TRANSPORTATION SYSTEM

TRANSPORTATION SAFETY AND SECURITY

SOUTHERN CALIFORNIA ASSOCIATION OF GOVERNMENTS

CONNECT SoCal

TECHNICAL REPORT

AS ADOPTED ON MAY 7, 2020

EXECUTIVE SUMMARY 1

INTRODUCTION 4

REGULATORY FRAMEWORK FOR SAFETY 8

EXISTING CONDITIONS SAFETY 10

ANALYTICAL APPROACH FOR SAFETY 25

SAFETY STRATEGIES 27

SAFETY NEXT STEPS 40

BEYOND 2045 41

EXISTING CONDITIONS SECURITY 42

ANALYTICAL APPROACH SECURITY 49

REGULATORY FRAMEWORK FOR SECURITY 52

SECURITY STRATEGIES 56

CONNECT SoCal

TECHNICAL REPORT

TRANSPORTATION SAFETY AND SECURITY

AS ADOPTED ON MAY 7, 2020

connectsocal.org

TRANSPORTATION SYSTEM

Transportation Safety and Security

EXECUTIVE SUMMARY

Policies, infrastructure and mode choice impact the safety of everyone who travels throughout the region on a daily basis. Traffic related fatalities and serious injuries are a critical and preventable public health and social equity concern in the Southern California Association of Governments (SCAG) region. Providing a safe transportation network is essential for the region to meet its economic, housing, environmental, equity and public health goals, and will require optimizing the existing system to strategically incorporate complete streets while supporting a range of other safety strategies.

On average, 1,500 people die, more than 5,200 are severely injured and 136,000 are injured on roadways throughout the SCAG region every year. These collisions are happening in communities all over the region, but 90 percent of collisions occur in urban areas and most collisions occur on local roads, not on highways. In fact, in the SCAG region, 65 percent of fatalities and serious injuries occur on less than 1.5 percent of the roadway network.

Traffic collisions also relate to congestion and, thus, involve greenhouse gas emission (GHG) due to bottlenecking and emergency management costs. Increased use of transit ridership, walking and biking is associated with a reduced number of collisions because the environment is safer for them to utilize; thus, as a domino effect, the urban footprint of these groups will increase and GHG will be reduced.

Safety is of particular concern to vulnerable roadway users including, children, older adults, people walking, people bicycling and people on scooters. These roadway users do not have the protections included in automobiles, and fatalities involving these users are more common when collisions occur. In recent years, trends for pedestrian and bicycle related collisions have shown an uptick since 2012. Infrastructure improvements support the reversal of this trend by creating safer streets that accommodate all modes. Reduction in speed limits helps manage the severity of impacts from higher speed collisions.

Efforts to implement safety improvements face both challenges and opportunities. For example, the growth of autonomous vehicles, as well as shared-mobility and e-mobility devices, pose both opportunities for increased mobility options and access, as well as potential risks for safety. Lack of data sets limits opportunities to understand the relationships between automation, shared-mobility and safety. On the bright side, many cities across the region plan to implement safety plans and strategies, as learned during SCAG's 2019 Traffic Safety Leadership Symposium and Workshop series, which was attended by approximately 270 city staff members and elected officials.

Since 2008, SCAG has integrated a Safety and Security approach into the Regional Transportation Plan and Sustainable Communities Strategy (RTP/SCS). Previous RTP/SCS plans have included information related to collisions in the SCAG region and identified strategies to increase and improve roadway safety. For Connect SoCal, SCAG identified the top three data-driven findings:

- Fatalities and serious injuries are mostly occurring on a subset of streets;
- Fatalities and serious injuries are increasing and are disproportionately impacting people walking and bicycling; and
- Fatalities and serious injuries are mostly occurring in areas with high concentrations of Disadvantaged Communities (DAC)* and Communities of Concern (COC).**

The strategies below can be applied to address the top three identified findings:

- Collaboration
- Education and Encouragement
- Information Generation and Data Sharing
- Investments in Infrastructure

*For reference, census tracts that have been identified by the California Environmental Protection Agency (Cal/EPA) as Disadvantaged Communities (DAC) in Senate Bill 535, are areas disproportionately burdened by and vulnerable to multiple sources of pollution.

**Census Designated Places (CDP) and the City of Los Angeles Community Planning Areas (CPA) that fall in the upper one-third of all communities in the SCAG region for having the highest concentration of minority population and low-income households are identified as Communities of Concern (COC).

Connect SoCal's approach aligns with California's Strategic Highway Safety Plan (SHSP). The SHSP is a comprehensive, statewide transportation safety plan, which provides a framework for reducing fatalities and serious injuries on all public roads, utilizing a Toward Zero Deaths (TZD) safe systems approach.

This report provides an in-depth discussion of existing conditions and strategies related to transportation safety and it provides strategies and a work plan to reach the Toward Zero Deaths goal.

Based on the new MAP-21 federal requirements, SCAG established regional safety targets which were submitted to the California Department of Transportation (Caltrans) in February 2020. The regional safety targets aim to reduce fatalities by a minimum of 3.03 percent and serious injuries by a minimum of 1.5 percent per year to reach the goal of TZD. When setting annual transportation safety goals and targets, SCAG followed the statewide framework to complete the analysis. This included considering the following actions:

- Aligning the plan with statewide goals;
- Utilizing a safe systems approach;
- Integrating data-driven decision making and performance measurements;
- Integrating considerations for public health, environmental justice and equity;
- Including analysis to identify vulnerable users that are disproportionately represented in deaths and severe injuries (such as pedestrians and bicyclists, and working class communities living and travelling in historically disinvested areas);
- Accounting for older drivers as the population ages; and
- Integrating strategies for transit and goods movement on highways and arterials.

This report provides guidance for local and county agencies to adopt and implement key strategies, arranged and categorized by transportation safety's four E's: Education, Enforcement, Evaluation, and Engineering, all explored through a lens of Equity.

With regards to security, catastrophic events like earthquakes, floods, fires, hazardous material incidents, dam failures, civil unrest, transportation incidents, tsunamis and terrorism can occur at any given moment in the SCAG region. The State of California has experienced 323 state proclaimed emergencies and 267 federally proclaimed disasters since the year 1950. While the threat of disasters cannot be eliminated, good planning can help minimize the impacts from disasters. Disaster incidents were highest between 2000 and 2009 when 59 people died and 885 people were injured between 2000 and 2009 in the State of California. The population tripled from 1950 to 2017, while the number of deaths resulting from disasters remained relatively within a narrow range. Within the SCAG region, the two most frequent disasters include floods (160 incidents since 1950) and fires (138 incidents since 1950).

While SCAG does not have a direct role as a first responder or emergency management, SCAG can play a role in:

- Providing a policy forum to help develop regional consensus and education on security policies and emergency responses.
- Assisting in expediting the planning and programming of transportation infrastructure repairs from major disasters.
- Leveraging projects and planning functions (including Intelligent Transportation System (ITS)) that can enhance or provide benefits to transportation security efforts and those responsible for planning and responding to emergencies.
  - Integrating security into the regional ITS architecture.
  - Becoming a central repository/mirror for regional geo-data that can be used for planning, training, response and relief efforts of law enforcement personnel and emergency responders.

INTRODUCTION

Connect SoCal prioritizes ensuring the safety and mobility of the region's residents, including drivers and passengers, transit riders, pedestrians, micro-mobility users and bicyclists. Every year in the SCAG region more than 1,500 people die, over 5,200 people are severely injured and more than 136,000 are injured in collisions. On average, there are 270 collisions occurring per day within the SCAG region, equaling roughly 99,000 per year. On any given day in Southern California, six people are killed by a car or a truck, most of which occur on local roadways. The problem is only getting worse: the number of pedestrians killed in crashes grew 50 percent between 2011 and 2016.

This report defines *safety* as the protection of persons and property from unintentional damage or destruction caused by a collision or natural events. A crucial aspect of any transportation system is to ensure the safety of people and goods throughout the course of travel. Transportation and law enforcement agencies at all levels understand the importance of providing a safe transportation system and have recognized ensuring safety as a primary strategy and responsibility.

While Connect SoCal and this report lay out a vision for improving safety across the region, the support of county and local agencies is needed to implement the projects and strategies. To support them, SCAG will continue to be a partner to these agencies by providing technical support and expertise through *Go Human* (SCAG's active transportation safety and encouragement campaign) and advocating for and facilitating access to additional safety resources.

PURPOSE

This report supports Connect SoCal by providing an in-depth discussion of current conditions and strategies related to transportation safety. The report serves as guidance for local and county agencies by providing information on existing conditions and the region's needs related to transportation safety. It also provides stakeholders with a framework for addressing the opportunities and challenges the region anticipates over the next 25 years with regards to safety. Since 2008, SCAG had integrated a Safety and Security approach into the RTP/SCS. Each plan has identified ways to better integrate and plan for safety into the regional transportation.

PLAN GOALS & OBJECTIVES

This report speaks directly to Connect SoCal's goals of creating healthier, safer and more sustainable communities. **TABLE 1** below includes the plan's goals and briefly summarizes how safety supports each one.

TABLE 1 Connect SoCal Safety and Security Goals

Goal	Safety and Security Connection
Improve mobility, accessibility, reliability, and travel safety for people and goods.	Improving safety and facilitating accessibility for all road users through a range of strategies and policies will result in fewer collisions, injuries and deaths in Southern California.
Enhance the preservation, security, and resilience of the regional transportation system.	Investments in infrastructure preservation directly correlates with and supports the reduction of fatalities and serious injuries. Moreover, a well preserved and resilient transportation system will provide better opportunities for safer and secure travel for users of all modes, especially for people walking and biking.
Support healthy and equitable communities.	Deaths and serious injuries as a result of collisions disproportionately impact disadvantaged communities (see Environmental Justice Technical Report), older adults, children and people walking and biking. Implementing safety strategies aims to support healthier and more equitable outcomes for these groups.
Increase person and goods throughput and travel choices within the transportation system.	Access to multiple efficient, and reliable transportation choices facilitate safety. Fewer collisions and accidents will result in a more efficient operation of our transportation system.

Source: SCAG

SCAG AND REGIONAL PLANNING

The Southern California Association of Governments (SCAG) metropolitan region includes 191 cities and six counties across 38,000 square miles. Currently, approximately 19 million people live in the SCAG region and demographic projections indicate that the region will grow by over 3.6 million people by 2045 (22,507,000 people). Population growth will bring new opportunities and challenges, including a rapidly aging population, new mobility and transportation innovations, shifts in employment and housing needs and travel behavior, and changes in the economy as a result of automation. Moreover, the region faces extensive challenges related to affordability, high rates of chronic diseases and health disparities, and the urgent and growing implications of climate disaster. Within these frameworks, the region plans to make significant investments in its transportation sector and plans to continue exploration around future land use patterns and development.

Based on a review of the projects included in the Federal Transportation Improvement Plan (FTIP), there are nearly 400 projects that are anticipated to result in safety benefits. Further, the programming for these projects is more than $5 billion (see **TABLE 2**). SCAG anticipates that with continued work with its Transportation Safety Working Group to develop a Regional Safety Strategy and High Injury Network, the region will continue to make progress towards investing in projects with safety benefits and achieving its annual safety targets.

Connect SoCal proposes a variety of safety investments to improve conditions throughout the region. The investments assume a variety of actions will be taken by cities, counties and other regional agencies to achieve the benefits achieved by the plan and have been informed by trends in funding, reviewing

TABLE 2 2016 RTP/SCS Safety Projects by County – FTIP (*Thousands)

County	Total Safety Projects	* Safety Projects Programming	* All Projects Programming	Total Projects	% of Total
Imperial	12	$11,287	$60,193	73	16
Los Angeles	232	$3,037,807	$19,382,656	936	25
Orange	36	$516,422	$3,007,022	180	20
Riverside	55	$1,311,227	$7,070,337	396	14
San Bernardino	25	$182,463	$4,006,990	265	9
Ventura	30	$187,597	$856,230	174	17
Various	2	$182,463	$184,686	7	29
Region Totals	392	$5,429,266	$34,568,114	2031	19

Source: SCAG, 2016 FTIP

countywide and local plans, and through the local input process. Current rates of funding and the speed of implementation will need to be accelerated to complete the proposed projects within Connect SoCal and secure the benefits outlined in the plan. This will require additional engagement with communities through programs like *Go Human* to build support for safety improvements to roadway networks. Please refer to the finance technical report for additional details on funding and investments for safety projects.

REGIONAL VISION – TRADITIONAL APPROACH VIS-À-VIS SAFE SYSTEMS APPROACH

Nationally, there are two main approaches for analyzing safety – a traditional approach and a safe systems approach. Traditional approaches to transportation safety prioritize reducing or preventing collisions, identifying crashes as the problem and human factors as the cause, and assigning responsibility to individual road users. The traditional safety approach utilizes incremental steps to reduce the problem, aiming for an optimum number of fatalities and serious injuries.

A safe systems approach refers to a transportation safety framework that utilizes systems thinking and science to create a transportation system that ensures that no crash results in death or serious injury. It utilizes an evidence-based, multidisciplinary view of the transportation system to develop a safe transportation system based on the needs of the road user. This approach accounts for interactions among all users including drivers, motorcyclists, passengers, pedestrians, bicyclists, and commercial and truck drivers.

The Collaborative Sciences Center for Road Safety (CSCRS) has identified four key principles of Safe Systems:

- Adapt the structure and function of the transportation system to the complexities of human behavior.
- Manage the kinetic energy transferred among road users.
- Treat road user safety as the foundation of all system interventions.
- Foster the creation of a shared vision and coordinated action.

A safe systems approach includes, but is not limited to the following safety programs:

- **Vision Zero –** Vision Zero is a strategy that aims to eliminate traffic fatalities and severe injuries, while increasing safe, healthy, equitable mobility for all. Vision Zero recognizes human error, and promotes roadway design and policy such that collisions that recognizes human error do not result in severe injury or death. Vision Zero recognizes that traffic deaths are preventable, and that reducing severe injury and death is not expensive.
- **Road to Zero (RTZ) –** RTZ aims to eliminate traffic fatalities by 2050, by combining three interrelated approaches: 1) Prioritize evidence based safety measures and coordinating a network to deploy them; 2) Accelerate Advanced Technology; and 3) Prioritize safety through fostering a safety culture and Safe Systems approach.
- **Toward Zero Deaths (TZD) –** TZD identifies strategies and tactics to reduce roadway fatalities for six emphasis areas: Drivers and Passengers, Vulnerable Users, Vehicles, Infrastructure, Emergency Medical Services, and Safety Management.

California is working toward a goal of Toward Zero Deaths. The State's goals are to reduce the number and rate of fatalities by 3.03 percent per year and to reduce the number and rate of severe injuries by 1.5 percent per year. The updated SHSP 2020-2024 includes 16 challenge areas (such as impaired driving, aggressive driving, etc.), which function as categories for improvement.

It should be noted that Caltrans is developing implementation plans for each of the challenge areas. The implementation plan will not be finalized until after this RTP/SCS is completed.

SCAG supports and embraces the efforts of the State and local jurisdictions to improve transportation safety. Ensuring the safety of people and goods that navigate the region's transportation network remains a priority for the state and the region.

ORGANIZATION OF THE REPORT

This Report addresses both safety and security. Both topics are addressed in the following sections that outline SCAG's safety and security analysis and data collection methodologies, including:

- **Regulatory Framework for Safety:** This section includes the Statutory Requirements, Statewide and Local Planning Efforts and SCAG's 2016 Plan and Progress.
- **Existing Conditions for Safety:** This section identifies the report's top findings that must be addressed to make daily travel safer for all people, as well as the primary collision factors, and an overview of the development and significance of the High Injury Network.
- **Analytical Approach for Safety:** This section addresses the approach taken in collecting data, public input, and outreach. SCAG has adopted the organizing framework from California's Strategic Highway Safety Plan and focuses the strategies around the 5 E's: engineering, enforcement, education, emergency response, and emerging technologies.
- **Safety Strategies:** This section identifies strategies and actions to address findings from the data analysis and align efforts with California's Strategic Highway Safety Plan, to help member agencies interested in pursuing safety initiatives and strategies at the local level, and to address actionable strategies that SCAG can support local jurisdictions with.
- **Safety Next Steps:** This section lays out next steps SCAG will initiate to continue enhancing safety in the SCAG region.
- **Existing Conditions for Security:** This section provides an overview of the disasters in the region and overall system statistics which relate to security.
- **Analytical Approach for Security:** This section addresses the approach taken by agencies which relate to security and regional preparedness and other emergency plans
- **Regulatory Framework for Security:** This section addresses FAST Act and MAP-21 (federal transportation legislation) requirements for security.
- **Security Strategies:** This section identifies security strategies.

LINK TO MAIN PLAN AND TO OTHER REPORTS

The Transportation Safety and Security Technical Report provides data for the several of Connect SoCal technical reports, which are described in more detail below. This technical report also uses data from the FTIP. Moreover, many of the topics included in this technical report are expanded upon in other technical reports for Connect SoCal. Please review the other technical documents for additional background and technical information. The plan is intended to be a resource for guidance and direction for local jurisdictions across the region. The report serves as a coordinated work plan for SCAG and local agencies' activities and strategies.

The Active Transportation Technical Report includes extensive information on how active transportation can help the region reduce greenhouse gas emissions through increased rates of walking and biking. The report also includes active transportation safety strategies and approaches.

The Demographics and Growth Forecast Technical Report includes extensive information on how the Southern California region is expected to grow and how the population will age. As people age, they become vulnerable road users and reliant on different modes of transportation. With the addition of over 3.6 million people, land use patterns will shift as additional housing is built and more job centers are created. This could create more opportunities for walking and biking across communities or it may further increase dependency on solo driving depending on how future land uses shape the region. This will in turn inform the strategies local jurisdictions explore to plan for safety.

The Emerging Technology Technical Report includes a detailed discussion of the projected impacts of new transportation technologies including scooters and bike-share. It also discusses the impacts that automation will have on the future transportation system which may impact safety outcomes.

The Environmental Justice Technical Report includes technical analysis related

to safety hazards for active transportation. The analysis identifies areas showing high concentrations of pedestrian and bicyclist involved collisions.

The Goods Movement Technical Report includes an in-depth discussion regarding freight traffic on all modes of the transportation system. Safety strategies must account for truck and delivery efforts.

The Performance Measures Technical Report details the plan's performance related to multiple metrics related to trip length, mode, safety, and health. In addition, it includes information on how each of these metrics is calculated and the data sources used.

The 2020 RTP/SCS project listing includes all planned projects for the next 25 years (2045). In addition, a financially unconstrained project listing is provided in the event that additional funding becomes available.

The Public Health Technical Report includes an extensive discussion on health equity and health disparities. Given the relationship between health disparities in disadvantaged communities and the relationship with safety outcomes, it is important to recognize deaths as a result of collisions as a public health crisis.

The Sustainable Communities Strategy Technical Report details a vision for how the region could grow over the next 25 years. Land use changes will directly impact the number of short trips, or trips on local roads, reflective of what kinds and where those trips occur.

The Transportation Finance Technical Report details the expected expenditures and revenues included in the plan. It includes additional detail on how revenues are expected to be spent on each mode over the course of the plan.

REGULATORY FRAMEWORK FOR SAFETY

SCAG is required to meet and follow federal and state statutes when developing the RTP/SCS. Within California, there are a variety of legislative and planning initiatives that will impact the future of transportation safety and security efforts across the region. This section includes a brief overview of the relevant legislation, guidelines and initiatives.

STATUTORY REQUIREMENTS

FEDERAL REQUIREMENTS

The Federal Highway Administration (FHWA) issued a Final Rule, effective April 14, 2016, to establish performance measures for state departments of transportation (DOTs) to carry out the Highway Safety Improvement Program (HSIP) as required by the Moving Ahead for Progress in the 21st Century Act (MAP–21). The Final Rule calls for State DOTs, working with Metropolitan Planning Organizations (MPOs), to establish targets for reducing the numbers and rates of transportation fatalities and serious injuries. Caltrans established vision-based statewide safety targets in August 2019 for the calendar year 2020. SCAG established regional targets for the year 2020 based on the State's methodology and submitted the targets to Caltrans in February 2020.

STRATEGIC HIGHWAY SAFETY PLAN

In 2019, the California Department of Transportation released an update to the Strategic Highway Safety Plan (SHSP). The SHSP is a federal requirement under MAP-21 (P.L. 112-141; 2012) and serves as a component of the HSIP. The SHSP is a comprehensive, data-driven effort that establishes targets and strategies for reducing serious injuries and fatalities on all public roads in California.

The development of SHSPs was initiated in 2005 following the enactment of the federal Safe, Accountable, Flexible, and Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU). With the enactment of subsequent legislation, MAP-21, the HSIP continues to serve as a core federal-aid program and states are required to develop, implement, evaluate and regularly update an SHSP. Additional requirements were mandated under MAP-21 to strengthen the overall SHSP, which include:

- Regular plan updates (at least every five years);
- Increased stakeholder involvement;
- Consideration of other safety factors (i.e., locations with risk factors, high-collision locations, rural roads and road safety audit findings)

when updating the SHSP;

- Integration with other state and regional transportation plans;
- Focus on use of proven effective strategies and countermeasures; and
- Identification of methods to evaluate the SHSP.

