
Highway Safety Improvement Program

*Data Driven Decisions*

# Utah
# Highway Safety Improvement Program
# 2014 Annual Report

Prepared by: UT

## Disclaimer

**Protection of Data from Discovery & Admission into Evidence**

23 U.S.C. 148(h)(4) states "Notwithstanding any other provision of law, reports, surveys, schedules, lists, or data compiled or collected for any purpose relating to this section [HSIP], shall not be subject to discovery or admitted into evidence in a Federal or State court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location identified or addressed in the reports, surveys, schedules, lists, or other data."

23 U.S.C. 409 states "Notwithstanding any other provision of law, reports, surveys, schedules, lists, or data compiled or collected for the purpose of identifying, evaluating, or planning the safety enhancement of potential accident sites, hazardous roadway conditions, or railway-highway crossings, pursuant to sections 130, 144, and 148 of this title or for the purpose of developing any highway safety construction improvement project which may be implemented utilizing Federal-aid highway funds shall not be subject to discovery or admitted into evidence in a Federal or State court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location mentioned or addressed in such reports, surveys, schedules, lists, or data."

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# Executive Summary

UDOT continues to have success lowering the numbers and rates of serious and fatal injuries. The statewide 5-year rolling averages show steady declines from 2009 through 2013. The decline of serious and fatal injuries holds true for nearly all crash types, roadway functional classifications, roadway ownership (State and non-State) categories, and SHSP focus areas. Because the declines have been so large, UDOT will have to continually find ways in the future to identify targeted construction projects and non-infrastructure programs to sustain the downward trend. To that end, UDOT continues to fund efforts to strengthen its ability to identify safety projects on all roads in the state as well as to find and correct systemic conditions that correlate with serious and fatal injuries.

# Introduction

The Highway Safety Improvement Program (HSIP) is a core Federal-aid program with the purpose of achieving a significant reduction in fatalities and serious injuries on all public roads. As per 23 U.S.C. 148(h) and 23 CFR 924.15, States are required to report annually on the progress being made to advance HSIP implementation and evaluation efforts. The format of this report is consistent with the HSIP MAP-21 Reporting Guidance dated February 13, 2013 and consists of four sections: program structure, progress in implementing HSIP projects, progress in achieving safety performance targets, and assessment of the effectiveness of the improvements.

# Program Structure

## Program Administration

**How are Highway Safety Improvement Program funds allocated in a State?**

☒ Central

☐ District

☐ Other

**Describe how local roads are addressed as part of Highway Safety Improvement Program**.

Local roads are eligible for HSIP funds if projects meet program requirements. However, UDOT lacks linear referencing systems and other information about local roads (non-State and non-Federal Aid) that would make it easier to compare relative safety needs on State roads and local roads, especially for systemic treatments. UDOT does perform crash analysis on non-State Federal Aid routes and accept applications from local agencies for HSIP funding consideration. Also, UDOT is planning to initiate pilot projects to apply the usRAP safety protocol to local roads in a few counties in 2015. This protocol is not dependent upon a linear referencing system or limited by UDOT's current roadway attribute databases.

**Identify which internal partners are involved with Highway Safety Improvement Program planning**.

☒Design

☒Planning

☒Maintenance

☒Operations

☐Governors Highway Safety Office

☐Other:

**Briefly describe coordination with internal partners**.

Infrastructure Project Selection Criteria

The process that UDOT uses to address the emphasis areas outlined in the Utah Strategic Highway Safety Plan is divided into the following five sections; Planning, Analysis, Prioritization, Programming, and Implementation.

*Planning*

UDOT uses two methods to plan HSIP projects. For the first method, each UDOT region sends an annual submittal to the Traffic & Safety Division that identifies their priority projects for HSIP funding consideration. The Traffic & Safety Division then screens the crash data, traffic data, and input from the region offices. A meeting is then held with each region office to identify potential spot safety locations based on the screened data and the region submittals. Although the annual submittal is the primary mechanism by which the regions request HSIP funding, the regions may request other projects mid-year and the same process is conducted to analyze, prioritize, program, and implement them.

For the second method, the Traffic & Safety Division employs a systemic approach to identify projects. This is done by looking at crash and roadway attribute data from a statewide perspective. UDOT has several efforts underway to identify projects systemically.

*Analysis*

A three-year crash history is compiled for each candidate location. Crash characteristics are analyzed and potential measures to mitigate those characteristics are identified. Benefit-to-cost ratios are

calculated for each location based on crash history, expected decrease in crashes for a potential mitigation measure, and cost of that mitigation measure. The Traffic & Safety Division conducts a formal meeting with each region to review potential HSIP project locations. Traffic and Safety Division staff, an FHWA representative, and various region staff attend these review meetings.

*Prioritization*

Prioritization is based on the following factors and is conducted by the Traffic & Safety Division:

- Greatest benefit to reduce fatal & serious injuries
- Benefit-to-cost ratio
- Timeline to completion
- Coordination with other projects

*Programming*

Each project is assigned a specific funding year within a three-year planning horizon and is set up in UDOT's project management system. Because the planning horizon covers a three-year period but is re-evaluated annually, project are frequently re-prioritized. This may result in modified or new projects with higher priorities taking the place of previously programmed projects. The Traffic & Safety Division conducts the programming process.

*Implementation*

After projects are programmed, project managers from the applicable UDOT region offices are assigned to each project. These project managers then shepherd the projects through UDOT's standard federal environmental, design, and construction processes.

**Identify which external partners are involved with Highway Safety Improvement Program planning**.

☒ Metropolitan Planning Organizations

☒ Governors Highway Safety Office

☐ Local Government Association

☒ Other: Other-SHSP Partners

**Identify any program administration practices used to implement the HSIP that have changed since the last reporting period**.

☐ Multi-disciplinary HSIP steering committee

☒ Other: Other-UDOT has adapted to the new processes associated with MAP-21

**Describe any other aspects of Highway Safety Improvement Program Administration on which you would like to elaborate**.

UDOT focuses its infrastructure improvements primarily on the Roadway Departure Crashes, Drowsy Driving, Distracted Driving, and Intersection Safety emphasis areas. The other emphasis areas (Public Outreach and Education, Use of Safety Restraints, Impaired Driving, Aggressive Driving, Teen Driving Safety, Motorcycle Safety, and Speed Management) are addressed primarily through non-infrastructure efforts such as education, media, and enforcement campaigns. UDOT partners with other state, local, and federal agencies to implement the non-infrastructure components of the SHSP. A "Zero Fatalities" goal (ut.zerofatalities.com) is also part of the SHSP.

## Program Methodology

**Select the programs that are administered under the HSIP.**

| | | |
|---|---|---|
| ☐ Median Barrier | ☐ Intersection | ☐ Safe Corridor |
| ☐ Horizontal Curve | ☐ Bicycle Safety | ☐ Rural State Highways |
| ☐ Skid Hazard | ☐ Crash Data | ☐ Red Light Running Prevention |
| ☐ Roadway Departure | ☒ Low-Cost Spot Improvements | ☐ Sign Replacement And Improvement |
| ☐ Local Safety | ☐ Pedestrian Safety | ☐ Right Angle Crash |
| ☐ Left Turn Crash | ☐ Shoulder Improvement | ☐ Segments |
| ☒ Other: Other-Reduce Serious & Fatal Injuries | | |

**Program:** **Low-Cost Spot Improvements**

**Date of Program Methodology:** **3/5/2014**

**What data types were used in the program methodology?**

| *Crashes* | *Exposure* | *Roadway* |
|---|---|---|
| ☒ All crashes | ☒ Traffic | ☒ Median width |
| ☐ Fatal crashes only | ☒ Volume | ☒ Horizontal curvature |
| ☒ Fatal and serious injury crashes only | ☐ Population | ☒ Functional classification |
| ☐ Other | ☒ Lane miles | ☒ Roadside features |
| | ☐ Other | ☐ Other |

**What project identification methodology was used for this program?**

☒ Crash frequency

☐ Expected crash frequency with EB adjustment

☐ Equivalent property damage only (EPDO Crash frequency)

☐ EPDO crash frequency with EB adjustment

☒ Relative severity index

☒ Crash rate

☒ Critical rate

☐ Level of service of safety (LOSS)

☐ Excess expected crash frequency using SPFs

☐ Excess expected crash frequency with the EB adjustment

☐ Excess expected crash frequency using method of moments

☐ Probability of specific crash types

☒ Excess proportions of specific crash types

☒ Other-Hierarchical Bayesian Model

**Are local roads (non-state owned and operated) included or addressed in this program?**

☒ Yes

☐ No

If yes, are local road projects identified using the same methodology as state roads?

☐ Yes

☒ No

If no, describe the methodology used to identify local road projects as part of this program.

We do not currently have tools to do network screening on local roads based on the physical characteristics of the roadway. However, since 2012 UDOT geospacially locates all crashes on every public road and performs hot spot analysis.

**How are highway safety improvement projects advanced for implementation?**

☒ Competitive application process

☐ Selection committee

☐ Other

**Select the processes used to prioritize projects for implementation. For the methods selected, indicate the relative importance of each process in project prioritization. Enter either the weights or numerical rankings. If weights are entered, the sum must equal 100. If ranks are entered, indicate ties by giving both processes the same rank and skip the next highest rank (as an example: 1, 2, 2, 4).**

☒ Relative Weight in Scoring

☐ Rank of Priority Consideration

| | |
|---|---|
| ☒ Ranking based on B/C | 20 |
| ☒ Available funding | 20 |
| ☐ Incremental B/C | |
| ☒ Ranking based on net benefit | 20 |
| ☐ Other | |
| ☒ Time to Completion | 20 |
| ☒ Coordination with other Projects | 20 |

**What proportion of highway safety improvement program funds address systemic improvements?**

50

**Highway safety improvment program funds are used to address which of the following systemic improvments?**

| | |
|---|---|
| ☒ Cable Median Barriers | ☒ Rumble Strips |
| ☐ Traffic Control Device Rehabilitation | ☐ Pavement/Shoulder Widening |
| ☒ Install/Improve Signing | ☐ Install/Improve Pavement Marking and/or Delineation |
| ☐ Upgrade Guard Rails | ☐ Clear Zone Improvements |
| ☐ Safety Edge | ☐ Install/Improve Lighting |
| ☒ Add/Upgrade/Modify/Remove Traffic Signal | ☒ Other Other-Structure Protection on Interstate Freeways |

**What process is used to identify potential countermeasures?**

☒ Engineering Study

☒ Road Safety Assessment

☐ Other:

**Identify any program methodology practices used to implement the HSIP that have changed since the last reporting period.**

☐ Highway Safety Manual

☐ Road Safety audits

☐ Systemic Approach

☒ Other: Other-Roadway data collection for usRAP protocol

**Describe any other aspects of the Highway Safety Improvement Program methodology on which you would like to elaborate.**

Non-Infrastructure Projects

UDOT uses some of its HSIP funding for non-infrastructure projects that aid roadway safety efforts. Such projects include:

*Educational Campaigns*

Zero Fatalities is a mutual effort between various state safety partners to address the top behaviors that lead to fatalities on Utah's roads. The program targets behaviors such as drowsy driving, distracted driving, aggressive driving, impaired driving, and lack of seatbelt usage.

*Integrating Safety Into Planning*

UDOT Traffic & Safety Division personnel work internally with other UDOT divisions to integrate safety planning into their core processes. UDOT also works with MPOs and other safety partners across the state to supply them with needed data and tools so they can better integrate safety into their internal planning processes. UDOT continues to partner with the MPOs in order to provide them with tools to incorporate safety into their transportation planning efforts. Integrating safety into UDOT and MPO planning processes helps all agencies proactively address safety.

*Improving Crash Data Analysis*

HSIP funding is also used to improve UDOT's crash database. The ability to accurately locate crashes and understand crash characteristics is vital to programming HSIP funds.

*University & Consultant Support*

The Traffic & Safety Division uses HSIP funding to contract with universities and consultants who assist with various HSIP functions. The functions include items such as program management, project management, crash data mapping, statistical analysis, safety modeling, report preparation, SPF/CMF development, training, and HSM analysis.

# Progress in Implementing Projects

## Funds Programmed

**Reporting period for Highway Safety Improvement Program funding.**

☐ Calendar Year

☐ State Fiscal Year

☒ Federal Fiscal Year

**Enter the programmed and obligated funding for each applicable funding category.**

| Funding Category | Programmed* | | Obligated | |
|---|---|---|---|---|
| HSIP (Section 148) | 28565375 | 68 % | 18871115 | 62 % |
| HRRRP (SAFETEA-LU) | 646644 | 2 % | 237641 | 1 % |
| HRRR Special Rule | | | | |
| Penalty Transfer - Section 154 | | | | |
| Penalty Transfer – Section 164 | 6799210 | 16 % | 7419080 | 24 % |
| Incentive Grants - Section 163 | | | | |
| Incentive Grants (Section 406) | | | | |
| Other Federal-aid Funds (i.e. STP, NHPP) | | | | |
| State and Local Funds | 5959759 | 14 % | 3926348 | 13 % |

| | | | | |
|---|---|---|---|---|
| **Totals** | 41970988 | 100% | 30454184 | 100% |

**How much funding is programmed to local (non-state owned and maintained) safety projects?**

$1,752,945.00

**How much funding is obligated to local safety projects?**

$979,389.00

**How much funding is programmed to non-infrastructure safety projects?**

$4,342,331.00

**How much funding is obligated to non-infrastructure safety projects?**

$4,342,331.00

**How much funding was transferred in to the HSIP from other core program areas during the reporting period?**

$7,419,080.00

**How much funding was transferred out of the HSIP to other core program areas during the reporting period?**

$0.00

**Discuss impediments to obligating Highway Safety Improvement Program funds and plans to overcome this in the future**.

Our biggest obstacle to obligating HSIP funds continues to be the addition of the Section 164 penalty transfer funds. During FY14 we knew that we were going to get these funds, so we programmed nearly all of the money. We were not able to obligate all of the money, however, largely due to not being able to meet fiscal year advertising deadlines. In order to address this situation in FY15, we began setting up the FY15 projects in July 2014 and seeded them with enough FY14 money to begin design. We anticipate that this will allow the regions to begin design early enough to comfortably advertise the projects before the end of FY15 and achieve higher obligated percentages next year.

Another obstacle was scope changes that resulted in some projects either being cancelled or advertised with estimates far below the funded amounts. We are working with the regions to get them more involved in up-front scoping of their safety projects so that initial concept estimates are closer in line with the amounts of funding we place in the projects.

**Describe any other aspects of the general Highway Safety Improvement Program implementation progress on which you would like to elaborate.**

Project delivery is administered through the UDOT region offices. We are working closely with our region counterparts to make sure safety projects are addressed in a timely manner. After projects are programmed, project managers from the applicable UDOT region offices are assigned to each project. These project managers then shepherd the projects through UDOT's standard federal environmental, design, and construction processes.

