03

Data Analysis and Emphasis Areas

Weld County is a diverse community with numerous unique attributes, ranging from agricultural farmland to densely populated urban areas. To best understand Weld County's current roadway safety environment, it is essential to examine the county through various lenses, including unincorporated Weld County, jurisdictions covered in the action plan, or the county as a whole.

Through the findings of this analysis, which looked at ten years of crash data (2014-2023), focused and data-driven decisions can be applied as guiding support for the implementation of this action plan. Additional data trends can be reviewed in Appendix C.

Crash Mapping

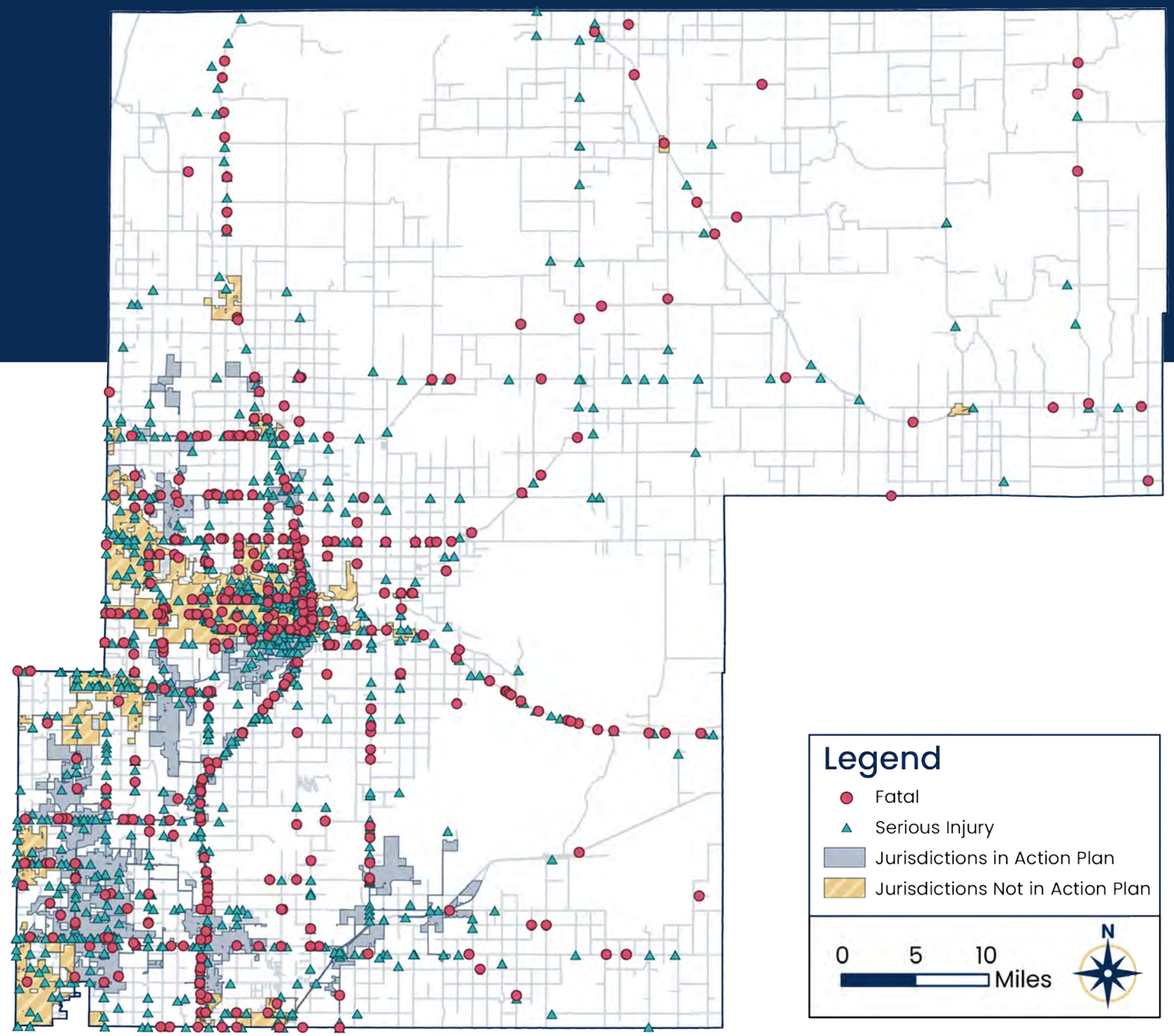
All Fatal & Serious Injury Crashes, 2014-2023

The primary goal of the safety action plan is to reduce crashes that result in people being killed or seriously injured (KSI) in Weld County. A total of 1,828 crashes have resulted in people being killed or seriously injured, with another 10,882 crashes resulting in non-incapacitating (minor) or possible injuries. Although non-injury crashes (aka PDO crashes) make up three-quarters of crashes in the county, this plan is focused on limiting injury crashes, particularly crashes that result in a fatality or serious injury.

Crash Severity	# of Crashes
Fatal	434
Serious Injury	1,394
Non-incapacitating Injury	4,023
Possible Injury	6,859
Property Damage Only	44,462
Grand Total	**57,172**

By mapping these crashes, it helps frame what roadways should be prioritized to limit KSI crashes. More than half (55%) of all KSI crashes occur in municipal jurisdictions within Weld County (23% being jurisdictions included within this action plan). In unincorporated Weld County, many KSI crashes occur on state highways, such as US 34 and US 85.

Area	# of KSI Crashes	% of KSI Crashes
Jurisdictions in Action Plan	428	23%
Unincorporated Weld County	819	45%
Jurisdictions Not in Action Plan	581	32%
All Weld County	**1,828**	**100%**

