuration. Box span layouts can typically accommodate larger intersections, are more flexible in the placement of span wire poles, and have a lower overall cost as opposed to mast arms. Mast arm layouts in comparison are characterized by a higher overall cost and are more aesthetically pleasing than box span layouts. Maintenance on mast arms is also expected to be lower as opposed to box span layouts [9].
Photo:	 *Box Span*  *Mast Arm*
Affected Crashes:	Angle, Rear-end, Intersection related crashes
Location:	Intersections with a high number of rear-end collisions, and/or intersections with a high number of angle crashes which could be a result of red light running.
Estimated Safety Benefit:	Safety benefits are dependent on the existing conditions of the intersection and proposed layout configuration.
Estimated Cost:	High

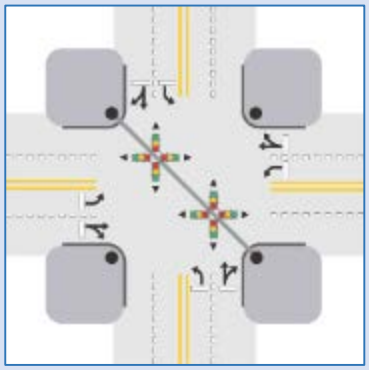
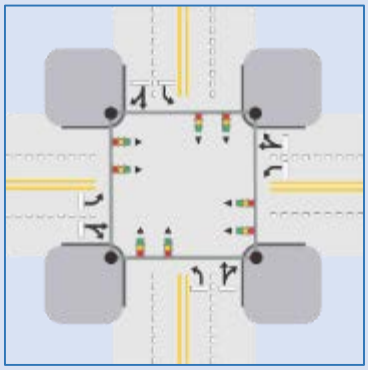
Cable Barrier on Shoulder	
4 E's Area of Focus:	Engineering
Description:	Cable barriers consist of high-tension steel cables supported by a weak post which prevent vehicles from departing the travel way. While traditionally cable barriers are installed along medians to prevent median crossover accidents, they may be also installed along shoulders to protect vehicles from colliding with fixed objects and/or avoiding steep slopes in the clear zone. Unlike rigid barriers, cable barriers include low installation and maintenance costs, and allow for a soft impact upon collision with adequate redirection capabilities. While situational, depending on the type, speed, and force of impact the cable barrier may not be able to fully prevent a lane departure crash and may become ineffective following a high speed high force impact. Thus the installation of cable barriers along a shoulder may require adequate offsets from a fixed object or high steep slope areas.
Photo:	
Affected Crashes:	Single Vehicle Lane Departure, Fixed-Objects, Overturns
Location:	Locations with steep slopes and/or fixed objects in the roadside.
Estimated Safety Benefit:	Existing literature does not examine safety impacts of shoulder cable barriers. Emphasis is placed on the safety benefits of median cable barriers.
Estimated Cost:	Low - Medium

Centerline & Shoulder Rumble Strips	
4 E's Area of Focus:	Engineering
Description:	Rumble strips are a road safety countermeasure which warn drivers of potential danger via vibration and noise transmitted from the wheel of the vehicle to the vehicle's interior. They can be installed over centerlines or on the shoulder.
Photo:	 *Source: FHWA*
Affected Crashes:	Single Vehicle Lane Departure, Head-on, Sideswipe-opposite
Location:	Roadway segments experiencing significant lane departure crashes, and/or head-on collisions with opposing traffic.
Estimated Safety Benefit:	Centerline Rumble Strips – 55% reduction in run-of-the-road crashes, sideswipe opposite, and head-on crashes [14]. Shoulder Rumble Strips – 20% reduction in run-of-the-road crashes [14].
Estimated Cost:	Low - Medium

Clear Zone	
4 E's Area of Focus:	Engineering
Description:	Clear zones are unobstructed and traversable areas following the edge of the traveled way designed to provide drivers with adequate room to regain control of a vehicle that has left the roadway. Examples include shoulders or recoverable slope areas. Fixed objects that may be found in the suggested clear zone include utility poles, pillars, non-breakaway mailboxes, wall/barriers, dangerous landscaping and non-breakaway fence posts. Arguably however, the primary issue for local agencies involve trees. By creating and maintaining clear zones along the roadway the likelihood that a roadway departure results in a collision, and/or high severity collision is reduced.
Photo:	 *Source: FHWA*
Affected Crashes:	Single Vehicle Lane Departure, Fixed-Objects, Overturns
Location:	Roadway segments with a high concentration of single vehicle lane departure crashes. Width of the clear zone is depending on vehicle speeds and volumes of the adjacent roadway.
Estimated Safety Benefit:	Increasing the distance of the clear zone from 3.3 ft to 16.7 ft reduces crashes of all types of severities by 22% [19]. Increasing the distance of the clear zone from 16.5 ft to 29.5 ft reduces crashes of all types of severities by 44% [19]. Removing or relocating fixed objects outside of clear zones reduces crashes of all types of severities by 75% [14]. Flattening the slope reduces fixed-object crashes or overturns by 15% [14].
Estimated Cost:	Low - Medium

Connected Vehicle Technologies	
4 E's Area of Focus:	Engineering Education Enforcement Emergency
Description:	Connected vehicle technology is arguably the most promising technology advancement in recent memory with the potential of revolutionizing all elements of the transportation system. By making use of innovations in technology such as wireless communications, advanced sensors, GPS navigation, and smart infrastructure among a plethora of other elements, connected vehicles can have the capability to identify threats on the roadway and disseminate the information not only to the driver, but also share the information among all vehicles occupying a specific space in the roadway so that every vehicle would be aware of the location of other nearby vehicles. While connected vehicle technology is still in the early phases of research and implementation, NHTSA estimates that's connected vehicles may reduce up to 80% of crashes not involving an impaired driver, and could be particularly effective in reducing crashes associated with human error [6].
Photo:	 *Source: U.S. DOT*
Affected Crashes:	All crashes
Location:	n/a
Estimated Safety Benefit:	80% potential reduction for all crashes not involving an impaired driver [6].
Estimated Cost:	High

Cross Traffic Does Not Stop	
4 E's Area of Focus:	Engineering
Description:	"Cross traffic does not stop" signs alert drivers that vehicles crossing an upstream intersections have the right-of-way and do not stop, thus informing and warning the driver to stop in advance of the intersection. The sign is generally installed in those locations where drivers may misinterpret the intersection as a four-way stop. A survey of 2,100 drivers by the Texas Department of Transportation indicated that 90% of the responses received preferred this type of sign as opposed to a double-headed arrow sign [8].
Photo:	 *Source: MUTCD*
Affected Crashes:	Angle Crashes
Location:	Two-way stop-controlled intersections where it could be misrepresented as a four-way stop.
Estimated Safety Benefit:	35% reduction in angle crashes [22].
Estimated Cost:	Low

Diagonal Span to Box Span Configuration	
4 E's Area of Focus:	Engineering
Description:	An adequate number and the proper placement of signal heads at an intersection are a recognized safety benefit. It improves the visibility of the traffic signals by providing drivers with the opportunity to quickly view the signal as opposed to searching the vicinity while approaching the intersection. This concern is magnified among older drivers to compensate for decreased head motion range and limited peripheral vision. In a diagonal span configuration the adequate number and placement of the signal heads cannot be addressed properly. Switching to a box span configuration mitigates this issue as it provides flexibility relative to the signal head's location and allows for the signal head to be placed over each lane of travel. While diagonal span configurations can still be found throughout Michigan, the box span layout is currently the preferred signal head configuration in Michigan.
Photo:	 *Diagonal Span*  *Box Span*
Affected Crashes:	Intersection related crashes
Location:	Diagonal span configured intersections with a high number of rear-end collisions, and/or intersections with a high number of angle crashes which could be a result of red light running.
Estimated Safety Benefit:	10% overall crash reduction [14].
Estimated Cost:	High

Double Up Stop Signs	
4 E's Area of Focus:	Engineering
Description:	Stop signs at stop-controlled intersections are generally installed on the right side of the road within the cone of vision of the driver. Certain safety conditions however can be improved by installing a secondary stop sign on the left side of the road as well. When a median is present a stop sign within the median can similarly improve the visibility and compliance within the stop-controlled intersection by acting as a form of gateway. Certain intersection configurations may not be ideal to this treatment as there may be driver confusion associated with the installation of a stop sign on the opposing roadway.
Photo:	 *Source: FHWA*
Affected Crashes:	Stop-controlled intersection crashes
Location:	Stop-controlled intersections with poor visibility or characterized by a high frequency of crashes.
Estimated Safety Benefit:	11% reductions in overall crashes [22]. 55% reduction in angle crashes [22].
Estimated Cost:	Low

Flashing Beacons and Stop Signs	
4 E's Area of Focus:	Engineering
Description:	Driver compliance within an intersection is vital to its safety operations. This is particularly challenging for stop-controlled intersections which are generally located in low volume rural areas and which tend to be characterized by higher speeds. Depending on geometrics or operational characteristics of the roadway, stop-controlled intersections can also present an additional challenge as they can be unexpected or not clearly visible to the driver. To improve visibility and driver compliance, flashing beacons can be installed either on top of the sign or overhead. Flashing beacons can further be actuated so they flash when vehicles approach the intersection.
Photo:	  *Source: FHWA*
Affected Crashes:	Angle crashes
Location:	Stop-controlled intersections with poor visibility or characterized by a high number of angel crashes and/or fatal and serious injury crashes.
Estimated Safety Benefit:	13% reductions in angle crashes [23]. 10% reduction in fatal and injury crashes [23].
Estimated Cost:	Med-High

Fluorescent Yellow Sheeting on Warning Signs	
4 E's Area of Focus:	Engineering
Description:	The use of fluorescent yellow sheeting in place of the standard yellow sheeting on warning signs is a relatively inexpensive method to increase the luminance and visibility of the applicable traffic signs on the roadway. Thus drivers may be better informed and alerted of potential hazardous conditions along the roadway. The improved visibility is applicable in both daytime and particularly nighttime conditions.
Photo:	 *Source: FHWA*
Affected Crashes:	Lane Departure, additional crashes applicable depending on hazardous conditions
Location:	Locations in which the roadway geometry or other obstructions hide the hazard condition applicable to the sign.
Estimated Safety Benefit:	20% crash in reduction in all types of single vehicle lane departure crashes [24].
Estimated Cost:	Low

Installation & Maintenance of Bicycle Lanes	
4 E's Area of Focus:	Engineering
Description:	The American Association of State Highway and Transportation Officials (AASHTO) defines a bike lane as the "portion of a roadway which has been designated by striping, signing, and pavement markings for the preferential or exclusive use of bicyclists". They are typically located on the right side of the roadway with pavement markings which direct bicyclists toward the direction of travel. Bicycle lane design standards vary depending upon the location and operational and geometric roadway conditions, the premise is to provide bicyclists with a safe travel path by minimizing potential conflicts with vehicles which are generally traveling at much higher speeds.
Photo:	
Affected Crashes:	Bicycle crashes
Location:	Roadways used by bicyclists with improperly designed bicycle lanes or no bicycle lanes, and which pose a particularly high risk to bicyclists.
Estimated Safety Benefit:	25% reduction in bicycle crashes when installed per MDOT standards [14].
Estimated Cost:	Low - High

Lane Width	
4 E's Area of Focus:	Engineering
Description:	As the roadway narrows, drivers tend to driver at lower speeds to be able to maneuver the reduction in space. The changes are not limited to physical changes but also restriping of the pavement to reduce the lane width. The remaining space could then be used to support additional uses such bike lanes, parking lanes and related.
Photo:	
Affected Crashes:	Speeding related crashes
Location:	Speed transition areas, in proximity to schools, residential neighborhoods, or segments with speeding violations.
Estimated Safety Benefit:	5% reduction in overall crashes [25].
Estimated Cost:	Low - High

Left turn signal phasing	
4 E's Area of Focus:	Engineering
Description:	Left turn movements represent a high risk intersection movement. Thus when a left turn phase is warranted it must be provided. This decision is not only a function of through volumes and left-turn volumes and delay, but it may also be based left-turn crash frequency. The addition of a left turn signal phasing can significantly reduce left-turn crashes.
Photo:	
Affected Crashes:	Left-turn crashes
Location:	Intersections where a left-turn signal phase is warranted and/or where there is a high concentration of left-turn crashes.
Estimated Safety Benefit:	30% reductions in left-turn crashes when a left-turn signal phase is added [14].
Estimated Cost:	Medium

Oversized Stop Signs	
4 E's Area of Focus:	Engineering
Description:	Similar to flashing beacon improvements at stop-controlled intersections, oversized signs aim to improve the driver visibility and compliance of stopped-controlled intersections. While the size of the stop sign is generally dictated in the Manual on Uniform Traffic Control Devices (MUTCD) and is a factor of speed, the installation of larger stop signs can improve the safety of un-signalized intersections
Photo:	
Affected Crashes:	Stop-controlled intersection crashes
Location:	High speed stop-controlled intersections or intersections with a high frequency of crashes.
Estimated Safety Benefit:	19% reductions in overall crashes [22].
Estimated Cost:	Low

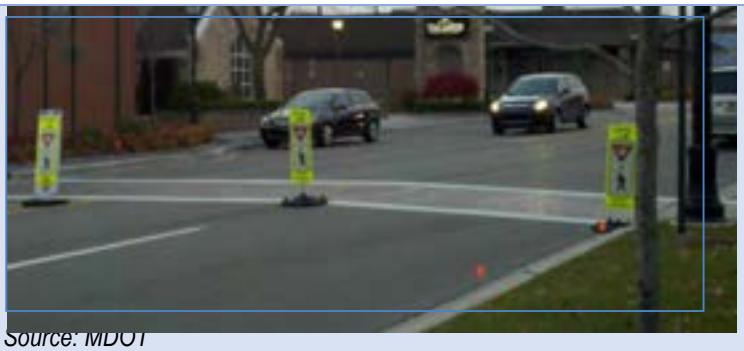
Paved Shoulders	
4 E's Area of Focus:	Engineering
Description:	Paved shoulders provide additional room for vehicle recovery along a roadway. They allow the driver to correct the vehicle's path after leaving the lane but before the vehicle runs off the road.
Photo:	 *Source: FHWA*
Affected Crashes:	Single Vehicle Lane Departure
Location:	Roadway segments with no paved shoulders or with minimal paved shoulder area, and that are experiencing significant single vehicle lane departure crashes and/or where non-motorized vehicles (i.e. bicycle) share the road with other vehicles.
Estimated Safety Benefit:	Up to 16% decrease in crashes. Effect varies over time [26].
Estimated Cost:	Low - High

Pedestrian Bump Outs	
4 E's Area of Focus:	Engineering
Description:	Pedestrian bump outs or bulb outs are extensions of the sidewalk and curb towards the roadway. In addition to shortening the roadway crossing distance, pedestrian bump outs also enhance pedestrian safety by increasing pedestrian visibility, and potentially reducing speeds by narrowing the roadway. Pedestrian bump outs are typically appropriate only in the presence of on-street parking lanes. When the extension is in proximity of an intersection, the turning needs of the larger vehicles using the facility must be assessed.
Photo:	 *Source: FHWA*
Affected Crashes:	Pedestrian crashes
Location:	Crossing locations with a high frequency of pedestrian crashes or where pedestrians are at elevated risks of crashes. On-street parking lanes must be present. Extension must not move into the travel way.
Estimated Safety Benefit:	30% overall crash reduction when removing parking and extending the curb [14].
Estimated Cost:	Low - Medium

Pedestrian Countdown Timer	
4 E's Area of Focus:	Engineering
Description:	Pedestrian countdown timers provide pedestrians or bicyclists with the remaining time in seconds for them to cross the roadway or the pedestrian phase to end. They can be passive or active (i.e. operate via a push-button). They can also be associated with auditory warnings to alert pedestrians whose vision may be limited. Because of the additional information that countdown timers provide, they are associated with increased crossing compliance and may also have an impact on motorized users. They are most common in urban and suburban areas.
Photo:	
Affected Crashes:	Pedestrian and/or bicycle related crashes
Location:	Intersections characterized by a high frequency of pedestrian and/or bicycle crashes.
Estimated Safety Benefit:	30% reduction in pedestrian or bicyclists related crashes when installed on intersections with no prior signals [14]. 25% reduction in pedestrian or bicyclists related crashes when upgrading existing signals [14].
Estimated Cost:	Medium

Pedestrian Refuge Island	
4 E's Area of Focus:	Engineering
Description:	Pedestrian refuge islands are raised sections of pavement placed on streets at an intersection or midblock to provide pedestrians with a protected resting place as they generally wait for a gap in traffic to finish crossing the road. They are generally installed on wide roadways to make crossing easier by allowing pedestrians to identify gaps one approach at a time.
Photo:	
Affected Crashes:	Pedestrian crashes
Location:	Marked or unmarked crosswalk locations affected by a high frequency of pedestrian crashes, or where pedestrians are at elevated risks due to minimal gaps in the traffic flow or vehicular sight distance issues.
Estimated Safety Benefit:	46% reduction in pedestrian crashes when placed at marked crosswalks [28]. 39% reduction in pedestrian crashes when placed at unmarked crosswalks [28].
Estimated Cost:	Medium - High

Protected Left Turn Phase	
4 E's Area of Focus:	Engineering
Description:	Left turn movements are high risk movements at an intersection. Thus when a left turn phase is warranted it must be provided. This decision is not only a function of through volumes, left-turn volumes, and delay, but it may also be based left-turn crash frequency. The addition of a left turn signal phasing can significantly reduce left-turn crashes. Depending on existing traffic and physical conditions of the intersection however, left-turn related crashes can still occur frequently. This could occur when left turns are permissive and conflicts are occurring with through traffic in the same direction and non-motorized crossing traffic. Older drivers may be more prone to these conflicts due to impaired judgement, decreased head motion range movements and limited peripheral vision. A protected left turn phase can mitigate such potential conflicts by providing left-turning vehicles with the right of way.
Photo:	
Affected Crashes:	Left-turn related crashes, Head-on, Angle
Location:	Signalized intersections operating permissive or permissive/protected left turn phases and characterized by a high frequency of left-turn related crashes.
Estimated Safety Benefit:	99% reduction in angle crashes when changing from permissive or permissive-protected to protected phasing [28]. 16% reduction in left-turn related crashes when changing from permissive to protected/permissive or permissive/protected phasing [29].
Estimated Cost:	Low

R1-6 In-Street & Gateway Treatment	
4 E's Area of Focus:	Engineering
Description:	The R1-6 (In-Street Pedestrian Crossing) treatment involves the use of these in-street signs to remind drivers to yield to pedestrians within the crosswalk. This treatment is particularly useful at signalized pedestrian crosswalks. The use of R1-6 signs has been shown to significantly increase pedestrian yield rates. While the use of a single in-street R1-6 sign on the centerline can lead to increased yield rates, a gateway treatment has been shown to be more effective due to the fact that the increase yielding compliance is related to the narrowness created by the gap between the sings. One advantage to the use of such treatments, in addition to its low cost, corresponds to the fact that this treatment does not require any action from the pedestrian crossing the street. Disadvantages include signs being struck by vehicles and/or snow plow trucks.
Photo:	 *Source: MDOT*
Affected Crashes:	Pedestrian crashes
Location:	Un-signalized intersections or midblock crossings with significant traffic and pedestrian volumes, and low speeds
Estimated Safety Benefit:	15-70% driver yielding rate to pedestrians at midblock and multilane urban and suburban crossings
Estimated Cost:	Low

Rectangular Rapid Flash Beacon (RRFB)	
4 E's Area of Focus:	Engineering
Description:	RRFBs are pedestrian activated LED lights which supplement pedestrian warning signs at un-signalized intersections or midblock crossings. Once activated the lights flash in rapid successions to alert drivers of oncoming pedestrian crossings. Their installation is generally a factor of traffic volumes and pedestrian crossing volumes and can be installed on two-lane or multi-lane roadways. They are less costly as opposed to traffic signals or pedestrian HAWK signals, and have been shown to significantly increase driver yielding rates to pedestrians.
Photo:	 *Source: FHWA*
Affected Crashes:	Pedestrian crashes
Location:	Un-signalized intersections or midblock crossings with significant traffic and pedestrian volumes
Estimated Safety Benefit:	100% driver yielding rate to pedestrians at midblock crossings on low speed roadways [30].
Estimated Cost:	Low

Reflective Sheeting for Sign Posts	
4 E's Area of Focus:	Engineering
Description:	Reflectivity is the property of the material that reflects a portion of the light back to the light source. Reflectivity improvements can be applied to the sign and/or sign posts. In both scenarios, depending on the environmental conditions, the sign becomes more visible to the drivers as it is being subjected to a vehicle's headlights.
Photo:	 *Source: FHWA*
Affected Crashes:	Dependent on specific location
Location:	Locations where sign visibility is poor and characterized by a significant concentration of crashes
Estimated Safety Benefit:	15% reduction in crashes for lollipop signs [14].
Estimated Cost:	Low

Road Safety Audit	
4 E's Area of Focus:	Engineering Education
Description:	A Road Safety Audit (RSA) is a comprehensive safety performance examination of an existing or future roadway location by an independent and multidisciplinary team. The objective of the RSA is to identify opportunities for safety improvements on the subject location for all potential road users. RSA's contribute to road safety by providing an unbiased assessment of a segment or intersection to identify safety concerns and potential countermeasures. Continuous screening of the network can help ensure that a proactive approach is taken to identify and alleviate any problem safety areas.
Photo:	 *Source: MDOT*
Affected Crashes:	Depends on specific location.
Location:	High crash risk locations or locations with a high concentration of crashes.
Estimated Safety Benefit:	Depends on specific location.
Estimated Cost:	Low – High

Roundabouts	
4 E's Area of Focus:	Engineering Education
Description:	Roundabouts reduce vehicle speeds as well as the number of conflict points found in a typical intersection. In terms of crashes, roundabouts reduce head-on, left-turn and angle type crashes which frequently result in serious or fatal injuries. They also create a safer environment for pedestrians using the facility by slowing vehicles and dividing the crossing into two stages. The design of a roundabout is crucial to fostering a safe environment for drivers and pedestrians alike. When the design and geometry force traffic to enter and circulate slowly, roundabouts operate safely and effectively handle turning traffic. While the number of roundabouts is steadily increasing in Michigan, in certain regions of the state they are still a relatively new design feature. Consequently education on roundabout usage is a key component of their success. MDOT and other communities often hold informational sessions during which they have shown feeds of existing roundabouts and traffic simulation models, hand out brochures, and display posters. MDOT has the following information available to aid in educating the public on roundabouts: • http://www.michigan.gov/documents/mdot/MDOT_RoundaboutBrochure_312721_7.pdf • https://www.youtube.com/watch?v=ONacAiKXe-8
Photo:	 *Source: MDOT*
Affected Crashes:	Head-on left turn, Angle
Location:	Intersections with a high proportion of crashes or violations.
Estimated Safety Benefit:	35% overall crash reduction [31]. 76% reduction in fatal and injury crashes [14].
Estimated Cost:	High

Safety Edge Pavement Treatments	
4 E's Area of Focus:	Engineering
Description:	Safety edge is the reshaping of the edge of the pavement into a 30 degree angle during installation. The angled safety edge avoids vertical drop offs if the granular shoulder shifts from the pavement edge. Safety edges are a simple and effective way to reduce fatal crashes on high speed roadways as the angle makes it safer and easier for drivers to reenter the roadway following a roadway departure.
Photo:	 *Source: FHWA*
Affected Crashes:	Single Vehicle Lane Departure
Location:	Roadway segments experiencing significant single vehicle lane departure crashes.
Estimated Safety Benefit:	5.6% to 9.5% decrease in crashes of all types of severities. 1.6% to 16.5% decrease in fatal and injury crashes [32].
Estimated Cost:	Low

Safety Paths, Sidewalk, and Crosswalk Improvements	
4 E's Area of Focus:	Engineering
Description:	According to NHTSA and the FHWA, an average of 4,500 pedestrians are killed each year in traffic crashes in the United States. Almost 8% of these are a result of pedestrians walking along the roadway where there is a lack of delineation between pedestrian pathways and vehicles. Consequently, providing safe and separate walkways can significantly reduce these types of crashes by almost 88% [9].Safe walkways can include sidewalks or widening and paving the shoulder so that there is more space between pedestrian or bicycle paths and the vehicle travel way. These facilities benefit the drivers and the non-motorists as they are visible reminders of both road users. Similarly, providing and/or improving crosswalks is associated with significant benefits for non-motorized users including comfort, health and recreation using these facilities.
Photo:	 *Source: FHWA*
Affected Crashes:	Pedestrian and/or bicyclist related crashes
Location:	Locations characterized by a high frequency of non-motorized users and/or pedestrian/bicyclist crashes with no or low visible safe pathways, crosswalks, sidewalks.
Estimated Safety Benefit:	88% reduction in pedestrian crashes when separating non-motorized user crossways from vehicular lanes [33]. 71% reduction in pedestrian crashes when installing or widening paved shoulders [33]. 40% reduction in pedestrian crashes when installing high visibility crosswalks [34]. (Crash reductions are dependent on type of treatment).
Estimated Cost:	Low - High

Signal Optimization	
4 E's Area of Focus:	Engineering
Description:	While intersections by their nature increase stop and go traffic, a poorly optimized intersection can increase driver aggression, and result in unsafe acceleration and deceleration maneuvers. Thus optimizing the signal not only improves the intersection operational efficiency, but can also reduce crashes.
Photo:	
Affected Crashes:	Intersection related crashes
Location:	Intersections with poor optimization and particularly compounded by a high crash frequency and/or crash rate.
Estimated Safety Benefit:	10% reductions in crashes associated with signal optimization or timing updates [14].
Estimated Cost:	Low

Speed Feedback Sign	
4 E's Area of Focus:	Engineering
Description:	Speed feedback signs are dynamic signs which measure and report the speed of the approaching vehicle. They can be associated with a speed limit sign to remind drivers of the posted speed limit, or warning messages to alert drivers if they are driving past the posted speed limit or recommended speed for the existing conditions. They can be particularly useful for speed transition zones, area in vicinity of schools, or residential neighborhoods.
Photo:	 *Source: FHWA*
Affected Crashes:	Speeding related crashes
Location:	Speed transition areas, in proximity to schools, residential neighborhoods, or segments with speeding violations.
Estimated Safety Benefit:	5% reduction in overall crashes [35].
Estimated Cost:	Low

Wet Reflective Pavement Markings	
4 E's Area of Focus:	Engineering
Description:	Water can significantly reduce pavement marking retroflectivity which affects the ability of the drivers to stay in their lane or on the roadway. The effect is particularly exacerbated during nighttime. To rectify or ameliorate this condition, wet reflective pavement markings are applied as opposed to standard pavement marking materials. These markings can be applied as paint, tape, or thermoplastic material and are designed to provide improved retroreflectivity during wet road surface conditions.
Photo:	 *Source: FHWA*
Affected Crashes:	Lane Departure, Head-on, Sideswipe-same, Nighttime crashes, Wet-weather crashes
Location:	Locations where pavement marking visibility is an issue during wet conditions, and/or locations with a high concentration of crashes as a result of wet conditions. Effect may be higher on multilane roadways.
Estimated Safety Benefit:	18% overall crash reduction [36]. 41% reduction for injury crashes [36]. 46% reduction in run-off-the-road crashes [36]. 25% reduction in wet-road crashes [36]. 30% reduction in night time crashes [36].
Estimated Cost:	Low - Medium

Appendix C – High Risk Segments and Intersections Lists

Top Segments by Total Crash Rate (Non-Trunkline)

Top 40 per County. Does not include state trunkline or segment shorter than 300ft.
Non-Deer/Non-Animal

Road Name	From	To	Length (mi)	County	Total Crash Rate (100 MVM)	Total Crashes
Jefferson Ave	South St	Wenzel Ave	0.38	St Joseph	2475.6	5
Michigan Ave	Silver St	0.12 miles east	0.12	St Joseph	2474.9	4
N Eagle St	E Green St	W Mansion St	0.14	Calhoun	2319.3	6
State St	Church St	Michigan Ave	0.15	Barry	1845.5	16
Lacey Rd	North Ave	M-66	3.00	Barry	1662.1	5
Edward St	South St	Michigan Ave	0.09	Kalamazoo	1539.9	5
Joshua Dr	Michigan Ave	Portage Ave	0.18	St Joseph	1510.1	3
Main St	Broadway St	0.38 miles north	0.38	Barry	1452.7	6
Drake Rd	KI Ave	0.06 miles south	0.06	Kalamazoo	1374.3	40
Solon St	Santos Ave	0.08 miles south	0.08	Kalamazoo	1324.1	7
Pearl St	Hanchet St	Division	0.16	Branch	1294.9	7
Prospect St	Chicago Rd	West St	0.13	St Joseph	1291.8	2
2nd St	Washington St	Cass St	0.11	St Joseph	1251.7	2
Hanchet St	Pearl St	Chicago St	0.09	Branch	1215.1	3
Main St	Paul Henry Thronapple	Grand Rapids St	0.24	Barry	1183.9	9
Pealer St	Railroad Dr	Main St	0.06	St Joseph	1183.1	3
Old US 27	I-94 WB ramp	I-94 EB ramp	0.06	Calhoun	1180.6	7
S-Drive S	1 1/2 Mile Rd	2 Mile Rd	0.66	Calhoun	1164.2	7
Stockbridge Ave	Mills St	Fulford St	0.43	Kalamazoo	1161.1	23
35th St	I-94 WB	Miller Service Dr	0.09	Kalamazoo	1158.5	10
Albion St	Austin Ave	Broadwell St	0.24	Calhoun	1155.6	3
South St	Gateway Ct	Centerville Rd	0.18	St Joseph	1145.8	3
Edwards St	Michigan Ave	Kalamazoo Ave	0.16	Kalamazoo	1120.5	7
State St	Broadway St	Church St	0.08	Barry	1102.4	5
Division St	State St	East St	0.34	Barry	1098.5	4
T Dr S	N Main St	0.25 miles east	0.25	Calhoun	1097.5	3
Prospect St	Main St	Lafayette St	0.31	St Joseph	1074.3	3
15 1/2 Mile Rd	I-69 SB	I-69 NB	0.07	Calhoun	1068.7	1
Sheldon St	Pitcher St	Vine St	0.06	Kalamazoo	1060.3	3
Monroe St	Chicago Rd	West St	0.12	St Joseph	1047.1	2
6th St	Mechanic St	River st	0.07	St Joseph	1038.5	1
Fort Cluster Dr	Miller Dr	Climax Dr	0.11	Kalamazoo	1032.4	2
N Berrien St	E Pine St	E North St	0.29	Calhoun	1023.7	2
Batavia Rd	Chicago Rd	Lindley Rd	0.19	Branch	1014.3	1
E Green St	N Eagle St	S Jefferson St	0.13	Calhoun	1010.1	5
Grand St	Hanover St	Hastings Riverwalk	0.33	Barry	1009.4	2
South St	Westnedge Ave	Edwards St	0.57	Kalamazoo	954.8	16
North Dr W	N Kalamazoo Ave	Brewer St	0.23	Calhoun	953.7	3
Mott St	Elm St	Main St	0.13	Calhoun	950.3	3
E Cass St	N Albion St	Market Pl	0.50	Calhoun	928.0	7
S Main St	W Jackson Dr	E Canal St	0.06	Calhoun	923.3	3
Solon St	Santos Ave	0.1 miles south	0.10	Kalamazoo	907.9	6
S Raymond Rd	E Columbia Ave	0.1 miles south	0.10	Calhoun	907.9	3
N Jefferson St	W Green St	W Mansion St	0.13	Calhoun	886.0	3
Monroe St	Race St	Grand St	0.56	Branch	882.9	8
S Main St	S Clinton St	0.07 miles north	0.07	Calhoun	882.6	3
Michigan Ave E	Capital Ave SW	McCamly St	0.15	Calhoun	870.9	15
Woodlawn Barber Cuttoff	Woodlawn Ave	Barber Rd	0.25	Barry	868.2	4
Main St	Chicago St	0.57 miles north	0.57	Branch	863.2	9

Road Name	From	To	Length (mi)	County	Total Crash Rate (100 MVM)	Total Crashes
Milham Ave	Georgia Ave	Westhedge Ave	0.10	Kalamazoo	862.8	25
Haven Rd	N Superior St	S Ionia St	0.14	Calhoun	857.2	2
Hanover St	Mill St	State Rd	0.21	Barry	855.3	1
Burdick St	Balch St	Lake St	0.23	Kalamazoo	828.1	13
N Superior St	E North St	Austin Ave	0.24	Calhoun	822.0	3
Howard St	Merill St	0.1 miles east	0.10	Kalamazoo	819.9	19
F Dr	I-94 WB	Wattles Rd	0.22	Calhoun	819.6	2
South St	Oakland Dr	Westhedge Ave	0.34	Kalamazoo	805.7	16
Beckley Rd	6 Mile Rd	Harper Village Dr	0.11	Calhoun	804.1	20
Reed Ave	Burdick St	Reed Ct	0.32	Kalamazoo	787.8	12
Youngs Rd	Stringtown Rd	Maple Rd	0.25	Branch	784.7	1
Miller Service Dr	35th St	Miller Drive	0.15	Kalamazoo	783.2	2
Westhedge Ave	Admiral Ave	0.08 miles north	0.08	Kalamazoo	781.5	35
Girard Rd	I-69 NB	Lutes Rd	0.27	Branch	742.1	2
Middle Colon Rd	3rd St	Maystead Rd	0.23	St Joseph	734.0	2
15 Mile Rd	15 1/2 Mile Rd	Baseline Rd	4.42	Calhoun	726.0	12
Lovell St	Oakland Dr	Park St	0.52	Kalamazoo	714.6	33
Bass Rd	Briggs Rd	Cherry Valley Rd	0.38	Barry	714.5	10
Kendall Ave	Santos Ave	0.1 miles south	0.10	Kalamazoo	709.5	14
Upton Ave	Angel St	S Kendall St	0.50	Calhoun	709.4	21
Airport Rd	Solomon Rd	0.25 miles south	0.25	Barry	706.9	5
W Main St	N Hillsdale St	N Webster St	0.15	Calhoun	705.9	2
Pifer Rd	Kingsbury Rd	Big Buck Dr	0.49	Barry	702.6	10
Milham Ave	Westhedge Ave	Chelsea Ln	0.08	Kalamazoo	701.3	15
Jefferson St	Wenzel Ave	Joseph St	0.56	St Joseph	698.9	2
3rd St	Main St	Front St	0.20	St Joseph	697.3	2
Westhedge Ave	Miham Ave	0.1 miles south	0.10	Kalamazoo	695.3	44
Drake Rd	Michigan Ave	0.06 miles south	0.06	Kalamazoo	686.1	22
W Michigan Ave	Jackson Dr W	McCamly St S	0.14	Calhoun	684.9	12
Lake Rd	Stone Lake Rd	Mathers Rd	0.39	St Joseph	678.8	4
N Kalamazoo Ave	Brewer St	North Dr W	0.50	Calhoun	676.3	4
Vine St	Westhedge Ave	Park St	0.12	Kalamazoo	675.6	7
W Van Buren St	McCamly St S	Division St N	0.27	Calhoun	675.4	27
Leland Rd	Silver St	Angevine Rd	0.52	St Joseph	672.9	2
Dunks Rd	Athens RD	Arney Rd	0.10	Branch	668.6	2
Westhedge Ave	Mall Dr	0.1 miles north	0.10	Kalamazoo	663.7	42
Clay St	Joseph St	Hatch St	0.08	St Joseph	658.7	1
Ray Quincy R	State Rd	0.25 miles south	0.25	Branch	654.9	3
Olmstead Rd	Lake St	Comstock Ave	0.17	Kalamazoo	638.8	8
Howard St E	Arboretum Pkwy	Kendall Ave	0.10	Kalamazoo	630.5	4
Rose St	Lovell St	Kalamazoo Ave	0.40	Kalamazoo	625.8	31
S Drive S	2 Mile Rd	M-66	1.22	Calhoun	625.0	7
Sprinkle Rd	East Cork St	Alvan Rd	0.07	Kalamazoo	616.0	25
Westhedge Ave	Ruth St	Della St	0.06	Kalamazoo	614.5	21
Verona Rd	Greenfield Blvd	N Kalamazoo Ave	0.66	Calhoun	613.3	7
Capital Ave NE	State St	North Ave	0.11	Calhoun	611.7	11
Portage St	Miller Rd	Phillips St	0.06	Kalamazoo	610.6	14
Dunks Rd	Girard Rd	St Joseph St	3.92	Branch	607.3	21
Harper Village Dr	B Dr N	6 1/2 Mile Rd	0.62	Calhoun	605.4	21
Jefferson St	Clinton St	Green St	0.31	Barry	604.9	4
Michigan Ave	Silver St	Lakehead Rd	0.37	St Joseph	603.6	3
Portage St	Lovell St	0.08 miles north-west	0.08	Kalamazoo	603.1	3
Maple St	West St	Hoffman St	0.52	St Joseph	597.6	3

Road Name	From	To	Length (mi)	County	Total Crash Rate (100 MVM)	Total Crashes
Stone Lake Rd	Lake Rd	Troyer Rd	0.41	St Joseph	596.6	3
Division St	Ladyman Rd	Main St	0.50	Branch	591.2	1
Shaver Rd	Centre Ave	0.1 miles north-east	0.10	Kalamazoo	589.3	18
Rose St	Kalamazoo Ave	North St	0.24	Kalamazoo	586.9	7
Drake Rd	Main St	Canterbury Ave	0.26	Kalamazoo	585.6	29
Jefferson St	Green St	Mill St	0.32	Barry	582.3	10
Main St	Bender Rd	Broadway St	0.83	Barry	578.2	16
S Raymond Rd	E Columbia Ave	E Michigan Ave	0.08	Calhoun	576.4	4
Capital Ave SW	Upton Ave	W Dickman Rd	0.12	Calhoun	574.9	13
Kilgore Rd	Burdick St	Lovers Ln	0.19	Kalamazoo	574.5	31
Lovell St	Park St	Portage St	0.49	Kalamazoo	572.4	22
Burr Oak Rd	Taggart Rd	Comm Rd	1.46	Branch	569.8	5
B Dr N	9 Mile Rd	Singletree Ln	0.12	Calhoun	569.4	2
Fawn River Rd	Bauman Rd	0.5 miles east	0.50	St Joseph	561.2	6
Oakland Dr	I-94 East	0.06 miles south	0.06	Kalamazoo	558.9	21
Capital Ave SW	E Dickman Rd	Hamblin Ave E	0.21	Calhoun	556.6	22
5th Ave	Main St	Portage Ave	0.12	St Joseph	553.1	1
I-94 WB ramp	I-94 West	Sprinkle Rd	0.18	Kalamazoo	549.2	5
Park Cir Dr	Vanrick Dr	Sprinkle Rd	0.15	Kalamazoo	547.4	3
Westhedge Ave	J L Hudson Dr	0.1 miles south	0.10	Kalamazoo	543.1	32
S Hannah St	Albion Rd	Elizabeth St	0.26	Calhoun	531.1	2
Avenue A	N 20th St	Upton ave	0.30	Calhoun	530.7	6
Lucas Rd	Day Rd	Lone Tree Rd	0.31	St Joseph	529.0	1
North Ave	Capital Ave	McCamly St	0.18	Calhoun	508.0	13
Schweitzer Rd	M-60	Holtom Rd	0.34	St Joseph	507.4	3
Waterman Ave	Clay St	Grand St	0.10	Branch	505.1	1
Jefferson St	Fairgrounds Dr	Park Ave	0.34	Branch	501.2	2
Broadway St	Union City Rd	0.56 miles south	0.56	Branch	494.5	4
Wattles Rd	Stowell Rd	0.52 miles east	0.52	St Joseph	492.1	4
11 Mile Rd	I-94 East ramp	Verona Rd	1.35	Calhoun	484.8	21
Jefferson St	Pearl St	Chicago St	0.09	Branch	481.7	1
N Linden St	Verona Rd	N Wright Ln	0.50	Calhoun	480.9	3
Portage Ave	Main St	Kelsey S	0.24	St Joseph	477.1	4
Coldwater St	Broadway St	Cedar St	0.24	Branch	472.4	4
25 1/2 Mile Rd	L Dr S	0.11 miles north	0.11	Calhoun	472.2	2
Centennial Rd	Dorrance Rd	I-69 NB	0.09	Branch	467.8	1
Woodlawn Ave	Woodlawn Barber Cutoff	0.35 miles east	0.35	Barry	466.7	3
McCallum St	Kelley Rd	0.27 miles east	0.27	Branch	455.7	1
East St	Division St	Freeport Rd	0.26	Barry	455.4	1
Freemont Rd	Central Rd	Skipper Ln	0.46	Branch	453.0	5
Parmalee	Whitneyville Rd	0.21 miles west	0.21	Barry	451.9	3
Idlewild Beach	Centennial Rd	0.15 miles south-east	0.15	Branch	446.4	1
Market St	State St	Grand St	0.32	Barry	445.7	4
Prairie St	Congress St	South St	0.50	St Joseph	444.6	2
Wattles Rd	Stowell Rd	0.28 miles south-west	0.28	St Joseph	441.8	3
Wenzel Ave	Centerville Rd	Jefferson St	0.33	St Joseph	440.6	3
Girard Rd	Marshall Rd	2.45 miles west	2.45	Branch	433.6	10
Main St	Broadway St	Russell St	0.22	Barry	433.2	3
Mill St	Broadway St	Michigan Ave	0.24	Barry	420.4	4
West St	Monroe St	Lakeview Ave	0.47	St Joseph	419.7	4
Constatine St	Broadway St	Millard St	0.51	St Joseph	419.7	6
Litchfield Rd	Storm Rd	0.49 miles west	0.49	Branch	417.0	1
Litchfield Rd	Burbank Rd	2.51 miles east	2.51	Branch	411.2	5

Road Name	From	To	Length (mi)	County	Total Crash Rate (100 MVM)	Total Crashes
Norris Rd	Keller Rd	Wildwood Rd	2.59	Barry	404.7	28
Girard Rd	Union City Rd	0.5 miles west	0.50	Branch	403.1	2
Nottawa St	Indiana Border	0.25 miles north	0.25	St Joseph	399.9	3
Lucas Rd	Lone Tree Rd	Hoffman Rd	0.42	St Joseph	395.5	1
Angevine Rd	Leland Rd	0.18 miles south	0.18	St Joseph	393.4	1
Covered Bridge Rd	Major Rd	River Rd	0.52	St Joseph	388.2	5
Lutz Rd	M-86	1.31 miles south	1.31	St Joseph	388.1	30
Clay St	Grand St	Chicago St	0.50	Branch	382.8	5
Green St	Hanover St	State St	0.19	Barry	382.6	1
Congress St	Centerville Rd	Prairie St	0.20	St Joseph	378.2	4
State Rd	Broadway St	Michigan Ave	0.23	Barry	377.4	2
St Joseph St	Broadway St	0.92 Miles West	0.92	Branch	368.4	3
Sprague St	Tibbits St	Sauk River Dr	0.07	Branch	366.8	2
Hutchinson Rd	Hickory Rd	Mud Lake Rd	0.26	Barry	357.7	1
Burr Oak Rd	Mill St	1.67 miles north	1.67	Branch	355.9	5
Briggs Rd	129th Ave	136th Ave	3.92	Barry	354.9	19
Sauger Lake Rd	Balk Rd	Nottawa Rd	1.01	St Joseph	354.5	3
Union City Rd	Western Ave	0.66 miles north	0.66	Branch	354.0	7
Barnum Rd	Clark Rd	Saddlebag Lake Rd	0.73	Barry	339.3	2
Fiske Rd	Chicago St	0.32 miles north	0.32	Branch	336.8	4
Jefferson St	Shriner St	Clinton St	0.22	Barry	331.5	4
Babcock Rd	Division Rd	Colon Rd	3.55	Branch	329.6	6
Kalamazoo St	Fawn River Rd	0.25 miles south	0.25	St Joseph	323.5	2
Star School Rd	M-37	Terry Ln	1.29	Barry	321.7	4
Boltwood St	Green St	State St	0.19	Barry	320.4	1
Albers Rd	Chicago St	Mill St	0.37	Branch	319.5	1
Western Ave	Chicago St	Riverside Dr	0.18	Branch	317.1	2
Orland Rd	Southern Rd	Southern Rd	0.21	Branch	316.6	1
Matteson Lake Rd	Industrial Ave	1.99 miles north	1.99	Branch	316.0	16
North Lakeview Ave	Hatch St	West St	0.16	St Joseph	316.0	5
Middle Colon Rd	Front St	3rd St	0.54	St Joseph	313.6	2
Broadway St	Calhoun St	St Joseph St	0.46	Branch	311.6	11
Michigan Ave	Sauk River Dr	Chicago St	0.27	Branch	302.1	4
Lockshore Rd	Cressey Rd	Baseline Rd	0.50	Barry	299.2	6
Clay St	Division St	0.08 miles north	0.08	Branch	297.4	1
Bishop Ave	Western Ave	Grand St	0.46	Branch	294.5	4
East St	Freeport Rd	0.19 miles east	0.19	Barry	291.7	1
Eckert Rd	Solomon Rd	Buechler Rd	2.57	Barry	280.8	5
Charlton Park Rd	Center Rd	1.59 miles south	1.59	Barry	268.6	9
Michigan Ave	State St	Mill St	0.10	Barry	253.1	2
Hickory Rd	Banfield Rd	Hickory Uldriks Cutoff	0.55	Barry	253.0	3
Crane Rd	Johnson Crane Cuttoff	Solomon Rd	1.14	Barry	252.5	2
Cobb Rd	Gilkey Lake Rd	Pifer Rd	1.13	Barry	246.4	6
Broadway St	Sager Broadway Cuttoff	Campground Rd	0.80	Barry	246.1	5
Church St	Green St	Mill St	0.32	Barry	240.2	2

Top Segments by Fatal Crash Rate (Non-Trunkline)

Top 20 per County (less if no segments with crashes). Does not include state trunkline or segment shorter than 300ft. Non-Deer/Non-Animal

