

# ARIZONA

## Strategic Highway Safety Plan



★ ENGINEERING



★ EDUCATION



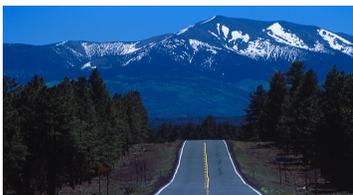
★ ENFORCEMENT



★ EMERGENCY RESPONSE

# Arizona Strategic Highway Safety Plan

*Safe Today, Safer Tomorrow*



*Working together to improve traffic safety.*

August 2007

## Governor's Traffic Safety Advisory Council Strategic Highway Safety Plan Endorsement

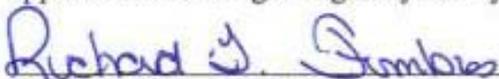
Traffic crashes are an epidemic in our state and in our country. In 2006, 1,288 people were killed on Arizona roads: more than 3 people were killed every day. The results are devastating, both in terms of loss of life and economically. In 2005, crashes resulted in an estimated \$5.8 billion of economic loss to our state<sup>1</sup>. The nationwide impact is even more tragic. Across the country, someone loses a loved one in a crash approximately every 12 minutes.

The Governor's Traffic Safety Advisory Council (GTSAC) was established in 2004 to serve as a role model in leadership for developing, promoting, and implementing cost-effective traffic safety strategies within the state transportation system to counteract the impact of traffic crashes in Arizona. In 2005, GTSAC sponsored the development of an Arizona Transportation Safety Plan which has now been translated into a Strategic Highway Safety Plan (SHSP) in compliance with 23 USC 148 requirements.

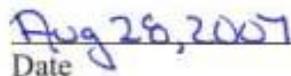
This SHSP has been developed through a data-driven collaborative approach between Arizona's many safety partners. The SHSP represents our state safety goal statement, and identifies the priority emphasis areas we will be initially focusing on to achieve our goal.

The SHSP is seen as a comprehensive statewide safety strategy document that will guide our existing safety planning and programming processes, that will facilitate the implementation of the recommended safety strategies and countermeasures through our existing plans and programs, and that can be used to modify our current planning processes over time to adopt and institutionalize the new SHSP safety culture.

On behalf of the Governor's Traffic Safety Advisory Council we, the undersigned, approve this Strategic Highway Safety Plan.



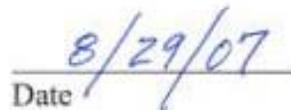
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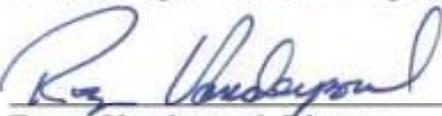
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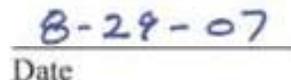
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<sup>1</sup> The Economic and Injury Burden of Motor Vehicle Crashes in Arizona for 2005, Reported by the Arizona CODES Project, July 2007

# Acknowledgements

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## **Executive Summary**

This document presents Arizona's first Strategic Highway Safety Plan (SHSP). As this is the first Plan, the document includes both the background and the Plan itself.

### **Introduction to Arizona's Main Traffic Safety Issues**

On average, at least three people are killed every day on Arizona's roads. In 2006, the number of fatalities was 1,288, an increase of 21.5 percent over 2001. Arizona's annual fatality crash rate is about 33 percent higher (2005) than the United States' national rate. Traffic related fatalities and serious injuries represent a tragic loss of life and loss of quality of life. In 2005, crashes resulted in an estimated \$5.8 billion of economic loss to our state.

Arizona is one of the fastest growing states, and vehicle miles traveled (VMT) have naturally increased. Although the data for 2001–2005 show that the Arizona fatality rate (fatalities per 100 million VMT) has been decreasing, the increase in the number of fatalities is clearly unacceptable. This document sets out Arizona's response to the challenge of decreasing the number of road fatalities in Arizona.

### **The Governor's Traffic Safety Advisory Council and the Transportation Safety Plan**

Arizona's response included the establishment of the Governor's Traffic Safety Advisory Council (GTSAC) in 2004. GTSAC develops, promotes, and implements effective traffic safety strategies designed to reduce the impact of traffic crashes in Arizona. The Council also serves as a role model in safety leadership.

In 2005, GTSAC championed and released the development of Arizona's Transportation Safety Plan (TSP). The TSP examined safety from a broad perspective that included engineering, education, enforcement, and emergency medical services (EMS) (the 4E's).

### **The Safe, Accountable, Flexible, and Efficient Transportation Equity Act and the Strategic Highway Safety Plan**

In July 2005, after the completion of Arizona's TSP, the Safe, Accountable, Flexible, and Efficient Transportation Equity Act – A Legacy for Users (SAFETEA-LU) was passed. This Act contains a number of important new and continued funding sources for safety related projects, programs, and initiatives. To access the Act's Highway Safety Improvement Plan (HSIP) funds, every state is required to develop a Strategic Highway Safety Plan (SHSP).

Since the SAFETEA–LU legislation was introduced, Arizona has focused its commitment to reverse the growing trend in the number of highway related fatalities on the SHSP process. The SHSP requires each state to adopt a traffic safety vision, to set clear and explicit safety goals, to implement appropriate strategies and countermeasures, and to evaluate the effectiveness of these strategies and countermeasures. The process to be adopted and the presentation of the Plan have been specified by the US Department of Transportation’s Champion Guide<sup>2</sup>.

The SHSP initiative has four basic phases:

- Phase 1.** Producing the Development Plan
- Phase 2.** Producing the Implementation Plan
- Phase 3.** Implementation
- Phase 4.** Evaluation and Updating

The four phases are integrated and synchronized with the business cycles of existing plans and programs. Future Plans will repeat and reiterate the process as developments, achievements, and new challenges require.

This report represents Phase 1, Development Plan (The Plan) and is a comprehensive, collaborative, high level, statewide safety strategy that will guide Arizona’s safety change initiative. The Plan can be regarded as an “umbrella” for all existing and future safety planning and programming processes. It is a living document, the first phase of an iterative process that will reconsider all safety initiatives as they are implemented and evaluated.

The Plan complies with the legislation’s requirements regarding the content and presentation of the Plan, but the SHSP process is not just a legislative requirement. The SHSP process is an overarching approach to safety that requires strong leadership, an inspiring vision, achievable goals, and a team dedicated to the opportunities represented by the SHSP. The Arizona Department of Transportation (ADOT), in consultation with the Federal Highway Administration – Arizona Division, was assigned the role of champion (project manager) for this SHSP phase by GTSAC.

Like the TSP, the SHSP encompasses engineering, enforcement, education, and EMS. The following issues are also specifically addressed: a state vision; a state goal; the selection of a set of emphasis areas; a sub-goal for each emphasis area; the selection of a set of appropriate strategies for each emphasis area; and a suite of countermeasures for each strategy. Every aspect of the approach is data driven, and every aspect is intended to draw in as wide a spectrum of Arizona’s many safety partners and the broader community as possible.

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<sup>2</sup> STRATEGIC HIGHWAY SAFETY PLANS: A CHAMPION’S GUIDE TO SAVING LIVES, Interim Guidance to Supplement SAFETEA-LU Requirements

As this is Arizona's first SHSP, a one-time initiation phase was added to bring the state's safety partners together to build a common understanding of the SHSP process, to review baseline safety statistics, and to set the vision, goals and priorities of this SHSP. The initiation phase included a workshop held in May, 2007.

The workshop participants included:

- American Automobile Association
- Arizona Courts
- Arizona Department of Health Services
- Arizona Department of Public Safety
- Arizona Department of Transportation
- Arizona Police Chiefs Association
- City of Peoria
- Coconino County
- Driver and Safety Education Association
- Federal Highway Administration
- Federal Motor Carrier Safety Administration
- Governors Office of Highway Safety
- Inter Tribal Council of Arizona
- Maricopa Association of Governments
- National Highway Traffic Safety Administration
- Pima Association of Governments
- TransTech Consulting

### **Arizona's Safety Vision**

The safety vision is “**Zero fatalities on Arizona roads, your life depends on it**” (the **Every One Counts** vision). The Plan's 4E and supporting public information and outreach strategies are all designed to support this new vision for safety in Arizona.

### **Arizona's State Safety Goal**

The vision developed is supported by a state “stretch” goal designed to bring about clear progress towards the Every One Counts vision. In the first five years, this goal requires a reduction in the number of fatalities of approximately 12 percent. The first five year period will be 2008–2012, and the base year of comparison will be 2007. The state goal is discussed in detail in **Section 4**.

Adoption of this goal required workshop participants to consider the pros and cons of expressing the goal as an absolute number of fatalities or as a rate. A fatality goal was favored because an absolute number is so clearly consistent with the Every One Counts vision, because an absolute number conveys a clear message that can be used in outreach programs and other communications with the public, and because progress in reducing the number of crash fatalities would also have a positive effect on serious injury crashes, non-serious injury crashes, and property damage only crashes. An additional state goal addressing serious injury crashes may be added in future Plans.

## Arizona's Six Emphasis Areas

There is a natural tendency to try to address every area of safety, but the SAFETEA-LU legislation recognizes that this is simply not possible in practice. A SHSP proceeds by selecting a number of emphasis areas that reflect the needs of the Plan's jurisdictions, and available resources.

As SHSPs are data driven, the emphasis areas were ranked by fatalities and selected after careful consideration of the most recent safety data available. The emphasis areas take into account the safety issues that most need to be addressed, and practical considerations such as data issues and staff availability.

Six emphasis areas were selected:

1. Restraint Usage
2. Speeding
3. Young Drivers
4. Impaired Driving
5. Roadway / Roadside (lane departure and intersections)
6. Data Improvement

Although the Plan will focus on the six emphasis areas listed, work on other areas of safety (such as pedestrians) will of course continue. With a Zero fatality vision, all areas of safety will have to be addressed. As each emphasis area involves many aspects of crashes, it is likely that addressing the selected emphasis areas will provide benefits in other areas of traffic safety.

The emphasis areas are expected to change in future Plans as goals are achieved or modified.

## Problem Statement for each Emphasis Area

In accordance with SAFETEA-LU requirements and the data driven basis of the Plan, the problem statement for each emphasis area sets out the number of fatalities and the number of serious injuries involving the emphasis area. The problem statements refer to the five year period from 2001–2005.

From 2001–2005, there were 5,644 traffic related fatalities and 37,265 traffic related serious injuries in Arizona. The number of fatalities and the number of serious injuries involving each emphasis area were as follows:

- Lack of restraint use contributed to 3,437 fatalities and 15,100 serious injuries
- Young drivers (age less than 25 years) accounted for 1,956 fatalities and 16,208 serious injuries
- Speeding contributed to 2,194 fatalities and 12,670 serious injuries
- Impaired driving contributed to 2,385 fatalities and 5,728 serious injuries
- Lane departure contributed to 2,958 fatalities and 10,957 serious injuries
- Intersection layout contributed to 1,271 fatalities and 16,365 serious injuries

The numbers total more than 5,644 fatalities and more than 37,265 serious injuries because of the overlap between emphasis areas: a single fatality or serious injury may be counted under more than one emphasis area. For example, a fatality may be a young driver who is also driving while impaired.

### **Sub-goal for each Emphasis Area**

Each emphasis area has a stretch sub-goal of reducing fatalities by 15 percent in each of the five year periods following 2007. Arizona's state safety goal aims for a 12 percent reduction in the number of fatalities in the first five years. The stretch goal of 15 percent for the individual emphasis areas was considered appropriate as it provides an allowance for double counting where emphasis areas overlap. The rationale for this approach is discussed in greater detail in **Section 4**.

### **Strategy Development for each Emphasis Area**

The development of strategies was based on an analysis of the data for the number of fatalities and serious injuries by:

- Driver versus passenger
- Gender
- Age group
- Collision manner (e.g. angle collisions, head-on collisions, etc.)
- Type of vehicle (e.g. passenger cars, pick-up truck, motorcycle, etc.)
- Month of the year
- Day of week
- Time of day

The recommended strategies are designed to achieve the emphasis area sub-goal. The discussion of the strategies recommended for each of the five emphasis areas (excluding Data Improvement) includes:

- A description of the proposed broad strategies
- A description of the detailed countermeasures that support the broad strategies
- Focus area (state or county) of the countermeasure
- Proposed timing of the implementation
- Appropriate performance measure(s)

### **Strategies for Restraint Usage**

The broad strategies for restraint usage are:

- Maximize restraint use by all vehicle occupants
- Educate the public on the proper use of child restraints

### **Strategies for Young Drivers**

The broad strategies for young drivers are:

- Strengthen legislative and administrative requirements
- Reduce young drivers' involvement in fatal and serious injury crashes
- Introduce training support for parents of young drivers
- Increase young drivers' safety awareness through education and training enhancements

### **Strategies for Speeding**

The broad strategies for speeding are:

- Reduce the incidence of speeding
- Reduce the number of chronic speeders
- Reduce the effects of speeding related crashes

### **Strategies for Impaired Driving**

The broad strategies for impaired driving are:

- Deter impaired driving through effective enforcement
- Reduce excessive drinking and underage drinking
- Prosecute and impose sanctions on DUI offenders
- Control and reduce the number of repeat offenders

### **Strategies for Roadway / Roadside**

The broad strategies for *lane departures* are:

- Reduce the incidence and severity of head-on collisions
- Reduce the number of vehicles leaving the roadway
- Minimize the effects of vehicles leaving the roadway

The broad strategies for *intersections* are:

- Reduce the number of intersection related fatalities through improved operations and traffic control
- Reduce the number of intersection related fatalities through improved geometric configuration
- Reduce the number of intersection related fatalities by improving driver compliance at intersections
- Reduce the number of potential conflicts at intersections through improved access management

### **Strategies for Data Improvement**

The broad strategies for data improvement are:

- Improve the timeliness, accuracy, and completeness of data
- Improve uniformity, integration, and accessibility of data

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## **1. Introduction**

### **1.1. Background**

In 2004, the Governor of Arizona established the Governor’s Traffic Safety Advisory Council (GTSAC). The mission of GTSAC is to develop, promote, and implement effective traffic safety investments to save lives and prevent injuries through a reduction in vehicle crashes.

In response to this mission, GTSAC championed the development of the Transportation Safety Plan (TSP) for the State. The TSP was released in 2005 and had a broad perspective that discussed safety investments in the areas of engineering, education, enforcement, and emergency medical services (EMS) (the 4E’s).

In July 2005, after the completion of Arizona’s TSP, the United States Congress passed the Safe, Accountable, Flexible, and Efficient Transportation Equity Act – A Legacy for Users (SAFETEA–LU). This Act contains a number of new and continued funding sources for safety related projects, programs, and initiatives. Section 148 of the Act provides funding for the Highway Safety Improvement Program (HSIP) and elevates the safety program from a set-aside to a core program. To access HSIP funds, states are required to develop a Strategic Highway Safety Plan (SHSP).

### **1.2. Arizona’s Commitment to Traffic Safety**

The development and maturation of the Arizona SHSP process started in 2004 with the creation of GTSAC, and continued through the production and publication of the 2005 Arizona TSP. The Arizona SHSP process is being fine-tuned through the nationwide SHSP initiative.

SAFETEA–LU is a major new initiative that requires states to change how they set and achieve traffic safety goals and objectives. Accomplishing this change takes strong leadership, an inspiring vision, achievable goals, a dedicated team, and healthy oversight to jump the gap from where states are now to where states want and need to be. This is certainly the approach taken for Arizona’s SHSP. In Arizona, the SHSP is not just a legislative requirement, it is the right thing to do and, over time, it will enable Arizona to reduce its traffic-related fatalities and serious injuries.

### 1.2.1. SHSP Leadership

The GTSAC<sup>3</sup> is the designated body responsible for leading traffic safety on a statewide level. GTSAC has the authority to establish committees or teams to deal with specific traffic safety issues, and may designate staff within the members' respective agencies to assist with or serve on these committees or teams. GTSAC's mandate to develop cost effective strategies to improve traffic safety on Arizona's federal, state, county, and local roads through the 4E's response is consistent with the intent and requirements of the SHSP initiative.

The GTSAC mandate, through the Governor's Executive Order, includes:

- Identifying best practices
- Recommending safety legislation and educational materials for driver education
- Analyzing laws and programs governing motor carrier safety
- Establishing a matrix of indicators that objectively measure progress in reducing serious injuries and fatalities due to vehicular crashes
- Reporting the state's progress in reducing serious injuries and fatalities due to vehicular crashes

GTSAC commits to meeting regularly and sponsors a variety of subcommittees. Each subcommittee is sponsored by a Council Member and supported by a technical staff person from one of the Executive Transportation Safety Committee agencies.

Current GTSAC Subcommittees, roles and efforts include:

- **Communications** – Elevates the awareness of the general public and the Legislature regarding transportation safety issues in Arizona. Acts as a resource for the Council in developing an overall media plan, and in supporting the technical subcommittees in the development of safety campaigns. Created and maintains the GTSAC website.
- **Driver Education** – Improves driver behavior and reduces the number of crashes through quality driver education and targeted testing procedures. Reviews and recommends specific educational materials that could be incorporated into existing or new driver training and high school driver education classes or courses.

GTSAC Members
1. AAA of Arizona
2. Arizona Chapter National Safety Council
3. Arizona County Sheriffs Association
4. Arizona Department of Public Safety
5. Arizona Department of Transportation
6. Arizona Driver and Safety Education Association
7. Arizona Police Chiefs Association
8. Federal Highway Administration Arizona Division
9. Federal Motor Carrier Safety Administration Arizona Division
10. Governor's Office of Highway Safety
11. Inter Tribal Council of Arizona, Inc. (ITCA)
12. Maricopa Association of Governments (MAG)
13. Mothers Against Drunk Driving (MADD)
14. National Highway Traffic Safety Administration (NHTSA)
15. Pima Association of Governments (PAG)
16. Professional Fire Fighters of Arizona
17. Safe Kids Arizona, Arizona Department of Health Services
18. Students Against Destructive Decisions (SADD)

<sup>3</sup> See Appendix B for GTSAC Charter

- **Issue Based Enforcement and Education** – Discusses and develops strategies for specific issues to improve driver safety in the State of Arizona. The four major areas of responsibility are: DUI enforcement; Reducing underage alcohol / reducing underage drinking and driving; Supporting the statewide Certified Drug Recognition Expert (DRE) program to reduce accidents caused by drug usage; and Promoting traffic laws
- **Legislative** – Addresses safety concerns that require legislative support. Supports the overall mission of the Council by providing information, by drafting proposed legislation impacting transportation safety, and by encouraging support of approved legislative proposals.
- **Photo Enforcement** – Promotes and assists with the implementation of photo enforcement technologies, with the focus on improving roadway safety within the State of Arizona. Participants represent enforcement, engineering, education and judicial / courts. All Arizona municipalities currently using Photo Enforcement Technologies (eight municipalities) are involved in the Photo Enforcement Subcommittee.
- **Road Safety Audit** – Conducts formal examinations of user safety of a future or existing roadway, including state, local and tribal road facilities. The examinations are conducted by an independent multidisciplinary audit team on state, local and tribal road facilities.
- **School Based Initiatives** – Develops and implements strategies to improve the safety of children walking and bicycling to / from school.
- **Traffic Records** – The Traffic Records Coordinating Committee (TRCC) is responsible for developing, approving, and implementing Arizona’s strategic plan for traffic records. The strategic plan for traffic records is designed to improve the timeliness, accuracy, completeness, uniformity, integration, and accessibility of state highway safety data.

### **1.2.2. SHSP Champion**

GTSAC has assigned the SHSP Development Plan Champion (Project Management) role to the Arizona Department of Transportation (ADOT), in consultation with the Federal Highway Administration – Arizona Division.

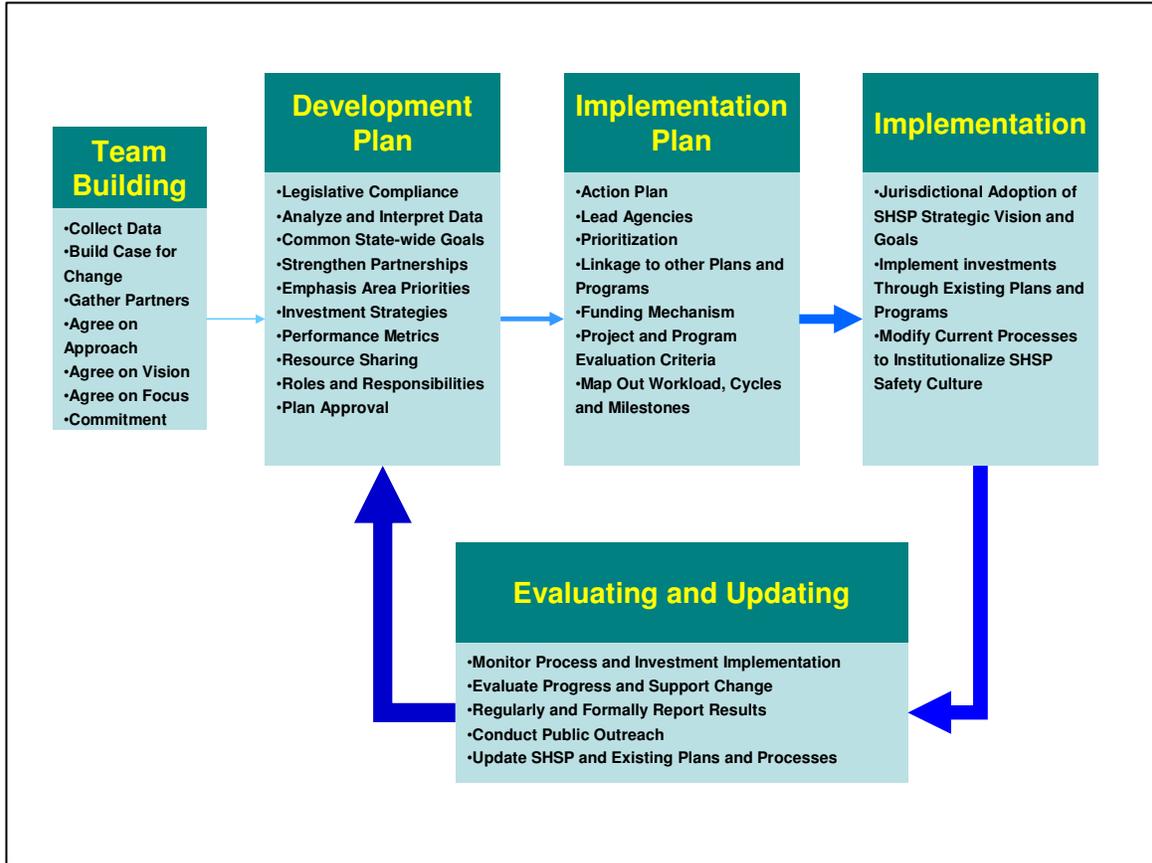
The SHSP initiative has four basic phases:

- Phase 1.** Producing the Development Plan
- Phase 2.** Producing the Implementation Plan
- Phase 3.** Implementation
- Phase 4.** Evaluation and Updating

These four phases are intended to repeat in a perpetual cycle, and are intended to be synchronized with the business cycles of existing plans and programs to ensure a true strategic and tactical integration of effort across the state’s various jurisdictions.

In developing this SHSP, Arizona added a one-time Team Building phase designed to bring state safety stakeholders (partners) together to better understand the long-term intent of the SHSP process, to review common baseline state safety statistics and trends, to acknowledge that their combined efforts would be more effective than the sum of current practice, and to decide how they would collectively and successfully deal with Arizona’s safety trends over time (**Exhibit 1**).

**Exhibit 1: SHSP Process and Activities**



To achieve the reductions in traffic fatalities and serious injury necessary to attain current and future state safety goals, the SHSP process does not end with the production of the SHSP Development Plan. The SHSP process acknowledges that the cycle is just beginning. In order to be successful, human resources need to be made available for each activity in each SHSP phase.

### 1.3. Safety Principles and Vision

*“The definition of insanity is doing the same thing over and over again and expecting different results.” Albert Einstein*

The SAFETEA–LU legislation and SHSP process have provided the State of Arizona with the opportunity to try something new, and to build a statewide safety team with a common focus, commitment, and goals to reverse the growing trend of highway related fatalities.

At the origin of the new vision is the concept of “One Team” consisting of the government and the traveling public. Safety is everyone’s responsibility and each individual Arizona citizen needs to ensure they make it home safely at the end of each day. Together we are more effective and more efficient than the sum of the parts.

This concept of “One Team” will not happen overnight, but will continue to pick up momentum through each SHSP phase and through each annual cycle. This joint effort enables the State of Arizona to adopt the following safety vision:

*“Zero fatalities on Arizona roads, your life depends on it”*

To achieve this vision of *Zero fatalities on Arizona roads, your life depends on it (Every One Counts)*, every Arizona safety team member, every traveling citizen, and every visitor will need to challenge themselves with regular personal safety goals. These goals should be developed and marketed through a SHSP public outreach program. The concept of public outreach program is discussed further in the Next Steps section of this report (**Section 15**).

In pursuit of the Every One Counts vision, Arizona has set stretch goals designed to make annual progress towards the vision through strategies that cover the 4Es, information, and public outreach. The goals are discussed in **Section 4**.

## 2. Arizona Demographics and Geography

### 2.1. Increase in Population, the Number of Drivers' Licenses, and Vehicle Miles Traveled

Arizona's highway safety challenge is heightened by the state's dramatic population growth. During the 12 months ending July 1, 2006<sup>4</sup>, Arizona replaced Nevada as the fastest-growing state in the union. From 2000–2006, Arizona's population increased by 22.9 percent whereas the national average increase in population was 6.4 percent. Arizona's population growth was approximately **360 percent greater** than the national average.

The three largest metropolitan areas are the counties of Maricopa, Pima, and Pinal. **Table 1** shows the 2006 population of Arizona's counties. Maricopa County<sup>5</sup> is the fastest growing county in the United States.

**Table 1: Population Estimates by County, 2006**

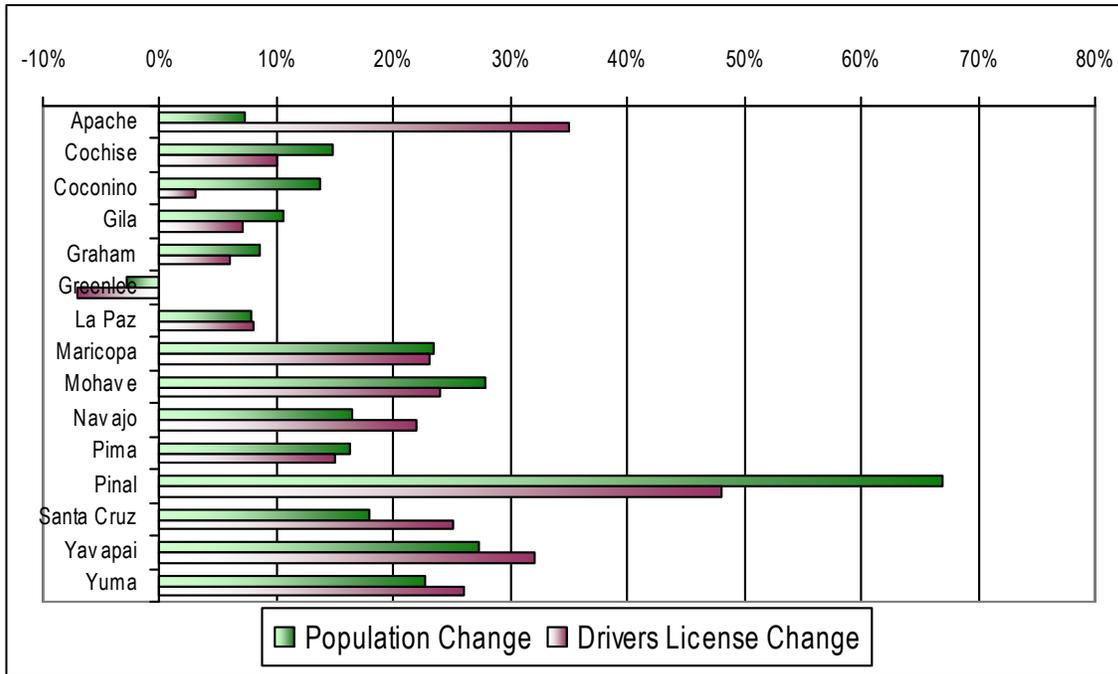
County	2006 Population Estimates
Apache	74,515
Cochise	135,150
Coconino	132,270
Gila	56,800
Graham	36,380
Greenlee	8,300
La Paz	21,255
Maricopa	3,792,675
Mohave	198,320
Navajo	113,470
Pima	981,280
Pinal	299,875
Santa Cruz	45,245
Yavapai	213,285
Yuma	196,390
<b>Total</b>	<b>6,305,210</b>

<sup>4</sup> US Census Bureau

<sup>5</sup> US Census Bureau

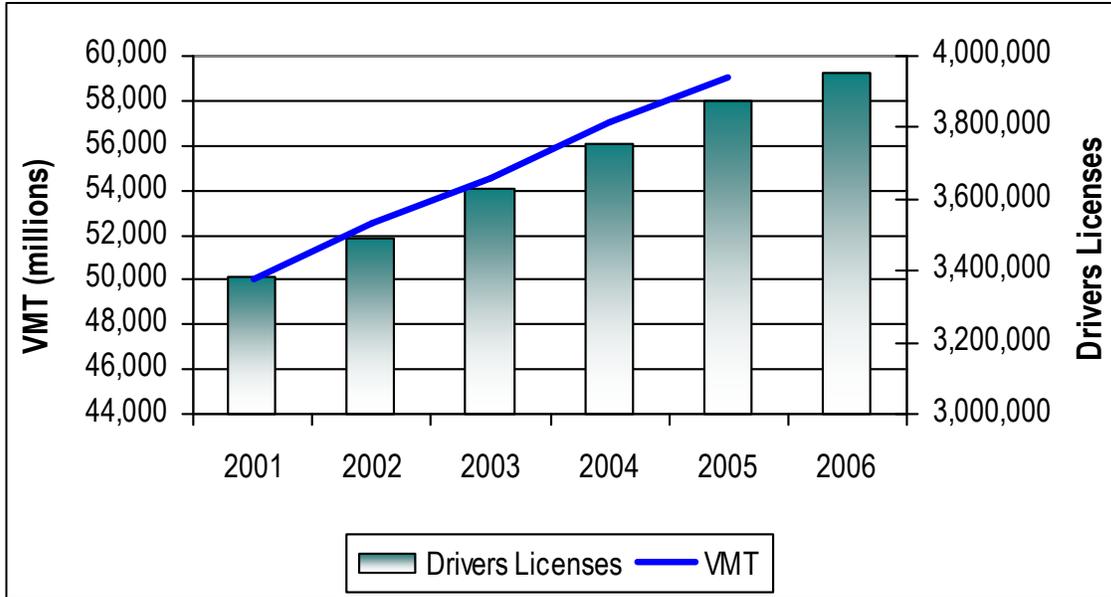
The increase in population growth has led to an increase in the number of drivers' licenses and the number of vehicle miles traveled (VMT). **Exhibit 2** shows the change in population and the number of drivers' licenses for each county between 2000 and 2006. Many counties experienced increases in population and the number of drivers' licenses of more than 10 percent and some experienced increases of more than 20 percent. Only Greenlee (which has very small population) experienced declines.

**Exhibit 2: Change in Population and the Number of Drivers' Licenses by County, 2000–2006**



**Exhibit 3** shows the increase in vehicle miles traveled (2001–2005) and the increase in the number of drivers’ licenses (2001–2006).

**Exhibit 3: Increase in Vehicle Miles Traveled, 2001–2005, and Number of Drivers’ Licenses<sup>6</sup>, 2001–2006**



## 2.2. Population Diversity

This SHSP recognizes the rich cultural diversity of Arizona. Arizona ancestry groups include 21 federally recognized tribes<sup>7</sup>. These are:

- |                                 |   |
|---------------------------------|---|
| 1. Ak-Chin Indian Community     | 12. Navajo Nation                             |
| 2. Cocopah Tribe                | 13. Pascua Yaqui Tribe                        |
| 3. Colorado River Indian Tribes | 14. Salt River Pima-Maricopa Indian Community |
| 4. Fort McDowell Yavapai Nation | 15. San Carlos Apache Tribe                   |
| 5. Fort Mojave Indian Tribe     | 16. San Juan Southern Paiute                  |
| 6. Fort Yuma – Quechan Tribe    | 17. Tohono O’odham Nation                     |
| 7. Gila River Indian Community  | 18. Tonto Apache Tribe                        |
| 8. Havasupai Tribe              | 19. White Mountain Apache Tribe               |
| 9. Hopi Tribe                   | 20. Yavapai-Apache Nation                     |
| 10. Hualapai Tribe              | 21. Yavapai-Prescott Indian Tribe             |
| 11. Kaibab-Paiute Tribe         |   |

<sup>6</sup> US Department of Transportation, Bureau of Transportation Statistics

<sup>7</sup> <http://ag.arizona.edu/edrp/tribes.html>, sponsored by the University of Arizona with support provided by the U.S. Department of Commerce- Economic Development Administration

The tribes are sovereign nations within Arizona and have expressed an interest in developing their own SHSPs in close association with the Arizona SHSP. The tribal SHSPs will give special attention to the unique safety issues of tribal lands. As the SHSP is implemented, GTSAC will work with the tribal governments and tribal communities to provide expertise and assistance so that the tribal governments may develop their own implementation plans designed to improve safety in tribal areas. The expertise and assistance should include, for example, police officer standards and training, public education packages, and establishing systems / policies to support data sharing.