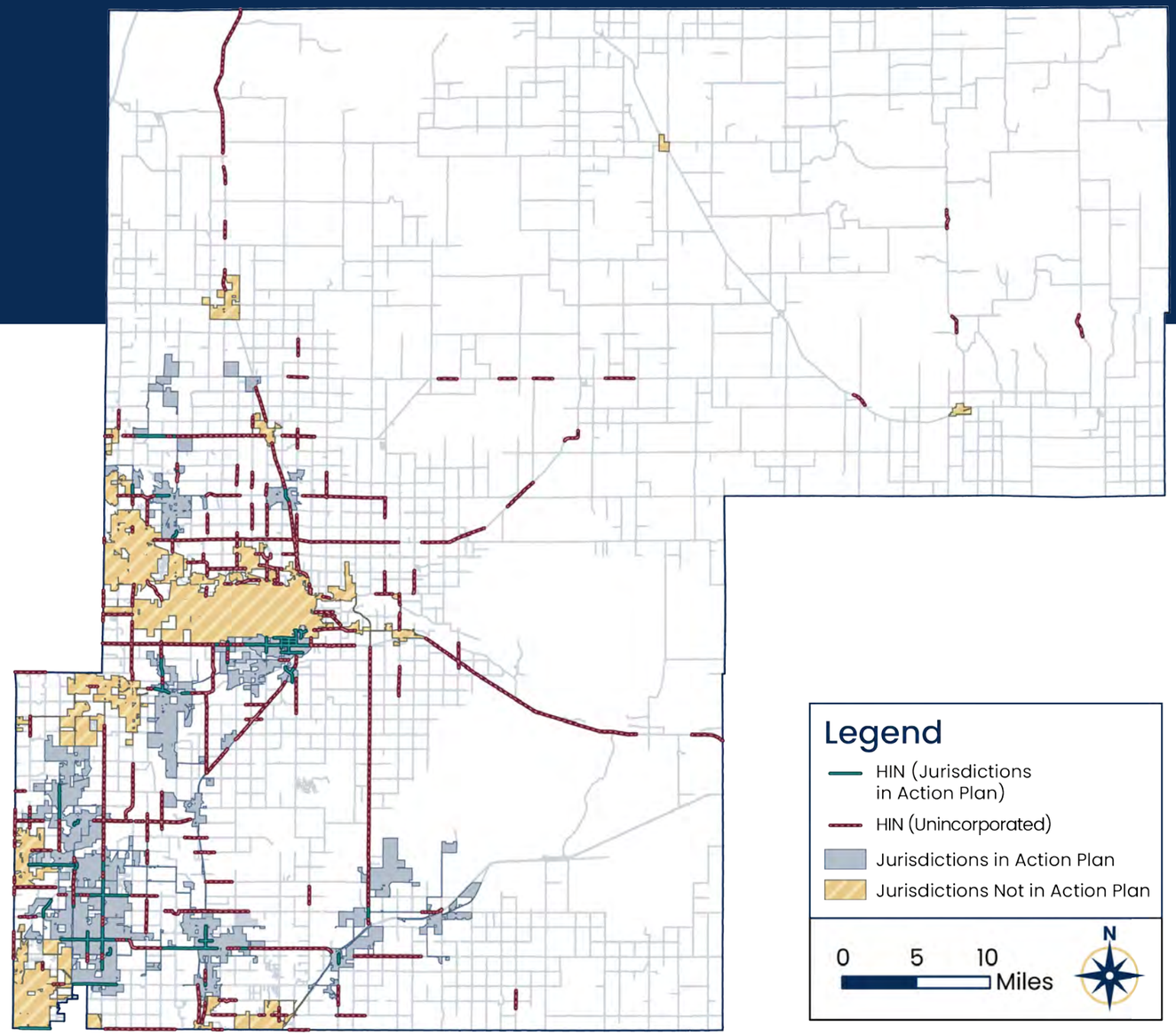


High Injury Network

The High Injury Network (HIN) is a mapping tool to help identify where people are being killed or seriously injured within Weld County. This data-driven approach helps focus on using resources in areas of greatest need. The most recently available ten years of crash data (2014–2023) were used to create the HIN.

The HIN (including jurisdictions within the plan and unincorporated Weld County) accounts for 9.5% of the county's total roadway miles, but accounts for 65.0% of all KSI non-intersection related crashes. This shows that on these 426 miles of roadway, KSI crashes are nearly seven times more likely to occur.

Category	# of KSI Crashes	% of KSI Crashes	# of Roadway Miles	% of Roadway Miles	Rep. Ratio
HIN (Jurisdictions in Action Plan)	143	68.4%	102	9.8%	7.0
HIN (Unincorporated Weld County)	304	63.5%	324	9.4%	6.8
HIN (Combined)	**447**	**65.0%**	**426**	**9.5%**	**6.8**



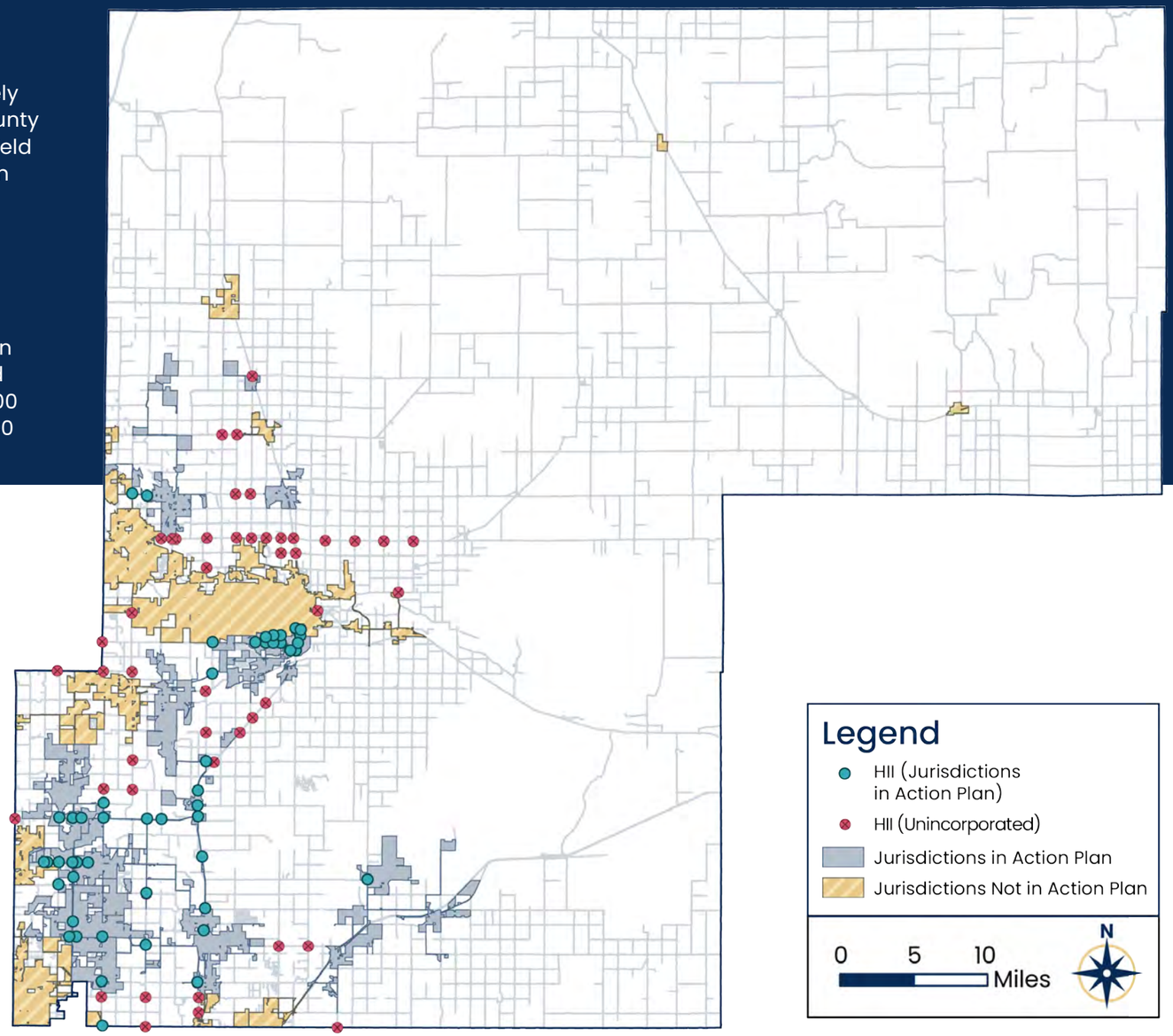
High Injury Intersections

High Injury Intersections (HII) are another key mapping tool. Like the HIN, the HII uses 10 years of injury crash data to identify the most dangerous intersections to most effectively allocate county resources and give context to transportation safety problems. Weld County has 13,780 intersections overall, all of which were included in the data analysis for the Weld County Safety Action Plan (SAP). For the purposes of the HII analysis, the plan focuses on 7,674 of the county's intersections in two specific categories:

- 5,052 in jurisdictions in action plan
- 2,622 in unincorporated Weld County

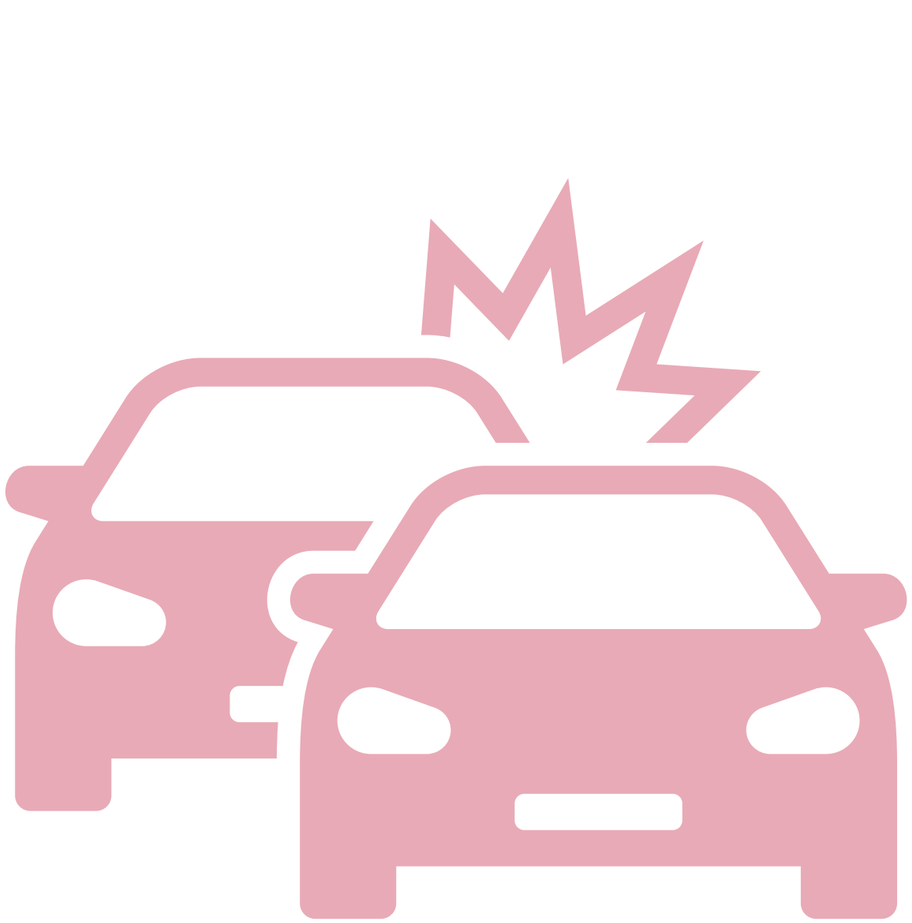
HII locations shown below have the highest concentration of intersection crashes in the county. For the purposes of the SAP, the top 100 intersections within the county (50 within jurisdictions in action plan and 50 in unincorporated Weld County) comprise the HII and account for 345 KSI crashes, or 59.1% of KSI crashes within these two categories. These 100 intersections represent 1.3% of the 7,674 intersections in the plan and just 0.7% of all 13,780 intersections in the entire county.

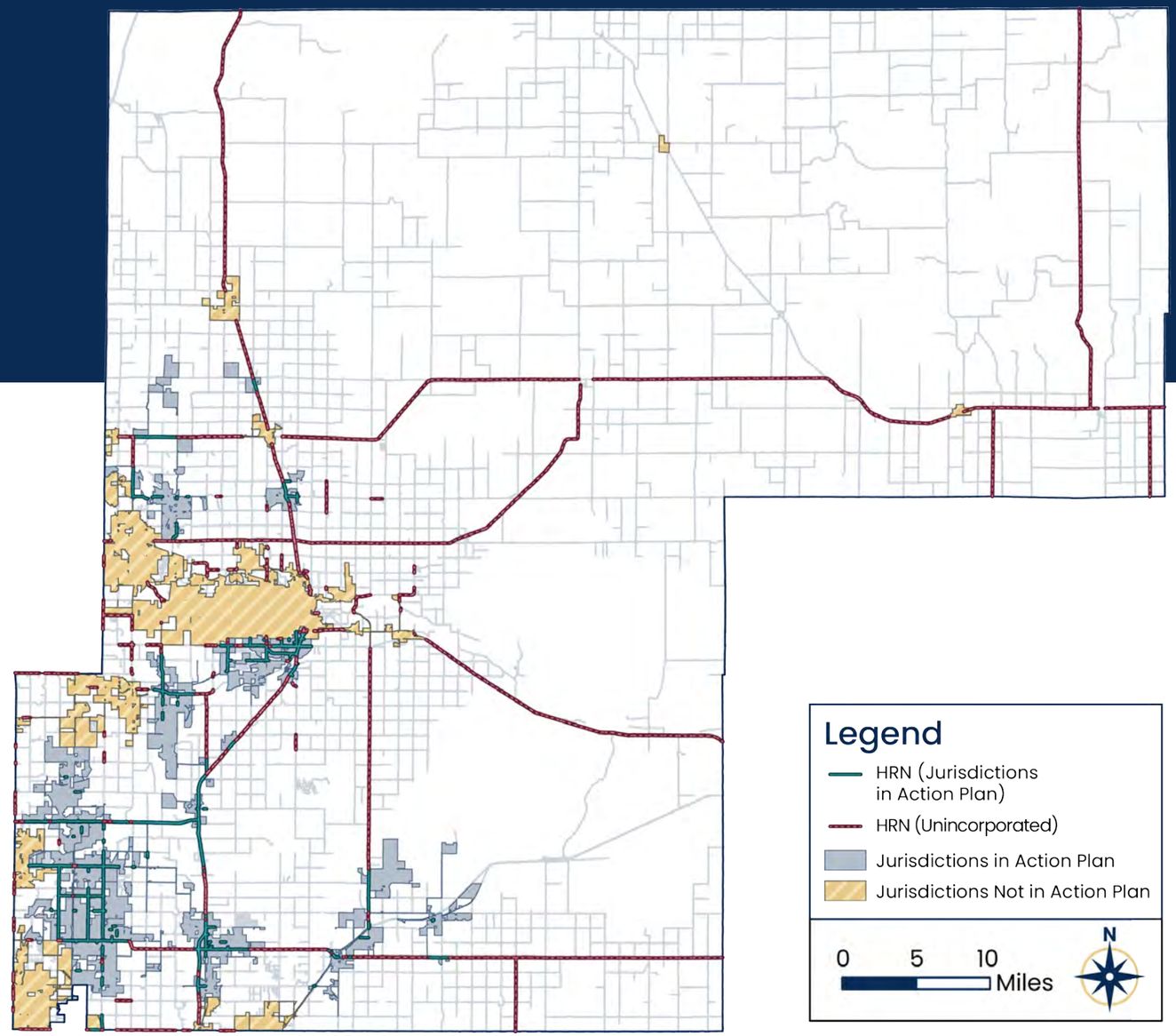
Category	# of KSI Crashes	% of KSI Crashes	# of Intersections	% of Intersections	Rep. Ratio
HII (Jurisdictions in Action Plan)	149	62.6%	50	1.0%	63.3
HII (Unincorporated Weld County)	196	56.6%	50	1.9%	29.7
HII (Combined)	**345**	**59.1%**	**100**	**1.3%**	**45.3**



High Risk Network

Both the HIN and HII are based on historical crash data, which is very useful in addressing existing problems where data is available. Since we know that KSI crashes account for a small share of total vehicle interactions, and near misses are rarely reported/recorded, some of the roadways most likely to experience a KSI crash may not be represented in the HIN and HII data. Therefore, the High Risk Network (HRN) can be used to identify streets where KSI crashes are likely to occur, based on existing attributes such as the number of lanes, traffic volumes, roadway functional classes, and speed limits.





