

Moving Towards Zero Deaths on Southwest Michigan Roads

2015 Local Road Safety Plan





Southwest Michigan Planning Commission Region

Local Road Safety Plan

Prepared By Kiel McIntosh P.E., Patrick Andridge, E.I.T.

Opus International Consultants Inc.
Detroit Office
Suite 210, 27333 Meadowbrook Road, Novi, MI
48377
USA

Reviewed By Andrew Ceifetz, P.E., CAPM

Telephone: +1 248 539 2222
Facsimile: +1 248 349 6862

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This Local Road Safety Plan for the
Berrien, Cass, and Van Buren Counties
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_____ 20____.

Acknowledgements

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DRAFT

Executive Summary

The overarching goal of the LRSP is the reduction of fatal and serious injury crashes within Berrien, Cass, and Van Buren Counties which form the region boundaries.

The process is directed by the FHWA guiding document, “Developing Safety Plans: A Manual for Local Rural Road Owners”. This process involves six steps including:

1. Establishing Strong Leadership & Advocates
2. Analyzing Safety Data
3. Determining Emphasis Areas
4. Identifying Strategies & Countermeasures
5. Prioritizing and Incorporating Strategies
6. Evaluating and Updating the LRSP

This report includes the initial five steps of the process while the final step is conducted on a regular basis to help ensure that the LRSP remains current and relevant to the local communities it is designed to serve. Additionally, while typical reports include countermeasures designed around engineering related treatments, the LRSP employs the four E's when addressing the identified emphasis areas, including:

- Engineering,
- Education,
- Enforcement, and;
- Emergency Services.

As mentioned, during this process a high level analysis of historic crash data available in the area was completed to help assess existing conditions and identify potential emphasis areas to help guide specific crash reductions. Additional consultation meetings were conducted with a wide range of stakeholders including representatives from the four E's as well as each of the three Counties. Based on the combined review of the crash analysis and stakeholder guidance and feedback, the following five emphasis areas were identified for the region:

- Roadway Departure Crashes
- Aggressive Driving
- Intersection Related Crashes
- Non-motorized Road Users
- High Risk/High Crash Locations

The selected emphasis areas and guidance from region stakeholders were used to categorize practical treatment strategies for addressing the identified target crashes. Detailed treatment information and details from the crash analysis and stakeholder consultation is available in the report and accompanying appendices.

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1 Introduction

The Michigan Department of Transportation (MDOT) has been working towards zero deaths on Michigan roadways. While substantial progress has been made at the state and local levels, additional assistance and direction is required. This is due, in part, to the fact that while only 19 percent of the United States population lives in rural areas, roughly 53 percent of all traffic fatalities occur there¹. In addition, the rural fatality rate is roughly 2.6 times higher than the urban fatality rate². A significant portion of these crashes, roughly one quarter, occur on non-federal aid highways³. As a part of this drive for progress, the Department has been working with regional planning councils and commissions to help facilitate the development of Local Road Safety Plans (LRSP). The intent of these LRSP is to collect and analyze crash data and other safety information for a more locally focused analysis and combine that with the knowledge and concerns of the local agencies and citizens.

1.1 Background

MDOT has taken steps to help guide the development of LRSPs for 14 State Planning and Development Regions across the Upper and Lower Peninsulas. These regions are based on the counties contained in each of the local planning commissions or councils with the intent of utilizing local knowledge and existing or potential inter-agency relationships to assist in the development process, as well as future evaluation and review cycles. The focus area for this LRSP is the area encompassed by the Southwest Michigan Planning Commission (SWMPC), consisting of Berrien, and Cass, and Van Buren counties. Figure 1 provides the geographic extent to be covered under this LRSP.

The goal of this document, as previously stated, is to help provide local agencies with guidance regarding local areas of concern identified during the development process and through consultation. From these areas, a series of treatment strategies are presented which come from any of the four E's; Engineering, Education, Enforcement, and Emergency Services. Upon completion of the final report, local agencies will be responsible for the evaluation and maintenance of the plan, to ensure that it reflects the changing needs and characteristics of the Southwest Region.

¹ National Highway Traffic Safety Administration, National Center for Statistics and Analysis, Traffic Safety Facts, Rural/Urban Comparison, 2013 Data (PDF), DOT HS 812 181

² FHWA Highway Statistics (2013) - <http://www.fhwa.dot.gov/policyinformation/statistics/2013/>

³ Ibid.

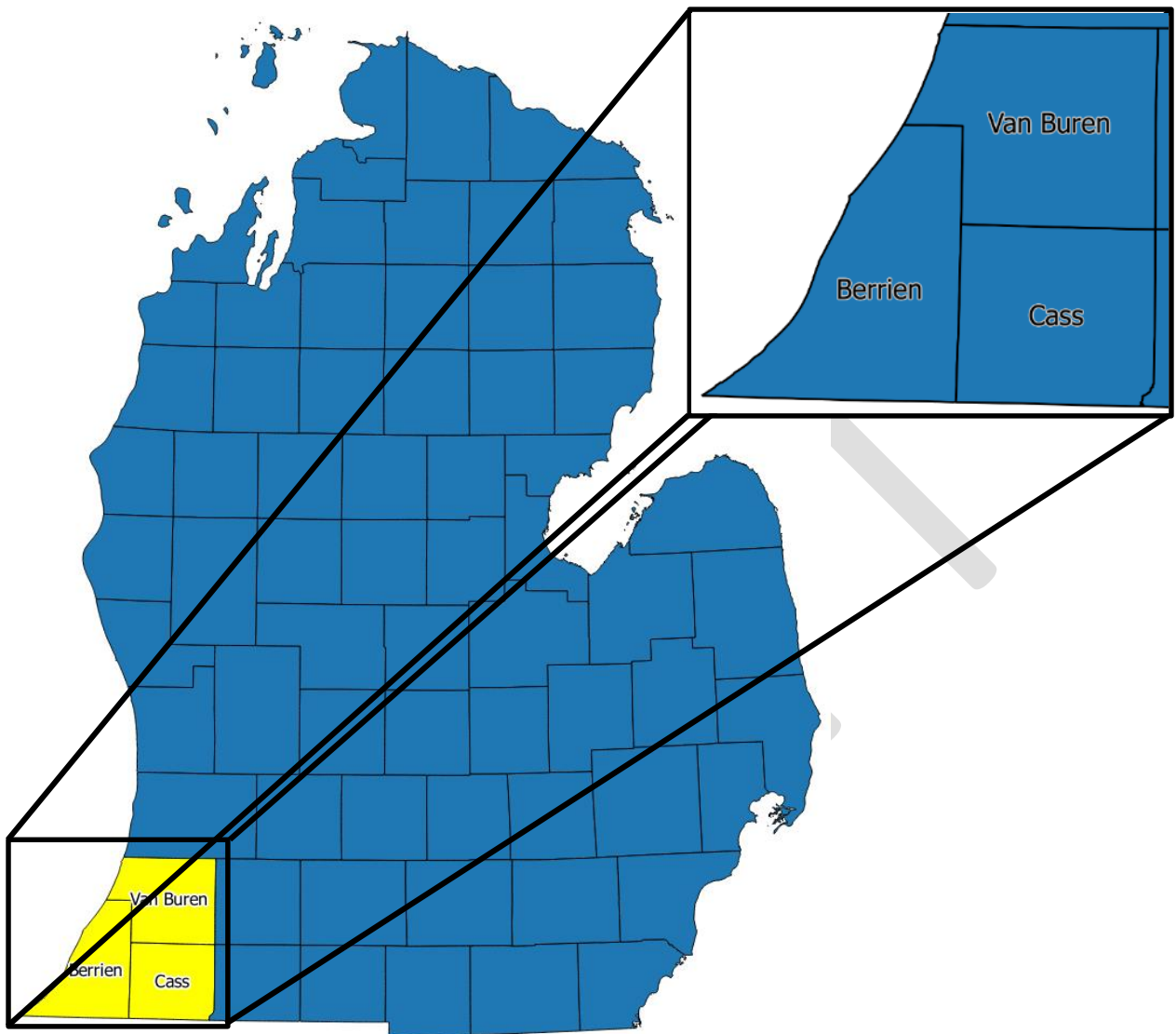


Figure 1 - Southwest Michigan Planning Commission Location

1.2 Mission, Vision, & Goals

The mission of the Southwest Michigan Planning Commission area LRSP is guided in part by the Strategic Highway Safety Plan and is as follows:

The Southwest Region is committed to providing a transportation network which promotes the safe, healthy, and efficient passage of people and goods through responsible stewardship, striving for equal access for all citizens.

This mission supports the more general vision commonly adopted by the State of Michigan and at various municipal levels regarding transportation safety. That is, the desire to work towards

significant reductions in traffic fatalities, consequently reducing the prevalence of other crash severities as well. This vision is commonly phrased as:

A responsive and well maintained transportation network which provides a safe and efficient multi-modal system while working towards a reduction in fatal and injury crashes.

In support of the mission and vision statements expressed in this document and reinforced through the selection of emphasis areas and countermeasures, the following goals have been identified, in no particular order:

- Reduce traffic fatalities by 15 percent from the three year rolling average of 40 in 2014 to no more than 34 in 2020
- Reduce serious injury crashes by roughly 20 percent from the three year rolling average of 475 in 2014 to no more than 380 in 2020
- Reduce the number of Roadway Departure crashes by 20 percent from the three year rolling average of 2,223 in 2014 to no more than 1,778 in 2020

Figures 2 through 4 provide the historic yearly and running average number of crashes for each of the stated goals, as well as the projected decrease for each goal. The rolling average helps to account for atypical years where crashes may have spiked or dropped off arbitrarily.

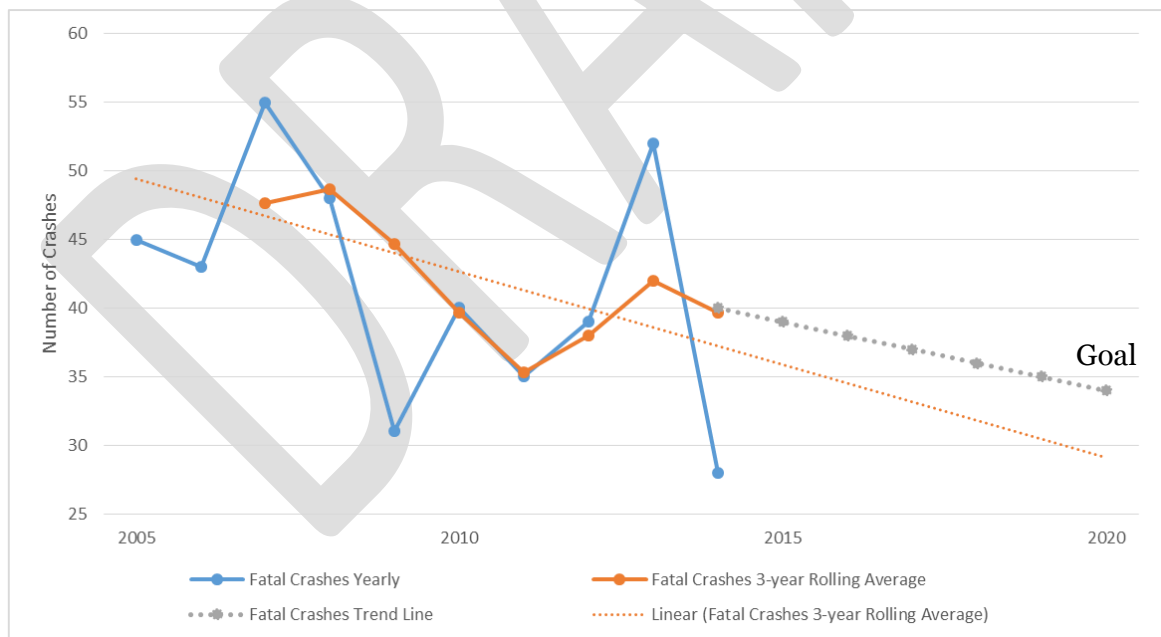


Figure 2 - Historic Fatal Crash Trends

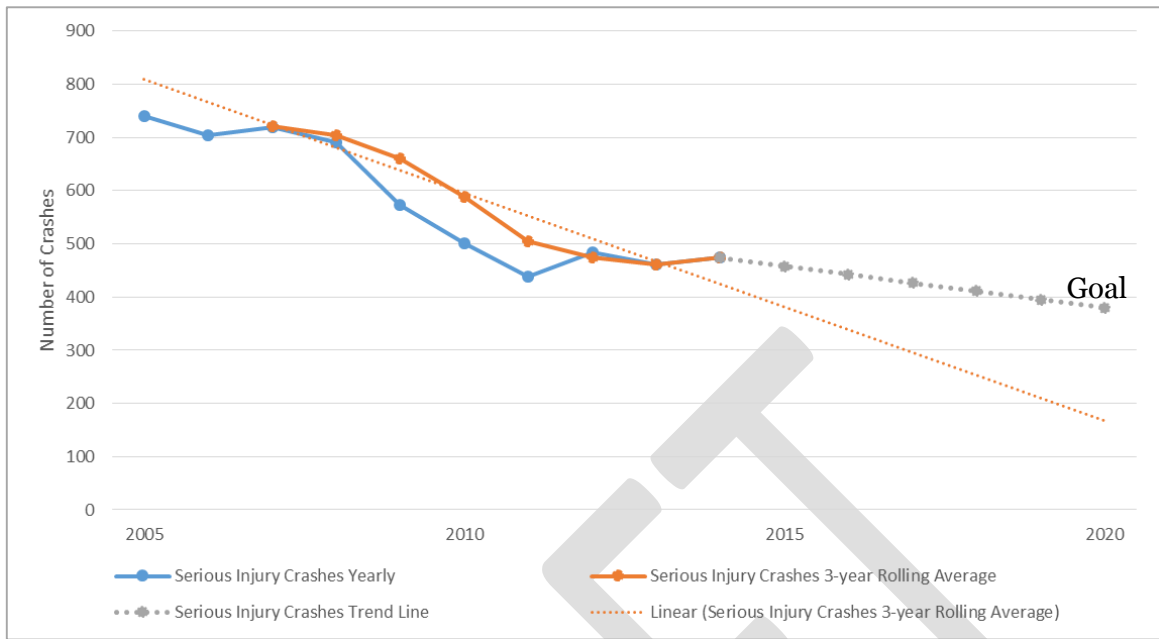


Figure 3 - Historic Serious Injury Crash Trends

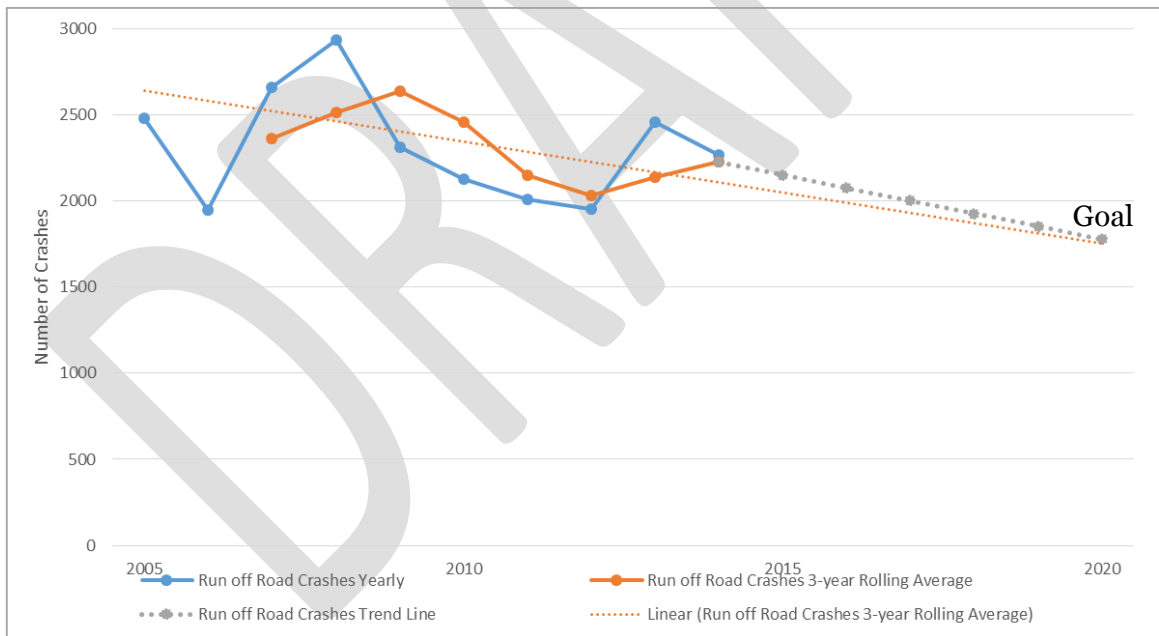


Figure 4 - Historic Run off Road Crash Trends

1.3 Introduction to the Four “E’s” of Safety

While a significant portion of transportation safety studies tend to focus on the potential to employ engineering safety treatments, potential countermeasures considered for the LRSP also include strategies related to enforcement, education, and emergency services. This is designed to better leverage the various components, related agencies, and opportunities to reduce the prevalence of traffic crashes in addition to engineering improvements. Figure 5 provides a summary of each of the 4 E’s and examples of treatments related to each.

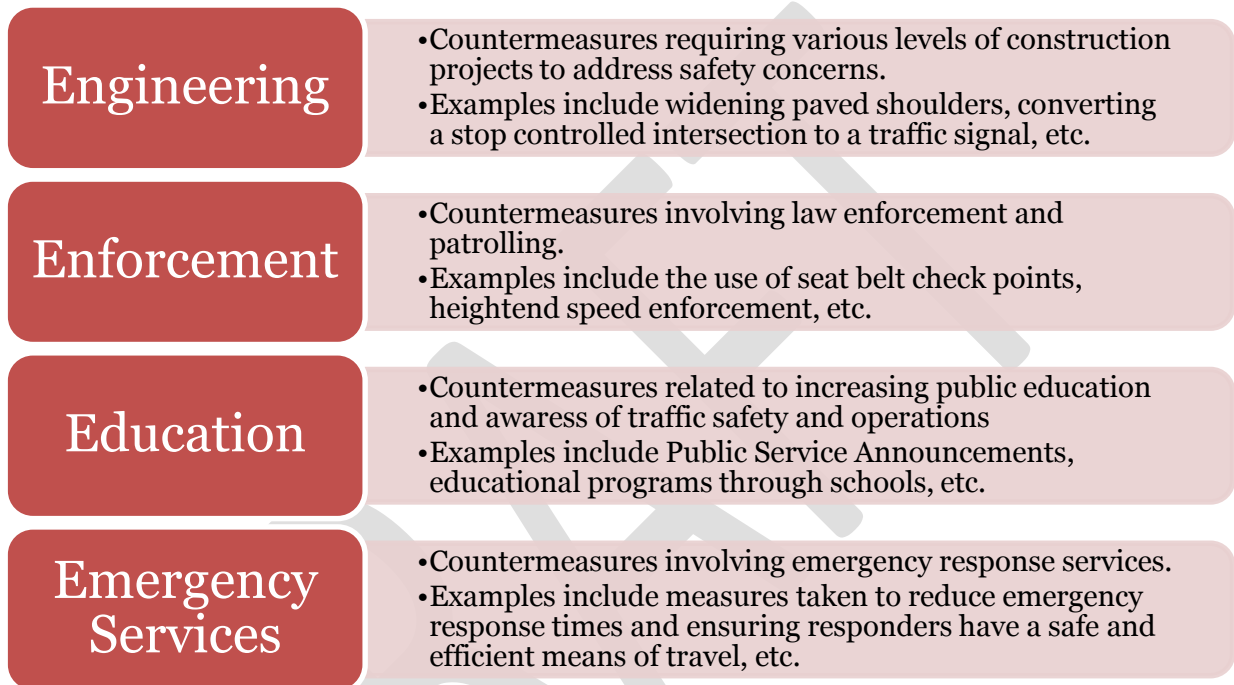


Figure 5 - Four "E's" of a Local Road Safety Plan

2 Local Road Safety Plan Methodology

2.1 Safety Data Analysis

As part of the Local Road Safety Plan development process, Opus International Consultants Inc. conducted an analysis of available safety data. The data was provided by the Michigan Department of Transportation for 2010 - 2014, representing the five most recent years of available data. The results of this analysis, when paired with feedback received from the Steering Committee and other stakeholders, was used to identify and prioritize treatment strategies for the region. The following sections provide a summary of the most relevant crash analysis results with additional details available in Appendix A.