LOCAL ROAD SAFETY PLANS

While the SHSP is used as a statewide approach for improving roadway safety, a Local Road Safety Plan (LRSP) can be a means for providing local and rural road owners (e.g., cities and counties) with an opportunity to address unique highway safety needs in their jurisdictions while contributing to the success of the SHSP. The process of preparing an LRSP creates a framework to systematically identify and analyze safety problems and recommend safety improvements. Preparing an LRSP facilitates the development of local agency partnerships and collaboration, resulting in a prioritized list of improvements and actions that can demonstrate a defined need and contribute to the statewide plan. Future statewide HSIP Calls-for-Projects will require that applicants (e.g., local agencies) have prepared an LRSP (or its equivalent, such as a Systemic Safety Analysis Report or Vision Zero Action Plan) to receive funding. HSIP provides federal funding for safety-related infrastructure projects to local jurisdictions.

PERFORMANCE TARGETS FOR SCAG REGION

Calendar year 2020 is the third year for which safety targets are being established pursuant to the new requirements under MAP-21. SCAG had the option to agree to support the statewide targets, establish numerical targets specific to the region, or use a combination of both. SCAG supports the statewide targets and adopted SCAG-specific targets based on Caltrans' target setting methodology in February 2020. This allows SCAG to more accurately monitor its performance in relation to the State's targets going forward. Because targets will be updated annually, SCAG will have the opportunity to revisit and update its targets each calendar year.

TABLE 3 Forecasted Reductions

Measure	2016		2019		2020	
	Single Year SCAG Region	Baseline 5-Year Rolling Average SCAG Region	SCAG Targets	Caltrans Targets	SCAG Targets	Caltrans Targets
Number of Fatalities	1711	1461.8	1467	3445.4	1607	3518
Rate of Fatalities per 100 MVMT	1.04	0.95	0.89	0.995	0.96	1.023
Number of Serious Injuries	5913	5068	5552	12688.1	5735.61	13,740.40
Rate of Serious Injuries per 100 MVMT	3.59	3.18	3.366	3.661	3.42	3.994
Total Number of Non - Motorized	1993	1828.8	2133	3949.8	1915.98	4147.4

Source: SCAG, 2019
Note: In all cases, referring to victims, not collisions

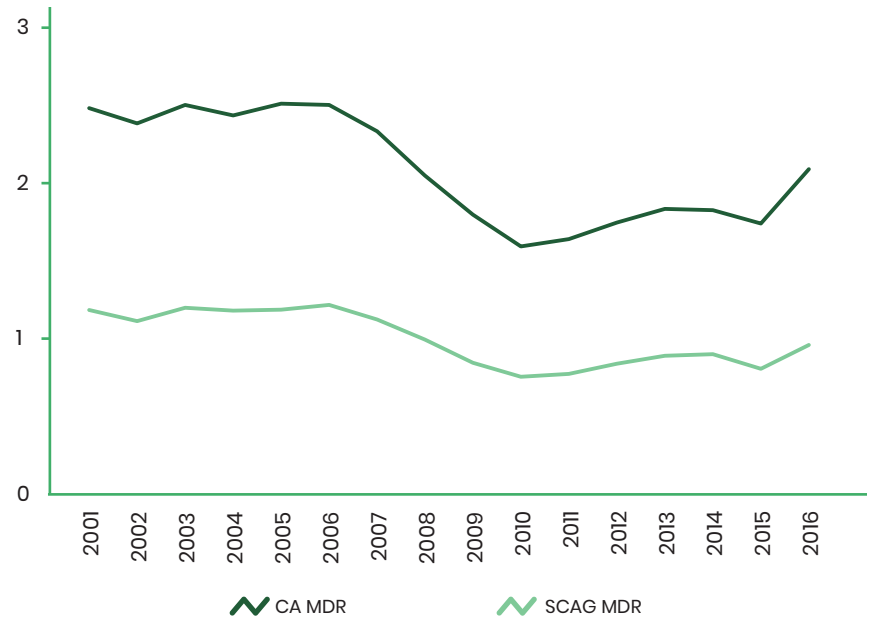
EXISTING CONDITIONS SAFETY

In 2016, more than 1,700 people died and nearly 5,800 were severely injured in traffic collisions in the SCAG region. On average, 280 collisions occur every day which is roughly 100,000 collisions a year. About 71 percent of the collisions occurred on local roads. The SCAG region has an extensive transportation system with more than 70,000 freeway and arterial lane-miles, as well as 3,900 miles of bikeways. The region had 14.9 million licensed drivers and 11.8 million registered vehicles as of 2016.

California has led the nation in roadway safety for much of the past 20 years. California's 2016 Mileage Death Rate (MDR) – fatalities per 100 million vehicle miles traveled (100 million VMT) is 1.13, slightly lower than the national MDR of 1.18. This time California has been above a rate of 1.0 as shown in **FIGURE 1.** This mileage death rate for California has been lower than 1.0 since 2008. The SCAG region has a fatality rate of 0.96 per 100 million VMT, which is lower than both the national and California fatality rate. There is a strong correlation between fatality rates and annual per capita vehicle miles traveled. States with higher vehicle miles traveled (VMT) typically also have higher per capita fatality rates, as the typical exposure to risk is increased.

The Statewide Integrated Traffic Reporting System (SWITRS) serves as the primary source for collecting collision data reflected within the California SHSP as well as for SCAG. Data collected for 2016 in the SCAG region is summarized in **TABLES 4-9** and **FIGURES 2-7.**

FIGURE 1 California and SCAG Mileage Death Rate



Source: Office of Traffic Safety (OTS)

TABLE 4 Traffic Fatalities in the SCAG Region (2016)

County	Driver Killed	Passenger Killed	Pedestrian Killed	Cyclist Killed	Motorcyclist Killed	Total Killed
Imperial	12	10	4	1	5	34
Los Angeles	322	147	286	40	143	847
Orange	70	29	67	12	45	205
Riverside	141	73	64	10	41	295
San Bernardino	143	49	65	5	38	272
Ventura	29	10	7	2	17	58
SCAG Region	717	318	493	70	289	1711

Source: SWITRS, 2016

TABLE 5 Traffic Injuries in the SCAG Region (2016)

County	Driver Injured	Passenger Injured	Pedestrian Injured	Cyclist Injured	Motorcyclist Injured	Total Injured
Imperial	465	282	16	19	26	783
Los Angeles	56,196	25,070	5,458	3,737	4,895	90,621
Orange	15,365	5,668	862	988	1,248	22,898
Riverside	10,149	9,562	492	369	864	20,589
San Bernardino	10,190	4,972	498	319	848	15,991
Ventura	4,076	2,408	236	275	295	7,013
SCAG Region	96,441	47,962	7,562	5,707	8,176	157,895

Source: SWITRS, 2016

TABLE 6 Traffic Fatalities Summary (2006 - 2016)

County	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Imperial	42	42	39	37	31	13	32	28	46	28	34
Los Angeles	801	759	715	589	568	542	628	630	644	661	847
Orange	210	193	162	154	106	140	153	185	174	185	205
Riverside	349	318	253	219	203	203	215	225	246	252	295
San Bernardino	397	354	290	236	221	240	244	264	281	262	272
Ventura	82	74	74	62	43	74	49	65	47	54	58
SCAG Region	1,881	1,740	1,533	1,297	1,172	1,212	1,321	1,397	1,438	1,442	1,711

Source: SWITRS, 2016

TABLE 7 Traffic Serious Injury Summary (2006 -2016)

County	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Imperial	100	86	79	62	64	64	74	58	68	69	56
Los Angeles	2942	3165	2785	2674	2345	2468	2573	2550	2555	2704	3215
Orange	715	687	682	619	615	647	686	710	688	755	817
Riverside	869	781	681	600	626	607	631	579	599	671	795
San Bernardino	912	837	726	618	619	582	608	629	605	689	720
Ventura	287	277	271	229	283	228	274	230	223	194	197
SCAG Region	5,825	5,833	5,224	4,802	4,552	4,596	4,846	4,756	4,738	5,082	5,800

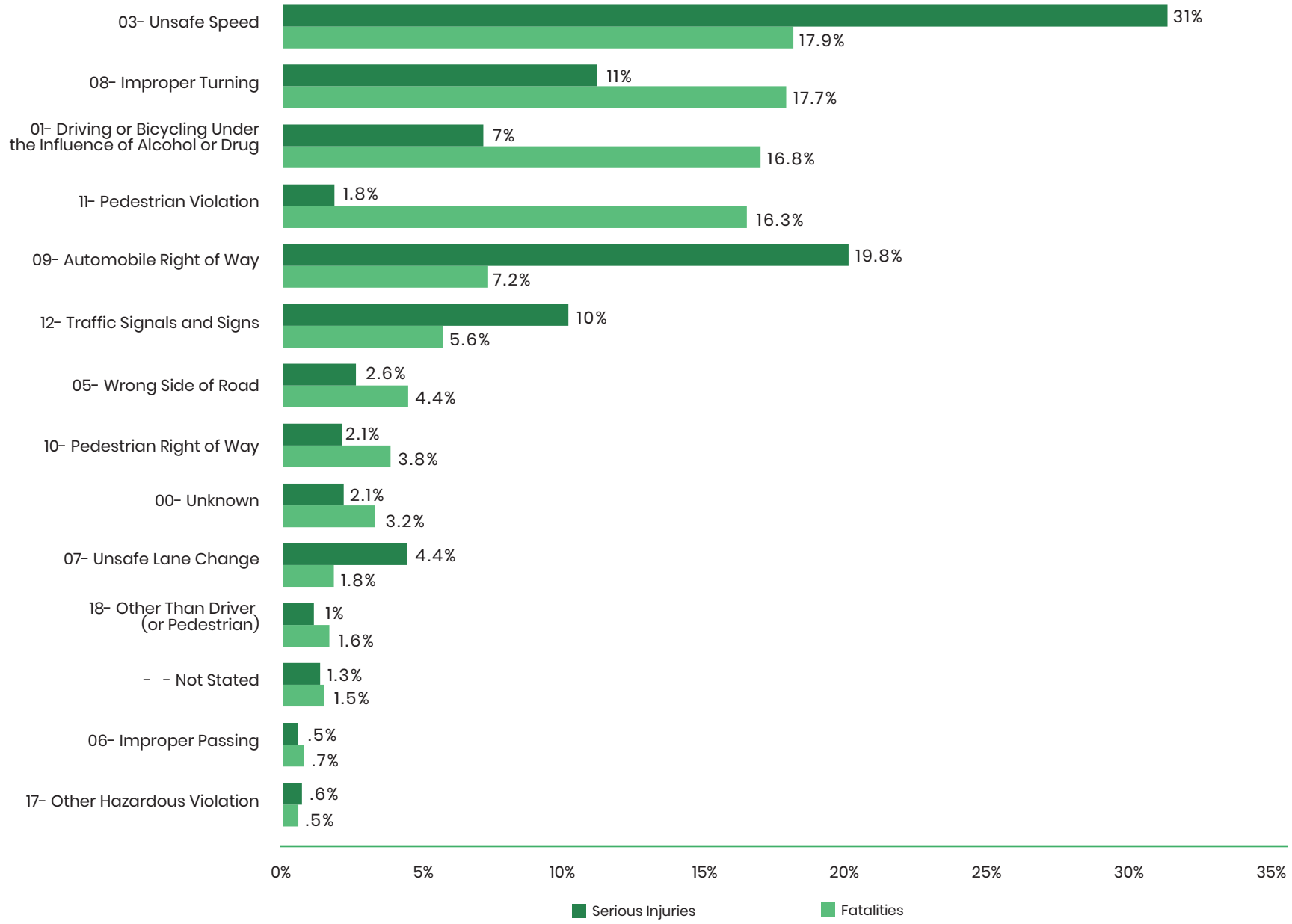
Source: SWITRS, 2016

TABLE 8 Traffic Injury Summary (2006–2016)

County	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Imperial	1,133	963	775	680	752	763	797	728	788	841	783
Los Angeles	83,941	82,480	74,893	73,107	71,866	72,056	72,451	73,123	75,039	81,777	90,621
Orange	21,671	20,082	18,891	18,735	19,043	19,323	20,072	19,804	19,699	21,266	22,898
Riverside	15,720	14,601	12,564	11,705	11,298	10,727	10,945	10,760	11,146	13,071	15,256
San Bernardino	16,628	15,090	12,571	11,735	11,764	11,382	11,844	12,177	13,179	14,539	15,991
Ventura	5,965	5,562	5,280	4,747	4,932	4,730	5,195	4,563	4,070	4,105	5,749
SCAG Region	145,058	138,778	124,974	120,709	119,655	118,981	121,304	121,155	123,921	135,599	151,298

Source: SWITRS, 2016

FIGURE 2 SCAG Region - Percent of Fatalities and Serious Injuries by Primary Collision Factor



Source: SWITRS, 2016

THE ECONOMIC AND SOCIAL COSTS OF COLLISIONS IN THE SCAG REGION

Fatalities and serious injuries in the SCAG region were on a downward trend beginning of 2008 but began rising in 2012 and continued on an upward trend through 2016. Fatalities increased by 29 percent between 2012 and 2016, whereas serious injuries increased by 32 percent between 2012 and 2016. While much of the growth in fatalities and injuries can be attributed to the growth in vehicle miles traveled, it represents an unacceptable personal burden on those involved. There is also a regional burden in lost productivity, increased traffic congestion and pollution.

The National Safety Council reports that the calculable costs of motor-vehicle crashes are wage and productivity losses, medical expenses, administrative expenses, motor vehicle damage, and employers' uninsured costs. The average costs for each traffic death, traffic injury or property damage crash in 2015 were:

- Death - $1,542,000
- Disabling - $90,000
- Property damage only (cost per vehicle) - $4,200

The above costs do not include the social or human costs of collisions, which are not easily quantifiable. These include but are not limited to, quality of life loss, emotional suffering, and effect on the individual and families.

While the California SHSP focuses on activities at the state level, local governments can supplement these activities to provide additional benefits.

TOP THREE FINDINGS

SCAG analyzed crash data for the region, including a data-driven methodology and a focuses on the areas with the greatest need. The top 3 findings identified below are based on geography, demographics, and vulnerability.

1. Fatalities and serious injuries are mostly occurring on a subset of streets.
2. Fatalities and serious injuries are increasing and are disproportionately impacting people walking and bicycling.
3. Fatalities and serious injuries are mostly occurring in Disadvantaged Communities (DAC) and Communities of Concern (COC).

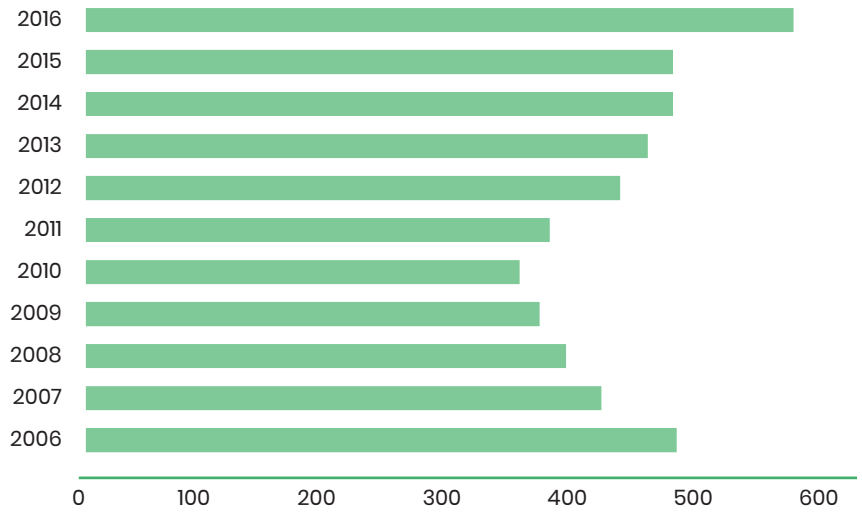
FATALITIES AND SERIOUS INJURIES ARE MOSTLY OCCURRING ON A SUBSET OF STREETS

- Between 2012 and 2016, 68 percent of fatalities and serious injuries in the region have occurred on local streets and arterials and 32 percent fatal and serious injuries have occurred on state highways.
- 65 percent of fatalities and serious injuries have occurred on less than 1.5 percent of the roadway network.
- 66 percent of the High Injury Network is in disadvantaged communities.

FATALITIES AND SERIOUS INJURIES ARE INCREASING AND ARE DISPROPORTIONATELY IMPACTING PEOPLE WALKING AND BICYCLING

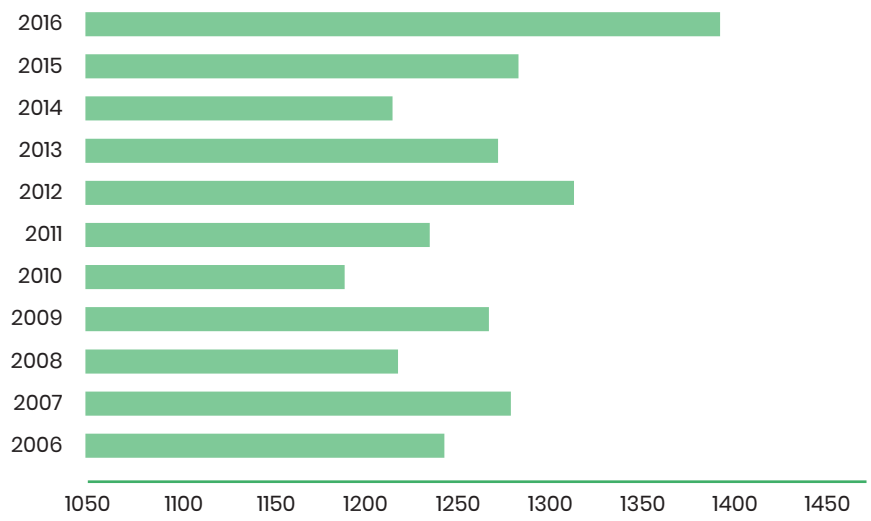
- About 72 percent of those killed in traffic collisions in 2016 were in vehicles or on motorcycles, while the remaining 27 percent were walking or bicycling.
- Only about 12 percent of all daily trips are made via walking or biking, so people walking or biking are overrepresented in injury data because they are more vulnerable.
- Pedestrian fatalities, after a brief period of annual declines, have increased each year since 2012 and are now 50 percent higher in 2016 than they were in 2011, the most recent low point. The number of pedestrians sustaining serious injuries has also recently increased from a recent low of 878 in 2011 to a high of 1,046 in 2016, an 18 percent increase.
- The numbers of both pedestrians and motorcyclists killed are the highest they have been for more than a decade

