Regional Comprehensive Safety Action Plan

Kanawha and Putnam Counties

TAKE US HOME ON SAFER ROADS

Kanawha & Putnam Counties

Regional Intergovernmental Council

June 2023

RESOLUTION OF THE B-C-K-P REGIONAL INTERGOVERNMENTAL COUNCIL POLICY BOARD CONCERNING THE REGIONAL COMPREHENSIVE SAFETY ACTION PLAN (CSAP)

Whereas the Regional Intergovernmental Council (RIC) is the federally designated metropolitan planning organization (MPO) for the Charleston, WV metropolitan planning area, comprised of Kanawha and Putnam counties;

Whereas the United States Department of Transportation (USDOT) approved the National Roadway Safety Strategy (NRSS) in January 2022 as the Department's comprehensive approach to significantly reducing serious injuries and deaths on our Nation's highways, roads, and streets. The USDOT is calling on stakeholders across the public sector, private sector, advocacy, and research communities to share the responsibility of improving roadway safety;

Whereas the West Virginia Department of Transportation (WVDOT) has adopted an ultimate objective of zero fatalities by the year 2050 per the 2022 – 2026 West Virginia Strategic Highway Safety Plan (SHSP). In this plan, Kanawha County accounts for the highest percentage of fatal and serious injury crashes in all seven emphasis areas – Speeding and Aggressive Driving, Roadway Departure, Occupant Protection, Older Driver (65+) Involved, Alcohol and Drug Impaired Driving, Intersections, and Pedestrians; and

Whereas the metropolitan planning organization of the RIC has developed a Regional Comprehensive Safety Action Plan (CSAP) to reduce and ultimately eliminate roadway fatalities and serious injuries.

Now, therefore, be it resolved, that the BCKP Regional Intergovernmental Council hereby adopts the Regional Comprehensive Safety Action Plan (CSAP) for Kanawha and Putnam counties to reduce and ultimately eliminate roadway fatalities and serious injuries.

So, resolved this 8th day of June 2023.

David Fletcher, Chairman
BCKP Regional Intergovernmental Council

Executive Summary

The Regional Intergovernmental Council (RIC) Regional Comprehensive Safety Action Plan embodies our values and hope for our region: Creating and maintaining a transportation system that takes us home safely. The streets and sidewalks are necessary to every resident and visitor within this region, and as such, should be a place where safety is promoted and promised. This document establishes actions and strategies to begin building upon that promise – to someday eliminate fatalities and serious injuries on the roads within our region.

Creating a Safe System in Kanawha and Putnam Counties

The Regional Intergovernmental Council (RIC) and its member agencies aim to achieve zero roadway fatalities and serious injuries by implementing effective safety countermeasures. This plan lays out goals and a vision to reach that objective through the Safe System Approach (SSA), which considers safe roads, safe road users, safe speeds, safe vehicles, and post-crash care.

Source: FHWA

Multi-disciplinary stakeholders from local agencies, West Virginia Division of Highways (WVDOH), Federal Highway Administration (FHWA), Kanawha Valley Regional Transportation Authority (KRT) and law enforcement and emergency response personnel collaborated in the planning process. Severe crashes occur for a multitude of reasons. By collaborating with transportation and safety practitioners with diverse backgrounds and perspectives, this plan addresses safety solutions holistically.

Safety Problem Identification

To assess safety problems, data driven analysis through crash mapping and crash frequency trends and equity analyses were performed. Through this effort, four emphasis areas for the region emerged – intersections, pedestrians, roadway departure, and speed and aggressive driving. Contributing causes to these crashes were determined to inform the actions and strategies that would be most effective in mitigating severe crashes in the region. A priority list of intersections with the most severe crashes was developed for the region. To inform the pedestrian analysis, a systemic GIS analysis was conducted for pedestrian crashes, allowing for a comprehensive understanding of the risk factors associated to pedestrian crashes. This analysis supports the proactive treatment of locations that have a propensity for severe pedestrian crashes. Together, this data-driven analysis was used to define the safety problems to inform strategies that could be implemented to be most effective in reducing and ultimately eliminating fatal and serious injuries due to traffic crashes in the region.

Action Plan

The Action Plan component of this document identifies actions and strategies to move toward eliminating traffic fatalities and serious injuries, specifically in the identified priority areas. This section is organized by strategy, outcome, responsible party, and emphasis area addressed. Targeted strategies include engineering, education, and enforcement measures, which will be implemented using a data-driven approach. This table is intended to be actively utilized and updated over the life of the plan by the parties identified. It is a roadmap to reduce the fatal and serious injury crashes in the RIC region.

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Planning Criteria

	Comprehensive Safety Action Plan Element Criteria	How the RIC Achieved It
1	Governing body in the jurisdiction publicly committed to an eventual goal of zero roadway fatalities and serious injuries.	Governing body reviews and approves of plan.
	Set targets to achieve significant declines in roadway fatalities and serious injuries.	The Plan commits to work toward zero deaths and includes targets for fatalities, serious injuries, and non-motorized vehicle crashes. Implementation of the plan is outlined over a specific number of years. The specific, measurable goal of the plan is to: reduce fatal and serious injury crashes by 25% in five years. Outlined in the Vision and Goals.
2	To develop the Action Plan, a committee, task force, implementation group, or similar body established and charged with the plan's development, implementation, and monitoring.	A stakeholder and an implementation group were created to develop the plan and identify how the strategies will be implemented. Outlined in Section 1: Engagement.
3	Analysis of existing conditions and historical trends to baseline the level of crashes involving fatalities and serious injuries across a jurisdiction, locality, Tribe, or region.	Documented in Section 2. Safety Problem Identification
	Analysis of systemic and specific safety needs is performed as needed (e.g., high risk)	A systemic pedestrian safety analysis was conducted and is summarized beginning on Page 37 in the Priority Safety Emphasis Areas
	Analysis of the location where there are crashes, the severity, as well as contributing factors and crash types.	Documented in Section 2. Safety Problem Identification
	A geospatial identification (geographic or locational data using maps) of higher risk locations.	Documented in Figure 35: Pedestrian Risk Network Analysis
4	Engagement with the public and relevant stakeholders, including the private sector and community groups.	Documented in Section 1: Engagement
	Incorporation of information received from the engagement and collaboration into the plan.	The Action Plan strategies and activities are a direct result of stakeholder/public input survey and stakeholder engagement meetings. Documented in Engagement
	Coordination that included inter- and intra-governmental cooperation and collaboration, as appropriate.	Stakeholders are identified on Page 4 in the Stakeholder Engagement section.
5	Considerations of equity using inclusive and representative processes.	Documented in Figure 31- Figure 34: Equity Priorities
	Identified underserved communities through data.	Documented in Figure 34: Equity Priorities

	Equity analysis in collaboration with appropriate partners, focused on initial equity impact.	The equity information was provided on the intersection hot spot rankings to help the region focus on equity impacts.
6	The plan development included an assessment of current policies, plans, guidelines, and/or standards to identify opportunities to improve how processes prioritize safety.	Documented in Current Safety Program.
	The plan discusses implementation through the adoption of revised or new policies, guidelines, and/or standards.	Both existing and new safety programs/projects were identified through the planning process. The implementation of these efforts is documented in Section 3. Action Plan and Strategy Solutions and each action is assigned a "lead agency."
7	The plan identifies a comprehensive set of projects and strategies to address the safety problems in the Action Plan, time ranges when projects and strategies will be deployed, and explain project prioritization criteria.	The results of the crash data analysis and stakeholder/public input helped identify locations and strategies to address the region's top safety needs. The preamble to Section 3. Action Plan and Strategy Solutions describes how projects and strategies were prioritized and the timeline for implementation.
8	A description of how progress will be measured over time that includes, at a minimum, outcome data.	Documented in Section 4. Next Steps: Progress and Transparency section of Plan
	The plan is posted publicly online.	Plan is published publicly on the RIC website.
9	The plan was finalized and/or last updated between 2018 and 2023.	Plan was finalized in 2023.

Introduction

Between 2017 and 2021, several hundred people in Kanawha and Putnam counties were involved in fatal and serious injury crashes, with devastating consequences for the individuals and their families. In Kanawha County alone, 113 people did not make it home, and 342 had their lives forever altered due to traffic crashes. In Putnam County, 34 people lost their lives, and 76 experienced life-altering injuries as a result of crashes. These tragic incidents highlight the urgent need for effective measures to ensure the safety of our transportation network and all those who use them. The question remains: how can we get everyone where they need to go without a fatality or serious injury? It is time to come together and work towards implementing solutions that prioritize road safety and prevent further loss of life. This Comprehensive Safety Action Plan (CSAP) analyzes the critical issues that lead to fatalities and severe injuries, as well as all crashes, and creates an action plan to reduce and ultimately eliminate fatalities and serious injuries on the roadways within the RIC region.

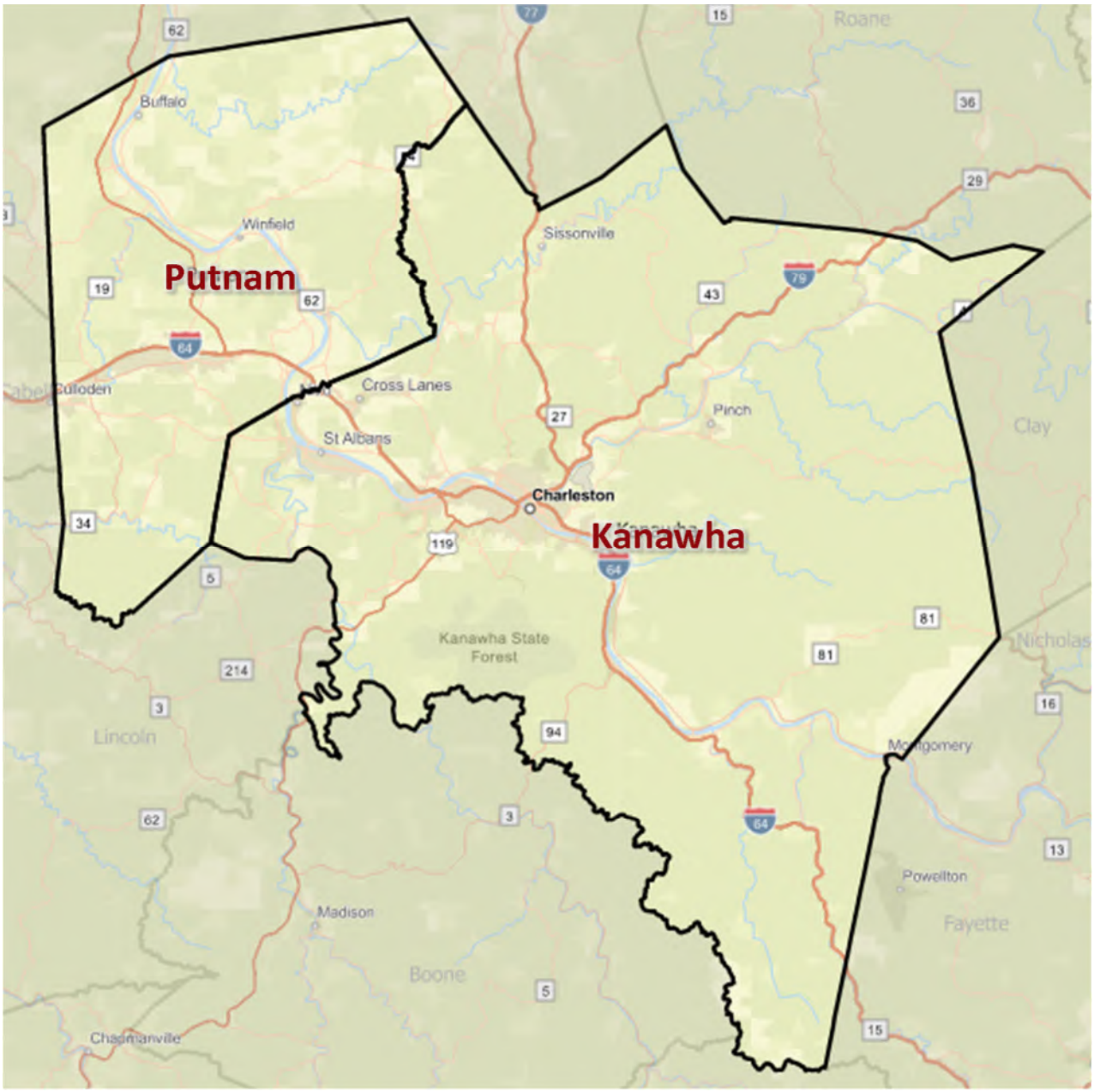
Now more than ever, safety is an important part of any improvement program. New financial boosts and discretionary grants like the Safe Streets and Roads for All (SS4A) program are paving the way towards implementing the necessary safety programs and projects to move towards zero fatalities and serious injuries.

The RIC CSAP was developed using the Safe System Approach (SSA) criteria to support safety and to utilize financial opportunities that have arisen. The inclusion of the SSA supports ongoing transportation and safety practices, while also implementing a framework from which stakeholder conversation, data, and analysis is utilized to identify specific solutions to address safety issues.

Section 1. Creating a Safe System in Kanawha and Putnam Counties

The planning area for this study is Kanawha County and Putnam County in West Virginia as shown in Figure 1. The focus of this plan was local roadways, with direct impacts to the residents in the region. Therefore, all roadways, except for interstates, were included in this study. The number of interstate crashes can overshadow the local crash issues and can have vastly different countermeasures and mitigation strategies than the arterial and more minor roadways.

Figure 1: Study Area



The Safe System Approach

The U.S. Department of Transportation's (USDOT) National Roadway Safety Strategy emphasizes the importance of safety through Vision Zero and the Safe System Approach (SSA). Vision Zero is the vision of the future: no fatalities resulting from traffic crashes. The goal of achieving zero fatalities on the road is a realistic objective that can be attained with the implementation of effective safety measures that align with the SSA. The RIC region sees the path towards the future - a framework that contains the necessary strategies and goals to successfully reduce and ultimately eliminate fatalities through the SSA. Transportation and safety stakeholders have already begun to implement important safety programs and projects which have proven to be successful. The RIC region had no fatalities or serious injuries for 276 days in 2021. In April 2021, there were zero fatalities or serious injuries for 19 consecutive days.

The SSA does not eliminate or drastically change the efforts currently in place. Instead, it is used as a tool to frame stakeholder conversations and data analysis to identify solutions that more intentionally address safe roads, safe road users, safe speeds, safe vehicles, and post-crash care. The five elements (inner ring) and six principles (outer ring) of the SSA as well as the underlying tenants of culture and equity were considered throughout the development of this plan (Figure 2). The following summarizes the SSA elements and the context in which they were considered in the CSAP.

***Safe Roads*:** Improving roads through planning, engineering, and design to ensure safe travel for all road users.

Safe Road Users: Encouraging road users to execute safe driving behaviors.

Safe Speeds: Considering speeds in coordination with the surrounding environment and contexts.

Safe Vehicles: Understanding how the vehicle size and technologies affect crashes and resulting severities.

Post-Crash Care: Improving the ability for first responders to access a crash scene and the quality of the data included in the crash report.

Figure 2: Safe System Approach (FHWA)

Culture: Demonstrating a commitment to safety over competing goals and demands. As part of individual job responsibilities, everyone is responsible for planning, engineering, and educating on the SSA concepts.

Equity: Ensuring all types of road users, whether walking, biking, driving, or rolling, have options for safe travel and safety improvements are implemented across the entirety of the roadway network.

Engagement

To inform the CSAP, stakeholders were engaged through three meetings over the course of the planning process. Additionally, the public was surveyed to help establish the current safety conditions as well as to identify improvements that may be viable in the RIC region.

Stakeholder Engagement

A stakeholder group was established to offer feedback on the formation of the plan and provide guidance and recommendations throughout the process, ultimately ensuring the successful development of the plan. The team was selected based on their expertise in the field, with each member bringing unique insights and perspectives to the project. Their role is to ensure that the plan is well-structured, achievable, and aligns with the goals of the region. With their support, the project team can confidently move forward with the plan, knowing that it has been thoroughly vetted and optimized for success.

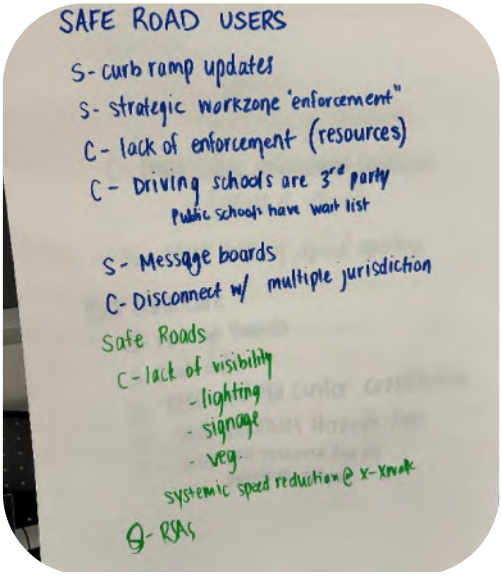
Stakeholders included entities within the two counties that had a focus or interest in transportation safety to share insight, feedback, and solutions. Three stakeholder meetings took place to help inform plan development. The following entities/representatives were included in the stakeholder engagement:

- City of Charleston
- Kanawha County Metro 911
- West Virginia Division of Highways
- Kanawha Valley Regional Transportation Authority (KVRTA)
- Local Bike/Walk Advocates
- The Greater Kanawha Valley Foundation (TGKVF)
- Putnam County Sheriff's Department
- Federal Highway Administration
- Disability Rights of West Virginia (DRWV)
- Kanawha County Emergency Ambulance Authority (KCEAA)
- Regional Intergovernmental Council

Over the course of three meetings, stakeholders were given relevant data and informational materials to identify the safety challenges and needs within the area. Stakeholders played an integral role in identifying safety opportunities, challenges, and problems, directly leading to plan focus and formation. Stakeholder meetings ensured the strategies and implementation efforts aligned with the vision and goals of the two counties. Presentations were given to provide context and resources for the planning process, and each stakeholder had access to the presentations and meeting summaries.

The purpose of stakeholder meeting #1 was to:

- Introduce the project and importance of transportation safety including Safe System Approach (SSA) concepts
- Discuss branding and begin thinking about the plan's vision and goals
- Review the strengths and weaknesses within the region related to: safe road users, safe roads, safe speeds, post-crash care, safe vehicles, equity, and culture.
- Discuss survey results
- Report crash statistics for the region
- Present emphasis area data and conduct exercise to identify which areas should be a priority for the plan



The purpose of stakeholder meeting #2 was to:

- Review crash and other data to prioritize emphasis areas
- Develop specific vision, goals, and objectives for the plan
- Discuss the results of the hot spot intersection analysis
- Explain the crash prioritization process
- Examine the equity analysis

The purpose of stakeholder meeting #3 was to:

- Present the logo and branding for final review
- Take a deeper dive into the prioritized emphasis areas
- Review the results of the systemic pedestrian analysis
- Discuss sample strategies and provide input on the most effective strategies for the region
- Collaborate to identify proven program, policy, and project solutions for those areas

Stakeholder meeting summaries are provided in Appendix A.

Public Survey

A survey was conducted to obtain input on safety challenges and opportunities in Kanawha and Putnam Counties. The survey was posted on RIC's social media pages through paid regional advertising and was also shared by some stakeholders through various methods. The survey was active from January 12, 2023 to April 24, 2023 during which time 163 responses were recorded.

A majority of survey respondents indicated that they feel motorists behave "somewhat unsafe" or "unsafe". In contrast, many survey takers were largely neutral that streets and intersections feel "safe", indicating that many people perceive others as driving unsafely, and not necessarily themselves.

Most respondents indicated they either "do not feel safe" when walking or biking, or remained "neutral". One possibility for the large number of "neutral" answers is that many do not walk or bike often, which is evidenced by the responses of disagreement on the question of whether the streets have safe accommodations for non-motorized users. Similarly, many respondents indicated their community is not developed in a way that is easy to walk or bike in.

The top three transportation safety investments respondents wanted to focus on were: intersection improvements, enforcement, and public education. More details about "other" responses regarding transportation improvements are provided in Appendix B.

Figure 3: Survey Question #1

Question 1: Please provide input on the current behaviors of road users in Kanawha and Putnam Counties.

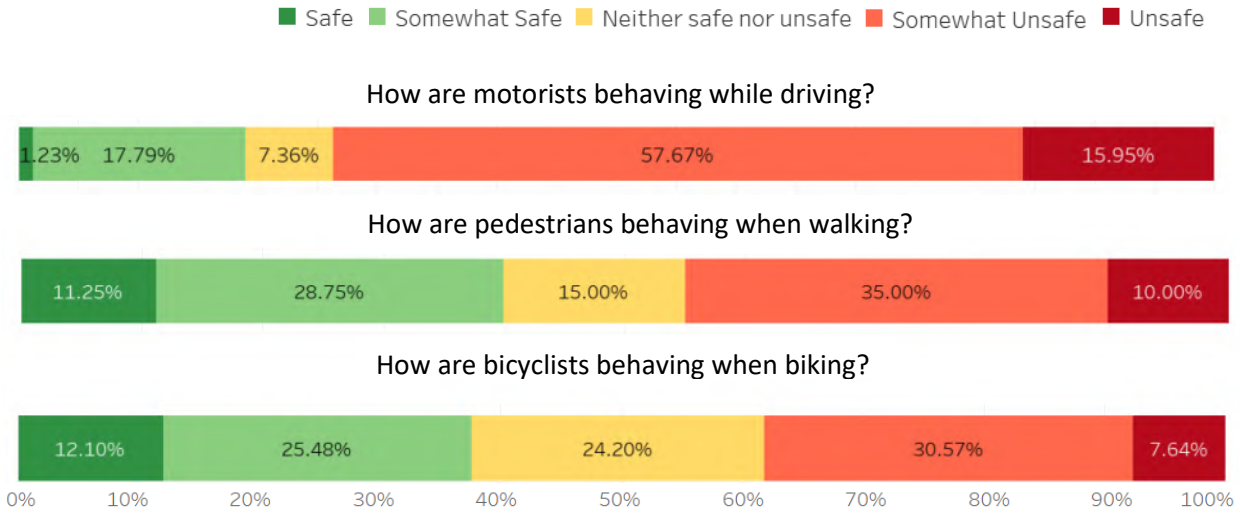


Figure 4: Survey Question #2

Question 2: Transportation safety investments should focus on the following priorities (select top 3):

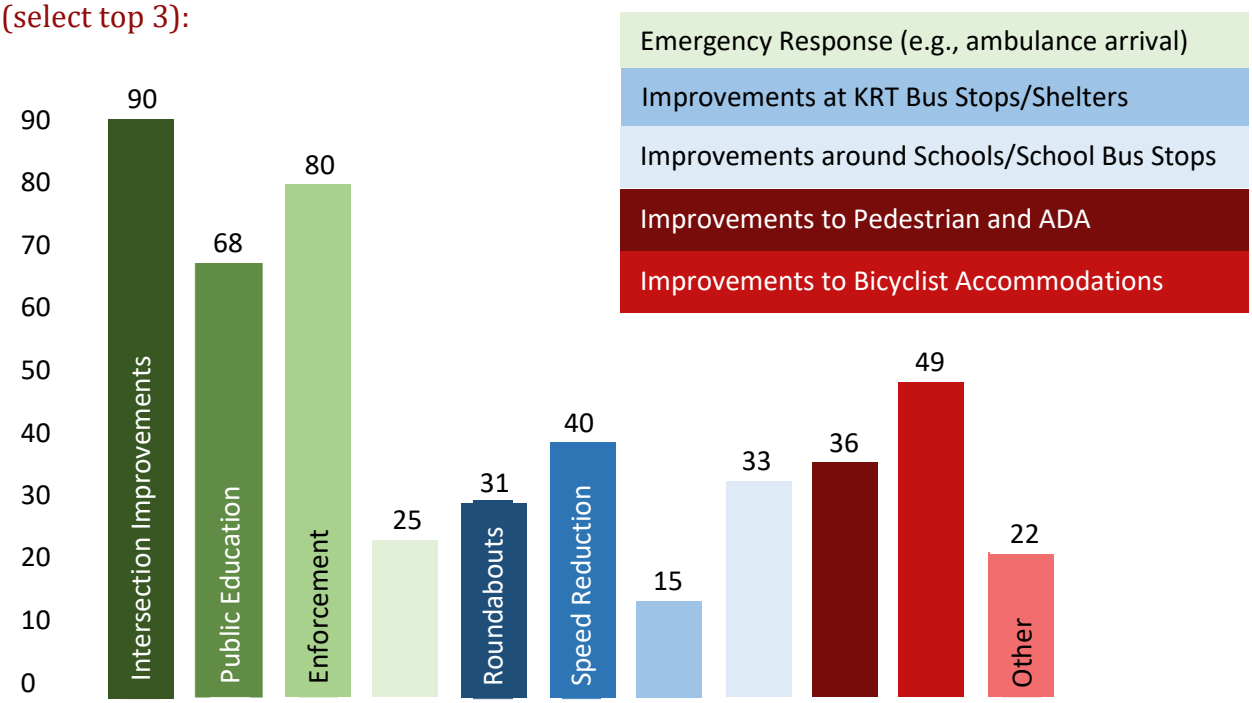
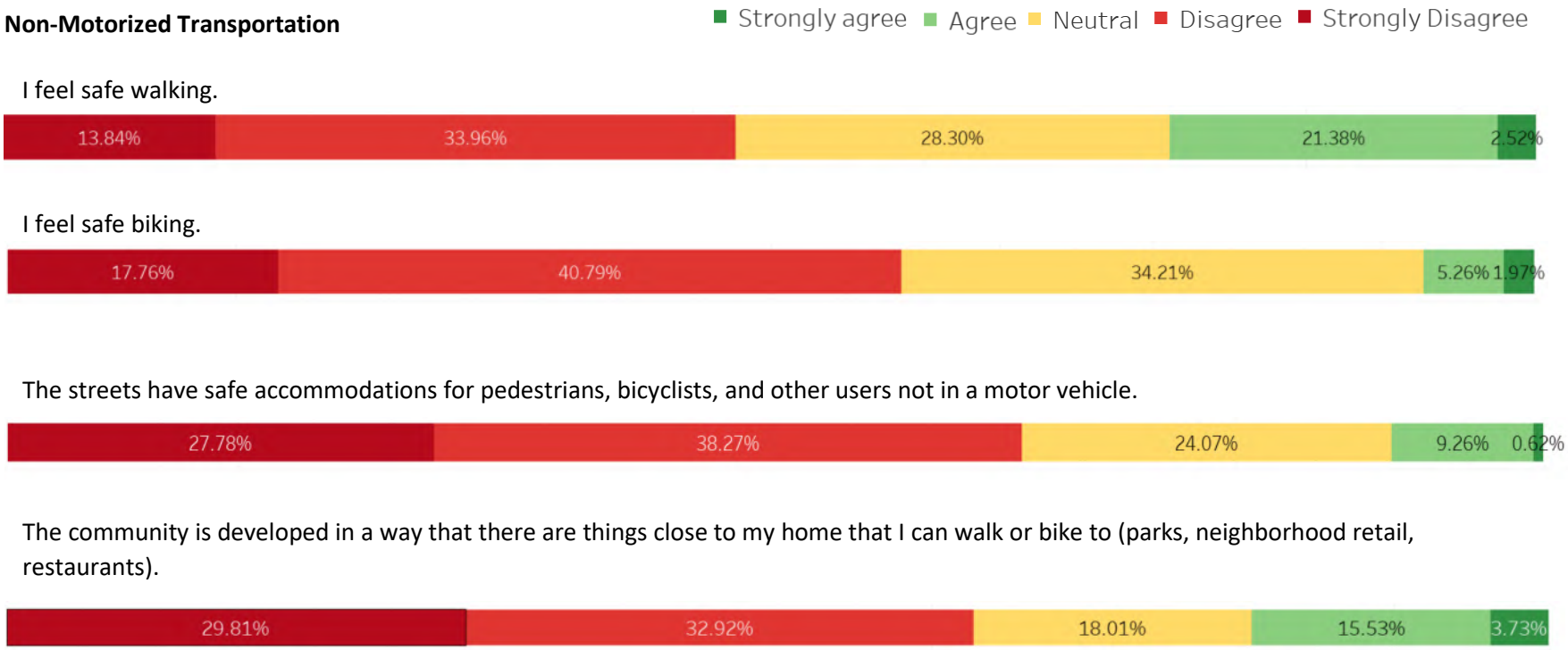


Figure 5: Survey Question #3

Question 3: Please rate if you agree or disagree with the following statements about the Kanawha and Putnam County region.

Non-Motorized Transportation



Motorist Behavior

As a motorist, the streets and intersections feel safe.

Motorists drive safely and courteously.

Vehicles tend to travel at safe and comfortable speeds.

Regulation

There is sufficient traffic law enforcement.

Education

Appropriate traffic safety educational information (e.g., distracted driving, impaired driving, slower speeds) is provided.

Equity

Safety improvements are equitably distributed across the region (i.e., no one area receives more improvements or better accommodations than another).

Public Survey (GIS Portion)

The public survey included a GIS mapping portion where participants could comment their concerns at a specific location. Feedback was received at fourteen points, with most of these points in Charleston, and specifically around the Charleston Town Center Mall. A majority of these comments had a general sentiment that vehicles are prioritized over pedestrians and bicyclists, making conditions for these vulnerable road users unsafe. This prioritization of vehicles is shown through the number of traffic lanes, unsafe crossing points, and speeding issues. Some people noted a lack of pedestrian facilities in some locations (sidewalks, lighting, crosswalks), visibility issues at intersections, right of way confusion, and poor road conditions. A summary of the indicated locations is provided in Figure 6.

Law Enforcement Survey

A separate survey was distributed to law enforcement personnel within the region. Respondents were asked to place a pin on a map indicating a safety concern based on their knowledge of the roadways in Kanawha County. In total, three locations were noted on the maps with two being on I-64 or I-79. Those results are summarized in Figure 7. The third location included within the study area is at an intersection on US-35 in Putnam County. The law enforcement officer described the danger of this intersection and noted potential hazards.

Figure 6: Public Survey Feedback Map

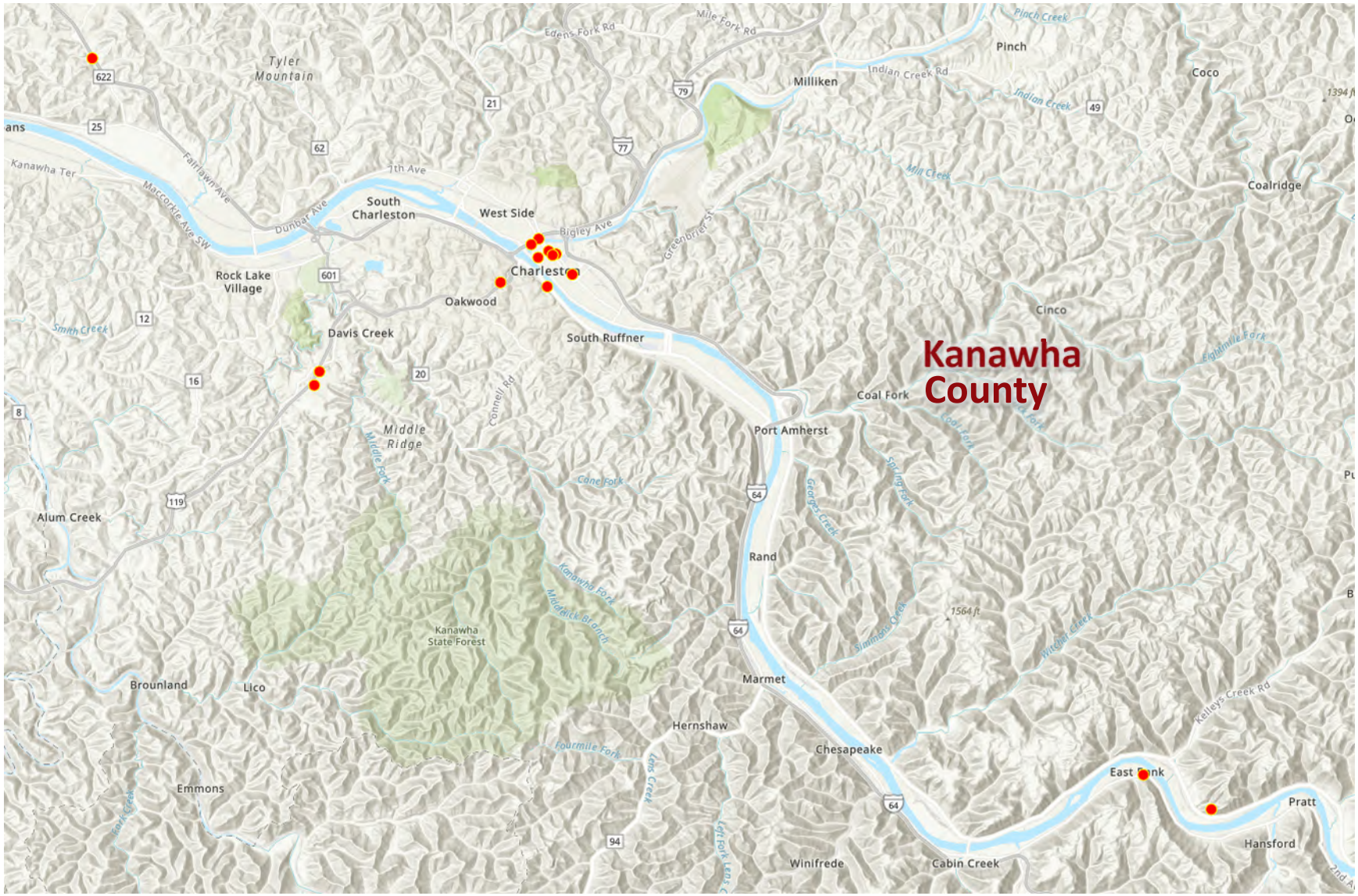
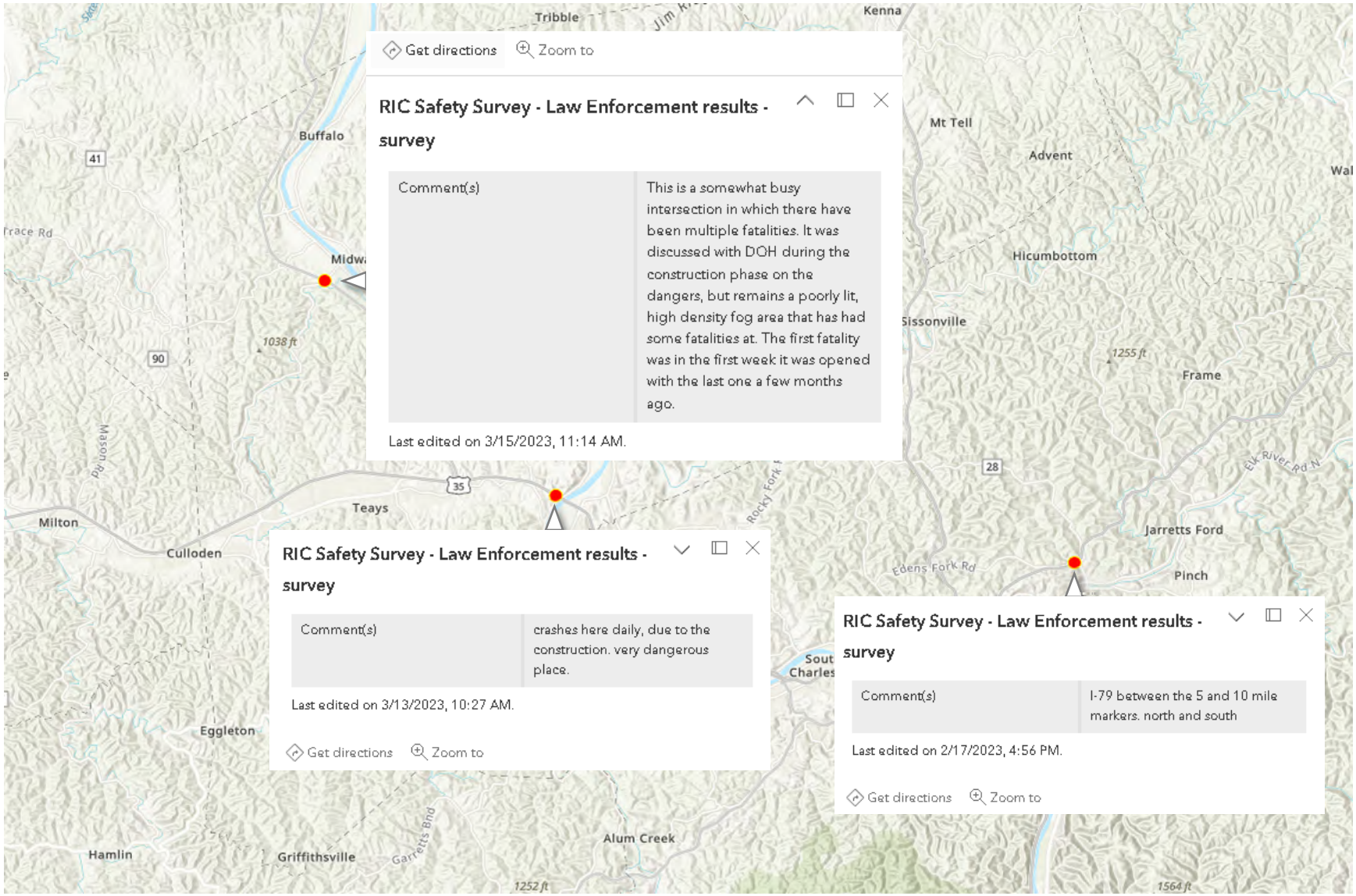


Figure 7: Law Enforcement Survey Results



Current Safety Program

Current plans were developed in support of advancing transportation safety. The City of Charleston, Kanawha and Putnam counties, the RIC, and the WVDOT all provide some current safety practice and implementation policies. The following summarizes the current plans and their respective goals that demonstrate the portfolio of local and regional safety initiatives.

RIC Kanawha-Putnam Bicycle and Pedestrian Plan (2019)

- Design new and existing bike facilities based on comfort level.
- Up to 144 miles of bicycle facility improvements will be implemented.
- Focus on motorist education for sharing the road.
- Targeted enforcement methods, especially near schools.
- Projects that give dedicated right-of-way to bicyclists and increased signage are high priority. Examples of this include: Teays Valley Road widening and shoulder installation, Kanawha Boulevard cycle track, and Barlow Drive bike path widening.
- Hold bike safety rodeos.
- Emphasis on Equity – utilizing data from the United States Census Bureau, this measurement focuses on the transportation planning area's local communities that possess a higher volume of low-income households.
- Inclusion of public participation through public surveys to look at bike safety issues.

City of Charleston Bike and Trail Master Plan (2016)

- Prioritize projects that focus on VRUs especially students and residents in census blocks with high poverty rates.
- Reduce sidewalk riding in downtown Charleston.
- Support a wider range of transportation options that are safe, connected, and convenient.
- Develop on-street and off-street bikeway facilities that meet national best practices.

RIC Metropolitan Transportation Plan (2021)

- Increase bicycle and pedestrian connectivity between population centers.
- Increase public awareness of bicycle and pedestrian facility locations.
- Promote education of bicycle safety among motorized and non-motorized users.
- Promote the adoption/implementation of Complete Streets.
- Incorporate bicycle and pedestrian improvements into development projects.
- Institutionalize bicycle and pedestrian friendliness as a core value of county and municipal projects, policies, and programs.

West Virginia Strategic Highway Safety Plan (2022)

- Goal of achieving zero fatalities by 2050, and ultimately zero serious roadway injuries. Short-term goal of reducing fatalities and serious injuries by four percent per year for the next five years.
- Focal point on developing and distributing information to the public to increase awareness of speeding, roadway departure, occupant protection, and alcohol and drug impaired drivers, pedestrian safety, and intersection safety.
- Implement programs that support the driving abilities of older drivers.

- Enhance highway safety data collection.
- Implementation of engineering countermeasures to support safer streets such as speeding, roadway departure, roadside environment, and intersections.
- Targeting aggressive driving, especially speeding.
- Implementing effective enforcement.
- Exploring the implementation of automated speed enforcement programs/red-light enforcement.
- Conduct targeted high-visibility impaired driving enhancement activities.

RIC Road Safety Audits (2020-2022)

- Detailed studies of the top crash locations in the region to identify infrastructure countermeasures that are effective at mitigating crash frequencies.
- Over the course of the program, 10 locations have been studied with a multidisciplinary team including RIC, WVDOH, local agencies, and law enforcement.

Other Success and Challenges

At its first meeting, the stakeholder group was asked to identify the current successes and challenges in the region related to the five elements of the Safe System Approach (SSA) – safe roads, safe road users, safe speeds, safe vehicles, and post-crash care. Some of the successes include:

- The process of improving sidewalks and replacing large quantities of curb ramps to bring them up to standard is currently underway.
- The Putnam County Sheriff's Department stated how after repetitive crashes were occurring in the same location within a work zone at the same time during the morning peak, they stationed a deputy at that location every morning. This resulted in their observed problems being nearly eliminated. While the officers did not enforce any traffic violations, the presence of the police cruiser slowed traffic and encouraged better driver behaviors.
- There have been crash reductions and reduced traffic congestion by the use of variable message boards along highways to give drivers advanced warning.
- There has been discussion involving reducing the number of lanes for some local streets in Charleston that lead to the freeway due to high speeds of traffic.
- Coordination from the 911 center, Police, and WVDOH has also been greatly improved. Once a crash occurs, coordination is nearly immediate and variable message boards and the WV511 application are updated to let travelers know of the crash and to use detours if possible.
- The WVDOH has prioritized restriping of roadways and adding additional, wider striping in sharp curves. They have also been pushing to add arrow signs to curves, especially in high crash areas.
- The Regional Intergovernmental Council has performed 10 Road Safety Assessments at high crash locations in the last two years.
- As a result of the WVDOT Strategic Highway Safety Plan, stakeholder meetings will be conducted across the state to combat speeding and aggressive driving. Regionally, stakeholders will be convened for addressing pedestrian and intersection crashes.
- WVDOT is working to improving access to and the quality of crash data with rollouts of a new data platform in the coming months.

Conversely, some of the challenges faced in the region include:

- One of the biggest challenges is the multi-jurisdictional overlaps on roadways. For example, it can be unclear who maintains roadways. This confusion could result in delays in improving the roadways.
- Law enforcement lacks the funding to always enforce all laws in all areas.
- In several areas where speed is a known issue, there is not enough shoulder to safely pull over vehicles.
- Some roadways lack appropriate visibility – either from overgrown vegetation or lack of lighting or signage.
- Driver's education is currently difficult to get into as part of the public education system. Many students are required to find a third-party education provider which is an added cost.
- Some stakeholders feel as if they need guidance to implement traffic calming practices during design phases of new projects.
- Rural areas also occasionally experience delays in EMS response. This issue could be mitigated by placing designated helipads in these rural areas to improve response time.
- With the push of electric and autonomous vehicles, there are issues with infrastructure and connectivity in regions. Even without "smart" infrastructure, lawmakers have already legalized the use of autonomous vehicles in West Virginia.
- Vehicles, especially electric vehicles, are much heavier than traditional vehicles, which can lead to more fatalities in crashes involving them. Increased vehicle size (i.e., pick-up trucks, more SUVs, etc.) are also issues in the region.

Vision and Goals

The plan vision and goals were developed with the stakeholder committee and serve as the basis for the development of the plan.

"Prioritizing safety on the transportation network for all people in Kanawha and Putnam Counties by cooperatively implementing enforcement, education, emergency medical services, and engineering solutions that eliminate fatalities and serious injuries."

The steering committee set a goal of reducing crash fatalities and serious injuries by a quarter by 2028 (five years) after reviewing historical crash trends and projections. Figures 3 through 8 show observed five-year rolling average for fatalities, serious injury, and non-motorized crashes in the two counties.

Goal:

Reduce fatal and serious injury crashes by 25% in five years.

The actions and implementation strategies will measure the success of our strategies and how the overarching vision and goals are being met. Although the goal is to reduce crash fatalities and serious injuries by a quarter within the next five years, throughout the implementation of this plan, the RIC will continue to focus on reaching zero crash fatalities and serious injuries.

Figure 8: Fatalities in Kanawha County

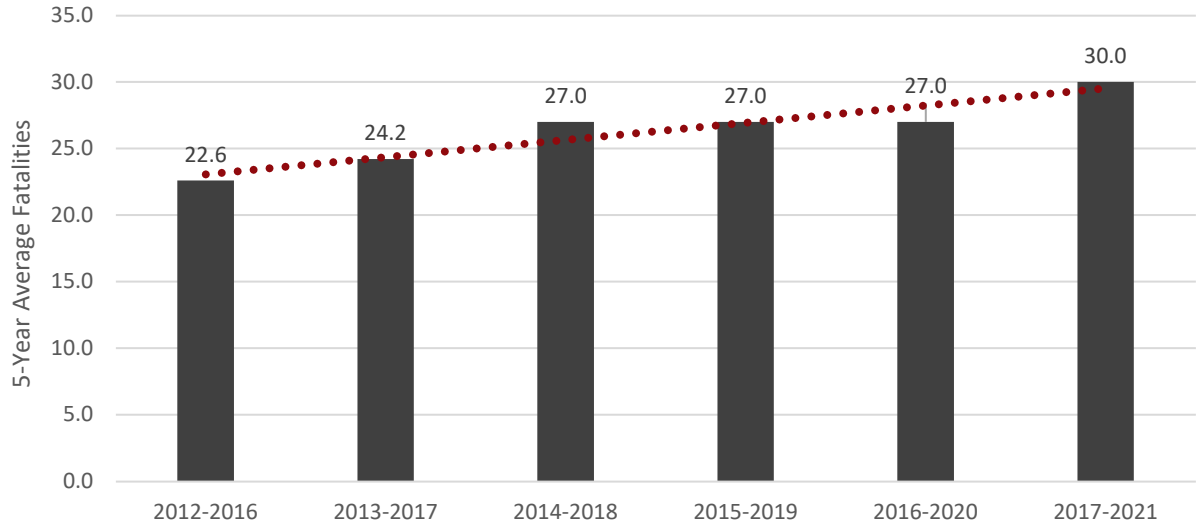


Figure 9: Serious Injuries in Kanawha County

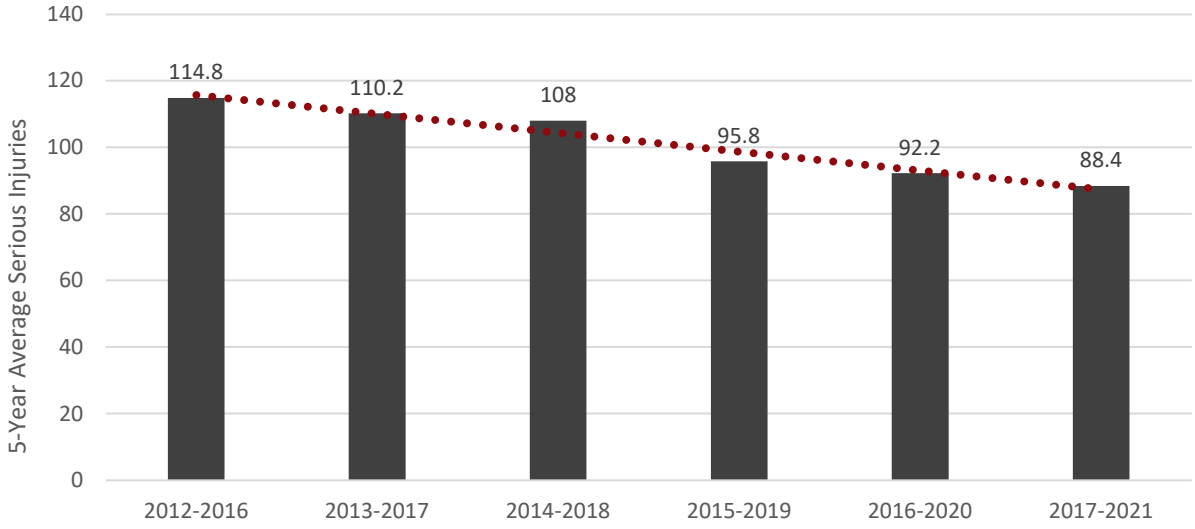


Figure 10: Non-Motorized Fatalities and Serious Injuries in Kanawha County

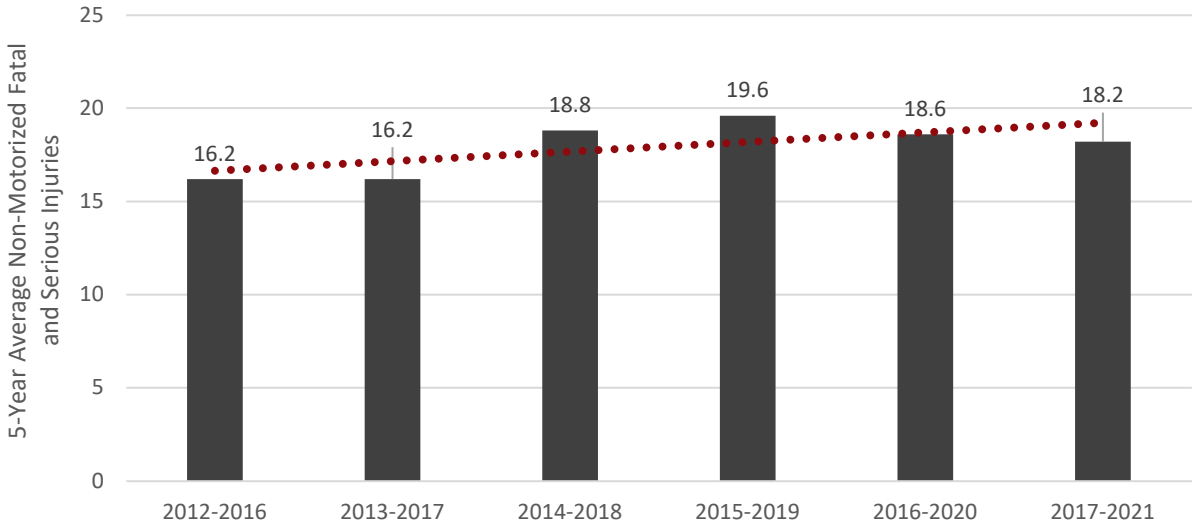


Figure 11: Fatalities in Putnam County

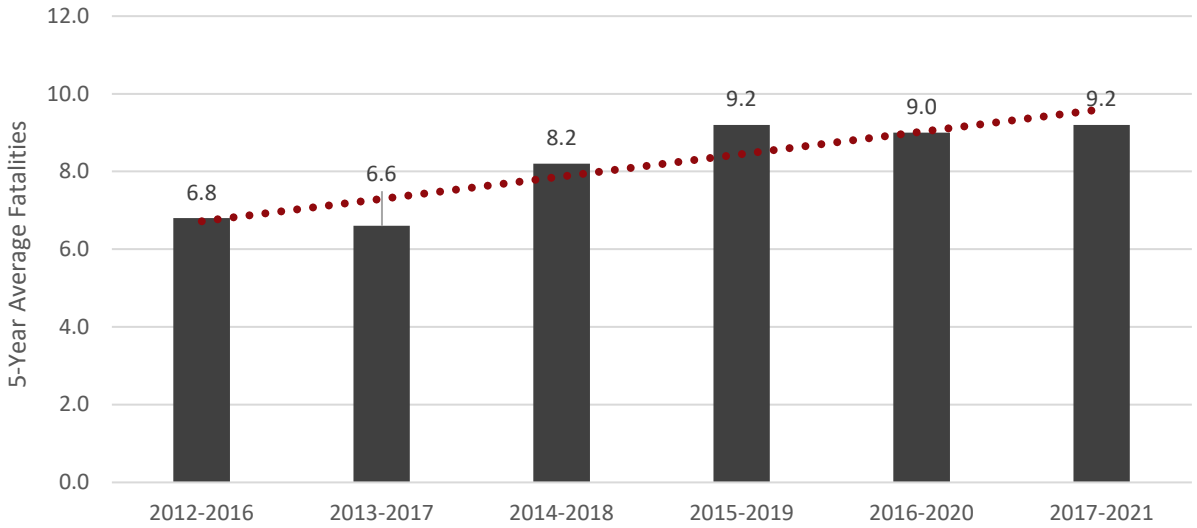


Figure 12: Serious Injuries in Putnam County

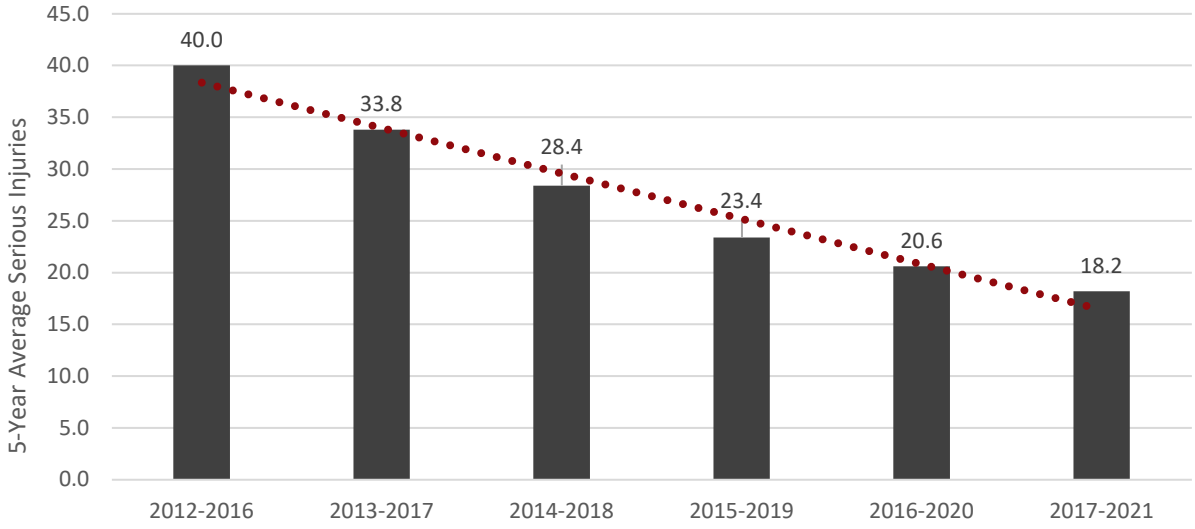
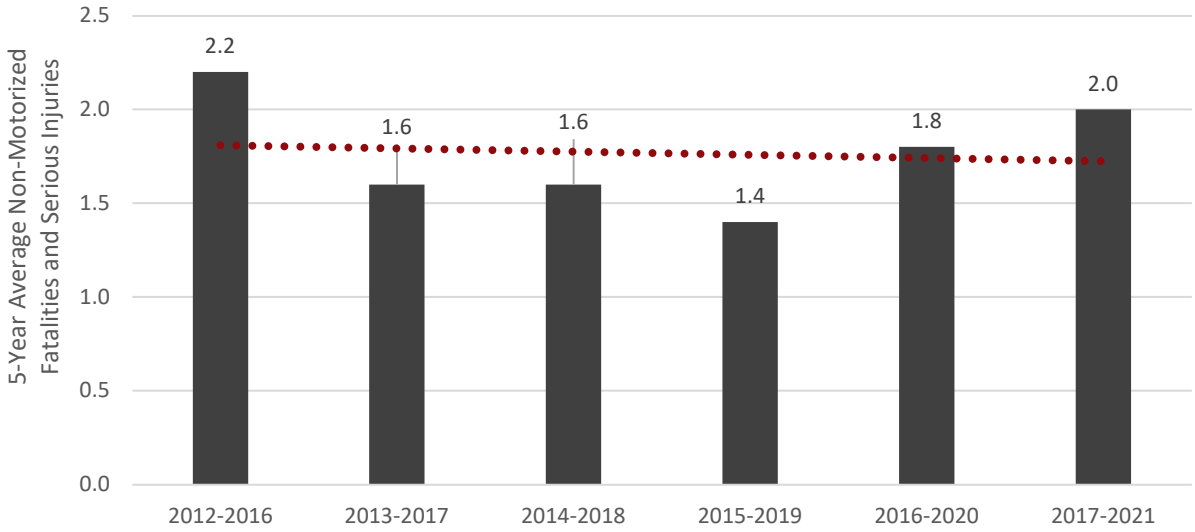


Figure 13: Non-Motorized Fatalities and Serious Injuries in Putnam County



Section 2. Safety Problem Identification

Regional Crash Analysis

A systematic examination of crash data was conducted to identify patterns and trends, determine the causes of crashes, and develop strategies to reduce the frequency and severity of crashes. Conducting a crash analysis is a critical step in improving roadway safety as it enables stakeholders to identify problem areas and develop targeted strategies to address them. Between 2017 and 2021 there were 18,795 non-interstate crashes in Kanawha County and 4,388 in Putnam County. Figure 14 illustrates the crashes specifically in the Charleston area while Figure 15 shows a heat map of the crashes which indicates where crashes are most prevalent in the two-county area.

2017 – 2021 Non-Interstate Crashes
18,795 Kanawha County
4,388 Putnam County

The data in Figure 16 through Figure 20 represent the number of crashes that occurred over a five-year period from 2017 to 2021. Table 1 and Table 2 summarizes the crashes by county and severity as well as the person totals by severity.

In Kanawha County in 2017, there were 4,195 total crashes reported, which decreased slightly to 4,091 in 2018. The number of crashes decreased further in 2019, with only 3,940 reported incidents. However, the trend was reversed in 2020, where the number of crashes dropped significantly to only 3,148, which represents a 20% reduction from the previous year. In 2021, there was a slight increase in the number of crashes, with 3,421 incidents reported. While total crashes dropped significantly in 2020 in the county, fatal and serious injury crashes rose in comparison to 2019. In total, nearly 46,000 people were involved in almost 19,000 crashes in Kanawha County between 2017 and 2021.

Putnam County has similar trends, with a significantly lower number of crashes in 2020. Putnam County had much higher serious injury crashes in 2020 than 2019, however, significantly lower fatal crashes in the same time period. Fatal crashes remained at a lower level in 2021 and serious injury crashes reduced but were still higher than 2019. Just over 10,500 people were involved in nearly 4,400 crashes in Putnam County between 2017 and 2021.

The significant drop in crashes in 2020 was most likely due largely to the COVID-19 pandemic and the associated lockdown measures, which resulted in reduced traffic volume on the roads.

Overall, the data suggests that the number of total crashes has been fluctuating over the years, with a general downward trend in recent years, except for the anomaly in 2020.

Crash statistics were broken apart and analyzed by jurisdiction, crash type, severity versus population, time of day, day of week, and month of year. These charts are provided in Appendix C.

Table 1: Kanawha County Five-Year Incident and Person Statistics

YEAR	FATAL CRASHES	INJURY CRASHES	PROPERTY DAMAGE CRASHES	MEDICAL & UNKNOWN CRASHES	TOTAL CRASHES	FATALITIES	SERIOUS INJURIES	MINOR INJURIES	POSSIBLY INJURIES	NO INJURIES	MEDICAL & UNKNOWN	TOTAL PEOPLE INVOLVED
2017	24	1,040	2,926	205	4,195	24	71	291	1,108	8,316	526	10,336
2018	25	1,015	2,879	172	4,091	28	81	314	1,056	8,152	441	10,072
2019	16	969	2,775	180	3,940	17	58	313	1,031	7,950	443	9,812
2020	16	808	2,157	167	3,148	16	74	240	825	5,875	377	7,407
2021	26	822	2,416	157	3,421	28	58	266	864	6,628	404	8,248
5-YEAR TOTAL	107	4,654	13,153	881	18,795	113	342	1,424	4,884	36,921	2191	45,875
ANNUAL AVERAGE	21	931	2,631	176	3759	23	68	285	977	7,384	438	9,175

Table 2: Putnam County Five-Year Incident and Person Statistics

YEAR	FATAL CRASHES	INJURY CRASHES	PROPERTY DAMAGE CRASHES	MEDICAL & UNKNOWN CRASHES	TOTAL CRASHES	FATALITIES	SERIOUS INJURIES	MINOR INJURIES	POSSIBLY INJURIES	NO INJURIES	MEDICAL & UNKNOWN	TOTAL PEOPLE INVOLVED
2017	6	200	731	5	942	7	18	64	197	2,060	2	2,348
2018	8	211	745	5	969	8	12	69	211	1,997	1	2,298
2019	12	190	693	3	898	13	12	61	194	1,947	2	2,229
2020	2	174	549	6	731	2	21	36	168	1,464	4	1,695
2021	3	166	676	3	848	4	13	71	145	1,762	1	1,996
5-YEAR TOTAL	31	941	3,394	22	4,388	34	76	301	915	9,230	10	10,566
ANNUAL AVERAGE	6	188	679	4	878	7	15	60	183	1,846	2	2,113

Figure 14: Crash Locations in the Charleston Area

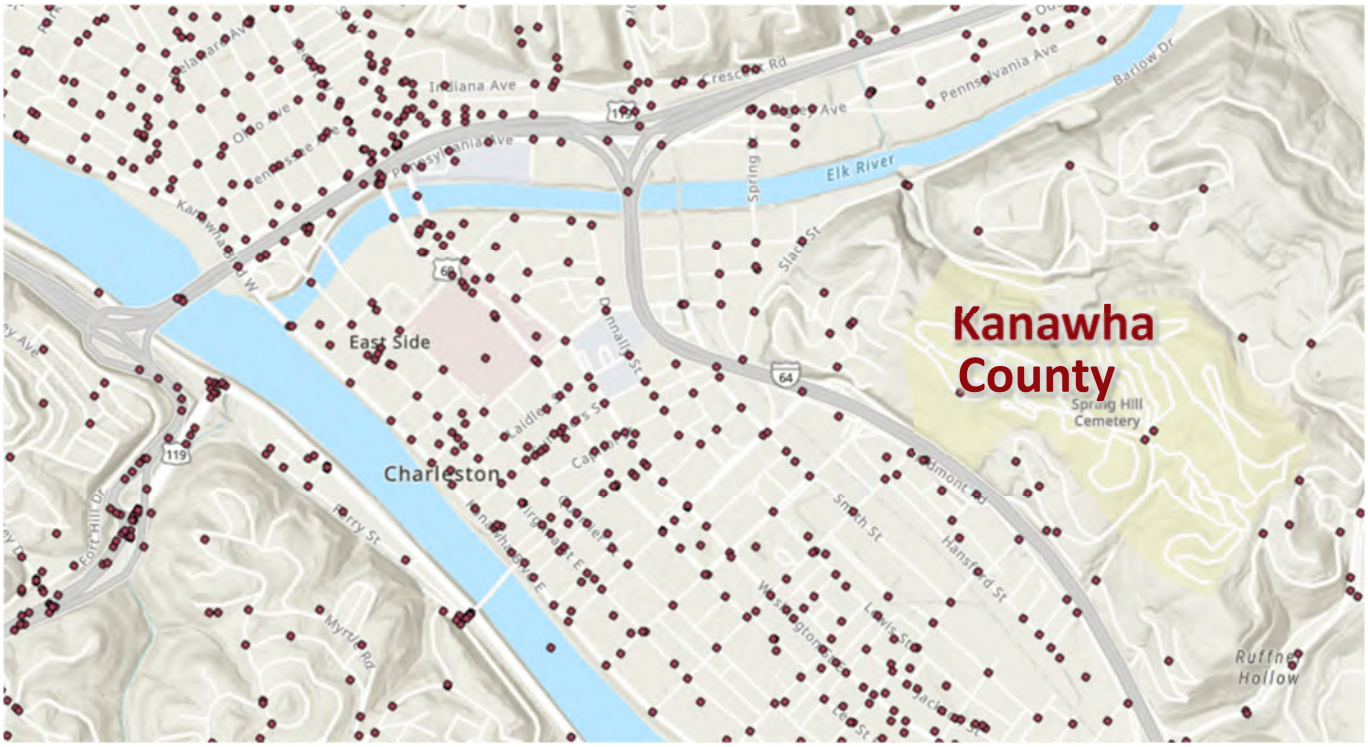


Figure 15: Heat Map of All Crashes in Kanawha and Putnam Counties

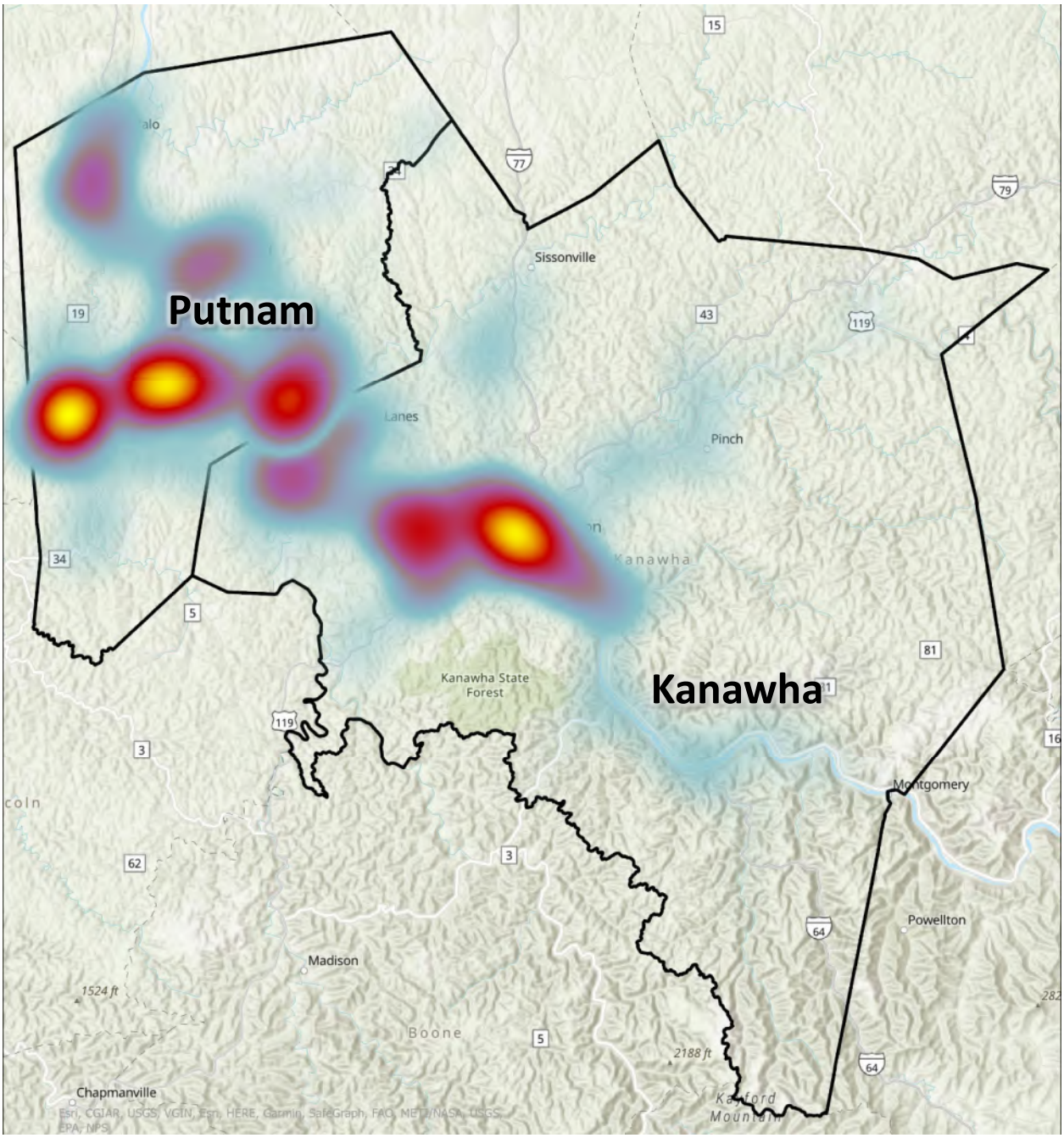


Figure 16: Total Crash Frequency- Kanawha County

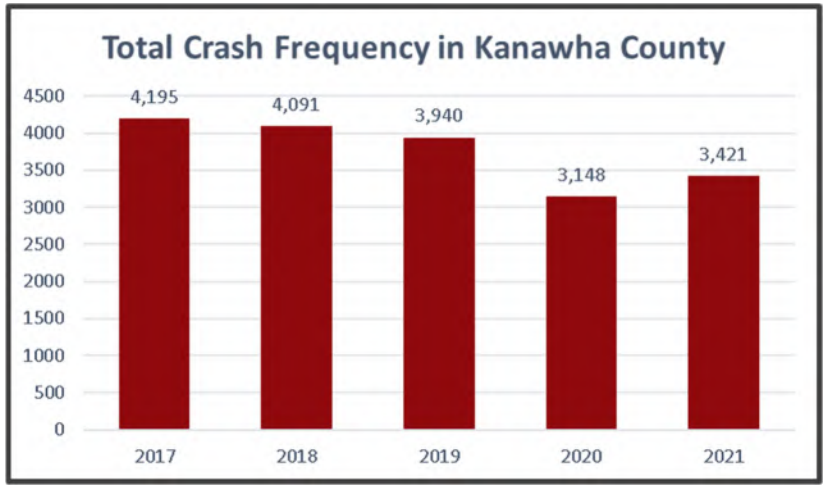


Figure 17: Total Crash Frequency- Putnam County

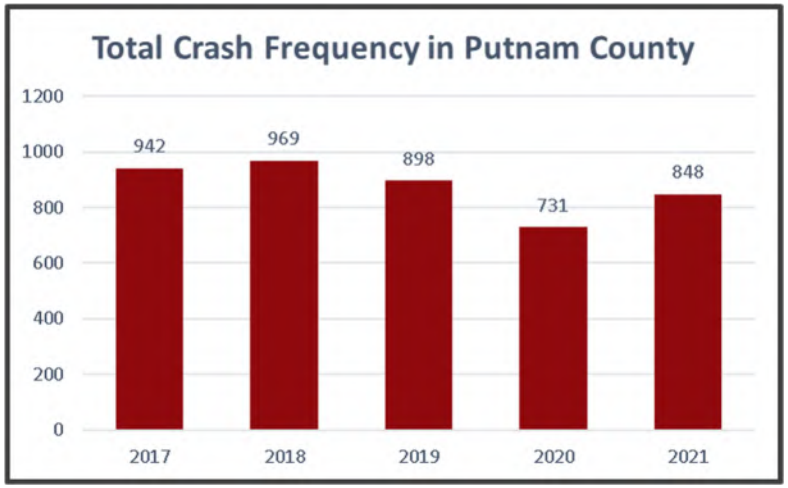


Figure 18: FSI Crashes in Kanawha County

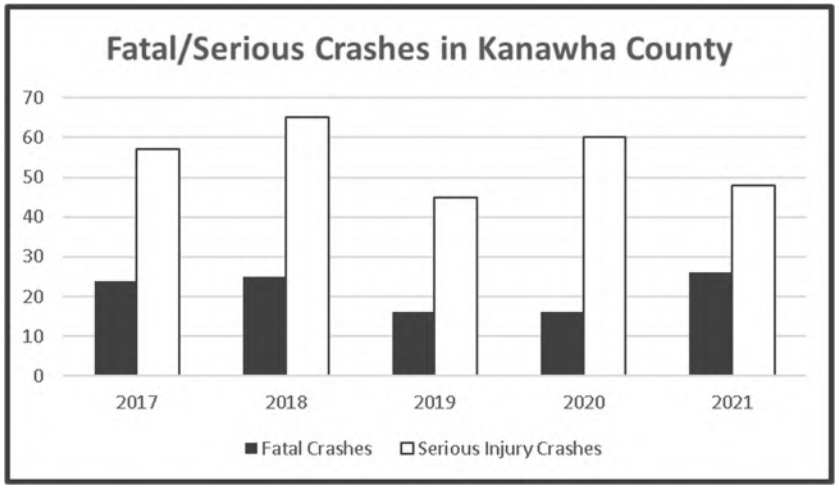
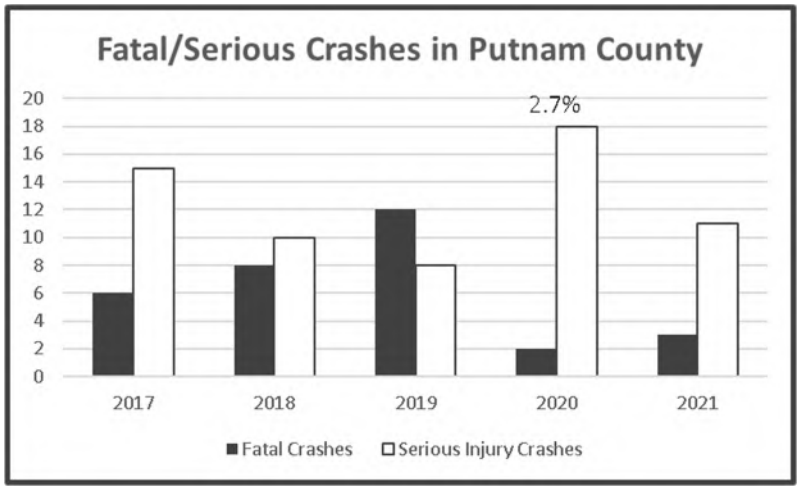


Figure 19: FSI Crashes in Putnam County



Crash Types

For each county, the crash types were evaluated. Figure 20 and Figure 21 summarize the most prevalent crash types for Kanawha County and Putnam County, respectively. The most predominant crash types in Kanawha County were angle, rear-end, and fixed object – which account for nearly 71 percent of all crashes. In Putnam County, rear-end, angle, and fixed object crashes comprise the most frequent crash types, but given the rural nature of the county, rear-end and fixed object crashes account for a higher percentage of total crashes than in Kanawha County.