2.1.1 Region Crash Analysis

A crash analysis was conducted for the entire three county region to develop a profile of various significant crash statistics. The results of this analysis as well as feedback received from the stakeholders were used to help identify both the emphasis areas for the region as well as the suggested treatments. The following figures (6 through 12) provide a brief summary of some of the more significant findings. It should be noted that deer involved crashes have been excluded from the analysis. Statewide statistics include all roads for the entire state of Michigan while the Region includes crashes occurring on all roads in all three counties. Crashes occurring on only the local road network, i.e. excluding the State maintained trunkline system, were included under the Local System. This comparison of regions and systems provides a high level understanding of how the network has been performing over the past five years.

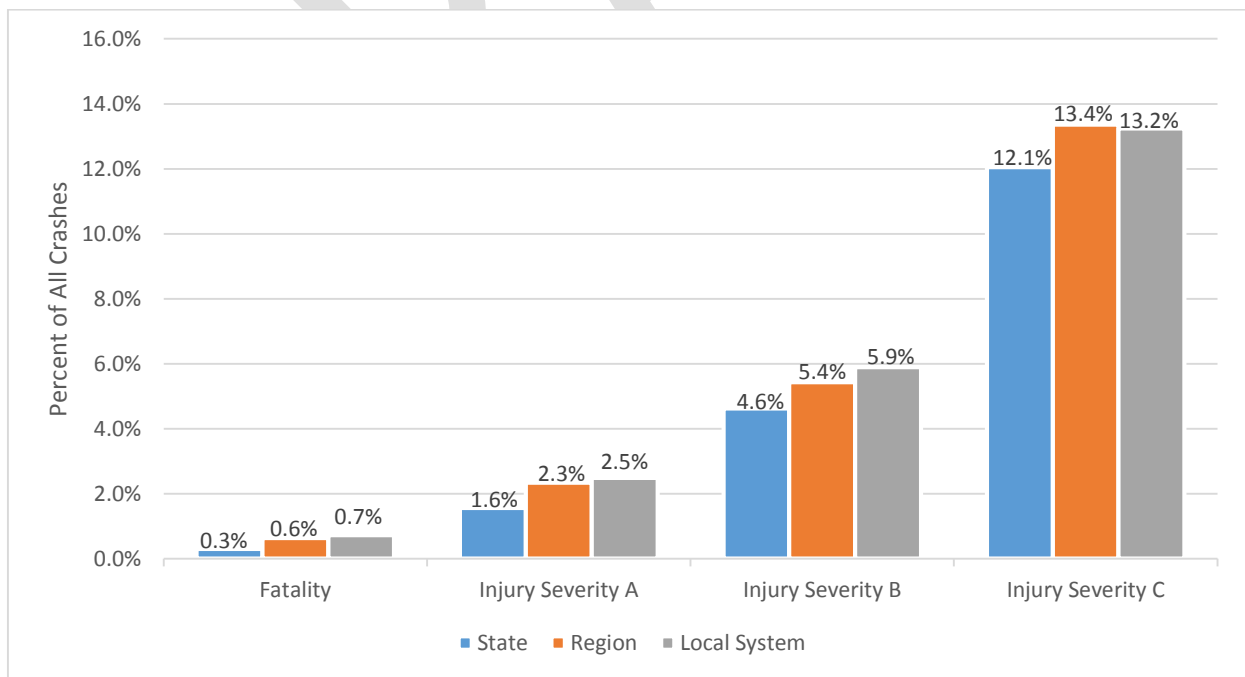


Figure 6 - Southwest Region Crash Severity Distribution

As shown in Figure 6, almost 22 percent of the reported crashes in the region for the analysis period resulted in a fatality or injury. It should be noted that the region experienced a greater proportion of fatal and injury crashes than was experienced statewide. During the five year period, almost three percent of the crashes experienced in the region resulted in fatalities or a serious injury (A-level severity) when compared to just under 2 percent for the State. Crashes occurring on the local system are also shown in the figure with the local system tracking fairly closely with the region as a whole.

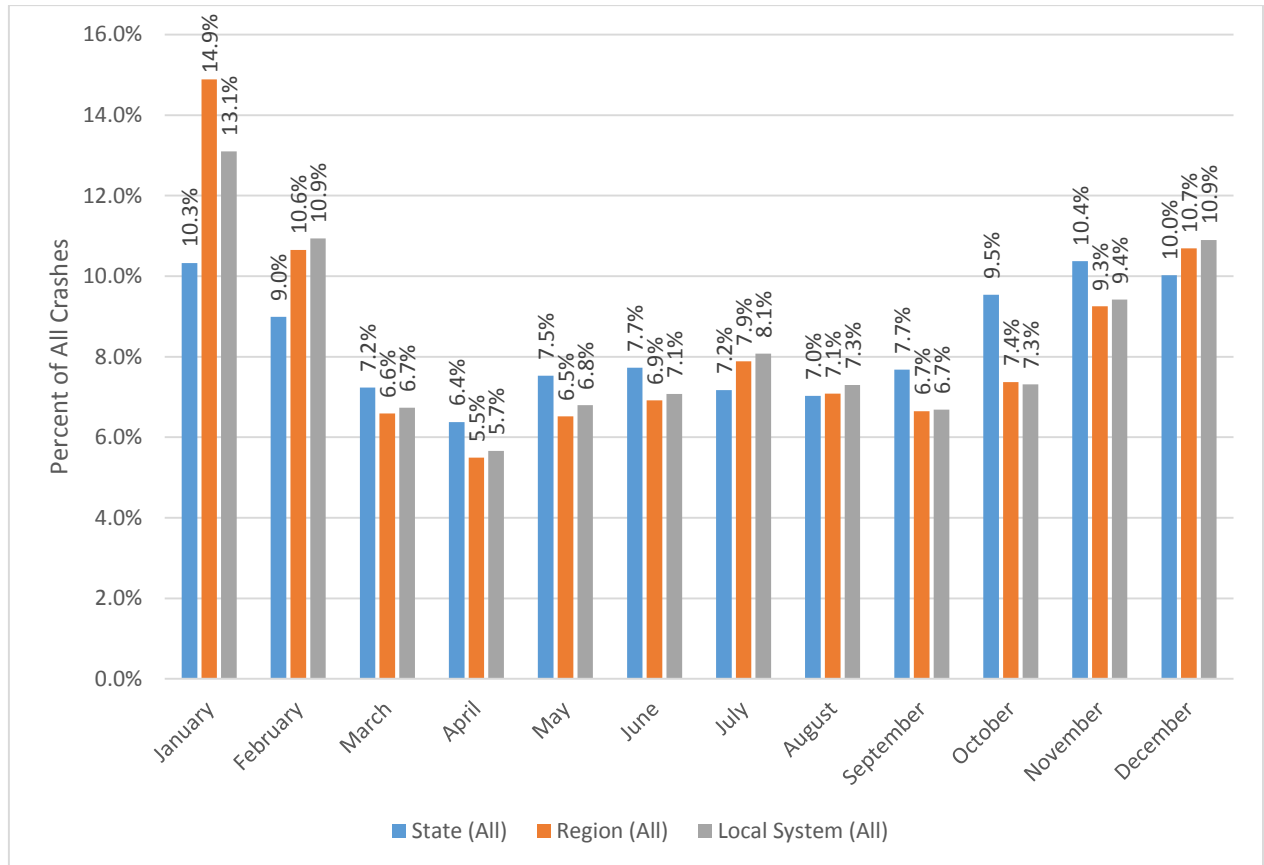


Figure 7 - Southwest Region Monthly Crash Distribution: All Severities

When considering crash distributions by month of year, a distinct increase can be seen in both the statewide, region wide, and local road data during the winter months, as shown in Figure 7. It is particularly pronounced for the region wide crash data however, with the crashes occurring during December, January, and February accounting for over a third (36 percent) of all crashes during the study period. As shown, the distribution of crashes by month for the local system tend to track fairly closely with the region as a whole. This would lend credence to the notion that winter weather may be playing a significant role in a large portion of crashes. Figure 8 provides a comparison between crashes of all severities in the region vs fatal and serious injury crashes. As shown in the figure, while all crashes tend to peak in the winter months, the fatal and serious injury crashes peak during the summer and fall, possibly due in part to increased tourist traffic.

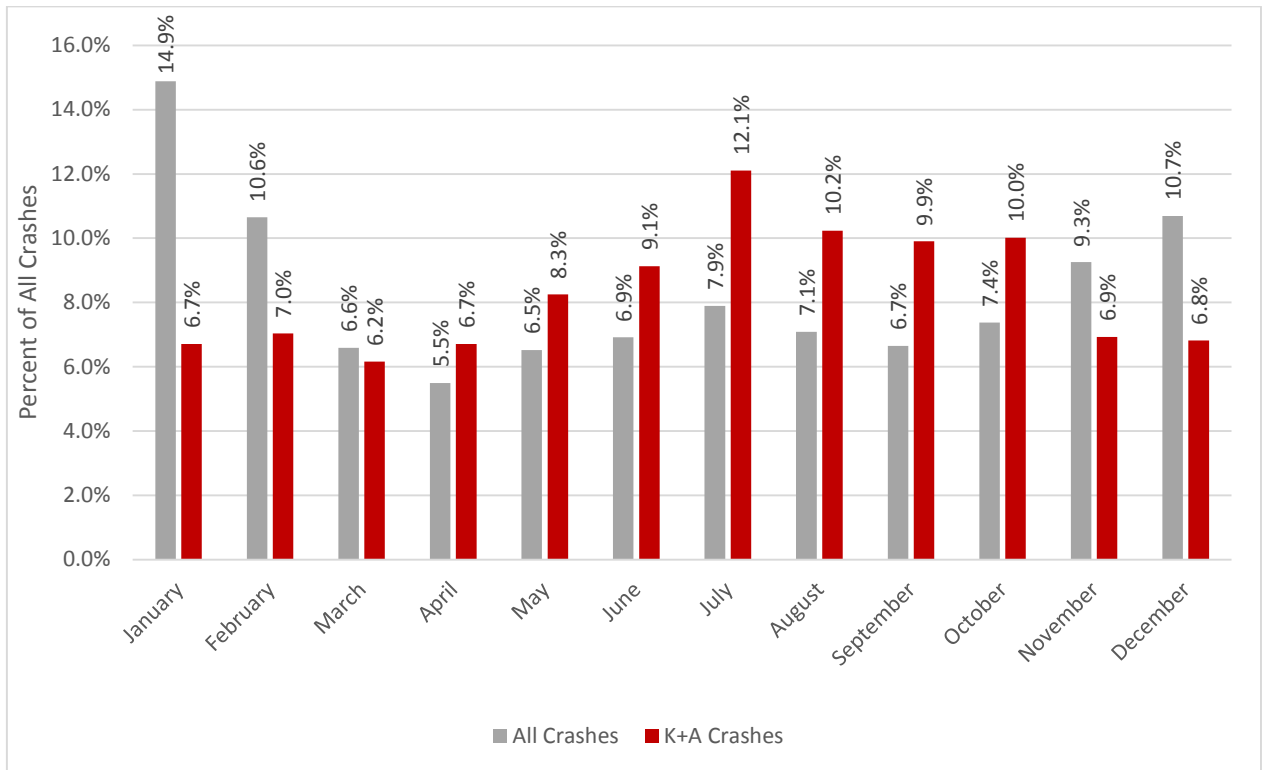


Figure 8 - Southwest Region Monthly Crash Distribution: All Severities vs. K+A for the Region

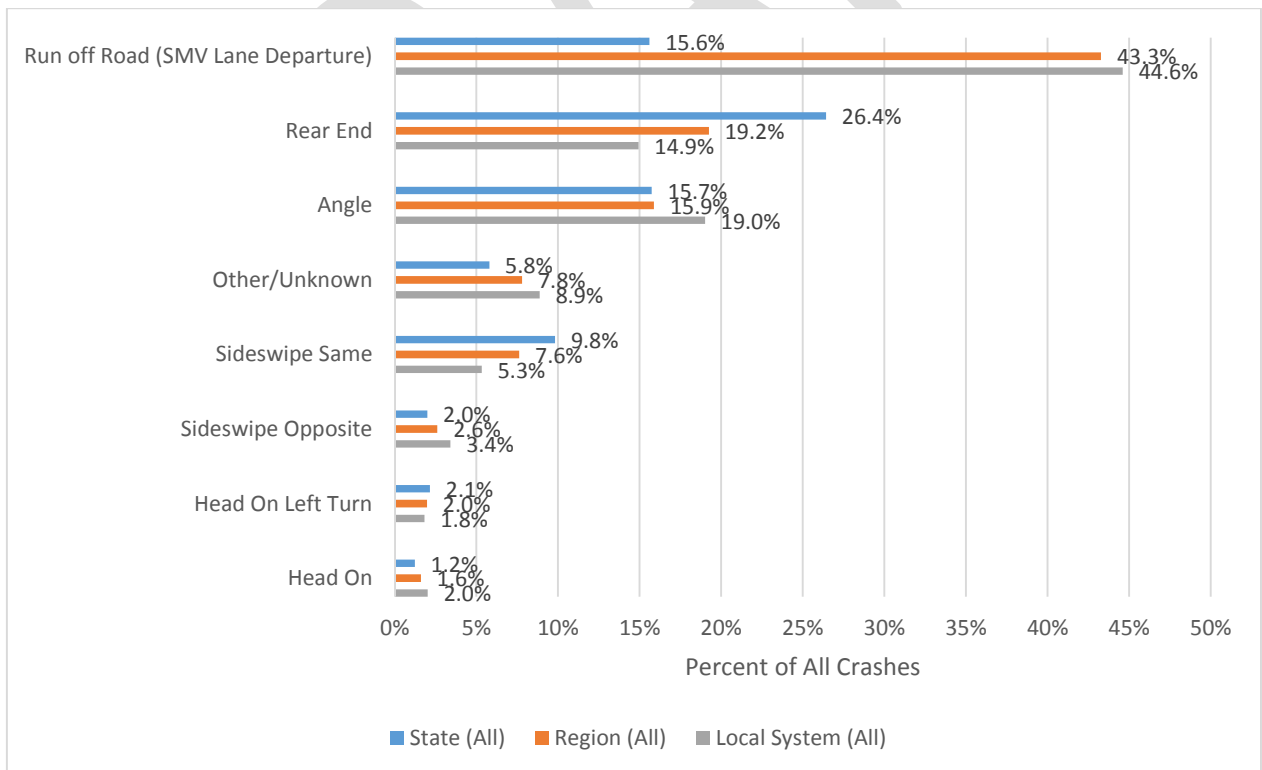


Figure 9 - Southwest Region Crash Type Distribution: All Severities

Figure 9 provides a comparison between the distribution of crashes statewide, region wide, and on local roads with the crash types ranked in descending order based on the statewide distribution. Based on available data, run off road crashes comprise a significant portion of all crashes occurring both in the state and the region specifically. As shown, the distribution of crashes occurring on the local system tend to track fairly closely with the region as a whole. This is likely due in part to the more rural nature of the region and presents an opportunity to develop treatment strategies tailored to crash patterns unique to the region. Figure 10 provides a comparison between crashes of all severities in the region vs fatal and serious injury crashes. While the two groupings generally fall in line with each other, there is a notably larger proportion of fatal and serious injury head on crashes as well as a notably larger proportion of fatal and serious injury run off road crashes.

