APPENDIX A:

DESCRIPTIVE SAFETY ANALYSIS

MVRPC SAFE STREETS FOR ALL
COMPREHENSIVE SAFETY ACTION PLAN

MVRPC SS4A SAFETY ACTION PLAN
DESCRIPTIVE SAFETY ANALYSIS

Contents

Introduction

This memo summarizes the results of the descriptive crash analysis and provides a data-driven basis for understanding the scope of fatal and serious injury (FSI) traffic crashes in the Miami Valley Regional Planning Commission (MVRPC) Metropolitan Planning Organization (MPO) Region, from here on known as the study area. For the purposes of this project, the study area includes the counties within the MPO: Montgomery County, Miami County, Greene County, plus a portion of Northern Warren County.[1] This memo articulates high-level FSI crash trends by user, with comparisons to all crashes (K – Fatal, A – Incapacitating, B – Non-Incapacitating, C – Possible Injury). Crashes reported as "No Injury / None Reported" (O) were excluded from this crash analysis.[2]

Descriptive Crash Analysis Methodology

The descriptive crash analysis methodology consisted of data collection, consolidation, processing, and contextualization based on available crash and roadway attribute data. A series of high-level descriptive summary tables and charts capture relationships between the study area-wide crash data, infrastructure data, and contextual variables. These statistics explore overall crash trends and patterns that can be used to guide the selection of variables warranting deeper analysis, new roadway behavior programs, policy changes, or the selection of safety countermeasures for project development. This report provides planners, engineers, and decision makers with more information to design roads and form infrastructure policies that respond to historical crashes and determine where there are similar crash conditions across the system.

Crash Data Overview

Police officers complete the Ohio OH-1 Crash Report Form when investigating a roadway crash.[3] The Report Form prompts responding officers to document information about the involved parties, location, crash factors, and vehicle types involved in the crash. The trends in this analysis are separated by rural and urban areas, as defined by ODOT's Adjusted Urbanized Areas boundaries (shown in Figure 1). [4]

[1] Four rural FSI crashes occurred along the MPO border, one identified as Butler County and three identified as Preble County. These four crashes have been included in the FSI crash count.

[2] There was a total of 143,452 "O" crashes within the 10-year period (2015-2024).

[3] https://publicsafety.ohio.gov/what-we-do/crash-reports/crash-reports-statistics/order-crash-forms/order-crash-forms

[4] https://gis.dot.state.oh.us/tims/Data/Download

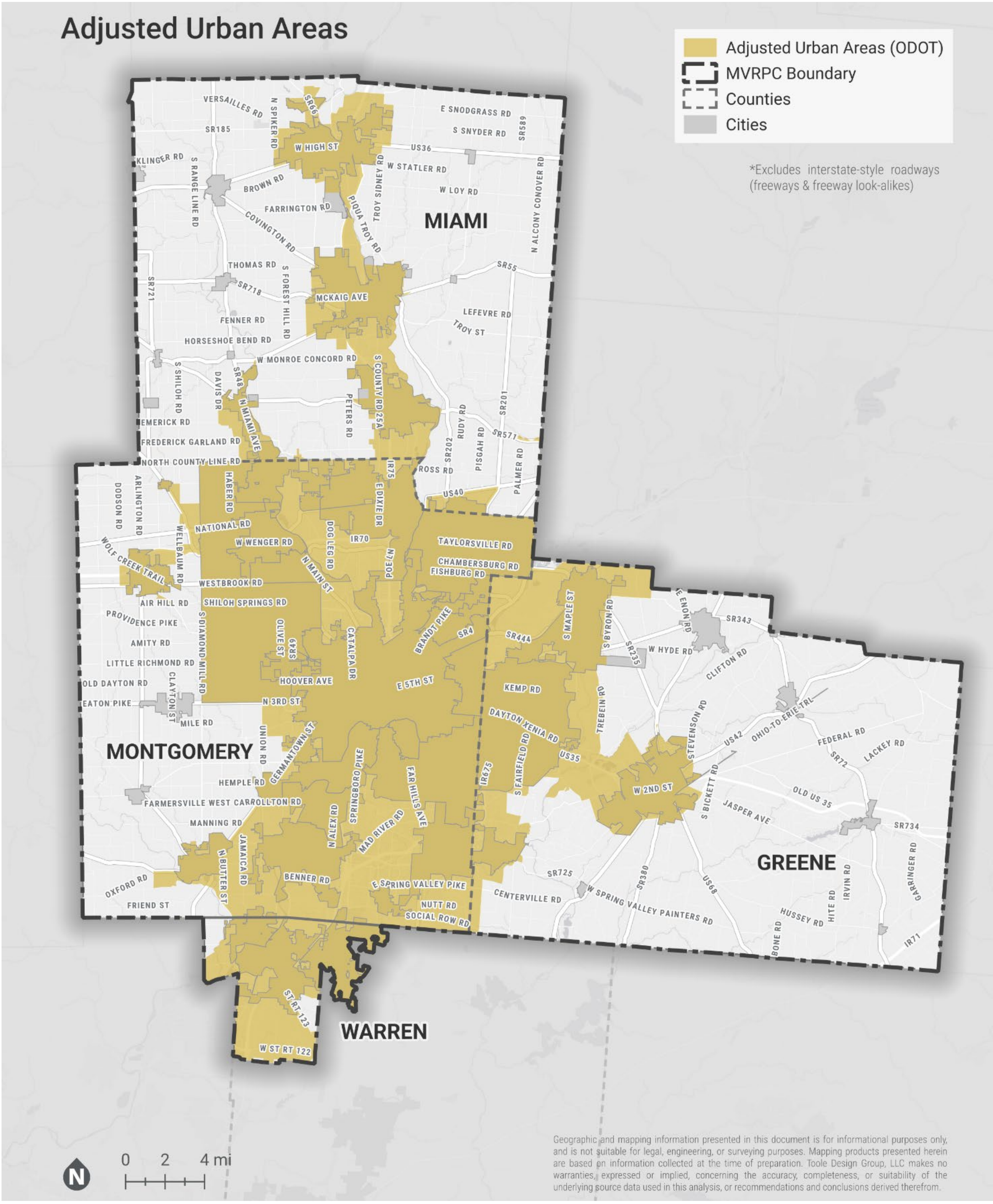

Figure 1. Rural and urban areas in the study area (areas not defined as an Adjusted Urban Area are considered rural)

Data Sources

Table 1 lists the primary data sources used in the descriptive safety analysis. These data sets were used and interpreted as-is.

Table 1: Data Sources

Dataset	Source	Attributes
Crash Data	AASHTOWare, TIMS	Attributes consistent with information documented in Ohio OH-1 Crash Report. Crash data was already geocoded.
Road Inventory	AASHTOWare, TIMS	Speed Limit Functional Class Roadway Jurisdiction
Context Area	Urban areas are defined based on ODOT's Adjusted Urban Areas boundaries.[5] Areas outside of the Adjusted Urban Areas are considered rural.	

Scope of Included and Excluded Crash Data

Crash data was obtained from the Ohio Department of Transportation's (ODOT) AASHTOWare and Transportation Information Mapping System (TIMS) for the most recent 10 years from 2015 through 2024 for the study area. This dataset was used for the descriptive crash analysis presented in this memo. For the purposes of this analysis, crashes lacking geolocation data (n = 662) and those occurring on restricted-access state and federal freeways (n = 7,875) were excluded. Major excluded facilities include I-70, I-75, and I-675, as well as portions of US 35 and Route 4. Select segments of Route 4 and US 35 were retained in the dataset, as they are classified as Functional Class 3 roadways and differ contextually from restricted-access facilities (i.e, at-grade crossings and access points). Crashes occurring on freeway ramps were also excluded for this analysis due to limitations such as miscoding and inconsistent classification. Freeway ramps will be reviewed separately as part of the High Injury Network and High Risk Network analyses, depending on data availability.

Study Limitations

Temporal Consistency Limitations

The consultant team studied crashes that occurred during a period of ten years, from 2015 through 2024. The compiled roadway data reflects current conditions according to the data made available at the time of this analysis. It can be assumed that some changes in roadway design and operations have occurred over the previous years that cannot be accounted for. For example, if a crash occurred in 2016 and the posted speed limit changed from 35 mph down to 30 mph in 2018, this analysis would link the 2016 crash with the present-day 30 mph speed limit. As crash data is viewed at an aggregate level within this document, the impacts of these temporal inconsistencies are expected to be minor.