Figure 20: Crash Types for All Crashes – Kanawha County (2017-2021)

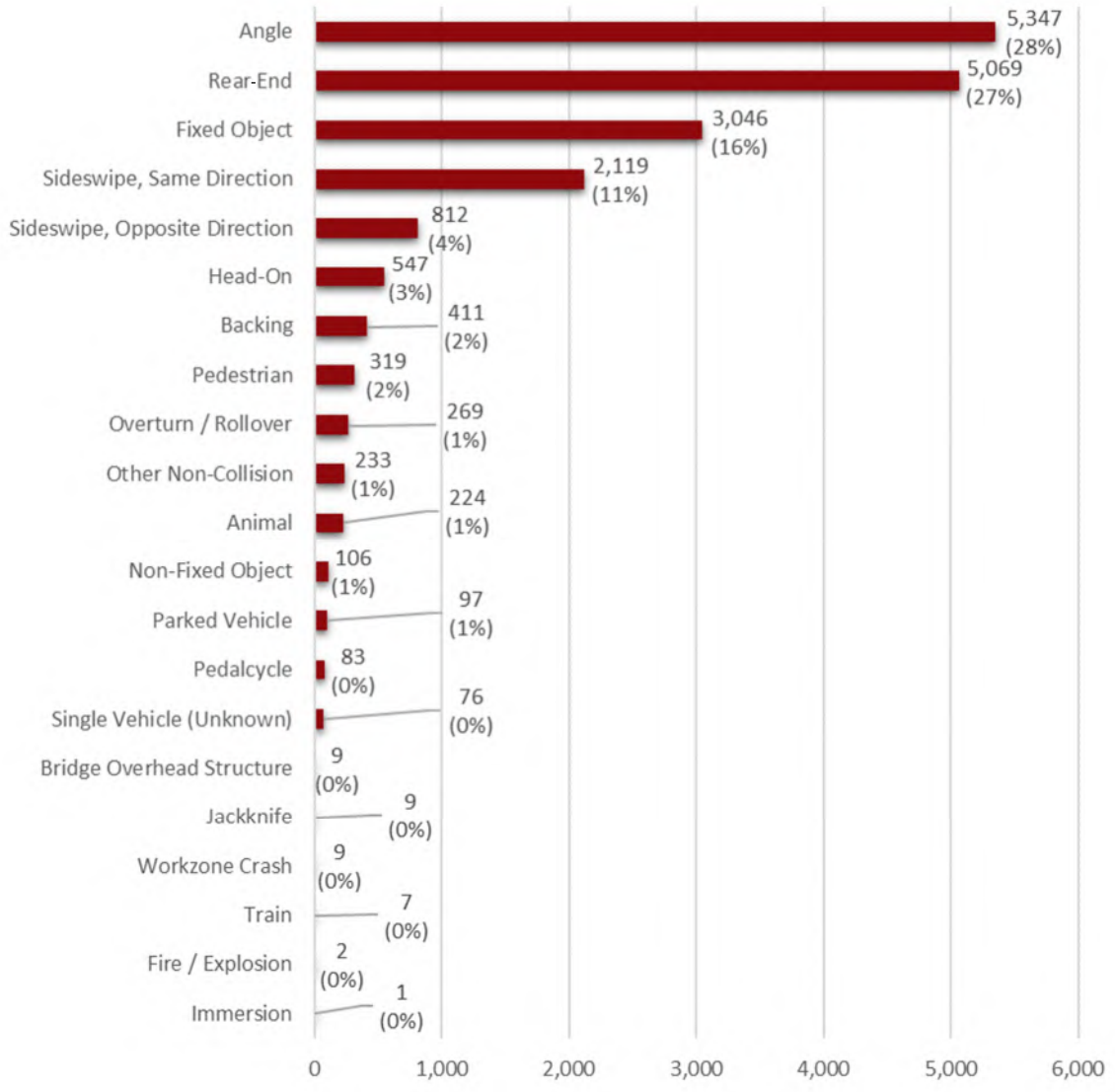
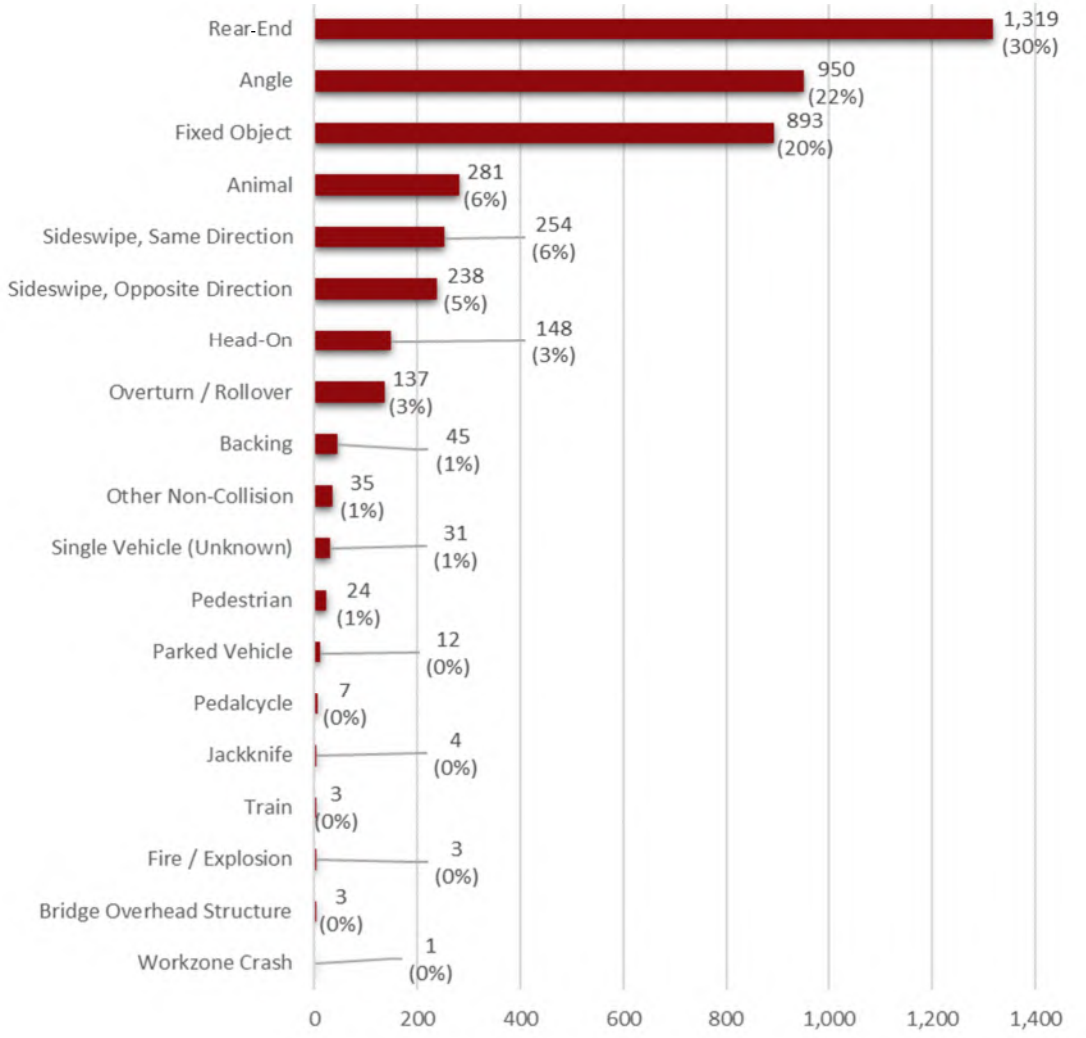


Figure 21: Crash Types for All Crashes – Putnam County (2017-2021)



The types of crashes resulting in fatal and serious injuries were also examined for each county. Figure 22 and Figure 23 summarize the results for Kanawha County. Figure 22 shows the total number of fatal and serious injury crashes by crash type while Figure 23 summarizes the percentage of fatal and serious injury for each crash type. Most fatal and serious injuries resulted from fixed object, angle, and pedestrian crashes. However, 23.8 percent of all pedestrian crashes resulted in a fatality or serious injury.

Figure 24 and Figure 25 summarize the results for Putnam County. Most fatal and serious injuries resulted from fixed object, angle, and pedestrian crashes. However, nearly 43 percent of all bicycle crashes and 25 percent of all pedestrian crashes resulted in a fatality or serious injury.

Figure 22: Fatal and Serious Injury Crashes by Crash Type – Kanawha County (2017-2021)

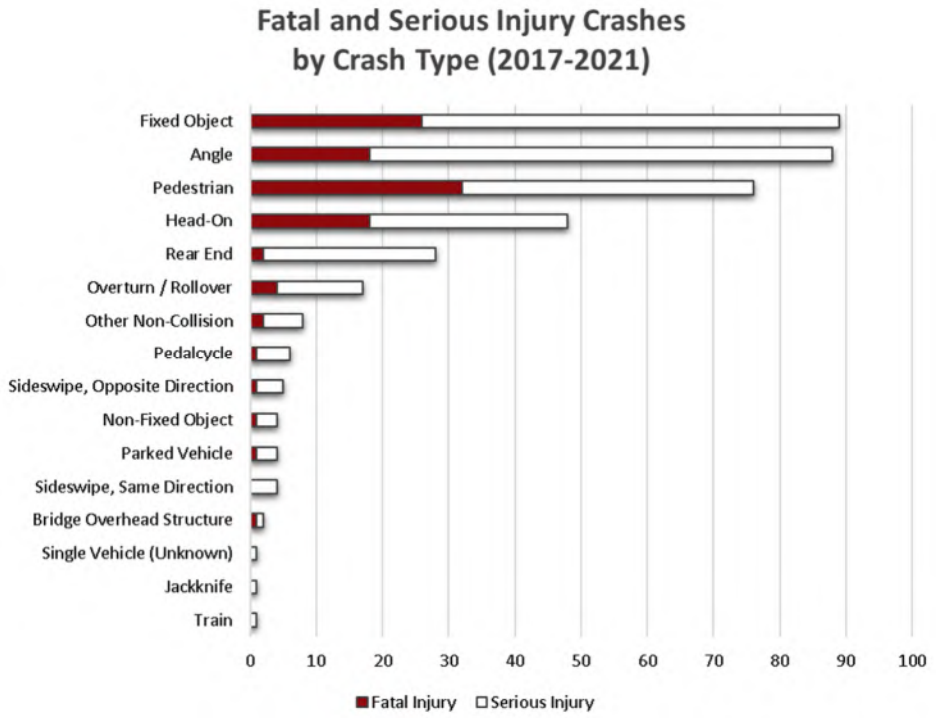


Figure 23: Fatal and Serious Injury Crash Percentage by Crash Type – Kanawha County (2017-2021)

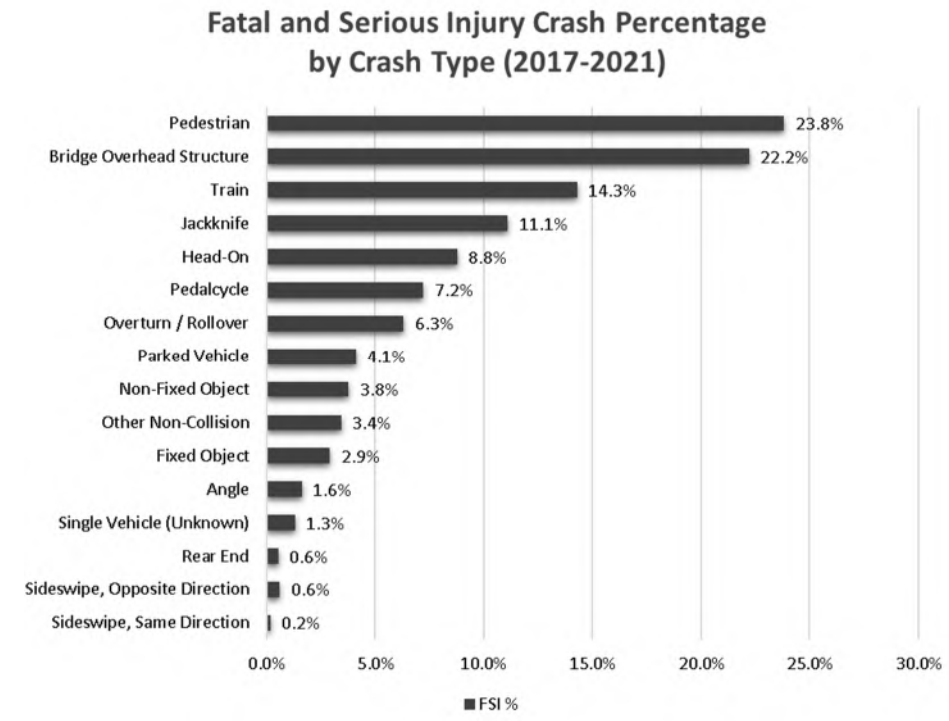


Figure 24: Fatal and Serious Injury Crashes by Crash Type – Putnam County (2017-2021)

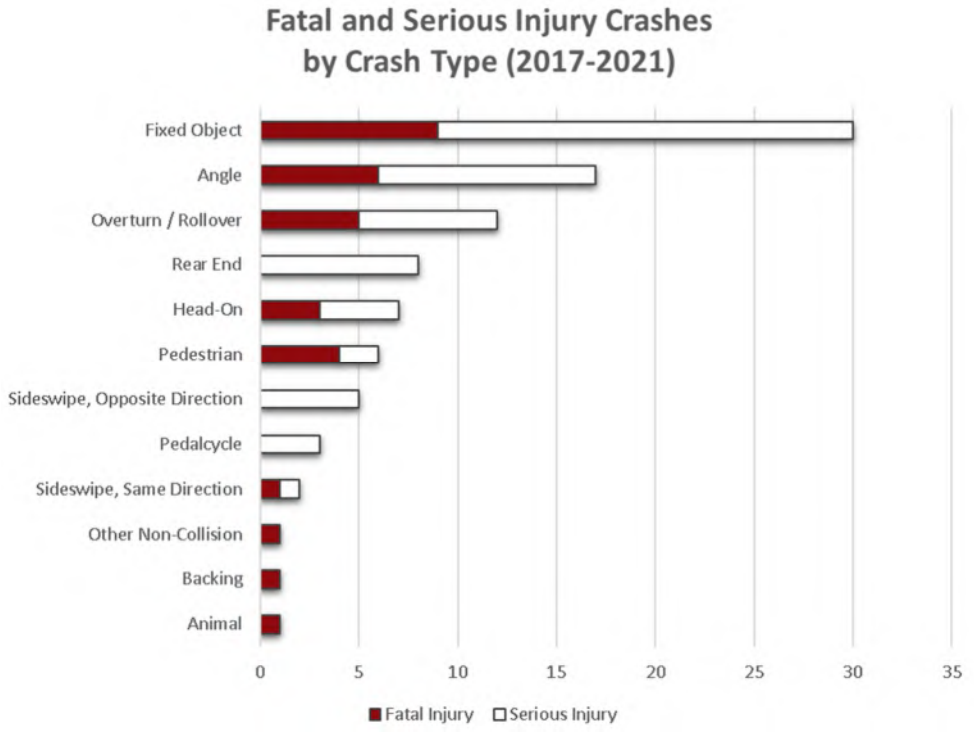
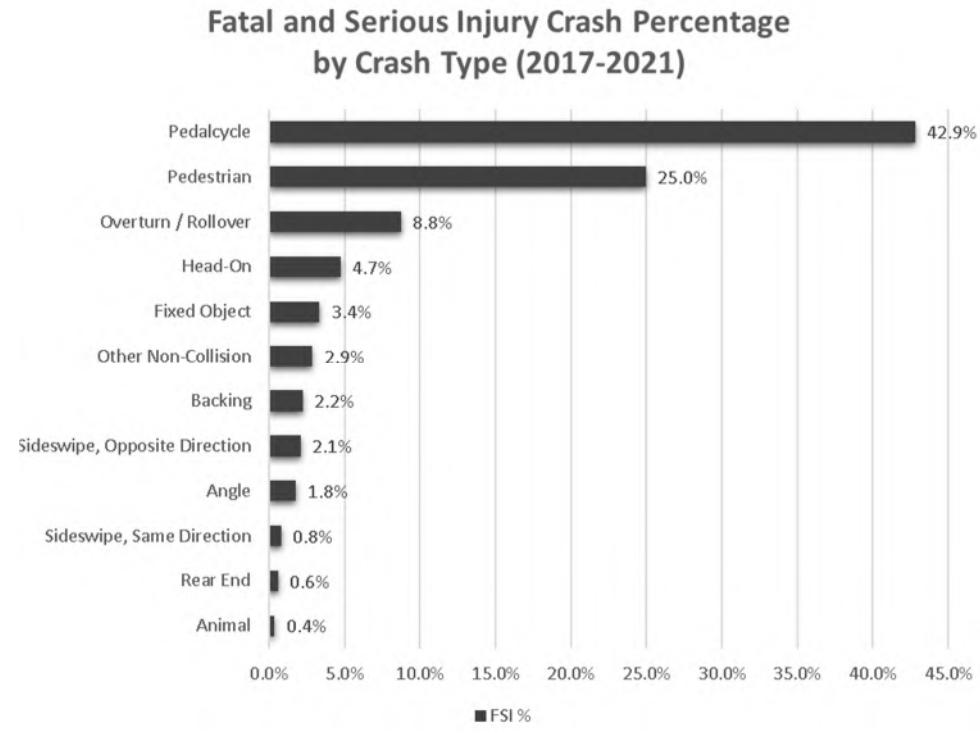


Figure 25: Fatal and Serious Injury Crash Percentage by Crash Type – Putnam County (2017-2021)



Contributing Factors

The contributing factors to the crashes in Kanawha and Putnam Counties were evaluated. These contributing factors align with the WVDOT *Strategic Highway Safety Plan* (SHSP) emphasis areas. The data for speed and aggressive driving and occupant protection was not provided with the data set used for the analysis as part of this plan, however, the percentage of fatal and serious injury crashes were provided in the WV SHSP. Table 3 summarizes the statewide identified emphasis areas in comparison to the occurrences in each county.

Table 3: Emphasis Areas Comparison

Emphasis Area	Statewide FSI	Kanawha County FSI*	Kanawha County FSI (2017-2021)**	Putnam County FSI*	Putnam County FSI (2017-2021)**
Speed and Aggressive Driving	57%	55%	--	74%	--
Roadway Departure	55%	48%	46%	48%	55%
Occupant Protection	32%	28%	--	28%	--
Older Driver	22%	24%	13%	19%	16%
Alcohol and Drug Impaired	22%	19%	15%	19%	14%
Intersections	18%	24%	29%	16%	19%
Pedestrians	7%	13%	17%	3%	5%

* From 2016-2020 data in WVDOT SHSP
**Does not include interstate crashes

For the non-interstate crash data between 2017 and 2021, further analysis was conducted to highlight the prevalence of each contributing factor on total crashes and on just those resulting in a fatality or serious injury. Figure 26 and Figure 27 summarize the statistics for Kanawha County. Given the lack of data for speed and aggressive driving and occupant protection, these contributing factors were not included in this analysis.

Figure 26: Emphasis Areas – All Crashes in Kanawha County

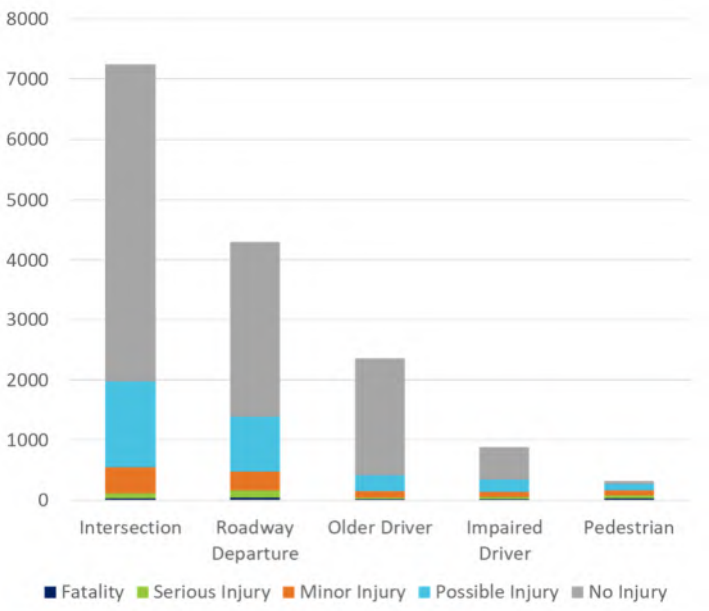
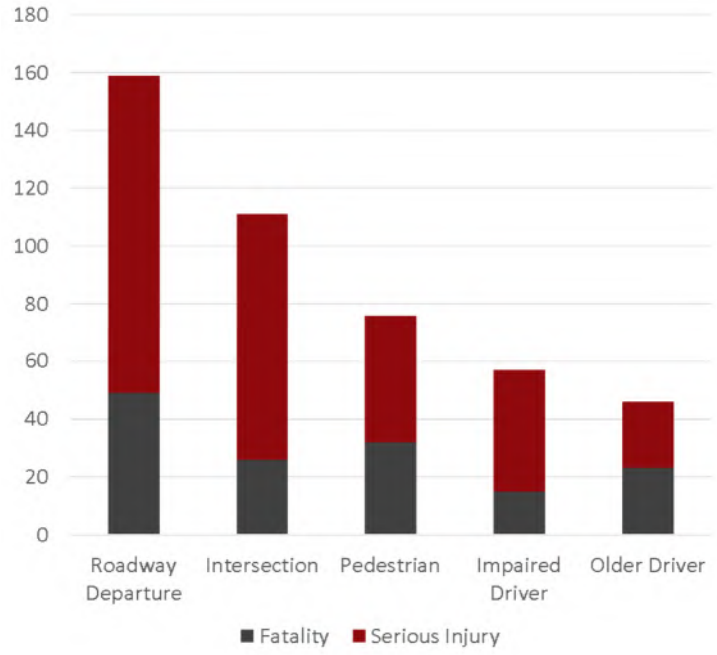


Figure 27: Emphasis Areas – Fatal and Serious Injury Crashes in Kanawha County



When analyzing all crashes in Kanawha County, intersections, roadway departures, and older drivers were the most prevalent contributing factors. However, for fatal and serious injury crashes, roadway departure, intersections, and pedestrians were the most frequent contributing factors.

A similar analysis was conducted for Putnam County and is summarized in Figure 28 and Figure 29. In the more rural Putnam County, roadway departures accounted for the most crashes, both in total crash frequency and those resulting in a fatality or serious injury. Intersections and older drivers rounded out the top three contributing factors in Putnam County with intersection crashes being more prevalent than older drivers in contributing to all crashes. However, older drivers were a contributing factor more often in crashes involving a fatality or serious injury crashes than intersections.

Figure 28: Emphasis Areas – All Crashes in Putnam County

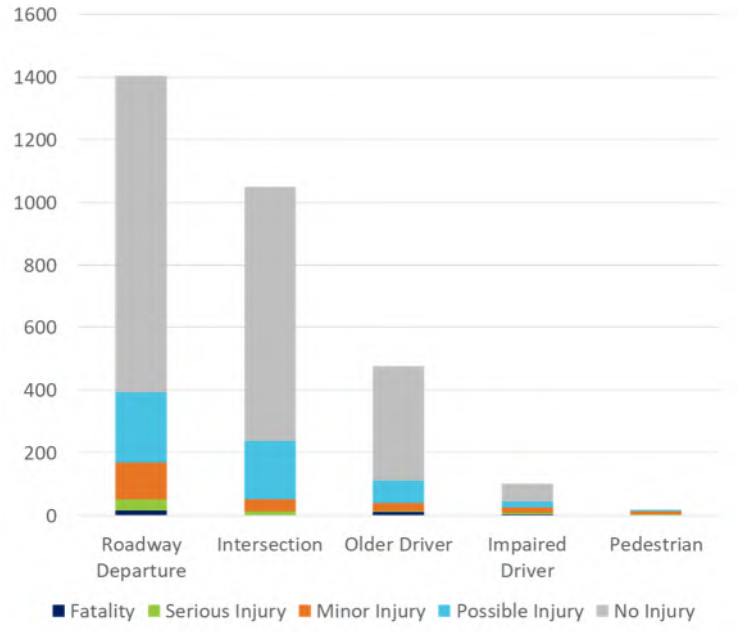
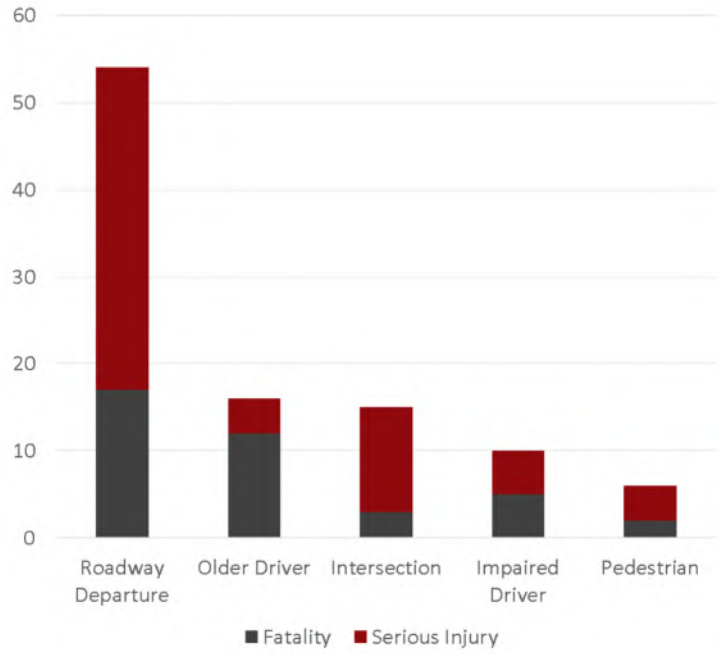


Figure 29: Emphasis Areas – Fatal and Serious Injury Crashes in Putnam County



Another analysis was conducted to determine the overlaps between contributing factors. For example, a roadway departure crash could have involved an older driver who was impaired. Understanding the overlaps in the crash causes helps to inform the appropriate countermeasures and targeted implementation. Table 4 and Table 5 summarize the contributing factors for fatal and serious injury crashes in Kanawha County and Putnam County, respectively.

The table should be read, starting with the horizontal bar at the top (primary emphasis area) and moving down to the vertical bar on the left (secondary emphasis area). For example, in Kanawha County, 47 percent of older driver crashes involve a roadway departure and 32 percent of the impaired driver crashes involved a pedestrian.

Table 4: Emphasis Area Overlaps – Kanawha County

Overlap \ Emphasis Area	Roadway Departure	Older Driver	Impaired	Pedestrian	Intersection
Roadway Departure	--	47%	52%	0%	18%
Older Driver	13%	--	1%	14%	14%
Impaired	17%	2%	--	29%	8%
Pedestrian	0%	19%	32%	--	14%
Intersection	11%	32%	14%	24%	--

Table 5: Emphasis Area Overlaps – Putnam County

Overlap	Emphasis Area: Roadway Departure	Older Driver	Impaired	Pedestrian	Intersection
Roadway Departure	--	61%	93%	0%	5%
Older Driver	18%	--	27%	17%	14%
Impaired	23%	22%	--	17%	14%
Pedestrian	0%	6%	7%	--	0%
Intersection	2%	17%	0%	0%	--

Equity Analysis

An equity analysis was conducted to ensure that the plan effectively addressed the needs of all members of the community, including those who are traditionally underserved or marginalized. The equity analysis for the safety action plan focused on several key indicators, including the percentage of households with no vehicle, the minority population, the disabled population, and the population below the poverty line. By examining these indicators, the analysis aimed to identify areas of the community that may be disproportionately impacted by transportation safety issues and ensure that the plan addressed these disparities.

In the RIC region there are 69 census tracts. Combining the key indicators studied, an equity rank was created to illustrate the equity priority areas in the RIC region. This equity rank can be used for project prioritization and to provide more context to the study of the area. The 20 census tracts with the highest equity rank represent the communities that are most marginalized. The characteristics of these 20 census tracts include:

- 28% of the land area
- 60% of all bike or pedestrian crashes
- 32% of all fatal and serious injury (FSI) crashes
- An average of 20.4% of households with zero vehicles (10.4% avg. for region)
- An average of 23.5% minority population (13.4% avg. for region)
- An average of 21.5% of population with a disability (17.4% avg. for region)
- An average of 27.5% of population in poverty (17.2% avg. for region)

Maps representing each of the analyzed equity indicators as well as the equity rank are illustrated in Figure 30 through Figure 34.

Figure 30: Percent of Households with No Vehicle

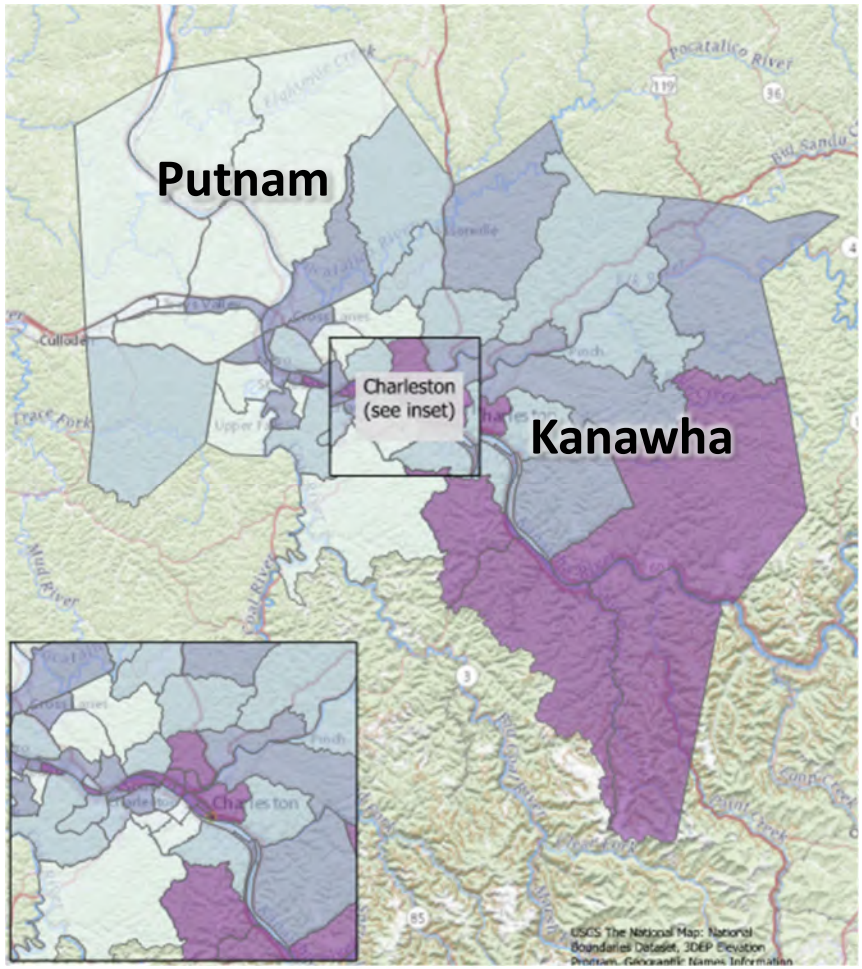


Figure 31: Percent Minority Population

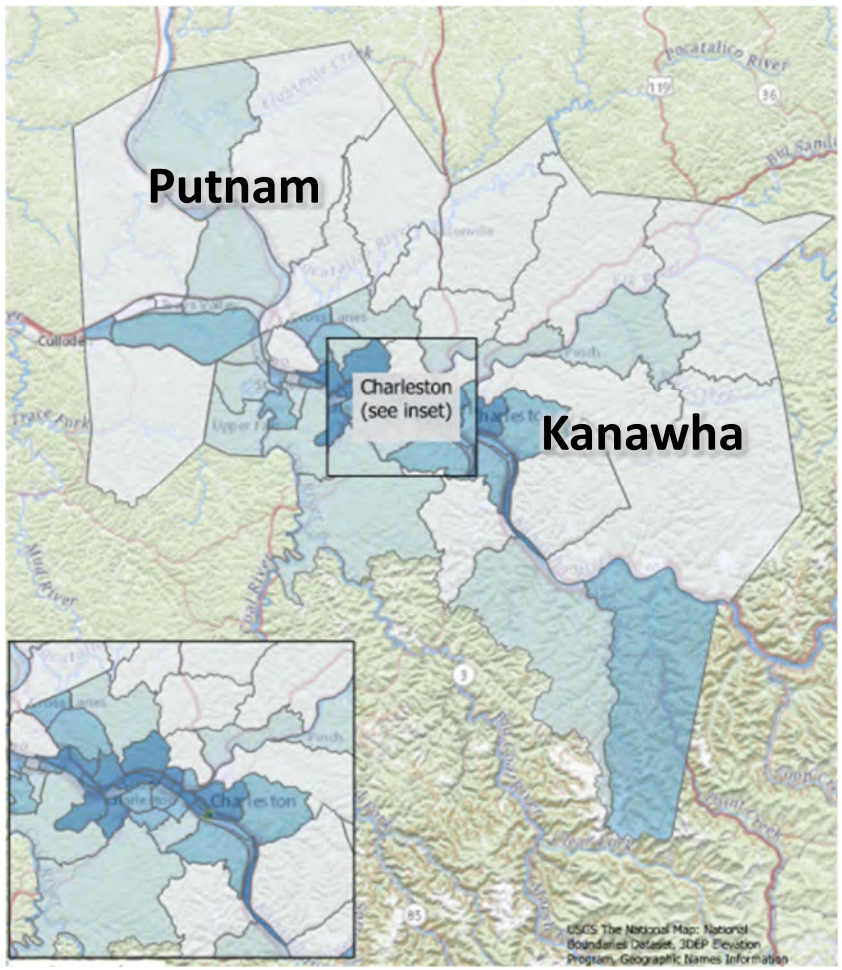


Figure 32: Percent Disabled Population

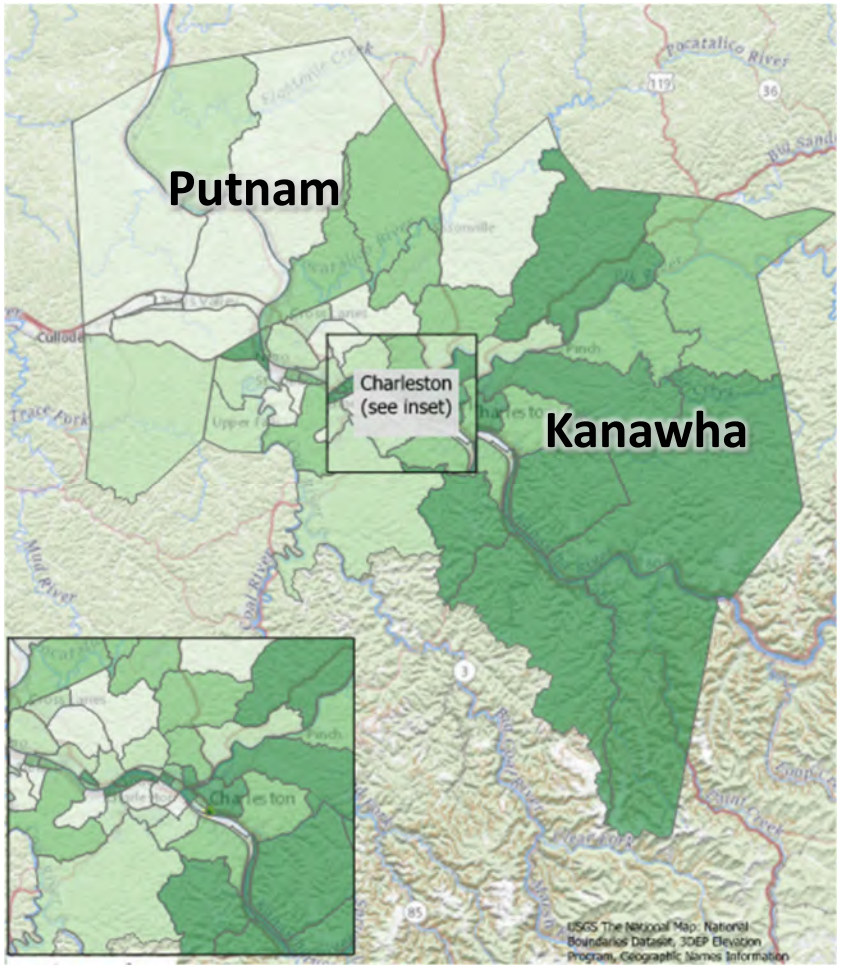


Figure 33: Percent of Population Below Poverty Line

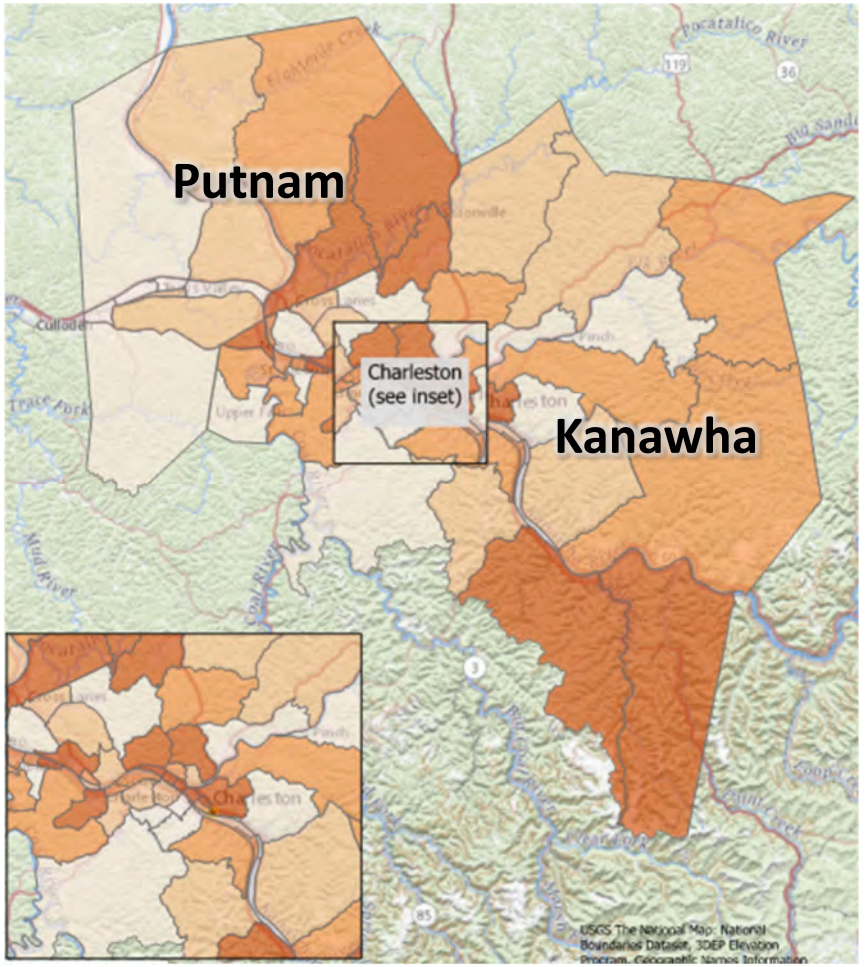
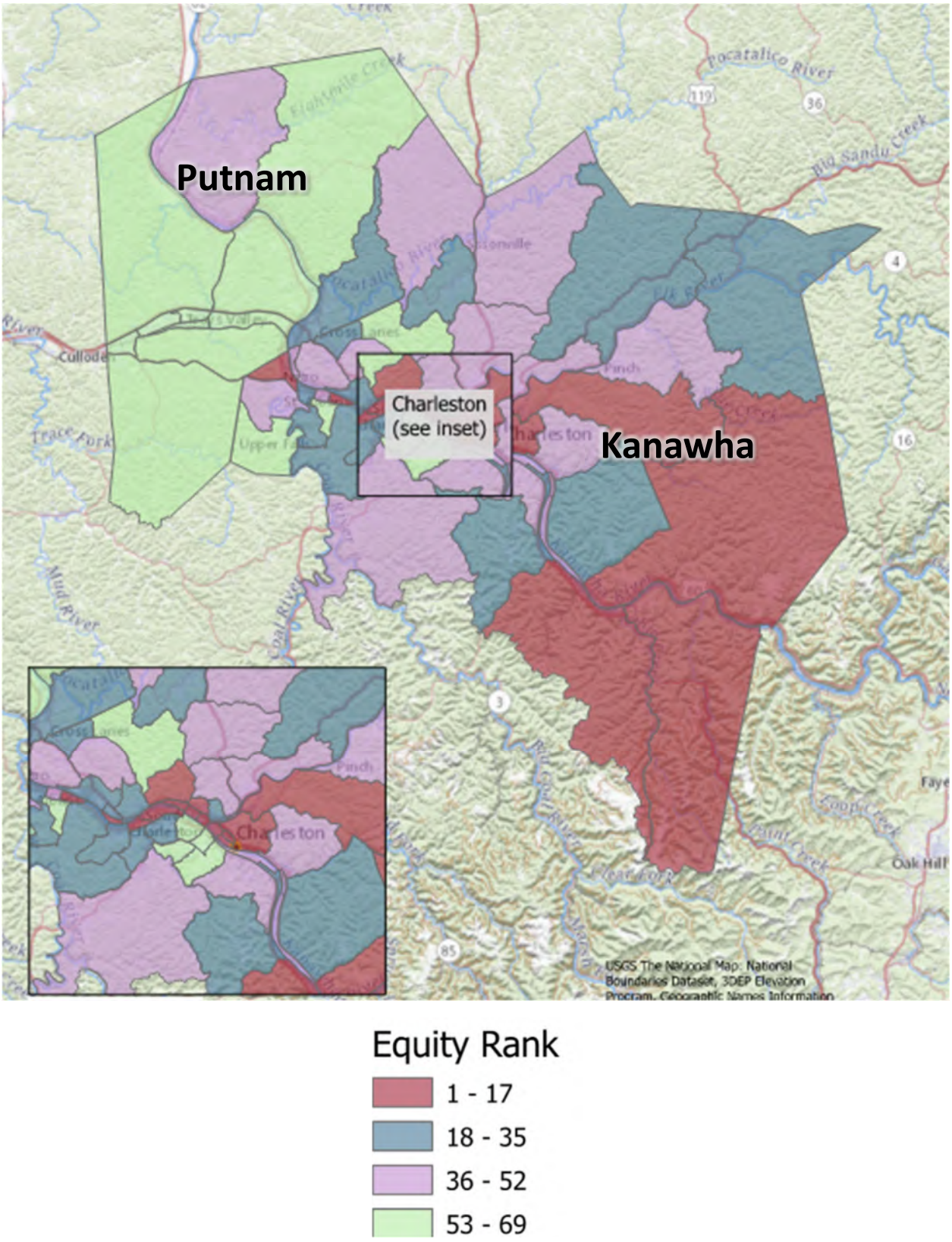


Figure 34: Equity Priorities

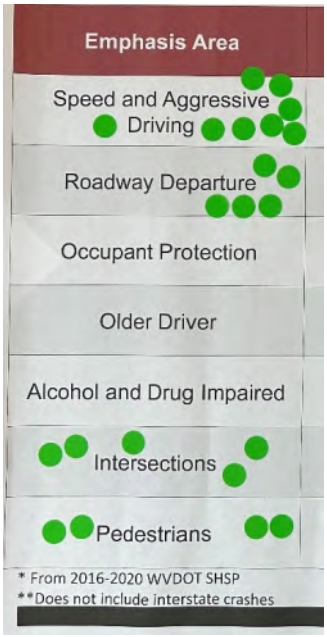


Priority Safety Emphasis Areas

Using all the data presented and local knowledge, stakeholders identified the topics and issues (emphasis areas) most pertinent to transportation safety in Kanawha and Putnam Counties. The top safety emphasis areas identified for this plan are:

- Intersections
- Pedestrians
- Roadway Departure
- Speed and Aggressive Driving

Exhibit 1: Emphasis Areas Stakeholder Exercise Photo



Intersections

Intersections impact all road users and are complex areas that require drivers to make multiple decisions in a short amount of time. Vehicles, pedestrians, and cyclists are often competing for the same space, and traffic flow is interrupted by traffic signals, stop signs, and other road signs. All of these factors can contribute to confusion and lead to crashes. Emphasizing intersections in this safety action plan works toward improving safety for all road users and reduces the number of crashes and fatalities that occur at these complex areas.

In Kanawha County there were 111 fatal or serious injury (FSI) crashes between January 1, 2017 and December 31, 2021, in which 131 people were fatal or seriously injured from crashes that occurred at intersections. Statistics for these crashes in comparison to statewide statistics in the WV SHSP are summarized in Table 6 below. Some other notable factors include:

- 27% (30 crashes) occurred on a Friday.
- 22% (29 people) of the fatal and serious injuries involved passengers.
- 52% (68 people) of the fatal and serious injuries involved people between the ages of 20 and 49 (roughly 37% of the population).

Table 6: Intersection Crash Details in Kanawha County

Data Trends/Key Facts for FSI at Intersections		
Statewide*	Kanawha**	
77%	77%	occurred on a weekday (Monday - Friday)
56%	54%	were male
53%	59%	involved angle crashes
49%	43%	occurred at T-intersections
42%	40%	occurred between 2 PM and 7 PM
34%	21%	involved older drivers (65 years old and older)
15%	18%	occurred on wet roadways
12%	11%	occurred in dark/unlit conditions
6%	16%	involved pedestrians

* From 2016-2020 data in the WVDOT SHSP **From 2017-2021 Crash Analysis

In Putnam County there were 15 intersection FSI crashes in which 21 people were fatally or seriously injured in intersection crashes between 2017 and 2021. Statistics for these crashes in comparison to statewide statistics in the WV SHSP are summarized in Table 7 below. Some other notable factors include:

- 40% (6 crashes) occurred on a Wednesday.
- 87% (13 crashes) occurred between the months of April and July.
- 38% (8 people) of the fatal and serious injuries involving passengers.

Table 7: Intersection Crash Details in Putnam County

Data Trends/Key Facts for FSI at Intersections		
Statewide*	Putnam**	
77%	93%	occurred on a weekday (Monday - Friday)
56%	52%	were male
53%	60%	involved angle crashes
49%	53%	occurred at T-intersections
42%	40%	occurred between 2 PM and 7 PM
34%	19%	involved older drivers (65 years old and older)
15%	13%	occurred on wet roadways
12%	7%	occurred in dark/unlit conditions
6%	0%	involved pedestrians

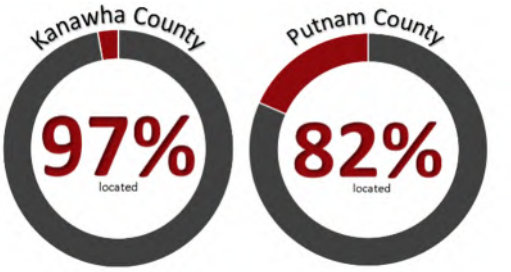
* From 2016-2020 data in the WVDOT SHSP **From 2017-2021 Crash Analysis

Additional statistics on intersection crashes are included in Appendix D.

Intersection Hot Spot Identification

Given the intersection priority area, hot spot locations were identified to inform countermeasures in the region.

The first step required locating the crashes. Crashes were located based on information from crash reports and were compiled with geographic data such as latitude and longitude, address, intersection, and other locator information. In Kanawha County, 97% of crashes were located, and in Putnam County 82% were located.



In order to conduct a thorough crash analysis, the team used Open Streetmap to obtain the intersection points in the study area. A 500-foot radius was then drawn around each intersection point to capture all crashes that may be attributed to the intersection. If two intersection radii overlapped, the crash was attributed to the closest intersections.

Once attributed to an intersection, crashes were given a weighted score based on equivalent property damage only (EPDO) factors which is a method that determines the relative severity of crashes by weighting the crash costs. Table 8 summarizes the weights of each level of injury severity which is based on the crash costs developed by WVDOT for economic analysis purposes.

Table 8: EPDO Costs and Weight

	Costs	Weight
Fatal Crash (K)	$9,646,264	930.119
Serious Injury Crash (A)	$552,237	53.248
Minor Injury Crash (B)	$177,292	17.095
Possible Injury Crash (C)	$104,838	10.109
Property Damage Only (O)	$10,371	1.00

Each intersection was given two EPDO scores. The EPDO (total) takes both the crash frequency and the severity of the crashes into account, while EPDO (per crash) looks at the weighted average of each crash.

Equivalent Property Damage Only (total) = (930.119 * Fatal Crashes) + (53.248 * Incap. Crashes) + (17.095 * Non-Incap. Crashes) + (10.109 * Possible Injury Crashes) + (PDO Crashes)

Equivalent Property Damage Only (per crash) = ((930.119 * Fatal Crashes) + (53.248 * Incap. Crashes) + (17.095 * Non-Incap. Crashes) + (10.109 * Possible Injury Crashes) + (PDO Crashes)) / Crash Frequency

Crash Frequency = Total number of crashes occurring at intersection

Composite Score = Crash Frequency Rank + EPDO (total) Rank + EPDO (per crash) Rank

The intersection's rank based on the total EPDO and the EPDO per crash and the rank of crash frequency were summed to determine the intersection composite score. The lower the composite score, the higher the intersection priority. The detailed rankings for intersections in Kanawha and Putnam Counties are provided in Appendix E. The top intersections in each county include:

Kanawha County

- Parkway Road & US-119
- Brounland Road & US-119
- MacCorkle Avenue SE & US-119
- 10th Street & Fletcher Square
- Patrick Street & Patrick Street Plaza
- Southridge Boulevard & US-119
- Goff Mountain Road & WV-62
- Lee Street E & Leon Sullivan Way
- Dunbar Toll Bridge & MacCorkle Avenue SW
- Dunbar Avenue & Wilson Street

Putnam County

- Grille Lane (South) & WV-34
- Buffalo Bridge & Shamrock Lane
- Hurricane Creek Road & US-35
- Shamrock Lane & US-35
- CR-9 & US-35
- WV-34 & Winfield Road
- Prairie Lane & Stricklin Road
- Mount Vernon Road & Teays Valley Road
- Great Teays Boulevard & Teays Valley Road
- Midland Trail & US-60

Pedestrians

Analyzing crash statistics related to pedestrians is crucial in understanding the risks and challenges they face on the roads. Pedestrians are vulnerable road users, and they are at a higher risk of severe injury or fatality in the event of a crash involving a motor vehicle.

Between 2017 and 2021 in Kanawha County there were 76 pedestrian FSI crashes that involved 81 fatalities or serious injuries. Statistics for these crashes in comparison to statewide statistics in the SHSP are summarized in Table 9. A majority of these crashes, 70%, occurred under dark, dawn, or dusk conditions. Of the pedestrians involved in these

crashes, 72% were male. Nearly 21% of these crashes occurred during the late-night hours between 1 AM and 7AM, and 28% of all fatal and serious injury crashes occurred in December and January.

Table 9: Pedestrian Crash Details in Kanawha County

Data Trends/Key Facts for FSI Crashes involving Pedestrians		
Statewide*	Kanawha**	
65%	72%	were male
47%	42%	occurred on a Tuesday, Wednesday, or Thursday
41%	41%	were ages 20 to 39
40%	41%	occurred between 5 PM and 10 PM
35%	34%	occurred in dark/unlit conditions
31%	29%	involved alcohol or drug impairment (driver or ped)
17%	24%	occurred at an intersection

* From 2016-2020 data in the WVDOT SHSP **From 2017-2021 Crash Analysis

There were six pedestrian FSI crashes, involving seven fatal or serious injuries in Putnam County between 2017 and 2021, which is not a large enough dataset to determine any significant trends. However, statistics for these crashes in comparison to statewide statistics in the SHSP are summarized in Table 10.

Table 10: Pedestrian Crash Details in Putnam County

Data Trends/Key Facts for FSI Crashes involving Pedestrians		
Statewide*	Putnam**	
65%	43%	were male
47%	33%	occurred on a Tuesday, Wednesday, or Thursday
41%	43%	were ages 20 to 39
40%	17%	occurred between 5 PM and 10 PM
35%	50%	occurred in dark/unlit conditions
31%	17%	involved alcohol or drug impairment (driver or ped)
17%	0%	occurred at an intersection

* From 2016-2020 data in the WVDOT SHSP **From 2017-2021 Crash Analysis

Additional statistics on pedestrian crashes are included in Appendix F.

Systemic Pedestrian Analysis

A systemic analysis of pedestrian crashes was conducted to determine where pedestrian crashes are most likely to occur. A key component of this analysis involved identifying risk factors based on available data and where crashes are currently occurring. The risk factors identified include:

Presence of vehicles
- Number of bidirectional traffic lanes
- Free flow speed
- Total annual volume
- Heavy vehicle volume

Presence of pedestrian
- Population density
- Proximity of bus stops
- Presence of public attractions
- Presence of schools
- Presence of businesses

The region was divided into segments based on the RIC's travel demand model (TDM). Based on the presence and characteristic of the risk factor, a score was awarded to each segment. The scores for the presence of vehicle and presence of pedestrian were added together to determine the overall risk factor for the segment. A higher pedestrian risk score indicates a greater potential for pedestrian crashes. Figure 35 summarizes the results of this analysis. More details, including the methodologies and the detailed rankings are provided in Appendix G.

Given the more rural nature of Putnam County, the highest 69 segments were all located within Kanawha County. The priority segments are listed below:

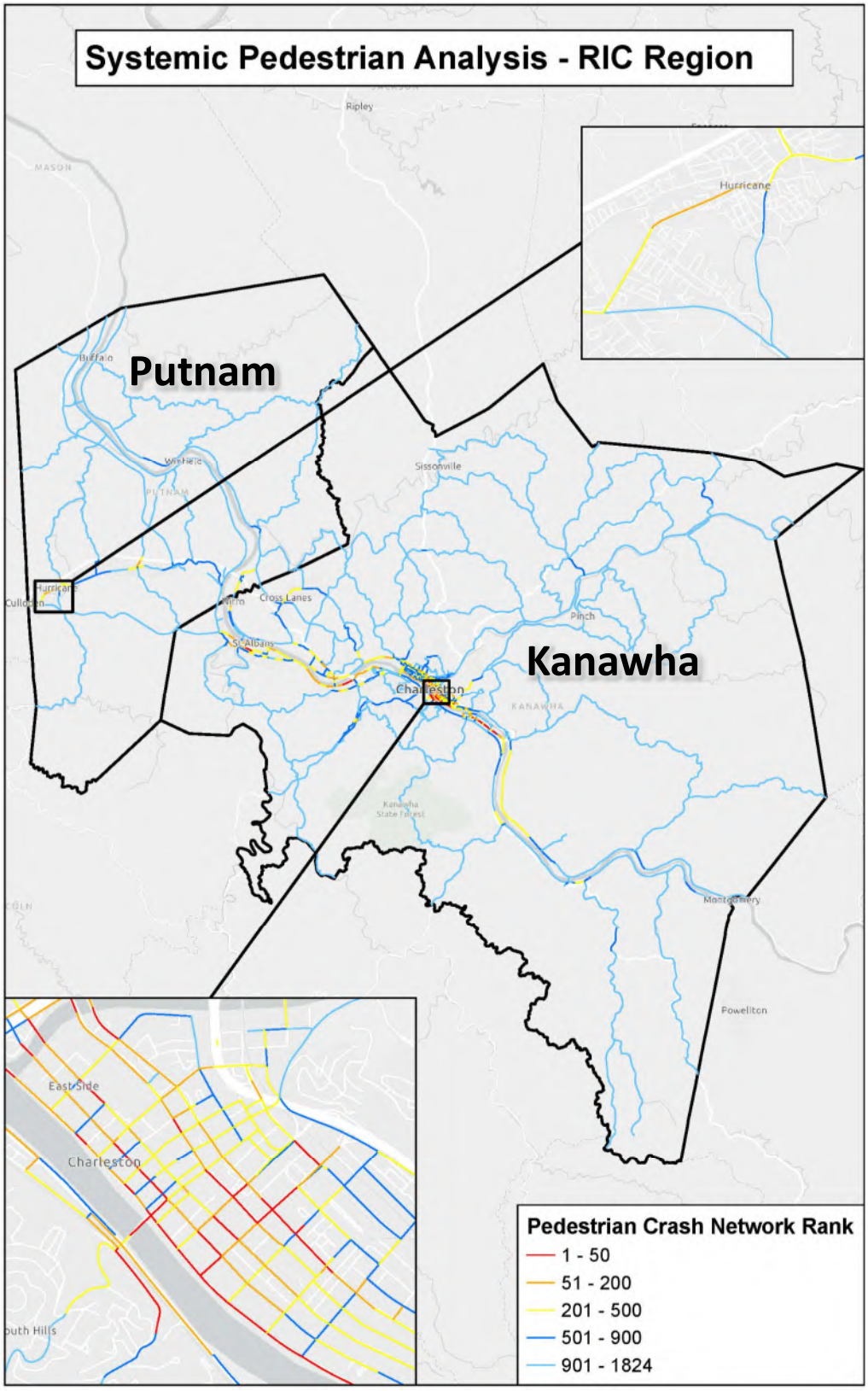
Kanawha County

- Kanawha Boulevard E from Brooks Street to Morris Street
- Washington Street E from Sentz Street to Brooks Street
- Brooks Street from Washington Street E to Lewis Street
- Virginia Street E from Leon Sullivan Way to Brooks Street
- WV-61 from 41st Street SE to 45th Street SE

Putnam County

- Main Street from Hale Street to Midland Trail
- WV-34 from Mount Vernon Road to Grille Lane
- WV-34 from Grille Lane to I-64
- CR-19 within the I-64 Ramps
- WV-25 from 19th Street to 23rd Street

Figure 35: Pedestrian Risk Network Analysis



Roadway Departure

Roadway departure is a type of crash that occurs when a vehicle leaves the roadway and most commonly, collides with another object, enters opposing traffic, or overturns. These crashes are a significant contributor to traffic fatalities and serious injuries, particularly on rural roads.

In Kanawha County between 2017 and 2021, there were 159 FSI roadway departure crashes which resulted in the fatal or serious injury of 205 individuals. Statistics for these crashes in comparison to statewide statistics in the SHSP are summarized in Table 11 below. Some other notable factors include:

- 44 (28%) occurred between the hours of 10 PM and 7 AM.
- 89 (56%) of the crashes involved striking a fixed object, while 48 (30%) involved a head-on collision.
- The majority of the fatal and serious injuries, representing 130 (63%) people, were the driver of the vehicle that left the roadway.
- Passengers accounted for 46 (22%) of the fatal and serious injuries.

Table 11: Roadway Departure Crash Details in Kanawha County

Data Trends/Key Facts for Roadway Departure FSI Crashes		
Statewide*	Kanawha**	
64%	62%	were male
48%	47%	occurred on a Friday, Saturday, or Sunday
41%	42%	were ages 20 to 39
30%	33%	occurred in dark/unlit conditions
26%	16%	involved impaired driving
26%	17%	occurred between 2 PM and 6 PM
19%	21%	occurred on wet roadways

* From 2016-2020 data in the WVDOT SHSP **From 2017-2021 Crash Analysis

In Putnam County between 2017 and 2021, 53 roadway departure FSI crashes occurred, resulting in 61 people being fatally or seriously injured. Statistics for these crashes in comparison to statewide statistics in the WV SHSP are summarized in Table 12. Some other notable factors include:

- 17 (31%) occurred during the time between 10 PM and 7 AM.
- Striking a fixed object was the leading cause of this crash type, accounting for 30 (57%) of the incidents, while 12 (23%) involved overturning or rolling over.
- The driver of vehicle one was fatally or seriously injured in 41 (67%) of the FSI crashes, and passengers accounted for 12 (20%) of FSIs.
- 13 (21%) of the fatal and serious injuries were reported among individuals between the ages of 15 and 21.

Table 12: Roadway Departure Crash Details in Putnam County

Data Trends/Key Facts for Roadway Departure FSI Crashes		
Statewide*	Putnam**	
64%	70%	were male
48%	43%	occurred on a Friday, Saturday, or Sunday
41%	33%	were ages 20 to 39
30%	41%	occurred in dark/unlit conditions
26%	17%	involved impaired driving
26%	20%	occurred between 2 PM and 6 PM
19%	19%	occurred on wet roadways

* From 2016-2020 data in the WVDOT SHSP **From 2017-2021 Crash Analysis

Additional statistics on roadway departure crashes are included in Appendix H.

Speed and Aggressive Driving

Studying crashes involving speeding and aggressive driving is crucial because these behaviors are significant contributing factors to road traffic crashes, injuries, and fatalities. Aggressive driving refers to any combination of driving behaviors that put other road users at risk, such as excessive speed, tailgating, running red lights or stop signs, and weaving in and out of traffic.

WVDOT provided information for speed and aggressive driving for crashes between 2017 and 2020 which was used in the analysis below. Crashes were evaluated for speed and aggressive driving contributing factors as part of the SHSP which included data from 2016 through 2020. Therefore, 2021 data was evaluated for speed and aggressive driving factors and was not included in this analysis.

Between 2017 and 2020, there were 211 speed and aggressive driving FSI crashes that fatally or seriously injured 262 individuals in Kanawha County. Statistics for these crashes in comparison to statewide statistics in the SHSP are summarized in Table 13. Some other notable factors include:

- 66 (31%) of the crashes were classified as angle collisions.
- 23% (60 people) of the fatal and serious injuries involved passengers.

Table 13: Speed and Aggressive Driving Crash Details in Kanawha County

Data Trends/Key Facts for Speed and Aggressive Driving FSI Crashes		
Statewide*	Kanawha**	
62%	48%	were roadway departure crashes
62%	55%	were male
40%	40%	were ages 20 to 39
36%	27%	occurred between 2 PM and 6 PM
33%	37%	occurred on Thursday or Friday
25%	24%	occurred in dark/unlit conditions
24%	10%	involved impaired driving
19%	20%	occurred on wet roadways

* From 2016-2020 data in the WVDOT SHSP **From 2017-2021 Crash Analysis

In Putnam County between 2017 and 2020, there were 61 FSI crashes involving speed and aggressive driving and fatally or seriously injuring 73 people. Statistics for these crashes in comparison to statewide statistics in the WV SHSP are summarized in Table 14 below. Some other notable factors include:

- 10 (16%) occurred between 10 PM and 7 AM.
- Angle collisions accounted for 16 (26%) of the crashes.
- 22 (30%) of the fatal and serious injuries were passengers in the crashing vehicle.

Table 14: Speed and Aggressive Driving Crash Details in Putnam County

Data Trends/Key Facts for Speed and Aggressive Driving FSI Crashes		
Statewide*	Putnam**	
62%	61%	were roadway departure crashes
62%	60%	were male
40%	33%	were ages 20 to 39
36%	31%	occurred between 2 PM and 6 PM
33%	31%	occurred on Thursday or Friday
25%	26%	occurred in dark/unlit conditions
24%	7%	involved impaired driving
19%	21%	occurred on wet roadways

* From 2016-2020 data in the WVDOT SHSP **From 2017-2021 Crash Analysis

Additional statistics on speed and aggressive driving crashes are included in Appendix I.

Section 3. Action Plan and Strategy Solutions

The Action Plan was developed by stakeholders, using information from existing planning efforts, local knowledge, and data analysis. These inputs were the deciding factors to identify the following effective solutions for the RIC region. Implementation of every action will be initiated over the next five years, with some occurring immediately and others later. Outcomes and lead agencies have been identified for every action to ensure someone is responsible for implementation and understands how to measure and evaluate progress or completion. The number of strategies and actions are limited in number and only include priority safety efforts, or the activities, that have the support, resources, and ability to be addressed over the next five years.

The actions are framed around three overarching strategies:

Strategy 1: Safe Roads: Consider how the safety engineering treatments to streets and intersections can accommodate human mistakes and injury tolerance.

Strategy 2: Safe Road Users: Educate all road users and support enforcement to reduce crashes.

Strategy 3: Safe Speeds: Review average speeds, in coordination with crashes, to identify roadway improvements, educational needs, and/or policies to reduce the severity of this crash type.

For each safety challenge identified – intersections (INT), pedestrians (PED), roadway departure (RWD), and speed and aggressive driving (S&A) – the solutions are cross cutting to address the roads, road users, and speeds.

Strategy 1. Retrofit existing streets and intersections to account for human mistakes and injury tolerances to reduce the severity of crashes that do occur and prevent future crashes.						
			Emphasis Areas Addressed			
Action	Outcome	Lead Agency	INT	PED	RWD	S&A
1. Implement proven safety countermeasures at intersections to reduce vehicle, bicycle, and pedestrian crashes, especially backplates, lighting, countdown pedestrian signal heads, leading pedestrian intervals, and high visibility crosswalks.	List of locations for systemic and systematic application of countermeasures.	Regional Intergovernmental Council	X	X		
2. Re-evaluate vehicular and pedestrian clearance intervals.	Yellow and all-red vehicular clearance intervals and Walk and Flashing Don't Walk intervals that meet current MUTCD guidelines.	WVDOH and Local Agencies	X	X		X
3. Conduct Road Safety Assessments (RSAs) at priority intersections.	Detailed study to identify spot-specific countermeasures for at least two intersections per years.	Regional Intergovernmental Council	X	X		X
4. Continue to evaluate corridors with high proportions of fatal and serious injury crashes involving roadway departures.	List of improvements for roadway departure corridors.	WVDOH			X	X
5. Identify and implement proven safety countermeasures such as walkways, roadway reconfigurations, and medians and refuge islands, along the pedestrian high-risk corridors.	List of locations for systemic and systematic application of countermeasures.	Regional Intergovernmental Council		X		
6. Implement proven safety countermeasures at intersections to reduce vehicle, bicycle, and pedestrian crashes, especially backplates, lighting, countdown pedestrian signal heads, leading pedestrian intervals, and high visibility crosswalks.	List of locations for systemic and systematic application of countermeasures.	Regional Intergovernmental Council	X	X		

Strategy 1. Retrofit existing streets and intersections to account for human mistakes and injury tolerances to reduce the severity of crashes that do occur and prevent future crashes. (Continued)						
			Emphasis Areas Addressed			
Action	Outcome	Lead Agency	INT	PED	RWD	S&A
7. Improve intersection safety through geometric modifications such as removing access points within the functional area of the intersection, dedicated turn lanes, reducing number and severity of conflict points through alternative intersections, and mitigating sight distance issues through skew correction.	List of locations for geometric improvements.	Regional Intergovernmental Council	X	X		
8. Assemble a joint task force compiled of representatives from WVDOH, RIC, and local agencies to discuss safety concerns in the region and identify solutions to ensure the plan has a collaborative central hub for implementation accountability.	Annual task force meetings	Regional Intergovernmental Council	X	X	X	X
9. Consider and accommodate the needs of all road users on roadway retrofits and reconstruction and on new roadways.	Complete Streets Policy	Regional Intergovernmental Council		X		

Strategy 2. Address the safety of all road users by providing education and enforcement on the personal responsibility of safe driving.						
			Emphasis Areas Addressed			
Action	Outcome	Lead Agency	INT	PED	RWD	S&A
1. Support the State's efforts to explore the viability of automated speed enforcement and automated red-light running enforcement programs.	Collaboration with the State	Regional Intergovernmental Council and Local Agencies	X	X	X	X
2. Continue daily enforcement and high visibility enforcement of traffic safety laws.	Enforcement of traffic laws	Local Law Enforcement	X	X	X	X
3. Distribute State-developed messaging to increase public awareness around safety.	Messages shared via social media and other local channels	Regional Intergovernmental Council and Local Agencies	X	X	X	X
4. Create a safety communications calendar and execute activities on safety messaging up to two times a year.	Social media post calendar	Regional Intergovernmental Council	X	X	X	X

Strategy 3. Assess speeds and adjust where needed or consider changes to the roadway to accommodate human injury tolerance, reduce impact forces, and provide additional time for drivers to stop.						
			Emphasis Areas Addressed			
Action	Outcome	Lead Agency	INT	PED	RWD	S&A
1. Implement self-enforcing speed management techniques, like narrowing lanes, roundabouts, curb bump outs, medians and others.	Application of speed management strategies where appropriate	WVDOH and Local Agencies	X	X	X	X
2. Re-evaluate speed limits using US Limits 2 considering 50th percentile speeds and roadway characteristics in locations where there is a significant presence of vulnerable road users or significant land use characteristics supporting the presence of vulnerable road users.	Revised speed limits during project development	WVDOH and Local Agencies	X	X		X
3. Conduct a region-wide review of speeds to understand where average speeds are higher than posted speeds to prioritize locations for review.	Prioritized list of locations	Regional Intergovernmental Council				X

Section 4. Next Steps: Progress and Transparency

The RIC Regional CSAP is a dynamic document, intended to be used by stakeholders and partners to continually advance safety via the strategies and actions listed herein.

Plan Leadership: The RIC assumes leadership of this plan and will support implementation. In this role, they are responsible for convening stakeholders involved in this plan on a regular basis to discuss all implementation activities.

Implementation Meetings: RIC will convene stakeholders, either in person or virtually, at a minimum of once annually to discuss progress and associated challenges with implementing the Action Plan. The meeting will focus on the "outcomes" for each action. Upon conclusion of the meeting(s), progress will be documented, and the Action Plan updated, as needed.

Stakeholders/Champions: The key stakeholders for this plan reviewed the data, discussed other known challenges, and collectively agreed to the strategies found within. And while they each take responsibility for traffic safety in different ways, crashes occur for a multitude of reasons. So, they committed to implementing the policies, programs, and projects that pertain to them as well as supporting the efforts of others. They will do this by:

- Being champions for safety in job responsibilities and personal lives
- Participating in events and campaigns relevant to this plan
- Sharing information about transportation safety within our agencies and to our peers
- Coming together at least once annually to share progress on safety activities

Annual Evaluation: When the previous year's crash data is available, the RIC will evaluate progress toward this plan's goals by assessing region-wide fatalities, serious injuries and crashes specifically for each of the four emphasis areas.

Other Planning Efforts: The RIC will remain informed of current and new local and statewide safety programs, policies, plans, guidelines, and/or standards. Based on this information, the RIC can continue to identify opportunities to build upon the current Action Plan.

Refreshing the Plan: From the date of adoption, the RIC Regional CSAP will be refreshed or fully updated every five years. This will ensure the crash and other data are up to date and solutions are revised to meet evolving implementation of policies, programs, and projects.

