



Strategic Transportation Safety Plan

MAG Contract No. 529 Project No. SP13-01

Technical Memorandum No. 1 – Transportation System Performance and Available Financial Resources from a Transportation Safety Perspective

1.1 INTRODUCTION

The Lee Engineering/TTI Team is developing a comprehensive update of the 2005 Strategic Transportation Safety Plan (STSP) for the Maricopa Association of Governments. The new STSP will establish regional vision, goals, objectives, strategies, countermeasures, and performance measures for transportation safety. The STSP will also identify strategies for addressing new areas of transportation safety. The development of the STSP will be closely coordinated with the ongoing development of the state's Strategic Highway Safety Plan (SHSP) by the Arizona DOT. The recommendations included in the STSP will be incorporated in the next generation MAG Regional Transportation Plan.

This technical memorandum is the first in a series to document the effort on the plan. Technical Memorandum #1 summarizes the work completed on Task 1: Transportation System Performance and Available Resources from a Transportation Safety Perspective. This task consists of three components: 1) preparing and delivering a formal presentation of the project work plan and schedule of planned activities at the project kick-off meeting, 2) reviewing the current state of transportation safety in the MAG region, and 3) comparing safety dollars allocated at the region, state, and nation level, reviewing current programs and funding sources available for road safety planning and implementation.

1.2 PROJECT INITIATION

The project's kick-off meeting was held on July 23, 2013 with a presentation by the consultant team of the work plan and schedule to the MAG Transportation Safety Committee (TSC).

1.2.1 Transportation Safety Committee (TSC)

The MAG TSC, formed in 2004, was the first for an MPO in the nation. The TSC provides oversight to the MAG Transportation Safety Planning Program from its various state and local partners. The primary goals of the Program are to help identify both current and potential future transportation safety issues, concerns and needs in the region, and determine ways to address them through the regional transportation planning process. The foundation of the TSC was set by the Regional Transportation Safety Stakeholders Group, formed in 2001. This diverse group, representing a broad cross section of public and private agencies and safety advocacy groups helped the region take the first steps in true multidisciplinary transportation safety planning. The Stakeholder group began the region's first Strategic Transportation Safety Plan, which the TSC completed in 2005.¹ Some of the safety priorities identified in the 2005 MAG Strategic Transportation Safety Plan are: developing a road safety information management system, promoting road safety audits, improving roads for older road users, better public awareness of road safety issues, reducing red light running, reducing bicycle and pedestrian crashes, and improving safety in access routes to schools.²

¹ <http://azmag.gov/Committees/Committee.asp?CMSID=1059>

² <http://www.azmag.gov/Committees/Committee.asp?CMSID=1059>

The TSC consists of representatives from:

AAA Arizona	City of El Mirage	City of Peoria
AARP	FHWA	City of Phoenix
ADOT	Town of Gilbert	City of Scottsdale
City of Apache Junction	City of Glendale	City of Surprise
City of Avondale	GOHS	City of Tempe
Town of Buckeye	City of Goodyear	Valley Metro RPTA
City of Chandler	Maricopa County	
City of Mesa	Town of Paradise Valley	

1.2.2 Transportation Safety Stakeholders Group (TSSG)

Oversight for this project will be provided by the MAG Transportation Safety Stakeholders Group (TSSG) that will consist primarily of TSC members and other key stakeholders. A primary objective of the TSSG will be to provide a broad view of transportation safety from the standpoints of a wide variety of user groups. They will participate in project workshops at key points during the project in conjunction with the MAG Transportation Safety Committee meetings.

The following individuals and agencies serve on the TSSG:

Dave Paul, Driving Arizona LLC, *Driver Education*
Max Merritt, City of Glendale Police Department, *Traffic Enforcement*
Sandy Adams, City of Glendale, *Traffic Safety Education*
Tomi St. Mars, ADHS, *Health and Human Services*
Cyndey DeModica, ADOT MVD, *Drivers License Manual*
Cathy Hollow, City of Tempe, Chair of MAG ITS Committee, *Intelligent Transportation Systems*
Katherine Coles, City of Phoenix, *Village Planning*
James Hash, City of Mesa, *Planning*
Denice Lacey, MCDOT, *Long Range Transportation Planning*
Matthew Dudley, City of Glendale, Chair of MAG Elderly & Persons with Disabilities / Transit Committee, *Elderly, Persons with Disabilities, Transit*
Sasha Saliego, GRIC, *Transportation Engineering*
Ester Corbett, *Inter-Tribal Council of Arizona*
Mark Poppe, ADOT, *Traffic Safety Engineering*

Members of the MAG Transportation Safety Committee

Renate Ehm, City of Mesa, *Traffic Engineer – Traffic Engineering Safety Studies*
Kerry Wilcoxon, City of Phoenix, *Traffic Engineer – Neighborhood Traffic*
Julian Dresang, City of Tempe, *Traffic Engineer*
Alberto Gutier, Governor's Office of Highway Safety
Gardner Tabon, Valley Metro RPTA, *Transit Operations & Safety*
Kelly LaRosa, FHWA Arizona Division, *Safety Programs*
Nicolaas Swart, MCDOT, *Traffic Engineering*
Tom Burch, AARP, *Safe Driving Programs*

MAG Staff

Monique de los Rios Urban, MAG, *Performance Measures*
Alice Chen, MAG, *Transportation Planning*
Sarath Joshua, MAG, *Safety Program Management*
Margaret Boone, MAG, *Transportation Safety Planning*

Kiran Guntupalli, MAG, *Transportation Safety Planning*
Leo Luo, MAG, *ITS Planning*
Jorge Luna, MAG, *Transit Planning*
DeDe Gaisthea, MAG, *Human Services Programs*

1.2.3 Work Plan

The STSP work plan will parallel the activities of the ADOT Statewide Strategic Highway Safety Plan (SHSP) that was recently initiated by ADOT. While the MAG region is the most populous area of Arizona, the collision patterns are expected to be significantly different than statewide crash patterns in some areas, resulting in different goals and emphasis areas. Since 50% of the deaths and 70% of the injuries in the state occur in the MAG region, it is critical that serious injury and fatal crashes be targeted, those crashes understood, and programs to reduce them be developed and implemented.

This STSP will be a comprehensive and workable multi-modal plan that identified needed system improvements, recommend potential legislative initiatives, and financial needs to institutionalize safety as a key consideration in the MAG transportation planning process. This Plan will provide guidance for future investment decisions that are reflected in the MAG Regional Transportation Plan (RTP) and the MAG Transportation Improvement Program (TIP) as shown in Figure 1. MAP-21 requires FHWA to develop safety related performance measures. The ADOT and MAG strategic plans will need to be consistent with MAP-21 federal directives and, correspondingly, with each other. The coordination between ADOT's and MAG's various plans and programs will primarily occur at the TIP (short-range) level. The STSP will identify current effective programs and initiate new programs that will result in reducing the number and severity of traffic crashes within the MAG region.

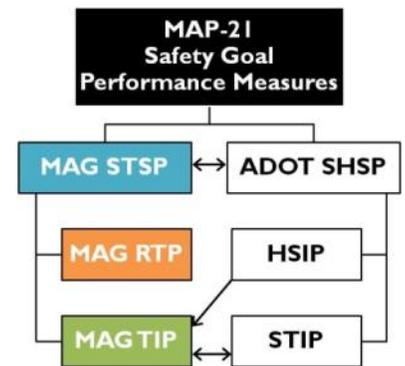


Figure 1 Coordination of Federal, ADOT, and MAG Plans and Programs

The work plan consists of 10 tasks to be completed in the course of 18 months and is displayed in Figure 2. Technical Memoranda will be prepared for each of the nine initial tasks. Supplementing the technical work will be two four-hour workshops:

- As part of Task 2, a *Visioning Workshop* will be held on September 24, 2013 from 9:30 am to 1:30 pm immediately following the 8:30 am TSC meeting. The purpose of this workshop will be to establish regional vision and goals for transportation safety which will identify *who* and *what* the STSP document should guide.
- The second workshop will be part of Task 4 and cover state-of-the-art *Network Screening Methodologies* as detailed in the Highway Safety Manual (HSM). This workshop will be held on January 28, 2014 from 10:30 am – 2:30 pm immediately following the 9:30 am TSC meeting.



Task	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	
	2013						2014												2015	
	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	
MAG Transportation Safety Committee Meeting	23		24		19		28		25		27		22		23		25		27	
1 Road System Performance & Available Resources from a Road Safety Perspective	█																			
1(b) Review Current State of Road Safety in the MAG Region	█																			
1(c) Current Programs & Funding Resources for Road Safety Planning & Implementation		█																		
2 Establish Regional Vision and Goals for Transportation Safety		█ ◆																		
3 Emphasis Areas, Potential Strategies, & Performance Measures			█																	
4 Network Screening Methodologies for Prioritization of Road Safety Needs					█ ◆															
5 Incorporating Safety in the Regional Transportation Plan							█													
6 Develop a Strategy to Incorporate Safety Enhancements in Road Infrastructure Projects								█												
7 Improving Safety via Traffic Operations & Technology Solutions										█										
8 Monitoring & Reporting on System Performance & Program Effectiveness												█								
9 Implementation Plan 2015 - 2025																█				
10 Final Report, Executive Summary & Presentations																	█			

◆ 4-hour Workshop

Figure 2 STSP Work Plan and Schedule

1.3 CURRENT STATE OF TRANSPORTATION SAFETY IN THE MAG PLANNING AREA

To gain insight into crash occurrence in the MAG planning area, an analysis of crash data was performed for the years 2008 through 2012. The results of this analysis provide an overview of road safety in the MAG planning area and are shown in Figure 3 through Figure 55. Crash trends and patterns for fatalities (K) and serious injuries (A) are presented and discussed in the following sections.

The Regional Transportation Safety Information Management System (RTSIMS) software was used to summarize the crash data pertinent to the MAG Metropolitan planning area. The primary source of crash data is the ALISS crash database maintained by the Arizona DOT. RTSIMS Version 1.0 serves as a key analytical tool at MAG for performing transportation safety analysis that is required for safety planning functions at the regional level. Any local agency in the MAG planning area can obtain a free copy of the software.

1.3.1 Regional Trends in Crashes that Involve Fatalities and Serious Injuries

K and A crashes represent approximately 3.5% of all crashes in the MAG planning area. Following a decline in 2009 and 2010, crashes have been increasing over the past two years.

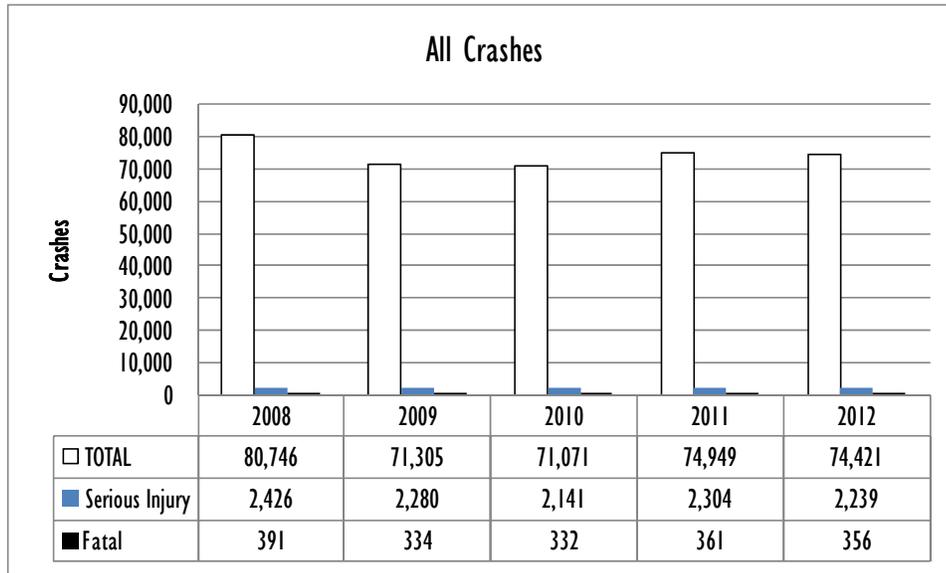


Figure 3 All Crashes, Fatal, and Serious Injury Crashes in the MAG Planning Area

Variation by Month

Serious injury crashes follow the general trend of all crashes with March having the most crash occurrences and July having the fewest. The number of fatal crashes remains steady throughout the year.

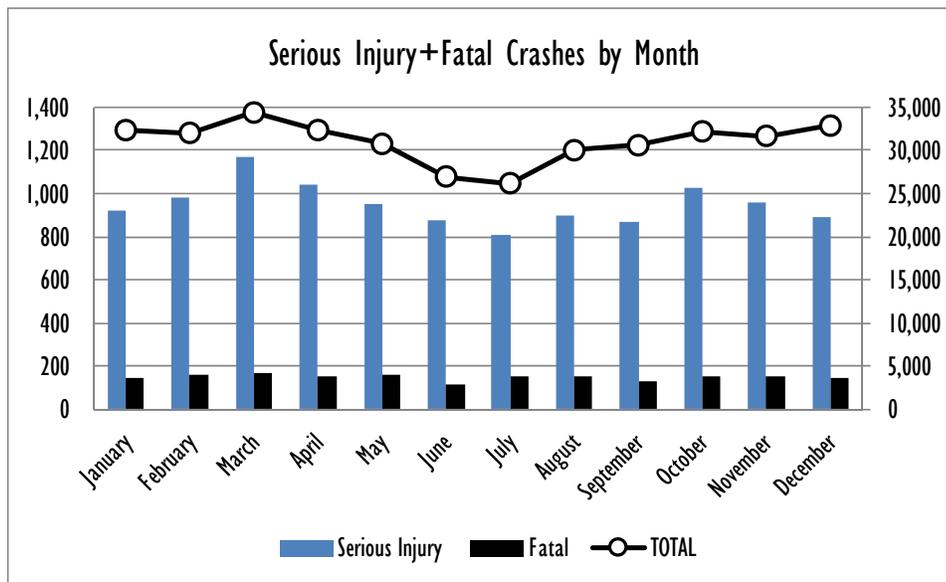


Figure 4 2008-2012 Fatal and Serious Injury Crashes in the MAG Planning Area by Month

Variation by Day of Week

The most serious injury crashes occur on Wednesday, Friday, and Thursday, respectively. There are 34% fewer crashes on Sunday, the lowest day, compared to the highest day, Wednesday. The total number of

crashes on Sunday is 48% lower than the highest day for all crashes, Friday. Fatal crashes are more likely to occur on the weekend, with the highest number occurring on Saturday. These trends suggest that crashes on Friday and the weekend are more likely to result in serious injury or death.

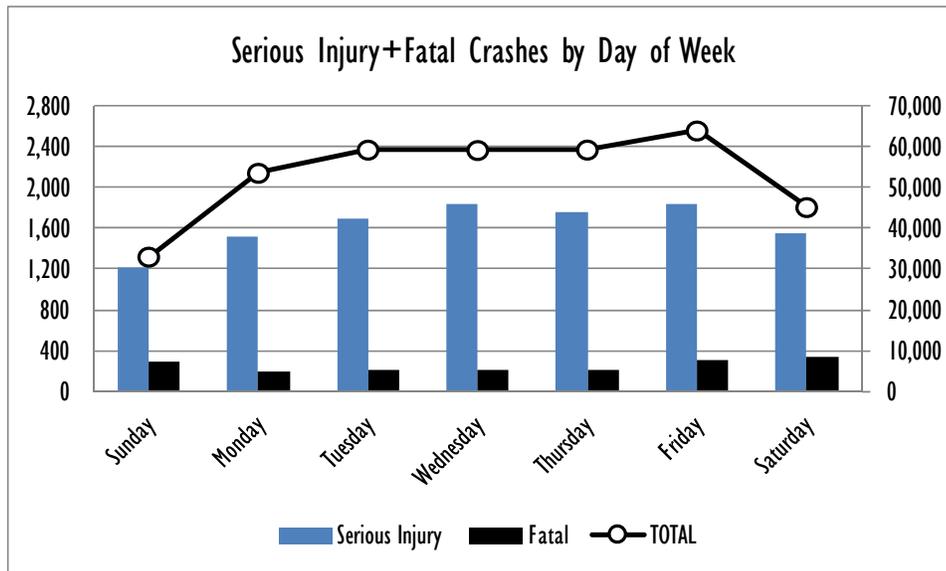


Figure 5 2008-2012 Fatal and Serious Injury Crashes in the MAG Planning Area by Day of Week

Variation by Hour of Day

Crashes of all severity peak in the morning, at noon, and during the afternoon peak traffic volume hours. Serious injury crashes also peak during these periods, but do not fluctuate to as great of an extent and comprise a much smaller portion of total crashes during the day. The most fatal crashes occur in the evening hours with the most occurring in the 6pm hour. Crashes occurring during the hours of midnight to 4 am are most likely to result in serious injury or death.

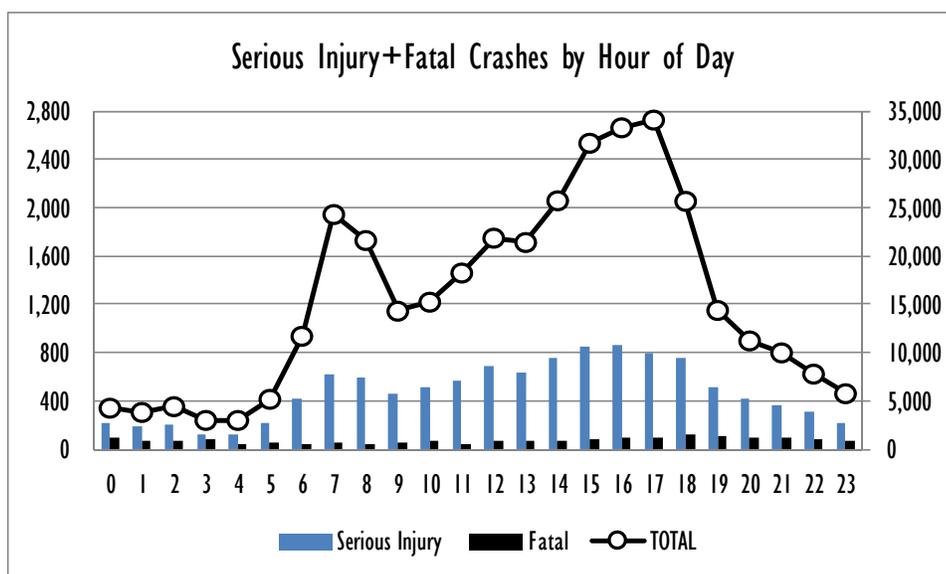


Figure 6 2008-2012 Fatal and Serious Injury Crashes in the MAG Planning Area by Hour of Day

Driver Behavior³

The Arizona crash report allows law enforcement officers to indicate conditions influencing the driver, bicyclist or pedestrian and behaviors that contribute to crashes. These include fell asleep/fatigued, speeding, and impairment due to illness, alcohol, drugs or medications and whether restraints were used.

Lack of restraint usage is defined as any driver or passenger not using a lap belt, shoulder and lap belt, or child restraint system. Although not required under Arizona law, this category also includes any motorcycle driver or passenger not using a helmet. Reporting of lack of restraint for serious injury and fatal crashes in the MAG planning area are 26% and 46%, respectively, for the years 2008 through 2012.

Driver conditions and behavior, referred to as “impaired driving” in the ADOT SHSP, includes all cases where the physical description one or more drivers involved in the crash indicated illness, physical impairment, fell asleep/fatigued, alcohol, drugs or medications as reported by the police officer. In the MAG planning area, 20.0% of serious injury crashes involve an impaired driver. Impaired driving is more likely to result in a fatal crash and is a factor in 44.4% of fatal crashes in the MAG planning area for the study period. Fatal crashes involving an impaired driver have gone down in the most recent three years compared to the number of crashes in 2008 and 2009.

This analysis also reviewed impairment due to alcohol, drugs, or medications on its own. In the MAG planning area, 42.4% of fatal crashes and 16.4% of serious injury crashes involve impairment due to alcohol, drugs, or medications. Thus, impairment due to illness, physical impairment, and fell asleep/fatigued combined contributes to a small percentage of the impaired driving category as defined in the ADOT SHSP.

This analysis also reviewed the fell asleep/fatigued physical driver description on its own. In the MAG planning area, 1.3% of fatal crashes and 1.8% of serious injury crashes involve impairment due to sleep or fatigue. Of these crashes 56.1% occurred on freeways.