Road Name	From	To	Length (mi)	County	Fatal Crash Rate (100 MVM)	Fatal Crashes
2nd St	Washington St	Riverside Dr	0.11	St Joseph	625.9	1
Kalamazoo St	Mill Rd	0.25 miles south	0.25	St Joseph	161.7	1
U Dr N	27½ Mile Rd	26½ Mile Rd	0.77	Calhoun	104.4	1
Hatch St	Lakeview Ave	Clay St	0.68	St Joseph	67.7	1
Colon Rd	State St	Farrand Rd	0.51	St Joseph	48.4	1
Upton Ave	Caroline St	Meachem Ave	0.42	Calhoun	46.1	1
40th St	Michigan Ave	L Ave	0.44	Kalamazoo	45.4	1
Sprinkle Rd	Regay Ct	0.06 miles south	0.06	Kalamazoo	44.8	1
Marshall Rd	0.05 miles north Fleming	0.49 miles south	0.49	Branch	43.2	1
Ravine Rd	US-131 NB	0.77 miles south	0.77	Kalamazoo	35.5	1
42nd St	S Ave	1.62 miles south	1.62	Kalamazoo	33.1	1
Buckhorn Rd	Michigan Ave	Heimbach Rd	3.02	St Joseph	31.2	1
Lafayette St	Big Hill Rd	0.85 miles west	0.85	St Joseph	30.9	1
Sprinkle Rd	0.08 miles south H Ave	0.10 miles south	0.10	Kalamazoo	30.1	1
Charlton Park Rd	Center Rd	1.59 miles south	1.59	Barry	29.8	1
32nd St	Baseline Rd	AB Ave	0.64	Kalamazoo	27.1	1
Lacey Rd	North Ave	Hutchinson Rd	1.99	Barry	26.5	1
A Dr N	Mudica St	I-69 NB	1.17	Calhoun	26.3	1
Cherry Valley Rd	Finkbeiner Rd	Green Lake Rd	1.00	Barry	26.1	1
Lutz Rd	Centreville-Constantine	0.91 miles south	0.91	St Joseph	25.8	1
Centre Ave EB	Mooresbridge Rd	0.10 mile east	0.10	Kalamazoo	25.4	1
Sprinkle Rd	North of Centre Ave	0.10 mile north	0.10	Kalamazoo	25.4	1
Waldo St	T Dr S	S County Line Rd	2.01	Calhoun	25.2	1
9th St	North of Financial Pkwy	0.10 miles north	0.10	Kalamazoo	22.5	1
Gun Lake Rd	Yankee Springs Rd	Erway Rd	3.79	Barry	22.3	1
Union City Rd	Jonesville Rd	1.53 miles south	1.53	Branch	21.8	1
Sprinkle Rd	0.18 miles south of Main	0.10 miles south	0.10	Kalamazoo	20.8	1
Sprinkle Rd	0.08 miles siouth of Main	0.10 miles south	0.10	Kalamazoo	20.8	1
Sprinkle Rd	0.21 miles north Michigan	0.10 miles south	0.10	Kalamazoo	20.8	1
Jonesville Rd	Squires Rd	1.92 miles west	1.92	Branch	20.6	2
Coats Grove Rd	Barber Rd	Charlton Park Rd	2.32	Barry	19.7	1
6th St	Op Ave	PQ Ave	1.00	Kalamazoo	19.6	1
Marshall Rd	S County Line Rd	North of Fleming Rd	2.22	Branch	19.0	2
L Dr S	17 Mile Rd (Old 27)	25 1/2 Mile Rd	8.06	Calhoun	18.0	1
Westnedge Ave	G Ave	Mosel Ave	1.02	Kalamazoo	17.6	1
Pine Lake Rd	Doster Rd	Enzian Rd	2.78	Barry	16.3	1
Capital Ave SW	B Dr S	Glenn Valley Dr	1.01	Calhoun	15.3	1
Lutz Rd	Centreville-Constantine	3.47 miles north	3.47	St Joseph	14.6	3
KI Ave	4th St	8th St	1.98	Kalamazoo	14.6	1
Orchard St	Grove St	Eddy St	1.65	Barry	14.5	1
Norris Rd	Keller Rd	Wildwood Rd	2.59	Barry	14.5	1
Q Ave	Vankal Ave	3rd St	1.608	Kalamazoo	13.4	2
11th St	Stadium Dr	KI Ave	0.73	Kalamazoo	12.9	1
Ravine Rd	US-131 SB	D Ave	2.16	Kalamazoo	12.7	1
North Ave	Baseline Rd	S Dr N	2.62	Calhoun	11.8	1
Romance Rd	Sears Drive	Westnedge Ave	0.27	Kalamazoo	11.5	1
Fawn River Rd	Crooked Creek Rd	Shimmel Rd	3.85	St Joseph	11.0	1
Clark Rd N	W Dickman Rd	River Rd W	0.84	Calhoun	10.6	1
D Ave	Ravine Rd	US-131 SB ramp	1.02	Kalamazoo	9.8	1

Road Name	From	To	Length (mi)	County	Fatal Crash Rate (100 MVM)	Fatal Crashes
Riverside Dr	Vistula Rd	Falcon Dr	2.90	St Joseph	9.6	1
Hickory Rd	Kellogg School Rd	Hickory Uldriks Cutoff	5.07	Barry	9.2	1
Norris Rd	Pine Lake Rd	3.63 miles north	3.63	Barry	8.2	1
Doster Rd	Crum Rd	Pine Rd	3.33	Barry	7.6	1
Centreville-Constantine Rd	Lutz Rd	Strobel Rd	4.23	St Joseph	6.8	1
E Michigan Ave	Partello Michigan Cutoff	22½ Mile Rd	3.53	Calhoun	6.3	1
Capital Ave SW	Glenn Valley Dr	Beckley Rd	1.00	Calhoun	5.3	1
N Dr North/Gorsline Rd	11 Mile Rd	I-69 NB	5.17	Calhoun	3.6	1

Top Segments by Injury Crash Rate (Non-Trunkline)

Top 20 per County (less if no segments with crashes). Does not include state trunkline or segment shorter than 300ft. Non-Deer/Non-Animal

Road Name	From	To	Length (mi)	County	Injury Crash Rate (100 MVM)	Injury Crashes
Michigan Ave	Silver St	0.12 miles east	0.12	St Joseph	1237.5	2
16 Mile Rd	I-69 NB	I-69 SB	0.07	Calhoun	1068.7	1
Wildwood Rd	Stringtown Rd	Maple Rd	0.25	Branch	784.7	1
Leland Rd	Silver St	Angevine Rd	0.52	St Joseph	672.9	2
E Green St	S Eagle St	S Jefferson St	0.13	Calhoun	606.1	3
Stone Lake Rd	Lake Rd	0.41 miles south	0.41	St Joseph	596.6	3
Solon St	Santos Ave	0.08 miles south	0.08	Kalamazoo	567.5	3
Joshua Dr	Michigan Ave	Portage Ave	0.18	St Joseph	503.4	1
S Dr S	1½ Mile Rd	2 Mile Rd	0.66	Calhoun	498.9	3
Division St	Pine St	Burr Oak St	0.20	Calhoun	454.6	1
Ray Quincy Rd	State Rd	0.25 miles south	0.25	Branch	436.6	2
F Dr N	I-94 WB	S Wattles Rd	0.22	Calhoun	409.8	1
Moore St	Main St (BL 131)	0.06 miles west	0.06	St Joseph	394.4	1
Girard Rd	I-69 NB	0.27 miles east	0.27	Branch	371.0	1
Railroad St	Main St (Old 27)	0.25 miles east	0.25	Calhoun	365.8	1
Sheldon St	Vine St	Sheldon Ct	0.06	Kalamazoo	353.4	1
Barnum Rd	Clark Rd	Saddlebag Lake Rd	0.73	Barry	339.3	2
Athens Rd	Dunks Rd (Old M-78)	Arney Rd	0.10	Branch	334.3	1
Lacey Rd	North Ave	M-66	3.00	Barry	332.4	1
Albers Rd	Chicago Rd	Mill St	0.37	Branch	319.5	1
5th Ave	Portage Ave	0.22 miles east	0.22	St Joseph	312.4	1
Edwards St	South St	Michigan Ave	0.09	Kalamazoo	308.0	1
S Main St	S Church St	0.07 miles north	0.07	Calhoun	294.2	1
Freeport Rd	East St	0.19 miles east	0.19	Barry	291.7	1
Dunks Rd	Girard Rd	3.92 miles north-east	3.92	Branch	289.2	10
Main St/44th St	Maple St	0.53 miles north	0.53	Kalamazoo	269.3	2
S Drive S	2 Mile Rd	M-66	1.22	Calhoun	267.9	3
E Spruce St	S Kalamazoo Ave	S Eagle St	0.15	Calhoun	266.6	1
Rose St	North St	Frank St	0.08	Kalamazoo	262.7	1
Reed Ave	Burdick St	Reed Ct	0.32	Kalamazoo	262.6	4
D Ave	37th St	0.23 miles east	0.23	Kalamazoo	262.2	1
Wilbur Rd	Flexible Bridge Rd	Moorepark Rd	0.50	St Joseph	258.5	1
Old 27	0.38 miles north of M-60	0.10 miles north	0.10	Calhoun	257.1	1
Miller Dr	Climax Dr	Michigan Ave	0.23	Kalamazoo	252.4	1
12th St	0.4 miles north of F Ave	0.10 miles north	0.10	Kalamazoo	252.0	1
12th St	0.1 miles north of E Ave	0.10 miles north	0.10	Kalamazoo	252.0	1
12th St	E Ave	0.10 miles north	0.10	Kalamazoo	252.0	1
12th St	0.2 miles south of D Ave	0.10 miles north	0.10	Kalamazoo	252.0	1
Verona Rd	I-94 WB	I-94 EB	0.08	Calhoun	249.6	1
Wattles Rd	Stowell Rd	0.52 miles east	0.52	St Joseph	246.0	2
15 Mile Rd	15½ Mile Rd	Baseline Rd	4.418	Calhoun	242.0	4
Drake Rd	KI Ave	0.06 miles south	0.06	Kalamazoo	240.5	7
Vine St	Burdick St	Jasper St	0.20	Kalamazoo	240.0	4
Mandigo Ave	Andrews St	Shore Dr/23rd St	1.09	Kalamazoo	230.4	5
Woodlawn Barber Cuttoff	Woodlawn Ave	Barber Rd	0.25	Barry	217.0	1
Dutch Settlement Rd	Day Rd	Bent Rd	0.99	St Joseph	216.2	1
H Dr S/G Dr	12 Mile Rd	14 Mile Rd	2.34	Calhoun	208.1	2
Nottawa St	Fawn River Rd	Hawthorne Rd	0.25	St Joseph	206.8	1
C Dr S	1/2 Mile Rd	B Dr S	1.78	Calhoun	203.4	1

Road Name	From	To	Length (mi)	County	Injury Crash Rate (100 MVM)	Injury Crashes
Girard Rd	Union City Rd	0.50 miles west	0.50	Branch	201.6	1
27 Mile Rd	B Dr	Division Dr	0.56	Calhoun	199.1	1
Douglas Ave	South of Kaaf Dr	0.10 miles south	0.10	Kalamazoo	198.9	2
Main St	Chicago St	0.57 miles north	0.57	Branch	191.8	2
Burdick St	Balch St	Lake St	0.23	Kalamazoo	191.1	3
Creamery Rd	Union City Rd	Railroad Rd	0.57	Branch	189.6	1
Qr Ave	25th St	28th St	1.26	Kalamazoo	187.4	2
Fawn River Rd	Bauman Rd	0.50 miles west	0.50	St Joseph	187.1	2
Milham Ave	Westnedge Ave	Chelsea Ln	0.08	Kalamazoo	187.0	4
Kilgore Rd	Burdick St	0.19 miles east	0.19	Kalamazoo	185.3	10
Pearl St	Hanchett St	Division St	0.16	Branch	185.0	1
Sprague St	South of Tibbits St	Sauk River dr	0.07	Branch	183.4	1
Fremont Rd	Lott Rd	0.29 miles north	0.29	Branch	182.3	1
20th Dickman Cutoff	N 20th St	W Dickman Rd	0.11	Calhoun	181.5	3
Freemont Rd	Central Rd	0.46 miles north	0.46	Branch	181.2	2
Kingsbury Rd	Pifer Rd	Orchard Rd	0.58	Barry	179.8	3
Cranson Rd	Block Rd	5.41 miles west	5.41	Branch	179.7	3
Balk Rd	Airline Rd	Featherston Rd	3.02	St Joseph	177.9	9
Ave A	N 20th St	Upton Ave	0.30	Calhoun	176.9	2
Girard Rd	Marshall Rd	2.45 miles west	2.45	Branch	173.4	4
J Dr S	7½ Mile Rd	0.71 miles east	0.71	Calhoun	170.5	1
Schweitzer Rd	Holtom Rd	0.34 miles west	0.34	St Joseph	169.1	1
N Kalamazoo Ave	Brewer St	North Dr W	0.50	Calhoun	169.1	1
Snow Prairie Rd	Lockwood Rd	Sprung Lake Rd	0.69	Branch	168.4	1
Capital Ave NE	North Ave	0.11 miles south-west	0.11	Calhoun	166.8	3
Girard Rd	Marshall Rd	I-69 SB	1.21	Branch	164.8	2
Litchfield Rd	Burbank Rd	2.51 miles east	2.51	Branch	164.5	2
Jefferson St	Park Ave	Pearl St	0.27	Branch	164.2	1
Otis Lake Rd	Guernsey Lake Rd	Keller Rd	1.05	Barry	158.4	2
Woodlawn Ave	Woodlawn Barber Cutoff	0.35 miles west	0.35	Barry	155.6	1
Union City Rd	State St	0.66 miles north	0.66	Branch	151.7	3
Broadway St	Sager Broadway Cutoff	Campground Rd	0.80	Barry	147.7	3
Wenzel Ave	Centerville Rd (M66)	Jefferson St	0.33	St Joseph	146.9	1
Constantine St	Wolf Rd	Broadway St	0.25	St Joseph	145.9	1
Cedar Creek Rd	Cloverdale Rd	Brogan Rd	2.56	Barry	144.1	5
Bass Rd	Briggs Rd	0.38 miles east	0.38	Barry	142.9	2
Airport Rd	Solomon Rd	0.25 miles south	0.25	Barry	141.4	1
Pifer Rd	Kingsbury Rd	Big Duck Dr	0.49	Barry	140.5	2
Swonk Rd	Fulton Rd	Correll Rd	1.13	St Joseph	138.0	1
Nottawa St	Indiana border	0.25 miles north	0.25	St Joseph	133.3	1
Bauman Rd	Indiana border	Fawn River Rd	1.72	St Joseph	132.7	2
Centreville-Constantine	Featherstone Rd	Lutz Rd	0.30	St Joseph	132.3	1
Brown Rd	Usborne Rd	0.61 miles west	0.61	Barry	131.8	1
Scott Rd	Fawn River Rd	1.84 miles south	1.84	St Joseph	130.4	2
Michigan Ave	State St	Mill St	0.10	Barry	126.6	1
9 Mile Rd	Boysen Rd	Marsh Rd/Boulter Rd	1.228	Barry	123.9	2
Cobb Rd	Gilkey Lake Rd	Pifer Rd	1.13	Barry	123.2	3
Charlton Park Rd	M-79	0.39 miles north	0.39	Barry	122.7	1
North Ave	Dowling Rd	Maple Grove Rd	1.99	Barry	118.8	2
Woodlawn Ave	Boradway St (M43)	Michigan Ave	0.23	Barry	118.1	2
Eckert Rd	Solomon Rd	Buehler Rd	2.57	Barry	112.3	2

Top Segments by Total Crashes (Non-Trunkline)

Top 40 per County. Does not include state trunkline, or segments with AADT.

Because AADT volumes are only available for a select number of segments, this list aims to provide an additional measure of safety for those segments in which traffic volumes cannot be obtained.

Non-Deer/Non-Animal

Road Name	From	To	Length (mi)	County	Total Crashes per Year
Howard St	Stearns Ave	Merrill St	0.26	Kalamazoo	5.2
Centre Ave	Angling Rd	Moorsbridge Rd	0.51	Kalamazoo	3.4
6 Mile Rd	Beckley Rd/B Dr N	0.45 miles south	0.45	Calhoun	3.2
Church St	Frank St	Norway Ave	0.20	Kalamazoo	3.2
Constantine Rd	River	Wolf Rd	1.42	St Joseph	3.2
Emajean St	KI Ave	Escape Dr	0.11	Kalamazoo	2.4
Main St	Washington St	Prairie St	0.08	Kalamazoo	2.0
Sage St	Valley Ridge Dr	Main St	0.14	Kalamazoo	2.0
River Rd	Winding River Rd	Nerrman Rd	1.10	St Joseph	2.0
Covered Bridge Rd	River Rd	Schweitzer Rd	1.84	St Joseph	2.0
Pennfield Rd	McAllister Rd	10 Mile Rd	1.05	Calhoun	1.8
Westbrook St	Greenwood Ave	Lafayette Ave	0.12	Kalamazoo	1.8
Academy St	Allen Blvd	Westnedge Ave	0.26	Kalamazoo	1.8
Stadium Dr	Venture Park	11th St	0.23	Kalamazoo	1.8
Croyden Dr	Drake Rd	0.40 miles west	0.40	Kalamazoo	1.8
Atc Dr	Cougar Dr	Kvcc Way	0.15	Kalamazoo	1.8
Schweitzer Rd	Holtom Rd	Covered Bridge Rd	1.98	St Joseph	1.8
Klinger Lake Rd	Wahl Rd	Timm Rd	0.75	St Joseph	1.8
Perkins St	Jefferson St	Elm St	0.29	Branch	1.6
Wildwood Rd	Ray Quincy Rd	Briggs Rd	1.51	Branch	1.6
J Bartlett Ave	East Ave N	Capital Ave NE (M-66)	0.36	Calhoun	1.6
Lane Blvd	Portage St	Race St	0.23	Kalamazoo	1.6
Reed Ave	Portage St	Race St	0.17	Kalamazoo	1.6
Greenwood Ave	Westbrook St	Redwood Ave	0.13	Kalamazoo	1.6
Greenwood Ave	Redwood Ave	Michigan Ave	0.13	Kalamazoo	1.6
Fraternity Village Dr	Michigan Ave	Michigamme Woods Dr	0.12	Kalamazoo	1.6
Wheaton Ave	Short Rd	Davis St	0.13	Kalamazoo	1.6
Elizabeth St	Cobb Ave	Westnedge Ave	0.25	Kalamazoo	1.6
8th St	MI Ave	Christoper Dr	0.63	Kalamazoo	1.6
Bridge St	Riverview Dr	Gilbert Ave	0.18	Kalamazoo	1.6
Enzian Rd	Guernsey Lake Rd	1.15 miles south	1.15	Barry	1.4
W Center St	S Clinton St	S Superior St	0.08	Calhoun	1.4
McKinley Ave S	Sherman Rd	E Emmett St	0.25	Calhoun	1.4
Jackson St SW	Jordan St	Thorne St	0.10	Calhoun	1.4
Clinton Ave	Race St	James St	0.12	Kalamazoo	1.4
Lafayette Ave	Redwood Ave	Michigan Ave	0.18	Kalamazoo	1.4
Forest St	Oak St	Westnedge Ave	0.13	Kalamazoo	1.4
Austin St	Oakland Dr	Davis St	0.16	Kalamazoo	1.4
Academy St	Church St	Rose St	0.07	Kalamazoo	1.4

Road Name	From	To	Length (mi)	County	Total Crashes per Year
Mabel St	Cobb Ave	Westnedge Ave	0.25	Kalamazoo	1.4
G Ave	Cypress Creek Ln	Goodrich Rd	0.78	Kalamazoo	1.4
Centre Ave	Lovers Ln	Newells Ln	0.21	Kalamazoo	1.4
O Ave	4th St	Glenwynd Dr	0.71	Kalamazoo	1.4
Locust St	Vine St	Duffield Ct	0.07	Kalamazoo	1.4
Winding Way	Ravine Rd	0.4 miles south-east	0.40	Kalamazoo	1.4
Green Meadow Rd	Drake Rd	Dragonfly Rd	0.30	Kalamazoo	1.4
Farrand Rd	Colon Rd	0.58 miles south	0.58	St Joseph	1.4
Wood School Rd	Ryan Rd	Kidder Dr	0.75	Barry	1.2
Washington St	Jefferson St	Elm St	0.27	Branch	1.2
Uldriks Dr	Meachem Rd	0.26 miles south	0.26	Calhoun	1.2
Uldriks Dr	Meachem Rd	V Dr N	0.75	Calhoun	1.2
N Washington Ave	Ardmoor Dr	Algonquin St	0.14	Calhoun	1.2
N Union St	Capital Ave NE	Sherman Rd	0.20	Calhoun	1.2
White Rabbit Rd	Mile Rd	9 Mile Rd	0.57	Calhoun	1.2
Clarence Blvd	Brigden Dr	0.59 miles north-east	0.59	Calhoun	1.2
Chapel Hill Dr	Riverside Dr	Enlow Ct	0.24	Calhoun	1.2
Cooper St	W Broadwell St	Kennedy St	0.09	Calhoun	1.2
B Dr N	22 Mile Rd	1.89 miles west	1.89	Calhoun	1.2
6 Mile Rd	B Dr S	Capercaillie Ln	0.52	Calhoun	1.2
6 Mile Rd	Hill Rd	0. 07 miles north	0.07	Calhoun	1.2
3 1/2 Mile Rd	B Dr S	0.69 miles north	0.69	Calhoun	1.2
Denso Rd	Clark Rd	Brady Rd	0.56	Calhoun	1.2
Vale St	Post Ave	Cliff St	0.18	Calhoun	1.2
Vanrick Dr	Park Cir	0.27 miles north	0.27	Kalamazoo	1.2
Lafayette Ave	Westbrook St	0.04 miles south	0.04	Kalamazoo	1.2
Knollwood Ave	Weaver Blvd	0.19 miles north	0.19	Kalamazoo	1.2
California Ave	Fraternity Village Dr	Michigan Ave	0.24	Kalamazoo	1.2
Fraternity Village Dr	California Ave	0.09 miles south	0.10	Kalamazoo	1.2
Vine St	Davis St	Locust Pl	0.09	Kalamazoo	1.2
Water St	Eleanor St	Edwards St	0.09	Kalamazoo	1.2
Woodward Ave	Paterson St	Interfaith Blvd	0.19	Kalamazoo	1.2
Wilbur Rd	Null Rd	Kipker Rd	0.76	St Joseph	1.2
Thornapple Lake Rd	Devine Rd	0.34 miles east	0.34	Barry	1.0
Quimby Rd	Tanner Lake Rd	Cook Rd	1.18	Barry	1.0
Parker Rd	Norris Rd/Delton Rd	0.52 miles south-east	0.52	Barry	1.0
Guernsey Lake Rd	McKibbin Rd	0.51 miles east	0.51	Barry	1.0
Center Rd	Charlton Park Rd	0.43 miles west	0.43	Barry	1.0
Jefferson St	Chicago St	Church St	0.09	Branch	1.0
Waterman Ave	Pierson St	Clay St	0.10	Branch	1.0
20 Mile Rd	G Dr S	1.28 miles south	1.28	Calhoun	1.0
Waubascon Rd	S Dr N	U Dr N	0.75	Calhoun	1.0
Byron St	Perry St	Capital Ave NE	0.12	Calhoun	1.0
Rittenhouse Ave	Caroline St	Capital Ave SW	0.15	Calhoun	1.0
Frisbie St	Blair St	Meachem Ave	0.27	Calhoun	1.0

Road Name	From	To	Length (mi)	County	Total Crashes per Year
Knapp Dr	Summit Dr	0.05 miles west	0.05	Calhoun	1.0
Althea Ave	Brizse Ave	E Willard Ave	0.22	Calhoun	1.0
Surby Ave	Beckman Ave	Foster Ave	0.19	Calhoun	1.0
Division Dr	Turberry Ln	0.1 miles west	0.10	Calhoun	1.0
25 1/2 Mile Rd	Division Dr	B Dr N	1.05	Calhoun	1.0
D Dr S	21 Mile Rd	0.26 miles west	0.26	Calhoun	1.0
9 Mile Rd	G Dr S	F Dr S	0.20	Calhoun	1.0
6 Mile Rd	0.04 miles north of E Dr S	0.28 miles north	0.28	Calhoun	1.0
6 Mile Rd	0.1 miles north of Hill Rd	0.35 miles north	0.35	Calhoun	1.0
N Brewer Dr	Golden Ave	Weeks Ave	0.22	Calhoun	1.0
Clay St	John St	West Ave	0.09	St Joseph	1.0
River Rd	Hebron Rd	0.38 miles west	0.38	St Joseph	1.0
Banker Street Rd	Nottawa Rd	0.72 miles west	0.72	St Joseph	1.0
Wood St	2nd Ave	0.23 miles south	0.10	St Joseph	1.0
Velte Rd	Brown Rd	Brown Rd (M-50)	0.23	Barry	0.8
Moor Rd	Stevens Rd	Osprey Dr	0.67	Barry	0.8
9 Mile Rd	0.08 miles west of Lindsey Rd	0.04 miles west	0.04	Barry	0.8
Broadway Rd	Brogan Rd	Pritchardville Rd	1.54	Barry	0.8
Hammond Rd	Ryan Rd	Willits Rd	1.55	Barry	0.8
Pine Lake Rd	Norris Rd	1 mile east	1.00	Barry	0.8
Hanchett St	Taylor St	Grand St	0.14	Branch	0.8
Wright St	Chicago St	Hull St	0.27	Branch	0.8
Willowbrook Rd	Centennial Rd	White Dr	0.66	Branch	0.8
Washington St	Elm St	Sprague St	0.13	Branch	0.8
Fiske Rd	Fenn Rd	Dorrance Rd	1.00	Branch	0.8
Grant St	Matteson St	Jackson St	0.40	Branch	0.8
Hull St	Morse St	Park Pl	0.10	Branch	0.8
Bennett Rd	Bennet Rd	0.48 miles west	0.48	Branch	0.8
Hodunk Rd	Barnhard Rd	Mauer Rd	0.51	Branch	0.8
Clarke Ave	Fairfield Dr	Marshall St	0.21	Branch	0.8
G Dr N	E River Rd	9 Mile Rd/Wattles Rd	0.72	Calhoun	0.8
29 1/2 Mile Rd	S Dr N	0.89 miles south	0.89	Calhoun	0.8
C Dr N	28 Mile Rd	28 1/2 Mile Rd	0.51	Calhoun	0.8
Uldriks Dr	R Dr N	1.01 miles north	1.01	Calhoun	0.8
Collier Ave	Michigan Ave	Bibb Ln	0.13	Calhoun	0.8
Constantine Rd	Centreville-Constatine Rd	Featherstone Rd	0.81	St Joseph	0.8
Covered Bridge Rd	Schweitzer Rd	0.01 miles north (bridge)	0.01	St Joseph	0.8
Covered Bridge Rd	0.01 miles north of Schweitzer	0.06 miles north (bridge)	0.06	St Joseph	0.8
Prairie River Rd	Mamroe Landing Rd	0.57 miles west	0.57	St Joseph	0.8
McKale Rd	Hackman Rd	0.36 miles south	0.36	St Joseph	0.8
Big Hill Rd	Plumb School Rd	0.76 miles north	0.76	St Joseph	0.8
Roberts Rd	Harder Rd	Gleason Rd	0.75	St Joseph	0.8
Coon Hollow Rd	Avery Rd	0.93 miles east	0.93	St Joseph	0.8
Wilbur Rd	US-131 SB	Null Rd	0.82	St Joseph	0.8
Long Lake Rd	Decker Rd	1.19 miles north	1.19	St Joseph	0.8

Road Name	From	To	Length (mi)	County	Total Crashes per Year
Mintdale Rd	Hideaway Ln	Centerville Rd	0.28	St Joseph	0.8
Enzian Rd	Pine Lake Rd	Shelp Lake Dr	0.44	Barry	0.6
Dowling Rd	Dowling Rd	Broadway St	0.46	Barry	0.6
Cook Rd	0.26 miles north of Hall Rd	0.34 miles north	0.34	Barry	0.6
Thornapple Lake Rd	Devine Rd	0.13 miles west	0.13	Barry	0.6
Thornapple Lake Rd	Woodland Rd	0.66 miles west	0.66	Barry	0.6
Usborne Rd	Brown Rd	0.6 miles south	0.60	Barry	0.6
Adams Rd	Meadow Hills Dr	Kiser Rd	0.21	Barry	0.6
McKeown Rd	Coburn Rd	0.35 miles north	0.35	Barry	0.6
Sheffield Rd	Marshfield Rd	Noonan Rd	0.68	Barry	0.6
Sprague Rd	M-43	0.2 miles north	0.20	Barry	0.6
Floria Rd	Sprague Rd	Pleasant Lake Rd	1.04	Barry	0.6
Head Rd	Keller Rd	0.28 miles north	0.28	Barry	0.6
Washington St	High St	Emory St	0.08	Barry	0.6
Mill St	3rd St	0.67 miles east	0.67	Barry	0.6
Mill St	Powell Rd	0.77 miles west	0.77	Barry	0.6
Cressey Rd	Burchette Rd	Enzian Rd	1.01	Barry	0.6
Cressey Rd	Enzian Rd	0.55 miles east	0.55	Barry	0.6
Ford Rd	Enzian Rd	Norris Rd	1.67	Barry	0.6
Guernsey Lake Rd	Norris Rd	1.78 miles west	1.78	Barry	0.6
Wildwood Rd	Fawn Lake Rd	0.07 miles west	0.07	Barry	0.6
Parker Rd	Ruble Dr	0.27 miles south	0.27	Barry	0.6
Lammers Rd	Ashby Dr	1.07 miles south	1.07	Barry	0.6
Broadway Rd	Broadway St	0.84 miles south-east	0.84	Barry	0.6
Broadway Rd	0.17 miles north of Sherwood	0.37 miles north	0.37	Barry	0.6
Bender Rd	Mulberry Dr	0.11 miles south	0.11	Barry	0.6
Center Rd	0.11 miles west of Cogswell	0.34 miles west	0.34	Barry	0.6
Robertson Rd	Garbow Rd	Parmalee Rd	0.99	Barry	0.6
Farrand Rd	Langwell Rd	Wattles Rd	1.01	Branch	0.6
Buchanan St	Fremont St	Fillmore St	0.13	Branch	0.6
Polk St	Pearl St	Chicago St	0.09	Branch	0.6
Walnut St	Park Ave	Peckham St	0.14	Branch	0.6
Hanchett St	Harrison St	Taylor St	0.09	Branch	0.6
Elm St	Washington St	Pearl St	0.10	Branch	0.6
Rose St	Chicago St	Hull St	0.28	Branch	0.6
Vans Ave	Chicago St	Hull St	0.31	Branch	0.6
Willowbrook Rd	Michigan Ave	0.3 miles south	0.30	Branch	0.6
Quincy Grange Rd	Elaine St	State Rd	0.65	Branch	0.6
Quincy Grange Rd	State Rd	Newton Rd	1.00	Branch	0.6
Clarendon Rd	Jonesville Rd	Newton Rd	1.04	Branch	0.6
Perkins St	Elm St	Sprague St	0.13	Branch	0.6
Park St	High St	0.07 miles south	0.07	Branch	0.6
Hull St	Sprague St	Balfour Dr	0.07	Branch	0.6
Cutter Ave	Morse St	Daugherty St	0.21	Branch	0.6
Hodunk Rd	Hurley Rd	Miller Lake Rd	0.50	Branch	0.6

Road Name	From	To	Length (mi)	County	Total Crashes per Year
Butler Rd	Burbank Rd	Clarendon Rd	0.76	Branch	0.6
Briggs Rd	0.22 miles north of Chicago Rd	0.89 miles north	0.89	Branch	0.6
Tuttle Rd	Sharon Ave	Arbogast Rd	1.12	Branch	0.6
Church St	Jefferson St	Morse St	0.08	Branch	0.6
Montgomery St	Grand St	Marshall St	0.22	Branch	0.6
Montgomery St	Marshall St	Hudson St	0.12	Branch	0.6
Clarke Ave	Grand St	Fairfield Dr	0.16	Branch	0.6
Branch Ave	Marshall St	Hudson St	0.12	Branch	0.6
Monroe St	Mechanic St	Congress St	0.11	St Joseph	0.6
Park St	Neuman St	West St	0.14	St Joseph	0.6
Jacob St	Chicago Rd	West St	0.18	St Joseph	0.6
Clay St	Main St	Washington St	0.06	St Joseph	0.6
Sturgis St	Main St	Ulm St	0.11	St Joseph	0.6
George St	Jerolene St	Lafayette Ave	0.12	St Joseph	0.6
Myrtle St	Laurel Ave	Michigan Ave	0.06	St Joseph	0.6
River Dr	6th St/River Dr	0.05 miles north-east	0.05	St Joseph	0.6
River Dr	Wood St	0.09 miles south-west	0.09	St Joseph	0.6
Blackstone Ave	State St	Mill St	0.07	St Joseph	0.6
Blossom Rd	Correll Rd	0.35 miles east	0.35	St Joseph	0.6
Barker Rd	Thomas Rd	Vistula Rd	1.15	St Joseph	0.6
Blue School Rd	Indian Prairie Rd	0.90 miles north	0.90	St Joseph	0.6
Barker Rd	Anderson	0.25 miles north	0.25	St Joseph	0.6
Indian Prairie Rd	Kalamazoo St	1.83 miles east	1.83	St Joseph	0.6
River Rd	Chicago Rd	Hebron Rd	0.38	St Joseph	0.6
River Rd	Hebron Rd	0.17 miles north-east	0.17	St Joseph	0.6
River Rd	0.07 miles west of Juneberry Ln	0.32 miles west	0.32	St Joseph	0.6

Top Segments by Fatal Crashes (Non-Trunkline)

Top 20 per County (less if no segment with crashes). Does not include state trunkline, or segments with AADT.
Because AADT volumes are only available for a select number of segments, this list aims to provide an additional measure of safety for those segments in which traffic volumes cannot be obtained.
Non-Deer/Non-Animal

Road Name	From	To	Length (mi)	County	Fatal Crashes per Year
Cressey Rd	Burchette Rd	Enzian Rd	1.01	Barry	0.2
Stevens Rd	Moor Rd	Stevens M43 Cutoff	0.20	Barry	0.2
Bivens Rd	Assyria Rd	0.52 miles west	0.52	Barry	0.2
Cressey Rd	Kane Rd	0.50 miles east	0.50	Barry	0.2
Wood School Rd	Mountain Ridge Dr	Fyan Dr	0.06	Barry	0.2
Barnhart Rd	0.25 miles east of Wheeler Rd	0.14 miles west of Gruner Rd	0.09	Branch	0.2
Waters Rd	Freemont Rd	0.51 miles west	0.51	Branch	0.2
Kelley Rd	0.19 mile south of Southern Rd	0.26 miles south	0.26	Branch	0.2
Kosmerick Rd	Parham Rd	0.28 miles west	0.28	Branch	0.2
Kosmerick Rd	Gilead Lake Rd	Brooks Rd	0.66	Branch	0.2
Hawley Dr	Union City Rd	0.11 miles west	0.11	Branch	0.2
29 1/2 Mile Rd	S Dr N	0.89 miles south	0.89	Calhoun	0.2
Meachem Rd	Bedford Rd N	0.91 miles west	0.91	Calhoun	0.2
Watkins Rd	Helmer Rd S	0.89 miles east	0.89	Calhoun	0.2
14 Mile Rd	J Dr N	L Dr N	0.98	Calhoun	0.2
Wagner Dr	Kelly Ave	Michael St	0.15	Calhoun	0.2
13 Mile Rd	R Dr N	S Dr N	0.50	Calhoun	0.2
A Dr S	13½ Mile Rd	14 Mile Rd	0.47	Calhoun	0.2
6 Mile Rd	Boyd Rd	0.28 miles south	0.28	Calhoun	0.2
12 Mile Rd	F Dr S	0.42 miles south	0.42	Calhoun	0.2
C Ave	Gull Lake Rd	0.22 miles west	0.22	Kalamazoo	0.2
29th St	N Ave	M N Ave	0.50	Kalamazoo	0.2
Crooked Lake Dr	PQ Ave	0.18 miles east	0.18	Kalamazoo	0.2
G Ave	3rd St	6th St	1.49	Kalamazoo	0.2
K L Ave	2nd St	2nd St/Oshtemo Tree	0.26	Kalamazoo	0.2
H Ave	5th St	6th St	0.74	Kalamazoo	0.2
34th St	UV Ave	0.12 miles north	0.12	Kalamazoo	0.2
J Ave	Wickford Dr	2nd St	0.71	Kalamazoo	0.2
Walnut Dr	Lucas Rd	Oak Dr	0.56	St Joseph	0.2
Bogen Rd	Centerville Rd	0.99 miles west	0.99	St Joseph	0.2
Constantine Rd	Centreville-Constantine Rd	Featherstone Rd	0.81	St Joseph	0.2
Constantine Rd	Withers Rd	Fairchild Rd	0.48	St Joseph	0.2
Big Hill Rd	Chicago Rd	0.16 mile south	0.16	St Joseph	0.2
Farrand Rd	Towerline Rd	Wagner Rd	1.08	St Joseph	0.2
Blue School Rd	Railroad track	Indian Prairie Rd	0.42	St Joseph	0.2
Blue School Rd	Dickinson Rd	Miller Rd	0.50	St Joseph	0.2
Big Hill Rd	Witt Lake Rd	Kelly Rd	1.00	St Joseph	0.2
Mount Zion Rd	Dutch Settlement Rd	Delong Rd	0.25	St Joseph	0.2
Carlton Rd	Bliss Rd	Flowwerfield Rd	1.51	St Joseph	0.2
Angevine Rd	Wakeman Rd	Heimbach Rd	1.00	St Joseph	0.2

Top Segments by Injury Crashes (Non-Trunkline)

Top 20 per County (less if no segment with crashes). Does not include state trunkline, or segments with AADT.
Because AADT volumes are only available for a select number of segments, this list aims to provide an additional measure of safety for those segments in which traffic volumes cannot be obtained.
Non-Deer/Non-Animal

Road Name	From	To	Length (mi)	County	Injury Crashes per Year
Constantine Rd	Wolf Rd	1.42 miles south	1.42	St Joseph	1.2
Centre Ave	Angling Rd	Moorsbridge Rd	0.51	Kalamazoo	1.0
River Rd	Winding River Rd	Nerrman Rd	1.10	St Joseph	1.0
Church St	Frank St	Norway Ave	0.20	Kalamazoo	0.8
Howard St	Stearns Ave	Merrill St	0.26	Kalamazoo	0.8
H Ave	Wyngate Meadow	33rd St	0.59	Kalamazoo	0.8
Enzian Rd	Guernsey Lake Rd	1.15 miles south	1.15	Barry	0.6
9 Mile Rd	0.08 mile west of Linsey Rd	0.04 miles west	0.04	Barry	0.6
Broadway Rd	Pritchardville Rd	Brogan Rd	1.54	Barry	0.6
Wildwood Rd	Ray Quincy Rd	Briggs Rd	1.51	Branch	0.6
Hodunk Rd	Barnhart Rd	Mauer Rd	0.51	Branch	0.6
19 Mile Rd	Partello Rd	G Dr N	0.97	Calhoun	0.6
6 Mile Rd	B Dr N	0.45 miles south	0.45	Calhoun	0.6
Jackson St W	Jordan St	Thomas St	0.10	Calhoun	0.6
Division Dr	Helmer Rd S	Turnberry Ln	0.10	Calhoun	0.6
W Kirby Rd	Bedford Rd N	0.13 miles west	0.13	Calhoun	0.6
6 1/2 Mile Rd	Santalina Trail	0.70 miles south	0.70	Calhoun	0.6
35th St	FG Ave	0.69 miles north	0.69	Kalamazoo	0.6
Croyden Dr	Drake Rd	0.40 miles west	0.40	Kalamazoo	0.6
34th St	Railroad tracks	0.34 miles north	0.34	Kalamazoo	0.6
McCollum Rd	Michigan Ave	Eagle Dr	0.25	Kalamazoo	0.6
V Ave	31st St	0.30 miles west	0.30	Kalamazoo	0.6
Schweitzer Rd	Holtom Rd	Covered Bridge Rd	1.98	St Joseph	0.6
Covered Bridge Rd	Schweitzer Rd	River Rd	1.84	St Joseph	0.6
Wilbur Rd	Null Rd	Kipker Rd	0.76	St Joseph	0.6
River Rd	Private Rd by Lake	0.38 miles west	0.38	St Joseph	0.6
Barker Rd	Thomas Rd	Vistula Rd	1.15	St Joseph	0.6
Thornapple Lake Rd	Devine Rd	0.34 miles east	0.34	Barry	0.4
Kellogg School Rd	Gilkey Lake Rd	0.34 miles northwest	0.34	Barry	0.4
Wood School Rd	Ryan Rd	0.75 miles north	0.75	Barry	0.4
Quimby Rd	Tanner Lake Rd	Cook Rd	1.18	Barry	0.4
Guernsey Lake Rd	McKibbin Rd	0.51 miles east	0.51	Barry	0.4
Center Rd	Charlton Park Rd	0.43 miles west	0.43	Barry	0.4
Enzian Rd	Shelp Lake dr	Pine Lake Rd	0.44	Barry	0.4
Floria Rd	Pleasant Lake Rd	Sprague Rd	1.04	Barry	0.4
Miller Rd	Guernsey Lake Rd	0.23 miles south	0.23	Barry	0.4
Cook Rd	South of Hall Rd	0.53 miles south	0.53	Barry	0.4
Ford Rd	Enzian Rd	0.51 miles west	0.51	Barry	0.4
Buehler Rd	Ryan Rd	0.21 miles north	0.21	Barry	0.4
Wood School Rd	Fyan Dr	Sisson Rd	0.25	Barry	0.4

Road Name	From	To	Length (mi)	County	Injury Crashes per Year
Otis Lake Rd	Keller Rd	Little Pine Lake Rd	0.85	Barry	0.4
Bater Rd	Behnke Rd	0.51 miles west	0.51	Branch	0.4
Perkins St	Jefferson St	Elm St	0.29	Branch	0.4
Willowbrook Rd	Centennial Rd	White Dr	0.66	Branch	0.4
Fisher Rd	Bennett Rd	0.48 miles west	0.48	Branch	0.4
Union Rd	S Rd	Adolph Rd	0.50	Branch	0.4
R Dr S	9 Mile Rd	9 1/2 Mile Rd	0.25	Calhoun	0.4
Marjorie St	Kingman Ave	Post Ave	0.13	Calhoun	0.4
R Dr S	9 Mile Rd	0.58 miles west	0.58	Calhoun	0.4
Rittenhouse Ave E	Capital Ave SW	Cleveland St	0.06	Calhoun	0.4
E Dr N	Grand Castle Terrace	Sherry Ln	0.61	Calhoun	0.4
B Dr N	East of 21 Mile Rd	22 Mile Road	1.89	Calhoun	0.4
6 Mile Rd	B Dr S	Capercaillie Ln	0.52	Calhoun	0.4
25 1/2 Mile Rd	Division Dr	B Dr N	1.05	Calhoun	0.4
G Dr N	E River Rd	Wattles Rd	0.72	Calhoun	0.4
1 Mile Rd	R Dr N	1.01 miles north	1.01	Calhoun	0.4
2 Mile Rd	R Dr N	S Dr N	0.51	Calhoun	0.4
S Dr N/Halbert Rd	Waubascom Rd	5 1/2 Mile Rd	1.01	Calhoun	0.4
Beadle Lake Rd	Division Dr	0.11 miles west	0.11	Calhoun	0.4
Yawger Rd	Hubbard St	North Ave	1.01	Calhoun	0.4
H Ave	5th St	6th St	0.74	Kalamazoo	0.4
California Ave	Fraternity Village Dr	Michigan Ave	0.24	Kalamazoo	0.4
Greenwood Ave	Westbrooke Dr	Redwood Ave	0.13	Kalamazoo	0.4
McKinley St	20th St	21st St	0.50	Kalamazoo	0.4
26th St	De Ave	0.56 miles North	0.56	Kalamazoo	0.4
R Ave	Pretty Lake Heights	6th St	0.68	Kalamazoo	0.4
Washington Ave	Division St	Cameron St	0.07	Kalamazoo	0.4
Park Pl	Westnedge Ave	Newell Ct	0.06	Kalamazoo	0.4
Goldsworth Dr	West of Pond Dr	0.16 miles west	0.16	Kalamazoo	0.4
Cedar St	Park St	Walnut Ct	0.08	Kalamazoo	0.4
Sherwood Ave	Gilbert Ave	Charlotte Ave	0.06	Kalamazoo	0.4
Klinger Lake Rd	Wahl Rd	Timm Rd	0.75	St Joseph	0.4
Quarterline Rd	Root Rd	0.50 miles west	0.50	St Joseph	0.4
River Rd	Hebron Rd	0.17 miles northeast	0.17	St Joseph	0.4
Maystead Rd	Big Hill Rd	Carpenterson Rd	1.00	St Joseph	0.4
Quarterline Rd	Millers Mill Rd	0.37 miles south	0.37	St Joseph	0.4
Roberts Rd	M-60	Broadway Rd	0.82	St Joseph	0.4
Correll Rd	North of Frisbie Rd	0.61 miles north	0.61	St Joseph	0.4
Mint Rd	Z Ave	Brown Rd	0.86	St Joseph	0.4
Blossom Rd	Shannon Rd	0.70 miles southwest	0.70	St Joseph	0.4
Locust St	Jeremy St	0.13 miles west	0.13	St Joseph	0.4
Constantine Rd	Fairchild Rd	Shorewood Dr	0.71	St Joseph	0.4
Big Hill Rd	Miller Rd	Fawn River Rd	0.50	St Joseph	0.4
Klinger Lake Rd	Wahl Rd	0.08 miles southwest	0.08	St Joseph	0.4
Stevens Rd	Moor Rd	Stevens M-43 Cutoff	0.20	Barry	0.2
Lindsey Rd	Mullen Rd	Wildwood Rd	1.08	Barry	0.2

Road Name	From	To	Length (mi)	County	Injury Crashes per Year
Irving Rd	Horseshore Trail	Church Rd	0.55	Barry	0.2
Willowbrook Rd	South of Sauk River Dr	0.30 miles south	0.30	Branch	0.2
Dayburg Rd	Union City Rd	Marshall Rd	1.11	Branch	0.2
Marshall Rd	Herricksville Rd	I-69 EB ramp	1.17	Branch	0.2
Fiske Rd	Chicago St	0.1 miles south	0.10	Branch	0.2
Booth Rd	Seffery Rd	0.13 miles east	0.13	Branch	0.2
Wilmin Rd	Lukesport Dr	0.03 miles west	0.03	Branch	0.2
Cutter Ave	Morse St	Daugherty St	0.21	Branch	0.2
Thomas St	Barry St	Calhoun St	0.12	Branch	0.2
Jefferson St	Grand St	Hull St	0.09	Branch	0.2
Hamman Rd	Brown Rd	Lester Rd	1.01	Branch	0.2
Jackson St	Grant St	Roosevelt St	0.08	Branch	0.2
Hudson St	Perkins St	Washington St	0.11	Branch	0.2
Round Lake Rd	Dutch School Rd	0.28 miles west	0.28	Branch	0.2

Top Urban Intersections by Total Crashes (Non-Trunkline)

Top 20 per County. Does not include intersection whose one leg is a state trunkline.