FIGURE 3 SCAG Region - Non Motorized Fatalities



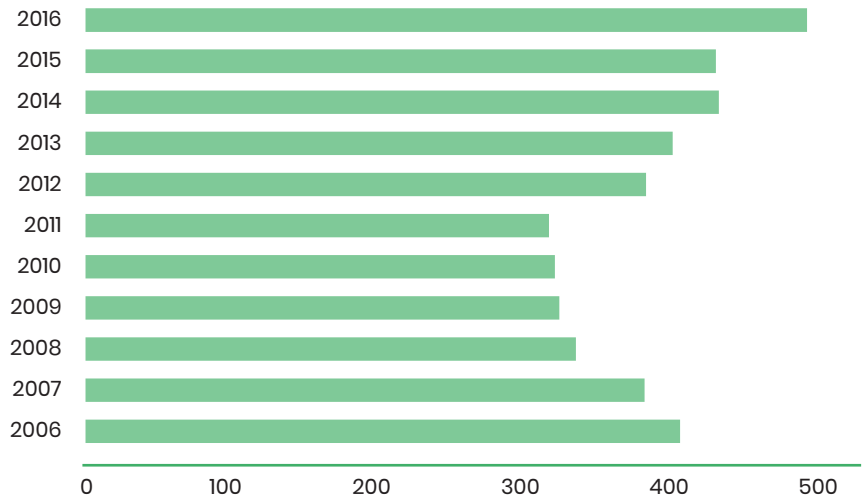
Source: SWITRS, 2016

FIGURE 4 SCAG Region - Non Motorized Serious Injuries



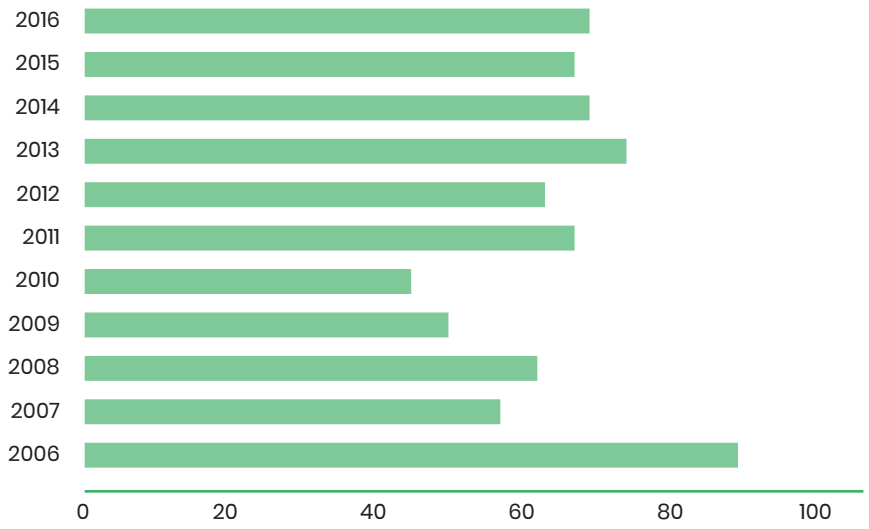
Source: SWITRS, 2016

FIGURE 5 Pedestrian Fatalities 2006-2016



Source: SWITRS, 2016

FIGURE 6 Bicycle Fatalities 2006-2016

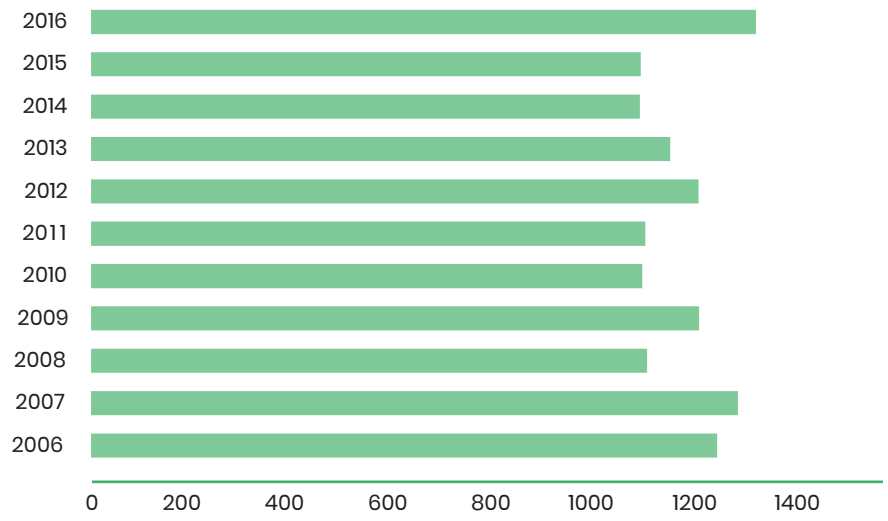


Source: SWITRS, 2016

FATALITIES AND SERIOUS INJURIES ARE MOSTLY OCCURRING IN DISADVANTAGED COMMUNITIES (DAC) OR COMMUNITIES OF CONCERN (COC)

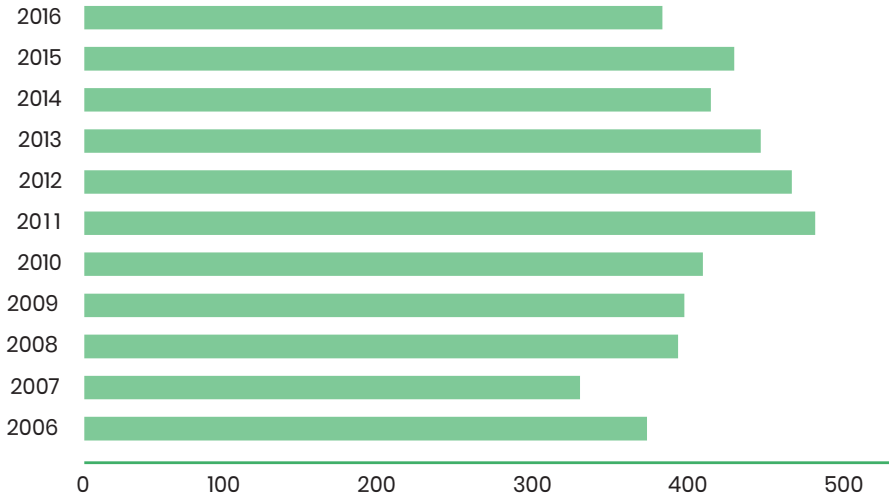
- On average between 2012 and 2016, 1,500 people are killed, 5,200 are seriously injured, and 136,000 are injured in traffic collisions each year in Southern California. SCAG, like California and the nation, experienced a period of annual declines in traffic-related fatalities until 2012 when they began to steadily rise. Although the region has experienced recent increases, overall, fatalities have declined by 16 percent, from a high of nearly 1,900 in 2006 to 1,580 in 2016. The trends are continuing to increase based on 2017 and 2018 data which is also reflected at a statewide level.
- The historical rates of fatalities and serious injuries per 1,000 people since 2001 and vehicle miles traveled have downward trends, with recent upticks that parallel those of the state.
- About 10 percent of all traffic collision victims and 5 percent of fatal collision victims are under the age of 18 (about 24 percent of the region's population) and 9 percent of all traffic collision victims and 16 percent of all fatal collision victims are 65 and older (they make up about 12 percent of the region's population).
- 66 percent of the High Injury Network is in the disadvantaged communities in the SCAG region.

FIGURE 7 Pedestrian Serious Injuries 2006-2016



Source: SWITRS, 2016

FIGURE 8 Bicycle Serious Injuries 2006-2016



Source: SWITRS, 2016

REGIONAL HIGH INJURY NETWORK

To identify where most of the collisions are occurring, SCAG created a High Injury Network (HIN) at a regional scale. High Injury Networks include stretches of roadways where the highest concentrations of collisions occur on the transportation network. The HIN is intended to show where fatal and serious injury collisions are occurring in the region and is not an assessment of whether a street or location is dangerous. A HIN suggests which corridors within a transportation network carry a higher risk of injury.

Through case studies from the City of San Francisco, City of Los Angeles, Oregon Metro and Portland Bureau of Transportation, SCAG developed a methodology to map a High Injury Network for the region. When developing an HIN, jurisdictions typically want to identify a subset of the network where the most collisions are occurring (>50 percent). Developing an HIN can prove helpful for a variety of reasons, including:

- Determining geographic areas where crashes are concentrated and the causes of these crashes, so that efforts can be focused on the most challenging areas and crash factors.
- Strengthening collaboration to focus street improvements and education campaigns (e.g., *Go Human*) along the HIN.
- Prioritizing investments within these areas to reduce collisions.

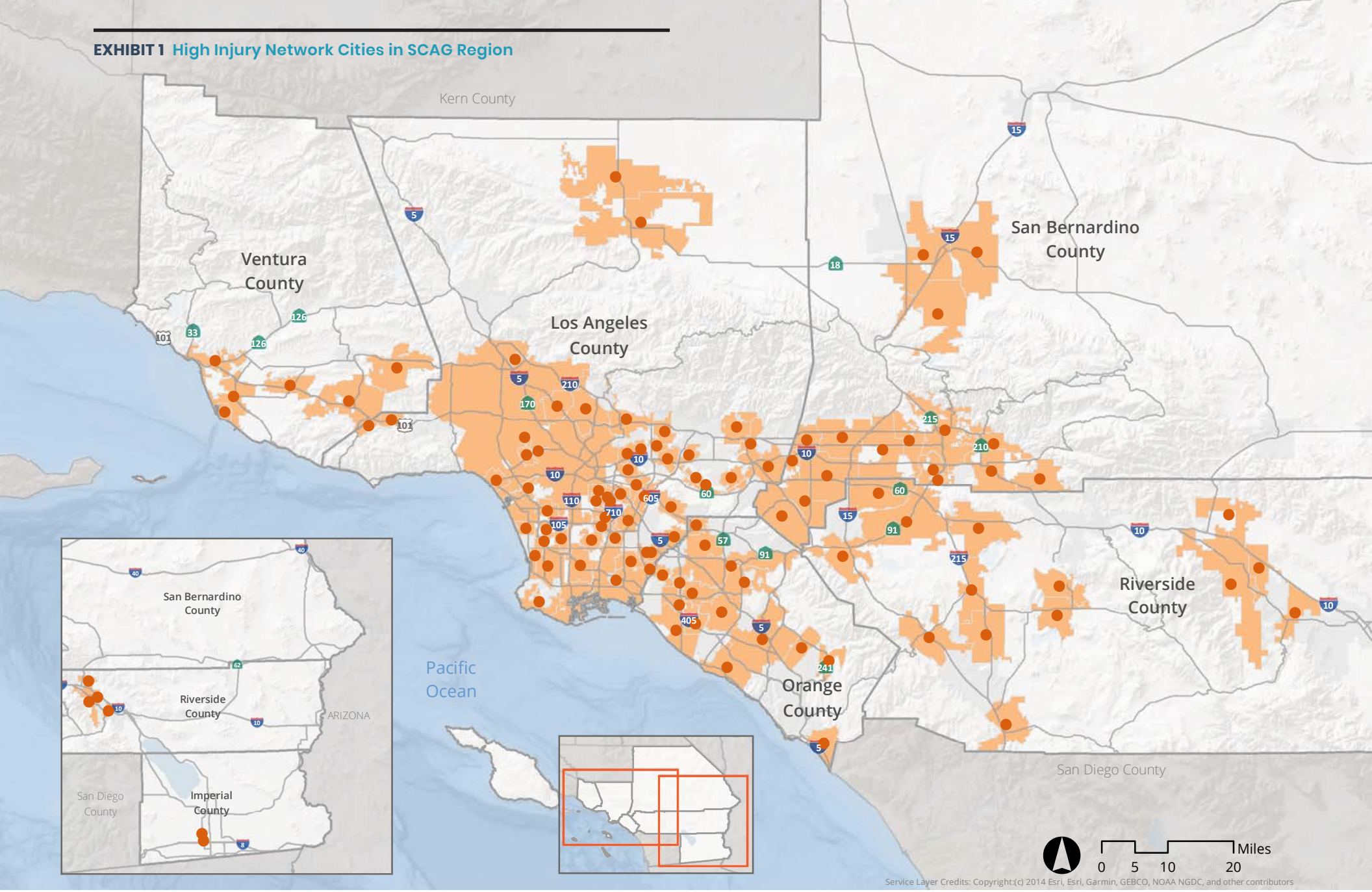
EXHIBIT 1 identifies the High Injury Network for the SCAG region by modes.

Although SCAG's Regional Safety Existing Conditions Report provides crash rates at the regional and county levels, the High Injury Network is not normalized by VMT or by population, as would be done to create crash rates. The High Injury Network crash scores are purposefully not normalized by VMT or population because the intent was to identify corridors with the highest concentrations of serious injury and fatal crashes, compared to the rest of the county, no matter the number of VMT or population. This intent is tied directly to achieving the region's Toward Zero Deaths-related safety targets and to help local jurisdictions focus on improvements where they are most needed.

SCAG identified cities in the region which are a part of SCAG's HIN. SCAG aims to work closely with these cities to identify safety concerns, reduce fatalities and serious injuries, and in turn achieve the region's safety targets. The map identifies the cities on SCAG's HIN. While developing HIN at a regional level helps in identifying cities in the SCAG region, it is recommended that cities develop a High Injury Network at the city level to identify concentrations of collisions.

Details on High Injury Network mapping are provided in **APPENDIX 1.**

EXHIBIT 1 High Injury Network Cities in SCAG Region

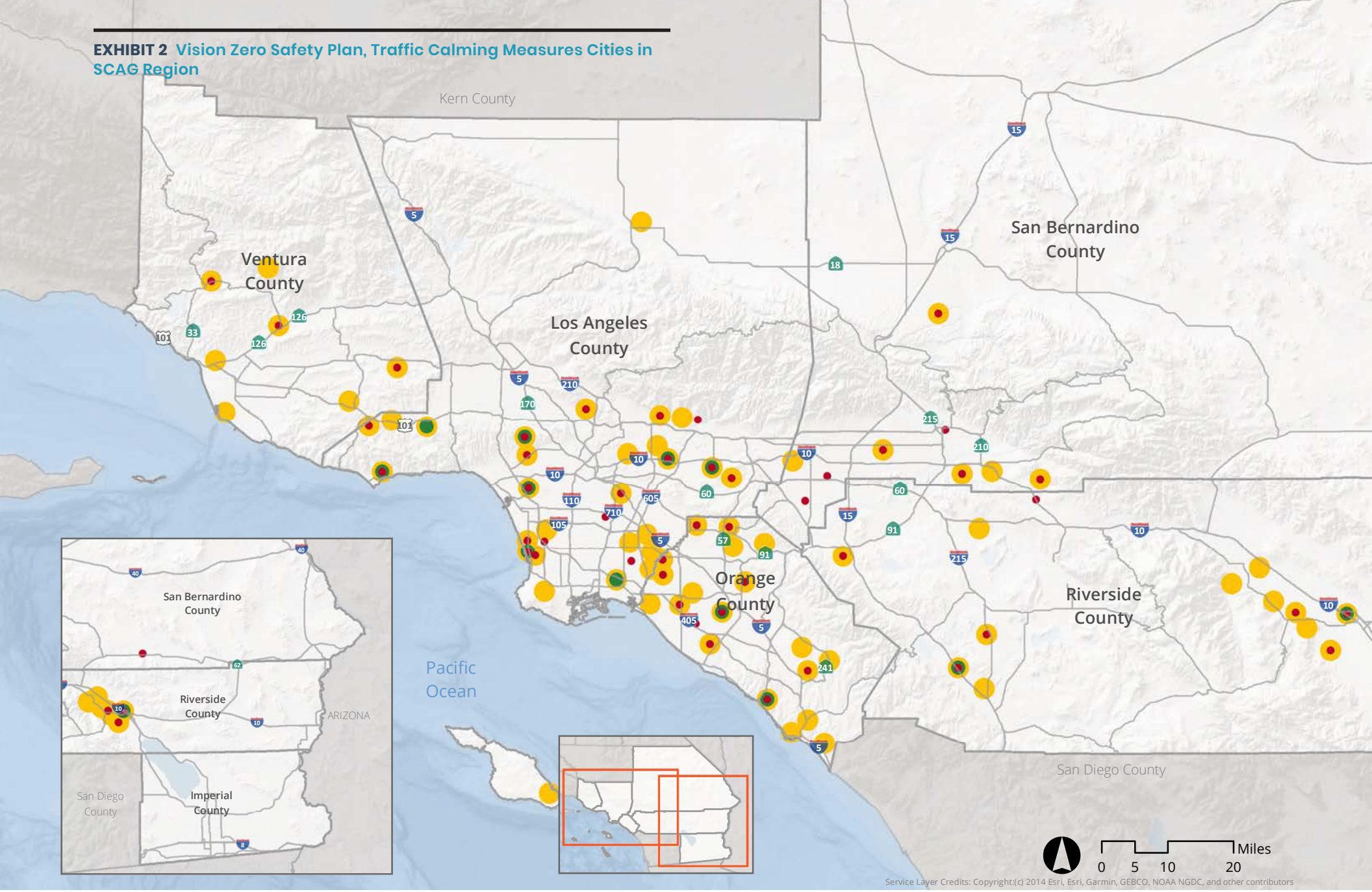


Legend

County Boundaries | City Boundaries | Freeway | High Injury Network Cities | High Injury Network City Boundary

Source: SCAG, 2019

EXHIBIT 2 Vision Zero Safety Plan, Traffic Calming Measures Cities in SCAG Region

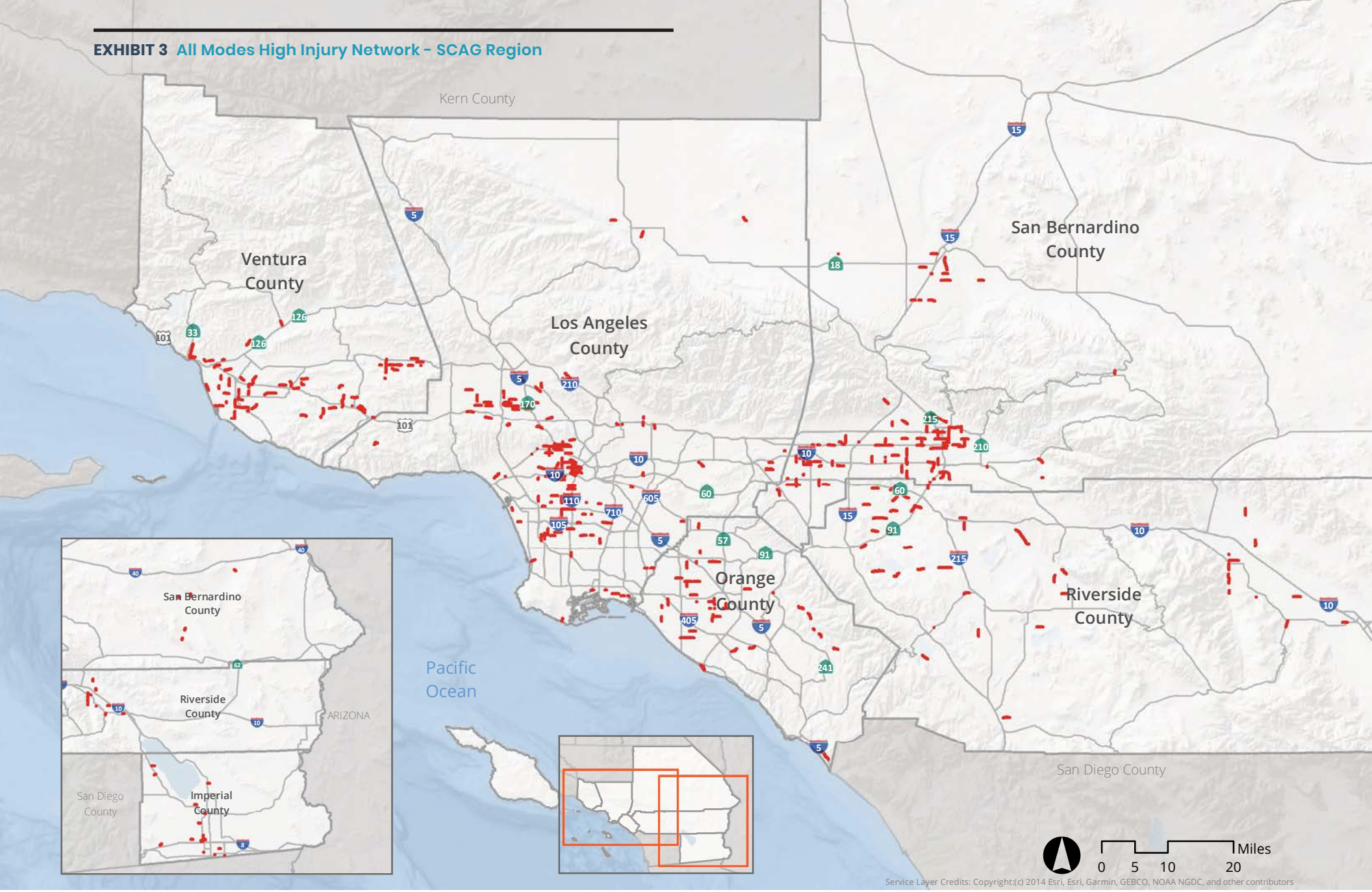


County Boundaries
City Boundaries
Freeway
Safety Plan/ Safety Targets
Vision Zero Policy
Traffic Calming Measures

Source: SCAG, 2019

Note: Traffic calming, as defined by the Institute of Traffic Engineers (ITE), is the combination of mainly physical measures that reduce the negative effects of motor vehicle use, alter driver behavior and improve conditions for non-motorized street users. Traffic calming plans are focused on these measures.