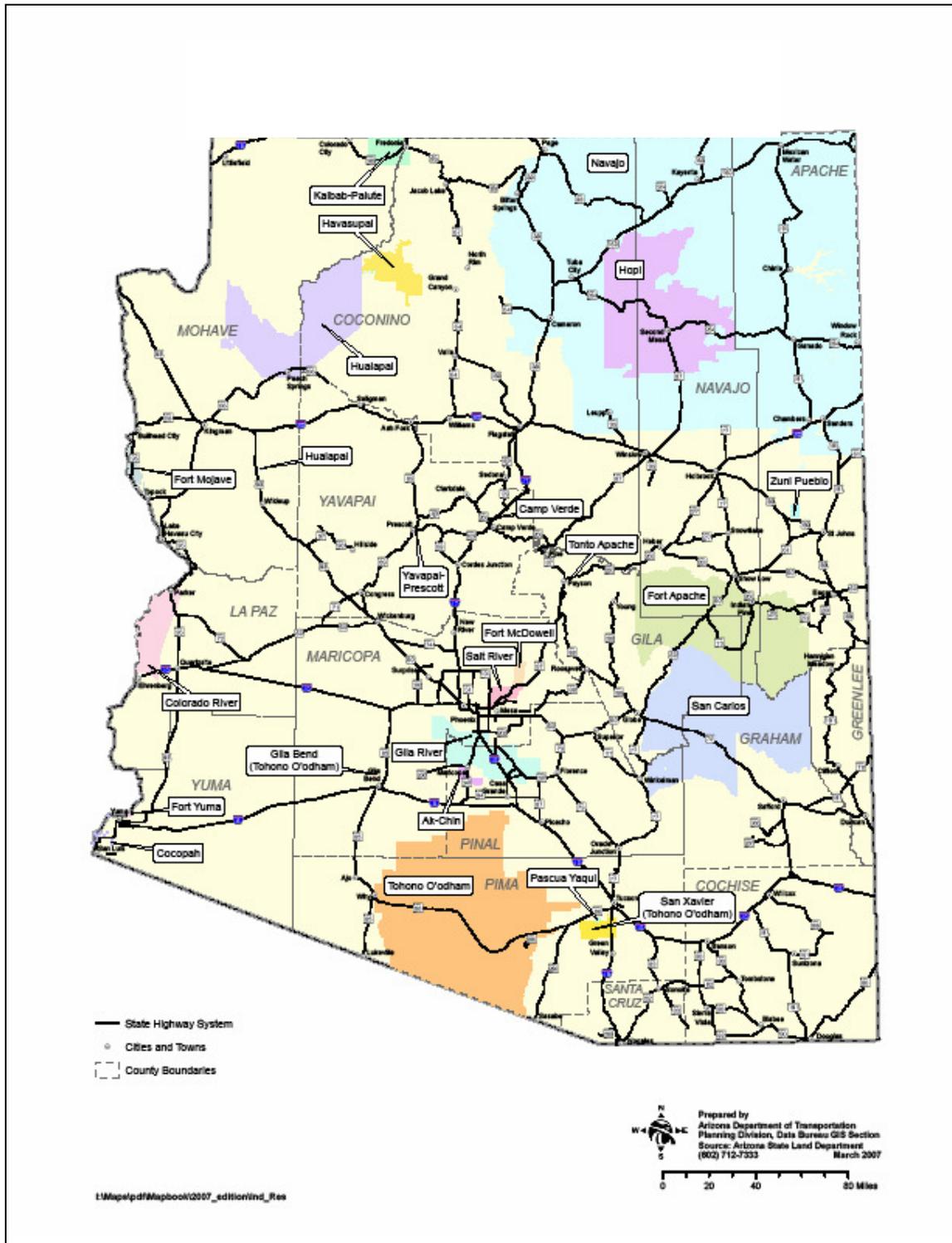
Arizona ancestry groups also include Mexican-Americans. According to the U.S. Census Bureau, Mexican-Americans make up about 21 percent of Arizona's population.

In order to reach the greatest numbers of people, it is clearly important for the SHSP to offer all education and outreach packages in multiple languages. The issues surrounding education and outreach packages in relation to cultural diversity are discussed further in the appropriate strategy.

### **2.3. Geography**

Arizona is the sixth largest state in area. Reservations and tribal communities comprise over a quarter of Arizona's lands (**Exhibit 4**). Due to Arizona's great expanses of desert, Arizona's major urban centers are separated by large rural areas. Addressing Arizona's safety concerns will require the integrated efforts of state, local and tribal governments and agencies to cover the full roadway network with careful consideration of the rural network in reservations and tribal areas.

**Exhibit 4: Map of Counties and Indian Reservations**



## 3. Safety Challenges and Trends

### 3.1. Data Challenges

Unless otherwise referenced, all safety data presented in this SHSP are Arizona Accident Location Information Surveillance System (ALISS) data supplied by ADOT. Before examining the central safety trends presented in **Section 3.2**, it is important to note that safety data represent a considerable challenge for the SHSP. High quality data are essential for establishing safety patterns and trends.

Data challenges are a natural phenomenon of change. During the preparation of this report, several data availability issues arose and some are listed below. Data improvements are discussed in greater detail in **Section 14** of this report.

Current data problems include the following issues:

- ALISS does not include all accident data available from all local governments.
- 4E safety data are limited in terms of access and analytical capability, and need improvement. Examples include data limitations affecting EMS, CODES<sup>8</sup>, citations, and convictions.
- Only some tribal data are currently available for analysis. While most tribal fatalities are included, serious injuries data may not be included. Typically, crashes occurring on routes within a Tribal Reservation may not be included, especially when the injured person is a tribal member. ADOT is working with the Inter Tribal Council of Arizona (ITCA) to obtain data from tribal areas and to share data with tribal governments.
- The Motor Vehicle Division Traffic Records Section is experiencing difficulties catching up and keeping up with the data workload.

### 3.2. Safety Challenges and Trends

This Section identifies four basic safety challenges that Arizona's SHSP needs to take into account:

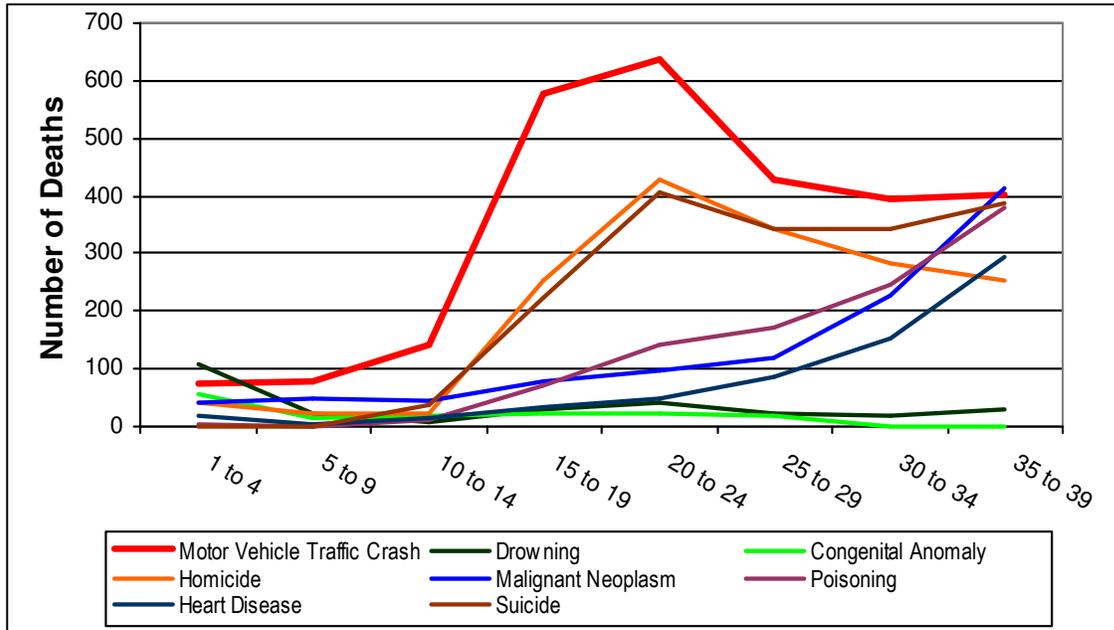
- Young people
- American Indians
- Increasing number of fatalities in Arizona
- Arizona's high fatality crash rate (compared with average for United States)

---

<sup>8</sup> See [http://www.gtsac.org/GTSAC/Studies\\_Reports/index.asp](http://www.gtsac.org/GTSAC/Studies_Reports/index.asp) for *The Economic and Injury Burden of Motor Vehicle Crashes in Arizona for 2005*, reported by the Arizona CODES Project, July 2007.

Motor vehicle crashes are a leading cause of death in Arizona, especially among young people. As shown in **Exhibit 5**, from 2000–2004, motor vehicle crashes were the leading cause of death for people in Arizona between the ages of one and 39. Motor vehicle crashes claimed more lives during this period than homicide, suicide, or poisoning. The groups most affected were the 15-19 and 20-24 age groups.

**Exhibit 5: Arizona Leading Causes of Death (Ages 1-39), 2000–2004<sup>9</sup>**



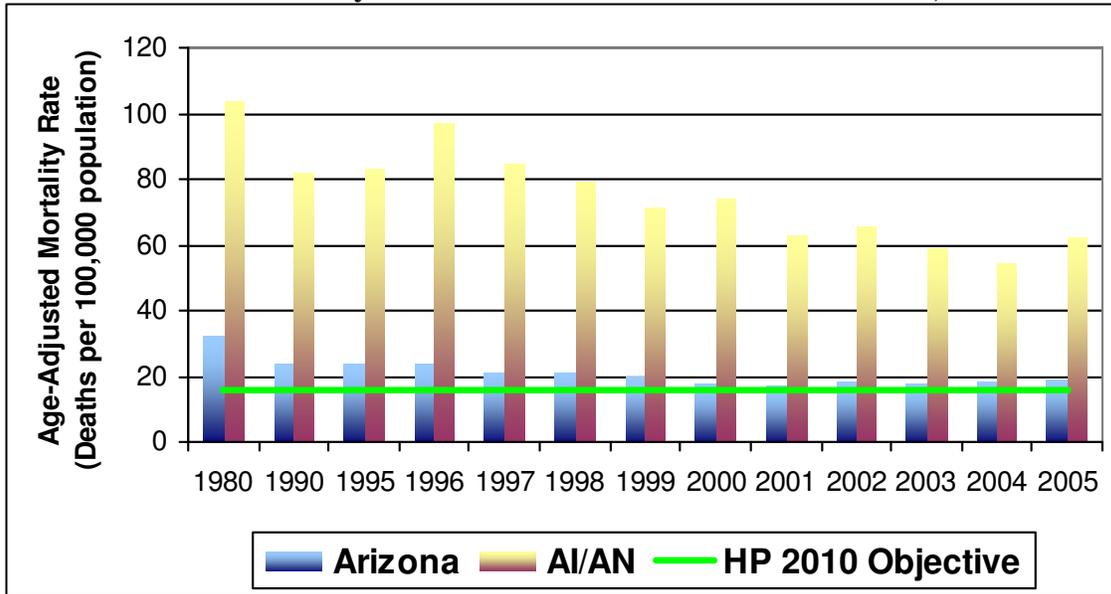
**Exhibit 6** shows that traffic fatalities among American Indians in Arizona are disproportionately high. From 1980–2005, the motor vehicle crash mortality rate was two to three times higher for American Indians (yellow-brown bars) than for other members of the Arizona population (blue-dark blue bars). **Exhibit 6** underlines the importance of working with tribal governments when developing and implementing the SHSP.

The information for **Exhibit 6** was provided by the Inter Tribal Council of Arizona. The source for this information is the Arizona Health Status and Vital Statistics 2005. The Healthy People 2010<sup>10</sup> objective (HP 15-15) is to reduce deaths caused by motor vehicle crashes to no more than 16 per 100,000.

<sup>9</sup> Centers for Disease Control and Prevention, National Centers for Injury Prevention and Control. Web-based Injury Statistics Query and Reporting System (WISQARS) [online]. (2005) [cited Apr 10, 2007]. Available from URL: [www.cdc.gov/ncipc/wisqars](http://www.cdc.gov/ncipc/wisqars)

<sup>10</sup> See [www.healthypeople.gov/](http://www.healthypeople.gov/)

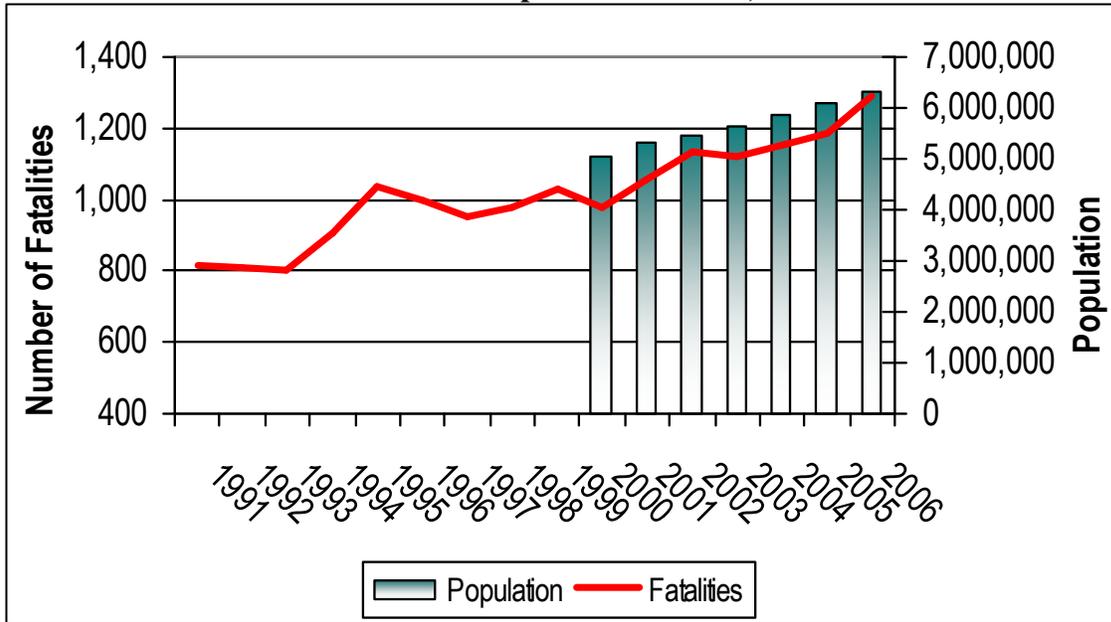
**Exhibit 6: Crash Mortality Rates for Arizona and American Indians, 1980–2005<sup>11</sup>**



**Exhibit 7** shows that for the 16 year period from 1991–2006, the number of traffic fatalities in Arizona has been steadily increasing: from about 800 in 1991 to nearly 1,300 in 2006. Fatalities increased from 1,057 in 2001 to 1,288 in 2006, an increase of 21.5 percent over five years, and an increase of 9 percent in a single year (from 2005 to 2006). **Exhibit 7** also shows population growth in Arizona from 1991–2006. Some of the increase in traffic fatalities may be attributed to recent population increases.

<sup>11</sup> AI/AN refers to American Indian/Alaska Native. The information can be found at the following site: [http://www.azdhs.gov/plan/report/hspam/hspam05/part\\_2.pdf](http://www.azdhs.gov/plan/report/hspam/hspam05/part_2.pdf)

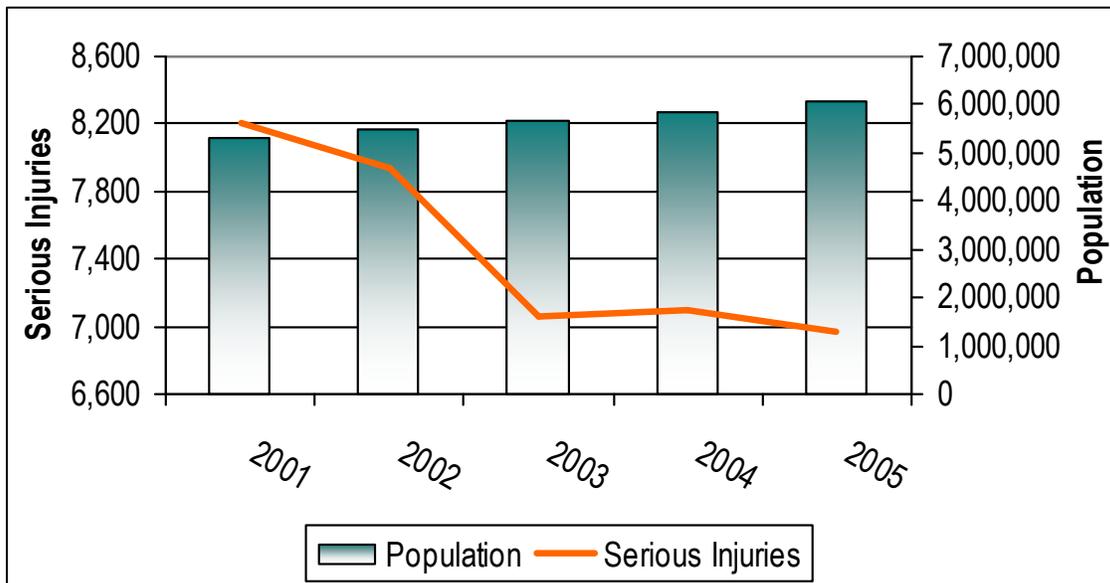
**Exhibit 7: Annual Fatalities versus Population Growth, 1991–2006<sup>12</sup>**



Arizona Population Forecast	
2010	6,637,381
2015	7,495,238
2020	8,456,448
2025	9,531,537
2030	10,712,397
US Census Bureau March 28, 2006	

**Exhibit 8** shows that although the population increased from 2001–2005, the number of serious injuries decreased: from 8,203 in 2001 to 6,970 in 2006, a decrease of 15 percent in five years. However, this trend has been slowing since 2003.

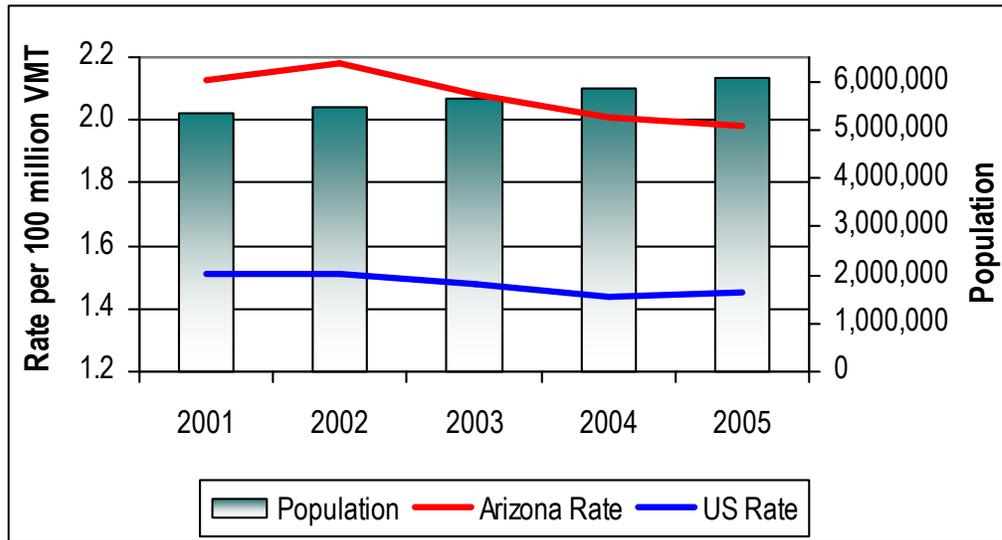
**Exhibit 8: Annual Serious Injuries versus Population Growth, 2001–2005**



<sup>12</sup> Unless otherwise referenced, all population information is from the Population Statistics Unit, Research Administration, Department of Economic Security

**Exhibit 9** compares the annual fatality crash rate<sup>13</sup> of Arizona with the average for the United States over the five year period from 2001–2005. In 2005, the annual fatality crash rate in Arizona was 2.0, approximately 33 percent higher than the United States rate of 1.5.

**Exhibit 9: Arizona versus United States Fatality Rate, 2001–2005**



“A child born today can expect to live an average of 78 years. That’s the good news. The bad news is that one out of every 90 children born today will die violently in a motor vehicle crash. And 70 of every 100 will be injured in a highway crash at some point during their lives, many more than once.”  
*AASHTO Strategic Highway Safety Plan*

Data for 2001–2005 show that the Arizona fatality rate has been decreasing at an average rate of 0.04 fatalities per 100 million VMT per year. As the number of fatalities is actually increasing, this decrease in the fatality *rate* is due to the annual increase in vehicle miles traveled in Arizona (see **Exhibit 9**). This is a very important distinction, as the SHSP objective is to reduce the absolute number of fatalities and serious injuries, not the rate at which they occur.

<sup>13</sup> A crash rate is the number of fatalities per 100 million vehicle miles traveled (VMT).

## 4. Arizona Safety Goal

This Section discusses the safety goals set for the SHSP: the statewide goal, and the supporting sub-goals.

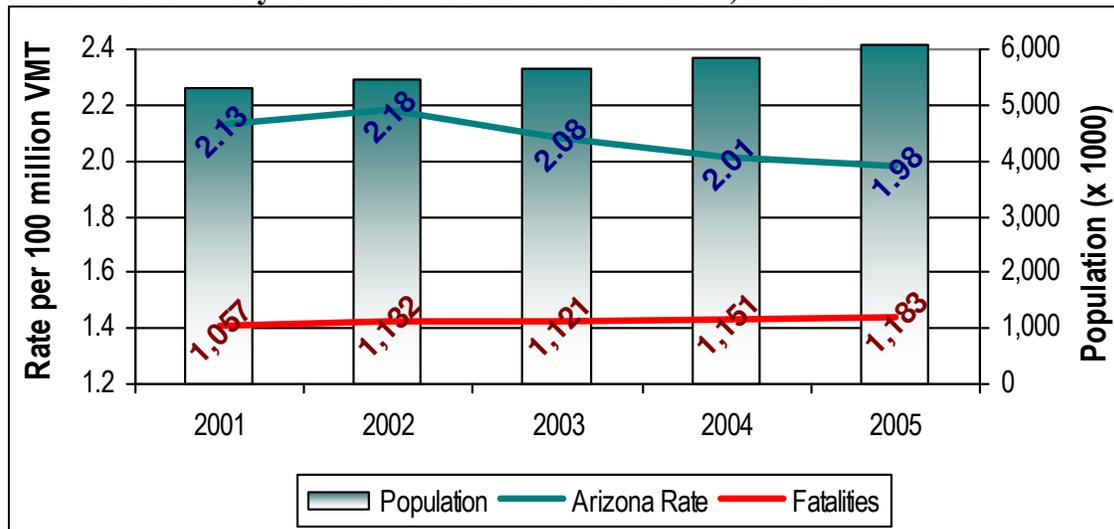
The Arizona safety goal was developed at the SHSP Goal and Emphasis Area Workshop (Workshop) held on May 30, 2007, and was attended by representatives from the key safety jurisdictions in the State<sup>14</sup>. The purpose of the Workshop was to establish a statewide safety goal, a sub-goal for each emphasis area, and a set of emphasis areas. (Section 5 discusses the selection of the emphasis areas.) The Workshop ensured that the safety goal selected for Arizona, and the sub-goals selected for the emphasis areas are completely integrated.

Attendees first debated the pros and cons of whether a safety rate or an absolute number would be more appropriate for the goal, and what length of time or term it would take to achieve the goal.

The adoption of an absolute number was preferred over the use of a rate for two main reasons:

1. An absolute number would be more understandable for the public, and would be more effective as an outreach and communications tool.
2. Arizona's number of fatalities continues to grow, even though there has been a reduction in the fatality rate, as shown in **Exhibit 10**.

**Exhibit 10: Fatality Rate versus Number of Fatalities, 2001–2005**



<sup>14</sup> See the Workshop's, *Setting Safety Goal and Emphasis Areas for the Strategic Highway Safety Plan Report* (2007)

To select the appropriate magnitude and term for the Arizona safety goal, five scenarios were presented and discussed at the Workshop. The five scenarios are shown in **Table 2**. For simplicity, each scenario adopted 2005 as its base year, and the analysis examined the implications of each scenario for the five year period 2006–2010. The comparison of the scenarios focused mainly on the implications for the change in the number of fatalities in 2010.

**Table 2: Five Scenarios for the Number of Fatalities in 2010**

Scenario	Description	2006–2010 Change
Status Quo Trend	Number of fatalities grows at existing average rate from 2006–2010	+9.0%
No Change in Annual Fatalities	Number of fatalities remains constant from 2006–2010	0.0%
Modest Improvement	Number of fatalities reduced by 5 percent from 2006–2010	-5.0%
Earnest Improvement	Number of fatalities reduced by 10 percent from 2006–2010	-10.0%
No fatalities by 2050	Number of fatalities reduced to zero by 2050. To achieve this, a decrease of about 11 percent is required from 2006–2010.	-11.1%

After considering the five scenarios shown in **Table 2**, the Workshop decided that the fifth scenario offered the best match with Arizona’s long term vision of “Zero fatalities on Arizona roads, your life depends on it.” The fifth scenario, “No fatalities by 2050,” implies the adoption of a “stretch” fatality goal with a reduction in the number of fatalities of approximately 11 percent from 2006–2010.

It is, however, important to note that Arizona’s safety vision and goal will be pursued in five year increments using 2007 as the base year. The first five year period will be 2008–2012.

As the base year for the SHSP will be 2007 (not 2005), implementation of the SHSP strategies will not start until 2008, and as fatalities may continue to increase at the 2005–2006 rate of 9%, working towards Arizona’s fatality goal will require a five year reduction (2008–2012) of approximately 12% from the number of fatalities estimated for the 2007 base year, as shown in **Table 3**.

**Table 3: Fatality Reduction Goal versus Base Year Data**

Base Year Data	Fatalities	Annual Reduction for Zero Fatalities Goal	Five Year Reduction for Zero Fatalities Goal
2005	1,183	2.2%	11.1%
2006	1,288	2.3%	11.4%
2007 <sup>15</sup>	1,406	2.3%	11.6%

The Workshop also considered sub-goals for each emphasis area. These sub-goals had to be completely integrated with the Arizona safety goal.

<sup>15</sup> Estimate only. Based on 2006 fatality level plus 9%

To achieve the Arizona safety goal, a 15 percent stretch sub-goal for the reduction in the number of fatalities was assigned to each emphasis area for the five year period from 2008–2012. The 15 percent target was chosen to take into account overlaps in the emphasis areas. For example, a fatality reduction in an emphasis area such as young drivers could also be counted as a fatality reduction in emphasis areas such as speeding, and impaired driving. As a result, the 15 percent stretch sub-goals for the emphasis areas are expected to lead to a total statewide reduction in the number of fatalities of less than 15 percent. The reductions achieved in each emphasis area will be monitored, evaluated and modified as required to achieve Arizona’s vision of “Zero fatalities.” Individual agencies and organizations may also continue to address the needs of areas that do not appear in the list of six emphasis areas, and will contribute to achieving the “Zero fatalities” vision.

Fatalities have been increasing (**Exhibit 7**), and serious injuries have been decreasing (**Exhibit 8**). To focus on the major undertaking of achieving zero fatalities, the Workshop decided that, for this iteration of the SHSP, Arizona would have a goal only for fatalities. It was also felt that efforts to reduce the number of fatalities would have a positive effect on the number of serious injuries and non-serious injuries, and on the number of property damage only crashes. As time enables the state safety partners to effectively adopt SHSP guidance and direction into current planning and programming processes, and to collectively make progress towards reducing the annual number of fatalities, an additional SHSP goal addressing serious injuries may be added.

## 5. Arizona Emphasis Areas

The FHWA Office of Safety suggests that states start with four to eight manageable emphasis areas. As SHSPs are data driven, emphasis areas must be related directly to data available and to the goal and term selected. The choice of emphasis areas must also take into account the availability of suitable staff, and the availability of staff to work on each phase of the SHSP<sup>16</sup>. The emphasis areas are expected to change over time as goals are achieved or modified.

The focus on selected emphasis areas resists the natural tendency to try to address every safety issue. If every issue is addressed and described as a high priority, it is likely that the resulting plan will fall short of expectations as it tries to deliver too much, too quickly. With a zero fatality vision, all emphasis areas will have to be addressed, but by focusing resources on the areas with the greatest potential return, Arizona's safety goal will be achieved more quickly and will allow the next generation of emphasis areas and strategies to be addressed earlier.

As each emphasis area will contain multiple crash attributes, addressing the emphasis areas with the most fatalities is likely to provide benefits in general safety and in other specific emphasis areas. For example, the selection of lane departure fatalities and intersection fatalities as emphasis areas would also address:

- 23 percent of Arizona's pedestrian fatalities and serious injuries
- 46 percent of Arizona's bicycle fatalities and serious injuries
- 55 percent of Arizona's truck fatalities and serious injuries
- 59 percent of Arizona's motorcycle fatalities and serious injuries
- 61 percent of Arizona's speeding fatalities and serious injuries
- 64 percent of Arizona's older driver fatalities and serious injuries
- 67 percent of Arizona's unrestrained fatalities and serious injuries
- 68 percent of Arizona's young driver fatalities and serious injuries
- 70 percent of Arizona's impaired fatalities and serious injuries

### 5.1. Process for Selecting Emphasis Areas

The list of potential emphasis areas is long. As mentioned in the introduction to **Section 4**, the emphasis areas used in this report were selected during the SHSP Goal and Emphasis Area Workshop held on May 30, 2007. The Workshop was attended by representatives from the key safety jurisdictions in the State<sup>17</sup>.

Selection of the emphasis areas was based on the analysis of the data and Arizona's ability to effectively manage the emphasis areas chosen.

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<sup>16</sup> Arizona has already implemented or is in the process of implementing several of the emphasis area strategies contained in this report, they are re-iterated within this report to capture the associated performance measures and identify any data enhancements necessary to be able to assess their effectiveness.

<sup>17</sup> See the Workshop's, *Setting Safety Goal and Emphasis Areas for the Strategic Highway Safety Plan* Report (2007)

## 5.2. Arizona Emphasis Areas

Prior to the workshop, a Safety Survey was developed to engage key safety stakeholders in the SHSP development process, to obtain their opinions on Arizona’s current safety planning / programming process, and to gather their input as to which emphasis areas should be the focus of the SHSP. In total, 21 safety stakeholder organizations, 12 GTSAC members, and 9 non-GTSAC organizations participated in the survey, and 32 responses were received (larger organizations provided multiple responses).

**Table 4** compares the emphasis areas selected by the 2005 TSP, the 2007 Safety Survey, and the SHSP data driven approach. The table shows that there was little agreement among the groups.

The diversity between the processes underscores the importance of a data-driven approach. All three processes selected only three of the potential emphasis areas: intersection safety, lane departure, and pedestrian safety. Two processes selected two of the potential emphasis areas: seat belt use, impaired driving, older drivers (age greater than 65 years), motorcycles, trucks and data improvement. Only one process selected young drivers (age less than 25 years), speeding, driver behavior, aggressive driving, and EMS.

**Table 4: Comparison of the Selection of Emphasis Areas**

Source of Selection	Seat Belt Use	Young Drivers	Intersection Safety	Speeding	Lane Departure	Impaired Driving	Older Drivers	Motorcycles	Pedestrians (bicycles)	Trucks	Driver Behavior	Data Improvement	Aggressive Driving	EMS
2005 TSP			✓		✓			✓	✓		✓	✓		
Safety Survey	✓		✓		✓	✓	✓		✓	✓		✓	✓	✓
Data Driven	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				

To clarify the selection process and to ensure that it was data driven, workshop participants reviewed the five year fatality and serious injury trends for the following 16 emphasis areas:

1. Person without seat belt
2. Lane departure
3. Speeding
4. Young drivers (age less than 25 years)
5. Impaired driving
6. Intersection
7. Older drivers (age greater than 65 years)
8. Pedestrians
9. Trucks
10. Motorcycle
11. Aggressive driving
12. Keeping drivers alert
13. Bicycle
14. Work zones
15. Animals
16. Vehicle-train crashes

After reviewing the data, the workshop participants selected six high priority emphasis areas for the SHSP:

1. Restraint Usage
2. Young Drivers (age less than 25 years)
3. Speeding
4. Impaired Driving
5. Roadway / Roadside
6. Data Improvement

In selecting these six emphasis areas, the Workshop clarified the following points:

- The Restraint Usage emphasis area includes all types of occupant protection.
- Young Drivers are defined as less than 25 years old.
- The Roadway / Roadside emphasis area combines lane departure and intersection fatalities.
- The data improvement emphasis area addresses data collection and sharing challenges. Strategies for the Data Improvement emphasis area will be developed, implemented, and monitored by the Traffic Records Coordinating Subcommittee (TRCC) of GTSAC.

The SHSP's primary focus will be on the six emphasis areas listed above, but individual agencies and organizations may continue to address the needs of other areas. Each of the SHSP's emphasis areas offers many opportunities to improve safety using the 4E's approach. The Roadway / Roadside emphasis area has an engineering emphasis. The Restraint Usage, Young Drivers, Speeding, and Impaired Driving emphasis areas have a behavioral emphasis.

**Table 5** shows the number of fatalities and serious injuries recorded for each of the emphasis areas in the five year period from 2001–2005 (when a total of 5,644 fatalities and 37,265 serious injuries occurred). As discussed in **Section 4**, the sum of the fatalities and serious injuries for the individual emphasis areas is higher than the totals for the period due to overlaps between emphasis areas.

**Table 5: Emphasis Area Fatalities and Serious Injuries, 2001–2005**

Emphasis Area	Number of Fatalities	Number of Serious Injuries
Lack of Restraint Use	3,437	15,100
Young Drivers	1,766	15,386
Speeding	2,194	12,670
Impaired Driving	2,385	5,728
Roadway / Roadside: Lane Departure	2,958	10,957
Roadway / Roadside: Intersections	1,271	16,365
Data Improvement	Not applicable	Not applicable

As progress is made with the six high priority emphasis areas, it will be possible for the SHSP to adopt and pursue additional emphasis areas.

## 6. Introduction to the Emphasis Areas Analysis and Emphasis Area Strategies

The Sections that follow discuss each emphasis area individually:

- Restraint Usage (**Section 7**)
- Young Drivers (**Section 8**)
- Speeding (**Section 9**)
- Impaired Driving (**Section 10**)
- Roadway / Roadside (an introduction to the Roadway / Roadside emphasis area is provided in **Section 11**)
  - Lane Departures (**Section 12**)
  - Intersections (**Section 13**)
- Data Improvements (**Section 14**)

Each Section is organized according to FHWA guidance for the preparation and presentation of a SHSP. With the exception of the Data Improvement emphasis area which follows NHTSA guidance for the development of a strategic plan for traffic safety data, each emphasis area is presented under five sub-headings:

1. Problem Statement
2. Sub-Goal Statement
3. Strategy Development
4. Summary of Findings from the Data
5. Strategies

The data presented are the most recent data available, usually the five year period from 2001–2005. Wherever possible, the same analyses are provided for each emphasis area. There is some repetition in the separate Sections to allow each Section to be read independently.

### 6.1. Problem Statement

The problem statement sets out the number of fatalities and the number of serious injuries involving the emphasis area during the five year period from 2001–2005. The problem statement also gives the number of fatalities and serious injuries to be expected if recent trends continue. These data are followed by an analysis of fatalities and serious injuries by urban versus rural areas<sup>18</sup>, and by Arizona county.

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<sup>18</sup> For a rural and urban definitions see [http://tpd.azdot.gov/gis/fclass/FC\\_GUIDE.pdf](http://tpd.azdot.gov/gis/fclass/FC_GUIDE.pdf)

## 6.2. Sub-Goal Statement

The sub-goal statement states the sub-goal for each emphasis area.

As discussed in **Section 4**, each emphasis area has a stretch sub-goal of reducing fatalities by 15 percent in the five year period following 2007. The stretch goal of 15 percent was considered appropriate as some emphasis areas overlap. For example, some fatalities involve both young drivers and impaired driving. By selecting the 15 percent sub-goals, there is an allowance for double counting. The reductions achieved in each emphasis area will be monitored, evaluated and modified as required to achieve Arizona’s vision of “Zero fatalities.”

