# OREGON Transportation Safety Action Plan 2016

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Oregon Department of Transportation

*draft report*

# Oregon Transportation Safety Action Plan

*prepared for*

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*Thank You to Safety Partners*

*Developing the Oregon TSAP would not have been possible without the significant efforts of committed safety practitioners throughout the state.  Primarily, the many years of leadership provided by the Oregon Transportation Safety Committee (OTSC) make it possible for this plan to continue to become a stronger multidisciplinary plan focused on saving lives and eliminating serious injuries for all travelers on Oregon's transportation system.  In addition, the TSAP Policy Advisory Committee (PAC) gave many hours of hard work and consideration to the development of the plan; the ODOT Transportation Safety Action Plan Project Coordination Team (PCT) carefully reviewed all aspects of the plan striving to achieve a plan that is meaningful and implementable; and partner agencies in Oregon, and public and private stakeholders from many different organizations and interests provided input at public meetings and via on-line interactive tools.*

# Table of Contents

**Executive Summary** ..... **ES-1**
What is the TSAP? ..... ES-1
Who Participated in Developing This Plan? ..... ES-2
TSAP Long-Term Goals ..... ES-3
Near-Term Emphasis Areas ..... ES-3

**1. Call to Action** ..... **1-1**

**2. Introduction** ..... **2-1**
What is the TSAP? ..... 2-1
Brief History of TSAPs in Oregon ..... 2-1
How this TSAP Update was Developed ..... 2-2
How this TSAP will be Used ..... 2-3
State and Federal Requirements ..... 2-9
Conclusion ..... 2-13

**3. Transportation Safety Trends** ..... **3-1**
Crash History and Trends ..... 3-1
Statewide Crash History and Trends ..... 3-3
Statewide Crash Attributes ..... 3-5
Regional Crash Attributes ..... 3-9
Conclusion ..... 3-16

**4. Safety Challenges and Opportunities** ..... **4-1**
The Human Impact of Crashes ..... 4-1
The Economic Cost of Crashes ..... 4-2
Transportation Safety Challenges and Opportunities ..... 4-4
Conclusion ..... 4-10

**5. Vision, Goals, Policies, and Strategies** ..... **5-1**
Vision ..... 5-1
Goals ..... 5-1

**6. Emphasis Areas** ..... **6-1**
Emphasis Area Considerations ..... 6-2
Emphasis Areas and Actions ..... 6-4
Conclusion ..... 6-29

**7. Performance Measures and Targets ..... 7-1**
Types of Performance Measures ..... 7-1
TSAP Performance Measures ..... 7-3
Performance Targets ..... 7-6
Conclusion ..... 7-13

**8. Implementation and Evaluation ..... 8-1**
Conclusion ..... 8-5

**Appendix A. Who Developed This Plan ..... A-1**
A.1 Oregon Transportation Safety Committee ..... A-1
A.2 Policy Advisory Committee ..... A-1
A.3 Project Coordination Team ..... A-2
A.4 Project Management Team ..... A-2

**Appendix B. TSAP Update Process and Federal Requirements ..... B-1**
B.1 Consultative Process ..... B-2
B.2 Coordination ..... B-3
B.3 Data-Driven Analysis ..... B-3
B.4 Performance-Based Planning ..... B-5
B.5 Strategy Selection ..... B-5
B.6 Schedule to Evaluate and Update SHSP ..... B-6
B.7 Special Rules ..... B-6

**Appendix C. Findings of Compliance with Oregon Transportation Safety, Land Use and Transportation Planning Requirements ..... C-1**

**Appendix D. Crash Type and Severity Ranking Supporting Data ..... D-1**

**Appendix E. TSAP Performance Measure Optional Trend Forecasts ..... E-1**

**Appendix F. Glossary ..... F-1**

# List of Tables


Table ES.1 TSAP Performance Targets *Five-Year Rolling Averages* ..... ES-4
Table 3.1 Fatal and Serious Injury Crashes by Attribute *2009 to 2013* ..... 3-6
Table 4.1 National Safety Council Economic Crash Costs *U.S. Average* ..... 4-2
Table 4.2 Examples of Significant Past Technological Innovations for Improved Safety ..... 4-8
Table 6.1 Impaired Driving Actions ..... 6-6
Table 6.2 Occupant Protection Actions ..... 6-8
Table 6.3 Speeding Actions ..... 6-10
Table 6.4 Distracted Driving Actions ..... 6-11
Table 6.5 Infrastructure Actions (General) ..... 6-13
Table 6.6 Intersection Actions ..... 6-14
Table 6.7 Roadway Departure Actions ..... 6-16
Table 6.8 Pedestrian Actions ..... 6-18
Table 6.9 Motorcyclist Actions ..... 6-20
Table 6.10 Bicyclist Actions ..... 6-22
Table 6.11 Vulnerable User Actions (General) ..... 6-25
Table 6.12 Older Road Users Actions ..... 6-25
Table 6.13 Commercial Vehicle Actions ..... 6-26
Table 6.14 Enforcement Actions ..... 6-26
Table 6.15 EMS Actions ..... 6-27
Table 6.16 Data Actions ..... 6-27
Table 6.17 Training and Education Actions ..... 6-28
Table 7.1 TSAP Performance Measures ..... 7-5
Table 7.2 TSAP Performance Targets *Five-Year Average* ..... 7-8
Table 8.1 Example Activities and Roles ..... 8-3
Table B.1 Meeting Federal Requirements for the TSAP Update ..... B-1
Table C.1 Potential Emphasis Areas Ranked by Fatal and Serious Injury Crash Frequency *2009 to 2013* ..... D-1
Table C.2 Potential Emphasis Areas Ranked by Fatal and Serious Injury (FSI) Crashes per 100 Total Crashes *2009 to 2013* ..... D-2

# List of Figures


Figure ES.1 Oregon Transportation Fatalities *1994 to 2015* ..... ES-1
Figure 2.1 Relationship of TSAP to Other State and MPO Plans ..... 2-8
Figure 3.1 Oregon Transportation Fatalities *1994 to 2015* ..... 3-2
Figure 3.2 Fatalities and Serious Injuries *2009 to 2013* ..... 3-3
Figure 3.3 Proportion of Fatalities and Serious Injuries by Urban and Rural Area *2009 to 2013* ..... 3-4
Figure 3.4 Proportion of Fatal and Serious Injury Crashes by Roadway Functional Classification *2009 to 2013* ..... 3-5
Figure 3.5 Proportion of Fatal and Serious Injury Crashes by Involved Road User *2009 to 2013* ..... 3-7
Figure 3.6 Proportion of Fatal and Serious Injury Crashes by Behavioral Issue *2009 to 2013* ..... 3-8
Figure 3.7 Proportion of Fatal and Serious Injury Crashes by Location Type *2009 to 2013* ..... 3-8
Figure 3.8 Fatal and Serious Injury Crashes by Most Common Attributes *2009 to 2013* ..... 3-9
Figure 3.9 Oregon DOT Regions ..... 3-10
Figure 3.10 Region 1 Fatal and Serious Injury Crashes by Attribute *Compared to Statewide, 2009 to 2013* ..... 3-11
Figure 3.11 Region 2 Fatal and Serious Injury Crashes by Attribute *Compared to Statewide, 2009 to 2013* ..... 3-12
Figure 3.12 Region 3 Fatal and Serious Injury Crashes by Attribute *Compared to Statewide, 2009 to 2013* ..... 3-13
Figure 3.13 Region 4 Fatal and Serious Injury Crashes by Attribute *Compared to Statewide, 2009 to 2013* ..... 3-14
Figure 3.14 Region 5 Fatal and Serious Injury Crashes by Attribute *Compared to Statewide, 2009 to 2013* ..... 3-15
Figure 4.1 Oregon Economic Crash Costs by Year *2009 to 2013 (Millions)* ..... 4-3
Figure 4.2 Oregon Economic Crash Costs by Rural/Urban Geography *2009 to 2013 (Millions)* ..... 4-3
Figure 4.3 Economic Crash Costs by ODOT Region *2009 to 2013 (Millions)* ..... 4-4
Figure 4.4 Percentage of Regional Crash Costs by Severity ..... 4-5
Figure 6.1 Crash Types Ranked by Crash Frequency and Severity *2009 to 2013* ..... 6-3
Figure 6.2 Emphasis Area Evaluation ..... 6-4
Figure 6.3 Impaired Driving Fatalities and Serious Injuries by Year *2009 to 2013* ..... 6-5
Figure 6.4 Impaired Driving as a Contributing Factor for All Crashes, Serious Injuries, and Fatalities ..... 6-6
Figure 6.5 Unrestrained Occupant Fatalities and Serious Injuries by Year *2009 to 2013* ..... 6-7
Figure 6.6 Failure to use Restraints for All Crashes, Serious Injuries, and Fatalities ..... 6-8
Figure 6.7 Speed-Related Fatalities and Serious Injuries by Year *2009 to 2013* ..... 6-9
Figure 6.8 Speeding as a Contributing Factor for All Crashes, Serious Injuries, and Fatalities ..... 6-10
Figure 6.9 Intersection-Related Fatalities and Serious Injuries by Year *2009 to 2013* ..... 6-12
Figure 6.10 Intersection-Related Crashes as a Percentage of All Crashes, Serious Injuries, and Fatalities ..... 6-13

Figure 6.11 Roadway Departure Fatalities and Serious Injuries by Year *2009 to 2013* ..... 6-15
Figure 6.12 Roadway Departure as a Percentage of All Crashes, Serious Injuries, and Fatalities ..... 6-16
Figure 6.13 Pedestrian Fatalities and Serious Injuries by Year *2009 to 2013* ..... 6-17
Figure 6.14 Pedestrian Involvement in All Crashes, Serious Injuries, and Fatalities ..... 6-18
Figure 6.15 Motorcycle Involved Fatalities and Serious Injuries by Year *2009 to 2013* ..... 6-19
Figure 6.16 Motorcycle Involvement in All Crashes, Serious Injuries, and Fatalities ..... 6-19
Figure 6.17 Bicyclist Fatalities and Serious Injuries by Year *2009 to 2013* ..... 6-21
Figure 6.18 Bicyclist Involvement in All Crashes, Serious Injuries, and Fatalities ..... 6-22
Figure 6.19 Older Driver Involved Fatalities and Serious Injuries by Year *2009 to 2013* ..... 6-23
Figure 6.20 Older Driver Involvement in All Crashes, Serious Injuries, and Fatalities ..... 6-24
Figure 6.21 Older Driver and Pedestrian Fatalities and Serious Injuries by Year *2009 to 2013* ..... 6-24
Figure 7.1 Historic and Optional Forecast Fatality Trends *2009 to 2035, Five-Year Average* ..... 7-7
Figure 7.2 Fatality Target ..... 7-9
Figure 7.3 Fatality Rate Target ..... 7-10
Figure 7.4 Serious Injury Target ..... 7-11
Figure 7.5 Serious Injury Rate Target ..... 7-12
Figure 7.6 Nonmotorized Fatalities and Serious Injuries Target ..... 7-13
Figure 8.1 Plan Linkages ..... 8-2
Figure E.1 Fatality Target ..... E-2
Figure E.2 Fatality Rate Target ..... E-3
Figure E.3 Serious Injury Target ..... E-4
Figure E.4 Serious Injury Rate Target ..... E-5
Figure E.5 Combined Non-Motorized Fatalities and Serious Injury Target ..... E-6

# Executive Summary

The Oregon Transportation Safety Action Plan (TSAP) provides long-term goals, policies and strategies and near-term actions to eliminate deaths or life-changing injuries on Oregon's transportation system by 2035. Transportation crashes and resulting injuries have historically been considered by many as an inevitable consequence of mobility. However, more recently this idea has been challenged as countries, states, and cities across the world seek to change safety culture and eliminate traffic fatalities and life-changing injuries entirely. The idea may be difficult to grasp initially, but when people are asked how many traffic fatalities are acceptable for their friends and family, the universal response is: 'zero'.

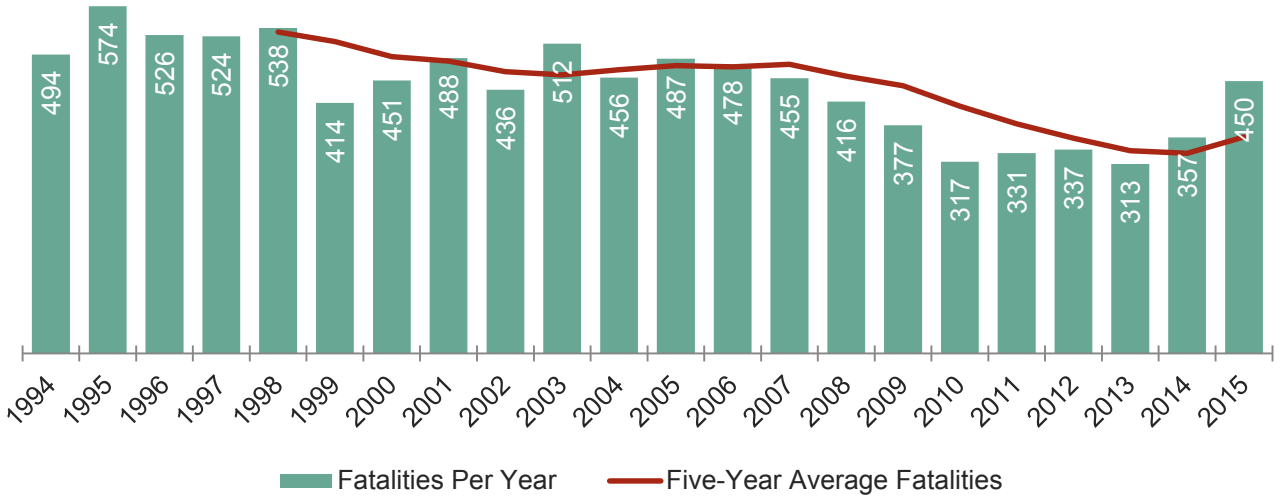
***Vision***

*Oregon envisions no deaths or life-changing injuries on Oregon's transportation system by 2035.*

## What is the TSAP?

Historically, transportation-related fatalities in Oregon have trended downwards. Since 2013, however, there has been an annual increase in transportation fatalities in Oregon. This increase is common across the country and fatalities do fluctuate in relationship to a variety of economic, demographic, and system factors. The increase does reinforce the importance of continuing to focus on and invest in multidisciplinary transportation safety programs.

**Figure ES.1 Oregon Transportation Fatalities**
*1994 to 2015*




The Federal Highway Administration requires every state to have a Strategic Highway Safety Plan (SHSP). The SHSP is a statewide coordinated safety plan providing a comprehensive framework for reducing fatalities and serious injuries. The SHSP identifies key safety needs and guides safety investments in infrastructure and safety behavior programs. The TSAP serves as the Oregon SHSP.

The TSAP provides the long-term vision of zero deaths and life-changing injuries and provides goals policies and strategies to work toward this vision. The long-term elements of the plan provide guidance to policy-

makers, planners, and designers about how to proactively develop a transportation system with fewer fatalities and serious injuries. The TSAP also includes a near-term component in the form of Emphasis Areas (EA) and actions. The EAs provide a framework for organizing and implementing near-term actions that will maximize the safety benefits of transportation investments (safety specific and otherwise).

The TSAP addresses all modes on all public roads in Oregon. This plan was developed under the leadership of ODOT, but it will be implemented by ODOT and all residents, stakeholders, cities, counties, metropolitan planning organizations, Tribal governments, and affected state agencies in Oregon.

## Who Participated in Developing This Plan?

Transportation safety policy, planning, programming, and projects are multidisciplinary and involve what are known as “the 4 Es” of safety:

- Engineering;
- Emergency Medical Services;
- Enforcement; and
- Education.

The TSAP brought the 4 Es of safety together in several different ways and at several different times throughout the project.

- Policy Advisory Committee (PAC) directed the development of the vision, goals, policies, strategies, emphasis areas, and near-term actions. The PAC met almost monthly throughout the course of the project.
- Project Coordination Team (PCT) provided technical input on major milestones, including the vision, goals, strategies, and actions. The PCT met four times over the course of the project and was made up of staff from all divisions of ODOT.
- The public was engaged several times and in several ways on the project. There were public meetings at the beginning and end of the project to provide input on desires for the TSAP and to provide input to specific strategies and actions. There also were an on-line survey and region open houses for the public to provide input on the plan.

Appendix A lists members of the Oregon Transportation Safety Committee (OTSC), the PAC, and PCT. The 2016 TSAP was adopted by the Oregon Transportation Commission at the recommendation of the Oregon Transportation Safety Committee on Month, Day, 2016.

## TSAP Long-Term Goals

> *Sustainable changes in behavior across the road network can be achieved by creating a social environment that intrinsically supports safe driving behaviors.*
>
> *Primer for Traffic Safety Culture, ITE Journal, November 2013*

The goals, policies, and strategies in the TSAP are focused on changing safety culture and proactively planning, designing, operating and maintaining a transportation system which eliminates fatalities and serious injuries. Everyone is responsible for ensuring their own safety and responsible to protect the lives of others traveling on the transportation system. Only when residents and visitors adopt safe traveling behaviors and decision-makers invest in safety programs, policies, and projects will we meaningfully reduce the number of fatalities and serious injury crashes in Oregon. Recognizing that decision-makers and stakeholders always have to balance competing demands for insufficient resources, the plan was developed with a safety first perspective to envision and work towards the safest transportation system possible.

Over the long term, the goals of the TSAP are:

- **Safety Culture –** Transform public attitudes to recognize all transportation system users have responsibility for other people's safety in addition to their own safety while using the transportation system. Transform organizational transportation safety culture among employees and agency partners (e.g., state agencies, MPOs, Tribes, counties, cities, Oregon Health Authority, stakeholders and public and private employers) to integrate safety considerations into all responsibilities.
- **Infrastructure –** Develop and improve infrastructure to eliminate fatalities and serious injuries for users of all modes.
- **Healthy, Livable Communities –** Plan, design, and implement safe systems, and support enforcement and emergency medical services to improve the safety and livability of communities, including improved health outcomes.
- **Technology –** Plan, prepare for, and implement technologies (existing and new) that can affect transportation safety for all users, including pilot testing innovative technologies as appropriate.
- **Collaborate and Communicate –** Create and support a collaborative environment for transportation system providers and public and private stakeholders to work together to eliminate fatalities and serious injury crashes.
- **Strategic Investments –** Target safety funding for effective engineering, emergency response, law enforcement, and education priorities.

## Near-Term Emphasis Areas

Emphasis areas (EA) provide a strategic framework for developing and implementing the near-term component of the Transportation Safety Action Plan (TSAP). Emphasis areas are near-term implementation focus areas directly related to the TSAP's long-term goals, policies, and strategies. The EAs were developed using the results of crash data analysis and input from committees, stakeholders, and the public. From this, four broad emphasis areas were chosen:

- **Emphasis Area: Risky Behaviors**. Reductions in fatalities and serious injuries can be accomplished by deterring unsafe or risky behaviors made by drivers and other transportation users. For this emphasis

area, actions are identified to minimize impaired driving, unbelted, speeding and distracted driving crashes.

- **Emphasis Area: Infrastructure**. Road assets in Oregon can be constructed or retrofitted to reduce fatal and serious injury crashes. Opportunities to do this include implementing safety treatments at intersections and along and across roadways. For this emphasis area, actions are identified to minimize intersection and roadway departure crashes.

- **Emphasis Area: Vulnerable Users.** Vulnerable road users can be characterized by the amount of protection they have when using the transportation system – pedestrians, bicyclists, and motorcyclists are more exposed than people in vehicles making them more susceptible to injury in the event of an incident. Older drivers can also be vulnerable due to decreasing visual acuity and perception-reaction time to events. For this emphasis area, actions are identified to minimize pedestrian, bicycle, motorcycle, and older road user crashes.

- **Emphasis Area: Improved Systems.** Opportunities to address and improve transportation safety come in a number of forms. Crash and other types of safety data can be advanced to better understand the causes and locations of crashes, leading to targeted solutions. Training is used to educate planners, engineers, designers, and construction staff about the importance of safety and how to incorporate it into their everyday job responsibilities. Fully staffed and funded law enforcement agencies can direct their efforts towards keeping users safe and when crashes do occur, making sure traffic incident management and emergency medical services are available to respond to and transport victims is essential to a safety transportation system. Commercial vehicle safety relies on licensing, training, and vehicle safety to decrease the frequency and severity of crashes. For this emphasis area, actions will be identified to continually improve data, train and educate transportation and safety staff, support law enforcement and emergency responders, and minimize commercial vehicle crashes.

## *Moving Forward*

The success of this plan will be measured by monitoring the number and rate of fatalities and serious injuries and the combined number of nonmotorized fatalities and serious injuries. FHWA requires annual targets be established, monitored, and reported – and there are penalties for not achieving the targets. The safety performance targets for upcoming five years of this plan are:

### Table ES.1 TSAP Performance Targets
*Five-Year Rolling Averages*

| Base Period | Fatalities (2011-2015) | Fatality Rate (2011-2015) | Serious Injury (2010-2014) | Serious Injury Rate (2010-2014) | Nonmotorized Fatalities and Serious Injuries (2010-2014) |
|---|---|---|---|---|---|
| Baseline | 357 | 1.04 | 1,491 | 4.42 | 234 |
| 2013-2017 | 357 | 0.94 | 1,491 | 4.42 | 234 |
| 2014-2018[a] | 350 | 0.89 | 1,461 | 4.33 | 229 |
| 2015-2019 | 343 | 0.83 | 1,432 | 4.24 | 225 |
| 2016-2020 | 328 | 0.78 | 1,368 | 4.06 | 215 |
| 2017-2021 | 306 | 0.73 | 1,274 | 3.78 | 200 |

[a] 2014-2018 is the first period that targets must be established for the HSIP Program.

The TSAP is the framework for engaging residents, stakeholders, employers, planners, engineers, enforcement agencies, emergency medical service providers, and others across the State to improve transportation safety in Oregon. Over time, and with focus, the vision of zero fatalities and life-changing injuries on Oregon roadways by 2035 can be achieved. The partnerships developed in creating this plan provide an understanding of the roles everyone can play to address safety and build trust in and ownership of the TSAP. The result will be a coordinated, multidisciplinary approach to implementing transportation safety improvements that reduce injuries and save lives.

# 1. Call to Action

Hundreds of thousands of Oregonians travel safely to and from work, recreation, and excursions on a daily basis. Even so, more than 400 people died on our transportation system in 2015, which averages out to more than one person every day.

*Oregon envisions no deaths or life-changing injuries on Oregon's transportation system by 2035.*

The Oregon Transportation Safety Action Plan (TSAP) aims to eliminate this tragedy. The TSAP is a strategic safety plan for all users, all roadways, and all transportation agencies in Oregon. The plan outlines the vision, goals, policies, and strategies for long-term safety and actions to achieve near-term opportunities for transportation safety in Oregon.

The broad reach of the plan is matched by the broad array of partners that will need to commit to implementing plans, policies, and programs to save lives and prevent injuries. These partners include state, regional, Tribal, county, and city agencies, and the private sector, including, but not limited to:

- Transportation planning and engineering organizations;
- Enforcement agencies;
- Emergency medical service providers;
- Education providers;
- Public health agencies;
- Safety advocacy groups;
- Private employers; and
- The traveling public.

Collectively these stakeholders have the opportunity to improve Oregon's transportation system and save lives by integrating safety into all aspects of planning, programming, project development, and operations and maintenance. Not only is the system improved with responsive investments targeting specific safety issues, the transportation system also is improved by investing in projects, programs, and policies that proactively save lives and prevent injuries.

This plan provides background on the TSAP's history and programs in Chapter 2. It summarizes existing transportation safety conditions in Chapters 3 and 4. Long-term vision, goals, policies, and strategies to eliminate fatalities and life-changing injuries on the Oregon transportation network are presented in Chapter 5. Detailed actions for stakeholders to begin implementing are documented in Chapters 6 and 8. Chapter 7 outlines how the State will measure and report progress towards achieving the safety vision.

To achieve the plan vision all stakeholders will need to:

- Support the ongoing TSAP planning process and find opportunities to implement recommended safety strategies and action steps in all planning, project development, programming, and operations and maintenance activities;
- Communicate and implement the TSAP vision, goals, policies, and emphasis areas to agency staff and partners;
- Integrate safety planning, programming and policies into current work responsibilities and authorities;
- Champion the cause of safety by educating the public on the critical role individuals play in preventing transportation fatalities and serious injuries;
- Commit to adopt and institutionalize a change in Oregon's safety culture; and
- Engage in implementing the TSAP and updating the TSAP in the future.

Leadership, collaboration, and communication will lead to a transportation safety culture focusing on getting everybody in Oregon home safely.

# 2. Introduction

A Strategic Highway Safety Plan (SHSP) is a statewide-coordinated safety plan that provides a comprehensive framework for reducing highway fatalities and serious injuries on all public roads. It is a Federally required document and is the primary planning tool to address transportation safety planning issues and needs in every state. The SHSP identifies safety priorities, also called emphasis areas, and guides safety program and project investments using strategies and actions as a framework. The document identifies both behavioral and infrastructure-related approaches to address safety based on input from multiple disciplines, including, but not limited to, the 4 Es (engineering, emergency response, law enforcement, and education). The SHSP must meet administrative and content requirements to be approved by the Federal Highway Administration. The TSAP is the Oregon SHSP and fulfills all the Federal requirements. This chapter provides background on the TSAP, describes the current planning effort to update and utilize the plan, and the process by which it meets legislative requirements.

## What is the TSAP?

The TSAP is a strategic document that defines Oregon's traffic safety trends and challenges and identifies a vision, goals, policies, strategies, and actions to eliminate fatalities and serious injuries. The TSAP also serves as Oregon's long-range safety topic plan, an element of the Oregon Transportation Plan (OTP), and parallel to other mode and topic plans like the Oregon Bicycle and Pedestrian Plan and Oregon Freight Plan.

The motivation for developing the TSAP is clear – everyone who uses Oregon's transportation system should arrive at their destination safely. Traffic crashes are one of the leading causes of preventable deaths and injuries in Oregon. While significant progress has been made in the last decade, preliminary data suggest that 450 people were killed in motor vehicle crashes in 2015, the highest annual total since 2007. In 2014, there were 357 traffic fatalities and another 1,496 people suffered life-altering injuries.

There is a need and intention to eliminate these fatalities for all modes in Oregon. Traffic crashes are a significant problem for Oregon's residents. There is an opportunity to save lives and reduce injuries through implementation of strategic actions in the areas of engineering, emergency response, law enforcement, and education. To take advantage of this opportunity, a change in culture is needed both within government agencies and other public entities, private-sector businesses, and the traveling public.

The development of the TSAP is an important step toward changing the traffic safety culture in Oregon. It comes at a pivotal time as it is imperative to counteract the recent fatality increase. To make significant progress, a high degree of coordination and collaboration across agencies and the public will be required. This is particularly true for crashes resulting from behavioral factors, such as speeding and impaired driving. The TSAP establishes the framework for addressing Oregon's most significant transportation safety challenges. While this plan addresses safety globally across modes, other statewide plans under the OTP may touch upon more specific safety strategies for each mode or topic.

## Brief History of TSAPs in Oregon

Oregon's first Transportation Safety Action Plan was adopted in 1995. The original plan was effective in focusing efforts to reduce death and injury and was held up nationally as a model for reducing crash rates and crash severity. In less than 10 years, a substantial portion of the original plan had been accomplished, or was in progress. In recognition of this, the 2004 TSAP was developed by the Oregon Transportation

Safety Commission and adopted by the Oregon Transportation Committee. The 2004 plan was created through a series of public input sessions and hearings to establish priorities and included Federal best practices. This plan was amended in 2006 for consistency with legislation adopted at that time.

In 2011, a third plan was developed and adopted. The 2011 plan identified new partnerships, better practices, and more aggressive methods. The 2016 TSAP recognizes that Oregon's population is growing, aging, and changing, and that transportation needs are changing with them. For example, in 1995 cell phones were an expensive tool and antilock brakes and airbags were barely a part of the driving picture. Today, automobile technology is standard and cell phones are common for all citizens. Further, connected and autonomous vehicles are on the horizon. As transportation systems become more complex and integrated the need to develop and expand strong partnerships among state and local agencies, community groups, businesses, and the media to achieve the envisioned safe transportation system grows. Only with a shared commitment can the actions in this new plan be fully and effectively implemented.

The 2016 TSAP was adopted by the OTC at the recommendation of the Oregon Transportation Safety Committee on Month, Day, 2016 and encompasses safety efforts to be undertaken by the Department of Transportation and safety partners throughout the State.

## How this TSAP Update was Developed

The TSAP update process began in October 2014. A Policy Advisory Committee (PAC) with representation from ODOT, Oregon Health Authority, Oregon State Police, Metropolitan Planning Organizations, Emergency Medical Services, Tribal organization, city and county planning and engineering departments, the Judiciary, the freight industry, and advocacy groups was formed to provide direction for the project. The PAC met 12 times throughout the course of the project. The PAC identified strengths, weaknesses, opportunities, and threats; shaped the plan vision, goals, policies, and strategies; selected emphasis areas for the plan after reviewing crash data trends and other factors; reviewed and synthesized public input to develop near-term actions; and guided the development of the Plan itself.

Along with the PAC, a Project Coordination Team (PCT) was established to ensure other ODOT plans and programs were considered in the TSAP update process. The PCT reviewed all major aspects of the Plan, with a particular focus on identifying content needed to ensure the plan could be implemented once adopted. The PCT met four times throughout the course of the update. There also was extensive outreach to public and private stakeholders.

***TSAP Update – Outreach Approach***

- *Twenty-two ODOT Staff interviews soliciting feedback on the 2011 TSAP.*
- *Eleven Community Conversations across Oregon before the plan started to learn about safety goals and concerns.*
- *One online survey before the plan started to learn about public perceptions of safety issues.*
- *Five Listening Meetings across Oregon to collect feedback on Emphasis Areas and actions for the TSAP.*
- *One online survey to collect feedback about Emphasis Areas and actions for the TSAP.*

In addition to the public input, there were several key activities that contributed to the development of the plan. These include:

- A Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis synthesized and built on the public input that occurred early in the project. Additional interviews were conducted with key safety stakeholders from ODOT, an MPO (Lane Council of Governments), and a County government

(Clackamas County) to identify important considerations and themes for the development of the TSAP. The SWOT analysis also related gaps in the 2011 TSAP to MAP-21 requirements,[1] and to subsequent changes put in place by the FAST Act,[2] to ensure that the updated plan meets Federal regulations.

- Crash data from 2009 to 2013 was reviewed to identify trends and problematic crash types and behaviors. The analysis helped the PAC and PCT understand the *"who, why, where,* and *what"* of crashes, fatalities, and serious injuries in Oregon.
- The PAC developed a Vision for the TSAP along with supporting Goals, Policies, and Strategies. The Goals, Policies, and Strategies define Oregon's long-term approach to eliminating fatalities and serious injuries on its transportation system. The PCT provided feedback to the PAC throughout this process.
- The PAC reviewed a variety of factors to select emphasis areas and identify actions for the plan. The emphasis area selection process was based on a review of fatal and serious injury crash frequency and severity trends, implementation considerations, and policy significance. The PCT also was actively engaged in reviewing and discussing these items.
- Performance Measures were developed to assist ODOT in tracking progress implementing the TSAP. The performance measures are consistent with MAP-21 requirements.

More detail on the TSAP update process is included in Appendix B.

## How this TSAP will be Used

### *Roles and Responsibilities*

Improving and sustaining transportation safety necessitates work from multiple agencies and multiple disciplines. Most transportation safety activities include a mix of Federal, state, and local policy and funding and implementation actions. A brief overview of how these responsibilities are coordinated and carried out follows:

#### Decision-Making

The **Oregon Transportation Commission** includes five commissioners, appointed by the Governor and representing the different geographic regions of the State. The OTC establishes state transportation policy. The commission meets monthly to oversee Department of Transportation activities relating to highways, public transportation, rail, transportation safety, motor carrier transportation, and drivers and motor vehicles. The OTC formally adopts the TSAP as a topic plan that is an element of the Oregon Transportation Plan.

The **Oregon Transportation Safety Committee** is charged as the hub for transportation safety activities in Oregon. The OTSC is a five member, Governor Appointed Committee (GAC) that oversees the administration of Federally funded safety programs and advises the Oregon Transportation Commission on the safety implications of transportation policy. The TSAP is adopted by OTSC as a plan for the whole State.

[1] MAP-21 Final Safety Performance Rules, https://www.fhwa.dot.gov/tpm/rule.cfm.

[2] FAST Act Federal Legislation, https://www.fhwa.dot.gov/fastact/.

They also advise the Transportation Safety Division and perform other functions related to transportation safety as delegated by the OTC.

Two other GACs focus on specific areas of concern in transportation safety and advise OTSC: Driving Under the Influence of Intoxicants (DUII) and Motorcycle Safety.

## Oregon Department of Transportation

**ODOT Values**: Of the values that guide ODOT decision-making, safety is number one:

> **Safety**: We protect the safety of the traveling public, our employees, and the workers who build, operate and maintain our transportation system.

### *Transportation Safety Division (TSD)*

The TSD plans, organizes, and conducts the statewide transportation safety program by coordinating activities and programs with other state agencies, local agencies, nonprofit groups, and the private sector. It serves as a clearinghouse for transportation safety materials and information, and cooperates and encourages research and special studies to support legislative initiatives and new programs.

The Transportation Safety Division provides information, direct services, grants, and contracts to the public and to partner agencies and organizations. More than half the funding comes from Federal funds earmarked for safety programs (the National Highway Traffic Safety Administration (NHTSA), Federal Highway Administration (FHWA), and similar Federal traffic safety grant programs). The division administers more than 550 grants and contracts each year to deliver safety programs to Oregon citizens.

### *Highway Division*

The Highway Division's **Traffic Roadway Section** addresses the Federal safety requirements, including the state Safety Management System (SMS). As defined by the Federal Highway Administration (FHWA), an SMS is "a systematic process which increases the likelihood of reaching safety goals by ensuring that all opportunities to improve highway safety are identified, considered, implemented as appropriate, and evaluated in all phases of highway planning, design, construction, maintenance, and operations." The All Roads Transportation Safety (ARTS) Program (formerly known as Jurisdictionally Blind Safety Program) addresses safety needs on all public roads in Oregon.

**Traffic Engineering and Operations** establishes guidelines for speed zones and traffic control devices on state and local roads.

### *Maintenance Branch of Highway Division*

**Operations and Maintenance Districts** respond to weather and other incidents that can cause dangerous conditions, including landslides/rockfall, down trees, drainage problems and others. Routine maintenance also reduces hazards such as clearing loose gravel from shoulders and bike lanes. Maintenance also manages the states roadside rest areas, giving tired or stressed drivers a safe place to relax and renew before returning to the highway.

**ODOT Traffic Incident Management** works with FHWA to coordinate training and support cooperation among the many emergency services providers involved in crash response and maintaining operations while managing crash scenes.

### *Driver and Motor Vehicles Services Division (DMV)*

The Driver and Motor Vehicle Services Division is charged with licensing drivers and vehicles which generates revenue for transportation programs. DMV safety activities include the At-Risk Driver Program which evaluates drivers when there is a concern about their ability to safely operate a motor vehicle, based on whether a driver has physical, cognitive, or medical limitations that affect their ability to drive a vehicle. DMV also provides driver manuals, new driver testing and licensing, insurance standards, and crash reporting.

### *Motor Carrier Transportation Division (MCTD)*

MCTD develops and implements a Commercial Vehicle Safety Plan, a Summary of Oregon Truck Safety and Guide, and a biennial Safety Action Plan to Reduce Truck-at-Fault Crashes.

Motor Carrier has nine Safety Offices statewide and a Truck Safety hotline to take reports of truck safety problems. The division provides information and education to help drivers understand how to drive around trucks safely and farm truck safety. The Division conducts truck and bus safety inspections. Truck Safety Corridors focus enforcement on traffic along Oregon's major freight routes where truck-at-fault crashes happen.

### *Transportation Development Division (TDD)*

TDD includes the crash data collection and analysis and long-range planning functions for ODOT.

- **Data.** The **Crash Analysis and Reporting Unit** provides motor vehicle crash data through database creation, maintenance and quality assurance, information and reports, and limited database access. Approximately 10 years of crash data are maintained at all times. Vehicle crashes include those coded for city streets, county roads, and state highways.

- **Planning** develops and maintains the Oregon Transportation Plan and the mode and topic plan that are part of the OTP and add further detail around major transportation issues. The TSAP is one of the topic plans.

- **Rail and Public Transit Divisions and Freight and Active Transportation Sections** are stakeholders in the TSAP as it supports safety initiatives relevant to each of the modes. The Rail Crossing Safety Section performs a variety of duties related to the safety and regulation of railroad crossings in Oregon.

- **Research:** Completed and ongoing research projects include safety and technology topics to improve engineering and planning practice and keep up with technological advancements.

## Other State Agencies

### *Oregon Health Authority*

The **Oregon Health Authority** is at the forefront of improving quality and increasing access to health care in order to improve the lifelong health of Oregonians, including programs for injury prevention and maintaining vital statistics.

**Emergency Medical Services and Trauma Systems Program.** Develop and regulate systems for quality emergency medical care in Oregon, ensuring that EMS Providers are fully trained, that emergency medical vehicles are properly equipped, and emergency medical systems are functioning efficiently and effectively.

**EMS Section.** Licenses Emergency Medical Responders (EMR), Emergency Medical Technicians (EMT), Advanced EMT (AEMT), EMT-Intermediate (EMT-I), and Paramedics in the State of Oregon. Oregon Emergency Medical Responder education must meet or exceed the National Emergency Medical Services Education Standards published by the National Highway Traffic Safety Administration, January 2009.

### *Oregon State Police*

The **Oregon State Police** maintain transportation safety as part of their agency mission. Their first two Key Performance Measures:

1. **Transportation Safety –** Enhance transportation safety by reducing fatalities on state and interstate highways, where the Oregon State Police have primary responsibility; and

2. **Traffic Incident Management –** Percent of lane-blocking crashes cleared within 90 minutes.

Department of State Police programs and services that contribute to transportation safety include: major crime investigations; state emergency response coordination; statewide Law Enforcement Data System; coordination of Federal grants for public safety issues; and medical examiner services.

### *Oregon Liquor Control Commission (OLCC)*

Local Liquor Commission staff members will make group presentations. Topics cover liquor laws, enforcement, false ID, and server responsibility. Commission has information on server education courses offered by private providers.

## Cities and Counties

Cities and counties can take a number of approaches to increasing transportation safety. The League of Oregon Cities and Association of Oregon Counties are partners in supporting local safety initiatives. By adopting a Safe Communities Program a community can take a big picture approach to injury prevention. Oregon Safe Communities are collaborations of the National Safety Transportation Safety Administration (NHTSA), the Oregon Department of Transportation, local communities and many other partners. Many communities appoint Traffic Safety Committees to focus energy on solving local safety problems. A community may choose to implement an Automated Enforcement Program, the locally funded use of Photo Red Light and Photo Radar enforcement equipment to reduce red light running and speeding; TSD reviews and provides an executive summary of local jurisdiction requests for legislative approval of use of these measures. Another popular safety program is Safe Routes to School, a local initiative that may be supported

by grant funding, and that identifies opportunities to encourage walking and biking to schools such as education, coordinating “walking buses” (one or more adults accompany children walking to school), mapping safe routes, bike-to-school events, infrastructure improvements, or other creative solutions to improve safety while encouraging exercise.

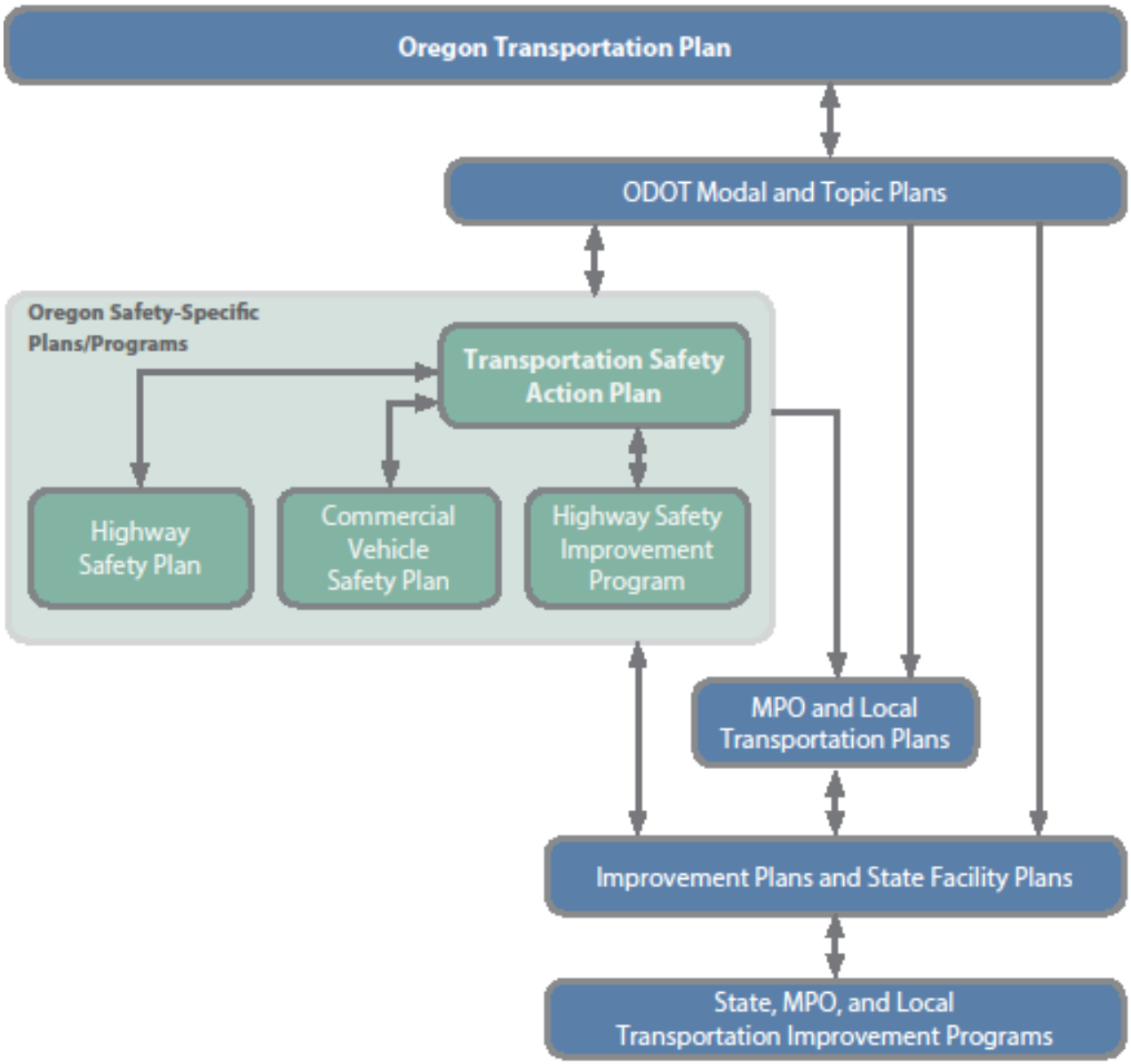
## How the TSAP Links to Other Plans

The TSAP serves as the unifying framework for transportation safety planning in Oregon. Various other plans, policies, and processes in the State have safety components that may be addressed through other programs and resources. The TSAP looks at transportation safety for all modes and focuses on a data-driven approach to identify goals, policies, strategies, and actions focused on safety. Other state modal and topic and regional and local plans also must be considered. Consistency between plans reinforces the transportation safety message while maximizing resources available to implement solutions. Figure 2.1 illustrates the relationship of the TSAP to other Oregon and MPO plans.

As part of the TSAP update process, a review of existing plans was conducted, with a specific emphasis on safety. The purpose of this review was to identify policies and strategies that should be considered in the TSAP to ensure consistency across plans.

As a Topic Plan that is part of the Oregon Transportation Plan, The TSAP Implements the OTP safety goals and informs safety goals of new and updated plans. Going forward, the TSAP will be an important resource for transportation safety direction as state, regional, Tribal, county, and city plans are updated or new plans are developed. These plans should be consistent with the TSAP with respect to safety to effectively link to TSD and other resources for safety planning and improvements.