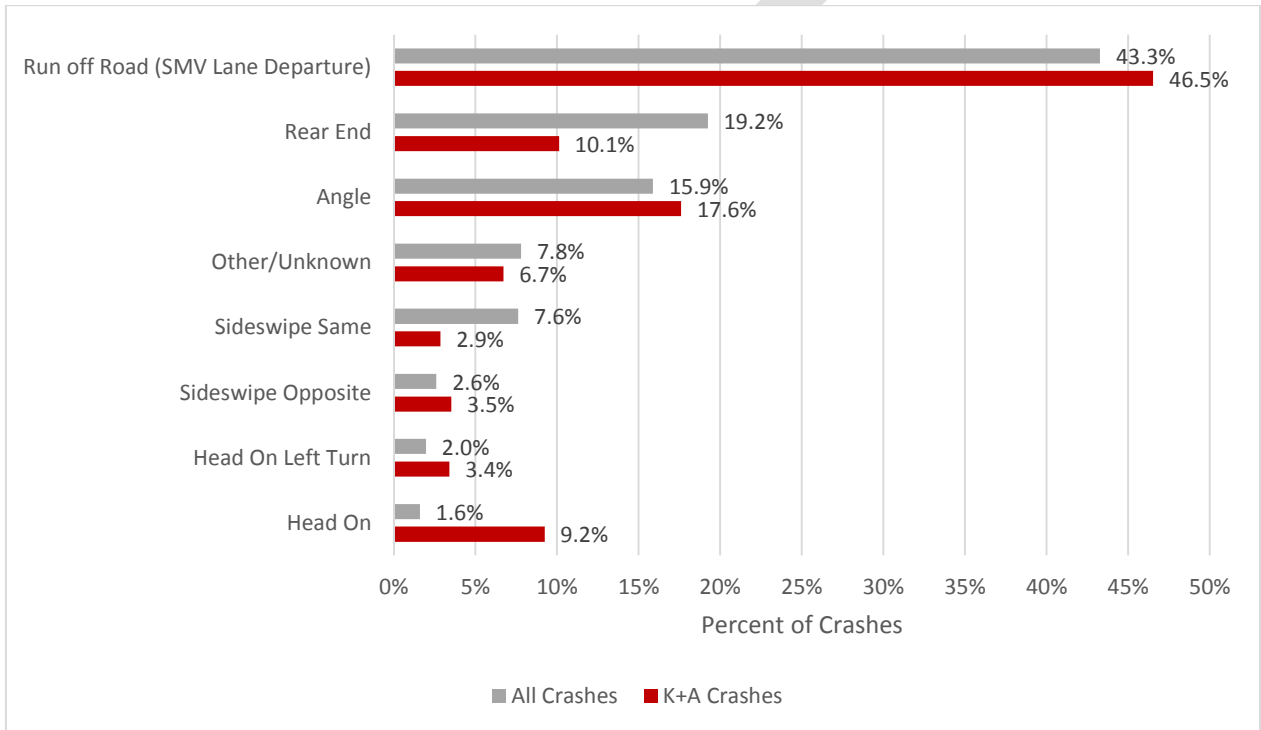


Figure 10 - Southwest Region Crash Type Distribution: All Severities vs K+A for the Region

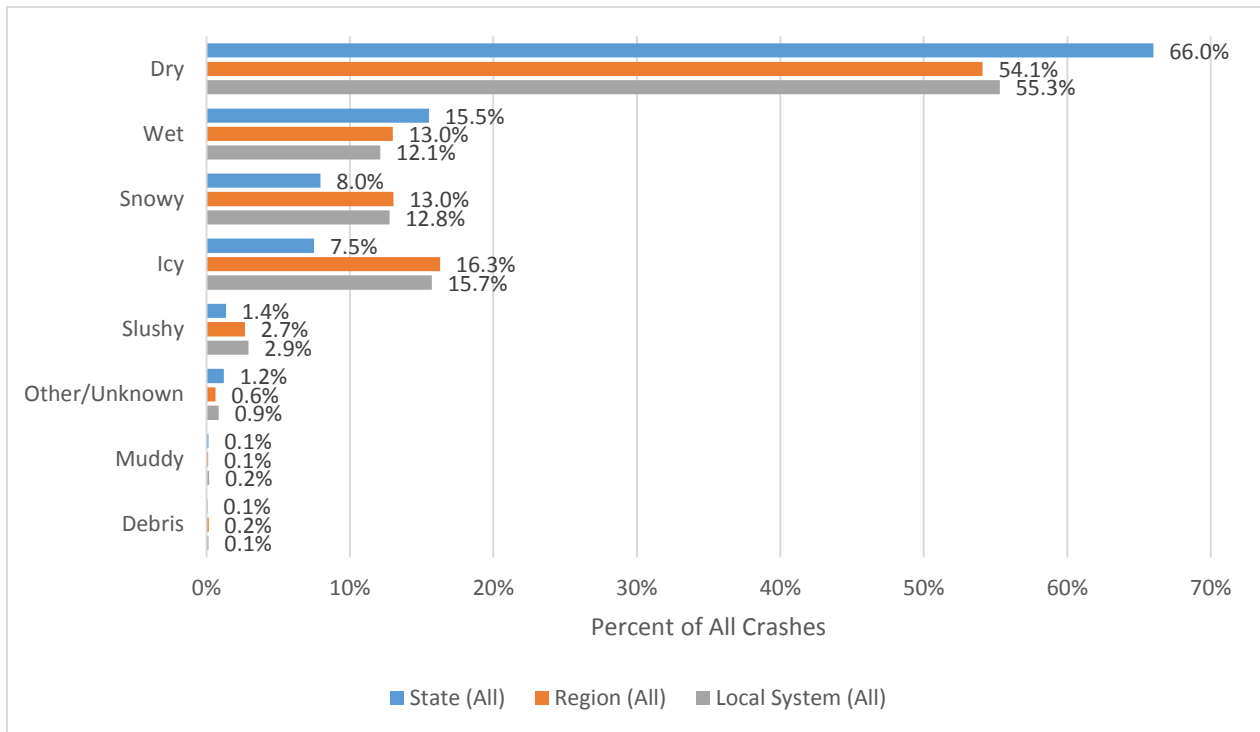


Figure 11 - Southwest Region Road Condition Distribution: All Severities

Figure 11 supports the results in Figure 8, showing the proportion of crashes occurring on snowing, icy, or slushy roads is significantly higher for the region when compared to the statewide distributions. As shown, the distribution of crashes by road condition tend to track fairly closely with the region as a whole. This may be due in part to the greater prevalence of snowfall events on the west side of the state, compounded by the region's coastline with Lake Michigan (i.e. increased lake effect snowfall). Figure 12 provides a comparison between all crashes occurring in the region and fatal and serious injuries. There is a significantly greater proportion of fatal and serious injuries occurring under dry conditions than crashes in general.

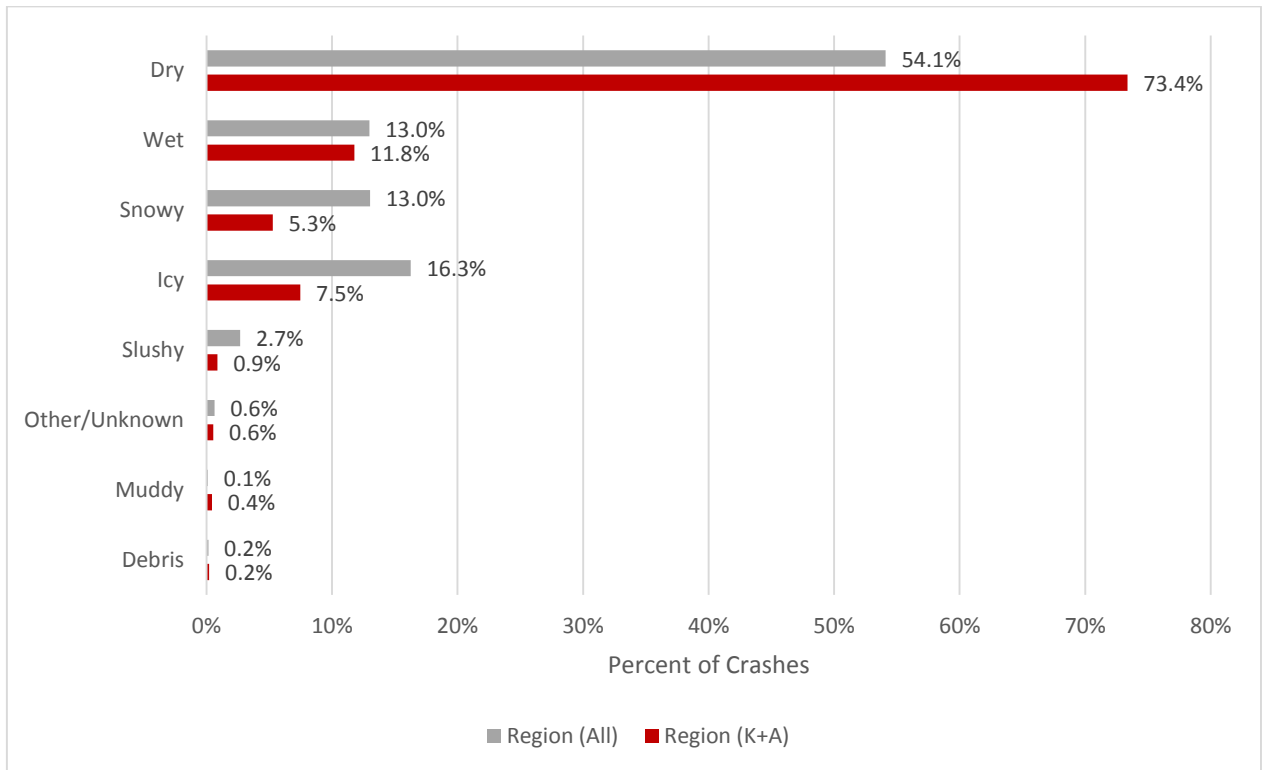


Figure 12 - Southwest Region Road Condition Distribution: All Severities vs K+A for the Region

The following flowchart (Figure 13) provides a breakdown highlighting some of the trends identified in the region. The flowchart largely reflects the information identified in the previous charts while providing a greater level of detail. It must be noted that as not all crash data is represented in the figure, percentages may not add up to 100 percent. Additional information and a more in depth breakdown of the crash trends is provided in Appendix A.

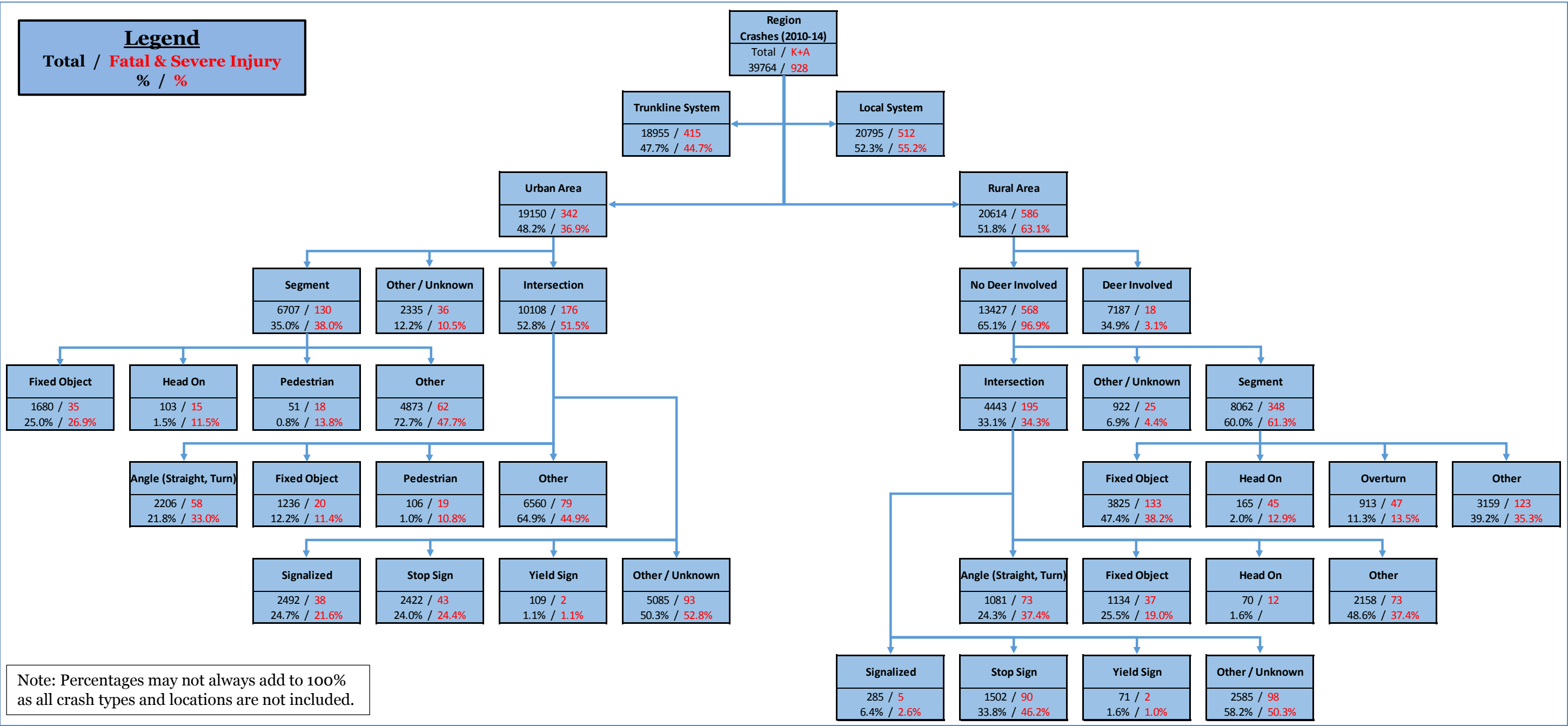


Figure 13 - Southwest Region Crash Divisions



2.1.2 Stakeholder Consultation

During the development process several meetings were held with a number of stakeholders throughout the region. These meetings included initial planning and discussion with the Southwest Michigan Planning Commission, the main stakeholder/steering committee, and additional individual meetings with representatives from around the region. During each meeting, a brief overview of the LRSP development process was provided and feedback and concerns were collected regarding a number of report components. During the largest stakeholder meeting, those in attendance participated in a group activity designed to collect and prioritize potential concerns and emphasis areas for the region. Figure 14 was taken at the meeting and shows the result of the activity.



Figure 14 - Emphasis Area Identification Activity

Additionally, representatives from the steering committee attended the Traffic Safety Network meeting in May to provide information and present the public with an opportunity to provide feedback. The combined attendance of these meetings included representatives from each of the four E's as well as all three counties and several levels of government. A list of attendees to each of the meetings can be found in Appendix A. A number of issues and concerns were discussed at each meeting. The following bullet points provide a general summary of the feedback received.

- Winter Maintenance
- Non-motorized
- Seasonal/tourist related
- Impaired Drivers
- Run off Road Crashes
- Commercial Vehicles
- High Risk Location Review
- Intersection Traffic Control

The issues discussed at each of the meetings were used to help further the crash data analysis and informed the identification and selection of Emphasis Areas. These areas are discussed in the following sections.

2.2 Emphasis Areas and Potential Countermeasures

Several Emphasis Areas have been identified based on information collected through the analyses of the crash data as well as feedback and concerns collected through consultation meetings. They include the following, summarized in Table 1.

Table 1 - Emphasis Areas

	Location	Fatal & Severe Injury Crashes	Percent of Total Fatal & Severe Injury Crashes (percent)
Roadway Departure	Rural	249	41.1
	Urban	109	32.0
	All	358	37.8
Aggressive Driving	Rural	349	57.6
	Urban	207	60.7
	All	556	58.7
Intersection Related	Rural	131	21.6
	Urban	113	33.1
	All	244	25.8
Non-motorized crashes	Rural	28	4.6
	Urban	50	14.7
	All	78	8.2
High Risk Locations	N/A		

The following sections provide additional information regarding each of the Emphasis Areas with a list of potential countermeasures. Additional details regarding each of the potential countermeasures is included in Appendix B. It must be noted that while each countermeasure is listed with their most closely applicable emphasis area, it may also prove beneficial for addressing several emphasis areas. An applicability matrix is provided in Appendix B to help illustrate this.

2.2.1 Roadway Departure

For the purpose of this LRSP, roadway departure crashes have been identified per the Michigan Department of Transportation's (MDOT) Crash Reporting Information System coding definitions. Roadway departure crashes account for over a third of all crashes occurring in the region and almost forty percent of all fatal and severe injury crashes. Additionally, just over two thirds of all fatal and severe roadway departure crashes occurred in rural areas. Approximately 51 percent of all run off road crashes occurred on the non-trunkline system. Several relatively low cost improvements or programs may be employed to help reduce the prevalence of these types of crashes. Table 2 provides some basic statistical information regarding the crashes included under this emphasis area.



Table 2 - Proportion of Region Wide Crashes

	Roadway Departure Crashes	Percent of Region Crashes
Total Crashes	10,795	34.7% of all crashes
Fatal & Injury Crashes	2,379	34.8% of fatal and injury crashes
Fatal Crashes	81	40.1% of fatal crashes

Roadway departure crashes may be associated with a number of factors including narrow roadways or those without shoulders, sharp or unmarked curves, and poor or non-existent lighting among others. Figure 15 provides images which were taken during field reviews of the network and provide some example locations where additional treatments may be warranted.

As shown in the top image, this curve in South Haven Township is a gradual one, but may benefit from additional signage or lighting as it may be easy for a driver to drift from their lane under dark conditions.

The second image was taken along a rural road in the region and provides an example of several potential issues. There is currently no shoulder at this location as well as a lack of center or shoulder rumble strips. Additionally, there are several trees and areas of dense brush growth located very close to the edge of the travel way.

The following treatments have been identified as offering potential countermeasures to roadway departure crashes. These may be applied independently or in concert to improve local conditions.

- **Advanced Curve Warning Signs and/or Chevrons**
- **Install/Expand Shoulders**
- **Install Center & Edgeline Rumble Strips**
- **Install Safety Edge Pavement Treatments**
- **Improve Nighttime Delineation**



Figure 15 - Example Run off Road Treatment Locations

2.2.2 Aggressive Driving

According to the National Highway and Traffic Safety Administration (NHTSA), aggressive driving is defined as:

“When individuals commit a combination of moving traffic offenses so as to endanger other persons or property”⁴

For the analysis of this LRSP, aggressive driving is defined using the following hazardous actions from the crash reports included in the data supplied by MDOT:

- Driving too fast for conditions
- Improper passing
- Failure to yield
- Improper lane use
- Failed to stop in assured clear distance
- Disobeyed traffic control
- Improper signal
- Improper turn
- Reckless driving

Aggressive driving was a contributing factor in approximately 64 percent of the crashes within the study area from 2010 to 2014 and approximately 59 percent of the serious injury and fatal crashes, as shown in Table 1. Table 3 provides the proportion of aggressive driver related crashes compared to the total crash distribution.

Table 3 - Proportion of Aggressive Driving Crashes

	Aggressive Driving Crashes	Percent of Region Crashes
Total Crashes	19,775	63.5% of all crashes
Fatal & Injury Crashes	4,598	67.3% of fatal and injury crashes
Fatal Crashes	108	53.5% of fatal crashes

Aggressive drivers may be located anywhere along the region’s network. Treatments targeted toward the reduction in aggressive drivers should generally be mobile in nature to allow them to be positioned in areas where the need is greatest. This may be determined through crash analysis or reports by law enforcement and emergency services. As with the other potential treatments detailed throughout the report, some targeted towards aggressive drivers have already been employed in the region and should be used to provide lessons and additional guidance regarding their use and efficacy. Figure 16 shows the deployment of a mobile speed trailer in the region.

⁴ <http://www.nhtsa.gov/Aggressive>





Figure 16 - Mobile Speed Trailer Deployment

The following treatments have been identified as offering potential countermeasures to aggressive driving crashes.

- **Mobile Speed Trailers**
- **Traffic Calming Projects**
- **Randomized Enforcement Locations**



2.2.3 Intersection Related

Given the complex nature of traffic flow through intersections, road users of all types can face additional challenges navigating them. Roughly one quarter of all intersection related crashes result in a fatality or injury, as evidenced in Figure 17.