Summary & Conclusion

Like many communities in West Virginia and around the country, the RIC region experiences severe injuries and fatalities as the result of traffic crashes. This plan provides a framework to address those tragedies and contribute to the overall safety of the region by mitigating the potential hazards on the region's transportation network. The RIC region will continue "prioritizing safety on the transportation network for all people in Kanawha and Putnam Counties by cooperatively implementing enforcement, education, emergency medical services, and engineering solutions that eliminate fatalities and serious injuries."

Appendix

Appendix A: Stakeholder Meeting Summaries

Stakeholder Meeting #1 Summary

February 8th, 2023
WV Regional Technology Park
David K. Hendrickson Conference Center
Building 2000E, Room 1220
2000 Union Carbide Drive
South Charleston, WV 25303
10:00 AM-12:00 PM

Attendees:

- Rick McElhaney, Metro 911
- Jenn Adkins, Metro 911
- Dennis Strawn, Bike/Walk Advocate
- Andy Backus, City of Charleston
- Marsha Mays, WVDOH
- Donna Hardy, WVDOH
- Brian Carr, WVDOH
- Putnam County Sheriff's Department
- Kara Greathouse, Federal Highway Administration (FHWA)
- Derrick Johnson, Federal Highway Administration (FHWA)
- Taniua Hardy, Disability Rights of West Virginia (DRWV)
- Michael Oakley, Kanawha County Emergency Ambulance Authority (KCEAA)
- Sean Hill, Kanawha Valley Regional Transportation Authority (KRT)
- Todd Dorcas, The Greater Kanawha Valley Foundation (TGKVF)
- Kelsey Harrah, Regional Intergovernmental Council (RIC)
- Sam Richardson, Regional Intergovernmental Council (RIC)
- Jake Smith, Regional Intergovernmental Council (RIC)
- Kendra Schenk, Burgess and Niple (B&N)
- Nicole Waldheim, Burgess and Niple (B&N)
- Austin Young, Burgess and Niple (B&N)
- Rodney Holbert, Burgess and Niple (B&N)

Welcome and Introductions

The meeting was opened with an introduction from Kelsey Harrah from Regional Intergovernmental Council who gave a general overview of the goals associated with the Comprehensive Safety Action Plan (CSAP). The plan is necessary to be able to compete for implementation funding through the US Department of Transportation Safe Streets and Roads for All Program. She thanked all who were able to take time to join us in the discussion of reducing fatal and serious injury accidents from occurring within the RIC region.

Transportation Safety Plan Focus and Approach

Kendra Schenk from Burgess & Niple emphasized the main reason for this plan is to get people home safely every day. In the past five years, 113 people lost their lives and 342 had life altering injuries in Kanawha County. In the past five years, 34 people lost their lives and 76 had life altering injuries in Putnam County.

To reduce these crashes, it will take a multidisciplinary approach with the help of everyone who was a part of this meeting. The process for this plan will involve a crash analysis, three stakeholder meetings, a systemic analysis, an action plan, and a report which all lead to the implementation of safety strategies to reduce fatalities and serious injuries..

A theme of this plan will be the Safe System Approach which involves the following tenants:

- Eliminating fatalities and serious injuries
- Taking a shared responsibility for crashes
- Addressing speed
- Providing reliable post-crash care
- Using innovations in technology
- Ensuring an equitable distribution of safety improvements
- Creating a culture of safety

There was discussion about zero fatalities and serious injuries being feasible in the region. In 2021, there were 276 days without a fatal or serious injury in the region including a string of 19 consecutive days in April 2021. Building upon the successes that occurred during 2021, elimination of traffic fatalities and serious injuries could be achieved in future years.

Vision Statement

Nicole Waldheim from Burgess & Niple introduced the overarching idea of the vision statement. As the vision statement is selected, it will be the driving factor that encourages the general public to care about and acknowledge safety in all modes of transportation.

Nicole gave some examples of vision statements selected from groups around the nation. The most important factor is how well the statement resonates through the region among the individuals who utilize the transportation system in Kanawha and Putnam Counties. The examples for vision statements included a community who selected to use a photo of someone waving and saying “Be safe”. This action is extremely common and all of us can relate to this vision statement.

Kendra then led the group discussion with all participants on key words to describe the safety vision for Kanawha and Putnam Counties. The group expressed interest across the spectrum. There was discussion about “Vision Zero” and “Toward Zero” with stakeholders preferring “Toward Zero Deaths” as a common theme. Others felt the need to include children, saying that most people resonate with the idea that we want to ensure our kids are safe and that we need to be safe for our children. The group recognized that the enforcement phrase “Click It or Ticket” was something that everyone was able to easily associate with, and that our final choice of a vision statement should be reflective of that kind of relatability. One proposed tagline is “Get There Safe”.

Safety Opportunities and Challenges

Kanawha and Putnam Counties has experienced successes as well as challenges in how safe road users, safe roads, safe speeds, post-crash care, safe vehicles, equity, and safety culture are addressed in the region.

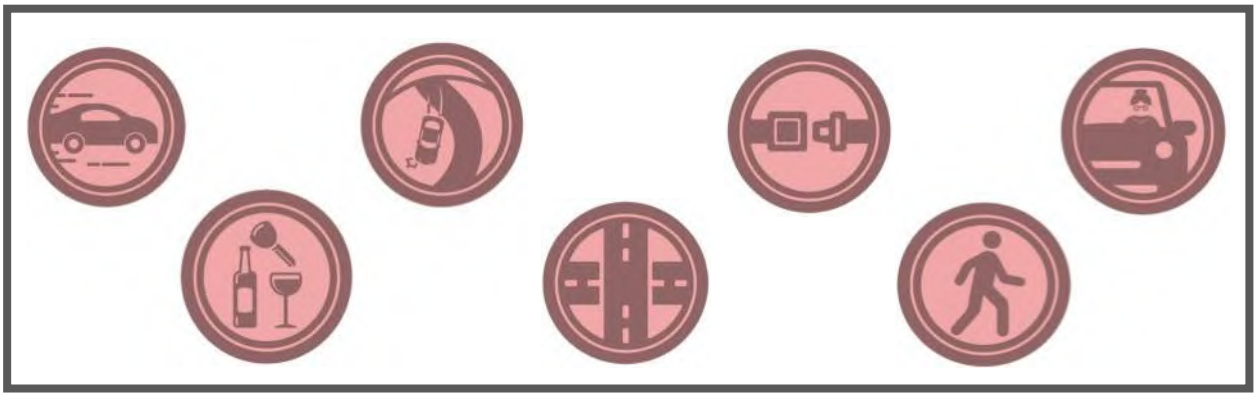
It was noted by participants that the region was experiencing some successes across these categories. They included the following:

- The process of improving sidewalks and replacing large quantities of curb ramps to bring them up to standard is currently underway.
- The Putnam County Sherriff's Department stated how after repetitive crashes were occurring in the same location within a work zone at the same time during the morning peak, they stationed a deputy at that location every morning. This resulted in their observed problems being nearly eliminated. While the officers did not enforce any traffic violations, the presence of the police cruiser slowed traffic and encouraged better driver behaviors.
- There have been crash reductions and reduced traffic congestion by the use of variable message boards along highways to give drivers advanced warning.
- There has been discussion involving reducing the number of lanes for some local streets in Charleston that lead to the freeway due to high speeds of traffic.
- Coordination from the 911 center, Police, and DOH has also been greatly improved. Once a crash occurs, coordination is nearly immediate and variable message boards and the WV511 application are updated to let travelers know of the crash and to use detours if possible.
- The WVDOH has prioritized restriping of roadways and adding additional, wider striping in sharp curves. They have also been pushing to add arrow signs to curves, especially in high crash areas.
- The Regional Intergovernmental Council has performed 10 Road Safety Assessments at high crash locations in the last two years.
- As a result of the WVDOT Strategic Highway Safety Plan, stakeholder meetings will be conducted across the state to combat speeding and aggressive driving. Regionally, stakeholders will be convened for pedestrian and intersection crashes.
- WVDOT is working to improving access to and the quality of crash data with rollouts of the new platform in the coming months.

The region has experienced some challenges in the push to maximize the safety of the regional transportation system. They included the following:

- One of the biggest challenges is the multi-jurisdictional overlaps on roadways. For example, it can be unclear who maintains roadways. This confusion could result in delays in improving the roadways.
- Law enforcement lacks the funding to always enforce all laws in all areas.
- In several areas where speed is a known issue, there is not enough shoulder to safety pull over vehicles.

- Some roadways lack appropriate visibility – either from overgrown vegetation or lack of lighting or signage.
- Driver's education is currently difficult to get into as part of the public education system. Many students are required to find a third-party education company which is an added cost.
- Some stakeholders feel as if they need guidance to implement in traffic calming practices during design phases of new projects.
- Rural areas also occasionally experience delays in EMS response. This issue could be mitigated by placing designated helipads in these rural areas to improve response time.
- With the push of electric and autonomous vehicles, there are issues with infrastructure and connectivity in regions. Even without "smart" infrastructure, lawmakers have already legalized the use of autonomous vehicles in West Virginia.
- Vehicles, especially electric vehicles are much heavier than traditional vehicles, which can lead to more fatalities in crashes involving them. Increased vehicle size (i.e., pick-up trucks, more SUVs, etc.) are also issues in the region.



Problem Identification

A public safety survey was published asking questions of about the safety of the regional transportation system. Some of the results of the survey are summarized in the Meeting #1 Presentation (attached). The survey is still live, and more participants are anticipated to complete it prior to the next stakeholder meeting.

A crash analysis was also completed for Kanawha and Putnam Counties. The results are summarized in the Meeting #1 Presentation (attached) in the form of tables and graphs.

There was discussion about the classification of roadway departure crashes. Any crash that involved a fixed object was classified as a roadway departure. If a driver swerved to avoid an animal but struck a fixed object, it was classified as a roadway departure crash, not an animal crash.

There was also a discussion about distracted driving crashes. While distraction is probably a contributing factor in many crashes, it is often greatly underreported, and it is difficult to assess the actual occurrences. Therefore, distraction has not been included as a top emphasis area.

Kanawha County Crash Analysis Summary:

YEAR	FATAL CRASHES	INJURY CRASHES	PROPERTY DAMAGE CRASHES	MEDICAL & UNKNOWN CRASHES	TOTAL CRASHES	FATALITIES	SERIOUS INJURIES	MINOR INJURIES	POSSIBLY INJURIES	NO INJURIES	MEDICAL & UNKNOWN	TOTAL PEOPLE INVOLVED
2017	24	1,040	2,926	205	4,195	24	71	291	1,108	8,316	526	10,336
2018	25	1,015	2,879	172	4,091	28	81	314	1,056	8,152	441	10,072
2019	16	969	2,775	180	3,940	17	58	313	1,031	7,950	443	9,812
2020	16	808	2,157	167	3,148	16	74	240	825	5,875	377	7,407
2021	26	822	2,416	157	3,421	28	58	266	864	6,628	404	8,248
5-YEAR TOTAL	107	4,654	13,153	881	18,795	113	342	1,424	4,884	36,921	2191	45,875
ANNUAL AVERAGE	21	931	2,631	176	3759	23	68	285	977	7,384	438	9,175

Putnam County Crash Analysis Summary:

YEAR	FATAL CRASHES	INJURY CRASHES	PROPERTY DAMAGE CRASHES	MEDICAL & UNKNOWN CRASHES	TOTAL CRASHES	FATALITIES	SERIOUS INJURIES	MINOR INJURIES	POSSIBLY INJURIES	NO INJURIES	MEDICAL & UNKNOWN	TOTAL PEOPLE INVOLVED
2017	6	200	731	5	942	7	18	64	197	2,060	2	2,348
2018	8	211	745	5	969	8	12	69	211	1,997	1	2,298
2019	12	190	693	3	898	13	12	61	194	1,947	2	2,229
2020	2	174	549	6	731	2	21	36	168	1,464	4	1,695
2021	3	166	676	3	848	4	13	71	145	1,762	1	1,996
5-YEAR TOTAL	31	941	3,394	22	4,388	34	76	301	915	9,230	10	10,566
ANNUAL AVERAGE	6	188	679	4	878	7	15	60	183	1,846	2	2,113

Safety Prioritization

Stakeholders were given four “dot” stickers and asked to place their dots next to the traffic safety problems that they feel should be given the most emphasis in this study in each Kanawha and Putnam County. These emphasis areas were taken from the WVDOT Strategic Highway Safety Plan. Stakeholders were instructed to use two dots on each emphasis area table for each county. The answers for this exercise are recorded under the “Priority” column. The results of the activity are as follows:

Emphasis Area	Statewide FSI	Kanawha County FSI*	Kanawha County FSI (2017-2021)**	Priority
Speed and Aggressive Driving	57%	55%	--	8
Roadway Departure	55%	48%	46%	5
Occupant Protection	32%	28%	--	0
Older Driver	22%	24%	11%	0
Alcohol and Drug Impaired	22%	19%	15%	0
Intersections	18%	24%	29%	5
Pedestrians	7%	13%	17%	4

Emphasis Area	Statewide FSI	Putnam County FSI*	Putnam County FSI (2017-2021)**	Priority
Speed and Aggressive Driving	57%	74%	--	6
Roadway Departure	55%	48%	64%	2
Occupant Protection	32%	28%	--	0
Older Driver	22%	19%	20%	0
Alcohol and Drug Impaired	22%	19%	10%	0
Intersections	18%	16%	16%	4
Pedestrians	7%	3%	5%	4

Wrap Up

The next steps will involve determining priority locations in preparation of Meeting #2 which will be held on March 29, 2023 from 1:00 PM to 3:00 PM. Further analysis of the selected emphasis areas will also be conducted for the next meeting. The plan will be complete for approval by the Regional Intergovernmental Council Policy Board on June 8, 2023.

Regional Comprehensive Safety Action Plan

Stakeholder Meeting #1

February 8, 2023

Regional Intergovernmental Council

BURGESS & NIPLE
Engineers ■ Architects ■ Planners

1

Agenda

- Welcome and Introductions
- Transportation Safety Plan Focus and Approach
- Discussion of Successes and Challenges
- Problem Identification
  - Public Survey Results
  - Crash Data Review
- Emphasis Area Priorities
- Wrap Up and Next Steps

2

2

Welcome and Introductions

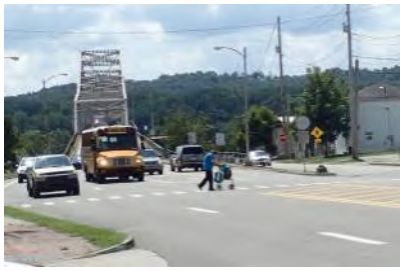
3

3

People Focus

Regional Intergovernmental Council

How can we get everyone where they need to go without a fatality or serious injury?



4

4

Making It Home

Kanawha County

Year	Fatalities	Serious Injuries
2017	24	71
2018	28	81
2019	17	58
2020	16	74
2021	28	58
5-YEAR TOTAL	113	342
ANNUAL AVERAGE	23	68

113 people in Kanawha County didn't make it home and 342 had their lives altered

Putnam County

Year	Fatalities	Serious Injuries
2017	7	18
2018	8	12
2019	13	12
2020	2	21
2021	4	13
5-YEAR TOTAL	34	76
ANNUAL AVERAGE	7	15

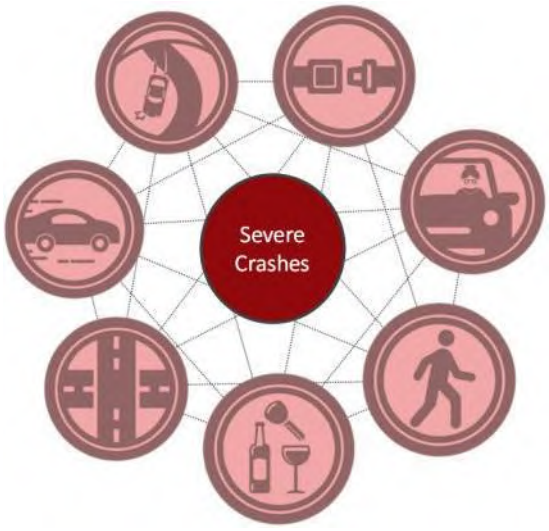
34 people in Putnam County didn't make it home and 76 had their lives altered

How can we get everyone where they need to go without a fatality or serious injury?

5

5

Multidisciplinary Approach



Severe crashes occur for a multitude of reasons. By collaborating with transportation and safety practitioners with diverse backgrounds and perspectives, we can think more holistically about solutions.

6

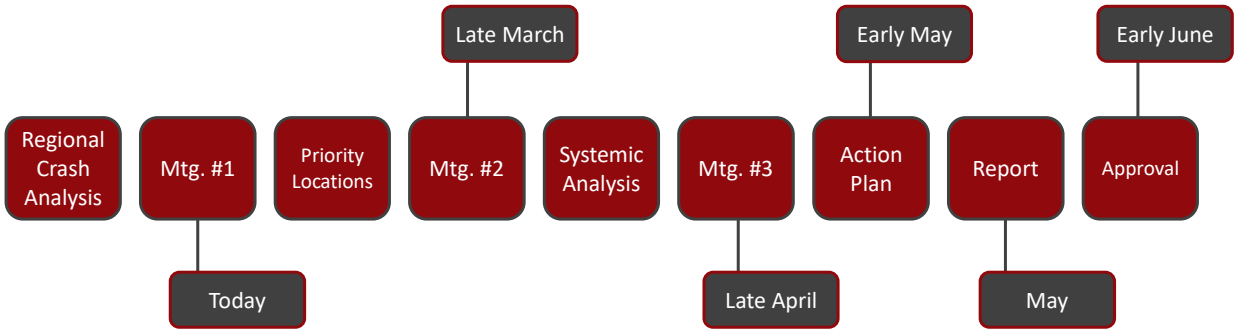
6

Put Together a Plan

7

7

Plan Schedule



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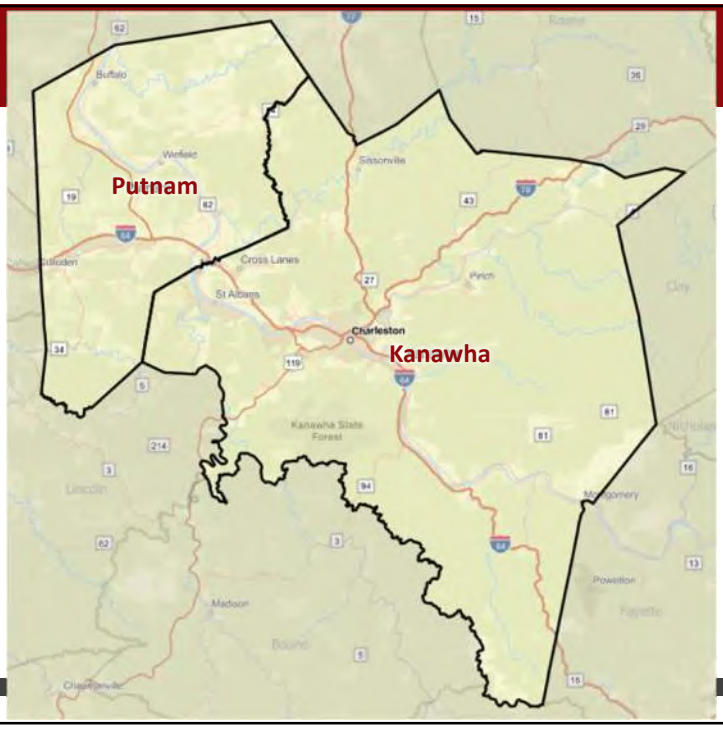
8

Study Area



9

9

What to Consider in the Plan

- Opportunities to **make roads safer – ZERO fatalities and serious injuries**
- Ensure we all take **personal responsibility**
- Address **speed**
- Reliable **post-crash care**
- **Innovations/Technology**
- Safety is **Equitable**
- Create a **Culture** of safety

10

10

IS ZERO ATTAINABLE?!

11

11

Zero is Attainable!

276 DAYS
in 2021 had
ZERO FATALITIES
OR SERIOUS INJURIES

In April 2021, there were
zero fatalities or **serious injuries** for
19 CONSECUTIVE DAYS

12

12

Vision Statement

- WVDOT SHSP – *Work cooperatively to improve roadway safety, eliminating fatalities and serious injuries through the coordinated efforts of enforcement, education, emergency medical services, and engineering*
- *Vision Zero*
- *Toward Zero Deaths. All transportation users should arrive safely at their destinations*
- *Well funded and safer roads for all transportation modes*

13

13

Branding

- Regional Comprehensive Safety Action Plan

14

14

slido

What word(s)/phrase(s) would you like to describe safety in the RIC Region?

ⓘ Start presenting to display the poll results on this slide.

15

Current Successes and Challenges

Regional Intergovernmental Council

16

16

Safe Road Users

- All road users (walk, bike, drive, transit, other)
- Responsibility to comply with rules
- Education and Enforcement

17

17

What To Build Upon and Overcome

Safe Road Users

Successes

Challenges

18

18

Safe Roads

- Increase survivability (speed, crash angles)
- Avoid crashes through complete separation
- Avoid crashes by limiting vehicle/other road user interactions
- Enhance attentiveness (infrastructure and education)

19

What To Build Upon and Overcome

Successes

Challenges

20

Safe Speeds

- Increase survivability
- Speed is appropriate to context
- Changes to road environment to slow speeds, where applicable (roundabouts, narrow lanes, curb extensions)

21

21

What To Build Upon and Overcome

Safe Speeds

Successes

Challenges

22

22

Post Crash Care

- Accessibility to crash scene
- Accessibility to hospital
- Accurate on-site documentation

What To Build Upon and Overcome

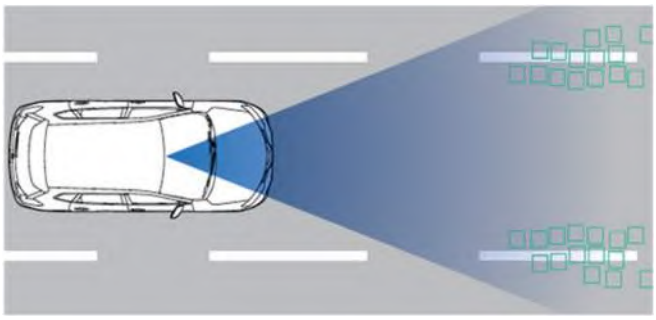
Post-Crash Care

Successes

Challenges

Safe Vehicles

- How technology and innovation will impact the safety of the transportation system



What To Build Upon and Overcome

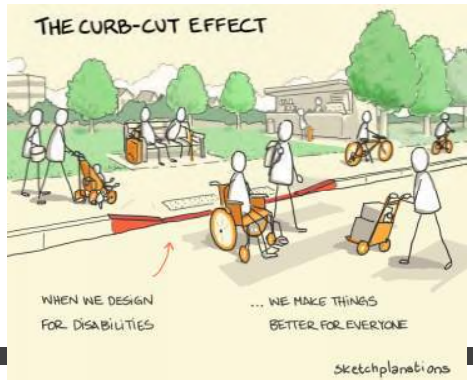
Safe Vehicles

Successes

Challenges

Equity

- Identify the best ways to advocate for all road users equally
- Encourage investments equitably across the region



27

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What To Build Upon and Overcome

Successes

Challenges

28

28

Culture

- Safety is prioritized over competing demands through leadership and funding,
- Safety is integrated into job responsibilities
- Safety is considered by all road users when using the transportation network

29

29

What To Build Upon and Overcome

Successes

Challenges

30

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Plan Inputs

Survey Results and Data Analysis

Regional Intergovernmental Council

31

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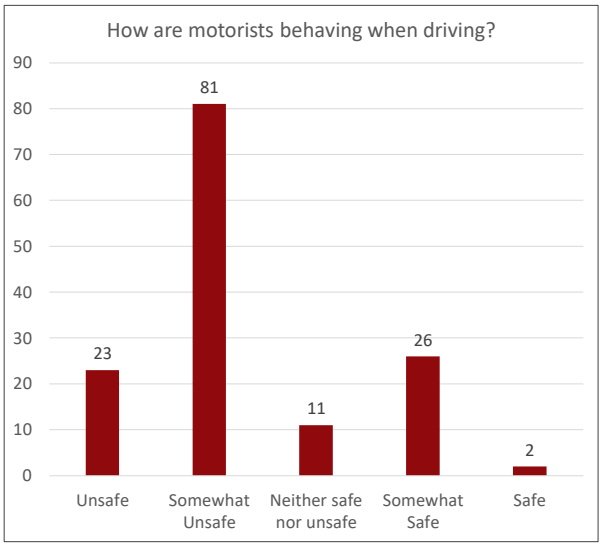
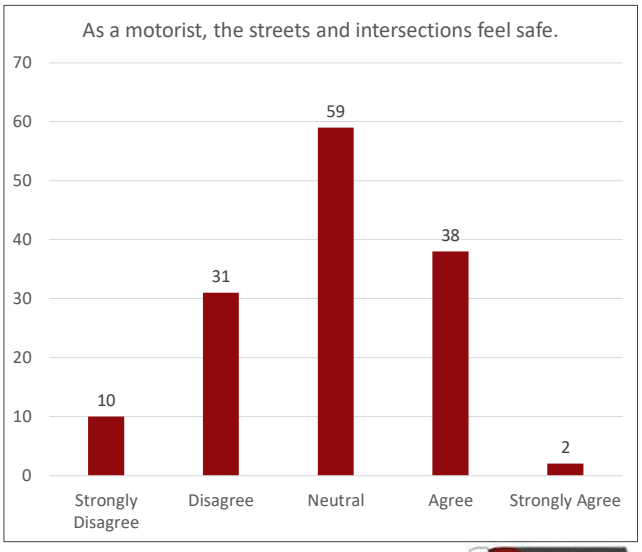
Survey Results – Motorist Behavior



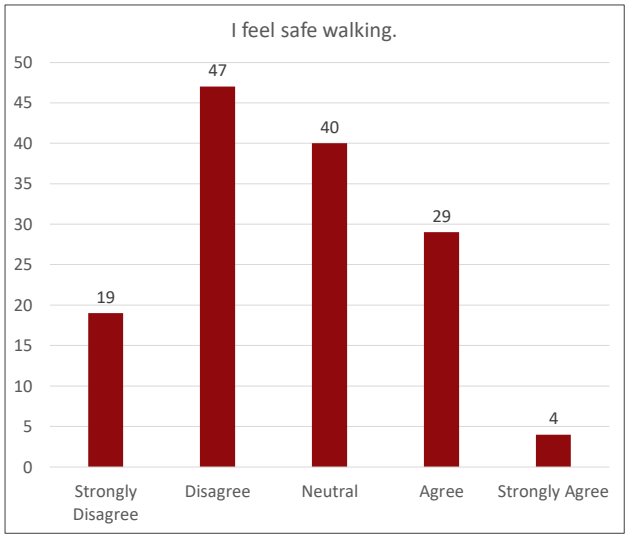


Regional Intergovernmental Council

32

32

Survey Results – Pedestrian Behavior



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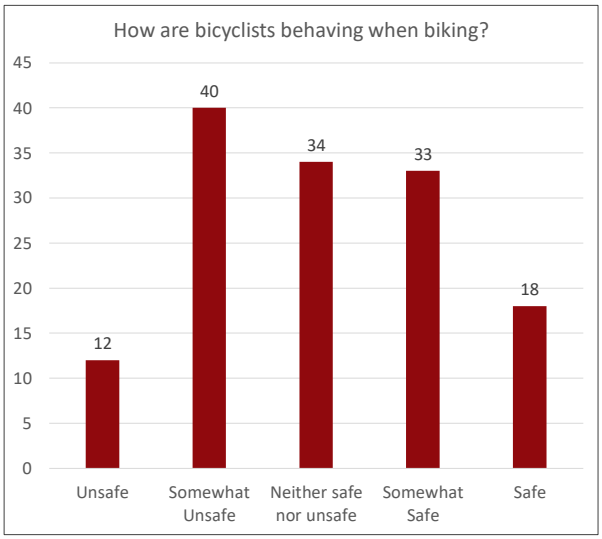
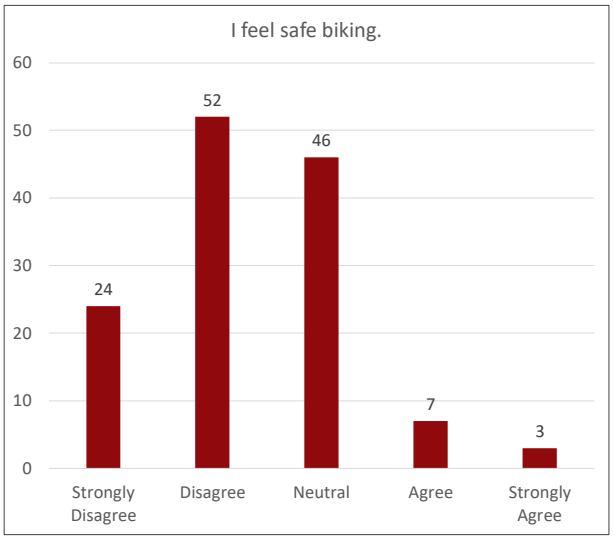
Survey Results – Bicyclist Behavior

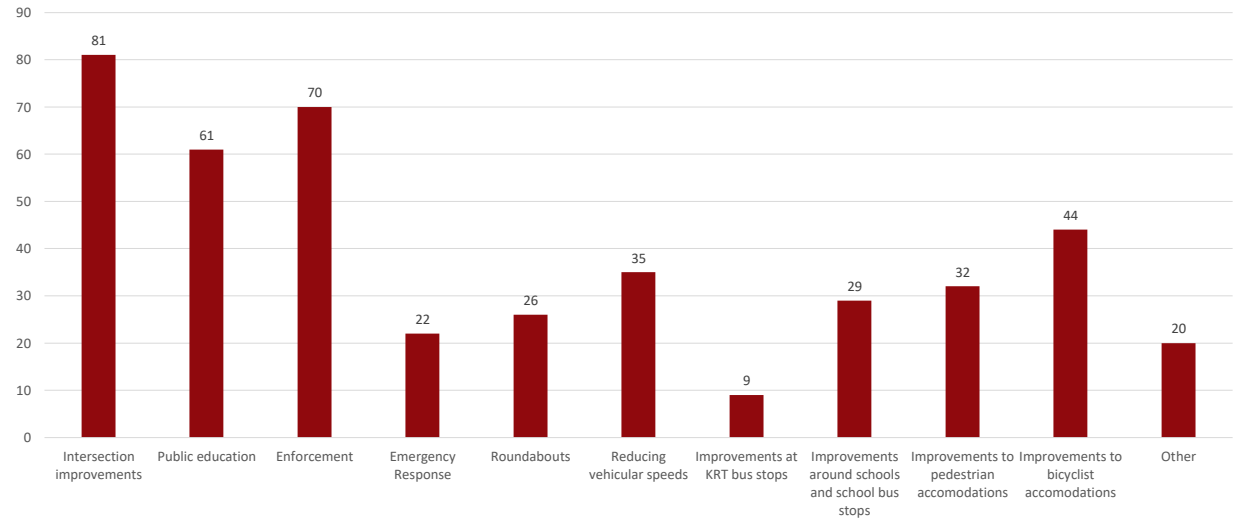




34

34

Survey Results – Potential Improvements



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Annual Crash Statistics

Kanawha County

YEAR	FATAL CRASHES	INJURY CRASHES	PROPERTY DAMAGE CRASHES	MEDICAL & UNKNOWN CRASHES	TOTAL CRASHES	FATALITIES	SERIOUS INJURIES	MINOR INJURIES	POSSIBLY INJURIES	NO INJURIES	MEDICAL & UNKNOWN	TOTAL PEOPLE INVOLVED
2017	24	1,040	2,926	205	4,195	24	71	291	1,108	8,316	526	10,336
2018	25	1,015	2,879	172	4,091	28	81	314	1,056	8,152	441	10,072
2019	16	969	2,775	180	3,940	17	58	313	1,031	7,950	443	9,812
2020	16	808	2,157	167	3,148	16	74	240	825	5,875	377	7,407
2021	26	822	2,416	157	3,421	28	58	266	864	6,628	404	8,248
5-YEAR TOTAL	107	4,654	13,153	881	18,795	113	342	1,424	4,884	36,921	2191	45,875
ANNUAL AVERAGE	21	931	2,631	176	3759	23	68	285	977	7,384	438	9,175

Putnam County

YEAR	FATAL CRASHES	INJURY CRASHES	PROPERTY DAMAGE CRASHES	MEDICAL & UNKNOWN CRASHES	TOTAL CRASHES	FATALITIES	SERIOUS INJURIES	MINOR INJURIES	POSSIBLY INJURIES	NO INJURIES	MEDICAL & UNKNOWN	TOTAL PEOPLE INVOLVED
2017	6	200	731	5	942	7	18	64	197	2,060	2	2,348
2018	8	211	745	5	969	8	12	69	211	1,997	1	2,298
2019	12	190	693	3	898	13	12	61	194	1,947	2	2,229
2020	2	174	549	6	731	2	21	36	168	1,464	4	1,695
2021	3	166	676	3	848	4	13	71	145	1,762	1	1,996
5-YEAR TOTAL	31	941	3,394	22	4,388	34	76	301	915	9,230	10	10,566
ANNUAL AVERAGE	6	188	679	4	878	7	15	60	183	1,846	2	2,113

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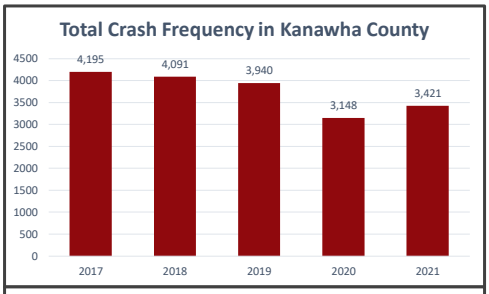
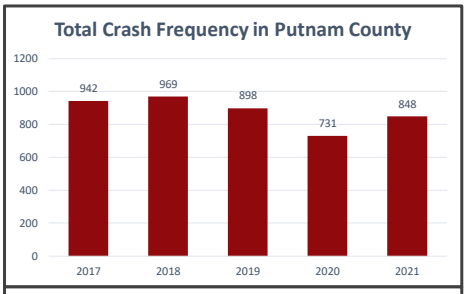
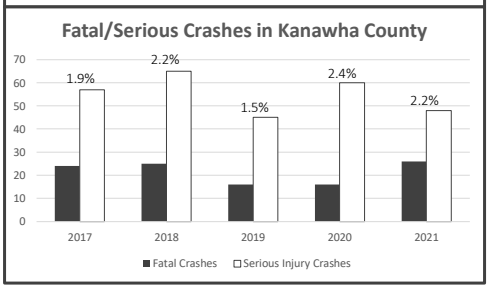
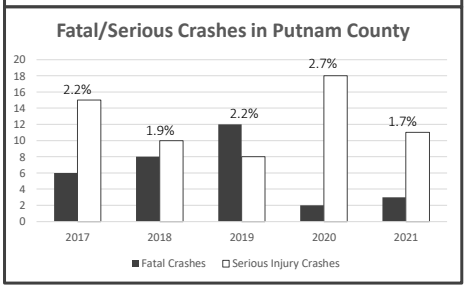
Crash Frequency









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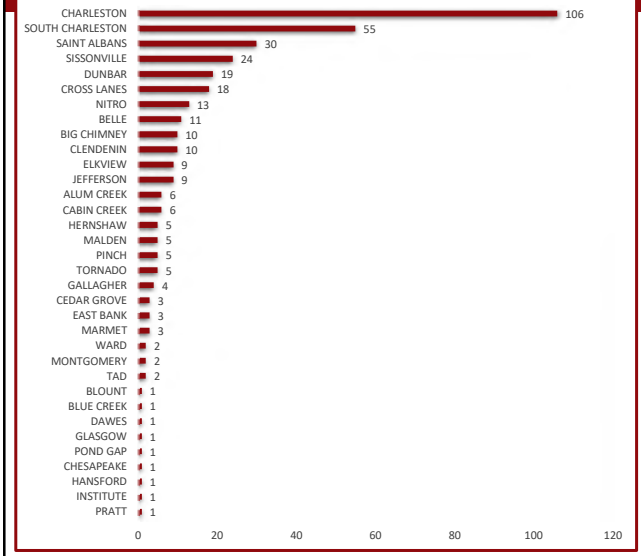
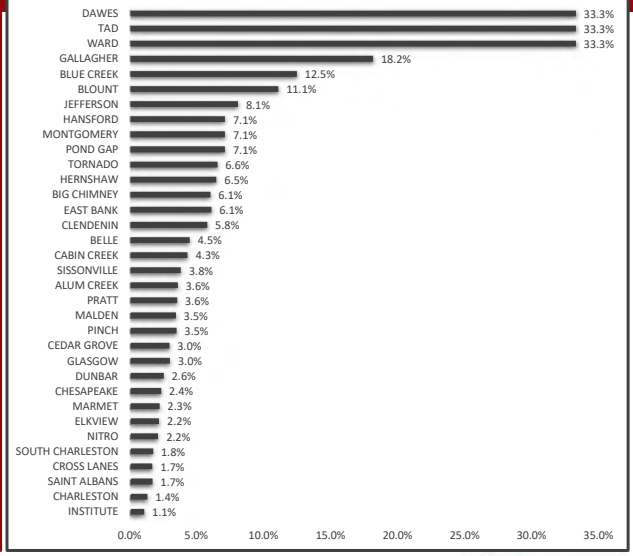
Fatal and Serious Injury Crashes by Jurisdiction (Kanawha County)



Fatal and Serious Injury Crash Percentage by Jurisdiction (Kanawha County)



* 8 Fatal and Serious Injury Crashes were not located within a jurisdiction

38

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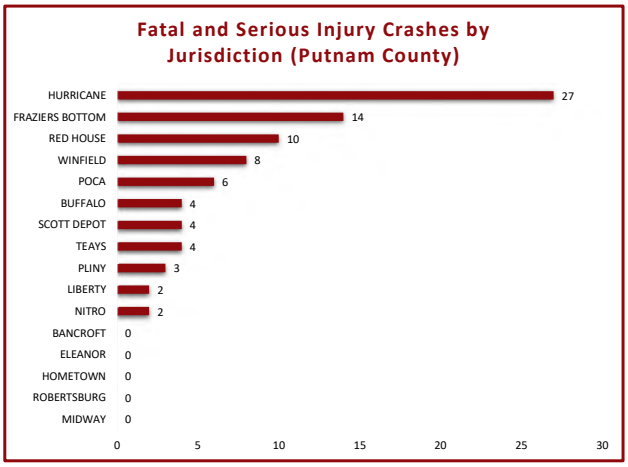
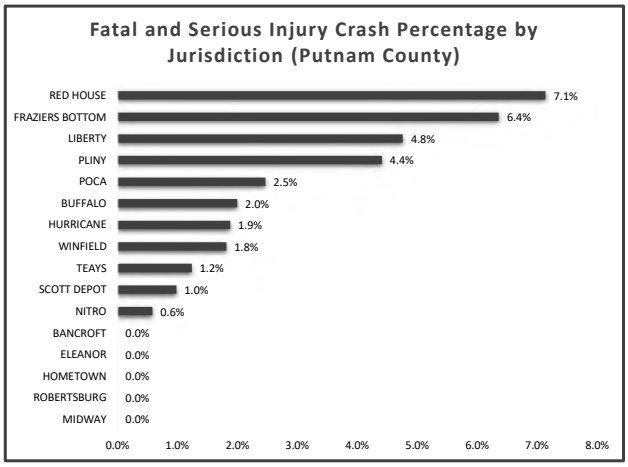
Jurisdiction Breakdown

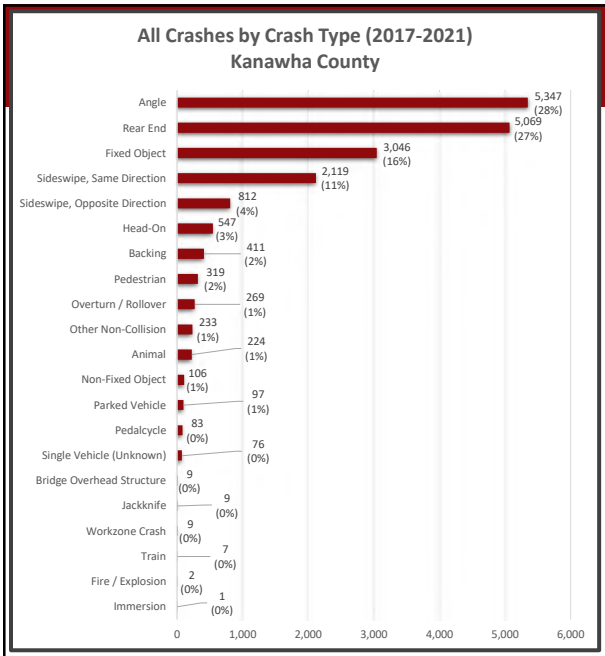


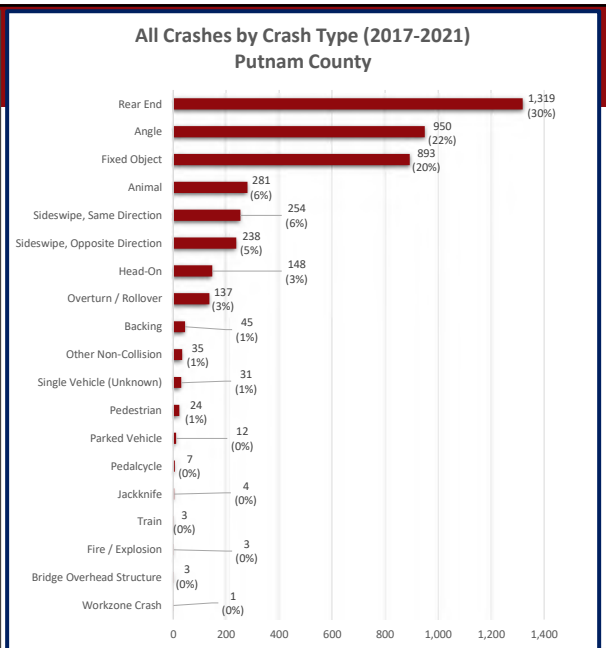


* 9 Fatal and Serious Injury Crashes were not located within a jurisdiction

39

39





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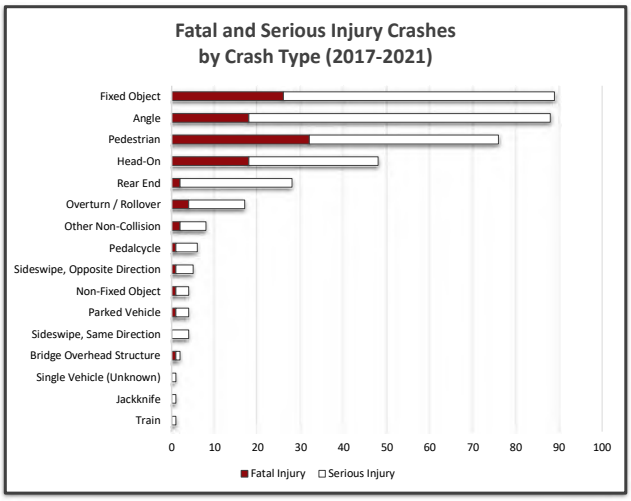
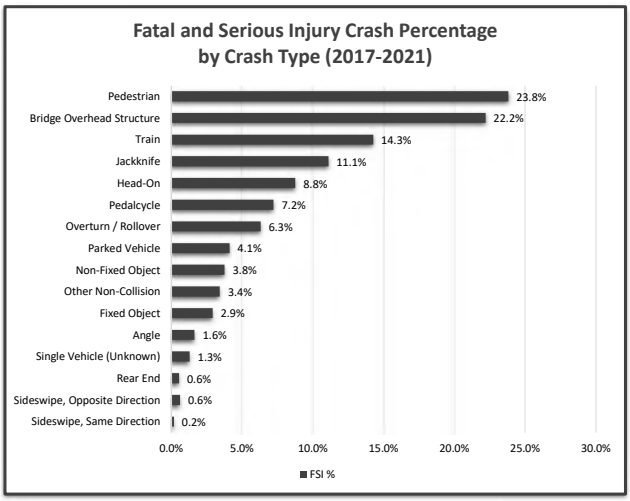
Crash Types – Kanawha County

Kanawha County





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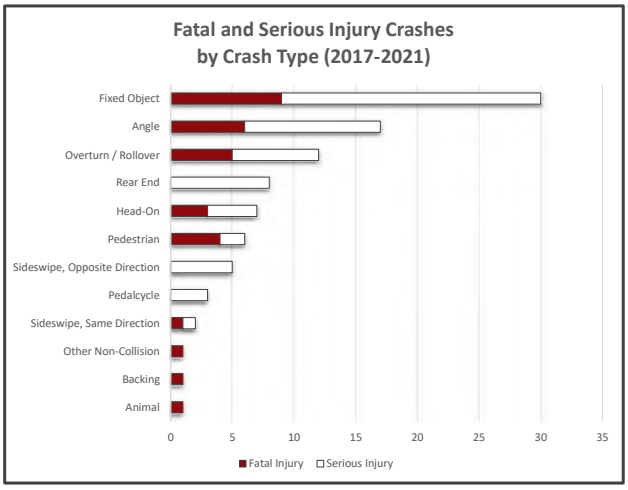
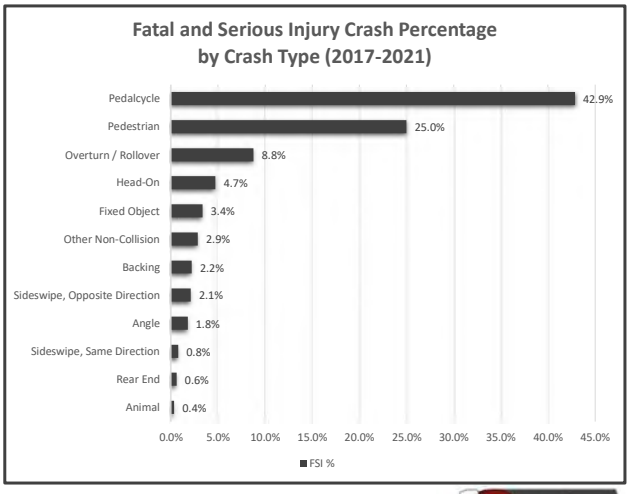
Crash Types

Putnam County





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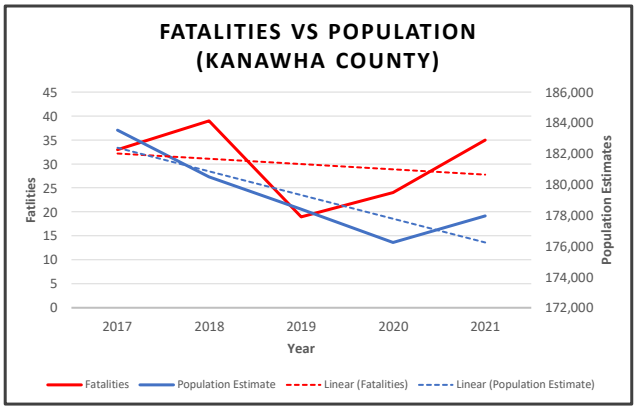
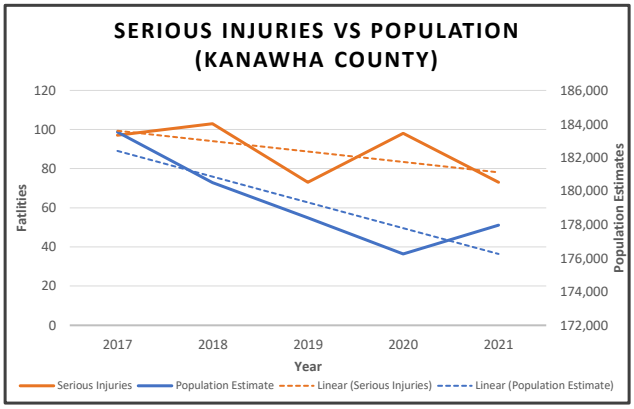
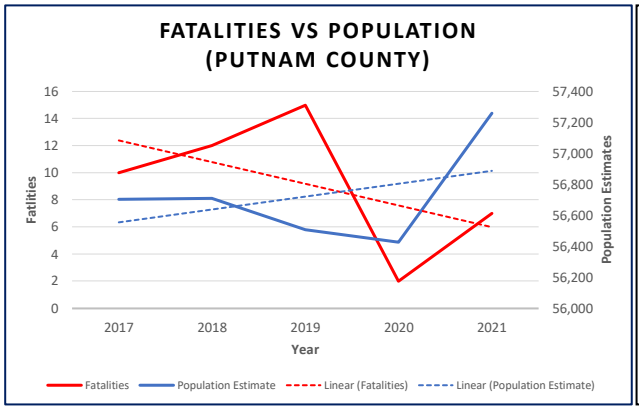
Severity versus Population

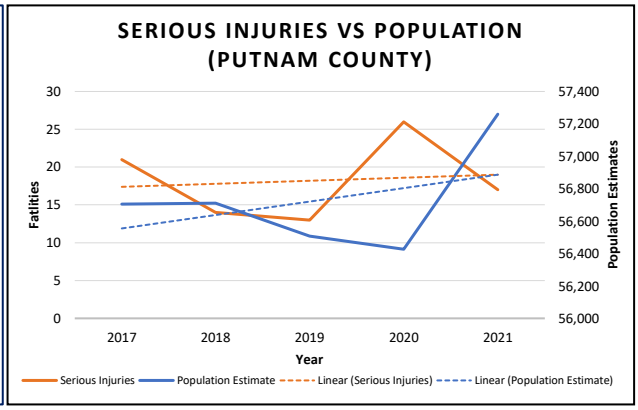




43

Severity versus Population





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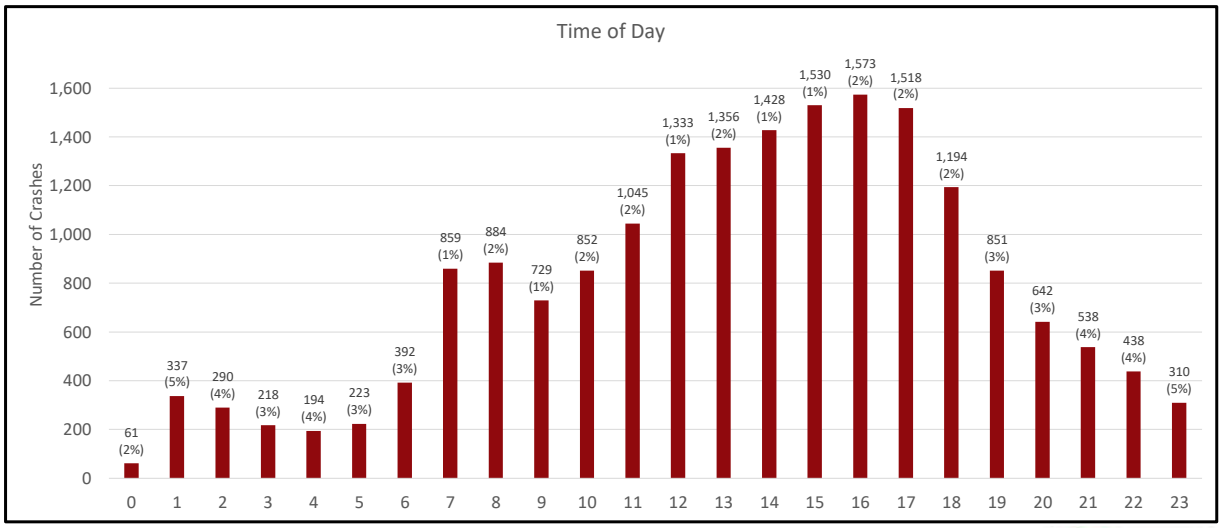
Time of Day – Kanawha County

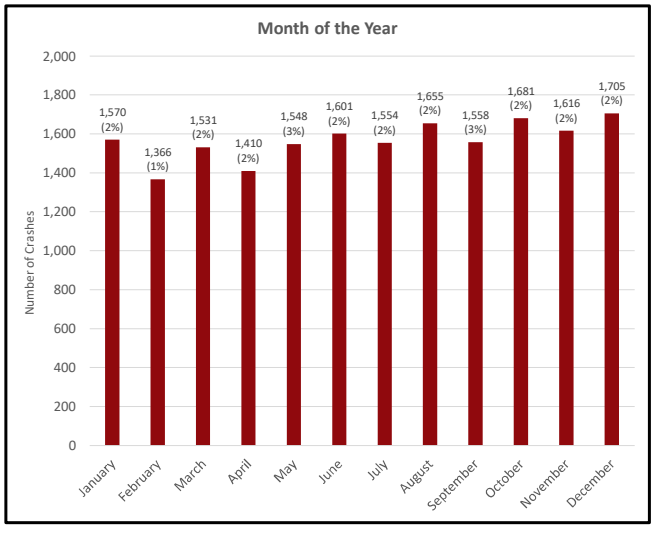


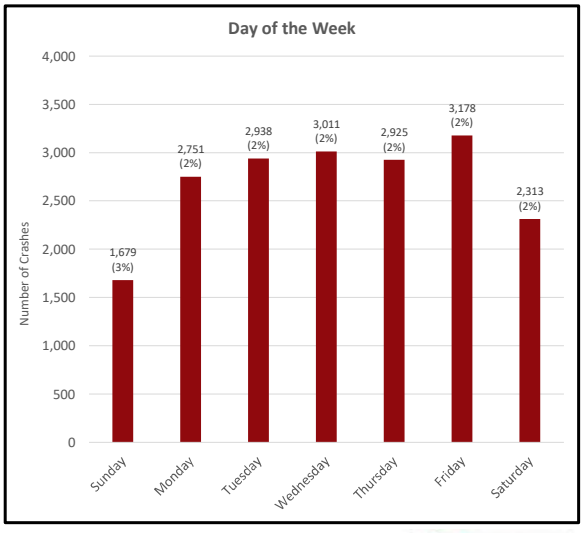
(XX%) – Percent Fatal and Serious Injury

45

45

Day and Month – Kanawha County



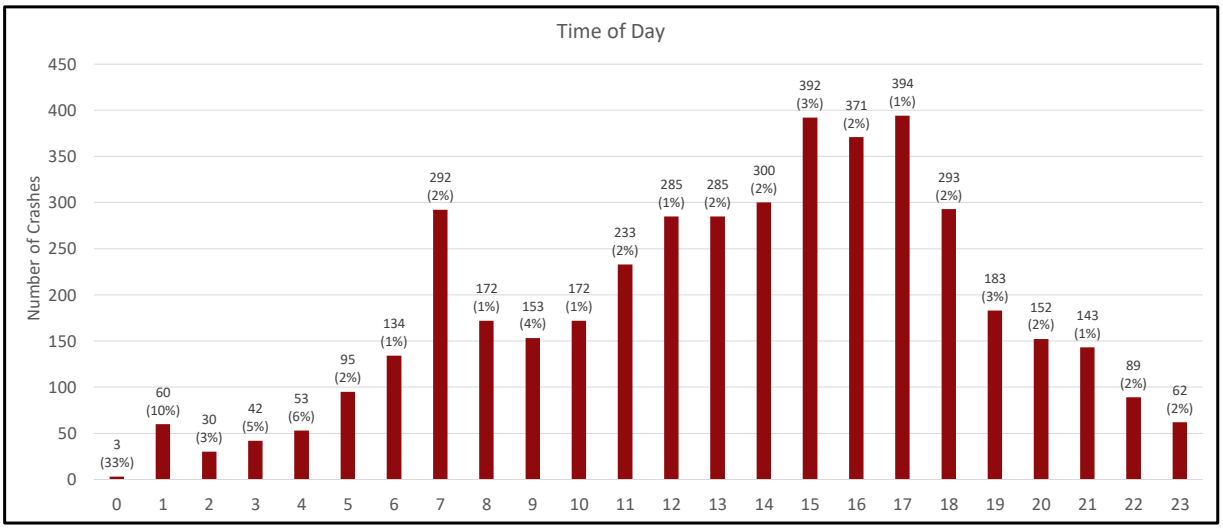


(XX%) – Percent Fatal and Serious Injury

46

46

Time of Day – Putnam County

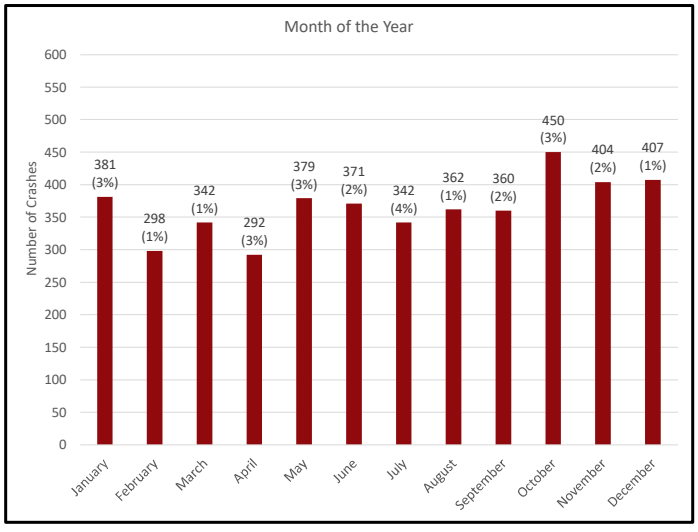


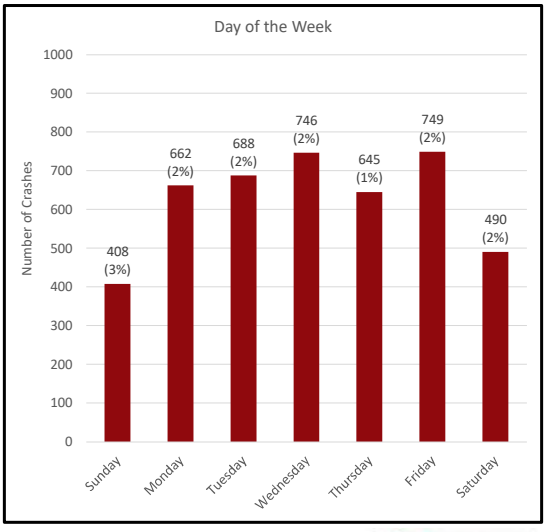
(XX%) – Percent Fatal and Serious Injury

47

47

Day and Month – Putnam County





(XX%) – Percent Fatal and Serious Injury

48

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Emphasis Area Priorities

Regional Intergovernmental Council

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WVDOT SHSP Emphasis Areas

Speed and Aggressive Driving

Roadway Departure

Occupant Protection

Older Driver (65+)

Alcohol or Drug Impaired

Regionally Focused (Kanawha County)

Intersection

Pedestrian

THESE SEVEN EMPHASIS AREAS ACCOUNT FOR 98% OF FATALITIES AND 95% SERIOUS INJURIES IN THE STATE

Regional Intergovernmental Council

50

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Emphasis Areas – Kanawha County

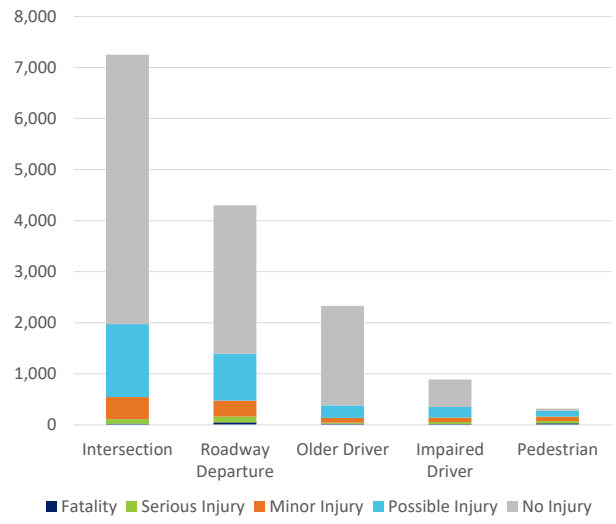
Emphasis Area	Statewide FSI	Kanawha County FSI*	Kanawha County FSI (2017-2021)**
Speed and Aggressive Driving	57%	55%	--
Roadway Departure	55%	48%	46%
Occupant Protection	32%	28%	--
Older Driver	22%	24%	11%
Alcohol and Drug Impaired	22%	19%	15%
Intersections	18%	24%	29%
Pedestrians	7%	13%	17%

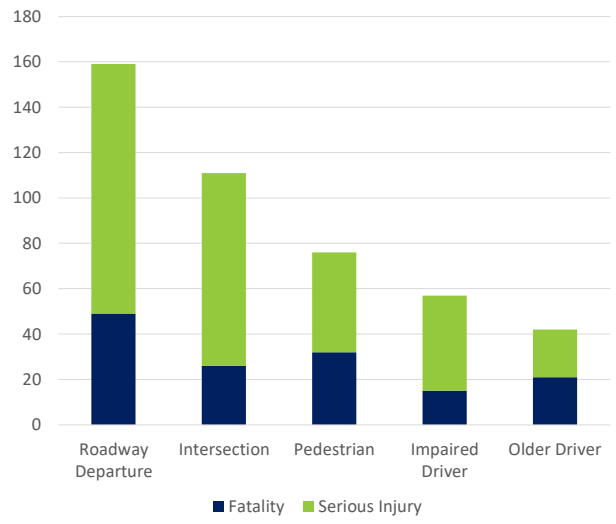
* From 2016-2020 WVDOT SHSP
**Does not include interstate crashes

51

51

Emphasis Areas – Kanawha County





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Emphasis Areas – Kanawha County

2017-2021 Non-Interstate

Emphasis Area

Overlap	Roadway Departure	Older Driver	Impaired	Pedestrian	Intersection
Roadway Departure	--	45%	52%	0%	18%
Older Driver	11%	--	1%	14%	12%
Impaired	17%	2%	--	14%	12%
Pedestrian	0%	22%	16%	--	14%
Intersection	11%	31%	23%	24%	--

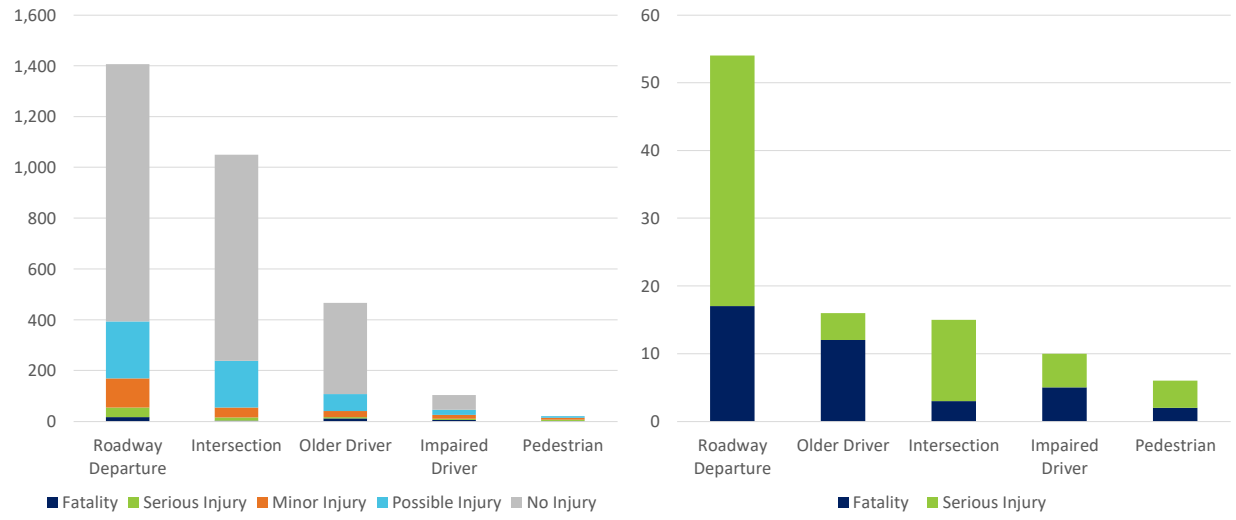
52% of the Impaired-Related Fatal and Serious Injuries involved Roadway Departure

Emphasis Areas – Putnam County

Emphasis Area	Statewide FSI	Putnam County FSI*	Putnam County FSI (2017-2021)**
Speed and Aggressive Driving	57%	74%	--
Roadway Departure	55%	48%	64%
Occupant Protection	32%	28%	--
Older Driver	22%	19%	20%
Alcohol and Drug Impaired	22%	19%	10%
Intersections	18%	16%	16%
Pedestrians	7%	3%	5%

* From 2016-2020 WVDOT SHSP
**Does not include interstate crashes

Emphasis Areas – Putnam County



55

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Emphasis Areas – Putnam County

2017-2021 Non-Interstate

Emphasis Area

Overlap	Roadway Departure	Older Driver	Impaired	Pedestrian	Intersection
Roadway Departure	--	63%	93%	0%	9%
Older Driver	20%	--	21%	14%	27%
Impaired	15%	11%	--	14%	27%
Pedestrian	0%	4%	7%	--	0%
Intersection	2%	22%	43%	0%	--

43% of Impaired Driver-Related Fatal and Serious Injuries occurred at Intersections

56

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Emphasis Area Priorities

- Put a dot next to the emphasis area you feel should be a priority
- Two dots per county
- Can put both dots on same emphasis area

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Next Steps

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Still to Come

- Branding
- More Detailed Emphasis Area Analysis
- Systemic Analysis and Results
- Stakeholder Meeting #2: Week of March 27th *(Tentative)*
- Stakeholder Meeting #3: Week of April 24th *(Tentative)*
- Implementation Actions

BOARD APPROVAL – JUNE 8TH

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Stakeholder Meeting #2 Summary

March 29th, 2023
WV Regional Technology Park
David K. Hendrickson Conference Center
Building 2000E, Room 1220
2000 Union Carbide Drive
South Charleston, WV 25303
1:30 PM-3:30 PM

Attendees:

- Dennis Strawn, Bike/Walk Advocate
- Paige Hill, City of Charleston
- Marsha Mays, WVDOH
- Donna Hardy, WVDOH (via phone)
- Brian Carr, WVDOH
- Putnam County Sheriff's Department
- Kara Greathouse, Federal Highway Administration (FHWA)
- Derrick Johnson, Federal Highway Administration (FHWA)
- Taniua Hardy, Disability Rights of West Virginia (DRWV)
- Michael Oakley, Kanawha County Emergency Ambulance Authority (KCEAA)
- Thomas Bibb, Kanawha County Emergency Ambulance Authority (KCEAA)
- Todd Dorcas, The Greater Kanawha Valley Foundation (TGKVF)
- C.W. Sigman, Kanawha County Office of Emergency Management
- Curt Zickafoose, Kanawha Valley Regional Transportation Authority (KVRTA)
- Kelsey Harrah, Regional Intergovernmental Council (RIC)
- Sam Richardson, Regional Intergovernmental Council (RIC)
- Jake Smith, Regional Intergovernmental Council (RIC)
- Kendra Schenk, Burgess and Niple (B&N)
- Austin Young, Burgess and Niple (B&N)
- Rodney Holbert, Burgess and Niple (B&N)

Welcome and Introductions

The meeting was opened with an introduction from Kelsey Harrah from the Regional Intergovernmental Council who gave a general overview of the goals associated with the Comprehensive Safety Action Plan (CSAP). The plan is necessary to be able to compete for implementation funding through the US Department of Transportation Safe Streets and Roads for All Program. She thanked all who were able to take time to join us in the discussion of reducing fatal and serious injury crashes from occurring within the RIC region.

Stakeholder Meeting #1 Recap and Goals for Meeting #2

Kendra Schenk from Burgess & Niple recapped that the main reason for this plan is to get people home safely every day. To reduce these crashes, it will take a multidisciplinary approach with the help of everyone, specifically those who take part in these stakeholder meetings. The process for this plan involves a crash analysis, three stakeholder meetings, a systemic analysis, an action plan, and a report. These items will lead to the implementation of safety strategies aimed at reducing fatalities and serious injuries.

A theme of this plan will be the Safe System Approach which involves the following components:

- Eliminating fatalities and serious injuries
- Taking a shared responsibility for crashes
- Addressing speed
- Providing reliable post-crash care
- Using innovations in technology
- Ensuring an equitable distribution of safety improvements
- Creating a culture of safety

For this meeting, the agenda included developing an impactful vision and goal statements. Data on intersection analysis would also be covered as well as the equity analysis results.

Vision and Goal Statement

Kendra recapped the overarching idea of the vision statement and how important a well-planned tag line was to get the general public and stakeholders invested in the plan.

As the tag line is selected, it will be the driving factor that encourages the general public to care about and acknowledge safety in all modes of transportation. It will get the public to want to open the plan and see what is inside. Kendra gave some examples of tag lines that would help facilitate conversation. The group unanimously selected a tag line based on the song “County Roads”. After minor revisions and feedback from the group, “Take us home on safer roads” was unanimously chosen.

Kendra then led the group discussion with the participants on selecting the vision statement. The group read the proposed statement that had been prepared based on the previous meeting and in alignment with the WVDOH’s goal stated in the Strategic Highway Safety Plan (SHSP). After seeing some examples and reading the prepared vision statement, the group decided to use the following vision statement:

“Prioritizing safety on the transportation network for all people in Kanawha and Putnam Counties by cooperatively implementing enforcement, education, emergency medical services, and engineering solutions that eliminate fatalities and serious injuries.”

Kendra then explained the importance of setting a goal so that the plan's potential successes and/or failures could be measured over a set amount of time. Data was presented showing the future forecast of fatal and serious injury crashes and how different reduction percentages impacted the overall number of fatalities and serious injuries.

The group agreed that the area should set a goal in fatal and serious injury crashes above that of the SHSP. After discussion and adjustments, it was decided that the group felt it best to set a goal of reducing ¼ of all fatal and serious injury crashes over the next 5 years. This goal was evaluated by the stakeholders who felt it was achievable with buy-in from everyone.

Hotspot Intersection Analysis

Kendra compared intersection data from Kanawha and Putnam counties to the SHSP so stakeholders could see how the region compared to state averages. She also highlighted some key take aways specific to each of the counties.

Kanawha county experienced a higher percentage than the statewide average of intersection related crashes in the following categories:

Data Trends/Key Facts for FSI at Intersections		
Statewide*	Kanawha**	
77%	77%	occurred on a weekday (Monday - Friday)
56%	54%	were male
53%	59%	involved angle crashes
49%	43%	occurred at T-intersections
42%	40%	occurred between 2 PM and 7 PM
34%	21%	involved older drivers (65 years old and older)
15%	18%	occurred on wet roadways
12%	11%	occurred in dark/unlit conditions
6%	16%	involved pedestrians

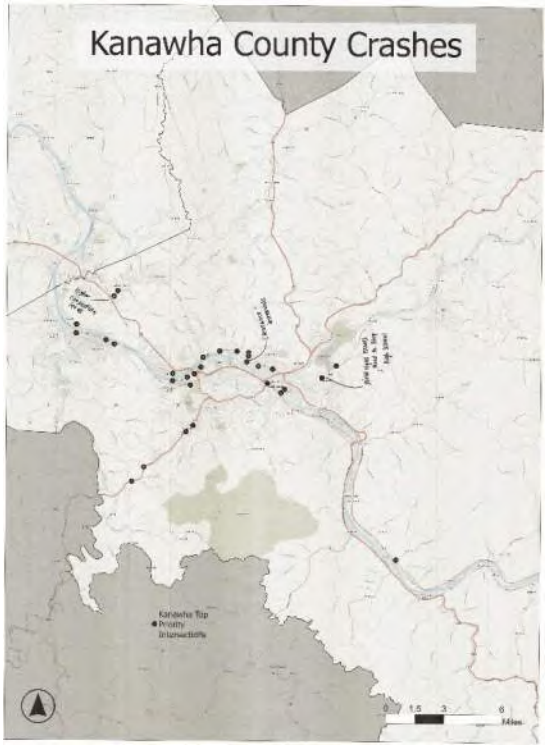
Other noteworthy data for this county included 111 intersection crashes that resulted in 131 fatalities and serious injuries (FSI), 27% of FSI crashes occurred on a Friday, 22% of the fatal and serious injuries involved passengers, 52% of the fatal and serious injuries involved people between the ages of 20 and 49 (a group that makes up only 37% of the population), and 37% of the fatal and serious injuries involved people between the ages of 20 and 39 (a group that makes up only 24% of the population).

