

CRASH TRENDS ON COUNTY- AND STATE- MAINTAINED ROADS

PALM BEACH COUNTY
SAFETY ACTION PLAN

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1. OVERVIEW

Palm Beach County is developing a countywide Safety Action Plan to reduce the number of people killed or seriously injured in traffic crashes. Funded by the federal Safe Streets for All (SS4A) grant program, the Plan will help the County and its partners identify where severe crashes are occurring, what factors are associated with them, and how to prioritize safety investments. It is guided by the principles of Vision Zero and the Safe System approach, which emphasize that serious crashes are preventable and that roadway design, policy, and education all play a role.

This memo summarizes the crash analysis conducted to inform the Safety Action Plan. The analysis includes a review of crash trends, conditions that are most often present when fatal and serious injury (FSI) crashes occur, and an initial identification of Palm Beach County's High-Injury Network (HIN), which highlights locations where these severe crashes are concentrated. The analysis focuses on County- and State-maintained roads, consistent with the scope of the SS4A grant, and will serve as the foundation for identifying future safety projects, policies, and programs.

STUDY AREA

This crash analysis focuses on Palm Beach County's roadway system, with an emphasis on County-maintained roads. These roads form the core of the analysis and will guide the primary recommendations in the Safety Action Plan. The analysis also includes State-maintained roads, recognizing that many serious crashes occur on high-speed, high-volume corridors regardless of ownership. While the County does not control these roads, understanding crash patterns on them is important for coordinated safety efforts. The study also considers all signalized intersections involving the County, including those shared with State and Local roads, to provide a comprehensive view of intersection safety. The study map and roadway classifications are shown in **FIGURE 1**.

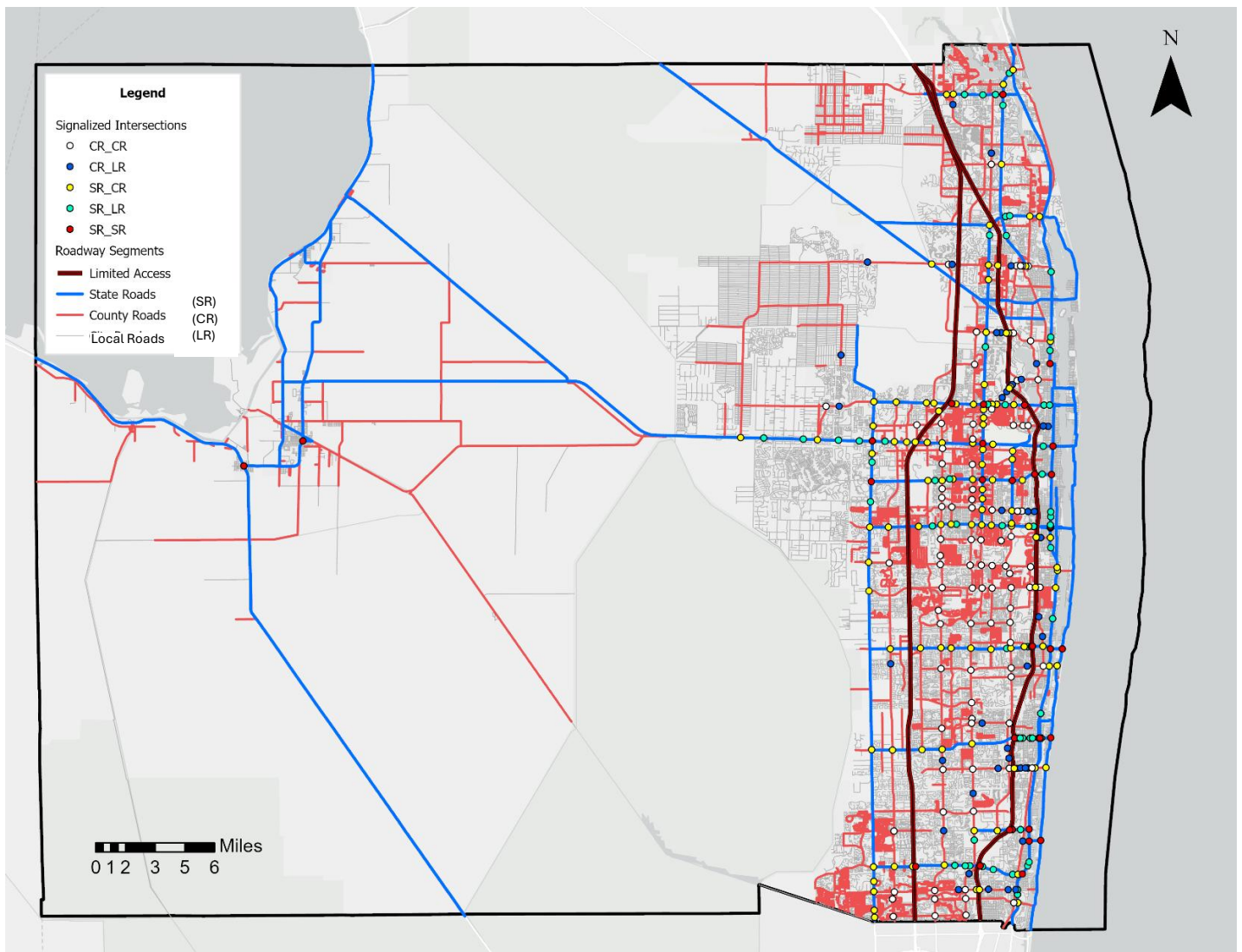


Figure 1 Palm Beach County Safety Action Plan Study Area

DATA INPUTS

All reported traffic crashes that occurred on County- and State-maintained roadways within Palm Beach County between 2019 and 2023 were included in this analysis. Crash data was obtained from Signal Four Analytics and supplemented with County roadway information, including traffic volumes, number of lanes, posted speed limits, and signal locations.

To support a consistent and accurate analysis, several modifications were made to the raw data to provide a consistent foundation for analyzing crash patterns across different roadway and intersection characteristics:

- **Location accuracy:** Crash records were reviewed and adjusted to correct geolocation errors and ensure crashes were accurately mapped to the roadway network.
- **Crash severity classification:** Severity was standardized based on the most serious outcome recorded in each crash report to enable consistent comparisons across the dataset.
- **Mode assignment:** Travel modes were determined based on the type of vehicle and the role of each person involved in the crash (e.g., pedestrian, bicyclist, motorcyclist, motor vehicle occupant).
- **Crash type consolidation:** Single-vehicle crashes involving fixed objects, rollovers, or roadway departures were grouped into a consolidated “lane departure” category to support crash analysis.
- **Crashes included in systemic analysis:** All crashes resulting in a fatality or serious injury (FSI) were isolated and used for recurring crash factor and pattern analysis.
- **Area type classification:** Although rural and urban roadways can have different safety challenges, this analysis does not distinguish between them. Approximately 98 % of crashes on State- and County-maintained roads in Palm Beach County occurred on roads classified as urban. As a result, all crashes were analyzed together, and findings primarily reflect the characteristics of urban roadway environments.

A NOTE ON DATA LIMITATIONS

The crash analysis in this report is based on police-reported crash data from Signal Four Analytics, covering crashes that occurred on County- and State-maintained roads in Palm Beach County between 2019 and 2023. While this dataset provides a valuable foundation for identifying trends and locations with characteristics commonly associated with crashes, it has several limitations.

Not all crashes are reported, and some contributing factors such as distraction, impairment, or crash circumstances may be underreported or inconsistently documented. In addition, fields like crash location, type, and severity may contain errors or rely on subjective interpretation. Several quality control steps were taken to clean and standardize the dataset, but the results still reflect only what was captured in the original reports.

Despite these limitations, the patterns identified in this analysis offer a reliable basis for understanding where and why severe crashes are occurring and for supporting data-informed safety strategies across the county.

HOW THIS DOCUMENT IS ORGANIZED

This document summarizes the results of a countywide crash analysis that informs the development of Palm Beach County’s Safety Action Plan. It is organized into the following sections:

1. **Overview:** Describes the geographic and temporal scope of the analysis, the types of crashes included, and the data sources and modifications used to support consistency and accuracy.
2. **Crash Summary Statistics:** Provides a high-level overview of crash frequency and severity across Palm Beach County, with breakdowns by year, travel mode, and emphasis areas.
3. **People-Focused Analysis:** Identifies how crashes affect different population groups, including youth, older adults, and communities near schools and transit stops. This section also examine where crashes may be disproportionately affecting vulnerable road users.
4. **Mode-Specific Crash Patterns:** Presents detailed crash context for each mode (motor vehicles, pedestrians, bicyclists, and motorcyclists) including crash types, roadway and intersection characteristics, and contributing factors such as lighting, speed, and driver behavior.
5. **Crash Profiles:** Summarizes key recurring crash patterns, such as pedestrian crossings at transit stops or crashes at wide unsignalized intersections, to support future countermeasure development.
6. **High-Injury Network:** Identifies corridors and intersections where fatal and serious injury crashes are most concentrated, based on the preliminary high-injury network developed for the Plan.
7. **Key Findings and Strategic Takeaways:** Synthesizes the most important crash trends and systemic patterns to inform the next phase of work, which will focus on identifying priority projects, programs, and policies.

2. CRASH SUMMARY STATISTICS

This section provides a high-level summary of all reported traffic crashes on County- and State-maintained roadways in Palm Beach County between 2019 and 2023. The goal is to understand overall crash volumes, severity levels, and general patterns across the roadway network. The analysis highlights factors often present where fatal and serious injury (FSI) crashes occur, identifies trends over time, and examines the disproportionate impact of severe crashes on vulnerable road users such as pedestrians, bicyclists, and motorcyclists. These summary statistics provide important context for the more detailed mode-specific analyses that follow.

COUNTYWIDE SUMMARY

From 2019-2023, 205,149 crashes occurred on streets in Palm Beach County. **FIGURE 2** shows the distribution of crashes by facility type and severity. Most crashes occurred on State roads and County-maintained roads. These two facility types also account for a disproportionately high share of fatal and serious injury (FSI) crashes, as shown by the green line, which represents the percentage of crashes that resulted in a fatality or serious injury on each facility type. While this discussion provides a brief overview of all crashes for comparison purposes, the rest of this document focuses on County- and State-maintained roads only.

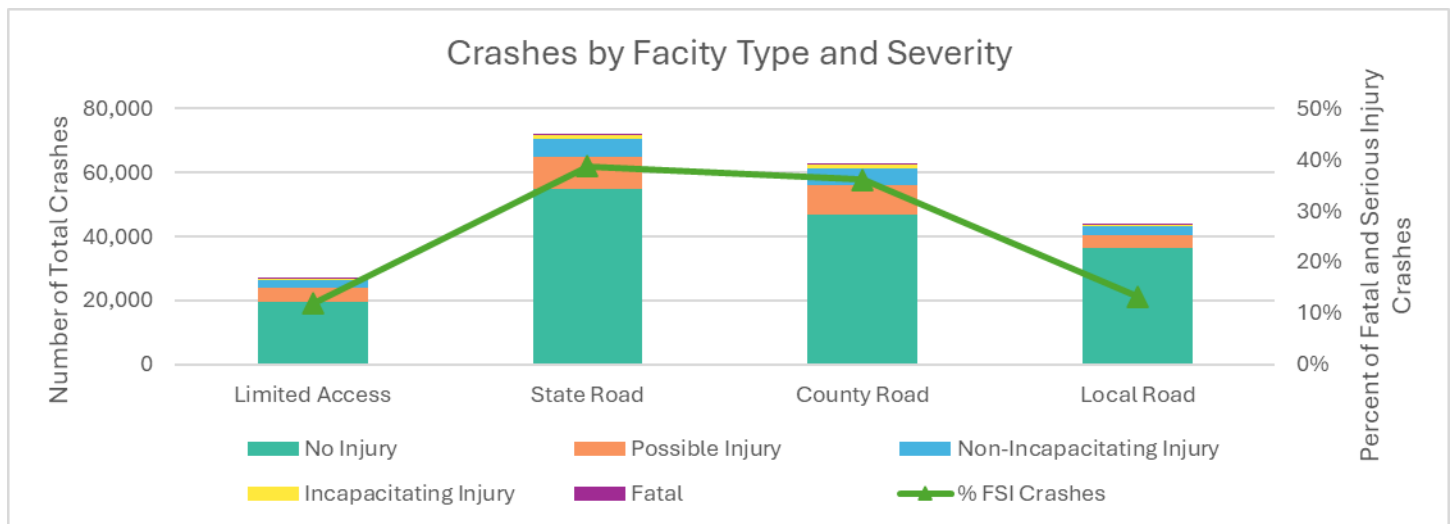


Figure 2 Crashes by Facility Type and Severity

CRASH TRENDS ON COUNTY- AND STATE-MAINTAINED ROADS

Between 2019 and 2023, there were approximately **135,000 reported traffic crashes** on State- and County-maintained roads in Palm Beach County. While most crashes resulted in minor or no injuries, this analysis focuses on understanding where the most severe outcomes occurred and what roadway conditions were commonly present. A summary of reported crashes by severity is provided in **TABLE 1**.

Table 1: Summary of All Reported Crashes on State- and County-maintained Roads, 2019-2023

Crash Severity	Crash Count	Percent of Total
Fatality	712	1%
Incapacitating Injury	2,480	2%
Non-Incapacitating Injury	10,833	8%
Possible Injury	19,140	14%
No Injury (Property Damage Only)	101,520	75%
Total	134,735	100%

FIGURE 3 shows total crashes by year and severity on State- and County-maintained Roads. While the total number of crashes has increased since 2020, the overall trend for fatal and serious injury crashes has declined between 2019 and 2023.

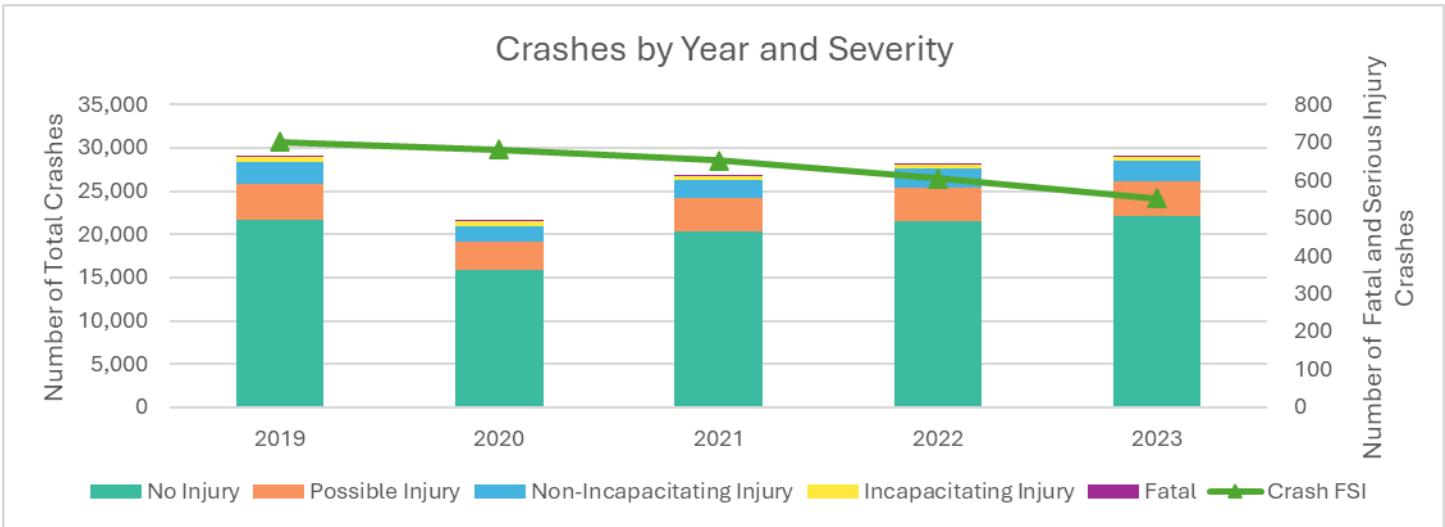


Figure 3 Crashes by Year and Severity for State- and County-Maintained Roads, 2019-2023

While anyone using the roadway network can be involved in a crash, some types of road users face significantly greater risk of severe outcomes. For example, pedestrians are involved in just 1% of all reported crashes but account for 14% of crashes resulting in a fatality or serious injury between 2019 and 2023. **FIGURE 4** highlights this disproportionate impact, showing that pedestrians, bicyclists, and motorcyclists represent a much larger share of fatal and serious injury crashes relative to their share of total crashes.

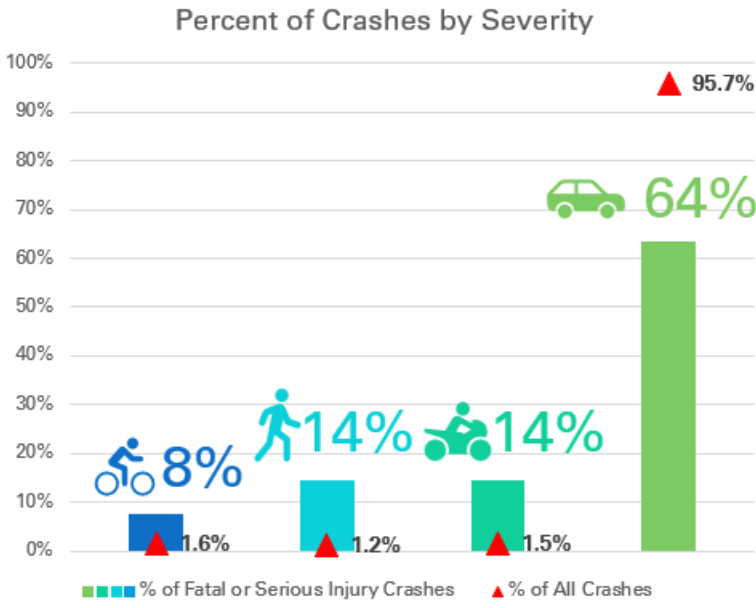


Figure 4 All Crashes by Travel Mode and Severity on State- and County-maintained Roads, 2019-2023

FIGURE 5 shows the distribution of crashes by crash type. Rear-end crashes make up the largest share, accounting for 40% of all crashes (54,190 crashes). Sideswipe crashes follow at 15% (19,588 crashes), and angle crashes account for 14% (19,144 crashes). Left-turn crashes represent 12% (16,094 crashes), and fixed-object or run-off-road crashes make up 7% (9,855 crashes). Together, these five crash types account for more than 80 percent of all reported crashes, highlighting a clear concentration in a small number of common crash patterns.

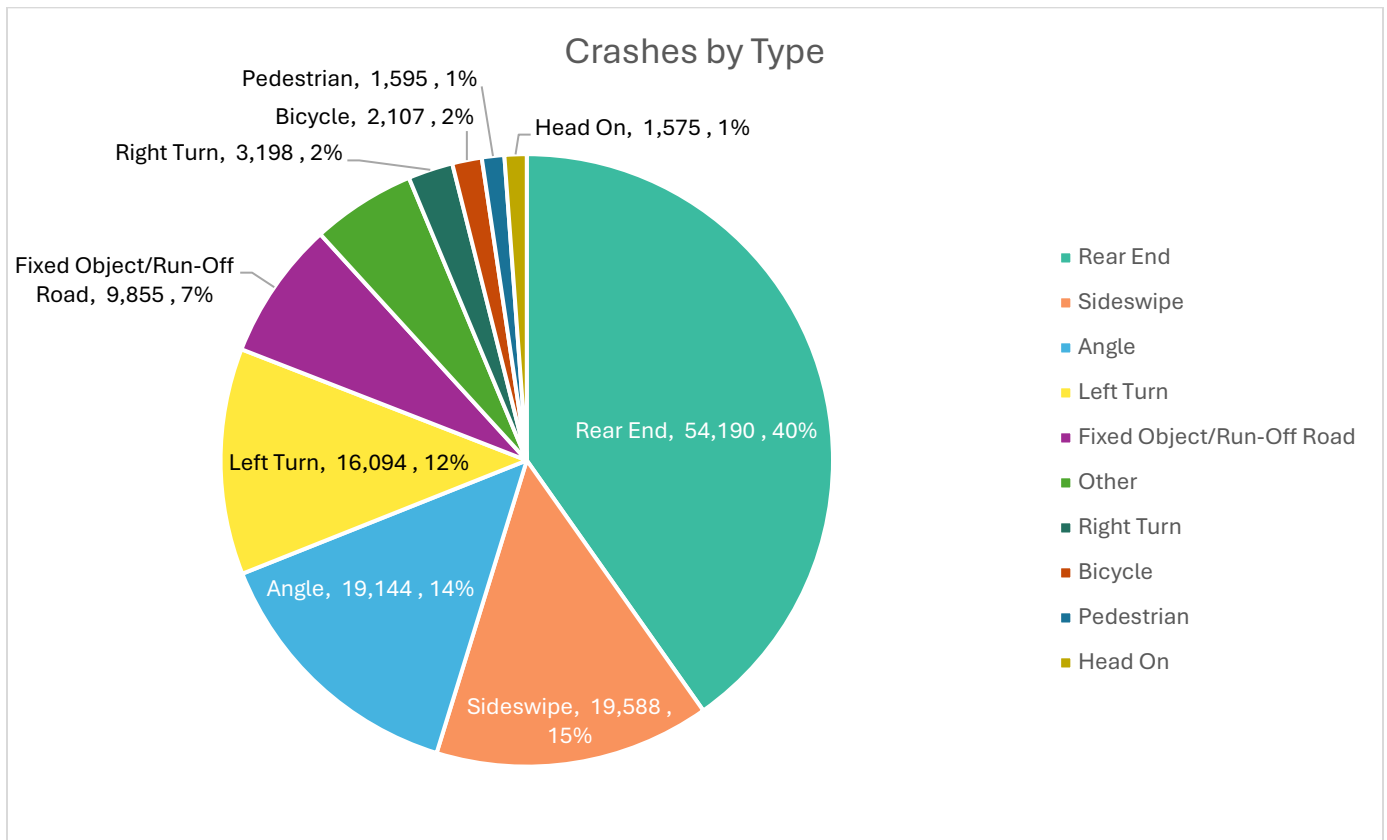


Figure 5 All Severity Crashes by Type on State- and County-maintained Roads, 2019-2023

RAIL-CAR-INVOLVED CRASH TRENDS AT SIGNALIZED INTERSECTIONS

From January 2019–October 2024, there were 24 rail-car-involved crashes countywide. Of these, 16 occurred at signalized intersections, spanning 14 unique locations. As shown in the **TABLE 2**, of the 14 intersections, two are located on the motorcycle High-Injury Network (HIN), one is on the pedestrian HIN, and two are on the bicycle HIN. None of the intersections fall within the top five priority corridors. Two intersections experienced multiple crashes—US 1/ Federal Hwy & Hypoluxo Rd and US 1/S Dixie Hwy & 12th Ave S—each with two crashes.