## General Listing of Projects

**List each highway safety improvement project obligated during the reporting period.**

| Project | Improvement Category | Output | HSIP Cost | Total Cost | Funding Category | Functional Classification | AADT | Speed | Roadway Ownership | Relationship to SHSP | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | Emphasis Area | Strategy |
| **I-15; Median Cable Barrier (PIN 11381)** | Roadside Barrier - cable | 12 Miles | 1018865 | 1018865 | Penalty Transfer – Section 164 ($948,484) ; HSIP ($70,381) | Rural Principal Arterial - Interstate | 15000 | 75 | State Highway Agency | Roadway Departure | Cable Barrier |
| **SR-39; Shoulder Improvements (PIN 11382)** | Roadside Barrier- metal | 11 Miles | 370000 | 370000 | HSIP (Section 148) | Urban Principal Arterial - Other | 400 | 40 | State Highway Agency | Roadway Departure | Guardrail |
| **SR-67; Median Cable Barrier (PIN 11384)** | Roadside Barrier - cable | 8 Miles | 1089677 | 1089677 | Penalty Transfer – Section 164 ($481,360) ; HSIP ($608,316) | Rural Principal Arterial - Other Freeways and Expressways | 22500 | 55 | State Highway Agency | Roadway Departure | Cable Barrier |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **I-84; Rumble Strips (PIN 11951)** | Roadway Rumble strips - edge or shoulder | 31 Miles | 199301 | 199301 | HSIP (Section 148) | Rural Principal Arterial - Interstate | 8200 | 70 | State Highway Agency | Lane Departure | Rumble Strips |
| **SR-225; Interchange Signing Improvements (PIN 12175)** | Roadway signs and traffic control Roadway signs and traffic control - other | 1 Miles | 1300000 | 1300000 | Penalty Transfer – Section 164 ($125,000) ; HSIP ($1,075,000) | Urban Principal Arterial - Other | 6000 | 45 | State Highway Agency | Lane Departure | Signing |
| **I-15 & I-84 Interstate Structure Protection (PIN 12176)** | Roadside Barrier - concrete | 201 Miles | 1200000 | 1200000 | HSIP (Section 148) | Rural Principal Arterial - Interstate | 10500 | 75 | State Highway Agency | Roadway Departure | Concrete Barrier |
| **US-89; Upgrade Mid-Block Crosswalks (PIN 12177)** | Pedestrians and bicyclists Pedestrian warning signs - add/modify flashers | 3 Numbers | 290000 | 429744 | Penalty Transfer – Section 164 ($240,000) ; HSIP ($50,000) | Urban Principal Arterial - Other | 26000 | 35 | State Highway Agency | Pedestrians | Signing |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **US-91; 3200 W & 2000 W Intersection Realignment (PIN 12614)** | Intersection geometry Intersection geometrics - modify skew angle | 1 Numbers | 2750000 | 2750000 | Penalty Transfer – Section 164 ($275,000); HSIP ($2,500,000) | Rural Principal Arterial - Other | 20650 | 60 | State Highway Agency | Intersections | Intersection Realignment |
| **US-89; Median Barrier (PIN 12884)** | Roadside Barrier - concrete | 1 Miles | 400000 | 400000 | HSIP (Section 148) | Urban Principal Arterial - Other | 31000 | 55 | State Highway Agency | Roadway Departure | Concrete Barrier |
| **US-89; Two Locations, Median Barrier (PIN 12892)** | Roadside Barrier - concrete | 5 Miles | 1700000 | 1700000 | HSIP (Section 148) | Urban Principal Arterial - Other | 34000 | 55 | State Highway Agency | Roadway Departure | Concrete Barrier |
| **SR-273; Intersection Realign & Signal (PIN 13023)** | Intersection traffic control Systemic improvements - signal-controlled | 1 Numbers | 600000 | 200000 | HSIP (Section 148) | Urban Minor Arterial | 15000 | 40 | State Highway Agency | Intersections | Intersection Signalization |
| **I-84: Cable Barrier (PIN** | Roadside Barrier - | 6 Miles | 355115 | 355115 | Penalty Transfer – Section | Urban Principal Arterial - | 18500 | 65 | State Highway | Roadway Departure | Cable Barrier |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **11385)** | cable | | | | 164 ($301,094) ; HSIP ($54,021) | Interstate | | | Agency | | |
| **SR-71/2700 W Signal Reconstruction (PIN 11402)** | Intersection traffic control Modify traffic signal timing - left-turn phasing (permissive to protected-only) | 1 Numbers | 1500000 | 1500000 | Penalty Transfer – Section 164 ($100,000) ; HSIP ($1,400,000) | Urban Principal Arterial - Other | 29600 | 40 | State Highway Agency | Intersections | Intersection Signalization |
| **SR-266/SR-71 Intersection Reconstruction (PIN 11404)** | Intersection traffic control Modify traffic signal timing - left-turn phasing (permissive to protected-only) | 1 Numbers | 1500000 | 1500000 | HSIP (Section 148) | Urban Principal Arterial - Other | 27500 | 45 | State Highway Agency | Intersections | Intersection Signalization |
| **SR-266/Auto** | Intersection | 1 | 210000 | 210000 | Penalty | Urban | 4350 | 40 | State | Intersectio | Intersectio |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Blvd/Main St Intersection Improvements (PIN 11405)** | traffic control Modify traffic signal timing - left-turn phasing (permissive to protected-only) | Numbers | 0 | 0 | Transfer – Section 164 ($80,000); HSIP ($2,020,000) | Principal Arterial - Other | 0 | | Highway Agency | ns | n Signalization |
| **SR-266/500 W Intersection Improvements (PIN 11408)** | Intersection traffic control Modify traffic signal timing - left-turn phasing (permissive to protected-only) | 1 Numbers | 1200000 | 1200000 | Penalty Transfer – Section 164 ($30,000); HSIP ($1,170,000) | Urban Principal Arterial - Other | 46500 | 40 | State Highway Agency | Intersections | Intersection Signalization |
| **SR-172/4100 S Intersection & Signal Improvements (PIN 12215)** | Intersection traffic control Modify traffic signal timing - left-turn phasing | 1 Numbers | 1248000 | 1248000 | HSIP (Section 148) | Urban Principal Arterial - Other | 44050 | 45 | State Highway Agency | Intersections | Intersection Signalization |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | (permissive to protected-only) | | | | | | | | | | |
| **I-80; Upgrade Barrier (PIN 12221)** | Roadside Barrier - cable | 14 Miles | 1210000 | 1210000 | Penalty Transfer – Section 164 ($100,000); HSIP ($1,110,000) | Rural Principal Arterial - Interstate | 21000 | 75 | State Highway Agency | Roadway Departure | Cable Barrier |
| **I-15, I-215, I-80; Interstate Structure Protection (PIN 12222)** | Roadside Barrier - concrete | 1 Numbers | 1000000 | 1000000 | HSIP (Section 148) | Urban Principal Arterial - Interstate | | 75 | State Highway Agency | Roadway Departure | Concrete Barrier |
| **SR-201 EB & I-80 EB; Overhead Sign Replacement (PIN 11499)** | Roadway signs and traffic control Sign sheeting - upgrade or replacement | 1 Numbers | 1000000 | 2000000 | HSIP (Section 148) | Urban Principal Arterial - Interstate | | 65 | State Highway Agency | Lane Departure | Signing |
| **SR-35/SR-208; Intersection Realignment** | Intersection geometry Intersection | 1 Numbe | 952912 | 952912 | Penalty Transfer – Section | Rural Principal Arterial - | 850 | 55 | State Highway | Intersections | Intersection Realignme |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **(PIN 11395)** | geometrics - modify skew angle | rs | | | 164 ($652,111) ; HSIP ($300,801) | Other | | | Agency | | nt |
| **I-15; Interstate Structure Protection** | Roadside Barrier - concrete | 30 Miles | 409871 | 400000 | Penalty Transfer – Section 164 ($317,234) ; HSIP ($82,766) | Rural Principal Arterial - Interstate | 15000 | 80 | State Highway Agency | Roadway Departure | Concrete Barrier |
| **I-15 & US-40; Freeway Structure Protection (PIN 12984)** | Roadside Barrier - concrete | 17 Miles | 1000000 | 1000000 | HSIP (Section 148) | Rural Principal Arterial - Interstate | 21400 | 75 | State Highway Agency | Roadway Departure | Concrete Barrier |
| **US-189; Signal Improvements (PIN 12181)** | Intersection traffic control Modify traffic signal - add flashing yellow arrow | 4 Numbers | 376938 | 378230 | Penalty Transfer – Section 164 ($296,938) ; HSIP ($80,000) | Urban Principal Arterial - Other | 48000 | 35 | State Highway Agency | Intersections | Intersection Signalization |
| **Bulldog/Freedom Blvd (PIN** | Intersection traffic | 4 Numbe | 372945 | 373136 | Penalty Transfer – | Rural Minor | 3700 | 35 | City of Municipa | Intersectio | Intersection |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **12232)** | control Modify traffic signal - add flashing yellow arrow | rs | | | Section 164 ($259,945) ; HSIP ($113,000) | Collector | 0 | | l Highway Agency | ns | Signalizati on |
| **SR-12; Sign & Geometry Improvements (PIN 12186)** | Roadway signs and traffic control Curve-related warning signs and flashers | 53 Miles | 800000 | 800000 | HSIP (Section 148) | Rural Principal Arterial - Other | 550 | 50 | State Highway Agency | Lane Departure | Signing |
| **SR-14; Guardrail & Barrier Improvements (PIN 12187)** | Roadside Barrier-metal | 4 Miles | 400000 | 500000 | HSIP (Section 148) | Rural Principal Arterial - Other | 1090 | 50 | State Highway Agency | Roadway Departure | Guardrail |
| **US-163; Install Guardrail (PIN 12188)** | Roadside Barrier-metal | 41 Miles | 115000 0 | 141700 0 | HSIP (Section 148) | Rural Principal Arterial - Other | 1000 | 65 | State Highway Agency | Roadway Departure | Guardrail |
| **I-15 & I-70; Structure** | Roadside Barrier - | 1 Numbe | 296000 | 296000 | Penalty Transfer – | Rural Principal | | 75 | State Highway | Roadway | Concrete |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Protection (PIN 12189)** | concrete | rs | 0 | 0 | Section 164 ($22,062); HSIP ($2,937,938) | Arterial - Interstate | | | Agency | Departure | Barrier |
| **Various Locations; Install Rumble Strips (PIN 12190)** | Roadway Rumble strips - edge or shoulder | 1 Numbers | 2800000 | 2800000 | HSIP (Section 148) | Rural Principal Arterial - Other | | | State Highway Agency | Lane Departure | Rumble Strips |
| **US-191; Roadside Improvements (PIN 12191)** | Roadside Barrier-metal | 8 Miles | 250000 | 250000 | HSIP (Section 148) | Rural Principal Arterial - Other | 865 | 40 | State Highway Agency | Roadway Departure | Guardrail |
| **SR-14; Curve Improvements (PIN 12192)** | Roadside Barrier - concrete | 1 Numbers | 600000 | 600000 | HSIP (Section 148) | Rural Minor Arterial | 810 | 50 | State Highway Agency | Roadway Departure | Concrete Barrier |
| **SR-95; Roadside Improvements (PIN 12193)** | Roadside Barrier - concrete | 4 Miles | 400000 | 400000 | HSIP (Section 148) | Rural Principal Arterial - Other | 405 | 55 | State Highway Agency | Roadway Departure | Concrete Barrier |
| **No Passing Signage (PIN 12202)** | Roadway signs and traffic control | 1 Numbers | 453250 | 453250 | Penalty Transfer – Section 164 | n/a | | | State Highway Agency | Lane Departure | Signing |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Roadway signs (including post) - new or updated | | | | ($361,385) ; HSIP ($91,865) | | | | | | |
| **No Passing Signage (PIN 12301)** | Roadway signs and traffic control Roadway signs (including post) - new or updated | 1 Numbers | 500000 | 500000 | HSIP (Section 148) | n/a | | | State Highway Agency | Lane Departure | Signing |
| **Interstate Structure Protection (PIN 12931)** | Roadside Barrier - concrete | 1 Numbers | 1500000 | 1500000 | HSIP (Section 148) | Rural Principal Arterial - Interstate | | | State Highway Agency | Roadway Departure | Concrete Barrier |
| **Rural Roads in Garfield County (PIN 11742)** | Roadside Barrier- metal | 1 Numbers | 325000 | 325000 | HRRRP (SAFETEA-LU) | n/a | | | County Highway Agency | Roadway Departure | Guardrail |
| **Research External Factors' Effect on Crashes** | Non-infrastructure Transportation safety | 1 Numbers | 40000 | 40000 | HSIP (Section 148) | n/a | | | n/a | Creating more effective processes and safety | Crash Mapping & Analysis |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **(PIN 12963)** | planning | | | | | | | | | management systems | |
| **usRAP Safer Roads Investment Plans (PIN 13019)** | Non-infrastructure Transportation safety planning | 1 Numbers | 150000 | 150000 | HSIP (Section 148) | n/a | | | n/a | Creating more effective processes and safety management systems | Crash Mapping & Analysis |
| **AGRC Local Roads Feasibility Study (PIN 13021)** | Non-infrastructure Data/traffic records | 1 Numbers | 50000 | 50000 | HSIP (Section 148) | | | | n/a | Data | Crash Mapping & Analysis |
| **Crash Database Maintenance (PIN 13022)** | Non-infrastructure Data/traffic records | 1 Numbers | 300000 | 300000 | HSIP (Section 148) | n/a | | | n/a | Data | Crash Mapping & Analysis |
| **Utah CODES 2014-2015 (PIN 13027)** | Non-infrastructure Data/traffic records | 1 Numbers | 75000 | 75000 | HSIP (Section 148) | n/a | | | n/a | Data | Crash Mapping & Analysis |
| **Safety Campaigns,** | Non-infrastructur | 1 Numbe | 200000 | 200000 | Penalty Transfer – | n/a | | | n/a | Increasing driver | Education |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Education, & Enf FY14 (PIN 12207)** | e Educational efforts | rs | 0 | 0 | Section 164 | | | | | safety awareness | |
| **T&S Program Mgmt Support 2014 (PIN 12209)** | Non-infrastructur e Non-infrastructur e - other | 1 Numbe rs | 120000 0 | 120000 0 | HSIP (Section 148) | n/a | | | n/a | Creating more effective processes and safety manageme nt systems | Statewide Safety Planning Support |
| | | | | | | | | | | | |

# Progress in Achieving Safety Performance Targets

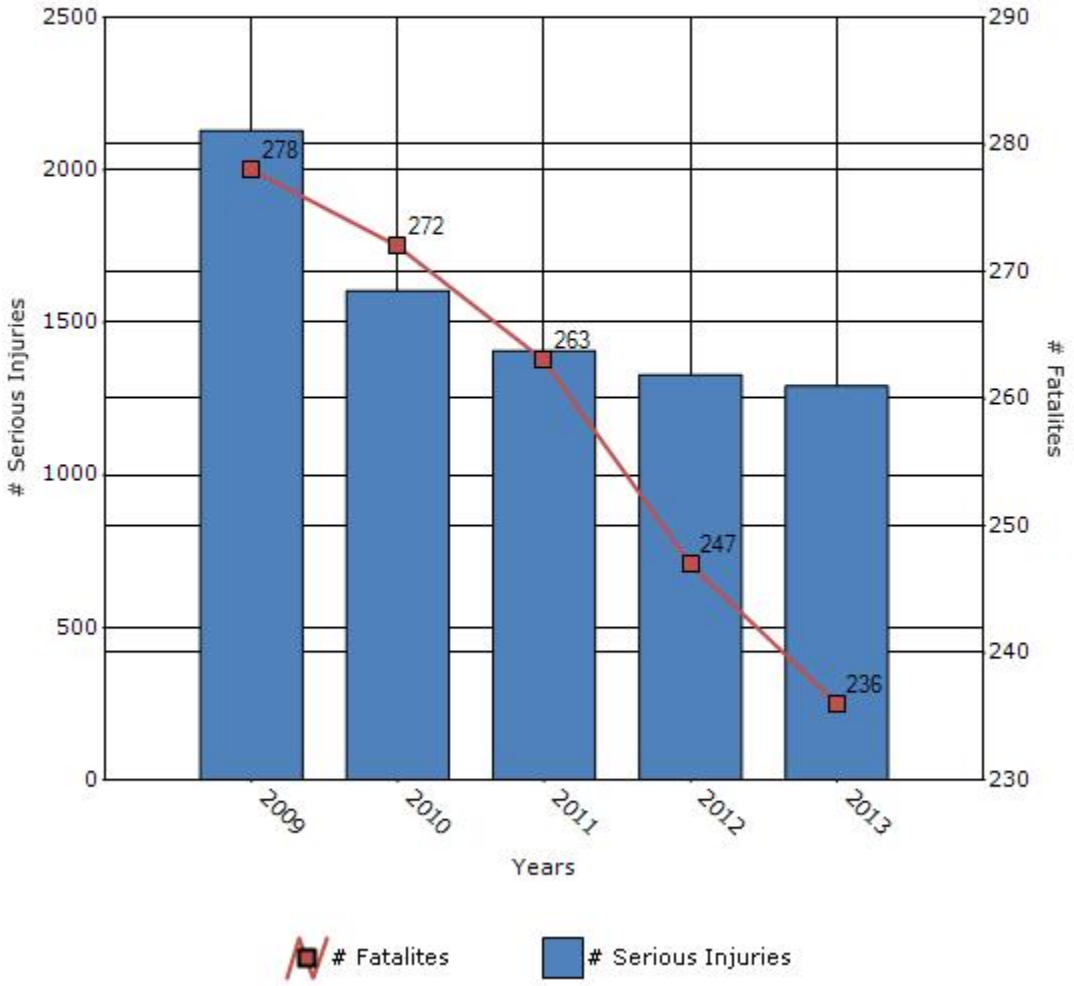
## Overview of General Safety Trends

**Present data showing the general highway safety trends in the state for the past five years.**

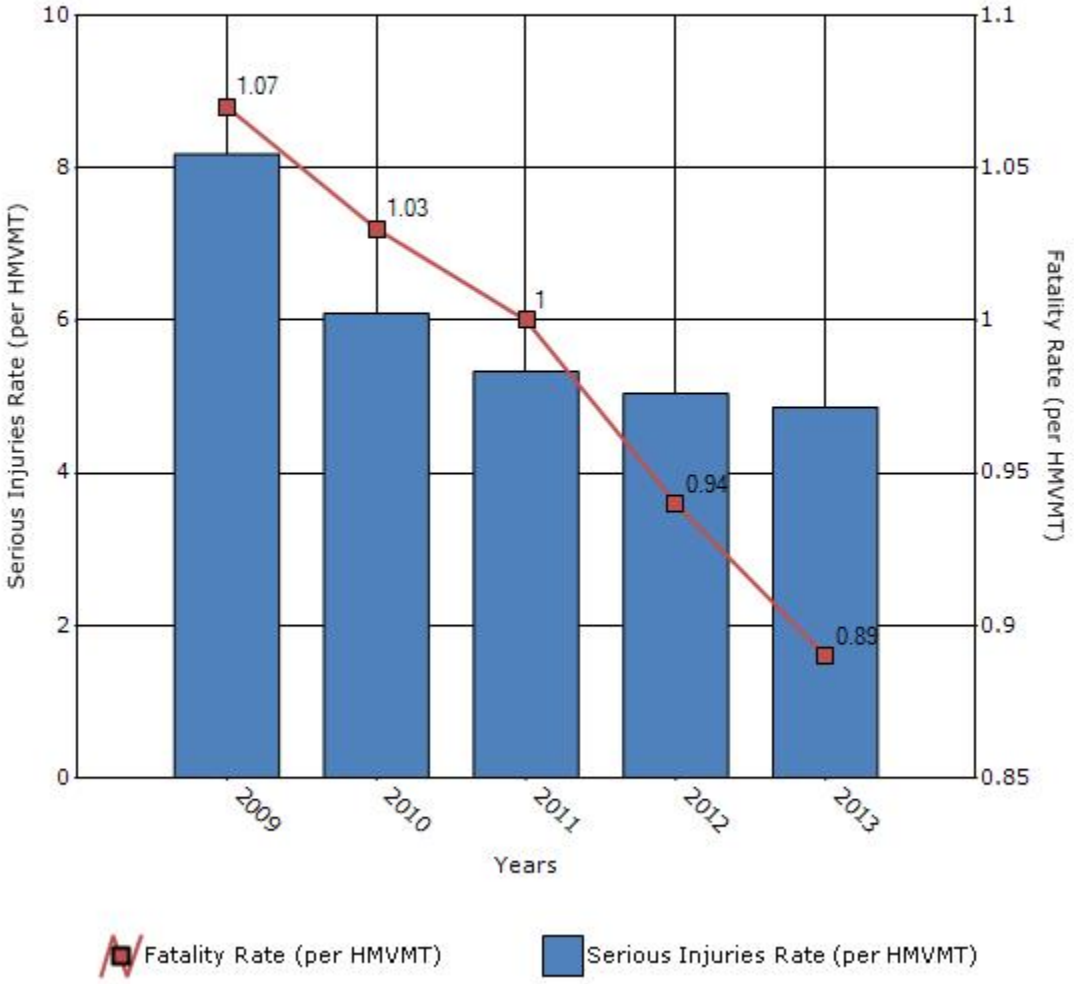
| Performance Measures* | 2009 | 2010 | 2011 | 2012 | 2013 |
|---|---|---|---|---|---|
| Number of fatalities | 278 | 272 | 263 | 247 | 236 |
| Number of serious injuries | 2129 | 1604 | 1407 | 1328 | 1291 |
| Fatality rate (per HMVMT) | 1.07 | 1.03 | 1 | 0.94 | 0.89 |
| Serious injury rate (per HMVMT) | 8.18 | 6.09 | 5.33 | 5.04 | 4.86 |

*Performance measure data is presented using a five-year rolling average.