Intersection	X	Y	County	Municipality	Total Crashes per Year
Drake & K L	-85.64827	42.27814	Kalamazoo	City of Kalamazoo	29.2
Stadium & 9th	-85.67754	42.25915	Kalamazoo	Oshtemo Township	29.0
Romence & Westnedge	-85.58940	42.21553	Kalamazoo	City of Portage	28.6
Beckley & Capital	-85.19861	42.26105	Calhoun	City of Battle Creek	18.8
Shaver & W Centre	-85.59165	42.20100	Kalamazoo	City of Portage	16.6
Milham & Westnedge	-85.58950	42.23011	Kalamazoo	City of Portage	16.6
Milham & Oakland	-85.61398	42.23012	Kalamazoo	City of Portage	16.2
Westnedge & Mall	-85.58951	42.22475	Kalamazoo	City of Portage	15.6
Stadium & 11th	-85.65806	42.26766	Kalamazoo	Oshtemo Township	13.4
Michigan & Drake	-85.64830	42.27533	Kalamazoo	City of Kalamazoo	13.2
Sprinkle & Main	-85.52906	42.30297	Kalamazoo	Comstock Township	13.0
Cork & Burdick	-85.57987	42.25964	Kalamazoo	City of Kalamazoo	12.8
Michigan & Howard	-85.62165	42.28162	Kalamazoo	City of Kalamazoo	12.8
Oakland & Centre	-85.61389	42.20105	Kalamazoo	City of Portage	12.6
Centre & Portage	-85.56004	42.20095	Kalamazoo	City of Portage	12.2
B N & Beckley	-85.17906	42.26105	Calhoun	City of Battle Creek	12.0
Milham & Constitution	-85.60153	42.23006	Kalamazoo	City of Portage	12.0
Oakland & Howard	-85.60519	42.27425	Kalamazoo	City of Kalamazoo	11.6
Rose & Exchange	-85.58475	42.29124	Kalamazoo	City of Kalamazoo	11.2
Sprinkle & Miller	-85.53082	42.26671	Kalamazoo	Comstock Township	11.0
Sprinkle & Michigan	-85.53077	42.28942	Kalamazoo	Comstock Township	10.8
9th & K L	-85.67753	42.28137	Kalamazoo	Oshtemo Township	10.4
B N & Harper Village	-85.17681	42.26108	Calhoun	Emmett Township	8.2
Capital SW & E Van Buren	-85.17978	42.32084	Calhoun	City of Battle Creek	8.2
Capital SW & W Territorial	-85.19956	42.30469	Calhoun	City of Battle Creek	7.8
North & E Emmett	-85.18038	42.33021	Calhoun	City of Battle Creek	7.8
North & E Roosevelt	-85.18058	42.33933	Calhoun	Pennfield Township	6.6
Capital SW & W Hamblin	-85.18469	42.31803	Calhoun	City of Battle Creek	5.8
Capital SW & Lakeview	-85.19942	42.29937	Calhoun	City of Battle Creek	5.6
W Minges & Capital SW	-85.19891	42.27562	Calhoun	City of Battle Creek	4.8
B N & 6 1/2 Mile	-85.16914	42.26108	Calhoun	Emmett Township	4.2
W Territorial & N 20th	-85.21899	42.30473	Calhoun	City of Battle Creek	4.2
Limit & Ridgemoor	-85.21006	42.34061	Calhoun	City of Battle Creek	4.2
Green & Market	-85.29513	42.64591	Barry	City of Hastings	4.0
N Washington & W Van Buren	-85.19011	42.32510	Calhoun	City of Battle Creek	4.0
Verona & Raymond	-85.14107	42.33213	Calhoun	City of Battle Creek	4.0
Beckley & Riverside	-85.18887	42.26105	Calhoun	City of Battle Creek	3.8
Cliff & Main	-85.17357	42.30949	Calhoun	City of Battle Creek	3.8
WGoodale & N Washington	-85.19042	42.34082	Calhoun	City of Battle Creek	3.8
Morgan & North	-85.18081	42.35547	Calhoun	Pennfield Township	3.8
State & Michigan	-84.98092	41.95623	Branch	City of Coldwater	3.6

Intersection	X	Y	County	Municipality	Total Crashes per Year
Morgan & Waubascon	-85.21030	42.35522	Calhoun	Bedford Township	3.6
West & Centerville	-85.42837	41.80119	St. Joseph	City of Sturgis	2.6
Michigan & Apple	-85.28616	42.64969	Barry	City of Hastings	2.4
State & Michigan	-85.28620	42.65359	Barry	City of Hastings	2.2
State & Marshall	-85.00055	41.95627	Branch	City of Coldwater	2.2
Jonesville & Marshall	-85.00073	41.98554	Branch	Girard Township	2.2
Congress & Orange	-85.42717	41.79592	St. Joseph	City of Sturgis	2.2
State & Michigan	-85.28615	42.64876	Barry	City of Hastings	1.8
Michigan & Woodlawn	-85.28626	42.66084	Barry	City of Hastings	1.8
Congress & Lakeview	-85.40890	41.79674	St. Joseph	City of Sturgis	1.8
Apple & Park	-85.29219	42.64967	Barry	City of Hastings	1.4
Garfield & Butters	-85.02354	41.92726	Branch	City of Coldwater	1.4
Morse & Hull	-84.99555	41.94244	Branch	City of Coldwater	1.4
Bogen & Nottawa	-85.41849	41.76687	St. Joseph	City of Sturgis	1.4
Norwood & Orange	-85.42717	41.79320	St. Joseph	City of Sturgis	1.4
Congress & Nottawa	-85.41863	41.79670	St. Joseph	City of Sturgis	1.4
West & Clay	-85.42195	41.80121	St. Joseph	City of Sturgis	1.4
Clinton & Market	-85.29505	42.64137	Barry	City of Hastings	1.2
Cook & Green	-85.30877	42.64335	Barry	Rutland Township	1.2
Apple & Jefferson	-85.28765	42.64970	Barry	City of Hastings	1.2
Michigan & Mill	-85.28617	42.65022	Barry	City of Hastings	1.2
State & Union City	-85.01094	41.95628	Branch	City of Coldwater	1.2
Fawn River & Nottawa	-85.41853	41.78142	St. Joseph	Sturgis Township	1.2
Green & Washington	-85.29363	42.64591	Barry	City of Hastings	1.0
Apple & Church	-85.28913	42.64969	Barry	City of Hastings	1.0
Elm & Washington	-84.99316	41.93669	Branch	City of Coldwater	1.0
Marshall & Grand	-85.00042	41.94195	Branch	City of Coldwater	1.0
Montgomery & Marshall	-85.00047	41.94763	Branch	City of Coldwater	1.0
State & State	-84.97128	41.95622	Branch	Coldwater Township	1.0
Wenzel & Orange	-85.42716	41.79410	St. Joseph	City of Sturgis	1.0
Saint Joseph & Clay	-85.42194	41.80224	St. Joseph	City of Sturgis	1.0
Clinton & Cass	-85.29955	42.64137	Barry	City of Hastings	0.8
Clinton & Jefferson	-85.28755	42.64141	Barry	City of Hastings	0.8
Madison & Washington	-85.29359	42.64228	Barry	City of Hastings	0.8
Center & Michigan	-85.28611	42.64687	Barry	City of Hastings	0.8
Center & Boltwood	-85.28456	42.64689	Barry	City of Hastings	0.8
Court & Market	-85.29513	42.64772	Barry	City of Hastings	0.8
Court & Washington	-85.29364	42.64775	Barry	City of Hastings	0.8
Apple & Washington	-85.29366	42.64966	Barry	City of Hastings	0.8
Garfield & Jay	-85.01497	41.92725	Branch	City of Coldwater	0.8
Sprague & Sauk River	-84.99068	41.93411	Branch	City of Coldwater	0.8
Clay & Pearl	-85.00536	41.94006	Branch	City of Coldwater	0.8
Jefferson & Main	-84.88397	41.94305	Branch	Quincy Township	0.8
Clarke & Marshall	-85.00051	41.95185	Branch	City of Coldwater	0.8
Bishop & Green	-85.01456	41.95256	Branch	City of Coldwater	0.8

Intersection	X	Y	County	Municipality	Total Crashes per Year
Narrows & River	-85.04039	41.97855	Branch	Coldwater Township	0.8
Broadway & Constantine	-85.63774	41.93277	St. Joseph	City of Three Rivers	0.8
Broadway & 4th	-85.62970	41.93318	St. Joseph	City of Three Rivers	0.8
Wenzel & Jefferson	-85.42204	41.79416	St. Joseph	City of Sturgis	0.8
West & Lakeview	-85.40892	41.80178	St. Joseph	Fawn River Township	0.8
Sprague & Garfield	-84.99064	41.92725	Branch	City of Coldwater	0.6
Willowbrook & Woodward	-84.97119	41.93255	Branch	City of Coldwater	0.6
Michigan & Sauk River	-84.98092	41.93348	Branch	City of Coldwater	0.6
Portage & Kelsey	-85.63228	41.94862	St. Joseph	City of Three Rivers	0.6
Fawn River & Balk	-85.46700	41.78102	St. Joseph	Sturgis Township	0.6
Fawn River & White School	-85.44754	41.78120	St. Joseph	Sturgis Township	0.6
Lakeview & Fawn River	-85.40888	41.78145	St. Joseph	Fawn River Township	0.6
Fawn River & Big Hill	-85.38897	41.78146	St. Joseph	Fawn River Township	0.6
Magnolia & Orange	-85.42711	41.79049	St. Joseph	City of Sturgis	0.6

Top Urban Intersections by Fatal Crashes (Non-Trunkline)

Top 10 per County (less if int. with no crashes). Does not include intersection whose one leg is a state trunkline.

Intersection	X	Y	County	Municipality	Fatal Crashes per Year
N Michigan & E Lincoln	-85.28621	42.65723	Barry	City of Hastings	0.2
W Territorial & S 20th	-85.21899	42.30473	Calhoun	City of Battle Creek	0.2
Limit & Ridgemoor	-85.21006	42.34061	Calhoun	City of Battle Creek	0.2
Custer & River W	-85.27940	42.34790	Calhoun	Bedford Township	0.2
9 Mile & D N	-85.12034	42.27585	Calhoun	Emmett Township	0.2
W Kingman & Main	-85.16972	42.30509	Calhoun	City of Battle Creek	0.2
Upton & Meacham	-85.19985	42.31796	Calhoun	City of Battle Creek	0.2
B S & Capital SW	-85.19825	42.23194	Calhoun	Leroy Township	0.2
Yawger & Waubascon	-85.21041	42.36250	Calhoun	Bedford Township	0.2
Westnedge & Trade Centre	-85.58953	42.23885	Kalamazoo	City of Portage	0.2
Sprinkle & Michigan	-85.53077	42.28942	Kalamazoo	Comstock Township	0.2
Emajean & Michigan	-85.64071	42.27705	Kalamazoo	City of Kalamazoo	0.2
Prairie & Main	-85.53240	42.11996	Kalamazoo	Schoolcraft Township	0.2
Stadium & 11th	-85.65806	42.26766	Kalamazoo	Oshtemo Township	0.2
Kilgore & Oakland	-85.61411	42.24522	Kalamazoo	City of Kalamazoo	0.2
Stadium & 4th	-85.72613	42.24946	Kalamazoo	Oshtemo Township	0.2
N & 9th	-85.67761	42.24526	Kalamazoo	Oshtemo Township	0.2
Riverview & Paterson	-85.56980	42.30325	Kalamazoo	City of Kalamazoo	0.2
Milham & Sprinkle	-85.54055	42.23024	Kalamazoo	City of Portage	0.2
Millard & Douglas	-85.64222	41.94005	St. Joseph	City of Three Rivers	0.2

Top Urban Intersections by Injury Crashes (Non-Trunkline)

Top 10 per County (less if int. with no crashes). Does not include intersection whose one leg is a state trunkline.

Intersection	X	Y	County	Municipality	Injury Crashes per Year
Stadium & 9th	-85.67754	42.25915	Kalamazoo	Oshtemo Township	6.4
Drake & K L	-85.64827	42.27814	Kalamazoo	City of Kalamazoo	5.0
Romence & Westnedge	-85.58940	42.21553	Kalamazoo	City of Portage	4.4
Sprinkle & Main	-85.52906	42.30297	Kalamazoo	Comstock Township	4.4
Beckley & Capital SW	-85.19861	42.26105	Calhoun	City of Battle Creek	4.0
Stadium & 11th	-85.65806	42.26766	Kalamazoo	Oshtemo Township	4.0
Shaver & Centre	-85.59165	42.20100	Kalamazoo	City of Portage	4.0
Cork & Burdick	-85.57987	42.25964	Kalamazoo	City of Kalamazoo	3.2
Sprinkle & Michigan	-85.53077	42.28942	Kalamazoo	Comstock Township	3.0
Milham & Westnedge	-85.58950	42.23011	Kalamazoo	City of Portage	3.0
Westnedge & Mall	-85.58951	42.22475	Kalamazoo	City of Portage	3.0
B & Beckley	-85.17906	42.26105	Calhoun	City of Battle Creek	2.8
Capital SW & W Territorial	-85.19956	42.30469	Calhoun	City of Battle Creek	2.0
North & E Emmett	-85.18038	42.33021	Calhoun	City of Battle Creek	2.0
Capital SW & Hamblin E	-85.18469	42.31803	Calhoun	City of Battle Creek	1.8
State & Michigan	-84.98092	41.95623	Branch	City of Coldwater	1.6
W Goodale & N Washington	-85.19042	42.34082	Calhoun	City of Battle Creek	1.4
Green & Market	-85.29513	42.64591	Barry	City of Hastings	1.2
Jonesville & Marshall	-85.00073	41.98554	Branch	Girard Township	1.2
Capital & E Van Buren	-85.17978	42.32084	Calhoun	City of Battle Creek	1.2
Capital SW & Lakeview	-85.19942	42.29937	Calhoun	City of Battle Creek	1.2
S Washington & W Van Buren	-85.19011	42.32510	Calhoun	City of Battle Creek	1.2
Parkway & N Washington	-85.19030	42.33364	Calhoun	City of Battle Creek	1.2
Michigan & Apple	-85.28616	42.64969	Barry	City of Hastings	1.0
State & Marshall	-85.00055	41.95627	Branch	City of Coldwater	0.8
Morse & Hull	-84.99555	41.94244	Branch	City of Coldwater	0.8
Michigan & Woodlawn	-85.28626	42.66084	Barry	City of Hastings	0.6
Garfield & Butters	-85.02354	41.92726	Branch	City of Coldwater	0.6
Broadway & 4th	-85.62970	41.93318	St. Joseph	City of Three Rivers	0.6
Bogen & Nottawa	-85.41849	41.76687	St. Joseph	City of Sturgis	0.6
Grand & Michigan	-85.28610	42.64415	Barry	City of Hastings	0.4
Center & Michigan	-85.28611	42.64687	Barry	City of Hastings	0.4
Apple & Park	-85.29219	42.64967	Barry	City of Hastings	0.4
Clinton & Market	-85.29505	42.64137	Barry	City of Hastings	0.4
Apple & Church	-85.28913	42.64969	Barry	City of Hastings	0.4
Center & Jefferson	-85.28757	42.64686	Barry	City of Hastings	0.4
Heath & Tanner Lake	-85.33341	42.65289	Barry	Rutland Township	0.4
Fulton & Colfax	-84.88142	41.94281	Branch	Quincy Township	0.4
Marshall & Grand	-85.00042	41.94195	Branch	City of Coldwater	0.4
Montgomery & Marshall	-85.00047	41.94763	Branch	City of Coldwater	0.4
Garfield & Jay	-85.01497	41.92725	Branch	City of Coldwater	0.4
Jefferson & Hooker	-84.99882	41.93356	Branch	City of Coldwater	0.4

West & Centerville	-85.42837	41.80119	St. Joseph	City of Sturgis	0.4
Congress & Orange	-85.42717	41.79592	St. Joseph	City of Sturgis	0.4
Norwood & Orange	-85.42717	41.79320	St. Joseph	City of Sturgis	0.4
Fawn River & Big Hill	-85.38897	41.78146	St. Joseph	Fawn River Township	0.4
Michigan & 5th	-85.62835	41.93118	St. Joseph	City of Three Rivers	0.4
Congress & Clay	-85.42089	41.79643	St. Joseph	City of Sturgis	0.2
Millard & Andrews	-85.63818	41.94011	St. Joseph	City of Three Rivers	0.2
South & Andrews	-85.63821	41.94134	St. Joseph	City of Three Rivers	0.2

Top Rural Intersections by Total Crashes (Non-Trunkline)

Top 20 per County. Does not include intersection whose one leg is a state trunkline.

Intersection	X	Y	County	Municipality	Total Crashes per Year
D & 12th	-85.64914	42.37650	Kalamazoo	Cooper Township	3.4
U & 8th	-85.68670	42.14252	Kalamazoo	Prairie Ronde Township	3.2
D & Douglas	-85.61027	42.37651	Kalamazoo	Cooper Township	2.4
B & Riverview	-85.56165	42.40539	Kalamazoo	Cooper Township	2.4
Center & Charlton Park	-85.21183	42.63960	Barry	Hastings Township	1.8
Main & Grand Rapids	-85.46164	42.71327	Barry	Thornapple Township	1.8
S & 34th	-85.43231	42.17247	Kalamazoo	Pavilion Township	1.8
D & Riverview	-85.55258	42.37632	Kalamazoo	Cooper Township	1.8
Fisher & Ray Quincy	-84.88345	41.88379	Branch	Algansee Township	1.6
D & 14th	-85.63006	42.37656	Kalamazoo	Cooper Township	1.6
Silver & Michigan	-85.52872	42.04245	St. Joseph	Mendon Township	1.6
Broadway & Carlton Center	-85.29064	42.72639	Barry	Carlton Township	1.4
Almena & Van Kal	-85.76597	42.27537	Kalamazoo	Oshtemo Township	1.4
Bass & Patterson	-85.54511	42.68144	Barry	Leighton Township	1.2
Fenn & Centennial	-84.98050	41.89813	Branch	Coldwater Township	1.2
Jonesville & Jonesville	-84.88457	41.98567	Branch	Butler Township	1.2
Girard & Marshall	-85.00097	42.02931	Branch	Girard Township	1.2
48th & E C	-85.29881	42.39023	Calhoun	Bedford Township	1.2
M N & 36th	-85.41368	42.25255	Kalamazoo	Charleston Township	1.2
Mercury & Michigan	-85.30133	42.26993	Kalamazoo	Charleston Township	1.2
Michigan & 40th	-85.37607	42.28056	Kalamazoo	Charleston Township	1.2
24th & D	-85.53187	42.37624	Kalamazoo	Richland Township	1.2
Marsh & 9 Mile	-85.51901	42.55217	Barry	Orangeville Township	1.0
Lawrence & Assyria	-85.13643	42.56703	Barry	Maple Grove Township	1.0
Adams & Kiser	-85.46652	42.69663	Barry	Thornapple Township	1.0
Copeland & Angola	-85.00504	41.79666	Branch	Kinderhook Township	1.0
L S & 17 Mile	-84.96238	42.15949	Calhoun	Fredonia Township	1.0
36th & W	-85.41179	42.11495	Kalamazoo	Wakeshma Township	1.0
M & 1st	-85.75505	42.25927	Kalamazoo	Oshtemo Township	1.0
D & 2nd	-85.74662	42.37507	Kalamazoo	Alamo Township	1.0
D & Westnedge	-85.59055	42.37655	Kalamazoo	Cooper Township	1.0
Farrand & Colon	-85.33913	41.96556	St. Joseph	Colon Township	1.0
Michigan & Silver	-85.51804	42.03884	St. Joseph	Mendon Township	1.0
Hickory & Brooklodge	-85.36627	42.44151	Barry	Barry Township	0.8
Fruin & Holden	-85.19489	42.47147	Barry	Johnstown Township	0.8
Pine Lake & Norris	-85.45502	42.50857	Barry	Orangeville Township	0.8
Gun Lake & Yankee Springs	-85.45814	42.60964	Barry	Yankee Springs Township	0.8
Patterson & 133rd	-85.54464	42.66025	Barry	Wayland Township	0.8
State & McCann	-85.41116	42.69887	Barry	Irving Township	0.8
Green Lake & Bender	-85.48630	42.71104	Barry	Thornapple Township	0.8
Main & High	-85.46384	42.71202	Barry	Thornapple Township	0.8

Intersection	X	Y	County	Municipality	Total Crashes per Year
Whitneyville & 108th	-85.45572	42.76903	Barry	Thornapple Township	0.8
Wildwood & Ray Quincy	-84.88376	41.91250	Branch	Quincy Township	0.8
Block & Central	-85.05834	41.86937	Branch	Ovid Township	0.8
H N & 28 Mile	-84.75713	42.30514	Calhoun	Sheridan Township	0.8
N N & Wheatfield	-85.08256	42.34809	Calhoun	Pennfield Township	0.8
Meachem & Uldriks	-85.27984	42.39494	Calhoun	Bedford Township	0.8
W & 8th	-85.68563	42.11340	Kalamazoo	Prairie Ronde Township	0.8
V & 28th	-85.49035	42.12914	Kalamazoo	Brady Township	0.8
10th & S	-85.66721	42.17199	Kalamazoo	Texas Township	0.8
Q & 29th	-85.48146	42.20129	Kalamazoo	Pavilion Township	0.8
Michigan & Parkville	-85.54822	42.04234	St. Joseph	Park Township	0.8
Featherstone & Centerville	-85.42875	41.85401	St. Joseph	Sherman Township	0.8
Doster & 4 Mile	-85.54330	42.47982	Barry	Gunplain Township	0.6
Head & Guernsey Lake	-85.39615	42.54469	Barry	Hope Township	0.6
Shultz & Shultz	-85.34579	42.58052	Barry	Hope Township	0.6
Center & Powell	-85.25124	42.63931	Barry	Hastings Township	0.6
Fiske & Fenn	-84.96107	41.89807	Branch	Coldwater Township	0.6
Marshall & Bidwell	-85.00076	42.00016	Branch	Girard Township	0.6
Dunks & Milligan	-85.23479	42.01427	Branch	Sherwood Township	0.6
Litchfield & Clarendon	-84.86531	42.04384	Branch	Butler Township	0.6
Coldwater & Saint Joseph	-85.13435	42.06490	Branch	Union Township	0.6
Copeland & Fremont	-84.93205	41.79641	Branch	California Township	0.6
Centennial & Warren	-84.98064	41.84336	Branch	Ovid Township	0.6
Central & Centennial	-84.98053	41.86914	Branch	Ovid Township	0.6
Wayne & Corey	-85.18500	41.87086	Branch	City of Bronson	0.6
Holcomb & S Avenue A	-85.23409	42.08650	Calhoun	Athens Township	0.6
N Main & Railroad	-84.98619	42.10081	Calhoun	Tekonsha Township	0.6
T S & E Jackson	-84.97389	42.10184	Calhoun	Tekonsha Township	0.6
S Sophia & Depot	-84.80782	42.13789	Calhoun	Homer Township	0.6
N Sophia & W Main	-84.80714	42.14569	Calhoun	Homer Township	0.6
K S & 5 Mile	-85.19762	42.16651	Calhoun	Leroy Township	0.6
D S & Sonoma	-85.21782	42.21732	Calhoun	Leroy Township	0.6
12 Mile & B S	-85.06085	42.23283	Calhoun	Fredonia Township	0.6
B N & 23 Mile	-84.84760	42.26152	Calhoun	Marengo Township	0.6
12 Mile & B N	-85.06136	42.26166	Calhoun	Marshall Township	0.6
13 Mile & E Michigan	-85.04258	42.28086	Calhoun	Marshall Township	0.6
H & Verona	-85.04766	42.30509	Calhoun	Marshall Township	0.6
Hamilton & Uldriks	-85.28017	42.40583	Calhoun	Bedford Township	0.6
Burr Oak & Clark	-85.52825	41.92249	St. Joseph	Nottawa Township	0.6
Roberts & Millard	-85.67317	41.93973	St. Joseph	Fabius Township	0.6
River & Covered Bridge	-85.52777	41.94048	St. Joseph	Nottawa Township	0.6
Wasepi & Nottawa	-85.44880	41.94095	St. Joseph	Nottawa Township	0.6
Heimbach & Buckhorn	-85.61597	41.99846	St. Joseph	Park Township	0.6
Clinton & Portage	-85.45181	42.01019	St. Joseph	Mendon Township	0.6
Marcellus & Buckhorn	-85.61630	42.02763	St. Joseph	Park Township	0.6

Intersection	X	Y	County	Municipality	Total Crashes per Year
Michigan & Fisher Lake	-85.56773	42.04223	St. Joseph	Park Township	0.6
Kalamazoo & Indian Prairie	-85.64325	41.78026	St. Joseph	White Pigeon Township	0.6
Dickinson & Blue School	-85.68193	41.80928	St. Joseph	Constantine Township	0.6
Dickinson & Constantine	-85.64320	41.80932	St. Joseph	Florence Township	0.6
Centerville & Mintdale	-85.42874	41.83825	St. Joseph	Sherman Township	0.6
Mintdale & Shimmel	-85.50636	41.83893	St. Joseph	Sherman Township	0.6
Mintdale & Balk	-85.46751	41.83916	St. Joseph	Sherman Township	0.6
Front & Halfway	-85.32130	41.84353	St. Joseph	Burr Oak Township	0.6
Angola & Fenn	-85.00487	41.89821	Branch	Coldwater Township	0.4
Lindley & Parham	-85.17578	41.91237	Branch	Batavia Township	0.4
Fremont & Dorrance	-84.93208	41.91248	Branch	Quincy Township	0.4
Dorrance & Willowbrook	-84.97098	41.91264	Branch	Coldwater Township	0.4
E Williams & S Avenue A	-85.23404	42.08432	Calhoun	Athens Township	0.4
E South & S Avenue A	-85.23407	42.08542	Calhoun	Athens Township	0.4

Top Rural Intersections by Fatal Crashes (Non-Trunkline)

Top 10 per County (less if int. with no crashes). Does not include intersection whose one leg is a state trunkline.

Intersection	X	Y	County	Municipality	Fatal Crashes per Year
D & 2nd	-85.74662	42.37507	Kalamazoo	Alamo Township	0.4
Nottawa & Truckenmiller	-85.44864	41.92640	St. Joseph	Nottawa Township	0.2
B & Riverview	-85.56165	42.40539	Kalamazoo	Cooper Township	0.2
Center & Charlton Park	-85.21183	42.63960	Barry	Hastings Township	0.2
M N & 36th	-85.41368	42.25255	Kalamazoo	Charleston Township	0.2
Mercury & Michigan	-85.30133	42.26993	Kalamazoo	Charleston Township	0.2
36th & W	-85.41179	42.11495	Kalamazoo	Wakeshma Township	0.2
Patterson & 133rd	-85.54464	42.66025	Barry	Wayland Township	0.2
Brown & Broadway	-85.29063	42.75536	Barry	Carlton Township	0.2
13 Mile & W Michigan	-85.04258	42.28086	Calhoun	Marshall Township	0.2
V N & Uldriks	-85.28017	42.40583	Calhoun	Bedford Township	0.2
Cloverdale & Cedar Creek	-85.32753	42.53702	Barry	Hope Township	0.2
Marshall & Dayburg	-85.00089	42.01470	Branch	Girard Township	0.2
R & 39th	-85.38372	42.18712	Kalamazoo	Climax Township	0.2
O & 38th	-85.39423	42.23058	Kalamazoo	Climax Township	0.2
Dickinson & Burke	-85.70133	41.80929	St. Joseph	Constantine Township	0.2
Block & Cranson	-85.07597	41.82582	Branch	Bethel Township	0.2
23 Mile & M N	-84.84837	42.34143	Calhoun	Lee Township	0.2

Top Rural Intersections by Injury Crashes (Non-Trunkline)

Top 10 per County (less if int. with no crashes). Does not include intersection whose one leg is a state trunkline.

Intersection	X	Y	County	Municipality	Injury Crashes per Year
U & 8th	-85.68670	42.14252	Kalamazoo	Prairie Ronde Township	1.4
D & 12th	-85.64914	42.37650	Kalamazoo	Cooper Township	1.0
S & 34th	-85.43231	42.17247	Kalamazoo	Pavilion Township	1.0
Almena & Van Kal	-85.76597	42.27537	Kalamazoo	Oshtemo Township	1.0
Center & Charlton Park	-85.21183	42.63960	Barry	Hastings Township	0.8
Whitneyville & 108th	-85.45572	42.76903	Barry	Thornapple Township	0.8
Fisher & Ray Quincy	-84.88345	41.88379	Branch	Algansee Township	0.8
Block & Central	-85.05834	41.86937	Branch	Ovid Township	0.8
Broadway & Carlton Center	-85.29064	42.72639	Barry	Carlton Township	0.6
Bass & Patterson	-85.54511	42.68144	Barry	Leighton Township	0.6
Lawrence & Assyria	-85.13643	42.56703	Barry	Maple Grove Township	0.6
Pine Lake & Norris	-85.45502	42.50857	Barry	Orangeville Township	0.6
Fenn & Centennial	-84.98050	41.89813	Branch	Coldwater Township	0.6
Copeland & Fremont	-84.93205	41.79641	Branch	California Township	0.6
Central & Centennial	-84.98053	41.86914	Branch	Ovid Township	0.6
48th & E C	-85.29881	42.39023	Calhoun	Bedford Township	0.6
B & Riverview	-85.56165	42.40539	Kalamazoo	Cooper Township	0.6
D & Douglas	-85.61027	42.37651	Kalamazoo	Cooper Township	0.6
D & 14th	-85.63006	42.37656	Kalamazoo	Cooper Township	0.6
V & 28th	-85.49035	42.12914	Kalamazoo	Brady Township	0.6
10th & S	-85.66721	42.17199	Kalamazoo	Texas Township	0.6
8th & X Y	-85.68489	42.09274	Kalamazoo	Prairie Ronde Township	0.6
Silver & Michigan	-85.52872	42.04245	St. Joseph	Mendon Township	0.6
Michigan & Parkville	-85.54822	42.04234	St. Joseph	Park Township	0.6
Patterson & 133rd	-85.54464	42.66025	Barry	Wayland Township	0.4
Gun Lake & Yankee Springs	-85.45814	42.60964	Barry	Yankee Springs Township	0.4
Head & Guernsey Lake	-85.39615	42.54469	Barry	Hope Township	0.4
Shultz & Lammers	-85.34579	42.58052	Barry	Hope Township	0.4
Copeland & Angola	-85.00504	41.79666	Branch	Kinderhook Township	0.4
Dunks & Milligan	-85.23479	42.01427	Branch	Sherwood Township	0.4
Angola & Fenn	-85.00487	41.89821	Branch	Coldwater Township	0.4
Southern & Fremont	-84.93226	41.77453	Branch	California Township	0.4
Parham & Cranson	-85.16498	41.82550	Branch	Bethel Township	0.4
D S & Sonoma	-85.21782	42.21732	Calhoun	Leroy Township	0.4
B N & 23 Mile	-84.84760	42.26152	Calhoun	Marengo Township	0.4
12 Mile & B N	-85.06136	42.26166	Calhoun	Marshall Township	0.4
G S & 8 Mile	-85.13880	42.19592	Calhoun	Newton Township	0.4
Division & 23 Mile	-84.84762	42.24686	Calhoun	Marengo Township	0.4
Farrand & Colon	-85.33913	41.96556	St. Joseph	Colon Township	0.4
River & Covered Bridge	-85.52777	41.94048	St. Joseph	Nottawa Township	0.4
Marcellus & Buckhorn	-85.61630	42.02763	St. Joseph	Park Township	0.4
Dickinson & Blue School	-85.68193	41.80928	St. Joseph	Constantine Township	0.4

Intersection	X	Y	County	Municipality	Injury Crashes per Year
Dickinson & Constantine	-85.64320	41.80932	St. Joseph	Florence Township	0.4
Mintdale & Balk	-85.46751	41.83916	St. Joseph	Sherman Township	0.4
Featherstone & Constantine	-85.64361	41.85290	St. Joseph	Florence Township	0.4
Featherstone & Shimmel	-85.50651	41.85350	St. Joseph	Sherman Township	0.4
V N & Uldriks	-85.28017	42.40583	Calhoun	Bedford Township	0.2
L S & 17 Mile	-84.96238	42.15949	Calhoun	Fredonia Township	0.2
H N & 28 Mile	-84.75713	42.30514	Calhoun	Sheridan Township	0.2
Meachem & Uldriks	-85.27984	42.39494	Calhoun	Bedford Township	0.2

Top Segments by Total Crash Rate (Trunkline)

Top 10 per County. Includes state trunkline only, and no segment shorter than 300ft.

Non-Deer/Non-Animal

Road Name	PR	Beginning Mile Point	Ending Mile Point	Framework	Length (mi)	County	Total Crash Rate (100 MVM)	Total Crashes
King Hwy (Business I-94)	6906	0.390	0.462	14a	0.07	Kalamazoo	2209.1	32
Broad St (Business US-131)	238202	0.000	0.071	14a	0.07	St Joseph	2205.0	6
W Main St (M-43)	21502	6.032	6.100	14a	0.07	Kalamazoo	1529.7	56
S Washington St (Business US-131)	238201	5.981	6.044	14a	0.06	St Joseph	1269.7	4
N Eaton St (Business I-94)	1297402	11.206	11.274	14a	0.07	Calhoun	1173.6	10
S Westnedge Ave (Business US-131)	10208	2.773	2.873	14a	0.10	Kalamazoo	1155.6	57
W Main St (M-43)	21502	5.534	5.600	14a	0.07	Kalamazoo	1084.1	37
S Westnedge Ave (Business US-131)	10208	5.097	5.158	14a	0.06	Kalamazoo	1056.7	14
Stadium Dr (Business I-94)	22207	6.637	6.696	14a	0.06	Kalamazoo	1055.2	32
Riverview Dr (M-43)	8403	0.256	0.339	14a	0.08	Kalamazoo	1041.7	27
W Chicago Rd (US-12)	232106	12.986	13.062	14a	0.08	St Joseph	1013.5	10
S Washington St (Business US-131)	238201	5.886	5.966	14a	0.08	St Joseph	999.9	4
Broad St (Business US-131)	238202	0.271	0.371	14a	0.10	St Joseph	976.4	5
E Michigan Ave (M-60)	3750035	1.003	1.064	14a	0.06	St Joseph	965.9	5
S Park St (Business US-131)	5007	0.347	0.405	14a	0.06	Kalamazoo	865.9	10
E Chicago St (US-12)	923007	19.414	19.472	14a	0.06	Branch	860.7	18
S Westnedge Ave (Business US-131)	10208	4.088	4.150	14a	0.06	Kalamazoo	837.8	23
S Westnedge Ave (Business US-131)	10208	4.779	4.873	14a	0.09	Kalamazoo	832.7	17
E Chicago St (US-12)	923007	17.714	17.783	14a	0.07	Branch	829.5	13
N Superior St (M-99)	1296305	7.055	7.127	14a	0.07	Calhoun	821.9	6
Broad St (Business US-131)	238202	0.171	0.235	14a	0.06	St Joseph	815.4	2
W Chicago Rd (US-12)	232106	17.262	17.329	14a	0.07	St Joseph	771.7	9
28 Mile Rd (M-99)	1296305	4.752	4.852	14a	0.10	Calhoun	763.7	2
W Chicago St (US-12)	923007	16.800	16.865	14a	0.06	Branch	745.1	11
E Michigan Ave (M-60)	3750035	0.920	1.003	14a	0.08	St Joseph	716.5	11
E Chicago St (US-12)	923007	19.072	19.172	14a	0.10	Branch	711.4	26
W Chicago Rd (US-12)	232106	5.100	5.160	14a	0.06	St Joseph	709.9	4
E Chicago St (US-12)	923007	19.872	19.941	14a	0.07	Branch	683.3	17
Capital Ave NE (M-66)	3130086	0.902	0.962	14a	0.06	Calhoun	675.9	9
E Columbia Ave (M-96)	1297108	4.270	4.365	14a	0.10	Calhoun	675.2	23
E Michigan Ave (Business I-94)	3130975	2.194	2.258	14a	0.06	Calhoun	645.2	4
E Michigan Ave (Business I-94)	3130975	0.919	0.994	14a	0.08	Calhoun	636.7	4
E Michigan Ave (Business I-94)	1301102	2.063	2.123	14a	0.06	Calhoun	616.4	8
W Michigan Ave (Business I-94)	1301102	1.298	1.359	14a	0.06	Calhoun	610.3	11
W Chicago St (US-12)	923007	23.310	23.372	14a	0.06	Branch	592.2	5
E Chicago St (US-12)	923007	19.492	19.572	14a	0.08	Branch	589.3	17
N Superior St (M-99)	1296305	6.805	7.035	14a	0.23	Calhoun	557.4	13
E Carlton Center Rd (M-43)	983603	2.417	2.477	14a	0.06	Barry	532.2	1
E Carlton Center Rd (M-43)	983603	1.917	1.978	14a	0.06	Barry	523.5	1
E Carlton Center Rd (M-43)	983603	5.217	5.278	14a	0.06	Barry	523.5	1
W Chicago St (US-12)	923007	7.300	7.400	14a	0.10	Branch	499.4	5
W Chicago St (US-12)	923007	17.636	17.700	14a	0.06	Branch	481.6	7
W Chicago St (US-12)	923007	23.882	23.943	14a	0.06	Branch	481.5	4
M-66	984110	2.100	2.200	14a	0.10	Barry	456.6	2
E Carlton Center Rd (M-43)	983603	6.837	6.917	14a	0.08	Barry	399.1	1

Road Name	PR	Beginning Mile Point	Ending Mile Point	Framework	Length (mi)	County	Total Crash Rate (100 MVM)	Total Crashes
E Carlton Center Rd (M-43)	984708	0.000	1.014	14a	1.01	Barry	373.0	24
W Gulf Lake Dr (M-66)	984110	0.800	0.863	14a	0.06	Barry	362.4	1
M-66	984110	8.100	8.164	14a	0.06	Barry	356.7	1
E Carlton Center Rd (M-43)	983603	4.117	4.217	14a	0.10	Barry	319.3	1
E Carlton Center Rd (M-43)	983603	4.317	4.417	14a	0.10	Barry	319.3	1

Top Segments by Fatal Crash Rate (Trunkline)

Top 10 per County (less if no crashes). Includes state trunkline only, and no segment shorter than 300ft.
Non-Deer/Non-Animal

Road Name	PR	Beginning Mile Point	Ending Mile Point	Framework	Length (mi)	County	Fatal Crash Rate (100 MVM)	Fatal Crashes
M-66	984110	0.800	0.863	14a	0.06	Barry	362.4	1
E Michigan Ave (Business I-94)	3130975	0.294	0.355	14a	0.06	Calhoun	203.2	1
S Washington St (Business US-131)	238201	4.981	5.081	14a	0.10	St Joseph	200.0	1
Business US-131	9308	1.500	1.600	14a	0.10	Kalamazoo	120.0	2
W Chicago Rd (US-12)	923007	14.100	14.175	14a	0.08	Branch	112.4	1
US-131	238201	1.931	2.000	14a	0.07	St Joseph	103.9	1
E Chicago Rd (US-12)	232106	20.462	20.562	14a	0.10	St Joseph	98.8	1
W Chicago Rd (US-12)	232106	12.272	12.362	14a	0.09	St Joseph	85.6	1
E Chicago Rd (US-12)	923007	25.072	25.172	14a	0.10	Branch	73.4	1
W Chicago Rd (US-12)	232106	15.762	15.862	14a	0.10	St Joseph	57.4	1
Helmer Rd (M-96)	1296603	4.634	4.706	14a	0.07	Calhoun	51.2	1
E Columia Ave (M-96)	1297108	4.775	4.865	14a	0.09	Calhoun	31.0	1
US-131	15007	2.200	2.300	14a	0.10	Kalamazoo	30.4	1
I-69	1295602	0.000	0.100	14a	0.10	Calhoun	28.1	1
US-131	15007	15.995	16.066	14a	0.07	Kalamazoo	25.2	1
I-69	1295602	23.813	23.913	14a	0.10	Calhoun	23.7	1
US-131	15007	16.166	16.245	14a	0.08	Kalamazoo	22.7	1
I-69	1295602	16.813	16.913	14a	0.10	Calhoun	22.0	1
Battle Creek Hwy (M-78)	984706	0.000	0.816	14a	0.82	Barry	20.5	1
I-194	1296702	1.680	1.780	14a	0.10	Calhoun	19.6	1
Durkee St (M-66)	984303	3.139	3.891	14a	0.75	Barry	19.2	1
US-131	15007	3.028	3.100	14a	0.07	Kalamazoo	18.5	1
I-94	1296506	25.397	25.497	14a	0.10	Calhoun	16.7	1
I-94	1296506	26.197	26.297	14a	0.10	Calhoun	16.7	1
US-131	15007	21.766	21.866	14a	0.10	Kalamazoo	16.6	1
US-131	15007	22.066	22.166	14a	0.10	Kalamazoo	16.6	1
Durkee St (M-66)	984303	3.891	4.661	14a	0.77	Barry	16.4	1
N Nottawa Rd (M-66)	238204	3.631	4.156	14a	0.53	St Joseph	15.9	1
Mendon Rd (M-60)	922904	0.000	1.125	14a	1.13	Branch	13.9	1
W Michigan Ave (M-89)	1298109	2.956	3.868	14a	0.91	Calhoun	13.6	3
I-94	14903	21.382	21.482	14a	0.10	Kalamazoo	11.7	1
M-37	982506	10.978	12.872	14a	1.89	Barry	10.9	2
S Centerville Rd (M-66)	238008	0.000	0.496	14a	0.50	St Joseph	10.4	1
E Main St (M-60)	3750037	10.642	12.384	14a	1.74	St Joseph	7.0	1
M-103	231906	0.792	3.055	14a	2.26	St Joseph	6.2	1
S Hanover St (M-37)	982805	1.490	2.466	14a	0.98	Barry	6.2	1
M-60	3750037	1.719	4.538	14a	2.82	St Joseph	5.9	1
Colon Rd (M-86)	922610	0.000	5.062	14a	5.06	Branch	5.6	1
E Michigan Ave (M-96)	6906	3.843	5.894	14a	2.05	Kalamazoo	5.4	1
M-37	982805	0.000	1.490	14a	1.49	Barry	5.0	1
W Dickman Rd (M-96)	1410	6.698	8.339	14a	1.64	Kalamazoo	4.9	1
W State St (M-37)	983402	0.000	0.926	14a	0.93	Barry	4.4	1
Chief Noonday Rd (M-179)	988709	0.000	10.834	14a	10.83	Barry	4.2	3
M-43	984708	1.014	5.986	14a	4.97	Barry	3.2	1

Top Segments by Injury Crash Rate (Trunkline)

Top 10 per County. Includes state trunkline only, and no segment shorter than 300ft.

