

APPENDIX IV
PERFORMANCE MANAGEMENT

Transportation Performance Management

The Moving Ahead for Progress in the 21st (MAP-21) is the Federal transportation funding bill signed into law in 2012. A key feature of MAP-21 is the establishment of a performance- and outcome- based program, known as “Performance Based Planning”, with the objective to invest in projects that will make progress toward the achievement of the national goals for the transportation. The most recent Federal transportation bill, Fixing America’s Surface Transportation Act of 2016 (FAST Act), carries forward the same performance management framework. The Federal Highway Administration (FHWA) worked with state and regional agencies to identify performance measures that meet the requirements. Beginning in 2018, state Departments of Transportation (DOTs) and Metropolitan Transportation Organizations (MPOs) will be required to implement the Federal performance measures.

Transportation Performance Management (TPM) is defined by FHWA as a strategic approach that uses information to make investments and policy decisions to achieve national performance goals. Three sets of performance measures are part of the TPM Regulations as “Performance Management” (PM):

- PM 1: Safety Measures
- PM 2: Infrastructure Measures (Pavement/Bridge)
- PM 3: System Performance Measures

State DOTs, such as Caltrans, are responsible for submitting performance targets and periodic reports on progress to those targets to FHWA. MPOs, such as KCAG, are required to establish targets for the same performance measures for the MPOs’ planning area within 180 days after the state establishes each target. MPOs may elect to support the statewide targets, establish numerical targets specific to their region, or use a combination of both approaches. For MPOs, these targets must be incorporated into their planning process, which includes their Transportation Improvement Program (TIP) and Regional Transportation Plan (RTP). Table 1 provides the timeline for the TPM target setting.

TABLE 1

Performance Management Implementation Timeline

Final Rule	Effective Date	States Set Targets By	MPOs Set Targets By	LRSTP, MTP, STIP and TIP Inclusion
Safety Performance Measures (PM 1)	April 14, 2016	Aug. 31, 2017	Up to 180 days after the State sets targets, but not later than Feb. 27, 2018	Updates or amendments on or after May 27, 2018
Pavement/ Bridge Performance Measures (PM 2)	May 20, 2017	May 20, 2018	No later than 180 days after the State(s) sets targets	Updates or amendments on or after May 20, 2019
System Performance Measures (PM 3)	May 20, 2017	May 20, 2018	No later than 180 days after the State(s) sets targets	Updates or amendments on or after May 20, 2019

Safety Performance Measures (PM 1)

FHWA issued the Safety Performance Management Final Rule (Safety PM) as an implementation of the Highways Safety Improvement Program (HSIP), effective April 14, 2016. The Safety PM identified the core Federal safety goal “to achieve a significant reduction in traffic fatalities and serious injuries on all public roads.” The Safety PM establishes five performance measures to carry out the HSIP, defined as five-year rolling averages for:

1. Number of Fatalities
2. Rate of Fatalities per 100 million Vehicle Miles Traveled (VMT)
3. Number of Serious Injuries
4. Rate of Serious Injuries per 100 million VMT
5. Number of Non-Motorized Fatalities and Non-Motorized Serious Injuries

Statewide Safety Targets

Caltrans’ approach to setting targets was guided by the Safety PM as well as the Caltrans Strategic Highway Safety Plan (SHSP) and Strategic Management Plan (SMP). In cooperation with the Office of Traffic Safety (OTS), Caltrans adopted five Safety Performance Management Targets shown on Table 2.

TABLE 2

State Safety Performance Management Targets

State 2018 Set on August 31 2017 (5 year Rolling Averages)*			
Measure	Data Source	Target	Details
Number of Fatalities	FARS	3,590.8	Toward Zero Deaths (TZD) – Vision based on a year to year decrease of 7.69% from 2017 onwards
Rate of Fatalities (per 100 Million VMT)	FARS & HPMS	1.029	Toward Zero Deaths (TZD) – Vision based on a year to year decrease of 7.69% from 2017 onwards
Number of Serious Injuries	SWITRS	12,823.4	Target that decreases 1.5% per year starting in 2017
Rate of Serious Injuries (per 100 Million VMT)	SWITRS & HPMS	3.831	Target that decreases 1.5% per year starting in 2017
Number of Non-Motorized Fatalities and Non-Motorized Serious Injuries (Bicycle and Pedestrians)	FARS & SWITRS	4,271.1	Target that decreases 10% per year, from 2017 onwards for both fatalities and serious injuries

*A 5-year rolling average is the unweighted mean of the previous 5 values

Caltrans’ methodology for target setting included three steps, which are: (1) estimating the existing trends to determine where we are now, (2) determining what external factors will impact the target in order to forecast future trends, and (3) to estimate targets based on forecasted fatality reductions from safety plans. Since the safety performance targets are set a year in advance where at least two years of collision data is unknown, forecasting future collision trends was required.