Exposure data

The analyses reported here do not adjust for exposure rates based on volumes by modes. Therefore, results show crash density but not frequency of crashes normalized by level of traffic or pedestrian and bicycle volumes, which is also called exposure. For example, in many communities, pedestrian crashes are more common during daylight conditions than dark conditions. This does not mean that daylight conditions are more dangerous than dark conditions. Rather, it reflects the fact that people are more likely to travel, and especially more likely to travel

[5] https://gis.dot.state.oh.us/tims/Data/Download

by walking, in light conditions than in dark conditions. Some proxies for exposure are noted in this analysis, such as land use, transit facilities, and functional classification.

Crash Reporting Accuracy and Underreporting

Crash report data may be incomplete due to limitations in reporting practices. Crash reporters, such as law enforcement officers have the option to select 'Other/Unknown,' which reduces the level of detail available regarding the circumstances of the crash. Additionally, the accuracy of reported crash severity may be limited, as officers typically lack medical training and crash victims may not immediately recognize internal injuries due to the effects of adrenaline. Actual number of crashes may be higher and underreported due to fears, language barriers, financial concerns, and more. Crashes involving motorists are more likely to be reported for insurance purposes, but crashes involving pedestrians or bicyclists only (e.g., a bicyclist hitting a fixed object) are less likely to be reported.

Summary of Key Findings

Years of Crash Data analyzed: 2015-2024

Total Crashes: 43,799

Total Fatal Crashes: 670

Total Serious Injury Crashes: 3,859

Total Fatal and Serious Injury (FSI) Crashes: 4,529

Crashes by Mode

- **Pedestrians:** Pedestrian crashes accounted for 4.1% of all crashes, but 10.4% of all FSI crashes. There were 1,776 crashes involving a pedestrian in the years analyzed, and 469 of these resulted in a fatality or serious injury.
- **Bicycles:** Bicycle crashes accounted for 1.9% of all crashes, but 2.9% of all FSI crashes. There were 843 crashes involving a bicyclist in the years analyzed, and 133 of these resulted in a fatality or serious injury.
- **Motorcycles:** Motorcycle crashes accounted for 4.7% of all crashes, and 15.9% of all FSI crashes. There were 2,042 crashes involving a motorcycle in the years analyzed, and 722 resulted in a fatality or serious injury.
- **Vehicles:** Vehicle crashes accounted for 89.4% of all crashes, and 70.8% of all FSI crashes. There were 39,138 crashes involving a vehicle in the years analyzed, and 3,205 resulted in a fatality or serious injury.

Crash Trends

Injury Severity: While most crashes do not result in severe injuries, an average of 67 crashes per year resulted in death and 386 crashes per year resulted in serious injury.

FSI Crashes by Urban and Rural: In total, 86% of all FSI crashes occurred in urban areas. The remaining 14% of FSI crashes occurred in rural areas.

Leading FSI Crash Dynamics: Crash dynamics provide insight into the position and direction of vehicles, pedestrians, and bicyclists at the time of a crash. The most common crash dynamic in the study area were fixed object/parked vehicle crashes in both urban and rural areas. This accounted for 30% of all FSI crashes. Next, angle crashes accounted for 21.6% of all FSI crashes and were the second most common crash dynamic for both urban and rural areas. Pedestrian crashes were the third top crash dynamic for urban areas, which accounted for 11.9% of urban FSI crashes (10.5% of all FSI crashes), while head-on collisions were the third top crash dynamic for rural areas, accounting for 9.4% of rural crashes (8% of all FSI crashes).

Leading FSI Contributing Factors: Contributing factors are variables that contribute to a crash. Approximately 32.3% of FSI crash reports included “other or unknown” according to the source data retrieved from the Ohio Department of Transportation’s crash data software platform, AASHTOWare and Transportation Information Mapping System (TIMS). When analyzing the remaining 68% of FSI crashes, failure to yield was the most known contributing factor in urban areas and improper backing was the most known contributing factor in rural areas. In rural areas, failure to yield and improper turning were the second and third most common contributing factors, respectively. In urban areas, improper backing and ran red light were the second and third most common contributing factors, respectively.

FSI Crash Behaviors: Crash behaviors are attributes of drivers or actions of drivers that may have contributed to the crash. Officers and first responders who complete this form may choose any that apply. In both urban and rural areas of the study area, the most common crash behaviors in FSI crashes were road departures, senior/older adult (age 65 and over) drivers involved, and speeding.

Roadway Characteristics for FSI Crashes: In urban areas, 68% of FSI crashes were intersection-related. In rural areas, 54% of FSI crashes were at mid-block locations. The highest density of FSI crashes per mile in urban areas occurred on principal arterials and county-owned roads. The highest density of FSI crashes per mile in rural areas occurred on major collectors and state-owned roads.

Posted Speed Limits for FSI Crashes: In urban areas, roadways with speed limits between 30 and 35 mph saw the most FSI crashes (1,630 of 3,888) and had the highest FSI crash rate per mile (12.88). In rural areas, the largest share of FSI crashes (520 of 641) and highest FSI density (1.71) occurred on roadways with posted speed limits between 50-55 mph, which also had the highest crash rate per mile of road.

Environmental Characteristics: In urban areas, most FSI crashes occurred in May, July, and August, and in rural areas the most FSI crashes occurred in August, May, and June. In urban areas, FSI crashes generally peaked between 3 and 6 PM, between noon and 3PM on Tuesdays and Thursdays, between 6 and 9PM on Fridays and Saturdays, and between 12 and 3AM on Sundays. In rural areas, FSI crashes generally peaked between 3 and 6 PM on all days, between noon and 3PM on Sundays and Wednesdays, and Saturdays between 6 and 9PM.

Descriptive Crash Analysis

The following sections provide a more detailed exploration of trends related to overall safety patterns, crash causation, roadway and environmental characteristics, and demographic factors. Each topic is supported by both narrative explanation and visualizations to help illustrate key findings and deepen understanding of the underlying trends.

General Crash Trends

FSI Crashes Per Year

Figure 2 displays the number of FSI crashes by year in the urban and rural areas of the study area. Urban FSI crashes were consistently higher than FSI crashes in rural areas. In 2016, the study area had the most FSI crashes (499) and the highest percentage of FSI crashes (11%) out of all years analyzed. The percentage of FSI crashes was at its highest from 2015 through 2017 (10.7 to 11%) and then reduced year by year through 2019, which had the lowest FSI percentage (9.0%). After 2019, the FSI percentage increased until 2022 which saw a percentage of FSI crashes at 10.1% and 458 total FSI crashes for the year. Overall, the first 5 years (2015-2019) saw more FSI crashes than the last five years (2020-2024).