Non-Deer/Non-Animal

Road Name	PR	Beginning Mile Point	Ending Mile Point	Framework	Length (mi)	County	Injury Crash Rate (100 MVM)	Injury Crashes
Broad St (Business US-131)	238202	0.000	0.071	14a	0.07	St Joseph	735.0	2
E Carlton Center Rd (M-43)	983603	1.917	1.978	14a	0.06	Barry	523.5	1
E Carlton Center Rd (M-43)	983603	5.217	5.278	14a	0.06	Barry	523.5	1
E Carlton Center Rd (M-43)	983603	6.837	6.917	14a	0.08	Barry	399.1	1
Broad St (Business US-131)	238202	0.271	0.371	14a	0.10	St Joseph	390.6	2
28 Mile Rd (M-99)	1296305	4.652	4.752	14a	0.10	Calhoun	381.8	1
E Carlton Center Rd (M-43)	983603	4.917	5.017	14a	0.10	Barry	319.3	1
E Carlton Center Rd (M-43)	983603	8.017	8.117	14a	0.10	Barry	319.3	1
W Chicago Rd (US-12)	923007	2.300	2.371	14a	0.07	Branch	318.0	2
S Washington St (Business US-131)	238201	5.981	6.044	14a	0.06	St Joseph	317.4	1
W Chicago Rd (US-12)	232106	12.986	13.062	14a	0.08	St Joseph	304.0	3
US-131	238201	1.800	1.900	14a	0.10	St Joseph	286.8	4
W Main St (M-43)	21502	4.300	4.400	14a	0.10	Kalamazoo	283.3	14
S Washington St (Business US-131)	238201	5.810	5.881	14a	0.07	St Joseph	281.7	1
M-99	1301707	0.500	0.600	14a	0.10	Calhoun	277.6	1
M-99	1301707	1.900	2.000	14a	0.10	Calhoun	277.6	1
W Main St (M-43)	21502	6.032	6.100	14a	0.07	Kalamazoo	273.2	10
F-Drive S (M-227)	1295909	0.792	0.892	14a	0.10	Calhoun	269.7	1
M-66	984110	8.600	8.687	14a	0.09	Barry	262.4	1
US-131	238201	1.718	1.800	14a	0.08	St Joseph	262.4	3
E Michigan Ave (Business I-94)	3130975	0.794	0.891	14a	0.10	Calhoun	246.1	2
W Chicago Rd (US-12)	923007	23.882	23.943	14a	0.06	Branch	240.8	2
Capital Ave NE (M-66)	3130086	1.497	1.572	14a	0.08	Calhoun	240.3	4
W Chicago Rd (US-12)	923007	23.310	23.372	14a	0.06	Branch	236.9	2
W Chicago Rd (US-12)	923007	15.700	15.775	14a	0.08	Branch	229.0	3
M-66	984110	8.400	8.500	14a	0.10	Barry	228.3	1
M-66	984110	3.000	3.100	14a	0.10	Barry	228.3	1
W Michigan Ave (Business I-94)	1301102	1.298	1.359	14a	0.06	Calhoun	221.9	4
11 Mile Rd (M-311)	1317710	10.689	10.773	14a	0.08	Calhoun	220.2	1
E Columbia Ave (M-96)	1297108	7.489	7.565	14a	0.08	Calhoun	219.2	4
W Dickman Rd (Business I-94)	1296303	3.846	3.905	14a	0.06	Calhoun	214.6	3
W Chicago Rd (US-12)	232106	1.600	1.700	14a	0.10	St Joseph	213.0	2
E Chicago Rd (US-12)	923007	6.900	6.968	14a	0.07	Branch	212.5	2
King Hwy (Business I-94)	6906	0.390	0.462	14a	0.07	Kalamazoo	207.1	3
N Westnedge Ave (Business US-131)	10208	6.999	7.056	14a	0.06	Kalamazoo	205.8	1
S Washington St (Business US-131)	238201	4.981	5.081	14a	0.10	St Joseph	200.0	1
W Chicago Rd (US-12)	923007	7.300	7.400	14a	0.10	Branch	199.8	2
E Chicago Rd (US-12)	232106	20.162	20.262	14a	0.10	St Joseph	197.5	2
W Chicago Rd (US-12)	923007	17.714	17.783	14a	0.07	Branch	191.4	3
E Chicago Rd (US-12)	923007	19.414	19.472	14a	0.06	Branch	191.3	4
E Chicago Rd (US-12)	923007	24.372	24.455	14a	0.08	Branch	176.9	2
Division St (Business I-69)	924202	3.343	3.400	14a	0.06	Branch	168.7	1
N Park St (Business US-131)	9308	0.131	0.196	14a	0.07	Kalamazoo	165.8	2
Stadium Dr (Business I-94)	22207	6.637	6.696	14a	0.06	Kalamazoo	164.9	5
W Main St (M-43)	21502	5.534	5.600	14a	0.07	Kalamazoo	146.5	5

Road Name	PR	Beginning Mile Point	Ending Mile Point	Framework	Length (mi)	County	Injury Crash Rate (100 MVM)	Injury Crashes
S Westnedge Ave (Business US-131)	10208	4.088	4.150	14a	0.06	Kalamazoo	145.7	4
W Main St (M-43)	21502	4.400	4.500	14a	0.10	Kalamazoo	141.6	7
W Gulf Lake Dr (M-43)	984708	0.000	1.014	14a	1.01	Barry	139.9	9
W Park St (US-131)	9308	0.814	0.900	14a	0.09	Kalamazoo	135.3	1
Lawrence Hwy (M-79)	3081377	0.063	1.043	14a	0.98	Barry	86.6	4

Top Segments by Total Crashes (Trunkline)

Top 10 per County. Includes state trunkline only.

Non-Deer/Non-Animal

Road Name	PR	Beginning Mile Point	Ending Mile Point	Framework	Length (mi)	County	Total Crashes per Year
N US-131	22308	0.000	0.320	14a	0.32	Kalamazoo	25.2
W Main St (M-43)	21502	5.534	5.851	14a	0.32	Kalamazoo	23.4
W Main St (M-43)	21502	4.286	5.036	14a	0.75	Kalamazoo	21.2
N US-131	22301	0.322	0.401	14a	0.08	Kalamazoo	18.0
Gull Rd (M-43)	7407	0.388	0.692	14a	0.30	Kalamazoo	17.6
W Main St (M-43)	21502	6.032	6.244	14a	0.21	Kalamazoo	16.2
S Westnedge Ave	10208	2.773	2.952	14a	0.18	Kalamazoo	14.8
Stadium Dr (Business I-94)	22207	6.696	7.117	14a	0.42	Kalamazoo	14.2
W I-94	26005	19.750	20.767	14a	1.02	Kalamazoo	10.6
E I-94	14903	19.754	20.782	14a	1.03	Kalamazoo	10.2
E Chicago St (US-12)	923007	19.648	19.941	14a	0.29	Branch	9.2
W I-94	1297009	7.923	8.445	14a	0.52	Calhoun	9.0
E Chicago St (US-12)	923007	19.049	19.189	14a	0.14	Branch	8.2
E I-94	1296506	8.446	9.656	14a	1.21	Calhoun	8.2
W I-94	1297009	8.445	9.658	14a	1.21	Calhoun	6.6
E I-94	1296506	0.083	0.332	14a	0.25	Calhoun	6.2
W I-94	1297009	13.089	14.344	14a	1.26	Calhoun	6.2
E I-94	1296506	9.656	10.015	14a	0.36	Calhoun	6.0
E Chicago St (US-12)	923007	19.414	19.492	14a	0.08	Branch	5.8
E I-94	1296506	4.327	4.935	14a	0.61	Calhoun	5.8
W I-94	1297009	0.092	0.321	14a	0.23	Calhoun	5.8
W I-94	1297009	11.270	11.627	14a	0.36	Calhoun	5.8
E I-94	1296506	14.371	15.147	14a	0.78	Calhoun	5.6
E Chicago St (US-12)	923007	18.919	19.049	14a	0.13	Branch	5.4
E Chicago St (US-12)	923007	19.492	19.648	14a	0.16	Branch	4.6
M-37	983110	13.001	13.849	14a	0.85	Barry	3.8
M-43	983402	1.157	1.500	14a	0.34	Barry	3.4
E Chicago St (US-12)	923007	17.960	18.047	14a	0.09	Branch	3.4
E Chicago St (US-12)	923007	18.630	18.757	14a	0.13	Branch	3.4
W Chicago Rd (US 12)	232106	15.321	16.213	14a	0.89	St Joseph	3.2
M-37	983110	0.651	1.231	14a	0.58	Barry	3.0
M-37	983110	12.413	12.863	14a	0.45	Barry	3.0
W Chicago St (US-12)	923007	16.590	16.865	14a	0.27	Branch	3.0
W Chicago Rd (US 12)	232106	13.311	14.314	14a	1.00	St Joseph	3.0
E Chicago Rd (US 12)	232106	20.413	20.940	14a	0.53	St Joseph	3.0
S Centerville Rd (M-66)	238008	2.505	2.659	14a	0.15	St Joseph	3.0
M-37	982805	0.000	0.918	14a	0.92	Barry	2.8
E Chicago St (US-12)	923007	19.189	19.316	14a	0.13	Branch	2.8
E Chicago Rd (US-12)	923007	22.563	23.051	14a	0.49	Branch	2.8
W Chicago Rd (US 12)	232106	12.986	13.311	14a	0.32	St Joseph	2.8
W Chicago Rd (US 12)	232106	17.076	17.329	14a	0.25	St Joseph	2.8
W State St (M-37)	983402	0.228	0.453	14a	0.23	Barry	2.6
S Centerville Rd (M-66)	238008	1.753	2.004	14a	0.25	St Joseph	2.6

Road Name	PR	Beginning Mile Point	Ending Mile Point	Framework	Length (mi)	County	Total Crashes per Year
US 131	238201	1.718	1.926	14a	0.21	St Joseph	2.6
W Michigan Ave (M-60)	3750035	0.009	0.137	14a	0.13	St Joseph	2.6
W Michigan Ave (M-60)	3750035	0.248	0.378	14a	0.13	St Joseph	2.6
W State St (M-37)	983402	0.453	0.636	14a	0.18	Barry	2.2
M-43	983008	2.069	2.537	14a	0.47	Barry	2.0
S Hanover St (M-37)	982805	2.026	2.091	14a	0.07	Barry	1.8
N Middleville Rd (M 37)	983110	2.461	3.046	14a	0.59	Barry	1.8

Top Segments by Fatal Crashes (Trunkline)

Top 10 per County (less if no crashes). Includes state trunkline only.

Non-Deer/Non-Animal

Road Name	PR	Beginning Mile Point	Ending Mile Point	Framework	Length (mi)	County	Fatal Crashes per Year
Chief Noonday Rd (M-179)	988709	1.931	2.504	14a	0.57	Barry	0.4
W Chicago Rd (US-12)	923007	14.047	14.175	14a	0.13	Branch	0.4
N US-131	15007	15.995	16.245	14a	0.25	Kalamazoo	0.4
N Busisness US-131	9308	1.325	1.666	14a	0.34	Kalamazoo	0.4
White Pigeon Rd (Business US-131)	238201	4.777	5.232	14a	0.46	St Joseph	0.4
S Hanover St (M-37)	982805	0.000	0.918	14a	0.92	Barry	0.2
S Hanover St (M-37)	982805	1.729	1.985	14a	0.26	Barry	0.2
N Middleville Rd (M-37)	983110	3.476	4.354	14a	0.88	Barry	0.2
M-37	982506	12.771	12.872	14a	0.10	Barry	0.2
M-37	983110	10.959	11.491	14a	0.53	Barry	0.2
M-37	982506	12.600	12.771	14a	0.17	Barry	0.2
M-43	984708	9.541	9.754	14a	0.21	Barry	0.2
Chief Noonday Rd (M-179)	988709	1.701	1.931	14a	0.23	Barry	0.2
S Grove St (M-43)	984708	5.608	5.986	14a	0.38	Barry	0.2
E Chicago St (US-12)	923007	24.861	25.622	14a	0.76	Branch	0.2
E Chicago St (US-12)	923007	24.530	24.861	14a	0.33	Branch	0.2
Mendon Rd (M-66)	922904	0.000	1.125	14a	1.13	Branch	0.2
W Colon Rd (M-86)	922610	1.624	2.377	14a	0.75	Branch	0.2
S I-194	1301610	3.056	3.465	14a	0.41	Calhoun	0.2
E I-94	1296506	13.375	14.371	14a	1.00	Calhoun	0.2
W I-94	1297009	25.143	26.045	14a	0.90	Calhoun	0.2
E I-94	1296506	10.356	11.275	14a	0.92	Calhoun	0.2
E I-94	1296506	25.143	26.045	14a	0.90	Calhoun	0.2
W I-94	1297009	12.494	12.851	14a	0.36	Calhoun	0.2
N I-194	1296702	1.596	2.723	14a	1.13	Calhoun	0.2
Columbia Ave E (M-96)	1297108	4.775	4.871	14a	0.10	Calhoun	0.2
Michigan Ave W (M-89)	1298109	1.675	1.956	14a	0.28	Calhoun	0.2
N I-69	1295602	23.220	25.012	14a	1.79	Calhoun	0.2
W Main St (M-43)	21502	4.034	4.286	14a	0.25	Kalamazoo	0.2
W I-94	26005	8.232	8.899	14a	0.67	Kalamazoo	0.2
W I-94	26005	17.187	17.868	14a	0.68	Kalamazoo	0.2
W I-94	26005	15.947	17.143	14a	1.20	Kalamazoo	0.2
W I-94	14701	0.000	0.294	14a	0.29	Kalamazoo	0.2
N US-131	15007	21.568	21.891	14a	0.32	Kalamazoo	0.2
Gull Rd (M-43)	7407	3.483	3.662	14a	0.18	Kalamazoo	0.2
E I-94	14903	4.755	5.112	14a	0.36	Kalamazoo	0.2
W Chicago Rd (US-12)	232106	15.321	16.213	14a	0.89	St Joseph	0.2
E Chicago Rd (US-12)	232106	20.413	20.940	14a	0.53	St Joseph	0.2
M-103	231906	0.815	1.540	14a	0.73	St Joseph	0.2
US-131	238201	1.931	2.408	14a	0.48	St Joseph	0.2
W Chicago Rd (US-12)	232106	12.272	12.986	14a	0.71	St Joseph	0.2
S Centerville Rd (M-66)	238008	0.134	0.496	14a	0.36	St Joseph	0.2
S Centerville Rd (M-66)	238008	1.337	1.476	14a	0.14	St Joseph	0.2

Road Name	PR	Beginning Mile Point	Ending Mile Point	Framework	Length (mi)	County	Fatal Crashes per Year
E Main St (M-60)	3750037	10.642	11.402	14a	0.76	St Joseph	0.2
Marcellus Rd (M-216)	238002	2.832	3.084	14a	0.25	St Joseph	0.2

Top Segments by Injury Crashes (Trunkline)

Top 10 per County. Includes state trunkline only.

Non-Deer/Non-Animal

Road Name	PR	Beginning Mile Point	Ending Mile Point	Framework	Length (mi)	County	Injury Crashes per Year
W Main St (M-43)	21502	4.286	5.036	14a	0.75	Kalamazoo	6.8
W Main St (M-43)	21502	5.534	5.851	14a	0.32	Kalamazoo	3.0
W I-94	26005	8.232	8.899	14a	0.67	Kalamazoo	2.8
Stadium Dr (Business I-94)	22207	6.696	7.117	14a	0.42	Kalamazoo	2.8
W I-94	26005	19.750	20.767	14a	1.02	Kalamazoo	2.8
E I-94	14903	21.662	23.050	14a	1.39	Kalamazoo	2.8
W Main St (M-43)	21502	6.032	6.244	14a	0.21	Kalamazoo	2.4
E I-94	14903	19.754	20.782	14a	1.03	Kalamazoo	2.4
E I-94	14903	14.230	15.301	14a	1.07	Kalamazoo	2.4
N US-131	22301	0.322	0.401	14a	0.08	Kalamazoo	2.2
E I-94	1296506	0.083	0.332	14a	0.25	Calhoun	1.8
N I-69	1295602	4.358	5.685	14a	1.33	Calhoun	1.8
E Chicago St (US-12)	923007	19.648	19.941	14a	0.29	Branch	1.6
W I-94	1297009	7.923	8.445	14a	0.52	Calhoun	1.4
E I-94	1296506	4.327	4.935	14a	0.61	Calhoun	1.4
W Chicago Rd (US-12)	232106	15.321	16.213	14a	0.89	St Joseph	1.4
US-131	238201	1.718	1.926	14a	0.21	St Joseph	1.4
E Chicago St (US-12)	923007	19.049	19.189	14a	0.14	Branch	1.2
E Chicago St (US-12)	923007	19.414	19.492	14a	0.08	Branch	1.2
E I-94	1296506	13.375	14.371	14a	1.00	Calhoun	1.2
W I-94	1297009	8.445	9.658	14a	1.21	Calhoun	1.2
W I-94	1297009	11.270	11.627	14a	0.36	Calhoun	1.2
E I-94	1296506	0.975	1.400	14a	0.43	Calhoun	1.2
W I-94	1297009	15.846	16.183	14a	0.34	Calhoun	1.2
Michigan Ave E (M-96)	3130975	5.384	6.069	14a	0.69	Calhoun	1.2
W Chicago Rd (US-12)	232106	13.311	14.314	14a	1.00	St Joseph	1.2
Chief Noonday Rd (M-179)	988709	1.931	2.504	14a	0.57	Barry	1.0
N Middleville Rd (M-37)	983110	13.001	13.849	14a	0.85	Barry	1.0
N Middleville Rd (M-37)	983110	0.651	1.231	14a	0.58	Barry	1.0
N Middleville Rd (M-37)	983110	12.413	12.863	14a	0.45	Barry	1.0
M-37	982506	3.615	3.877	14a	0.26	Barry	1.0
M-60	3750037	0.822	1.038	14a	0.22	St Joseph	1.0
S Hanover St (M-37)	982805	0.000	0.918	14a	0.92	Barry	0.8
E Richplain Dr (M-89)	982503	0.000	1.017	14a	1.02	Barry	0.8
M-37	982506	9.062	9.574	14a	0.51	Barry	0.8
M-79	3081377	0.064	0.727	14a	0.66	Barry	0.8
E Chicago Rd (US-12)	923007	22.563	23.051	14a	0.49	Branch	0.8
E Chicago Rd (US-12)	923007	20.674	21.055	14a	0.38	Branch	0.8
E Chicago St (US-12)	923007	6.813	6.968	14a	0.16	Branch	0.8
W Chicago Rd (US-12)	232106	19.495	20.413	14a	0.92	St Joseph	0.8
W Chicago Rd (US-12)	232106	2.139	3.150	14a	1.01	St Joseph	0.8
Marcellus Rd (M-216)	238002	2.430	2.832	14a	0.40	St Joseph	0.8
Marcellus Rd (M-216)	238002	2.272	2.430	14a	0.16	St Joseph	0.8

Road Name	PR	Beginning Mile Point	Ending Mile Point	Framework	Length (mi)	County	Injury Crashes per Year
N Nottawa Rd (M-66)	238204	4.512	4.899	14a	0.39	St Joseph	0.8
W State St (M-43)	983402	1.157	1.500	14a	0.34	Barry	0.6
E Chicago St (US-12)	923007	18.919	19.049	14a	0.13	Branch	0.6
E Chicago St (US-12)	923007	19.492	19.648	14a	0.16	Branch	0.6
W Chicago St (US-12)	923007	16.590	16.865	14a	0.27	Branch	0.6
W Chicago St (US-12)	923007	17.714	17.783	14a	0.07	Branch	0.6
W Chicago Rd (US-12)	232106	12.986	13.311	14a	0.32	St Joseph	0.6

Top Urban Intersections by Total Crashes (Trunkline)

Top 10 per County. Includes intersections where at least one leg is a trunkline.

Intersection	X	Y	County	Municipality	Total Crashes per Year
Beckley & M-66	-85.18107	42.26106	Calhoun	City of Battle Creek	36.0
Stadium & Howard	-85.61421	42.27631	Kalamazoo	City of Kalamazoo	35.6
Stadium & Drake	-85.64832	42.26971	Kalamazoo	City of Kalamazoo	28.8
Main & Drake	-85.64817	42.29630	Kalamazoo	City of Kalamazoo	28.0
Sprinkle & Gull	-85.52221	42.32323	Kalamazoo	Comstock Township	25.4
Columbia & Capital Ave	-85.19939	42.29857	Calhoun	City of Battle Creek	23.4
Riverview & Gull	-85.56937	42.30099	Kalamazoo	City of Kalamazoo	21.8
Kalamazoo & Park	-85.58738	42.29444	Kalamazoo	City of Kalamazoo	20.6
Michigan & Westnedge	-85.58975	42.29157	Kalamazoo	City of Kalamazoo	20.4
Main & Maple Hill	-85.65788	42.29611	Kalamazoo	Oshtemo Township	19.8
Bedford & W Michigan	-85.23014	42.34439	Calhoun	City of Battle Creek	19.4
Michigan & Allen	-85.59371	42.29120	Kalamazoo	City of Kalamazoo	18.4
Westnedge & Kilgore	-85.58963	42.24514	Kalamazoo	City of Kalamazoo	17.2
Helmer & Bedford	-85.23906	42.31861	Calhoun	City of Battle Creek	13.6
Dickman & Capital Ave SW	-85.18838	42.31606	Calhoun	City of Battle Creek	10.4
M-60 & Michigan	-85.65170	41.94248	St. Joseph	Fabius Township	10.4
E Chicago & Willowbrook	-84.97004	41.93563	Branch	City of Coldwater	10.2
Columbia & Riverside	-85.18953	42.29859	Calhoun	City of Battle Creek	10.2
W Dickman & S Washington	-85.19421	42.31854	Calhoun	City of Battle Creek	9.8
Helmer & W Columbia	-85.23843	42.29735	Calhoun	City of Battle Creek	9.8
S 20th & W Columbia	-85.21881	42.29763	Calhoun	City of Battle Creek	9.6
M-60 & Millard	-85.65170	41.93977	St. Joseph	City of Three Rivers	9.6
Michigan & Washington	-85.19055	42.32425	Calhoun	City of Battle Creek	9.4
E Chicago & Michigan	-84.98090	41.93741	Branch	City of Coldwater	9.2
M-60 & Broadway	-85.65168	41.93257	St. Joseph	City of Three Rivers	9.0
Chicago & Division	-85.00075	41.94064	Branch	City of Coldwater	8.2
W State & N Broadway	-85.29066	42.64872	Barry	City of Hastings	8.0
US-131 & Main	-85.63518	41.97202	St. Joseph	Lockport Township	8.0
Chicago & Centerville	-85.42842	41.79812	St. Joseph	City of Sturgis	7.6
N Broadway & Apple St	-85.29066	42.64967	Barry	City of Hastings	7.2
N Bradoway & W State	-85.29071	42.65389	Barry	City of Hastings	7.0
W State & Heath	-85.31971	42.64649	Barry	Rutland Township	6.2
Centerville & Fawn River	-85.42820	41.78135	St. Joseph	City of Sturgis	6.0
E Chicago & Fiske	-84.96151	41.93429	Branch	City of Coldwater	5.8
E Chicago & S I-69	-84.97577	41.93658	Branch	City of Coldwater	5.6
E Chicago & Jefferson	-84.99744	41.94011	Branch	City of Coldwater	5.4
W State & Industrial Park	-85.30315	42.64866	Barry	City of Hastings	5.2
E Chicago & N I-69	-84.97151	41.93590	Branch	City of Coldwater	5.2
Michigan & Main	-85.63274	41.94406	St. Joseph	City of Three Rivers	5.2
US-131 & Hoffman	-85.64679	41.95407	St. Joseph	Fabius Township	5.2
E Chicago & S Sprague	-84.99063	41.93899	Branch	City of Coldwater	5.0
Centerville & South	-85.42832	41.78863	St. Joseph	City of Sturgis	5.0

Intersection	X	Y	County	Municipality	Total Crashes per Year
S Broadway & E Green	-85.29062	42.64592	Barry	City of Hastings	4.8
Main & Hoffman	-85.63473	41.95468	St. Joseph	City of Three Rivers	4.8
S Michigan & W Green	-85.28611	42.64597	Barry	City of Hastings	4.0
W State & N Market	-85.29515	42.64871	Barry	City of Hastings	3.8
Division & Pearl	-85.00111	41.93937	Branch	City of Coldwater	3.8
E Chicago & Hudson	-84.99909	41.94036	Branch	City of Coldwater	3.4
Gunn Lake & M-37	-85.33521	42.64576	Barry	Rutland Township	3.0
M-37 & Heath	-85.34339	42.65299	Barry	Rutland Township	2.6

Top Urban Intersections by Fatal Crashes (Trunkline)

Top 10 per County (less if no crashes). Includes intersections where at least one leg is a trunkline.

Intersection	X	Y	County	Municipality	Fatal Crashes per Year
M-43 & Heath	-85.31971	42.64649	Barry	Rutland Township	0.2
M-43 & W North	-85.29073	42.66341	Barry	City of Hastings	0.2
Dickman & S Washington	-85.19421	42.31854	Calhoun	City of Battle Creek	0.2
Superior & Austin	-84.75301	42.25063	Calhoun	City of Albion	0.2
W Dickman & Wyndtree	-85.26964	42.33228	Calhoun	City of Springfield	0.2
Capital Ave NE & J Bartlett	-85.15417	42.34412	Calhoun	Pennfield Township	0.2
Michigan & Parrott	-85.28234	42.36077	Calhoun	Bedford Township	0.2
Main & Maple Hill	-85.65788	42.29611	Kalamazoo	Oshtemo Township	0.2
Nazareth & Gull	-85.53618	42.31666	Kalamazoo	Kalamazoo Township	0.2
Kalamazoo & King Hwy	-85.57253	42.29475	Kalamazoo	City of Kalamazoo	0.2
Gull & E G	-85.50389	42.33270	Kalamazoo	Richland Township	0.2
Grand & Lyons	-85.63736	42.12154	Kalamazoo	Schoolcraft Township	0.2
Westnedge & Vine	-85.58957	42.28412	Kalamazoo	City of Kalamazoo	0.2
Business I-94 & Lake	-85.55264	42.28018	Kalamazoo	Kalamazoo Township	0.2
US-131 & Shaver	-85.63783	42.14585	Kalamazoo	Schoolcraft Township	0.2
Gull & Eastland	-85.53325	42.31800	Kalamazoo	Kalamazoo Township	0.2
Gull & 28th	-85.49342	42.34026	Kalamazoo	Richland Township	0.2
US-131 & Broadway	-85.65168	41.93257	St. Joseph	City of Three Rivers	0.2
US-131 & William R Monroe	-85.65203	41.92683	St. Joseph	Fabius Township	0.2

Top Urban Intersections by Injury Crashes (Trunkline)

Top 10 per County. Includes intersections where at least one leg is a trunkline.

Intersection	X	Y	County	Municipality	Injury Crashes per Year
M-66 & Beckley	-85.18107	42.26106	Calhoun	City of Battle Creek	6.0
Stadium & Howard	-85.61421	42.27631	Kalamazoo	City of Kalamazoo	5.4
W Michigan & Bedford	-85.23014	42.34439	Calhoun	City of Battle Creek	5.2
Main & Maple Hill	-85.65788	42.29611	Kalamazoo	Oshtemo Township	5.0
Drake & Main	-85.64817	42.29630	Kalamazoo	City of Kalamazoo	4.6
Stadium & Drake	-85.64832	42.26971	Kalamazoo	City of Kalamazoo	4.2
Dickman & Capital Ave	-85.18838	42.31606	Calhoun	City of Battle Creek	4.0
Bedford & Morgan	-85.23043	42.35484	Calhoun	Bedford Township	4.0
Gull & Nazareth	-85.53618	42.31666	Kalamazoo	Kalamazoo Township	4.0
Kalamazoo & Park	-85.58738	42.29444	Kalamazoo	City of Kalamazoo	4.0
US-131 & Main	-85.63518	41.97202	St. Joseph	Lockport Township	4.0
Columbia and Capital Ave SW	-85.19939	42.29857	Calhoun	City of Battle Creek	3.8
W Columbia & Helmer	-85.23843	42.29735	Calhoun	City of Battle Creek	3.8
US-131 & Broadway	-85.65168	41.93257	St. Joseph	City of Three Rivers	3.8
Westnedge & Howard	-85.58963	42.27421	Kalamazoo	City of Kalamazoo	3.6
Bedford & Jackson	-85.23208	42.33842	Calhoun	City of Battle Creek	3.4
US-131 & W U	-85.63760	42.14336	Kalamazoo	Schoolcraft Township	3.4
Dickman & 20th	-85.21945	42.31915	Calhoun	City of Springfield	3.2
Allen & Michigan	-85.59371	42.29120	Kalamazoo	City of Kalamazoo	3.2
Park & Walnut	-85.58722	42.28621	Kalamazoo	City of Kalamazoo	3.2
US-131 & Michigan	-85.65170	41.94248	St. Joseph	Fabius Township	3.2
US-131 & Millard	-85.65170	41.93977	St. Joseph	City of Three Rivers	3.2
Dickman & Helmer	-85.23906	42.31861	Calhoun	City of Battle Creek	3.0
Dickman & S Washington	-85.19421	42.31854	Calhoun	City of Battle Creek	2.6
Chicago & Willowbrook	-84.97004	41.93563	Branch	City of Coldwater	2.4
Chicago & Hudson	-84.99909	41.94036	Branch	City of Coldwater	2.0
Broadway & Apple	-85.29066	42.64967	Barry	City of Hastings	1.8
Chicago & Michigan	-84.98090	41.93741	Branch	City of Coldwater	1.6
Chicago & Jefferson	-84.99744	41.94011	Branch	City of Coldwater	1.6
US-131 & Hoffman	-85.64679	41.95407	St. Joseph	Fabius Township	1.6
Centerville & South	-85.42832	41.78863	St. Joseph	City of Sturgis	1.6
Main & Hoffman	-85.63473	41.95468	St. Joseph	City of Three Rivers	1.6
Broadway & Market	-85.29515	42.64871	Barry	City of Hastings	1.4
Chicago & Sprague	-84.99063	41.93899	Branch	City of Coldwater	1.2
Division & Pearl	-85.00111	41.93937	Branch	City of Coldwater	1.2
Chicago & Centerville	-85.42842	41.79812	St. Joseph	City of Sturgis	1.2
Chicago & Nottawa	-85.41869	41.79934	St. Joseph	City of Sturgis	1.2
Michigan & Douglas	-85.64312	41.94255	St. Joseph	City of Three Rivers	1.2
State & Industrial Park	-85.30315	42.64866	Barry	City of Hastings	1.0
Broadway & Court	-85.29064	42.64774	Barry	City of Hastings	1.0
Chicago & Division	-85.00075	41.94064	Branch	City of Coldwater	1.0
Chicago & Fiske	-84.96151	41.93429	Branch	City of Coldwater	1.0

Intersection	X	Y	County	Municipality	Injury Crashes per Year
Chicago & N I-69	-84.97151	41.93590	Branch	City of Coldwater	1.0
Chicago & Main	-84.88399	41.94422	Branch	Quincy Township	1.0
M-43 & Heath	-85.31971	42.64649	Barry	Rutland Township	0.8
Broadway & State	-85.29066	42.64872	Barry	City of Hastings	0.8
M-43 & State	-85.29071	42.65389	Barry	City of Hastings	0.8
Broadway & Green	-85.29062	42.64592	Barry	City of Hastings	0.8
Green & Michigan	-85.28611	42.64597	Barry	City of Hastings	0.8
Gun Lake & M-37	-85.33521	42.64576	Barry	Rutland Township	0.6

Top Rural Intersections by Total Crashes (Trunkline)

Top 10 per County. Includes intersections where at least one leg is a trunkline.

Intersection	X	Y	County	Municipality	Total Crashes per Year
Middleville & Main	-85.47002	42.71101	Barry	Thornapple Township	7.6
US-131 & Chicago	-85.66252	41.79712	St. Joseph	White Pigeon Township	5.0
M-60 & Athens	-85.23521	42.06130	Branch	Sherwood Township	3.8
Beckwith & E G	-85.36549	42.33213	Kalamazoo	Charleston Township	3.8
US-131 & Broad	-85.67290	41.84705	St. Joseph	Constantine Township	3.4
M-89 & 34th	-85.43534	42.37527	Kalamazoo	Richland Township	2.8
Chicago & Matteson	-85.19465	41.87238	Branch	City of Bronson	2.4
M-89 & 40th	-85.37689	42.37257	Kalamazoo	Ross Township	2.4
US-131 & Marcellus	-85.63584	42.02752	St. Joseph	Park Township	2.4
M-60 & Silver	-85.51762	42.00610	St. Joseph	Mendon Township	2.4
Chicago & Shimmel	-85.50596	41.79379	St. Joseph	Sturgis Township	2.4
Saddlebag Lake & Brown	-85.07446	42.75590	Barry	Woodland Township	2.2
Arlington & Crane	-85.47632	42.72554	Barry	Thornapple Township	2.2
Mendon & 8 Mile	-85.13554	42.07683	Calhoun	Burlington Township	2.2
US-131 & W X Y	-85.63661	42.09222	Kalamazoo	Schoolcraft Township	2.2
Chicago & Washington	-85.64381	41.79813	St. Joseph	White Pigeon Township	2.2
M-37 & Lacey	-85.25896	42.50036	Barry	Johnstown Township	2.0
Chicago & Wayne	-85.18510	41.87389	Branch	Bronson Township	2.0
Main & Almena	-85.71749	42.29576	Kalamazoo	Oshtemo Township	2.0
Main & Shimmel	-85.50718	41.91918	St. Joseph	Nottawa Township	2.0
Chicago & Lutz	-85.62312	41.79922	St. Joseph	White Pigeon Township	2.0
11 Mile & B N	-85.08097	42.26149	Calhoun	Emmett Township	1.8
Washington & Water	-85.66903	41.84209	St. Joseph	Constantine Township	1.8
Main & Clark	-85.52827	41.92370	St. Joseph	Nottawa Township	1.8
17 Mile & F S	-84.96271	42.20312	Calhoun	Fredonia Township	1.6
M-37 & M-79	-85.27068	42.61147	Barry	Hastings Township	1.4
Yankee Springs & Chief Noonday	-85.44695	42.63863	Barry	Yankee Springs Township	1.4
Middleville & 108th	-85.50648	42.76855	Barry	Thornapple Township	1.4
Main & 2nd	-85.74537	42.29526	Kalamazoo	Oshtemo Township	1.4
Leight & Hillsdale	-84.80894	42.14627	Calhoun	Homer Township	1.2
M-89 & 37th	-85.40174	42.37186	Kalamazoo	Ross Township	1.2
Main & 22nd	-85.76590	42.29534	Kalamazoo	Oshtemo Township	1.2
Grove & Delton	-85.40862	42.50349	Barry	Barry Township	1.0
Chief Noonday & Patterson	-85.54416	42.63088	Barry	Wayland Township	1.0
Chief Noonday & Briggs	-85.51078	42.63120	Barry	Yankee Springs Township	1.0
Chicago & Lincoln	-85.18984	41.87313	Branch	City of Bronson	1.0
Chicago & Buchanan	-85.19354	41.87256	Branch	City of Bronson	1.0
Mendon & Arbogast	-85.15819	42.06861	Branch	Union Township	1.0
Wheatfield & B S	-85.08036	42.23229	Calhoun	Newton Township	1.0
M-89 & 38th	-85.38690	42.36964	Kalamazoo	Ross Township	1.0
S US-131 & W D	-85.65853	42.37618	Kalamazoo	Alamo Township	1.0
Bedford N & Banfield	-85.23637	42.41093	Calhoun	Bedford Township	0.8

Intersection	X	Y	County	Municipality	Total Crashes per Year
M-60 & 9 Mile	-85.11918	42.08613	Calhoun	Burlington Township	0.8
M-66 & K S	-85.20723	42.16640	Calhoun	Leroy Township	0.8
Capital Ave & Burr Oak	-85.23557	42.08843	Calhoun	Athens Township	0.8
Colon & Snow Prairie	-85.11764	41.94152	Branch	Batavia Township	0.6
Chicago & Parham	-85.17557	41.87545	Branch	Bethel Township	0.6
Chicago & Albers	-85.20422	41.87083	Branch	Bronson Township	0.6
Chicago & Douglas	-85.19827	41.87177	Branch	City of Bronson	0.6
Michigan & 12 Mile	-85.05997	42.28627	Calhoun	Marshall Township	0.6

Top Rural Intersections by Fatal Crashes (Trunkline)

Top 10 per County (less if no crashes). Includes intersections where at least one leg is a trunkline.

Intersection	X	Y	County	Municipality	Fatal Crashes per Year
M-66 & State	-85.09493	42.63954	Barry	Castleton Township	0.2
M-37 & Bedford	-85.27017	42.59695	Barry	Hastings Township	0.2
Middleville & Peets	-85.42725	42.67482	Barry	Rutland Township	0.2
Mendon & Athens	-85.23521	42.06130	Branch	Sherwood Township	0.2
M-60 & Stanton	-85.22836	42.05919	Branch	Sherwood Township	0.2
Leight & W Main	-84.81370	42.14730	Calhoun	Homer Township	0.2
Chicago & Shimmel	-85.50596	41.79379	St. Joseph	Sturgis Township	0.2
M-86 & M-66	-85.40976	41.91905	St. Joseph	Colon Township	0.2

Top Rural Intersections by Injury Crashes (Trunkline)

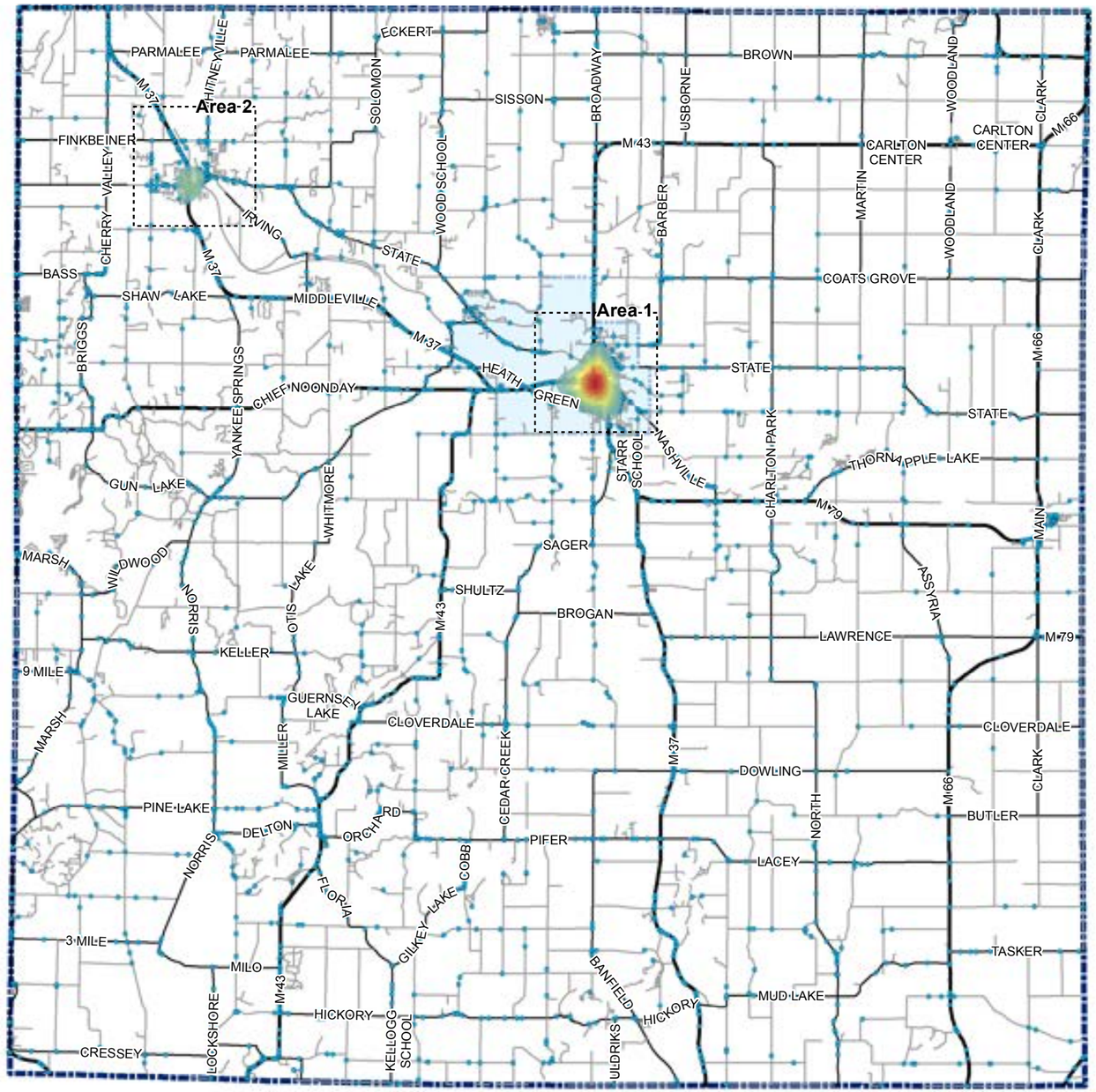
Top 10 per County. Includes intersections where at least one leg is a trunkline.

Intersection	X	Y	County	Municipality	Injury Crashes per Year
Broadway & Main	-85.47002	42.71101	Barry	Thornapple Township	1.4
Beckwith & E G	-85.36549	42.33213	Kalamazoo	Charleston Township	1.4
11 Mile & B N	-85.08097	42.26149	Calhoun	Emmett Township	1.2
Chicago & Lutz	-85.62312	41.79922	St. Joseph	White Pigeon Township	1.2
Chicago & Wayne	-85.18510	41.87389	Branch	Bronson Township	1.0
M-89 & 34th	-85.43534	42.37527	Kalamazoo	Richland Township	1.0
US-131 & Marcellus	-85.63584	42.02752	St. Joseph	Park Township	1.0
M-60 & Silver	-85.51762	42.00610	St. Joseph	Mendon Township	1.0
Main & Shimmel	-85.50718	41.91918	St. Joseph	Nottawa Township	1.0
M-60 & Arthur L Jones	-85.71190	41.91153	St. Joseph	Fabius Township	1.0
Arlington & Crane	-85.47632	42.72554	Barry	Thornapple Township	0.8
M-37 & Lacey	-85.25896	42.50036	Barry	Johnstown Township	0.8
M-37 & M-79	-85.27068	42.61147	Barry	Hastings Township	0.8
Cherry Valley & 108th	-85.50648	42.76855	Barry	Thornapple Township	0.8
Mendon & Athens	-85.23521	42.06130	Branch	Sherwood Township	0.8
Mendon & 8 Mile	-85.13554	42.07683	Calhoun	Burlington Township	0.8
Hillsdale & Leigh	-84.80894	42.14627	Calhoun	Homer Township	0.8
Chicago & Shimmel	-85.50596	41.79379	St. Joseph	Sturgis Township	0.8
Saddlebag Lake & Brown	-85.07446	42.75590	Barry	Woodland Township	0.6
Chief Noonan & Yankee Springs	-85.44695	42.63863	Barry	Yankee Springs Township	0.6
M-79 & Charlton Park	-85.21166	42.61055	Barry	Hastings Township	0.6
M-37 & Hickory Rd	-85.24195	42.44677	Barry	Johnstown Township	0.6
Chicago & Lincoln	-85.18984	41.87313	Branch	City of Bronson	0.6
17 Mile & F S	-84.96271	42.20312	Calhoun	Fredonia Township	0.6
US-131 & W X Y	-85.63661	42.09222	Kalamazoo	Schoolcraft Township	0.6
Main & Almena	-85.71749	42.29576	Kalamazoo	Oshtemo Township	0.6
Main & 2nd	-85.74537	42.29526	Kalamazoo	Oshtemo Township	0.6
Main & 22nd	-85.76590	42.29534	Kalamazoo	Oshtemo Township	0.6
Chicago & US-131	-85.66252	41.79712	St. Joseph	White Pigeon Township	0.6
Business US-131 & Broad	-85.67290	41.84705	St. Joseph	Constantine Township	0.6
Chicago & Washington	-85.64381	41.79813	St. Joseph	White Pigeon Township	0.6
US-131 & Michigan	-85.63604	42.04219	St. Joseph	Park Township	0.6
M-66 & State	-85.09493	42.63954	Barry	Castleton Township	0.4
Chicago & Matteson	-85.19465	41.87238	Branch	City of Bronson	0.4
Mendon & Arbogast	-85.15819	42.06861	Branch	Union Township	0.4
Colon & Snow Prairie	-85.11764	41.94152	Branch	Batavia Township	0.4
Colon & Hodunk	-85.05933	41.94290	Branch	Batavia Township	0.4
Wheatfield & B S	-85.08036	42.23229	Calhoun	Newton Township	0.4
M-60 & 19 Mile	-85.11918	42.08613	Calhoun	Burlington Township	0.4
W Michigan & 12 Mile	-85.05997	42.28627	Calhoun	Marshall Township	0.4
M-60 & Old 27 S	-84.98669	42.10648	Calhoun	Tekonsha Township	0.4
M-66 & H S	-85.20758	42.18817	Calhoun	Leroy Township	0.4

Intersection	X	Y	County	Municipality	Injury Crashes per Year
S I-69 & Marshall	-84.99031	42.07591	Calhoun	Tekonsha Township	0.4
M-89 & 40th	-85.37689	42.37257	Kalamazoo	Ross Township	0.4
M-89 & 37th	-85.40174	42.37186	Kalamazoo	Ross Township	0.4
M-89 & 38th	-85.38690	42.36964	Kalamazoo	Ross Township	0.4
S US-131 & W D	-85.65853	42.37618	Kalamazoo	Alamo Township	0.4
Chicago & Buchanan	-85.19354	41.87256	Branch	City of Bronson	0.2
Chicago & Parham	-85.17557	41.87545	Branch	Bethel Township	0.2
Chicago & Douglas	-85.19827	41.87177	Branch	City of Bronson	0.2

Appendix D – High Risk Area & Related Maps

Barry County
2010 - 2014 Crash Density



N
W E
S

0 1 2 4 6 8 Miles

Legend

- Urban Boundary
- Barry County
- Crash

Road Network

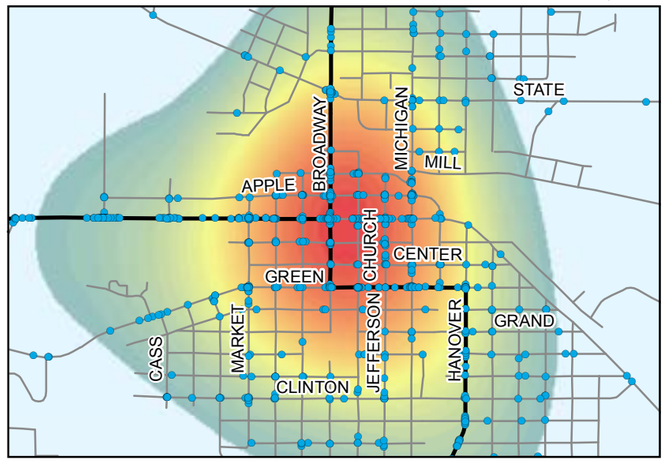
- State Trunkline
- County Primary
- All Other

Crash Density

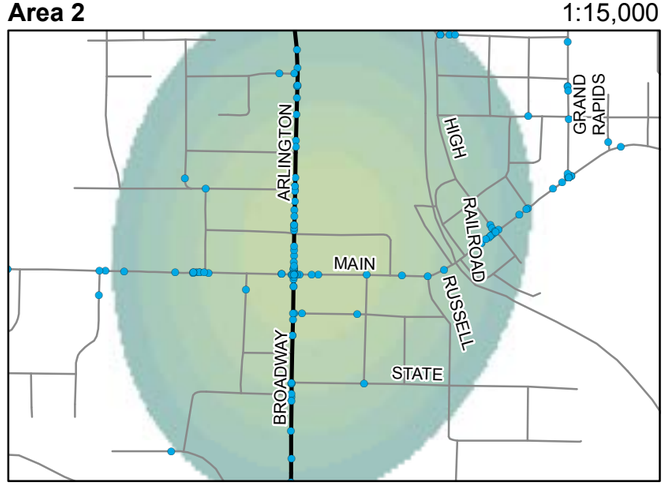
High

Low

Area 1 1:27,000

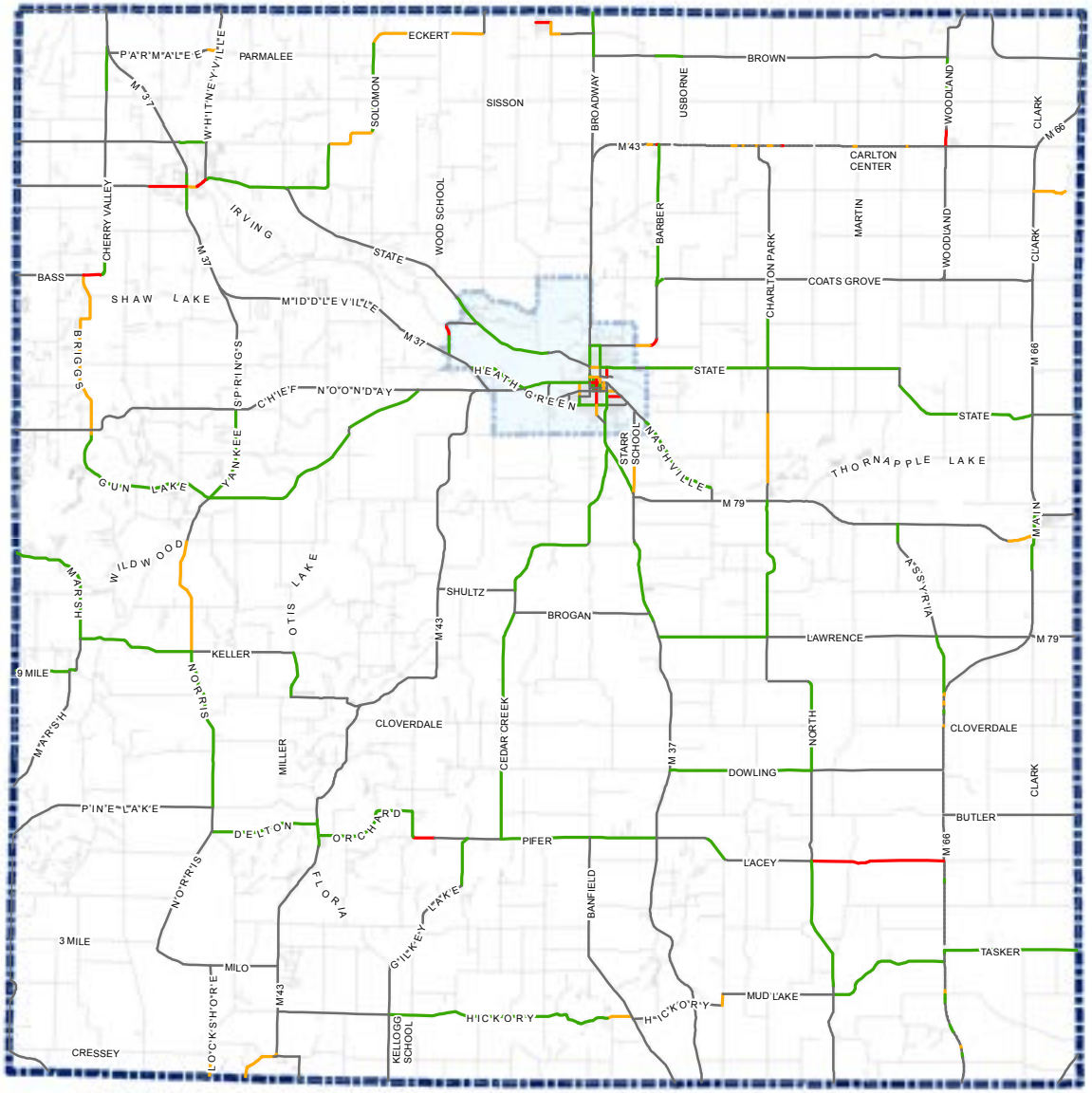


Area 2 1:15,000



HRC
HUBBELL, ROTH & CLARK, INC
CONSULTING ENGINEERS SINCE 1915

Barry County
Segment Crash Rate (2010 - 2014)



Legend

- Urban Boundary
- Barry County
- No Data

Segment Crash Rate (per 100 MVM)

- 124 or below
- 124 - 248
- 248 - 496
- 496 or more

Note:
Segments less than 300 ft are not illustrated.
Segment crash rates are expressed in 100 Million Vehicle Miles (MVM) traveled.
The first category (i.e. 124 or below) represents the county dataset average segment crash rates. Successive categories represent segment crash rate in multiples of two, three, and four or more relative to the county average.

