Appendix C

Crash Analysis/HIN Methodology

202 East Spokane Falls Blvd, Ste 303
Spokane, WA 99202
P 800.878.5230

Technical Memorandum

June 19, 2024 Project# 29478

To: Mike Ulrich
Senior Transportation Planner
Spokane Regional Transportation Council

From: Morgan Dean PhD, Chris Bame PE, Wende Wilber PTP

RE: SRTC Regional Safety Action Plan – Task 5.3 Crash Analysis

Key Findings

This report presents a comprehensive look at the fatal and serious injury (FSI) crashes in the Spokane Regional Transportation Council (SRTC) boundary (Spokane County) from 2018 through 2022. This data will be further refined and summarized into a final Regional Safety Action Plan (RSAP).

This Key Findings section summarizes the crash data trends seen in the overall region and in four of the jurisdictions: City of Spokane, Unincorporated Spokane County, City of Spokane Valley, and Airway Heights. Findings related to the remaining five jurisdictions (Liberty Lake, Cheney, Medical Lake, Deer Park, and Fairfield) are located after the descriptive and systemic analyses in the main body of the report. In addition to these key findings, which focus on the characteristics of the crashes, the next step will be to develop the High Injury Network (HIN). This process will identify segments and intersections with historically high numbers of crashes.

CRASH CHARACTERISTIC KEY FINDINGS

Of the fourteen jurisdictions that comprise Spokane County, nine of them have recorded fatal and serious injury crashes within the last full five years of available crash data.

Regional Trends

- Crash Mode
  - FSI crashes are increasing, particularly pedestrian, vehicle-only, and motorcycle crashes.
  - Pedestrian crashes occur more often in the evening hours and in fall/winter months (when good lighting conditions are compromised).
  - High school and college-aged bicyclists are at an increased risk of being involved in an FSI crash than pedestrians, drivers, or motorcyclists in this age range.
- Crash Type
  - Run-off-road crashes, pedestrian crashes, motorcycle crashes, angle crashes occur most often.
- Crash Factors
  - A higher proportion of pedestrian crashes occurred in wet conditions, compared to other crash modes.

  - Speeding, distracted drivers, and impaired persons all contribute to approximately 20% of FSI crashes. Distracted driving disproportionately affects pedestrians while speeding disproportionately affects motorcyclists.
- Crash Location
  - 80% of the region's FSI crashes occur in the City of Spokane and Unincorporated Spokane County.
  - Most crashes occur on streets owned by cities (likely related to network composition).

City of Spokane

- Crash Mode
  - 70% of the region's pedestrian and bicyclist crashes occurred in the City of Spokane.
  - 57% of the region's FSI crashes involving a bicyclist younger than 20 years old occurred in the City of Spokane.
- Crash Factors
  - Distracted driving was the most common contributing circumstance in the City of Spokane's FSI crashes, often contributing to more than 20 FSI crashes per year.
  - 41% of the region's crashes involving an impaired person occurred in the City of Spokane.
  - Crashes were more likely to occur in wet conditions, compared to the overall region.

Unincorporated Spokane County

- Crash Mode
  - 21% of the region's FSI vehicle-only crashes are in Unincorporated Spokane County. Vehicle-only crashes account for 63% of this area's FSI crashes.
  - In recent years, FSI motorcycle crashes have increased.
- Crash Type
  - 37% of FSI run-off-road crashes are in Unincorporated Spokane County. Within these areas, run-off-road crashes are responsible for 46% of the serious injury crashes.
  - Lane departure crashes more than tripled from 2021 to 2022.
- Crash Factors
  - 47% of the lane and road departure crashes occurred in daylight conditions. This percentage is lower when looking at the region as a whole, indicating there are factors besides lighting that are contributing to these crashes in Unincorporated Spokane County.
  - Distracted driving has decreased, but speeding has increased and has become the most common contributing factor to FSI crashes. Impaired driving also increased every year from 2019 to 2021.
  - Crashes were more likely to occur in wet/icy/snowy/slushy conditions, compared to the overall region.

Unincorporated Spokane County: WSDOT Facilities

- Crash Mode
  - 11% of the region's FSI vehicle-only crashes are in Unincorporated Spokane County. Vehicle-only crashes account for 77% of this area's FSI crashes.
  - In recent years, FSI motorcycle crashes have increased.

- Crash Type
    - 14% of FSI run-off-road crashes are in Unincorporated Spokane County WSDOT facilities. Within these areas, run-off-road crashes are responsible for 25% of the fatal crashes and 34% of the serious injury crashes.
    - FSI motorcycle crashes are more common than FSI pedestrian crashes within this jurisdiction.
- Crash Factors
    - 53% of the lane and road departure crashes occurred in daylight conditions. This percentage is lower when looking at the region as a whole, indicating there are factors besides lighting that are contributing to these crashes in Unincorporated Spokane County WSDOT facilities.
    - 2022 yielded a decrease in most human behavior contributing circumstances. However, drug impaired driving has been increasing steadily since 2018.
    - Crashes were more likely to occur in wet/icy/snowy/slushy conditions, compared to the overall region.

City of Spokane Valley

- Crash Mode
    - 29% of FSI crashes involving a bicyclist younger than 20 years old are in the City of Spokane Valley.
    - FSI motorcycle crashes have been increasing since 2018 and were more common than pedestrian crashes from 2019 to 2022. Motorcycle crashes comprised 34% of fatal crashes and 18% of serious injury crashes.
- Crash Factors
    - 25% of FSI impaired crashes are in the City of Spokane Valley. From 2021 to 2022, the number of impairment crashes almost doubled.
    - 56% of the lane and road departure crashes occurred in daylight conditions. This percentage is lower when looking at the region as a whole, indicating there are factors besides lighting that are contributing to these crashes in Spokane Valley.

City of Airway Heights

- Crash Mode
    - Pedestrian and vehicle-only FSI crashes are occurring at the same frequency in Airway Heights. Over the last five years, there were eight pedestrians and six vehicle-only crashes. Pedestrian crashes were more common during the fall and winter months, on weekdays, and at night.
- Crash Type
    - Three of the six vehicle-only crashes were angle crashes.
    - 12 of the 17 crashes occurred on city streets and eight occurred on roadway segments.
- Crash Factors
    - Of the 17 FSI crashes, 11 had contributing factors related to human behavior. Of these 11 crashes, seven involved distracted driving.
    - Distracted driving had the largest impact on pedestrians, affecting three of the five pedestrian crashes.

NETWORK-BASED SYSTEMIC KEY FINDINGS

Emphasis areas are identified from the systemic analysis include:

- Collectors, arterials, and highways in commercial/mixed-use land uses that have 3 or more lanes and posted speeds of 30 mph or higher.
- Collectors, arterials, and highways in open space/agricultural land uses that have posted speeds of 45 mph or higher.

Emphasis areas will be refined in tandem with the development of the High Injury Network and feedback from local jurisdictions.

Table of Contents

Key Findings 1
Crash Characteristic Key Findings 1
Network-Based Systemic Key Findings 4
Introduction 7
Crash Analysis Overview 7
Role in Achieving the RSAP Vision/Goals 8
Crash Analysis Dataset 8
Crashes Considered 8
Crash Data Cleaning and Elements Used 8
Descriptive Crash Analysis 10
Regional Crash Trends 10
Crash Characteristics 10
Human Factors/Driver Behavior 29
Maps of Crashes for Descriptive Crash Analysis 37
City of Spokane Crash Trends 50
Crash Characteristics 50
Human Factors/Driver Behavior 61
Maps of Crashes for Descriptive Crash Analysis 65
Unincorporated Spokane County Crash Trends (Excluding WSDOT Facilities) 78
Crash Characteristics 78
Human Factors/Driver Behavior 89
Unincorporated Spokane County Crash Trends: WSDOT Facilities 93
Crash Characteristics 93
Human Factors/Driver Behavior 104
City of Spokane Valley Crash Trends 108
Crash Characteristics 108
Human Factors/Driver Behavior 120
Maps of Crashes for Descriptive Crash Analysis 124
Airway Heights Crash Trends 137
Crash Characteristics 139
Human Factors/Driver Behavior 143
Crash Analysis in Areas with Low Crash Rates 145
Liberty Lake Crash Trends 146

Cheney Crash Trends 148
Medical Lake Crash Trends 150
Deer Park Crash Trends 152
Fairfield Crash Trends 154
Systemic Crash Analysis 156
Crash Characteristic Based Analysis 156
Posted Speed Analysis 156
Lighting Conditions Analysis 160
Network Based Analysis 166
Functional Classification 167
Number of Lanes 168
Posted Speed 171
Land Use 173
Combination of Factors 173
High Injury Network Methodology 176
Summary and Next Steps 177
Appendix A – Crash Data Selection and Analysis 178
Appendix B – Data Gaps 183

Introduction

In recent years, nationwide, fatal and serious traffic (FSI) crash counts are increasing. Of particular concern are pedestrian and bicyclist crashes which collectively comprise approximately 20% of the nation's annual fatalities and increased by 17% between 2019 and 2021. To address these issues, the USDOT has adopted a Safe System approach through the National Roadway Safety Strategy (NRSS). The Safe System and NRSS framework rely on a holistic approach to protecting all road users and, eventually, eliminating all serious and fatal crashes.

Spokane County, like the nation, is experiencing increases in FSI crash frequency, particularly for vulnerable populations, such as pedestrians and bicyclists. In 2022, Spokane County had the highest rate of fatal and serious pedestrian crashes in the state as reported by the Washington Traffic Safety Commission (WTSC). At the state level, Washington State DOT (WSDOT) is working to combat these concerning trends by upholding a Target Zero goal of zero fatal and serious crashes by the year 2030. The Spokane Regional Transportation Council (SRTC) is taking action to support this goal through the development of a Regional Safety Action Plan (RSAP). A key component of the RSAP is the analysis of existing conditions and historical trends to assess the baseline number of FSI crashes across the County and within the 14 jurisdictions.

CRASH ANALYSIS OVERVIEW

This analysis is comprised of three sub-analyses: the descriptive crash analysis, the systemic crash analysis, and the high injury network analysis.

Descriptive Crash Analysis: Identifies trends, location characteristics, and contributing factors that most commonly occur in the regional crash data. This includes the analysis of crash mode and severity, when crashes occur, where crashes occur, and human factors/driver behavior trends.

Systemic Safety Analysis: Identifies characteristics across the regional network that correlate with FSI crashes for each mode, even if the crashes are not geographically concentrated. These characteristics include roadway features, land use context, and external conditions (e.g., lighting and road surface conditions).

Equity Analysis: Identifies disadvantaged and historically underserved communities and how they are impacted by crashes. This is still being developed, however, initial mapping is included in Appendix B.

High Injury Network (HIN): The HIN is currently being completed. The HIN will identify the roadway segments and intersections for the region and within each of the 14 subregions with the highest number of historic crashes. The HIN will be used in conjunction with the descriptive crash analysis and the systemic safety analysis to support the prioritization of projects and policies to help achieve the target of zero fatal and serious injury crashes.

ROLE IN ACHIEVING THE RSAP VISION/GOALS

It is through this multi-faceted and comprehensive analysis that the SRTC RSAP will be a strong candidate for implementation grants, which require the following conditions to be met:

Analysis of **existing conditions** and **historical trends** to baseline the level of crashes involving fatalities and serious injuries across a jurisdiction, locality, Tribe, or region.

Analysis of the **location** where there are crashes, the **severity**, as well as **contributing factors** and **crash types**.

Analysis of **systemic and specific safety needs** is also performed, as needed (e.g., high risk road features, specific safety needs of relevant road users).

A **geospatial** identification (geographic or locational data using maps) of higher risk locations.

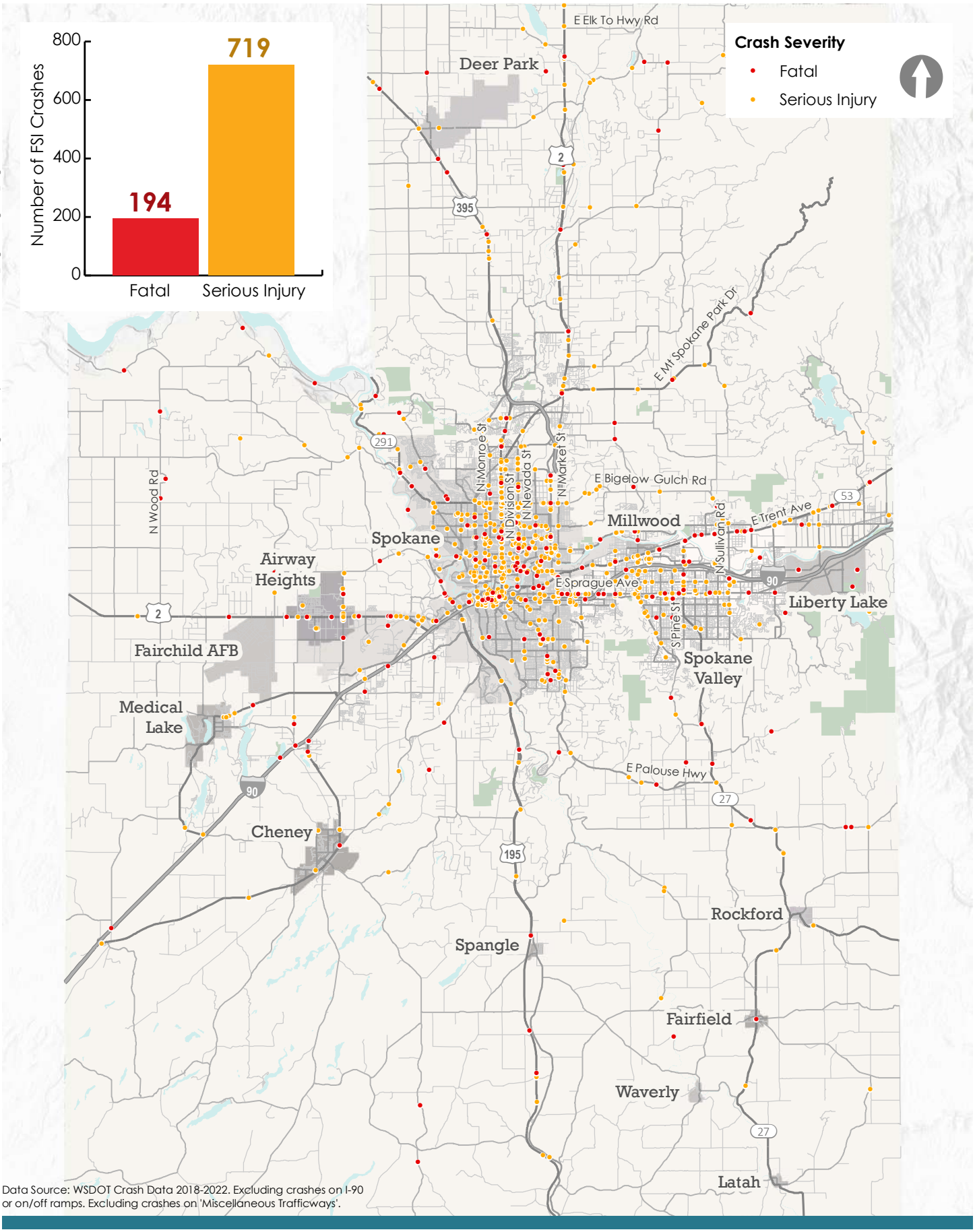
Crash Analysis Dataset

CRASHES CONSIDERED

The crash data used to conduct the analysis was provided by WSDOT. SRTC performed some data cleaning before providing the data to the project team. The project team applied additional data filtering criteria to assess crash pattern trends in relation to the vision and goals of the RSAP (Appendix A – Table 27). The final dataset contained 913 serious and fatal injury crashes in the Spokane Region. The 913 analyzed crashes are mapped in Figure 1.

CRASH DATA CLEANING AND ELEMENTS USED

A variety of data elements provided in the WSDOT crash data were used to produce the crash data analysis results. For some of these elements, further data cleaning and data reduction was done. Appendix A includes a complete list of the analyzed crash characteristics presented in the analysis, the WSDOT elements used to define the crash characteristics, and notes on any data cleaning/reduction.



Data Source: WSDOT Crash Data 2018-2022. Excluding crashes on I-90 or on/off ramps. Excluding crashes on 'Miscellaneous Trafficways'.

SRTC SAFETY ACTION PLAN

Figure 1

Fatal and Serious Injury Crashes

Descriptive Crash Analysis

The descriptive crash analysis identifies trends, location characteristics, and contributing factors that most commonly occur in the regional crash data. This includes the analysis of crash mode and severity, when crashes occur, where crashes occur, and human factors/driver behavior trends. The descriptive crash analysis is completed for the overall region and by jurisdiction. Crashes are analyzed according to the jurisdiction recorded in the crash report.

REGIONAL CRASH TRENDS

Crash Characteristics

The total number of crashes, when counting by mode (Table 1), is 918, which is five more than the 913 tallied by city. This is because five of the FSI crashes included multiple different vulnerable road user types (bicyclist, motorcycle, pedestrian) and so was counted in more than one mode category. A more detailed breakdown of the number of fatal and serious injury crashes by city, mode, and severity is in Table 2. The crashes that occurred in Unincorporated Spokane County have been separated into two groups and analyzed independently: crashes that occurred on county roads and crashes that occurred on WSDOT facilities (state routes). This separation was done to account for differences in agency responsibility: within the Unincorporated County, WSDOT assumes greater responsibility for state routes, while the County maintains responsibility over County roads. For other communities with populations less than 25,000, the breakdown of state versus county versus local roads can be found in the table provided in the jurisdiction's report section.

The FSI crashes by mode are mapped in Figure 2 and Figure 3. Several jurisdictions had no FSI crashes between 2018 and 2022. Facilities with risk factors for FSI crashes within these jurisdictions were still considered for systemic treatments identified through this plan, to minimize the risk for future FSI crashes.

Table 1. Summary of Fatal and Serious Injury Crashes by City and Mode (2018 – 2022)

City	Bicyclist	Motorcycle	Pedestrian	Vehicle-Only	Total
City of Spokane	36	95	151	197	479
Spokane Valley	12	40	30	73	155
Unincorporated (Excludes State Routes)	6	35	16	98	155
Unincorporated: WSDOT Facilities	2	19	2	78	101
Airway Heights	1	2	8	6	17
Liberty Lake	0	1	1	2	4
Cheney	0	0	0	3	3
Medical Lake	0	0	0	2	2
Deer Park	0	1	0	0	1
Fairfield	0	0	0	1	1
Millwood	No Fatal or Serious Injury Crashes				
Rockford					
Latah					
Spangle					
Waverly					
Total	**57**	**193**	**208**	**460**	**918**

Table 2. Summary of Fatal and Serious Injury Crashes by City, Mode, and Severity (2018 – 2022)

City	Bicyclist		Motorcycle		Pedestrian		Vehicle-Only		Total		Total
	F	S	F	S	F	S	F	S	F	S	
City of Spokane	1	35	17	78	28	123	24	173	70	409	**479**
Spokane Valley	0	12	12	28	7	23	13	60	32	124	**155**
Unincorporated (Excludes State Routes)	0	6	7	28	7	9	35	63	49	106	**155**
Unincorporated: WSDOT	2	0	6	13	0	2	28	50	36	65	**101**
Airway Heights	0	1	0	2	2	6	1	5	3	14	**17**
Liberty Lake	0	0	1	0	1	0	1	1	3	1	**4**
Cheney	0	0	0	0	0	0	1	2	1	2	**3**
Medical Lake	0	0	0	0	0	0	0	2	0	2	**2**
Deer Park	0	0	0	1	0	0	0	0	0	1	**1**
Fairfield	0	0	0	0	0	0	1	0	1	0	**1**
Total (Severity, Mode)	**3**	**54**	**43**	**150**	**45**	**163**	**104**	**356**	**195**	**724**	**918**
Total (All)	**57**		**193**		**208**		**460**		**918**		**--**

2023 FSI CRASH DATA

2023 FSI crash data was recently made available by WSDOT (Table 3). The list of jurisdictions with recorded FSI crashes in 2023 versus from 2018 through 2022 differ by two cities: In 2023, Fairfield had zero FSI crashes (one crash 2018 – 2022), while Millwood had one FSI crash (zero crashes 2018 – 2022). Table 4 provides a summary of the number of crashes by mode in 2023 and compares the data to the 2022 frequencies. While total FSI crashes went down, the number of **pedestrian and bicyclist crashes increased**.

Table 3. Summary of Fatal and Serious Injury Crashes by City, Mode, and Severity (2023)

City	Bicyclist		Motorcycle		Pedestrian		Vehicle-Only		Total		Total
	F	S	F	S	F	S	F	S	F	S	
Spokane	1	8	3	24	9	32	4	43	17	107	**124**
Spokane Valley	0	5	3	11	5	9	1	15	9	40	**49**
Unincorporated (Excludes State Routes)	1	3	0	6	4	1	4	22	9	32	**41**
Unincorporated: WSDOT	1	1	4	3	0	2	7	7	12	13	**25**
Cheney	0	0	0	1	0	2	0	1	0	4	**4**
Liberty Lake	0	0	0	1	2	0	0	1	2	2	**4**
Airway Heights	0	0	0	0	0	1	0	1	0	2	**2**
Deer Park	0	0	1	0	0	0	0	1	1	1	**2**
Medical Lake	0	0	0	0	0	0	0	1	0	1	**1**
Millwood	0	0	0	0	0	1	0	0	0	1	**1**
Total (Severity, Mode)	**3**	**17**	**11**	**46**	**20**	**48**	**16**	**92**	**50**	**203**	**253**
Total (All)	**20**		**57**		**68**		**108**		**253**		**--**

Table 4. Summary of 2023 FSI Crash Data in SRTC

FSI Crash Mode	2022	2023	Frequency Change From 2022	Percent Change From 2022
All	221	**253**	↑ **32**	↑ 14.5%
Vehicle-Only	112	108	↓ 4	↓ 3.6%
Motorcycle	52	**57**	↑ **5**	↑ **9.6%**
Pedestrian	46	**68**	↑ **22**	↑ **47.8%**
Bicyclist	11	**20**	↑ **9**	↑ **81.8%**

FATALITY RATE

Fatality rate describes the number of fatalities per 100,000 people in a population. Fatality rate was computed for Spokane County and for the seven jurisdictions that had traffic fatalities from 2018 to 2022. The population for each location was obtained from the 2020 American Community Survey 5-Year Estimates Data Profiles. The number of fatalities was obtained from WSDOT data using the 'TOTAL FATALITIES' data element.

Table 5. Annual Fatalities Per 100,000 Persons for Jurisdictions in SRTC

Location	Fatalities (2018 – 2022)	Average Annual Fatalities	2020 Population (ACS)	Annual Fatalities Per 100,000 Persons
Spokane County	197.0	39.4	513,402	7.7
Spokane	71.0	14.2	219,185	6.5
Spokane Valley	33.0	6.6	99,275	6.7
Unincorporated	85.0	17	162,736	10.5
Airway Heights	3.0	0.6	8,885	6.8
Cheney	1.0	0.2	12,455	1.6
Fairfield	1.0	0.2	485	41.2
Liberty Lake	3.0	0.6	10,381	5.8

CRASH MODE AND SEVERITY: LONG-TERM TRENDS

Crash mode describes the road user types involved in the crash. Severity refers to the level of injury sustained by a road user due to a crash. This section, unlike the sections that follow it, track crash trends over the last decade: 2013 through 2022. These long-term trends provide an overview of how safety has changed in the region over time. The following FSI crash trends were observed in the region's crash data:

Crash Mode Trends

- The number of **FSI crashes has been increasing** over the last decade (Exhibit 1 and Exhibit 2) The number of annual serious injury crashes has been increasing steadily since 2019, while the number of fatal crashes increased from 2019 to 2021 and saw a dip in 2022.
- **Vehicle-only** crashes were responsible for approximately 50% of the annual fatal and serious crashes (Exhibit 3). **Motorcycle** crashes were responsible for approximately 20% of the annual FSI crashes, a percentage which is increasing.
- Prior to 2020, the number of FSI **vehicle-only** crashes was decreasing. In recent years, the number of FSI vehicle-only crashes has largely increased. Similarly, since 2021, the number of FSI **motorcycle** crashes has doubled from earlier years.
- Like the total number of FSI crashes, FSI **pedestrian** crashes have been increasing throughout the last decade (Exhibit 3). Similarly, while **bicycle** crash frequency peaked between 2016 and 2019, the frequency of bicycle crashes in recent years is greater than it was from 2013 to 2015.

Relative Frequency Trends

- **Pedestrians, bicyclists, and motorcyclists are overrepresented in FSI crashes**. This is observed when comparing all crashes to FSI crashes by crash mode. For example, vehicle-only crashes make up 93% of all crashes, but only half of all FSI crashes. Pedestrian crashes show the opposite trend, as they comprise only 3% of all crashes yet comprise 23% of FSI crashes. This trend highlights the difference in risk of serious or fatal injury between vehicle occupants and more vulnerable road users.
- FSI **pedestrian** crashes have a higher frequency than bicyclist crashes which may be related to mode share distribution.

Exhibit 1. Fatal and Serious Injury Crashes by Year and Mode in SRTC (2013 – 2022)

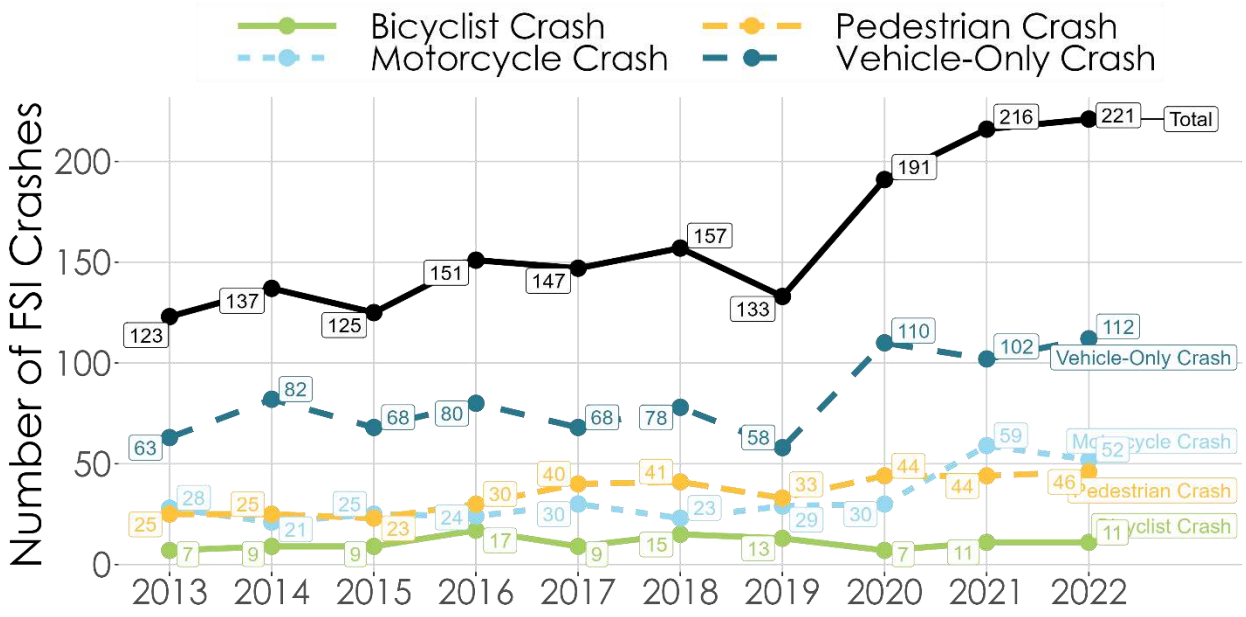


Exhibit 2. Fatal and Serious Injury Crashes by Year and Severity in SRTC (2013 – 2022)

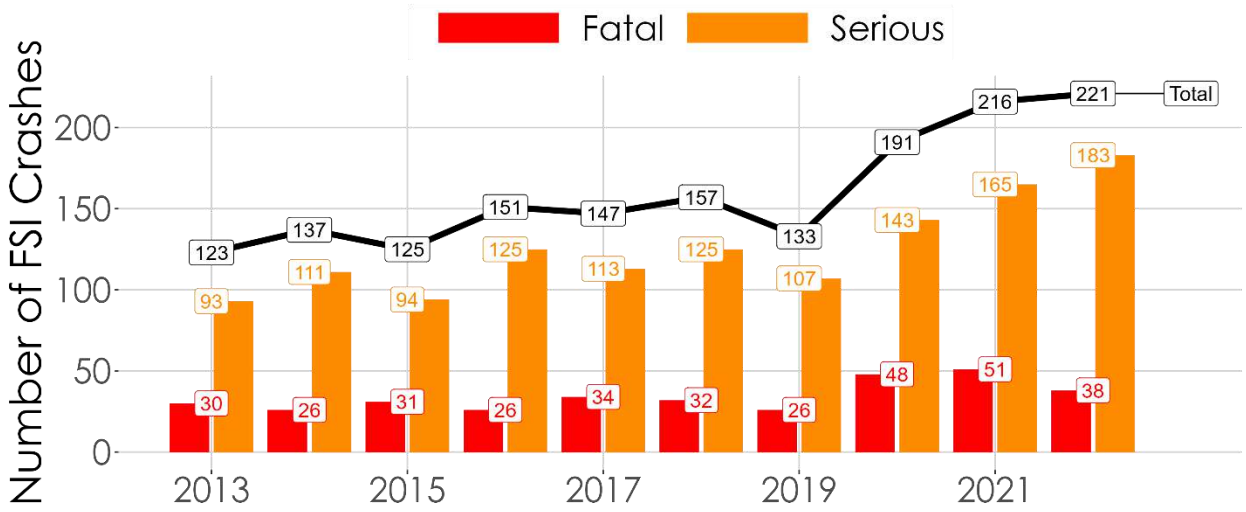
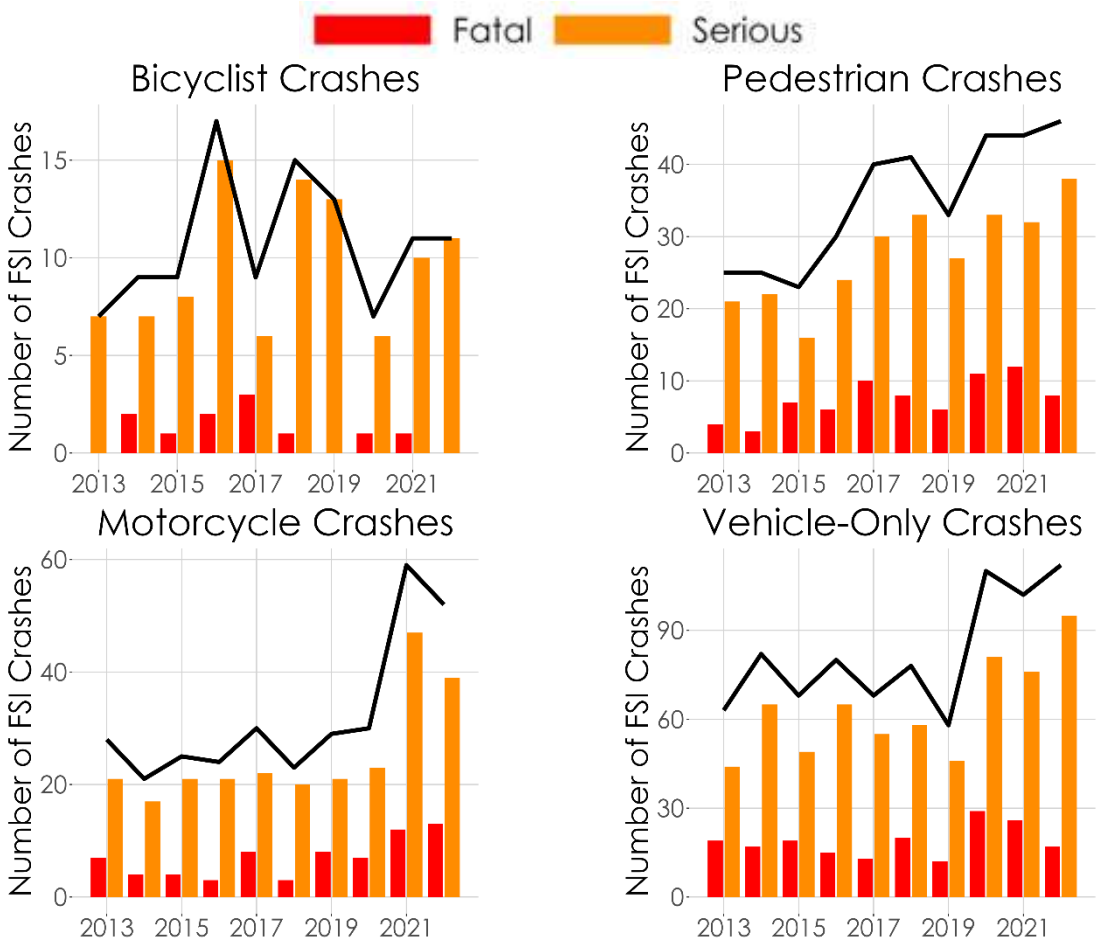


Exhibit 3: Fatal and Serious Injury Crashes by Year and Mode in SRTC (2013 – 2022)



CRASH TYPE

Crash type describes the manner of collision among the crash-involved road users. The 'other' category includes collisions with animals, vehicles leaving or entering parking positions, other same direction crashes, rollover crashes, and same direction left turn across path crashes. The following crash type trends were observed:

- One third of the fatal crashes and one fifth of the serious injury crashes were due to **run-off-road** (also known as road departure) crashes. Run-off-road crashes are typically single-vehicle crashes that involve the vehicle departing from the roadway and colliding with a roadside object (e.g., guardrail, tree, mailbox). Within this dataset, 91% of the run-off-road crashes were also **single-vehicle** crashes.
- **Pedestrian** and **motorcycle** crashes are the two next most common FSI crash types, comprising approximately 20% and 16% of the FSI crash population, respectively.
- The fourth most common crash type was an **angle crash**. In this dataset, an angle crash describes two vehicles colliding perpendicularly, at a 'T' angle. These crashes may also be referred to as 'straight crossing path' crashes, which most often occur at intersections.

- Seven FSI crashes occurred in a **work zone** (Table 6): one involved only vehicles, 1 involved a bicyclist, and four involved a pedestrian. Dark lighting, speeding, and not using designated crossing facilities were common characteristics among these crashes.

Exhibit 4: Fatal and Serious Injury Crashes by Crash Type in SRTC (2018 – 2022)

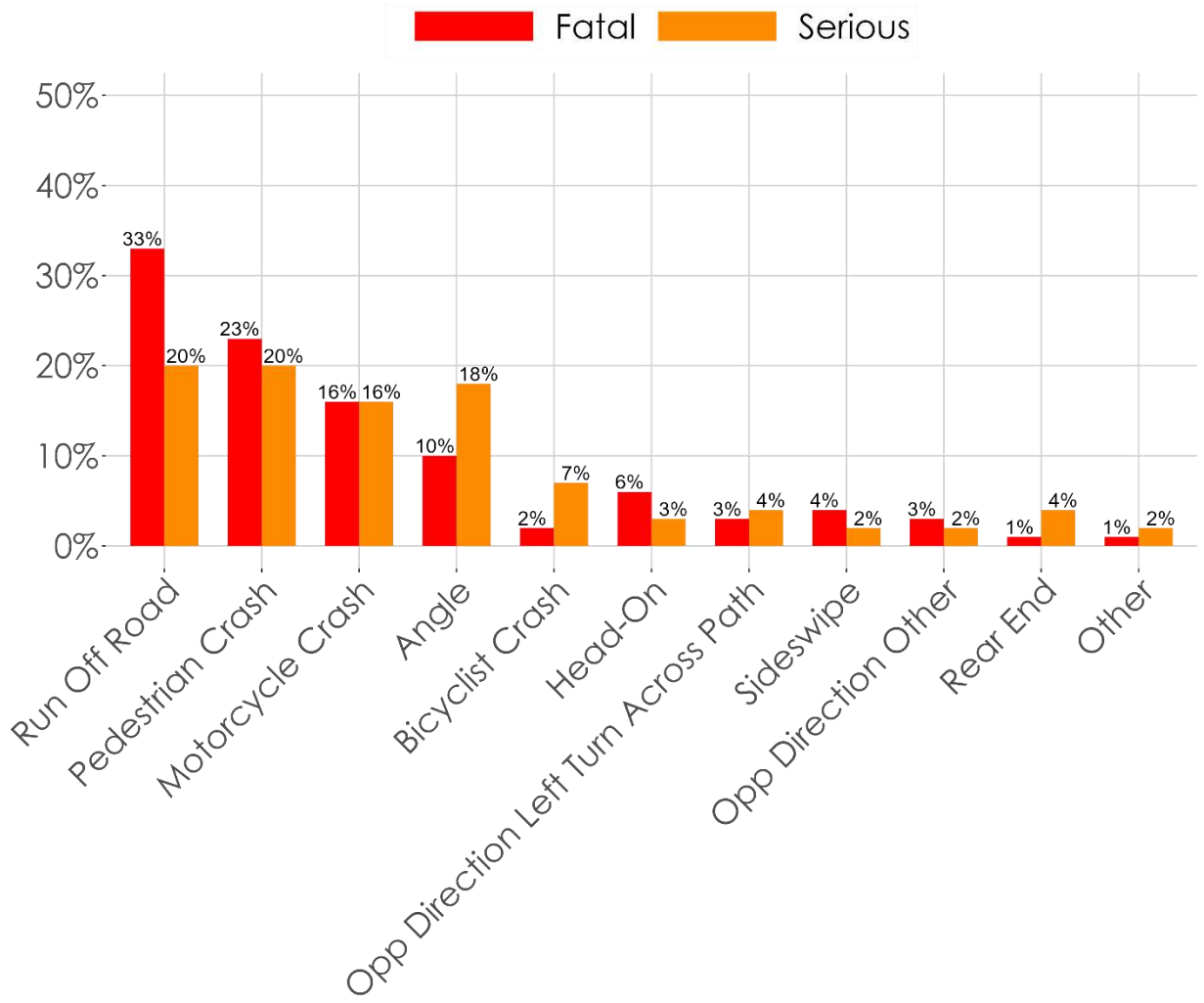


Table 6. Summary of FSI Work Zone Crashes in SRTC (2018 – 2022)

Mode	No.	Lighting	Contributing Factors	Additional Notes
Vehicle-Only	1	Daylight	Exceeded reasonable safe speed.	Multi-vehicle; involved a truck tractor & semi-trailer.
	2		Exceeded stated speed limit.	Disregarded traffic signs and signals. Hit and run.
Pedestrian	1	Dark – streetlights on	Driver under influence (alcohol).	None.
	2		None.	Crossing at intersection with no signal; failed to use crosswalk; did not grant vehicle right of way.
	3			Crossed at non-intersection (no crosswalk).
	4	Daylight		Vehicle improper passing. Pedestrian was a roadway worker.
Bicyclist	1	Dark – streetlights on	Bicyclist under influence (alcohol).	Hit and run.

WSDOT uses specific indicators in the crash data to identify road departure and lane departure crashes. Lane departure crashes involve the vehicle departing from the intended lane of travel and colliding with another vehicle on the roadway (for example head-on crashes and opposite direction sideswipe crashes). Within this report, road departure and lane departure crashes are considered independent categories. While vehicles that depart the road have also departed from the initial travel lane, they are only classified in one category based on where the collision occurred (on or off the roadway). The following trends were observed:

- Combined, FSI **road and lane departure crashes** comprise **approximately 25%-30%** of the annual FSI crashes (Exhibit 5). Road departure crashes are more common than lane departure crashes.
- From 2019 to 2021, the number of FSI **road and lane departure crashes were increasing** (Exhibit 6 and Exhibit 7). Despite decreases in 2022, there were still approximately 40 FSI road departure crashes and 15 FSI lane departure crashes.
- **28% of the FSI road and lane departure crashes occurred in the dark** (Exhibit 8). Including the 'Dark – Street Lights On' and 'Dark – Unknown Lighting' categories, nearly two-thirds of the FSI road and lane departures occurred in dark conditions. Considering all FSI crash types, daylight comprises over 60% of the crashes. This indicates FSI road and lane departure crashes are at a higher risk of occurring under darker conditions.

Exhibit 5: Annual Lane and Road Departure Crash Composition of Fatal and Serious Injury Crashes in SRTC (2018 – 2022)

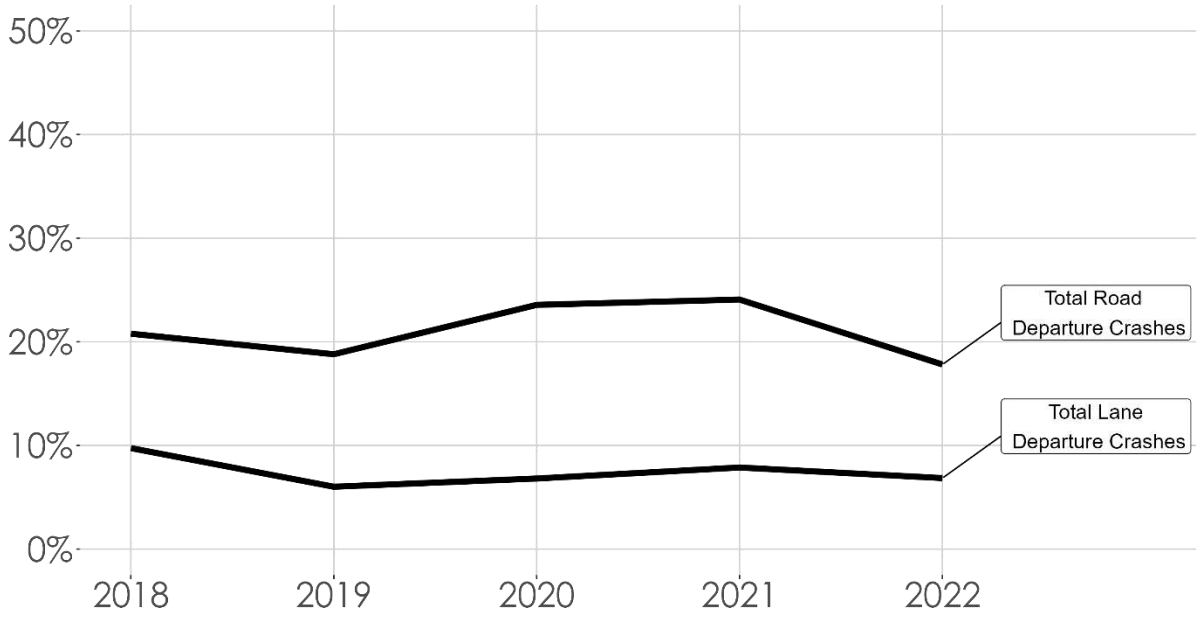


Exhibit 6: Fatal and Serious Injury Lane Departure Crashes by Year in SRTC (2018 – 2022)

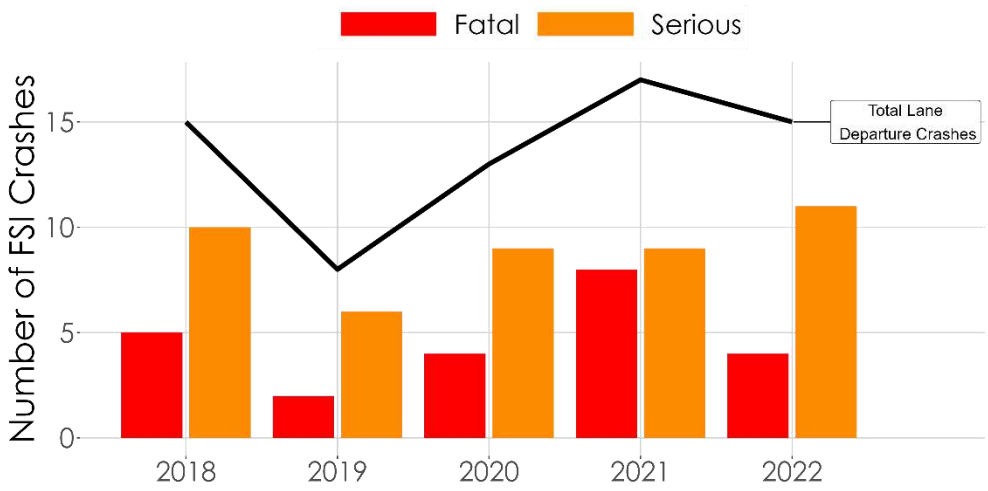


Exhibit 7: Fatal and Serious Injury Road Departure Crashes by Year in SRTC (2018 – 2022)

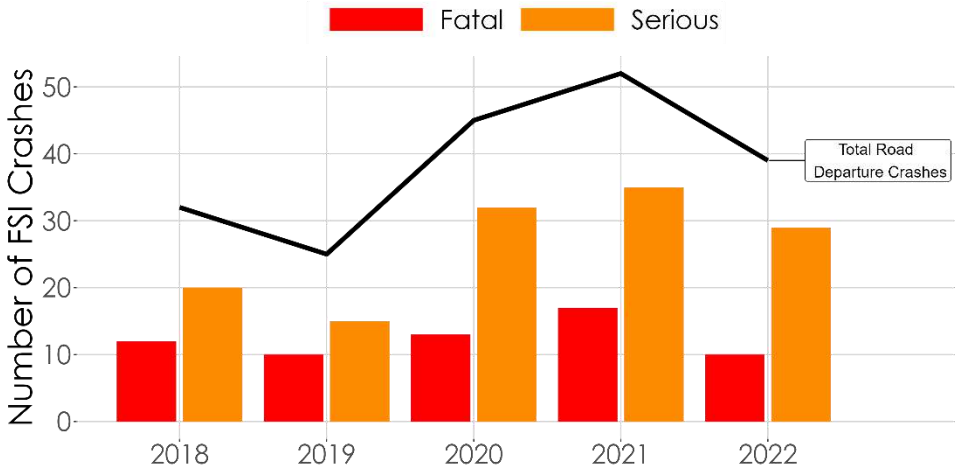
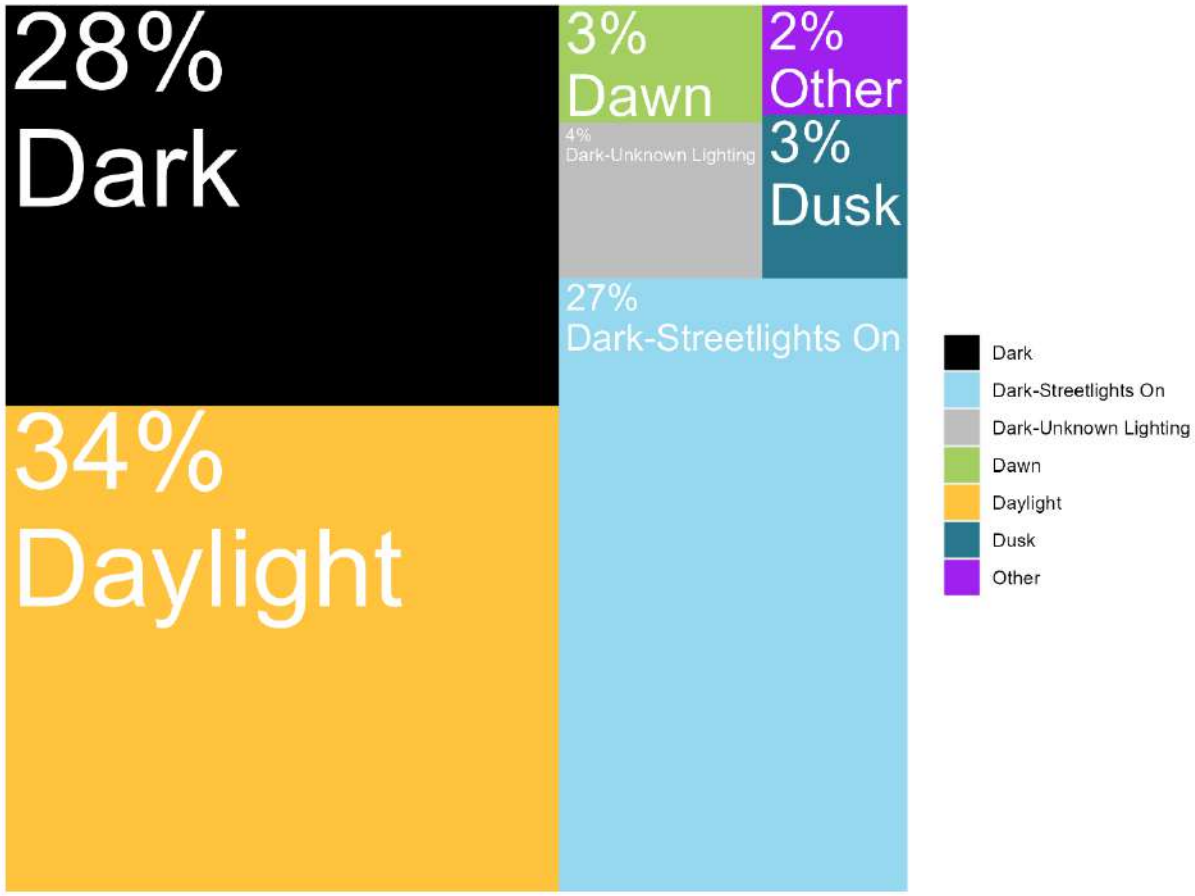


Exhibit 8: Lighting Conditions for Fatal and Serious Injury Lane and Road Departure Crashes in SRTC (2018 – 2022)



WHEN DO CRASHES HAPPEN?

Crashes were assessed temporally considering the month, day of the week, and hour of the day.

Month (Exhibit 9 and Exhibit 10)

- FSI **pedestrian** crashes occur more in the fall and winter months. Motorcycle and bicyclist crashes exhibit the opposite trend, having peak frequencies in the summer months.
- High **pedestrian** crash frequencies in the fall and winter may be related to several factors, including the school year schedule and earlier sunsets. Earlier sunsets yield darker lighting conditions earlier in the day, which can decrease pedestrian visibility.
- **Vehicle-only** crashes have a higher variability year to year and show a less clear trend than the other three crash modes. Overall, vehicle-only crashes were slightly more frequent in the summer months.

Day of Week (Exhibit 11 and Exhibit 12)

- **Pedestrian** and **bicyclist** FSI crashes peak on Tuesday and decrease in frequency through Sunday.
- **Motorcycle** and **vehicle-only** FSI crashes peak on Fridays.

Hour of Day (Exhibit 13 and Exhibit 14)

- **Vehicle-only** FSI crashes peak at 7 AM and between 4 and 6 PM. This is expected, as these are peak hours for road users traveling to and from work.
- Similar to vehicle-only crashes, **bicycle** crashes peak at 6 AM and 4 PM.
- **Pedestrian** FSI crashes peak at 6 AM and 9 AM in the morning. The PM peak hours for pedestrian FSI crashes were from 4 to 6 PM and from 8 to 9 PM. These later PM peak hours are likely due to darker lighting conditions which present an increased FSI crash risk for pedestrians.
- **Motorcycle** crashes peak between 1 PM to 10 PM.

Exhibit 9: Fatal and Serious Injury Crashes by Time of Year in SRTC (2018 – 2022)

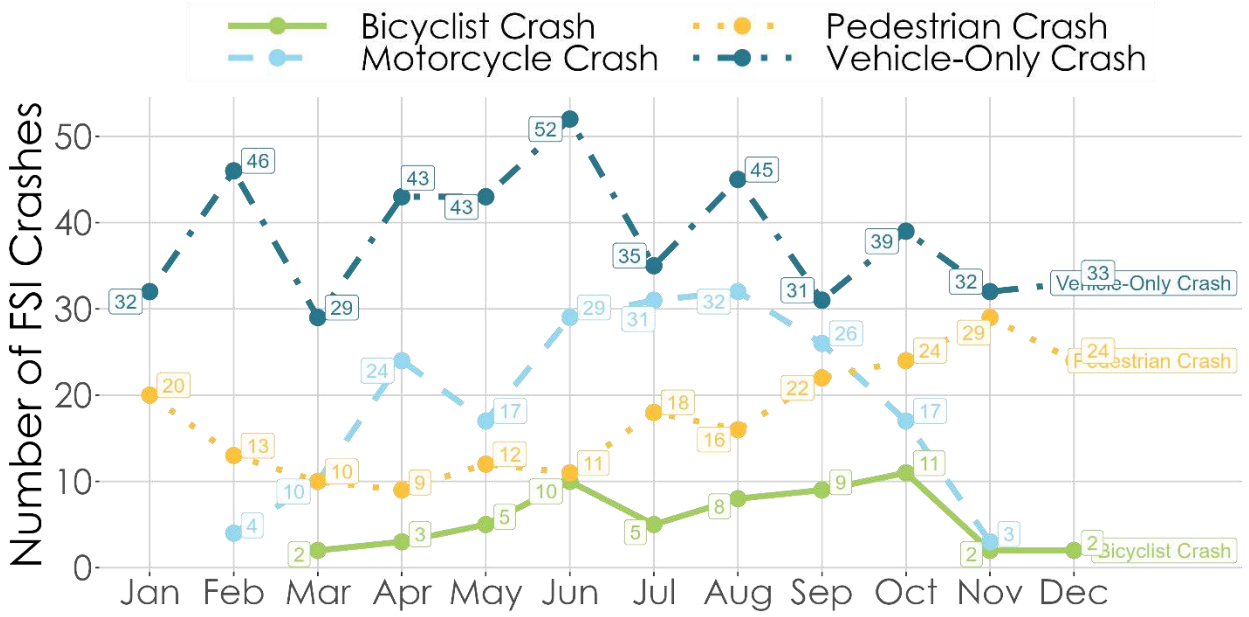


Exhibit 10: Fatal and Serious Injury Crashes by Time of Year in SRTC (Percent) (2018 – 2022)

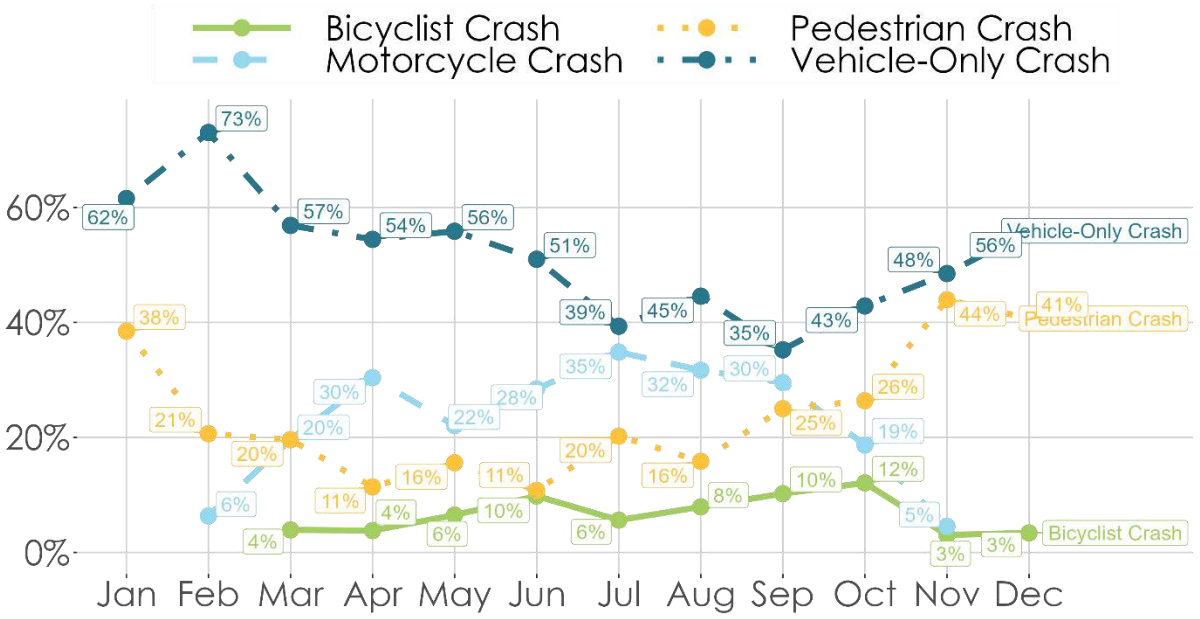


Exhibit 11: Fatal and Serious Injury Crashes by Weekday in SRTC (2018 – 2022)

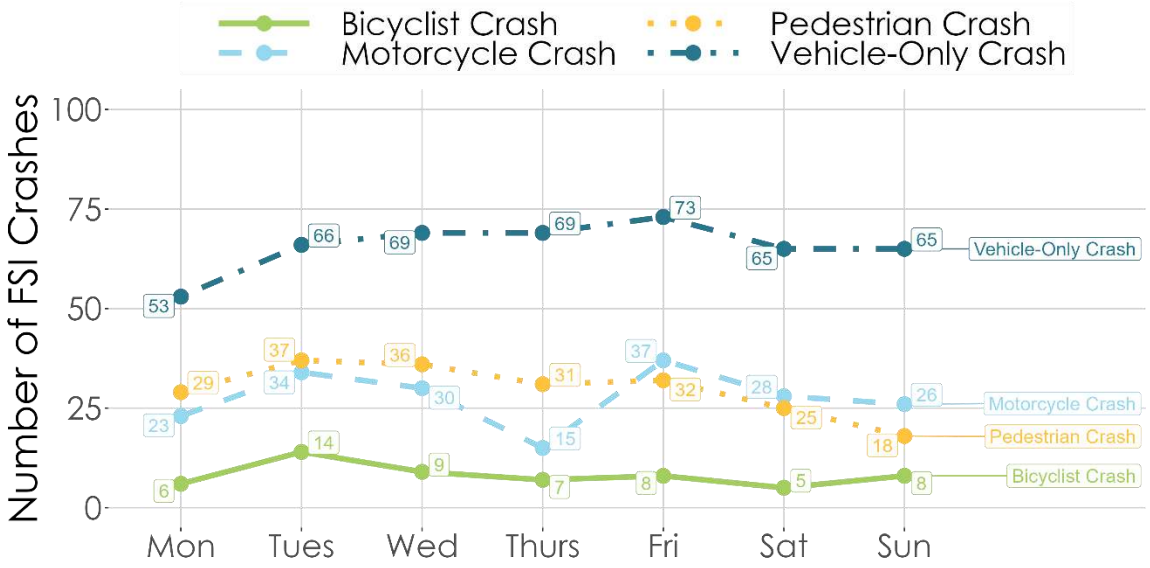


Exhibit 12: Fatal and Serious Injury Crashes by Weekday in SRTC (Percent) (2018 – 2022)

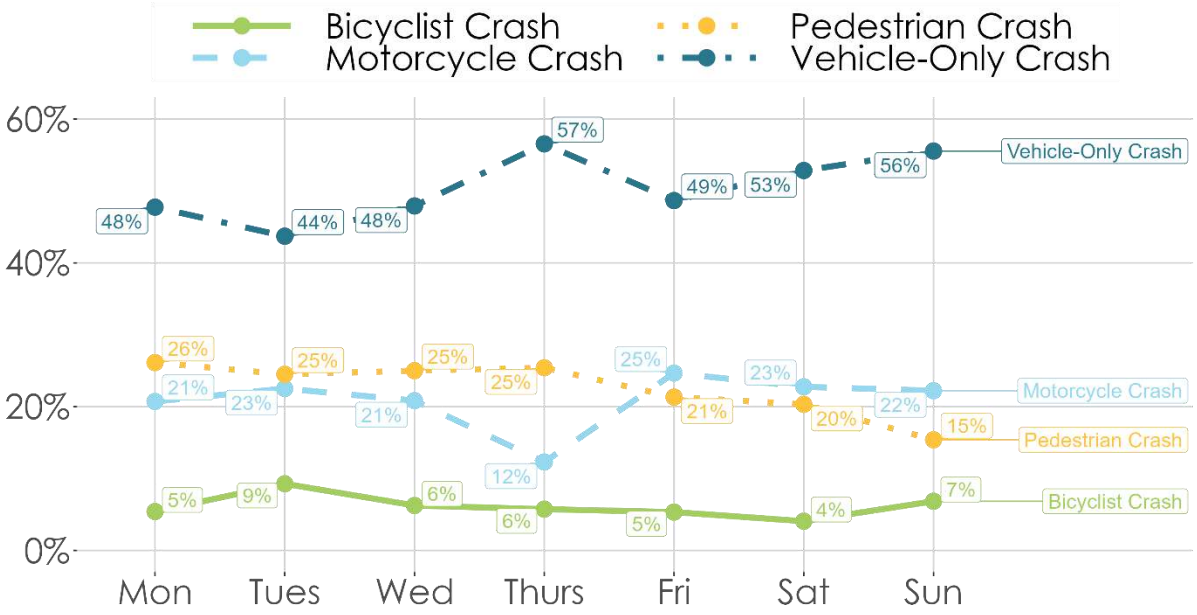


Exhibit 13: Fatal and Serious Injury Crashes by Time of Day in SRTC (2018 – 2022)

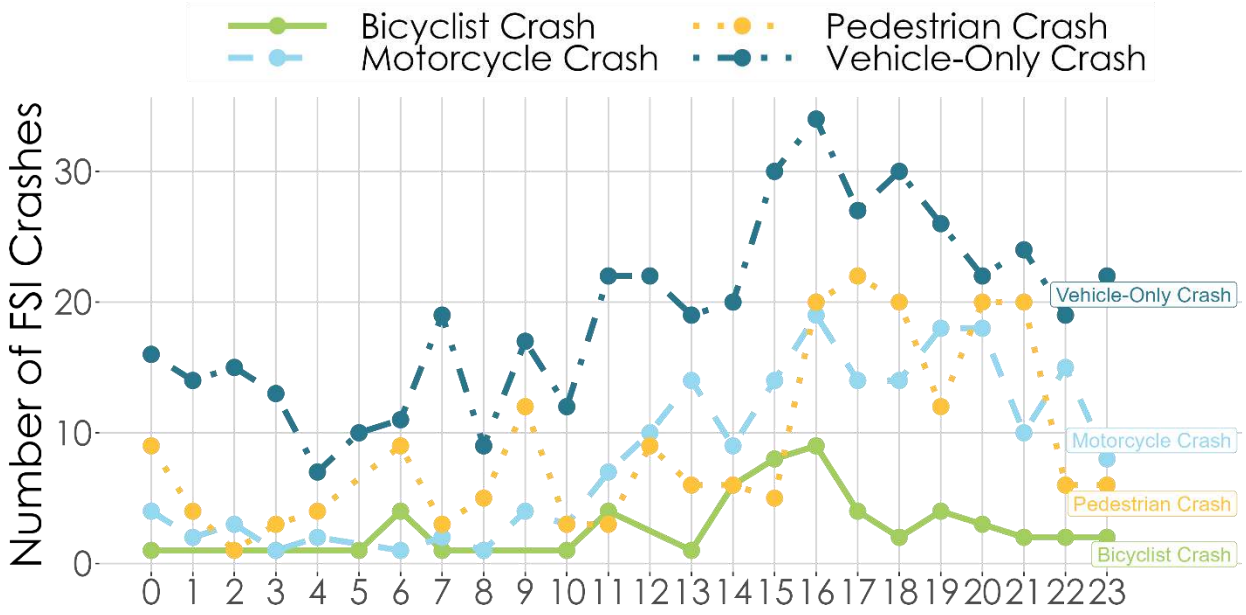
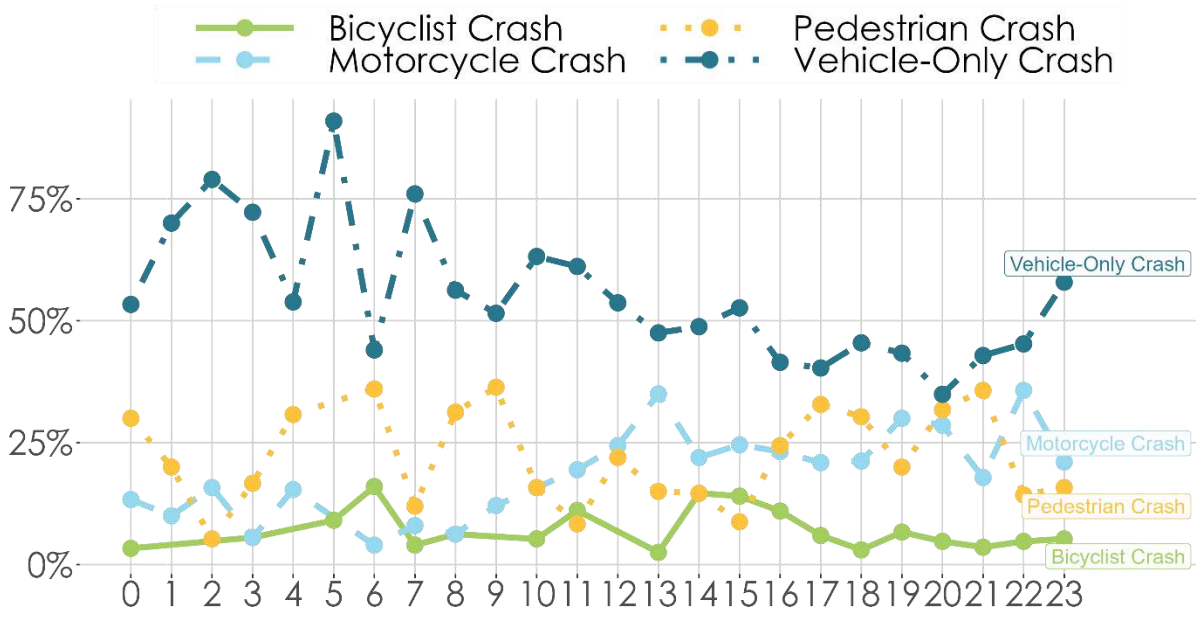


Exhibit 14: Fatal and Serious Injury Crashes by Time of Day in SRTC (Percent) (2018 – 2022)



WHERE DO CRASHES HAPPEN?

The location of crashes was categorized by the city within the region, the facility jurisdiction, and the relationship to a junction (roadway segment versus intersection). The following observations were made:

City (Exhibit 15)

- The majority of the FSI crashes occur in **Spokane**, **Unincorporated Spokane County**, and **Spokane Valley**. This is likely related to the distribution of the population within the region.
- More than half of the serious injury crashes occurred in the **City of Spokane**.
- Almost half the fatal crashes occurred in **Unincorporated Spokane County**.

Facility Jurisdiction (Exhibit 16)

- Most of the fatal and serious crashes occur on **city streets**. This may be related to the percentage of the roadway network comprised by city streets.

Relationship to Junction (Exhibit 17)

- More than half (57%) of the fatal crashes occurred on **roadway segments** while more than half (52%) of the serious injury crashes occurred at **intersections**.

Exhibit 15: Fatal and Serious Injury Crashes by Boundaries in SRTC (2018 – 2022)

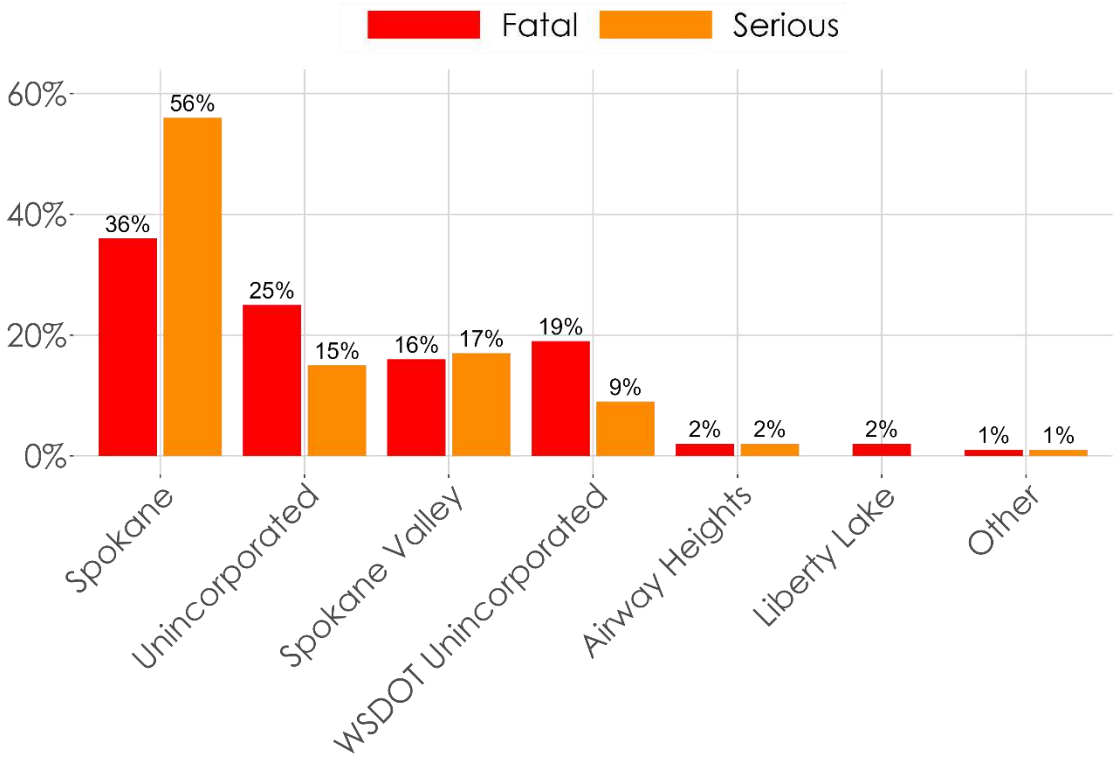


Exhibit 16. Fatal and Serious Injury Crashes by Facility Jurisdiction in SRTC (2018 – 2022)

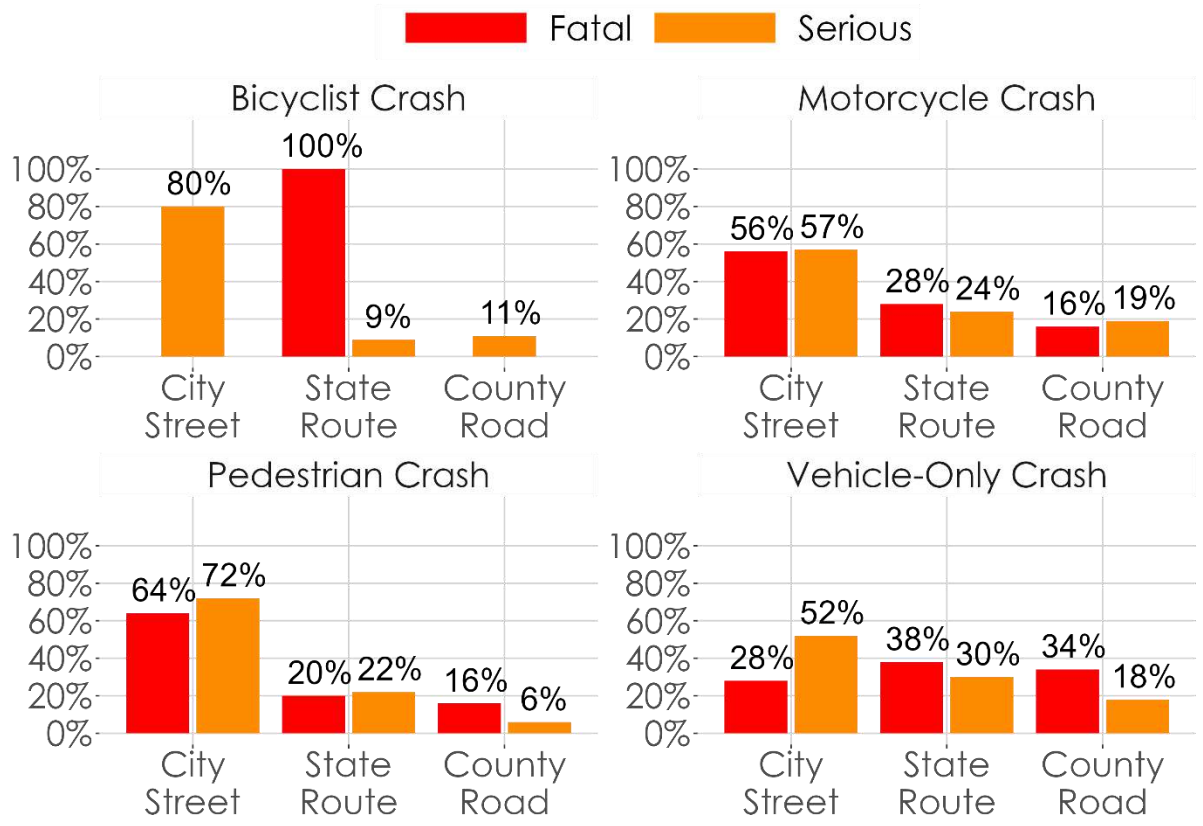
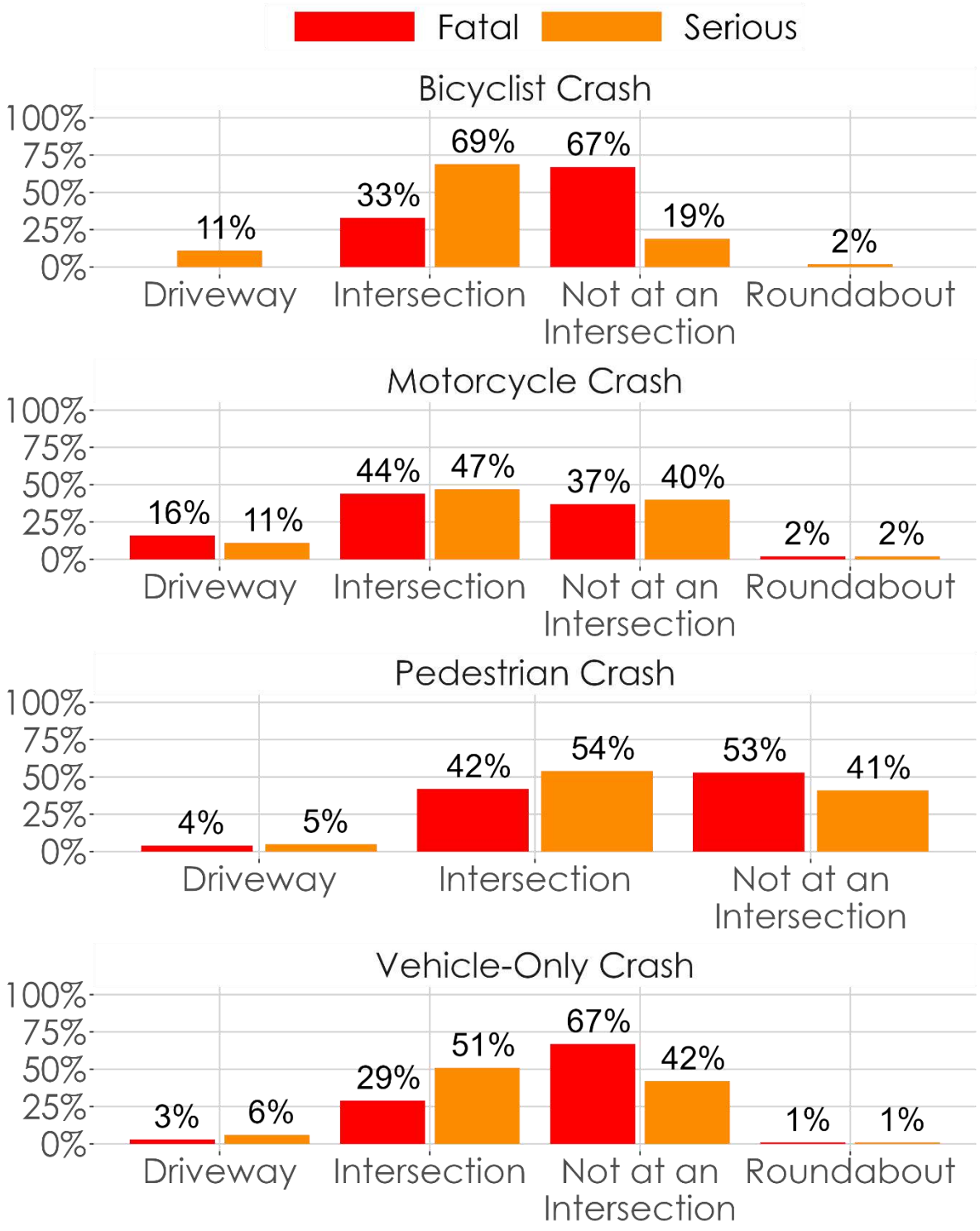


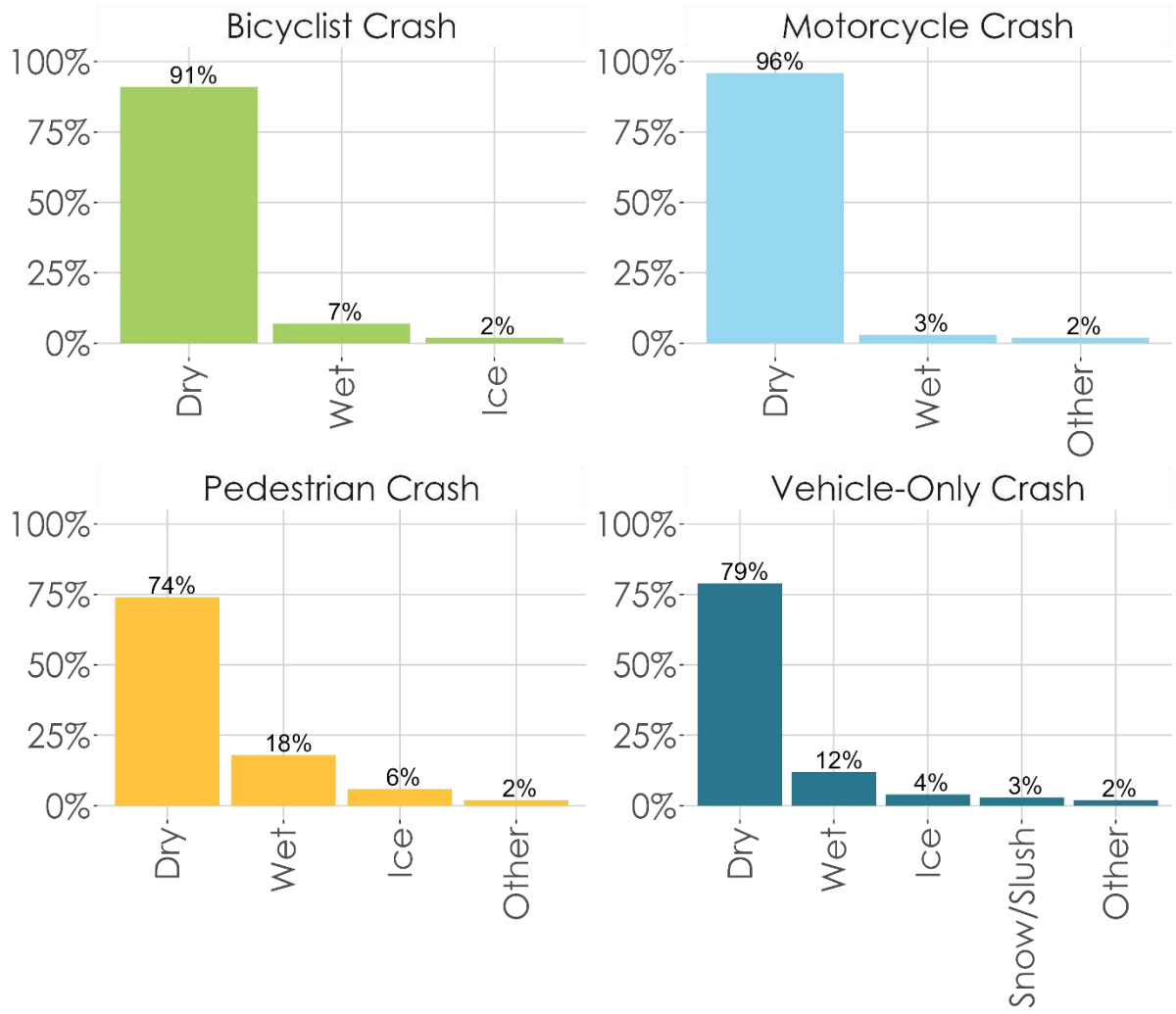
Exhibit 17: Fatal and Serious Injury Crashes by Relationship to Intersection in SRTC (2018 – 2022)



ENVIRONMENTAL

Roadway surface conditions were most often **dry** for FSI crashes throughout the region. **Wet** roadway conditions comprised a larger percentage of the crashes within the **pedestrian** (18%) and **vehicle-only** (12%) crash modes. The 'other' category includes oil, unknown conditions, sand/mud/dirt, and standing water.

Exhibit 18. Distribution of Roadway Conditions for Fatal and Serious Injury Crashes in SRTC (2018 – 2022)



Human Factors/Driver Behavior

In the context of this technical memo, human factors describe characteristics related to the crash that are influenced by the road user's characteristics and behaviors.

CONTRIBUTING CIRCUMSTANCES

Contributing circumstances describe road user behaviors that may have influenced the crash. The following contributing circumstances were analyzed: speeding driver, drowsy driver, distracted driver, impaired (drugs and/or alcohol) person involved, drug impaired person involved, and alcohol impaired person involved.

It is important to note that quantitative values are not provided within the crash records. For example, it is unclear for speeding drivers whether they were speeding relative to the posted speed or to the flow of traffic. Given the order of magnitude associated with the frequency of the category, it is likely these drivers were speeding significantly compared to the vehicles on the roadway. Another important consideration with this data is how these factors are determined. It is likely this data does not capture the full scale of the problem, as certain factors, such as drowsy driving, drug impairment, and drowsy driving cannot be tested for and rely on self-reported data.

The following observations were made when analyzing the contributing circumstances data:

- **Speeding** and **distracted driving** were the two most common contributing circumstances within the FSI crashes (Exhibit 19 and Exhibit 20). Compared to 2018 and 2019, the number of speeding drivers involved in FSI crashes is much higher in recent years. Distracted driving peaked in 2021 but has since decreased.
    - 65 of the 193 **FSI motorcycle crashes** (34%) involved speeding. In 62 of these 65 crashes (95%), the motorcyclist was speeding.
- **Impairment** frequency has more than quadrupled in frequency since 2018. This is mostly due to a large increase in the number of drug-impaired involved persons in the FSI crashes. Alcohol impairment has increased slightly, but not to the same degree as drug impairment.
    - Five of the 57 **FSI bicycle crashes** (9%) involved an impaired road user. In one of these five a bicyclist was impaired, while in four of these five a driver was impaired.
    - 33 of the 208 **FSI pedestrian crashes** (16%) involved an impaired road user. In 14 of these 33 a pedestrian was impaired, while in 19 of these 33 (58%) a driver was impaired.
- **Distracted driving** disproportionately affects pedestrians while speeding disproportionally affects motorcyclists (Exhibit 21).