Intersection-related crashes averaged 2–3 per year from 2019 through 2023, followed by a notable increase to 7 crashes in 2024. Among these signalized intersection crashes, 7 resulted in fatal or serious injuries (FSI), leading to 4 fatalities and 6 injuries, while 9 involved no reported injuries.

Aging drivers were involved in approximately half of the intersection crashes, and half occurred during nighttime conditions. In addition, five intersection crashes involved distracted driving.

Overall, these patterns highlight signalized intersections as priority locations for further evaluation, particularly with respect to nighttime visibility, driver attention, and aging-driver considerations.

PBC Intersection ID	EW_ST	NS_ST	Vehicle HIN	Motorcycle HIN	Pedestrian HIN	Bicycle HIN	Total Rail Crash Count	FSI Rail Crash Count
40375	OCEAN AVE	FEDERAL HWY				x	1	1
15550	BURNS RD	ALT A1A				x	1	1
17370	NORTHLAKE BLVD	OLD DIXIE HWY		x			1	1
53174	WEST ATLANTIC AVE	I-95 WEST					1	1

PBC Intersection ID	EW_ST	NS_ST	Vehicle HIN	Motorcycle HIN	Pedestrian HIN	Bicycle HIN	Total Rail Crash Count	FSI Rail Crash Count
53080	WEST ATLANTIC AVE	WHATLEY RD					1	1
51615	GEORGE BUSH BLVD	NE 5TH AVE					1	0
40585	E CENTRAL BLVD	FEDERAL HWY					1	0
27955	OKEECHOBEE BLVD	QUADRILLE BLVD					1	0
20090	BEELINE HWY	JOG RD					1	0
27133	BANYAN BLVD	QUADRILLE BLVD					1	0
27487	FERN ST	S QUADRILLE BLVD					1	1
27525	HIBISCUS ST	QUADRILLE BLVD					1	1
41800	HYPOLUXO RD	FEDERAL HWY		x			2	0
38600	12TH AVE S	DIXIE HWY			x		2	0

Table 2 All Severity Crashes Reported to Involve Rail Car at Signalized Intersections in Palm Beach County, January 2019-October 2024

3. PEOPLE-FOCUSED ANALYSIS

This section examines how traffic crashes impact people on State- and County-maintained Roads in Palm Beach County, with a focus on identifying who is most affected by fatal and serious injury outcomes. The analysis highlights vulnerable users such as pedestrians, bicyclists, motorcyclists, older adults, and youth. It also reviews key behavioral crash factors such as speeding, distraction, alcohol, and drug involvement, and looks at how these behaviors relate to crash severity. Finally, the section includes an analysis that identifies where transportation-disadvantaged communities experience higher crash rates, along with a summary of crashes near schools and transit stops. *This section only considers crashes on State- and County-maintained roads in Palm Beach County from 2019-2023.*

STATE EMPHASIS AREAS

Florida’s Strategic Highway Safety Plan (SHSP) identifies a set of emphasis areas that reflect crash types, road user characteristics, and behaviors commonly associated with fatal and serious injury (FSI) crashes. These categories help agencies align local analysis and safety strategies with state and federal priorities. This section applies the same emphasis areas to crashes on State- and County-maintained roads in Palm Beach County to understand how local crash trends compare to statewide focus areas.

Each emphasis area is described below and in **FIGURE 6**, along with its relative share of total crashes and FSI crashes in Palm Beach County:

- **Intersection:** Crashes occurring at or influenced by intersections. This is the leading emphasis area in Palm Beach County, accounting for 47% of FSI crashes and 39% of all crashes.
- **Lane Departure:** Crashes involving a vehicle leaving the travel lane, including run-off-road, rollover, or fixed-object collisions. These crashes account for 24% of FSI crashes and 22% of total crashes.
- **Aging Road Users:** Crashes involving people aged 65 and older. These account for 28% of FSI crashes and 25% of total crashes.
- **Pedestrians and Bicyclists:** Crashes involving people walking or biking. While these crashes make up just 3% of all crashes, they account for 22% of FSI crashes, reflecting their high severity.
- **Motorcyclists and Moped Riders:** Crashes involving people riding motorcycles or mopeds. These represent 2% of total crashes but 14% of FSI crashes.

- **Teen Drivers:** Crashes involving drivers under the age of 21. These account for 12% of total crashes but only 10% of FSI crashes.
- **Commercial Motor Vehicle Operators:** Crashes involving large trucks or other commercial vehicles. These make up 5% of total crashes and 6% of FSI crashes.
- **Occupant Protection:** Crashes where improper seatbelt use or lack of occupant protection was a factor. These represent 2% of total crashes and 15% of FSI crashes.
- **Speeding and Aggressive Driving:** Crashes where speeding or aggressive behaviors were reported. These represent 6% of total crashes and 14% of FSI crashes.
- **Distracted Driving:** Crashes involving inattention or distraction, including use of phones or other devices. These represent 13% of all crashes and 12% of FSI crashes.
- **Impaired Driving:** Crashes involving alcohol or drug use. These account for 2% of total crashes and 9% of FSI crashes.

As shown in **FIGURE 6**, intersections, lane departures, and vulnerable road users (especially pedestrians, bicyclists, and motorcyclists) are the most prominent emphasis areas for fatal and serious injury crashes in Palm Beach County. For example, pedestrians and bicyclists make up 3% of all crashes but 22% of FSI crashes. Risky behaviors such as speeding, distraction, and impairment appear in a smaller share of crashes overall but are strongly associated with crash severity.

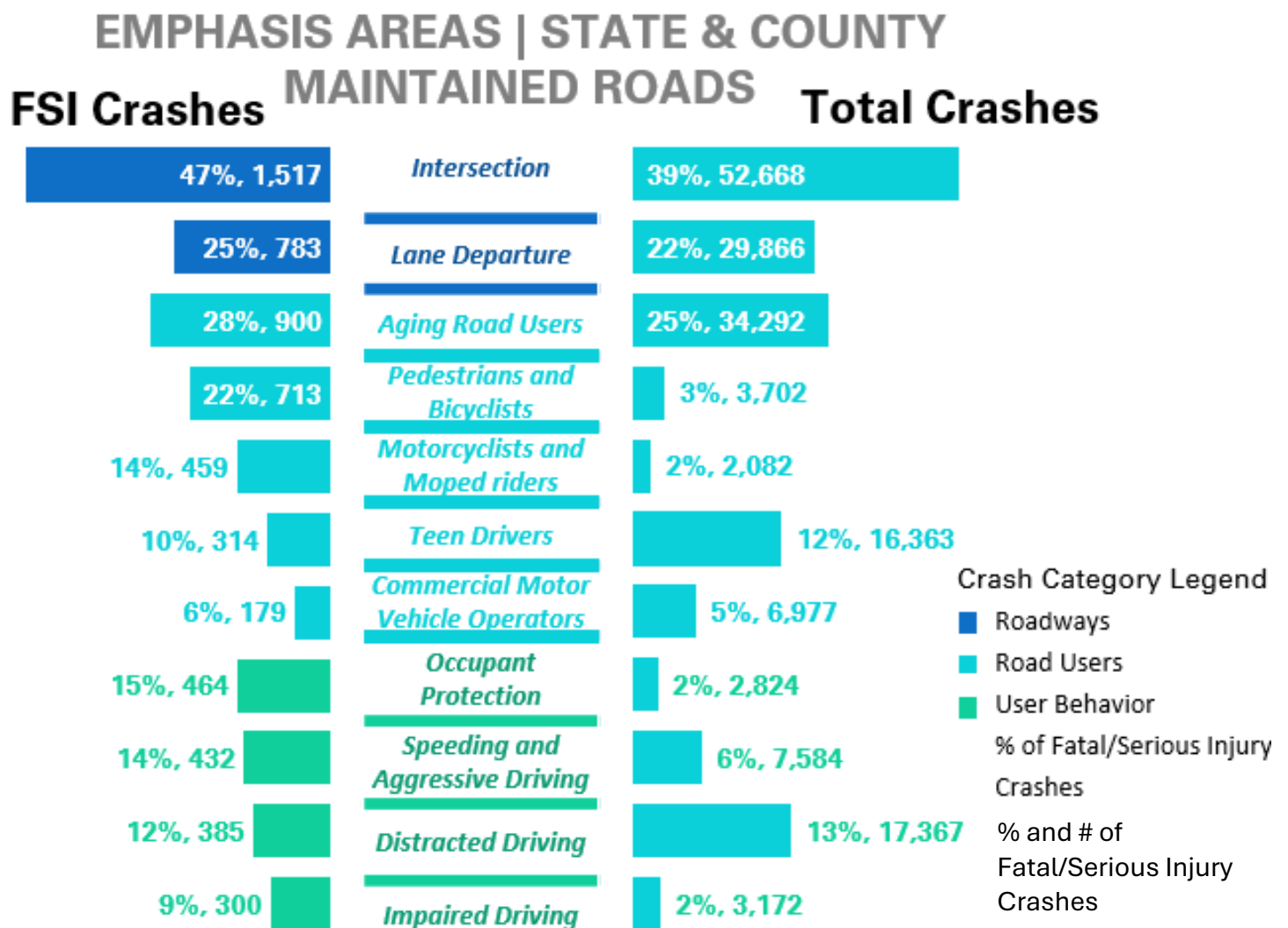


Figure 6 Crashes by Emphasis Area on State- and County-maintained Roads, 2019-2023

CRASH SUMMARY BY AGE GROUPS

Crash outcomes can vary significantly by age, particularly for people walking, biking, or riding motorcycles. Understanding which age groups are most affected by different types of crashes can help target safety strategies toward those at greatest risk. **FIGURE 7** shows the distribution of crash victims by age group and travel mode, providing insight into how different segments of the population experience roadway risk.

Adults between the ages of 18 and 64 make up the majority of crash victims across all modes, which is consistent with their higher levels of travel and exposure. However, older adults (age 65 and over) and youth (under 18) are overrepresented in certain crash types. For example, older adults account for 18 percent of pedestrian and bicycle crash victims, compared to 15 percent in vehicle crashes and 13 percent in motorcycle crashes. Youth under 18 make up 7 percent of bicycle crash victims and 8 percent of pedestrian crash victims but represent a much smaller share of motor vehicle and motorcycle crashes. These trends highlight the need to consider age-related vulnerability when designing safer streets, particularly for non-driving modes.

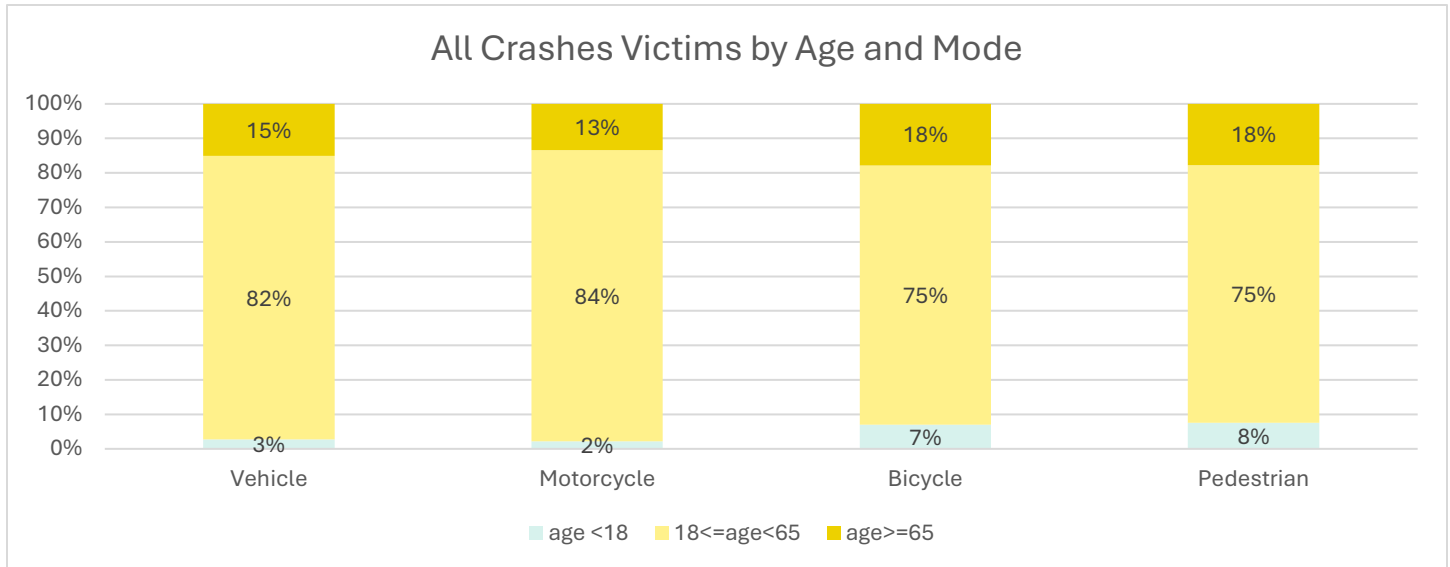


Figure 7 All Severity Crashes Victims by Age and Mode on State- and County-maintained Roads, 2019-2023

FIGURE 8 shows injury severity outcomes for vulnerable road users (pedestrians, bicyclists, motorcyclists) by age group. Older adults (65+) are the most vulnerable: they have the highest percentage of fatalities (13%) and incapacitating injuries (14%). Youth (<18) have relatively fewer severe outcomes, with lower fatality (4%) and incapacitating injury (8%) rates. Adults (18–64) show middle severity patterns, with a balance across all categories. Severity increases with age, with fewer “no injury” outcomes among older adults.

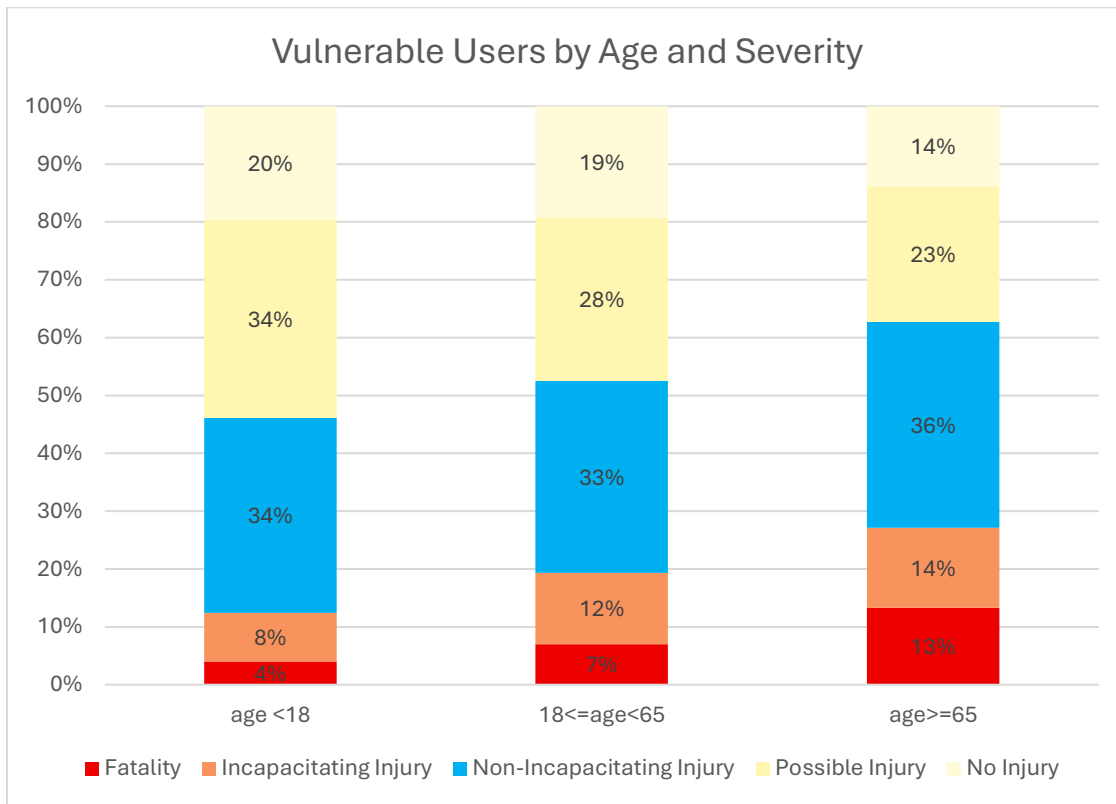


Figure 8 All Severity Vulnerable Users involved Crashes by Vulnerable User’s Age and Severity on State- and County-maintained Roads, 2019-2023

DRIVING BEHAVIOR

Risky driving behaviors such as speeding, distraction, and impairment play a significant role in traffic crashes and are closely linked to fatal and serious injury outcomes. This section summarizes crashes on State- and County-maintained roads in Palm Beach County where specific behaviors were reported in the crash record, including speeding or aggressive driving, distracted driving, and alcohol or drug involvement. While these behaviors are documented in only a portion of crash reports, the crashes where they are identified are far more likely to result in a fatal or serious injury. It is important to note that this analysis relies on what was recorded by law enforcement at the time of the crash, and these factors are often underreported or inconsistently documented. As a result, the true impact of driver behavior on crash outcomes may be greater than what the available data reflects.

TABLE 3 summarizes crashes where speeding or aggressive driving was noted in the crash report. These crashes make up 6 percent of all crashes, but account for 16% of all fatalities and 13% of serious injuries, making them significantly more severe than crashes without these behaviors.

Speeding or aggressive Driving?	Fatality	Incapacitating Injury	Non-Incapacitating Injury	Possible Injury	No Injury	Total
Yes	115 (16.2%)	317 (12.8%)	981 (9%)	1,419 (7.4%)	4,751 (4.7%)	7,583 (5.6%)
No	597 (83.8%)	2,163 (87.2%)	9,902 (91%)	17,721 (92.6%)	96,769 (95.3%)	127,152 (94.4%)
Total	712	2,480	10,883	19,140	101,520	134,735

Table 3 All Severity Crashes Reported to Involve Speeding or Aggressive Driving on State- and County-maintained Roads, 2019-2023

TABLE 4 summarizes crashes where distracted driving was noted in the crash report. These make up 13% of all crashes. While the share of fatalities is lower (5%), distracted driving is associated with a higher proportion of injury crashes overall.

Distracted Driving?	Fatality	Incapacitating Injury	Non-Incapacitating Injury	Possible Injury	No Injury	Total
Yes	34 (4.8%)	351 (14.2%)	1,588 (14.6%)	2,837 (14.8%)	12,522 (12.3%)	17,332 (12.9%)
No	678 (95.2%)	2,129 (85.8%)	9,295 (85.4%)	16,303 (85.2%)	88,998 (87.7%)	117,403 (87.1%)
Total	712	2,480	10,883	19,140	101,520	134,735

Table 4 All Severity Crashes Reported to Involve Distracted Driving on State- and County-maintained Roads, 2019-2023

TABLE 5 summarizes crashes where alcohol involvement was noted in the crash report. Although these crashes represent 2% of total crashes, they account for 13% of all fatalities and nearly 7% of serious injuries, highlighting disproportionate risk.

Alcohol involved?	Fatality	Incapacitating Injury	Non-Incapacitating Injury	Possible Injury	No Injury	Total
Yes	91 (12.8%)	164 (6.6%)	535 (4.9%)	602 (3.1%)	1,465 (1.4%)	2857 (2.1%)
No	621 (87.2%)	2,316 (93.4%)	10,348 (95.1%)	18,538 (96.9%)	100,055 (98.6%)	131,878 (97.9%)
Total	712	2,480	10,883	19,140	101,520	134,735

Table 5 All Severity Crashes Reported to Involve Alcohol Impairment on State- and County-maintained Roads, 2019-2023

TABLE 6 summarizes crashes where drug involvement was noted in the crash report. These are the least frequently reported of the four behaviors, accounting for 0.5% of crashes, but they are linked to 5.5% of all fatalities and 2.4% of serious injuries, suggesting elevated severity even at low volume.