## Figure 2.1 Relationship of TSAP to Other State and MPO Plans



# State and Federal Requirements

## *State Planning Requirements and Relationships to State Laws*

### Oregon Transportation Commission (OTC) Role – Duties and Responsibilities

ORS 184.618(1) states**:**

> *As its primary duty, the Oregon Transportation Commission shall develop and maintain a state transportation policy and a comprehensive, long-range plan for a safe, multimodal transportation system for the State, which encompasses economic efficiency, orderly economic development, and environmental quality. The plan shall include, but not be limited to, aviation, highways, mass transit, pipelines, ports, rails, and waterways. The plan shall be used by all agencies and officers to guide and coordinate transportation activities and to insure transportation planning utilizes the potential of all existing and developing modes of transportation.*

Oregon has designated the Oregon Transportation Plan, the adopted mode and topic plans (Aviation, Bicycle and Pedestrian, Freight, Highway, Public Transportation, Rail, Transportation Options, and Transportation Safety Action), and facility plans as the state transportation policy and comprehensive long-range plan. Thus the OTP and each of the mode, topic, and facility plans have legal authority.

The OTP and its modal and topic elements achieve the statutory planning requirement for the Oregon Transportation Commission and the Oregon Department of Transportation (ODOT). The OTP is the umbrella document, which is refined by the mode and topic plans. ORS 184.618(1) requires state agencies to use the OTP to "guide and coordinate transportation activities" but it does not authorize the OTC to impose OTP goals, policies, and performance recommendations on other state agencies. However, the OTP operates in the legal context of the State Agency Coordination Program and the Land Conservation and Development Commission's Transportation Planning Rule (TPR) (discussed further below), which impose additional requirements and authority in the planning process for other jurisdictions. The OTP, and its elements, also must comply with Federal legislation.

### Oregon Relationship to State Land Use Planning Goals and Administrative Rules

#### *State Agency Coordination Program (OAR 731-15-0045)*

The Oregon Transportation Commission adopted rules to implement ODOT's State Agency Coordination (SAC) Program in September 1990. The program establishes procedures used by the Department to ensure compliance with statewide planning goals in a manner compatible with acknowledged city, county, and regional comprehensive plans.

The adoption of transportation policy falls under the requirements of the State Agency Coordination Program rules (OAR 731-15). The rules require ODOT to involve interested parties and affected jurisdictions when developing plans or adopting major amendments to plans. The Department must ensure the plan is in compliance with all applicable statewide planning goals.

### *Transportation Planning Rule (OAR 660-012)*

Oregon's statewide planning goals established state policies in 19 different areas. The TPR implements the Land Conservation and Development Commission's Planning Goal 12 (Transportation) which requires ODOT to prepare a TSP to identify transportation facilities and services to meet state needs. The Oregon Transportation Plan and adopted multimodal, mode, topic, and facility plans serve as the state TSP.

The TPR requires metropolitan planning organizations and certain counties to prepare regional TSPs consistent with the adopted state TSP. Cities and counties must prepare local TSPs that are consistent with the state TSP and applicable regional TSPs. The Oregon Transportation Plan and its mode, topic, and facility plans, comprise the adopted state transportation systems plan, so regional and local TSPs must be consistent with the OTP, including the Transportation Safety Action Plan.

## Safety-Specific Regulation

- **ORS 802.300. Transportation Safety Committee.** Creates the Oregon Transportation Safety Committee to advise the OTC and the Director regarding the safety programs and funds identified in 802.310.

- **802.310 Transportation safety programs administrator.** The Director of the Department or their delegate is named as the Governor's Highway Safety Representative for purposes of meeting NHTSA program requirements. Further, the Director is charged with organizing, planning, and conducting a statewide safety program. The program is to coordinate with partners inside and outside the Department to promote safety, serving as the clearinghouse for safety information. The Director and OTC are charged with making safety recommendations based on the advice of the OTSC. Finally, the Department is charged with working with local governments on plans and activities for safety.

- **802.315.** Department authority to apply for and receive Federal highway safety program grants and other funds local government program participation. The Department, with advice from the OTSC is to plan and conduct highway safety programs carried out under the Federal Highway Safety Act.

- **802.320. Motorcycle safety program.** The Department, with advice from the OTSC, is to plan for and conduct training for motorcyclist safety. The Department does this in consultation with local groups. (The Governor's Advisory Committee on Motorcycle Safety provides a conduit for local consultation)

- **802.325. Bicycle safety program.** The Department is charged with planning for and delivering bicycle safety programs in consultation with local groups. This program is allowed to raise funds to provide programs.

- **802.329. City and county highway safety program participation authorized.** Cities and counties are allowed to participate in highway safety programs explicitly.

- **802.331. Highway Safety Trust Account.** Establishes continuous funding for highway safety.

- **802.340. Transportation Safety Account.** This funding rule provides for transportation safety program funding, with a special set-aside just for motorcycle safety.

- **184.740. Safe Routes to Schools Fund.** This law allows for funding Safe Routes to School Programs.

- **184.741. Safe routes to schools program; rules.** This law provides for the planning of, and conducting of, local and state safe route to school programming.

## Federal Requirements

Oregon's first TSAP was developed in 1995, prior to any Federal mandate to do so. It was not until 10 years later, in 2005, that the Federal government passed the Safe, Accountable, Flexible, and Efficient Transportation Equity Act – A Legacy for Users (SAFETEA-LU), which required all states to develop a Strategic Highway Safety Plan (SHSP). Whereas the TSAP was an element of the Oregon Transportation Plan (OTP) with a 20-year planning horizon, SHSPs were considered to establish safety priorities for the next five years. After the TSAP was updated in 2004, it was subsequently amended in 2006 to better align with the SHSP requirements established in SAFETEA-LU. However, the TSAP was (and currently is) designed to serve as both the shorter term SHSP as well as the longer term OTP safety element.

More recent Federal legislation – the 2012 Moving Ahead for Progress in the 21st Century (MAP-21) and the 2015 Fixing America's Surface Transportation (FAST) Act – continued the requirement for states to have a SHSP. Moreover, several specific process-oriented requirements must be met as states develop their SHSPs. The SHSP must incorporate input from a range of partners from diverse disciplines, address all roadway users on all public roads, be data driven, include measurable objectives, and identify how progress will be evaluated. The SHSP must be developed through a cooperative process involving local, state, Federal, Tribal, and private-sector safety stakeholders. In particular, the following stakeholders must be consulted in the SHSP update process:

- Governors Highway Safety Representative;
- Metropolitan Planning Organizations;
- Representatives of major modes of transportation;
- State and local traffic enforcement officials;
- Highway-rail grade-crossing safety representative;
- Motor carrier safety program;
- Motor vehicle administration agencies;
- County transportation officials;
- State representative of nonmotorized users; and
- Federal, state, Tribal, and local safety stakeholders.

MAP-21 established a new High-Risk Rural Roads (HRRR) special rule under 23 USC 148(g), which requires a state to obligate a certain amount of funds on HRRRs if the fatality rate has increased during the past two years. In particular, it states that: "If the fatality rate on rural roads in a state increases over the most recent two-year period for which data are available, that state shall be required to obligate in the next fiscal year for projects on high-risk rural roads an amount equal to at least 200 percent of the amount of

funds the state received for fiscal year 2009 for high-risk rural roads." This plan recognizes this requirement and establishes a baseline for monitoring high-risk rural roads.

MAP-21 also includes a special rule (23 U.S.C. 148(g)(2)) related to drivers and pedestrians over 65: if statewide traffic fatalities and serious injuries per capita for these groups increase during the most recent two-year period for which data are available, the State must include strategies in its SHSP to address those issues. This plan recognizes this requirement and establishes a baseline for monitoring fatalities and serious injuries involving older drivers and pedestrians.

Appendix C: Findings of Compliance with Oregon Transportation Safety, Land Use and Transportation Planning Requirements

## *Meeting Federal TSAP Requirements*

*The TSAP meets Federal requirements for a SHSP, but is unique in it's linkage to long-term goals, policies, and strategies that influence transportation policy, planning, programming and projects.*

The TSAP fulfills Oregon's requirement to have an updated SHSP. A checklist detailing how Oregon has met MAP-21 requirements is provided in Appendix B, and a few key highlights are listed here:

- **Consultation.** The TSAP update process included extensive stakeholder and public involvement. Consultation with the required groups occurred throughout the process. The PAC was provided with several opportunities to review the document and to offer suggestions. Additionally, the draft final plan was distributed for public comment in June and July 2016.

- **Data.** A thorough analysis of crash data was conducted to identify trends and areas of concern, and to support selection of emphasis areas for the TSAP.

- **Performance Management.** Oregon has set the five required safety performance measure targets (fatalities, fatality rate, serious injuries, serious injury rate, and nonmotorized fatalities and serious injuries) via the TSAP update process. HSIP and HSP staff were involved in the target-setting process.

- **Multidisciplinary Approach.** The PAC was established to oversee all aspects of the update. The PAC included representatives from the 4 Es (engineering, emergency response, law enforcement, and education), various transportation modes (bicycles, pedestrians, trucking), and from public and private organizations. Technical staff from ODOT also were included in the developing the plan. Many different divisions of ODOT staff were on the PCT, including pedestrian and bicycle experts, motor carriers, freight, traffic operations, traffic engineering, construction, and maintenance.

- **Coordination.** A thorough review of existing plans was conducted to inform the development of the TSAP.

- **Evaluation.** The TSAP includes a chapter on evaluating progress, including, but not limited to, monitoring the MAP-21 required performance measures.

- **High-Risk Rural Roads (HRRR) Special Rule.** A review of the fatal crash rate on Oregon's rural roads indicates that the HRRR Special Rule currently does not apply to Oregon. The five-year average fatality rate on rural roads has decreased each year since 2007.

- **Older Drivers and Pedestrians Special Rule.** A review of the per capita older drivers and pedestrians fatal and serious injury rate indicates that this rule does apply to the update process. The five-year average number of older driver and pedestrian fatalities and serious injuries per 1,000 residents 65 years of age or older increased from 0.34 in 2012 to 0.35 in 2013 and 0.36 in 2014. Strategies to address the increase in fatalities and serious injuries among the older population are included in the TSAP.

## Conclusion

The TSAP is Oregon's Federally required SHSP. It meets the Federal requirements for an updated SHSP and goes well beyond. The TSAP is integrated into the Oregon transportation policy framework, and includes long-term planning goals and policies. As a result it serves as both a short-term (five year) and long-term policy document to guide Oregon toward no fatalities and serious injuries on its transportation system. It also creates an opportunity for a wide range of stakeholders to become involved in statewide safety planning and programming.

# 3. Transportation Safety Trends

The TSAP was developed using the best available safety data to identify critical transportation safety issues and safety improvement opportunities for all public roads in Oregon. The contents of the TSAP are primarily derived from an analysis of 2009-2013 Oregon crash data, which describes trends related to crash types, crash severity, crash demographics, and contributing factors at the statewide and ODOT regional level. The results of this analysis are described in this chapter.

While the results of this crash analysis are important indicators of transportation safety opportunities, it is important to recognize data limitations. Specific challenges in Oregon include:

- Oregon is a self-reporting state, which means that only those crashes involving a personal injury are required to receive a law enforcement officer-completed crash report. Therefore, there are a relatively small number of Property Damage Only (PDO) crashes in the Oregon State crash database (compared to other states in the U.S.). The problem of underreported crashes can skew the results of crash data analysis.

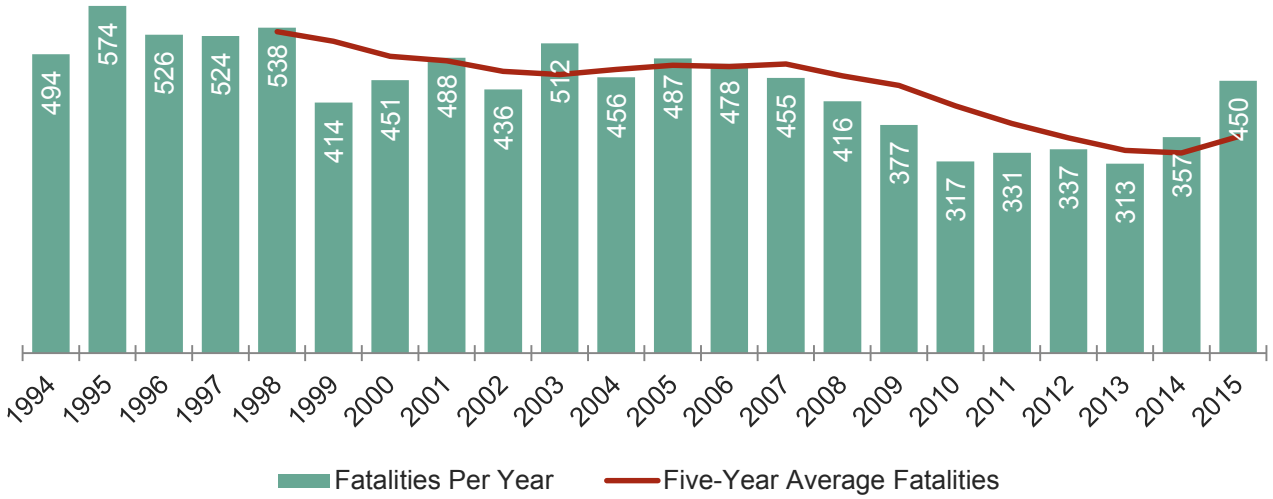
- In 2011, the State of Oregon made a change to reporting in the Crash Analysis and Reporting (CAR) system that affected the overall crash database, resulting in a higher number of reported crashes. The higher numbers result from a change to an internal departmental process that added previously unavailable, nonfatal crash reports to the annual data file. The result of this change is a false perception that the number of Property Damage Only and Injury crashes increased by 15 percent in Oregon, when in fact that did not occur.

While crash data serves as the primary data source for the development of the TSAP, input from committees, stakeholders, and the public also were considered during the planning process.

## Crash History and Trends

Figure 3.1 shows the number of transportation fatalities in Oregon from 1994 through 2015. In 1994 approximately 500 people died on Oregon's transportation system. Fatalities peaked in 1995 at 574 and were the lowest in 2013 at 313 people. There was an overall downward trend in fatalities through 2013; however there has been a recent increasing trend that needs to be a focus of this plan. To account for fluctuations in crashes, the chart also shows the rolling five-year average number of crashes from 1998 through 2015. Between 1994 and 1998, on average there were 531 fatalities per year on the transportation system, and between 2011 and 2015 there were on average 358 fatalities per year.

## Figure 3.1 Oregon Transportation Fatalities
*1994 to 2015*




Recent fatalities and serious injuries were studied in this plan using crash data from 2009 through 2013, which was the most recent data at the time the project analyses were conducted. In addition, 2014 or 2015 data were used in a few cases, as this data became available during the course of the plan's development. Statewide 2014 and 2015 fatality data and VMT estimates were used to develop fatality performance measures, and 2014 data was used to develop the serious injury and nonmotorized fatalities and serious injuries performance measures. See Chapter 7 for more information regarding the development of performance measures.

In the five-year period from 2009 to 2013, 1,675 people were killed and 7,191 were seriously injured in Oregon in more than 230,000 reported roadway crashes.[3] Transportation fatalities and serious injuries occur in every region of Oregon, for all system users, and on all types of streets and highways.

***From 2009 to 2013***

- *1,675 people were killed traveling in Oregon.*
- *7,191 people were seriously injured while traveling in Oregon.*
- *More than 230,000 crashes occurred.*

Safety professionals study statewide crash data and regional details to understand the history of crashes and use that information to improve roadway safety. Though the locations, types, and attributes[4] of past crashes are not perfect predictors of the future, they provide important clues to help engineers and other professionals identify safety needs, select targeted treatments, and evaluate the effectiveness of strategies. Answering the question, "what does the crash data tell us?" is an important first step toward developing and implementing an effective TSAP.

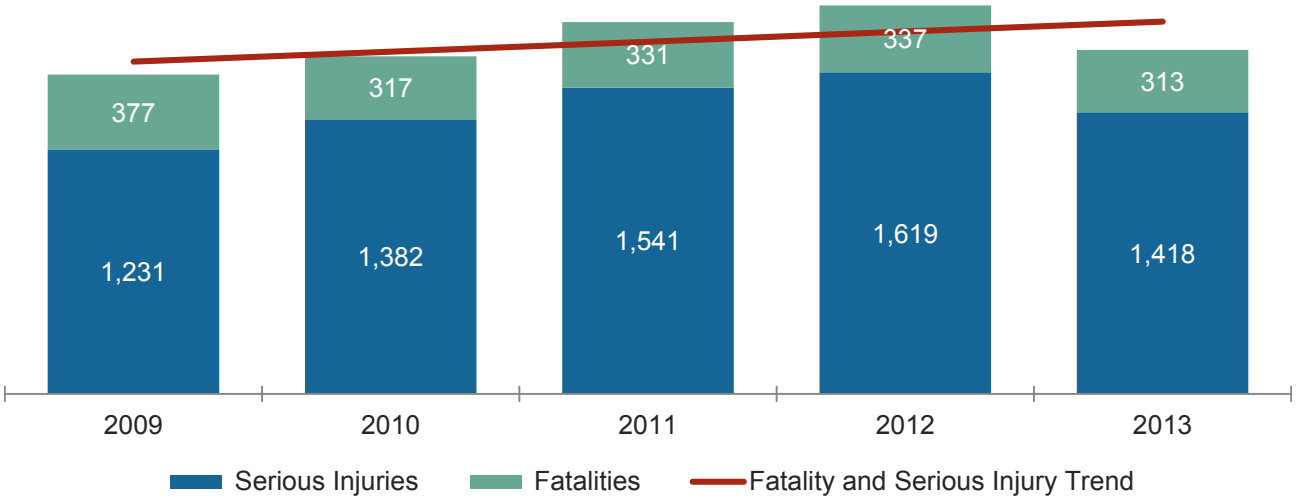
[3] Crash injury severity is determined by the "KABCO" scale, where K=Killed; A=Serious Injury; B=Minor Injury; C=Possible Injury; and O=Property Damage Only.

[4] "Attributes" as used in this plan means characteristics of a crash that may be useful for analysis. In some cases they may contribute to a crash occurring or its severity, but that is not required for them to be considered.

## Statewide Crash History and Trends

Figure 3.2 illustrates the recent trend of traffic fatalities and serious injuries in Oregon.[5] In the most recent year of the study period, 2013, there were 313 people killed and 1,418 seriously injured. Serious injuries are considered "life altering" for the victim, their loved ones, or both; examples include loss of limbs, paralysis, and disfigurement. In many cases these injuries make it difficult to work, care for family members, or pursue other typical daily activities.

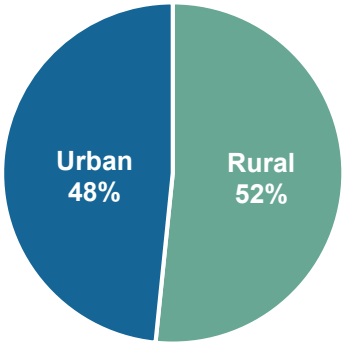
**Figure 3.2 Fatalities and Serious Injuries**
*2009 to 2013*




Roadway crashes and resulting outcomes are not limited to either urban or rural areas of Oregon. As illustrated in Figure 3.3, fatalities and serious injuries have a nearly equal distribution by location.

[5] In 2011 the State of Oregon made a change to reporting in the Crash Analysis & Reporting (CAR) system that resulted in a higher number of crashes reported for the 2011 data file compared to previous years, resulting from the addition of previously unavailable, non-fatal crash reports. The result of this change is a false perception that the number of non-fatal crashes increased by 15 percent from 2010 to 2011.

## Figure 3.3 Proportion of Fatalities and Serious Injuries by Urban and Rural Area *2009 to 2013*



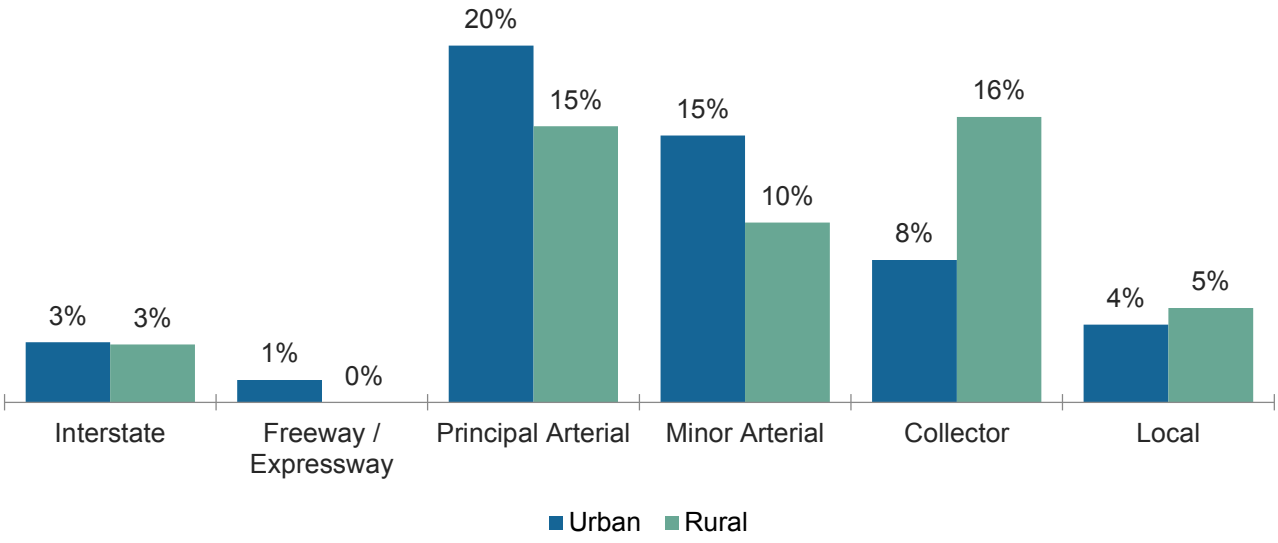

Fatal and serious injury crashes also occur on all types of roadways. Roads are classified as follows:

- **Interstate.** Highest classification of arterials, designed and constructed with mobility and long-distance travel in mind. Direction lanes, separated by barrier, and ramp-only access.
- **Freeway/Expressway.** Directional travel lanes usually separated by a physical barrier, and access and egress points are limited to on- and off-ramp locations or a very limited number of at-grade intersections.
- **Principal Arterial.** Provides a high degree of mobility through urban and rural areas, and abutting land uses can be served directly.
- **Minor Arterial.** Provides moderate-length trips and offers connectivity to the higher arterial system, providing intracommunity continuity.
- **Collector.** Gathers traffic from local road and connects to the arterial network.
- **Local.** Provides direct access to abutting land, and are not intended for long-distance travel. Often designed to discourage through traffic.[6]

As shown in Figure 3.4, the distribution of fatal and serious injury crashes by roadway functional classification is not equal. Crashes with serious outcomes are most common on Principal Arterials and Minor Arterials, as well as Rural Collector roads.

[6] Highway Functional Classification Concepts, Criteria and Procedures, Federal Highway Administration, Washington, D.C., 2013. https://www.fhwa.dot.gov/planning/processes/statewide/related/highway_functional_classifications/section00.cfm.

**Figure 3.4 Proportion of Fatal and Serious Injury Crashes by Roadway Functional Classification**
*2009 to 2013*




## Statewide Crash Attributes

One way to study fatal and serious injury crashes is to categorize them by attribute (e.g., age of driver, alcohol involvement, roadway departure). With an understanding of these attributes it is possible to develop plans, policies, and programs to reduce crash frequency and severity.

Table 3.1 shows a number of attributes related to fatal and serious injury crashes in Oregon. In some cases the attribute may contribute directly to the crash occurring or to its severity. However, due to limitations of crash data elements (because in most cases the reporting officer was not at the scene when the crash occurred), this analysis only concludes that the category correlates to the crash, not that it was necessarily the cause. The crash attributes shown in this table can also be organized into three categories: Road Users, Behavioral Issues, and Roadway Locations. Analysis of these categories follows Table 3.1.

## Table 3.1 Fatal and Serious Injury Crashes by Attribute
*2009 to 2013*

| Attribute | Fatal and Serious Injury Crashes | | | | | | Percent Total |
|---|---|---|---|---|---|---|---|
| | 2009 | 2010 | 2011 | 2012 | 2013 | Total | |
| Roadway or Lane Departure Crashes[a] | 747 | 793 | 882 | 879 | 802 | **4,103** | 53.5% |
| Aggressive Driving Involved[b] | 501 | 548 | 603 | 567 | 548 | **2,767** | 36.1% |
| Intersection Crashes | 419 | 499 | 575 | 581 | 559 | **2,633** | 34.4% |
| Speed-Related Crashes[c] | 379 | 421 | 453 | 415 | 399 | **2,067** | 27.0% |
| Alcohol and/or Other Drugs Involved | 288 | 280 | 362 | 403 | 362 | **1,695** | 22.1% |
| Alcohol Involved (No Drugs) | 246 | 239 | 316 | 344 | 300 | **1,445** | 18.9% |
| Young Drivers – 21-25 Involved | 192 | 250 | 269 | 280 | 257 | **1,248** | 16.3% |
| Young Drivers – 15-20 Involved | 209 | 234 | 244 | 235 | 196 | **1,118** | 14.6% |
| Unrestrained Occupants | 203 | 170 | 231 | 225 | 200 | **1,029** | 13.4% |
| Older Drivers – 65-75 Involved | 158 | 192 | 199 | 221 | 211 | **981** | 12.8% |
| Pedestrian(s) Injured or Killed | 128 | 155 | 164 | 174 | 149 | **770** | 10.0% |
| Unlicensed Drivers Involved | 89 | 85 | 136 | 156 | 137 | **603** | 7.9% |
| Older Drivers – 76 or Older Involved | 113 | 95 | 128 | 131 | 100 | **567** | 7.4% |
| Inattentive Drivers Involved | 55 | 71 | 79 | 80 | 65 | **350** | 4.6% |
| Bicyclists(s) Injured or Killed | 66 | 44 | 80 | 79 | 65 | **334** | 4.4% |
| Commercial Motor Vehicle Involved | 49 | 73 | 82 | 53 | 65 | **322** | 4.2% |
| Work Zone Involved | 34 | 24 | 25 | 22 | 14 | **119** | 1.6% |
| School Bus or School Zone Involved | 4 | 16 | 6 | 8 | 10 | **44** | 0.6% |

[a] The Roadway or Lane Departure definition excludes intersections, pedestrian-related, and bicycle-related crashes.

[b] Aggressive Driving Involved consists of Too Fast for Conditions, Following Too Closely, and/or Driving in Excess of Posted Speed (note that duplicate crashes are not counted more than once).

[c] Speed-related Crashes consists of Too Fast for Conditions and/or Driving in Excess of Posted Speed (note that duplicate crashes are not counted more than once).

The attributes listed in Table 3.1 are not mutually exclusive, so they cannot be summed to calculate a total number. For example, in many cases roadway or lane departure crashes also are speed related, so those two attributes can be correlated to a single crash, but they will show up twice in the table.

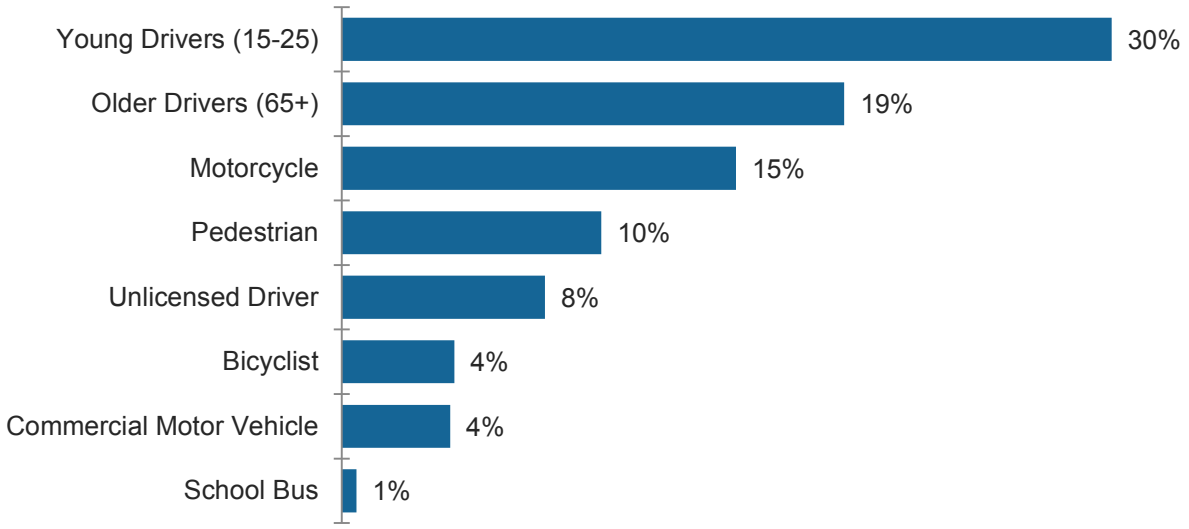
### *Road Users*

Road users are illustrated in Figure 3.5, and they range from typical motor vehicle drivers to nonmotorized road users and those operating special vehicles (e.g., school buses, commercial motor vehicles). Young drivers (age 15-25) are involved in the highest proportion of fatal and serious injury crashes, followed by older drivers (age 65+) and motorcyclists.[7] Regarding age groups, young drivers and older drivers are a

[7] Note that some road user attributes are not mutually exclusive. For example, some motorcycle riders are also young drivers.

consideration because they are typically overrepresented in traffic crashes compared to middle-age motorists (age 26 to 64).

**Figure 3.5 Proportion of Fatal and Serious Injury Crashes by Involved Road User**
*2009 to 2013*



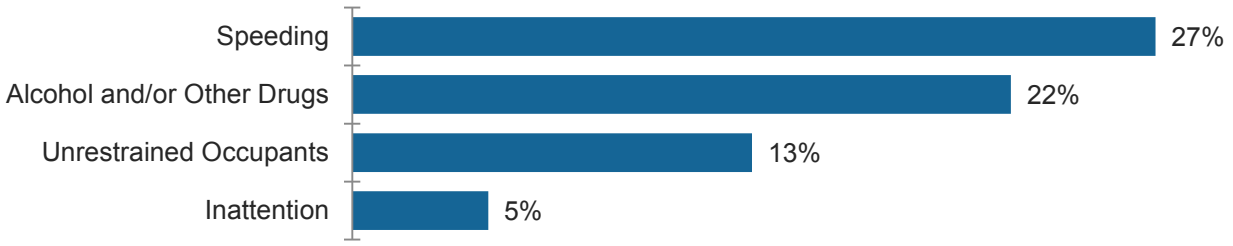

Note: Young drivers age 15 to 20 account for 15 percent of fatal and serious injury crashes, while those 21 to 25 account for 16 percent.

## *Behavioral Issues*

Behavioral issues (e.g., speeding, impaired driving, and distracted driving) have a significant effect on the frequency and severity of roadway crashes. In fact, more than 90 percent of all crashes involve human error.[8] Some of these crash attributes are choices a motorist makes before getting behind the wheel (e.g., drinking alcohol). Others are actions taken during a trip that affect the road users and others (e.g., speeding, not wearing a safety belt). As shown in Figure 3.6, speeding is the most common behavioral issue associated with fatal and serious injury crashes in Oregon, followed by alcohol-involved drivers. Note that although inattention shows up as a lower percentage in this figure, the actual occurrence of this attribute could be higher. It can be difficult for law enforcement officers to accurately identify inattention, as it often must be self-reported.

[8] K. Rumar. "The Role of Perceptual and Cognitive Filters in Observed Behavior," Human Behavior in Traffic Safety, eds. L. Evans and R. Schwing, Plenum Press, 1985.

**Figure 3.6 Proportion of Fatal and Serious Injury Crashes by Behavioral Issue**
*2009 to 2013*




## *Roadway Locations*

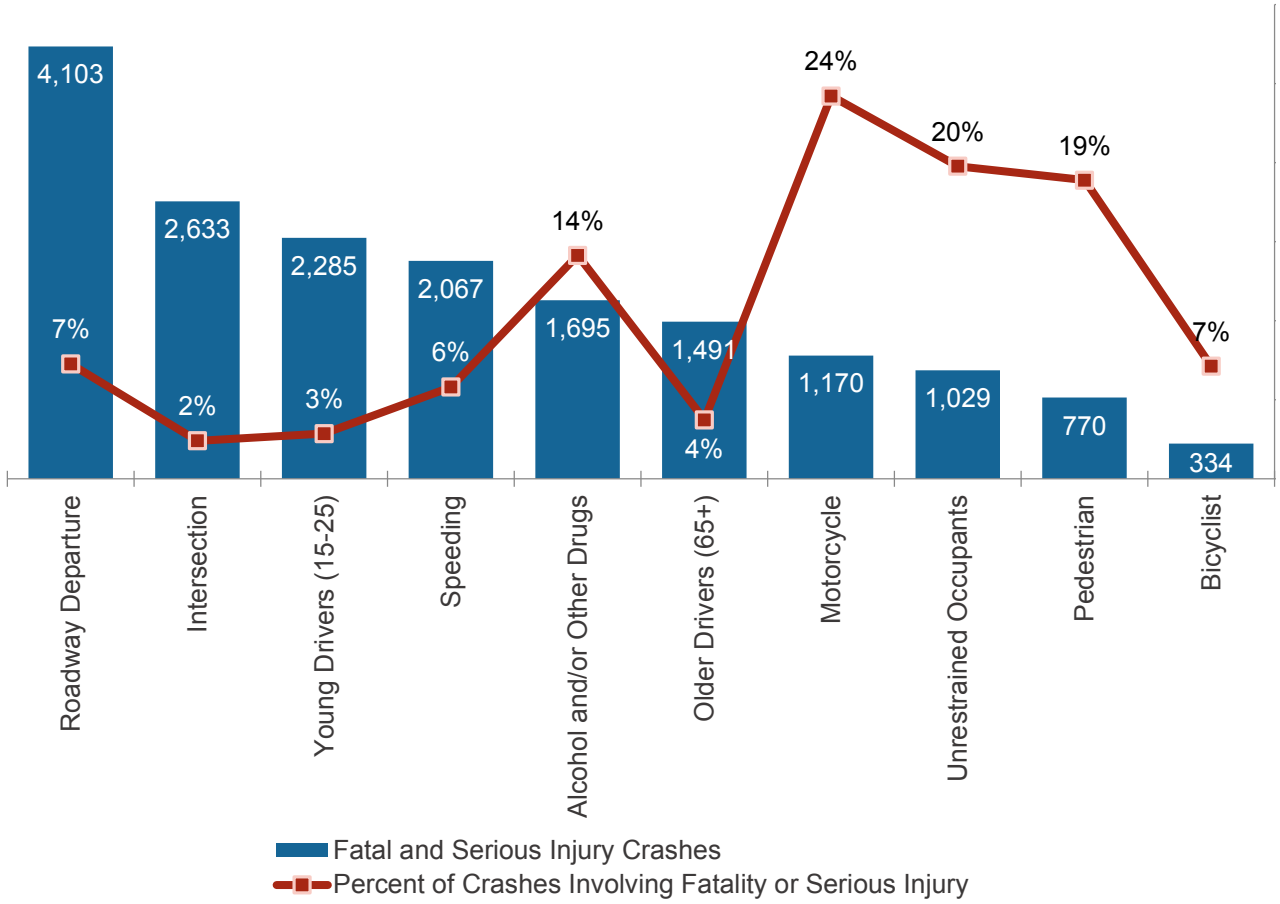
Roadway locations are important because they can point safety engineers to spots experiencing crashes and to roadway elements that may contribute to increased risk for crashes. The roadway (or off-roadway) locations of fatal or serious injury crashes include roadway or lane departure locations, intersections, work zones, and school zones. Figure 3.7 shows that more than half of fatal and serious injury crashes in Oregon occur as a result of a vehicle departing its proper lane. Crashes at intersections also account for a large number of fatalities and serious injuries. Approximately one out of three fatal and serious injury crashes from 2009 to 2013 occurred at an intersection.

**Figure 3.7 Proportion of Fatal and Serious Injury Crashes by Location Type**
*2009 to 2013*

## *Most Common Statewide Crash Attributes*

The crash attributes also were considered on a statewide basis. Figure 3.8 illustrates the number of fatal and serious injury crashes that include each attribute, and also the percentage of all reported Oregon crashes (i.e., all severities) by attribute that resulted in a fatality or serious injury. For example, motorcycles were involved in 1,170 fatal and serious injury crashes during the study period, while 24 percent of all reported motorcycle-involved crashes included at least one fatality or serious injury.

**Figure 3.8 Fatal and Serious Injury Crashes by Most Common Attributes**
*2009 to 2013*




Note: Young drivers age 15 to 20 account for 1,118 fatal and serious injury crashes, while those 21 to 25 account for 1,248.

Note that these categories are not mutually exclusive, as a single crash can include more than one attribute. For example, a number of alcohol-involved crashes also include unrestrained occupants, so a single crash may show up in both bars in Figure 3.8.

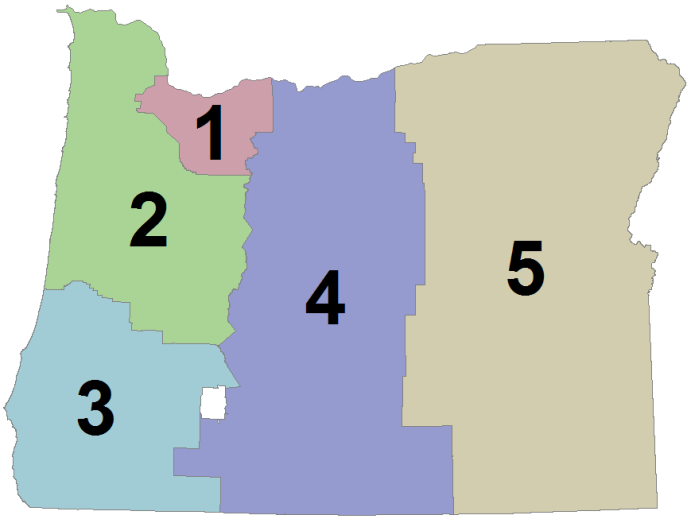
## Regional Crash Attributes

ODOT divides the State into five regions (Figure 3.9):

- **Region 1. Portland Metro** (Clackamas, Hood River, Multnomah and Washington Counties).
- **Region 2. Willamette Valley, North, and Mid-Coast** (Clatsop, Columbia, Tillamook, Yamhill, Polk, Marion, Lincoln, Linn, Benton, and Lane Counties).
- **Region 3. Southern Oregon and South Coast** (Douglas, Curry, Coos, Josephine, and Jackson Counties).

- **Region 4: Central Oregon** (Wasco, Sherman, Gilliam, Jefferson, Wheeler, Crook, Deschutes, Lake, and Klamath Counties).
- **Region 5: Eastern Oregon** (Morrow, Umatilla, Union, Wallowa, Baker, Grant, Harney, and Malheur Counties).

## Figure 3.9 Oregon DOT Regions

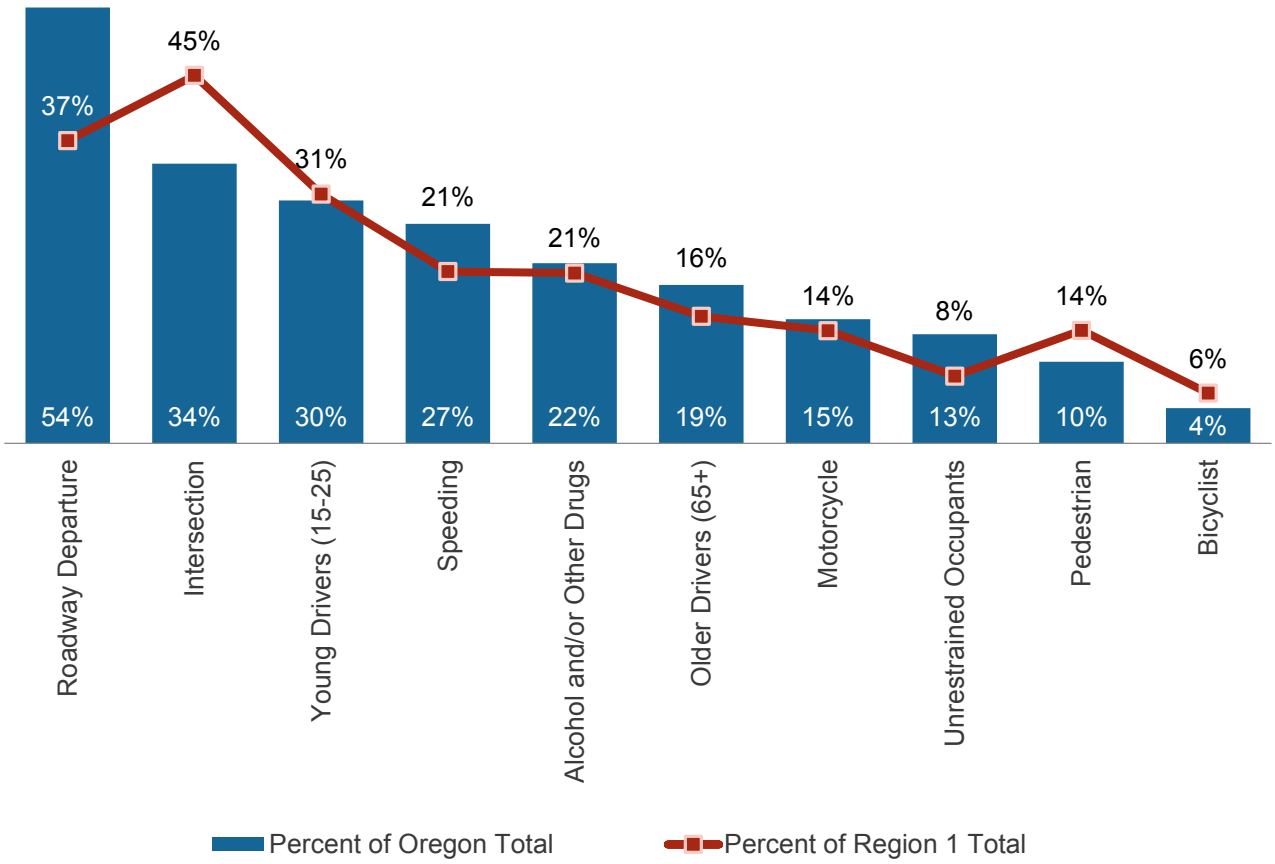



Source: Oregon DOT, http://www.oregon.gov/ODOT/PublishingImages/regions.gif.

Each of ODOT's five regions has a slightly different distribution of its most common crash attributes as compared to the statewide numbers. Figure 3.10 through Figure 3.14 show each region's fatal and serious injury crash attributes compared to Oregon overall.