## 6.3. Strategy Development

The strategy development section analyzes the number of fatalities and serious injuries in detail as a basis for selecting strategies. There are two main headings:

1. Drivers, Vehicles, and Collision Manner
2. Seasonality

Drivers, vehicles, and collision manner analyzes the number of fatalities and serious injuries by:

- driver versus passenger
- gender
- age group
- type of vehicle (e.g. passenger cars, pick-up truck, motorcycle, etc.)
- collision manner (e.g. angle collisions, head-on collisions, etc.)

Seasonality analyzes the number of fatalities and serious injuries by:

- month of the year
- day of week
- time of day

It was originally intended to include weather conditions as a third heading. Arizona’s weather, however, is dominated by clear conditions, and the analysis found that between 77 percent and 83 percent of fatalities for each emphasis area occurred during clear weather, as shown in **Table 6**. As a result, the weather heading was not included under the discussion of emphasis area strategies.

**Table 6: Fatalities versus Weather by Emphasis Area, 2001–2005**

Weather Conditions	Restraint Usage Fatalities	Young Drivers Fatalities	Speeding Fatalities	Impaired Driving Fatalities	Roadway / Roadside Fatalities
Not Reported, No Adverse Conditions	9%	3%	1%	4%	3%
Clear	77%	83%	82%	83%	81%
Cloudy	10%	10%	11%	10%	11%
Sleet / Hail	0%	0%	1%	0%	1%
Rain	2%	2%	4%	2%	3%
Snow	0%	0%	1%	0%	1%
Other	2%	2%	0%	1%	0%
<b>Totals</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

#### 6.4. Strategies

The section on strategies recommends a set of strategies designed to achieve the emphasis area’s sub-goal.

For each strategy, between one and nine detailed supporting countermeasures are listed and discussed. The countermeasures are then summarized in a table that shows the focus area (state or county), timing of implementation and performance measure(s).

The type of performance measure that is most appropriate varies, and it is not always possible to express a performance measure as a reduction in the number of fatalities. In some cases, the number of fatalities is not the most appropriate performance measure, and in some cases, the link between a countermeasure, treatment or safety approach has not yet been well established. For example, the impact on the number of fatalities of a media or enforcement campaign is not well quantified. In the case of seat belts, it is clear that seat belts save lives, but the safety effect of a one percent or five percent increase in seat belt usage is very difficult to quantify.

Wherever possible and feasible, the countermeasures proposed in GTSAC’s Action Plan and ADOT’s Transportation Safety Plan have been included within the appropriate emphasis area strategy.

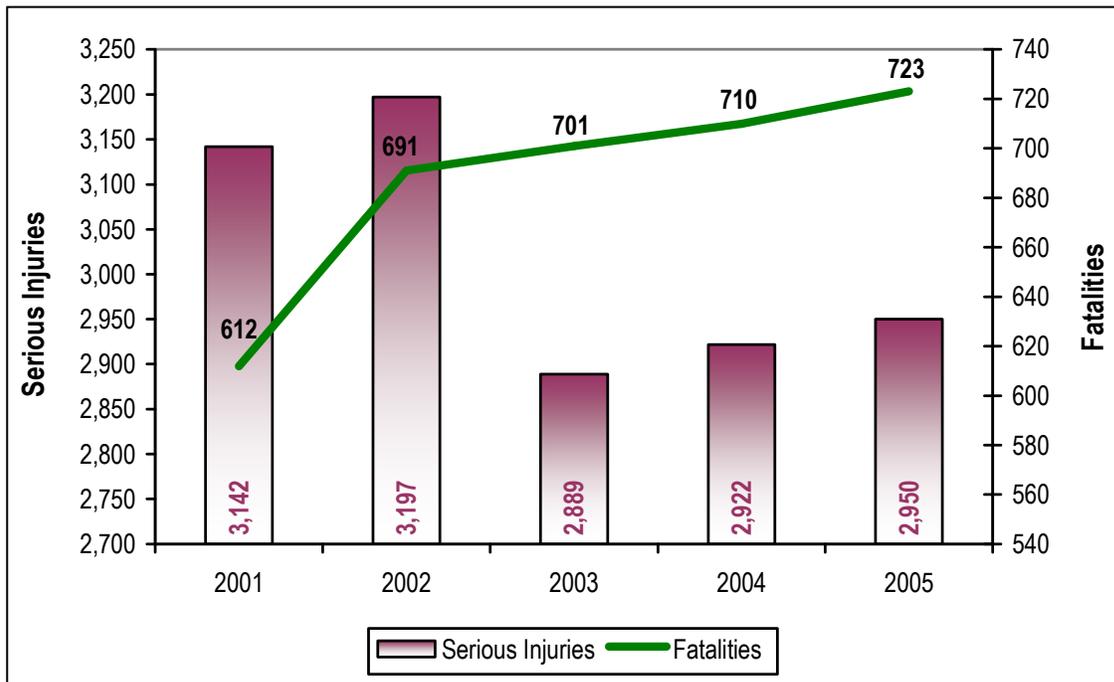
## 7. Emphasis Area 1: Restraint Usage

### 7.1. Problem Statement

In the five years from 2001–2005, lack of restraint usage was a contributing factor to 3,437 fatalities and 15,100 serious injuries in Arizona.

**Exhibit 11** shows the number of fatalities and the number of serious injuries involving lack of restraint usage in Arizona in each year from 2001–2005.

**Exhibit 11: Fatalities and Serious Injuries Involving Lack of Restraint Usage, 2001–2005**



The number of fatalities involving the lack of restraint use increased by 18 percent: from 612 in 2001 to 723 in 2005. If this trend continues, the number of annual lack of restraint use related fatalities will increase from 723 in 2005 to 904 in 2012 (an increase of 25 percent).

**Table 7** shows that most lack of restraint use fatalities (60 percent) occur in rural areas, and most severe injuries (66 percent) occur in urban areas.

**Table 7: Urban versus Rural Lack of Restraint Usage Fatalities and Serious Injuries, 2001–2005**

Roadway	Serious Injuries	Fatalities	Total
Urban	66%	40%	53%
Rural	34%	60%	47%
<b>Totals</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

**Table 8** analyzes the number of lack of restraint usage fatalities by Arizona county from 2001–2005. The table also shows the breakdown by urban versus rural location within each county from 2001–2005.

Maricopa and Pima counties account for 52 percent of all lack of restraint usage fatalities. Whereas most fatalities (60 percent) occur in rural rather than urban areas ( **Table 8**), in Maricopa County, most restraint usage fatalities occur in urban areas (73 percent).

**Table 8: Urban versus Rural Lack of Restraint Usage Fatalities by County, 2001–2005**

County	Total Fatalities by County	County as % of Total for Arizona	Urban Fatalities by County	Urban Fatalities as % of County Total	Rural Fatalities by County	Rural Fatalities as % of County Total
Apache	171	5%	0	0%	171	100%
Cochise	148	4%	16	11%	132	89%
Coconino	184	5%	20	11%	164	89%
Gila	78	2%	4	5%	74	95%
Graham	37	1%	1	3%	36	97%
Greenlee	3	0%	0	0%	3	0%
Maricopa	1342	40%	1,008	73%	334	16%
Mohave	173	5%	33	19%	140	81%
Navajo	175	5%	10	6%	165	94%
Pima	408	12%	159	39%	249	61%
Pinal	287	8%	56	20%	231	80%
Santa Cruz	32	1%	6	19%	26	81%
Yavapai	219	6%	44	20%	175	80%
Yuma	87	3%	18	21%	69	79%
La Paz	93	3%	0	0%	93	100%
<b>Totals</b>	<b>3437</b>	<b>100%</b>	<b>1,375</b>		<b>2062</b>	

## 7.2. Restraint Usage Sub-Goal Statement

The sub-goal statement for restraint usage is: Reduce number of fatalities related to lack of restraint usage by 15 percent from the 2007 level over the five year period from 2008–2012.

## 7.3. Strategy Development

The data available to assist with strategy development are discussed under two headings:

1. Drivers, Vehicles, and Collision Manner (**Section 7.3.1**)
2. Seasonality (**Section 7.3.2**)

The data are then summarized (**Section 7.3.3**).

**7.3.1. Drivers, Vehicles, and Collision Manner**

**Table 9** shows that the majority of fatalities involving lack of restraint usage are drivers (63 percent) rather than passengers (37 percent). The majority of serious injuries involving lack of restraint usage are also drivers (63 percent) rather than passengers (37 percent).

**Table 9: Lack of Restraint Usage Fatalities and Serious Injuries by Driver versus Passenger, 2001–2005**

Casualty	Serious Injuries	Serious Injuries %	Fatalities	Fatalities %
Driver	9,484	63%	2,163	63%
Passenger	5,616	37%	1,274	37%
	<b>15,100</b>	<b>100%</b>	<b>3,437</b>	<b>100%</b>

**Table 10** shows that the majority of fatalities involving lack of restraint usage involve males (71 percent) rather than females (29 percent). The majority of serious injuries involving lack of restraint usage also involve males (66 percent) rather than females (34 percent).

**Table 10: Lack of Restraint Usage Fatalities and Serious Injuries by Gender, 2001–2005**

Gender	Serious Injuries	Serious Injuries %	Fatalities	Fatalities %
Female	5,177	34%	995	29%
Male	9,913	66%	2,441	71%
Unknown	10	0%	1	0%
<b>Totals</b>	<b>15,100</b>	<b>100%</b>	<b>3,437</b>	<b>100%</b>

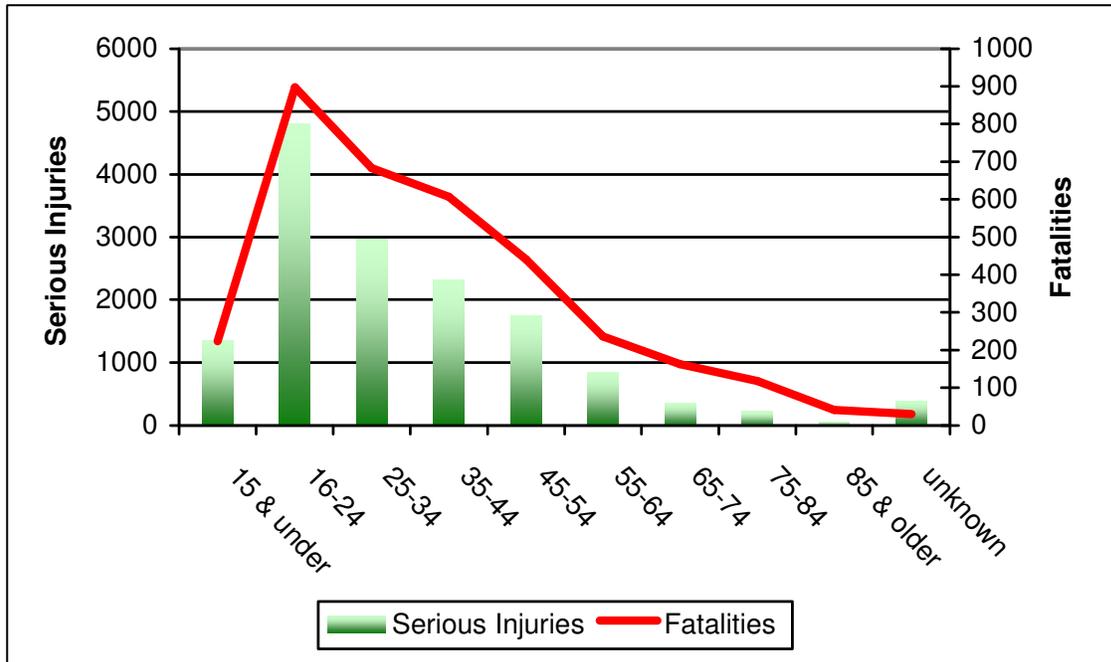
The age distribution for crashes involving lack of restraint usage is shown in **Table 11** and **Exhibit 12**. The 16-24 age group accounts for the largest group of restraint use fatalities (26 percent), followed by the 25-34 age group (20 percent), and the 35-44 age group (18 percent). In the case of serious injuries related to lack of restraint usage, the 16-24 age group also accounts for the largest group (32 percent), followed by the 25-34 age group (20 percent), and the 35-44 age group (15 percent).

**Table 11: Lack of Restraint Usage Fatalities and Serious Injuries by Age Group, 2001–2005**

Age Group	Serious Injuries	Serious Injuries %	Fatalities	Fatalities %
15 and under	1,356	9%	223	6%
16-24	4,815	32%	897	26%
25-34	2,969	20%	683	20%
35-44	2,317	15%	607	18%
45-54	1,755	12%	440	13%
55-64	855	6%	236	7%
65-74	362	2%	162	5%

Age Group	Serious Injuries	Serious Injuries %	Fatalities	Fatalities %
75-84	223	1%	118	3%
85 and older	60	0%	41	1%
Unknown	388	3%	30	1%
<b>Totals</b>	<b>15,100</b>	<b>100%</b>	<b>3,437</b>	<b>100%</b>

**Exhibit 12: Lack of Restraint Usage Fatalities and Serious Injuries by Age Group, 2001–2005**



**Table 12** analyzes fatalities and serious injuries in crashes involving lack of restraint usage by the type of collision. Single vehicle collisions account for the largest group of lack of restraint usage fatalities (54 percent) and serious injuries (40 percent). Three other types of collision account for at least 10 percent of fatalities or serious injuries involving lack of restraint usage: angle crashes account for 12 percent of the fatalities and 21 percent of the serious injuries; left-turn crashes account for 7 percent of the fatalities and 14 percent of the serious injuries; and head-on crashes account for 12 percent of the fatalities and 5 percent of the serious injuries.

**Table 12: Lack of Restraint Usage Fatalities and Serious Injuries by Collision Manner, 2001–2005**

Collision Manner	Serious Injuries	Serious Injuries %	Fatalities	Fatalities %
Angle	3,138	21%	408	12%
Backing	6	0%	0	0%
Head-On	752	5%	408	12%
Left Turn	2,122	14%	227	7%
Non-Contact (mc) <sup>19</sup>	10	0%	1	0%
Non-Contact (not mc)	18	0%	6	0%
Other	357	2%	133	4%
Rear-End	1,812	12%	213	6%
Sideswipe (opposite)	230	2%	54	2%
Sideswipe (same)	529	4%	97	3%
Single Vehicle	5,981	40%	1,873	54%
U-Turn	145	1%	17	0%
<b>Totals</b>	<b>15,100</b>	<b>100%</b>	<b>3,437</b>	<b>100%</b>

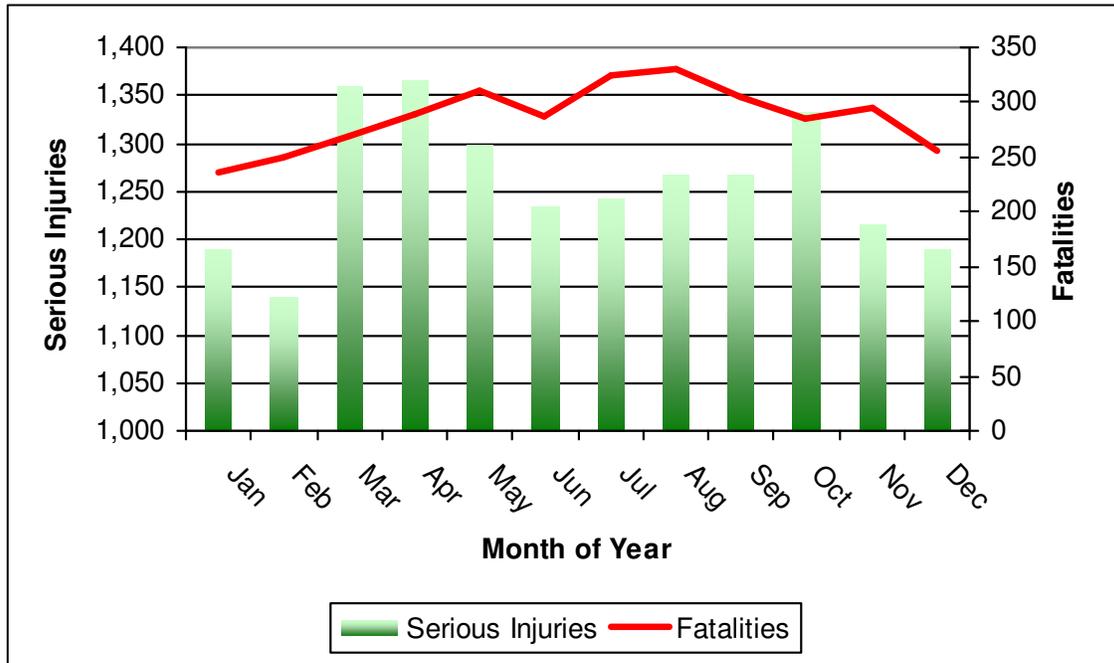
### 7.3.2. Seasonality

To assist in the timing of education and enforcement campaigns, the data for lack of restraint usage were analyzed to determine whether lack of restraint usage crashes tend to occur at particular times (month, day, or time of day).

**Exhibit 13** shows that fatalities related to lack of restraint usage tend to peak over the summer months of July and August. Serious injuries peak in March and April, and again in October.

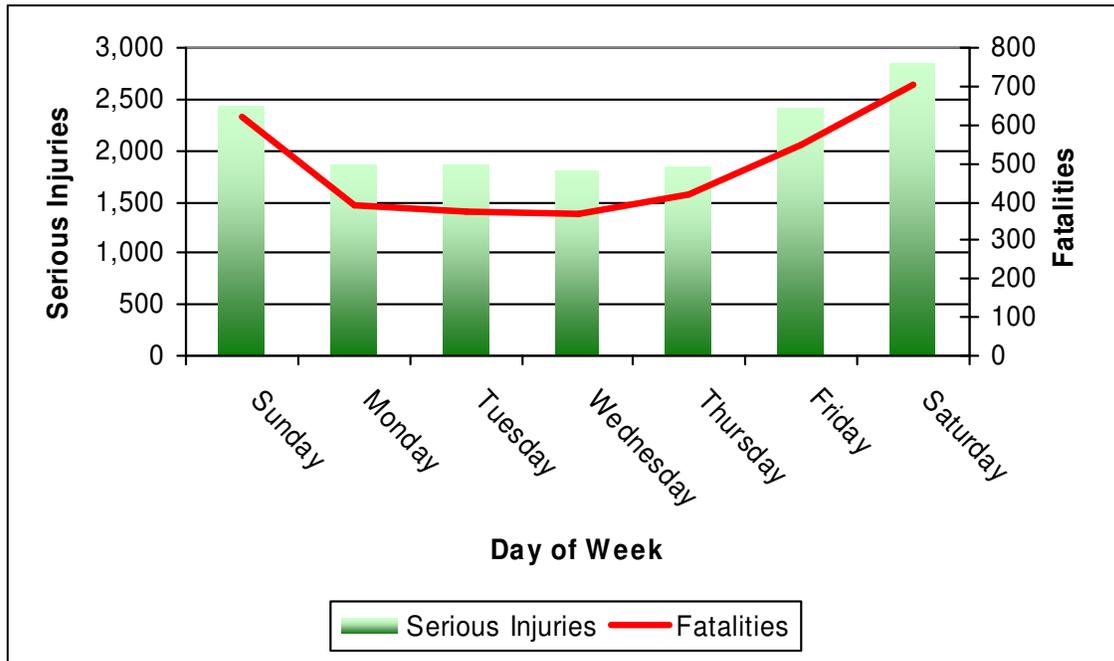
<sup>19</sup> (mc) means motorcycle

**Exhibit 13: Lack of Restraint Usage Fatalities and Serious Injuries by Month of Year, 2001–2005**



**Exhibit 14** shows that fatalities and serious injuries related to lack of restraint usage are most numerous on weekends and Fridays. Fatalities related to lack of restraint usage increase by 92 percent from Wednesday to Saturday.

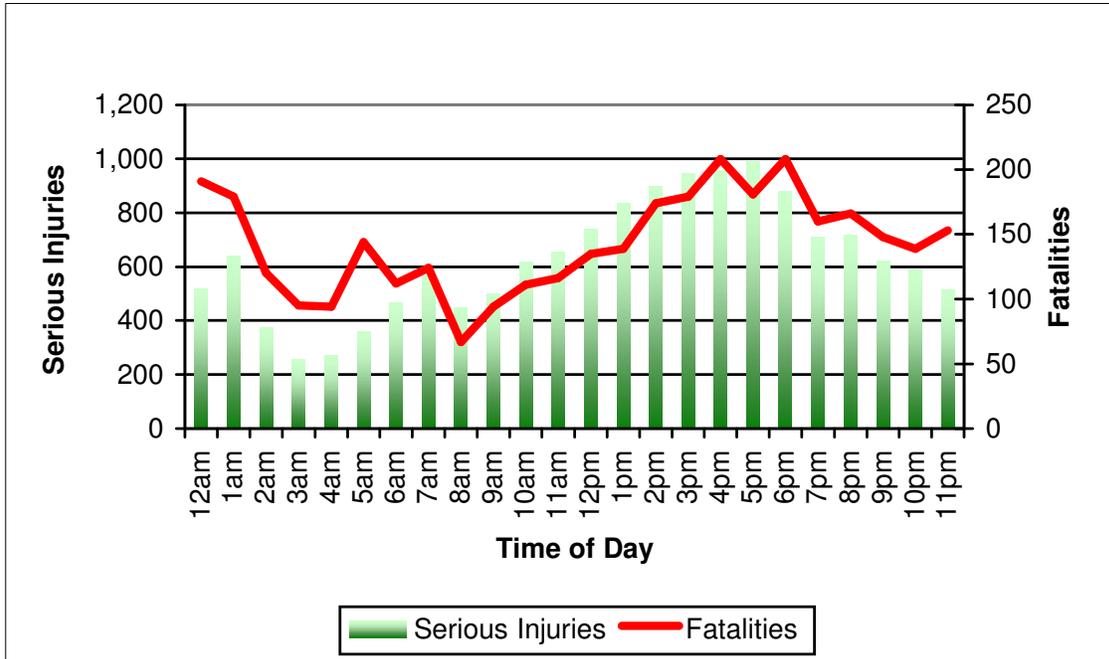
**Exhibit 14: Lack of Restraint Usage Fatalities and Serious Injuries by Day of Week, 2001–2005**



**Exhibit 15** shows that lack of restraint usage fatalities tend to occur at particular times of day: the middle of the night, between midnight and 1:00am; and the afternoon peak period from 4:00pm to 6:00pm. A smaller peak in fatalities occurs in the morning from 5:00am to 7:00am. A smaller peak in fatalities occurs in the morning from 5:00am to 7:00am.

Serious injuries related to lack of restraint usage tend to increase in the morning from around 10:00am, and peak in the late afternoon at 5:00pm.

**Exhibit 15: Lack of Restraint Usage Fatalities and Serious Injuries by Time of Day, 2001–2005**



### 7.3.3. Summary of Lack of Restraint Usage Data

The following bullets provide a summary of the data in **Section 7**:

- In the five years from 2001–2005, lack of restraint use contributed to 3,437 fatalities and 15,100 serious injuries in Arizona.
- Fatalities related to lack of restraint usage are increasing.
- Maricopa and Pima Counties account for 52 percent of all lack of restraint usage fatalities.
- Most fatalities (60 percent) occur in rural areas.
- Most fatalities are drivers (63 percent) rather than passengers (37 percent)
- Most fatalities involve males (71 percent).
- The 16-24 age group accounts for the largest group of fatalities (26 percent), followed by the 25-34 age group (20 percent), and the 35-44 age group (18 percent).
- Single vehicle collisions account for 54 percent of fatalities.
- Fatalities tend to peak in July and August.
- Fatalities are most numerous on weekends and Fridays.
- Fatalities tend to occur in the middle of the night, between midnight and 1:00am, and during the afternoon peak period from 4:00pm to 6:00pm.

## 7.4. Restraint Usage Strategies and Countermeasures

The following strategies are recommended to achieve the restraint usage goal.

### 7.4.1. Strategy: Maximize Restraint Use by All Vehicle Occupants

The following countermeasures are proposed to maximize restraint usage by all vehicle occupants in Arizona:

- Countermeasure 1.** Enact a primary seat belt law to increase restraint usage<sup>20</sup>. According to NHTSA, 25 States and the District of Columbia have enacted primary enforcement of seat belt laws. Primary enforcement provisions permit law enforcement officers to stop a vehicle solely on the basis of an observed seat belt violation. Enacting a primary seat belt law increases occupant seat belt use. Enact the legislative change either through legislation or through a referendum. The law should cover all seating positions, the type of vehicle, and all occupants regardless of age. Other legislative changes should include:
- Requiring booster seats for children aged 5-8, or weighing approximately 80 pounds, or standing less than 4-feet, 9-inches tall
  - Requiring safety belts for children aged 9 and older, or standing 4-feet, 9-inches or taller
  - Requiring that all children 12 and under ride in back seat of vehicle
  - Providing immunity from civil liability for certified Child Passenger Safety technicians who install car seats. Agencies such as AAA have discontinued providing such services in Arizona because of liability concerns
- Countermeasure 2.** Increase the penalties for the non-use of restraint.
- Countermeasure 3.** Conduct short-term high visibility seat belt law enforcement campaigns at selected locations.
- Countermeasure 4.** Ensure sustained enforcement in counties with 10 percent or more of the state's fatalities attributed to non-use of occupant restraints.
- Countermeasure 5.** Increase the perception that violators will be caught and pay the consequences. Use public relation programs and the media to increase the perception.

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<sup>20</sup> Four Arizona tribal communities have already implemented a primary seat belt law.

**Countermeasure 6.** Develop educational and public information campaigns for different audiences to support enforcement strategies on restraint usage<sup>21</sup>. Ensure that educational programs are multi-lingual and sensitive to Arizona’s tribal communities and other cultures. Some cultures, for example, find the mention of death or discussions of death unwelcome. Develop a campaign targeting 16-24 year olds as this group accounts for 26 percent of fatalities related to lack of restraint usage, and 32 percent of serious injuries related to lack of restraint usage. Develop programs where employers, schools, and similar institutions can relay the importance of using occupant restraint. Increase awareness by highlighting the short-term medical costs, and long-term societal loss and burden caused by lack of restraint usage fatalities and injuries.

Continue to promote the Arizona Trucking Association’s 3-year, *Share the Road* program that promotes increased seat belt usage by truck drivers. This is a successful program and educational insights from it may be transferable to new educational and public information campaigns developed under this countermeasure<sup>22</sup>.

The six countermeasures designed to maximize all vehicle occupants’ use of restraints are summarized in **Table 13** which also provides information about the area of focus, timing, and performance measures.

**Table 13: Maximize Restraint Use by All Vehicle Occupants: Summary of Proposed Countermeasures, Focus Area, Timing, and Performance Measures**

Countermeasure Description	State or County Focus Area	Timing of Implementation	Performance Measure(s)
Enact changes in seatbelt legislation	Statewide	Immediately	Change in state laws  Change in seat belt usage
Increase penalties for non-use	Statewide	Year round	Number of citations issued
Conduct high-visibility enforcement campaign	High crash location	March, April, August, October Friday, Saturday, Sunday 12:00pm – 6:00pm 12:00am – 2:00am	Number of lack of restraint usage fatalities reduced in targeted locations  Number of citations issued

<sup>21</sup> Where feasible, training and “train the trainer” programs should be shared to make the best use of limited resources and expertise.

<sup>22</sup> The *Share the Road* program also has a module for training passenger car drivers about the operating characteristics of large trucks, and how to drive safely around them. This information could be incorporated into the educational components of the Young Drivers and Roadway / Roadside emphasis areas.

Countermeasure Description	State or County Focus Area	Timing of Implementation	Performance Measure(s)
Ensure sustained enforcement in counties with high percentage of fatalities	Maricopa Pima	Friday, Saturday, Sunday 12:00pm – 6:00pm 12:00am – 2:00pm	Number of lack of restraint usage fatalities reduced in targeted counties  Number of citations issued
Increase the perception that violators will be caught and face the consequences	Statewide	Year round	Change in public perceptions (as indicated in population surveys)  Number of lack of restraint usage fatalities reduced in targeted counties
Conduct educational and public information campaign to support all strategies	Statewide	Year round	Campaigns targeting different audience produced and marketed  Number of lack of restraint usage fatalities reduced in targeted locations

**7.4.2. Strategy: Educate the Public on the Proper Use of Child Restraints**

The following countermeasures are proposed to educate the public on the proper use of child restraints:

- Countermeasure 1.** Conduct high-profile child restraint inspection events at various locations across each community.
- Countermeasure 2.** Train law enforcement and others to check for proper child restraint usage.
- Countermeasure 3.** Develop a restraint usage intervention program, and determine venues for most appropriate implementation (e.g. Trauma Centers, parenting classes).

The three countermeasures designed to educate the public on the proper use of child restraints are summarized in **Table 14** which also provides information about the area of focus, timing, and performance measures.

**Table 14: Educate the Public on the Proper Use of Child Restraints: Summary of Proposed Countermeasures, Focus Area, Timing, and Performance Measures**

<b>Countermeasure Description</b>	<b>State or County Focus Area</b>	<b>Performance Measure(s)</b>
Conduct high-profile child restraint inspection events	Statewide with focus on: Maricopa Pima	Number of inspections carried out
Train law enforcement and others to check for proper child restraint use	Statewide	Number of checks carried out
Develop restraint usage intervention program	Statewide	Program developed  Number of interventions

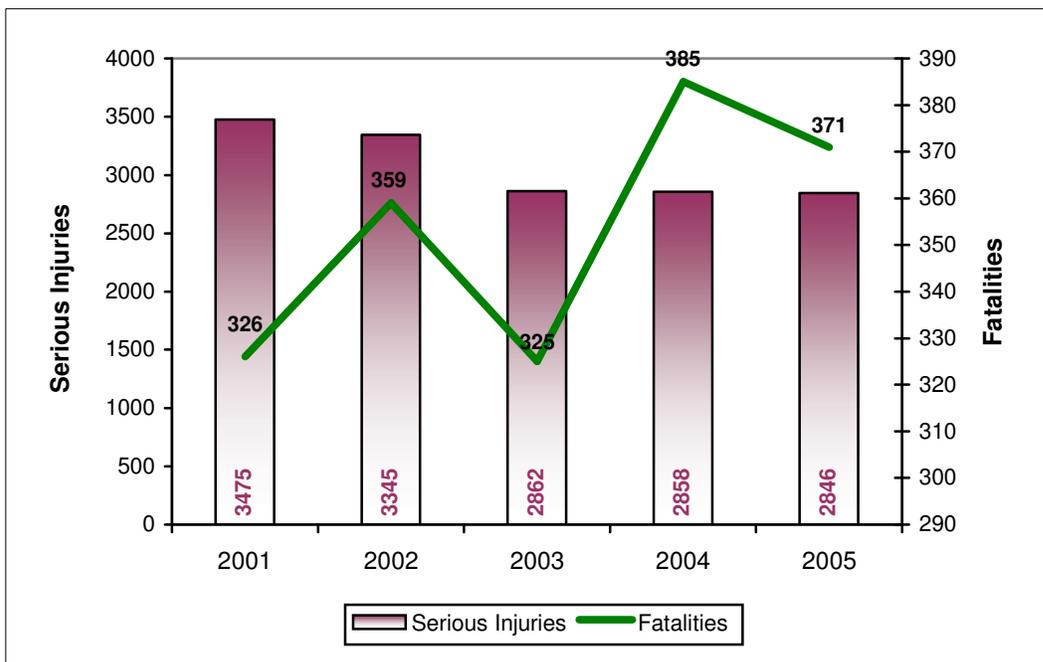
## 8. Emphasis Area 2: Young Drivers

### 8.1. Problem Statement

In this report, young drivers are drivers less than 25 years of age. In the five years from 2001–2005, young drivers were involved in 1,766 fatalities and 15,386 serious injuries in Arizona.

**Exhibit 16** shows the number of fatalities and the number of serious injuries involving young drivers in Arizona in each year from 2001–2005.

**Exhibit 16: Fatalities and Serious Injuries Involving Young Drivers, 2001–2005**



The number of fatalities increased from 326 in 2001 to 371 in 2005 (an increase of 14 percent). If this trend continues, the number of young driver fatalities will increase from 371 in 2005 to 458 by 2012 (an increase of 23 percent).

**Table 15** shows that young driver fatalities are split evenly between the rural and urban areas. Most serious injury crashes (76 percent) occur in urban areas.

**Table 15: Urban versus Rural Young Driver Fatalities and Serious Injuries, 2001–2005**

Roadway	Serious Injuries	Fatalities	Total
Urban	76%	50%	63%
Rural	24%	50%	37%
<b>Totals</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

**Table 16** analyzes the number of young driver fatalities by Arizona county from 2001–2005. The table also shows the breakdown by urban versus rural location within each county from 2001–2005.

Maricopa and Pima counties account for 60 percent of all young driver fatalities. Whereas most fatalities (73 percent) occur in rural rather than urban areas (**Table 16**), in Maricopa County, young driver fatalities occur mainly in urban areas (80 percent), and in Pima County, about half of young driver fatalities occur in urban areas (49 percent).

**Table 16: Urban versus Rural Young Driver Fatalities by County, 2001–2005**

County	Total Fatalities By County	County as % of Total For Arizona	Urban Fatalities By County	Urban Fatalities as % of County Total	Rural Fatalities By County	Rural Fatalities as % of County Total
Apache	73	4%	0	0%	73	100%
Cochise	73	4%	13	18%	60	82%
Coconino	82	5%	10	12%	72	88%
Gila	20	1%	1	5%	19	95%
Graham	11	1%	0	0%	11	100%
Greenlee	1	0%	0	0%	1	100%
Maricopa	859	49%	691	80%	168	20%
Mohave	76	4%	11	14%	65	86%
Navajo	65	4%	5	8%	60	92%
Pima	198	11%	97	49%	101	51%
Pinal	124	7%	20	16%	104	84%
Santa Cruz	11	1%	1	9%	10	91%
Yavapai	96	5%	22	23%	74	77%
Yuma	42	2%	13	31%	29	69%
La Paz	35	2%	0	0%	35	100%
<b>Totals</b>	<b>1,766</b>	<b>100%</b>	<b>884</b>		<b>882</b>	

## 8.2. Young Drivers Sub-Goal Statement

The sub-goal statement for young drivers is: Reduce young driver related fatalities by 15 percent from the 2007 level over the five year period from 2008–2012.

## 8.3. Strategy Development

The data available to assist with strategy development are discussed under two headings:

1. Drivers, Vehicles, and Collision Manner (**Section 8.3.1**)
2. Seasonality (**Section 8.3.2**)

The data are then summarized (**Section 8.3.3**).

**8.3.1. Drivers, Vehicles, and Collision Manner**

**Table 17** shows that most fatalities from crashes involving young drivers are drivers (59 percent) rather than passengers (41 percent). Most serious injuries involving young drivers are also the drivers (64 percent) rather than passengers (36 percent).