“Speeding” in the context of this analysis is based on data entered by the reporting officer as: “speed too fast for condition” or “exceeded lawful speed”. The reporting officers’ assessments are based on traffic, roadway, and weather conditions at the time of the crash and do not necessarily represent speeds in excess of the posted speed limit. Speeding is involved in the greatest number (30%) of serious injury crashes of these three emphasis areas. Speeding is also a factor in approximately 33% of fatal crashes in the MAG planning area. Fatal crashes involving speeding have gone down in the most recent three years compared to the number of crashes in 2008 and 2009. Speeding involved in serious injury and fatal crashes in the MAG planning area are 31.1% and 33.1%, respectively, for the years 2008 through 2012.

Distracted driving in the context of this analysis is based on data entered by the reporting officer as “inattention/distraction” or “electronic communication device”. There were a total of 2,446 fatal and serious injury distracted driving crashes for the years 2008 through 2012. Distracted driving

³ Definitions of restraint, speeding, and impaired driving were obtained from the Arizona SHSP Report Card 2007-2011, Draft June 2013

contributed to 18.6% of all fatal and serious injury crashes, 12.9% of fatal crashes, and 19.5% of serious injury crashes.

“Crash Trees” are provided in Figure 7 through Figure 11. They provide the total number of K and A crashes and the percentage of all K plus A, K, and A crashes, respectively, in the MAG planning area. The data is further broken down between freeways and arterials and local roads. The data for non-intersection related and unsignalized intersection related may include unknown or unreported values.

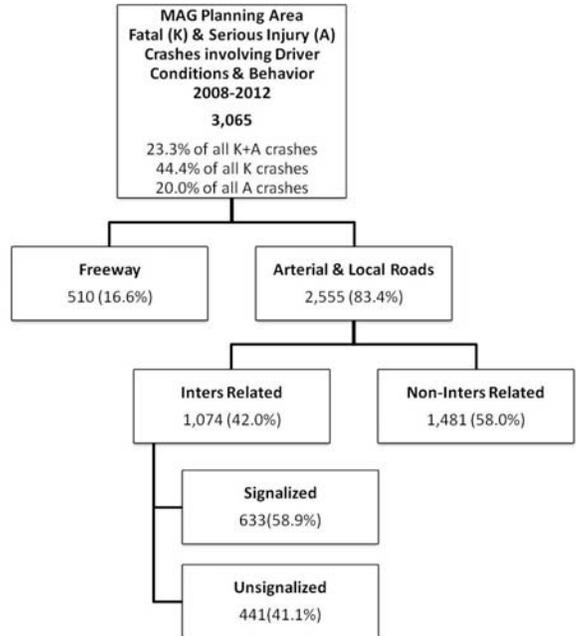


Figure 7 Crash Tree of Fatal and Serious Injury Crashes involving Driver Conditions & Behavior in the MAG Planning Area for 2008-2012

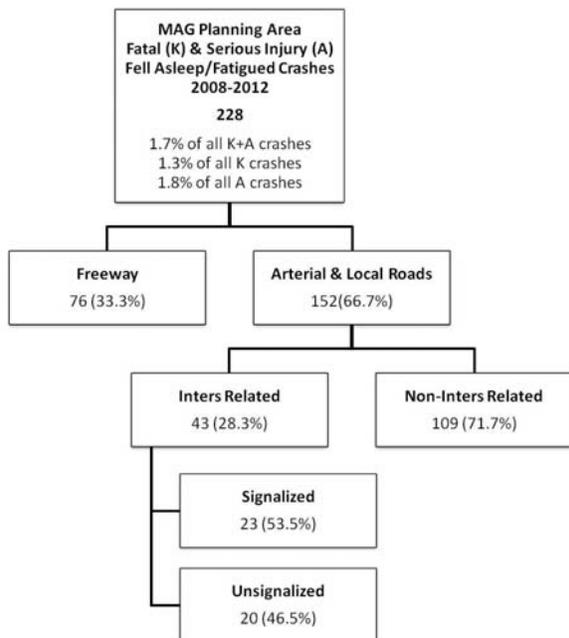


Figure 8 Crash Tree of Fell Asleep/Fatigued Impaired Fatal and Serious Injury Crashes in the MAG Planning Area for 2008-2012

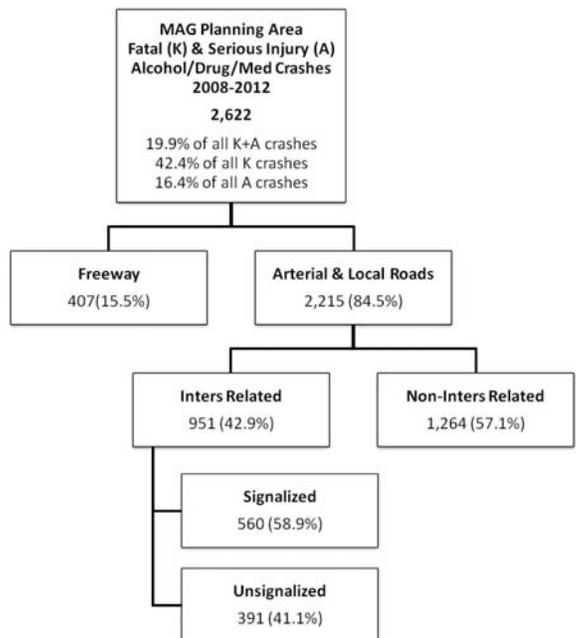


Figure 9 Crash Tree of Alcohol, Drug, and Medication Impaired Fatal and Serious Injury Crashes in the MAG Planning Area for 2008-2012

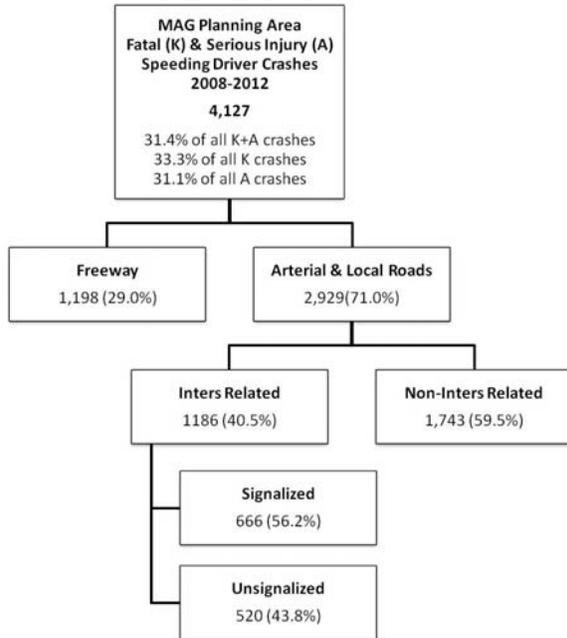


Figure 10 Crash Tree of Speeding Involved Fatal and Serious Injury Crashes in the MAG Planning Area for 2008-2012

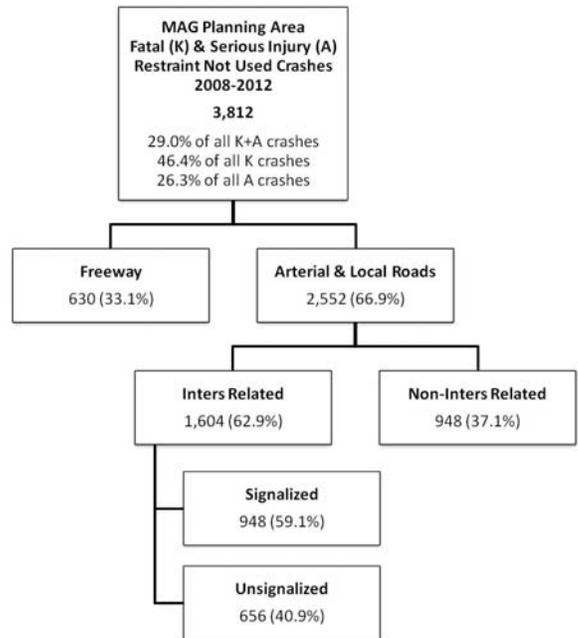


Figure 11 Crash Tree of Restraint Not Used Fatal and Serious Injury Crashes in the MAG Planning Area for 2008-2012

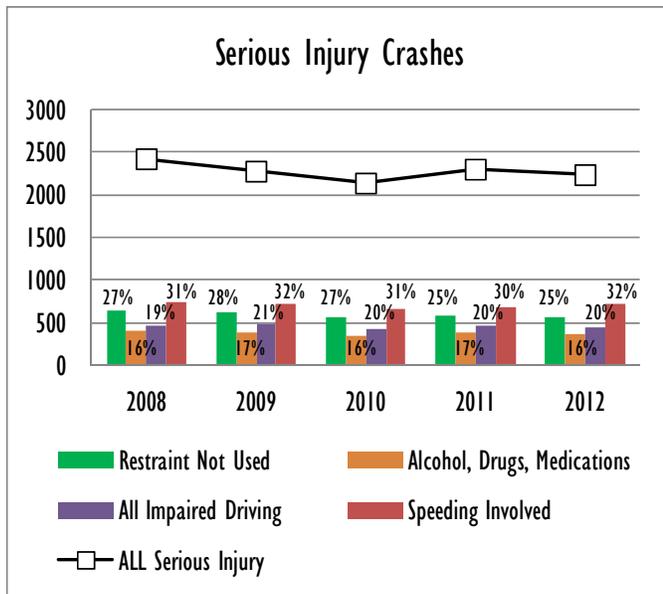


Figure 12 Serious Injury Crashes in the MAG Planning Area by Driver Behavior

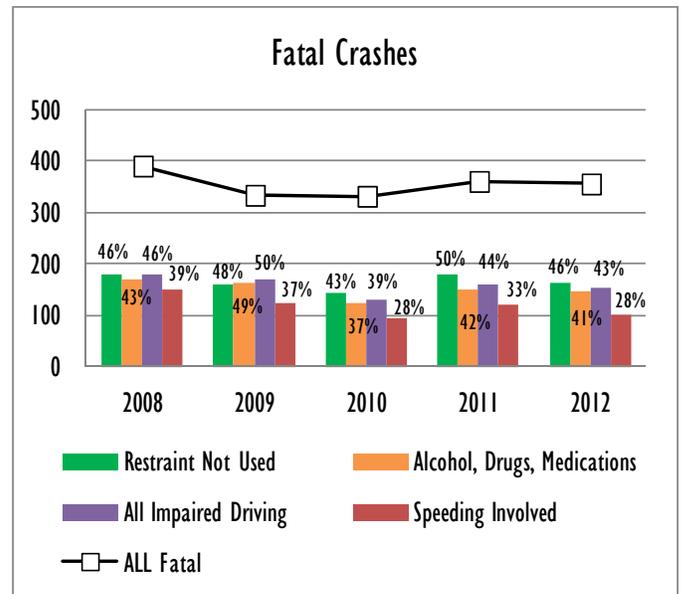


Figure 13 Fatal Crashes in the MAG Planning Area by Driver Behavior

1.3.2 Safety Performance of the Freeway and Arterial Street Systems

“Crash Trees” for fatal and serious injury crashes in the MAG planning area are provided in Figure 14 and Figure 15. They are a tool to help identify and select the facility types and roadway and traffic characteristics of the locations where target crash types occur most frequently.⁴

⁴ <http://www.fhwa.dot.gov/publications/publicroads/13mayjun/03.cfm> accessed 9/4/2013

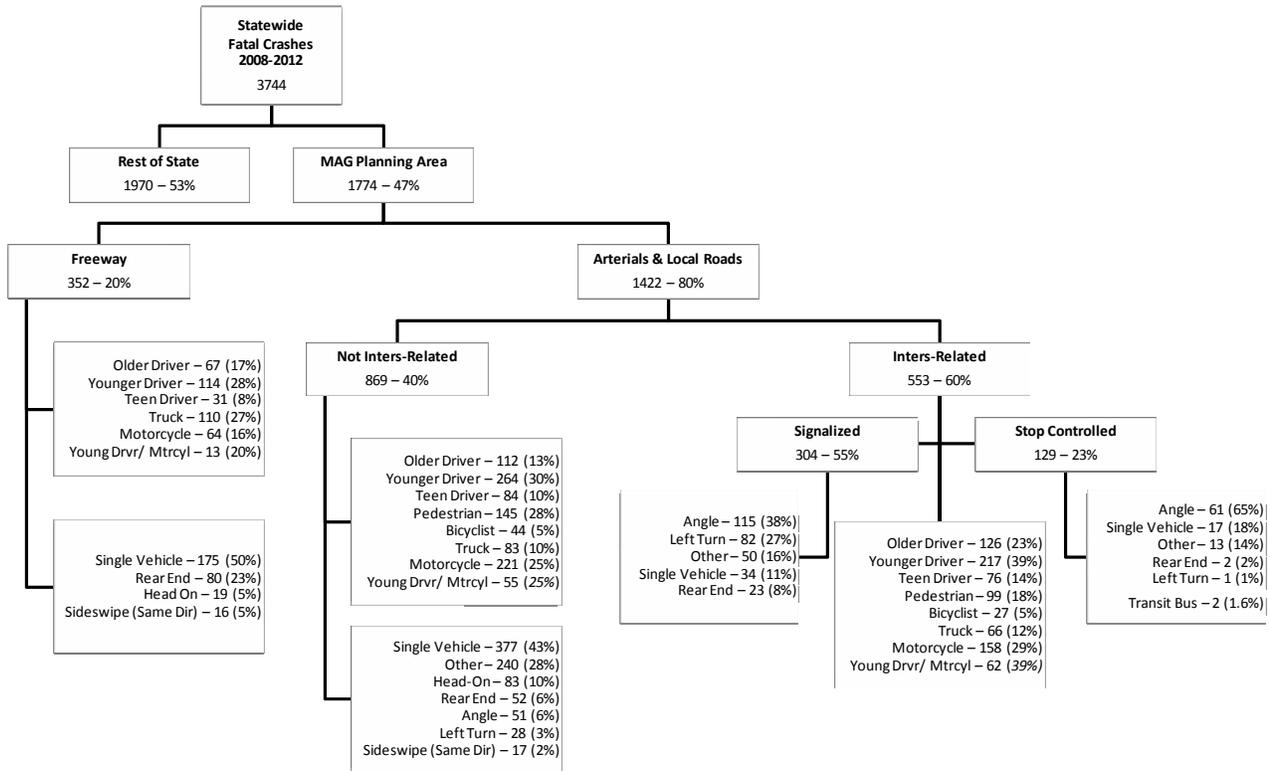


Figure 14 Crash Tree of Fatal Crashes in the MAG Planning Area for 2008 - 2012

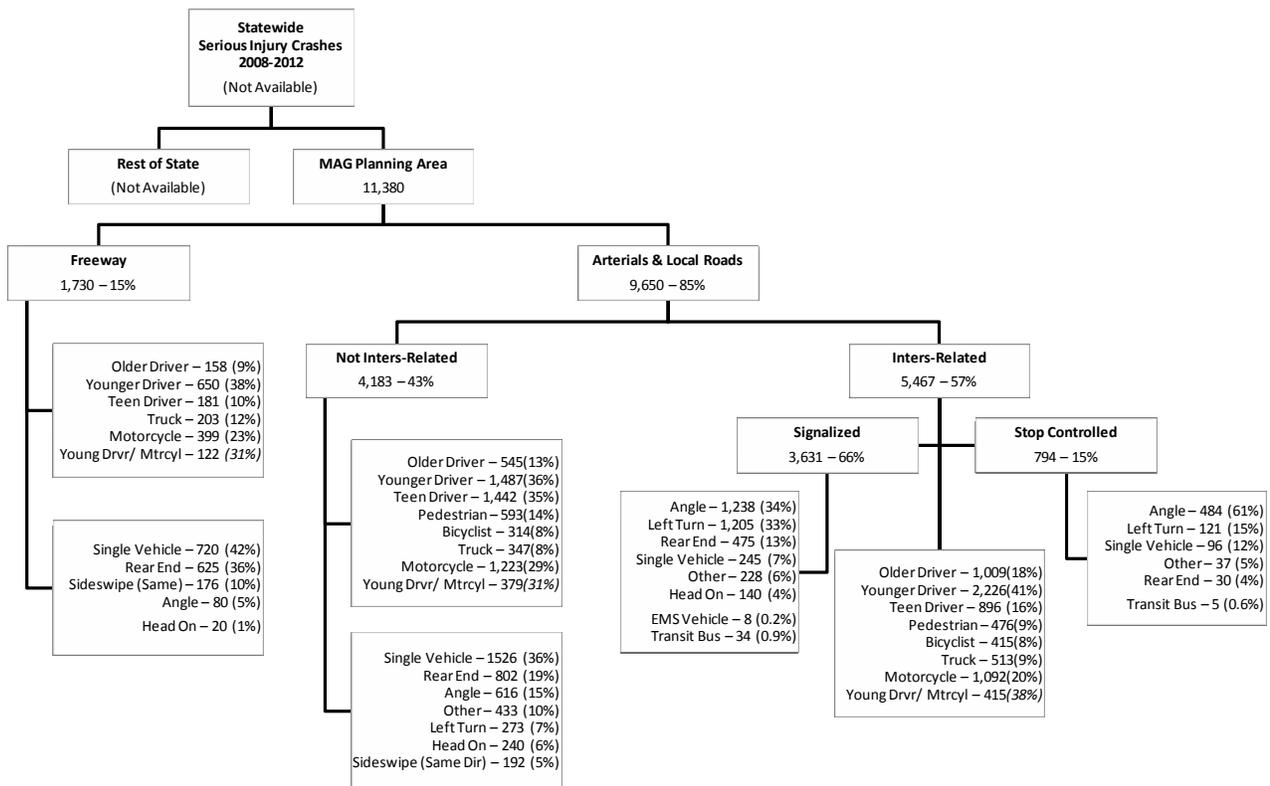


Figure 15 Crash Tree of Serious Injury Crashes in the MAG Planning Area for 2008 - 2012

Fatal and serious injury crashes (K and A) on freeways decreased by 20% from the year 2008 to 2009 then increased by 8% and 11% in the years 2010 and 2011, respectively. Serious injury crashes went down by more than 6% in 2012, but fatal crashes increased by more than 15%.

Fatal and serious injury crashes on arterial and local roads appears to follow a downward trend with a reduction in K and A crashes of 8% from 2008 to 2012.