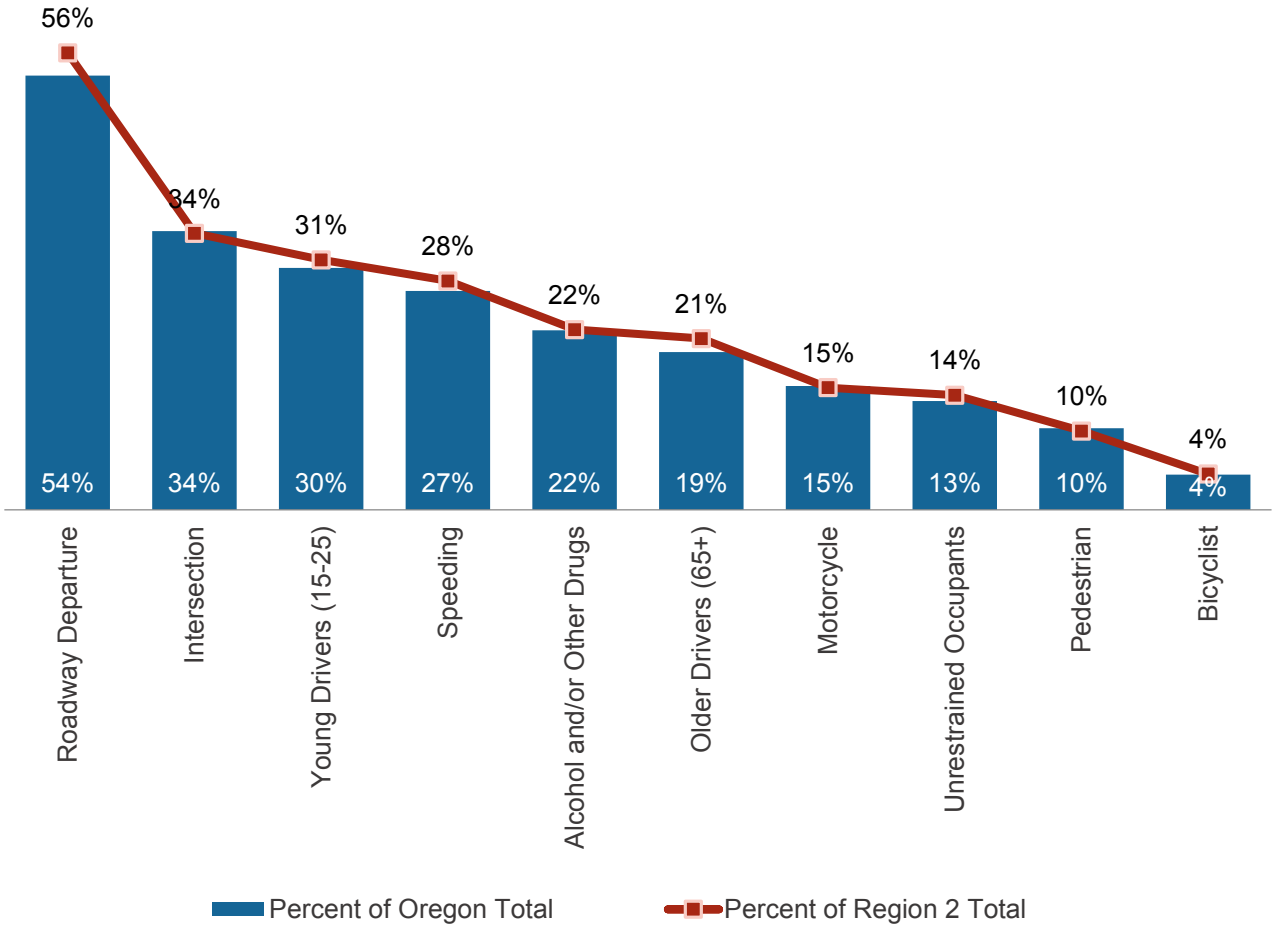
Region 1 (Figure 3.10) does not match the statewide distribution of serious crash attributes. Major differences include additional fatal and serious injury crashes at intersections and a higher proportion involving pedestrians and bicyclists. Region 1 also experienced fewer fatalities and serious injuries related to roadway or lane departure, speed, older drivers, and unrestrained occupants than the statewide average.

**Figure 3.10 Region 1 Fatal and Serious Injury Crashes by Attribute**
*Compared to Statewide, 2009 to 2013*



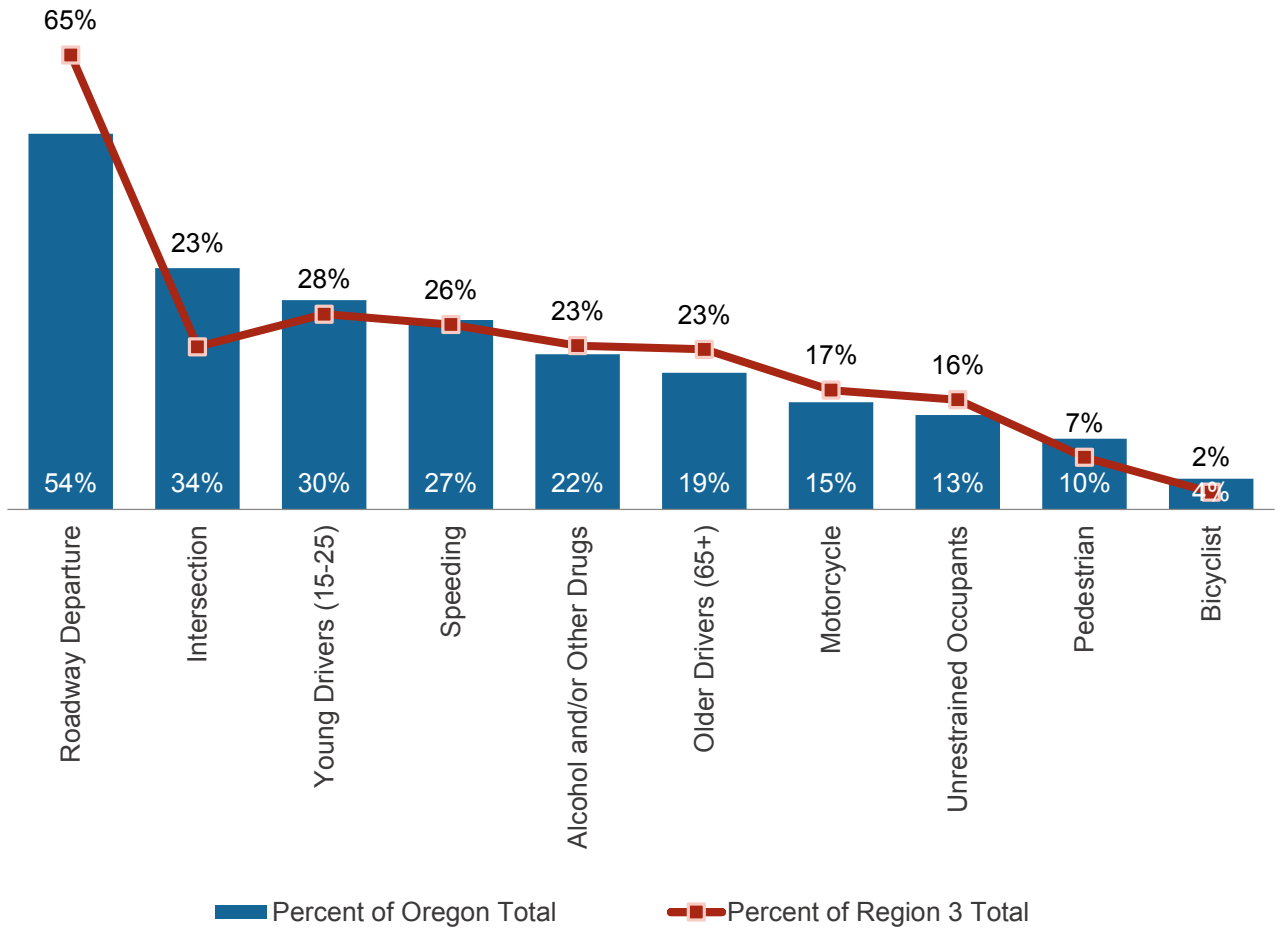
Region 2 (Figure 3.11) is a near-perfect match to the statewide proportions and distribution of the top attribute. The region has a mix of urban and rural transportation needs, similar to the State of Oregon.

**Figure 3.11 Region 2 Fatal and Serious Injury Crashes by Attribute**
*Compared to Statewide, 2009 to 2013*



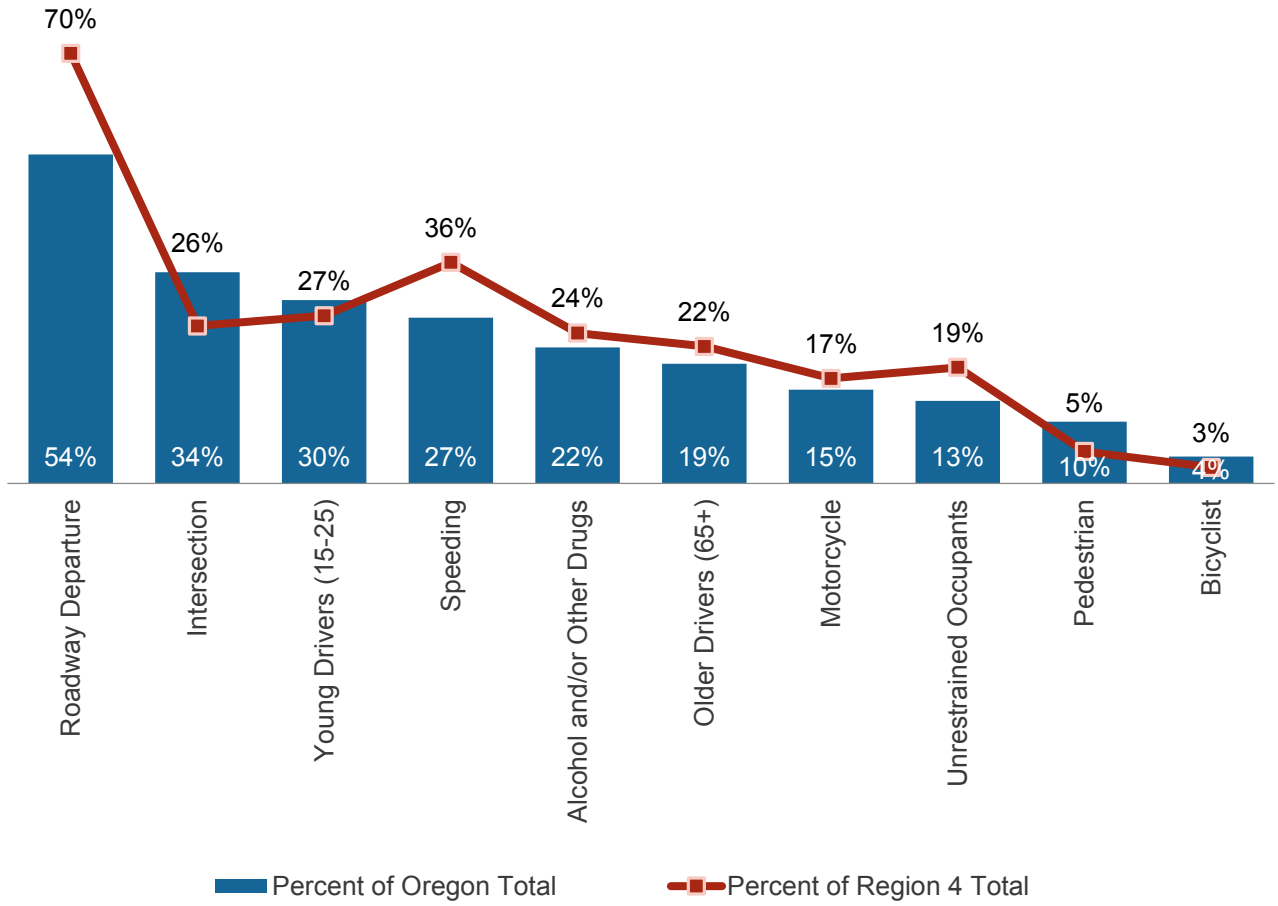
Region 3 (Figure 3.12 has a higher frequency of roadway or lane departure and speed-related fatal and serious injury crashes compared to the statewide average. It also experienced a lower proportion of intersection-related fatal and serious injury crashes than the rest of the State.

**Figure 3.12 Region 3 Fatal and Serious Injury Crashes by Attribute**
*Compared to Statewide, 2009 to 2013*



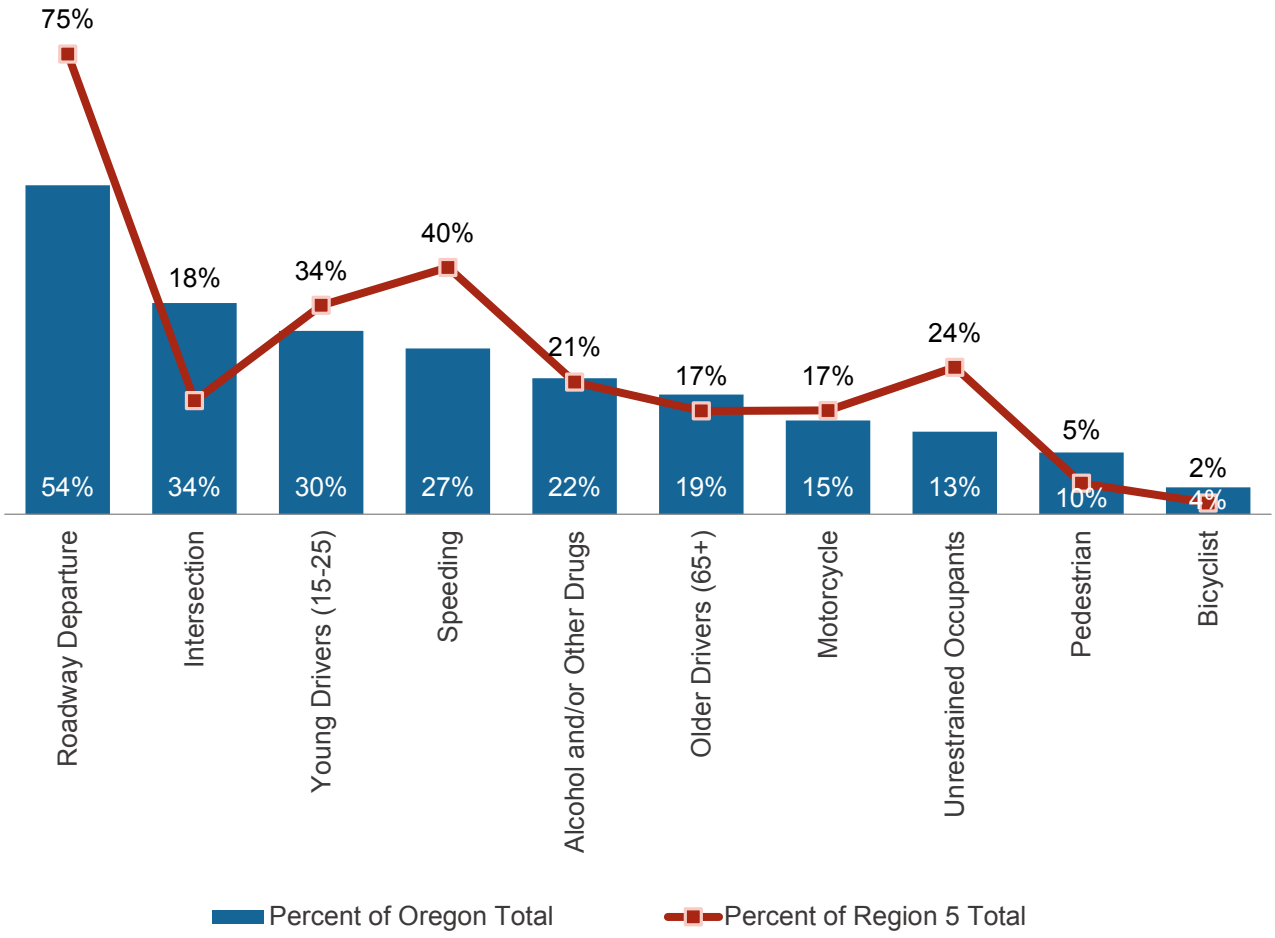
Region 4 (Figure 3.13) has a higher frequency of roadway or lane departure and speed-related fatal and serious injury crashes compared to the statewide average, partially because of its high number of rural road miles. It also has a higher proportion of unrestrained occupants than the State overall.

**Figure 3.13 Region 4 Fatal and Serious Injury Crashes by Attribute**
*Compared to Statewide, 2009 to 2013*



Region 5 (Figure 3.14) also is quite rural, which contributes to its higher frequency of roadway or lane departure and speed-related fatal and serious injury crashes compared to the statewide average. It also experienced a lower proportion of intersection-related and pedestrian-involved fatal and serious injury crashes than the rest of the State.

**Figure 3.14 Region 5 Fatal and Serious Injury Crashes by Attribute**
*Compared to Statewide, 2009 to 2013*



## Conclusion

From a broad perspective, the 2009-2013 Oregon crash trend analysis shows:

- The number of fatalities and serious injuries are approximately equally distributed in urban (48 percent) and rural areas (52 percent).
- Crashes with fatal or serious injury outcomes are most common on Principal Arterials and Minor Arterials, as well as Rural Collector roads.
- Statewide, from 2009-2013:
  - Roadway or lane departure crashes (54 percent of crashes) were the most common;
  - Young drivers (15-25) were most frequently (31 percent of crashes) involved; and
  - Speeding (27 percent of crashes) was the most common behavioral factor.
- While motorcycle crashes are not the most frequent, of all the motorcycle crashes that do occur 24 percent result in a fatality or serious injury. This is the highest severity proportion.
- There are different types, severities and attributes for crashes in the different ODOT Regions of the State:
  - **Region 1: Portland Metro** (Clackamas, Hood River, Multnomah and Washington Counties) has more intersection crashes, a higher proportion of fatal and serious injury crashes involving pedestrians and bicyclists, and fewer fatalities and serious injuries related to roadway or lane departure, speed, older drivers, and unrestrained occupants than the statewide average.
  - **Region 2: Willamette Valley, North, and Mid-Coast** (Clatsop, Columbia, Tillamook, Yamhill, Polk, Marion, Lincoln, Linn, Benton, and Lane Counties) essentially matches the statewide average distribution of crashes, due to the urban and rural nature of the region. The most frequent crash type are roadway departure crashes and crashes involving young drivers.
  - **Region 3: Southern Oregon and South Coast** (Douglas, Curry, Coos, Josephine, and Jackson Counties) experiences more roadway or lane departure and speed-related fatal and serious injury crashes compared to the statewide average, and a lower proportion of intersection-related fatal and serious injury crashes than the rest of the State.
  - **Region 4: Central Oregon** (Wasco, Sherman, Gilliam, Jefferson, Wheeler, Crook, Deschutes, Lake, and Klamath Counties) also has a higher frequency of roadway or lane departure and speed-related fatal and serious injury crashes, and a higher proportion of unrestrained occupants than the State overall.
  - **Region 5: Eastern Oregon** (Morrow, Umatilla, Union, Wallowa, Baker, Grant, Harney and Malheur Counties), also has a higher frequency of roadway or lane departure and speed-related fatal and serious injury crashes and a lower proportion of intersection-related and pedestrian-involved fatal and serious injury crashes than the rest of the State.

It is important to address both infrastructure and human behavior safety issues to meet Oregon's long-term vision. Oregon's crash data provides an important starting point toward deciding the distribution of limited resources by region, attribute, and potential countermeasures to address a diversity of safety programs and projects. The data also is critical to inform the selection of emphasis areas, strategies, and actions which provide the framework for lowering fatalities and serious injuries in Oregon and are presented in later chapters.

# 4. Safety Challenges and Opportunities

An important aspect of making a case for strategic investments in the transportation system is understanding the costs of not making those investments. The case for safety is in some regards intuitive – no one wants to lose a loved one to a crash, so investing in safety is easily accepted as a good use of resources, particularly by those directly affected by personal loss from a crash. But when deciding how to make the best use of limited resources, it also is helpful to have a sense of the real costs of transportation-related fatalities and serious injuries. Those costs are at once personal, societal, and economic.

Every crash in Oregon has an impact on families, communities and the economy. This chapter describes those impacts in detail, and also looks broadly at the challenges and opportunities for reducing them.

## The Human Impact of Crashes

The loss of a family member or friend to a sudden and unexpected crash is devastating. Over 30,000 motor vehicle crash victims and their families experience this every year in the United States, including over 400 in Oregon in 2015.

*Crashes, fatalities, and injuries are NOT a consequence of mobility. They are a failure of society.*

*Everyone is responsible for ensuring their own safety, and responsible to protect the lives of others through responsible decision-making.*

The impacts of a motor vehicle fatality are far reaching. Not only is the crash victim's life cut short, but spouses, children, parents, extended families, friends, and coworkers are each impacted in ways that are difficult to measure: the loss of a child is an unimaginable burden for most parents that they will carry for the remainder of their life; the premature death of a parent leaves a permanent void in a child's life; a spouse or friend lost in a crash can never be replaced. These experiences can fundamentally change the quality of a person's life.

Fortunately, Oregon has made great progress in reducing crash fatalities and associated impacts over the past 10 years; however, too many individuals and families are still being significantly impacted by debilitating injuries. In 2013, more than 1,400 people suffered incapacitating injuries in motor vehicle crashes in Oregon. Outcomes from these crashes can range from a short-term inconvenience (e.g., broken arm, concussion) to a life-altering injury (e.g., paralysis, loss of a limb). Life-altering injuries can further lead to depression and other health problems which again impact not only the victim, but friends, families, and coworkers as well.

Crashes and resulting injuries have historically been considered by many as an inevitable consequence of mobility. However, currently this idea is being challenged as countries, states, and cities across the world seek to change culture and eliminate traffic fatalities entirely. The idea may be difficult to grasp initially, but when people are asked how many traffic fatalities are acceptable for their friends and family, the universal response is: 'zero'.

As long as transportation users engage in risky behaviors such as driving under the influence of alcohol or drugs, speeding, not wearing seat belts, texting while driving or walking and biking, wearing dark clothing at night, and not using reflectors or lights, fatalities and injuries will continue to occur on our transportation network. Furthermore, unless we design our roads for the speeds that are appropriate within the land use and geographic contexts and the types of users expected, crashes will also continue as before. A multidisciplinary approach is required, with dedicated and sustained effort from government agencies representing the 4 Es of Safety (engineering, emergency response, law enforcement, and education) as well as the general public.

## The Economic Cost of Crashes

While it is difficult to quantify the emotional costs of crashes, it is possible to estimate the purely financial impacts of lost lives, injuries, and property damage attributable to crashes involving motor vehicles. Economists often use two approaches to quantify the costs of crashes: economic costs and comprehensive costs. Economic costs can generally be described as those costs which are measurable, while comprehensive costs include the economic costs as well as lost quality of life.

*Comprehensive crash costs attempt to account for lost quality of life in addition to the economic costs described in this chapter.*

*The total comprehensive crash cost for Oregon over the 2009-2013 timeframe was $15.6 billion – approximately $785 per year for each Oregon resident, compared to roughly $300 per year in economic costs.*

Consistent with the 2011 Transportation Safety Action Plan (TSAP), crash costs developed by the National Safety Council (NSC) are used in this chapter to estimate the statewide economic cost of crashes. Understanding the economic cost of crashes will help Oregon's policy-makers and the public compare the scale of the traffic safety problem to other societal concerns.

The NSC defines the economic cost of crashes as 'a measure of the dollars spent and income not received due to accidents, injuries, and fatalities.' This includes costs associated with lost wages and productivity, travel delay, medical expenses and emergency response, administrative costs, damage to motor vehicles and property, and additional costs borne by employers as a result of fatalities or injuries. Table 4.1 shows NSC economic crash costs.

### Table 4.1 National Safety Council Economic Crash Costs
*U.S. Average*

| Injury Severity | Cost (2013 Dollars) |
|---|---|
| K – Killed | $1,500,000 per Person |
| A – Disabling Injury | $74,900 per Person |
| B – Evident Injury | $24,000 per Person |
| C – Possible Injury | $13,600 per Person |
| O – No Injury | $2,600 per Crash |

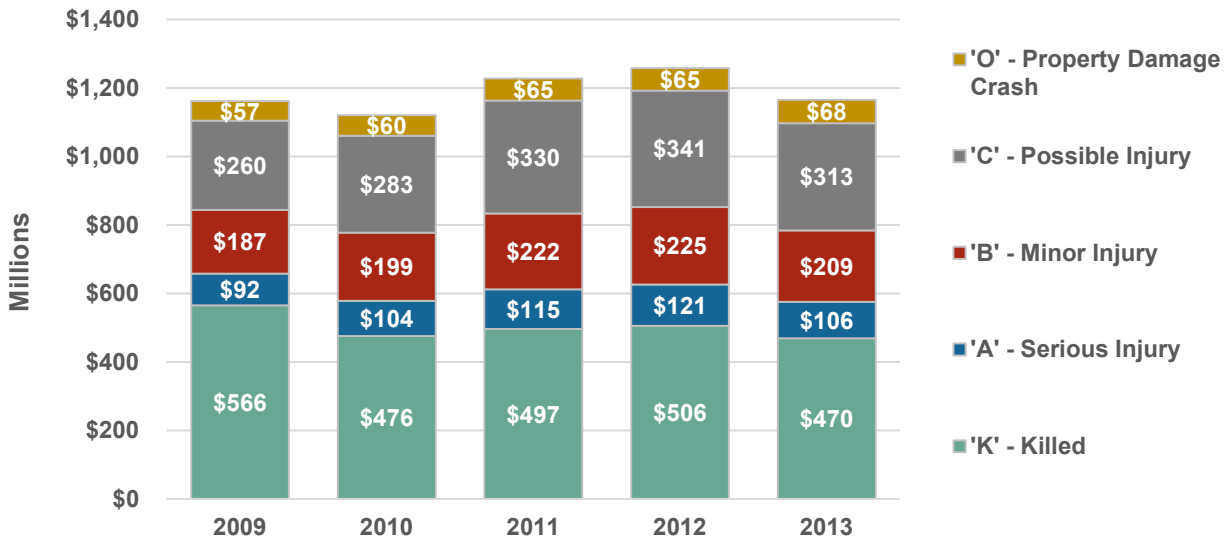
Source: National Safety Council. Estimating the Costs of Unintentional Injuries, 2013.

Note: 'K' crashes as used by the NSC are equivalent to fatal crashes in the TSAP document. Similarly, 'A' crashes are equivalent to 'serious injury' or 'incapacitating injury' crashes in the TSAP document or elsewhere.

The economic cost of crashes in Oregon in 2013 was close to $1.2 billion. Figure 4.1 provides a breakdown of economic crash costs by year and severity level from 2009 to 2013. The total economic crash cost to Oregon over the five-year period was close to $6 billion ($5.9 billion), or roughly $300 per Oregon resident per year.

## Figure 4.1 Oregon Economic Crash Costs by Year

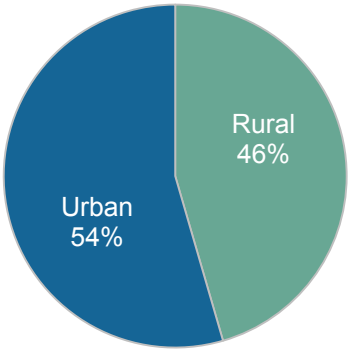
*2009 to 2013 (Millions)*




Crashes in rural areas tend to be more severe than those in urban areas. As a result, despite having significantly fewer crashes, rural areas account for 46 percent of the total economic crash cost burden in Oregon ($2.7 billion from 2009 to 2013 compared to $3.2 billion in urban areas (Figure 4.2)).

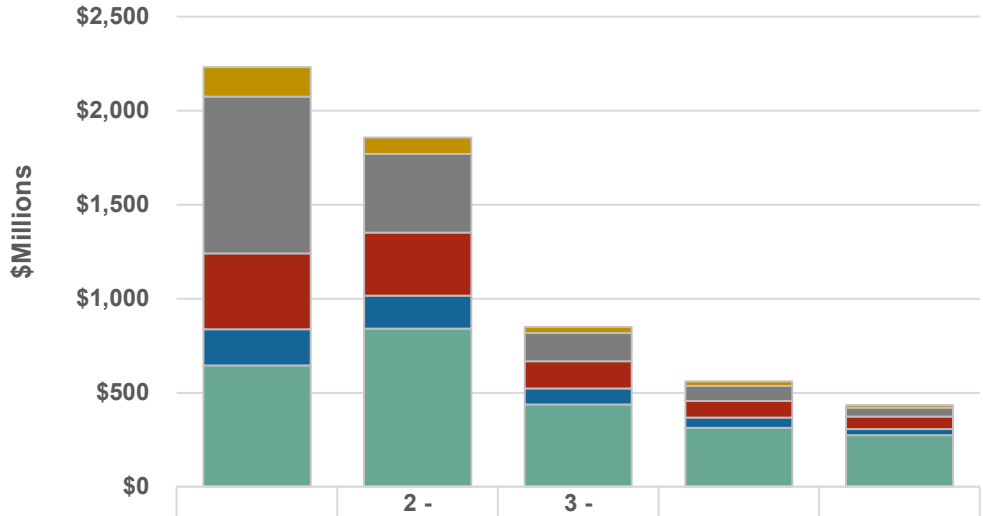
## Figure 4.2 Oregon Economic Crash Costs by Rural/Urban Geography

*2009 to 2013 (Millions)*




Another way to evaluate the geographic distribution of crash costs is by ODOT region. Figure 4.3 shows the distribution of crash costs by injury severity across the five ODOT regions. The Portland Metro region (ODOT Region 1) experiences the highest overall burden, followed by the Willamette Valley region (ODOT Region 2). Region 1 has the greatest number of crashes by a significant margin, but Region 2 actually has a higher number of fatalities (561 in Region 2 from 2009 to 2013 compared to 430 in Region 1), which drives up the economic cost.

**Figure 4.3 Economic Crash Costs by ODOT Region**
*2009 to 2013 (Millions)*




| | 1 - Portland Metro | 2 - Willamette Valley, North and Mid- Coast | 3 - Southern Oregon and South Coast | 4 - Central Oregon | 5 - Eastern Oregon |
|---|---|---|---|---|---|
| 'O' - Property Damage Crash | $155 | $88 | $33 | $24 | $14 |
| 'C' - Possible Injury | $834 | $417 | $150 | $80 | $47 |
| 'B' - Minor Injury | $405 | $336 | $146 | $88 | $67 |
| 'A' - Serious Injury | $192 | $175 | $84 | $54 | $33 |
| 'K' - Killed | $645 | $842 | $438 | $314 | $275 |

## Transportation Safety Challenges and Opportunities

Given the significant impact of crashes on Oregon's families, communities and economy, it is important to look broadly at the challenges and opportunities for reducing these impacts.

### *Challenges*

#### Significance of Motor Vehicle Crashes Compared to Other Causes of Death and Injury

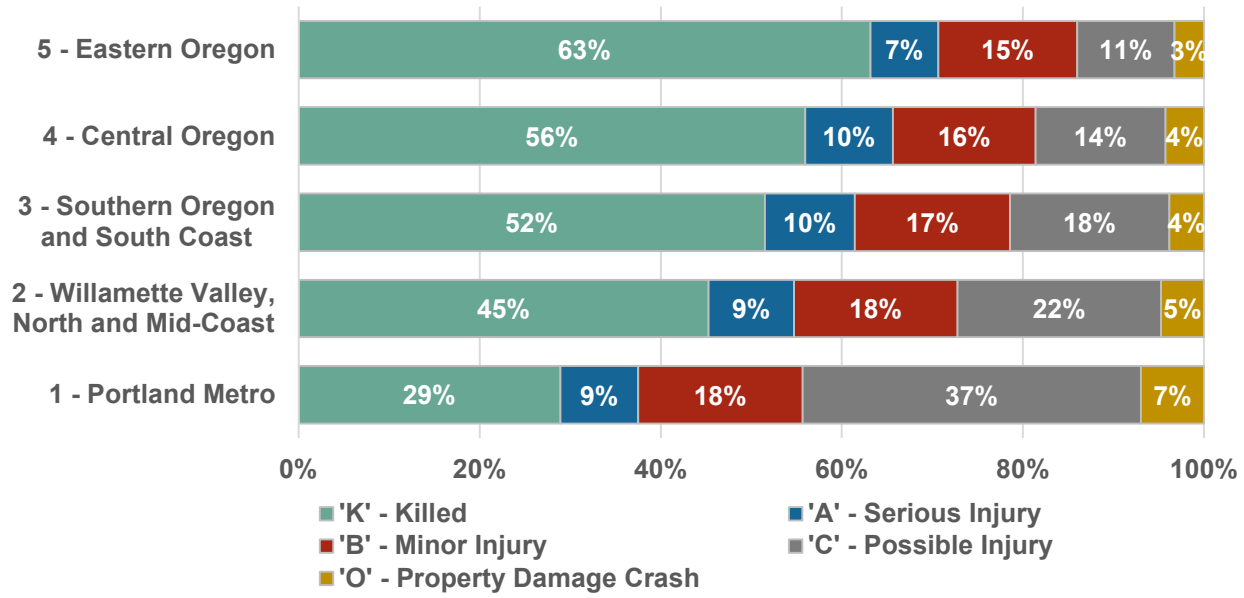
Injuries were responsible for 2,595 deaths in Oregon in 2013, making the category the third leading cause of death behind cancer (7,771 deaths) and heart disease (6,464 deaths). However, among the population 44 years or younger (excluding newborns), injuries have been the leading cause of death each year since 2000. As a result, more years of life are lost to injury than other causes of death in Oregon. Within the injury category, motor vehicle crashes are the fourth leading cause of death, behind suicide, unintentional falls, and unintentional poisoning (e.g., alcohol poisoning or drug overdose). Motor vehicle crashes are a significant cause of death in Oregon.

The Oregon Health Authority estimates that the number of motor vehicle fatalities per 100,000 Oregon residents fell from 13.4 per year in 2000 to 8.2 in 2013, a 39-percent decline. Hospitalization rates for motor vehicle-related injuries also fell by around 30 percent during the same period. These trends are encouraging, especially relative to trends for other injury types. For example, mortality rates from both unintentional falls and poisoning more than doubled during that timeframe.

## Geographic Equity

The burden of traffic crashes is not distributed evenly across society. As discussed above, rural areas experience a disproportionate share of fatalities and serious injuries, and associated costs. Figure 4.4 shows the distribution of crash costs by severity for each of ODOT's five regions. Fatalities make up a greater share of costs in regions that are more rural in character. For example, in Region 5 (Eastern Oregon), fatalities account for more than 60 percent of crash costs, while in Region 1 (Portland Metro), they are responsible for only 30 percent of costs.

### Figure 4.4 Percentage of Regional Crash Costs by Severity




While only 19 percent of the Oregon population lives in rural areas, 67 percent of fatalities occur in these areas, along with almost half of serious injuries (48 percent).[9] Longer emergency response times and constrained medical resources are likely to explain much of the difference in severity between urban and rural areas, but other factors also are at play. For example, a higher percentage of fatalities in rural areas involved occupants failing to use seat belts (32 percent in rural areas compared to 22 percent in urban areas). Similarly, 71 percent of speed-related fatalities and serious injuries were on rural roadways.

[9] U.S. Census Bureau. Oregon: 2010, Population and Housing Units. 2010 Census of Population and Housing. August 2012. https://www.census.gov/prod/cen2010/cph-2-39.pdf.

## Shifting Demographics

Oregon's population grew by over 5 percent from 2010 to over 4 million people in 2015, which was slightly faster than the U.S. overall. This growth translates into higher levels of travel and commercial activity, especially in metropolitan areas where most of the growth has occurred.[10]

***Changing Travel Demographics***

- *More people.*
- *More older drivers.*
- *More travel and commercial activity – especially in urban area.*

Oregon also is experiencing an increase in the older driver population as baby boomers move into and through the retirement years. The portion of the population 65 years or older increased from 12.8 percent in 2000 to 13.9 percent in 2010 and 16 percent in 2014.[11] Although older drivers are safer in many respects than younger and middle age drivers, they have lower survival rates when involved in crashes, which could contribute to an increase in motor vehicle fatalities.

## Competing Priorities in Urban Areas

In urban areas there is a high mix of modes of travel, speed of travel and trip purpose. Trucks move freight and vehicles, bicycles and transit move people to work, recreation, and shopping. There is inherent conflict and risk in this mix of modes, trip purposes, and speed of travel. Implementing a range of transportation solutions in urban areas is necessary to meet transportation goals, such as safety, mobility, reliability, or improved air quality Planners and engineers need to draw on the best available evidence to implement a data-driven approach to safer systems.

***Competing Priorities***

- *High mix of modes and in urban areas.*
- *Balancing safety, mobility, reliability, air quality, access.*
- *Equity.*
- *Transit Availability.*

There also are equity considerations in planning for safer transportation systems in urban areas. Research shows that pedestrian crash incidents in areas with higher crime rates, lower transit availability, and population demographics such as lower income levels or number of children. In these areas it may be critical to consider safety specifically.[12]

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[10] Portland State University Population Research Center. Oregon Annual Population Report. 2014. http://www.pdx.edu/prc/sites/www.pdx.edu.prc/files/Oregon_Annual_Pop_Report_Tables_2014_v3.pdf.

[11] U.S. Census Bureau. American Fact Finder.

[12] Cottrill, C. Evaluating Pedestrian Crashes in Areas with High Low-income or Minority Populations. Accident Analysis and Prevention, October 2010.

## Technology Concerns

Technology has made and continues to make significant contributions to transportation safety, but it is not always beneficial. For example, the proliferation of cell phones and other handheld devices has given rise to an increased distracted population. Unfortunately, reliable statistics on the use of cell phones while driving and as a contributor to crashes and injuries are difficult to obtain, but available data and anecdotal evidence point to distraction as a significant traffic safety concern. A recent survey conducted by Southern Oregon University found that three out of four drivers surveyed engage in distracted driving. Furthermore, 83 percent of respondents felt that distracted driving is an important safety concern on Oregon's roads.[13] Research into the impact of various types of distraction on cognitive abilities confirms the risks associated with the use of technology while driving.[14]

***Advantages and Disadvantages of Technology***

- *In-vehicle distractions – cell phones, dashboard computers.*
- *Expense of implementing technology solutions.*
- *Equity of implementing technology solutions.*

Technological innovation can be expensive to implement and the benefits do not always outweigh the costs. For example, rigorous commercial vehicle driver training may in some cases be less expensive than implementing technology requirements that are potentially less effective. Equity is another concern stemming from the cost of technology. Advancements in technology are slower to reach lower income residents and those in rural areas, where a significant portion of fatalities and serious injuries occur.

# *Opportunities*

## Mobility and System Efficiency Benefits of Reducing Crashes and Injuries

While mobility and safety are often thought of as competing goals, this is not always the case. Crashes are part of a broader category of congestion referred to as 'nonrecurring congestion', which also includes congestion resulting from disabled vehicles, work zones, adverse weather, and special events.[15] Crashes impose costs on society through increased travel time, wasted fuel, and increased emissions. The vast majority of these costs are experienced on urban interstates and expressways. A single crash typically affects travel conditions from around 25 minutes to an hour and a half, depending on pre-crash traffic density, whether travel lanes are closed, and the severity of the crash.[16] Generally more severe crashes impose higher congestion costs. According to NHTSA, crashes resulted in $28 billion in congestion-related costs to the U.S. economy in 2010. Reducing crashes therefore is a significant

***Benefits of Saving Lives***

- *Over and above the obvious – There will be reduced congestion and more reliability if crashes are eliminated.*

[13] Angela Durant et al. Distracted Driving: an Epidemic, A Study of Distracted Driving Attitudes, Behaviors, and Barriers Preventing Change. Southern Oregon University, prepared for Oregon Department of Transportation. https://www.oregon.gov/ODOT/Documents/Distracted%20Driving%20An%20Epidemic.pdf.

[14] AAA Foundation for Traffic Safety. Measuring Cognitive Distraction in the Automobile. 2013. https://www.aaafoundation.org/sites/default/files/MeasuringCognitiveDistractions.pdf.

[15] FHWA. Office of Operations. Reducing Non-Recurring Congestion. 2015. http://ops.fhwa.dot.gov/program_areas/reduce-non-cong.htm.

[16] National Highway Traffic Safety Administration. The Economic and Societal Impact of Motor Vehicle Crashes. 2010. http://www-nrd.nhtsa.dot.gov/pubs/812013.pdf.

opportunity to improve the economy through not only the reduction of injury costs, but also through reduced congestion costs.

## The Role of Technology

Throughout history, technology has played a pivotal role in transportation safety. A few notable past examples are shown in Table 4.2.

### Table 4.2 Examples of Significant Past Technological Innovations for Improved Safety

| Application Area | Technological Innovation |
|---|---|
| Vehicle Safety | • Reduced likelihood of getting in a crash (e.g., antilock brakes, traction control, antiroll bars)<br>• Improved crash injury outcomes (e.g., seat belts, air bags, child passenger seats, crumple zones) |
| Infrastructure | • Improved pavement technology to increase traction<br>• More conspicuous signs and markings<br>• Cable median barriers and guardrails |
| Law Enforcement | • Breathalyzers and other devices to detect impaired drivers<br>• Ignition interlock devices to reduce repeat DUI offenses<br>• Speed and red-light-running cameras |
| Emergency Response | • Improved communications to reduce response time<br>• Advanced equipment to sustain life following a serious crash |
| Problem Identification and Research | • Sophisticated methods and data to identify intersections and corridors with the greatest safety concern<br>• Advanced research into crash causes and countermeasures<br>• Integration of datasets across agencies and disciplines to better understand and address traffic safety issues |

## Connected and Automated Vehicles

Technology continues to evolve and influence traffic safety. Perhaps the most significant safety-related technological change on the horizon is the introduction of connected vehicles for both private travel and the movement of freight to the road network. Connected vehicles have the potential to reduce the likelihood of crashes through the use of vehicle-to-vehicle (V2V) and vehicle-to-infrastructure (V2I) applications. Examples of V2V and V2I applications include:

***Connected and Automated Vehicles Will:***

- *Reduce likelihood of crashes.*
- *Take time before all vehicles have the technologies.*
- *Require public investment, policies and programs in urban and rural areas.*
- *Initially benefit higher income residents.*

- **V2V.** Forward collision warning, emergency electronic brake light, blind spot/lane change warning, do not pass warning, intersection movement assist, and left turn assist.
- **V2I.** Curve speed warning, red light violation warning, spot weather information warning, reduced speed zone warning, stop sign gap assist, smart roadside, and transit pedestrian warning.

Automated vehicles are an extension of the connected vehicles concept where some or all of the driving function is handled by the vehicle itself. In the case of fully automated vehicles, human input would be limited to providing destination information only. In theory, such vehicles hold the potential to eliminate crashes altogether, and also would bring about other beneficial outcomes, such as reduced congestion. While technology for these vehicles have come a long way, there are numerous technical, legal, policy, and implementation challenges that must be resolved before connected and automated vehicles will significantly impact safety outcomes. Furthermore, the widespread implementation of these vehicles and associated infrastructure will not happen overnight. Rather, the technology will be gradually integrated into the fleet as new vehicles are purchased. Regulation may help to promote or require V2V and V2I in new car purchases, but even so the turnover in the fleet is such that it may be several decades before fully autonomous vehicles are widely implemented.[17]

## Safety Analytics

The use of analytical tools and processes offers a more immediate application of technology to transportation safety. The increasing quality and quantity of safety-related data (e.g., crash, roadway inventory, and volume) is enabling new insights into the causes of crashes and possible measures to reduce their occurrence or severity. Methods for collecting safety data specific to other modes such as bicycles and pedestrians are emerging and will expand capability to assess risks and identify solutions for non-auto modes. Advances in statistical modeling have enabled more reliable problem identification and application of safety countermeasures taking advantage of available data. Additionally, some agencies have begun to use prior crash history to forecast the likely occurrence of crashes and to proactively deploy law enforcement and emergency response resources accordingly.[18] This data and proactive approach also allows communities to better plan for the safety of the transportation system in their long-range work.

***Safety Analytics***

- *The timeliness and quality of data can save lives.*
- *Better data and analytical tools will mean the right solutions at the right time.*
- *Staff will need training and resources to take full advantage of safety analytics.*

## Shifting Demographics

Like most states, Oregon's population has become increasingly focused in urban and suburban areas over the past few decades. The share of the population living in metropolitan areas increased from 77 percent in 2000 to 83 percent in 2014. This trend is likely to continue as the Portland region in particular attracts new residents from across the country.

Along with the overall trend toward living in urbanized areas, urban centers also are becoming denser. Increased density is being driven by a number of factors, including the preference among empty nesters and millennials for urban lifestyles, where a variety of amenities are within close proximity.

***Shifting Transportation and Lifestyles***

- *More people are choosing urban lifestyles.*
- *Urban areas are becoming more dense.*
- *More people are choosing non-auto travel.*
- *Transit is one of the safest modes of travel.*
- *Managed speeds can significantly reduce the severity of crashes.*

[17] http://www.vtpi.org/avip.pdf.

[18] http://www.timesfreepress.com/news/local/story/2014/aug/01/new-software-predicts-when-and/263323/.