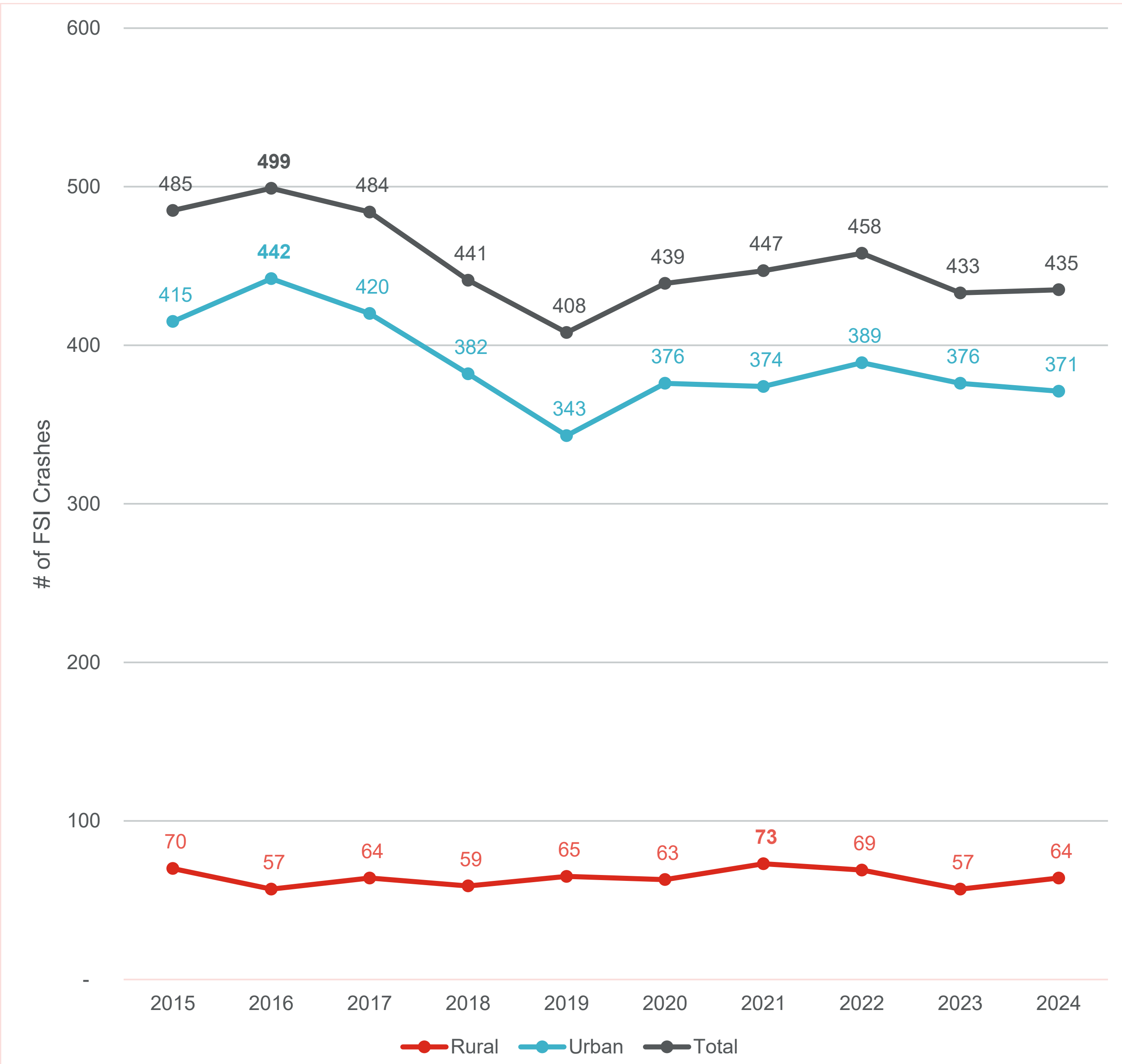

Figure 2. FSI crashes by year, 2015-2024

Figure 3 displays the number of urban, rural, and total fatal crashes by year for the study area. Fatal crashes in urban areas were consistently higher than fatal crashes in rural areas. The highest number of fatalities within the study area occurred in 2020. Figure 4 displays the number of urban, rural, and total serious injury crashes by year for the study area. The study area saw significantly more serious injury crashes than fatal crashes within the ten-year period. Serious injury crashes in urban areas were once again consistently higher than serious injury crashes in rural areas. The highest number of serious injury crashes within the study area occurred in 2016.

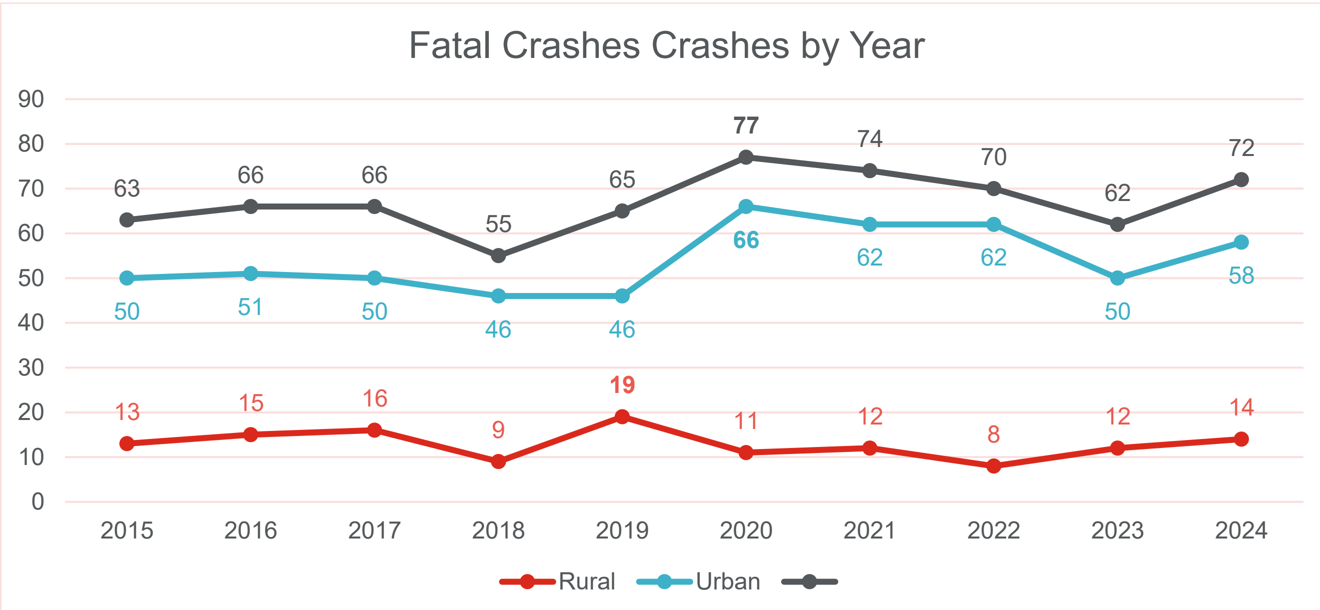

Figure 3: Fatal Crashes by Year

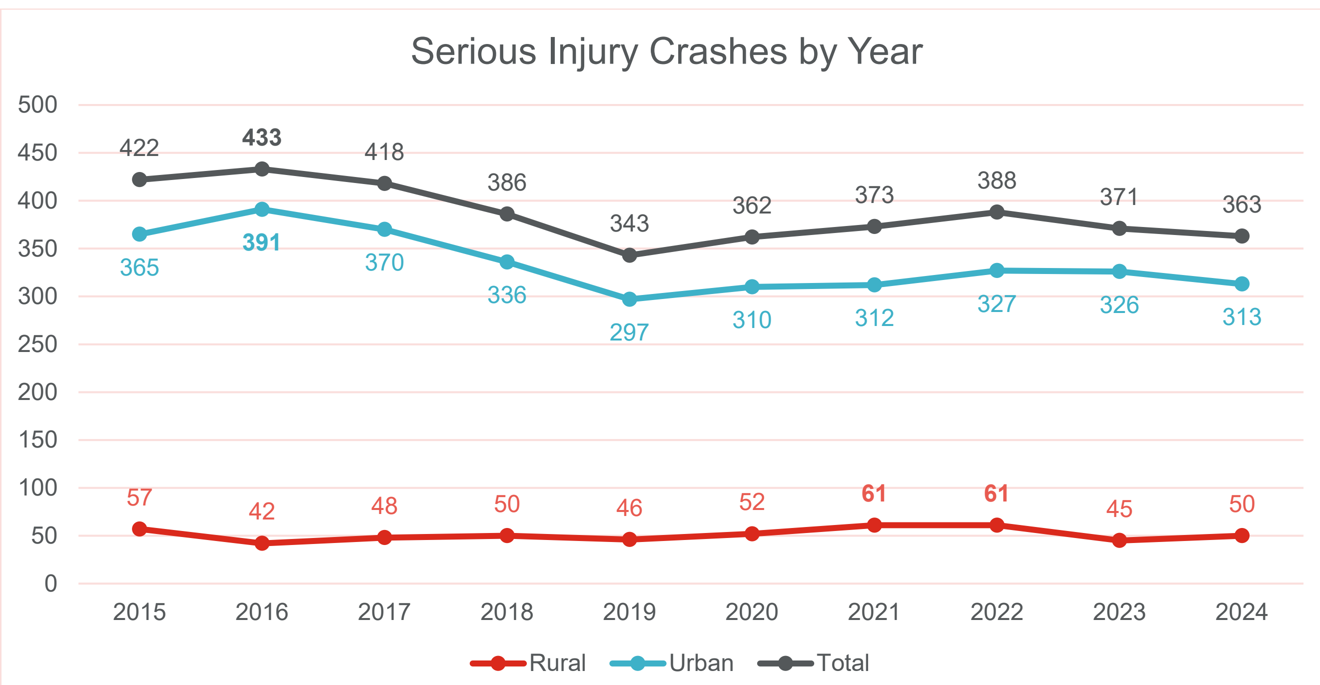

Figure 4: Serious Injury Crashes by Year

Crashes by Mode

Table 2 presents FSI crashes by mode of travel for urban and rural areas within the study area. Vehicle crashes ("vehicle-vehicle") accounted for 70.8% of all FSI crashes. Bicycle-vehicle, pedestrian-vehicle, and motorcycle-vehicle crashes are disproportionately represented in FSI crashes. Pedestrian crashes accounted for 4.1% of all crashes, but 10.4% of all FSI crashes. There were 1,776 crashes involving a pedestrian in the years analyzed, and 469 of these resulted in a fatality or serious injury. Bicycle crashes accounted for 1.9% of all crashes, but 2.9% of all FSI crashes. There were 843 crashes involving a bicyclist in the years analyzed, and 133 of these resulted in a fatality or serious injury. This reflects the tendency for crashes involving a vulnerable road user (person walking or biking) to be much higher in severity than vehicle crashes on average. Motorcycle crashes accounted for 4.7% of all crashes, but 15.9% of all FSI crashes. There were 2,042 crashes involving motorcyclists in the years analyzed, and 722 of these resulted in a fatality or serious injury.