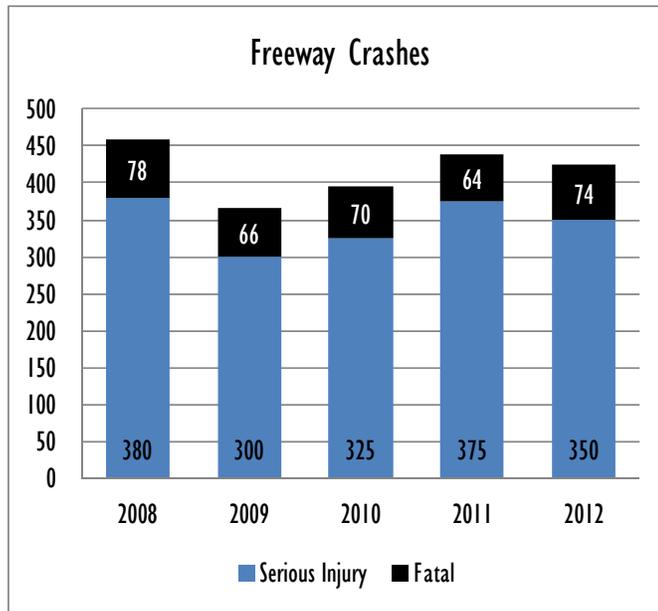


Figure 16 Fatal and Serious Injury Freeway Crashes in the MAG Planning Area

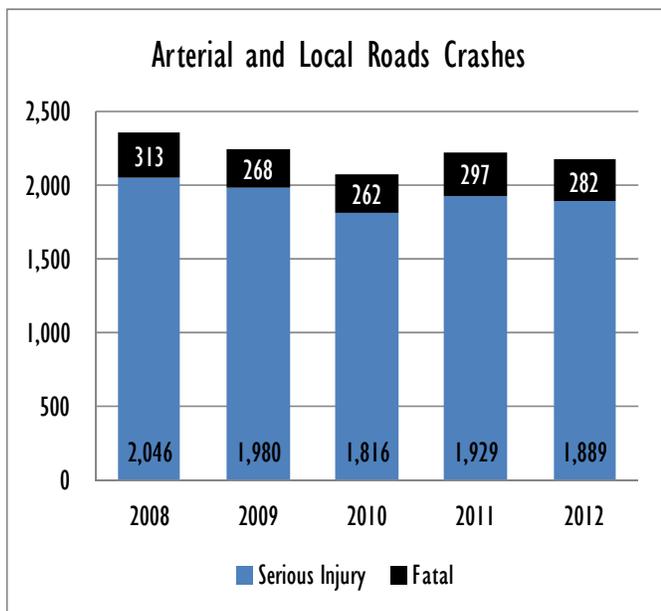


Figure 17 Fatal and Serious Injury Arterial and Local Roads Crashes in the MAG Planning Area

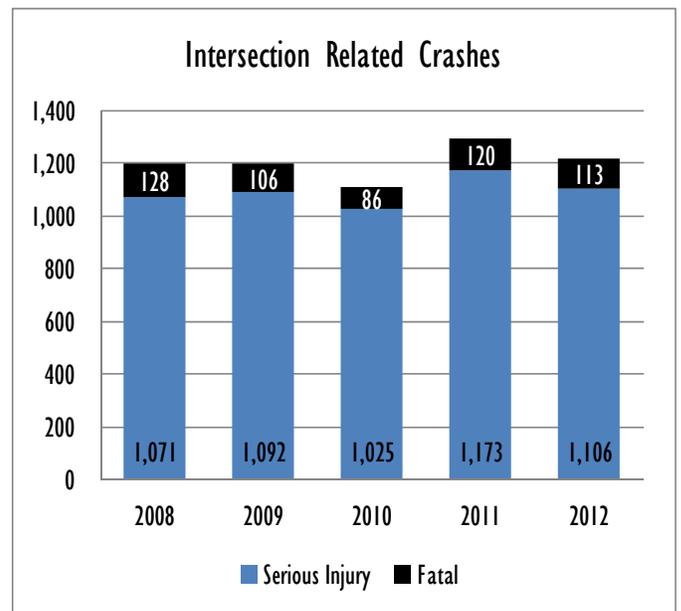


Figure 18 Fatal and Serious Injury Intersection Related Crashes in the MAG Planning Area

Most incapacitating and fatal freeway crashes are single vehicle and rear end crashes. Most incapacitating and fatal crashes on arterial and local roads are angle, single vehicle crashes, left turn, and rear end.

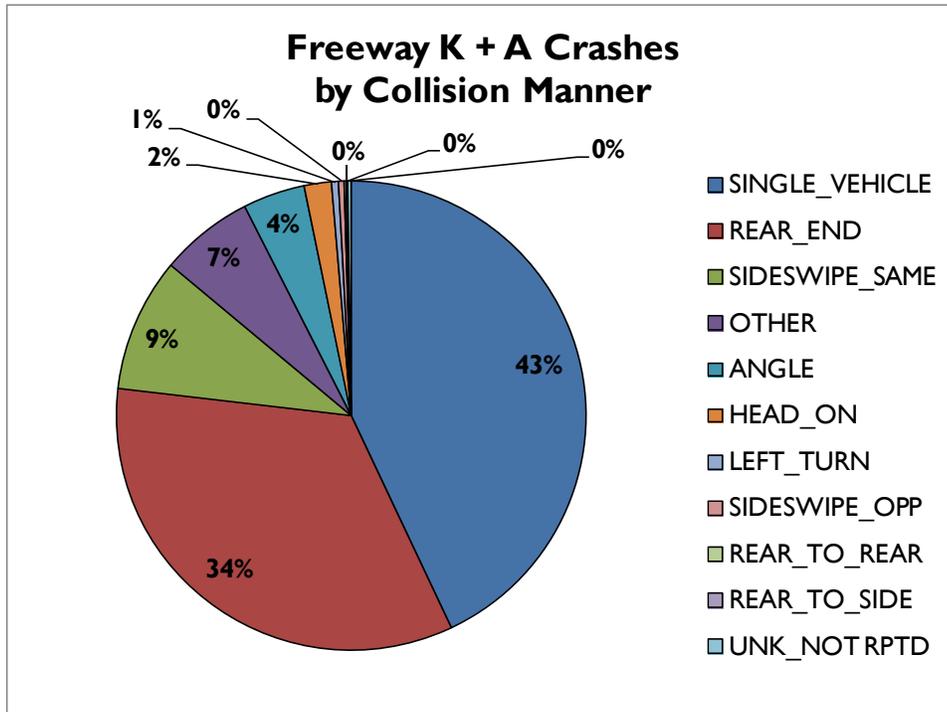


Figure 19 Fatal and Serious Injury Freeway Crashes in the MAG Planning Area by Collision Manner

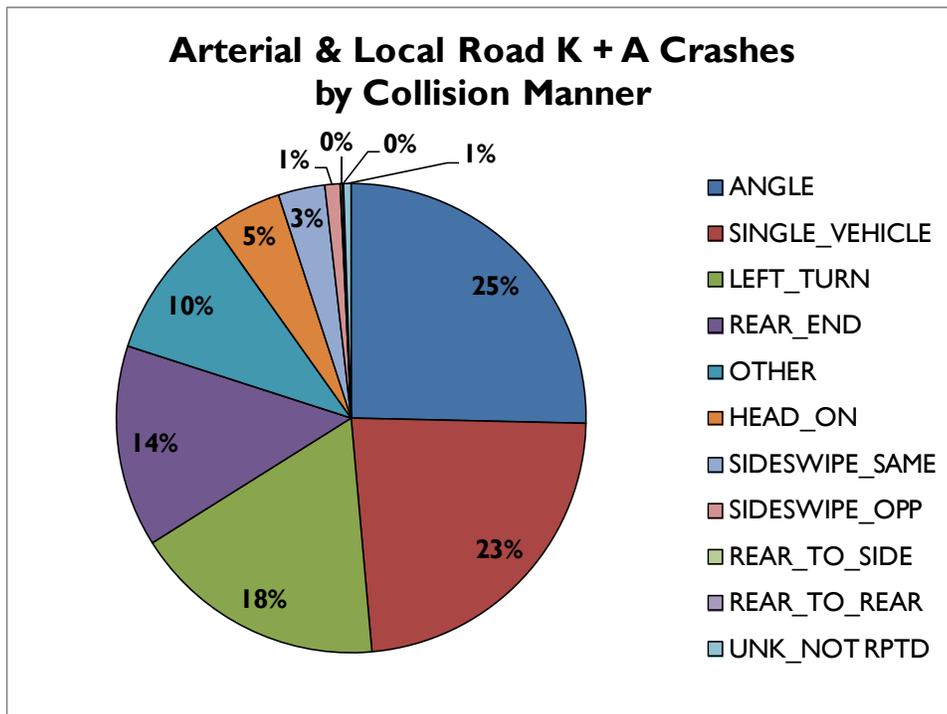


Figure 20 Fatal and Serious Injury Arterial and Local Road Crashes in the MAG Planning Area by Collision Manner

The ADOT Highway Performance Monitoring System Daily Vehicle Miles of Travel (VMT) for Maricopa County is shown in the graphs below compared to K and A crashes in the MAG region.

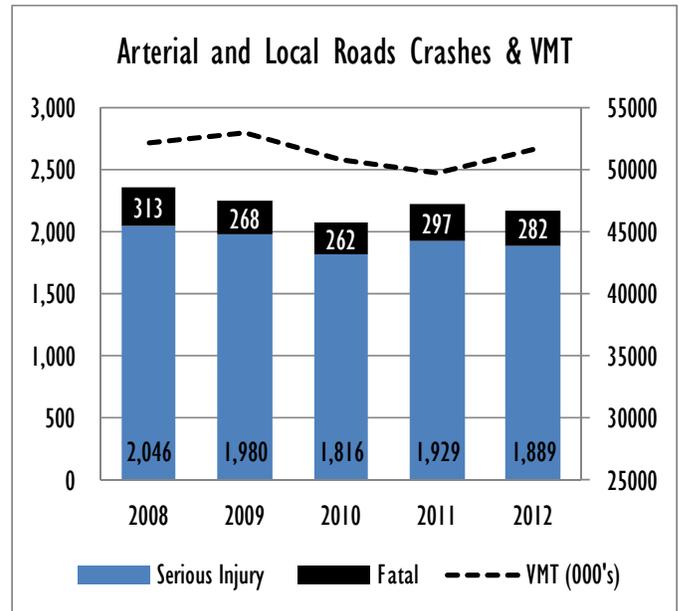
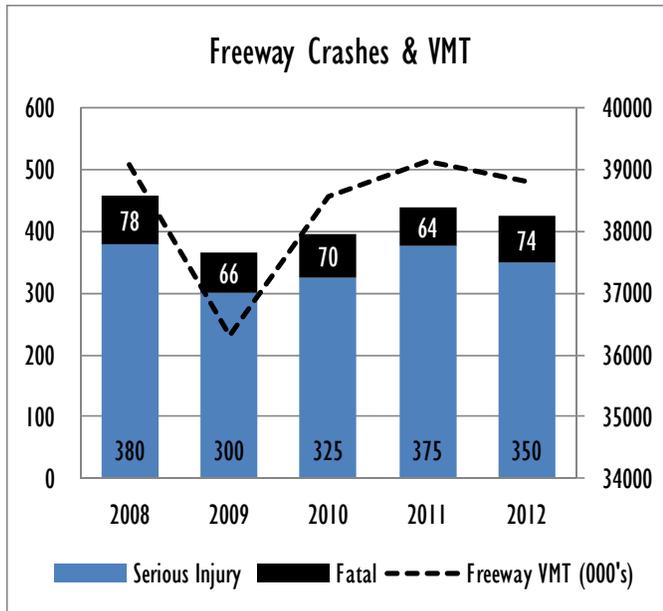


Figure 21 Freeway Fatal and Serious Injury Crashes in the MAG Planning Area Compared to Maricopa County VMT

Figure 22 Arterial and Local Road Fatal and Serious Injury Crashes in the MAG Planning Area Compared to Maricopa County VMT

Figure 23 Roadway Fatalities in the USA, Arizona, and MAG

1.3.3 Fatal and Injury Crashes Involving Pedestrians and Bicyclists

The total number of bicyclist crashes increased by more than 7% in 2011 and again by more than 7% in 2012. The proportion of K and A crashes has not followed this trend.

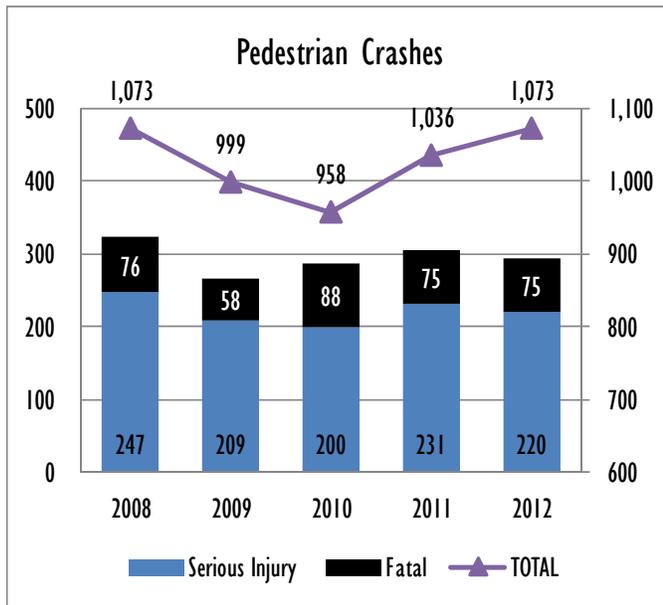


Figure 24 Pedestrian Crashes in the MAG Planning Area

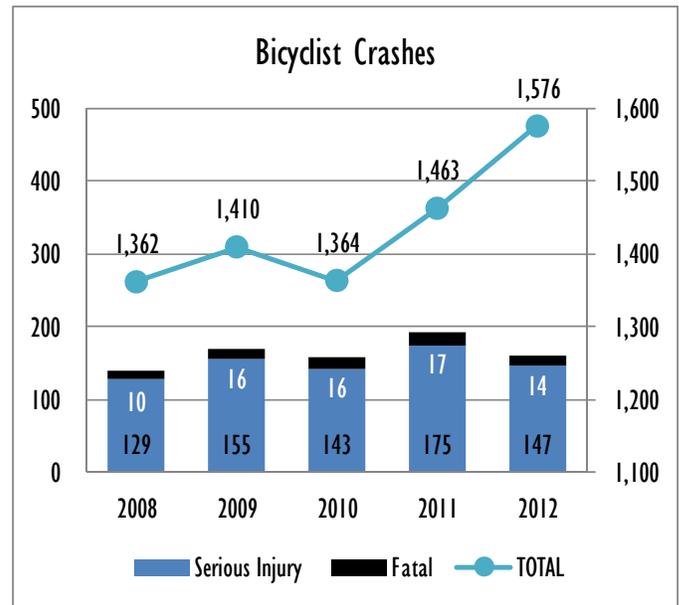


Figure 25 Bicyclist Crashes in the MAG Planning Area

Variation by Age

15 to 19 year olds are involved in the most pedestrian and bicycle crashes (followed by 20-24 and 10-14 year olds, respectively). This age group is also vulnerable to K and A pedestrian crashes; however, the proportion of K and A bicyclist crashes within this age group is small compared with the total number of bicyclist crashes.

Pedestrians over 60 and bicyclists over 75 are more likely to sustain serious injuries or die from a crash.

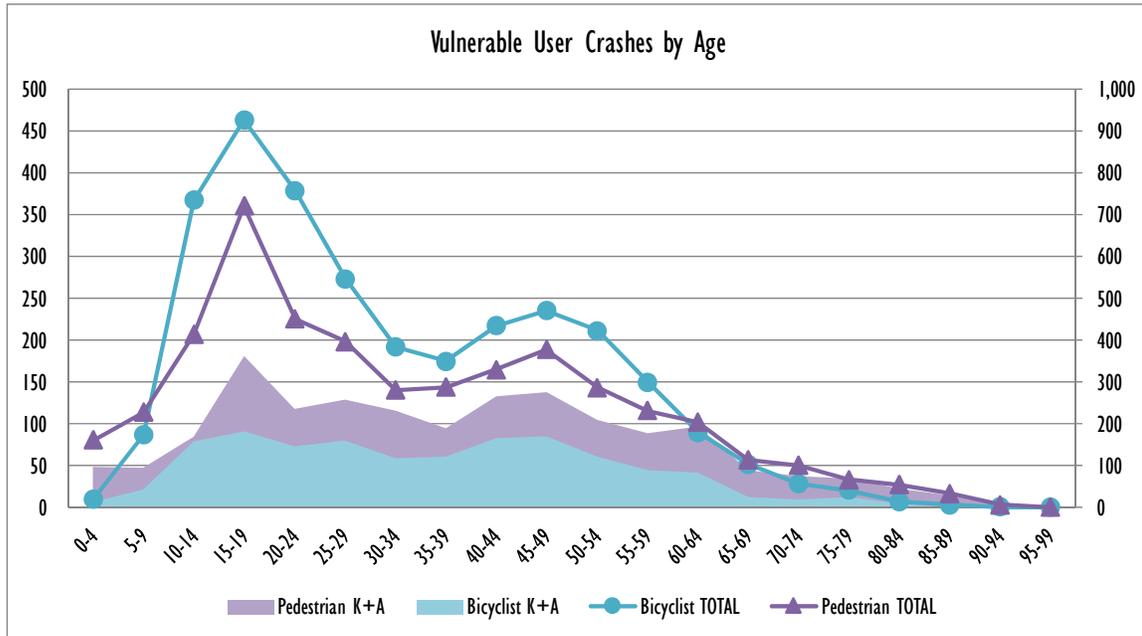


Figure 26 Pedestrian and Bicyclist Crashes in the MAG Planning Area by Age

Variation by Hour of the Day

The total number of bicyclist crashes peak at 7 AM and 4 PM, while total pedestrian crashes peak at 7AM and 6PM. The fatal and serious injury crashes between 6 AM and 6 PM for bicyclists and pedestrians represent 11% and 24% of their total crashes, respectively. For the nighttime hours of 7 PM to 5 AM, fatal and serious injury crashes for bicyclists and pedestrians represent 19% and 42%, respectively.

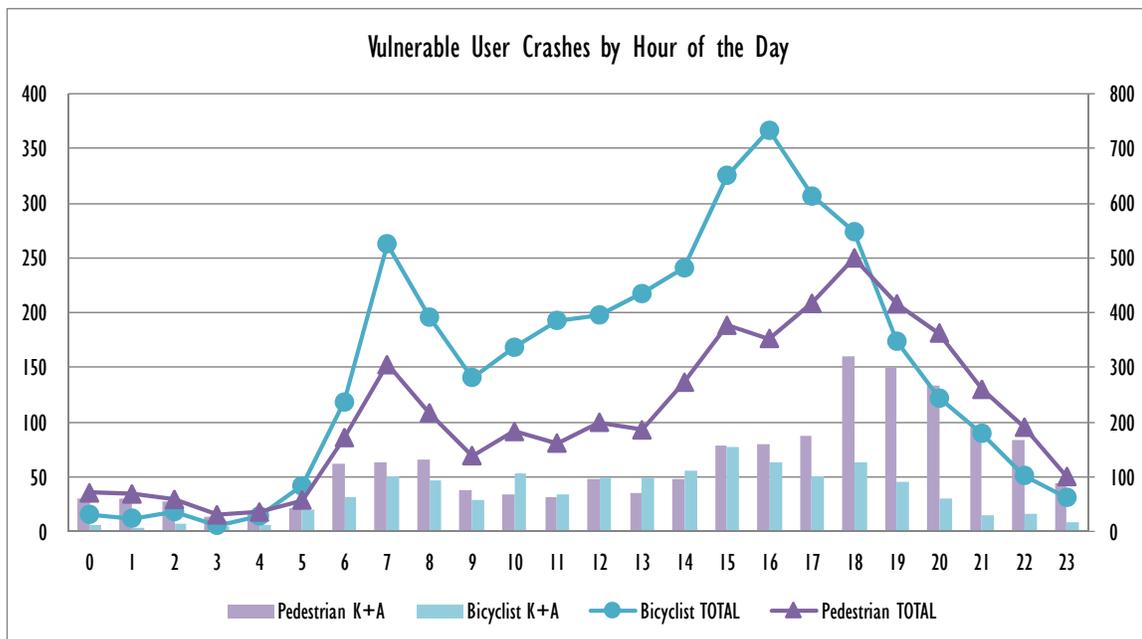


Figure 27 Pedestrian and Bicyclist Crashes in the MAG Planning Area by Hour of the Day

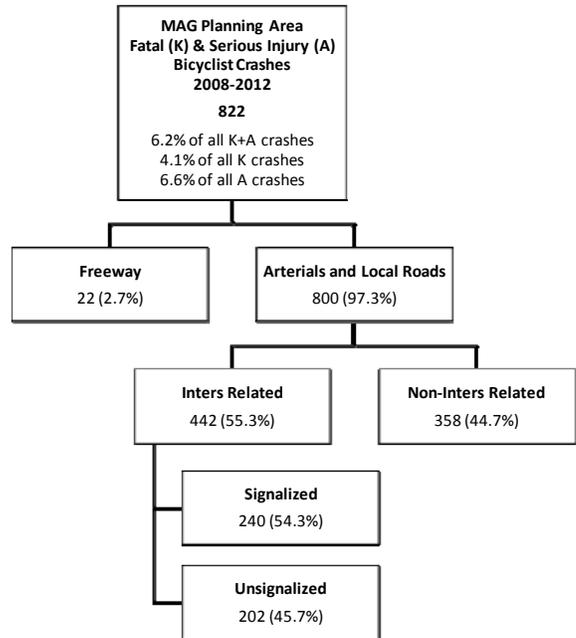
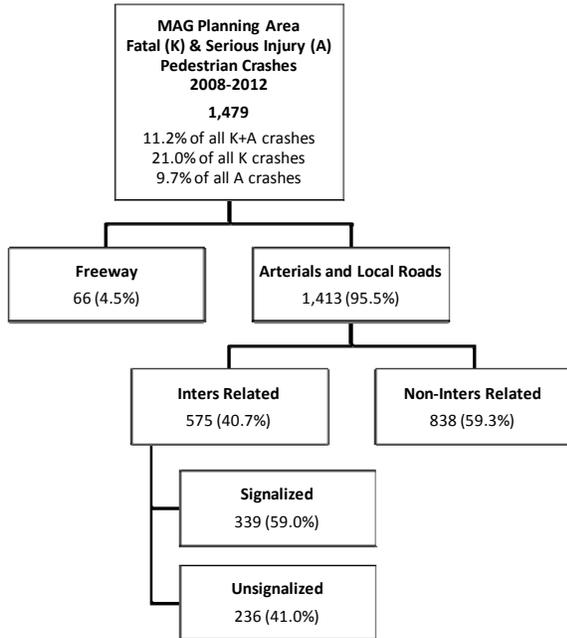


Figure 28 Crash Tree of Fatal and Serious Injury Pedestrian Crashes in the MAG Planning Area for 2008-2012 Figure 29 Crash Tree of Fatal and Serious Injury Bicyclist Crashes in the MAG Planning Area for 2008-2012

Figure 30 displays the serious injury and fatal pedestrian crashes that have occurred in the MAG planning area during the study period. Most of these crashes occur in areas of higher population density⁵. Figure 32 provides a closer look of this data.