0 1.5 3 6 9 12 Miles

N W E S

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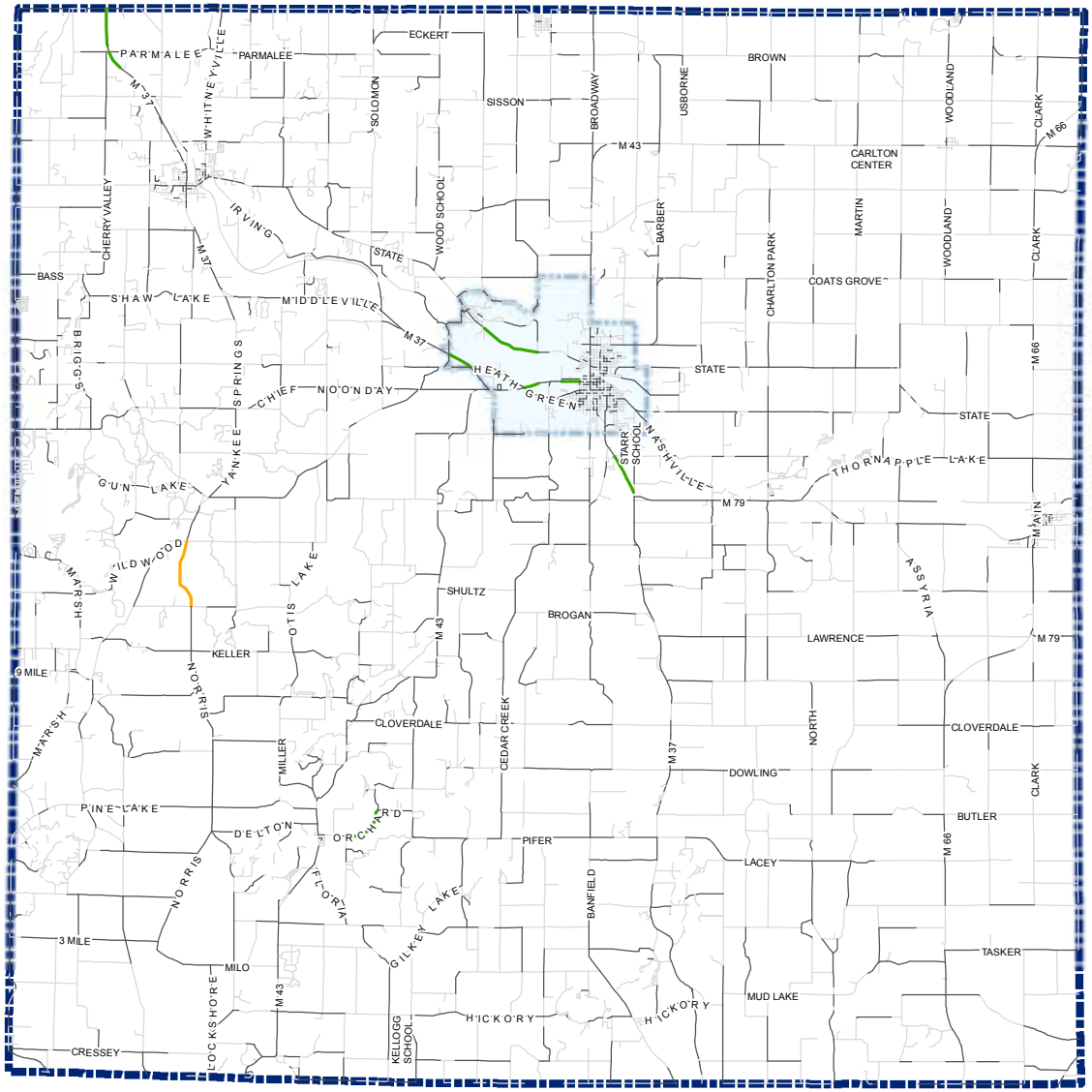
CONSULTING ENGINEERS SINCE 1915

Barry County
Segment Crash Frequency (2010 - 2014)



Legend

- Urban Boundary
- Barry County
- No Reported Crashes

Segment Crashes per Year

- 2 or below
- 2 - 4
- 4 - 6
- 6 or more

0 1.5 3 6 9 12 Miles

N W E S

HRC
HUBBELL, ROTH & CLARK, INC
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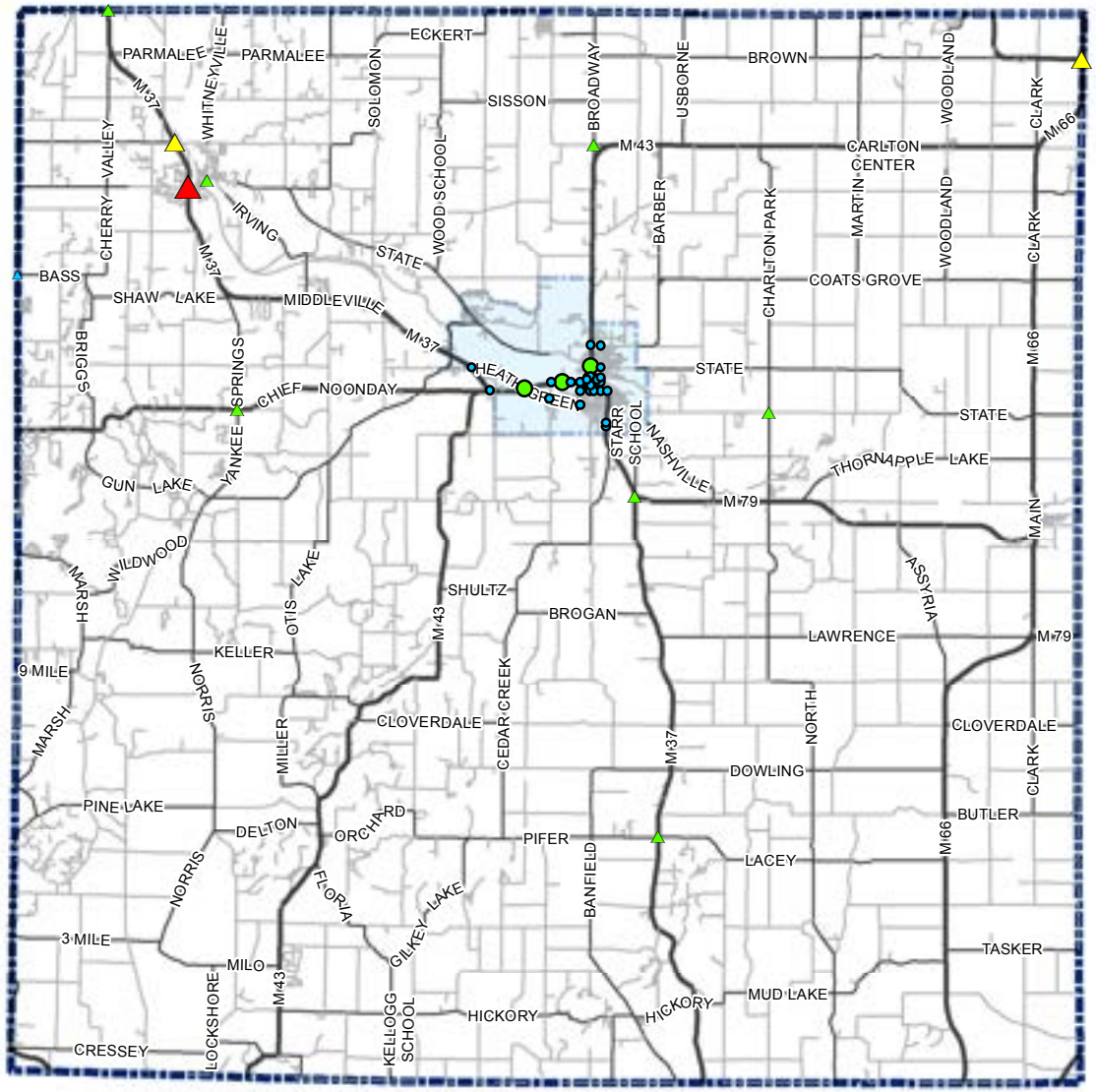
Barry County Intersections
Crashes per Year (2010 - 2014)



Legend

Urban Boundary

Barry County

Road Network

- State Trunkline
- County Primary
- All Other

Intersection Urban Crashes/Year

- 0 - 5
- 5 - 10
- 10 - 15
- 15 - 20
- 20 or More

Intersection Rural Crashes/Year

- 0 - 1
- 1 - 2
- 2 - 3
- 3 - 4
- 4 or More

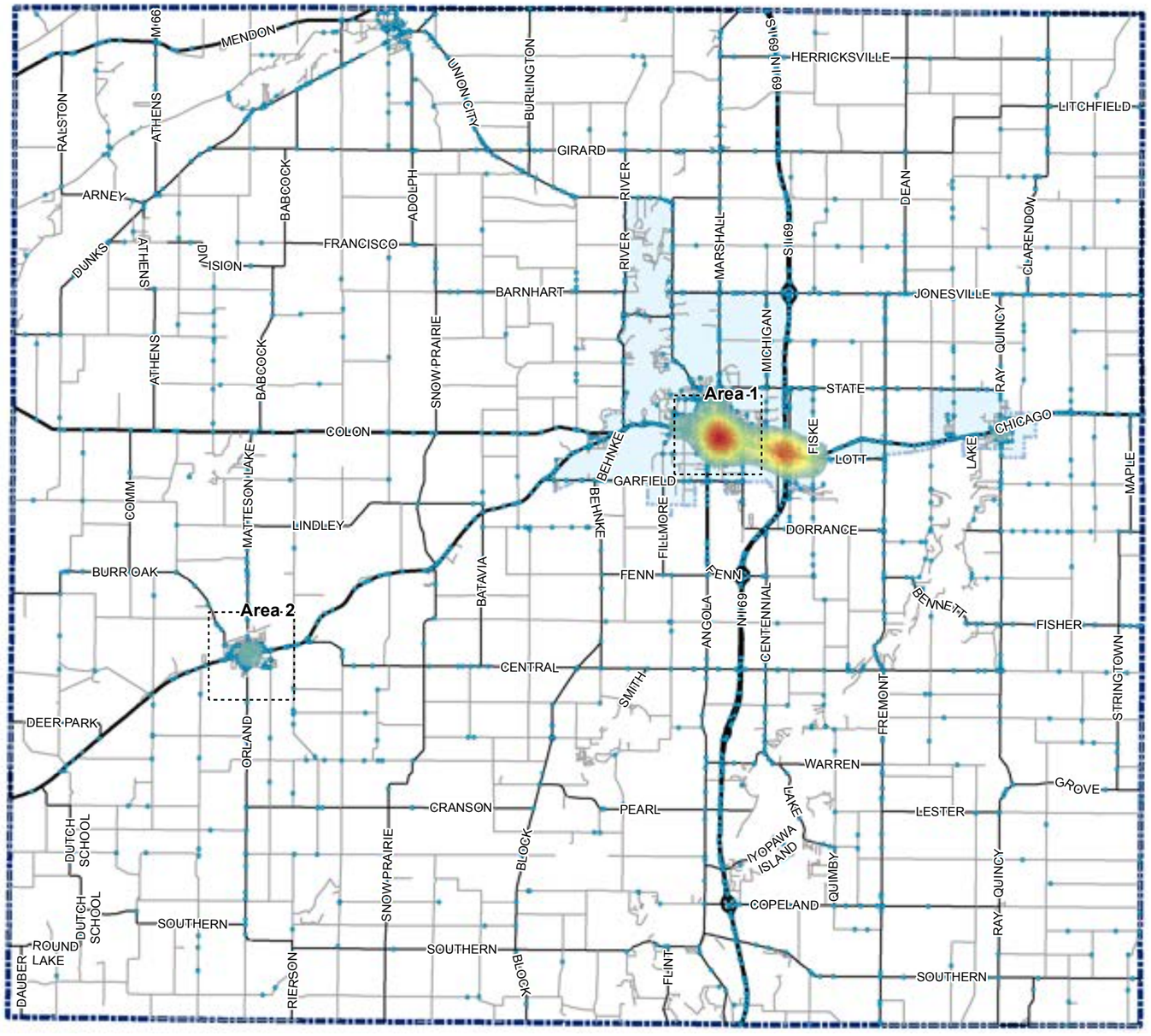
Note:
Urban intersections with less than five crashes between 2010 and 2014 are not included. Rural intersections with less than three crashes between 2010 and 2014 are not included.

0 1.5 3 6 9 12 Miles

N W E S

HRC HUBBELL, ROTH & CLARK, INC CONSULTING ENGINEERS SINCE 1915

Branch County
2010 - 2014 Crash Density



Legend

- Urban Boundary
- Branch County
- Crash

Road Network

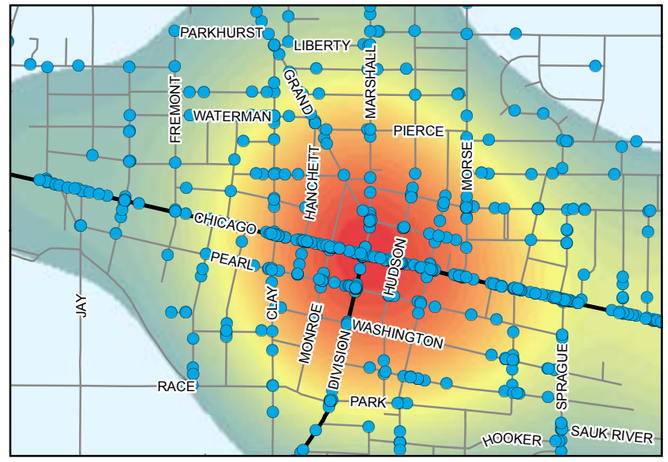
- State Trunkline
- County Primary
- All Other

Crash Density

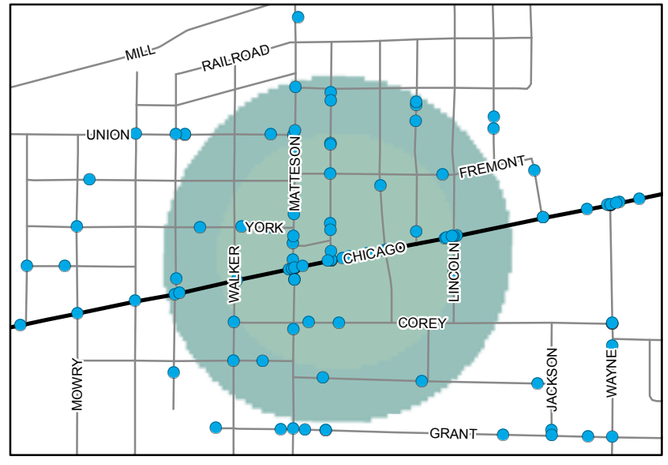
High

Low

Area 1 1:25,000



Area 2 1:15,000



N W E S

0 1 2 4 6 8 Miles

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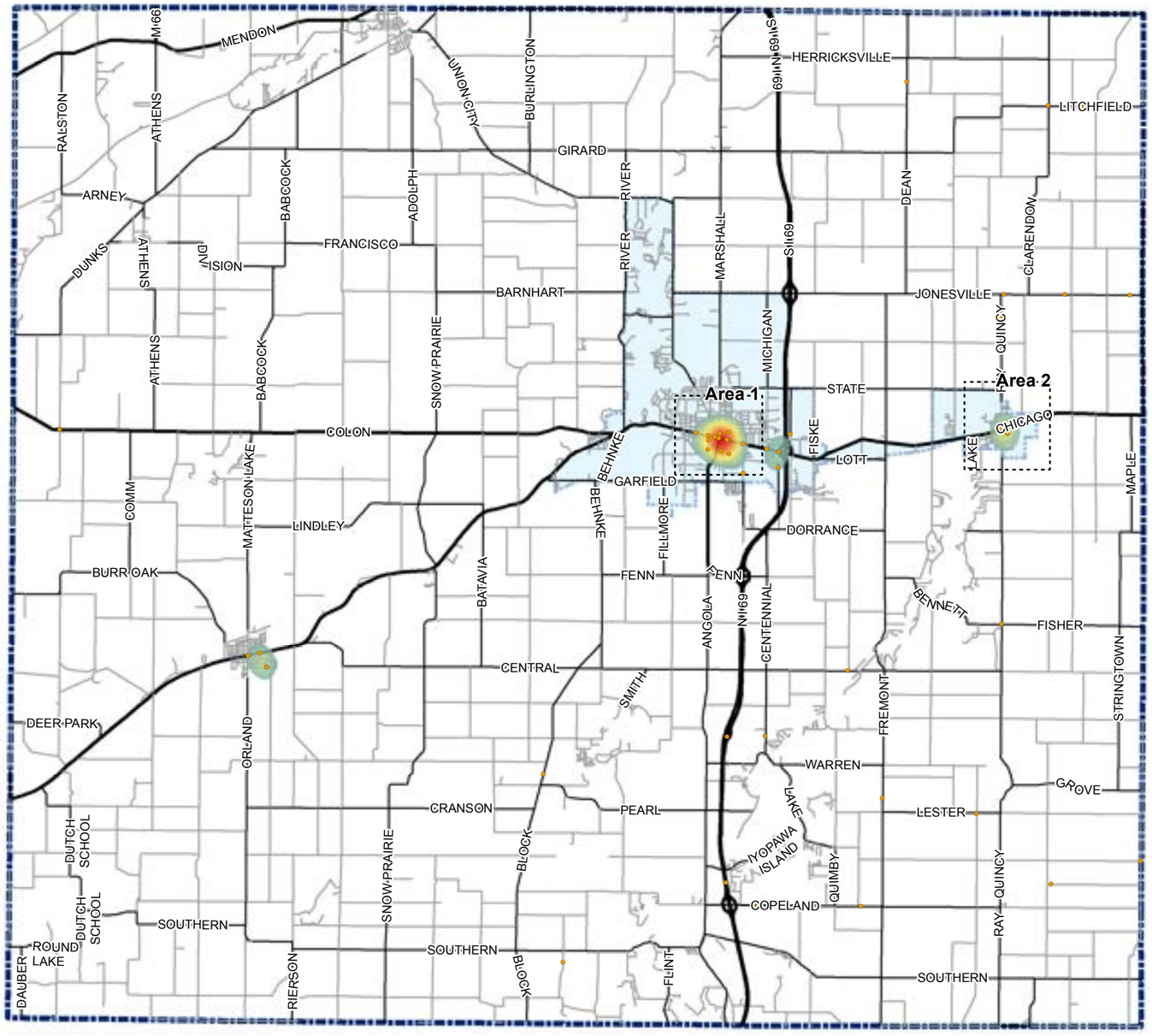
Branch County
2010 - 2014 Ped Crash Density



0 1 2 4 6 8 Miles

Legend

- Urban Boundary
- Branch County
- Ped Crash

Road Network

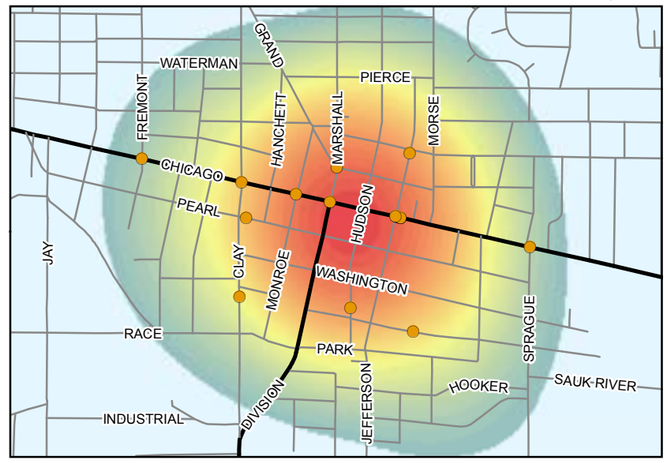
- State Trunkline
- County Primary
- All Other

Crash Density

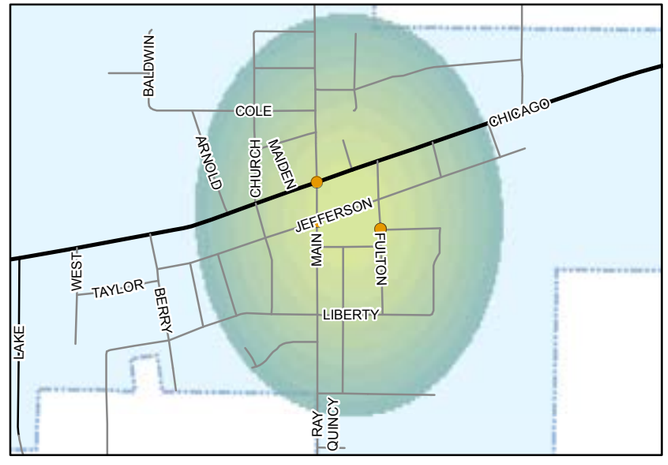
High

Low

Area 1 1:25,000



Area 2 1:20,000



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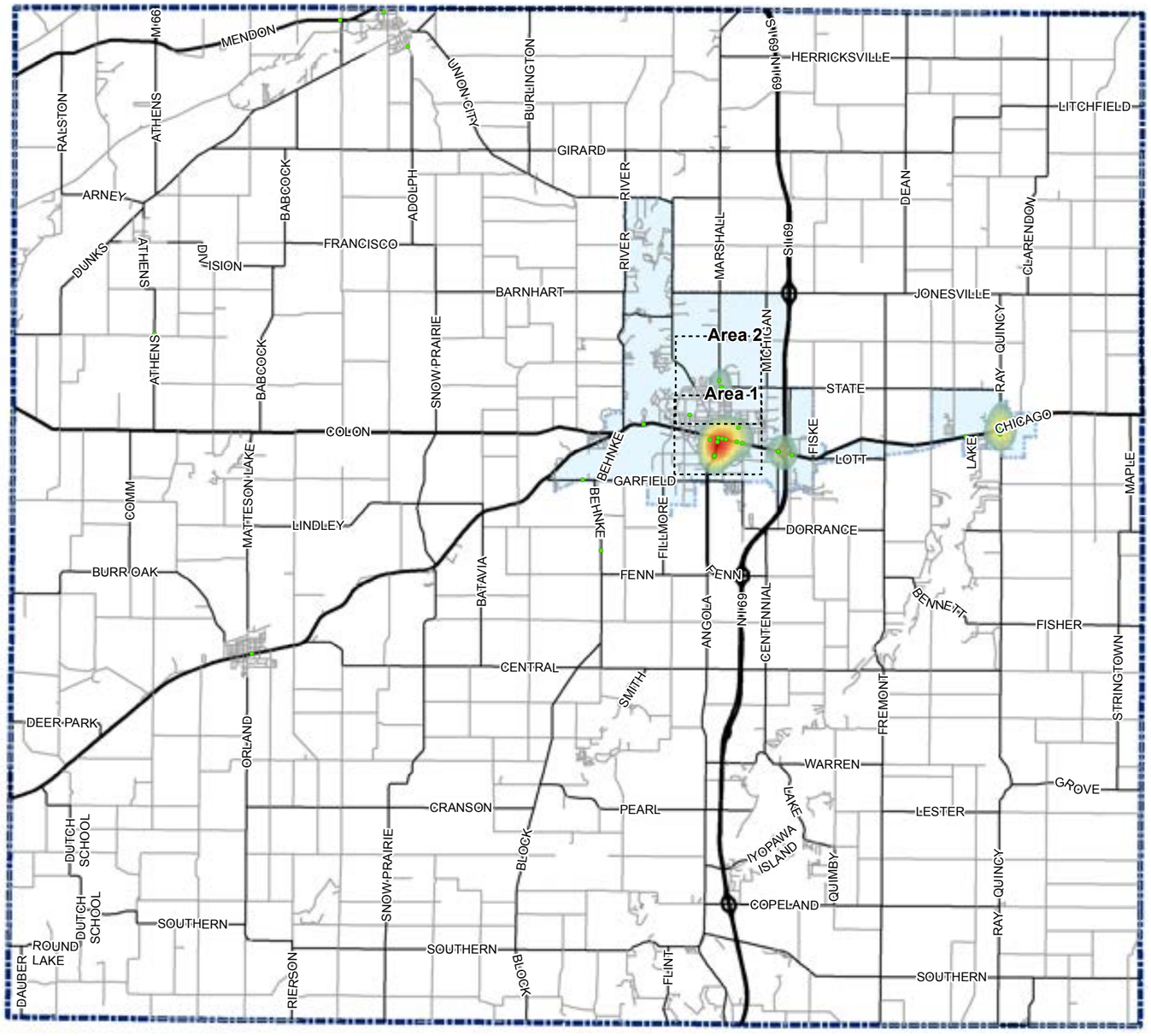
Branch County
2010 - 2014 Bicycle Crash Density



Legend

- Urban Boundary
- Branch County
- Bicycle Crash

Road Network

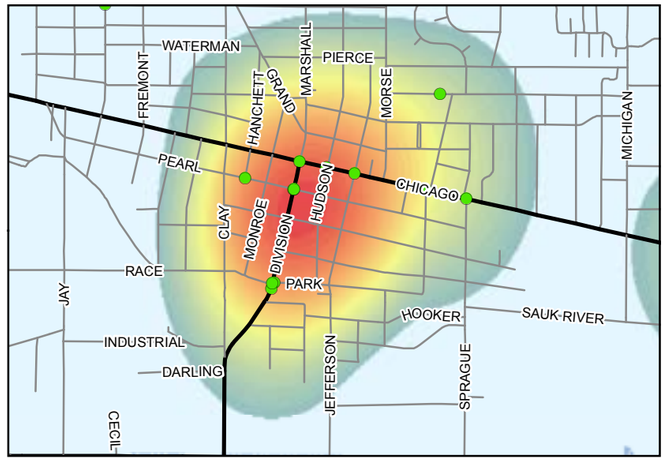
- State Trunkline
- County Primary
- All Other

Crash Density

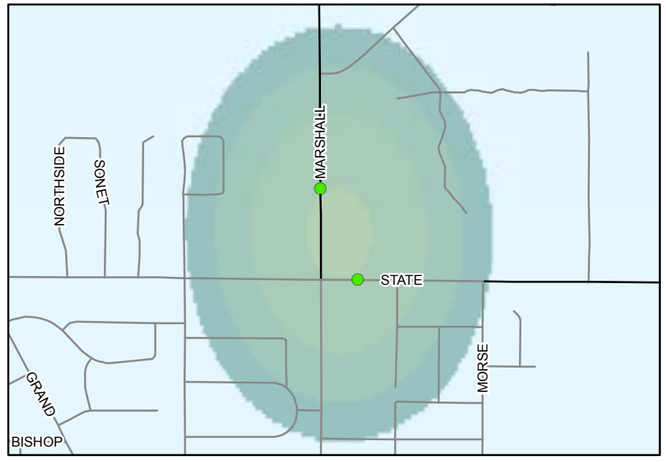
High

Low

Area 1 1:30,000



Area 2 1:15,000



N W E S

0 1 2 4 6 8 Miles

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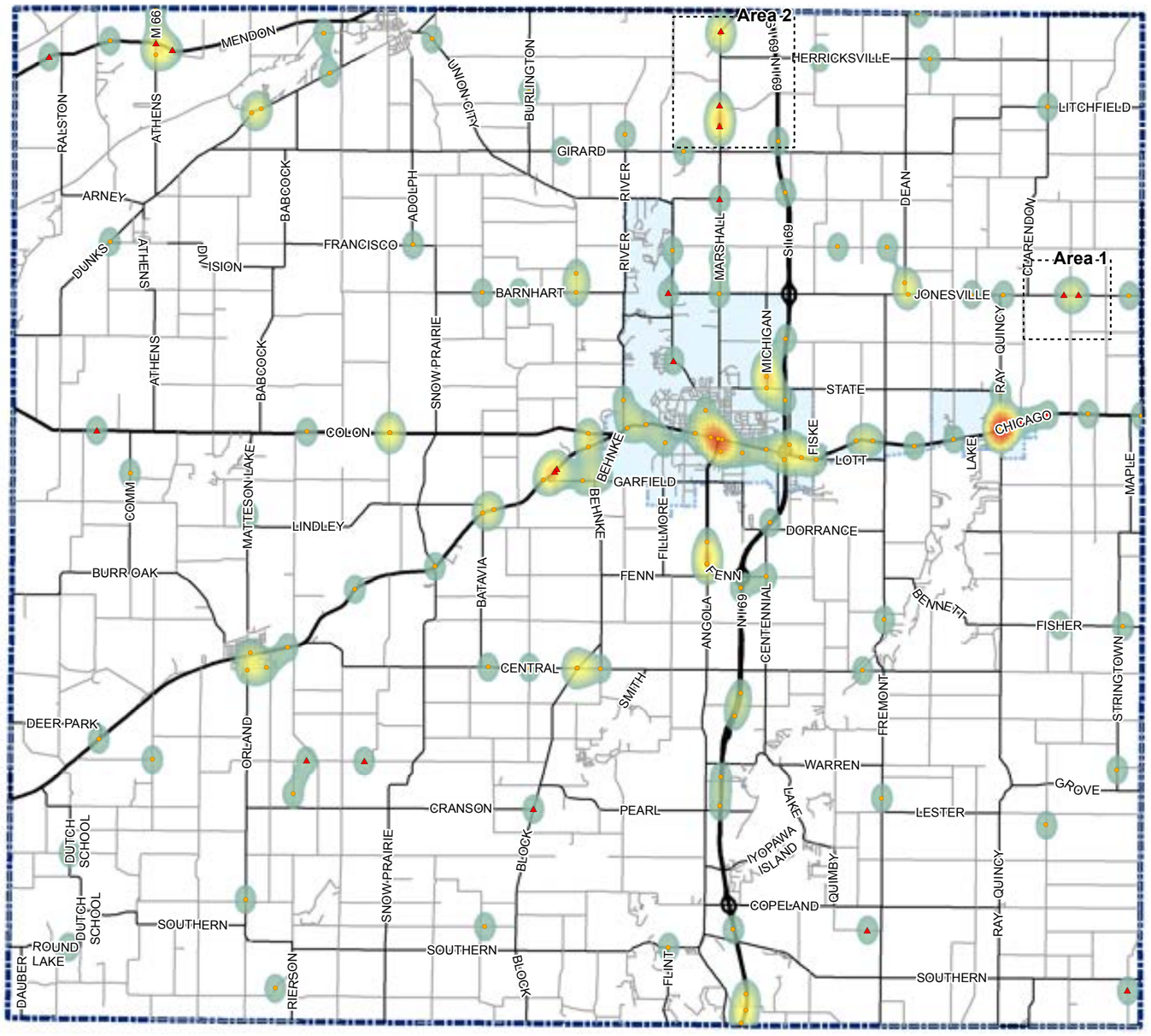
Branch County
2010 - 2014 KA Crash Density



Legend

- Urban Boundary
- Branch County
- A Level Injury
- Fatal

Road Network

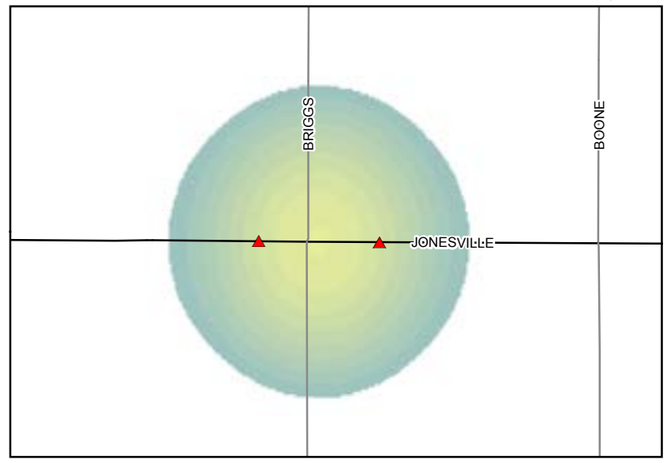
- State Trunkline
- County Primary
- All Other

Crash Density

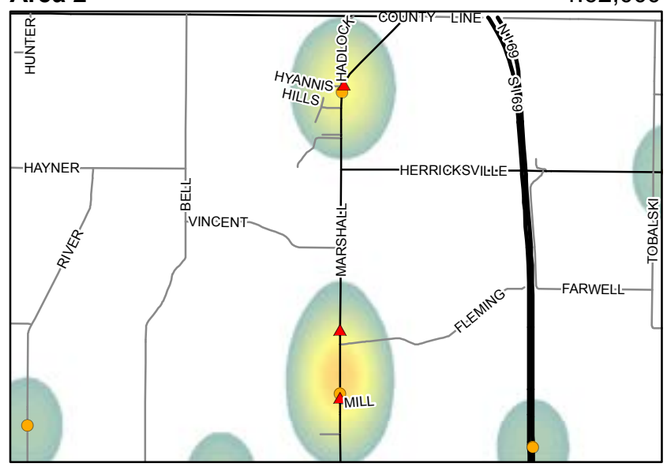
High

Low

Area 1 1:25,000



Area 2 1:62,000



N W E S

0 1 2 4 6 8 Miles

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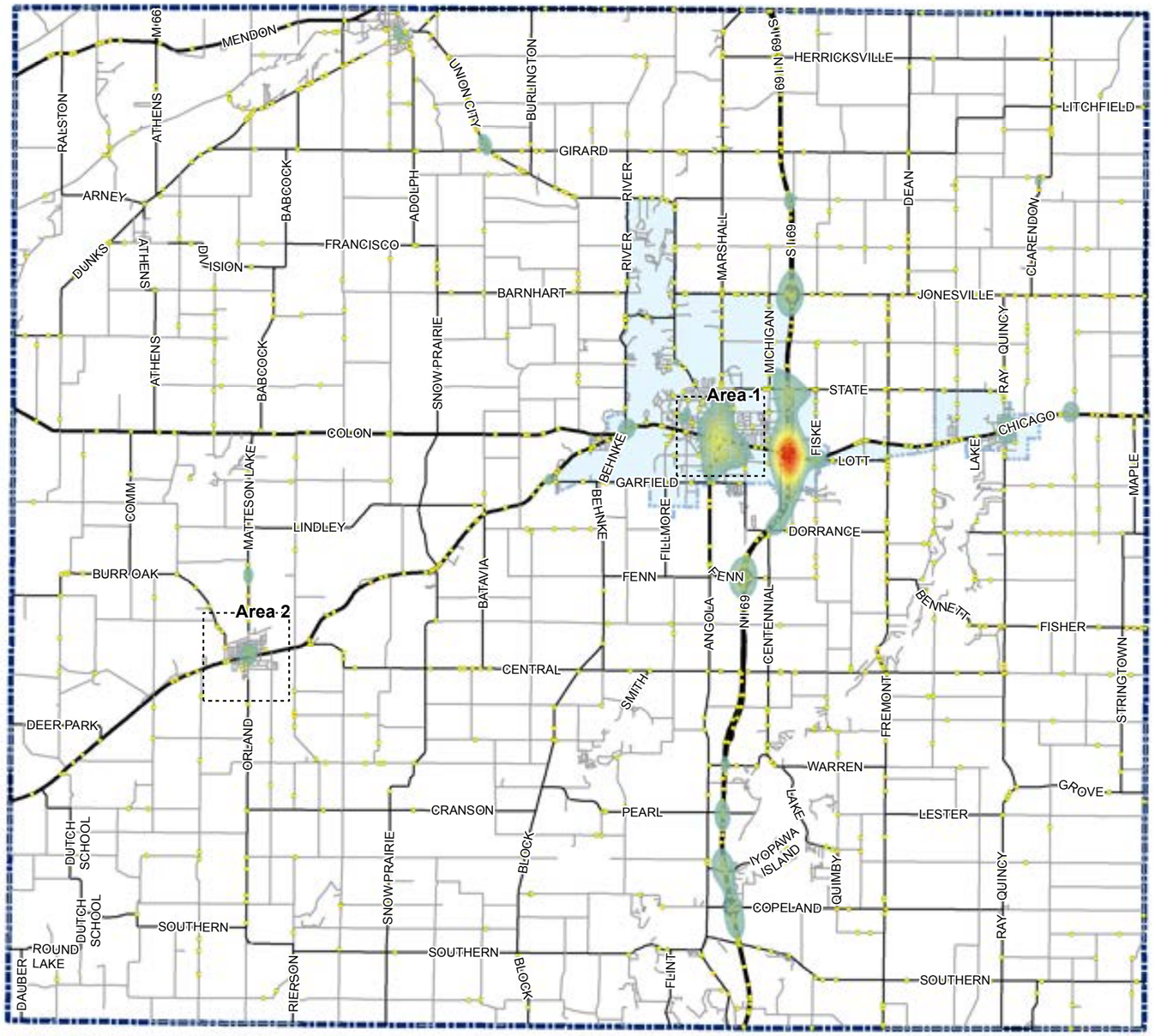
Branch County
2010 - 2014 Single Vehicle Lane Departure Crash Density



0 1 2 4 6 8 Miles

Legend

- Urban Boundary
- Branch County
- Single Veh Lane Departure

Road Network

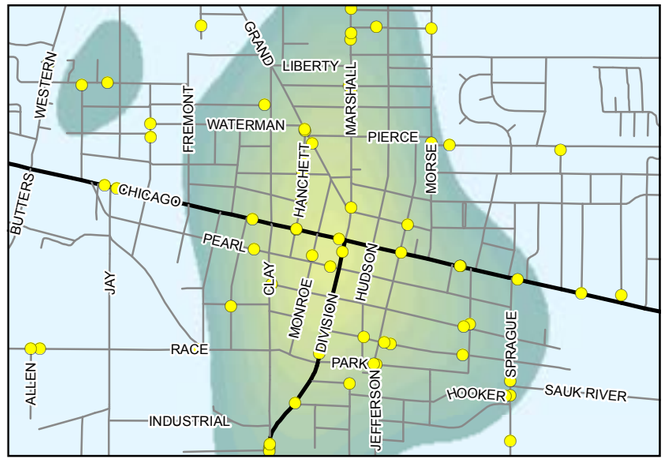
- State Trunkline
- County Primary
- All Other

Crash Density

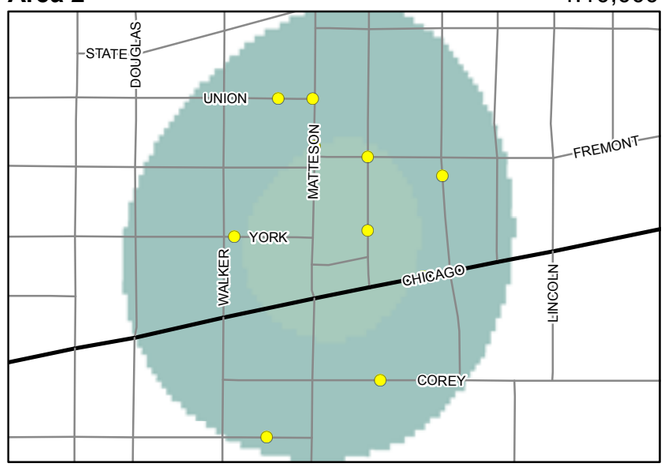
High

Low

Area 1 1:30,000



Area 2 1:10,000



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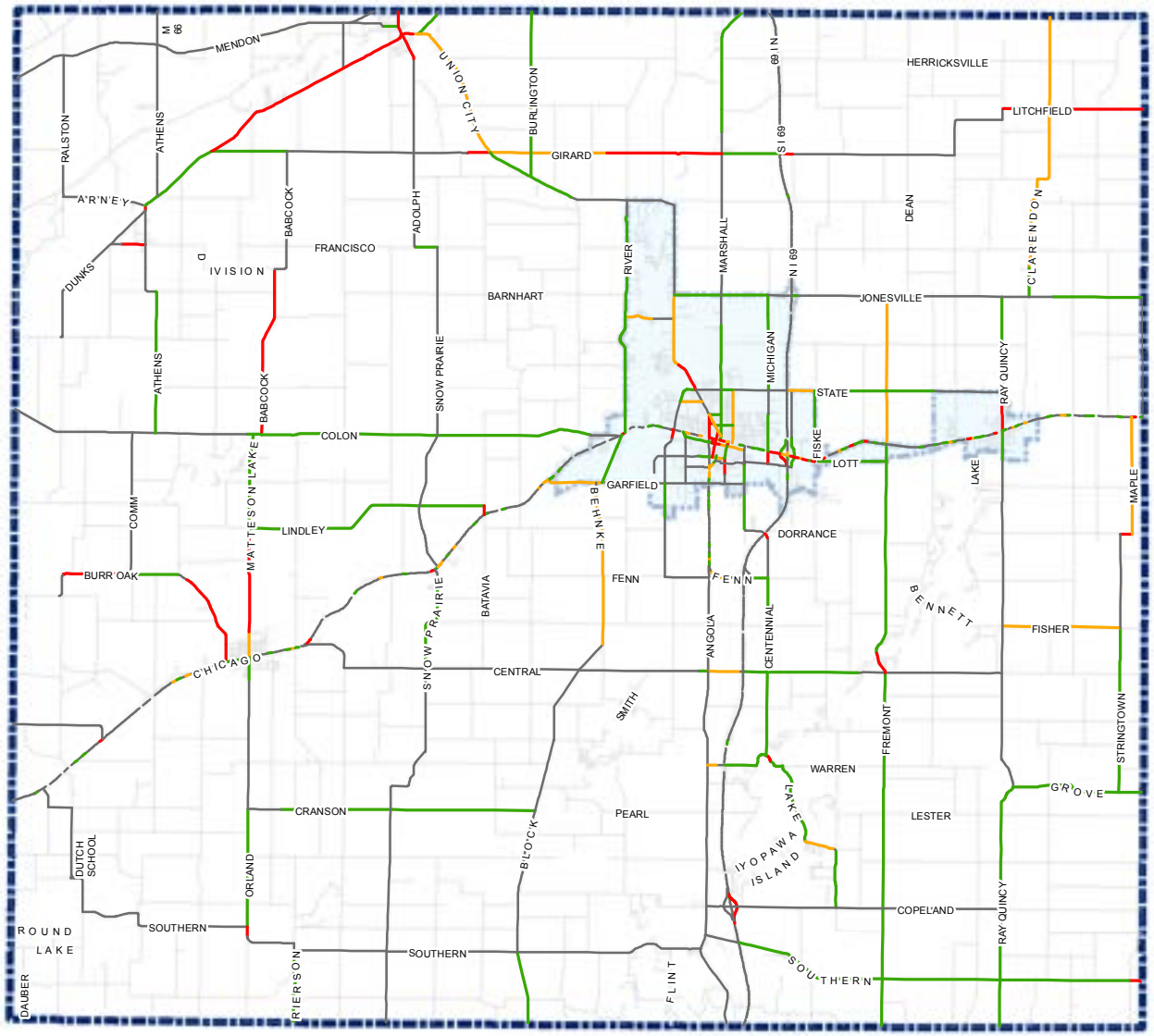
Branch County
Segment Crash Rate (2010 - 2014)



Legend

- Urban Boundary
- Branch County
- No Data

Segment Crash Rate (per 100 MVM)

- 100 or below
- 100 - 200
- 200 - 300
- 300 or More

Note:
Segments less than 300 ft are not illustrated.
Segment crash rates are expressed in 100 Million Vehicle Miles (MVM) traveled.
The first category (i.e. 100 or below) represents the county dataset average segment crash rates. Successive categories represent segment crash rate in multiples of two, three, and four or more relative to the county average.