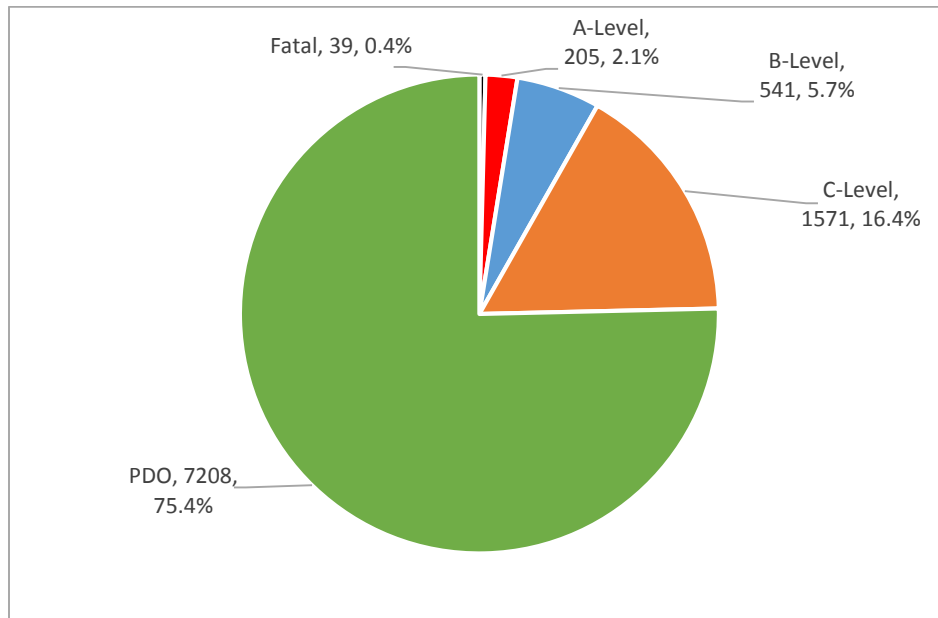


Figure 17 - Intersection Crashes by Severity

Additionally, the local road network experienced a greater number of intersection crashes in general and severe and fatal crashes specifically than the trunkline system. Figure 18 provides a summary of intersection crashes by system and severity.

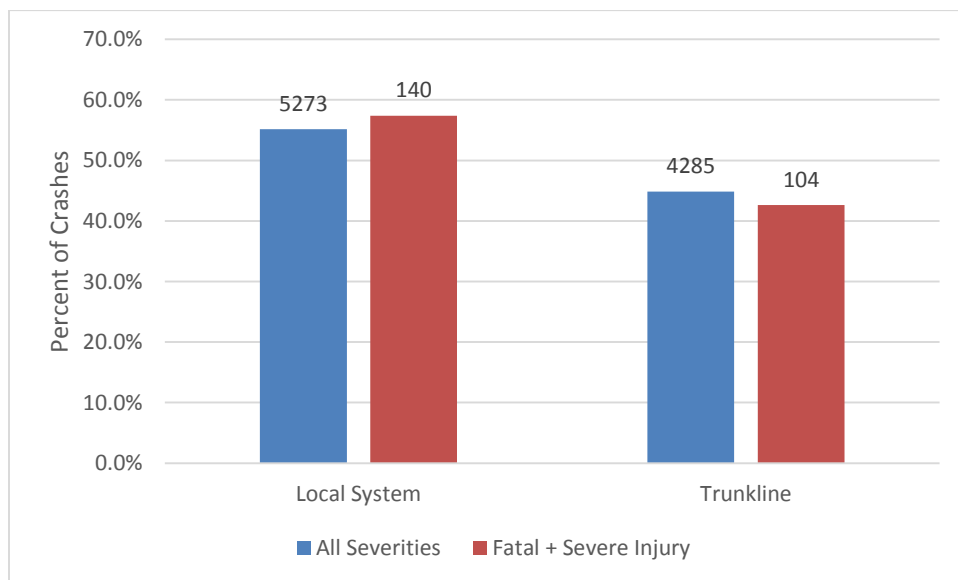


Figure 18 - Intersection Crashes by System

Potential factors contributing to the prevalence of intersection related crashes could include, but are not limited to the geometry or traffic control employed at the intersection, poor lane use markings or lane designations, drowsy or impaired drivers or driver error in general. Table 4 provides the proportion of intersection related crashes compared to the total crash distribution.

Table 4 - Proportion of Intersection Related Crashes

	Intersection Crashes	Percent of Region Crashes
Total Crashes	9,564	30.7% of all crashes
Fatal & Injury Crashes	2,356	34.5% of fatal and injury crashes
Fatal Crashes	39	19.3% of fatal crashes

Each intersection location is unique from the next and will require in-depth analysis to determine the root causes of any issues or concerns. A range of intersection types and associated treatments may be applied to improve the safe operation of each depending on their individual characteristics and local needs. Figure 19 provides some example installations of a number of treatments and different intersection types. It should be noted that each intersection treatment and type has different benefits and drawbacks and must be tailored to each specific location.



Figure 19 - Intersection Related Treatments: Roundabout (upper left), Transverse Rumble Strips (upper right), and Intersection Warning Signs (bottom)

The following treatments have been identified as offering potential countermeasures to intersection related crashes.

- **Review Intersection Traffic Control**
- **Emergency Vehicle Signal Preemption**
- **Advanced Intersection Signage**
- **Installation of Transverse Rumble Strips**

2.2.4 Non-motorized

While non-motorized crashes make up a relatively small portion of overall crashes in the region, it was raised as a significant concern during discussions held with stakeholders and others in the area. While the likelihood of a non-motorized crash occurring is relatively low, the probability that any single non-motorized crash will result in an injury or fatality is disproportionately high. Figure 20 provides the distribution of non-motorized crashes by severity in the region. As shown, almost 90 percent of all non-motorized crashes result in an injury or fatality.

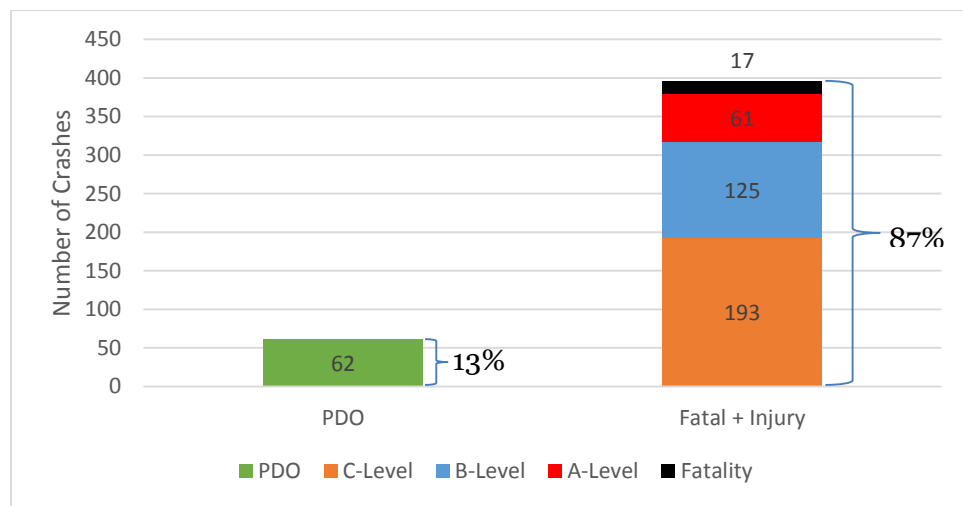


Figure 20 - Non-Motorized Crashes by Severity

Table 5 provides the proportion of non-motorized road user crashes compared to the total crash distribution.

Table 5 - Proportion of Non-Motorized Road User Crashes

	Non-Motorized Road User Crashes	Percent of Region Crashes
Total Crashes	458	1.5% of all crashes
Fatal & Injury Crashes	396	5.8% of fatal and injury crashes
Fatal Crashes	17	8.4% of fatal crashes

During field reviews of representative areas of the network, several non-motorized users were observed traveling along the side of the road. Figure 21 provides an example of one of these areas.



Figure 21 - Vulnerable Road User



Figure 22 - Bike Lane Installations

Alternatively, some areas have already begun to implement some of the recommended treatments, including the bike paths in the City of South Haven. Figure 22 serves as an example of some of these installations.

The following treatments have been identified as offering potential countermeasures to non-motorized road user involved crashes.

- **Crosswalk Improvements**
- **Improve Sidewalk/Multi-use Trail Interconnectivity & Maintenance**
- **Pedestrian and Bicycle Education Programs**
- **Installation and Maintenance of Bicycle Lanes**

2.2.5 High Risk Locations

High risk locations exist across the network and may fall outside of the other identified emphasis areas. Ideally, these locations would share certain qualities or characteristics which would be addressed as a group, providing safety benefits to the network as a whole. While the specific measures or thresholds for identifying high risk locations throughout the network would require further agreement across the stakeholders and agencies operating the region, a basic example has been used here to highlight the potential for concentrations of crashes at specific locations. Table 6 provides a rudimentary example highlighting the potential for significant improvements by targeting high risk locations. In this example, using the latest crash data for the region, roughly a quarter of the intersection related crashes have occurred on approximately 0.6 percent of the intersections in the region as shown in the highlighted lines of the table.

Table 6 - High Risk Intersection Summary

Yearly Estimated Crash Frequency (Crashes/Year)	Estimated Percent of All Intersections*	Estimated Percent of Intersection Related Crashes
0.0	77.7%	0.0%
< 0.6	17.7%	34.7%
0.6 – 1.6	2.6%	18.8%
1.6 – 3.6	1.3%	21.4%
3.6 – 10.6	0.5%	19.7%
>10.6	0.1%	5.4%

*Estimated based on Michigan Geographic Framework – All Roads shapefile

A similar process could be completed to help identify high risk segment locations within the network. Several network screening tools and processes are available, some of which are likely already employed to varying degrees by the region's several transportation agencies. The following have been identified as offering potential countermeasures to identify high risk locations and their potential treatments.

- **Regular Network Screening Paired with Road Safety Audits**



2.3 Countermeasure Prioritization

Due to the interconnected nature of transportation safety and treatment strategies, countermeasures may have a varying impact for more than one emphasis area. While this can increase the complexity when attempting to quantify their overall effect, it does provide an opportunity to prioritize treatment strategies, at least in part, on the number of emphasis areas they have the potential to impact. Table 7 provides a rudimentary summary of the applicability of each countermeasure within each of the emphasis areas. The countermeasures are prioritized based on the potential number of emphasis areas which could be impacted by their installation, as well as the number of crashes each emphasis area has historically been associated with. The goal is to prioritize the treatments which have the potential to impact the greatest proportion of crashes within the Region.

Table 7 - Countermeasure Prioritization

Ranking	Countermeasure(s)	Roadway Departure	Aggressive Driving	Intersection Related	Non-Motorized Crashes	High Risk Locations
1	Installation of Transverse Rumble Strips		✓	✓	✓	
2	Traffic Calming Projects		✓		✓	
3	Impaired Driving Enforcement Zones		✓			
4	Randomized Enforcement Locations		✓			
5	Mobile Speed Trailers		✓			
6	Install/Expand Shoulders	✓			✓	
7	Install Center/Edgeline Rumble Strips	✓				
8	Advanced Curve Warning/Chevrons	✓				
9	Install Safety Edge Pavement Treatment	✓				
10	Review Intersection Traffic Control			✓	✓	
11	Crosswalk Improvements			✓	✓	
12	Advanced Intersection Signage			✓		
13	Improve Sidewalk/Multi-use Trail Interconnectivity & Maintenance				✓	
14	Installation and Maintenance of Bicycle Lanes				✓	
15	Regular Network Screening & RSA's	✓	✓	✓	✓	✓

Table 7 provides an initial prioritization of the countermeasures identified in this report. As with the emphasis areas and the countermeasures themselves, the prioritization should be reviewed and updated regularly to reflect the performance of each countermeasure and the priorities and guidance of the Region.



3 Next Steps

3.1 Implementation Process

While the Southwest Michigan Planning Commission, County Road Commissions, law enforcement, educators, and emergency responders have taken great strides towards improving road safety in the region, fatal and serious traffic crashes remain a priority to be addressed. The emphasis areas and potential countermeasures outlined in this report provide a foundation for the stakeholders and agencies to draw on when implementing new, or maintaining existing, traffic safety projects and programs. The SWMPC will continue to work with and foster strong relationships with and between the various stakeholders and agencies to help promote and coordinate these projects and programs. In this way, the SWMPC may provide assistance on a yearly basis when counties are working to identify projects and tasks for the coming year, law enforcement and emergency responders are considering taking additional steps or implementing new programs, and education providers are considering the implementation of education campaigns. These projects and programs will be reported to the SWMPC in preparation for future evaluation tasks. Additionally, the SWMPC may serve as a central repository where agencies may seek information regarding projects and tasks being considered or currently underway in other jurisdictions. The LRSP should be reviewed on a bi-yearly basis with representatives from each of the four E's present to provide guidance and feedback. Additionally, the LRSP should be used in support of the yearly development of the various Transportation Improvement Plans to help identify areas where safety improvements could be incorporated into design and maintenance projects.

Through the continued cooperation and relationships between the SWMPC and related agencies, as well as between the agencies themselves, the LRSP provides a high level document to guide the application of various transportation safety countermeasures throughout the region.

3.2 Evaluation Process

Given the rapid nature of change in today's technologically driven world, it is crucial that the Local Road Safety Plan is continuously updated and evaluated. Michigan enjoys one of the country's more robust traffic crash reporting systems which will be used to help evaluate the efficacy of systematic and individual safety treatments and programs. This will require continued cooperation between the various stakeholders across Berrien, Cass, and Van Buren Counties. Accurate records regarding the implementation of each safety related engineering improvement, education or public awareness campaign, law enforcement program, and emergency service changes should be maintained by each responsible party. In most if not all situations this is already occurring, but must be maintained to help ensure enough information is retained to properly evaluate each treatment. This project and process information will be used in conjunction with the crash data as it becomes available to assess the impacts of each treatment on the related fatal and serious injury crashes. This process should occur, at a minimum, every two years.

In addition to the treatment evaluations conducted on a regular basis, feedback and concerns should be collected from stakeholders, relevant agencies, and the public to ensure that the most pressing concerns are included in the LRSP. This could be accomplished through a yearly or bi-annual meeting held with

all involved agencies and surveys distributed to the public. This information, when used in conjunction with a review of the most recent crash data and treatment effectiveness evaluations, should be used to update the LRSP. In this manner, progress may be tracked against the goals identified in the plan, as well as offering an opportunity to add additional concerns and emphasis areas and adjust or update the goals identified in the report. Additionally, as the report is updated and maintained it should remain publicly available. In this way, the LRSP may remain a living document, adapting and adjusting according to the needs of the local communities it is designed to serve and support.



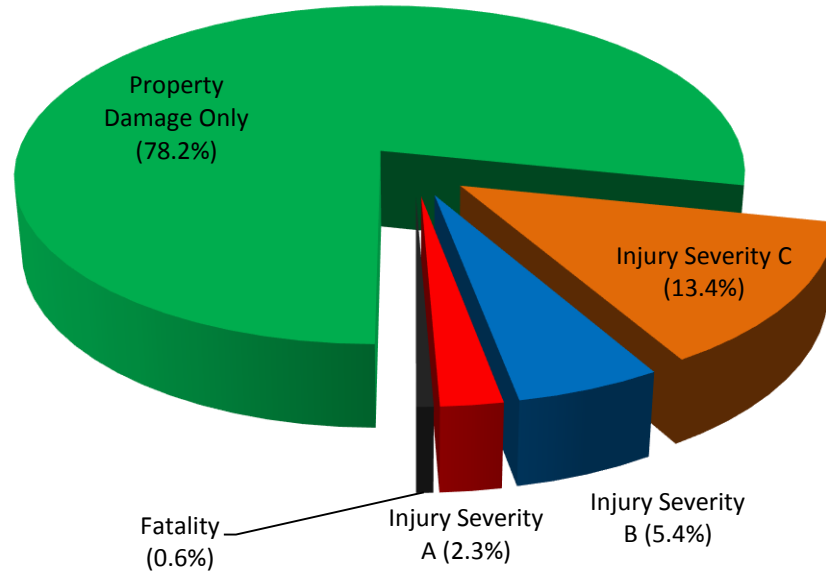
Appendices



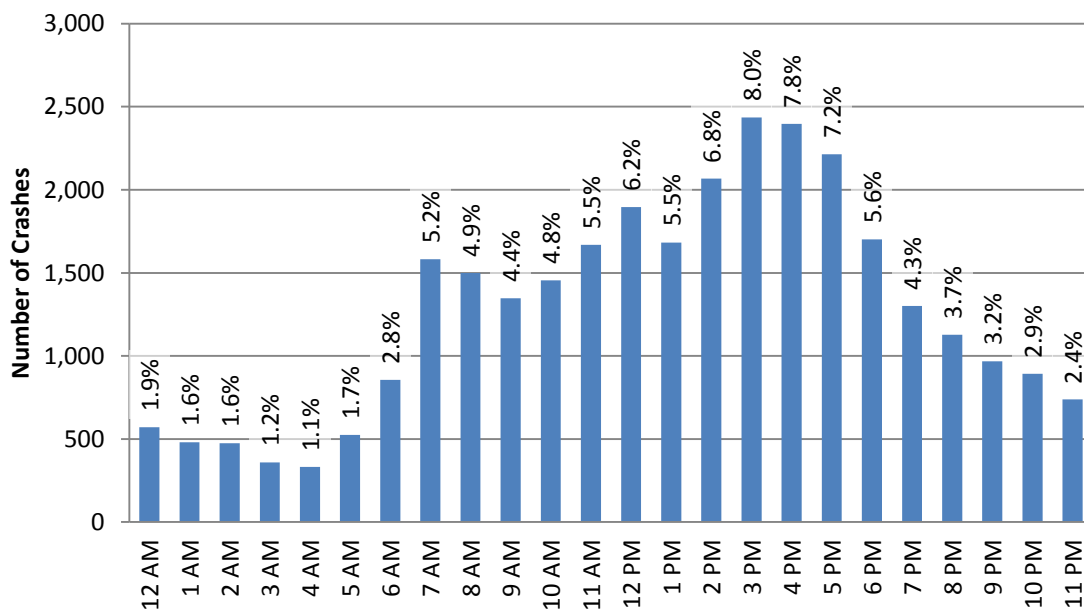
Appendix A – Regionwide Data Analysis Summary (Excluding Deer Crashes) 2010-2014