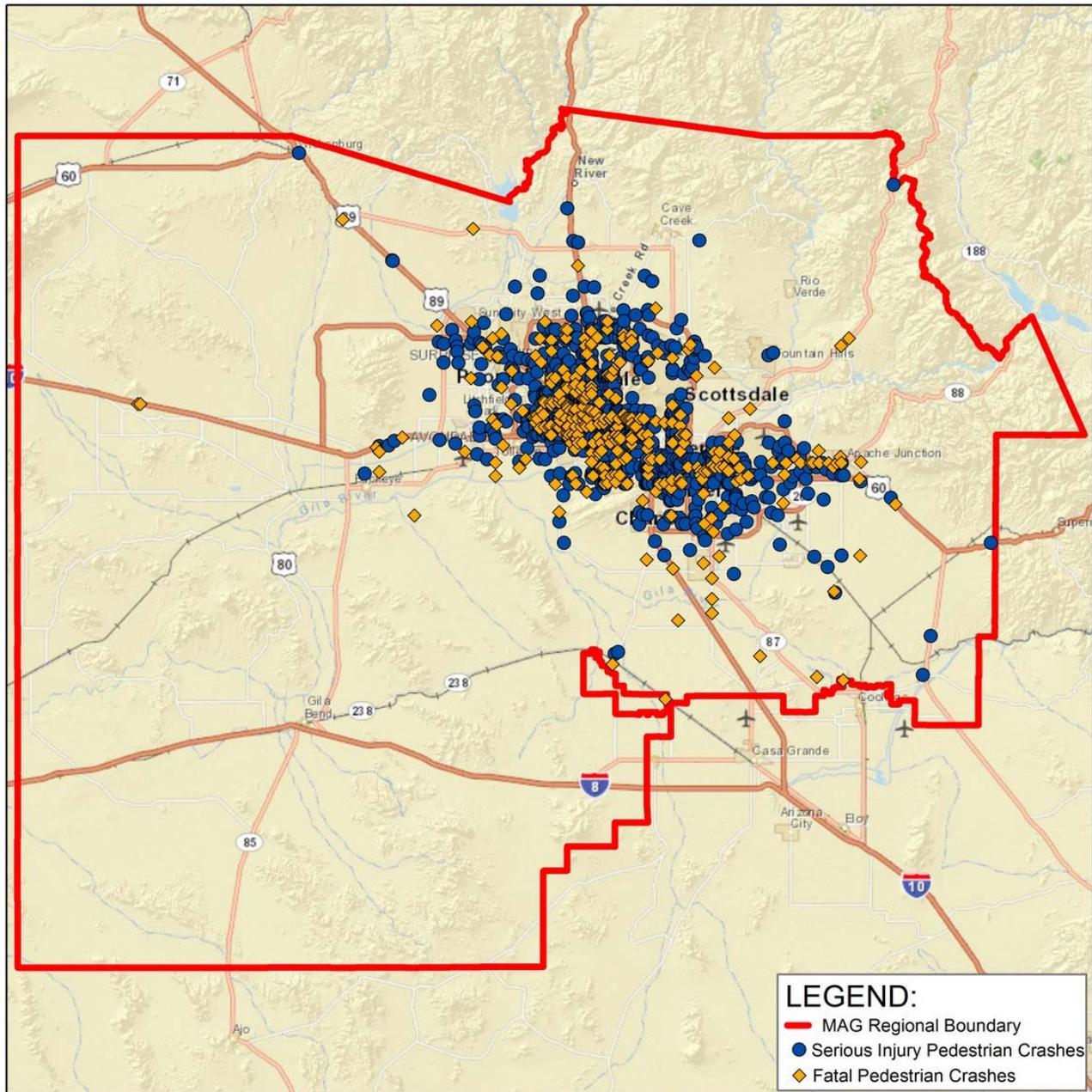


Figure 30 Spatial Analysis of Fatal and Serious Injury Pedestrian Crashes in the MAG Planning Area for 2008 – 2012

⁵ Census 2010, Block Group level data, March 2011, MAG

Figure 31 displays the serious injury and fatal bicyclist crashes that have occurred in the MAG planning area during the study period. Most of these crashes occur in areas of higher population density⁶ with clusters of crashes near colleges and universities and central business districts. Figure 33 provides a closer look of this data.

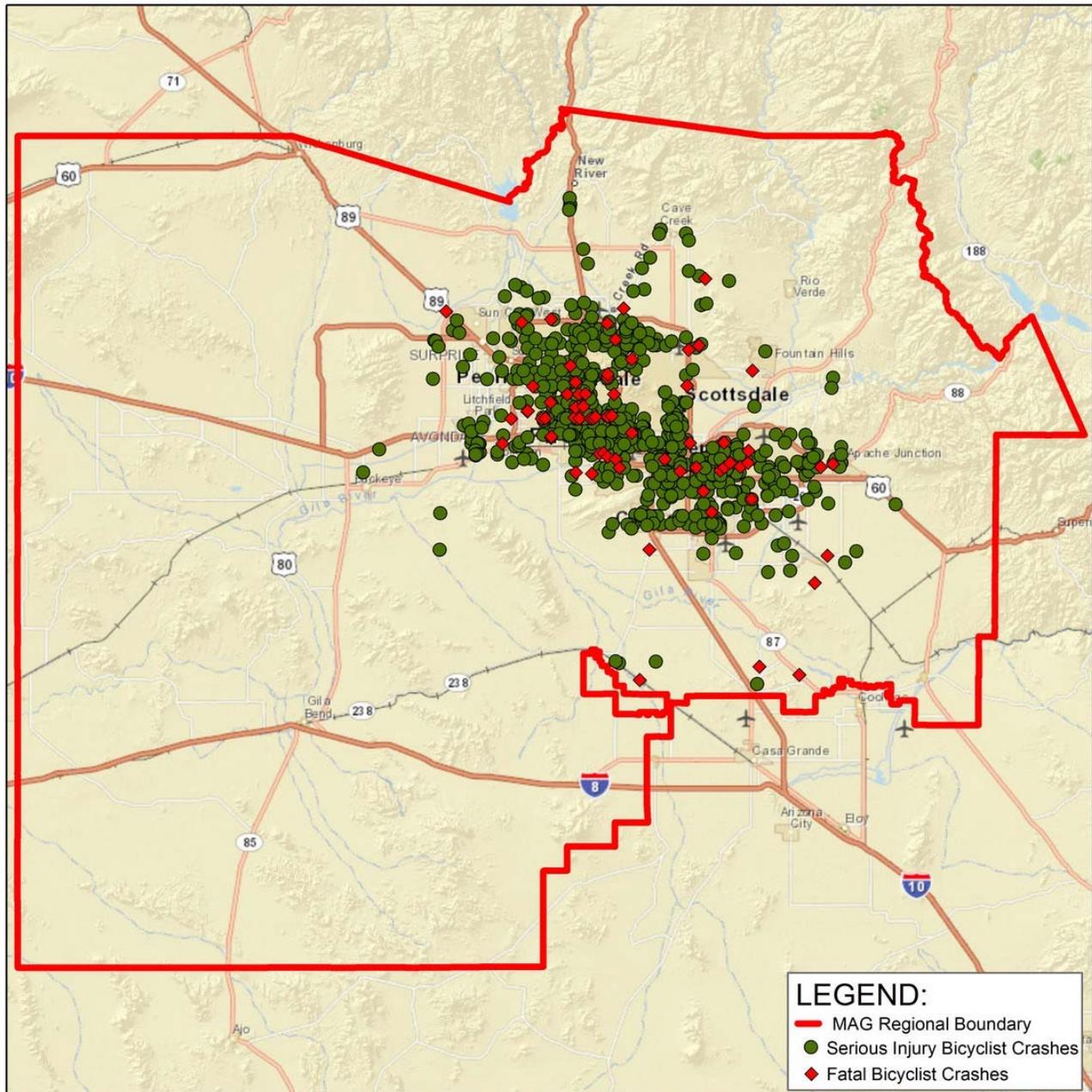


Figure 31 Spatial Analysis of Fatal and Serious Injury Bicyclist Crashes in the MAG Planning Area for 2008 - 2012

⁶ Census 2010, Block Group level data, March 2011, MAG

In the MAG planning area, 40.7% of serious injury and fatal bicyclist crashes occur at intersections. This suggests that pedestrians are more likely to be involved in a serious injury or fatal crash when crossing roads at midblock locations. There does not appear to be a correlation between pedestrian involved serious injury and fatal crashes and transit. Main Street/Apache Trail east of Power Road appears to have a high number of fatal pedestrian crashes. This may be attributed to the land use and roadway geometry which is a six lane divided arterial with a median approximately 40 feet wide. The road is lined with businesses on both sides with limited driveway access control and no pedestrian infrastructure.

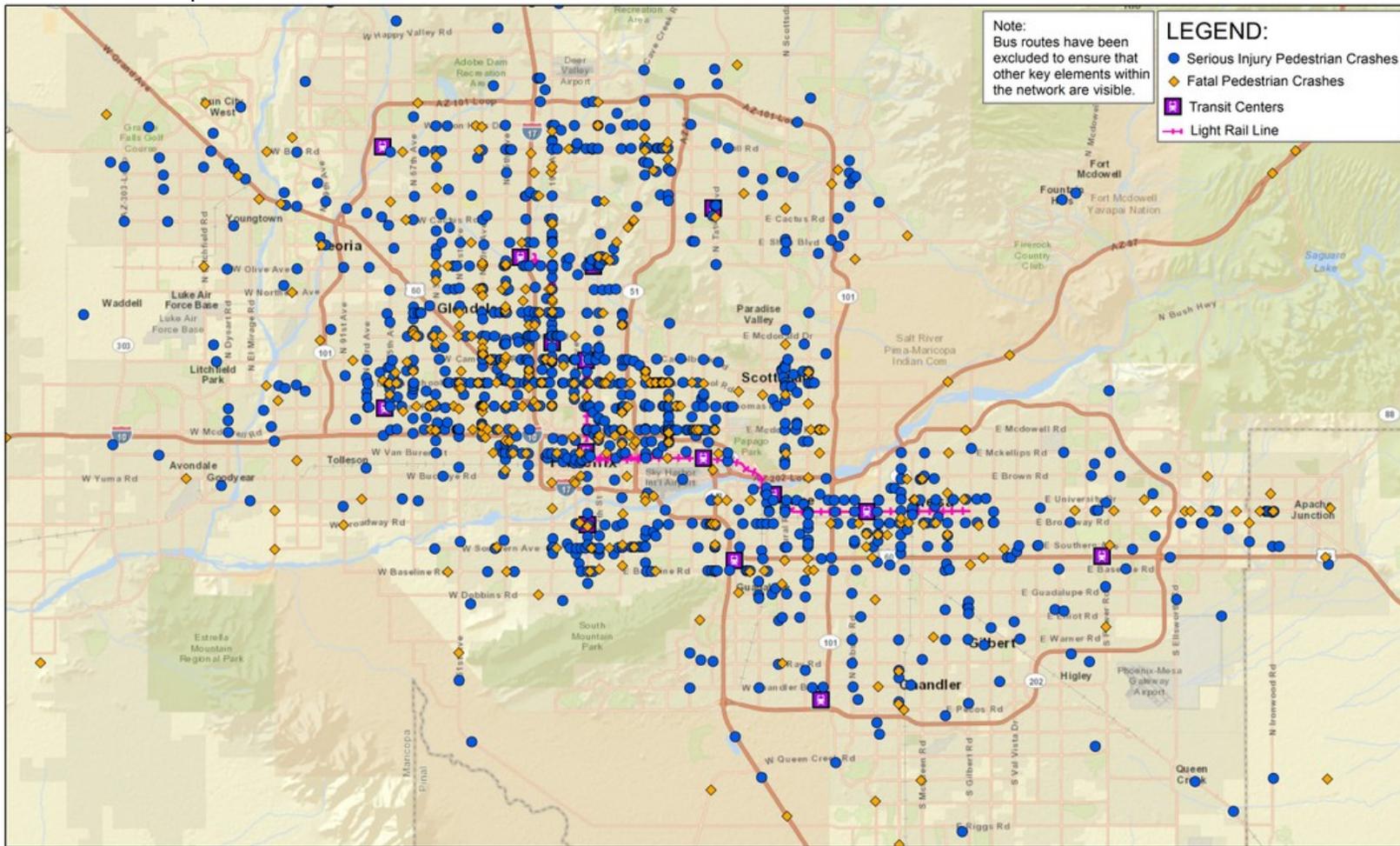


Figure 32 Spatial Analysis of Fatal and Serious Injury Pedestrian Crashes in the MAG Urban Area for 2008 – 2012



In the MAG planning area, 55.3% of serious injury and fatal bicyclist crashes occur at intersections. Serious injury bicyclist crashes occur most often in areas where more bicyclists are expected to ride – universities and colleges. Notably, roads near the main campus of Arizona State University in Tempe and Mesa Community College in Mesa. The central business districts of Phoenix, Scottsdale, and Chandler also appear to have clusters of serious injury bicyclist crashes. The most fatal bicyclist crashes have occurred on Indian School Road, west of 16th Street. There does not appear to be a correlation between bicyclist serious injury and fatal crashes and transit.

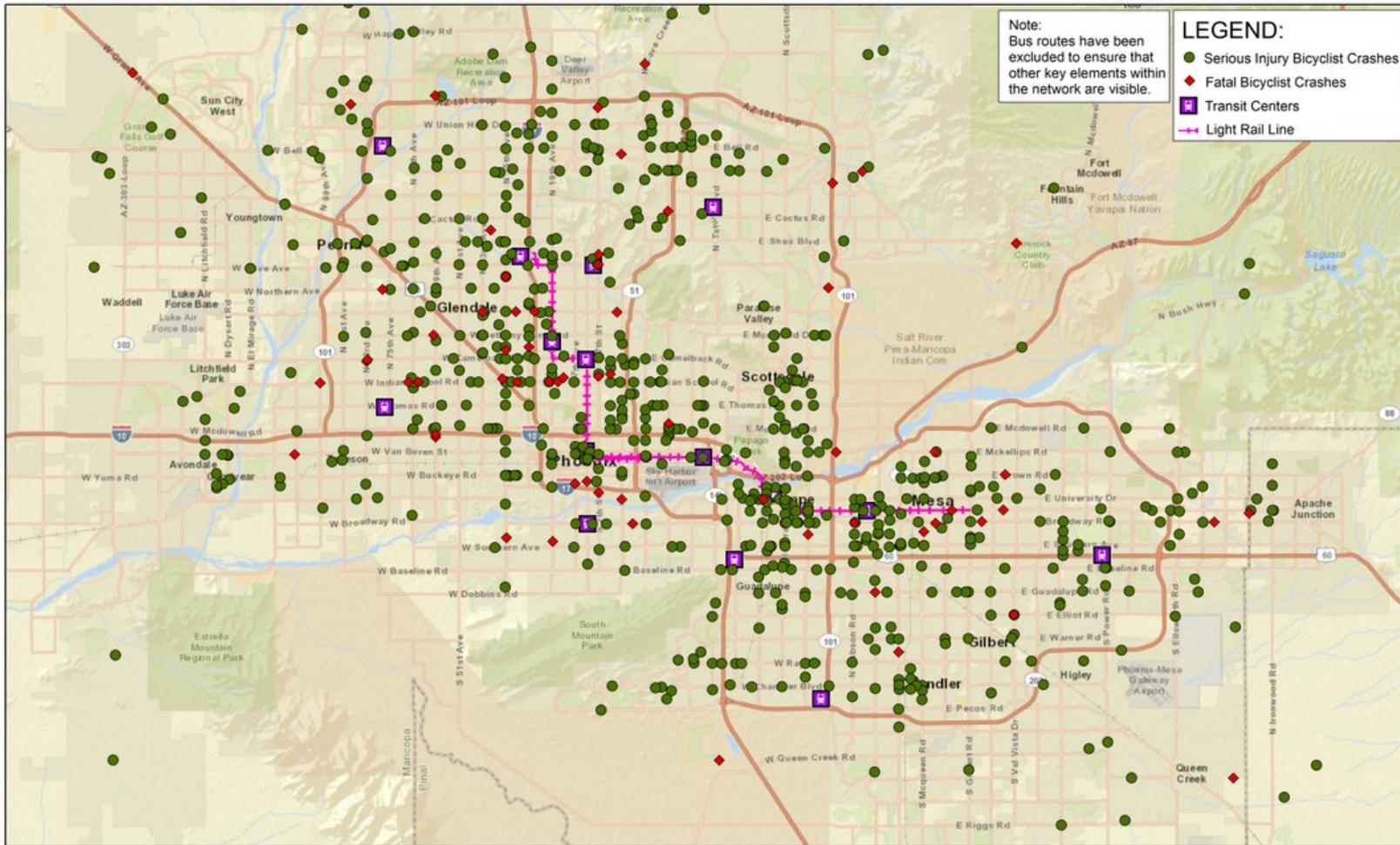


Figure 33 Spatial Analysis of Fatal and Serious Injury Bicyclist Crashes in the MAG Urban Area for 2008 - 2012



Comparison of MAG Planning Region to State

Nearly 70% of all crashes in the state of Arizona occur in the MAG region. Approximately half of fatal crashes in the state occur in the MAG region.

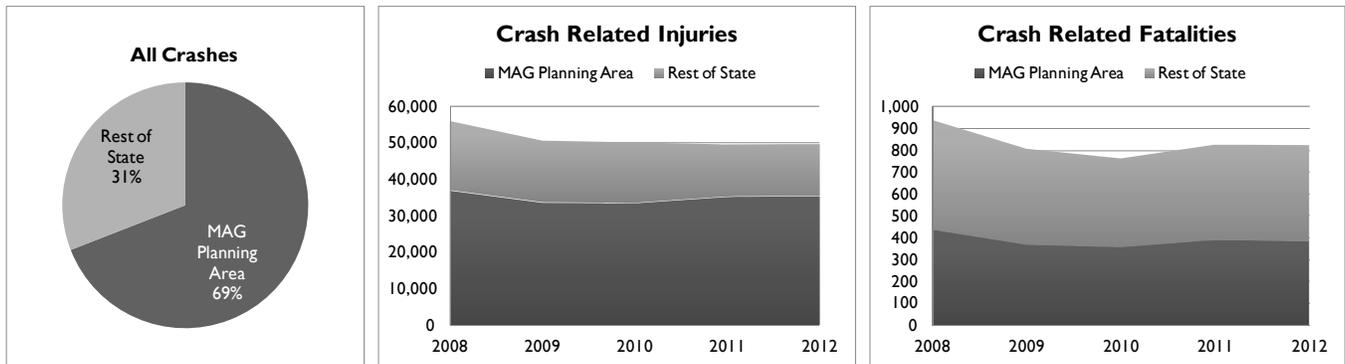


Figure 34 2008-2012 Total Crash Comparison of MAG Planning Region to State

More than 65% of bicycle and pedestrian injuries from crashes occur in the MAG planning area. More than half of pedestrian fatalities from crashes occur in the MAG planning area. Although there are very few bicyclist fatalities compared to bicyclists' injuries, most also occur in the MAG planning area.