0 1.25 2.5 5 7.5 10 Miles

N W E S

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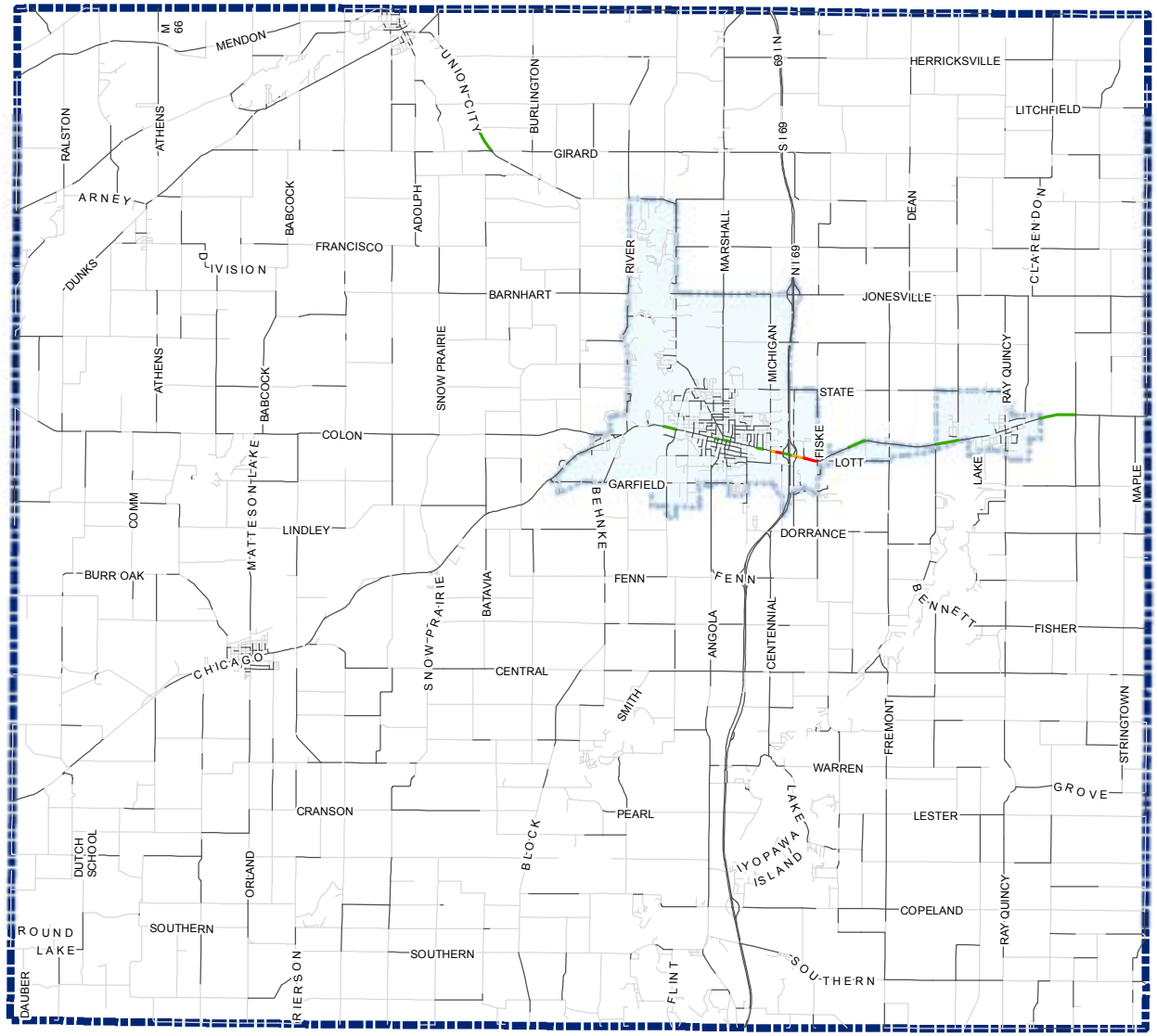
Branch County
Segment Crash Frequency (2010 - 2014)



Legend

- Urban Boundary
- Branch County
- No Reported Crashes

Segment Crashes per Year

- 2 or below
- 2 - 4
- 4 - 6
- 6 or more

0 1.25 2.5 5 7.5 10 Miles

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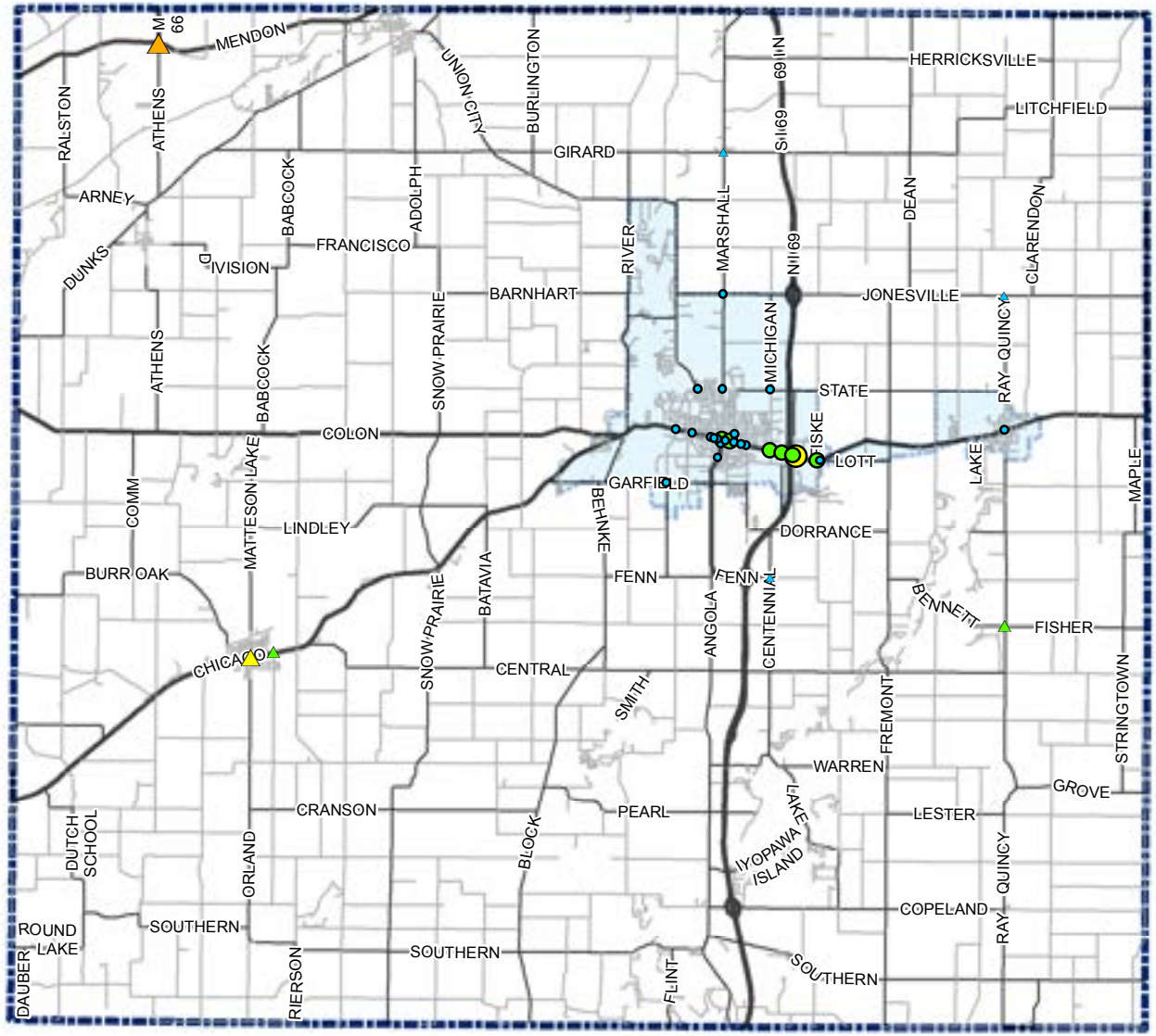
Branch County Intersections
Crashes per Year (2010 - 2014)



Legend

- Urban Boundary
- Branch County

Road Network

- State Trunkline
- County Primary
- All Other

Intersection Urban Crashes/Year

- 0 - 5
- 5 - 10
- 10 - 15
- 15 - 20
- 20 or More

Intersection Rural Crashes/Year

- 0 - 1
- 1 - 2
- 2 - 3
- 3 - 4
- 4 or More

Note:
Urban intersections with less than five crashes between 2010 and 2014 are not included. Rural intersections with less than three crashes between 2010 and 2014 are not included.

0 1.25 2.5 5 7.5 10 Miles

N W E S

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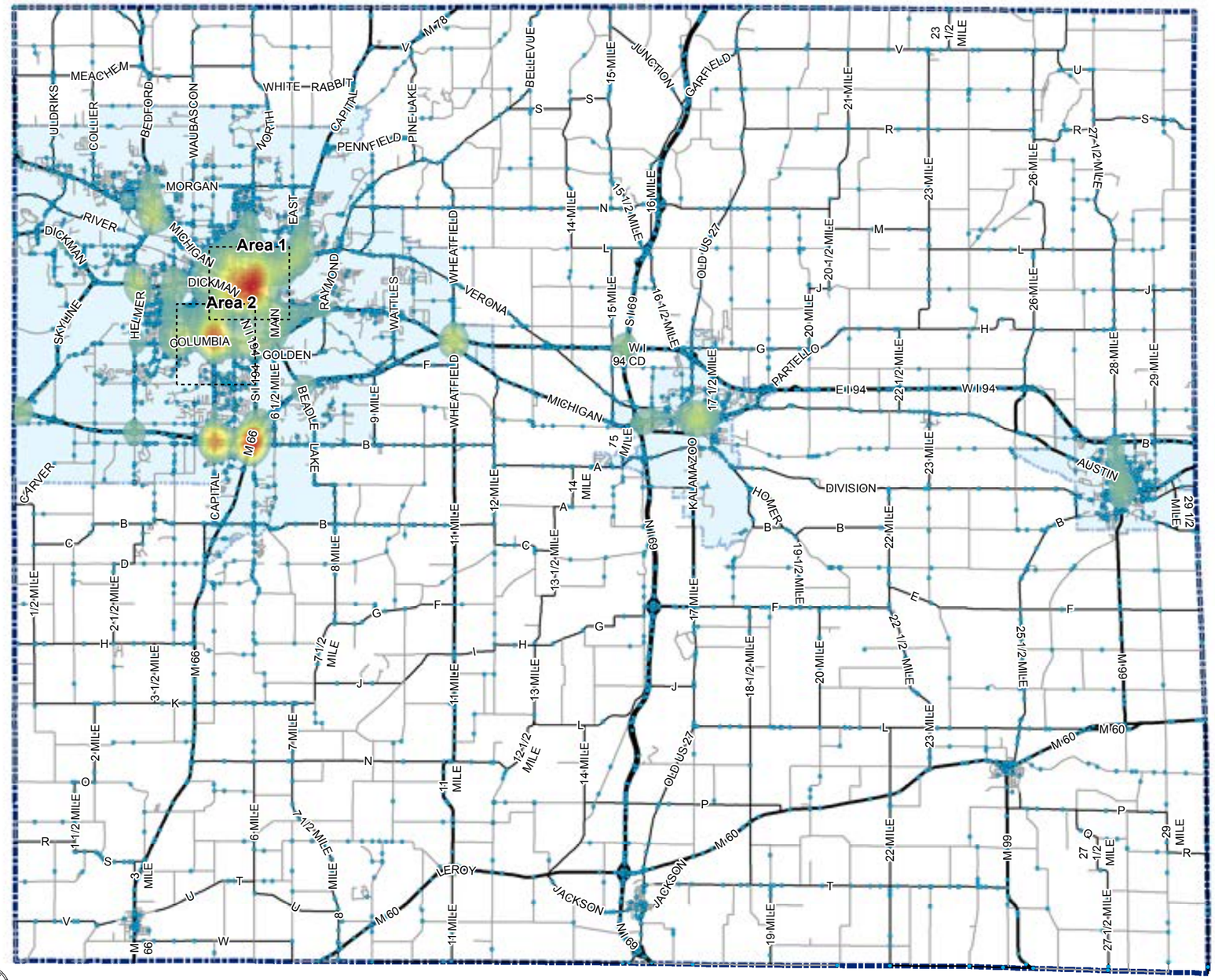
Calhoun County
2010 - 2014 Crash Density



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Legend

- Urban Boundary
- Calhoun County
- Crash

Road Network

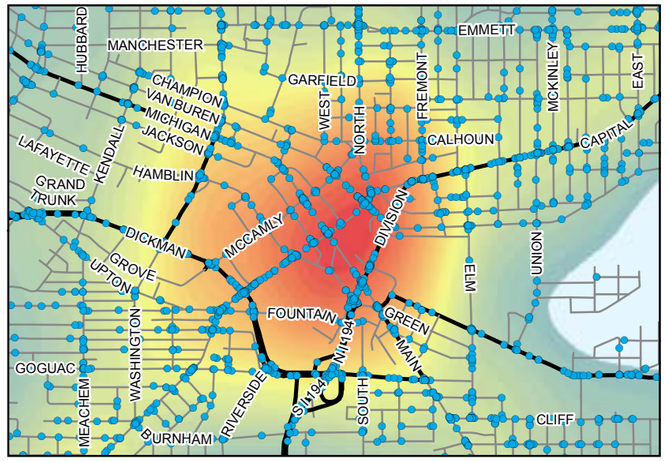
- State Trunkline
- County Primary
- All Other

Crash Density

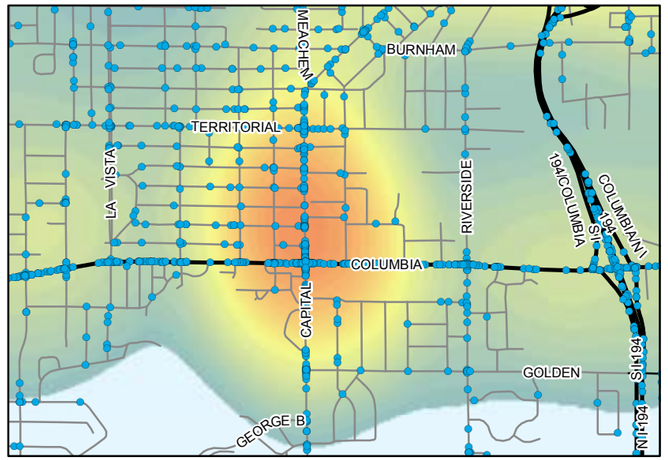
High

Low

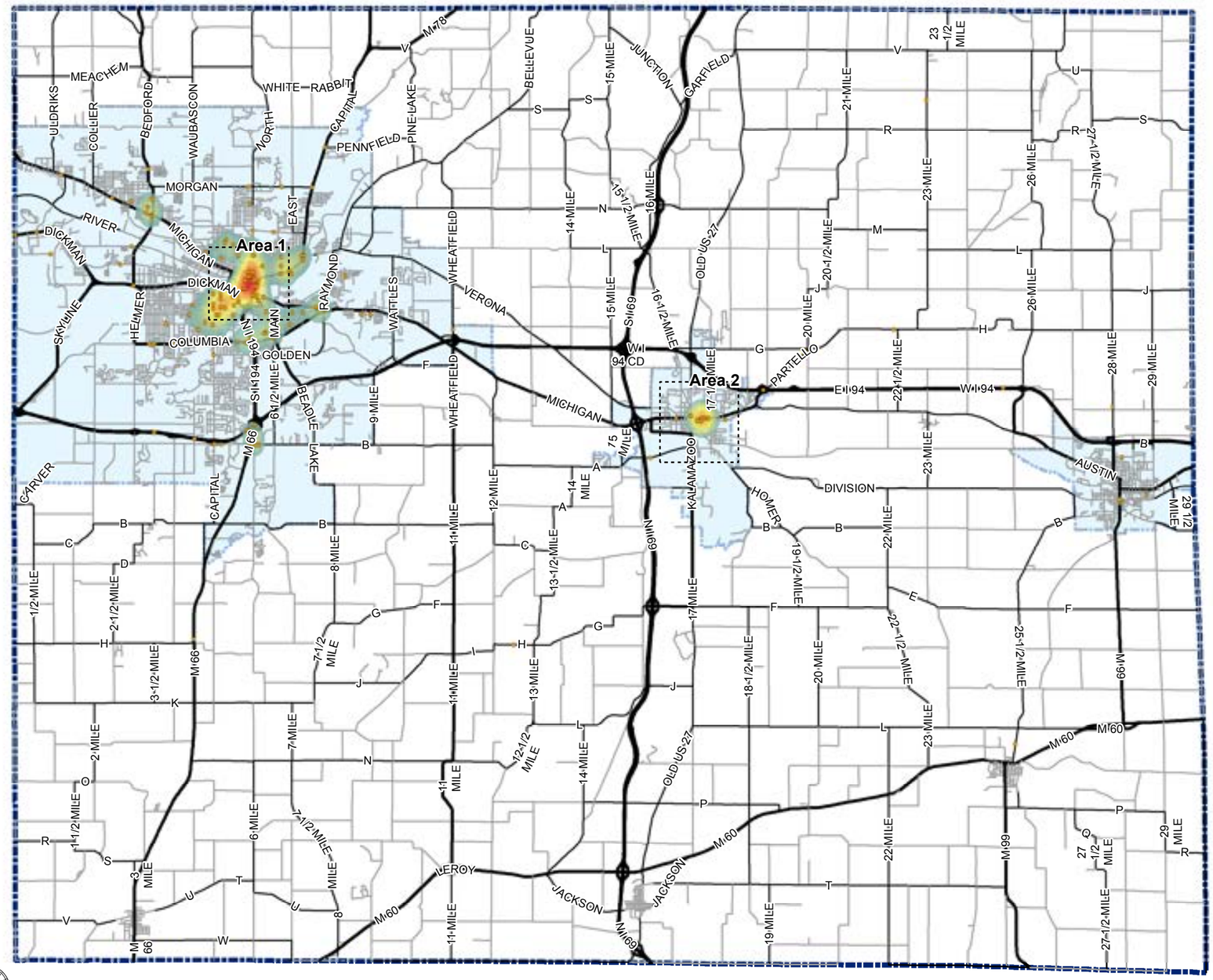
Area 1 1:35,000



Area 2 1:30,000



Calhoun County
2010 - 2014 Ped Crash Density



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Legend

- Urban Boundary
- Calhoun County
- Ped Crash

Road Network

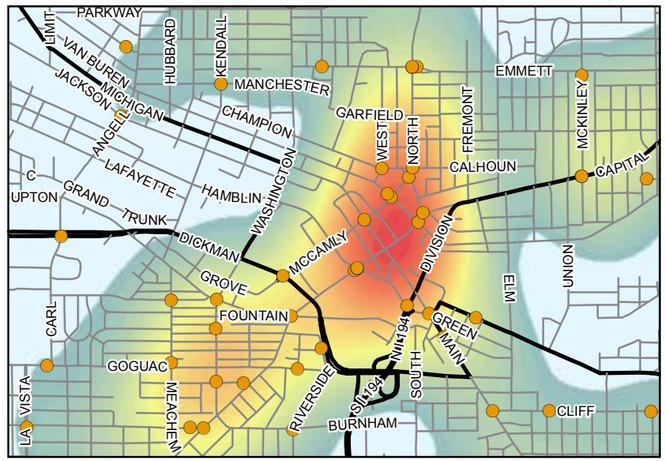
- State Trunkline
- County Primary
- All Other

Crash Density

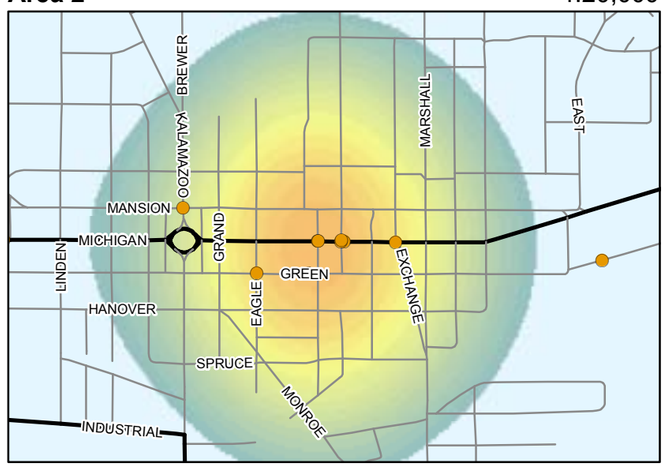
High

Low

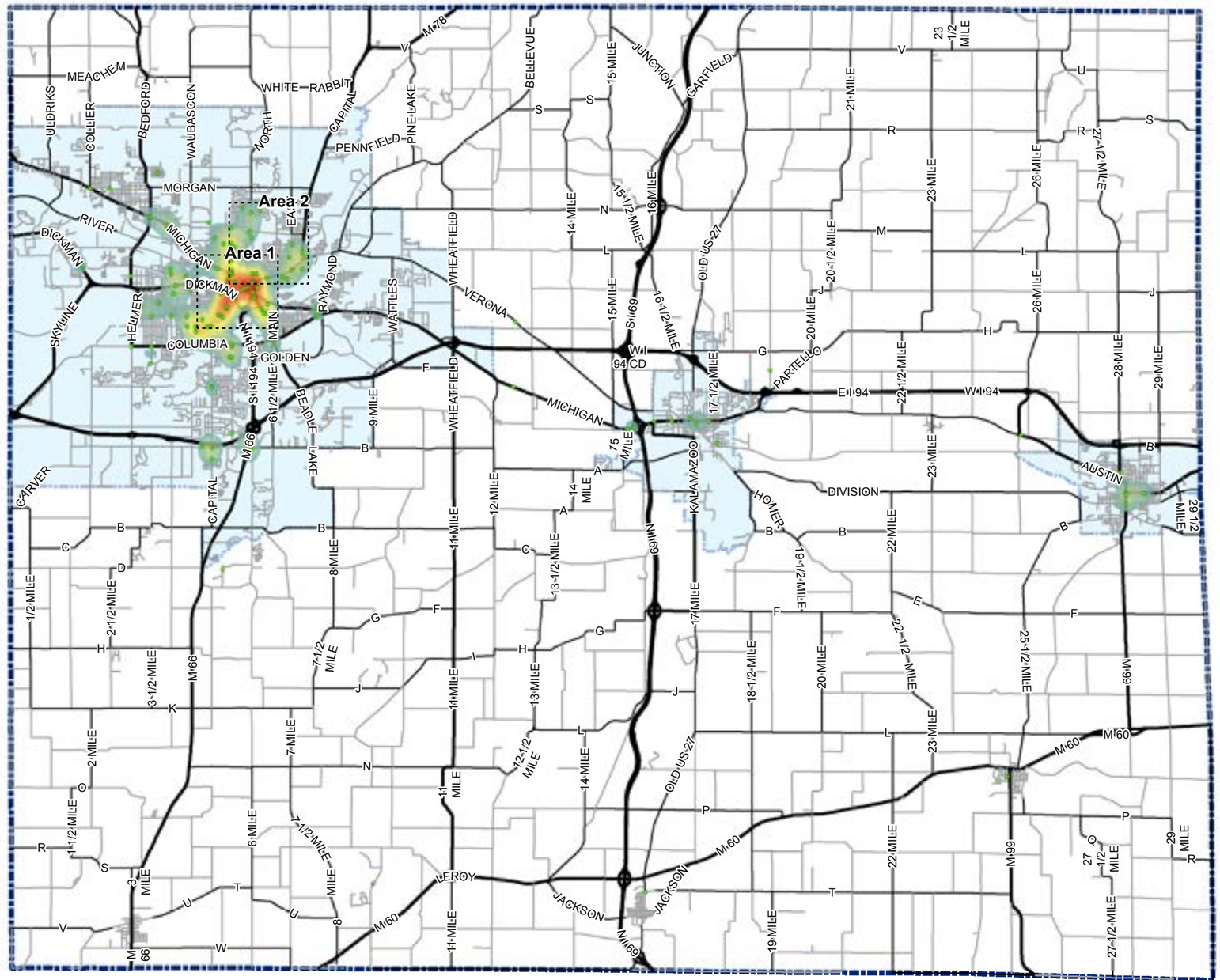
Area 1 1:40,000



Area 2 1:20,000



Calhoun County
2010 - 2014 Bicycle Crash Density



Legend

- Urban Boundary
- Calhoun County
- Bicycle Crash

Road Network

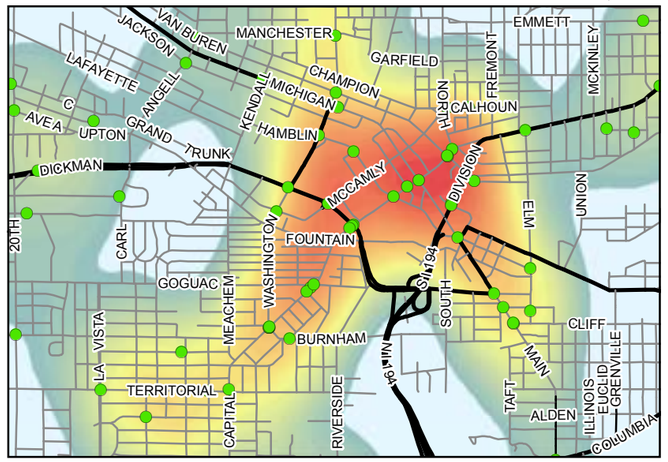
- State Trunkline
- County Primary
- All Other

Crash Density

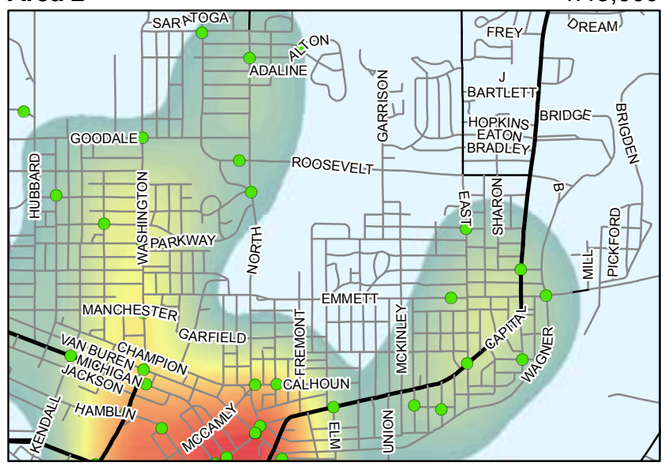
High

Low

Area 1 1:45,000



Area 2 1:45,000



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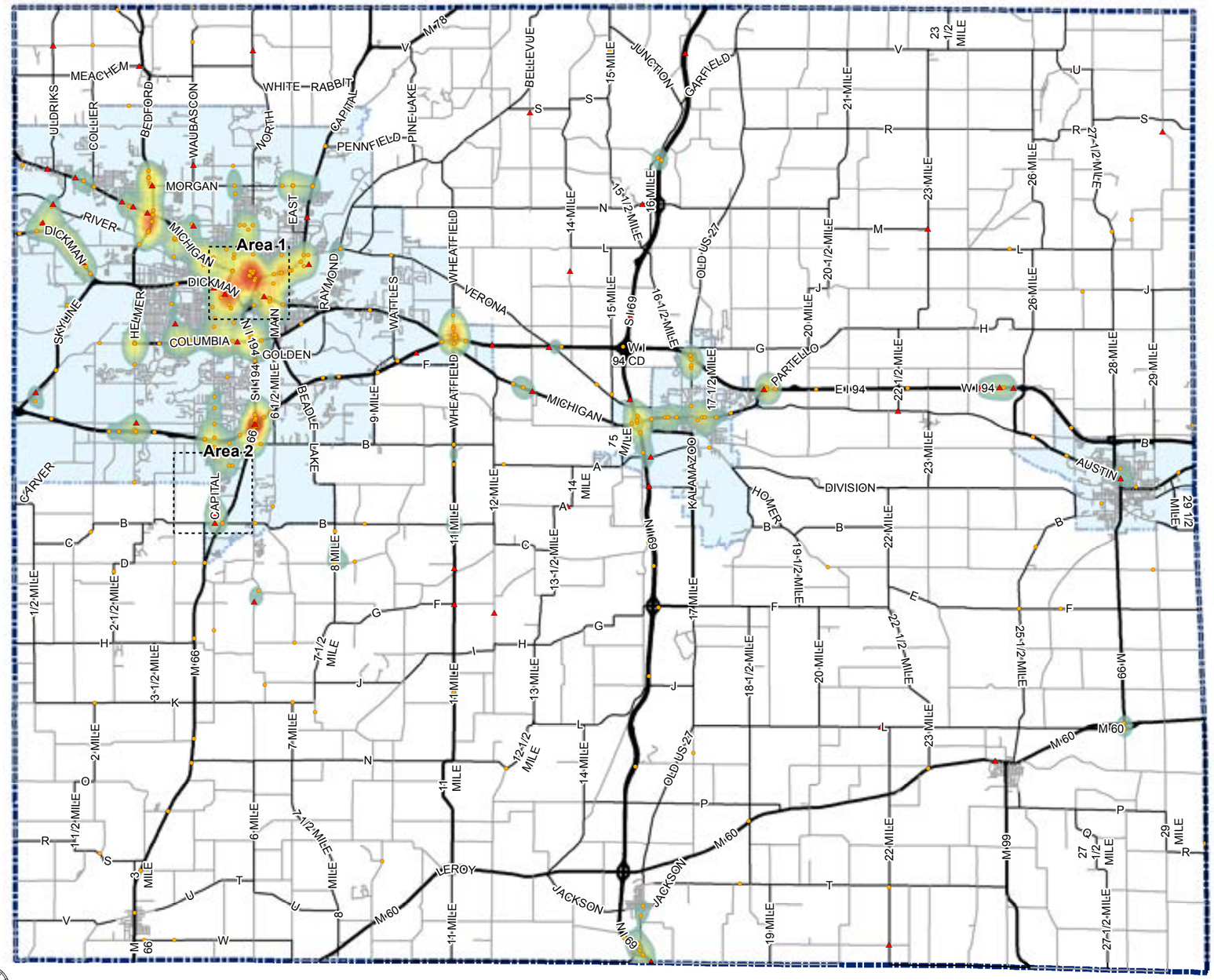
Calhoun County
2010 - 2014 KA Crash Density



Legend

- Urban Boundary
- Calhoun County
- A Level Injury
- Fatal

Road Network

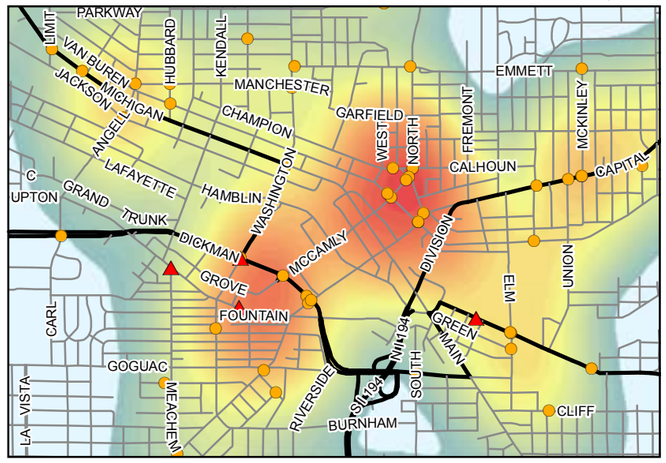
- State Trunkline
- County Primary
- All Other

Crash Density

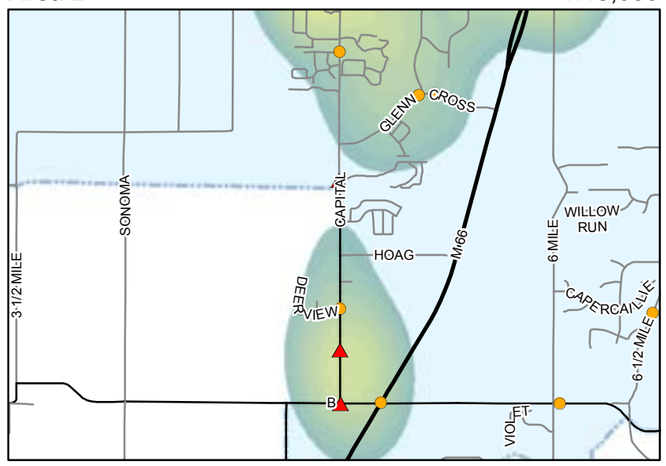
High

Low

Area 1 1:40,000



Area 2 1:45,000



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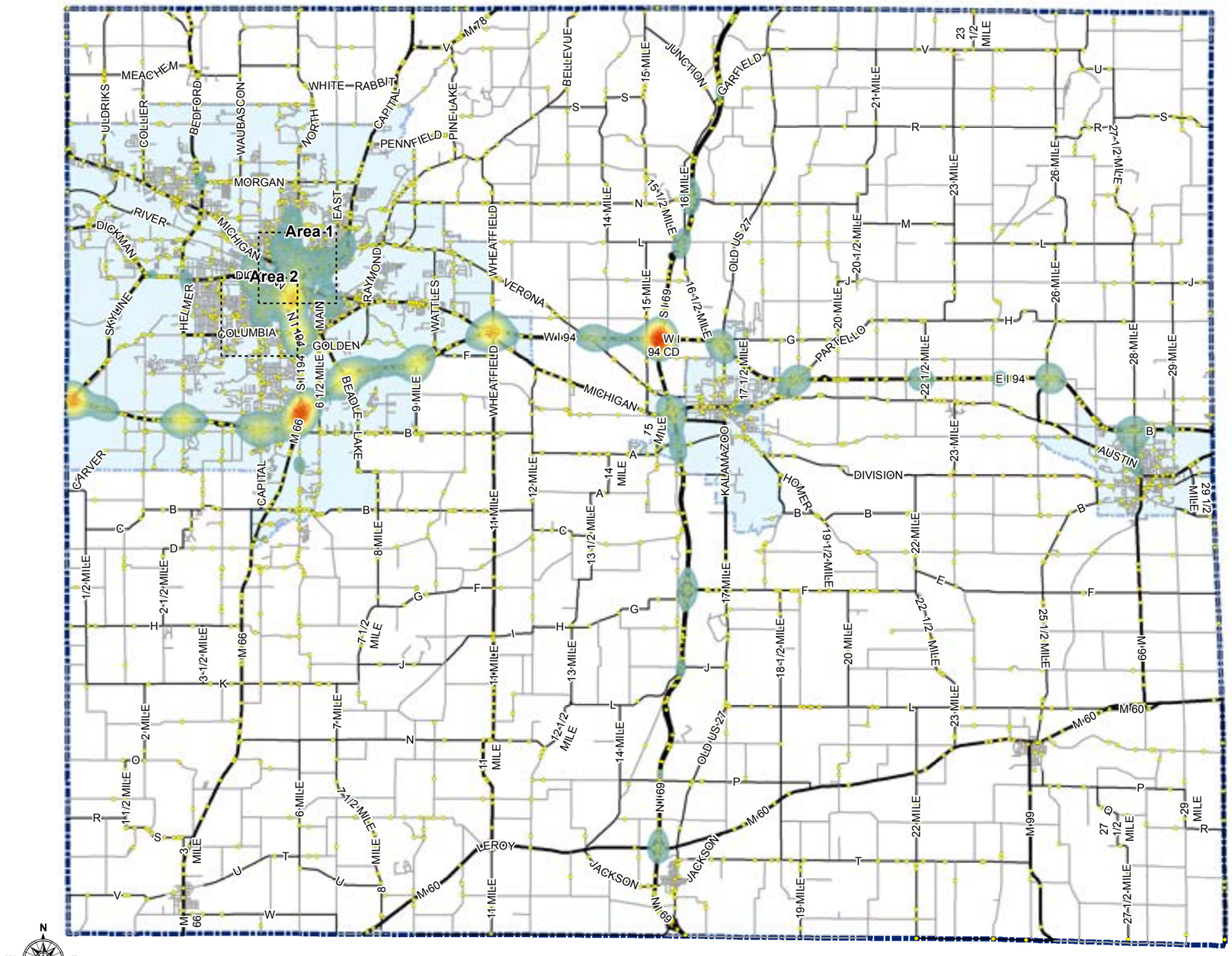
Calhoun County
2010 - 2014 Single Vehicle Lane Departure Crash Density



N W E S

0 1 2 4 6 8 Miles

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Legend

- Urban Boundary
- Calhoun County
- Single Veh Lane Departure

Road Network

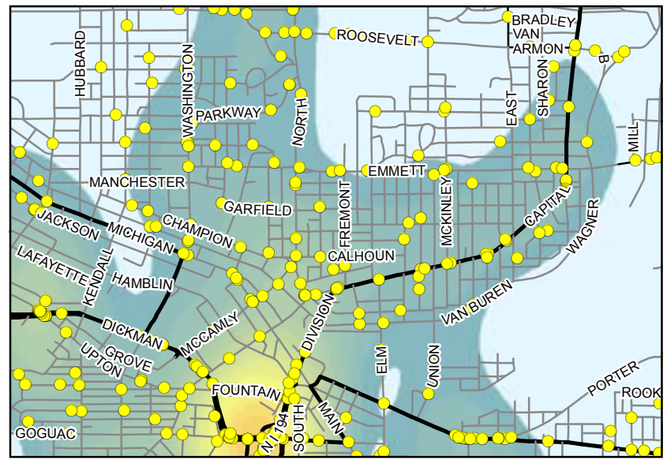
- State Trunkline
- County Primary
- All Other

Crash Density

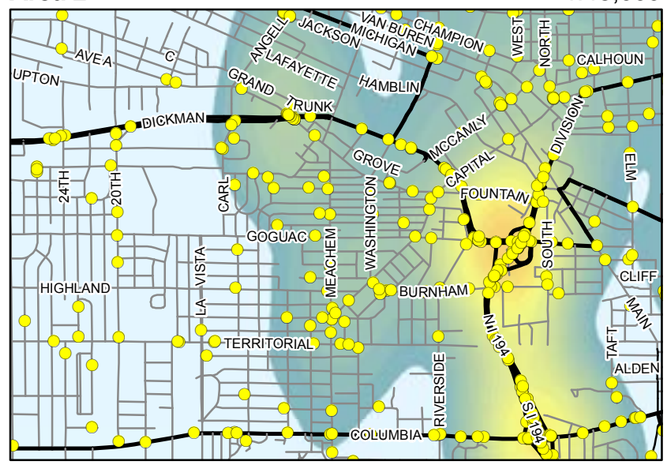
High

Low

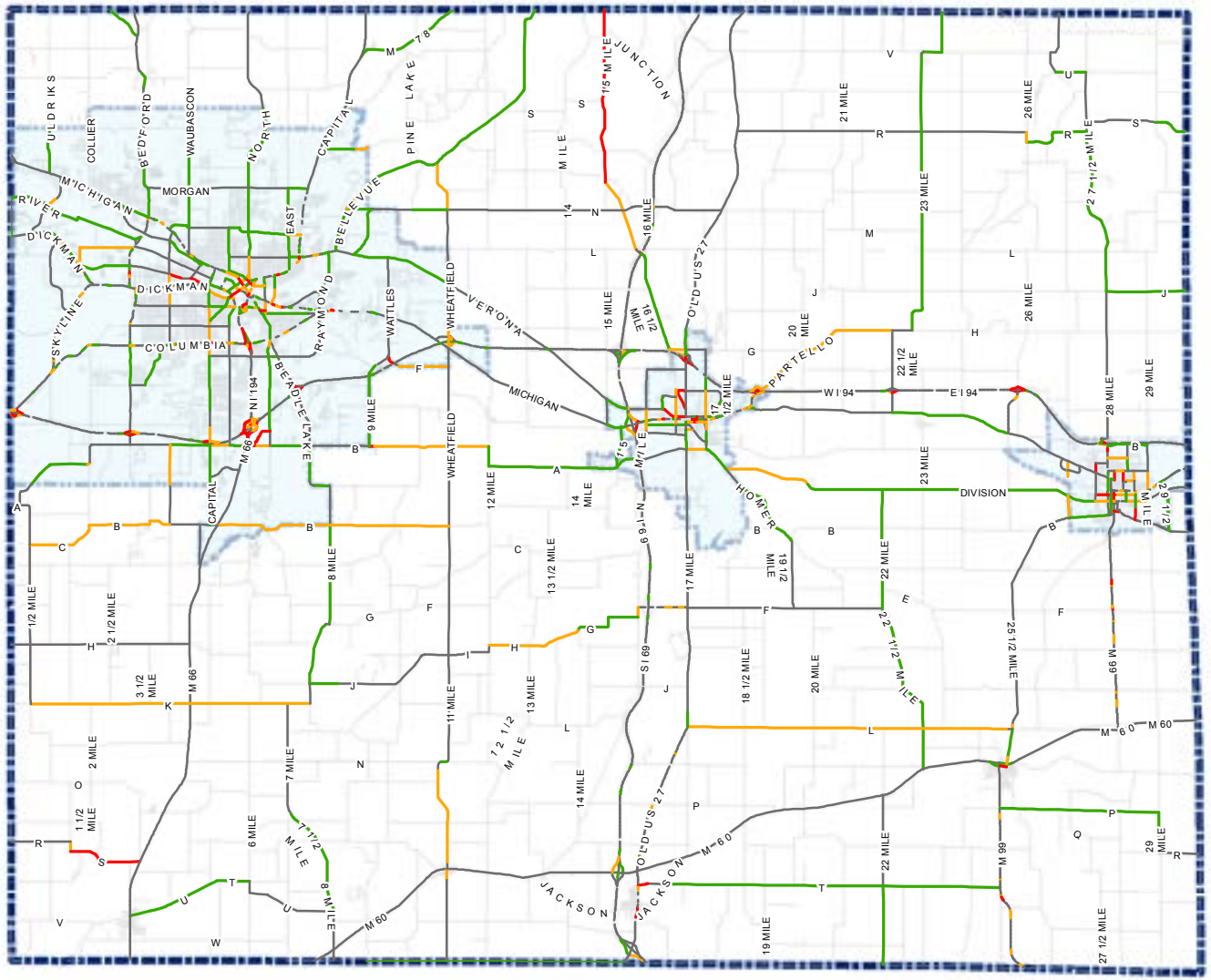
Area 1 1:45,000



Area 2 1:45,000



Calhoun County
Segment Crash Rate (2010 - 2014)



Legend

- Urban Boundary
- Calhoun County
- No Data

Segment Crash Rate (per 100 MVM)

- 128 or below
- 128 - 256
- 256 - 512
- 512 or higher

Note:
Segments less than 300 ft are not illustrated.
Segment crash rates are expressed in 100 Million Vehicle Miles (MVM) traveled.
The first category (i.e. 128 or below) represents the county dataset average segment crash rates. Successive categories represent segment crash rate in multiples of two, three, and four or more relative to the county average.