## Number of Fatalities and Serious injuries for the Last Five Years



## Rate of Fatalities and Serious injuries for the Last Five Years

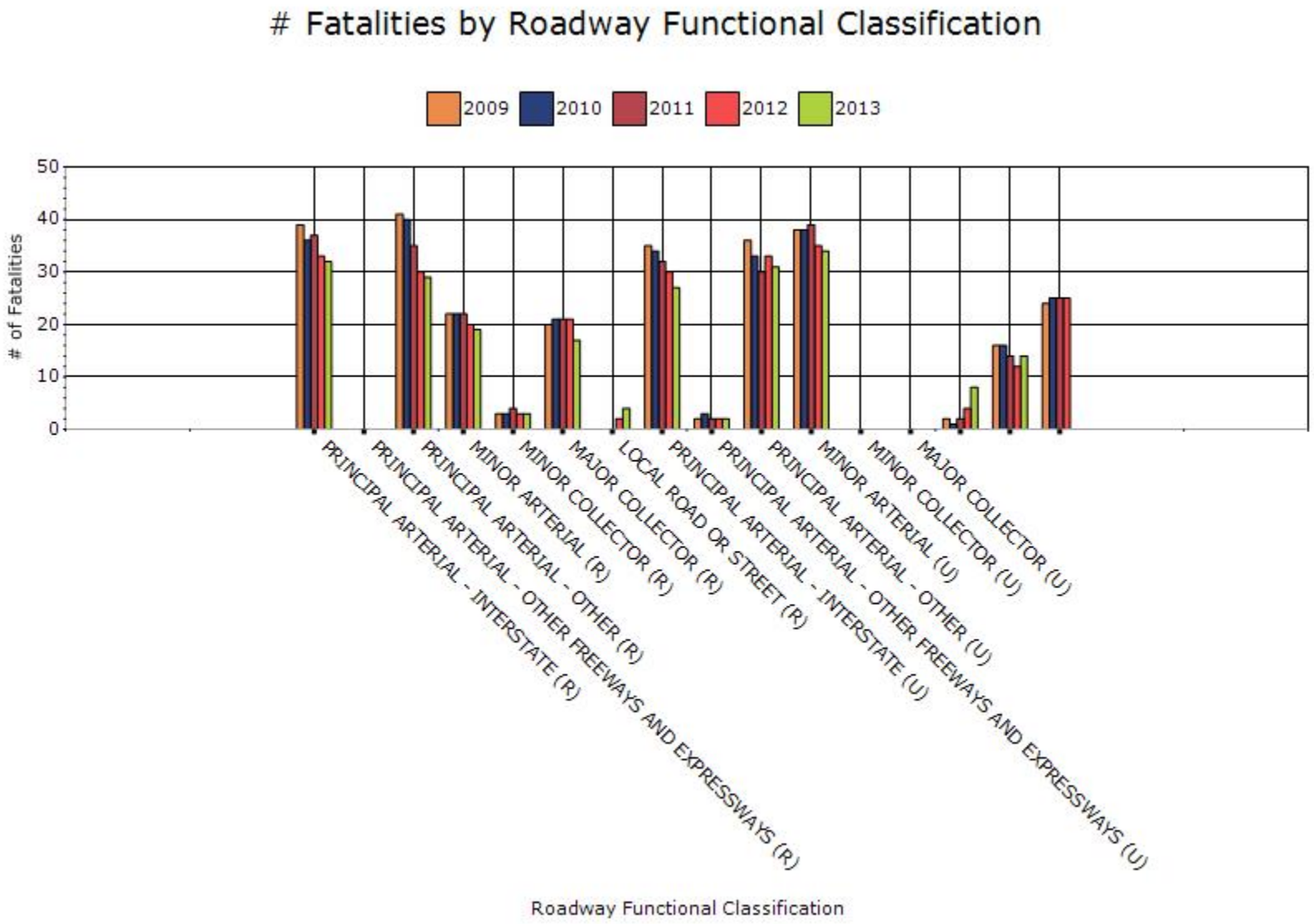


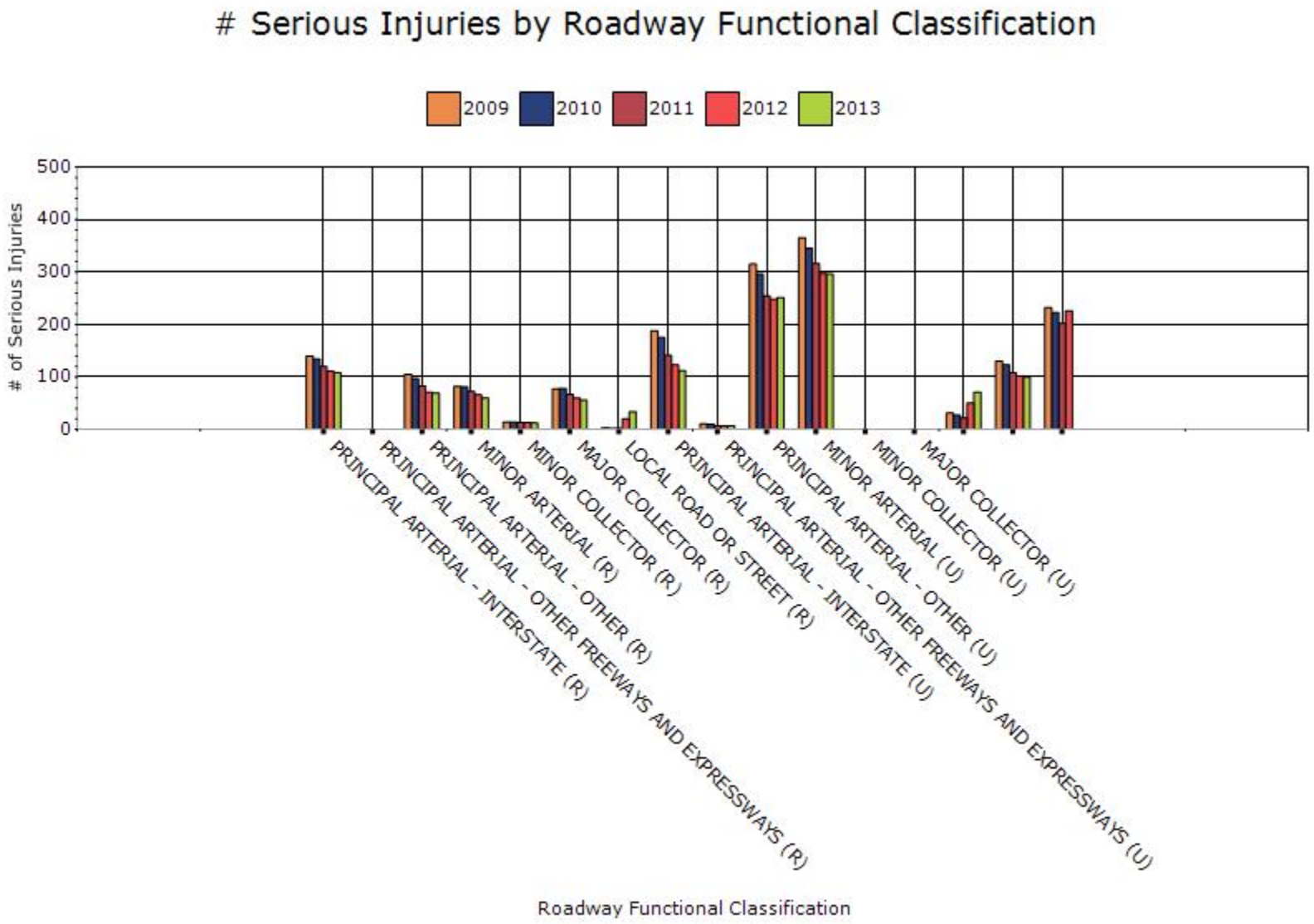
**To the maximum extent possible, present performance measure* data by functional classification and ownership.**

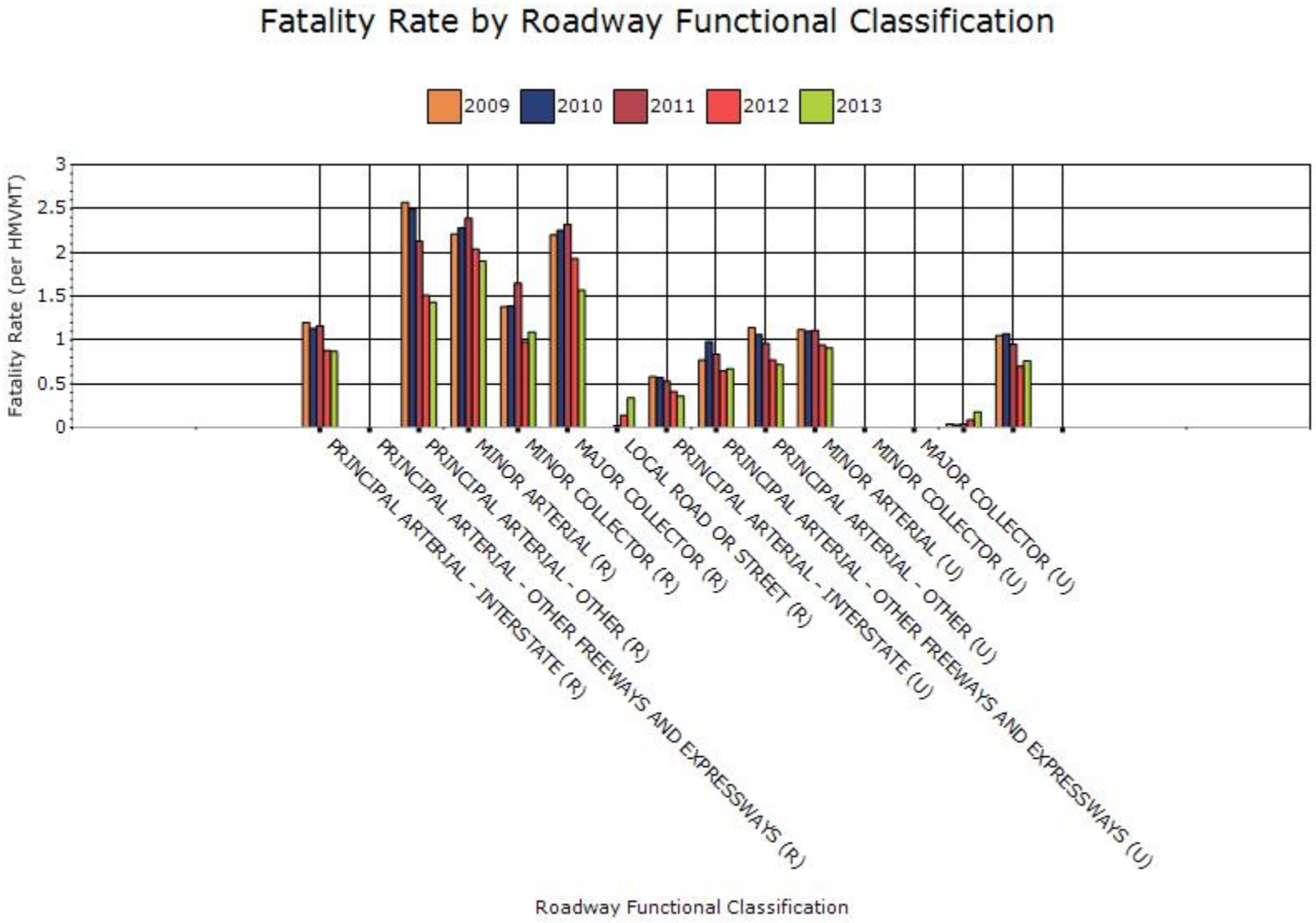
## Year - 2013

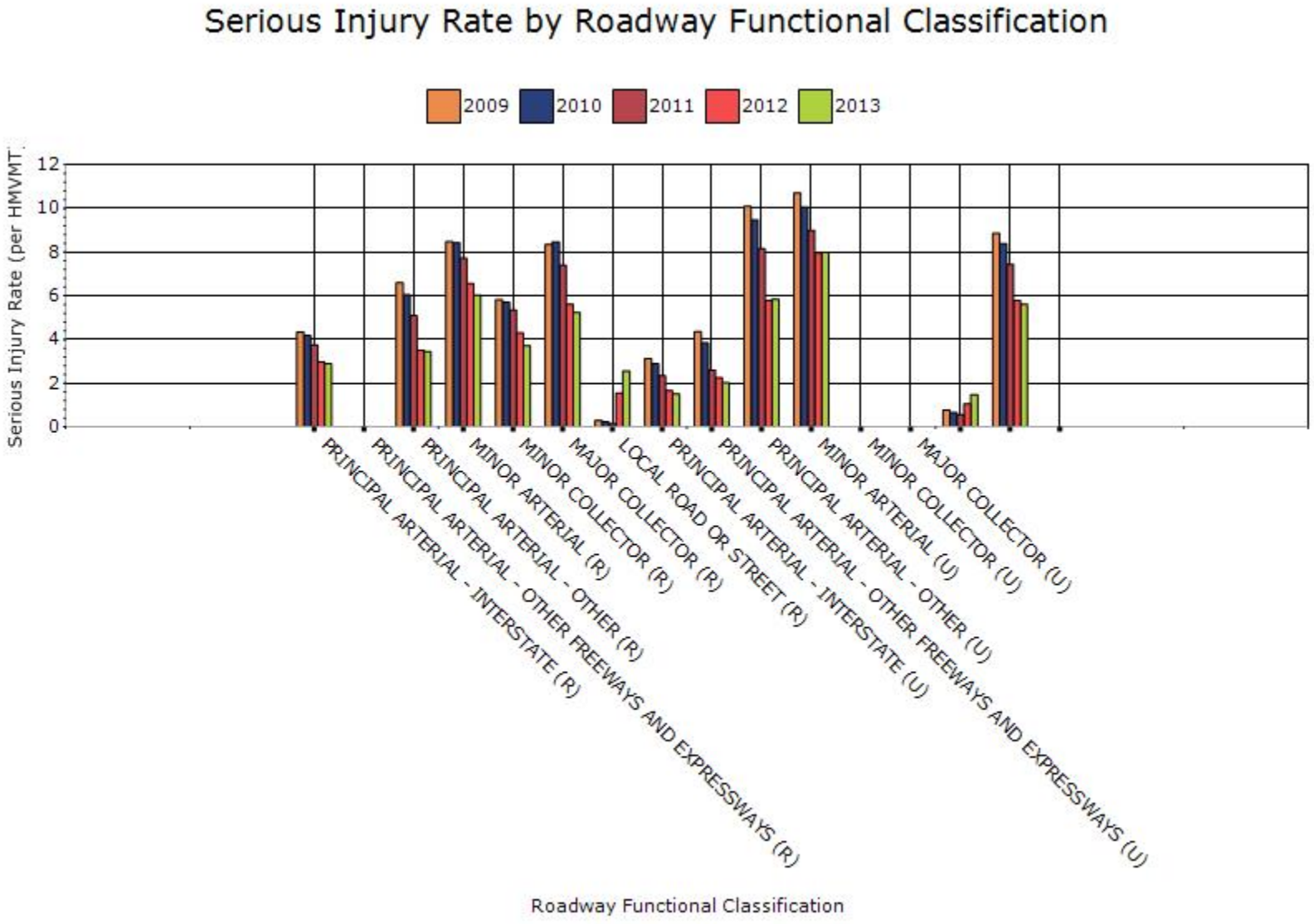
| Function Classification | Number of fatalities | Number of serious injuries | Fatality rate (per HMVMT) | Serious injury rate (per HMVMT) |
|---|---|---|---|---|
| **RURAL PRINCIPAL ARTERIAL - INTERSTATE** | 32 | 108 | 0.87 | 2.89 |
| **RURAL PRINCIPAL ARTERIAL - OTHER FREEWAYS AND EXPRESSWAYS** | 0 | 0 | 0 | 0 |
| **RURAL PRINCIPAL ARTERIAL - OTHER** | 29 | 69 | 1.43 | 3.44 |
| **RURAL MINOR ARTERIAL** | 19 | 60 | 1.9 | 6.03 |
| **RURAL MINOR COLLECTOR** | 3 | 12 | 1.09 | 3.72 |
| **RURAL MAJOR COLLECTOR** | 17 | 56 | 1.57 | 5.24 |
| **RURAL LOCAL ROAD OR STREET** | 4 | 34 | 0.34 | 2.56 |
| **URBAN PRINCIPAL** | 27 | 112 | 0.36 | 1.5 |

| | | | | |
|---|---|---|---|---|
| **ARTERIAL - INTERSTATE** | | | | |
| **URBAN PRINCIPAL ARTERIAL - OTHER FREEWAYS AND EXPRESSWAYS** | 2 | 7 | 0.67 | 2.02 |
| **URBAN PRINCIPAL ARTERIAL - OTHER** | 31 | 251 | 0.72 | 5.84 |
| **URBAN MINOR ARTERIAL** | 34 | 296 | 0.91 | 7.99 |
| **URBAN MINOR COLLECTOR** | 0 | 0 | 0 | 0 |
| **URBAN MAJOR COLLECTOR** | 0 | 0 | 0 | 0 |
| **URBAN LOCAL ROAD OR STREET** | 8 | 71 | 0.18 | 1.48 |
| **URBAN COLLECTOR** | 14 | 100 | 0.76 | 5.61 |
| **UNKNOWN** | 0 | 0 | 0 | 0 |