EXHIBIT 3 All Modes High Injury Network - SCAG Region

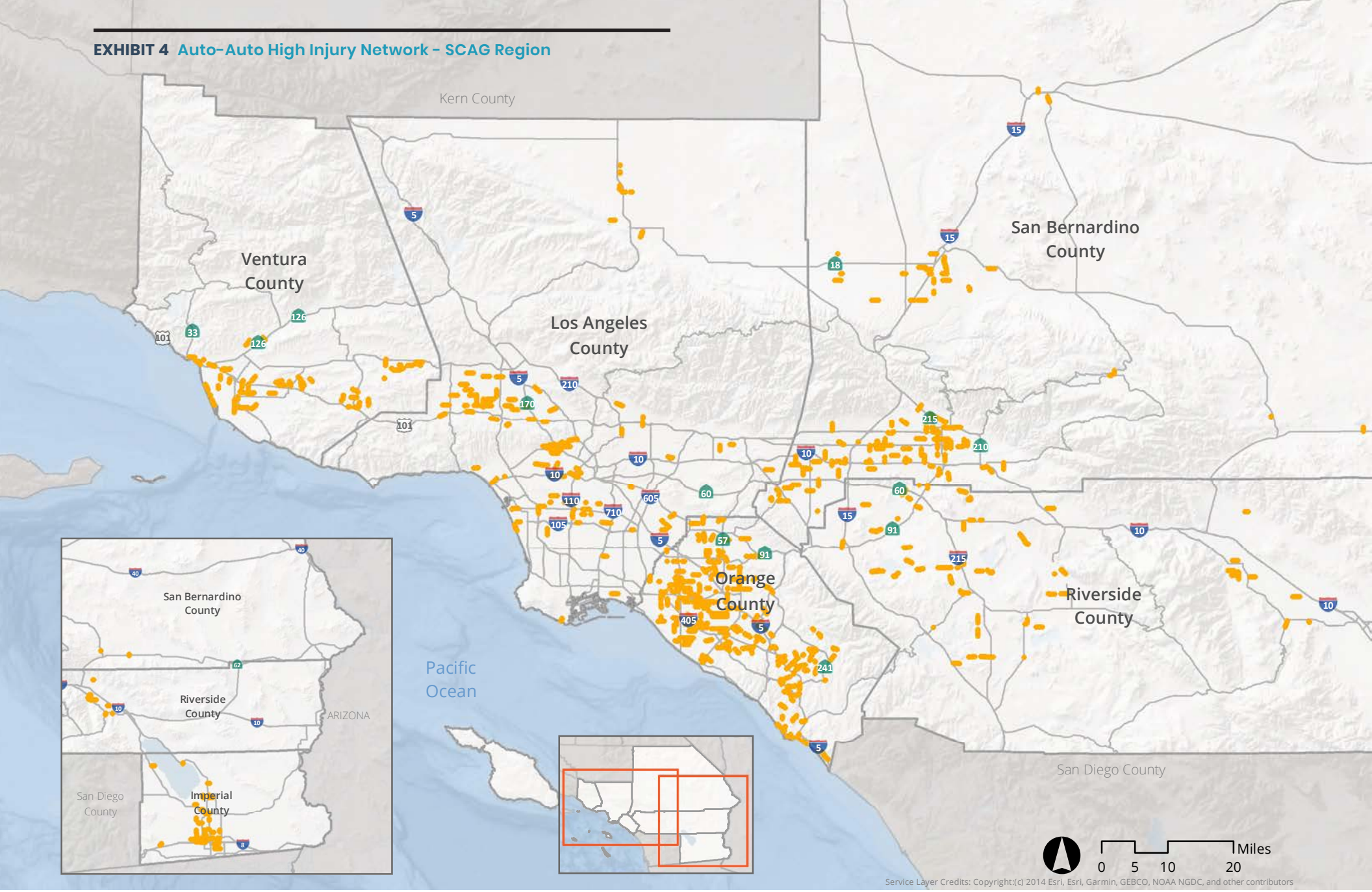


Legend

County Boundaries | City Boundaries | Freeway | All Modes High Injury Network

Source: SCAG, 2019

EXHIBIT 4 Auto-Auto High Injury Network - SCAG Region

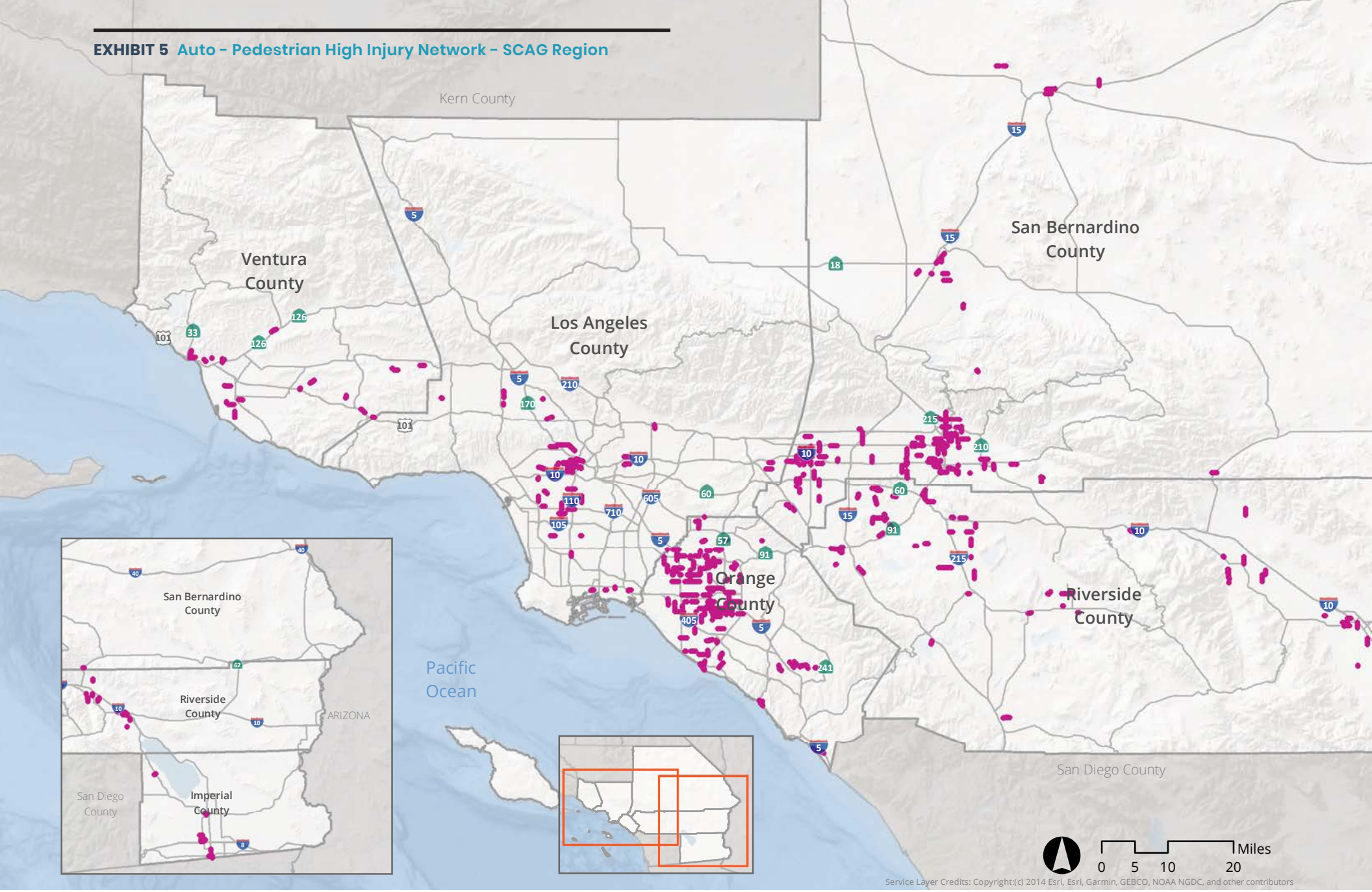


Legend

County Boundaries | City Boundaries | Freeway | Auto-Auto High Injury Network

Source: SCAG, 2019

EXHIBIT 5 Auto - Pedestrian High Injury Network - SCAG Region

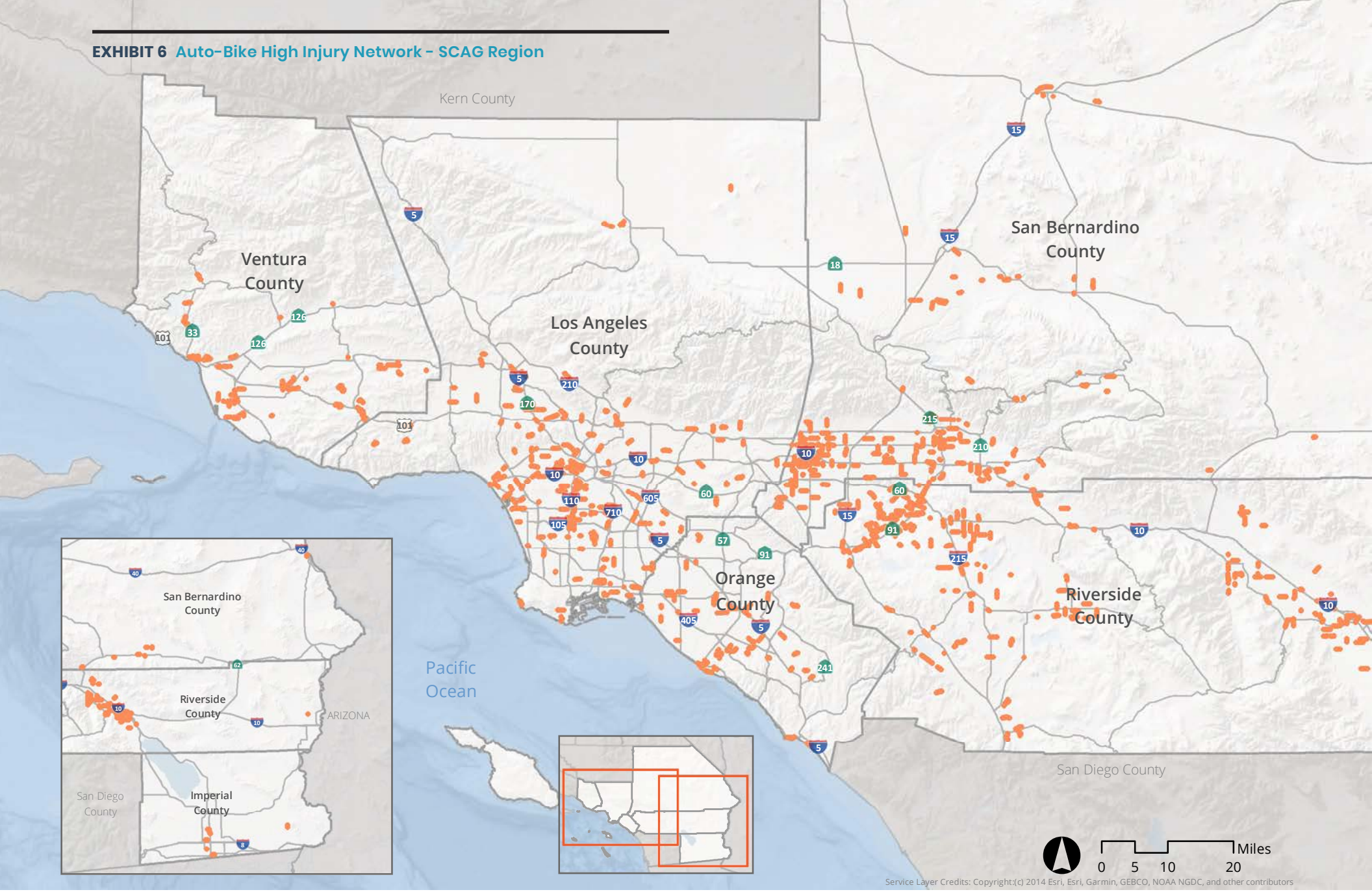


Legend

County Boundaries | City Boundaries | Freeway | Auto-Pedestrian High Injury Network

Source: SCAG, 2019

EXHIBIT 6 Auto-Bike High Injury Network - SCAG Region



Legend

County Boundaries | City Boundaries | Freeway | Auto-Bike High Injury Network

Source: SCAG, 2019

SAFETY CATEGORY IN SUSTAINABLE COMMUNITIES PROGRAM

The Sustainable Communities Program (formerly known as Compass Blueprint Grant Program) was established as an innovative vehicle for promoting local jurisdictional efforts to test local planning tools. As of 2019, there have been 347 projects with a total SCAG contribution of $48M. In 2016, the totals were 203 projects with a total SCAG contribution of $24M. Since 2016, there have been 144 projects with a total SCAG contribution of $24M. Of the total projects since 2016, 104 projects have a safety focus, including Safe Routes to School, Vision Zero, active transportation plans, and *Go Human*. By supporting exemplary projects, the Sustainability Planning Grants Program illustrates the value that effective growth planning can bring to regional partners and the region as a whole. The Sustainable Communities Program provides direct technical assistance to SCAG member jurisdictions to complete planning and policy efforts that enable implementation of the regional SCS.

EMERGING ISSUES

Emerging technology continues to have the potential to expand transportation choices and equity throughout the region. By providing more options for local and regional trips, emerging technologies may shift trips to less environmentally damaging modes, minimize negative environmental externalities associated with current vehicle use, increase system efficiency, improve safety and reduce auto-related collisions and fatalities. However, realizing the potential benefits potential negative impacts is dependent on the rate of technology development and adoption of a wide range of public and private sector innovations.

GOODS MOVEMENT

Goods movement generally refers to the movement of raw, semi-finished, and finished materials and products used by businesses and residents across the transportation system. These goods move in myriad ways and through complex systems, often using multiple modes of transportation (e.g., ships, trucks, trains, planes, etc.). Products can be produced within the U.S. or another country, and make their way to a business, retail store, or directly to consumers versus traditional purchases by consumers at physical retail outlets. The efficient movement of these goods are critical to maintain a strong economy and ensure improvements in the quality of life of regional residents. Goods movement supports industries and activities that provide jobs, tax revenue, and resources that bolster innovation, creativity, and access to local and world markets through trade. This movement depends directly on the infrastructure that comprises the transportation network such as highways, rail lines, ports, and networks of warehousing and other distribution facilities. Maintaining and improving existing infrastructure, and expanding infrastructure capacity where appropriate, is key to ensuring the competitiveness of a growing economy. However, goods movement also has negative impacts and externalities. Growing trade and increased volumes of goods moving across the transportation system have contributed to greater congestion, safety concerns, harmful emissions of dangerous pollutants, wear-and-tear on roadways, and impacts on local neighborhoods. As the MPO for the region, SCAG has adopted a vision for the region's goods movement system.

ANALYTICAL APPROACH FOR SAFETY

Data and input for this report were collected through a combination of outreach processes and data gathering efforts. These included SCAG's local input process with cities, county agencies and councils of governments; SCAG's working groups that provide input into SCAG's plan. Along with the outreach process, various statewide data sources including the Statewide Integrated Traffic Records System (SWITRS), Transportation Injury Mapping System (TIMS), and California Office of Traffic Safety (OTS) were used in the development of this report to help provide a holistic context for Transportation Safety.

OUTREACH

Through outreach, SCAG identified the needed areas for engagement, policy development, and technical expertise ahead of the RTP/SCS. The

Transportation Safety Working Group, Transportation Safety webpage on the SCAG website, Transportation Safety fact sheets by County, Toolbox Tuesday Trainings, and Traffic Safety Leadership Symposium and Workshop Series were some of the primary tools used by SCAG for outreach and engagement.

LOCAL INPUT PROCESS

SCAG solicited input from local jurisdictions across the six-county region to inform Connect SoCal. Safety information was also collected through the local input process. During the Local Input Process, SCAG met one-on-one with all 197 local jurisdictions in the region and received input on various regional significant topics such as the safety element in local jurisdictions' General Plans, Vision Zero plans, traffic calming measures, safety plans and safety targets.

TRANSPORTATION SAFETY WORKING GROUP

SCAG formed a Transportation Safety Working Group in April 2018 to work closely with transportation safety stakeholders to develop a safety strategy that could be incorporated into Connect SoCal. The Transportation Safety Working Group provides a forum for stakeholders to convene and develop recommendations on promoting transportation safety throughout the region. The resulting Technical Report includes regional strategies and recommendations on actions local governments can take to motivate reductions in serious injuries and fatalities. The Transportation Safety Working Group meets on a quarterly basis and is open to agency staff and the public.

In order to effectively engage regional stakeholders and provide useful resources, SCAG involved stakeholders from various agencies including national, state regional and local agencies. Stakeholders were included from the agencies listed below:

- **National:** U.S. Department of Transportation (USDOT), Federal Highway Administration (FHWA), National Highway Traffic Safety Administration (NHTSA)
- **State:** California Department of Transportation (Caltrans), California Office of Traffic Safety (OTS)
- **Regional/Sub-regional:** Councils of Governments (COG), County Transportation Commissions (CTCs), County Departments of Public Health (DPH)
- **Cities:** A combination of leaders in the field as well as those interested in adopting transportation safety-related plans and policies
- **Other stakeholders:** Non-Governmental Organizations (NGO), community-based organizations, industry groups, and universities (e.g., LA County Bike Coalition, Walk Los Angeles, Safe Routes to School Coalition, AAA, etc.)

DATA

SCAG utilized open source data platforms to analyze collision data for the SCAG region. The data sources SCAG utilized are listed below:

- SWITRS (Statewide Integrated Traffic Records System)
- OTS (Office of Traffic Safety)
- TIMS (Transportation Injury Mapping System)
- SHSP (Strategic Highway Safety Plan)

REGIONAL SAFETY LEADERSHIP SYMPOSIUM, WORKSHOP AND WEBINAR SERIES

SCAG held a Regional Traffic Safety Leadership Symposium on May 1, 2019 to initiate a conversation about safety needs in the SCAG region. The symposium explored regional traffic safety issues and the policy and implementation tools available to local governments. Expert panelists highlighted local strategies to improve safety, including balancing equity and enforcement, education and outreach strategies, and safe street design. Designed for elected officials, city managers, and high-level planning staff, the Symposium's primary goals were to:

- Encourage collaboration among local elected officials to support collision-reducing strategies;
- Inform elected officials and high-level practitioners about traffic safety issues and solutions in the region; and
- Motivate action at the local level through the *Go Human* Safety Pledge.

Details about the symposium are outlined in **APPENDIX 2**.

SAFETY STRATEGIES

SCAG adopted its 2020 Regional Safety targets in February 2020 and aims to reduce fatalities by a minimum of 3.03 percent and serious injuries by a minimum of 1.5 percent annually to reach the goal of TZD. Connect SoCal prioritizes ensuring the safety and mobility of the region's residents, including drivers and passengers, transit riders, pedestrians, and bicyclists. The Plan's Safety and Security Technical report provides a framework largely grounded in the State's Strategic Highway Safety Plan that can help member agencies interested in pursuing safety initiatives and strategies at the local level. The Plan also aims to address actionable strategies in which SCAG can support local jurisdictions.

CHALLENGE AREAS AND SAFETY STRATEGIES

Connect SoCal prioritizes ensuring the safety and mobility of the region's residents, including drivers and passengers, transit riders, pedestrians, and bicyclists. To enhance safety in the region, SCAG anticipates providing cities with resources to develop safety plans and help achieve the aforementioned safety targets.

Traffic collisions also relate to congestion and, thus, involve greenhouse gas emission due to bottlenecking and emergency management costs. Increased use of transit ridership, walking and biking is associated with reduced numbers of collisions because the environment is safer for them to utilize; thus, as a domino effect, the urban footprint of these groups will increase and GHG will be reduced. Safety is of particular concern to vulnerable roadway users including children, older adults, people walking, people bicycling and people on scooters. These roadway users do not have the protections included in automobiles, and fatalities involving these users are more common when collisions occur.

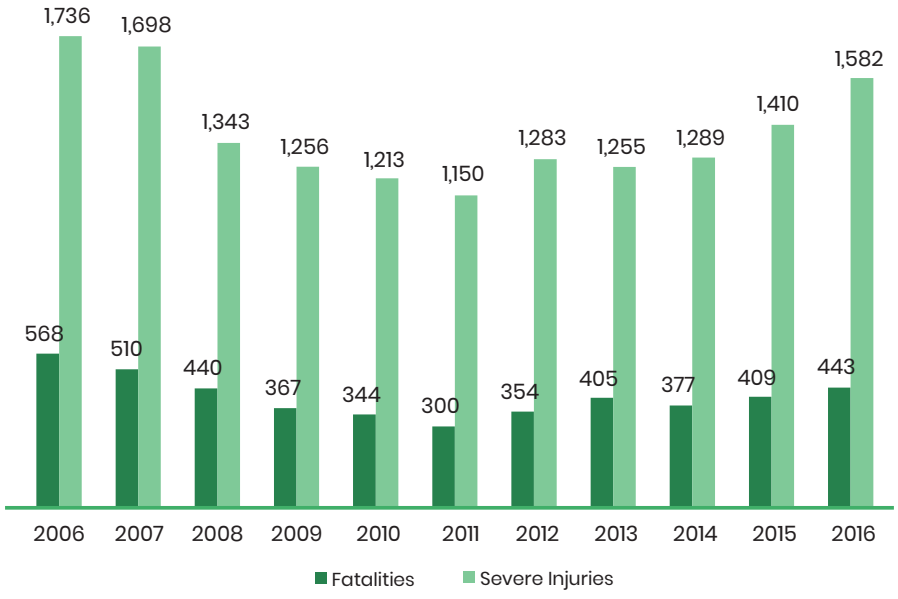
SCAG's safety strategies are largely grounded in the State's Strategic Highway Safety Plan (SHSP) that can help member agencies interested in pursuing safety initiatives and strategies at the local level. The Connect SoCal Plan also aims to address actionable strategies in which SCAG can support local jurisdictions. Below are the 16 challenge areas and actions outlined in the SHSP and SCAG actions. SCAG encourages local jurisdictions to implement these actions at the local level.