Emphasis Areas

The Weld County Safety Action Plan Task Force selected **four emphasis areas based on findings in the data analysis**. Emphasis areas provide an opportunity to take a deeper look at potential issues that the action plan aims to identify and address.

These emphasis areas include:

BEHAVIORAL:
Impaired & Distracted Driving, Speeding

ENVIRONMENTAL:
Land Use Context, Road Hazards

INFRASTRUCTURE:
Lighting, Intersection & Roadway Design

MODES OF TRAVEL:
Vehicle Types, Vulnerable Road Users

EMPHASIS AREAS

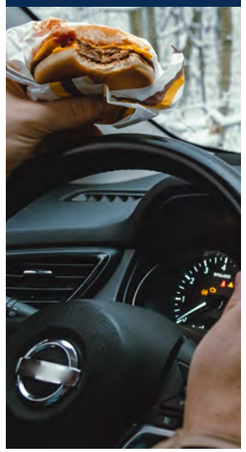
BEHAVIORAL
Examining behavioral factors like impaired driving, distracted driving, and speeding are important to dissecting the root causes of many fatal and serious injury crashes. Understanding unsafe behaviors such as these directly influence roadway safety and help identify where enforcement, education, and policy efforts should be focused.

ENVIRONMENTAL
Environmental factors such as land use context and road hazards play a significant role in roadway safety by shaping how drivers interact with the built environment. Vehicles in rural areas face different safety challenges compared to those in urban settings. Contextualizing land use and exploring hazards better informs what makes a roadway less safe.

INFRASTRUCTURE
Infrastructure elements, such as lighting, intersection design, and roadway design, directly impact how safely and efficiently traffic moves. Analyzing design factors, such as intersection geometry and roadway type, are essential for identifying safety issues and implementing solutions that reduce conflicts and improve traffic flow.

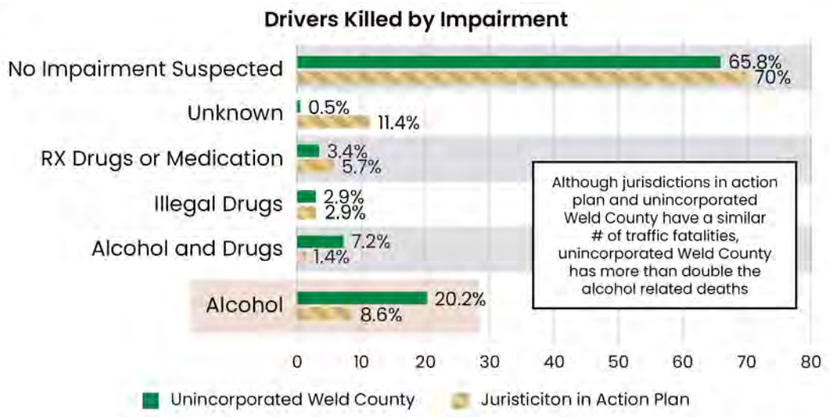
MODES OF TRAVEL
Different travel modes, such as walking, biking, or driving various types of vehicles, present unique safety challenges and vulnerabilities. Vulnerable road users (VRUs), like pedestrians, bicyclists, and motorcyclists, are at higher risk in crashes due to lack of protection. Understanding how travel mode affects crash outcomes helps guide the development of safer, more inclusive transportation systems.

5.9%
of KSI crashes involve a driver **who is either preoccupied or distracted by a passenger.**

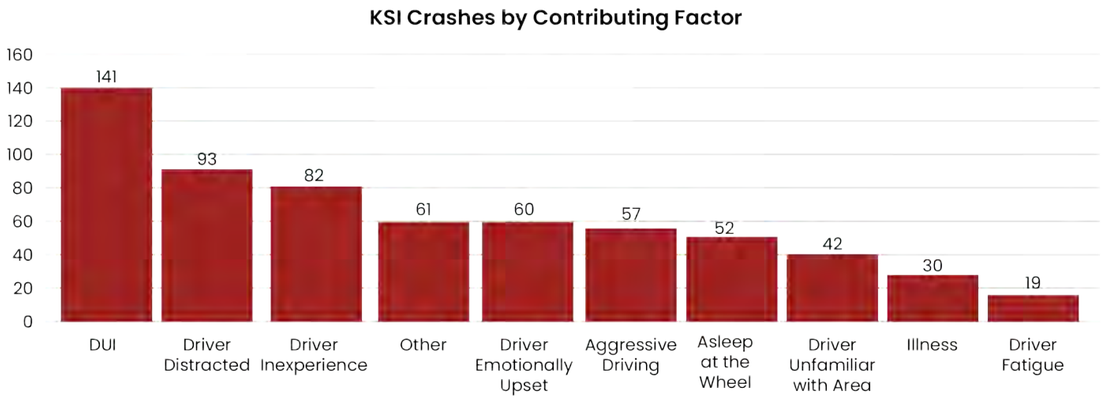


Impaired & Distracted Driving

People aren't perfect. Sometimes, they make mistakes and poor decisions — however, they should not have to pay with their lives or live their lives permanently altered because of a single moment or choice. Some behaviors may be considered reckless, or even negligent, and have an outsized impact on KSI crashes. Impairment, the use of alcohol or drugs while traveling, is one of those.

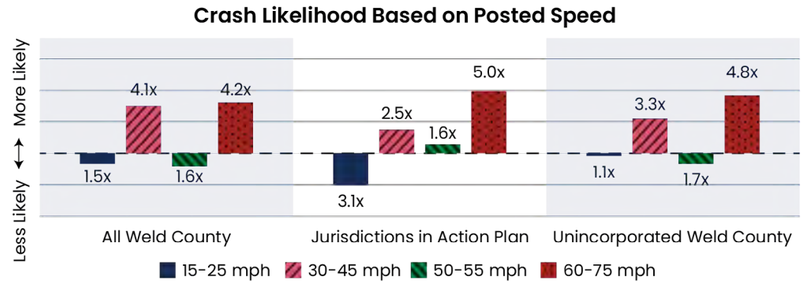


Even if someone is unimpaired, the current world is constantly trying to grab everyone's attention away from the road, making distractions another concern for roadway users. Nearly half of all KSI crashes have no apparent contributing factor.



Speeding

Speeding is often one of the first thoughts that come to mind when considering reckless driving.