**Table 17: Young Driver Fatalities and Serious Injuries by Driver versus Passenger, 2001–2005**

Casualty	Serious Injuries	Serious Injuries %	Fatalities	Fatalities %
Driver	9,834	64%	1,050	59%
Passenger	5,552	36%	716	41%
	<b>15,386</b>	<b>100%</b>	<b>1,766</b>	<b>100%</b>

**Table 18** shows that most young driver fatalities are males (67 percent). The gender difference for serious injuries is less pronounced, with 53 percent of young drivers with serious injuries being males.

**Table 18: Young Driver Fatalities and Serious Injuries by Gender, 2001–2005**

Gender	Serious Injuries	Serious Injuries %	Fatalities	Fatalities %
Female	7,239	47%	588	33%
Male	8,140	53%	1,178	67%
Unknown	7	0%	0	0%
	<b>15,386</b>	<b>100%</b>	<b>1,766</b>	<b>100%</b>

**Table 19** analyzes young driver fatalities and serious injuries by the type of vehicle involved in the crash. (The data are based on crashes involving young drivers rather than fatalities and serious injuries involving young drivers as in the previous Tables.)

Most young driver fatalities involve passenger cars (67 percent) and pick-up trucks (23 percent). Most young driver serious injuries also involve passenger cars (73 percent) and pick-up trucks (20 percent). Motorcycle crashes also involved in 6 percent of young driver fatalities and 5 percent of young driver serious injuries.

**Table 19: Young Driver Fatal and Serious Injury Crashes by Vehicle Type, 2001–2005**

Vehicle Type	Serious Injury Crashes %	Fatal Crashes %
Not Reported	0%	2%
Passenger Car	74%	67%
Pick-Up Truck	20%	23%
Truck Tractor	0%	1%
Bus (including school bus)	0%	0%
Motorcycle (two or three wheel)	5%	6%
Emergency Vehicle	0%	0%
Other Vehicle	1%	1%
	<b>100%</b>	<b>100%</b>

**Table 20** analyzes fatalities and serious injuries involving young drivers by the type of collision.

Single vehicle crashes account for the largest group of young driver fatalities (40 percent). Two other types of collision account for at least 10 percent of young driver fatalities: angle crashes (18 percent), and head-on crashes (18 percent).

Angle vehicle crashes account for the largest group of young driver serious injuries (25 percent). Three other types of collision account for at least 10 percent of young driver serious injuries: single vehicle crashes (22 percent), left-turn crashes (19 percent), and rear-end crashes (19 percent).

**Table 20: Young Drivers Fatalities and Serious Injuries Collision Manner, 2001–2005**

Collision Manner	Serious Injuries	Serious Injuries %	Fatalities	Fatalities %
Single Vehicle	3,369	22%	711	40%
Sideswipe (same)	597	4%	66	4%
Sideswipe (opposite)	218	1%	38	2%
Angle	3,915	25%	311	18%
Left Turn	2,939	19%	154	9%
Rear-End	2,931	19%	119	7%
Head-On	852	7%	293	18%
Backing	12	0%		0%
Other	376	2%	63	4%
Non-Contact (mc)		0%		0%
Non-Contact (not mc)	16	0%	4	0%
U-Turn	161	1%	7	0%
<b>Totals</b>	<b>15,386</b>	<b>100%</b>	<b>1,766</b>	<b>100%</b>

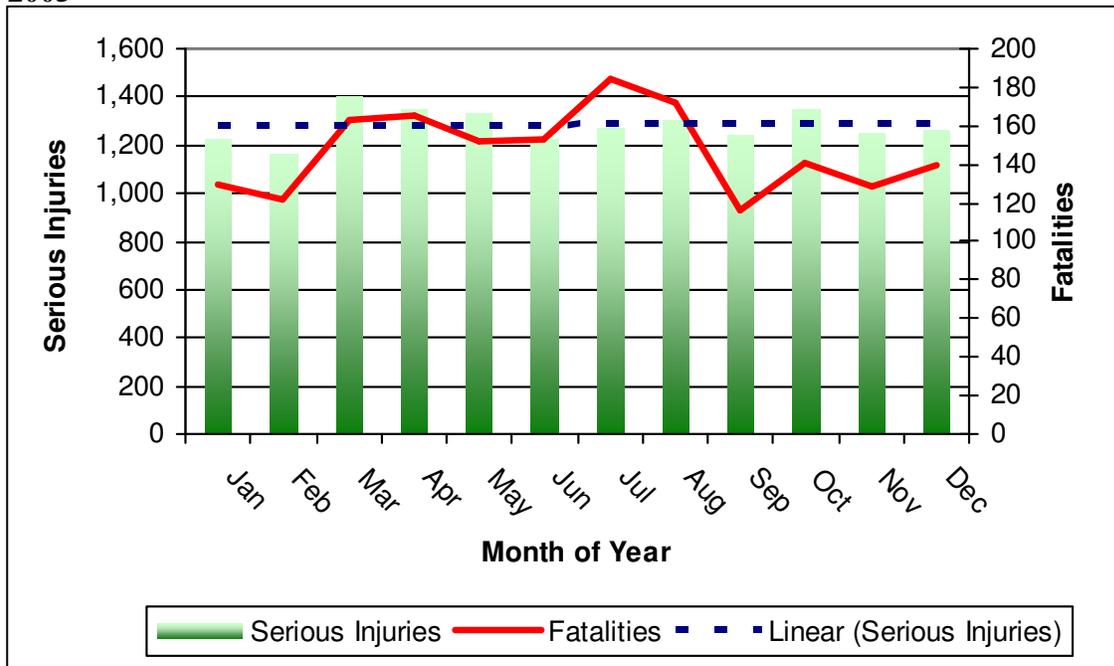
### 8.3.2. Seasonality

To assist in the timing of education and enforcement campaigns, the young driver data were analyzed to determine whether crashes involving young drivers tend to occur at particular times (month, day, or time of day).

**Exhibit 17** shows that young driver fatalities tend to increase from March through August with a peak in July and August.

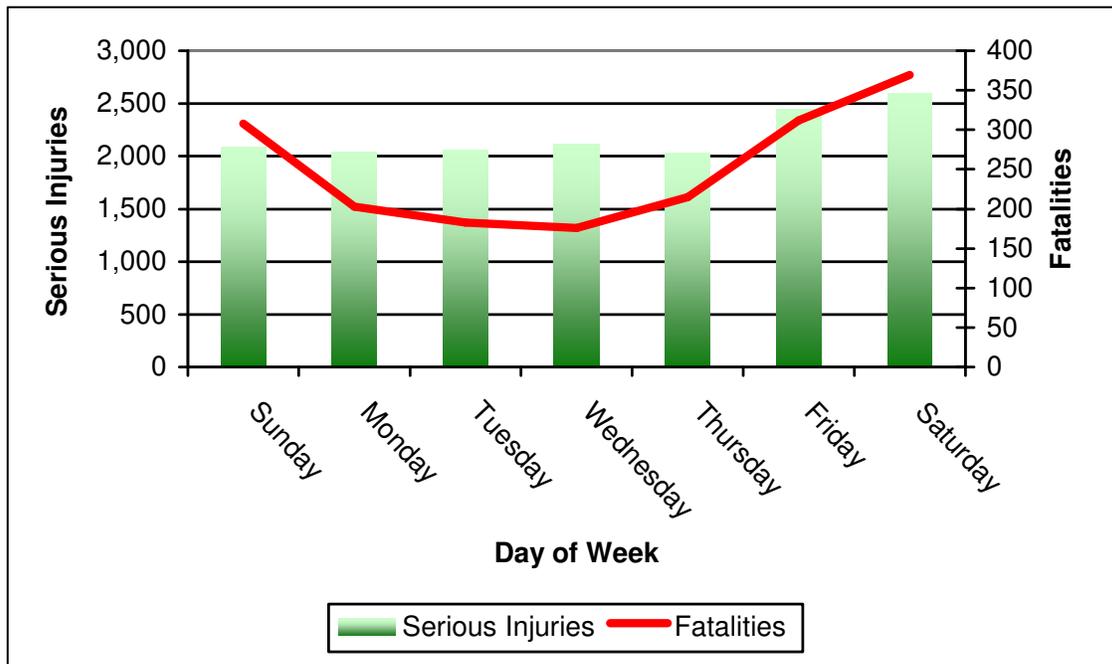
Young drivers serious injuries tend to occur at a fairly constant rate throughout the year, as shown by the bold dashed linear trend line in **Exhibit 17**. There are small peaks in serious injuries in March and October.

**Exhibit 17: Young Driver Fatalities and Serious Injuries by Month of Year, 2001–2005**



**Exhibit 18** shows that young driver fatalities and serious injuries are most numerous on weekends and Fridays. The chance of a young driver becoming a fatality increases by 110 percent from Wednesday to Saturday.

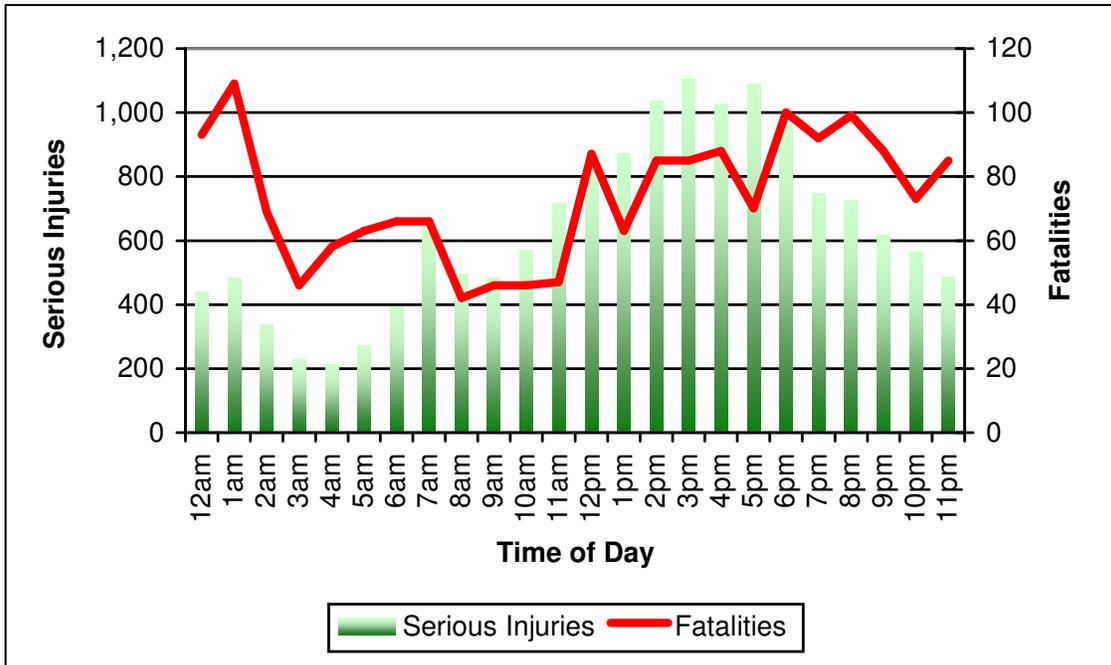
**Exhibit 18: Young Driver Fatalities and Serious Injuries by Day of Week, 2001–2005**



**Exhibit 19** shows that young driver fatalities peak in the very early morning, around 1:00am. Fatalities increase throughout the afternoon, building to a second peak between 6:00pm and 8:00pm.

The number of young driver serious injuries has a small peak in the early morning hours, and begins increasing substantially at 11am with a peak occurring between 2:00pm and 6:00pm.

**Exhibit 19: Young Driver Fatalities and Serious Injuries by Time of Day, 2001–2005**



**8.3.3. Summary of Young Drivers Data, 2001–2005**

The following list provides a summary of the data for young drivers presented in **Section 8**:

- Young drivers accounted for 1,766 fatalities and 15,386 serious injuries in the five year period from 2001–2005.
- Young driver fatalities are increasing.
- Fatalities are split evenly between the rural and urban areas.
- Maricopa and Pima counties account for 60 percent of all young driver fatalities.
- Most fatalities are drivers (59 percent) rather than passengers (41 percent).
- Most fatalities are males (67 percent).
- Most fatalities involve passenger cars (67 percent) and pick-up trucks (23 percent).
- Single vehicle collisions account for the largest group of fatalities (40 percent).
- Fatalities tend to peak from March through August.
- Fatalities are most numerous on weekends and Fridays.
- Fatalities tend to peak around 1:00am with a second peak between 6:00pm to 8:00pm.

## 8.4. Young Drivers Strategies and Countermeasures

The following strategies are recommended to achieve the young drivers' goal.

### 8.4.1. Strategy: Strengthen Legislative and Administrative Requirements

In addition to the data presented above, legislation and administrative requirements related to young drivers need to take in to account the following: nighttime driving increases the fatal crash risk among teenage drivers; and teenage driving with passengers increases the risk of crashing, and this risk grows with the number of passengers<sup>23</sup>.

The following countermeasures are proposed to strengthen legislation and administrative requirements related to young drivers in Arizona:

- Countermeasure 1.** Establish a Study Committee composed of former members of the Teenage Driver Safety Act (TDSA) Coalition to meet regularly to review and evaluate the success of the new graduated license law that goes into effect on July 1, 2008.
- Countermeasure 2.** Require drivers' licenses to be renewed every five years with a written test. Also, require each person to pass a written test to move from a class G license to a class D license, but give exemptions to drivers who have not had a citation or collision.
- Countermeasure 3.** As part of the graduated licensing program, implement mandatory defensive driving classes to be taken and mastered prior to graduating to the next phase of licensing.
- Countermeasure 4.** Align the Arizona Driver's Manual with the SHSP goals, objectives and strategies.
- Countermeasure 5.** Remove conflicting directives, for example, the air quality directive that requires schools to encourage young drivers to carpool (whereas graduated licensing requirements do not encourage young drivers to have passengers).

The five countermeasures designed to strengthen legislative and administrative requirements related to young drivers are summarized in **Table 21** which also provides information about the area of focus, timing, and performance measures.

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<sup>23</sup> NHTSA Countermeasures That Work

**Table 21: Strengthen Legislative and Administrative Requirements: Summary of Proposed Countermeasures, Focus Area, Timing, and Performance Measures**

Countermeasure Description	State or County Focus Area	Timing of Implementation	Performance Measure(s)
Establish a Graduated License Study Committee	Statewide	One time implementation	Committee established  Committee findings linked to legislative change process
Make renewal of drivers' licenses more stringent	Statewide	Year round	Legislation developed and enacted
Consider making mandatory defensive driving classes part of the graduated licensing program	Statewide	Year round	Program developed and implemented  Students trained per year
Align Arizona Driver's Manual with SHSP	Statewide	Ensure linkage with each SHSP update	Integration process implemented
Remove conflicting directives	Statewide	As required	Number of conflicting directives changed  Number of conflicting directives not changed

**8.4.2. Strategy: Reduce Young Drivers' Involvement in Fatal and Serious Injury Crashes**

The following countermeasure is proposed to reduce young drivers' involvement in fatal and serious injury crashes in Arizona.

**Countermeasure 1.** Introduce enforcement campaigns that are tailored to enforce and enhance awareness of graduated licensing conditions, zero-tolerance (alcohol / DUI) laws, and the life-saving benefits of wearing a safety belt.

The countermeasure designed to reduce young drivers' involvement in fatal and serious injury crashes is summarized in **Table 22** which also provides information about the area of focus, timing, and performance measures.

**Table 22: Reduce Young Drivers' Involvement in Fatal Crash and Serious Injury Crashes: Summary of Proposed Countermeasures, Focus Area, Timing, and Performance Measures**

Countermeasure Description	State or County Focus Area	Timing of Implementation	Performance Measures
Introduce enforcement campaigns tailored to young drivers	Statewide	Friday, Saturday, Sunday 12:00pm – 6:00pm 12:00am – 2:00am	Number of young drivers citations issued  Number of young driver fatalities per year

**8.4.3. Strategy: Introduce Training Support for Parents of Young Drivers**

The following countermeasures are proposed to introduce training support for parents of young drivers in Arizona.

**Countermeasure 1.** Enlist the support of parents to teach driving skills and manage the driving behavior of their children. Link to existing programs, for example, AAA’s Dare to Prepare, and / or insurance company programs such as Steer Clear, Wrecked and TeenSmart<sup>24</sup>.

**Countermeasure 2.** Develop and implement a website that acts as a parent and young driver safety clearinghouse by providing easy access to various driver safety sites for parents and young drivers. The website will provide links to where parents and young drivers can find more information on driver safety, and private and public driver education programs. The website will also provide an opportunity to exchange ideas and provide feedback. The website should be part of the current GTSAC website and could be managed through the Communications subcommittee.

**Countermeasure 3.** Provide teens and parents with an information package that includes tools and resources that will assist parents who are teaching teens to drive, and that informs teens and their parents of the website (Countermeasure 2). The agency responsible for distribution and updating of the information packages will be determined during the development of the Implementation Plan. The Arizona AAA should be considered as the lead agency for this countermeasure.

The three countermeasures designed to introduce training support for parents of young drivers are summarized in **Table 23** which also provides information about the area of focus, timing, and performance measures.

**Table 23: Introduce Training Support for Parents of Young Drivers: Summary of Proposed Countermeasures, Focus Area, Timing, and Performance Measures**

Countermeasure Description	State or County Focus Area	Timing of Implementation	Performance Measure(s)
Enlist the support of parents in teaching and managing young drivers	Statewide	Year round	Number of young driver families enrolled in each program per year
Develop a parent and young driver website	Statewide	Start up and maintain year round	Website implemented  Website updated bi-annually  Number of hits on

<sup>24</sup> Steer Clear is a State Farm young drivers insurance program, Wrecked is part of the Farmers Insurance Group of Companies’ "You're Essential to Safety" (Y.E.S.) young drivers insurance program, and TeenSmart is an American Automobile Association program.

			website per year
Provide teens and parents with an information package	Statewide	Year round	Package developed  Number of packages handed out  Number of hits on website per year

**8.4.4. Strategy: Increase Young Drivers’ Safety Awareness**

The following countermeasures are proposed to increase young drivers’ safety awareness..

**Countermeasure 1.** Develop a new, or promote an existing model Driver Improvement Program (Traffic Survival School / Defensive Driving) along similar lines to the Mesa Defensive Driving Program for teenagers.

**Countermeasure 2.** Develop a master young driver (non-mandatory) program that addresses both standards and curriculum and can be used by all Arizona Driver and Safety Education learning institutions. Ideally this master program would be offered in every high school in Arizona.

Consideration should be given to: including the science portion of driver education into the science portion of Arizona's Instrument to Measure Standards (AIMS) test; including legal responsibilities and governmental requirements of driver education in the social studies portion of the AIMS test; and modifying the writing portion of the AIMS test to include driver education topics of social importance, such as wearing seat belts at all times, never drinking and driving, sharing the roadway with others, preventing road rage, and being a responsible driver<sup>25</sup>.

**Countermeasure 3.** Require all driver education instructors to participate in continuing education specific to driver education. This countermeasure may include semi-annual conferences designed to update educators with current driver safety practices and procedures, on-line training, or a university course.

**Countermeasure 4.** Coordinate efforts with other emphasis areas. Ensure programs developed for restraints usage, impaired driving, and speeding have components that specifically address young drivers.

<sup>25</sup> The Arizona Driver and Safety Education Association (ADSEA) could be the lead agency for this countermeasure.

- Countermeasure 5.** Develop and implement a safe driving outreach program targeted to young drivers who are between the ages of 19 and 24 and who are no longer in high school.
- Countermeasure 6.** Examine existing defensive driving courses, and / or safe driving record programs and promote suitable courses and programs for reduced car insurance premiums. Appropriate crash data will have to be collected and analyzed, and recommendations will have to be marketed to automobile insurance companies, and private and public driver education programs.
- Countermeasure 7.** Link restraint usage, speeding, and impaired driving educational and outreach programs to educational and outreach programs for young drivers.
- Countermeasure 8.** Market safe driving during vehicle registration using multi-media to target young drivers, and require the successful completion of a safe driving test (approximately 15 minutes) prior to young drivers receiving their vehicle registration.

The eight countermeasures designed to increase young drivers’ safety awareness are summarized in **Table 24** which also provides information about the area of focus, timing, and performance measures.

**Table 24: Increase Young Drivers’ Safety Awareness: Summary of Proposed Countermeasures, Focus Area, Timing, and Performance Measures**

Countermeasure Description	State or County Focus Area	Timing of Implementation	Performance Measure(s)
Develop / promote a Driver Improvement Program for teenagers	Statewide	Year round	Program developed and implemented  Number of young driver fatalities per year
Establish a mandatory master training program for driver education.	Statewide	Year round	Date of standard curriculum developed  Number of institutions using master program per year  Number of students trained per year
Require continuing education for driver instructors	Statewide	Year round	Number of driver instructors receiving continuing education per year
Coordinate efforts with other emphasis areas	Statewide	Year round	Structure in place to coordinate efforts with the young drivers’ component of other emphasis areas
Develop an outreach program for 19-24 age group	Statewide	Year round	Outreach program implemented  Feedback survey developed and

Countermeasure Description	State or County Focus Area	Timing of Implementation	Performance Measure(s)
			implemented
Develop a defensive driving course linked to insurance premiums	Statewide	Year round	Course developed and implemented Insurance company buy-in
Link young driver educational and outreach programs with restraint usage, speeding, and impaired driving	Statewide	Year round	All associated educational programs linked and consistent
Market safe driving during vehicle registration	Statewide	Year round	Program implemented Number of young drivers who fail test per year, and average young driver score per year

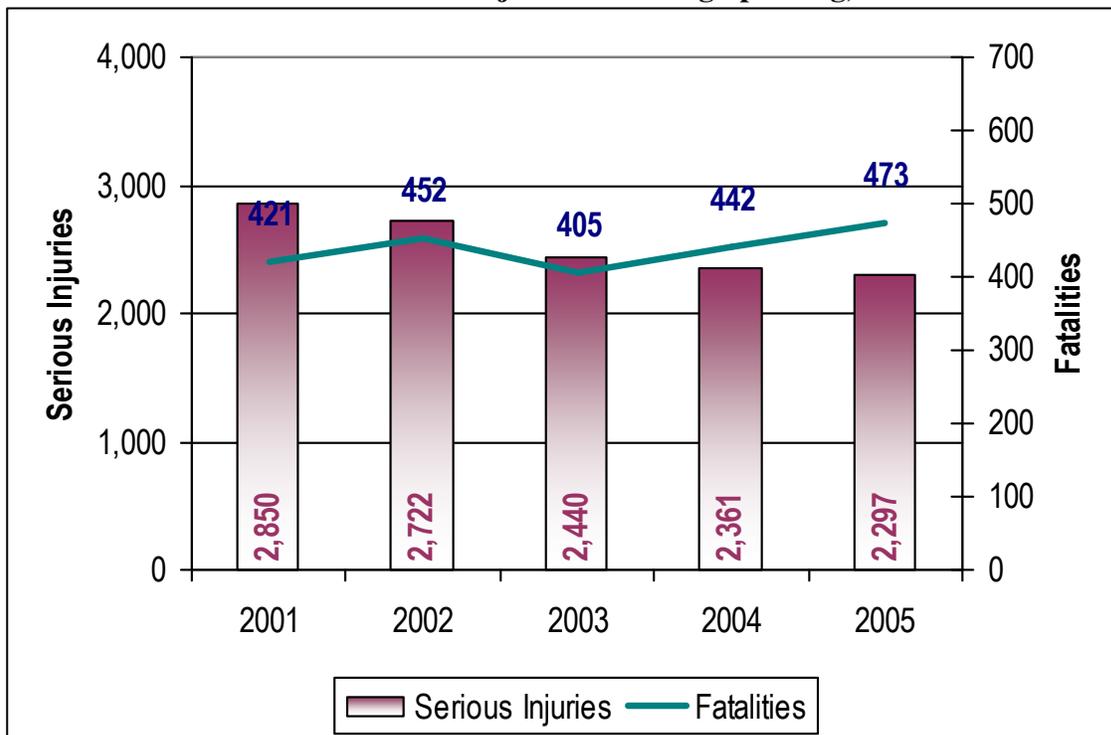
## 9. Emphasis Area 3: Speeding

### 9.1. Problem Statement

In the five years from 2001–2005, speeding contributed to 2,194 fatalities and 12,670 serious injuries. Most speeding related fatalities and serious injuries (82%) were due not to exceeding the posted speed, but to driving too fast for the conditions. The remaining 12% of speeding related fatalities and serious injuries were the result of exceeding the posted speed. See **Appendix C** for a breakdown of speeding data by injury type, speed and posted speed.

**Exhibit 20** shows the number of fatalities and serious injuries involving speeding in Arizona in each year from 2001–2005.

**Exhibit 20: Fatalities and Serious Injuries Involving Speeding, 2001–2005**



The number of fatalities increased from 421 in 2001 to 473 in 2005 (an increase of 12 percent). If this trend continues, the number of speeding related fatalities will increase from 473 in 2005 to 523 by 2012 (an increase of 11 percent).

The number of speeding related serious injuries decreased from 2,850 in 2001 to 2,297 in 2005.

**Table 25** shows that most speeding related fatalities occur in rural areas (59 percent) rather than urban areas. Most serious injuries (64 percent) occur in urban areas.

**Table 25: Urban versus Rural Speeding Fatalities and Serious Injuries, 2001–2005**

Roadway	Serious Injuries	Fatalities	Total
Urban	64%	41%	53%
Rural	36%	59%	48%
<b>Totals</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

**Table 26** analyzes speeding related fatalities by Arizona county from 2001–2005. The table also shows the breakdown by urban versus rural locations within each county from 2001–2005.

**Table 26: Urban and Rural Speeding Fatalities by County, 2001–2005**

County	Total Fatalities by County	County as % of Total for Arizona	Urban Fatalities by County	Urban Fatalities as % of County Total	Rural Fatalities by County	Rural Fatalities as % of County Total
Apache	90	4%	0	0%	90	100%
Cochise	121	6%	9	7%	112	93%
Coconino	113	5%	12	11%	101	89%
Gila	54	2%	2	4%	52	96%
Graham	13	1%	0	0%	13	100%
Greenlee	2	0%	0	0%	2	100%
La Paz	79	4%	0	0%	79	100%
Maricopa	878	39%	691	79%	187	21%
Mohave	149	7%	33	22%	116	78%
Navajo	78	4%	5	6%	73	94%
Pima	248	10%	89	36%	159	64%
Pinal	144	7%	24	17%	120	83%
Santa Cruz	15	1%	3	20%	12	80%
Yavapai	146	7%	18	12%	128	88%
Yuma	64	3%	14	22%	50	78%
<b>Totals</b>	<b>2,194</b>	<b>100%</b>	<b>900</b>		<b>1,294</b>	

Maricopa and Pima Counties account for 49 percent of all speeding related fatalities. Whereas most speeding fatalities (59 percent) occur in rural areas rather than urban areas (**Table 26**), in Maricopa County, most fatalities occur in urban areas (79 percent).

## 9.2. Speeding Goal

The sub-goal statement for speeding is: Reduce speeding related fatalities by 15 percent from the 2007 level over the five year period from 2008–2012.

## 9.3. Strategy Development

The data available to assist with strategy development are discussed under two headings:

1. Drivers, Vehicles, and Collision Manner (**Section 9.3.1**)
2. Seasonality (**Section 9.3.2**)

The data are then summarized (**Section 9.3.3**).

### 9.3.1. Drivers, Vehicles, and Collision Manner

**Table 27** shows that most speed related fatalities are drivers (60 percent) rather than passengers (36 percent). Three percent of fatalities are pedestrians and 1 percent are bicyclists.

**Table 27: Speeding Fatalities by Casualty Type, 2001–2005**

Casualty	Fatalities	Fatalities %
Driver	1,309	60%
Passengers	793	36%
Pedestrians	69	3%
Bicyclist	23	1%
<b>Totals</b>	<b>2,194</b>	<b>100%</b>

**Table 28** shows that most speed related fatalities involve males (71 percent). The gender difference for speed related serious injuries is less marked, but most serious injuries also involve males (58 percent).

**Table 28: Speeding Fatalities and Serious Injuries by Gender, 2001–2005**

Gender	Serious Injuries	Serious Injuries %	Fatalities	Fatalities %
Female	5,333	42%	637	29%
Male	7,330	58%	1,556	71%
Unknown	7	0%	1	0%
<b>Totals</b>	<b>12,670</b>	<b>100%</b>	<b>2,194</b>	<b>100%</b>

The age distribution for fatalities and serious injuries involving speed is shown in **Table 29** and **Exhibit 21**. The age groups 16-24 and 25-34 account for 29 percent and 21 percent of fatalities respectively. The 35-44 and 45-54 age groups account for 15 percent and 13 percent of fatalities respectively.

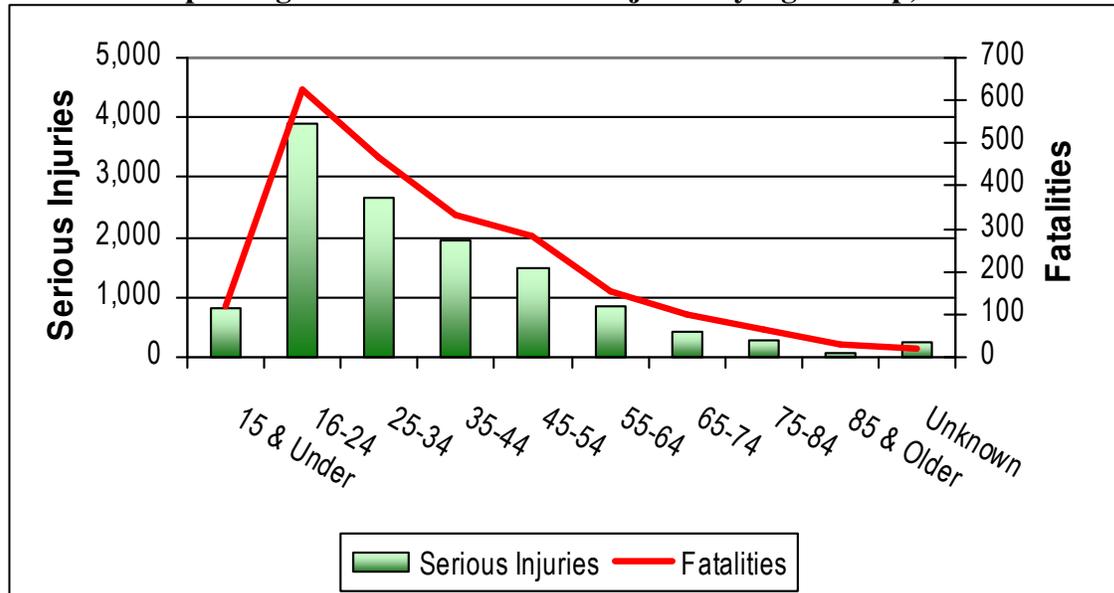
The pattern for serious injuries related to speed is similar. The age groups 16-24 and 25-34 account for 31 percent and 21 percent of fatalities respectively. The 35-44 and 45-54 age groups account for 15 percent and 12 percent of fatalities respectively.

These results provide a good example of the overlap between fatalities discussed in **Section 4**. In this case, it is clear that young driver fatalities are often speeding fatalities.

**Table 29: Speeding Fatalities and Serious Injuries by Age Group, 2001–2005**

Age Group	Serious Injuries	Serious Injuries %	Fatalities	Fatalities %
15 & under	798	6%	119	5%
16-24	3,904	31%	624	29%
25-34	2,675	21%	465	21%
35-44	1,944	15%	334	15%
45-54	1,484	12%	281	13%
55-64	838	7%	156	7%
65-74	437	3%	99	5%
75-84	273	2%	67	3%
85 & older	73	1%	28	1%
unknown	244	2%	21	1%
<b>Totals</b>	<b>12,670</b>	<b>100%</b>	<b>2,194</b>	<b>100%</b>

**Exhibit 21: Speeding Fatalities and Serious Injuries by Age Group, 2001–2005**



**Table 30** analyzes speed related fatalities and serious injuries by the type of vehicle involved in the crash. Most speed related fatalities involve passenger cars (62 percent) and pick-up trucks (28 percent). Most speed related serious injuries also involve passenger cars (64 percent) and pick-up trucks (22 percent). Motorcycles are involved in 8 percent of speed related fatalities and 11 percent of speed related serious injuries.

**Table 30: Speeding Fatal and Serious Injury Crashes by Vehicle Type, 2001–2005**

Vehicle Type	Serious Injury Crashes %	Fatal Crashes %
Not Reported	0%	0%
Passenger Car	65%	62%
Pick-Up Truck	22%	28%
Truck Tractor	1%	1%
Bus (including school bus)	0%	0%
Motorcycle (two or three wheel)	11%	8%
Emergency Vehicle	0%	0%
Other Vehicle	1%	1%
<b>Totals</b>	<b>100%</b>	<b>100%</b>

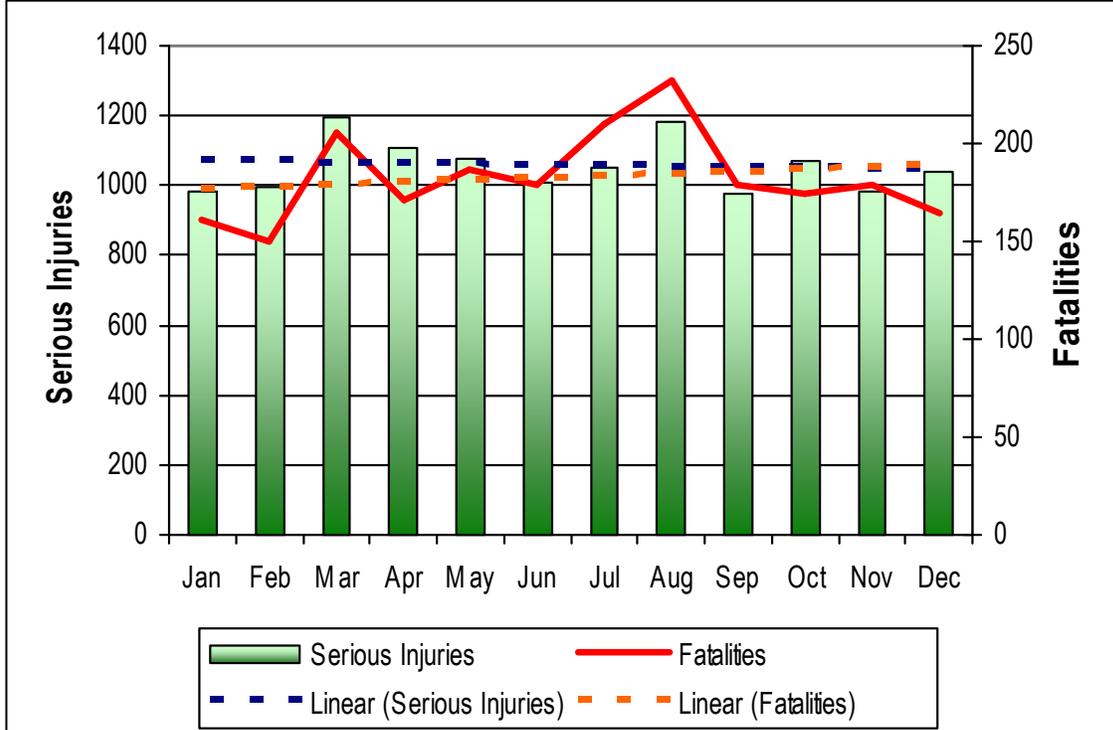
### 9.3.2. Seasonality

To assist in the timing of speed reduction campaigns, data on speeding related fatalities and serious injuries were analyzed to determine whether the fatalities and serious injuries involving speed tend to occur at particular times (month, day, or time of day).