# Fatalities by Roadway Functional Classification
2009
2010
2011
2012
2013
# of Fatalities
50
40
30
20
10
0
PRINCIPAL ARTERIAL - INTERSTATE (R)
PRINCIPAL ARTERIAL - OTHER FREEWAYS AND EXPRESSWAYS (R)
PRINCIPAL ARTERIAL - OTHER (R)
MINOR ARTERIAL (R)
MINOR COLLECTOR (R)
MAJOR COLLECTOR (R)
LOCAL ROAD OR STREET (R)
PRINCIPAL ARTERIAL - INTERSTATE (U)
PRINCIPAL ARTERIAL - OTHER FREEWAYS AND EXPRESSWAYS (U)
PRINCIPAL ARTERIAL - OTHER (U)
MINOR ARTERIAL (U)
MINOR COLLECTOR (U)
MAJOR COLLECTOR (U)
Roadway Functional Classification

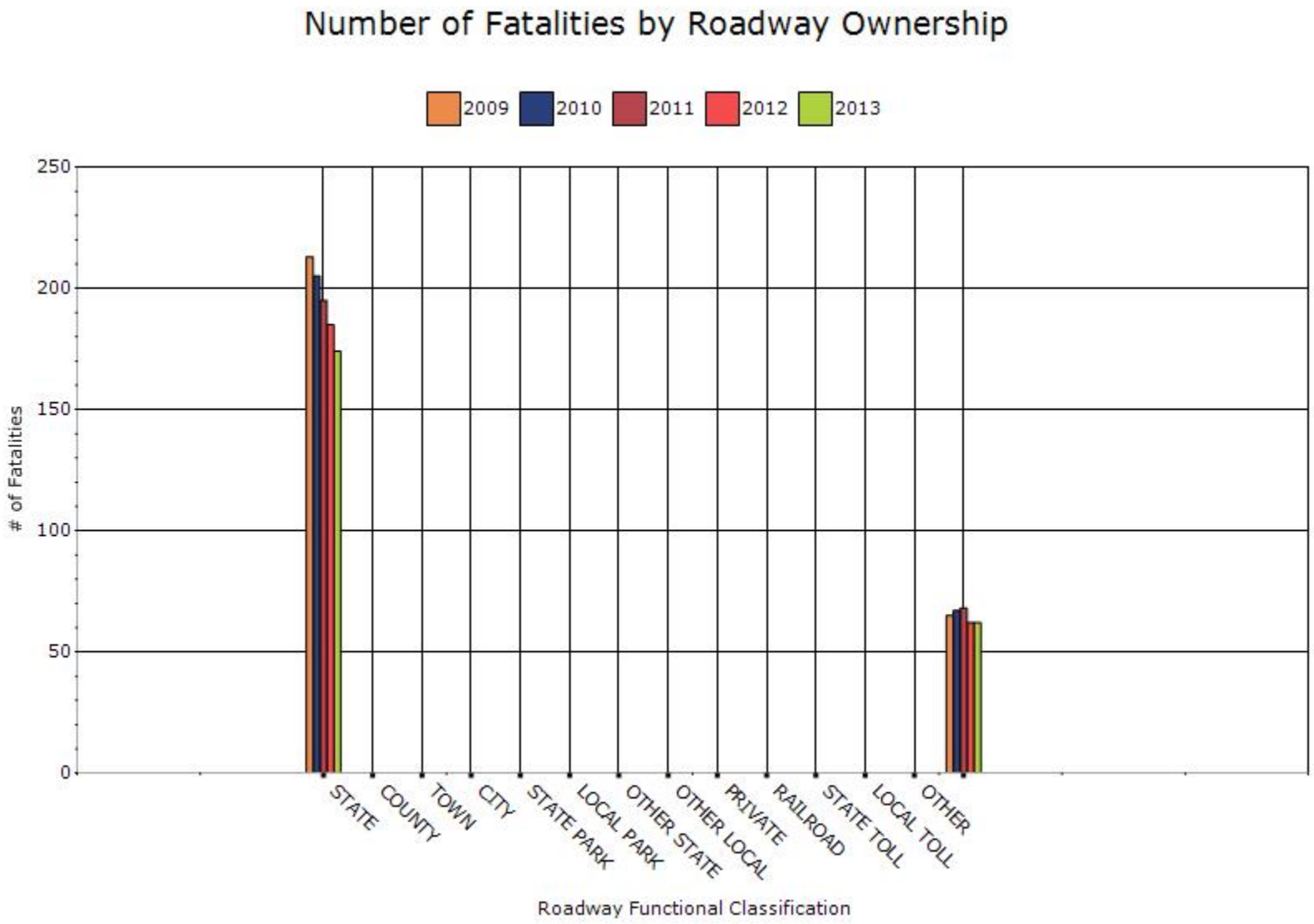

# Serious Injuries by Roadway Functional Classification
2009
2010
2011
2012
2013
# of Serious Injuries
500
400
300
200
100
0
PRINCIPAL ARTERIAL - INTERSTATE (R)
PRINCIPAL ARTERIAL - OTHER FREEWAYS AND EXPRESSWAYS (R)
PRINCIPAL ARTERIAL - OTHER (R)
MINOR ARTERIAL (R)
MINOR COLLECTOR (R)
MAJOR COLLECTOR (R)
LOCAL ROAD OR STREET (R)
PRINCIPAL ARTERIAL - INTERSTATE (U)
PRINCIPAL ARTERIAL - OTHER FREEWAYS AND EXPRESSWAYS (U)
PRINCIPAL ARTERIAL - OTHER (U)
MINOR ARTERIAL (U)
MINOR COLLECTOR (U)
MAJOR COLLECTOR (U)
Roadway Functional Classification

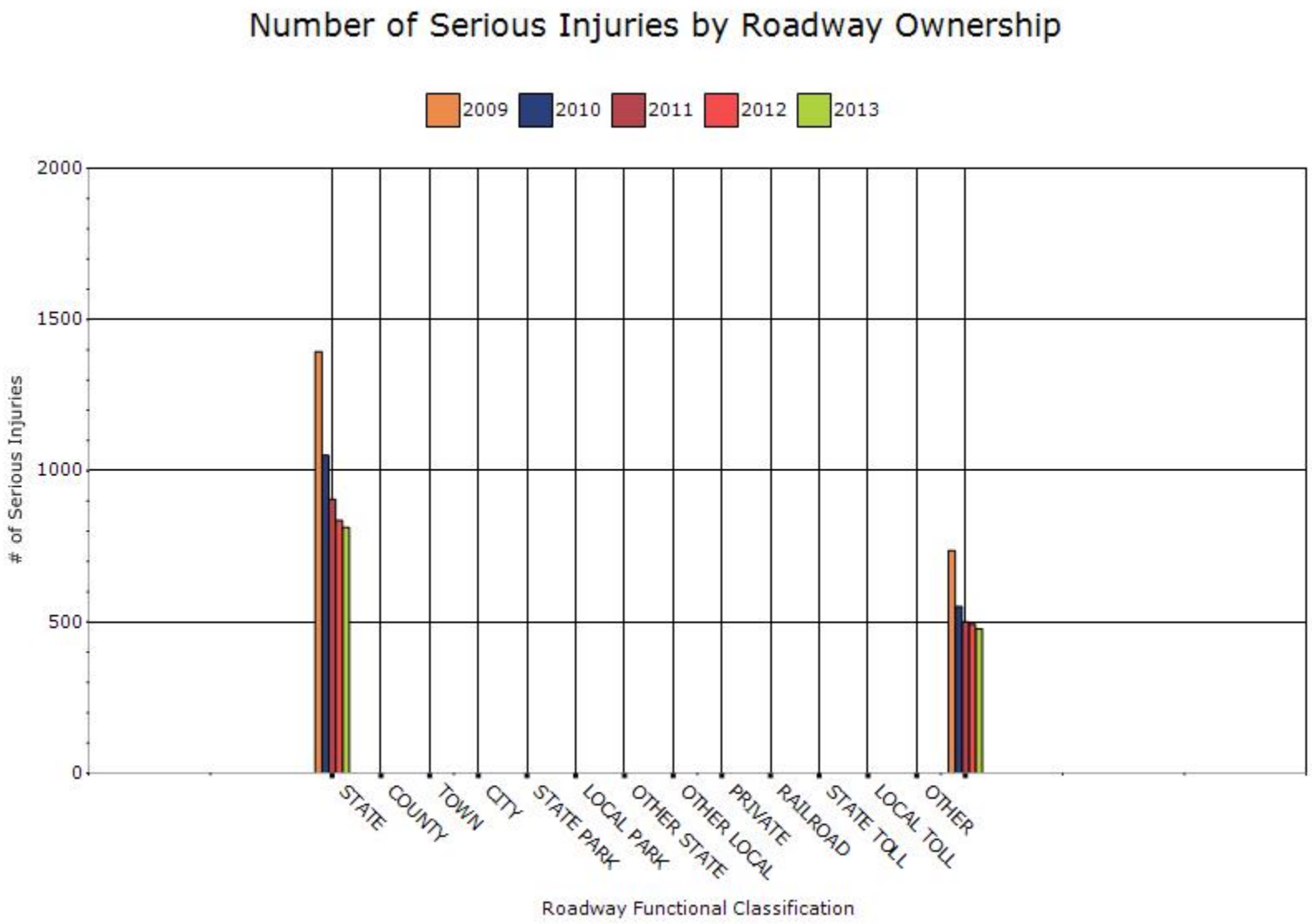

Fatality Rate by Roadway Functional Classification
2009
2010
2011
2012
2013
Fatality Rate (per HMVMT)
3
2.5
2
1.5
1
0.5
0
PRINCIPAL ARTERIAL - INTERSTATE (R)
PRINCIPAL ARTERIAL - OTHER FREEWAYS AND EXPRESSWAYS (R)
PRINCIPAL ARTERIAL - OTHER (R)
MINOR ARTERIAL (R)
MINOR COLLECTOR (R)
MAJOR COLLECTOR (R)
LOCAL ROAD OR STREET (R)
PRINCIPAL ARTERIAL - INTERSTATE (U)
PRINCIPAL ARTERIAL - OTHER FREEWAYS AND EXPRESSWAYS (U)
PRINCIPAL ARTERIAL - OTHER (U)
MINOR ARTERIAL (U)
MINOR COLLECTOR (U)
MAJOR COLLECTOR (U)
Roadway Functional Classification

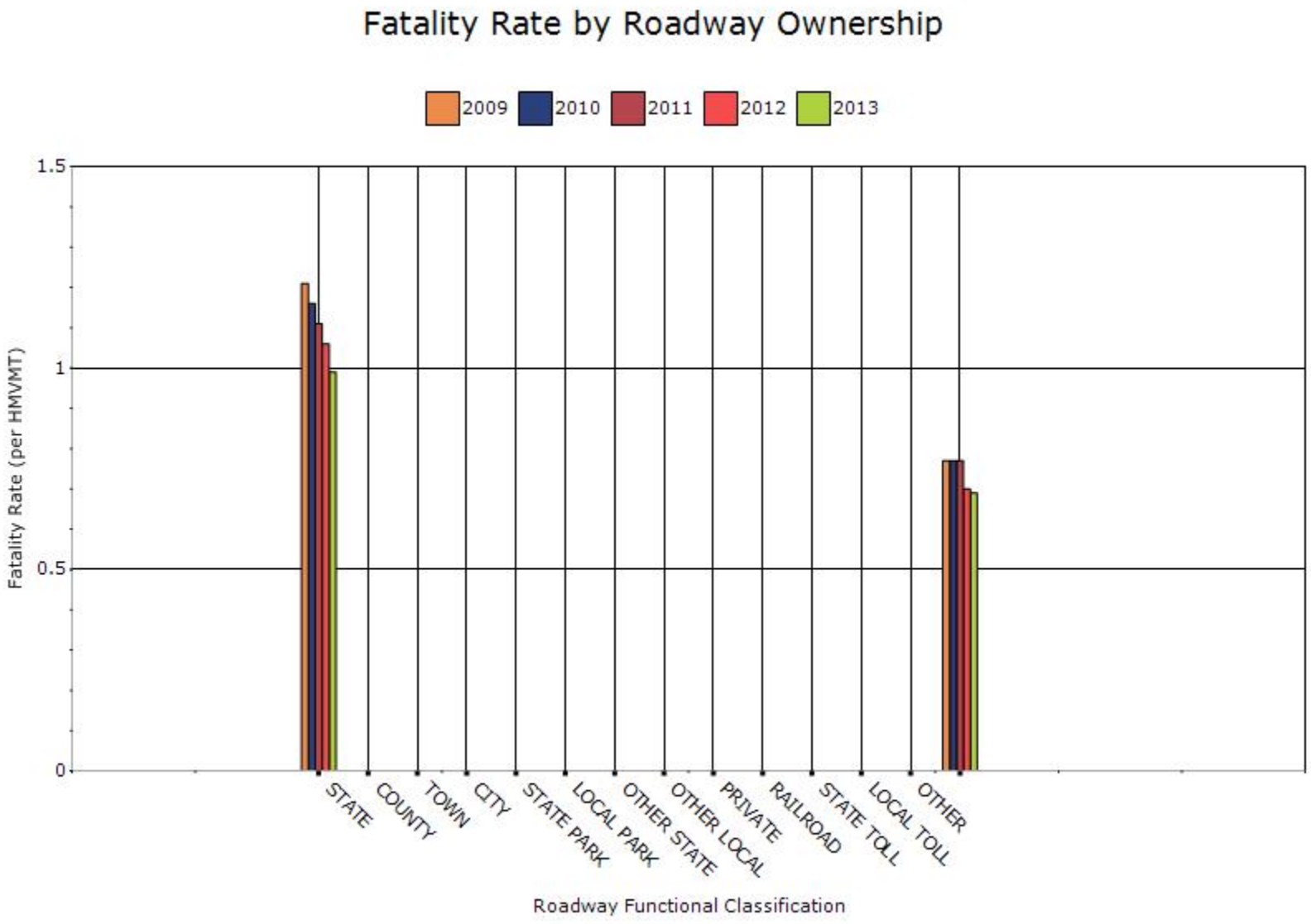

Serious Injury Rate by Roadway Functional Classification
2009
2010
2011
2012
2013
Serious Injury Rate (per HMVMT)
0
2
4
6
8
10
12
PRINCIPAL ARTERIAL - INTERSTATE (R)
PRINCIPAL ARTERIAL - OTHER FREEWAYS AND EXPRESSWAYS (R)
PRINCIPAL ARTERIAL - OTHER (R)
MINOR ARTERIAL (R)
MINOR COLLECTOR (R)
MAJOR COLLECTOR (R)
LOCAL ROAD OR STREET (R)
PRINCIPAL ARTERIAL - INTERSTATE (U)
PRINCIPAL ARTERIAL - OTHER FREEWAYS AND EXPRESSWAYS (U)
PRINCIPAL ARTERIAL - OTHER (U)
MINOR ARTERIAL (U)
MINOR COLLECTOR (U)
MAJOR COLLECTOR (U)
Roadway Functional Classification

