STATE OF SAFETY IN THE REGION

Prepared for

Puget Sound Regional Council

Prepared by

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Purpose

The Puget Sound Regional Council (PSRC) aims to achieve the state's goal of zero fatalities and serious injuries through strategic planning and action[1].PSRC's Regional Safety Action Plan (RSAP) will employ historic crash data, geographic and demographic data, research, and engagement with communities to gain a comprehensive understanding of safety issues and challenges across the central Puget Sound region. The plan will identify emphasis areas and provide an array of strategies and tools for local jurisdictions to consider based on the specific safety issues and contexts that they are addressing.

This State of Safety in the Region report provides a data driven analysis that identifies safety conditions, trends and key findings in the region. It lays the groundwork for the development of the emphasis areas and associated strategies that will form the core of the RSAP.

Key Findings

The following key findings provide critical insights into transportation safety trends and conditions within the central Puget Sound region:

1. **Increase in Fatalities**: Deaths on the region's roadways have nearly doubled in the last decade, which is concerning and unacceptable. The regionwide trends underscore that severe outcomes are becoming more common despite an overall decline in crashes proportionate to the number of miles driven. (See *Regional Crash Trends 2010-2023, pages 9-13*)
2. **People Walking and Biking**: People walking and biking represent nearly half of the increase in deaths, with people walking making up the majority. (See *Regionwide Crash Trends for People Walking and Biking, pages 14-16*)
3. **Geographic Distribution**: Crashes occur everywhere in the region, with rural areas having as many deaths as the biggest cities when adjusted for population. (See *Urban and Rural , pages 24-28*)
4. **Equity Disparities**: Communities with over fifty percent of residents living in poverty experience 37% higher rates of serious injuries and deaths than the

regional average. Similarly, communities with higher proportions of people of color experience 32% higher rates of serious injuries and deaths compared to the regional average. (See *Equity Focus Areas, pages 30-33*)

5. **Compounded Equity Disparities:** Additionally, in census tracts where these two equity areas overlap, the rate of serious injuries and deaths is 70% above the regional average. (See *Equity Focus Areas, pages 30-33*)
6. **Native American and Alaskan Native Communities**: These residents are seven times more likely to die in crashes than white residents. (See *Tribal Lands, pages 33-34*)
7. **Crash Locations**: Fatalities and serious injuries occur more frequently on major arterials with higher posted speeds. (See *High-Crash Locations and High Injury Network, pages 50-52*)
8. **Vehicle Types**: The majority of crashes involve passenger cars and light duty trucks. Crashes with motorcyclists are less common, but when they do occur, motorcyclists face a one in four risk of death or serious injury, five times that of passenger cars or light duty trucks. (See *Injuries and Fatalities by Vehicle Type, pages 47-49*)
9. **Vehicle Types and Vulnerable Road Users:** In crashes involving light trucks and SUVs, pedestrian and bicyclist deaths are 43% higher than crashes involving passenger cars. (See *Injuries and Fatalities by Vehicle Type, pages 47-49*)
10. **Contributing Factors**: Speeding, impairment, distraction, and failure to yield are the most frequent factors resulting in deaths and serious injuries. (See *Contributing Factor / Crash Types Analysis, pages 38-42*)

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Acronyms and Abbreviations

Abbreviation	**Definition**
AADT	Average Annual Daily Traffic
ACS	American Community Survey
EFA	Equity Focus Area
MIC	Manufacturing and Industrial Center
PSRC	Puget Sound Region Council
RTP	Regional Transportation Plan
SS4A	Safe Streets and Roads for All
UGA	Urban Growth Area
VMT	Vehicle Miles Travelled
WSDOT	Washington State Department of Transportation
WTSC	Washington Traffic Safety Commission
Crash Data Abbreviations	**Definition**
K	Fatality
A	Suspected Serious Injury (SI)
B	Suspected Minor Injury
C	Possible Minor Injury
O	No Injury; Property Damage Only
KABCO	Fatalities, Serious Injuries, Minor Injuries or No Injuries (Or All Crashes)
KABC	Fatalities, Serious Injuries, and Minor Injuries
KSI (KA)	Serious Injuries and Fatalities

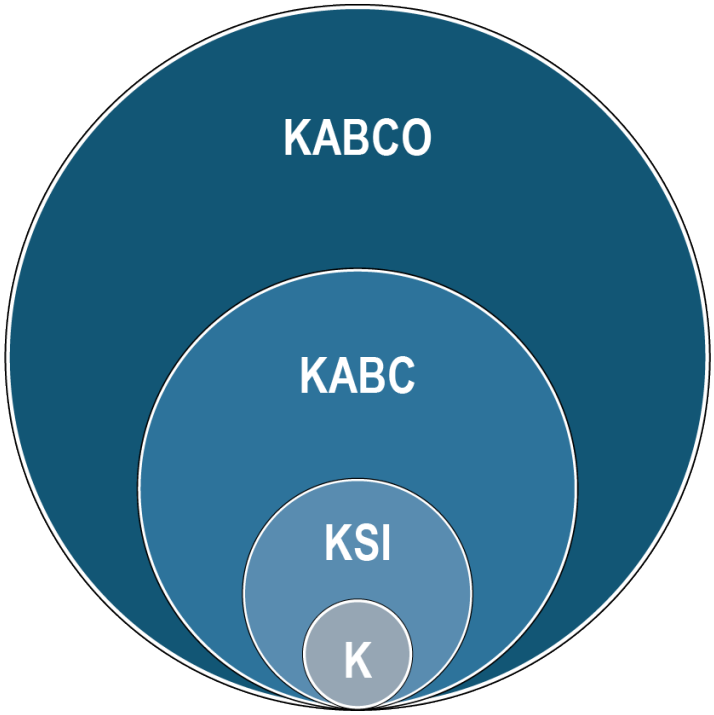
Please Note: Under 23 U.S. Code § 148 and 23 U.S. Code § 407, safety data, reports, surveys, schedules, lists compiled or collected for the purpose of identifying, evaluating, or planning the safety enhancement of potential crash sites, hazardous roadway conditions, or railway-highway crossings are not subject to discovery or admitted into evidence in a federal or state court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location mentioned or addressed in such reports, surveys, schedules, lists, or data.

Crash Data Groupings and Methodologies

The following section introduces the industry-standard acronyms for various crash data groupings. All reported crashes are categorized by severity of outcomes. The broadest group, as shown in Figure 1, include Property Damage Only (PDO) crashes (also deemed "O"). Because there are no injuries in these crashes, they are excluded from this analysis. Crash types are then nested as shown in Figure 1, according to their level of severity. This safety analysis includes all injury and fatal crashes (KABC). The aggregate KABC value, summing all injuries and fatalities across a geography, roadway, or contributing factor is used as a baseline to examine safety.

The second-level data group is KSI (or KA), which is a subset of KABC that includes data from both the serious injury crash (or A) and fatal crash (K) categories. These severe injury and fatality crash types are prioritized as they reflect the likelihood of severe outcomes across geographies and crash types. For geospatial analysis, serious injuries and fatalities are grouped together to find high-crash corridors (KSI per mile) and high-crash intersections/locations (KSI per 100-foot radius of any point). The third-level data group contains only the aggregate fatalities to find those locations, geographies, roadways, and driver behaviors that may have contributed to traffic fatalities. This report uses KSI to KABC, K to KSI, and K to KABC ratios to understand which typologies have the most dangerous outcomes. Figure 1 below illustrates the data levels of KABCO to K.

Figure 1. Injury Class Grouping



Background

This State of Safety in the Region report describes the historic transportation safety trends and current safety conditions within the central Puget Sound region, locations of higher concentrations of all injury and fatal crashes and contributing factors. While people generally use roadways in a safe manner, mistakes, lapses in judgement, and other more significant risky behaviors still occur. Behavioral safety factors or *contributing factors* are important to understanding traffic safety in our region.

Population in the central Puget Sound region is expected to increase and by 2050 the region is forecasted to reach 5.8 million people.[1] As the region continues to grow, safety of the transportation system for all people is an increasingly critical concern. VISION 2050 – the region's long range growth strategy - prioritizes maintaining and operating "transportation systems to provide safe, efficient, and reliable movement of people, goods, and services" (MPP-T-1) and improving "the safety of the transportation system and, in the long term, achieve the state's goal of zero fatalities and serious injuries." (MPP-T-4).[2] The plan further defines safety in terms of modes including designing "communities to provide safe and welcoming environments for walking and bicycling" (MPP-DP-15) and ensuring "a safe and convenient transportation system for all users while accommodating the movement of freight and goods, using best practices and context sensitive design strategies." (MPP-T-11). The plan also speaks to public safety including coordinating and designing for "public safety services and programs, including emergency management." (MPP-PS-17).

In addition, safety is one of the key policy focus areas identified in PSRC's 2022 adopted Regional Transportation Plan. PSRC hosted a safety summit in 2023 to bring together a wide variety of voices, including elected officials, transportation experts, engaged citizens, local agency staff and others to advance the conversation on the state of road safety in the region. In 2022 and 2023, PSRC applied for and received Safe Streets and Roads for All (SS4A) discretionary grant funds from the U.S. Department of Transportation for the development of a Regional Safety Action Plan.

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[1] PSRC, VISION 2050, https://www.psrc.org/planning-2050/vision-2050

[2] PSRC, VISION 2050 Multicounty Planning Policies, https://www.psrc.org/sites/default/files/2022-02/vision-2050-mpps.pdf

This report embodies PSRC's data-driven approach to identifying transportation safety issues in the region. It serves as a snapshot in time discussing the current safety trends and findings using data and analytics. Crash and geographic data sources, analysis methods, and safety trends and key findings are described herein.

Regional Safety Data Sources and Description

Collision Data

The Washington State Department of Transportation (WSDOT) collects and maintains crash-related data for the state of Washington. PSRC acquired this crash information for the period from 2010 through 2023. This dataset includes information for each person involved in reported injury crashes (KABC crashes). It also includes records for those not injured in a crash (KABCO records). Other pertinent information is provided for motor vehicle drivers, motor vehicle passengers, and people walking and biking. Other types of information such as location, date and time, roadway conditions, quantities of vehicles, people walking and biking involved, injuries, as well as driver actions and impairment information help in analyzing trends.

In addition to the information provided by WSDOT, PSRC has additional geographic data, which was appended to each WSDOT collision, linking it to PSRC's regional geography typologies and census tracts.

Geographic Typologies

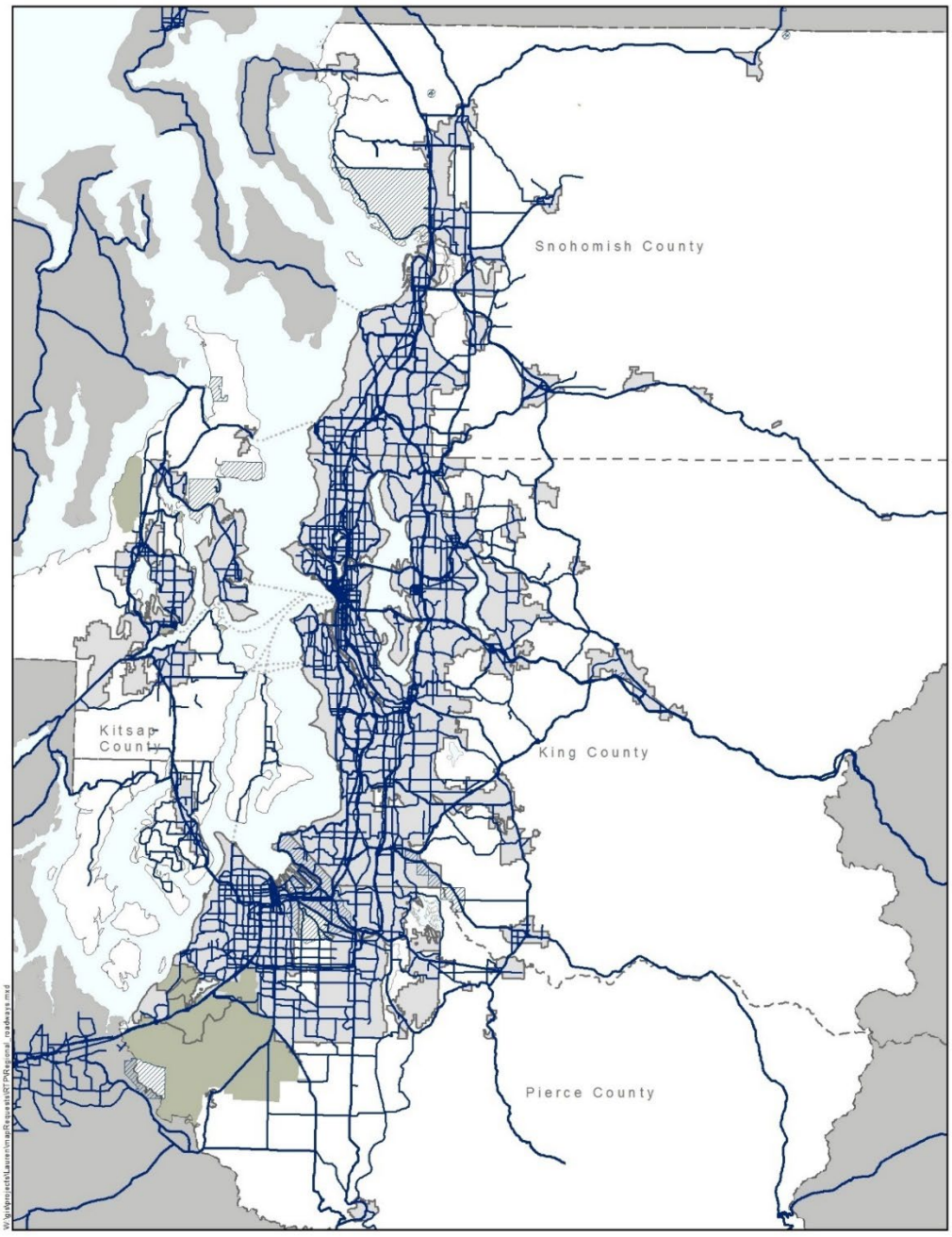
In this study, geospatial analyses were conducted to summarize crashes by different geographic typologies. The spatial data were sourced from PSRC's data team and the Washington Geospatial Open Data Portal. The datasets used are listed below.

Regional Network

Crash data was connected to a regional network for analysis. This network includes the roadway network from the Regional Travel Demand Model Network[3] used by PSRC. It consists of interstates, state routes, principal arterials, and minor arterials that serve transit. For the analysis period of this study (2016 through 2023), over 90% of injury crashes, which include serious injury crashes and fatalities in the four-county region, occurred along this network. The regional network shown in Figure 2 accounts for less than 20% of the four-county public roadway mileage but represents the major linkages between employment, residential, and economic centers.

[3] Puget Sound Regional Council, Regional Travel Demand Model 2015

Figure 2. Roadway Network from PSRC's Regional Travel Demand Model Network



Regional Growth Centers

The region has 30 designated Regional Growth Centers. Regional Growth Centers are characterized by compact, pedestrian-oriented development with mixed uses and are planned for population and employment opportunity growth.