**Exhibit 22** shows that fatalities related to speeding tend to occur at a fairly constant rate throughout the year, as shown by the bold, orange dashed linear trend line. The peak month for speed related fatalities is August. There is a smaller peak in March.

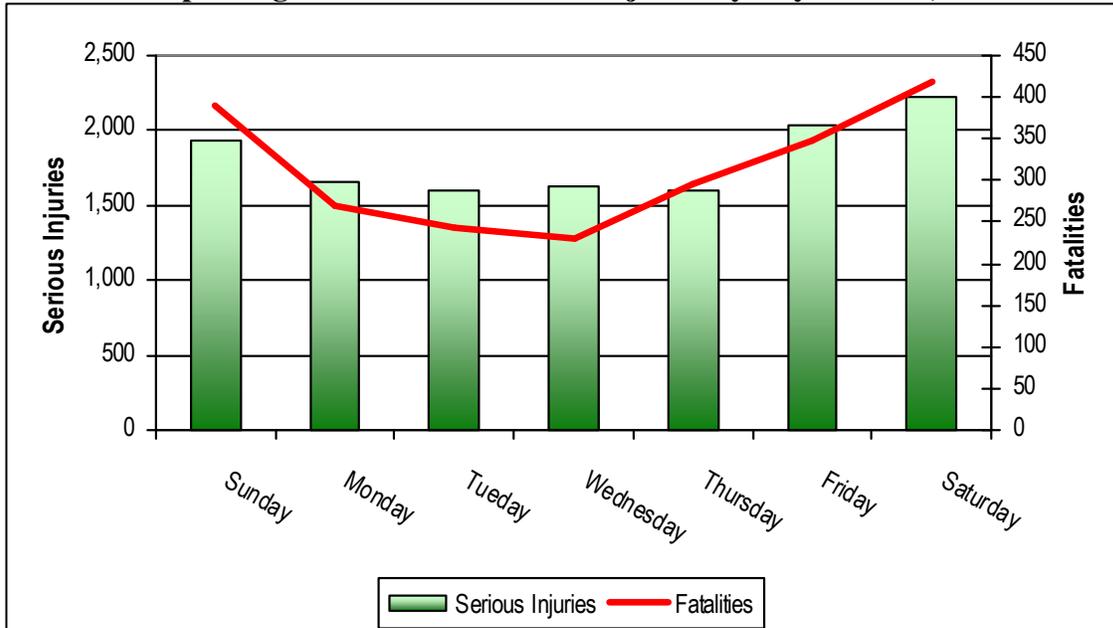
**Exhibit 22** shows that serious injuries related to speed also tend to occur at a fairly constant rate throughout the year, as shown by the bold, dark dashed linear trend line. The peak months for speed related serious injuries are March and August.

**Exhibit 22: Speeding Fatalities and Serious Injuries by Month of Year, 2001–2005**



**Exhibit 23** shows that fatalities and serious injuries involving speed are most numerous on weekends and Fridays. The chance of being involved in a speed related fatality increases by 92 percent from Wednesday to Saturday.

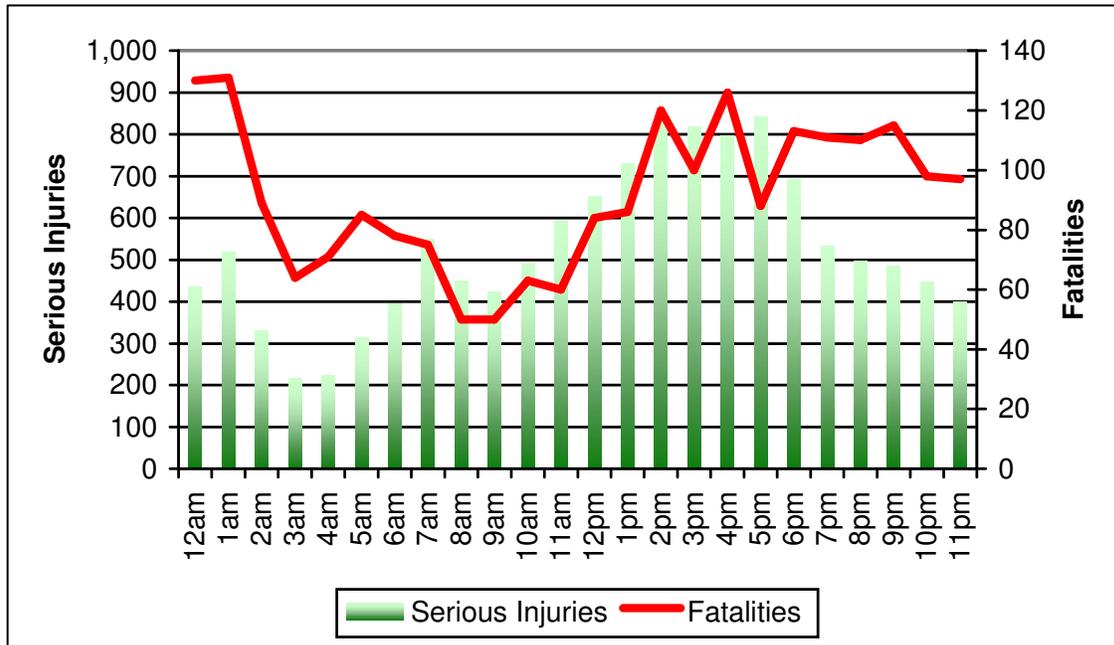
**Exhibit 23: Speeding Fatalities and Serious Injuries by Day of Week, 2001–2005**



**Exhibit 24** shows that the main peak time for speed related fatalities is in the very early morning, between midnight and 1:00am. There is a small peak in the early morning between 5:00am and 7:00am, and a high peak between 2:00pm and 4:00pm.

The number of serious injuries involving speed shows a small peak in the very early morning between midnight and 1:00am. The main peak period is between 2:00pm and 5:00pm.

**Exhibit 24: Speeding Fatalities and Serious Injuries by Time of Day, 2001–2005**



**9.3.3. Summary of Speeding Crash Data**

The following list provides a summary of the data for speeding presented in **Section 9:**

- Speed contributed to 2,193 fatalities and 12,670 serious injuries in the five year period from 2001–2005.
- Speeding related fatalities are increasing.
- Most fatalities occur in rural areas (59 percent).
- Maricopa and Pima counties account for 49 percent of all speeding related fatalities.
- Most fatalities are drivers (60 percent), and 36 percent are passengers.
- Most fatalities involve males (71 percent).
- People aged 16-24 and 25-34 account for 29 percent and 21 percent of fatalities respectively.
- People aged 35-44 and 45-54 account for 15 percent and 13 percent of fatalities respectively.
- Most fatalities involve passenger cars (62 percent) and pick-up trucks (28 percent).
- Fatalities occur throughout the year with slight peaks in March and August.
- Fatalities are most numerous on weekends and Fridays.
- Fatalities tend to peak in the very early morning and again in the afternoon hours between 2:00pm and 4:00pm.

## 9.4. Speeding Strategies and Countermeasures

All actions related to the following speeding strategies and countermeasures should be linked to NHTSA's Speed Management Workshop, where feasible. The following strategies are recommended to achieve the speeding goal<sup>26</sup>.

### 9.4.1. Strategy: Reduce the Incidence of Speeding

Strategies for reducing the incidence of speeding are based on the premise that a reduction in speeds will result in crashes that are less severe, and that less severe crashes will translate into fewer fatalities and serious injuries.

The following countermeasures are proposed to reduce the incidence of speeding in Arizona:

**Countermeasure 1.** Identify high crash locations where many crashes are attributed to speeding and use established guidelines to review the speed limit to ensure that the limit is appropriate to the location. This countermeasure needs the support of an aggressive enforcement campaign to ensure speed compliance. It is recommended that this countermeasure should be implemented initially in urban areas in Maricopa County and Pima County, and statewide in rural areas.

**Countermeasure 2.** Provide increased enforcement with high-visibility at high crash locations in Maricopa and Pima Counties. To maximize the effective use of limited human resources, the planned enforcement activities can be scheduled outside of peak periods from 2:00pm to 5:00pm and from 12:00pm to 1:00am on weekends and Fridays in the months of March and August. These times should be confirmed during the development of the Implementation Plan details.

**Countermeasure 3.** Install automated detection and enforcement systems at high crash locations where speeding is a problem. To maximize the effectiveness of limited technological resources, equipment could be rotated among locations. Actions developed from this countermeasure should be linked to the Department of Public Safety / Arizona Department of Transportation statewide photo program, and to GTSAC's Photo Enforcement Technology.

The rotation (sharing) of equipment should not restrict or hamper more effective and flexible mobile enforcement. Appropriate and affordable quantities of equipment can be assessed during the development of the Implementation Plan.

**Countermeasure 4.** Work towards making speeding enforcement consistent, impartial, and uniform for all speeding violators in Arizona. Use public

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<sup>26</sup> Where feasible, training and "train the trainer" programs should be shared to make the best use of limited resources and expertise.

outreach and educational campaigns to remind the public that speed enforcement is conducted to reduce the number of crashes, save lives, and prevent serious injuries (not to collect fines).

**Countermeasure 5.** Develop educational and public speed management and outreach campaigns for various target audiences to support the strategies on speeding. In particular, develop outreach campaigns targeting drivers and occupants aged 16-24. Check with all safety partners that safety management and outreach campaigns are acceptable and appropriate to the target audiences. Ensure that campaigns and programs are multi-lingual and sensitive to Arizona’s tribal communities and other cultures. Some cultures, for example, find the mention of death or discussions of death unwelcome.

**Countermeasure 6.** Increase the perception that violators will be caught and will have to pay the consequences. Use public relation programs and the media to increase this perception.

The six countermeasures designed to reduce the incidence of speeding in fatal and serious injury crashes are summarized in **Table 31** which also provides information about the area of focus, timing and performance measures.

**Table 31: Reduce the Incidence of Speeding: Summary of Proposed Countermeasures, Focus Area, Timing, and Performance Measures**

Countermeasure Description	State or County Focus Area	Timing of Implementation	Performance Measure(s)
Review speed limits at high crash locations to ensure that they are appropriate. Support review with an aggressive enforcement component	By County where applicable	Year round	Number of crash locations assessed per year  Number of fatalities resulting from driving to fast for conditions  Number of fatalities resulting from exceeding lawful speed
Increase high-visibility enforcement at high crash locations	Maricopa and Pima Counties	March, August Friday, Saturday, Sunday 2:00pm – 5:00pm 12:00pm – 1:00am	Reduction in mean speed  Number of fatalities at high crash locations within enforcement net  Number of officers involved
Expand use of automated	Statewide	Year round	Number of citations

Countermeasure Description	State or County Focus Area	Timing of Implementation	Performance Measure(s)
enforcement using speed cameras			issued.  Number of fatalities at high crash locations with cameras
Work towards making enforcement consistent, impartial and uniform for all violators	Statewide	Year round	Buy in from state and local police
Develop educational and public information campaign to support all strategies	Statewide	Year round	Surveys to measure the number of people reached by the campaign
Increase perception that violators will be caught and face the consequences	Statewide	Year round	Surveys to measure change in perceptions

**9.4.2. Strategy: Reduce the Number of Chronic Speeders**

The following countermeasures are proposed to be used to reduce the number of chronic speeders in Arizona. The first two countermeasures target repeat (chronic) speeding offenders.

- Countermeasure 1.** Increase penalties for repeat offenders. This countermeasure may require legislative changes.
- Countermeasure 2.** Work with members of the court system to develop and deliver educational packages that deliver a structured curriculum to repeat offenders. Ensure that the packages target the appropriate age group, and that they are multi-lingual and culturally sensitive.
- Countermeasure 3.** Develop educational and outreach programs and tools to address street racing. This countermeasure will require modifications to current data collection, storage and access.

The three countermeasures designed to reduce the number of chronic speeders are summarized in **Table 32** which also provides information about the area of focus, timing and performance measures.

**Table 32: Reduce the Number of Chronic Speeders: Summary of Proposed Countermeasures, Focus Area, Timing, and Performance Measures**

Countermeasure Description	State or County Focus Area	Performance Measure(s)
Increase penalties for repeat offenders	Statewide	Change in speeding penalties  Number of fatalities involving repeat offenders
Educate repeat offenders using a structured curriculum for speeding	Statewide	Number of repeat offenders who complete the course
Develop programs and tools to address street racing	Statewide	Program developed and implemented  Number of educational sessions per year  Average number of people attending each session  Number of street racing convictions per year per area

**9.4.3. Strategy: Reduce Effects of Speeding Related Crashes**

The following countermeasure is proposed to reduce the effects of speeding related crashes.

**Countermeasure 1.** Rural roadways account for 59 percent of the fatalities and 36 percent of the serious injuries attributed to speeding. Improve EMS response times to locations identified as high crash rural locations related to speeding. This countermeasure has the potential to improve the effectiveness of on-scene medical treatment thereby mitigating fatalities and serious injuries.

The countermeasure designed to reduce the effects of speeding related crashes is summarized in **Table 33** which also provides information about the area of focus, timing and performance measure.

**Table 33: Reduce the Effects of Speeding Related Crashes: Summary of Proposed Countermeasures, Focus Area, Timing, and Performance Measures**

Countermeasure Description	State or County Focus Area	Performance Measure
Reduce EMS response time to high crash rural locations	Rural roadways	Improved EMS response times

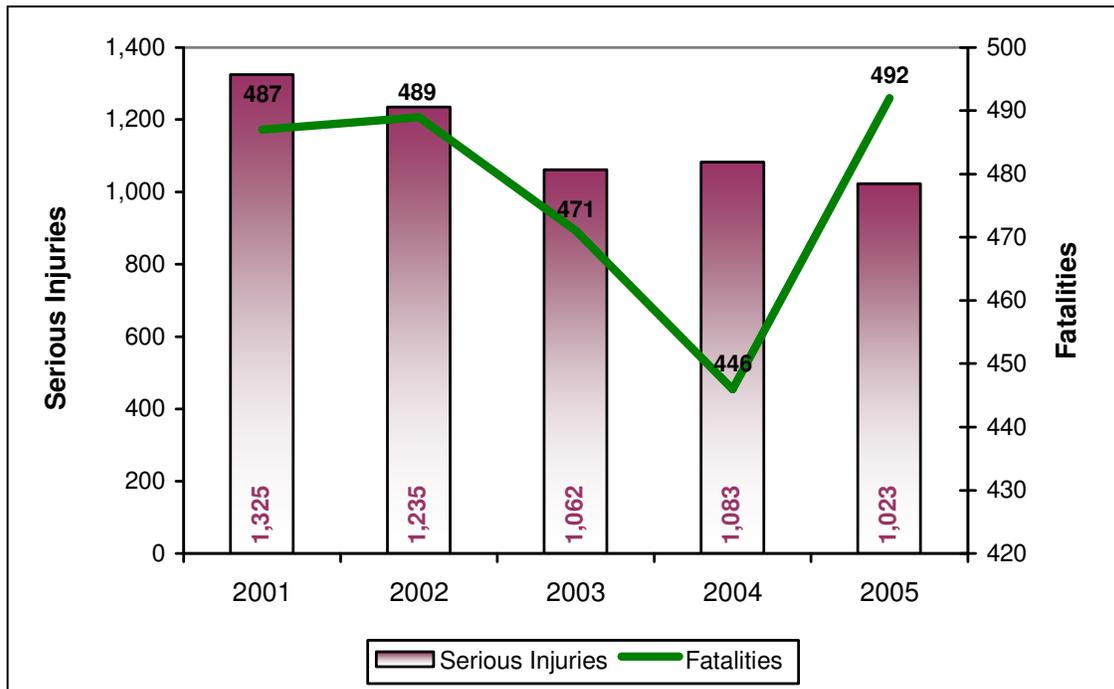
## 10. Emphasis Area 4: Impaired Driving<sup>27</sup>

### 10.1. Problem Statement<sup>28</sup>

In the five years from 2001–2005, impaired driving was a contributing factor to 2,385 fatalities and 5,728 serious injuries.

**Exhibit 25** shows the number of fatalities and the number of serious injuries involving impaired driving in Arizona in each year from 2001–2005.

**Exhibit 25: Fatalities and Serious Injuries Involving Impaired Driving, 2001–2005**



Between 2001 and 2005, the number of impaired driving fatalities decreased from 2001–2004, and then sharply increased from 2004–2005. Overall, the number of impaired driving fatalities increased from 487 in 2001 to 492 in 2005 (an increase of 1 percent). The number of serious injuries related to impaired driving decreased from 1,325 in 2001 to 1,023 in 2005 (a decrease of 23 percent).

**Table 34** shows that a small majority of impaired driving fatalities occur in rural areas (54 percent) rather than in urban areas. Most impaired driving serious injuries (64 percent) occur in urban areas.

<sup>27</sup> In this section, Fatality Analysis Reporting System (FARS) data are used for impaired driving fatality data, and the Arizona Accident Location Information Surveillance System (ALISS) data are used for serious injury data. FARS was used due to its more up to date impaired driving fatality data. As a result, unlike other sections, several statistics are shown as percentages. A goal of the TRCC is to increase the Blood Alcohol Content (BAC) reporting in ALISS to bring the FARS and ALISS numbers together.

<sup>28</sup> In August 2005, legislation allowing bars to stay open until 2am became effective. This has resulted in a shift in the early morning fatality and serious injury peak from 1am to 2am.

**Table 34: Urban versus Rural Impaired Driving Fatalities and Serious Injuries, 2001–2005**

Roadway	Serious Injuries	Fatalities	Total
Urban	64%	45%	55%
Rural	36%	55%	46%
<b>Totals</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

**Table 35** analyzes impaired driving fatalities by Arizona county from 2001–2005. The Table also shows the breakdown by urban versus rural location within each county.

**Table 35: Urban and Rural Impaired Driving Fatalities by County, 2001–2005**

County	County Total %	Urban %	Rural %
Apache	5%	0%	100%
Cochise	4%	5%	95%
Coconino	4%	7%	93%
Gila	1%	5%	95%
Graham	1%	0%	100%
Greenlee	0%	0%	100%
Maricopa	45%	78%	22%
Mohave	6%	12%	88%
Navajo	4%	5%	95%
Pima	11%	43%	57%
Pinal	7%	12%	88%
Santa Cruz	1%	10%	90%
Yavapai	6%	27%	73%
Yuma	2%	32%	68%
La Paz	3%	0%	100%
<b>Total</b>	<b>100%</b>		

Maricopa County accounts for 45 percent of all impaired driving fatalities. Pima County accounts for 11 percent. Whereas most impaired driving fatalities (55 percent) occur in rural areas rather than urban areas (**Table 35**), in Maricopa County, most fatalities occur in urban areas (78 percent).

## 10.2. Impaired Driving Sub-Goal Statement

The sub-goal statement for impaired driving is: Reduce impaired driving related fatalities by 15 percent from the 2007 level over the five year period from 2008–2012.

### 10.3. Strategy Development

The data available to assist with strategy development are discussed under two headings:

1. Drivers, Vehicles, and Collision Manner (**Section 10.3.1**)
2. Seasonality (**Section 10.3.2**)

The data are then summarized (**Section 10.3.3**).

#### 10.3.1. Drivers, Vehicles, and Collision Manner

**Table 36** shows that most impaired driving fatalities are drivers (60 percent) rather than passengers (34 percent). Pedestrians account for 5 percent of the fatalities related to impaired driving. Most impaired driving serious injuries are also drivers (64 percent) rather than passengers (34 percent).

**Table 36: Impaired Driving Fatalities and Serious Injuries by Casualty Type, 2001–2005**

Casualty	Serious Injuries %	Fatalities %
Driver	64%	60%
Pedestrian	2%	5%
Pedal cyclist	0%	1%
Passenger	34%	34%
<b>Totals</b>	<b>100%</b>	<b>100%</b>

**Table 37** shows that most impaired driving fatalities are males (73 percent). Most impaired driving serious injuries are also males (67 percent).

**Table 37: Impaired Driving Fatalities and Serious Injuries by Gender, 2001–2005**

Gender	Serious Injuries %	Fatalities %
Female	33%	27%
Male	67%	73%
Unknown	0%	0%
<b>Totals</b>	<b>100%</b>	<b>100%</b>

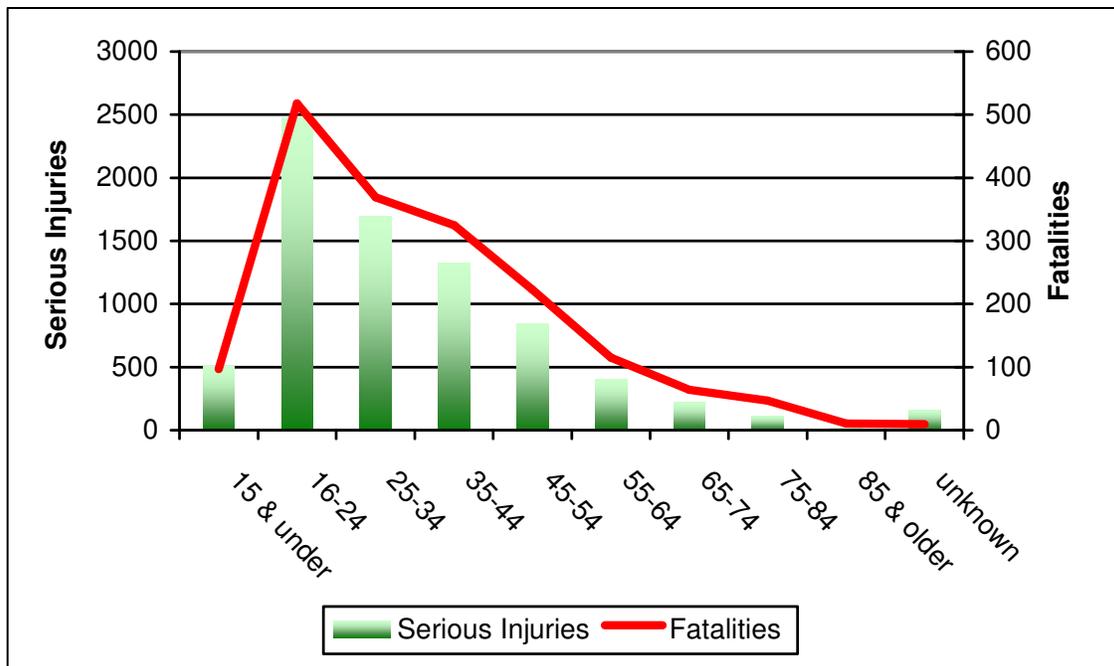
The age distribution for fatalities and serious injuries involving impaired driving is shown in **Table 38** and **Exhibit 26**. The 16-24 age group accounts for 28 percent of fatalities. The 25-34 and 35-44 age groups account for 21 percent and 18 percent of fatalities respectively. The 45-54 age group accounts for an additional 13 percent of the fatalities.

The pattern for serious injuries related to impaired driving is similar. The 16-24 age group accounts for 32 percent of serious injuries. The 25-34 and 35-44 age groups account for 22 percent and 17 percent of serious injuries respectively. The 45-54 age group accounts for an additional 11 percent of the serious injuries.

**Table 38: Impaired Driving Fatalities and Serious Injuries by Age Group, 2001–2005**

Age Group	Serious Injuries %	Fatalities %
15 & under	7%	5%
16-24	32%	28%
25-34	22%	21%
35-44	17%	18%
45-54	11%	13%
55-64	5%	6%
65-74	3%	4%
75-84	1%	3%
85 & older	0%	1%
unknown	2%	1%
	<b>100%</b>	<b>100%</b>

**Exhibit 26: Impaired Driving Fatalities and Serious Injuries by Age Group, 2001–2005**



**Table 39** analyzes impaired driving fatal and serious injury crashes by the type of vehicle. Most impaired driving fatal crashes involve passenger cars (63 percent) and pick-up trucks (28 percent). Most impaired driving serious injury crashes also occur in passenger cars (66 percent) and pick-up trucks (25 percent). Motorcycles are involved in 7 percent of impaired driving fatalities and 7 percent of impaired driving serious injuries.

**Table 39: Impaired Driving Fatal and Serious Injury Crashes by Vehicle Type, 2001–2005**

Vehicle Type	Serious Injury Crashes %	Fatal Crashes %
Not Reported	0%	2%
Passenger Car	66%	63%
Pick-Up Truck	25%	28%
Truck Tractor	1%	0%
Bus (including school bus)	0%	0%
Motorcycle (two or three wheel)	7%	7%
Emergency Vehicle	0%	0%
Other Vehicle	1%	0%
<b>Totals</b>	<b>100%</b>	<b>100%</b>

**Table 40** analyzes fatalities and serious injuries related to impaired driving by the type of collision. Single vehicle crashes account for the largest group of impaired driving crashes: 57 percent of the fatalities and 46 percent of the serious injuries. Only three other types of collision account for at least 10 percent of the crashes: angle crashes account for 12 percent of the fatalities and 15 percent of the serious injuries; head-on crashes account for 14 percent of the fatalities; and rear-end crashes account for 12 percent of the serious injuries

**Table 40: Impaired Driving Fatalities and Serious Injuries Collision Manner, 2001–2005**

Collision Manner	Serious Injuries %	Fatalities %
Single Vehicle	46%	57%
Sideswipe (same)	3%	3%
Sideswipe (opposite)	3%	1%
Angle	15%	12%
Left Turn	8%	4%
Rear-End	12%	6%
Head-On	9%	14%
Backing	0%	0%
Other	3%	3%
Non-Contact (mc)	0%	0%
Non-Contact (not mc)	0%	0%
U-Turn	1%	0%
<b>Totals</b>	<b>100%</b>	<b>100%</b>

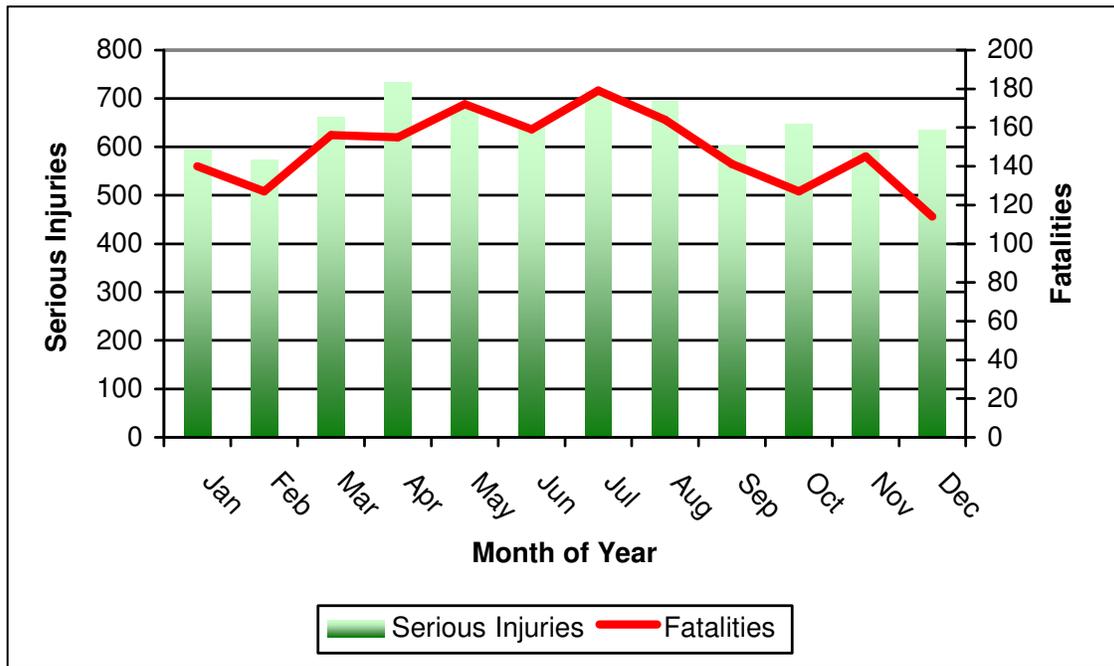
### 10.3.2. Seasonality

To assist in the timing of education and enforcement campaigns, data on impaired driving fatalities and serious injuries were analyzed to determine whether fatalities and serious injuries involving impaired driving tend to occur at particular times (month, day, or time of day).

**Exhibit 27** shows that fatalities related to impaired driving tend to occur at a fairly constant rate throughout the year, dipping slightly over the winter months. There were slight peaks in May and July.

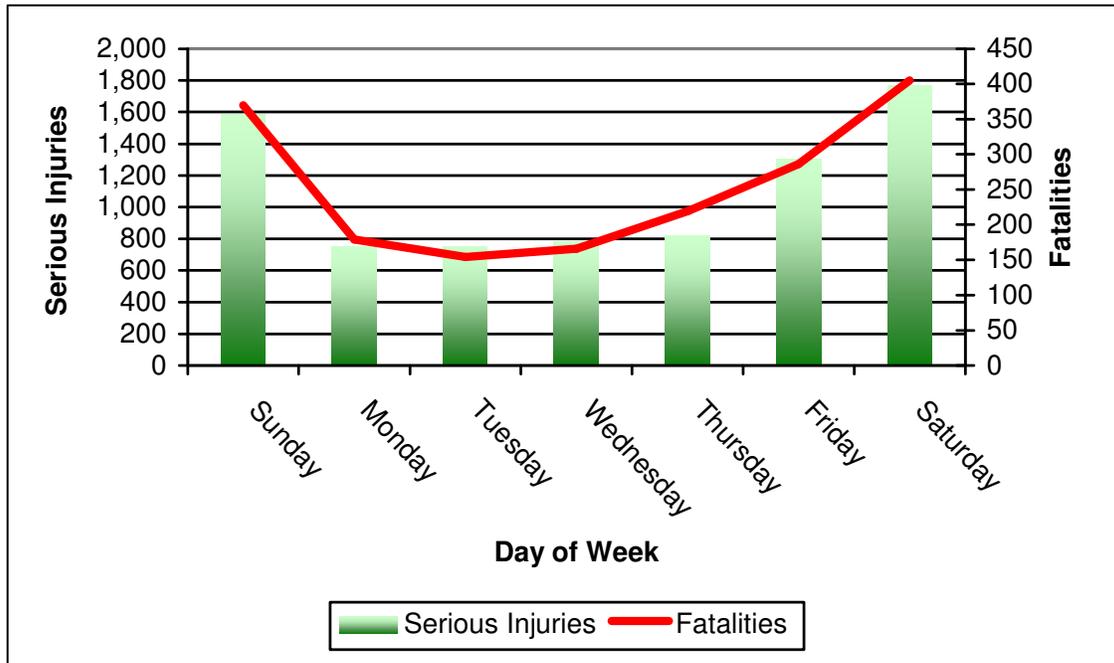
**Exhibit 27** also shows that serious injuries related to impaired driving tend to occur at a fairly constant rate throughout the year, dipping slightly over the winter months. Slight peaks in impaired driving serious injuries occur during the months of April and July.

**Exhibit 27: Impaired Driving Fatalities and Serious Injuries by Month of Year, 2001–2005**



**Exhibit 28** shows that fatalities and serious injuries related to impaired driving are most numerous on Fridays and weekends, especially on Saturdays. The chance of being involved in an impaired driving related fatality increases by 140 percent from Wednesday to Saturday.

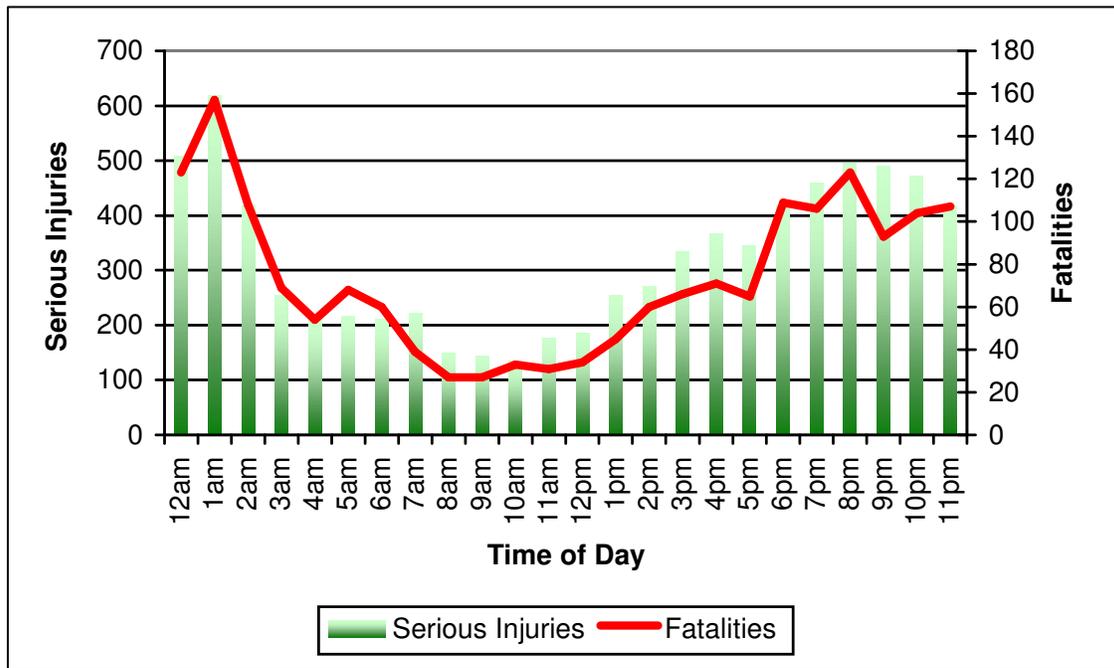
**Exhibit 28: Impaired Driving Fatalities and Serious Injuries by Day of Week, 2001–2005**



**Exhibit 29** shows that impaired driving fatalities peak in the very early morning, between midnight and 1:00am. There are relatively few impaired driving fatalities in the morning and early afternoon, but the number of fatalities then builds to a second peak between 6:00pm and 8:00pm.

The number of serious injuries related to impaired driving shows the same peak in the very early morning between midnight and 1:00am, the same drop in the morning and early afternoon, and a second peak around 8:00pm and 9:00pm.