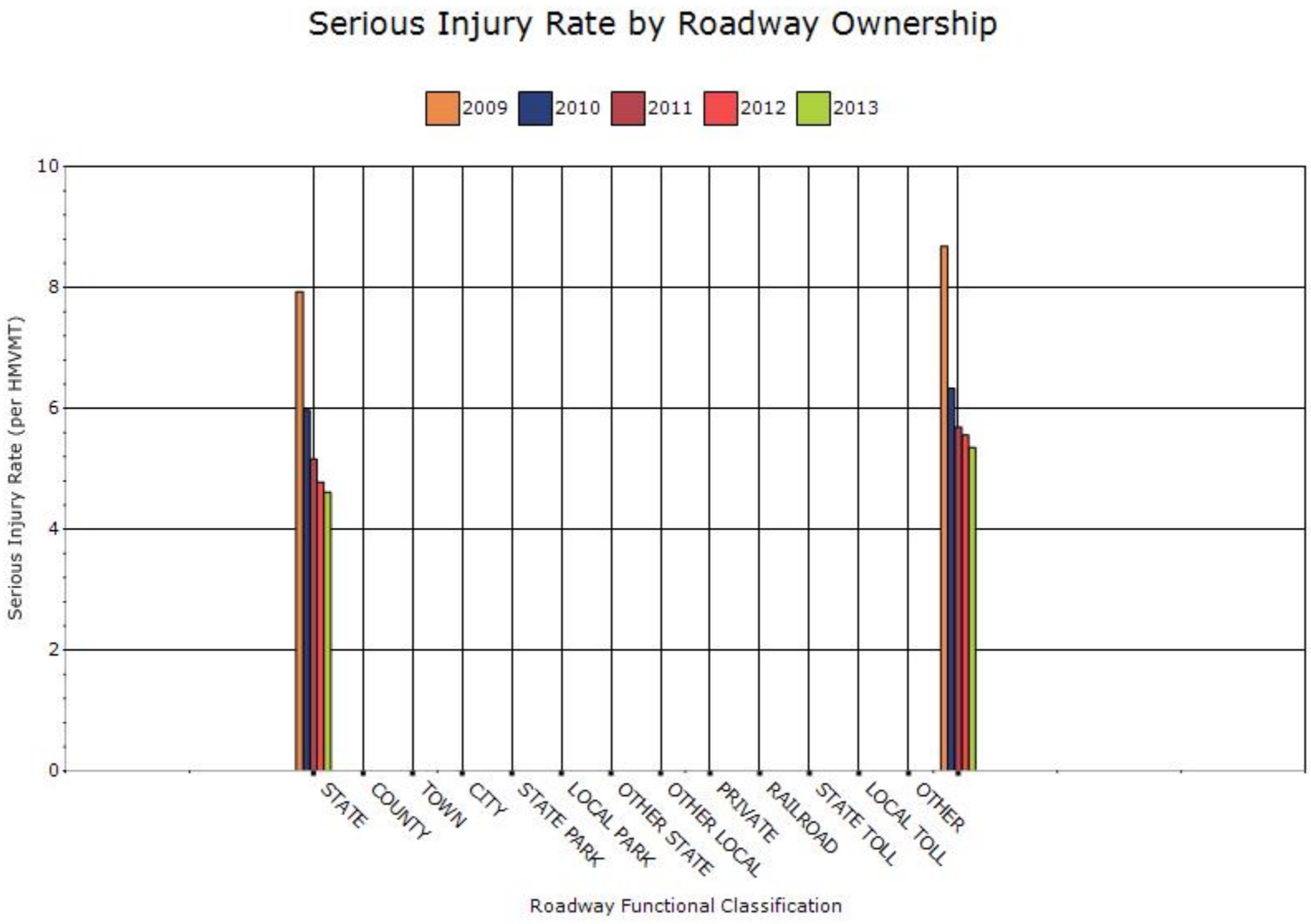
# Year - 2013

| Roadway Ownership | Number of fatalities | Number of serious injuries | Fatality rate (per HMVMT) | Serious injury rate (per HMVMT) |
|---|---|---|---|---|
| **STATE HIGHWAY AGENCY** | 174 | 813 | 0.99 | 4.61 |
| **COUNTY HIGHWAY AGENCY** | 0 | 0 | 0 | 0 |
| **TOWN OR TOWNSHIP HIGHWAY AGENCY** | 0 | 0 | 0 | 0 |
| **CITY OF MUNICIPAL HIGHWAY AGENCY** | 0 | 0 | 0 | 0 |
| **STATE PARK, FOREST, OR RESERVATION AGENCY** | 0 | 0 | 0 | 0 |
| **LOCAL PARK, FOREST OR RESERVATION AGENCY** | 0 | 0 | 0 | 0 |
| **OTHER STATE AGENCY** | 0 | 0 | 0 | 0 |
| **OTHER LOCAL AGENCY** | 0 | 0 | 0 | 0 |
| **PRIVATE (OTHER THAN RAILROAD)** | 0 | 0 | 0 | 0 |
| **RAILROAD** | 0 | 0 | 0 | 0 |
| **STATE TOLL AUTHORITY** | 0 | 0 | 0 | 0 |
| **LOCAL TOLL AUTHORITY** | 0 | 0 | 0 | 0 |
| **OTHER PUBLIC INSTRUMENTALITY (E.G. AIRPORT, SCHOOL, UNIVERSITY)** | 0 | 0 | 0 | 0 |
| **ALL OTHER** | 62 | 478 | 0.69 | 5.35 |


Number of Fatalities by Roadway Ownership
2009
2010
2011
2012
2013
250
200
150
100
50
0
# of Fatalities
STATE
COUNTY
TOWN
CITY
STATE PARK
LOCAL PARK
OTHER STATE
OTHER LOCAL
PRIVATE
RAILROAD
STATE TOLL
LOCAL TOLL
OTHER
Roadway Functional Classification


Number of Serious Injuries by Roadway Ownership
2009
2010
2011
2012
2013
2000
1500
1000
500
0
# of Serious Injuries
STATE
COUNTY
TOWN
CITY
STATE PARK
LOCAL PARK
OTHER STATE
OTHER LOCAL
PRIVATE
RAILROAD
STATE TOLL
LOCAL TOLL
OTHER
Roadway Functional Classification


Fatality Rate by Roadway Ownership
2009
2010
2011
2012
2013
1.5
1
0.5
0
Fatality Rate (per HMVMT)
STATE
COUNTY
TOWN
CITY
STATE PARK
LOCAL PARK
OTHER STATE
OTHER LOCAL
PRIVATE
RAILROAD
STATE TOLL
LOCAL TOLL
OTHER
Roadway Functional Classification


Serious Injury Rate by Roadway Ownership
2009
2010
2011
2012
2013
Serious Injury Rate (per HMVMT)
10
8
6
4
2
0
STATE
COUNTY
TOWN
CITY
STATE PARK
LOCAL PARK
OTHER STATE
OTHER LOCAL
PRIVATE
RAILROAD
STATE TOLL
LOCAL TOLL
OTHER
Roadway Functional Classification

**Describe any other aspects of the general highway safety trends on which you would like to elaborate**.

Overall, serious injury and fatality rates continue to decline in Utah. Serious injury rates have been reduced on a statewide basis by approximately 40% (on a rolling 5-year basis) from 2009 to 2013. Fatality rates have been reduced by approximately 15%.

When broken down by functional class, all classifications have experienced steady declines in serious injury and fatality rates except for rural crashes (both urban and rural). This is probably because UDOT's ability to track local road crashes has become better over the past few years. This has likely resulted in some crashes that were classified as "unknown" as now being attributed to local roads.

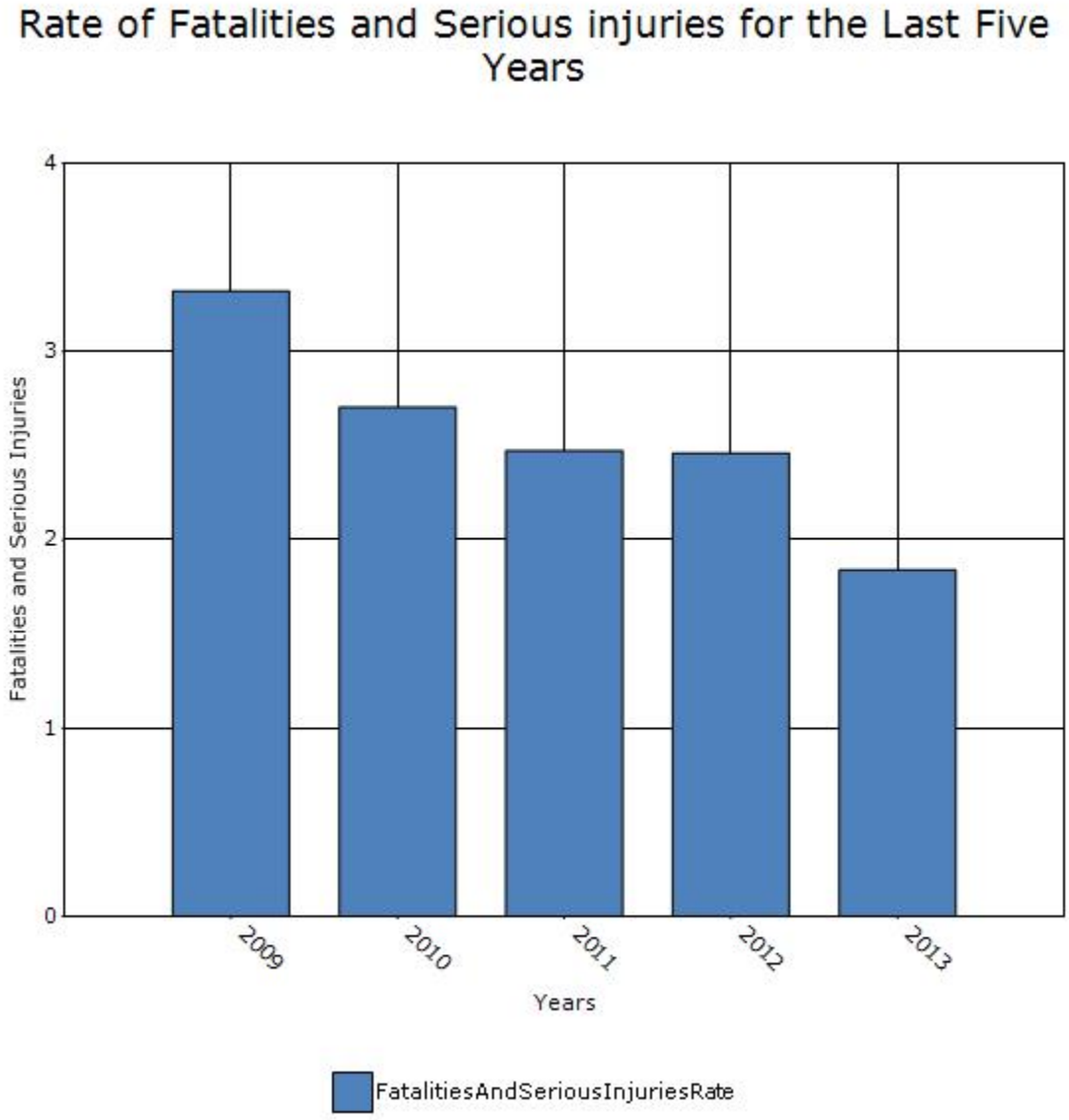
## Application of Special Rules

**Present the rate of traffic fatalities and serious injuries per capita for drivers and pedestrians over the age of 65**.

| Older Driver Performance Measures | 2009 | 2010 | 2011 | 2012 | 2013 |
|---|---|---|---|---|---|
| Fatality rate (per capita) | 0.536 | 0.54 | 0.532 | 0.514 | 0.392 |
| Serious injury rate (per capita) | 2.788 | 2.168 | 1.942 | 1.948 | 1.45 |
| Fatality and serious injury rate (per capita) | 3.322 | 2.706 | 2.474 | 2.46 | 1.84 |

*Performance measure data is presented using a five-year rolling average.

Each year's fatalities and serious injuries were divided by the "Number of People 65 Years of Age and Older (per 1,000 total population)" figures for each of the respective years, as instructed in Interim Guidance for the Older Driver Rule provided on the FHWA website. Those are the values we entered in the spreadsheet above. Then the system calculated the 5-yr rolling averages automatically. This method is in line with the instructions on the FHWA website.




**Does the older driver special rule apply to your state?**

No

# Assessment of the Effectiveness of the Improvements (Program Evaluation)

**What indicators of success can you use to demonstrate effectiveness and success in the Highway Safety Improvement Program?**

☐ None

☐ Benefit/cost

☐ Policy change

☒ Other: Other-Reduction in serious injuries and fatalities

**What significant programmatic changes have occurred since the last reporting period?**

☐ Shift Focus to Fatalities and Serious Injuries

☐ Include Local Roads in Highway Safety Improvement Program

☐ Organizational Changes

☐ None

☒ Other: Other-UDOT continues to invest more in systemic analysis. We are working on implementing usRAP and other models that will help us better identify worthy projects, especially off of the State system.

**Briefly describe significant program changes that have occurred since the last reporting period**.

1) UDOT has continued to work with BYU to further develop a statewide crash model capable of identifying systemic trends, locations where certain crash types are over-represented, and HSM calibration factors.

2) UDOT is in the beginning stages of developing Safer Roads Investment Plans using the usRAP protocol for the entire State highway system as well as a couple of counties where non-State roads will also be evaluated with the protocol.

## SHSP Emphasis Areas

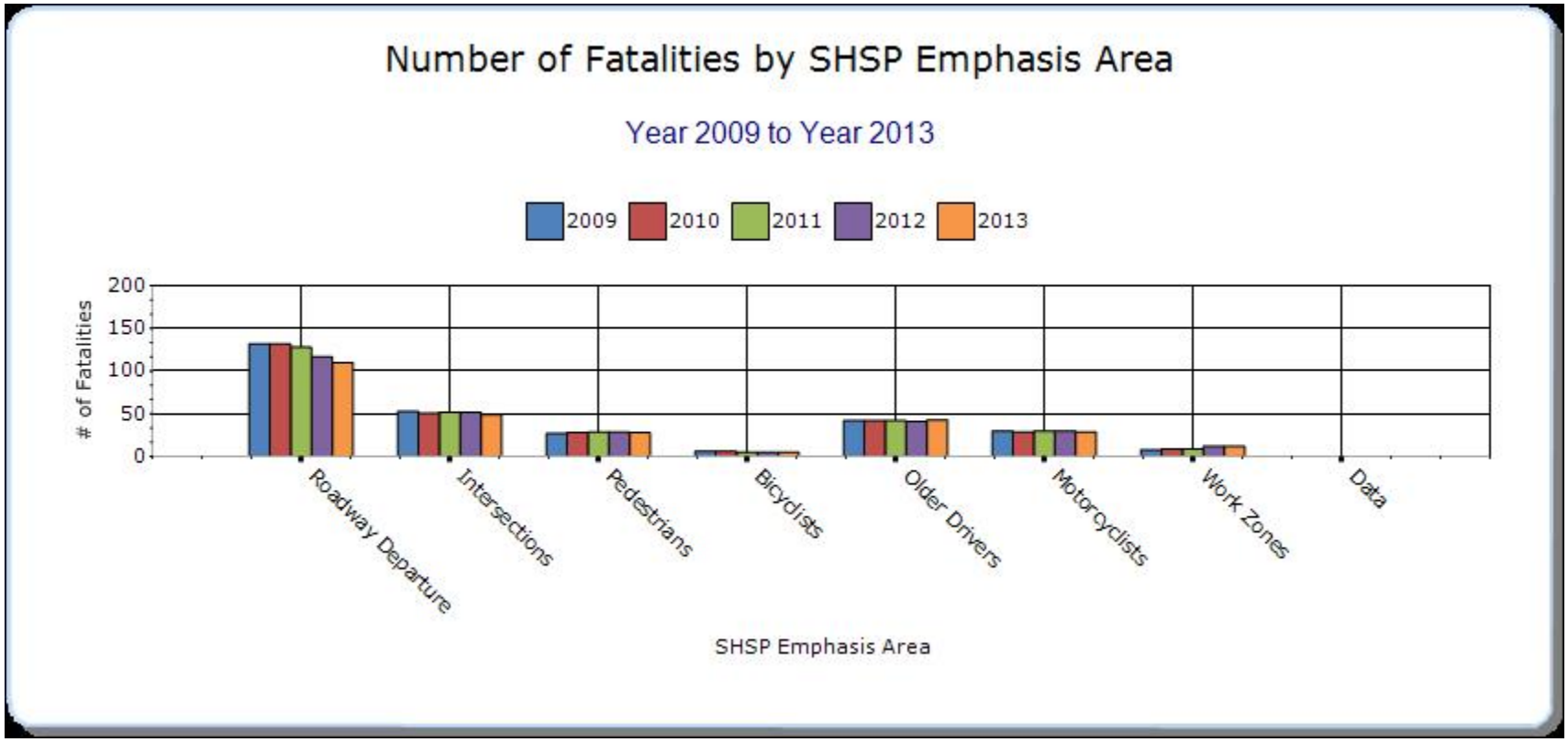
**For each SHSP emphasis area that relates to the HSIP, present trends in emphasis area performance measures.**