Transportation and land use patterns in urban areas tend to support the use of transit, bicycling, and walking, as well as relatively newer transportation forms such as car sharing and transportation network company services (e.g., Uber). Widespread use of smart phones and other mobile devices are playing a pivotal role in advancing new ways for people to travel in the city.

All of these trends associated with greater urbanization have an impact on safety outcomes. Crashes in urban areas tend to have less severe outcomes due to lower speeds and access to medical services.

The use of transit in urban areas likely contributes to improved safety, in part due to the extent it reduces traffic volumes and conflicts. And transit is one of the safest modes of transportation.[19] It provides an alternative to driving for many commuters who would otherwise drive or who should not be operating a vehicle for health or other reasons. The role of transit in improving safety outcomes has not been fully explored in the literature, but research has demonstrated that cities with higher per capita transit use also have lower per capita fatality rates.[20]

Less is known about the relationship of the level of walking and bicycling to safety outcomes for these modes or for the broader public. A 'safety in numbers' theory has been proposed, suggesting that higher levels of walking and bicycling result in lower crash rates involving these modes. While data consistent with this theory has been presented from several countries, a consensus on this question has not been reached. For instance, data from Portland indicates that while bicycle traffic on Portland's bridges increased from 2,850 in 1991 to 18,794 in 2011 (a more than six-fold increase) the number of bicycle crashes approximately only doubled, increasing from 155 to 297. However, during the same period, bikeway facility miles increased by a factor of four (from 70 to 307 miles). It is possible that one or both of these factors played a role in reducing the crash rate, but it cannot be determined without a more rigorous study. Nonetheless, the evidence suggests that at the very least, higher levels of bicycling and walking do not result in a dramatic increase in crashes.

Another significant trend in urban areas is the emergence of the sharing economy. Car sharing and Transportation Network Companies (TNC) such as Uber and Lyft are changing the relationship between the public and their vehicles. In particular, these innovations make it easier for people to live car-free, potentially resulting in fewer serious crashes on our roadways. TNCs also may have a positive impact on risky behaviors such as impaired driving.[21]

## Conclusion

To take advantage of the opportunities and address the challenges, ODOT Divisions, partner agencies, and stakeholders have collaborated to inform the development of safety goals, policies, and strategies. This information will be used as a guide to incorporate safety into daily job functions and as part of everyone's personal responsibility to safety. The following chapter describes the policy and strategy outcomes associated with the challenges and opportunities.

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[19] Bureau of Transportation Statistics. Distribution of Transportation Fatalities by Mode. http://www.rita.dot.gov/bts/sites/rita.dot.gov.bts/files/publications/national_transportation_statistics/html/table_02_04.html.

[20] Litman, T. A New Transit Safety Narrative. Journal of Public Transportation, Vol. 17, No. 4, 2014. http://www.nctr.usf.edu/wp-content/uploads/2014/12/JPT17.4_Litman.pdf.

[21] Greenwood, B. & S. Wattal. Show Me the Way to Go Home: An Empirical Investigation of Ride Sharing and Alcohol Related Motor Vehicle Homicide. Fox School of Business Research Paper No. 15-054. 2015. http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2557612&download=yes.

# 5. Vision, Goals, Policies, and Strategies

This portion of the TSAP outlines a strategic framework, including a vision, goals, policies, and strategies, to define what Oregonians wants to achieve in the future for transportation safety. The vision outlines the aspirational, yet achievable, objective of eliminating fatalities and serious injuries by 2035. To make advancements towards the vision, six goal areas provide specificity to ODOT, stakeholder agencies, and the public to focus efforts and resources. Within each goal area, a diverse list of policies and strategies convey the mid- and long-term opportunities, programs, and activities that have the best chance of improving transportation safety for all modal users. Incorporation of the goals, policies, and strategies into all ODOT and stakeholder plans will help Oregon achieve its vision.

***Goal Areas***

- *Improving Safety Culture.*
- *Improving Infrastructure.*
- *Facilitating Healthy and Livable Communities.*
- *Best Available Technologies.*
- *Communicating and Collaborating.*
- *Strategic Investments.*

## Vision

Every day, people arrive safely at their destinations in Oregon, but tragically, fatalities and serious injuries still occur on the Oregon transportation system. Any fatality or life-changing injury is a significant loss that can be avoided by implementing state-of-the-art programs, policies, and projects related to safety engineering, emergency response, law enforcement, and education. The TSAP lays the foundation to consider and prioritize safety for all modes and all users of our transportation system in order to eliminate all deaths and life-changing injuries on the transportation system.

***Vision***

*Oregon envisions no deaths or life-changing injuries on Oregon's transportation system by 2035.*

Achieving this vision by 2035 requires commitment and engagement from a variety of Oregon's agencies and stakeholders. Engineers, emergency medical service providers, law enforcement and educators traditionally play a strong role in advocating for, planning, designing, and implementing transportation safety plans and will continue to do so. However, this plan also includes goals, policies, strategies, and actions relevant to public health professionals, the media, private stakeholders, the individual transportation system user, and others. All of these organizations and individuals will be tasked with planning and implementing safe travel options, and traveling responsibly, with the safety of all users in mind.

## Goals

Decision-makers are always faced with tradeoffs in developing a comprehensive transportation system. There are a large variety of system needs (e.g., mobility, access, reliability, environmental impacts, health impacts, equity, modal options, and safety) that need to be balanced and prioritized for a wide variety of contexts. The goals, policies, and strategies in the TSAP present a "safety-first" perspective.

*There are always tradeoffs. The goals, policies, and strategies in this plan are developed and presented from a "safety-first" perspective.*

# Goal 1: Safety Culture

## Background

Developing and sustaining a strong safety culture, where safety is integrated into everyday decision-making, is key to reducing unnecessary deaths and serious injuries related to transportation. Cultural change is not a simple thing – it involves educating all those who participate in developing (planners, designers, engineers, operations, and maintenance and staff) and using the transportation system that they have a basic responsibility to consider the safety of themselves and others as part of their job functions and daily activities.

For those who address transportation and/or safety in their jobs, including the state legislature, ODOT, metropolitan planning organizations, local jurisdictions, emergency responders, law enforcement, health services providers, rail and transit providers, nonprofit organizations, industries, and other organizations, cultural shifts will be seen when safety is prioritized as a core value. A strong safety culture means that agency leadership and employees, at all levels, are encouraged and rewarded for prioritizing safety, and identifying safety issues and solutions while carrying out their agency's missions and their individual job responsibilities.

Inspiring a strong safety culture among the public (individual drivers, passengers, bicyclists and pedestrians) can be implemented in a number of ways. Good public information and education on the rules of the road and changes in regulations; broadly available and up-to-date driver training; clear communication of the benefits of transportation law enforcement changing social norms to expect slower speeds; respect and responsibility for other users; and community engagement in transportation safety plans and programs; can all contribute to higher awareness of how choices influence the safety of all system users.

Opportunities to address safety culture are different based on the types of decisions being made and on who is making those decisions, but Oregon will achieve shifts on all fronts to elevate awareness of safety issues and identify safety solutions.

## Goal

Transform public attitudes to recognize all transportation system users have responsibility for other people's safety in addition to their own safety while using the transportation system. Transform organizational transportation safety culture among employees and agency partners (e.g., state agencies, MPOs, local agencies (Tribes, counties, cities), Oregon Health Authority, stakeholders, and public and private employers) to integrate safety considerations into all responsibilities.

## Policies

- **Policy 1.1.** Communicate proactively with system users about safety culture.
- **Policy 1.2.** Promote safety culture within agencies, stakeholder organizations, and employers.
- **Policy 1.3.** Implement regulatory changes, including legislative concepts and administrative rule changes, as needed, to provide incentives or remove impediments to developing a multimodal transportation safety culture.

## Strategies

*Policy 1.1. Communicate proactively with system users about safety culture.*

- **Strategy 1.1.1 –** Promote safe travel behavior through educational initiatives, focusing on how system user behavior can contribute to a safer transportation system for all.
- **Strategy 1.1.2 –** Tailor safety culture marketing and media tools to specific user groups with specific needs (e.g., youth, older travelers, walkers, bikers, minority groups, and different income groups).
- **Strategy 1.1.3 –** Continuously evaluate the effectiveness of policies, programs or projects implemented to improve public understanding of safety culture and changes in positive transportation safety behaviors.

*Policy 1.2. Promote safety culture within agencies, stakeholder organizations, and employers.*

- **Strategy 1.2.1 –** Provide transportation and safety leaders and staff with training, information, and education on proven methods to integrate safety into all aspects of the planning, programming, project development, construction, operations, and maintenance processes.
- **Strategy 1.2.2 –** Implement best practices for ongoing enhancement of safety culture training, information, and tools within ODOT and across agencies and stakeholders.
- **Strategy 1.2.3 –** Coordinate and collaborate with public and private employers to implement work-related transportation safety programs.

*Policy 1.3. Implement regulatory changes, including legislative concepts and administrative rule changes, as needed, to provide incentives or remove impediments to developing a multimodal transportation safety culture.*

- **Strategy 1.3.1 –** Collaborate with state, regional, Tribal, county and city transportation and safety agencies, and other stakeholders, to identify unsafe walking, biking, or driving behaviors which could be addressed through legislation. Identify and pursue legislation to modify these behaviors.

# *Goal 2: Infrastructure*

## Background

Transportation infrastructure should be planned, designed, built, operated, and maintained to provide the safest feasible environment for all transportation users. When safety is considered during all of these stages and proven treatments are applied, small user mistakes will not result in serious injuries.

Oregon's transportation infrastructure includes state and local public facilities (streets, freeways, paths, sidewalks, transit, bicycle facilities, signs, lights, traffic signals, interchanges, barrier rail, guard rail, etc.) and other transportation assets, including technology resources that support transportation operations, planning, and decision-making. The design of these facilities influences how people interact with and use the transportation system. People driving, riding, walking and bicycling navigate the transportation system using visual cues, signage, regulations, and their personal expectations about how other people will use the transportation system. Infrastructure for all travelers needs to be planned, designed, constructed, operated,

and maintained to clearly convey travel speed and behavior consistent with the surrounding land uses and anticipated users, and to carefully manage interactions and expectations across modes.

Inevitably, crashes will occur, but the transportation system can be planned and designed to limit the severity of crashes. This is achieved by creating environments that minimize potential conflicts within and across modes; planning and designing facilities consistent with the desired context and use of the facilities; and implementing countermeasures with known or high potential to minimize crash severity and frequency.

## Goal

Develop and improve infrastructure to eliminate fatalities and serious injuries for users of all modes.

## Policies

- **Policy 2.1.** Continually improve and implement safety data collection, management, and distribution for data-driven decision-making for infrastructure planning and development and operations activities, across all divisions at ODOT, and with partner agencies and stakeholders.

- **Policy 2.2.** Continually improve and implement design and analysis techniques for safety-related decision-making in transportation planning, programming, design, construction, operations and maintenance for all modes.

- **Policy 2.3.** Plan, design, construct, operate, and maintain the transportation system to achieve healthy and livable communities and eliminate fatalities and serious injuries for all modes.

- **Policy 2.4.** Implement regulatory changes, including legislative concepts, administrative rule changes, and updates to design standards, as needed, to enable and/or remove impediments to new approaches to safety engineering.

## Strategies

*Policy 2.1. Continually improve safety data collection, management, and distribution for data-driven decision-making for infrastructure planning and, development and operations activities, across all divisions at ODOT, and with partner agencies and stakeholders.*

- **Strategy 2.1.1 –** Develop a strategic plan for safety data enhancement using a coordinated effort with ODOT and partner agencies and stakeholders. Integrate the findings with other strategic data planning efforts at ODOT.

- **Strategy 2.1.2 –** Identify and implement new methods for crash, roadway and exposure (e.g., vehicle, pedestrian and bicycle volume) data collection, sharing, and storage.

- **Strategy 2.1.3 –** Support national safety research and lead state and local research to identify opportunities to enhance data analysis techniques and test countermeasures to eliminate fatalities and serious injuries.

- **Strategy 2.1.4 –** Review state crash report forms to ensure appropriate data is collected and extraneous data is eliminated. Provide training and education to state and local enforcement agencies on resulting form(s).

*Policy 2.2. Continually improve and implement design and analysis techniques for safety-related decision-making in transportation planning, programming, design, construction, operations and maintenance for all modes.*

- **Strategy 2.2.1 –** Update ODOT manuals, guides, processes and procedures, etc., to include quantitative safety analysis in planning, project development and design, programs and maintenance activities.
- **Strategy 2.2.2 –** Implement reactive, risk-based, and predictive safety analysis and tools into all stages of the project development process.
- **Strategy 2.2.3 –** Incorporate quantitative and/or risk-based safety benefits and disbenefits into project prioritization processes.
- **Strategy 2.2.4 –** Develop and monitor planning, program, and project-level performance measures and/or indicators to assess transportation safety outcomes for all modes.

*Policy 2.3. Plan, design, construct or improve, operate and maintain the transportation system to achieve healthy and livable communities and eliminate fatalities and serious injuries for all modes.*

- **Strategy 2.3.1 –** Implement Practical Design[22] and/or other proven and innovative approaches to address transportation safety issues for all system users.
- **Strategy 2.3.2 –** Plan, design and construct facilities for desired operating speed.
- **Strategy 2.3.4 –** Coordinate and collaborate with local jurisdictions to identify community safety concerns and establish solutions.
- **Strategy 2.3.5 –** Educate transportation planning and design professionals on how to incorporate safer context-sensitive designs into community projects.
- **Strategy 2.3.6 –** Implement best practices to eliminate work zone-related fatalities and serious injuries.
- **Strategy 2.3.7 –** Continue to identify and implement best practices related to traffic incident management services to reduce secondary crashes and improve system operations and reliability.
- **Strategy 2.3.8 –** Implement access management practices that improve system safety for all modes consistent with state statutes and rules.
- **Strategy 2.3.9 –** Continue to plan, design and implement best practices for rail safety program and systems management, particularly rail crossings.
- **Strategy 2.3.10 –** Evaluate safety countermeasures for pilot projects and large-scale implementation as appropriate.

[22] Practical Design is "a systematic approach to deliver the broadest benefit to the transportation system, within existing resources, by establishing appropriate project scopes to deliver specific results." http://www.oregon.gov/odot/hwy/techserv/pages/practical_design.aspx.

- **Strategy 2.3.11 –** Coordinate with freight interests to plan, design, and construct infrastructure that safely accommodates commercial motor vehicles and enhances economic interests.

- **Strategy 2.3.12 –** Collaborate with ODOT Rail and Public Transit Division, transit service providers and researchers to evaluate infrastructure techniques to improve safety for transit riders. Update codes and policies to support best practices.

*Policy 2.4. Support regulatory changes, including legislative concepts, administrative rule changes, and updates to design standards, as needed, to enable and/or remove impediments to new approaches to safety engineering.*

- **Strategy 2.4.1 –** Work with state, regional, Tribal, county, and city agencies to implement best practices in setting design speeds and speed limits.

- **Strategy 2.4.2 –** Work with school districts, state, regional, Tribal, county, and city governments and local education interest groups to evaluate and implement best practices for safety in school zones.

## *Goal 3: Healthy, Livable Communities*

### Background

Cities and counties plan their transportation systems in relation to planned land uses. Increased interest in livability and providing access to transportation options is leading communities to develop walkable neighborhoods and think more about how infrastructure can be safe, equitable, convenient, and contribute to positive health outcomes. The TSAP provides safety strategies and actions to integrate into local planning and programming activities.

Crashes causing deaths or life-changing injuries are a major public health issue in communities. Effective traffic law enforcement is an important tool for reducing risky behavior and reinforcing safety culture. In addition, timely response by law enforcement and emergency medical responders can lead to decreases in transportation-related fatalities and serious injuries. With appropriate resources, more emergency medical responders can be trained and made available to respond to crashes in a timely manner and law enforcement can target dangerous behaviors such as speed and impaired driving and implement proven approaches and programs for protecting public safety.

### Goal

Plan, design, and implement safe systems, and support enforcement and emergency medical services to improve the safety and livability of communities, including health outcomes.

### Policies

- **Policy 3.1.** Advance coordination and collaboration between law enforcement and state, regional, Tribal, county and city transportation agencies, including freight and rail, public health agencies, mental and physical health care providers, and private stakeholders, to make communities safer places.

- **Policy 3.2.** Support traffic enforcement funding to provide sufficient resources for officers to respond to incidents, increase levels of ongoing traffic enforcement, conduct focused enforcement, and participate in activities such as emphasis patrols.

- **Policy 3.3.** Support emergency medical service (EMS) funding to provide sufficient resources to train first responders and to respond to transportation-related crashes and other medical emergencies fully equipped and in a timely manner.

- **Policy 3.4.** Invest in transportation system enhancements that improve safety and perceptions of security for people while traveling in Oregon.

- **Policy 3.5.** Provide all regions and localities in Oregon with resources and tools to offer programs and education based on local needs and issues, considering issues of equity.

## Strategies

*Policy 3.1. Advance coordination and collaboration between law enforcement and state, regional, and Tribal, county and city transportation agencies, public health agencies, mental and physical health care providers, and private stakeholders to make communities safer places.*

- **Strategy 3.1.1 –** Support a data-driven approach to law enforcement, using data analysis to efficiently deploy enforcement resources to locations or corridors.

- **Strategy 3.1.2 –** Support a high-visibility enforcement program (i.e., Share the Road) increasing traffic, bicycle and pedestrian law enforcement capabilities (priority and funding).

- **Strategy 3.1.3 –** Conduct best practice traffic investigations to reduce traffic delays and to improve quality and timeliness of crash data.

- **Strategy 3.1.4 –** Engage law enforcement in community safety activities such as teaching education classes on safer behaviors.

- **Strategy 3.1.5 –** Conduct education and outreach to law enforcement to increase understanding and enforcement of traffic, commercial vehicle, pedestrian, and bicycle laws.

*Policy 3.2. Support traffic enforcement funding to provide sufficient resources for officers to respond to incidents, increase levels of ongoing traffic enforcement, conduct focused enforcement, and participate in activities such as emphasis patrols.*

- **Strategy 3.2.1 –** Identify community needs for funding and training to enhance traffic safety programs and enforcement.

*Policy 3.3. Support emergency medical service (EMS) funding to provide sufficient resources to train first responders and to respond to transportation-related crashes and other medical emergencies fully equipped and in a timely manner.*

- **Strategy 3.3.1 –** Identify community needs for funding and training to enhance EMS systems and improve response times and services. Recognize and address the differing needs of paid and volunteer providers.

*Policy 3.4. Invest in transportation system enhancements that improve safety and perceptions of security for people while traveling in Oregon.*

- **Strategy 3.4.1 –** Enhance perceptions of bicycling, walking, and transit safety and security by identifying and implementing appropriate facility design, lighting, and other changes to the built environment to improve personal security for pedestrians, bicyclists, and transit riders.
- **Strategy 3.4.2 –** Identify opportunities to improve transportation system redundancy and otherwise safeguard critical infrastructure against natural and manmade disasters.

*Policy 3.5. Provide all regions and localities in Oregon with resources and tools to offer program and education based on local needs and issues, considering issues of equity.*

- **Strategy 3.5.1 –** Explore methods to distribute and implement safety programs and funding between urban and rural communities to eliminate fatalities and serious injury crashes.
- **Strategy 3.5.2 –** Provide transportation safety educational opportunities for people of all ages, ethnicities, and income levels.
- **Strategy 3.5.3 –** Support adequate funding for EMS particularly in rural and remote areas, to the extent that this is the most efficient use of resources to eliminate fatalities and serious injuries.
- **Strategy 3.5.4 –** Encourage implementation of Safe Communities statewide.[23]

## Goal 4: Technology

### Background

As recently as just a few years ago, safety improvements were focused on changes to transportation design and human behavior. Today, those issues remain critical to address, but incremental changes, to infrastructure and automobile technology, are shifting the conversation about safety. For example, vehicle fleets are now coming with standard safety features, such as automatic lights, forward collision avoidance systems, backup cameras, blind spot monitoring, lane departure warnings, and other custom features. Transportation infrastructure also is becoming "smarter," – traffic lights can be synchronized to better address roadway incidents, overhead signs can alert drivers of a crash or provide speed guidance as a function of traffic or weather conditions, and signals can let transit users know when a train is approaching.

Successful, low-cost practices in Oregon include the implementation of intelligent transportation solutions (ITS). ODOT and other transportation agencies, such as MPOs have utilized CCTV cameras to quickly and efficiently detect, verify, and plan responses for highway incidents, including crashes. Speed Warning Systems are used to provide information to motorists who are traveling at unsafe speeds and Over-Length Warning Systems use detectors to determine whether approaching vehicles (typically commercial trucks) are too long to safely maneuver a challenging roadway geometry. With the technology in place to implement ITS solutions throughout Oregon, it is possible for more regional, Tribal, county, and city transportation agencies

[23] The Safe Communities model is a long-standing approach to reducing injuries and deaths. It works through engaging local partners who care about safety, using data to identify leading causes of injury, making a plan to address the issues using proven methods and measuring success. There is a Safe Communities America® accreditation program through the National Safety Council. (http://www.nsc.org, accessed March 18, 2016).

transportation and safety agencies and stakeholders to expand their use of lower cost technologies. ODOT currently is exploring how and where to deploy ITS solutions more widely in both urban and rural environments.

A number of other technologies, with proven safety benefits, also are being utilized or explored by ODOT, MPOs, and Tribal, county, and city transportation agencies. Some of those initiatives include variable speed signs, traffic operations centers, pedestrian countdown signals, mobile applications that prevent unsafe behaviors such as texting and driving, and others. The intent is to share information and implementation ideas about these technologies to increase their successful deployment throughout urban and rural parts of the State.

An emerging technology garnering national attention and testing is autonomous and connected vehicles. If deployed in Oregon, it would enable on-road communications between vehicles, between vehicles and pedestrians/bicyclists, and between vehicles and infrastructure. This has tremendous safety implications as the technology would allow for automatic control of signal timing, speed management, and the operation of transit and commercial vehicles, among other safety features. ODOT continues to stay at the forefront of this national dialogue and inform transportation and safety stakeholders of new developments.

Existing and emerging technologies have positive and negative safety effects which need to be considered during the transportation decision-making process. Decision-makers also will have to consider not only the potential for “high-tech” solutions, but also “low-tech” solutions which may have similar safety benefits yet require less investments.

## Goal

Plan, prepare for, and implement technologies (existing and new) that improve transportation safety for all users, including pilot testing innovative technologies as appropriate.

## Policies

- **Policy 4.1.** Actively monitor technological advances and plan, design, maintain, and operate the system in a way that takes full advantage of opportunities to use technology to eliminate fatalities and serious injuries.
- **Policy 4.2.** Apply technological improvements in data management systems to enhance collaboration across agencies and provide tools for data collection and analysis to partner agencies and stakeholders.
- **Policy 4.3.** Leverage technology tools and best practices across divisions and agencies to deploy useful technologies across the State and the transportation system.
- **Policy 4.4.** Identify legislative concepts as needed to enable the implementation of innovative technologies.

## Strategies

*Policy 4.1. Actively monitor technological advances and plan, design, maintain, and operate the system in a way that takes full advantage of opportunities to use technology to eliminate fatalities and serious injuries.*

- **Strategy 4.1.1 –** Explore and integrate technology to eliminate crash frequency and severity, prioritizing implementation of technologies that address the TSAP safety emphasis areas.[24]
- **Strategy 4.1.2 –** Research and test safety technology for deployment in Oregon.
- **Strategy 4.1.3 –** Continue to research connected and autonomous vehicles to leverage the potential safety benefits associated with these technologies.
- **Strategy 4.1.4 –** Bring public- and private-sector stakeholders together to develop opportunities for applying technology solutions and addressing barriers to implement new technologies. Consider potential economic, business, environmental, and privacy impacts of deploying technologies.

*Policy 4.2. Apply technological improvements in data management systems to enhance collaboration across agencies and provide tools for data collection and analysis to partner agencies and stakeholders.*

- **Strategy 4.2.1 –** Provide leadership and staff support to statewide efforts for improving data availability, quality, and consistency across agencies.
- **Strategy 4.2.2 –** Support data strategic planning efforts through the TRCC to ensure safety data needs are considered and integrated.
- **Strategy 4.2.3 –** Develop tools to facilitate data sharing and analysis across agencies.

*Policy 4.3. Leverage technology tools and best practices across divisions and agencies to deploy useful technologies across the State and the transportation system.*

- **Strategy 4.3.1 –** Develop statewide resources to share best practices, tools, and training for statewide and systemwide deployment of appropriate safety technology.
- **Strategy 4.3.2 –** Implement technology advances equitably in urban and rural areas.
- **Strategy 4.3.3 –** Identify and implement methods to extend safety technology to underserved system users and the transportation disadvantaged.

*Policy 4.4 – Identify legislative concepts enabling the implementation of innovative technologies.*

- **Strategy 4.4.1 –** Support legislation to enable innovations in enforcement technology (i.e., innovations in field testing for alcohol and drug impairment in automated enforcement).

[24] Emphasis areas (EA) provide a strategic framework for developing and implementing the Transportation Safety Action Plan. Emphasis areas are near-term implementation focus areas directly related to the TSAP's long-term goals, policies, and strategies and are discussed further in Chapter 6.

- **Strategy 4.4.2 –** Review regulations that may impact the adoption of innovative technology and support appropriate new laws and/or amend administrative rules or standards that may constrain implementation of advanced technology.

## *Goal 5: Collaborate and Communicate*

### Background

Safety and transportation go hand in hand, however different roles and job responsibilities between transportation and safety practitioners; funding silos; competing priorities; and other issues are common challenges that could lead to a lack of coordination on transportation and safety issues. Awareness of the co-benefits and the opportunities to work together to develop a safer transportation system will build momentum toward eliminating fatalities and serious injuries. Collaboration and communication within and across agencies presents opportunities to plan, program and prioritize policies or projects to enhance safety of the system. Achieving zero deaths or serious injuries is only possible if overall intentions are coordinated across partners.

This goal area focusses on: 1) facilitating communication between transportation planners and safety specialists; 2) leveraging this communication to share information and collaborate on problem identification, analysis, funding, resources, and tools to advance transportation safety in Oregon; and 3) ensuring this planning effort is coordinated with other transportation and safety planning efforts throughout the State. With coordination and communication focused on transportation safety it is anticipated that state, regional, Tribal, county, and city partners will:

- Gain access to and better understand available safety data;
- Form relationships and connect with other transportation safety stakeholders; and
- Understand the safety emphasis areas and proven strategies, which could be subsequently integrated with other stakeholder planning and programming activities.

The increased awareness and buy-in will create opportunities for integrating TSAP goals, policies, and strategies in all planning and project development processes; behavioral programming and emergency services improvements. Further, it will create opportunities for regional and Tribal, county, and city governments, and stakeholders to integrate transportation safety policies, projects, and programs into their day-to-day activities.

### Goal

Create and support a collaborative environment for transportation system providers and public and private stakeholders, to work together to eliminate fatalities and serious injury crashes.

### Policies

- **Policy 5.1.** Increase transportation system providers and public and private stakeholder awareness of the TSAP and other safety policies to eliminate fatality and serious injury crashes.

- **Policy 5.2.** Ensure ongoing communication and coordination among transportation System providers and public and private stakeholders on the implementation of the TSAP's policies and strategies and throughout program development and project selection.

- **Policy 5.3.** Enhance public awareness of the importance of transportation safety and the individual's role in eliminating fatalities and serious injury crashes.

## Strategies

*Policy 5.1. Increase transportation system providers and public and private stakeholder awareness of the TSAP and other safety policies to eliminate fatality and serious injury crashes.*

- **Strategy 5.1.1 –** Develop an internal (among partners and agencies) communication protocol for transportation safety topics.

- **Strategy 5.1.2 –** Engage ODOT Regions and Divisions, MPOs, ACTs, Tribes, cities, counties, the health and medical community, transportation services, enforcement and emergency medical service, and traffic incident management providers in safety planning and implementation.

- **Strategy 5.1.3 –** Evaluate agency awareness and implementation of safety activities through periodic statewide surveys.

*Policy 5.2. Ensure ongoing communication and coordination among transportation System providers and public and private stakeholders on the implementation of the TSAP's policies and strategies and throughout program development and project selection.*

- **Strategy 5.2.1 –** Identify joint legislative safety priorities amongst agencies and provide information to state legislators.

- **Strategy 5.2.2 –** Enhance enforcement and emergency medical service communications systems as feasible to improve response time and services for all travelers in Oregon.

- **Strategy 5.2.3 –** Facilitate communication and coordination between transportation agencies, EMS, and law enforcement on evacuation planning and emergency preparedness.

- **Strategy 5.2.4 –** Promote sharing and leveraging of resources across programs, communities, and agencies.

- **Strategy 5.2.5 –** Participate in Federal rulemaking and guidance development programs to maximize opportunities to achieve the TSAP Vision.

*Policy 5.3. Enhance public awareness of the importance of transportation safety and the individual's role in eliminating fatalities and serious injury crashes.*

- **Strategy 5.3.1 –** Collaborate with the media and agency public information offices to develop information which improves public awareness of safety programs, laws, roles, responsibilities, and expectations. Ensure campaigns take into account Oregon demographics.

- **Strategy 5.3.2 –** Work with educators in the State's public school system (including community colleges and other locations where transportation disadvantaged groups such as recent immigrants, newly licensed adult drivers, ESL populations, etc., are likely to receive education) to improve awareness and understanding of transportation laws, roles, and responsibilities through programs such as Safe Routes to School.

## *Goal 6: Strategic Investments*

### Background

Oregon is committed to zero transportation-related fatalities and serious injuries. To make progress and improve traffic safety, stakeholders and partners are tasked with coordinating priorities, leveraging joint resources where possible, and utilizing quantitative data-driven tools (e.g., benefit-cost analysis). Funds are limited, therefore projects, programs, and policies will need to be prioritized focusing on those treatments which will have the greatest benefit toward achieving the vision of zero fatalities and serious injuries.

Two of the most common ways to fund safety projects are through the Highway Safety Improvement Program (HSIP) and Section 402 State and Community Highway Safety Grant Program. These dollars can be used to implement the strategies and actions identified for the emphasis areas.[25] Another opportunity for funding transportation safety improvements is to make safety a consideration for all transportation projects, regardless of funding source or project type. All transportation jurisdictions develop some type of transportation improvement program identifying near-term projects for funding. Agencies use a qualitative and/or quantitative prioritization process to consider and select projects that best meet the goals, outlined in their planning documents. When safety needs are considered as a decision criteria in this prioritization process, the opportunity exists to transform the transportation system into a progressively safer system, reducing the loss of life and impact of serious injuries.

The policies, strategies, and actions in the TSAP can support policy, program and project selection processes helping decision-makers remain focused on implementing projects which maximize the safety return on investment. Projects, programs, or policies, selected for implementation should be known to be effective, or known to be innovative with an evaluation component included. It also will be necessary to recognize activities will change with funding levels.

### Goal

Target safety funding for effective education, enforcement, engineering, and emergency medical services priorities.

### Policies

- **Policy 6.1.** Allocate infrastructure safety funds strategically considering all modes, to maximize total safety benefits.

[25] Emphasis areas (EA) provide a strategic framework for developing and implementing the Transportation Safety Action Plan TSAP. Emphasis areas are near-term implementation focus areas directly related to the TSAP's long-term goals, policies, and strategies and are discussed further in Chapter 6.

- **Policy 6.2.** Allocate funding of behavioral, emergency medical services, and health safety efforts strategically across programs to maximize total safety benefits.

- **Policy 6.3.** Identify and pursue opportunities to increase funding for strategic safety-related infrastructure, behavior, and emergency medical service enhancements.

## Strategies

*Policy 6.1. Allocate infrastructure safety funds strategically considering all modes, to maximize total safety benefits.*

- **Strategy 6.1.1 –** Develop a quantitative, predictive, benefit-cost analysis or risk-based, data-driven decision framework to identify and prioritize potential projects.

- **Strategy 6.1.2 –** Develop a comprehensive program of systemic and spot safety improvements for all public roads.

- **Strategy 6.1.3 –** Apply proven countermeasures to address the contributing factors and reduce severity.

- **Strategy 6.1.4 –** Use benefit-cost analysis (or similar) to select measures and projects with the greatest potential to reduce fatalities and serious injuries.

- **Strategy 6.1.5 –** Develop and implement programs to monitor safety effectiveness of infrastructure investments.

*Policy 6.2. Allocate funding of behavioral, emergency medical services, and health safety efforts strategically across programs to maximize total safety benefits.*

- **Strategy 6.2.1 –** Collaborate with mental and physical health care providers to leverage funding for behavioral-related safety programs.

- **Strategy 6.2.2 –** Develop a data-driven decision framework to integrate quantitative safety performance into behavioral programming prioritization decisions.

- **Strategy 6.2.3 –** Identify funding needs to optimize emergency medical services and enforcement to minimize injuries post-crash.

- **Strategy 6.2.4 –** Evaluate effectiveness of behavioral safety programs to maximize benefits of safety investments.

*Policy 6.3. Identify and pursue opportunities to increase funding for strategic safety-related infrastructure, behavior, and emergency medical service enhancements.*

- **Strategy 6.3.1 –** Identify new sources of potential funding that can be dedicated and targeted to strategic investments that return greatest safety benefits.

- **Strategy 6.3.2 –** While complying with Federal safety funding requirements and limitations, promote opportunities to leverage funding sources in order to maximize safety benefits and outcomes.

## Conclusion

The six transportation safety goal areas and supporting policies and strategies identify mid- to long-term initiatives to drive down fatalities and serious injuries. The policies and strategies are intended to address a broad range of transportation safety issues, which can be adopted during any ODOT or stakeholder agency planning process. The subsequent chapter, Emphasis Areas, identifies specific safety priorities and actions to be implemented over the near term.

# 6. Emphasis Areas

Emphasis areas (EA) provide a strategic framework for developing and implementing the Transportation Safety Action Plan (TSAP). Emphasis areas are near-term implementation focus areas directly related to the TSAP's long-term goals, policies, and strategies.

*Emphasis Areas provide a strategic framework for developing action items for near-term implementation.*

*Emphasis Areas focus near-term safety projects, programs, and policies on actions that will maximize the benefits of safety investment.*

EAs also provide a framework for the Oregon Department of Transportation to meet Federal requirements for project and program prioritization. Emphasis areas are flexible and adaptive to new safety challenges and opportunities that may arise during implementation of the TSAP. The EAs were developed using the results of crash data analysis and input from committees, stakeholders, and the public. From this, four broad emphasis areas were chosen: Infrastructure, Risky Behaviors, Vulnerable Users, and Improved Systems. Each of these includes a number of subcategories to better define the EA.

- **Emphasis Area: Risky Behaviors.** Reductions in fatalities and serious injuries can be accomplished by deterring unsafe or risky behaviors made by drivers and other transportation users. For this emphasis area, actions will be identified to minimize impaired driving, unrestrained, speeding, and distracted driving crashes.

***Risky Behavior Subareas***

- *Impaired Driving*
- *Unbelted Occupants*
- *Speeding*
- *Distracted Driving*

- **Emphasis Area: Infrastructure**. Road assets in Oregon can be constructed or retrofitted to reduce fatal and serious injury crashes. Opportunities to do this include implementing safety treatments at intersections and along and across roadways. For this emphasis area, actions will be identified to minimize intersection and roadway departure crashes.

***Infrastructure Subareas***

- *Intersection*
- *Roadway Departure*

- **Emphasis Area: Vulnerable Users.** Vulnerable road users can be characterized by the amount of protection they have when using the transportation system – pedestrians, bicyclists, and motorcyclists are more exposed than the drivers operating vehicles making them more susceptible to injury in the event of an incident. Older drivers and other older system users can also be vulnerable due to decreasing visual acuity and perception-reaction time to events. For this emphasis area, actions will be identified to minimize pedestrian, bicycle, motorcycle, and older road user crashes.

***Vulnerable User Subareas***

- *Pedestrians*
- *Bicyclists*
- *Motorcyclists*
- *Older Road Users*

- **Emphasis Area: Improved Systems.** Opportunities to address and improve transportation safety come in a number of forms. Crash and other types of safety data can be advanced to better understand the causes and locations of crashes, leading to targeted solutions. Training and education are used to educate planners, engineers, designers, and construction staff about the importance of safety and how to incorporate it into their everyday job responsibilities. Fully staffed and funded law enforcement

***Improved System Subareas***

- *Improved Data*
- *Training and Education*
- *Enforcement*
- *Emergency Medical Services*
- *Commercial Vehicles*

agencies can direct their efforts towards keeping users safe and when crashes do occur, making sure emergency medical services are available to respond to and transport victims is essential. Commercial vehicle safety relies on licensing, training, and vehicle safety to decrease the frequency and severity of crashes. For this emphasis area, actions will be identified to continually improve data, train transportation and safety staff, support law enforcement and emergency responders, and minimize commercial vehicle crashes.

This chapter describes each of the EA subcategories, the data used to support the identification of EA priorities, and near-term actions that can be implemented to lower fatalities and serious injuries for each emphasis area.

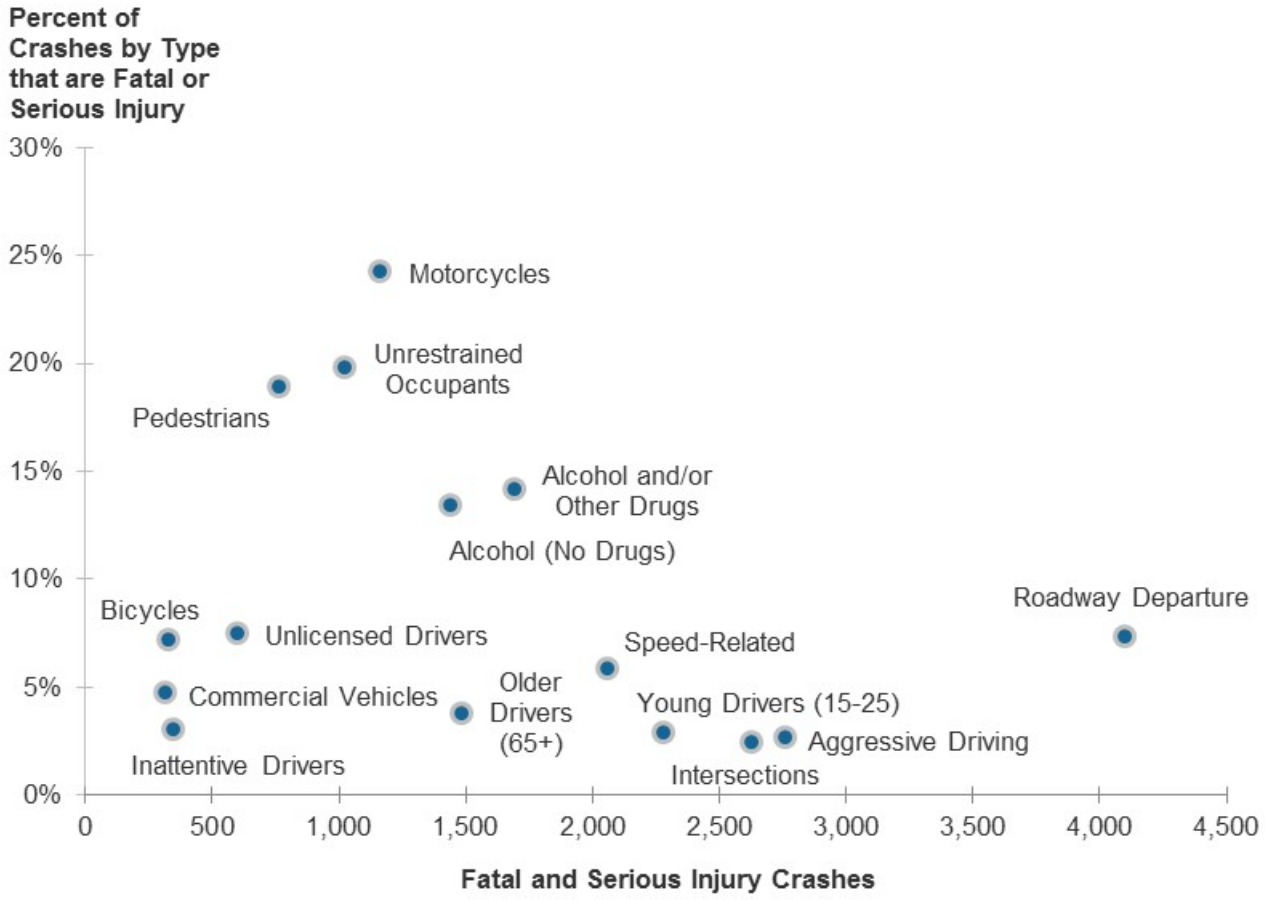
## Emphasis Area Considerations

EAs were selected based on an assessment of recent crash history (2009 to 2013) and qualitative considerations related to the capabilities to address different crash types. Figure 6.1 shows the relationship of crash frequency and crash severity. Fatal and serious injury crashes are ranked by frequency along the *x*-axis and by severity along the *y*-axis. Crash types toward the upper right part of the figure rank more highly from the perspective of being frequent and severe. Appendix C shows the underlying data for this figure.

***Frequency and Severity Ranking of Crashes***

- *Roadway departure crashes are most frequent; approximately 7 percent of these include fatal or serious injuries.*
- *Motorcycle crashes are less frequent; approximately 25 percent of these include fatal or serious injuries.*
- *Motorcycle, unrestrained occupants, and pedestrians have the highest severity ranking.*
- *Roadway departure, aggressive driving and intersections have the highest frequency ranking.*

## Figure 6.1 Crash Types Ranked by Crash Frequency and Severity
*2009 to 2013*




From a qualitative perspective emphasis areas also were selected considering these questions:

- **Effectiveness Data.** Are there proven countermeasures available for use in Oregon? If not, is there an ability and commitment to evaluate effectiveness of programs and projects?
- **Institutional Capacity.** Are there agencies or individuals who are able to commit ongoing staff resources to address this safety problem?
- **Emphasis Area Overlap.** Does the potential emphasis area significantly overlap with other potential emphasis areas and, if so, can they both be addressed simultaneously?
- **Consistency with Existing Plans and Policies.** Is the potential EA consistent with other state plans and policies and does it address a significant policy goal?
- **Public Input.** Are there issues the public perceives as critical to driving down fatalities and serious injuries? Can these issues be addressed within the framework of the TSAP?

Figure 6.2 shows the resulting evaluation of potential EAs using the frequency severity chart and the above qualitative categories. As shown emphasis areas were evaluated as strong, moderate, or weak emphasis

area candidates for each criterion. The PAC reviewed this information as well as input from stakeholders to select emphasis areas for the TSAP.[26]

## Figure 6.2 Emphasis Area Evaluation

| Potential Emphasis Area | Frequency | Severity | Effectiveness Data | Emphasis Area Overlap | Institutional Capacity | Policy Focus |
|---|---|---|---|---|---|---|
| Aggressive Driving | ■ | ○ | ◐ | ○ | ◐ | ● |
| Impaired Driving | ◐ | ■ | ● | ○ | ● | ● |
| Bicycles | ○ | ◐ | ◐ | ● | ● | ● |
| Commercial Vehicles | ○ | ◐ | ○ | ● | ● | ◐ |
| Distracted Driving (Inattentive Drivers) | ○ | ○ | ○ | ● | ○ | ○ |
| Intersections | ■ | ○ | ● | ● | ● | ● |
| Motorcycles | ◐ | ■ | ◐ | ○ | ◐ | ● |
| Older Drivers (65+) | ◐ | ○ | ○ | ◐ | ◐ | ◐ |
| Pedestrians | ○ | ■ | ◐ | ● | ● | ● |
| Roadway Departure | ■ | ◐ | ● | ◐ | ● | ● |
| Speed-Related | ■ | ◐ | ◐ | ○ | ◐ | ● |
| Unlicensed Drivers | ○ | ■ | ○ | ● | ○ | ○ |
| Unrestrained Occupants | ◐ | ■ | ● | ○ | ◐ | ● |
| Young Drivers (15-25) | ■ | ○ | ◐ | ◐ | ◐ | ● |
| Foundational EAs (EMS, Data, and Training) | N/A | | | | ■ | ■ |

**Legend and Notes**

| | |
|---|---|
| ■ | Strong Emphasis Area Candidate |
| ◐ | Moderate Emphasis Area Candidate |
| ○ | Weak Emphasis Area Candidate |

Frequency = number of fatal and serious injury crashes from 2009 to 2013; Severity = fatal and serious injury crashes per 100 total crashes; Effectiveness Data = proven, effective countermeasures are known, or projects and programs can be evaluated for effectiveness; Emphasis Area Overlap = the potential EA significantly overlaps with one or more other potential emphasis areas; Institutional Capacity = there are existing programs and resources to support implementation of strategies related to this potential EA; Policy Focus = the potential EA represents a significant policy focus for Oregon.