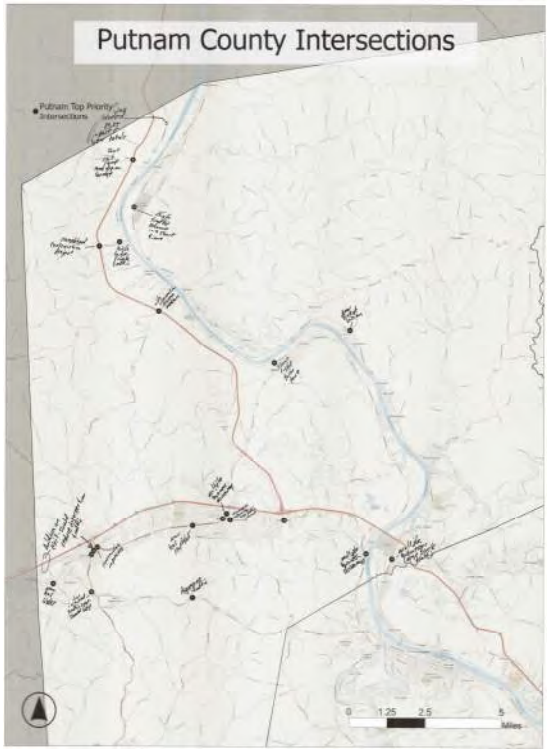
Putnam county experienced a higher percentage than the statewide average of intersection related crashes in the following categories:

Data Trends/Key Facts for FSI at Intersections		
Statewide*	Putnam**	
77%	93%	occurred on a weekday (Monday - Friday)
56%	52%	were male
53%	60%	involved angle crashes
49%	53%	occurred at T-intersections
42%	53%	occurred between 2 PM and 7 PM
34%	19%	involved older drivers (65 years old and older)
15%	13%	occurred on wet roadways
12%	7%	occurred in dark/unlit conditions
6%	0%	involved pedestrians

Other noteworthy data for this county included 15 intersection crashes that resulted in 21 FSI, 40% of FSI crashes occurred on a Wednesday, 87% of FSI crashes occurred between the months of April and July, and 38% of the fatal and serious injuries involved passengers.

Kendra explained how the prioritization process was implemented and how each intersection was ranked based on the Equivalent Property Damage Only (EPDO) factors. Stakeholders were given an allotted amount of time to review large printouts of each county with the EPDO prioritized intersections marked. They were asked to take markers and comment on priority intersections as well as other areas they see as more important and give feedback based on personal experience. These maps can be found below:





Kanawha County Map comments from stakeholders:

- #5 (Patrick St & Patrick St Pl.) – Issues noticed with the clearance intervals of the signals.
- #12 (Gatewater Rd & Goff Mountain Rd) – Area experiences higher congestion levels.
- #14 (Airport Road & Greenbrier Street) – Near a high school, there are issues with the yield sign and suggest switching to a stop sign.

Putnam County Map comments from stakeholders:

- #1 (Buffalo Bridge & Shamrock Lane) – Multiple business driveways nearby.
- #3 (Hurricane Creek Road & US-35) – Wide intersection with a narrow median.
- #4 (Shamrock Lane & US-35) – Completed construction project.
- #5 (CR-9 & US-35) – Short exit ramp and dip on bridge.
- #6 (WV-34 & Winfield Road) – Short light affects the turning lane.
- #7 (Prarie Lane & Stricklin Road) – Aggressive driving within traffic here.
- #7 (Mount Vernon Road & Teays Valley Road) – New stoplight was installed.
- #9 (Great Teays Blvd & Teays Valley Road) – Aggressive driving and high traffic volume.
- #10 (Midland Trail & US-60) – Just installed a new traffic light.
- #10, #15, #17 (Near Interstate) – Building a new exit from I64, should reduce traffic at these intersections.
- #12 (Charleston Road & Coveside Place) – Poor line of vision.
- #13 (1st Avenue & 41st Street) – Multiple businesses, large amount of truck traffic.
- #16 (Charleston Road & Sugar Maple Lane) – High traffic volume in a short time. Toyota plant has a strict “late to work” policy which causes an increase in speeding in the area of people late to work.
- #19 (Teays Valley Road & Winfield Road) – Multiple business driveways nearby.
- #19 (Main Street & US-60) – Now has a light.

Equity Analysis

Equity in relation to safety involves ensuring that we don’t focus on being “equal” but ensure solutions in a specific region actually benefit the individuals within that region. The equity analysis looked at four categories in percentage of individuals within a given census tract: zero vehicle households, minority population (race other than white), population with disability, and population living below the poverty level.

In Kanawha County, Census Tract 9 was ranked #1 per the equity analysis. This tract has 47.9% households with zero vehicles, 37.8% minority population, 26.2% disabled population, 59.4% of population living below the poverty level. This area also had six FSI crashes and 46 bicycle and pedestrian crashes.

As a summary of the equity analysis, the "top" 20 ranked Census Tracts (29% of all census tracts), include the following:

- 60% of all bike or pedestrian crashes
- 32% of all FSI crashes
- An average of 20.4% of households with zero vehicles (10.4% avg. for region)
- An average of 23.5% minority population (13.4% avg. for region)
- An average of 21.5% of population with a disability (17.4% avg. for region)
- An average of 27.5% of population in poverty (17.2% avg. for region)

Comparing the top intersections from the hotspot analysis to the equity analysis, we see the following overlaps:

- 18 out of 50 locations (36%) are in "Top" 20 Census Tracts
- 13 out of 50 locations (26%) are in "Top" 10 Census Tracts

It is important to acknowledge these rankings as we look ahead toward developing strategies to mitigate fatalities and serious injuries.

Wrap Up

As a final note, Kendra discussed what the implementation plan would look like and how it would be structured. An example was provided so that the stakeholders could see what we would have as a final product.

Looking forward, the branding of the safety plan will be developed. A more detailed emphasis area analysis will be completed. At the next meeting the group will also cover the systemic analysis results.

The next stakeholder meeting will be held tentatively the week of April 24th.

After Meeting #3 at the end of April, Burgess and Niple will provide implementation actions aimed to meet the needs discussed over the course of the three stakeholder meetings. The plan will be proposed for approval by the Policy Board of the Regional Intergovernmental Council on June 8, 2023.

Stakeholder Meeting #2 Sign-In Sheet

March 29, 2023

Name	Agency	Email
Kelsey Harrah	RIC	Kelsey@wvregion3.org
Jake Smith	RIC	JakeJsmith@wvregion3.org
Samuel Richardson	RIC	srichardson@wvregion3.org
Curt Zickefoose	KYOVA	CZickefoose@Kyova.org
Brian Carr	WVDOH	Brian.G.Carr@wv.gov
Mike Oakley	KCEMA	MikeOakley@KCEMA.org
Thomas Bibb	KCEMA	thomasDbibb@kcema.org
Dennis Strawn	Bike/Ped Advocate	dennis.a.strawn@gmail.com
Kara Greathouse	FHWA	Kara.greathouse@dot.gov
Paige Hill	City of Charleston	paige.hill@cityofcharleston.org
Derrick Johnson	FHWA	Derrick.Johnson@dot.gov
C.W. Sigman	Kan OEM	cwsigman@kanawha.us
Tanika Hardy	DRWV	thardy@drofwv.org

Stakeholder Meeting #2 Sign-In Sheet

March 29, 2023

Name	Agency	Email
Todd Dorcas	TGKVP	tdorcas@tgkvf.org
Marsha Mays	WVDOH - Traffic	Marsha.K.Mays@wv.gov
x Donna Hardy -Virtual	WVDOT-Traffic	

Regional Comprehensive Safety Action Plan

Stakeholder Meeting #2

March 29, 2023

Regional Intergovernmental Council

BURGESS & NIPLE
Engineers ■ Architects ■ Planners

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Agenda

- Welcome and Introductions
- Stakeholder Meeting #1 and Goals for Meeting #2
- Vision and Goal Statement
- Hotspot Intersection Analysis
- Equity Analysis
- Wrap Up and Next Steps

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Regional Intergovernmental Council

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Welcome and Introductions

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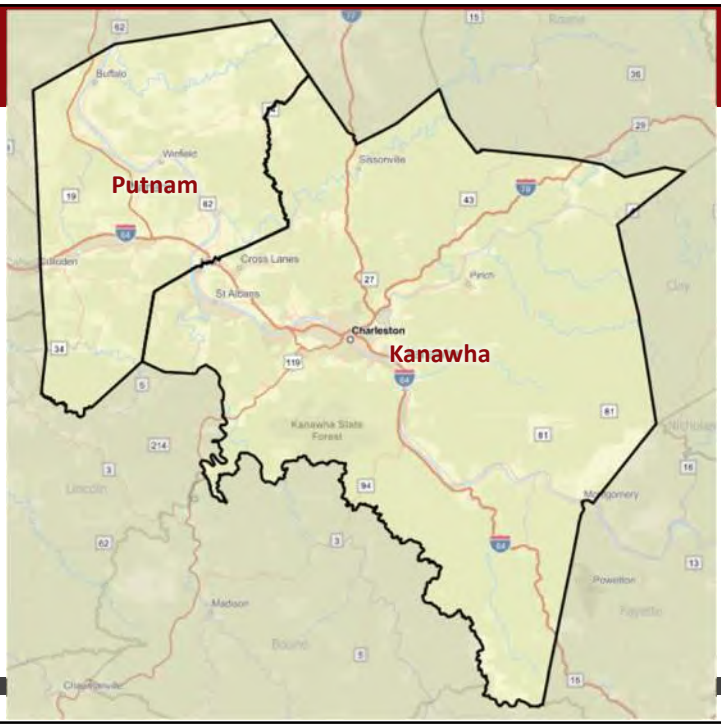
Study Area



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Steps of Safety Plan

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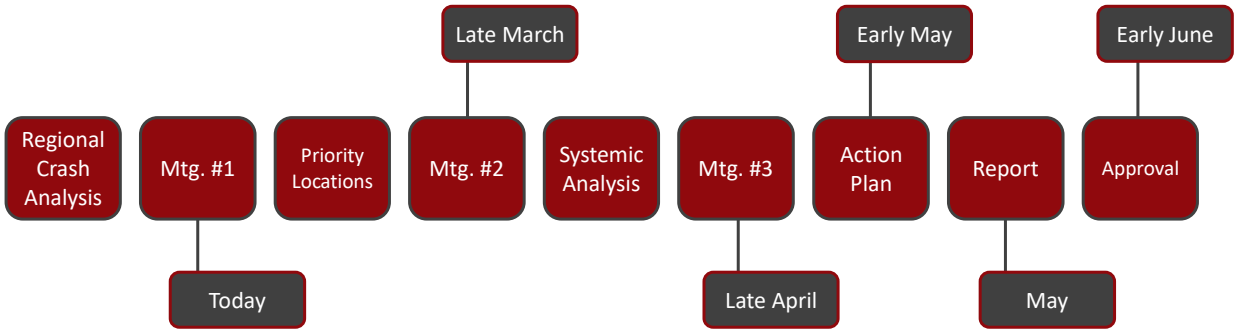
Plan Schedule



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What to Consider in the Plan

- Opportunities to **make roads safer – ZERO fatalities and serious injuries**
- Ensure we all take **personal responsibility**
- Address **speed**
- Reliable **post-crash care**
- **Innovations/Technology**
- Safety is **Equitable**
- Create a **Culture** of safety

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Emphasis Areas

Emphasis Area	Statewide FSI	Kanawha County FSI*	Kanawha County FSI (2017-2021)**	Putnam County FSI*	Putnam County FSI (2017-2021)**
Speed and Aggressive Driving	57%	55%	--	74%	--
Roadway Departure	55%	48%	46%	48%	55%
Occupant Protection	32%	28%	--	28%	--
Older Driver	22%	24%	13%	19%	16%
Alcohol and Drug Impaired	22%	19%	15%	19%	14%
Intersections	18%	24%	29%	16%	19%
Pedestrians	7%	13%	17%	3%	5%

* From 2016-2020 WVDOT SHSP
**Does not include interstate crashes

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Goals for Meeting #2

- Defining the Vision and Goals for Safety in the RIC Region
- Telling the Data Story
  - Hotspot Intersections
  - Equity

Speed and Aggressive Driving

Roadway Departure

Intersection

Pedestrian

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Vision and Goals for Safety

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Key Messages Related to Safety

Source: City of Columbus Vision Zero Action Plan

Source: WAMPO

Source: MAG STSP

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Potential Tag Lines

- Getting everyone there safely
- Prioritizing lives over all else
- Toward zero deaths
- Working together to prioritize safety / lives
- Take me home, safer roads

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Potential Vision Statement for RIC Region

We will prioritize safety on the transportation network for all people in Kanawha and Putnam Counties by cooperatively implementing enforcement, education, emergency medical services, and engineering solutions that eliminate fatalities and serious injuries.

GOAL

The goal of the **West Virginia Strategic Highway Safety Plan** is to work cooperatively to improve roadway safety, eliminating fatalities and serious injuries through the coordinated efforts of enforcement, education, emergency medical services, and engineering.

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Goal Statements

OVERALL OBJECTIVE

The objective of the **2022-2026 West Virginia Strategic Highway Safety Plan** is to achieve zero fatalities by 2050 and ultimately zero serious injuries on our roadways, by **reducing fatalities and serious injuries 4%** annually over the next five years.

OBJECTIVE
Reduce fatalities and serious injuries by 2% per year.

Source: Eastgate Regional Council of Governments

Goal

The overall goal of the STSP is to **reduce the severity and number of people impacted by crashes.**

Source: MAG STSP

- Reduce the number of fatalities by 8 percent from 2017 to 2025
- Reduce the fatality rate by 1 percent annually
- Reduce the number of non-motorized fatalities and serious injuries by 8 percent from 2017 to 2025
- Reduce the number of serious injuries by 8 percent from 2017 to 2025
- Reduce the serious injury rate by 1 percent annually

Source: MORPC Safety Plan

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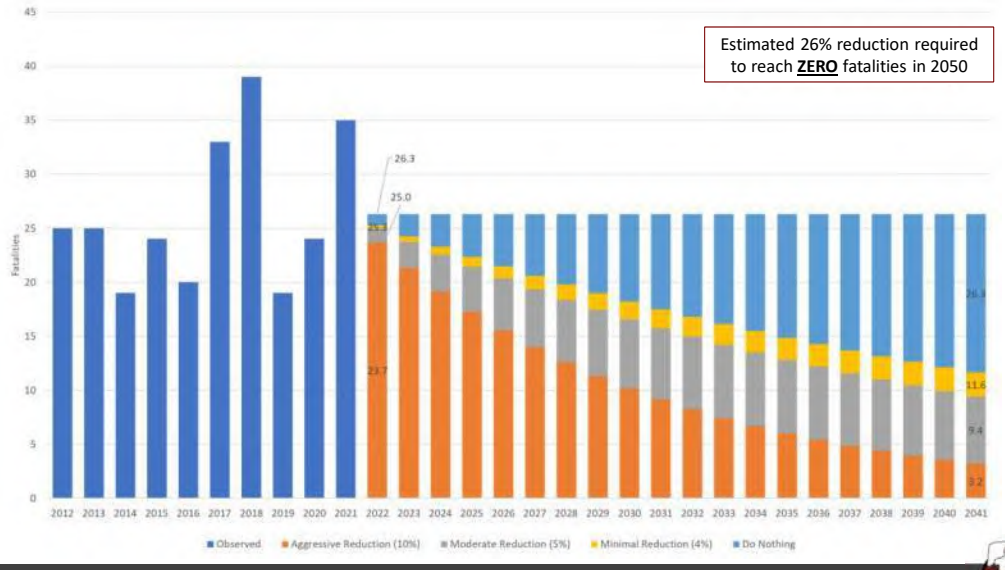
Fatalities – Kanawha County



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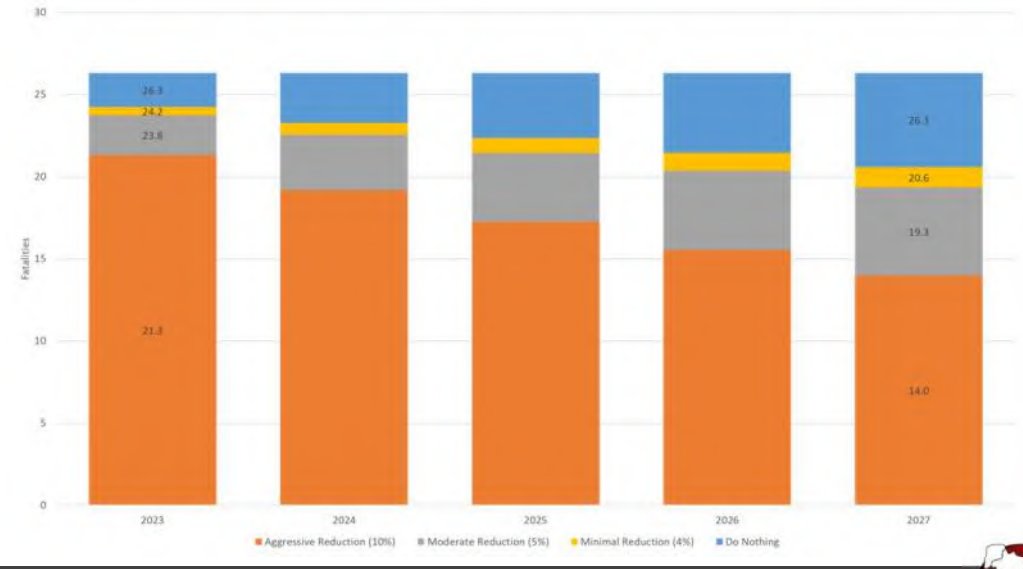
Fatalities – Kanawha County



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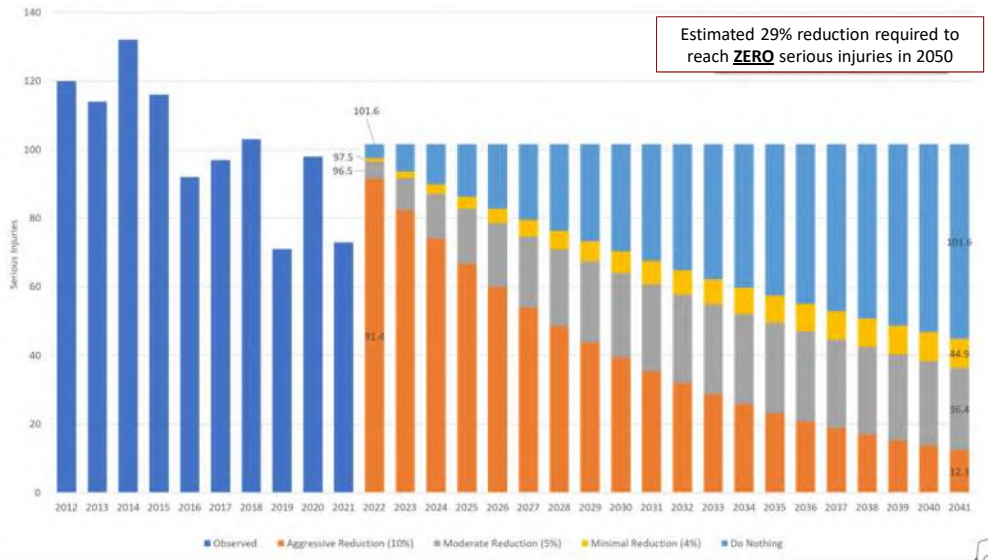
Serious Injuries – Kanawha County



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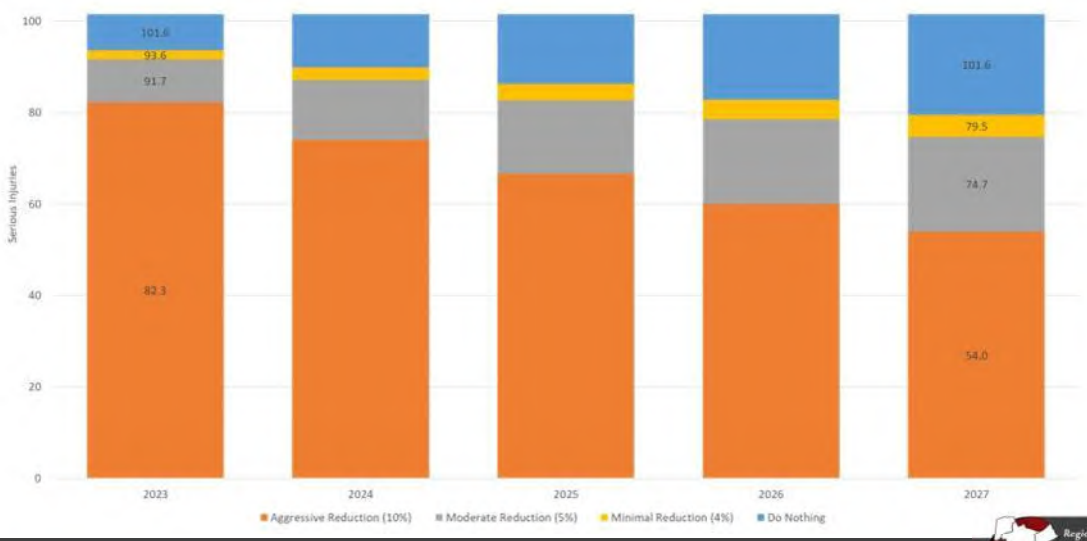
Serious Injuries – Kanawha County



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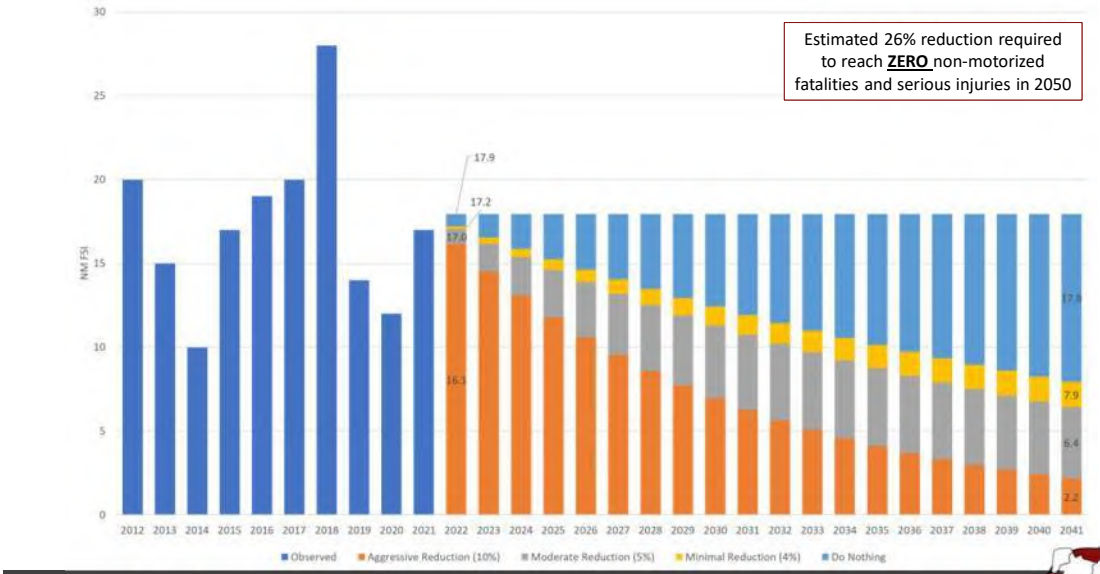
Non-Motorized Fatalities and Serious Injuries
Kanawha County



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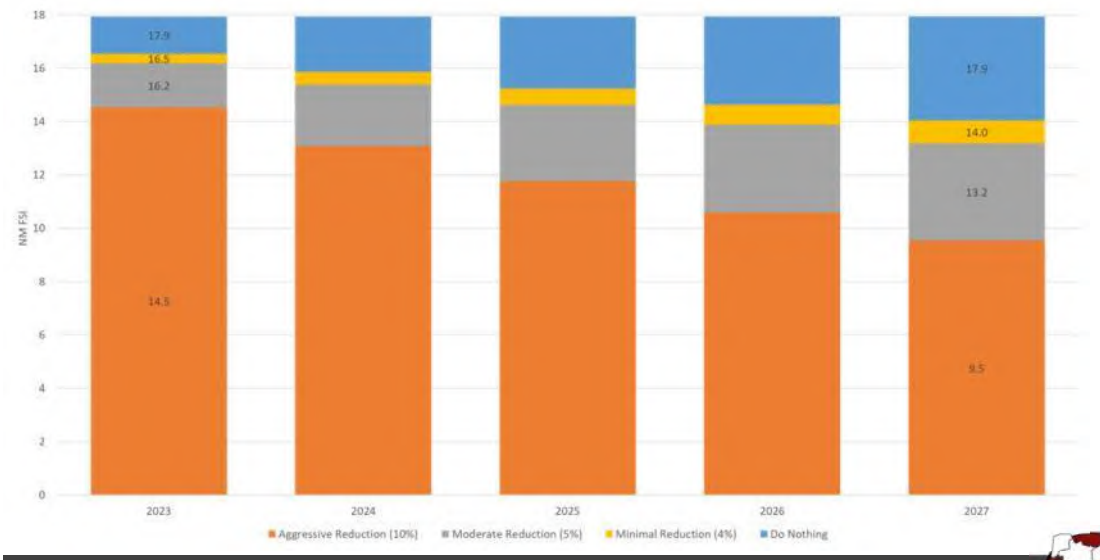
Non-Motorized Fatalities and Serious Injuries
Kanawha County



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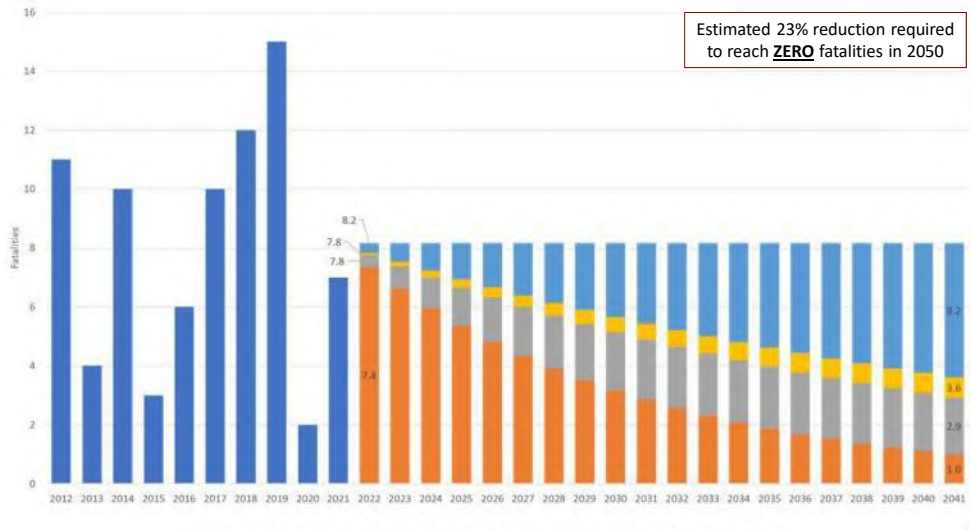
Fatalities – Putnam County



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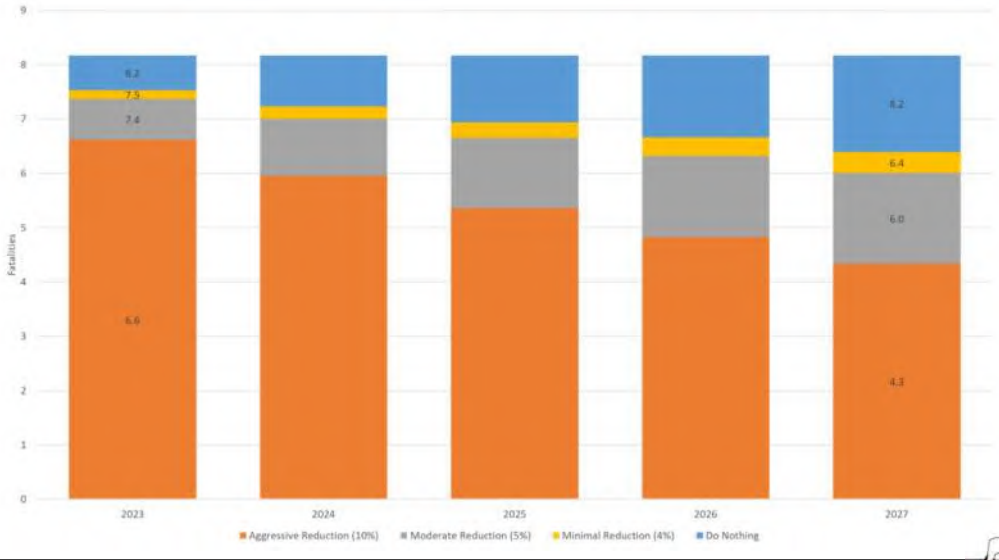
Fatalities – Putnam County



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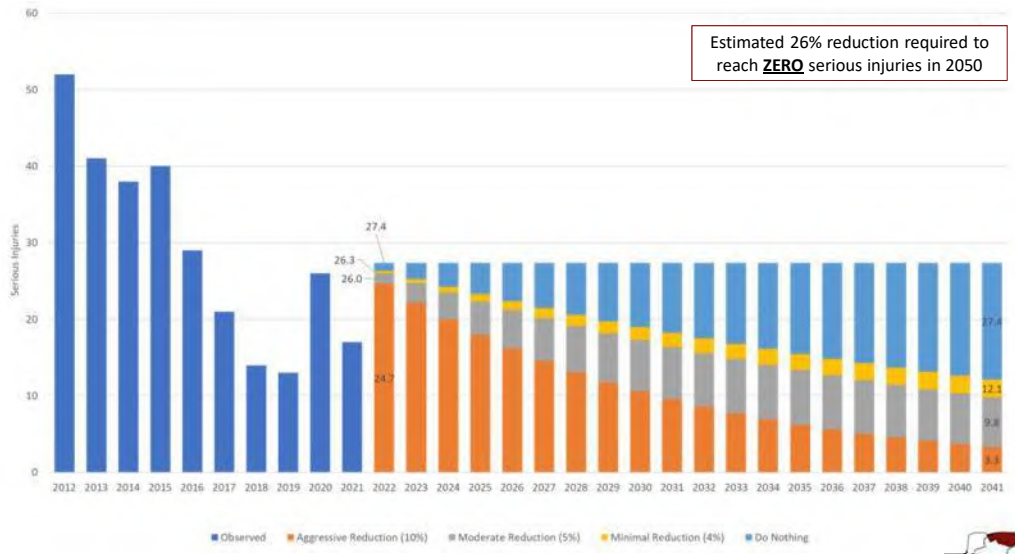
Serious Injuries – Putnam County



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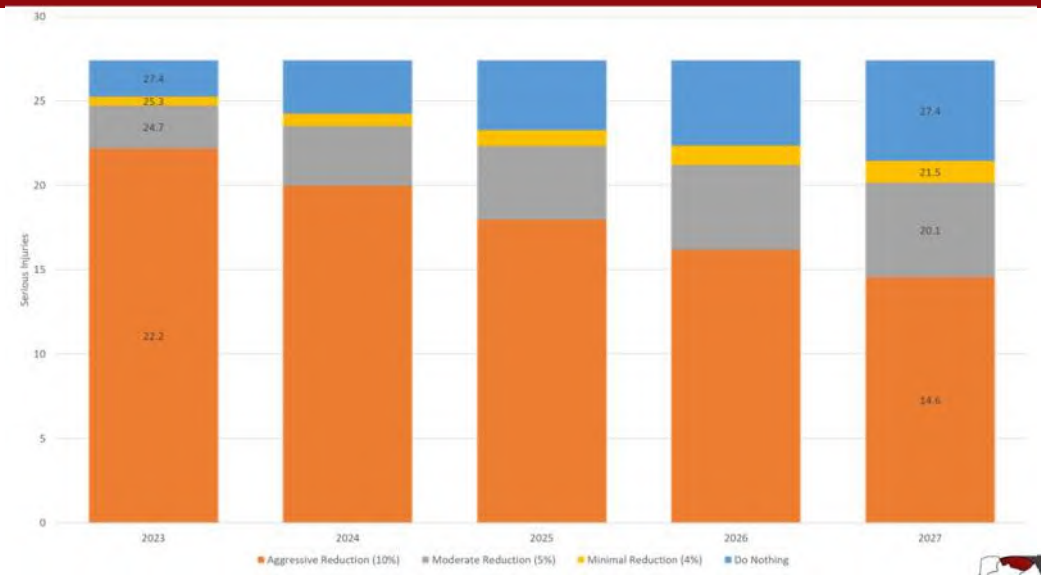
Serious Injuries – Putnam County



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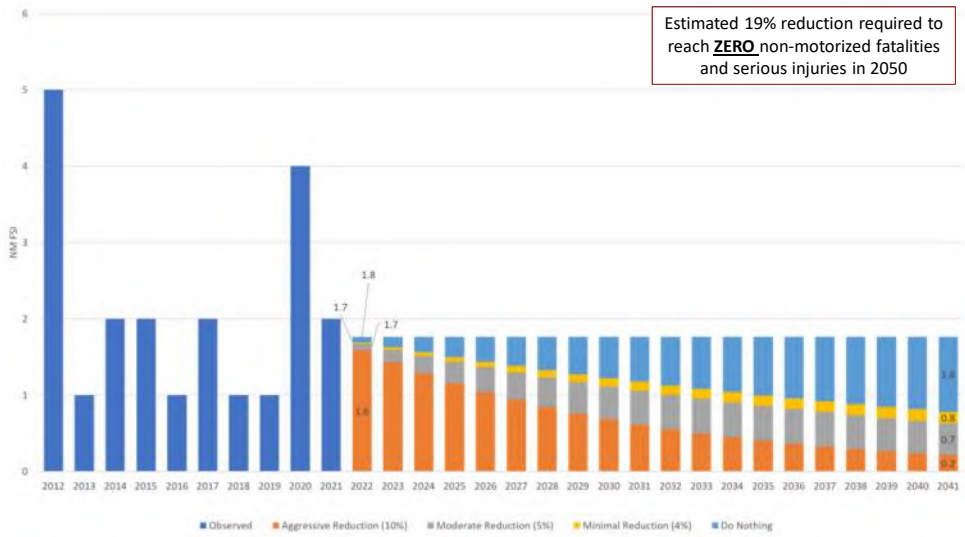
Non-Motorized Fatalities and Serious Injuries
Putnam County



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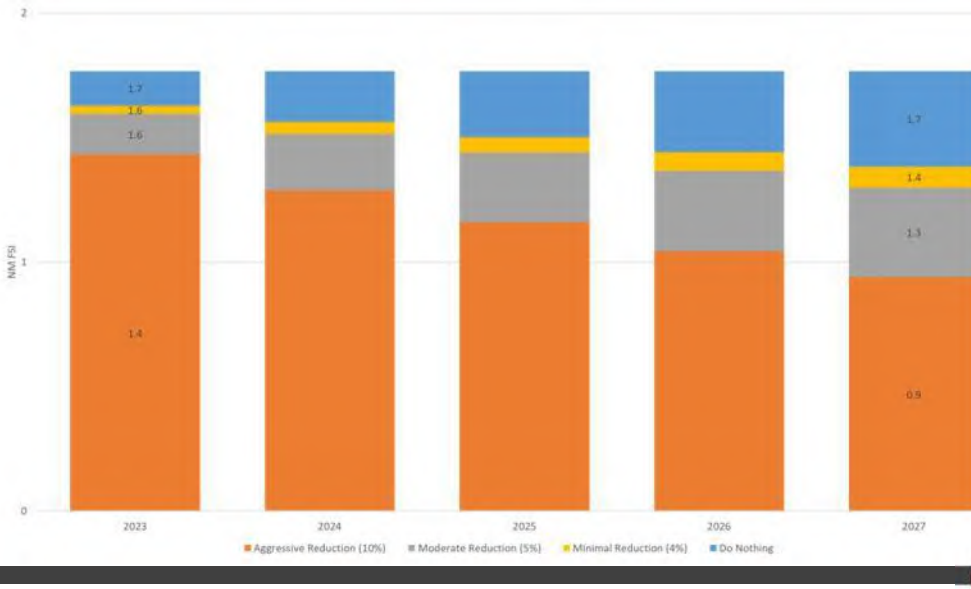
Non-Motorized Fatalities and Serious Injuries
Putnam County



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Goal Statements

- Reduce the number of fatalities by _____ percent _____.
- Reduce the number of serious injuries by _____ percent _____.
- Reduce the number of non-motorized fatalities and serious injuries by _____ percent _____.

Percentage

Timeframe

27

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Intersection Hot Spots

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Intersection Crash Details - Kanawha

Data Trends/Key Facts for FSI at Intersections		
Statewide*	Kanawha**	
77%	77%	occurred on a weekday (Monday - Friday)
56%	54%	were male
53%	59%	involved angle crashes
49%	43%	occurred at T-intersections
42%	40%	occurred between 2 PM and 7 PM
34%	21%	involved older drivers (65 years old and older)
15%	18%	occurred on wet roadways
12%	11%	occurred in dark/unlit conditions
6%	16%	involved pedestrians

* From 2016-2020 WVDOT SHSP
** From 2017-2021 Crash Analysis

Intersection Crash Details - Kanawha

- Other Notable Facts
  - **111 intersection fatal or serious injury crashes**
  - **131 fatal or serious injuries**
  - 27% (30 crashes) occurred on Friday
  - 22% (29 people) of the fatal and serious injuries involved passengers
  - 52% (68 people) of the fatal and serious injuries involved people between the ages of 20 and 49 (roughly 37% of the population)

Intersection Crash Details - Putnam

Data Trends/Key Facts for FSI at Intersections		
Statewide*	Putnam**	
77%	93%	occurred on a weekday (Monday - Friday)
56%	52%	were male
53%	60%	involved angle crashes
49%	53%	occurred at T-intersections
42%	53%	occurred between 2 PM and 7 PM
34%	19%	involved older drivers (65 years old and older)
15%	13%	occurred on wet roadways
12%	7%	occurred in dark/unlit conditions
6%	0%	involved pedestrians

* From 2016-2020 WVDOT SHSP
** From 2017-2021 Crash Analysis

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Intersection Crash Details - Putnam

- Other Notable Facts
  - **15 intersection fatal or serious injury crashes**
  - **21 fatal or serious injuries**
  - 40% (6 crashes) occurred on Wednesday
  - 87% (13 crashes) occurred between the months of April and July
  - 38% (8 people) of the fatal and serious injuries involved passengers

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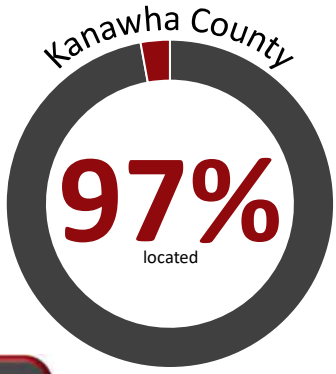
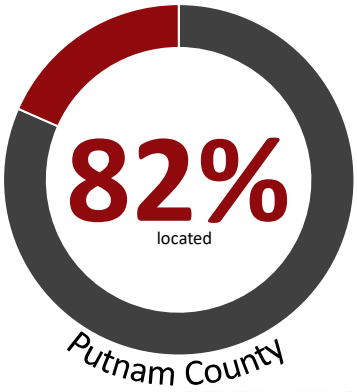
Crash Location Process

- Latitude/Longitude
- Address
- Intersection
- Other locator information





2017 – 2020 Non-Interstate Crashes
18,795 Kanawha County
4,388 Putnam County

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Crash Prioritization Process

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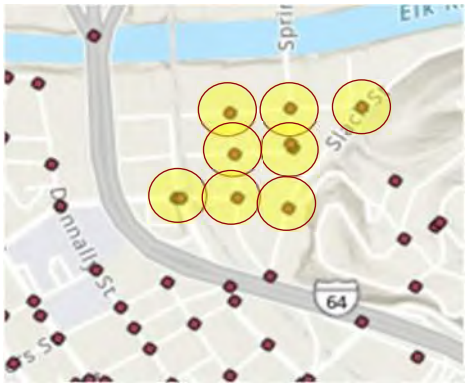
Crash Prioritization Process

- Used Open Streetmap to get intersection points
- 500-foot radius around intersection point
- Crashes within two intersection radii were located to the closest intersection



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Crash Prioritization Process

Equivalent Property Damage Only (EPDO) Factors

	Costs	Weight
Fatal Crash (K)	$9,646,264	930.119
Serious Injury Crash (A)	$552,237	53.248
Minor Injury Crash (B)	$177,292	17.095
Possible Injury Crash (C)	$104,838	10.109
Property Damage Only (O)	$10,371	1.00

Int. A
65
Crashes

5 Minor Injury Crashes
10 Possible Injury Crashes
50 Property Damage Only Crashes

(5 x 17.095) + (10 x 10.109) + (50 x 1) =
236.6 PDO Crashes

15 Minor Injury Crashes
25 Possible Injury Crashes
10 Property Damage Only Crashes

(15 x 17.095) + (25 x 10.109) + (10 x 1) =
519.15 PDO Crashes

Int. B
50
Crashes

36

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Crash Prioritization Process

Ranking Process

Ranking Based on EPDO Total

Intersection	Crash Frequency	Fatal/Injury %	K	A	B	C	O	EPDO (Total)
Parkway Rd & US 119	39	44%	3	2	2	10	22	3054.133
Goff Mtn Rd & WV 62	52	23%	1	0	0	11	40	1081.318
Central Ave & Russell St	8	50%	1	0	1	2	4	971.432

Ranking Based on EPDO per Crash

Intersection	Crash Frequency	Fatal/Injury %	K	A	B	C	O	EPDO (per crash)
Central Ave & Russell St	8	50%	1	0	1	2	4	121.429
Parkway Rd & US 119	39	44%	3	2	2	10	22	78.311
Goff Mtn Rd & WV 62	52	23%	1	0	0	11	40	20.795

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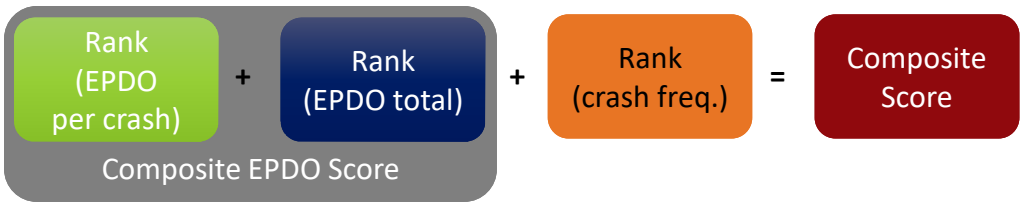
Crash Prioritization Process

Example Ranking

Intersection	Crash Frequency	Composite EPDO Score	Crash Frequency Rank	Composite Score	Final Rank
Shamrock Lane & US-35	15	5	25	30	4
Hurricane Creek Road and US-35	30	33	12	45	5



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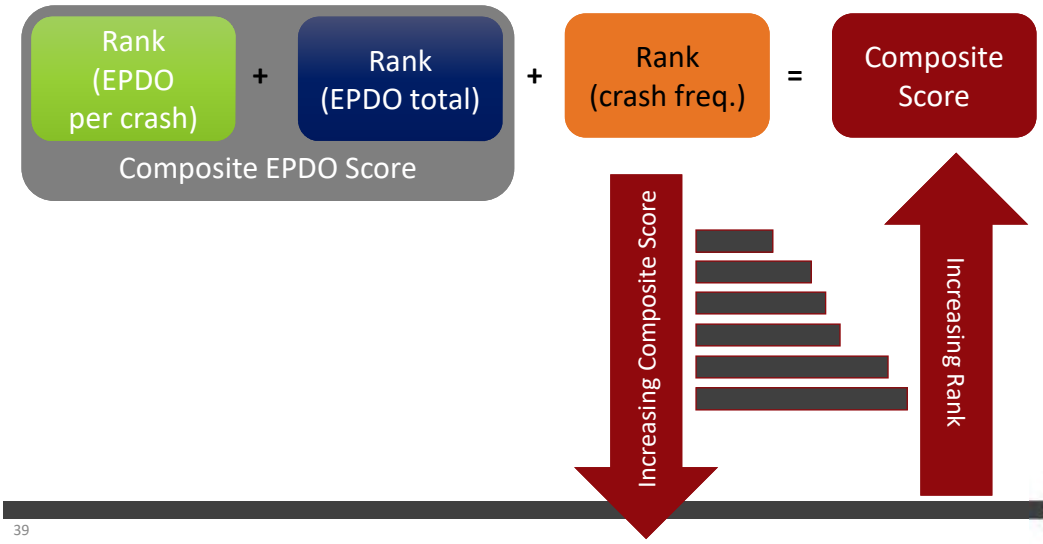
Crash Prioritization Process

Ranking



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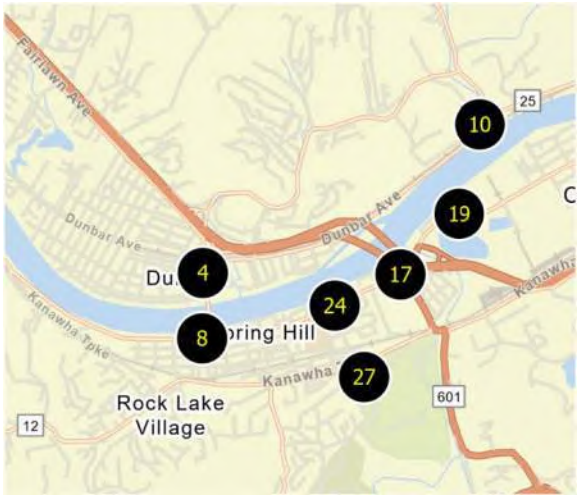
Crash Prioritization Process

- Review the maps
- Provide comments on locations
  - Does this location make sense?
  - What are the potential contributing issues at these locations?



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Equity Analysis

Regional Intergovernmental Council

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Equality vs. Equity

Source: Robert Wood Johnson Foundation

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Equity Information

- Zero Vehicle Households
- Minority Population
- Population with Disability
- Population below Poverty Level

AMERICAN COMMUNITY SURVEY
U.S. CENSUS BUREAU

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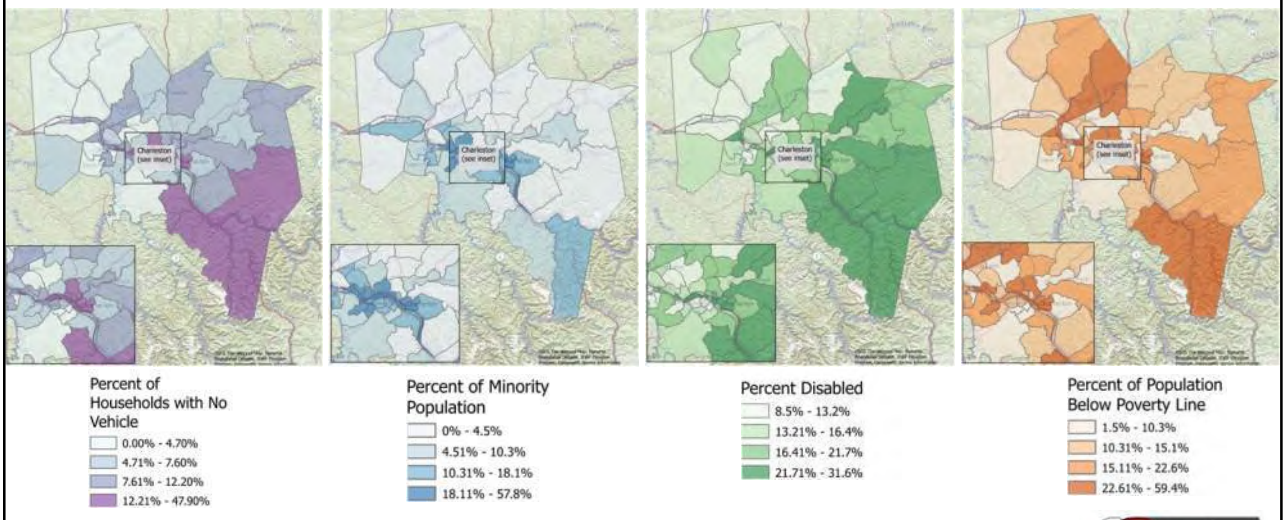
Equity Analysis



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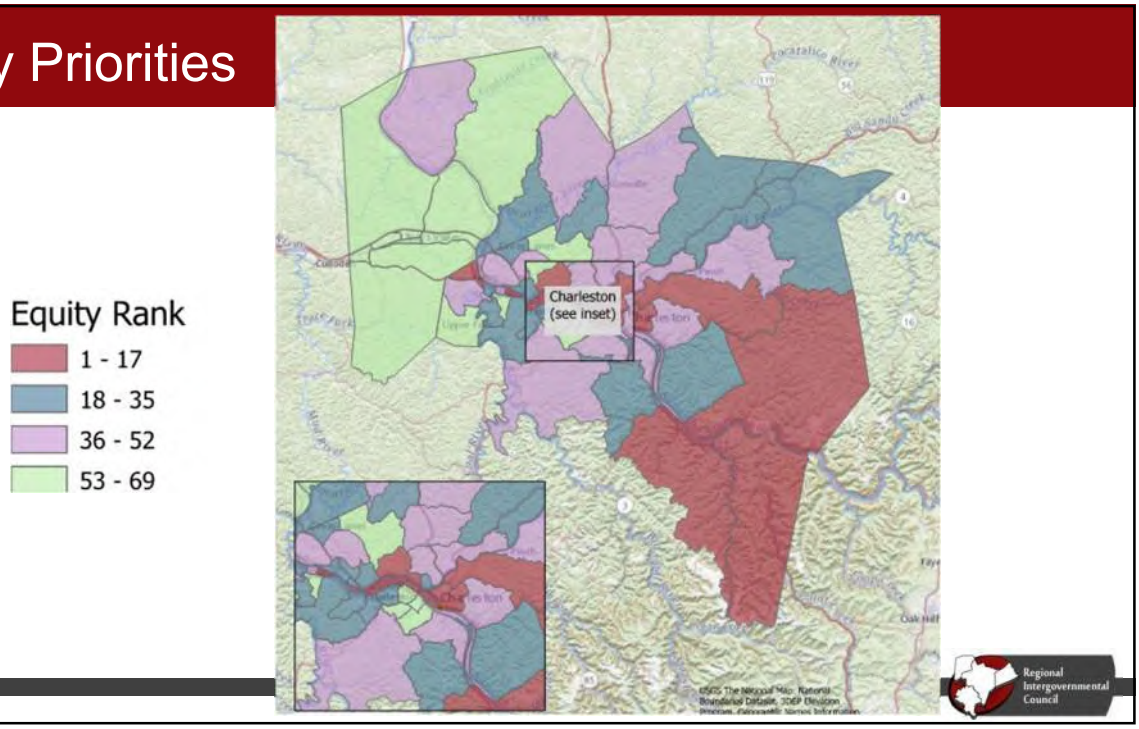
Equity Priorities



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45

Equity Priorities

- Kanawha County Census Tract 9
  - 47.9% zero vehicle households
  - 37.8% minority
  - 26.2% disabled
  - 59.4% poverty
  - 6 FSI crashes
  - **46 bike or pedestrian crashes**

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Equity Priorities

- 69 census tracts
- "Top" 20 Census Tracts (29% of Census Tracts & 28% by total area) Include:
  - 60% of all bike or pedestrian crashes
  - 32% of all FSI crashes
  - An average of 20.4% of households with zero vehicles (10.4% avg. for region)
  - An average of 23.5% minority population (13.4% avg. for region)
  - An average of 21.5% of population with a disability (17.4% avg. for region)
  - An average of 27.5% of population in poverty (17.2% avg. for region)

Equity Priorities

- Top Intersection Locations
  - 18 out of 50 locations (36%) are in "Top" 20 Census Tracts
  - 13 out of 50 locations (26%) are in "Top" 10 Census Tracts
  - Equity score could be used for prioritization purposes

Next Steps

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Implementation Plan

Table 3: Action Plan Strategy 1

Strategy 1: Retrofit existing streets and intersections to accommodate human mistakes and injury tolerances to reduce the severity of crashes that do occur and prevent future crashes

Action	Outcome	Lead Agency	Emphasis Areas Addressed			
			Intersections	Young Drivers	Vulnerable Road Users	Speed
1. In school zones and in high pedestrian areas, install no right turn on red and/or yield to pedestrian signage	Identify locations for signage	City of Hilliard – Division of Transportation & Mobility	X		X	
2. Implement proven safety countermeasures at traffic signals and crosswalks to reduce vehicle, bicycle, and pedestrian crashes, especially backplates, countdown pedestrian signal heads, leading pedestrian intervals, rapid flashing beacons, and high visibility crosswalks	Continue systemic and systematic application of countermeasures	City of Hilliard – Division of Transportation & Mobility	X	X	X	
3. Coordinate with COTA to re-evaluate bus layover locations related to mobility and safety concerns close to intersections	Coordination with COTA	City of Hilliard – Division of Transportation & Mobility	X			
4. Review left turn phasing at intersections, prioritizing high crash intersections	Identify locations where existing permissive/protected left turns should be converted to protected only	City of Hilliard – Division of Transportation & Mobility	X			

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Still to Come

- Branding
- More Detailed Emphasis Area Analysis
- Systemic Analysis and Results
- Stakeholder Meeting #3: Week of April 24th *(Tentative)*
- Implementation Actions

BOARD APPROVAL – JUNE 8TH

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Kanawha County Fatality Forecast
(20 Years)

Estimated 26% reduction required to reach **ZERO** fatalities in 2050

Fatalities

45
40
35
30
25
20
15
10
5
0

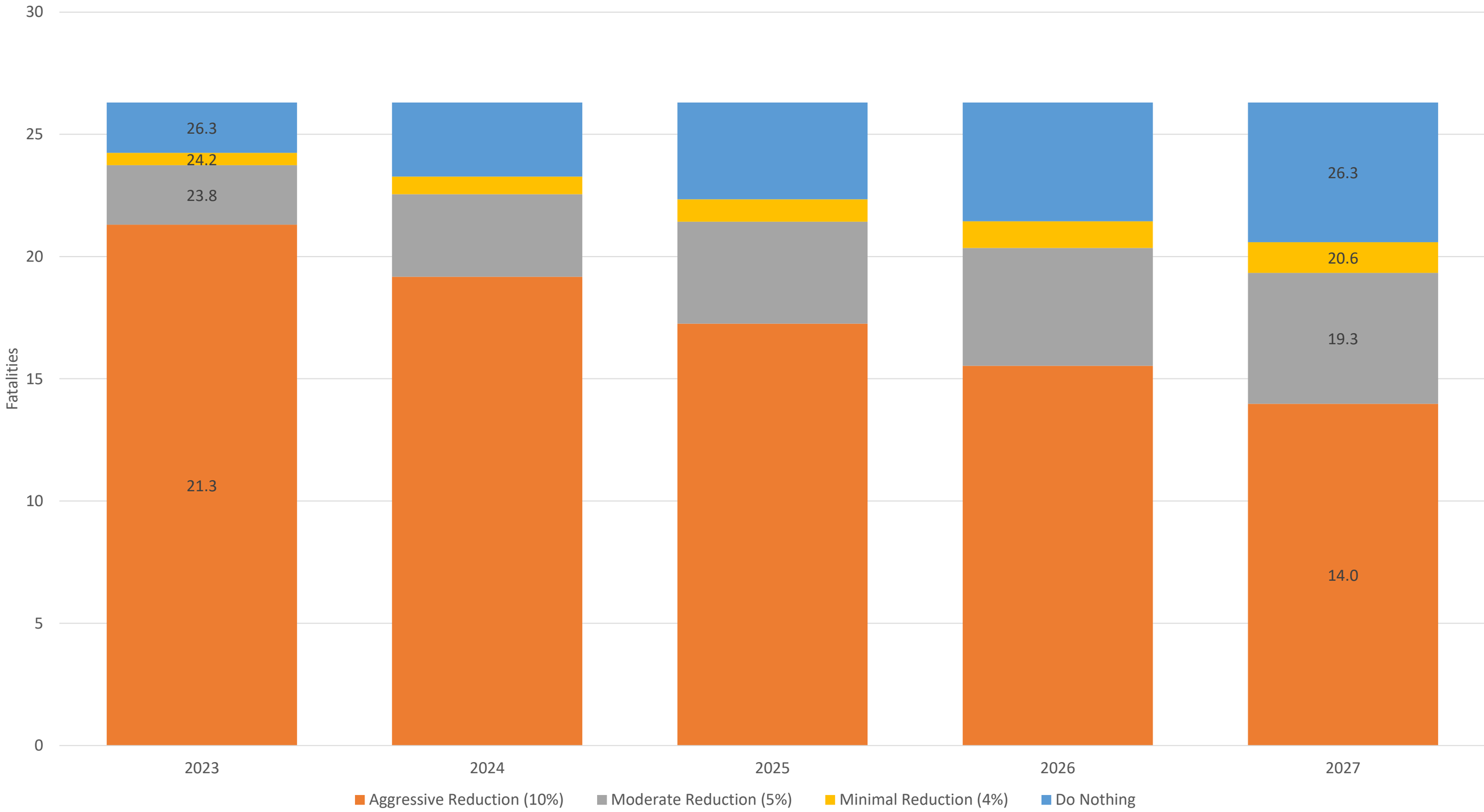
26.3
25.0
25.3
23.7
26.3
11.6
9.4
3.2

2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033 2034 2035 2036 2037 2038 2039 2040 2041

Observed
Aggressive Reduction (10%)
Moderate Reduction (5%)
Minimal Reduction (4%)
Do Nothing

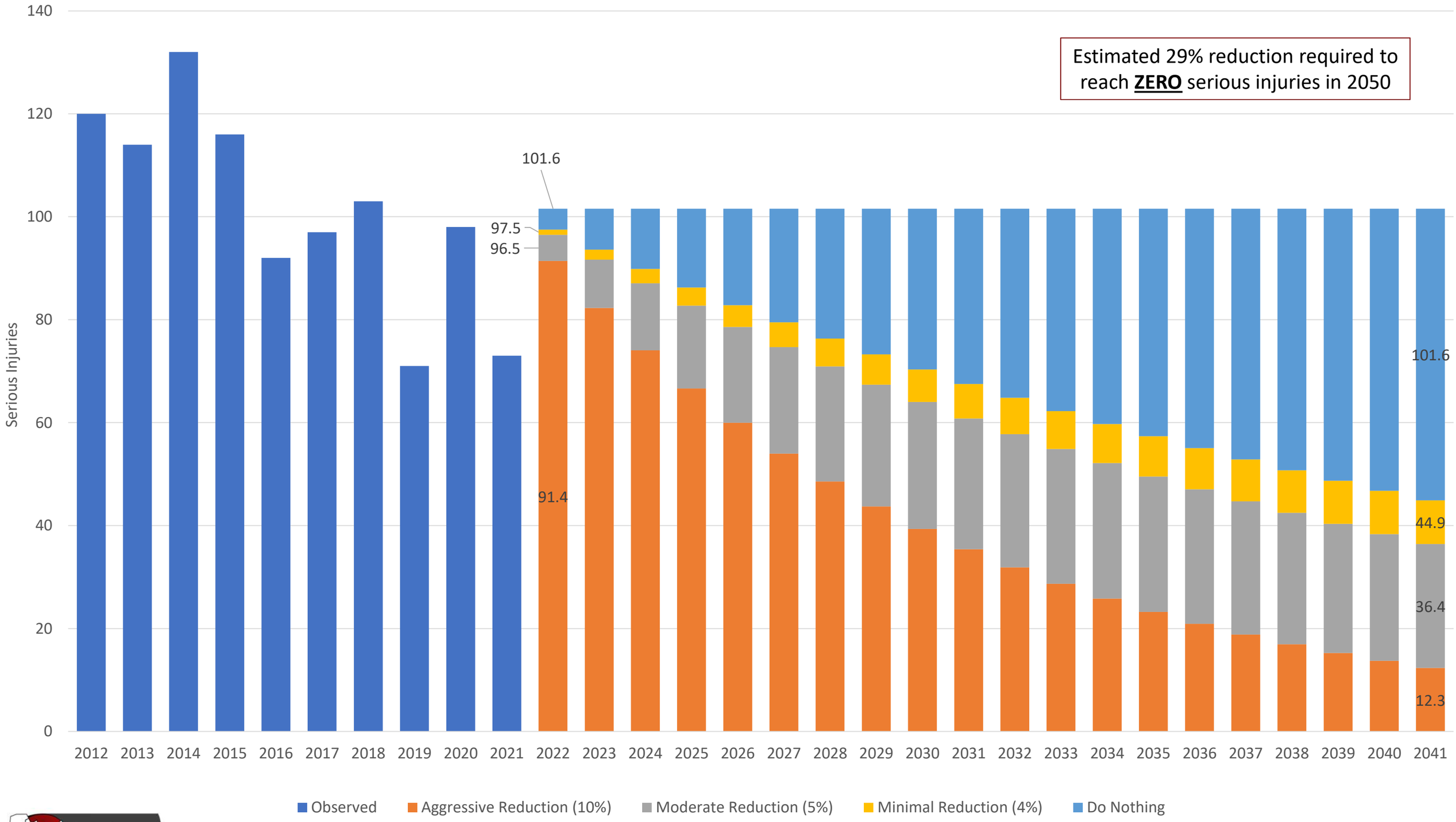
Regional Intergovernmental Council

Kanawha County Fatality Forecast
(Short-Term)



Kanawha County Serious Injury Forecast
(20 Years)

Estimated 29% reduction required to reach **ZERO** serious injuries in 2050



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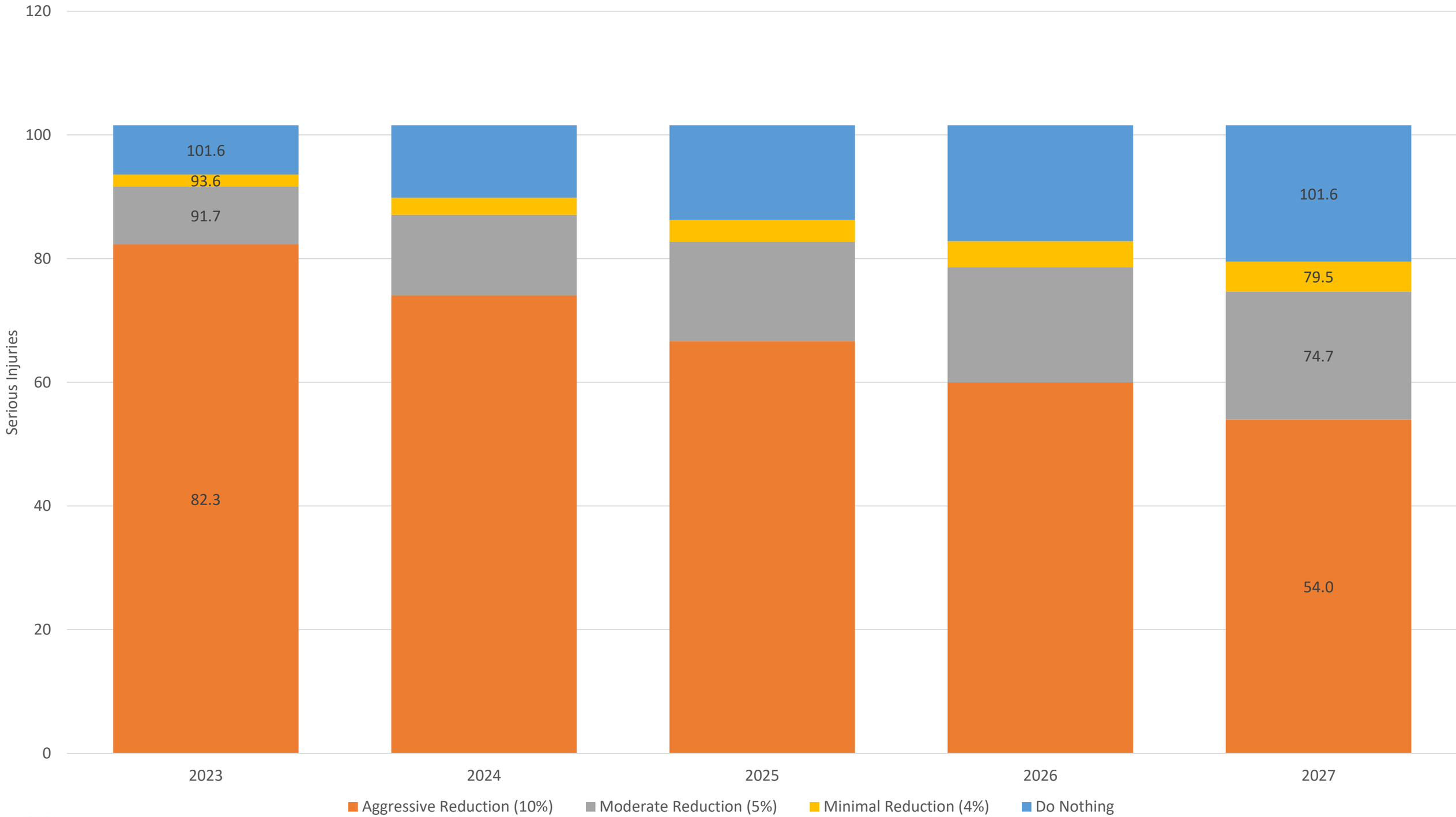
Kanawha County Serious Injury Forecast (Short-Term)



Regional Intergovernmental Council

Kanawha County Non-Motorized Fatality and Serious Injury Forecast
(20 Years)

Estimated 26% reduction required to reach **ZERO** non-motorized fatalities and serious injuries in 2050

NM FSI

30
25
20
15
10
5
0

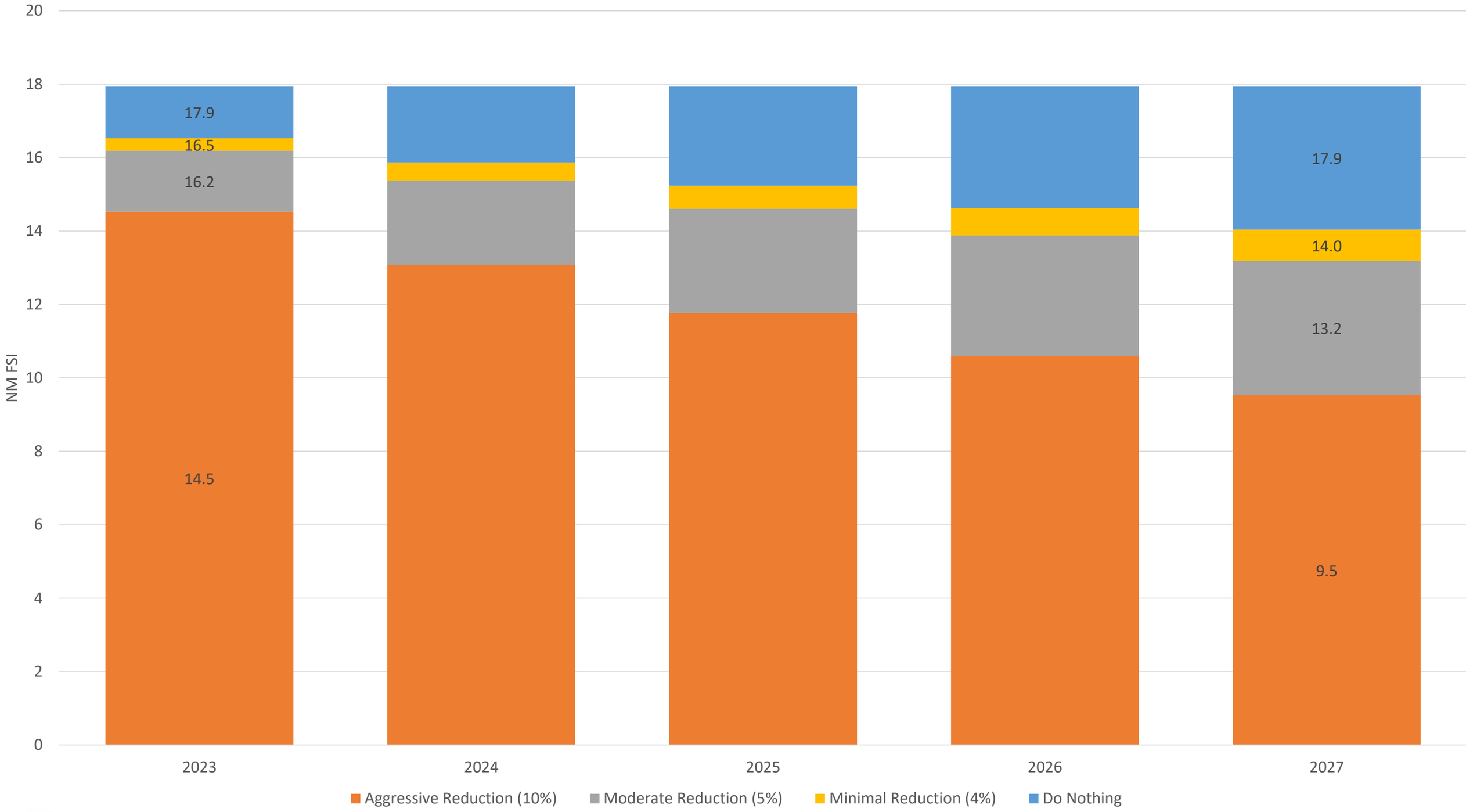
17.9
17.2
17.0
16.1
17.9
7.9
6.4
2.2

2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033 2034 2035 2036 2037 2038 2039 2040 2041

Observed | Aggressive Reduction (10%) | Moderate Reduction (5%) | Minimal Reduction (4%) | Do Nothing

Regional Intergovernmental Council

Kanawha County Non-Motorized Fatality and Serious Injury Forecast (Short-Term)



Putnam County Fatality Forecast
(20 Years)

Estimated 23% reduction required to reach **ZERO** fatalities in 2050

Fatalities

16
14
12
10
8
6
4
2
0

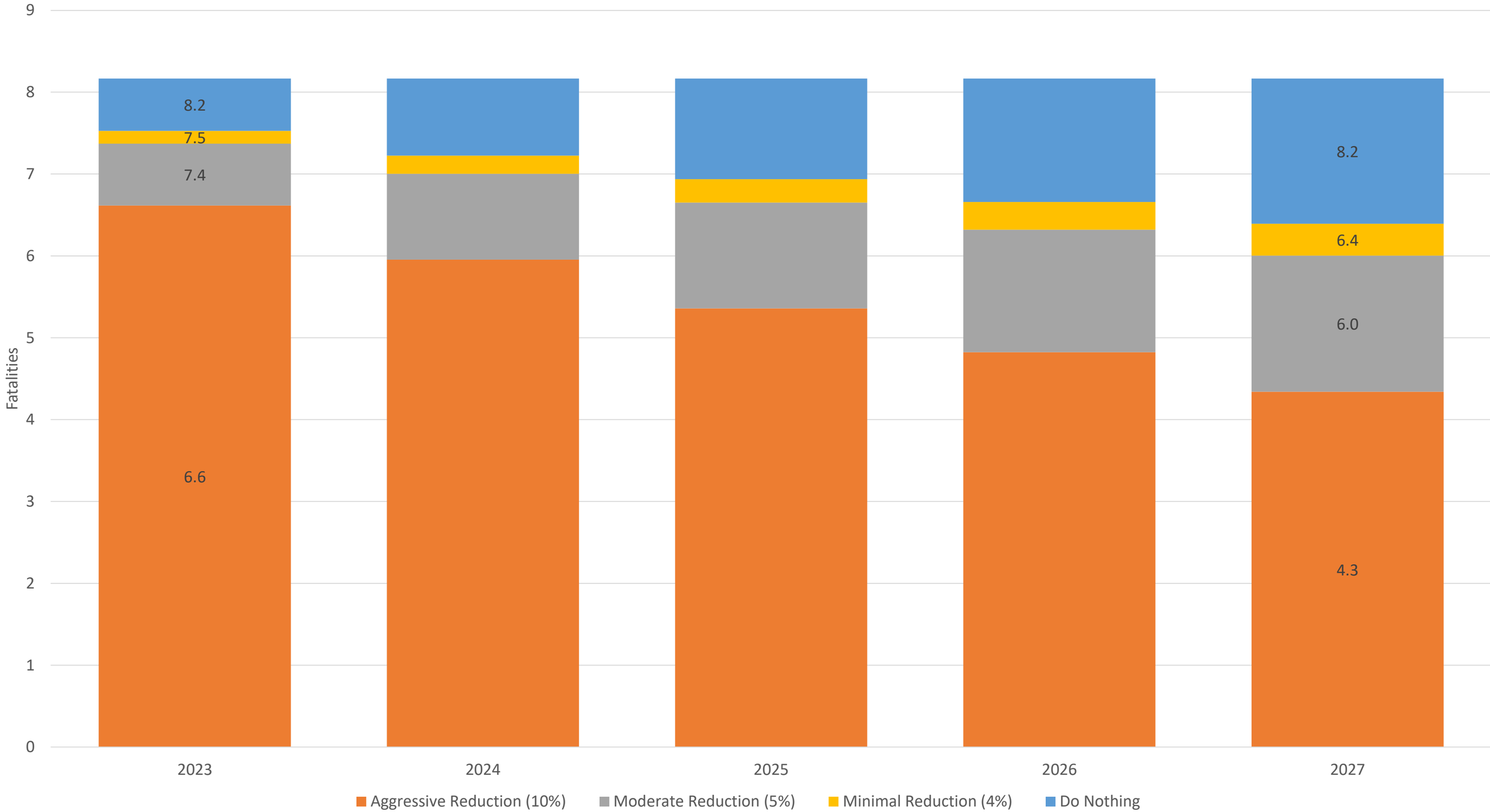
8.2
7.8
7.8
7.4
8.2
3.6
2.9
1.0

2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033 2034 2035 2036 2037 2038 2039 2040 2041