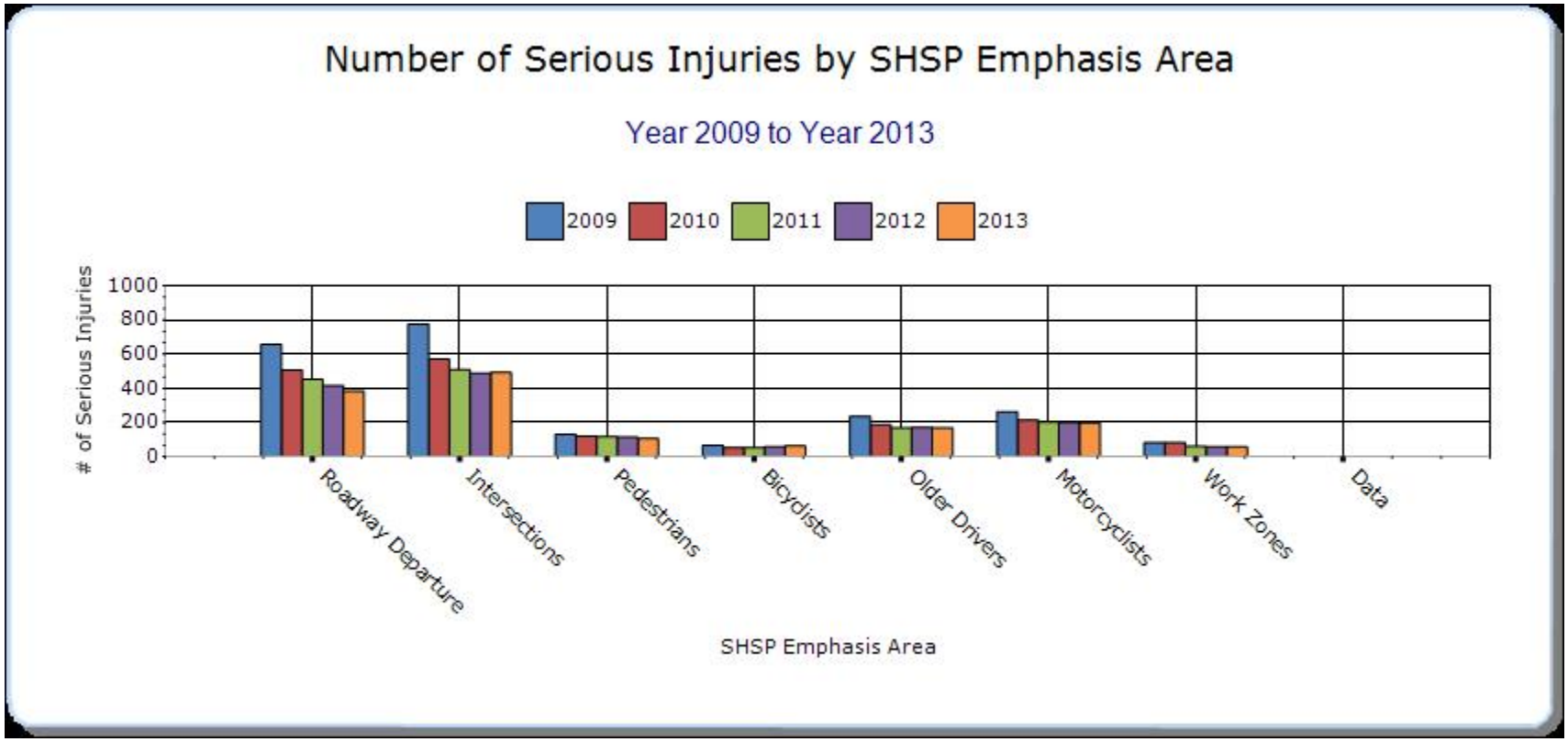
### Year - 2013

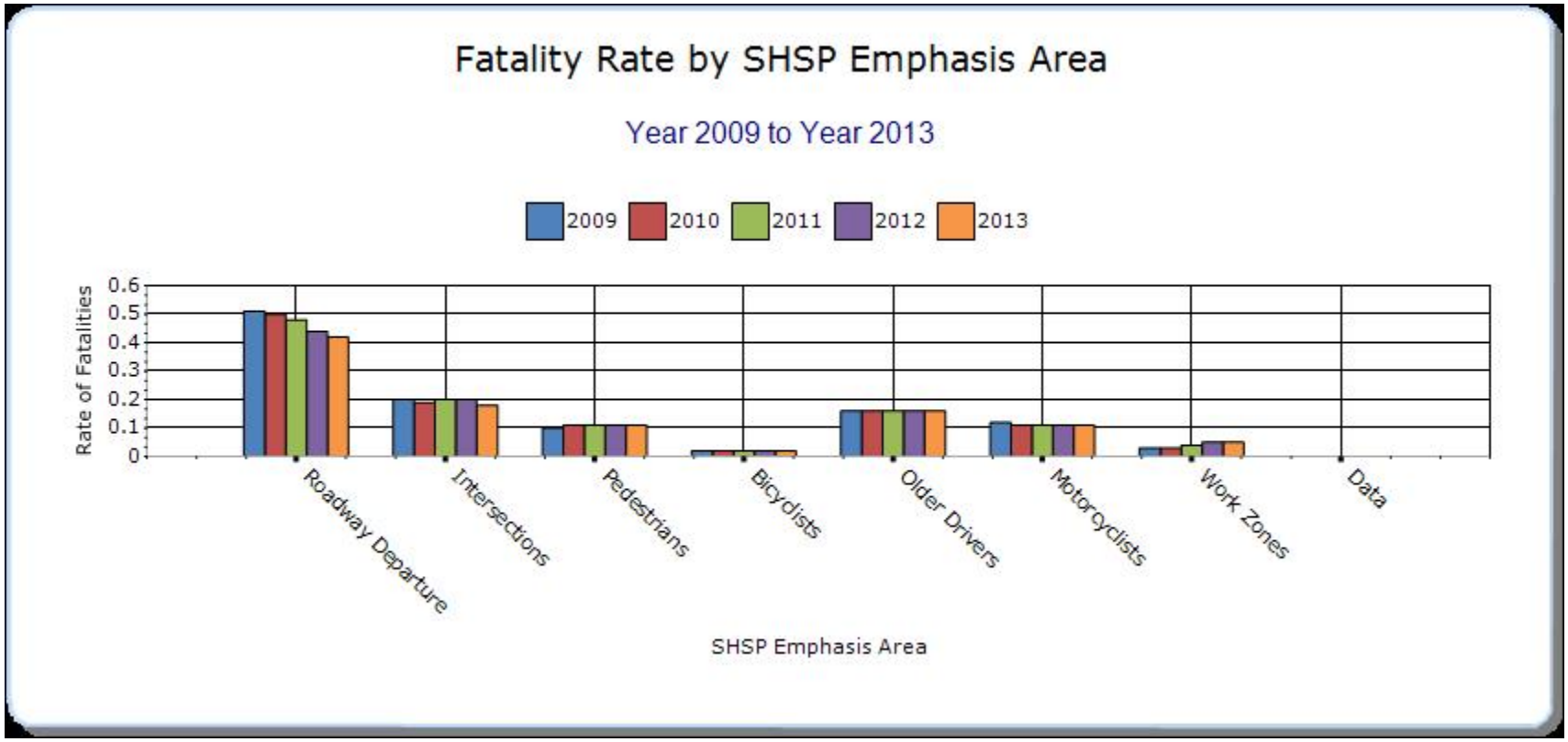
| HSIP-related SHSP Emphasis Areas | Target Crash Type | Number of fatalities | Number of serious injuries | Fatality rate (per HMVMT) | Serious injury rate (per HMVMT) | Other-1 | Other-2 | Other-3 |
|---|---|---|---|---|---|---|---|---|
| **Roadway Departure** | Run-off-road | 110 | 384 | 0.42 | 1.44 | 0 | 0 | 0 |
| **Intersections** | Intersection | 49 | 492 | 0.18 | 1.85 | 0 | 0 | 0 |
| **Pedestrians** | Vehicle/pedestrian | 28 | 106 | 0.11 | 0.4 | 0 | 0 | 0 |
| **Bicyclists** | Vehicle/bicycle | 5 | 62 | 0.02 | 0.23 | 0 | 0 | 0 |
| **Older Drivers** | Older Drivers | 43 | 169 | 0.16 | 0.64 | 0 | 0 | 0 |
| **Motorcyclists** | Motorcycle Involved | 29 | 198 | 0.11 | 0.74 | 0 | 0 | 0 |
| **Work Zones** | Work Zone Related | 12 | 57 | 0.05 | 0.21 | 0 | 0 | 0 |
| **Adverse Roadway Surface Condition** | Wet road | 36 | 223 | 0.14 | 0.84 | 0 | 0 | 0 |
| **Adverse Weather** | Poor weather conditions | 22 | 120 | 0.08 | 0.45 | 0 | 0 | 0 |
| **Aggressive Driving** | Aggressive Driving | 12 | 48 | 0.05 | 0.18 | 0 | 0 | 0 |
| **Collision with Fixed** | Run-off-road | 55 | 243 | 0.21 | 0.91 | 0 | 0 | 0 |

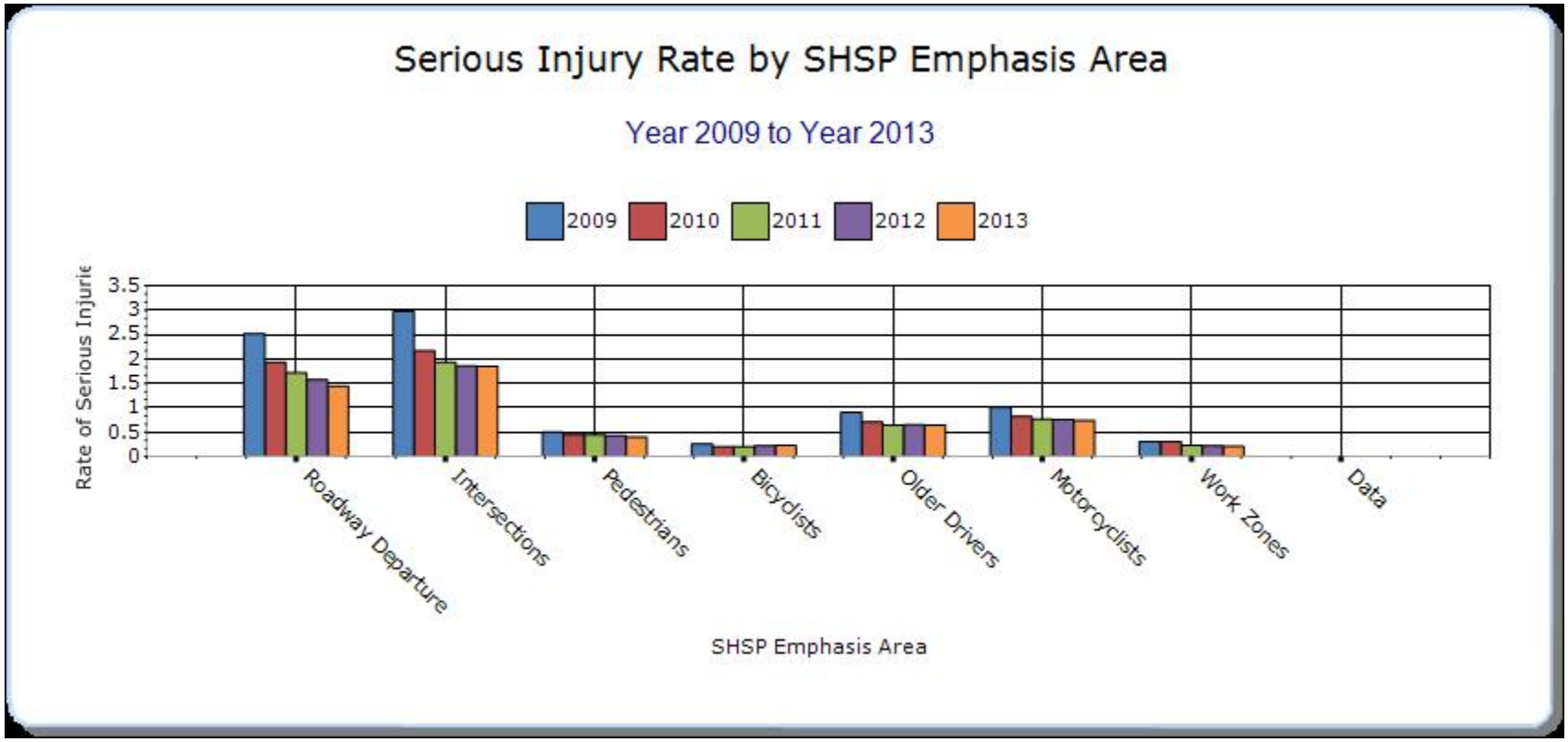
| Object | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Commercial Motor Vehicle** | Truck-related | 30 | 87 | 0.11 | 0.33 | 0 | 0 | 0 |
| **Distracted Driving** | Distracted Driving | 18 | 130 | 0.07 | 0.49 | 0 | 0 | 0 |
| **Domestic Animal Related** | Domestic Animals | 0 | 5 | 0 | 0.02 | 0 | 0 | 0 |
| **Drowsy Driving** | Drowsy Driving | 13 | 57 | 0.05 | 0.21 | 0 | 0 | 0 |
| **DUI** | DUI | 45 | 153 | 0.17 | 0.58 | 0 | 0 | 0 |
| **Interstate Highway** | Interstates | 59 | 219 | 0.22 | 0.83 | 0 | 0 | 0 |
| **Night/Dark Condition** | Night-time | 85 | 350 | 0.32 | 1.32 | 0 | 0 | 0 |
| **Overturn/Rollover** | Rollover | 93 | 350 | 0.35 | 1.32 | 0 | 0 | 0 |
| **Railroad Crossing** | Railroad Related | 1 | 4 | 0.01 | 0.02 | 0 | 0 | 0 |
| **Roadway Geometry Related** | Road Geometry | 109 | 437 | 0.41 | 1.65 | 0 | 0 | 0 |
| **State Route** | Crashes on State Routes | 174 | 813 | 0.65 | 3.06 | 0 | 0 | 0 |
| **Single Vehicle** | Single Vehicle | 133 | 614 | 0.5 | 2.31 | 0 | 0 | 0 |
| **Speed Related** | Speed-related | 60 | 240 | 0.23 | 0.91 | 0 | 0 | 0 |
| **Teenage Driver** | Teen Drivers | 35 | 216 | 0.13 | 0.81 | 0 | 0 | 0 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Involved** | | | | | | | | |
| **Train Involved** | Train Involved | 2 | 3 | 0.01 | 0.01 | 0 | 0 | 0 |
| **Transit Vehicle Involved** | Transit Vehicle | 4 | 12 | 0.02 | 0.05 | 0 | 0 | 0 |
| **Urban County** | Urban County | 132 | 916 | 0.5 | 3.45 | 0 | 0 | 0 |
| **Wild Animal Related** | Vehicle/animal | 3 | 18 | 0.01 | 0.07 | 0 | 0 | 0 |
| **Improper Restraint** | Improper Restraint | 86 | 255 | 0.32 | 0.96 | 0 | 0 | 0 |
| **Rural Non-State** | Rural Non-State Roads | 19 | 108 | 0.07 | 0.41 | 0 | 0 | 0 |
| | | | | | | | | |


Number of Fatalities by SHSP Emphasis Area
Year 2009 to Year 2013
2009
2010
2011
2012
2013
# of Fatalities
200
150
100
50
0
Roadway Departure
Intersections
Pedestrians
Bicyclists
Older Drivers
Motorcyclists
Work Zones
Data
SHSP Emphasis Area


Number of Serious Injuries by SHSP Emphasis Area
Year 2009 to Year 2013
2009
2010
2011
2012
2013
# of Serious Injuries
1000
800
600
400
200
0
Roadway Departure
Intersections
Pedestrians
Bicyclists
Older Drivers
Motorcyclists
Work Zones
Data
SHSP Emphasis Area


Fatality Rate by SHSP Emphasis Area
Year 2009 to Year 2013
2009
2010
2011
2012
2013
Rate of Fatalities
0.6
0.5
0.4
0.3
0.2
0.1
0
Roadway Departure
Intersections
Pedestrians
Bicyclists
Older Drivers
Motorcyclists
Work Zones
Data
SHSP Emphasis Area

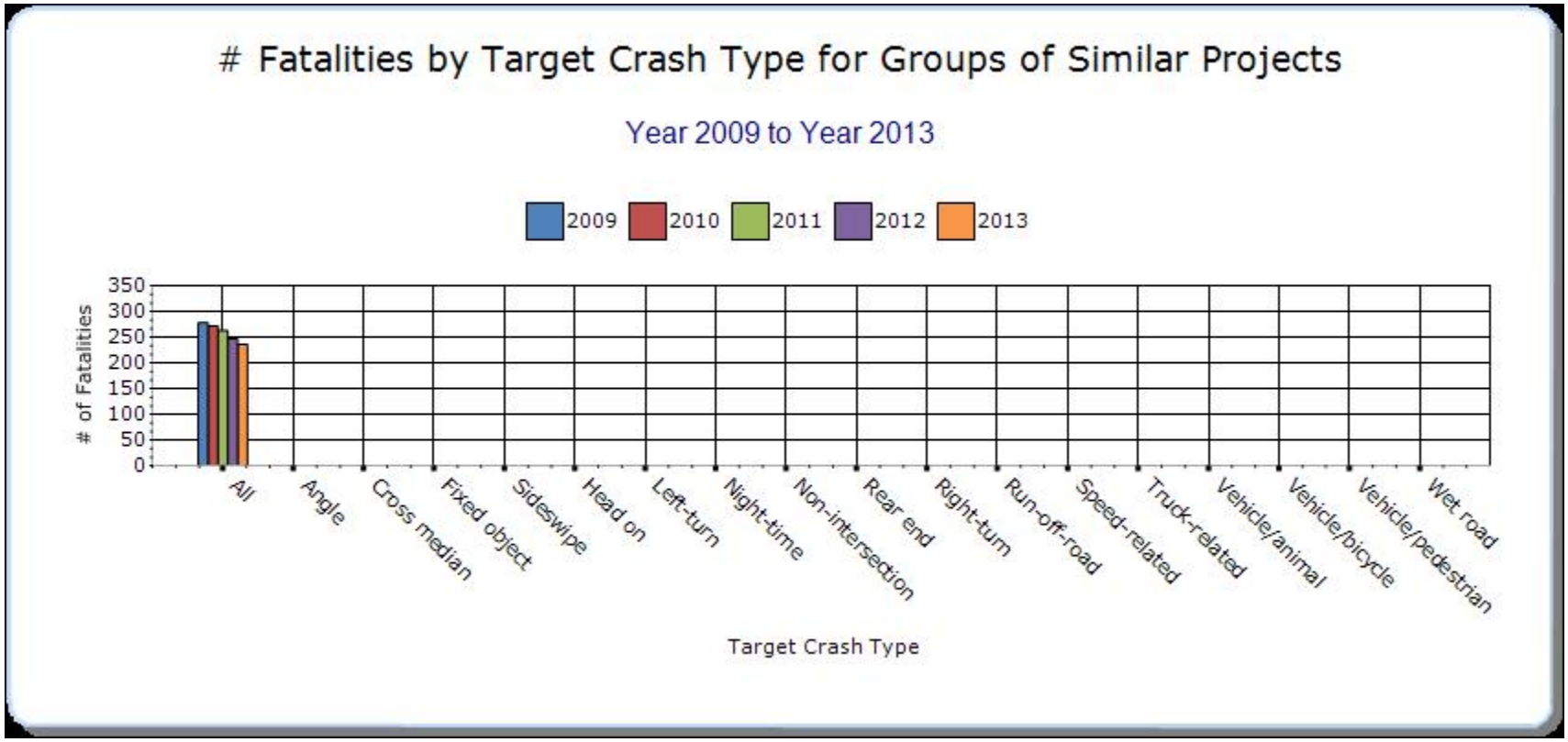

Serious Injury Rate by SHSP Emphasis Area
Year 2009 to Year 2013
2009
2010
2011
2012
2013
Rate of Serious Injurie
3.5
3
2.5
2
1.5
1
0.5
0
Roadway Departure
Intersections
Pedestrians
Bicyclists
Older Drivers
Motorcyclists
Work Zones
Data
SHSP Emphasis Area