Table 2. FSI crashes by mode, 2015-2024

	Rural			*Urban*			*Total*		
	FSI	FSI%	Total Crashes%	FSI	FSI%	Total Crashes%	FSI	FSI%	Total Crashes%
Bicycle-Vehicle	13	2.0%	1.0%	120	3.1%	2.0%	133	2.9%	1.9%
Pedestrian-Vehicle	11	1.7%	1.2%	458	11.8%	4.3%	469	10.4%	4.1%
Motorcycle-Vehicle	122	19.0%	8.6%	600	15.4%	4.3%	722	15.9%	4.7%
Vehicle Crashes	495	77.2%	89.2%	2,710	69.7%	89.4%	3,205	70.8%	89.4%
Total	**641**	**100.0%**	**100.0%**	**3,888**	**100.0%**	**100.0%**	**4,529**	**100.0%**	**100.0%**

Crash Causation

Crash Dynamic

Figure 5 summarizes FSI crashes by crash dynamic for rural and urban areas within the study area. In both urban and rural areas, fixed object/parked vehicle and angle crashes were the leading crash types that resulted in fatal and serious injuries. Head-on crashes were the third most common crash type in rural areas, while in urban areas, vulnerable road users (pedestrians and bicyclists) accounted for the third most common crash type. A single crash can have more than one crash type identified, so the total of the numbers, in Figure 5 exceed the total number of FSI crashes. For example, a crash can be turning related and involve a vulnerable road user (person walking or biking).

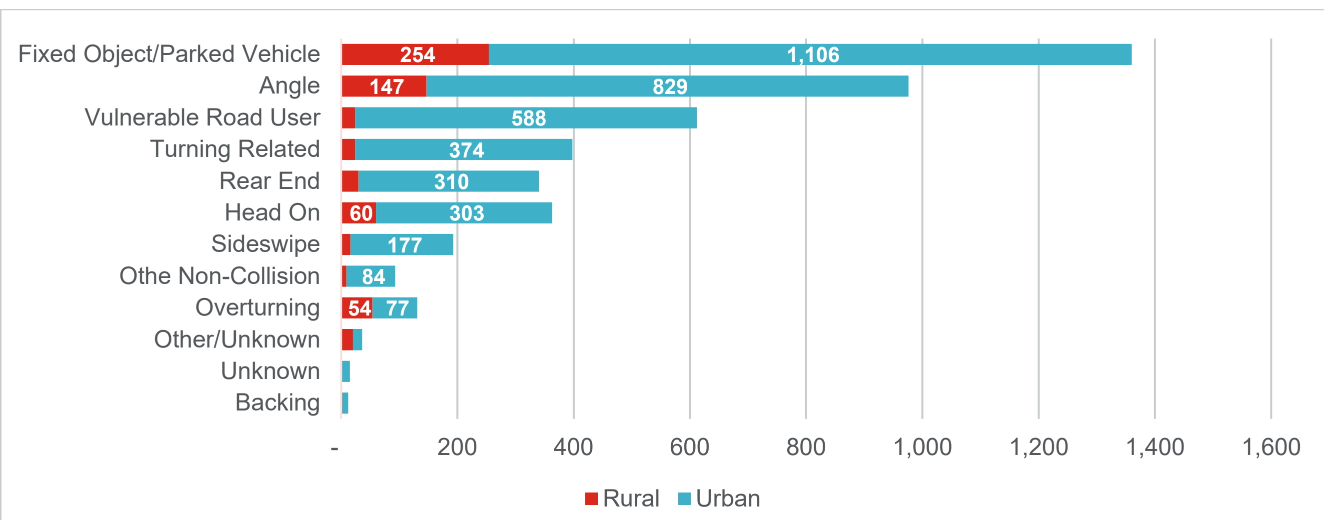

Figure 5. FSI crash dynamic by urban vs. rural, 2015-2024

Leading Contributing Factors

Approximately 32.3% of FSI crash reports reported “other or unknown” according to the source data retrieved from the AASHTOWare/TIMS platform. For the remaining 68% of FSI crashes, the top contributing factors are shown in Figure 6. The top three contributing factors for urban areas were failure to yield, improper backing up, and ran a red light. In rural areas, the top three contributing factors were improper backing, failure to yield, and improper turns.

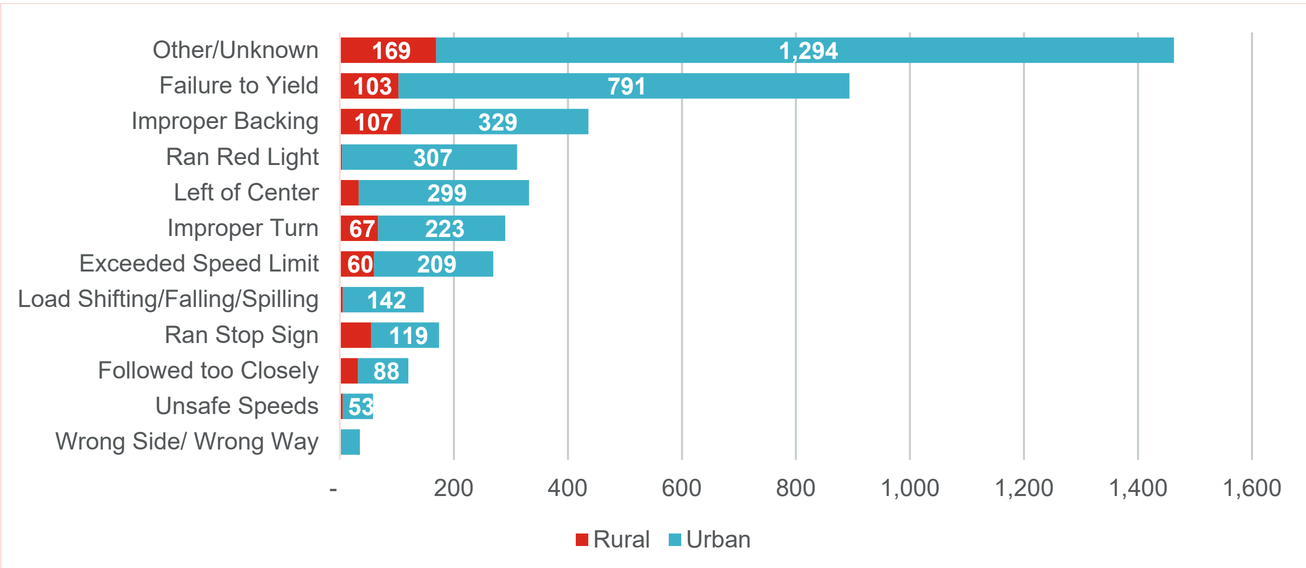

Figure 6. Top contributing factors to FSI crashes by urban vs rural, 2015-2024

FSI Crash Behaviors

There are six behaviors identified in the Ohio OH-1 Crash Report Form, including road-departure, youth (under 25 years old), speeding, senior/older adults (65 years old and older), impairment (drugs, medication, or alcohol), and distracted driving. Officers and first responders who complete this form may choose any that apply. Figure 7 shows that in both rural and urban areas within the study area, the top crash behavior in FSI crashes were road-departures, speeding, and older adults involved. When grouping by similar types of behaviors, of the 4,529 FSI crashes, 27% of all reported FSI crashes involved impairment (drugs, medication, or alcohol) as a behavior, and 30% of all reported FSI crashes involved age as a behavior (under 25 years, 65 years and older).