Exhibit 19: Frequency of Contributing Circumstances in Fatal and Serious Injury Crashes in SRTC (2018 – 2022)

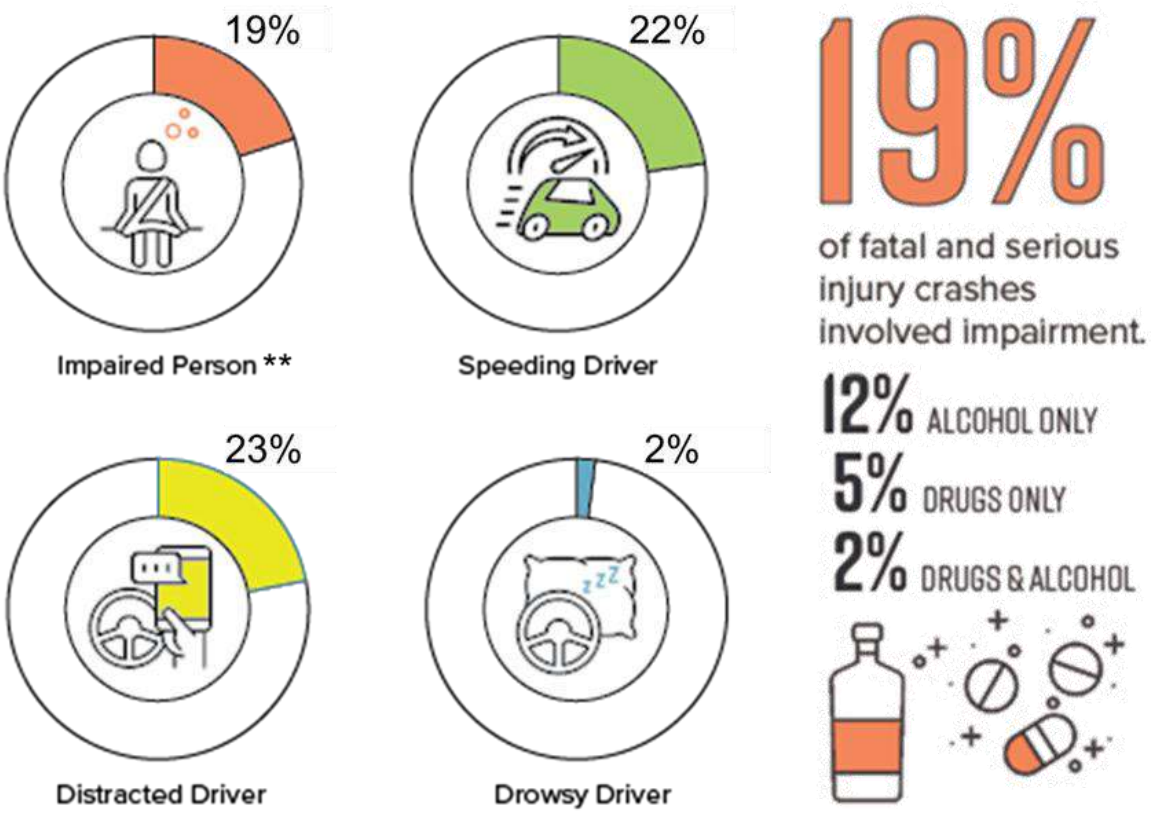


Exhibit 20: Fatal and Serious Injury Crashes Involving a Contributing Circumstance in SRTC (2018 – 2022)

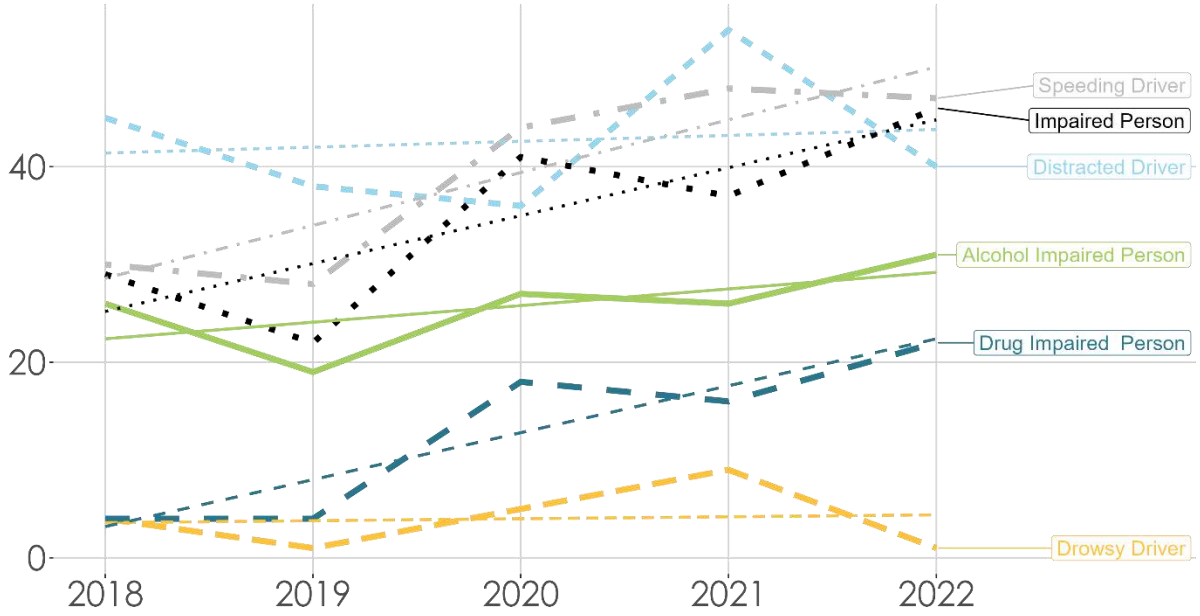
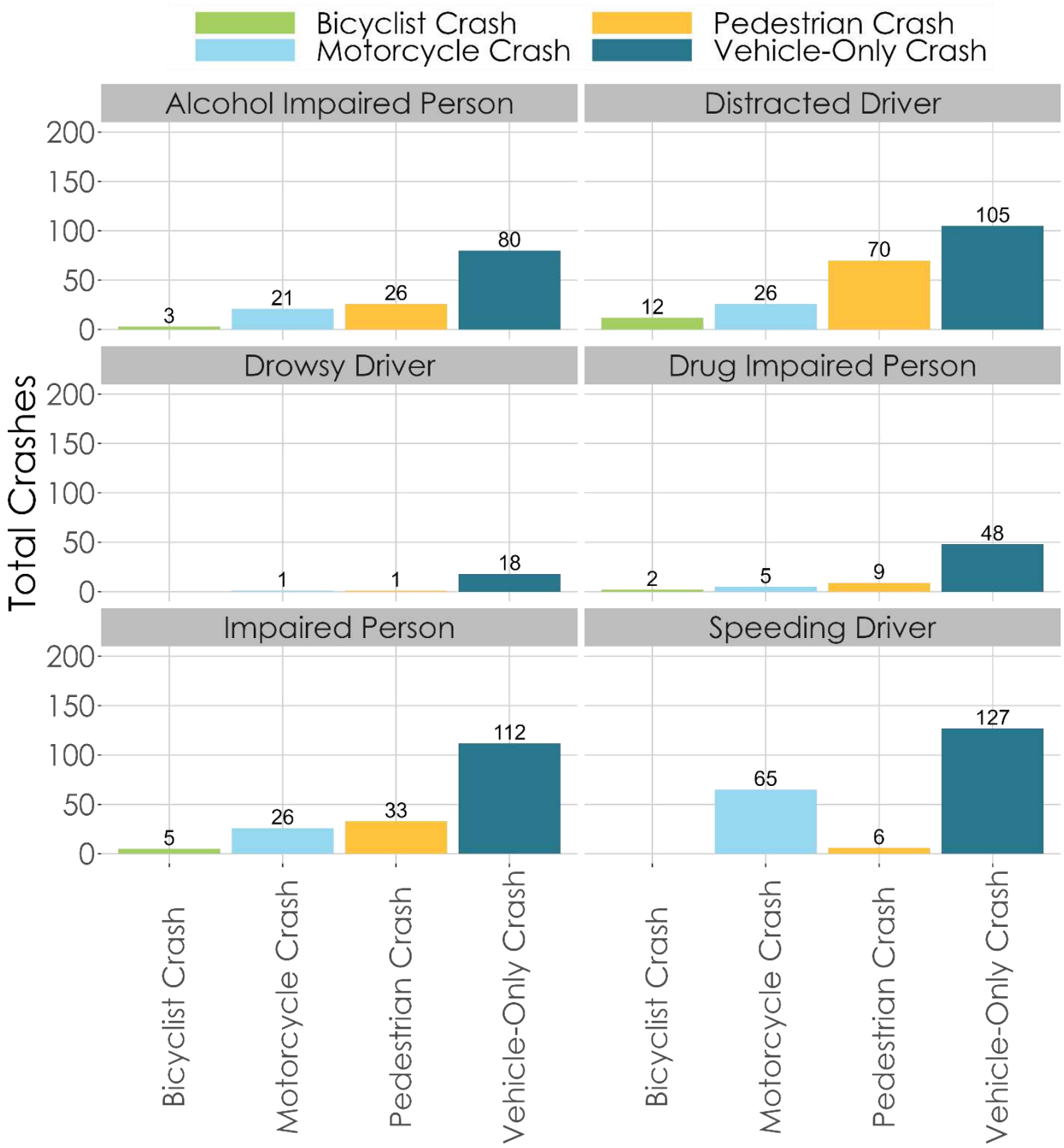


Exhibit 21: Fatal and Serious Injury Crashes Contributing Circumstance by mode in SRTC (2018 – 2022)



To further investigate the characteristics of vulnerable road user crashes, the most common maneuvers made by vulnerable road users were identified (Table 7). Additionally, a wider range of contributing circumstances were investigated to identify their role in crashes. Apart from speeding, the previous contributing circumstances investigated focused on road user state. In this analysis, all contributing circumstances were investigated, including those related to roadway use infractions (Table 8). The following observations were made:

- The most common maneuver for pedestrians involved in FSI crashes was **crossing at an intersection with no signal** (20% of the FSI pedestrian crashes). This was followed by **crossing at a non-crosswalk** (18%).
- The most common maneuver for pedestrians involved in FSI crashes was **riding with traffic** (40%), followed by **crossing or entering the trafficway** (26%).
- In 39% of the FSI pedestrian and bicyclist crashes, the pedestrians and bicyclists were noted as having **no contributing circumstances**. The next most common contributing circumstance (in 19% of both pedestrian and bicyclist crashes) was a pedestrian or bicyclist **not granting right of way** to a vehicle.

Table 7: Most Common Maneuvers for in FSI Crashes in SRTC (2018 – 2022)

Road User Type	Maneuvers		
	Most Common	2nd Most Common	3rd Most Common
Pedestrian	Crossing at Intersection – No Signal (20%)	Crossing at Non-Intersection – No Crosswalk (18%)	Crossing at Intersection with Signal (10%)
Bicyclist	Riding with Traffic (40%)	Crossing or Entering Trafficway (26%)	Remaining Maneuvers Comprise 5% or Less of the Dataset

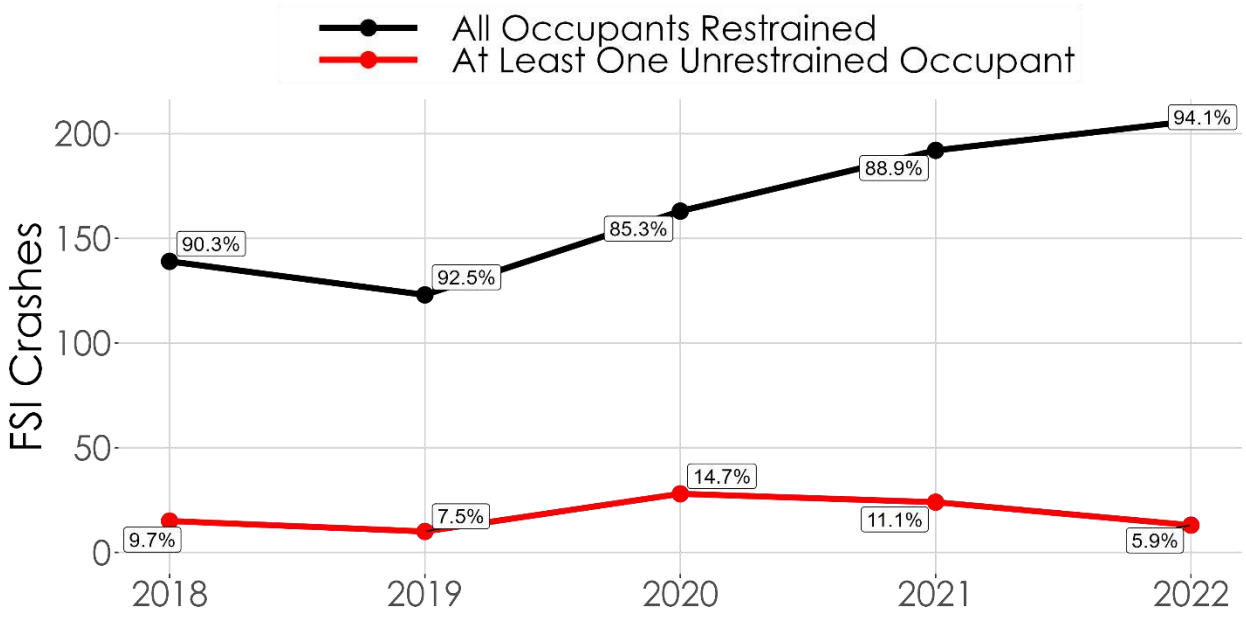
Table 8: Most Common Contributing Circumstances for Vulnerable Road Users in FSI Crashes in SRTC (2018 – 2022)

Road User Type	Contributing Circumstances		
	Most Common	2nd Most Common	3rd Most Common
Pedestrian	None (39%)	Did Not Grant Right of Way to Vehicle (19%)	Under Influence of Alcohol (6%)
Bicyclist	None (39%)	Did Not Grant Right of Way to Vehicle (19%)	Remaining Maneuvers Comprise 5% or Less of the Dataset

One additional behavioral component in crashes is seatbelt use. WSDOT crash data records whether all occupants were belted or if at least one occupant involved in the crash was unbelted. Exhibit 22 shows the number of crashes over the years involving belted and unbelted occupants; text boxes are used to communicate the percent of FSI crashes comprised by the number of FSI crashes. Over the last five years, 5% to 15% of FSI crashes have involved an unrestrained occupant. It is important to note that seatbelt use rates within a crash population, particularly within an FSI crash population, are going to be lower compared to across the entire population. This is because not wearing a seatbelt makes it more likely that an occupant will sustain an injury.

At a national level, as of 2021, seat belt use rates were at approximately 90% for front seat occupants and 78% for rear seat occupants. While it is not a direct comparison to compare seatbelt use across crashes versus seatbelt use among individual occupants, these results do indicate that the seatbelt use rate in the region of Spokane is similar to the national seatbelt use rate and to the 2022 seatbelt use rate in Washington State (93.9%).

Exhibit 22: Percent of FSI Crashes with Restrained and Unrestrained Occupants in SRTC (2018 – 2022).



ROAD USER CHARACTERISTICS

The distribution of road user age was assessed for each of the four road user types. The following trends were identified:

- High school and college aged (**15 to 24 years**) **drivers** comprised approximately 22% of the drivers in FSI crashes (Exhibit 23). **Ages 20 to 24** was the most common age range for **drivers** in FSI crashes.
- Middle school and high school aged (**10 to 19 years**) **bicyclists** comprised 24% of the bicyclists involved in FSI crashes. In other crash modes, this age range comprises only 5% to 11% of the road users.
- Ages 35 to 39 was the most common age range for **pedestrians** and bicyclists in FSI crashes.
- 13% of the **motorcyclists** fell within the **45 to 49 age range**. In other crash modes, this age range comprised only 4% to 8% of the road users. **Ages 30 to 34** was the most common age range for **motorcyclists**.

Exhibit 23: Fatal and Serious Injury Crashes Vehicle Driver Age Distribution in SRTC (2018 – 2022)

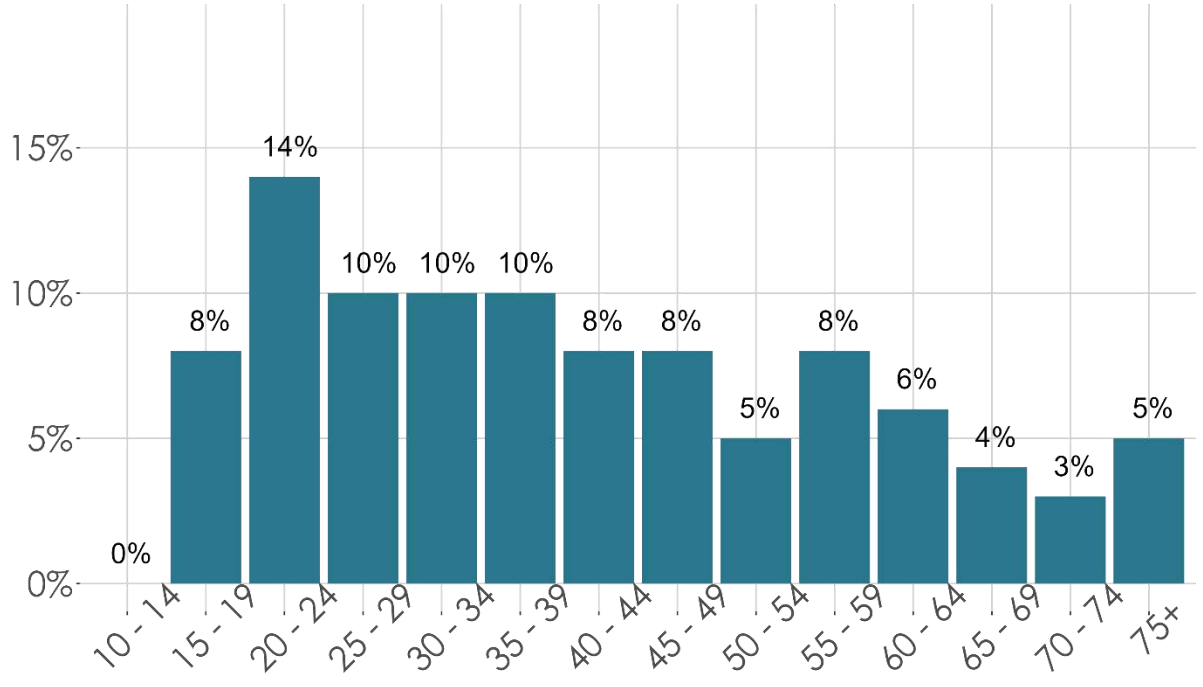


Exhibit 24: Fatal and Serious Injury Crashes Motorcyclist Age Distribution in SRTC (2018 – 2022)

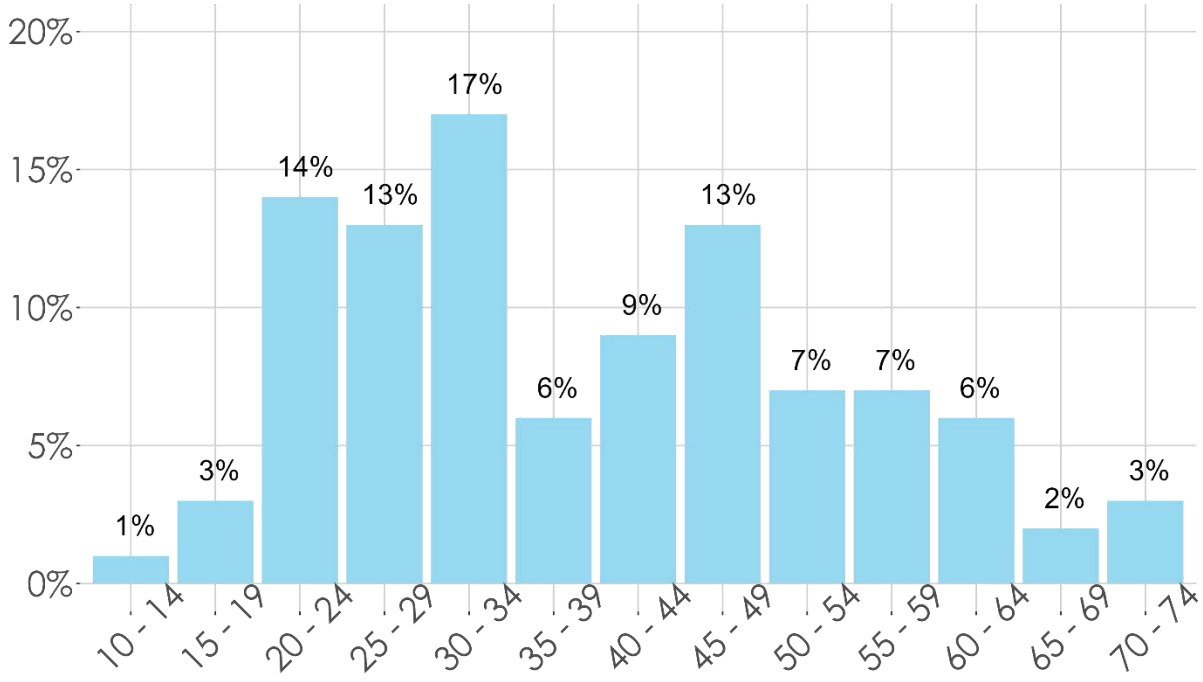


Exhibit 25: Fatal and Serious Injury Crashes Pedestrian Age Distribution in SRTC (2018 – 2022)

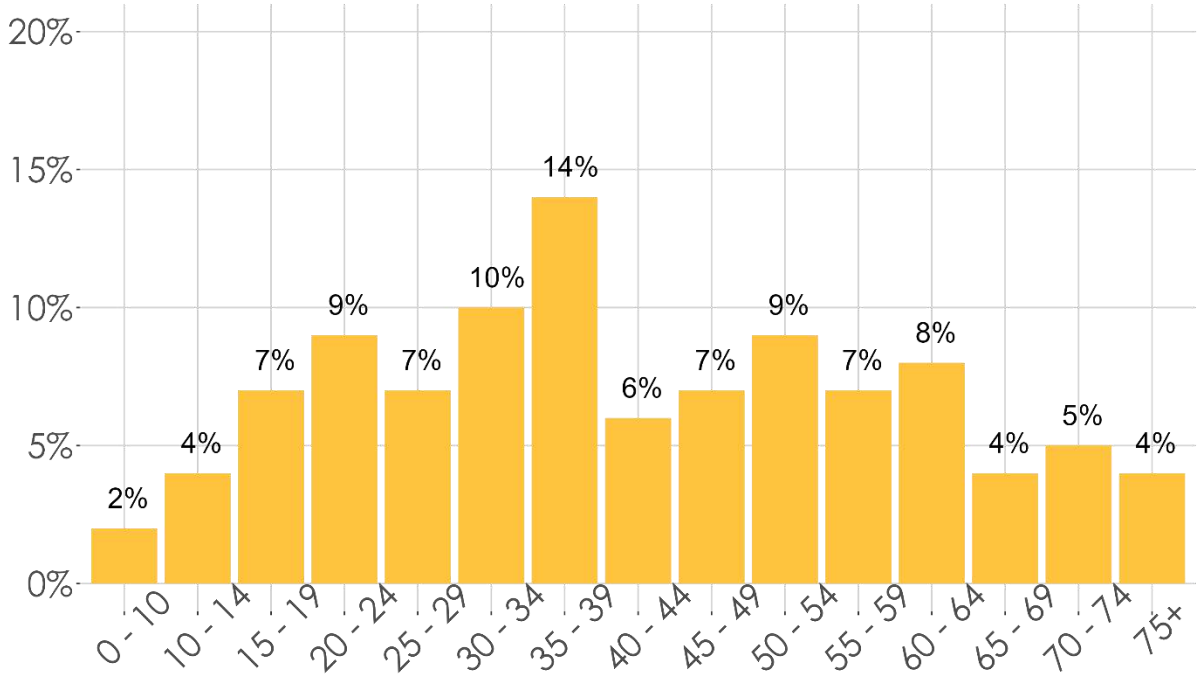
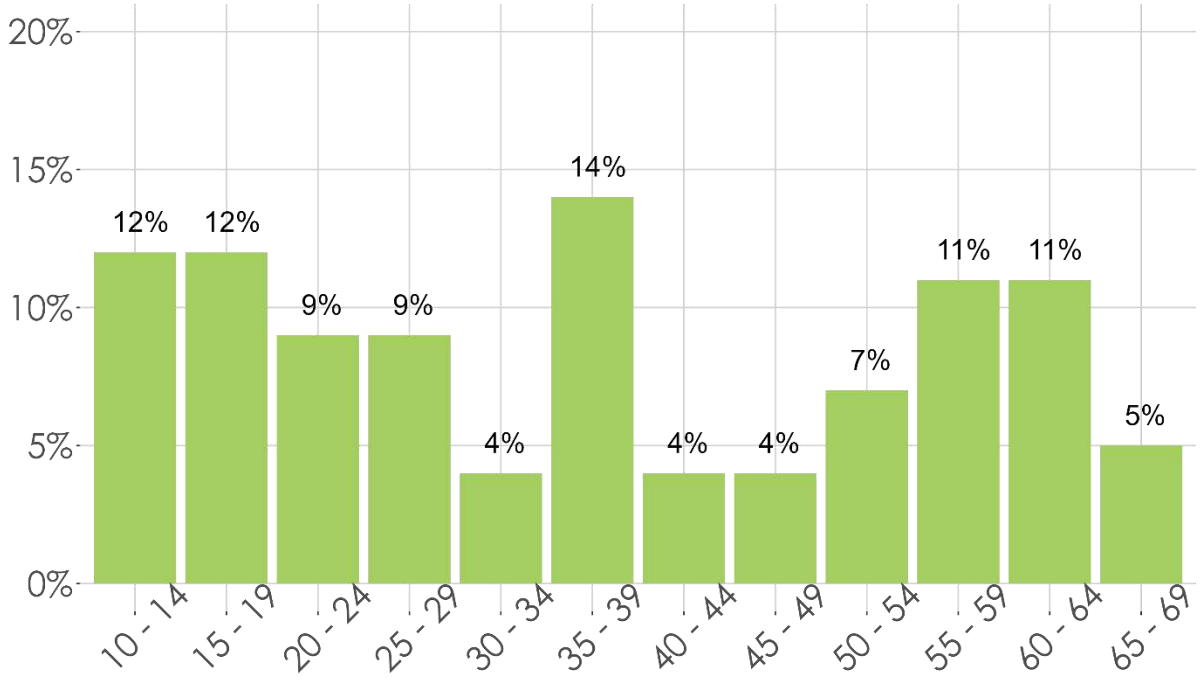


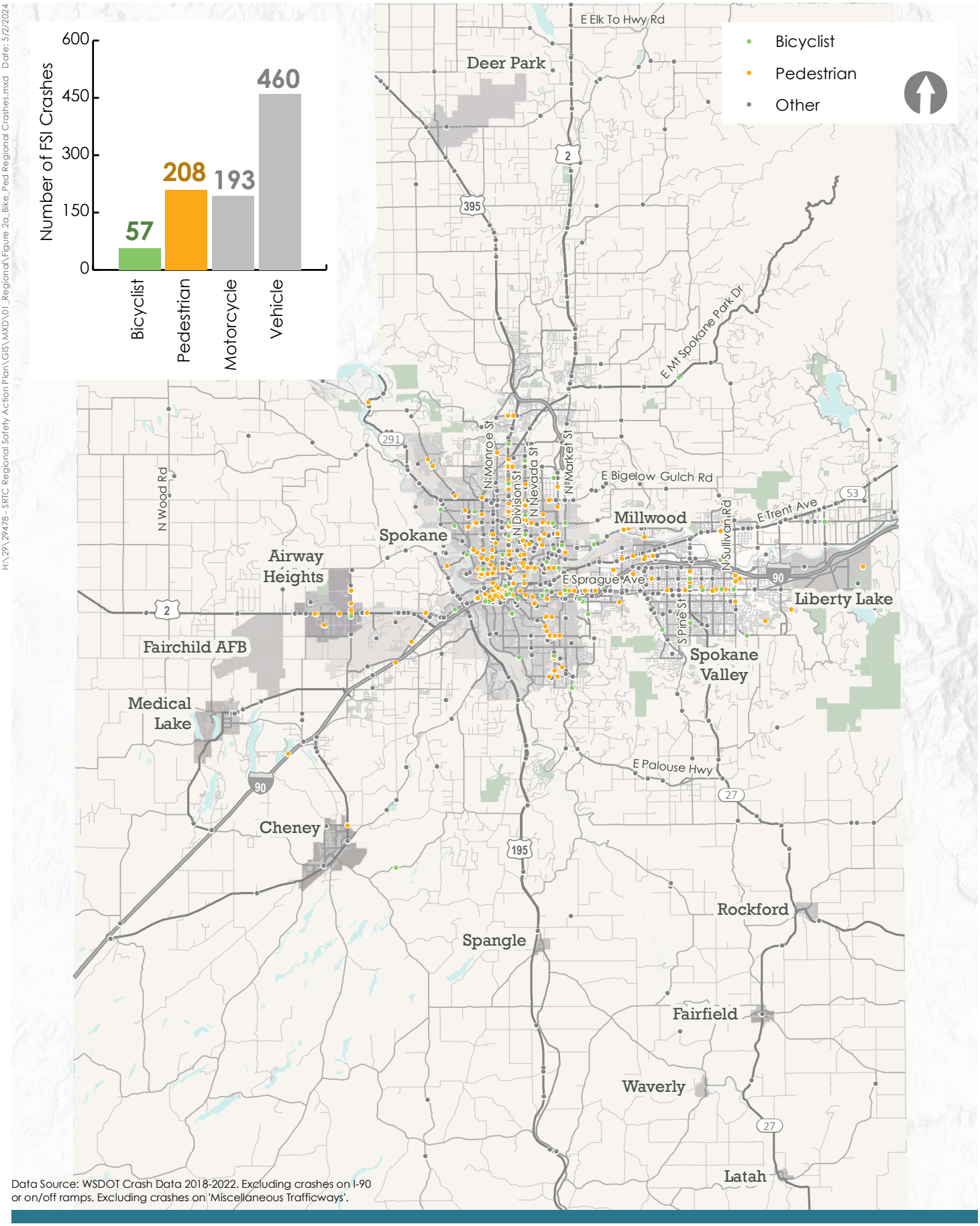
Exhibit 26: Fatal and Serious Injury Crashes Bicyclist Age Distribution in SRTC (2018 – 2022)



MAPS OF CRASHES FOR DESCRIPTIVE CRASH ANALYSIS

Maps are prepared to understand the geographic distribution of crashes, aligned with the descriptive crash analysis. The following maps are included:

- Fatal and Serious Injury Crashes Involving a Motorcyclist or Only Vehicles
    - Crashes are concentrated in the urban areas of Spokane and Spokane Valley. However, crashes occur throughout the planning region.
- Fatal and Serious Injury Crashes Involving a Pedestrian or Bicyclist
    - Crashes are concentrated in the urban areas of Spokane. Crashes also occur in other jurisdictions, but do not often occur in more rural areas.
- Fatal and Serious Injury Crashes Involving Run Off the Road
    - Crashes are distributed throughout the region, including urban and rural areas.
- Fatal and Serious Injury Crashes Involving a Motorcyclist or Only Vehicles by Lighting Condition
    - Crashes in urban areas tend to be under lighted conditions.
    - Crashes in rural areas tend to be under dark conditions without streetlights.
- Fatal and Serious Injury Crashes Involving a Pedestrian or Bicyclist by Lighting Condition
    - Most crashes occur under lighted conditions, however crashes under dark conditions tend to occur on the edges of urban areas.
- Fatal and Serious Injury Crashes by Roadway Jurisdiction
- Fatal and Serious Injury Crashes Involving a Motorcyclist or Only Vehicles by Junction Relationship
    - Crashes in urban areas are more common at intersections than crashes in rural areas, which are more commonly not at intersections.
- Fatal and Serious Injury Crashes Involving a Pedestrian or Bicyclist by Junction Relationship
    - Several crashes were identified at driveways close together along Sprague Avenue in Spokane Valley.
- Fatal and Serious Injury Crashes Involving an Impaired Person
- Fatal and Serious Injury Crashes Involving Speeding
- Fatal and Serious Injury Crashes Involving a Distracted Driver
- Fatal and Serious Injury Crashes Involving a Bicyclist Under 20 Years Old
    - Crashes tend to be distributed throughout the area of Spokane and Spokane Valley, indicating the crashes may be related to systemic conditions, rather than a particular locational characteristic.

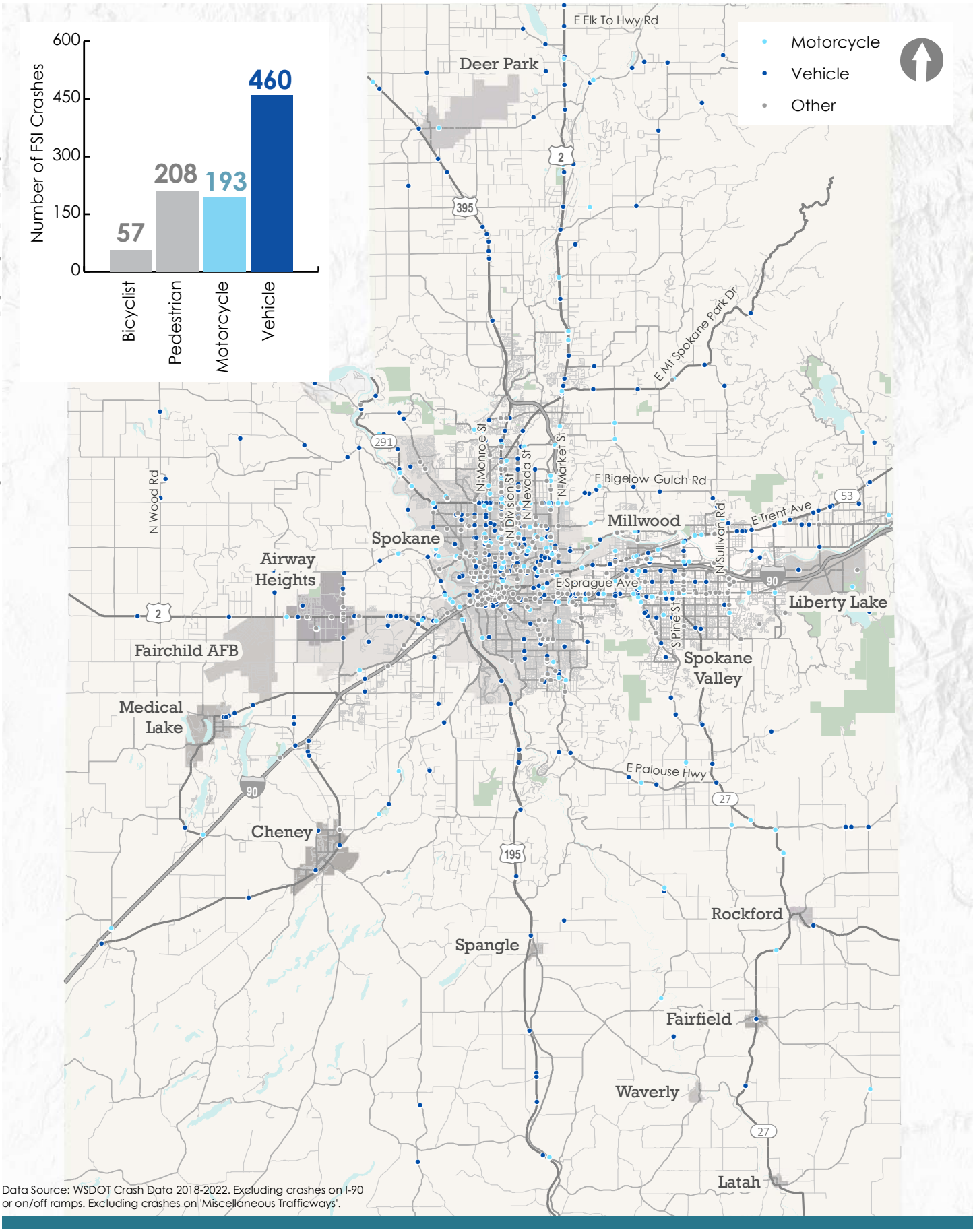


Data Source: WSDOT Crash Data 2018-2022. Excluding crashes on I-90 or on/off ramps. Excluding crashes on 'Miscellaneous Trafficways'.

SRTC SAFETY ACTION PLAN

Figure 2a

Fatal and Serious Injury Bicyclist and Pedestrian Crashes

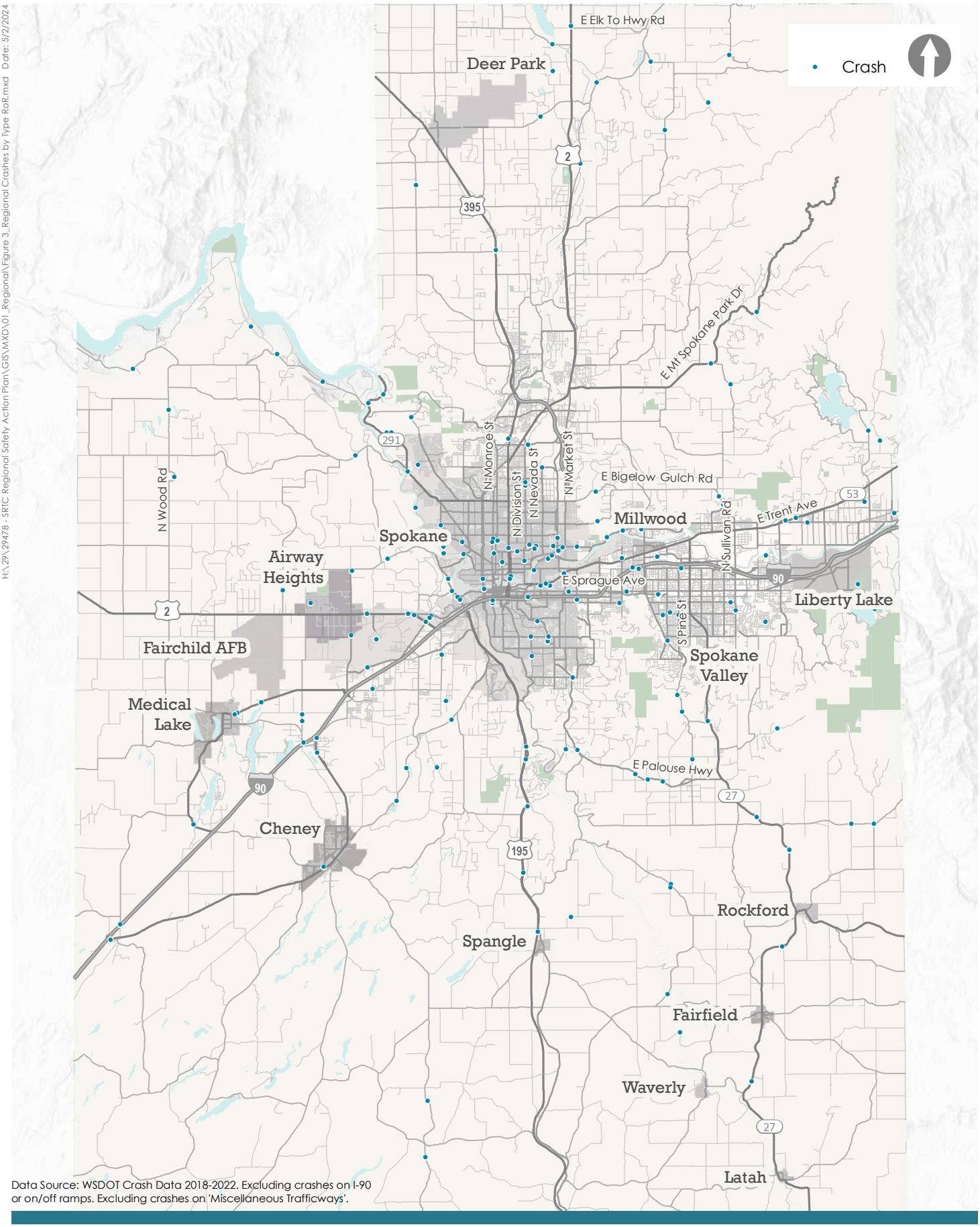


Data Source: WSDOT Crash Data 2018-2022. Excluding crashes on I-90 or on/off ramps. Excluding crashes on 'Miscellaneous Trafficways'.

SRTC SAFETY ACTION PLAN

Figure 2b

Fatal and Serious Injury Motorcycle and Vehicle Crashes

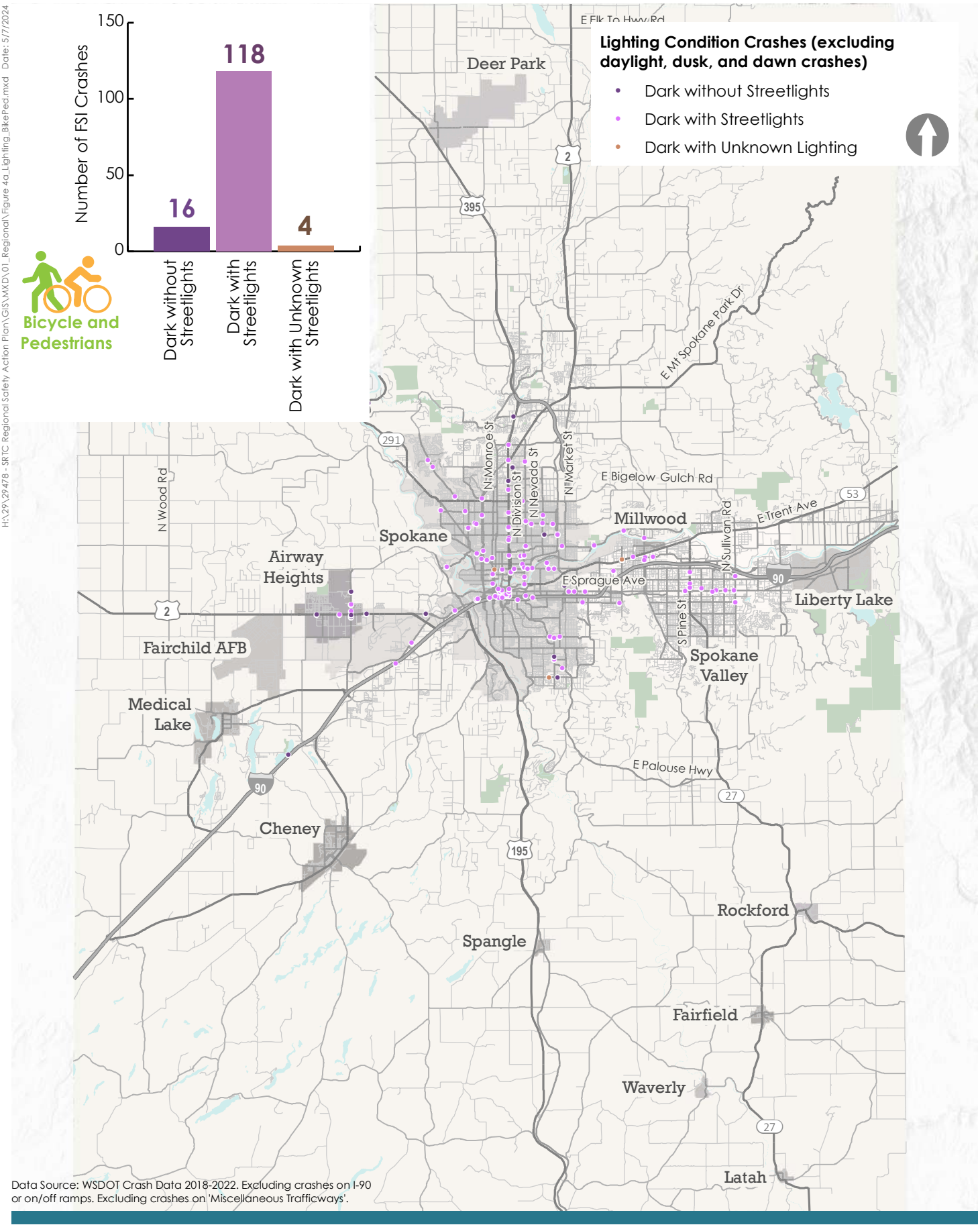


Data Source: WSDOT Crash Data 2018-2022. Excluding crashes on I-90 or on/off ramps. Excluding crashes on 'Miscellaneous Trafficways'.

SRTC SAFETY ACTION PLAN

Figure 3

Fatal and Serious Injury Run Off the Road Crashes

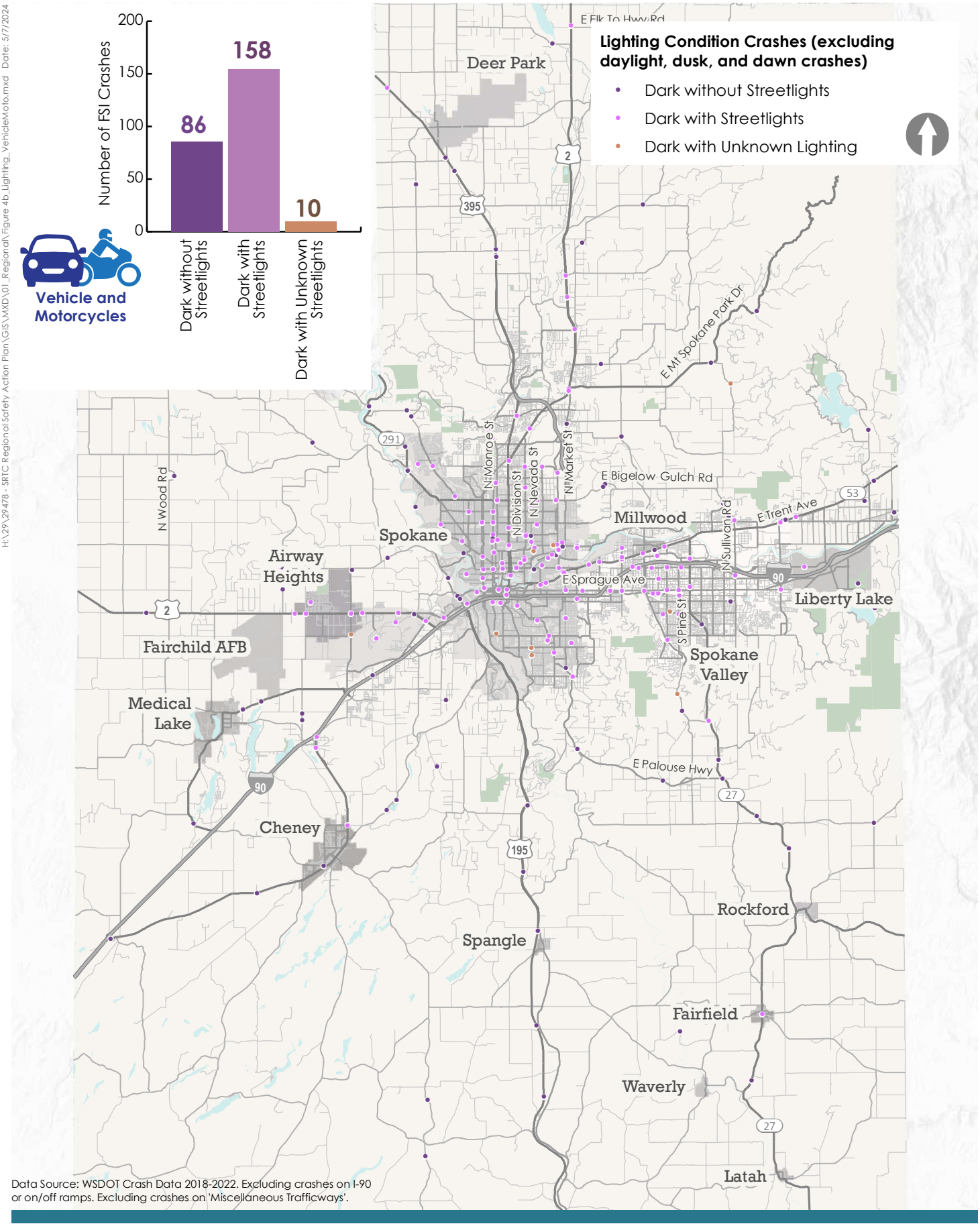


Data Source: WSDOT Crash Data 2018-2022. Excluding crashes on I-90 or on/off ramps. Excluding crashes on 'Miscellaneous Trafficways'.

SRTC SAFETY ACTION PLAN

Figure 4a

Fatal and Serious Injury (Bicycle and Pedestrian) Crashes by Lighting Condition

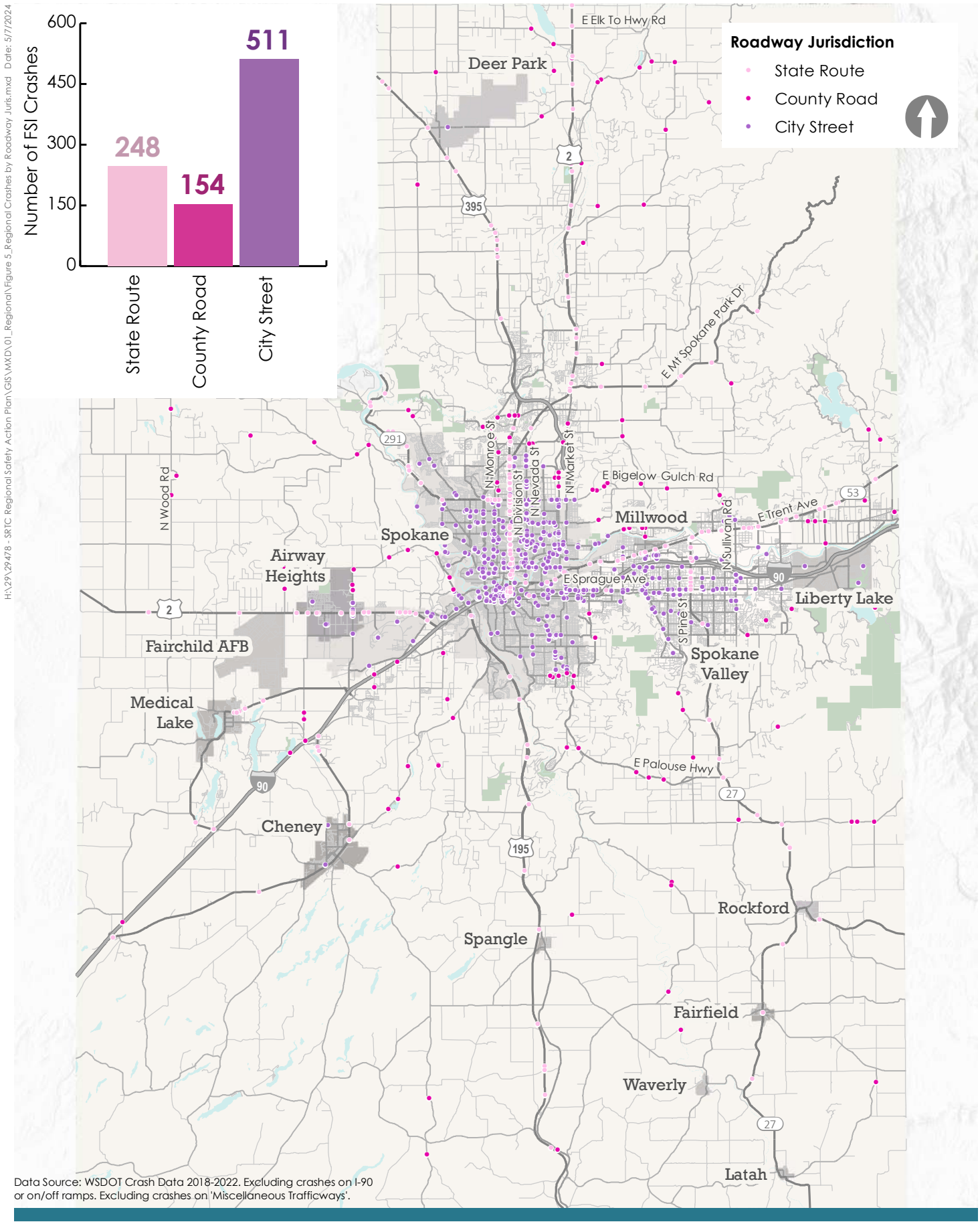


Data Source: WSDOT Crash Data 2018-2022. Excluding crashes on I-90 or on/off ramps. Excluding crashes on 'Miscellaneous Trafficways'.

SRTC SAFETY ACTION PLAN

Figure 4b

Fatal and Serious Injury (Auto and Motorcycle) Crashes by Lighting Condition

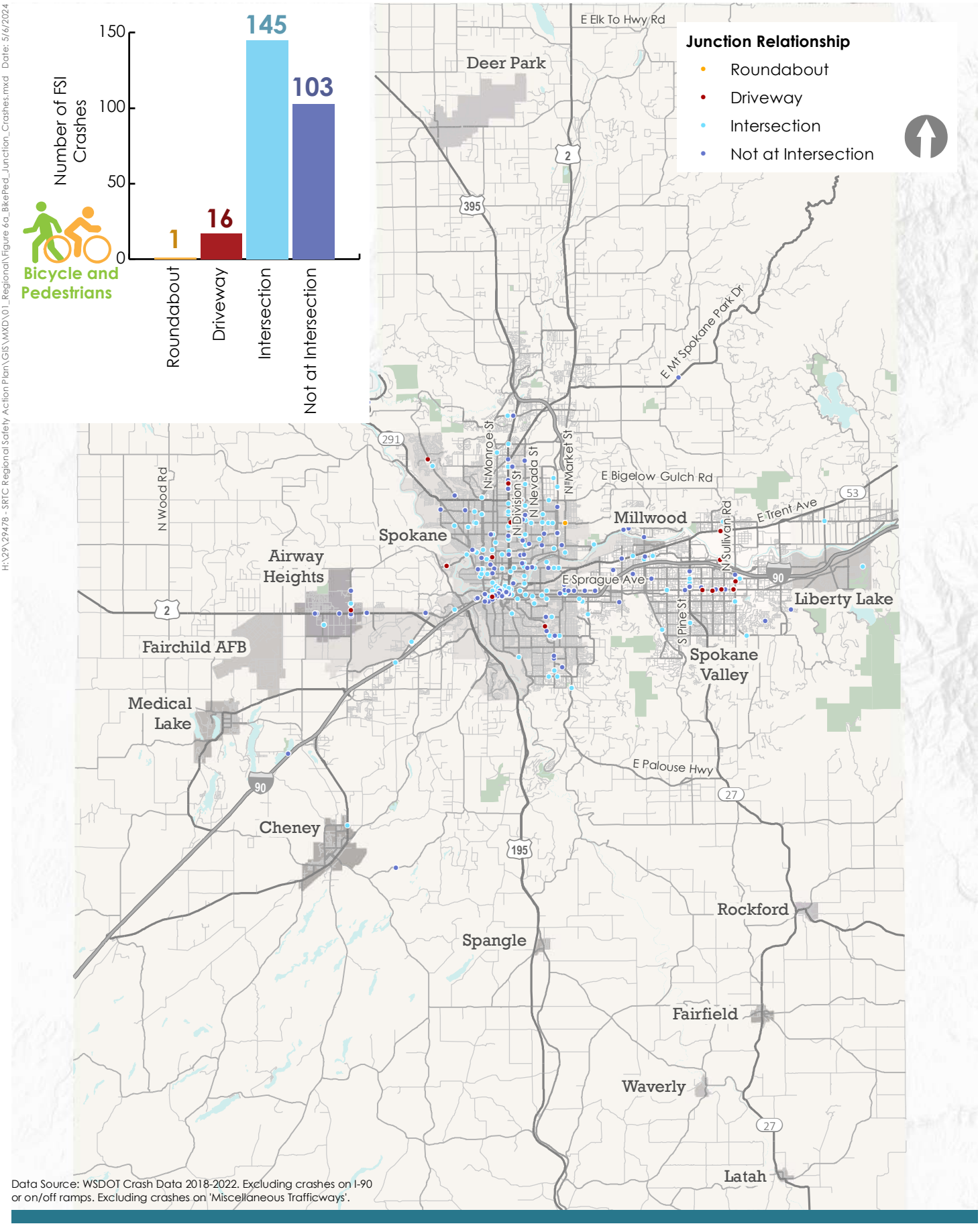


Data Source: WSDOT Crash Data 2018-2022. Excluding crashes on I-90 or on/off ramps. Excluding crashes on 'Miscellaneous Trafficways'.

SRTC SAFETY ACTION PLAN

Figure 5

Fatal and Serious Injury Crashes by Roadway Jurisdiction

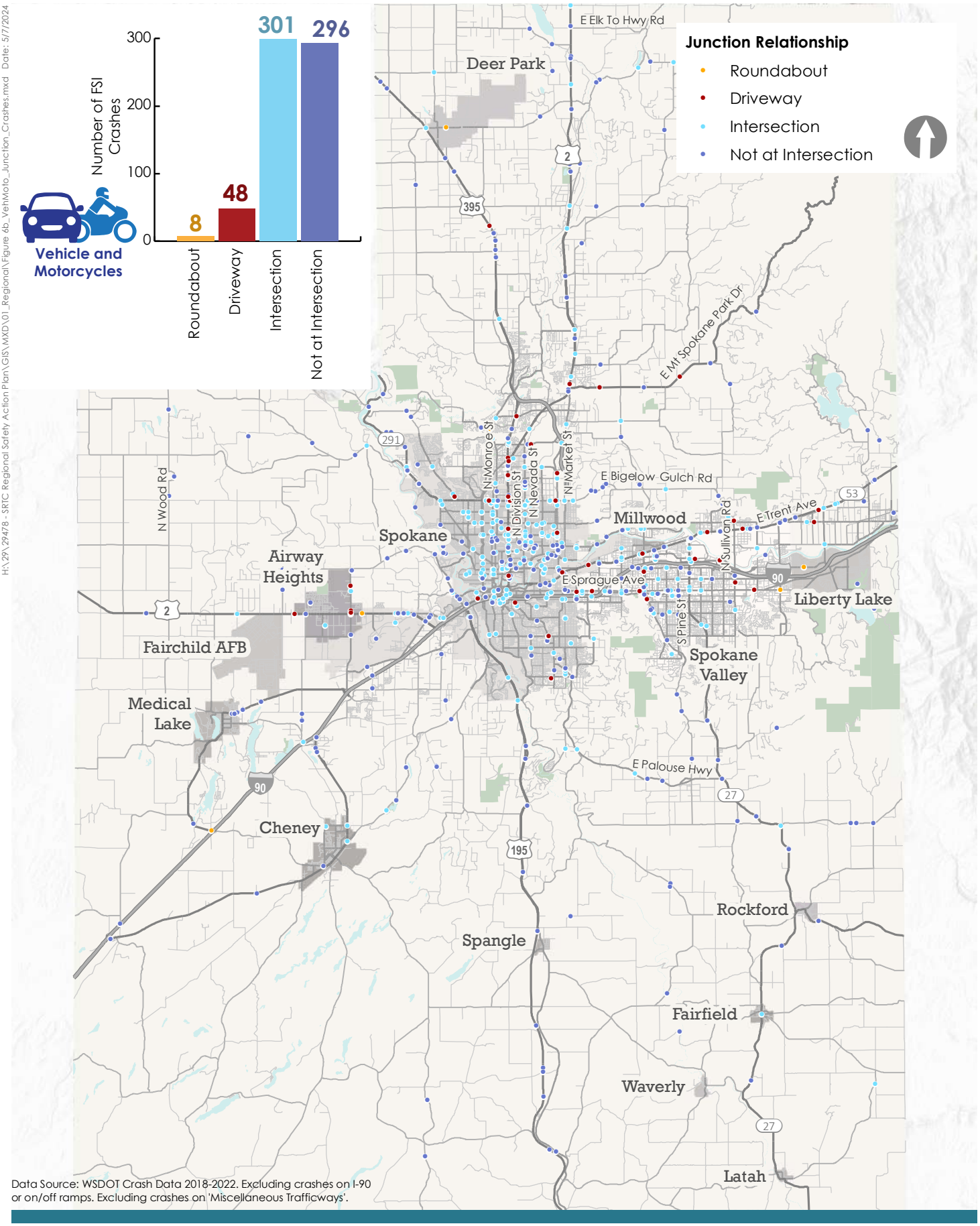


Data Source: WSDOT Crash Data 2018-2022. Excluding crashes on I-90 or on/off ramps. Excluding crashes on 'Miscellaneous Trafficways'.

SRTC SAFETY ACTION PLAN

Figure 6a

Fatal and Serious Injury Bicycle and Pedestrian Crashes by Junction Relationship

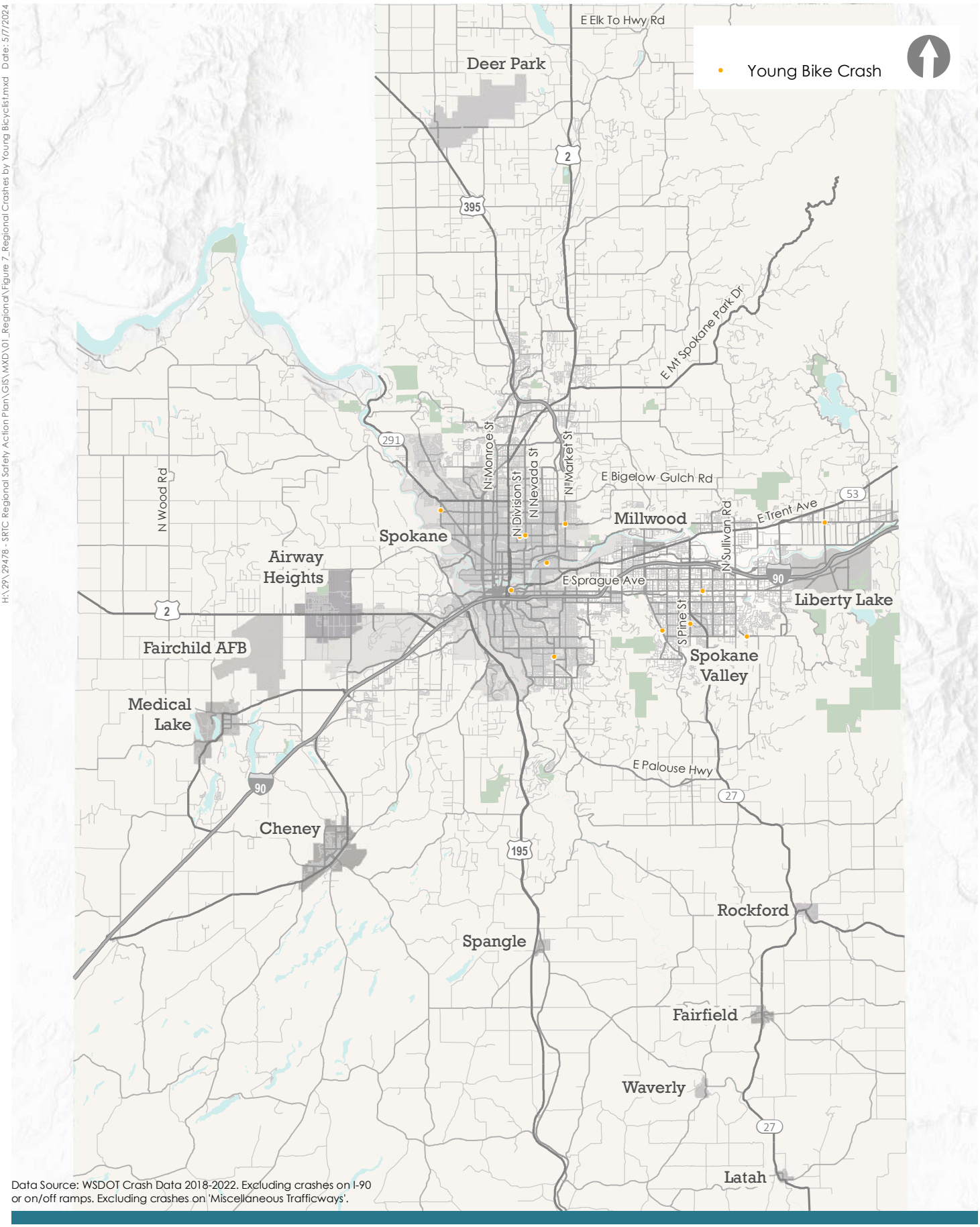


Data Source: WSDOT Crash Data 2018-2022. Excluding crashes on I-90 or on/off ramps. Excluding crashes on 'Miscellaneous Trafficways'.

SRTC SAFETY ACTION PLAN

Figure 6b

Fatal and Serious Injury (Vehicle and Motorcycle) Crashes by Junction Relationship

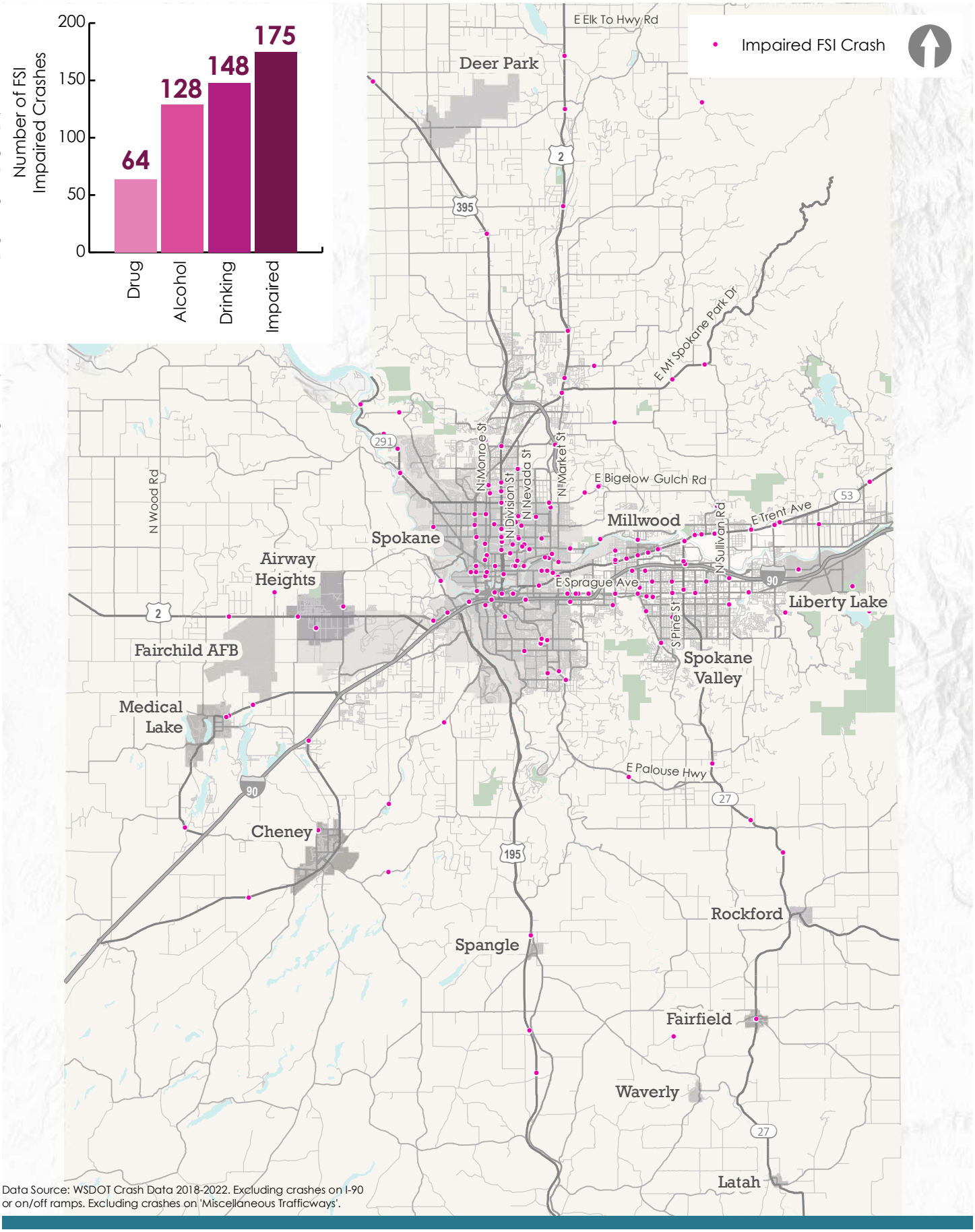


Data Source: WSDOT Crash Data 2018-2022. Excluding crashes on I-90 or on/off ramps. Excluding crashes on 'Miscellaneous Trafficways'.

SRTC SAFETY ACTION PLAN

Figure 7

Fatal and Serious Injury Crashes Involving a Bicyclist Under Age 20

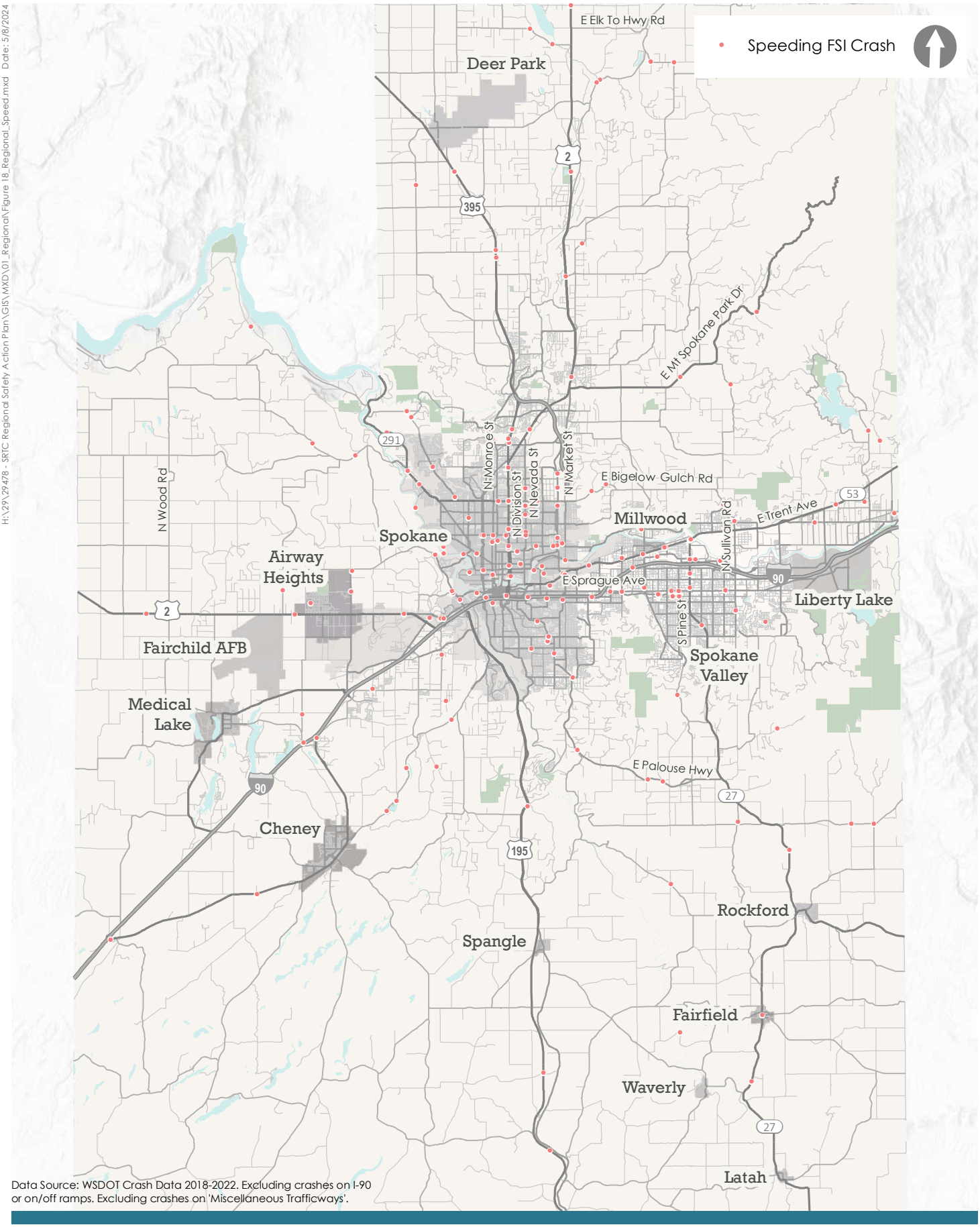


Data Source: WSDOT Crash Data 2018-2022. Excluding crashes on I-90 or on/off ramps. Excluding crashes on 'Miscellaneous Trafficways'.

SRTC SAFETY ACTION PLAN

Figure 8

Fatal and Serious Injury Type of Impaired Crashes

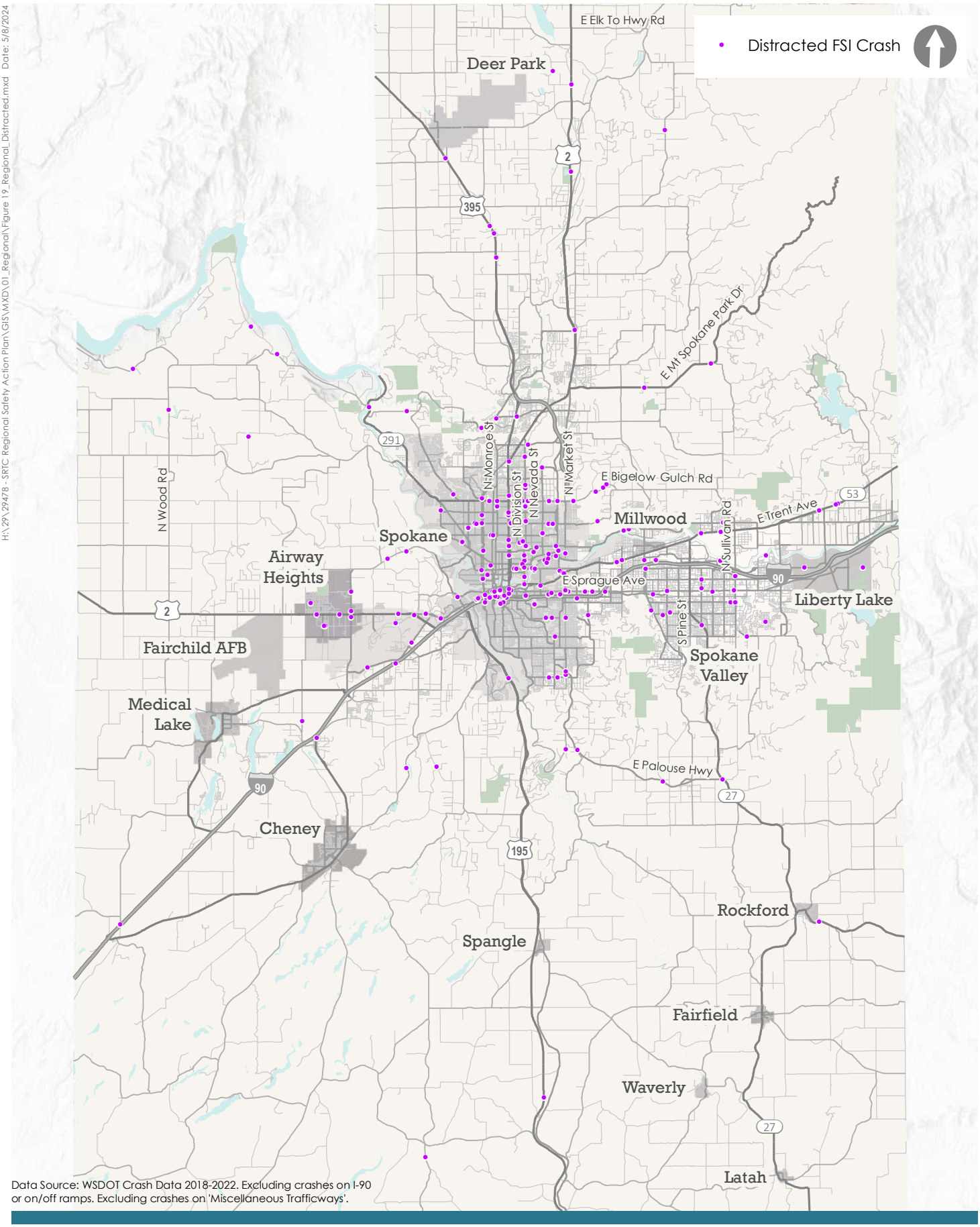


Data Source: WSDOT Crash Data 2018-2022. Excluding crashes on I-90 or on/off ramps. Excluding crashes on 'Miscellaneous Trafficways'.

SRTC SAFETY ACTION PLAN

Figure 9

Fatal and Serious Injury Speeding Crashes



Data Source: WSDOT Crash Data 2018-2022. Excluding crashes on I-90 or on/off ramps. Excluding crashes on 'Miscellaneous Trafficways'.

SRTC SAFETY ACTION PLAN

Figure 10

Fatal and Serious Injury Distracted Crashes

CITY OF SPOKANE CRASH TRENDS

Crash Characteristics

The first few exhibits in this section look at long-term trends from 2013 through 2022. The exhibits that follow characterize the 479 fatal and serious injury crashes (2018 – 2022) in the City of Spokane:

- 197 vehicle-only crashes
- 151 pedestrian crashes
- 95 motorcycle crashes
- 36 bicyclist crashes

CRASH MODE AND SEVERITY

The following fatal and serious injury **crash trends** are observed in the City of Spokane's crash data:

Crash Mode Trends

- The trends in the number of annual injuries for the City of Spokane are similar to the regional trends, with a general **increase in FSIs** since 2013 (Exhibit 27 and Exhibit 28).
- The annual **number of FSIs** in the City is approximately half the annual number of FSIs in the region.
- FSI **vehicle-only** and **pedestrian crashes** have been dramatically increasing since 2013 (Exhibit 29).
- In 2017, there were **more pedestrian crash FSIs than vehicle-only crash FSIs**. This was not observed in the regional data, where vehicle-only crash FSIs were always the most common.
- FSI **motorcycle crashes** have increased in recent years while FSI **bicycle crashes** have decreased since 2018 and remained fairly constant.

Relative Frequency Trends

- FSI **pedestrian crashes** are more overrepresented in the City of Spokane than in the region as a whole. In the City, pedestrian crashes comprise 4% of all crashes but 40% and 30% of fatal and serious injury crashes, respectively. In the region they comprise 3% of all and 23% of FSI crashes.
- In contrast, FSI **vehicle-only crashes** make up a smaller percentage of the FSI crash population. These observations are consistent with trends previously noted in this section.