Drug involved?	Fatality	Incapacitating Injury	Non-Incapacitating Injury	Possible Injury	No Injury	Total
Yes	39 (5.5%)	59 (2.4%)	142 (1.3%)	165 (0.9%)	303 (0.3%)	708 (0.5%)
No	673 (94.5%)	2,421 (97.6%)	10,741 (98.7%)	18,975 (99.1%)	101,217 (99.7%)	134,027 (99.5%)
Total	712	2,480	10,883	19,140	101,520	134,735

Table 6 All Severity Crashes Reported to Involve Drug Impairment on State- and County-maintained Roads, 2019-2023

OTHER CATEGORIES OF INTEREST ANALYSIS

Three categories of interest: (1) crash trends in areas experiencing persistent poverty, (2) crash trends in school zones, and (3) crash trends around bus and rail stops.

Areas Experiencing Persistent Poverty Crash Analysis

Addressing the safety needs of all roadway users is a key component of the Safe System approach and is critical to building a transportation network that protects people who may be more exposed to risk or face barriers to mobility. As part of this crash analysis, a network screening was conducted to assess whether certain communities experience a disproportionate share of severe crashes. This analysis focused on transportation-disadvantaged areas, defined as U.S. Census block groups where the percentage of low-income households and zero-vehicle households is higher than the county average. The crash data used in this section include all-severity crashes from 2019–2023 on non-limited access roads in Palm Beach County.

FIGURE 9 presents crash rates per centerline mile by census block group, using a five-level shading scale from dark (higher crash rates) to light (lower crash rates). Block groups that meet the definition of transportation-disadvantaged and also have crash rates exceeding the countywide average (29.4 crashes per mile) are highlighted on the map. These areas are primarily located along corridors such as Okeechobee Boulevard, SR 802, South Jog Road near SR 802, and West Woolbright Road in Boynton Beach.

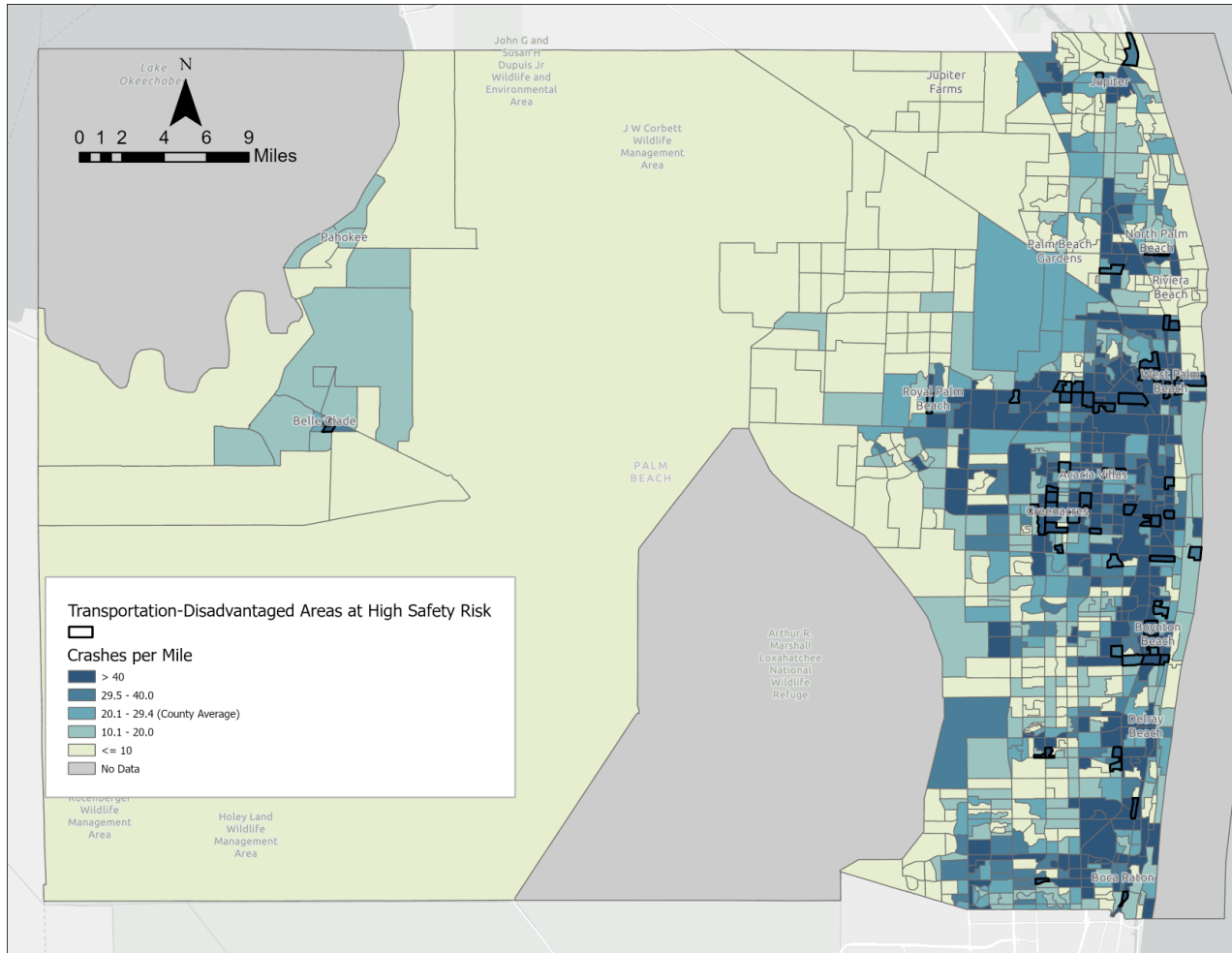


Figure 9 Transportation Disadvantaged Areas at High Safety Risk

School Zone Crash Analysis

The share of children walking or biking to school has been steadily declining for more than three decades, with increasing reliance on cars for school travel. This shift has contributed to greater traffic congestion, poorer air quality, and reduced daily physical activity. Safety concerns are a key factor behind the low rates of walking and biking. According to the 2017 National Household Travel Survey, 82.8% of children who walked to school lived within two miles of their school. Building on this finding, this analysis examines the safety performance of two-mile school zones surrounding public and private schools in the county.

FIGURE 10 presents crash rates per centerline mile by school zones, using a five-level shading scale from red (higher crash rates) to blue (lower crash rates). School zones with crash rates above the countywide average of 29.4 crashes per mile are shown as **red and orange points** on the map. These high-risk zones are concentrated along the coastline from North Palm Beach to Boca Raton, as well as in large clusters on both the north and south sides of Southern Boulevard, extending from the coast to Range Line Road.

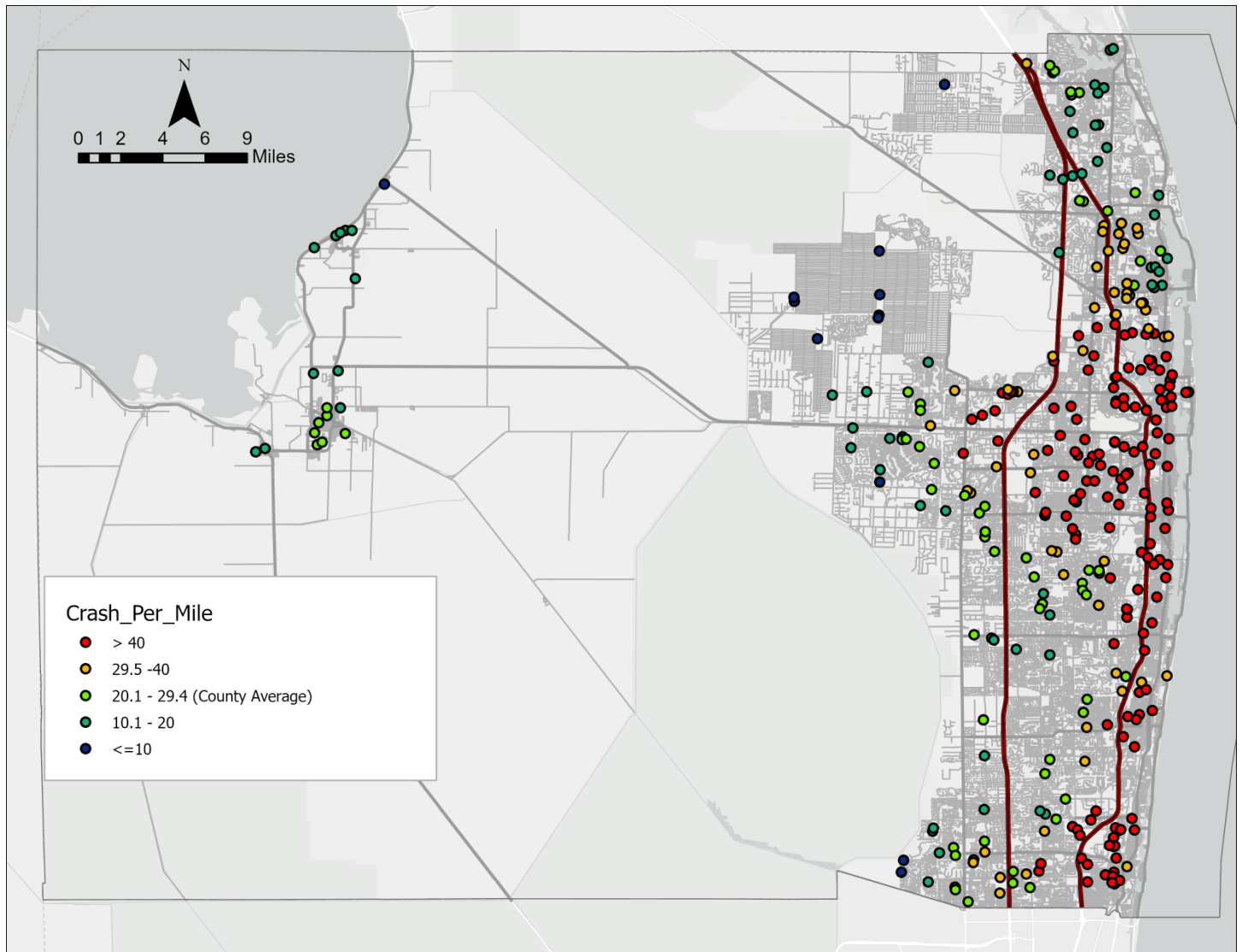


Figure 10 School Zone at High Safety Risk (Red and Orange Points)

Public Transportation Stop Area Crash Analysis

Public transportation plays a vital role in providing mobility, especially for people without access to a car. However, the area around transit stops often present safety challenges for pedestrians and bicyclists who rely on walking or biking to reach transit. Concerns such as inadequate crossings, high traffic volumes, and roadway design features can increase risk for vulnerable users. To better understand these risks, this analysis evaluates the safety performance of roadway segments within a 0.5-mile buffer of public transit stops across the county.

FIGURE 11 presents crash rates per centerline mile by public transportation stop areas, using a five-level shading scale from red (higher crash rates) to blue (lower crash rates). Most transit stops are located in areas with crash rates exceeding the countywide average of 29.4 crashes per mile. This pattern is likely influenced by the fact that many stops are located in denser urban areas, where higher traffic volumes and pedestrian activity naturally increase crash risk. For this analysis, the focus is on the highest-risk stops, defined as those with crash rates above 100 crashes per mile and shown as **red points** on the map.

These high-risk zones are concentrated along major corridors, including 45th Street and the downtown area of West Palm Beach, Okeechobee Boulevard and North Military Trail in unincorporated areas, the Lake Avenue and North Congress Avenue crossing in Palm Springs, the North Dixie Highway and Lake Avenue crossing in Lake Worth, the North Congress Avenue and West Boynton Beach Boulevard crossing in Boynton Beach, the West Atlantic Avenue corridor in Delray Beach, and the Glades Road and North Military Trail crossing in Boca Raton.

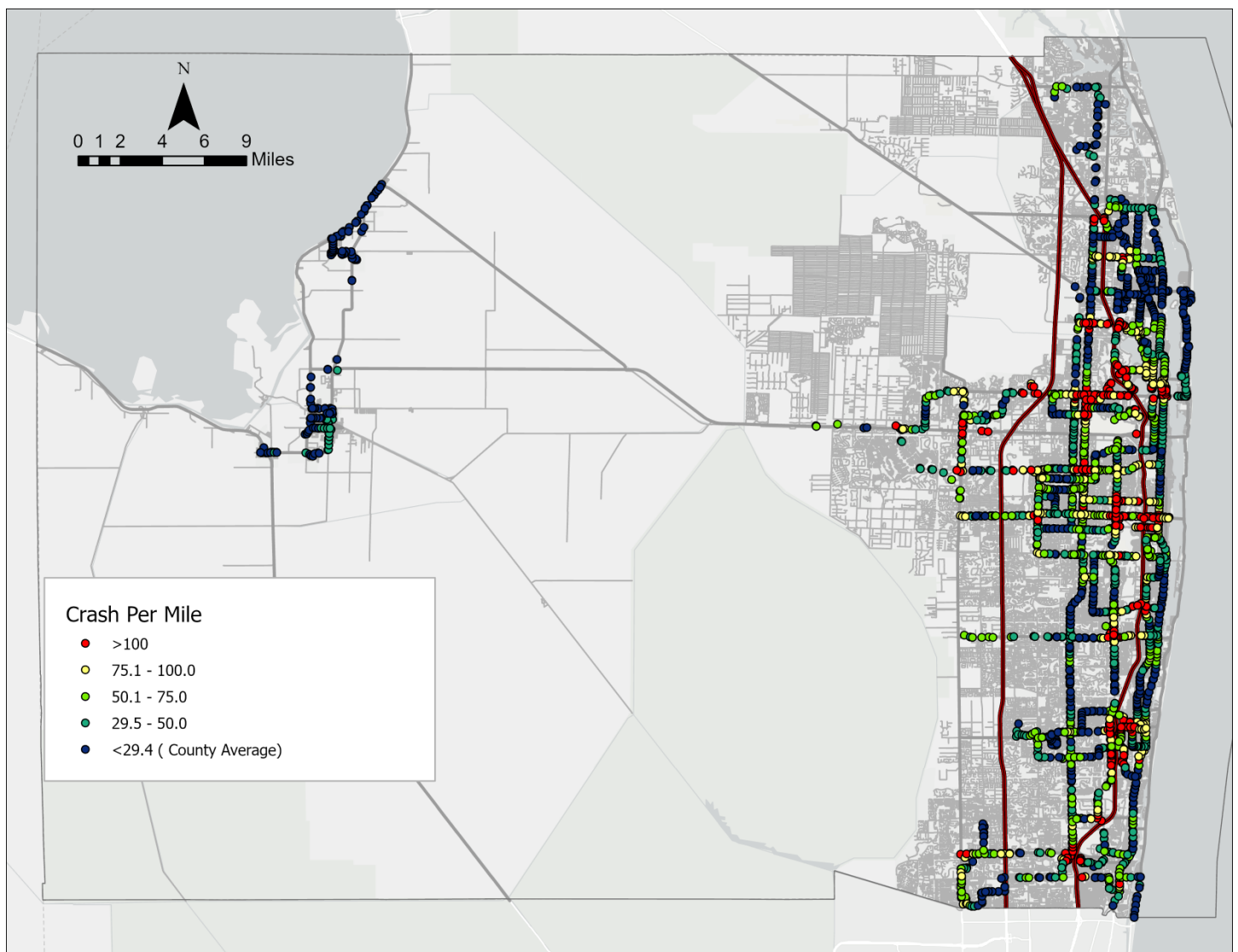


Figure 11 Transit Stop Area at High Safety Risk

4. MODE-SPECIFIC CRASH PATTERNS & FACTORS FOR FSI CRASHES

To better understand how crashes affect different types of roadway users, a focused analysis of crashes involving people walking, biking, riding motorcycles, and traveling in motor vehicles was developed. While the previous sections included all reported crashes to understand broader trends and common crash conditions, this section looks only at crashes that resulted in a fatality or serious injury (FSI). It also includes only crashes that occurred on State- or County-maintained roads, consistent with the focus of the Safety Action Plan.

This focus reflects the core principle of the Safe System Approach: the transportation system should be designed so that when crashes occur, they do not result in death or serious harm. By concentrating on the most severe outcomes, this analysis helps the County identify patterns that have the greatest impact on people's lives and better prioritize strategies that protect those most at risk.

To understand where fatal and serious injury (FSI) crashes are occurring and what conditions often present where they occur, this analysis separately evaluated crashes along roadway segments and at intersections. For each, crashes were grouped by relevant roadway or operational characteristics to identify common conditions across Palm Beach County's State- and County-maintained roads. Note that this relationship does not determine causality.

- **Segment crashes** refer to those that occurred in areas between signalized intersections. Segment crashes were evaluated using a variety of contextual factors to allow for meaningful comparison across the county's diverse roadway types. These include average annual daily traffic (AADT), number of lanes, posted speed limits, and facility type (e.g., undivided vs. divided). The analysis also considers whether these crashes involved common recurring crash conditions such as nighttime visibility, lane departures, or driver behaviors like careless operation. Statistics highlighted in bold purple within upcoming table summaries are overrepresented in the data.
- **Intersection crashes** refer to those that occur within 250 feet of the center of a signalized intersection. Intersection crashes were evaluated considering characteristics like entering traffic volume (ETV), intersection configuration (e.g., number of legs), number of lanes, and speed limit combinations. The analysis also identifies top crash types such as left turn or angle crashes and summarizes contributing actions like failure to yield or red-light running. Statistics highlighted in bold purple within upcoming table summaries are overrepresented in the data.

The analysis identifies common crash types, severity patterns, and contributing factors for each mode. It also highlights whether crashes are more likely to occur midblock or at intersections, helping the County tailor future safety improvements to the needs of each group.

MOTOR VEHICLE CRASHES

From 2019-2023, there were 2,020 motor vehicle crashes which resulted in someone being fatally or seriously injured. These crashes were split relatively evenly between segments and intersections, with 52% occurring along segments and 48% occurring at signalized intersections (**FIGURE 12**). As shown in **TABLE 7**, they are most frequent during afternoon and evening hours (noon to 6 PM), aligning with heavier traffic volumes seen in afternoon rush hour periods.

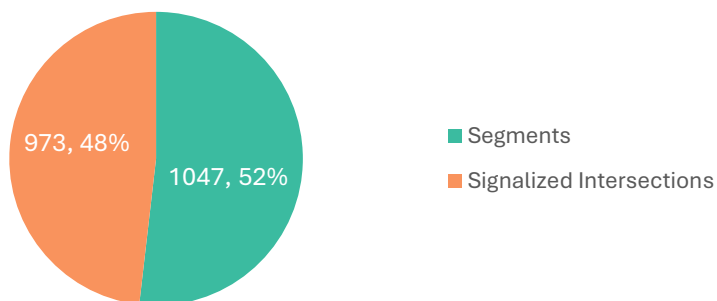


Figure 12 FSI Motor Vehicle Crashes by Network Type on State- and County-maintained Roads, 2019-2023

	12-3 AM	3-6 AM	6-9 AM	9-Noon	Noon-3 PM	3-6 PM	6-9 PM	9- Midnight
Motor Vehicle Crashes	121 (6%)	97 (4.8%)	242 (12%)	288 (14.3%)	364 (18%)	414 (20.5%)	298 (14.8%)	196 (9.7%)

Table 7 FSI Motor Vehicle Crash Summary by Time of Day on State- and County-maintained Roads, 2019-2023

TABLE 8 shows that most motor vehicle FSI crashes occur during daylight hours (47%), which reflects higher exposure from typical travel patterns. However, crash severity is higher in dark conditions. Although overall traffic exposure is significantly lower at night, crashes occurring in the dark—whether on lighted or unlighted roads—account for 46 percent of all fatal crashes, a share similar to daylight conditions. In contrast to daylight conditions, dark conditions have a higher proportion of fatal crashes compared to serious injury crashes, indicating that when a severe crash occurs at night, it is more likely to result in a fatality than during daylight. In particular, roads without lighting appear more dangerous, making up 12 percent of fatal crashes but only 4 percent of serious injury crashes.

Reported Lighting Condition	Dark - Lighted	Dark - Not Lighted	Dark - Unknown Lighting	Dawn	Daylight	Dusk	Unknown	Total
Fatal Crashes	119 (34.3%)	41 (11.8%)	4 (1.2%)	9 (2.6%)	163 (47%)	6 (1.7%)	5 (1.4%)	347
Serious Injury Crashes	390 (23.3%)	64 (3.8%)	1 (0.1%)	23 (1.4%)	1,150 (68.7%)	45 (2.7%)	0 (0%)	1,673

Table 8 FSI Motor Vehicle Crash Summary by Reported Lighting Condition on State- and County-maintained Roads, 2019-2023

TOP CRASH TYPES

FIGURE 13 shows that the most common fatal and serious injury (FSI) crash type involving motor vehicles is fixed-object or run-off-road crashes, which account for 30 percent of all FSI motor vehicle crashes. Rear-end crashes are the second most common, representing 20 percent of cases. For both crash types, the most frequently reported contributing action was operating the vehicle in a careless or negligent manner. This was cited in 28 percent of fixed-object crashes and 58 percent of rear-end crashes.