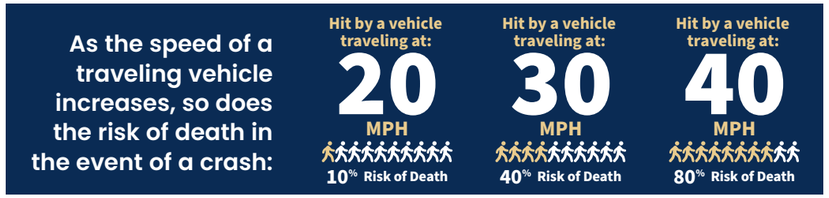
For roadways with a posted speed limit of 50-55 mph, we see the trend dip; this is due to most roadway facilities with higher speeds having increased safety infrastructure such as medians, separated pedestrian/bicycle paths, access management, and improved shoulders. As speeds increase, the infrastructure present may not be best suited to adequately handle forces due to these speeds as well as having a higher level of traffic volume.

8 in 10 fatal crashes within all Weld County occur on a road with a posted speed limit of 55 mph or higher.

The likelihood of fatality increases exponentially with vehicle speed; for every 10 mph increase, the likelihood of a fatality doubles. Speed is such an impactful factor within crashes for several reasons, including:

- The higher the speed, the more forceful the crash
- The higher the speed, the narrower the field of vision drivers have
- As speeds increase, the amount of time drivers have to react decreases
- As speeds increase, so do their braking distances (meaning, drivers may be unable to stop in time)

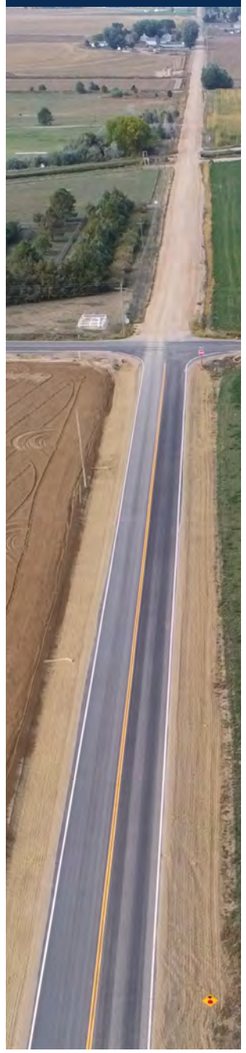
This likelihood of fatality increases more sharply for pedestrians.



Source :https://www.ite.org/technical-resources/topics/speed-management-for-safety/speed-as-a-safety-problem/

15%
of KSI crashes involve a vehicle **going more than 5mph over the posted speed limit.**

95%
of Weld County is considered **unincorporated (rural).**



Land Use Context

Rural and urban areas within the county often differ in various safety challenges due to the differences in infrastructure, road users, and traffic volume. When examining surface area, more than 95% of Weld County is considered unincorporated (rural). Although jurisdictions account for less than 5% of the county's surface area, more than half of KSI crashes occur within a municipal area.

While these urban areas are more represented in terms of the number of KSI crashes, rural (unincorporated) crashes are:

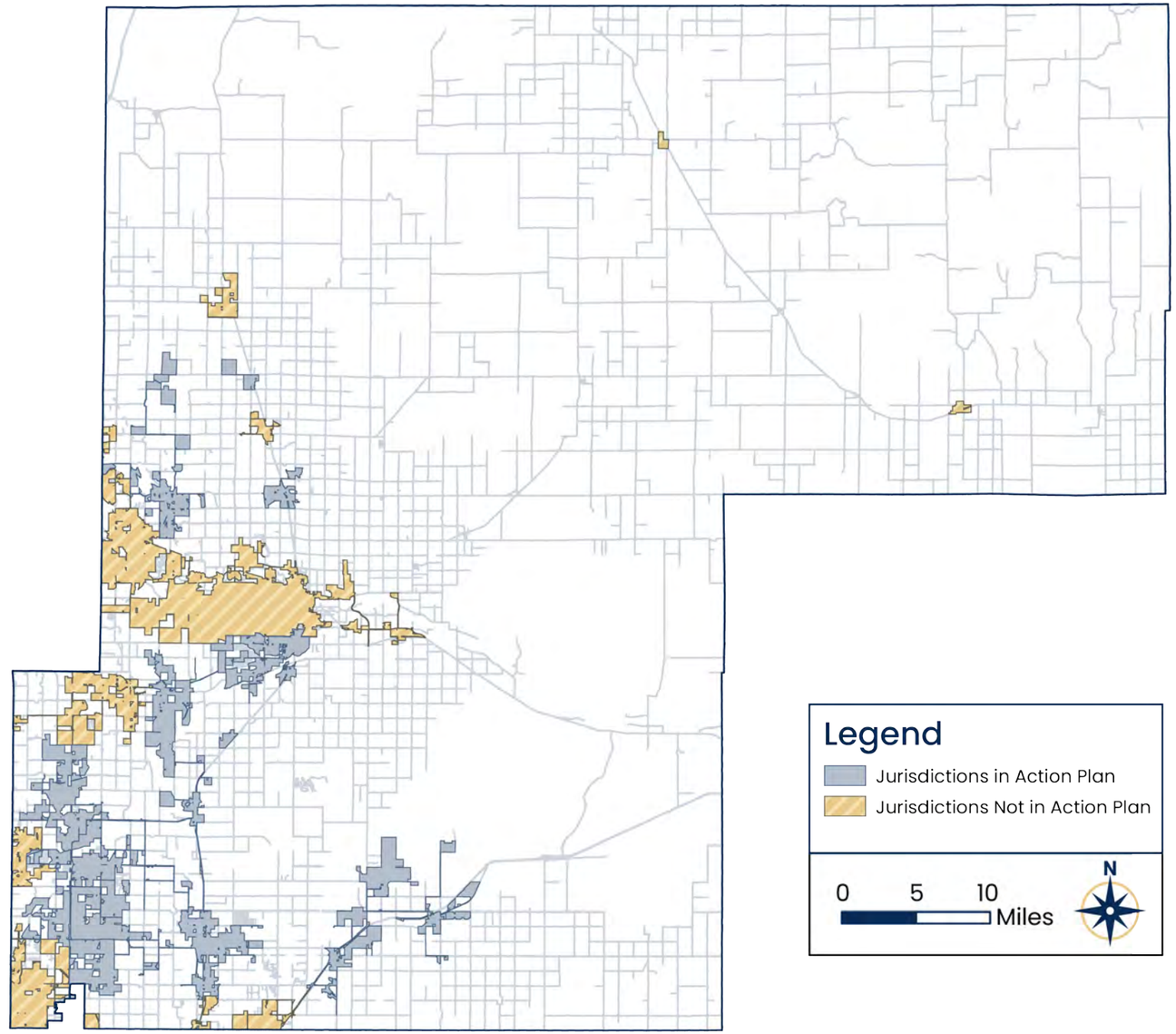
2.8x more likely
to result in a fatality than urban crashes

1.7x more likely
to result in a serious injury than urban crashes.