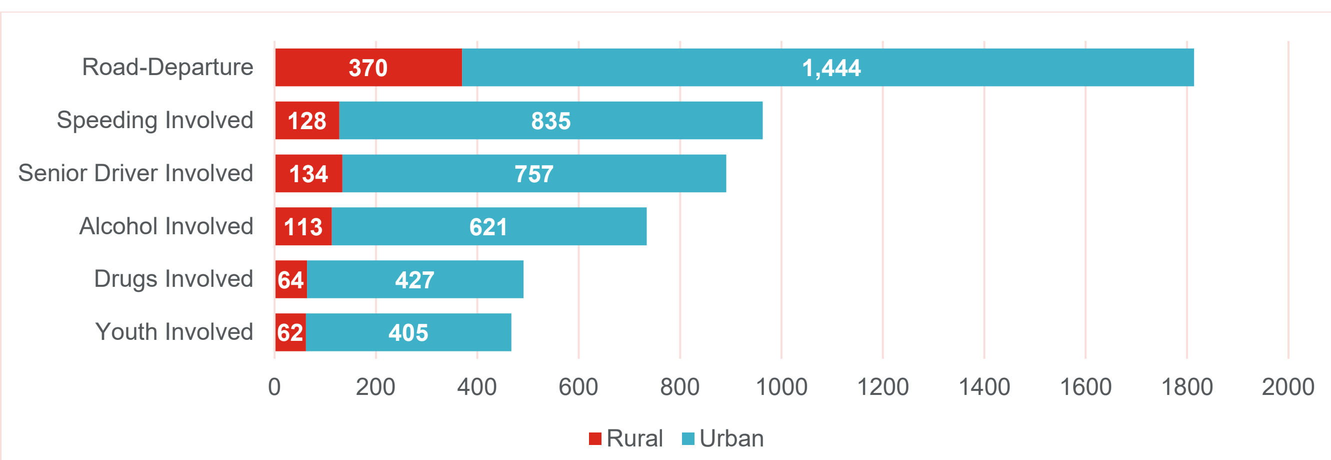

Figure 7. Behaviors involved in FSI crashes by urban vs rural, 2015-2024

Roadway Characteristics

Crash Location (Intersection vs. Mid-Block)

Figure 8 summarizes the FSI crashes by location type in urban and rural areas within the study area. Crashes within 150 feet of urban intersections and 250 feet of rural intersections are considered intersection crashes; crashes within 100 feet of the centerline network but not near intersections are considered mid-block crashes; and the remaining crashes are considered off-network (like on private property or in parking lots), as their spatial location are not near any intersection or roadways. Because of the difference in the design of roadways in urban and rural environments results in different crash dynamics involving speed, sight distances, and other factors, different distances are used for intersection-related crashes. In rural areas, 54% of all FSI crashes occurred at mid-block locations. In urban areas, 68% of all FSI crashes were intersection related.

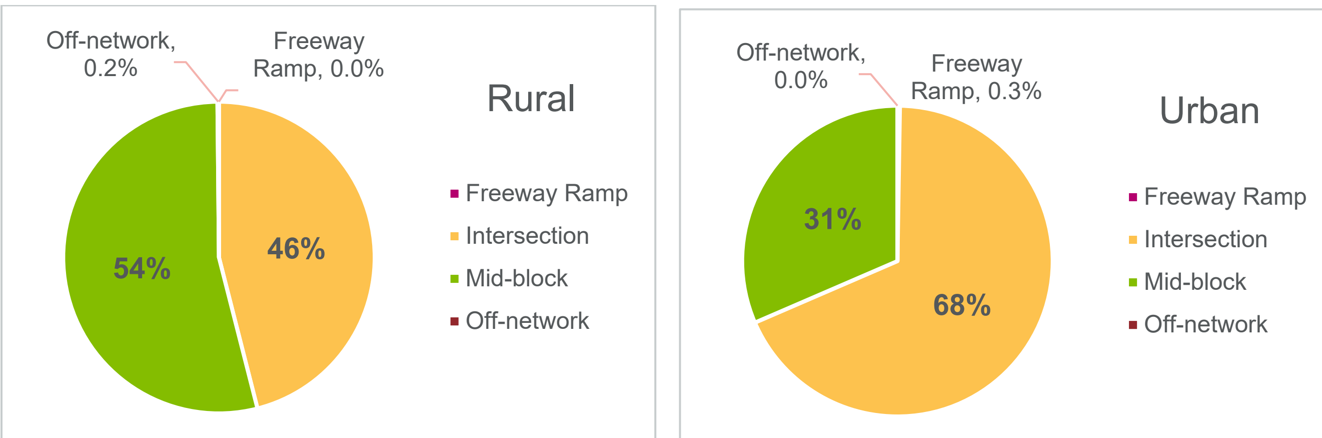

Figure 8. FSI crashes by crash location, 2015-2024

Functional Classification

Table 3 summarizes FSI crashes by roadway functional classification in the urban and rural areas of the study area. When normalizing by roadway miles, principal arterial streets had the highest FSI crash density in urban and rural areas at 2.1 FSI per mile and 4.2 FSI per mile. Without normalizing by roadway miles, principal arterials had the highest share of FSI crashes in urban areas (1,201 out of 3,888), while major collectors in rural areas had the highest share of FSI crashes (231 out of 641). These are highlighted in red in Table 3 below.

Table 3. FSI crashes by functional class, 2015-2024

	Rural			*Urban*			*Total*		
	FSI	**FSI/Mile**	**Mile**	**FSI**	**FSI/Mile**	**Mile**	**FSI**	**FSI/Mile**	**Mile**
Principal arterials	26	2.1	12.3	1,201	4.2	286.5	1,227	4.1	298.8
Minor arterials	97	1.3	75.8	1,069	3.1	345.8	1,166	2.8	421.7
Major collectors	231	0.9	261.6	862	1.6	531.5	1,093	1.4	793.2
Minor collectors	99	0.6	166.1	10	0.4	22.5	109	0.6	188.5
Local roads	188	0.1	1,314.8	746	0.2	3,680.5	934	0.2	4,995.3
Total	**641**	**0.3**	**1,891.4**	**3,888**	**0.7**	**5,274.7**	**4,529**	**0.6**	**7,166.1**

State Routes/Roadway Jurisdiction

Table 4 summarizes FSI crashes by roadway jurisdictions in urban and rural areas within the study area. In urban areas, county-owned roads accounted for the largest crash density at 2.1 FSI per mile and the highest share of FSI crashes (1,347 of 3,888). In rural areas, state-owned roads accounted for the largest crash density at 0.9 FSI per mile, while county-owned roads accounted for **the** highest share of FSI crashes (314 of 641). These are highlighted in red in Table 4 below.

Table 4. FSI crashes by roadway jurisdiction, 2015-2024

	Rural			*Urban*			*Total*		
	FSI	**FSI/Mile**	**Mile**	**FSI**	**FSI/Mile**	**Mile**	**FSI**	**FSI/Mile**	**Mile**
Federal	-	-	-	1	0.0	57.4	1	0.0	57.4
State	258	0.9	294.2	1,063	1.6	681.6	1,321	1.4	975.8
County	314	0.4	849.1	1,347	2.1	640.1	1,661	1.1	1,489.2
Municipal	5	0.1	85.8	1,219	0.5	2,684.0	1,224	0.4	2,769.8
Township	64	0.1	597.1	241	0.3	758.7	305	0.2	1,355.8
Private	-	-	65.2	17	0.0	453.0	17	0.0	518.2
Total	**641**	**0.3**	**1,891.4**	**3,888**	**0.7**	**5,274.7**	**4,529**	**0.6**	**7,166.1**

Posted Speed Limit

Table 5 summarizes FSI crashes by posted speed limit in the urban and rural areas of the study area. In urban areas, the largest share of FSI crashes (1,630 of 3,888) and the highest FSI density (12.3) occurred on roadways with posted speed limits between 30-35 mph. In rural areas, the largest share of FSI crashes (520 of 641) and the highest FSI density (1.7) occurred on roadways with posted speed limits between 50-55 mph. These are highlighted in red in Table 5 below.