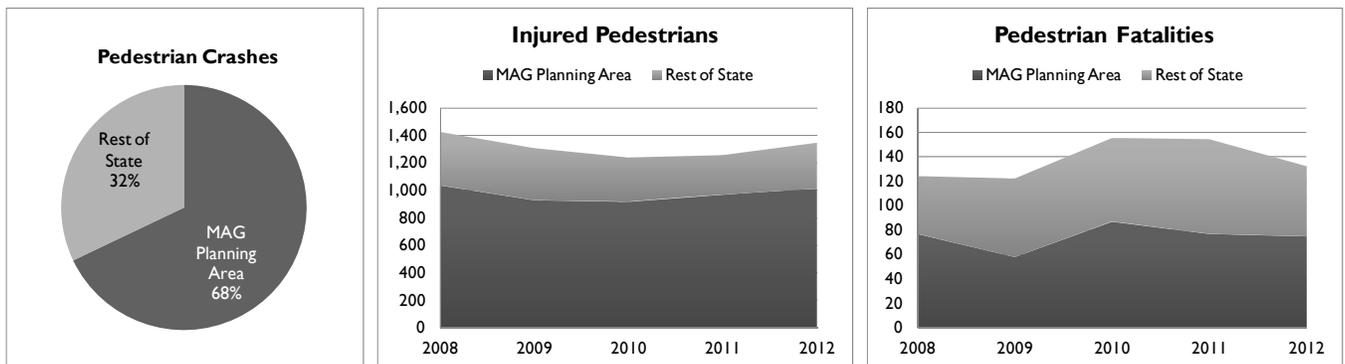


Figure 35 2008-2012 Pedestrian Crash Comparison of MAG Planning Region to State

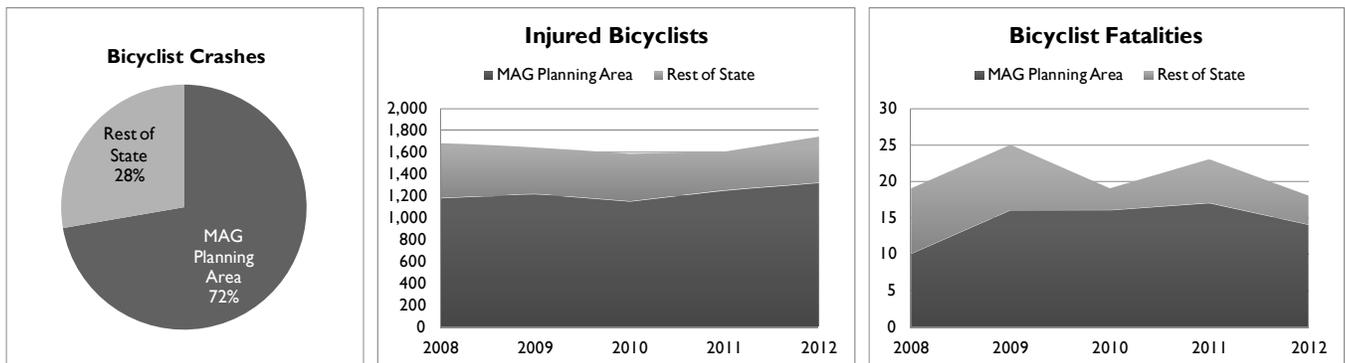


Figure 36 2008-2012 Bicyclist Crash Comparison of MAG Planning Region to State

1.3.4 Fatal and Injury Crashes Involving Younger Drivers

Drivers younger than 35 years old are involved in more crashes per person than older age groups.

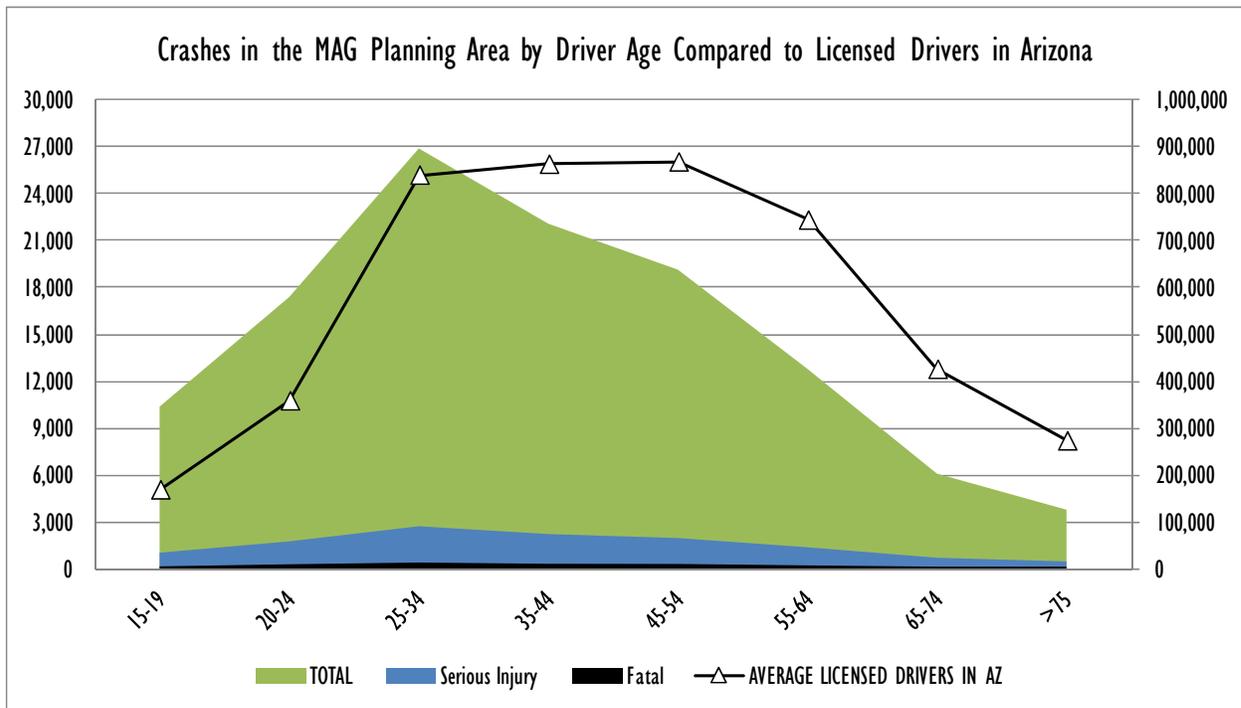


Figure 37 2008-2012 Crashes in MAG Planning Area Compared to Number of Licensed Drivers in Arizona

The number of serious injury crashes involving drivers between the ages of 16 and 25 are decreasing; however, fatal crashes have been increasing following a 31% drop from 2008 to 2010. 73% of fatal crashes of younger drivers are male. There are few crashes for novice drivers (16 & 17 year olds) on freeways. This is likely because they travel less on freeways.

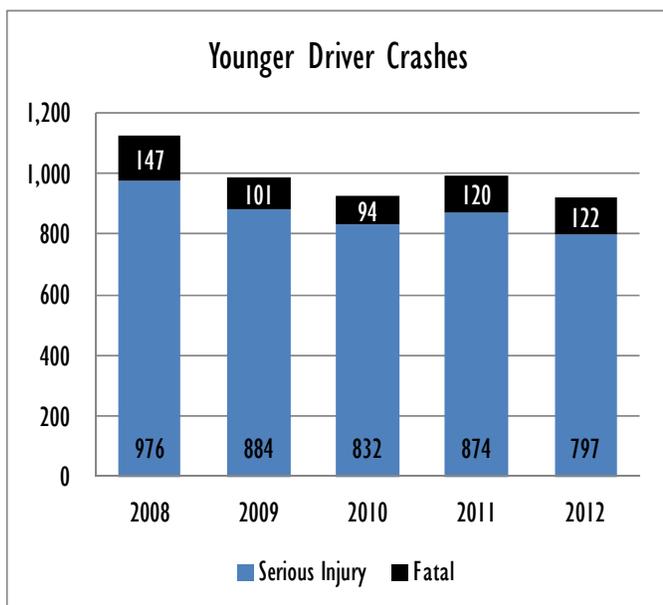


Figure 38 Younger Driver (16-25 years old) Fatal and Serious Injury Crashes in the MAG Planning Area

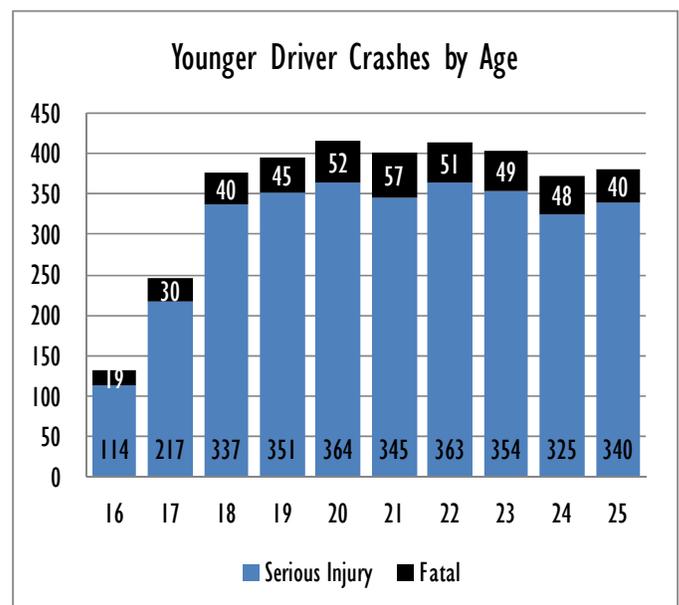


Figure 39 2008-2012 Younger Driver Fatal and Serious Injury Crashes in the MAG Planning Area by Age

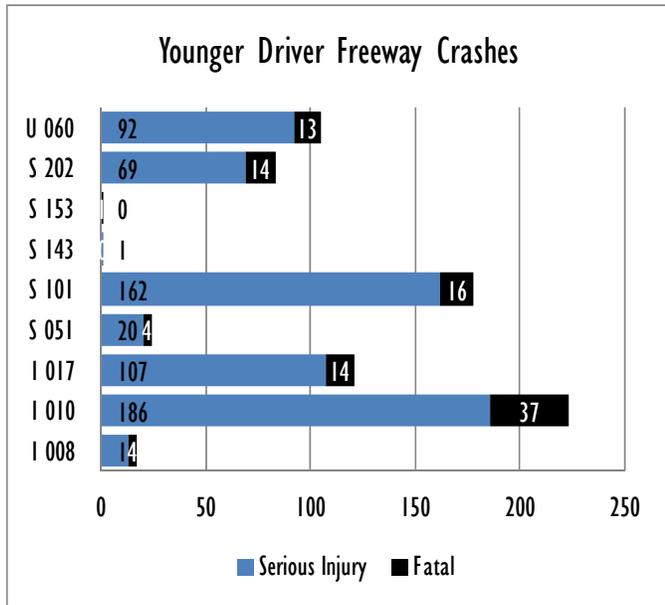


Figure 40 2008-2012 Fatal and Serious Injury Younger Driver Crashes in the MAG Planning Area by Freeway

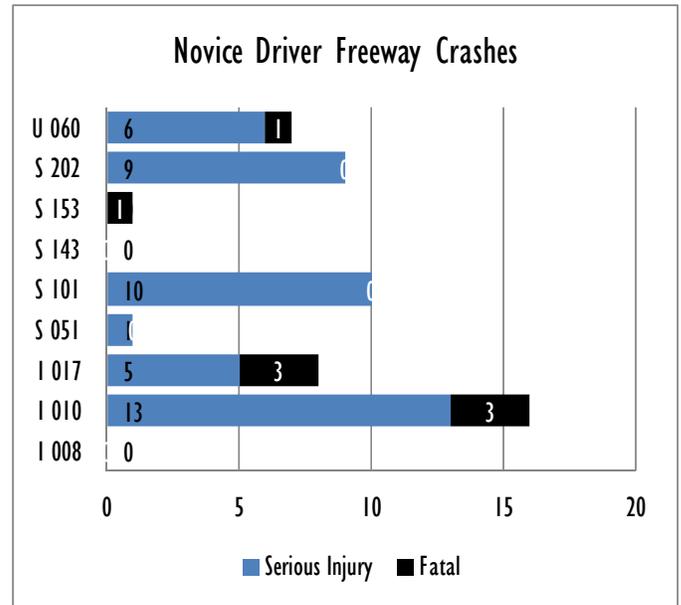


Figure 41 2008-2012 Fatal and Serious Injury Novice Driver (16 & 17 year olds) Fatal and Serious Injury Crashes in the MAG Planning Area by Freeway

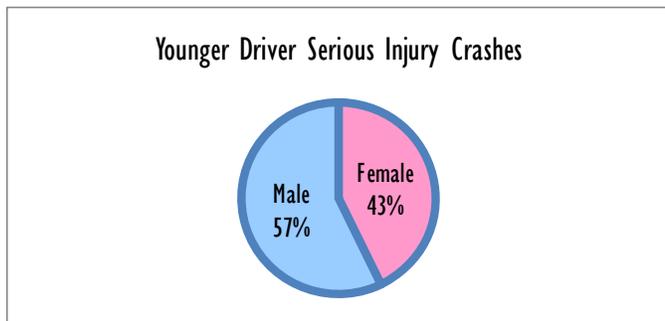


Figure 42 2008-2012 Younger Driver Serious Injury Crashes in the MAG Planning Area by Gender

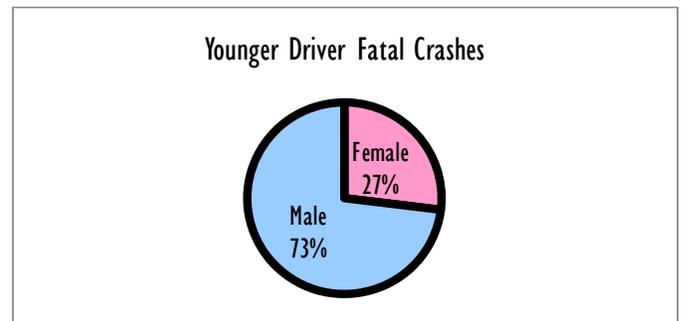


Figure 43 2008-2012 Younger Driver Fatal Crashes in the MAG Planning Area by Gender

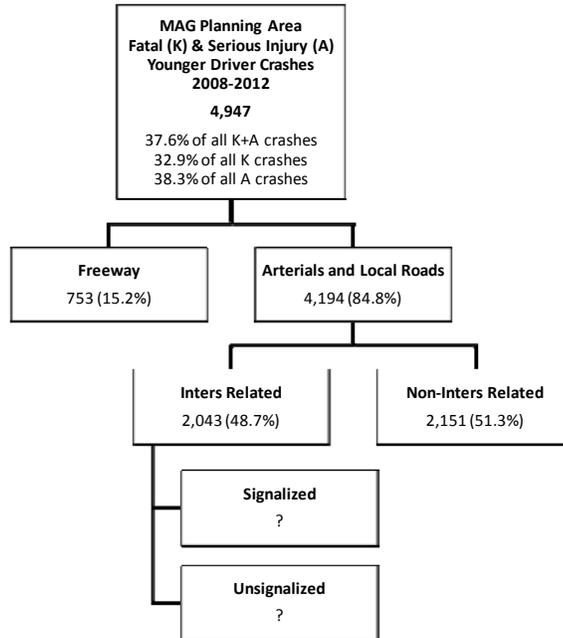


Figure 44 Crash Tree of Younger Driver Fatal and Serious Injury Crashes in the MAG Planning Area for 2008 - 2012

1.3.5 Fatal and Injury Crashes Involving Older Drivers

Serious injuries among drivers over 65 are increasing. The older a driver is, especially over 80, the more likely they will sustain serious injuries. Female drivers have a greater proportion of deaths over 85. Male drivers have a greater proportion of deaths compared to total crashes over the age of 80. This is likely due to increased frailty with age.

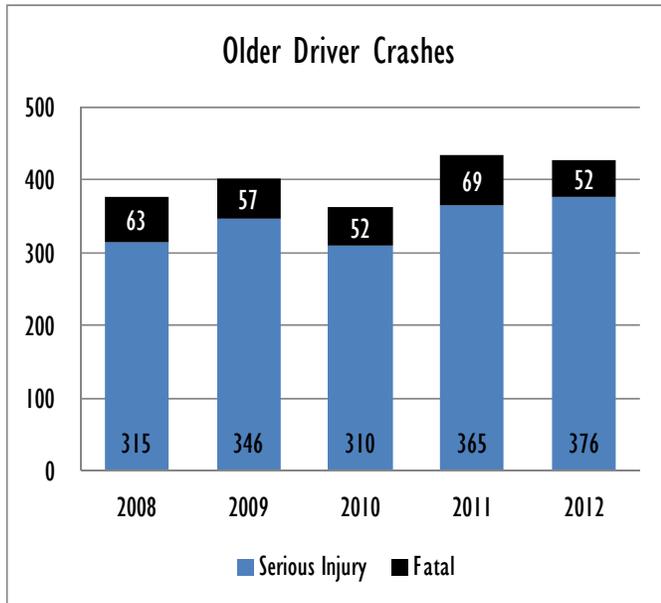


Figure 45 Fatal and Serious Injury Older Driver Crashes in the MAG Planning Area

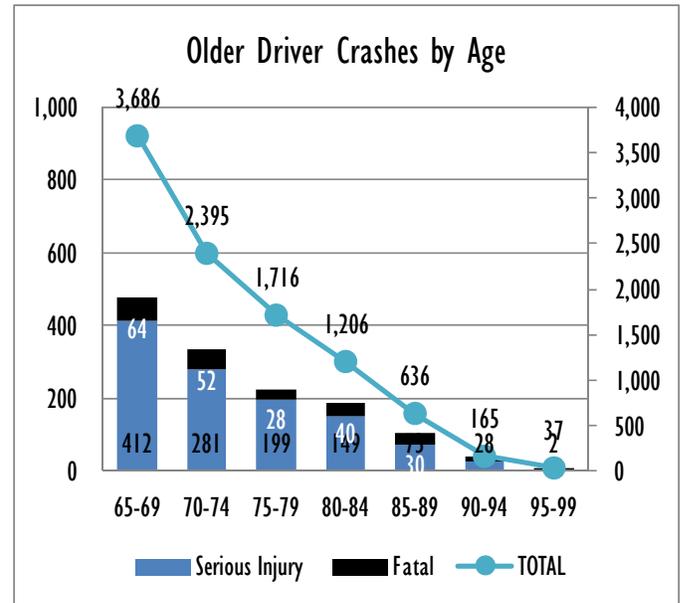


Figure 46 2008-2012 Fatal and Serious Injury Older Driver Crashes in the MAG Planning Area by Age

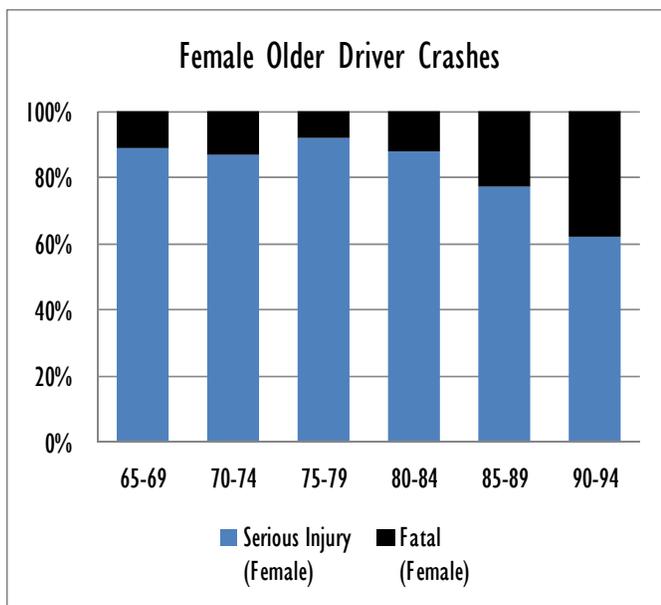


Figure 47 2008-2012 Fatal and Serious Injury Female Older Driver Crashes in the MAG Planning Area

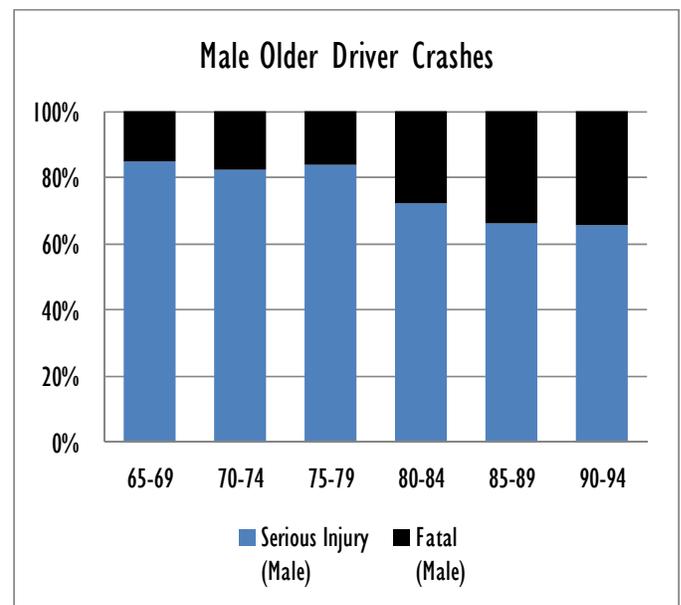


Figure 48 2008-2012 Fatal and Serious Injury Male Older Driver Crashes in the MAG Planning Area

1.3.6 Safety at Railroad and LRT Crossings

The number of crashes at railroad grade crossings has significantly decreased since 2008. The State of Arizona Traffic Crash Report Instruction Manual was revised October 2008 and may have affected the way crashes are reported. Reported collisions with a railroad train, according to the 2008 revision, must occur at or near a railroad crossing.