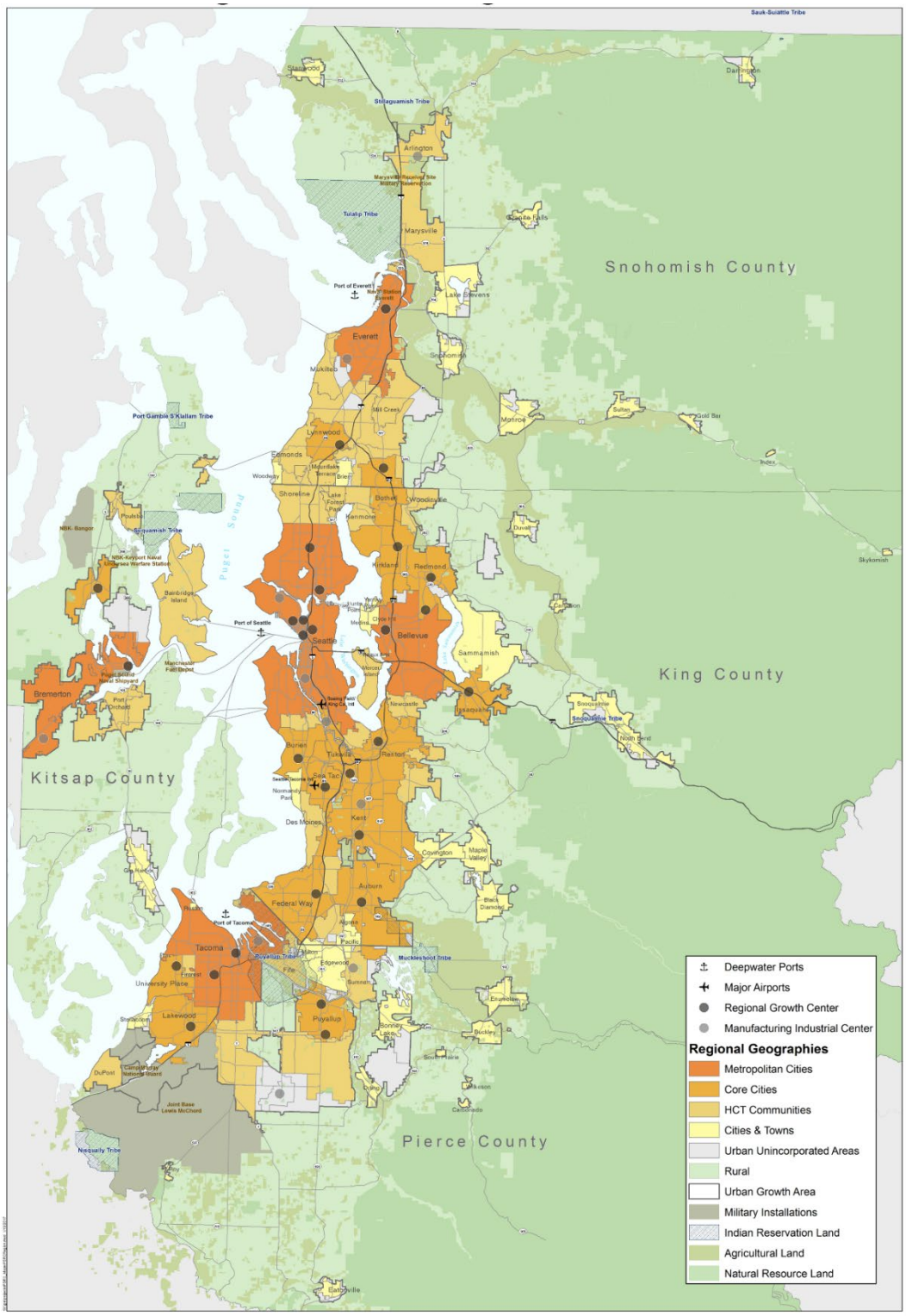
Manufacturing/Industrial Centers

The region also has 10 designated regional manufacturing/industrial centers. These are existing employment areas with intensive manufacturing and industrial land uses. Unlike Regional Growth Centers, Manufacturing/ Industrial Centers are not planned for significant residential growth.

Regional Geographies

Under VISION 2050, PSRC has defined different types of "regional geographies" for planning purposes. In addition to jurisdictional boundaries of counties and cities, PSRC further organizes the region into specific types of cities, urban unincorporated areas, and rural areas. These are shown in Figure 3 and described below:

Figure 3. Central Puget Sound: Regional Geography Classification (source PSRC)



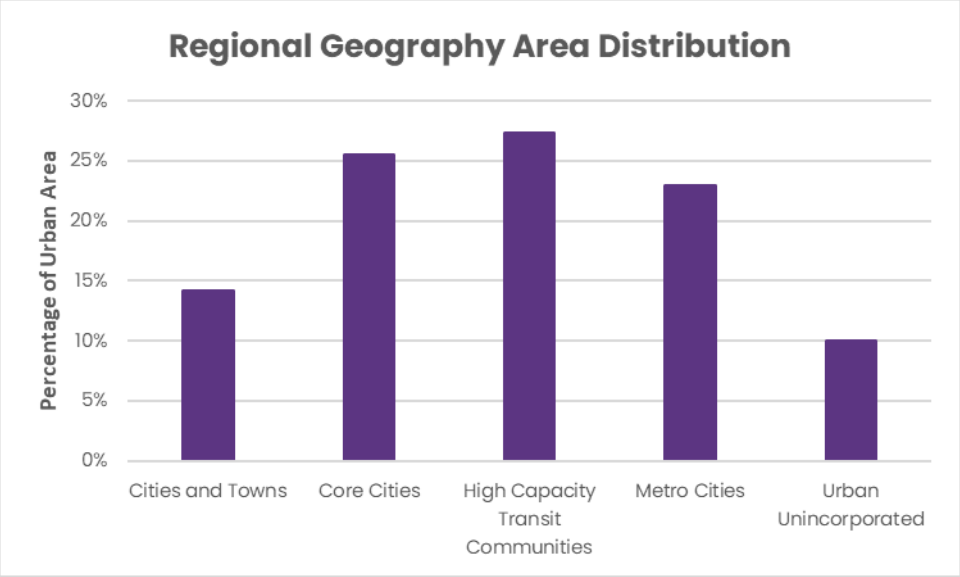
Counties

County refers to a political and administrative division of a state. The central Puget Sound region is comprised of King, Kitsap, Pierce, and Snohomish counties. When referring to "Regionwide," it means the combination of all four counties.

Urban Areas

Urban areas are areas that lie within the Urban Growth Area[4]. Figure 4 shows the proportions of urban land area that the top 5 regional geographies cover.

Figure 4. Regional Geography Area Distribution



In this report, crashes for the county as well as urban and rural areas of the counties were analyzed. The Vision 2050 Regional Geographies are defined by PSRC as:

- Metropolitan Cities – These are the five largest cities in the region– Seattle, Everett, Bellevue, Tacoma, and Bremerton.
- Core Cities – These are the 15 urban cities that contain designated Regional Growth Centers.
- High-Capacity Transit Communities – These are incorporated cities that are not Metropolitan Cities or Core Cities but will experience significant changes as they are served by high-capacity transit. This category covers the most 'urban area' designated land.

[4] Puget Sound Regional Council, Urban Growth Area Map, https://psrc-psregcncl.hub.arcgis.com/documents/5254ed3eee7f41e6904b643b3af5b10f/explore

- Cities & Towns – These are incorporated cities and towns that are not included in Metropolitan Cities, Core Cities, or High-Capacity Transit Communities.
- Urban Unincorporated - These are areas within the urban growth boundary that are not currently within the boundaries of a city but are expected to grow with urban development. These areas are anticipated to eventually come under the jurisdiction of a city through either annexation or incorporated into a new city. Urban Unincorporated areas collectively cover the least urban area.

Rural Areas

Rural areas are low density areas outside the urban growth boundary that are currently under the jurisdiction of counties.

Tribal Lands

Tribes are sovereign nations, and each Tribe has its own government with its own governing charter or constitution and set of general laws. The federal government currently recognizes nine Tribal nations in the region: Muckleshoot, Nisqually, Port Gamble S'Klallam, Puyallup, Sauk-Suiattle, Snoqualmie, Stillaguamish, Suquamish, and Tulalip. The Tribal reservation and off-reservation trust land boundaries within the Puget Sound region were available as part of the Washington Geospatial Open Data Portal.

Population Estimates

Population estimates and demographic data were collected from the American Community Survey (ACS) Data through the Census Bureau. ACS data includes population data for each year from 2010 to 2023. ACS data was used to control for population size when comparing the number of crash-severity outcomes across time accounting for population growth, and within different geographical typologies. Crash-severity outcomes controlled for population size are expressed as crash outcome per 100,000 (100K) people.

Equity Data

Equity Focus Areas (EFA)

Racial and ethnic disparities in key quality of life indicators persist in the central Puget Sound Region. PSRC considers six equity focus areas to evaluate disparities between people in different communities as compared to the regional average. The six equity focus areas considered describe Census Tracts where there are greater proportions of certain demographic groups. These six areas are:

- People of Color
- People with Low Incomes
- People with a Disability
- People with Limited English Proficiency
- Youth (persons under 18)
- Older Adults (persons over 65)

Regional Crash Trends 2010-2023

Analyses of trends are useful for safety professionals and policy makers to understand the history of crashes within the region. Regional crash trends analyses reveal information about crash types and crash severity across geographies and time in the central Puget Sound region. The data analyzed ranges from 2010 to 2023, providing a recent yet comprehensive timeframe for assessing traffic crash trends. Long-term crash data (2010-2023) was used to examine trends in injury and fatal crashes across a variety of variables, including urban vs. rural, roadway classification types, bicycle/pedestrian crashes, and distracted driving. An eight-year existing conditions analysis period (2016-2023) was used to establish a current snapshot of roadway safety in the region shown in Figure 5.

Figure 5. Central Puget Sound Region

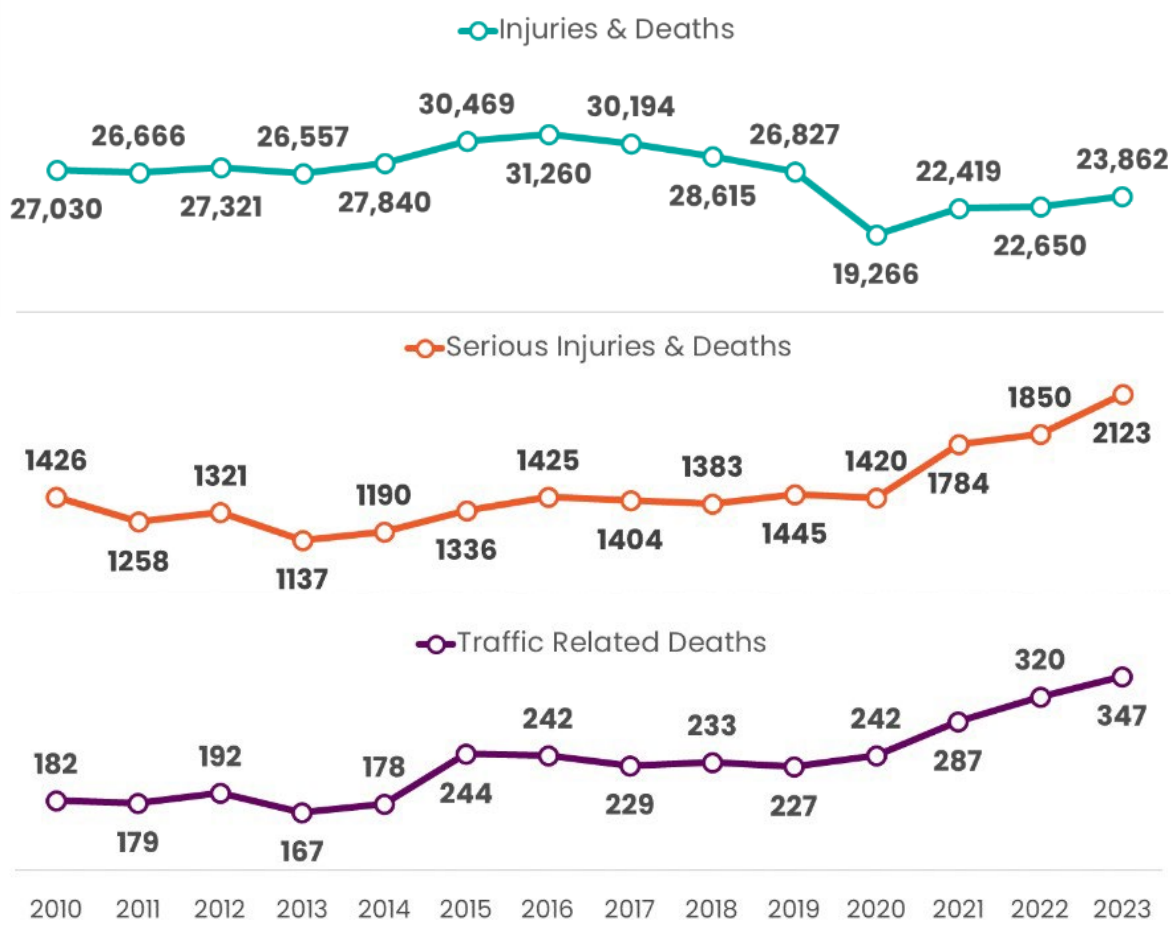
Regionwide

Crashes were aggregated at the county level to examine regionwide crash trends. County population estimates from the 2010 and 2020 Census, and 2021-2023 ACS were used to control for population growth over time, while vehicles miles traveled was used to control for increased travel throughout the region. Regional crash trends shown in Figure 6, Figure 7, and Figure 8 tell the overarching story that although all

crashes resulting in injury (including fatality) have gradually declined from peak levels in 2015, the region is experiencing increases in more severe outcome crashes including crashes resulting in serious injury and death.

Figure 6 shows the upward trend in traffic-related fatalities (K), and serious injuries and fatalities combined (KSI) from 2010 to 2023. Traffic related fatalities have almost doubled since 2010.

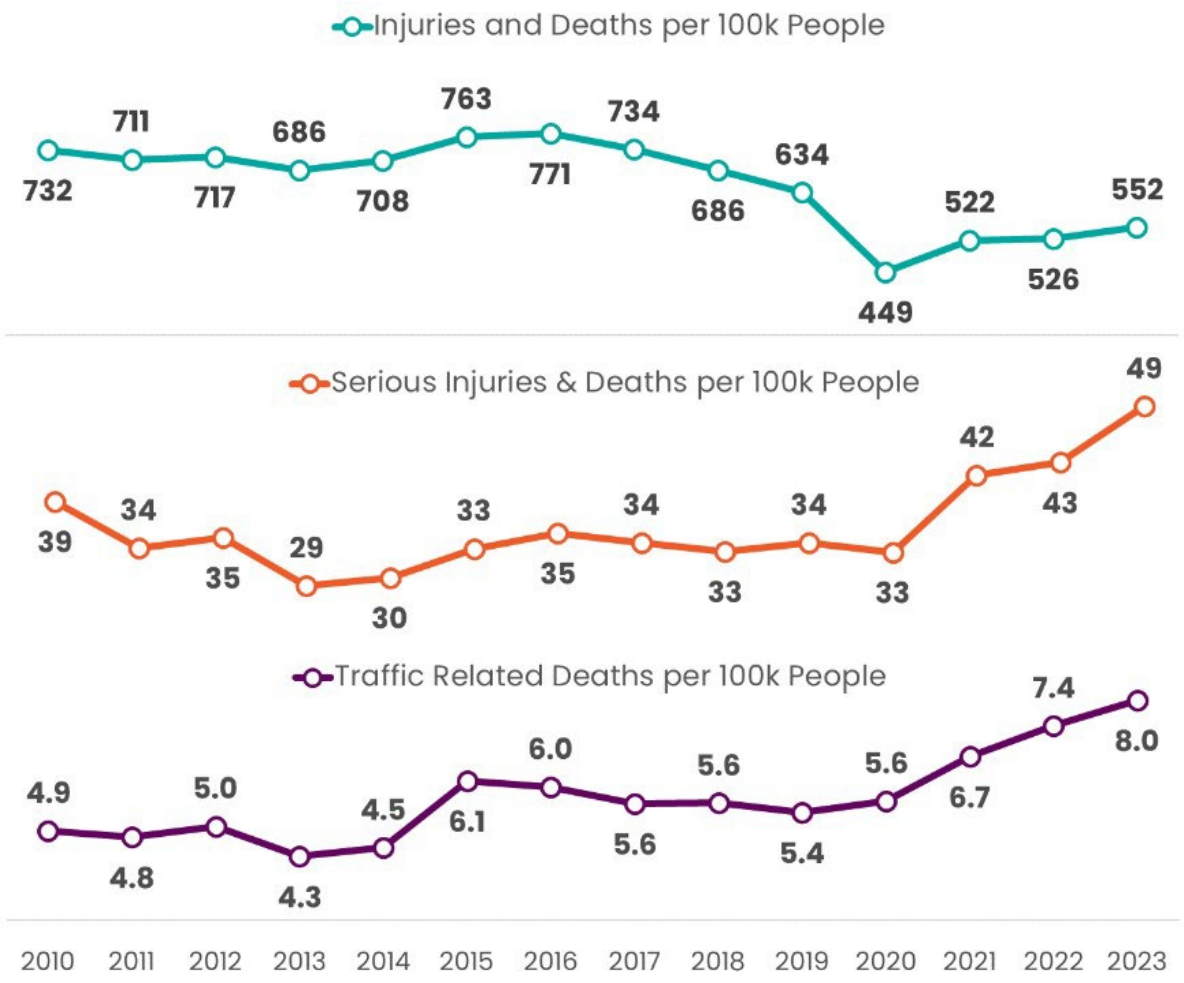
Figure 6. Comparison of Traffic-Related Injury Severity in the central Puget Sound region



It is important to normalize crash information for population size and vehicle miles traveled as greater population and more driving increase the likelihood of crashes. Figure 7 shows crashes per 100,000 people and Figure 8 shows the crashes per one hundred million vehicle miles traveled (VMT). These two figures also show a similar trend as the absolute numbers in Figure 6. This relationship shows that while the number of all injury crashes (including fatalities) have increased from 2020, traffic

related fatalities are outpacing all injury and fatal crashes even when controlled for population growth.