Observed
Aggressive Reduction (10%)
Moderate Reduction (5%)
Minimal Reduction (4%)
Do Nothing

Regional Intergovernmental Council

Putnam County Fatality Forecast
(Short-Term)



Putnam County Serious Injury Forecast
(20 Years)

Estimated 26% reduction required to reach **ZERO** serious injuries in 2050

Serious Injuries

60
50
40
30
20
10
0

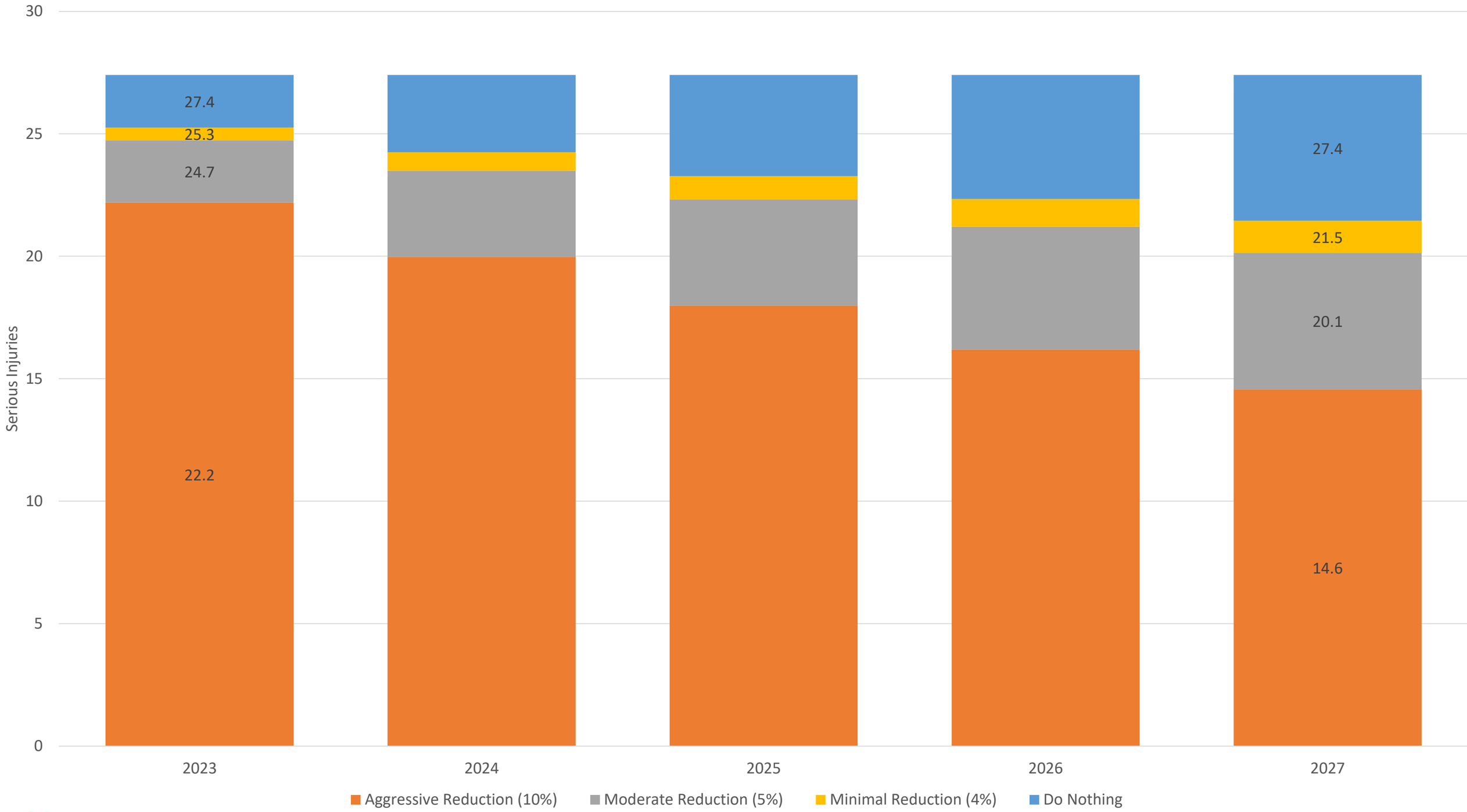
27.4
26.3
26.0
24.7
27.4
12.1
9.8
3.3

2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033 2034 2035 2036 2037 2038 2039 2040 2041

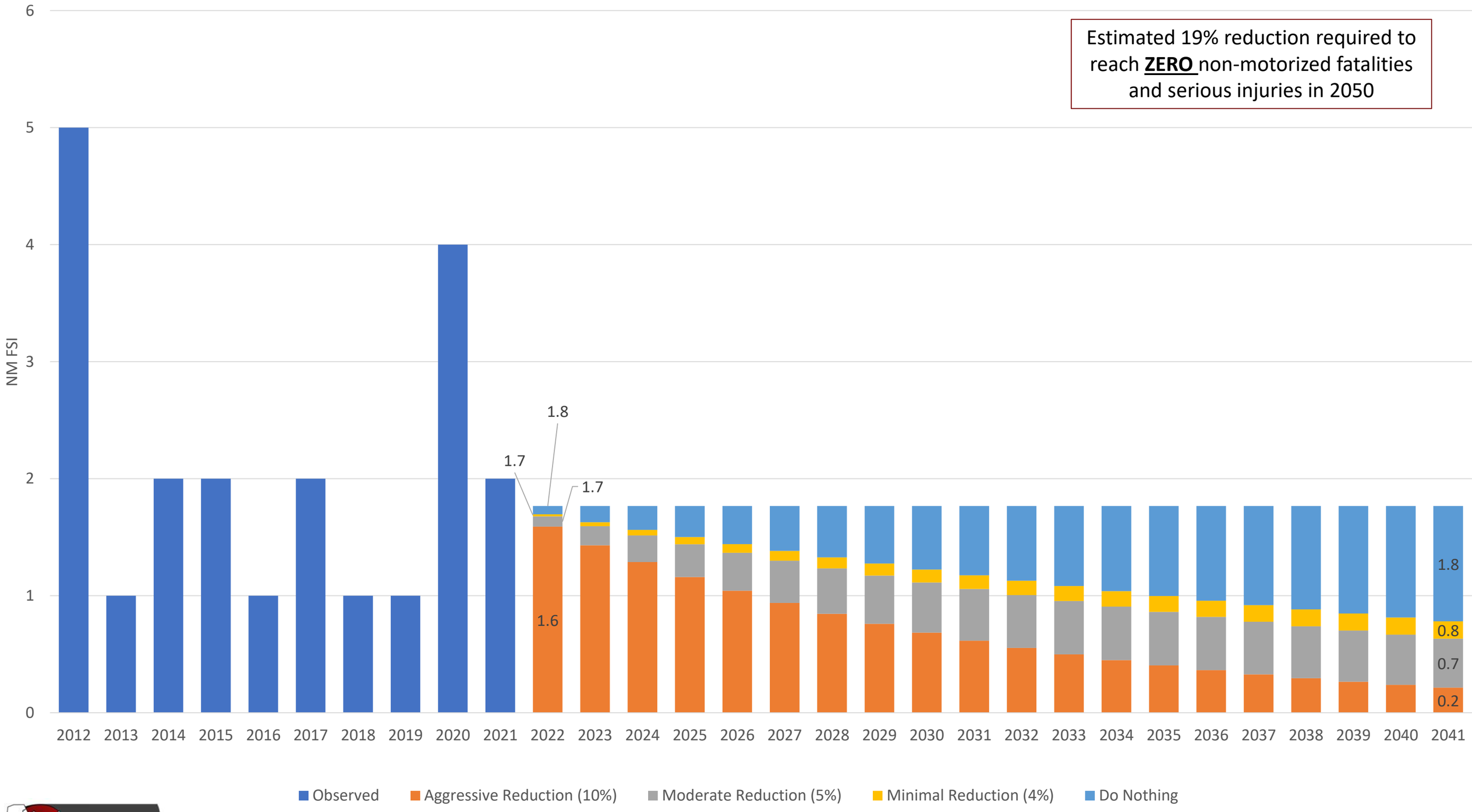
Observed
Aggressive Reduction (10%)
Moderate Reduction (5%)
Minimal Reduction (4%)
Do Nothing

Regional Intergovernmental Council

Putnam County Serious Injury Forecast
(Short-Term)

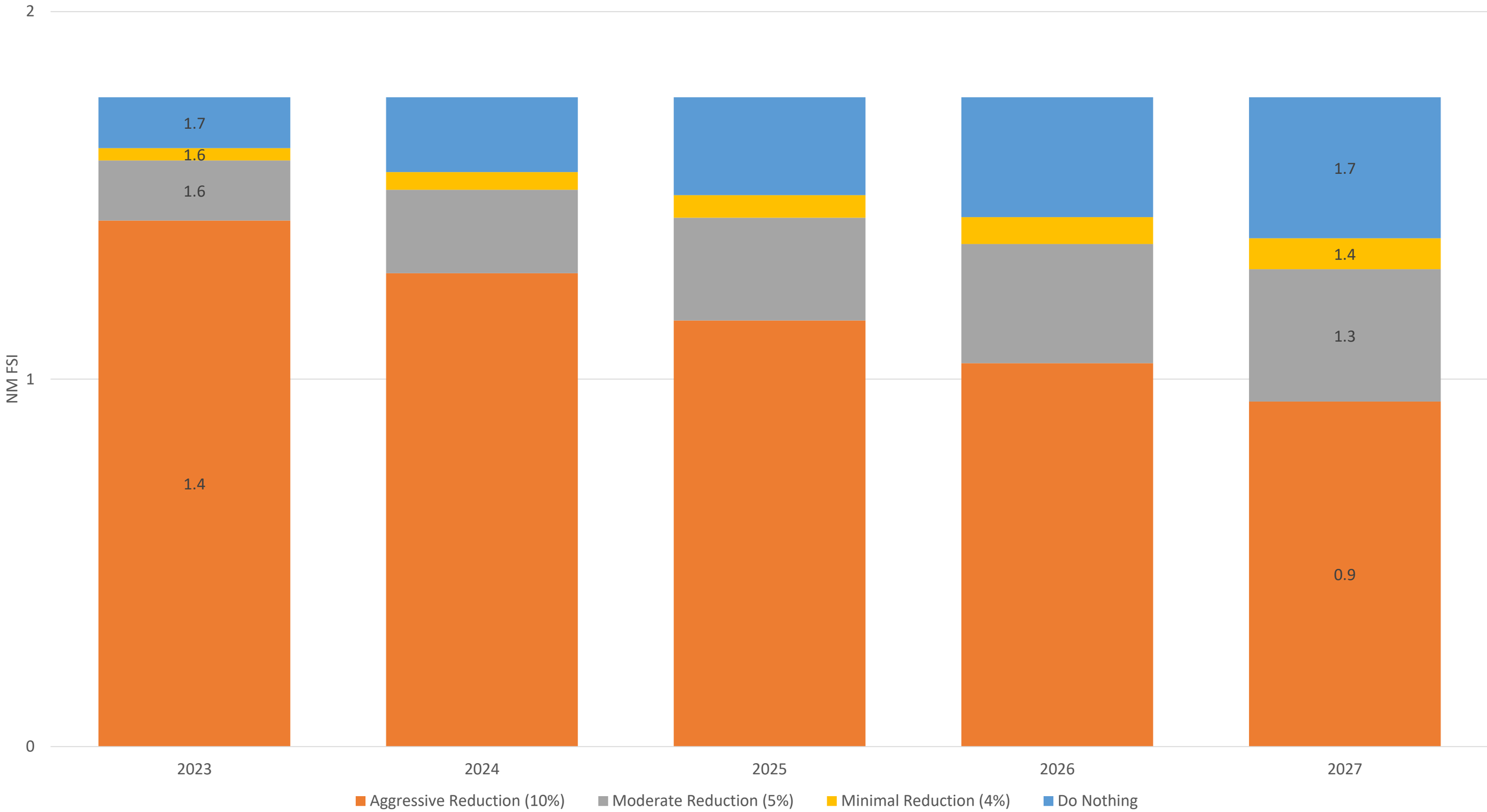


Putnam County Non-Motorized Fatality and Serious Injury Forecast (20 Years)



Regional Intergovernmental Council

Putnam County Non-Motorized Fatality and Serious Injury Forecast (Short-Term)



Rank	Intersection	Jurisdiction	Fatal	Serious Injury	Minor Injury	Possible Injury	No Injury	Total Crashes	Fatal & Injury %	EPDO Per Crash	EPDO Total	Crash Frequency Rank	EPDO Per Crash Rank	EPDO Total Rank	Composite Score	Equity Ranking
1	Grille Lane (South) & WV-34	Hurricane	1	1	3	6	34	45	24%	25.096	1129.306	7	7	3	17	61
1	Buffalo Bridge & Shamrock Lane	Fraziers Bottom	1	0	5	13	55	74	26%	16.243	1202.011	3	13	1	17	60
3	Hurricane Creek Road & US-35	Winfield	1	2	2	3	21	29	28%	38.694	1122.132	13	5	4	22	60
4	Shamrock Lane & US-35	Fraziers Bottom	1	3	2	2	7	15	53%	76.751	1151.271	25	3	2	30	60
5	CR-9 & US-35	Fraziers Bottom	0	2	2	7	19	30	37%	7.682	230.449	12	25	8	45	60
6	WV-34 & Winfield Road	Winfield	0	1	2	6	14	23	39%	7.047	162.092	17	28	12	57	57
7	Prarie Lane & Stricklin Road	Hurricane	0	1	1	2	2	6	67%	15.427	92.561	33	14	18	65	56
7	Mount Vernon Road & Teays Valley Road	Hurricane	0	0	4	8	25	37	32%	4.710	174.252	10	44	11	65	68
9	Great Teays Boulevard & Teays Valley Road	Scott Depot	0	1	2	2	13	18	28%	6.703	120.656	22	30	14	66	61
10	Midland Trail & US-60	Hurricane	0	1	0	11	37	49	24%	4.111	201.447	4	53	10	67	54
10	Locust Street & Midland Trail	Hurricane	0	2	1	10	63	76	17%	3.785	287.681	2	58	7	67	65
12	Charleston Road & Coveside Place	Red House	0	1	1	0	3	5	40%	14.669	73.343	34	15	26	75	55
13	1st Avenue & 41st Street	Nitro	0	1	1	1	17	20	15%	4.873	97.452	20	42	17	79	30
14	Mount Vernon Road & WV-34	Hurricane	0	0	1	7	16	24	33%	4.327	103.858	16	48	16	80	61
15	E Main Street & Midland Trail	Hurricane	0	1	0	1	3	5	40%	13.271	66.357	34	18	32	84	56
16	Charleston Road & Sugar Maple Lane	Buffalo	0	1	0	1	11	13	15%	5.720	74.357	26	36	25	87	48
17	Old Hurricane Creek Road & Putnam Avenue	Hurricane	0	0	3	9	65	77	16%	2.692	207.266	1	79	9	89	69
18	Teays Valley Road & US-35	Scott Depot	0	0	2	6	31	39	21%	3.227	125.844	9	69	13	91	61
19	Main Street & US-60	Hurricane	0	0	1	5	11	17	35%	4.626	78.640	23	46	23	92	54
19	Teays Valley Road & Winfield Road	Scott Depot	0	0	2	5	27	34	21%	3.286	111.735	11	66	15	92	61

Rank	Intersection	Jurisdiction	Fatal	Serious Injury	Minor Injury	Possible Injury	No Injury	Total Crashes	Fatal & Injury %	EPDO Per Crash	EPDO Total	Crash Frequency Rank	EPDO Per Crash Rank	EPDO Total Rank	Composite Score	Equity Ranking
1	Parkway Road & US-119	South Charleston	3	2	2	10	22	39	44%	78.311	3054.133	36	23	1	60	27
2	Brounland Road & US-119	South Charleston	2	2	3	11	18	36	50%	59.645	2147.218	39	29	2	70	50
3	Maccorkle Avenue SE & US-119	Charleston	1	1	2	13	37	54	31%	21.962	1185.974	23	45	5	73	53
4	10th Street & Fletcher Square	Dunbar	1	4	1	5	39	50	22%	24.995	1249.751	27	43	4	74	10
5	Patrick Street & Patrick Street Plaza	Charleston	1	1	6	3	50	61	18%	19.119	1166.264	20	49	7	76	9
6	Southridge Boulevard & US-119	South Charleston	1	0	3	13	70	87	20%	13.596	1182.821	10	64	6	80	34
7	Goff Mountain Road & WV-62	Charleston	1	0	0	11	40	52	23%	20.795	1081.318	25	47	9	81	51
8	Lee Street E & Leon Sullivan Way	Charleston	1	0	1	8	28	38	26%	27.792	1056.086	37	39	10	86	1
8	Dunbar Toll Bridge & Maccorkle Avenue SW	South Charleston	1	0	0	7	33	41	20%	25.217	1033.882	34	41	11	86	22
10	Dunbar Avenue & Wilson Street	Dunbar	1	3	1	5	7	17	59%	68.500	1164.503	58	26	8	92	19
11	Maryland Avenue & Washington Street W	Charleston	1	0	1	5	23	30	23%	34.025	1020.759	45	37	12	94	3
12	Maccorkle Avenue & Richmond Street	Charleston	1	0	2	4	6	13	54%	77.750	1010.745	62	24	14	100	34
12	Gatewater Road & Goff Mountain Road	Saint Albans	1	0	1	5	15	22	32%	46.035	1012.759	53	34	13	100	34
14	Airport Road & Greenbrier Street	Charleston	1	0	1	4	17	23	26%	43.680	1004.650	52	35	15	102	7
15	26th Street W & 7th Avenue	Charleston	1	0	1	4	9	15	40%	66.443	996.650	60	27	17	104	9
15	Coonskin Drive & Greenbrier Street	Charleston	1	0	3	1	12	17	29%	59.030	1003.513	58	30	16	104	7
17	Sissonville Drive & Washington Street W	Charleston	1	0	1	3	16	21	24%	47.311	993.541	54	33	18	105	9
17	Jefferson Road & Maccorkle Avenue SW	South Charleston	1	0	2	25	117	145	19%	9.200	1334.034	2	100	3	105	11
19	Maccorkle Avenue SW & Riheldaffer Avenue	South Charleston	1	0	1	3	8	13	38%	75.811	985.541	62	25	20	107	2
20	Central Avenue & Russell Street	Charleston	1	0	1	2	4	8	50%	121.429	971.432	67	18	23	108	4
21	6th Street & Maccorkle Avenue	Saint Albans	1	0	1	2	11	15	27%	65.229	978.432	60	28	22	110	25
22	37th Street W & 7th Avenue	Charleston	1	0	0	3	7	11	36%	87.950	967.446	64	22	25	111	9
23	E Dupont Avenue & Witcher Creek Road	Belle	1	0	1	1	5	8	38%	120.290	962.323	67	19	26	112	12
24	7th Avenue & Rebecca Street	Charleston	1	0	0	2	7	10	30%	95.734	957.337	65	20	28	113	9
24	Maccorkle Avenue SW & Park Avenue	South Charleston	1	0	1	1	14	17	18%	57.137	971.323	58	31	24	113	11
26	Maccorkle Avenue & Pfaff Street	Saint Albans	1	0	0	1	3	5	40%	188.646	943.228	70	13	33	116	12
27	Country Club Boulevard & Spring Hill Avenue	South Charleston	1	0	0	0	4	5	20%	186.824	934.119	70	14	39	123	27
27	Rabel Road & Wolf Pen Lane	South Charleston	1	0	0	0	4	5	20%	186.824	934.119	70	14	39	123	50
27	Kanawha Boulevard E & Leon Sullivan Way	Charleston	1	0	0	0	9	10	10%	93.912	939.119	65	21	37	123	1
30	1st Avenue & Center Street	Nitro	0	5	3	20	48	76	37%	7.470	567.705	14	121	45	180	46

Census Tract	Percentage					Total Crashes	Fatal Crashes	Serious Injury	Bike and Ped Crashes	Equity Rank
	65 and Older	Disability	Zero Vehicle Household	Poverty	Minority					
Census Tract 9, Kanawha County, West Virginia	21	26.2	47.9	59.4	37.8	909	2	4	46	1
Census Tract 129, Kanawha County, West Virginia	21	25.6	25.2	21.8	22.5	592	2	9	12	2
Census Tract 8, Kanawha County, West Virginia	16.7	18.9	35.5	30.8	29.6	1064	2	7	36	3
Census Tract 7, Kanawha County, West Virginia	24.1	25.9	37.4	24.5	57.8	440	2	3	28	4
Census Tract 121, Kanawha County, West Virginia	22.4	25.3	16.9	26.6	10.9	196	5	5	6	5
Census Tract 12, Kanawha County, West Virginia	10.5	20.3	29.7	29.4	35.7	245	1	3	23	6
Census Tract 11, Kanawha County, West Virginia	14.4	22.4	25.2	31.9	25	528	1	2	13	7
Census Tract 122, Kanawha County, West Virginia	18.1	21.8	19.8	28.2	6.9	277	5	6	6	8
Census Tract 1, Kanawha County, West Virginia	11.5	14.7	6	46.6	41.1	316	5	6	10	9
Census Tract 102, Kanawha County, West Virginia	32.3	20.9	22.1	13.2	38	163	1	6	11	10
Census Tract 130.01, Kanawha County, West Virginia	30.9	27.5	9	21	12.2	774	2	6	8	11
Census Tract 118, Kanawha County, West Virginia	31.7	25.1	14.5	17.9	2.7	395	7	9	4	12
Census Tract 134, Kanawha County, West Virginia	19.7	18.1	16.2	37.6	17	185	2	1	5	12
Census Tract 13, Kanawha County, West Virginia	11.5	14.5	26.6	22.6	25.3	252	0	5	15	14
Census Tract 2, Kanawha County, West Virginia	18.2	14.1	5.9	28.7	26.2	113	1	8	2	15
Census Tract 138, Kanawha County, West Virginia	10.1	22.4	11.3	52.2	5.6	215	1	4	4	15
Census Tract 113.01, Kanawha County, West Virginia	20	22.2	11.9	16.2	2.5	194	4	7	1	17
Census Tract 6, Kanawha County, West Virginia	15.9	19.5	13.6	17.9	32	255	1	1	14	17
Census Tract 101, Kanawha County, West Virginia	20.5	15.9	9.1	11.9	26.5	461	2	7	10	19
Census Tract 5, Kanawha County, West Virginia	33	28.6	23.9	11.8	14.4	273	0	2	3	20
Census Tract 132, Kanawha County, West Virginia	15.2	18.4	6.5	16.2	10.3	291	5	11	4	21
Census Tract 131, Kanawha County, West Virginia	19.8	12.3	7.6	25.6	21.4	488	3	6	14	22
Census Tract 104, Kanawha County, West Virginia	14.3	16.4	10	24.2	47.6	205	0	1	2	23
Census Tract 128, Kanawha County, West Virginia	17.4	12.5	9.5	13.9	15.6	417	0	10	3	24
Census Tract 114.02, Kanawha County, West Virginia	15.9	26.8	9.2	13	0.9	185	5	4	4	25
Census Tract 136, Kanawha County, West Virginia	23.3	12.4	9	15.9	12.5	762	4	10	10	25
Census Tract 130.02, Kanawha County, West Virginia	21.9	15.8	6.1	11	20.9	502	1	9	0	27
Census Tract 123.02, Kanawha County, West Virginia	30.2	27.4	15	11	3.8	191	2	4	2	27
Census Tract 112, Kanawha County, West Virginia	28.3	16.9	12.1	19.4	1.1	151	3	6	0	29
Census Tract 205, Putnam County, West Virginia	16.7	16.9	9.7	23.4	2.4	507	3	5	4	30
Census Tract 17, Kanawha County, West Virginia	23.9	16.4	11.5	21.1	13.3	237	0	2	6	30
Census Tract 103, Kanawha County, West Virginia	23.2	31.6	5.3	16.1	23.6	107	0	1	3	32
Census Tract 111, Kanawha County, West Virginia	18.4	25.6	6.8	12.5	0.4	349	4	6	5	33
Census Tract 107.01, Kanawha County, West Virginia	17.7	14	12.2	11.1	12.3	427	2	6	5	34
Census Tract 108.03, Kanawha County, West Virginia	18.7	20.7	5.8	26.6	0.1	309	3	5	2	35
Census Tract 18, Kanawha County, West Virginia	25.8	16.7	6.2	22.3	15.8	98	1	1	8	36
Census Tract 106.01, Kanawha County, West Virginia	28.6	18.2	8	21.1	8.2	164	1	2	6	37
Census Tract 3, Kanawha County, West Virginia	11.5	18	13.5	27.4	4.3	119	0	0	4	38
Census Tract 135, Kanawha County, West Virginia	23	21.7	11.9	15.8	5.1	188	0	1	3	39
Census Tract 115, Kanawha County, West Virginia	27.4	23.3	7.4	9	18.8	192	0	1	5	40
Census Tract 109, Kanawha County, West Virginia	16.7	18.7	7.5	20.4	0	116	2	5	2	41
Census Tract 15, Kanawha County, West Virginia	20.3	11.5	5.8	10.6	18.1	806	0	9	23	42
Census Tract 110, Kanawha County, West Virginia	26.2	14.6	11	6.7	9.5	273	2	5	3	43
Census Tract 137.02, Kanawha County, West Virginia	15.1	16.2	4.1	22	7.8	252	0	5	4	43
Census Tract 108.04, Kanawha County, West Virginia	21.7	19.8	5.2	24	0.3	116	2	3	0	45

Census Tract	Percentage					Total Crashes	Fatal Crashes	Serious Injury	Bike and Ped Crashes	Equity Rank
	65 and Older	Disability	Zero Vehicle Household	Poverty	Minority					
Census Tract 106.02, Kanawha County, West Virginia	25.2	14.4	6.6	9.5	4.5	400	1	9	1	46
Census Tract 114.01, Kanawha County, West Virginia	12.6	17.1	7	9.4	12.2	135	1	1	3	47
Census Tract 202, Putnam County, West Virginia	18	15.7	3.2	15.1	8.3	261	3	3	0	48
Census Tract 113.02, Kanawha County, West Virginia	24.9	19.9	5.6	5.7	4.9	188	0	6	0	49
Census Tract 123.01, Kanawha County, West Virginia	14.7	13.3	1.8	8.5	7.6	667	9	10	7	50
Census Tract 105, Kanawha County, West Virginia	17.6	12.6	0	13.8	15.3	482	0	6	3	51
Census Tract 108.02, Kanawha County, West Virginia	22.3	12	8.7	11	2.9	144	3	5	1	52
Census Tract 21, Kanawha County, West Virginia	22.3	12.4	5.4	10.7	17	399	1	2	4	53
Census Tract 207, Putnam County, West Virginia	16.9	14.7	5.6	7	0.4	231	4	5	0	54
Census Tract 201, Putnam County, West Virginia	19.6	10	1.4	18.1	2.6	179	4	5	1	55
Census Tract 206.09, Putnam County, West Virginia	20.4	8.5	2.9	12.7	10.7	149	1	6	2	56
Census Tract 204, Putnam County, West Virginia	17.9	10	2.2	10.5	6	371	2	7	1	57
Census Tract 19.01, Kanawha County, West Virginia	20	14.3	4.1	2.8	12.6	287	1	2	4	58
Census Tract 20, Kanawha County, West Virginia	16	13	2.6	4.6	13.1	369	1	4	2	59
Census Tract 203, Putnam County, West Virginia	16.4	9.9	2.5	6.9	2	580	7	14	2	60
Census Tract 206.01, Putnam County, West Virginia	21.4	10.2	8.8	1.5	8.2	467	1	3	2	61
Census Tract 107.02, Kanawha County, West Virginia	20.4	13.2	3	6.6	5.1	193	1	6	1	62
Census Tract 206.04, Putnam County, West Virginia	23.2	9.4	4.7	14.5	8.8	178	1	0	1	63
Census Tract 19.02, Kanawha County, West Virginia	31.3	15	3.8	10.3	5.2	119	0	1	2	64
Census Tract 206.08, Putnam County, West Virginia	24.2	12.1	3.4	4.2	11	270	1	2	6	65
Census Tract 133, Kanawha County, West Virginia	23.6	13.2	3.6	3.9	8.4	53	0	1	0	66
Census Tract 137.01, Kanawha County, West Virginia	13.1	14	0	2.9	9.4	72	0	2	0	66
Census Tract 206.07, Putnam County, West Virginia	14.3	9.6	3.7	6.9	2	207	1	3	1	68
Census Tract 206.06, Putnam County, West Virginia	13.3	12.1	0.7	2.5	1.8	260	0	2	2	69

Stakeholder Meeting #3 Summary

May 2, 2023
WV Regional Technology Park
David K. Hendrickson Conference Center
Building 2000E, Room 1220
2000 Union Carbide Drive
South Charleston, WV 25303
1:30 PM-3:30 PM

Attendees:

- Dennis Strawn, Bike/Walk Advocate
- Taniua Hardy, Disability Rights of West Virginia (DRWV)
- Todd Dorcas, The Greater Kanawha Valley Foundation (TGKVF)
- C.W. Sigman, Kanawha County Office of Emergency Management
- Curt Zickafoose, Kanawha Valley Regional Transportation Authority (KVRTA)
- Sean Hill, Kanawha Valley Regional Transportation (KVRTA)
- Andy Backus, City of Charleston
- Kelsey Harrah, Regional Intergovernmental Council (RIC)
- Sam Richardson, Regional Intergovernmental Council (RIC)
- Jake Smith, Regional Intergovernmental Council (RIC)
- Erin Grushon, Burgess and Niple (B&N)
- Kendra Schenk, Burgess and Niple (B&N)

Welcome and Introductions

The meeting was opened with an introduction from Kelsey Harrah from the Regional Intergovernmental Council who gave a general overview of the goals associated with the Comprehensive Safety Action Plan (CSAP). This is the third and final meeting in the CSAP process.

Stakeholder Meetings #1 and #2 Recap and Goals for Meeting #3

Kendra Schenk from B&N reviewed the agenda, CSAP schedule, and the emphasis areas of focus in the plan. The vision and objective developed at the second meeting was also reviewed.

"Prioritizing safety on the transportation network for all people in Kanawha and Putnam Counties by cooperatively implementing enforcement, education, emergency medical services, and engineering solutions that eliminate fatalities and serious injuries."

The goal of this meeting is to identify strategies to address crashes within the four identified emphasis areas.

Branding

The draft logo was presented and comments were solicited. Comments included:

- Indication that the logo represents the RIC region
- Wheelchair vulnerable road user included in the logo
- Make the mountains look more representative of West Virginia.

Based on this feedback, the logo was revised and the following logo was developed.

Implementation Strategies

For each of the four strategies – Intersections, Pedestrians, Roadway Departure, and Speed and Aggressive Driving – crash statistics and potential strategies were presented.

Intersections

After reviewing crash trends and the strategies, the following feedback and comments were provided:

- There is concern about potential conflicts between curb extensions and truck turns. However, it was clarified that curb extensions would be installed after careful consideration for the roadway context. On roadways with heavy truck traffic, curb extensions may not be feasible.
- There was also concern about converting intersections to all-way stop-controlled intersections (four-way stop) because vehicles currently do not stop at these types of intersections now. If selected, this strategy will not lock an agency into a specific traffic control. Rather, the strategy will include general recommendations to consider alternative traffic control.
- There should be additional emphasis placed on compliance of traffic controls.
- The strategy regarding prohibition of right-turns on red was discussed. This strategy would be limited to areas like places with high pedestrian activity and near schools. In lieu of prohibiting right-turns on red, a sign saying “turning traffic yield to pedestrians” could be installed.

- A countermeasure to protect cyclists at intersections should be added to the list for consideration.
- Along Corridor G, there is an issue with "short signals" (very little all red time). An appropriate countermeasure is to implement adequate vehicular clearance intervals.

Pedestrians

Kendra shared key facts and trends and provided an overview of the difference between site-specific, systematic, and systemic approaches and explained the methodology for the systemic analysis that B&N conducted related to pedestrian safety in Kanawha and Putnam counties. A "risk score" was created for all roadway segments. The higher the score, the higher the potential for pedestrian crash. This score was based on the presence and level of risk (e.g., vehicular volumes, speed, pedestrian generators, etc.). Sidewalk data was not available for use in this analysis. Therefore, a roadway segment with a high risk score may have sidewalks which does provide a level of safety for pedestrians so they do not have to walk in the roadway.

Several of the countermeasures for pedestrian crashes were included and discussed in the intersection section. One comment was made about the short Walk and Flashing Don't Walk timings at several intersections around the area. The countermeasure which ensures adequate pedestrian clearance intervals should be considered.

Roadway Departure

The crash statistics and trends were shared, and the strategies were discussed. The following feedback and comments were provided:

- Widening the roadway pavement, to be included under the "improve shoulders" strategy should be considered.
- The raised pavement markers are very helpful along roadways in the region.
- Rumble strips are great for vehicles, but they can create a conflict for bicyclists. Providing breaks in the rumble strips at intervals along the corridor could help with this issue.

Speed and Aggressive Driving

After discussing the crash trends and key facts, the stakeholders had the following comments about the strategies presented:

- The automated enforcement is a great strategy but there is concern that it would not be publicly accepted and would require legislative action prior to implementation.
- Reducing speed limit through signing alone is not an effective solution. The roadway would need to be designed such that motorists perceive it is natural to drive at a slower speed (self-enforcing roadways).

At the conclusion of this discussion, stakeholders were provided dot stickers to indicate which of the countermeasures would be most effective in the RIC region and would like to see as potential strategies in the plan. The results of the exercise are as follows:

Intersections:

- Evaluate modifying traffic control (1)
- Lighting (4)
- Restrict right-turn on red (2)
- Improve driver awareness of intersections (1)
- Implement adequate vehicular clearance times (2)
- Improve access management (3)
- Guide motorists more effectively through complex intersections (0)
- Review left-turn phasing at intersections (0)
- Reduce crossing conflicts at intersections (2)
- Dedicated left and right-turn lanes at intersections (2)
- Provide offset left-turn lanes at intersections (0)
- Improve sight distance (3)
- Install backplates with reflective borders (0)
- Convert offset T-intersections to four-legged intersections (0)
- Realign intersection approaches to reduce or eliminate intersection skew (3)
- Improve crosswalk visibility (4)
- Leading pedestrian intervals (5)
- Curb extensions (0)
- Implement adequate Walk and Flashing Don't Walk timings (3)
- Construct pedestrian refuge islands (1)
- Conduct Road Safety Audits (2)

Pedestrians:

- Improved crosswalk visibility (5)
- Leading pedestrian interval (4)
- Medians and pedestrian refuge islands (2)
- Pedestrian Hybrid Beacons (1)
- Rectangular Rapid Flashing Beacon (1)
- Road Diet/Reconfigurations (2)
- Walkways (3)
- Restrict right-turn on red (1)
- Pedestrian safety zones (0)
- Install traffic calming measures (1)
- Curb extensions (1)
- Implement adequate Walk and Flashing Don't Walk Timings (8)

Roadway Departure:

- Roadside design improvement at curves (2)
- Enhanced delineation for horizontal curves (2)
- Rumble strips (2)
- Raised pavement markers (0)
- Median barriers (2)
- SafetyEdge^{PM} pavement edge treatment(2)

- Improve shoulders (5)
- Improved pavement friction (4)

Speed and Aggressive Driving:

- Review established speed limits (1)
- Self-enforcing speed management techniques (3)

Education & Enforcement:

- Improve driver compliance with traffic control devices (4)
- Automated enforcement (intersections) (6)
- Enforcement campaigns (pedestrians) (0)
- Improve pedestrian and motorist safety awareness and behavior (5)
- Automated enforcement (speed) (6)
- Increase penalties for repeat and excessive speeding offenders (4)
- High-visibility enforcement campaign (speed) (1)
- Outreach about the dangers of speed (6)

Wrap Up

As a final note, Kendra discussed the next steps for the CSAP. B&N will provide implementation actions aimed to meet the needs discussed over the course of the three stakeholder meetings. The plan will be proposed for approval by the Policy Board of the Regional Intergovernmental Council on June 8, 2023.

Regional Comprehensive Safety Action Plan

Stakeholder Meeting #3

May 2, 2023

Regional Intergovernmental Council

BURGESS & NIPLE
Engineers ■ Architects ■ Planners

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Agenda

- Welcome and Introductions
- Stakeholder Meeting #1 & #2 and Goals for Meeting #3
- Branding
- Strategies Discussion
  - Intersections
  - Pedestrians
  - Roadway Departure
  - Speed and Aggressive Driving
- Wrap Up and Next Steps

2

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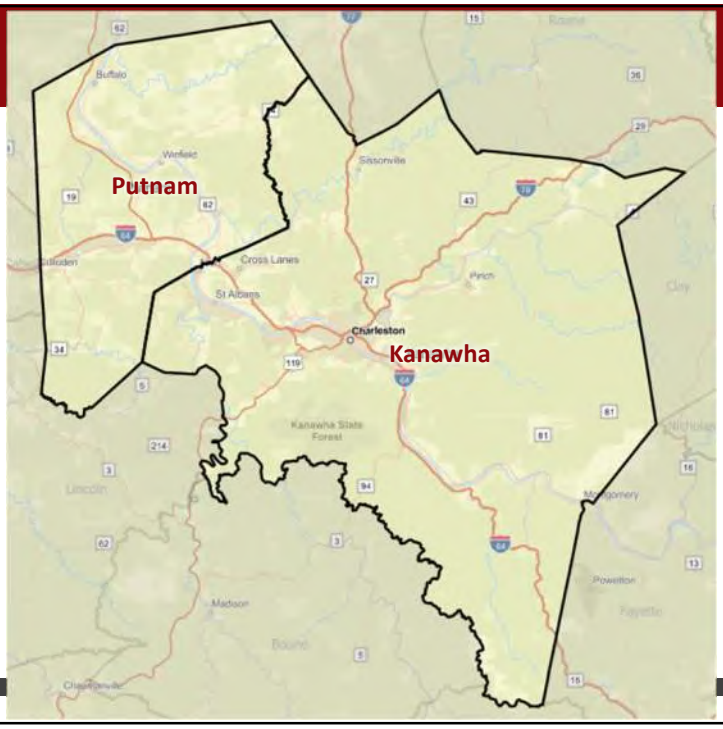
Study Area



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Steps of Safety Plan

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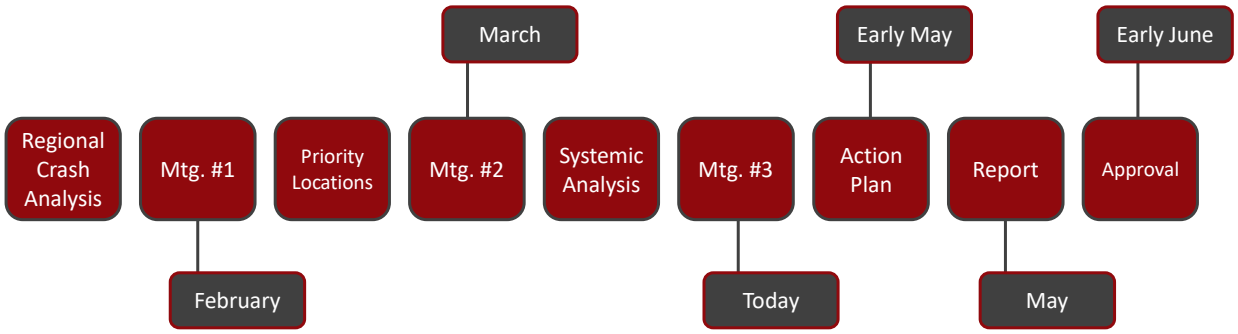
Plan Schedule



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What to Consider in the Plan

- Opportunities to **make roads safer – ZERO fatalities and serious injuries**
- Ensure we all take **personal responsibility**
- Address **speed**
- Reliable **post-crash care**
- **Innovations/Technology**
- Safety is **Equitable**
- Create a **Culture** of safety

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Emphasis Areas

Emphasis Area	Statewide FSI	Kanawha County FSI*	Kanawha County FSI (2017-2021)**	Putnam County FSI*	Putnam County FSI (2017-2021)**
Speed and Aggressive Driving	57%	55%	--	74%	--
Roadway Departure	55%	48%	46%	48%	55%
Occupant Protection	32%	28%	--	28%	--
Older Driver	22%	24%	13%	19%	16%
Alcohol and Drug Impaired	22%	19%	15%	19%	14%
Intersections	18%	24%	29%	16%	19%
Pedestrians	7%	13%	17%	3%	5%

* From 2016-2020 WVDOT SHSP
**Does not include interstate crashes

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Vision Statement

Prioritizing safety on the transportation network for all people in Kanawha and Putnam Counties by cooperatively implementing enforcement, education, emergency medical services, and engineering solutions that eliminate fatalities and serious injuries.

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Objective

Reduce fatalities and serious injuries by 25% in the next five years.

276 DAYS
in 2021 had
ZERO FATALITIES
OR SERIOUS INJURIES

In April 2021, there were
zero fatalities or **serious injuries** for
19 CONSECUTIVE DAYS

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Goals for Meeting #3

- Identify strategies for four emphasis areas

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Branding

Regional Intergovernmental Council

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Branding

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Strategies

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Sample Strategies

Table 3: Action Plan Strategy 1

Strategy 1: Retrofit existing streets and intersections to accommodate human mistakes and injury tolerances to reduce the severity of crashes that do occur and prevent future crashes

Action	Outcome	Lead Agency	Emphasis Areas Addressed			
			Intersections	Young Drivers	Vulnerable Road Users	Speed
1. In school zones and in high pedestrian areas, install no right turn on red and/or yield to pedestrian signage	Identify locations for signage	City of Hilliard – Division of Transportation & Mobility	X		X	
2. Implement proven safety countermeasures at traffic signals and crosswalks to reduce vehicle, bicycle, and pedestrian crashes, especially backplates, countdown pedestrian signal heads, leading pedestrian intervals, rapid flashing beacons, and high visibility crosswalks	Continue systemic and systematic application of countermeasures	City of Hilliard – Division of Transportation & Mobility	X	X	X	
3. Coordinate with COTA to re-evaluate bus layover locations related to mobility and safety concerns close to intersections	Coordination with COTA	City of Hilliard – Division of Transportation & Mobility	X			
4. Review left turn phasing at intersections, prioritizing high crash intersections	Identify locations where existing permissive/protected left turns should be converted to protected only	City of Hilliard – Division of Transportation & Mobility	X			

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Sample Strategies

EDUCATION STRATEGIES AND ACTIONS

Strategy 1: Conduct enforcement and public outreach at selected locations with a significant number of intersection crashes.

Timeline: 0-2 years

Leaders	Description	Performance Measure
Jurisdiction Engineers	Prioritize intersections for combined education and enforcement efforts. Overlay impaired driver, unbelted and young driver crash data on top 20 intersections to further prioritize and select locations.	Map overlays completed
Urbana Daily Citizen	Highlight major intersection safety concerns through media outlets to raise awareness and encourage behavioral changes.	# of media messages shared

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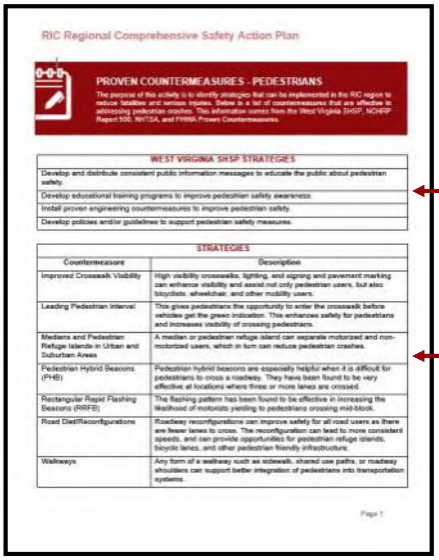
Strategies


RIC Regional Comprehensive Safety Action Plan

PROVEN COUNTERMEASURES - PEDESTRIANS

WEST VIRGINIA SHSP STRATEGIES

Develop and distribute consistent public information messages to educate the public about pedestrian safety.
Develop educational training programs to improve pedestrian safety awareness.
Install proven engineering countermeasures to improve pedestrian safety.
Develop policies and/or guidelines to support pedestrian safety measures.

STRATEGIES

Countermeasure	Description
Improved Crosswalk Visibility	High visibility crosswalks, lighting, and signing and pavement marking can enhance visibility and assist not only pedestrian users, but also bicyclists, wheelchair, and other mobility users.
Leading Pedestrian Interval	This gives pedestrians the opportunity to enter the crosswalk before vehicles get the green indication. This enhances safety for pedestrians and increases visibility of crossing pedestrians.
Medians and Pedestrian Refuge Islands in Urban and Suburban Areas	A median or pedestrian refuge island can separate motorized and non-motorized users, which in turn can reduce pedestrian crashes.
Pedestrian Hybrid Beacons (PHB)	Pedestrian hybrid beacons are especially helpful when it is difficult for pedestrians to cross a roadway. They have been found to be very effective at locations where three or more lanes are crossed.
Rectangular Rapid Flashing Beacons (RRFB)	The flashing pattern has been found to be effective in increasing the likelihood of motorists yielding to pedestrians crossing mid-block.
Road DietReconfigurations	Roadway reconfigurations can improve safety for all road users as there are fewer lanes to cross. The reconfiguration can lead to more consistent speeds, and can provide opportunities for pedestrian refuge islands, bicycle lanes, and other pedestrian friendly infrastructure.
Walkways	Any form of a walkway such as sidewalk, shared use paths, or roadway shoulders can support better integration of pedestrians into transportation systems.

Page 1

Strategies in WVDOT Strategic Highway Safety Plan

Strategies from other research and plans

Which strategies will be most effective in the RIC region?

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Dot Exercise

- Put a “dot” next to the strategy you think could be most effective in the region.
  - 5 “dots” per poster
  - You may double up dots if you believe that strategy is most important/effective

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Intersections

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Intersection Crash Details - Kanawha

Data Trends/Key Facts for FSI at Intersections		
Statewide*	Kanawha**	
77%	77%	occurred on a weekday (Monday - Friday)
56%	54%	were male
53%	59%	involved angle crashes
49%	43%	occurred at T-intersections
42%	40%	occurred between 2 PM and 7 PM
34%	21%	involved older drivers (65 years old and older)
15%	18%	occurred on wet roadways
12%	11%	occurred in dark/unlit conditions
6%	16%	involved pedestrians

* From 2016-2020 WVDOT SHSP
** From 2017-2021 Crash Analysis

Intersection Crash Details - Kanawha

- Other Notable Facts
  - **111 intersection fatal or serious injury crashes**
  - **131 fatal or serious injuries**
  - 27% (30 crashes) occurred on Friday
  - 22% (29 people) of the fatal and serious injuries involved passengers
  - 52% (68 people) of the fatal and serious injuries involved people between the ages of 20 and 49 (roughly 37% of the population)

Intersection Crash Details - Putnam

Data Trends/Key Facts for FSI at Intersections		
Statewide*	Putnam**	
77%	93%	occurred on a weekday (Monday - Friday)
56%	52%	were male
53%	60%	involved angle crashes
49%	53%	occurred at T-intersections
42%	40%	occurred between 2 PM and 7 PM
34%	19%	involved older drivers (65 years old and older)
15%	13%	occurred on wet roadways
12%	7%	occurred in dark/unlit conditions
6%	0%	involved pedestrians

* From 2016-2020 WVDOT SHSP
** From 2017-2021 Crash Analysis

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Intersection Crash Details - Putnam

- Other Notable Facts
  - **15 intersection fatal or serious injury crashes**
  - **21 fatal or serious injuries**
  - 40% (6 crashes) occurred on Wednesday
  - 87% (13 crashes) occurred between the months of April and July
  - 38% (8 people) of the fatal and serious injuries involved passengers

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Strategies

- Review strategy handouts
- Questions about strategies listed?
- Are there strategies we missed that could be effective in the RIC region?

Pedestrians

Pedestrian Crash Details - Kanawha

Data Trends/Key Facts for FSI Crashes involving Pedestrians		
Statewide*	Kanawha**	
65%	72%	were male
47%	42%	occurred on a Tuesday, Wednesday, or Thursday
41%	41%	were ages 20 to 39
40%	41%	occurred between 5 PM and 10 PM
35%	34%	occurred in dark/unlit conditions
31%	29%	involved alcohol or drug impairment (driver or ped)
17%	24%	occurred at an intersection

* From 2016-2020 WVDOT SHSP
** From 2017-2021 Crash Analysis

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Pedestrian Crash Details - Kanawha

- Other Notable Facts
  - **76 pedestrian fatal or serious injury crashes**
  - **81 fatal or serious injuries**
  - 21% (16 crashes) occurred between 1 AM and 7 AM
  - 28% (21 crashes) occurred in December and January
  - 70% (53 crashes) occurred under dark, dawn, or dusk conditions

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Pedestrian Crash Details - Putnam

Data Trends/Key Facts for FSI Crashes involving Pedestrians		
Statewide*	Putnam**	
65%	43%	were male
47%	33%	occurred on a Tuesday, Wednesday, or Thursday
41%	43%	were ages 20 to 39
40%	17%	occurred between 5 PM and 10 PM
35%	50%	occurred in dark/unlit conditions
31%	17%	involved alcohol or drug impairment (driver or ped)
17%	0%	occurred at an intersection

* From 2016-2020 WVDOT SHSP
** From 2017-2021 Crash Analysis

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Pedestrian Crash Details - Putnam

- Other Notable Facts
  - **6 pedestrian fatal or serious injury crashes**
  - **7 fatal or serious injuries**
  - 67% (4 crashes) occurred under dark conditions (1 lighted, 3 not lighted)

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Systemic Analysis

- **Site-Specific Approach**
  - Deploy improvements at locations with the highest crash frequency (hotspots)
    - *Install a roundabout at an intersection with high frequency of severe crashes*
- **Systematic Approach**
  - Deploy countermeasures on an entire system
    - *Install edgeline markings on all paved roads*
- **Systemic Approach**
  - Deploy cost-effective countermeasures at locations with the greatest risk
    - *Install chevrons and enhanced pavement markings at curves with radii between 500 and 1000 feet*

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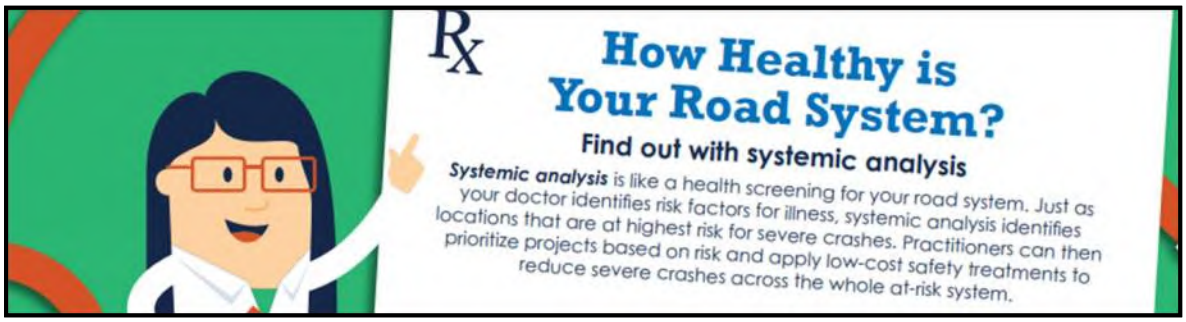
Systemic Analysis



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Systemic Analysis – Pedestrian Crashes

- Risk Factors Identified for Pedestrian Crashes
  - Vehicular volume
  - Number of vehicle lanes
  - Free-flow speed
  - Heavy vehicle percentage

← Presence of vehicles

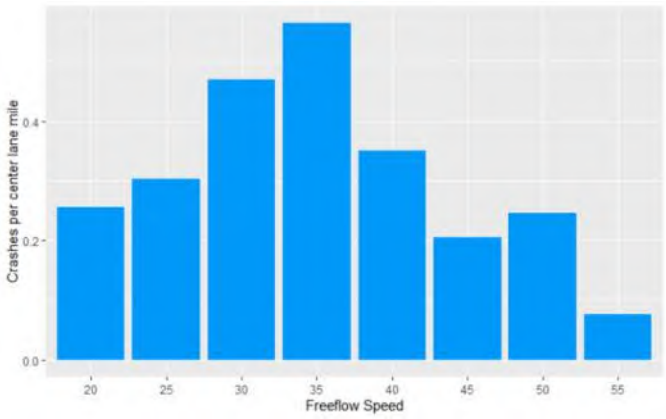
Presence of pedestrians ↓

  - Population density
  - Presence of bus stops
  - Presence of public attractions
    - Parks, recreational activity centers, etc.
  - Presence of schools
  - Presence of businesses
    - Liquor stores, child daycare, bars, gas stations, grocery stores, restaurants, etc.

Systemic Analysis – Pedestrian Crashes

- Assigned “scores” to the risk factors

Speed	Score
20 mph	3/8
25 mph	5/8
30 mph	7/8
35 mph	**8/8**
40 mph	6/8
45 mph	2/8
50 mph	4/8
55 mph	1/8



Systemic Analysis – Pedestrian Crashes

- Added the risk factor scores in two "categories"
  - Road Network Scores
  - Pedestrian Volume Scores
- Pedestrian Risk Score
  - Higher Pedestrian Risk Score = More Potential for Pedestrian Crash

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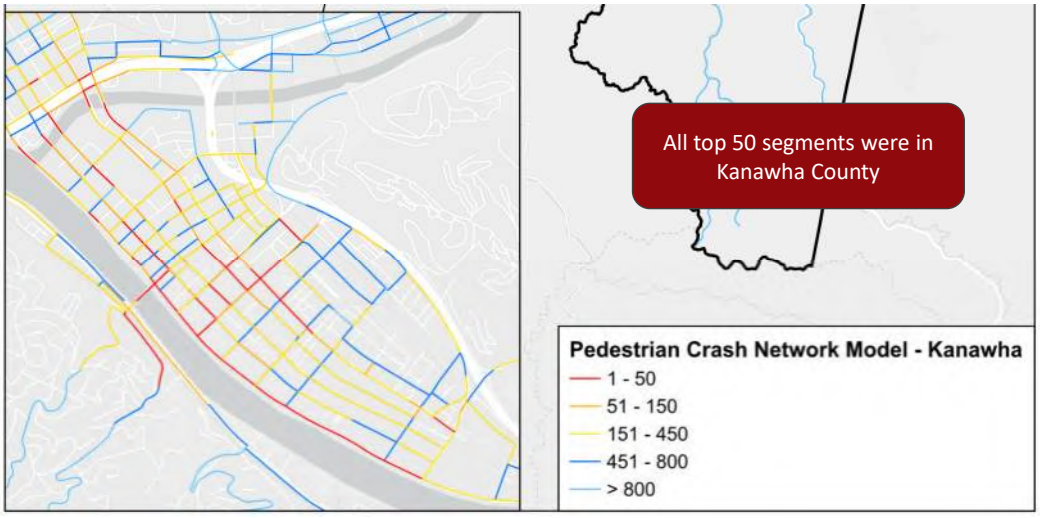
Systemic Analysis – Pedestrian Crashes



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Strategies

- Review strategy handouts
- Questions about strategies listed?
- Are there strategies we missed that could be effective in the RIC region?

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Roadway Departure

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Roadway Departure Crash Details - Kanawha

Data Trends/Key Facts for Roadway Departure FSI Crashes		
Statewide*	Kanawha**	
64%	62%	were male
48%	47%	occurred on a Friday, Saturday, or Sunday
41%	42%	were ages 20 to 39
30%	33%	occurred in dark/unlit conditions
26%	16%	involved impaired driving
26%	17%	occurred between 2 PM and 6 PM
19%	21%	occurred on wet roadways

* From 2016-2020 WVDOT SHSP
** From 2017-2021 Crash Analysis

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Roadway Departure Crash Details - Kanawha

- Other Notable Facts
  - **159 roadway departure fatal or serious injury crashes**
  - **205 fatal or serious injuries**
  - 28% (44 crashes) occurred between 10 PM and 7 AM
  - 56% (89 crashes) involved striking a fixed object
  - 30% (48 crashes) involved a head-on collision
  - 63% (130 people) of the fatal and serious injuries represented "Driver of Vehicle 1"
  - 22% (46 people) of the fatal and serious injuries were passengers

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Roadway Departure Crash Details - Putnam

Data Trends/Key Facts for Roadway Departure FSI Crashes		
Statewide*	Putnam**	
64%	70%	were male
48%	43%	occurred on a Friday, Saturday, or Sunday
41%	33%	were ages 20 to 39
30%	41%	occurred in dark/unlit conditions
26%	17%	involved impaired driving
26%	20%	occurred between 2 PM and 6 PM
19%	19%	occurred on wet roadways

* From 2016-2020 WVDOT SHSP
** From 2017-2021 Crash Analysis

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Roadway Departure Crash Details - Putnam

- Other Notable Facts
  - **53 roadway departure fatal or serious injury crashes**
  - **61 fatal or serious injuries**
  - 31% (17 crashes) occurred between 10 PM and 7 AM
  - 57% (30 crashes) involved striking a fixed object
  - 23% (12 crashes) involved an overturn/rollover
  - 67% (41 people) of the fatal and serious injuries represented "Driver of Vehicle 1"
  - 20% (12 people) of the fatal and serious injuries were passengers
  - 21% (13 people) of the fatal and serious injuries were between ages 15 and 21

40

40

Strategies

- Review strategy handouts
- Questions about strategies listed?
- Are there strategies we missed that could be effective in the RIC region?

41

41

Speed and Aggressive Driving

42

42

Speed & Aggressive Driving Crash Details - Kanawha

Data Trends/Key Facts for Speed and Aggressive Driving FSI Crashes		
Statewide*	Kanawha**	
62%	48%	were roadway departure crashes
62%	55%	were male
40%	40%	were ages 20 to 39
36%	27%	occurred between 2 PM and 6 PM
33%	37%	occurred on Thursday or Friday
25%	24%	occurred in dark/unlit conditions
24%	10%	involved impaired driving
19%	20%	occurred on wet roadways

* From 2016-2020 WVDOT SHSP
** From 2017-2020 Crash Analysis

43

43

Speed & Aggressive Driving Crash Details - Kanawha

- Other Notable Facts
  - **211 speed and aggressive driving fatal or serious injury crashes**
  - **262 fatal or serious injuries**
  - 23% (49 crashes) occurred between 10 PM and 7 AM
  - 31% (66 crashes) were angle collisions
  - 23% (60 people) of the fatal and serious injuries involved passengers

44

44

Speed & Aggressive Driving Crash Details - Putnam

Data Trends/Key Facts for Speed and Aggressive Driving FSI Crashes		
Statewide*	Putnam**	
62%	61%	were roadway departure crashes
62%	60%	were male
40%	33%	were ages 20 to 39
36%	31%	occurred between 2 PM and 6 PM
33%	31%	occurred on Thursday or Friday
25%	26%	occurred in dark/unlit conditions
24%	7%	involved impaired driving
19%	21%	occurred on wet roadways

* From 2016-2020 WVDOT SHSP
** From 2017-2020 Crash Analysis

45

45

Speed & Aggressive Driving Crash Details - Putnam

- Other Notable Facts
  - **61 speed and aggressive driving fatal or serious injury crashes**
  - **73 fatal or serious injuries**
  - 16% (10 crashes) occurred between 10 PM and 7 AM
  - 26% (16 crashes) were angle collisions
  - 30% (22 people) of the fatal and serious injuries involved passengers

46

46

Strategies

- Review strategy handouts
- Questions about strategies listed?
- Are there strategies we missed that could be effective in the RIC region?

47

47

Dot Exercise

48

48

Dot Exercise

- Put a “dot” next to the strategy you think could be most effective in the region.
  - 5 “dots” per poster
  - You may double up dots if you believe that strategy is most important/effective

49

49

Next Steps

50

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Next Steps

- Implementation Plan
- Report Document

BOARD APPROVAL – JUNE 8TH

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PROVEN COUNTERMEASURES - INTERSECTIONS

The purpose of this activity is to identify strategies that can be implemented in the RIC region to reduce fatalities and serious injuries. Below is a list of countermeasures that are effective in addressing intersection crashes. This information comes from the West Virginia SHSP, NCHRP Report 500, NHTSA, and FHWA Proven Countermeasures.

WEST VIRGINIA SHSP STRATEGIES
Implement high-visibility enforcement initiatives at locations identified as having intersection crash rates higher than the statewide average.
Explore the viability of implementing an automated red-light running enforcement program.
Develop and distribute consistent public information messaging to educate the public on traffic laws, new traffic control devices, and intersection safety.
Reduce the frequency and severity of intersection crashes through operational, geometric, and traffic control device improvements.
Implement policies and guidelines targeting safety improvements at intersections.

STRATEGIES	
Countermeasure	**Description**
Modify Traffic Control at Intersections	Will likely require a warrant and traffic analyses. Could include converting an intersection to all-way stop control, traffic signal, roundabout, or other alternative intersection configuration. There should be consideration to the impacts of these improvements (i.e., increased rear end crashes at signalized intersections)
Intersection Lighting	Intersection lighting can improve visibility and can reduce crashes that are attributed to dark conditions such as right-angle, left-turn, and rear-end crashes.
Restrict Right-Turn on Red	Restricting right-turn on red can be beneficial in mitigating vehicular crashes when sight distance is limited or obstructed for turning traffic. Similarly, in areas highly trafficked by pedestrians, restricting right-turn on red decreases the likelihood of pedestrian-vehicle crashes occurring.
Improve Driver Awareness of Intersections	Some intersection-related collisions occur because one or more drivers approaching an intersection are unaware of the intersection until it is too late to avoid a collision. The implementation of intersection ahead warning signs, stop ahead signs, flashing warning beacons, and supplemental signal heads can increase driver awareness and recognition of intersections and potential conflicts with pedestrians or other motorists. Speed reduction measures upon approach are also proven to enhance awareness of an upcoming intersection.

Countermeasure	Description
Improve Driver Compliance with Traffic Control Devices	Some crashes are caused by noncompliance with traffic control devices or traffic laws at intersections. Enforcement, and in some cases education, have been shown to be effective measures in reducing traffic-law violations and, consequently, improving safety at intersections.
Implement Adequate Vehicular Clearance Intervals	Inappropriate Yellow or All-Red clearance intervals can lead to red light running, angle crashes, and rear end crashes.
Improve Access Management	Reducing and/or avoiding access points near an intersection enhances safety. Additionally, consideration for the number of signals in a one-mile stretch influences safety performance.
Guide Motorists More Effectively Through Complex Intersections	As drivers approach and traverse through complex intersections, drivers may be required to perform unusual or unexpected maneuvers. Providing more effective guidance, through infrastructure treatments (e.g., improved striping, modified signage, etc.) or education could reduce potential conflicts.
Review Left-Turn Phasing at Intersections	Reducing left-turn conflicts can simplify decision-making for drivers and minimize the potential for higher severity crash types. Solutions include protected left-turn phasing, permissive/protected or protected/permissive phasing, or flashing yellow arrows (FYA).
Reduce Crossing Conflicts at Intersections	Solutions include implementing a restricted crossing U-turn (RCUT) or Median U-turns that modify the direct left-turn and reduce the number of conflicts at intersections. Roundabouts also reduce conflict points.
Dedicated Left and Right-Turn Lanes at Intersections	Creating a physical separation between turning traffic and through traffic can provide safety and operational benefits at intersections.
Provide Offset Left-Turn Lanes at Intersections	A potential problem in installing left-turn lanes at intersections is that vehicles in opposing turn lanes on the major road may block drivers' views of approaching traffic. This can lead to collisions between vehicles turning left from the major road and through vehicles on the opposing major-road approach. To reduce the potential for crashes of this type, the left-turn lanes can be offset by moving them laterally so that vehicles in opposing lanes no longer obstruct the opposing driver.
Improve Sight Distance	Some collisions occur because of limited sight distance for drivers approaching or stopped at an intersection. Strategies that minimize the possibility of crashes related to sight obstruction have been tried and proven and should be identified at priority locations, as needed.
Install Back Plates with Retroreflective Borders	Backplates that are added to a traffic signal head can improve visibility of a signal head. This can help with signal visibility and is also advantageous during power outages when a signal would be dark, providing a cue for motorists to stop at the intersection ahead.
Automated Enforcement	Automated enforcement systems that address red-light running have been proven extremely effective at reducing rear end crashes at intersections as well as right angle crashes at intersections with red light cameras.

Countermeasure	Description
Convert Offset T-Intersections to Four-Legged Intersections	It is expected that this strategy would reduce crashes involving left-turning traffic from the major road onto the cross street at each of the two T-intersections. It can reduce or eliminate safety problems associated with insufficient spacing between existing offset T-intersections.
Realign Intersection Approaches to Reduce or Eliminate Intersection Skew	The strategy is targeted to reduce the frequency of collisions resulting from insufficient intersection sight distance and awkward sight lines at a skewed intersection.
Improve Crosswalk Visibility	High visibility crosswalks, lighting, and signing and pavement marking can enhance visibility and assist not only pedestrian users, but also bicyclists, wheelchair, and other mobility users.
Leading Pedestrian Interval	This gives pedestrians the opportunity to enter the crosswalk before vehicles get the green indication. This enhances safety for pedestrians and increases visibility of crossing pedestrians.
Curb Extensions	Extensions of the curb at intersections increase pedestrian visibility and reduce the crossing distance for pedestrians.
Implement Adequate Walk and Flashing Don't Walk Timings	The Walk and Flashing Don't Walk phases should be based on average walking speeds.
Construct Pedestrian Refuge Islands in Medians at Intersections	For wide intersections, it may be beneficial to construct median refuge islands so that pedestrians do not have to cross all lanes of the intersection in one pass.
Conduct Road Safety Audits (RSAs) At Intersections	RSAs are performed by a multidisciplinary team, consider all road users, account for human factors and road user capabilities, are documented in a formal report with the goal of identifying crash contributing factors and improvements to improve safety at the subject location.

PROVEN COUNTERMEASURES - PEDESTRIANS

The purpose of this activity is to identify strategies that can be implemented in the RIC region to reduce fatalities and serious injuries. Below is a list of countermeasures that are effective in addressing pedestrian crashes. This information comes from the West Virginia SHSP, NCHRP Report 500, NHTSA, and FHWA Proven Countermeasures.

WEST VIRGINIA SHSP STRATEGIES
Develop and distribute consistent public information messages to educate the public about pedestrian safety.
Develop educational training programs to improve pedestrian safety awareness.
Install proven engineering countermeasures to improve pedestrian safety.
Develop policies and/or guidelines to support pedestrian safety measures.

STRATEGIES	
Countermeasure	**Description**
Improved Crosswalk Visibility	High visibility crosswalks, lighting, and signing and pavement marking can enhance visibility and assist not only pedestrian users, but also bicyclists, wheelchair, and other mobility users.
Leading Pedestrian Interval	This gives pedestrians the opportunity to enter the crosswalk before vehicles get the green indication. This enhances safety for pedestrians and increases visibility of crossing pedestrians.
Medians and Pedestrian Refuge Islands in Urban and Suburban Areas	A median or pedestrian refuge island can separate motorized and non-motorized users, which in turn can reduce pedestrian crashes.
Pedestrian Hybrid Beacons (PHB)	Pedestrian hybrid beacons are especially helpful when it is difficult for pedestrians to cross a roadway. They have been found to be very effective at locations where three or more lanes are crossed.
Rectangular Rapid Flashing Beacons (RRFB)	The flashing pattern has been found to be effective in increasing the likelihood of motorists yielding to pedestrians crossing mid-block.
Road Diet/Reconfigurations	Roadway reconfigurations can improve safety for all road users as there are fewer lanes to cross. The reconfiguration can lead to more consistent speeds, and can provide opportunities for pedestrian refuge islands, bicycle lanes, and other pedestrian friendly infrastructure.
Walkways	Any form of a walkway such as sidewalk, shared use paths, or roadway shoulders can support better integration of pedestrians into transportation systems.

Countermeasure	Description
Restrict Right-Turn on Red	Restricting right-turn on red can be beneficial in mitigating vehicular crashes when sight distance is limited or obstructed for turning traffic. Similarly, in areas highly trafficked by pedestrians, restricting right-turn on red decreases the likelihood of pedestrian-vehicle crashes occurring.
Pedestrian Safety Zones	Properly designed and implemented pedestrian zone programs have been effective in reducing crashes and injuries. This includes identifying a high crash zone areas then implementing a pedestrian safety zone that targets education, enforcement, and engineering measures within that area.
Install Traffic Calming Measures	Traffic calming measures tend to reduce vehicles speeds, use self-enforcing physical signage, therefore supporting pedestrian safety.
Curb Extensions	Extensions of the curb at intersections increase pedestrian visibility and reduce the crossing distance for pedestrians.
Implement Adequate Walk and Flashing Don't Walk Timings	The Walk and Flashing Don't Walk phases should be based on average walking speeds.
Enforcement Campaigns	This strategy is primarily directed at motorists who fail to give pedestrians proper right-of-way at crosswalks. It also targets some of the most serious risk-taking traffic violations by pedestrians (e.g., jaywalking)
Improve Pedestrian & Motorist Safety Awareness and Behavior	Targeted campaigns coupled with improving signage, and other roadway configurations can support pedestrian safety.

PROVEN COUNTERMEASURES – ROADWAY DEPARTURE

The purpose of this activity is to identify strategies that can be implemented in the RIC region to reduce fatalities and serious injuries. Below is a list of countermeasures that are effective in addressing roadway departure crashes. This information comes from the West Virginia SHSP, NCHRP Report 500, NHTSA, and FHWA Proven Countermeasures.

WEST VIRGINIA SHSP STRATEGIES
Implement proven engineering countermeasures to reduce the likelihood of vehicles leaving a travel lane.
Implement proven engineering countermeasures to improve the roadside environment, minimizing the consequences of leaving the roadway.
Develop and distribute consistent public information regarding implementation of new engineering treatments.
Improve incident management and response to incidents by improving data sharing and enhancing incident management training to improve incident clearance times and reduce the likelihood of secondary incidents.