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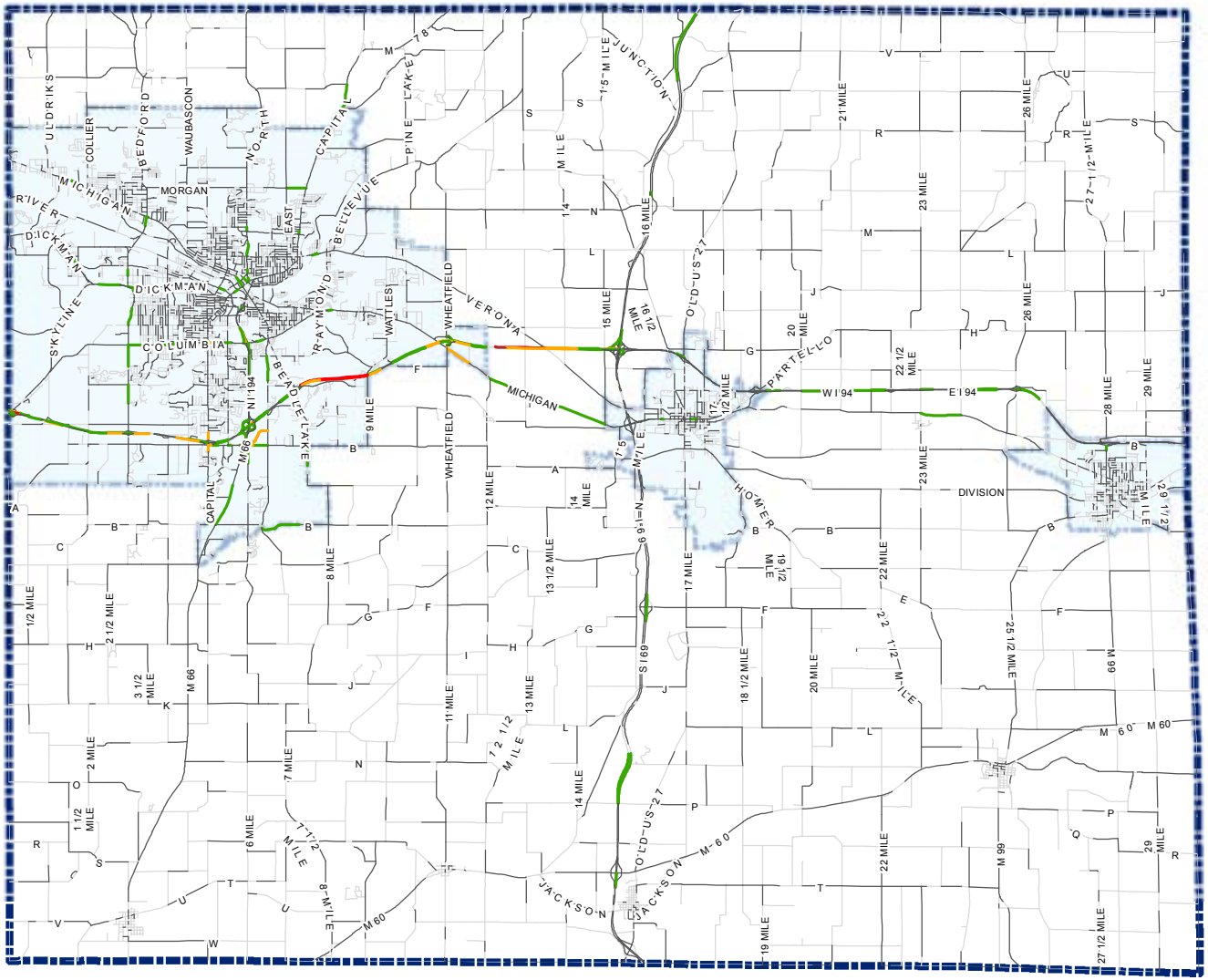
Calhoun County
Segment Crash Frequency (2010 - 2014)



Legend

- Urban Boundary
- Calhoun County
- No Reported Crashes

Segment Crashes per Year

- 2 or below
- 2 - 4
- 4 - 6
- 6 or more

0 1.5 3 6 9 12 Miles

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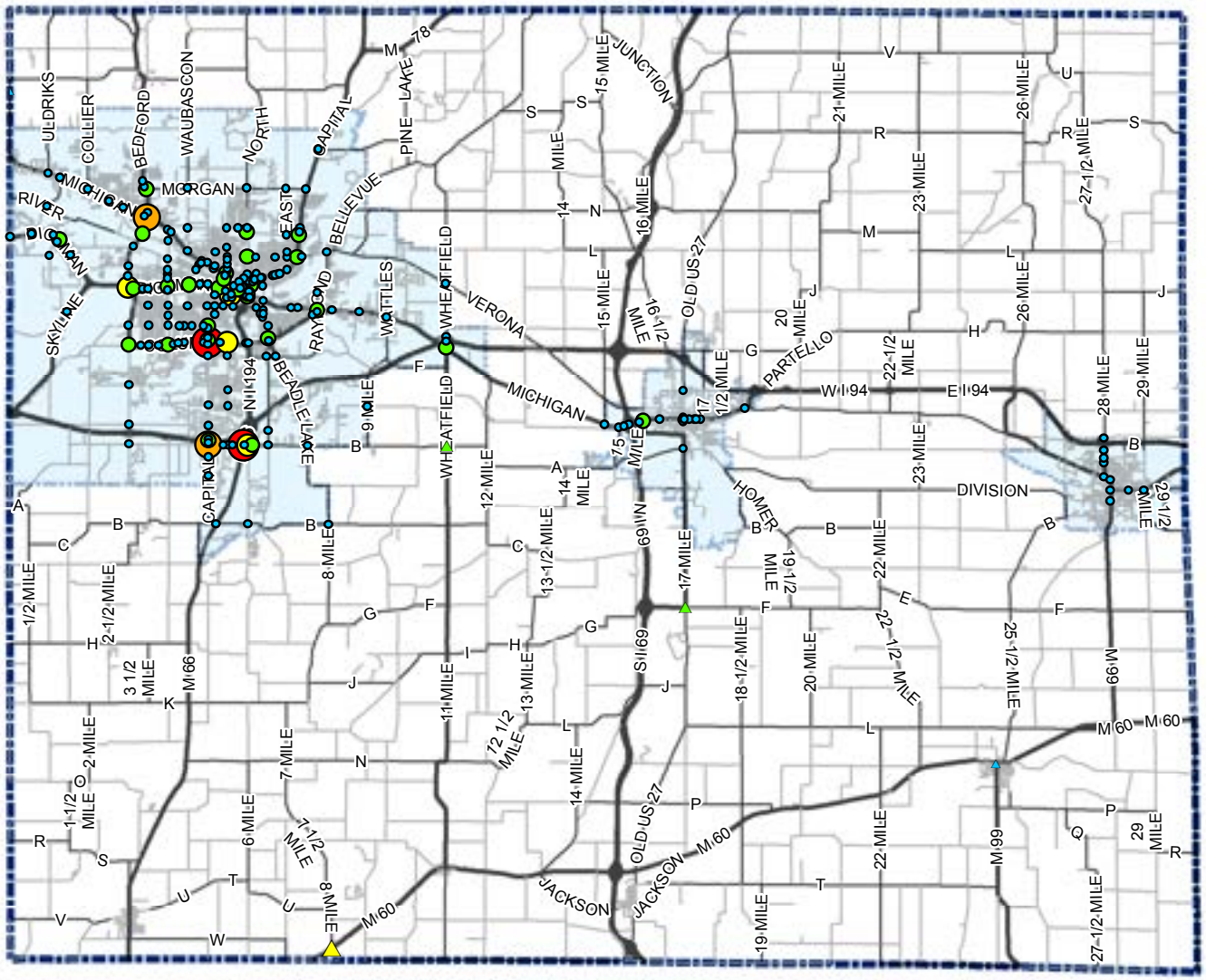
Calhoun County Intersections
Crashes per Year (2010 - 2014)



Legend

- Urban Boundary
- Calhoun County

Road Network

- State Trunkline
- County Primary
- All Other

Intersection Urban Crashes/Year

- 0 - 5
- 5 - 10
- 10 - 15
- 15 - 20
- 20 or More

Intersection Rural Crashes/Year

- 0 - 1
- 1 - 2
- 2 - 3
- 3 - 4
- 4 or More

Note:
Urban intersections with less than five crashes between 2010 and 2014 are not included. Rural intersections with less than three crashes between 2010 and 2014 are not included.

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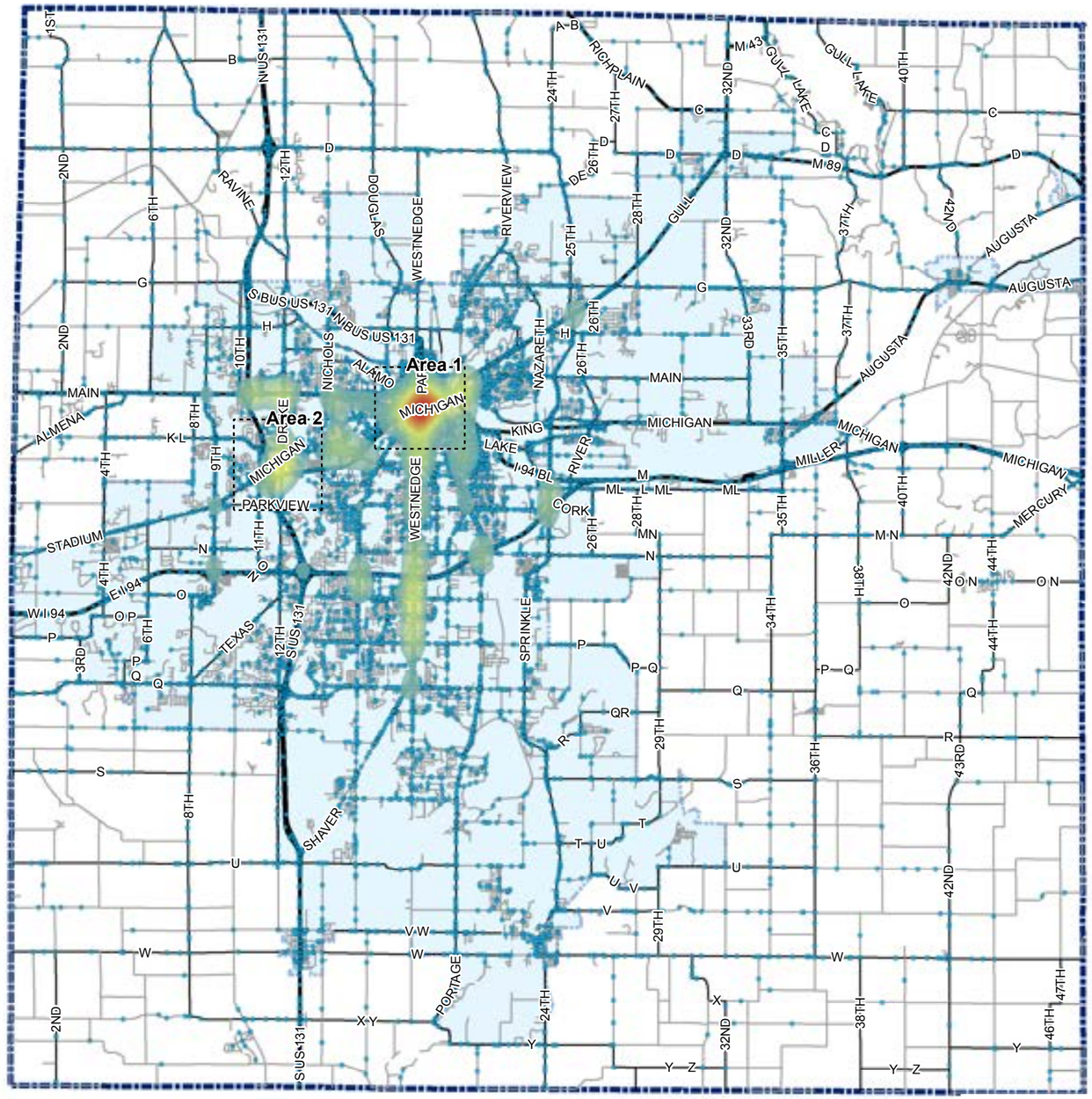
Kalamazoo County
2010 - 2014 Crash Density



0 1 2 4 6 8 Miles

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Legend

- Urban Boundary
- Kalamazoo County
- Crash

Road Network

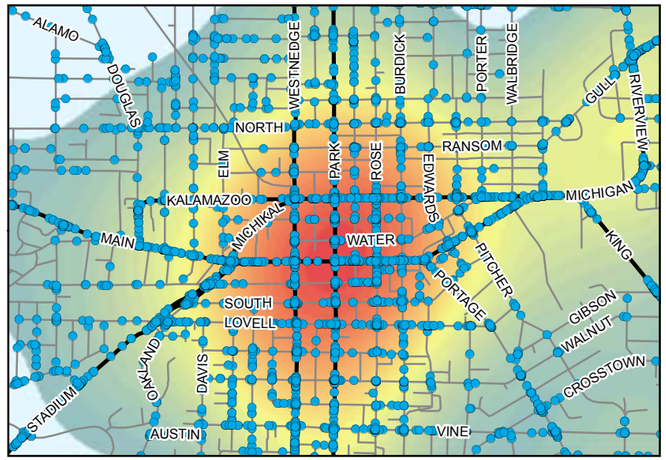
- State Trunkline
- County Primary
- All Other

Crash Density

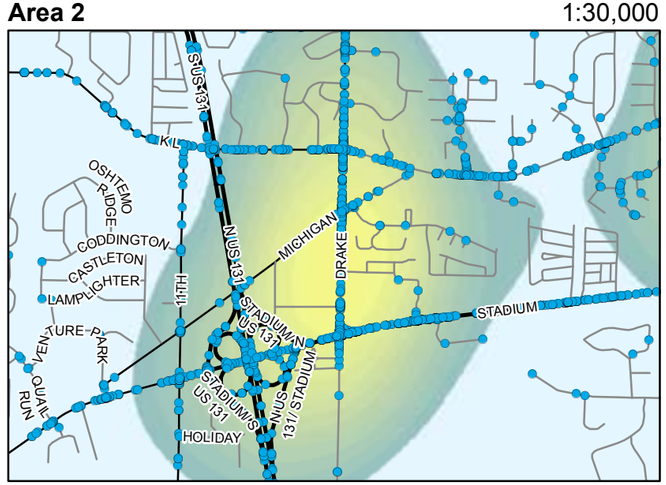
High

Low

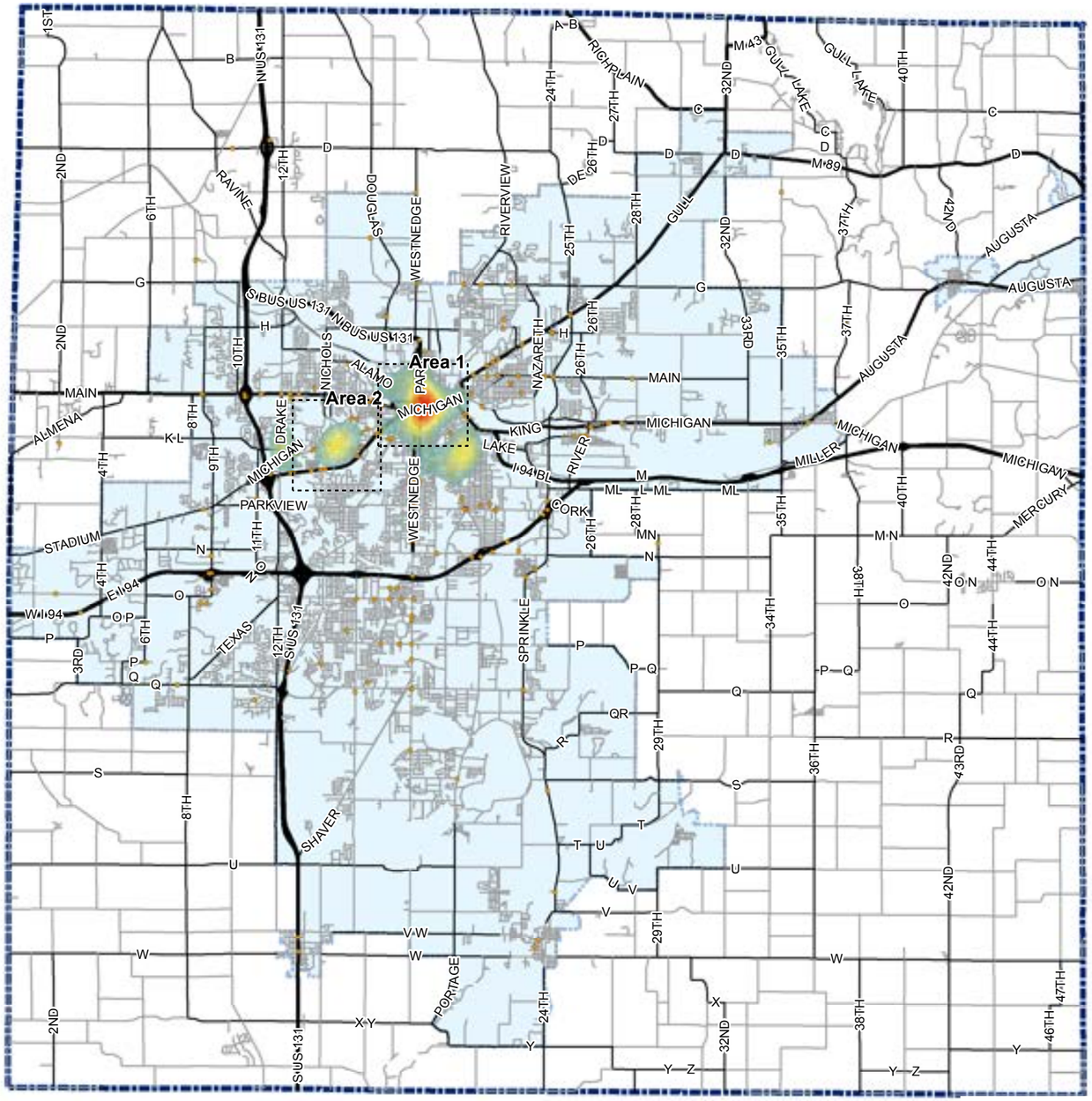
Area 1 1:30,000



Area 2 1:30,000



Kalamazoo County
2010 - 2014 Ped Crash Density



Legend

- Urban Boundary
- Kalamazoo County
- Ped Crash

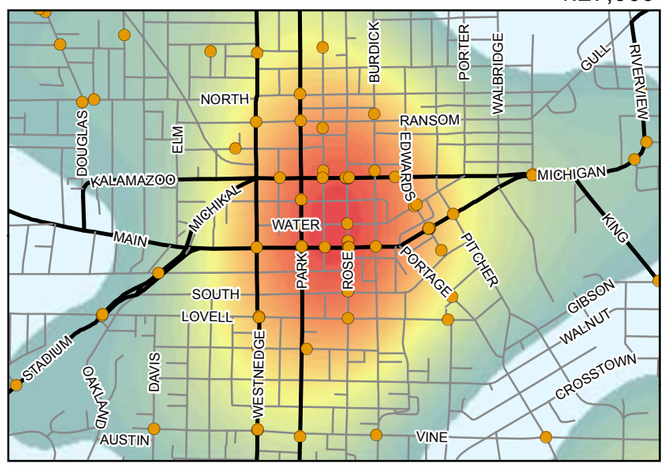
Road Network

- State Trunkline
- County Primary
- All Other

Crash Density

- High
- Low

Area 1 1:27,000



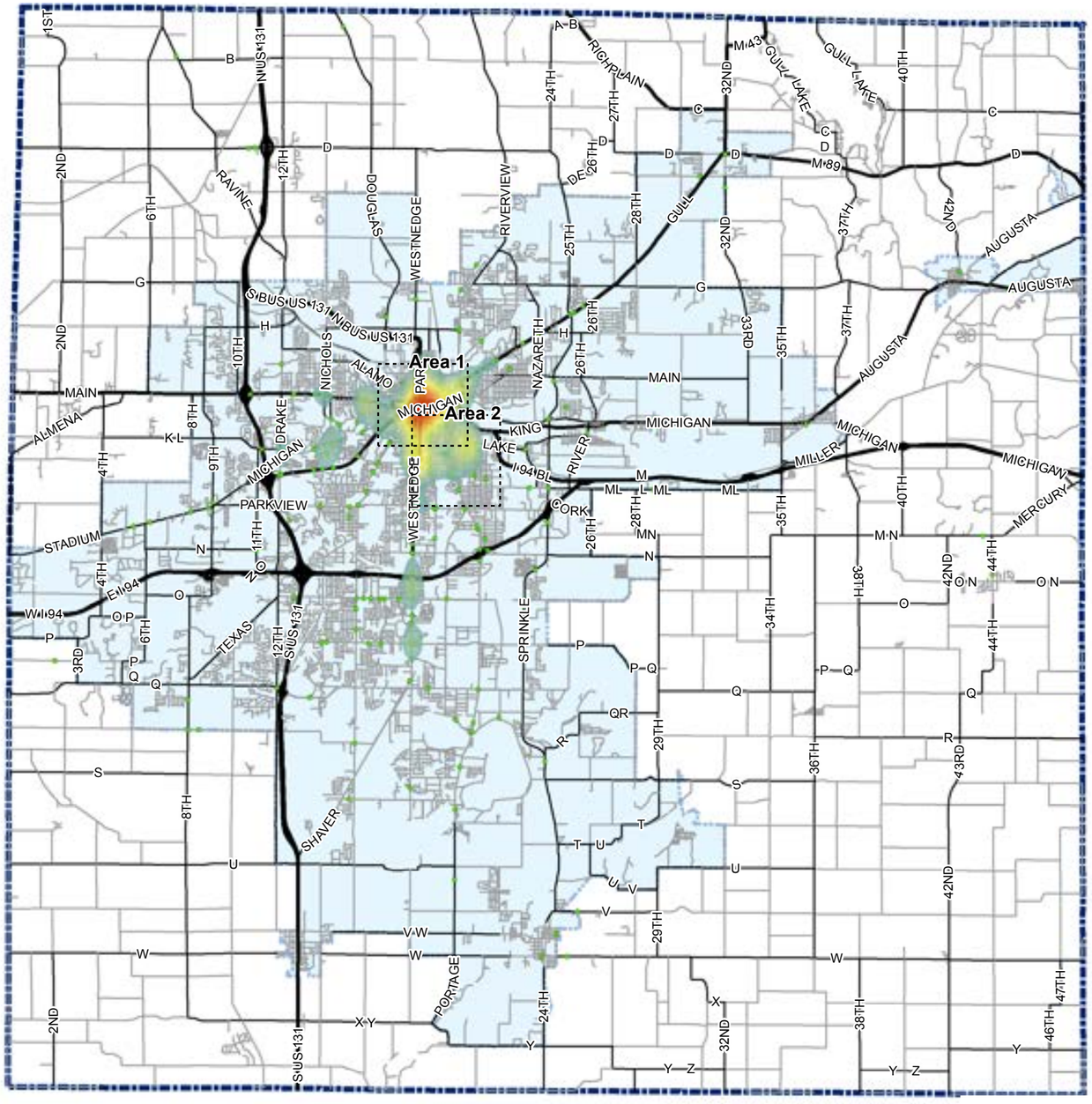
Area 2 1:20,000

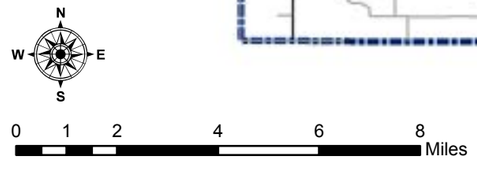
N W E S

0 1 2 4 6 8 Miles

HRC
HUBBELL, ROTH & CLARK, INC
CONSULTING ENGINEERS SINCE 1915

Kalamazoo County
2010 - 2014 Bicycle Crash Density





0 1 2 4 6 8 Miles

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Legend

- Urban Boundary
- Kalamazoo County
- Bicycle Crash

Road Network

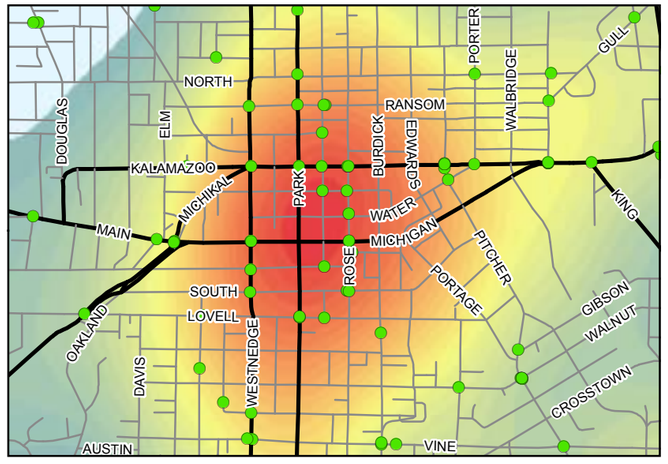
- State Trunkline
- County Primary
- All Other

Crash Density

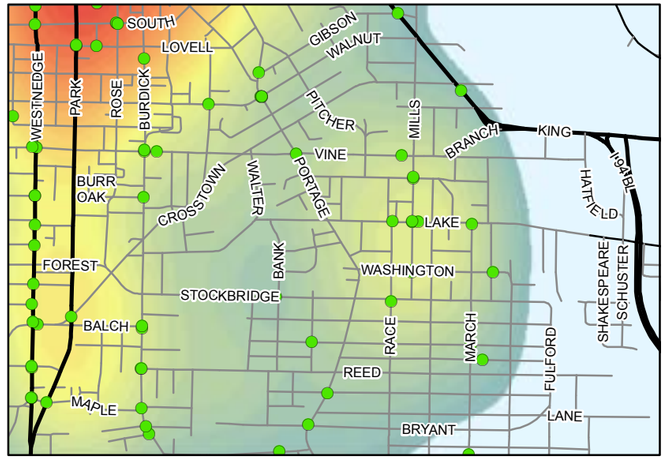
High

Low

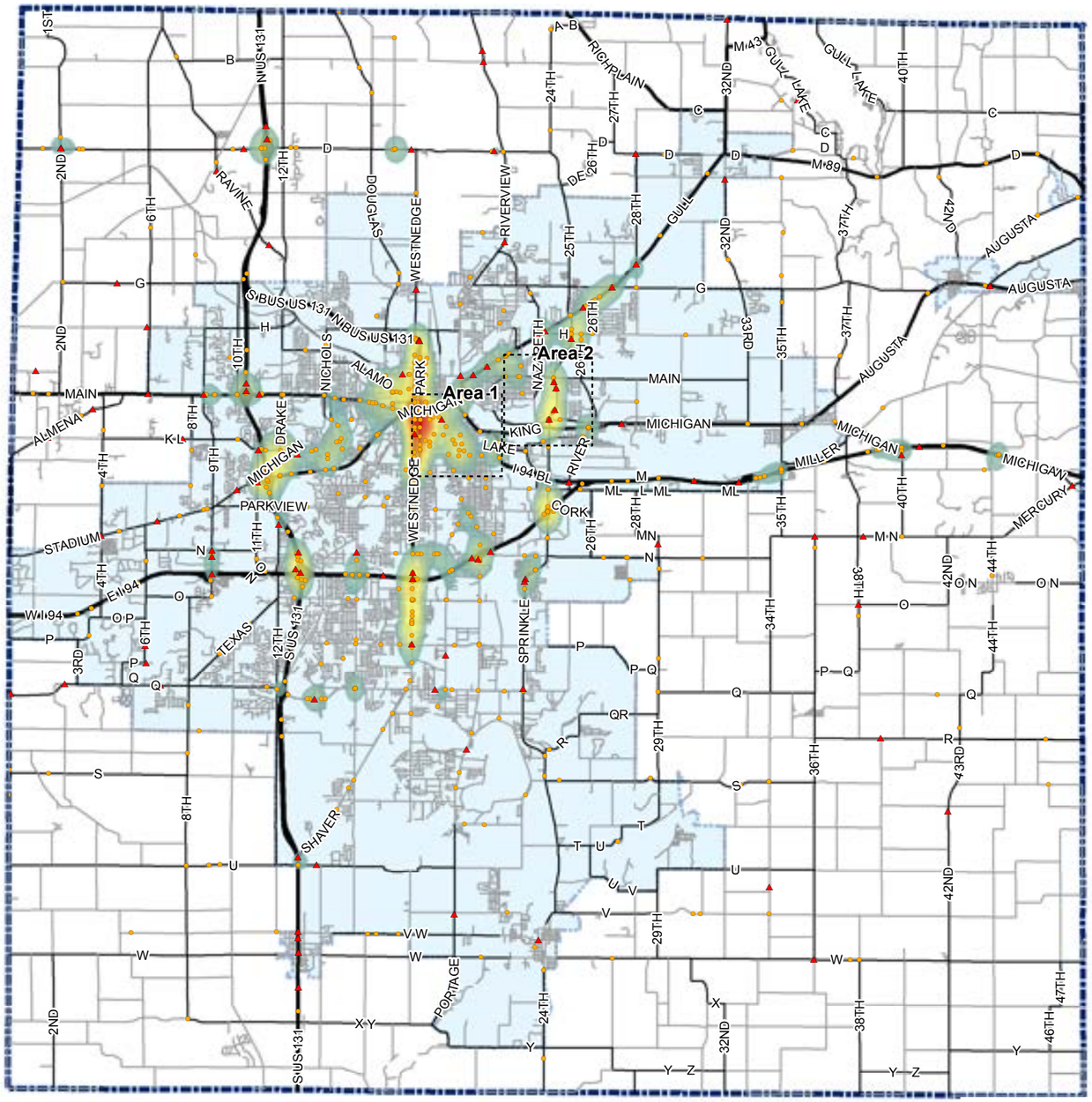
Area 1 1:25,000



Area 2 1:30,000



Kalamazoo County
2010 - 2014 KA Crash Density



Legend

- Urban Boundary
- Kalamazoo County
- A Level Injury
- Fatal

Road Network

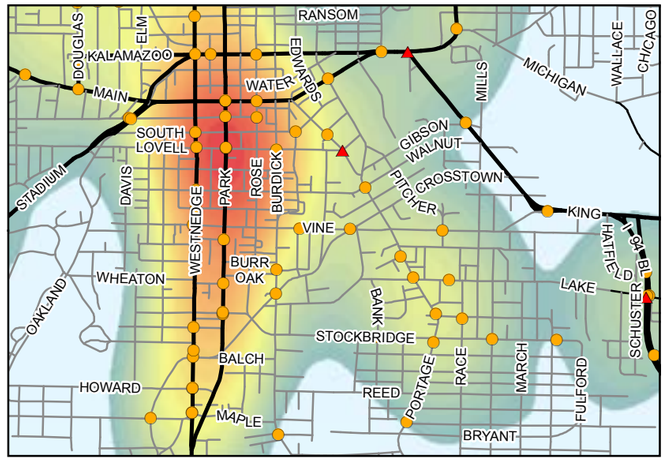
- State Trunkline
- County Primary
- All Other

Crash Density

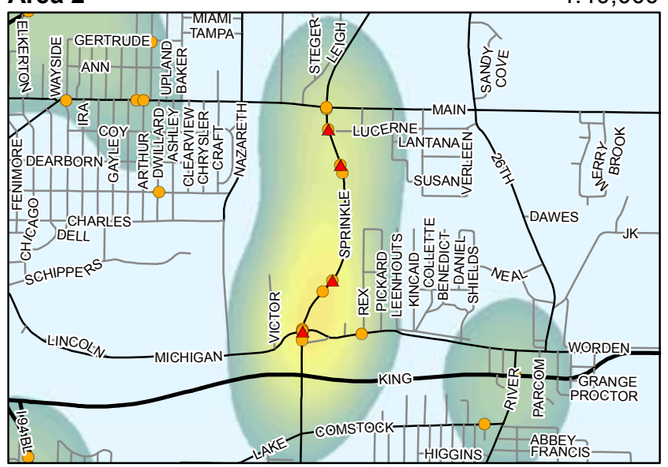
High

Low

Area 1 1:40,000



Area 2 1:40,000



N W E S

0 1 2 4 6 8 Miles

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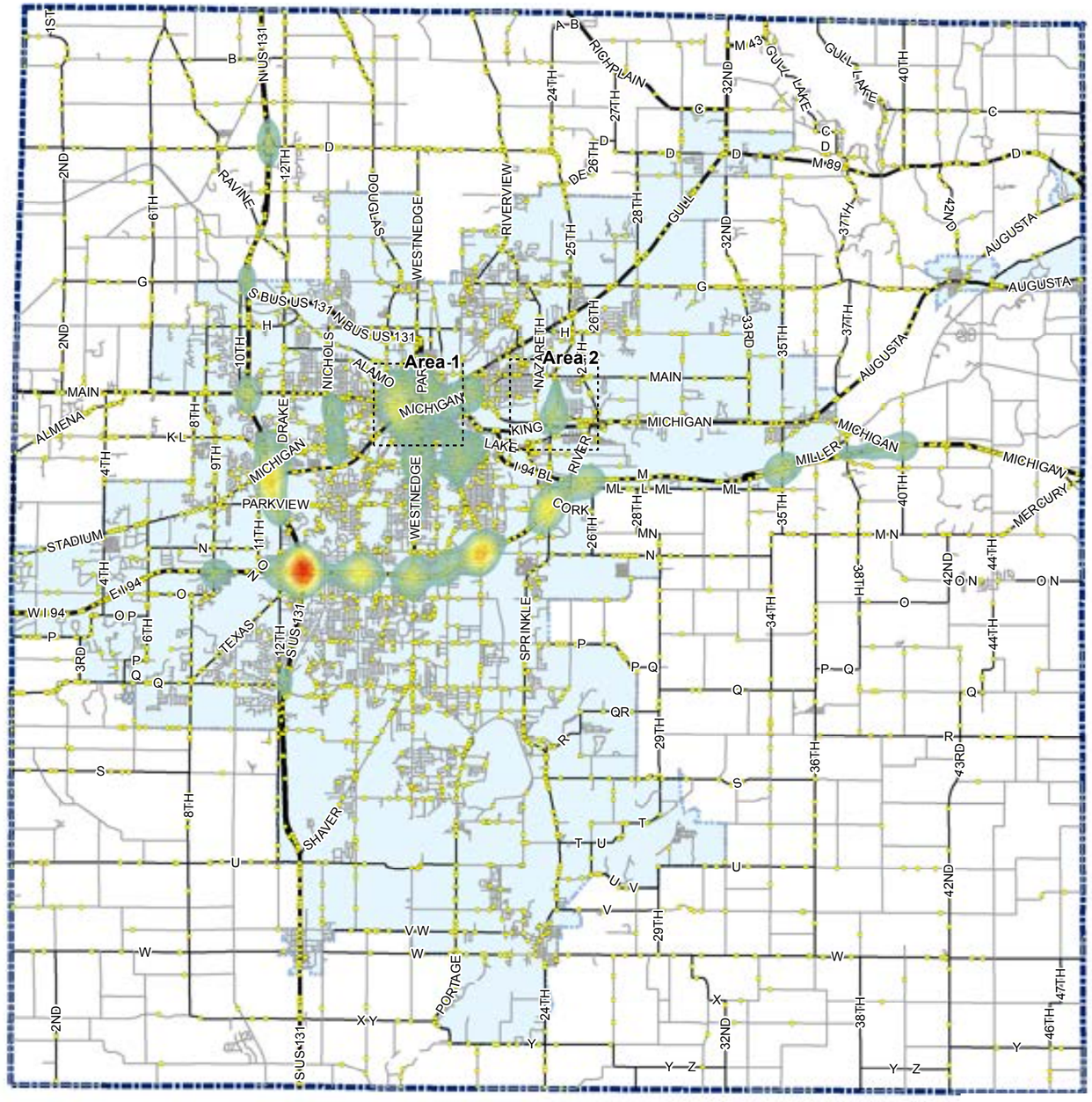
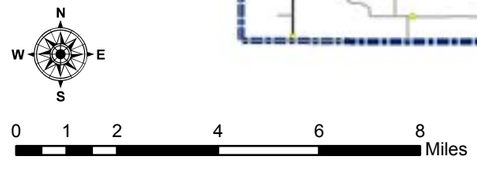
Kalamazoo County
2010 - 2014 Single Vehicle Lane Departure Crash Density





Legend

- Urban Boundary
- Kalamazoo County
- Single Veh Lane Departure

Road Network

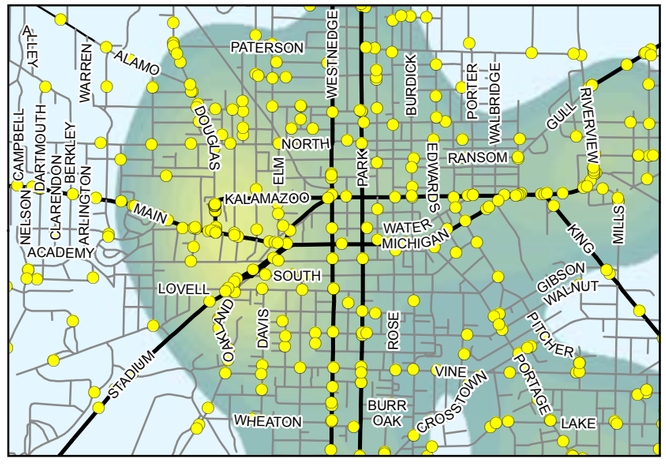
- State Trunkline
- County Primary
- All Other

Crash Density

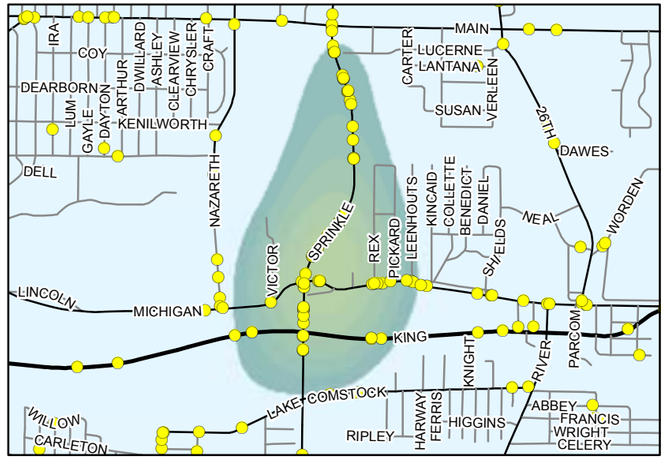
High

Low

Area 1 1:40,000



Area 2 1:35,000



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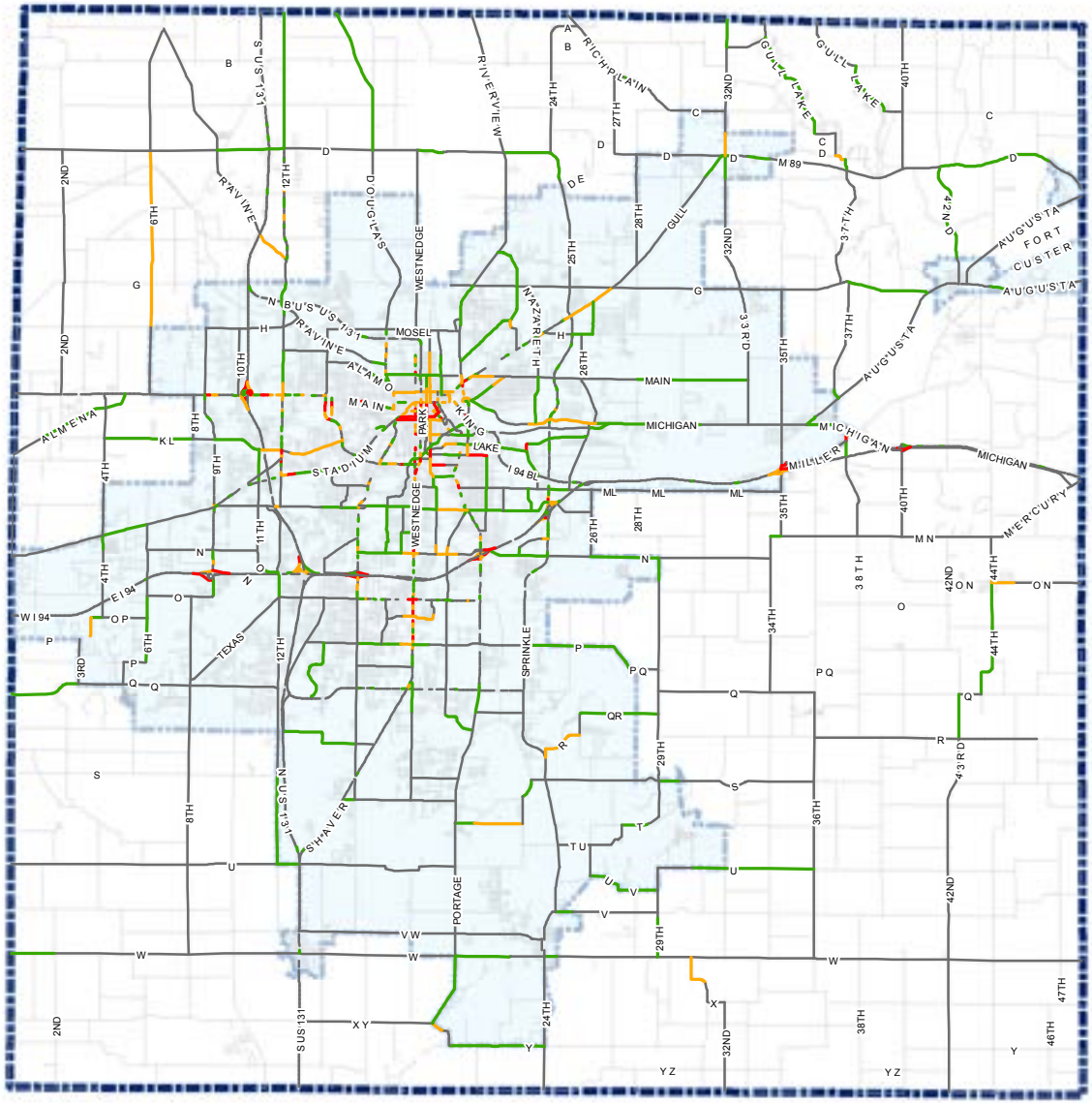
Kalamazoo County
Segment Crash Rate (2010 - 2014)



Legend

- Urban Boundary
- Kalamazoo County
- No Data

Segment Crash Rate (per 100 MVM)

- 147 or below
- 147 - 294
- 294 -589
- 589 or higher

Note:
Segments less than 300 ft are not illustrated.
Segment crash rates are expressed in 100 Million Vehicle Miles (MVM) traveled.
The first category (i.e. 147 or below) represents the county dataset average segment crash rates. Successive categories represent segment crash rate in multiples of two, three, and four or more relative to the county average.

0 1.5 3 6 9 12 Miles

N W E S

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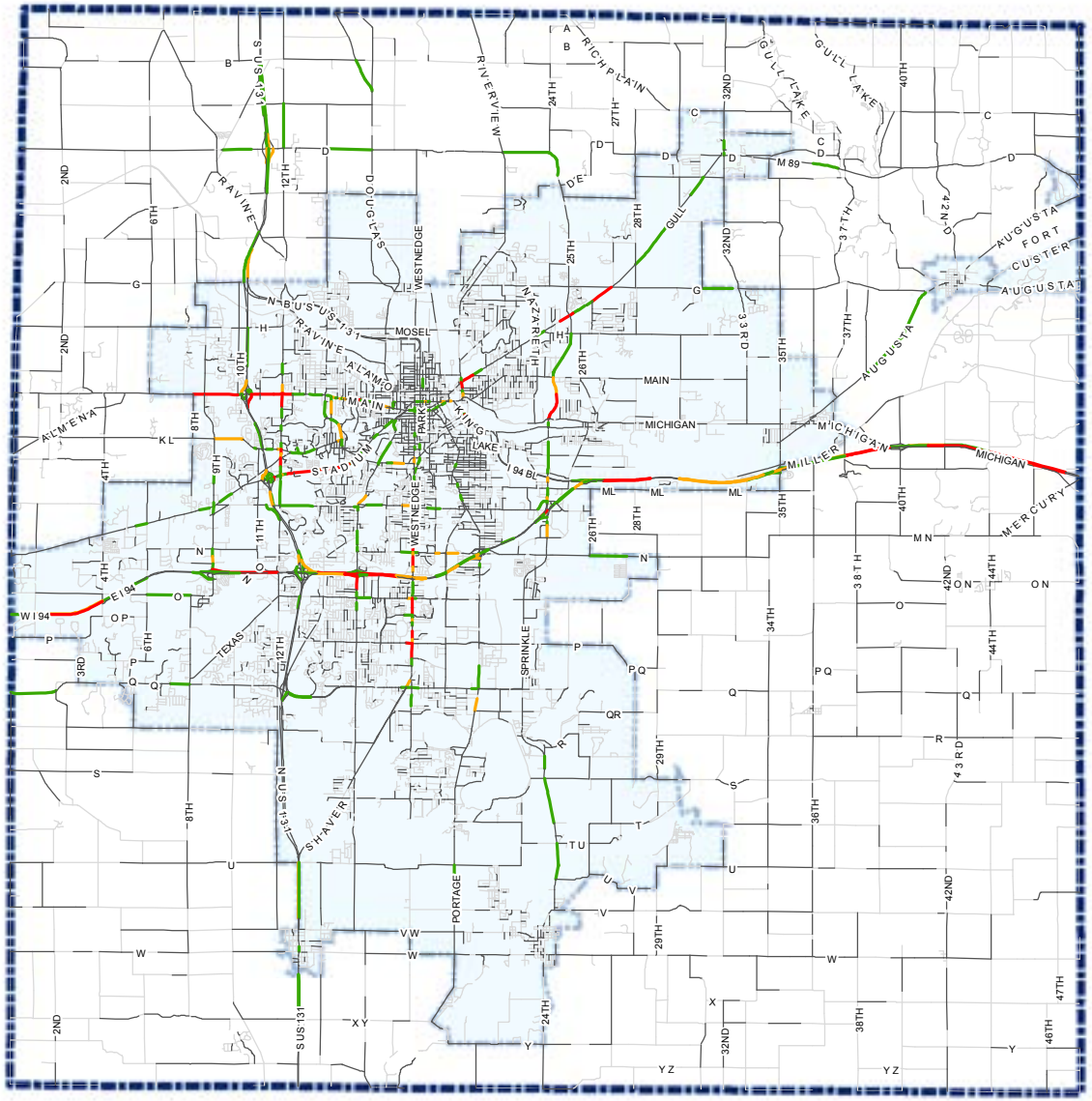
Kalamazoo County
Segment Crash Frequency (2010 - 2014)



Legend

- Urban Boundary
- Kalamazoo County
- No Reported Crashes

Segment Crashes per Year

- 2 or below
- 2 - 4
- 4 - 6
- 6 or more

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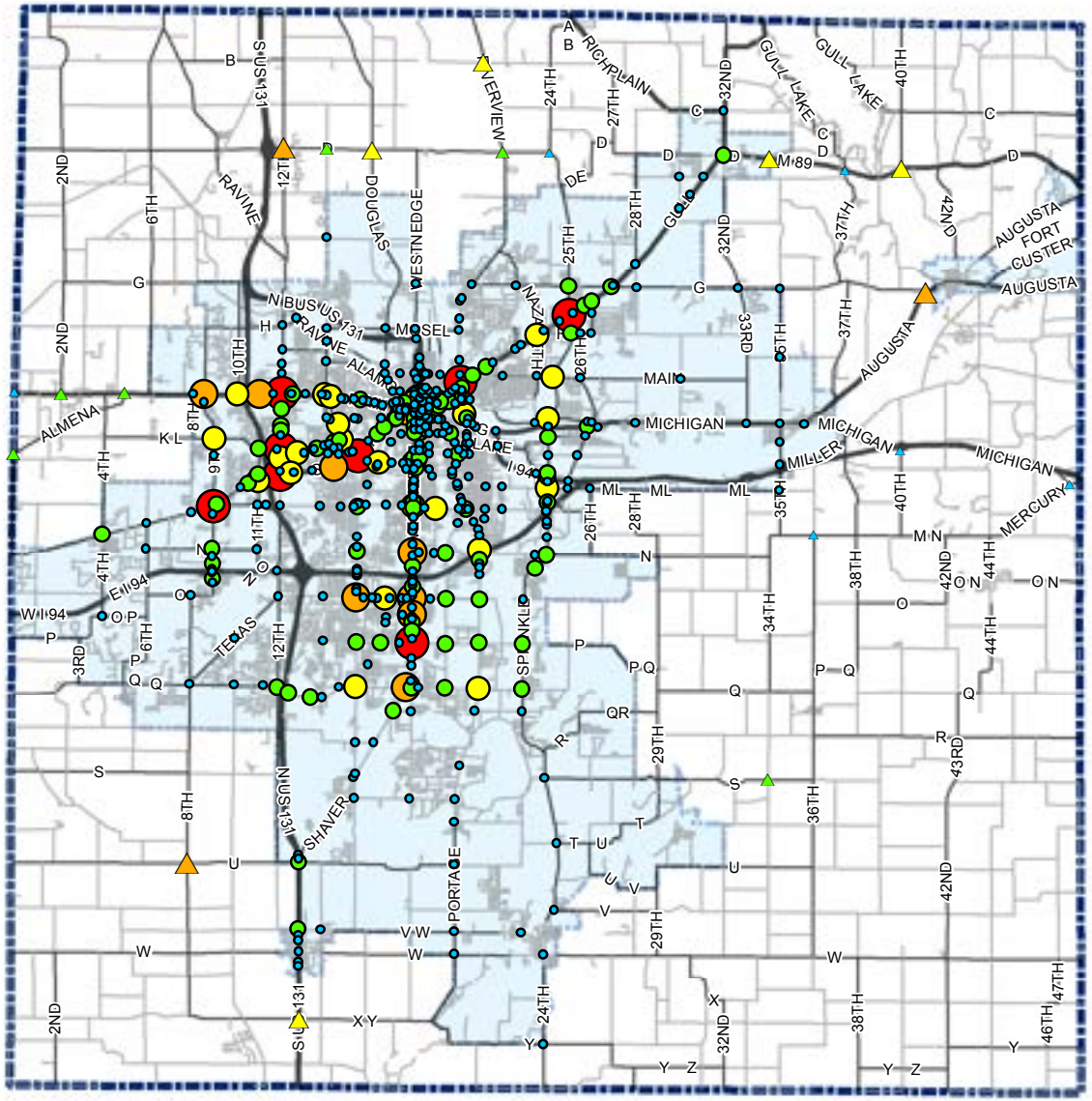
Kalamazoo County Intersections Crashes per Year (2010 - 2014)



Legend

- Urban Boundary
- Kalamazoo County

Road Network

- State Trunkline
- County Primary
- All Other

Intersection Urban Crashes/Year

- 0 - 5
- 5 - 10
- 10 - 15
- 15 - 20
- 20 or More

Intersection Rural Crashes/Year

- 0 - 1
- 1 - 2
- 2 - 3
- 3 - 4
- 4 or More

Note:
Urban intersections with less than five crashes between 2010 and 2014 are not included. Rural intersections with less than three crashes between 2010 and 2014 are not included.