Exhibit 27. Fatal and Serious Crashes by Year and Mode in the City of Spokane (2013 – 2022)

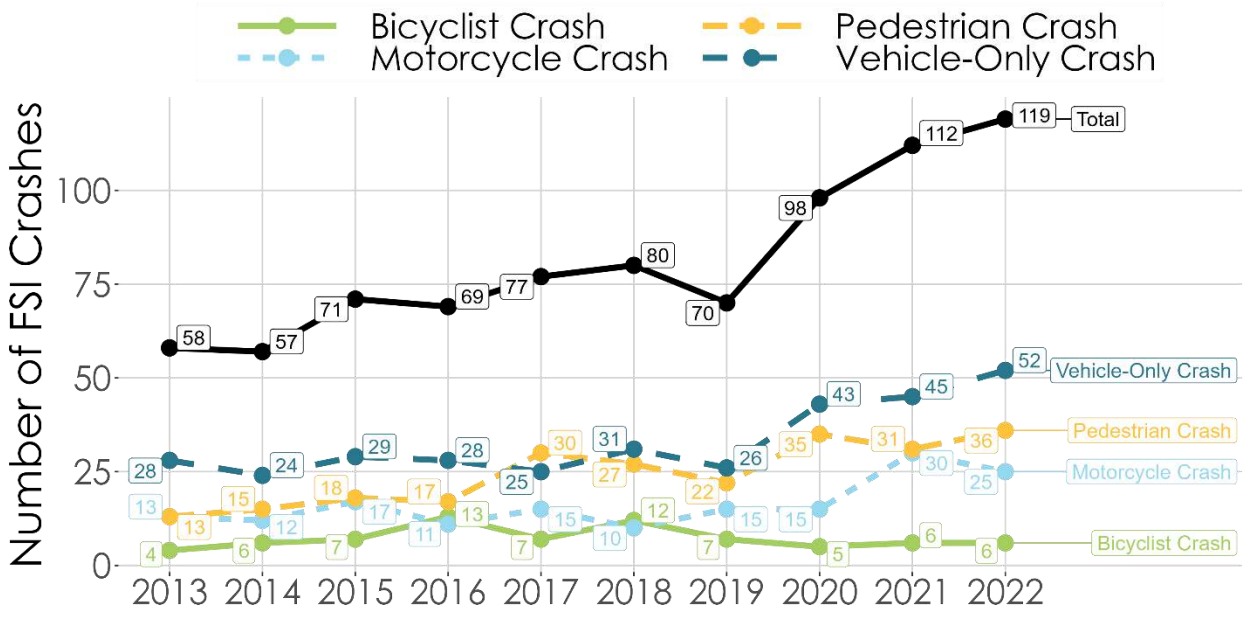


Exhibit 28. Fatal and Serious Injury Crashes by Year and Severity in the City of Spokane (2013 – 2022)

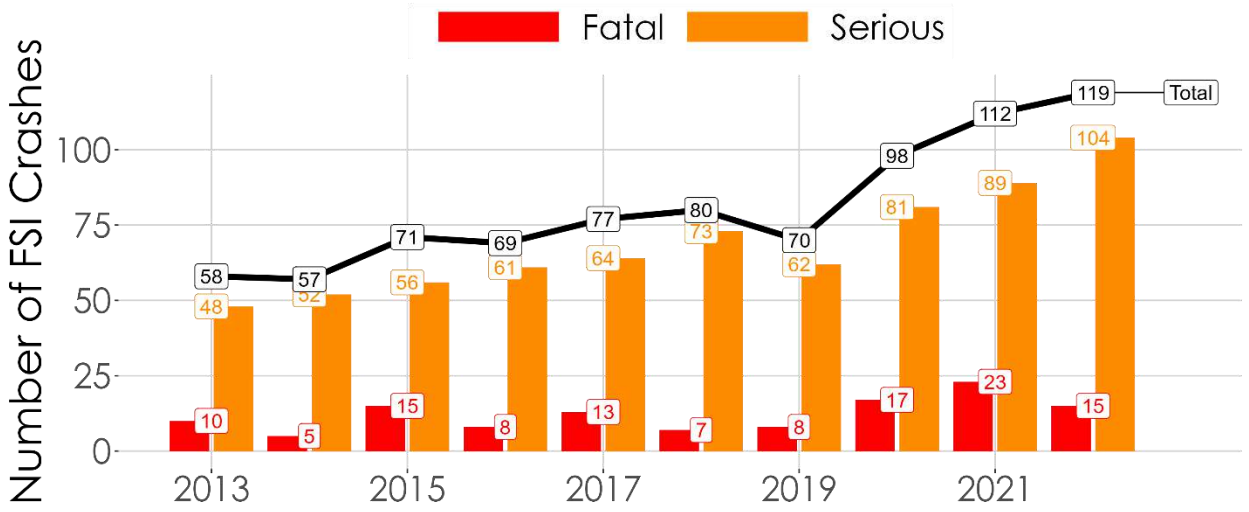
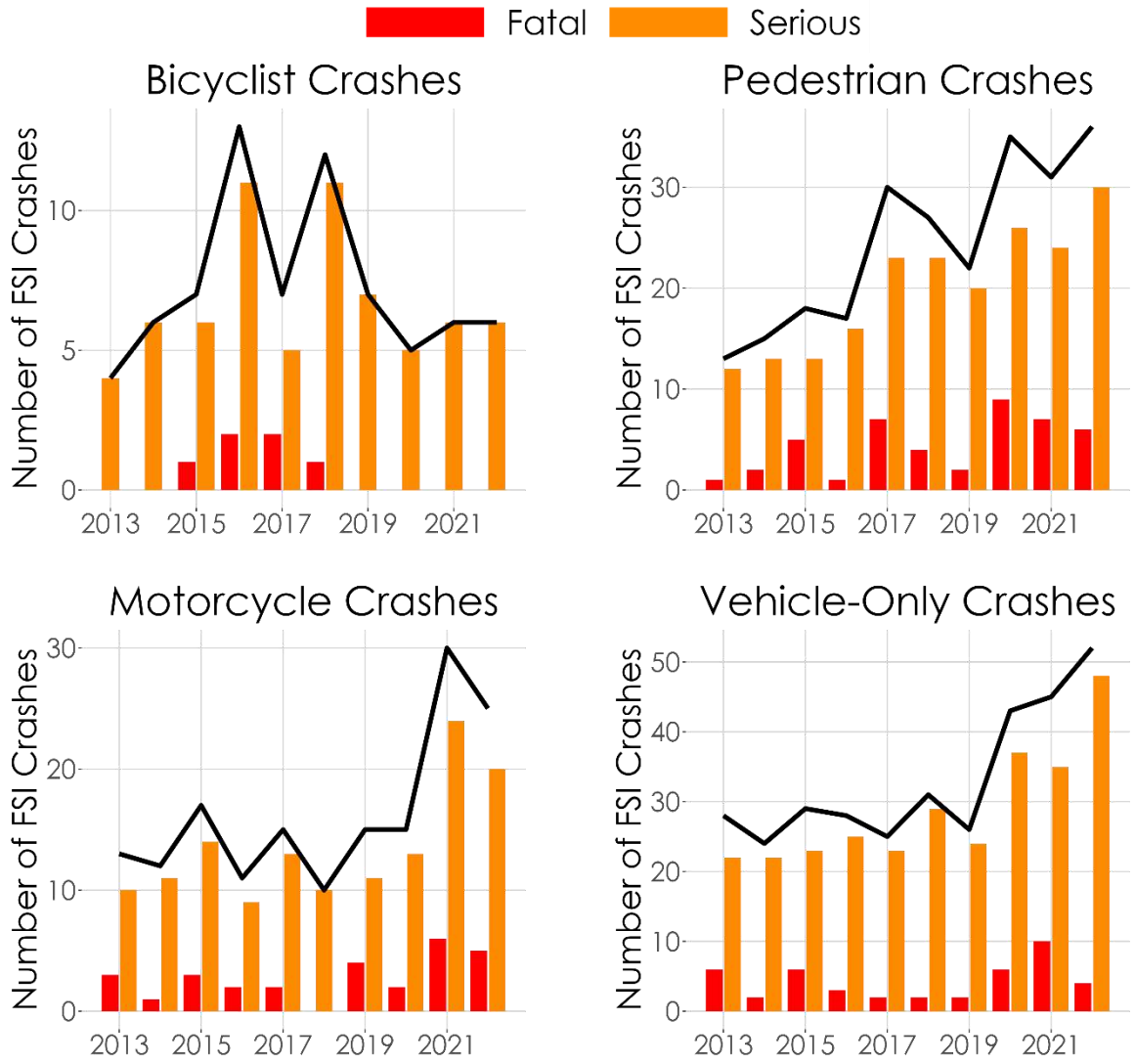


Exhibit 29: Fatal and Serious Injury Crashes by Year and Mode in the City of Spokane (2013 – 2022)



CRASH TYPE

The following crash type trends were observed:

- Crash type frequencies in the City of Spokane vary from the regional trends. In the City, FSI pedestrian crashes are the most common crash type and comprise 39% and 27% of the fatal and serious injury crashes, respectively (Exhibit 30). In the regional trends, run-off-road crashes were the most common crash type.
- Both road departure and lane departure crashes make up a smaller percentage of the FSI crashes in the City than in the region (Exhibit 31).
- FSI **road departure crashes** are generally on an increasing trend (Exhibit 33) while FSI **lane departure crashes** have remained fairly constant (Exhibit 32).
- Compared to the regional trends, a larger percentage of the FSI road and lane departure crashes in the City occur in daylight conditions (Exhibit 34).

Exhibit 30: Fatal and Serious Injury Crashes by Crash Type in the City of Spokane (2018 – 2022)

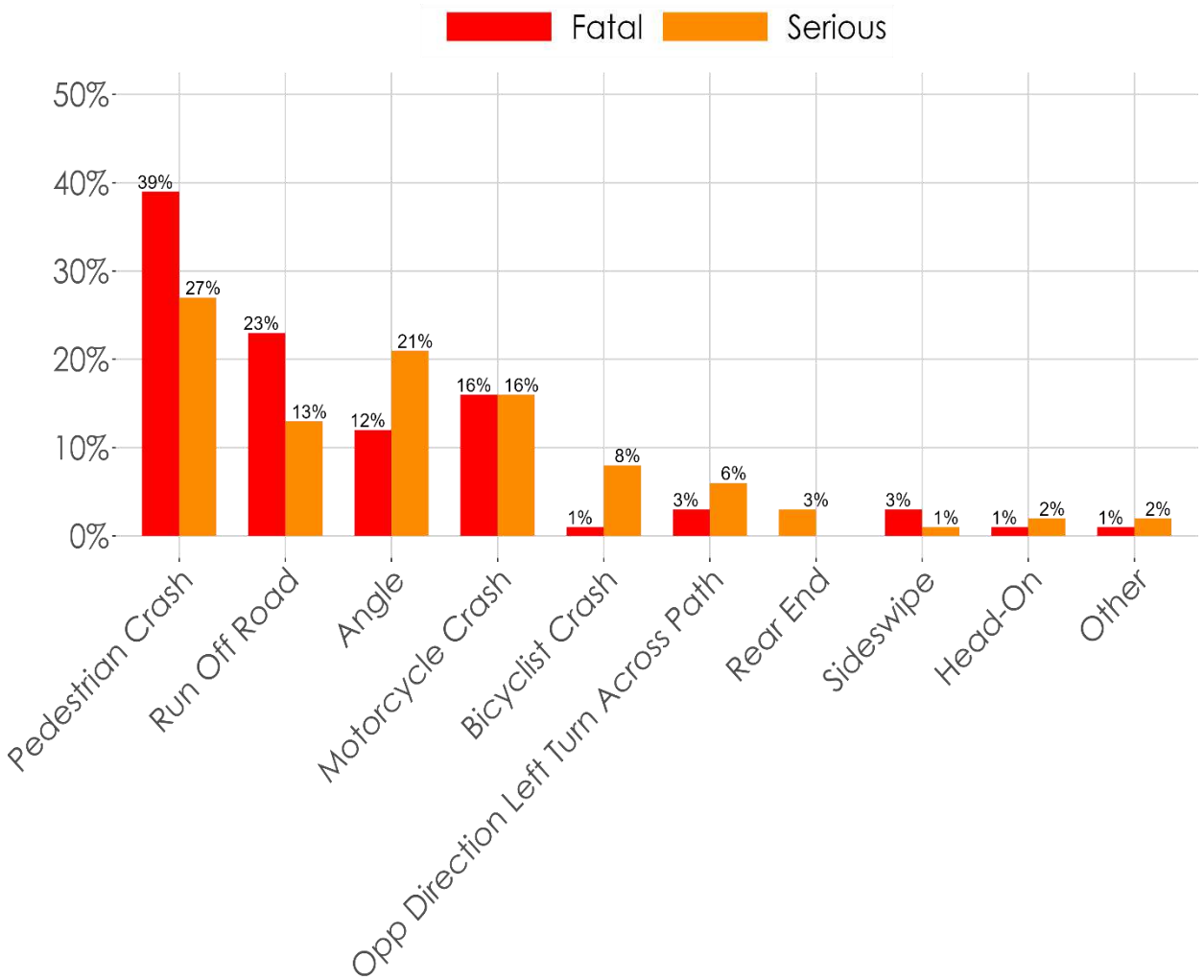


Exhibit 31: Annual Lane and Road Departure Crash Composition of Fatal and Serious Injury Crashes in the City of Spokane (2018 – 2022)

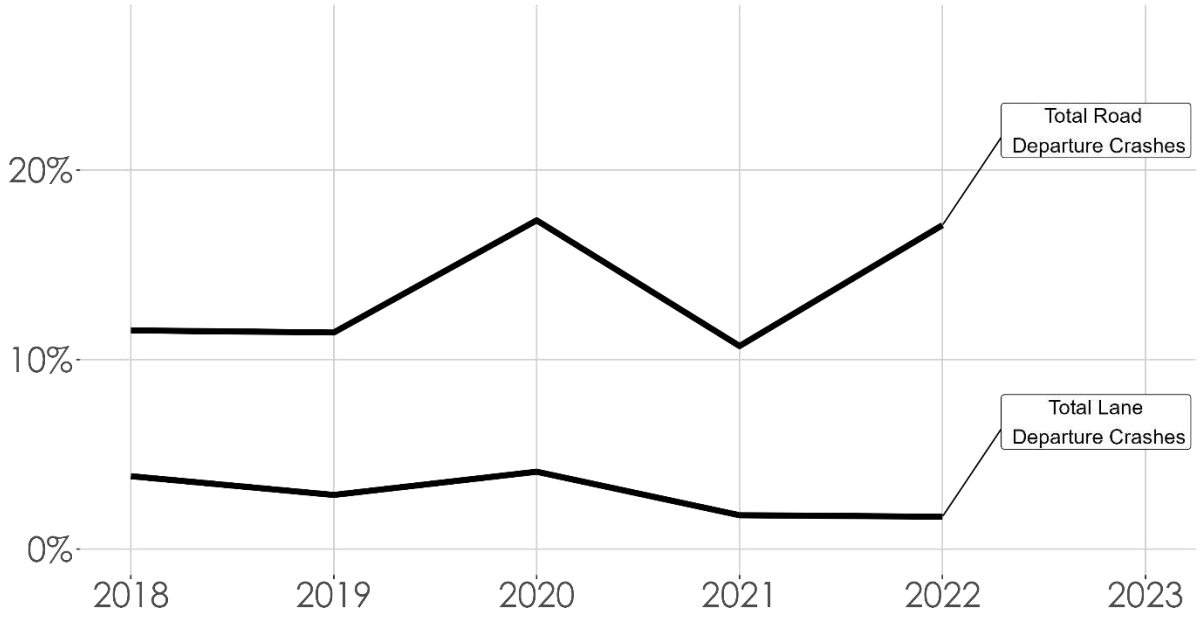


Exhibit 32: Fatal and Serious Injury Lane Departure Crashes by Year in the City of Spokane (2018 – 2022)

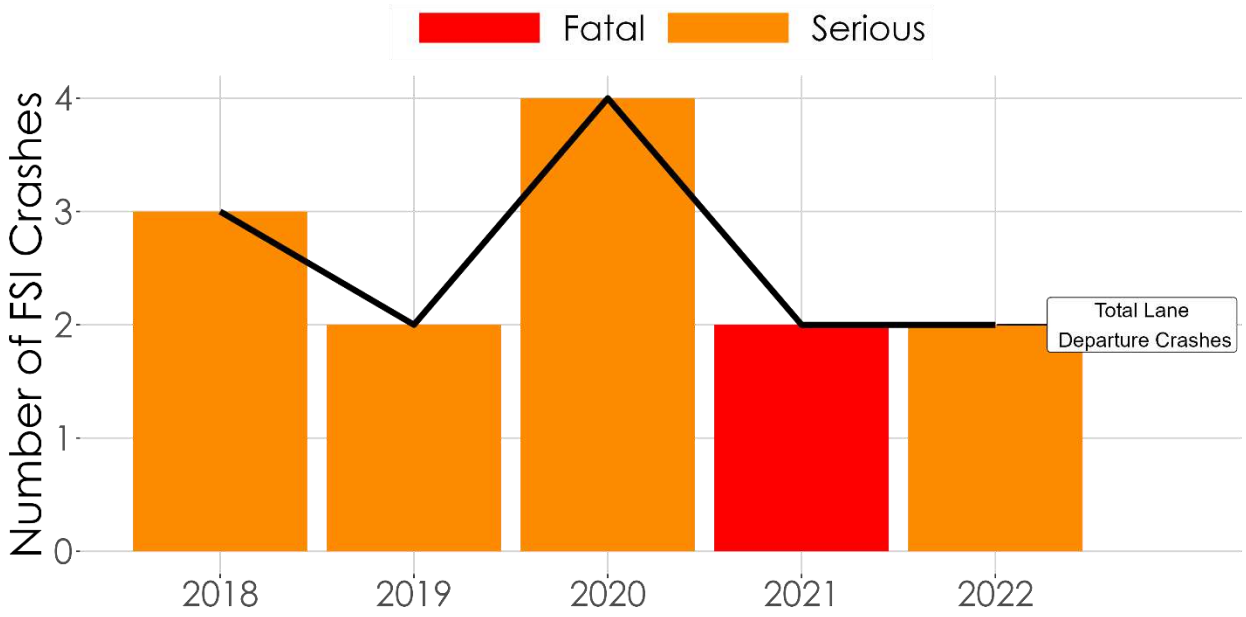


Exhibit 33: Fatal and Serious Injury Road Departure Crashes by Year in the City of Spokane (2018 – 2022)

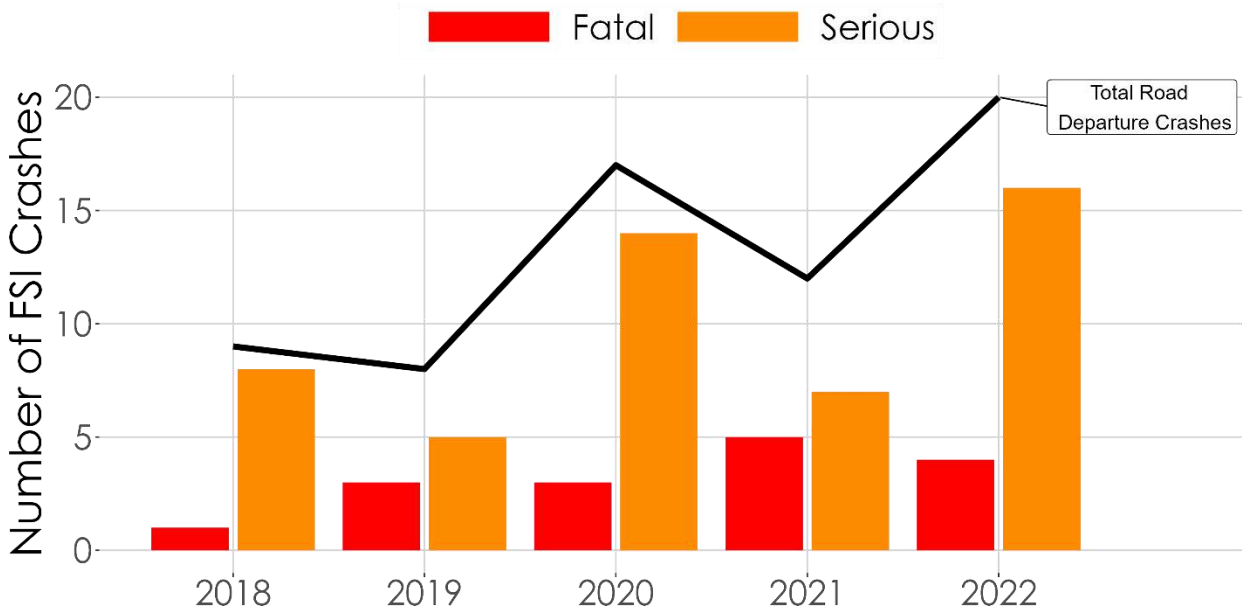
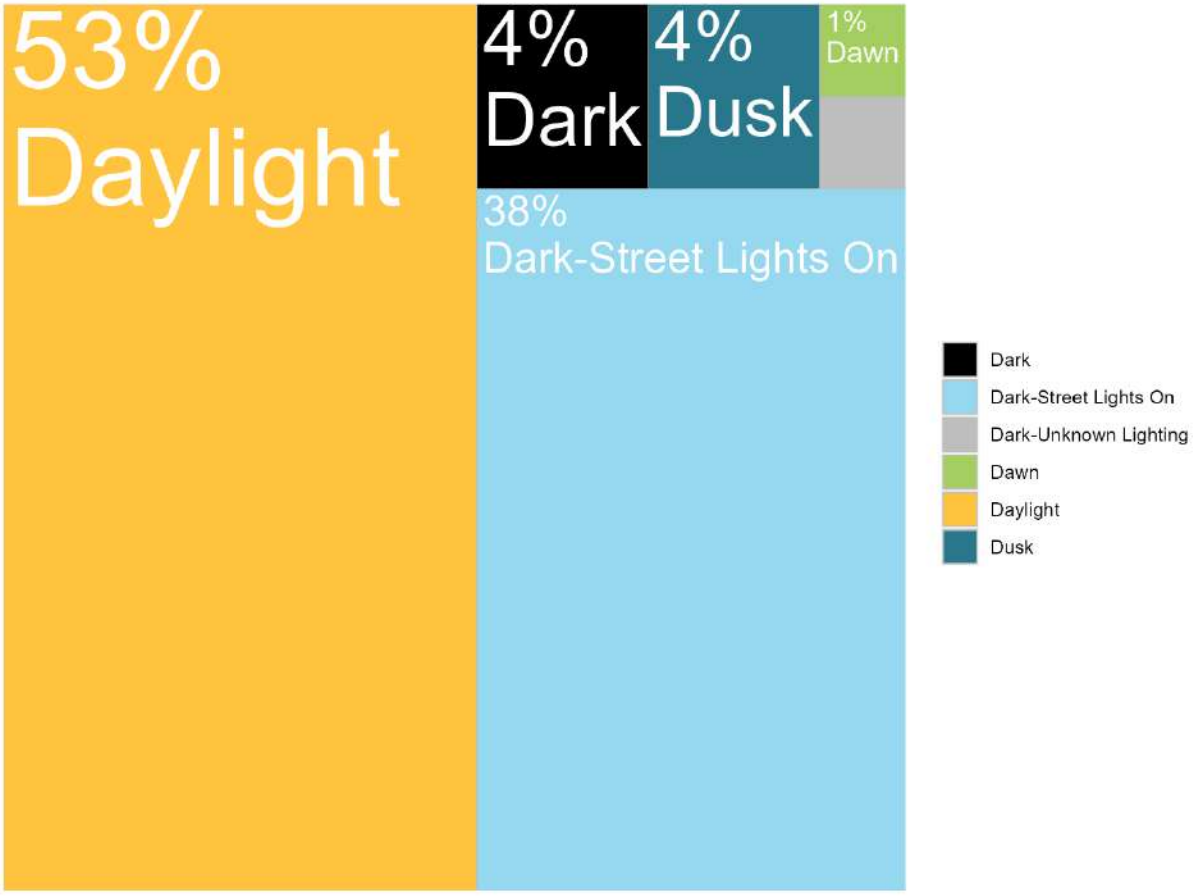


Exhibit 34: Lighting Conditions for Fatal and Serious Injury Lane and Road Departure Crashes in the City of Spokane (2018 – 2022)



WHEN DO CRASHES HAPPEN?

When crashes occur can be measured by the month, day of the week, and hour of the day. The following observations were made when observing all four time-based data elements:

Month (Exhibit 35)

- FSI **motorcycle crashes** peak in the summer months which matches regional trends.
- FSI **pedestrian crashes** peak in November which matches regional trends.
- FSI **bicycle crashes** peak in October which matches regional trends.
- FSI **vehicle-only crashes** vary more month to month than the other crash modes. This is consistent with regional trends.

Day of Week (Exhibit 36)

- FSI **pedestrian and bicycle crashes** decrease throughout the week.
- Compared to regional trends, FSI **vehicle-only and motorcycle** crashes vary more throughout the week, with peaks on Friday and Saturday for motorcycle crashes and dip for vehicle-only crashes on Saturday.

Hour of Day (Exhibit 37)

- FSI **pedestrian, vehicle-only, and bicycle crashes** peak between 3 PM and 5 PM, whereas FSI **motorcycle crashes** peak between 3 PM and 8 PM.

Exhibit 35: Fatal and Serious Injury Crashes by Time of Year in the City of Spokane (2018 – 2022)

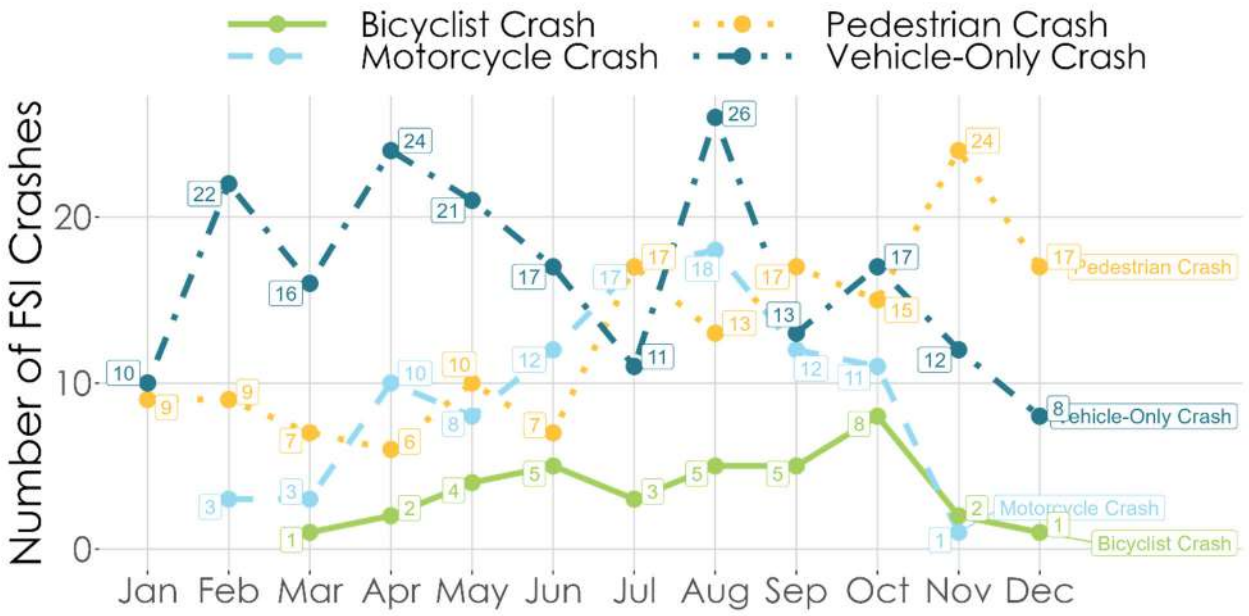


Exhibit 36: Fatal and Serious Injury Crashes by Weekday in the City of Spokane (2018 – 2022)

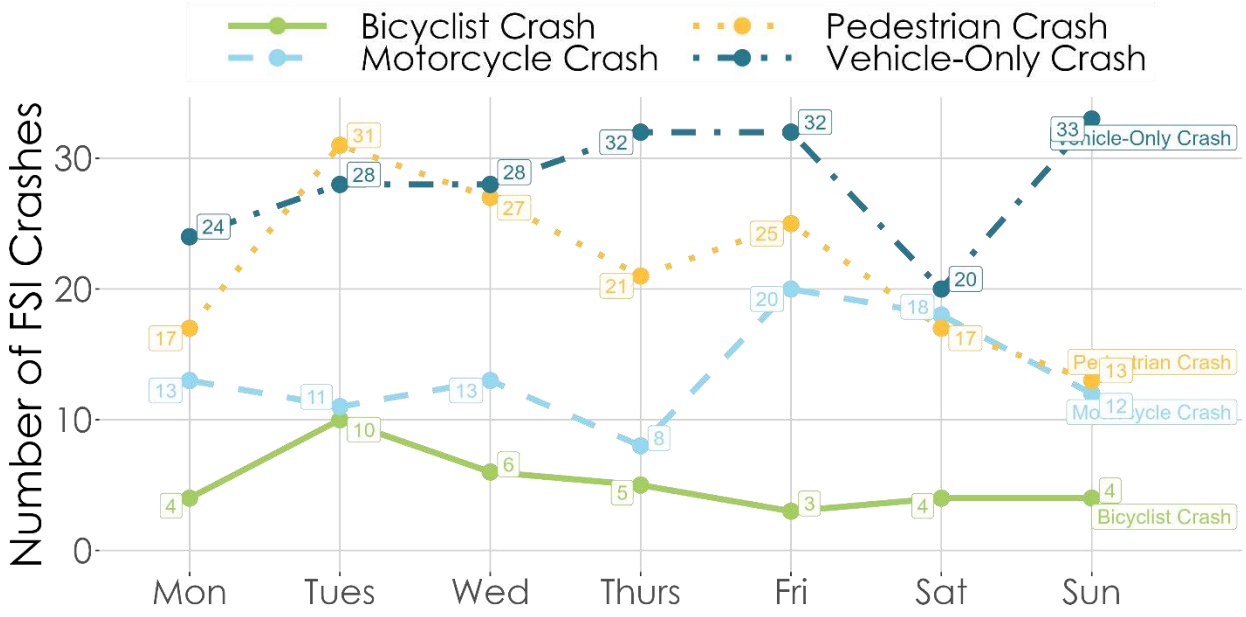
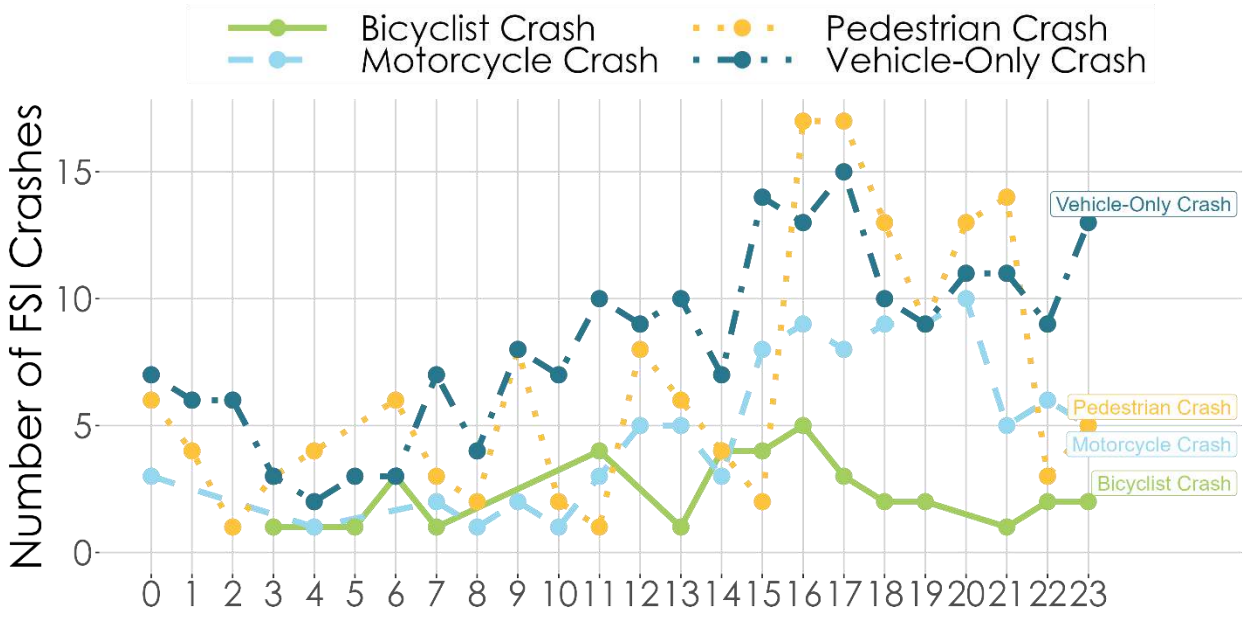


Exhibit 37: Fatal and Serious Injury Crashes by Time of Day in the City of Spokane (2018 – 2022)



WHERE DO CRASHES HAPPEN?

Facility Jurisdiction (Exhibit 38)

- More than 80% of the FSI crashes occurred on **city streets**. This is likely because city streets comprise a large portion of the City of Spokane's roadway network.

Relationship to Junction (Exhibit 39)

- Compared to the regional trends, a larger percentage of the FSI crashes occurred at an **intersection** than anywhere else. This is expected, as the dense urban grid network creates a greater number of intersections.
- There was a similar percentage of **driveway** crashes compared to the region.

Exhibit 38. Fatal and Serious Injury Crashes by Facility Jurisdiction in the City of Spokane (2018 – 2022)

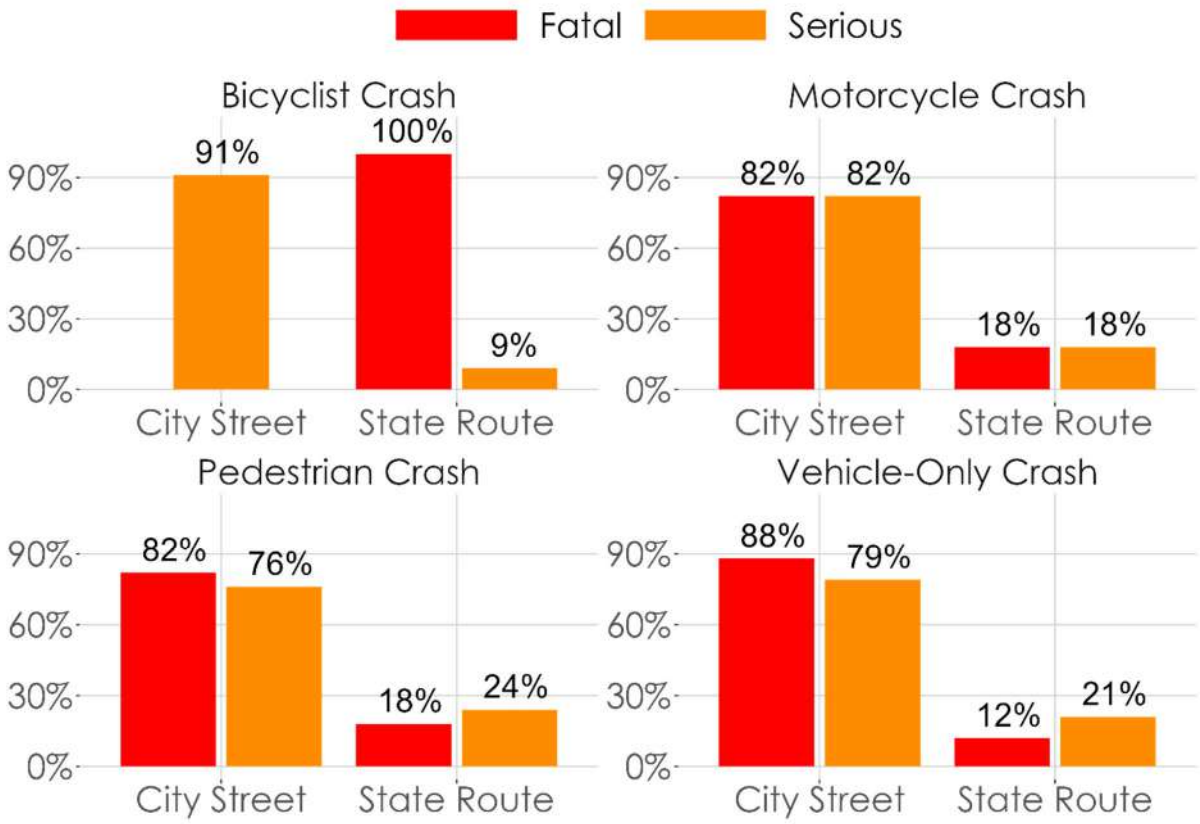
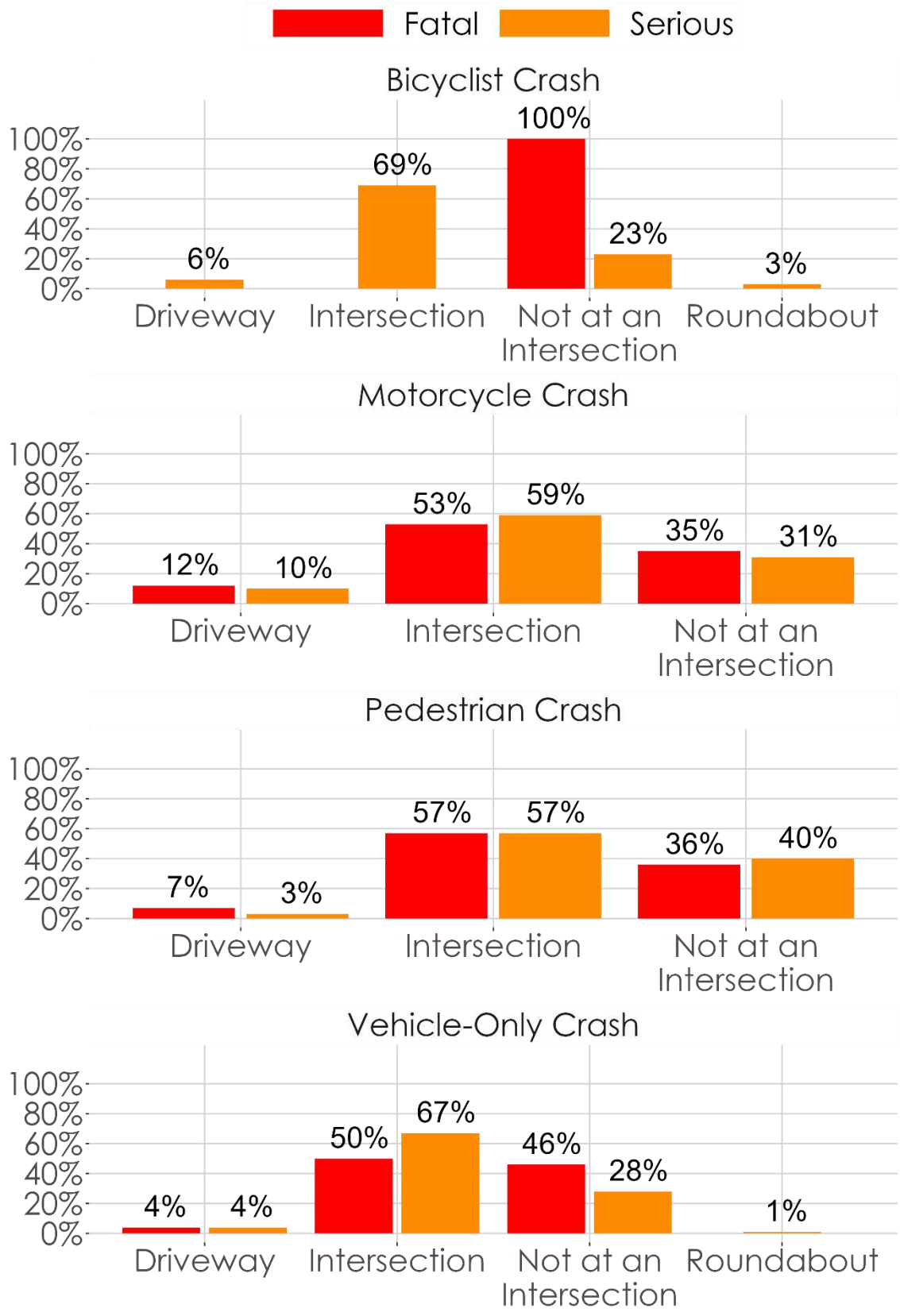


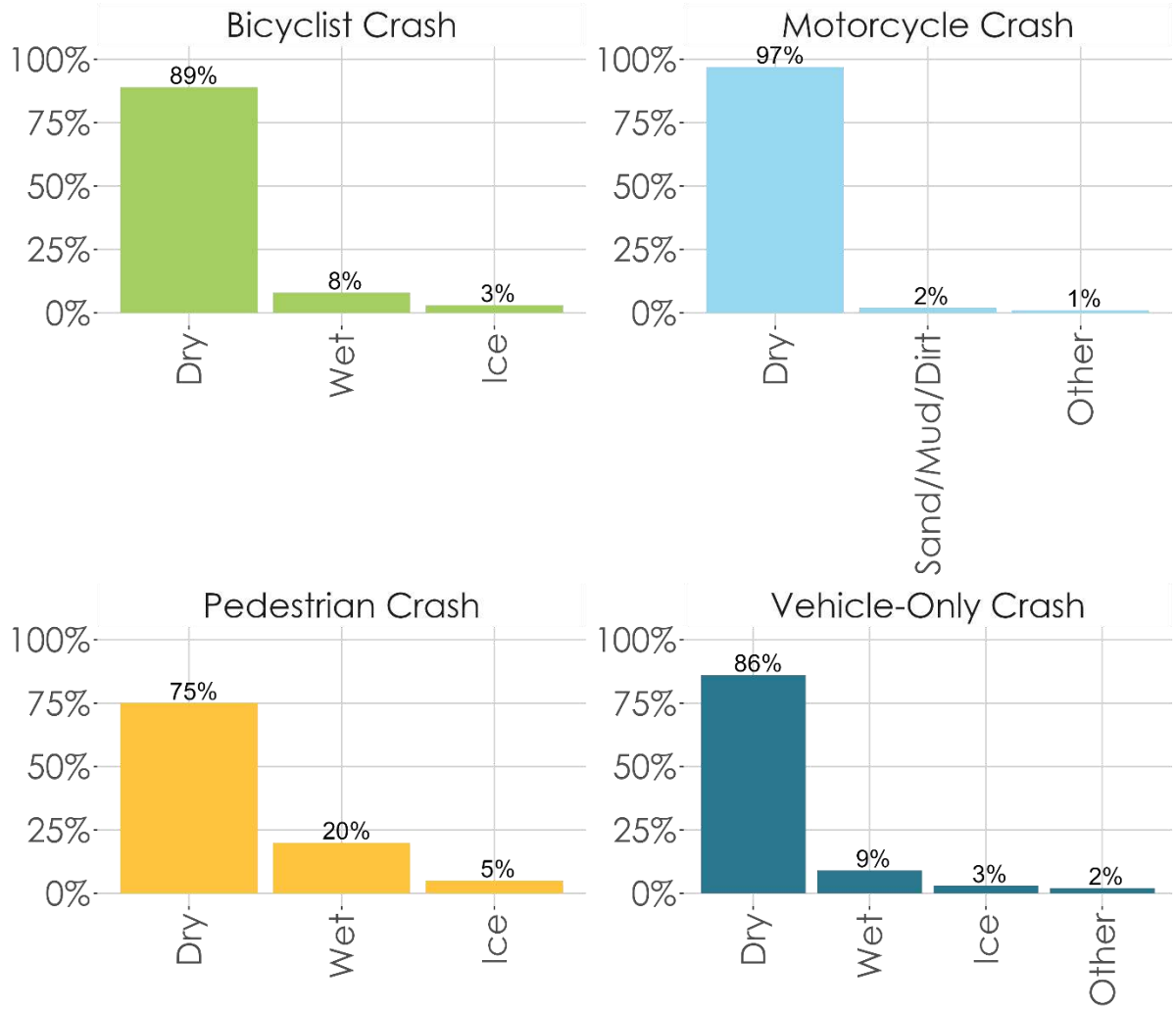
Exhibit 39: Fatal and Serious Injury Crashes by Relationship to Intersection in the City of Spokane (2018 – 2022)



ENVIRONMENTAL

As seen in the regional data, **dry** surface conditions were most common within each crash mode, while **wet** conditions comprised a larger proportion of the **pedestrian** crashes (20%).

Exhibit 40. Distribution of Roadway Conditions for Fatal and Serious Injury Crashes in the City of Spokane (2018 – 2022)



Human Factors/Driver Behavior

The following observations were made when analyzing the contributing circumstances data:

- Distracted driving is the most common contributing circumstance in the City of Spokane. This factor is also overrepresented in pedestrian crashes compared to all other crash modes.
- Alcohol impairment, and impairment in general, is disproportionately present in pedestrian crashes.
- Speeding, as seen in the regional trends, disproportionately affects motorcycle crashes.

CONTRIBUTING CIRCUMSTANCES

Exhibit 41: Fatal and Serious Injury Crashes Involving a Contributing Circumstance in the City of Spokane (2018 – 2022)

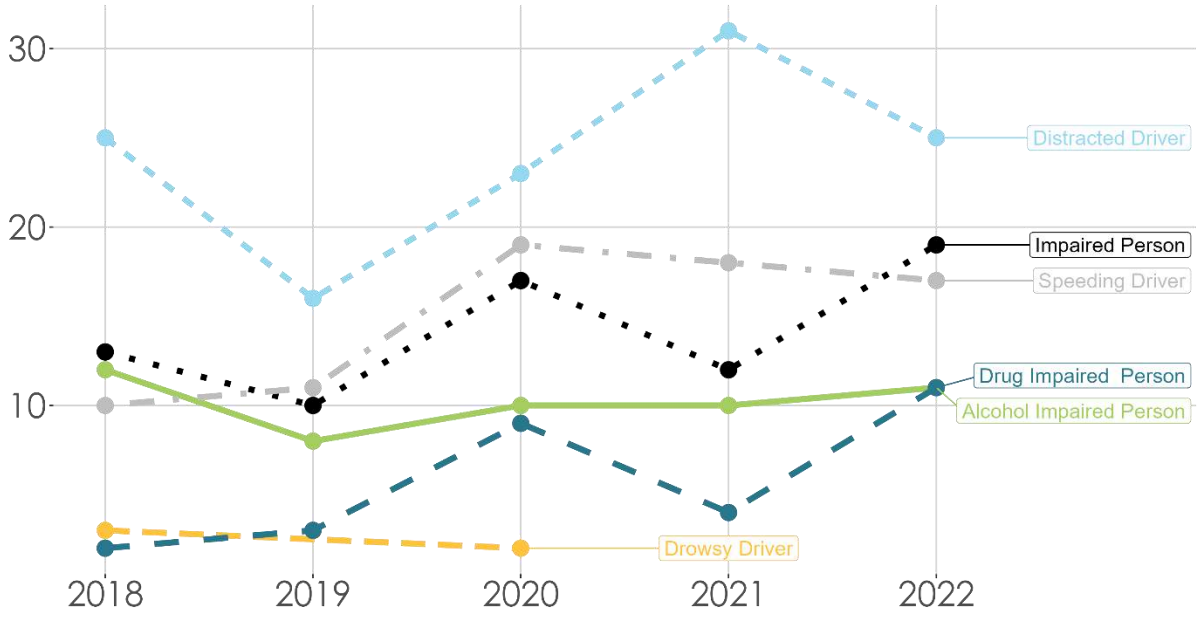
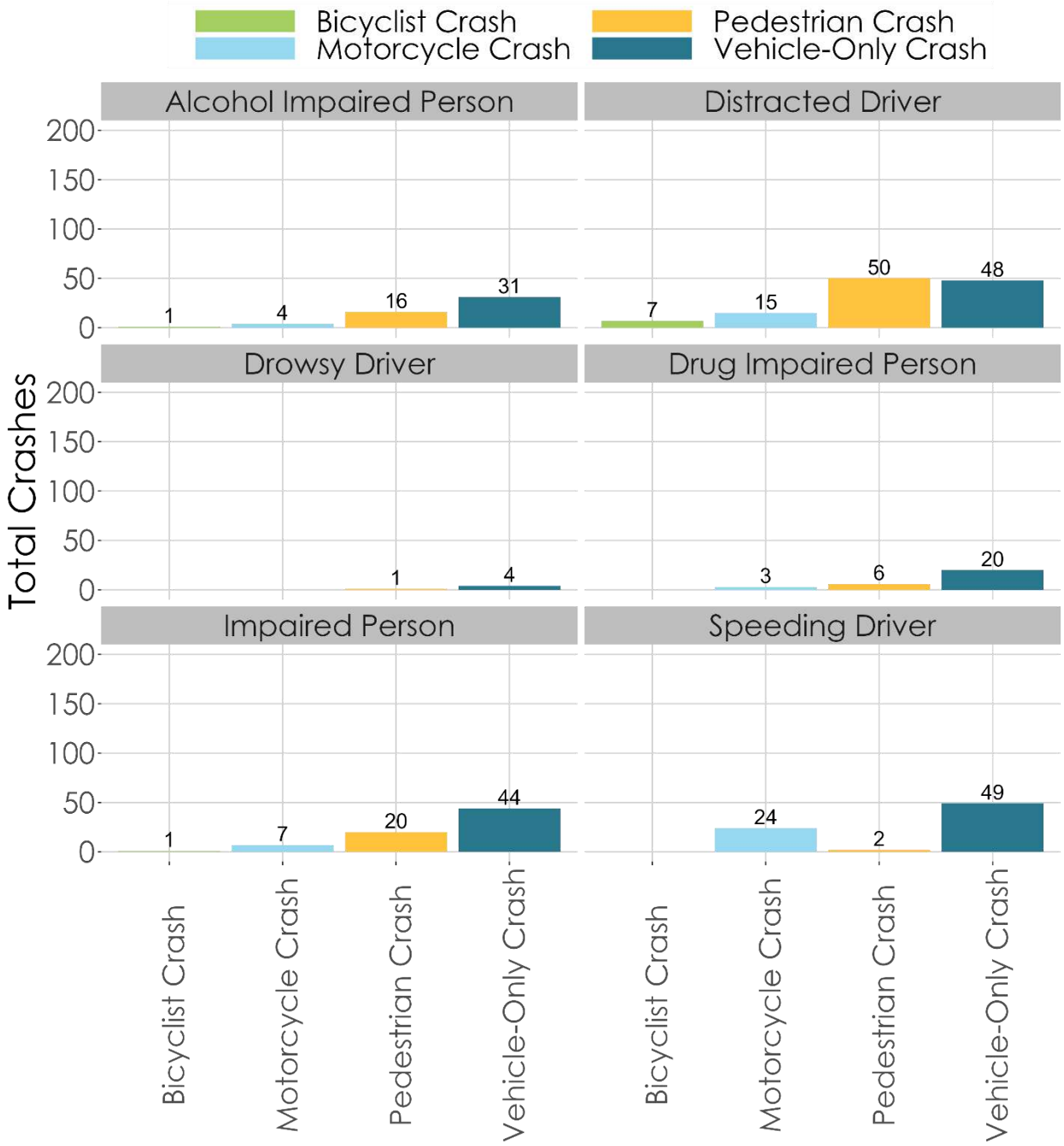


Exhibit 42: Fatal and Serious Injury Crashes Contributing Circumstance by mode in the City of Spokane (2018 – 2022)



ROAD USER CHARACTERISTICS

The age distribution for each road user type was very similar to the regional distributions (Exhibit 43 through Exhibit 46). This includes the trend previously observed, that ages 10 through 19 comprise a much larger percentage of all bicyclists than in any other road user type (Exhibit 46).

Exhibit 43: Fatal and Serious Injury Crashes Vehicle Driver Age Distribution in the City of Spokane (2018 – 2022)

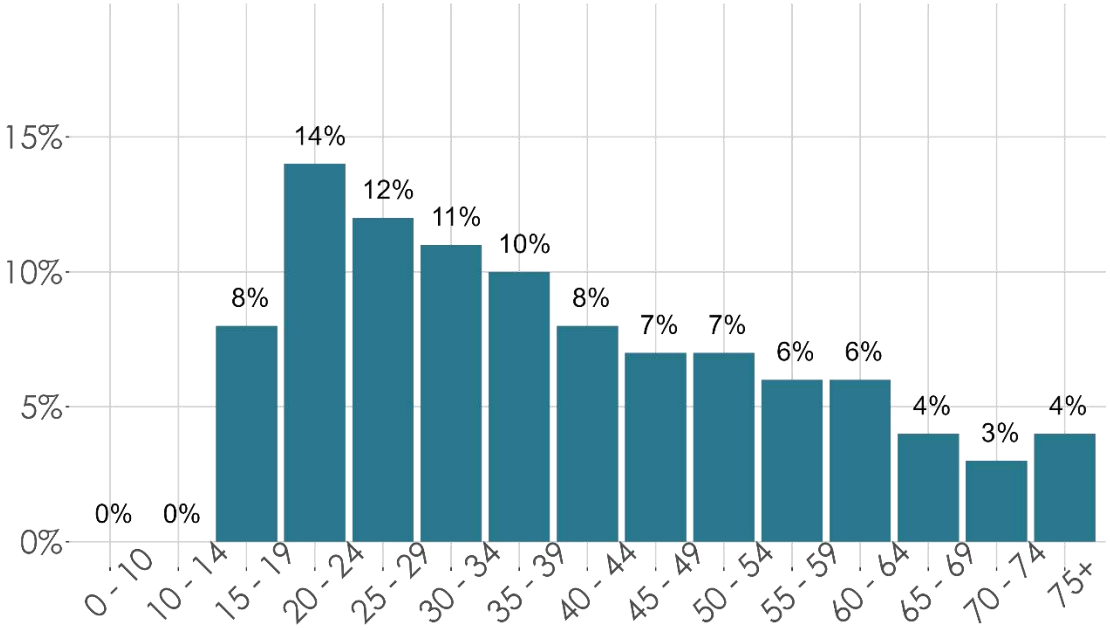


Exhibit 44: Fatal and Serious Injury Crashes Motorcyclist Age Distribution in the City of Spokane (2018 – 2022)

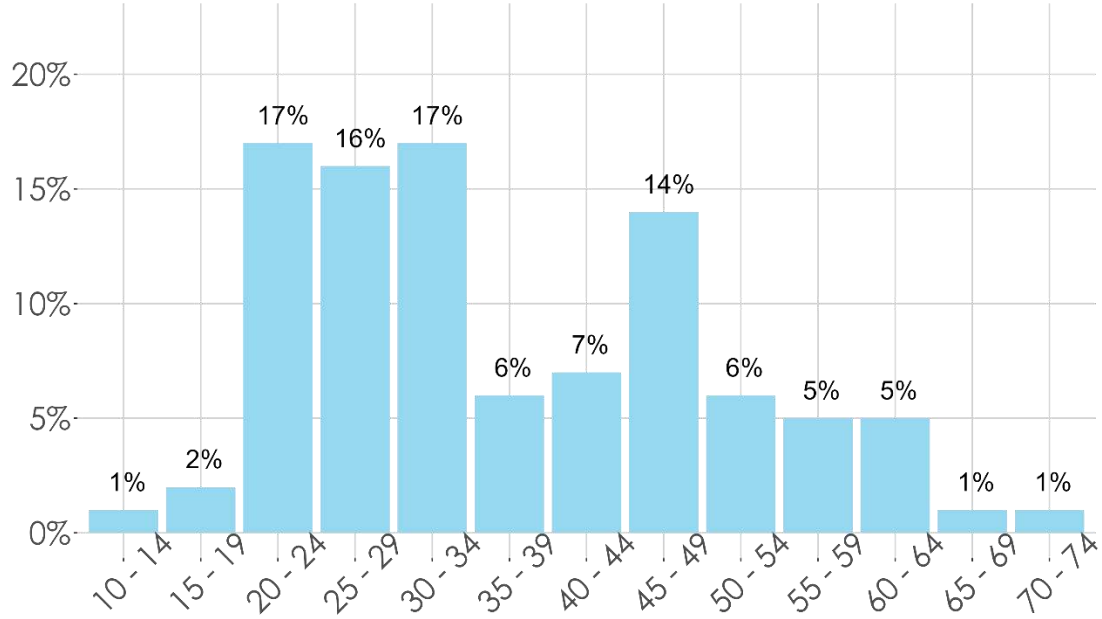


Exhibit 45: Fatal and Serious Injury Crashes Pedestrian Age Distribution in the City of Spokane (2018 – 2022)

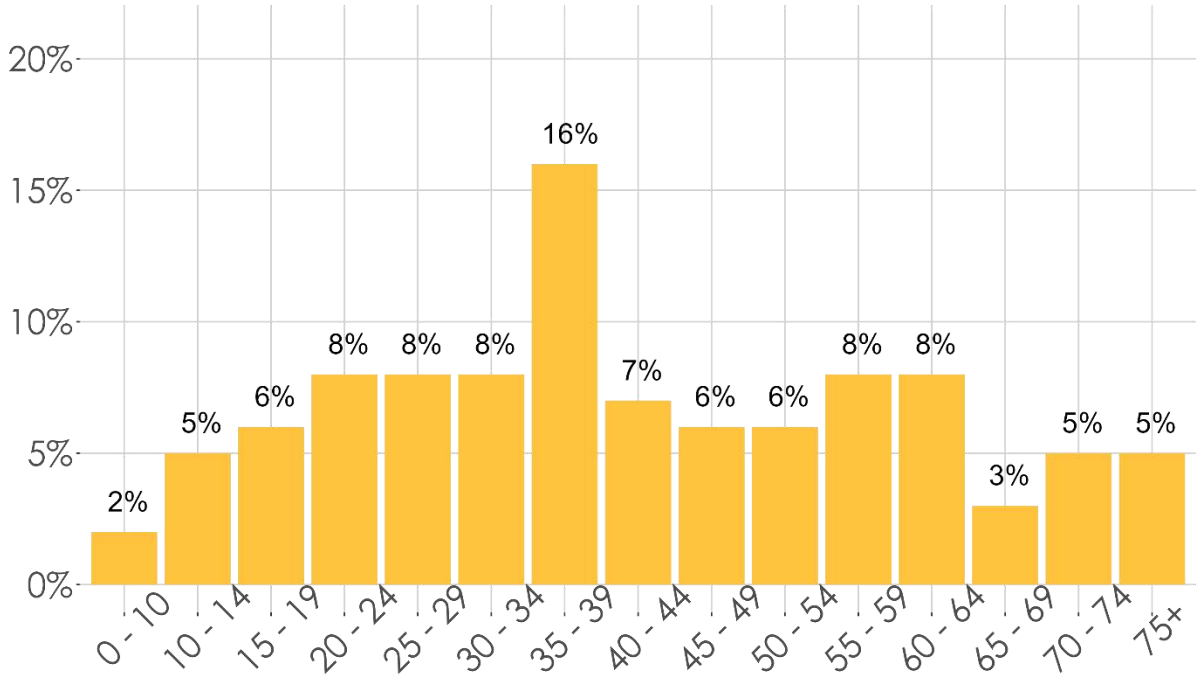
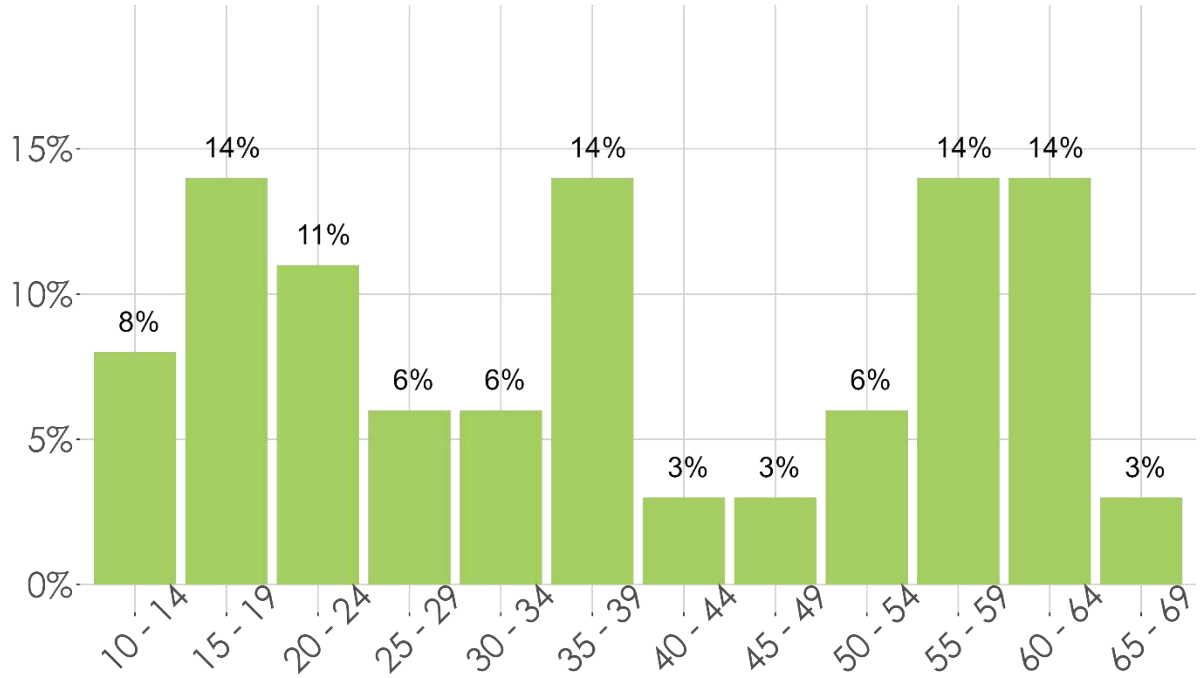


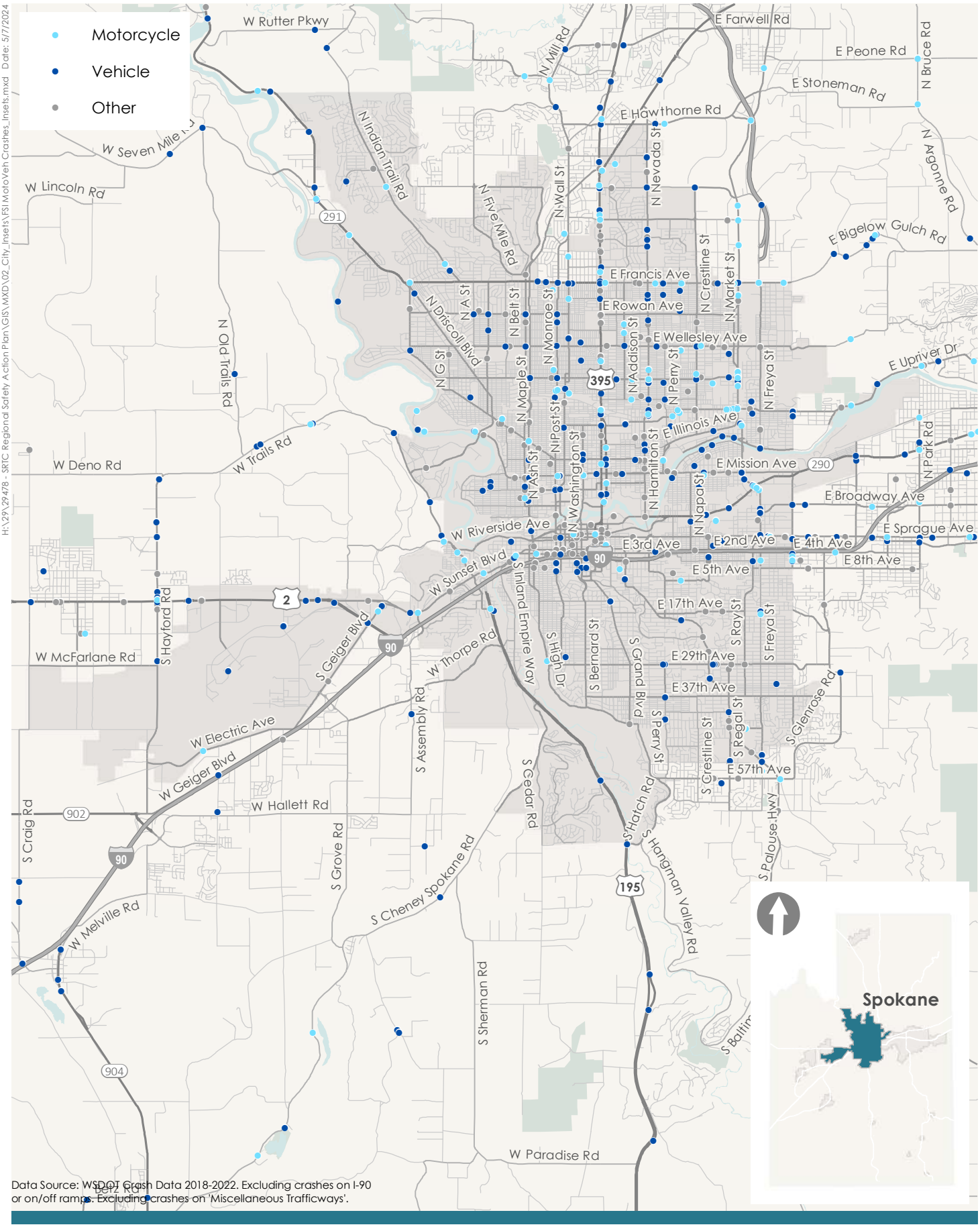
Exhibit 46: Fatal and Serious Injury Crashes Bicyclist Age Distribution in the City of Spokane (2018 – 2022)



MAPS OF CRASHES FOR DESCRIPTIVE CRASH ANALYSIS

Maps are prepared to understand the geographic distribution of crashes, aligned with the descriptive crash analysis. Key findings are identified for each map. The following maps are included:

- Fatal and Serious Injury Crashes Involving a Motorcyclist or Only Vehicles
    - Crashes are concentrated in the downtown area of Spokane and the portion of the city north of the river.
- Fatal and Serious Injury Crashes Involving a Pedestrian or Bicyclist
    - Crashes are concentrated in the downtown area of Spokane.
    - Several corridors including Division Street and Wellesley Avenue stand out as having a string of crashes along them.
- Fatal and Serious Injury Crashes Involving Run Off the Road
    - Crashes are distributed throughout the city.
- Fatal and Serious Injury Crashes Involving a Motorcyclist or Only Vehicles by Lighting Condition
- Fatal and Serious Injury Crashes Involving a Pedestrian or Bicyclist by Lighting Condition
- Fatal and Serious Injury Crashes by Roadway Jurisdiction
- Fatal and Serious Injury Crashes Involving a Motorcyclist or Only Vehicles by Junction Relationship
- Fatal and Serious Injury Crashes Involving a Pedestrian or Bicyclist by Junction Relationship
- Fatal and Serious Injury Crashes Involving an Impaired Person
- Fatal and Serious Injury Crashes Involving Speeding
- Fatal and Serious Injury Crashes Involving a Distracted Driver
- Fatal and Serious Injury Crashes Involving a Bicyclist Under 20 Years Old
    - Crashes tend to be distributed throughout the area of Spokane, indicating the crashes may be related to systemic conditions, rather than a particular locational characteristic.



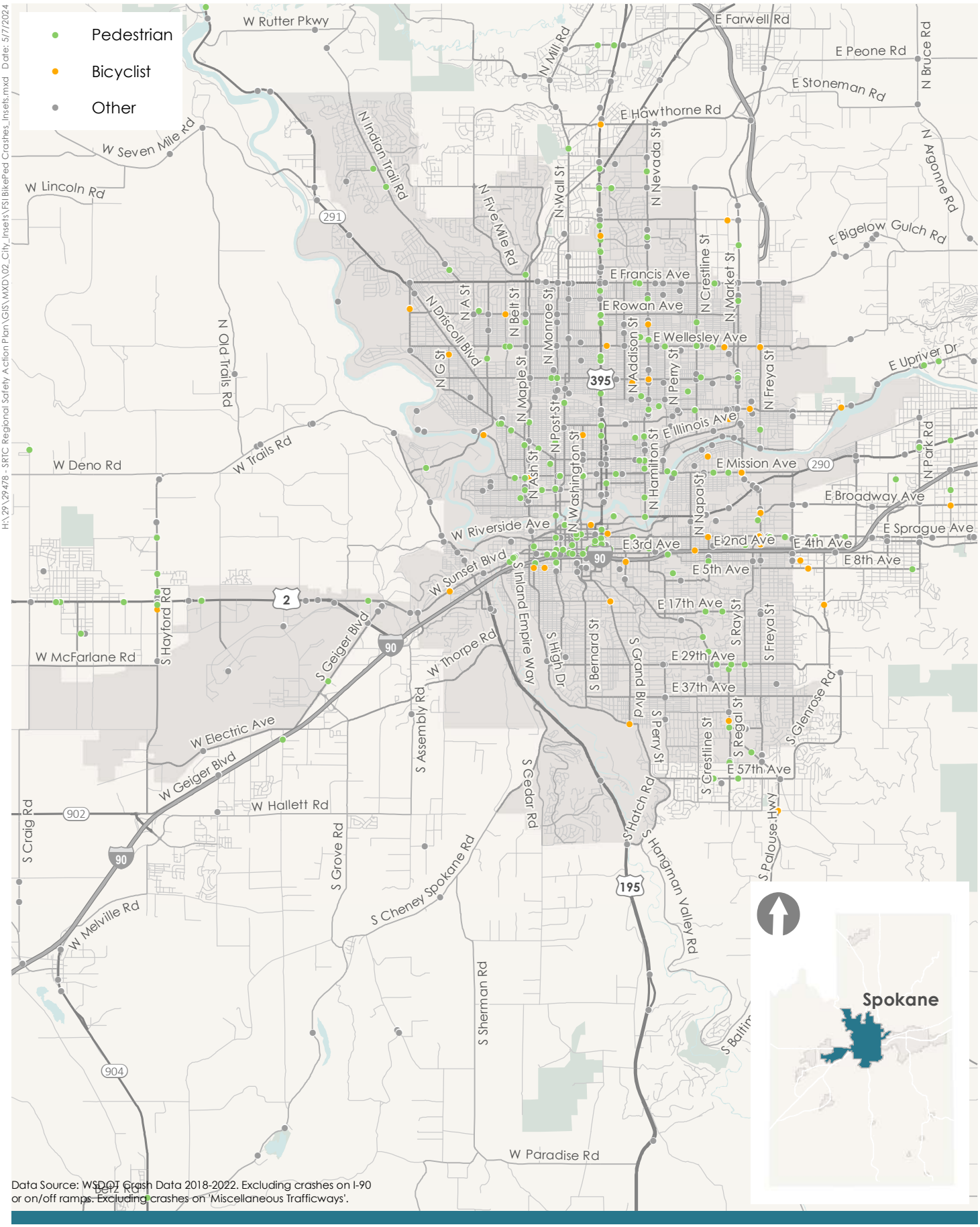
Data Source: WSDOT Crash Data 2018-2022. Excluding crashes on I-90 or on/off ramps. Excluding crashes on 'Miscellaneous Trafficways'.

H:\29\29478 - SRTC Regional Safety Action Plan\GIS\MXD\02_City_Insets\FSI MotoVeh Crashes_Insets.mxd Date: 5/7/2024

SRTC SAFETY ACTION PLAN

Figure 11

Fatal and Serious Injury Crashes
Motorcycle and Vehicle - Spokane



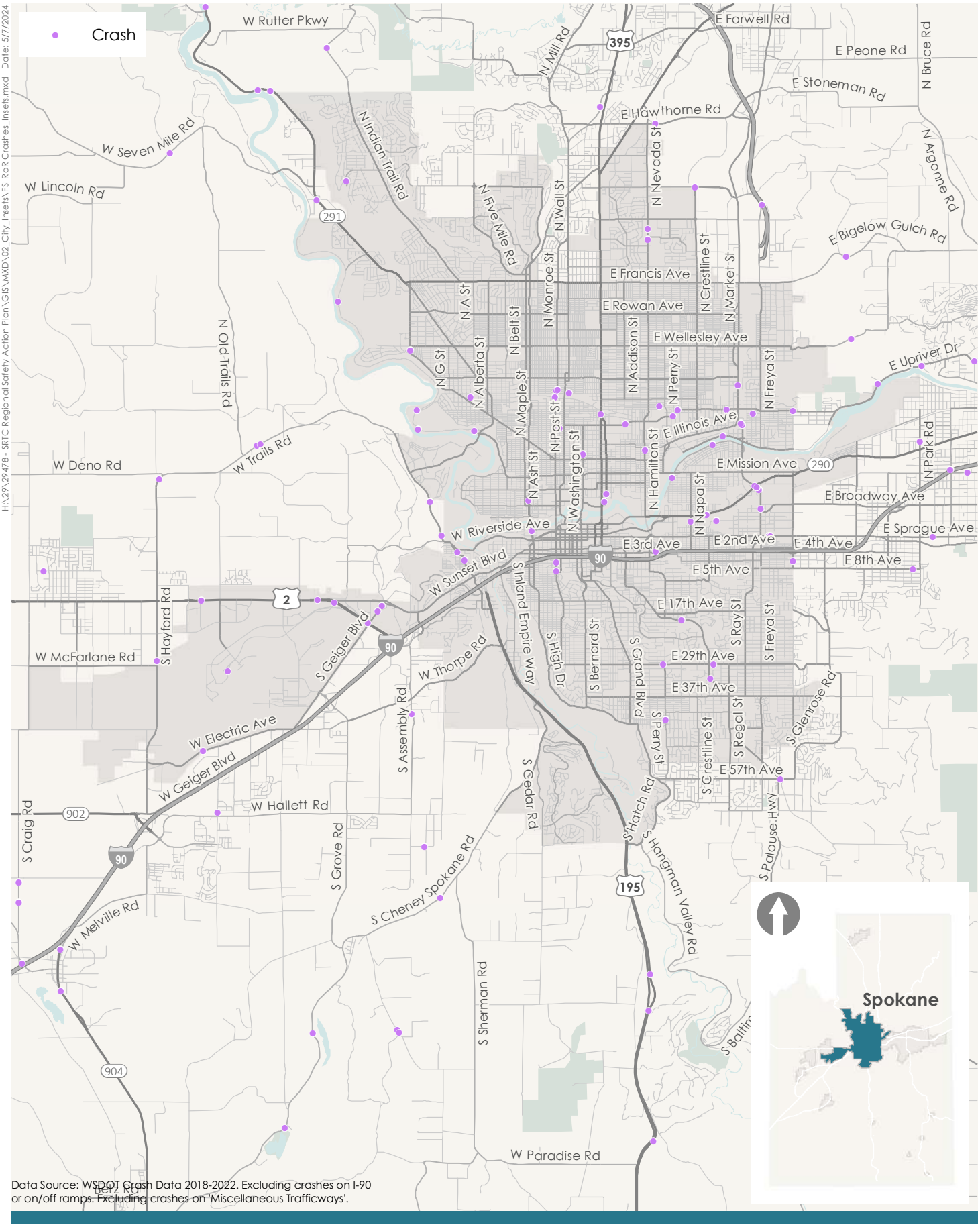
Data Source: WSDOT Crash Data 2018-2022. Excluding crashes on I-90 or on/off ramps. Excluding crashes on 'Miscellaneous Trafficways'.

H:\29\29478 - SRTC Regional Safety Action Plan\GIS\MXD\02_City_Insets\FSI BikePed Crashes_Insets.mxd Date: 5/7/2024

SRTC SAFETY ACTION PLAN

Figure 12

Fatal and Serious Injury Crashes Bicyclist and Pedestrian - Spokane

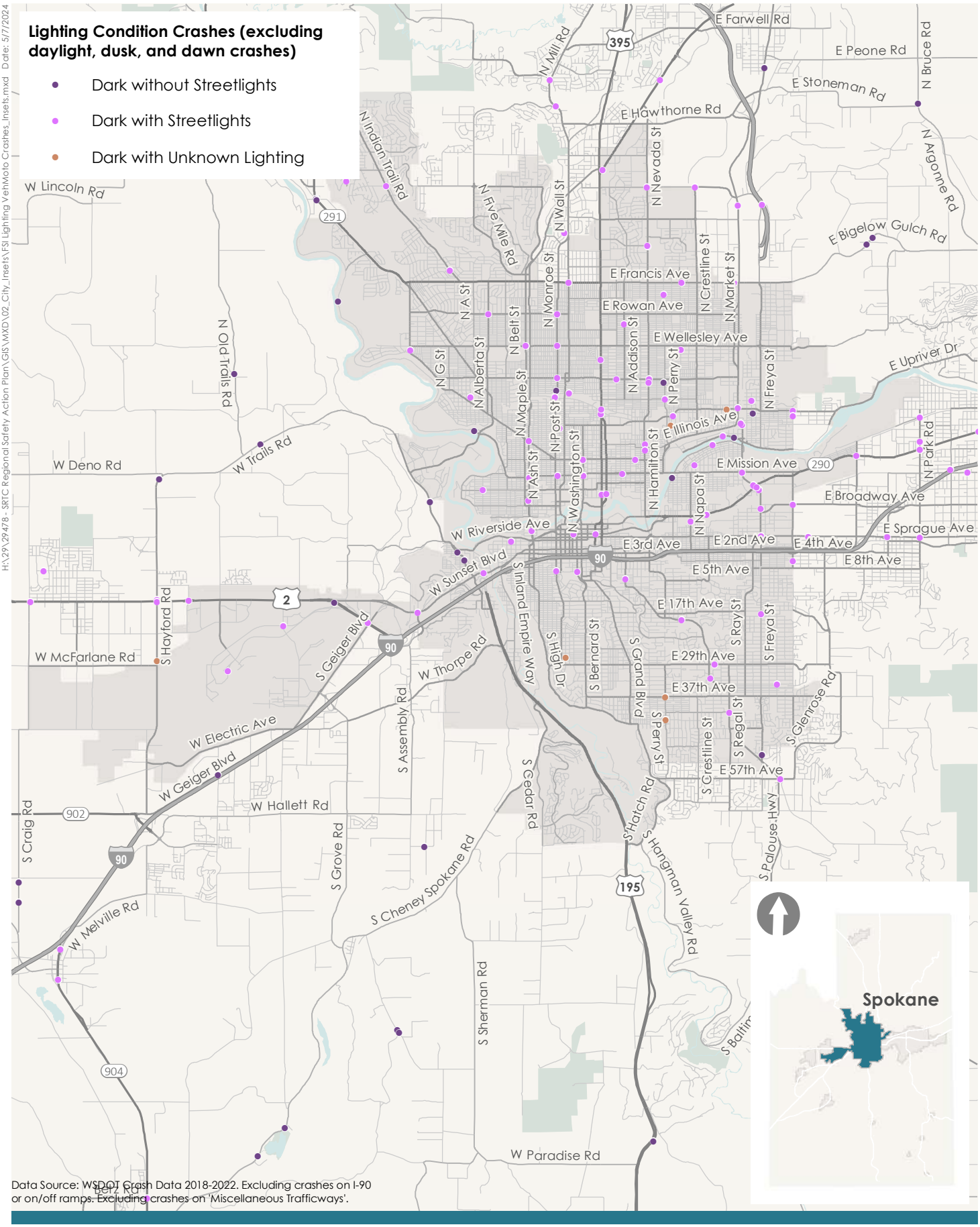


H:\29\29478 - SRTC Regional Safety Action Plan\GIS\MXD\02_City_Insets\FSI RoR Crashes_Insets.mxd Date: 5/7/2024

SRTC SAFETY ACTION PLAN

Figure 13

Fatal and Serious Injury Crashes Run Off the Road - Spokane



SRTC SAFETY ACTION PLAN

Figure 14

Fatal and Serious Injury Crashes (Auto and Vehicle) Lighting Conditions - Spokane

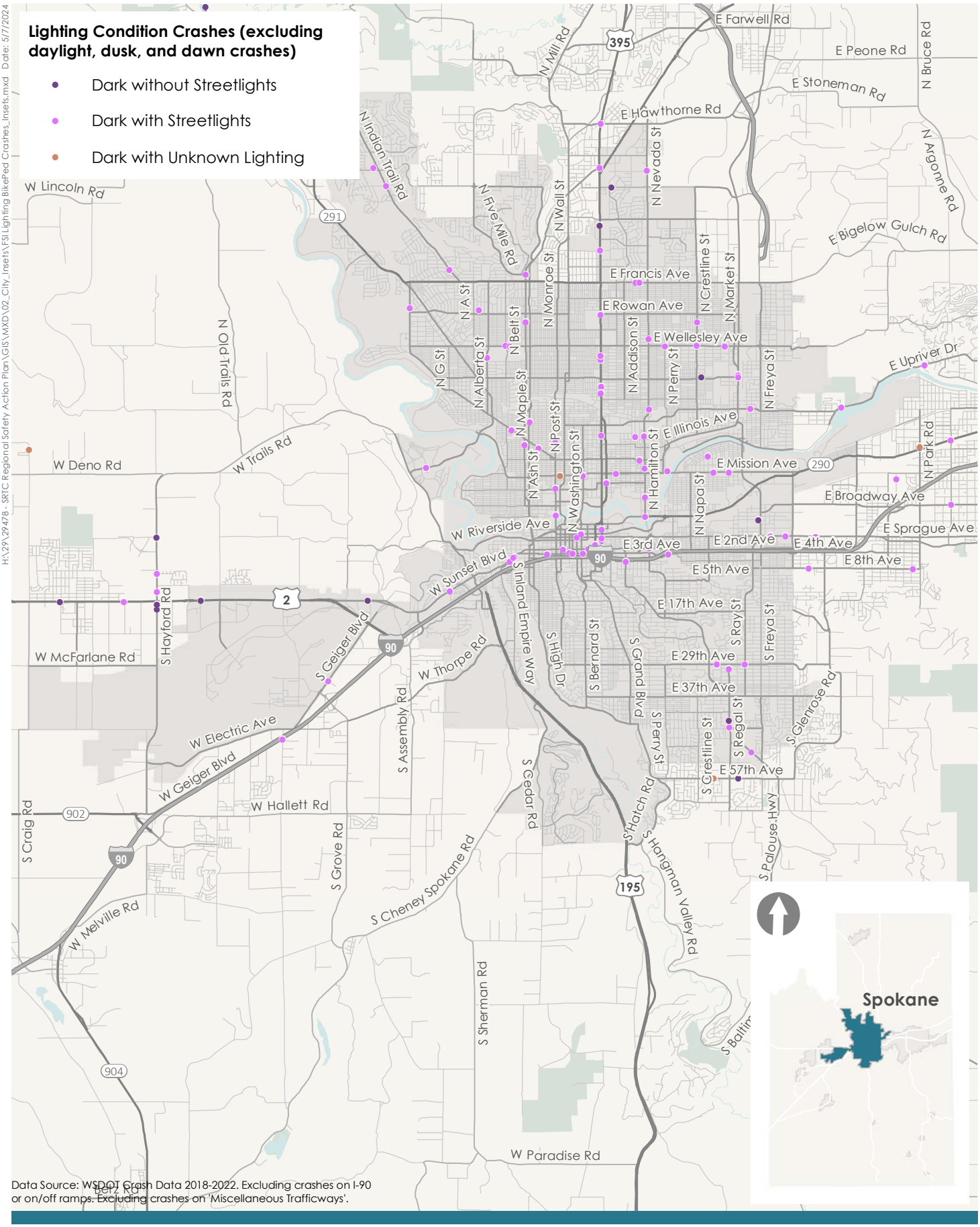
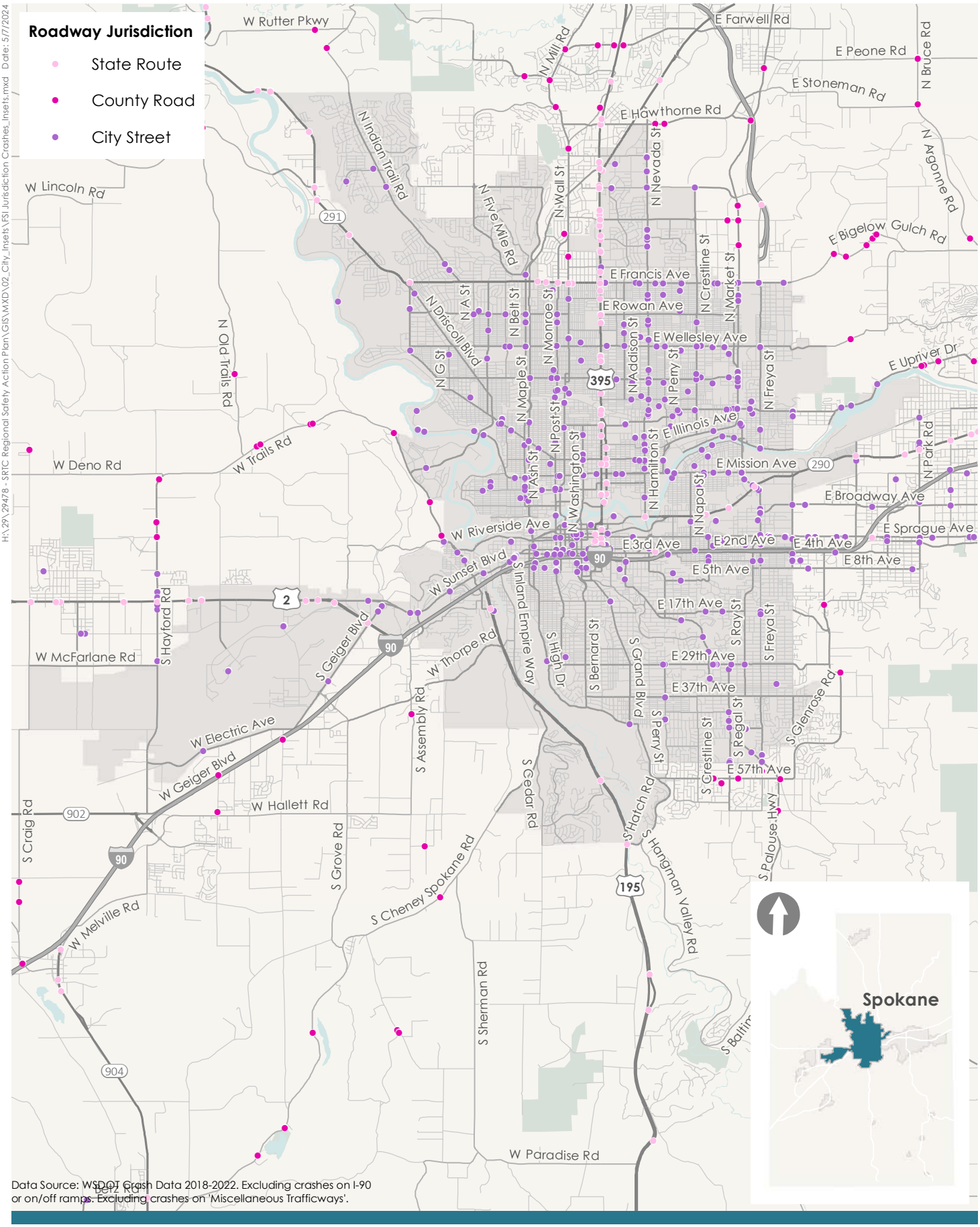


Figure 15

Fatal and Serious Injury Crashes (Bicycle and Pedestrian) Lighting Conditions - Spokane



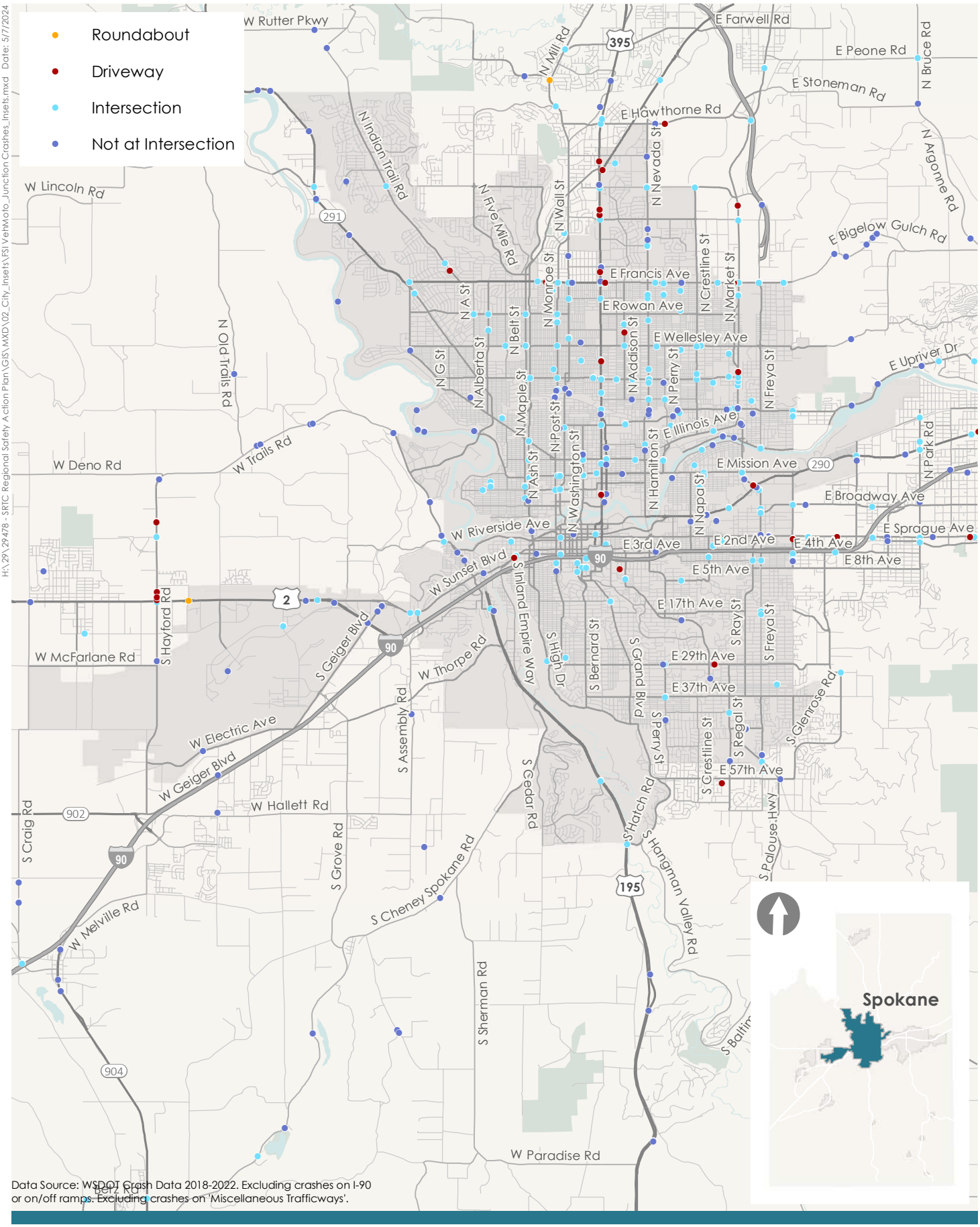
Data Source: WSDOT Crash Data 2018-2022. Excluding crashes on I-90 or on/off ramps. Excluding crashes on 'Miscellaneous Trafficways'.