Table 5. FSI crashes by posted speed limit, 2015-2024

	Rural			*Urban*			*Total*		
(mph)	FSI	FSI/Mile	Mile	FSI	FSI/Mile	Mile	FSI	FSI/Mile	Mile
25 and under	57	0.4	138.1	938	0.3	3,574.9	995	0.3	3,713.0
30-35	22	0.6	38.9	1,630	12.3	133.0	1,652	9.6	171.9
40-45	38	0.03	1,299.6	753	0.9	846.0	791	0.4	2,145.6
50-55	520	1.7	304.1	522	3.6	145.8	1,042	2.3	449.9
60 and over	4	0.2	25.3	44	0.4	109.1	48	0.4	134.4
Unknown	0	-	85.5	0	-	465.9	0	-	551.4
Total	**641**	**0.3**	**1,891.4**	**3,888**	**0.7**	**5,274.7**	**4,529**	**0.6**	**7,166.1**

Environmental Characteristics

FSI Crashes by Month of Year

Figure 9 summarizes the share of FSI crashes by month in urban and rural areas within the study area. In rural areas, the most FSI crashes occurred in May, July, and August, while the fewest occurred in February and March. In urban areas, the most FSI crashes occurred in August, May, and June, and the fewest occurred in February and January.

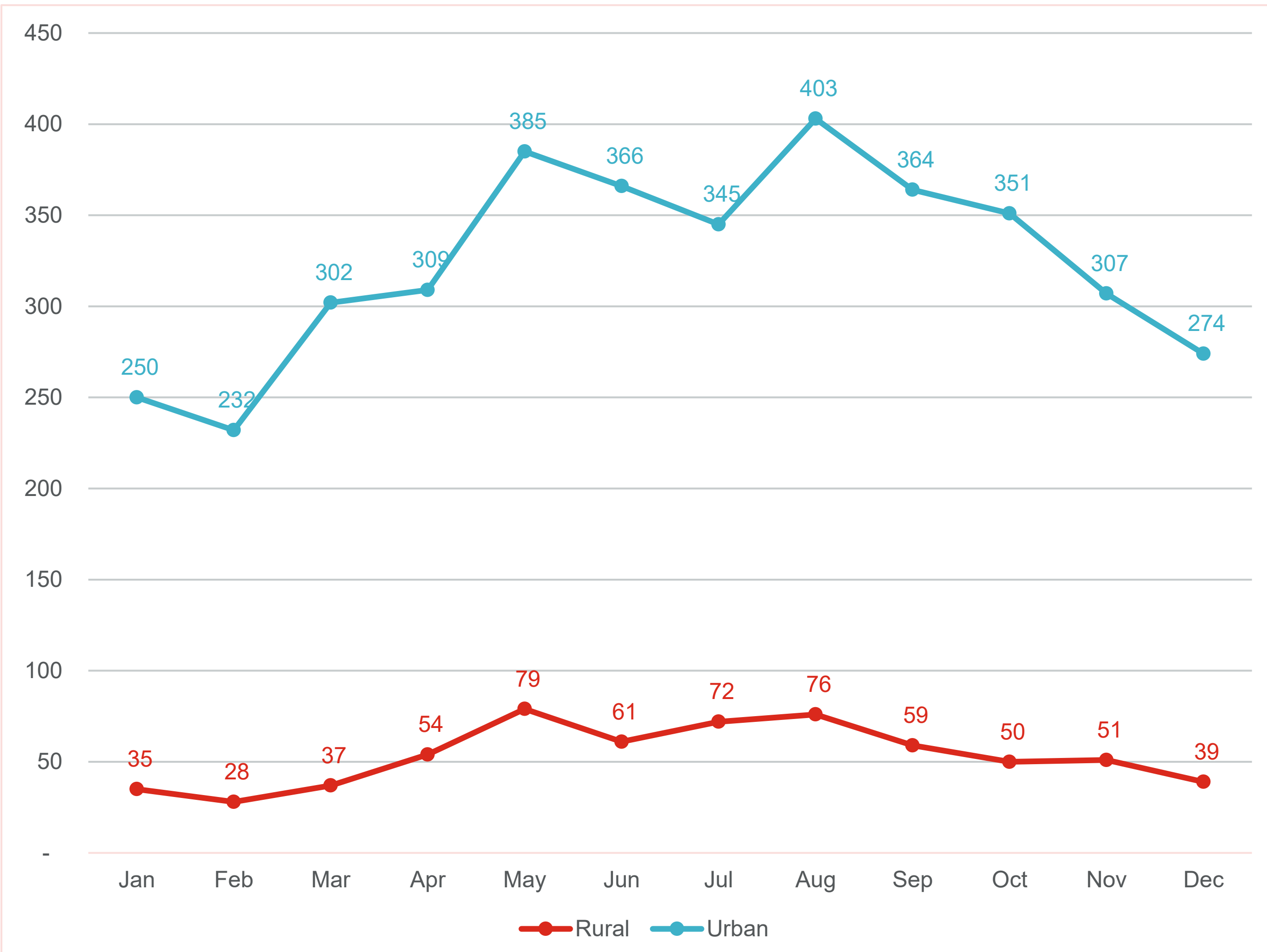

Figure 9. FSI crashes by month by urban vs rural, 2015-2024

FSI Crashes by Day of Week and Time of Day

Table 6 summarizes FSI crashes by day of week and time of day in rural areas. In rural areas, FSI crashes generally peaked between 3 and 6 PM on all days, noon and 3PM on Sundays and Wednesdays, and Saturdays between 6 and 9PM. These trends are shown in bold and darker red in Table 6 below.

Table 6. Rural FSI crashes by day of week and time of day in rural areas, 2015-2024

	12-3 AM	3-6 AM	6-9 AM	9 AM-12 PM	12-3 PM	3-6 PM	6-9 PM	9 PM-12 AM	Unknown	Total
Sunday	9	7	4	14	**22**	**16**	12	7	10	101
Monday	2	4	10	7	17	**18**	9	2	-	69
Tuesday	3	5	11	5	14	**19**	16	4	2	79
Wednesday	3	5	12	10	**23**	**16**	14	4	1	88
Thursday	5	8	18	11	9	**22**	16	7	3	99
Friday	1	4	17	17	17	**21**	10	9	2	98
Saturday	7	4	3	11	13	**31**	**19**	11	8	107
Total	**30**	**37**	**75**	**75**	**115**	**143**	**96**	**44**	**26**	**641**

Table 7 summarizes FSI crashes by day of week and time of day in urban areas. In urban areas, FSI crashes generally peaked between 3 and 6 PM, between noon and 3PM on Tuesdays and Thursdays, between 6 and 9PM on Fridays and Saturdays, and between 12 and 3AM on Sundays. These trends are shown in bold and darker red in Table 7 below.

Table 7. Urban FSI crashes by day of week and time of day in urban areas, 2015-2024

	12-3 AM	3-6 AM	6-9 AM	9 AM-12 PM	12-3 PM	3-6 PM	6-9 PM	9 PM-12 AM	Unknown	Total
Sunday	**101**	23	27	69	80	98	88	30	32	548
Monday	38	30	51	69	82	**120**	90	38	24	542
Tuesday	23	27	57	81	**109**	**109**	81	32	21	540
Wednesday	26	29	49	55	95	**113**	89	40	17	513
Thursday	34	25	55	66	**105**	**113**	80	41	18	537
Friday	38	45	40	77	97	**125**	**103**	79	10	614
Saturday	78	26	36	71	84	**104**	**101**	59	35	594
Total	**338**	**205**	**315**	**488**	**652**	**782**	**632**	**319**	**157**	**3,888**

FSI Crashes by Weather Condition

Figure 10 summarizes FSI crashes by weather conditions in rural and urban areas. In both urban and rural areas, the majority of FSI crashes occurred in clear weather conditions. The second and third most common weather conditions, respectively, were cloudy and rainy for both urban and rural areas.