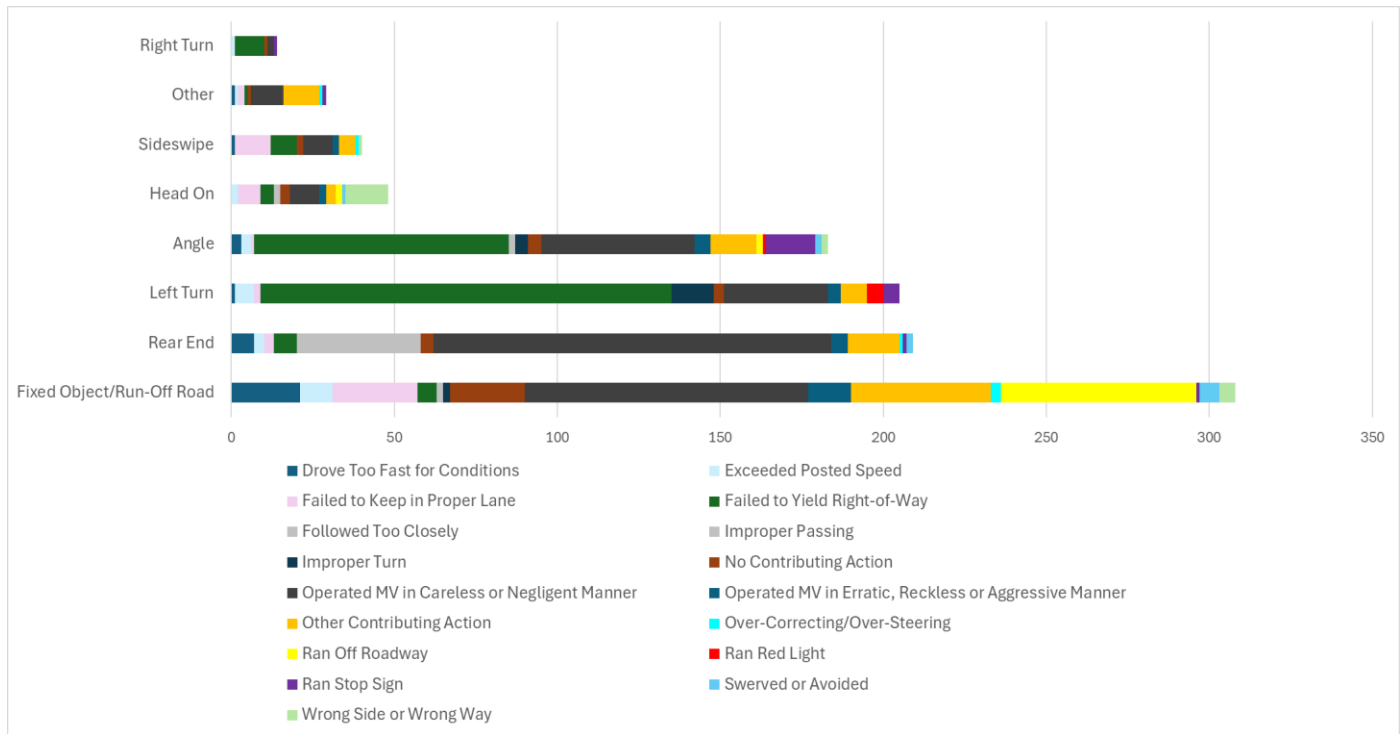


Figure 13 Segment related FSI Motor Vehicle Crashes by Crash Type on State- and County-maintained Roads, 2019-2023

CRASH SUMMARY BY ROADWAY CHARACTERISTICS

FSI crashes are disproportionately concentrated on higher-volume roads, as shown in ***THE** total crashes shown in this table are less than the total crashes on the segments because some roadway segments do not have AADT data available.

Table 9. Segments with AADT over 40,000 represent 6.5% of centerline miles but account for nearly 23% of fatal and serious injury (FSI) crashes. In contrast, segments with AADT under 20,000 make up the majority of roadway mileage (67.5%) but account for 34% of crashes.

AADT	<= 20,000	20,000 – 40,000	40,000 – 60,000	≥ 60,000
% of Centerline miles with AADT	67.5%	26.0%	5.5%	1.0%
Vehicle only Crashes*	331 (33.8%)	423 (43.3%)	171 (17.5%)	53 (5.4%)

*The total crashes shown in this table are less than the total crashes on the segments because some roadway segments do not have AADT data available.

Table 9 Segment related FSI Motor Vehicle Crash Summary by AADT on State- and County-maintained Roads, 2019-2023

FSI crashes are also disproportionately concentrated on higher-speed roads, as shown in **TABLE 10**. Most severe crashes occur on roadways with posted speed limits between 40 and 50 MPH. These segments represent 31% of centerline miles but account for over 66% of FSI crashes. In contrast, low-speed roads (≤ 35 MPH) make up two-thirds of the network but see 22% of crashes.

Posted Speed Limit	<=35 MPH	40-50 MPH	>=55 MPH
% of Centerline miles with speed limit	66.5%	31.4%	2.1%
Vehicle only Crashes	233 (22.3%)	688 (65.7%)	126 (12%)

Table 10 Segment related FSI Motor Vehicle Crash Summary by Posted Speed Limit on State- and County-maintained Roads, 2019-2023

TABLE 11 illustrates that most County- and State-maintained roads in Palm Beach County have three or fewer lanes, representing 62% of total centerline mileage. These roads account for 23% of fatal and serious injury crashes. In contrast, segments with four to seven lanes comprise 37% of the network but are associated with 69% of crashes. This distribution indicates that wider roads may experience a higher concentration of severe crashes relative to their network share.

Number of Lanes	3 or fewer Lanes	4-5 Lanes	6-7 Lanes	8 or more Lanes
% of Centerline miles with # lanes	61.9%	18.5%	18.2%	1.4%
Vehicle only Crashes	243 (23.2%)	376 (35.9%)	350 (33.4%)	78 (7.5%)

Table 11 Segment related FSI Motor Vehicle Crash Summary by Number of Lanes on State- and County-maintained Roads, 2019-2023

INTERSECTION CRASH ANALYSIS

TOP CRASH TYPES

FIGURE 14 summarizes fatal and serious injury crashes at signalized intersections by crash type and associated driver actions. The most common crash type is left-turn crashes, which account for 40% of intersection-related FSI crashes. Angle crashes are the second most common, representing 22% of vehicle FSI crashes.

For left-turn crashes, the most frequently reported contributing actions are failure to yield right-of-way (44%) and running a red light (25%). For angle crashes, the top contributing actions are running a red light (48%) and operating a vehicle in a careless or negligent manner (20%).

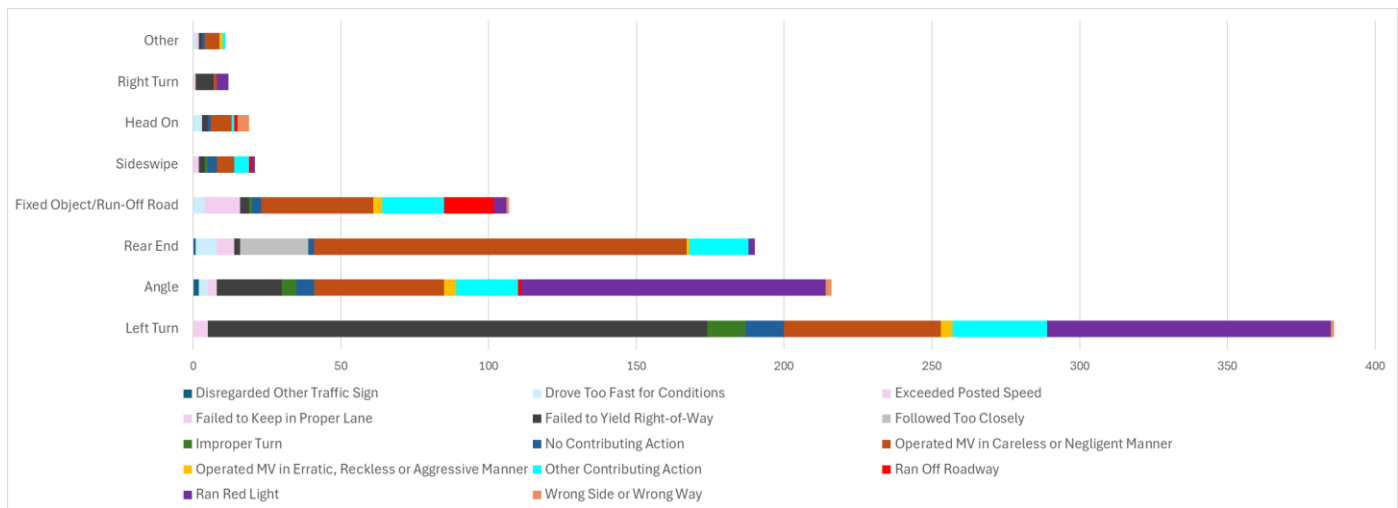


Figure 14 Intersection related FSI Motor Vehicle Crash Summary by Crash Type on State- and County-maintained Roads, 2019-2023

CRASH SUMMARY BY ROADWAY CHARACTERISTICS

TABLE 12 summarizes FSI crashes by the number of legs at signalized intersections. Most crashes occurred at four- or five-leg intersections, which make up 82% of the studied locations and account for 86% of crashes. Three-leg intersections represent 18% of locations and 14% of crashes. This distribution generally aligns with network prevalence but suggests slightly higher crash exposure at larger intersections.

Number of Legs	3 legs	4 or 5 legs
% Intersections	18.3%	81.7%
Vehicle only Crashes	139 (14.3%)	834 (85.7%)

Table 12 Intersection Related FSI Motor Vehicle Crashes by Number of Intersection Legs on State- and County-maintained Roads, 2019-2023

TABLE 13 presents FSI crashes by entering traffic volume (ETV) at each intersection. Intersections with ETV greater than 60,000 make up 13.1% of the system but account for 22.4% of crashes, indicating notable overrepresentation. Intersections with 30,000 to 60,000 ETV represent 47% of locations and account for 55% of crashes. In contrast, intersections with ETV less than or equal to 30,000 make up nearly 40% of the network but represent 23% of crashes. These findings suggest that intersections with higher overall volume experience a greater share of severe crashes.

ETV	<= 30K	30K < - ≤ 60K	≥ 60K
% Intersections	39.9%	47.0%	13.1%
Vehicle only Crashes	225 (23.1%)	530 (54.5%)	218 (22.4%)

Table 13 Intersection Related FSI Motor Vehicle Crashes by Entering Traffic Volume on State- and County-maintained Roads, 2019-2023

TABLE 14 shows the distribution of crashes based on the lane configuration of intersecting roadways. Intersections where a six or more lane road crosses a road with three or fewer lanes account for 33.4% of intersections and 39.3% of crashes, making this combination notably overrepresented. Intersections where both roads have six or more lanes or six and four to five lanes also show elevated crash shares. In contrast, intersections where both roads have three or fewer lanes represent 15.8% of intersections but account for 11% of crashes.

# of Lanes on Each Approach	>=6 & >=6	>=6 & 4-5	>=6 & <=3	>=6 & odd leg	4-5 & 4-5	4-5 & <=3	4-5 & odd leg	<=3 & <=3	<=3 & odd leg
% Intersections	3.9%	6.4%	33.4%	3.1%	5.2%	30.0%	1.8%	15.8%	0.5%
Vehicle only Crashes	86 (8.8%)	115 (11.8%)	382 (39.3%)	17 (1.7%)	44 (4.5%)	217 (22.3%)	4 (0.4%)	107 (11.1%)	1 (0.1%)

Table 14 Intersection Related FSI Motor Vehicle Crashes by Number of Lanes on Each Approach on State- and County-maintained Roads, 2019-2023

Table 15 compares crash patterns across combinations of posted speed limits for intersecting roads. Intersections where both roads have posted speeds between 40 and 50 MPH account for 17.8% of locations but represent 32% of FSI crashes, indicating strong overrepresentation. Intersections where a 40–50 MPH road intersects a ≤35 MPH road make up 48.6% of intersections and account for 46.6% of crashes, which is approximately proportional. The data suggest that medium-speed intersections, particularly where both roads fall in the 40–50 MPH range, are associated with elevated crash risk.

Posted Speed on Each Approach (MPH)	<=35 & odd leg	<=35 & <=35	40-50 & odd leg	40-50 & <=35	40-50 & 40-50	>=55 & <=35	>=55 & >=55	>=55 & 40-50
% Intersections	0.8%	24.8%	4.5%	48.6%	17.8%	1.8%	0.6%	1.0%
Vehicle only Crashes	2 (0.2%)	150 (15.4%)	21 (2.2%)	453 (46.6%)	311 (32%)	11 (1.1%)	9 (0.9%)	15 (1.6%)

Table 15 Intersection Related FSI Motor Vehicle Crashes by Posted Speed on Each Approach on State- and County-maintained Roads, 2019-2023

CRASH TREE SUMMARIES

Crash trees are a type of decision-tree analysis used to identify common combinations of conditions which are commonly present where specific crash types occur. Each crash tree begins with a broad crash category, such as lane departure or left-turn crashes, and progressively filters the data by roadway and operational characteristics (e.g., traffic volume, number of lanes, speed limit, intersection type). Note that this relationship does not determine causality. This approach helps highlight the recurring patterns where these severe crashes are most likely to occur.

The following summaries highlight some of the most frequently occurring crash scenarios for the top two FSI crash types across Palm Beach County’s State- and County-maintained roads on segments and on intersections.

1. Lane Departure Crashes on Segments

- **Share of Segment Vehicle FSI Crashes:** 30% (310)
- **Common scenario:** AADT between 20,000–40,000, divided roadway, 6–7 lanes, posted speed limit of 40–50 MPH
- **Share of all lane departure crashes:** 20%
- **Top contributing factor:** Careless or negligent driving (34%)
- **Other key conditions:** 52% occurred at night

2. Rear-End Crashes on Segments

- **Share of Segment Vehicle FSI Crashes:** 20% (210)
- **Common scenario:** AADT between 20,000–40,000, divided roadway, 6–7 lanes, posted speed limit of 40–50 MPH
- **Share of all rear-end crashes:** 21%
- **Top contributing factors:**
 - Careless or negligent driving (60%)
 - Following too closely (16%)
- **Other key conditions:** 19% occurred on wet road surfaces

3. Left-Turn Crashes at Intersections

- **Share of Intersection Vehicle FSI Crashes:** 40% (387)
- **Common scenario:** 4-leg intersection with entering volume of 30,000–60,000; major road with ≥6 lanes and 40–50 MPH speed limit intersecting a minor road with ≤3 lanes and ≤35 MPH speed limit
- **Share of all left-turn crashes:** 25%
- **Top contributing factors:**
 - Failure to yield right-of-way (48%)
 - Running a red light (24%)

4. Angle Crashes at Intersections

- **Share of Intersection Vehicle FSI Crashes:** 22% (217)
- **Common scenario 1:** 4-leg intersections with entering volume ≥60,000, where both roads have ≥6 lanes and 40–50 MPH speed limits
- **Share of all angle crashes for common scenario 1:** 11%
- **Common scenario 2:** 4-leg intersections with entering volume between 30,000–60,000, where a ≥6-lane, 40–50 MPH road intersects a ≤3-lane, ≤35 MPH road
- **Share of all angle crashes for common scenario 2:** 10%
- **Top contributing factors for scenario 1 and 2, respectively:**
 - Running a red light (55% and 54%)
 - Failure to yield right-of-way (18% and 17%)

MOTORCYCLE CRASHES

From 2019-2023, there were 459 crashes involving a motorcycle which resulted in someone being fatally or seriously injured. **FIGURE 15** shows that a majority (68%) of these crashes occurred along segments, with the remaining 32% occurring at intersections. As shown in **TABLE 16**, they are most frequent in the afternoon and evening hours of 3 to 9 PM, which aligns with heavier traffic and recreational riding times.

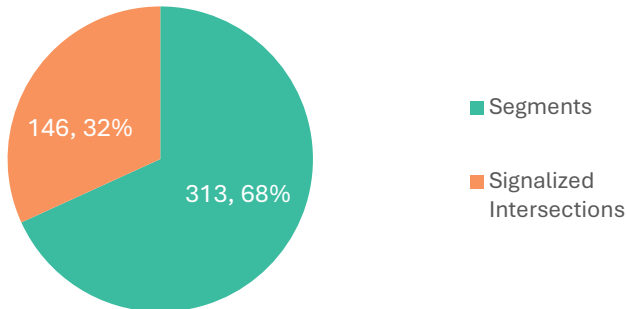


Figure 15 FSI Motorcycle Crashes by Network Type on State- and County-maintained Roads, 2019-2023

Time	12-3 AM	3-6 AM	6-9 AM	9-Noon	Noon-3 PM	3-6 PM	6-9 PM	9-Midnight
Motorcycle Crashes	25 (5.4%)	11 (2.4%)	34 (7.4%)	44 (9.6%)	68 (14.8%)	106 (23.1%)	104 (22.7%)	67 (14.6%)

Table 16 FSI Motorcycle Crash Summary by Time of Day on State- and County-maintained Roads, 2019-2023

TABLE 17 summarizes fatal and serious injury motorcycle crashes by reported lighting conditions. Most crashes occurred during daylight, which accounted for 50% of fatal crashes and 60% of serious injury crashes. However, a substantial share of fatal crashes (37%) occurred in dark but lighted conditions, highlighting an elevated risk of fatal outcomes when riding at night, even on illuminated roadways.

Motorcycle crashes in dark-unlighted conditions were less common overall but still present in the data, with 10% of fatal crashes and 6% of serious injury crashes reported under these conditions. While daytime riding is associated with a higher number of severe crashes, likely due to greater overall exposure, nighttime crashes appear to carry a higher risk of fatal outcomes.

Reported Lighting Condition	Dark - Lighted	Dark - Not Lighted	Dark - Unknown Lighting	Dawn	Daylight	Dusk	Total
Fatal Crashes	43 (37.4%)	11 (9.6%)	2 (1.7%)	1 (0.9%)	57 (49.6%)	1 (0.8%)	115
Serious Injury Crashes	96 (27.9%)	20 (5.8%)	0 (0%)	3 (0.9%)	207 (60.2%)	18 (5.2%)	344

Table 17 FSI Motorcycle Crash Summary by Reported Lighting Condition on State- and County-maintained Roads, 2019-2023

SEGMENT CRASH ANALYSIS

TOP CRASH TYPES

FIGURE 16 shows the top crash types for FSI motorcycle crashes. The most common crash type is fixed-object or run-off-road, accounting for 31% of all FSI motorcycle crashes. This is followed closely by left turn crashes at 30%.

For fixed-object/run-off-road crashes, the most common contributing action was careless or negligent driving, reported in 33% of cases. For left-turn crashes, the top contributing factor was failure to yield the right-of-way, cited in 58% of crashes. These patterns highlight the role of both roadway departure and turning movement conflicts in the most severe motorcycle crashes.

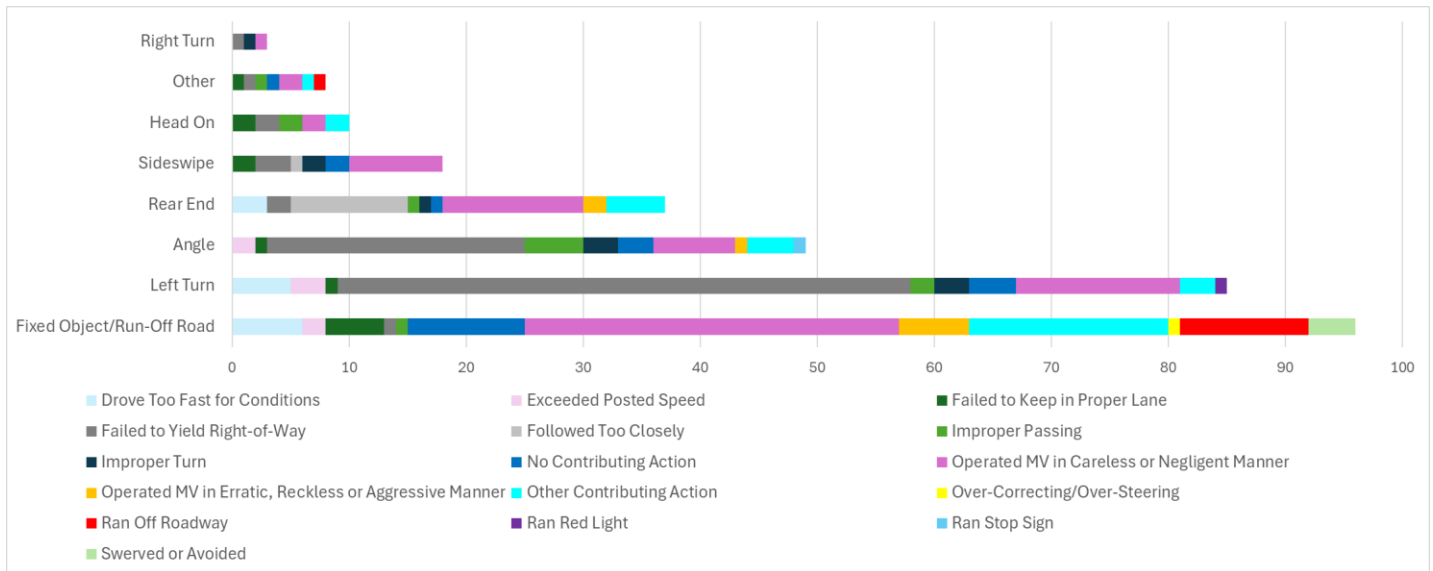


Figure 16 Segment related FSI Motorcycle Crashes by Network Type on State- and County-maintained Roads, 2019-2023

CRASH SUMMARY BY ROADWAY CHARACTERISTICS

***THE** total crashes shown in this table are less than the total crashes on the segments because some roadway segments do not have AADT data available.