## Emphasis Areas and Actions

This section describes each EA subcategory and the accompanying actions. Actions are specific programs, policies, projects and potential future legal policy changes for implementing the EAs over the next five years. The actions listed are achievable and, where possible, proven effective. For actions that have not been tested for their effectiveness, they will be evaluated during implementation to understand their contribution to crash reductions. The actions are categorized by the primary EA they address, but many have the potential to contribute to fatality and serious injury reductions across multiple EAs. While this section focuses on the implementation of safety solutions over the next five years, each EA and action also will contribute to the success of the long-term goals, policies, and strategies outlined in Chapter 5.

[26] Distracted driving was identified as an emphasis because available data and anecdotal evidence point to distraction as a significant traffic safety concern. A recent survey conducted by Southern Oregon University found that three out of four drivers surveyed engage in distracted driving. Furthermore, 83 percent of respondents felt that distracted driving is an important safety concern on Oregon's roads.

## Emphasis Area: Risky Behaviors

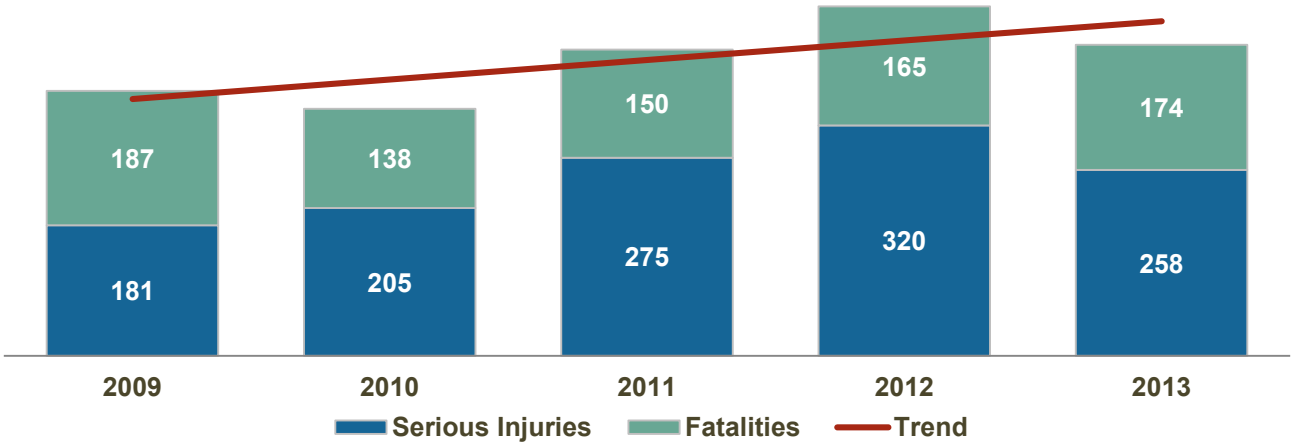
### Impaired Driving

Alcohol impairment is measured as blood alcohol content (BAC) reading of 0.08 percent or higher for drivers and 0.04 percent for commercial motor vehicle drivers. In Oregon, as in most states, the penalties are severe for drinking and driving and could result in jail time, a suspended or revoked license, substance abuse treatment requirements, and/or fines. While the risks of driving under the influence of alcohol are well known, thresholds for impairment and testing for drugged driving are less well established. Drivers may not fully understand how DUII standards apply when driving on prescription or recreational drugs. In addition, law enforcement agencies are still refining detection processes. Drugged driving is impaired driving and research and improvements in test methods are ongoing in this area. In Oregon, impaired driving crashes are defined as crashes in which the reporting officer indicates alcohol or other drugs were somehow involved in the crash. These crashes could include alcohol only, marijuana and illegal prescription drugs, or a combination of drugs and alcohol.

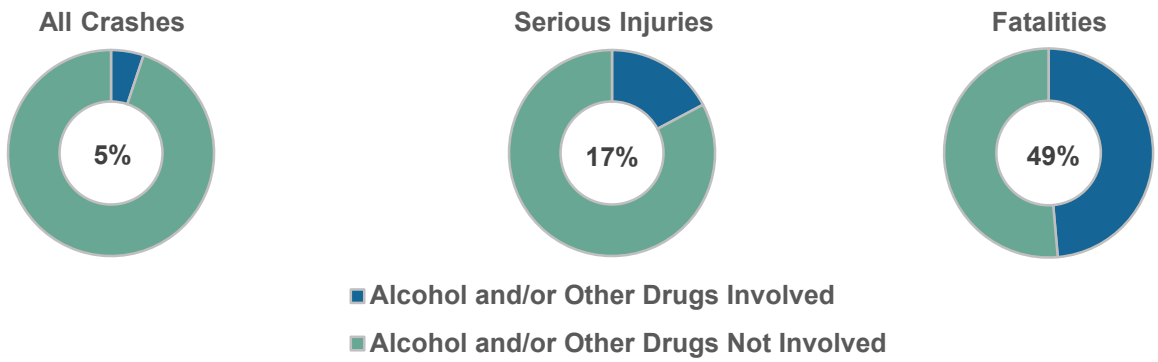
#### *Problem Identification*

Between 2009 and 2013, impaired driving crashes (alcohol and/or drugs) accounted for 22 percent of all the fatal and serious injury crashes in Oregon and contributed to 625 fatalities and 1,087 serious injuries. Crashes occur more or less equally in rural Oregon (52 percent) and urban parts of the State (48 percent). About 70 percent of impaired driving crashes roadway departures; aggressive driving (44 percent) and speed (42 percent) also are common in conjunction with impaired driving crashes.

**Figure 6.3 Impaired Driving Fatalities and Serious Injuries by Year**
*2009 to 2013*



## Figure 6.4 Impaired Driving as a Contributing Factor for All Crashes, Serious Injuries, and Fatalities




*Impaired Driving Actions*

## Table 6.1 Impaired Driving Actions

| Tier 1 | |
|---|---|
| **Action:** | **Change social norms by increasing awareness of the types of impaired driving (e.g., 'drink driving', drugged driving, and driving under the influence of prescription drugs).** |
| Co-Benefits: | Roadway Departure, Motorcycles, Pedestrians, Bicyclists, Older Road Users |
| **Action:** | **Provide training and education on marijuana impairment detection for law enforcement.** |
| Co-Benefits: | Roadway Departure, Motorcycles, Pedestrians, Bicyclists, Older Road Users, Training, Enforcement |
| **Action:** | **Conduct targeted impaired driving enforcement.** |
| Co-Benefits: | Roadway Departure, Motorcycles, Pedestrians, Bicyclists, Older Road Users, Data, Enforcement |
| **Action:** | **Adopt National Transportation Safety Board recommendation to reduce Blood Alcohol Content limit to 0.05.** |
| Co-Benefits: | Roadway Departure, Motorcycles, Pedestrians, Bicyclists, Older Road Users, Enforcement |
| **Action:** | **Revise DUII statutes to eliminate impaired driving (alcohol, marijuana or other intoxicants).** |
| Co-Benefits: | Roadway Departure, Motorcycles, Pedestrians, Bicyclists, Older Road Users, Enforcement |
| **Tier 2** | |
| **Action:** | **Strengthen laws aimed at reducing repeat DUII offenders.** |
| Co-Benefits: | Roadway Departure, Motorcycles, Pedestrians, Bicyclists, Older Road Users, Enforcement |
| **Action:** | **Improve DUII arrest and adjudication processes.** |
| Co-Benefits: | Roadway Departure, Motorcycles, Pedestrians, Bicyclists, Older Road Users, Enforcement |

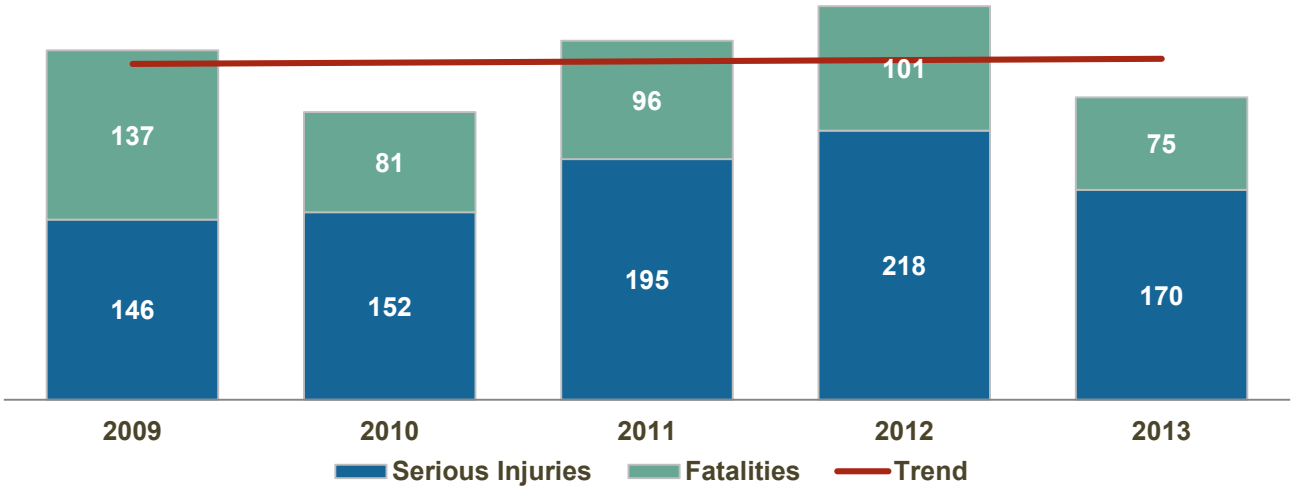
## Occupant Protection

In Oregon, passenger car drivers, pickup truck drivers, and sports car drivers are often using their seatbelts – the national average for observed seatbelt use in 2014 was 87 percent for passenger cars and in Oregon it was 98 percent.[27] While wearing a seatbelt has become a cultural norm in Oregon, the numbers also reflect targeted enforcement efforts – in 2014, 7,429 seat belt citations were issued in Oregon. Residents now recognize that the use of restraints and child car seats reduces the severity of a crash.[28] In Oregon, unbelted crashes are defined as one or more victims are not using appropriate protection. Enforcement of occupant protection laws and education about proper use of restraints for adults and children will continue to have a positive impact on crash severity.

### *Problem Identification*

Between 2009 and 2013, crashes involving occupants not properly using restraints accounted for 13 percent of all the fatal and serious injury crashes in Oregon and contributed to 490 fatalities and 881 serious injuries. Approximately 65 percent of these crashes occurred in a rural environment. Almost all unrestrained fatal and serious injury crashes (72 percent) result from lane departure crashes. Aggressive driving (44 percent) and speeding (41 percent) also are strongly correlated to unrestrained crashes.

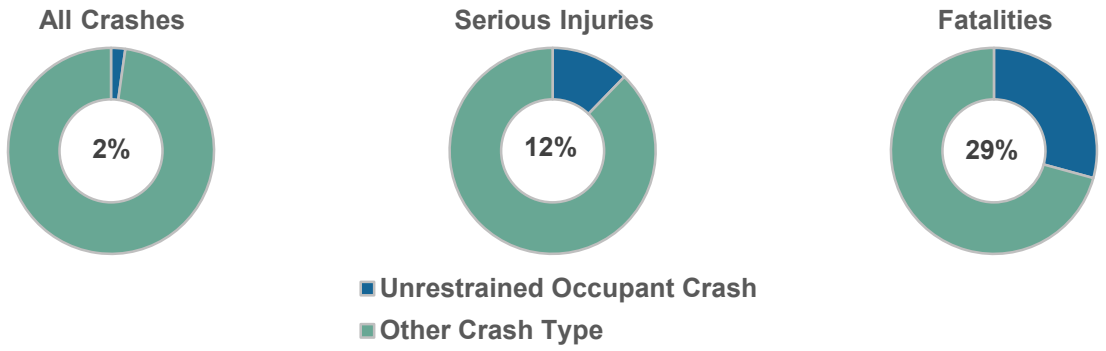
**Figure 6.5 Unrestrained Occupant Fatalities and Serious Injuries by Year**
*2009 to 2013*




[27] https://www.oregon.gov/ODOT/TS/docs/+2016%20Federal%20Version%20Final.pdf.

[28] https://www.oregon.gov/ODOT/TS/docs/+2016%20Federal%20Version%20Final.pdf.

## Figure 6.6 Failure to use Restraints for All Crashes, Serious Injuries, and Fatalities




*Occupant Protection Actions*

## Table 6.2 Occupant Protection Actions

| Tier 1 | |
|---|---|
| **Action:** | **Conduct targeted enforcement to enforce occupant protection laws.** |
| Co-Benefits: | Enforcement |
| **Tier 2** | |
| **Action:** | **Conduct targeted education to increase the use of seat belts and child safety seats.** |
| Co-Benefits: | Older Road Users, Training |
| **Action:** | **Provide youth safety items (e.g., child safety seats, bicycle helmets) to satisfy public demand.** |
| Co-Benefits: | Intersections, Roadway Departure, Motorcycles, Pedestrians, Bicyclists, Older Road Users |
| **Action:** | **Recruit and train certified child passenger safety (CPS) technicians as needed.** |
| Co-Benefits: | Training |

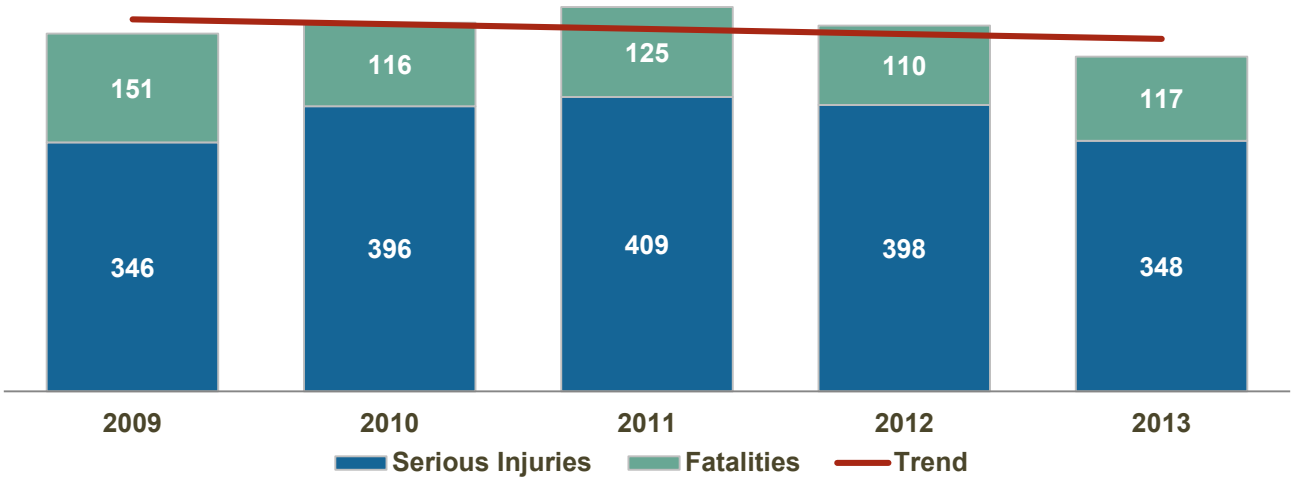
## Speeding

In Oregon, speeding crashes are defined as a vehicle traveling too fast for conditions, following too closely, or traveling above the posted or statutory speed limit. Speed-related fatalities and serious injuries have been trending downward, on average, since 2009. In Federal Fiscal Year 2014, law enforcement issued 21,732 speeding citations during grant-funded activities, to deter this unsafe driving behavior.[29] An Oregon statewide public opinion survey from March 2013 reported that 76 percent of drivers say they rarely exceed the speed limit on a local road with a posted speed of 30 miles per hour and 77 percent say they rarely exceed it on a road with a speed limit of 65 miles per hour.[30] However, the outcome of speeding crashes, when they do occur, is severe. Targeted enforcement, including traffic patrols and effective automated enforcement, will continue to be implemented throughout Oregon. In addition, roadway design and speed limits will be considered in tandem to achieve safe operating speeds.

### *Problem Identification*

Between 2009 and 2013, speed-related crashes accounted for 27 percent of all the fatal and serious injury crashes in Oregon and contributed to 619 fatalities and 1,897 serious injuries. About 70 percent of these crashes occurred in a rural environment. Almost all speed-related fatal and serious injury crashes (85 percent) result from lane departure crashes. Alcohol involvement (30 percent) and unrestrained occupants (20 percent) also are strongly correlated to speeding crashes.

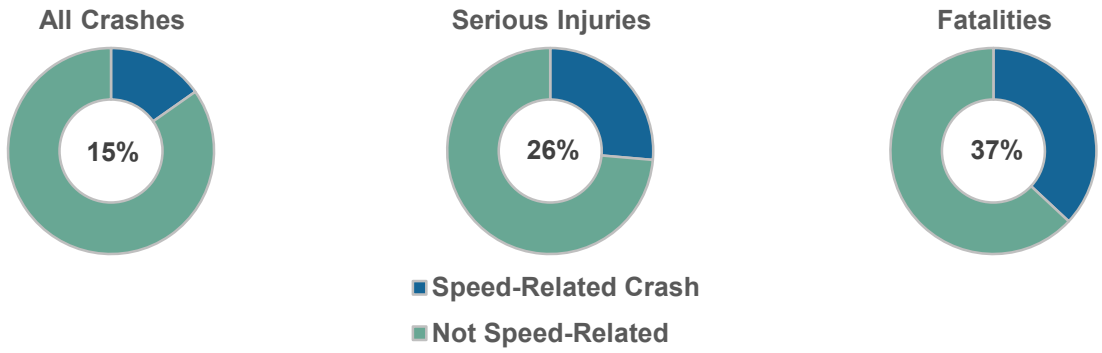
**Figure 6.7 Speed-Related Fatalities and Serious Injuries by Year**
*2009 to 2013*




[29] https://www.oregon.gov/ODOT/TS/docs/+2016%20Federal%20Version%20Final.pdf.

[30] https://www.oregon.gov/ODOT/TS/docs/+2016%20Federal%20Version%20Final.pdf.

## Figure 6.8 Speeding as a Contributing Factor for All Crashes, Serious Injuries, and Fatalities




*Speeding Actions*

## Table 6.3 Speeding Actions

| Tier 1 | |
|---|---|
| **Action:** | **Educate all transportation system users about the dangers of speeding.** |
| Co-Benefits: | Roadway Departure, Motorcycles, Pedestrians, Bicyclists, Older Road Users |
| **Action:** | **Continue work between ODOT, cities, and counties to consider and revise, as appropriate, regulations and programs for establishing speed limits to achieve safety goals, improve balance among multimodal interests, and support community objectives** |
| Co-Benefits: | Roadway Departure, Motorcycles, Pedestrians, Bicyclists, Older Road Users, Enforcement |
| **Action:** | **Establish the same statutory speed limits in residential and business districts.** |
| Co-Benefits: | Intersections, Roadway Departure, Motorcycles, Pedestrians, Bicyclists, Older Road Users, Enforcement |
| **Action:** | **Modify laws to allow more effective automated enforcement of traffic laws.** |
| Co-Benefits: | Motorcycles, Pedestrians, Bicyclists, Older Road Users, Enforcement |
| **Action:** | **Track and assess changes to crash rates, fatalities, and serious injuries on highways recently approved for higher speed limits.** |
| Co-Benefits: | Roadway Departure, Motorcycles, Pedestrians, Bicyclists, Older Road Users, Data |
| **Action:** | **Focus facility design and redesign to achieve operating speeds consistent with safety goals, context, users and land use.** |
| Co-Benefits: | Intersections, Roadway Departure, Motorcycles, Pedestrians, Bicyclists, Older Road Users |
| **Action:** | **Conduct targeted enforcement to reduce speeding.** |
| Co-Benefits: | Roadway Departure, Motorcycles, Pedestrians, Bicyclists, Older Road Users, Data, Enforcement |

## Distracted Driving

Distracted driving is operating a motor vehicle while doing another activity that takes your attention away from driving.[31] The proliferation of cell phones and other handheld devices has given rise to an increased distracted population. Unfortunately, reliable statistics on the use of cell phones while driving and as a contributor to crashes and injuries are difficult to obtain, but available data and anecdotal evidence point to distraction as a significant traffic safety concern. A recent survey conducted by Southern Oregon University found that three out of four drivers surveyed engage in distracted driving.

A previous loophole in Oregon's distracted driving allowed drivers to use handheld cell phones if the call was related to their jobs. This language was eliminated in 2012 and current legislation prohibits texting and use of handheld cell phones for all drivers with the exception of police, emergency responders, and drivers in emergency situations. Novice drivers are prohibited from all cell phone use. More can be done to make these laws enforceable.

One of the first actions recommended in this subarea is to define and assess the scale of distracted driving in Oregon.

*Distracted Driving Actions*

### Table 6.4 Distracted Driving Actions

| **Tier 1** | |
|---|---|
| **Action:** | **Support the task force on distracted driving and implement countermeasures.** |
| Co-Benefits: | Data |
| **Action:** | **Decrease distracted driving through education and changing social norms.** |
| Co-Benefits: | Pedestrians, Bicyclists, Older Road Users |
| **Action** | **Work with other states on research and data development to identify scope and scale of distracted driving and possible solutions.** |
| Co-Benefits: | Distracted Driving, Data |
| **Action** | **Adopt and revise current distracted driving law to remove loopholes and be consistent with Federal guidance.** |
| Co-Benefits: | Motorcycles, Pedestrians, Bicyclists, Older Road Users, Enforcement |
| **Tier 2** | |
| **Action:** | **Conduct targeted enforcement to enforce distracted driving laws.** |
| Co-Benefits: | Enforcement |

[31] https://www.oregon.gov/ODOT/DMV/Pages/road_rules.aspx (accessed 3/16/16).

# Emphasis Area: Infrastructure

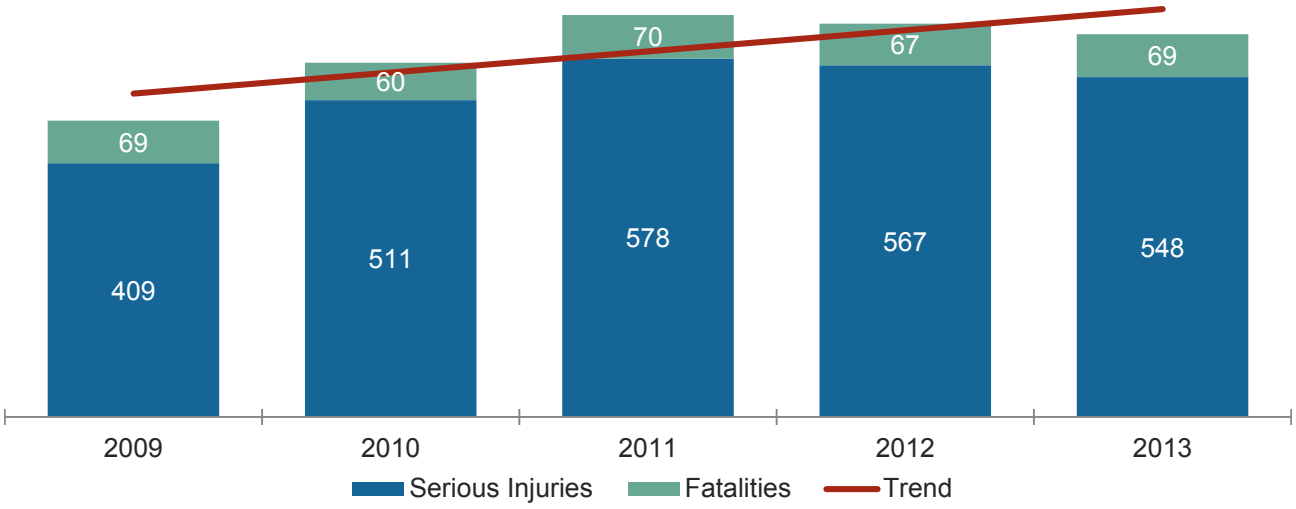
## Intersections

An intersection is a point at which two or more roads intersect. Most intersections are designed for motorized vehicles as well as pedestrians, bicyclists, transit users and freight travel. As an inherent concern at intersections is that they create conflict points among multiple road users, which can be exacerbated by differences in vehicle size and travel speed as well as the complexity of the intersection design. Intersection crashes in Oregon are defined as incidents that occur at a signalized or unsignalized intersection in an urban or rural environment.

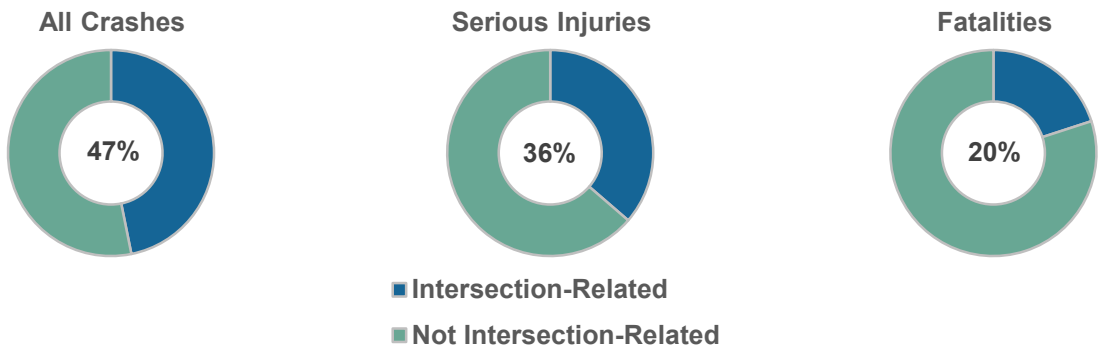
### *Problem Overview*

Between 2009 and 2013, intersection crashes accounted for 34 percent of all the fatal and serious injury crashes in Oregon and contributed to 335 fatalities and 2,613 serious injuries. About 76 percent of these crashes occurred in an urban environment; and older drivers, aggressive drivers, and younger drivers were disproportionately more involved in intersection crashes.

**Figure 6.9 Intersection-Related Fatalities and Serious Injuries by Year**
*2009 to 2013*



## Figure 6.10 Intersection-Related Crashes as a Percentage of All Crashes, Serious Injuries, and Fatalities




### *Intersection Actions*

General infrastructure actions were developed and are shown in Table 6.5. These actions may relate to intersection and roadway departure crash types. Intersection-specific actions also were developed and are shown Table 6.6.

## Table 6.5 Infrastructure Actions (General)

| Tier 1 | |
|---|---|
| **Action:** | **Implement design treatments to achieve appropriate speeds and manage sight distance consistent with context, users, and community goals.** |
| Co-Benefits: | Speeding, Intersections, Roadway Departure, Motorcycles, Pedestrians, Bicyclists, Older Road Users, Commercial Vehicles |
| **Tier 2** | |
| **Action:** | **Implement targeted infrastructure and striping maintenance programs to address safety issues closely associated with weather, maintenance, or roadway debris that affects travelers.** |
| Co-Benefits: | Intersections, Roadway Departure, Bicyclists |
| **Action:** | **Support multimodal safety considerations during local Transportation System Plan development, and other planning efforts (e.g., local Transportation Safety Action Plans) to guide project planning, operations and maintenance for safer transportation facilities** |
| Co-Benefits: | Intersections, Roadway Departure, Pedestrians, Bicyclists, Data |

## Table 6.6 Intersection Actions

| Tier 1 | |
|---|---|
| **Action:** | **Implement low-cost systemic safety improvements at intersections.** |
| Co-Benefits: | Motorcycles, Pedestrians, Bicyclists, Older Road Users, Commercial Vehicles |
| **Tier 2** | |
| **Action:** | **Implement intersection design treatments to reduce conflicts between users and improve driver awareness of the next intersection and compliance with traffic controls.** |
| Co-Benefits: | Motorcycles, Pedestrians, Bicyclists, Older Road Users, Commercial Vehicles |
| **Action:** | **Implement access management on high-volume roads and/or around complex intersections to reduce crashes.** |
| Co-Benefits: | Motorcycles, Pedestrians, Bicyclists, Older Road Users, Commercial Vehicles |

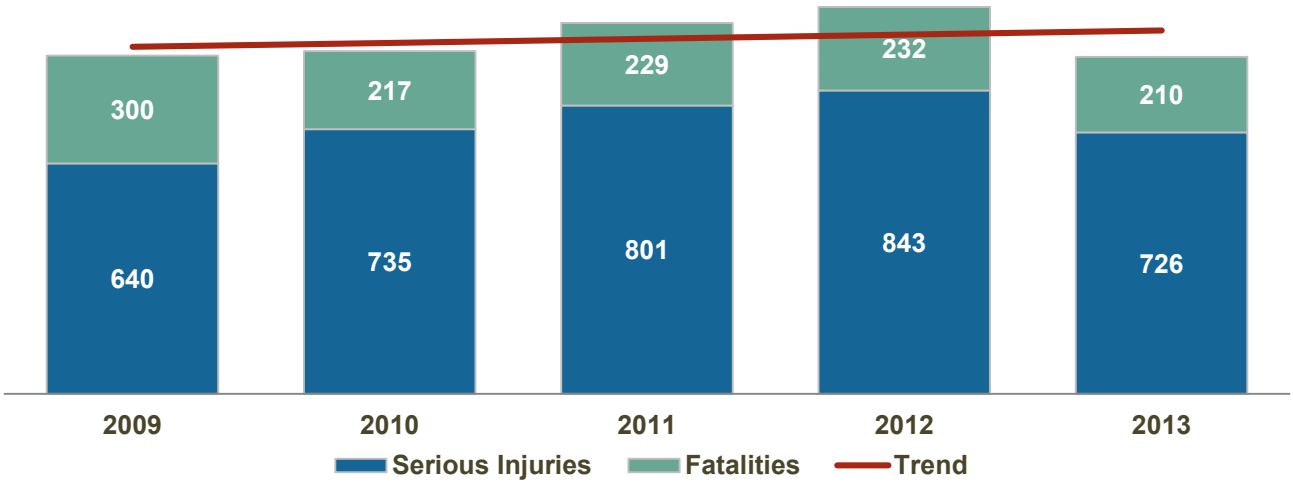
## Roadway Departure

When operating a vehicle, an event may arise requiring the driver to swerve suddenly to avoid another car or object; or an unsafe speed could affect control of the car. All of these impact a driver's ability to stay on the road, possibly resulting in a crash. Roadway departure crashes are defined as non-intersection crashes involving a vehicle departing its lane and running off the road, into a median or into an opposing lane of traffic.

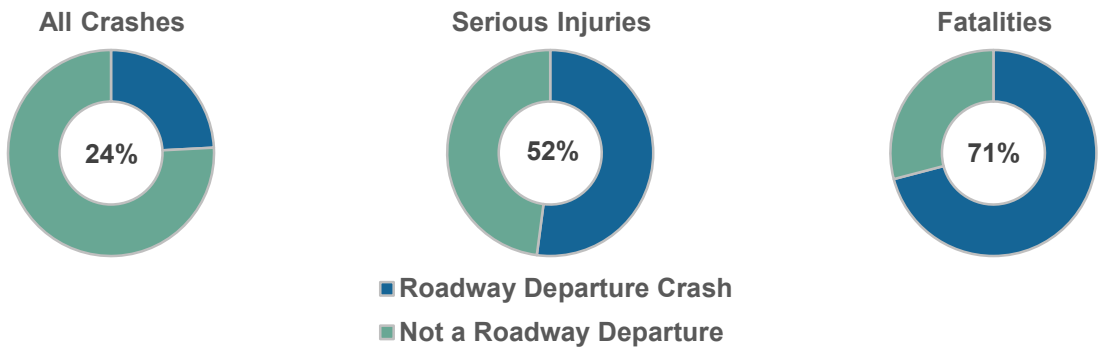
### *Problem Overview*

Between 2009 and 2013 approximately 53 percent of all fatal and serious injury crashes in Oregon included a roadway departure and contributed to 1,188 fatalities and 3,745 serious injuries. About 73 percent of these crashes were in a rural environment. Many risky behavior-related crashes involve the vehicle leaving the lane or entire roadway. For example, lane departure accounts for 44 percent of aggressive driving fatal and serious injuries, 43 percent of speed-related fatal and serious injuries, and 18 percent of impaired driving fatal and serious injuries.

**Figure 6.11 Roadway Departure Fatalities and Serious Injuries by Year**
*2009 to 2013*



## Figure 6.12 Roadway Departure as a Percentage of All Crashes, Serious Injuries, and Fatalities




*Roadway Departure Actions*

## Table 6.7 Roadway Departure Actions

| | |
|---|---|
| **Tier 1** | |
| **Action:** | **Design and implement treatments addressing risk factors associated with roadway departure crashes.** |
| Co-Benefits: | Impaired Driving, Speeding, Unrestrained Occupants, Distracted Driving, Motorcycles, Older Road Users, Commercial Vehicles, Data |
| **Tier 2** | |
| **Action:** | **Implement low-cost systemic safety roadway improvements.** |
| Co-Benefits: | Impaired Driving, Speeding, Unrestrained Occupants, Distracted Driving, Motorcycles, Older Road Users, Commercial Vehicles |
| **Action:** | **Improve road delineation to improve the visibility of road edges in rural areas.** |
| Co-Benefits: | Impaired Driving, Speeding, Unrestrained Occupants, Distracted Driving, Motorcycles, Pedestrians, Bicyclists, Older Road Users, Commercial Vehicles |

## Emphasis Area: Vulnerable Users

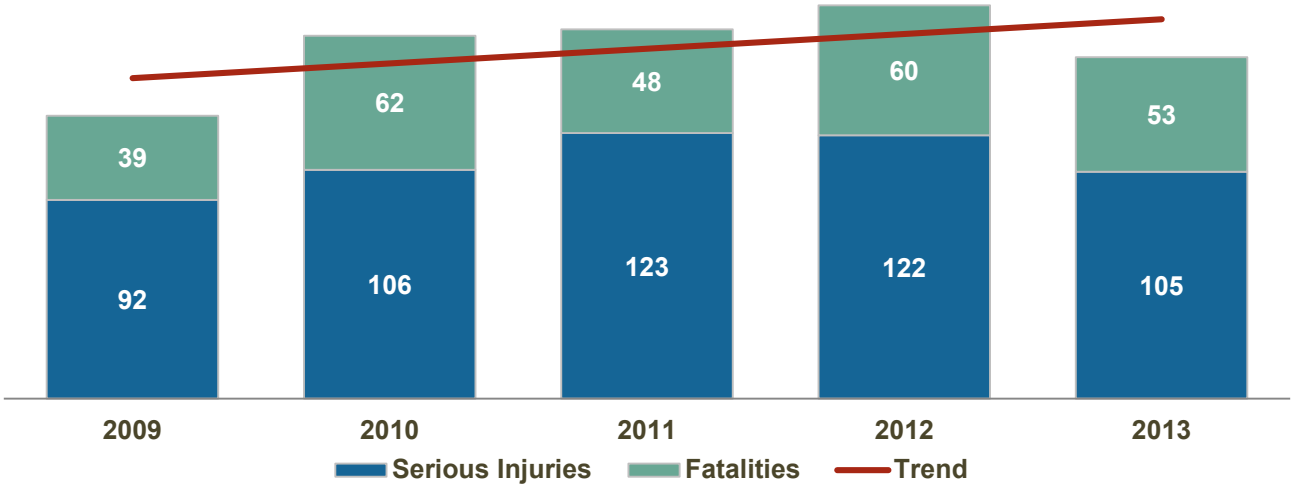
### Pedestrians

Pedestrian fatalities and serious injuries can be caused by inattentive drivers or inattentive pedestrians. Regardless of who is at fault, crashes involving a pedestrian tend to be more serious because pedestrians are completely exposed when using the transportation system. Nationally, as well as in Oregon, urban areas are working to create healthy communities and lifestyles. Alternative transportation infrastructure, including sidewalks, is being implemented to encourage residents to walk to work, to run errands, or for recreation. An increase in these environments has encouraged more people to walk, but it also has increased the chances for pedestrian, vehicle conflicts. In addition, some communities do not yet have adequate infrastructure in place to accommodate pedestrians, which can also be a risk factor of crashes. In Oregon, pedestrian crashes are defined as crashes where one or more pedestrian was involved in the crash.

#### *Problem Identification*

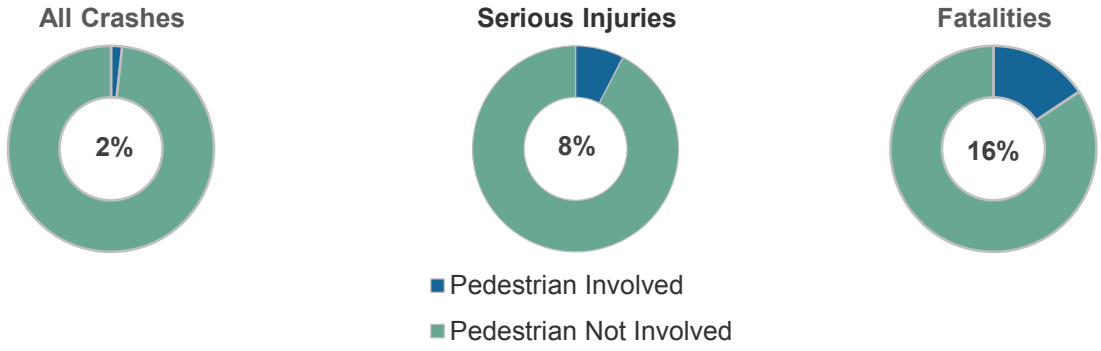
Between 2009 and 2013, crashes involving pedestrians accounted for 10 percent of all the fatal and serious injury crashes in Oregon and contributed to 262 fatalities and 548 serious injuries. Nearly 90 percent of these crashes occurred in an urban environment, where there are more pedestrians and sidewalk infrastructure. In 2015 in Portland, approximately 27 percent of transportation related fatalities were pedestrians (10 of 37 fatalities). Nationally, pedestrians make up 14 percent of all traffic fatalities.[32] A number of pedestrian-related fatal and serious injury crashes (17 percent) involved older driver crashes. Crashes at intersections or when alcohol and/or other drugs are involved also are strongly correlated to pedestrian crashes.

**Figure 6.13 Pedestrian Fatalities and Serious Injuries by Year**
*2009 to 2013*




[32] *2015 Portland Traffic Safety Report*, Portland Bureau of Transportation, Active Transportation and Safety Division, pages 3 and 4, February 8, 2016.

## Figure 6.14 Pedestrian Involvement in All Crashes, Serious Injuries, and Fatalities




*Pedestrian Actions*

## Table 6.8 Pedestrian Actions

| Tier 1 | |
|---|---|
| **Action:** | **Evaluate the safety performance of innovative pedestrian facilities. Continue implementing the most effective.** |
| Co-Benefits: | Intersections, Data |
| **Action:** | **Provide safe facilities and crossings in areas where pedestrians are present or access is needed. Prioritize transit corridors, school areas, multilane streets and highways and other high risk areas and facilities.** |
| Co-Benefits: | Intersections, Bicyclists, Data |
| **Action:** | **Improve maintenance of existing pedestrian facilities.** |

## Motorcyclists

Motorcyclists are vulnerable because of their level of exposure when traveling on Oregon's roads. When a motorcyclist runs off the road or interacts with another vehicle, the lack of protection can increase the severity of the crash. Motorcycle crashes are defined as a motorcyclist who is involved in a crash, but is not necessarily the cause of the crash.

### *Problem Identification*

Between 2009 and 2013, motorcycle crashes accounted for 15 percent of all the fatal and serious injury crashes in Oregon and contributed to 211 fatalities and 1,030 serious injuries. About 56 percent of these crashes occurred in a rural environment. A large number of motorcycle fatal and serious injury crashes (61 percent) result from lane departure crashes. Crashes at intersections (46 percent) and aggressive driving (42 percent) also are strongly correlated to motorcycle crashes.

**Figure 6.15 Motorcycle Involved Fatalities and Serious Injuries by Year**
*2009 to 2013*

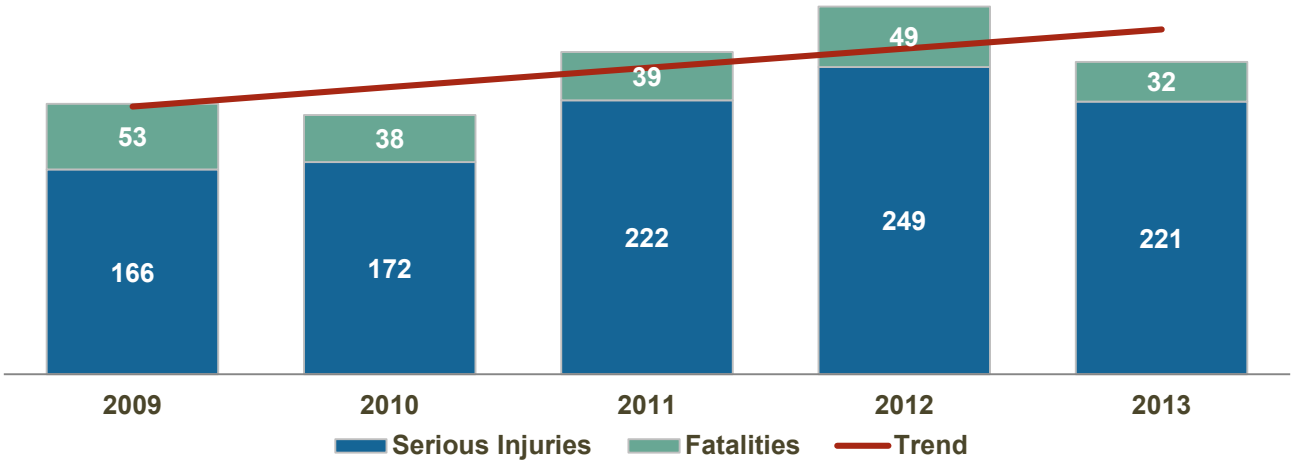
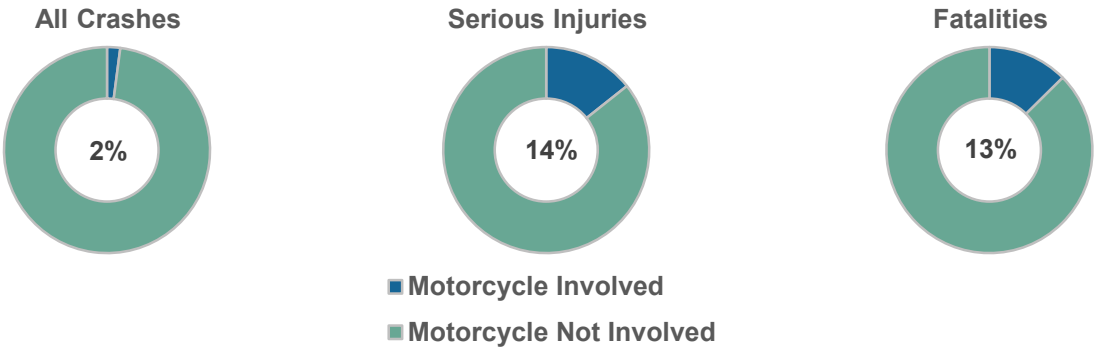



**Figure 6.16 Motorcycle Involvement in All Crashes, Serious Injuries, and Fatalities**



### *Motorcyclist Actions*

## Table 6.9 Motorcyclist Actions

| Tier 1 | |
|---|---|
| **Action:** | **Increase awareness of motorcyclists among the general public through education and outreach.** |
| **Action:** | **Provide education and enforcement to decrease impaired motorcycle riding.** |
| Co-Benefits: | Impaired Driving, Training, Enforcement |
| **Action:** | **Modify Oregon's helmet definition to match federal regulations** |
| Co-Benefits: | |
| **Tier 2** | |
| **Action:** | **Increase awareness among motorcyclists that the majority of crashes involve speed, impairment, and roadway departure.** |
| Co-Benefits: | Impaired Driving, Speeding, Roadway Departure |
| **Action**: | **Adopt and implement road surface maintenance practices across jurisdictions that reduce hazards for people operating motorcycles.** |

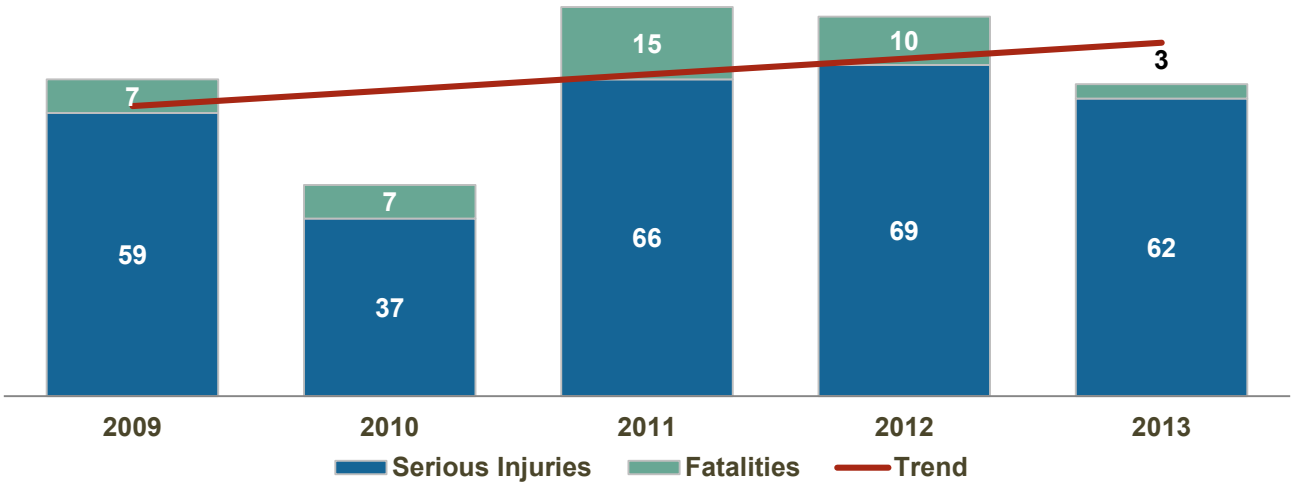
## Bicyclists

Bicycle fatalities and serious injuries can be caused by inattentive drivers or inattentive bicyclists. Regardless of who is at fault, crashes involving a bicyclist tend to be more serious because bicyclists are completely exposed when using the transportation system. Nationally, as well as in Oregon, urban areas are developing transportation systems and land use to promote healthy communities and lifestyles. Alternative transportation infrastructure, including bike lanes, bike-specific traffic signals, and bike racks, are being implemented to encourage residents to bike to work, run errands, or for recreation. In the City of Portland, 7.2 percent of commuters go by bike, which is the highest percentage of commuters for a large American city.[33] As biking environments improve and more people ride bikes, there are more chances for bicycle-vehicle conflicts. In Oregon, bicycle crashes are defined as crashes where one or more bicyclists (or other pedalcyclists) was/were involved in the crash.