H:\29\29478 - SRTC Regional Safety Action Plan\GIS\MXD\02_City_Insets\FSI Jurisdiction Crashes_Insets.mxd Date: 5/7/2024

SRTC SAFETY ACTION PLAN

Figure 16

Fatal and Serious Injury Crashes
Roadway Jurisdiction - Spokane



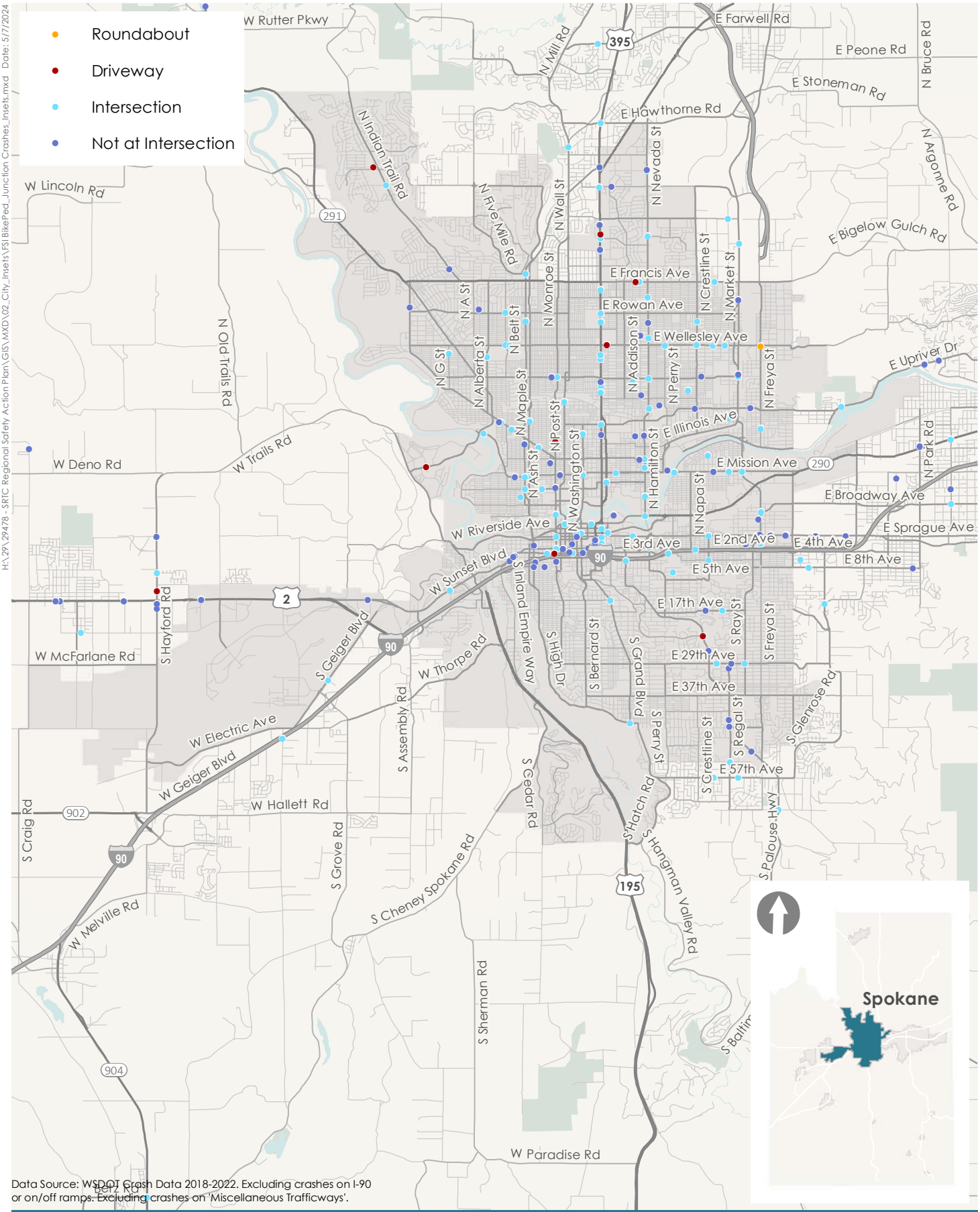
Data Source: WSDOT Crash Data 2018-2022. Excluding crashes on I-90 or on/off ramps. Excluding crashes on 'Miscellaneous Trafficways'.

H:\29\29478 - SRTC Regional Safety Action Plan\GIS\MXD\02_City_Insets\FSI VehMoto_Junction Crashes_Insets.mxd Date: 5/7/2024

SRTC SAFETY ACTION PLAN

Figure 17

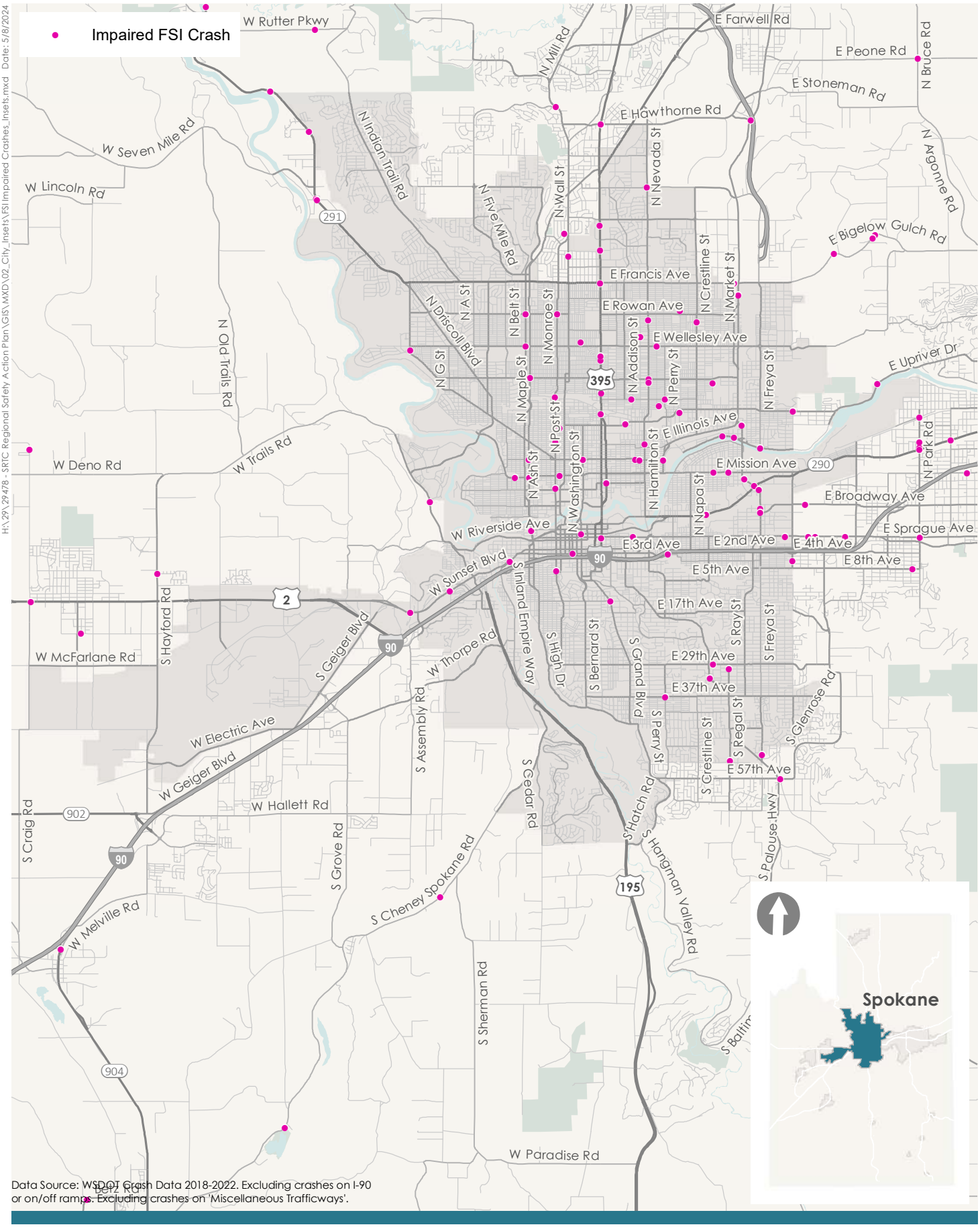
Fatal and Serious Injury Crashes (Vehicle and Motorcycle) Junction Relationship - Spokane



SRTC SAFETY ACTION PLAN

Figure 18

Fatal and Serious Injury Crashes (Bicyclist and Pedestrian) Junction Relationship - Spokane



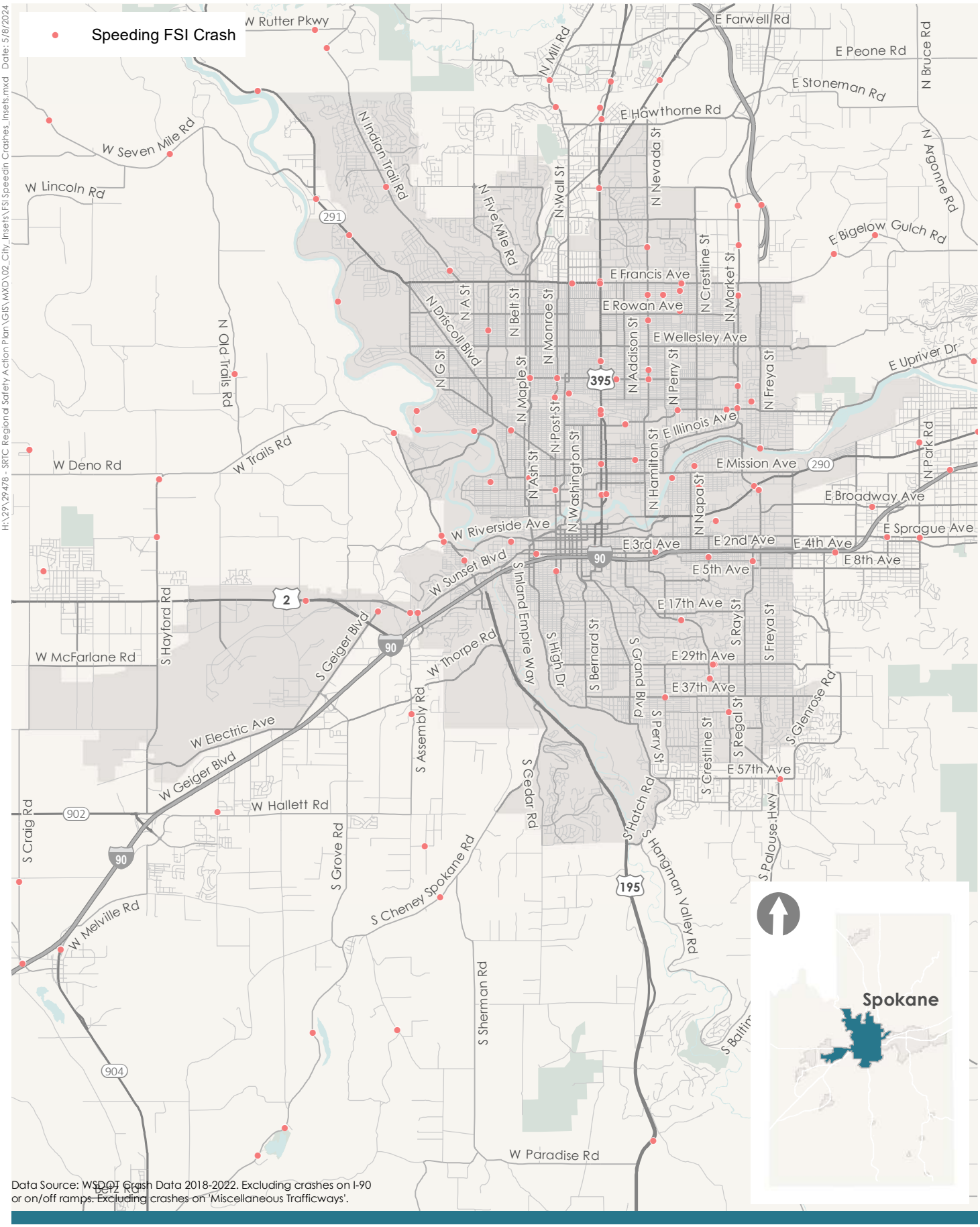
Data Source: WSDOT Crash Data 2018-2022. Excluding crashes on I-90 or on/off ramps. Excluding crashes on 'Miscellaneous Trafficways'.

H:\29\29478 - SRTC Regional Safety Action Plan\GIS\MXD\02_City_Insets\FSI Impaired Crashes_Insets.mxd Date: 5/8/2024

SRTC SAFETY ACTION PLAN

Figure 19

Fatal and Serious Injury Crashes - Impaired Spokane



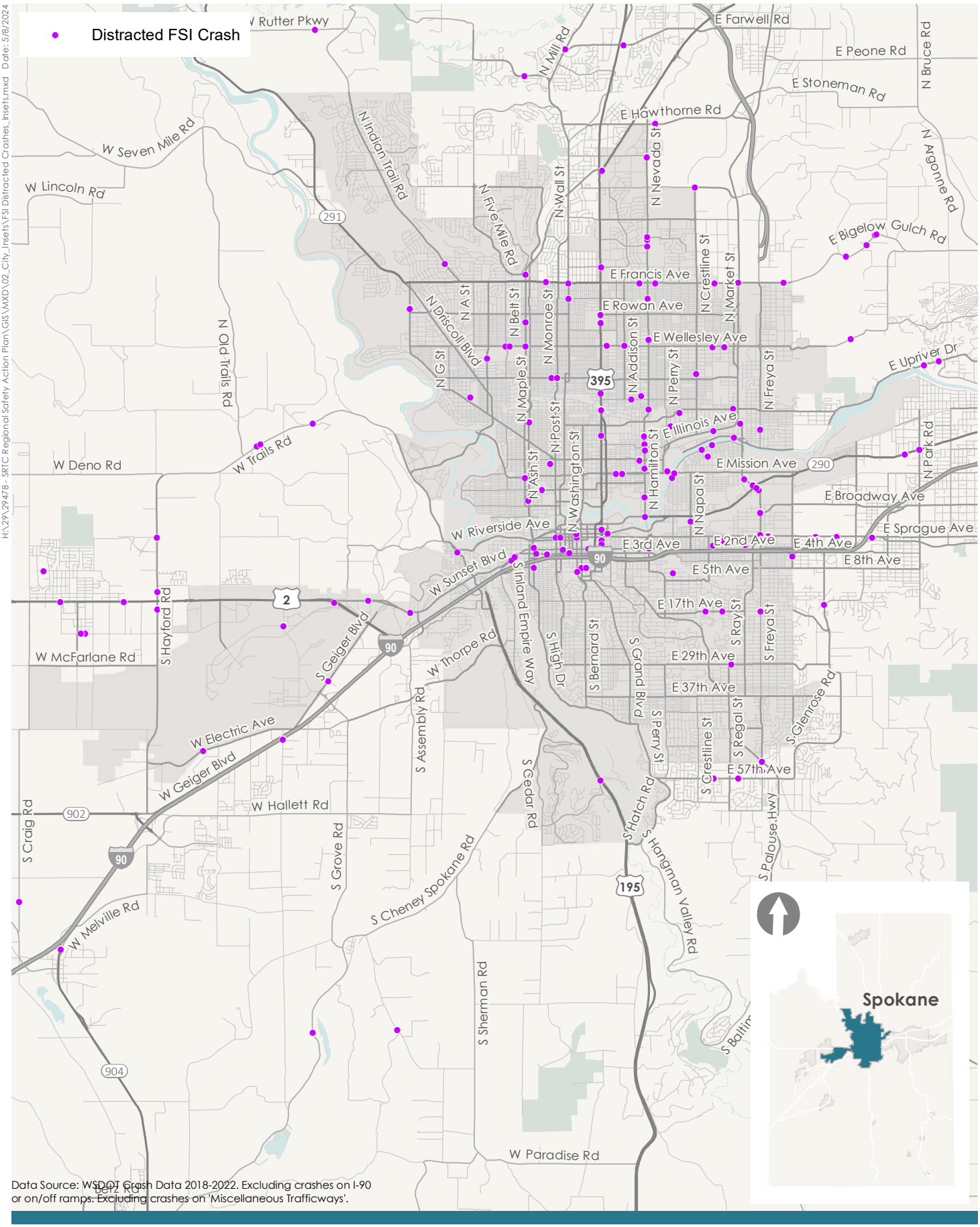
Data Source: WSDOT Crash Data 2018-2022. Excluding crashes on I-90 or on/off ramps. Excluding crashes on 'Miscellaneous Trafficways'.

H:\29\29478 - SRTC Regional Safety Action Plan\GIS\MXD\02_City_Insets\FSI Speedin Crashes_Insets.mxd Date: 5/8/2024

SRTC SAFETY ACTION PLAN

Figure 20

Fatal and Serious Injury Crashes - Speeding Spokane



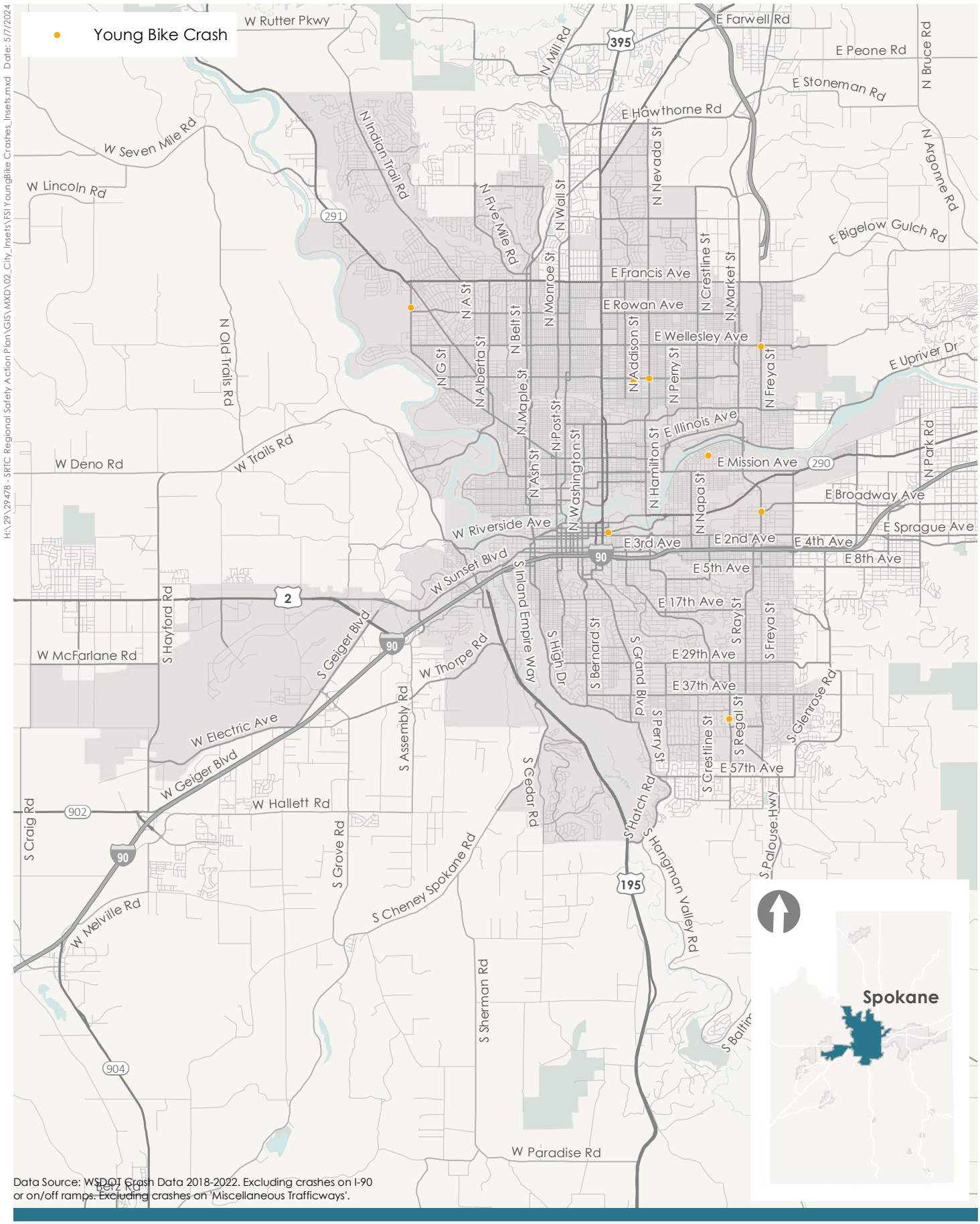
Data Source: WSDOT Crash Data 2018-2022. Excluding crashes on I-90 or on/off ramps. Excluding crashes on 'Miscellaneous Trafficways'.

H:\29\29478 - SRTC Regional Safety Action Plan\GIS\MXD\02_City_Insets\FSI Distracted Crashes_Insets.mxd Date: 5/8/2024

SRTC SAFETY ACTION PLAN

Figure 21

Fatal and Serious Injury Crashes - Distracted Spokane



Data Source: WSDOT Crash Data 2018-2022. Excluding crashes on I-90 or on/off ramps. Excluding crashes on 'Miscellaneous Trafficways'.

H:\29\29478 - SRTC Regional Safety Action Plan\GIS\MXD\02_City_Insets\FSI YoungBike Crashes_Insets.mxd Date: 5/7/2024

SRTC SAFETY ACTION PLAN

Figure 22

Fatal and Serious Injury Crashes
Bicyclist Under Age 20 - Spokane

UNINCORPORATED SPOKANE COUNTY CRASH TRENDS (EXCLUDING WSDOT FACILITIES)

Crash Characteristics

The first few exhibits in this section look at long-term trends from 2013 through 2022. The exhibits that follow characterize the 155 FSI crashes (2018 – 2022) in Unincorporated Spokane County:

- 98 vehicle-only crashes
- 35 motorcycle crashes
- 16 pedestrian crashes
- 6 bicyclist crashes

CRASH MODE AND SEVERITY

The following FSI **crash trends** were observed in the City of Spokane's crash data:

Crash Mode Trends

- As seen in the regional trends, **FSI crashes are increasing** in Unincorporated Spokane County (Exhibit 47). The number of **fatal crashes** peaked in 2020, while the number of **serious injury crashes** peaked more recently in 2022 with nearly 30 serious injury crashes (Exhibit 48).
- The annual **number of FSIs** in Unincorporated Spokane County is approximately one-third the annual number of FSIs in the region.
- Over the last decade, FSI **vehicle-only crashes** have been increasing, with a peak in 2020 (Exhibit 49). Vehicle-only crashes are responsible for the majority of FSIs in Unincorporated Spokane County.
- While FSI **motorcycle crashes** decreased from 2021 to 2022, there has been a general trend upward for this crash mode.
- In 2020 and 2022, there were zero fatal **pedestrian crashes**. However, fatal pedestrian crashes in the area tend to comprise a larger percentage of the FSI pedestrian crash population than they do in the region as a whole. This may indicate a higher risk of fatality for pedestrians who are struck in these areas.
- FSI **bicyclist crashes** are the rarest crash mode in Unincorporated Spokane County. The only fatal crash in the last decade occurred in 2017.

Relative Frequency Trends

- Similar to the region, FSI **pedestrian crashes** are overrepresented in Unincorporated Spokane County (1% of all crashes, 14% of fatal crashes, and 8% of serious injury crashes in Unincorporated Spokane County).
- **Vehicle-only crashes** tend to be more severe in Unincorporated Spokane County, compared to the rest of the region. In Unincorporated Spokane County, vehicle-only crashes comprise 95% of all crashes, 71% of fatal crashes, and 59% of serious injury crashes. In the region overall, vehicle-only crashes make up 93% of all crashes, and about half of all FSI crashes. This indicates a higher risk of FSIs for vehicle occupants involved in crashes in these areas.

Exhibit 47. Fatal and Serious Crashes by Year and Mode in Unincorporated Spokane County (Excluding WSDOT Facilities) (2013 – 2022)

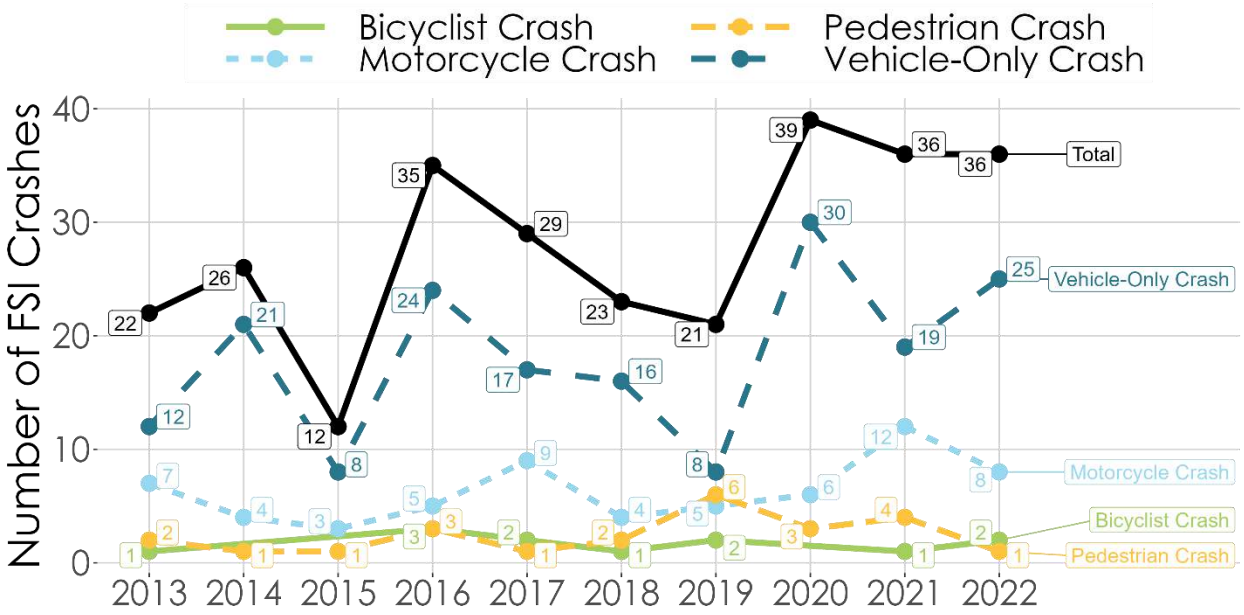


Exhibit 48. Fatal and Serious Injury Crashes by Year and Severity in Unincorporated Spokane County (Excluding WSDOT Facilities) (2013 – 2022)

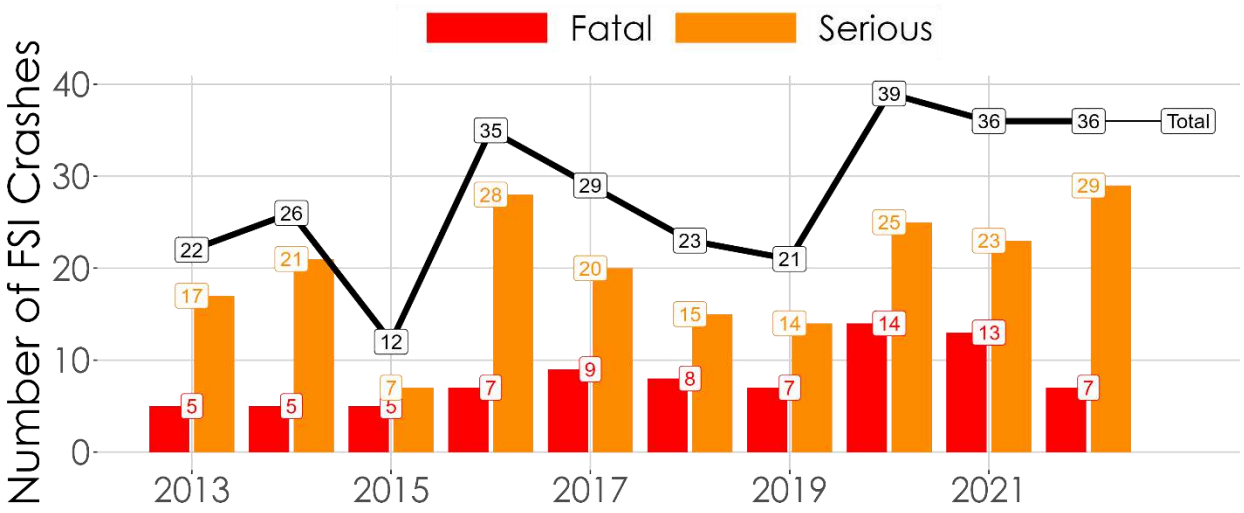
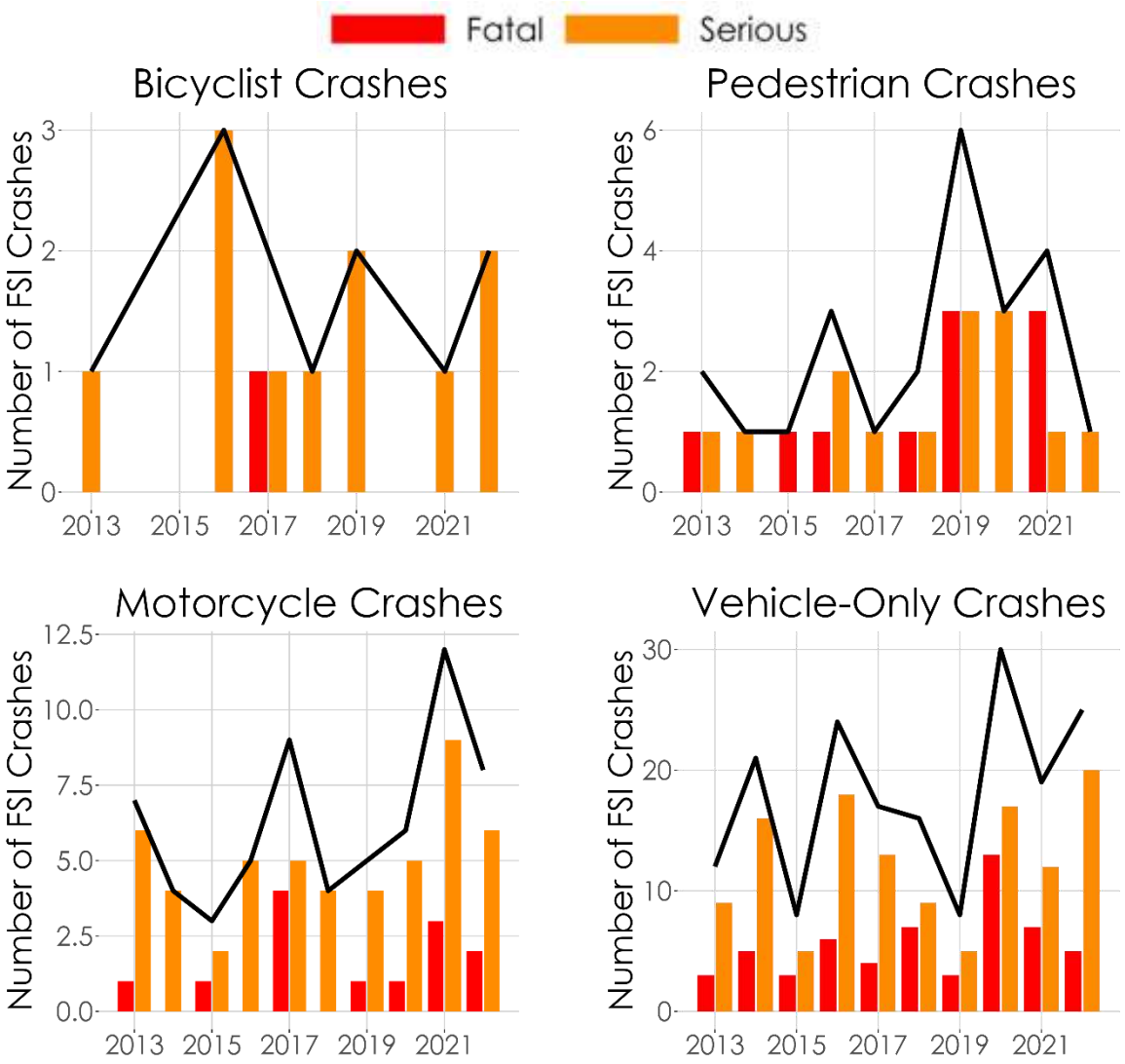


Exhibit 49: Fatal and Serious Injury Crashes by Year and Mode in Unincorporated Spokane County (Excluding WSDOT Facilities) (2013 – 2022)



CRASH TYPE

The following crash type trends were observed:

- **Run-off-road** FSI crashes comprise nearly half of the serious injury crashes in these areas (Exhibit 50). This is a larger percentage than this crash type comprises in the region, indicating this crash type is a larger problem in these areas than in other jurisdictions. The frequency of this crash type was increasing from 2019 to 2021 (Exhibit 53).
- **Motorcycle FSI crashes** comprise a larger percentage of crashes than pedestrian crashes, which is opposite from the trend observed in the region.
- Like road departure (run-off-road) FSI crashes, **lane departure FSI crashes** (includes head-on and other opposite direction crashes) comprise a larger percentage of crashes in these areas than in the region (Exhibit 51). The frequency of this crash type more than tripled from 2021 to 2022 (Exhibit 52).
- There is a **higher percentage of daylight crashes** within road and lane departure crash populations in Unincorporated Spokane County than across the region (Exhibit 54). This likely indicates there are other significant contributing circumstances to these crashes besides lighting conditions.

Exhibit 50: Fatal and Serious Injury Crashes by Crash Type in Unincorporated Spokane County (Excluding WSDOT Facilities) (2018 – 2022)

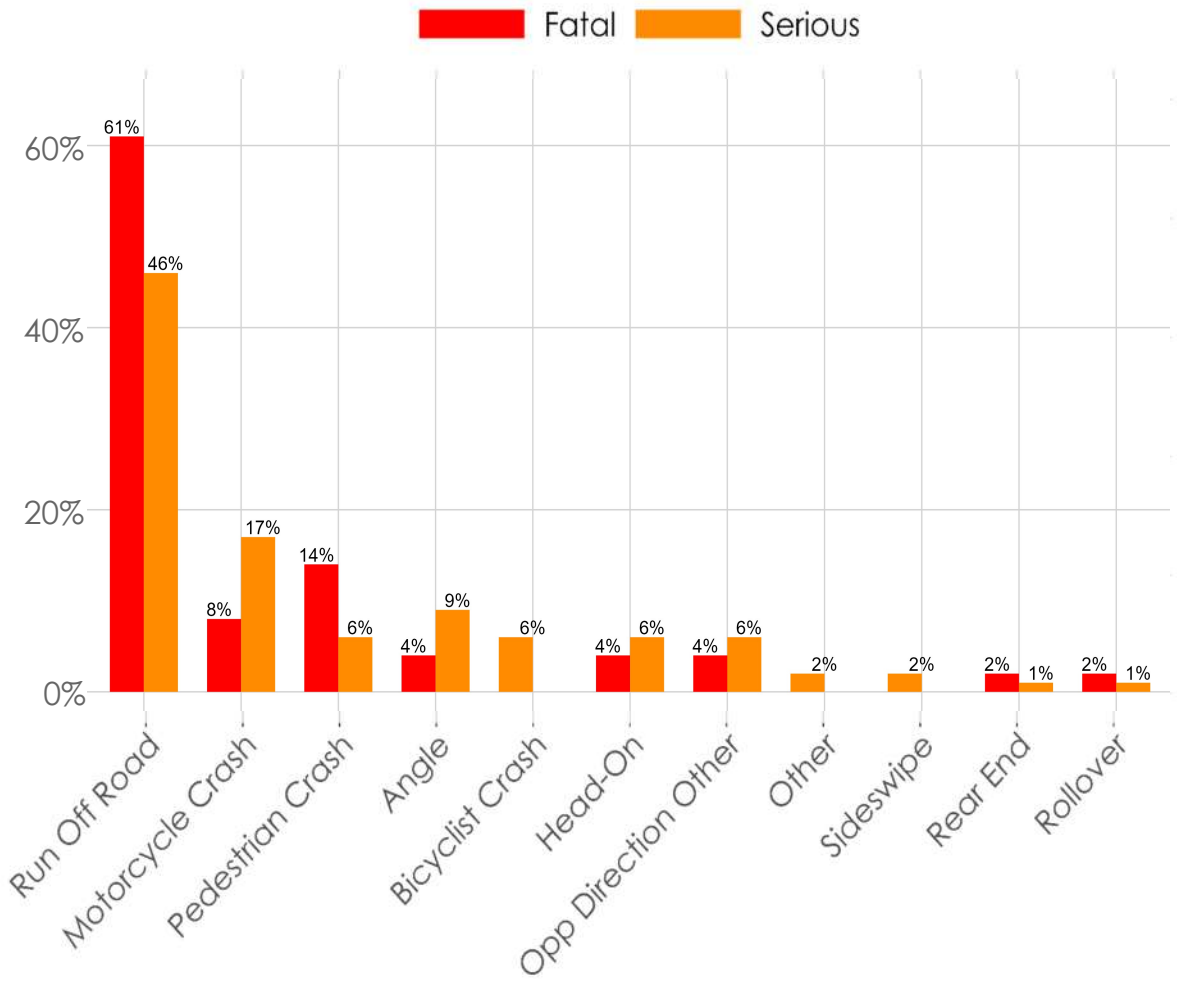


Exhibit 51: Annual Lane and Road Departure Crash Composition of Fatal and Serious Injury Crashes in Unincorporated Spokane County (Excluding WSDOT Facilities) (2018 – 2022)

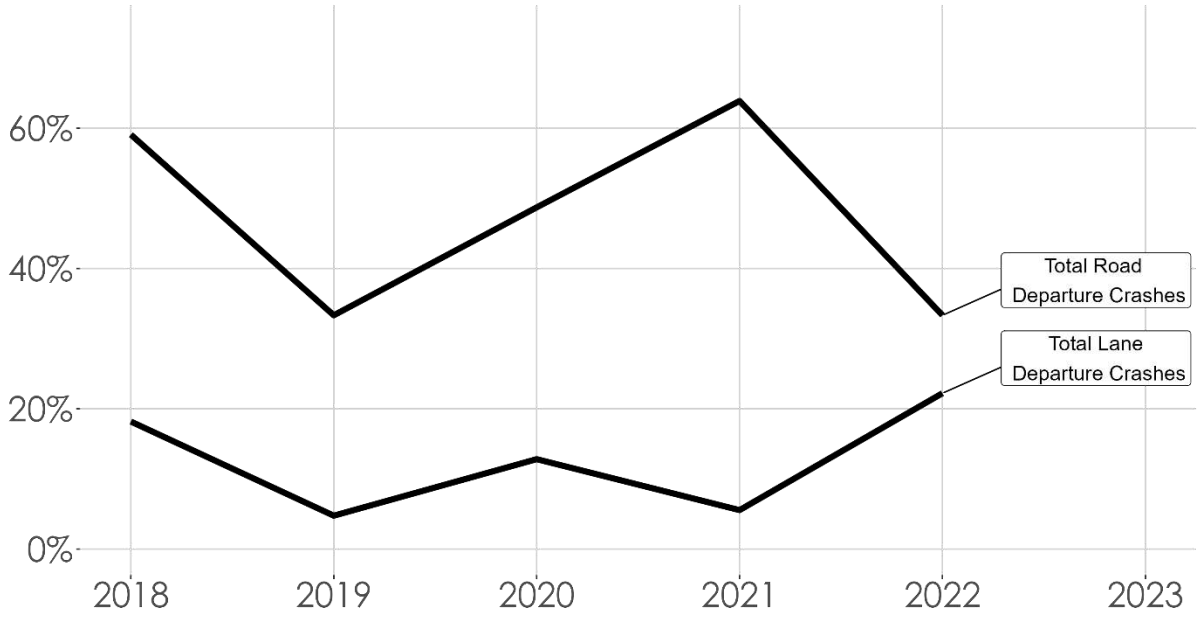


Exhibit 52: Fatal and Serious Injury Lane Departure Crashes by Year in Unincorporated Spokane County (Excluding WSDOT Facilities) (2018 – 2022)

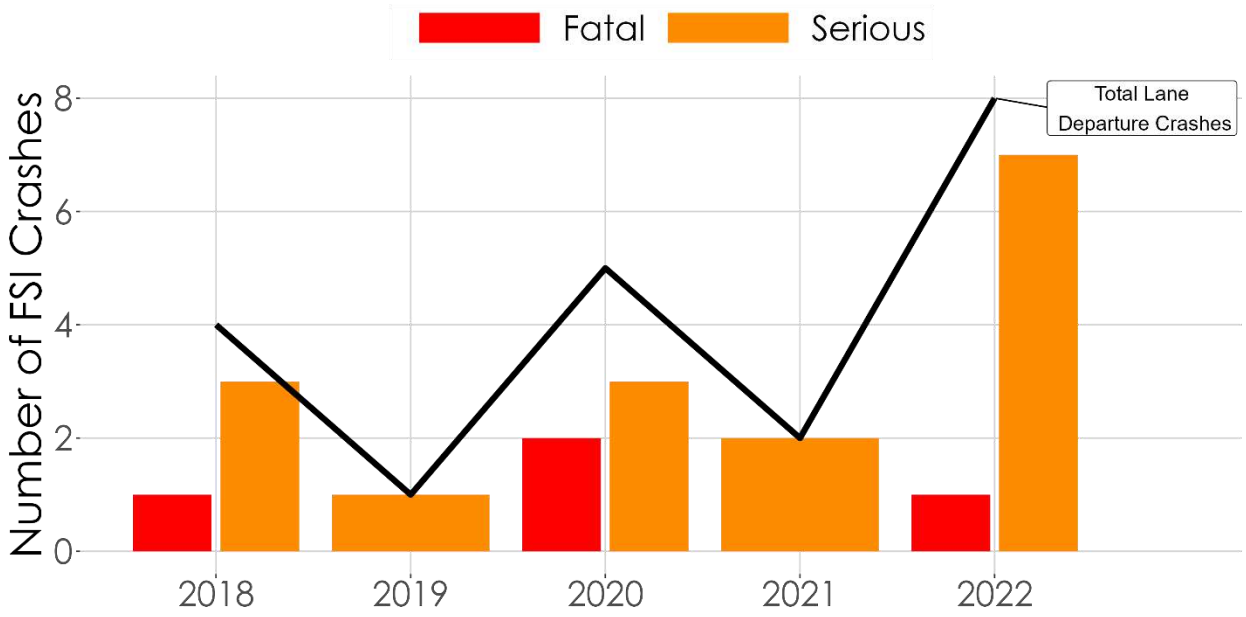


Exhibit 53: Fatal and Serious Injury Road Departure Crashes by Year in Unincorporated Spokane County (Excluding WSDOT Facilities) (2018 – 2022)

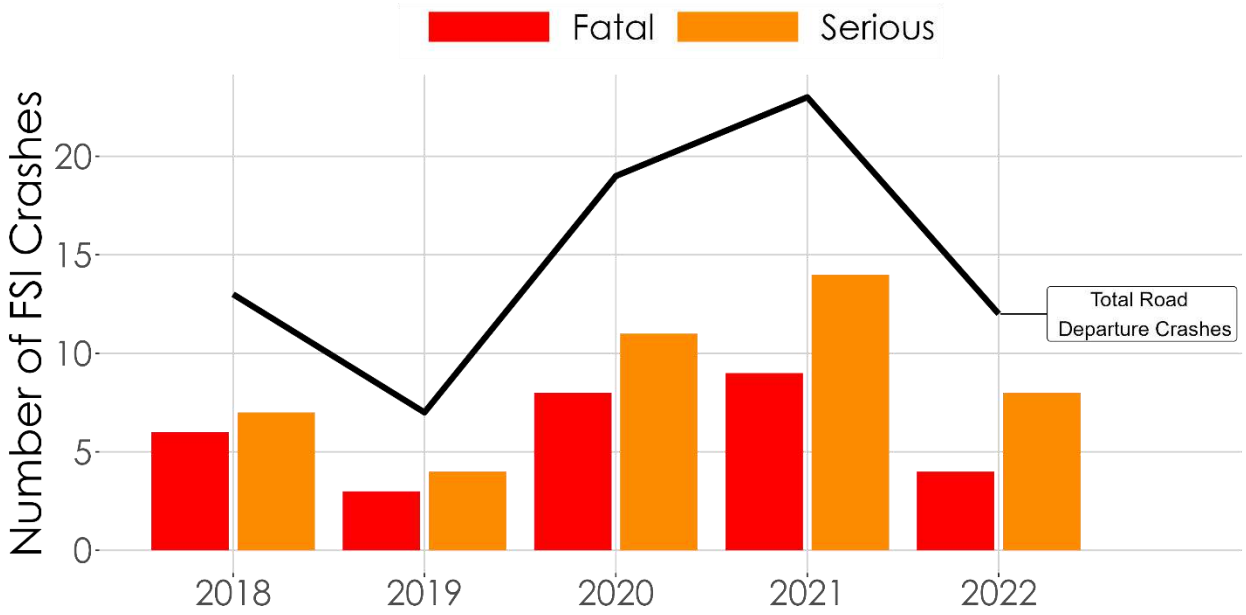
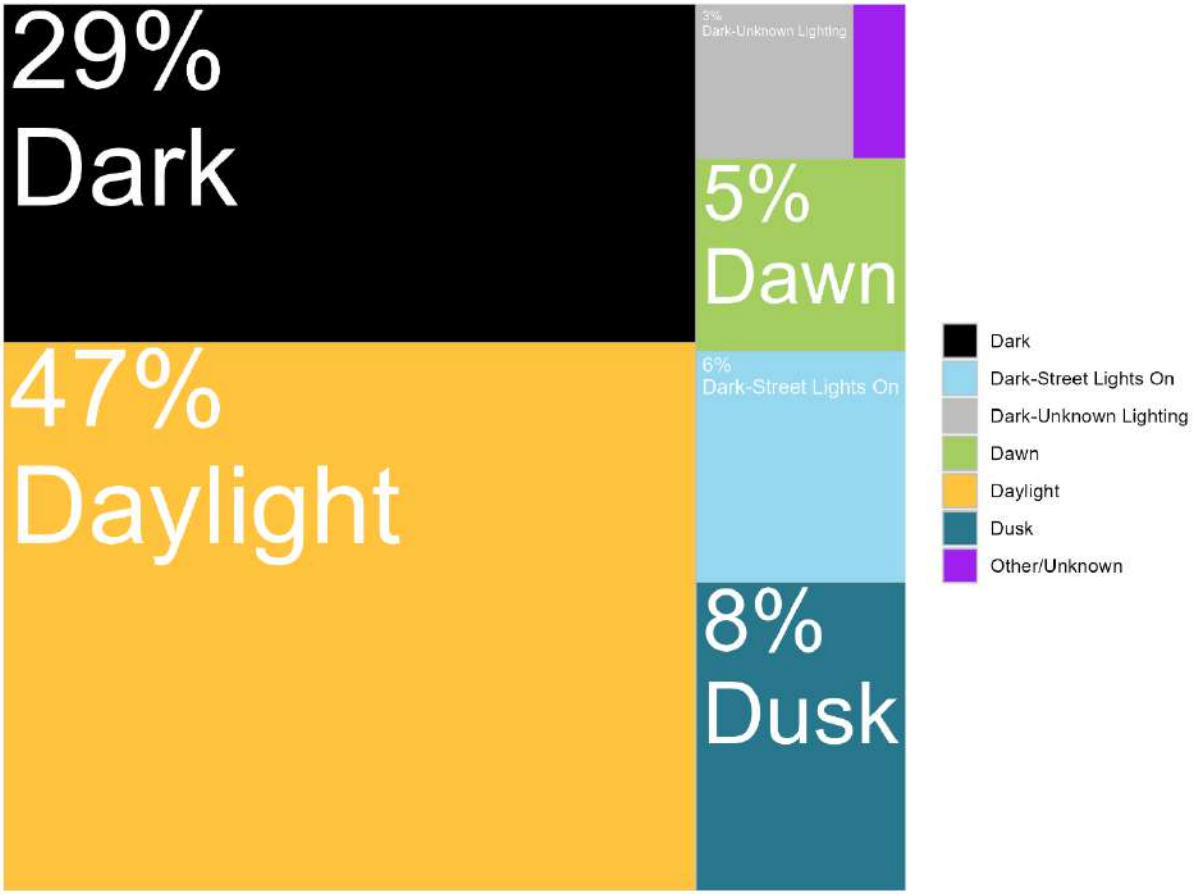


Exhibit 54: Lighting Conditions for Fatal and Serious Injury Lane and Road Departure Crashes in Unincorporated Spokane County (Excluding WSDOT Facilities) (2018 – 2022)



WHEN DO CRASHES HAPPEN?

When crashes occur can be measured by the month, day of the week, and hour of the day. The following observations were made when observing all three time-based data elements:

Month (Exhibit 55)

- As observed in the region, FSI **vehicle-only** crashes peak in June. **Bicyclist** crashes also peak in June, whereas they peak in October across the region, with June as a close second peak.
- FSI **motorcycle** crashes are most common in Unincorporated Spokane County in May, July, and August, which matches regional trends.

Day of Week (Exhibit 56)

- As observed in the regional data, there is more variation among **vehicle-only** and **motorcycle** crash frequency across days of the week than with **pedestrian** and **bicycle** crashes.
- **Vehicle-only** crashes peak on Saturday while **motorcycle** crashes peak on Sunday and Monday. The regional peak day for both crash modes is Friday.

Hour of Day (Exhibit 57)

- **Vehicle-only** crashes peak at 7 AM, 12 PM, and between 4 PM and 7 PM. This is consistent with the regional trend.
- FSI **motorcycle** crashes peak in the afternoon and evening at 1 PM and between 6 PM and 11 PM. This 1 PM peak is an earlier peak than the 4 PM regional peak for motorcycle crashes.

Exhibit 55: Fatal and Serious Injury Crashes by Time of Year in Unincorporated Spokane County (Excluding WSDOT Facilities) (2018 – 2022)

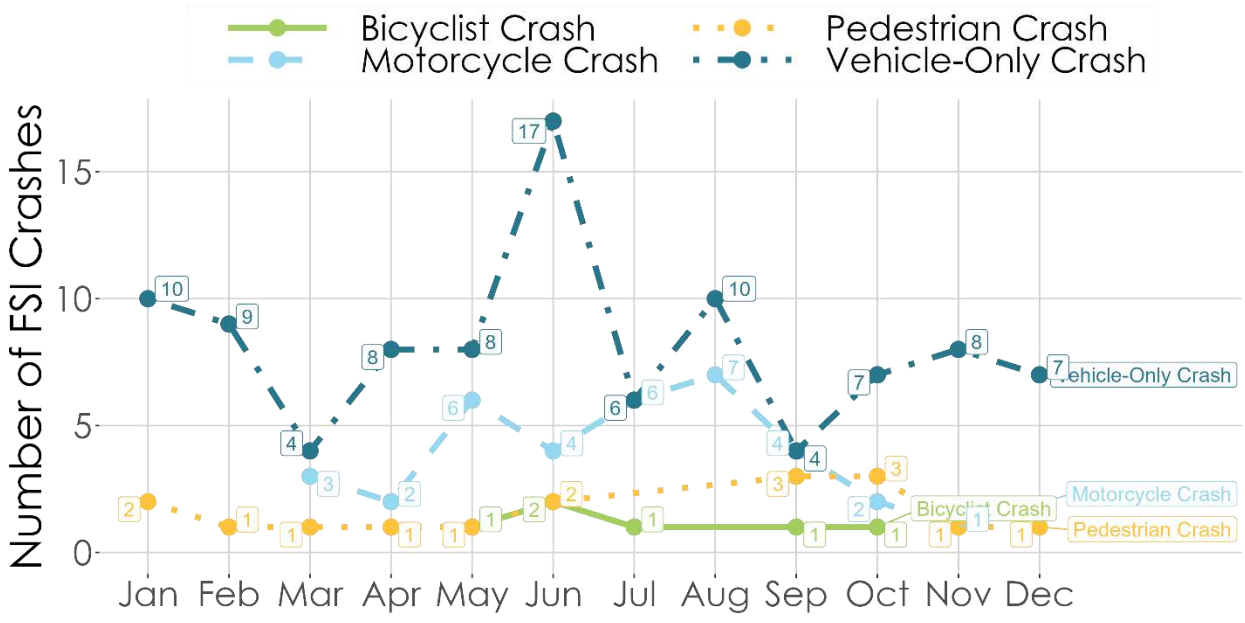


Exhibit 56: Fatal and Serious Injury Crashes by Weekday in Unincorporated Spokane County (Excluding WSDOT Facilities) (2018 – 2022)

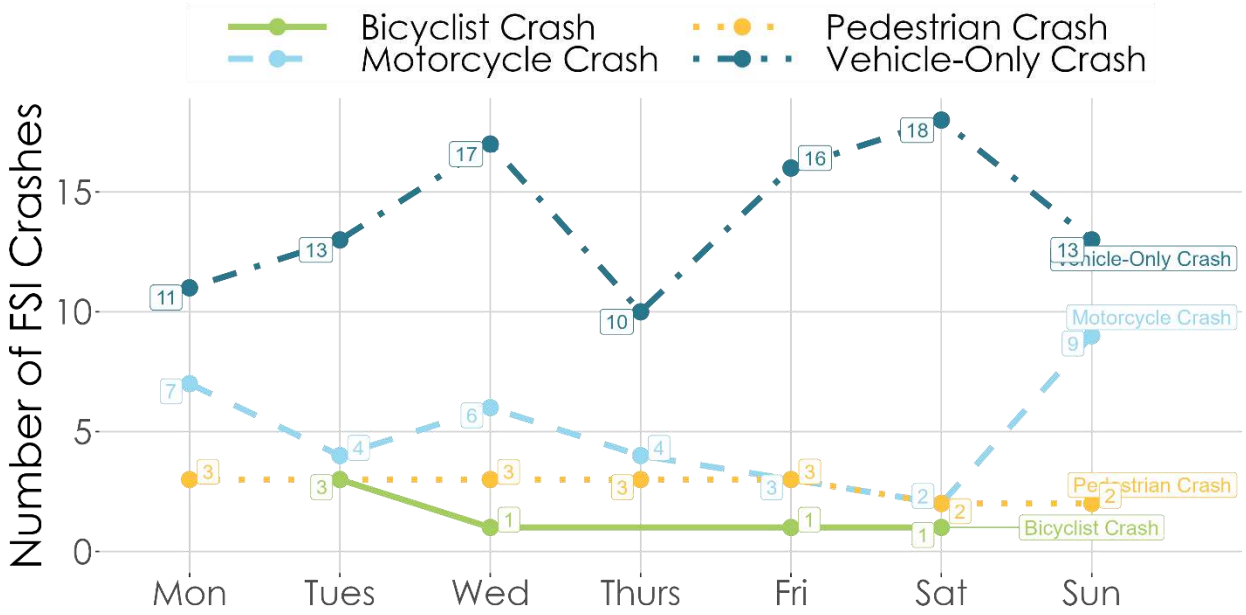
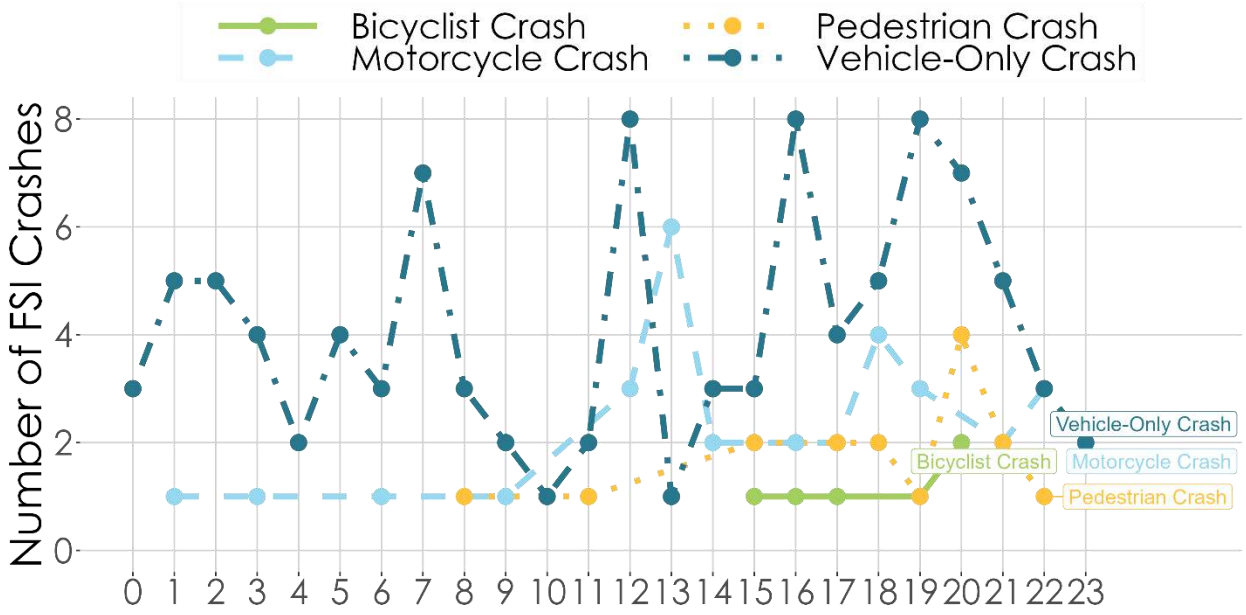


Exhibit 57: Fatal and Serious Injury Crashes by Time of Day in Unincorporated Spokane County (Excluding WSDOT Facilities) (2018 – 2022)



WHERE DO CRASHES HAPPEN?

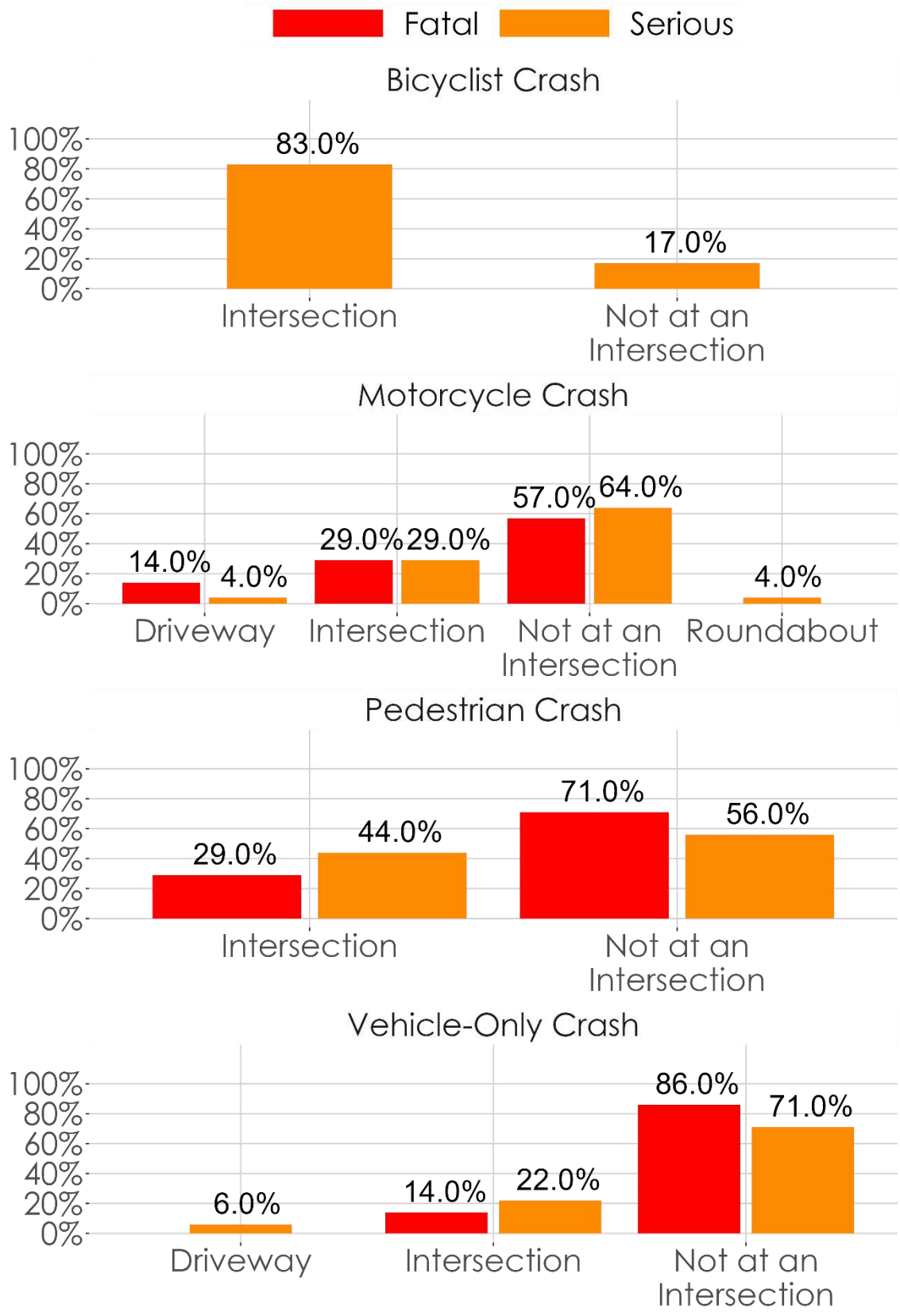
Facility Jurisdiction

- All the FSI crashes occurred on **county roads**. These results reflect the composition of Unincorporated Spokane County roadway network, which in this context excludes state routes.

Relationship to Junction (Exhibit 58)

- More than two-thirds of both the **fatal crashes** and **serious injury crashes** in Unincorporated Spokane County do not occur at an intersection. Intersection crashes are more common across the region due to the various cities with grid systems.
- FSI **bicycle** crashes were the only crash mode that had a higher percentage of intersection crashes than non-intersection crashes.

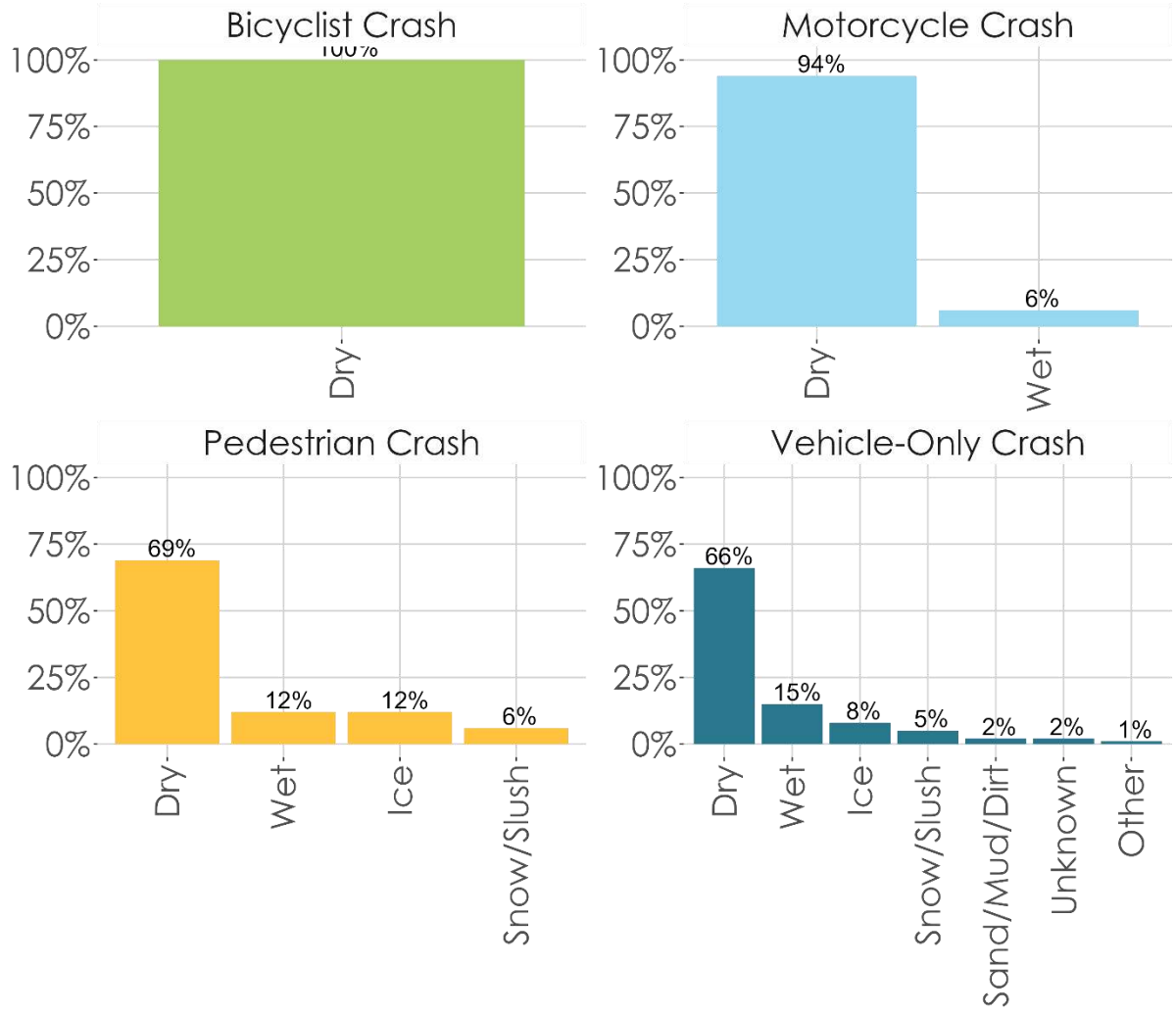
Exhibit 58: Fatal and Serious Injury Crashes by Relationship to Intersection in Unincorporated Spokane County (Excluding WSDOT Facilities) (2018 – 2022)



ENVIRONMENTAL

As seen in the regional data, **dry** surface conditions were most common within each crash mode (Exhibit 59). Compared to both the region as a whole and the other subregions, Unincorporated Spokane County had the lowest percentage of dry conditions for pedestrian crashes (69%). **Wet, icy, and snowy/slushy** conditions together comprised 30% of the FSI pedestrian crashes in these areas. Vehicle-only crashes are also more likely to occur in **wet, icy, and snowy/slush**y conditions in Unincorporated Spokane County (28%), compared to the overall region (19%).

Exhibit 59. Distribution of Roadway Conditions for Fatal and Serious Injury Crashes in Unincorporated Spokane County (Excluding WSDOT Facilities) (2018 – 2022)



Human Factors/Driver Behavior

CONTRIBUTING CIRCUMSTANCES

The following observations were made when analyzing the contributing circumstances data:

- Since 2020, **speeding driver** is the most frequent contributing circumstance to FSI crashes in Unincorporated Spokane County. In the region, distracted driving is just as frequent of a circumstance as speeding, which is not observed in this area-specific data (Exhibit 60).
- There is a high relative frequency of **motorcycle** crashes involving a **distracted driver** or **speeding** (Exhibit 61).
- There is a high relative frequency of **pedestrian** and **bicyclist** crashes involving a **distracted driver**.

Exhibit 60: Fatal and Serious Injury Crashes Involving a Contributing Circumstance in Unincorporated Spokane County (Excluding WSDOT Facilities) (2018 – 2022)

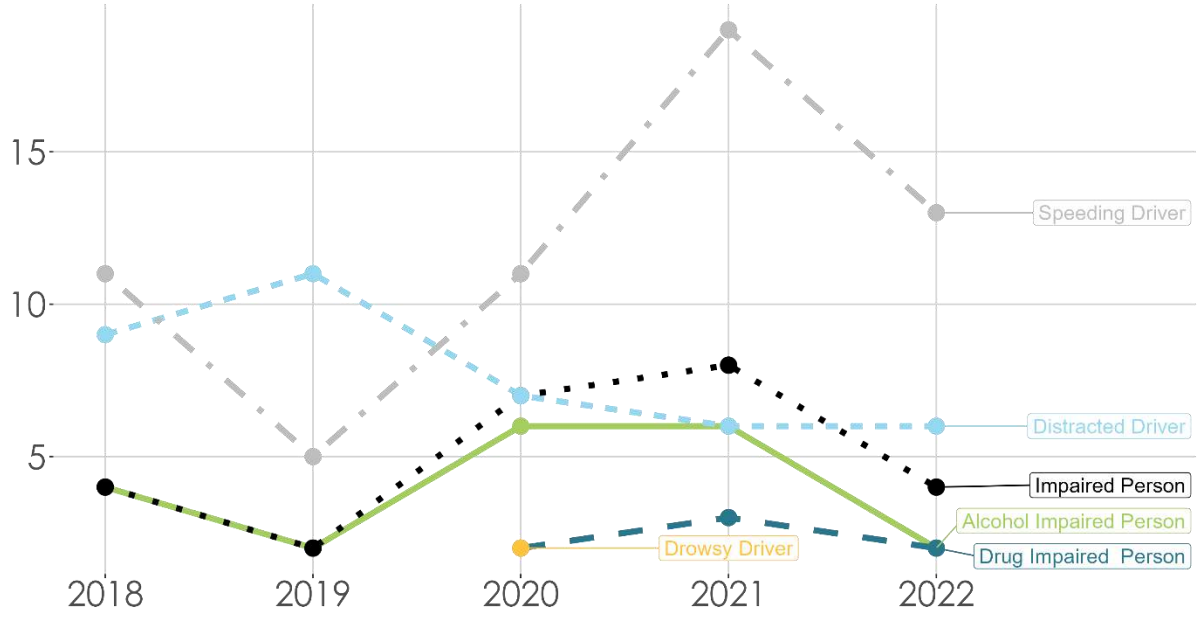
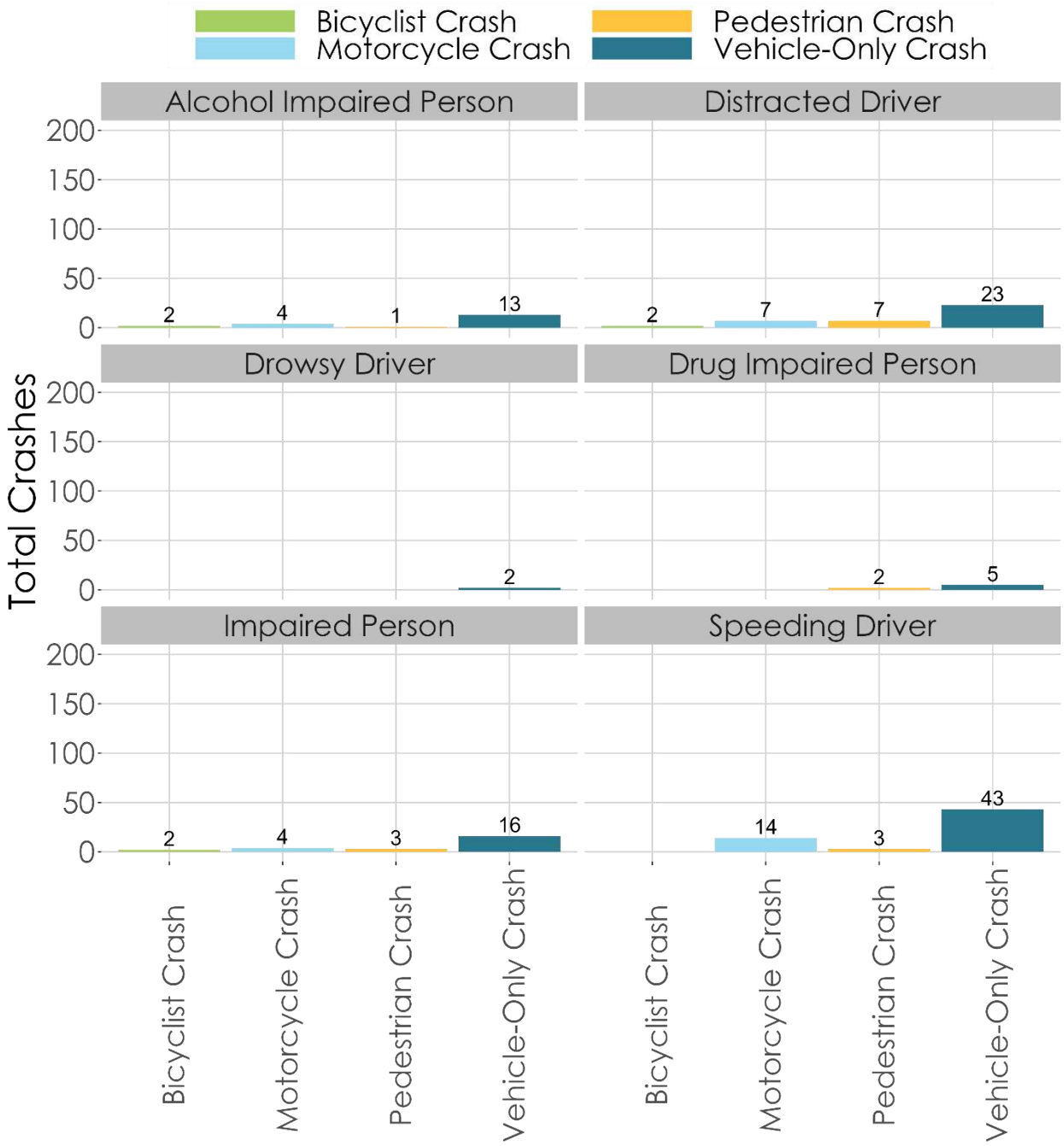


Exhibit 61: Fatal and Serious Injury Crashes Contributing Circumstance by mode in Unincorporated Spokane County (Excluding WSDOT Facilities) (2018 – 2022)



ROAD USER CHARACTERISTICS

The distribution of vehicle driver and motorcyclist ages are summarized below. Since there were a lower number of pedestrians (16) and bicyclists (6) involved in FSI crashes in Unincorporated Spokane County, a table was used to note the distribution of ages. The following age-related observations were made:

- The age of **vehicle drivers**, as seen in the region, is weighted more toward younger drivers (Exhibit 62).
- The age distribution for **motorcyclists** was similar to the regional distribution (Exhibit 63).
- There was a fairly even age distribution for **pedestrians**, while **bicyclists** tended slightly toward younger riders (Table 9).

Exhibit 62: Fatal and Serious Injury Crashes Vehicle Driver Age Distribution in Unincorporated Spokane County (Excluding WSDOT Facilities) (2018 – 2022)

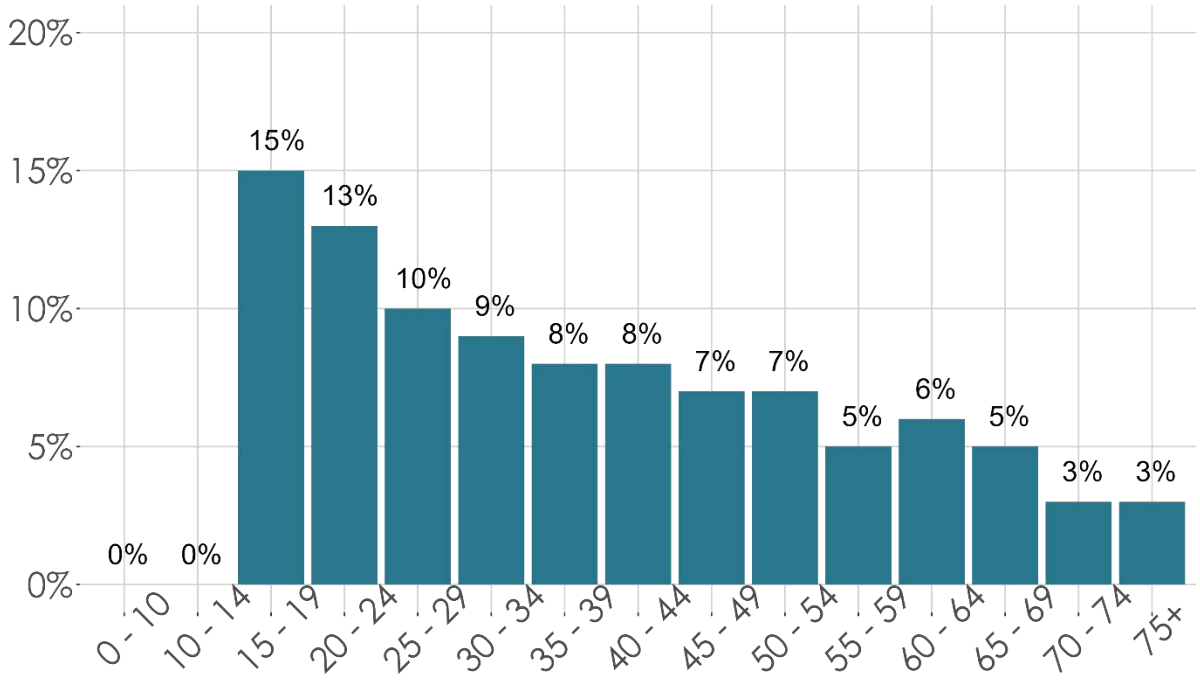


Exhibit 63: Fatal and Serious Injury Crashes Motorcyclist Age Distribution in Unincorporated Spokane County (Excluding WSDOT Facilities) (2018 – 2022)

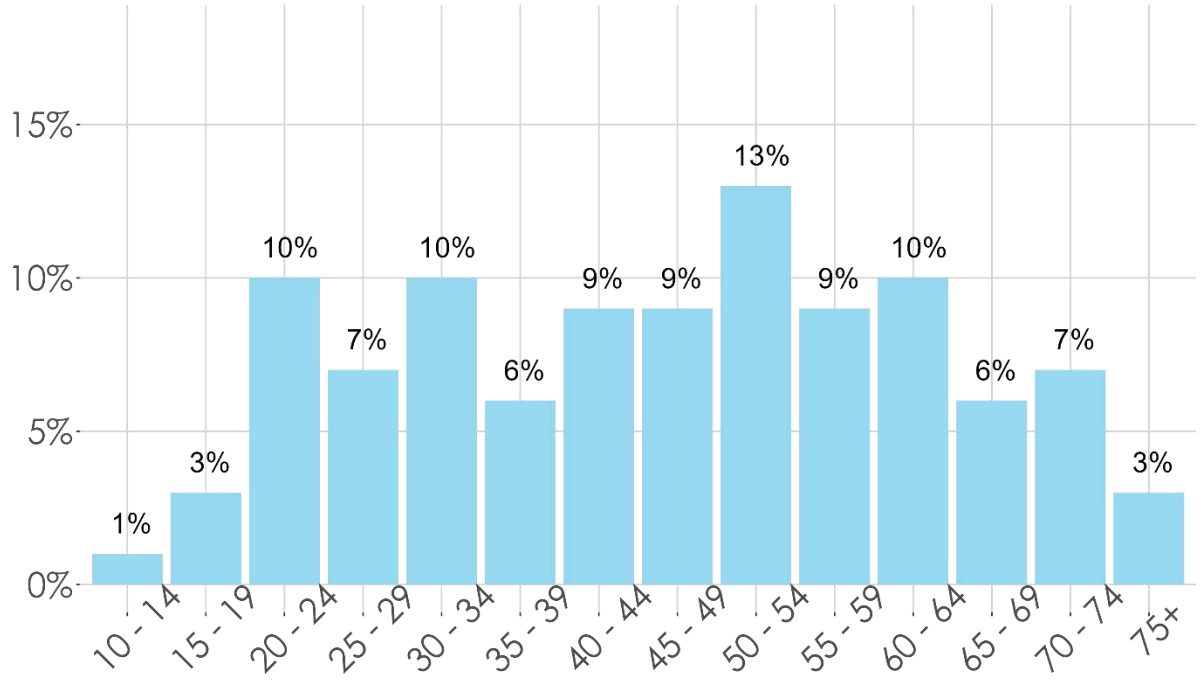


Table 9. Fatal and Serious Injury Crashes Pedestrian and Bicyclist Age Distribution in Unincorporated Spokane County (Excluding WSDOT Facilities) (2018 – 2022)

Age	Total Road Users	
	Pedestrian	Bicyclist
10-14	0	**1**
15-19	**2**	**1**
25-29	0	**1**
30-34	**2**	0
35-39	**2**	**1**
40-44	**1**	**1**
45-49	**2**	0
50-54	**3**	**1**
60-64	**1**	0
65-69	0	**0**
70-74	**1**	0
Unknown	**2**	0

UNINCORPORATED SPOKANE COUNTY CRASH TRENDS: WSDOT FACILITIES

Crash Characteristics

The first few exhibits in this section look at long-term trends from 2013 through 2022. The exhibits that follow characterize the 256 FSI crashes (2018 – 2022) in Unincorporated Spokane County:

- 78 vehicle-only crashes
- 19 motorcycle crashes
- 2 pedestrian crashes
- 2 bicyclist crashes

CRASH MODE AND SEVERITY

The following fatal and serious injury **crash trends** are observed in the City of Spokane's crash data:

Crash Mode Trends

- The number of annual **FSI crashes** on Unincorporated Spokane County's WSDOT facilities has **peaked several times** over the last decade, with the most recent peak in 2021 (Exhibit 64 and Exhibit 65).
- FSI **motorcycle crashes** have increased while FSI **vehicle-only crashes** have followed the same up and down pattern observed when looking at all modes combined (Exhibit 66). This is because the vehicle-only crashes comprise the majority of (77%) of the FSI crashes in this jurisdiction.
- FSI **pedestrian crashes** appear to have become less frequent in recent years, while FSI **bicyclist crashes** have remained fairly constant. However, there are not enough pedestrian and bicyclist crashes to identify concrete patterns in frequency.