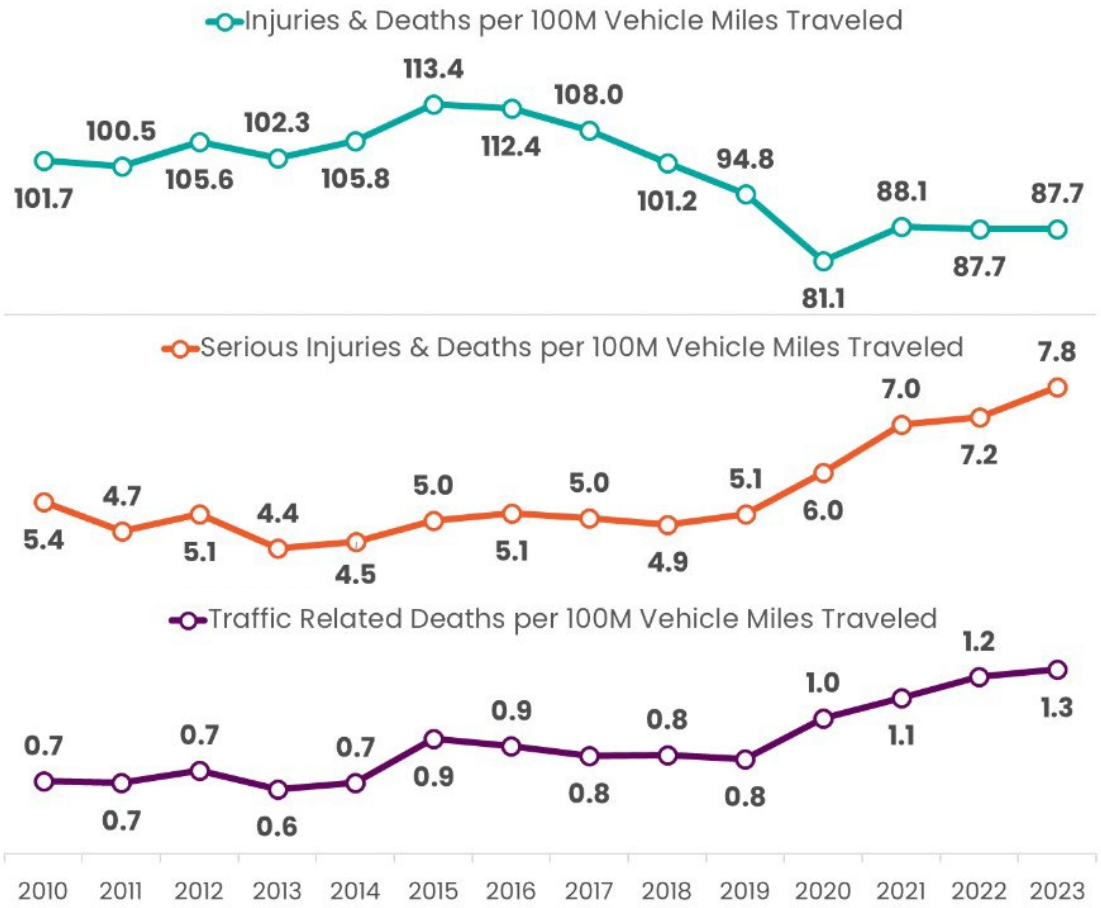
Figure 7. Comparison of Traffic-Related Injury Severity per 100,000 People in central Puget Sound region



Notably, in 2016, all injury crashes per 100,000 people reached a peak of 771. By 2023, this number had decreased to 552, representing a 28% decline. Meanwhile, serious injury crashes and fatalities per 100,000 people increased 40%, from 35 in 2016 to 49 in 2023. Traffic fatalities per 100,000 also increased from 6 in 2016 to 8 in 2023, representing a 33% increase.

Similar results are observed when accounting for growing regional travel as measure in 100 million VMT. Although the total number of injury crashes has declined per miles driven, the number of serious injuries and fatal crashes has increased.

Figure 8. Comparison of Traffic-Related Injury Severity per 100 million VMT in central Puget Sound region



The findings indicate that collisions in the central Puget Sound region are becoming more deadly, even when considering increased traffic volume. Like the population-adjusted crash rates, all injury crashes per 100 million VMT peaked in 2015. By 2023, that number had declined 22%. However, serious injury crashes and fatalities per 100 million VMT rose 56% and fatalities per 100 million VMT rose 44% over the same period. The regionwide trends underscore that severe outcomes are becoming more common despite an overall decline in crashes proportionate to the number of miles driven.

Regionwide Crash Trends for People Walking and Biking

People walking and biking are the most vulnerable road users (VRU). Crash information for people walking or biking is reported individually by mode. As the severity of crash outcomes increases, people walking are more affected compared to those biking (Figure 9*Figure 9*). Crash information for people walking and biking was combined into a single dataset (bike and pedestrian) with information about crash injury severity. After crash information relating to people walking and biking was combined into a single data set, bike and pedestrian crash outcomes was sorted into categories by injury severity, including:

- Bike and Pedestrian all injuries and fatalities (KABC)
- Bike and Pedestrian serious injuries and fatalities (KSI)
- Bike and Pedestrian fatalities (K)

While bike and pedestrian injuries and the normalized number (per 100,000 people) went down slightly in 2023, the fatality rate has doubled since 2010. Figure 10 shows that the fatality rate for people walking and biking is increasing faster than serious injuries and fatalities combined. Additionally, fatalities per 100,000 people in the bike and pedestrian group have doubled compared to all injury classes (Figure 10) which increased by 1.6 times since 2010.

Figure 9. Bike & Pedestrian Crash Data in the central Puget Sound region, 2010 to 2023.

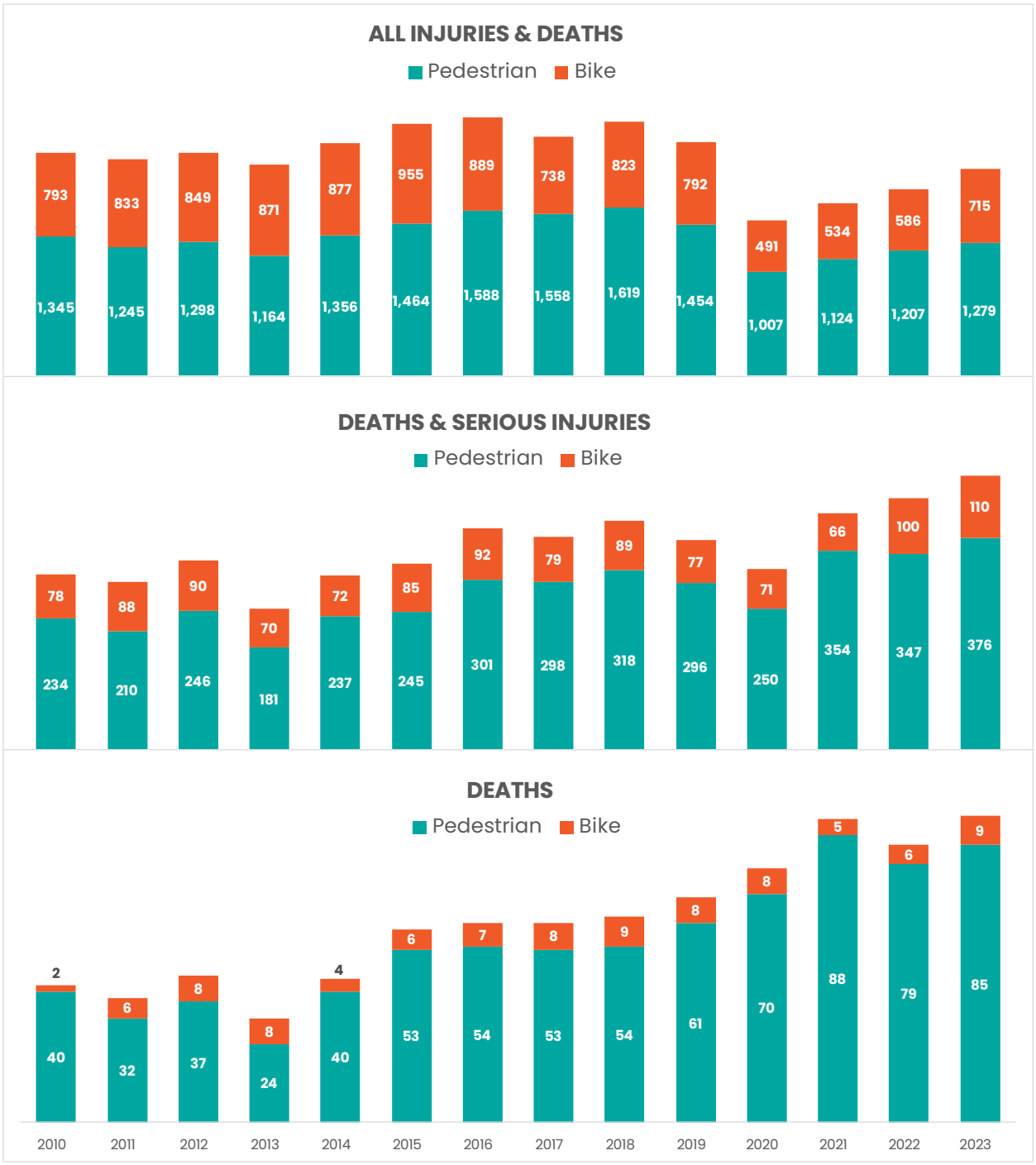
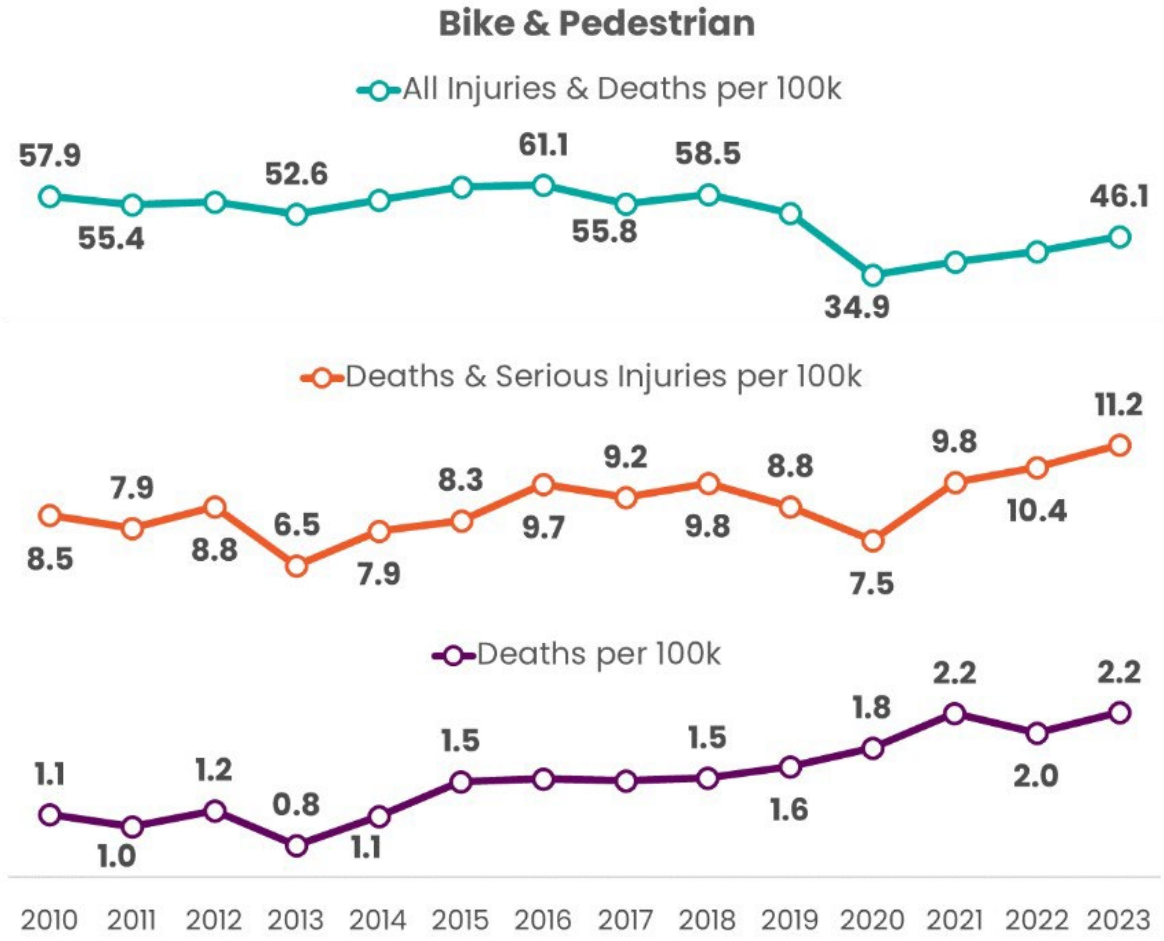


Figure 10. Bike & Pedestrian Injuries and fatalities per 100,000 People in the central Puget Sound region, 2010 to 2023.



Urban and Rural Areas

Figure 11 below shows the urban and rural areas of the central Puget Sound region. It is estimated that 98% of the growth between 2018 and 2050 will be within the urban growth area.[5]

Figure 11. Central Puget Sound region: Urban and Rural Areas

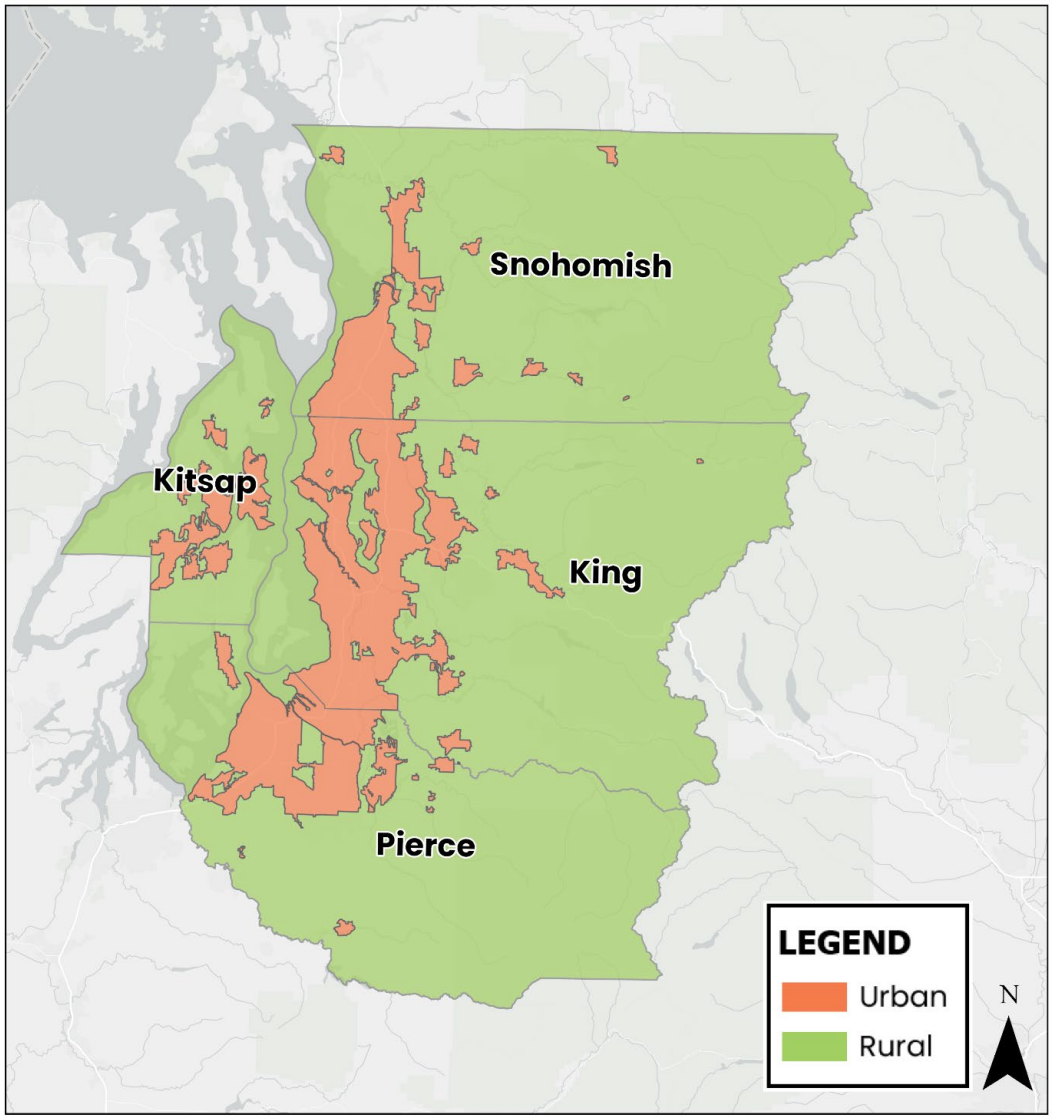
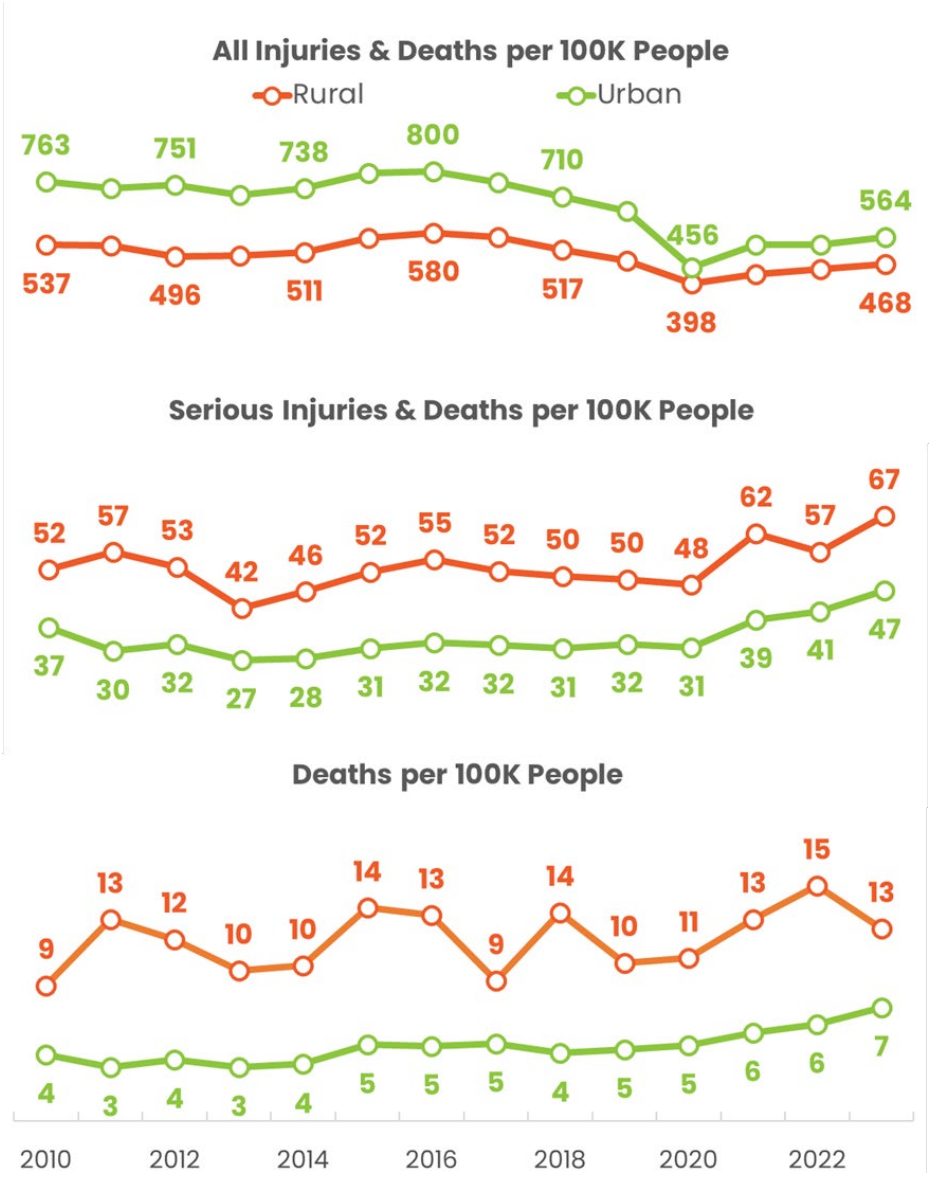