### *Problem Identification*

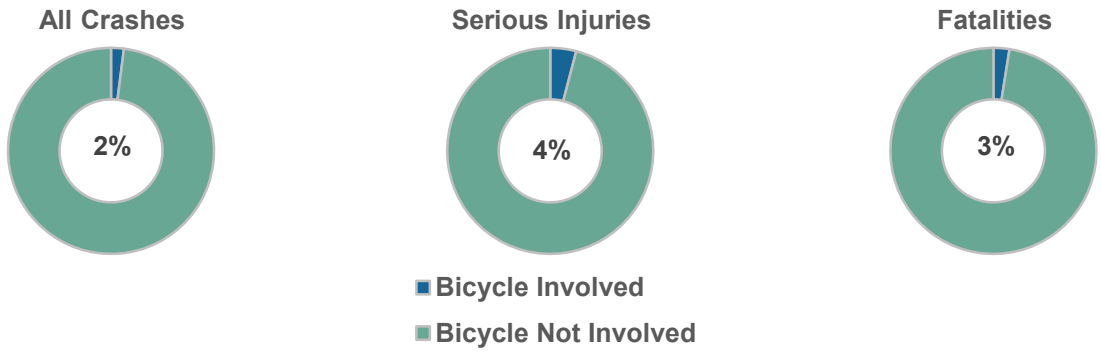
Between 2009 and 2013, crashes involving bicyclists (pedalcyclists) accounted for 4 percent of all the fatal and serious injury crashes in Oregon and contributed to 42 fatalities and 293 serious injuries. About 86 percent of these crashes occurred in an urban environment, where there are more bicyclists and bicycle infrastructure. A number of bicycle-related fatal and serious injury crashes result from young driver crashes. Older driver crashes and crashes when aggressive driving is involved also are strongly correlated to bicycle crashes.

**Figure 6.17 Bicyclist Fatalities and Serious Injuries by Year**
*2009 to 2013*




[33] https://www.portlandoregon.gov/transportation/article/407660.

## Figure 6.18 Bicyclist Involvement in All Crashes, Serious Injuries, and Fatalities




*Bicyclist Actions*

## Table 6.10 Bicyclist Actions

| Tier 1 | |
|---|---|
| **Action:** | **Evaluate the safety impacts of innovative bicycle facilities. Continue implementing the most effective.** |
| Co-Benefits: | Intersections, Data |
| **Tier 2** | |
| **Action:** | **Adopt and implement road surface maintenance practices across jurisdictions that reduce hazards for people riding bicycles.** |
| Co-Benefits: | Motorcycles |
| **Action:** | **Provide youth safety items (e.g., bicycle helmets) to satisfy public demand.** |
| Co-Benefits: | Intersections, Roadway Departure, Motorcycles, Pedestrians, Bicyclists, Older Road Users |

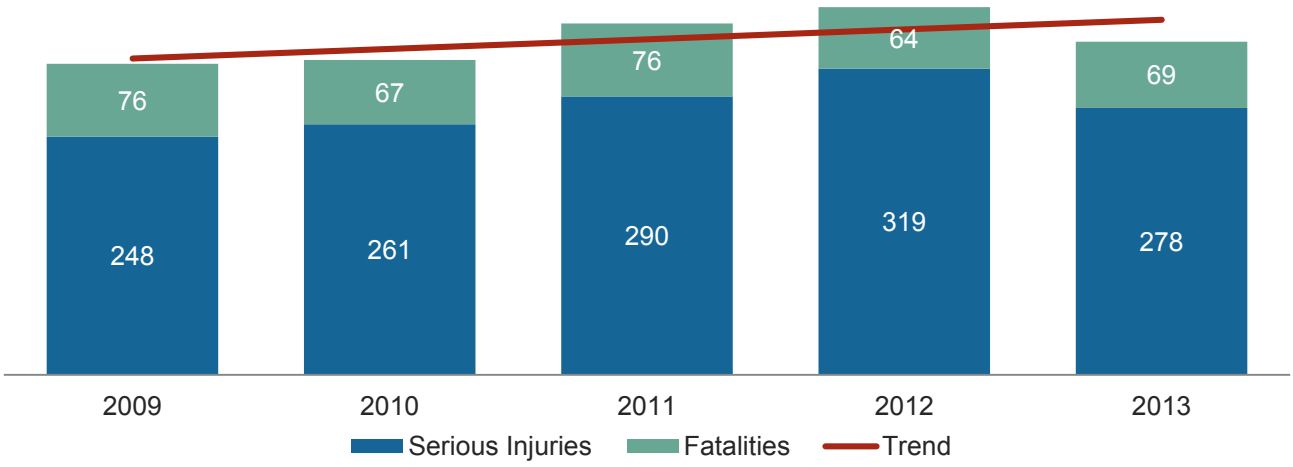
## Older Drivers and Pedestrians

While older drivers are a concern now in Oregon, crash numbers could increase dramatically over the next decade as the U.S. population ages. Operating a vehicle requires drivers to react quickly, see and hear clearly, judge distances and speeds, and be aware of other drivers and road users. As people age, it can lead to a decline in some of these abilities. When older drivers do crash, it also tends to be more severe as they can get hurt more seriously and face longer recovery times than younger drivers. In Oregon, older driver crashes are defined as crashes where drivers older than 65 are involved in, but not necessarily the cause of, a crash. Older pedestrian fatalities and serious injuries also are a concern for many of the same reasons listed above – their reaction time to oncoming vehicles is slower, they may not be able to see crosswalks or automobiles as well, they may misjudge the amount of time required to cross a street, or not be as aware of their surroundings. In addition, when older pedestrian are struck by a vehicle, the injuries tend to be more severe.

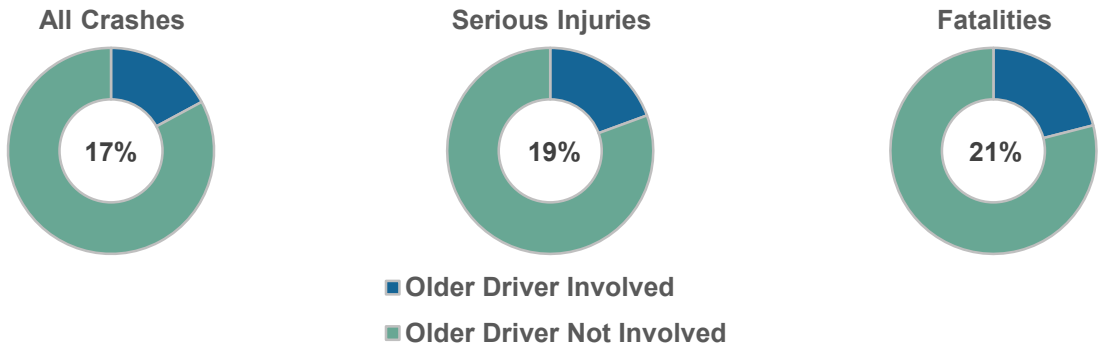
### *Problem Identification*

Between 2009 and 2013, older driver crashes accounted for 13 percent of all the fatal and serious injury crashes in Oregon and contributed to 352 fatalities and 1,396 serious injuries. Approximately 50 percent of these crashes occurred in an urban environment. A large number of older driver fatal and serious injury crashes (44 percent) result from lane departure crashes. Crashes at intersections (40 percent) and aggressive driving (26 percent) also are strongly correlated to older driver crashes.

**Figure 6.19 Older Driver Involved Fatalities and Serious Injuries by Year**
*2009 to 2013*

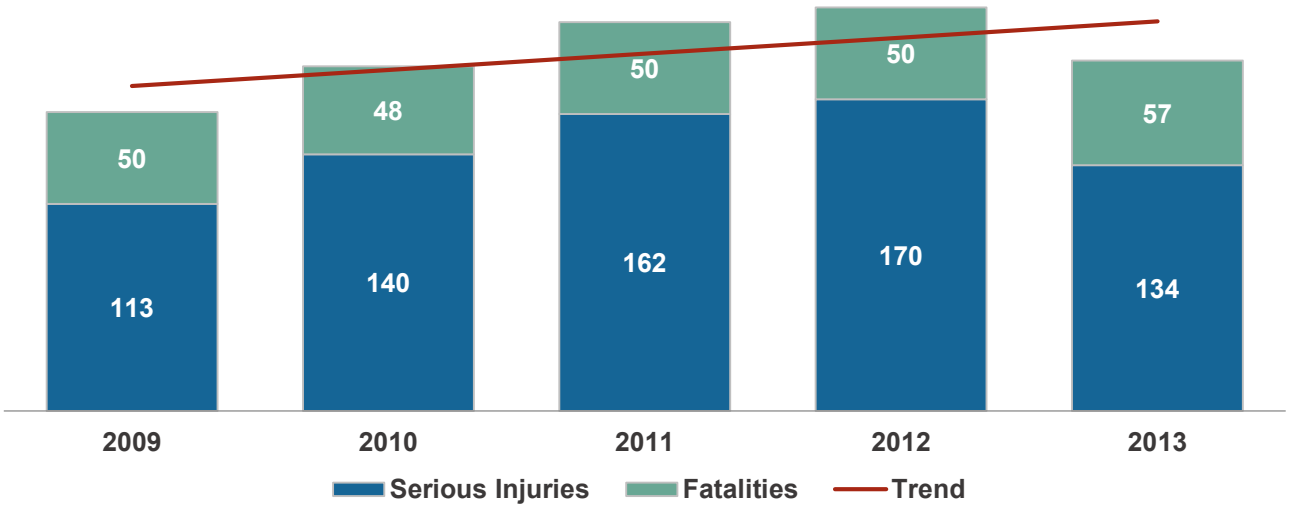


## Figure 6.20 Older Driver Involvement in All Crashes, Serious Injuries, and Fatalities




## Figure 6.21 Older Driver and Pedestrian Fatalities and Serious Injuries by Year

*2009 to 2013*



General vulnerable actions were developed and are shown in Table 6.11. These actions relate to all vulnerable road users, not just older drivers and pedestrians. Older road user-specific actions also were developed and are shown Table 6.12.

### Table 6.11 Vulnerable User Actions (General)

| Tier 2 | |
|---|---|
| **Action:** | **Conduct education campaigns to encourage all users to recognize responsibility for safety of all travelers (e.g., share the road, slow down for kids).** |
| Co-Benefits: | Speeding, Intersections, Motorcycles, Pedestrians, Bicyclists |
| **Action:** | **Evaluate the need for actions which address the issues associated with children and adolescents, and young vehicle operators.** |
| Co-Benefits: | Intersections, Roadway Departures, Impaired Driving, Speeding, Unrestrained Occupants, Distracted Driving |

### Table 6.12 Older Road Users Actions

| Tier 1 | |
|---|---|
| **Action:** | **Identify risk factors for older drivers and implement treatments, within current law.** |
| Co-Benefits: | Data |
| **Tier 2** | |
| **Action:** | **Identify risk factors for older walkers and implement treatments, within current law.** |
| Co-Benefits: | Pedestrians, Data |

## *Emphasis Area: Improved Systems*

Five additional subareas were identified as vital components to achieving the zero fatalities and serious injuries vision. To positively influence crash outcomes in Oregon, it is necessary to invest in data improvements to better identify crash locations and understand contributing factors; provide training to transportation and safety stakeholders to expand implementation of safety efforts; coordinate with law enforcement and emergency responders on opportunities to reduce the severity of crash outcomes; and address the consequences of commercial vehicle crashes.

### Commercial Vehicles

The Motor Carrier Safety Division at ODOT develops an annual Commercial Vehicle Safety Plan. The mission of the Motor Carrier Transportation Division is to promote a safe, responsible, and efficient commercial transportation industry in Oregon.[34] Similar to the TSAP, the plan outline critical state commercial vehicle issues, potential solutions and performance measures. There also are Federal guidelines documented in the plan.

[34] Summary of Oregon Truck Safety and Guide to the 2015 Commercial Vehicle Safety Plan. https://www.oregon.gov/ODOT/MCT/docs/CVSPlan2015.pdf.

*Actions*

## Table 6.13 Commercial Vehicle Actions

| | |
|---|---|
| **Action:** | **Implement the annual Commercial Motor Vehicle Safety Plan.** |

## Enforcement

Law enforcement officials prevent crashes through traffic details, special mobilization campaigns such as Click It or Ticket, saturation patrols, and checkpoints. These different approaches enable officers to prosecute safety offenses, such as impaired driving and distracted driving, but also keep all road users safe at the same time. They also respond to crashes when they do occur to collect information for a crash report, which details the specifics of the crash, person(s), and vehicle(s), involved in the incident. This information later helps transportation and safety stakeholders make informed decisions about safety solutions. Fully staffed and funded law enforcement agencies can direct their efforts towards targeted enforcement and data collection.

*Actions*

## Table 6.14 Enforcement Actions

| Tier 1 | |
|---|---|
| **Action:** | **Equitably enforce and prosecute traffic safety offenses for all modes.** |
| Co-Benefits: | Impaired Driving, Speeding, Unrestrained Occupants, Distracted Driving, Motorcycles, Pedestrians, Bicyclists and Older Road Users |
| **Action:** | **Increase funding for traffic patrol to enforce traffic laws.** |
| Co-Benefits: | Impaired Driving, Speeding, Unrestrained Occupants, Distracted Driving |

## Emergency Medical Services

Emergency medical service providers are the people responding to victims at crash scenes. Having a prompt and effective EMS system can increase the survival rates for crash victims, especially in rural areas where longer travel distances can make the difference between life and death. The primary responsibility for EMS staff are to triage, treat, and transport crash victims, but they also may coordinate evacuation with other agencies, provide advanced emergency medical care, and determine the cause of injuries for the trauma center. Fully staffed, funded, and trained emergency response teams can provide services that save lives and/or reduce the impact of injuries.

*Actions*

## Table 6.15 EMS Actions

| Tier 1 | |
|---|---|
| **Action:** | **Recruit, train, and retain EMS responders in urban, rural, and sparsely populated areas.** |
| Co-Benefits: | Impaired Driving, Speeding, Unrestrained Occupants, Distracted Driving, Intersections, Roadway Departure, Motorcycles, Pedestrians, Bicyclists, Older Road Users, Training |
| **Tier 2** | |
| **Action:** | **Promote Traffic Incident Management (TIM) Responder Training for EMS officials in rural and sparsely populated areas.** |
| Co-Benefits: | Training |
| **Action:** | **Conduct annual trauma symposium for EMS providers.** |
| Co-Benefits: | Training |
| **Action:** | **Address EMS equipment shortfalls through increased funding** |
| Co-Benefits: | All users |

## Data

Crash, roadway, and volume (motor vehicle, pedestrian, and bicycle) data is essential to understanding crash trends, identifying critical issues, developing emphasis areas and actions, and evaluating the effectiveness of solutions. Data should be timely, accurate, complete, consistent, integrated, and accessible. The improvement of data is addressed by the Oregon Traffic Records Coordinating Committee and other interested stakeholders. Moving forward, a priority of this group will be to develop and implement a Traffic Records Strategic Plan to ensure the best available data is used for safety planning and investment decisions.

*Actions*

## Table 6.16 Data Actions

| Tier 1 | |
|---|---|
| **Action:** | **Evaluate pedestrian and bicycle high crash locations and risk factors through analysis of existing data and development of new data sources.** |
| Co-Benefits: | Pedestrians, Bicyclists |
| **Action:** | **Improve timeliness of crash data.** |
| **Action** | **Improve reliability of crash reports.** |
| Co-Benefits: | Distracted Driving, Data |
| **Action** | **Identify data needs related to impaired driving and implement measures to address gaps. Coordinate with public health.** |
| Co-Benefits: | Impaired Driving |
| **Action** | **Develop and implement a new Traffic Records Strategic Plan based on the 2016, and subsequent future assessments of the traffic records system.** |
| **Tier 2** | |
| **Action:** | **Evaluate type and extent of crash underreporting. Implement necessary actions to address issue.** |

## Training and Education

Oregon is committed to educating engineers, educators, enforcement, emergency service providers, and the general public about new safety information and offering training opportunities to maintain and upgrade skills. Continued driver education and training, for young and experienced drivers and motorcyclists, will contribute to crash reductions. Specific education and training opportunities would contribute to a better understanding of traffic laws, new transportation infrastructure, work zone awareness, and motorcycle safety.

### *Actions*

### Table 6.17 Training and Education Actions

| **Tier 1** | |
|---|---|
| **Action:** | **Implement education and training related to new types of infrastructure (e.g., signal heads, safety edge, crosswalks, bike lanes, or roundabouts) and traffic laws.** |
| Co-Benefits: | Intersections |
| **Action:** | **Encourage and support local planning for safety efforts, and the formation of local government commissions and committees, and other affiliated groups which address transportation safety.** |
| Co-Benefits: | All modes |
| **Action:** | **Implement education, training or examinations to ensure licensed drivers understand current traffic laws.** |
| Co-Benefits: | Motorcycles, Pedestrians, Bicyclists, Older Road Users, Commercial Vehicles |
| **Tier 2** | |
| **Action:** | **Conduct training and education to reduce the number of unendorsed travelers (all modes).** |
| Co-Benefits: | Motorcycles, Pedestrians, Bicyclists, Older Road Users, Commercial Vehicles |
| **Action:** | **Conduct training on traffic safety laws for law enforcement officers, attorneys and judges to improve consistent enforcement and adjudication processes.** |
| Co-Benefits: | Enforcement |
| **Action:** | **Provide continued improvement of the education system for new drivers, including issues dealing with access to, and cost associated with passenger vehicle operator training. Evaluate requiring driver training for youthful operators.** |
| Co-Benefits: | Intersections, Roadway Departures, Impaired Driving, Speeding, Unrestrained Occupants, Distracted Driving, Motorcycles, Pedestrians, Bicyclists |
| **Action:** | **Provide education and other countermeasures to ensure safe work zones around roadway construction and improvement projects for workers and the traveling public.** |
| Co-Benefits: | Intersections, Roadway Departures, Impaired Driving, Speeding, Distracted Driving, Older Road Users |
| **Action:** | **Provide support for use of comprehensive, integrated approaches such as 4 E to those who design, operate, maintain, and use the system. Extend efforts to all agencies and partners through education and other measures.** |
| Co-Benefits: | Enforcement, Emergency Response, Intersections, Roadway Departures |

## Conclusion

EAs represent the key factors contributing to crashes. In Oregon, the results of data analysis and public input identify Infrastructure, Risky Behaviors, Vulnerable Users, and Improved Systems as the priority areas to focus staff time and resources to achieve reductions in transportation-related fatalities and serious injuries. To effectively direct resources, project, programmatic, and potential future legal policy changes have been identified and will be implemented over the next five years by a variety of Oregon's agencies and stakeholders.

# 7. Performance Measures and Targets

In order to understand the value of TSAP efforts over time, performance must be measured. Establishing performance measures provides the information needed to evaluate safety implementation and identify the need for changes to the TSAP in the future. To better understand whether the policies, strategies, emphasis areas, and actions identified in the previous chapters are contributing to fatality and serious injury reductions, the TSAP establishes performance measures that align with FHWA requirements under the MAP-21 rule, FAST Act, and NHTSA. To evaluate progress towards the TSAP vision, performance targets also have been identified to meet Federal requirements. This chapter outlines the recommended TSAP performance measures and targets.

## Types of Performance Measures

In transportation, performance measures are defined as "data about the use, condition, and impact of the transportation system…reported for illustrative purposes to demonstrate progress made toward established targets."[35]

The National Performance Review definition of performance measure is as follows:

"A process of assessing progress toward achieving predetermined goals, including information on the efficiency with which resources are transformed into goods and services (outputs), the quality of those outputs (how well they are delivered to clients and the extent to which clients are satisfied) and outcomes (the results of a program activity compared to its intended purpose), and the effectiveness of government operations in terms of their specific contributions to program objectives."[36]

Measurements are categorized into two distinct types: efficiency and effectiveness. Efficiency measures are focused on effort and outputs. They track the goings-on of a program, and in traffic safety examples include the following:

*Efficiency performance measures track effort and output of a program.*

*Efficiency performance measures track how many activities were conducted, or miles of treatment were installed.*

- Number of miles of rumble strips installed;
- Number of seat belt violation citations written;
- Number of labor hours of overtime enforcement conducted; and
- Number of schools visited last year to promote traffic safety.

The value of efficiency measures is that they are often easy to quantify through real-time tracking or year-end data collection. The limitation, however, is that efficiency measures do not measure the end result directly. For example, installing rumble strips does not guarantee a reduction in crashes, and writing

[35] MAP-21, Performance Measures, and Performance-Based Funding, http://www.cmap.illinois.gov/about/updates/-/asset_publisher/UIMfSLnFfMB6/content/map-21-performance-measures-and-performance-based-funding.

[36] Performance Measure Fundamentals, FHWA Office of Operations, Washington, D.C., 2015. http://www.ops.fhwa.dot.gov/perf_measurement/fundamentals/.

additional seat belt citations does not necessarily improve seat belt use or reduce unbelted crashes. When choosing efficiency measurements, it is important to make a connection from the effort to its ultimate goal.

Effectiveness measures, in contrast, are defined above as "the results of a program activity." These measures tie more directly to the ultimate goals of reducing fatalities and serious injuries. Examples include:

*Effectiveness performance measures track the results of a program or activity.*

*Effectiveness performance measures track how many fatalities or injuries occurred, or number of unbelted fatalities.*

- Number of traffic fatalities in a given jurisdiction over the past year;
- Seat belt use rate;
- Number of unbelted fatalities;
- Number of marijuana-related fatalities and serious injuries; and
- Number of fatal crashes involving unendorsed motorcyclists.

Effectiveness measures are typically of higher value due to their focus on the desired result. However, it is often difficult to acquire information for effectiveness measures in a timely manner. For example, obtaining the number of unbelted occupant-related traffic crashes can take months or years for collection, quality assurance, and archiving. Additionally, it is not always clear if the change in the effectiveness measure was directly connected to outputs. For example, it is not prudent to assume a crash reduction was caused by traffic safety efforts; other factors, including statistical randomness, play a part.

## Predictive Measures

In addition to the example measures and attributes discussed above, transportation safety has recently expanded its analysis methods to include predictions of safety based on a variety of data. This method can be used for decision-making throughout the project development process, including planning, design, construction, operations, and maintenance. Examples include screening potential locations for improvement and choosing alternative roadway designs using data such as traffic volume, roadway geometry, and roadside conditions.

ODOT's Transportation Planning Analysis Unit has been actively testing and applying safety analysis methods to see which predictive methods from AASHTO's 2010 *Highway Safety Manual* work best for different analysis cases, and incorporating lessons learned into TPAU's Analysis Procedures Manual. Oregon should continue to work with national researchers and safety advocates to promote development of long-term, predictable safety performance measures and incorporate such measures in future TSAPs as appropriate.

# TSAP Performance Measures

## *Federal Highway Administration Performance Measures*

The recent 2016 FHWA Final Rule on National Performance Management Measures, established five safety performance measures for Federal-aid highway programs.[37] The performance measures are:[38]

1. Number of roadway fatalities;
2. Number of roadway serious injuries;
3. Roadway fatalities per vehicle miles traveled (i.e., fatality rate);
4. Roadway serious injuries per vehicle miles traveled (i.e., serious injury rate); and
5. Combined nonmotorized fatalities and nonmotorized serious injuries.

Along with these five primary measures, the Federal government requires states to track the performance of two categories under these *Special Rules*:

- **Rural Road Safety.** MAP-21 added the *High-Risk Rural Roads (HRRR) Special Rule*. First, MAP-21 defined an HRRR as "any roadway functionally classified as a rural major or minor collector or a rural local road with significant safety risks, as defined by a state in accordance with an updated state strategic highway safety plan." Second, it establishes a special rule that states, "If the fatality rate on rural roads in a state increases over the most recent two-year period for which data are available, that state shall be required to obligate in the next fiscal year for projects on high-risk rural roads an amount equal to at least 200 percent of the amount of funds the state received for fiscal year 2009 for high-risk rural roads." For the State of Oregon, this equates to approximately $2.4 million required to be obligated to HRRR safety efforts if the *Special Rule* applies.[39]

  The Rural Road Safety rule does not apply because the five-year average fatality rate has declined in each successive year leading up to the development of the plan.

- **Older Drivers and Pedestrians Safety.** The legislation defines Older Drivers and Pedestrians as "drivers and pedestrians 65 year of age and older." The *Older Drivers and Pedestrians Special Rule* applies if the rate of traffic fatalities and serious injuries for these road users increases during the most recent two-year period for which data are available. If it does apply, a state "shall be required to

[37] Federal Register, National Performance Management Measures: Highway Safety Improvement Program Final Rule. 2016. https://www.Federalregister.gov/articles/2016/03/15/2016-05202/national-performance-management-measures-highway-safety-improvement-program.

[38] Federal Register, National Performance Management Measures: Highway Safety Improvement Program Final Rule. 2016. https://www.Federalregister.gov/articles/2016/03/15/2016-05202/national-performance-management-measures-highway-safety-improvement-program.

[39] Highway Safety Improvement Program MAP-21 High Risk Rural Roads Guidance, Federal Highway Administration Office of Safety, Washington, DC, December 27, 2012. http://www.fhwa.dot.gov/map21/guidance/guidehrrr.cfm.

include…strategies to address the increase in those rates." Additional details for calculating this combined crash rate and determining applicability are available in FHWA guidance.[40]

The Older Drivers and Pedestrians special rule was found to apply because the five-year average number of fatalities and serious injuries for older drivers and pedestrians increased on a per-capita basis in 2014. As a result the TSAP update includes strategies to reduce fatalities and serious injuries among drivers and pedestrians 65 years or older.

## Oregon Traffic Safety Performance Plan and NHTSA Performance Measures

The Oregon Traffic Safety Performance Plan identifies the following performance measures, which satisfy the NHTSA performance measure requirements.[41]

- Fatalities;
- Serious Traffic Injuries;
- Fatalities/100M VMT;
- Rural Road Fatalities/100M VMT;
- Urban Road Fatalities/100M VMT;
- Unrestrained Passenger Vehicle Occupant Fatalities, All Seat Positions;
- Alcohol Impaired Driving Fatalities Involving a Driver or Motorcycle Operator with a BAC of 0.08 and Above;
- Speed-related Fatalities;
- Motorcyclist Fatalities;
- Unhelmeted Motorcyclist Fatalities;
- Drivers Age 20 or Younger in Fatal Crashes;
- Pedestrian Fatalities;
- Bicyclist Fatalities; and
- Statewide Observed Seat Belt Use, Passenger Vehicles, Front Seat Outboard Occupants.

[40] MAP-21 Section 148: Older Drivers and Pedestrians Special Rule Interim Guidance, Federal Highway Administration Office of Safety, Washington, DC, October 1, 2012. http://www.fhwa.dot.gov/map21/guidance/guideolder.cfm.

[41] Oregon Traffic Safety Performance Plan, Fiscal Year 2016, Federal Version Report, Page 11.

## TSAP Performance Measures

The Oregon TSAP performance measures (consistent with NHTSA and FHWA requirements) are shown in Table 7.1.

### Table 7.1 TSAP Performance Measures

| Performance Measure | Performance Measure Required by NHTSA[a] | Required by FHWA in Performance Measures Final Rule |
|---|---|---|
| 1. Fatalities | ● | ● |
| 2. Fatalities/100M VMT | ● | ● |
| 3. Serious Injuries | ● | ● |
| 4. Serious Injuries/100M VMT | | ● |
| 5. Nonmotorized Fatalities + Serious Injuries | | ● |
| **Special Rules** | | |
| Rural Road Safety | | ● |
| Older Driver and Pedestrian Safety | | ● |

[a] "Traffic Safety Performance Measures for State and Federal Agencies," National Highway Traffic Safety Administration, DOT HS 811 025, Washington, D.C., 2008. Available at http://www.nhtsa.gov/DOT/NHTSA/Traffic%20Injury%20Control/Articles/Associated%20Files/811025.pdf.

# Performance Targets

## *Requirements*

Each of the five FHWA safety performance measures are required to have an annual target. The targets are based on a five-year rolling average and are applicable to all roads regardless of ownership or functional classification.

The number of fatalities, rate of fatalities, and number of serious injuries also are performance measures in the Oregon Traffic Safety Performance Plan (OTSPP) meeting NHTSA requirements. The Federal rules require that these performance measures (#1, #2, and #3 above) have identical targets in the State SHSP and Highway Safety Plan. Further, it identifies the Strategic Highway Safety Plan (the TSAP in Oregon) as the venue for coordination of these common measures. Reporting of results for these various performance measures is accomplished in the HSIP annual report for FHWA and the OTSPP and Annual Report for NHTSA.

Once established, states will have to demonstrate progress toward meeting the targets in the appropriate annual reports. For safety, progress is made when four of five targets are met or performance is better than the prior year. If targets are not met or progress is not made, states will be required to spend all of the HSIP funds only for highway safety improvement projects, and submit an HSIP implementation plan.

The Federal rule also requires MPOs to establish performance targets. MPOs can use the state-established targets or establish targets specifically for the planning area. Similar to the state target, the targets are applicable to all public roads in the MPO. States and MPO will coordinate their targets.

Several optional trend forecasts were considered in the process of selecting the targets. The optional trends were considered for each of the five performance measures. Figure 7.1 shows these optional trend forecasts for fatalities; the trend forecasts for all five performance measures are shown in Appendix E. The trend forecasting options were:

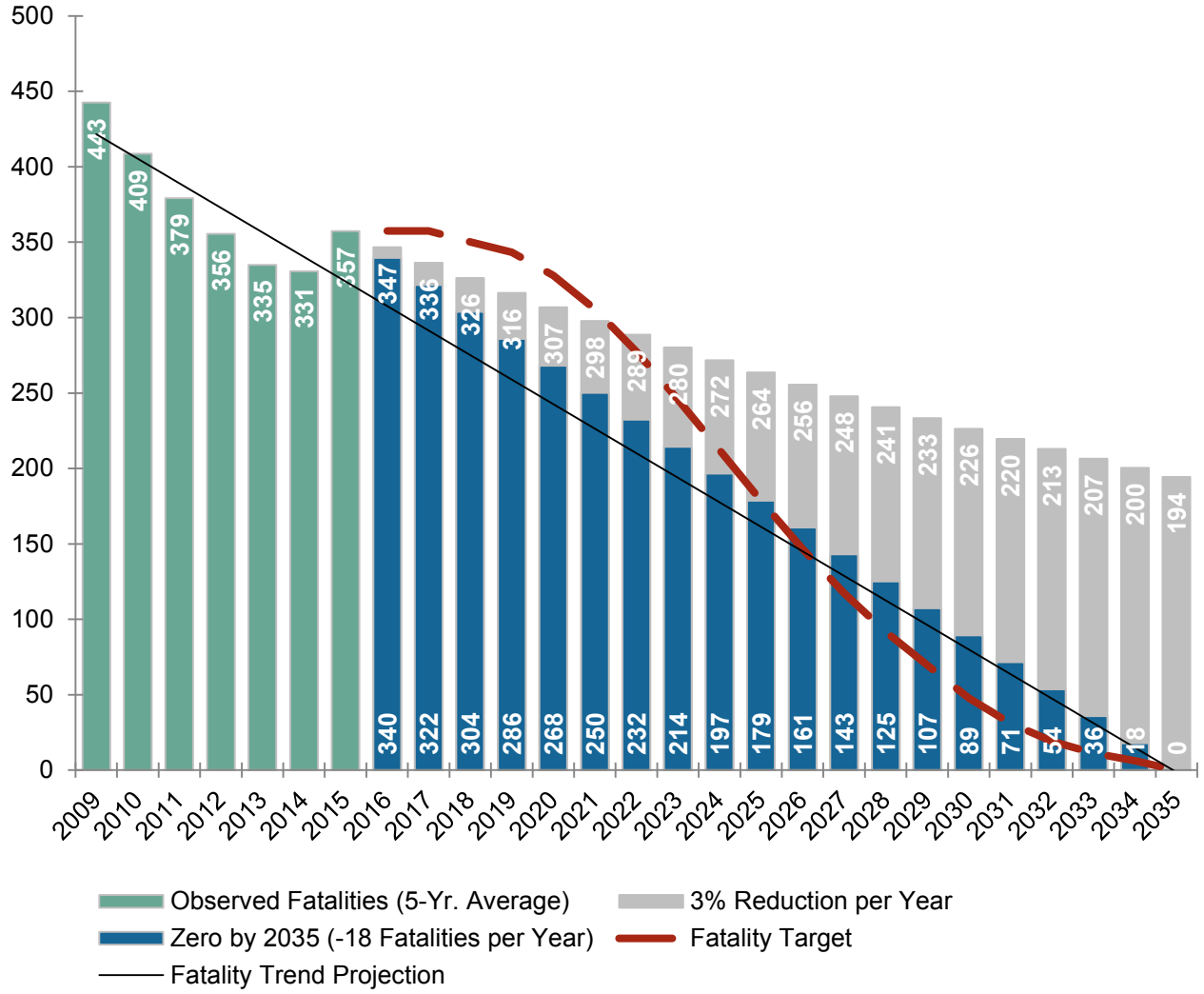
- **Straight line to zero by 2035.** In this forecast a straight line reduction in fatalities was assumed between the most recent five-year average and an average of zero fatalities in the five-year period between 2031 and 2035. This is shown in blue bars in the figure.

- **3-percent reduction per year.** Historically, the Highway Safety Office has set a target of a 3-percent reduction in fatalities per year in its annual Transportation Safety Performance Plan. In the figure, the 3-percent reduction per year is forecast for the 20-year duration of the plan. This trend is forecast in the grey bars in the figure.

- **Trend-line.** The black line is a straight-line trend forecast from historic crash trends for the 20-year duration of the plan. It is based on the data shown in the green bars (2009 to 2015 for fatalities and 2009 to 2014 for the other performance measures).

- **S-Curve.** The S-Curve forecast (shown in Orange) was developed assuming the five-year average number of crashes may be relatively flat in the near future; start to decline in a few years in recognition of different programs of the plan being implemented and potential benefits of connected and/or automated vehicles; and flatten out again in the in the future as it becomes more difficult to address the remaining fatalities.

**Figure 7.1 Historic and Optional Forecast Fatality Trends**
*2009 to 2035, Five-Year Average*




The PAC found strengths and weaknesses in each of these trend forecasts. For example, the trend-line forecast and the straight-line to zero forecast show that, with focus and effort, zero can be achieved. However, recognizing the recent increase in fatalities (Figure 3.1), the PAC believes it is possible in the near future the five-year average number of fatalities may remain flat until programs and projects in this TSAP are well underway. The PAC also agreed in future years of the plan, the reductions will be more difficult to achieve because of smaller numbers; therefore, the rate of reduction would flatten out. Finally, the 3-percent per year forecast has put Oregon on a path to success; however, in order to reach zero fatalities, the PAC agreed it was necessary for more aggressive targets.

Based on these considerations, the PAC recommended setting targets based on the S-Curve forecast trend. The resulting TSAP targets shown in Table 7.2 are for each five-year period of the five-year plan. For example, the TSAP establishes a target that for the five-year period between 2015 and 2019, there will be on average: 343 fatalities per year, 0.83 fatalities per 100 million vehicle miles of travel; 1,432 people seriously

injured, 4.24 people seriously injured per 100 million vehicle miles of travel; and 225 nonmotorized fatalities and serious injuries.

## Table 7.2 TSAP Performance Targets
*Five-Year Average*

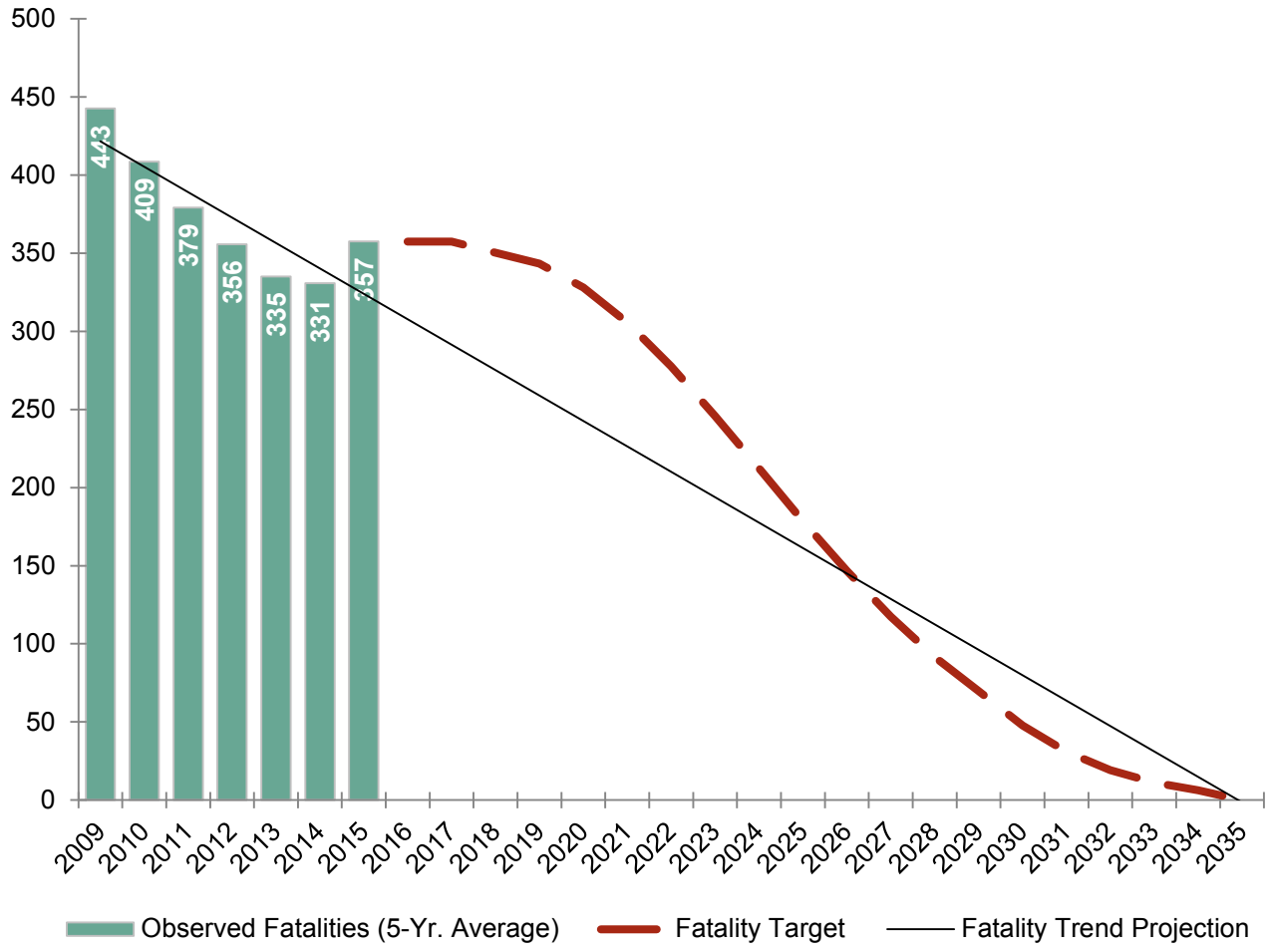
| Base Period | Fatalities (People) (2011-2015) | Fatality Rate (People per 100 Million VMT) (2011-2015) | Serious Injury (People) (2010-2014) | Serious Injury Rate (People per 100 Million VMT) (2010-2014) | Nonmotorized Fatalities and Serious Injuries (People) (2010-2014) |
|---|---|---|---|---|---|
| Baseline | 357 | 1.04 | 1,491 | 4.42 | 234 |
| 2013-2017 | 357 | 0.94 | 1,491 | 4.42 | 234 |
| 2014-2018[a] | 350 | 0.89 | 1,461 | 4.33 | 229 |
| 2015-2019 | 343 | 0.83 | 1,432 | 4.24 | 225 |
| 2016-2020 | 328 | 0.78 | 1,368 | 4.06 | 215 |
| 2017-2021 | 306 | 0.73 | 1,274 | 3.78 | 200 |

[a] 2014-2018 is the first period that targets must be established for the HSIP Program.