Certain crash types are significantly more represented in rural areas (when compared to urban areas):

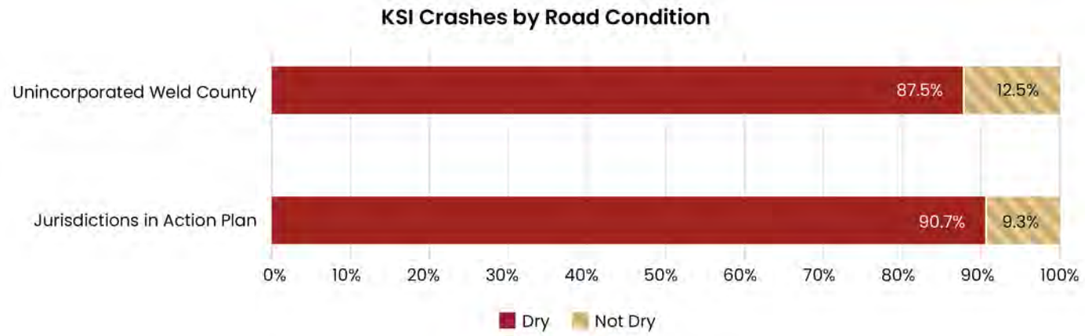
- Overturning crashes are 3.8x times more likely
- Embankment or Ditch crashes are 3.7x times more likely
- Fence or Fence Part crashes are 3.2x times more likely
- Light or Utility Pole crashes are 2.3x times more likely
- Sideswipe Opposite Direction crashes are 2.1x more likely
- Head-on crashes are 1.7x more likely

Rural areas will also have more roadway miles at higher post speeds. 81% of injury crashes in unincorporated Weld County occur on roads with a posted speed limit of 55 mph+ compared to roughly 50% for similar crashes in municipal jurisdictions within Weld County.



Road Hazards

Road hazards are something drivers can't necessarily control, but these things still need to be accounted for when developing safer roadways. Factors like poor weather and roadside obstacles can pose an increased risk to drivers and vulnerable road users alike. Moisture on the road like water, ice, snow, or mud has a larger impact on injury crashes in unincorporated Weld County compared to municipal jurisdictions in the action plan.



Roadside obstacles can be many things such as parked cars, animals, construction equipment, or anything else that can find their way onto a road.

9% of injury crashes **involve a fixed object in Weld County.**

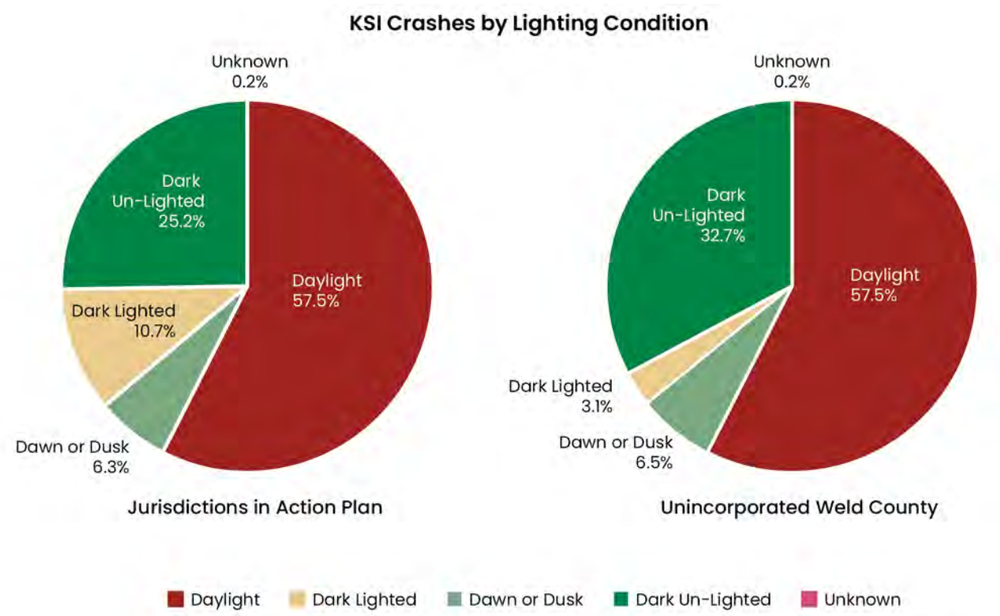
1 in 4 of fixed objects **involve a fence or fence post.**

Lighting

Nationally, the number of fatal crashes occurring in daylight versus darkness is approximately the same; however, the nighttime fatality rate is three times the daytime rate because only 25 percent of vehicle miles traveled (VMT) occur at night.[1]

In Weld County, a little more than half of crashes in urban and rural environments happen in daylight; however, **rural (unincorporated) Weld County experiences 7.5% more crashes in unlit conditions at night than in jurisdictions in the action plan.**

1.7X Crashes in Weld County on dark (lit or unlit)roads **are 1.7X more likely to involve a fatal or serious injury.**



[1] **FHWA | Lighting**

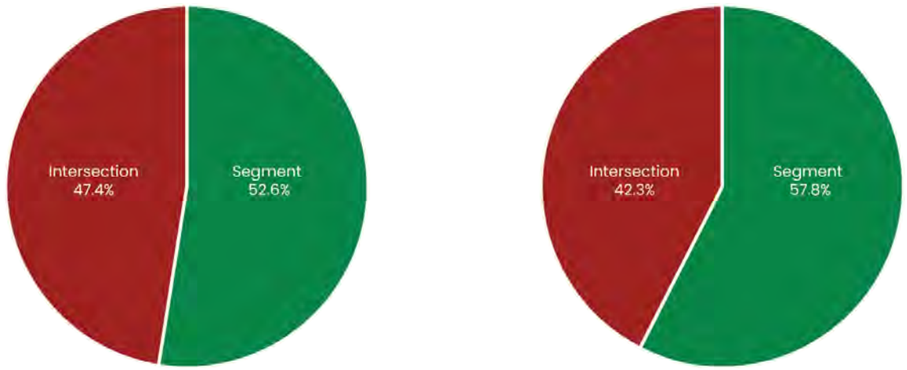
Half
of all intersection crashes in Weld County **occur at less than 1% of total intersections.**

Intersection & Roadway Design

Intersections are a natural point of conflict for roadway safety. With the complexity of vehicle movements (e.g., crossing paths, merging, diverging), varying control types, and the potential presence of pedestrians, intersections have many things that can contribute to a hazardous crash environment.

Typically, urban intersections see more crashes due to higher traffic volume compared to their rural counterparts. For jurisdictions in the action plan and unincorporated Weld County, segments are the primary location of crashes. When considering KSI crashes in Weld County, segments contain the majority of KSI crashes in the action plan.

KSI Crashes by Crash Location



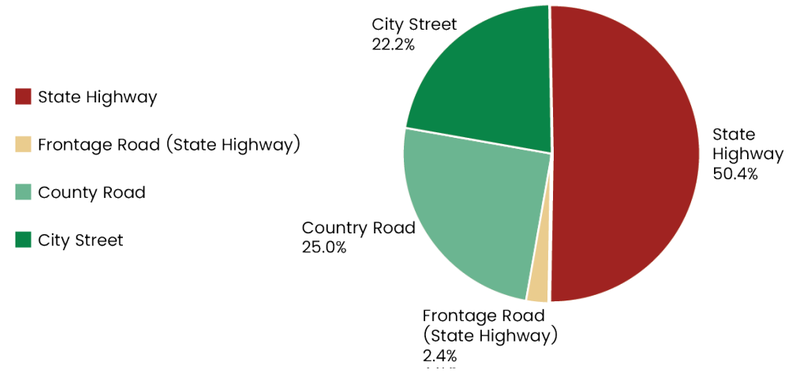
Roadway design plays a crucial role in traffic safety, influencing both the frequency and severity of crashes. Roadway classification, the number of lanes, and other elements such as access management play a vital role in not only lessening the severity of crashes but also limiting them altogether. In Weld County, half of all KSI crashes occur on a state highway.