STRATEGIES	
Countermeasure	**Description**
Roadside Design Improvement at Curves	Roadside design improvements can be implemented alone or in combination and are particularly recommended at horizontal curves to prevent roadway departure fatalities. Possible treatments are wider clear zones, slope flattening, adding/widening shoulders, cable barrier, guardrail, and concrete barrier.
Enhanced Delineation for Horizonal Curves	Enhanced delineation treatments such as warning signage, reflectors, or delineators (mounted on flexible posts or in web of guardrail), lighting, raised pavement markers, chevron signs, and wider edgeline markings can alert drivers in advance of the curve and high friction surface treatments can prevent slips to prevent roadway departure fatalities.
Rumble Strips	Longitudinal rumble strips are milled or raised elements on the pavement intended to alert drivers through vibration and sound that their vehicles have left the travel lane. Rumble strips are edgeline or center line rumble strips where the pavement marking is placed over the rumble strip, which can also prevent roadway departure crashes.
Raised Pavement Markers	This is a helpful tool to provide additional guidance to motorists around curves and reduces head-on collisions.

Countermeasure	Description
Median Barriers	Median barriers are longitudinal barriers that separate opposing traffic on a divided highway and are designed to redirect vehicles striking either side of the barrier. Median barriers significantly reduce the severity of cross-median roadway departure crashes. Median barriers can be **cable, concrete,** or **beam guardrail.**
SafetyEdge	SafetyEdge technology shapes the edge of the pavement at approximately 30 degrees from the pavement cross slope during the paving process. This systemic safety treatment eliminates the vertical drop-off at the pavement edge, allowing drifting vehicles to return to the pavement safely.
Improve Shoulders	Widening and/or paving shoulders can keep vehicles from encroaching on the roadside.
Improved Pavement Friction	Treatments like High-Friction Surface Treatments can be used to increase friction to prevent roadway departures, especially in horizontal curves.

PROVEN COUNTERMEASURES – SPEED AND AGGRESSIVE DRIVING

The purpose of this activity is to identify strategies that can be implemented in the RIC region to reduce fatalities and serious injuries. Below is a list of countermeasures that are effective in addressing speed and aggressive driving crashes. This information comes from the West Virginia SHSP, NCHRP Report 500, NHTSA, and FHWA Proven Countermeasures.

WEST VIRGINIA SHSP STRATEGIES
Conduct effective speeding and aggressive driving enforcement activities.
Explore the viability of implementing an automated speed enforcement program.
Develop and distribute consistent public information messages to increase public awareness of the consequences of speeding and aggressive driving.
Implement proven engineering countermeasures to effectively manage speeds.

STRATEGIES	
Countermeasure	**Description**
Review Established Speed Limits	Well established speed limits based on the use of appropriate engineering practices form the basis for roadway design and operations. Reviewing those corridors that have higher than average speeds to possibly reduce speed limits can support this countermeasure. Active enforcement and considering corridor context when establishing speed limits is important.
Automated Enforcement	Automated speed enforcement and red-light camera systems could be used as a component of a broader traffic safety and speed management program supported by a demonstrated need through problem identification. These systems should be used to support traditional enforcement efforts or be deployed in locations where speed feedback signs may be unsafe or impractical.
Self-Enforcing Speed Management Techniques	Narrowing lanes, roundabouts, red-light cameras, medians, curb bump outs, and other techniques keeps the driver engaged and is a tried-and-true countermeasure.
Increase Penalties for Repeat and Excessive Speeding Offenders	Increasing fines can lead people to becoming more conscious in speed-prone areas and can influence driver behavior.
High-Visibility Enforcement Campaign	High-visibility enforcement campaigns have been used to deter speeding and aggressive driving. The objective is to convince the public that speeding and aggressive driving actions are likely to be detected and that offenders will be punished.
Outreach About the Dangers of Speeding	The objective of this education campaign is to provide the public with information about the dangers of speeding.

RIC REGION – SUCESSESS AND CHALLENGES

At the first stakeholder meeting, we identified the current successes and challenges within the RIC region related to traffic safety. As countermeasures are identified, consider how the current successes could continue or be built upon and how challenges may be overcome through strategies that are specific to the RIC region.

Successes:

- The process of improving sidewalks and replacing large quantities of curb ramps to bring them up to standard is currently underway.
- The Putnam County Sheriff's Department stated how after repetitive crashes were occurring in the same location within a work zone at the same time during the morning peak, they stationed a deputy at that location every morning. This resulted in their observed problems being nearly eliminated. While the officers did not enforce any traffic violations, the presence of the police cruiser slowed traffic and encouraged better driver behaviors.
- There have been crash reductions and reduced traffic congestion by the use of variable message boards along highways to give drivers advanced warning.
- There has been discussion involving reducing the number of lanes for some local streets in Charleston that lead to the freeway due to high speeds of traffic.
- Coordination from the 911 center, Police, and DOH has also been greatly improved. Once a crash occurs, coordination is nearly immediate and variable message boards and the WV511 application are updated to let travelers know of the crash and to use detours if possible.
- The WVDOH has prioritized restriping of roadways and adding additional, wider striping in sharp curves. They have also been pushing to add arrow signs to curves, especially in high crash areas.
- The Regional Intergovernmental Council has performed 10 Road Safety Assessments at high crash locations in the last two years.
- As a result of the WVDOT Strategic Highway Safety Plan, stakeholder meetings will be conducted across the state to combat speeding and aggressive driving. Regionally, stakeholders will be convened for pedestrian and intersection crashes.
- WVDOT is working to improving access to and the quality of crash data with rollouts of the new platform in the coming months.

Challenges:

- One of the biggest challenges is the multi-jurisdictional overlaps on roadways. For example, it can be unclear who maintains roadways. This confusion could result in delays in improving the roadways.
- Law enforcement lacks the funding to always enforce all laws in all areas.
- In several areas where speed is a known issue, there is not enough shoulder to safety pull over vehicles.
- Some roadways lack appropriate visibility – either from overgrown vegetation or lack of lighting or signage.
- Driver's education is currently difficult to get into as part of the public education system. Many students are required to find a third-party education company which is an added cost.
- There is needed guidance to implement in traffic calming practices during design phases of new projects.
- Rural areas also occasionally experience delays in EMS response. This issue could be mitigated by placing designated helipads in these rural areas to improve response time.
- With the push of electric and autonomous vehicles, there are issues with infrastructure and connectivity in regions. Even without "smart" infrastructure, lawmakers have already legalized the use of autonomous vehicles in West Virginia.
- Vehicles, especially electric vehicles are much heavier than traditional vehicles, which can lead to more fatalities in crashes involving them. Increased vehicle size (i.e., pick-up trucks, more SUVs, etc.) are also issues in the region.

Rank	Road Name	Segment	Crashes	County
1	Kanawha Blvd E	Brooks St to Morris St	1	Kanawha
2	Washington St E	Sentz St to Brooks St	1	Kanawha
3	Brooks St	Washington St E to Lewis St	2	Kanawha
4	Virginia St E	Leon Sullivan Way to Brooks St	0	Kanawha
5	State Route 61	41st St SE to 45th St SE	2	Kanawha
6	Lee St E	Leon Sullivan Way to Brooks St	1	Kanawha
7	Quarrier St	Leon Sullivan Way to Brooks St	0	Kanawha
8	Washington St E	Morris St to Bradford St	5	Kanawha
9	Washington St E	Brooks St to Morris St	3	Kanawha
10	S Side Brg	Loudon Heights Rd to Ferry St	0	Kanawha
11	S Side Brg	S Side Bridge - Kanawha Blvd E to Virginia St E	0	Kanawha
12	Kanawha Blvd E	Elizabeth St to Greenbrier St	0	Kanawha
13	Washington St E	Sidney Ave to Greenbrier St	5	Kanawha
14	Brooks St	Lee St E to Washington St E	1	Kanawha
15	Morris St	Washington St E	2	Kanawha
16	State Route 61	45th St SE to 50th St SE	2	Kanawha
17	Kanawha Blvd E	Morris St to Bradford St	2	Kanawha
18	Virginia St W	Virginia St Bridge	0	Kanawha
19	Kanawha Blvd W	Kanawha Blvd Bridge	0	Kanawha
20	Kanawha Blvd E	Bradford St to Ruffner Ave	3	Kanawha
21	Brooks St	Kanawha Blvd E to Virginia St E	0	Kanawha
22	Kanawha Blvd E	Ruffner Ave to Elizabeth St	2	Kanawha
23	6th Ave	8th St to Washington St	0	Kanawha
24	Loudon Heights Rd	S Side Bridge to Roller Rd	0	Kanawha
25	Washington St E	Bradford St to Shelton Ave	3	Kanawha
26	Lee St E	Dickinson St to Leon Sullivan Way	1	Kanawha
27	Quarrier St	Clendenin St to Truslow St	0	Kanawha
28	Randolph St	Randolph St Bridge	0	Kanawha
29	Lee St Brg	Lee St Bridge	2	Kanawha
30	Smith St	Leon Sullivan Way to Brooks St	1	Kanawha
31	State Route 61	36th St SE to 38th St SE	1	Kanawha
32	Maccorkle Ave	Ford St to Jefferson Rd	3	Kanawha
33	State Route 61	52nd St SE to 56th St SE	2	Kanawha
34	US Route 119	Pennsylvania Ave S - Lee St W to Washington St W	0	Kanawha
35	Tennessee Ave	Randolph St to Wyoming St	1	Kanawha
36	Washington St E	Washington St Bridge to Clendenin St	1	Kanawha
37	Lee St E	Laidley St to Summers St	2	Kanawha
38	Virginia St E	Capitol St to Hale St	0	Kanawha
39	Kanawha Blvd E	Truslow St to Goshorn St	2	Kanawha
40	US Route 119	Lee St E to Washington St E	5	Kanawha
41	Broad St	Lee St E to Washington St E	3	Kanawha
42	Virginia St E	Summers St to Capitol St	0	Kanawha
43	Kanawha Blvd E	McFarland St to Dunbar St	0	Kanawha
44	Virginia St E	Hale St to Dickinson St	0	Kanawha
45	Virginia St E	Court St to Laidley St	2	Kanawha
45	Virginia St E	Laidley St to Summers St	1	Kanawha
47	Kanawha Blvd E	Leon Sullivan Way to Brooks St	0	Kanawha
48	Kanawha Blvd E	Dunbar St to Leon Sullivan Way	0	Kanawha
49	Kanawha Blvd E	Hale St to McFarland St	1	Kanawha
50	Kanawha Blvd E	Summers St to Capitol St	1	Kanawha

Rank	County Rank	Road Name	Segment	County	Crashes
70	1	Main St	Hale St to Midland Trl	Putnam	2
121	2	State Route 34	Mount Vernon Rd to Grille Ln	Putnam	1
140	3	State Route 34	Grille Ln to I-64	Putnam	0
151	4	County Route 19	I-64 Underpass	Putnam	0
242	5	State Route 25	19th St to 23rd St	Putnam	0
247	6	State Route 34	I-64 Underpass	Putnam	0
257	7	Hurricane Creek Rd	I-64 to Old Hurricane Creek Rd	Putnam	0
279	8	State Route 34	Thistlewood Dr to State Route 34/ Teays Valley Rd	Putnam	0
289	9	Main St	US Route 60 to Hale St	Putnam	0
310	10	Hurricane Creek Rd	Old Hurricane Creek Rd to Teays Valley Rd	Putnam	0
324	11	State Route 34	I-64 to N Poplar Fork Rd	Putnam	0
327	12	State Route 25	37th St to Pickens Rd	Putnam	0
334	13	State Route 34	State Route 34/ Teays Valley Rd to Mount Vernon Rd	Putnam	0
366	14	Teays Valley Rd	Mount Vernon Rd to Heritage Pl	Putnam	0
397	15	State Route 34	Hurricane Creek Rd to Spur Ln	Putnam	0
404	16	US Route 60	County Line to Main St	Putnam	0
426	17	State Route 25	I-64 to Cross Lanes Dr	Putnam	0
453	18	County Route 33	State Route 34 to Mount Vernon Rd	Putnam	0
454	19	State Route 34	Main St to Hurricane Creek Rd	Putnam	0
475	20	State Route 25	Pickens Rd to I-64	Putnam	1

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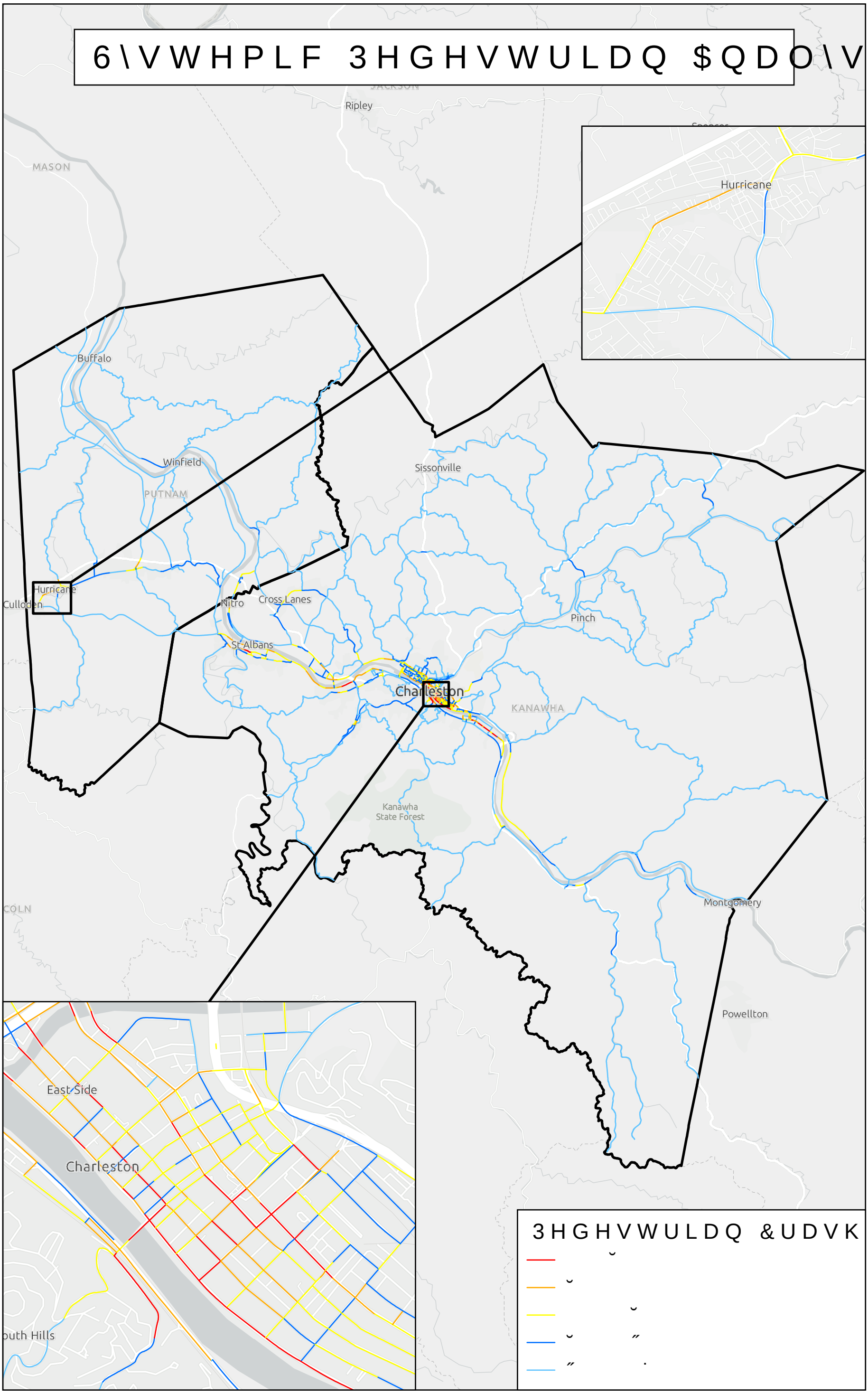

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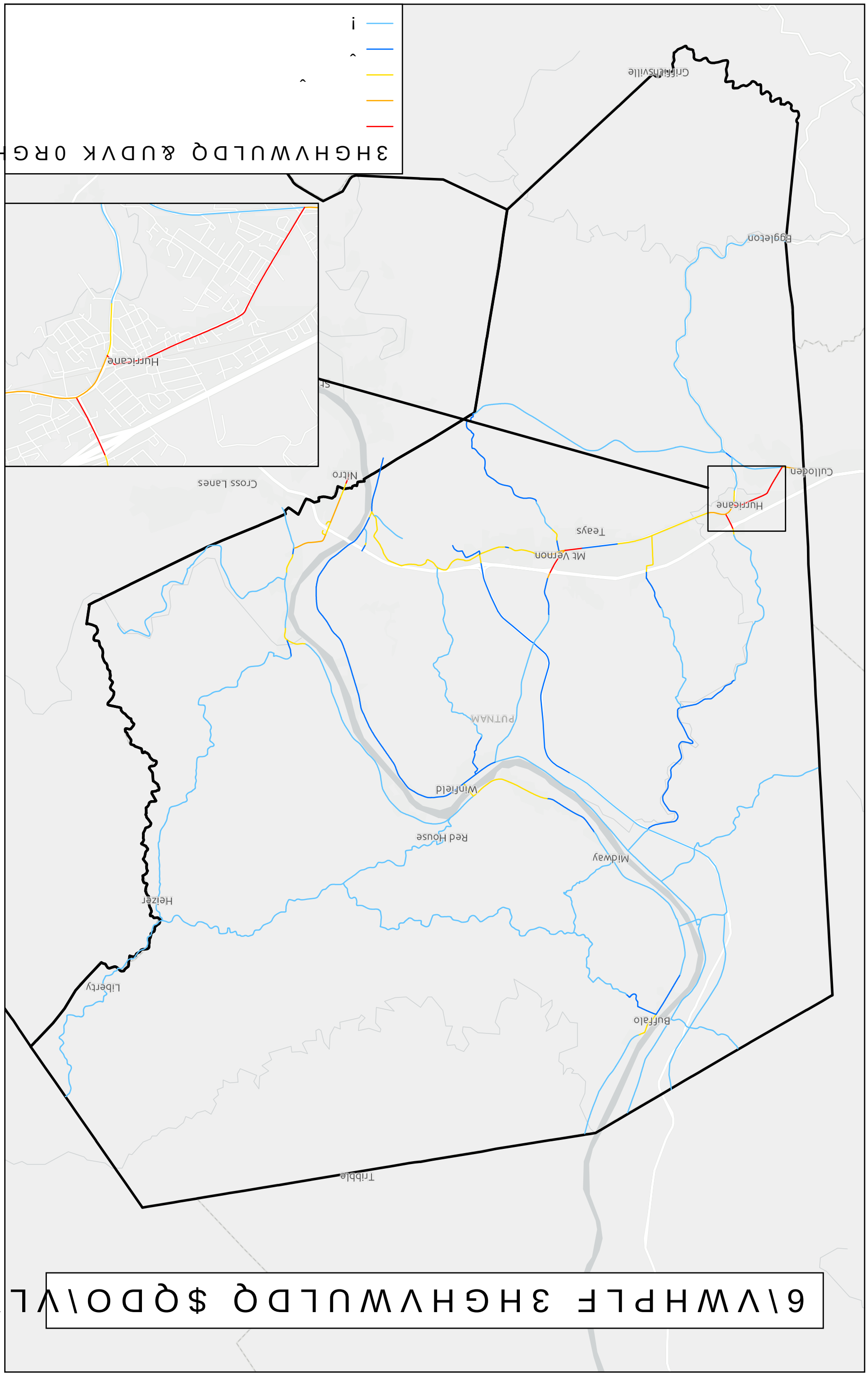

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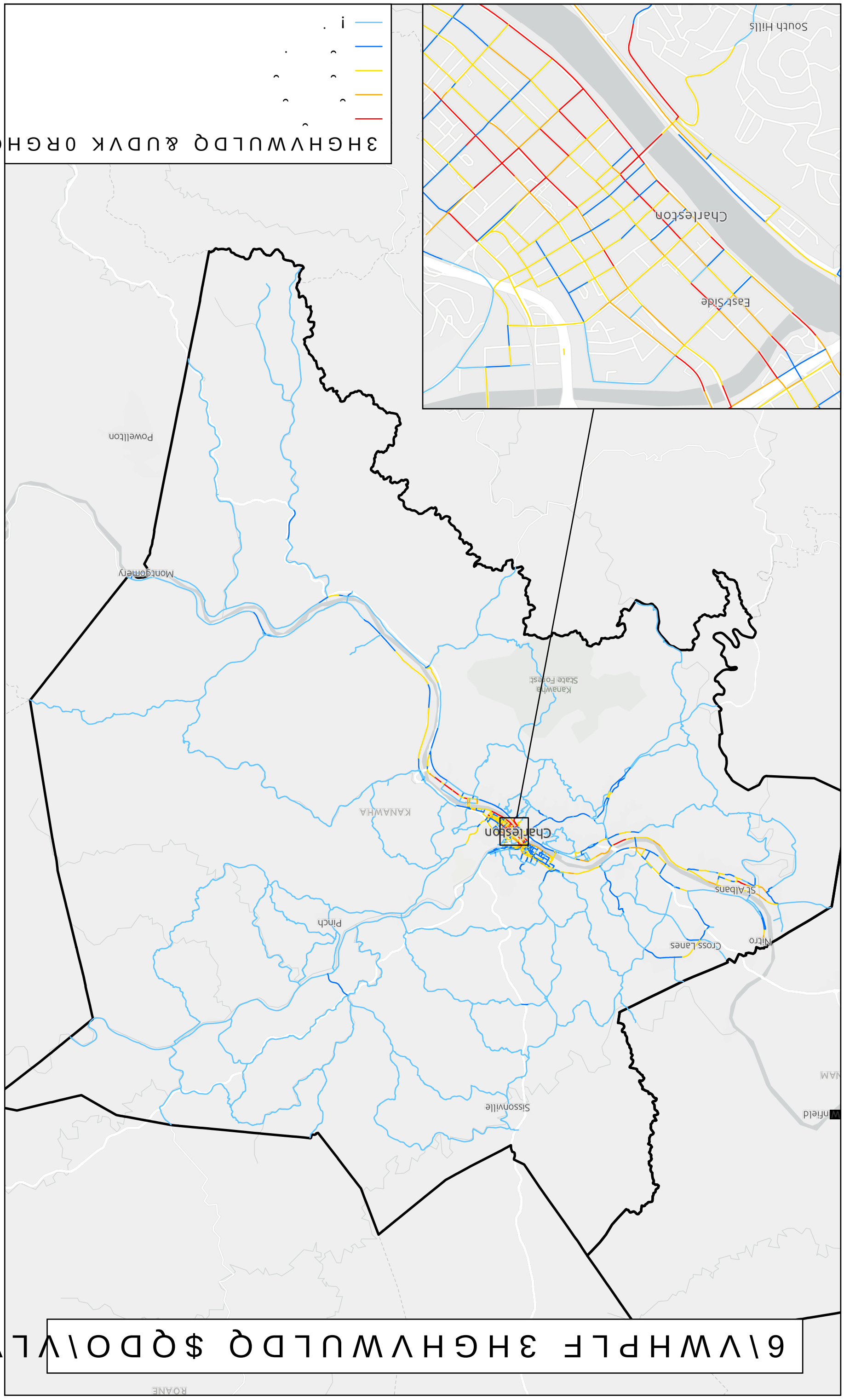
Charleston
East Side
South Hills
Kanawha State Forest
Sissonville
Nitro
St. Albans
Cross Lanes
Pinch
Montgomery
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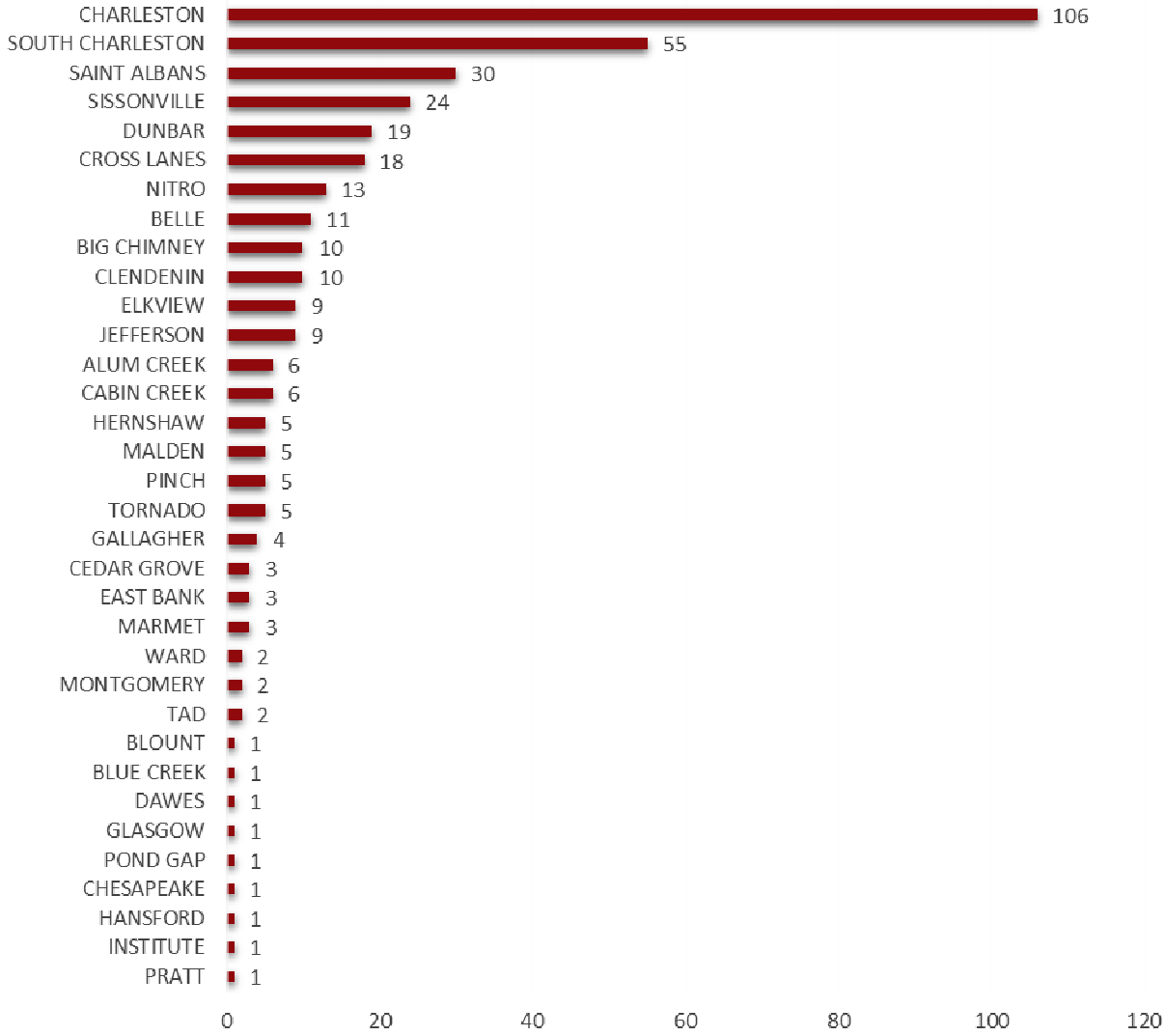
Appendix B: Public Survey Responses

Question 2: Transportation safety investments should focus on the following priorities ("Other" responses only):

- Sidewalk or other safe pedestrian paths to get them off the shoulder
- Bike lane
- More enforcement of distracted drivers
- Interstate entrance ramp at Washington St - women's and children's hospital- Chloe that entrance from seven am to nine am
- People are just not adherring to safe driving…nuts
- Do not allow grown men on children's bikes to meander in busy traffic streets . Do not allow peopls to Jay walk or stand in traffic meandering . This addled behavior is a danger to all who try to share the streets safely
- Bicyclists in a traffic lane should be required to be registered and insured just like any motor vehicle occupying the road. It's a safety issue for the greater good of the overall motoring public. The fees collected could be used to help fund public safety improvements. If motor vehicles are required to pay to use state roads and OHV vehicles are required to get a permit too then bicyclists should pay their fair share too.
- Interstate safety
- Tractor trailers
- Road surface repair. The roads are horrible (potholes and poor pavement) and the rattling is slowly deconstructing my car
- Road diets to create more MultiusePaths
- Research AI traffic infrastructure
- education of motorist about bicyclists
- Improvements to intersections via raised crosswalks, removal turn lanes, etc. The issue with intersections is that they are dangerous for pedestrians and people with alternate modes of transportation (mobility scooters, bikes, etc) not that they are not accommodating enough for cars.
- Road conditions such as potholes
- People are challenging motorists. It's not just dealing with vehicles.
- Oakwood road to I64/77 is a disaster and needs to be improved.
- education of motorists about pedestrians
- roadway quality
- more sidewalks
- Distracted driving
- Adding reflective to lines painted on the road. The lines and lanes tend to be the hardest thing to see anymore especially in any weather but clear.
- More and safe sidewalks

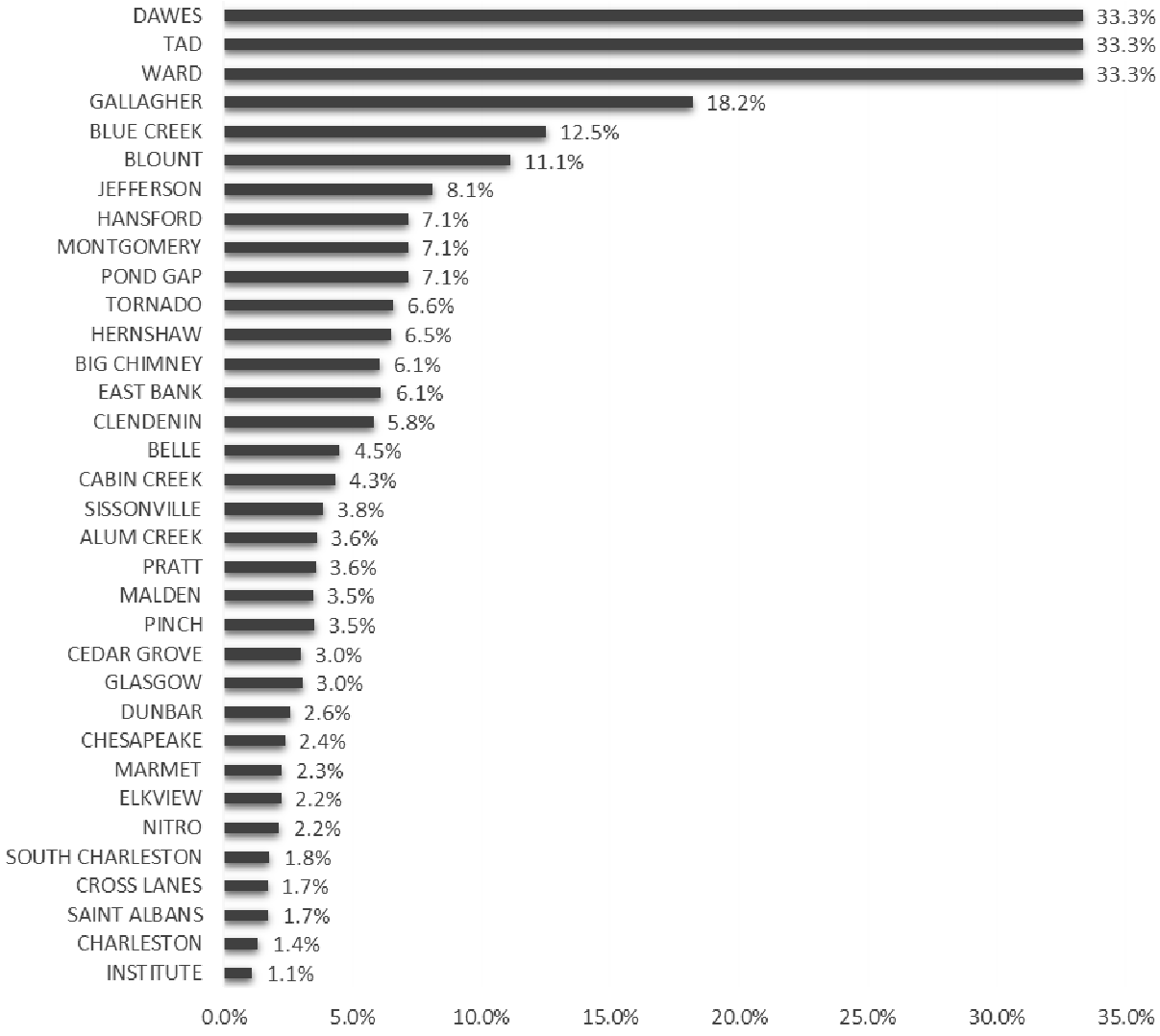
Appendix C: Additional Regional Crash Trends Analysis

Fatal and Serious Injury Crashes by Jurisdiction (Kanawha County)



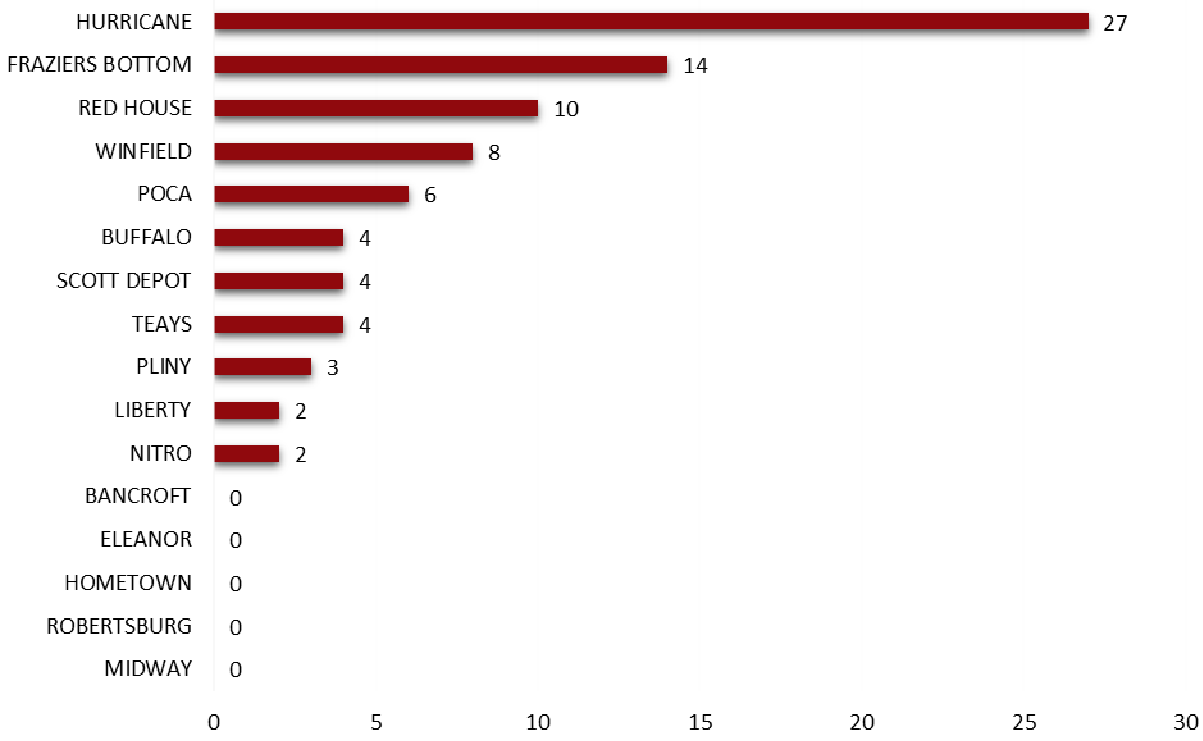
*8 fatal crashes were not located within a jurisdiction

Fatal and Serious Injury Crash Percentage by Jurisdiction (Kanawha County)

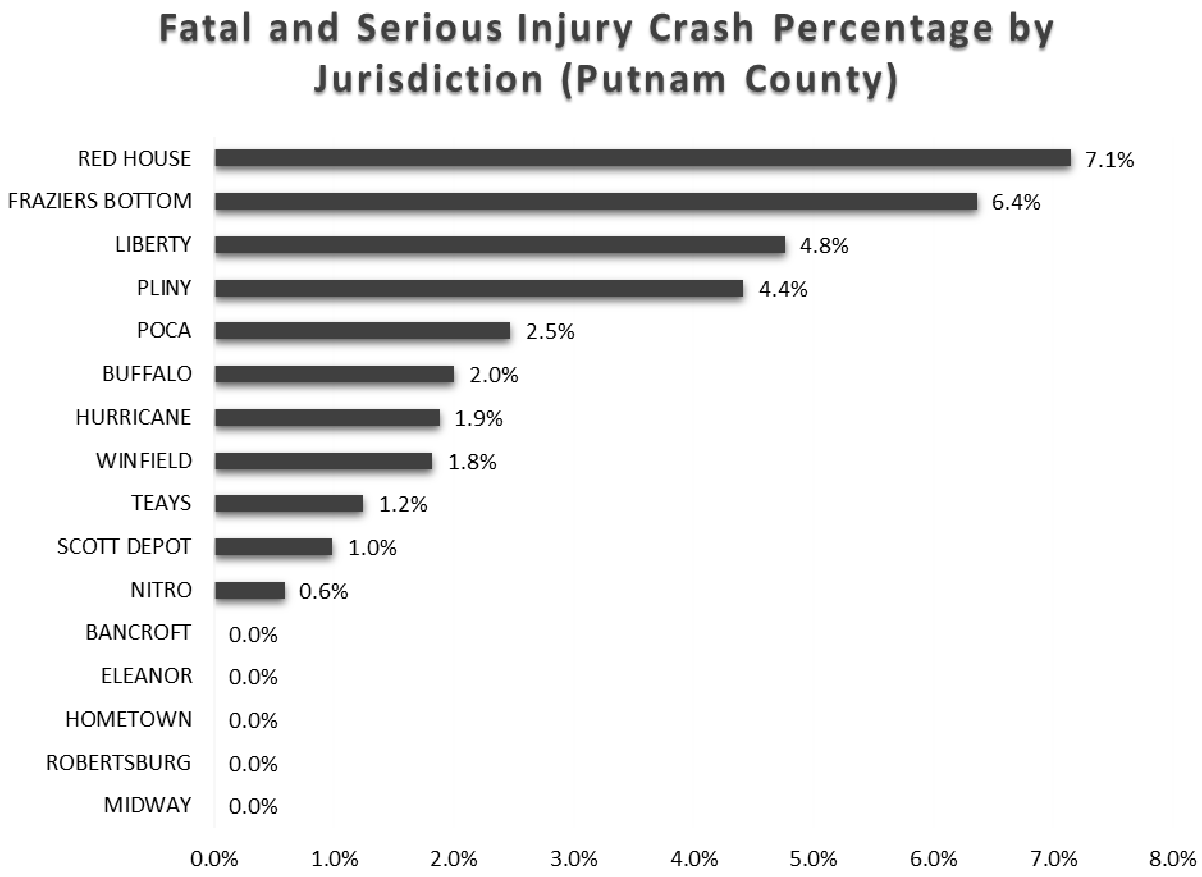


*8 fatal crashes were not located within a jurisdiction

Fatal and Serious Injury Crashes by Jurisdiction (Putnam County)

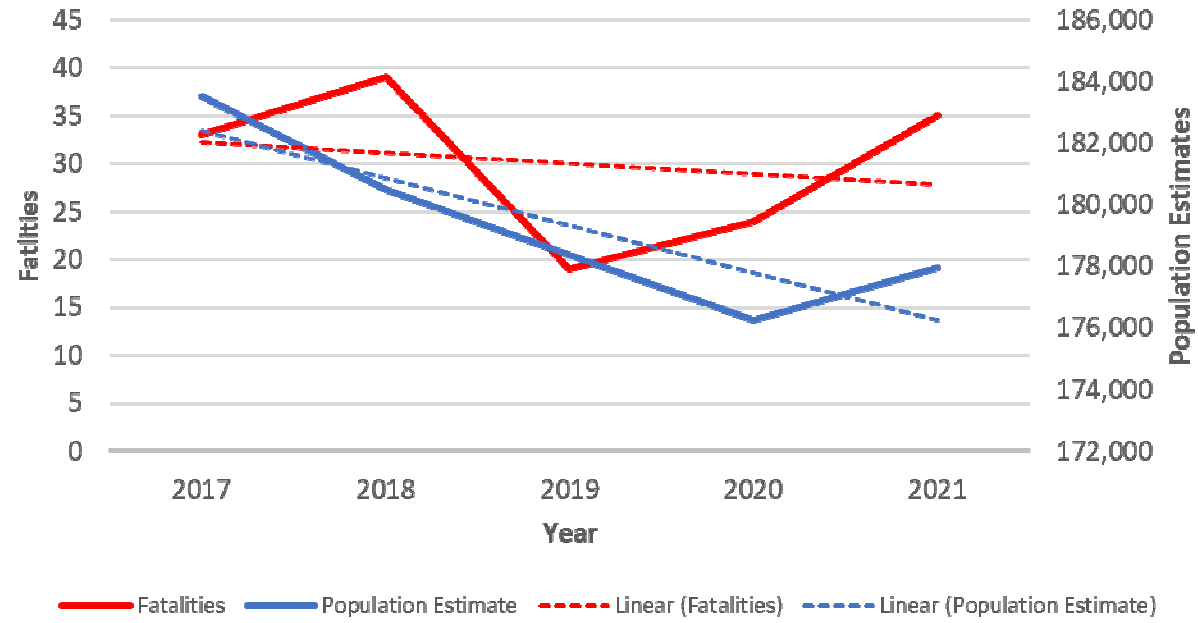


*9 fatal and serious injury crashes were not located within a jurisdiction

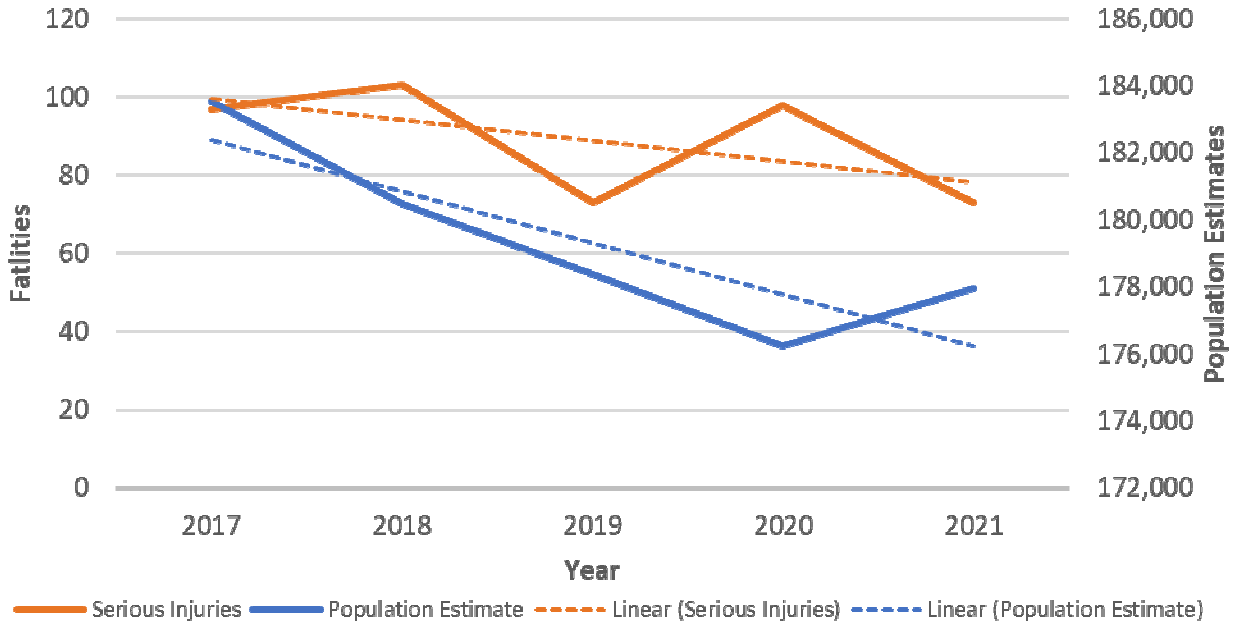


*9 fatal and serious injury crashes were not located within a jurisdiction

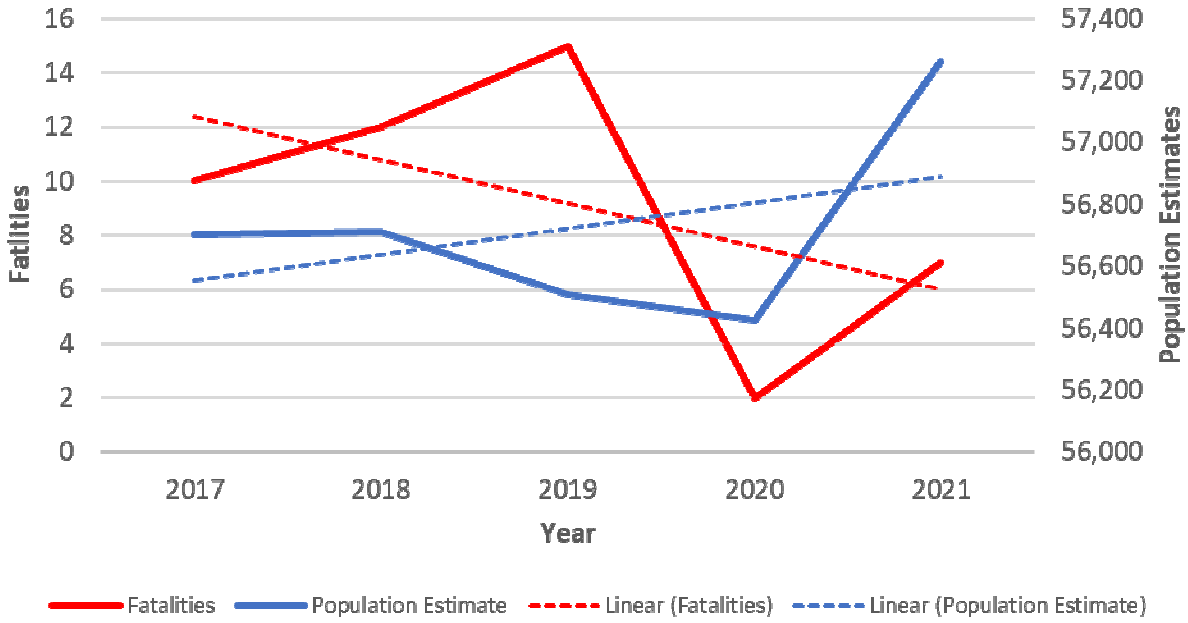
FATALITIES VS POPULATION (KANAWHA COUNTY)



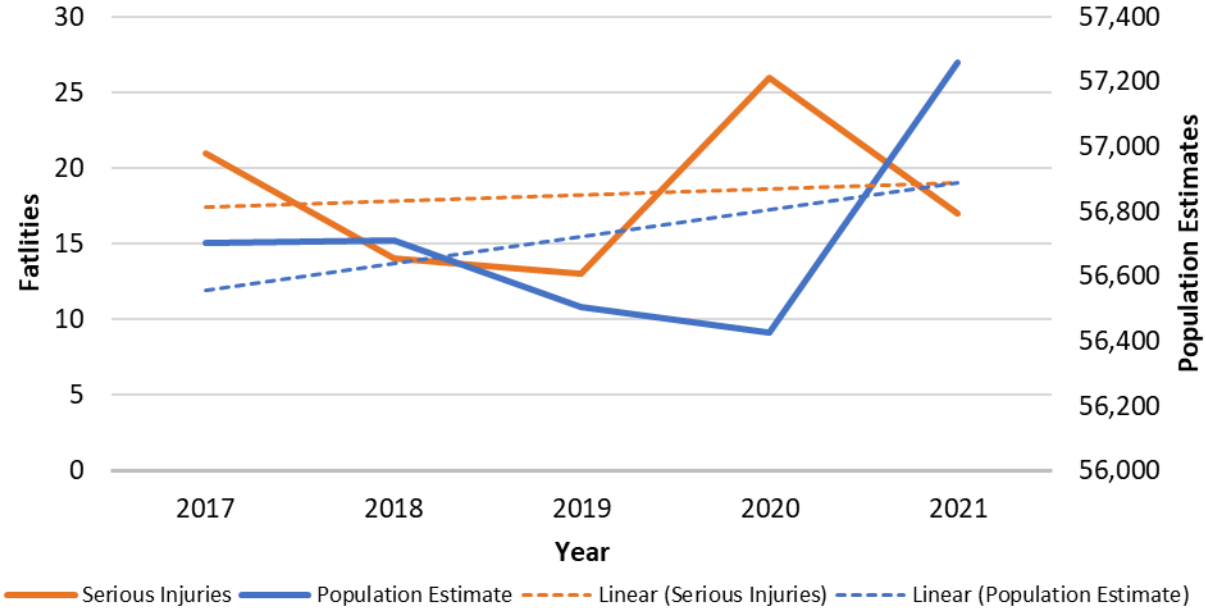
SERIOUS INJURIES VS POPULATION (KANAWHA COUNTY)

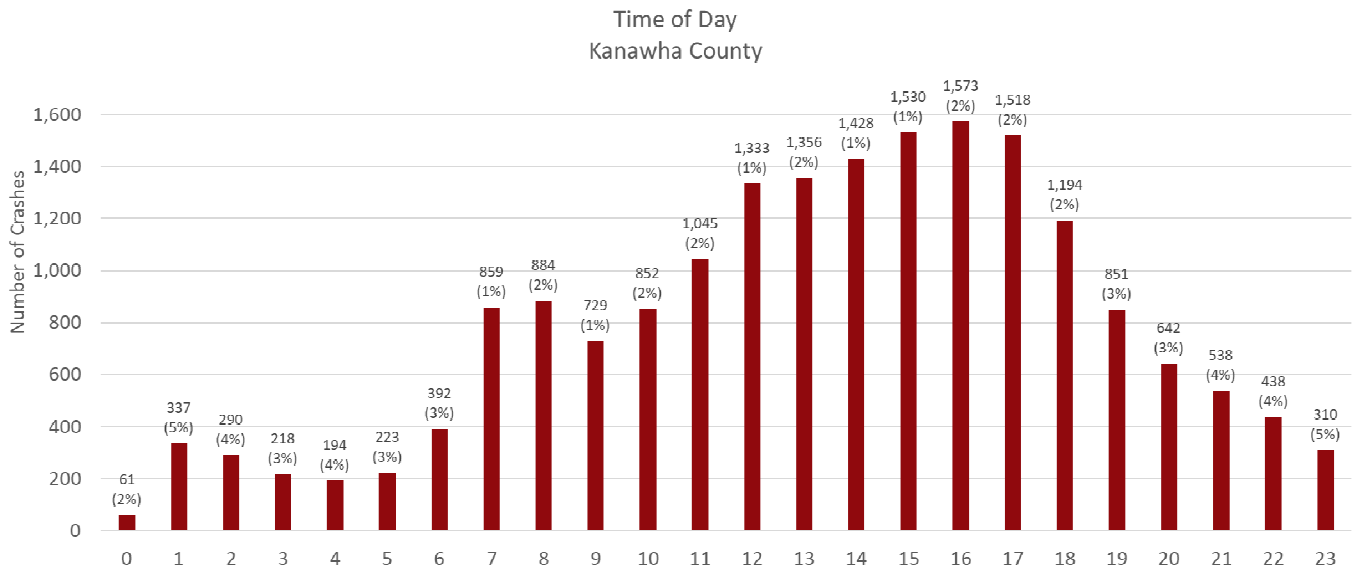


FATALITIES VS POPULATION (PUTNAM COUNTY)

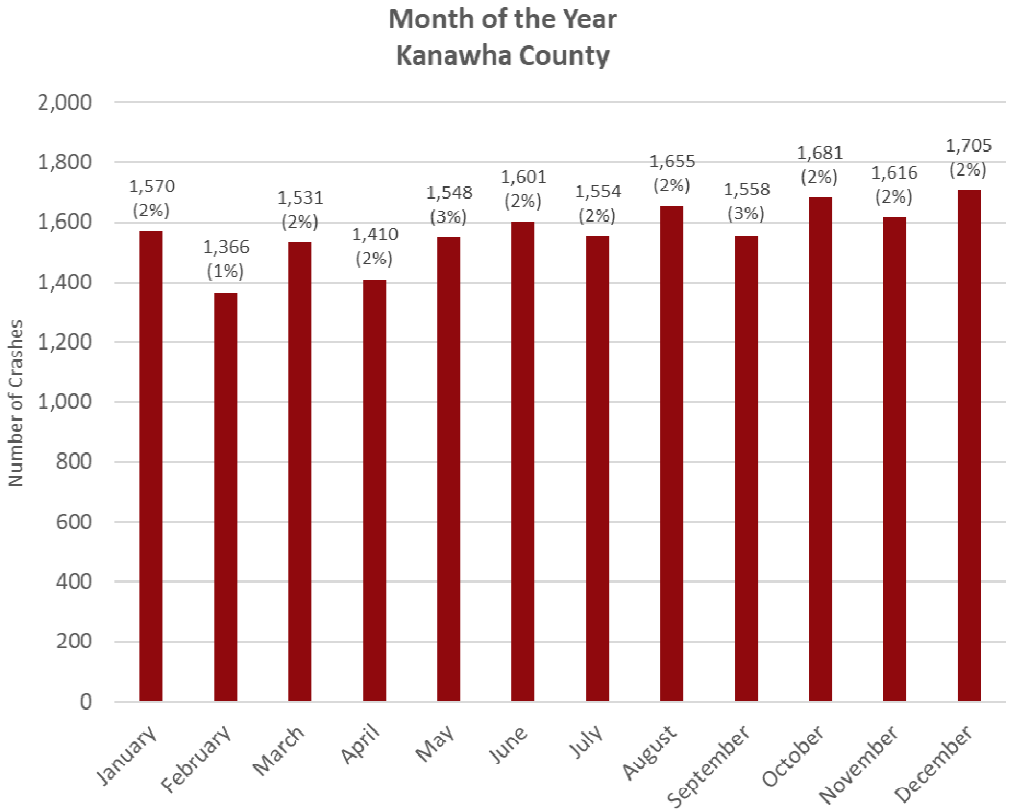


SERIOUS INJURIES VS POPULATION (PUTNAM COUNTY)

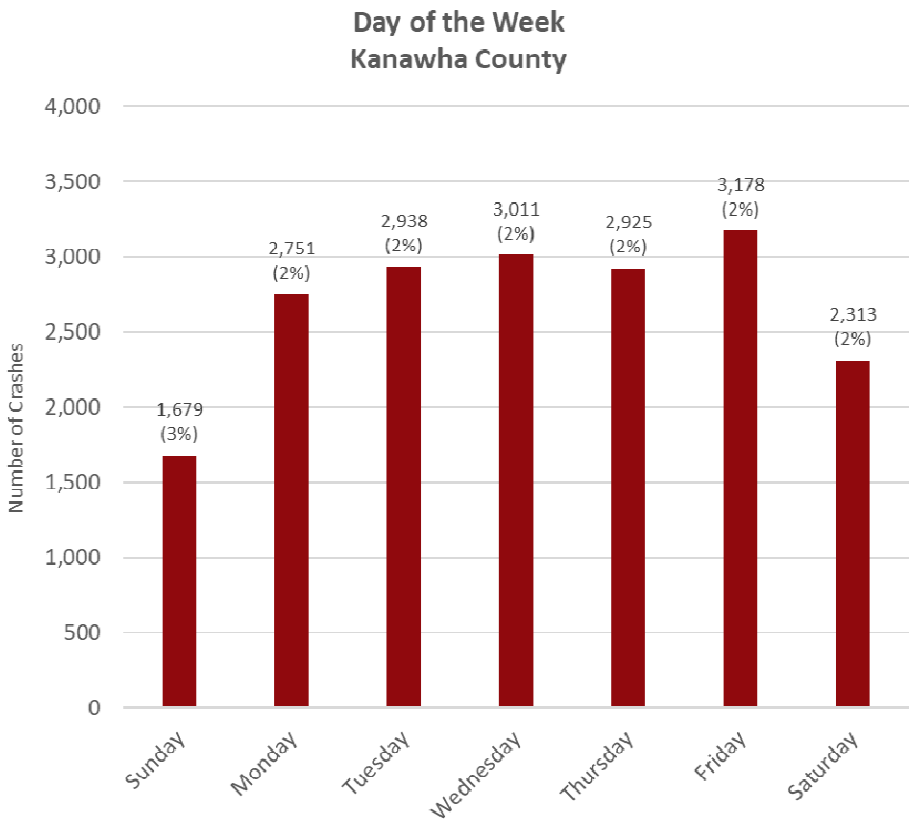




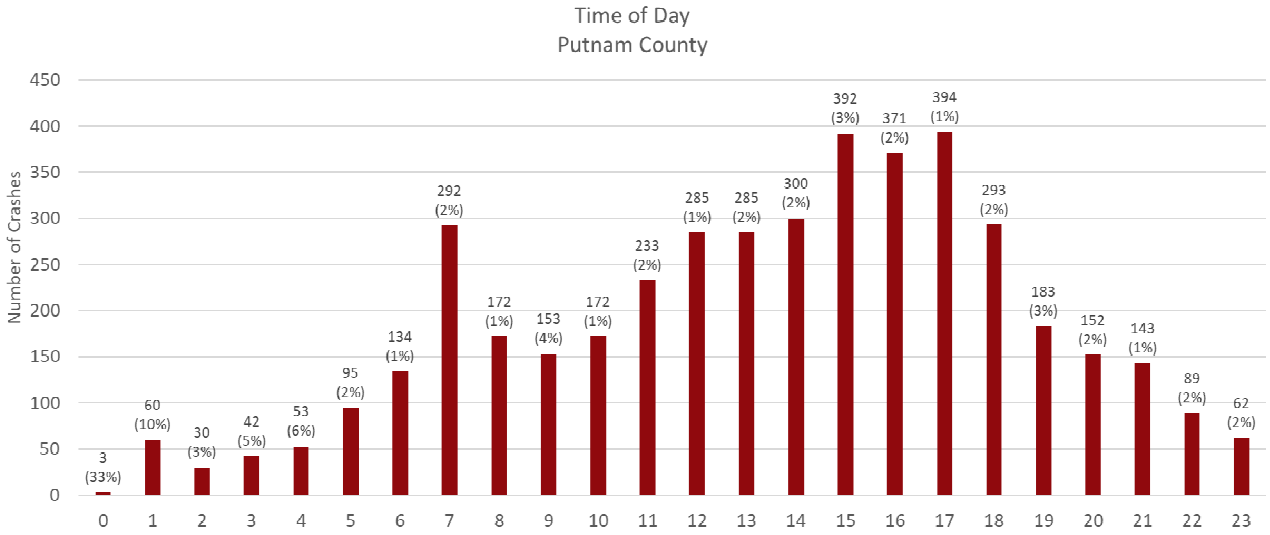
(XX%) – Percent Fatal and Serious Injury



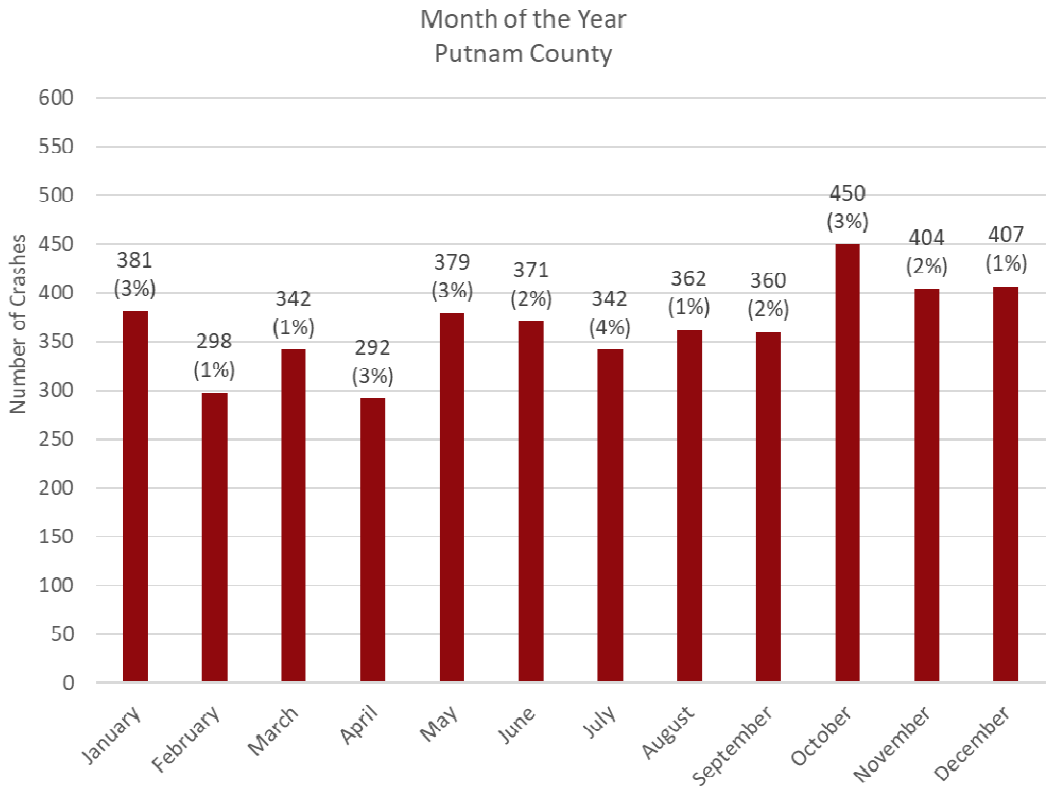
(XX%) – Percent Fatal and Serious Injury



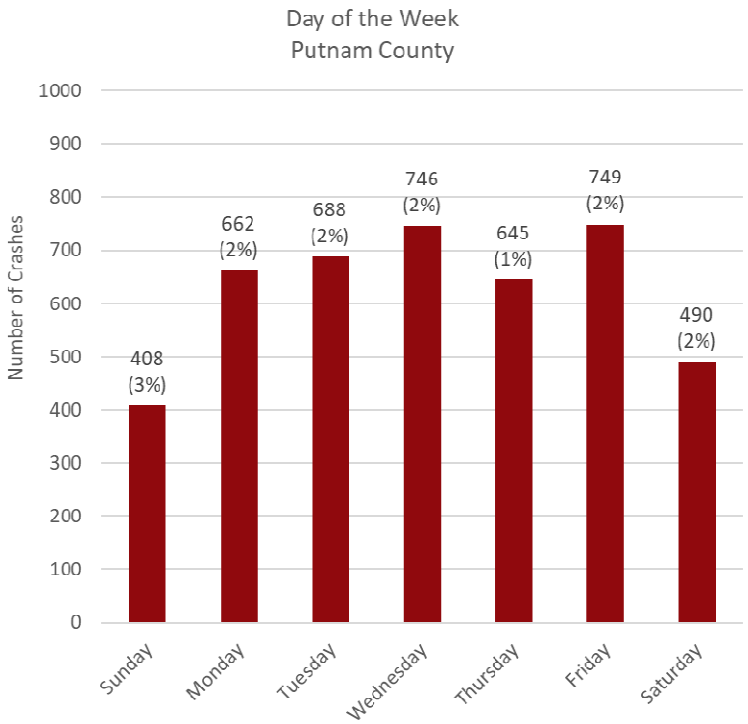
(XX%) – Percent Fatal and Serious Injury



(XX%) – Percent Fatal and Serious Injury



(XX%) – Percent Fatal and Serious Injury

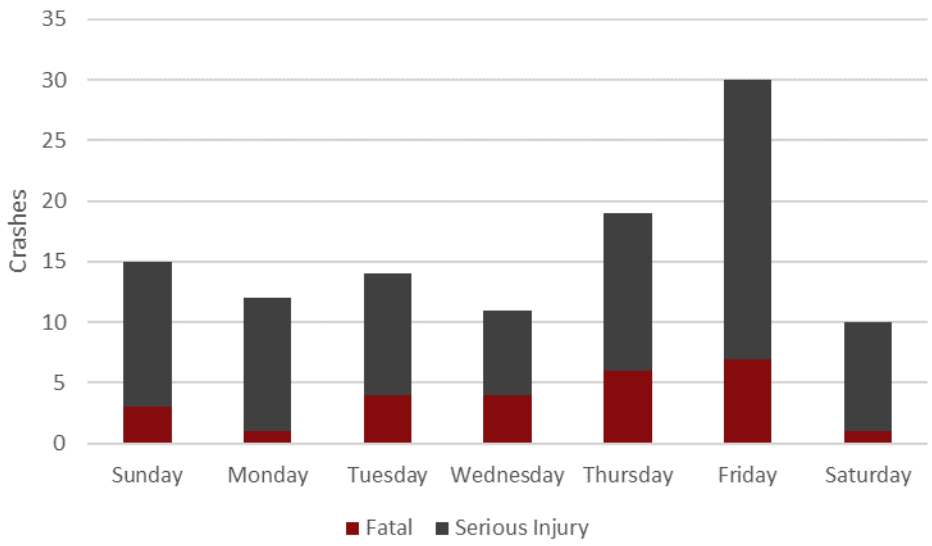


(XX%) – Percent Fatal and Serious Injury

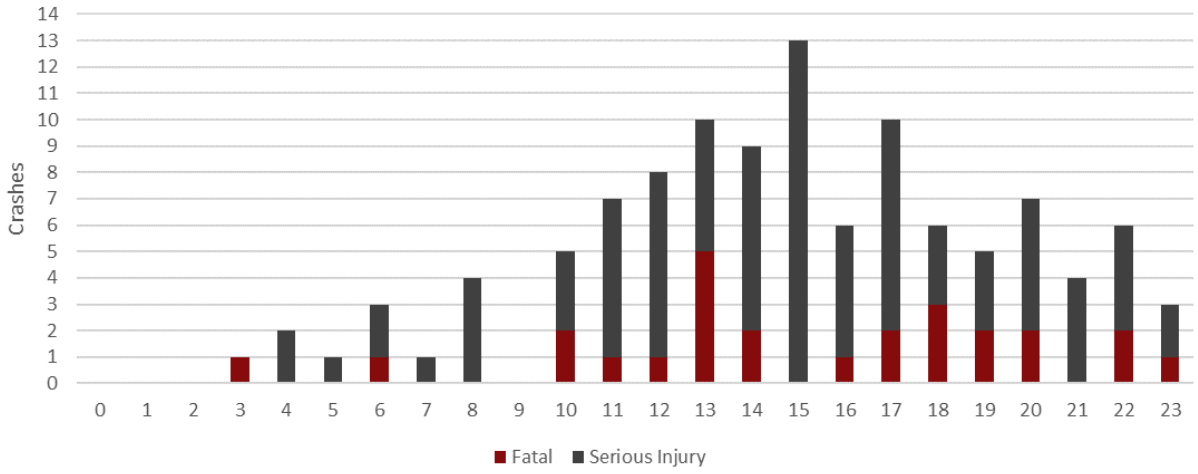
Appendix D: Intersection Crash Statistics