Crash Analysis

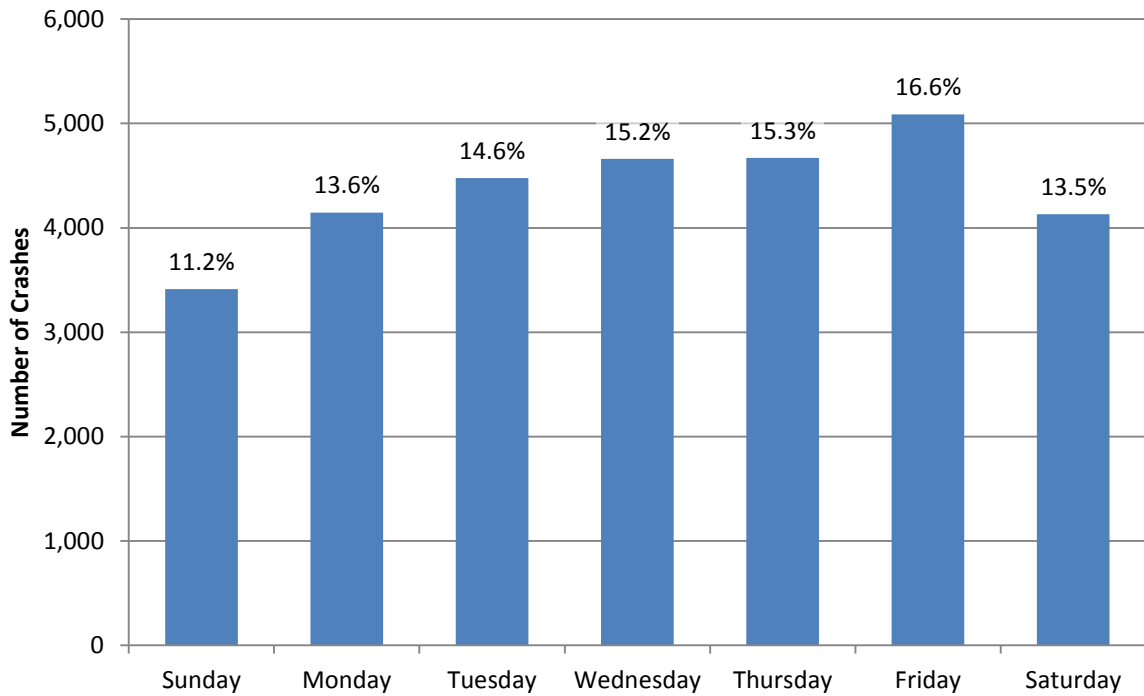
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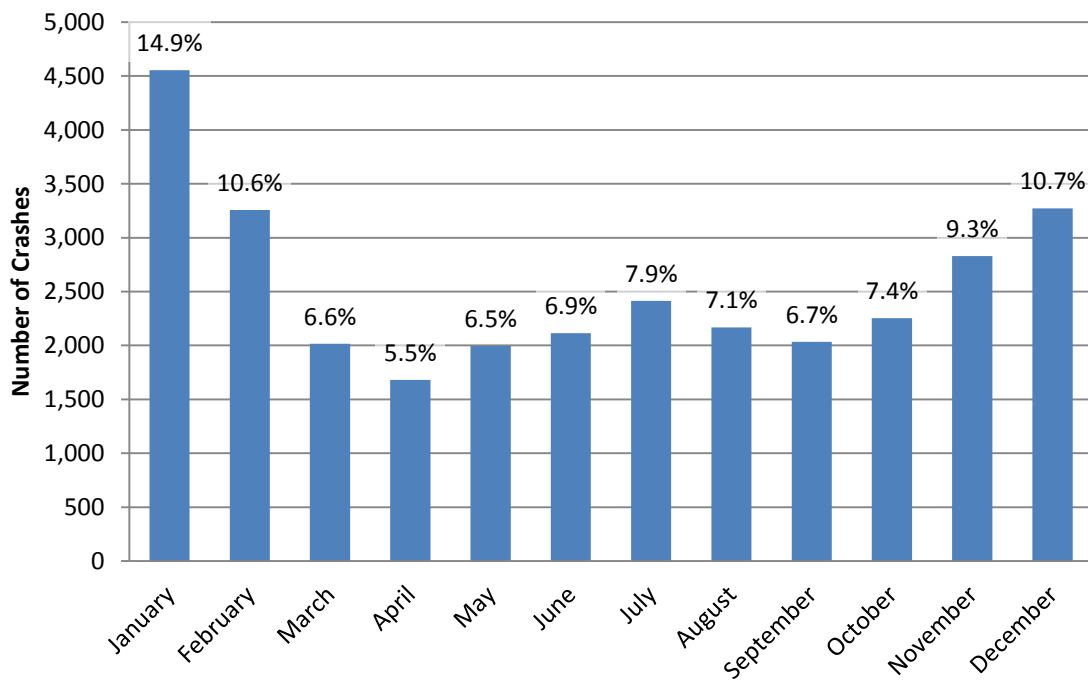
Hour of Day



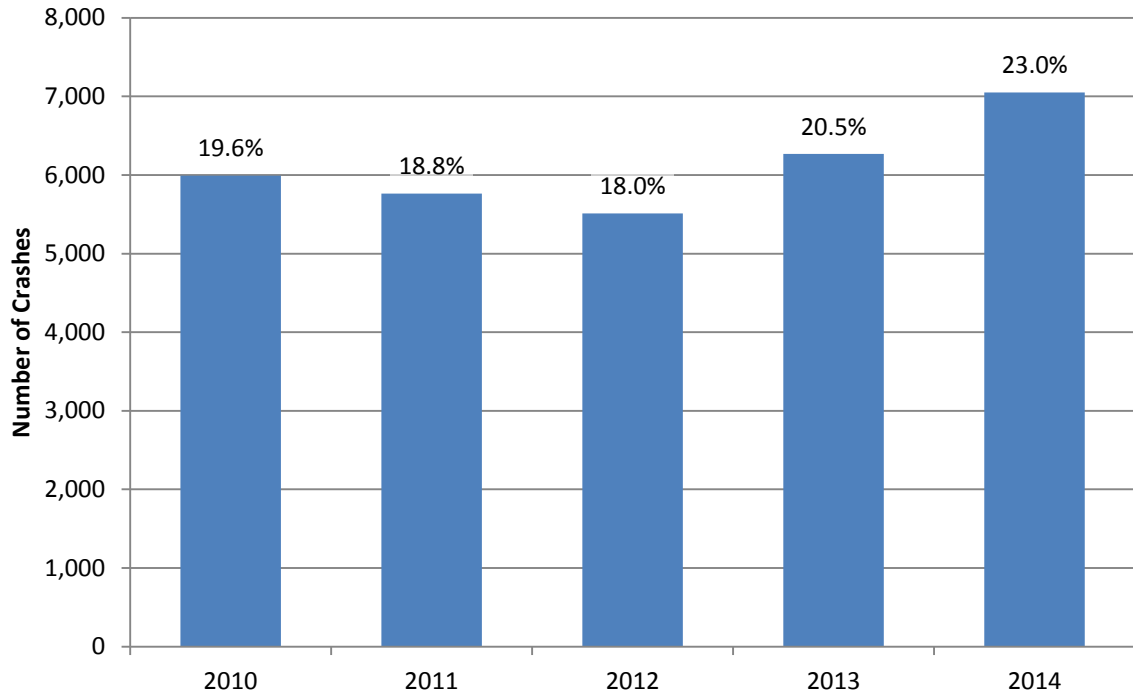
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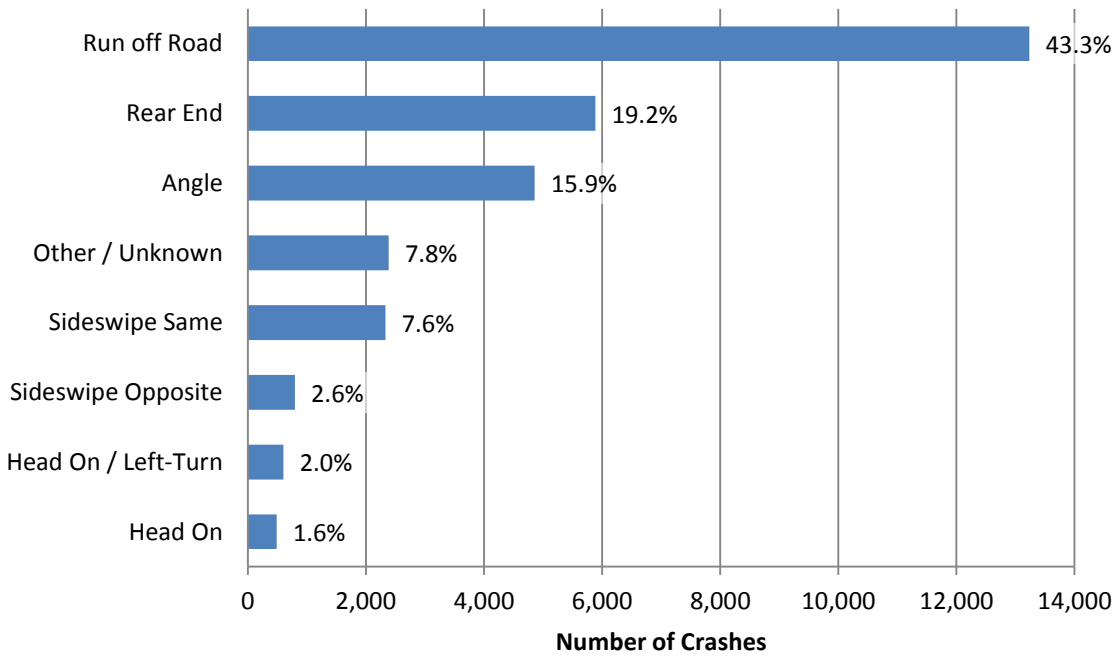
Month of Year



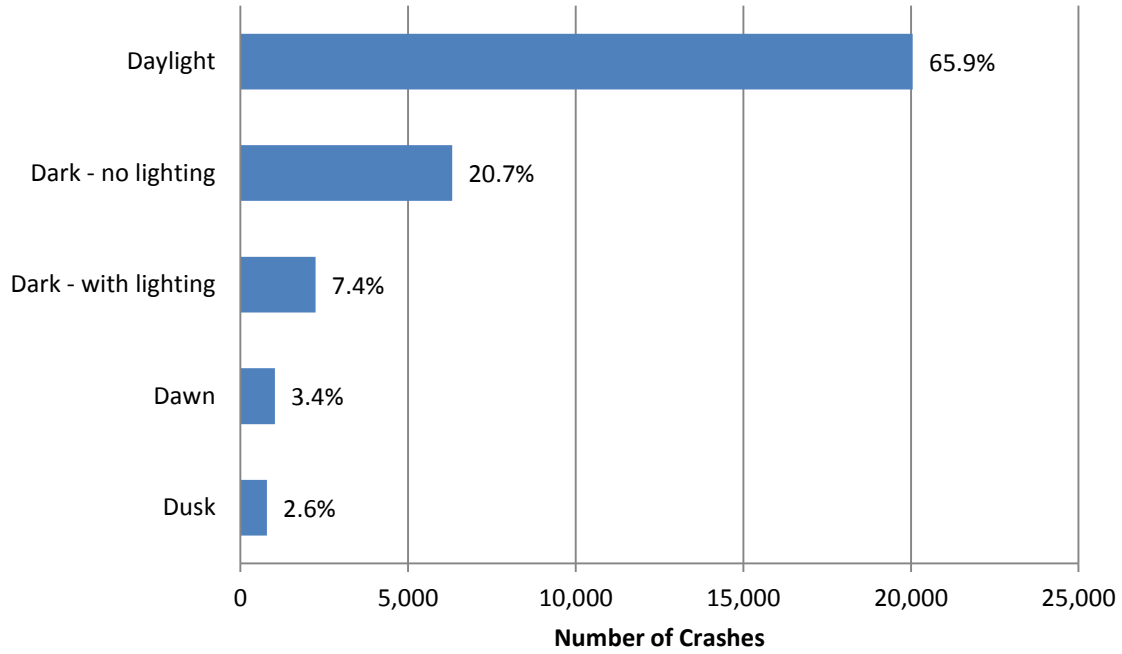
Year



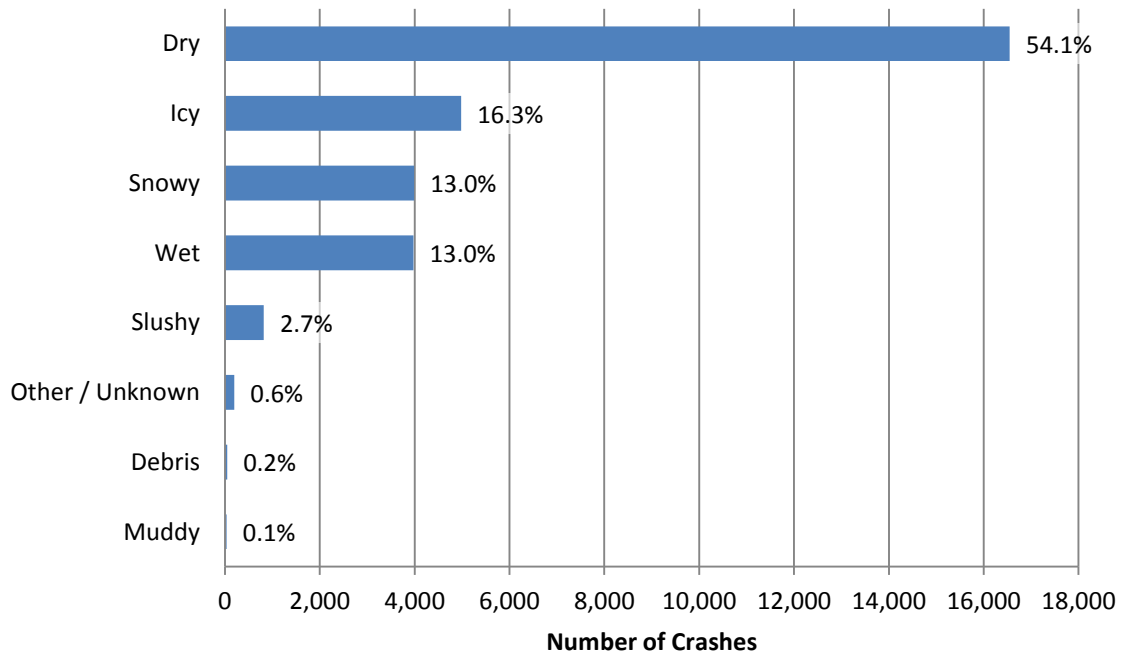
Collision Type



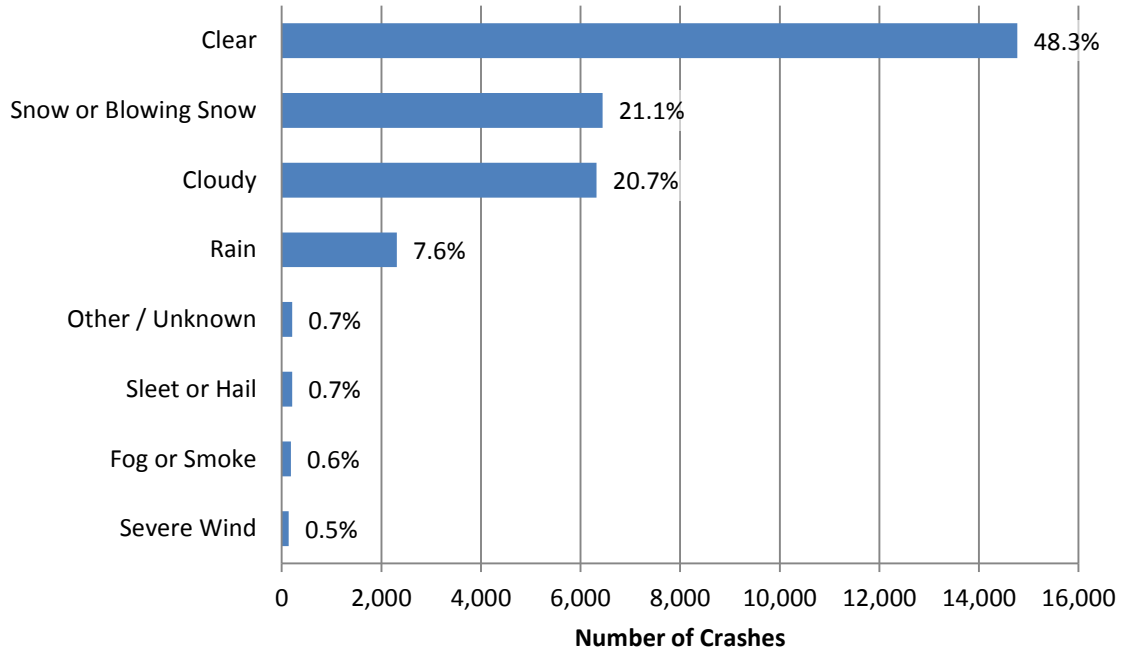
Lighting



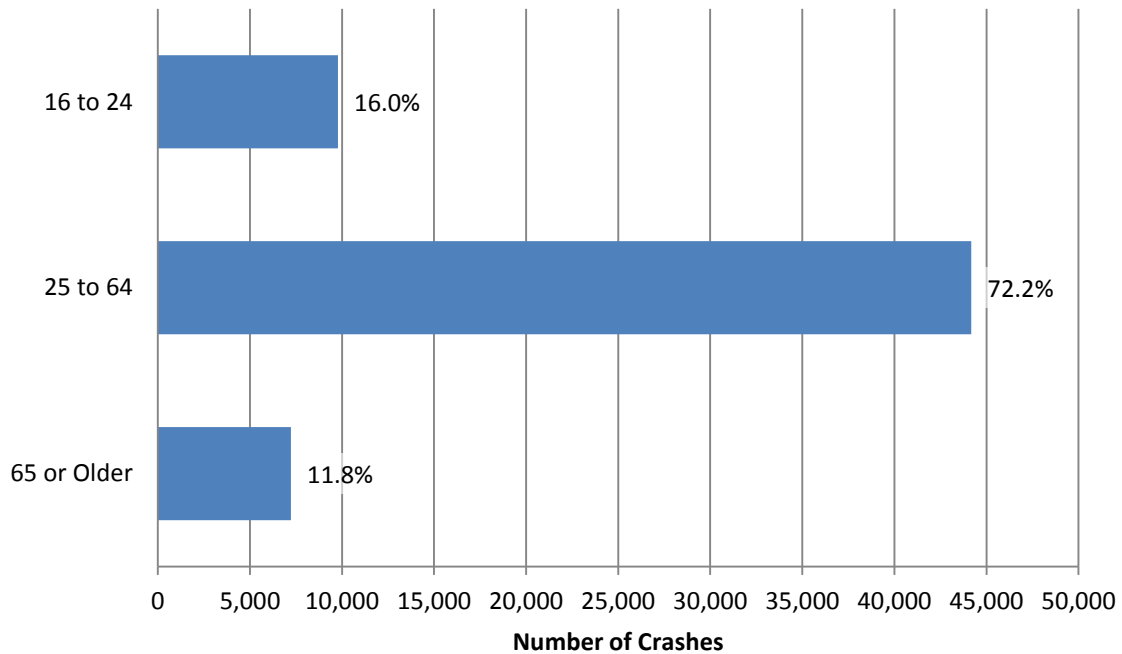
Road Conditions



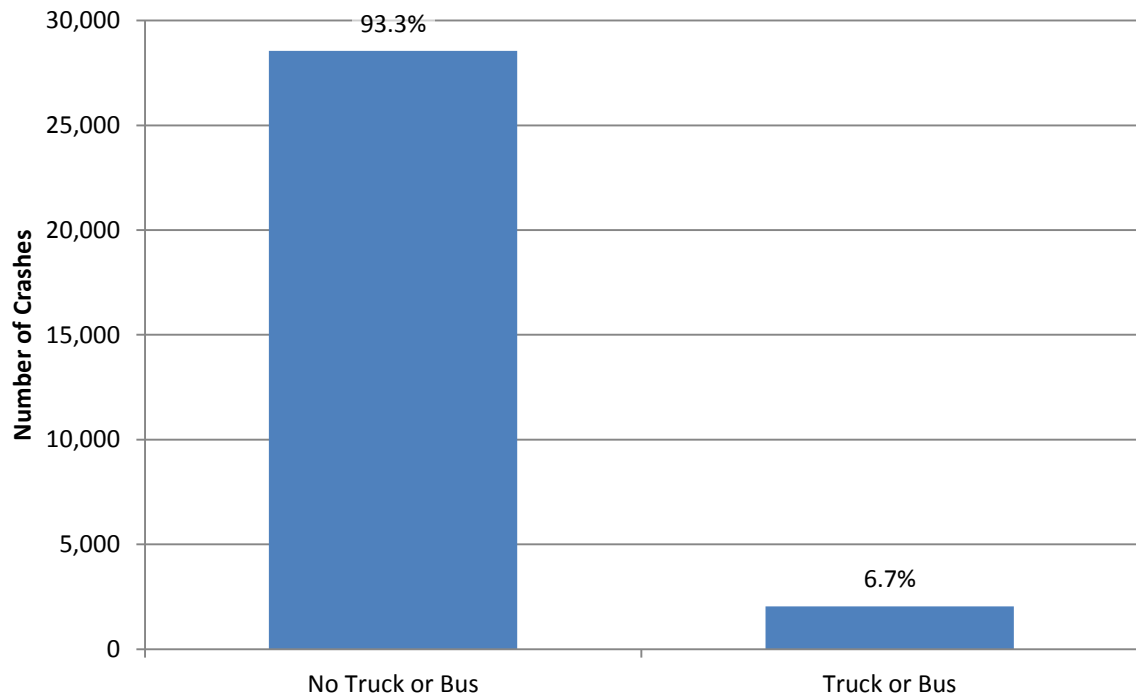
Weather Conditions



Age



Commercial Vehicles



Crash Distributions by Type

The following table provides a more detailed distribution of crashes for several subcategories across crash types for the three county region. Cells highlighted in red represent the top five highest percentages for each subcategory.