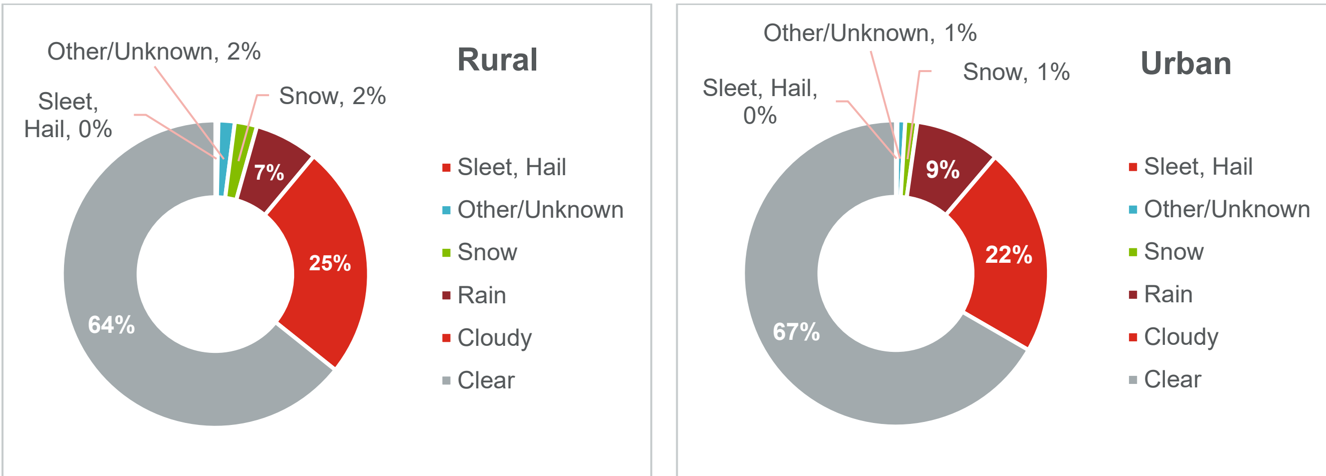

Figure 10. FSI crashes by weather condition, 2015-2024

FSI Crashes by Lighting Condition

Figure 11 summarizes FSI crashes by weather conditions in rural and urban areas. In urban and rural areas, the majority of FSI crashes occurred in daylight conditions. In rural areas, the next highest share of FSI crashes occurred in dark, not lighted roadway conditions while in urban areas the next highest share of FSI crashes occurred in dark, lighted roadway conditions.

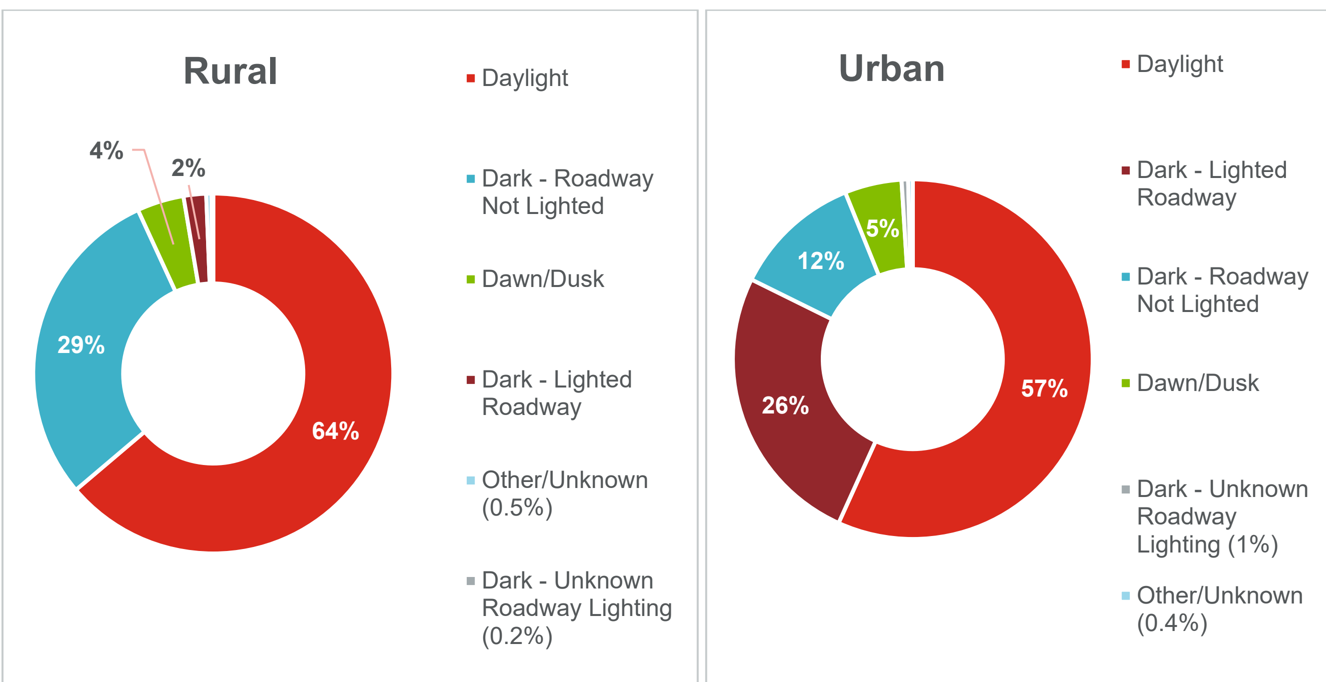

Figure 11. FSI crashes by lighting condition, 2015-2024

FSI Crashes by Road Surface Condition

Figure 12 summarizes FSI crashes by weather conditions in rural and urban areas. In both urban and rural areas, the highest number of FSI crashes occurred on dry road surfaces, followed by wet road surfaces.

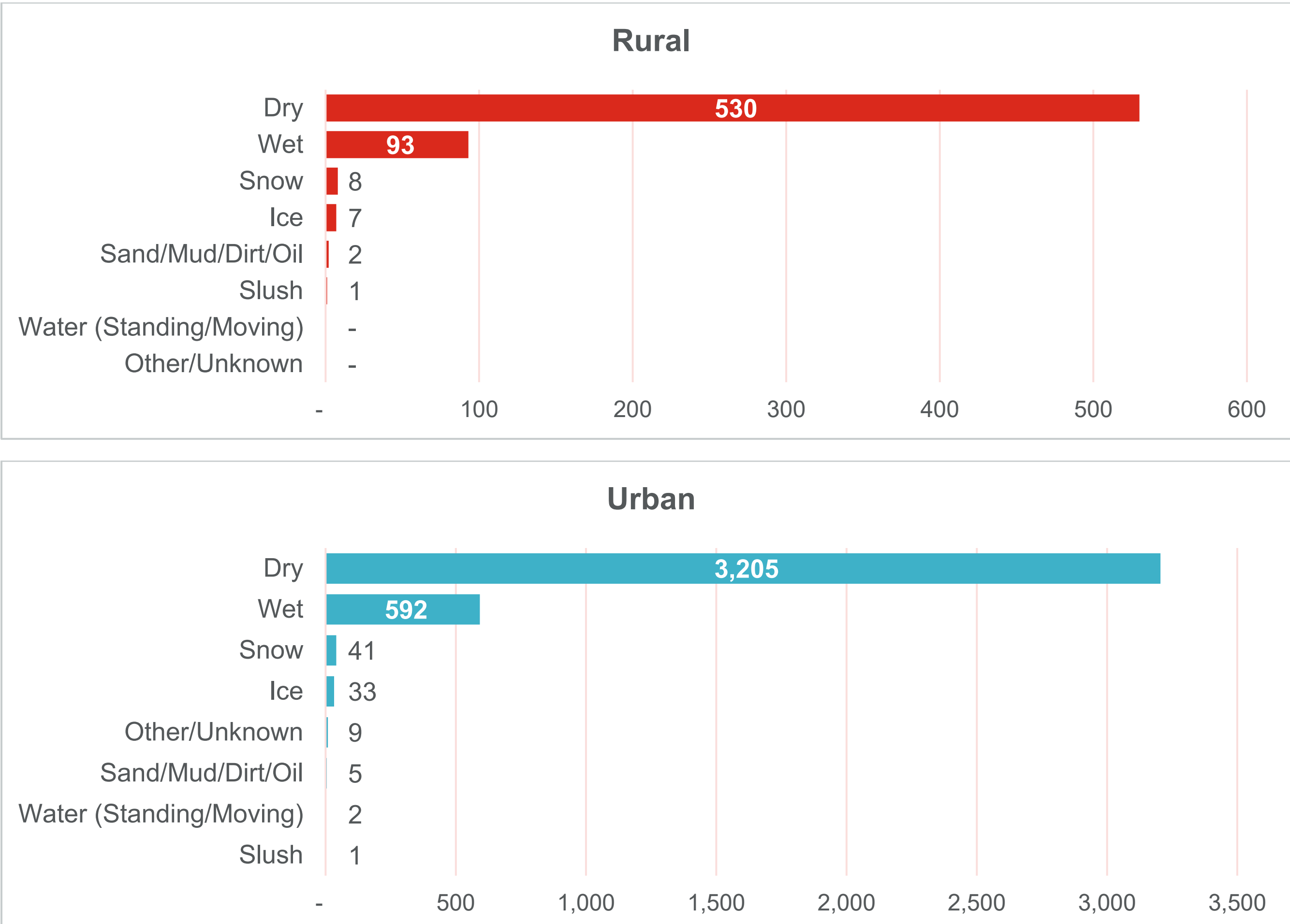

Figure 12. FSI crashes by road surface condition, 2015-2024

Age and Gender

Figure 13 summarizes the gender breakdown of first-reported (i.e., reported at-fault) parties in FSI crashes. In both urban and rural areas, males were the leading gender group that were first-reported at-fault for FSI crashes.