Crashes on principal arterial – other freeway and expressways roadways are 6.5x more likely in all of Weld County and 7.9x more likely in unincorporated Weld County.

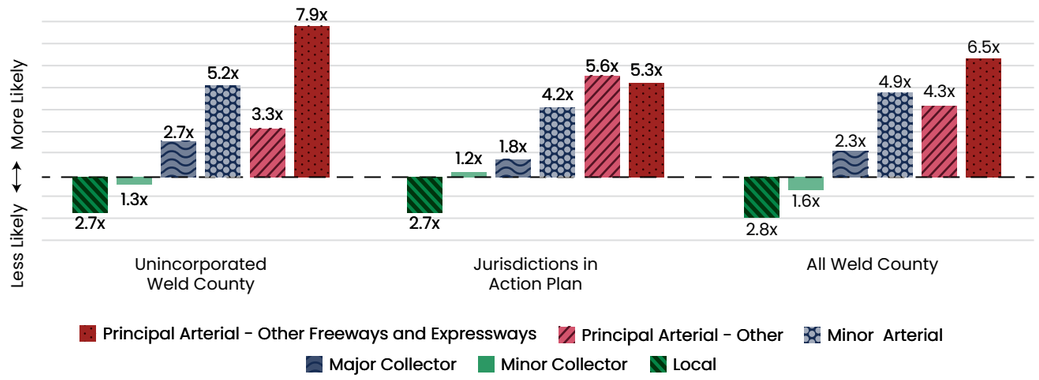
Although crashes are more likely on these functional class roads, these roadways have higher traffic volumes and are designed to better limit crash severity.

1 in 4
fatal crashes **occur on a local road (CDOT classification).**

KSI Crashes in All Weld County by Roadway Type

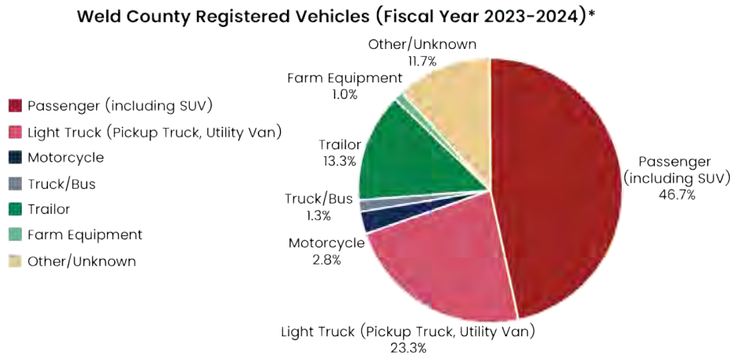


Crash Likelihood Based on CDOT Roadway Functional Classification



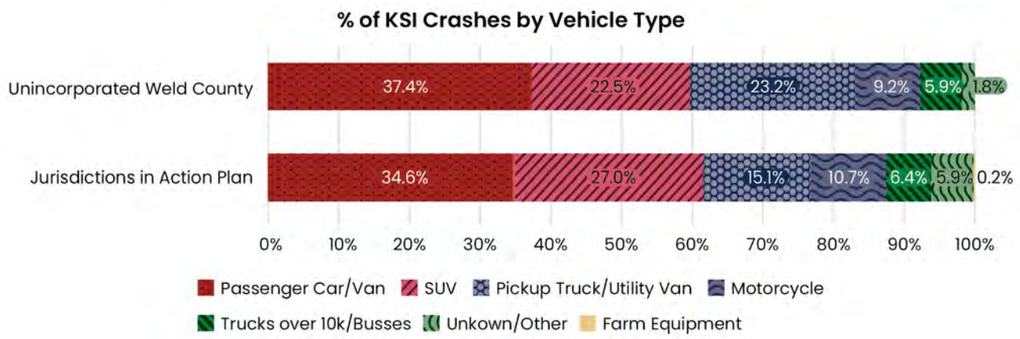
Vehicle Types

Different vehicle types impact safety in unique ways. Larger vehicles (like trucks) can lead to more severe crashes as the size and weight can increase damage caused by these vehicles in crashes whereas smaller vehicles (like motorcycles) are at a higher risk of fatalities and serious injuries due to more physical exposure by the driver.



Source: Colorado Department of Revenue Fiscal Year 2023-2024 Annual Report

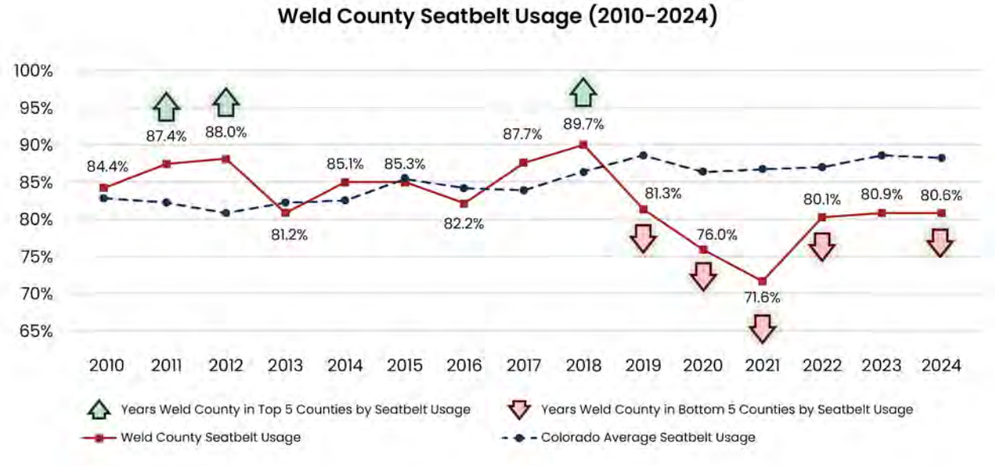
Vehicles type will vary based on geography as well. Rural areas will have more work vehicles like pickup trucks, cargo vans, and farm equipment whereas urban areas will see more passenger vehicles (including SUVs). **Looking at specifically heavy trucks, crashes involving a heavy truck make up a small percentage (0.3%) of all crashes within Weld County. Of the 42 crashes involving a heavy truck, 38% resulted in a fatal or serious injury.**



Safety equipment usage by vehicle types also varies.

Over the last 15 years, Weld County's seatbelt usage has fluctuated. In 2010, Weld County had a usage rate of 84.4% (ranked 11 out of the 25 counties included in the survey), reaching a peak of 89.7% (ranked 5 out 31 counties) in 2018. During this period, Weld County was in the top five counties by seatbelt usage in the entire state for three years (nearly reaching CDOT's 90% threshold for seatbelt usage rate in 2018).

However, beginning in 2019, Weld County's seatbelt usage dipped, reaching a low of 71.6% in 2021 (ranked 29 out of 31 counties); between 2019 and 2024, Weld County was ranked in the bottom five counties by seatbelt usage for five out of six years.