Table 18 summarizes motorcycle FSI crashes by AADT and shows that segments with AADT between 20,000 and 40,000 make up 26% of centerline miles but account for 41% of crashes, indicating a disproportionate crash concentration on moderately traveled roads. Segments with AADT over 40,000 represent 6.5% of the network and account for 23% of crashes, further emphasizing elevated risk on busier roadways. In contrast, segments with AADT under 20,000 represent the majority of mileage (68%) but account for 36% of crashes.

AADT	<= 20,000	20,000 – 40,000	40,000 – 60,000	≥ 60,000
% of Centerline miles with AADT	67.5%	26.0%	5.5%	1.0%
Motorcycle Crashes*	104 (35.7%)	119 (40.9%)	55 (18.9%)	13 (4.5%)

*The total crashes shown in this table are less than the total crashes on the segments because some roadway segments do not have AADT data available.

Table 18 Segment related FSI Motorcycle Crash Summary by AADT on State- and County-maintained Roads, 2019-2023

TABLE 19 compares motorcycle crashes by posted speed limit. Segments posted at 40–50 MPH represent 31% of network mileage but account for 56% of crashes, indicating a high-risk category. High-speed roads (≥55 MPH) are relatively limited in coverage (2.1% of mileage) but account for 6% of crashes. Roads posted at 35 MPH or below comprise 66.5% of the network but account for 38.3% of motorcycle crashes.

Posted Speed Limit	<=35 MPH	40-50 MPH	>=55 MPH
% of Centerline miles with speed limit	66.5%	31.4%	2.1%
Motorcycle Crashes	120 (38.3%)	175 (55.9%)	18 (5.8%)

Table 19 Segment related FSI Motorcycle Crash Summary by Posted Speed Limit on State- and County-maintained Roads, 2019-2023

TABLE 20 presents crash data by the number of lanes. Motorcycle crashes are more likely to occur on multilane roadways. 4–5 lane roads represent 18.5% of the network and account for the largest share of crashes (33.5%), followed closely by 6–7 lane roads, which represent 18.2% of the mileage and 29.7% of crashes. In comparison, 3 or fewer lane roads account for 62% of the network but 31% of crashes.

Number of Lanes	3 or fewer Lanes	4-5 Lanes	6-7 Lanes	8 or more Lanes
% of Centerline miles with # lanes	61.9%	18.5%	18.2%	1.4%
Motorcycle Crashes	98 (31.3%)	105 (33.5%)	93 (29.7%)	17 (5.5%)

Table 20 Segment related FSI Motorcycle Crashes Summary by Number Lanes on State- and County-maintained Roads, 2019-2023

INTERSECTION CRASHES

TOP CRASH TYPES

TABLE 21 presents fatal and serious injury motorcycle crashes at intersections by crash type and contributing driver action. The most common crash type is left-turn crashes, representing 30% of intersection-related FSI motorcycle crashes. Angle crashes follow at 25%.

For left-turn crashes, the top contributing factor was failure to yield the right-of-way, reported in 59% of crashes. Running a red light was the second most common factor, present in 23% of cases.

For angle crashes, running a red light was the top contributing factor (36%), followed by careless or negligent operation (17%). Together, left-turn and angle crashes account for 55% of all intersection-related motorcycle FSI crashes, indicating a need to further evaluate conflict points and driver behavior at signalized locations.

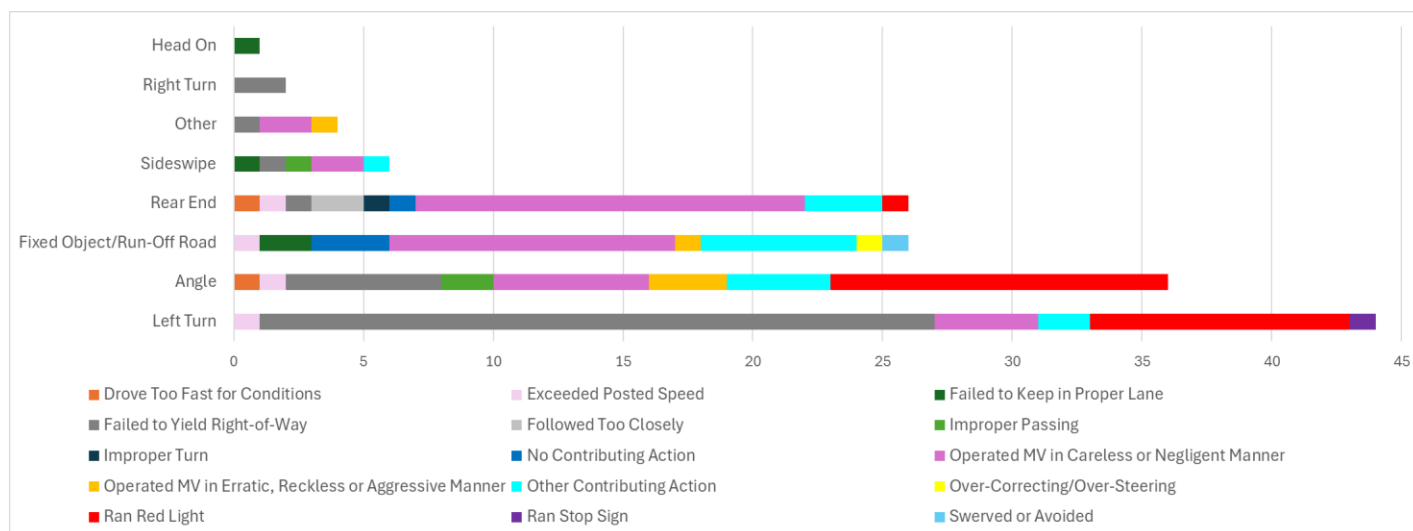


Table 21 Intersection related FSI Motorcycle Crashes Summary by Light Condition on State- and County-maintained Roads, 2019-2023

CRASH SUMMARY BY ROADWAY CHARACTERISTICS

TABLE 22 summarizes motorcycle crashes by number of intersection legs. Intersections with 4 or 5 legs represent 82% of signalized intersections in the dataset, but account for 90% of FSI motorcycle crashes. This overrepresentation suggests greater risk at more complex intersections, which may introduce additional turning movements or conflict points compared to simpler 3-leg intersections.

Number of Legs	3 legs	4 or 5 legs
% Intersections	18.3%	81.7%
Motorcycle Crashes	14 (9.6%)	132 (90.4%)

Table 22 Intersection Related FSI Motorcycle Crashes by Number of Intersection Legs on State- and County-maintained Roads, 2019-2023

TABLE 23 presents FSI motorcycle crashes by ETV at intersections. Intersections with 30K to 60K ETV account for 47% of locations and 51% of crashes, while intersections with 60K+ ETV make up just 13% of locations but represent 23% of crashes. These patterns show that a disproportionate share of severe motorcycle crashes occur on roads with higher traffic volumes.

ETV	<= 30K	30K < - ≤ 60K	≥ 60K
% Intersections	39.9%	47.0%	13.1%
Motorcycle Crashes	38 (26%)	75 (51.4%)	33 (22.6%)

Table 23 Intersection Related FSI Motorcycle Crashes by Entering Traffic Volume on State- and County-maintained Roads, 2019-2023

TABLE 24 shows FSI motorcycle crashes based on the lane configuration of intersecting roads. Intersections where a 6+ lane road meets a 3-lane or smaller road make up 33% of intersections but account for 37% of crashes. Intersections of two 6+ lane roads make up 4% of locations but are associated with 10% of crashes. These trends suggest elevated risk where wide, high-volume roads intersect with narrower streets (or with other wide roads) likely due to increased speed and complexity.

# of Lanes on Each Approach	>=6 & >=6	>=6 & 4-5	>=6 & <=3	>=6 & odd leg	4-5 & 4-5	4-5 & <=3	4-5 & odd leg	<=3 & <=3	<=3 & odd leg
% Intersections	3.9%	6.4%	33.4%	3.1%	5.2%	30.0%	1.7%	15.8%	0.5%
Motorcycle Crashes	15 (10.3%)	13 (8.9%)	54 (37%)	4 (2.7%)	9 (6.1%)	33 (22.6%)	0 (0%)	16 (11%)	2 (1.3%)

Table 24 Intersection Related FSI Motorcycle Crashes by Number of Lanes on Each Approach on State- and County-maintained Roads, 2019-2023

TABLE 25 shows that intersections where a 40–50 MPH road intersects with a ≤35 MPH road make up the largest share of the network at 48.6% of signalized intersections and account for 45.9% of severe motorcycle crashes. This indicates nearly proportional representation, though slightly underrepresented relative to their presence in the network. Intersections where both roads are 40–50 MPH are 17.8% of intersections but account for 25.3% of crashes, showing clear overrepresentation. Together, these two types account for 66.4% of intersections and 71.2% of crashes, pointing to mid-speed intersections as key locations for motorcycle crash risk.

Posted Speed on Each Approach (MPH)	<=35 & odd leg	<=35 & <=35	40-50 & odd leg	40-50 & <=35	40-50 & 40-50	>=55 & <=35	>=55 & >=55	>=55 & 40-50
% Intersections	48.6%	17.8%	17.8%	17.8%	17.8%	17.8%	17.8%	17.8%
Motorcycle Crashes	45.9%	25.3%	25.3%	25.3%	25.3%	25.3%	25.3%	25.3%

% Intersections	0.8%	24.8%	4.5%	48.6%	17.8%	1.8%	0.6%	1.0%
Motorcycle Crashes	2 (1.4%)	30 (20.5%)	4 (2.7%)	67 (45.9%)	37 (25.3%)	2 (1.4%)	3 (2.1%)	1 (0.7%)

Table 25 Intersection Related FSI Motorcycle Crashes by Posted Speed on Each Approach on State- and County-maintained Roads, 2019-2023

Note: crash trees and further recurring crash condition analysis for FSI motorcycle crashes was not completed due to the low number of total crashes and potential for breakdown in statistical reliability.

PEDESTRIAN CRASHES

From 2019-2023, there were 458 crashes involving someone walking which resulted in a death or serious injury.

Figure 17 shows that a majority (61%) of these crashes occurred along segments, with the remaining 39% occurring at intersections. As shown in **TABLE 26**, they are most frequent in the evening hours of 6 PM to 12 AM. Early morning (3-6 AM) also shows an elevated share at 9.4%, despite activity typically being lower at these times.

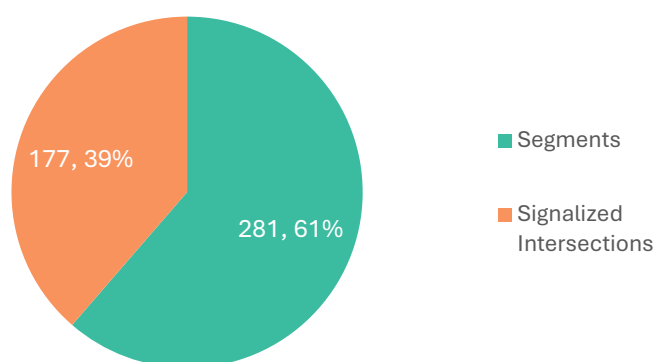


Figure 17 FSI Pedestrian Crashes by Network Type on State- and County-maintained Roads, 2019-2023

	12-3 AM	3-6 AM	6-9 AM	9-Noon	Noon-3 PM	3-6 PM	6-9 PM	9-Midnight
Pedestrian Crashes	33 (7.2%)	43 (9.4%)	40 (8.7%)	30 (6.6%)	38 (8.3%)	33 (7.2%)	129 (28.2%)	112 (24.5%)

Table 26 FSI Pedestrian Crash Summary by Time of Day on State- and County-maintained Roads, 2019-2023

TABLE 27 shows that the majority of fatal and serious injury pedestrian crashes occurred under dark conditions. Crashes in dark but lighted conditions account for 53.9% of fatalities and 44.9% of serious injuries, while dark and unlighted conditions make up an additional 21.1% of fatalities and 14.2% of serious injuries. Combined, nearly three-quarters of fatal crashes and more than half of serious injury crashes happened at night, highlighting the elevated risk of walking in low-light conditions. Although daylight conditions saw a substantial share of serious injuries (34.3%), they were associated with a smaller share of fatal crashes (22.1%).

Reported Lighting Condition	Dark - Lighted	Dark - Not Lighted	Dark - Unknown Lighting	Dawn	Daylight	Dusk	Total
Fatal Crashes	110 (53.9%)	43 (21.1%)	3 (1.5%)	2 (1%)	45 (22.1%)	1 (0.4%)	204
Serious Injury Crashes	114 (44.9%)	36 (14.2%)	1 (0.4%)	7 (2.8%)	87 (34.3%)	9 (3.4%)	254

Table 27 FSI Pedestrian Crashes Summary by Reported Lighting Condition on State- and County-maintained Roads, 2019-2023

Pedestrian crash records often lack detail in standard crash type fields, so this analysis utilized the “Vulnerable Road User Action” field from Signal Four Analytics to identify segment and intersection crash trends. This field provides more specific information about pedestrian behavior at the time of the crash, including whether the person was crossing in a marked crosswalk, walking along the road, or entering the roadway unexpectedly. These details help identify patterns that would otherwise be obscured. For the purposes of this assessment, “Not Near Crosswalk” refers to crashes that occurred more than 100 feet away from a crosswalk.

SEGMENT CRASH ANALYSIS

TOP SEGMENT CRASH TYPES

*The sum of percentages may not equal exactly 100% because of rounding adjustments.

Table 28 summarizes combinations of vehicle maneuver, pedestrian action, and crosswalk context for segment crashes. The most common scenario involved a vehicle traveling straight ahead and a pedestrian failing to yield the right-of-way away not near a crosswalk, which accounted for 23.5% of all FSI crashes. Other common patterns included:

- Pedestrians darting or dashing into the road away from a crosswalk (18.9%)
- Pedestrians in the roadway improperly or with no improper action, both near and far from marked crosswalks (various combinations totaling over 15%)

Crashes occurring far from a crosswalk (defined as more than 100 feet away) were involved in many of the most severe crashes. These midblock incidents may reflect gaps in safe pedestrian crossing infrastructure, especially on higher-speed corridors.

Vehicle Maneuver	Vulnerable Road User Action	Crosswalk Context	% of Total FSI Crashes*
Changing Lanes	Failure to Yield Right-of-Way	Not Near Crosswalk	0.8%
Making U-Turn	In Roadway Improperly	Not Near Crosswalk	0.8%
Negotiating a Curve	No Improper Action	Not Near Crosswalk	0.8%
Slowing	Dart/Dash	Not Near Crosswalk	0.8%
Straight Ahead	Failure to Yield Right-of-Way	Near Crosswalk	3.0%
		Not Near Crosswalk	23.5%
	Dart/Dash	Near Crosswalk	2.3%
		Not Near Crosswalk	18.9%
	In Roadway Improperly	Not Near Crosswalk	17.4%
	No Improper Action	Near Crosswalk	0.8%
		Not Near Crosswalk	9.8%
Other	Near Crosswalk	0.8%	
	Not Near Crosswalk	7.6%	
Turning Left	Failure to Yield Right-of-Way	Near Crosswalk	0.8%
	No Improper Action	Near Crosswalk	0.8%
		Not Near Crosswalk	0.8%
	Other	Near Crosswalk	0.8%
Turning Right	No Improper Action	Near Crosswalk	0.8%
Unknown	Failure to Yield Right-of-Way	Not Near Crosswalk	5.30%
	Dart/Dash	Not Near Crosswalk	0.8%

	In Roadway Improperly	Not Near Crosswalk	0.8%
	No Improper Action	Not Near Crosswalk	2.30%

*The sum of percentages may not equal exactly 100% because of rounding adjustments.

Table 28 Segment Related FSI Pedestrian Crashes by Vehicle Maneuver, Pedestrian Action and Distance to the Crosswalk on State- and County-maintained Roads, 2019-2023

CRASH SUMMARY BY ROADWAY CHARACTERISTICS

TABLE 29 shows that while most of the County and State roadway mileage has average annual daily traffic (AADT) of 20,000 or less (67.5%), these lower-volume roads account for 35.3% of pedestrian FSI crashes. Crashes are disproportionately concentrated on moderate- and high-volume roadways, especially those with AADT between 20,000 and 40,000, which represent 26% of the network but account for 41% of crashes. Roadways with AADT above 40,000 make up just 6.5% of mileage but account for nearly 24% of crashes.

AADT	<= 20,000	20,000 – 40,000	40,000 – 60,000	≥ 60,000
% of Centerline miles with AADT	67.5%	26.0%	5.5%	1.0%
Pedestrian Crashes*	94 (35.3%)	109 (41%)	55 (20.7%)	8 (3%)

*The total crashes shown in this table are less than the total crashes on the segments because some roadway segments do not have AADT data available.

Table 29 Segment related FSI Pedestrian Crash Summary by AADT on State- and County-maintained Roads, 2019-2023

TABLE 30 indicates that pedestrian fatal and serious injury crashes are more likely to occur on roads with posted speeds between 40 and 50 MPH, which account for 31.4% of centerline miles but are associated with 56.9% of crashes. In contrast, roads with speed limits 35 MPH or below make up two-thirds of roadway mileage but are associated with 38.1% of crashes, suggesting lower risk relative to exposure. High-speed roads (≥55 MPH) are rare and account for a smaller share of crashes, but still show some overrepresentation given their limited mileage.

Posted Speed Limit	<=35 MPH	40-50 MPH	>=55 MPH
% of Centerline miles with speed limit	66.5%	31.4%	2.1%
Pedestrian Crashes	107 (38.1%)	160 (56.9%)	14 (5%)

Table 30 Segment Related FSI Pedestrian Crash Summary by Posted Speed Limit on State- and County-maintained Roads, 2019-2023

TABLE 31 highlights that pedestrian crashes are more likely to occur on multi-lane roads. Segments with four or more lanes represent 38.1% of roadway mileage but are associated with 79% of pedestrian crashes. In particular, 4–5 lane roads account for 18.5% of the network but 43.4% of crashes. This pattern mirrors trends observed in motorcycle and vehicle crashes, where wider roadways present increased exposure and potential for conflict.

	3 or fewer Lanes	4-5 Lanes	6-7 Lanes	8 or more Lanes
% of Centerline miles with # lanes	61.9%	18.5%	18.2%	1.4%
Pedestrian Crashes	59 (21%)	122 (43.4%)	89 (31.7%)	11 (3.9%)

Table 31 Segment Related FSI Pedestrian Crash Summary by Number of Lanes on State- and County-maintained Roads, 2019-2023

INTERSECTION CRASHES

TOP INTERSECTION CRASH TYPES

***THE** sum of percentages may not equal exactly 100% because of rounding adjustments.

Table 32 summarizes fatal and serious injury (FSI) pedestrian crashes at signalized intersections based on vehicle maneuver and Vulnerable Road User Action. The most common crash scenario involved a vehicle traveling straight and a pedestrian failing to yield the right-of-way, representing 22.7% of intersection crashes. Other frequent combinations include:

- Darting or dashing into the roadway in front of a vehicle going straight (16.0%)
- Failure to obey traffic signs or signals during a vehicle's straight movement (9.3%)
- Pedestrians in the roadway improperly during a straight movement (12.0%)

Though less common, left-turning vehicles were also involved in crashes with pedestrians in the roadway improperly or with no improper action, highlighting potential issues with visibility, yielding behavior, or turn signal timing.

Overall, straight-through vehicle movements are linked to the highest number of FSI pedestrian crashes at intersections, especially when combined with unexpected pedestrian behavior or failures to yield or obey signals.

Vehicle Maneuver	Vulnerable Road User Action	% of Total FSI Crashes*
Changing Lanes	No Improper Action	1.3%
Leaving Traffic Lane	No Improper Action	1.3%
Slowing	Other	1.3%
Straight Ahead	Dart/Dash	16.0%
	Failure to Obey Traffic Signs, Signals, or Officer	9.3%
	Failure to Yield Right-of-Way	22.7%
	In Roadway Improperly	12.0%
	No Improper Action	4.0%
	Other	9.3%
Turning Left	In Roadway Improperly	2.7%
	No Improper Action	4.0%
Turning Right	Failure to Obey Traffic Signs, Signals, or Officer	1.3%
	Failure to Yield Right-of-Way	1.3%
	No Improper Action	5.3%
	Other	1.3%
Other	Other	6.6%
Unknown	Failure to Obey Traffic Signs, Signals, or Officer	1.3%
	Failure to Yield Right-of-Way	2.7%
	In Roadway Improperly	1.3%

*The sum of percentages may not equal exactly 100% because of rounding adjustments.

Table 32 Intersection Related FSI Pedestrian Crashes by Pedestrian Actions and Vehicle Maneuver on State- and County-maintained Roads, 2019-2023

CRASHES SUMMARY BY ROADWAY CHARACTERISTICS

TABLE 33 shows that 4–5 leg intersections make up 81.7% of signalized intersections and are associated with 96% of fatal and serious injury pedestrian crashes, suggesting higher crash risk at more complex, multi-leg intersections.

Number of Legs	3 legs	4 or 5 legs
% Intersections	18.3%	81.7%
Pedestrian Crashes	7 (4%)	170 (96%)

Table 33 Intersection Related FSI Pedestrian Crashes by Number of Intersection Legs on State- and County-maintained Roads, 2019-2023

TABLE 34 indicates that intersections with entering traffic volumes of 60,000 or more represent 13.1% of the network but account for 28.2% of pedestrian crashes. Intersections with ETV between 30,000 and 60,000 are nearly proportional, representing 47% of locations and 45.8% of crashes. Crash risk appears to increase with entering traffic volume, particularly at the highest-volume intersections.