**Exhibit 29: Impaired Driving Fatalities and Serious Injuries by Time of Day, 2001–2005<sup>29</sup>**



**10.3.3. Summary of Impaired Driving Data**

The following list provides a summary of the data for impaired driving presented in **Section 10:**

- Impaired driving contributed to 2,385 fatalities and 5,728 serious injuries in the five year period from 2001–2005.
- Fatalities related to impaired driving stayed at about the same level from 2001–2005. There was a dip in 2004 followed by a sharp increase in 2005.
- Most fatalities occur in rural areas (55 percent).
- Maricopa County accounts for 45 percent of all impaired driving fatalities.
- Most fatalities related to impaired driving are drivers (60 percent) rather than passengers (34 percent).
- Pedestrians account for 5 percent of impaired driving fatalities.
- Most fatalities from impaired driving are males (73 percent).
- People aged 16-24 account for 28 percent of the fatalities.
- People aged 25-34 and 35-44 account for 21 percent and 18 percent of fatalities respectively.
- Most impaired driving fatalities involve passenger cars (63 percent) and pick-up trucks (28 percent).
- Motorcycles are involved in 7 percent of impaired driving fatalities.
- Single vehicle crashes account for 57 percent of impaired driving fatalities.
- Angle crashes account for 12 percent of the fatalities, and head-on crashes account for 14 percent.

<sup>29</sup> In August 2005, legislation allowing bars to stay open until 2am became effective. This has resulted in a shift in the early morning fatality and serious injury peak from 1am to 2am.

- Fatalities related to impaired driving occur throughout the year, with a slight dip in the winter months and slight peaks in May and July.
- Fatalities involving impaired driving are most numerous on Fridays and weekends, especially Saturdays.
- Impaired driving fatalities peak in the very early morning, between midnight and 1:00am, and again between 6:00pm and 8:00pm.

## 10.4. Impaired Driving Strategies and Countermeasures

The following strategies are recommended to achieve the goal for impaired driving.

### 10.4.1. Strategy: Deter Impaired Driving Through Effective Enforcement

The following countermeasures are proposed to deter impaired driving through effective enforcement:

- Countermeasure 1.** Continue to encourage the greater use of sobriety check points and saturation patrols. Sobriety checkpoints are used at predetermined locations to check for impaired driving offenders. The purpose is to deter impaired driving by increasing the perception of the risk of arrest.
- Countermeasure 2.** Increase police and community awareness of current laws prohibiting driving under the influence of prescription and over-the-counter drugs.
- Countermeasure 3.** Continue to support efforts by the Department of Public Safety’s DUI / Special Enforcement Squad (e.g. Phoenix program).
- Countermeasure 4.** Expand and enhance educational and public information campaigns for various audiences to support enforcement strategies for impaired driving. Develop a campaign targeting young people aged 16-24 as this group accounts for 28 percent of all impaired driving fatalities<sup>30</sup>. The campaign should be sub-divided into a 16-20 age group and a 21-24 age group, with separate messages for the two groups.
- Countermeasure 5.** Increase the perception that violators will be caught and will have to pay the consequences. Use public relation programs and the media to increase the perception.

The five countermeasures designed to deter impaired driving through effective enforcement are summarized in **Table 41** which also provides information about the area of focus, timing, and performance measures.

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<sup>30</sup> Educational and outreach programs and marketing should be multi-lingual and sensitive to different Arizona cultures, e.g. tribal communities. Where feasible, training and “train the trainer” programs should be shared to make the best use of limited resources and expertise.

**Table 41: Deter Impaired Driving Through Effective Enforcement: Summary of Proposed Countermeasures, Focus Area, Timing, and Performance Measures**

Countermeasure Description	State or County Focus Area	Timing of Implementation	Performance Measure
Increase frequency of sobriety checkpoint and saturation patrols	High crash locations	Friday, Saturday, Sunday 6:00pm – 2:00am	Number of impaired citations issued
Increase police and community awareness of laws prohibiting driving under the influence of medication	Statewide	April, May, August, September	Major campaign designed and implemented
Support the DPS DUI / Special Enforcement Squad	High crash locations e.g. Maricopa County	Year round Friday, Saturday, Sunday 6:00pm – 2:00am	Number of impaired driving fatalities reduced at high crash locations
Expand and enhance educational and public information campaign to support all strategies. Give special attention to 16-24 age group.	Statewide	Year round	Campaigns targeting different audience produced and marketed
Increase the perception that violators will be caught and face the consequences	Statewide	Year round	Population surveys indicate changes in perceptions

**10.4.2. Strategy: Reduce Excessive Drinking and Underage Drinking**

The following countermeasures are proposed to reduce excessive drinking and underage drinking:

- Countermeasure 1.** Support and encourage current programs and new programs designed to educate agencies, court personnel, academy staff and recruits, students, parents, and the public of the importance about the problem of excessive drinking and underage drinking, and how to reduce the problem of underage alcohol consumption<sup>31</sup>. Ensure that campaigns and programs are multi-lingual and sensitive to Arizona’s tribal communities and other cultures. Some cultures, for example, find the mention of death or discussions of death unwelcome.

<sup>31</sup> Where feasible, training and “train the trainer” programs should be shared to make the best use of limited resources and expertise.

**Countermeasure 2.** Work with the Department of Liquor and License Control to reduce the availability of alcohol to those under 21. Use well-publicized compliance checks on alcohol retailers. Support Arizona's Strategic Prevention Framework for Underage Drinking, Prevention / Reduction Committee's efforts to (a) enact legislation that increases the mandatory sanctioned guidelines for liquor related laws, and includes stiff penalties for using, possessing, manufacturing, and distributing false ID's, and (b) create a "keg law." Coordinate all actions related to this countermeasure, and ensure that all actions are consistent with the efforts of other associated groups, for example, Mothers Against Drunk Driving (MADD), Students Against Destructive Decisions (SADD), and the Emergency Nurses Association.

**Countermeasure 3.** Encourage alcoholic beverage industry, specifically retailers, to implement more effective enforcement practices.

The three countermeasures designed to reduce excessive drinking and underage drinking are summarized in **Table 42** which also provides information about the area of focus, timing, and performance measures.

**Table 42: Reduce Excessive Drinking and Underage Drinking: Summary of Proposed Countermeasures, Focus Area, Timing, and Performance Measures**

Countermeasure Description	State or County Focus Area	Timing of Implementation	Performance Measure(s)
Support programs that target the dangers of underage drinking	Statewide	Year round	Number of educational programs implemented by area  Number of children and young people reached per year  Number of events per year
Reduce access to alcohol for those under 21. Coordinate with associated groups	Statewide	Year round	Improved compliance by alcohol retailers
Encourage more effective retailer enforcement practices	Statewide	Year round	Number violations per year under the Covert Underage Buyers (CUB) program

**10.4.3. Strategy: Prosecute and Impose Sanctions on DUI Offenders**

The following countermeasures are proposed to prosecute and impose sanctions on DUI offenders:

**Countermeasure 1.** Administratively suspend driver license of individuals arrested for impaired driving.

**Countermeasure 2.** Introduce stronger penalties for refusing Blood Alcohol Content (BAC) testing since a DUI conviction is more difficult without a BAC test.

**Countermeasure 3.** Work with legal system to improve conviction rate of offenders.

The three countermeasures designed to prosecute and impose sanctions on DUI offenders are summarized in **Table 43** which also provides information about the area of focus, timing and performance measures.

**Table 43: Prosecute and Impose Sanctions on DUI Offenders: Summary of Proposed Countermeasures, Focus Area, Timing, and Performance Measures**

Countermeasure Description	State or County Focus Area	Timing of Implementation	Performance Measure(s)
Administratively suspend license of individuals arrested for impaired driving	Statewide	Preferably before other countermeasures are implemented	Number of licenses suspended  DUI citations per fulltime DUI enforcement officer
Introduce stronger penalties for refusing BAC test	Statewide	Preferably before other countermeasures are implemented	Legislation enacted
Improve conviction rate of offenders	Statewide	Year round	Number of convictions  Increase in the conviction rate for citations

**10.4.4. Strategy: Control and Reduce the Number of Repeat Offenders**

The following countermeasures should be used to control and reduce the number of repeat offenders:

**Countermeasure 1.** Administratively seize the vehicle or license plate of repeat offenders who have suspended licenses and continue to drive without a valid license. To reduce the problem of storage space, the vehicle can be immobilized on the offender’s property using a locking device. The vehicle or license plate is returned after the license suspension period has expired.

- Countermeasure 2.** Install an alcohol interlock in the vehicles of all offenders to prevent a vehicle being started if the driver has been drinking. The alcohol interlock should be a condition for license reinstatement.
- Countermeasure 3.** Identify repeat offenders and refer them to a program with appropriate treatment. Regard repeat offenders as dependent on alcohol or as having problems with alcohol use.
- Countermeasure 4.** Monitor repeat offenders to ensure they comply with the conditions of their sentences such as alcohol treatment and prohibitions on driving.
- Countermeasure 5.** Enact legislation for a lower BAC limit for repeat offenders.

The five countermeasures designed to control and reduce the number of repeat offenders are summarized in **Table 44** which also provides information about the area of focus, timing, and performance measures.

**Table 44: Control and Reduce the Number of Repeat Offenders: Summary of Proposed Countermeasures, Focus Area, Timing, and Performance Measures**

Countermeasure Description	State or County Focus Area	Timing of Implementation	Performance Measure(s)
Administratively seize vehicle or vehicle license plate upon arrest	Statewide	Year round	Number of vehicles or license plates seized
Make the installation of an alcohol interlock a condition of license reinstatement	Statewide	Year round	Number of alcohol interlocks installed
Refer repeat offenders to alcohol treatment programs	Statewide	Year round	Number of repeat offenders successfully treated by programs <sup>32</sup>
Monitor repeat offenders	Statewide	Year round	Number of repeat offenders who successfully complete treatment
Lower BAC limit for repeat offenders	Statewide	Preferably before other countermeasures are implemented	Legislation enacted

<sup>32</sup> There are several related programs. Performance measurement needs to be specific to each program.

## 11. Emphasis Area 5: Roadway / Roadside – Introduction

The roadway / roadside emphasis area discusses lane departure and intersection related fatalities and serious injuries on Arizona roadways. The emphasis area was sub-divided to accommodate the available data.

The strategies for the roadway / roadside emphasis area focus mainly on engineering strategies whereas the strategies for the other emphasis areas focus primarily on improving drivers' behavior.

In addition to the comprehensive strategies designed to reduce the number of roadway / roadside fatalities and serious injuries, ADOT plans to address the following issues as part of the roadway / roadside emphasis area:

- Providing continued support for the Road Safety Audit (RSA) program and its development into a proactive priority (data driven) RSA program
- Working to develop an internal highway multi-division safety plan that would provide a comprehensive approach to addressing safety in all program / project areas including the HSIP, the railway-highway crossing program, safe routes to school, the high risk rural roads program, the access management program, research programs, the traffic evaluation new products committee, the Local Technical Assistance Program (LTAP), preliminary screening of design projects (operational safety evaluation), maintenance, installation of traffic signals, and work zone safety
- Developing a process that assists ADOT in spending available HSIP funding on county, local, and tribal roadways
- Developing a process that helps ADOT to work closely with local and tribal governments to advance projects
- Establishing a multi-disciplinary highway safety group to identify cost effective strategies to minimize the effects of vehicles leaving the roadway in lane departure crashes. ADOT is currently developing a Highway Safety Issues Group (HSIG) to address this issue

Lane departure fatalities and serious injuries are discussed in **Section 12**. Intersection fatalities and serious injuries are discussed in **Section 13**.

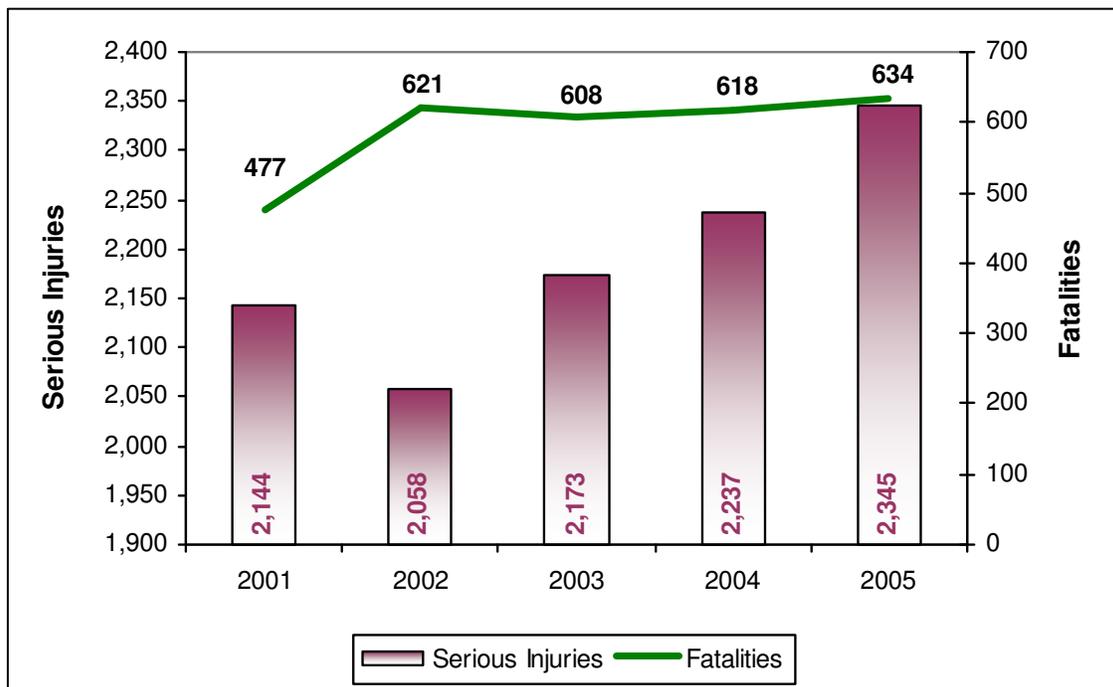
## 12. Emphasis Area 5: Roadway / Roadside – Lane Departures

### 12.1. Problem Statement – Lane Departure

In the five years from 2001–2005, lane departure was a contributing factor to 2,958 fatalities and 10,957 serious injuries.

**Exhibit 30** shows the number of fatalities and the number of serious injuries involving lane departure in Arizona in each year from 2001–2005.

**Exhibit 30: Fatalities and Serious Injuries Involving Lane Departure, 2001–2005**



The number of lane departure fatalities increased from 477 in 2001 to 634 in 2005 (an increase of 33 percent). If this trend continues, the number of lane departure related fatalities will increase from 634 in 2005 to 872 by 2012 (an increase of 37 percent).

**Table 45** shows that most lane departure fatalities (68 percent) occur in rural areas rather than urban areas. Serious injuries are split between urban areas (51 percent) and rural areas (49 percent).

**Table 45: Urban versus Rural Lane Departure Fatalities and Serious Injuries, 2001–2005**

Roadway	Serious Injuries	Fatalities	Total
Urban	51%	32%	42%
Rural	49%	68%	59%
<b>Totals</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

**Table 46** shows the total number of lane departure fatalities by Arizona county from 2001–2005. The table also shows the breakdown by urban versus rural location within each county.

**Table 46: Urban versus Rural Lane Departure Fatalities by County, 2001–2005**

County	Total Fatalities by County	County Fatalities as % of Total for Arizona	Urban Fatalities by County	Urban Fatalities as % of County Total	Rural Fatalities by County	Rural Fatalities as % of County Total
Apache	139	5%	0	0%	139	100%
Cochise	151	5%	14	9%	137	91%
Coconino	202	7%	16	8%	186	92%
Gila	78	3%	2	3%	76	97%
Graham	28	1%	0	0%	28	100%
Greenlee	4	0%	0	0%	4	100%
Maricopa	963	33%	650	67%	313	33%
Mohave	187	6%	32	17%	155	83%
Navajo	144	5%	10	7%	134	93%
Pima	340	11%	120	35%	220	65%
Pinal	239	8%	50	21%	189	79%
Santa Cruz	30	1%	5	17%	25	83%
Yavapai	246	8%	33	13%	213	87%
Yuma	92	3%	18	20%	74	80%
La Paz	115	4%	0	0%	115	100%
<b>Totals</b>	<b>2,958</b>	<b>100%</b>	<b>950</b>		<b>2,008</b>	

Maricopa County accounts for 33 percent of all lane departure fatalities. Pima County accounts for an additional 11 percent. Whereas most lane departure fatalities (68 percent) occur in rural rather than urban areas (**Table 46**), in Maricopa County, most fatalities occur in urban areas (67 percent).

## 12.2. Sub-Goal Statement – Lane Departure

The sub-goal statement for lane departure is: Reduce lane departure fatalities by 15 percent from the 2007 level over the five year period from 2008–2012.

## 12.3. Strategy Development – Lane Departure

The data available to assist with strategy development are discussed under two headings:

1. Drivers, Vehicles, and Collision Manner (**Section 12.3.1**)
2. Seasonality (**Section 12.3.2**)

The data are then summarized (**Section 12.3.3**).

### 12.3.1. Drivers, Vehicles, and Collision Manner

**Table 47** shows that most lane departure fatalities are drivers (62 percent) rather than passengers (37 percent). Most lane departure serious injuries are also drivers (63 percent) rather than passengers (36 percent). Pedestrians account for 1 percent of both lane departure fatalities and serious injuries.

**Table 47: Lane Departure Fatal and Serious Injuries by Casualty Type, 2001–2005**

Casualty	Serious Injuries	Serious Injuries %	Fatalities	Fatalities %
Driver	6,949	63%	1,838	62%
Pedestrian	85	1%	35	1%
Pedal cyclist	15	0%	5	0%
Passenger	3,908	36%	1,080	37%
	<b>10,957</b>	<b>100%</b>	<b>2,958</b>	<b>100%</b>

**Table 48** shows that most lane departure fatalities are males (68 percent). Most lane departure serious injuries are also males (62 percent).

**Table 48: Lane Departure Fatalities and Serious Injuries by Gender, 2001–2005**

Gender	Serious Injuries	Serious Injuries %	Fatalities	Fatalities %
Female	4,184	38%	934	32%
Male	6,767	62%	2,024	68%
Unknown	6	0%		0%
	<b>10,957</b>	<b>100%</b>	<b>2,958</b>	<b>100%</b>

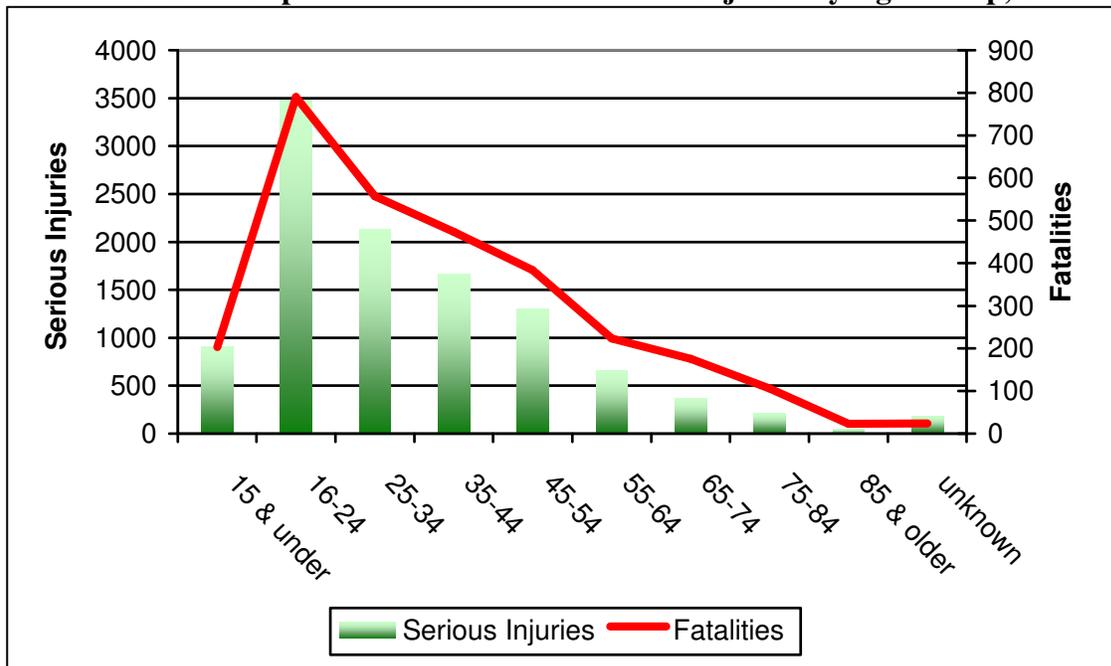
The age distribution for fatalities and serious injuries involving lane departure is shown in **Table 49** and **Exhibit 31**. The 16-24 age group accounts for 27 percent of fatalities. The 25-34 and 35-44 age groups account for 19 percent and 16 percent of fatalities respectively. The 45-54 age group accounts for an additional 13 percent of the fatalities.

The pattern for serious injuries related to lane departure is similar. The 16-24 age group accounts for 32 percent of serious injuries. The 25-34 and 35-44 age groups account for 19 percent and 15 percent of serious injuries respectively. The 45-54 age group accounts for an additional 12 percent of the serious injuries.

**Table 49: Lane Departure Fatalities and Serious Injuries by Age Group, 2001–2005**

Age Group	Serious Injuries	Serious Injuries %	Fatalities	Fatalities %
15 and under	913	8%	203	7%
16-24	3476	32%	790	26%
25-34	2131	20%	557	18%
35-44	1666	15%	473	16%
45-54	1303	12%	384	13%
55-64	657	6%	223	8%
65-74	367	3%	175	6%
75-84	214	2%	106	4%
85 and older	45	0%	23	1%
unknown	185	2%	24	1%
<b>Totals</b>	<b>10,957</b>	<b>100%</b>	<b>2,958</b>	<b>100%</b>

**Exhibit 31: Lane Departure Fatalities and Serious Injuries by Age Group, 2001–2005**



**Table 50** analyzes lane departure fatal and serious injury crashes by the type of vehicle involved in the crash. Most lane departure fatalities involve passenger cars (61 percent) and pick-up trucks (30 percent). Most lane departure serious injuries also occur in passenger cars (63 percent) and pick-up trucks (24 percent). Motorcycles are involved in 6 percent of lane departure fatalities and 11 percent of lane departure serious injuries.

**Table 50: Lane Departure Fatal and Serious Injury Crashes by Vehicle Type, 2001–2005**

Vehicle Type	Serious Injury Crashes %	Fatal Crashes %
Not Reported	0%	1%
Passenger Car	63%	61%
Pick-Up Truck	24%	30%
Truck Tractor	1%	1%
Bus (including school bus)	0%	0%
Motorcycle (two or three wheel)	11%	6%
Emergency Vehicle	0%	0%
Other Vehicle	1%	1%
<b>Totals</b>	<b>100%</b>	<b>100%</b>

**Table 51** analyzes lane departure fatalities and serious injuries by the type of collision. Single vehicle crashes are the largest group, accounting for 66 percent of the fatalities and 65 percent of the serious injuries. Only two other types of collision account for at least 10 percent of fatalities or serious injuries involving lane departure: head-on crashes account for 23 percent of the fatalities and 15 percent of the serious injuries; and sideswipe (same direction) crashes account for 11 percent of the serious injuries.

**Table 51: Lane Departure Fatalities and Serious Injuries by Collision Manner, 2001–2005**

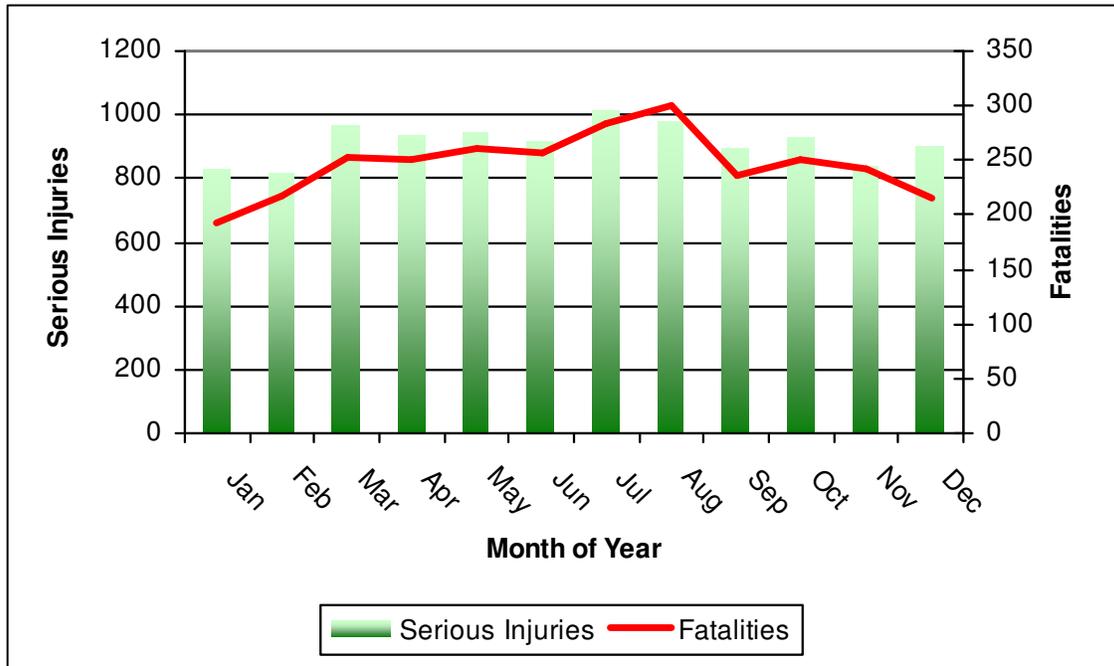
Collision Manner	Serious Injuries	Serious Injuries %	Fatalities	Fatalities %
Single Vehicle	7,176	65%	1,954	66%
Sideswipe (same)	1,225	11%	142	5%
Sideswipe (opposite)	478	4%	84	3%
Angle	29	0%	5	0%
Left Turn	9	0%	1	0%
Rear-End	31	0%	15	1%
Head-On	1,697	15%	671	23%
Other	289	3%	81	3%
Non-Contact (mc)	3	0%		0%
Non-Contact (not mc)	15	0%	4	0%
U-Turn	5	0%	1	0%
<b>Totals</b>	<b>10,957</b>	<b>100%</b>	<b>2,958</b>	<b>100%</b>

**12.3.2. Seasonality**

To assist in the timing of education and enforcement campaigns, data on lane departure fatalities and serious injuries were analyzed to determine whether lane departure fatalities and serious injuries tend to occur at particular times (month, day, or time of day).

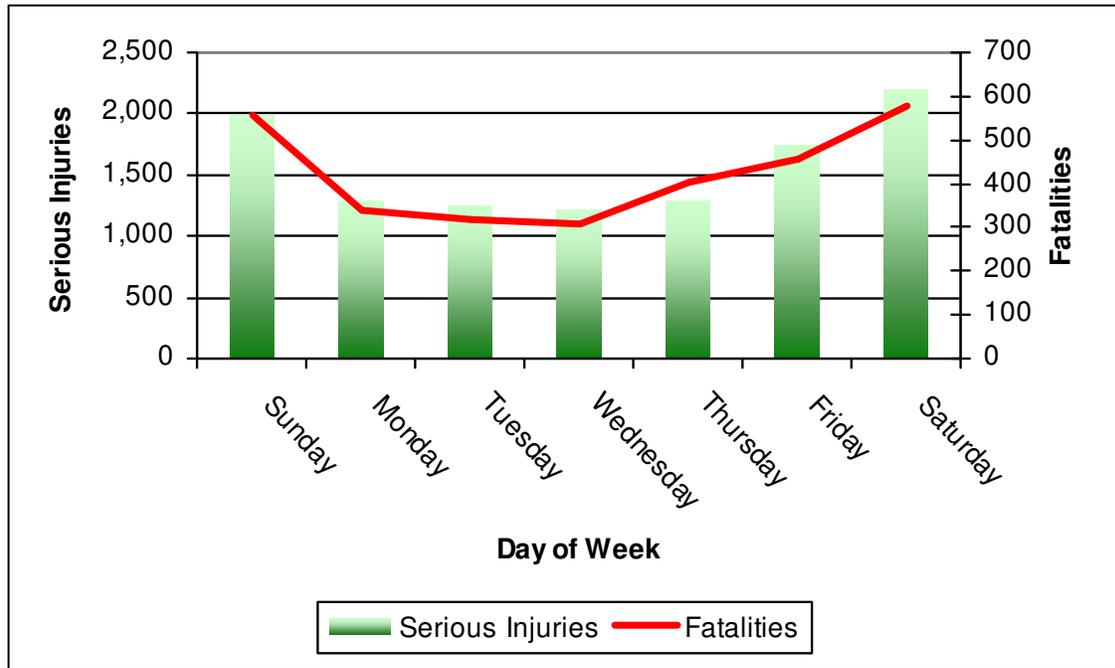
**Exhibit 32** shows that fatalities and serious injuries from lane departure crashes occur throughout the year, and tend to peak in July and August.

**Exhibit 32: Lane Departure Fatalities and Serious Injuries by Month of Year, 2001–2005**



**Exhibit 33** shows that lane departure fatalities and serious injuries are most numerous on weekends and Fridays. The chance of a lane departure fatality increases by 88 percent from Wednesday to Saturday.

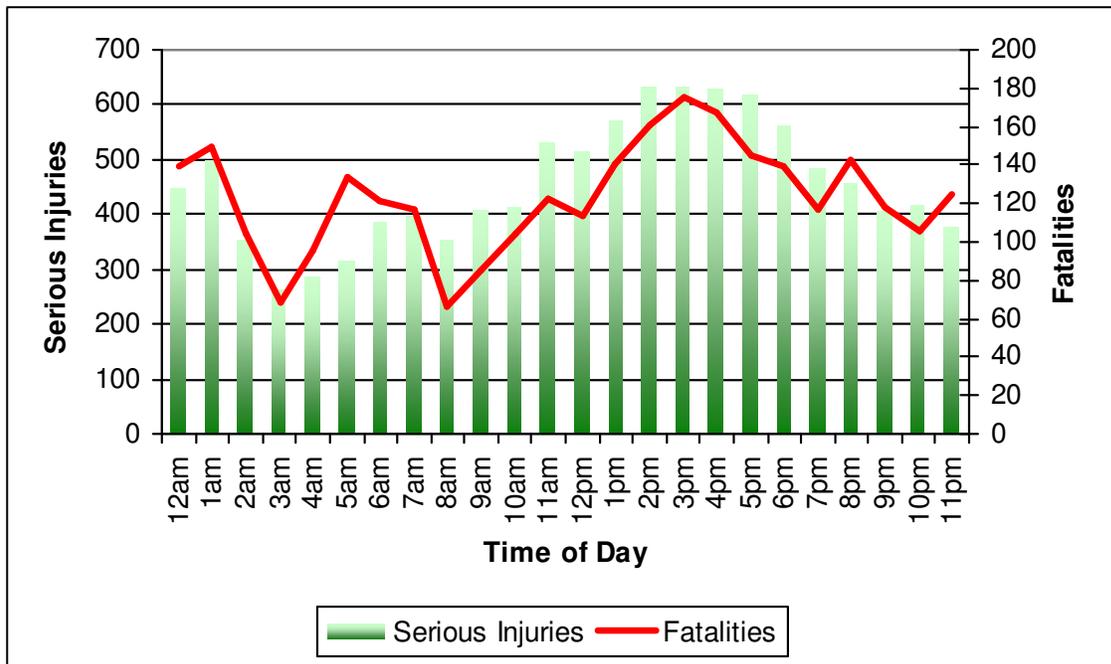
**Exhibit 33: Lane Departure Fatalities and Serious Injuries by Day of Week, 2001–2005**



**Exhibit 34** shows that lane departure fatalities occur throughout the day. Fatalities peak in the afternoon around 3:00pm, with smaller peaks around 1:00am, 5:00am, and 8:00pm.

Lane departure serious injuries peak in the afternoon from between 1:00pm and 6:00pm. There is a second peak around 1:00am.

**Exhibit 34: Lane Departure Fatalities and Serious Injuries by Time of Day, 2001–2005**



**Table 52** shows that 50 percent of lane departure fatalities occur during daylight and 43 percent occur in darkness. The pattern for lane departure serious injuries is similar with 56 percent occurring during daylight and 38 percent occurring during darkness.

**Table 52: Lane Departure Serious Injuries and Fatalities by Light Condition, 2001–2005**

Light Condition	Serious Injuries	Serious Injuries %	Fatalities	Fatalities %
Not Reported	12	0%	16	1%
Daylight	6,030	56%	1,480	50%
Dawn or Dusk	697	6%	187	6%
Darkness	4,218	38%	1,275	43%
<b>Totals</b>	<b>10,957</b>	<b>100%</b>	<b>2,958</b>	<b>100%</b>

### 12.3.3. Summary of Lane Departure Data

The following list provides a summary of the lane departure data presented in **Section 12:**

- Lane departures contributed to 2,958 fatalities and 10,957 serious injuries in the five year period from 2001 through 2005.
- Fatalities related to lane departure increased from 2001–2005.
- Most fatalities occur in rural areas (68 percent).
- Maricopa County accounts for 33 percent of all lane departure fatalities.
- Most fatalities related to lane departure are drivers (62 percent) rather than passengers (37 percent).
- Pedestrians account for 1 percent of lane departure fatalities.
- Most lane departure fatalities are males (68 percent).
- People aged 16-24 account for 26 percent of the fatalities.
- People aged 25-34 and 35-44 account for 18 percent and 16 percent of fatalities respectively.
- Most lane departure fatalities involve passenger cars (61 percent) and pick-up trucks (30 percent).
- Motorcycles account for 6 percent of lane departure fatalities.
- Single vehicle crashes account for 66 percent of lane departure fatalities.
- Head-on crashes account for 23 percent of fatalities.
- Fatalities related to lane departure occur throughout the year, and tend to peak in July and August.
- Fatalities involving lane departure are most numerous on weekends and Fridays
- Lane departure fatalities occur throughout the day. Fatalities peak around 3:00pm, with smaller peaks around 1:00am, 5:00am and 8:00pm.
- Half of lane departure fatalities occur during daylight (50 percent), and 43 percent occur in darkness.

## 12.4. Lane Departure Strategies and Countermeasures

The following strategies are recommended to achieve the lane departure goal.

**12.4.1. Strategy: Reduce the Incidence and Severity of Head-on Collisions**

The following countermeasures are proposed to reduce the incidence and severity of head-on fatalities:

- Countermeasure 1.** Consider installing centerline rumble strips / rumble strips on rural two-lane roads to deter vehicles from crossing into the opposite lane.
- Countermeasure 2.** Consider the installation of median treatments at appropriate locations, e.g. median cable barrier at accident prone locations
- Countermeasure 3.** Consider a systematic approach to installing centerline raised pavement markings (RPMs), and rumble strips on roadways with narrow shoulders.
- Countermeasure 4.** Consider better delineation of guard rails and the elimination of edge drop-offs.

The four countermeasures designed to reduce the incidence and severity of head-on collisions are summarized in **Table 53** which also provides information about the area of focus, timing and performance measures.