Figure 12 shows all traffic related injury types per 100,000 people for both Urban and Rural Areas from 2010 to 2023. Injury and fatality crashes in Urban and Rural Areas peaked in 2016 to a low in 2020 (corresponding with the global COVID-19 pandemic)

[5] Puget Sound Regional Council, Regional Transportation Plan, https://www.psrc.org/media/5934

but rose again in 2021. All injuries in rural areas have consistently been lower than in urban areas, but the gap has narrowed over time. Both urban and rural areas show a consistent upward trend of roadway fatalities. However, fatalities per 100,000 people in the rural areas are at least twice, and in some cases three times the fatalities of urban areas.

Figure 12. All Traffic Related Injury Types per 100,000 People, Urban vs. Rural



Tribal Lands

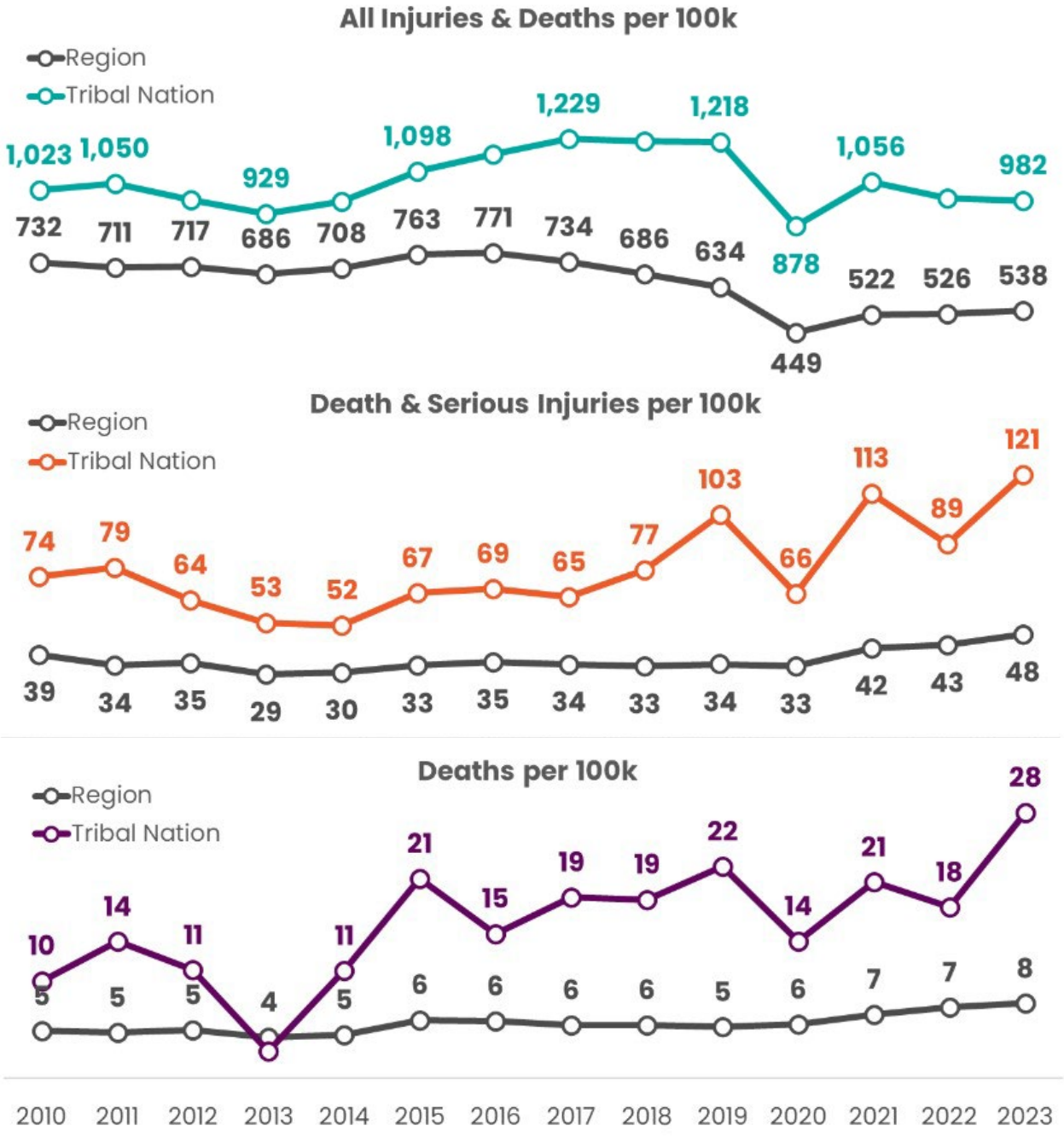
Injury and Fatality Rates on Tribal Lands

Crash severity is disproportionately worse on Tribal Lands in comparison to the region overall. This study considers injuries and fatalities that occurred on or within fifty feet of Tribal Lands and compares them to the broader region. The analysis (shown in Figure 13) focuses on all levels of injury severity.

Injury rates were derived using several metrics related to crash severity and outcome commonality. The first metric compares All Injuries per 100,000 people between Tribal nations and the broader region. Notably, Tribal nations consistently experience higher injury rates per 100,000 people. This disparity highlights a significant public health concern for people living on Tribal Lands.

Severity and Fatalities Trends: The second and third metrics in the graphic, titled "Fatalities & Serious Injuries per 100,000 people" and "Fatalities per 100,000 people," reinforce this disparity. As the severity of injury increases, the gap between Tribal nations and the region widens. Tribal communities face disproportionately higher risks of serious injuries and fatalities. More importantly, the fatality rate in the Tribal land areas has almost tripled since 2010. It is important to note that the number of traffic-related injuries and fatalities on Tribal land is controlled for population size by comparing proportions of traffic-related injury and fatalities to 100,000 people. Currently there are much fewer than 100,000 people living on Tribal land.

Figure 13. All Traffic Related Injury Types per 100,000 people, Tribal Nations vs Region



Regional Crash Analysis (2016-2023)

The regional crash analysis serves as a snapshot in time of the current traffic related safety context in the central Puget Sound region. The regional crash analysis considered an eight-year period between 2016 and 2023. This timeframe was considered to determine a baseline for PSRC regarding traffic safety. The crash analysis compares crash outcomes between regional geographies, contributing factors, crash types, land use, equity areas, and vehicle type to determine attributes contributing to especially severe outcome crashes. This data-driven analysis provides better understanding of where and why serious injury and fatal crashes can be documented, and potentially provides insight to appropriate and effective strategies that can be developed to improve safety in the region.

Crash Analysis by Geographies

The analysis examined crash data across counties, distinguishing between urban and rural areas. Sub-types within these regions were also considered. The analysis identified priority areas for targeted safety measures by comparing the traffic-related injury and fatality rates for that specific geography to the Puget Sound region's average.

Regionwide

In the multi-year analysis spanning from 2016 to 2023, data was controlled with 2020 population data. The region witnessed a total of 205,093 injuries and fatalities from road crashes during the 8-year study period (Table 1). This corresponds to an average of 4,776 injuries and fatalities per 100,000 people. Notably, the region has a fatality rate of fifty per 100,000 people. The ratio of serious injuries and fatalities to all injuries was approximately 1 in 16, which means one in sixteen people involved in an injury-causing crash would sustain a serious injury or fatality. Among all crash injuries, there is a one in ninety-six chance of a fatality. Of all serious injury and fatal crashes, there is a one in six chance of a fatality.

Table 1. Crash Statistics: central Puget Sound region from 2016 to 2023

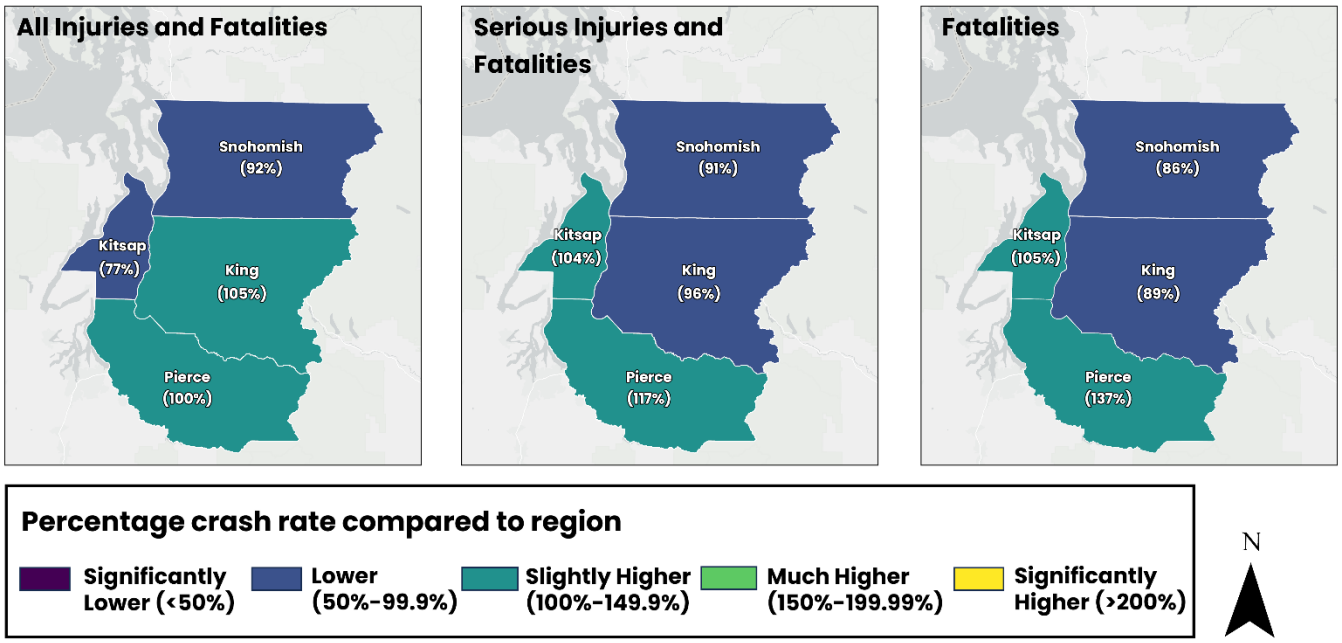
	Regionwide
2020 Population	4,294,373
All Injuries & Fatalities	205,093
All Injuries & Fatalities per 100k People	4,776

	Regionwide
Serious Injuries & Fatalities	12,834
Serious Injuries & Fatalities per 100k People	299
Fatalities	2,127
Fatalities per 100k People	50
Ratio of Fatalities to All Injuries	1 in 96
Ratio of Serious Injuries & Fatalities to All Injuries	1 in 16
Ratio of Fatalities to Serious Injuries & Fatalities	1 in 6

County

The crashes in PSRC counties are summarized in Figure 14 and Table 2. King County has higher (105%) total crashes resulting in injuries or fatalities per 100,000 people and fewer (89%) fatalities per 100,000 people compared to the region. The inverse is true for Kitsap County which has fewer (77%) crashes resulting in injuries or fatalities per 100,000 people but higher (105%) fatalities per 100,000 people than the region. Pierce County's total injuries per 100,000 people is similar to the region, but it experiences a high fatality rate (137%) per 100,000 people, which is the highest among the four counties. These numbers suggest variability in crash frequency and severity within the central Puget Sound region.

Figure 14. Percentage Crash Rate by County compared to the central Puget Sound region



Every 1 in 96 crashes in the central Puget Sound region results in a fatality. On the county level, every 1 in 71 crashes in Kitsap and Pierce County results in a fatality, while the ratio is 1 in 103 for Snohomish and 1 in 114 for King County. This shows that fewer fatalities occur for every crash in Snohomish and King counties as compared to Kitsap and Pierce counties.

Table 2. Crash Statistics: Counties in Comparison to central Puget Sound region

	King	Kitsap	Pierce	Snohomish	Regionwide
2020 Population	2,269,675	275,611	921,130	827,957	4,294,373
All Injuries & Fatalities (KABC)	114,245	10,174	44,209	36,465	205,093
All Injuries & Fatalities per 100k People	5,034	3,691	4,799	4,404	4,776
All Injuries & Fatalities Rate Compared to Region	1.05	0.77	1.00	0.92	
Serious Injuries & Fatalities (KSI)	6,497	857	3,218	2,262	12,834
Serious Injuries & Fatalities per 100k People	286	311	349	273	299
Serious Injuries & Fatalities Rate Compared to Region	0.96	1.04	1.17	0.91	

	King	Kitsap	Pierce	Snohomish	Regionwide
Fatalities (K)	1,003	143	627	354	2,127
Fatalities per 100k People	44	52	68	43	50
Fatalities Rate Compared to Region	0.89	1.05	1.37	0.86	
Ratio of Fatalities to All Injuries	1 in 114	1 in 71	1 in 71	1 in 103	1 in 96
Ratio of Serious Injuries & Fatalities to All Injuries	1 in 18	1 in 12	1 in 14	1 in 16	1 in 16
Ratio of Fatalities to Serious Injuries & Fatalities	1 in 6	1 in 6	1 in 5	1 in 6	1 in 6

Urban and Rural Areas

The central Puget Sound region's Urban and Rural areas were compared for crash frequency and severity spanning from 2016 to 2023. The results of the analysis are included in Table 3.