ALL RAILROAD GRADE CROSSING CRASHES BY YEAR						
Year	No Injury	Possible Injury	Non Incap.	Serious Injury	Fatal	TOTAL
2008	120	28	12	6	2	168
2009	75	8	7	3	0	93
2010	59	12	7	1	1	80
2011	40	8	6	2	1	57
2012	40	9	4	4	0	57

Figure 49 Railroad Grade Crossing Crashes in the MAG Planning Area by Severity

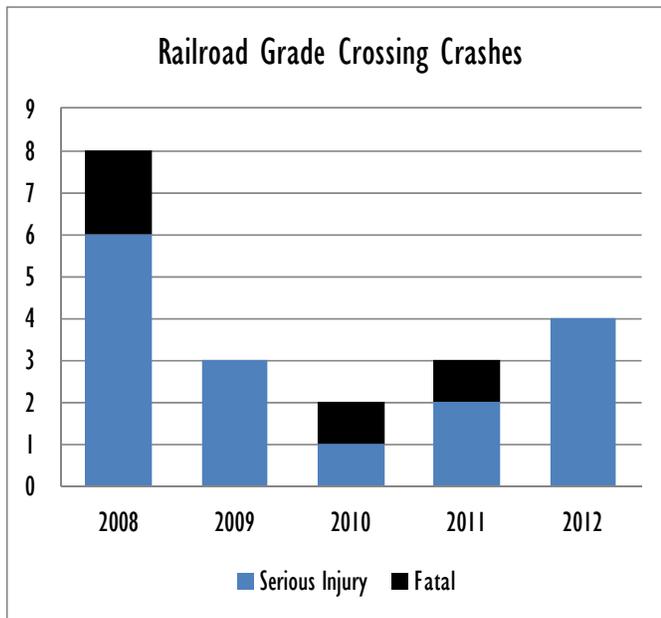


Figure 50 Fatal and Serious Injury Railroad Grade Crossing Crashes in the MAG Planning Area

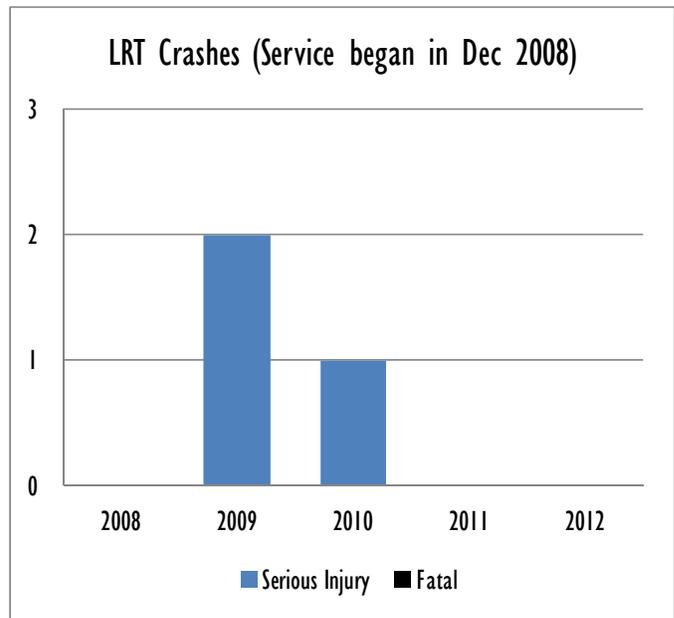


Figure 51 Fatal and Serious Injury Crashes involving Light Rail Transit (LRT) in the MAG Planning Area

The light rail transit (LRT) system, operated by Valley Metro Rail, began service on December 28, 2008. The urban, at-grade, in-street system is 20 miles long within the cities of Phoenix, Tempe, and Mesa. Most of the LRT crossings are the intersection of two streets. At these intersections, the LRT tracks are parallel to one street and perpendicular to the other street.

The system was designed with safety in mind and continues to work towards a high safety record. The most common light rail vehicle accident types for on-street systems are:

- Left and right-turning vehicles crossing illegally and in front of light rail vehicle
- Red light running

- Pedestrians walking in front of moving light rail vehicle⁷

Few crashes involving LRT result in serious injuries to LRT passengers or motor vehicle occupants. There were no fatalities within the study period. (The first fatal occurred in 2013)

1.3.7 Safety of Motorcyclists

The primary manner of collision for motorcyclists on freeways (41%) and arterials and local roads (33%) are single vehicle crashes. On freeways, rear-end crashes result in 36% of K and A crashes. On arterials and local roads, angle and left-turn crashes each account for 19% of K and A crashes.

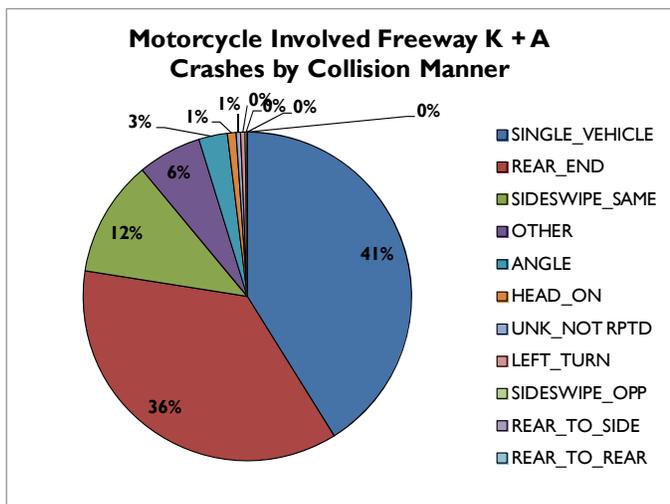


Figure 52 2008-2012 Motorcycle Involved Fatal and Serious Injury Freeway Crashes in the MAG Planning Area by Collision Manner

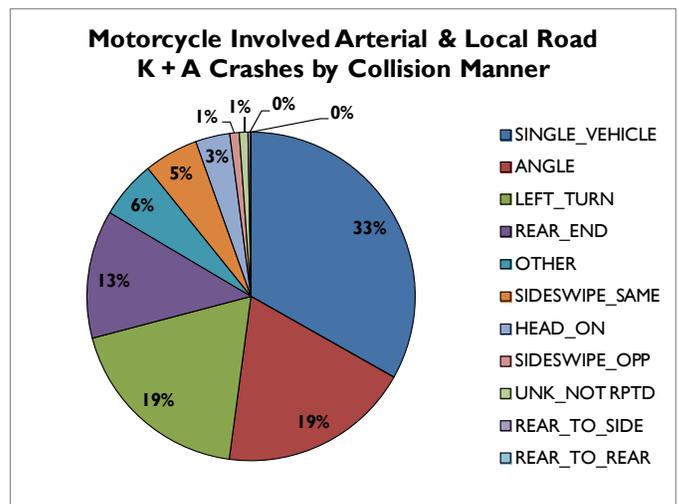


Figure 53 2008-2012 Motorcycle Involved Fatal and Serious Injury Arterial and Local Road Crashes in the MAG Planning Area by Collision Manner

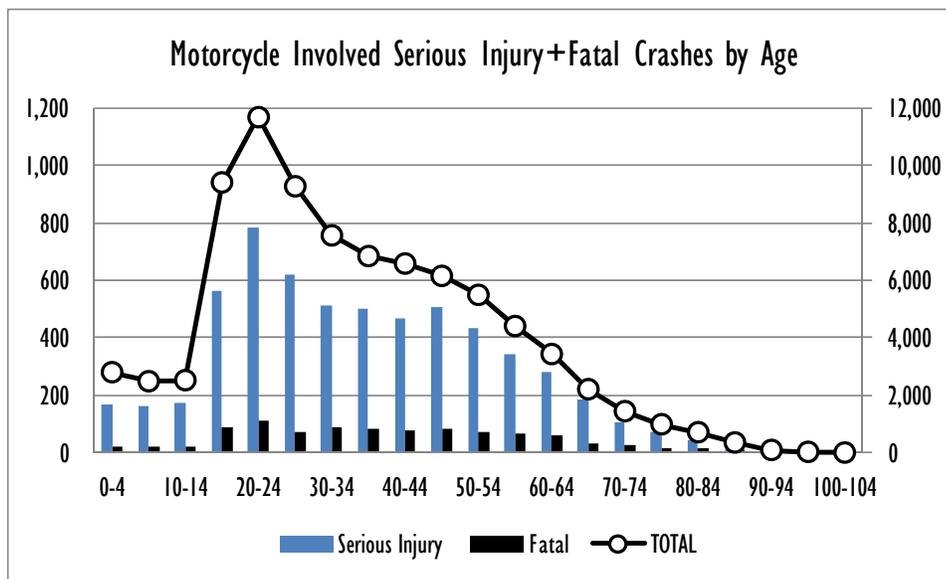


Figure 54 2008-2012 Motorcycle Involved Crashes in the MAG Planning Area by Age

⁷ http://www.valleymetro.org/safety/driver_safety

1.3.8 Safety of Trucks

According to a 2011 presentation on MAG's Truck Travel Model, total truck VMT any given year is approximately 33% of overall regional vehicular VMT. Trucks are involved in 9.8% of all fatal and serious injury crashes, with more than 75% of truck crashes occurring on arterials and local roads in the MAG planning area.

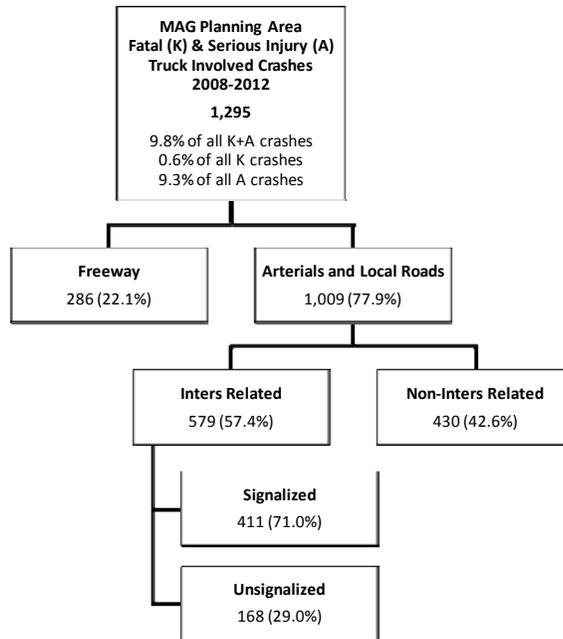


Figure 55 Crash Tree of Truck Related Fatal and Serious Injury Crashes in the MAG Planning Area for 2008 - 2012

1.3.9 Availability of Trauma Centers, EMS Response to Serious Crashes

Some agencies in the MAG planning area deploy emergency vehicle preemption (EVP) and select signalized intersections. EVP technology use optical emitters on vehicles and optical readers on those traffic signals equipped with EVP. There are multiple manufacturers and each agency has the choice to close their system (to prevent use by individuals who purchase optimal emitters off the internet), which can cause issues when an EVP system from another manufacturer cannot be read. If all of the EVP systems are left open or uncoded, there is not a problem.

There are six Level I Trauma Centers within the MAG region. Four of these are concentrated in central Phoenix within five miles of each other.

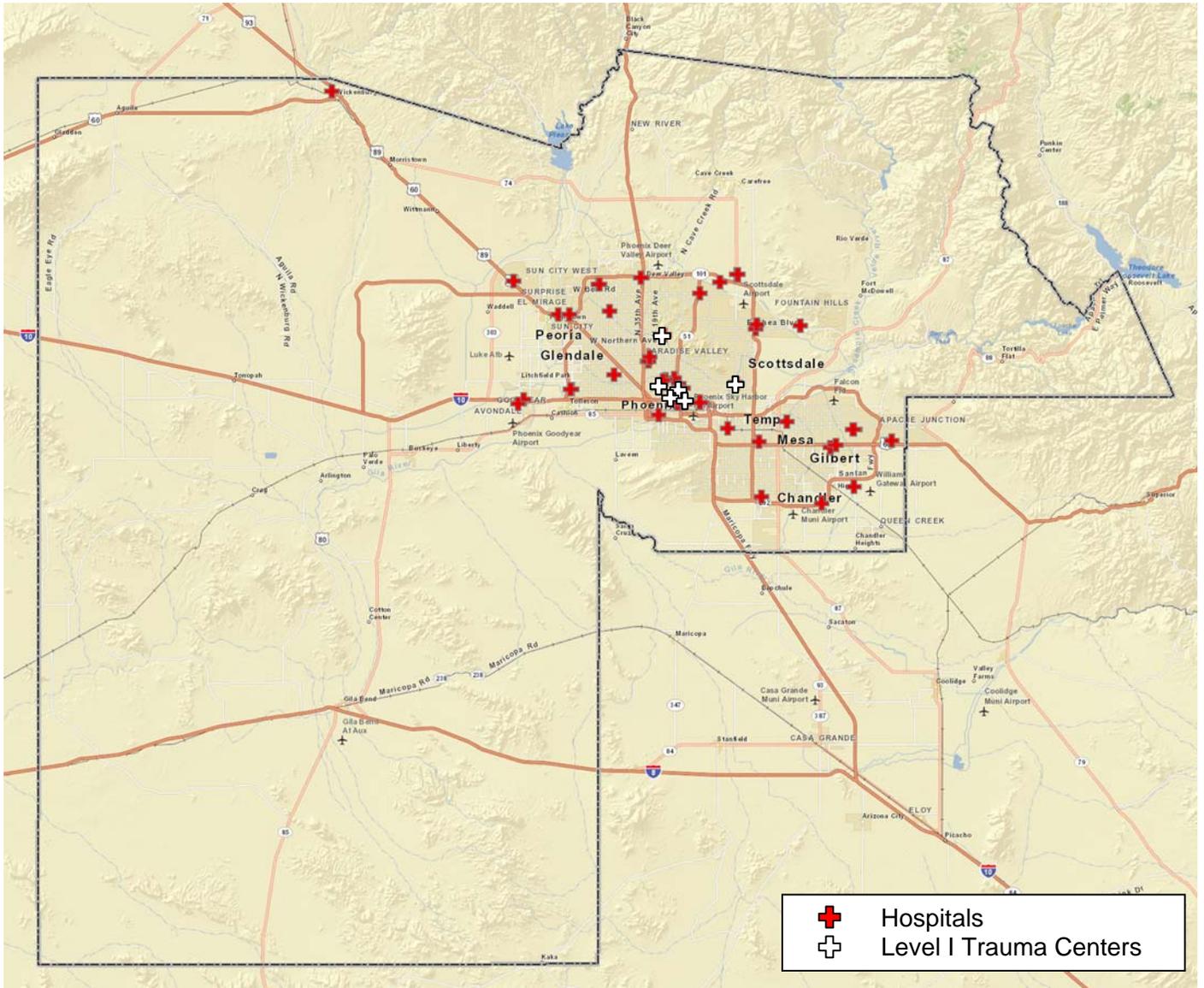


Figure 56 Hospitals and Level I Trauma Centers within the MAG Planning Area, Source: MAG Building Landmark Inventory Viewer

The GOHS provides funding in support of Emergency Medical and Fire Services with the following objectives:

- To increase vehicle extrication safety, efficiency and times by purchasing extrication equipment that is technologically advanced, safe and reliable for cutting metal materials in newer vehicles.
- To decrease response time (time of notification to hospital treatment or transport) in a Fire District service area.
- To decrease average response time for the arrival of appropriate equipment at the collision site in rural areas.
- To improve the EMS delivery system in a Fire District service area and surrounding communities through the replacement of out-dated and unreliable emergency/rescue equipment.

Collection of statistical data helps to support the organizational effort in meeting the objectives. The following information is required when submitting a proposal for funding. For this purpose, Emergency Medical and Fire Services should track the most recent three years of traffic calls for service, injuries, fatalities, and crash to hospital arrival times.⁸

1.3.10 A Comparison of the MAG Region to Other Selected Urban Regions

Figure 57 and Figure 58 compare the road fatality and injury rates based on population to other similar metropolitan regions. These comparisons are based on data included in Crashes vs. Congestion – What’s the Cost to Society report prepared for AAA by Cambridge Systematics, Inc. in November 2011. The regions selected for comparison were Dallas, Denver, Houston, Las Vegas, Los Angeles, Sacramento, Salt Lake City, San Diego, and Seattle.

Note that the injury rate is per 1000 persons and the fatality rate is per 100,000 persons. This was done to provide conveniently-expressed rates. The equivalent population rate of fatalities is significantly lower than the rate of serious injuries.

The MAG region has an injury rate of 7.77 injuries per 1000 population. Figure 57 reveals that this rate places it near the middle of the metro areas, is similar to rates found in Seattle, and slightly less than rates found in Dallas, Salt Lake City and Houston.

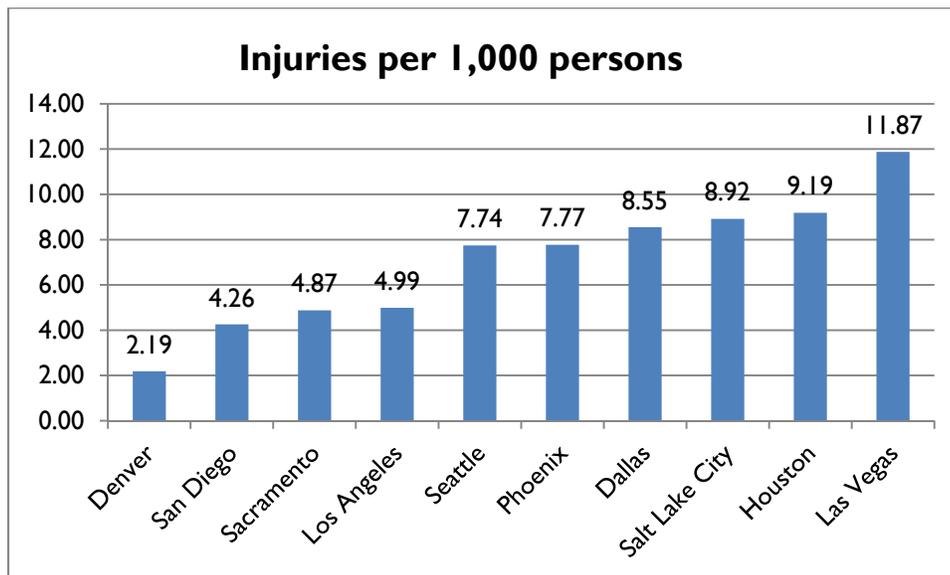


Figure 57 Injuries per 1,000 Persons in Select Urban Regions, Source: What’s the Cost to Society prepared for AAA by Cambridge Systematics, Inc, November 2011

However, in terms of fatalities, the Phoenix metropolitan area has the second highest rate, 8.75 fatalities per 100,000 population (Figure 58). The rate falls between a group consisting of Dallas, Las Vegas, San Diego and Sacramento and Houston, which has the highest rate of fatalities by population (10 per 100,000 persons).