Kanawha County 2017-2021

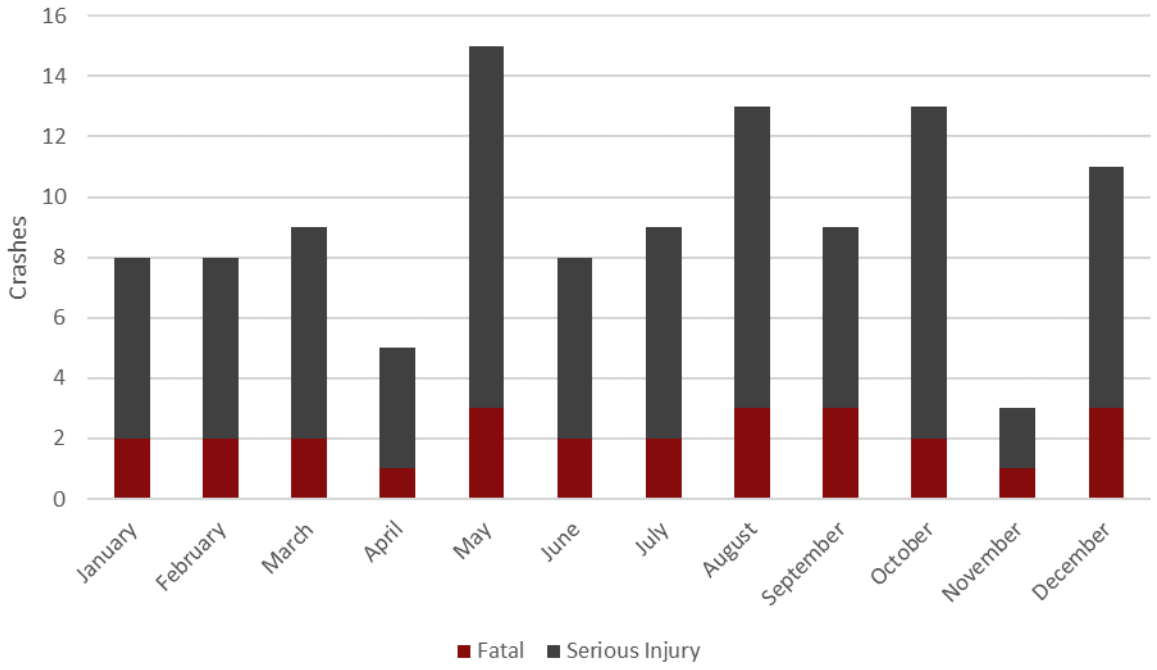
Intersection Crashes by Day of Week



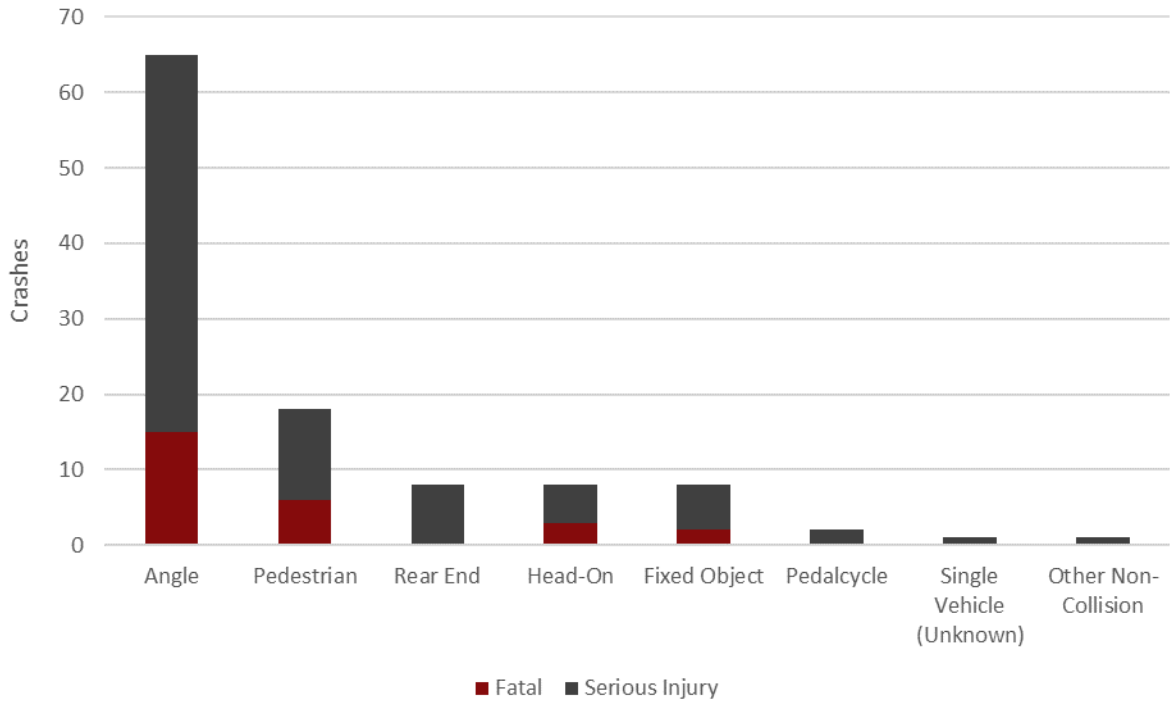
Intersection Crashes by Time of Day



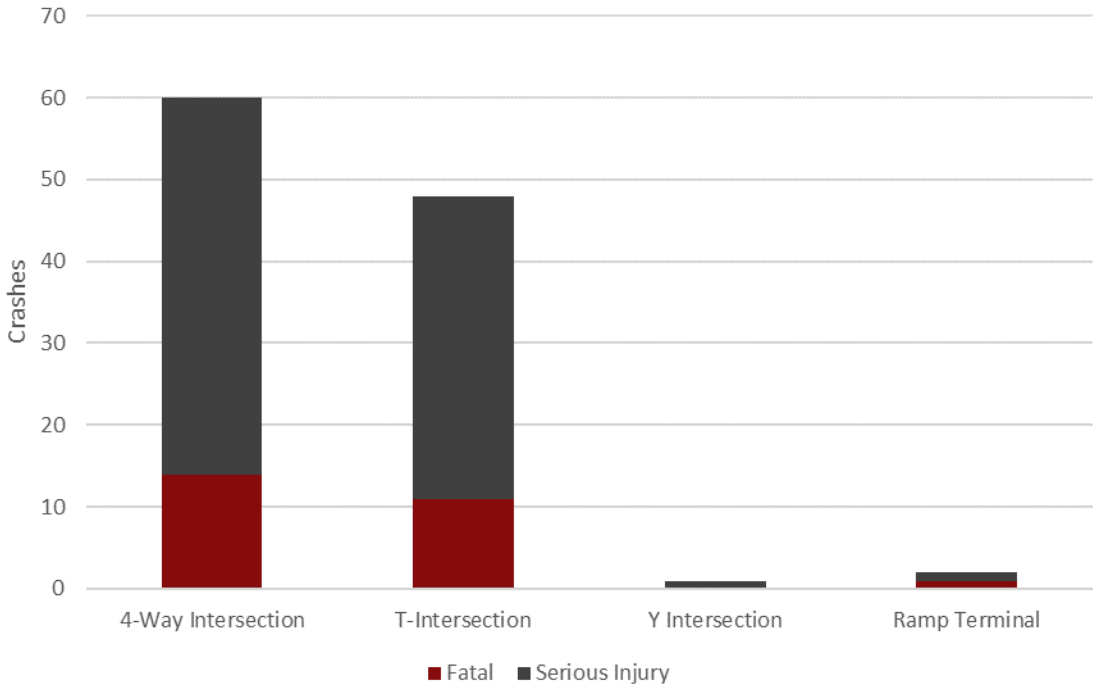
Intersection Crashes by Month of Year



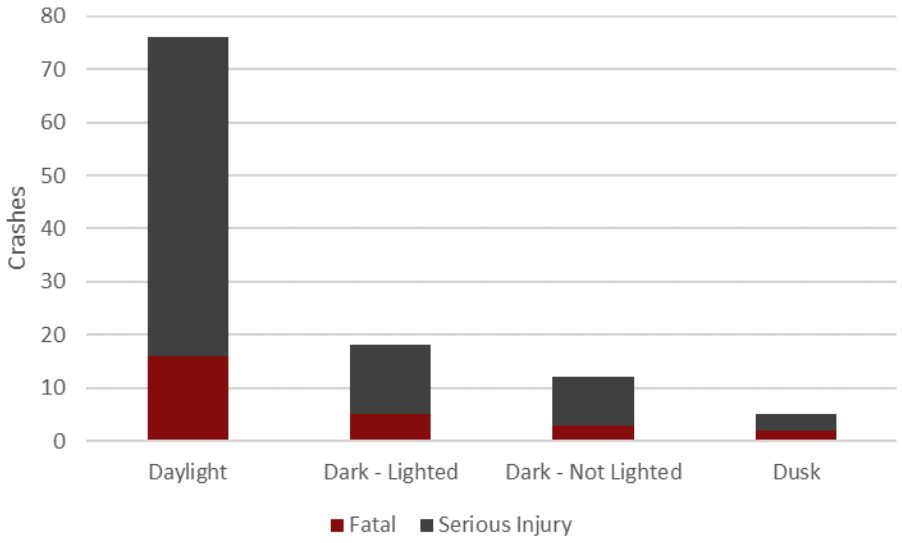
Intersection Crashes by Type



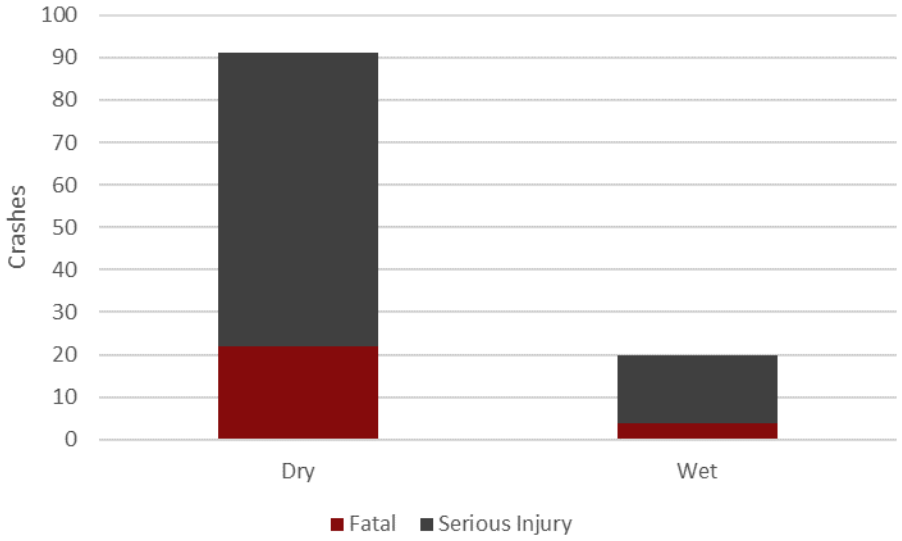
Intersection Crashes by Type of Intersection



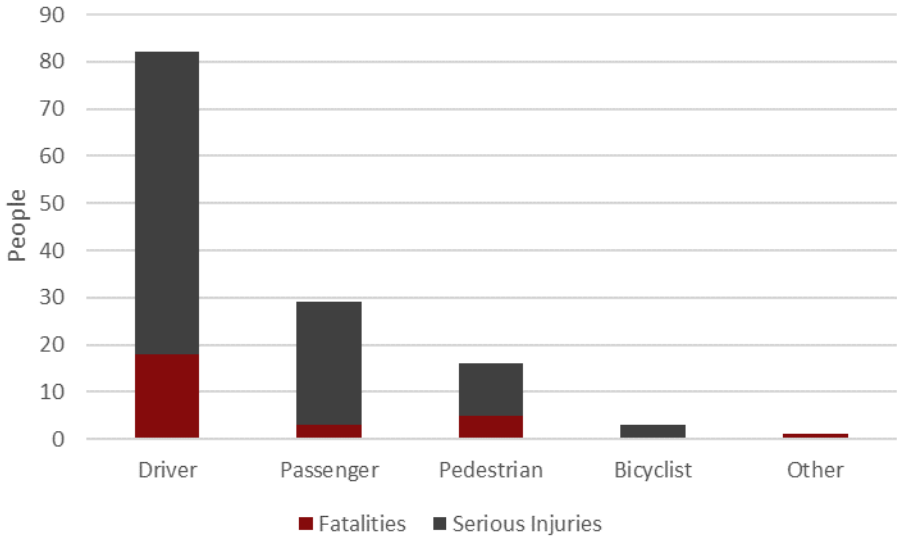
Intersection Crashes by Lighting Condition



Intersection Crashes by Pavement Condition

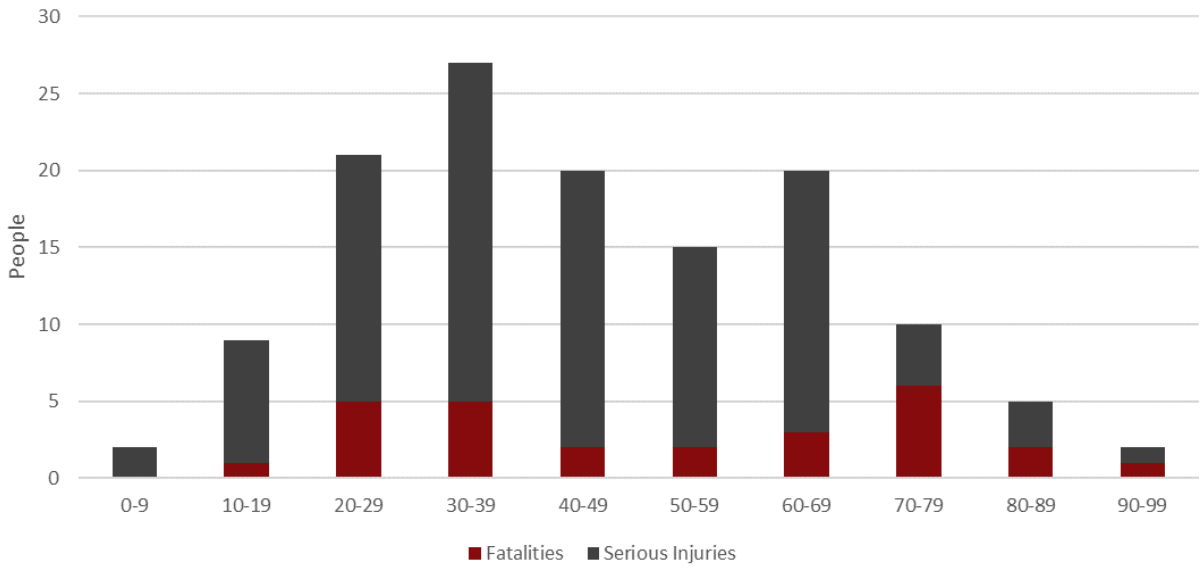


Intersection Fatalities and Serious Injuries by Person Type



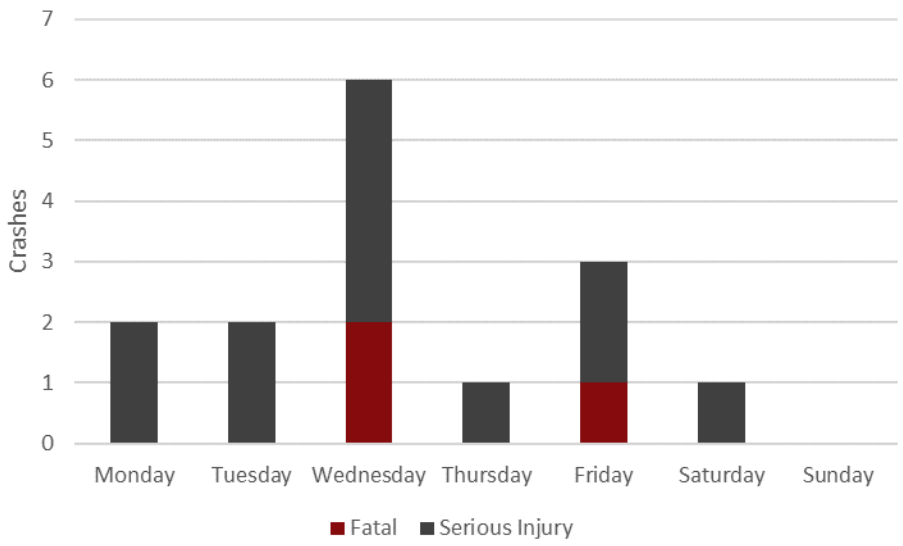
Intersection Fatalities and Serious Injuries by Gender

Intersection Fatalities and Serious Injuries by Age

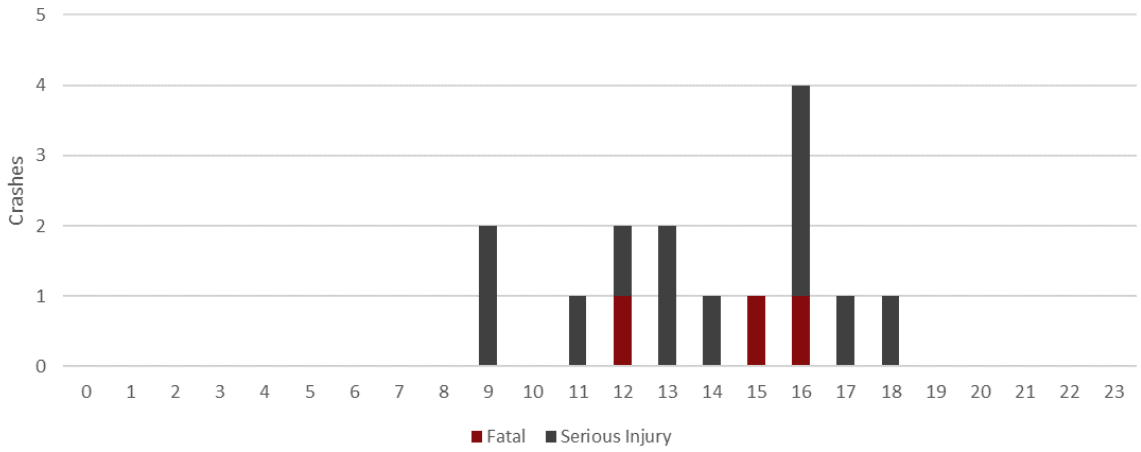


Putnam County 2017-2021

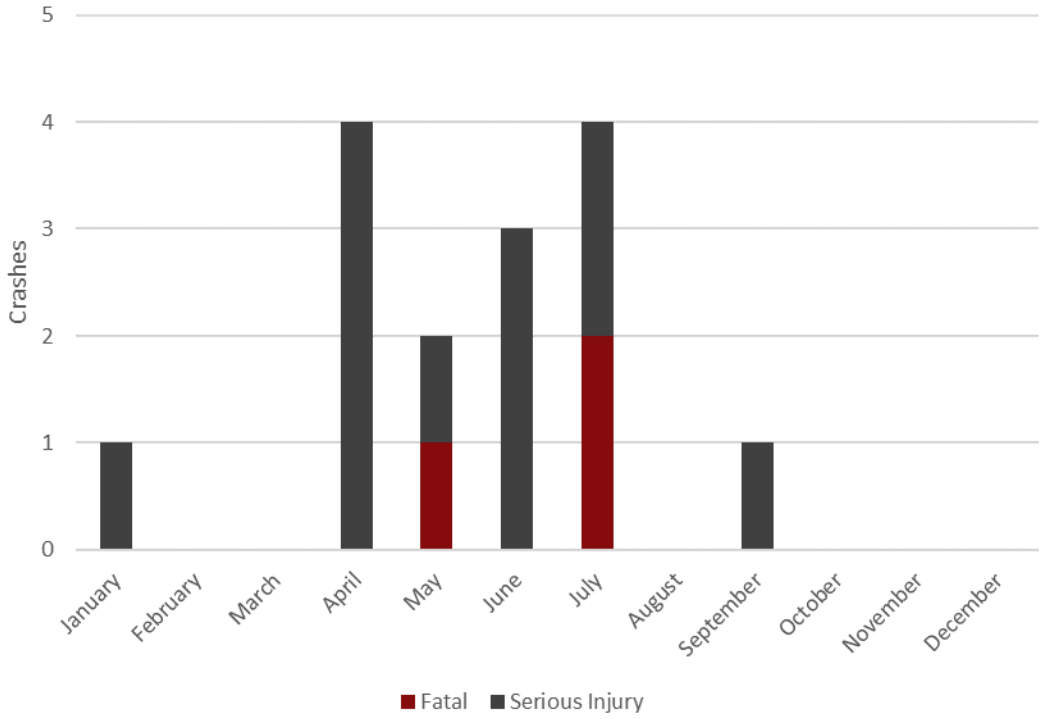
Intersection Crashes by Day of Week



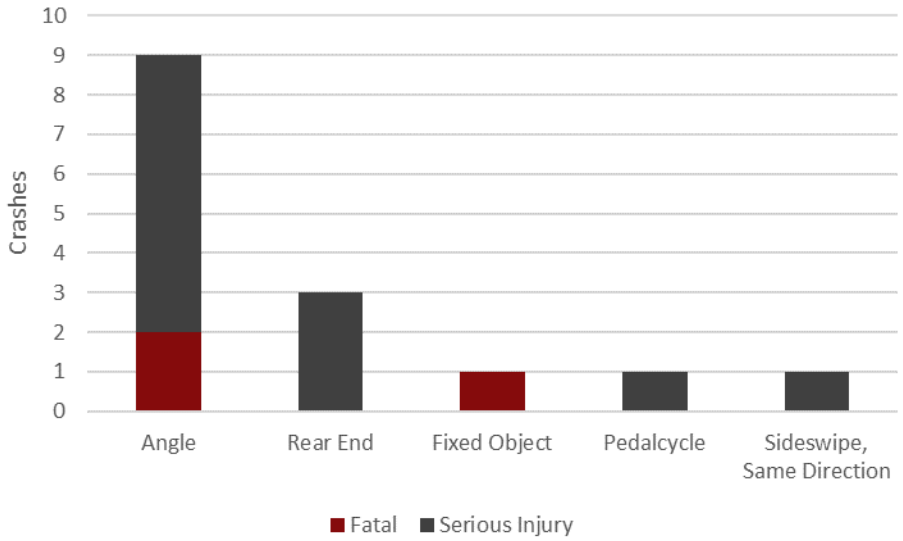
Intersection Crashes by Time of Day



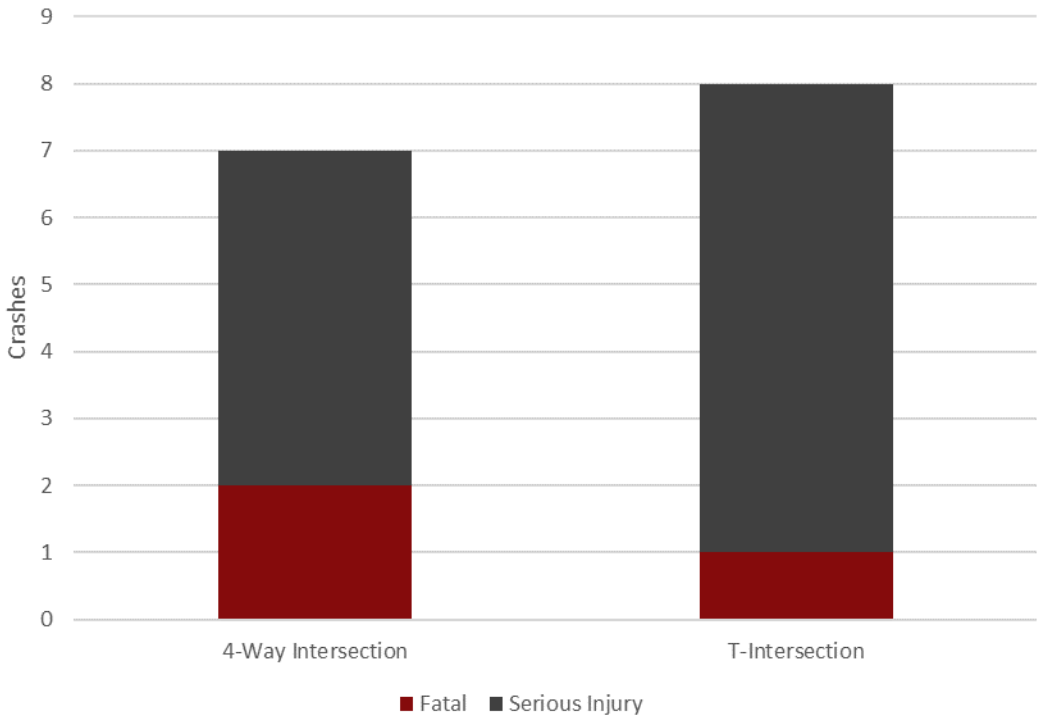
Intersection Crashes by Month of Year



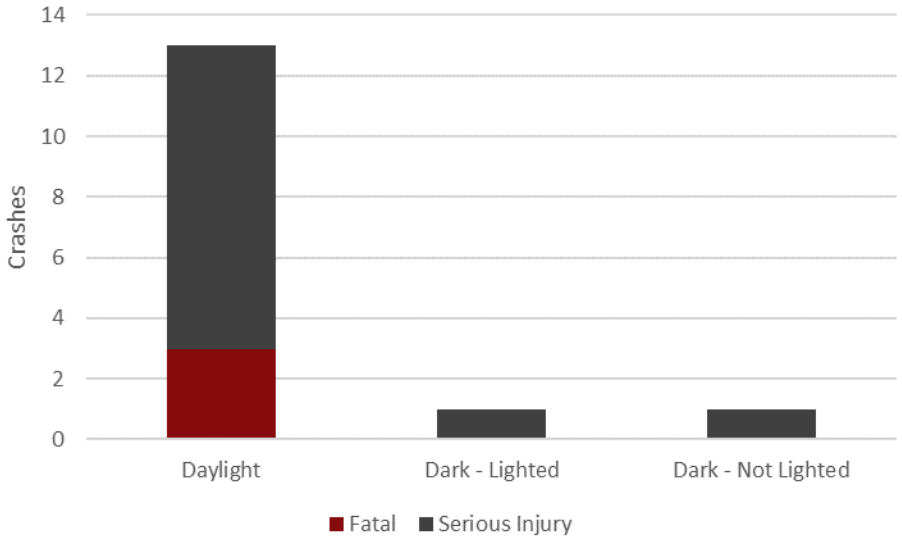
Intersection Crashes by Type



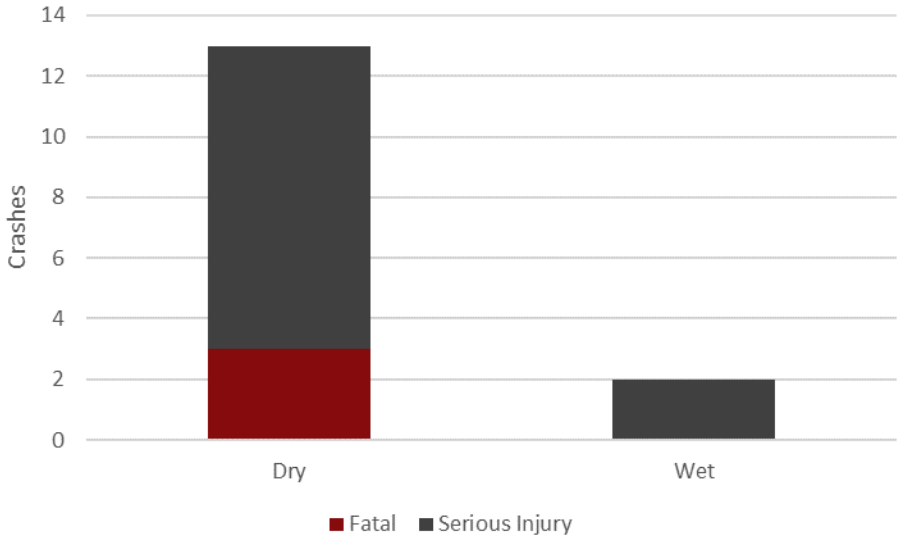
Intersection Crashes by Type of Intersection



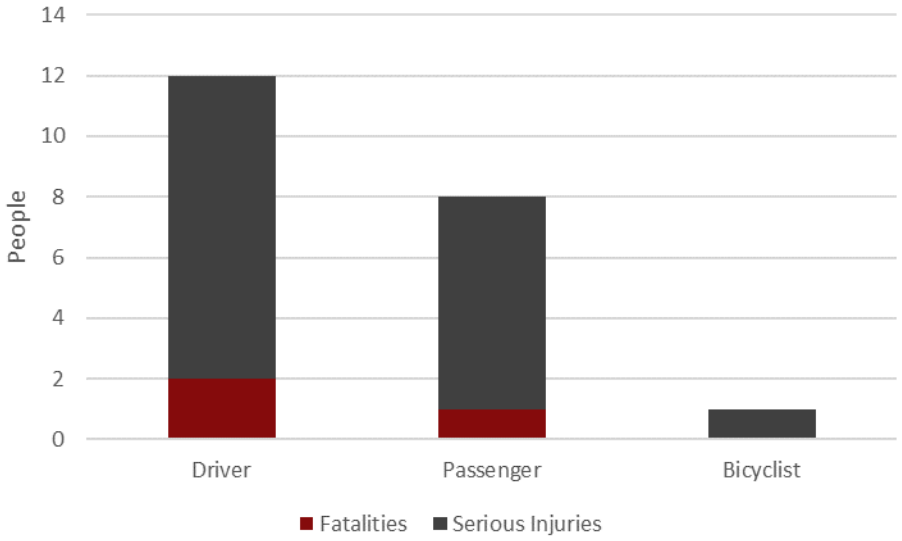
Intersection Crashes by Lighting Condition



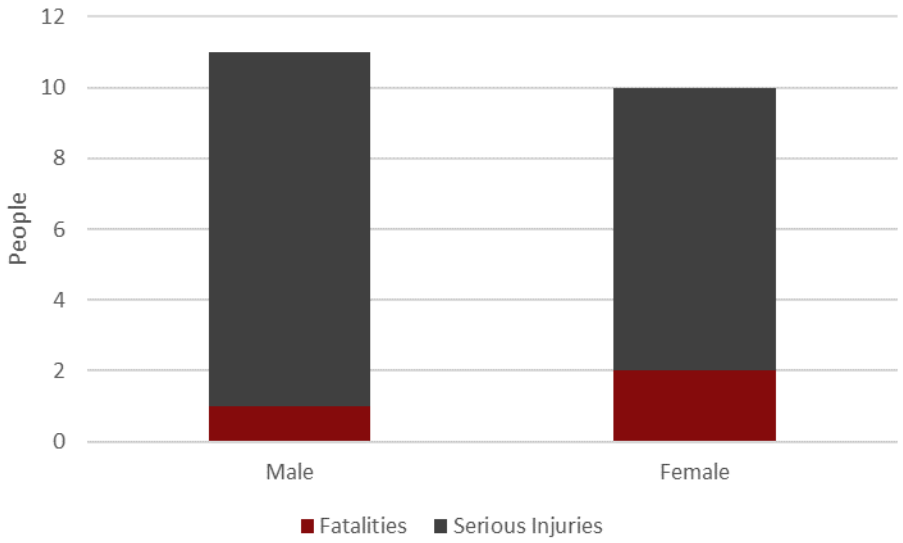
Intersection Crashes by Pavement Condition



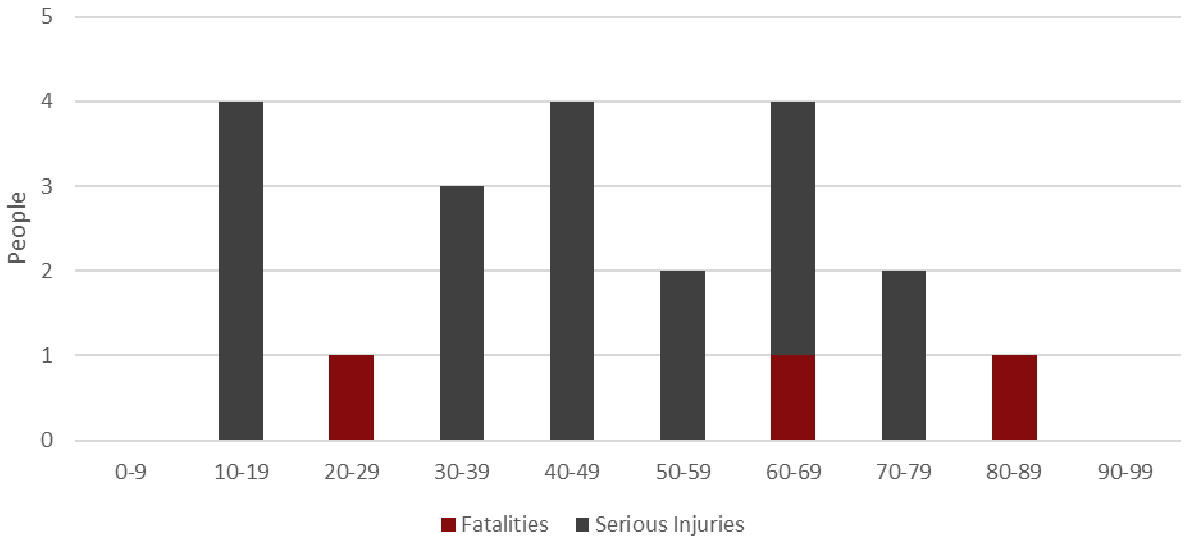
Intersection Fatalities and Serious Injuries by Person Type



Intersection Fatalities and Serious Injuries by Gender



Intersection Fatalities and Serious Injuries by Age



Appendix E: Intersection Rankings

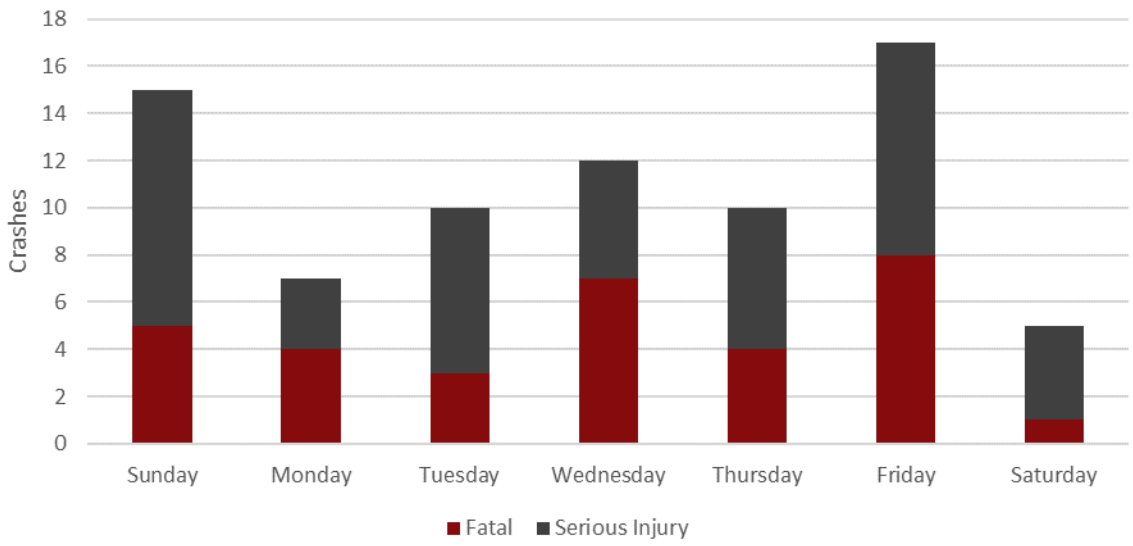
Rank	Intersection	Jurisdiction	Fatal	Serious Injury	Minor Injury	Possible Injury	No Injury	Total Crashes	Fatal & Injury %	EPDO Per Crash	EPDO Total	Crash Frequency Rank	EPDO Per Crash Rank	EPDO Total Rank	Composite Score	Equity Ranking
1	Parkway Road & US-119	South Charleston	3	2	2	10	22	39	44%	78.311	3054.133	36	23	1	60	27
2	Brounland Road & US-119	South Charleston	2	2	3	11	18	36	50%	59.645	2147.218	39	29	2	70	50
3	Maccorkle Avenue SE & US-119	Charleston	1	1	2	13	37	54	31%	21.962	1185.974	23	45	5	73	53
4	10th Street & Fletcher Square	Dunbar	1	4	1	5	39	50	22%	24.995	1249.751	27	43	4	74	10
5	Patrick Street & Patrick Street Plaza	Charleston	1	1	6	3	50	61	18%	19.119	1166.264	20	49	7	76	9
6	Southridge Boulevard & US-119	South Charleston	1	0	3	13	70	87	20%	13.596	1182.821	10	64	6	80	34
7	Goff Mountain Road & WV-62	Cross Lanes	1	0	0	11	40	52	23%	20.795	1081.318	25	47	9	81	51
8	Lee Street E & Leon Sullivan Way	Charleston	1	0	1	8	28	38	26%	27.792	1056.086	37	39	10	86	1
8	Dunbar Toll Bridge & Maccorkle Avenue SW	South Charleston	1	0	0	7	33	41	20%	25.217	1033.882	34	41	11	86	22
10	Dunbar Avenue & Wilson Street	Dunbar	1	3	1	5	7	17	59%	68.500	1164.503	58	26	8	92	19
11	Maryland Avenue & Washington Street W	Charleston	1	0	1	5	23	30	23%	34.025	1020.759	45	37	12	94	3
12	Maccorkle Avenue & Richmond Street	Saint Albans	1	0	2	4	6	13	54%	77.750	1010.745	62	24	14	100	34
12	Gatewater Road & Goff Mountain Road	Cross Lanes	1	0	1	5	15	22	32%	46.035	1012.759	53	34	13	100	34
14	Airport Road & Greenbrier Street	Charleston	1	0	1	4	17	23	26%	43.680	1004.650	52	35	15	102	7
15	26th Street W & 7th Avenue	Charleston	1	0	1	4	9	15	40%	66.443	996.650	60	27	17	104	9
15	Coonskin Drive & Greenbrier Street	Charleston	1	0	3	1	12	17	29%	59.030	1003.513	58	30	16	104	7
17	Sissonville Drive & Washington Street W	Charleston	1	0	1	3	16	21	24%	47.311	993.541	54	33	18	105	9
17	Jefferson Road & Maccorkle Avenue SW	South Charleston	1	0	2	25	117	145	19%	9.200	1334.034	2	100	3	105	11
19	Maccorkle Avenue SW & Riheldaffer Avenue	South Charleston	1	0	1	3	8	13	38%	75.811	985.541	62	25	20	107	2
20	Central Avenue & Russell Street	Charleston	1	0	1	2	4	8	50%	121.429	971.432	67	18	23	108	4
21	6th Street & Maccorkle Avenue	Saint Albans	1	0	1	2	11	15	27%	65.229	978.432	60	28	22	110	25
22	37th Street W & 7th Avenue	Charleston	1	0	0	3	7	11	36%	87.950	967.446	64	22	25	111	9
23	E Dupont Avenue & Witcher Creek Road	Belle	1	0	1	1	5	8	38%	120.290	962.323	67	19	26	112	12
24	7th Avenue & Rebecca Street	Charleston	1	0	0	2	7	10	30%	95.734	957.337	65	20	28	113	9
24	Maccorkle Avenue SW & Park Avenue	South Charleston	1	0	1	1	14	17	18%	57.137	971.323	58	31	24	113	11
26	Inter	Saint Albans	1	0	0	1	3	5	40%	188.646	943.228	70	13	33	116	12
27	Country Club Boulevard & Spring Hill Avenue	South Charleston	1	0	0	0	4	5	20%	186.824	934.119	70	14	39	123	27
27	Rabel Road & Wolf Pen Lane	South Charleston	1	0	0	0	4	5	20%	186.824	934.119	70	14	39	123	50
27	Kanawha Boulevard E & Leon Sullivan Way	Charleston	1	0	0	0	9	10	10%	93.912	939.119	65	21	37	123	1
30	1st Avenue & Center Street	Nitro	0	5	3	20	48	76	37%	7.470	567.705	14	121	45	180	46

Rank	Intersection	Jurisdiction	Fatal	Serious Injury	Minor Injury	Possible Injury	No Injury	Total Crashes	Fatal & Injury %	EPDO Per Crash	EPDO Total	Crash Frequency Rank	EPDO Per Crash Rank	EPDO Total Rank	Composite Score	Equity Ranking
1	Grille Lane (South) & WV-34	Hurricane	1	1	3	6	34	45	24%	25.096	1129.306	7	7	3	17	61
1	Buffalo Bridge & Shamrock Lane	Fraziers Bottom	1	0	5	13	55	74	26%	16.243	1202.011	3	13	1	17	60
3	Hurricane Creek Road & US-35	Winfield	1	2	2	3	21	29	28%	38.694	1122.132	13	5	4	22	60
4	Shamrock Lane & US-35	Fraziers Bottom	1	3	2	2	7	15	53%	76.751	1151.271	25	3	2	30	60
5	CR-9 & US-35	Fraziers Bottom	0	2	2	7	19	30	37%	7.682	230.449	12	25	8	45	60
6	WV-34 & Winfield Road	Winfield	0	1	2	6	14	23	39%	7.047	162.092	17	28	12	57	57
7	Prarie Lane & Stricklin Road	Hurricane	0	1	1	2	2	6	67%	15.427	92.561	33	14	18	65	56
7	Mount Vernon Road & Teays Valley Road	Hurricane	0	0	4	8	25	37	32%	4.710	174.252	10	44	11	65	68
9	Great Teays Boulevard & Teays Valley Road	Scott Depot	0	1	2	2	13	18	28%	6.703	120.656	22	30	14	66	61
10	Midland Trail & US-60	Hurricane	0	1	0	11	37	49	24%	4.111	201.447	4	53	10	67	54
10	Locust Street & Midland Trail	Hurricane	0	2	1	10	63	76	17%	3.785	287.681	2	58	7	67	65
12	Charleston Road & Coveside Place	Red House	0	1	1	0	3	5	40%	14.669	73.343	34	15	26	75	55
13	1st Avenue & 41st Street	Nitro	0	1	1	1	17	20	15%	4.873	97.452	20	42	17	79	30
14	Mount Vernon Road & WV-34	Hurricane	0	0	1	7	16	24	33%	4.327	103.858	16	48	16	80	61
15	E Main Street & Midland Trail	Hurricane	0	1	0	1	3	5	40%	13.271	66.357	34	18	32	84	56
16	Charleston Road & Sugar Maple Lane	Buffalo	0	1	0	1	11	13	15%	5.720	74.357	26	36	25	87	48
17	Old Hurricane Creek Road & Putnam Avenue	Hurricane	0	0	3	9	65	77	16%	2.692	207.266	1	79	9	89	69
18	Teays Valley Road & US-35	Scott Depot	0	0	2	6	31	39	21%	3.227	125.844	9	69	13	91	61
19	Main Street & US-60	Hurricane	0	0	1	5	11	17	35%	4.626	78.640	23	46	23	92	54
19	Teays Valley Road & Winfield Road	Scott Depot	0	0	2	5	27	34	21%	3.286	111.735	11	66	15	92	61

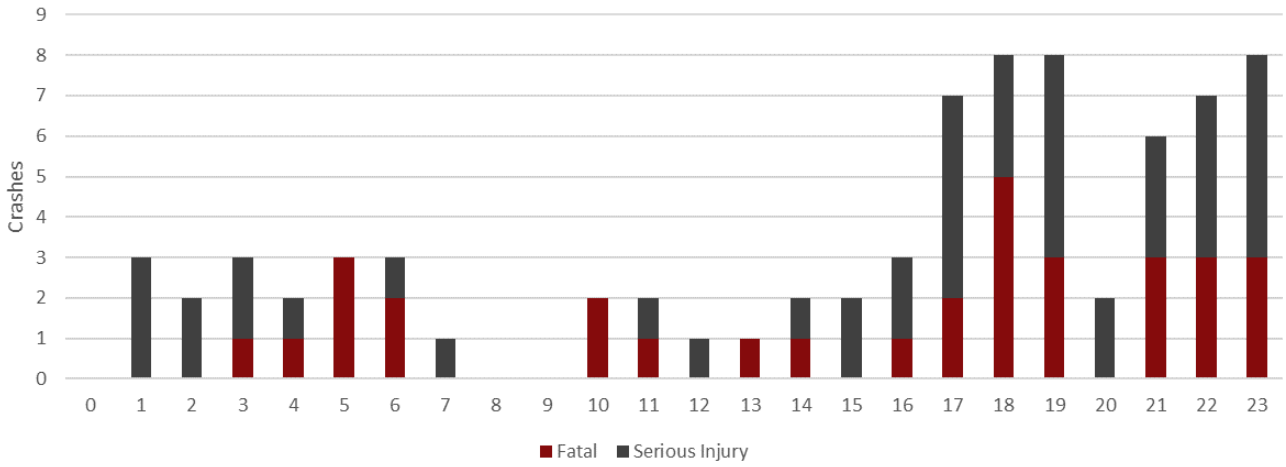
Appendix F: Pedestrian Crash Statistics

Kanawha County 2017-2021

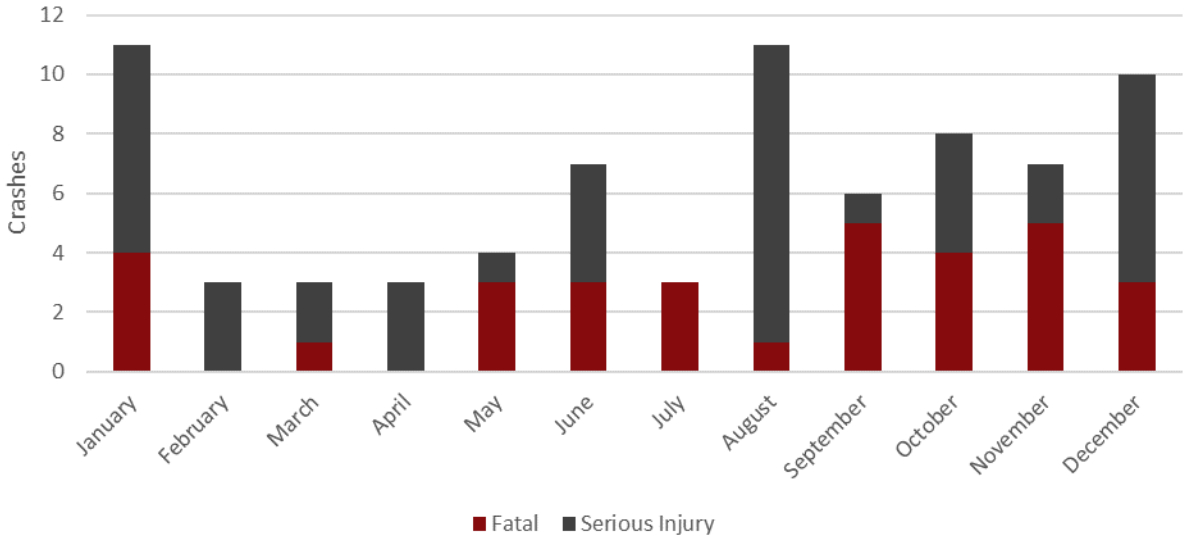
Pedestrian Crashes by Day of Week



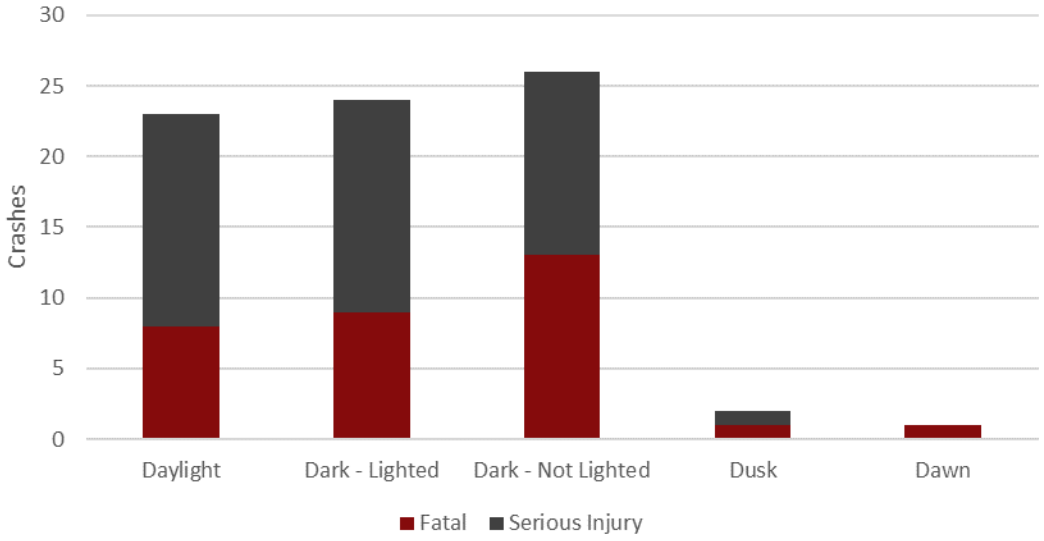
Pedestrian Crashes by Time of Day



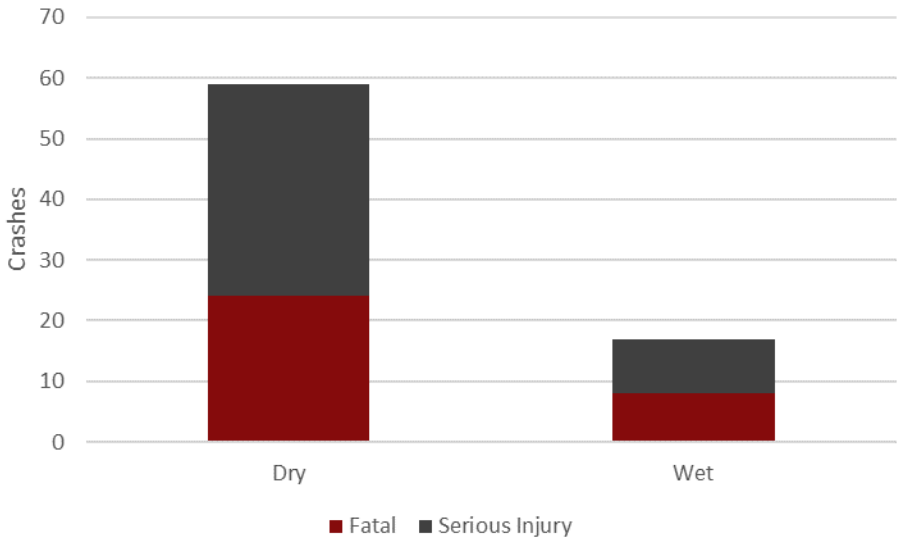
Pedestrian Crashes by Month of Year



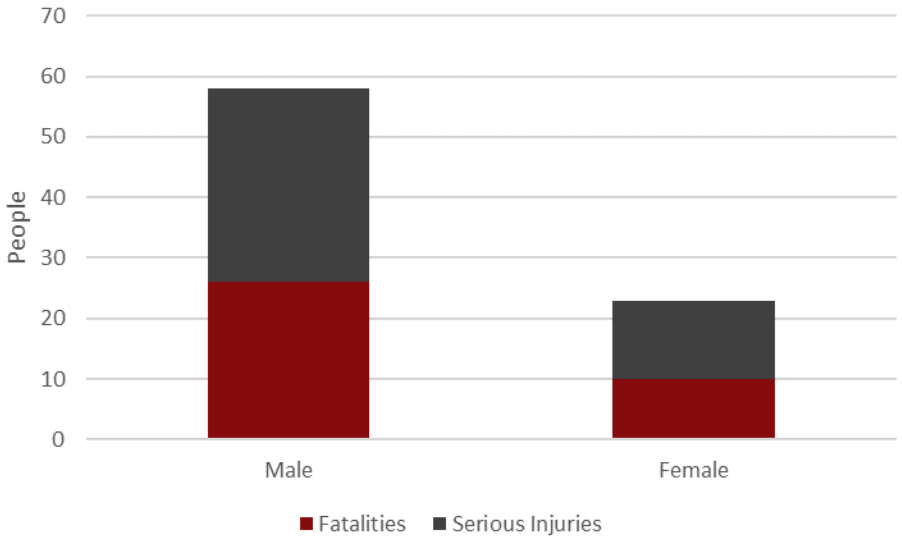
Pedestrian Crashes by Lighting Condition



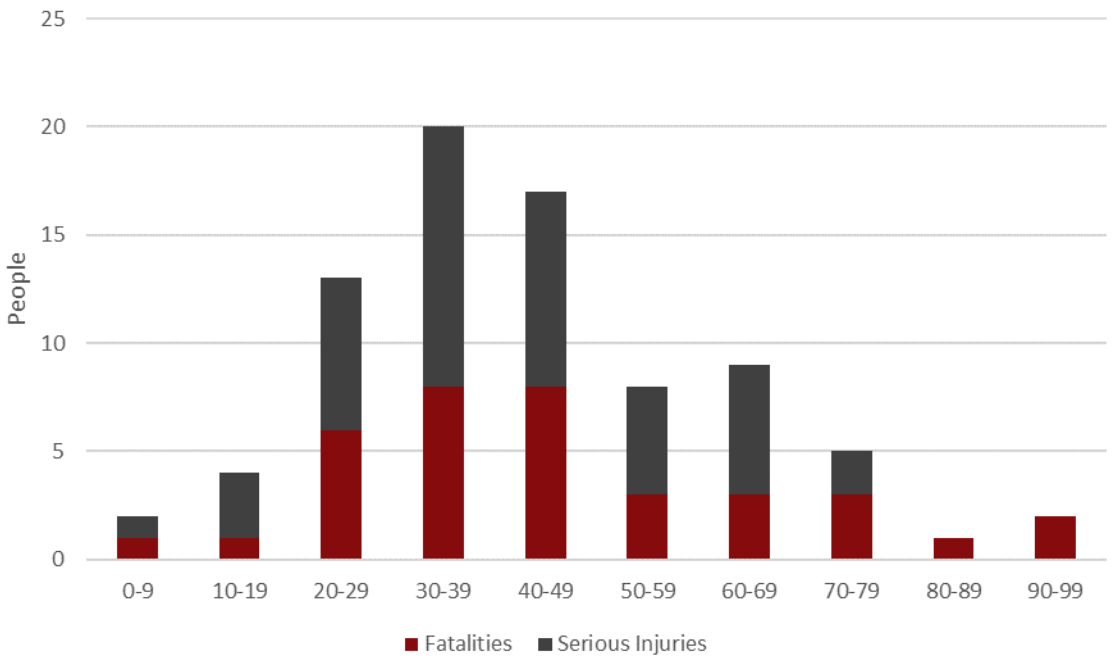
Pedestrian Crashes by Pavement Condition



Pedestrian Fatalities and Serious Injuries by Gender

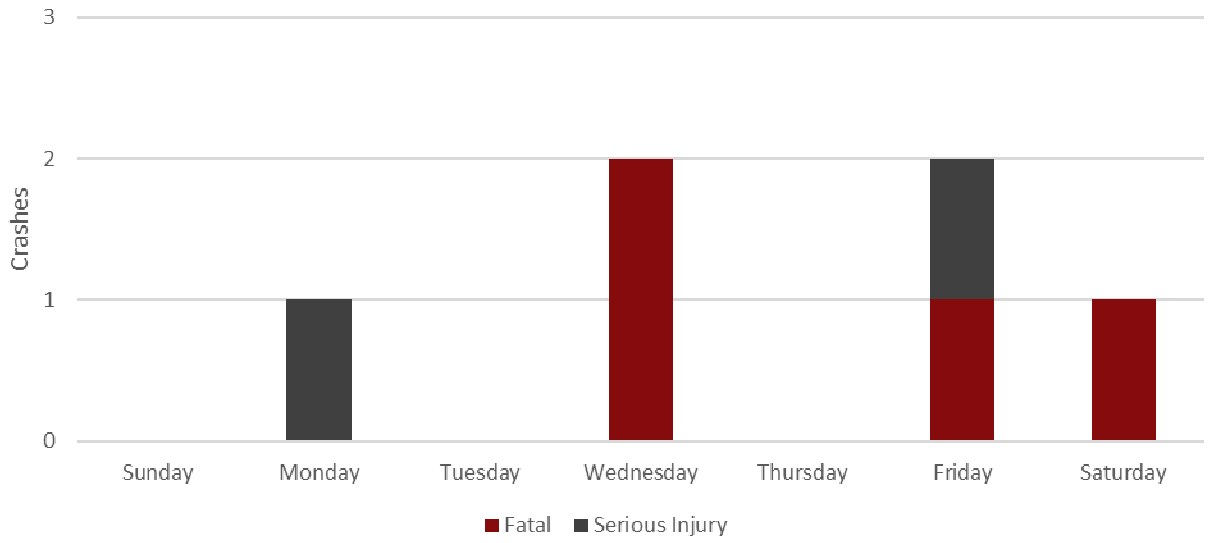


Pedestrian Fatalities and Serious Injuries by Age

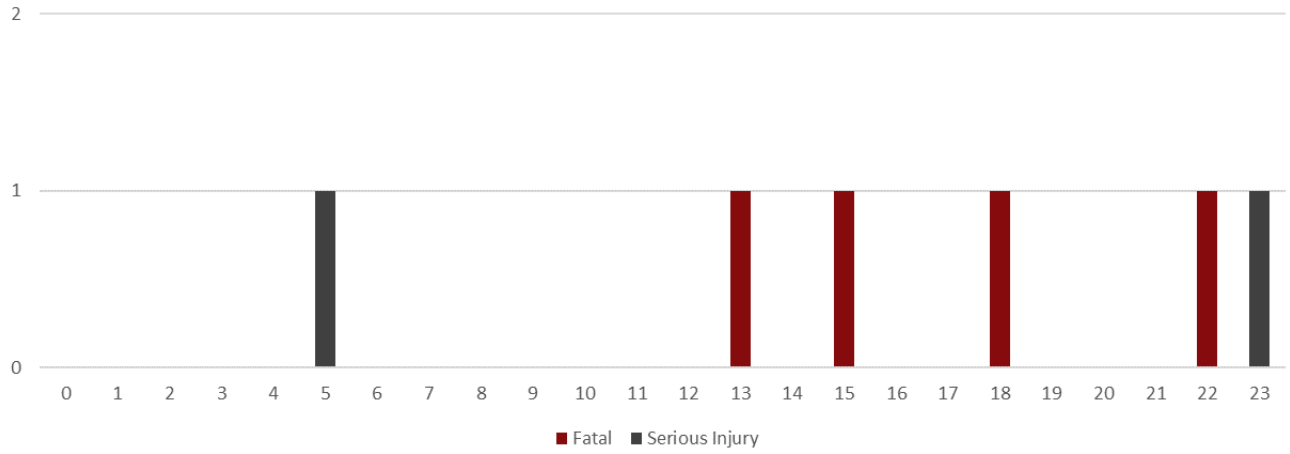


Putnam County 2017-2021

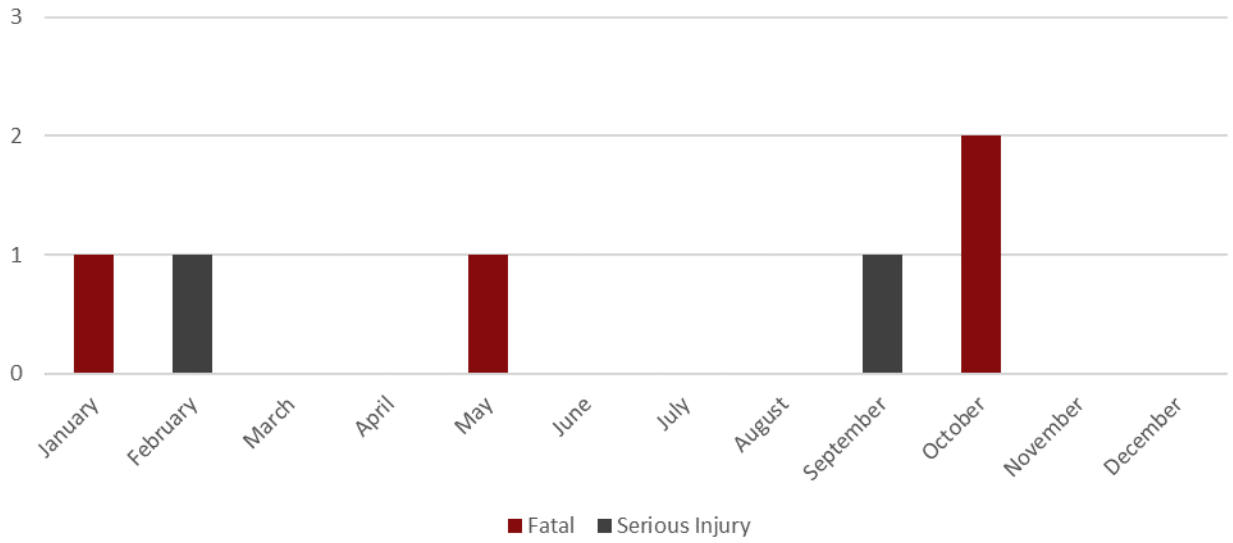
Pedestrian Crashes by Day of Week



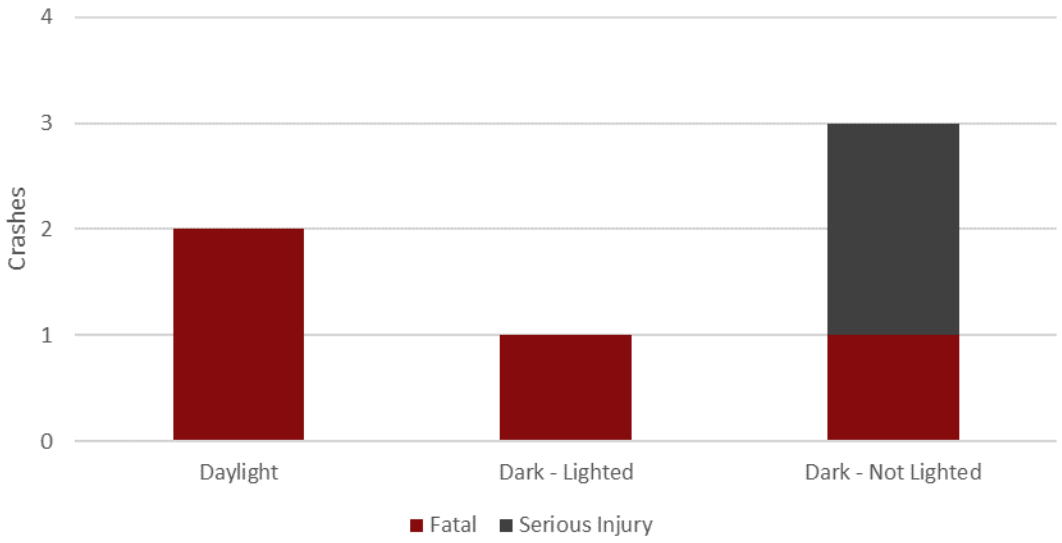
Pedestrian Crashes by Time of Day



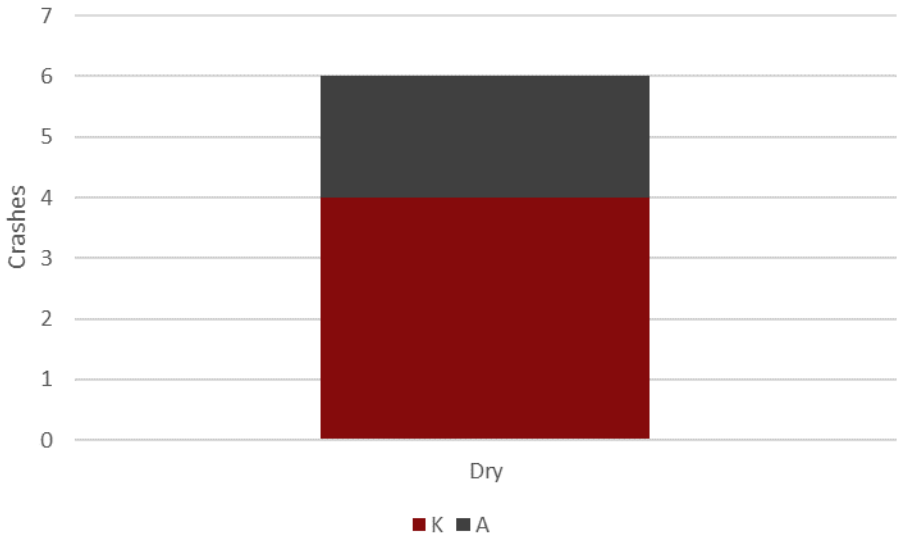
Pedestrian Crashes by Month of Year



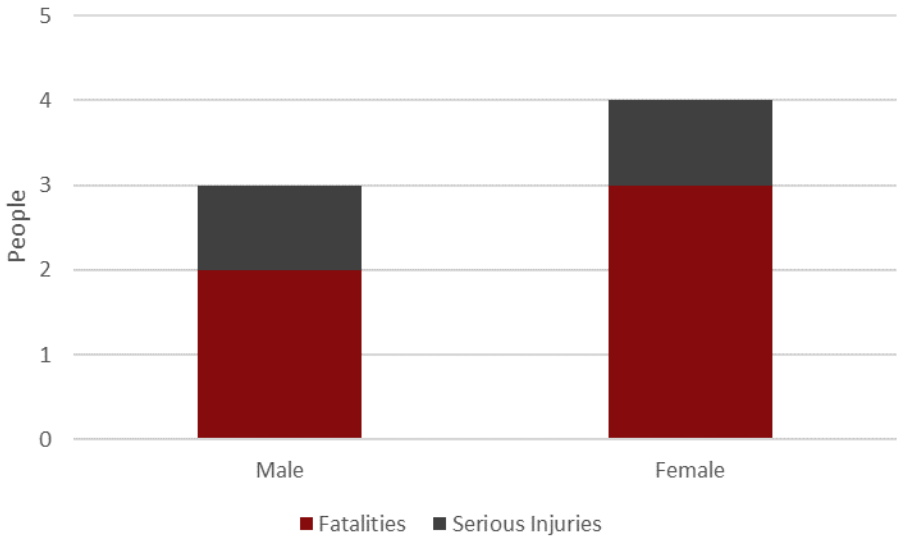
Pedestrian Crashes by Lighting Condition



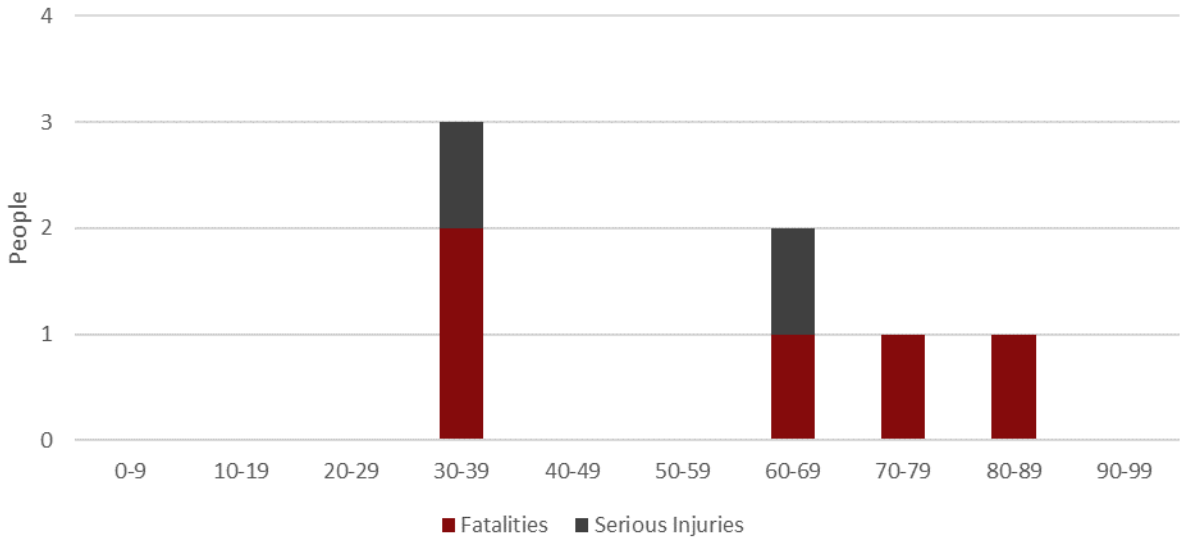
Pedestrian Crashes by Pavement Condition



Pedestrian Fatalities and Serious Injuries by Gender



Pedestrian Fatalities and Serious Injuries by Age



Appendix G: Systemic Pedestrian Analysis Methodologies and Results

Systemic Pedestrian Analysis Methodology

Pedestrian safety is a critical concern in both urban and rural areas, where people walk or bike as part of their daily routines. To improve pedestrian safety, researchers and policymakers need accurate data and tools to identify high-risk areas and implement targeted interventions. In this study, the project team aimed to develop a pedestrian risk model using a variety of data sources to estimate the risk of pedestrian-related crashes based on transportation network characteristics and potential proxies for pedestrian volume. Statistical analysis was used to identify the most significant predictors of pedestrian crashes. Indicators were assigned weights to develop an overall risk score for each transportation network segment. The resulting model can help transportation planners and policymakers prioritize resources and interventions to improve pedestrian safety in the studied area.

Data Collection

Data on the characteristics of the transportation network and potential proxies for pedestrian volume were collected from a variety of sources. Network characteristics, obtained from the 2019 Traffic Demand Model (TDM), included the following information for each segment of the network:

- The number of bidirectional traffic lanes
- Free flow speed
- Total annual volume
- Heavy vehicle volume

To estimate pedestrian volume, several proxies were used such as:

- Population density of the census tract.
- Proximity of bus stops within 100ft of a segment.
- The number of businesses such as liquor stores, gas stations, grocery stores, bars and restaurants, and daycare services within half a mile of a segment (SafeGraph).
- The number of public attractions including museums, historical sites, zoos, and parks within half a mile of a segment (Data Axle; NAICS code 7127).
- The number of public and private schools within half a mile of a segment (HIFLD).

The aim was to gather a comprehensive understanding of the transportation network and its potential impact on pedestrian safety.

Indicator Selection

Two criteria were established to ensure inputs into the model were meaningful for predicting pedestrian-related crashes. First, each indicator had to have an intuitive relationship with the number of pedestrian crashes. For example, a three-lane road might lead to more pedestrian crashes due to the third lane serving as a turning lane at an intersection. Additionally, each indicator had to show a statistically significant correlation with the number of pedestrian-related crashes. Establishing a statistically significant relationship was done using either a simple Pearson correlation coefficient or a linear regression model between the indicator and pedestrian crashes. By using these criteria, the project team aimed to select indicators that would provide valuable insights into pedestrian safety risks across the transportation network.

Data Normalization

Network Characteristics

Each selected indicator was normalized to determine which characteristics of the transportation network are disproportionately contributing to pedestrian-related crashes. Network characteristic indicators were normalized by calculating the number of crashes per mile for a given indicator value. This calculation was done by dividing the total number of crashes that occurred for a given indicator value ($crashes_i$) by the sum of the total miles for a given indicator value ($miles_i$), as shown in the equation below. For example, the expected crashes per mile for five-lane roads was calculated by dividing the total number of crashes that occurred on any five-lane road in the network by the total number of miles of five-lane roads within the network. Each indicator value was then ranked based on the expected number of crashes per mile and divided by the total number of possible values for a given indicator, resulting in a normalized indicator score. For continuous network characteristics – such as Total Annual Volume – values were sorted into discreet bins and normalized using the same calculation.

$$Expected\ Crashes\ per\ Mile = \frac{\sum crashes_i}{\sum miles_i}$$

Pedestrian Volume

The pedestrian volume indicators listed above were all found to have a statistically significant linear relationship with the number of crashes. Therefore, these indicators were normalized using a simple min-max normalization, shown in the equation below where x_i' is the normalized value and x_i is the indicator value for a given network segment. However, an exception was made for the presence of a bus stop. Since few segments had more than one bus stop located within 100 feet, and none had more than two, a binary score of 0 or 1 was assigned to indicate the absence or presence of a bus stop, respectively. By doing so, the model considers the presence of a bus stop, while avoiding any potential issues caused by insufficient sample size.

$$x_i' = \frac{x_i - \min(x)}{\max(x) - \min(x)}$$

Indicator Weighting

Once each indicator was normalized, weights were assigned to them so that the weights would sum up to 1 within each theme. A theme score was then calculated for each segment by summing up the weighted indicators within each theme. Next, each theme was assigned a weight and summed to calculate an overall pedestrian risk score. Finally, each segment was ranked according to its pedestrian risk score, with a rank of 1 indicating the segment with the highest pedestrian risk score in the transportation network.

Conclusion

The methodology presented in this study provides a comprehensive approach to assessing pedestrian risk in the RIC region. By considering both network characteristics and pedestrian volumes, this methodology provides a more complete understanding of the factors contributing to pedestrian crashes. Assigning weights to each indicator allows stakeholders familiar with the region to easily adjust the model and better prioritize known risk multipliers, reflecting on-the-ground conditions. Ranking segments based on their pedestrian risk score allows transportation planners and decision-makers to

identify areas in need of intervention to improve pedestrian safety. The findings from this study can be used to inform policy decisions and target resource allocation to reduce pedestrian-related crashes and ultimately save lives.