1. REDUCE AGGRESSIVE DRIVING AND SPEEDING

Aggressive driving and speeding includes behaviors such as driving at and unsafe speed, tailgating, reckless driving maneuvers as determined by officer on the scene and drivers running over traffic signals and signs. Fatalities and serious injuries related to aggressive driving and speeding have increased as seen on **FIGURE 9**. SCAG recommends local jurisdictions implement strategies to reduce fatalities and serious injuries related to aggressive driving and speeding, which could include, but are not limited to:

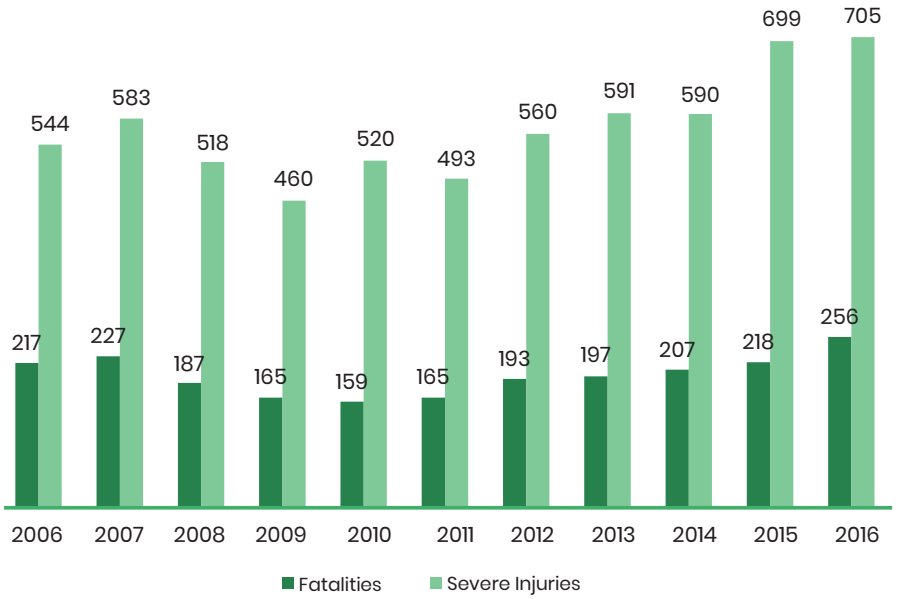
- Conducting public outreach campaigns focused on addressing speeding and aggressive driving specifically.
- Identifying locations with concentrations of speed-related crashes to develop and encourage implementation of systemic approach.
- Promoting best engineering practices for streets and safe speeds.
- Setting speed limits that are safe and reasonable.

FIGURE 9 Aggressive Driving Serious Injuries and Fatalities 2006-2016



Source: SWITRS, 2016

FIGURE 10 Serious Injuries and Fatalities Among Aging Drivers 2006-2016



Source: SWITRS, 2016

2. IMPROVE SAFETY FOR AGING POPULATIONS

Aging populations, defined as those 65 or older, although affected at different rates, can face challenges using the road including visibility, agility, and speed. Fatalities and serious injuries have increased related to aging populations. SCAG recommends the following strategies for local jurisdictions to improve safety for aging populations, which could include, but are not limited to:

- Supporting roadway, intersection and interchange improvements that support improving right of way decisions by older populations and road users.
- Promoting implementation of multimodal guidance for aging road users included in the California manual on uniform traffic control devices.
- Implementing design treatments that support safety such as curb extensions, bulb-outs and pedestrian refuge islands that shorten crossing distances.
- Working with Transit Network Companies (TNCs) to explore programs that support transportation options for older adults.
- Working with businesses, community organizations, senior centers, and transit agencies to improve motorized transportation services for the aging population.
- Establishing Safe Routes for Seniors programs that engage older adults, with a focus in areas with older adult serving uses (such as community centers, senior housing, and others), to identify physical and programmatic barriers to mobility including safe pedestrian

access, lack of shade and/or seating, and ADA/universal access concerns. Create plans, programs, and allocate funding to improve the identified issues.

3. IMPROVE BICYCLIST SAFETY

Bicycling has continued to become a more popular activity across the SCAG region. Fatalities and serious injuries between motor vehicles and bicycles have steadily increased throughout the years and remain at a higher number (see **FIGURE 6** and **8**). SCAG recommends the following strategies for local jurisdictions to improve safety for bicyclists, which could include, but are not limited to:

- Connecting bicycle facilities, including regionally significant bicycle corridors for bicycle travel throughout the region.
- Developing and implementing active transportation master plans.
- Adopting Complete Streets policies—providing safe access for all modes—as fundamental principles of transportation plans.
- Implementing pedestrian and bicycle safety in all roadway maintenance projects where new striping will be required or existing striping is to be replaced.
- Using intersection control devices that detect bicyclists, particularly left turn signals.
- Conducting bicycle education in lieu of fines for bicyclists and motorists who commit bicycle-related traffic violations.
- Expanding Safe Routes to School programs for non-infrastructure projects focusing on education, bicyclist visibility, motorist awareness and accommodation of bicyclists.
- Utilizing SCAG's standardized database of bicycle data, including safety, counts, surveys, etc. for data analysis.
- Implementing traffic calming treatments that support bicycle safety.
- Developing a regulatory framework to develop partnerships with TNCs that support infrastructure developments to support bicycle safety.
- Participating in programs to educate all roadway users regarding the rights and responsibilities of bicyclists.

4. IMPROVE COMMERCIAL VEHICLES SAFETY

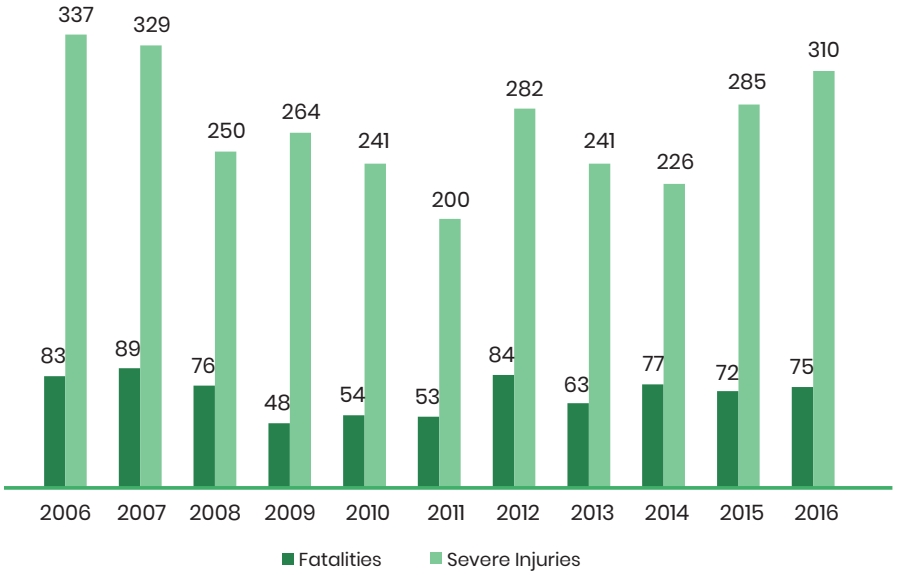
Commercial vehicles include trucks, truck tractors, school buses or other buses. The SCAG region has a significant number of commercial vehicles that transport goods from marine ports and Mexico. Fatalities and serious injuries involving commercial vehicles have steadily increased throughout the years and are at an all-time high. SCAG recommends the following strategies for local jurisdictions to improve commercial vehicle safety, which could include, but are not limited to:

- Supporting the use of dedicated truck capacity on corridors with significant truck traffic in order to separate commercial vehicles from passenger vehicles.
- Identifying intersections and interchanges prone to high commercial vehicle collisions, identify appropriate infrastructure improvements and make adjustments as needed.
- Identifying and promoting the use of technology for improving commercial vehicle safety.
- Identifying rest stops along highways and local neighborhoods for trucks to stop and rest since drowsy drivers in all vehicles present a significant danger on highways and roads.

FIGURE 11 Serious Injuries and Fatalities Among Commercial Vehicles 2006-2016

Source: SWITRS, 2016

FIGURE 12 Serious Injuries and Fatalities Among Distracted Drivers 2006-2016



Source: SWITRS, 2016

5. REDUCE DISTRACTED DRIVING

Distracted driving occurs when the driver of a motor vehicles is not paying attention or is using an electronic device. It is generally believed that distracted driving collisions are significantly underreported in the data due to difficulty of determining distracted driving as a factor after a collision. Distracted driving continues to be a safety concern for the SCAG region. SCAG recommends the following strategies for local jurisdictions to reduce fatalities and injuries related to distracted driving, which could include, but are not limited to:

- Developing enforcement and education programs designed to discourage distracted driving.
- Improving data quality on distracted driving.
- Conducting education on the risks of distracted driving using evidence-based strategies to create a culture of traffic safety.

6. ENSURE DRIVERS ARE LICENSED

Driver licensing includes unlicensed or improperly licensed drivers. Information on driver licensing is only currently available pertaining to fatalities. Driver licensing remains a safety concern for the SCAG region. SCAG recommends the following strategies for local jurisdictions to ensure drivers are properly licensed, which could include, but are not limited to:

- Improving educational components to inform the public about the new laws as new initial licensing and renewal licensing laws are implemented and established.
- Creating a public awareness campaign addressing the consequences of driving without a valid license.
- Supporting the State in developing driver education components for teens and new drivers.

TABLE 9 SCAG Region Distracted Drivers in Fatal and Injury Collisions 2012-2016

Inattention (all party)	2012		2013		2014		2015		2016	
	Fatal	Injury	Fatal	Injury	Fatal	Injury	Fatal	Injury	Fatal	Injury
A – Cell Phone Handheld (7/1/03)	58	110	80	146	99	177	111	203	142	261
B – Cell Phone Handsfree (7/1/03)	18	31	13	24	26	40	32	53	33	59
C – Electronic Equipment	42	65	45	82	61	96	61	116	73	133
D – Radio/CD	65	118	69	115	96	157	83	153	80	161
E – Smoking	8	14	12	25	10	23	6	13	8	20
F – Eating	28	50	30	61	38	65	36	80	52	90
G – Children	36	94	33	86	40	94	39	83	48	112
H – Animal	13	24	14	22	10	20	14	26	9	26
I – Personal Hygiene	4	9	4	10	9	13	7	14	3	8
J – Reading	5	14	14	21	7	16	6	10	6	13
K – Other	347	647	431	791	440	880	522	974	533	1,093
P – Cell Phone(1/1/01, value prior to 7/03 form revision)	2	2	2	2	2	2	1	1	2	2
- - Not Stated	2,192	2,950	2,157	2,735	2,275	2,862	2,439	2,994	2,541	3,046
Total	2,818	4,128	2,904	4,120	3,113	4,445	3,357	4,720	3,530	5,024

Source: SWITRS, 2016

7. IMPROVE EMERGENCY RESPONSE SERVICES

Emergency response services are critical to reduce the severity of injuries or fatalities through high quality medical care on the scene and at transport to a trauma center. SCAG recommends the following strategies for local jurisdictions to improve emergency response services, which could include, but are not limited to:

- Using Intelligent Transportation System technology to improve response time for EMS to and from collision sites.
- Developing guidance documents to share with EMS responders to increase crash scene safety.

8. EXPLORE THE UTILITY OF EMERGING TECHNOLOGIES

Emerging technologies may help in the prevention, identification, and response to collisions. Exploring technology advancements is important as they may potentially help reduce the frequency and severity of collisions. Emerging technologies include autonomous and connected vehicles as well as advancements to safety devices in vehicles, improvements to emergency response, and any technologies helping the 5 Es of traffic safety, including the use of Transportation Network Companies (TNCs) for cars, bikes, or scooters. SCAG recommends the following strategies for local jurisdictions to improve emerging technology research and data collection, which could include, but are not limited to:

- Exploring the use of emerging technology for the use of data collection and analysis regarding level of service, injuries and fatalities on roadways.
- Working with transit network companies to share data to help improve safety outcomes.

9. REDUCE IMPAIRED DRIVING FATALITIES

Impaired driving occurs when any evidence of alcohol or drug use is detected, even when the level is not over the illegal limit. The number of fatalities and injuries involving impaired driving reduced between 2006 and 2011 but has seen an increase to an all-time high in 2016. SCAG recommends the following strategies for local jurisdictions to reduce impaired driving fatalities and injuries, which could include, but are not limited to:

- Promoting and expanding safe ride home options supported by collaborations with Transportation Network Companies (TNCs).
- Extending and promoting late night transit during holiday weekends and after major sporting/special events.
- Developing a methodology to understand primary and secondary collision factors in a collision.
- Developing and distributing a “tool kit” identifying programs, providers, and resources that will assist communities in implementing effective community based, comprehensive, multijurisdictional DUI task forces.
- Designing and developing a study to identify discrepancies in county DUI rates and develop recommendations for system improvements.
- Improving enforcement with targeted areas and during specified hours, and providing more Drug Recognition Evaluator (DRE) trainings, and increasing drugged driving education.
- Increasing frequency, consistency and publicity of sobriety checkpoints in areas with high DUI caused collisions.

FIGURE 13 Serious Injuries and Fatalities Among Impaired Drivers 2006-2016

Source: SWITRS, 2016

FIGURE 14 Serious Injuries and Fatalities at Intersections 2006-2016

Source: SWITRS, 2016

10. IMPROVE SAFETY AT INTERSECTIONS

Intersections can be a point of conflict for road users navigating multiple right-of-ways. Improving safety at intersections also includes train or rail vehicle crossings. Since 2011, the number of fatalities involving intersections has increased to an all-time high in 2016. SCAG recommends the following strategies for local jurisdictions to improve safety at intersections, which could include, but are not limited to:

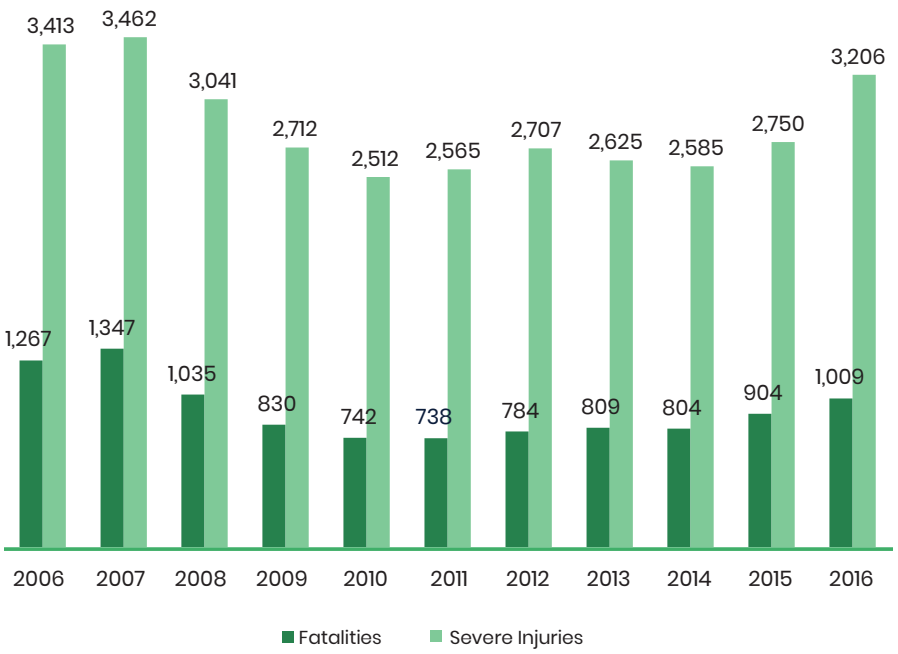
- Incorporating intersection safety into the planning grant strategy.
- Incorporating Intelligent Transportation Systems (ITS) at high incident intersections to reduce red-light violations causing collisions.
- Implementing infrastructure improvements including but not limited to clearly marked crosswalks, median sanctuaries for pedestrians, signalization at problem non-signalized intersections, advanced stop bars and sharks teeth, yield markings, and changing intersection geometries to improve safety.
- Implementing installation of improved visibility traffic signals as part of the normal traffic signal replacement cycle.
- Planning for, and developing roadway, intersection and interchange improvements that support improving rights of way decision by older drivers.
- Reducing modal conflicts at intersections by implementing dedicated pedestrian crossing phasing, protected left and right turn phasing, leading pedestrian interval, or other signal enhancements.

11. REDUCE THE OCCURRENCE OF LANE DEPARTURE FATALITIES

Lane departures includes head-on, hit object, and overturned vehicles, and also includes when a vehicle runs off the road or crosses into the opposing lane prior to the collision. Lane departures decreased from 2008 to 2011 and have steadily increased to an all-time high in 2016. SCAG recommends the following strategies for local jurisdictions to reduce the occurrence of lane departure fatalities and injuries, which could include, but are not limited to:

- Continuing the deployment of high visibility signage and road striping that enhances driver's ability to notice, recognize and respond to warning signs during nighttime or periods of inclement weather.
- Addressing systemic risks on non-state roads with low-cost safety countermeasures.
- Improving the dissemination of crash data at the jurisdiction level.
- Targeting highest risk jurisdictions for funding and technical assistance.
- Implementing an effective, consistent, and coordinated Traffic Incident Management (TIM) program at the state and local level to reduce the duration and impacts of traffic incidents and improve the safety for motorists, crash victims and emergency responders.
- Promoting the use of vehicle technology to improve safety related to lane departures.

FIGURE 15 Serious Injuries and Fatalities Among Lane Departure Incidents 2006-2016



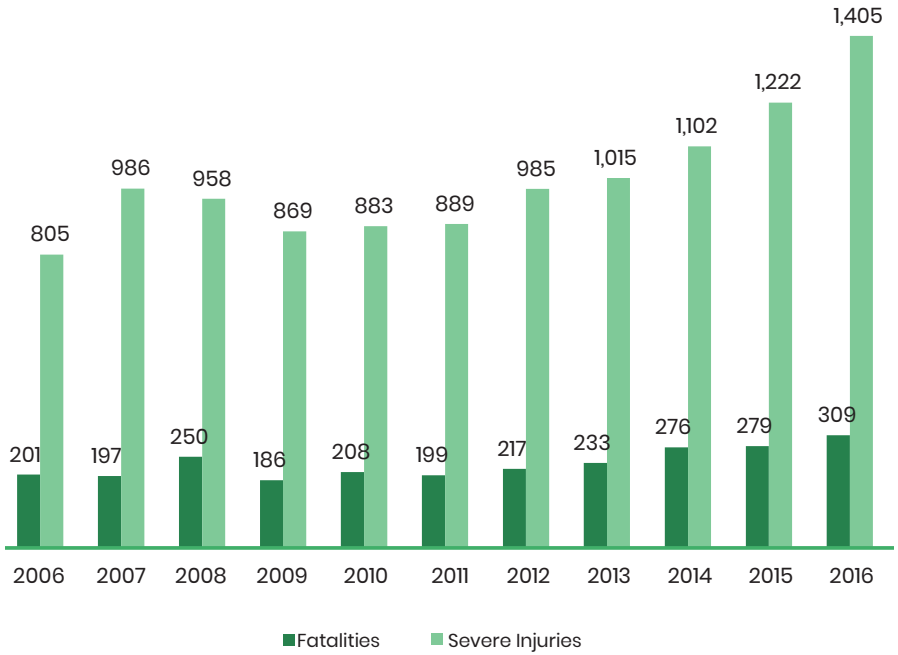
Source: SWITRS, 2016

12. IMPROVE MOTORCYCLE SAFETY

Motorcycling continues to be a popular activity and motorcyclists are vulnerable to fatality and injury. SCAG recommends the following strategies for local jurisdictions to improve motorist safety, which could include, but are not limited to:

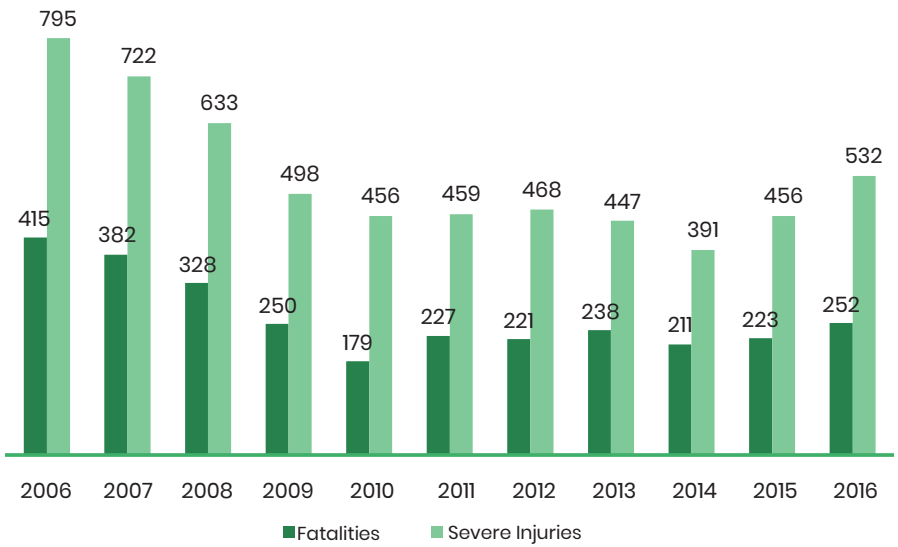
- Working with the state and CTCs to determine if proposed projects have potential benefits to safety in this challenge area.
- Working with local governments to help identify motorcycle high-collision concentration locations and help develop plans to mitigate possible causes.
- Promoting the most significant causes of motorcycle injuries and fatalities, including speeding, helmet use, and lane splitting.