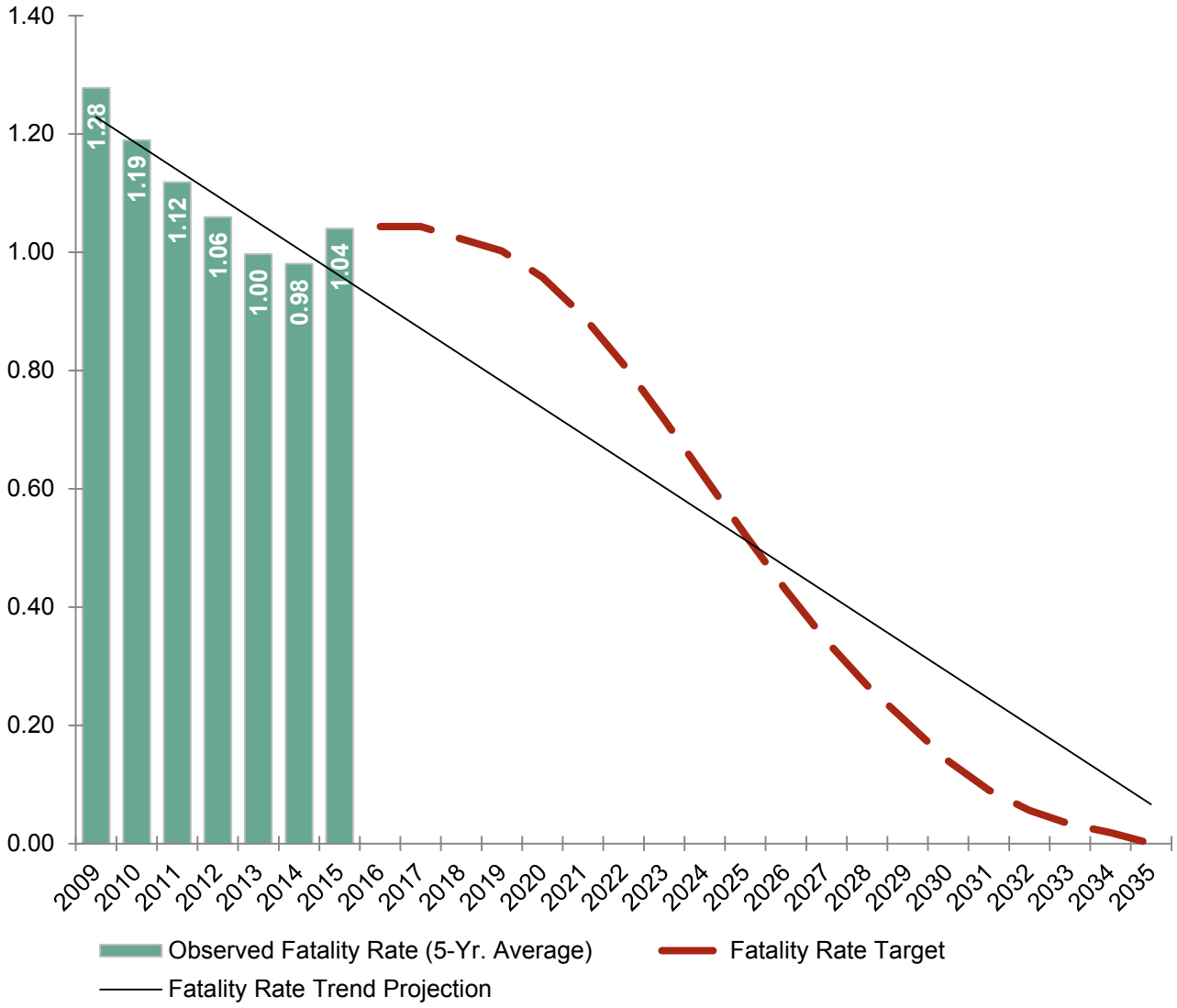
Figure 7.2 through Figure 7.6 show recent fatality and injury data and a forecast of how Oregon will achieve the vision of zero fatalities and life-changing injuries by 2035 using the five performance measures. As shown in each figure, it is forecast that initial reductions will be relatively slow as the goals, policies and strategies in this plan begin to be implemented. Over time, as the goals, policies, and strategies gain a foothold in Oregon, fatalities and serious injuries will decline more rapidly. Finally, it is forecast the trend will flatten out in the later years of the plan because it will be more and more difficult to address the final safety issues in the State.

As described in Chapter 4, in addition to the goals policies and strategies in this plan, there are many factors that will influence the number and severity of crashes. These factors include: age of the population, mode of travel, number of miles of travel, how fast people drive, where people live, or connected and automated vehicles. These external factors will be an important considerations in future updates to the TSAP.

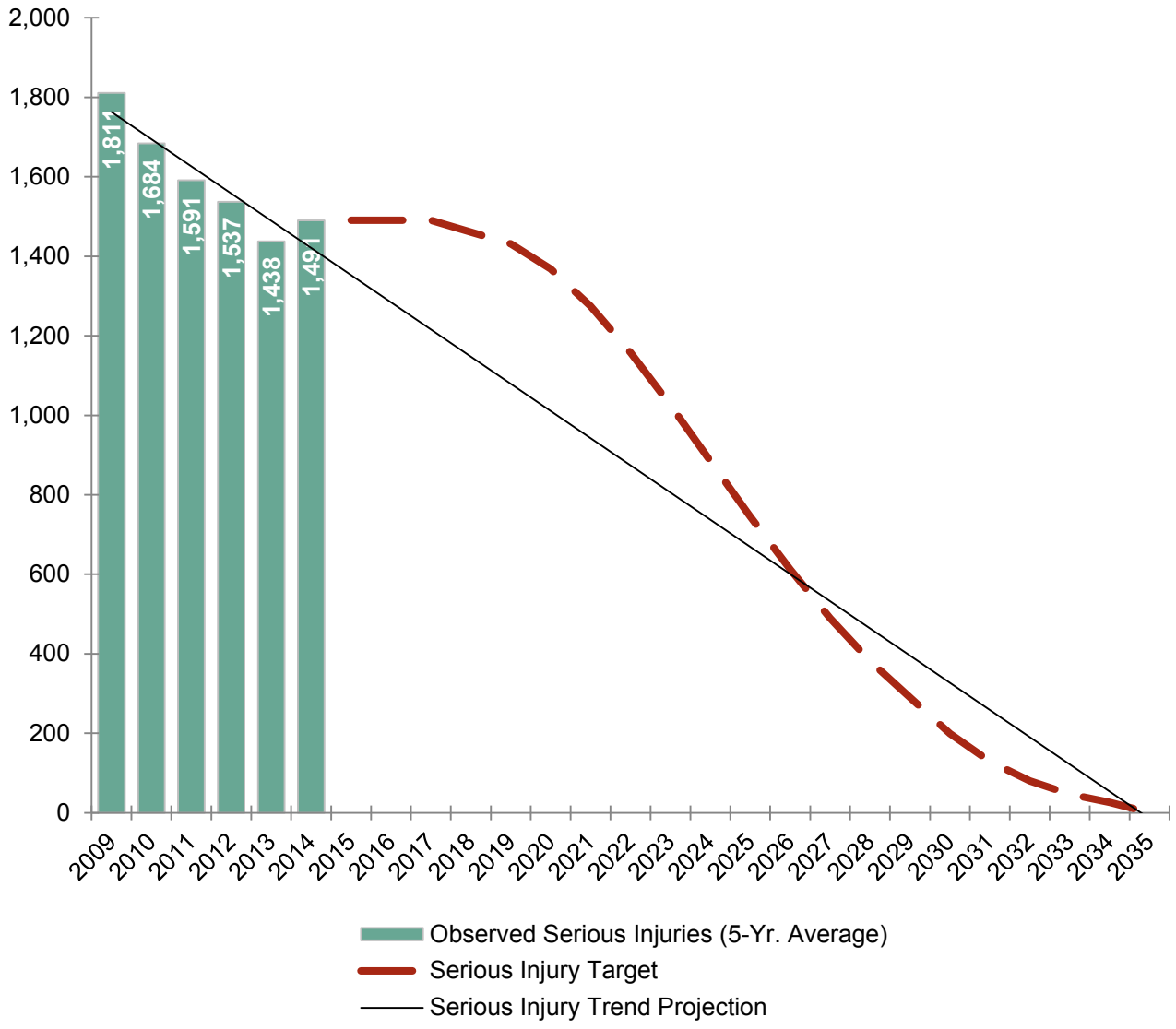
## Figure 7.2 Fatality Target



## Figure 7.3 Fatality Rate Target



## Figure 7.4 Serious Injury Target



## Figure 7.5 Serious Injury Rate Target

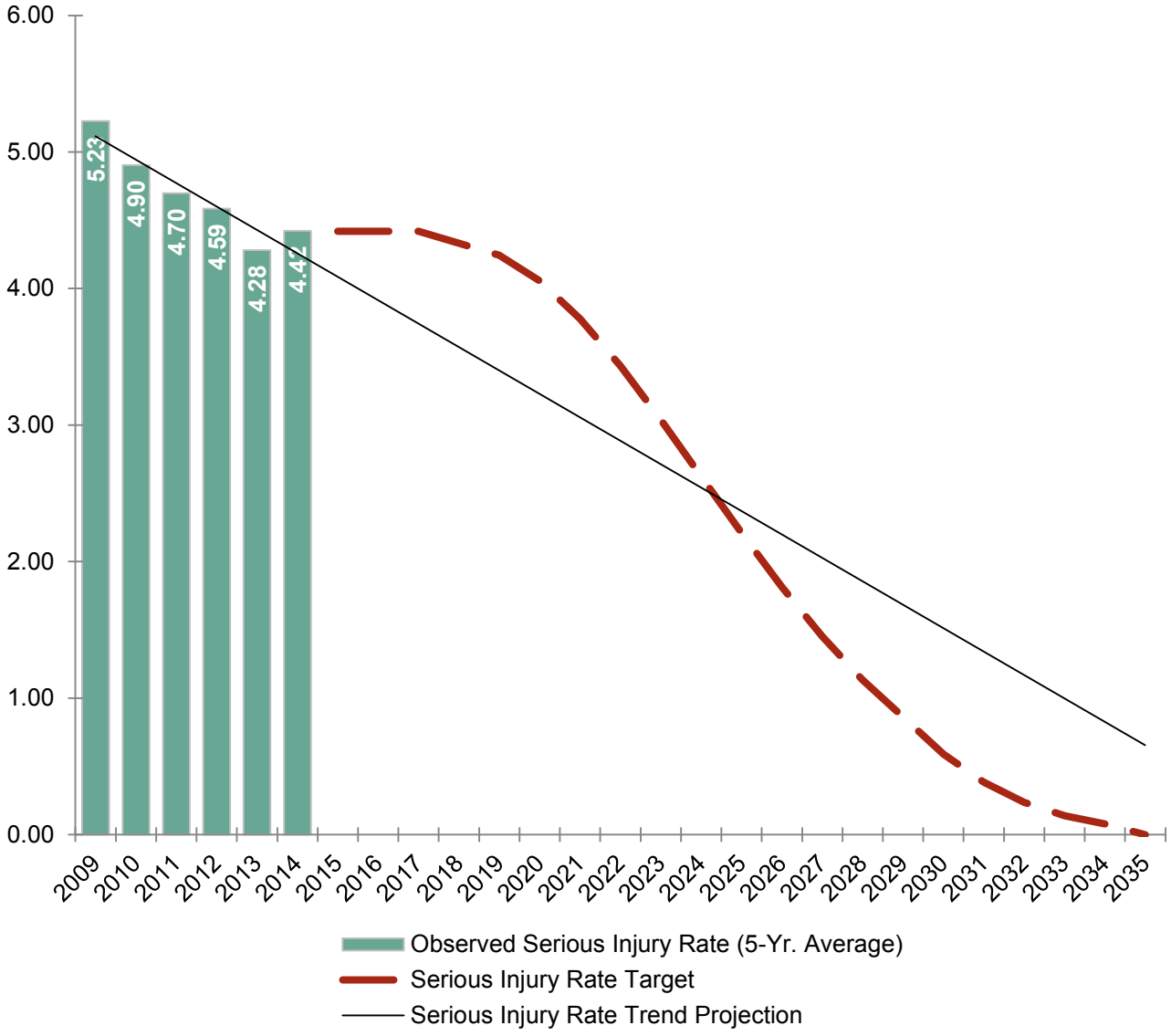
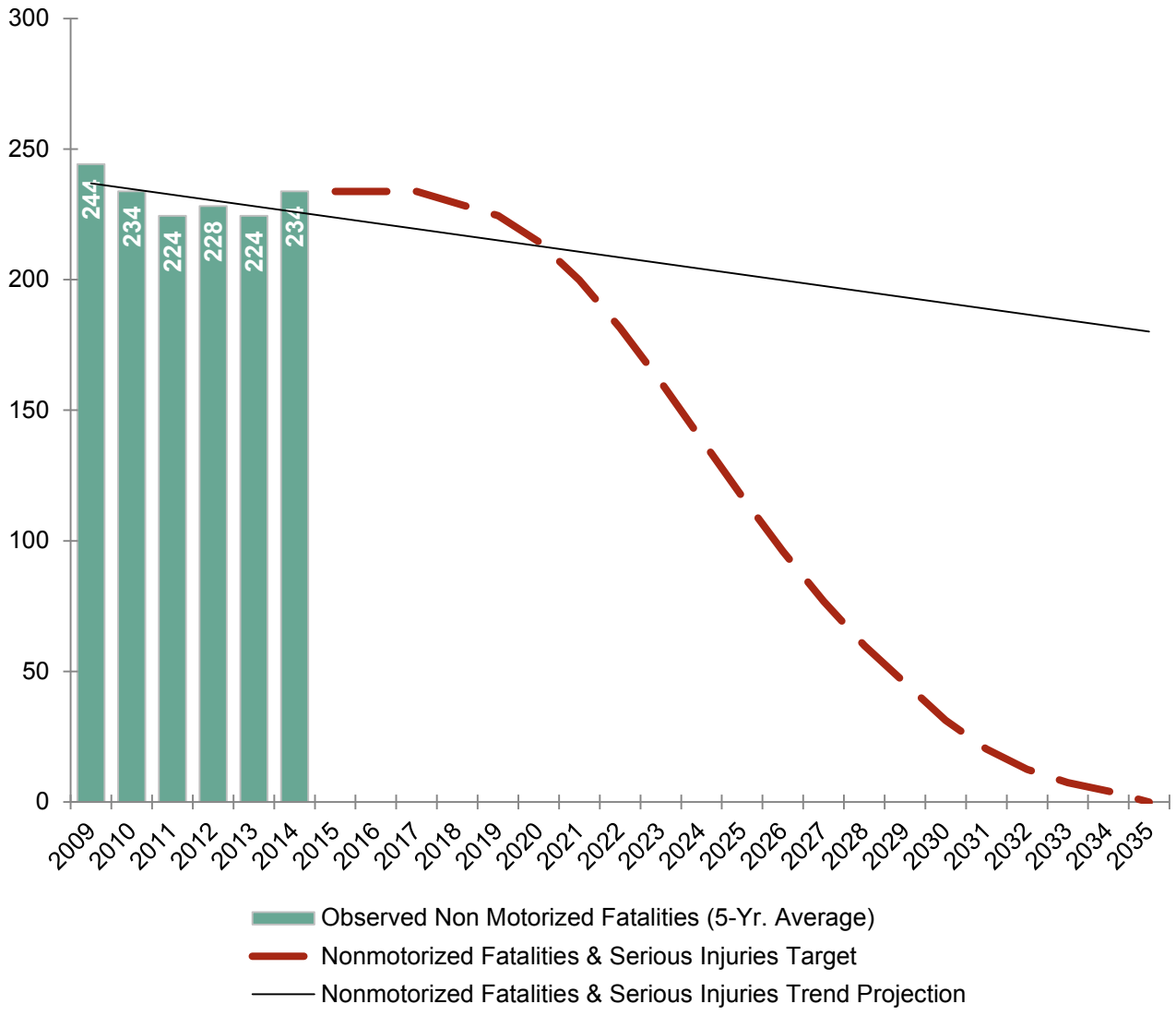


**Figure 7.6 Nonmotorized Fatalities and Serious Injuries Target**




## Conclusion

The TSAP performance measures and targets will provide ODOT divisions and partner and stakeholder agencies with data-driven information on the successes and challenges associated with the policies, strategies, emphasis areas, and actions identified to eliminate fatalities and serious injuries. This data can be used to make adjustments to the TSAP over time. The following chapter, Implementation and Evaluation, describes how measures and targets will be established and monitored to continually improve transportation safety in Oregon.

# 8. Implementation and Evaluation

One of the TSAP goals is to create a document that is applicable to and usable by all ODOT divisions and partner and stakeholder agencies. To achieve this, the policies and strategies in the Vision, Goals, Policies, and Strategies chapter, broadly relate safety to long-term transportation issues, and can be integrated into the development of any transportation plan. The emphasis areas and actions in the Emphasis Areas chapter present short-term safety needs and solutions that can be utilized by any safety or transportation professional. The result is a TSAP that relates to the personal and/or professional responsibilities for all Oregonians making it easier to implement. Ongoing coordination and collaboration will enhance implementation efforts, and also set the stage to evaluate progress on policies, programs, and projects. This chapter discusses TSAP implementation and evaluation opportunities.

## *How the TSAP fits into Practice*

The TSAP is the framework for engaging residents, stakeholders, employers, planners, engineers, enforcement agencies, and emergency medical service providers across the State in improving transportation safety in Oregon. Over time, and with focus, the vision of zero fatalities and life-changing injuries on Oregon roadways by 2035 can be achieved.

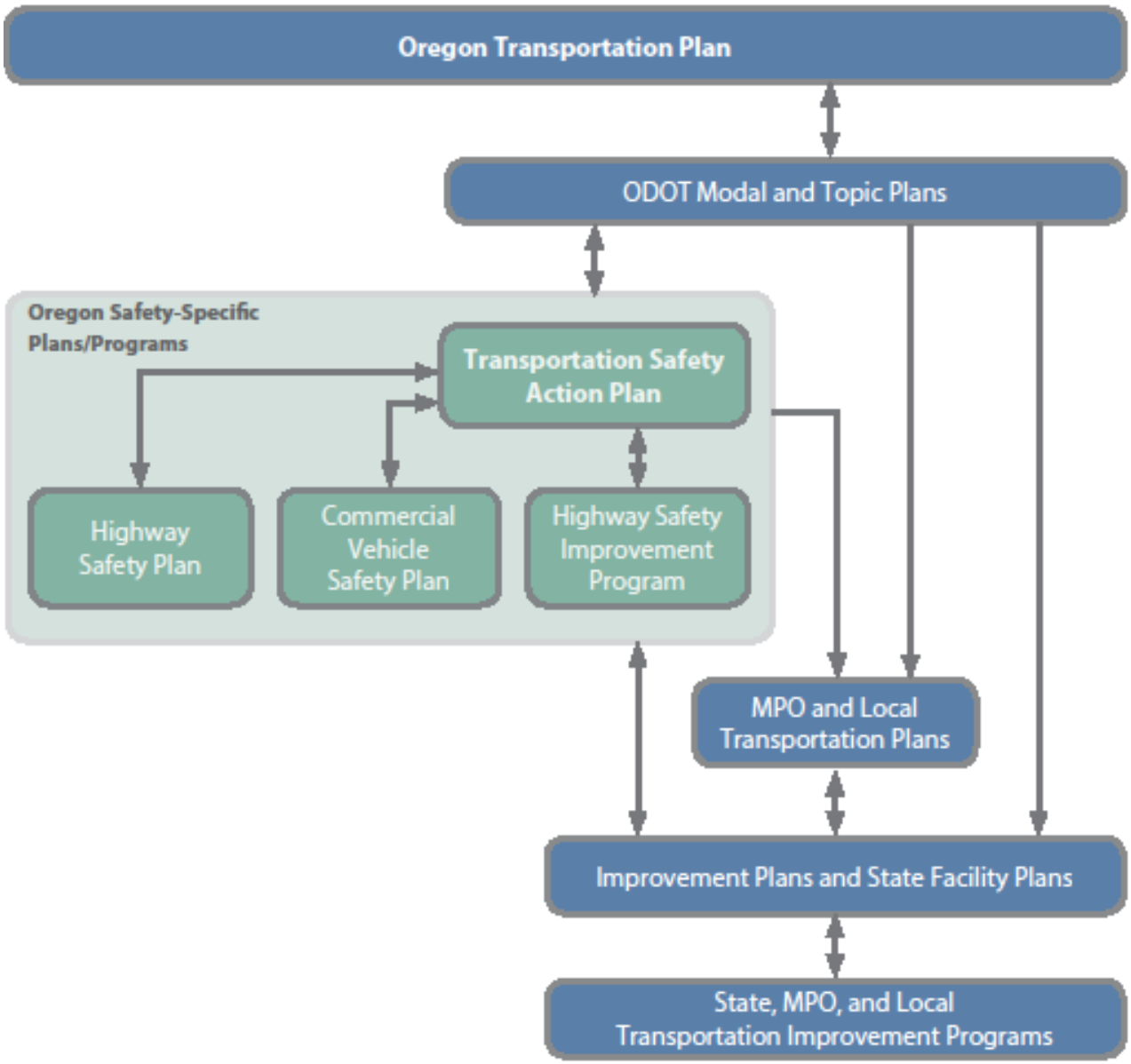
The TSAP serves as the foundation for the integration of behavioral and engineering safety practices into all aspects of planning, programming and policy activities in the State. While safety-specific plans and programs are critical to achieving the vision for safety in Oregon, it also is important that traditional transportation planning, design, operations and maintenance, and programs and policies proactively integrate safety into their decision-making processes. The TSAP provides long-term overarching safety vision, goals, policies, and strategies that can be implemented at the state, regional, Tribal, county, and city government level (Figure 8.1).

Using the goals, policies, and strategies in the TSAP, planners, and engineers can track and plan for safety on the transportation system by:

- **Reviewing past, current, and predicted safety trends –** How many fatal and serious injuries are occurring? Where might these crashes occur in the future?
- **Developing safety goals, objectives, measures, and targets –** What are we trying to achieve and are we making progress towards zero fatal and serious injury crashes?
- **Identifying transportation programs and projects to achieve results –** What activities are needed to achieve the vision and goals?
- **Monitoring and evaluating system performance –** What is the performance of the system over time?

This approach to safety fits within the context of the traditional transportation planning process, which agencies already use to analyze trends, set goals and objectives, identify programs and projects, and evaluate progress towards transportation priorities. The TSAP provides a framework for state, MPO, Tribal, county and city planners, engineers, and stakeholders to create a safer culture and system for Oregonians.

## Figure 8.1 Plan Linkages




The TSAP also provides near-term actions for reducing fatalities and life-changing injuries. These can be used to inform project, program and policy concepts, evaluation and decision-making at the state, regional, Tribal, county, and city level. The strategies and actions in the TSAP will directly influence planning and programming activities for the Oregon Traffic Safety Performance Plan and the ODOT Highway Safety Improvement Program.

Example long-term and near-term coordination, implementation or outreach roles or activities for agencies and stakeholders in Oregon are summarized in Table 8.1. This table is not exhaustive, but meant to highlight several of the key agency's activities and roles.

## Table 8.1 Example Activities and Roles

| Agency | Example Activities and Roles |
|---|---|
| ODOT | • Lead state in vision, culture, direction, and best practices inside and outside of the agency to advance safety planning, programming and policies.<br>• Lead and integrate the vision of no fatalities or life-changing injuries in all DOT activities from system and project planning through construction, operations, and maintenance.<br>• Develop and implement policies, processes, and procedures to integrate quantitative safety planning and engineering through all business units.<br>• Serve as a collaborator and communicator with agencies and stakeholders throughout Oregon to improve safety on all roads.<br>• Lead public education to change safety culture for all users of the transportation system.<br>• Monitor performance of plan<br>• Conduct and facilitate outreach to support implementation of plan |
| Oregon Health Authority | • Continue collaboration with ODOT to integrate health and transportation.<br>• Add transportation safety education to public health education programs.<br>• Continue collaboration with ODOT to integrate crash data and transportation-related prehospitalization, trauma, and hospitalization data to improve Oregon crash data and analysis. |
| Metropolitan Planning Organizations | • Elevate multimodal transportation safety planning in long-range planning processes.<br>• Collaborate with partner state and local agencies and stakeholders to identify and prioritize solutions for near-term safety issues (spot-specific and systemic treatments).<br>• Advance safety culture education and programs.<br>• Integrate transportation safety programs into ongoing activities.<br>• Collaborate with enforcement agencies and emergency service providers to improve services for residents.<br>• Develop regional safety action plan to support long-range plans in the region. |
| Tribal, County, and City Agencies | • Evaluate local spot-specific and systemic safety needs; develop plans and programs to address needs.<br>• Collaborate with the state, MPO and stakeholder partners to educate the public about Tribal, county and city transportation safety-related behavioral issues.<br>• Integrate safety programming, planning, and policy into local planning.<br>• Develop coalition with enforcement and EMS providers to target and improve specific community needs.<br>• Use the TSAP as a resource for local goals, policies strategies, and actions. |
| Private Entities and Nonprofit Organizations | • Refer to TSAP to identify education and marketing topics for employees and stakeholders.<br>• Collaborate with regional, Tribal, county and city partners to elevate safety issues and integrate safety into local planning and policy documents.<br>• Collaborate with enforcement and EMS to identify targeted education and marketing campaigns. |
| Enforcement Agencies | • Collaborate with Tribal, county, city, MPO, and state partners to advance safety culture within organizations and with the public.<br>• Collaborate with Tribal, county, city, MPO, and state partners to develop targeted enforcement or education campaigns to address critical behaviors identified in the TSAP.<br>• Educate the public and Tribal, county, city, state, and MPO partners about critical and emerging issues which could be addressed through the planning and programming processes.<br>• Identify and deploy best practices related to impaired and distracted driving education and enforcement.<br>• Identify and deploy best practices related to crash data collection, compilation, and transfer. |
| Emergency Medical Services | • Apply concepts from the TSAP to advocate for best practices in funding, training, and deployment of EMS services. |

## Monitoring Progress

ODOT continually monitors progress on the performance of transportation programs and measures with annual reporting on both the TSAP and the Highway Safety Improvement Program. The Oregon Traffic Safety Performance Plan identifies performance goals annually and evaluation of progress is reported in the Performance Plan Annual Evaluation, consistent with National Traffic Highway Safety Administration requirements. The Highway Safety Improvement Plan: Annual Evaluation Report is prepared to satisfy Federal reporting and provide documentation for the 2016 federal grant year for Federal Highway Administration funding programs.

## Oregon Traffic Safety Performance Plan

TSD's core monitoring activity is the yearly effort wherein each program manager uses the most up to date data to set their performance goals for the upcoming year. The purpose of the performance plan is to show the impact funds, staff time, and programs will have on the safety of the traveling public.

Performance measures incorporate elements of the Oregon Benchmarks, Oregon Transportation Safety Action Plan, the Safety Management System, and nationally recognized measures. Both long-range (by the year 2020) and short-range (current year) measures are utilized and updated annually.

Oregon uses a minimum of 3-, 5-, or 8-year history average, then a change rate of 3 percent, plus or minus, to establish performance measures. This level of change has proven to be effective in prior Highway Safety Plans. This level of change is generally representative of one standard deviation, meaning that the actions taken had an influence on the result outside of just pure chance. The Oregon highway safety community has also embraced this formula and supports the use of 3 percent.

## Performance Plan Annual Report

The annual report explains what funds were spent and how TSD fared on annual performance measures. It reports on the accomplishments and challenges experienced during the fiscal year, considering all of the funds controlled by the Transportation Safety Division. This is TSD's most comprehensive and established procedure for monitoring progress. In addition, program managers do some independent investigations throughout the year when questions come up, when new data is available, or as issues arise.

## HSIP Annual Evaluation Report

ODOT is required to submit an annual HSIP report to the FHWA Division Administrator by August 31st of each year, pursuant to 23 CFR 924.15. This report describes the progress being made to implement safety projects, assesses the effectiveness of these projects, and describes the extent to which the improvements have contributed to reducing fatalities and serious injuries. Traffic-Roadway Section is responsible for generating this report and submitting it to the FHWA.

The annual evaluation reports on the progress of the Highway Safety Improvement Program. For the purposes of this report, HSIP projects are classified into these general categories: Intersection Improvements, Signing and Delineation, Roadway / Structure Improvements, Roadside Improvements, Safety Appurtenances (guard rail, medians, etc.), and traffic calming projects.

ODOT is responsible to report on project effectiveness by looking at the cost of projects, before and after crash data, and other information, using benefit-cost analysis or other approved methodology to show whether the project achieved its purpose.

### *Crash Data Reporting*

ODOT's Crash Analysis and Reporting program publishes annual reports on crash data that are instrumental in program planning and assessing performance for both TSD and the Highway Division. These include Traffic Crash Summary Reports (all roads), State Highway Crash Rate Tables (state highways), and Motor Carrier Crash Rate Tables.

## Conclusion

At least four fundamental elements support all SHSP implementation practices: leadership, collaboration, communication, and data collection and analysis.[42] The same also is true for successful evaluation. Implementing and evaluating the TSAP will require a great deal of leadership from ODOT and communication with and amongst regional, county, and local planners and engineers, stakeholder agencies, and advocates as well as employers and private citizens. The partnerships developed in creating this plan provide an understanding of the roles everyone can play to address safety and build trust in and ownership of the TSAP. The result will be a coordinated, multidisciplinary approach, to implementing and evaluating transportation safety improvements that reduce injuries and save lives.

[42] Federal Highway Administration. Strategic Highway Safety Plan Implementation Process Model. June 2010.

# Appendix A. Who Developed This Plan

## A.1 Oregon Transportation Safety Committee

**VICTOR HOFFER,** Chair

**LOUIS A. ORNELAS,** Vice Chair

**JEROME S. COOPER,** Member

**MIKE LAVERTY,** Member

**MARIAN OWENS,** Member

## A.2 Policy Advisory Committee

**MICHAEL LAVERTY,** Oregon Transportation Safety Committee

**VICTOR HOFFER,** Oregon Transportation Safety Committee

**LUIS ORNELAS,** Oregon Transportation Safety Committee

**MARIAN OWENS,** Oregon Transportation Safety Committee

**JEROME S COOPER,** Oregon Transportation Safety Committee

**EMILY ACKLAND,** Association of Oregon Counties

**PAMELA BARLOW LIND,** Cascades West ACT and Confederated Tribes of Siletz Indians

**KIMBERLY DAILEY,** Oregon Judicial Department

**TYLER DEKE,** Bend Metropolitan Planning Organization

**CHUCK HAYES,** Governor's Advisory Committee on DUI

**CHRIS HENRY,** City of Eugene/Governor's Advisory Committee on Motorcycle Safety

**CRAIG HONEYMAN,** League of Oregon Cities

**DAVE JOSTAD,** May Trucking Company

**SCOTT KOTCHER,** Oregon Walks

**BRIAN RAY,** Kittelson & Associates

**JEFF LEWIS,** Oregon State Police

**MICHAEL TYNAN,** Oregon Health Authority

**TROY COSTALES,** ODOT Transportation Safety Division

## A.3 Project Coordination Team

**MICHAEL P. BARRY,** Region 5, Local Agency Program

**DOUGLAS W. BISH,** Technical Services, Traffic Engineering

**CAROL A CARTWRIGHT,** Region 2, Roadway Manager

**LISA CORNUTT,** Principal Planner, STIP Coordinator

**JOHN CYRUS,** Rail Transit Compliance Specialist 3

**DENNIS A. HACKNEY,** Region 5, Assistant District 13 Manager

**LYNDA HORST,** Rail Transit Specialist

**JOEL R. MCCARROLL, REGION 4,** Traffic Manager

**CHRISTINA MCDANIEL-WILSON,** Senior Transportation Analyst, TPAU

**ROSEANN O'LAUGHLIN,** Senior Transportation Planner, Freight Section

**LARRY OLSON, REGION 1,** District 2C Manager

**AMY J. RAMSDELL,** Salem Motor Carrier Services Manager

**HOWARD H. RUSSELL,** Safety Compliance Field Unit Manager

**ROSEALEE A. SENGER,** Region 3, Traffic Safety Coordinator

**SHELLEY M. SNOW,** Strategic Communication Coordinator

**LANA R. TRIBBEY,** Driver and Motor Vehicle Services, Customer Services Group Manager

## A.4 Project Management Team

### *ODOT Members*

**TROY COSTALES,** Transportation Safety Division Administrator

**ERIK HAVIG,** Planning Section Manager

**NANCY E. MURPHY,** Agency Project Manager, Principal Planner 4

**WALT MCALLISTER,** Safe Communities and Public Information Program Manager

**MICHAEL ROCK,** Interim Planning Programs Unit Manager

### *Consultant Team*

**BETH WEMPLE,** Cambridge Systematics, Inc.

**BRIAN CHANDLER,** Leidos

**JEANNE LAWSON,** JLA Public Involvement

**JOSEPH FISH,** Cambridge Systematics, Inc.

**NICOLE WALDHEIM,** Cambridge Systematics, Inc.

# Appendix B. TSAP Update Process and Federal Requirements

The TSAP is required to provide a detailed description of the SHSP update process to meet Federal requirements outlined in MAP-21. Table B.1 highlights the required elements of the update process and summarizes how they were achieved. The text following describes the update process in greater detail.

## Table B.1 Meeting Federal Requirements for the TSAP Update

| MAP-21 Requirement | Description of Requirement | Summary of ODOT Activities |
|---|---|---|
| Consultative Process | The State has conferred with a required list of stakeholders early in the SHSP update process, considered their input prior to decision-making, and routinely informed them about actions taken regarding SHSP development. | • Formation of three committees with diverse stakeholder representation to provide input into TSAP.<br>• About 25 interviews and 10 regional meetings with ODOT staff, stakeholder agencies, and the public to understand the strengths, opportunities, weaknesses, and threats from previous TSAP.<br>• Five listening sessions in each ODOT regions to obtain public and stakeholder input on the emphasis areas, strategies, and actions. |
| Coordination | The SHSP is aligned with other transportation plans in the State. | • All relevant transportation and safety plans were reviewed and applicable strategies included in the TSAP.<br>• Agencies, responsible for developing other transportation and safety plans in Oregon, were active participants in the TSAP update. |
| Data-Driven Analysis | The State has used the best available safety data to identify emphasis areas that address safety concerns on all public roads. | • Using crash data from 2009-2013, an analysis was completed for all public roads in Oregon. Based on these results, eight emphasis areas were selected.<br>• An additional seven emphasis areas were selected based on PAC suggestions, effectiveness data, institutional capacity, emphasis area overlap, consistency with existing plans, and public input. |
| Performance-Based Planning | The SHSP includes goals and measureable objectives to enable the State to track and monitor the status of SHSP implementation efforts and monitor progress. | • The TSAP sets five-year goals and measurable objectives for the five MAP-21 required performance measures. |
| Strategy Selection | Effective emphasis area strategies were selected and the 4 Es of safety were addressed as key factors in strategy selection. | • Strategies and actions include behavioral and infrastructure solutions are were developed based on input from the PAC, the PMT, listening sessions, and effective countermeasures. |
| Schedule to Evaluate and Update SHSP | State's plans and schedule to evaluate and update the SHSP. | • Performance measures and targets have been identified to evaluate progress on an annual basis towards the TSAP vision.<br>• The TSAP will be updated within a five-year time period from the adoption of this Plan. |
| Special Rules | States must include a definition for "high-risk rural roads" if fatality rates have increased.<br>States must include strategies to address pedestrians and older drivers if there have been increases in fatality and serious injury rates. | • The high-risk rural road special rule does not apply in Oregon.<br>• The special rule for older drivers and pedestrians does apply in Oregon. The TSAP includes strategies to address this issue area. |

## B.1 Consultative Process

Considerable outreach was conducted with the required stakeholders (23 U.S.C. 148(a)(11)(A)) and others through committee meetings, interviews, surveys, and listening sessions.

### *Committees*

**Policy Advisory Committee (PAC).** This diverse group of stakeholders informed and guided development of Oregon's safety priorities and ensured policy decisions resulted in workable strategies. More specifically, they were responsible for:

- Discussing and deliberating Oregon's priorities for transportation safety;
- Reviewing and responding to work products;
- Working toward consensus on policy issues and plan products; and
- Making an adoption recommendation to the Oregon Transportation Commission.

The PAC met monthly over the course of the TSAP Update and included representatives from: Oregon Transportation Safety Committee, Confederated Tribes of Siletz, ODOT Safety Division, ODOT Planning Division, Bend Metropolitan Planning Organization, City of Eugene, Governor's Advisory Committee on Motorcycles, Oregon State Police, Oregon Walks, Oregon Health Authority, Oregon Judicial Department, Association of Oregon Counties, Governor's Advisory Committee on DUII, League of Oregon Cities, and May Trucking.

**Project Coordination Team (PCT).** Provided technical input to major milestones, including vision, goals, emphasis areas, strategies, and actions. The PCT met four times over the course of the project and included staff from all modal divisions of ODOT.

**Project Management Team (PMT).** Provided overall direction for the project and managed all TSAP activities and administration. The PMT was a collaborative effort between ODOT's Transportation Planning and Safety Sections, who met biweekly to discuss current project tasks. This teaming arrangement enhanced coordination between the different transportation modal plans and safety plans.

### *Interviews and Surveys*

To understand how the previous TSAP impacted transportation and safety plans, programs, projects, and institutional awareness throughout the State, 22 interviews were conducted with representatives from several ODOT Divisions. Offices interviewed included Maintenance, Driver and Motor Vehicle Services, Project Delivery, Motor Carrier, Transportation Development, Crash Data, and Bike and Pedestrian programs.

In addition, 10 regional meetings were held with community members and transportation and safety stakeholders from late October 2014 through December 2014. Events were held across the State in Lincoln City, John Day, Redmond, Klamath Falls, Phoenix, Coos Bay, Hood River, Eugene, Portland, and Astoria; and in total, more than 90 individuals participated. About 450 comments were received from participants, providing insights into the strengths and weaknesses of current safety planning efforts and opportunities and potential threats moving forward.

To dig deeper into some of the institutional, planning, and programmatic elements of safety, three individuals, representing perspectives from Oregon DOT (Planning Division), an MPO (Lane Council of Governments), and a local jurisdiction (Clackamas County) also were interviewed.

### *Listening Sessions and Survey*

Listening meetings were held in the five ODOT regions. Participants included ODOT staff; stakeholder agencies; community groups; MPO, local, and Tribal representatives; and members of the public. The purpose of the meetings was to review and provide input on the preliminary emphasis areas, including suggestions for strategies and actions. For those who could not attend, an on-line survey was created.

## B.2 Coordination

The TSAP serves as the unifying framework for transportation safety planning in Oregon. As part of the TSAP update process, a review of existing plans was conducted, with a specific emphasis on safety. The purpose of this review was to identify policies and strategies that should be considered in the TSAP to ensure consistency across plans. This alignment of plans reinforces the transportation safety message while maximizing resources available to implement solutions. The text box shows all of the plans reviewed.

***Oregon Plans Reviewed***

*Oregon Transportation Plan, Oregon Freight Plan, Oregon Rail Plan, Oregon Highway Plan, Oregon Transportation Options Plan, Oregon Public Transportation Plan, and the Oregon Bicycle and Pedestrian Plan*

*Additionally, strategies from the Oregon Traffic Safety Performance Plan, Oregon Commercial Vehicle Safety Plan, Roadway Departure Implementation Plan, Intersection Safety Implementation Plan, and Bicycle and Pedestrian Safety Implementation Plan.*

As a Topic Plan that is part of the Oregon Transportation Plan, The TSAP Implements the OTP safety goals and informs safety goals of new and updated plans. Going forward, the TSAP will be an important resource for transportation safety direction as state, regional, Tribal, county, and city plans are updated or new plans are developed. These plans should be consistent with the TSAP with respect to safety.

Lastly, the TSAP was developed in coordination with the stakeholders responsible for reviewing and updating other transportation and safety plans in the State. For example, the ODOT Safety Division, responsible for the Highway Safety Plan, participated on the PAC committee. This collaboration ensured that safety plans and safety elements in transportation plans had a higher degree of coordination.

## B.3 Data-Driven Analysis

For the TSAP update, recent and historic Oregon crash data was analyzed to document trends related to crash types, crash severity, crash demographics, and contributing factors. The information was used by ODOT and other safety stakeholders to:

- Inform the existing conditions section of the TSAP;
- Support the data-driven approach to the TSAP required by MAP-21 legislation; and
- Support identification and selection of the most appropriate emphasis areas for the TSAP.

The time period covered in the data analysis was from 2009-2013 and included crashes on all public roads in Oregon, regardless of roadway ownership or maintenance.

A key part of the analysis was an assessment of crash categories to identify those contributing to Oregon's fatal and serious injury crashes. More than 20 crash categories were identified for further analysis, but the following categories stood out as the most common:

1. Roadway Departure;
2. Intersections;
3. Speed-related;
4. Alcohol Involved;
5. Motorcycle Involved;
6. Young Drivers (15-20) Involved;
7. Unrestrained Occupants;
8. Pedestrian(s) Involved; and
9. Older Drivers (65+) Involved.

Of these nine, roadway departures, intersections, speed-related, impaired driving, motorcycles, unrestrained occupants, pedestrians, and older drivers were identified as emphasis areas for the TSAP.

Young drivers was not selected as an emphasis area because these crashes are less severe, fatalities and serious injuries are trending downwards, and young drivers can be addressed in combination with other emphasis areas, including roadway departures and speeding.

Bicyclists/Pedalcyclists and Distracted Divers were identified as emphasis areas by ODOT and other safety stakeholders. Although the frequency of bicyclist-related crashes is lower, it was concluded that bicycle users are increasingly vulnerable as mode shift occurs across the State; bicycle ridership continues to increase; and bicycle crashes are severe when they do occur. Distracted driving also was identified as an issue of concern but because of reporting constraints it is not yet possible to quantify the scale of the problem. One of the first actions recommended in this subarea is to define and assess the scale of distracted driving in Oregon.

Five overarching emphasis areas, including Improved Data, Training, Enforcement, Emergency Medical Services, and Commercial Vehicles also were identified and will benefit all safety activities.

In addition to the crash data analysis, emphasis areas also were selected based other quantitative and qualitative indicators, including:

- **Effectiveness Data.** Are there proven countermeasures available for use in Oregon? If not, is there an ability and commitment to evaluate effectiveness of programs and projects?

- **Institutional Capacity.** Are there agencies or individuals who are able to commit ongoing staff resources to address this safety problem?
- **Emphasis Area Overlap.** Does the potential emphasis area significantly overlap with other potential emphasis areas and, if so, can they both be addressed simultaneously?
- **Consistency with Existing Plans and Policies.** Is the potential EA consistent with other state plans and policies and does it address a significant policy goal? If not, does the potential EA push the State in an appropriate policy direction?
- **Public Input.** Are there issues the public perceives as critical to driving down fatalities and serious injuries? Can these issues be addressed within the framework of the TSAP?

## B.4 Performance-Based Planning

The TSAP includes goals and measureable objectives to enable Oregon to track and monitor the status of SHSP implementation efforts and monitor progress for:

- Number of roadway fatalities;
- Number of roadway serious injuries;
- Roadway fatalities per vehicle miles traveled (i.e., fatality rate);
- Roadway serious injuries per vehicle miles traveled (i.e., serious injury rate); and
- Combined nonmotorized fatalities and nonmotorized serious injuries.

Each of the five safety performance measures have an annual target, which are based on a five-year rolling average, and are applicable to all roads regardless of ownership or functional classification. The number of fatalities, rate of fatalities, and number of serious injuries have identical annual targets in the TSAP and Highway Safety Plan and the reporting of these results will occur in the HSIP annual report for FHWA and the OTSPP and Annual Report for NHTSA.

Along with these five primary measures, a performance analysis was completed for high-risk rural roads and older pedestrians and drivers to meet the Special Rules requirements.

## B.5 Strategy Selection

The TSAP identifies strategies for each of the overarching safety goals and actions within each emphasis area to achieve those strategies to reduce or eliminate safety hazards. The strategies and actions were developed based on input from the PAC, the results of the five listening sessions, expertise of PMT members, strategies identified in other Oregon transportation and safety planning documents, and resources on effective countermeasures. The range of emphasis area actions correlates with the magnitude of the problem – for example, roadway departure fatalities and serious injuries occur most frequently, so a number of targeted actions are necessary to fully address the problem. Over time, strategies and actions will be assessed based on achievements in meeting performance measures and targets.

The diversity of stakeholders on the PAC and participants at the listening sessions has contributed to a list of strategies and actions that are representative of engineering, enforcement, emergency response, and engineering solutions. The speed emphasis area provides an example of actions that span across multiple disciplines, describing activities from education of road users on speeding hazards to facility design considerations and operating speeds.