Source: CDOT Statewide Seatbelt Survey (2010-2024)

The National Highway Traffic Safety Administration (NHTSA) estimates that wearing a seat belt reduces the risk of serious injury or death by up to 65%. **Looking at crashes in Weld County by seatbelt usage, a quarter of all serious injury crashes and a third of fatal crashes involved at least one driver with improper or no seatbelt usage.**

Vulnerable Road Users

Vulnerable road users, made up of pedestrians, bicyclists, and motorcyclists, account for over 21% of all KSI crashes. When we examine transportation mode share in Weld County, vehicle traffic makes up 97% of commute trips but less than 79% of KSI crashes. This means that the other modes of travel in Weld County are far over-represented:

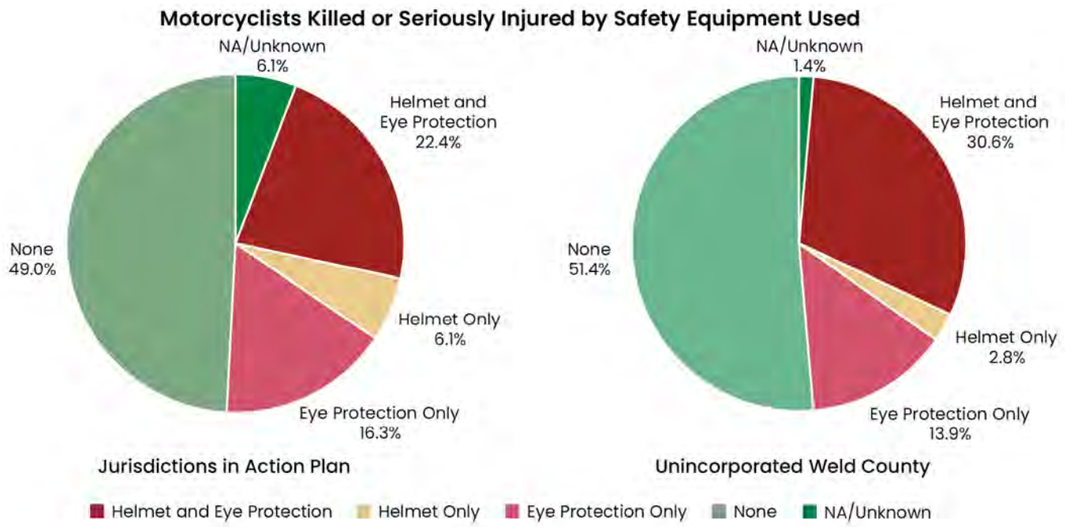
Pedestrians are nearly **3.0 TIMES as likely** to be involved in a KSI crash

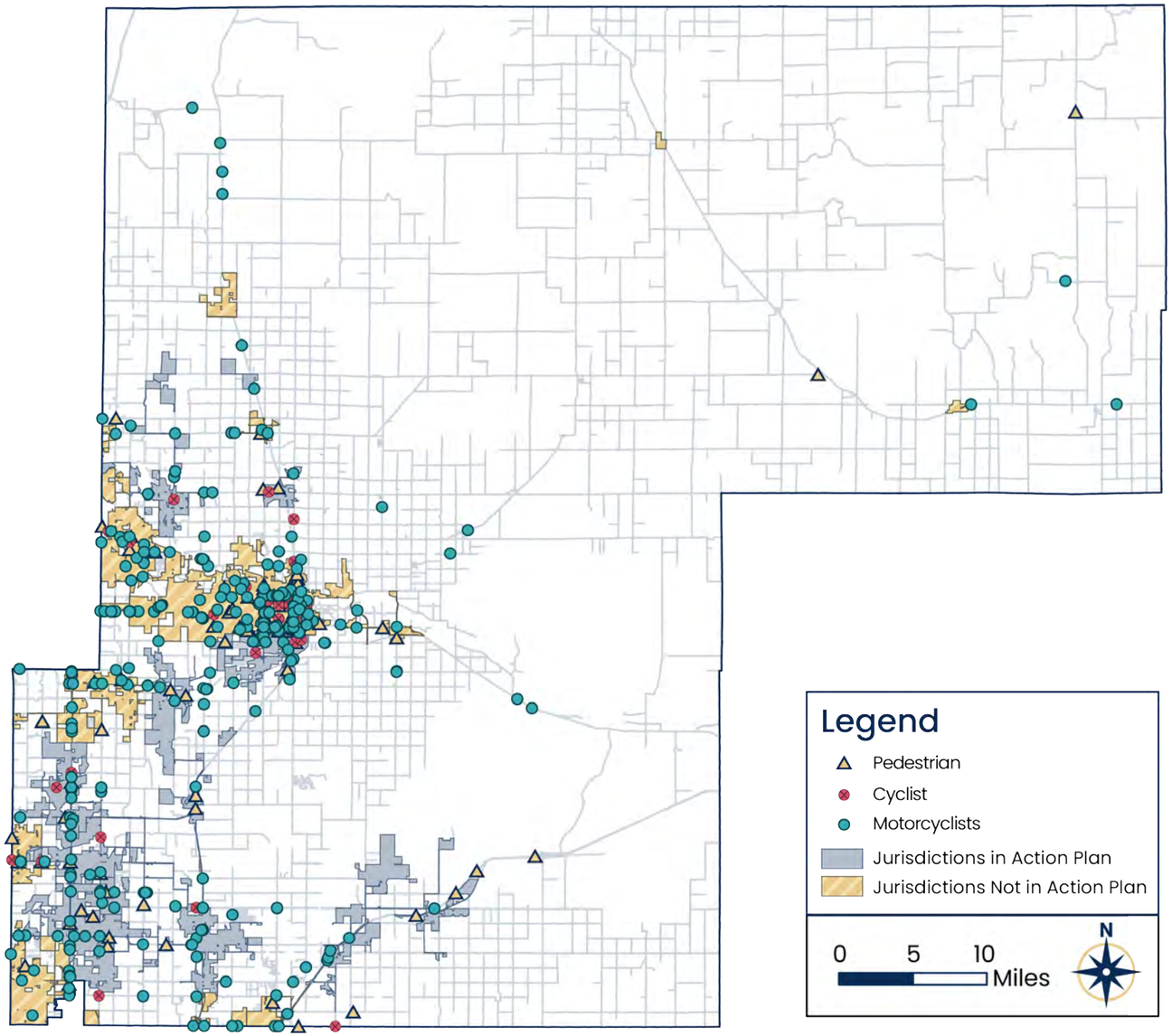
Bicyclists are nearly **11.2 TIMES as likely** to be involved in a KSI crash

Motorcyclists are nearly **10.2 TIMES as likely** to be involved in a KSI crash

For motorcyclists, one contributing factor to this overrepresentation could be low rates of helmet and safety gear usage by motorcyclists, as more than half motorcyclists injured in crashes were not wearing any form of safety gear. Approximately three-quarters of motorcyclists within jurisdictions in the action plan and two-thirds of motorcyclists in unincorporated Weld County were not wearing helmets. Currently, Colorado does not have a law requiring riders 18 and over to wear a helmet. Motorcycle helmet usage is estimated to reduce the risk of death for motorcyclists by 42% and the risk of head injury by 69%.[2]

Although Colorado legally requires all riders (driver or passenger) to use some form of eye protection, 61.2% of urban (jurisdictions in action plan) riders and 55.6% rural riders killed or injured in a crash were not wearing eye protection.





[2] https://pubmed.ncbi.nlm.nih.gov/18254047/