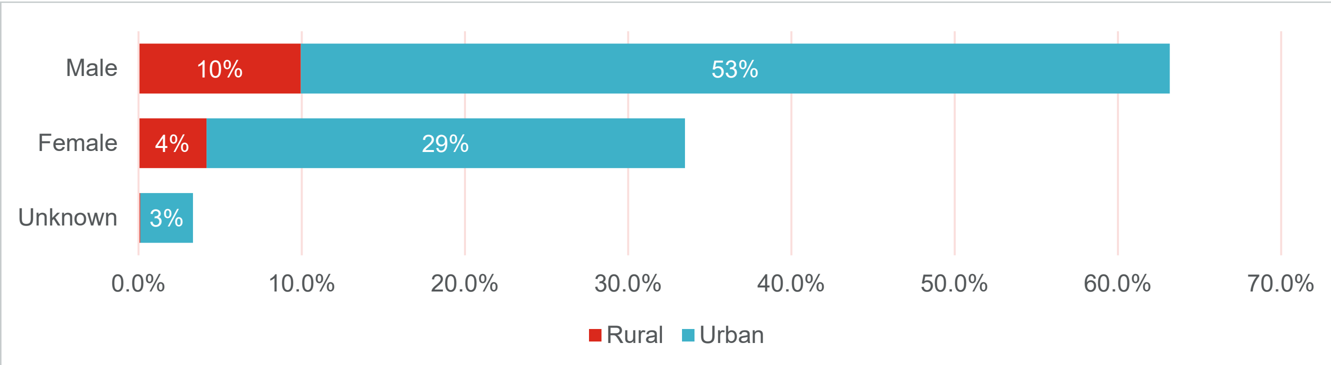

Figure 13: FSI crashes by first-reported at-fault gender, 2015-2024

Table 8 summarizes the gender and age breakdown of first-reported at-fault parties in FSI crashes. In both urban and rural areas, males between the ages of 20 and 29 were the leading population group that were first reported (i.e., reported at-fault) for FSI crashes. When comparing with the population distribution in the study area, males aged between 20 to 29 were overrepresented in FSI crashes in urban areas.

Table 8. FSI Crashes by first-reported at-fault party age and gender, 2015-2024

	Rural				*Urban*				*Census Population*		
Age	**Female**	**Male**	**Known**	**Total**	**Female**	**Male**	**Known**	**Total**	**Female**	**Male**	**Total**
Under 5	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	5.5%	6.1%	5.8%
5 to 9	0.0%	0.1%	0.0%	0.1%	0.1%	0.4%	0.0%	0.5%	5.7%	6.4%	6.1%
10 to 14	0.0%	0.0%	0.0%	0.0%	0.1%	0.6%	0.0%	0.7%	6.1%	6.5%	6.3%
15 to 19	0.6%	1.0%	0.0%	1.6%	2.9%	4.3%	0.0%	7.2%	6.3%	6.9%	6.6%
20 to 24	0.6%	1.4%	0.0%	2.0%	3.6%	7.3%	0.0%	10.9%	6.4%	6.9%	6.7%
25 to 29	0.5%	0.8%	0.0%	1.3%	3.5%	7.1%	0.0%	10.7%	6.4%	6.8%	6.6%
30 to 34	0.4%	1.2%	0.0%	1.6%	3.5%	6.0%	0.0%	9.5%	6.5%	6.7%	6.6%
35 to 39	0.3%	1.0%	0.0%	1.2%	2.3%	4.7%	0.0%	7.0%	6.1%	6.5%	6.3%
40 to 44	0.2%	0.5%	0.0%	0.7%	2.1%	4.0%	0.0%	6.1%	5.8%	5.8%	5.8%
45 to 49	0.3%	0.6%	0.0%	0.9%	1.7%	2.9%	0.0%	4.6%	5.6%	5.6%	5.6%
50 to 54	0.2%	0.9%	0.0%	1.1%	1.7%	3.7%	0.0%	5.4%	6.1%	6.1%	6.1%
55 to 59	0.2%	0.5%	0.0%	0.7%	1.2%	3.3%	0.0%	4.5%	6.4%	6.7%	6.5%
60 to 64	0.3%	0.6%	0.0%	0.9%	1.3%	2.8%	0.0%	4.2%	6.9%	6.4%	6.6%
65 to 69	0.2%	0.3%	0.0%	0.4%	1.3%	2.1%	0.0%	3.4%	6.0%	5.6%	5.8%
70 to 74	0.2%	0.5%	0.0%	0.6%	1.2%	1.2%	0.0%	2.5%	5.3%	4.7%	5.0%
75 to 79	0.1%	0.3%	0.0%	0.4%	1.2%	1.0%	0.0%	2.2%	3.6%	3.0%	3.3%
80 to 84	0.1%	0.1%	0.0%	0.2%	0.7%	0.7%	0.0%	1.4%	2.5%	1.8%	2.1%
85 & over	0.0%	0.2%	0.0%	0.2%	0.7%	0.7%	0.0%	1.4%	2.7%	1.4%	2.1%
Unknown	0.0%	0.0%	0.1%	0.1%	0.1%	0.3%	3.2%	3.5%			
Total	**4.2%**	**9.9%**	**0.1%**	**14.2%**	**29.3%**	**53.2%**	**3.2%**	**85.8%**	**51.1%**	**48.9%**	**100.0%**

Conclusion

The most notable findings include the difference in the share of FSI crashes for urban (68%) compared to rural (14%) areas, a high percentage of urban intersection crashes (68%), and an overrepresentation of vulnerable road users (people walking or biking) and motorcycle FSI crashes compared to total crashes (bicycle crashes accounted for 1.9% of all crashes, but 2.9% of all FSI crashes; pedestrian crashes accounted for 4.1% of all crashes, but 10.4% of all FSI crashes; motorcycle crashes accounted for 4.7% of all crashes, and 15.9% of all FSI crashes).

Other notable findings included common FSI crash dynamics such as fixed object crashes (30% of all FSI crashes) and common contributing factors such as failure to yield and improper backing. The most common FSI crash behavior was road-departures.

The highest density of FSI crashes per mile in urban areas occurred on principal arterials and county-owned roads. The highest density of FSI crashes per mile in rural areas occurred on major collectors and state-owned roads. In urban areas, the highest density of FSI crashes per mile occurred on roads with posted speed limits between 30-35 mph. In rural areas, the highest density of FSI crashes occurred on roads with posted speed limits between 50-55 mph.

In urban areas, most FSI crashes occurred in May, July, and August, and in rural areas the most FSI crashes occurred in August, May, and June. In urban areas, FSI crashes generally peaked between 3 and 6 PM, between noon and 3PM on Tuesdays and Thursdays, between 6 and 9PM on Fridays and Saturdays, and between 12 and 3AM on Sundays. In rural areas, FSI crashes generally peaked between 3 and 6 PM on all days, between noon and 3PM on Sundays and Wednesdays, and Saturdays between 6 and 9PM.

These overall crash trends and patterns can specifically guide new roadway behavior programs, policy changes, or the selection of safety measures for project development. The report provides more information on how to better design roads and form infrastructure policies that respond to historical crashes and determine where there are similar crash conditions across the system. The findings from this Descriptive Crash Analysis will be used to guide and make recommendations to improve safety and help achieve the goal of reducing and eventually eliminating fatal and serious injury crashes within the MVRPC MPO region.

In addition to outlining programs and policy recommendations, this report also establishes a timeframe for conducting the High Injury Network and High Risk Network analyses. It was determined that five years of crash data, 2020 to 2024, will be used for these analyses, except for the bicycle and pedestrian networks, which will be expanded to ten years, 2015 to 2024. While the 2020 to 2024 dataset provides sufficient coverage when reviewing all crashes, the extended timeframe offers additional value for evaluating bicycle and pedestrian crashes, which tend to occur less frequently and benefit from a larger sample size.