FIGURE 16 Serious Injuries and Fatalities Among Motorcycles 2006-2016



Source: SWITRS, 2016

FIGURE 17 Serious Injuries and Fatalities Related to Occupant Protection 2006-2016



Source: SWITRS, 2016

13. IMPROVE OCCUPANT PROTECTION BY INCREASED USE OF SEAT BELTS AND CHILD SAFETY SEATS

The misuse, non-use, or lack of vehicle safety equipment including lap belts, shoulder harnesses, passive restraints or child restraints is an important safety factor. Between 2006 and 2016, fatalities and injuries involving occupant protection reduced, while between 2014 and 2016 the numbers increased. SCAG recommends the following strategies for local jurisdictions to improve occupant protection, which could include, but are not limited to:

- Increasing enforcement and education campaigns for occupant protection programs.
- Implementing education campaigns for child passenger safety usage.
- Promoting the establishment of permanent child passenger safety fitting stations with paid staff, targeting counties based on need.
- Improving occupant protection data collection processes.

14. IMPROVE PEDESTRIAN SAFETY

Most trips start off as pedestrian trips and they are key to a well-functioning transportation system. The number of pedestrian related fatality and injuries has risen consistently between 2006 and 2016 and is at an all-time high (see **FIGURE 5** and **7**). SCAG recommends the following strategies for local jurisdictions to improve pedestria n safety, which could include,

but are not limited to:

- Continuing to work with local jurisdictions to provide a comprehensive education for all road users.
- Developing a pedestrian safety action plans based on FHWA criteria.
- Ensuring all sidewalks and intersections are ADA compliant.
- Supporting improvements to roadway design standards and Intelligent Transportation Systems (ITS) that increase bicyclist and pedestrian safety.
- Considering pedestrian needs in all roadway and transit projects.
- Facilitating the planning, development, and implementation of projects, services and activities that will improve safety and reduce traffic, fuel consumption and air pollution in the vicinity (approximately 2 miles) of primary and middle schools (grades K-8).
- Increasing pedestrian crossing times to account for older or slower pedestrians.
- Incorporating pedestrian safety into smart growth, land use planning, and other local plans.
- Participating in programs to educate all roadway users regarding the rights and responsibilities of pedestrians.
- Improving pedestrian striping and including standard safety upgrades in routine maintenance and striping projects.
- Incorporating median sanctuaries for pedestrians at appropriate intersections.
- Installing lighting surrounding crosswalks at intersections and mid-block locations to provide better visibility of pedestrians crossing streets at night.
- Developing citywide Safe Routes to School strategies to guide measures around local schools.
- Improving pedestrian safety expertise among transportation professionals and others involved in roadway and land-use design.

15. IMPROVE WORK ZONE SAFETY

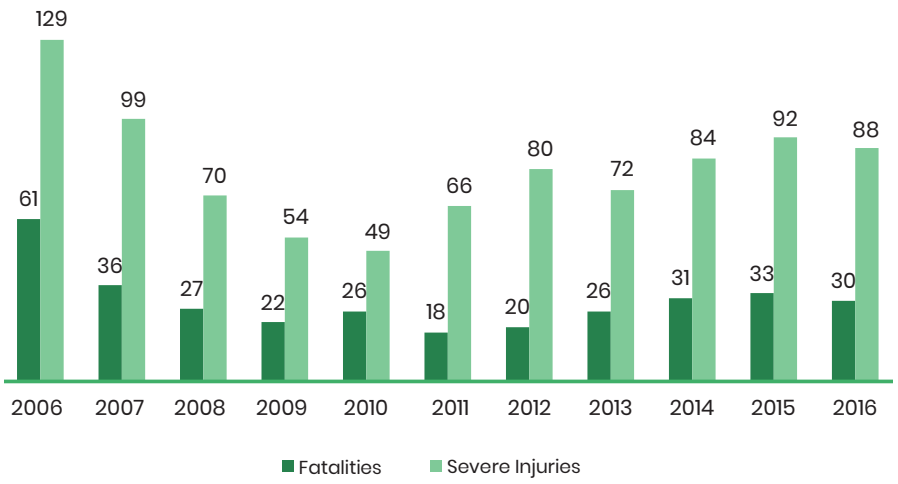
Work zones are construction or repair zones, which may create unexpected conditions for drivers that increase the chance for collisions. Work zone related fatalities have varied up and down between 2006 to 2016. SCAG recommends the following strategies for local jurisdictions to improve work zone safety, which could include, but are not limited to:

- Improving safe driving through work zones with education and enforcement.
- Applying advanced technology to improve work zone safety.
- Improving work zone data collection and analysis.

16. IMPROVE SAFETY FOR YOUNG DRIVERS

Young drivers are defined as drivers between 15 and 20 year old. Fatalities and injuries involving young drivers are a leading cause of death for the age

FIGURE 18 Serious Injuries and Fatalities Among Work Zones 2006-2016

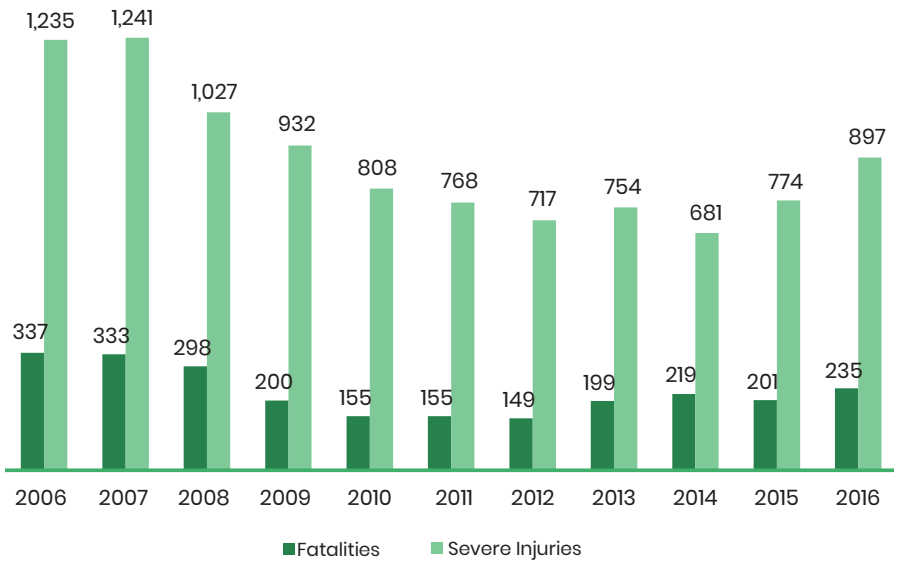


Source: SWITRS, 2016

group, and key contributors to collisions involving young drivers include driver inexperience, driver distractions, speeding and improper turning. Fatalities among young drivers have been increasing since 2012, while serious injuries have been increasing since 2014. SCAG recommends the following strategies for local jurisdictions to improve safety for young drivers, which could include, but are not limited to:

- Establishing a task force to resolve issues and making recommendations related to improving young driver education and training.
- Implementing the Driver Performance Evaluation drive test, as originally developed, to include freeway driving.
- Supporting state authorities in the education and enforcement of safety device violations.

FIGURE 19 **Serious Injuries and Fatalities Among Young Drivers 2006-2016**



Source: SWITRS, 2016

- Implementing and maintaining anti-DUI programs in high schools and universities such as Teenage Party Prevention, Enforcement and Dispersal, Minor Decoy Program, the Shoulder Tap Program and TRACE.
- Establishing efforts to address marijuana impaired driving.

SCAG ACTIONS

- SCAG will develop and maintain a High Injury Network mapping tool to support planning efforts related to transportation safety.
- SCAG will work with local jurisdictions to provide active transportation safety education opportunities through its *Go Human* campaign.
- SCAG will continue to represent Southern California on California Strategic Highway Safety Plan (SHSP) Steering Committee, the California Walk Bike Technical Advisory Committee, and the Active Transportation Program Technical Advisory Committee.
- SCAG will support regional safety efforts including Vision Zero policies and plans.
- SCAG will support bicycle and pedestrian safety as part of SCAG's Sustainable Communities Program.
- SCAG will analyze the shared use of sidewalks between different modes (bicyclists, pedestrian's e-scooters) and the impacts on personal safety (i.e. dockless devices blocking foot traffic or other conflicts when riding near pedestrians).
- SCAG will work to ensure funding strategies reflect unique local needs.

ASSEMBLY BILL 2363 – ZERO TRAFFIC FATALITIES TASK FORCE

Unsafe speed is the primary collision factor for approximately a third of all collisions in the SCAG region. Speeding makes a crash more likely, and in a crash that is speeding related, a person is more likely to be injured and the injuries are more likely to be severe. For motorists it is important to know that at 50 miles per hour, a pedestrian has only 25 percent chance of survival if struck by a vehicle. However, at about 25 miles per hour, if struck by a vehicle, a pedestrian has a 90 percent chance of survival.

Assembly Bill 2363 was passed in September 2018 and required the establishment of a Zero Traffic Fatalities Task Force by the Secretary of Transportation. The Task Force's work was focused on identifying changes in speed setting methodologies and other steps that could reduce traffic injuries and fatalities. More specifically, the Task Force considered the following topics:

- Existing process for establishing speed limits
- Existing policies on how to reduce speeds on local streets and roads.
- Recommendation of alternatives to the 85th percentile
- Engineering recommendations on how to increase vehicular, pedestrian, and bicycle safety.
- Existing reports and analyses on calculating the 85th percentile at the local, state, national, and international level.
- Usage of the 85th percentile in urban and rural settings.
- How local bicycle and pedestrian plans affect the 85th percentile.

SCAG participated in the Task Force and advocated for the region's need for setting appropriate speed limits that will promote safety for all users of the road. The Task Force Report of Findings and Recommendations was released in January 2020 and is available for review online.[1] SCAG is working with stakeholders on legislation to advance the recommendations.

1. California State Transportation (CalSTA) Agency Online. (2020). CalSTA Report of Findings: AB 2363 Zero Traffic Fatalities Task Force. Retrieved from CalSTA's website.

REGIONAL HIGH INJURY NETWORK

SCAG identified cities in the region which are a part of SCAG's High Injury Network. While developing the HIN at a regional level helps in identifying cities in the SCAG region, it is recommended that cities develop a High Injury Network at the city level to identify concentrations of collisions. Developing a High Injury Network is typically a first step to identify streets where safety improvements should be targeted to better utilize limited resources available for safety projects.

SAFETY PLANS AND SAFETY TARGETS

Twelve Cities and one County in the SCAG region have a Vision Zero Plan; some of which are in development and 47 cities have a safety element incorporated in general plans. To enhance safety in the region, SCAG anticipates to provide cities with resources to develop safety plans and help achieve safety targets. Safety resources are available on SCAG's *Go Human* website.

TOOLS

ACTIVE TRANSPORTATION DATABASE

The Active Transportation Database (ATDB) was developed to collect and store bicycle, pedestrian, wheelchair, and scooter/skateboard volume counts from infrastructure and planning projects across Southern California that can be used to develop crash rates. The ATBD will serve the following purposes:

- Provide a standardized methodology for pre and post counts required by the Active Transportation Program (ATP). Allow agencies that have installed automated counters to store data in order to develop seasonal correction factors for short duration counts and other modal analysis.
- Provide an open data set for researchers interested in analyzing trends in bicycle and pedestrian trips and mode shift.

TABLE 10 **Strategies as Categorized by 5 E's**

Strategies	Education	Engineering	Enforcement	Equity	Emergency services
Reduce aggressive driving and speeding	●	●	●	●	
Improve safety for aging population	●	●		●	
Improve Bicyclists safety	●	●	●	●	
Improve Commercial Vehicles safety		●		●	
Reduce Distracted Driving	●		●		
Ensure Drivers are licensed	●		●		
Improve Emergency Response services					●
Improve research and data collection on Equipment – autonomous vehicles	●				
Reduce Impaired Driving fatalities	●	●	●	●	●
Improve safety at Intersections		●	●	●	
Reduce the occurrence of Lane departure fatalities	●	●		●	●
Improve Motorcycle safety	●		●		
Improve Occupant protection by increased use of seat belts and child safety seats	●		●		
Improve Pedestrian safety	●	●	●	●	
Improve Work Zone safety	●	●	●		●
Improve safety for Young drivers	●	●	●		

Source: SCAG,2020

- Support active transportation planning by providing a "one-stop-shop" of data commonly used in active transportation planning.

TRANSPORTATION INJURY MAPPING SYSTEM (TIMS)

Local jurisdictions are encouraged to utilize the Transportation Injury Mapping System (TIMS) developed by U.C. Berkeley to analyze collision data and measure progress for safety in their jurisdictions. The website can also be used to set safety targets for a city.

SCAG HIGH INJURY NETWORK

SCAG developed a High Injury Network to identify streets where the highest concentrations of collisions occur on the region's transportation network. The High Injury Network was used as a tool for targeted education campaigns by SCAG. SCAG encourages local jurisdictions to develop and analyze a High Injury Network to identify streets and focus the improvements on a subset of streets to enhance safety. Resources to how develop a High Injury Network are available on SCAG's website.

REGIONAL SAFETY LEADERSHIP SYMPOSIUM AND WORKSHOP SERIES

The Regional Safety Leadership Symposium was held at the J.W. Marriott in Palm Desert in conjunction with SCAG's General Assembly on Wednesday, May 1, 2019 from 11 a.m. – 5 p.m. The Regional Safety Leadership Symposium aimed to educate and encourage collaboration among local elected officials to support collision-reducing policies, strategies, and projects. SCAG aimed to inform elected officials or their high-level practitioner designees (e.g., City Managers or Planning Directors) about timely traffic safety issues in the SCAG region, and motivate action to improve safety at the city level through a Traffic Safety Pledge that identified a commitment to safety related actions. Approximately 100 attendees participated in the event which included elected officials and their designated staff. SCAG received 22 pledges on the day of the symposium.

SCAG also conducted four 5-6 hour workshops and two webinars to educate cities in the SCAG region about traffic safety issues and countermeasures to improve safety. These traffic safety workshops attracted the participation of about 170 government agency staff including city planners, law enforcements officers, traffic engineers, public works, public health and public informations officers. The purpose of these workshops was to educate agencies about traffic safety issues in the SCAG region and provide agencies with resources they could utilize to work towards enhancing safety in the region.

SCAG's Past President Hon. Michele Martinez, Hon. Cheryl Viegas-Walker, Director of the Western Riverside Council of Governments (WRCOG), Chris Gray and Hon. Meghan Sahli–Wells made keynote remarks at their respective workshops, speaking about the importance of investing in and prioritizing safety in communities. Workshop speakers highlighted best practices in the region and the importance of collaboration with cross departmental staff, including law enforcement, public information officers, public health staff, and city planning staff. Each workshop ended with attendees creating work plans for actionable next steps for improving safety in their respective communities. Resources from the workshops can be found on SCAG's website on the *Go Human* page.

GO HUMAN

Go Human is a community outreach and advertising campaign through SCAG, with the goals of reducing traffic collisions in Southern California and encouraging people to walk and bike more. SCAG hopes to create safer and healthier cities through education, advocacy, information sharing and events that help residents re-envision their neighborhoods.

SAFETY NEXT STEPS

SCAG'S STRATEGIC PLAN

SCAG aims to focus on the most challenging areas first through education and information sharing. Implemented in 2015, SCAG developed *Go Human,* an active transportation safety and encouragement campaign. The campaign's

goal is to increase the number of people walking and biking and decrease the number of collisions, injuries and deaths occurring throughout the region. The campaign utilizes a multipronged approach to achieve these goals, through education, advertising, temporary safety demonstrations and programming. The *Go Human* campaign makes several resources available to partner jurisdictions to implement these approaches:

- **Co-Branding –** SCAG has developed a focus-group tested, award winning advertising campaign that has been utilized across the region. The campaign materials prioritize safety messaging around key behaviors, informed by crash data analysis. SCAG continues to partner with jurisdictions to co-brand and print a variety of materials for distribution, including postcards, lawn signs, bus shelter ads, bus backs, banners and more.
- **Go Human Challenge –** SCAG's *Go Human* Challenge is a five-piece learning module that includes a variety of interactive, gamified stations and trivia. SCAG has made this learning tool available, at no cost, to loan to partner jurisdictions as a programming tool for community events.
- **Go Human Kit of Parts –** This resource is available to cities and jurisdictions across the region to borrow and install to temporarily showcase a variety of innovative design elements. The Kit, inclusive of modular elements, is designed for residents to test designs and support feedback efforts regarding use and support.
- SCAG's Safety Leadership Symposium and Safety Pledge.
- Safety Workshop and Webinar Series.

IMPLEMENTATION MONITORING

In preparation for the development of Connect SoCal, all 197 local jurisdictions within the SCAG region were asked to complete a Local Input Survey to gauge current progress toward implementation of regional sustainability goals as set forth in the 2012 RTP/SCS and 2016 RTP/SCS. Responses (reflective of a 60 percent response rate), illustrate Southern California's current performance implementing sustainability policies and strategies, at the regional level. To date, 38 jurisdictions have implemented a safety plan or safety target and six jurisdictions have implemented Vision Zero policies. These efforts allow SCAG to track and monitor safety performance for the region.

FUNDING RESOURCES

As SCAG is not an implementing agency and cannot provide funding for implementing safety improvements, SCAG encourages local jurisdictions to consider Federal, state and local funding resources available through various agencies. A detailed list of funding resources for safety can be found on SCAG's *Go Human* website under safety resources and work plan and other resources.

EVALUATE SAFETY TARGET SETTING PROCESS

By 2021, SCAG will know if the region's safety targets have been met. Once those targets have been met or not, SCAG will return to the target setting process and evaluate what more can be done. SCAG intends to use a safety model for future planning cycles. The model will forecast safety by incorporating changing trends in the economy, technology and other contributing factors.

BEYOND 2045

There are many technological changes that are anticipated that will affect the transportation safety and security landscape beyond 2045. Those include emerging technologies such as micromobility and automated/connected vehicle technology (ACV). Micromobility refers to transport mobility that comprise fleets of bicycles, electric bicycles (e-bikes) and/or electric scooters (e-scooters) that are available for short term rental. ACV technologies cover a range of enabling advancements that allow vehicles to operate without driver input and coordinate with other vehicles to achieve improvements in safety and throughput. The ACV term covers on-board sensing capabilities, data integration and vehicle to vehicle (V2V) communication.

Emerging technology continues to have the potential to expand transportation choices and equity throughout the region. By providing more options for local

and regional trips, emerging technologies may shift trips to less environmentally damaging modes, minimize negative environmental externalities associated with current vehicle use, increase system efficiency, improve safety, and reduce auto-related collisions and fatalities. However, realizing the potential benefits is dependent on the rate of technology development and adoption of a wide range of public and private sector innovations.

Safety and security considerations for emerging technologies include:

Privacy risks: The volumes of data being transmitted as a part of transportation technology systems can become at-risk for data breach if data is not protected.

Collision risks: While studies have shown that ACV will theoretically reduce collisions and fatalities (94 percent of collisions are due to human error1), if[2]), the data being transmitted to or from ACV could be tampered with or blocked, collisions could increase.

EXISTING CONDITIONS SECURITY

IMPACTS OF DISASTER ON INFRASTRUCTURE

SCAG is an extremely large and diverse region, with population of about 19 million residents. Natural or manmade disasters can have devastating impacts on our region's livelihood and infrastructure. It is critically important to protect our region's infrastructure in the form of transportation, utilities, communications, fuel, and water to provide the residents of this region with the quality of life they deserve. In addition, transportation infrastructure is critical to preserving life as it allows residents and goods to reach necessary destinations. Compromised infrastructure as a result of disaster may have impacts beyond the immediate SCAG region. Additionally, failure of multiple infrastructure components may result in a catastrophic impact to the mobility needs of the region. Some of the ways in which the infrastructure can be affected in a disaster or emergency are shown in the following tables.

Each instance of infrastructure damage may severely restrict the abilities of emergency responders to provide service following a disaster. Types of damages and their effects on emergency services are included in **TABLE 11.**

Basic assessments of the impacted areas are needed to produce an adequate emergency response to a disaster. An assessment of vulnerabilities to security and safety also may prevent or limit effects of a catastrophic incident as shown in **TABLE 12.**

TABLE 11 Possible Effects of Damage to Infrastructure

Service	Effect
Transportation	Inability to get emergency service personnel into the affected area
	Inability to transport victims away from the area
Electrical	Increased risk of fire and electrical shock
	Possible disruption to transportation system if downed lines are across roads
Water	Disruption of service to homes, businesses, and medical providers
	Increased risk to public health if there is extensive damage or contamination to supply
	Inadequate water supply for firefighting.
Fuel Supplies	Increased risk of fire or explosion from ruptured fuel lines
	Risk of asphyxiation from natural gas leaks in confined areas

Source: SCAG

2 U.S. Department of Transportation, National Highway Traffic Safety Administration (NHTSA). (2015). Critical Reasons for Crashes Investigated in the National Motor Vehicle Crash Causation Survey. Washington, DC: NHTSA

TABLE 12 Possible Impact of Damage on Emergency Services Providers

Type of Damage	Impact on Emergency Services
Roadways, Bridges, Tunnels, Interchanges	Inability to assess damage accurately
	Ambulances prevented from reaching victims and/or victims prevented from reaching emergency medical services
	Police prevented from reaching areas of civil unrest
	Fire departments prevented from getting to fires
	Flow of needed supplies is interrupted
	Inability to deploy assets as part of incident response and to manage transportation flows
	Inability for emergency service providers to manage an evacuation
Structural	Damaged hospitals unable to receive patients
	Increased risk of damage from falling debris
Disrupted Communication	Victims unable to call for help
	Coordination of services is hampered
	Inability for incident command structure to receive real time situational information, reducing its effectiveness
Fuel Line Damage	Fire and paramedic services overburdened
	Inability to sustain emergency response and recovery
Disrupted Water Service	Firefighting capabilities restricted
	Medical facilities hampered

Source: SCAG

Numerous agencies participate in the response to incidents and assist with hazard preparedness for individual jurisdictions. Collaboration occurs between many of these agencies. The Federal Emergency Management Agency (FEMA) oversees coordination. However, FEMA defines metropolitan areas and coordination different than the US Department of Transportation, limiting SCAG's ability to participate at an agency level. SCAG aims to utilize its strengths and organization to assist planners, first responders and recovery teams in a supporting role.