ETV	<= 30K	30K < - ≤ 60K	≥ 60K
% Intersections	39.9%	47.0%	13.1%
Pedestrian Crashes	46 (26%)	81 (45.8%)	50 (28.2%)

Table 34 Intersection Related FSI Pedestrian Crashes by Entering Traffic Volume on State- and County-maintained Roads, 2019-2023

TABLE 35 highlights that intersections where both intersecting roads have six or more lanes account for 3.9% of intersections but 13.6% of crashes, indicating a disproportionate crash risk. Intersections where a 6+ lane road meets a 3-lane or smaller road are the most common configuration (33.4%) and account for a similar share of crashes (32.8%). Crashes are most concentrated at intersections involving wide roads, especially when both intersecting roads are multi-lane facilities.

# of Lanes on Each Approach	>=6 & >=6	>=6 & 4-5	>=6 & <=3	>=6 & odd leg	4-5 & 4-5	4-5 & <=3	4-5 & odd leg	<=3 & <=3	<=3 & odd leg
% Intersections	3.9%	6.4%	33.4%	3.1%	5.2%	30.0%	1.8%	15.8%	0.5%
Pedestrian Crashes	24 (13.6%)	21 (11.9%)	58 (32.8%)	0 (0%)	13 (7.3%)	47 (26.5%)	0 (0%)	13 (7.3%)	1 (0.6%)

Table 35 Intersection Related FSI Pedestrian Crashes by Number of Lanes on Each Approach on State- and County-maintained Roads, 2019-2023

TABLE 36 shows that intersections where both roads have posted speeds of 40–50 MPH make up 17.8% of the network but account for 30.5% of crashes, indicating overrepresentation. Crash concentrations are highest at intersections involving medium-speed roads, particularly when both approaches are in the 40–50 MPH range.

Posted Speed on Each Approach (MPH)	<=35 & odd leg	<=35 & <=35	40-50 & odd leg	40-50 & <=35	40-50 & 40-50	>=55 & <=35	>=55 & >=55	>=55 & 40-50
% Intersections	0.8%	24.8%	4.5%	48.6%	17.8%	1.8%	0.6%	1.0%
Pedestrian Crashes	1 (0.6%)	52 (29.4%)	0 (0%)	70 (39.5%)	54 (30.5%)	0 (0%)	0 (0%)	0 (0%)

Table 36 Intersection Related FSI Pedestrian Crashes by Speed Limit Combination of the Intersecting Roads on State- and County-maintained Roads, 2019-2023

BICYCLE CRASHES

From 2019-2023, there were 255 crashes involving someone riding a bicycle which resulted in a death or serious injury.

FIGURE 18 shows that a majority (61%) of these crashes occurred along segments, with the remaining 39% occurring at intersections. As shown in **TABLE 37**, they are most frequent during the afternoon/evening (3–9 PM, ~41%), but are generally more spread out throughout the daylight hours than the other modes considered.

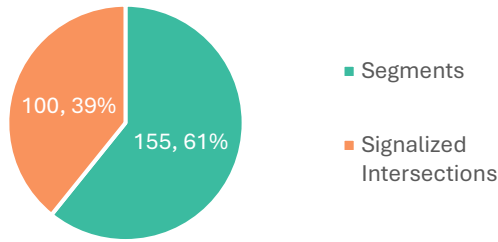


Figure 18 FSI Bicycle Crashes by Network Type on State- and County-maintained Roads, 2019-2023

	12-3 AM	3-6 AM	6-9 AM	9-Noon	Noon-3 PM	3-6 PM	6-9 PM	9-Midnight
Bicycle Crashes	7 (2.7%)	7 (2.7%)	28 (11%)	47 (18.4%)	33 (12.9%)	55 (21.6%)	51 (20%)	27 (10.7%)

Table 37 FSI Bicycle Crashes Summary by Time of Day on State- and County-maintained Roads, 2019-2023

TABLE 38 summarizes fatal and serious injury (FSI) bicycle crashes by reported lighting condition. While most serious injuries occurred during the day (67.9%), fatal crashes were more evenly split between daylight (41.3%) and dark but lighted conditions (39.1%). Combined, these two lighting conditions account for more than 80% of bicycle fatalities. In contrast, dark-not lighted conditions contributed a smaller share of crashes (8.7% of fatalities and 8.1% of serious injuries) but still represent elevated risk due to reduced visibility. These patterns suggest that while daytime exposure leads to more injuries overall, crashes occurring at night under lit conditions are more likely to be fatal.

Reported Lighting Condition	Dark - Lighted	Dark - Not Lighted	Dark - Unknown Lighting	Dawn	Daylight	Dusk	Total
Fatal Crashes	18 (39.1%)	4 (8.7%)	0 (0%)	1 (2.2%)	19 (41.3%)	4 (8.7%)	46
Serious Injury Crashes	30 (14.4%)	17 (8.1%)	1 (0.5%)	6 (2.9%)	142 (67.9%)	13 (6.2%)	209

Table 38 FSI Bicycle Crashes Summary by Reported Lighting Condition on State- and County-maintained Roads, 2019-2023

As with pedestrian crashes, bicycle-involved crash records often lack detail in standard crash type fields, so this analysis utilized the “Vulnerable Road User Action” field from Signal Four Analytics to identify segment and intersection crash trends. This field provides more specific information about the behavior of the person biking at the time of the crash, including whether the person was traveling along the roadway, crossing midblock, riding against traffic, or navigating through an intersection. These details help identify patterns that would otherwise be obscured.

SEGMENT CRASH ANALYSIS

TOP CRASH TYPES

***THE** sum of percentages may not equal exactly 100% because of rounding adjustments.

Table 39 The most common scenario resulting in fatal and serious injury (FSI) crashes involves a driver and person biking traveling in the same direction, with both going straight ahead. These scenarios account for more than 35% of all bicycle-related FSI crashes, and most of them occurred on roads without any dedicated bicycle facility (54%). The most common bicyclist actions in these cases were listed as “Other,” “No Improper Action,” or “Failure to Yield the Right-of-Way.”

Crashes involving drivers turning right or left and a person biking also represent a significant portion of the total (22% and 11.2% of bicycle-involved FSI crashes, respectively), particularly at locations without dedicated infrastructure. These often involve similar bicyclist actions and may point to visibility or yielding conflicts during turning movements.

Although bicycle facilities were present in some crash records, more than half of all fatal and serious injury crashes occurred where no bike facility was recorded. This emphasizes the need to understand how roadway design and the absence of dedicated infrastructure may relate to crash risk, although this relationship does not necessarily determine causality.

Bike Facility	Vehicle Maneuver	Vulnerable Road User Action	% of Total FSI Crashes*
Separated	Straight Ahead	In Roadway Improperly	1.40%
Buffered	Straight Ahead	Failure to Yield ROW	1.40%
		In Roadway Improperly	1.40%
	Turning Right	No Improper Action	1.40%
		Other	1.40%
Colored	Straight Ahead	No Improper Action	1.40%
Designated	Unknown	Other	1.40%
	Straight Ahead	Failure to Yield ROW	1.40%
		Dart/Dash	1.40%
		In Roadway Improperly	1.40%
		Failure to Obey Signals	2.80%
		No Improper Action	4.20%
		Other	8.30%
	Turning Left	Failure to Yield ROW	1.40%
		No Improper Action	2.80%
		Other	1.40%
	Turning Right	Failure to Yield ROW	4.20%
		No Improper Action	2.80%
Sharrow	Straight Ahead	Other	1.40%
	Turning Left	No Improper Action	1.40%
	Turning Right	No Improper Action	1.40%
None	Other	No Improper Action	1.40%
	Overtaking/Passing	Other	1.40%
	Stopped in Traffic	Other	1.40%
	Straight Ahead	Failure to Yield ROW	13.90%
		Dart/Dash	6.90%
		In Roadway Improperly	2.80%
		Failure to Obey Signals	1.40%
		No Improper Action	2.80%
		Other	6.90%
	Turning Left	No Improper Action	2.80%
		Other	1.40%
	Turning Right	Failure to Yield ROW	1.40%
		No Improper Action	6.90%
Other		2.80%	

*The sum of percentages may not equal exactly 100% because of rounding adjustments.

Table 39 Segment Related FSI Bicycle Crashes Summary by Bike Facility, Vehicle Maneuver, and Bicyclist Action on State- and County-maintained Roads, 2019-2023

CRASHES SUMMARY BY ROADWAY CHARACTERISTICS

***THE** total crashes shown in this table are less than the total crashes on the segments because some roadway segments do not have AADT data available.

Table 40 shows that while lower-volume roads ($\leq 20,000$ AADT) make up more than two-thirds of County- and State-maintained roadway mileage, they account for about one-third of bicycle crashes. Moderate- to high-volume roads (20,000–60,000 AADT) comprise a smaller portion of the network (31.5%) but carry a much higher share of crashes (64.4%), indicating a disproportionate risk for people biking.

AADT	$\leq 20,000$	20,000 – 40,000	40,000 – 60,000	$\geq 60,000$
% of Centerline miles with AADT	67.5%	26.0%	5.5%	1.0%
Bicycle Crashes*	47 (32.8%)	60 (42%)	32 (22.4%)	4 (2.8%)

*The total crashes shown in this table are less than the total crashes on the segments because some roadway segments do not have AADT data available.

Table 40 Segment related FSI Bicycle Crash Summary by AADT on State- and County-maintained Roads, 2019-2023

TABLE 41 highlights that bicycle crashes are concentrated on moderate-speed roads (40–50 MPH). These segments make up 31.4% of the roadway network but account for 54.2% of crashes. Conversely, roads with speed limits of 35 MPH or lower make up two-thirds of mileage and less than half of crashes.

Posted Speed Limit	≤ 35 MPH	40-50 MPH	≥ 55 MPH
% of Centerline miles with speed limit	66.5%	31.4%	2.1%
Bicycle Crashes	70 (45.2%)	84 (54.2%)	1 (0.6%)

Table 41 Segment Related FSI Bicycle Crash Summary by Posted Speed Limit on State- and County-maintained Roads, 2019-2023

TABLE 42 shows that bicycle crashes are more likely to occur on wider, multi-lane roads. Roads with 4–7 lanes account for 36.7% of the network but represent more than 70% of bicycle crashes. In contrast, roads with 3 or fewer lanes account for 61.9% of the network and 31.6% of crashes. This suggests that higher-volume, multi-lane roads pose greater risk to people biking.

Number of Lanes	3 or fewer Lanes	4-5 Lanes	6-7 Lanes	8 or more Lanes
% of Centerline miles with # lanes	61.9%	18.5%	18.2%	1.4%
Bicycle Crashes	49 (31.6%)	49 (31.6%)	51 (32.9%)	6 (3.9%)

Table 42 Segment Related FSI Bicycle Crash Summary by Number of Lanes on State- and County-maintained Roads, 2019-2023

INTERSECTION CRASHES

TOP CRASH TYPES

***THE** sum of percentages may not equal exactly 100% because of rounding adjustments.

Table 43 highlights that the most common fatal and serious injury (FSI) crash scenario at intersections involves a vehicle traveling straight while the person biking is reported to *failure to obey traffic signs, signals, or officer* (23.3%) or *failing to yield the right-of-way* (16.3%). These scenarios make up nearly 40% of intersection-related FSI bicycle crashes. Other notable patterns include:

- Turning movements, particularly right turns, are linked to several crash scenarios. Right-turn crashes with “no improper action” by the bicyclist account for 9.3%, and right-turn “other” actions add another 7%.
- Straight-ahead vehicle movements paired with “no improper action” or “other” by the bicyclist account for a combined 16.3%.
- Left-turn crashes are also prevalent, especially where the bicyclist was reported to take no improper action (9.3%).

These trends suggest multiple contributing factors at signalized intersections, including motorist turning behavior, failure to yield, and complex interactions at conflict points.

Vehicle Maneuver	Vulnerable Road User Action	% of Total FSI Crashes*
Straight Ahead	Dart/Dash	2.3%
	Failure to Obey Traffic Signs, Signals, or Officer	23.3%
	Failure to Yield Right-of-Way	16.3%
	In Roadway Improperly	2.3%
	No Improper Action	7.0%
	Other	9.3%
Turning Left	Failure to Yield Right-of-Way	2.3%
	No Improper Action	9.3%
Turning Right	Dart/Dash	2.3%
	Failure to Obey Traffic Signs, Signals, or Officer	2.3%
	Failure to Yield Right-of-Way	2.3%
	No Improper Action	9.3%
	Other	7.0%
Unknown	Failure to Yield Right-of-Way	2.3%
	No Improper Action	2.3%

*The sum of percentages may not equal exactly 100% because of rounding adjustments.

Table 43 Intersection Related FSI Bicycle Crashes by Vehicle Maneuver and Bicyclist Action on State- and County-maintained Roads, 2019-2023

CRASHES SUMMARY BY ROADWAY CHARACTERISTICS

TABLE 44 shows that 4- or 5-leg intersections make up 81.7% of all signalized intersections and account for 87% of bicycle crashes, indicating a modest overrepresentation. These more complex intersections present multiple conflict points for people biking, increasing the risk of crashes.

	3 legs	4 or 5 legs
% Intersections	18.3%	81.7%
Bicycle Crashes	13 (13%)	87 (87%)

Table 44 Intersection Related FSI Bicycle Crashes by Number of Intersection Legs on State- and County-maintained Roads, 2019-2023

TABLE 45 indicates that intersections with Entering Traffic Volumes (ETV) of 60,000 or more represent 13.1% of intersections but 26% of crashes, showing strong overrepresentation. Crashes are concentrated at higher-volume intersections, likely due to increased vehicle exposure and turning conflicts.

ETV	<= 30K	30K < - ≤ 60K	≥ 60K
% Intersections	39.9%	47.0%	13.1%
Bicycle Crashes	24 (24%)	50 (50%)	26 (26%)

Table 45 Intersection Related FSI Bicycle Crashes by Entering Traffic Volume on State- and County-maintained Roads, 2019-2023

TABLE 46 shows that bicycle crashes are concentrated at intersections where wide roads meet narrower ones. However, intersections where a 6+ lane road meets a 4–5 lane road make up 6.4% of locations but account for 14% of crashes, and 6+ lane to 6+ lane intersections make up 3.9% of locations but 13% of crashes. These combinations are clearly overrepresented, highlighting the increased risk for people biking at large, complex intersections.

# of Lanes on Each Approach	>=6 & >=6	>=6 & 4-5	>=6 & <=3	>=6 & odd leg	4-5 & 4-5	4-5 & <=3	4-5 & odd leg	<=3 & <=3	<=3 & odd leg
% Intersections	3.9%	6.4%	33.4%	3.1%	5.2%	30.0%	1.8%	15.8%	0.5%
Bicycle Crashes	13 (13%)	14 (14%)	34 (34%)	1 (1%)	4 (4%)	25 (25%)	1 (1%)	8 (8%)	0 (0%)

Table 46 Intersection Related FSI Bicycle Crashes by Number of Lanes on Each Approach on State- and County-maintained Roads, 2019-2023

TABLE 47 illustrates that intersections involving 40–50 MPH roads are consistently overrepresented in bicycle crashes. Intersections where both roads are 40–50 MPH make up 17.8% of intersections but are associated with 33% of bicycle crashes, suggesting elevated crash risk in these speed environments.

Posted Speed on Each Approach (MPH)	<=35 & odd leg	<=35 & <=35	40-50 & odd leg	40-50 & <=35	40-50 & 40-50	>=55 & <=35	>=55 & >=55	>=55 & 40-50
% Intersections	0.8%	24.8%	4.5%	48.6%	17.8%	1.8%	0.6%	1.0%
Bicycle Crashes	0 (0%)	12 (12%)	2 (2%)	50 (50%)	33 (33%)	1 (1%)	0 (0%)	2 (2%)

Table 47 Intersection Related FSI Bicycle Crashes by Posted Speed on Each Approach on State- and County-maintained Roads, 2019-2023

5. CRASH PROFILES

This section highlights common crash scenarios that lead to fatal and serious injury crashes in Palm Beach County. While the previous chapter focused on recurring crash factors based on overrepresentation in crash data, this chapter takes a closer look at the circumstances and patterns behind those crashes.

For each mode, the analysis identifies typical crash types, behaviors, and roadway conditions such as the speed of the road, number of lanes, or traffic volumes that are often present where FSI crashes occur. While this relationship does not necessarily determine causality, these crash profiles help tell the story behind the numbers and offer insight into how and where to prioritize changes.

VEHICLE CRASHES

This section builds on the crash tree summaries presented earlier by identifying common crash profiles: specific combinations of roadway conditions and driver behavior that are overrepresented in fatal and serious injury crashes. Motor vehicle FSI crashes in Palm Beach County are concentrated in the following main scenarios:

LANE DEPARTURE CRASHES

Lane departure crashes are the top type of vehicle FSI crashes on segments, accounting for 30 % of vehicle FSI crashes on segments. As shown in **FIGURE 19**, these crashes are most common on 6–7 lane divided roadways with posted speeds of 40–50 MPH and AADT between 20K–40K. The top contributing factor is careless or negligent driving (34%), and 52% occur at night, highlighting a potential role for visibility, fatigue, or impairment. Over half of the lane departure crashes happening on these facility types occurred at nighttime.

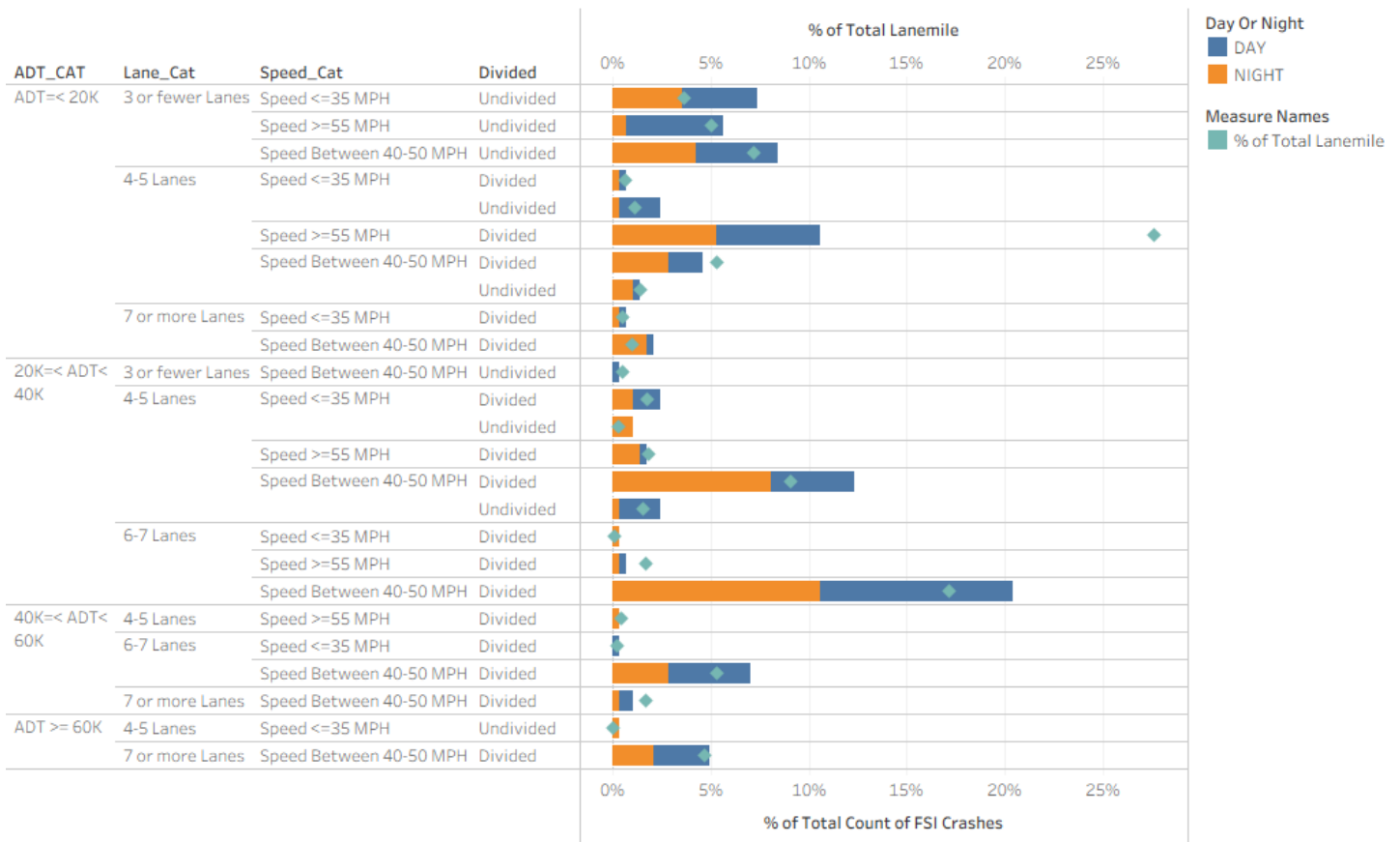


Figure 19 FSI Motor Vehicle Involved Lane Departure Crashes by Road Characteristics on State- and County-maintained Roads, 2019-2023

REAR END CRASHES

Rear end crashes are the second highest type of vehicle FSI crashes on segments, accounting for 20 % of vehicle FSI crashes on segments. As shown in **FIGURE 20**, these crashes typically occur on similar roadway types as fixed object crashes: 6–7 lane, divided roads with posted speeds of 40–50 MPH and AADT between 20K–40K. Careless driving is again the top factor (60%), followed by following too closely (16%). About 19% happen on wet roads, suggesting a role for stopping distance and speed control.