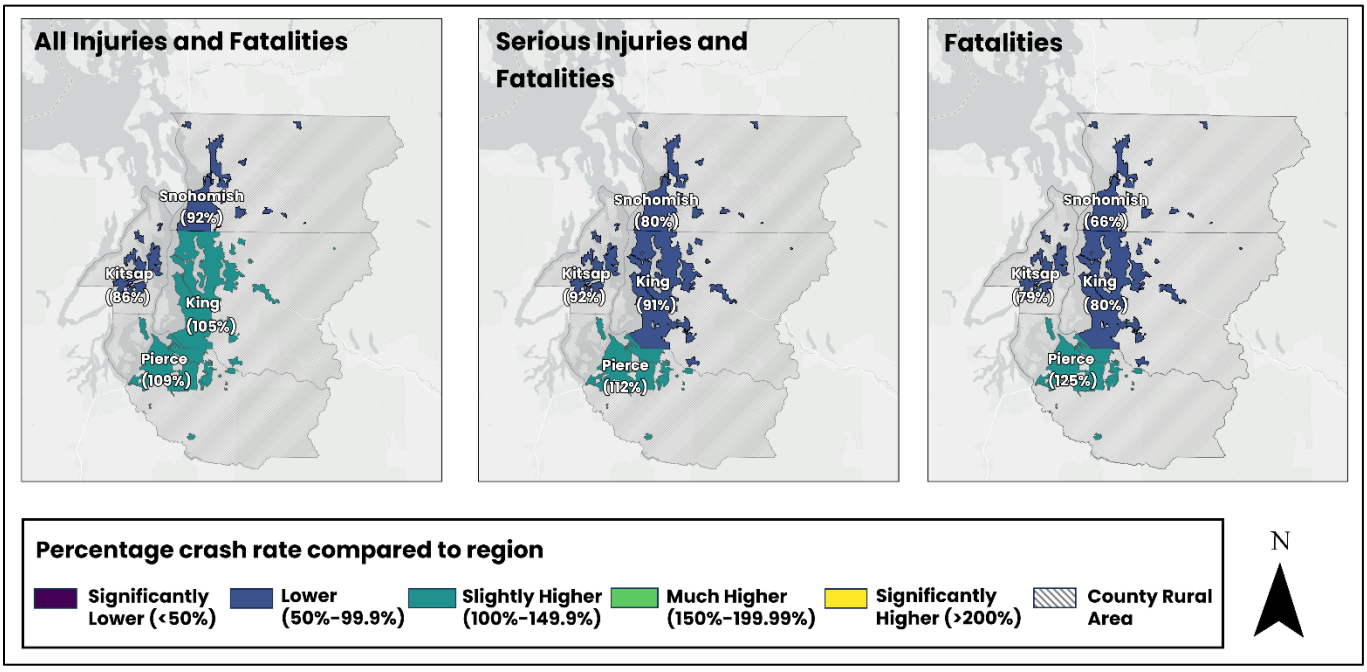
Table 3. Crash Statistics: Urban vs Rural in Comparison to central Puget Sound region

	Urban	Rural	Regionwide
2020 Population	3,755,773	538,600	4,294,373
All Injuries & Fatalities (KABC)	184,319	20,774	205,093
All Injuries & Fatalities per 100k People	4,908	3,857	4,776
All Injuries & Fatalities Rate Compared to Region	**1.03**	0.81	
Serious Injuries & Fatalities (KSI)	10,471	2,363	12,834
Serious Injuries & Fatalities per 100k People	279	439	299
Serious Injuries & Fatalities Rate Compared to Region	0.93	**1.47**	
Fatalities (K)	1,603	524	2,127
Fatalities per 100k People	43	97	50
Fatalities Rate Compared to Region	0.86	**1.96**	
Ratio of Fatalities to All Injuries	1 in 115	1 in 40	1 in 96
Ratio of Serious Injuries & Fatalities to All Injuries	1 in 18	1 in 9	1 in 16
Ratio of Fatalities to Serious Injuries & Fatalities	1 in 7	1 in 5	1 in 6

Urban Areas: Urban areas in the region experience higher crash frequency but the rate of fatal crashes per capita tend to be lower when compared to rural areas. A potential explanation for this phenomenon could be due to increased traffic density, complex intersections, and pedestrian activity, which can lower speeds but increase areas of conflict between roadway users.

Crash rates in urban areas by county in PSRC's Urban Growth Area are summarized in Figure 15 and Table 4. The urban areas of King (105%) and Pierce (109%) counties have higher injury and fatality rates per 100,000 than the region overall. However, when considering fatalities only, the urban areas of King County have an 80% fatality rate while the urban areas of Pierce County have a 125% fatality rate per 100,000 compared to all urban areas throughout the region combined.

Figure 15. Urban Area Percentage Crash Rate by County compared to the central Puget Sound region



In the urban areas of the region overall, one out of every 115 crashes result in a fatality. In the urban areas of King and Snohomish counties, the ratios are 1 in 128 and 1 in 135, respectively. The urban areas of Kitsap and Pierce counties have a higher fatality rate, with ratios of 1 in 105 and 1 in 84, respectively.

Table 4. Crash Statistics: Urban Areas by County in Comparison to central Puget Sound region

	King	Kitsap	Pierce	Snohomish	Urban Total	Regionwide
2020 Population	2,142,459	168,787	750,551	693,976	3,755,773	4,294,373
All Injuries & Fatalities (KABC)	107,808	6,899	38,996	30,616	184,319	205,093
All Injuries & Fatalities per 100k People	5,032	4,087	5,196	4,412	4,908	4,776
All Injuries & Fatalities Rate Compared to Region	1.05	0.86	1.09	0.92	1.03	
Serious Injuries & Fatalities (KSI)	5,835	463	2,514	1,659	10,471	12,834
Serious Injuries & Fatalities per 100k People	272	274	335	239	279	299
Serious Injuries & Fatalities Rate Compared to Region	0.91	0.92	1.12	0.80	0.93	
Fatalities (K)	844	66	466	227	1,603	2,127
Fatalities per 100k People	39	39	62	33	43	50
Fatalities Rate Compared to Region	0.80	0.79	1.25	0.66	0.86	
Ratio of Fatalities to All Injuries	1 in 128	1 in 105	1 in 84	1 in 135	1 in 115	1 in 96
Ratio of Serious Injuries & Fatalities to All Injuries	1 in 18	1 in 15	1 in 16	1 in 18	1 in 18	1 in 16
Ratio of Fatalities to Serious Injuries & Fatalities	1 in 7	1 in 7	1 in 5	1 in 7	1 in 7	1 in 6

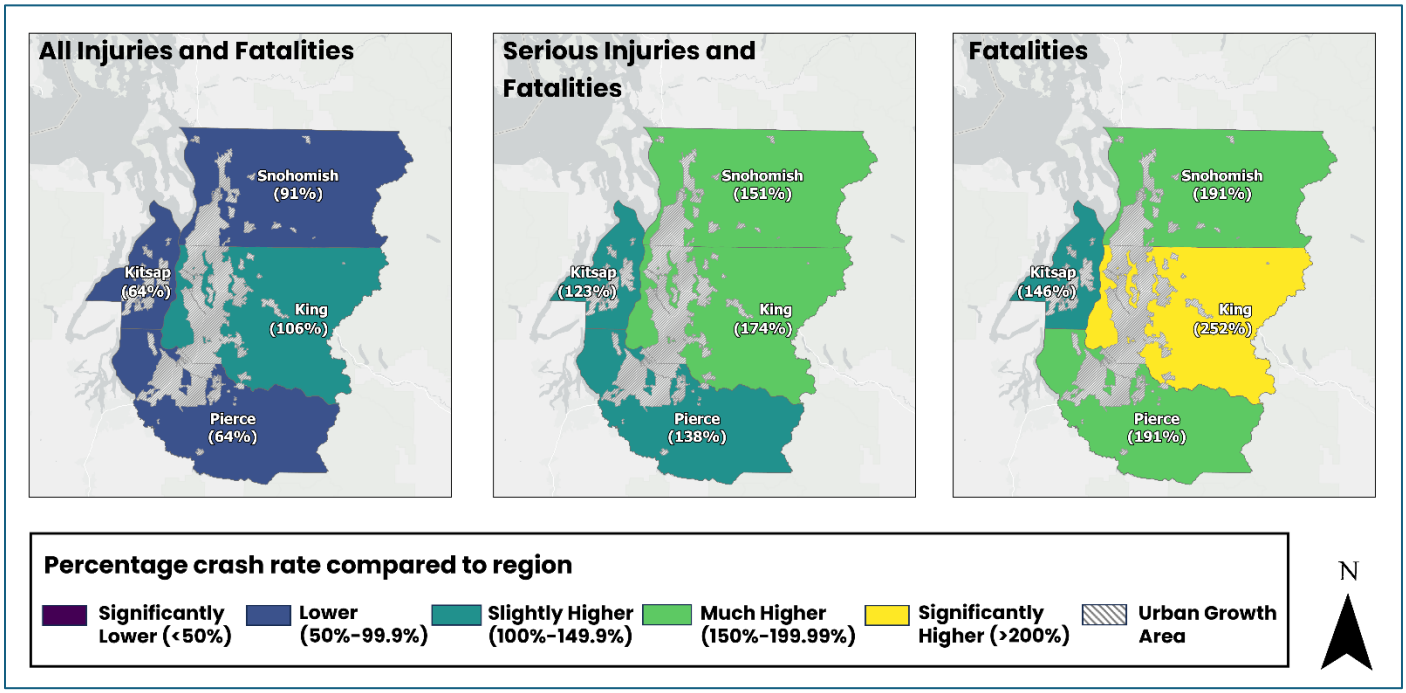
Rural Areas: In contrast, rural areas experienced a disproportionate share of fatal crashes even though total crash frequency was lower compared to urban areas. Factors such as longer distances, higher speeds, and limited emergency services could contribute to the severity of crashes. Recognizing these divergent risk profiles allows PSRC to tailor interventions effectively and point to different safety measures needed in urban and rural areas.

Rural Areas by County

As shown in Figure 16, the rural areas of Pierce, Snohomish, and Kitsap counties have crash rates of all severity injury and fatality below the regional average, controlled for population size. However, when considering fatalities alone, these areas

experienced rates higher than the regional average, with rates of 191% (Pierce), 191% (Snohomish), and 146% (Kitsap), respectively. The rural areas of King County had the highest proportion of all severity injury and fatality (106%), and when looking at fatal crashes alone, the rural areas of King County experienced fatal crashes at 252% of the regional rate. Although the crashes led to more severe outcomes in rural portions of all counties, the rural parts of King County experienced an even larger safety disparity.

Figure 16. Percentage Crash Rate by Rural County compared to central Puget Sound region



When comparing the ratio of all severe injury crashes to fatal crashes, the rural portions of all counties experience higher fatality rates compared to the region, with Pierce County experiencing the highest ratio of fatal crashes to all severity injury crashes (1 in 32), as shown in Table 5.

Table 5. Crash Statistics: Rural Areas by County in Comparison to central Puget Sound region

	King	Kitsap	Pierce	Snohomish	Rural Total	Regionwide
2020 Population	127,216	106,824	170,579	133,981	538,600	4,294,373
All Injuries & Fatalities (KABC)	6,437	3,275	5,213	5,849	20,774	205,093
All Injuries & Fatalities per 100k People	5,060	3,066	3,056	4,366	3,857	4,776
All Injuries & Fatalities Rate Compared to Region	1.06	0.64	0.64	0.91	0.81	
Serious Injuries & Fatalities (KSI)	662	394	704	603	2,363	12,834
Serious Injuries & Fatalities per 100k People	520	369	413	450	439	299
Serious Injuries & Fatalities Rate Compared to Region	1.74	1.23	1.38	1.51	1.47	
Fatalities (K)	159	77	161	127	524	2,127
Fatalities per 100k People	125	72	94	95	97	50
Fatalities Rate Compared to Region	2.52	1.46	1.91	1.91	1.96	
Ratio of Fatalities to All Injuries	1 in 40	1 in 43	1 in 32	1 in 46	1 in 40	1 in 96
Ratio of Serious Injuries & Fatalities to All Injuries	1 in 10	1 in 8	1 in 7	1 in 10	1 in 9	1 in 16
Ratio of Fatalities to Serious Injuries & Fatalities	1 in 4	1 in 5	1 in 4	1 in 5	1 in 5	1 in 6

Regional Geographies

Between 2016 and 2023, Metropolitan Cities recorded the highest number of injuries and fatalities, followed by Core Cities. These urban areas experienced a significant volume of injuries. Even when adjusting for population size, the results are similar, with Core Cities leading, followed by Metropolitan Cities.

Core Cities, Metropolitan Cities, and Rural areas had a comparable number of absolute fatalities, as illustrated in Figure 17 and Figure 18. However, when fatalities are measured per 100,000 people, Rural areas have the highest fatality rate at 97 per

100,000 people. Metropolitan Cities and Core Cities exhibit a lower rate of 57 and 44 fatalities per 100,000 people, respectively.

Figure 17. All Injuries and Fatalities by Regional Geographies[6]

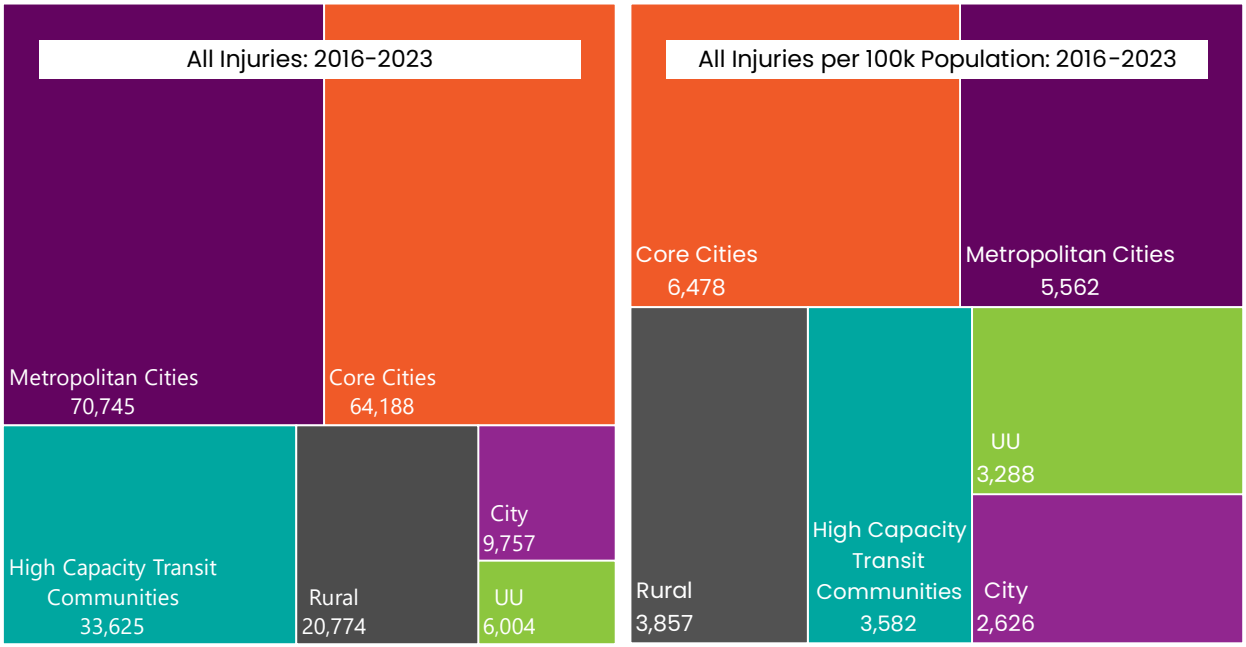
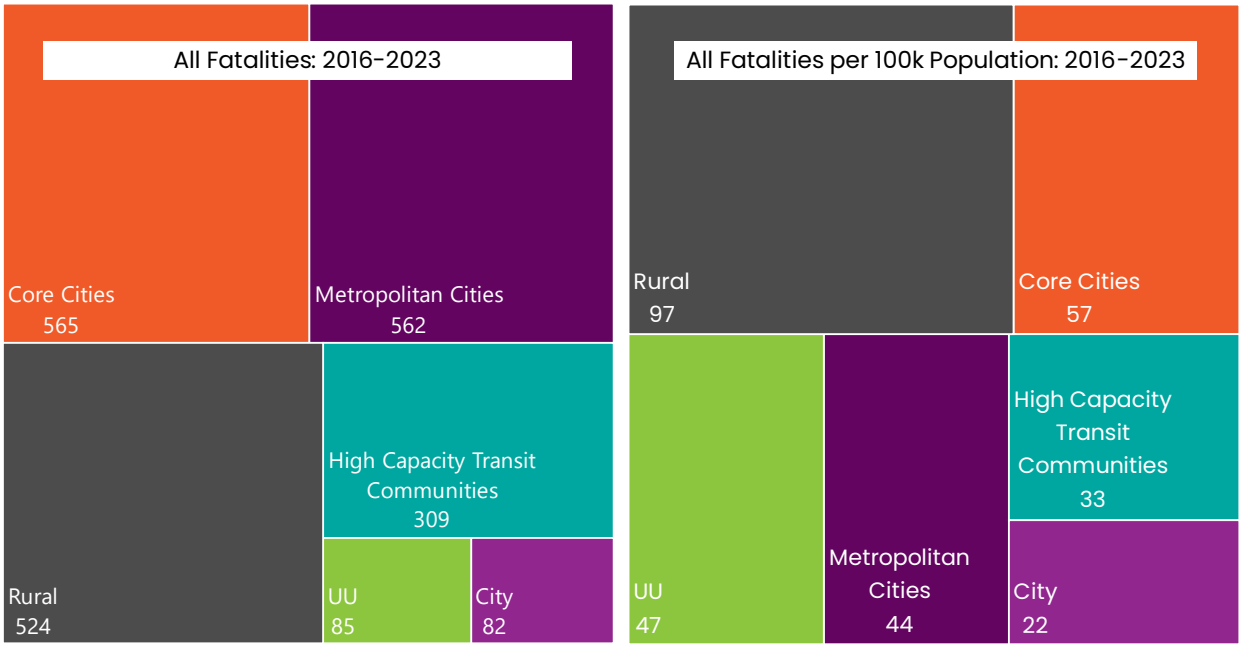


Figure 18. Fatalities by Regional Geographies [7]



Equity Focus Areas

This study extends beyond crash data by geography typologies to explore PSRC's six equity focus areas. PSRC looks at areas with higher than regional averages for people of color, people with low incomes, older adults, youth, people with disabilities,

people with limited English proficiency, and people with low-income to determine whether these communities experience disproportionate conditions or outcomes when compared to the region as a whole. PSRC also considers those areas with over 50% of people of color and people with low incomes.