The United States has nearly 3.8 million square miles and has a population of nearly 327 million people. Its transportation systems continue to evolve and expand to accommodate its population, workforce and economy. Security of the nation's transportation systems and the lives of the people who use these systems are a top priority of government agencies at all levels. Transportation systems include airports, ports, waterways, rail, highways and pipelines. According to the Bureau of Transportation Statistics, the United States maintains more than four million miles of roadway (streets, roads, and highways), nearly 600 thousand bridges, 150 thousand miles of railway, more than 5,100 public airports, 2.4 million miles of gas pipelines, and more than 215 thousand miles of oil pipeline.

This region remains one of the largest economic engines in the United States and the world. In 2016 the region had a Gross Regional Product of more than $800 billion. Indeed, Southern California faces numerous challenges in maintaining its important role in the country and the world including the ability to prevent, or recover from catastrophic events. In the SCAG region, transportation infrastructure also encompasses a vast system:

Due to the vast expanse of transportation infrastructure, it would be physically and financially impossible to protect all transportation systems from natural disaster or human caused incidents. Consequently, there is a subset of transportation infrastructure that is of specific interest to national, state and regional leaders. These critical facilities vary in degree of importance. In the risk assessment section, critical facilities are examined for the Southern California region.

TABLE 13 System Statistics Overview

		System Statistics
Roadways and Freeways	Freeway Lanes Miles (excluding carpool)	11438 miles
	Carpool Lanes Miles (including HOT lanes)	1060 miles
	Road Lane Miles (arterials)	60421 miles
Public Transit	Buses	5549 of vehicles
	Metro Rail	87 miles and 80 stations
	Metrolink	512 miles and 56 stations
Aviation/Ports	Commercial/General Aviation Ports	57
	LAX ranks Among world's airports	5th in passengers and 14th in cargo
	Long Beach/Los Angeles ranks among world's container ports	5th

Source: SCAG

CRITICAL INFRASTRUCTURE

The USA PATRIOT Act of 2001, passed shortly after the terrorist attacks of September 11, defines critical infrastructure as:

"Systems and assets, whether physical or virtual, so vital to the United States that the incapacity or destruction of such systems and assets would have a debilitating impact on security, national economic security, national public health or safety, or any combination of those matters (Sec. 1016(e))."

Additionally, the national strategy for Homeland Security identified thirteen sectors of critical infrastructure as shown in **TABLE 14.**

While many sectors will be affected at one time or another during any type of incident or disaster, the scope of this section is specific to transportation infrastructure (e.g., aviation, maritime, mass transit, highway, freight rail, and pipeline).

Critical Transportation Infrastructure (CTI) consists of transportation facilities whose removal from service would severely impact the public safety, national security, economic activity, or environmental quality. Examples of Critical Transportation Infrastructure are shown in **TABLE 15.**

TABLE 14 Critical Transportation Infrastructure

1	Major arterial highways and bridges comprising the National Highway System (NHS), including Strategic Highway Network (STRAHNET) and National Intermodal Connectors.
2	International marine harbors, ports, airports and border crossings.
3	Major railroads, including depots, terminals and stations.
4	Oil and natural gas pipelines.
5	Transportation Control Systems (e.g., air traffic control centers, national control center).

Source: SCAG

TABLE 15 Critical Infrastructure Sectors

Agriculture	Information Technology and Telecommunications
Food	Energy
Water	Transportation
Public Health	Banking and Finance
Emergency Services	Chemical Industry and Hazardous Materials
Government	Postal and Shipping
Defense Industrial Base	

Source: The Department of Homeland Security

As with most regions of the world, the transportation infrastructure in Southern California plays a major role in its residents' quality of life. The region's expansive urban form makes travel critical to daily life. A failure in the transportation system as a result of natural disaster or human-caused event would bring significant disruptions to the quality of life of many individuals and adverse economic impacts for the region.

A number of plans, programs, organizations and infrastructure are in place within the SCAG region to provide safety and security of the regional transportation system for many potential situations. The following sections provide an overall summary of efforts to maintain and increase the transportation safety and security of the region.

STRATEGIC HIGHWAY NETWORK

The Strategic Highway Network (STRAHNET) routes within the SCAG region are essential to readily accommodate the movement of military supplies and personnel in times of national emergencies. STRAHNET routes were selected by the federal government, and include the National Interstate system, as well as key "non-interstate" routes and connectors to ports and military installations.

SCAG, through its planning processes, identifies the operation and maintenance needs of the interstate and state highway system within its jurisdiction, including STRAHNET. Within the SCAG region, all interstate facilities are part of the STRAHNET. Also, SR-14, SR-101 and Route 395 are part of the non-interstate STRAHNET routes. Various connectors between the ports as well as various military installations and STRAHNET are also included.

CALIFORNIA CRITICAL NEEDS ASSESSMENTS

There have also been several assessments of the critical state transportation infrastructure, which include identification of the key transportation facilities. Assessments have been conducted by the following bodies:

- The California Emergency Management Agency
- The California Attorney General's Office
- The California Highway Patrol (CHP) conducted a vulnerability assessment of the State's highway system and has issued a confidential report to the state legislature

The results of these assessments have been shared with the transportation system operators and incorporated into their security planning. However, security considerations have precluded the inclusion or discussion of these critical system elements in public documents.

UNITED STATES DEPARTMENT OF DEFENSE

The Department of Defense (DOD) has several installations within the SCAG region. In the case of a large scale emergency, the DOD is authorized to provide resources when response and recovery requirements are beyond the capabilities of civilian authorities, and these efforts do not interfere with the DOD's core mission or ability to respond to operational contingencies.

Requests for Defense Support to Civilian Authorities (DSCA) are made through the local, county and state authorities as a request for assistance to the federal coordinating official in the appropriate lead federal agency and is normally accompanied by, or submitted after a request from the Governor for a disaster declaration from the President. The Defense Coordinating Officer coordinates the DOD resources to be provided. The California National Guard may be activated as part of the DSCA and can provide law enforcement support, crisis management and consequence management services. Activation of the National Guard for local support during emergencies is done by the Governor via the California Office of Emergency Services.

INTERNATIONAL BORDER CROSSINGS

Within the SCAG region, there are three international ports of entry along the Mexico-Imperial County border: two at Calexico (Calexico and Calexico-East) and one at Andrade. Traffic from these ports enters California on the I-8 corridor. U.S. Customs and the Border Protection Agency within DHS are charged with the management and control of the official ports of entry. Security planning includes local emergency services as well as the CHP.

Caltrans District 11 has developed a Border Master Planning collaboration with local, state and federal stakeholders in the United States and Mexico. The plan established criteria to be used in future studies to coordinate and prioritize projects related to existing and new Ports of Entry (POEs) as well as roads leading to the California Mexico POEs. As part of the constrained portion of the 2016 RTP/SCS, improvements to the Calexico East Port of Entry are proposed including increasing the number of Commercial Vehicle inspection lanes and booths in an effort to ease border congestion. In 2019, SCAG completed the Calexico West Port-of-Entry Traffic Circulation Plan (TCP) in partnership with the Imperial County Transportation Commission (ICTC) to identify routes to provide direct, less congested, safe, and timely crossings for transportation modes including autos, commercial vehicles, bicycles and pedestrians for the newly expanded and reconfigured Calexico West POE.

In addition, as part of Caltrans *Border Infrastructure Needs Assessment,* safety is identified as an evaluation criterion amongst other variables to help prioritize projects along the Mexico-Imperial County border. Future projects will consider operational improvements, design and retrofitting of border crossings, as well as roadway improvements designed to ease congestion at border crossings.

SEAPORTS

DHS has designated the Ports of Long Beach, Los Angeles and Hueneme as at risk for potential terrorist actions. Security at the ports is the joint responsibility of the U.S. Coast Guard, the U.S. Customs and Border Protection Agency, federal and state Homeland Security offices, Port police agencies, Harbor Patrols, and emergency service agencies. The U.S. Coast Guard leads the local Area Maritime Security Commission which coordinates activities and resources for all port stakeholders.

The Port of Los Angeles is unique in that it has a dedicated police force, the Los Angeles Port Police, to patrol the area within the jurisdiction of the Port of Los Angeles. The Port Police enforces federal, state and local public safety statutes as well as environmental and maritime safety regulations in order to maintain the free flow of commerce and produce a safe, secure environment that promotes uninterrupted Port operations. In addition, the Port Police partners with other law enforcement agencies such as the Los Angeles Police Department, California Highway Patrol, and Customs and Border Protection in the Cargo Theft Interdiction Program (CTIP), which investigates cargo theft, and the High Intensity Drug Trafficking Area, which targets drug trafficking at the Ports of Los Angeles and Long Beach. Furthermore, per the Maritime Transportation Security Act of 2002, the Port of Los Angeles works with the Coast Guard to develop security plans for facilities at the port.

Similar to the Port of Los Angeles, security at the Port of Long Beach entails physical security enhancements, police patrols, coordination with federal, state and local agencies to develop security plans for the port area and investigate suspicious incidents, and obtaining federal funding to pay for these enhancements. As with the Port of Los Angeles, the Port of Long Beach works with the Coast Guard to develop security plans for facilities at the port.

In contrast to the Port of Los Angeles, however, the Port of Long Beach does not have its own dedicated police force. Instead, the Long Beach Police Department is responsible for patrolling the port area. In doing so, the Port reimburses the Long Beach Police and Fire Departments for their port-related activities and expenses. The Port also funds its own Harbor Patrol to supplement law enforcement work conducted by other agencies such as the Coast Guard.

In addition, several programs are in place to effectively monitor and screen seaport cargo. They include:

- **Investigations:** The federal Container Security Initiative (CSI) directs Customs agents, working with host governments, to inspect and examine all cargo containers deemed high-risk before they are loaded on U.S.-bound vessels. The CSI contains four core elements: Identifying high-risk containers; pre-screening containers before they reach U.S. ports of entry; using technology to pre-screen high-risk containers; and developing and using smart and secure containers.
- **Inspections:** The 24-hour rule requires manifest information on cargo containers to be delivered to U.S. Customs 24 hours before the container is loaded onto a vessel in a foreign port. Customs has the right to stop any container from being loaded, for any reason, while the

container is still overseas.

- **Partnerships:** Most of the largest U.S. importers and their trading partners participate in the Customs-Trade Partnership Against Terrorism (C-TPAT), a public-private partnership designed to improve security standards throughout the cargo supply chain.
- **Technology:** U.S. Customs uses X-ray, gamma ray and radiation-detection devices to screen incoming cargo at U.S. ports.

AIRPORTS

Airport security planning is the joint responsibility of the federal Transportation Security Administration (TSA), the airlines and the individual airports. There are seven airports in the SCAG region offering scheduled commercial service. In addition, over 50 general aviation and reliever airports in the region are available for public use, including some of the most active general aviation airports in the country. Airports in the SCAG region have upgraded their security systems since the September 11, 2001 terrorist attacks using a variety of strategies in conjunction with local, state and federal law enforcement.

In addition, airports serve a vital role in recovery efforts. Airports can serve as evacuation centers, and if in working order after an incident, can serve as staging centers for relief efforts. Large flat areas at airports provide excellent staging areas for emergency relief including supplies and equipment, in addition to the staging of aerial relief fleets such as helicopters.

TRANSPORTATION MANAGEMENT CENTERS

Caltrans, in conjunction with the California Highway Patrol (CHP), has created Transportation Management Centers (TMCs) to rapidly detect and respond to incidents while managing the resulting congestion. TMCs serve as the nerve center for our urban freeway and highway systems. Real time information is gathered from many sources such as electronic sensors in the pavement, freeway call boxes, video cameras, 911 calls, officers on patrol, Caltrans highway crews, ramp meter sensors, earthquake monitors, motorist cellular calls, and commercial traffic reporters, which is sent to the TMC 24-hours a day, seven days a week.

With the help of ITS technologies such as electronic sensors in the pavement, freeway call boxes, video cameras, ramp meter sensors, earthquake monitors, motorist cellular calls, and commercial traffic reports, as well as Caltrans highway crews, 9-1-1 calls and officers on patrol, the TMC provides coordinated transportation management for general commutes, special events and incidents affecting traffic. The TMCs are operated within each Caltrans district. For the SCAG region, Districts 7, 8, 11 and 12 all have TMCs.

RAIL AND MASS TRANSIT SECURITY

Rail and mass transit systems have long been an attractive target for terrorists and criminals. Since the early 1990s, the California Public Utilities Commission has required that transit agencies operating rail systems prepare a comprehensive System Safety Program Plan (SSPP) that also included a security component.

Most transit agencies have a security and emergency management plan, which details how the agency would coordinate with first responder (law enforcement and fire) agencies, their respective County Office of Emergency Services, and the statewide Standardized Emergency Management System (SEMS).

Transit agencies that apply for DHS Transit Security Grants Program (TSGP) funds are required to develop a regional transit security strategy. Several transit agencies within the SCAG region have worked together to develop a regional transit security strategy. The Federal Highway Administration and Federal Transit Administration (FHWA/FTA) require Metropolitan Planning Organizations, such as SCAG, to be consistent with transit safety and security planning and to review processes, plans and programs, as appropriate.

After the Chatsworth Metrolink train crash, the federal government initiated a requirement for train operators to develop and implement Positive Train Control (PTC) on their locomotives. PTC is an automated system that can stop a locomotive if the engineer does not respond to warning signals. Fortunately, since the 2016 RTP/SCS was adopted, Metrolink became the first commuter

railroad in the nation to implement PTC. SCAG anticipates this will eventually expand to light rail and integration of PTC into the regional ITS Architecture.

THREATS AND HAZARDS

As part of this section, an overview of local plans as related to threats and hazards resulting from disasters affecting transportation infrastructure will be presented. The list of threats/hazards that can disrupt regional continuity has been divided into three categories:

- Natural
- Accidental Technological/Infrastructure Failure
- Terrorism and Behavioral

The Transportation Research Board has classified emergency events that affect transportation agencies into several categories as shown in **TABLE 16.**

ASSET CATEGORIES AND DESCRIPTIONS

As previously mentioned, the United States' transportation network is vast and expansive. Because millions of passengers and goods use some aspect of the transportation sector each year, critical transportation assets have become highly attractive targets for terrorist attacks.

As outlined in the Transportation Systems Sector-Specific Plan, the transportation systems sector has been divided into six key sub-sectors: aviation, freight rail, highway, maritime, mass transit and pipeline. Identified below are 15 critical transportation assets found within the SCAG region that fall within one of the sub-sectors:

- Public roads/highways
- Bridges/interchanges/overpasses/tunnels
- Traffic management and operations centers
- Intelligent Transportation Systems
- Airports

TABLE 16 Emergency Events Impacting Transportation Agencies

Naturally Occurring	Intentional	Human Caused Accidental/ Non-Intentional
Earthquake	Bomb threat/other threat of violence	Accidental contamination or hazardous materials spills
Flood	Fire/arson	Accidental damage to or destruction of physical plant and asset(s)
Storm surge	Riot/civil disorder	Accident that affects transportation system
Hurricane/typhoon	Sabotage (external and/or internal actors)	Gas outage
Ice storms	Security breach	HVAC system failure or malfunction
Snow storm/blizzard	Cyber attack	Inappropriate training on emergency procedures
Landslide/mudslide	Terrorist assault using explosives, firearms, or conventional weapons	Power outage
Naturally occurring epidemic/pandemic	War	Software/hardware failure or malfunction
Tornadoes	Workplace violence	Unavailability of key personnel
Tsunamis		Uninterruptible power supply (UPS) failure or malfunction
Volcanic eruptions		Voice and data telecommunications failure or malfunction
Wildfires		Water outage

Source: Transportation Research Board (TRB)

- Mass transit bus and rail facilities (public)
- Mass transit bus and rail facilities (operations and maintenance)
- Bus and rail transit vehicles
- Port and harbor facilities
- Rail freight vehicles
- Rail cargo facilities
- Rail tracks and alignments
- Intermodal connections
- Pipelines

With all of these different critical transportation assets located throughout the SCAG region and which people depend upon for continuity of life, it can be a difficult task to determine which ones are most vulnerable to threats/hazards.

As can be seen by performing risk assessments, the critical transportation assets that become the most important to protect are the ones that are used by the greatest number of people, contribute significantly to the economic well-being of the region, and provide the greatest connectivity between all of the different transportation components.

APPLICABILITY OF THREATS TO ASSETS

Based on review of local and state documents, including hazard mitigation plans, the potential threats/hazards within the SCAG region have been pre-identified. As mentioned earlier, SCAG is in a great position to coordinate the cooperation of relevant agencies, particularly transportation and emergency management, throughout the six counties of the SCAG region. Coordination throughout the SCAG region is vital due to the interconnectedness of transportation critical infrastructure located throughout the SCAG region.

ANALYTICAL APPROACH SECURITY

SECURITY AND EMERGENCY PREPAREDNESS

SCAG's Regional Preparedness Goal is stated as, "to achieve and sustain at risk target levels of capability to prevent, protect against, respond to, and recover from major human-caused or natural events in order to minimize the threat and impact to lives, property and the region."

Prior to the September 11, 2001 terrorist attacks on the United States, there was not a single incident that impacted transportation facilities as result of a national consequence. Prior aircraft incidents involved hostage taking or placing explosives on the plane. The use of passenger aircraft as missiles, and recent transit related terrorism in other countries created a new awareness of the vulnerabilities of transportation facilities.

As concerns about the threat of terrorism have grown, government agencies at all levels have taken new measures to secure the welfare of its citizens. Hurricanes Katrina and Sandy and other natural disasters have also brought attention to how critical emergency preparedness is to the response and recovery from a catastrophic event. Transportation and transit agencies throughout the United States are taking increased steps to protect their facilities against the threats of crime, terrorist activity, and natural disasters.

As stated earlier, there are numerous agencies that have been developed to participate in the response of a disastrous event and assist with hazard preparedness for individual jurisdictions.

CALIFORNIA EMERGENCY MANAGEMENT AGENCY

Domestic security at the state government level in California is primarily handled by the California Emergency Management Agency (EMA). The role of EMA is to coordinate overall state agency responses to major disasters in support of local government. The office is responsible for assuring the state's readiness to respond to and recover from natural, man-made, and war-

caused emergencies, and for assisting local governments in their emergency preparedness, response and recovery efforts. The EMA serves as the central contact point in the state for any emergency or imminent disaster. It coordinates the notification of appropriate state administering agencies that may be required to respond, as well as the emergency activities of all state agencies in the event of an emergency.

In doing so, the EMA does not focus on security specifically, but rather more broadly on addressing all potential incidents that could impact the state, such as earthquakes, fires, floods, and terrorist attacks. Furthermore, EMA coordinates with federal agencies such as the Department of Homeland Security and Federal Emergency Management Agency, as well as other state and local agencies such as the California Highway Patrol.

The EMA released the 2010–2015 Statewide Emergency Management Strategic Plan, which outlines California's vision, mission, principles for emergency management, as well as goals and objectives for the period of 2010-2015. In addition to the strategic plan, EMA has released a local planning guide on terrorism, which provides guidance to local cities in planning for potential terrorist acts.

The EMA is required to develop model guidelines for local government agencies and community based organizations to develop a (voluntary) disaster registry program for long-term and community health facilities and for individuals that are disabled or elderly. Individuals registered in the program should be prepared to be self-sufficient for at least 72 hours.

MULTI-HAZARD MITIGATION PLANS

Mitigating hazards before the occurrence of a disaster is the primary step in preparing for emergencies, rather than the final step of recovery. The goal of hazard mitigation plans is to guide implementation activities in order to achieve the greatest reduction of vulnerability, which will result in saved lives, reduced injuries, reduced property damage, and greater protection of the environment.

FEMA requires state and local governments to develop hazard mitigation plans and update them every three years. The Disaster Mitigation Act of 2000 (DMA 2000), Section 322 (a-d) requires that local governments, as a condition of receiving federal disaster mitigation funds, have a mitigation plan that describes the process for identifying hazards, risks and vulnerabilities; identifies and prioritizes mitigation actions; encourages the development of local mitigation; and provides technical support for those efforts. "Local Governments" are defined in the DMA 2000 to typically include counties, local municipalities, and tribal governments; but can also include other local agencies and organizations, including Councils of Governments, schools and other special districts.