		Subcategory															
		All	Alc. Involved	Speeding	Aggressive Driving	Non-Motorized (Pedestrian & Bicycle)	Non-Motorized K&A (Pedestrian & Bicycle)	Non-Trunkline	Trunkline	Urban	Rural	Angle	Rear End	Lane Departure	Intersection	Tangent Section	Curve Section
Crash Type	11 Overturn	5.20%	9.10%	12.49%	0.62%	0.00%	0.00%	5.41%	4.99%	2.39%	8.73%	0.00%	0.00%	14.30%	0.76%	7.33%	11.02%
	12 Hit Train	0.04%	0.00%	0.00%	0.05%	0.00%	0.00%	0.05%	0.03%	0.03%	0.04%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	13 Pedestrian	0.75%	1.73%	0.12%	0.60%	50.66%	71.79%	0.88%	0.61%	0.92%	0.53%	0.00%	0.00%	0.00%	0.69%	1.02%	0.41%
	14 Bicycle	0.61%	0.56%	0.03%	0.87%	41.48%	20.51%	0.78%	0.44%	0.82%	0.35%	0.00%	0.00%	0.00%	0.96%	0.66%	0.05%
	15 Fixed Object	28.92%	52.66%	59.20%	5.60%	0.00%	0.00%	31.56%	26.31%	20.94%	38.95%	0.00%	0.00%	74.65%	9.67%	37.89%	59.64%
	16 Other Object	2.55%	0.93%	1.08%	0.27%	0.00%	0.00%	1.76%	3.33%	2.37%	2.77%	0.00%	0.00%	1.53%	0.38%	2.83%	2.19%
	17 Hit Parked Vehicle	0.54%	0.68%	0.17%	0.08%	0.66%	0.00%	0.69%	0.40%	0.58%	0.50%	0.00%	0.00%	0.10%	0.10%	0.31%	0.46%
	18 Animal	1.53%	0.06%	0.03%	0.04%	0.00%	0.00%	1.81%	1.25%	0.74%	2.52%	0.00%	0.00%	0.06%	0.08%	3.46%	0.77%
	19 Misc. Single Veh.	4.15%	5.57%	6.36%	0.62%	0.00%	0.00%	3.80%	4.49%	3.41%	5.07%	0.00%	0.00%	8.68%	1.44%	4.62%	5.77%
	20 Misc. Multiple Veh.	4.21%	1.79%	2.06%	3.78%	0.00%	0.00%	3.57%	4.85%	4.25%	4.16%	0.00%	0.00%	0.00%	3.66%	3.71%	1.89%
	21 Angle Straight	9.88%	4.33%	2.89%	20.37%	0.00%	0.00%	12.03%	7.75%	11.80%	7.48%	80.19%	0.00%	0.00%	24.82%	3.46%	1.68%
	22 Angle Turn	2.44%	0.93%	0.67%	5.39%	0.00%	0.00%	2.37%	2.51%	3.33%	1.33%	19.81%	0.00%	0.00%	6.04%	1.08%	0.77%
	23 Head On Left Turn	1.66%	1.24%	0.09%	3.90%	0.00%	0.00%	1.55%	1.78%	2.29%	0.88%	0.00%	0.00%	0.00%	3.96%	0.94%	0.10%
	24 Rear End Straight	14.99%	7.18%	5.47%	28.80%	0.00%	0.00%	10.99%	18.96%	19.86%	8.87%	0.00%	87.20%	0.00%	19.92%	15.51%	3.11%
	25 Rear End Left Turn	1.30%	0.37%	0.27%	2.62%	0.00%	0.00%	1.34%	1.27%	1.25%	1.38%	0.00%	7.59%	0.00%	2.37%	1.02%	0.41%
	26 Rear End Right Turn	0.90%	0.31%	0.26%	1.81%	0.00%	0.00%	0.69%	1.10%	1.11%	0.62%	0.00%	5.21%	0.00%	1.48%	0.45%	0.15%
	27 Dual Left Turn	0.18%	0.06%	0.01%	0.36%	0.00%	0.00%	0.14%	0.22%	0.27%	0.07%	0.00%	0.00%	0.00%	0.40%	0.06%	0.05%
	28 Dual Right Turn	0.28%	0.06%	0.01%	0.59%	0.00%	0.00%	0.14%	0.41%	0.39%	0.14%	0.00%	0.00%	0.00%	0.60%	0.09%	0.00%
	31 Head On	1.58%	2.60%	1.95%	0.96%	0.00%	0.00%	2.01%	1.15%	1.44%	1.75%	0.00%	0.00%	0.00%	1.13%	2.23%	3.67%
	32 Side-Swipe Same	7.33%	3.22%	3.84%	10.23%	0.00%	0.00%	5.08%	9.57%	8.57%	5.78%	0.00%	0.00%	0.00%	5.89%	7.27%	2.19%
	33 Side-Swipe Opp	2.36%	2.29%	2.13%	1.30%	0.00%	0.00%	3.04%	1.70%	2.20%	2.57%	0.00%	0.00%	0.00%	2.01%	3.26%	4.85%
	34 Angle Drive	2.14%	0.62%	0.27%	4.47%	0.00%	0.00%	2.51%	1.78%	3.10%	0.94%	0.00%	0.00%	0.00%	4.29%	0.00%	0.00%
	35 Rear End Drive	1.15%	0.50%	0.26%	2.50%	0.00%	0.00%	1.19%	1.11%	1.75%	0.41%	0.00%	0.00%	0.00%	2.72%	0.00%	0.00%
	36 Other Drive	0.95%	0.43%	0.17%	1.47%	0.00%	0.00%	1.18%	0.72%	1.16%	0.68%	0.00%	0.00%	0.00%	2.06%	0.00%	0.00%
	37 Backing	3.59%	2.10%	0.09%	1.66%	4.59%	7.69%	4.79%	2.40%	4.20%	2.82%	0.00%	0.00%	0.44%	3.96%	2.50%	0.71%
	38 Parking	0.76%	0.68%	0.08%	1.02%	2.62%	0.00%	0.63%	0.88%	0.82%	0.67%	0.00%	0.00%	0.24%	0.60%	0.28%	0.10%



Crash Distributions by Hazardous Action

The following table provides a more detailed distribution of crashes for several subcategories across hazardous action citations for the three county region. Cells highlighted in red represent the top five highest percentages for each subcategory.

		Subcategory															
		All	Alc. Involved	Speeding	Aggressive Driving	Non-Motorized (Pedestrian & Bicycle)	Non-Motorized K&A (Pedestrian & Bicycle)	Non-Trunkline	Trunkline	Urban	Rural	Angle	Rear End	Lane Departure	Intersection	Tangent Section	Curve Section
Hazardous Action	00 None	29.69%	9.22%	4.72%	28.25%	47.82%	53.85%	28.51%	30.87%	30.78%	28.32%	30.36%	36.49%	17.31%	30.10%	30.42%	16.48%
	01 Speed Too Fast	23.27%	21.41%	94.62%	0.00%	1.97%	3.85%	22.09%	24.44%	16.48%	31.80%	5.29%	5.72%	57.77%	7.64%	26.88%	48.47%
	02 Speed Too Slow	0.20%	0.06%	0.00%	0.04%	0.00%	0.00%	0.18%	0.21%	0.20%	0.19%	0.10%	0.22%	0.00%	0.07%	0.22%	0.36%
	03 Failed to Yield	10.84%	3.96%	0.21%	27.72%	19.43%	8.97%	11.54%	10.15%	14.10%	6.75%	42.64%	3.59%	0.00%	24.23%	4.91%	1.89%
	04 Disobeyed Traffic Control	1.80%	1.92%	0.01%	4.61%	0.87%	1.28%	1.99%	1.61%	2.24%	1.24%	9.75%	0.28%	0.00%	4.78%	0.51%	0.36%
	05 Drove Wrong Way	0.13%	0.37%	0.00%	0.02%	0.00%	0.00%	0.14%	0.13%	0.13%	0.14%	0.23%	0.02%	0.00%	0.15%	0.13%	0.15%
	06 Drove Left of Center	0.97%	2.48%	0.01%	0.01%	0.44%	0.00%	1.20%	0.74%	0.92%	1.03%	0.31%	0.02%	0.00%	0.61%	1.56%	2.24%
	07 Improper Passing	0.78%	0.31%	0.00%	2.01%	0.44%	0.00%	0.87%	0.70%	0.59%	1.02%	0.39%	0.47%	0.00%	0.86%	0.98%	0.41%
	08 Improper Lane Use	1.37%	1.18%	0.03%	3.49%	1.09%	2.56%	1.08%	1.65%	1.82%	0.80%	0.29%	0.56%	0.00%	1.22%	1.41%	0.87%
	09 Improper Turn	1.07%	0.56%	0.01%	2.74%	0.22%	0.00%	0.95%	1.19%	1.30%	0.78%	1.22%	0.22%	0.00%	1.88%	0.79%	0.31%
	10 Improper Signal	0.31%	0.31%	0.05%	0.77%	0.00%	0.00%	0.33%	0.29%	0.33%	0.28%	0.26%	0.41%	0.00%	0.37%	0.36%	0.10%
	11 Improper Backing	2.69%	1.30%	0.05%	0.04%	1.31%	1.28%	3.59%	1.80%	3.45%	1.74%	0.83%	0.54%	0.00%	2.80%	1.50%	0.41%
	12 Fail to Stop in Assured Clear Distance	10.52%	4.52%	0.16%	26.92%	2.84%	5.13%	9.07%	11.95%	13.72%	6.50%	3.10%	43.76%	2.68%	16.29%	9.54%	3.57%
	13 Other	6.45%	20.61%	0.04%	0.42%	9.83%	12.82%	6.95%	5.95%	5.96%	7.05%	1.88%	3.44%	10.71%	3.85%	7.39%	8.27%
	14 Unknown	3.09%	3.96%	0.03%	0.14%	4.80%	5.13%	3.41%	2.78%	2.62%	3.69%	1.59%	0.92%	0.00%	1.93%	3.74%	4.74%
	15 Reckless Driving (1999)	1.05%	9.41%	0.01%	2.70%	2.18%	1.28%	1.39%	0.72%	0.95%	1.19%	0.44%	0.43%	0.00%	0.72%	1.43%	1.84%
	16 Careless or Negligent Driving (1999)	5.65%	18.38%	0.05%	0.09%	6.33%	3.85%	6.53%	4.78%	4.30%	7.35%	1.30%	2.84%	11.53%	2.42%	8.10%	9.44%
	99 Uncoded & Errors	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%



Crash Distribution by Road Condition

The following table provides a more detailed distribution of crashes for several subcategories across road conditions for the three county region. Cells highlighted in red represent the top three highest percentages for each subcategory.

		Subcategory															
		All	Alc. Involved	Speeding	Aggressive Driving	Non-Motorized (Pedestrian & Bicycle)	Non-Motorized K&A (Pedestrian & Bicycle)	Non-Trunkline	Trunkline	Urban	Rural	Angle	Rear End	Lane Departure	Intersection	Tangent Section	Curve Section
Road Condition	0 Uncoded & Errors	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	1 Dry	54.21%	71.97%	12.97%	68.67%	80.79%	74.36%	55.33%	53.10%	57.70%	49.83%	64.14%	63.92%	32.58%	64.29%	51.05%	45.61%
	2 Wet	12.86%	13.49%	8.87%	15.27%	12.45%	19.23%	12.11%	13.61%	13.85%	11.63%	15.45%	14.33%	11.71%	14.35%	12.65%	11.89%
	3 Icy	16.05%	5.88%	42.08%	6.96%	1.97%	3.85%	15.68%	16.43%	13.98%	18.67%	8.39%	11.19%	29.67%	9.47%	17.47%	21.73%
	4 Snowy	13.00%	6.68%	28.29%	7.72%	4.15%	2.56%	12.75%	13.24%	11.92%	14.35%	10.16%	9.29%	18.93%	9.94%	13.76%	16.07%
	5 Muddy	0.14%	0.25%	0.26%	0.07%	0.00%	0.00%	0.19%	0.10%	0.06%	0.25%	0.00%	0.06%	0.29%	0.03%	0.23%	0.20%
	6 Slushy	2.65%	0.56%	6.90%	1.01%	0.22%	0.00%	2.94%	2.37%	1.93%	3.56%	1.46%	0.90%	5.43%	1.38%	3.84%	3.32%
	7 Debris	0.15%	1.18%	0.09%	0.02%	0.00%	0.00%	0.15%	0.16%	0.07%	0.25%	0.05%	0.02%	0.22%	0.13%	0.21%	0.26%
	8 Other	0.88%	0.00%	0.50%	0.23%	0.44%	0.00%	0.80%	0.97%	0.48%	1.39%	0.26%	0.28%	1.16%	0.35%	0.75%	0.92%



Top Intersections by Yearly Crash Frequency

Intersection	Latitude	Longitude	City	County	Crashes / Year
M-51 & Silverbrook Ave	41.81963341	-86.24708861	Niles	Berrien	15.2
S 11th St & Bell Rd	41.79791366	-86.24832849	Niles	Berrien	14.8
S 11th St & Chesnut	41.79083417	-86.25037422	Niles	Berrien	13.6
Scottdale Rd & E Napier Ave	42.08707591	-86.43645949	Benton Harbor	Berrien	12.2
Scottdale Rd & Pipestone Rd	42.09746956	-86.43471558	Benton Harbor	Berrien	11.6
M-139 & Nickerson Ave	42.07430151	-86.43653109	Benton Harbor	Berrien	11.2
M-60 & Broadway St	41.82792302	-86.24770355	Niles	Berrien	10.8
M-51 & W Bertrand Rd	41.77467173	-86.25070724	Niles	Berrien	9.2
Kalamazoo St & W Michigan Ave	42.21767291	-85.89093854	Paw Paw	Van Buren	9.2
Pipestone Rd & Mall Dr	42.08099854	-86.41741987	Benton Harbor	Berrien	8.6
M-51 & S Fulkerson Rd	41.78340602	-86.2505068	Niles	Berrien	8.6
Hilltop Rd & S Cleveland Ave	42.07989254	-86.49530439	St Joseph	Berrien	8.6
M-40 & G.E. Fadel St	42.20946315	-85.89131669	Paw Paw	Van Buren	8.2
Scottdale Rd & S Niles Rd	42.04368694	-86.43529058	St Joseph	Berrien	8.0
E Napier Ave & S Crystal Ave	42.09058834	-86.41721638	Benton Harbor	Berrien	7.8
N Front St & E Division St	41.98372792	-86.10764524	Dowagiac	Cass	7.8
N 5th St & E Main St	41.82992983	-86.25392603	Niles	Berrien	7.6
S 3rd Rd & Pulaski Hwy	41.80129833	-86.25453648	Niles	Berrien	7.6
Blue Star Hwy & Pheonix Rd	42.40345713	-86.25899456	South Haven	Van Buren	7.6
Scottdale Rd & Fairplain Dr	42.08320808	-86.43661873	Benton Harbor	Berrien	7.0
M-40 & M-43	42.30286893	-85.87877759	Paw Paw	Van Buren	7.0
M-63 & Hilltop Rd	42.07987891	-86.48554153	St Joseph	Berrien	7.0
E Napier Ave & Colfax Ave	42.08706895	-86.45593207	Benton Harbor	Berrien	6.8
Hilltop Rd & Niles Ave	42.07990442	-86.48389742	St Joseph	Berrien	6.8
S 3rd St & Grant St	41.82789137	-86.25611758	Niles	Berrien	6.6
E Napier Ave & Union Ave	42.08707323	-86.44152457	Benton Harbor	Berrien	6.4
M-139 & Garland Ave	41.95534877	-86.35687108	Berrien Springs	Berrien	6.2
M-60 & E Main St	41.82686268	-86.24436471	Niles	Berrien	6.2
S 11th St & Fort St	41.8123808	-86.24810532	Niles	Berrien	6.2
W John Beers Rd & Cleveland Ave	42.01438687	-86.49486456	Stevensville	Berrien	6.2
Red Arrow Hwy & Marquette Woods Rd	42.03322918	-86.51423376	Stevensville	Berrien	6.2