Relative Frequency Trends

- The most overrepresented population in Unincorporated Spokane County WSDOT facilities is FSI **motorcycle crashes** (2% of all crashes, 17% of fatal crashes, and 20% of serious injury crashes).
- FSI **bicyclist crashes** and **pedestrian crashes** were also slightly overrepresented within this jurisdiction, comprising less than 1% each of all crashes, but comprising 6% of fatal bicyclist crashes and 3% of serious injury pedestrian crashes. The less severe overrepresentation of vulnerable road users in this jurisdiction is likely due to reduced pedestrian and bicyclist activity along these roadways.
- **Vehicle-only crashes** tend to be more severe on Unincorporated Spokane County WSDOT facilities, compared to the rest of the region. On the Unincorporated Spokane County WSDOT facilities, vehicle-only crashes comprise 97% of all crashes, 78% of fatal crashes, and 77% of serious injury crashes. In the region overall, vehicle-only crashes make up 93% of all crashes, and about half of all FSI crashes. This indicates a higher risk of FSIs for vehicle occupants involved in crashes in these areas.

Exhibit 64. Fatal and Serious Crashes by Year and Mode in Unincorporated Spokane County WSDOT Facilities (2013 – 2022)

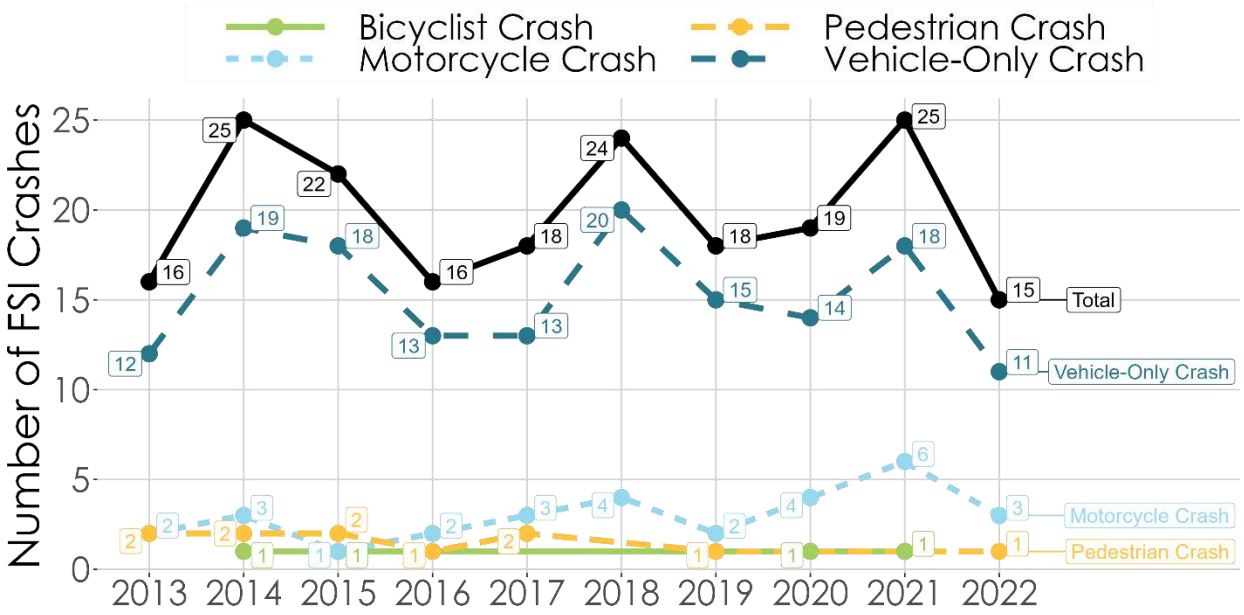


Exhibit 65. Fatal and Serious Injury Crashes by Year and Severity in Unincorporated Spokane County WSDOT Facilities (2013 – 2022)

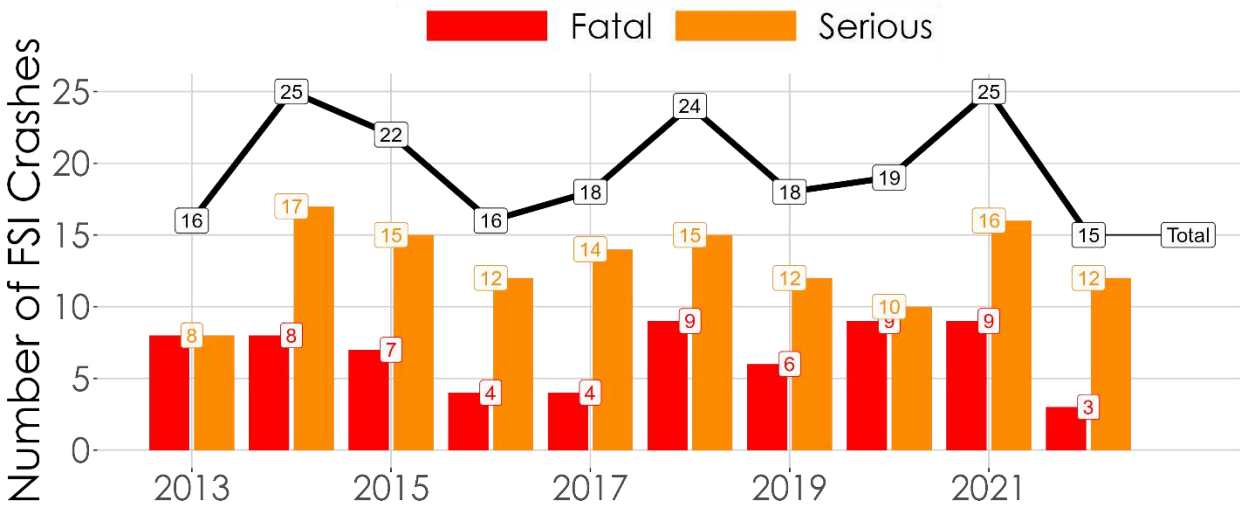
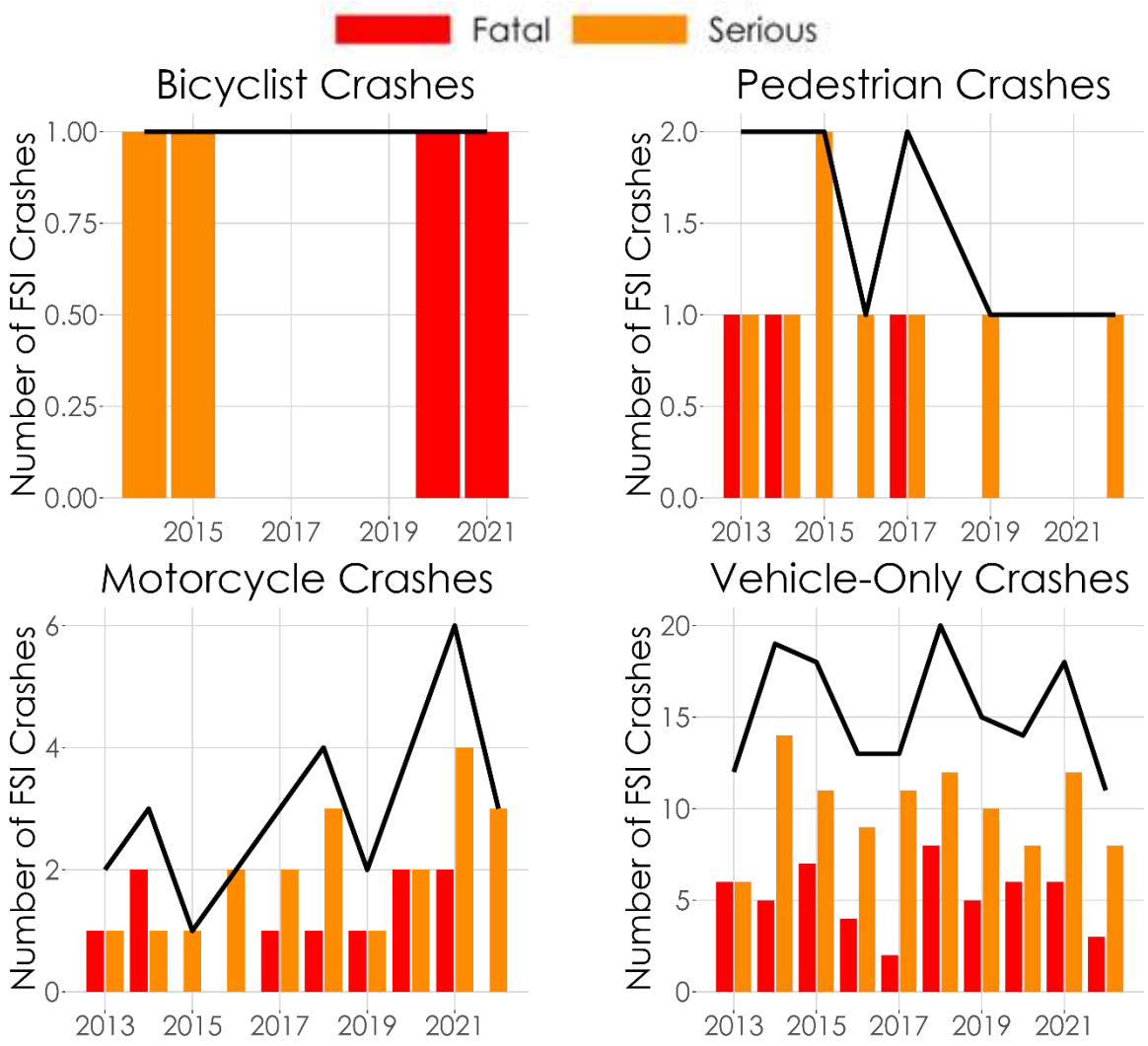


Exhibit 66: Fatal and Serious Injury Crashes by Year and Mode in Unincorporated Spokane County WSDOT Facilities (2013 – 2022)



CRASH TYPE

The following crash type trends were observed:

- **Run-off-road** FSI crashes comprise approximately one-third of the FSI crashes in these areas (Exhibit 67). They comprise a smaller percentage of fatal crashes than they do in the region, but a larger percentage of serious injury crashes than in the region. The frequency of this crash type was increasing from 2021 to 2022 (Exhibit 69).
- **Motorcycle FSI crashes** comprise a much larger percentage of crashes than pedestrian crashes, which is opposite to the trend observed in the region.
- Like road departure (run-off-road) FSI crashes, **lane departure FSI crashes** (includes head-on and other opposite direction crashes) comprise a larger percentage of crashes in these areas than in the region (Exhibit 68). The frequency of this crash type had been increasing annually from 2018 to 2021 but decreased in 2022 (Exhibit 70).
- There is a **higher percentage of daylight crashes** within road and lane departure crash populations in Unincorporated Spokane County WSDOT facilities than across the region (Exhibit 71). This likely indicates there are other significant contributing circumstances to these crashes besides lighting conditions.

Exhibit 67: Fatal and Serious Injury Crashes by Crash Type in Unincorporated Spokane County WSDOT Facilities (2018 – 2022)

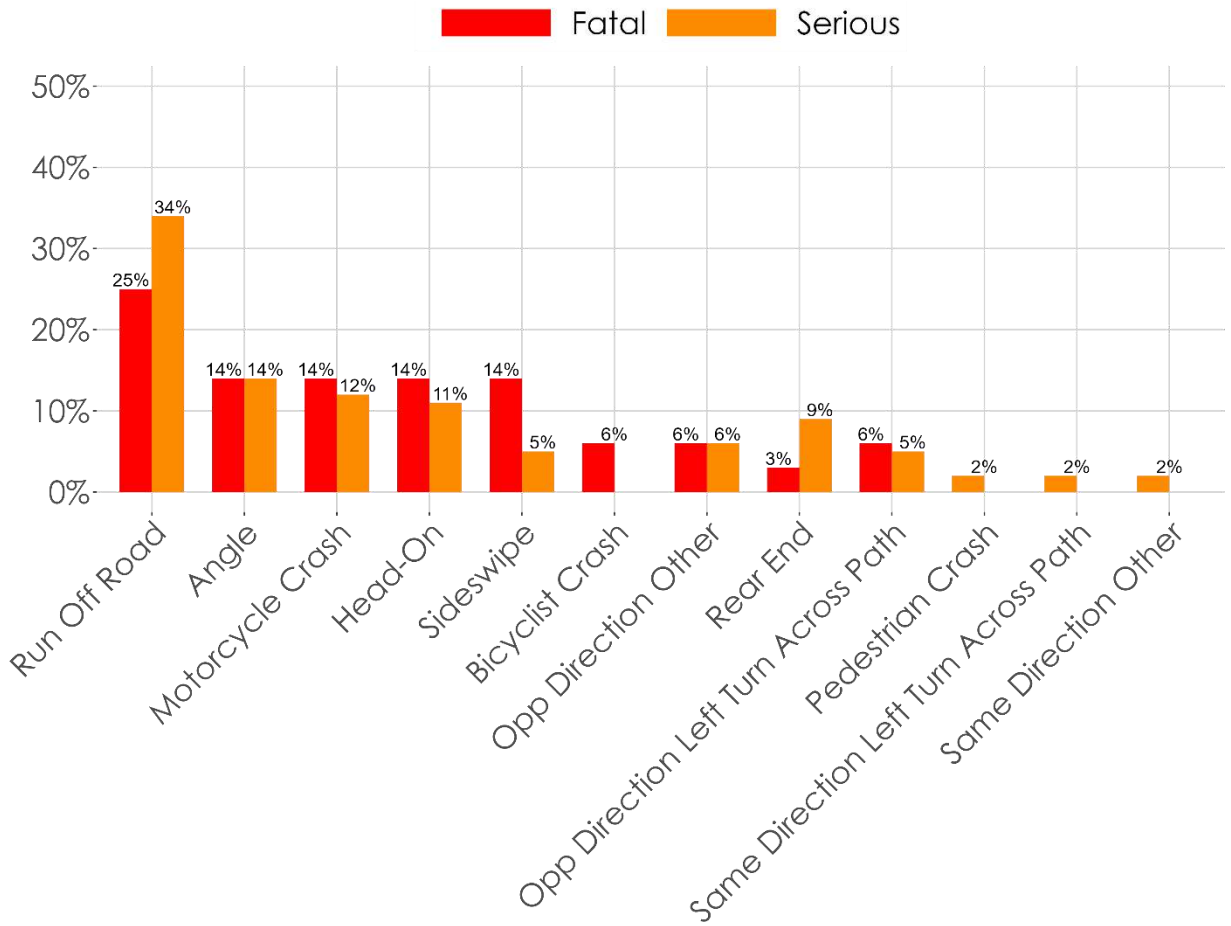


Exhibit 68: Annual Lane and Road Departure Crash Composition of Fatal and Serious Injury Crashes in Unincorporated Spokane County WSDOT Facilities (2018 – 2022)

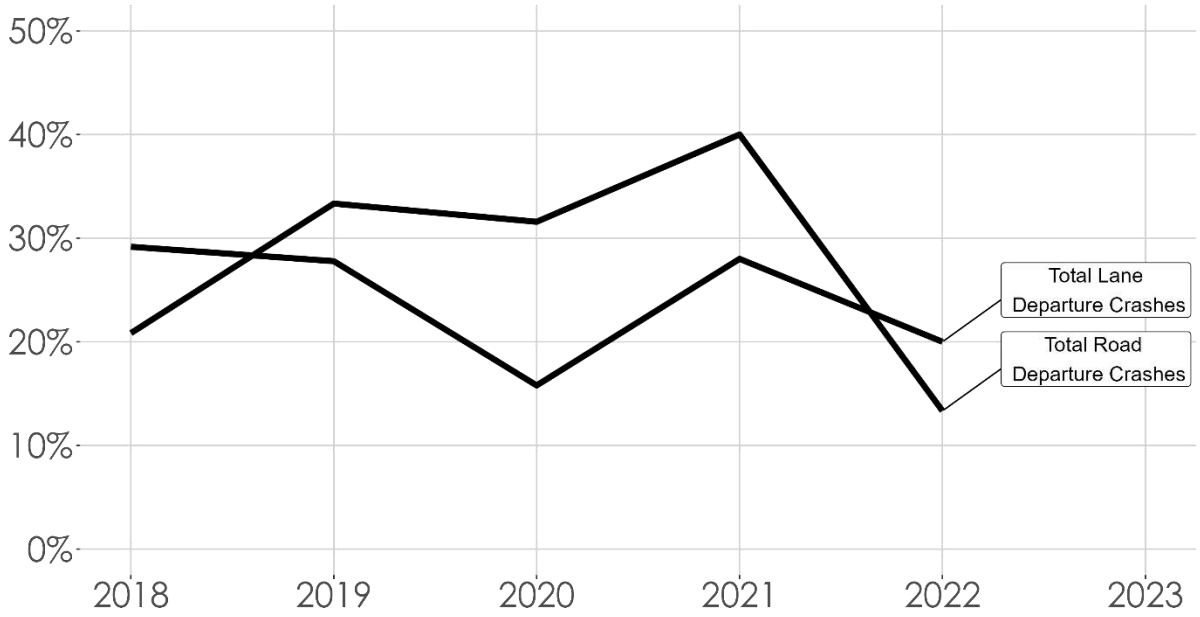


Exhibit 69: Fatal and Serious Injury Lane Departure Crashes by Year in Unincorporated Spokane County WSDOT Facilities (2018 – 2022)

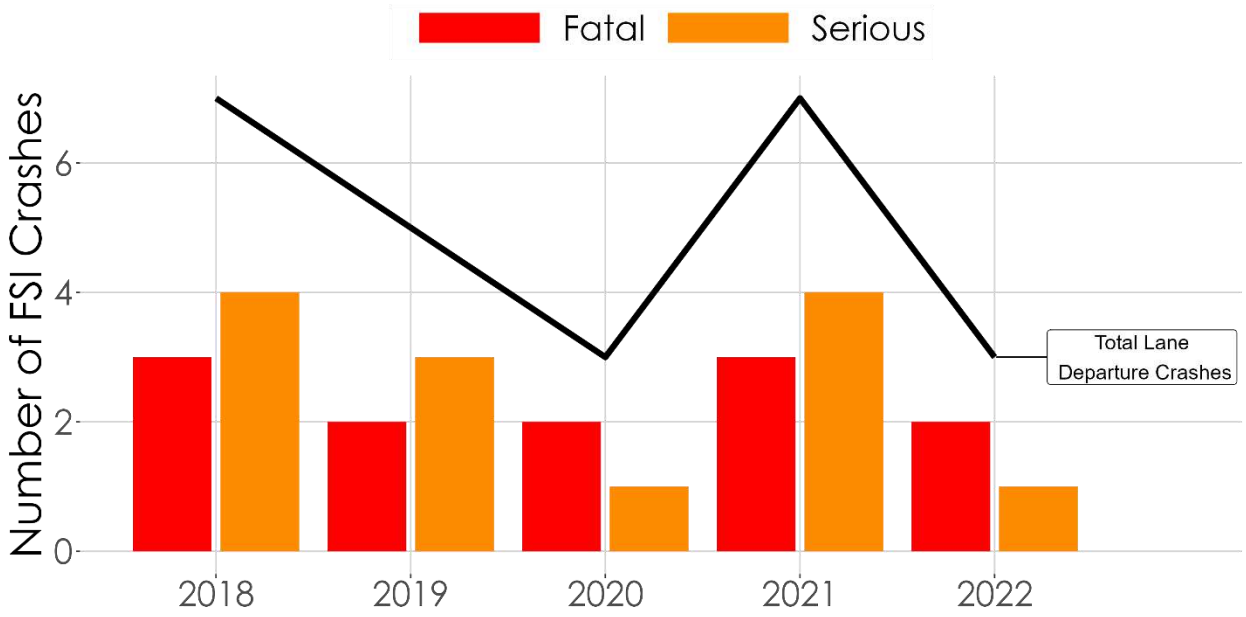


Exhibit 70: Fatal and Serious Injury Road Departure Crashes by Year in Unincorporated Spokane County WSDOT Facilities (2018 – 2022)

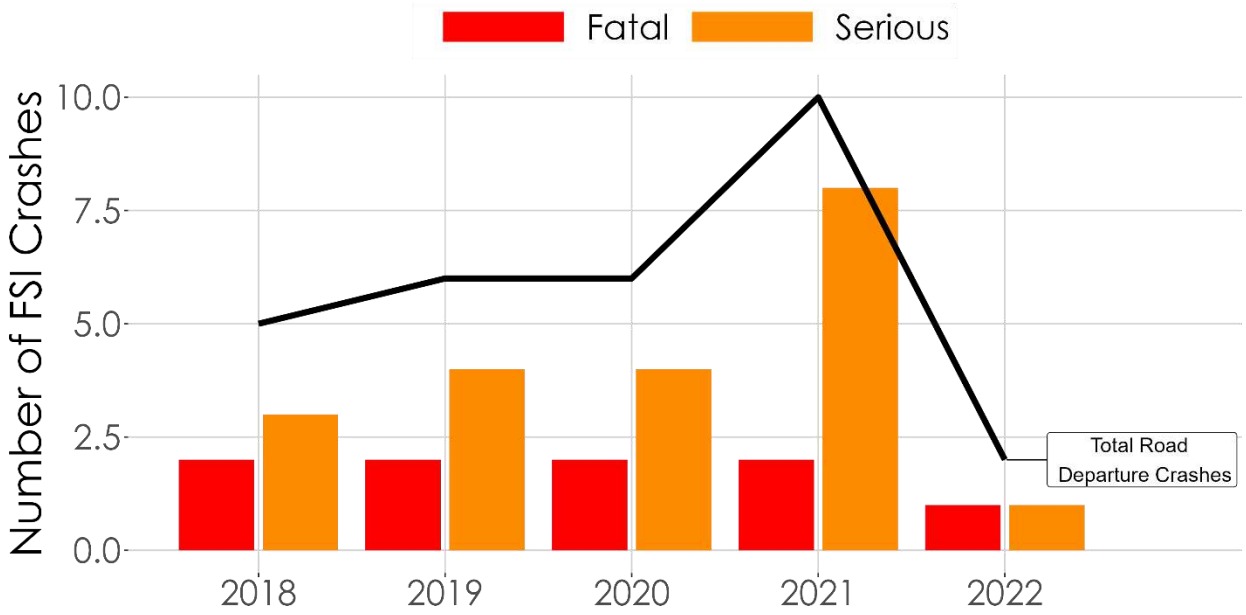
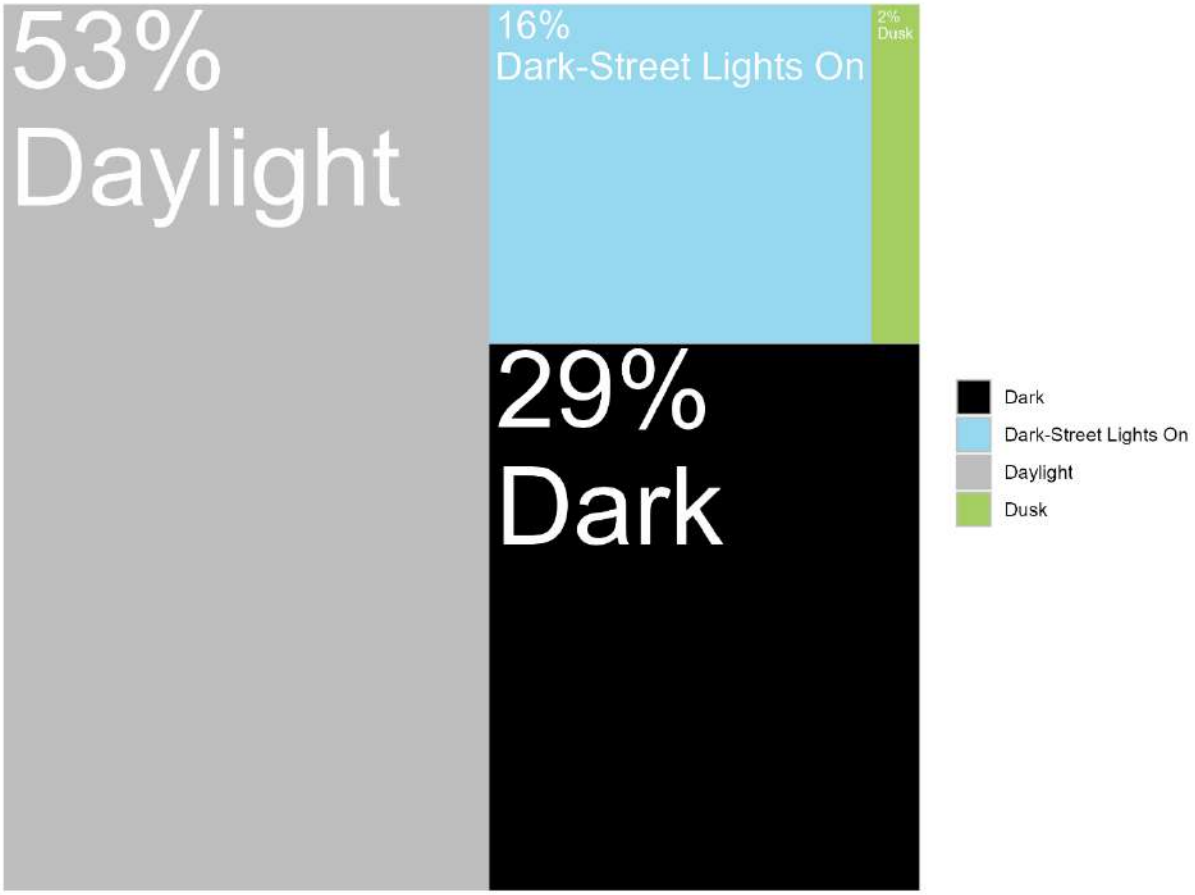


Exhibit 71: Lighting Conditions for Fatal and Serious Injury Lane and Road Departure Crashes in Unincorporated Spokane County WSDOT Facilities (2018 – 2022)



WHEN DO CRASHES HAPPEN?

When crashes occur can be measured by the month, day of the week, and hour of the day. The following observations were made when observing all three time-based data elements:

Month (Exhibit 72)

- FSI **vehicle-only** crashes peaked in December, as opposed to the June peak across the region. However, vehicle-only crashes did see secondary peaks in June and July.
- All the FSI **motorcycle** crashes occurred between March and October. This higher activity in warm weather months mimics the regional trends.
- There were two FSI **pedestrian** crashes and two FSI **bicyclist** crashes. Both pedestrian crashes occurred in winter while both bicycle crashes occurred in summer.

Day of Week (Exhibit 73)

- As observed in the regional data, there is variation among FSI **vehicle-only** and **motorcycle** crash frequency across days of the week, with vehicle-only peaks on Friday and Saturday and a motorcycle peak on Friday. Both regional peaks are on Friday.
- Both FSI **pedestrian** crashes occurred on a Tuesday while the two FSI **bicycle** crashes occurred on a Friday and Sunday.

Hour of Day (Exhibit 74)

- FSI **vehicle-only** crashes mimicked regional trends, peaking at 7AM, 3 PM, and 6 PM.
- FSI **motorcycle** crashes were frequent both in the early afternoon and late at night.
- Both FSI **bicyclist** crashes occurred either in the early morning (6 AM) or at night (8 PM).
- The two FSI **pedestrian** crashes occurred at 2 PM and 6 PM.

Exhibit 72: Fatal and Serious Injury Crashes by Time of Year in Unincorporated Spokane County WSDOT Facilities (2018 – 2022)

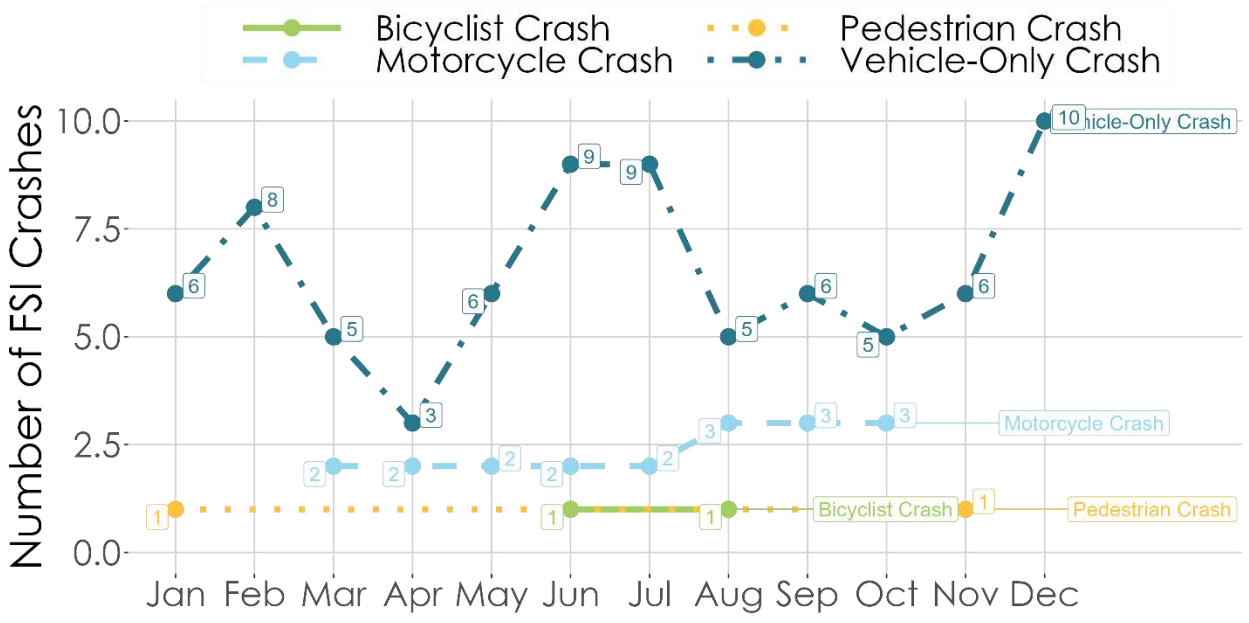


Exhibit 73: Fatal and Serious Injury Crashes by Weekday in Unincorporated Spokane County WSDOT Facilities (2018 – 2022)

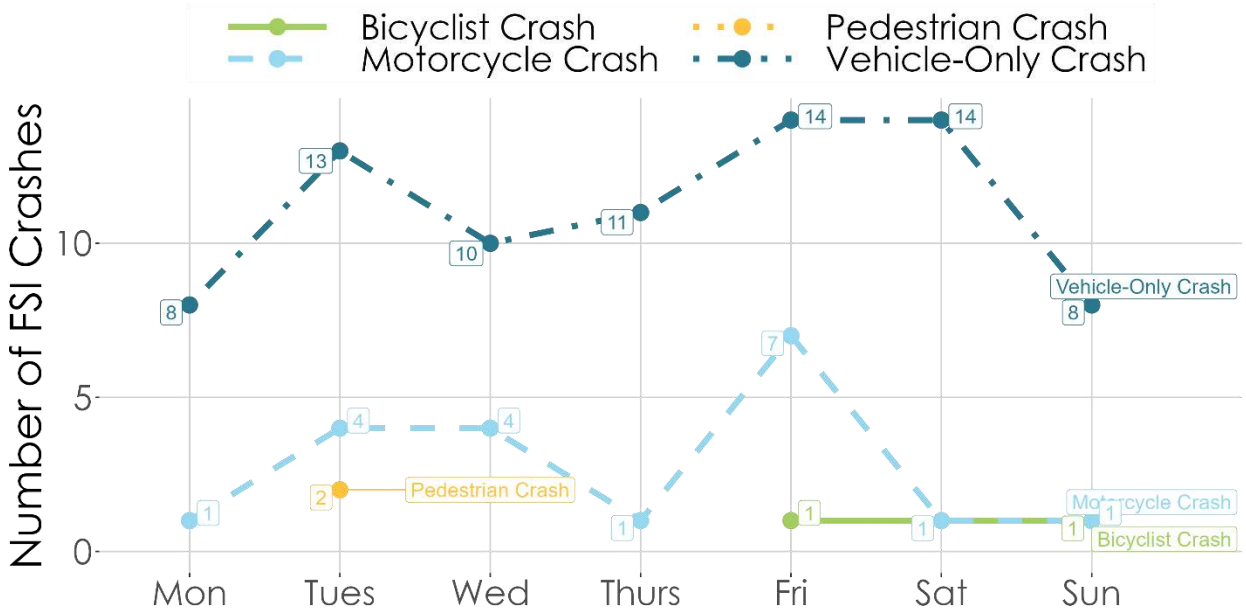
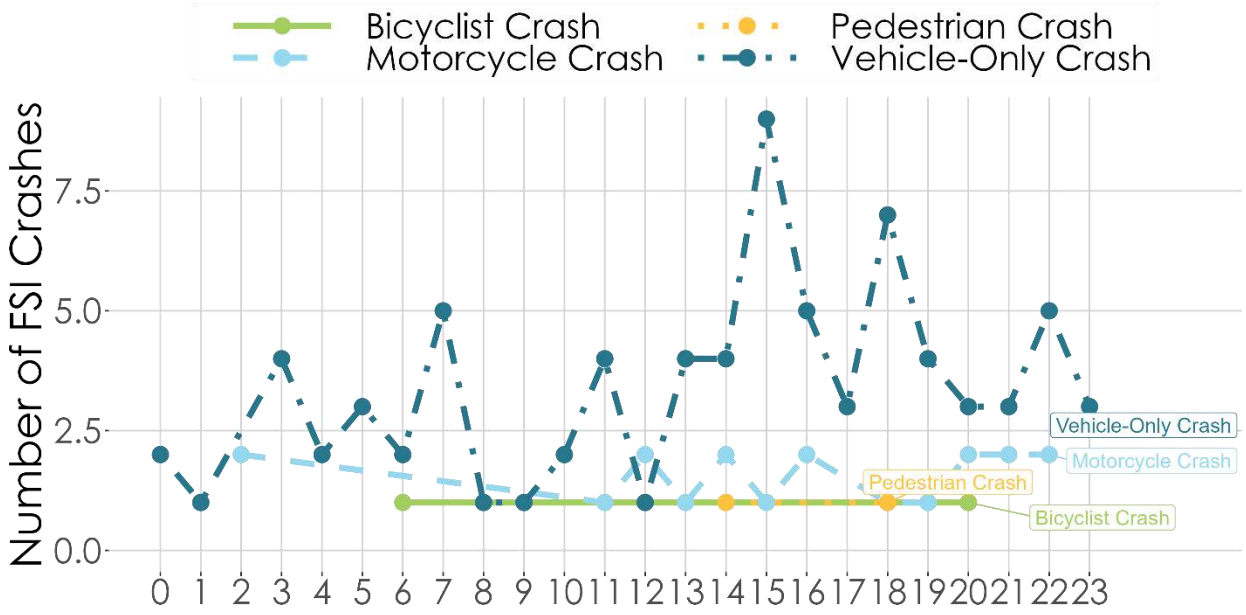


Exhibit 74: Fatal and Serious Injury Crashes by Time of Day in Unincorporated Spokane County WSDOT Facilities (2018 – 2022)



WHERE DO CRASHES HAPPEN?

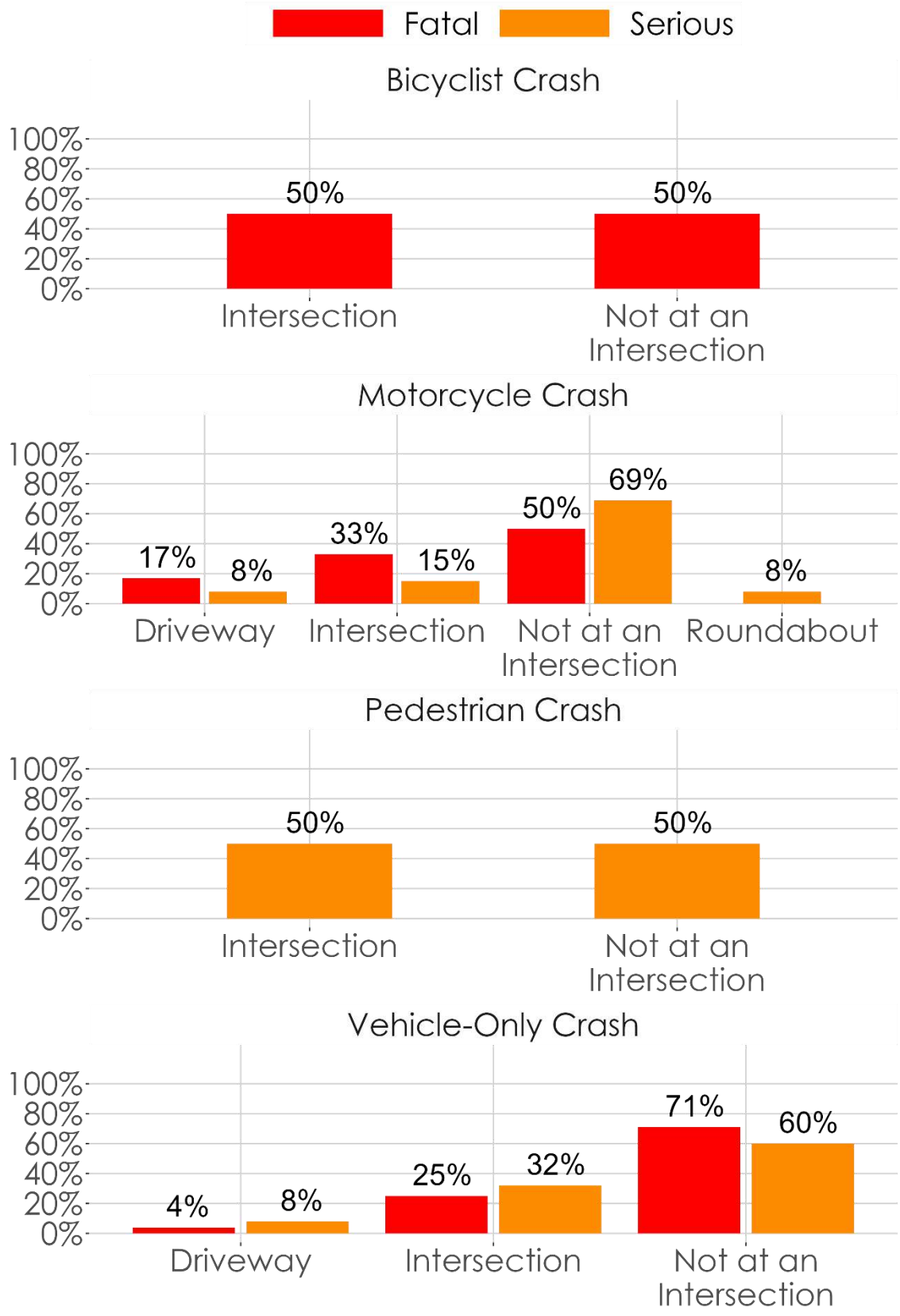
Facility Jurisdiction

- All the FSI crashes occurred on **state routes**. These results reflect the composition of Unincorporated Spokane County WSDOT facility roadway network.

Relationship to Junction (Exhibit 75)

- The majority of the FSI crashes on Unincorporated Spokane County WSDOT facilities **did not occur at an intersection**. Intersection crashes were more common across the region due to the various cities with grid systems.

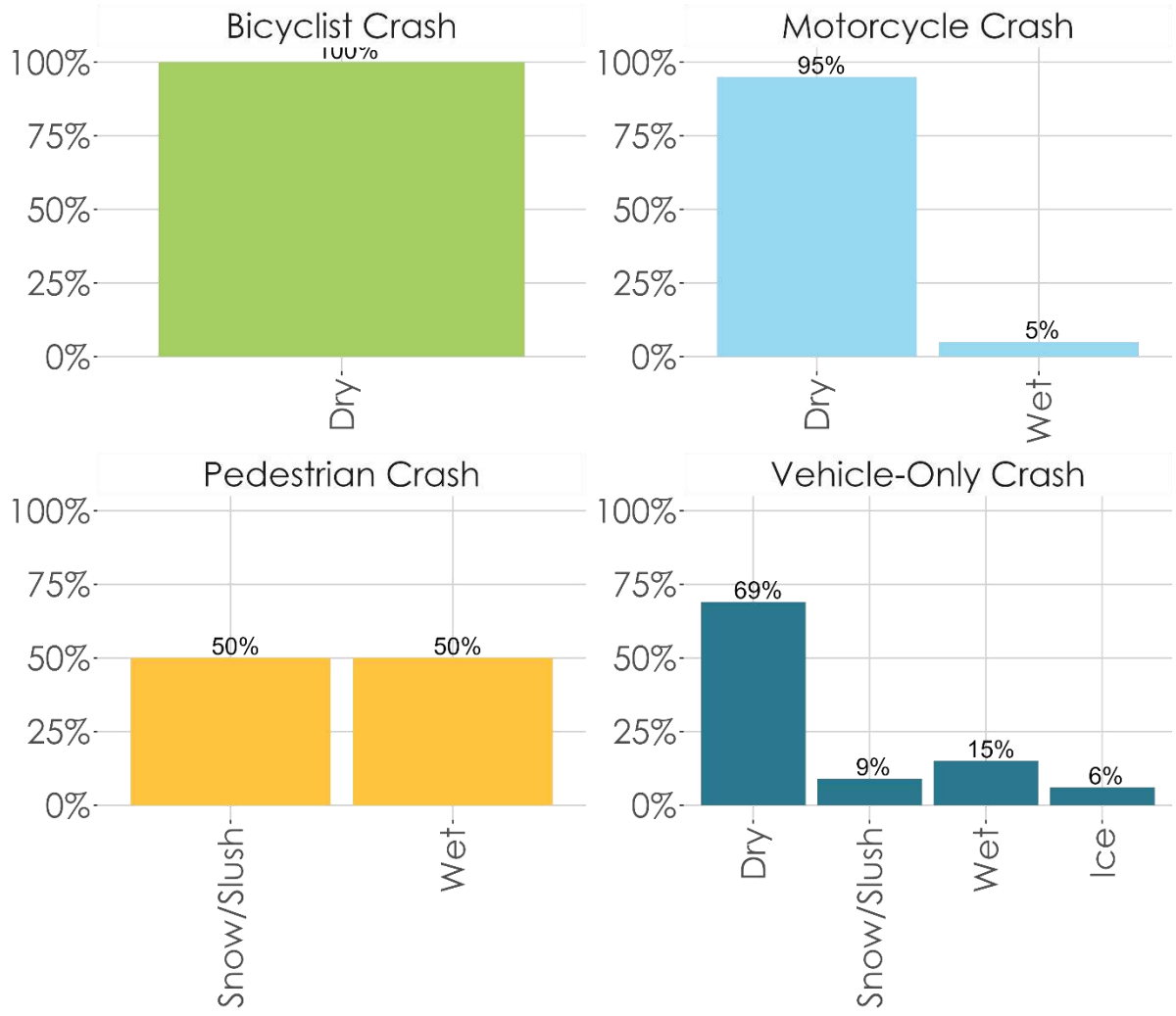
Exhibit 75: Fatal and Serious Injury Crashes by Relationship to Intersection in Unincorporated Spokane County WSDOT Facilities (2018 – 2022)



ENVIRONMENTAL

As seen in the regional data, **dry** surface conditions were most common within each crash mode, with the exception of the two **pedestrian** crashes (one in snow/slush and one in wet conditions). **Wet, icy, and snowy/slushy** conditions together comprised 30% of the FSI vehicle-only crashes in these areas compared to the overall region composition of 19%.

Exhibit 76. Distribution of Roadway Conditions for Fatal and Serious Injury Crashes in Unincorporated Spokane County WSDOT Facilities (2018 – 2022)



Human Factors/Driver Behavior

CONTRIBUTING CIRCUMSTANCES

The following observations were made when analyzing the contributing circumstances data:

- **Speeding driver** and **impairment** are the two most common contributing circumstances to FSI crashes in Unincorporated Spokane County WSDOT facilities.
- From 2021 to 2022, the frequency of all the assessed contributing circumstances **decreased** except for the involvement of a drug impaired person which has been increasing in frequency since 2018.
- As seen in the region and other jurisdictions, **speeding** disproportionately appears in FSI **motorcycle** crashes.

Exhibit 77: Fatal and Serious Injury Crashes Involving a Contributing Circumstance in Unincorporated Spokane County WSDOT Facilities (2018 – 2022)

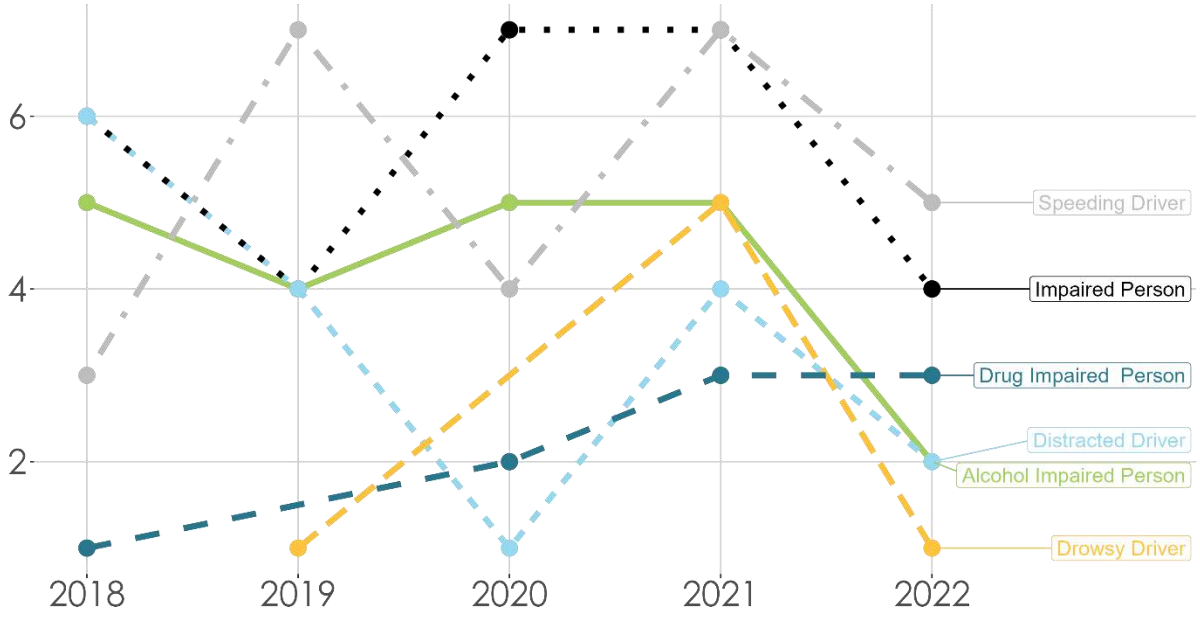
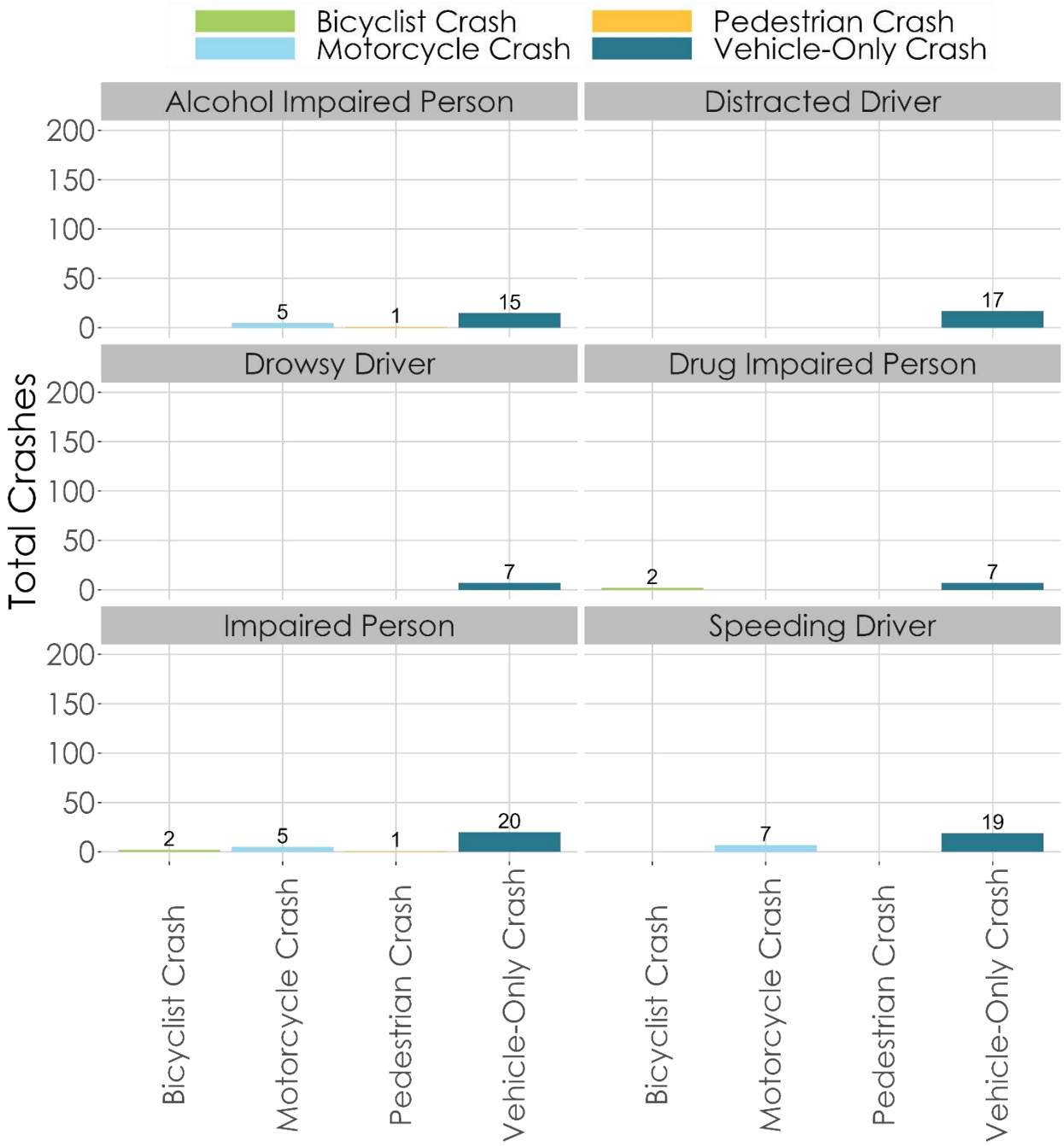


Exhibit 78: Fatal and Serious Injury Crashes Contributing Circumstance by mode in Unincorporated Spokane County WSDOT Facilities (2018 – 2022)



ROAD USER CHARACTERISTICS

The distribution of vehicle driver and motorcyclist ages are shown below. Since there were a lower number of pedestrians (2) and bicyclists (2) involved in FSI crashes in Unincorporated Spokane County, a table was used to note the distribution of ages. The following age-related observations were made:

- The age of **vehicle drivers** is weighted toward younger drivers within Unincorporated Spokane County WSDOT facilities, as seen in the regional trends (Exhibit 79).
- The age distribution for **motorcyclists** was very similar to the regional distribution, with motorcyclists in their 30s comprising approximately one-fourth of the population (Exhibit 80).
- Both **pedestrians** were in the 15 to 19 year age range, while one **bicyclists** was in their 20s and another was in their 60s (Table 10Table 9).

Exhibit 79: Fatal and Serious Injury Crashes Vehicle Driver Age Distribution in Unincorporated Spokane County WSDOT Facilities (2018 – 2022)

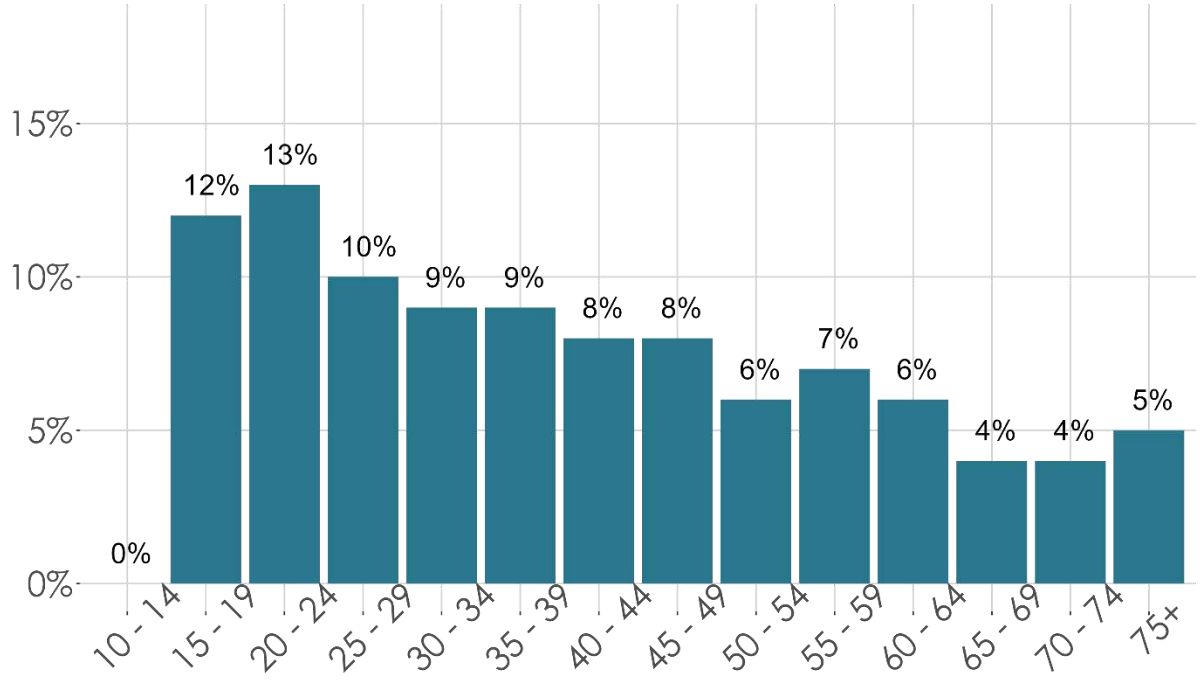


Exhibit 80: Fatal and Serious Injury Crashes Motorcyclist Age Distribution in Unincorporated Spokane County WSDOT Facilities (2018 – 2022)

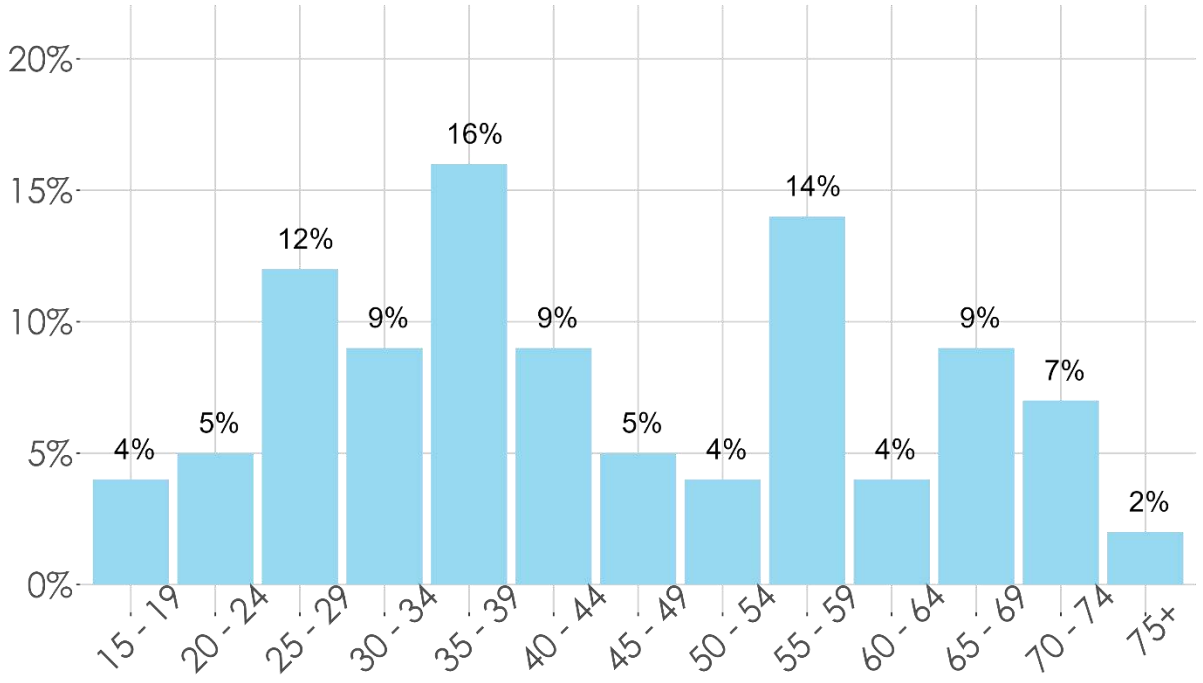


Table 10. Fatal and Serious Injury Crashes Pedestrian and Bicyclist Age Distribution in Unincorporated Spokane County WSDOT Facilities (2018 – 2022)

Age	Total Road Users	
	Pedestrian	Bicyclist
15-19	**2**	0
25-29	0	**1**
65-69	0	**1**

CITY OF SPOKANE VALLEY CRASH TRENDS

Crash Characteristics

The first few exhibits in this section look at long-term trends from 2013 through 2022. The exhibits that follow characterize the 155 FSI crashes (2018 – 2022) in the City of Spokane:

- 73 vehicle-only crashes
- 40 motorcycle crashes
- 30 pedestrian crashes
- 12 bicyclist crashes

CRASH MODE AND SEVERITY

The following fatal and serious injury **crash trends** are observed in the City of Spokane's crash data:

Crash Mode Trends

- FSI crashes have been steadily **increasing since 2019** after several years of remaining constant (Exhibit 81 and Exhibit 82). In 2022, there were more than double the number of FSI crashes than there were in 2019. This dramatic increase in recent years has also been observed for the entire region.
- Peak crash frequencies within the last decade for FSI **vehicle-only**, **motorcycle**, and **bicyclist** crashes have all occurred between 2019 and 2022 (Exhibit 83).
- The number of **pedestrian** FSI crashes in 2021 and 2022 was more than double the number in 2019 and 2020.

Relative Frequency Trends

- **Fatal motorcycle crashes** are largely overrepresented in the City of Spokane Valley, with motorcycle crashes comprising 3% of all crashes and 38% of fatal crashes. This overrepresentation is more drastic than what is seen in the regional data. As a trade-off, fatal vehicle-only crashes are at a lower percentage compared to the region. The remaining relativistic percentages are similar between the City and the region.

Exhibit 81. Fatal and Serious Crashes by Year and Mode in the City of Spokane Valley (2013 – 2022)

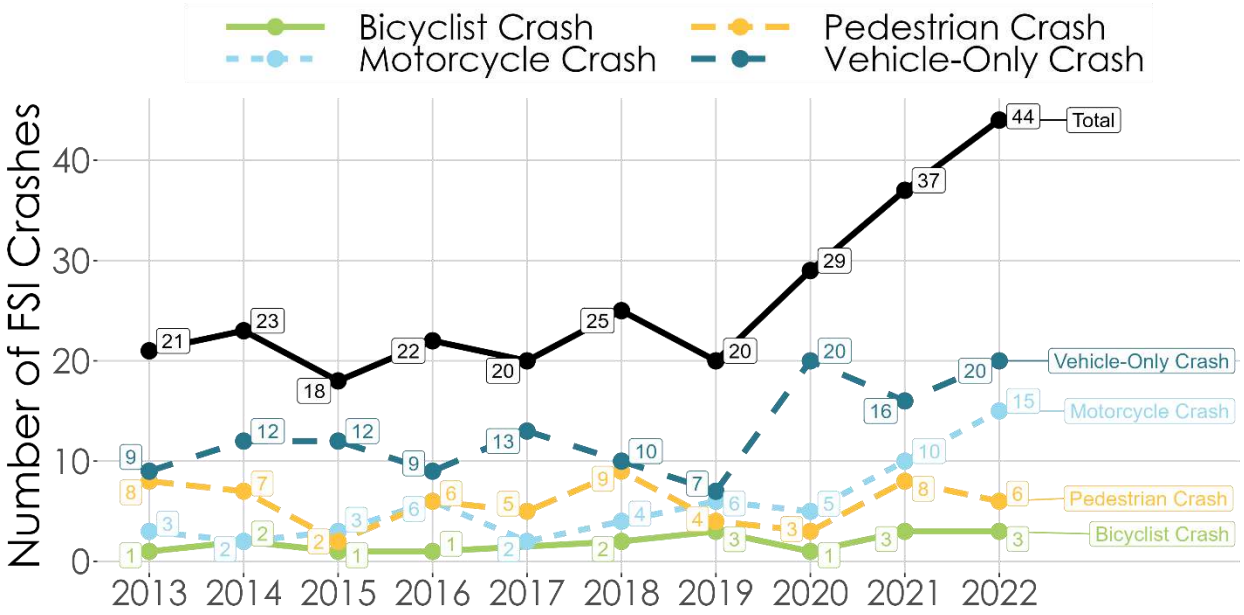


Exhibit 82. Fatal and Serious Injury Crashes by Year and Severity in the City of Spokane Valley (2013 – 2022)

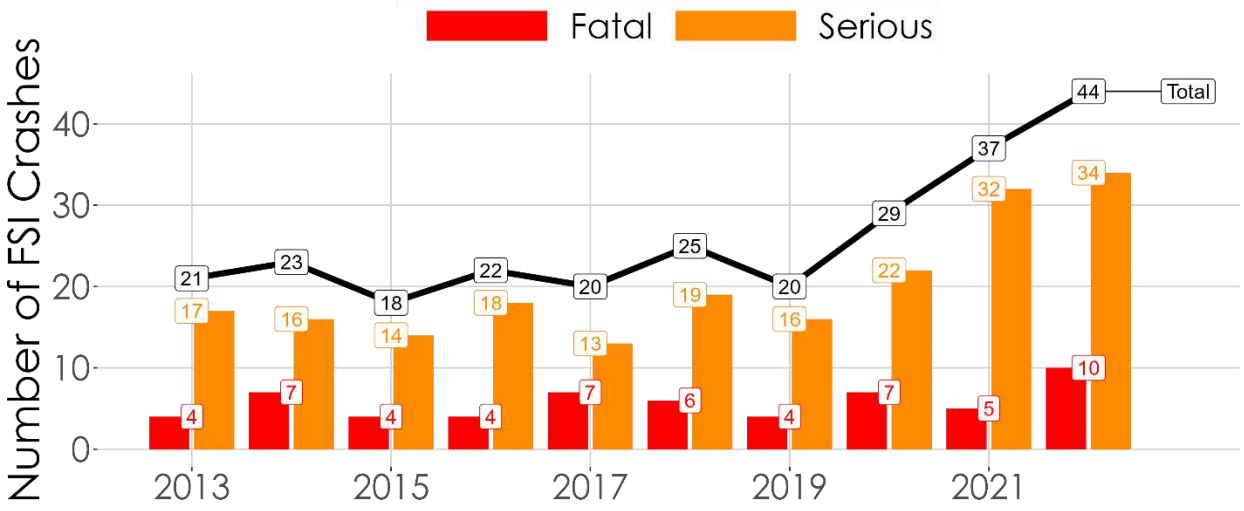
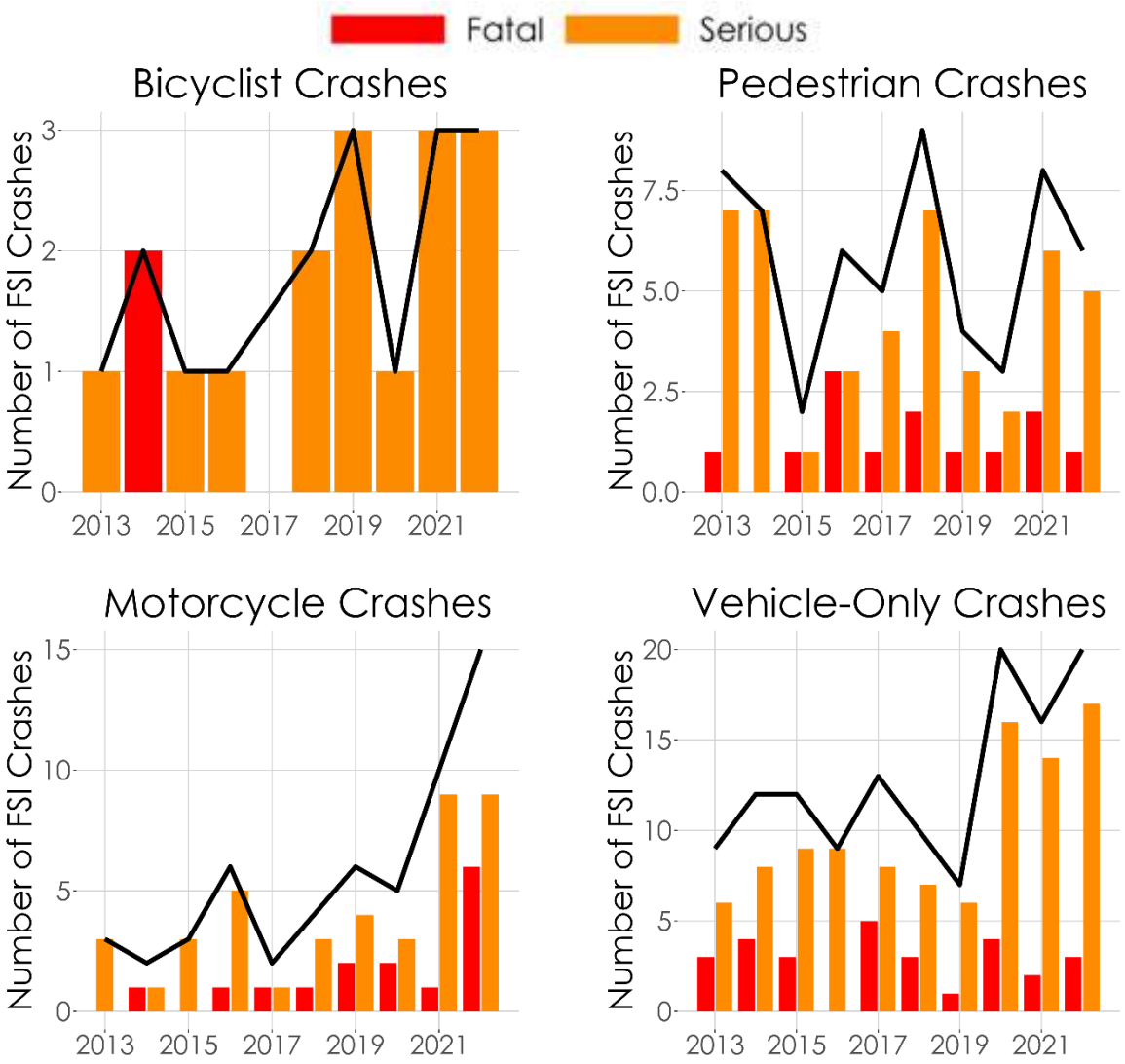


Exhibit 83: Fatal and Serious Injury Crashes by Year and Mode in the City of Spokane Valley (2013 – 2022)



CRASH TYPE

The following crash type trends were observed:

- **Motorcycle** crashes comprise the largest percentage of the FSI crashes in Spokane Valley, followed by **pedestrian** crashes and then **run-off-road** crashes (Exhibit 84). In the region, run-off-road crashes are the most common FSI crash type. This indicates a higher rate of motorcycle crashes in the City of Spokane Valley than in other cities.
- **Lane departure** and **road departure** crashes comprise a smaller percentage of FSI crashes in the City of Spokane Valley than they do in the entire region (Exhibit 85). While road departure frequency has remained constant, 2021 and 2022 saw an increased number of lane departure crashes (Exhibit 86 and Exhibit 87).
- 93% of the **lane and road departure** crashes occurred in daylight or in dark conditions with streetlights on (Exhibit 88). Compared to the region and other cities, this is a very high proportion of lighted conditions for this crash type.

Exhibit 84: Fatal and Serious Injury Crashes by Crash Type in the City of Spokane Valley (2018 – 2022)

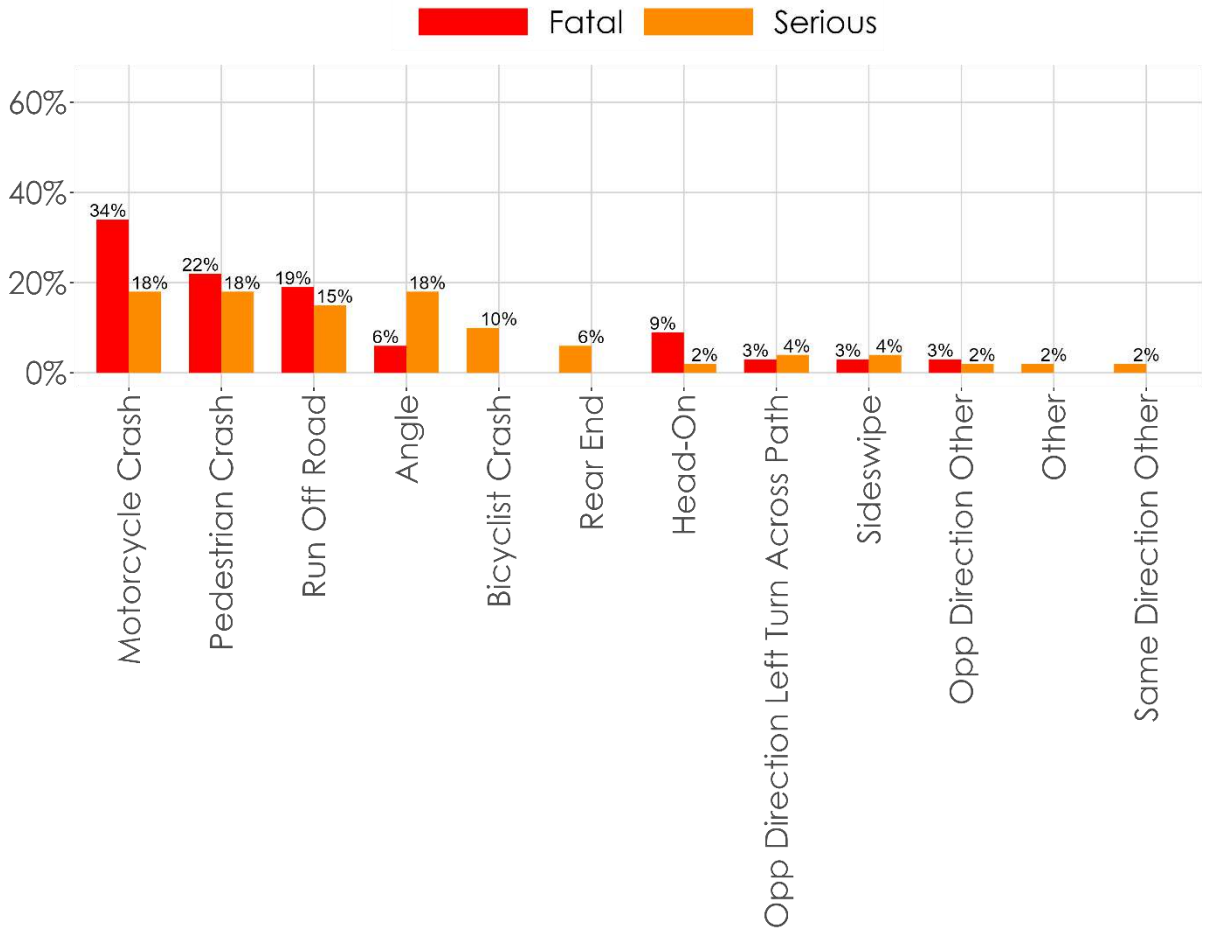


Exhibit 85: Annual Lane and Road Departure Crash Composition of Fatal and Serious Injury Crashes in the City of Spokane Valley (2018 – 2022)

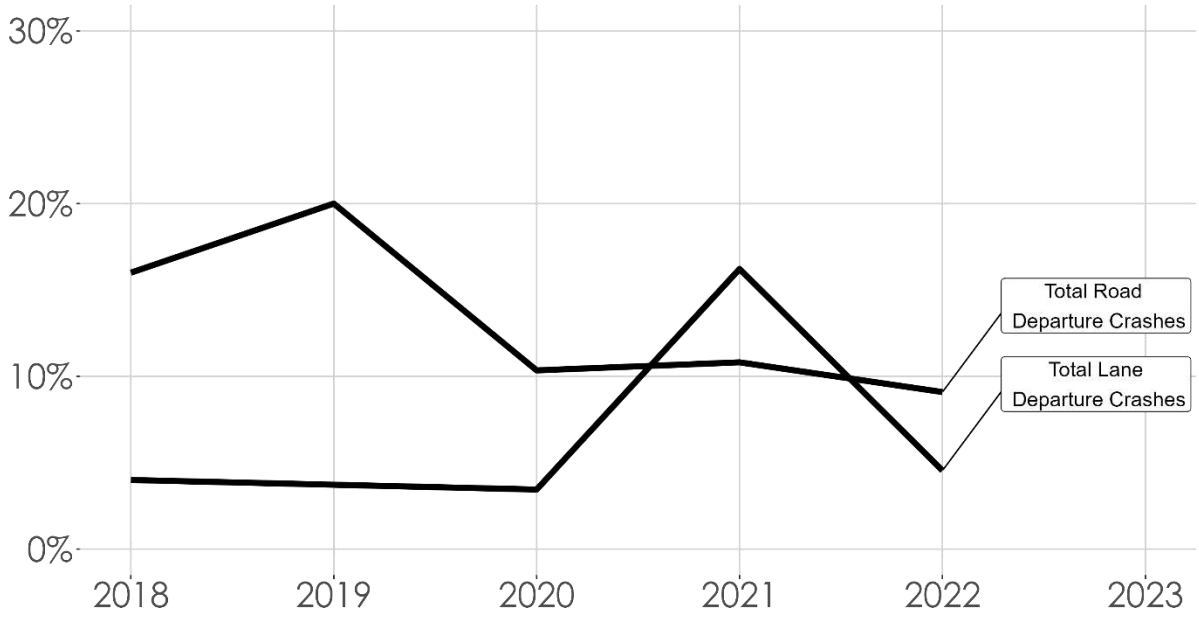


Exhibit 86: Fatal and Serious Injury Lane Departure Crashes by Year in the City of Spokane Valley (2018 – 2022)

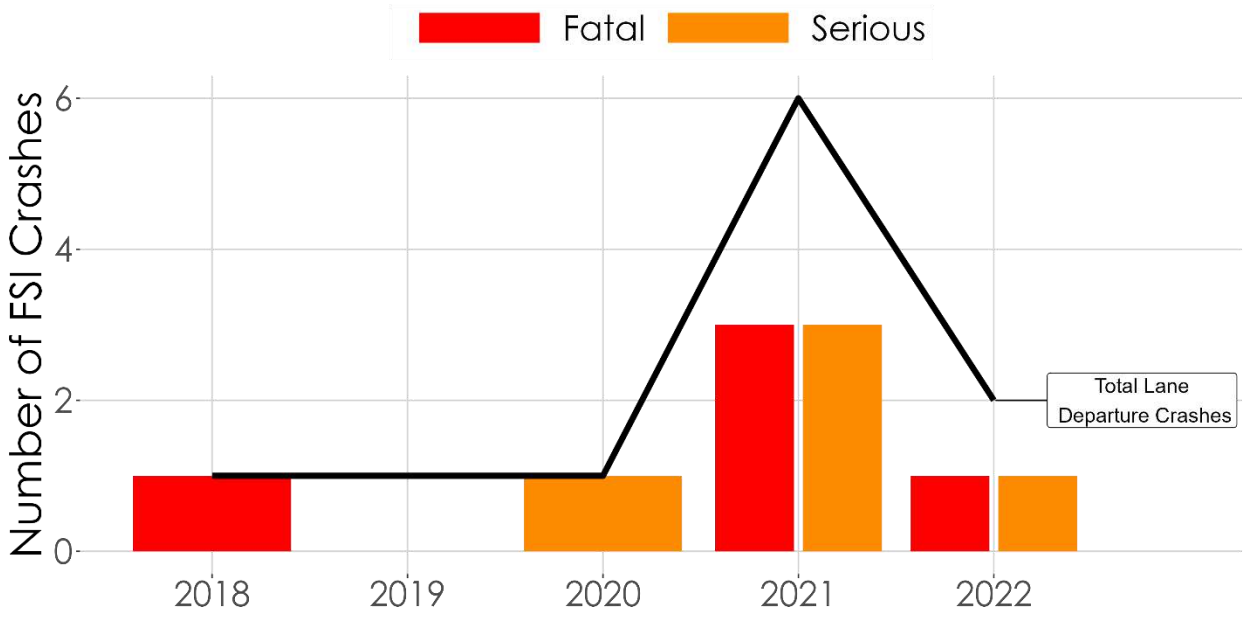


Exhibit 87: Fatal and Serious Injury Road Departure Crashes by Year in the City of Spokane Valley (2018 – 2022)

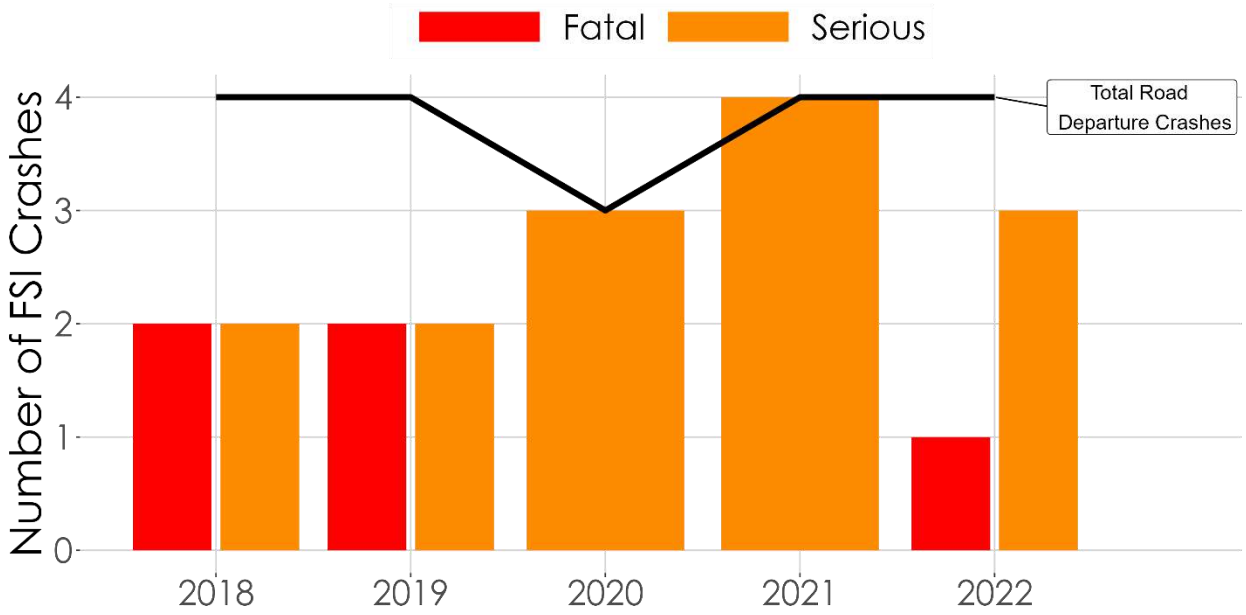
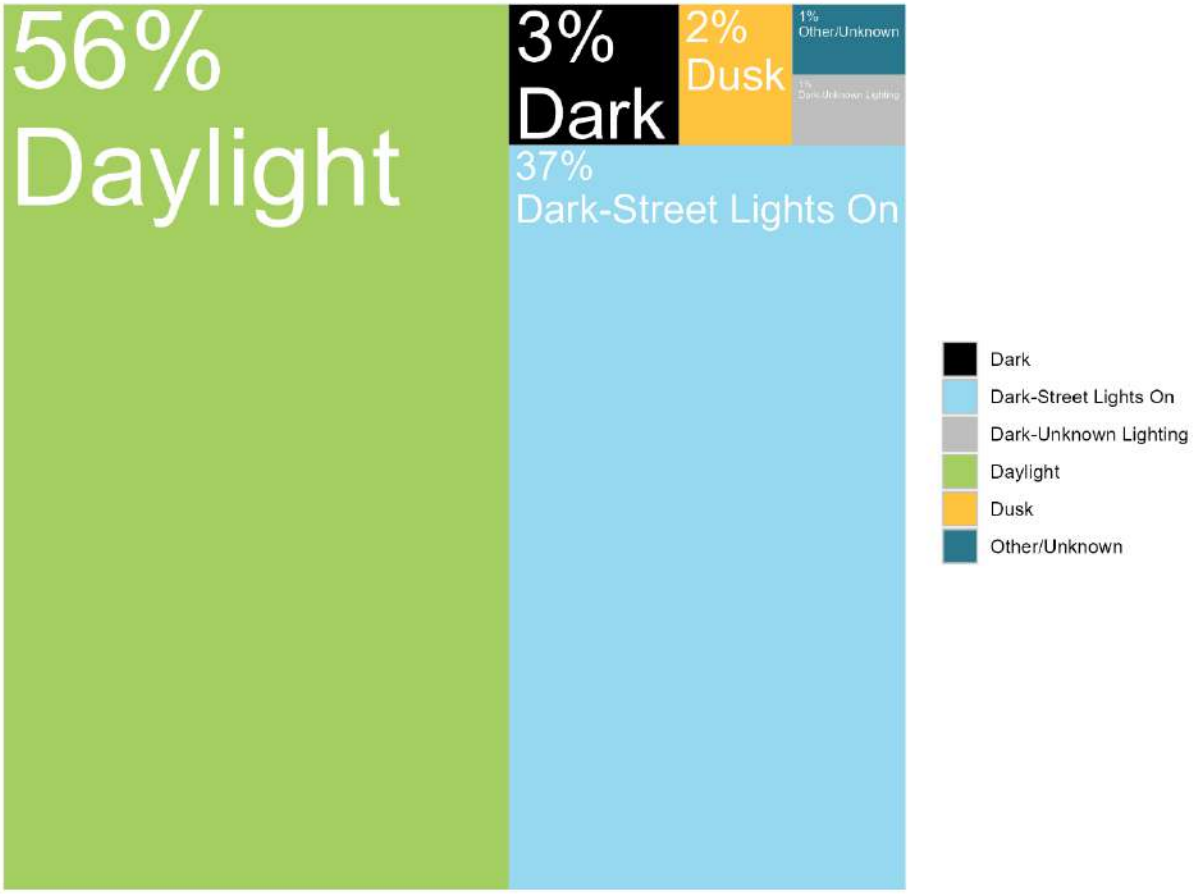


Exhibit 88: Lighting Conditions for Fatal and Serious Injury Lane and Road Departure Crashes in the City of Spokane Valley (2018 – 2022)



WHEN DO CRASHES HAPPEN?