Examining these locations, daylights correlations and disparities, informing targeted safety measures. The data highlights that crashes within the central Puget Sound region are not distributed evenly. People living within census tracts with a higher proportion of people of color or people with low incomes experience more serious injuries and fatality from crashes. People in census tracts where those attributes overlap experience even worse outcomes. Table 6 gives a summary of tracts that fall within the equity focus areas. It shows that census tracts with higher percentages of people with low incomes have the highest injury, serious injury, and fatality rates compared to the region as a whole.

[6] For planning purposes, PSRC organizes the region into Metropolitan Cities, Core Cities, High-Capacity Transit Communities, Cities and Towns ("City"), Urban Unincorporated areas ("UU"), and Rural Areas.

[7] For planning purposes, PSRC organizes the region into Metropolitan Cities, Core Cities, High-Capacity Transit Communities, Cities and Towns ("City"), Urban Unincorporated areas ("UU"), and Rural Areas.

Table 6. Crash Statistics: Equity Focus Areas

Census Tracts	Majority People of Color	Majority Low-Income	Majority Low-Income AND People of Color	Majority Region-Wide	Youth Above Regional Average	Elderly Above Regional Average	Disability Above Regional Average	People of Color Above Regional Average	Low-Income Above Regional Average	Limited English Proficiency Above Regional Average
2020 Population	1,009,472	104,854	76,136	4,294,373	2,301,456	1,952,982	1,975,492	2,011,106	1,752,858	1,667,386
All Injuries & Fatalities (KABC)	69,826	6,655	5,741	205,093	85,504	79,036	100,058	105,581	99,743	85,675
All Injuries & Fatalities per 100k	6,917	6,347	7,540	4,776	3,715	4,047	5,065	5,250	5,690	5,138
All Injuries & Fatalities Rate	1.45	1.33	1.58		0.78	0.85	1.06	1.1	1.19	1.08
Serious Injuries & Fatalities (KSI)	3,975	429	387	12,834	5,344	5,117	6,280	5,570	5,868	4,508
Serious Injuries & Fatalities per 100k	394	409	508	299	232	262	318	277	335	270
Serious Injuries & Fatalities Rate	1.32	1.37	1.70		0.78	0.88	1.06	0.93	1.12	0.9
Fatalities (K)	644	62	58	2,127	936	895	1,109	897	1,007	737
Fatalities per 100k	64	59	76	50	41	46	56	45	57	44
Fatalities Rate Compared to Region	1.29	1.19	1.54		0.82	0.93	1.13	0.9	1.16	0.89
Ratio of Fatalities to All Injuries	1 in 108	1 in 107	1 in 99	1 in 96	1 in 91	1 in 88	1 in 90	1 in 118	1 in 99	1 in 116
Ratio of Serious Injuries & Fatalities to All Injuries	1 in 18	1 in 16	1 in 15	1 in 16	1 in 16	1 in 15	1 in 16	1 in 19	1 in 17	1 in 19
Ratio of Fatalities to Serious Injuries & Fatalities	1 in 6	1 in 7	1 in 6	1 in 6	1 in 6	1 in 6	1 in 6	1 in 6	1 in 6	1 in 6

Shown in Table 7, census tracts with a majority of people color experience 32% higher serious injury or fatal outcomes compared to the regional average. Similarly, census tracts with a majority people with low incomes experience an increase of 37% of serious injury or fatal outcomes. However, when census tracts are both majority people of color and majority people with low incomes, a serious injury or fatality is 70% higher compared to the regional average.

Table 7. Census Tracts with Majority People of Color and Majority People with Low Incomes Compared to Regional Percentage of Serious Injury and Fatal Crashes

Type of Census Tract	Comparison to regional average Serious Injury or Fatal Crashes	Comparison to regional average Fatal Crashes
Majority People of Color Census Tracts	132%	119%
Majority People with Low Incomes Census Tracts	137%	129%
Combination Majority People of Color and Poverty Census Tracts	170%	154%

Tribal Lands

Crash outcomes are also more severe on Tribal Lands. People living on Tribal lands experience serious injury or fatal crashes more than double the crash severity in the central Puget Sound region as a whole. Additionally, people living on Tribal lands experience triple (213% higher) the fatality rate.

A full depiction of crash information can be found in Table 8, which shows the summary of crashes and severity information for all Tribal Lands in comparison to non-tribal lands.

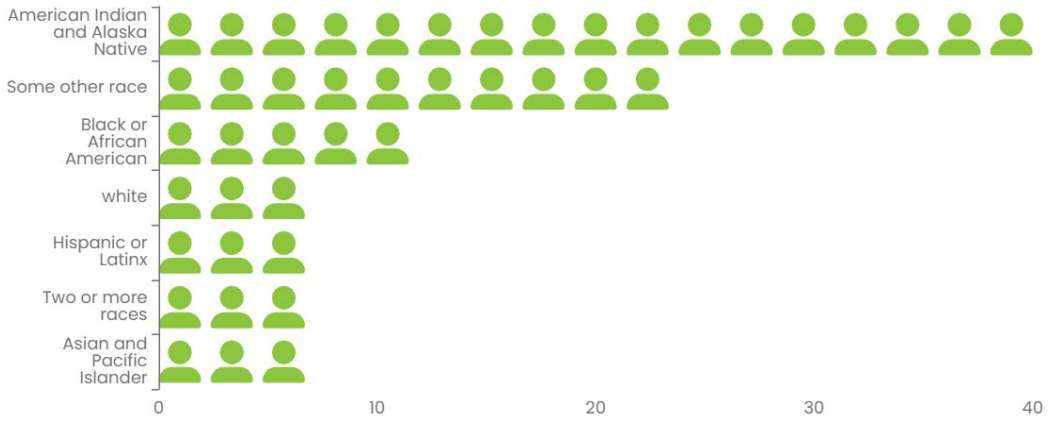
Table 8. Tribal Lands Crash Severity Compared to the Central Puget Sound Region

	Total of All Injuries	Share of All Injuries	Total of Fatalities & Serious	Share of Fatalities & Serious	Total of Fatalities	Share of Fatalities	Ratio of Fatalities to All Injuries	Ratio of Serious Injuries & Fatalities to All Injuries	Ratio of Fatalities to Serious Injuries & Fatalities
All Tribal Lands	6,657	3%	540	4%	119	6%	1 in 56	1 in 12	1 in 5
Not on Tribal Lands	198,436	97%	12,294	96%	2,008	94%	1 in 99	1 in 16	1 in 6

It is also important to note the disparities that occur for Tribal members whether they live on tribal lands or not. As seen in Figure 19, in 2022, people who identify as

American Indian and Alaskan Native were seven times more likely to die in a traffic collision than white residents in the region.

Figure 19. Comparison of Traffic-Related Deaths per 100k by Census Race & Ethnicity



Source: U.S. Department of Transportation, National Highway Traffic Safety Administration (NHTSA); Bureau of Transportation Statistics (BTS); 2020; Fatality Analysis Reporting System, 2023.

Manufacturing/Industrial Centers

The region has 10 designated Manufacturing and Industrial Centers (MICs) where more intensive industrial activity occurs. In general, where there are higher proportions of heavy trucks, people walking and biking involved in crashes have more severe outcomes.

A full depiction of crash information can be found in Table 9, which shows the summary of all crash outcomes for PSRC's designated MICs in comparison to areas outside of MICs.

Table 9. Crash Statistics: Manufacturing and Industrial Centers

	Total of All Injuries	Share of All Injuries	Total of Fatalities & Serious	Share of Fatalities & Serious	Total of Fatalities	Share of Fatalities	Ratio of Fatalities to All Injuries	Ratio of Serious Injuries & Fatalities to All Injuries	Ratio of Fatalities to Serious Injuries & Fatalities
All MICs	11,393	3%	739	4%	145	6%	1 in 79	1 in 15	1 in 5
Not in MICs	193,700	97%	12,095	96%	1,982	94%	1 in 98	1 in 16	1 in 6

Shown in Table 10, people walking and biking are nearly two times as likely to be killed in an MIC than in other locations. People walking and biking experience a serious injury or fatality at the rate of 1 in every 4 collisions or 25% of the time within MICs, while people walking or biking outside of MICs experience a serious injury or fatality at the rate of 1 out of every 5 collisions or 20% of the time, a 5-percentage point hike.

Table 10. Comparison of Severe Outcome Crashes in MIC and Non-MIC Locations

Manufacturing Industrial Center Injuries or Fatalities Walking or Biking	**Serious Injuries & Fatalities**	**Fatalities**
MIC	1 in 4	1 in 14
Not in a MIC	1 in 5	1 in 28

The Duwamish MIC and the Paine Field / Boeing Everett MIC are the most dangerous MICs for people walking and biking. With 42% of all fatal victims being people walking and biking, Duwamish MIC, located south of Seattle, is the largest MIC in the region and has the highest fatalities share for people walking and biking (Table 11).

Table 11. Serious Injury and Fatal Outcomes for Pedestrian and Bicyclist Victims within Manufacturing Industrial Centers

Share of Pedestrian and Bicyclist Victims by MIC	All Injuries & Fatalities	Serious Injuries & Fatalities	Fatalities
Duwamish	5%	23%	42%
Paine Field / Boeing Everett	5%	19%	38%
MIC (share of all victims)	**5%**	**20%**	**30%**
Not in a MIC (share of all victims	**8%**	**25%**	**28%**

Regional Growth Centers

The region has 30 designated Regional Growth Centers (RGCs). These are focal points for planned growth, economic development and regional transportation infrastructure investments.

The ratio of fatalities to all injuries is much higher outside of RGCs (1 in 90) compared to within them (1 in 200), indicating that crashes tend to be more severe outside of RGCs. A full depiction of crash information can be found in Table 12, which shows the summary of all crash outcomes for all 30 of the region's RGCs in comparison to non-RGCs.

Table 12. Crash Statistics: Regional Growth Centers

	Total of All Injuries	Share of All Injuries	Total of Fatalities & Serious	Share of Fatalities & Serious	Total of Fatalities	Share of Fatalities	Ratio of Fatalities to All Injuries	Ratio of Serious Injuries & Fatalities to All Injuries	Ratio of Fatalities to Serious Injuries & Fatalities
All RGCs	23,031	11%	1,143	9%	115	5%	1 in 200	1 in 20	1 in 10
Not in RGCs	182,062	89%	11,691	91%	2,012	95%	1 in 90	1 in 16	1 in 6

High-Frequency Transit Stop Locations

Areas around high frequency transit stops and stations[8] make up only 1% (0.41%) of the central Puget Sound region's roughly one thousand square miles of urban area. Notably, people walking or biking near these high-frequency transit locations experience serious injury or fatality more frequently than within the urban region overall. One possible reason for this is that high-frequency transit locations tend to be in areas that have higher concentrations of foot traffic.

Shown in Table 13, from 2016 to 2023, there were roughly 106 (106.3) people walking or biking in high-frequency transit stop locations per square mile that suffered a serious injury or fatality as compared to less than 3 three (2.7) overall in the region's urban areas. In areas near high-frequency transit stop locations, roughly 15 people walking or biking died per square mile, in comparison to the much lower ratio of one person every two square miles (0.5 per square mile) that died in a crash in the region's urban areas (excluding high-frequency transit station areas).

Table 13. 2016-2023 Crash outcomes for people walking or biking at High-Frequency Transit Station Areas compared to PSRC Urban Areas

Land Coverage	Traffic-related serious injury or fatality for people walking or biking per square mile	Traffic-related fatality for people walking or biking per square mile
High Frequency Transit Stop Locations	106.3	14.5
PSRC Urban Areas (excluding High-Frequency Transit Station Areas)	2.7	0.5

[8] High-Frequency Transit Stops and Stations are 300-foot areas around transit stops or collections of transit stops that are among the highest 20 percent of transit stops in the central Puget Sound region.

Contributing Factor / Crash Types Analysis

The National Roadway Safety Strategy (NRSS) considers that humans are vulnerable and that they make mistakes. To the extent crash records provide insight into transportation system user behaviors, trends in these contributing factors can provide insight into crash types and resulting serious injuries and fatalities. Crash records are only as accurate as the reporting officers accounts and may not capture all behaviors, specifically inattention. Additionally, there may be more than one contributing factor, and it might be difficult to identify how each behavior contributed to the severity of the crash.

Behaviors are classified as:

- U-Turns
- Reckless driving
- Speeding
- Disobeying signals or stop signs
- Impairment: Drug impairment and alcohol impairment
- Failure to yield to either vehicle or non-motorist (angle crashes, head on collision, crosswalks)
- Distracted Driving and Inattention
- Traveling in the wrong way/Lane violation

Crash types are:

- Hit and run
- Single vehicle on highway (limited access)
- Single vehicle on surface streets

Single vehicle crashes (both highway and surface streets) are particularly deadly crash types, accounting for 53% of all fatalities together. Because it is such a problem it is flagged in the crash data as a standalone column. Further, single vehicle crashes are often an indicator of risky behaviors such as inattention, speeding, drug or alcohol intoxication, or reckless driving.

There are two approaches to this analysis:

- Count-Based Approach: This method involves using the columns that flag the summary count of dangerous behaviors involved in each crash. However, it does not always reflect who specifically contributed to the crash.

- Text-Based Approach: This method uses three different text columns to determine the contributing factors of each person involved in the crash (driver, bicyclist, pedestrian). It allows for easy identification of who directly contributed to the crash and enables isolation of driver contributing factors. However, it requires more complex data wrangling.

In either approach, the exercise of calculating the crash severity outcomes considers all casualty types.

Approach 1 – Count-Based (Table 14): For all injuries or fatalities.

Single vehicle crashes on surface streets make up the largest share of fatalities at 43%, despite accounting for only 15% of all injuries. The fatality to all injury ratio of 1 in 35 demonstrates that single vehicle crashes on surface streets are nearly three times more likely to result in a fatality than all crashes in general, which has a fatality to all injury ratio of 1 in 96. Single vehicle crashes often co-occur with other contributing factors such as driver age, speeding, and influence of drugs and alcohol.

Similarly, speeding-involved crashes make up the second largest share of fatalities at 31%, despite accounting for only 18% of all injuries. The fatality to all injury ratio is 1 in 58, meaning that for every 58 injuries in crashes involving speeding, one is a fatality. However, when only considering serious injuries and fatalities, the chance of that injury being fatal is 1 in 5. This underscores the severity of speeding-related crashes and the critical need for effective interventions to reduce speeding.

Conversely, wrong way vehicles account for one of the smallest shares of fatalities in the central Puget Sound region. However, they are the deadliest crash type with a 1 to 14 fatality to all injury ratio.

While young drivers (ages 16-25) are not inherently the contributing factor in crashes, data suggests that they are more likely to engage in risky behaviors that can lead to serious injuries and fatalities, with 29% of fatalities involving younger drivers. It is important to note that the data does not imply that young drivers are always at fault. Instead, it highlights that young drivers are often involved in fatal crashes. Factors such as lack of experience, overconfidence, driving while intoxicated, and susceptibility to distractions like mobile phone use can contribute to this increased risk.

When looking at alcohol impairment, drug impairment, and a combination of impairments (alcohol and drug impairment combined), the shares of fatality rates were all higher than the shares of all injuries, accounting for 17%, 10%, and 24% of all traffic-related fatalities, respectively. It is important to note these crash types also include people walking and biking who are impaired. An alternative approach would be to isolate motor vehicle drivers who are under the influence of drugs and/or alcohol. The ratio of fatalities to all injuries for drug-impaired (all users) incidents is 1 in 16, which is the second deadliest crash type.