E Napier Ave & Langley Ave	42.09070511	-86.47900048	St Joseph	Berrien	6.0
E Napier Ave & Pipestone Rd	42.08987085	-86.42294134	Benton Harbor	Berrien	5.8
E Napier Ave & Niles Ave	42.09080855	-86.48497242	St Joseph	Berrien	5.8
Niles Ave & Hollywood Rd	42.05691703	-86.45582884	St Joseph	Berrien	5.8
W John Beers Rd & Red Arrow Hwy	42.01446089	-86.52863453	Stevensville	Berrien	5.8
Center St & S Church St	42.18613482	-86.3062565	Coloma	Berrien	5.6
US-12 & Red Bud Trail S	41.80530246	-86.35832196	Niles	Berrien	5.6
Grant St & Lincoln Ave	41.82711595	-86.2637087	Niles	Berrien	5.4
US-12 & M-62	41.79983367	-86.077721	Edwardsburg	Cass	5.2
Niles Ave & Botham Rd	42.08717104	-86.48538436	St Joseph	Berrien	5.2
Red Arrow Hwy & St Joseph Ave	42.02886696	-86.51517034	Stevensville	Berrien	5.2
Scottdale Rd & E Empire Ave	42.10158405	-86.43447437	Benton Harbor	Berrien	5.0
M-139 & Snow Rd	41.94643	-86.33863602	Berrien Springs	Berrien	5.0
N Front St & E Prairie Ronde St	41.99097053	-86.10726205	Dowagiac	Cass	5.0
S State St & E Van Buren St	42.3609513	-85.87897774	Gobles	Van Buren	5.0
M-51 & Ontario Rd	41.76896157	-86.25081061	Niles	Berrien	5.0
Blue Star Hwy & M-43	42.38699408	-86.26182118	South Haven	Van Buren	5.0
E Main St & Front St	41.82990072	-86.25867105	Niles	Berrien	4.8
Union Pier Rd & Red Arrow Hwy	41.82812346	-86.69222506	Union Pier	Berrien	4.8
Red Arrow Hwy & S Main St	42.18668696	-86.26067708	Watervliet	Van Buren	4.8
Red Arrow Hwy & Co Rd 681	42.2164429	-86.10849188	Lawrence	Van Buren	4.6
Ironwood Rd & Redfield St	41.76831683	-86.21738208	Niles	Berrien	4.6
N 5th St & Wayne St	41.83576204	-86.25385726	Niles	Berrien	4.6
Red Arrow Hwy & Co Rd 652	42.23728213	-85.785644	Mattawan	Van Buren	4.4
S 12th St & M-60	41.82690284	-86.245671	Niles	Berrien	4.4
W Michigan Ave & Hazen St	42.21754471	-85.89795084	Paw Paw	Van Buren	4.4
M-63 & Port St	42.11055343	-86.47934847	St Joseph	Berrien	4.4
E Front St & Red Bud Trail	41.82737453	-86.35822967	Buchanan	Berrien	4.2
M-51 S & S Paul St	41.98437818	-86.12175916	Dowagiac	Cass	4.2
Grant St & S St Joseph Ave	41.82710135	-86.2613816	Niles	Berrien	4.2
Red Arrow Hwy & Glendford Rd	42.04341914	-86.51415483	St Joseph	Berrien	4.2
Pokagon Hwy & Dailey Rd	41.91201611	-86.08759563	Cassopolis	Cass	4.0
Phoenix Rd & Broadway St	42.40323446	-86.27105283	South Haven	Van Buren	4.0
M-63 & Broad St	42.10820162	-86.48131656	St Joseph	Berrien	4.0

Pipestone Rd & E Empire Ave	42.10159884	-86.44055494	Benton Harbor	Berrien	3.8
Center St & S Paw Paw St	42.18613982	-86.30572494	Coloma	Berrien	3.8
M-40 & 62nd Ave	42.19356223	-85.86196055	Lawton	Van Buren	3.8
Wilson Rd & Harbor Country Dr	41.77001771	-86.72761498	New Buffalo	Berrien	3.8
US-12 & S Whittaker St	41.79406393	-86.74365435	New Buffalo	Berrien	3.8
US-12 & Conrad Rd	41.79254154	-86.10831673	Niles	Cass	3.8
Phoenix Rd & 73rd St	42.40364986	-86.24912772	South Haven	Van Buren	3.8



Attendance List

Kick-Off & Stakeholder Meeting

	Persons Present	Organization/Position
1.	Lawrence Hummel	VBCRC
2.	Barry Antilla	VBCRC
3.	Craig Erickson	VBCRC
4.	Joel Hoort	VBCRC
5.	Brian Berndt	BCRC
6.	Jim Campbell	MSP
7.	Alyson Kechkaylo	MSP-OHSP
8.	Steve Stepek	KATS
9.	Mickey Bittner	Wightman & Associates, Inc.
10.	Kim Lariviere	MDOT
11.	Lynnette Firman	MDOT
12.	Kim Gallagher	SWPC
13.	Gautam Mani	SWPC
14.	Daniel Paquette	Buchanan Community Schools
15.	Tim Zebell	St. Joseph City Engineer
16.	Larry Halberstadt	South Haven City Engineer
17.	Kiel McIntosh	Opus International
18.	Patrick Andridge	Opus International
19.	Andrew Ceifetz	Opus International



Traffic Safety Committee Meeting



SOUTH CENTRAL/SOUTHWEST TRAFFIC SAFETY COMMITTEE

My 28, 2015

Name	Organization
Christy Sanborn	OHSP-MSP
Julie Blanchard	Tri County Head Start
Stacie Dohm	Tri-County Head Start
Kelly Gall	Tri-County Head Start
Paul Clift	Van Buren County Rd Com
Brian Matthews	Van Buren Co Sheriff's
Michael Swerglow	Berrien Co. Road Comm
Don Gouloze	BERRIEN CO. ROAD COMM
Rob Herbstreith	MSP NILES
GARY LOROLA	MDOT- COLOMA
Joanna Johnson	RCKC
Megan Hicks	Senator Margaret O'Brien
James Johnson	AAA
Barry Miller	Berrien Co. Sheriff
Erin McArthur	Woodlands - Class Co



SOUTH CENTRAL/SOUTHWEST TRAFFIC SAFETY COMMITTEE

My 28, 2015

Name	Organization
Craig Erickson	VBRC
Megan Arndt	KATS
Fred Nagler	" "
Maurice Burton	MSP Niles
Pat Karr	Battle Creek Area Transportation Study
Jim Haekstra	RCKC
LAUREN Hammel	VAN BUREN CRC
David Vanhopik	MSP Law Law
Jim Campbell	MSP 50TH
Kevin Kilm	Dowagiac Union Sch.
Kim Lariviere	MDOT
Joe Gorman	MDOT
Quinton Kekuakoulo	OHSP
James E. Gules	AAA

Appendix B – Countermeasure Summary

The following sections provide brief descriptions of each of the recommended treatment strategies, organized by their associated emphasis area. While it is expected that several treatments may have a positive impact for more than one emphasis area, they are listed with their most closely associated area. Each countermeasure description will maintain the following format:

Countermeasures Name/Title	
4-“E” Area of Focus:	List of applicable focus areas
Countermeasure Definition:	Brief description of the countermeasure(s) including an example photo where applicable.
Types of crashes affected:	List of crash types most commonly addressed by the countermeasure(s).
Locations for use:	Brief description of locations commonly identified as candidate locations for the countermeasure(s).
Estimated Safety Benefit:	Range of applicable crash reduction factors obtained from the Crash Modification Factor Clearing House.
Estimated Cost Tier:	Very High High Moderate Low Minimal



Roadway Departure Countermeasures

Advanced Curve Warning Signs and/or Chevrons

4-“E” Area of Focus: Engineering

Countermeasure Definition:

Advanced curve warning signs provide drivers with additional time to adjust their speed to prepare for the upcoming curve. These “Curve Ahead” warning signs may be supplemented with advisory warning speeds where warranted based on the geometry of the curve. Additionally, target arrows and chevron signs help to delineate the path of the curve improving the driver’s ability to stay in their lane and on the road. Flashing beacons may be added to the signs to improve their conspicuity and draw drivers’ attention to the curve.



Source: FHWA

Types of crashes affected: Single Vehicle Lane Departure, Sideswipe Opposite, Head On

Locations for use: In advance of and along unmarked or higher risk curves, particularly sharper curves or compound vertical and horizontal curves.

Estimated Safety Benefit: 4 to 52 percent reduction for crashes of all types and severities
28 to 55.5 percent reduction in run off road crashes of all severities

Estimated Cost Tier: Minimal

Install/Expand Shoulders

4-“E” Area of Focus: Engineering

Countermeasure Definition:

Gravel and paved shoulders provide drivers with additional room for correction and vehicle recovery, with paved shoulders being more stable and providing improved traction and control. While paved shoulders are preferred, the installation and maintenance of, at a minimum, gravel shoulders should be considered on roads currently lacking this feature. This extra pavement area improves the driver's ability to correct after leaving their lane but before departing from the road itself.



Source: FHWA

Types of crashes affected: Single Vehicle Lane Departure

Locations for use: Road segments with little to no paved shoulder. Especially areas with high concentrations of run off road crashes or significant non-motorized volumes sharing the road with vehicles.

Estimated Safety Benefit: 16 to 60 percent reduction in crashes of all types and severities
2 to 18 percent reduction in serious and minor injury fixed object, head on, run off road, and sideswipe crashes

Estimated Cost Tier: Moderate

Install Center & Edgeline Rumble Strips

4-“E” Area of Focus: Engineering

**Countermeasure
Definition:**

Center and edgeline rumble strips provide the driver with an auditory and tactile alert when they begin to move out of their lane. These strips can be pressed into newly laid pavement or milled in after the fact. They are especially effective when drowsy or distracted drivers are concerned.



Source: FHWA

Types of crashes affected: Single Vehicle Lane Departure, Head On, Sideswipe Same Direction

Locations for use: Road segments experiencing high concentrations of run off road or head on crashes.

Estimated Safety Benefit: Centerline: 21 percent reduction in head on and sideswipe crashes of all severities
Edgeline: 5 to 18 percent reduction in fatal and serious injury crashes of all types

Estimated Cost Tier: Low – Moderate

Install Safety Edge Pavement Treatments

4-“E” Area of Focus: Engineering

**Countermeasure
Definition:**

Installation of safety edges (a 30 degree slope) along the edge of paved shoulders improves the ability of drivers to safely return to the roadway when correcting for a roadway departure event.



Source: FHWA

Types of crashes affected: Single Vehicle Lane Departure

Locations for use: Road segments experiencing high concentrations of run off road crashes.

Estimated Safety Benefit: 7.7 to 15.5 percent reduction in all crash types of all severities
4.7 to 14 percent reduction in run off road crashes of all severities

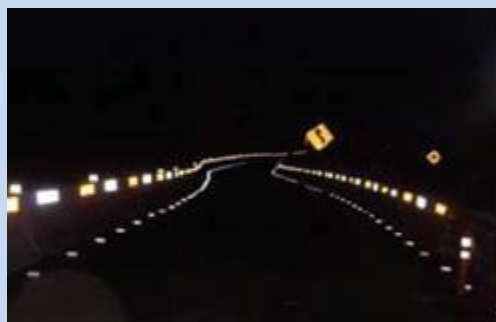
Estimated Cost Tier: Minimal – Low

Improve Nighttime Delineation

4-“E” Area of Focus: Engineering

**Countermeasure
Definition:**

Improving the delineation visibility on stretches of dark or unlit roadway improves the tracking ability of drivers. This can be done through the installation of overhead lighting, improved pavement marking retroreflectivity, or other reflective equipment along the roadside. These treatments help to illuminate the road itself or improve the delineation of the roadside.



Source: FHWA

Types of crashes affected: Single Vehicle Lane Departure

Locations for use: Road segments experiencing high concentrations of run off road crashes.

Estimated Safety Benefit:

- Lighting Installation: 46 to 54 percent reduction in serious and minor injury nighttime crashes
- Improved Pavement Markings: N/A – the predicted reduction is a function of the change in retroreflectivity
- Install Raised Pavement Markers: 13 to 19 percent reduction in all crash types of all severity

Estimated Cost Tier: Minimal – Low

Aggressive Driver Related Countermeasures

Impaired Driving Enforcement Zones	
4-“E” Area of Focus:	Enforcement Emergency Response
Countermeasure Definition:	Enforcement zones can serve as a visible deterrent to individuals considering driving after drinking or taking other substances. They also serve as an active measure used to remove impaired drivers from the road, helping to reduce crashes involving impaired drivers.
Types of crashes affected:	Drinking and/or Drug Involved crashes
Locations for use:	Known problem areas or during large events
Estimated Safety Benefit:	Unavailable
Estimated Cost Tier:	Moderate



Mobile Speed Trailers

4-“E” Area of Focus:

Enforcement

Education

Countermeasure Definition:

Mobile Speed Trailers may be placed at locations experiencing higher rates of speed violations. These trailers detect and display the speed of the oncoming vehicle and are often paired with supplemental speed limit signs. This provides the driver with real-time feedback and reinforces the speed limit. While this particular treatment has limited staying power after the trailer has been removed, it can be cycled through problem areas to help at multiple locations.



Source: FHWA

Types of crashes affected: N/A

Locations for use: Areas with higher proportions of speed violations or areas with increased non-motorized traffic.

Estimated Safety Benefit: Unavailable

Estimated Cost Tier: Low

Traffic Calming Projects

4-“E” Area of Focus:

Engineering

Education

Countermeasure Definition:

Several methods exist to help lower traffic speeds in lower volume areas. As drivers tend to travel at speeds they feel comfortable at rather than posted speed limits, steps can be taken to safely lower the speed drivers feel comfortable driving at. Some examples include narrowing lane widths, installing/allowing on-street parking, installing curb bump-outs, etc.



Source: FHWA

Types of crashes affected: N/A

Locations for use: Lower volume and speed areas experiencing higher rates of speed violations or areas with higher non-motorized traffic.

Estimated Safety Benefit: N/A

Estimated Cost Tier: Low – Very High

Randomized Enforcement Locations

4-“E” Area of Focus:	Enforcement Emergency Response
Countermeasure Definition:	The presence of law enforcement tends to provide a calming presence for traffic flow and encourages drivers to obey the speed limits and other traffic laws. While increasing the number of officers can be beneficial, randomizing the patrols and locations can also help. By changing staging and monitoring points for law enforcement, drivers have a more difficult time avoiding known enforcement areas, effectively increasing the influence of law enforcement in the area.
Types of crashes affected:	N/A
Locations for use:	Known problem locations experiencing higher violation rates in general.
Estimated Safety Benefit:	N/A
Estimated Cost Tier:	Moderate



Intersection Related Countermeasures

Review Intersection Traffic Control

4-“E” Area of Focus: Engineering
Education

Countermeasure Definition:

Intersection traffic control type should be reviewed to determine whether or not it is warranted and whether a more appropriate option could be employed.

Additional steps could be taken to help educate the public regarding any new traffic control methods or provide information regarding appropriate navigation and right of way issues associated with existing traffic control.



Source: FHWA

Types of crashes affected: Angle, Rear End, Head On Left Turn

Locations for use: High risk/crash intersections or those with a higher proportions of traffic control violations.

Estimated Safety Benefit: N/A – Benefit depends heavily on specific existing conditions and proposed reconfiguration

Estimated Cost Tier: Moderate – Very High

Advanced Intersection Signage

4-“E” Area of Focus: Engineering

Countermeasure Definition:

The installation of new or supplemental intersection warning and/or lane use signs provide additional warning to the driver that they are approaching an intersection. This provides them with additional time to take appropriate actions to adjust speed, change lanes, scan for traffic or pedestrians, etc.



Source: FHWA

Types of crashes affected: Angle, Rear End, Head On Left Turn

Locations for use: High risk/crash intersections or those with a higher proportions of improper lane use, turn, and signal violations.

Estimated Safety Benefit: Advanced Street Name Sign: 1.6 percent reduction in all crash types of all severities
Stop Ahead Pavement Markings: 31 percent reduction in all crash types of all severities

Estimated Cost Tier: Minimal – Low

Installation of Transverse Rumble Strips

4-“E” Area of Focus: Engineering

Countermeasure Definition: Installation of rumble strips across the travel lanes on approaches to stop controlled intersections.



Source: FHWA

Types of crashes affected: Angle, Rear End, Head-on Left Turn

Locations for use: Stop controlled intersections with higher risk/crash history and/or higher traffic control violation rates.

Estimated Safety Benefit: 20 percent reduction in all crash types of all severities in rural areas

Estimated Cost Tier: Low – Moderate

Vulnerable Road User Involved Countermeasures

Crosswalk Improvements

4-“E” Area of Focus:

Engineering
Education

Countermeasure Definition:

Installation of a range of crosswalk improvements would improve the conspicuity of the crosswalk, better alerting drivers of the potential for cross traffic. Some examples include marked & signed crosswalks, improved lighting, pedestrian countdown timers and push buttons, flashing beacons, etc.

Additional and supplemental education information could be distributed to help improve pedestrian and other non-motorized use of crosswalks and associated features.



Source: FHWA

Types of crashes affected:

Vulnerable/Non-motorized Crashes

Locations for use:

Intersections and midblock crossings

Estimated Safety Benefit:

29 percent reduction in crashes of all types and severities in urban or suburban areas

37 to 69 percent reduction in pedestrian involved crashes in urban or suburban areas

Estimated Cost Tier:

Minimal – Moderate

Improve Sidewalk/Multi-use Trail Interconnectivity & Maintenance

4-“E” Area of Focus:

Engineering

Education

Countermeasure Definition:

Building on the existing sidewalk and multi-use trails would provide pedestrians and bicyclists with a safer area to travel and help to separate them from motor vehicle traffic. Implementing or improving on existing maintenance programs would help to ensure that the sidewalks and trails remain a viable route for pedestrians and bicyclists.



Source: FHWA

Types of crashes affected:

Vulnerable/Non-Motorized Crashes

Locations for use:

Gaps in sidewalk and trail connectivity as well as higher pedestrian and bicyclist volume areas or where increased demand is expected.

Estimated Safety Benefit:

N/A

Estimated Cost Tier:

Low – High

Pedestrian and Bicycle Education Programs

4-“E” Area of Focus:	Education
Countermeasure Definition:	Education programs geared towards pedestrians and bicyclist regarding proper navigation of the trail and road network should prove beneficial in reducing the number of vehicular and non-motorized conflicts. This may be especially helpful for younger children who may not know the proper way to cross the street or how to behave around traffic. Additionally, education regarding bicycle and vehicle interactions is crucial to improve the way drivers and bicyclist share the road and respond to each other’s presence.
Types of crashes affected:	Bicycle & Pedestrian Involved Crashes
Locations for use:	N/A
Estimated Safety Benefit:	Unavailable
Estimated Cost Tier:	Low – High



Installation & Maintenance of Bicycle Lanes

4-“E” Area of Focus:

Engineering

Education

Countermeasure Definition:

Installation and maintenance of existing and future bike lanes which provide a defined area for bicyclist traffic in the roadway.

Education and public awareness campaigns regarding the lanes and appropriate use and interaction between vehicles and bicycles and other slower moving traffic should be implemented. This is crucial as the installation of bicycle lanes may increase the number of users in the road, which could result in an increase in bicycle related crashes if the knowledge regarding appropriate use is not distributed.



Source: FHWA

Types of crashes affected:

Bicycle Involved Crashes

Locations for use:

Could be applied to any roadway with the appropriate cross-section. Generally should be focused on areas with high bicycle traffic demand or areas where an increase in demand is expected.