Top 50 Kanawha County

Rank	Road Name	Segment	Crashes	County
1	Kanawha Blvd E	Brooks St to Morris St	1	Kanawha
2	Washington St E	Sentz St to Brooks St	1	Kanawha
3	Brooks St	Washington St E to Lewis St	2	Kanawha
4	Virginia St E	Leon Sullivan Way to Brooks St	0	Kanawha
5	WV-61	41st St SE to 45th St SE	2	Kanawha
6	Lee St E	Leon Sullivan Way to Brooks St	1	Kanawha
7	Quarrier St	Leon Sullivan Way to Brooks St	0	Kanawha
8	Washington St E	Morris St to Bradford St	5	Kanawha
9	Washington St E	Brooks St to Morris St	3	Kanawha
10	S Side Brg	Loudon Heights Rd to Ferry St	0	Kanawha
11	S Side Brg	S Side Bridge - Kanawha Blvd E to Virginia St E	0	Kanawha
12	Kanawha Blvd E	Elizabeth St to Greenbrier St	0	Kanawha
13	Washington St E	Sidney Ave to Greenbrier St	5	Kanawha
14	Brooks St	Lee St E to Washington St E	1	Kanawha
15	Morris St	Washington St E	2	Kanawha
16	WV-61	45th St SE to 50th St SE	2	Kanawha
17	Kanawha Blvd E	Morris St to Bradford St	2	Kanawha
18	Virginia St W	Virginia St Bridge	0	Kanawha
19	Kanawha Blvd W	Kanawha Blvd Bridge	0	Kanawha
20	Kanawha Blvd E	Bradford St to Ruffner Ave	3	Kanawha
21	Brooks St	Kanawha Blvd E to Virginia St E	0	Kanawha
22	Kanawha Blvd E	Ruffner Ave to Elizabeth St	2	Kanawha
23	6th Ave	8th St to Washington St	0	Kanawha
24	Loudon Heights Rd	S Side Bridge to Roller Rd	0	Kanawha
25	Washington St E	Bradford St to Shelton Ave	3	Kanawha
26	Lee St E	Dickinson St to Leon Sullivan Way	1	Kanawha
27	Quarrier St	Clendenin St to Truslow St	0	Kanawha
28	Randolph St	Randolph St Bridge	0	Kanawha
29	Lee St Brg	Lee St Bridge	2	Kanawha
30	Smith St	Leon Sullivan Way to Brooks St	1	Kanawha
31	WV-61	36th St SE to 38th St SE	1	Kanawha
32	MacCorkle Ave	Ford St to Jefferson Rd	3	Kanawha
33	WV-61	52nd St SE to 56th St SE	2	Kanawha
34	US-119	Pennsylvania Ave S - Lee St W to Washington St W	0	Kanawha
35	Tennessee Ave	Randolph St to Wyoming St	1	Kanawha
36	Washington St E	Washington St Bridge to Clendenin St	1	Kanawha

Rank	Road Name	Segment	Crashes	County
37	Lee St E	Laidley St to Summers St	2	Kanawha
38	Virginia St E	Capitol St to Hale St	0	Kanawha
39	Kanawha Blvd E	Truslow St to Goshorn St	2	Kanawha
40	US-119	Lee St E to Washington St E	5	Kanawha
41	Broad St	Lee St E to Washington St E	3	Kanawha
42	Virginia St E	Summers St to Capitol St	0	Kanawha
43	Kanawha Blvd E	McFarland St to Dunbar St	0	Kanawha
44	Virginia St E	Hale St to Dickinson St	0	Kanawha
45	Virginia St E	Court St to Laidley St	2	Kanawha
45	Virginia St E	Laidley St to Summers St	1	Kanawha
47	Kanawha Blvd E	Leon Sullivan Way to Brooks St	0	Kanawha
48	Kanawha Blvd E	Dunbar St to Leon Sullivan Way	0	Kanawha
49	Kanawha Blvd E	Hale St to McFarland St	1	Kanawha
50	Kanawha Blvd E	Summers St to Capitol St	1	Kanawha

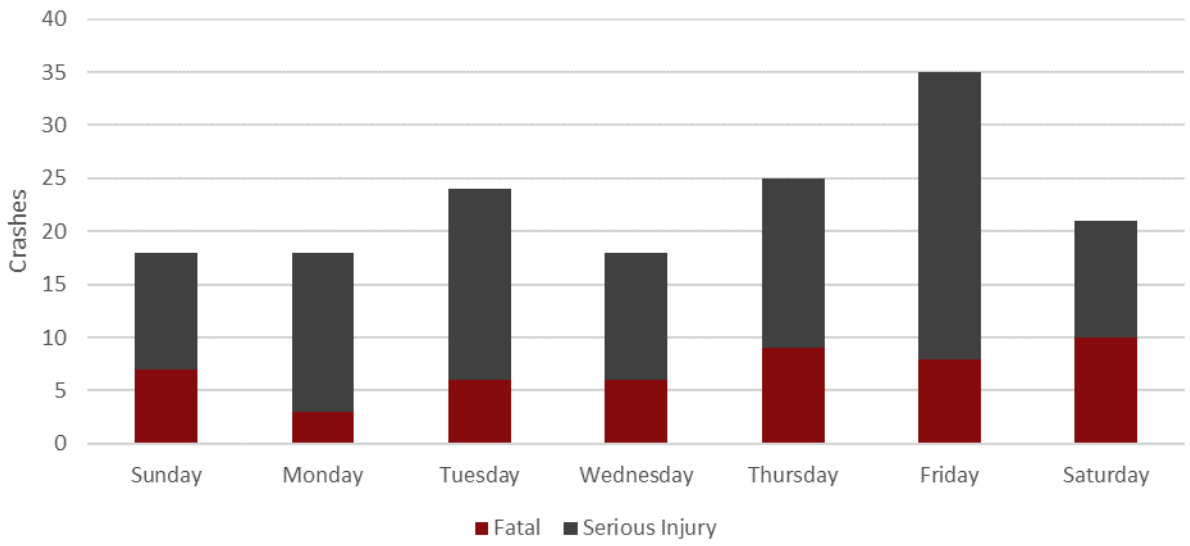
Top 20 Putnam County

Rank	County Rank	Road Name	Segment	County	Crashes
70	1	Main St	Hale St to Midland Trl	Putnam	2
121	2	WV-34	Mount Vernon Rd to Grille Ln	Putnam	1
140	3	WV-34	Grille Ln to I-64	Putnam	0
151	4	CR-19	I-64 Underpass	Putnam	0
242	5	WV-25	19th St to 23rd St	Putnam	0
247	6	WV-34	I-64 Underpass	Putnam	0
257	7	Hurricane Creek Rd	I-64 to Old Hurricane Creek Rd	Putnam	0
279	8	WV-34	Thistlewood Dr to State Route 34/ Teays Valley Rd	Putnam	0
289	9	Main St	US Route 60 to Hale St	Putnam	0
310	10	Hurricane Creek Rd	Old Hurricane Creek Rd to Teays Valley Rd	Putnam	0
324	11	WV-34	I-64 to N Poplar Fork Rd	Putnam	0
327	12	WV-25	37th St to Pickens Rd	Putnam	0
334	13	WV-34	State Route 34/ Teays Valley Rd to Mount Vernon Rd	Putnam	0
366	14	Teays Valley Rd	Mount Vernon Rd to Heritage Pl	Putnam	0
397	15	WV-34	Hurricane Creek Rd to Spur Ln	Putnam	0
404	16	US-60	County Line to Main St	Putnam	0
426	17	WV-25	I-64 to Cross Lanes Dr	Putnam	0
453	18	CR-33	State Route 34 to Mount Vernon Rd	Putnam	0
454	19	WV-34	Main St to Hurricane Creek Rd	Putnam	0
475	20	WV-25	Pickens Rd to I-64	Putnam	1

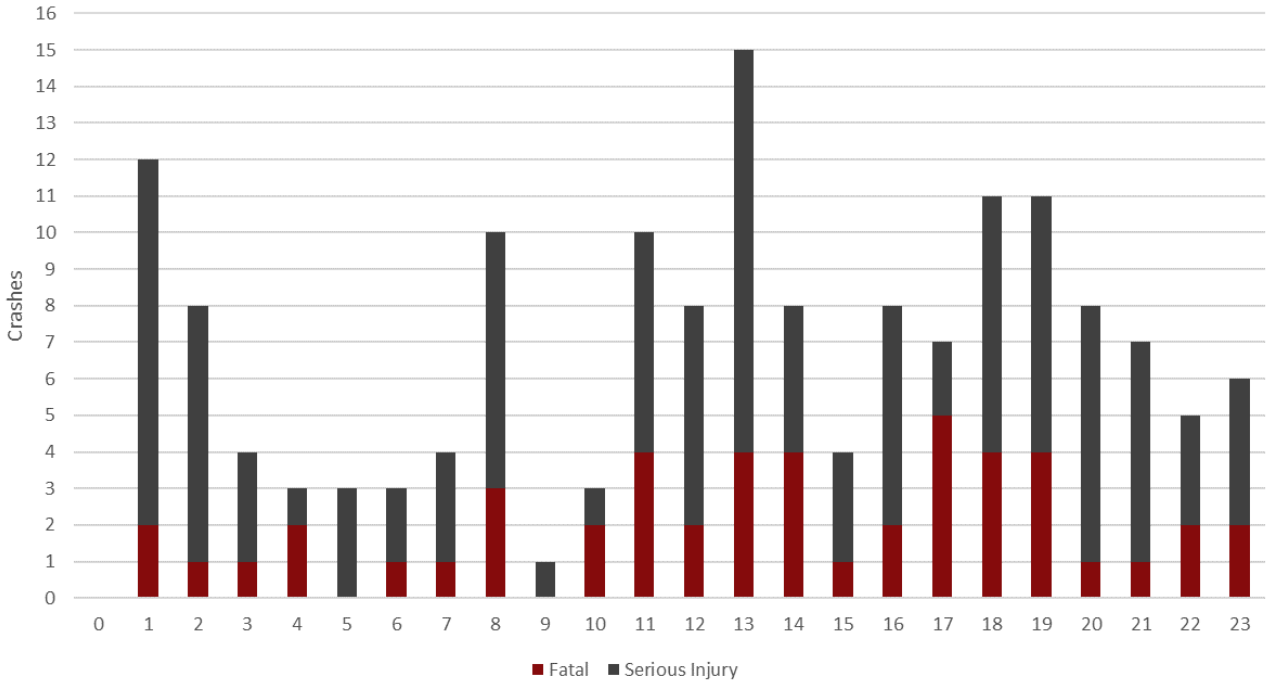
Appendix H: Roadway Departure Crash Statistics

Kanawha County 2017-2021

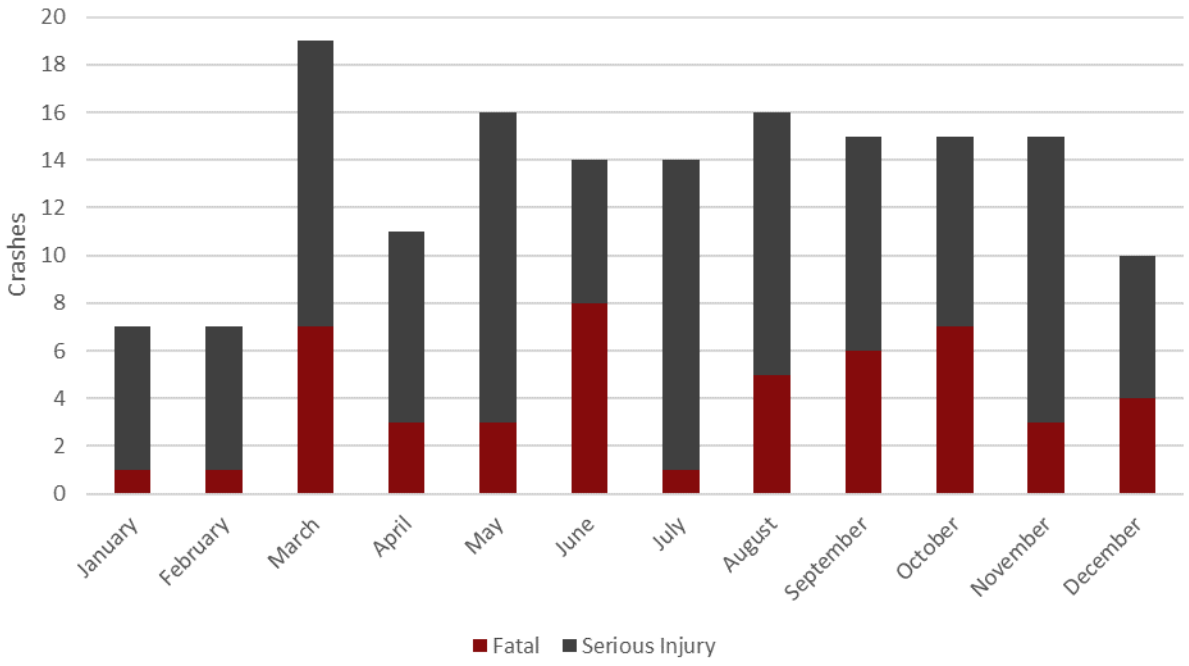
Roadway Departure Crashes by Day of Week



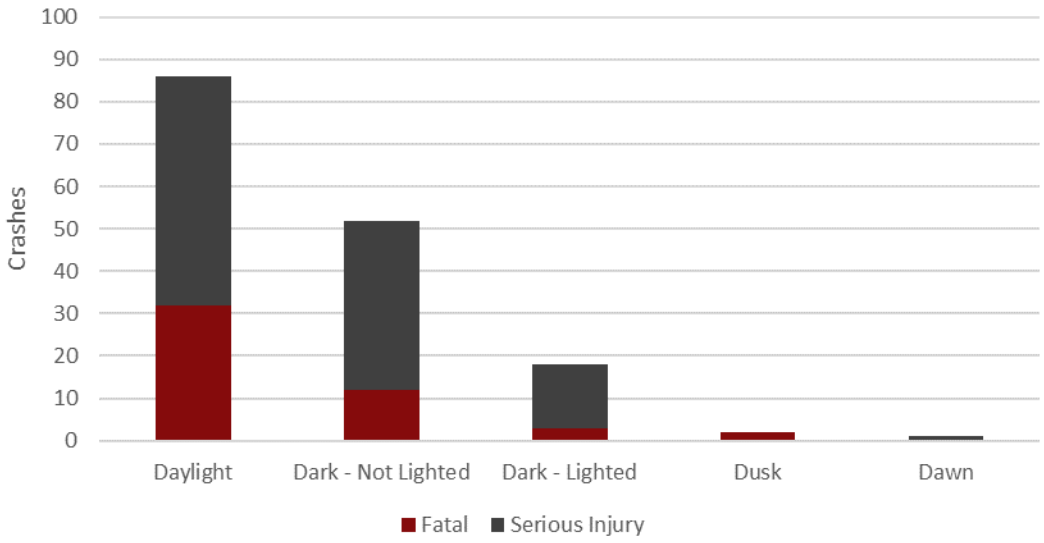
Roadway Departure Crashes by Time of Day



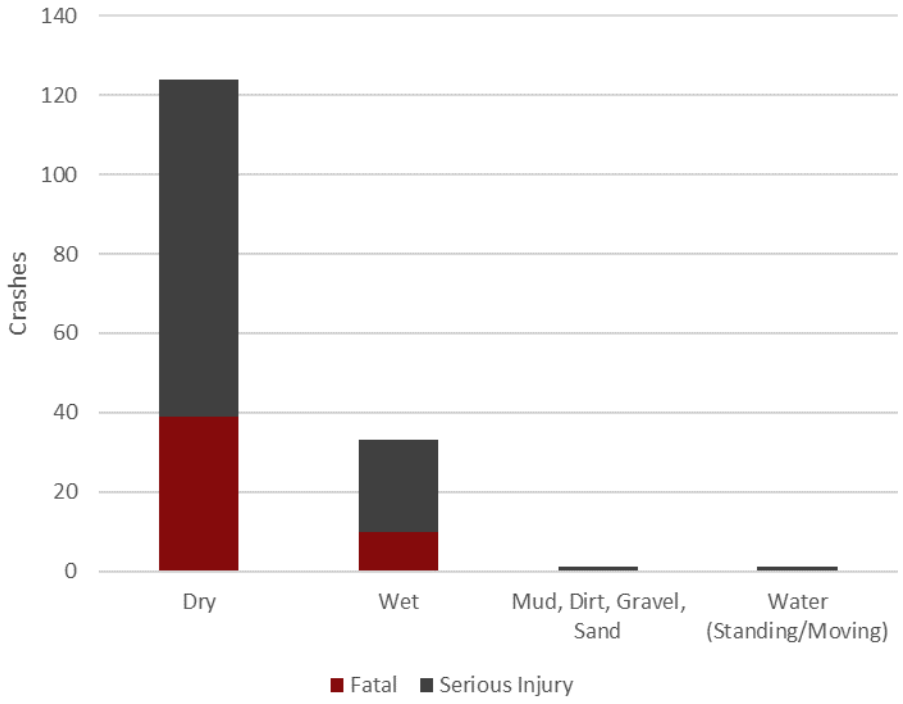
Roadway Departure Crashes by Month of Year



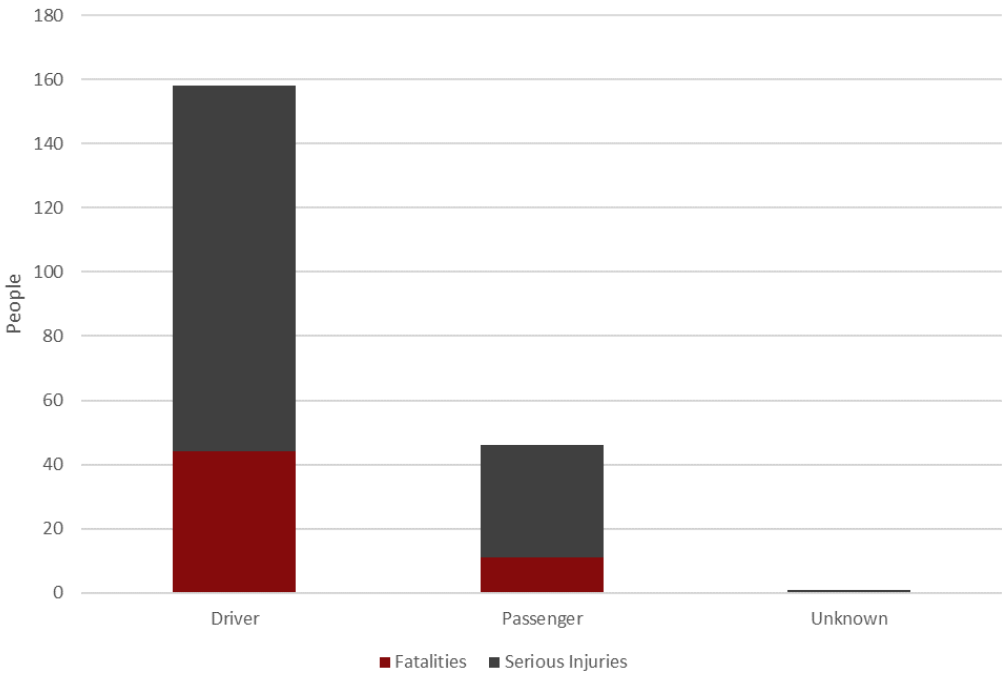
Roadway Departure Crashes by Lighting Condition



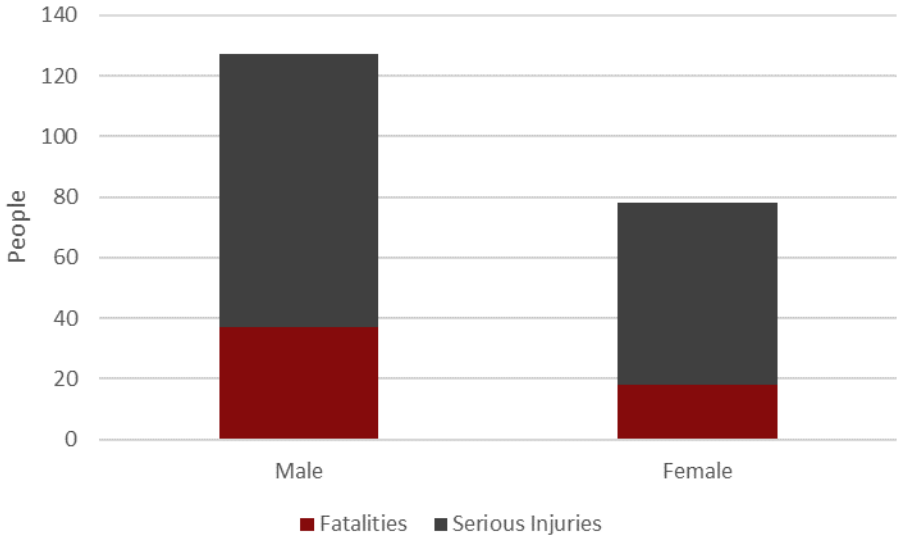
Roadway Departure Crashes by Pavement Condition



Roadway Departure Fatalities and Serious Injuries by Person Type



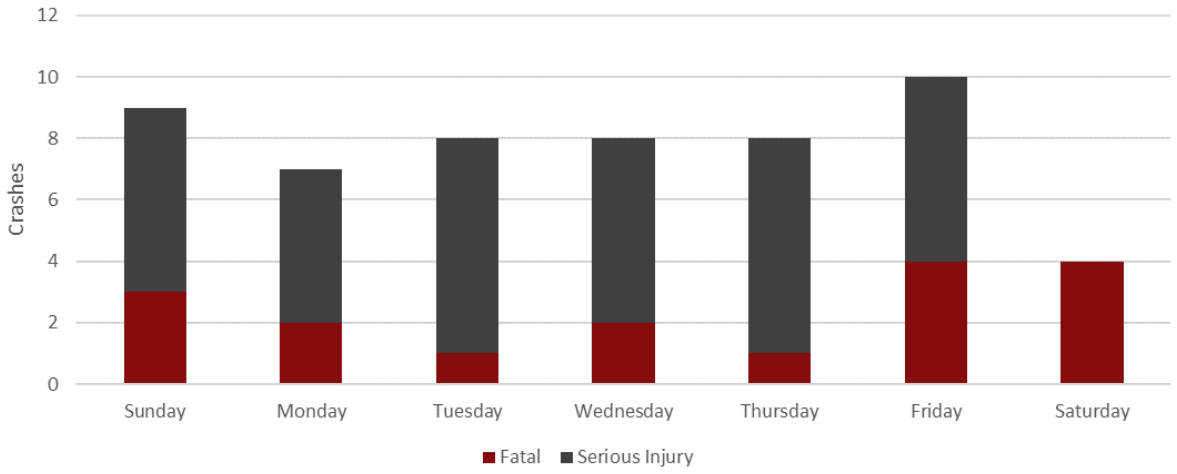
Roadway Departure Fatalities and Serious Injuries by Gender



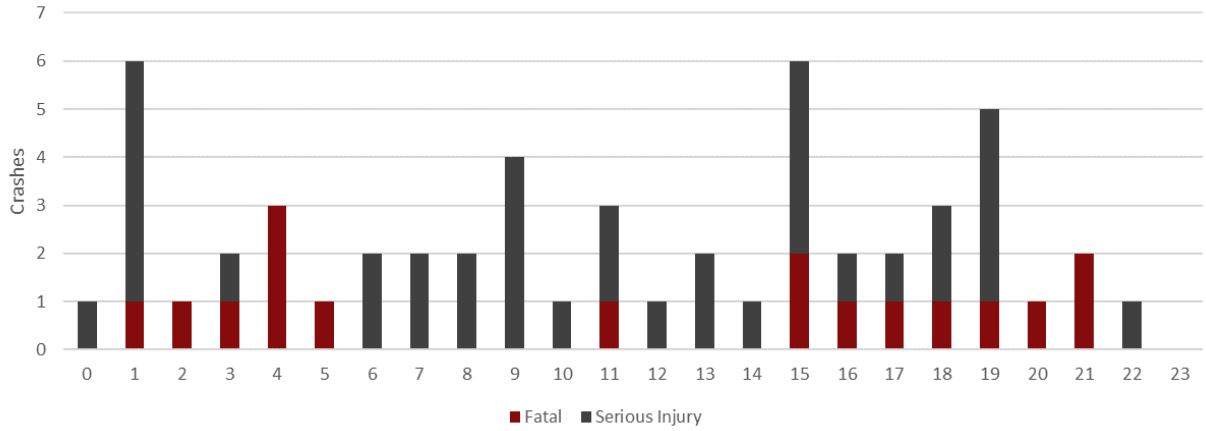
Roadway Departure Fatalities and Serious Injuries by Age

Putnam County 2017-2021

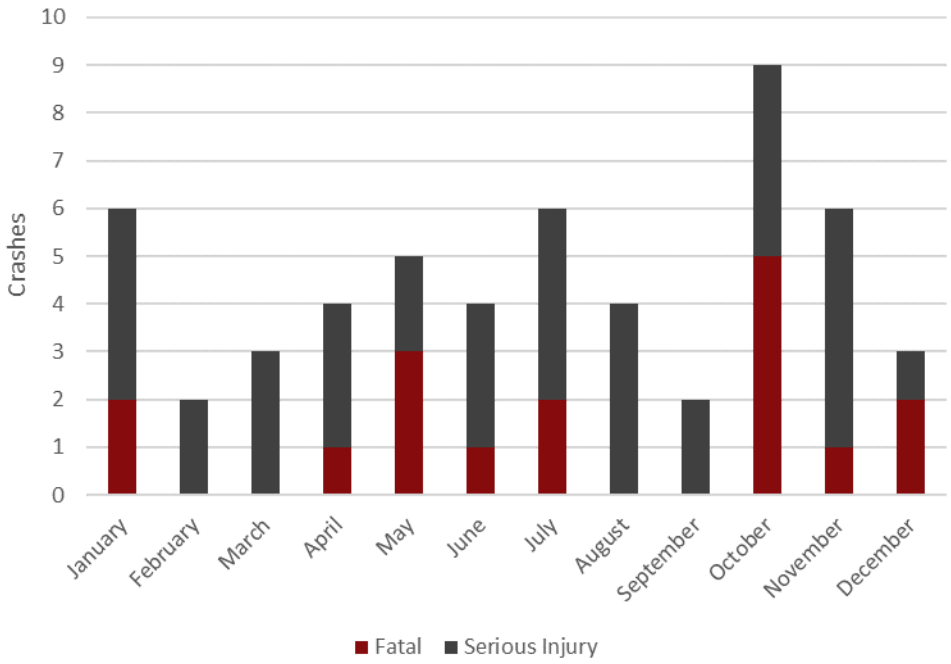
Roadway Departure Crashes by Day of Week



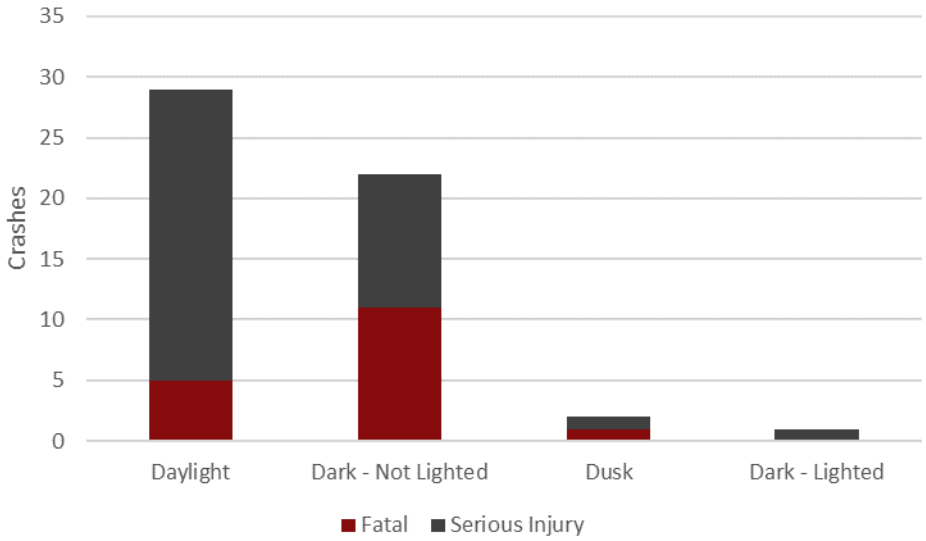
Roadway Departure Crashes by Time of Day



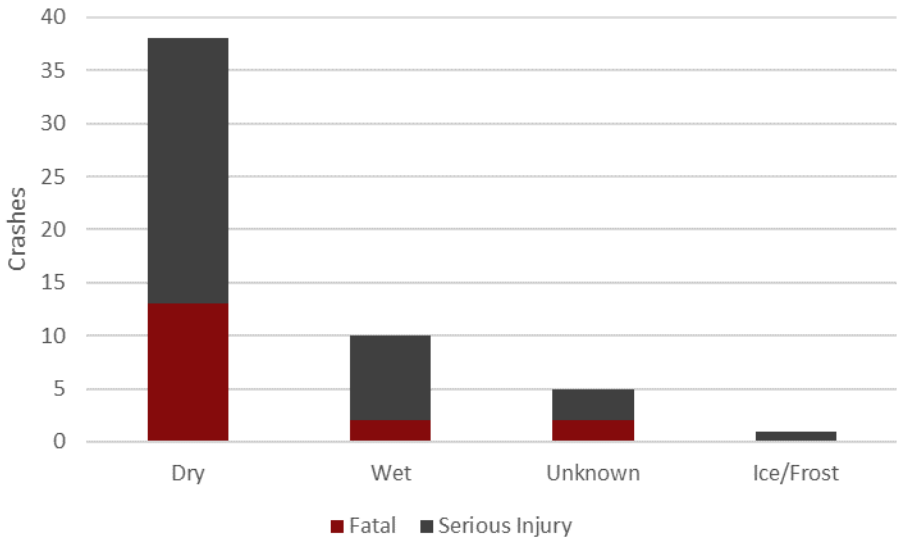
Roadway Departure Crashes by Month of Year



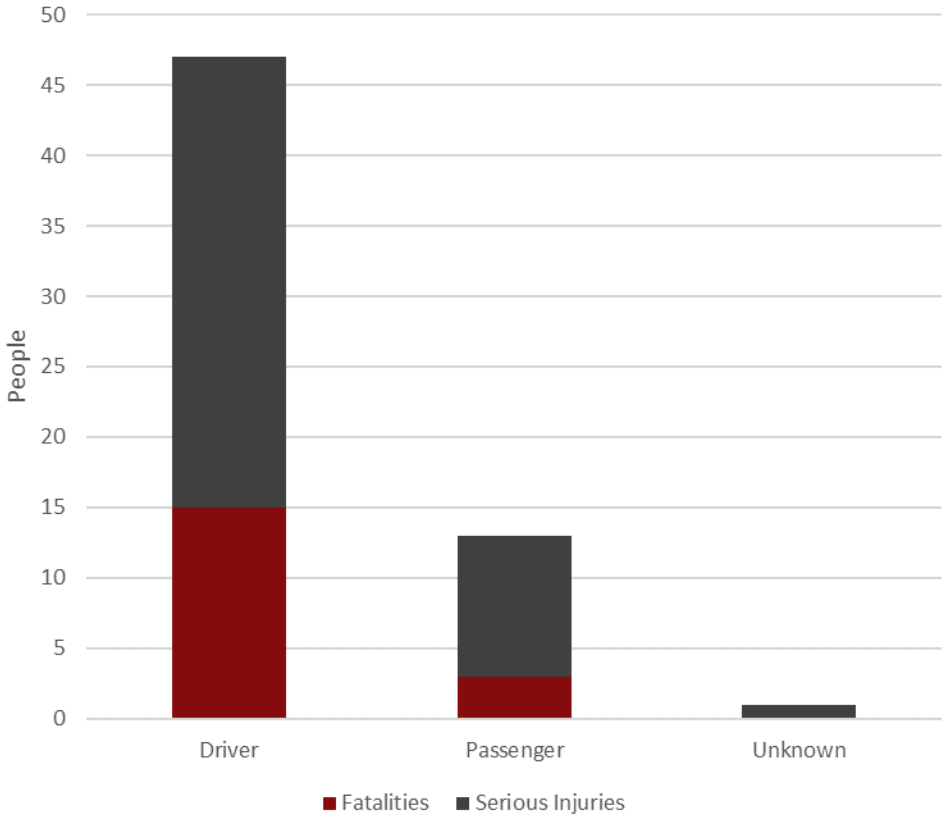
Roadway Crashes by Lighting Condition



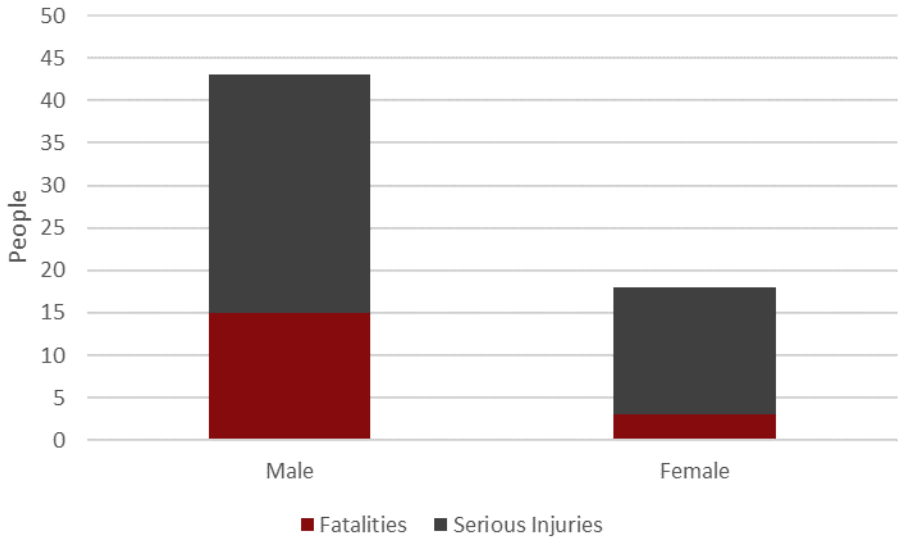
Roadway Departure Crashes by Pavement Condition



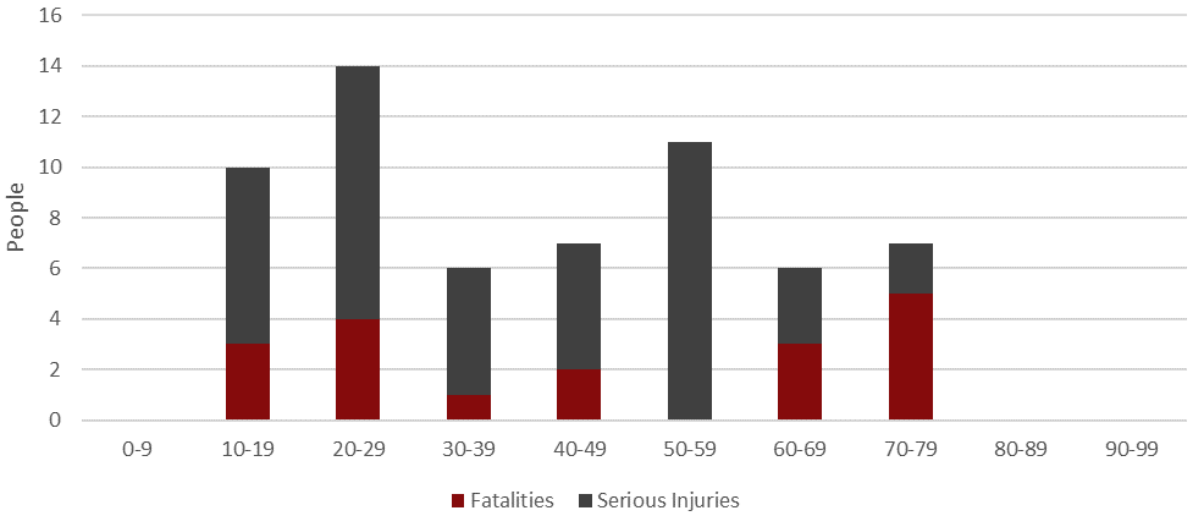
Roadway Departure Fatalities and Serious Injuries by Person Type



Roadway Departure Fatalities and Serious Injuries by Gender



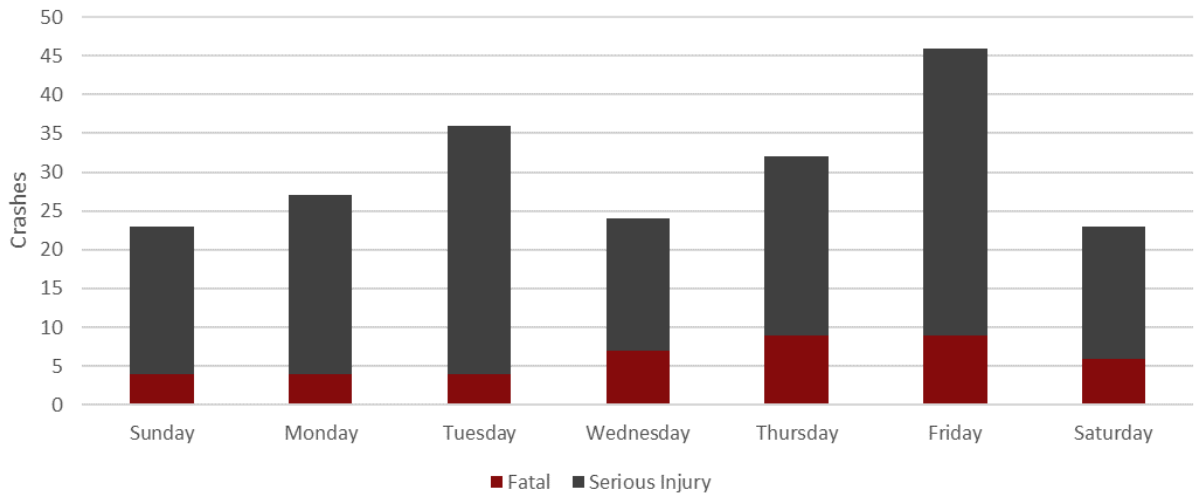
Roadway Departure Fatalities and Serious Injuries by Age



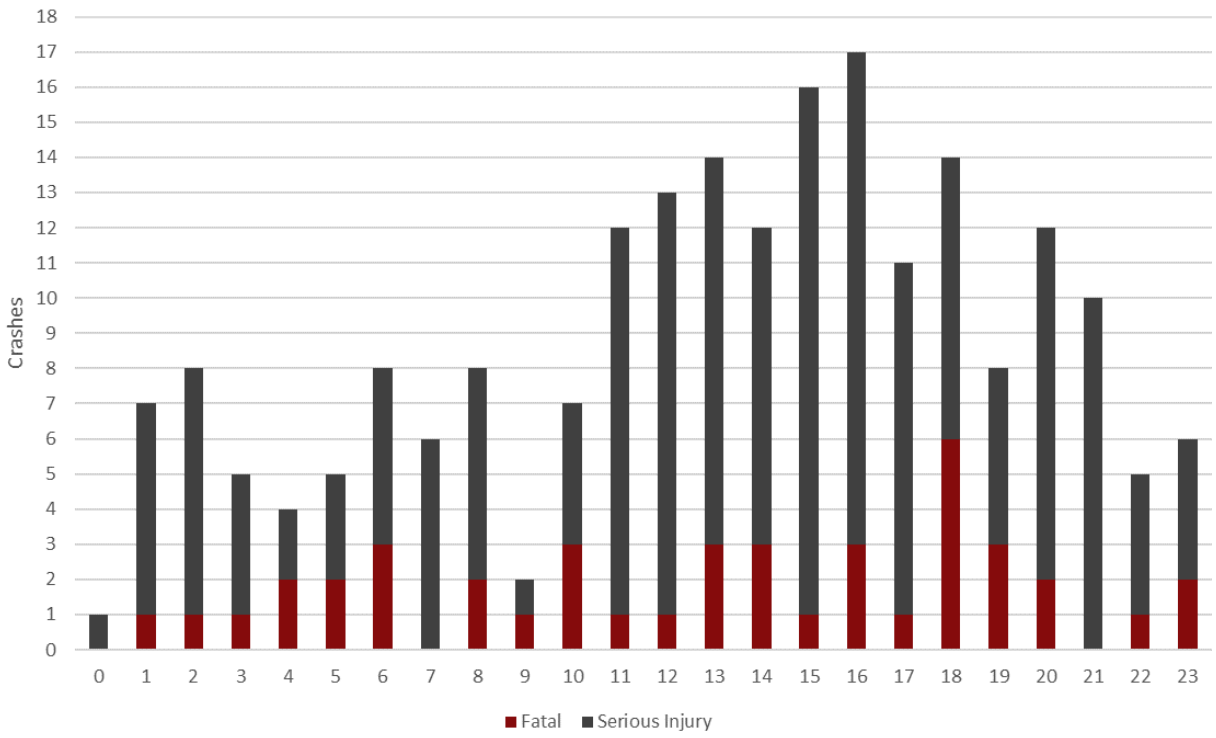
Appendix I: Speed and Aggressive Driving Crash Statistics

Kanawha County 2017-2020

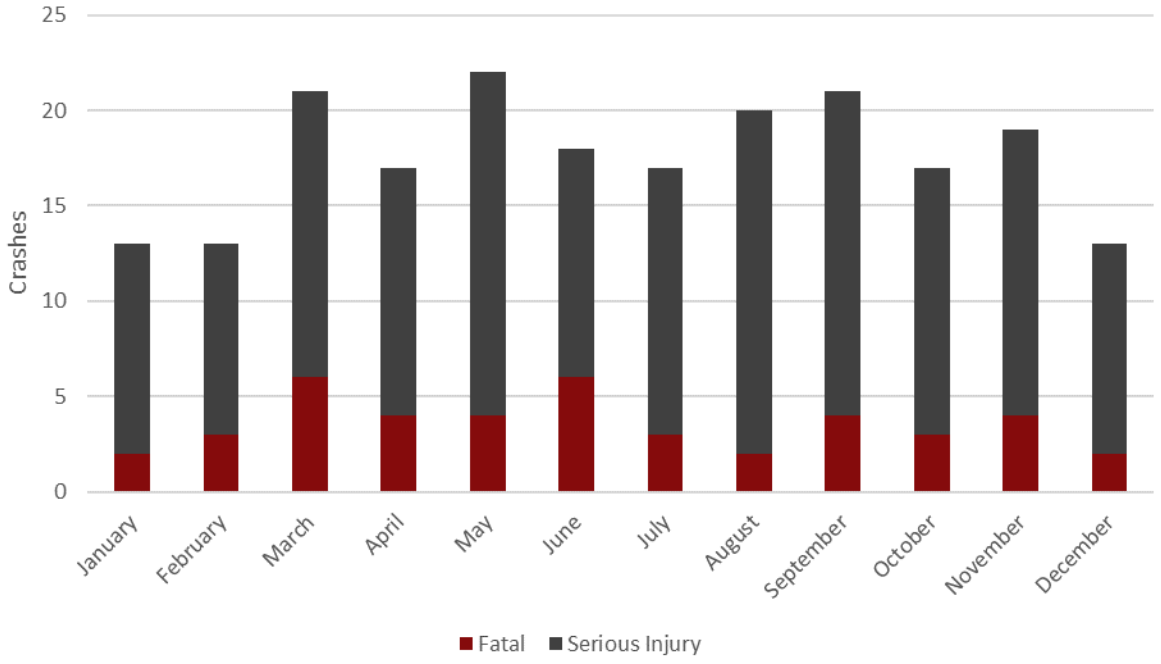
Speed and Aggressive Driving Crashes by Day of Week



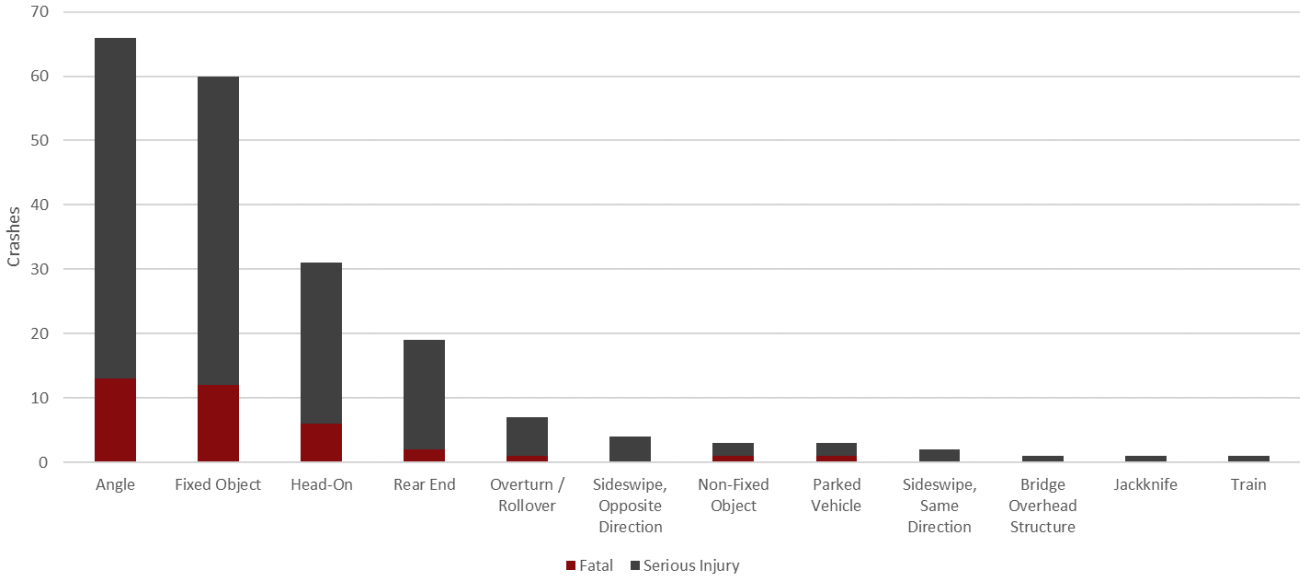
Speed and Aggressive Driving Crashes by Time of Day



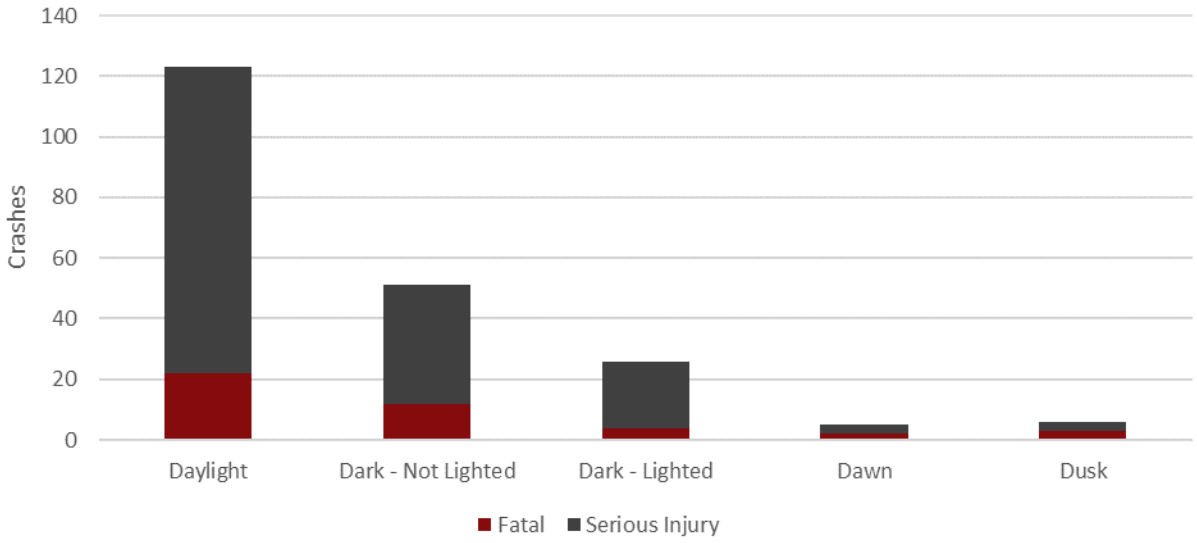
Speed and Aggressive Driving Crashes by Month of Year



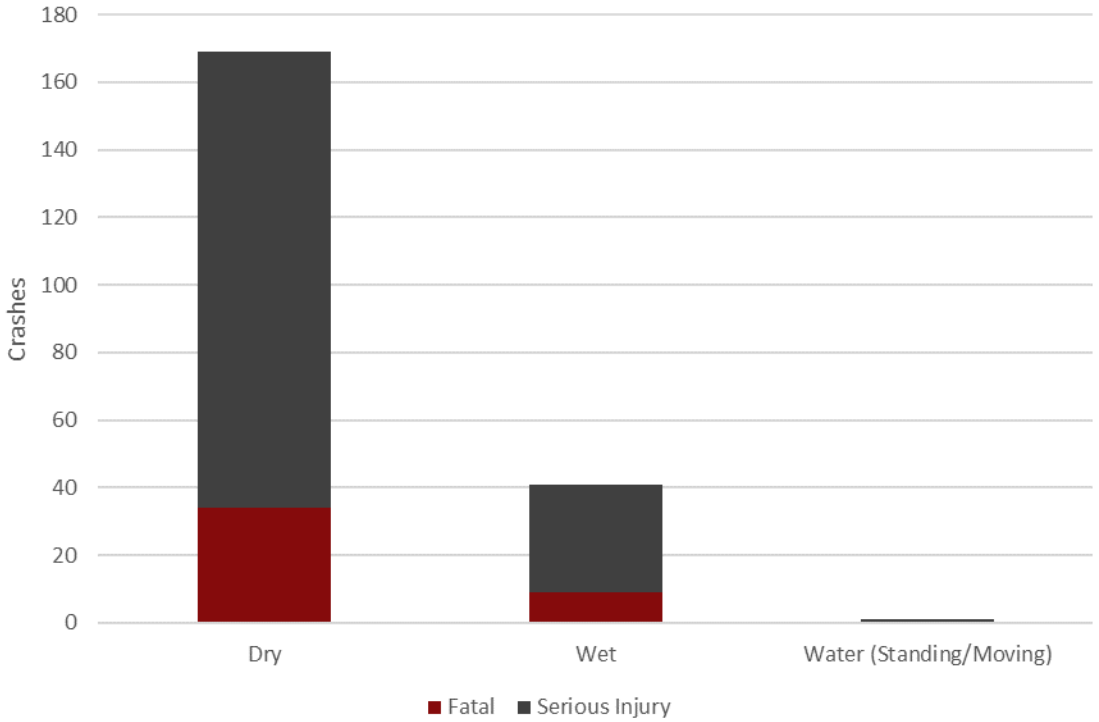
Speed and Aggressive Driving Crashes by Type



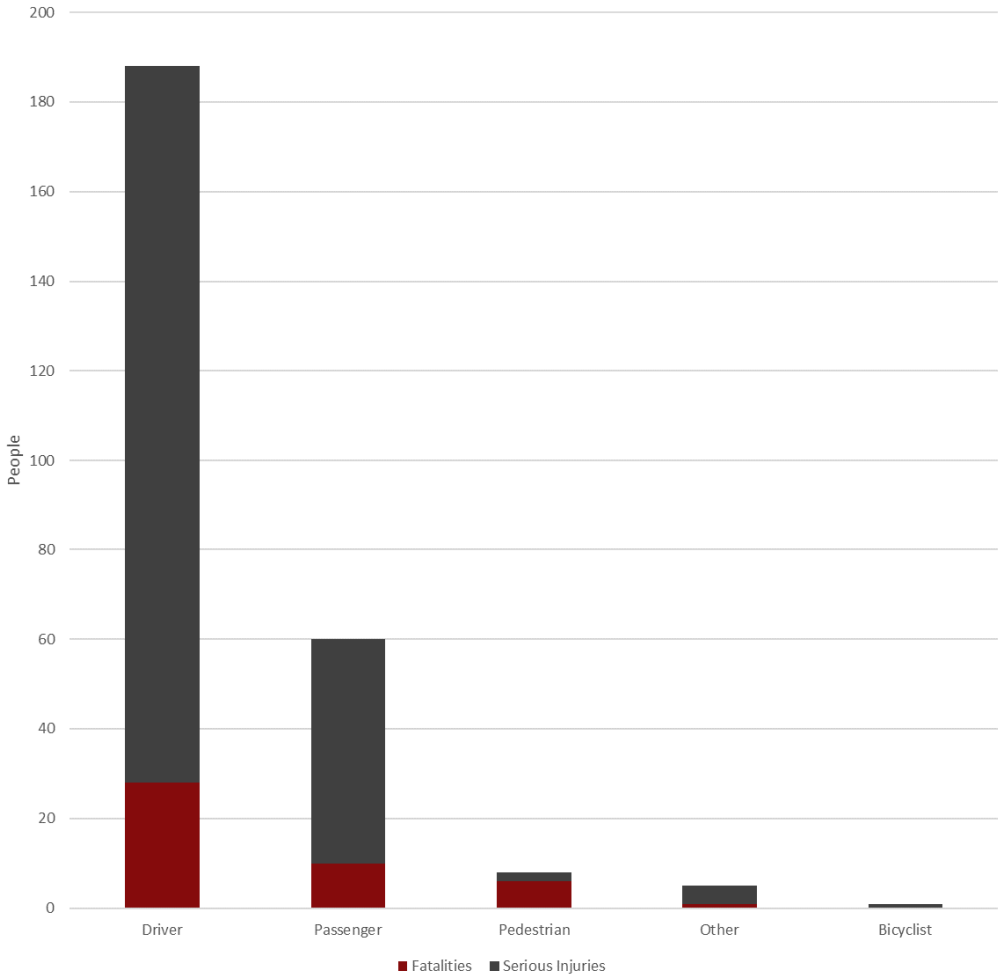
Speed and Aggressive Driving Crashes by Lighting Condition



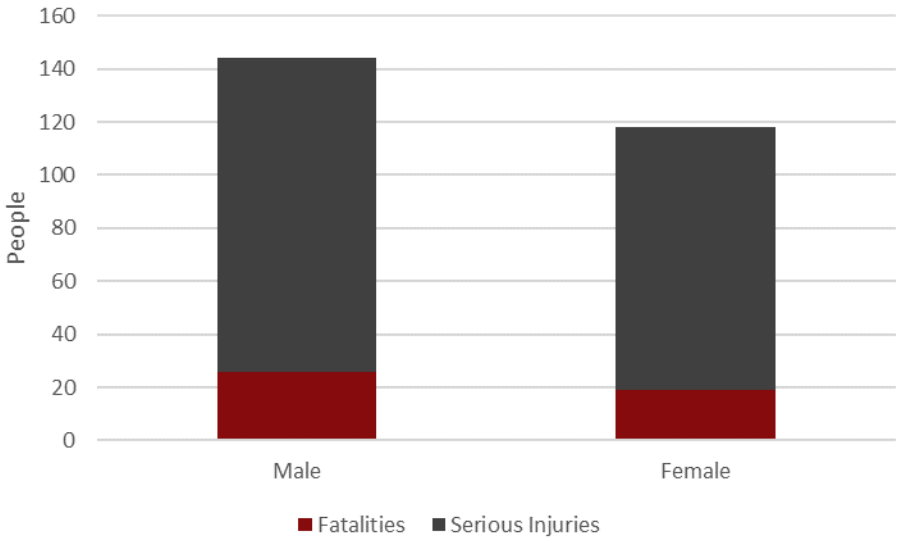
Speed and Aggressive Driving Crashes by Pavement Condition



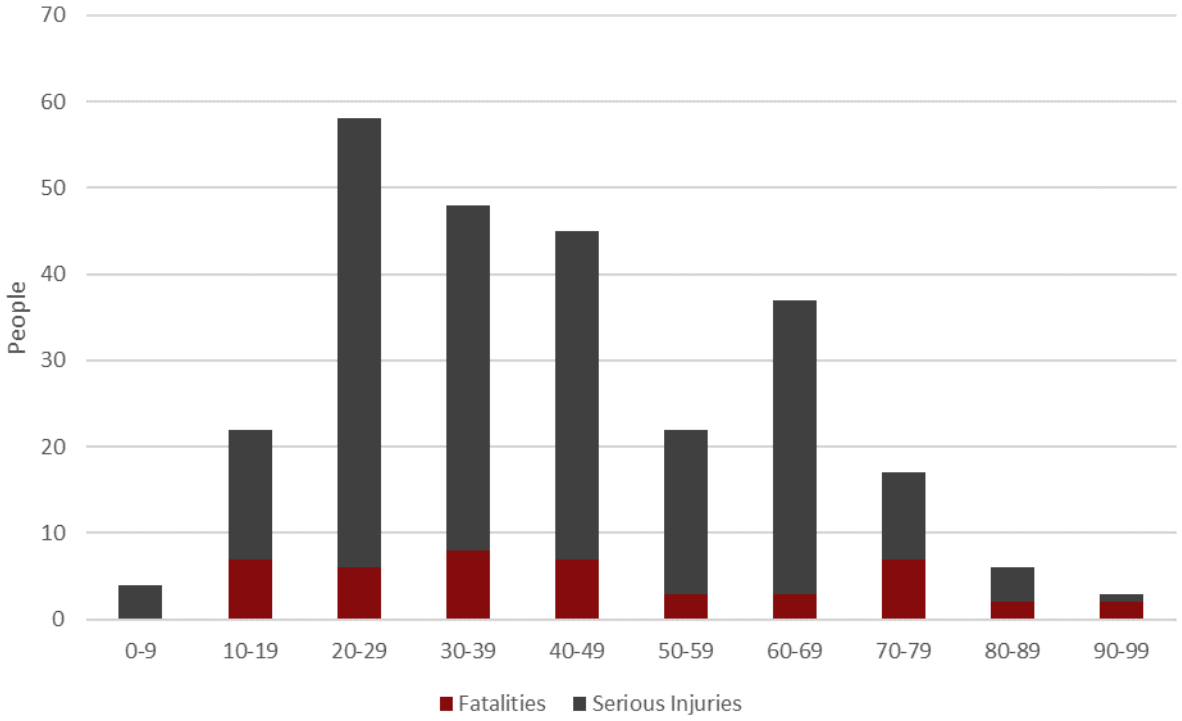
Speed and Aggressive Driving Fatalities and Serious Injuries by Person Type



Speed and Aggressive Driving Fatalities and Serious Injuries by Gender

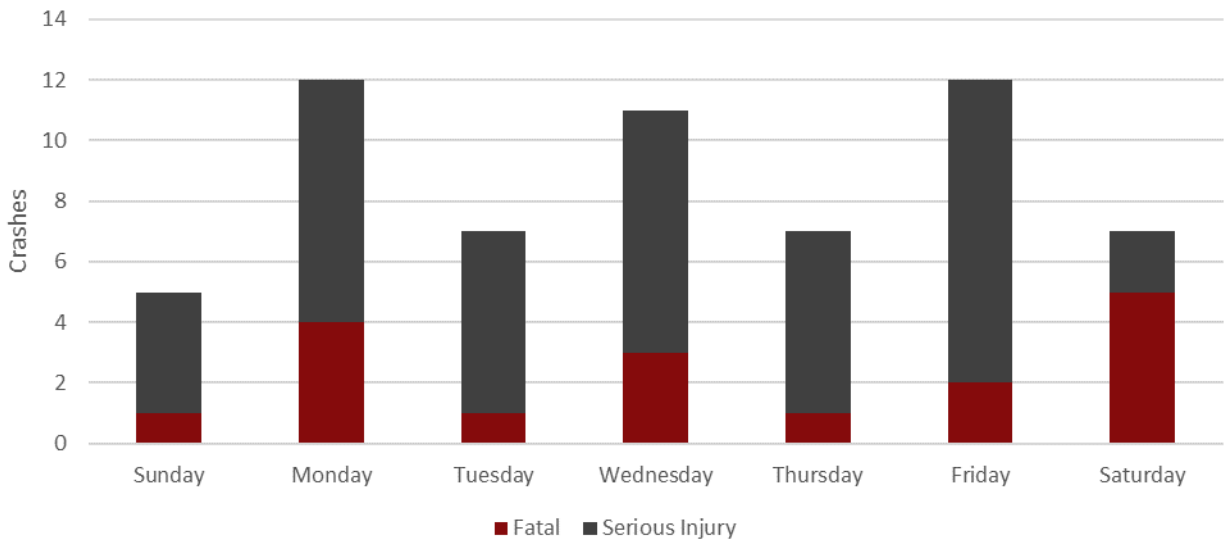


Speed and Aggressive Driving Fatalities and Serious Injuries by Age

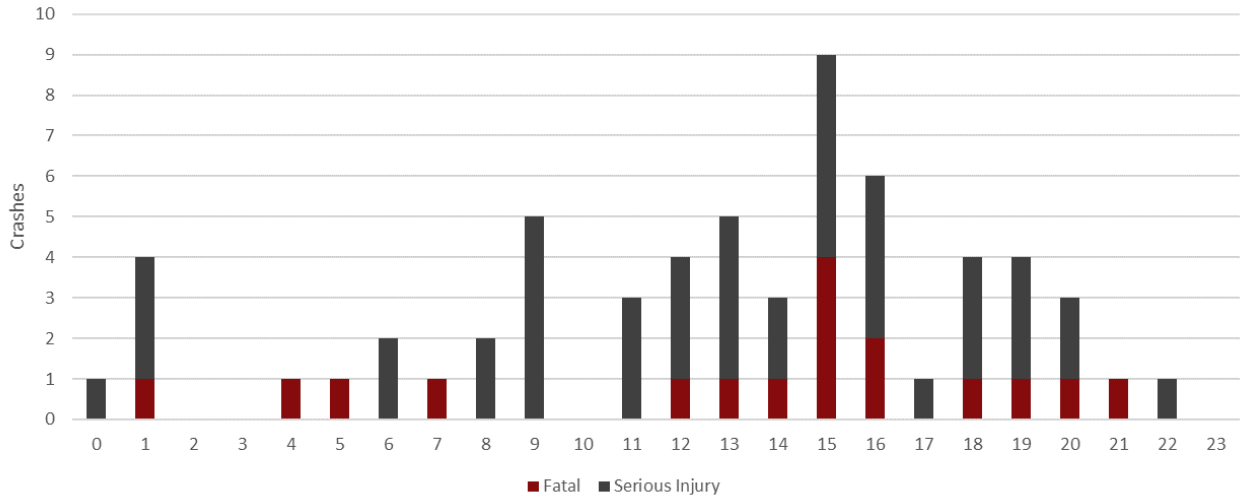


Putnam County 2017-2020

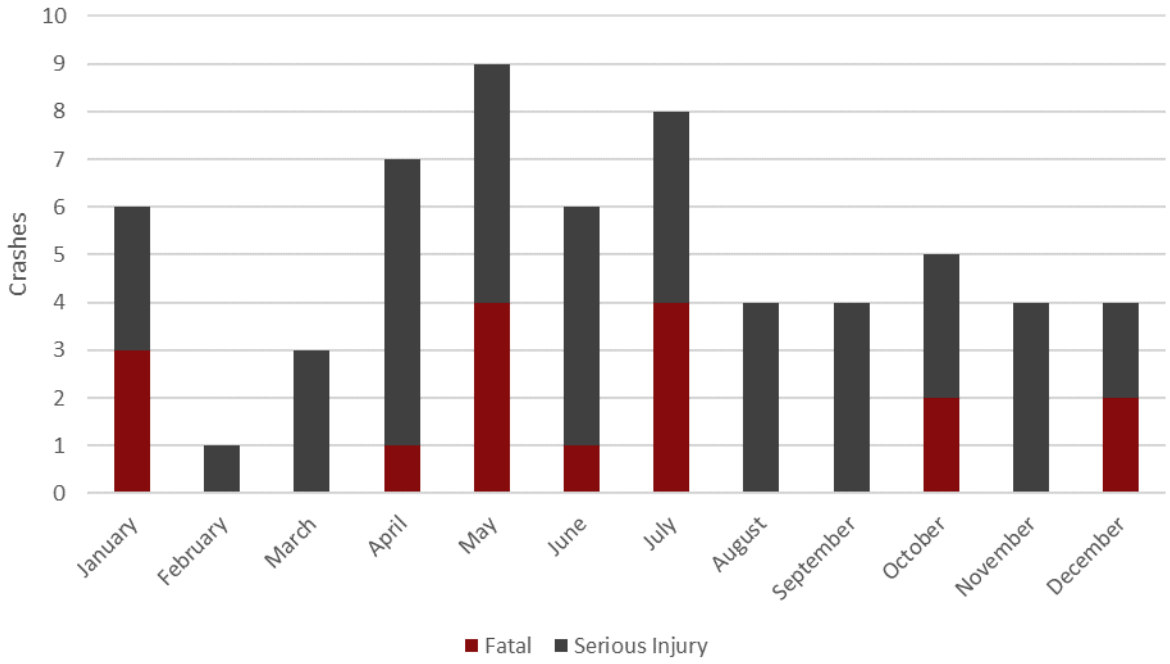
Speed and Aggressive Driving Crashes by Day of Week



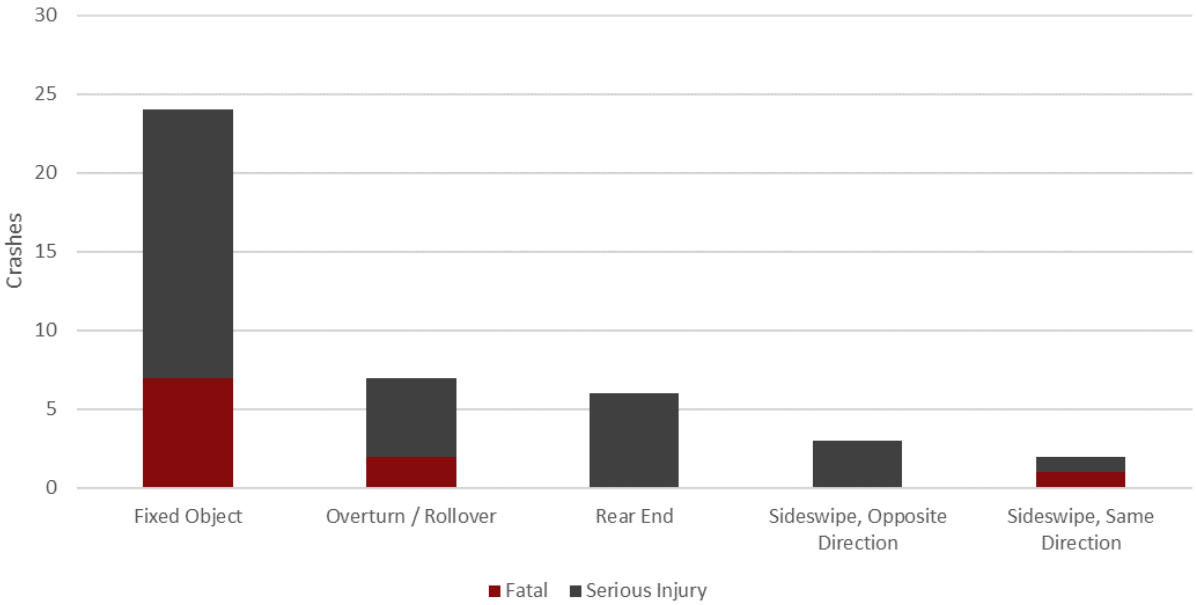
Speed and Aggressive Driving Crashes by Time of Day



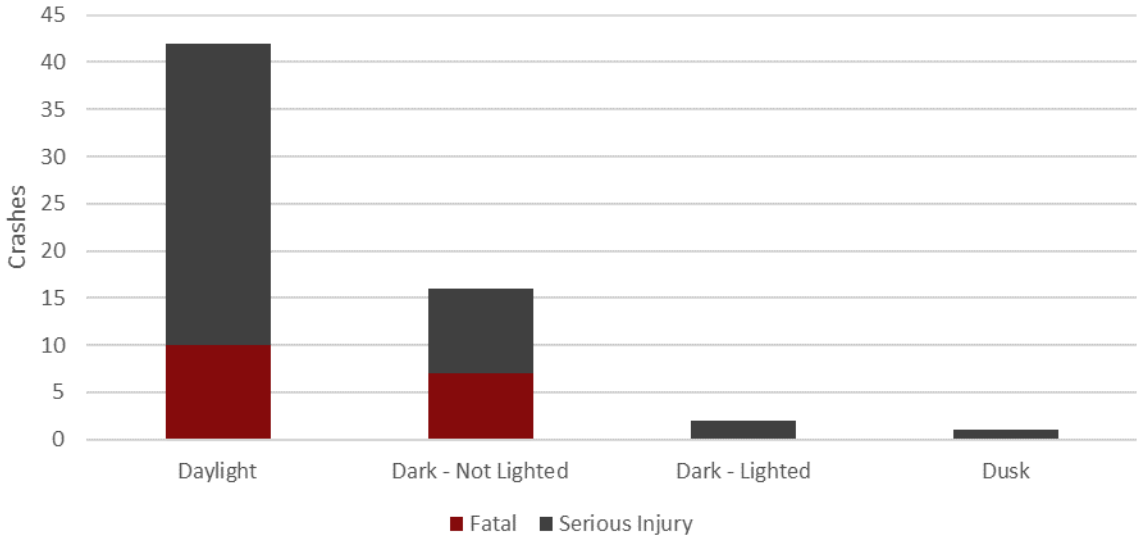
Speed and Aggressive Driving Crashes by Month of Year



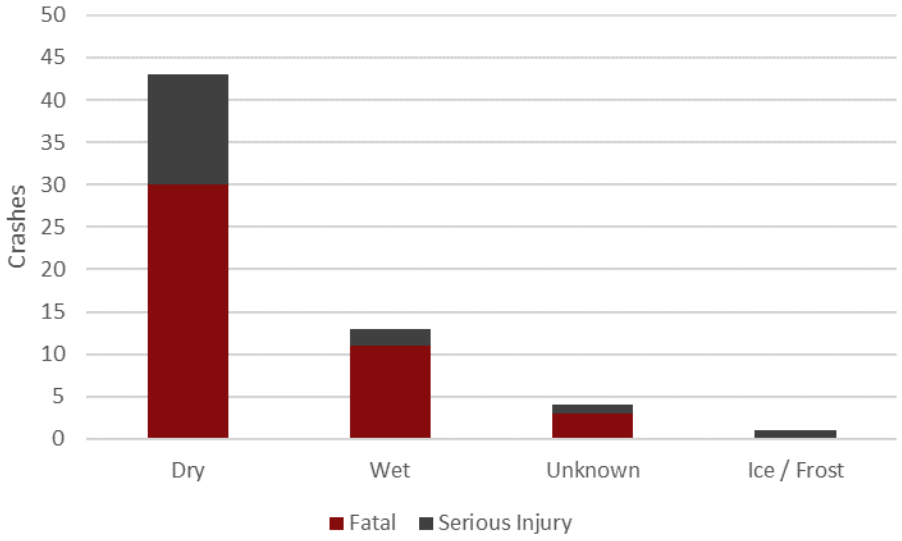
Speed and Aggressive Driving Crashes by Type



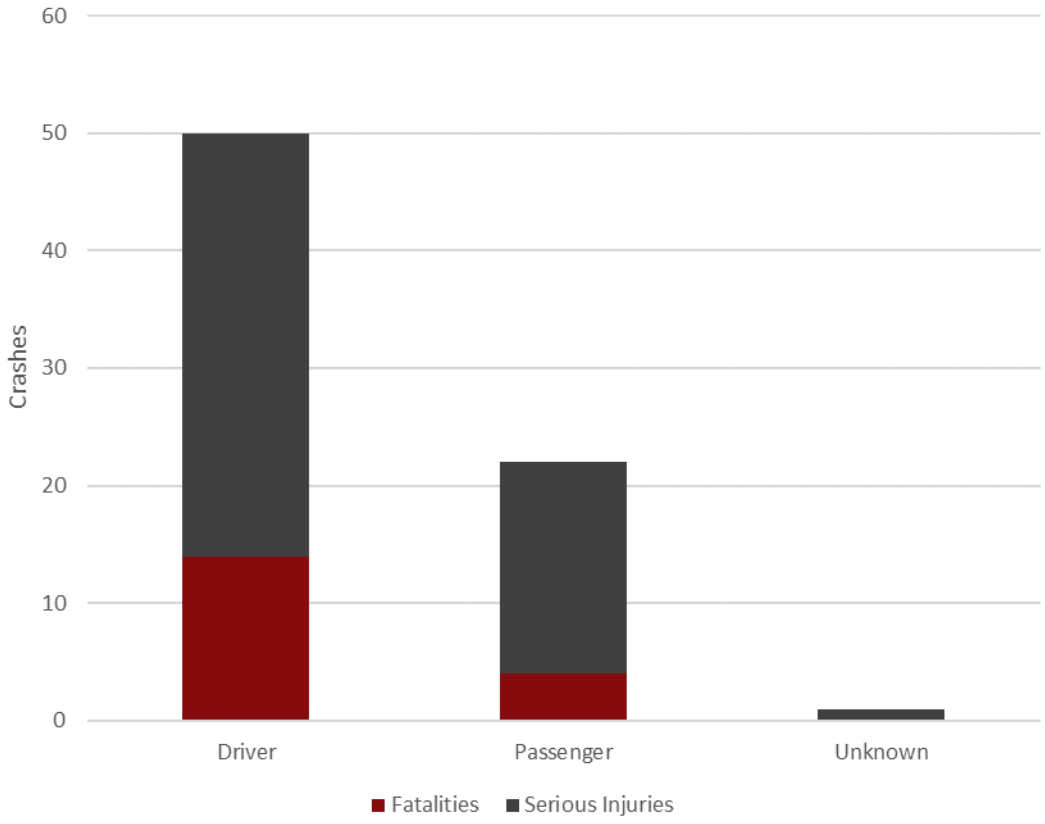
Speed and Aggressive Driving Crashes by Lighting Condition



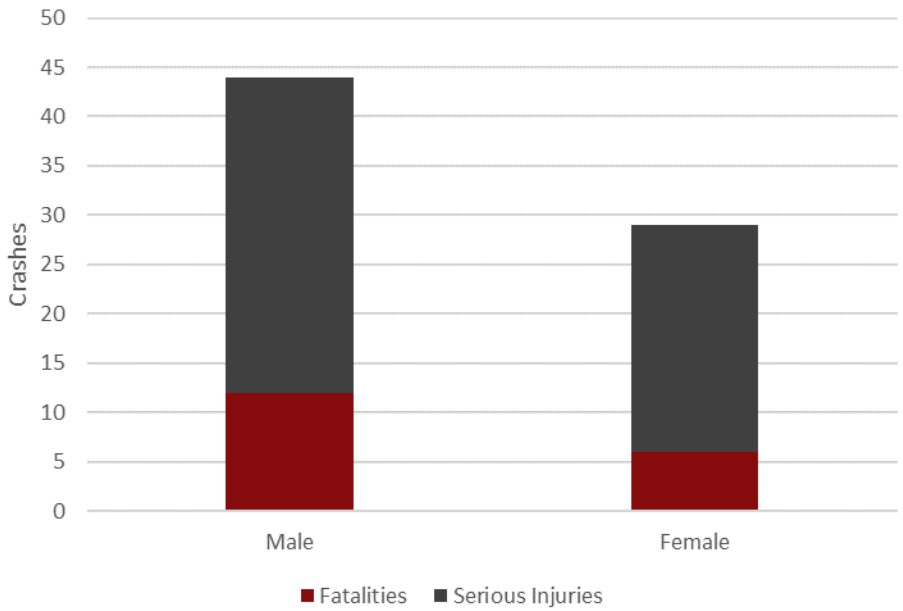
Speed and Aggressive Driving Crashes by Pavement Condition



Speed and Aggressive Driving Fatalities and Serious Injuries by Person Type



Speed and Aggressive Driving Fatalities and Serious Injuries by Gender



Speed and Aggressive Driving Fatalities and Serious Injuries by Age