0 1.5 3 6 9 12 Miles

N W E S

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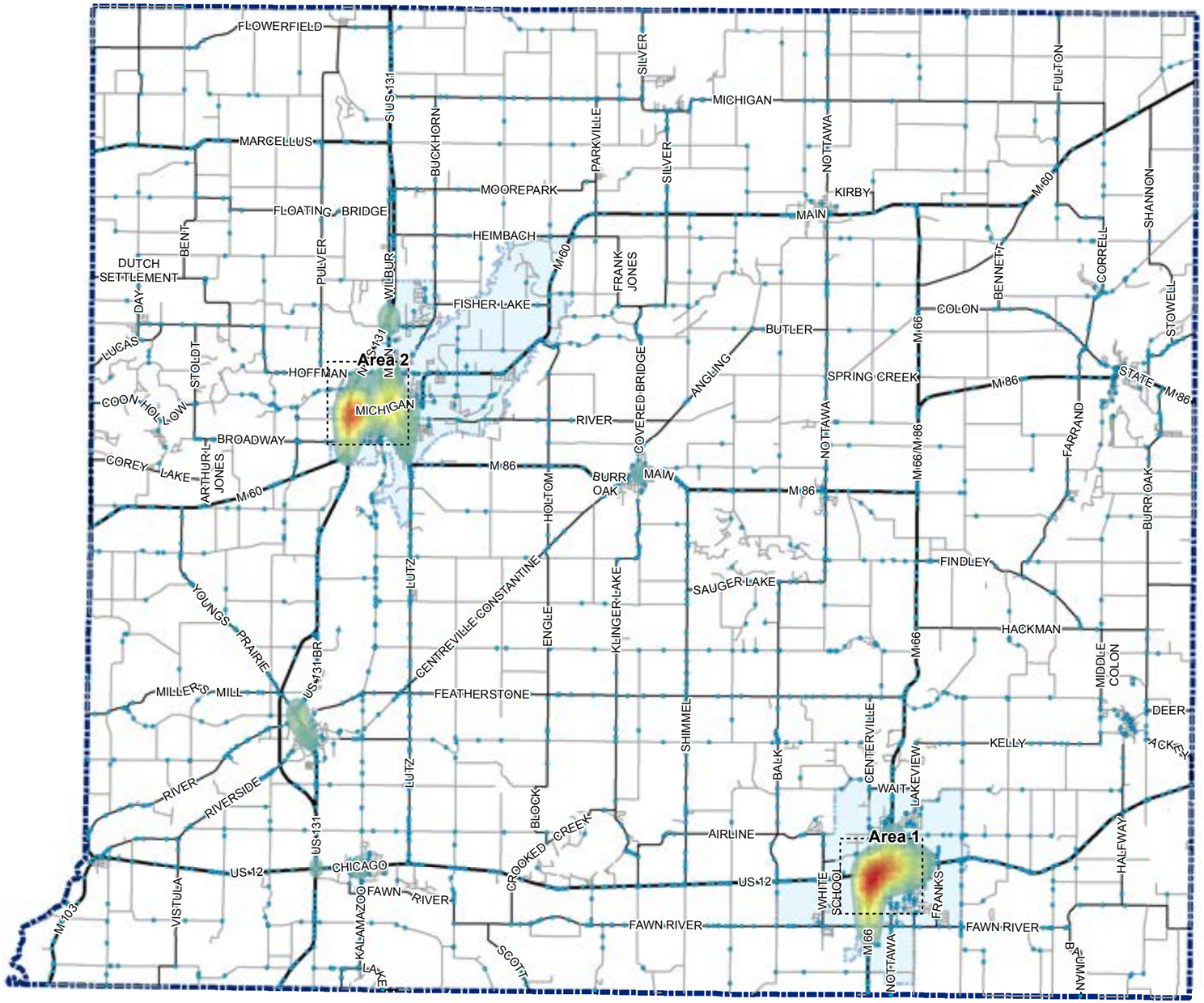
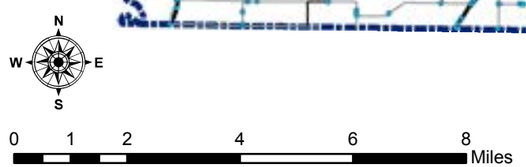
St. Joseph County
2010 - 2014 Crash Density





0 1 2 4 6 8 Miles

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Legend

- Urban Boundary
- St. Joseph County
- Crash

Road Network

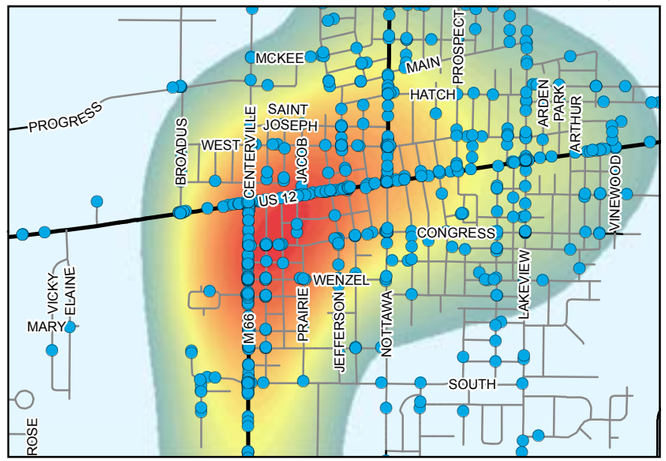
- State Trunkline
- County Primary
- All Other

Crash Density

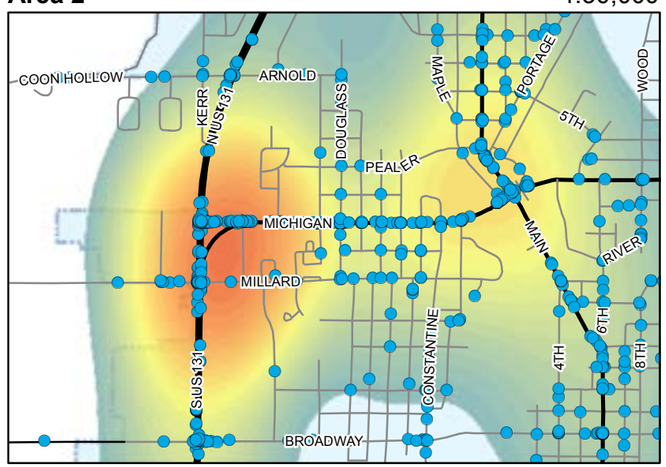
High

Low

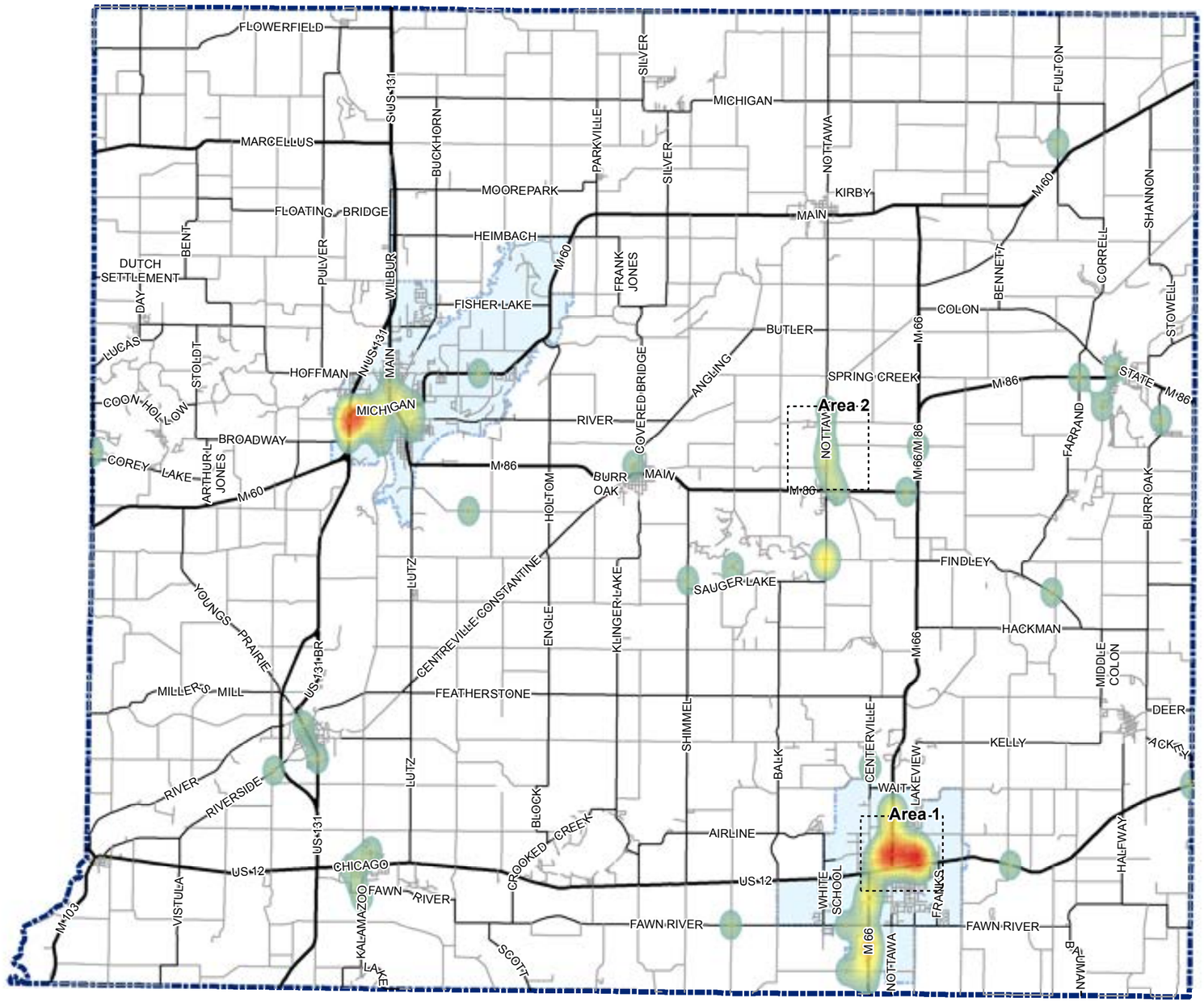
Area 1 1:35,000



Area 2 1:30,000



St. Joseph County
2010 - 2014 Ped Crash Density



Legend

- Urban Boundary
- St. Joseph County
- Ped Crash

Road Network

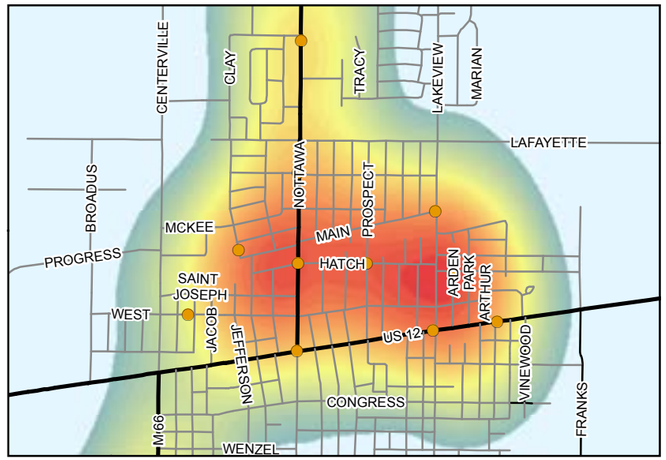
- State Trunkline
- County Primary
- All Other

Crash Density

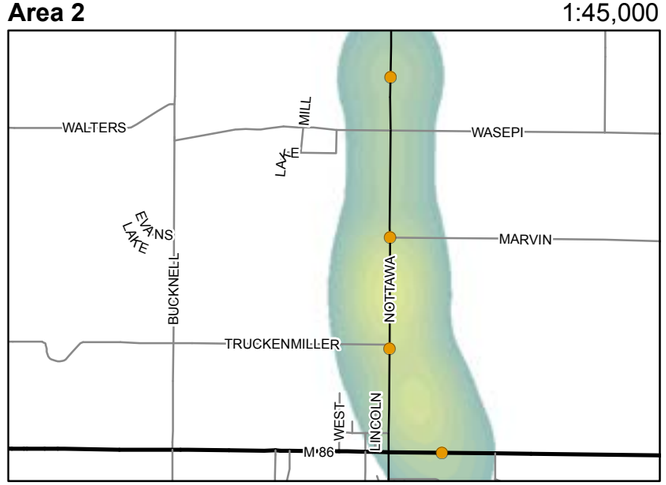
High

Low

Area 1 1:35,000



Area 2 1:45,000



0 1 2 4 6 8 Miles

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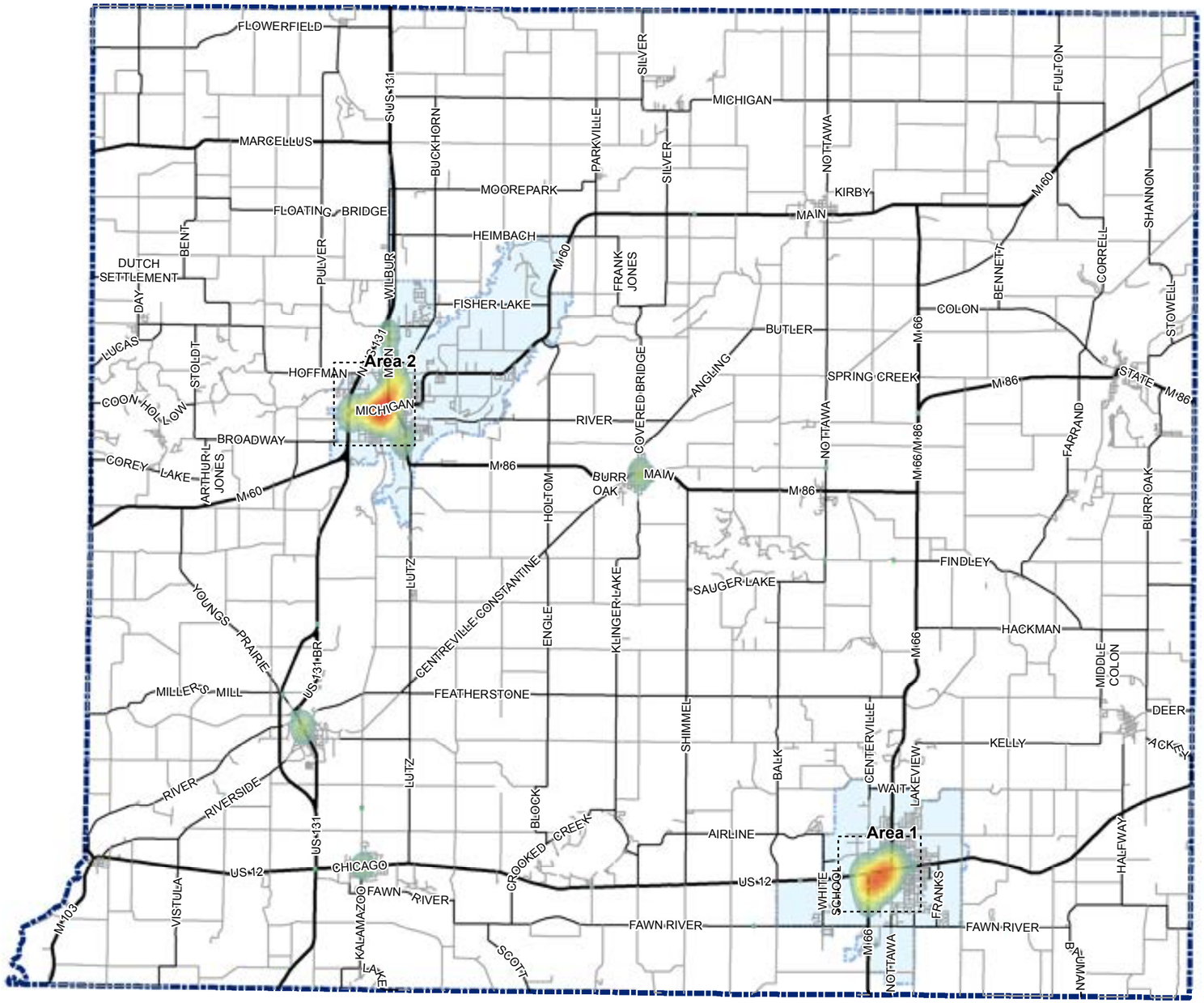
St. Joseph County
2010 - 2014 Bicycle Crash Density



N
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S

0 1 2 4 6 8 Miles

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Legend

- Urban Boundary
- St. Joseph County
- Bicycle Crash

Road Network

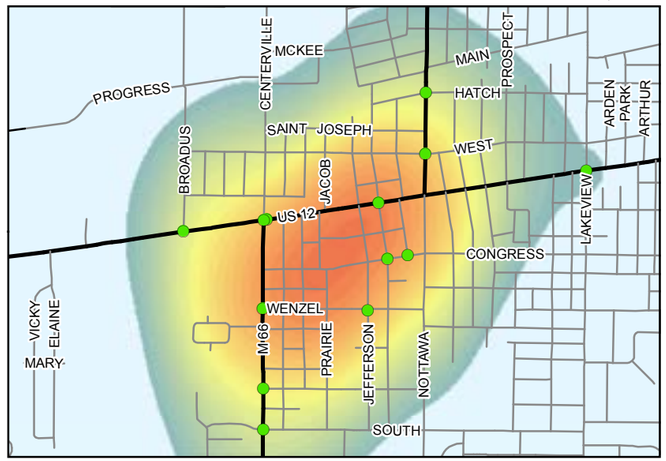
- State Trunkline
- County Primary
- All Other

Crash Density

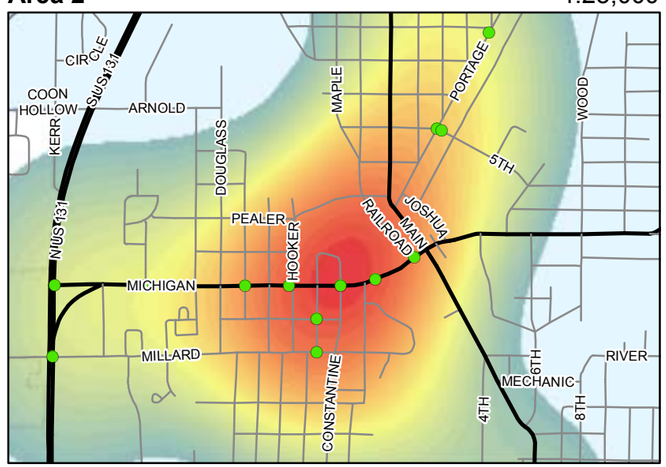
High

Low

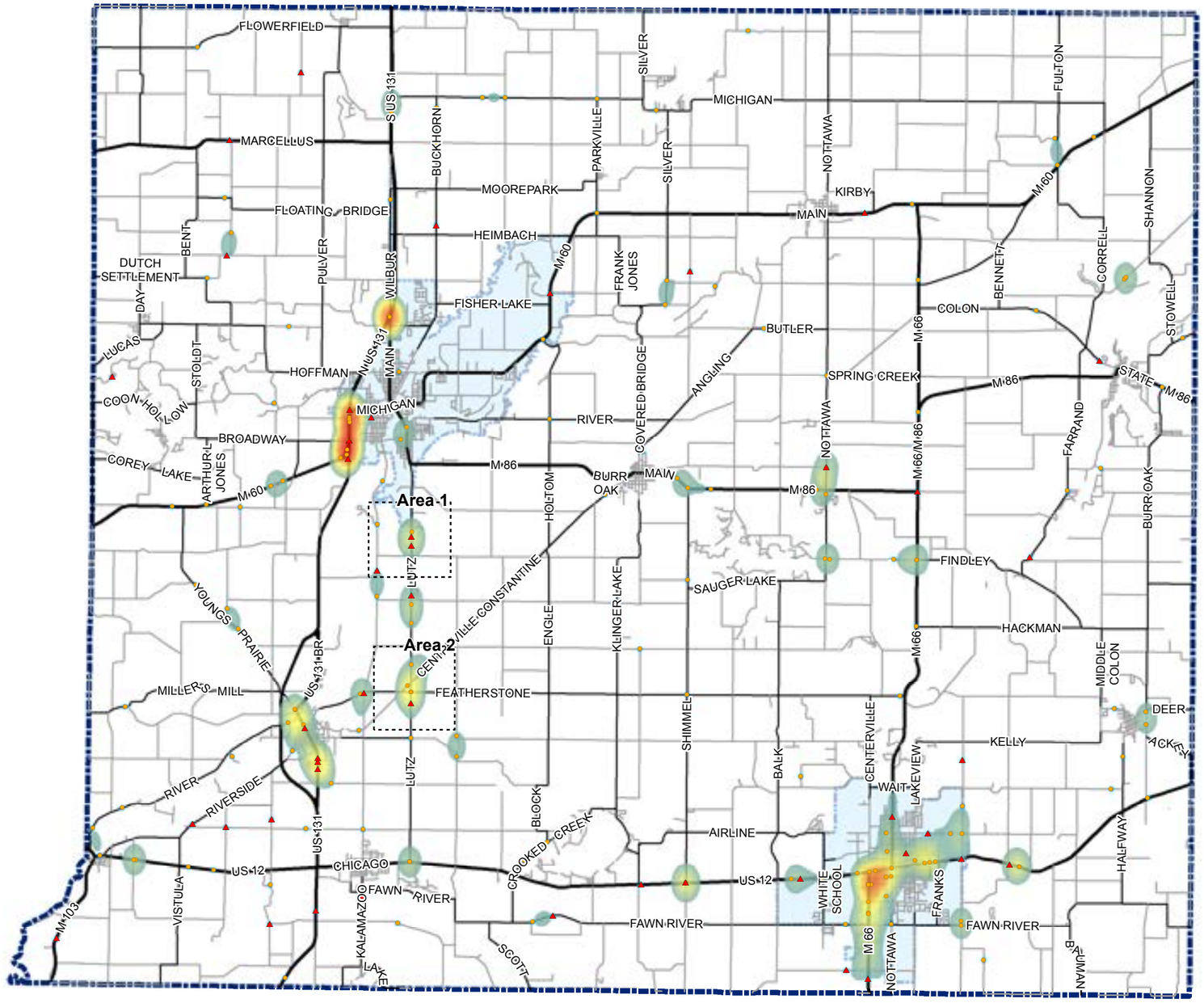
Area 1 1:30,000



Area 2 1:25,000



St. Joseph County
2010 - 2014 KA Crash Density



0 1 2 4 6 8 Miles

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Legend

- Urban Boundary
- St. Joseph County
- A Level Injury
- Fatal

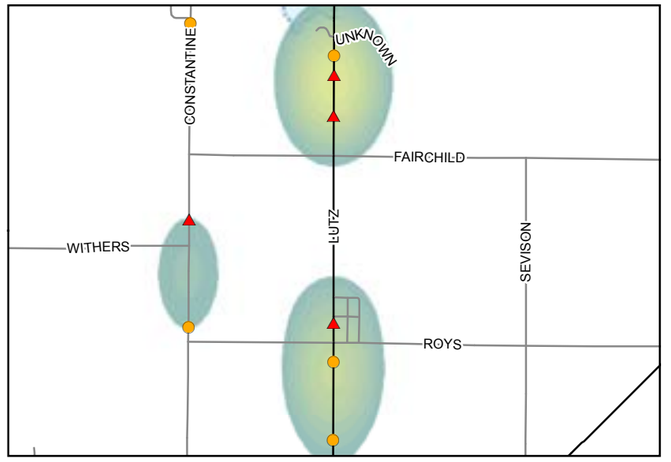
Road Network

- State Trunkline
- County Primary
- All Other

Crash Density

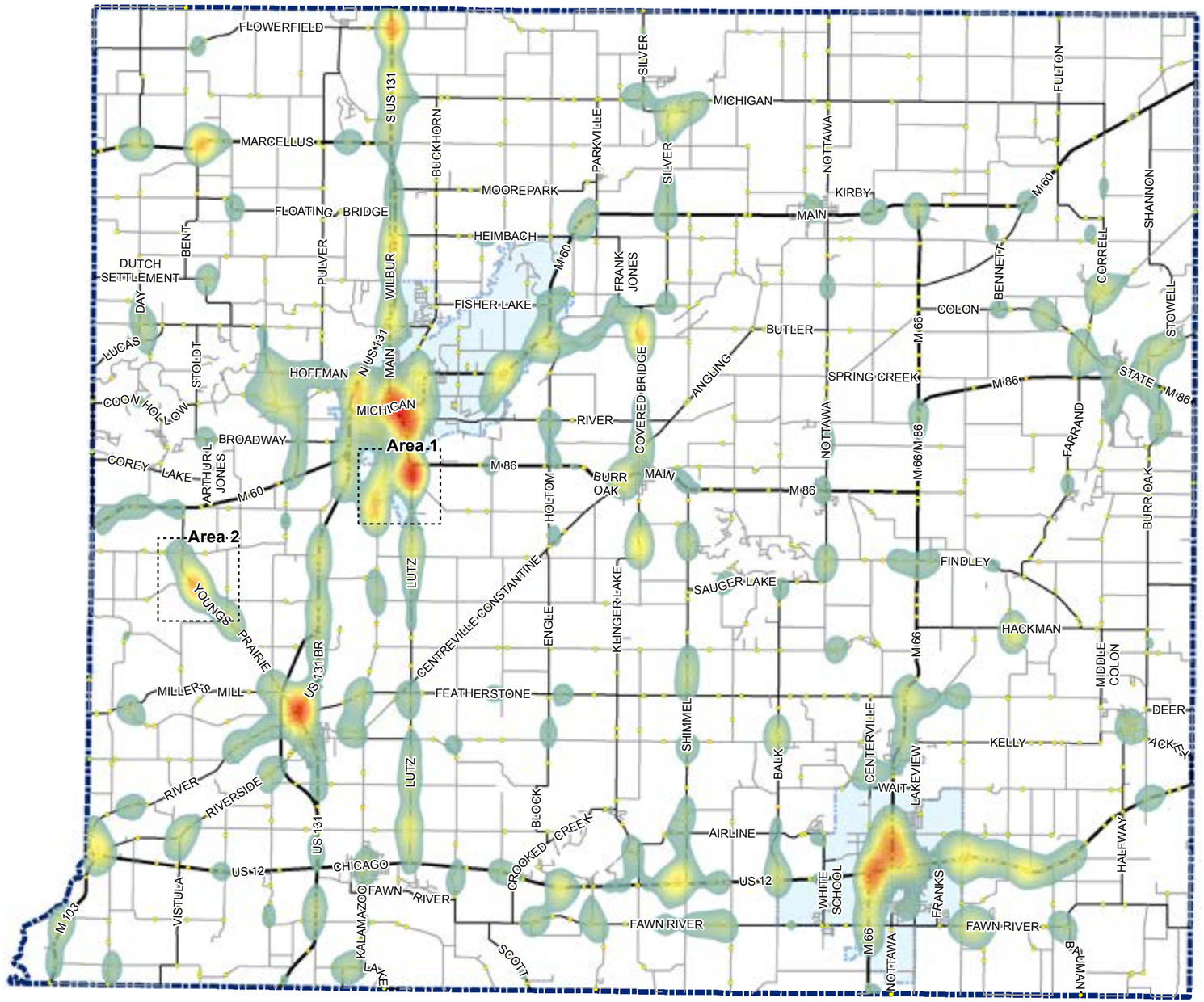
- High
- Low

Area 1 1:50,000



Area 2 1:40,000

St. Joseph County
2010 - 2014 Single Vehicle Lane Departure Crash Density



Legend

- Urban Boundary
- St. Joseph County
- Single Veh Lane Departure

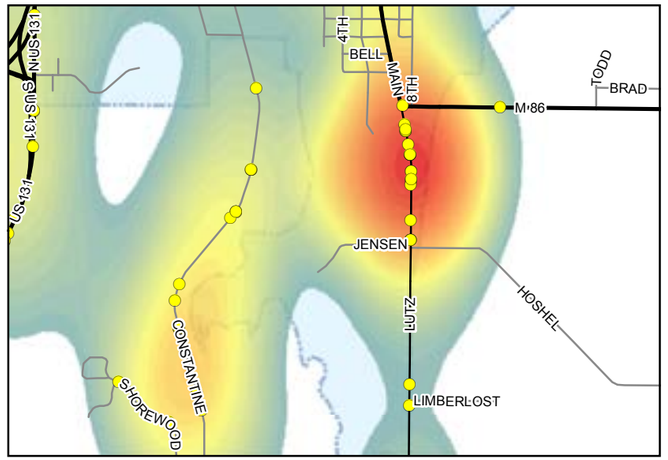
Road Network

- State Trunkline
- County Primary
- All Other

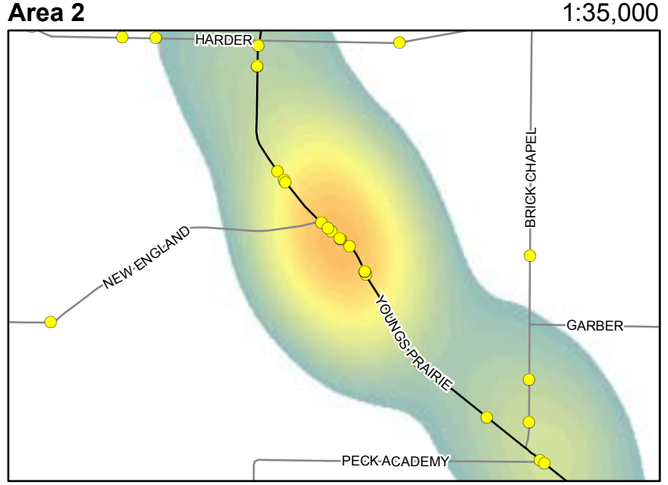
Crash Density

- High
- Low

Area 1 1:35,000



Area 2 1:35,000



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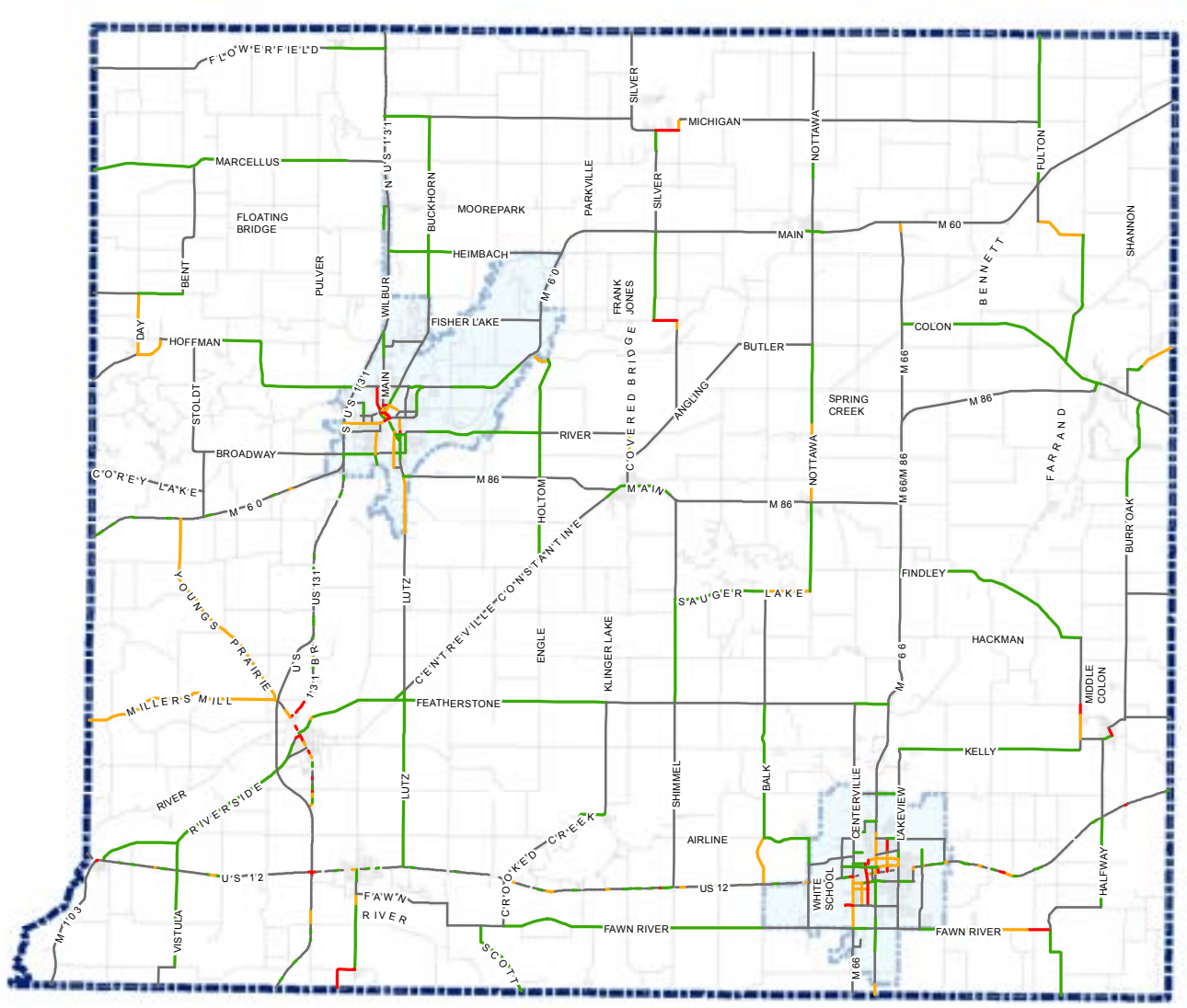
St. Joseph County
Segment Crash Rate (2010 - 2014)



Legend

- Urban Boundary
- St. Joseph County
- No Data

Segment Crash Rate (per 100 MVM)

- 133 or below
- 133 - 266
- 266 - 532
- 532 or more

Note:
Segments less than 300 ft are not illustrated.
Segment crash rates are expressed in 100 Million Vehicle Miles (MVM) traveled.
The first category (i.e. 133 or below) represents the county dataset average segment crash rates. Successive categories represent segment crash rate in multiples of two, three, and four or more relative to the county average.

0 1.5 3 6 9 12 Miles

N W E S

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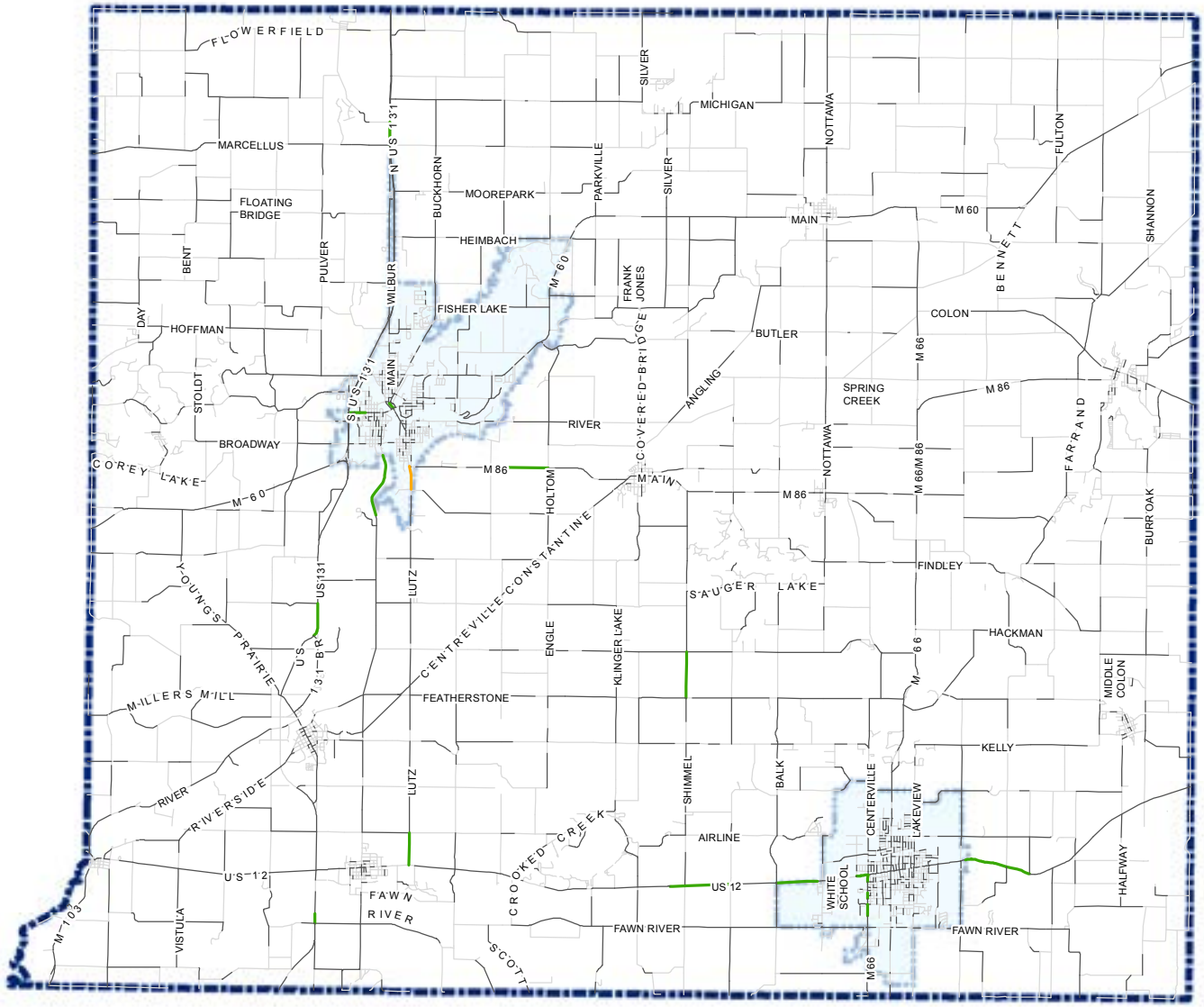
St. Joseph County
Segment Crash Frequency (2010 - 2014)



Legend

- Urban Boundary
- St. Joseph County
- No Reported Crashes

Segment Crashes per Year

- 2 or below
- 2 - 4
- 4 - 6
- 6 or more

0 1.25 2.5 5 7.5 10 Miles

N W E S

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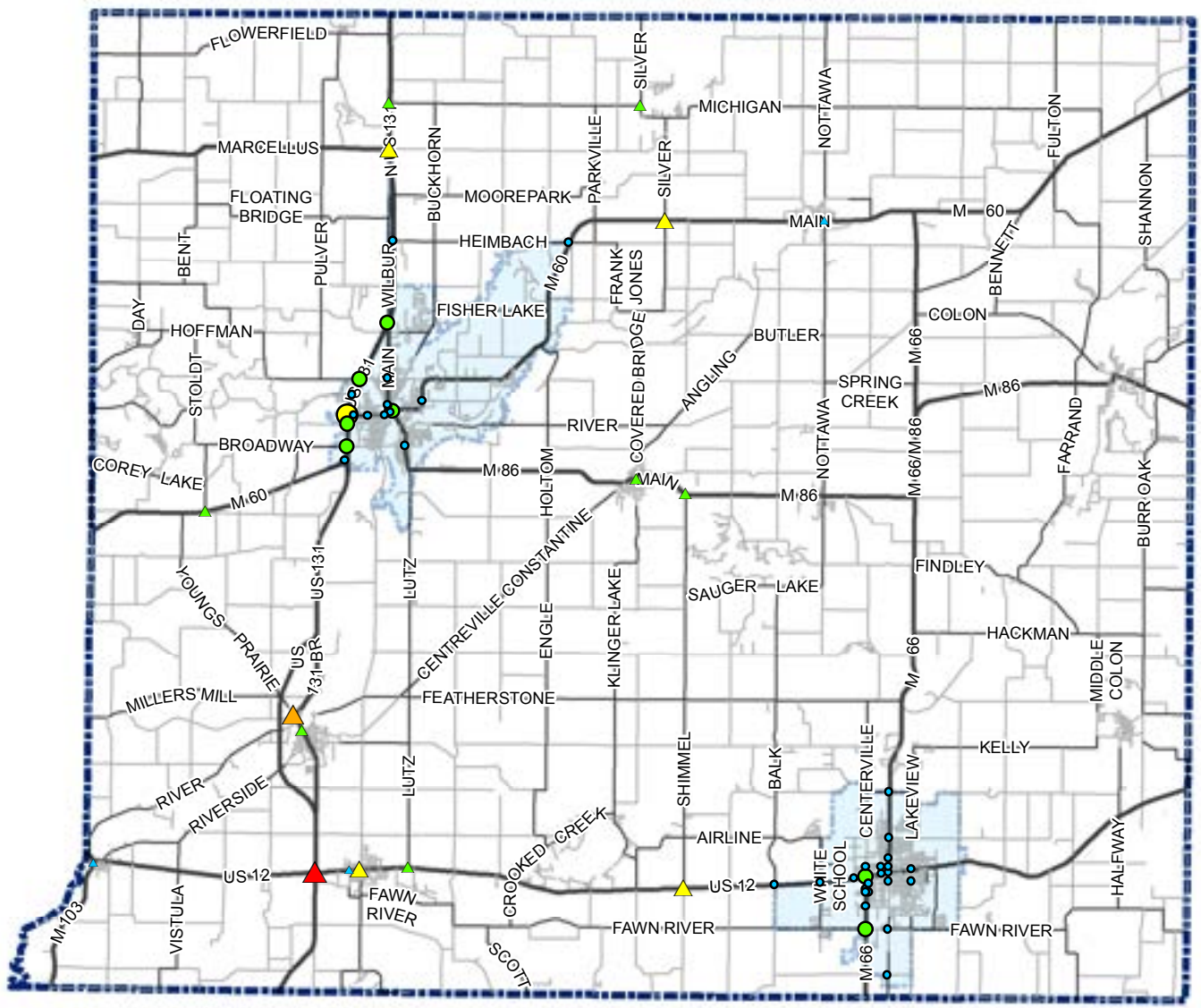
St. Joseph County Intersections Crashes per Year (2010 - 2014)



Legend

- Urban Boundary
- St. Joseph County

Road Network

- State Trunkline
- County Primary
- All Other

Intersection Urban Crashes/Year

- 0 - 5
- 5 - 10
- 10 - 15
- 15 - 20
- 20 or More

Intersection Rural Crashes/Year

- 0 - 1
- 1 - 2
- 2 - 3
- 3 - 4
- 4 or More

Note:
Urban intersections with less than five crashes between 2010 and 2014 are not included. Rural intersections with less than three crashes between 2010 and 2014 are not included.

0 1.25 2.5 5 7.5 10 Miles

N W E S

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