Estimated Safety Benefit:

13 percent reduction in fatal and injury bicyclist involved crashes in urban areas

Estimated Cost Tier:

Low - Moderate

High Risk Locations

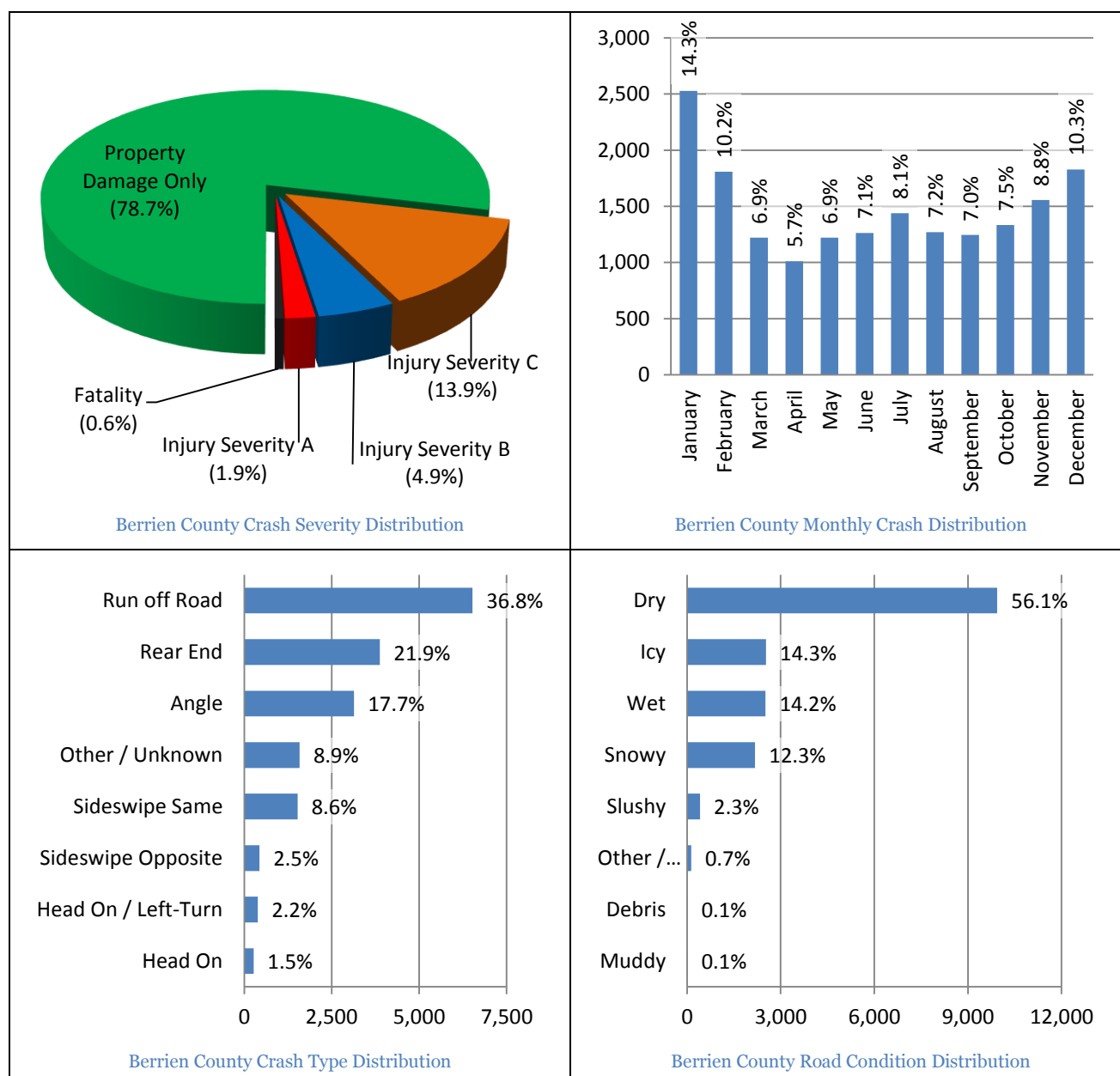
Regular Network Screening Paired with Road Safety Audits	
“E” Area of Focus:	Engineering & Education
Countermeasure Definition:	Regular network screening of the region will help to ensure that problem areas are continually being identified and tracked. The isolation of specific high risk or high crash prone sites provide the opportunity to conduct road safety audits, which are an in-depth, site specific review of the location including the identification of tailored countermeasures.
Types of crashes affected:	Depends on specific location review
Locations for use:	High risk/High crash sites
Estimated Safety Benefit:	N/A
Estimated Cost Tier:	Low – High



Appendix C – County Summaries

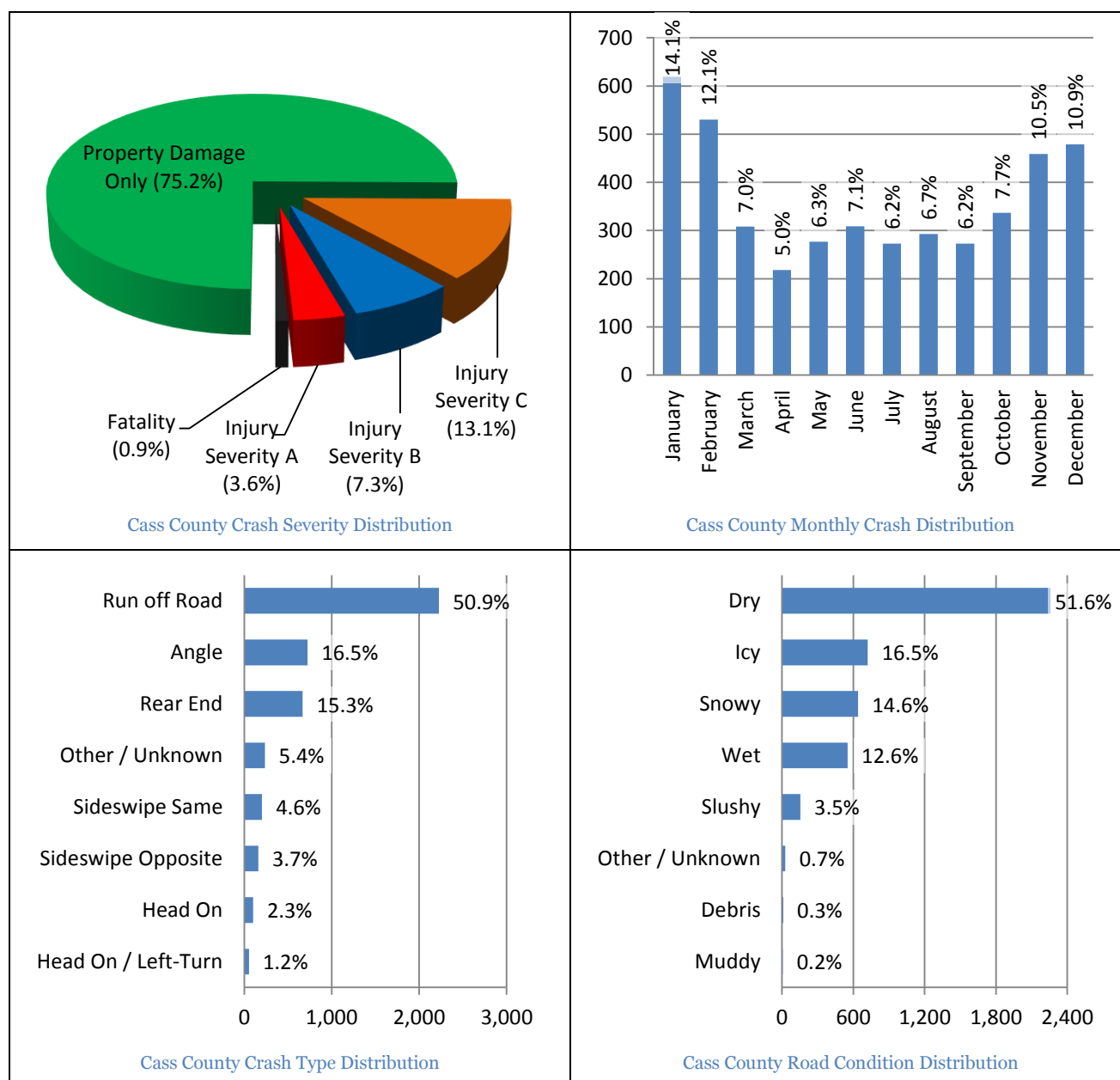
Berrien County Summary

Berrien County experienced just over half of the crashes (approx. 17,800 of 30,200 total) reported in the region during the analysis period. The summary statistics provided here mirror those for the region as a whole fairly closely. The following figures would suggest that crashes in this county peak during the winter months, as supported by the monthly distribution and the significant portion occurring under icy, wet, or snowy road conditions. Additionally, run off road, rear end, and angle crashes account for roughly 76 percent of all crashes in the county.



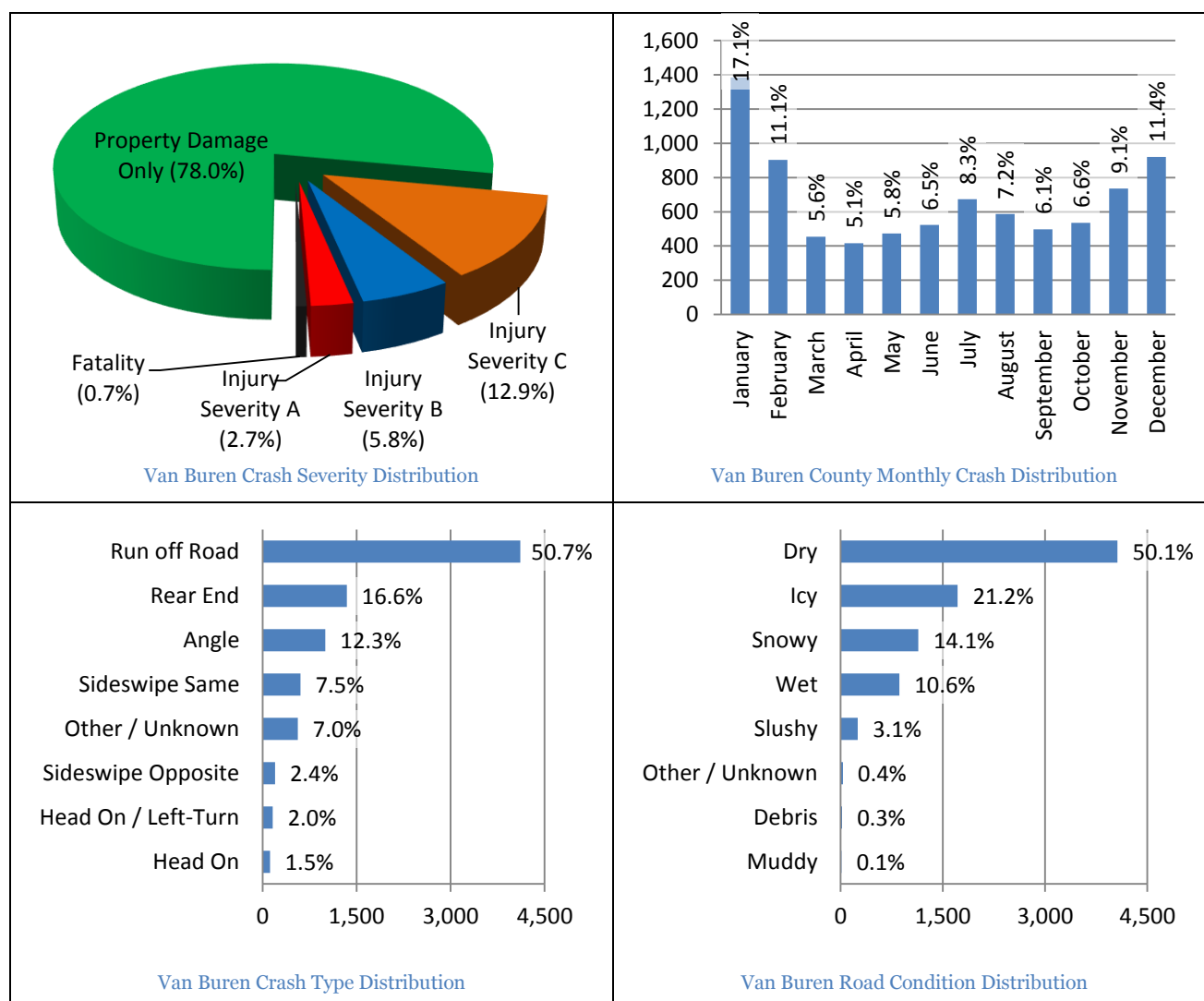
Cass County Summary

Cass County experienced only one seventh of the crashes (approx. 4,400 of 30,200 total) reported in the region during the analysis period. The summary statistics provided here mirror those for the region as a whole fairly closely, with a greater emphasis on run off road crashes. The following figures would suggest that crashes in this county also peak during the winter months, as supported by the monthly distribution and the significant portion occurring under icy, wet, or snowy road conditions. Additionally, run off road, rear end, and angle crashes account for over 80 percent of all crashes in the county with just over 50 percent being run off road crashes.



Van Buren County Summary

Van Buren County experienced just over one quarter of the crashes (approx. 8,100 of 30,200 total) reported in the region during the analysis period. The summary statistics provided here also mirror those for the region as a whole fairly closely. The following figures would suggest that crashes in this county peak during the winter months, having the greatest spike during this period of the three counties, as supported by the monthly distribution and the significant portion occurring under icy, wet, or snowy road conditions. Additionally, run off road, rear end, and angle crashes account for roughly 80 percent of all crashes in the county with run off road crashes accounting for just over 50 percent.



Appendix D – Potential Funding Sources

MDOT Safety Program

The Michigan Department of Transportation Safety Program announces a call for projects on a yearly basis. The program operates on a matched funding basis. For projects addressing safety issues that do not include fatalities or serious injuries, the match is 80 percent federal funds / 20 percent local funds. For safety projects which address concerns related to a fatality or serious injury, the match shifts to 90 percent federal funds / 10 percent local. Projects eligible for funding under this program include all safety related projects which meet current standards, warrants, and are compliant with the ADA and Buy American Acts among others. Additionally, the program allows for funding of systemic safety projects with monetary goals for projects such as road safety audits, non-motorized facilities, surfacing treatments, and rumble strip and guard rail installations among others.

Transportation Alternatives Program

The Transportation Alternatives Program (TAP) provides competitive grants to agencies in an effort to support and encourage the development of intermodal transportation systems as an alternative to vehicular traffic. The program is open to a wide range of agencies including county road commissions, cities, villages, and regional transportation authorities. As the Safe Routes to School Program has been brought under the umbrella of the TAP, they cover a similar group of eligible project types. Some projects unique to TAP funding include conversion of abandoned railroad corridors to trails, vegetation management practices in rights of way, and boulevards in the right of way of former divided highways. Applications for funding are accepted year round.

Safe Routes to School Program

The Safe Routes to School Program (SR2S) has three main goals:

- To increase and encourage children of all capabilities to walk and bicycle to school,
- Improve the safety and appeal of walking and biking to school, and;
- To support the planning and implementation of projects and programs to reduce vehicular traffic and emissions in the areas around schools.

The program is currently administered under the Transportation Alternative Program and paired with the Transportation Enhancements and Recreational Trails programs. The program generally includes sidewalk improvements, on-street and off-street bicycle facilities improvements, driver feedback and variable speed limit signs, sidewalk lighting, etc. Additional non-infrastructure projects are included in the list of eligible projects such as walk or bike to school day programs, personal safety education programs, and volunteer safety patrols among others.



Highway Safety Improvement Program

The main goal of the Highway Safety Improvement Program mirrors that of the LRSP in that it seeks to help reduce the number of fatalities and serious injuries occurring each year on the transportation network. The program spurred the development of the statewide road safety plans and helps to provide high level direction and guidance. Funds made available through the HSIP may be used for both infrastructure and non-infrastructure programs. Most projects eligible under the program require a 10 percent local match. Some projects, however, may receive 100 percent federal funding depending on the specific project type. While the High Risk Rural Roads fund has been phased out under MAP-21, there are still measures to direct some funding towards high risk rural roads when certain metrics are exceeded.

Local Matches

Regardless of the project type and funding source, collection of local matches for safety projects and programs provide an additional source of funding. Additionally, inclusion of a source of local matches tend to improve the feasibility or reception of funding applications from other sources. It provides evidence for local support for the project and help to offset other matching or federal costs. Local matches can be coordinated with community groups, local business, or other community partners with a stake in the project area or outcome.

Congestion Mitigation and Air Quality Improvement (CMAQ) Program

While CMAQ funding is designated for projects which help to reduce congestion, delay and other operational characteristics, some safety projects may have a positive impact on these metrics. As such, there may be potential to apply for CMAQ funding on eligible projects in support of other safety funding sources. This could provide the opportunity to obtain CMAQ funding that may be used as matching funds for other applications.

Surface Transportation Improvement Grants (STP)

Funds made available through the STP cover a wide range of potential projects. State and local governments may apply for the funding with portions set aside specifically for metropolitan planning areas with populations of varying levels, including below 200,000 and 50,000 people. Potentially eligible projects include:

- Public transportation capital improvements,
- Car and vanpool projects,
- Fringe and corridor parking facilities,
- Bicycle and pedestrian facilities, and;
- Bus terminals and facilities.

Projects eligible for funding under the STP do not necessarily need to have a safety component. The grants generally require local matches, the amount of which varies depending on the type of project and system the project is occurring on. Generally a 20 percent matching fund is required.



Metropolitan Planning Program and State Planning and Research Program

A wide range of planning activities may be eligible for funding under either of these programs. Funds are allocated to each state based in part on the state's proportion of urban areas when compared to the nation as a whole. Funds are then distributed by the state to the municipal planning organizations (MPO) based on individual state formulas with each MPO receiving a guaranteed minimum. Projects do not necessarily need to be safety related, although safety related projects are specifically mentioned in the list of eligible project types. Funding may be applied towards planning activities for:

- developing the economic vitality of the metropolitan area,
- increasing the safety and security of the transportation system for motorized and non-motorized users,
- improving the accessibility and mobility of people and freight,
- protecting and enhance the environment, promote energy conservation,
- improving the quality of life, and promote consistency between transportation improvements and State and local planned growth and economic development patterns,
- enhancing the integration and connectivity of the transportation system, across and between modes, for people and freight,
- promoting efficient system management and operation, and;
- emphasizing the preservation of the existing transportation system.

Transportation Enhancement Activities

This program covers funding for projects that fall under at least one of twelve specific activities. The states solicit and select projects for funding and may disburse said funding to Federal, Tribal, State, or local government agencies. The twelve activities eligible for funding under this program are summarized as follows:

- Providing facilities and safety and educational activities for non-motorized users,
- Acquisition of scenic or historic easements or sites, including historic highway programs,
- Landscaping beautification and historic preservation and operation of buildings and facilities,
- Preservation of abandoned railway corridors,
- Management of outdoor advertising,
- Archaeological planning and research,
- Environmental mitigations related to transportation activities, and;
- The establishment of transportation museums.





Opus International Consultants Inc.
Suite 210, 27333 Meadowbrook Road, Novi,
MI
48377
USA

t: +1 248 539 2222
f: +1 248 349 6862
w: www.opusinternational.com