Finally, crashes involving a distracted person contribute to 21% of all fatalities. This crash type includes all persons involved in a crash, not just the driver. Although only 1 in 136 injuries are fatal in this type of crash, 1 in 6 injuries is fatal when considering just serious injuries and fatalities.

Table 14. Dangerous Crash Types for All Injuries or Fatalities, Count-Based Approach, 2016-2023

Contributing Factor	Total of All Injuries	Share of All Injuries	Total of Fatalities & Serious	Share of Fatalities & Serious	Total of Fatalities	Share of Fatalities	Ratio of Fatalities to All Injuries	Ratio of Serious Injuries & Fatalities to All Injuries	Ratio of Fatalities to Serious Injuries & Fatalities
Alcohol Impaired Person	12,699	6%	1,982	15%	362	17%	1 in 35	1 in 6	1 in 5
Distracted Person Involved	60,460	29%	2,894	23%	446	21%	1 in 136	1 in 21	1 in 6
Driver Age 16-25	76,446	37%	3,915	31%	609	29%	1 in 126	1 in 20	1 in 6
Drowsy Driver	3,855	2%	222	2%	23	1%	1 in 168	1 in 17	1 in 10
Drug Impaired Person	3,458	2%	794	6%	218	10%	1 in 16	1 in 4	1 in 4
Hit and Run	18,966	9%	1,226	10%	191	9%	1 in 99	1 in 15	1 in 6
Impaired Person	15,139	7%	2,536	20%	516	24%	1 in 29	1 in 6	1 in 5
Single Vehicle Highway	7,641	4%	877	7%	210	10%	1 in 36	1 in 9	1 in 4

Contributing Factor	Total of All Injuries	Share of All Injuries	Total of Fatalities & Serious	Share of Fatalities & Serious	Total of Fatalities	Share of Fatalities	Ratio of Fatalities to All Injuries	Ratio of Serious Injuries & Fatalities to All Injuries	Ratio of Fatalities to Serious Injuries & Fatalities
Single Vehicle Surface Streets	31,531	15%	5,158	40%	908	43%	1 in 35	1 in 6	1 in 6
Speeding Driver	37,928	18%	3,206	25%	652	31%	1 in 58	1 in 12	1 in 5
Vehicle Travel in Wrong Way	768	<1%	211	2%	53	2%	1 in 14	1 in 4	1 in 4
All Crash Types	**205,093**		**12,834**		**12,834**		**1 in 96**	**1 in 16**	**1 in 6**

Note: Crash types do not sum up to the last row ("All Crash Types") or 100% as crashes can have multiple contributing factors.

Approach 2 – Text-Based (Table 17): Motor vehicle drivers' contributing factors, for all injuries or fatalities.

By adopting this alternative methodology, motor vehicle drivers can be isolated, and a more precise study of their behavior and relationship with crashes can be conducted.

Speeding: Excessive speed significantly contributes to fatal crashes, as this factor accounts for the largest share of all traffic-related fatalities (31%). When drivers exceed posted speed limits, they compromise their ability to react to sudden obstacles or changes in traffic conditions. Speeding is involved in a substantial portion of traffic fatalities - 1 in every 58 crashes involving speeding results in a fatality. Moreover, every 1 in 5 severe crashes results in a fatality. This implies that speeding is a major road safety issue with involved drivers exposed to heightened risk.

Distracted Driving: Distractions, such as mobile phone use, divert attention from the road. This metric persists as a high contributing factor to fatalities, with an 18% share of all fatalities.

Impaired Driving: Alcohol or drug impairment significantly increases crash risks. Intoxicated drivers exhibit poor judgment, impaired motor skills, and reduced reaction times. Alcohol-impaired crashes account for 16% of all traffic fatalities, and

drug-impaired crashes account for 8%, but when looking at alcohol and drug impairment combined, the share rises to 22%. Again, crashes that involve drug-impaired drivers have a high fatality rate, as 1 in 17 people involved in such crashes sustain a fatality.

Reckless Driving: For this approach, reckless driving behaviors can be assessed, including aggressive maneuvers and racing. Although this behavior only makes up 5% of all fatalities, the chance of sustaining a fatality is high, at 1 in 22.

Approach 2 - Results

Shown in Table 15, the top five attributes regionwide related to serious injury and fatal crashes include speeding driver, impaired[9], distracted, failure to yield to roadway users, and reckless. Of the top five attributes, speeding driver, impaired, and distracted are prevalent in both intersection and non-intersection crashes. However, at intersections, "failure to yield to roadway user" is attributed more frequently in crashes resulting in serious injuries and fatalities. Additionally, reckless driving is more frequently attributed to crashes at non-intersections, resulting in serious injuries or fatalities.

Table 15. Regionwide Top 5 Contributing Crash Factors

Contributing Factor	Serious Injuries & Fatalities	Fatalities
Speeding Driver	25%	31%
Impaired	18%	22%
Distracted	20%	18%
Failure to yield (to Motorist & Non-motorists combined)	14%	9%
Reckless	5%	5%

Shown in Table 16, regionwide, the top five crash types resulting in serious injury and fatality included fixed object (vehicles departing the roadway and colliding with a fixed object), collision with a person walking or biking, right angle (crashes that occur at intersections when vehicles arrive on perpendicular roads and collide), roll over, and head-on. It is important to note that fixed object, rollover, and head-on collisions suggest dangerous driving behavior, including speeding, distraction, and impairment. At intersections, rear-end and head-on crashes resulting in serious

[9] Impaired includes people under the influence of drugs or alcohol or people under the influence of both drugs and alcohol.

injury or fatality occur more frequently. However, at non-intersections, rollover and head-on crashes are more prevalent as crash types that result in serious injury and fatalities.

Table 17 highlights which contributing factors typically have the most severe outcomes. The purpose of comparing All Injuries to Serious Injuries and Fatalities and Fatalities through ratios is to show which crash types have the highest probability of resulting in severe outcomes. For example, 25% of all drug-impaired crashes result in a severe outcome. Out of these crashes due to drug impairment, approximately 33% result in a fatality.

Table 16. Regionwide Top 5 Crash Types

Crash Type	Serious Injuries & Fatalities	Fatalities
Fixed Object	33%	40%
Collision with Person Walking or Biking	25%	28%
Right Angle	22%	16%
Roll Over	10%	11%
Head-On	7%	9%

Table 17. Dangerous Crash Types of Moving Vehicle Driver for All Injuries or Fatalities, Text-Based Approach

Contributing Factors	Total of All Injuries	Share of All Injuries	Total of Fatalities & Serious	Share of Fatalities & Serious	Total of Fatalities	Share of Fatalities	Ratio of Fatalities to All Injuries	Ratio of Serious Injuries & Fatalities to All Injuries	Ratio of Fatalities to Serious Injuries & Fatalities
Alcohol Impaired	12,241	6%	1,846	14%	339	16%	1 in 36	1 in 7	1 in 5
Disobey Signal or Stop Sign	12,363	6%	692	5%	78	4%	1 in 159	1 in 18	1 in 9
Distracted	59,131	29%	2,552	20%	387	18%	1 in 153	1 in 23	1 in 7
Drowsy	5,219	3%	364	3%	48	2%	1 in 109	1 in 14	1 in 8
Drug Impaired	2,879	1%	651	5%	174	8%	1 in 17	1 in 4	1 in 4
Equipment	3,839	2%	273	2%	45	2%	1 in 85	1 in 14	1 in 6
Reckless Driving	2,517	1%	593	5%	112	5%	1 in 22	1 in 4	1 in 5

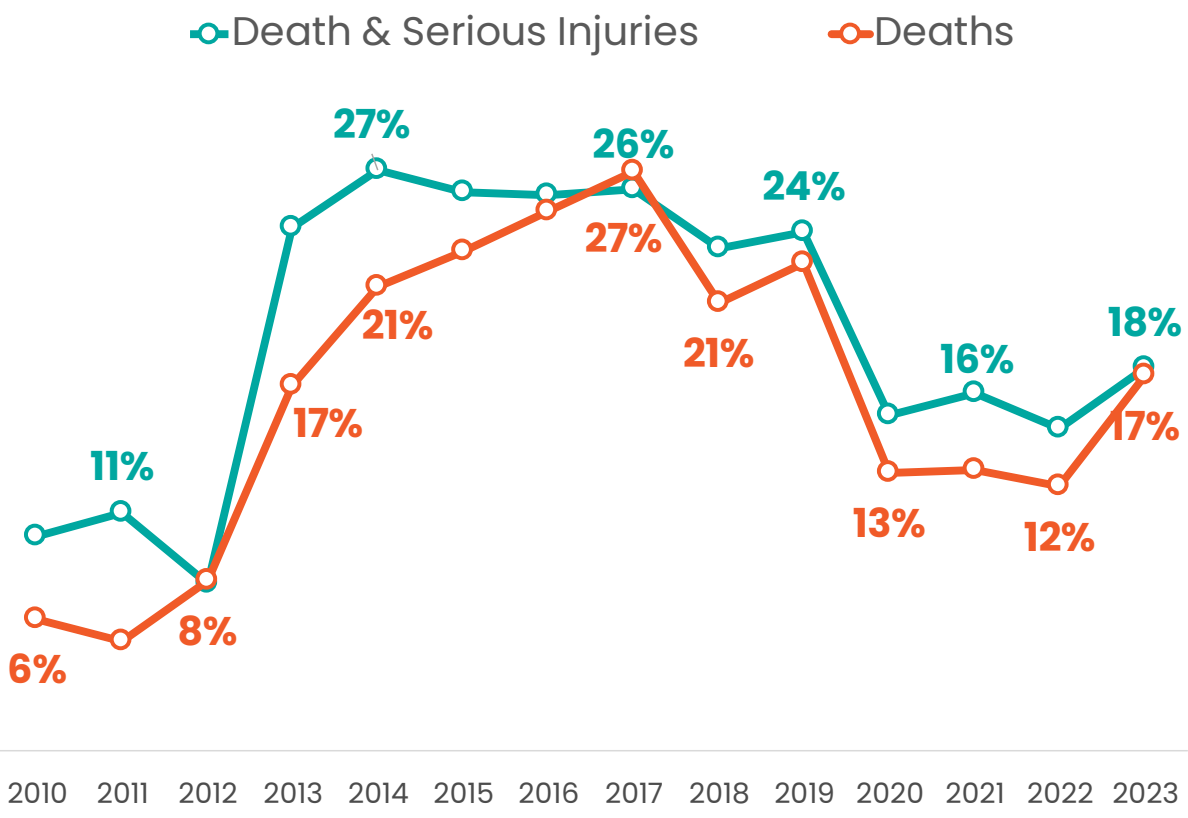
Contributing Factors	Total of All Injuries	Share of All Injuries	Total of Fatalities & Serious	Share of Fatalities & Serious	Total of Fatalities	Share of Fatalities	Ratio of Fatalities to All Injuries	Ratio of Serious Injuries & Fatalities to All Injuries	Ratio of Fatalities to Serious Injuries & Fatalities
Failure to Yield to Vehicle	33,535	16%	1,312	10%	143	7%	1 in 235	1 in 26	1 in 9
Failure to Yield to Non-Motorist	4,305	2%	523	4%	50	2%	1 in 86	1 in 8	1 in 10
Follow Too Closely	33,229	16%	366	3%	32	2%	1 in 1038	1 in 91	1 in 11
Impaired	14,432	7%	2,336	18%	469	22%	1 in 31	1 in 6	1 in 5
Improper Backing	472	0%	26	0%	4	0%	1 in 118	1 in 18	1 in 7
Improper Passing	2,148	1%	283	2%	48	2%	1 in 45	1 in 8	1 in 6
Improper Turn/Merge	9,651	5%	473	4%	38	2%	1 in 254	1 in 20	1 in 12
U-Turn	1,590	1%	89	1%	8	0%	1 in 199	1 in 18	1 in 11
Lane Violation	1,483	1%	260	2%	56	3%	1 in 26	1 in 6	1 in 5
Over-correcting / Oversteering	1,268	1%	186	1%	35	2%	1 in 36	1 in 7	1 in 5
Speeding	37,928	18%	3,206	25%	652	31%	1 in 58	1 in 12	1 in 5
All Crash Types	**205,093**		**12,834**		**12,834**		**1 in 96**	**1 in 16**	**1 in 6**

Distracted Driving Crash Trends

An analysis of crash trends assessed the proportion of serious injuries and fatalities resulting from crashes involving distracted drivers relative to the overall share of all serious injuries and fatalities.

As shown in Figure 20, between 2010 and 2023, the proportion of serious injuries and fatalities due to distracted driving, compared to overall serious injuries and fatalities, peaked in 2014 at 27%. During the same period, the peak percentage of fatalities due to distracted driving, relative to overall fatalities, occurred in 2017, reaching 27%. Although both numbers declined in 2020 as a share of the overall total, distracted driving was identified as a contributing factor in traffic-related fatalities in 2023, increasing five percentage points from one year prior.

Figure 20. Severe Crash Outcomes involving Distracted Drivers as a Percentage of All Crash Types



Stolen Vehicle Involved – Contributing and Co-Occurring Factors

Regionwide 1.6% of all fatal and serious injury crash types occur in incidents where stolen vehicles were involved. The most prevalent contributing or co-occurring factors in crashes involving stolen vehicles are shown in Table 18. With a total of 651 injuries or fatalities, 'Hit and Run' incidents account for 58% of all crashes involving a stolen vehicle. This suggests that a large proportion of injuries or fatalities in these crashes are also injuries or fatalities of hit and run incidents. This intersection of factors emphasizes the complexity and severity of these incidents. It is not merely about addressing vehicle theft but also confronting the reckless and irresponsible behavior linked with hit and run incidents.

Table 18. Contributing and Co-Occurring Factors of Stolen Vehicle Crashes

Contributing Factor	Total of All Injuries	Share of All Injuries	Total of Fatalities & Serious	Share of Fatalities & Serious	Total of Fatalities	Share of Fatalities	Ratio of Fatalities to All Injuries	Ratio of Serious Injuries & Fatalities to All Injuries	Ratio of Fatalities to Serious Injuries & Fatalities
Disobey Signal or Stop Sign	231	21%	42	21%	5	16%	1 in 46	1 in 6	1 in 8
Distracted	162	15%	27	13%	6	19%	1 in 27	1 in 6	1 in 5
Reckless Driving	222	20%	48	24%	7	22%	1 in 32	1 in 5	1 in 7
Impaired	151	14%	38	19%	6	19%	1 in 25	1 in 4	1 in 6
Speeding	397	36%	93	46%	10	31%	1 in 40	1 in 4	1 in 9
Hit and Run	651	58%	66	33%	11	34%	1 in 59	1 in 10	1 in 6
All Stolen Vehicle Crash Types	**1,117**		**202**		**32**		**1 in 35**	**1 in 6**	**1 in 6**

Injuries and Fatalities by Vehicle Type

Motorcycles and heavy vehicles (trucks, tractor-trailers) have more severe outcomes for people involved in the crash compared to all other vehicle types but are a small proportion of total serious injury and fatality crashes. Even though passenger vehicles (cars and light trucks or sport utility vehicles - SUVs) have a similar number of crashes resulting in injuries and fatalities (Figure 21), the outcomes for those involved with light duty trucks/SUVs are substantially worse for people walking and biking. For example, people walking and biking are killed at a rate 43% higher in crashes involving light trucks and SUVs than crashes involving passenger cars.

Figure 21. Fatalities by Vehicle Types

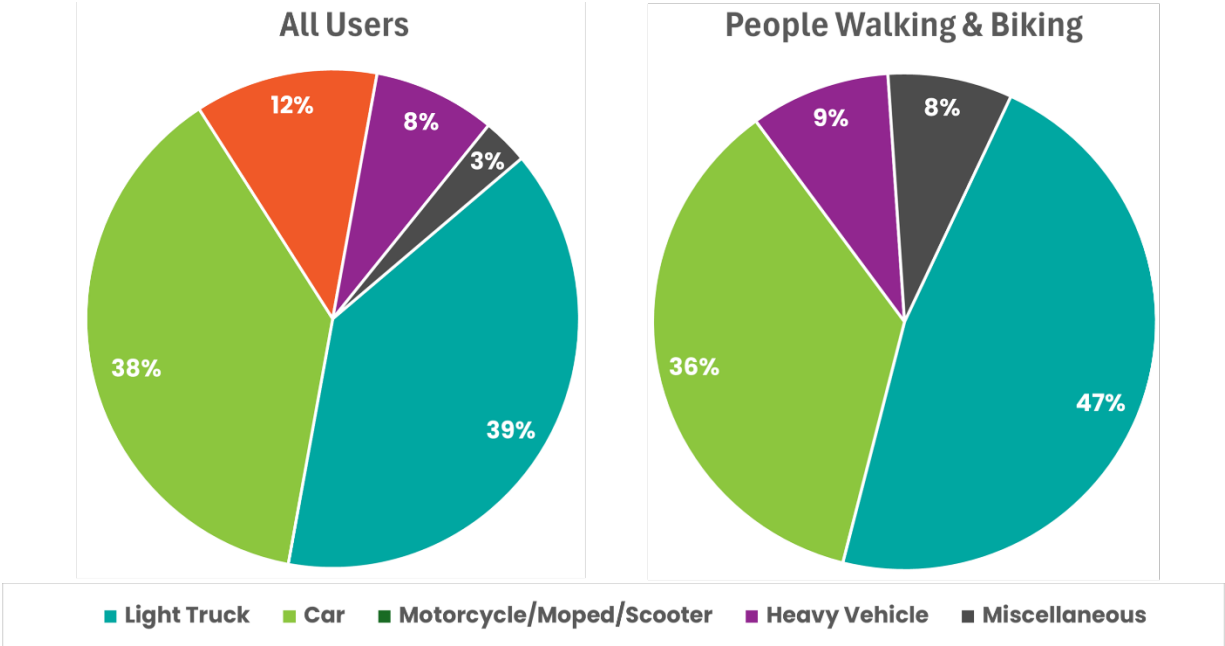


Table 19 provides a comprehensive breakdown of injuries or fatalities by vehicle type, including both injuries and fatalities. The ratios provided allow for an analysis of severity and fatality rates relative to total incidents.