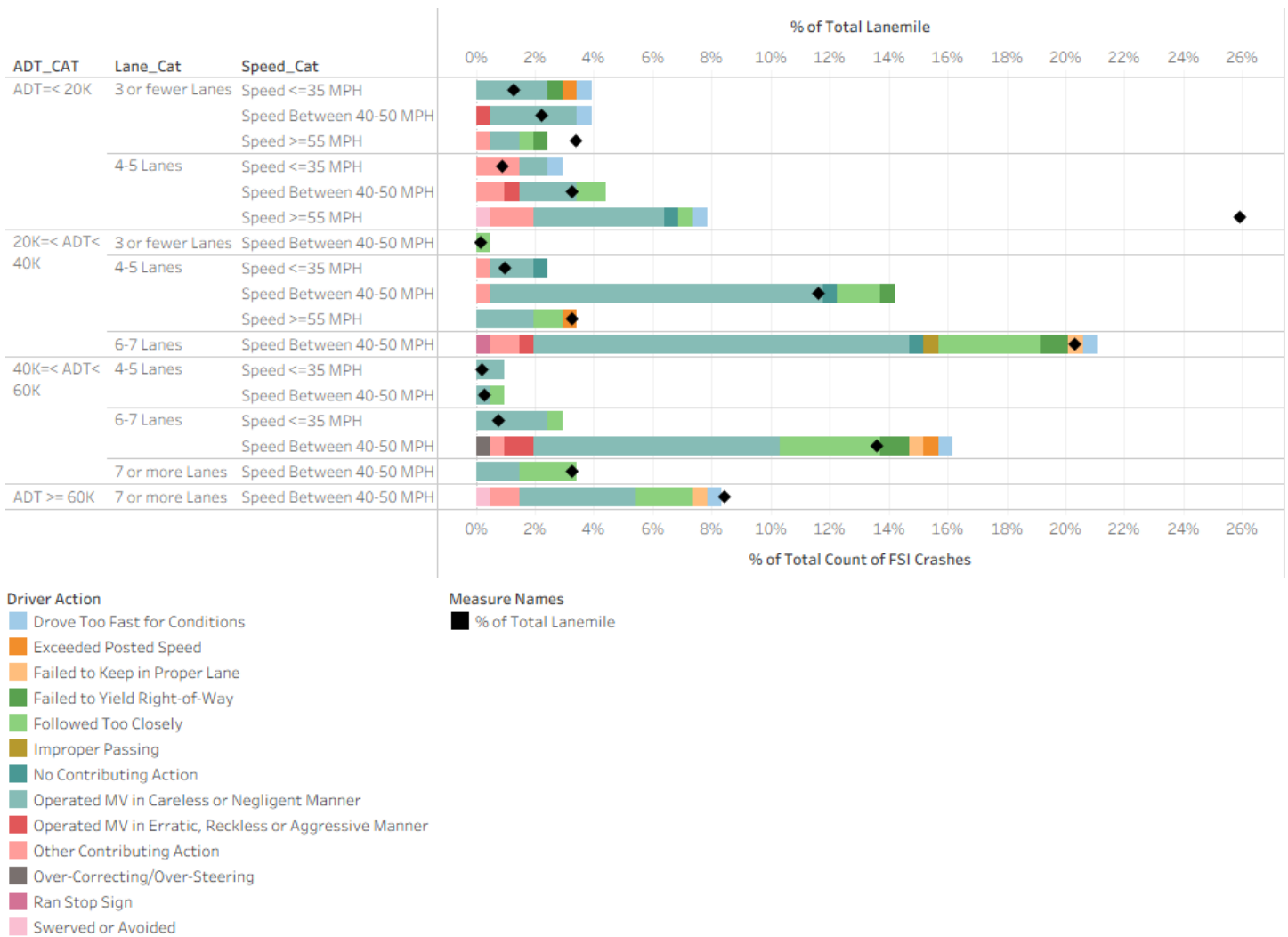


Figure 20 FSI Motor Vehicle Involved Rear End Crashes by Road Characteristics on State- and County-maintained Roads, 2019-2023

Left-turn crashes are the top type of vehicle FSI crashes at signalized intersections, accounting for 40 % of vehicle FSI crashes at intersections. The most common locations are 4-leg signalized intersections where a 6+ lane road (posted 40–50 MPH) intersects a 3-lane or smaller road (posted ≤35 MPH), and the entering traffic volume is between 30K–60K. The driver is typically turning left, and the primary contributing factors are failing to yield the right-of-way (48%) or running a red light (24%).

MOTORCYCLE CRASHES

Motorcycle-involved FSI crashes in Palm Beach County are concentrated in the following main scenarios:

LANE DEPARTURE CRASHES

Lane departure crashes are the top type of motorcycle FSI crashes on segments, accounting for 31% these crashes. As shown in **FIGURE 21**, these crashes are most common on 6–7 lane, divided roadways with AADT between 20K–40K and posted

speeds of 40–50 MPH. Over one-third (34%) involve careless or negligent driving, and more than half (52%) occur at night, often on lighted roadways. These conditions suggest visibility and speed may contribute to crash severity.

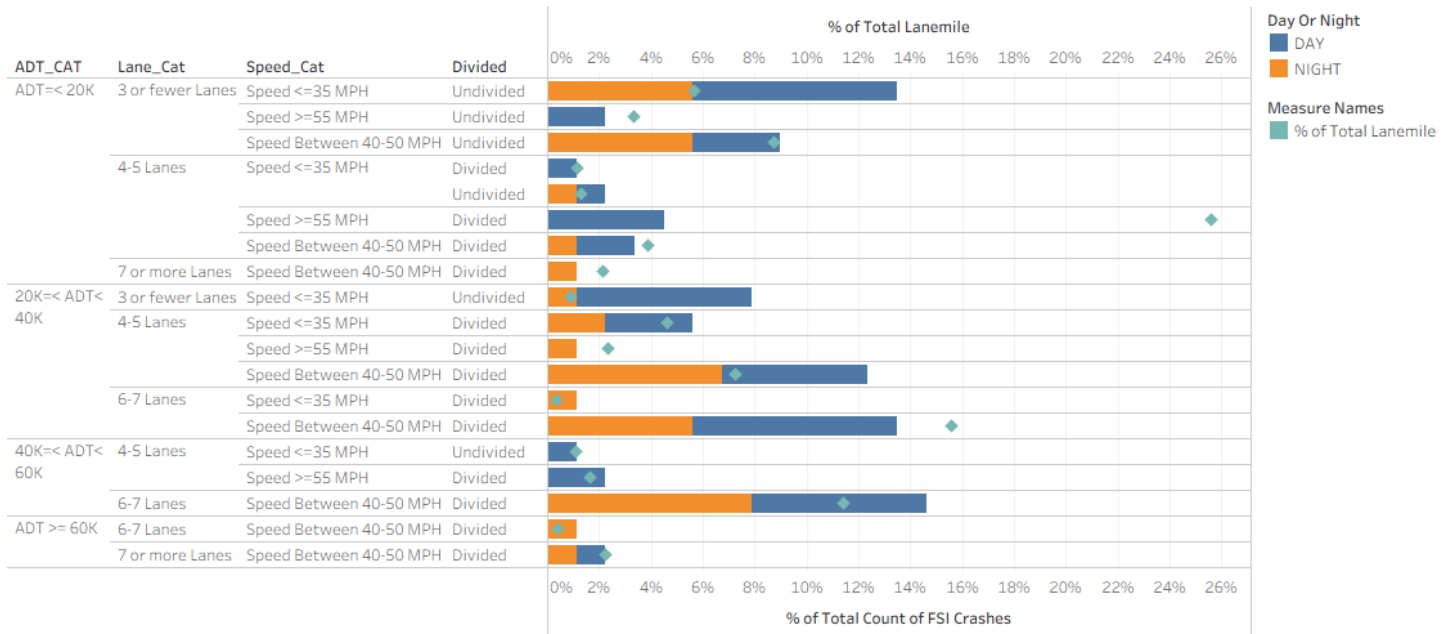


Figure 21 FSI Motorcycle Involved Lane Departure Crashes by Road Characteristics on State- and County-maintained Roads, 2019-2023

LEFT TURN CRASHES

Left-turn crashes are the top type of motorcycle FSI crashes at signalized intersections, accounting for 30 % of motorcycle FSI crashes at intersections. **FIGURE 22** shows that the most common conditions for left-turn crashes involve a 6+ lane divided roadway intersecting with another wide road (often 4–5 or 6+ lanes) at posted speeds of 40–50 MPH. These crashes are heavily concentrated at high-volume intersections and frequently involve failure to yield or visibility issues. About 25–36% occur at night, depending on the facility type.

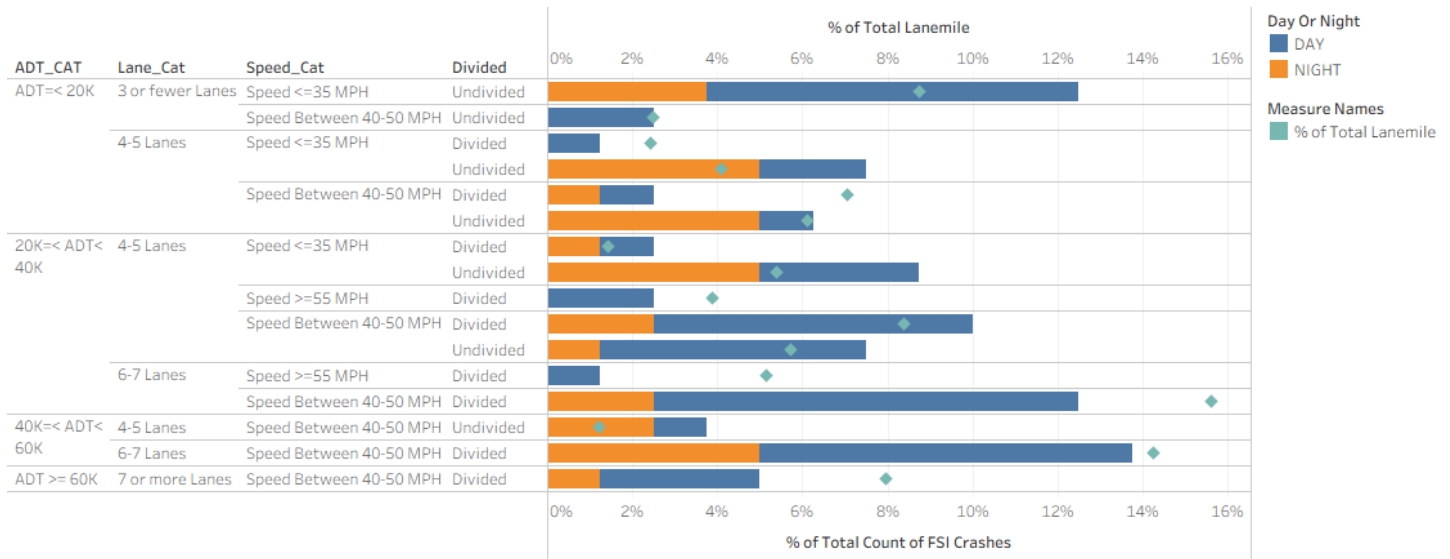


Figure 22 FSI Motorcycle Involved Left Turn Crashes by Road Characteristics on State- and County-maintained Roads, 2019-2023

PEDESTRIAN CRASHES

Pedestrian-involved FSI crashes in Palm Beach County are concentrated in the following main scenarios:

MID-BLOCK CRASHES

Mid-block crossings are the top scenario, accounting for 73% of all pedestrian FSI crashes along segments. These crashes are overrepresented on segments with the following characteristics.

- AADT \leq 20,000, undivided, 4-5 lanes, and speed limits \leq 35 MPH.
- AADT between 20,000–40,000, divided, 4-5 lanes, and speed limits \leq 35 MPH.
- AADT between 20,000–40,000, undivided, 4-5 lanes, speed limits \leq 35 MPH.

As shown in **FIGURE 23**, these conditions often reflect major roadways with wide cross-sections and limited controlled crossings, where pedestrians may attempt to cross between intersections. Most crashes in these scenarios occur at night.

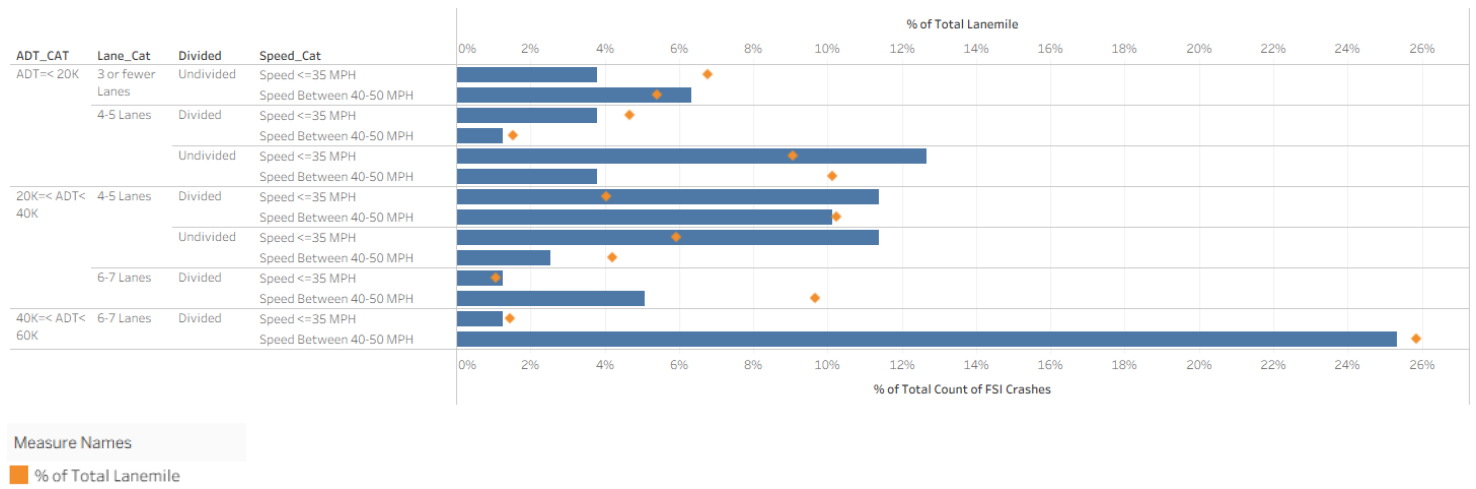


Figure 23 FSI Pedestrian Involved Mid-Block Crossing Crashes by Road Characteristics on State- and County-maintained Roads, 2019-2023

SIGNALIZED INTERSECTIONS

The second most common scenario occurs at signalized intersections, accounting for 25% of pedestrian FSI crashes at signalized intersections. These typically involve pedestrians crossing while vehicles are traveling through the intersection. Crashes are overrepresented at:

- 4- or 5-leg intersections with ETV \geq 60K
- Major roads with 6 or more lanes and speed limits of 40–50 MPH intersecting with minor roads with 3 or fewer lanes and speeds of 35 MPH or less
- Intersections with full crosswalks present, suggesting that marked crossings alone are insufficient without supportive signal phasing, lighting, and other treatments

As shown in **FIGURE 24**, nearly two-thirds of these intersection crashes occurred at night, reinforcing the need to address visibility and lighting at high-volume, multi-lane intersections

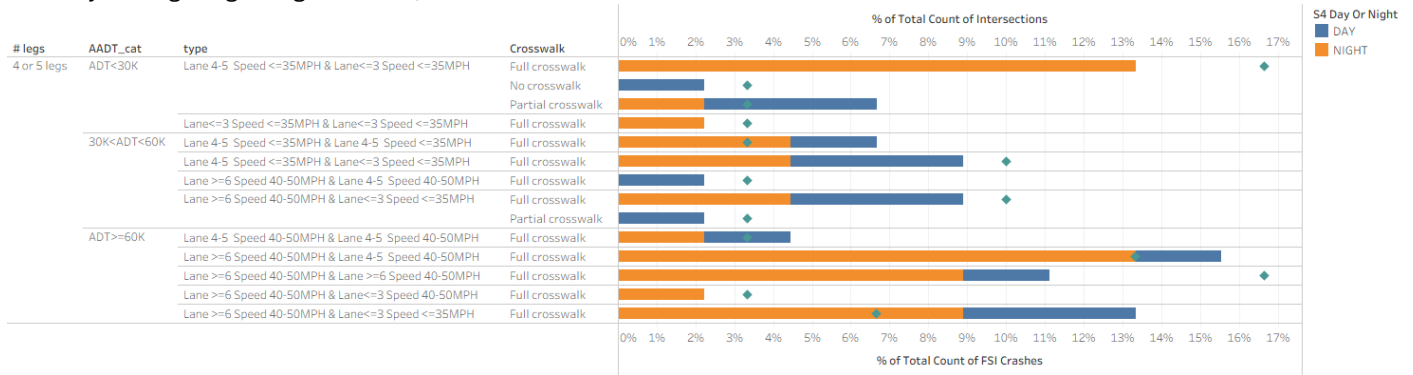


Figure 24 Intersection Related FSI Pedestrian Crashes by Road Characteristics on State- and County-maintained Roads, 2019-2023

BICYCLE CRASHES

Bicycle-involved FSI crashes on segments most commonly occur in locations without dedicated bicycle facilities, particularly where riders must share space with fast-moving or high-volume vehicles. This profile accounts for 13% of all bicycle FSI crashes and is overrepresented on segments with the following characteristics:

- AADT ≤ 20,000, undivided, 4–5 lanes, and speed limits ≤ 35 MPH, no bike facility present
- AADT between 20,000–40,000, undivided, 4–5 lanes, and speed limits ≤ 35 MPH, no bike facility present
- AADT between 20,000–40,000, divided, 6–7 lanes, and speed limits between 40–50 MPH, no bike facility present

As shown in **FIGURE 25**, these crashes frequently occur in wide cross-section environments where roadway conditions do not accommodate people biking, especially in moderate- to high-speed corridors. The presence of high traffic volumes and speeds, combined with the absence of protected infrastructure, are common factors where bicycle FSI crashes occur.

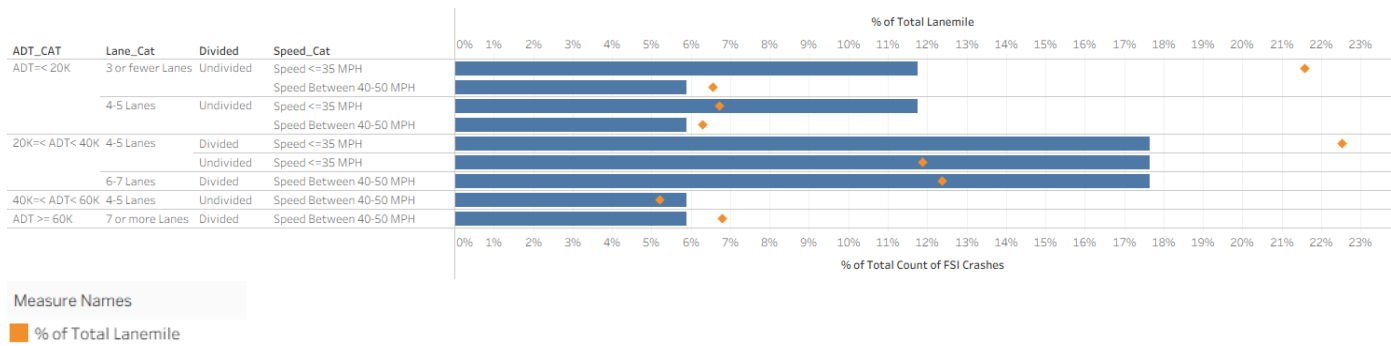


Figure 25 FSI Bicycle Crashes by Road Characteristics on State- and County-maintained Roads, 2019-2023

6. HIGH-INJURY NETWORK

The High-Injury Network (HIN) identifies roadway segments and intersections in Palm Beach County where the most severe crashes occur. It highlights locations with a disproportionate number of fatal and serious injury (FSI) crashes, as well as corridors with a high concentration of pedestrian or bicycle crashes, regardless of severity. The analysis covers all State and County-maintained public roads, excluding limited access highways, within Palm Beach County.

Separate HINs were developed for motor vehicle, pedestrian, bicycle, and motorcycle crashes, considering both segments and intersections. The full methodology for the HIN development can be found in the Methodology Technical Memorandum. Each HIN is based on crash frequency, severity score, frequency rate (normalized by traffic volume) and severity rate (normalized by traffic volume). A crash rate only analysis was also conducted should the County want to understand those findings as a standalone piece of information, as a subset of the multilayered HIN findings.

For roadway segments, all four metrics are averaged to generate a final rank. The top-ranked segments are selected to account for 50% of all segment-related FSI crashes for each mode.

For intersections, the final rank is based on the average of the top two metrics (crash frequency and severity score). Intersections are selected to represent 50% of all intersection-related FSI crashes for each mode.

VEHICLE HIN

The HIN includes 1,005 FSI vehicular crashes, representing 50% of all FSI vehicular crashes on state and county roads as shown in **FIGURE 26**. However, the HIN disproportionately covers only 8% of state roads and 34% of county roads.