California updated its State of California Multi-Hazard Mitigation Plan in 2018. The state is required to adopt a federally-approved State Multi-Hazard Mitigation Plan to be eligible for certain disaster assistance and mitigation funding. The Plan is an evaluation of the hazards California faces and the strategies, goals and activities the state will pursue to address these hazards. The Plan:

- Documents statewide hazard mitigation planning in California
- Describes strategies and priorities for future mitigation activities
- Facilitates the integration of local and tribal hazard mitigation planning activities into statewide efforts
- Meets state and federal statutory and regulatory requirements

All six SCAG counties and a number of cities within the SCAG region have completed Hazard Mitigation Plans. EMA dictates that these plans must also be updated every three years.

COUNTY OFFICES OF EMERGENCY SERVICES

Counties and cities are the first responders to any security or emergency situation. These responders include fire departments, police and sheriff department, hospitals, ambulance services and transportation agencies. Coordination among public and private agencies within various cities and counties makes the most use of all available resources in the event of any emergency.

While each city and county has their own security procedures, the policies are

generally similar. Mutual Aid agreements between cities, counties and private organizations help to maximize resources and reduce the human suffering associated with disaster situations. Each SCAG county has a department in charge of security and emergency response.

NATIONAL INCIDENT MANAGEMENT SYSTEM / STANDARDIZED EMERGENCY MANAGEMENT SYSTEM

The National Incident Management System (NIMS) is a tool for states, counties and local jurisdictions to respond to catastrophic events through better communication and coordination.

NIMS provides a consistent nationwide template to enable federal, state, local and tribal governments, and private-sector and nongovernmental organizations to work together effectively and efficiently to prepare for, prevent, respond to and recover from domestic incidents, regardless of cause, size or complexity, including acts of catastrophic terrorism.

California has a similar management system called the Standard Emergency Management System (SEMS) which is mandated under California Government Code Section §8607(a). State of California Executive Order S-2-05 requires the state to integrate, to the extent appropriate, the NIMS, into the State's SEMS.

The NIMS Integration Center strongly recommends that all elected officials who will be interacting with multiple jurisdictions and agencies during an emergency incident to take the following NIMS courses, at a minimum:

- FEMA IS-700: NIMS, an Introduction
- ICS-100: Introduction to Incident Command System (ICS) or equivalent

(Note: FEMA IS-700 "NIMS, and Introduction" and ICS-100 are used extensively in the development of this section)

All federal, state, local, tribal, private sector and non-governmental personnel with a direct role in emergency management and response must be NIMS and ICS trained. This includes all emergency service related disciplines such as Emergency Medical Technicians (EMTs), hospitals, public health, fire service, law enforcement, public works/utilities, skilled support personnel, and other emergency management response, support and volunteer personnel.

The NIMS employs two levels of incident management, depending upon the type of incident.

Incident Command System (ICS) is a standard, on scene, all-hazard incident management system. ICS allows users to adopt an integrated organizational structure to match the needs of single or multiple incidents.

Multi-Agency Coordination Systems are a combination of facilities, equipment, personnel, procedures and communications integrated into a common framework for coordinating and supporting incident management.

ICS has been in use for over 30 years and is used for planned events, fires, earthquakes, hurricanes, acts of terrorism, etc. ICS helps all responders communicate and effectuate logistics.

NIMS requires all emergency plans and standard operating procedures to incorporate NIMS components, principles and policies; include emergency planning, training, response, exercises, equipment, evaluation and corrective actions. Chief elected and appointed officials in a community need to be directly involved in these NIMS preparedness elements, especially the elements that deal with exercising community emergency management policies, plans, procedures and resources. It is important to recognize that the NIMS is a dynamic system, and the doctrine as well as the implementation requirements will continue to evolve as emergency management capabilities change.

MUTUAL AID AGREEMENTS (MAA)

Immediately following the 1994 Northridge earthquake, city and county emergency managers in the Governor's Office of Emergency Services (EMA) Coastal, Southern, and Inland Regions developed a coordinated emergency management concept called the Emergency Managers Mutual Aid (EMMA) system. EMMA provided a valuable service in the emergency response and recovery efforts at the Southern Regional Emergency Operations Center (REOC),

local Emergency Operations Centers (EOCs), the Disaster Field Office (DFO), and community service centers. The purpose of Emergency Managers Mutual Aid (EMMA) is to support disaster operations in affected jurisdictions by providing professional emergency management personnel. In accordance with the Master Mutual Aid Agreement, local and state emergency managers have responded in support of each other under a variety of plans and procedures.

The objectives of the EMMA Plan include:

- Providing emergency management personnel from unaffected areas to support local jurisdictions, Operational Areas, and regional emergency operations during proclaimed emergencies.
- Providing a system, including an organization, information and forms necessary to coordinate the formal request, reception, assignment and training of assigned personnel.
- Establishing a structure to maintain this document (the Emergency Managers Mutual Aid Plan) and its procedures. Providing for the coordination of training for emergency managers, including Standardized Emergency Management System (SEMS/NIMS) training, emergency management course work, exercises, and disaster response procedures.
- Promoting professionalism in emergency management.

The transportation sector, as are other critical sectors of the country, is continuously striving to improve prevention, preparedness, response, recovery and mitigation capabilities at all levels of society. As is discussed below, MPOs can play a significant role in promoting preparedness and recovery capabilities.

INTELLIGENT TRANSPORTATION SYSTEMS (ITS) RELATED TO SECURITY

In 2018, SCAG initiated a comprehensive update of its multi-county Regional ITS Architecture. Expected to be completed in late 2019, it will be the product of coordination between major stakeholders in the region, including all six counties. It will also incorporate recent updates to the National ITS Architecture, which is now an integrated framework called the Architecture Reference for Cooperative and Intelligent Transportation (ARC-IT) and incorporates the previously separate Connected Vehicle Reference Implementation Architecture. The SCAG update effort takes an exhaustive account of our current ITS security assets, as well as needs, challenges, opportunities and plans for the future of ITS security in the region. Several ITS programs contain security elements. Some examples are: express lanes, Positive Train Control (PTC), non-motorized transportation technologies and new cross-county services. Planned security-related ITS projects identified by SCAG and its regional stakeholders include critical transportation infrastructure surveillance and information dissemination, port security systems enhancements, rail infrastructure security, multi-agency video sharing and distribution, regional rail grade crossing security, and a security threat and guidance clearinghouse. A more exhaustive list can be found in the forthcoming "Southern California Regional Intelligent Transportation Systems (ITS) Architecture Update" and in the Congestion Management Program (CMP) Technical Report of Connect SoCal.

REGULATORY FRAMEWORK FOR SECURITY

On December 4, 2015, President Obama signed into law the Fixing America's Surface Transportation Act (FAST Act), which authorized federal surface transportation programs for highways, highway safety, and transit for a 5-year period (2016-2020). Like MAP-21, the previous transportation authorization law, the FAST Act included an emphasis on safety and security. Though rulemaking is not yet available for the FAST Act, we anticipate that it may be similar to MAP-21 and require that MPOs develop a metropolitan planning process that provides for consideration of projects and strategies that are consistent with the Highway Safety Improvement Program (HSIP). Under MAP-21, the metropolitan transportation planning process needed to be consistent with the Strategic Highway Safety Plan and other transit safety and security planning and review processes, plans, and programs, as appropriate.

SCAG'S ROLE IN SECURITY

SCAG does not have a direct role in first response or emergency management. As an MPO, SCAG can potentially play a role in providing a coordinating forum working with the region's transportation agencies and planning agencies. In this role, SCAG could offer the capacity to identify policy directions and conduct planning regarding resource needs. In addition, the agency's Geographic Information Systems and transportation modeling expertise offers a regional tool that may support security and emergency management planning and deployment and evacuation preparedness and response.

INFORMATION SHARING ROLE

The region's transportation system is both an asset that needs to be protected from catastrophic events, as well as a resource used to respond to such events. SCAG's primary focus is on planning for this transportation system. As the regional planning agency for transportation, SCAG houses a wealth of transportation related data and information that could be brought to bear in planning for and preparing for emergency events. Thus, SCAG should be viewed as a resource agency that can provide meaningful assistance in preparing emergency preparedness, prevention and evacuation plans.

REGIONAL SECURITY PLANNING

While there are a number of agencies that have direct roles in safety and security operations, there is no single entity that focuses on broad policies related to disaster prevention and response within the region. SCAG could partially fill this void in conjunction with its role in security planning as part of its broader transportation planning responsibilities.

SCAG could help bring situational awareness of security to the region for the array of potential disasters. This recognizes the fact that the region's ITS planning and deployments provide an opportunity for the region to leverage this investment to enhance situational awareness and further the efforts of the emergency management community.

SCAG's active role in the security planning process (within the policy arena) would require:

- Emphasizing transportation as a resource and itself as a stakeholder in security planning and operations.
- Educating officials about transportation-related issues with regards to safety and security.
- Participating in a regional security working group.
- Assisting with the identification of opportunities and resources that support emergency management.
- Leveraging federal funds to support security preparedness.
- Increasing its knowledge of best practices and how to implement them, and then identifying its role with regard to their implementation.
- SCAG would also increase its role as a data source and further serve as a clearinghouse for various types of data sets.
- SCAG would play a role in supporting situational awareness for safety and security purposes by using geospatial data.

REGIONAL PREPAREDNESS

SCAG's regional preparedness goal is to prevent, protect, respond and recover from major human-caused or natural events in order to minimize the threat and impact to lives, property, the transportation network and the regional economy. Its transportation security plans will help ensure that there is a productive movement of persons and goods when a disastrous event strikes the region. SCAG has the following opportunities to elevate its role in the region and its ability to provide a policy forum and serve as a data clearinghouse:

- Develop proactive transportation security strategies that support economic vitality in the region.
- Enhance the effectiveness of agencies responsible for security preparedness and emergency response.
- Ensure that regional transportation technology investments meet the

needs of emergency responders through interoperable, robust and strategically redundant ITS and communications infrastructure.

- Provide a regional forum for members of the transportation and emergency management communities to coordinate transportation and security initiatives, and to reach agreement on how to work more closely together during the decision notification process prior to and following an event.
- Update the regional ITS architecture and associated County architectures, describing specific systems interoperability requirements to support regional safety and security objectives.

LIFELINE MITIGATION ACTION PLAN

Earthquakes and earthquake preparedness are a way of life for Southern California's people, governments and industries. Very large earthquakes (M>7.5) on the San Andreas Fault are both the most uncommon and potentially the most devastating to the region and the nation. The San Andreas fault is fastest moving fault in California – big earthquakes happen somewhere on the San Andreas Fault on average twice per century. They can be the most devastating because the fault is the longest fault in the state extending through some of the most populous areas. The magnitude represents the total energy released in the earthquake and is controlled by the area of the fault rupture, so a longer fault produces a bigger earthquake. When a fault ruptures in an area populated with 20 million – such as Southern California – the risk of loss of life and property is the greatest in the nation. In fact, Southern California has more than 300 faults, including the San Andreas, which makes the region one of the most prone to earthquake risk in the continental United States.

Lying at the base of the San Gabriel and San Bernardino Mountains, the San Andreas Fault intersects all of the critical infrastructure, known as "lifelines," coming into the Los Angeles region -- aqueducts, power transmission, transportation, fuels, and communication lines. The San Andreas Fault cuts across at the narrowest part of the Cajon Pass, which means that all the lifelines critical to the Los Angeles region that cross the mountains at Cajon Pass also cross the San Andreas Fault within 400 meters of each other. The Cajon Pass is also unique in that it is a federally designated utility corridor1. If the failure of one lifeline critical to the Los Angeles region has consequences for another, that interaction will be most likely to happen at Cajon Pass. Because an earthquake is caused by movement across a fault, these critical lifelines will break at all San Andreas Fault crossings. It is therefore essential to develop appropriate mitigation strategies for all critical lifelines to the Los Angeles region in advance of this event.

The consequences of a major San Andreas earthquake for Southern California were analyzed almost ten years ago in the ShakeOut Scenario (Jones et al, 2008). Based upon the assumptions at this time, it was estimated that approximately $213 billion in economic losses; 53,000 casualties; and 1,800 fatalities would be incurred. That scenario has been used as the basis of planning and exercises for hundreds of organizations within the Los Angeles region for earthquake preparedness planning. Using ShakeOut as a catalyst, agencies now recognize various opportunities to reduce future losses by mitigating some of the identified weaknesses.

In 2016, SCAG, in partnership with the Dr. Lucy Jones Center for Science and Society, launched a new initiative to help local cities and counties protect Southern California communities and economies from the disruption that a major earthquake would cause. The initiative provides local leaders tools that can assist them in building the resilience that keeps natural disasters from becoming catastrophes. One part of the project was focused on how cities can work with utility providers to mitigate the likelihood of significant disruption to lifeline services to the Los Angeles region in the event of a major earthquake.

In 2016, recognizing the significance of this vulnerability for the region, the Southern California Association of Governments (SCAG) approached the Dr. Lucy Jones Center for Science and Society (DLJCSS) to explore possible initiatives to reduce this vulnerability. SCAG and DLJCSS convened a working group of utilities to conduct a pilot project at the Cajon Pass. The San Andreas Fault cuts across at the narrowest part of the Pass, which means that most of the lifelines that cross the mountains at Cajon Pass also cross the San Andreas Fault within 400 meters of each other. If the failure of one lifeline has consequences for another, that interaction will be most likely to happen at Cajon Pass.

The working group developed following action items which are as below,

- Develop a GIS form that includes the data and detailed locations of landslides and fault offsets from the ShakeOut Scenario for easy use by utilities
- Identify mitigation stakeholders that can support initiatives
- Transition the Lifeline Mitigation Workgroup into the Critical Lifelines Workgroup – Mitigation Subcommittee chaired by Craig Davis (LADWP), Marisa Aho (LA City), and Kate Long (CalOES) to include additional lifelines and partners from local, state, federal levels, then set regular meetings to refine and enact priorities
- Convene response agencies to identify the mitigation that would have the biggest impact on their response
- Initiate joint planning by lifeline operators to identify effective means of stockpiling mitigation-related assets to facilitate repair.
- Expand existing studies to acquire a more detailed landslide vulnerability analysis in the Cajon Pass
- Conduct an economic analysis of the impact of closing Cajon Pass for one day, one week, and one month.
- Get a fire analysis from USFS to determine which are the most important factors in controlling or isolating the fire

PROMOTER OF REGIONAL ITS SOLUTION

SCAG also envisions developing a comprehensive ITS, as SCAG controls the regional ITS architecture, funding, and programming. Major elements of SCAG's role include:

- Identifying more command and control for Critical Transportation Infrastructure (CTI).
- Developing mechanisms to make data available through Traffic Management Centers (TMC) to assist first responders and training first responders to take advantages of these resources.
- Identifying system detection gaps and using this to prioritize funding.
- Prioritizing command and control infrastructure through funding.
- Supporting County Office of Emergency Services through the programming and planning of funding to TMCs and other activities.

Continuity of government is another area SCAG may be able to provide leadership within the region. There is a lack of agreement between agencies for mutual aid (in many cases, especially in the transportation arena). SCAG could play a role in facilitating this process and identifying needs and prioritizing agreements and planning at the regional and sub-regional level between agencies, particularly for long-term recovery after events.

REGIONAL PROVIDER OF DATA AND INFORMATION

SCAG has been a leader in the development of regionally significant data resources, research, and data trainings for Southern California, both as an affiliate with the California State Data Center, as well as through SCAG's Future Communities Initiative. This program is an $8 million effort to promote the use of data and new technology at the local level to enhance data driven decision making. Aspects include technology grants, data trainings and fellowships to serve local jurisdictions, university partnerships in SCAG and the City of Los Angeles' data science federation, and a regional data platform. Overall, SCAG's strategic goal is serve as the region's foremost data repository, as adopted in the agency's most recent strategic plan. SCAG has a strong desire and commitment to be a major data repository. However, SCAG will undertake this role where and if appropriate to facilitate the planning processes and activities of local and regional stakeholders. SCAG's goal is to be an acquirer and source for regional level data and information. This role is consistent with the one mentioned earlier in this section.

Several relevant transportation and security planning documents illustrate that SCAG has a challenging task in serving the region. It also has a tremendous opportunity to not only serve the region in transportation security planning efforts but to serve as an example for the rest of the nation. As mentioned

above, federal mandates have recently passed to make security planning part of the purview of MPOs. However, the mandates do not clearly delineate the roles and steps of MPOs. Essentially, SCAG will be breaking new ground in shaping its role in the arena of transportation security planning.

SECURITY STRATEGIES

SCAG has developed an action plan and policies detailing eight measures that the agency will undertake in the regional transportation security planning.

- SCAG should help ensure the rapid repair of transportation infrastructure in the event of an emergency.
  - SCAG, in cooperation with local and state agencies, should identify critical infrastructure needs necessary for emergency responders to enter the region, the evacuation of affected facilities and the restoration of utilities.
  - SCAG, in cooperation with CTCs, state and federal agencies should develop a transportation recovery plan for the emergency awarding of contracts to rapidly and efficiently repair damaged infrastructure.
- SCAG should continue to deploy and promote the use of ITS technologies that enhance transportation security.
  - SCAG should work to expand the use of ITS to improve surveillance, monitoring and distress notification systems and to assist in the rapid evacuation of disaster areas.
  - SCAG should incorporate security into the Regional ITS Architecture.
  - Transit operators should incorporate ITS technologies as part of their security and emergency preparedness and share that information with other operators.
  - Aside from deploying ITS technologies for advanced customer information, transit agencies should work intensely with ethnic, local and disenfranchised communities through public information/ outreach sessions ensuring public participation is used to its fullest. In case of evacuation, these transit dependent persons may need additional assistance to evacuate to safety.
- SCAG should establish transportation infrastructure practices that promote and enhance security.
  - SCAG should work with transportation operators to plan and coordinate transportation projects, as appropriate, with the Department of Homeland Security grant projects, to enhance the Regional Transit Security Strategy (RTSS).
  - SCAG should establish transportation infrastructure practices that identify and prioritize the design, retrofit, hardening and stabilization of critical transportation infrastructure to prevent failure, to minimize loss of life and property, injuries and avoid long term economic disruption.
- SCAG should establish a forum where policy-makers can be educated and regional policy can be developed.
  - SCAG should work with local officials to develop regional consensus on regional transportation safety, security and safety/security policies.
- SCAG will help enhance the region's ability to deter and respond to acts of terrorism and human-caused or natural disasters through regionally cooperative and collaborative strategies.
  - SCAG should work with local officials to develop regional consensus on regional transportation safety, security and safety/security policies.
  - SCAG should encourage all SCAG elected officials to be educated in National Incident Management System (NIMS).
  - SCAG should work with partner agencies, federal, state and local jurisdictions to improve communications and interoperability and to find opportunities to leverage and effectively use transportation and public safety/security resources in support of this effort.
- SCAG will work to enhance emergency preparedness awareness among public agencies and with the public at large.
  - SCAG should work with local officials to develop regional

consensus on regional transportation safety, security and safety/security policies.

  - SCAG should work to improve the effectiveness of regional plans by maximizing the sharing and coordination of resources that would allow for proper response by public agencies.
  - SCAG should encourage and provide a forum for local jurisdictions to develop mutual aid agreements for essential government services (including in the transportation arena) during any incident recovery.
- SCAG will help to enhance the capabilities of local and regional organizations, including first responders, through provision and sharing of information.
  - SCAG should work with local agencies to collect regional GeoData in a common format, and provide access to the GeoData for emergency planning, training and response.
  - SCAG should develop and establish a regional information sharing strategy, linking SCAG and its member jurisdictions for ongoing sharing and provision of information pertaining to the region's transportation system and other critical infrastructure.
- SCAG should provide the means for collaboration in planning, communication and information sharing before, during or after a regional emergency.
  - SCAG should develop and incorporate strategies and actions pertaining to response and prevention of security incidents and events as part of the on-going regional planning activities.
  - SCAG should offer a regional repository of GIS data for use by local agencies in emergency planning and response, in a standardized format.

SCAG™

INNOVATING FOR A BETTER TOMORROW

MAIN OFFICE

900 Wilshire Blvd., Ste. 1700
Los Angeles, CA 90017
Tel: (213) 236-1800

REGIONAL OFFICES

IMPERIAL COUNTY
1405 North Imperial Ave., Ste.104
El Centro, CA 92243
Tel: (213) 236-1967

ORANGE COUNTY
OCTA Building
600 South Main St., Ste. 741
Orange, CA 92868
Tel: (213) 236-1997

RIVERSIDE COUNTY
3403 10th St., Ste. 805
Riverside, CA 92501
Tel: (951) 784-1513

SAN BERNARDINO COUNTY
1170 West 3rd St., Ste. 140
San Bernardino, CA 92410
Tel: (213) 236-1925

VENTURA COUNTY
4001 Mission Oaks Blvd., Ste. L
Camarillo, CA 93012
Tel: (213) 236-1960

CONNECT SoCal

TECHNICAL REPORT

TRANSPORTATION SAFETY AND SECURITY

PROPOSED FINAL

connectsocal.org

PLEASE RECYCLE 2907 2020.05.12