"Motorcycles/Mopeds/Scooters" are the vehicles exhibiting the highest rate of serious injuries and fatalities. Despite accounting for 8,038 total injuries or fatalities, which is significantly less than "Cars" with 148,335 injuries or fatalities, "Motorcycles/Moped/Scooter" have a much higher serious injury and fatality rate indicating an increased risk for drivers of these types of vehicles. It underscores the

importance of safety measures specifically targeted toward motorcycle, moped, and scooter riders to help reduce the severity and fatality rates associated with these incidents.

"Heavy Vehicles" accounted for 11,265 total injuries or fatalities, which is about 5% of all incidents. However, the severity of these incidents is quite high, with 883 serious injuries and fatalities, a ratio of serious injury and fatalities to all injuries and fatalities of 1 in 13. This indicates that heavy vehicles are more likely to cause serious harm to others when involved in a collision. Furthermore, "Heavy Vehicles" also have a higher fatality ratio at 1 in 50, compared to "Cars" at 1 in 130.

Table 19. Casualty by Vehicle Type

Vehicle Type	All Injuries & Fatalities	Serious Injuries & Fatalities	Fatalities	Ratio of Fatalities to All Injuries	Ratio of Serious Injuries & Fatalities to All Injuries	Ratio of Fatalities to Serious Injuries & Fatalities
Car	148,335	7,383	1,137	1 in 130	1 in 20	1 in 6
Heavy Vehicle	11,265	883	224	1 in 50	1 in 13	1 in 4
Light Truck	134,380	6,903	1,155	1 in 116	1 in 19	1 in 6
Miscellaneous	5,205	423	90	1 in 58	1 in 12	1 in 5
Motorcycle/ Moped/ Scooter	8,038	2,223	349	1 in 23	1 in 4	1 in 6
Total Injuries or Fatalities	**205,093**	**12,834**	**2,127**	**1 in 96**	**1 in 16**	**1 in 6**

Vulnerable road users, including people walking or biking, often suffer more severe outcomes when they are involved in crashes with any vehicle type.

The ratio of fatalities to all injuries is 1 in 96 for all casualty groups (Table 19). However, for people biking, this ratio is slightly higher at 1 in 93, and for people walking, it is significantly higher at 1 in 20 (Table 20). This indicates that people walking are the most vulnerable group, with a higher likelihood of fatal outcomes when involved in crashes.

Table 20. Vulnerable Road Users (Bike and Pedestrian) by Vehicle Type

Vehicle Type	All Injuries & Fatalities	Serious Injuries & Fatalities	Fatalities	Ratio of Fatalities to All Injuries	Ratio of Serious Injuries & Fatalities to All Injuries	Ratio of Fatalities to Serious Injuries & Fatalities
Car	7,798	1,416	231	1 in 34	1 in 6	1 in 6
Heavy Vehicle	555	192	56	1 in 10	1 in 3	1 in 3
Light Truck	7,199	1,463	304	1 in 24	1 in 5	1 in 5
Miscellaneous	922	212	54	1 in 17	1 in 4	1 in 4
Motorcycle/ Moped/ Scooter	72	19	3	1 in 24	1 in 4	1 in 6
Pedestrian Injuries or Fatalities	**10,836**	**2,540**	**544**	**1 in 20**	**1 in 4**	**1 in 5**
Bike Injuries or Fatalities	**5,568**	**684**	**60**	**1 in 93**	**1 in 8**	**1 in 11**

Intersections

Table 21 compares crashes that occur at intersections to crashes that do not occur at intersections by all injuries, serious injuries and fatalities, and fatalities. The most common contributing factors related to fatalities at intersections are Speeding (26%), Failure to Yield (24%), and Distracted Users (20%). The most common crash types related to fatalities at intersections are angle crashes that occur when vehicles arrive on perpendicular roads and collide (51%), crashes involving people walking and biking (30%), and crashes involving fixed objects (23%).

Table 21. Crash Statistics: Intersections

	All Injuries	Share All Injuries	Serious Injuries and Fatalities	Share of Serious Injuries and Fatalities	Fatalities	Share of Fatalities
At Intersection	93,118	45%	4,666	36%	538	25%
NOT At Intersection	111,975	55%	8,168	64%	1,589	75%
All Crash	205,093		12,834		2,127	

Geospatial High Crash Analyses

High-Crash Locations

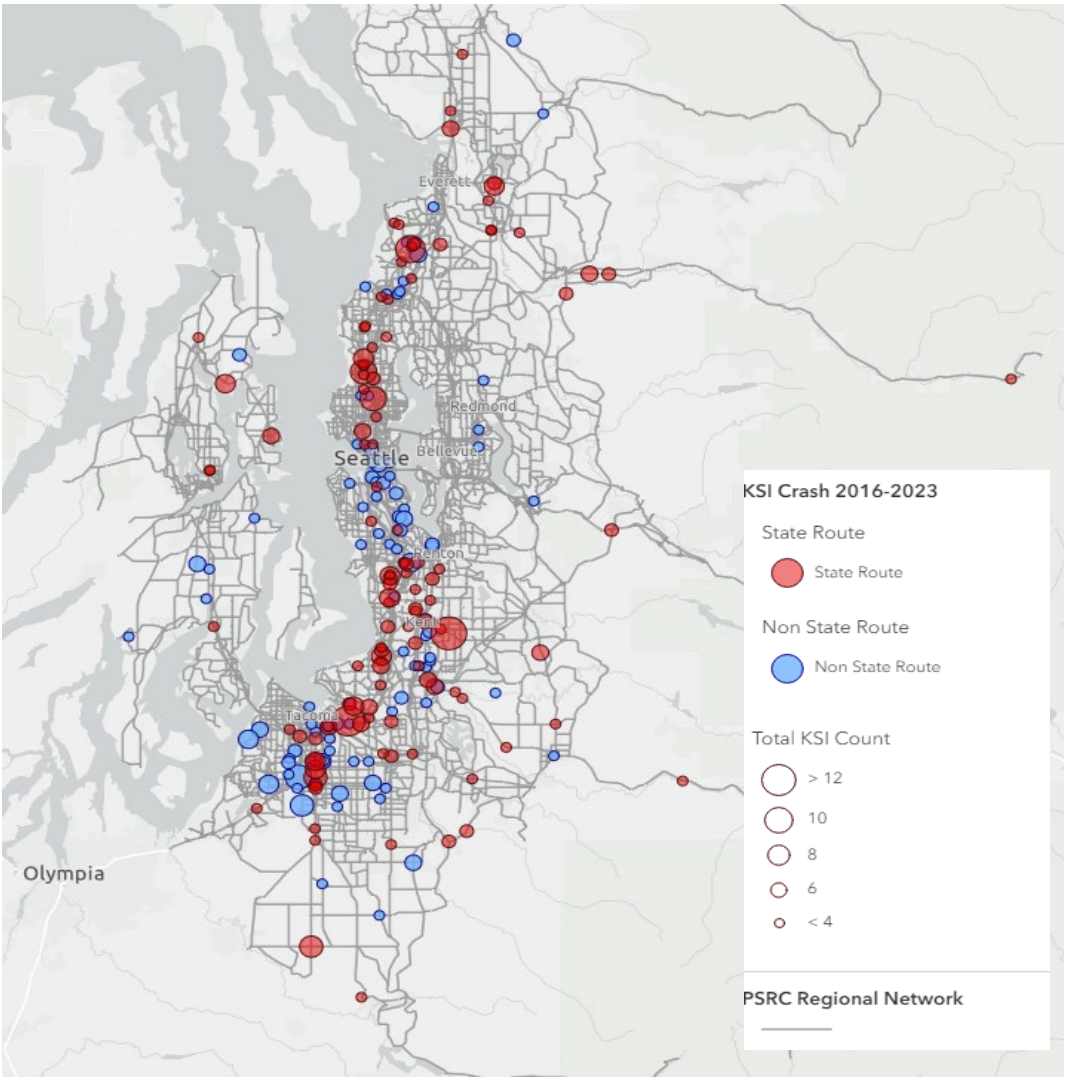
The main goal for this analysis is to plot high serious injury and fatality crash locations on a map, including crashes at intersections and non-intersection crashes between 2016-2023.

Serious injury crashes and fatalities are aggregated based on the physical location of the crash, specifically if it is within 30 meters (100 feet) of another crash on the same street.

Crashes that occurred on state routes (red) were differentiated from those that did not (blue).

For visualization purposes, high serious injury and fatality crash locations are defined as locations with at least four serious injuries or fatalities over the 2016 to 2023 study period. Figure 22 shows a snapshot of the high-crash locations map in the Puget Sound region.

Figure 22. High-Crash Locations/Intersections Map in the central Puget Sound region

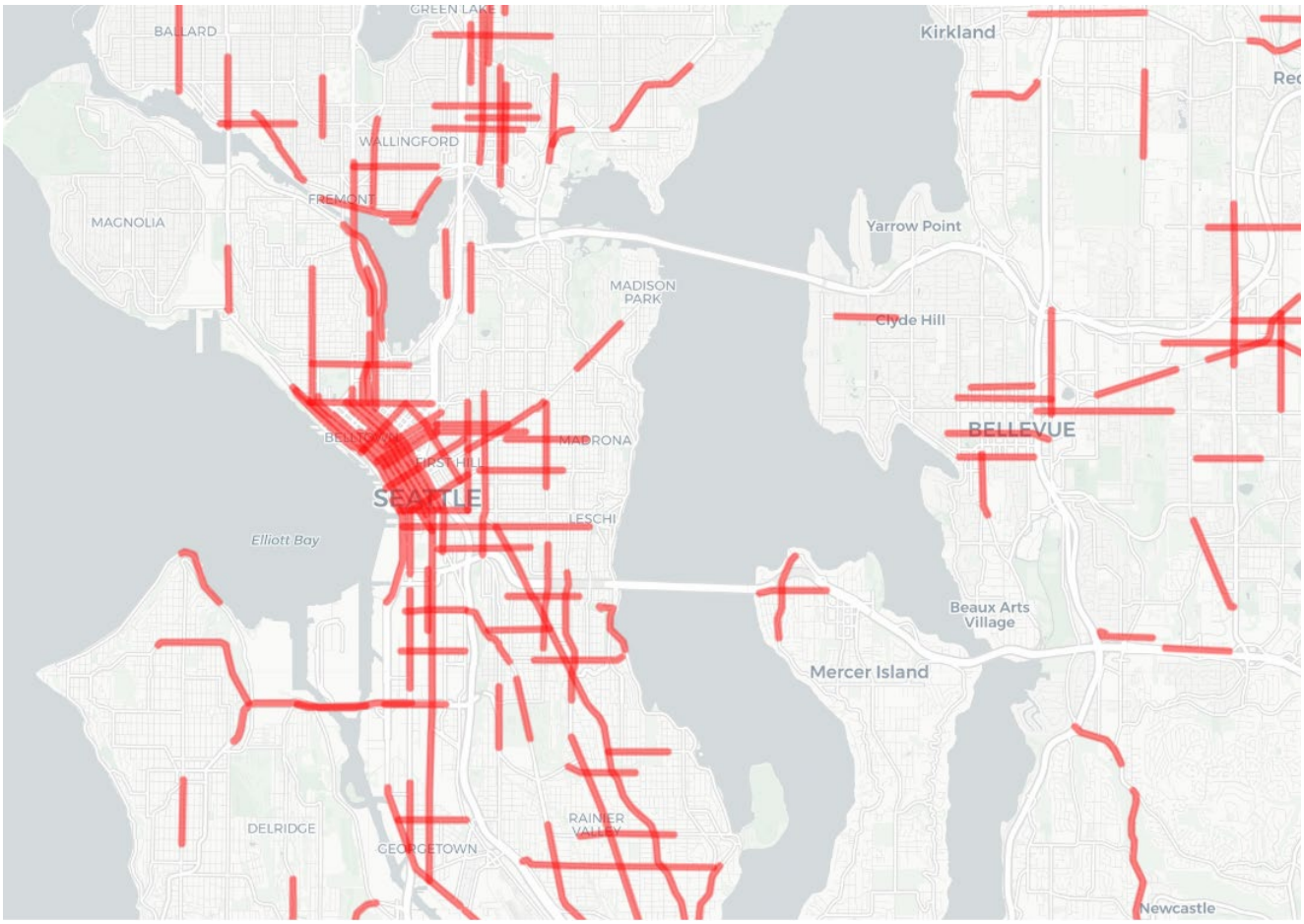


High Injury Network

The High Injury Network (HIN) maps corridors with a high density of fatalities and serious injuries (Figure 23). To build the HIN, roadways were broken down into 10-meter segments before spatially attributing serious injury crashes and fatalities to the road segments. Crashes on each roadway segment were then saved in an array for an additional comparison of the *Primary Roadway* and/or *Intersecting Roadway* fields in the original crash data to validate the spatial join. A sliding window algorithm was performed with a one-mile minimum contiguous segment applied to corridors with parameters including a minimum distance of one mile and start to end points on surface streets at intersections. The process ranked corridors in the Regional Network by serious injury or fatality per mile. The output of this process

made the network more usable for policy makers and easier to translate to tabular format. Comparison of different study periods enables tracking of progress on HIN corridors over time.

Figure 23. High Injury Network Showing Seattle Top Crash Locations



High-Risk Networks (HRN) (vulnerable street users – people walking and biking)

The High-Risk Network (HRN) follows the same general methodology of the HIN, with only vulnerable road users considered when developing the corridors. Additionally, the final map will show People with Low Income EFAs over 50%, people of color EFAs over 50%, and the overlap of the two. This will show to what degree the HRN is correlated to equity issues.

Work Zone Contributing Factors

Work zones are of particular concern as they result in injuries and fatalities in the workplace. There were 3,165 total work zone crashes in the central Puget Sound region from 2016 to 2023, with 36 crashes resulting in fatality. Work zone crashes are not common when compared to crashes in the region as a whole. Table 22 provides a detailed breakdown of the contributing factors of crashes occurring in work zones.

Table 22. Contributing Factors of Crashes in Work Zones

Contributing Factor	Total of All Injuries	Share of All Injuries	Total of Fatalities & Serious	Share of Fatalities & Serious	Total of Fatalities	Share of Fatalities	Ratio of Fatalities to All Injuries	Ratio of Serious Injuries & Fatalities to All Injuries	Ratio of Fatalities to Serious Injuries & Fatalities
Distracted	939	30%	41	23%	9	25%	1 in 104	1 in 23	1 in 5
Drowsy	112	4%	9	5%	1	3%	1 in 112	1 in 12	1 in 9
Reckless Driving	32	1%	6	3%	1	3%	1 in 32	1 in 5	1 in 6
Failure to Yield to Vehicle	231	7%	8	4%	1	3%	1 in 231	1 in 29	1 in 8
Follow Too Closely	997	32%	10	6%	1	3%	1 in 997	1 in 100	1 in 10
Impaired	318	10%	39	22%	8	22%	1 in 40	1 in 8	1 in 5
Speeding	893	28%	53	30%	15	42%	1 in 60	1 in 17	1 in 4
All Crash Types in Workzone	**3,165**		**179**		**36**		**1 in 88**	**1 in 18**	**1 in 5**

Conclusions and Applications for the Region

The most compelling story of the region is the urgent need for action in response to the rising number of roadway fatalities. This crisis has been brought into sharp focus by this analysis, which highlights the areas and behaviors contributing the most to this alarming trend. The results of this analysis will serve as the basis for the

development of key emphasis areas and a toolbox of correlated strategies that will serve as the core of the Regional Safety Action Plan.