When crashes occur can be measured by the month, day of the week, and hour of the day. The following observations were made when observing all four time-based data elements:

Month (Exhibit 89)

- FSI **vehicle-only** crashes peaked in June, which matches the regional peak month.
- The number of **motorcycle** crashes was greater than the number of vehicle-only crashes in April and equal to the number of vehicle-only crashes in June.
- **Bicycle** crashes trended higher in the early fall months, peaking in September and October, similar to the regional trends.
- **Pedestrian** crashes peaked in the fall and early winter months, similar to the region.

Day of Week (Exhibit 90)

- **Motorcycle** and **vehicle-only** FSI crashes saw peaks during the week (Tuesday and Thursday, respectively). This differs from regional trends which show this crash mode peaking on Friday.
- **Pedestrian** crashes peaked on Monday while **bicyclist** crashes remained fairly constant throughout the week. In the region, both crash modes peaked on Tuesday, with bicyclist crashes also having very little variation in frequency.

Hour of Day (Exhibit 91)

- **Vehicle-only** and **pedestrian** crashes have AM peaks at 9 AM, which is similar to the regional peaks of 9 AM for pedestrian crashes and 7 AM for vehicle-only crashes.
- **Motorcycle** crashes peaked at 4 PM, as seen in the regional data.
- Like the regional data, **pedestrian** crashes peaked later in the day than **bicycle** crashes, with a pedestrian peak at 9 PM and a bicyclist peak at 3 PM.

Exhibit 89: Fatal and Serious Injury Crashes by Time of Year in the City of Spokane Valley (2018 – 2022)

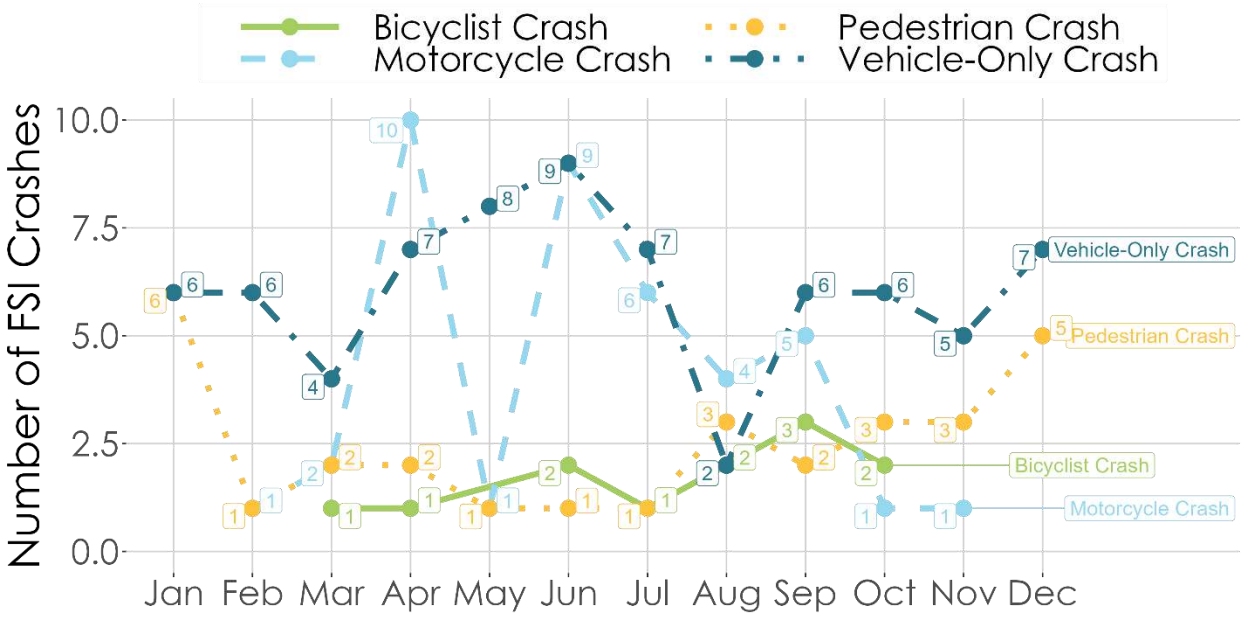


Exhibit 90: Fatal and Serious Injury Crashes by Weekday in the City of Spokane Valley (2018 – 2022)

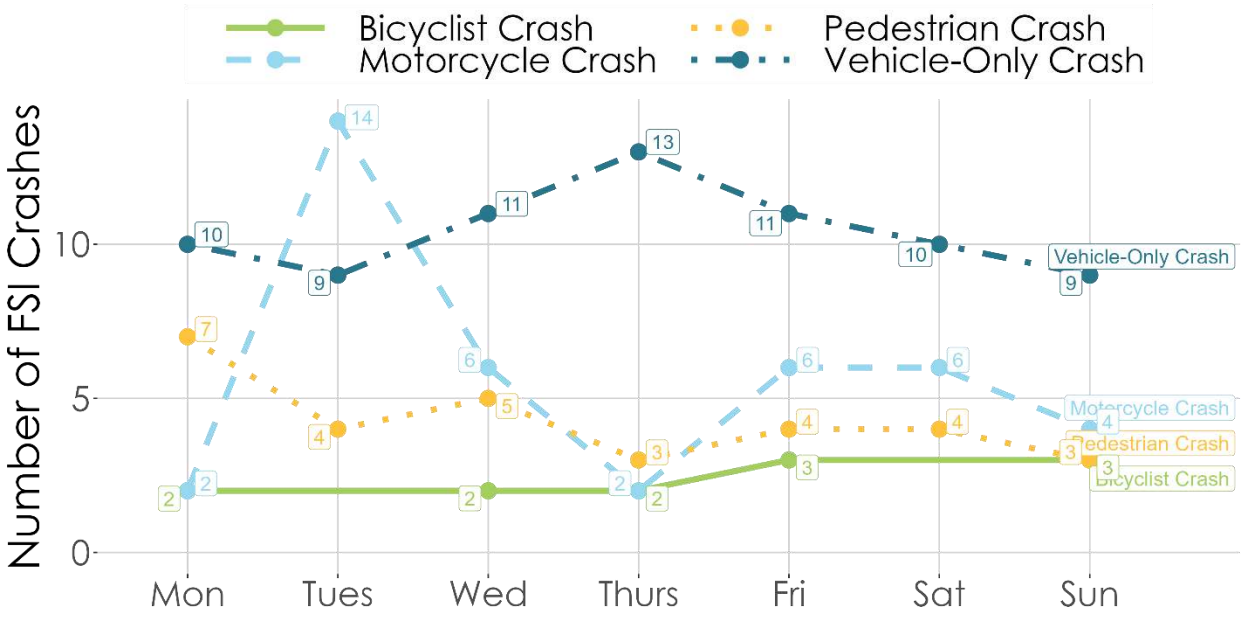
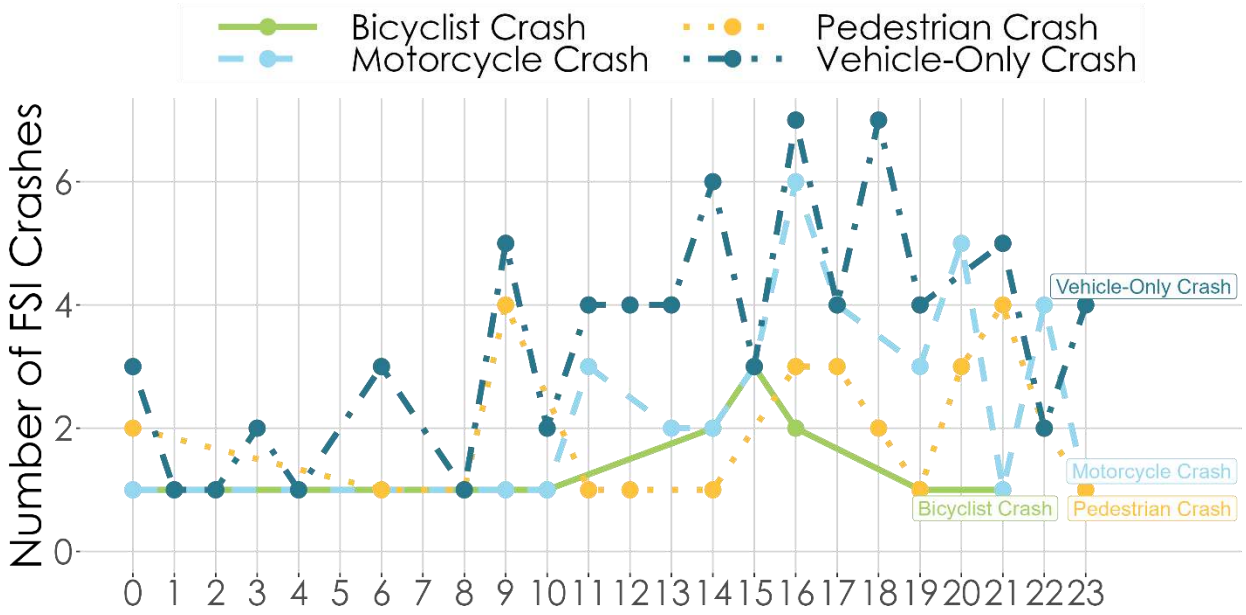


Exhibit 91: Fatal and Serious Injury Crashes by Time of Day in the City of Spokane Valley (2018 – 2022)



WHERE DO CRASHES HAPPEN?

Facility Jurisdiction (Exhibit 92)

- The jurisdictional trends match those of the region, with **city street** crashes being more common than state route crashes. There were no crashes on county roads, due to the composition of the roadway network within the City.
- Similar to regional trends, vehicle-only crashes on state routes were more commonly fatal (rather than serious injury) compared to vehicle-only crashes on city streets.

Relationship to Junction (Exhibit 93)

- There was a larger composition of **driveway** and **roundabout** crashes in the City than in the region.
- The remaining FSI crashes were split fairly evenly between **intersection** and **roadway segment** crashes. This is similar to the regional data which yielded a slightly higher percentage of roadway segment crashes.

Exhibit 92. Fatal and Serious Injury Crashes by Facility Jurisdiction in the City of Spokane Valley (2018 – 2022)

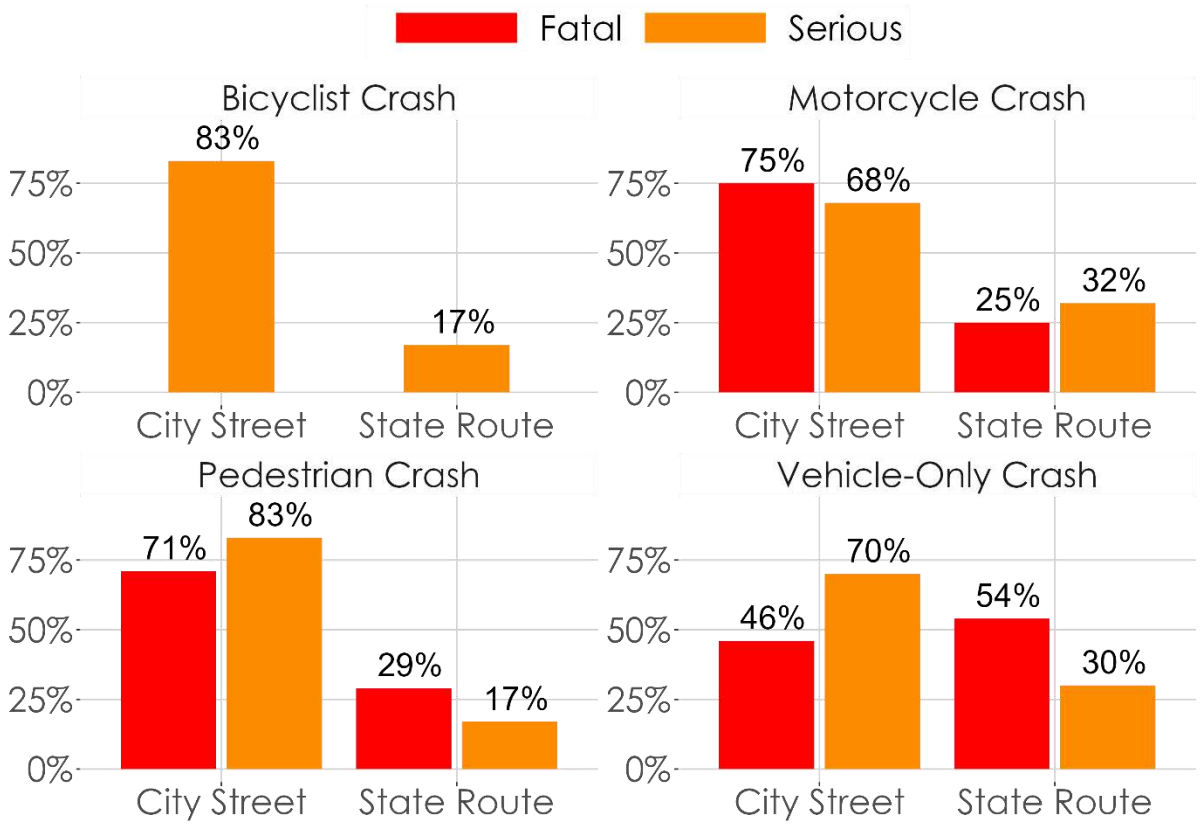
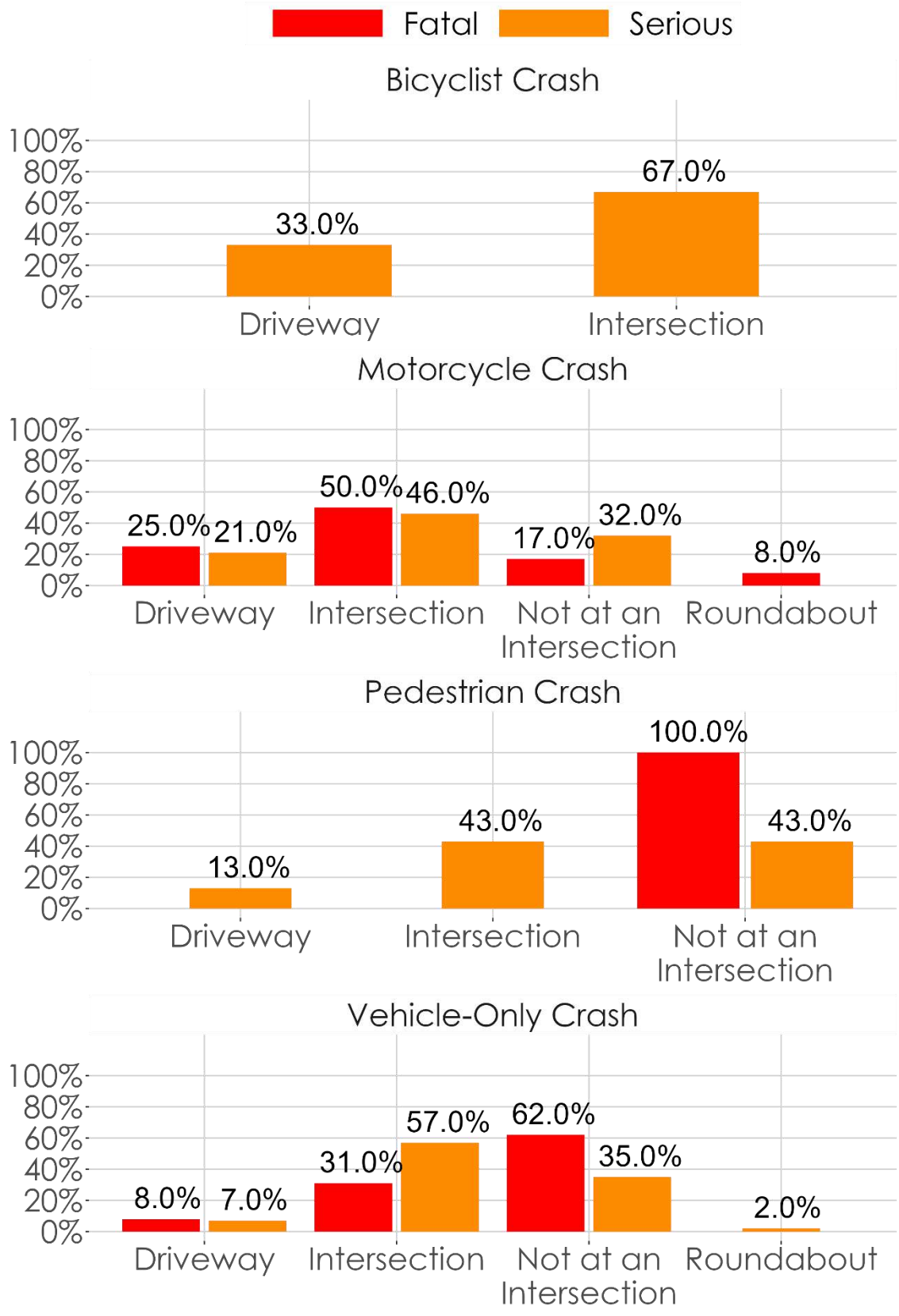


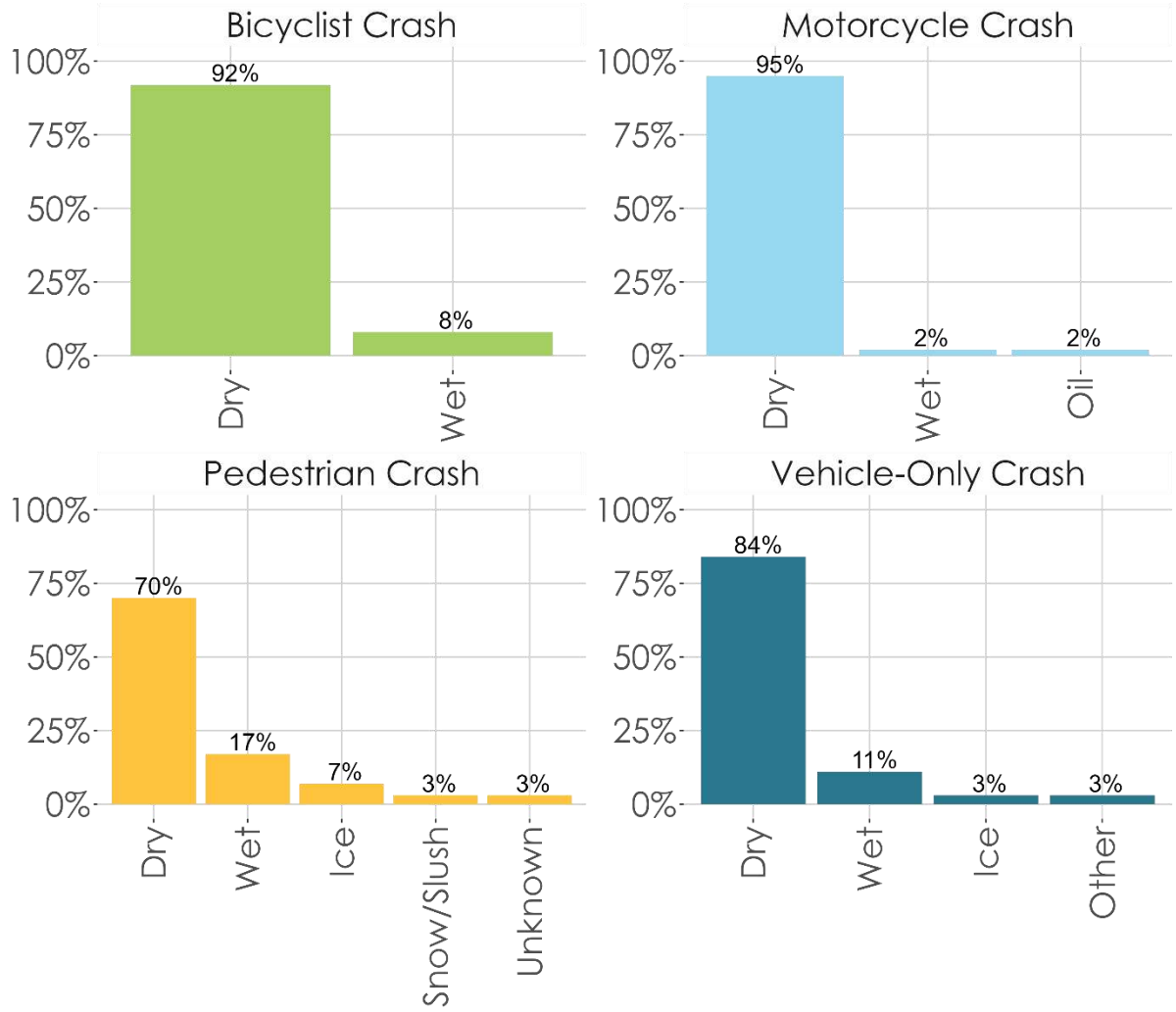
Exhibit 93: Fatal and Serious Injury Crashes by Relationship to Intersection in the City of Spokane Valley (2018 – 2022)



ENVIRONMENTAL

As seen in the regional data, **dry** surface conditions were most common within each crash mode, while **wet** conditions comprised a larger proportion of the **pedestrian** crashes (17%).

Exhibit 94. Distribution of Roadway Conditions for Fatal and Serious Injury Crashes in the City of Spokane Valley (2018 – 2022)



Human Factors/Driver Behavior

CONTRIBUTING CIRCUMSTANCES

The following observations were made when analyzing the contributing circumstances data:

- In 2022, there was a significant increase in the number of FSI crashes involving an **impaired** person and/or a **speeding driver**. Within the impairment category, both alcohol impairment and drug impairment have increased over the last five years. These trends are consistent with the regional data (Exhibit 95).
- **Speeding** was a contributing factor in more **motorcycle** crashes than in vehicle-only crashes, indicating a disproportionate effect on the motorcyclist population (Exhibit 96). This disproportionate effect was also seen across the region.
- **Alcohol impairment** disproportionately affects motorcyclists and pedestrians, while driver **distraction** disproportionately affects pedestrians, a trend seen in the regional data.

Exhibit 95: Fatal and Serious Injury Crashes Involving a Contributing Circumstance in the City of Spokane Valley (2018 – 2022)

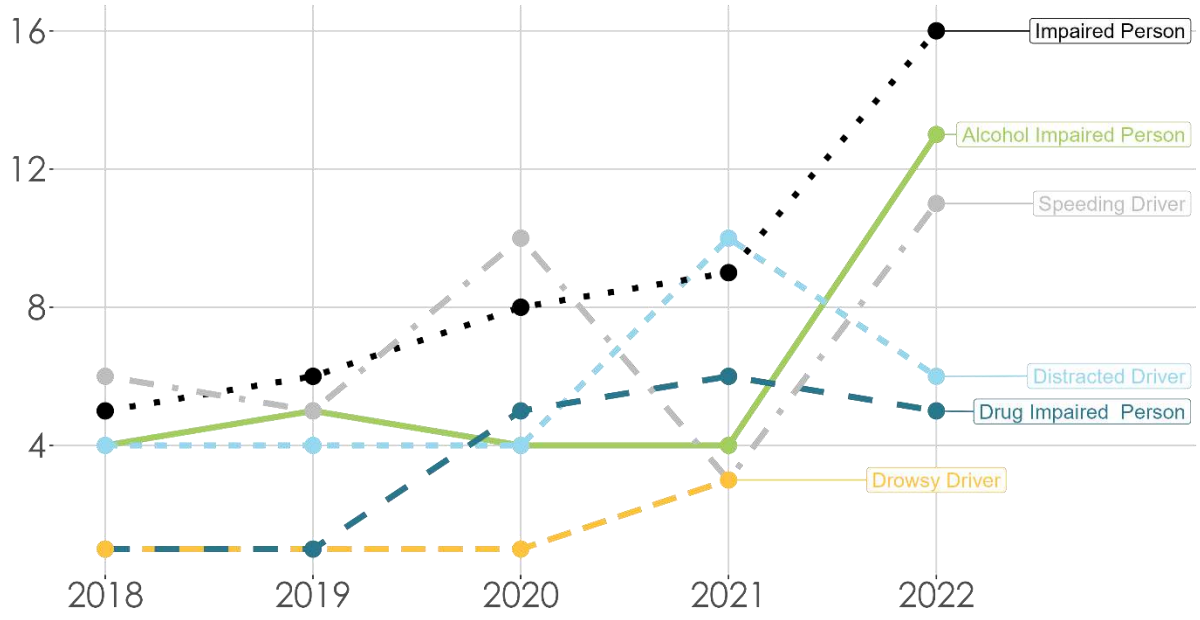
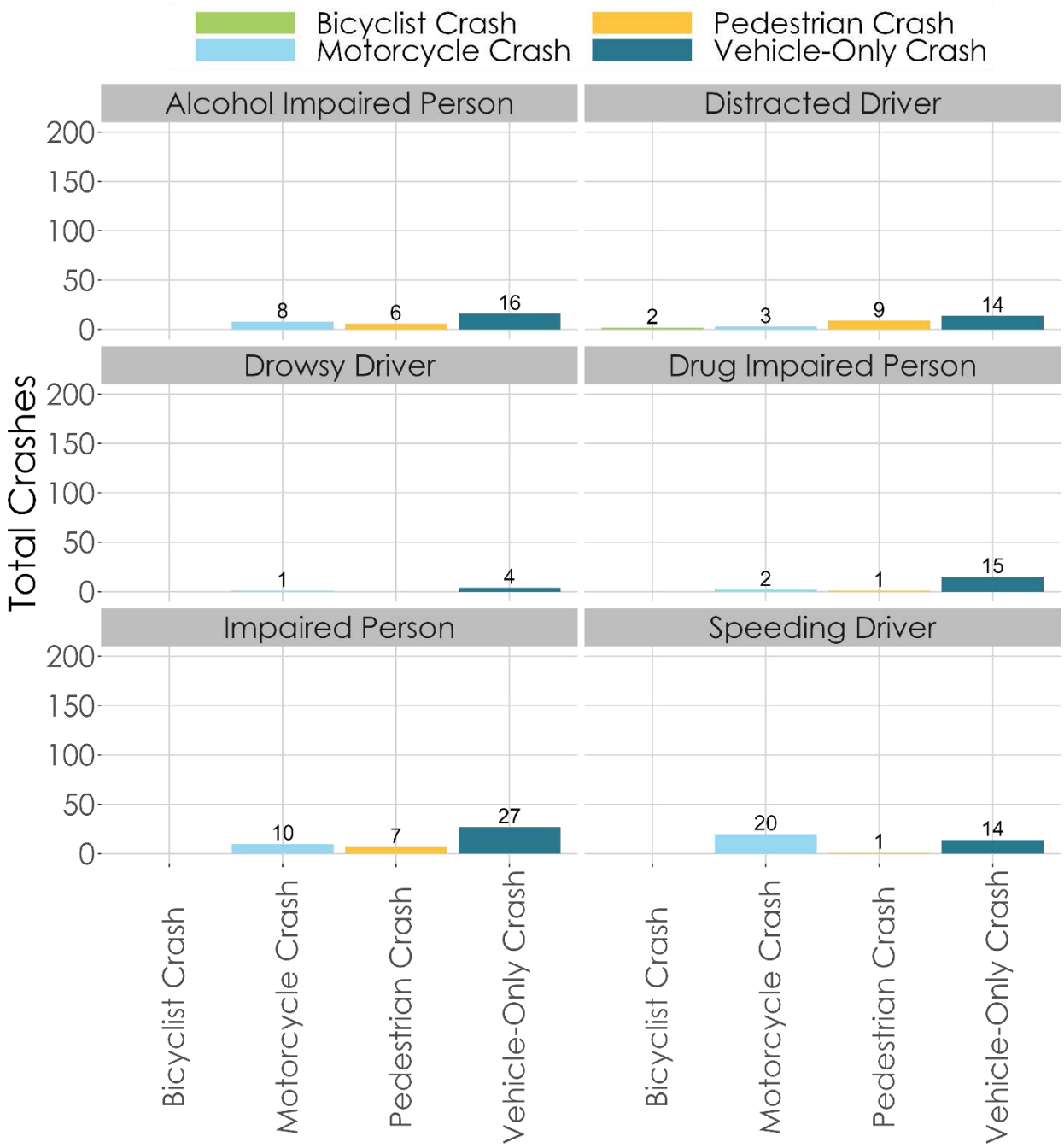


Exhibit 96: Fatal and Serious Injury Crashes Contributing Circumstance by mode in the City of Spokane Valley (2018 – 2022)



ROAD USER CHARACTERISTICS

The age distribution for each road user type was very similar to the regional distributions (Exhibit 97 through Exhibit 100). This includes the trend previously observed, that ages 10 through 19 comprise a much larger percentage of all bicyclists than in any other road user type (Exhibit 100).

Exhibit 97: Fatal and Serious Injury Crashes Vehicle Driver Age Distribution in the City of Spokane Valley (2018 – 2022)

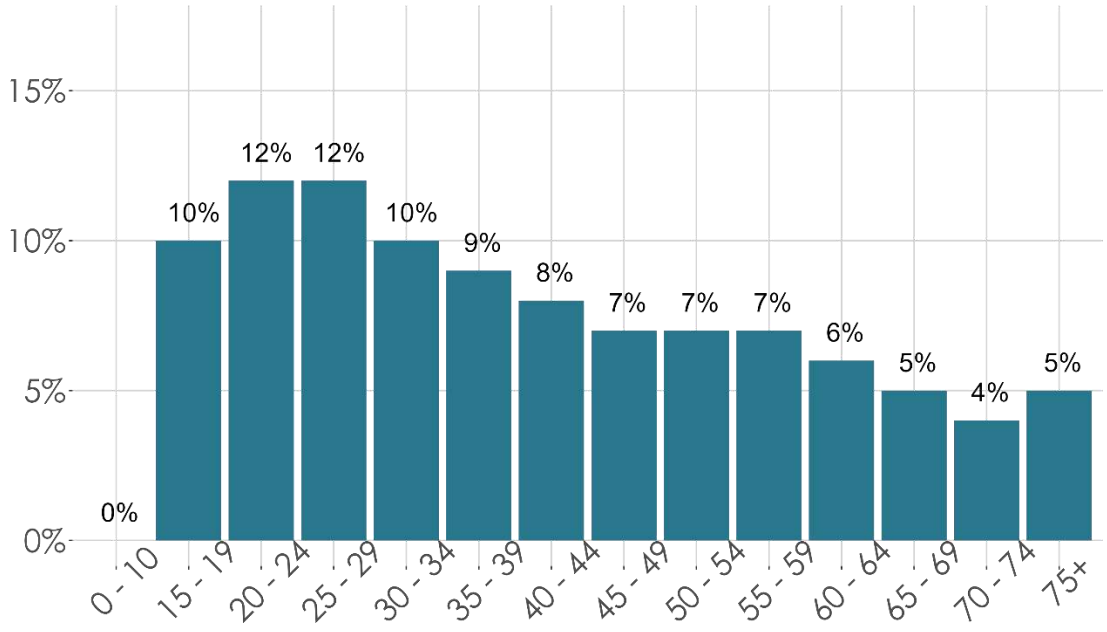


Exhibit 98: Fatal and Serious Injury Crashes Motorcyclist Age Distribution in the City of Spokane Valley (2018 – 2022)

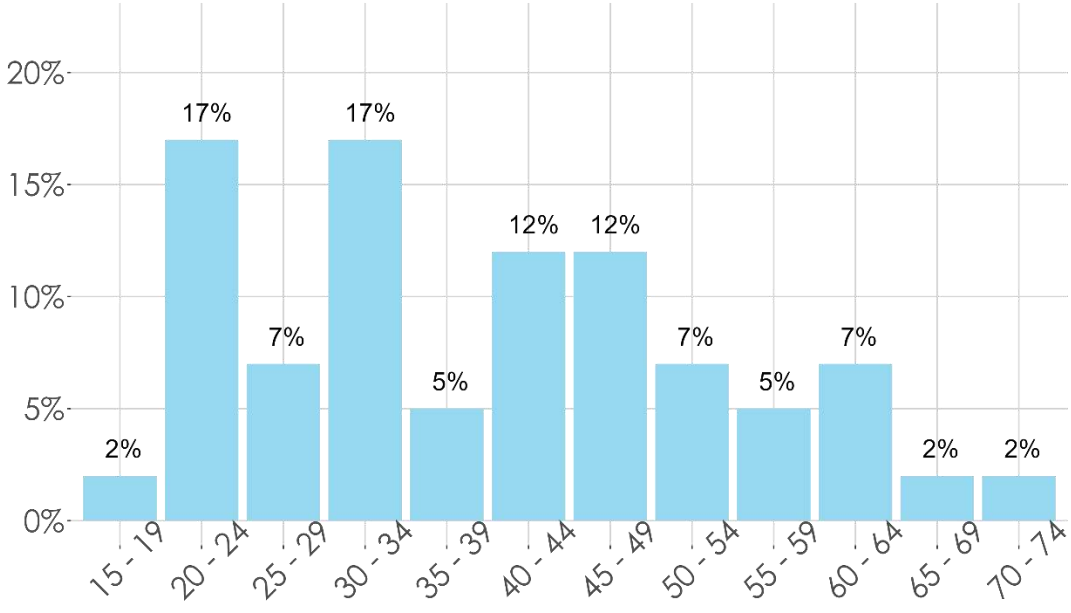


Exhibit 99: Fatal and Serious Injury Crashes Pedestrian Age Distribution in the City of Spokane Valley (2018 – 2022)

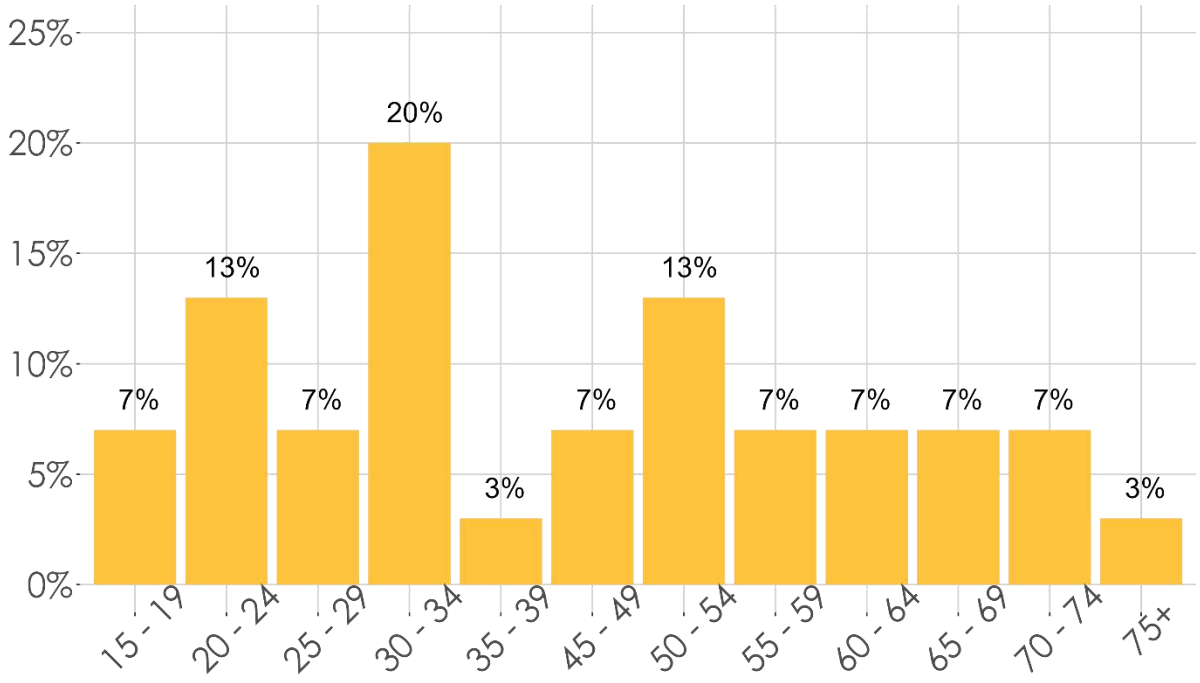
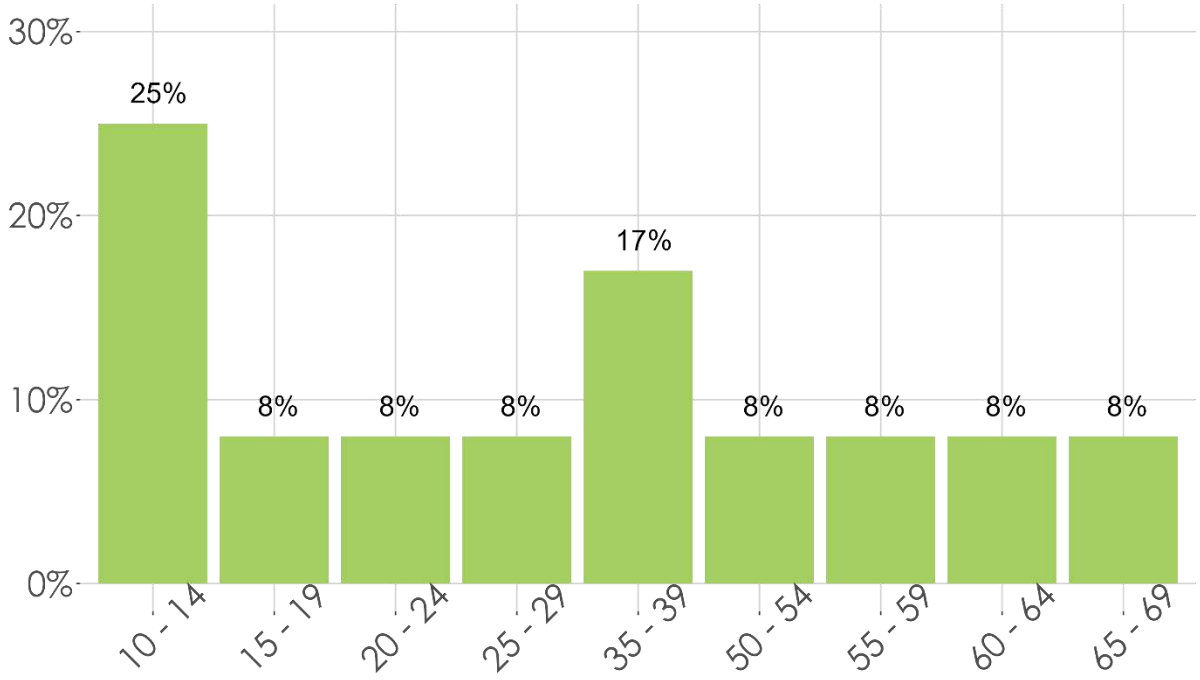


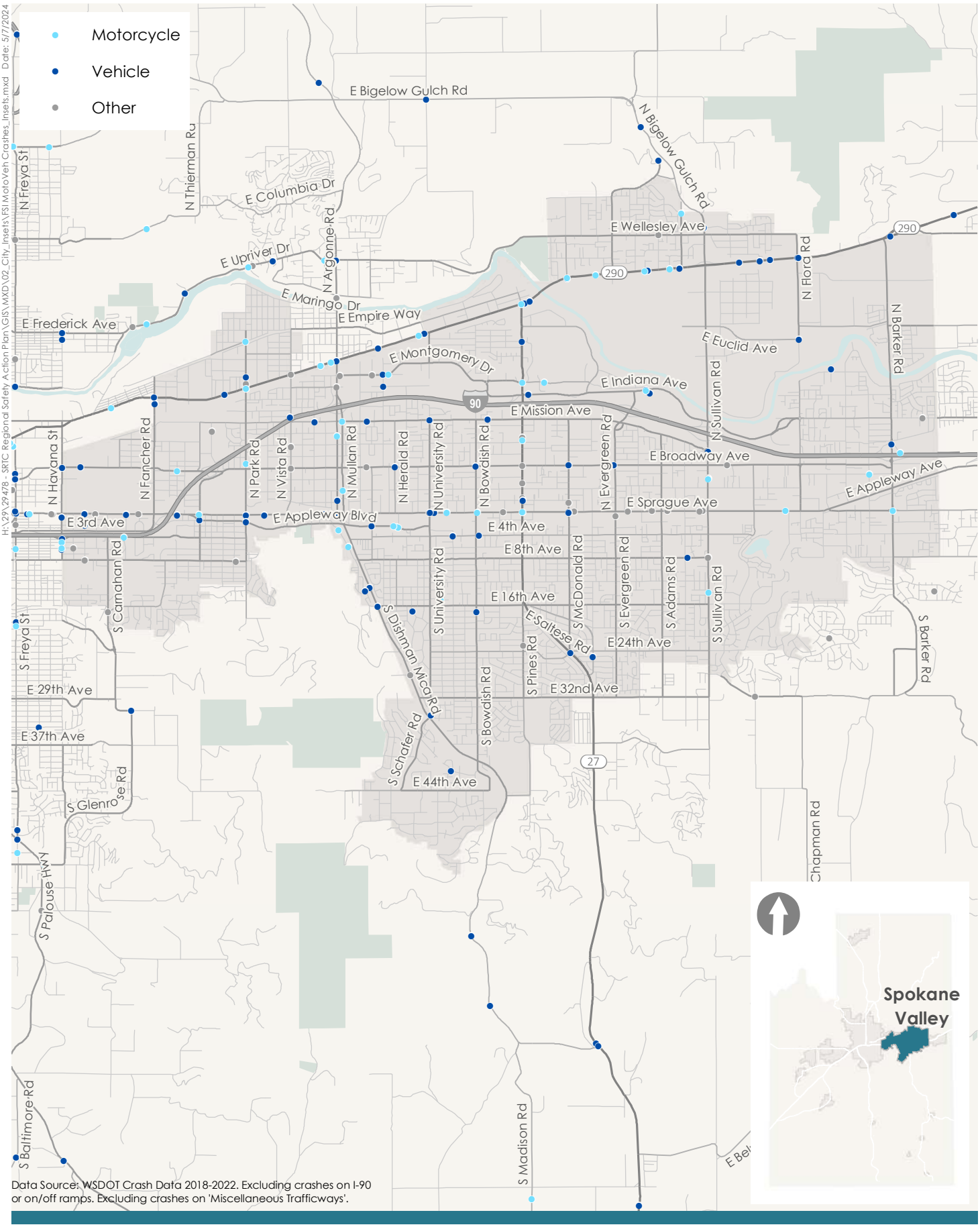
Exhibit 100: Fatal and Serious Injury Crashes Bicyclist Age Distribution in the City of Spokane Valley (2018 – 2022)



MAPS OF CRASHES FOR DESCRIPTIVE CRASH ANALYSIS

Maps are prepared to understand the geographic distribution of crashes, aligned with the descriptive crash analysis. Key findings are identified for each map. The following maps are included:

- Fatal and Serious Injury Crashes Involving a Motorcyclist or Only Vehicles
    - Crashes are distributed throughout Spokane Valley.
- Fatal and Serious Injury Crashes Involving a Pedestrian or Bicyclist
    - Several corridors including Sprague Avenue and Pines Road stand out as having a string of crashes along them.
- Fatal and Serious Injury Crashes Involving Run Off the Road
    - Crashes are distributed throughout the city.
- Fatal and Serious Injury Crashes Involving a Motorcyclist or Only Vehicles by Lighting Condition
    - Crashes tend to occur under lit conditions.
- Fatal and Serious Injury Crashes Involving a Pedestrian or Bicyclist by Lighting Condition
    - Crashes tend to occur under lit conditions.
- Fatal and Serious Injury Crashes by Roadway Jurisdiction
- Fatal and Serious Injury Crashes Involving a Motorcyclist or Only Vehicles by Junction Relationship
- Fatal and Serious Injury Crashes Involving a Pedestrian or Bicyclist by Junction Relationship
    - Several crashes at driveways happen along Sprague Avenue.
- Fatal and Serious Injury Crashes Involving an Impaired Person
    - Crashes appear to occur more commonly along SR 290, compared to the distribution of all FSI crashes in the city.
- Fatal and Serious Injury Crashes Involving Speeding
- Fatal and Serious Injury Crashes Involving a Distracted Driver
- Fatal and Serious Injury Crashes Involving a Bicyclist Under 20 Years Old
    - Crashes tend to be distributed throughout the area of Spokane Valley, indicating the crashes may be related to systemic conditions, rather than a particular locational characteristic.



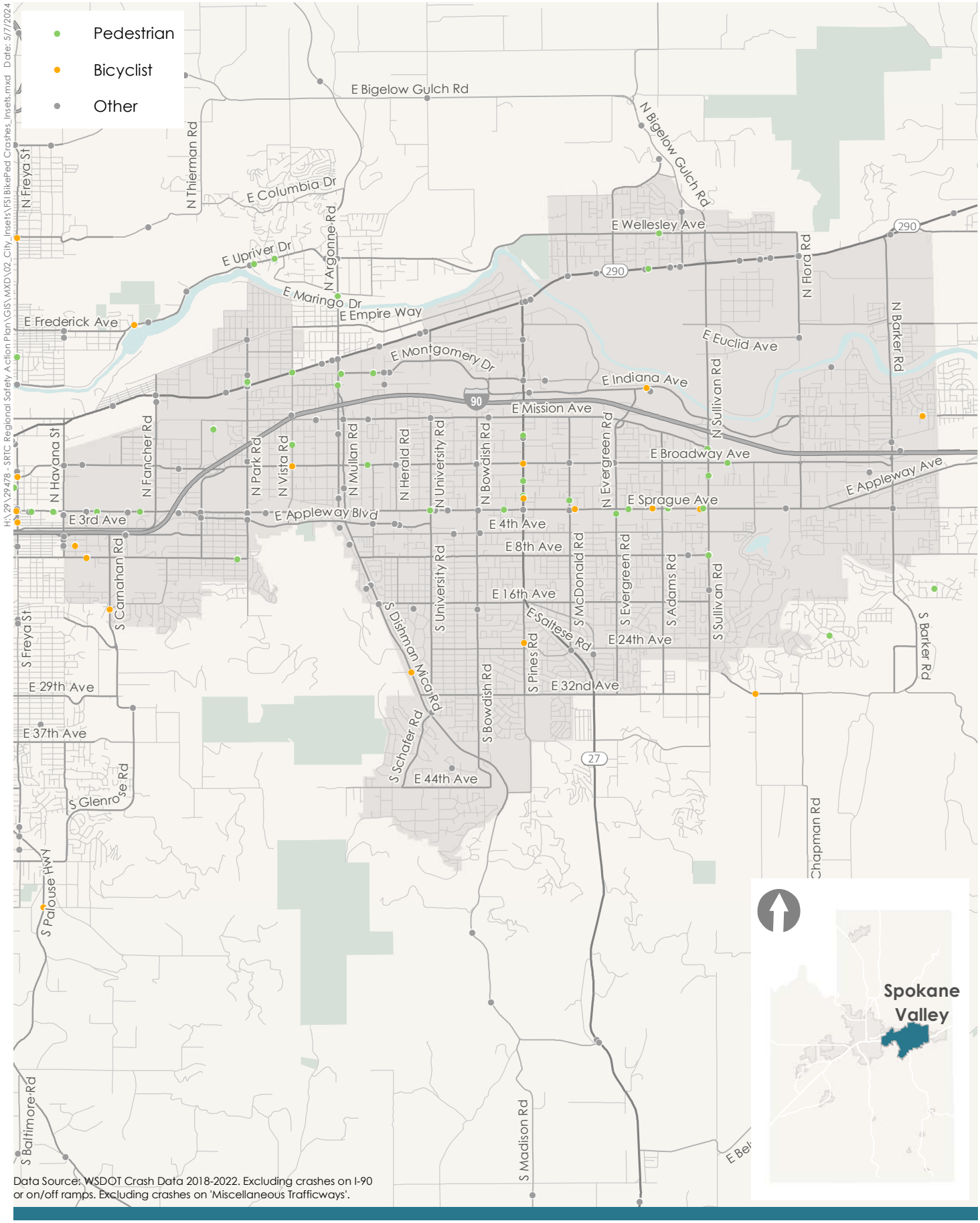
Data Source: WSDOT Crash Data 2018-2022. Excluding crashes on I-90 or on/off ramps. Excluding crashes on 'Miscellaneous Trafficways'.

H:\29\29478 - SRTC Regional Safety Action Plan\GIS\MXD\02_City_Insets\FSI MotoVeh Crashes_Insets.mxd Date: 5/7/2024

SRTC SAFETY ACTION PLAN

Figure 23

Fatal and Serious Injury Crashes
Motorcycle and Vehicle - Spokane Valley



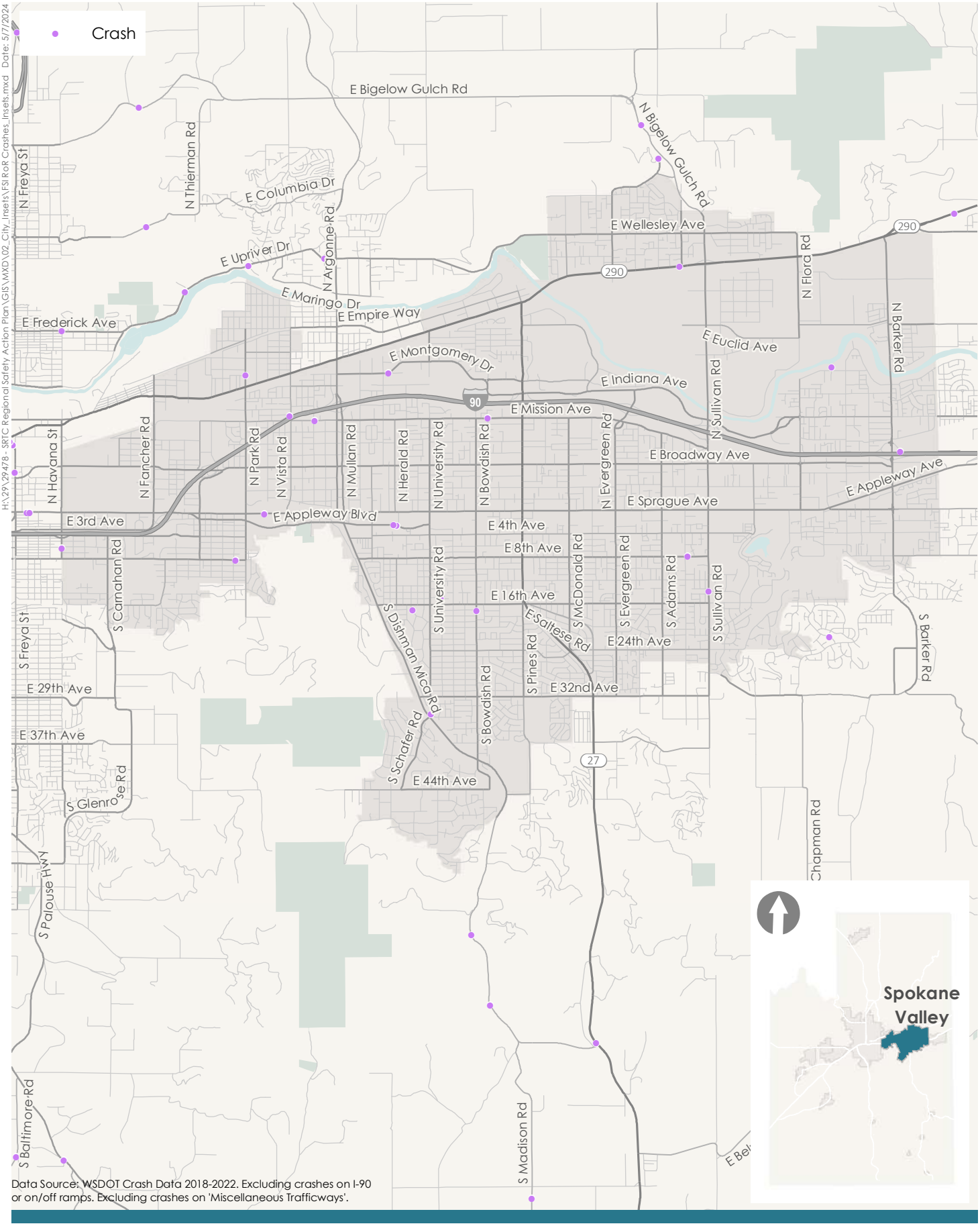
Data Source: WSDOT Crash Data 2018-2022. Excluding crashes on I-90 or on/off ramps. Excluding crashes on 'Miscellaneous Trafficways'.

H:\29\29478 - SRTC Regional Safety Action Plan\GIS\MXD\02_City_Insets\FSI BikePed Crashes_Insets.mxd Date: 5/7/2024

SRTC SAFETY ACTION PLAN

Figure 24

Fatal and Serious Injury Crashes
Bicyclist and Pedestrian - Spokane Valley

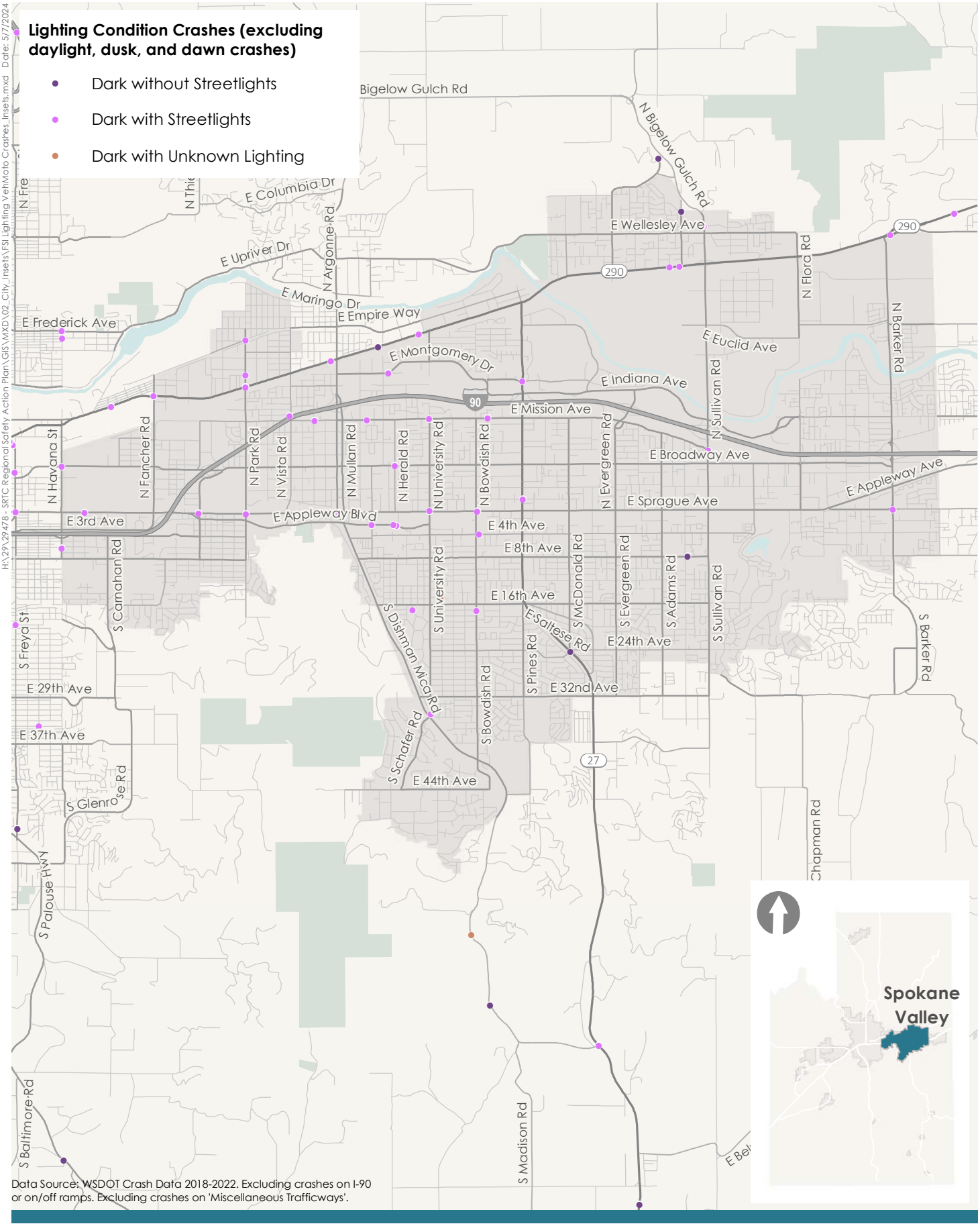


Data Source: WSDOT Crash Data 2018-2022. Excluding crashes on I-90 or on/off ramps. Excluding crashes on 'Miscellaneous Trafficways'.

SRTC SAFETY ACTION PLAN

Figure 25

Fatal and Serious Injury Crashes
Run Off the Road - Spokane Valley

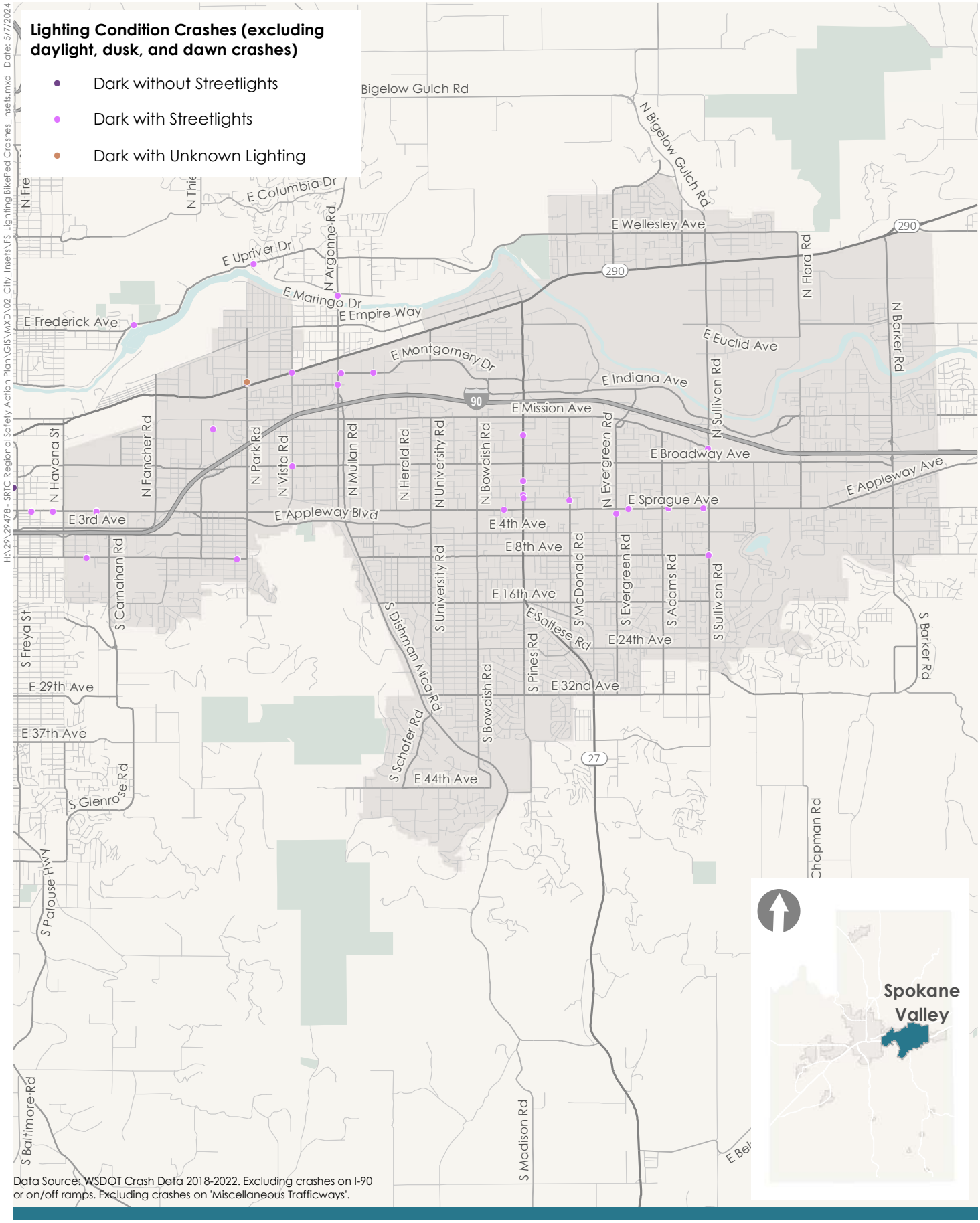


Data Source: WSDOT Crash Data 2018-2022. Excluding crashes on I-90 or on/off ramps. Excluding crashes on 'Miscellaneous Trafficways'.

SRTC SAFETY ACTION PLAN

Figure 26

Fatal and Serious Injury Crashes (Auto and Vehicle) Lighting Conditions - Spokane Valley



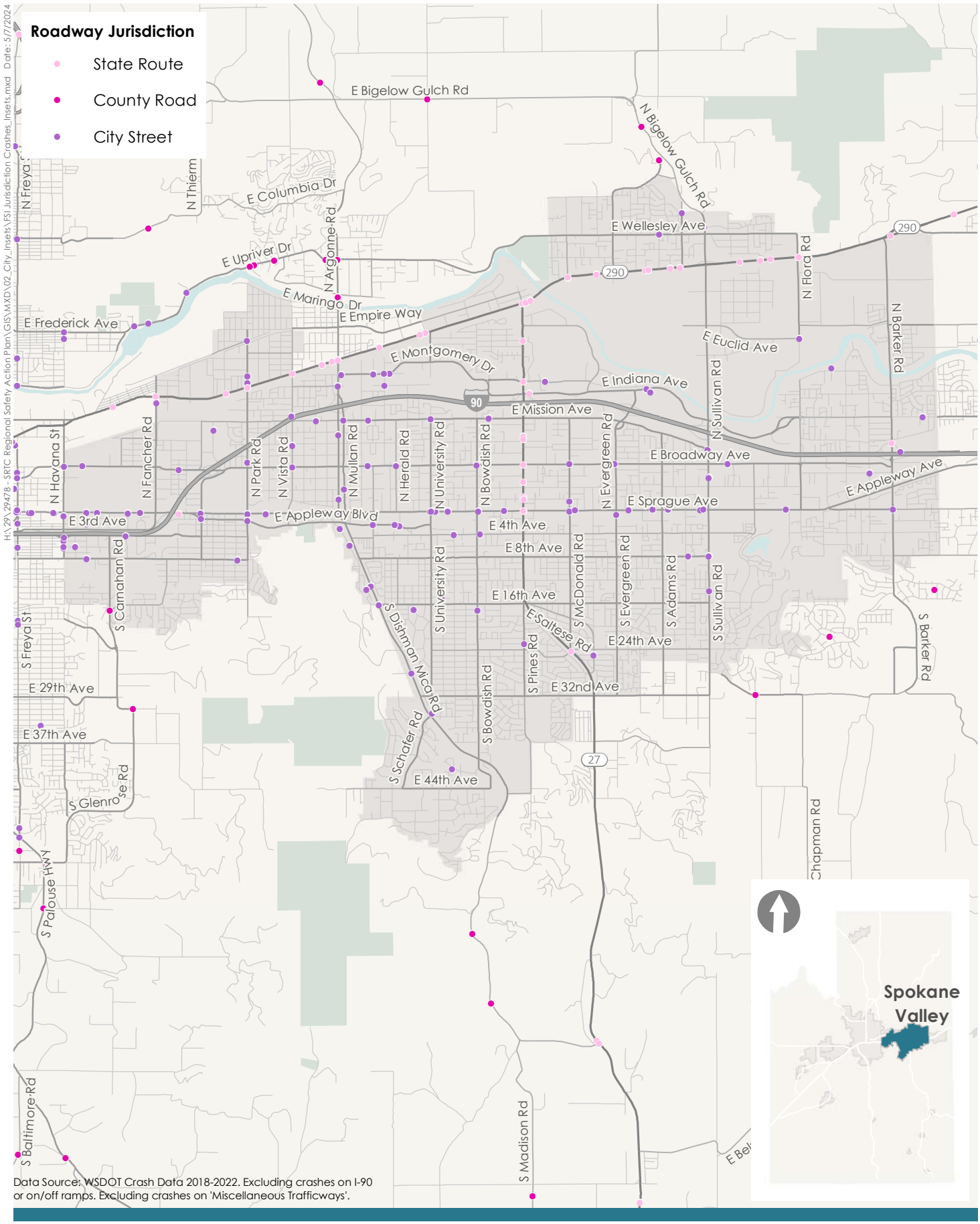
Data Source: WSDOT Crash Data 2018-2022. Excluding crashes on I-90 or on/off ramps. Excluding crashes on 'Miscellaneous Trafficways'.

H:\29\29478 - SRTC Regional Safety Action Plan\GIS\MXD\02_City_Insets\FSI Lighting BikePed Crashes_Insets.mxd Date: 5/7/2024

SRTC SAFETY ACTION PLAN

Figure 27

Fatal and Serious Injury Crashes (Bicycle and Pedestrian) Lighting Conditions - Spokane Valley



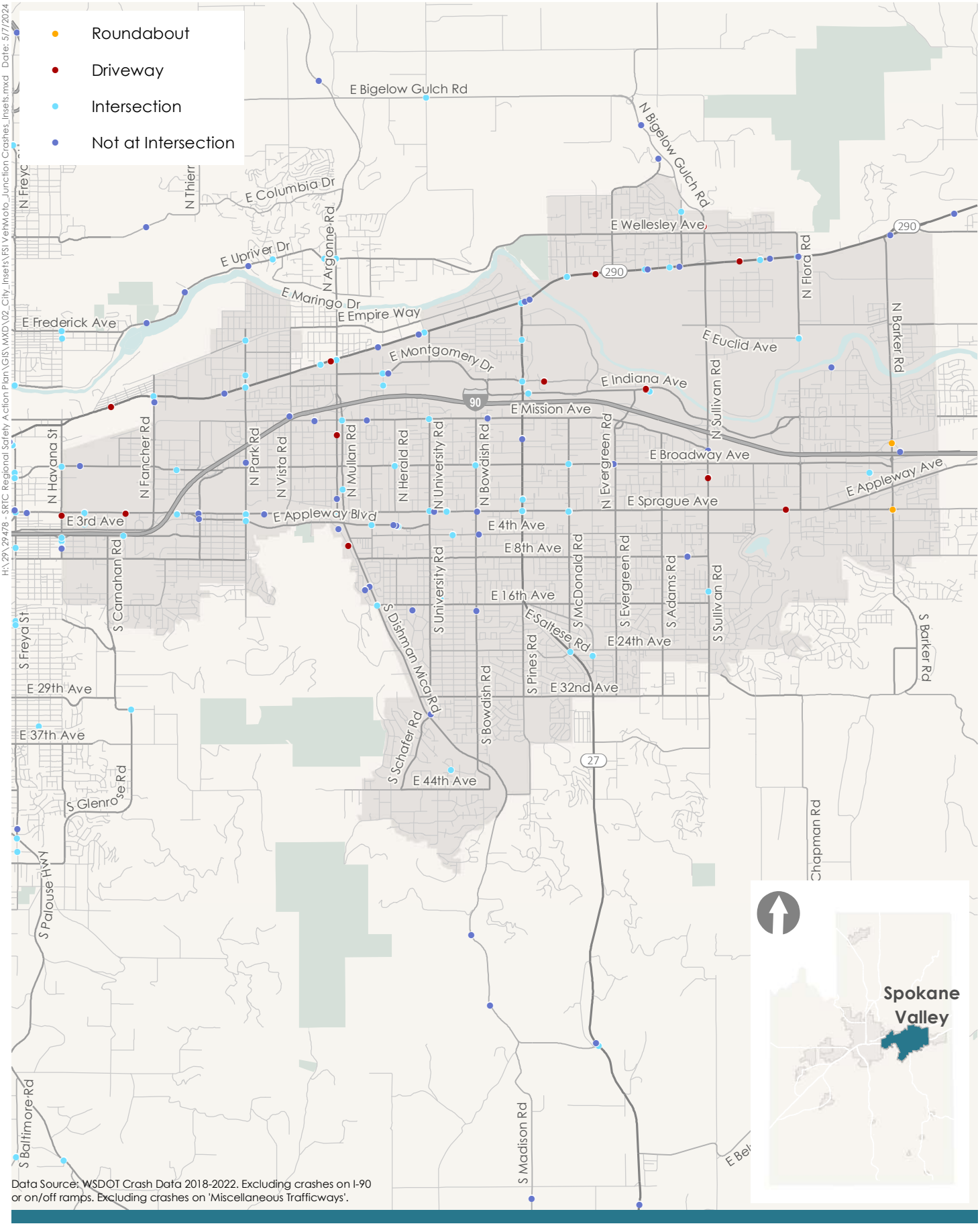
Data Source: WSDOT Crash Data 2018-2022. Excluding crashes on I-90 or on/off ramps. Excluding crashes on 'Miscellaneous Trafficways'.

H:\29\29478 - SRTC Regional Safety Action Plan\GIS\MXD\02_City_Insets\FSI Jurisdiction Crashes_Insets.mxd Date: 5/7/2024

SRTC SAFETY ACTION PLAN

Figure 28

Fatal and Serious Injury Crashes
Roadway Jurisdiction - Spokane Valley



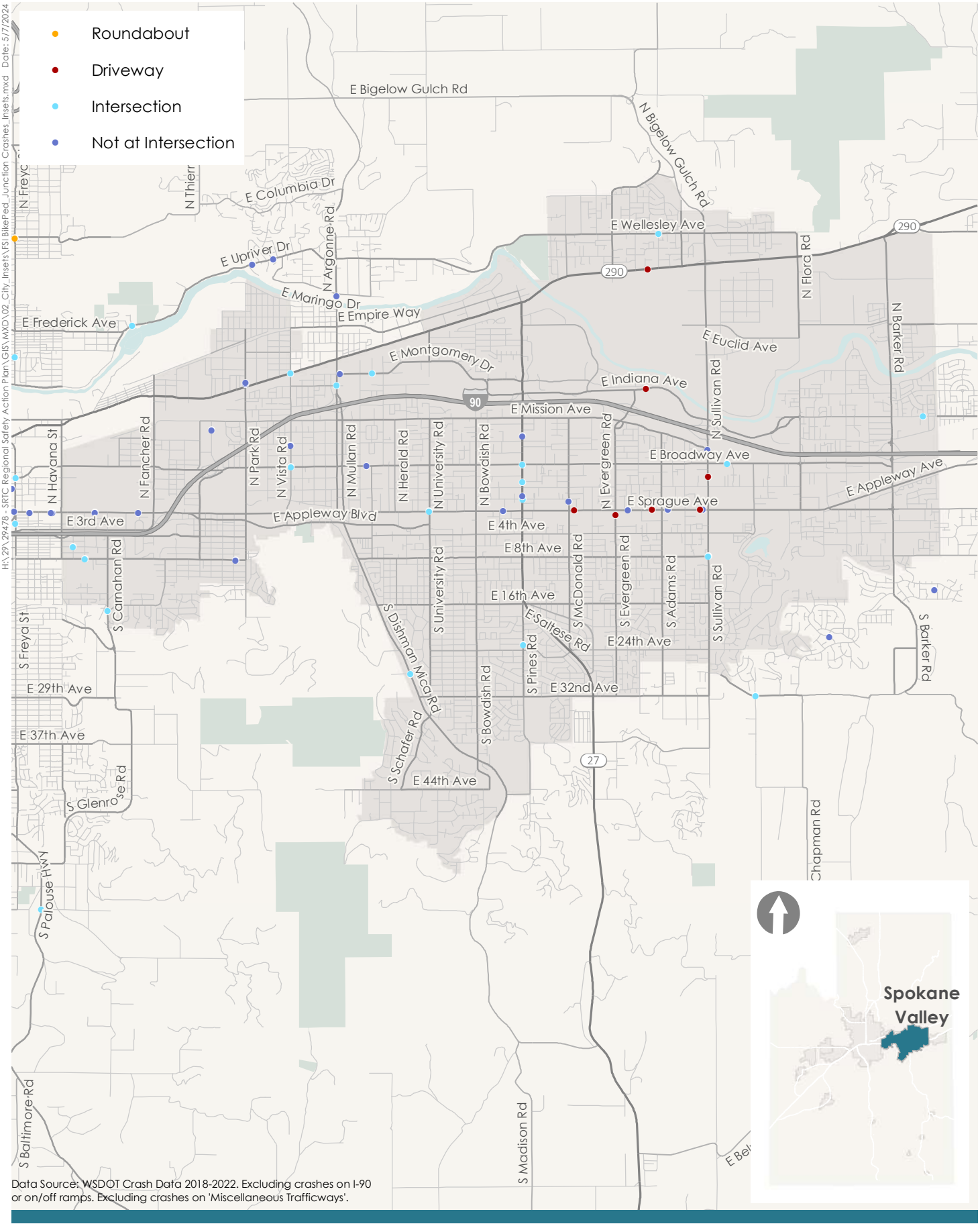
Data Source: WSDOT Crash Data 2018-2022. Excluding crashes on I-90 or on/off ramps. Excluding crashes on 'Miscellaneous Trafficways'.

H:\29\29478 - SRTC Regional Safety Action Plan\GIS\MXD\02_City_Insets\FSI VehMoto_Junction Crashes_Insets.mxd Date: 5/7/2024

SRTC SAFETY ACTION PLAN

Figure 29

Fatal and Serious Injury Crashes (Vehicle and Motorcycle) Junction Relationship - Spokane Valley

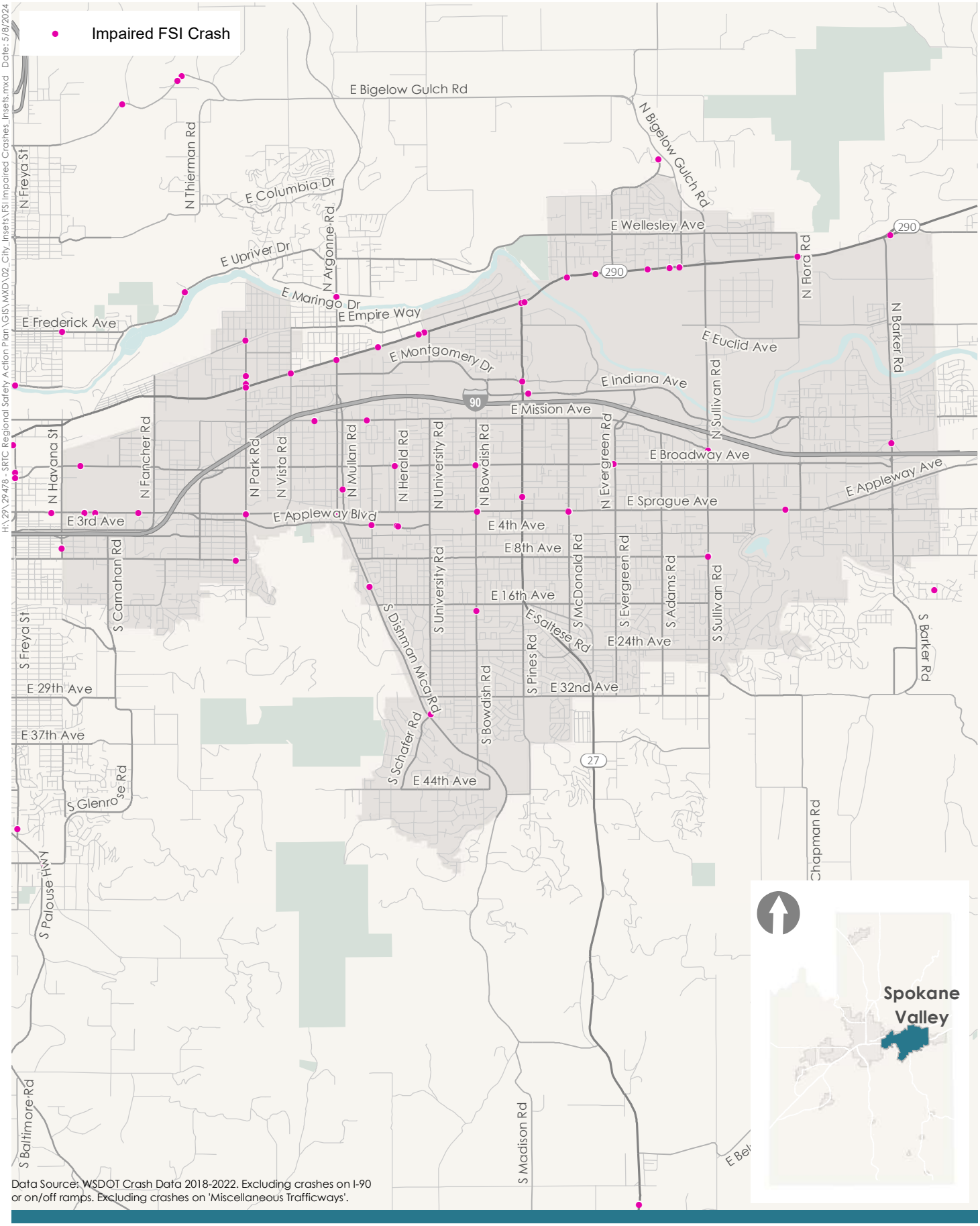


Data Source: WSDOT Crash Data 2018-2022. Excluding crashes on I-90 or on/off ramps. Excluding crashes on 'Miscellaneous Trafficways'.

SRTC SAFETY ACTION PLAN

Figure 30

Fatal and Serious Injury Crashes (Bicyclist and Pedestrian) Junction Relationship - Spokane Valley



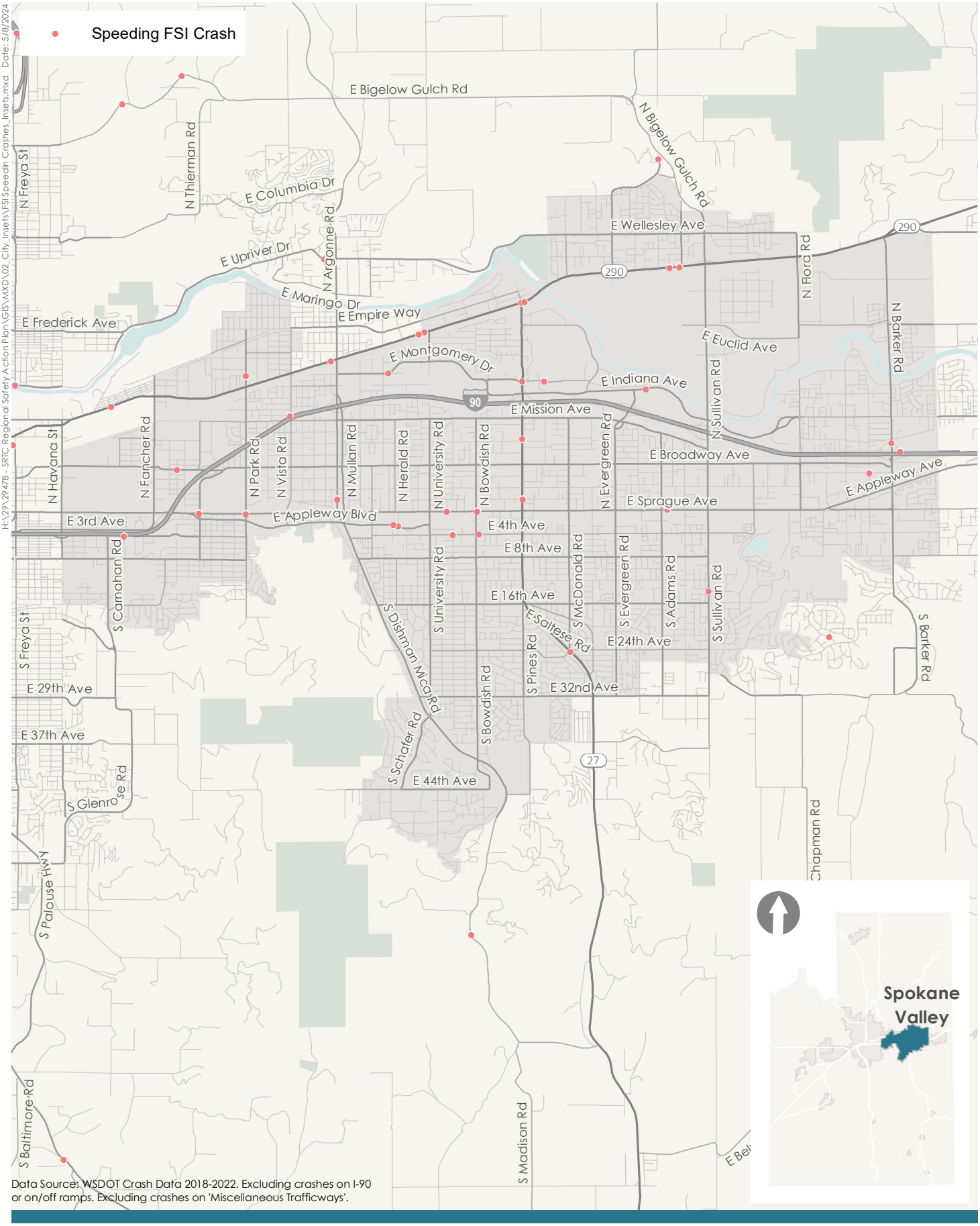
Data Source: WSDOT Crash Data 2018-2022. Excluding crashes on I-90 or on/off ramps. Excluding crashes on 'Miscellaneous Trafficways'.