## Groups of similar project types

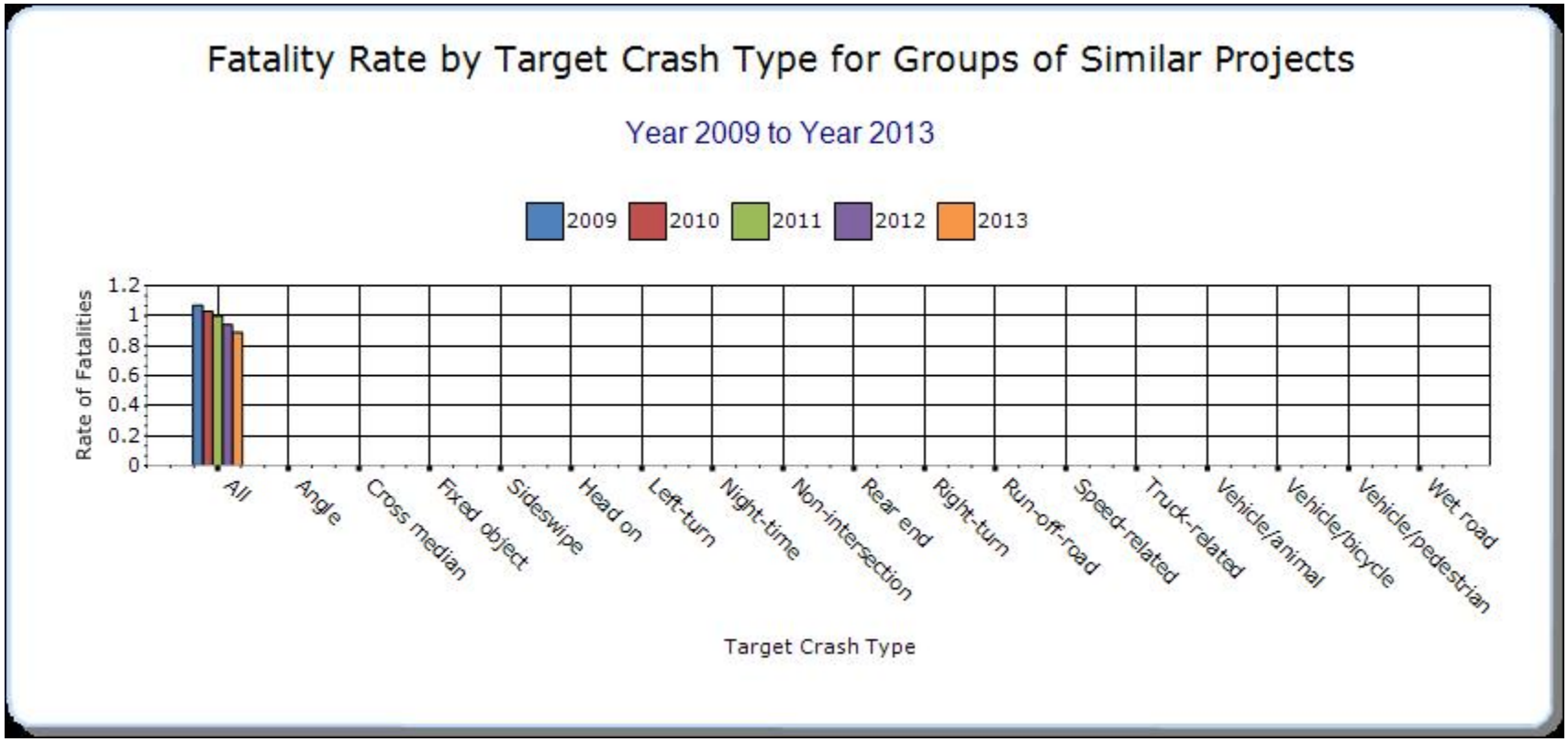
**Present the overall effectiveness of groups of similar types of projects.**

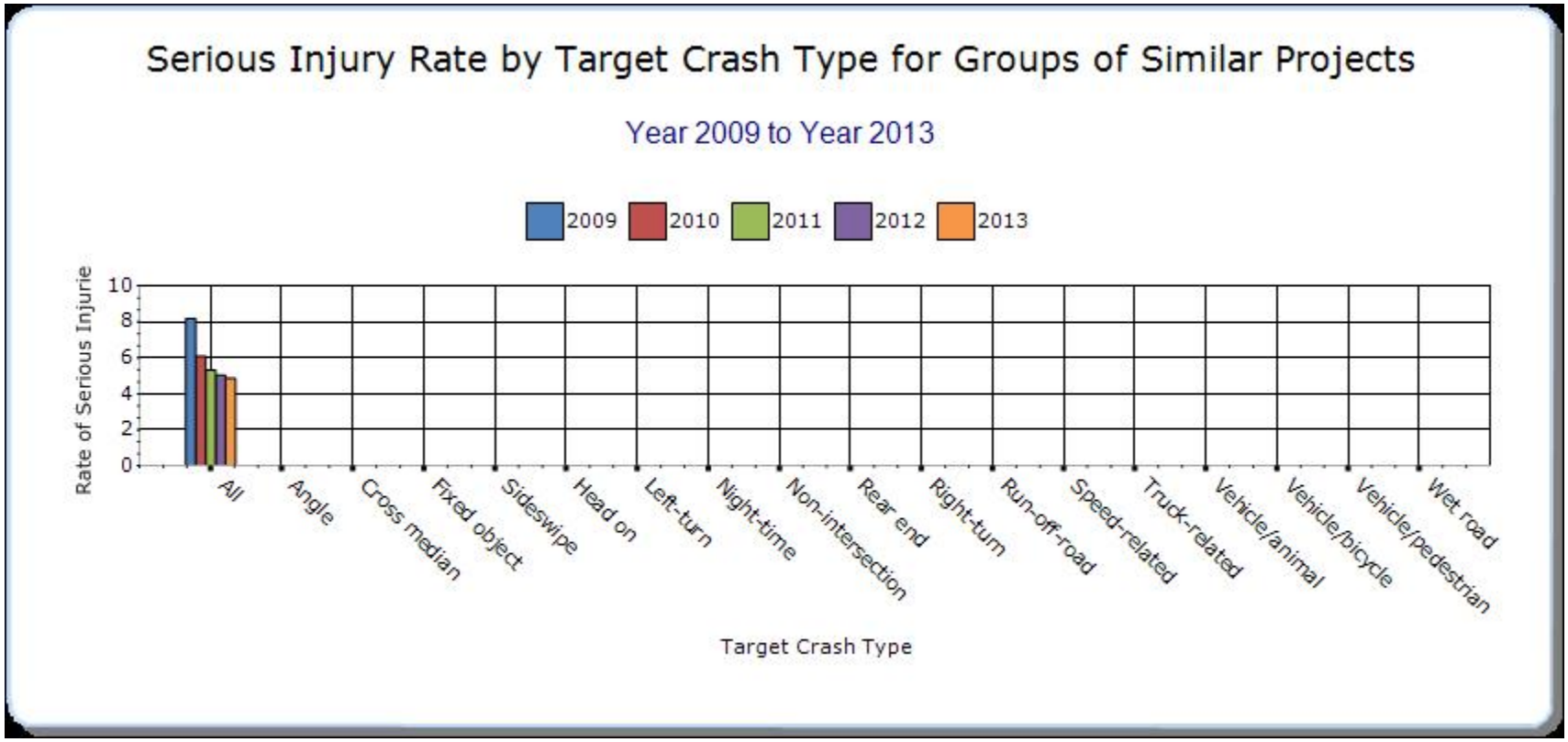
### Year - 2013

| HSIP Sub-program Types | Target Crash Type | Number of fatalities | Number of serious injuries | Fatality rate (per HMVMT) | Serious injury rate (per HMVMT) | Other-1 | Other-2 | Other-3 |
|---|---|---|---|---|---|---|---|---|
| **Low-Cost Spot Improvements** | Roadway Departure | 110 | 384 | 0.42 | 1.44 | 0 | 0 | 0 |
| **Other-Reduce Serious & Fatal Injuries** | All | 236 | 1291 | 0.89 | 4.86 | 0 | 0 | 0 |
| | | | | | | | | |


# Fatalities by Target Crash Type for Groups of Similar Projects
Year 2009 to Year 2013
2009
2010
2011
2012
2013
# of Fatalities
350
300
250
200
150
100
50
0
All
Angle
Cross median
Fixed object
Sideswipe
Head on
Left-turn
Night-time
Non-intersection
Rear end
Right-turn
Run-off-road
Speed-related
Truck-related
Vehicle/animal
Vehicle/bicycle
Vehicle/pedestrian
Wet road
Target Crash Type


#Serious Injuries by Target Crash Type for Groups of Similar Projects
Year 2009 to Year 2013
2009
2010
2011
2012
2013
# of Serious Injuries
2500
2000
1500
1000
500
0
All
Angle
Cross median
Fixed object
Sideswipe
Head on
Left-turn
Night-time
Non-intersection
Rear end
Right-turn
Run-off-road
Speed-related
Truck-related
Vehicle/animal
Vehicle/bicycle
Vehicle/pedestrian
Wet road
Target Crash Type


Fatality Rate by Target Crash Type for Groups of Similar Projects
Year 2009 to Year 2013
2009
2010
2011
2012
2013
Rate of Fatalities
1.2
1
0.8
0.6
0.4
0.2
0
All
Angle
Cross median
Fixed object
Sideswipe
Head on
Left-turn
Night-time
Non-intersection
Rear end
Right-turn
Run-off-road
Speed-related
Truck-related
Vehicle/animal
Vehicle/bicycle
Vehicle/pedestrian
Wet road
Target Crash Type




Most of our low-cost spot improvements have been rumble strips and median barrier, both of which target run-off-road crashes. For this reason, we estimated the impact of that program by using the "Roadway Departure" crash totals.

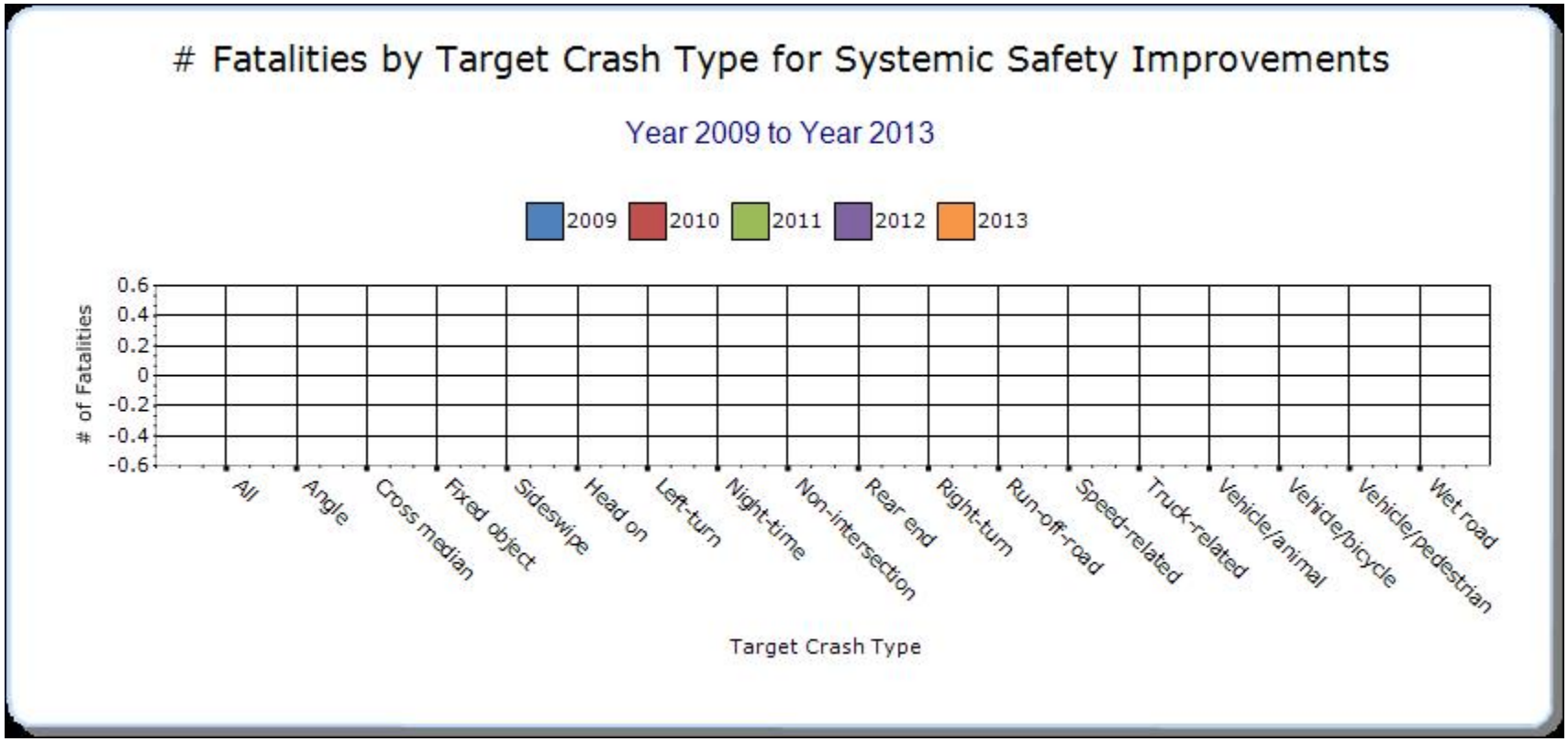
The only other real sub-program that UDOT does is "reducing fatal and serious injury crashes" and we used the overall crash totals to estimate that.