**Table 53: Reduce the Incidence and Severity of Head-on Collisions: Summary of Proposed Countermeasures, Focus Area, Timing, and Performance Measures**

Countermeasure Description	State or County Focus Area	Timing of Implementation	Performance Measure(s)
Consider installing centerline rumble strips / rumble strips on rural two-lane roadways	High crash two-lane rural roads	Year round	Length of centerline rumble strips / strips installed  Number of head-on fatalities on treated roadways
Consider installing median treatments at appropriate locations	High crash road segments	Year round	Length of median installed  Number of head-on fatalities on treated roadways
Consider systematic approach to installing centerline RPMs and rumble strips on roadways with narrow shoulders	High crash segments	Year round	Length of treatment  Number of head-on fatalities on treated roadways
Consider better delineation of guard rails and the elimination of edge drop-offs	High crash segments	Year round	Length of treatment  Number of head-on fatalities on treated roadways

**12.4.2. Strategy: Reduce the Number of Vehicles Leaving the Roadway**

The following countermeasures are proposed to reduce the number of vehicles leaving the roadway:

- Countermeasure 1.** On rural roadways with narrow paved shoulders or no paved shoulders, consider widening the shoulders and /or installing edgeline profile markings and / or edgeline rumble strips.
- Countermeasure 2.** Consider low cost safety improvements for horizontal curves and installing countermeasures for the outside of curves.
- Countermeasure 3.** Consider enhanced delineation of roadway curves and tangents.

The three countermeasures designed to reduce the number of vehicles leaving the roadway are summarized in **Table 54** which also provides information about the area of focus, timing, and performance measures.

**Table 54: Reduce the Number of Vehicles Leaving the Roadway: Summary of Proposed Countermeasures, Focus Area, Timing, and Performance Measures**

Countermeasure Description	State or County Focus Area	Timing of Implementation	Performance Measure(s)
Consider widening shoulders and /or installing edgeline profile markings and /or edgeline rumble strips for rural roads	High crash rural roadways	Year round	Length of treatment  Number of run-off road fatalities on treated roadways
Consider low cost improvements for horizontal curves and installing countermeasures for the outside of curves	Horizontal curves with high incidence of run-off crashes	Year round	Number of curves improved  Number of run-off road fatalities at treated curves
Consider enhanced delineation of roadway curves and tangents	Road segments with high incidence of run-off	Year round	Length of segments improved  Number of run-off road fatalities at treated segments

**12.4.3. Strategy: Minimize the Effects of Vehicles Leaving the Roadway**

The following countermeasures are proposed to minimize the effects of vehicles leaving the roadway:

- Countermeasure 1.** Improve the design of slopes and ditches to prevent rollovers.
- Countermeasure 2.** Coordinate with land owners and appropriate agencies to trim trees and / or remove trees to improve the roadside clear zone.
- Countermeasure 3.** Promote the education of designers and landscape architects regarding the importance and requirements of traversable roadsides, particularly in urban areas.
- Countermeasure 4.** Educate drivers on the dangers of driving while drowsy or distracted, and promote legislation that reduced the dangers of distracted driving.
- Countermeasure 5.** Educate drivers on the dangers of unsecured loads that could fall off and create obstacles for other drivers.
- Countermeasure 6.** Improve EMS response times for rural lane departure crashes.
- Countermeasure 7.** Establish a multi-disciplinary highway safety group that will identify cost effective countermeasures designed to minimize the effects of vehicles leaving the roadway in lane departure crashes. ADOT is currently developing a Highway Safety Issues Group (HSIG) to address this countermeasure. As HSIG becomes established, the group could be expanded to include other jurisdictions.

The seven countermeasures designed to minimize the effects of vehicles leaving the roadway are summarized in **Table 55** which also provides information about the area of focus, timing, and performance measures.

**Table 55: Minimize the Effects of Vehicles Leaving the Roadway: Summary of Proposed Countermeasures, Focus Area, Timing, and Performance Measures**

Countermeasure Description	State or County Focus Area	Timing of Implementation	Performance Measure(s)
Improve the design of slopes and ditches to prevent rollovers	Rural areas	Year round	Total length of treated segments  Number of fatalities per year on treated segments
Coordinate tree trimming / removal with other agencies to improve the roadside clear	Road segments with trees within the clear zone	Year round	Total length of segments with improved clear zones

<b>Countermeasure Description</b>	<b>State or County Focus Area</b>	<b>Timing of Implementation</b>	<b>Performance Measure(s)</b>
zone			
Promote the education of designers and landscape architects regarding traversable roadsides	Urban areas	Year round	Number of designers and landscape architects trained
Distracted and drowsy driving legislation and driver education	Statewide	Year round	Number of fatalities due to distracted and drowsy driving  Legislation developed
Educate drivers on the dangers of unsecured loads	Statewide	Year round	Number of lane departure fatalities attributed to debris from unsecured loads
Improve rural EMS response times	High crash rural areas	Year round	Improved EMS times
Expand HSIG to include other jurisdictions	Statewide	Year round	Group established and functional

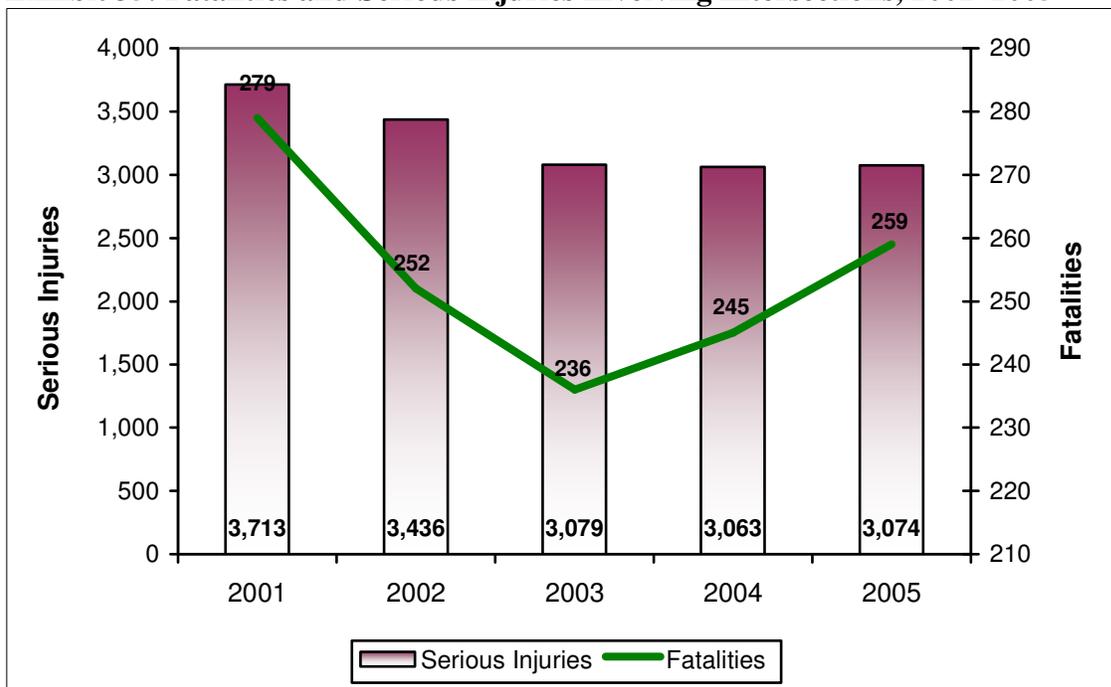
## 13. Emphasis Area 5: Roadway / Roadside – Intersections

### 13.1. Problem Statement – Intersections

In the five years from 2001–2005, there were 1,271 intersection related fatalities and 16,365 intersection related serious injuries.

**Exhibit 35** shows the number of fatalities and the number of serious injuries involving intersections in Arizona in each year from 2001–2005.

**Exhibit 35: Fatalities and Serious Injuries Involving Intersections, 2001–2005**



The number of intersection fatalities decreased from 279 in 2001 to 259 in 2005 (a decrease of 7 percent). There was a sharp dip in the number of intersection fatalities in 2003, but the number then rose again.

The number of intersection serious injuries decreased from 3,713 in 2001 to 3,074 in 2005 (a decrease of 17 percent).

**Table 56** shows that most intersection fatalities (75 percent) occur in urban rather than rural areas. Most serious injuries (85 percent) also occur in urban rather than rural areas.

**Table 56: Urban versus Rural Intersection Fatalities and Serious Injuries, 2001–2005**

Roadway	Serious Injuries	Fatalities	Total
Urban	85%	75%	80%
Rural	15%	25%	20%
<b>Totals</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

**Table 57** shows the total number of intersections fatalities by Arizona county from 2001–2005. The table also shows the breakdown by urban versus rural location within each county.

**Table 57: Urban versus Rural Intersection Fatalities by County, 2001–2005**

County	Total Fatalities by County	County Fatalities as % of Total for Arizona	Urban Fatalities by County	Urban Fatalities as % of County Total	Rural Fatalities by County	Rural Fatalities as % of County Total
Apache	5	0%	0	0%	5	100%
Cochise	38	3%	19	50%	19	50%
Coconino	12	1%	5	42%	7	58%
Gila	4	0%	2	50%	2	50%
Graham	6	0%	1	17%	5	83%
Greenlee	0	0%	0	0%	0	0%
Maricopa	847	67%	734	87%	113	13%
Mohave	31	2%	12	39%	19	61%
Navajo	13	1%	6	46%	7	54%
Pima	179	14%	118	66%	61	34%
Pinal	59	5%	22	37%	37	63%
Santa Cruz	3	0%	1	33%	2	67%
Yavapai	31	2%	19	61%	12	39%
Yuma	29	2%	17	59%	12	41%
La Paz	14	1%	0	0%	14	100%
<b>Totals</b>	<b>1,271</b>	<b>100%</b>	<b>956</b>		<b>315</b>	

Maricopa County accounts for 67 percent of all intersection fatalities. Pima County accounts for an additional 14 percent.

### 13.2. Sub-Goal Statement – Intersections

The sub-goal statement for intersections is: Reduce intersection fatalities by 15 percent from the 2007 level over the five year period from 2008–2012.

### 13.3. Strategy Development – Intersections

The data available to assist with strategy development are discussed under two headings:

1. Drivers, Vehicles, and Collision Manner (**Section 0**)
2. Seasonality (**Section 13.3.2**)

The data are then summarized (**Section 13.3.3**).

#### 13.3.1. Drivers, Vehicles, and Collision Manner

**Table 58** shows that most intersection fatalities are drivers (56 percent) rather than passengers (29 percent). Pedestrians account for 12 percent of intersection fatalities, and pedalcyclists account for 3 percent.

Most intersection related serious injuries are also drivers (62 percent) rather than passengers (30 percent). Pedestrians account for 4 percent of intersection related serious injuries, and pedalcyclists also account for 4 percent.

**Table 58: Intersection Fatalities and Serious Injuries by Casualty Type, 2001–2005**

Casualty	Serious Injuries	Serious Injuries %	Fatalities	Fatalities %
Driver	10,117	62%	706	56%
Pedestrian	729	4%	151	12%
Pedalcyclist	605	4%	40	3%
Passenger	4,914	30%	374	29%
<b>Totals</b>	<b>16,365</b>	<b>100%</b>	<b>1,271</b>	<b>100%</b>

**Table 59** shows that most intersection fatalities are males (66 percent). Intersection related serious injuries are split evenly between males (51 percent) and females (49 percent).

**Table 59: Intersection Fatalities and Serious Injuries by Gender, 2001–2005**

Gender	Serious Injuries	Serious Injuries %	Fatalities	Fatalities %
Female	8,065	49%	427	34%
Male	8,291	51%	844	66%
Unknown	9	0%		0%
<b>Totals</b>	<b>16,365</b>	<b>100%</b>	<b>1,271</b>	<b>100%</b>

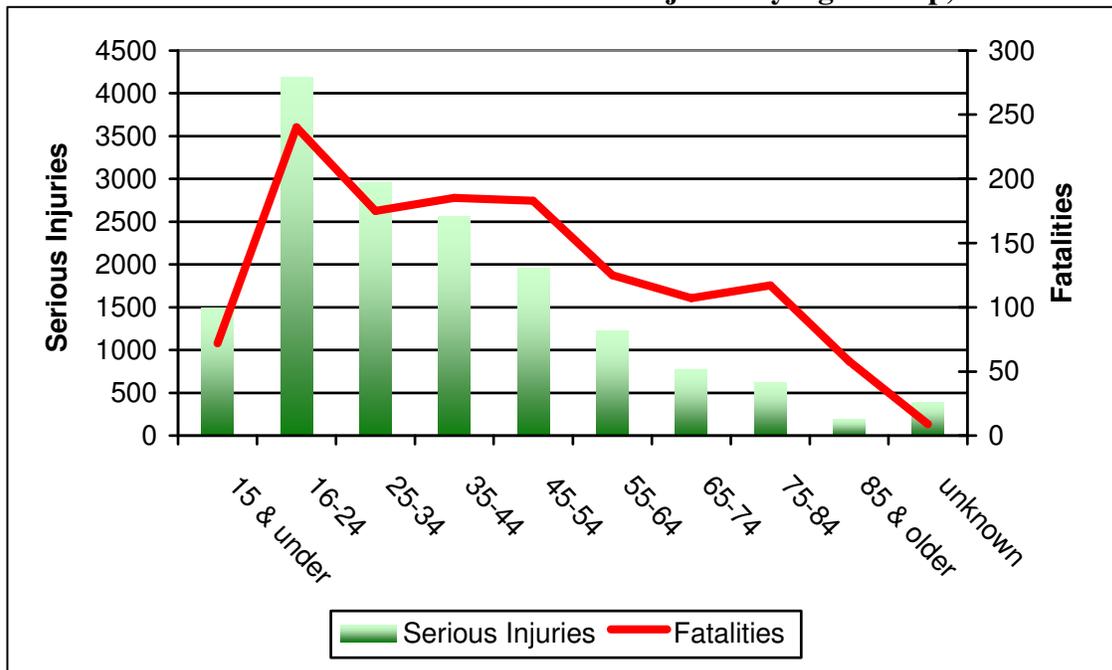
The age distribution for fatalities and serious injuries involving intersections is shown in **Table 60** and **Exhibit 36**. The 16-24 age group accounts for 19 percent of fatalities. The 25-34 and 35-44 age groups account for 14 percent and 15 percent of fatalities respectively. The 45-54 age group accounts for an additional 14 percent of the fatalities.

In the case of serious injuries related to intersections, the 16-24 age group accounts for 26 percent of serious injuries. The 25-34 and 35-44 age groups account for 18 percent and 16 percent of serious injuries respectively. The 45-54 age group accounts for an additional 12 percent of the serious injuries.

**Table 60: Intersection Fatalities and Serious Injuries by Age Group, 2001–2005**

Age Group	Serious Injuries	Serious Injuries %	Fatalities	Fatalities %
15 and under	1497	9%	72	6%
16-24	4190	26%	240	19%
25-34	2962	18%	175	14%
35-44	2566	16%	185	15%
45-54	1959	12%	183	14%
55-64	1224	7%	125	10%
65-74	769	5%	107	8%
75-84	618	4%	117	9%
85 and older	195	1%	58	5%
Unknown	385	2%	9	1%
<b>Totals</b>	<b>16,365</b>	<b>100%</b>	<b>1,271</b>	<b>100%</b>

**Exhibit 36: Intersection Fatalities and Serious Injuries by Age Group, 2001–2005**



**Table 61** analyzes intersection fatalities and serious injuries by the type of vehicle. Most intersection fatalities involve passenger cars (60 percent) and pick-up trucks (20 percent). Most intersection related serious injuries also involve passenger cars (73 percent) and pick-up trucks (19 percent). Motorcycles are involved in 18 percent of intersection fatalities and 7 percent of intersection related serious injuries.

**Table 61: Intersection Fatal and Serious Injury Crashes by Vehicle Type, 2001–2005**

Vehicle Type	Serious Injury Crashes %	Fatal Crashes %
Not Reported	0%	1%
Passenger Car	73%	60%
Pick-Up Truck	19%	20%
Truck Tractor	0%	0%
Bus (including school bus)	0%	0%
Motorcycle (two or three wheel)	7%	18%
Emergency Vehicle	0%	0%
Other Vehicle	1%	1%
	<b>100%</b>	<b>100%</b>

**Table 62** analyzes intersection fatalities and serious injuries by the type of collision. Angle, left turn, and single vehicle crashes account for the great majority of intersection fatalities and serious injuries. Angle crashes account for the largest group: 45 percent of the fatalities and 41 percent of the serious injuries. Left turn crashes account for the second largest group: 22 percent of the fatalities and 31 percent of the serious injuries. Single vehicle crashes account for 22 percent of the fatalities and 13 percent of the serious injuries. Rear end crashes account for 13 percent of the serious injuries.

**Table 62: Intersection Fatalities and Serious Injuries by Collision Manner, 2001–2005**

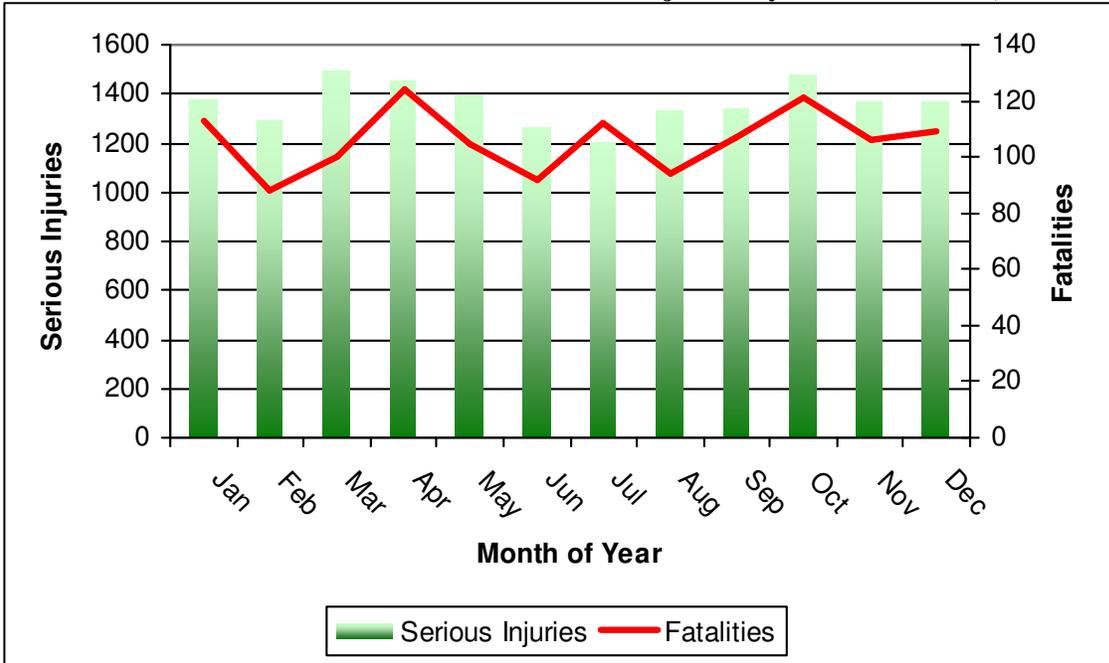
Collision Manner	Serious Injuries	Serious Injuries %	Fatalities	Fatalities %
Single Vehicle	2,122	13%	282	22%
Sideswipe (same)	246	2%	14	1%
Sideswipe (opposite)	50	0%	8	1%
Angle	6,686	41%	570	45%
Left Turn	4,992	31%	277	22%
Rear-End	1,750	11%	55	4%
Head-On	235	1%	28	2%
Backing	6	0%	0%	0%
Other	176	1%	32	3%
Non-Contact (mc)	2	0%	1	0%
Non-Contact (not mc)	7	0%	1	0%
U-Turn	93	1%	3	0%
	<b>16,365</b>	<b>100%</b>	<b>1,271</b>	<b>100%</b>

**13.3.2. Seasonality**

To assist in the timing of education and enforcement campaigns, the data on intersection fatalities and serious injuries were analyzed to determine whether intersection fatalities and serious injuries tend to occur at particular times (month, day, or time of day).

**Exhibit 37** shows that intersection fatalities and serious injuries occur throughout the year. The number of fatalities tends to peak slightly in April and October. The number of serious injuries tends to peak in March and October.

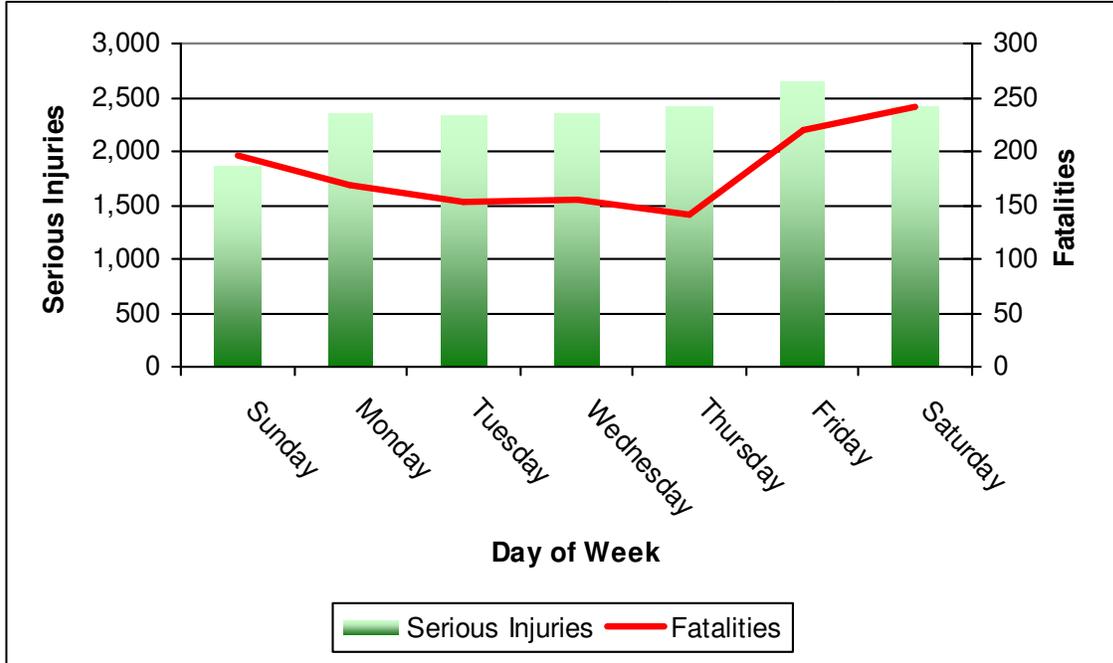
**Exhibit 37: Intersection Fatalities and Serious Injuries by Month of Year, 2001–2005**



**Exhibit 38** shows that intersection fatalities are most numerous on weekends and Fridays. The chance of an intersection fatality occurring increases by 88 percent from midweek (Tuesday, Wednesday, and Thursday) to Saturday.

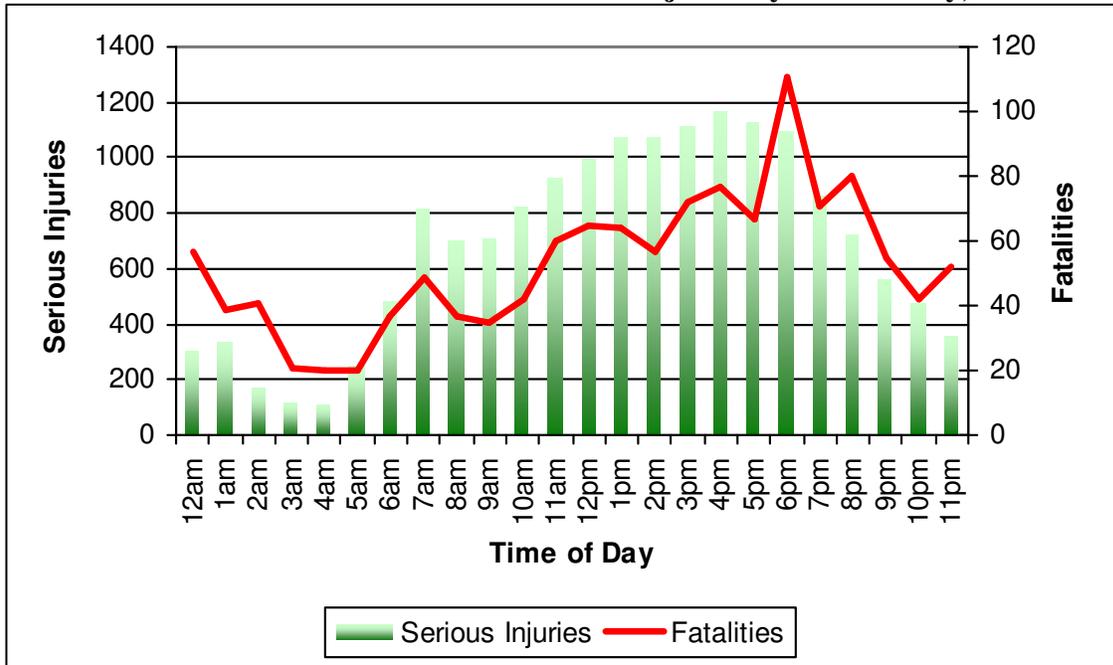
Intersection related serious injuries occur throughout the week, but tend to peak on Fridays and dip on Sundays.

**Exhibit 38: Intersection Fatalities and Serious Injuries by Day of Week, 2001–2005**



**Exhibit 39** shows that intersection fatalities build up each day from about 7:00am to a peak at 6:00pm. Serious injuries related to intersections also tend to build up each day. Serious injuries tend to peak at 4:00pm.

**Exhibit 39: Intersection Fatalities and Serious Injuries by Time of Day, 2001–2005**



### **13.3.3. Summary of Intersection Data**

The following list provides a summary of the intersection data presented in **Section 13:**

- There were 1,271 intersection related fatalities and 16,365 intersection related serious injuries in the five year period from 2001–2005.
- Fatalities related to intersections decreased from 2001–2005.
- Most fatalities occur in urban areas (75 percent).
- Maricopa County accounts for 67 percent of all intersection fatalities.
- Most fatalities related to intersection are drivers (56 percent) rather than passengers (29 percent).
- Pedestrians account for 12 percent of intersection fatalities.
- Pedalcyclists account for 3 percent of intersection fatalities.
- Most intersection fatalities are males (66 percent).
- People aged 16-24 account for 19 percent of intersection fatalities.
- People aged 25-34 and 35-44 account for 14 percent and 15 percent of fatalities respectively.
- Most intersection fatalities involve passenger cars (60 percent) and pick-up trucks (20 percent).
- Motorcycles are involved in 18 percent of intersection fatalities.
- Angle crashes account for 45 percent of intersection fatalities.
- Left turn crashes account for 22 percent of fatalities.
- Single vehicle crashes account for 22 percent of fatalities.
- Fatalities related to intersections occur throughout the year, and tend to peak slightly in April and October
- Fatalities related to intersections are most numerous on weekends and Fridays.
- Intersection fatalities build up each day from about 7:00am to a peak at 6:00pm.

### **13.4. Intersection Strategies and Countermeasures**

The following strategies are recommended to achieve the intersection goal. Strategies for both signalized and unsignalized intersections are presented in the following sections.

To assist with all of the following intersection strategies and countermeasures an Intersection Safety Action Plan should be developed by ADOT, to be shared with local and tribal governments. The plan will identify intersection safety problems, and recommend cost-effective and publicly acceptable strategies and countermeasures designed to reduce intersection fatalities and serious injuries.

#### **13.4.1. Strategy: Reduce the Number of Intersection Related Fatalities Through Improved Operations and Traffic Control**

The following countermeasures are proposed to reduce the number of intersection related fatalities through improved operations and traffic control.

- Countermeasure 1.** Evaluate the operation of signalized intersections by examining the timing, phasing, cycle time, and progression of signals.

**Countermeasure 2.** Improve the operation of pedestrian and bicycle facilities and promote the implementation of the Statewide Pedestrian Safety Action Plan

The two countermeasures designed to reduce the number of intersection related fatalities through improved operations and traffic control are summarized in **Table 63** which also provides information about the area of focus, timing, and performance measures.

**Table 63: Reduce the Number of Intersection Related Fatalities Through Improved Operations and Traffic Control: Summary of Proposed Countermeasures, Focus Area, Timing, and Performance Measures**

Countermeasure Description	State or County Focus Area	Timing of Implementation	Performance Measures
Evaluate the operation of signalized intersections	High crash / high capacity intersections	Year round	Number of intersections evaluated  Number of fatalities at evaluated intersections
Improve operation of pedestrian and bicycle facilities  Promote the implementation of the statewide pedestrian safety action plan	Intersections with high number of pedestrian and bicyclist fatalities	Year round	Number of intersections with improved pedestrian and bicycle operation  Statewide implementation of pedestrian safety action plan  Number of fatalities at evaluated intersections

**13.4.2. Strategy: Reduce the Number of Intersection Related Fatalities Through Improved Geometric Configuration**

The following countermeasures are proposed to reduce the number of intersection related fatalities through improved geometric configuration.

**Countermeasure 1.** Provide and improve channelization, signage, and signal operation for turning traffic.

**Countermeasure 2.** Improve sight distances at both signalized and unsignalized intersections. For example, remove parking that restricts sight distance, and clear sight distance triangles of shrubs and trees.

**Countermeasure 3.** Consider replacing signalized intersections with roundabouts, and promote the benefits of roundabouts in traffic safety.

The three countermeasures designed to reduce the number of intersection related fatalities through improved geometric configuration are summarized in **Table 64** which also provides information about the area of focus, timing, and performance measures.

**Table 64: Reduce the Number of Intersection related Fatalities Through Improved Geometric Configuration: Summary of Proposed Countermeasures, Focus Area, Timing, and Performance Measures**

Countermeasure Description	State or County Focus Area	Timing of Implementation	Performance Measures
Provide and improve channelization, signage, and signal operation for turning traffic	Intersections with high number of turning crashes	Year round	Number of intersections with improved turns Number of fatalities at treated intersections
Improve sight distance at intersections	Statewide	Year round	Number of intersections treated Number of fatalities at treated intersections
Consider replacing signalized intersections with roundabouts.  Promote the benefits of roundabouts in traffic safety	Signalized intersections	Year round	Number of converted signalized intersections Number of fatalities at treated intersections

**13.4.3. Strategy: Reduce the Number of Intersection Related Fatalities by Increasing Driver Compliance with Traffic Control Devices**

The following countermeasures are proposed to reduce the number of intersection related fatalities by improving driver compliance at intersections.

- Countermeasure 1.** Provide lighting to improve the visibility of unsignalized intersections during nighttime conditions.
- Countermeasure 2.** Consider installing advance warning traffic devices on rural unsignalized intersection approaches.
- Countermeasure 3.** Promote the use of automated enforcement devices at intersections to deter red light running and speeding. Develop and distribute educational / promotional materials on the role of automated enforcement technologies in intersection safety.
- Countermeasure 4.** Consider the use of speed feedback signs at intersections to inform drivers of their operating speeds.
- Countermeasure 5.** Ensure improved compliance with laws regarding running red-lights and stop-signs by using sustained enforcement based upon local enforcement experience and the latest data on crashes and fatalities.

The five countermeasures designed to reduce the number the intersection related fatalities by improving driver compliance at intersections are summarized in **Table 65** which also provides information about the area of focus, timing, and performance measures.

**Table 65: Reduce the Number of Intersection Related Fatalities by Increasing Driver Compliance with Traffic Control Devices: Summary of Proposed Countermeasures, Focus Area, Timing, and Performance Measures**

<b>Countermeasure Description</b>	<b>State or County Focus Area</b>	<b>Timing of Implementation</b>	<b>Performance Measure(s)</b>
Improve visibility of unsignalized intersections during nighttime conditions	High crash unsignalized intersections	Year round	Number of treated intersections  Number of fatalities at treated unsignalized intersections
Consider installing advance warning traffic devices on rural unsignalized intersection approaches	Rural high crash unsignalized intersections	Year round	Number of treated intersections  Number of fatalities at treated rural unsignalized intersections
Promote the use of automated enforcement devices and develop appropriate educational / promotional materials	High crash intersections	Year round	Number of treated intersections  Number of fatalities at treated intersections  Appropriate educational / promotional material developed and used
Consider the use of speed feedback signs	High crash intersections	Year round	Number of treated intersections  Number of fatalities at treated intersections
Ensure improved compliance with laws regarding running red-lights and stop-signs	High crash locations	Year round	Number of fatalities at intersections

**13.4.4. Strategy: Reduce the Number of Potential Conflicts at Intersections Through Improved Access Management**

Consider improved access management to reduce the number of access points adjacent to intersections. Access points usually lead to conflicts and speed differentials which have the potential for unsafe operating conditions, especially close to an intersection.

**Countermeasure 1.** Implement the access management plan being developed by ADOT.

**Countermeasure 2.** Promote the use of good access management strategies to local and tribal governments.

The two countermeasures designed to reduce the number of potential conflicts at intersections through improved access management are summarized in **Table 66** which also provides information about the area of focus, timing, and performance measures.

**Table 66: Reduce the Number of Potential Conflicts at Intersections Through Improved Access Management: Summary of Proposed Countermeasures, Focus Area, Timing, and Performance Measures**

<b>Countermeasure Description</b>	<b>State or County Focus Area</b>	<b>Timing of Implementation</b>	<b>Performance Measure</b>
Implement ADOT access management plan	Statewide	Upon completion of Plan	Plan developed and implemented
Promote use of access management strategies to local and tribal governments	Statewide	Year round	Local and tribal governments implementing good access management strategies

## 14. Emphasis Area 6: Data Improvement

As developing a SHSP is a data driven process, SAFETEA–LU requires States to have a functional crash data system that can be used to identify safety problems and to conduct countermeasure analyses. Data improvement is identified as an emphasis area in the SHSP because SAFETEA–LU requires the States to improve existing crash data by improving traffic records data collection, analysis capabilities, and integration with other sources of safety data.

The broad strategies for data improvement are:

- Improve the timeliness, accuracy, and completeness of data
- Improve uniformity, integration, and accessibility of data

Comprehensive and quality safety data are the lifeline of a SHSP. High quality, readily available data are essential to the quantification and understanding of a State’s safety picture. The data system must be able to provide answers to the “who, what, where, when and how” questions associated with every fatality and serious injury.

This Section of the SHSP introduces and discusses the TRCC Strategic Plan for Traffic Safety Data (**Section 14.1**), and outlines the role of the TRCC in the SHSP (**Section 14.2**).