## B.6 Schedule to Evaluate and Update SHSP

To evaluate whether the policies, strategies, emphasis areas, and actions are contributing to fatality and serious injury reductions, the TSAP establishes performance measures that align with FHWA requirements under the MAP-21 rule and NHTSA. On an annual basis, ODOT will:

- Analyze crash data to evaluate progress toward the five overarching safety targets;
- Coordinate with the ODOT Safety Division to evaluate progress on the FHWA required overlapping safety targets and NHTSA required performance measures and targets;
- Review fatalities on high-risk rural roads and fatalities and serious injuries per capita among older drivers and pedestrians assess if action is needed to comply with MAP-21; and
- Publish the annual crash report to monitor and evaluate safety performance.

On an ongoing basis, transportation and safety partners will be encouraged to:

- Integrate the TSAP strategies and actions into other transportation and safety planning documents and evaluate the results; and
- Review progress on the actions established for each emphasis area.

In compliance with MAP-21, Oregon shall complete a TSAP update no later than five years from the previous approved version.

## B.7 Special Rules

Special rules under MAP-21 related to fatality rates on high-risk rural roads and fatality and serious injury rates for pedestrians and older drivers. Based on a review of the analysis, the following was determined:

- **High-Risk Rural Roads (HRRR) Special Rule.** A review of the fatal crash rate on Oregon's rural roads indicates that the HRRR Special Rule currently does not apply to Oregon. The five-year average fatality rate on rural roads has decreased each year since 2007.
- **Older Drivers and Pedestrians Special Rule.** A review of the per capita older drivers and pedestrians fatal and serious injury rate indicates that this rule does apply to the update process. The five-year average number of older driver and pedestrian fatalities and serious injuries per 1,000 residents 65 years of age or older increased from 0.34 in 2012 to 0.35 in 2013 and 0.36 in 2014. Strategies to address the increase in fatalities and serious injuries among the older population are included in the TSAP.

# Appendix C. Findings of Compliance with Oregon Transportation Safety, Land Use and Transportation Planning Requirements

Forthcoming from ODOT

# Appendix D. Crash Type and Severity Ranking Supporting Data

## Table D.1 Potential Emphasis Areas Ranked by Fatal and Serious Injury Crash Frequency

*2009 to 2013*

| Rank | Potential Emphasis Area | Fatal and Serious Injury Crashes |
|---|---|---|
| 1 | Roadway Departure Crashes | 4,103 |
| 2 | Aggressive Driving Involved | 2,767 |
| 3 | Intersection Crashes | 2,633 |
| 4 | Young Drivers – 15-25 Involved | 2,366 |
| 5 | Speed-Related Crashes | 2,067 |
| 6 | Alcohol and/or Other Drugs Involved | 1,695 |
| 7 | Older Drivers – 65+ Involved | 1,548 |
| 8 | Alcohol Involved (No Drugs) | 1,445 |
| 9 | Motorcycle Involvement | 1,170 |
| 10 | Unrestrained Occupants | 1,029 |
| 11 | Pedestrian(s) Involved | 770 |
| 12 | Unlicensed Drivers Involved | 603 |
| 13 | Inattentive Drivers Involved | 350 |
| 14 | Pedalcycle(s) Involved | 334 |
| 15 | Commercial Motor Vehicle Involved | 322 |

## Table D.2 Potential Emphasis Areas Ranked by Fatal and Serious Injury (FSI) Crashes per 100 Total Crashes

*2009 to 2013*

| Rank | Potential Emphasis Area | Fatal and Serious Injury Crashes | Total Crashes | Fatal and Serious Injury Crashes per 100 Total Crashes |
|---|---|---|---|---|
| 1 | Motorcycle Involvement | 1,170 | 4,831 | 24.2 |
| 2 | Unrestrained Occupants | 1,029 | 5,205 | 19.8 |
| 3 | Pedestrian(s) Involved | 770 | 4,077 | 18.9 |
| 4 | Alcohol and/or Other Drugs Involved | 1,695 | 11,990 | 14.1 |
| 5 | Alcohol Involved (No Drugs) | 1,445 | 10,798 | 13.4 |
| 6 | Unlicensed Drivers Involved | 603 | 8,102 | 7.4 |
| 7 | Roadway Departure Crashes | 4,103 | 56,488 | 7.3 |
| 8 | Pedalcycle(s) Involved | 334 | 4,694 | 7.1 |
| 9 | Speed-Related Crashes | 2,067 | 35,627 | 5.8 |
| 10 | Commercial Motor Vehicle Involved | 322 | 6,829 | 4.7 |
| 11 | Older Drivers – 65+ Involved | 1,548 | 41,139 | 3.8 |
| 12 | Inattentive Drivers Involved | 350 | 11,668 | 3.0 |
| 13 | Young Drivers – 15-25 Involved | 2,366 | 84,024 | 2.8 |
| 14 | Aggressive Driving Involved | 2,767 | 107,301 | 2.6 |
| 15 | Intersection Crashes | 2,633 | 109,460 | 2.4 |

# Appendix E. TSAP Performance Measure Optional Trend Forecasts

Several optional trend forecasts were considered for each of the five performance measures:

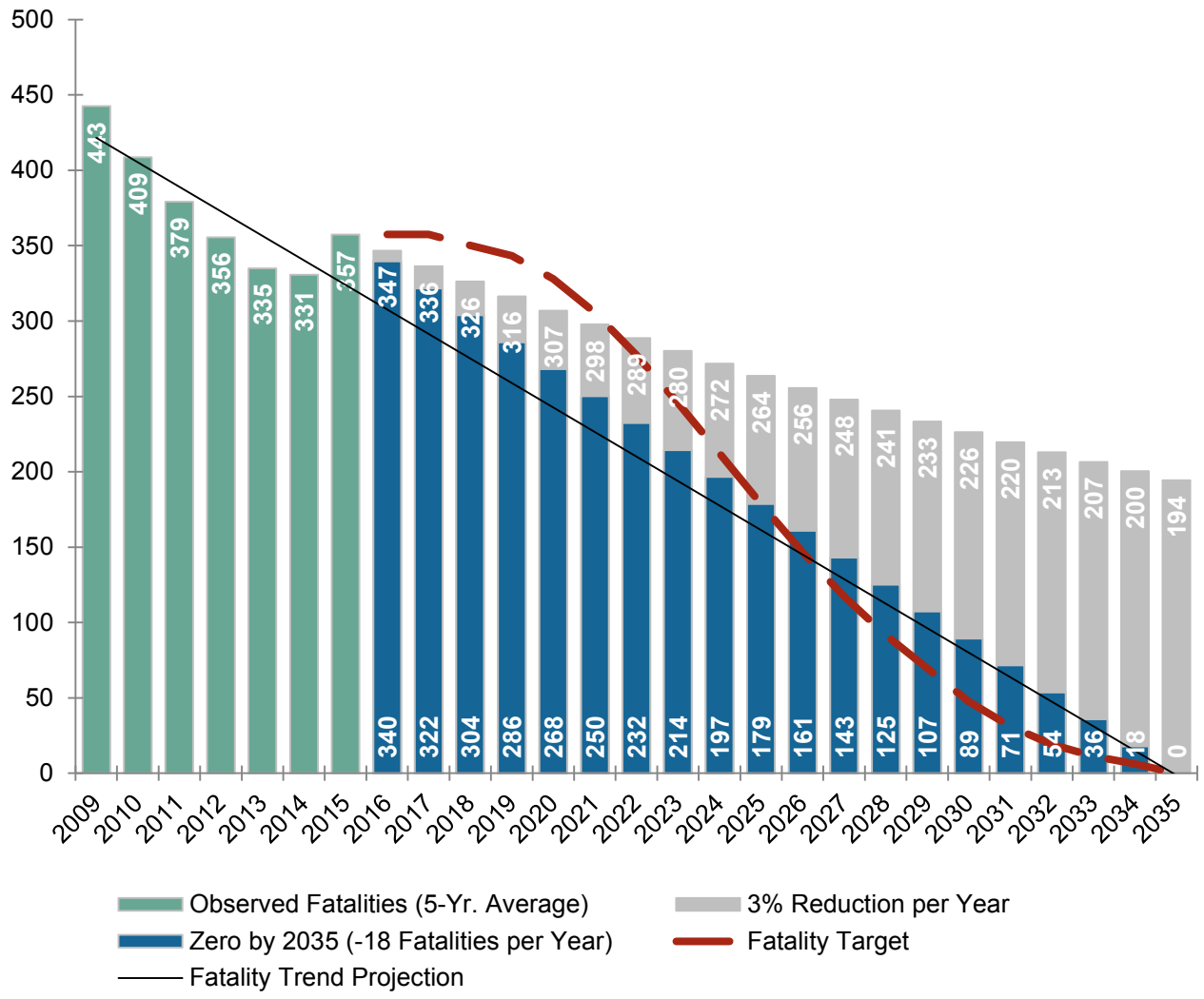
- Number of roadway fatalities;
- Number of roadway serious injuries;
- Roadway fatalities per vehicle miles traveled (i.e., fatality rate);
- Roadway serious injuries per vehicle miles traveled (i.e., serious injury rate); and
- Combined nonmotorized fatalities and nonmotorized serious injuries.

The forecasts are shown in Figures E.1 to E.5. The trend forecasting options were:

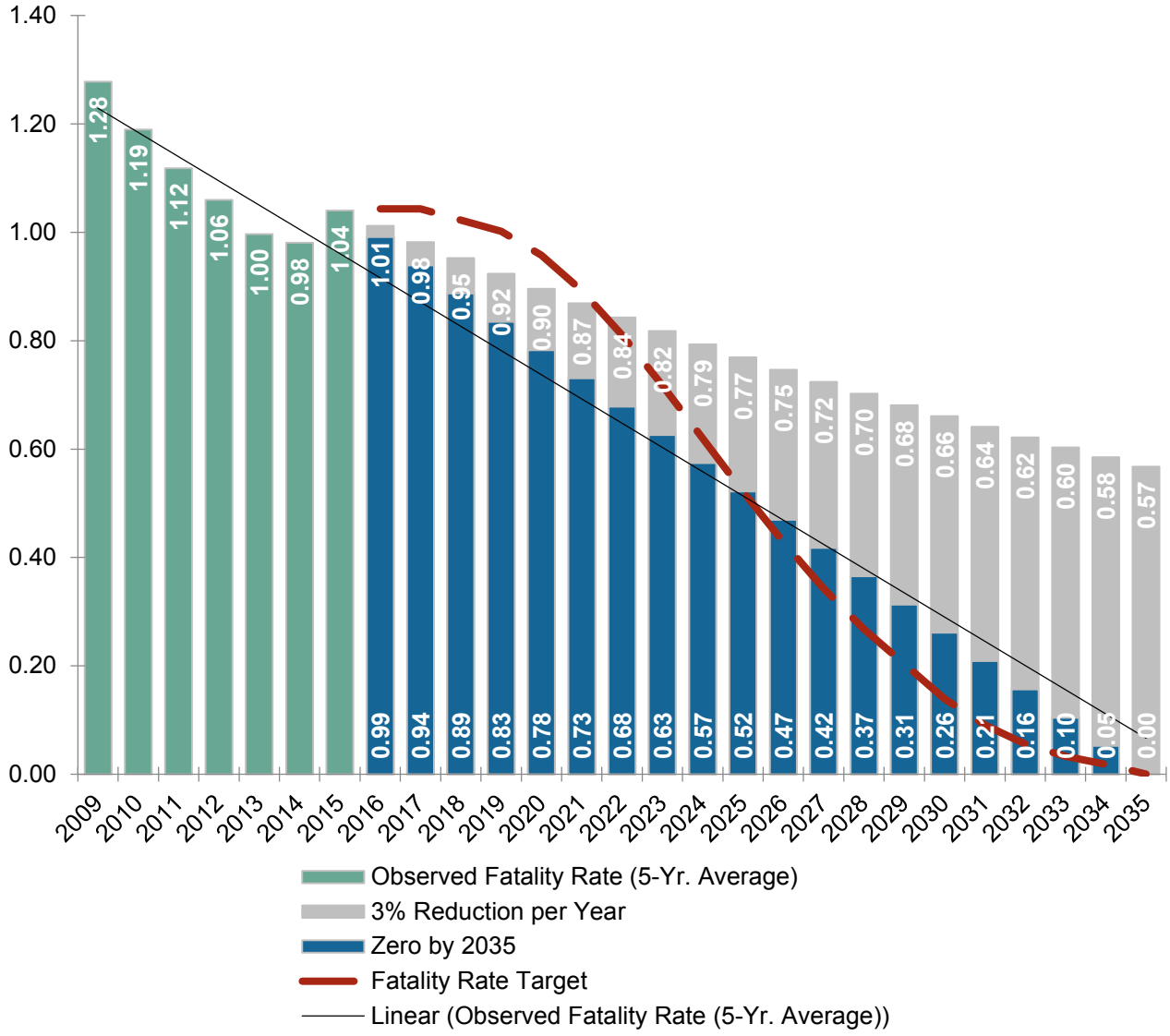
- **Straight line to zero by 2035.** In this forecast a straight line reduction in fatalities was assumed between the most recent five year average and an average of zero fatalities in the five year period between 2031 and 2035. This is shown in blue bars in the figure.
- **3-percent reduction per year.** Historically, the Highway Safety Office has set a target of a 3-percent reduction in fatalities per year in its annual Transportation Safety Performance Plan. In the figure, the 3-percent reduction per year is forecast for the 20-year duration of the plan. This trend is forecast in the grey bars in the figure.
- **Trend-line.** The black line is a straight-line trend forecast from historic crash trends for the 20 year duration of the plan. It is based on the data shown in the green bars (2009 to 2015 for fatalities and 2009 to 2014 for the other performance measures).
- **S-Curve.** The S-Curve forecast (shown in Orange) was developed assuming the five-year average number of crashes may be relatively flat in the near future; start to decline in a few years in recognition of different programs of the plan being implemented and potential benefits of connected and/or automated vehicles; and flatten out again in the in the future as it becomes more difficult to address the remaining fatalities.

The PAC found strengths and weaknesses in each of these trend forecasts. For example, the trend-line forecast and the straight-line to zero forecast show that, with focus and effort, zero can be achieved. However, recognizing the recent increase in fatalities, the PAC believes it is possible in the near future the five-year average number of fatalities may remain flat until programs and projects in this TSAP are well underway. The PAC also agreed in future years of the plan, the reductions will be more difficult to achieve because of smaller numbers; therefore, the rate of reduction would flatten out. Finally, the 3-percent per year forecast has put Oregon on a path to success; however, in order to reach zero fatalities, the PAC agreed it was necessary for more aggressive targets.

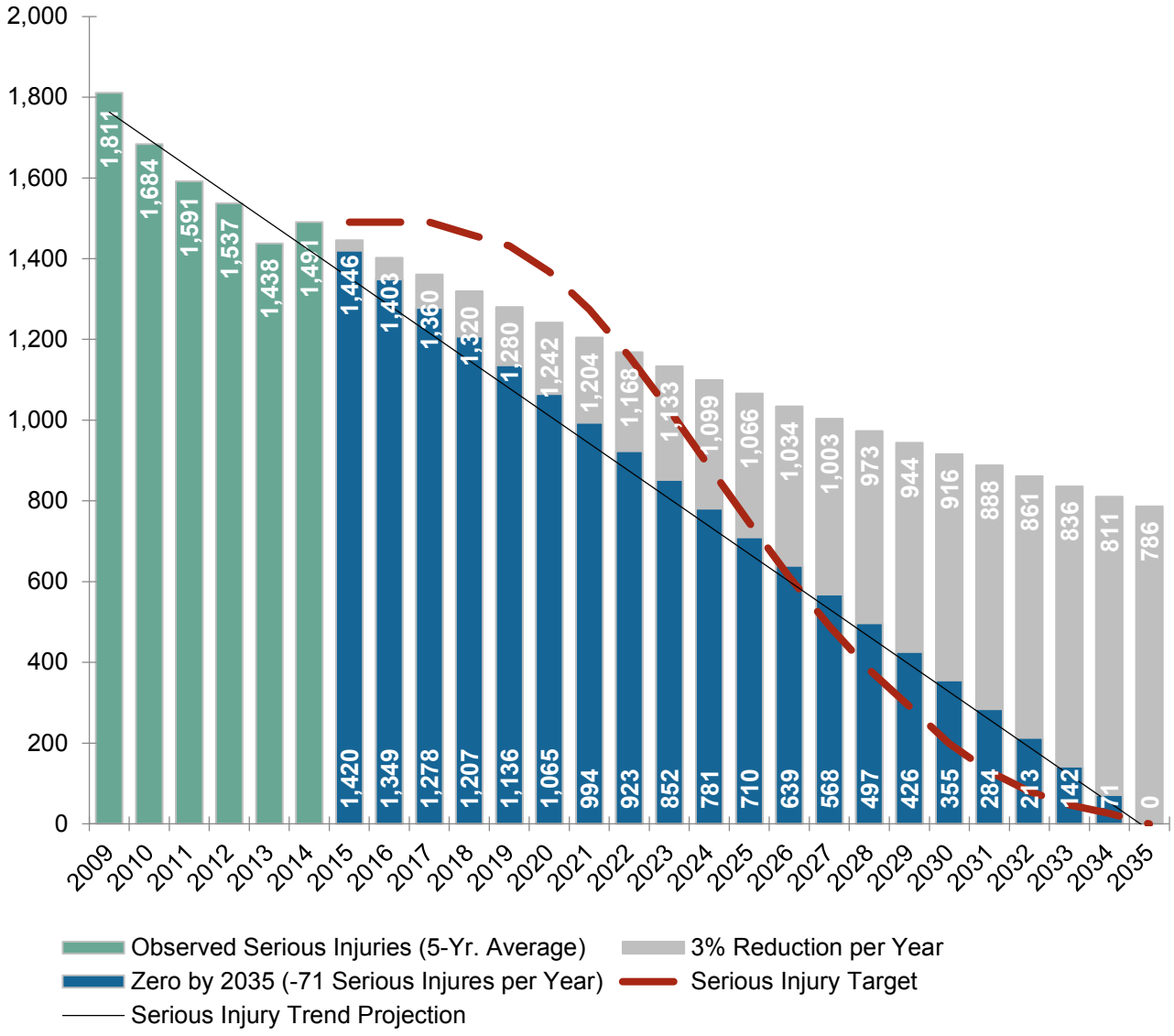
## Figure E.1 Fatality Target



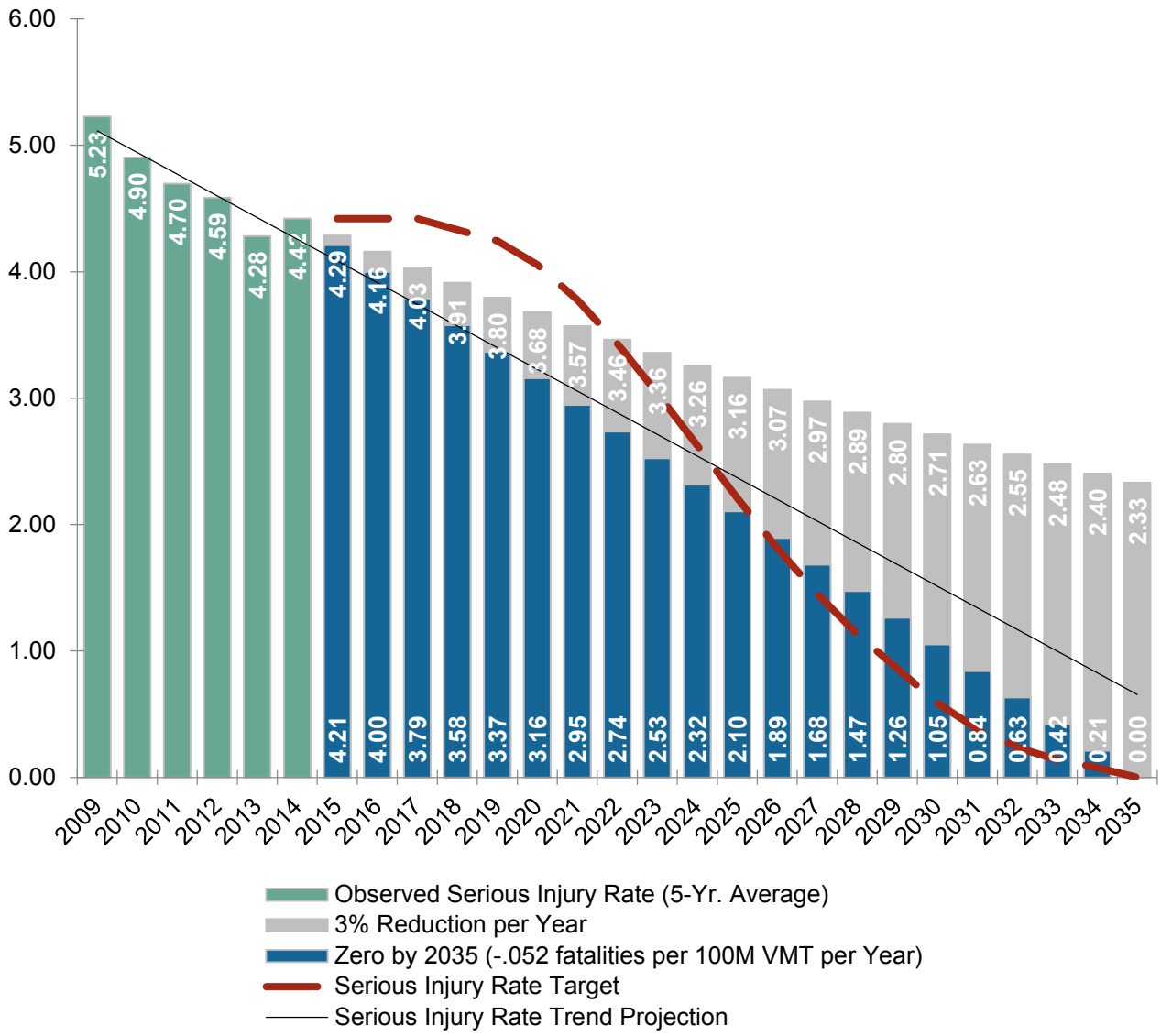
## Figure E.2 Fatality Rate Target



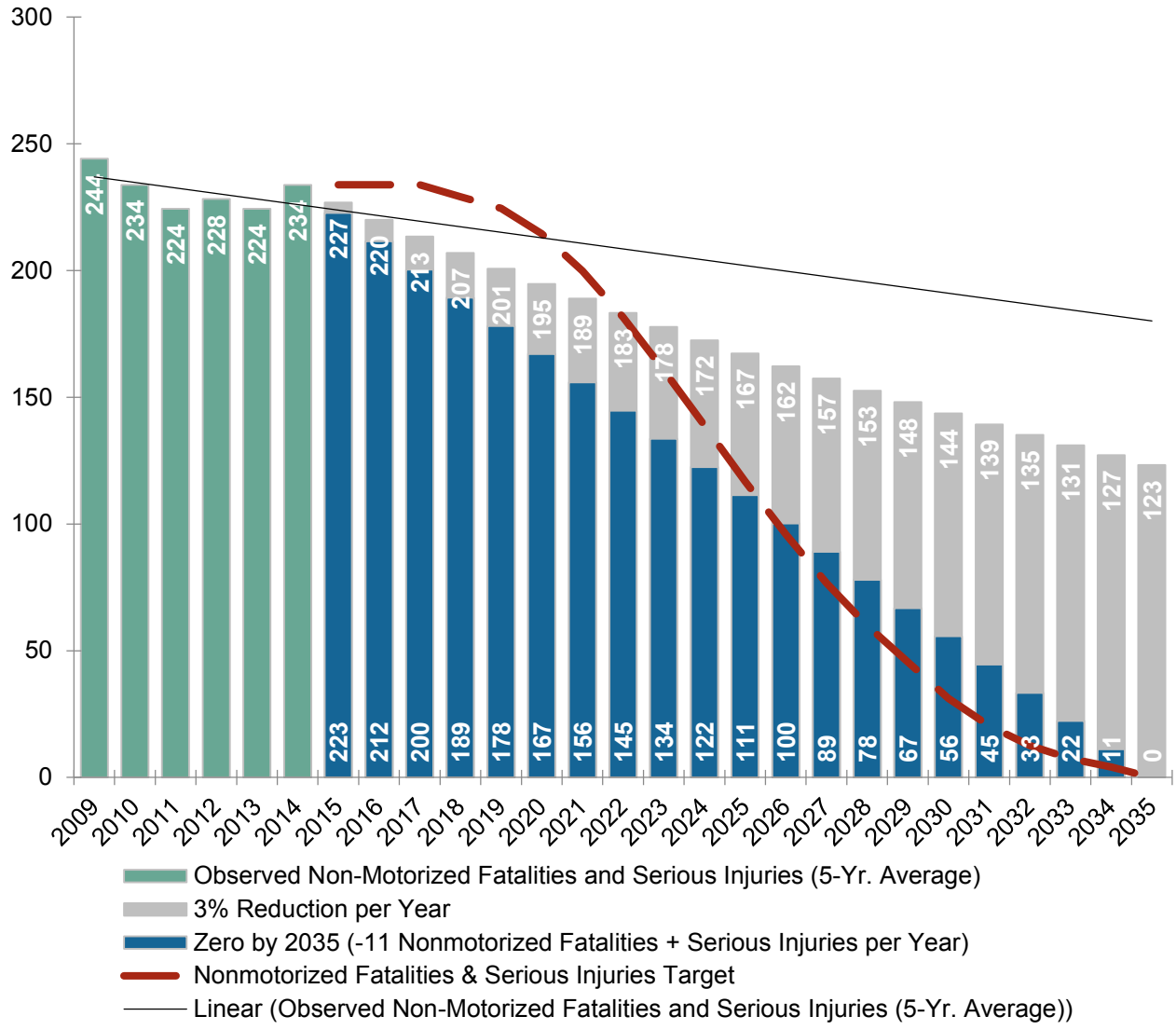
## Figure E.3 Serious Injury Target



## Figure E.4 Serious Injury Rate Target



## Figure E.5 Combined Non-Motorized Fatalities and Serious Injury Target



# Appendix F. Glossary

**23USC:** Title 23 of the U.S. Code regarding transportation funding

**3Es:** Engineering, Education, Enforcement

**4Es:** Education, Engineering, Enforcement and Emergency Medical Services

**5-Point Child Restraint (CR) Harness:** A child restraint harness with five attachment points, two at the shoulder, two at the hips, one between the legs.

**AASHTO:** American Association of State Highway and Transportation Officials

**ABS**: Anti-Lock Brake System

**ACT:** Area Commission on Transportation

**Aggressive Driving:** An individual commits a combination of moving traffic offenses so as to endanger other persons or property (FHWA). For purposes of this plan those offenses are driving too fast for conditions, following too closely, and/or driving in excess of posted speed.

**Aggressive Driving-Related Crash:** One of more of driving too fast for conditions, following too closely, and/or driving in excess of posted speed was an attribute of the crash. As used in this plan, note that duplicate crashes are not counted more than once.

**Arterial:** A functional classification for surface streets. AASHTO defines arterials from the motor vehicle perspective as providing a high degree of mobility for the longer trip lengths and high volumes of traffic, ideally providing a high operating speed and level of service and avoiding penetrating identifiable neighborhoods.

**Attributes:** As used in this plan means characteristics of a crash that may be useful for analysis. Note that some road user attributes are not mutually exclusive. For example, some motorcycle riders are also young drivers. In some cases they may contribute to a crash occurring or its severity, but that is not required for them to be considered attributes.

**AV:** Autonomous vehicle

**BAC:** Blood Alcohol Content

**Booster Seats:** Are intended to be used as a transition to lap and shoulder belts by older children who have outgrown convertible seats (over 40 pounds). They are available in high backs, for use in vehicles with low seat backs or no head restraints, and no-back; booster bases only.

**BPSST:** Board on Public Safety Standards and Training

**Car Seat:** Common term for a specially designed device that secures a child in a motor vehicle, meets federal safety standards, and increases child safety in a crash.

**CAV:** Connected Autonomous Vehicle

**Child Safety Seat/Child Restraint:** A crash tested device that is specially designed to provide infant/child crash protection. A general term for all sorts of devices including those that are vests or car beds rather than seats.

**CFAA:** Criminal Fine and Assessment Account

**Countermeasure:** An activity or initiative to prevent, neutralize, or correct a specific problem.

**County/Local Traffic Safety Group:** An advisory or decision body recognized by one or more local governments and tasked with addressing traffic safety within the geographic area including one or more cities.

**Collector**: A functional classification for surface streets. AASHTO defines collectors as providing both land access and traffic circulation within neighborhoods and commercial and industrial areas. The role of the collector system, from the motor vehicle perspective, is to distribute traffic to and from the arterial system.

**CTSP:** Community Traffic Safety Program

**CRF:** Crash Reduction Factor

**CVIS:** Commercial Vehicle Information System

**DHR:** Oregon Department of Human Resources

**DHS:** Oregon Department of Human Services

**Distracted Driving:** Engagement in any activity that could divert a person's attention away from the primary task of driving: the practice of driving a motor vehicle while engaged in another activity. Typical distractions include eating, dealing with passengers or pets, changing settings on vehicle devices, and, increasingly, using a cellular phone or other electronic device.

**DMV:** Driver and Motor Vehicle Services, Oregon Department of Transportation

**DPSST:** Department of Public Safety Standards and Training

**DOE:** Oregon Department of Education

**DRE:** Drug Recognition Expert

**DUI:** Driving Under the Influence

**DUII:** Driving Under the Influence of Intoxicants, sometimes DUI is used

**Emphasis Areas (EA):** Topics identified to provide a strategic framework for developing and implementing a Strategic Highway Safety Plan. Emphasis areas are near-term focus areas to be implemented through agreed upon Actions, as articulated in this plan in Chapter 6.

**EMS:** Emergency Medical Services

**Expressway:** In Oregon, a route designated to prioritize through traffic with a long term management focus on managing direct access to the roadway to minimize conflicts.

**F & I:** Fatal and injury crashes

**FARS:** Fatal Analysis Reporting System, U.S. Department of Transportation

**FAST Act:** The **Fixing America's Surface Transportation (FAST) Act** is a funding and authorization bill to govern United States federal surface transportation spending, signed by President Obama on December 4, 2015. It is subsequent to MAP-21, but does not replace all of the applicable requirements of that earlier law, so both must be referenced.

**Fatality Rate:** The number of traffic fatalities per number of vehicle miles traveled in a given year. The rate is usually expressed in terms of fatalities per one hundred million miles traveled. Sometimes also expressed as a rate of fatalities per population or licensed drivers

**FHWA:** Federal Highway Administration

**FMCSA:** Federal Motor Carrier Safety Administration

**FRA:** Federal Rail Administration

**Freeway:** Directional travel lanes usually separated by a physical barrier, and access and egress points are limited to on- and off-ramp locations or a very limited number of at-grade intersections.

**GAC-DUII:** Governor's Advisory Committee on DUII

**GAC:** Motorcycle Governor's Advisory Committee on Motorcycle Safety

**GDL:** Graduated Driver Licensing

**GHSA:** Governors Highway Safety Association

**GLS:** Graduated Licensing System

**GR:** Governor's Representative

**Hazard index formula:** Any safety or crash prediction formula used for determining the relative likelihood of hazardous conditions at railway-highway grade crossings, taking into consideration weighted factors, and severity of crashes. (23 CFR § 924.3)

**HEP:** Hazard Elimination Program (earlier federal program, replaced by HSIP)

**High Crash Location:** Highway or road segments that are susceptible to an inordinate number of crashes. Identification of high crash locations is part of the problem identification process.

**High Risk Rural Road:** The term "high risk rural road" means any roadway functionally classified as a rural major or minor collector or a rural local road with significant safety risks, as defined by a State in accordance with an updated State strategic highway safety plan. (23 USC section 148)

**High Visibility Enforcement (HVE):** Law enforcement efforts that are highly visible and well publicized through paid and earned media support. (NHTSA)

**Highway Safety Improvement Program:** The term "highway safety improvement program" means projects, activities, plans, and reports carried out under this section. (23 USC section 148)

**Highway Safety Improvement Project:** (23 USC section 148) In general, the term "highway safety improvement project" means strategies, activities, and projects on a public road that are consistent with a State strategic highway safety plan and correct or improve a hazardous road location or feature; or address a highway safety problem.

**HR3:** High Risk Rural Road

**HSEC:** ODOT Highway Safety Engineering Committee

**HSIP:** Federal Highway Safety Improvement Program

**HSIS:** Highway Safety Information System

**HSM:** Highway Safety Manual

**HSP:** Highway Safety Plan, the grant application submitted for federal section 402 and similar funds. Funds are provided by the National Highway Traffic Safety Administration and the Federal Highway Administration.

**IACP:** International Association of Chiefs of Police

**ICS:** Incident Command System

**IHSDM:** Interactive Highway Safety Design Model

**IID:** Ignition Interlock Device

**IIHS:** Insurance Institute for Highway Safety

**Impaired Driving:** Driving a vehicle while the driver's reflexes have suffered from alcohol or other drugs to a point that is generally considered unsafe to operate a vehicle. Impairment is usually viewed less severely than intoxication. (NHTSA)

"**Injury A**" and "**Incapacitating injury**" are used interchangeably. Incapacitating injuries typically are injuries that the victim is not able to walk away from. They are synonymous with the term "**Severe injury**"

"**Injury B**" and "**Moderate injury**" are used interchangeably.

"**Injury C**" and "**Minor injury**" are used interchangeably.

"**Injury K**" and "**Fatality"** are used interchangeably

**IRIS:** Integrated Road Information System

**ITS:** Intelligent Transportation Systems

**Lane Departure:** See "Roadway Departure"

**LCDC:** Land Conservation and Development Commission

**Local** is a functional classification for surface streets that includes all public surface streets not defined as arterial or collector. Local streets are typically low-speed streets with low traffic volumes in residential areas, but also include similar streets in commercial and industrial areas.

**LTSG:** Local Traffic Safety Group: An advisory or decision body recognized by a local government and tasked with addressing traffic safety. Limited to one geographic area, and may not include cities or other governmental areas within the boundaries.

**MADD:** Mothers against Drunk Driving

**MAP-21:** Moving Ahead for Progress in the 21st Century Act (P.L. 112-141), reauthorization of federal highway funding, signed into law by President Obama on July 6, 2012. Subsequent adoption of the FAST Act does not replace MAP-21 in all areas regulation of transportation safety planning and funding, so both must be referenced.

**MCTD:** Motor Carrier Transportation Division

**Minor Arterial:** Provides moderate-length trips and offers connectivity to the higher arterial system, providing intracommunity continuity.

**MIRE:** Model Inventory of Roadway Elements: The listing and standardized coding by the Federal Highway Administration of roadway and traffic data elements critical to safety management, analysis, and decisionmaking (23 USC section 148)

**Monitoring:** Management and oversight of the day-to-day operations of grant and sub-grant supported activities to assure compliance with applicable Federal and State requirements and that performance goals are being achieved.

**Motorcycle:** A motor vehicle with motive power having a seat or saddle for the use of the rider and designed to travel on not more than three wheels in contact with the ground.

**MPO:** Metropolitan Planning Organization. MPOs are designated by the governor to coordinate transportation planning in an urbanized area of the state. MPOs exist in the Portland, Salem, Eugene-Springfield, and Medford areas.

**MUTCD:** Manual on Uniform Traffic Control Devices

**NHTSA:** National Highway Traffic Safety Administration

**NTSB:** National Transportation Safety Board

**OACP:** Oregon Association Chiefs of Police

**OBM:** Oregon Benchmark

**Occupant Protection:** Any device(s) installed in a vehicle designed to prevent an occupant from crashing into the vehicle's interior or to reduce the severity of injuries for that occupant. Safety belts, child safety seats, air bags, padded interiors, and side door beams are all occupant protection devices.

**ODAA:** Oregon District Attorneys Association

**ODE:** Oregon Department of Education

**ODOT:** Oregon Department of Transportation

**ODOT Regions:** ODOT'S service territory is divided into five geographic Regions:

**Region 1:** Portland Metro (Clackamas, Hood River, Multnomah and Washington Counties)

**Region 2:** Willamette Valley, North, and Mid-Coast (Clatsop, Columbia, Tillamook, Yamhill, Polk, Marion, Lincoln, Linn, Benton, and Lane Counties)

**Region 3:** Southern Oregon and South Coast (Douglas, Curry, Coos, Josephine, and Jackson Counties)

**Region 4:** Central Oregon (Wasco, Sherman, Gilliam, Jefferson, Wheeler, Crook, Deschutes, Lake, and Klamath Counties)

**Region 5:** Eastern Oregon (Morrow, Umatilla, Union, Wallowa, Baker, Grant, Harney, and Malheur Counties)

**OHA:** Oregon Health Authority

**OJD:** Oregon Judicial Department

**OJIN:** Oregon Judicial Information Network

**OLCC:** Oregon Liquor Control Commission

**Older Drivers and Pedestrians**: Drivers and pedestrians 65 year of age and older.

**OMHAS:** Office of Mental Health and Addiction Services

**OSP:** Oregon State Police

**OSSA:** Oregon State Sheriffs' Association

**OTC:** Oregon Transportation Commission

**OTP:** Oregon Transportation Plan

**OTSAP:** Oregon Transportation Safety Action Plan

**OTSC:** Oregon Transportation Safety Committee

**PAC:** Policy Advisory Committee

**Per capita** is used to describe crash rate per population. Except where otherwise noted, crash rates are per million residents.

**Per VMT** is used to describe crash rate per motorized vehicle miles. Except where otherwise noted, crash rates are per 100 million motorized vehicle miles travelled.

**Performance Measure:** "A process of assessing progress toward achieving predetermined goals, including information on the efficiency with which resources are transformed into goods and services (outputs), the quality of those outputs (how well they are delivered to clients and the extent to which clients are satisfied) and outcomes (the results of a program activity compared to its intended purpose), and the effectiveness of government operations in terms of their specific contributions to program objectives." (FHWA)

**Performance Plan:** The document, accompanied by the HSP that States submit to NHTSA annually for approval. The performance plan contains: 1) a list of annual quantifiable and measurable highway safety performance targets that is data driven, consistent with the Uniform Guidelines for Highway Safety Program, and based on highway safety problems identified by the State during the planning process conducted; and 2) performance measures developed by DOT in collaboration with the Governor's Highway Safety Association and others, beginning with the MAP-21 directed "Traffic Safety Performance Measures for States and Federal Agencies" (DOT HS 811025), which are used as a minimum in developing the performance targets.

**PI&E:** Public Information and Education

**PMT:** Project Management Team

**Practical Design:** "A systematic approach to deliver the broadest benefit to the transportation system, within existing resources, by establishing appropriate project scopes to deliver specific results" as defined by ODOT Technical Services.

**Problem Identification:** A process of analyzing general data to isolate specific causes or locations of traffic crashes.

**Project to Maintain Minimum Levels of Retroreflectivity:** A project that is designed to maintain a highway sign or pavement marking retroreflectivity at or above the minimum levels prescribed in Federal or State regulations. (23 USC section 148)

**Public Grade Crossing:** A railway-highway grade crossing where the roadway (including associated sidewalks, pathways and shared use paths) is under the jurisdiction of and maintained by a public authority and open to public travel, including non-motorized users. All roadway approaches must be under the jurisdiction of a public roadway authority, and no roadway approach may be on private property. (23 CFR § 924.3)

**Public Road:** Any highway, road, or street under the jurisdiction of and maintained by a public authority and open to public travel, including non-State-owned public roads and roads on tribal land. (23 CFR § 924.3)

**PUC:** Oregon Public Utility Commission

**Road Safety Audit:** A formal safety performance examination of an existing or future road or intersection by an independent multidisciplinary audit team. (23 CFR § 924.3)

**Road users:** A motorist, passenger, public transportation operator or user, truck driver, bicyclist, motorcyclist, or pedestrian, including a person with disabilities. (23 USC section 148)

**Roadway Departure:** Leaving one's lane unintentionally, typically due to distraction or impairment, including leaving the roadway entirely, moving into an adjacent lane or across a center lane or median into oncoming traffic.

**Roadway Departure Crash:** Crash where roadway departure is an attribute. As used in this plan, note that the roadway or lane departure definition excludes intersections, pedestrian-related, and bicycle-related crashes.

**RTP:** Regional Transportation Plan for a Metropolitan Planning Organization

**Safe Communities Group:** A coalition of private and/or public sector entities who use a data driven approach to community safety issues.

**Safe Communities Model:** A long-standing approach to reducing injuries and deaths that works through engaging local partners who care about safety, using data to identify leading causes of injury, making a plan to address the issues using proven methods and measuring success.

**Safety data** includes, but is not limited to, crash, roadway, and traffic data on all public roads. For railway-highway grade crossings, safety data also includes the characteristics of highway and train traffic, licensing, and vehicle data. (23 CFR § 924.3)

**Safety stakeholder**: (23 CFR § 924.3) includes, but is not limited to,

1. A highway safety representative of the Governor of the State;
2. Regional transportation planning organizations and metropolitan planning organizations, if any;
3. Representatives of major modes of transportation;
4. State and local traffic enforcement officials;
5. A highway-rail grade crossing safety representative of the Governor of the State;
6. Representatives conducting a motor carrier safety program under Section 31102, 31106, or 31309 of Title 49;
7. Motor vehicle administration agencies;
8. County transportation officials;
9. State representatives of non-motorized users; and
10. Other Federal, State, tribal and local safety stakeholders.

**Serious Injury:** An incapacitating injury or any injury, other than a fatal injury, which prevents the injured person from walking, driving, or normally continuing the activities the person was capable of performing before the injury occurred.

**Severity:** A measurement of the degree of seriousness concerning both vehicle impact (damage) and bodily injuries sustained by vehicle occupant.

**SFST:** Standard Field Sobriety Testing

**SHSP:** Strategic Highway Safety Plan, A comprehensive, multi-disciplinary plan, based on safety data developed by a State Department of Transportation in accordance with 23 U.S.C. 148.

**Side Impact Air Bags:** Provide additional chest protection to adults in many side crashes. Children who are seated in close proximity to a side air bag may be at risk of serious or fatal injury if the air bag deploys. Check with the vehicle dealer or vehicle owner's manual for information about danger to children.

**SIP:** Safety Investment Program (used for ranking safety projects prior to 2012; no longer used)

**SMS:** Safety Management System or Highway Safety Management System

**SPIS:** Safety Priority Indexing System

**Speeding:** Driving too fast for conditions and/or driving in excess of posted speed

**Speed-Related Crashes:** Attributes of crash include driving too fast for conditions and/or driving in excess of posted speed (note that duplicate crashes are not counted more than once).

**Spot Safety Improvement:** An improvement or set of improvements that is implemented at a specific location on the basis of location-specific crash experience or other data-driven means.

**SSHSP:** State Strategic Highway Safety Plan; A comprehensive, multi-disciplinary plan, based on safety data developed by a State Department of Transportation in accordance with 23 U.S.C. 148.

**State Highway Safety Improvement Program:** The term “State highway safety improvement program” means a program of highway safety improvement projects, activities, plans and reports carried out as part of the Statewide transportation improvement program under section 135(g). (23 USC section 148)

**Strategic Highway Safety Plan (SHSP):** A comprehensive, multi-disciplinary plan, based on safety data developed by a State Department of Transportation in accordance with 23 U.S.C. 148.

**STIP:** Statewide Transportation Improvement Program

**Systemic Safety Improvement:** An improvement or set of improvements that is widely implemented based on high-risk roadway features that are correlated with particular severe crash types.

**TAC:** Technical Advisory Committee

**TRCC:** Traffic Records Coordinating Committee

**TRS:** ODOT Traffic-Roadway Section

**TSAP:** Oregon’s Transportation Safety Action Plan

**TSD:** Transportation Safety Division, Oregon Department of Transportation

**TSRP:** Traffic Safety Resource Prosecutor

**U.S. DOT:** United States Department of Transportation

**VMT:** Vehicle miles traveled; a measure used as a means of determining exposure in calculating fatality rates.

**Young Drivers:** As used in this plan, “Young Drivers” includes two age groups: age 15-20 and 21-25. Where appropriate, the groups were considered as one to simplify presentation. However, it is recognize there are different countermeasures to address the two different age groups.