H:\29\29478 - SRTC Regional Safety Action Plan\GIS\MXD\02_City_Insets\FSI Impaired Crashes_Insets.mxd Date: 5/8/2024

SRTC SAFETY ACTION PLAN

Figure 31

Fatal and Serious Injury Crashes - Impaired
Spokane Valley



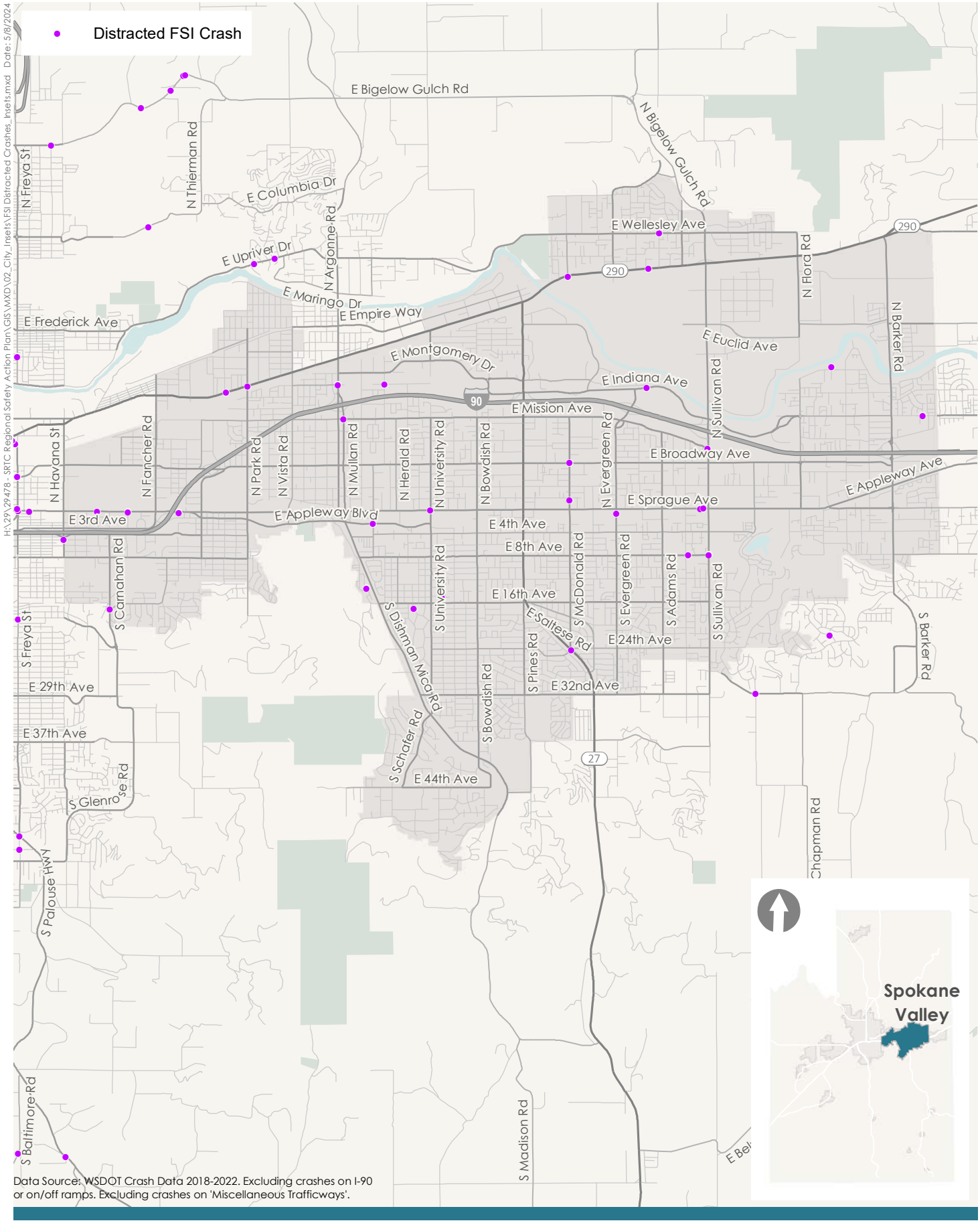
Data Source: WSDOT Crash Data 2018-2022. Excluding crashes on I-90 or on/off ramps. Excluding crashes on 'Miscellaneous Trafficways'.

H:\29\29478 - SRTC Regional Safety Action Plan\GIS\MXD\02_City_Insets\FSI Speedin Crashes_Insets.mxd Date: 5/8/2024

SRTC SAFETY ACTION PLAN

Figure 32

Fatal and Serious Injury Crashes - Speeding
Spokane Valley



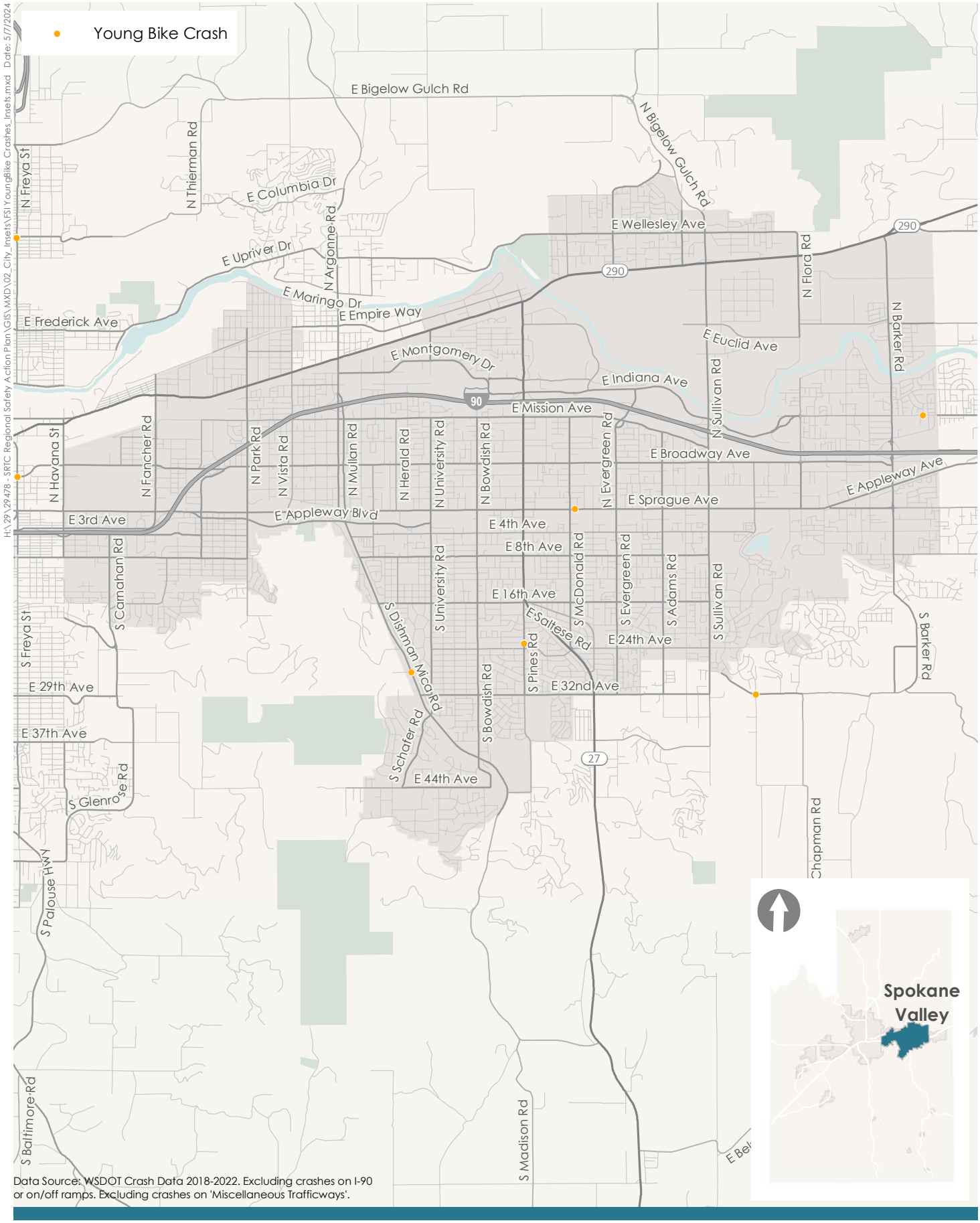
Data Source: WSDOT Crash Data 2018-2022. Excluding crashes on I-90 or on/off ramps. Excluding crashes on 'Miscellaneous Trafficways'.

H:\29\29478 - SRTC Regional Safety Action Plan\GIS\MXD\02_City_Insets\FSI Distracted Crashes_Insets.mxd Date: 5/8/2024

SRTC SAFETY ACTION PLAN

Figure 33

Fatal and Serious Injury Crashes - Distracted Spokane Valley



Data Source: WSDOT Crash Data 2018-2022. Excluding crashes on I-90 or on/off ramps. Excluding crashes on 'Miscellaneous Trafficways'.

H:\29\29478 - SRTC Regional Safety Action Plan\GIS\MXD\02_City_Insets\SI Young Bike Crashes_Insets.mxd Date: 5/7/2024

SRTC SAFETY ACTION PLAN

Figure 34

Fatal and Serious Injury Crashes
Bicyclist Under Age 20 - Spokane Valley

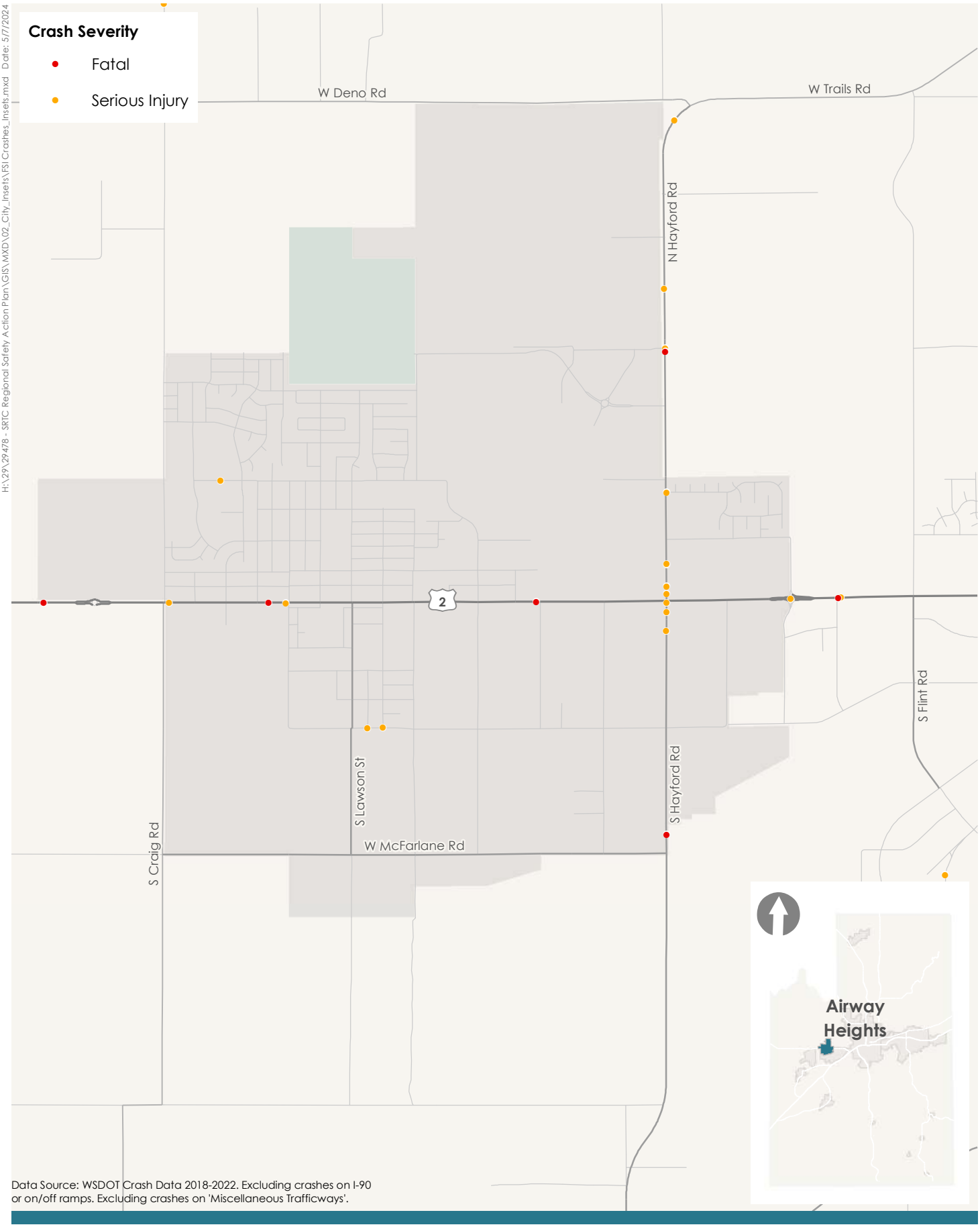
AIRWAY HEIGHTS CRASH TRENDS

The first few exhibits in this section look at long-term trends from 2013 through 2022. The results that follow characterize the 17 FSI crashes (2018 – 2022) in the City of Airway Heights:

- 8 pedestrian crashes
- 6 vehicle-only crashes
- 2 motorcycle crashes
- 1 bicyclist crashes

The crashes are shown geographically in Figures 35-37. Crashes are shown according to the latitude and longitude of the crash, including crashes that occur in Unincorporated Spokane County nearby. The rest of the crash analysis in this section is conducted for crashes that are recorded as occurring within the Airway Heights jurisdiction on the crash report. This difference may result in a different number of crashes appearing on the map, compared to the descriptive crash analysis.

This section relies more heavily on tables than on figures, compared to the previous sections. This is due to the relatively reduced number of FSI crashes in the City of Airway Heights, which makes displaying the data in bar charts and as percentages less helpful and potentially misleading.

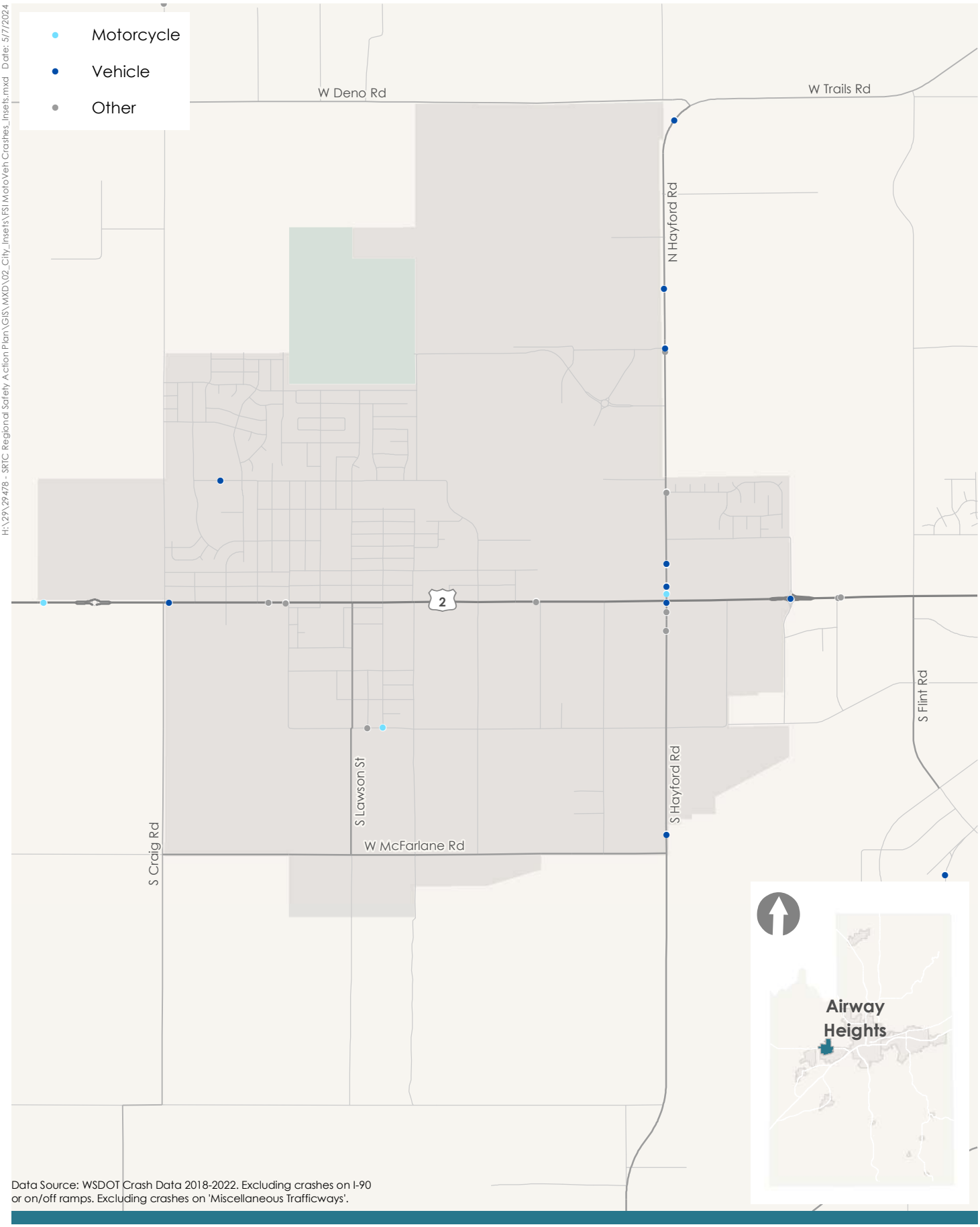


Data Source: WSDOT Crash Data 2018-2022. Excluding crashes on I-90 or on/off ramps. Excluding crashes on 'Miscellaneous Trafficways'.

SRTC SAFETY ACTION PLAN

Figure 35

Fatal and Serious Injury Crashes Airway Heights

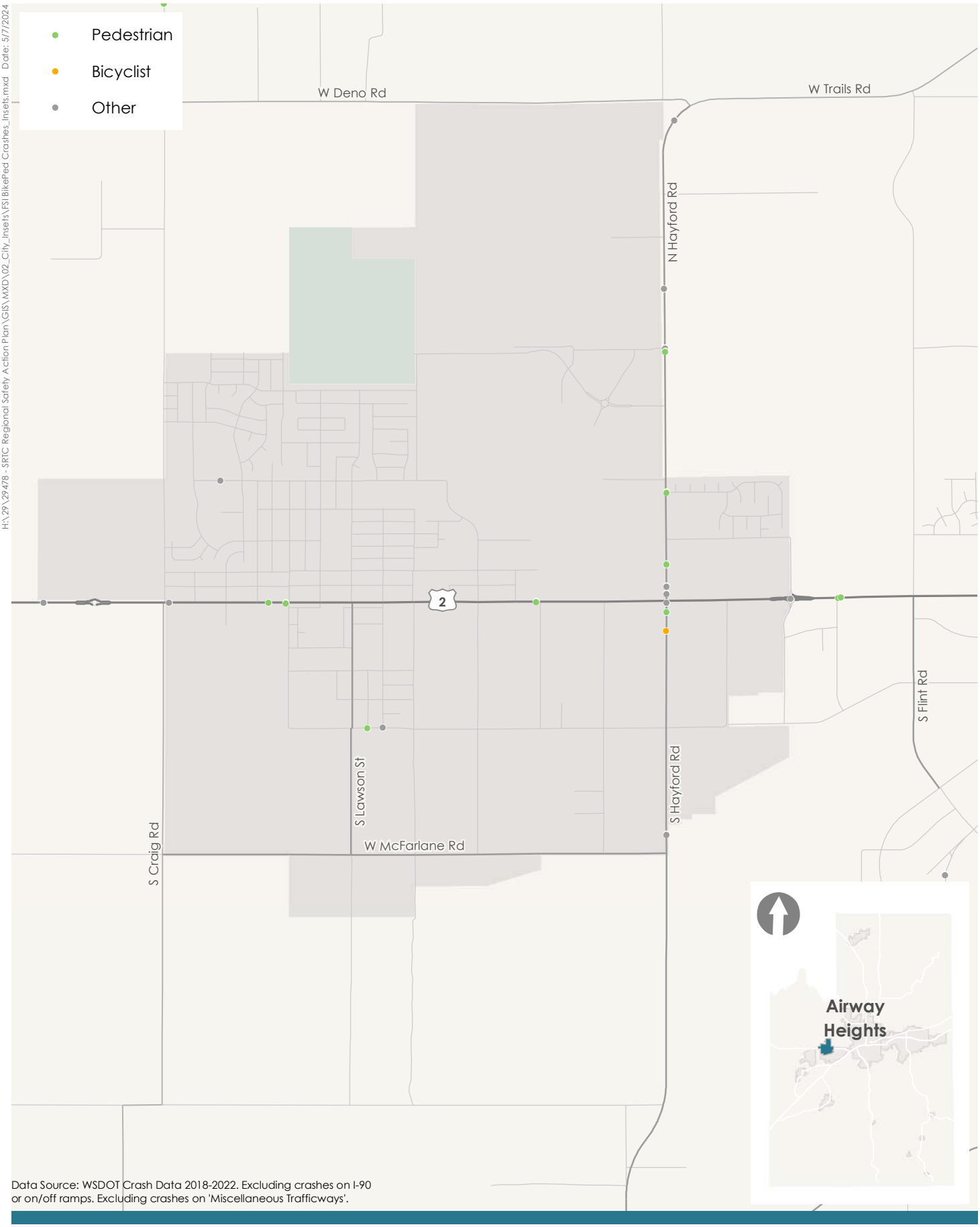


Data Source: WSDOT Crash Data 2018-2022. Excluding crashes on I-90 or on/off ramps. Excluding crashes on 'Miscellaneous Trafficways'.

SRTC SAFETY ACTION PLAN

Figure 36

Fatal and Serious Injury Crashes
Motorcycle and Vehicle - Airway Heights



Data Source: WSDOT Crash Data 2018-2022. Excluding crashes on I-90 or on/off ramps. Excluding crashes on 'Miscellaneous Trafficways'.

SRTC SAFETY ACTION PLAN

Figure 37

Fatal and Serious Injury Crashes Bicyclist and Pedestrian - Airway Heights

Crash Characteristics

CRASH MODE AND SEVERITY

The following FSI **crash trends** were observed in the Airway Heights crash data:

- Over the last decade, there has been a general **increase** in the number of **FSI crashes** (Exhibit 101 and Exhibit 102).
- There have been an equal number of **pedestrian and vehicle-only** FSI crashes. Additionally, all 10 pedestrian crashes occurred within the last seven years, as opposed to the last ten.
- **Pedestrian** crashes are **severely overrepresented** in the City, comprising 2% of all crashes, but 67% of fatal crashes and 43% of serious injury crashes.

Exhibit 101: Fatal and Serious Injury Crashes by Year and Mode in Airway Heights (2013 – 2022)

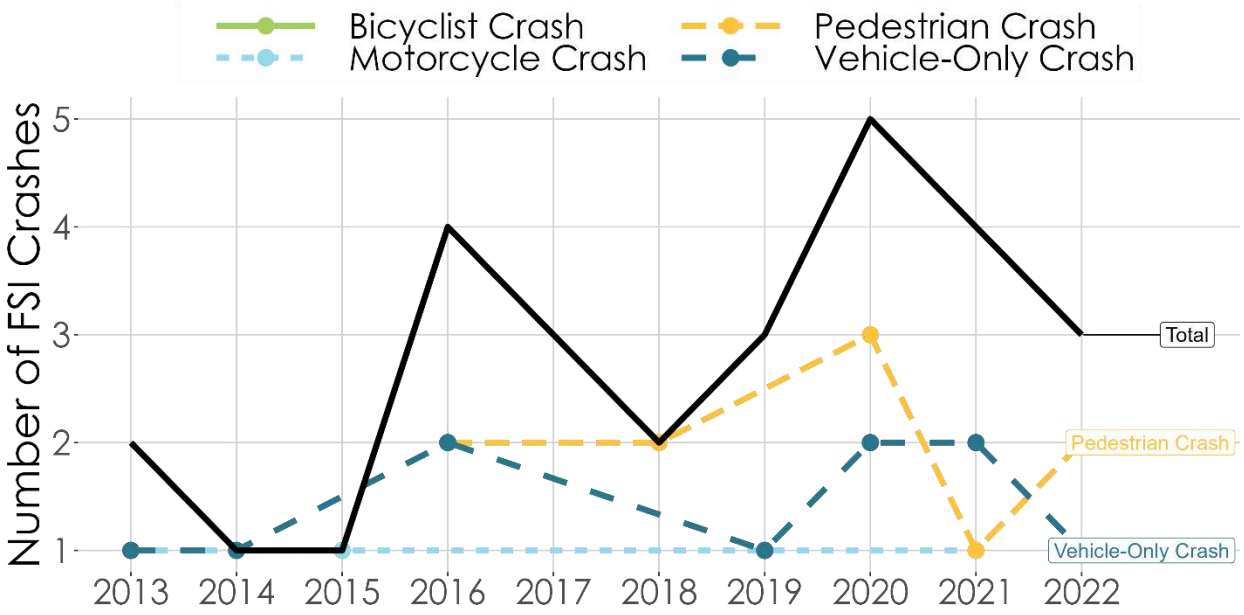
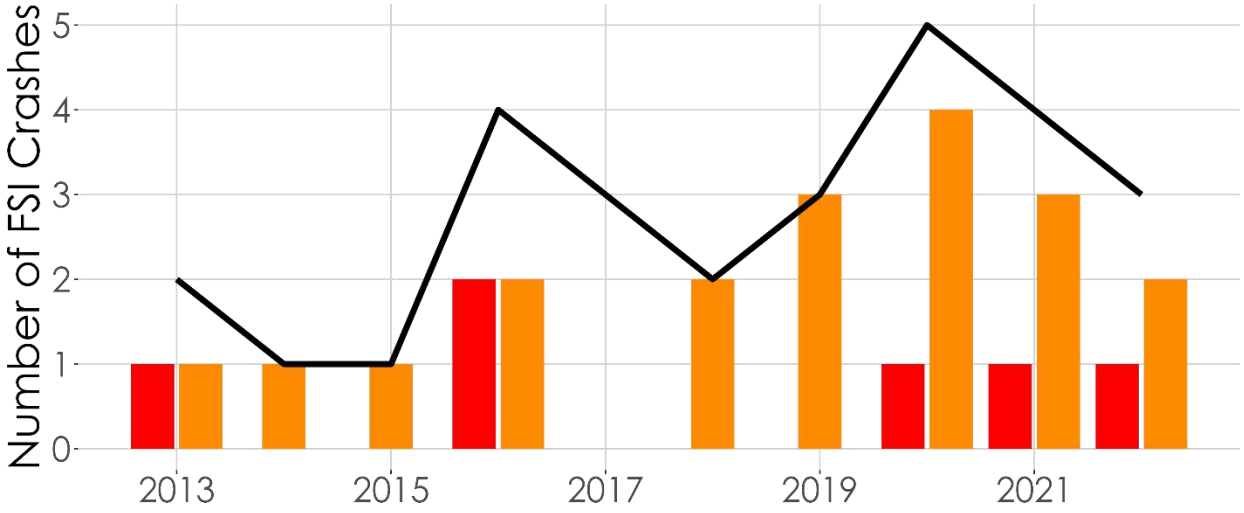


Exhibit 102: Fatal and Serious Injury Crashes by Year and Severity in Airway Heights (2013 – 2022)



CRASH TYPE

- When looking at the most recent five years of data (2018 through 2022) there are **more pedestrian crashes than** vehicle-only crashes (Table 11). Additionally, the pedestrian crashes represent two of the three fatal crashes seen in the City.
- Within the **vehicle-only** FSI crash population, there were three angle crashes, two run-off-road crashes, and one opposite direction crash. In the region, angle crashes were the fourth most common crash type after run off road crashes, pedestrian crashes, and motorcycle crashes.
- The two **run-off-road crashes** occurred in two different **lighting conditions**: dark conditions with streetlights on and dark conditions with unknown lighting. These lighting conditions reflect the region's lighting conditions for lane and road departure crashes, which more often occur in dark conditions than in daylight.

Table 11: Fatal and Serious Injury Crashes by Crash Type in Airway Heights (2018 – 2022)

Crash Type	Total Fatal Crashes	Total Serious Injury Crashes	Total Crashes
Pedestrian	2	6	8
Motorcycle	0	2	2
Bicyclist	0	1	1
Vehicle-Only	1	5	6
Angle	0	3	3
Run Off Road	1	1	2
Opposite Direction Other (Not Sideswipe or Head-On)	0	1	1
Total	3	14	17

WHEN DO CRASHES HAPPEN?

When crashes occur can be measured by the month (Table 12), day of the week (Table 13), and hour of the day (Table 14). The following observations were made when observing all four time-based data elements:

- Five of the six FSI **vehicle-only** crashes occurred between July and November. The distribution of crash months is more distributed across the entire year when looking at the entire region.
- Seven of the eight FSI **pedestrian** crashes occurred during fall and winter months, which matches regional trends. All eight pedestrian crashes also occurred during the earlier weekdays (Monday through Thursday) which tend to have higher pedestrian crash frequencies across the region. The hourly trends are also consistent with the regional trends, which show pedestrian crashes occurring later in the evening.
- The day of the week (Tuesday) and time of day (4 PM – 5 PM) of the FSI **bicycle** crash aligns with regional trends. However, there is not enough data to consider this a pattern within the City.
- The months, days, and times of the two FSI **motorcycle** crashes generally follow regional trends (summer and early fall months, weekends, and evening hours). However, there is not enough data to consider this a pattern within the City.

Table 12. Fatal and Serious Injury Crashes by Mode and Time of Year in Airway Heights (2018 – 2022)

Year	Pedestrian	Bicyclist	Vehicle Only	Motorcycle	Total
January	**2**	0	0	0	**2**
February	**2**	0	0	0	**2**
March	0	0	0	0	**0**
April	0	0	**1**	0	**1**
May	0	0	0	0	**0**
June	**1**	0	0	**1**	**2**
July	0	0	**1**	0	**1**
August	0	0	**1**	0	**1**
September	0	0	**1**	**1**	**2**
October	**2**	0	**1**	0	**3**
November	0	0	**1**	0	**1**
December	**1**	**1**	0	0	**2**
Total	**8**	**1**	**6**	**2**	**17**

Table 13. Fatal and Serious Injury Crashes by Mode and Weekday in Airway Heights (2018 – 2022)

Year	Pedestrian	Bicyclist	Vehicle Only	Motorcycle	Total
Monday	**2**	0	0	0	**2**
Tuesday	**1**	**1**	0	0	**2**
Wednesday	**3**	0	**3**	0	**6**
Thursday	**2**	0	**2**	0	**4**
Friday	0	0	0	**1**	**1**
Saturday	0	0	0	**1**	**1**
Sunday	0	0	**1**	0	**1**
Total	**8**	**1**	**6**	**2**	**17**

Table 14. Fatal and Serious Injury Crashes by Mode and Time of Day in Airway Heights (2018 – 2022)

Year	Pedestrian	Bicyclist	Vehicle Only	Motorcycle	Total
12 AM – 1 AM	**1**	0	0	0	**1**
1 AM – 2 AM	0	0	**1**	0	**1**
2 AM – 3 AM	0	0	**2**	0	**2**
6 AM – 7 AM	**2**	0	0	0	**2**
10 AM – 11 AM	**1**	0	0	0	**1**
11 AM – 12 PM	0	0	**2**	0	**2**
3 PM – 4 PM	**1**	0	0	0	**1**
4 PM – 5 PM	0	**1**	0	0	**1**
6 PM – 7 PM	**2**	0	**1**	0	**3**
7 PM – 8 PM	**1**	0	0	**2**	**3**
Total	**8**	**1**	**6**	**2**	**17**

WHERE DO CRASHES HAPPEN?

- Of the 17 crashes in the City, most of them (12) occurred on **city streets**, a pattern also observed in the regional crash data (Table 15).
- The relationship of the crashes to intersections also mimicked regional trends, with slightly more crashes occurring along **roadway segments** than at intersections (Table 16).
- Crashes tend to be clustered around the intersection of US 2 and Hayford Road.

Table 15. Fatal and Serious Injury Crashes by Facility Jurisdiction in Airway Heights (2018 – 2022)

Facility Jurisdiction	Pedestrian	Bicyclist	Vehicle Only	Motorcycle	Total
City Street	5	1	4	2	12
State Route	3	0	2	0	5
County Road	0	0	0	0	0
Total	8	1	6	2	17

Table 16. Fatal and Serious Injury Crashes by Relationship to Intersection in Airway Heights (2018 – 2022)

Relationship to Intersection	Pedestrian	Bicyclist	Vehicle Only	Motorcycle	Total
Not at an Intersection	4	1	3	0	8
Intersection	3	0	1	1	5
Driveway	1	0	2	1	4
Roundabout	0	0	0	0	0
Total	8	1	6	2	17

ENVIRONMENTAL

Dry roadway conditions were present for both motorcycle crashes, the motorcycle crash, and all six vehicle-only crashes. Two of the eight **pedestrian** crashes did not occur in dry conditions: one had oily roadway conditions and the other had icy conditions.

Table 17: Distribution of Roadway Conditions for Fatal and Serious Injury Crashes in the City of Spokane Valley (2018 – 2022)

Roadway Condition	Pedestrian	Bicyclist	Vehicle Only	Motorcycle	Total
Dry	6	1	6	2	**15**
Ice	1	0	0	0	**1**
Oil	1	0	0	0	**1**
Total	**8**	**1**	**6**	**2**	**17**

Human Factors/Driver Behavior

CONTRIBUTING CIRCUMSTANCES

- There were human factors related contributing circumstances in **11 of the 17 FSI crashes** in the City (Table 18).
- Most often, **distracted driving** was a contributing circumstance, playing a role in 7 of the 17 FSI crashes.
- Overall, the contributing circumstances had a disproportionate effect on **pedestrians**. The disproportionate effect of these factors on vulnerable road users is also observed across the region.

Table 18. Fatal and Serious Injury Crashes Contributing Circumstance by mode in Airway Heights (2018 – 2022)

Contributing Circumstance	Pedestrian	Bicyclist	Vehicle Only	Motorcycle	Total
Speeding Driver	0	0	1	0	**1**
Distracted Driver	3	1	2	1	**7**
Alcohol Impaired Person	2	0	1	0	**3**
Total	**5**	**1**	**4**	**1**	**17**

ROAD USER CHARACTERISTICS

The distribution of road user age by road user type is document in Table 19. Overall, **drivers** tended to be younger than 45, while **pedestrians** were more evenly distributed across the age ranges.

Table 19. Fatal and Serious Injury Crashes Road User Age Distribution in Airway Heights (2018 – 2022)

Age Group	Pedestrians	Bicyclists	Drivers	Motorcyclists	Total
0 – 10	0	0	0	0	**0**
10 – 14	0	0	0	0	**0**
15 – 19	0	0	**1**	**1**	**2**
20 – 24	**1**	0	**5**	0	**6**
25 – 29	**1**	0	**1**	0	**2**
30 – 34	0	0	**3**	0	**3**
35 – 39	**1**	0	**2**	0	**3**
40 – 44	**1**	0	**4**	0	**5**
45 – 49	0	**1**	0	0	**1**
50 – 54	**2**	0	0	0	**2**
55 – 59	**1**	0	**2**	**1**	**4**
60 – 64	0	0	**1**	0	**1**
65 – 69	**1**	0	**1**	0	**2**
70 – 74	0	0	0	0	**0**
75+	0	0	0	0	**0**
Total	**8**	**1**	**20**	**2**	**31**

Crash Analysis in Areas with Low Crash Rates

The data for jurisdictions with less than 10 FSI crashes is summarized in this section.

A map of each jurisdiction shows the geographic distribution of crashes. Crashes are shown according to the latitude and longitude of the crash, including crashes that occur outside the jurisdiction, but nearby. The summary tables include crashes that are recorded as occurring within the jurisdiction in the crash report. This difference may result in a different number of crashes appearing on the map, compared to the summary tables.

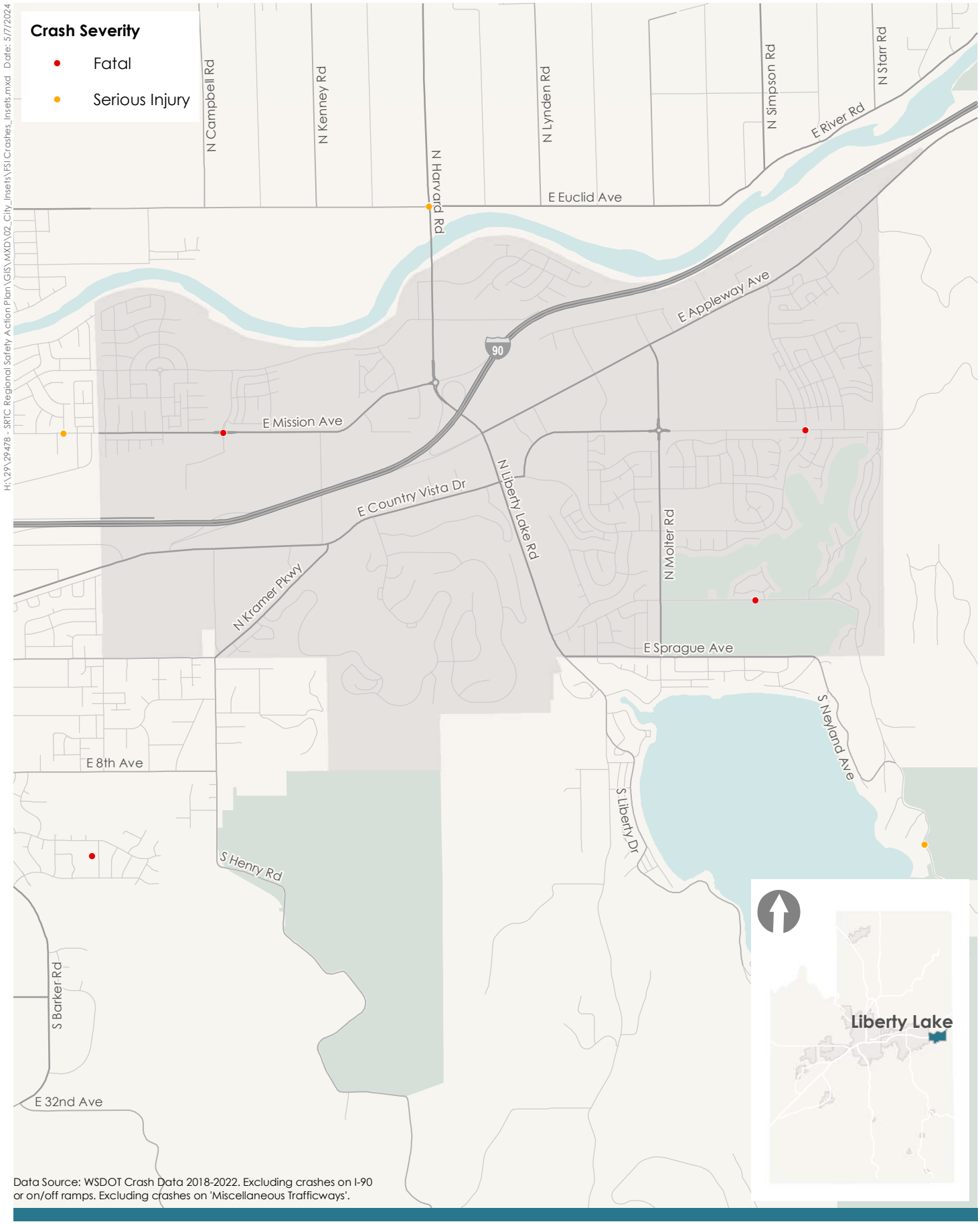
LIBERTY LAKE CRASH TRENDS

From 2018 through 2022, there were four FSI crashes in the City of Liberty Lake, three of which resulted in a fatal injury and two of which involved a pedestrian or motorcyclist (Table 20). The crashes in and around Liberty Lake are shown geographically in Figures 38-40. Several crashes that occur near Liberty Lake, in Unincorporated Spokane County, are shown on the map, but are not included in the summary table below. The following observations were made:

- **Location:** All four crashes occurred on city streets, which is the region's most common location for FSI crashes. The vehicle-only crashes occurred at roundabouts which comprise just 1% of the region's FSI crashes. The motorcycle crash did not occur at an intersection which aligns with regional trends.
- **Crash Type:** Two of the fatal crashes and the serious injury crash were run-off-road crashes, the most common crash type in the region. The remaining fatal crash was a pedestrian crash, the region's second most common crash type.
- **Environment:** Most of the environmental conditions associated with these crashes (partly cloudy, raining, wet surface, dark lighting) did not align with the region's most common conditions (clear weather, dry surface, daylight).
- **Human Factors:** All four crashes had contributing circumstances related to human behavior. Drinking was involved in three of the four crashes and driver distraction was involved in two of the four.

Table 20. Summary of FSI crashes in Liberty Lake (2018 – 2022)

Category and Characteristic		Crash #1: Fatal	Crash #2: Fatal	Crash #3: Fatal	Crash #4: Serious
Time of Crash	Year	2018	2018	2019	2018
	Month	September	October	October	December
	Day	Tuesday	Thursday	Tuesday	Saturday
	Time	8:30 PM	8:10 AM	2:55 AM	4:30 PM
Crash Location	Facility Jurisdiction	City Street	City Street	City Street	City Street
	Intersection Relationship	Not at intersection	At intersection	Entering roundabout	Entering roundabout
Collision Manner	Mode	Motorcycle	Pedestrian	Vehicle-only	Vehicle-only
	Type	Run off road (fence)	Pedestrian	Run-off-road (retaining wall)	Run off road (traffic island)
Environment	Weather	Clear or partly cloudy	Clear or partly cloudy	Raining	Clear or partly cloudy
	Surface Condition	Dry	Dry	Wet	Dry
	Lighting	Dark – no streetlights	Daylight	Dark – streetlights	Dark – streetlights
Human Factors	Contributing Circumstances	Drinking	Distracted driver	Drinking, distracted driver	Impaired (Alcohol)

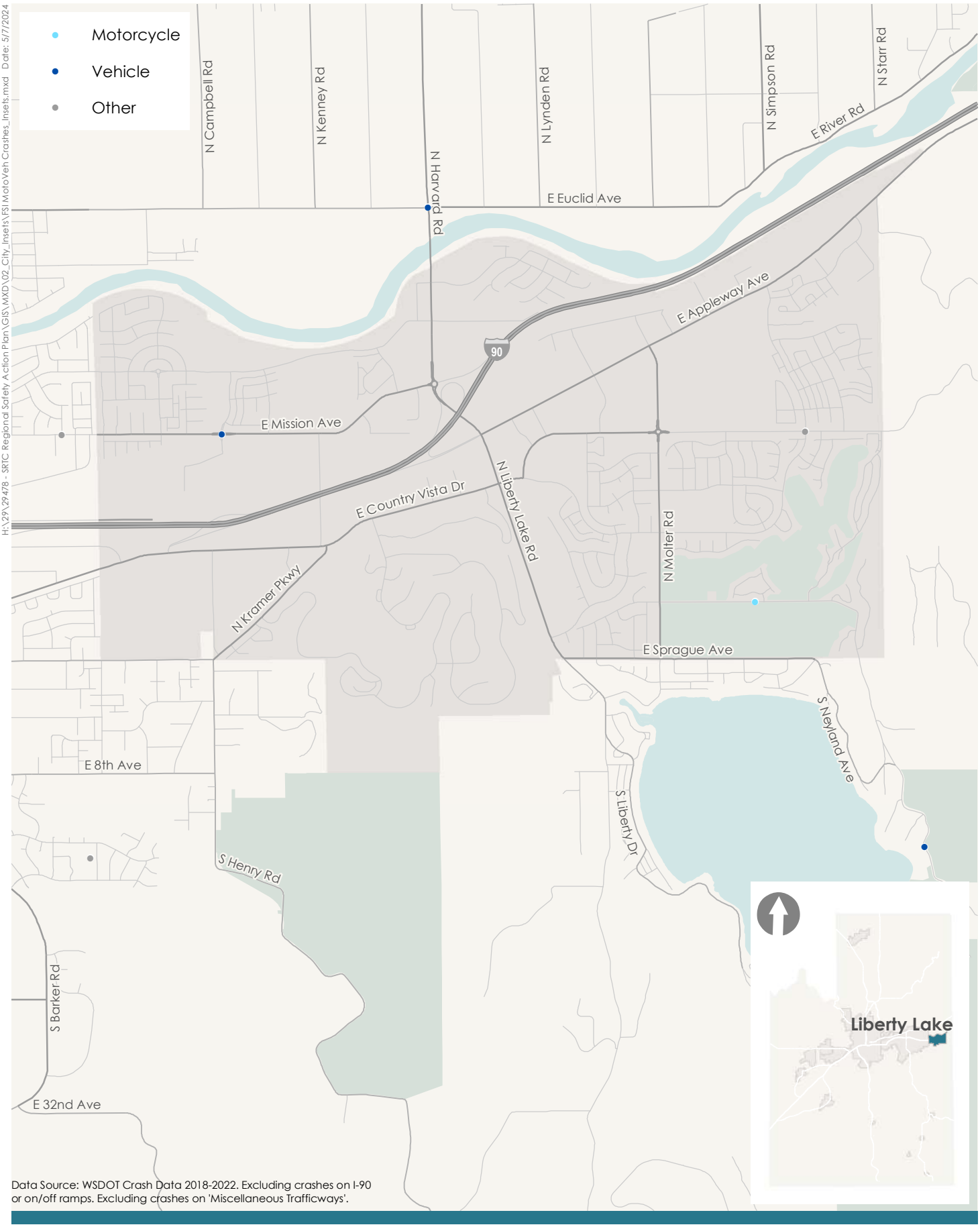


Data Source: WSDOT Crash Data 2018-2022. Excluding crashes on I-90 or on/off ramps. Excluding crashes on 'Miscellaneous Trafficways'.

SRTC SAFETY ACTION PLAN

Figure 38

Fatal and Serious Injury Crashes Liberty Lake

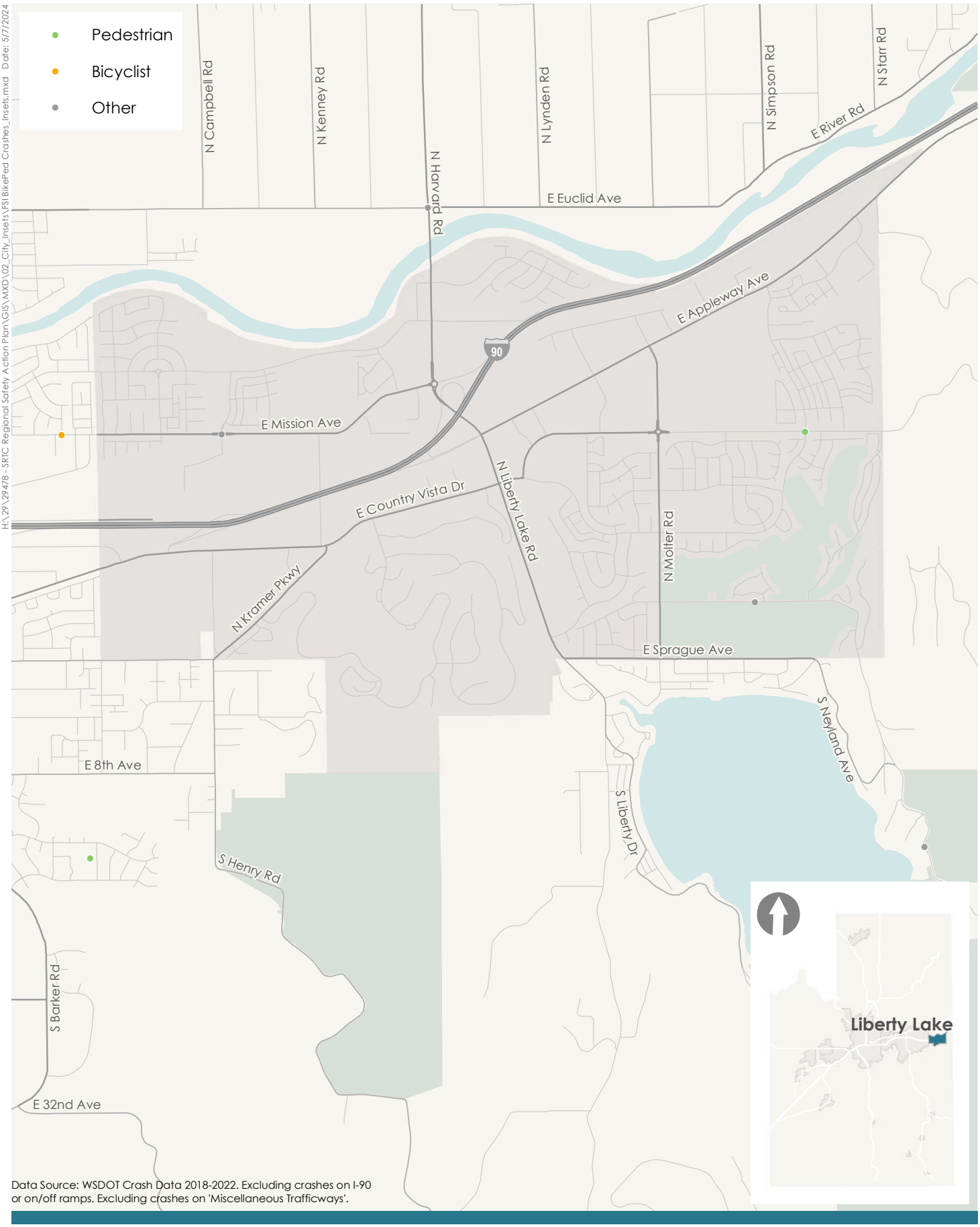


Data Source: WSDOT Crash Data 2018-2022. Excluding crashes on I-90 or on/off ramps. Excluding crashes on 'Miscellaneous Trafficways'.

SRTC SAFETY ACTION PLAN

Figure 39

Fatal and Serious Injury Crashes
Motorcycle and Vehicle - Liberty Lake



Data Source: WSDOT Crash Data 2018-2022. Excluding crashes on I-90 or on/off ramps. Excluding crashes on 'Miscellaneous Trafficways'.

SRTC SAFETY ACTION PLAN

Figure 40

Fatal and Serious Injury Crashes Bicyclist and Pedestrian - Liberty Lake

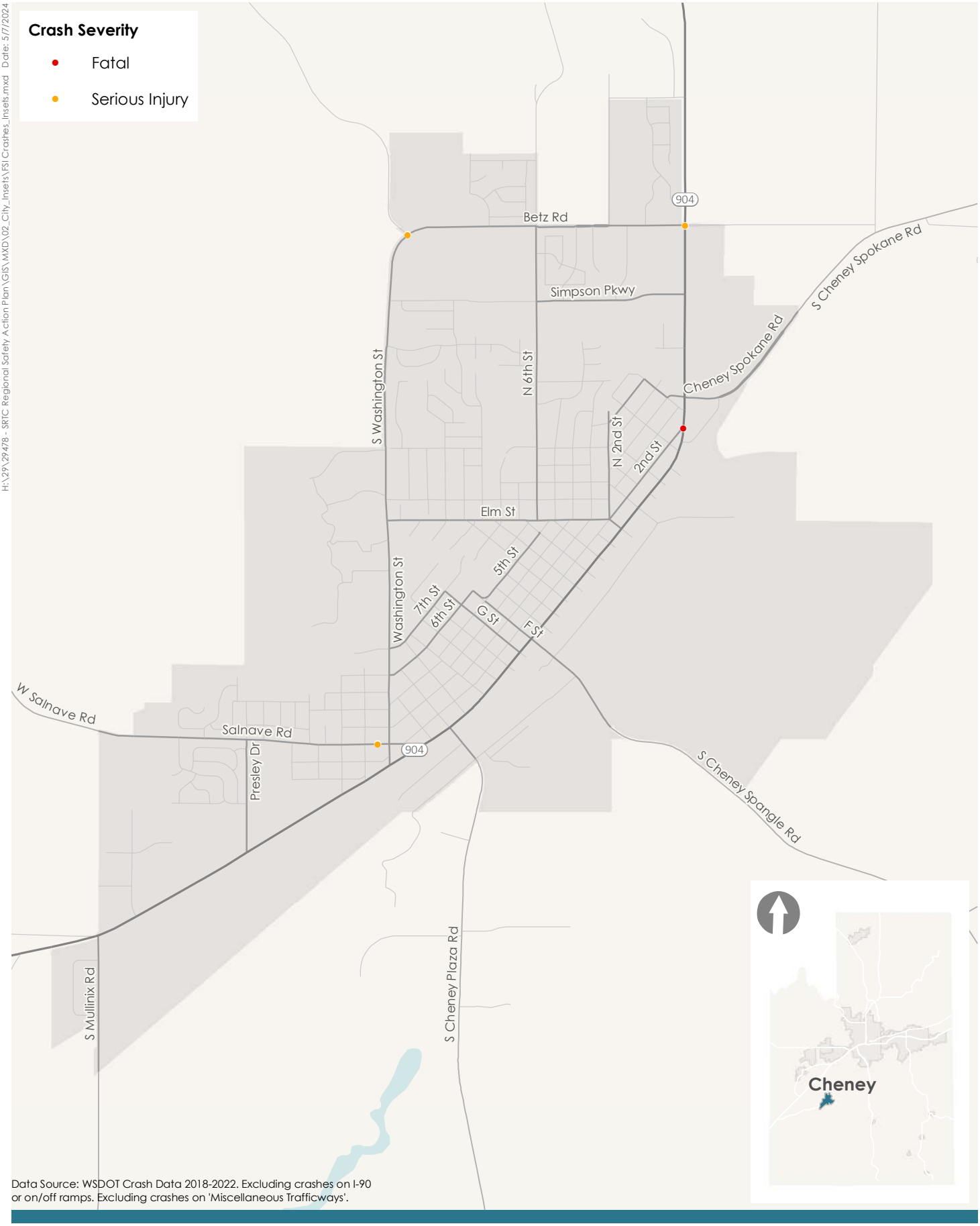
CHENEY CRASH TRENDS

From 2018 through 2022, there were three FSI crashes in the City of Cheney: one fatal crash and two serious injury crashes (Table 21). All three crashes were vehicle-only. The crashes in and around Cheney are shown geographically in Figures 41-43. Several crashes that occur near Cheney, in Unincorporated Spokane County, are shown on the map, but are not included in the summary table below. The following observations were made:

- **Time:**
  - Being on Thursday, Saturday, and Sunday, none of the three crashes fell on Friday, the region's peak day for vehicle-only FSI crashes.
  - The fatal crash fell between 5 and 6 PM and one of the serious crashes fell between 9 and 10 AM. While these hours were not the highest peak hours for crashes in the region, they do fall within typical peak-hour ranges for road users commuting. The second serious crash fell between midnight and 1 AM which is not a peak hour in the region.
- **Location:** The two serious crashes occurred on city streets which is the location for 60% of the region's serious injury crashes. The fatal crash occurred on a state route, which accounts for 33% of the region's fatal crashes. Additionally, the fatal crash occurred at an intersection, while both serious injury crashes did not occur at an intersection. This is the opposite of regional trends.
- **Crash Type:** There was one run-off-road crash and two angle crashes, which are the region's most common and fourth most common crash types, respectively.
- **Environment:** The weather and surface conditions (clear and dry) reflect the most common conditions in the region. One of the serious crashes occurred in dark conditions with no streetlights on, which is a rare condition within the region, compared to the percentage of crashes that occur in daylight.
- **Human Factors:** The fatal crash had no noted contributing factors. However, one of the serious injury crashes involved a drowsy driver and the other involved an alcohol impaired person. Drowsy drivers are only noted as contributing to 2% of the region's FSI crashes, while alcohol impairment contributed to 14%.

Table 21. Summary of FSI crashes in Cheney (2018 – 2022)

Category and Characteristic		Crash #1: Fatal	Crash #2: Serious	Crash #3: Serious
Time of Crash	Year	2022	2021	2021
	Month	July	September	October
	Day	Thursday	Saturday	Sunday
	Time	5:37 PM	12:40 AM	9:13 AM
Crash Location	Facility Jurisdiction	State Route	City Street	City Street
	Intersection Relationship	At intersection	Not at intersection	Not at intersection
Collision Manner	Mode	Vehicle-only	Vehicle-only	Vehicle-only
	Type	Angle	Run-off-road (tree or stump; rollover)	Angle
Environment	Weather	Clear	Clear	Clear
	Surface Condition	Dry	Dry	Dry
	Lighting	Daylight	Dark – no streetlights	Daylight
Human Factors	Contributing Circumstances	None	Drowsy driver	Impaired (Alcohol)



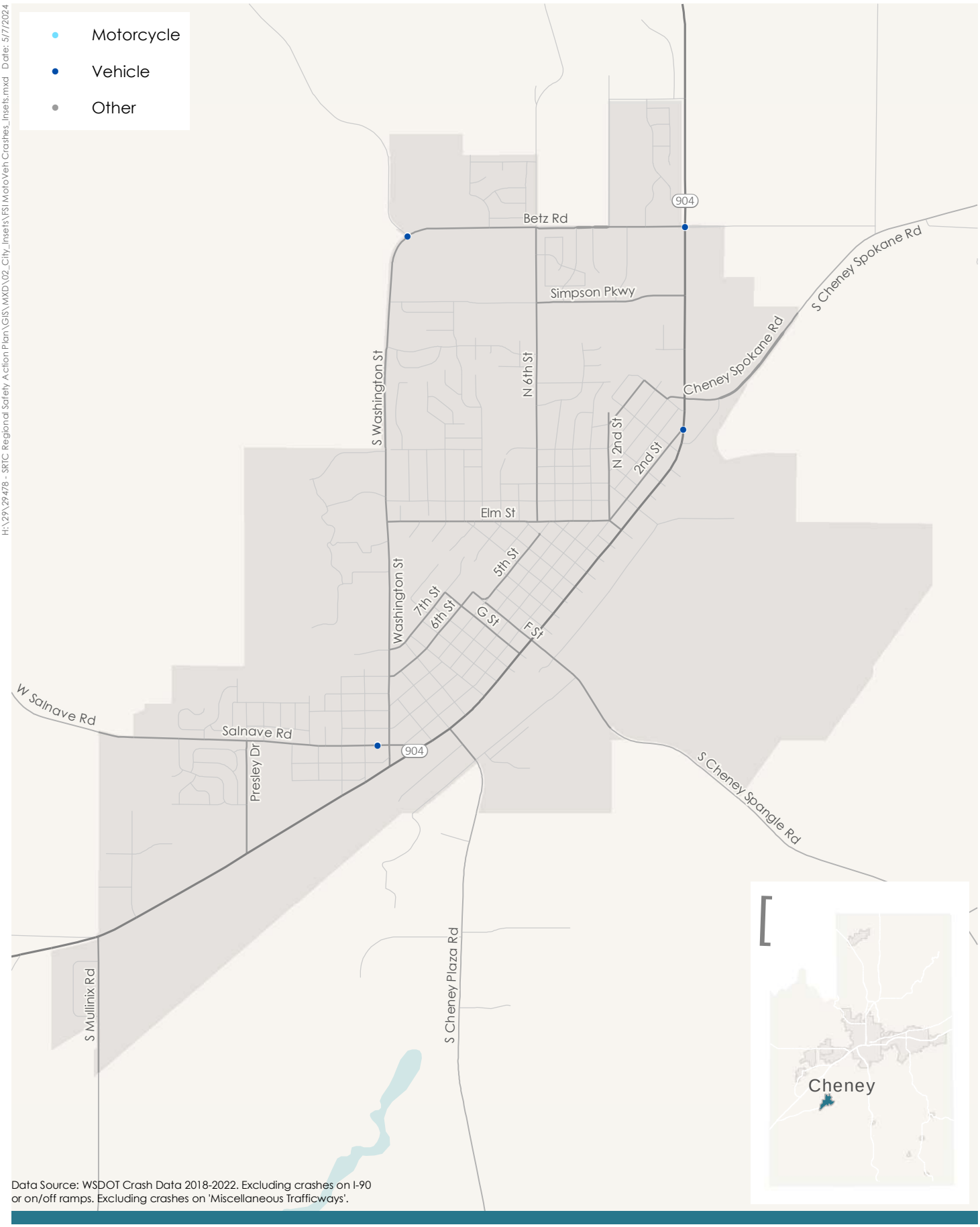
Data Source: WSDOT Crash Data 2018-2022. Excluding crashes on I-90 or on/off ramps. Excluding crashes on 'Miscellaneous Trafficways'.

H:\29\29478 - SRTC Regional Safety Action Plan\GIS\MXD\02_City_Insets\FSI Crashes_Insets.mxd Date: 5/7/2024

SRTC SAFETY ACTION PLAN

Figure 41

Fatal and Serious Injury Crashes Cheney



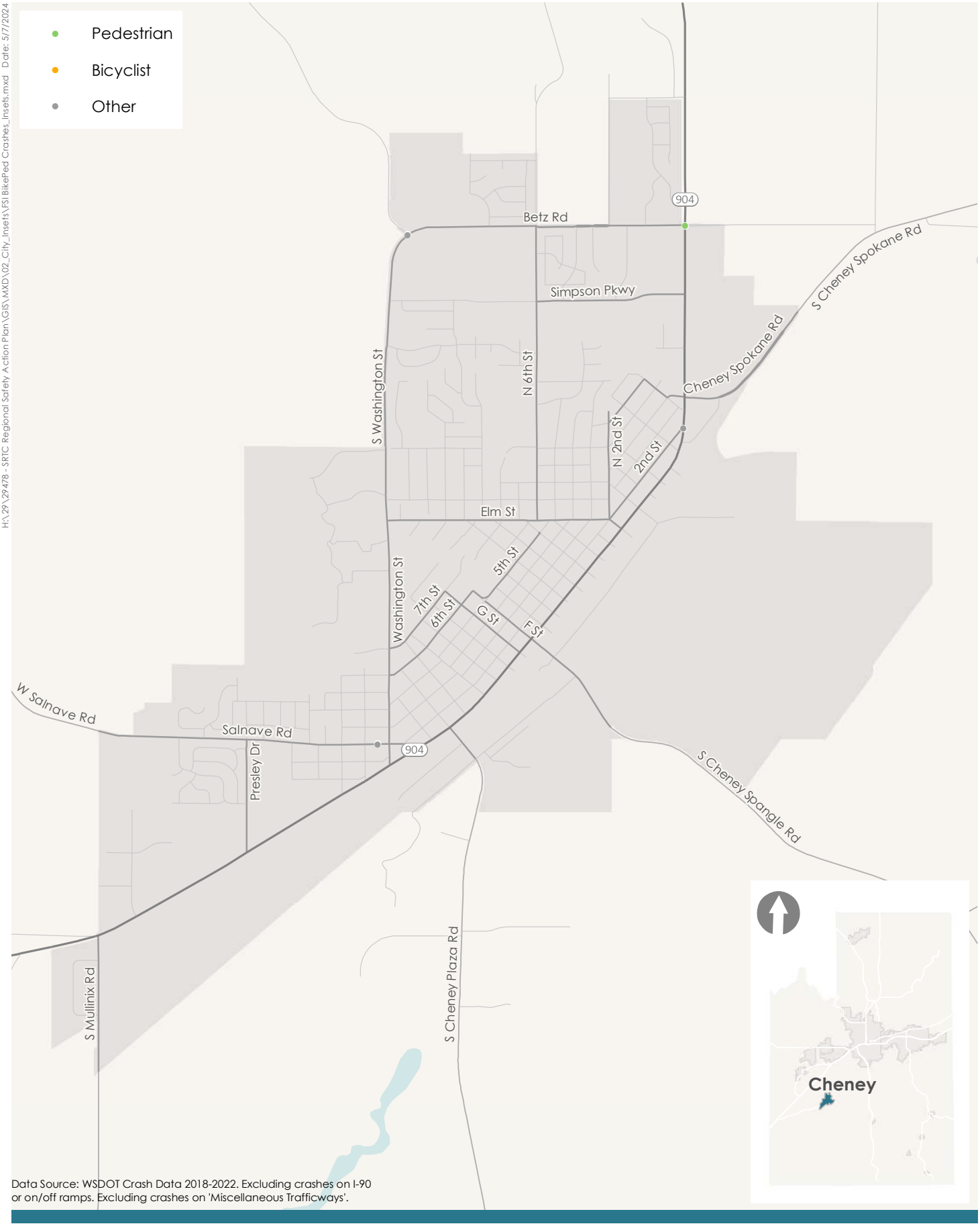
Data Source: WSDOT Crash Data 2018-2022. Excluding crashes on I-90 or on/off ramps. Excluding crashes on 'Miscellaneous Trafficways'.

H:\29\29478 - SRTC Regional Safety Action Plan\GIS\MXD\02_City_Insets\FSI MotoVeh Crashes_Insets.mxd Date: 5/7/2024

SRTC SAFETY ACTION PLAN

Figure 42

Fatal and Serious Injury Crashes
Motorcycle and Vehicle - Cheney



Data Source: WSDOT Crash Data 2018-2022. Excluding crashes on I-90 or on/off ramps. Excluding crashes on 'Miscellaneous Trafficways'.

H:\29\29478 - SRTC Regional Safety Action Plan\GIS\MXD\02_City_Insets\FSI BikePed Crashes_Insets.mxd Date: 5/7/2024

SRTC SAFETY ACTION PLAN

Figure 43

Fatal and Serious **Injury Crashes**
Bicyclist and Pedestrian - Cheney

MEDICAL LAKE CRASH TRENDS

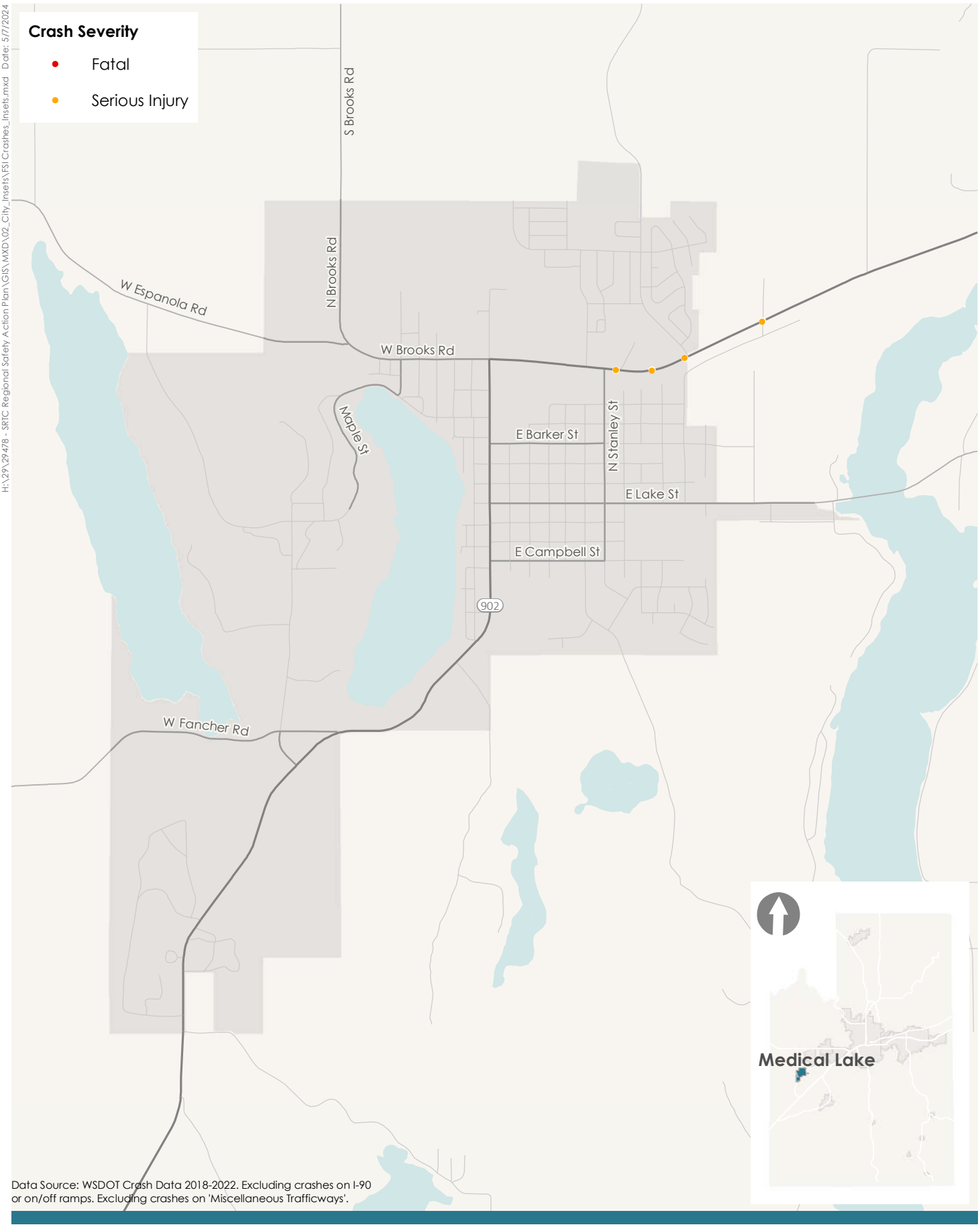
The City of Medical Lake is the western most jurisdiction within the region. From 2018 through 2022, there were two FSI crashes in the City, each of which resulted in at least one serious injury (Table 22). Both crashes were vehicle-only and one of the crashes was a single-vehicle run-off-road crash. The crashes in and around Medical Lake are shown geographically in Figures 44 and 45. The two eastern-most crashes are not recorded as being within Medical Lake on the crash report and are therefore not included in the summary table. However, including these crashes in the FSI crash map is useful for highlighting an FSI crash trend on State Route 902.

The following observations were made:

- **Time:**
  - Both crashes occurred on a Tuesday which does not correlate with the Friday peak in the regional data. Additionally, February and August are secondary peak months within the regional data; June is the peak month.
  - One of the crashes fell between 3 and 6 PM, the regional peak hour range.
- **Location:** Both crashes occurred on State Route 902 and not at an intersection. This differs from regional trends, which showed serious injury crashes as being most common on city streets and at intersections. State Route 902 has a posted speed of 30 MPH and one lane traveling in each direction.
- **Crash Type:** One of the Medical Lake crashes was a run-off-road crash, which was the most common FSI crash type in the region.
- **Environment:** The environmental conditions for the crashes (clear weather, dry roadway surface, and daylight) match the most common conditions among the region's FSI crash population.
- **Human Factors:** Alcohol impairment was a contributing factor in one of the two crashes, a factor which contributed to 19% of the region's FSI crashes.

Table 22. Summary of FSI crashes in Medical Lake (2018 – 2022)

Category and Characteristic		Crash #1: Serious	Crash #2: Serious
Time of Crash	Year	2020	2022
	Month	February	August
	Day	Tuesday	Tuesday
	Time	3:20 PM	7:10 PM
Crash Location	Facility Jurisdiction	State Route	State Route
	Intersection Relationship	Not at intersection	Not at intersection
Collision Manner	Mode	Vehicle-only	Vehicle-only
	Type	Rear-end	Run-off-road (earth bank or ledge; rollover)
Environment	Weather	Clear	Clear
	Surface Condition	Dry	Dry
	Lighting	Daylight	Daylight
Human Factors	Contributing Circumstances	None	Impairment (Alcohol)

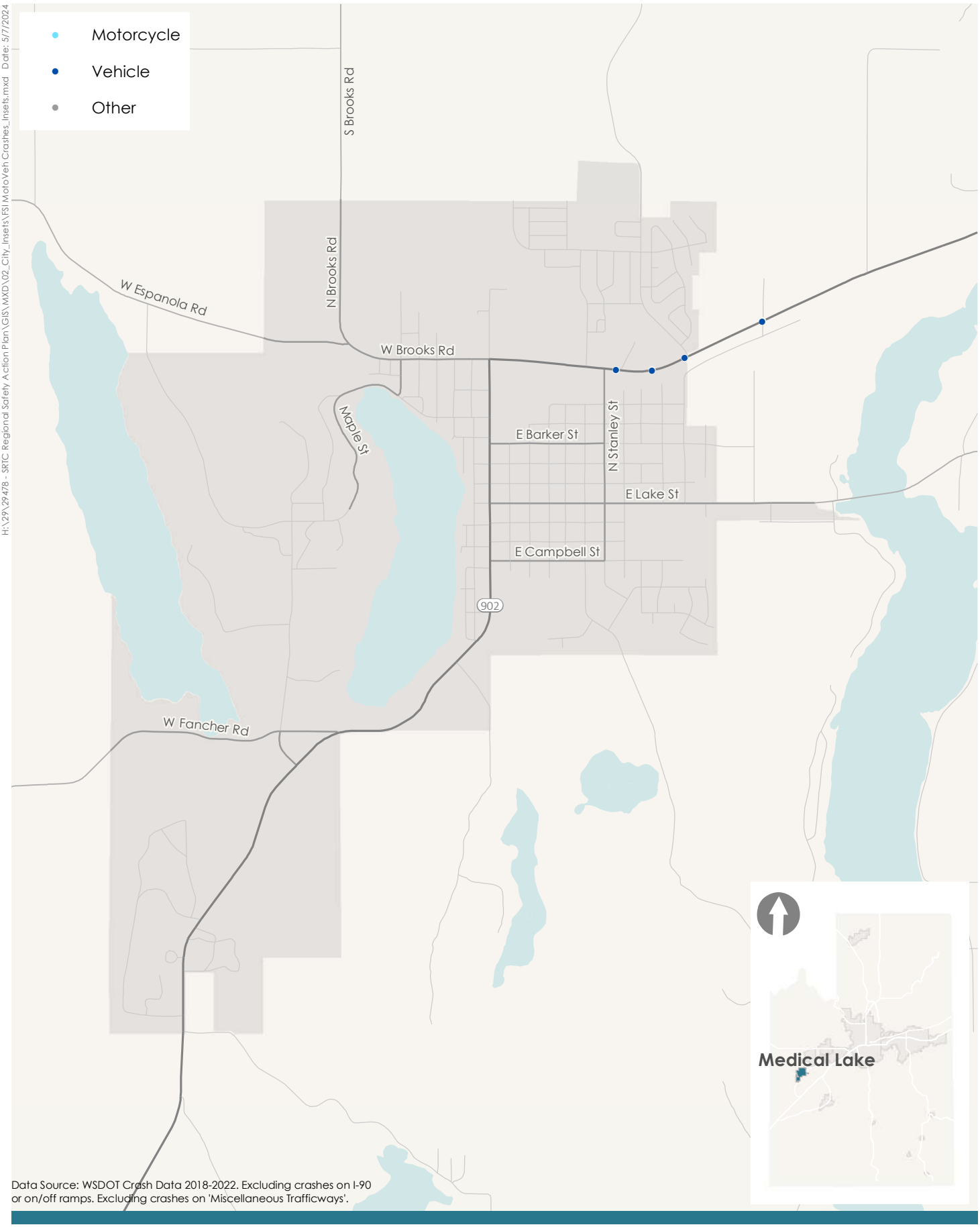


Data Source: WSDOT Crash Data 2018-2022. Excluding crashes on I-90 or on/off ramps. Excluding crashes on 'Miscellaneous Trafficways'.

SRTC SAFETY ACTION PLAN

Figure 44

Fatal and Serious Injury Crashes
Medical Lake



Data Source: WSDOT Crash Data 2018-2022. Excluding crashes on I-90 or on/off ramps. Excluding crashes on 'Miscellaneous Trafficways'.

SRTC SAFETY ACTION PLAN

Figure 45

Fatal and Serious Injury Crashes
Motorcycle and Vehicle - Medical Lake

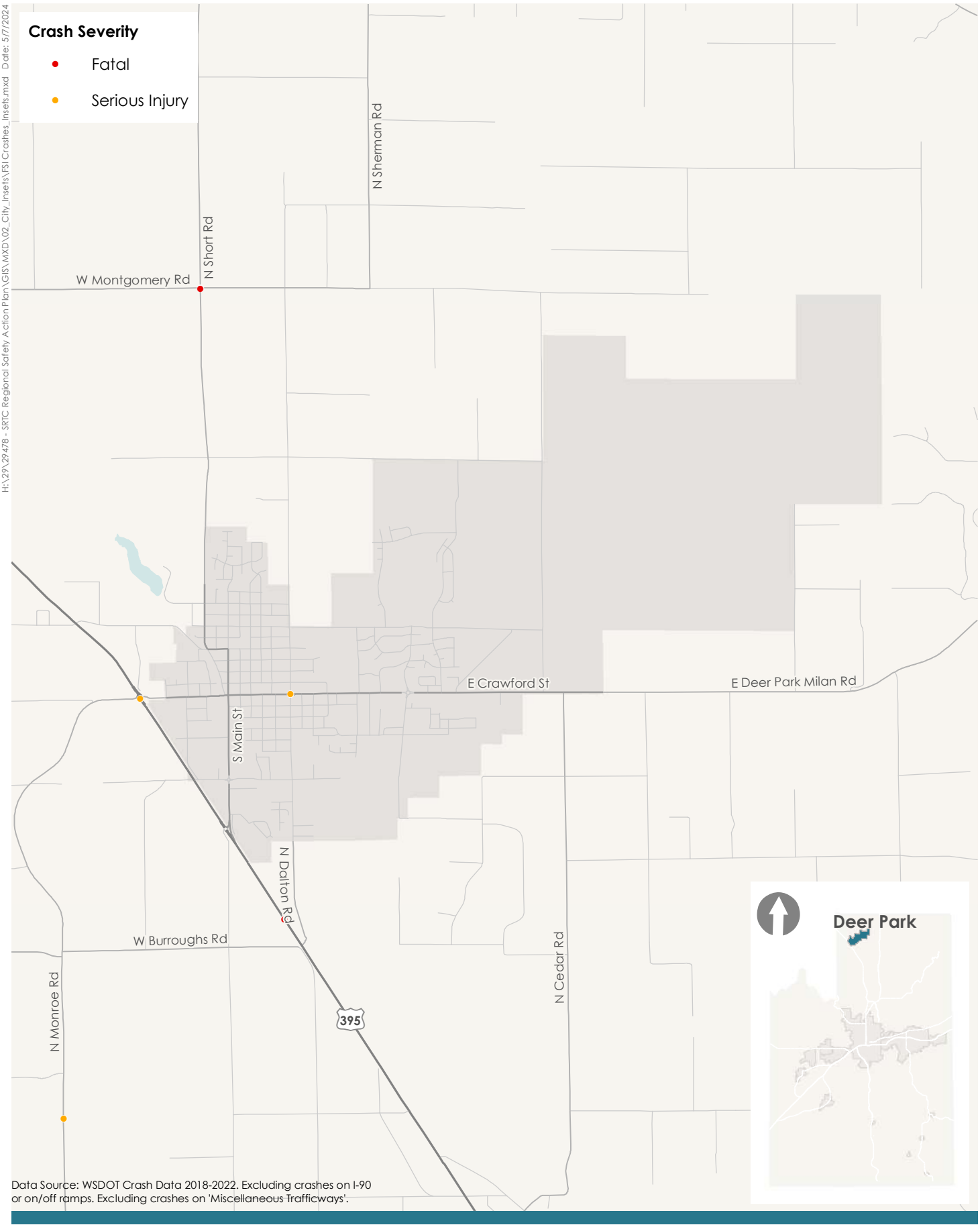
DEER PARK CRASH TRENDS

From 2018 through 2022, there was one FSI crash in the City of Deer Park, which resulted in a serious injury (Table 23). The crashes in and around Deer Park are shown geographically in Figures 46 and 47. Several crashes that occur near Deer Park, in Unincorporated Spokane County, are shown on the map, but are not included in the summary table below. The following observations were made when comparing the Deer Park serious injury crash to the regional FSI crash trends:

- **Time:**
  - The crash occurred on a Wednesday, while the region's peak day for motorcycle crashes is Friday.
  - The crash occurred at 10:30 AM which does not correlate with peak motorcycle crash times in the region, which most often occur between 1 PM and 11 PM.
- **Location:** The crash occurred on a city street while the motorcycle was entering a roundabout; city streets were the location of 60% of the region's serious injury crashes. Roundabout crashes comprise only 1% of the region's serious injury crashes.
- **Crash Type:** Angled crashes were the fourth most common in the region, following run-off-road crashes, pedestrian crashes, and motorcyclist crashes.
- **Environment:** The weather, surface conditions, and lighting conditions (clear, dry, and daylight) reflect the most common conditions in the region.
- **Human Factors:** There were no noted contributing circumstances to this crash.