Both comparisons indicate that there is room for improvement in the Phoenix region in terms of reducing both fatalities and injuries.

⁸ Page 10 of GOHS Project Directors Manual FY2014 dated 7/22/2013

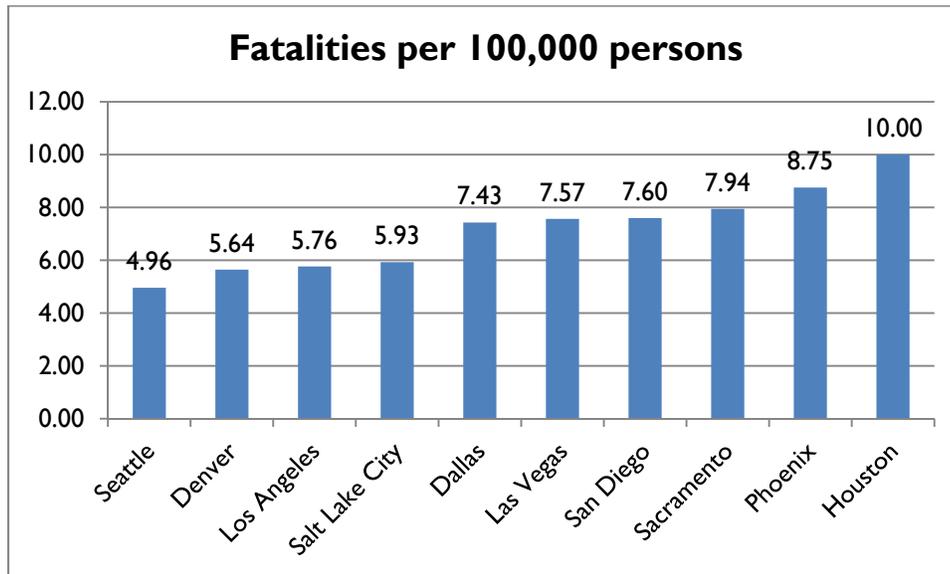


Figure 58 Fatalities per 100,000 Persons in Select Urban Regions,
 Source: *What's the Cost to Society* prepared for AAA by Cambridge Systematics, Inc, November 2011

Tables 1 and 2 provide the actual number of injuries, fatalities, population and rates. The number of injuries reported for the Denver region is an order of magnitude less than that found in all the other regions. This may indicate the need to verify this value.

Table 1 Injuries per 1,000 Persons

Metropolitan Area	Injuries	Population (millions)	Injuries per 1000 persons
Denver	5577	2.55	2.19
San Diego	12998	3.05	4.26
Sacramento	10369	2.13	4.87
Los Angeles	64190	12.87	4.99
Seattle	26379	3.41	7.74
Phoenix	33924	4.36	7.77
Dallas	55124	6.45	8.55
Salt Lake City	10082	1.13	8.92
Houston	53898	5.87	9.19
Las Vegas	22595	1.90	11.87



Table 2 Fatalities per 100,000 Persons

Metropolitan Area	Fatalities	Population (millions)	Fatalities per 100,000 persons
Seattle	169	3.41	4.96
Denver	144	2.55	5.64
Los Angeles	742	12.87	5.76
Salt Lake City	67	1.13	5.93
Dallas	479	6.45	7.43
Las Vegas	144	1.90	7.57
San Diego	232	3.05	7.60
Sacramento	169	2.13	7.94
Phoenix	382	4.36	8.75
Houston	587	5.87	10.00

1.4 PROGRAMS AND FUNDING RESOURCES FOR ROAD SAFETY PLANNING AND IMPLEMENTATION

The MAG regional transportation programming and planning processes have been designed to respond to both Federal and State mandates directed at the metropolitan transportation planning processes as well as to introduce best planning practices that would benefit the region.⁹ The MAG region is currently transitioning from the requirements of the Federal funding legislation: the Safe, Accountable, Flexible, and Efficient Transportation Equity Act—A Legacy for Users (SAFETEA-LU) to the new legislation: Moving Ahead for Progress in the Twenty First Century (MAP-21) signed into law on July 6, 2012 (went into effect on October 1, 2012).

MAP-21, as a two-year transportation reauthorization bill, provides federal funding of transportation programs only through September 2014. Total annual funding provided by MAP-21 is generally comparable to that in the previous Federal legislation (SAFETEA-LU). However, since MAP-21 covers only a two-year period, future Federal funding levels may be subject to change within a relatively short time unless congress passes a reauthorization bill.¹⁰

In addition to future federal funding uncertainties, there are MAP-21 rules and regulations being developed by FHWA that are expected to be finalized in 2014. Therefore, certain aspects of the federal program discussed in the following section will necessarily be updated in subsequent Technical Memoranda. However, what is known is that MAP-21 requires a performance-based and data-driven process for developing and implementing transportation improvement projects. Thus, as was described in Figure 1 the foundation for the STSP will be a consistency with federal safety goals and performance measures, and coordination with ADOT’s SHSP.

This section describes current and potential future funding sources for application toward road safety improvements, and including non-infrastructure projects. A roster of financial resources is summarized in Table 3 at the end of this technical memorandum. The resources listed in the table are primarily those that are specifically directed to safety projects. In addition to these resources, the region needs to consider safety in its programming of transportation capital improvements through the TIP process, as well in its

⁹ MAG FY2013 Transportation Programming Guidebook

¹⁰ 2012 Annual Report on Prop 400

longer range RTP development process. The relationship of the TIP and RTP to safety project funding is mentioned here and will be addressed further in Technical Memoranda Numbers 5 and 6.

1.4.1 Federal, State, and Metropolitan Levels

Of the federal transportation funds, generated mainly from gasoline and diesel taxes at the pump, approximately 90 percent are returned to Arizona. The MAG region receives approximately \$70 million annually from this fund for transportation-related improvements. However, nearly all of these funds anticipated for the next 20 years have been programmed in the 2003 Regional Transportation Plan.

As part of the requirements of the MAP-21 Federal funding legislation, Federal funds are set aside exclusively for transportation projects. Member agencies have access to these funds for implementing road safety improvements through ADOT, MAG, and the Governor's Office of Highway Safety (GOHS). MAP-21 authorizes a total combined amount (\$37.5 billion in FY2013 and \$37.8 billion in FY2014) in contract authority to fund five formula programs (including certain setasides within the programs described below):

- National Highway Performance Program (NHPP)
- Surface Transportation Program (STP)
- Highway Safety Improvement Program (HSIP)
- Congestion Mitigation and Air Quality Improvement Program (CMAQ)
- Metropolitan Planning Program
- PL funds – MAG planning funds through the work program
- Regional Sales Tax funds
- NHTSA Funds

Of these formula programs the ones that are most directly related to safety are HSIP and NHTSA funds. However, safety can be a consideration in the other programs as well but dependent upon the evaluation criteria used in the various state and regional project rating processes.

MAP-21 creates a streamlined, performance-based, and multimodal program to address the many challenges facing the U.S. transportation system. These challenges include improving safety, maintaining infrastructure condition, reducing traffic congestion, improving efficiency of the system and freight movement, protecting the environment, and reducing delays in project delivery.

MAP-21 supports the US Department of Transportation's (DOT) aggressive safety agenda by continuing the successful Highway Safety Improvement Program, doubling funding for infrastructure safety, strengthening the linkage among modal safety programs, and creating a positive agenda to make significant progress in reducing highway fatalities. It also continues to build on other aggressive safety efforts, including the Department's fight against distracted driving and its push to improve transit and motor carrier safety.

Transportation Planning

In MAP-21, the metropolitan and statewide transportation planning processes are continued and enhanced to incorporate performance goals, measures, and targets into the process of identifying needed transportation improvements and project selection. Public involvement remains a hallmark of the planning process.

Requirements for a long-range plan and a short-term transportation improvement plan (TIP) continue, with the long-range plan to incorporate performance plans required by the Act for specific programs. The long-range plan must describe the performance measures and targets used in assessing system performance and progress in achieving the performance targets. The TIP must also be developed to make progress toward established performance targets and include a description of the anticipated achievements. In the statewide and nonmetropolitan planning process, selection of projects in nonmetropolitan areas, except projects on the NHS or funded with funds remaining from the discontinued Highway Bridge Program, must be made in cooperation with affected nonmetropolitan officials or any regional transportation planning organization.

The USDOT Secretary is required to establish criteria for the evaluation of the new performance-based planning processes. The process will consider whether States developed appropriate performance targets and made progress toward achieving the targets. Five years after enactment of MAP-21, the Secretary is to provide to the Congress reports evaluating the overall effectiveness of performance-based planning and the effectiveness of the process in each State and for each MPO.

MAG has also established a Regional ITS Strategic Plan with goals aligned with the CMAQ program.

Performance Management

The cornerstone of MAP-21’s highway program transformation is the transition to a performance and outcome-based program. States will invest resources in projects to achieve individual targets that collectively will make progress toward national goals.¹¹

MAP-21 establishes national performance goals for Federal highway programs. Their number one goal is safety - **to achieve a significant reduction in traffic fatalities and serious injuries on all public roads.**

The performance-based approach requires standards and measures for serious injuries and fatalities per vehicle mile traveled, number of serious injuries and fatalities, and transit safety (49 USC 5329). The FTA

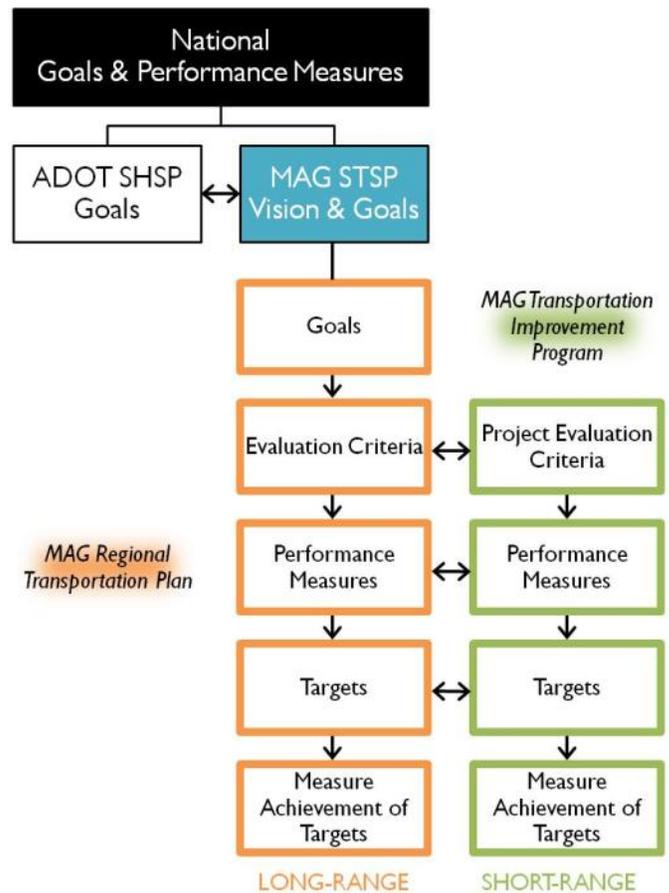


Figure 59 Relationship of Goals & Performance Measures at the Federal, State, and Regional Level

¹¹ USDOT FHWA. July 17, 2012. MAP-21 A Summary of Highway Provisions

has been granted new Public Transportation Safety Authority, which provides additional authority to set minimum safety standards, conduct investigations, audits, and examinations.

Under MAP-21, MPO plans will need to describe how programs and projects will achieve targets. MPOs must coordinate, to the maximum extent practical, with the relevant State's SHSP in selecting a target to ensure consistency. Coordination is also required with public transportation providers, to the maximum extent practical.

1.4.1.1 Statewide Highway Safety Improvement Program (HSIP)

The purpose of Highway Safety Improvement Program (HSIP) is to achieve a significant reduction in traffic fatalities and serious injuries on all public roads through the implementation of infrastructure-related highway safety improvements.

ADOT is responsible for administering the state program with oversight from FHWA. ADOT's Highway Safety Section is responsible for the development of guidelines related to process and project eligibility. Figure 60 illustrates the HSIP funding allocation within the state of Arizona. Based on the current ADOT process for programming HSIP funds, twenty-five (25) percent of federal HSIP funds the state receives each year is suballocated to be programmed by the MPOs and COGs in the state, for safety improvement projects. The annual HSIP sub-allocation to the MAG region (referred to as MAG-HSIP), starting in FY 2014, is \$1,900,000 for the expanded MAG planning area. The balance 75 percent of HSIP (referred to as statewide-HSIP) is programmed by ADOT and is available for safety improvements on any public road.

ADOT is anticipated to receive \$32.7 million per year for the fiscal years 2014 through 2017. MAG anticipates \$1.9 million in fiscal years 2014 through 2017.

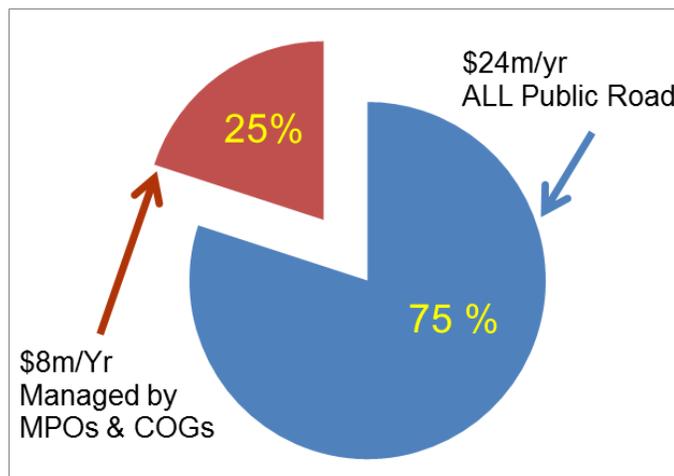


Figure 60 Distribution of Federal HSIP Funds by ADOT

ADOT Discretionary HSIP. Because Arizona DOT has adopted the SHSP, Arizona DOT has some flexibility to use up to 10 percent of HSIP funds for non-infrastructure safety projects when all infrastructure needs, including those for railway-highway grade crossings, have been met for a particular year. These funds are programmed by ADOT. However, ADOT has not certified that all infrastructure needs have been met, as a result, this 10 percent has been utilized as part of the statewide pool of HSIP.

Arizona DOT submits a written request for approval to the FHWA Arizona Division Office for each year that Arizona DOT certifies that the requirements have been met.

Statewide-HSIP. Safety improvement projects that involve major road construction activities can compete for Statewide-HSIP funds awarded by ADOT. MAG is currently updating the list of Top 100 high crash risk intersections in the region. Local agencies that have intersections that rank high on this MAG list, and also are placed on ADOT's Top Five Percent Report to FHWA, may effectively compete for Statewide-HSIP funds. A formal multi-year project programming process for this portion of the federal HSIP funds (statewide-HSIP) does not exist at this time, and is expected to be developed by ADOT in the future.

At present, project applications are received and reviewed by the ADOT Traffic Safety Section on a continuing basis. Qualifying projects are selected, further refined in consultation with local agency staff and programmed in an appropriate fiscal year, based on the availability of funds. Projects that seek statewide HSIP funds are in competition with similar projects submitted to ADOT from statewide local agencies. Guidelines have been prepared by MAG to help prepare better HSIP project applications from the MAG region. These guidelines have incorporated FHWA requirements for qualifying HSIP projects as well as qualifying criteria stipulated in the ADOT HSIP Manual.

Depending on the availability of Statewide-HSIP funds, MAG may issue a call for projects and recommend projects for Statewide-HSIP in FY2016 - FY2018.

MAG-HSIP

All MAG HSIP funds available through FY 2014 are currently programmed for qualifying road safety improvement projects. The next opportunity for programming MAG HSIP funds will be for projects in FY 2014 through FY 2017. A call for projects occurred in July 2013 (due Friday, August 2, 2013). MAG-HSIP funds are programmed based on a call for projects and a recommendation from the MAG Transportation Safety Committee. These projects must meet eligibility requirements for federal safety funds. Based on guidance from ADOT, MAG-HSIP funds are applied primarily for making systematic road safety improvements that would also qualify as Categorical Exclusion Type 1—requiring minimal clearance requirements.

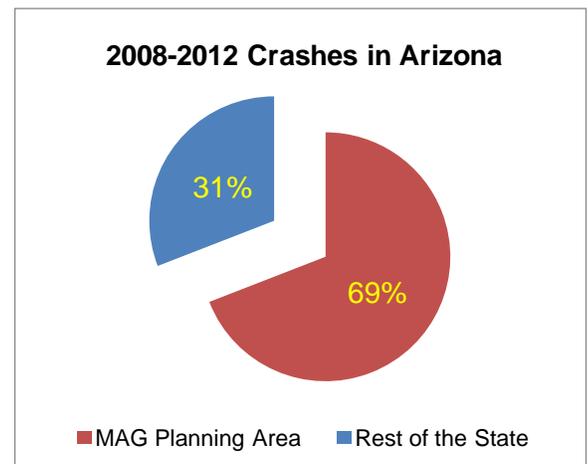


Figure 61 2008-2012 Distribution of Crashes in Arizona

1.4.1.2 Railroad Crossings (Federal)

ADOT administers the Railroad-Highway Grade Crossing Program. Funds are available on a Statewide basis for projects. ADOT maintains the inventory of all public railroad crossings, which are ranked based on the Relative Hazard Exposure Index. A diagnostic review team consisting of representatives from ADOT, the ACC, FHWA, the Railroad and the Road Sponsor (State, City, County, or Tribe) evaluates the identified railroad crossings through an on-site diagnostic review. A list of projects is developed through this process. Each project receives up to 90% Federal funding. The ADOT allocation is approximately \$2 million per year

of \$220 million nationwide. The program guidelines are available through ADOT's Utility & Railroad Section.

1.4.1.3 High Risk Rural Roads (Federal)

No high risk rural roads (HRRR) set aside unless safety statistics worsen in Arizona. If the fatality rate on rural roads increases over the most recent 2-year period, the State must obligate for projects on HRRRs at least 200% of their FY09 HRRR program.

1.4.1.4 Older Drivers (Federal)

If fatalities and serious injuries per capita for road users (drivers and pedestrians) over 65 increases during the most recent 2-year period, the State must include strategies in their subsequent SHSP, considering Older Driver Handbook recommendations.

1.4.1.5 Transportation Alternatives Program (TAP) (Federal)

MAP-21 combined three existing programs from prior federal law: Transportation Enhancements, Safe Routes to School and Recreational Trails Program under a new program entitled Transportation Alternatives Program (TAP).

Eligible activities for Transportation Alternatives (for road safety planning and implementation) include:

- Construction, planning, and design of on-road and off-road trail facilities for pedestrians, bicyclists, and other nonmotorized forms of transportation.
- Construction, planning, and design of infrastructure-related projects and systems that will provide safe routes for non-drivers, including children, older adults, and individuals with disabilities to access daily needs.

Eligible entities include:

- A local government
- A regional transportation authority
- A transit agency
- A natural resource or public land agency
- A school district, local education agency or school
- A tribal government
- Any other local or regional governmental entity with responsibility for or oversight of transportation or recreational trails (other than an MPO or state agency) that the state determines to be eligible

Funding of the program

- 50% of the funds will be sub allocated to MPO's and other parts of the state in proportion to their relative shares of the population of the State. (DRAFT FY2013 \$5.7)
- 50% of the funds will be administered by ADOT (DRAFT FY2013 \$7.5)
- Federal authorization for 2013 is \$809M and 2014 is \$820M.

A project selection process will be carried out by MAG and ADOT for their respective funding. MAG will continue to work with ADOT and FHWA in determining the process for programming Transportation Alternative funds in federal fiscal year (FFY) 2013, 2014, and beyond.

Safe Routes to School. The Safe Routes to Schools Program will be funded to States and to Metropolitan/Regional Planning Organizations. The Program provides funds to substantially improve the ability of primary and middle school students to walk and bicycle to school safely. The specific purposes of the program are:

1. to enable and encourage children, including those with disabilities, to walk and bicycle to school
2. to make bicycling and walking to school a safer and more appealing transportation alternative, thereby encouraging a healthy and active lifestyle from an early age; and
3. to facilitate the planning, development, and implementation of projects and activities that will improve safety and reduce traffic, fuel consumption, and air pollution in the vicinity (approximately 2 miles) of primary and middle schools (Grades K-8).