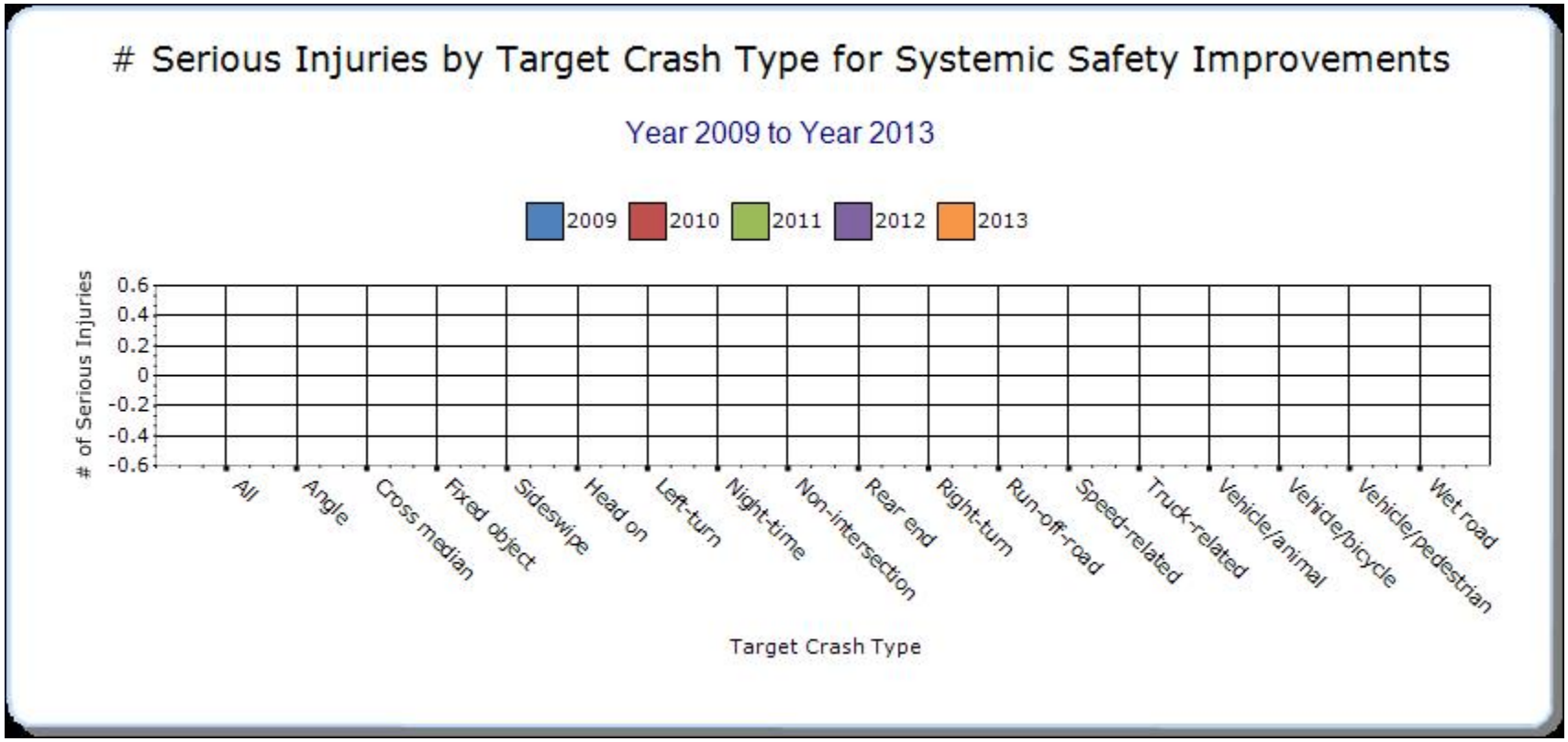
## Systemic Treatments

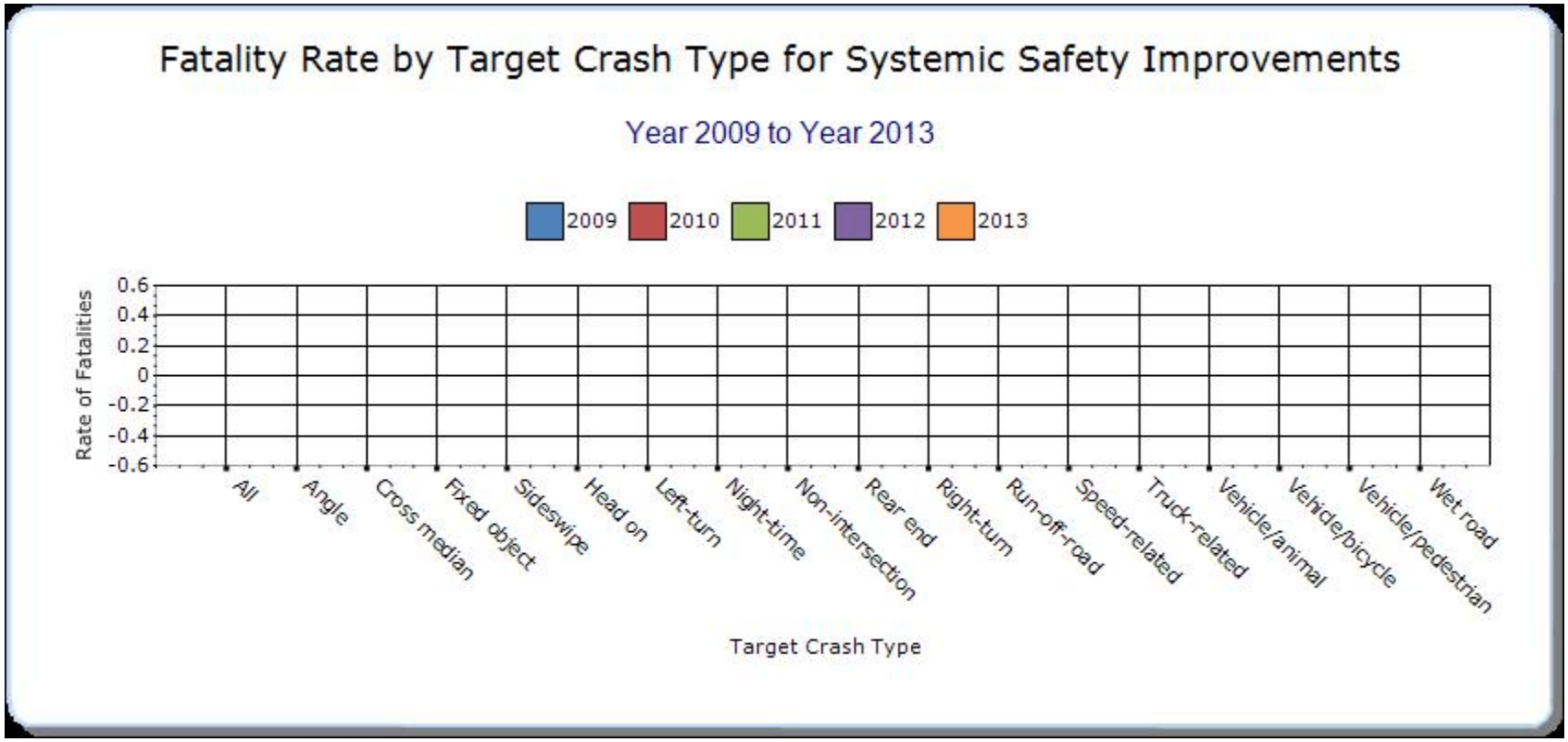
**Present the overall effectiveness of systemic treatments.**

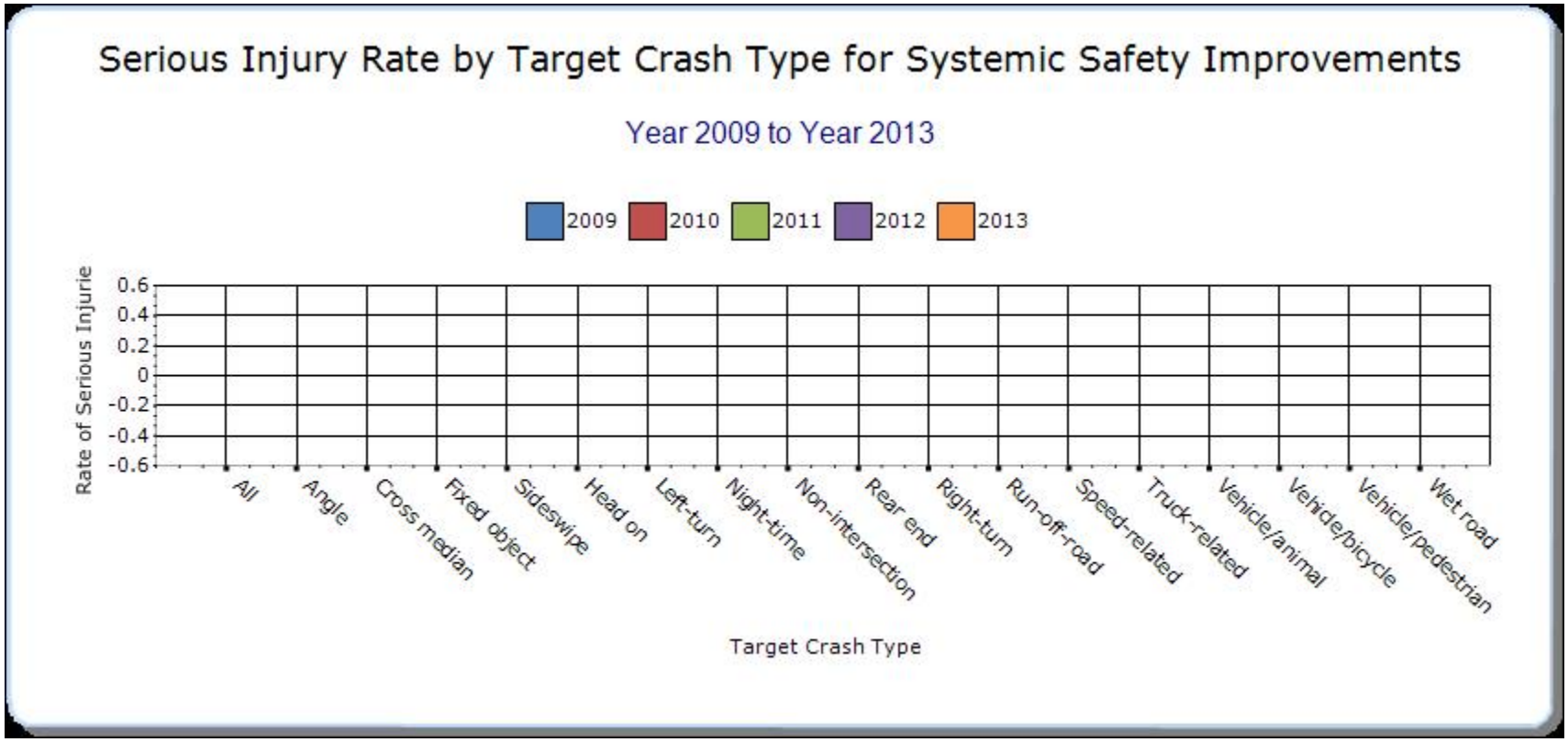
### Year - 2013

| Systemic improvement | Target Crash Type | Number of fatalities | Number of serious injuries | Fatality rate (per HMVMT) | Serious injury rate (per HMVMT) | Other-1 | Other-2 | Other-3 |
|---|---|---|---|---|---|---|---|---|
| **Median Barriers, Rumble Strips, Guardrails** | Roadway Departure | 110 | 384 | 0.42 | 1.44 | 0 | 0 | 0 |
| | | | | | | | | |


# Fatalities by Target Crash Type for Systemic Safety Improvements
Year 2009 to Year 2013
2009
2010
2011
2012
2013
# of Fatalities
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
All
Angle
Cross median
Fixed object
Sideswipe
Head on
Left-turn
Night-time
Non-intersection
Rear end
Right-turn
Run-off-road
Speed-related
Truck-related
Vehicle/animal
Vehicle/bicycle
Vehicle/pedestrian
Wet road
Target Crash Type


# Serious Injuries by Target Crash Type for Systemic Safety Improvements
Year 2009 to Year 2013
2009
2010
2011
2012
2013
# of Serious Injuries
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
All
Angle
Cross median
Fixed object
Sideswipe
Head on
Left-turn
Night-time
Non-intersection
Rear end
Right-turn
Run-off-road
Speed-related
Truck-related
Vehicle/animal
Vehicle/bicycle
Vehicle/pedestrian
Wet road
Target Crash Type


Fatality Rate by Target Crash Type for Systemic Safety Improvements
Year 2009 to Year 2013
2009
2010
2011
2012
2013
Rate of Fatalities
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
All
Angle
Cross median
Fixed object
Sideswipe
Head on
Left-turn
Night-time
Non-intersection
Rear end
Right-turn
Run-off-road
Speed-related
Truck-related
Vehicle/animal
Vehicle/bicycle
Vehicle/pedestrian
Wet road
Target Crash Type




Most of our systemic safety improvements have been geared toward mitigating run-off-road crashes, so we used the "Roadway Departure" crash type to estimate our impact on systemic crash types.

**Describe any other aspects of the overall Highway Safety Improvement Program effectiveness on which you would like to elaborate**.

As has been demonstrated in the other questions, Utah continues to experience a downward trend in overall serious and fatal injury crashes. Also, nearly all individual crash categories (whether broken down by crash type, road ownership, SHSP emphasis area, etc) have experienced declines. As fatalities continue to be reduced it will become more difficult to find projects that have a large impact on improving safety. UDOT will need to be vigilant about continuing to identify ways to further reduce serious and fatal injury crashes. Our gradual shift towards using systemic methods continues and we will be dependent upon projects identified through systemic means to continue our downward trends.

**Provide project evaluation data for completed projects (optional).**

| Location | Functional Class | Improvement Category | Improvement Type | Bef-Fatal | Bef-Serious Injury | Bef-Other Injury | Bef-PDO | Bef-Total | Aft-Fatal | Aft-Serious Injury | Aft-Other Injury | Aft-PDO | Aft-Total | Evaluation Results (Benefit/ Cost Ratio) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **I-15; Benjamin to Spanish Fork - MP 253 TO 255 (PIN 6932)** | Rural Principal Arterial - Interstate | Roadside | Barrier - cable | 0 | 3 | 14 | 12 | 29 | 1 | 0 | 3 | 17 | 21 | 10.03 |
| **SR-12 AT MP 121.5 (PIN 6525)** | Rural Principal Arterial - Other | Roadside | Barrier- metal | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 1.45 |
| **I-15 Cable Barrier (PIN 6934)** | Rural Principal Arterial - Interstate | Roadside | Barrier - cable | 0 | 1 | 1 | 9 | 11 | 0 | 3 | 3 | 30 | 36 | 0 |
| **I-215; REDWOOD RD. TO I-15 (PIN 7769)** | Urban Principal Arterial - Interstate | Roadside | Barrier - cable | 1 | 1 | 4 | 12 | 18 | 1 | 0 | 3 | 9 | 13 | 18.67 |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **US-6; MP 235.5 TO MP 239 (PIN 6847)** | Rural Principal Arterial - Other | Animal-related | Wildlife Fencing | 0 | 0 | 1 | 17 | 18 | 0 | 0 | 0 | 9 | 9 | 0.54 |
| **US-91, MANTUA TO CACHE COUNTY LINE (PIN 6922)** | Urban Principal Arterial - Other | Roadside | Barrier - concrete | 1 | 1 | 2 | 5 | 9 | 0 | 1 | 1 | 4 | 6 | 2.58 |
| **SR-154; NORTH OF SR-201 (PIN 7829)** | Urban Principal Arterial - Other Freeways and Expressways | Roadside | Barrier - cable | 0 | 1 | 0 | 3 | 4 | 0 | 0 | 0 | 2 | 2 | 4.93 |
| **US-89; SPRINGVILLE TO PROVO (PIN 7119)** | Urban Principal Arterial - Other | Shoulder treatments | Widen shoulder - paved or other | 1 | 0 | 8 | 2 | 11 | 0 | 0 | 2 | 1 | 3 | 30.69 |
| **SR-28 AT MP 38; NEPHI SANDSTONE ACCESS (PIN 7111)** | Rural Principal Arterial - Other | Intersection geometry | Auxiliary lanes - add acceleration lane | 0 | 0 | 1 | 3 | 4 | 0 | 0 | 0 | 2 | 2 | 0.61 |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **VARIOUS LOCATIONS ON US-40 AND US-189 (PIN 7469)** | Rural Principal Arterial - Other | Roadway | Rumble strips - edge or shoulder | 3 | 10 | 31 | 81 | 125 | 1 | 4 | 23 | 82 | 110 | 265.9 |
| **US-89 - MILEPOST 22 TO 26 (PIN 6555)** | Rural Principal Arterial - Other | Roadside | Barrier- metal | 0 | 2 | 2 | 4 | 8 | 0 | 0 | 2 | 1 | 3 | 9.08 |
| **US-191 - MP 86 to 114 (PIN 6557)** | Rural Principal Arterial - Other | Roadside | Barrier- metal | 0 | 0 | 1 | 2 | 3 | 0 | 0 | 0 | 2 | 2 | 1.05 |
| **I-15, 2700 NORTH TO HOT SPRINGS (PIN 6921)** | Rural Principal Arterial - Interstate | Roadside | Barrier - cable | 2 | 1 | 11 | 23 | 37 | 0 | 0 | 6 | 18 | 24 | 12.86 |
| **I-15 FROM SR-193 TO SR-97, MP 334 TO 338 (PIN 7524)** | Rural Principal Arterial - Interstate | Roadside | Barrier - cable | 3 | 3 | 29 | 59 | 94 | 2 | 4 | 13 | 64 | 83 | 9.49 |
| **SR-24; MP 86 TO 117 (PIN 7575)** | Rural Principal Arterial - | Roadside | Barrier- metal | 1 | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 10.43 |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Other | | | | | | | | | | | | | |
| **US-91 MP 14 TO 16 (PIN 8240)** | Rural Principal Arterial - Other | Roadside | Barrier - concrete | 0 | 0 | 6 | 4 | 10 | 1 | 0 | 0 | 4 | 5 | 0 |
| **I-80 WEST VARIOUS LOCATIONS BETWEEN MP 0 AND 99 (PIN 8357)** | Rural Principal Arterial - Interstate | Roadside | Barrier - cable | 0 | 2 | 5 | 11 | 18 | 0 | 0 | 5 | 17 | 22 | 6.97 |
| **I-80 WB, MAINLINE MP 127 AND RAMP (PIN 8236)** | Urban Principal Arterial - Interstate | Roadside | Barrier - concrete | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0.31 |
| **US-189 PROVO CANYON MP 9 TO 12 (PIN 8223)** | Rural Principal Arterial - Other | Roadside | Barrier - cable | 2 | 1 | 2 | 4 | 9 | 0 | 0 | 2 | 2 | 4 | 13.39 |
| **I-15 VARIOUS LOCATIONS BETWEEN MP 221.95 - 253.04 (PIN** | Rural Principal Arterial - Interstate | Roadside | Barrier - cable | 8 | 6 | 72 | 90 | 176 | 4 | 11 | 42 | 135 | 192 | 1.31 |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **8287)** | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |

We spoke with the UDOT RE in charge of construction supervision for the I-15 Cable Barrier Project (PIN 6934). He feels that the cable barrier is too close to the roadway (8') and that ROR type crashes are now reported higher because they get tangled in the cable barrier easier than if it were placed further back. He was not able to provide plan sets for us to look at to determine whether the barrier was installed per plans or not.

For the US-91 project (PIN 8240), overall crashes were reduced by 50% but a lone fatality in the "after" period resulted in the low B/C. We reviewed the fatal crash report, confirmed the existence of the project upgrade, and verified that the crash was not mitigated by the improvement.

# Optional Attachments

| Sections | Files Attached |
| --- | --- |

# Glossary

**5 year rolling average** means the average of five individual, consecutive annual points of data (e.g. annual fatality rate).

**Emphasis area** means a highway safety priority in a State's SHSP, identified through a data-driven, collaborative process.

**Highway safety improvement project** means strategies, activities and projects on a public road that are consistent with a State strategic highway safety plan and corrects or improves a hazardous road location or feature or addresses a highway safety problem.

**HMVMT** means hundred million vehicle miles traveled.

**Non-infrastructure projects** are projects that do not result in construction. Examples of non-infrastructure projects include road safety audits, transportation safety planning activities, improvements in the collection and analysis of data, education and outreach, and enforcement activities.

**Older driver special rule** applies if traffic fatalities and serious injuries per capita for drivers and pedestrians over the age of 65 in a State increases during the most recent 2-year period for which data are available, as defined in the Older Driver and Pedestrian Special Rule Interim Guidance dated February 13, 2013.

**Performance measure** means indicators that enable decision-makers and other stakeholders to monitor changes in system condition and performance against established visions, goals, and objectives.

**Programmed funds** mean those funds that have been programmed in the Statewide Transportation Improvement Program (STIP) to be expended on highway safety improvement projects.

**Roadway Functional Classification** means the process by which streets and highways are grouped into classes, or systems, according to the character of service they are intended to provide.

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

**Systemic safety improvement** means an improvement that is widely implemented based on high risk roadway features that are correlated with specific severe crash types.

**Transfer** means, in accordance with provisions of 23 U.S.C. 126, a State may transfer from an apportionment under section 104(b) not to exceed 50 percent of the amount apportioned for the fiscal year to any other apportionment of the State under that section.