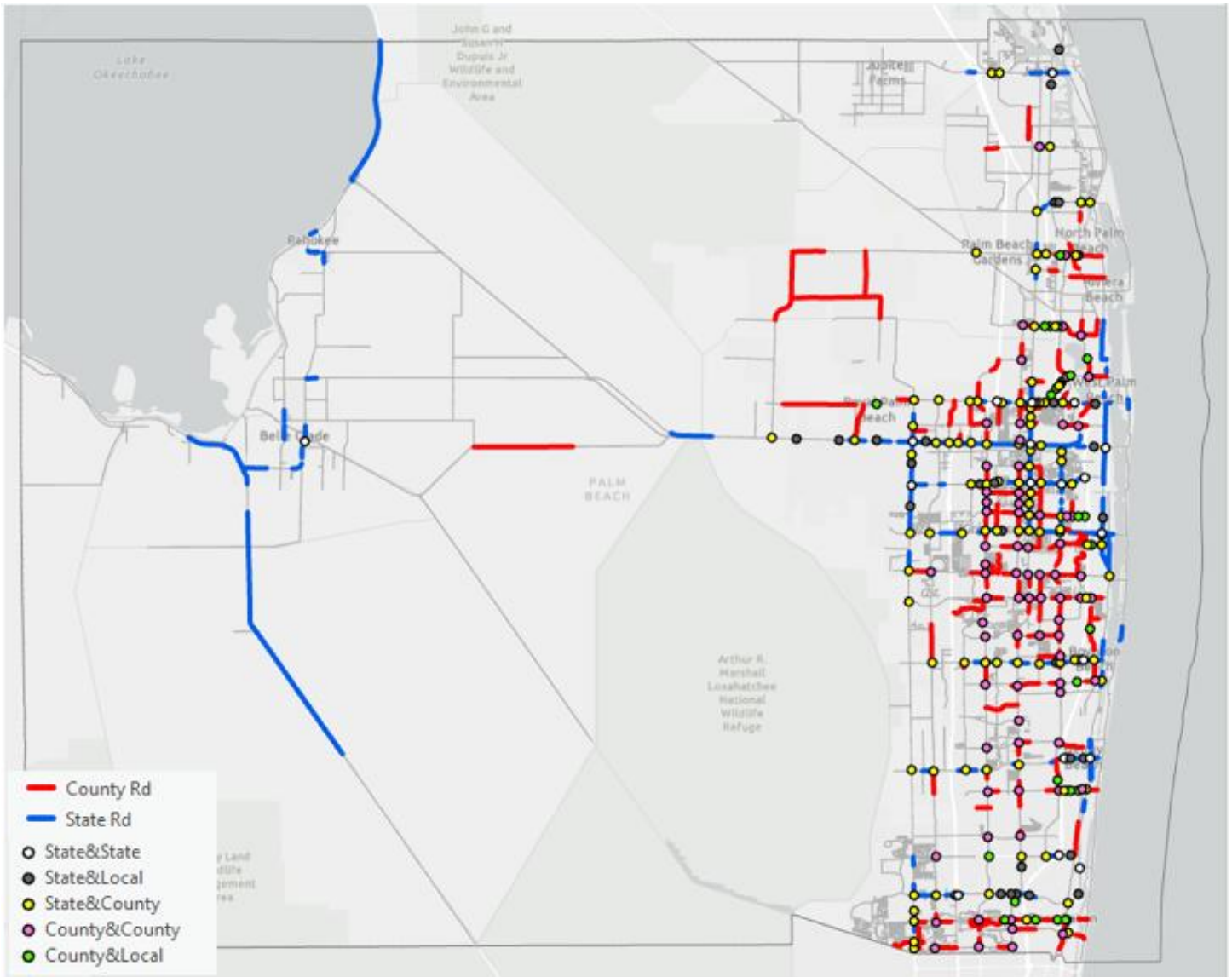


Figure 26 HIN for Motor Vehicle Involved Crashes

MOTORCYCLE HIN

The HIN includes 233 FSI motorcycle involved crashes, representing 50% of all FSI motorcycle involved crashes on state and county roads as shown in **FIGURE 27**. However, the HIN disproportionately covers only 4% of state roads and 11% of county roads.

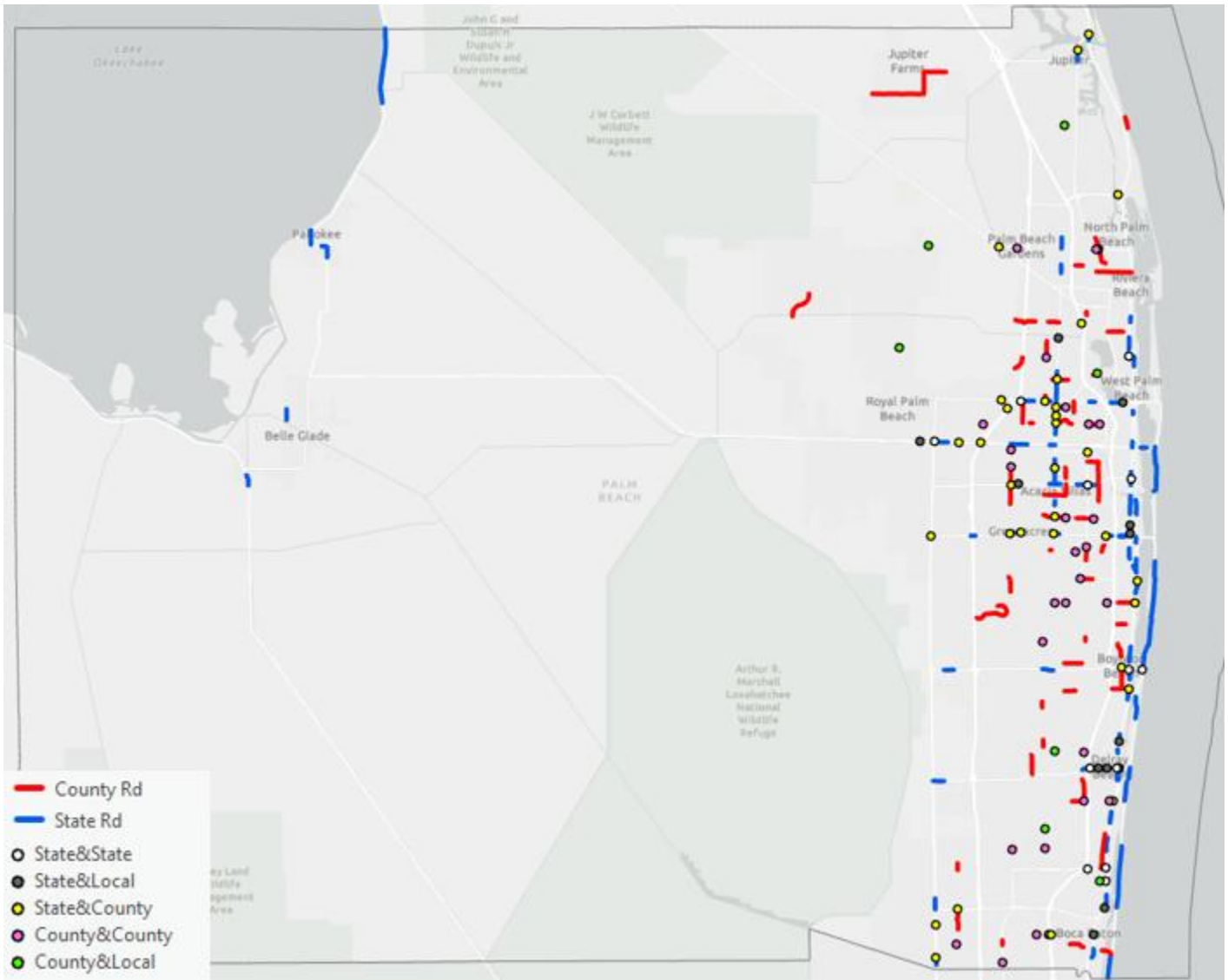


Figure 27 HIN for Motorcycle Involved Crashes

PEDESTRIAN HIN

The HIN includes 229 FSI pedestrian involved crashes, representing 50% of all FSI pedestrian involved crashes on state and county roads as shown in **FIGURE 28**. However, the HIN disproportionately covers only 2% of state roads and 6% of county roads.

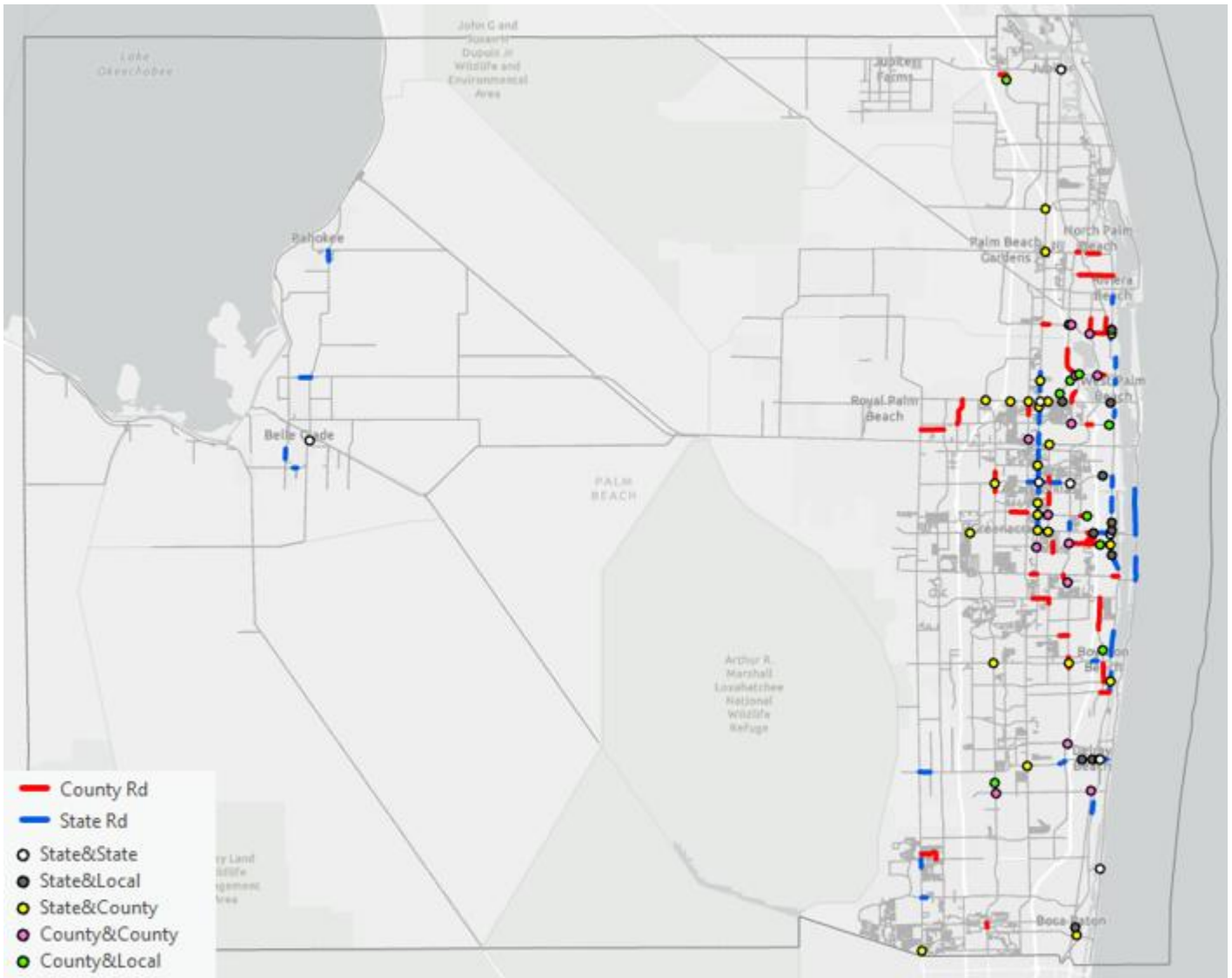


Figure 28 HIN for Pedestrian Involved Crashes

BICYCLE HIN

The HIN includes 132 FSI bicycle involved crashes, representing 50% of all FSI bicycle involved crashes on state and county roads as shown in **FIGURE 29**. However, the HIN disproportionately covers only 2% of state roads and 5% of county roads.

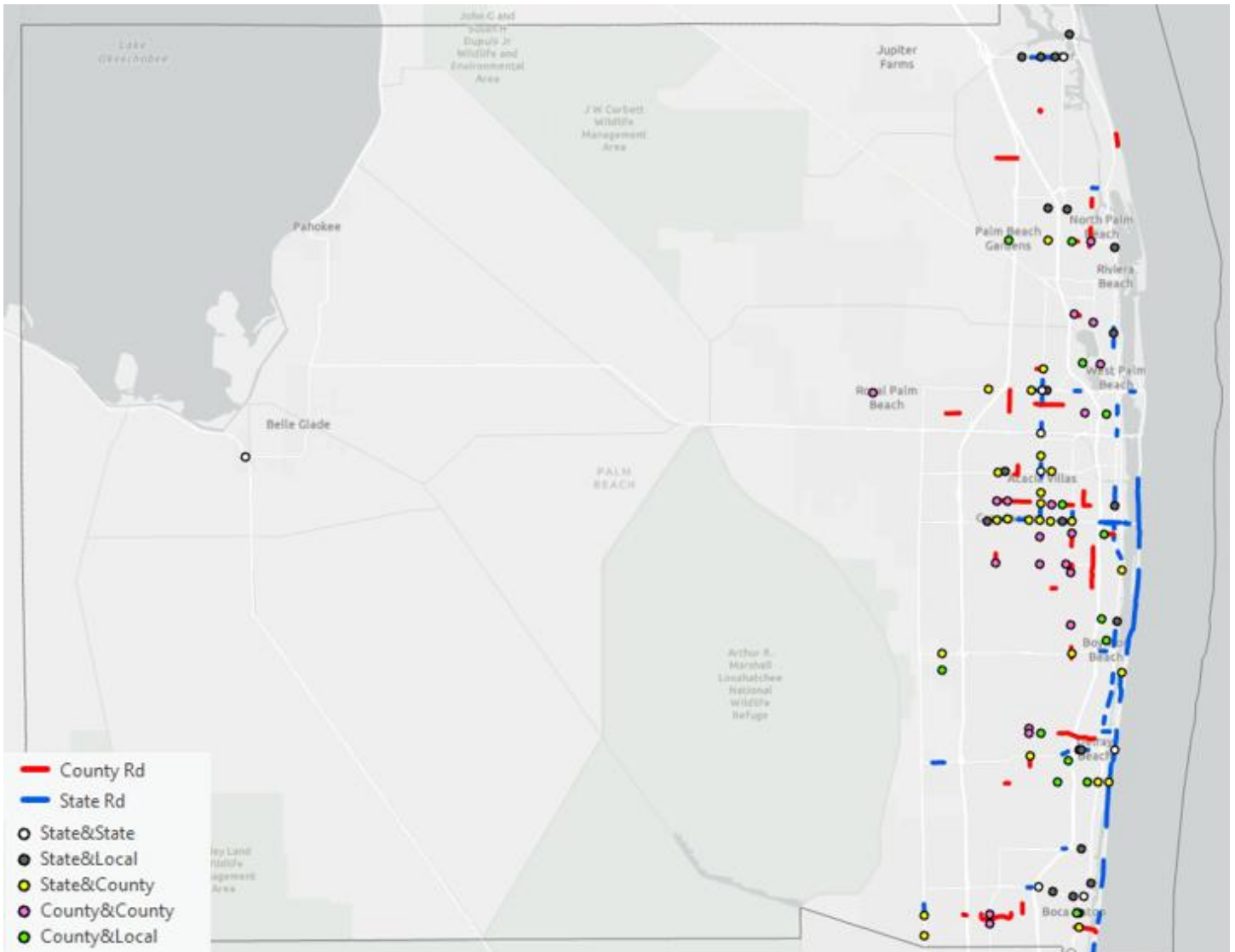


Figure 29 HIN for Bicycle Involved Crashes

7. KEY FINDINGS & STRATEGIC TAKEAWAYS

This section summarizes the key findings from the fatal and serious injury (FSI) crash analysis and highlights common associated factors and roadway characteristics by travel mode. These insights provide a foundation for developing countermeasures that target the most pressing safety challenges in Palm Beach County.

CROSS-MODE TAKEAWAYS

- **Mid-speed, high-volume, multi-lane roads are consistently high-risk.**
 - Across all modes, roads with 40–50 MPH speed limits, AADT between 20,000 and 40,000, and 4 or more lanes are associated with a disproportionate share of fatal and serious injury crashes.
 - These roadways account for a relatively small share of network mileage but represent the majority of severe crashes.
- **Severe crashes are concentrated on a small portion of the network.**
 - High-risk roadway and intersection characteristics are relatively limited in geographic extent but account for the majority of FSI crashes, suggesting the potential for targeted countermeasures to have widespread safety benefits.
- **Intersections with high traffic volumes and wide approaches are hot spots.**
 - Many fatal and serious injury crashes, especially for pedestrians and bicyclists, occur at signalized intersections where 6+ lane roads intersect with 4–5 lane or other wide roads, particularly at locations with ETV \geq 60,000.
- **Lack of crossing opportunities is correlated to pedestrian risk.**
 - A large share of fatal and serious pedestrian crashes occur midblock and far from crosswalks. While crash reports often cite pedestrian "error" such as darting or failure to yield, the data suggest these behaviors may stem from unsafe roadway conditions and missing infrastructure, not simply individual choices.
- **Lighting conditions are correlated with crash severity, especially for vulnerable users.**
 - A significant portion of fatal crashes involving motorcycles, pedestrians, and bicyclists occur in dark, lighted conditions, suggesting a need for more comprehensive lighting and visibility strategies, as well as speed management during nighttime hours.
- **Failure to yield and negligent driving are common contributing factors.**
 - Across all modes, failure to yield right-of-way and general careless or negligent driving are frequently cited as top contributing actions in FSI crashes, reinforcing the importance of roadway design that reduces conflict points and mitigates human error.

MODE-SPECIFIC TAKEAWAYS:

MOTOR VEHICLE

- The most common severe crash types were run-off-road (30%), rear-end (20%), and left-turn (40% of intersection crashes).
- Run-off-road crashes typically involved single vehicles striking fixed objects, especially at night and on 4–7 lane roads with 40–50 MPH speed limits and AADT between 20,000 and 40,000.
- Rear-end crashes occurred most often on high-volume arterials (20K–60K AADT) during daylight hours and were frequently linked to careless driving or following too closely, especially on wet pavement.
- Left-turn crashes occurred predominantly at 4-leg intersections where major roads with 6 or more lanes intersected with 4–5 lane roads, with contributing factors including failure to yield and red-light running.
- Potential systemic countermeasures to be considered may include:
 - Enhanced delineation, lighting, and roadside safety on run-off-road corridors
 - Improved signal timing and visibility, including advance warning and friction treatments
 - Protected left-turn phasing and signal upgrades at large intersections
 - Speed management and access control on wide, high-volume corridors
 - Left turn calming at intersections such as hardened centerlines and median noses

MOTORCYCLE

- Motorcycle crashes were disproportionately fatal, with over half of fatal crashes occurring at night, particularly on lighted roadways.
- The most common crash types were run-off-road/lane departure (31% of segment FSI crashes) and left-turn crashes (30% of intersection FSI crashes), with riders most often hit while traveling straight and another vehicle turned across their path.
- Crashes were concentrated on 4–7 lane roads with 40–50 MPH speed limits and AADT between 20,000 and 40,000.
- High-risk intersections included those where 6+ lane roads intersected with ≤3-lane roads, especially with ETV ≥ 60,000.
- Potential systemic countermeasures to be considered may include:
 - Lighting and curve delineation improvements, including run off prevention (i.e. rumble strips and friction treatments) to reduce nighttime and lane departure crashes
 - Protected turn phasing and advance warning for high-risk intersections
 - Speed reduction strategies and visibility enhancements on key corridors

PEDESTRIAN

- Most FSI pedestrian crashes occurred on 4+ lane roads with 40–50 MPH speed limits and AADT between 20,000 and 40,000.
- Many crashes happened midblock and away from crosswalks (73% of segment FSI crashes), pointing to a need for improved crossing opportunities, not necessarily pedestrian fault.
- Pedestrians were often hit by drivers traveling straight, and crash reports frequently cited failure to yield, dart/dash, or being in the roadway improperly. These patterns are often tied to long distances between safe crossings.
- Intersections with 6+ lane roads and high entering volumes (ETV ≥ 60,000) showed higher crash frequencies.
- Potential systemic countermeasures to be considered may include:
 - High-visibility and midblock crossings at key corridors
 - Improved pedestrian infrastructure and signal spacing improvements
 - Speed management near pedestrian activity centers
 - Median refuges and lighting at crossings
 - Signal timing strategies like leading pedestrian intervals, right turn on red restrictions, and/or flashing yellow arrow – omit phases

BICYCLE

- Severe bicycle crashes were most common on 4–7 lane roads with 40–50 MPH speed limits and AADT between 20,000 and 40,000.
- Many involved riders traveling straight and drivers doing the same, especially where no bike facility was present.
- Frequently cited contributing factors included failure to yield, "other", or unclear causes, suggesting infrastructure gaps and limited driver awareness.
- Crashes were concentrated at intersections where two 40–50 MPH roads or a 40–50 MPH road intersected with a ≤35 MPH road.
- Potential systemic countermeasures to be considered may include:
 - Protected bike lanes and buffered facilities on high speed or volume corridors
 - Signal timing and geometric improvements at high-speed intersections
 - Driver awareness campaigns and signage for shared roadways
 - Intersection designs that reduce exposure and improve visibility