Federal Safe Routes to School funding will be announced as FHWA direction is received and a call for applications in several different categories will be made available. ADOT will no longer issue calls for projects. All funds will be distributed at the Council of Governments (COG) level¹².

Other Federal Transportation Funding Sources. In addition, potential access to other transportation funding sources (not directly focused on safety) for safety projects may also be available. Surface Transportation Programming (STP) funds that are allocated to this region can be utilized for transportation safety improvements. The Arizona Department of Transportation provides the following guidance:

*Improvements to safety features that are routinely provided as part of a broader Federal-aid project should be funded from the same source as the broader project. States should address the full scope of their safety needs and opportunities on all roadway categories by using other funding sources such as Interstate Maintenance (IM), Surface Transportation Program (STP), National Highway System (NHS), and Equity Bonus (EB) funds in addition to HSIP funds.*¹³

1.4.1.6 Federal Transit Administration (FTA) Resources

State of Good Repair (SGR) Grants administered by FTA are dedicated to repairing and upgrading fixed guideway and motorbus public transportation facilities operating for at least 7 years.¹⁴ Urbanized Area Formula Grants, administered by FTA, funds capital, planning and Job Access and Reverse Commute Program (JARC)-eligible activities with a new takedown for safety oversight.¹⁵

Public transportation provisions of MAP-21 are contained in Title 49 Section 5329).¹⁶ Under the new law FTA the authority to establish and enforce a new comprehensive framework to oversee the safety of public transportation throughout the United States. FTA will implement the new law in consultation with the transit community and the U.S. Department of Transportation's (DOT) Transit Rail Advisory Committee for Safety (TRACS), which has been working since September of 2010 to help guide this effort.

Safety performance criteria and standards. Under the new law, FTA must develop safety performance criteria for all modes of public transportation (rail, bus, etc.). FTA must also develop minimum safety

¹² Per Brian Fellows, ADOT

¹³ 2010 ADOT HSIP Manual

¹⁴ USDOT FTA MAP-21 Fact Sheet. State of Good Repair Grants Section 5337

¹⁵ MAP-21_Public_Presentation.pdf

¹⁶ Federal Transit Administration. 8.22.2012. MAP-21 A Summary of Public Transportation Provisions (MAP21_essay_style_summary_v5_MASTER.pdf)

performance standards for vehicles not regulated by other Federal agencies. In addition, FTA must develop a public transportation safety certification training program for individuals involved in transit safety.

Grantee safety plans

MAP-21 requires all recipients of FTA funding to develop agency safety plans that include performance targets, strategies, and staff training. For rural recipients, the plan may be drafted by the State. For small urban systems, FTA must issue a rule designating which small urban systems may have their safety plans drafted by the State. These measures and targets must be incorporated into metropolitan and statewide transportation plans and transportation improvement programs.

State Safety Oversight. MAP-21 includes new requirements for the State Safety Oversight (SSO) program, through which States with heavy rail, light rail, and streetcar systems must establish safety oversight for these transit systems. MAP-21 requires State Safety Oversight Agencies (SSOAs) to be legally and financially independent from the rail systems they oversee, and have the authority, staff training, and expertise to enforce Federal and State safety laws. FTA must certify whether each SSO is adequate and meets the requirements. FTA will oversee implementation of the SSO programs and audit each SSO agency at least triennially.

Funding for State Safety Oversight. The law also directs FTA to distribute funding via formula to support State safety oversight work. The funding is a takedown (one-half of one percent) from the Urbanized Area Formula program, and totals approximately \$22 million per year. A 20 percent local match is required for these funds.

Additional Authorities. The new law provides FTA with several additional authorities including the authority to inspect and audit all public transportation systems; to make reports and issue directives with respect to the safety of public transportation systems; to issue subpoenas and take depositions; to require the production of documents; to prescribe record-keeping and reporting requirements; to investigate public transportation accidents and incidents; to enter and inspect equipment, rolling stock, operations and relevant records; and to issue regulations to carry out transit safety provisions.

MAP-21 also grants FTA enforcement authority and permits FTA to issue directives, require more frequent oversight of transit systems, impose more frequent reporting requirements, and require that formula grant funds be spent to correct safety deficiencies before funds are spent on other projects.

1.4.1.7 Governor's Office of Highway Safety (GOHS) Non-infrastructure Grant Funds

The GOHS administers the 402, 405, 410, and 164 federally funded programs. The grant cycle for FFY 2014 funding runs from October 1, 2013 through September 30, 2014. Applications are accepted through the GOHS online eGrants system only. Alcohol-related, speed-related, pedestrian, and bicyclist crash data for injuries and fatalities is required for some GOHS grant applications. The funding can be used for:

- Overtime and employee related expenses for enforcement and education
- Professional and outside services
 - Specialized training instructor, print shop, and equipment installation
- Travel for training – in and out of state
 - Collision reconstruction, Lifesavers conference, Borkenstein, and Drug Recognition Expert (DRE) conference
- Materials and Supplies
 - Portable Breath Testing (PBT) mouthpieces, brochures, DRE and phlebotomy supplies (blood kits), and bicycle helmets

- Capital outlay
 - Child safety seats, phlebotomy chairs, enforcement vehicles, speed trailers, PBT's, speed detection equipment, live scan finger print scanner, e-citation equipment, and extrication equipment

The Governor's Office of Highway Safety places a priority in funding enforcement campaigns targeting speeding and aggressive drivers. Speeding is one of the top three causes of deaths on Arizona's roads and highways (the others being impaired driving and failure to be properly restrained). Speed related crashes continue to be a leading cause of all traffic fatalities in Arizona. In 2011, speed related fatalities accounted for 35.64 percent of all traffic fatalities. Speed related traffic fatalities increased 12.21 percent from 2010 to 294 deaths in 2011. Over the five year period from 2007 to 2011, speed related fatalities decreased 12.5 percent.¹⁷ In Fiscal Year 2011, the Governor's Office of Highway Safety provided \$1,132,985 in funding to law enforcement agencies to enforce Arizona's speed and aggressive driving laws. Arizona is one of only 11 states to have specific laws targeting aggressive driving (ARS § 28-693). These laws define aggressive driving as speeding and at least two of the following: failure to obey a traffic control device, passing on the right out of regular lanes of traffic, unsafe lane change, following too closely, failure to yield right of way and is an immediate hazard to another person or vehicle. The GOHS devotes funding to law enforcement agencies to combat aggressive driving through overtime and unmarked enforcement vehicles.

In 1993 the Tempe Police Department partnered with the Governor's Office of Highway Safety, Tempe Saint Luke's Hospital and the Tempe Municipal Court to develop the Children Are Priceless Passengers (CAPP) Program. The program was initiated to reduce the infant and toddler death and injuries in Arizona by educating the public on the effectiveness of continuous and proper use of child safety seats. The program provides two hour child safety classes in both English and Spanish and instructed by nationally certified child safety seat technicians.

In support of occupant protection, the "Buckle Up, Baby" campaign, a GOHS program supported by the Phoenix Police Department, allows anyone to report their observation of a child under the age of 8 not properly restrained while riding in a motor vehicle. A packet of useful information is then mailed to the registered owner of the vehicle stating their vehicle was observed transporting an unrestrained child. The information is not provided to any law enforcement agencies, insurance companies, or the Arizona Motor Vehicles Division.

In an effort to improve safety conditions for all pedestrians throughout Arizona, GOHS places special emphasis on funding projects related to the enforcement of pedestrian safety laws, school-based pedestrian safety education programs and coalitions dedicated to comprehensive pedestrian safety programs. Additionally, the GOHS provides funding to agencies throughout Arizona to promote bicycle safety, here are some of those programs:

- Funding to enforce bicycle laws.
- Bicycle helmet distribution programs - emphasis on low-income children.
- Support of "Bicycle Safety Month" in May and "Back to School Safety" Month.
- Comprehensive school based pedestrian and bicycle safety education outreach.
- Participation and coordination of safety fairs –Arizona State Fair Safety Days and

¹⁷ <http://www.azdot.gov/mvd/statistics/crash/PDF/11crashfacts.pdf> and http://www-nrd.nhtsa.dot.gov/departments/nrd-30/ncsa/STSI/4_AZ/2011/4_AZ_2011.htm

- Children's Assistance and Resource Event (CARE Fair) –distribute bicycle helmets/education.
- Provide support to Perimeter Bicycle Association's El Tour de Phoenix Children's Ride and youth helmet give-away projects.

The Arizona Motorcycle Safety Advisory Council (AMSAC), since its inception in 2000, has become increasingly active in projects to raise awareness of both drivers and motorcyclists regarding issues affecting motorcycle safety. One dollar (\$1.00) of each motorcycle registration goes into the State Motorcycle Safety Fund. It is the privilege and responsibility of the Arizona Motorcycle Safety Advisory Council to advise the Governor's Office of Highway Safety on how to best expend the monies to benefit all the motorcycle riders in the state, by furthering educational efforts and raising awareness about the increasing numbers of motorcycles on the road.

Through the Motorcycle Safety Fund, the GOHS funds a comprehensive Motorcycle Operator Manual, which is distributed by the Arizona Department of Transportation's Motor Vehicle Division (MVD). It contains essential operation and crash avoidance information for safely riding a motorcycle on Arizona streets and roadways. Arizona licensing information is also provided.¹⁸ Additional AMSAC projects include billboard campaigns, radio PSAs, motorcycle safety fairs, and motorcycle awareness presentations in high school driver's education classes.

1.4.1.8 Planning Assistance for Rural Areas (PARA) (Federal)

Planning Assistance for Rural Areas (PARA) is sponsored by the Arizona Department of Transportation Multimodal Planning Division (MPD) and provides federal funds to local communities, cities, towns, and counties located outside Transportation Management Areas (Phoenix and Tucson urbanized boundaries); and Tribal governments and their sub-units are eligible including: chapters, districts and villages. The PARA program is funded 100% by ADOT using Federal Statewide Planning and Research (SPR) funds; therefore no local match is required. The awarded funding is a limit or cap of \$250,000 for each PARA study process. Additional funds may be provided in special circumstances. This is dependent upon the specific circumstance, funding availability, and ADOT approval.

PARA funds are limited to planning applications and may not be used for the design or construction of transportation facilities. PARA funds may be applied to address a broad range of planning issues related to roadway and non-motorized transportation modes. Funds may also be applied to studies dedicated solely to the planning of public transportation services from the FTA sections 5303 and 5304 programs. There is a 20% local match requirement to support transit planning studies.

Partnerships between communities are encouraged. PARA funds may be used for planning studies that address the needs of multiple jurisdictions, as well as for needs that are limited to neighborhoods within jurisdictions. Applicants are encouraged to focus their requests for funding on the most critical transportation planning needs identified in their communities.

1.4.1.9 Regional Funding Sources (non-Federal)

The half-cent sales tax (aka Regional Area Road Fund (RARF)¹⁹) for transportation approved through Proposition 400 is the major funding source for the MAG Regional Transportation Plan (RTP), providing over half the revenues for the Plan. In 2012, arterial street projects received \$34 million, which MAG programs, and \$8.9 million was distributed to MAG and the Public Transportation Fund for planning

¹⁸ Arizona Motorcycle Operator Manual

<http://mvd.azdot.gov/mvd/formsandpub/viewPDF.asp?lngProductKey=1133&lngFormInfoKey=1133>

¹⁹ http://www.azdot.gov/Inside_ADOT/FMS/Rarfund.asp

purposes.²⁰ In addition to the half-cent sales tax, there are a number of other RTP funding sources, which are primarily from State and Federal agencies.²¹

The State of Arizona taxes motor fuels and collects a variety of fees and charges relating to the registration and operation of motor vehicles on the public highways of the state. These collections include gasoline and use fuel taxes, motor carrier taxes, vehicle license taxes, motor vehicle registration fees, and other miscellaneous fees. These revenues are deposited in the Arizona Highway User Revenue Fund (HURF) and are then distributed to the cities, towns and counties and to the State Highway Fund. These taxes represent a primary source of revenues available to the state for highway construction, improvements and other related expenses.²²

I.4.2 Summary of Future Funding Opportunities

There are several potential funding sources for safety improvements in the future: (1) Safety improvements that result from physical street improvements funded through the Transportation Improvement Program (TIP); (2) New safety programs funded through MAP-21; (3) Safety projects or programs developed through the MAG Unified Planning Work Program and Annual Budget.

²⁰ http://www.azdot.gov/Inside_ADOT/FMS/PDF/rarftankchart_12.pdf

²¹ 2012 Annual Report on Prop 400

²² http://www.azdot.gov/Inside_ADOT/FMS/Hurfund.asp

Table 3 Funding Programs Available for Safety Related Projects in the MAG Planning Area

SUMMARY OF FUNDING PROGRAMS AVAILABLE FOR SAFETY RELATED PROJECTS								
Program	Source	Administered by:	Availability to MAG Region	Purpose(s)	Applicability		Amount Available (in \$1,000s)	
					Infra-structure	Non- infra-structure	FY 2014	FY 2015-19
Highway Safety Improvement Program (HSIP)	Federal	ADOT	Competitive Process for Statewide	Correct / improve hazardous road location or feature, including bicycle / pedestrian	X		\$32,700	\$32,700 / year
Highway Safety Improvement Program (HSIP)	Federal	MAG	MAG process for MAG planning area	Correct / improve hazardous road location or feature, including bicycle / pedestrian	X		\$1,900 (MAG planning area)	\$1,900 / year (MAG planning area)
Railroad-Highway Grade Crossing	Federal (set aside of HSIP)	ADOT	Competitive Statewide Process	Reduce hazard exposure at public railroad crossings	X		\$2,000 (statewide)	\$2,000 / year (statewide)
Transportation Alternatives Program (TAP)	Federal	ADOT (50%) and MPOs (50%)	Competitive Process for Statewide portion, and MAG process for MAG portion	Transportation enhancements, Safe Routes to School, Recreational Trails	X		\$5,662 available to MPOs in state H12	Process underway to determine MAG portion
High Risk Rural Roads (HRRR) Safety	Federal (set aside of HSIP)	ADOT	Limited to rural areas	Construction and operational improvements on rural roads	X		\$-0-	Dependent on whether safety statistics worsen
Older Drivers	Federal (set aside of HSIP)	ADOT	State Highway Strategic Plan (SHSP)	If fatalities and serious injuries of older drivers and pedestrians per capita increase over 2-year period Consider strategies in next SHSP Update focused on older drivers and pedestrians		X	\$-0-	
State of Good Repair (SGR)	Federal	FTA	Competitive Federal Process	Dedicated to repair and upgrading of public transportation facilities operating at least 7 years	X		variable	
Urbanized Area Formula Grants	Federal	FTA	Formula-based	Safety oversight is eligible	X	X		
Regional Area Road Fund (RARF)	MAG	MAG		Regional arterial street and public transportation projects	X	X		
Highway User Revenue Fund (HURF)	State	ADOT	Formula-based	Highway construction, improvements and other related expenses	X			
Planning Assistance for Rural Areas (PARA)	Federal (Statewide Planning and Research)	ADOT		Planning of rural transportation systems to address issues related to roadway, transit, and non-motorized transportation modes.		X		
Governor's Office of Highway Safety (GOHS)	Federal (National Highway Traffic Safety Administration, NHTSA)	GOHS		Campaigns to target speed-related crashes		X		
Children Are Priceless Passengers (CAPP)	Federal (NHTSA)	GOHS and local agencies		Reduce infant and toddler death and injuries by educating the public on proper use of child safety seats		X		
Governor's Office of Highway Safety (GOHS)	Federal (NHTSA)	GOHS		Various programs to promote bicycle safety		X		

Appendix I

Acronyms and Definitions

AAA	American Automobile Association	CRF	Crash Reduction Factor
AARP	American Association of Retired Persons	DCR	Design Concept Report
AASHTO	American Association of State Highway and Transportation Officials	DPS	Department of Public Safety
ACC	Arizona Corporation Commission	DRE	Drug Recognition Expert
ACN	Automatic Collision Notification	DUI	Driving Under the Influence
ADA	Americans with Disabilities Act	EMS	Emergency Medical Services
ADHS	Arizona Department of Health Services	EVP	Emergency Vehicle Preemption
ADOT	Arizona Department of Transportation	FARS	(USDOT) Fatal Analysis Reporting System
ADT	Average Daily Traffic	FFY	Federal Fiscal Year
ALERT	Arizona Local Emergency Response Team	FHWA	Federal Highway Administration
ALISS	(ADOT) Accident Location Identification Surveillance System	FMS	(MAG) Freeway Management System
ARS	Arizona Revised Statutes	FRA	Federal Rail Administration
ATIS	Arizona Transportation Information System	FSP	Freeway Service Patrol
BRT	Bus Rapid Transit	FTA	Federal Transit Administration
B/C	Benefit-Cost Ratio	FY	Fiscal Year
CAPP	(State) Children are Priceless Passengers	GIS	Geographic Information Systems
CARE	(State) Children's Assistance and Resource Event	GIS-T	Geographic Information Systems for Transportation
CFR	Code of Federal Regulations	GOHS	(Arizona) Governor's Office of Highway Safety
COG	Council of Governments	GRIC	Gila River Indian Community
CMAQ	(Federal) Congestion Mitigation and Air Quality Improvement Program	GHSA	Governors Highway Safety Association
CMF	Crash Modification Factors	GTSAC	Governor's Traffic Safety Advisory Council
		HES	Hazard Elimination and Safety
		HES	(ADOT) Highway Enhancements for Safety
		HPMS	(FHWA) Highway Performance Monitoring System



HRRRP	(Federal) High Risk Rural Roads Program	PAR	Police Accident Report
HSIP	Highway Safety Improvement Program	PBT	Portable Breath Testing
HSM	Highway Safety Manual	PDO	Property Damage Only
HURF	(State) Highway User Revenue Fund	RARF	(MAG) Regional Area Road Fund
IM	(Federal) Interstate Maintenance	REACT	Regional Emergency Action Team
ITS	Intelligent Transportation Systems	RESCU	Remote Emergency Satellite Cellular Unit
JARC	(Federal) Job Access and Reverse Commute Program	RHGCP	Railway-Highway Grade Crossing Program
LRT	Light Rail Transit	ROSS	Regional Off-Street System
LTAP	Local Technical Assistance Program	RPTA	Regional Public Transportation Authority (aK and A Valley Metro)
MAG	Maricopa Association of Governments	RSA	(MAG & ADOT) Road Safety Assessment
MAP-21	Moving Ahead for Progress in the 21 st Century	RSA	(FHWA) Road Safety Audit
MPO	Metropolitan Planning Organization. MPOs are designated by the governor to coordinate transportation planning in an urbanized area of the state. MAG is an MPO	RTP	Regional Transportation Program
MUTCD	Manual on Uniform Traffic Control Devices	RTSIMS	(MAG) Regional Transportation Safety Information Management System
MVD	(ADOT) Motor Vehicle Division	SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users
NCHRP	National Cooperative Highway Research Program	SGR	(Federal) State of Good Repair
NEPA	(Federal) National Environmental Policy Act	SHS	State Highway System
NHPP	(Federal) National Highway Performance Program	SHSP	(ADOT) Strategic Highway Safety Plan
NHS	(Federal) National Highway System	SRTS	Safe Routes to Schools
NHI	National Highway Institute	STIP	Statewide Transportation Improvement Program
NHTSA	National Highway Traffic Safety Administration	STP	Surface Transportation Program
PA	Project Assessment	STSP	(MAG) Strategic Transportation Safety Plan
		TADS	(City of Phoenix) Traffic Accident Data System
		TAP	(Federal) Transportation Alternatives Program
		TCN	Traffic Counts Network

TIGER	(Federal) Transportation Investment Generating Economic Recovery Program	TSC	(MAG) Transportation Safety Committee
TIP	(MAG) Transportation Improvement Program	TSSG	(MAG) Transportation Safety Stakeholders Group
TMA	(Federal) Transportation Management Areas	URL	Uniform Resource Locator
TPC	(MAG) Transportation Performance Committee	USC	United States Code
TraCS	Traffic and Criminal Software	USDOT	United States Department of Transportation
TRACS	(Federal) Transit Rail Advisory Committee for Safety	UTSM	(MAG) Urban Transportation Modeling System
		VMT	Vehicle miles traveled