Table 23. Summary of FSI crashes in Deer Park (2018 – 2022)

Category and Characteristic		Crash #1: Serious
Time of Crash	Year	2022
	Month	June
	Day	Wednesday
	Time	10:30 AM
Crash Location	Facility Jurisdiction	City Street
	Intersection Relationship	Entering roundabout
Collision Manner	Mode	Motorcycle
	Type	Angle
Environment	Weather	Clear
	Surface Condition	Dry
	Lighting	Daylight
Human Factors	Contributing Circumstances	None



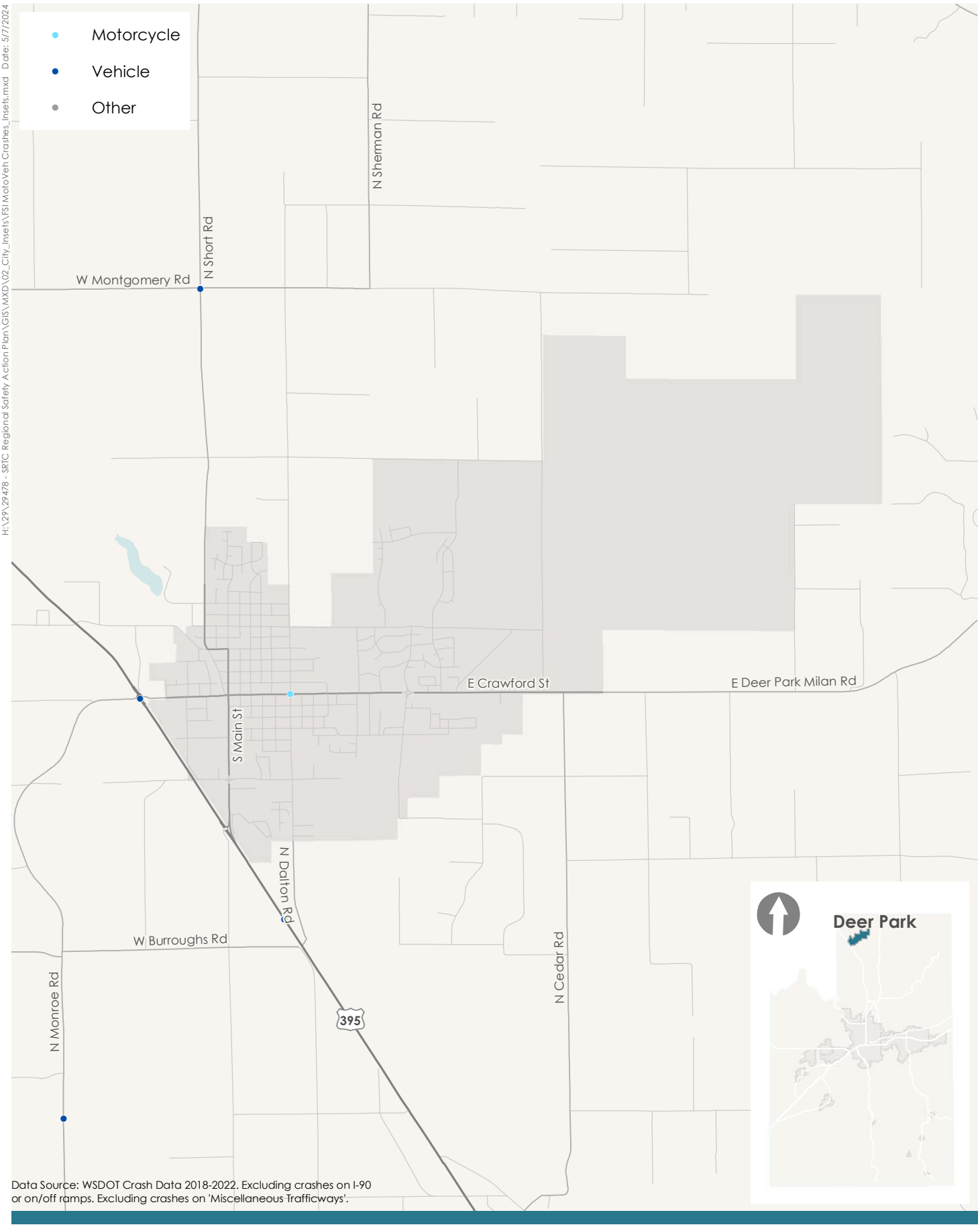
H:\29\29478 - SRTC Regional Safety Action Plan\GIS\MXD\02_City_Insets\FSI Crashes_Insets.mxd Date: 5/7/2024

Data Source: WSDOT Crash Data 2018-2022. Excluding crashes on I-90 or on/off ramps. Excluding crashes on 'Miscellaneous Trafficways'.

SRTC SAFETY ACTION PLAN

Figure 46

Fatal and Serious Injury Crashes Deer Park



H:\29\29478 - SRTC Regional Safety Action Plan\GIS\MXD\02_City_Insets\FSI MotoVeh Crashes_Insets.mxd Date: 5/7/2024

Data Source: WSDOT Crash Data 2018-2022. Excluding crashes on I-90 or on/off ramps. Excluding crashes on 'Miscellaneous Trafficways'.

SRTC SAFETY ACTION PLAN

Figure 47

Fatal and Serious Injury Crashes Motorcycle and Vehicle - Deer Park

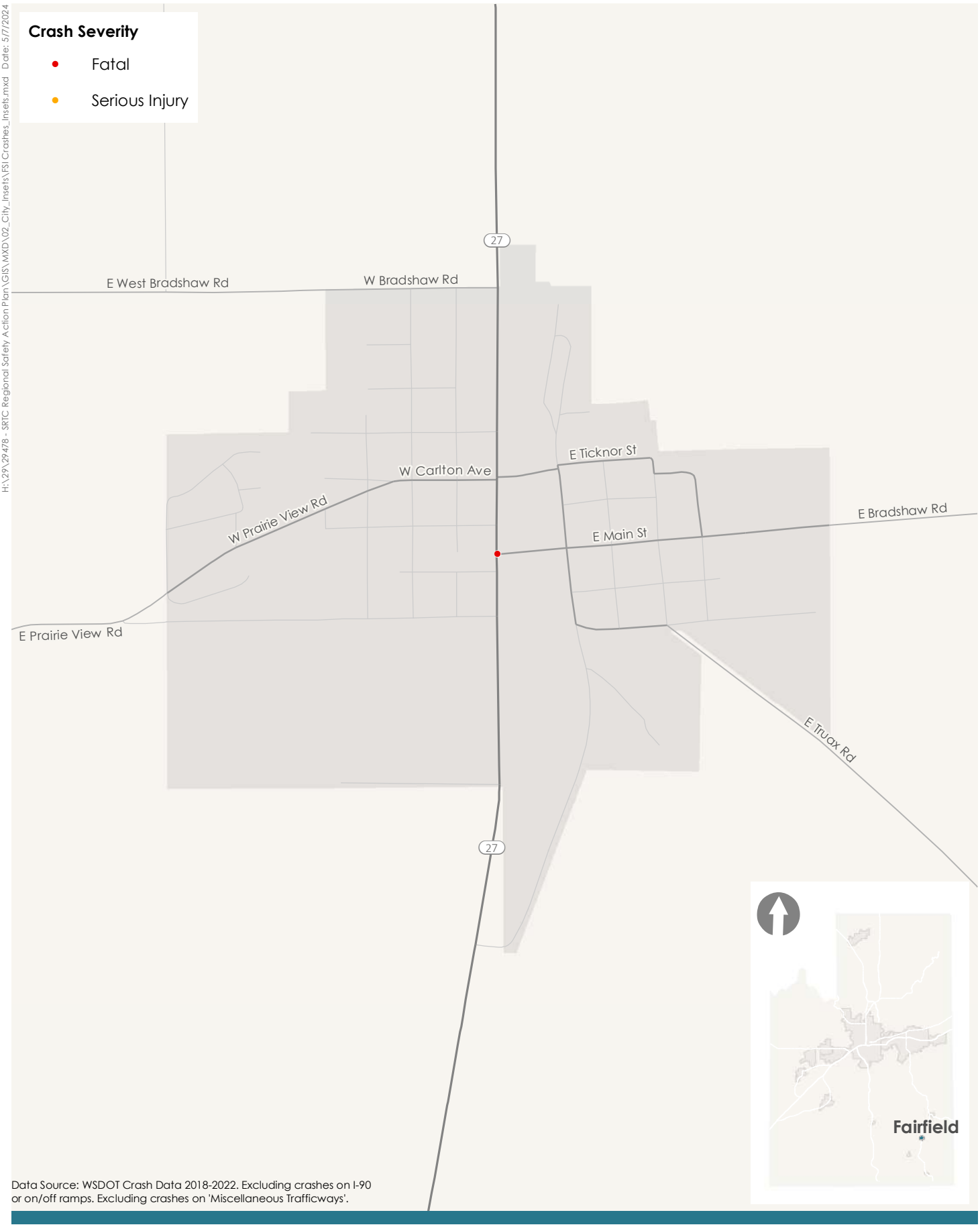
FAIRFIELD CRASH TRENDS

From 2018 through 2022, there was one FSI crash in the City of Fairfield, which resulted in a fatal injury (Table 24). The following observations were made:

- **Time:**
  - The crash occurred on a Saturday, but the regional peak day for vehicle-only crashes is Friday.
  - The nighttime crash did not fall within the peak time range (3 PM to 6 PM) for the region.
- **Location:** The crash occurred at an intersection on a state route. This does not correlate with the regional trends which show fatal crashes being comprised of mostly city street crashes and not occurring at an intersection.
- **Crash Type:** Angled crashes were the fourth most common in the region, following run-off-road crashes, pedestrian crashes, and motorcyclist crashes.
- **Environment:** The weather and surface conditions (clear and dry) reflect the most common conditions in the region. However, the crash occurred in dark conditions with no streetlights on, which is a rare condition within the region, compared to the percentage of crashes that occur in daylight.
- **Human Factors:** Both drug and alcohol impairment were contributing factors to the crash, in addition to speeding. Drug and alcohol impairment was a contributing factor in 14% and 7% of the regional FSI crashes, respectively. Speeding contributed to 22% of the regional FSI crashes.

Table 24. Summary of FSI crashes in Fairfield (2018 – 2022)

Category and Characteristic		Crash #1: Fatal
Time of Crash	Year	2022
	Month	October
	Day	Saturday
	Time	8:19 PM
Crash Location	Facility Jurisdiction	State Route
	Intersection Relationship	At intersection
Collision Manner	Mode	Vehicle-only
	Type	Angle
Environment	Weather	Clear
	Surface Condition	Dry
	Lighting	Dark – streetlights
Human Factors	Contributing Circumstances	Impaired (Alcohol, Drugs), Speeding



Data Source: WSDOT Crash Data 2018-2022. Excluding crashes on I-90 or on/off ramps. Excluding crashes on 'Miscellaneous Trafficways'.

SRTC SAFETY ACTION PLAN

Figure 48

Fatal and Serious Injury Crashes Fairfield

Systemic Crash Analysis

CRASH CHARACTERISTIC BASED ANALYSIS

Posted Speed Analysis

This section summarizes the distribution of posted speed limits for the FSI crashes in the region. The posted speed is not reflective of vehicle travel speed at the time of the crash. Additionally, speed limit was recorded per crash-involved vehicle. Therefore, there are more recorded speed limits than there are number of crashes. This is evident in the table describing the posted speeds for the Airway Heights FSI crashes (Table 25). The following trends were observed:

Regional (Exhibit 103)

- More than 70% of **pedestrian** and **bicyclist** FSI crashes occurred on roadways with posted speeds of 30 and 35 MPH.
- More than 40% of **vehicle-only** and **motorcycle** FSI crashes occurred on roadways with posted speeds of 30 and 35 MPH.
- **Vehicle-only** and **motorcycle** FSI crashes are more common than pedestrian and bicyclist crashes at higher posted speeds (greater than 45 MPH).

City of Spokane (Exhibit 104)

- **30 MPH** was the most common posted speed for every crash mode, comprising approximately 80% of the bicyclist crashes.
- **Bicyclist** crashes occurred across the smallest range of posted speeds (25 MPH to 40 MPH), while **vehicle-only** crashes covered the largest range (10 MPH to 55 MPH).

Unincorporated Spokane County (Exhibit 105)

- **35 MPH** was the most common posted speed for pedestrian, bicyclist, and motorcycle crashes, comprising more than 50% of the pedestrian crashes and all six bicyclist crashes. Motorcycle crashes were also very common on 45 MPH roadways.
- **Bicyclist** crashes occurred across the smallest range of posted speeds (35 MPH), while **vehicle-only** crashes covered the largest range (15 MPH to 55 MPH).

Unincorporated Spokane County: WSDOT Facilities (Exhibit 106)

- **55 and 65 MPH** was the most common posted speed for vehicle-only and motorcycle crashes, comprising more than 50% of each crash population. This is largely due to the roadways in this jurisdiction generally having higher posted speeds.
- Both **pedestrian** crashes occurred on a roadway with a posted speed of 35 MPH, while the two bicyclist crashes occurred on roadways with posted speeds of 45 and 50 MPH.

City of Spokane Valley (Exhibit 107)

- **35 MPH** was the most common posted speed for all crash modes, comprising approximately 75% of the pedestrian and bicyclist crashes.

- **Bicyclist** crashes occurred across the smallest range of posted speeds (25 MPH to 35 MPH), while **vehicle-only** crashes covered the largest range (25 MPH to 55 MPH).

Airway Heights (Table 25)

- Roadways posted at **35 MPH and 45 MPH** had a high frequency of **pedestrian** and **vehicle-only** crashes.
- Unlike other locations, **motorcycle** crashes occurred most often on 25 MPH roads. However, there is not enough data to claim this to be a trend within the City.

Exhibit 103: Fatal and Serious Injury Crashes Posted Speed Distribution by mode in SRTC (2018 – 2022)

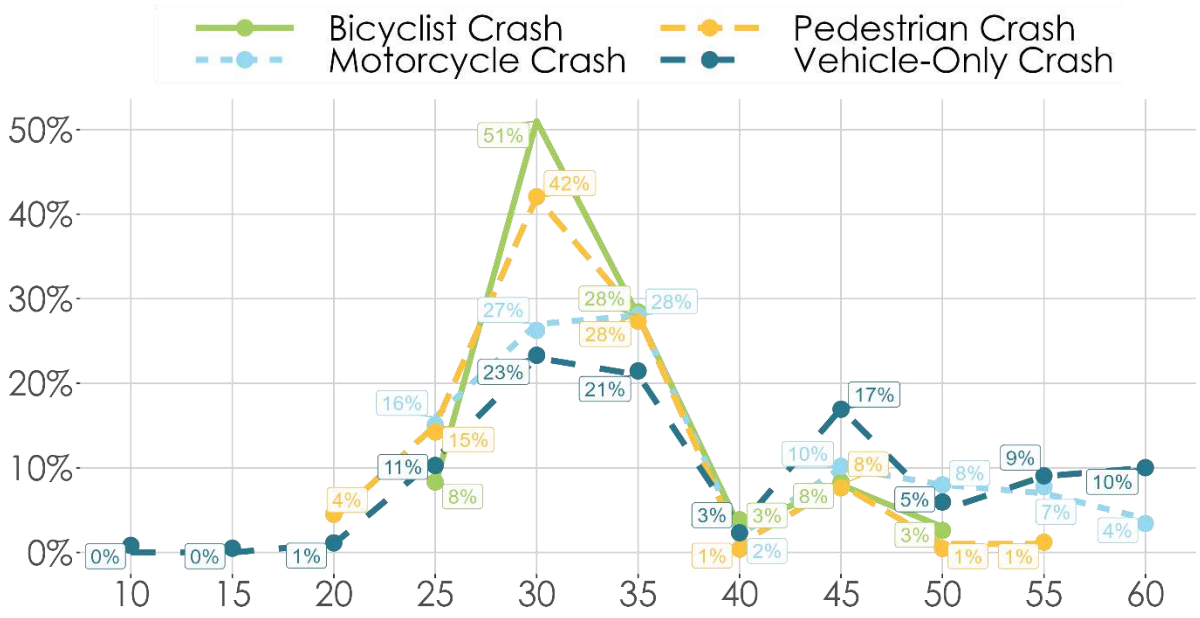


Exhibit 104: Fatal and Serious Injury Crashes Posted Speed Distribution by mode in the City of Spokane (2018 – 2022)

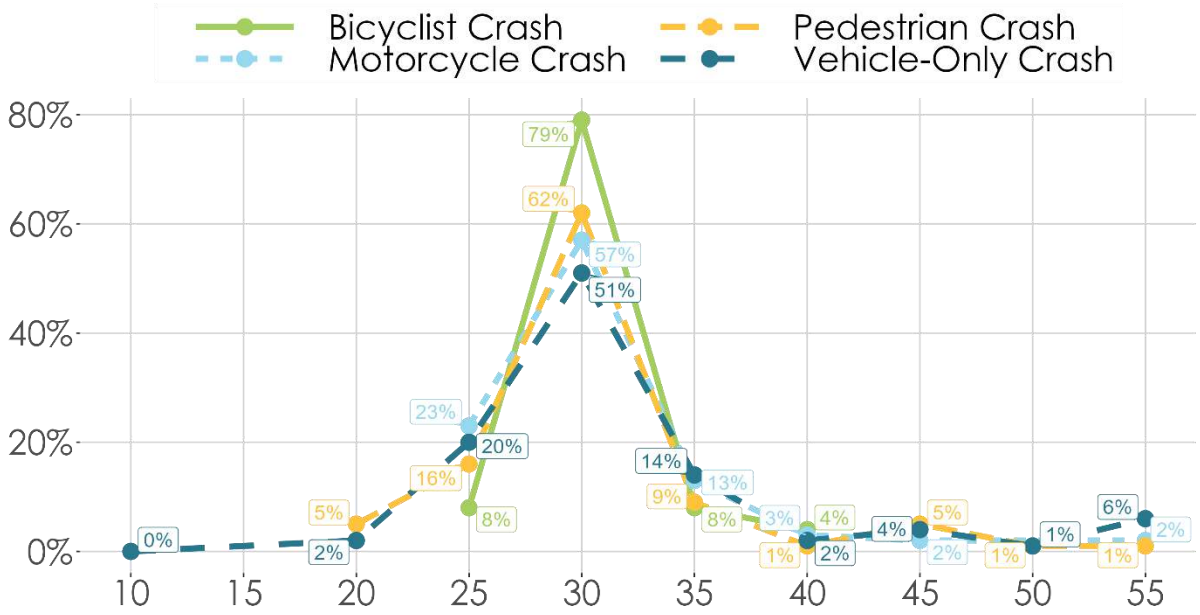


Exhibit 105: Fatal and Serious Injury Crashes Posted Speed Distribution by mode in Unincorporated Spokane County (Excluding WSDOT Facilities) (2018 – 2022)

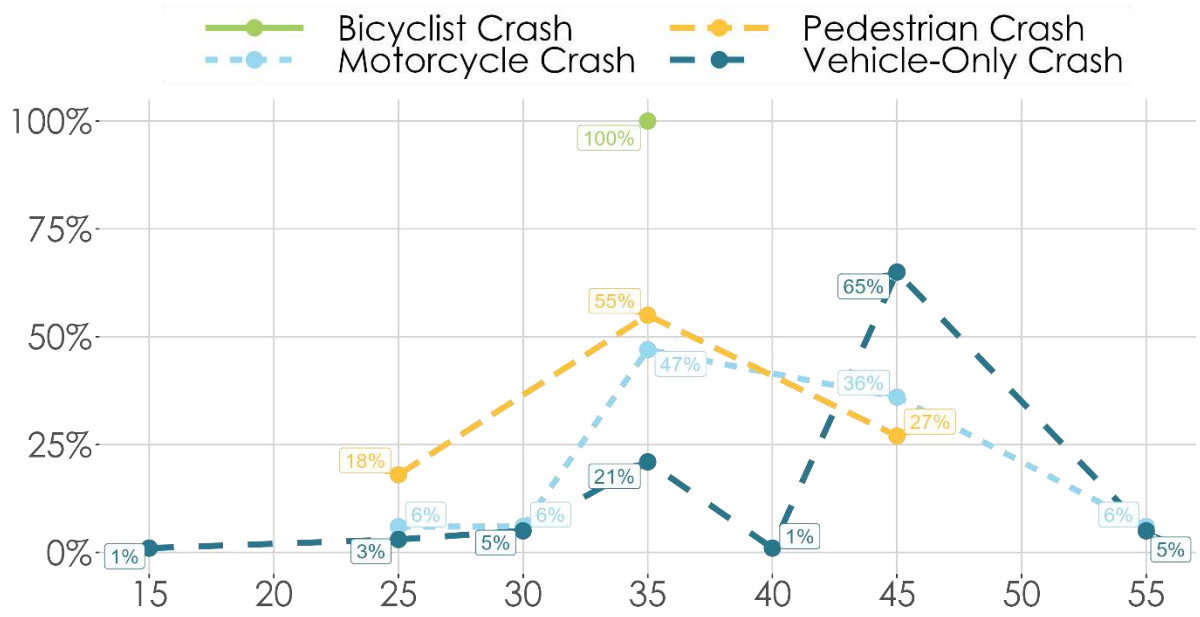


Exhibit 106: Fatal and Serious Injury Crashes Posted Speed Distribution by mode in Unincorporated Spokane County WSDOT Facilities (2018 – 2022)

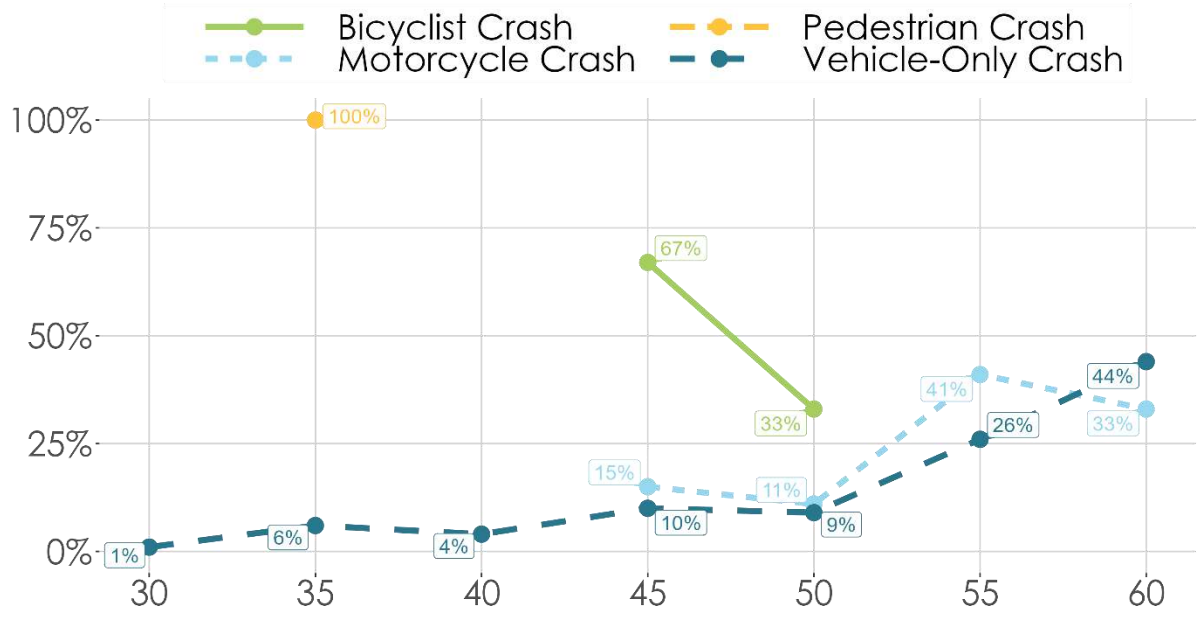


Exhibit 107: Fatal and Serious Injury Crashes Posted Speed Distribution by mode in the City of Spokane Valley (2018 – 2022)

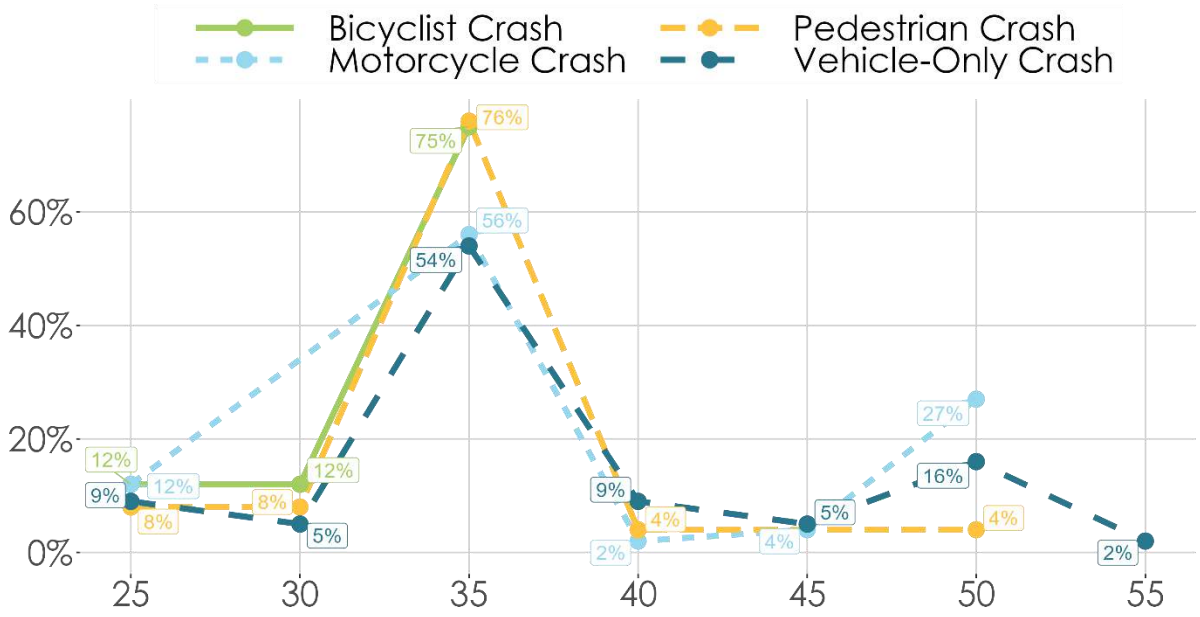


Table 25: Distribution of Lighting for Fatal and Serious Injury Crashes in the City of Airway Heights (2018 – 2022)

Posted Speed	Pedestrian	Bicyclist	Vehicle Only	Motorcycle	Total
25	1	0	1	2	**4**
35	5	0	4	1	**10**
45	3	1	4	0	**8**
Total	**9**	**1**	**9**	**3**	**22**

Lighting Conditions Analysis

Regional (Exhibit 108)

- **Daylight** was the most common condition for bicyclist, motorcycle, and vehicle-only crashes.
- 51% of **pedestrian** crashes were in **dark conditions with streetlights on**, while only 37% of the crashes occurred in daylight conditions. This condition comprised 23% to 25% of crashes for the other three crash modes.

City of Spokane (Exhibit 109)

- The City of Spokane lighting distributions are very **similar to those of the region**, with daylight as the most common condition for three of the modes and dark conditions with streetlights on as the most common condition for the FSI pedestrian crashes (52%).
- Compared to the region, there was a larger percentage of **vehicle-only** crashes in dark conditions with streetlights on (25% in the region versus 36% in the City).

Unincorporated Spokane County (Exhibit 110)

- **Daylight** was the most common condition for all four crash modes.
- **Dark conditions** without any additional lighting from streetlights was more common than streetlights on conditions. This condition comprised approximately one third of the pedestrian and vehicle-only crashes.

Unincorporated Spokane County: WSDOT Facilities (Exhibit 111)

- **Daylight** was the most common condition for vehicle-only and motorcycle crashes. One of the two pedestrian crashes and one of the two bicyclist crashes also occurred in daylight conditions.
- **Dark conditions** without any additional lighting from streetlights was more common than streetlights on conditions. This condition comprised approximately one third of the vehicle-only crashes and one-fifth of the motorcycle crashes.

City of Spokane Valley (Exhibit 112)

- The City of Spokane Valley lighting distributions are very **similar to those of the region**, with daylight as the most common condition for three of the modes and dark conditions with streetlights on as the most common condition for the FSI pedestrian crashes (62%).
- Compared to the region, there was a larger percentage of **motorcycle** crashes in dark conditions with streetlights on (23% in the region versus 32% in the City).

Airway Heights (Exhibit 113)

- **Dark conditions with streetlights** on was the most common lighting condition for pedestrian, motorcycle, and vehicle-only FSI crashes.

Exhibit 108: Distribution of Lighting for Fatal and Serious Injury Crashes in SRTC (2018 – 2022)

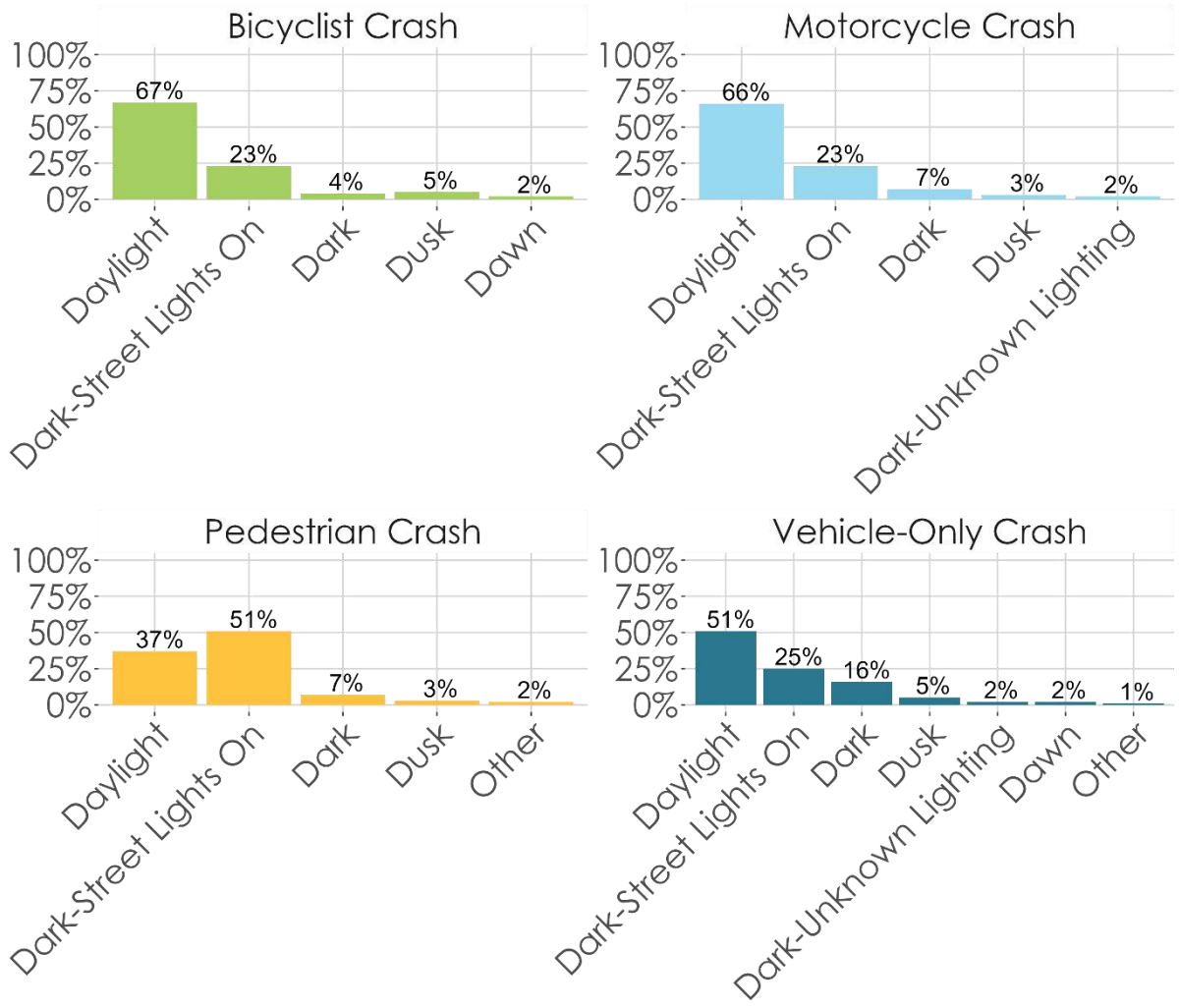


Exhibit 109: Distribution of Lighting for Fatal and Serious Injury Crashes in the City of Spokane (2018 – 2022)

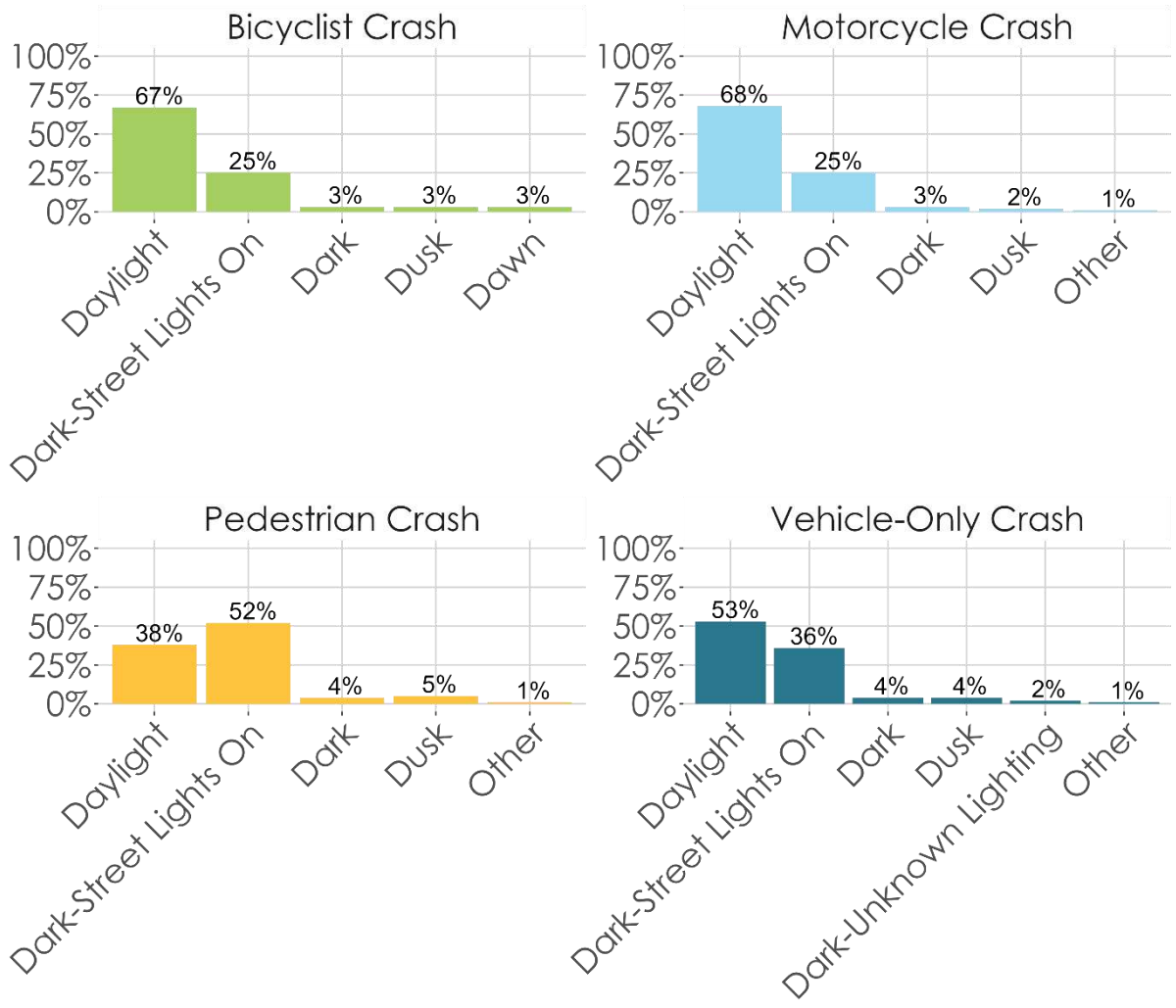


Exhibit 110: Distribution of Lighting for Fatal and Serious Injury Crashes in Unincorporated Spokane County (Excluding WSDOT Facilities) (2018 – 2022)

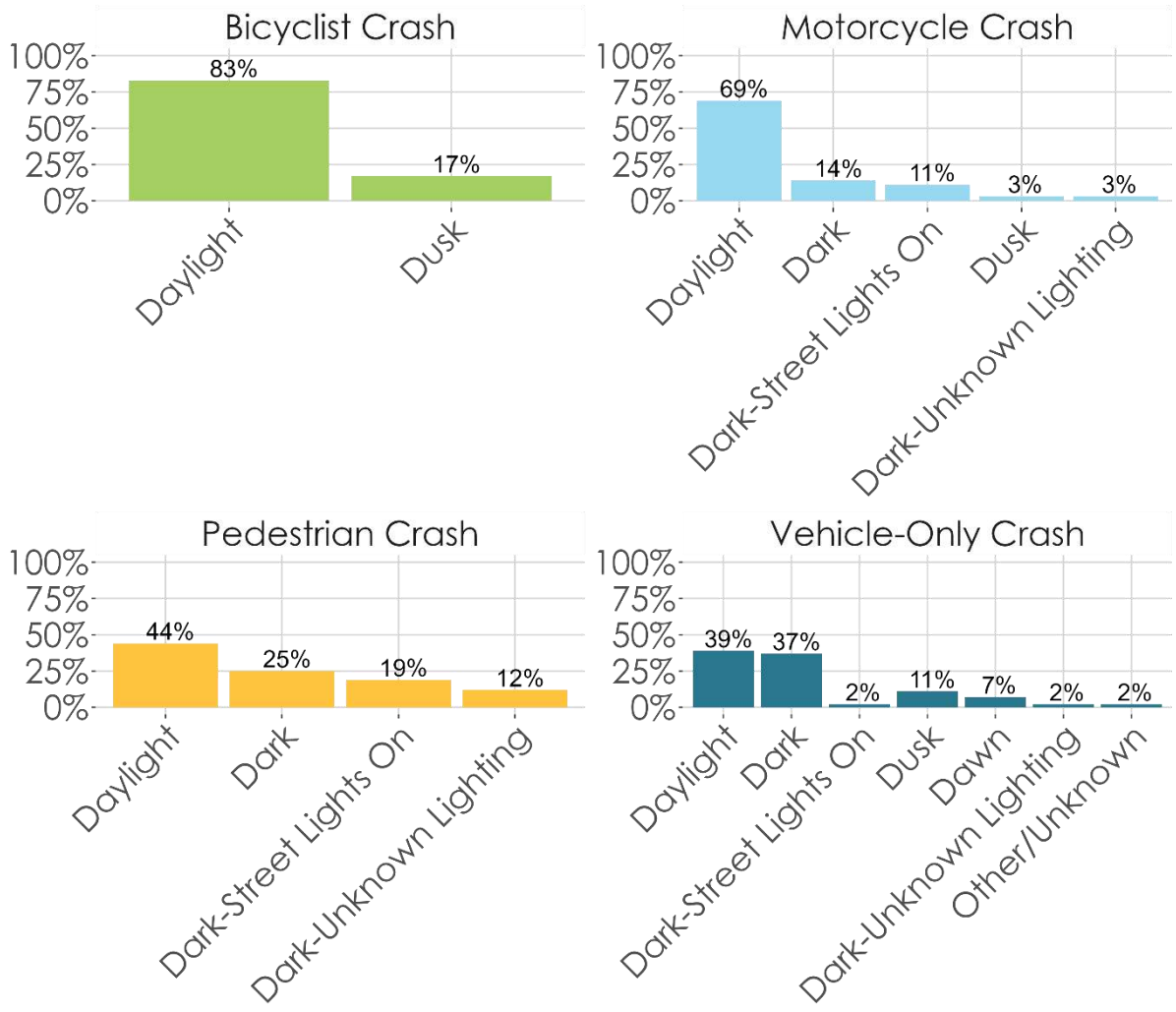


Exhibit 111: Distribution of Lighting for Fatal and Serious Injury Crashes in Unincorporated Spokane County WSDOT Facilities (2018 – 2022)

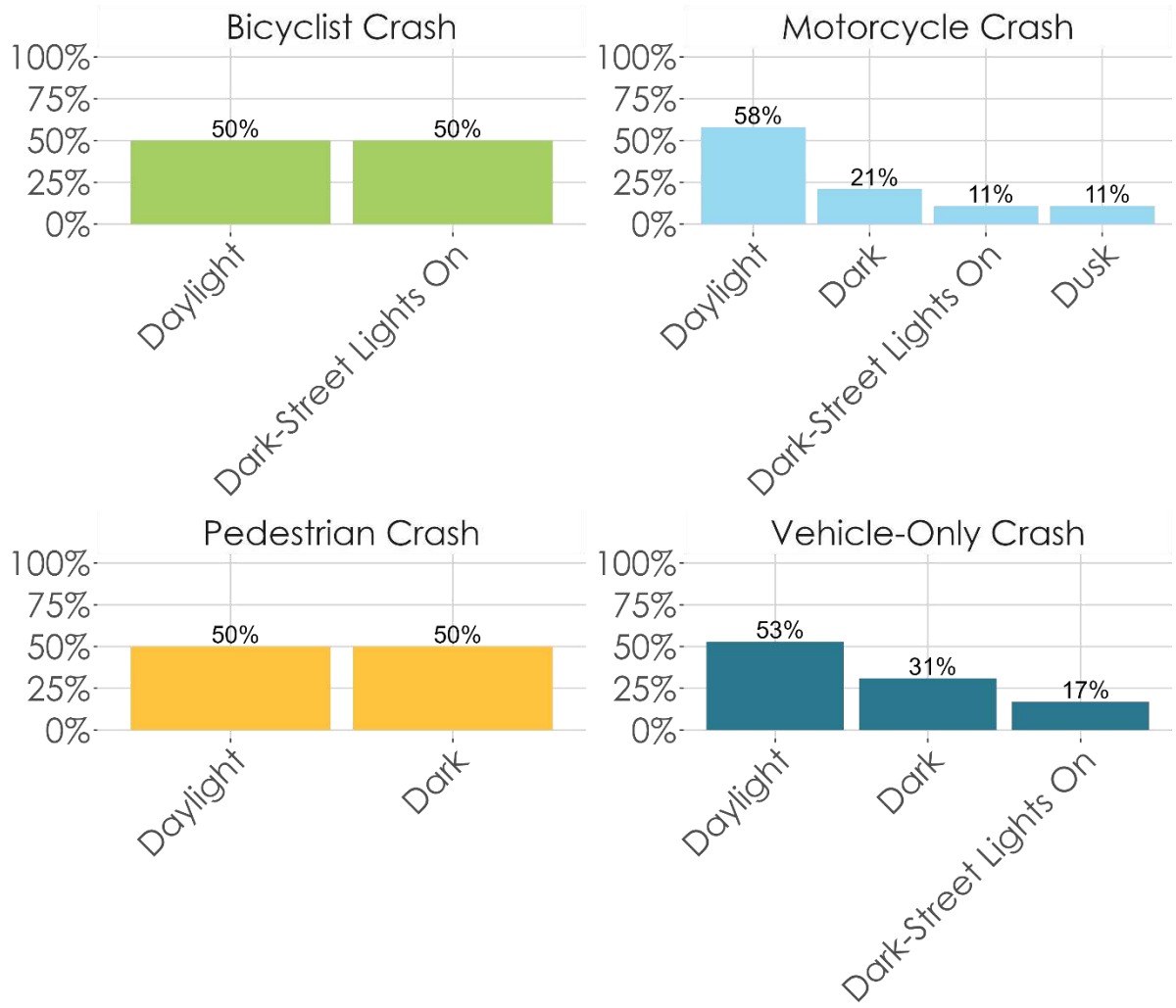


Exhibit 112: Distribution of Lighting for Fatal and Serious Injury Crashes in the City of Spokane Valley (2018 – 2022)

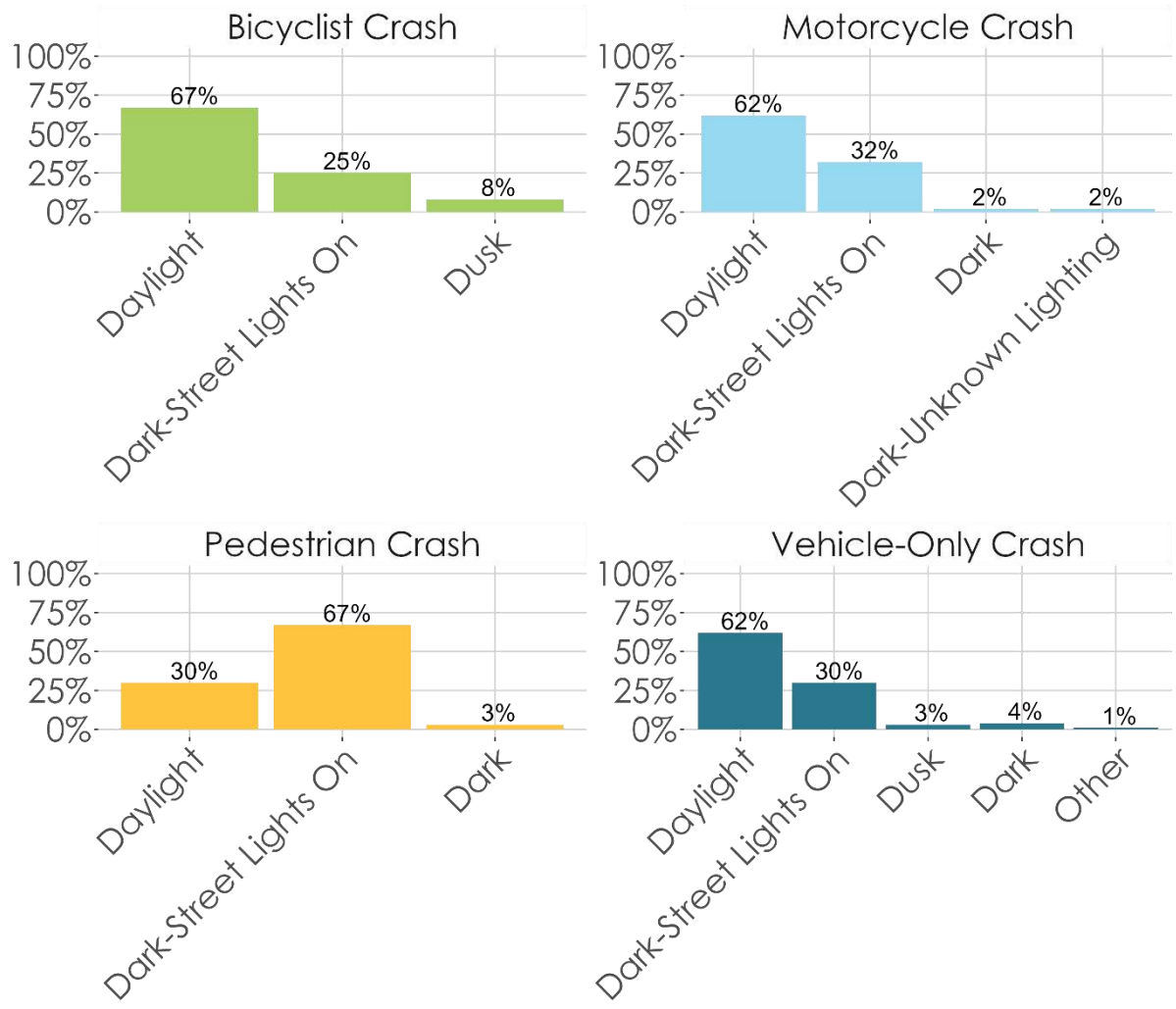


Table 26: Distribution of Lighting for Fatal and Serious Injury Crashes in the City of Airway Heights (2018 – 2022)

Posted Speed	Pedestrian	Bicyclist	Vehicle Only	Motorcycle	Total
Daylight	2	1	2	0	**5**
Dark – Streetlights On	4	0	3	1	**8**
Dark – No Streetlights	2	1	0	0	**3**
Dark – Unknown Lighting	0	0	1	0	**1**
Total	**8**	**2**	**6**	**1**	**17**

NETWORK BASED ANALYSIS

A systemic analysis is used to identify roadway characteristics that may lead to a greater risk of crashes. The systemic analysis is helpful for smaller jurisdictions that may not have a significant crash history. If the jurisdiction has roadways that are identified as higher risk, safety improvements can be conducted to reduce the likelihood of a crash in the future.

The characteristics included in the network based systemic analysis are:

- **Roadway functional classification**
- **Number of lanes**
- **Posted speed**
- **Land use**

Systemic safety improvements will have the greatest benefit when applied to roadway types that have a greater proportion of crashes than the centerline miles of that facility in the network. For example, if a focus area is defined that can prioritize funding for 10% of the network, where 30% of crashes are occurring, it is expected that the projects implemented on those facilities will have a greater impact on reducing the future occurrence of crashes. To assess this, a 'risk factor' is calculated. The risk factor compares two values:

- **Portion of FSI Crashes**: What percentage of FSI crashes in the region occur on roadways with a given set of characteristics?
- **Portion of Centerline Miles**: What percentage of centerline miles in the region occur on roadways with a given set of characteristics?

Risk factor is calculated as **Portion of FSI Crashes** divided by **Portion of Centerline Miles**. The risk factor is calculated for each of the network characteristics included in the analysis.

Based on the systemic analysis, the recommended focus areas are:

- **Commercial Streets**: Collectors, arterials, and highways in commercial/mixed-use land uses that have 3 or more lanes and posted speeds of 30 mph or higher. 86 miles or 2% of centerline miles in the region, but 220 FSI crashes or 24% of FSI crashes.
- **Rural Streets**: Collectors, arterials, and highways in open space/agricultural land uses that have posted speeds of 45 mph or higher. 302 miles or 7% of centerline miles in the region, but 116 FSI crashes or 13% of FSI crashes.

These focus areas may be refined based upon findings from the High Injury Network (HIN) analysis and feedback from jurisdictions.

Functional Classification

The functional classification of roadways throughout the region are shown in Figure 49. The portion of FSI crashes on each functional classification is compared to the centerline miles of the functional classification in the region in Exhibit 113. For example, 25% of FSI crashes have been on major arterials, but 5% of the roadway network is major arterials. Crashes on I-90 were excluded from the analysis.

FSI crashes occur on minor arterials, major arterials, and highways disproportionately to the portion of network those functional classifications comprise. These functional classifications will be considered in the identification of focus areas.

Exhibit 113: Portion of Crashes and Street Network by Functional Classification

Functional Classification	Portion of FSI Crashes	Portion of Centerline Miles	Risk Factor
Local	24%	74%	0.33
Collector	13%	11%	1.13
Minor Arterial	16%	5%	3.00
Major Arterial	25%	5%	5.29
Highway	22%	4%	5.36
Other	1%	1%	0.75

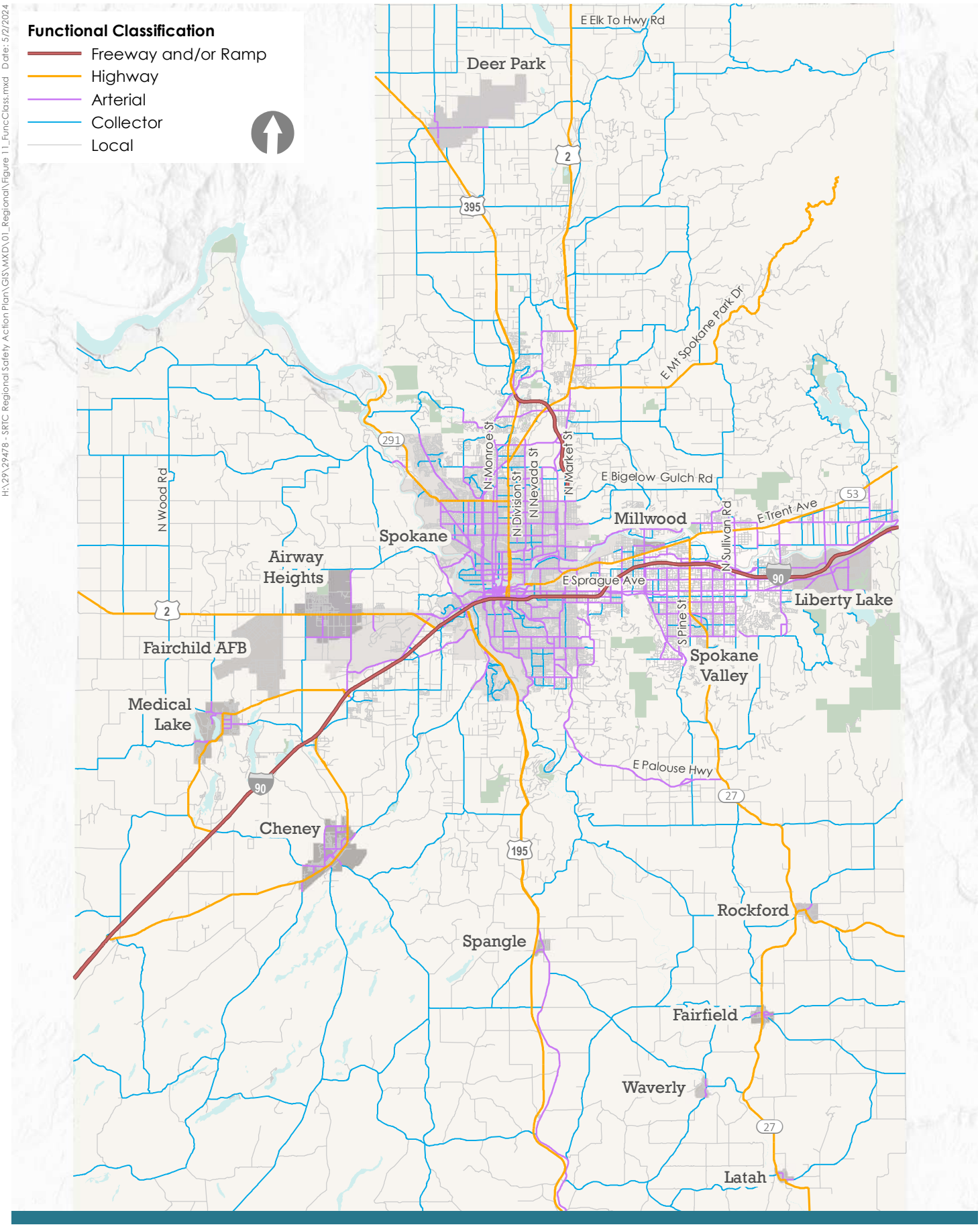


Figure 49

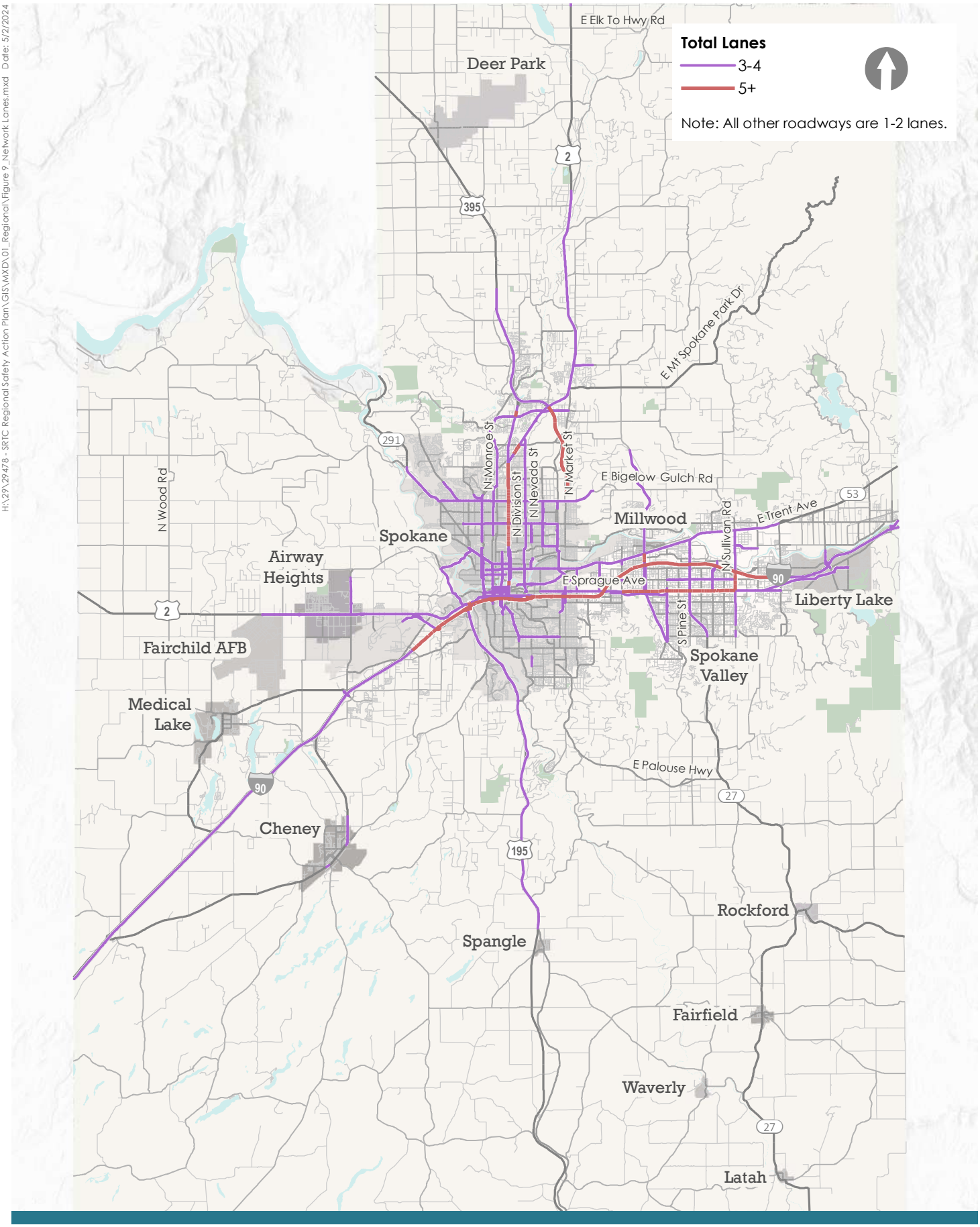
Roadway Functional Classification

The number of lanes throughout the region are shown in Figure 50. The portion of FSI crashes on roadways with each number of lanes is compared to the centerline miles of roadways by number of lanes in the region in Exhibit 1134. For example, 37% of FSI crashes have been on roads with 3 or more lanes, but 4% of the roadway network has more than 3 lanes.

FSI crashes occur on roadways with 3 or more lanes disproportionately to the portion of network those number of lanes comprise. These number of lanes will be considered in the identification of focus areas.

Exhibit 114: Portion of Crashes and Street Network by Number of Lanes

Number of Lanes	Portion of FSI Crashes	Portion of Centerline Miles	Risk Factor
1 & 2	63%	95%	0.66
3 & 4	33%	4%	7.69
5+	4%	0%	11.22



SRTC SAFETY ACTION PLAN

Figure 50

Roadway Network: Roadways with More than 2 Total Lanes

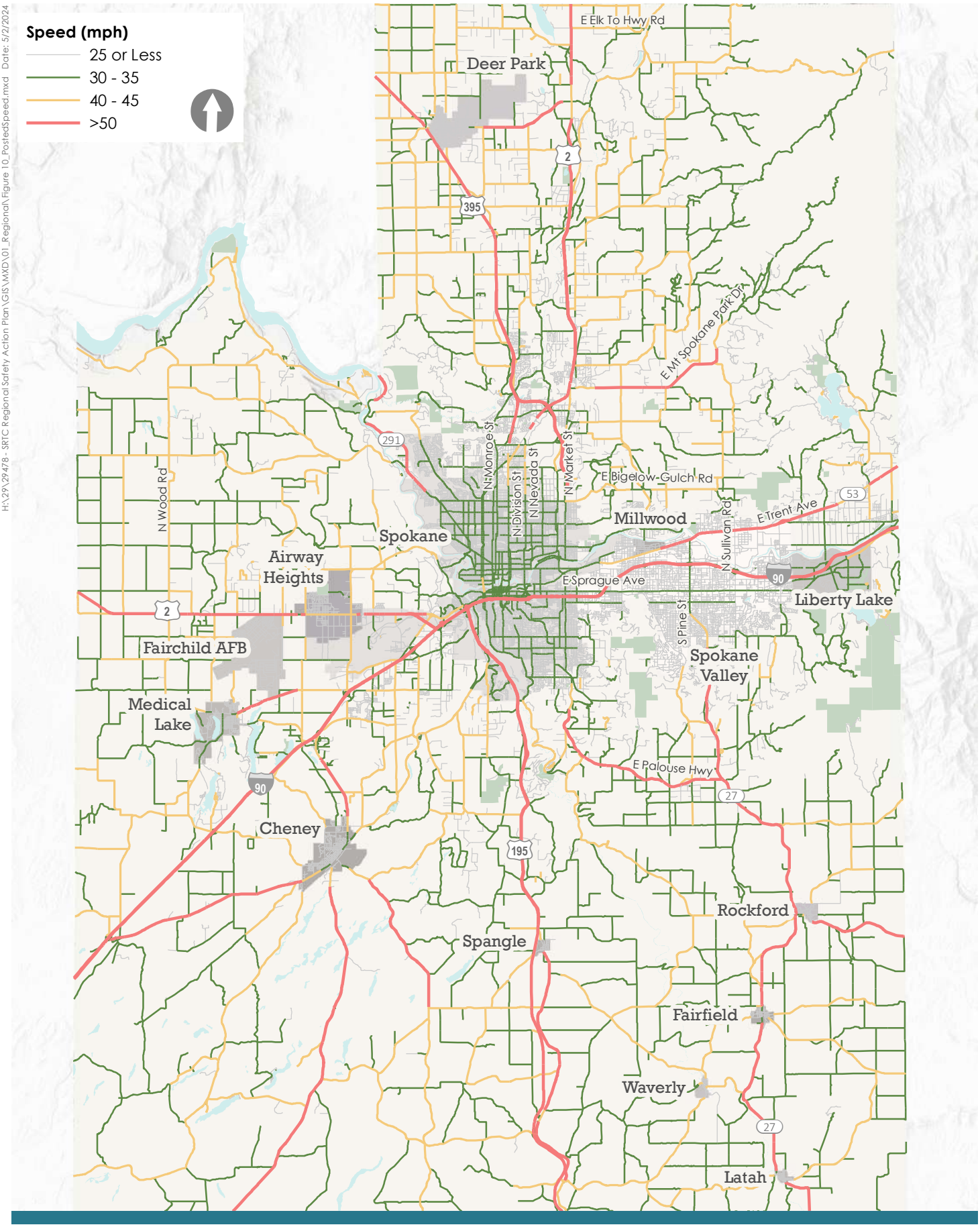
Posted Speed

The posted speed throughout the region is shown in Figure 51. The portion of FSI crashes on roadways with each number of lanes is compared to the centerline miles of roadways by number of lanes in the region in Exhibit 115. For example, 25% of FSI crashes have been on roads with posted speeds of 30, but 5% of the roadway network has posted speeds of 30.

FSI crashes occur on roadways with posted speeds of 30 or more disproportionately to the portion of network those posted speeds comprise. These posted speeds will be considered in the identification of focus areas. This analysis considers the posted speed of roadways, rather than the typical operating speed of the facility or the speed at the time of the crash. In other regions, posted speeds of 30 mph have not been identified as key corridors. The identification of 30 mph corridors in Spokane may indicate a propensity for speeding on some of these corridors.

Exhibit 115: Portion of Crashes and Street Network by Posted Speed

Posted Speed	Portion of FSI Crashes	Portion of Centerline Miles	Risk Factor
Less than 30	32%	62%	0.51
30	25%	5%	4.89
35	17%	19%	0.88
40	2%	0%	7.48
45	12%	10%	1.21
50+	13%	3%	3.76



SRTC SAFETY ACTION PLAN

Figure 51

Roadway Posted Speed

Land Use

The land use throughout the region is shown in Figure 52. The portion of FSI crashes on roadways with each number of lanes is compared to the centerline miles of roadways by number of lanes in the region in Exhibit 116. For example, 39% of FSI crashes have been on roads in commercial land uses, but 10% of the roadway network is in commercial land uses.

FSI crashes occur on roadways with commercial and mixed-use land uses disproportionately to the portion of network those land uses comprise. These land uses will be considered in the identification of focus areas.

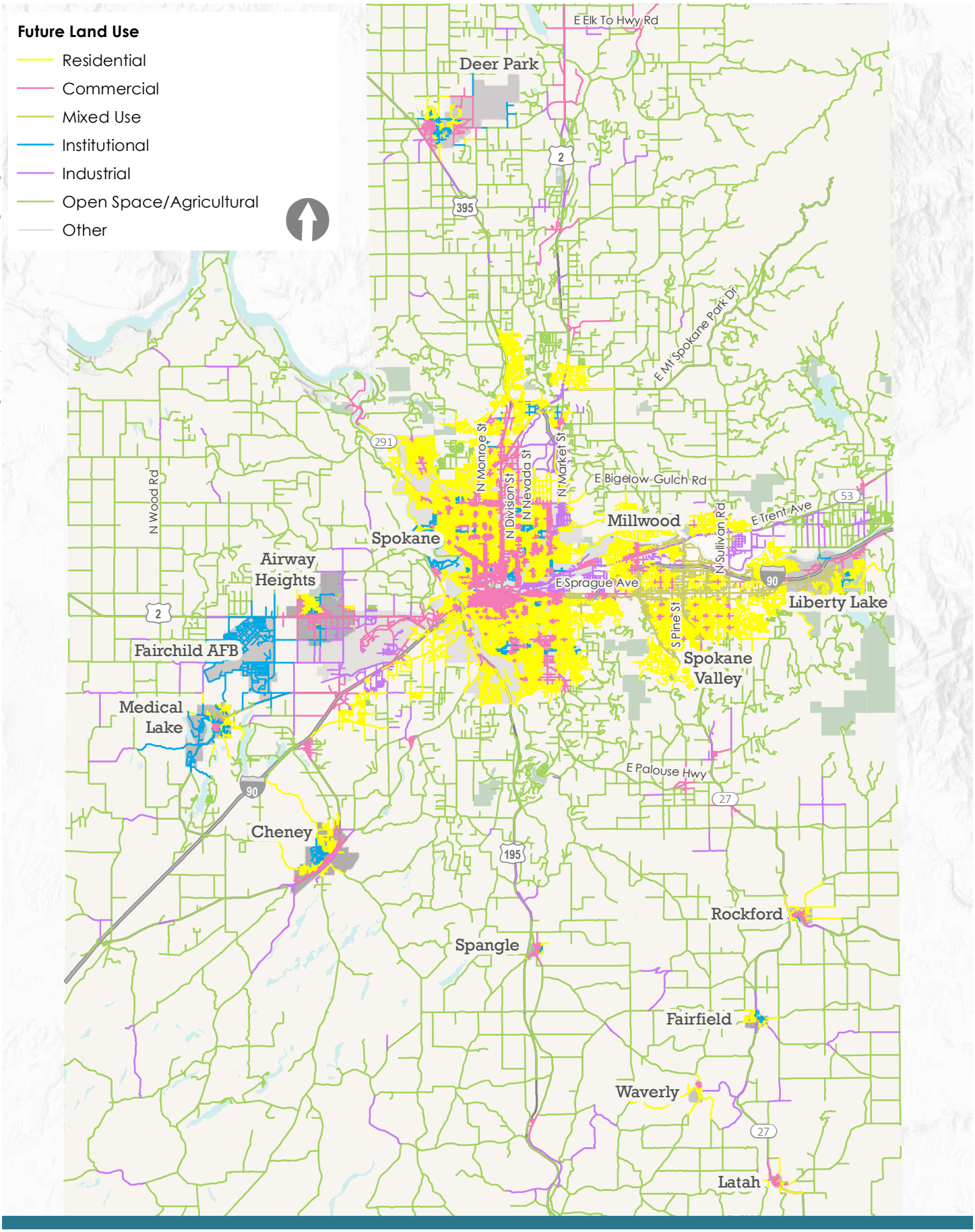
Exhibit 116: Portion of Crashes and Street Network by Land Use

Land Use	Portion of FSI Crashes	Portion of Centerline Miles	Risk Factor
Mixed Use	8%	3%	3.06
Commercial	39%	10%	3.74
Institutional	1%	4%	0.30
Residential	24%	38%	0.64
Industrial	8%	5%	1.62
Open Space / Agricultural	18%	39%	0.45
Other	0%	0%	0.92

Combination of Factors

The results from the above characteristic analysis were combined to identify some emphasis facilities that have a higher risk for FSI crashes:

- **Collectors, arterials, and highways** in **commercial/mixed-use** land use zones that have **3 or more lanes** and **posted speeds of 30 mph** or higher. These facilities comprise 86 miles or 2% of centerline miles in the region, but 220 FSI crashes or 24% of FSI crashes.
- **Collectors, arterials, and highways** in **open space/agricultural** land use zones that have **posted speeds of 45 mph** or higher. These facilities comprise 302 miles or 7% of centerline miles in the region, but 116 FSI crashes or 13% of FSI crashes.
- Corridors that match the criteria of the emphasis facilities are shown in Figure 53.



H:\29\29478 - SRTC Regional Safety Action Plan\GIS\MXD\01_Regional\Figure 12_NetworkLU.mxd Date: 5/2/2024

SRTC SAFETY ACTION PLAN

Figure 52

Roadways by Land Use

High Injury Network Methodology

The High Injury Network (HIN) identifies segments and intersections (signalized and roundabouts) with historically higher rates of fatal and serious injury (FSI) crashes. The HIN represents the areas in most critical need of safety interventions and prioritizes them for multi-agency focus and investment. A project may be programmed that has different limits than the HIN segments if the project addresses the crashes identified on the HIN segments. For example, a project may extend to the next logical intersection, rather than stopping right at the limit of the HIN segment.

Crash Score Method - Segment

- **Create Segments:** Split the roadway network into segments that are a maximum of 0.5 miles long within municipal jurisdictions. In Unincorporated Spokane County, split the roadway network into segments that are a maximum of 2 miles long.
- **Match Crashes to Segments:** Crashes within 50' of a segment that are not near a signalized or roundabout intersection are matched to a segment. Crashes within 250' of a signalized or roundabout intersection are excluded and assigned to the intersection.
- **Calculate Segment Score**: Crash Scores are calculated for segments. FSI crashes count for 100 points and all other crashes count for 1 point.
- **Define HIN Segments**: Segments were included in the HIN if they had 2 or more FSI crashes.

Crash Score Method - Intersection

- **Identify Intersection Crashes:** Crashes within 250' of a signalized or roundabout intersection are matched to the intersection.
- **Calculate Intersection Score**: Crash Scores are calculated for intersections. FSI crashes count for 100 points and all other crashes count for 1 point.
- **Define HIN Intersections**: Intersections were included in the HIN if they had 2 or more FSI crashes.

Summary and Next Steps

Through the crash analysis, trends in the characteristics of crashes and the characteristics of roadways where crashes tend to occur were identified. As a next step, the High Injury Network will be developed. The HIN provides another perspective for identifying high crash locations. This analysis will be paired with the analysis documented in this memo.

The completed crash analysis along with public involvement will guide the development of recommended countermeasures and prioritized projects.

Appendix A – Crash Data Selection and Analysis

As described in the text of the memo, the WSDOT crash data was filtered to only include FSI crashes on the roadways over which local jurisdictions and SRTC have the ability to implement countermeasures. The queries used to complete this filtering process and identify the subset of crashes used for the rest of the analysis is described in Table 27.

Table 27. KAI Data Filtering and Selection Process

Data Filtering Criteria	Explanation	Crashes Removed	Crashes Remaining in Dataset
All Crashes (2013 – 2023)	This is the complete dataset provided by SRTC.		**88,853**
Recent Full Crash Years (2018 – 2022) Query: YEAR is within range 2018:2022	This removes older crash years which may be less insightful for understanding recent crash patterns. Older data may also not capture recent changes in infrastructure which can influence crash patterns. Crash year 2023 was removed because it is only a partial year (January – October).	55,220	**33,633**
Crash Did Not Occur On Limited Access Facilities (I-90 or an On-Ramp/Off-Ramp) Query: PRIMARY TRAFFICWAY does not equal '90' FIRST IMPACT LOCATION (City St, County Rd & Misc 2010 forward, State Routes indefinite) does not include 'On Ramp' or 'Off Ramp'	Interstates, on-ramps, and off-ramps are excluded.	3,973	**29,660**
Crash Did Not Occur On a 'Miscellaneous Trafficway' Query: JURISDICTION does not equal 'Miscellaneous Trafficway'	Miscellaneous trafficways include crashes on private roads and parking lots.	119	**29,541**
Serious and Fatal Crash Query: MOST SEVERE INJURY TYPE does not equal 'Fatal' or 'Suspected Serious Injury'	This RSAP focuses on eliminating all serious and fatal injury crashes. Unless otherwise explicitly stated, all figures in this report capture the crash trends associated with serious and fatal injury crashes only.	28,627	**914**
Remove Duplicate Crash Report Query: REPORT NUMBER does not equal EA71059	A crash in Spokane Valley was initially recorded as a serious injury crash and later re-recorded as a fatal crash after the pedestrian died. The serious injury crash record was removed to avoid duplicating the crash in the data.	1	**913**
The final crash dataset contains 913 serious (719) injury and fatal (194) injury crashes.			

The specific fields from the WSDOT data that were used for the crash analysis are described in Table 28.

Table 28. Summary of KAI Data Cleaning

Data Category	Crash Characteristic Analyzed	Data Element Derived From [WSDOT/SRTC Data Element]	Notes
Severity	Fatal	Most Severe Injury Type	Occupants who were 'Dead at Scene', 'Dead on Arrival', and 'Died in Hospital' were combined to form the Fatal Crash element.
	Serious		No changes were made.
Time	Year	Year	No changes were made.
	Month	Month	No changes were made.
	Weekday	Date	Excel was used to convert crash dates to a day of the week.
	Hour		No changes were made.
Type	Mode	TZ Pedestrian Involved Indicator TZ Pedalcyclist Involved Indicator TZ Motorcycle Collision Indicator	Crashes that did not fall under the three categories to the left were classified as a fourth crash mode, vehicle-only crashes. When analyzing crash mode, crashes could be double counted: If a crash involved one vehicle, one pedestrian, and one bicyclist, the crash would be counted as both a pedestrian crash and a bicyclist crash. If a crash involved two pedestrians, it was still counted as one pedestrian crash.
	Collision Type	TZ Run Off The Road Indicator TZ Motorcycle Collision Indicator First Collision Type / Object Struck	Crashes categorized as run off the road crashes or as striking off-road objects were combined in a 'Run-off-road' category. Off-road objects include roadside barriers, crash cushions, bridge rails, posts and poles, trees, curbs, fences, ditches, mailboxes, buildings, hydrants, meters, banks, walls, construction materials, and islands. The motorcycle collision indicator was used to form a motorcycle crash type category. The remaining crash categories were taken directly from the First Collision Type / Object Struck Category. Some straightforward grouping was done to reduce the number of crash types. For example: all animal-related crashes were combined into one category.

Data Category	Crash Characteristic Analyzed	Data Element Derived From [WSDOT/SRTC Data Element]	Notes
	Lane Departure	TZ Lane Departure Indicator	No changes were made.
	Road Departure	TZ Run Off The Road Indicator	Crashes that also classified as lane departures were not counted as road departure crashes in the analysis.
Location	City	City	No changes were made.
	Jurisdiction	Jurisdiction	No changes were made.
	Relationship to Junction	Junction Relationship	Three categories were combined to form a 'Not at an Intersection' category: Driveway Related but Not at Driveway Intersection Related but Not at Intersection Not at Intersection and Not Related Crashes with a junction relationship description including 'at Intersection', 'at Driveway', and 'Roundabout', were categorized as 'Intersection', 'Driveway', and 'Roundabout', respectively.
Road User	Human Factors/ Contributing Circumstances	TZ Alcohol Impaired Involved Person Indicator TZ Drug Impaired Involved Person Indicator TZ Impaired Involved Person Indicator TZ Drinking Involved Person Indicator TZ Speeding Driver Indicator TZ Distracted Driver Indicator TZ Drowsy Driver Indicator	Crashes involving multiple contributing circumstances were included in the analysis of each factor.
	Age	Veh 1 MV Driver Age Veh 2 MV Driver Age Veh 3 MV Driver Age Unit 1 Bicyclist Age Unit 2 Bicyclist Age Unit 3 Bicyclist Age Unit 2 Pedestrian Age Unit 3 Pedestrian Age	No changes were made.

Data Category	Crash Characteristic Analyzed	Data Element Derived From [WSDOT/SRTC Data Element]	Notes
Roadway	Posted Speed	Veh 1 Posted Speed Veh 2 Posted Speed Veh 3 Posted Speed	This data element was recorded for each vehicle. All vehicle's posted speeds were considered in the element, regardless of if the posted speed was the same or different among the crash-involved vehicles.
Environment	Lighting	Lighting	No changes were made.
	Surface Conditions	Road Surface Conditions	No changes were made.

For the Network Based Systemic Analysis, data was aggregated from several data files provided by SRTC.

- **Public Safety Streets**: This network was used as the 'base' for the analysis network. The segmentation of this network was used.
- **HPMS**: This network was matched to the Public Safety Streets where it was available to assess the functional classification, lanes, and posted speed for the analysis network. Where the HPMS did not overlap the analysis network, the analysis network was assumed to have a local functional class, with a posted speed of 25, and 2 lanes.
- **Future Land Use**: Each segment of the network was joined to the Future Land Use layer within 100 feet. The segment was assigned the 'highest priority' land use group, as defined in the table below.

LU_Group	Priority
Mixed Use	7
Commercial	6
Institutional	5
Residential	4
Industrial	3
Open Space/Agricultural	2
Other	1

The Public Safety Streets file was further queried to remove alleyways, ramps, and I-90. This is intended to make the portion of network calculations reflective of the crash analysis. For example, I-90 is not included in the crash analysis, so it should also not be included in the

network analysis. Alleyways do not tend to have a large traffic volume or many crashes, so including them in the analysis will shift the portion of network calculation away from alignment with the crash data. The following query was used to remove these segments from the analysis network:

"FullName" NOT LIKE '%I 90%' AND "StreetType" NOT IN ('Aly', 'Ramp')

Crashes were matched to the created network to add the characteristics used for the Systemic Analysis to the crash data.

Appendix B – Data Gaps

Introduction

The purpose of this technical memo is to detail the identified gaps between the data scoped for inclusion in the analysis and available data sets.

Data Gaps Summary and Matrix

The identified data gaps fit into two categories:

Category 1: This category describes data that was of interest to the project and now won't be used for the analysis. This category only applies to **roadway geometry data**. Roadway geometry data, such as horizontal and vertical curves, is not available. This data is typically not available through local agencies.

Category 2: These layers are now being used as part of a visual analysis along the HIN to inform project prioritization and strategies. For example, if there is a high number of pedestrian crashes near bus stops, strategies would be tailored to this situation.

- Bike facilities
- Sidewalk data
- Transit route
- Activity centers
- Public schools

For data sources not identified as being a part of either of these two categories, no changes were made to the intended implementation of the data within the analysis. The following matrix (Table 29) details each of the data elements of interest, listing the source, status, and additional notes on the data. The status column describes whether the data was received and what portion of the analysis the data is being used in. The note column highlights data elements, data source characteristics, and any additional information to explain why the data source is being used the way it is in the analysis.

Table 29. Crash Analysis Data Summary

Category	Data	Source	Note (Including Data Gaps)	Status
Systemic Safey Analysis				
Crash	Crashes	WSDOT crashdata_srff_20100101_20231017	Spokane County from 01/01/2010 through 10/17/2023.	Received
Roadway Characteristics	Bike LTS	SRTC BikeLTS_Network_ADT	Does not include all streets and does not overlap with HPMS perfectly; cannot make quantitative conclusions based on the layer and crash locations. Includes shared roads, no facility, multi-use path, bike lane. Includes proposed bike lanes.	Received – visual overlay
	Streets	SRTC: Source Public_Safety_Streets	Includes posted speed. Streets and HPMS do not share line segments.	Received – roadway network
	Highway Performance Monitoring System	SRTC hpms_2020	Polyline M Subset of the full road network. Has Access Control, Through Lanes, AADT, Has overlapping segments with different attributes. Turn Lanes, Number Signals or Stop Signs, and Median Type/Width do not look correct.	Received – posted speed and number of lanes in roadway network
	Sidewalk	SRTC 2013 Sidewalk Data	Updated 2013. Drawn on the sidewalk alignment.	Received – visual overlay
		City of Spokane Cos_sidewalks	Updated 2023. Largely overlaps with 2013 data in COS. Not quite on the same line. Drawn on the sidewalk alignment.	Received – visual overlay
		Open Street Map	The sidewalk network does not align with the street network. Substantial GIS processing would be needed.	Received – visual overlay
	Transit Routes	SRTC STA_Routes_January_2023	Potentially manually define 'high frequency' routes as those defined by STA as 15 min service.	Received – visual overlay

Category	Data	Source	Note (Including Data Gaps)	Status
	Transit Stops	SRTC STA_Stops_September_2022		Received – visual overlay
	Lighting	Avista	Lighting network data not always in sync with crash data lighting status.	Received – visual overlay
	Roadway Geometry	Data source not available.		
	Operating Speed	INRIX data via NPMRDS Analytics	50th percentile speeds available for most arterials and highways for 15-minute time periods. 85th and 90th percentile speeds are typically more helpful in identifying high operating speed corridors.	Access instructions provided – not used; see notes
Land Use Characteristics	Future Land Use	SRTC	Visual layer to add context to HIN.	Received – matched to roadway network
	Zoning	SRTC	Grouped into 150 land uses and would require a data reduction process. Future land use was used in place of zoning due to having a reduced number of categories.	Received – not used; see notes
	Parcels	Spokane County	Level of detail was not needed for the analysis.	Received – not used; see notes
	Public Schools	Spokane County	Will be used to address specific community concerns identified during engagement.	Received
	Regional Activity Centers	SRTC	SRTC's regional activity centers identified in Horizon 2045. Activity Centers are very large and unlikely to be a distinguishing factor. Commercial and mixed future land uses (in Future Land Use data) were used to identify high activity areas.	Received – not used; see notes
Demographic and Area Characteristics				

Category	Data	Source	Note (Including Data Gaps)	Status
Population Characteristics	J40 Census Tracts	USDOT J40	Data is specific to Washington State. Dataset of focus for equity analysis.	Received – equity analysis
	Indicators of Potential Disadvantage	SRTC srtc_ipd_tracts	This GIS layer merges with J40 Census Tracts data.	Received – equity analysis
	Indicators of Potential Disadvantage	SRTC srtc_ipd_tract_analysis	This is the spreadsheet connected to the tracts GIS layer.	Received
	Environmental Health Disparity	WA DoH env_health_disparities_v2	WA Dept of Health Environmental Health Disparities Map	Received
	Trauma Registry		Due to confidentiality, level of data received did not inform plan	Waiting to receive
Data		**Source**	**Note**	**Status**
Monitoring Progress and Post Crash Care				
Planned Roadway Projects			This will be used during strategy development phase.	Received
Planned Bicycle Network		SRTC BikePlanAGOL_02_23	This will be used during strategy development phase.	Received