The Section also briefly presents strategies for improving the data available for the SHSP’s five emphasis areas:

1. Restraint Usage (**Section 14.3**)
2. Young Drivers (**Section 14.4**)
3. Speeding (**Section 14.5**)
4. Impaired Driving (**Section 14.6**)
5. Roadway / Roadside (**Section 14.7**)

### 14.1. TRCC Strategic Plan for Traffic Safety Data

Arizona’s Traffic Records Coordination Committee (TRCC) was established on January 11, 2006 as a subcommittee of the Governor’s Traffic Safety Advisory Council (GTSAC). The TRCC is responsible for developing, approving, and implementing Arizona’s strategic plan for traffic records, and for ensuring that data are available to support federally funded traffic safety programs and programs funded by state and local sources. The objective is to provide quality safety data to support all traffic safety programs.

TRCC finalized *Arizona’s Strategic Plan for Traffic Safety Data* on May 30, 2006. The plan was approved by GTSAC on May 10, 2006. The plan identifies strategies and actions designed to address data and system deficiencies, and to provide quality data. The plan addresses existing deficiencies in the traffic safety information systems, and sets priorities for corrective action. The activities listed in the plan should improve the timeliness, accuracy, completeness, uniformity, integration, and accessibility of Arizona’s highway safety data.

The plan addresses the following traffic safety information systems:

- Crash information
- Roadway information
- Driver information
- Vehicle information
- Enforcement / adjudication information
- Injury surveillance information (CODES)

## **14.2. TRCC Role in the SHSP**

The TRCC has an important role to play in the implementation and evaluation of SHSP strategies. Detailed data queries will be required for the successful implementation of the strategies developed for the five emphasis areas (restraint usage, young drivers, speeding, impaired driving, and roadway / roadside), and for the successful evaluation of the strategies.

To support implementation, Arizona's crash data will be analyzed to identify the road network's high crash locations for each of the emphasis areas. The appropriate strategy listed in the SHSP will then be implemented to improve safety at the highway locations identified. For a proactive approach, locations with similar characteristics can also be identified and treated.

To support evaluation, the SHSP must be able to track all the resources used to implement the strategies, and must be able to monitor the performance measures listed for each strategy. It should be possible to monitor the effectiveness of the strategies by conducting up to the minute research into the results of the strategies. This is important for evaluating the strategies and for introducing appropriate modifications as required. All these implementation and evaluation issues are essential aspects of working towards Arizona's vision of Zero fatalities on the state's roads.

The TRCC will further support the SHSP's implementation and evaluation phases by addressing any deficiencies found in the data systems, including on-going assistance for local and tribal governments regarding collecting, maintaining, and analyzing crash data.

## **14.3. Data Requirements for Restraint Usage**

The following data requirements were identified for restraint usage during the development of individual strategies.

**Data Requirement 1.** Consideration of an improved system for determining restraint usage compliance across the state. The compliance rate for occupant restraint in Arizona must be determined as accurately as possible.

**Data Requirement 2.** Data suitable for identifying subpopulations (e.g. age groups, ethnic groups, gender) at particularly high risk of non use of restraints

**Data Requirement 3.** Data on restraint use suitable for localities interested in promoting local intervention programs

The data requirements for restraint usage are summarized in **Table 67** which also provides information about the area of focus, and the time when the data are required.

**Table 67: Restraint Usage Data Requirements: Summary of Proposed Data Requirement, Focus Area, and Timing**

Data Required	State or County Focus Area	Timing of Requirement
An improved system for determining restraint usage compliance across the State (for consideration)	State	Before and after data for evaluating effectiveness of strategies
Data on subpopulations at particularly high risk of non use	State	Before data
Data for the support of local intervention programs	Local	Before data

#### 14.4. Data Requirements for Young Drivers

The data requirements of young drivers are included in the strategies presented for the other emphasis areas.

Young drivers will be analyzed in two age groups:

1. 16-20 years old
2. 21-24 years old

#### 14.5. Data Requirements for Speeding

The following data requirements were identified for speeding during the development of individual strategies.

**Data Requirement 1.** Improved data and identification process for repeat speeding offenders

**Data Requirement 2.** Tracking of all speeding citations issued across the state

**Data Requirement 3.** Improve traffic records system(s) to provide patrol officers to immediately access a driver’s complete driving record and identify repeat (chronic) speeding offenders.

The data requirements for restraint usage are summarized in **Table 68** which also provides information about the area of focus, and the time when the data are required.

**Table 68: Speeding Data Requirements: Summary of Proposed Data Requirement, Focus Area, and Timing**

Data Required	State or County Focus Area	Timing of Requirement
Data and process for improving the identification of repeat speeding offenders	Statewide	Continuous
Statewide speeding citations	Statewide	Continuous
Enable patrol officers to immediately identify repeat (chronic) speeding offenders	Statewide	Traffic record system(s) improved to provide patrol officers immediate access to driver's records  Number of repeat offenders ticketed per year

### 14.6. Data Requirements for Impaired Driving

The following data requirements were identified for impaired driving during the development of individual strategies.

**Data Requirement 1.** Improved reporting of DUI crashes. This requirement includes ensuring that ALISS fatality numbers are aligned with the Fatality Analysis Reporting System (FARS).

**Data Requirement 2.** Tracking of all DUI citations issued across the state

**Data Requirement 3.** Improved identification process for repeat DUI offenders. It will be necessary to work with the court system to enhance the reporting of DUI convictions and to ensure access to data on DUI convictions and conviction rates. It will be necessary to design and implement a centralized statewide citation tracking system containing information about a citation's entire life cycle.

The data requirements for restraint usage are summarized in **Table 69** which also provides information about the area of focus, and the time when the data are required.

**Table 69: Impaired Driving Data Requirements: Summary of Proposed Data Requirement, Focus Area, and Timing**

Data Required	State or County Focus Area	Timing of Requirement
Improved reporting of DUI crashes. Aligning ALISS and FARS fatality numbers	Statewide	Continuous
Statewide tracking of DUI citations	Statewide	Continuous
Improved identification process for repeat DUI offenders	Statewide	Continuous

## 14.7. Data Requirements for Roadway / Roadside

The following data requirements were identified for roadway / roadside during the development of individual strategies.

**Data Requirement 1.** Support for the data requirements of a Fatal Crash Review Panel. This Panel would consist of representatives from all 4E areas, would formally investigate and analyze each fatality, and would develop strategies to prevent the reoccurrence of the fatality.

**Data Requirement 2.** Data on rural roads that are eligible for funding under the High Risk Rural Roads Program (HRRRP). It will be necessary to enlist the support of counties to identify the eligible roads.

**Data Requirement 3.** Consideration of an improved system for determining EMS response times to crashes in rural areas

The data requirements for restraint usage are summarized in **Table 70** which also provides information about the area of focus, and the time when the data are required.

**Table 70: Roadway / Roadside Data Requirements: Summary of Proposed Data Requirement, Focus Area, and Timing**

Data Required	State or County Focus Area	Timing of Requirement
Data requirements of a Fatal Crash Review Panel	Statewide	Comprehensive before and after crash data
Rural roads eligible for HRRRP funding	Rural roads	Data needed to establish HRRRP in Arizona
EMS rural response times (for consideration)	Rural roads	Before and after response times

## 15. Next Steps

### 15.1. Introduction to SHSP Implementation and Evaluation

As discussed in **Section 1.2.2**, the SHSP is a process made up of four basic cyclic phases, as shown in **Exhibit 40**:

- Phase 1.** Producing the Development Plan
- Phase 2.** Producing the Implementation Plan
- Phase 3.** Implementation
- Phase 4.** Evaluation and Updating (including Public Outreach)

This report addresses Phase 1 of the SHSP cycle. GTSAC will continue to coordinate the SHSP and will develop the details of Phases 2, 3 and 4 in the Fall of 2007. Phase 2 is scheduled to start in the Fall of 2007.

Phase 2, the SHSP Implementation Plan, and Phase 3, SHSP Implementation, are briefly introduced in **Section 15.2**. Phase 4, SHSP Evaluation and Updating is briefly introduced in **Section 15.3** which includes an introduction to the evaluation process (**Section 15.3.1**) and an introduction to the public outreach program requirement (**Section 15.3.2**).

**Exhibit 40: SHSP Four Basic Cyclic Phases**



## 15.2. SHSP Implementation Plan

The Implementation Plan (Phases 2 and 3 of the SHSP) will build on the findings and direction established by the emphasis area (EA) team members during Phase 1. The Implementation Plan will use Phase 1's safety performance data, strategies, and performance measures to develop specific safety actions.

Implementation will include identifying the specific locations where traffic fatalities and serious injuries are most severe as a basis for applying many of the proposed strategies and countermeasures. The Implementation Plan will also develop an action plan with a schedule of costs and estimated benefits. Where appropriate, the action plan will identify and incorporate existing safety plans or programs through which the Plan's safety actions will be implemented.

Each EA will have an EA safety action team. Ideally, the EA action teams will be made up of Phase 1 EA participants. Each EA action team will be under the leadership of a lead agency. Ideally, the lead agency will provide the Chair for the action team.

Each EA safety action team will have a number of actions / programs. Where an EA's actions / programs (e.g. the Young Driver Outreach Program) cross safety jurisdictions, a stakeholder action team (e.g. AAA, ADOT, GOHS, and SADD) will be identified to help develop and market the Implementation Plan's program. (The stakeholder action teams will continue to report to the appropriate assigned lead agency.)

At the broad level, the lead agency for each action / program will identify and champion the changes that must be made to current processes to:

- Integrate the SHSP process, goals, strategies, and actions with existing practice
- Integrate the Plan's performance measures into existing safety planning and programming processes

At the more detailed level, the lead agency or project manager responsible for each action / program will:

- Establish and manage the necessary action team
- Develop and confirm the project / action details, i.e. the what, where, when, how, cost, funding source(s), and performance measures<sup>33</sup>
- Use performance measures to track progress towards the EA sub-goals, and report back to GTSAC on:
  - implementation progress
  - post-implementation safety outcomes / impacts
  - challenges / issues.

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<sup>33</sup> The cost and affordability of emphasis area actions may dictate priorities and the timing of sub-goal achievement.

The information gathered will be used for internal and public outreach purposes. As SHSP implementation is a new process, appropriate reporting cycles will be determined during implementation.

- Coordinate efforts with other EA team leads to ensure consistency, and to encourage new partnerships and the sharing of new learning experiences. This sharing of experiences between EA action teams is critical to building the new SHSP safety culture as many existing organizations and agencies have similar programs and initiatives that will have to be complimentary to, or assimilated by, the SHSP recommendations and focus. Integration will develop over time as the new partnerships grow.
- Coordinate EA input for SHSP updates. As SHSP updating is a new process, SHSP updating frequency will be determined by considering implementation progress.

A public outreach program is also part of the Implementation Plan. The public outreach program is introduced in **Section 15.3.2**.

Due to the long-term cyclic nature of the SHSP process, the Implementation Plan will produce a calendarized activity plan that maps out ongoing SHSP work requirements, and the timing for the implementation, monitoring, evaluating, reporting and updating of the Plan. The calendar will enable GTSAC to assess the necessary human resource requirements, staff assignments, schedules, and milestones, and to address any organizational or reporting changes and modifications that may be required for GTSAC's existing subcommittee mandate structure.

The following GTSAC subcommittees should continue to operate as before, with minor adjustments:

- Road Safety Audit
- Photo Enforcement
- Traffic Records Coordinating Committee
- Legislation
- Communications – This subcommittee will likely need to be expanded to coordinate communications, marketing and outreach at both the macro SHSP level and the individual EA level. With multiple focus areas and multiple stakeholders, information accuracy and consistency will very important. The Communications subcommittee will also need to monitor and address any information cultural and linguistic sensitivities.

Other subcommittees would be transitioned over time to the new emphasis area action teams.

## 15.3. SHSP Evaluation and Updating

*“What gets measured gets done,” Peter F. Drucker*

Phase 4 of the SHSP is Evaluation and Updating. This Phase includes Public Outreach. The measurement and evaluation of progress, and the updating of the SHSP are essential. To ensure that Arizona is making steady progress towards its Every One Counts vision, GTSAC will develop an evaluation process (Section 15.3.1) and a public outreach program (Section 15.3.2).

### 15.3.1. Evaluation Process

Phase 4’s evaluation process will monitor, evaluate and report on the progress made by the SHSP safety action teams. The process will include an examination of the impact of the SHSP on existing plans and programs, and the integration of the SHSP process, goals and strategies into each safety partner’s planning and programming processes.

At this time, an annual evaluation and reporting cycle is envisioned. The cycle will be coordinated with the SHSP Development Plan (Phase 1), Implementation Plan and updates (Phases 2 and 3), and the SHSP Outreach program (Phase 4)).

An annual evaluation and reporting structure will enable GTSAC to market the success of its safety strategies and actions promptly. The approach will also enable the Council to re-direct efforts if the strategies or actions do not bring about reductions in the number of fatalities.

Evaluation will include tracking the quality of safety data available, tracking the accessibility of safety data, and ensuring the compatibility of data from diverse sources. Increased data collection from engineering, education enforcement, and EMS will enhance Arizona’s safety analysis capability, and will improve decision-making.

By tracking, evaluating, and reporting on safety goal progress, GTSAC will be able to determine when Arizona has achieved the first set of emphasis area goals, and when Arizona can introduce additional emphasis areas into the SHSP. In this way, Arizona will address the state’s safety challenges and will continue to move towards its Every One Counts vision.

### 15.3.2. SHSP Public Outreach

In addition to the specific emphasis area educational and outreach programs outlined in this report, the Implementation Plan will include a SHSP outreach program designed to engage Arizona citizens and visitors. GTSAC will develop the outreach program which will be managed by GTSAC’s communications subcommittee.

Key messages will need to be confirmed. General themes will include:

- Traffic fatalities are not acceptable, they can happen to you or to a loved one
- Safety is everybody’s business, everybody must play a role
- How you, the public, can set personal daily safety goals that may save a life

It is expected that the program would be introduced through a major event, for example, a Traffic Safety Week<sup>34</sup>, and that there would be quarterly or bi-annual public updates on upcoming actions and progress. An annual Traffic Safety Week could be considered as a way of keeping safety and Arizona's SHSP in the minds of the public.

Media for the SHSP outreach program would include: television, radio, newspaper, theater and cinema announcements; brochures; and a safety website. Introductory and follow-up surveys may be used to assess the public's interest, acceptance and participation.

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<sup>34</sup> The annual GTSAC Safety Event at the State capitol might also provide an opportunity for the public kick-off event. The 4<sup>th</sup> annual GTSAC Safety Event is scheduled for January 16, 2008.

## 16. Appendix A – Data Queries

Crash data from ADOT’s Accident Location Information Surveillance System (ALISS) were used to determine Arizona emphasis areas and strategies unless otherwise referenced. A summary of the data queries used is provided below. All the data refer to the five year period 2001–2005.

### Arizona Traffic Safety Trends

Description	Query
Traffic fatalities and serious injuries as a public health concern.	<i>Number of fatalities and cause of death 2000-2004, ages 1-39 years</i>  Data from Centers for Disease Control and Prevention, National Centers for Injury Prevention and Control
Arizona fatalities and serious injuries trends from 2001 to 2005.	<i>Number of annual fatalities and serious injuries for 2001-2005</i>
Arizona fatal and serious injury rates over five years (2001 to 2005).	<i>Number of annual fatalities and serious injuries per 100 MVT from 2001-2005</i>

### Queries for Restraint Usage

Description	General Query	Detailed Query
The number of fatalities and serious injuries resulting from crashes in Arizona involving not wearing seat belts. Seat belt usage or occupant protection comprised: <ul style="list-style-type: none"> <li>▪ Lap belt</li> <li>▪ Lap and shoulder</li> <li>▪ Passive belt</li> <li>▪ Passive and lap</li> <li>▪ Child restraint</li> </ul>	<p><i>Number of Fatalities and Serious injuries 2001-2005</i></p> <p><i>Without Restraint Usage (p.restraint_used not in (2,3,5,7,8); p.person_type in (1,4))</i></p> <p><i>Restraint used: Lap Belt (2), Lap and Shoulder, Child Restraint (5), Passive Belt (7), Passive and Lap (8)</i></p> <p><i>Person type: Driver (1), Passenger(4)</i></p>	<ul style="list-style-type: none"> <li>▪ Time of day</li> <li>▪ Day of week</li> <li>▪ Month of year</li> <li>▪ Weather</li> <li>▪ Gender (male or female)</li> <li>▪ Age</li> <li>▪ Location (rural or urban, county)</li> <li>▪ Driver or occupant</li> <li>▪ Manner of collision (single vehicle, sideswipe (same), sideswipe (opposite), angle, left turn, rear-end, head-on, backing, other, driveway / alley related, non-contact (mc), non-contact (not mc), and u-turn)</li> </ul>

**Queries for Young Drivers**

Description	General Query	Detailed Query
<p>The number of fatalities and serious injuries resulting from crashes in Arizona involving young drivers (age less than 25 years)</p>	<p><i>Number of Fatalities and Serious injuries 2001-2005</i></p> <p><i>Young Driver Involved (age less than 25 years)</i></p> <p><i>Person type:</i>  <i>Driver (1)</i>  <i>Passenger(4)</i></p>	<ul style="list-style-type: none"> <li>▪ <i>Time of day</i></li> <li>▪ <i>Day of week</i></li> <li>▪ <i>Month of year</i></li> <li>▪ <i>Weather</i></li> <li>▪ <i>Gender (male or female)</i></li> <li>▪ <i>Vehicle type (bus, emergency vehicle, motorcycle, other, passenger car, RV, taxi, truck, and pickup truck)</i></li> <li>▪ <i>Location (rural or urban, county)</i></li> <li>▪ <i>Driver or occupant</i></li> <li>▪ <i>Manner of collision (single vehicle, sideswipe (same), sideswipe (opposite), angle, left turn, rear-end, head-on, backing, other, driveway / alley related, non-contact (mc), non-contact (not mc), and u-turn)</i></li> </ul>

**Queries for Speeding**

Description	General Query	Detailed Query
<p>The number of fatalities and serious injuries resulting from crashes in Arizona due to speeding. Speeding comprised:</p> <ul style="list-style-type: none"> <li>▪ Speed too fast for conditions</li> <li>▪ Exceeded lawful speed</li> </ul>	<p><i>Number of Fatalities and Serious injuries 2001-2005</i></p> <p><i>Speeding (Violation in (2-speed too fast for condition; 3-exceeded lawful speed))</i></p> <p><i>Person type:</i>  <i>Driver (1)</i>  <i>Pedestrian (2)</i>  <i>Pedalcyclist (3)</i>  <i>Passenger(4)</i></p>	<ul style="list-style-type: none"> <li>▪ <i>Time of day</i></li> <li>▪ <i>Day of week</i></li> <li>▪ <i>Month of year</i></li> <li>▪ <i>Weather</i></li> <li>▪ <i>Gender (male or female)</i></li> <li>▪ <i>Age</i></li> <li>▪ <i>Vehicle type (bus, emergency vehicle, motorcycle, other, passenger car, RV, taxi, truck, and pickup truck)</i></li> <li>▪ <i>Location (rural or urban, county)</i></li> <li>▪ <i>Driver or occupant</i></li> <li>▪ <i>Manner of collision (single vehicle, sideswipe (same), sideswipe (opposite), angle, left turn, rear-end, head-on, backing, other, driveway / alley related, non-contact (mc), non-contact (not mc), and u-turn)</i></li> </ul>

**Queries for Impaired Driving**

Description	General Query	Detailed Query
<p>The number of fatalities and serious injuries resulting from crashes in Arizona involving impaired drivers. Impaired driving comprised:</p> <ul style="list-style-type: none"> <li>▪ Had been drinking</li> <li>▪ Appeared to be under influence of drugs</li> <li>▪ Ill-ability influenced</li> <li>▪ Physical impairment</li> <li>▪ Prescription drugs</li> </ul>	<p><i>Number of Fatalities and Serious injuries 2001-2005</i></p> <p><i>Impaired Driving (physical in (2-had been drinking, 3-appeared to be under influence of drugs, 4-ill-ability influenced, 6-physical impairment, 7-prescription drugs))</i></p> <p><i>Person type:</i>  <i>Driver (1)</i>  <i>Pedestrian (2)</i>  <i>Pedalcyclist (3)</i>  <i>Passenger(4)</i></p>	<ul style="list-style-type: none"> <li>▪ <i>Time of day</i></li> <li>▪ <i>Day of week</i></li> <li>▪ <i>Month of year</i></li> <li>▪ <i>Weather</i></li> <li>▪ <i>Gender (male or female)</i></li> <li>▪ <i>Age</i></li> <li>▪ <i>Vehicle type (bus, emergency vehicle, motorcycle, other, passenger car, RV, taxi, truck, and pickup truck)</i></li> <li>▪ <i>Location (rural or urban, county)</i></li> <li>▪ <i>Driver or occupant</i></li> <li>▪ <i>Manner of collision (single vehicle, sideswipe (same), sideswipe (opposite), angle, left turn, rear-end, head-on, backing, other, driveway / alley related, non-contact (mc), non-contact (not mc), and u-turn)</i></li> </ul>

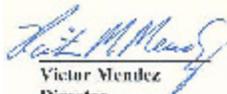
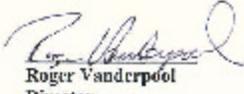
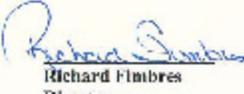
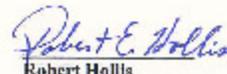
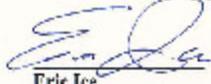
**Queries for Lane Departure**

Description	General Query	Detailed Query
<p>The number of fatalities and serious injuries resulting from lane departure crashes in Arizona. Lane departure crashes comprised:</p> <ul style="list-style-type: none"> <li>▪ Vehicle leaving the roadway</li> <li>▪ Crashes with fixed objects</li> <li>▪ Head-on and across-median crashes</li> </ul>	<p><i>Number of Fatalities and Serious injuries 2001-2005</i></p> <p><i>run_off_road = 1</i></p> <p><i>collision_manner in ('1' - sideswipe same, '2' - sideswipe opposite '6 - Headon)</i></p> <p><i>first_harmful - Collision with ('27'- tree, '28' - Boulder, '29' - Utility Pole, '30' - Luminaire, '31' - Traffic signal, '32' - Traffic sign, '33' - Median Barrier, '34' - Guard Rail, '35' - Fence, '36' - Bridge abutment, '37' - Traffic Barricade, '39' - Bridge culvert, '40' - Curb, '41' - Other Fixed Object)</i></p> <p><i>Person type:</i>  <i>Driver (1)</i>  <i>Pedestrian (2)</i>  <i>Pedalcyclist (3)</i>  <i>Passenger(4)</i></p>	<ul style="list-style-type: none"> <li>▪ <i>Time of day</i></li> <li>▪ <i>Day of week</i></li> <li>▪ <i>Month of year</i></li> <li>▪ <i>Weather</i></li> <li>▪ <i>Light Condition (not reported, daylight, dawn or dusk, darkness.)</i></li> <li>▪ <i>Gender (male or female)</i></li> <li>▪ <i>Age</i></li> <li>▪ <i>Vehicle type (bus, emergency vehicle, motorcycle, other, passenger car, RV, taxi, truck, and pickup truck)</i></li> <li>▪ <i>Location (rural or urban, county)</i></li> <li>▪ <i>Driver or occupant</i></li> <li>▪ <i>Manner of collision (single vehicle, sideswipe (same), sideswipe (opposite), angle, left turn, rear-end, head-on, backing, other, driveway / alley related, non-contact (mc), non-contact (not mc), and u-turn)</i></li> </ul>

**Queries for Intersection**

Description	General Query	Detailed Query
<p>The number of fatalities and serious injuries resulting from intersections crashes in Arizona.</p>	<p><i>Number of Fatalities and Serious injuries 2001-2005</i></p> <p><i>Intersection Related</i></p> <p><i>Person type:</i>  <i>Driver (1)</i>  <i>Pedestrian (2)</i>  <i>Pedalcyclist (3)</i>  <i>Passenger(4)</i></p>	<ul style="list-style-type: none"> <li>▪ <i>Time of day</i></li> <li>▪ <i>Day of week</i></li> <li>▪ <i>Month of year</i></li> <li>▪ <i>Weather</i></li> <li>▪ <i>Gender (male or female)</i></li> <li>▪ <i>Age</i></li> <li>▪ <i>Vehicle type (bus, emergency vehicle, motorcycle, other, passenger car, RV, taxi, truck, and pickup truck)</i></li> <li>▪ <i>Location (rural or urban, county)</i></li> <li>▪ <i>Driver or occupant</i></li> <li>▪ <i>Manner of collision (single vehicle, sideswipe (same), sideswipe (opposite), angle, left turn, rear-end, head-on, backing, other, driveway / alley related, non-contact (mc), non-contact (not mc), and u-turn)</i></li> </ul>

## 17. Appendix B – GTSAC Charter

<h1>CHARTER</h1>		
<b>GOVERNOR, STATE OF ARIZONA</b> <b>Honorable Janet Napolitano</b>		
<b>Executive Transportation Safety Committee</b>	<b>Governor's Traffic Safety Advisory Council</b>	
Arizona Department of Transportation Arizona Department of Public Safety Arizona Governor's Office of Highway Safety Federal Highway Administration Federal Motor Carrier Safety Administration	AAA of Arizona Arizona Driver & Safety Education Association Arizona County Sheriffs Association Arizona Police Chiefs Association Arizona Safe Kids Coalition Mothers Against Drunk Driving Students Against Destructive Decisions Inter Tribal Council of Arizona National Highway Traffic Safety Administration National Safety Council Professional Fire Fighters of Arizona Maricopa Association of Governments Pima Association of Governments	
<b>Mission:</b>	<b>Under direction of the Governor's Traffic Safety Advisory Council, develop, promote, and implement effective traffic safety strategies to save lives and prevent injuries through a reduction in motor vehicle crashes.</b>	
<b>Vision:</b>	<b>A role model in leadership for creating the safest transportation system in the country.</b>	
<p>Arizona's Transportation Safety Plan has been developed under the oversight of the Arizona Executive Transportation Safety Committee to reduce the number of lives lost, human suffering and the economic costs associated with motor vehicle crashes in Arizona. By signing this document the signatories agree to support the committee's mission and the Transportation Safety Plan for the State of Arizona.</p>		
 Victor Mendez Director ADOT	 Roger Vanderpool Director DPS	 Richard Fimbres Director GOHS
 Robert Hollis Division Administrator FHWA	 Eric Ice Division Administrator FMCSA	
<small>Revised and Signed 02/28/2007</small>		

# 18. Appendix C – Injury Severity by Posted Speed

Number of Crashes 2001 - 2005  
 Injury Severity by Posted Speed & (Estimated Speed - Posted Speed)  
 (v.unit\_number = 1)  
 Query: 7/19/07

posted speed	injury severity	Estimated Speed - Posted Speed											
		<=0	1_5	5_10	11_15	16_20	21_25	25_30	31_35	36_40	41_45	46_50	>=51
0	0 Not Reported	4	-	-	-	-	-	-	-	-	-	-	-
	1 No Injury	19,782	5,239	2,639	1,257	722	520	474	430	400	224	123	173
	2 Possible Injury	3,825	1,049	665	345	250	178	155	131	152	81	58	54
	3 Non-Incapacitating Injury	2,667	644	421	242	160	139	124	139	126	108	64	79
	4 Incapacitating	743	153	104	58	41	48	32	35	51	36	40	35
	5 Fatal	406	9	11	4	4	4	4	4	8	5	7	20
5	6 Unknown	7,206	83	52	36	34	45	39	31	31	23	15	34
	1 No Injury	349	33	18	11	38	13	32	36	31	4	3	7
	2 Possible Injury	67	11	6	3	7	7	10	14	9	1	-	-
	3 Non-Incapacitating Injury	33	5	-	1	1	3	5	4	4	2	-	-
	4 Incapacitating	7	3	1	-	1	-	1	1	-	-	-	1
	5 Fatal	2	-	-	-	-	-	-	-	-	-	-	-
10	6 Unknown	10	4	1	-	3	-	-	-	-	-	-	-
	1 No Injury	228	9	8	34	14	41	45	40	3	4	-	1
	2 Possible Injury	55	2	1	7	3	6	18	7	-	1	-	1
	3 Non-Incapacitating Injury	36	1	3	4	-	2	7	4	-	1	-	-
	4 Incapacitating	7	-	-	-	-	-	4	-	-	-	-	-
	5 Fatal	-	-	-	-	-	1	-	-	-	-	-	1
15	6 Unknown	14	2	4	4	4	-	2	1	-	-	-	-
	1 No Injury	1,547	70	110	89	79	67	31	12	8	6	2	3
	2 Possible Injury	218	26	25	15	13	19	16	2	1	-	-	1
	3 Non-Incapacitating Injury	156	9	18	20	15	11	3	7	1	1	1	-
	4 Incapacitating	40	5	9	5	3	3	5	1	-	2	-	1
	5 Fatal	1	-	1	1	1	-	-	-	-	1	-	-
20	6 Unknown	111	15	16	21	10	9	8	3	1	3	1	-
	1 No Injury	342	32	22	31	40	13	4	2	1	1	-	-
	2 Possible Injury	56	6	4	8	9	4	2	1	-	-	-	-
	3 Non-Incapacitating Injury	46	10	6	12	4	6	-	1	2	-	-	1
	4 Incapacitating	12	-	2	2	6	2	-	-	-	-	-	-
	5 Fatal	3	-	-	-	-	-	-	-	-	-	-	-
25	6 Unknown	23	5	2	1	4	1	1	-	1	1	-	1
	1 No Injury	48,323	2,011	1,731	1,288	597	413	126	123	43	42	19	31
	2 Possible Injury	8,676	473	420	315	166	113	31	35	8	8	5	8
	3 Non-Incapacitating Injury	6,658	529	481	426	220	215	46	60	25	17	7	13
	4 Incapacitating	1,912	155	158	151	105	96	31	38	21	11	4	13
	5 Fatal	163	16	17	25	15	16	8	14	8	5	1	6
30	6 Unknown	4,641	426	429	496	230	171	38	64	18	18	5	17
	1 No Injury	11,794	330	247	126	95	17	25	10	3	3	3	5
	2 Possible Injury	3,115	121	90	43	23	7	9	6	5	1	1	-
	3 Non-Incapacitating Injury	2,117	121	111	53	34	14	14	3	3	4	2	4
	4 Incapacitating	538	38	42	25	20	7	7	4	6	-	3	1
	5 Fatal	34	2	4	5	5	-	2	5	1	-	2	1
30	6 Unknown	328	27	34	18	30	7	6	-	3	1	1	2

Continued on next page...

posted speed	injury severity	Estimated Speed - Posted Speed											
		<=0	1_5	5_10	11_15	16_20	21_25	25_30	31_35	36_40	41_45	46_50	>=51
35	1 No Injury	62,424	1,441	720	454	175	155	52	48	25	18	5	18
	2 Possible Injury	19,577	619	313	225	69	64	19	24	9	8	4	6
	3 Non-Incapacitating Injury	11,859	619	352	273	76	92	33	38	7	14	3	15
	4 Incapacitating	3,442	221	145	117	59	58	32	28	6	13	-	7
	5 Fatal	224	27	26	32	16	18	14	7	6	6	4	6
	6 Unknown	1,171	91	78	106	27	44	11	19	5	5	2	1
40	1 No Injury	84,051	1,094	668	208	222	58	44	34	26	8	7	14
	2 Possible Injury	29,579	482	290	95	108	28	25	19	11	2	3	5
	3 Non-Incapacitating Injury	16,935	468	378	119	135	47	40	21	17	3	7	5
	4 Incapacitating	4,800	180	165	58	93	28	30	19	12	7	11	4
	5 Fatal	286	38	30	25	26	11	22	11	16	7	4	3
	6 Unknown	1,083	47	68	25	47	12	17	8	7	1	3	4
45	1 No Injury	76,235	1,128	534	377	173	90	50	43	16	12	4	17
	2 Possible Injury	22,479	442	217	157	79	49	19	16	4	5	1	6
	3 Non-Incapacitating Injury	14,350	446	267	203	94	69	38	27	8	10	2	5
	4 Incapacitating	4,719	182	110	94	53	58	32	29	14	10	1	11
	5 Fatal	466	34	31	31	22	28	13	15	12	12	1	7
	6 Unknown	1,421	60	32	63	16	18	8	15	4	2	2	6
50	1 No Injury	6,519	190	120	63	25	11	15	4	-	1	3	1
	2 Possible Injury	1,778	51	41	29	17	8	8	1	2	2	1	2
	3 Non-Incapacitating Injury	1,750	59	65	38	20	14	11	-	3	1	2	2
	4 Incapacitating	730	34	35	22	16	9	7	2	6	-	2	-
	5 Fatal	179	9	15	16	13	12	5	1	1	-	4	-
	6 Unknown	294	2	25	9	10	1	4	-	2	-	2	-
55	1 No Injury	31,582	1,531	786	318	123	68	18	14	4	10	-	3
	2 Possible Injury	8,029	384	286	101	41	19	6	18	1	4	-	2
	3 Non-Incapacitating Injury	5,204	369	310	158	65	46	12	10	1	7	1	-
	4 Incapacitating	1,402	116	85	56	35	16	8	10	3	7	1	-
	5 Fatal	356	31	27	19	14	9	5	7	2	7	-	1
	6 Unknown	639	28	22	10	11	9	2	3	-	1	-	-
60	1 No Injury	38	11	-	1	-	-	-	-	-	-	-	-
	2 Possible Injury	15	-	-	-	-	-	-	-	-	-	-	-
	3 Non-Incapacitating Injury	9	3	-	-	-	-	-	-	-	-	-	-
	4 Incapacitating	1	2	-	-	-	-	-	-	-	-	-	-
	5 Fatal	1	-	-	-	-	-	-	-	-	-	-	-
	6 Unknown	1	-	-	-	-	-	-	-	-	-	-	-
65	1 No Injury	29,796	791	244	107	34	28	3	12	1	3	-	2
	2 Possible Injury	6,115	183	76	38	10	5	4	5	-	1	-	1
	3 Non-Incapacitating Injury	5,380	247	140	68	16	14	3	14	1	2	-	2
	4 Incapacitating	1,547	84	69	35	11	12	-	8	1	-	-	-
	5 Fatal	495	27	33	17	13	6	2	4	-	-	-	1
	6 Unknown	549	13	7	4	5	-	-	-	-	1	1	-
70	1 No Injury	17	5	-	-	-	-	-	-	-	-	-	-
	2 Possible Injury	7	-	-	-	-	-	-	-	-	-	-	-
	3 Non-Incapacitating Injury	6	2	1	-	-	-	-	-	-	-	-	-
	4 Incapacitating	5	1	-	-	-	-	-	-	-	-	-	-
75	1 No Injury	12,660	291	52	13	4	10	1	-	-	-	-	-
	2 Possible Injury	1,817	65	10	1	-	2	-	-	-	-	-	1
	3 Non-Incapacitating Injury	3,414	130	42	19	1	6	1	-	-	-	-	1
	4 Incapacitating	1,310	66	25	14	1	5	1	1	-	-	-	-
	5 Fatal	606	32	12	14	1	5	1	2	-	-	-	-
	6 Unknown	318	4	-	2	1	-	-	-	-	-	-	-