Caltrans considered external factors that could affect collision, fatality and serious injury rates on public roads. This analysis referenced an active National Cooperative Highway Research Project (NCHRP) 17-67 titled, “Identification of Factors Contributing to the Decline of Fatalities in the United States.”, which preliminarily determined that economic factors contribute up to 85% of the variation of collisions on a yearly basis. Factors, such as Unemployment and per capital Gross Domestic Product (GDP) growth, can account for majority the variation in collision trends. To accurately forecast future collision trends, the difficult task of forecasting the economy with political and economic uncertainties would be required.

In forecasting trends, Caltrans elected to take a more straightforward approach by taking currently existing data for previous years and extrapolating these values to get the remaining and current years. Caltrans also used a vision-based or “aspirational” target setting approach consistent with the SHSP and SMP, such as the Toward Zero Deaths principle.

The number of fatalities and rate of fatalities are shown in Figure 1 and 2. Historical data is from National Highway Traffic Safety Administration’s (NHTSA) Fatality Analysis Reporting System (FARS), which records data on all public roads. Rate of fatalities is calculated using Vehicle Miles Traveled (VMT) from the Highway Performance Monitoring System (HPMS). The

figures show a forecasted 13% from 2016 to 2017 based on the trend from the existing data from 2015 to 2016. Fatalities decrease at a rate of 7.69% at 2018 to 2020, based on the SHSP's goal of Toward Zero Deaths concept by 2030.

Figure 1
Caltrans Number of Fatalities Target Setting

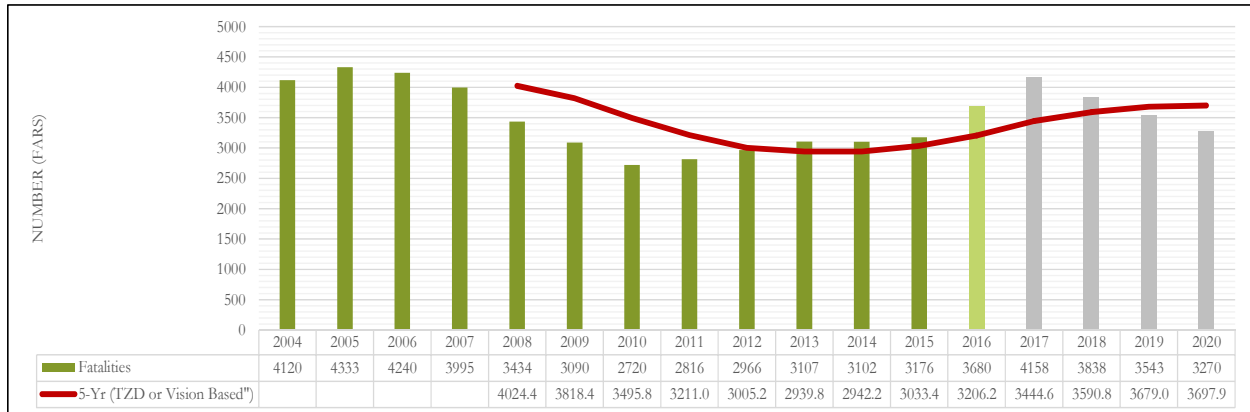
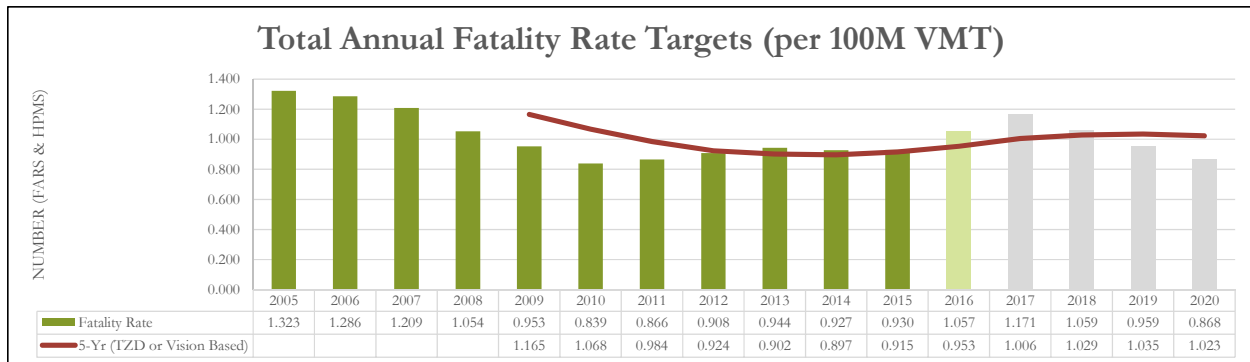


Figure 2
Caltrans Rate of Fatalities Target Setting



Number of serious injuries and rate of serious injuries are shown in Figures 3 and 4. Serious injury data is gathered from California Highway Patrol's (CHP) Statewide Integrated Traffic Records System (SWITRS), which includes data from local law enforcement agencies on all public roads. Rate of serious injuries is calculated using VMT from HPMS. These figures represent a 9% increase from 2016 to 2017 consistent with the trend from 2015 to 2016. Stating in the year 2018, serious injuries decrease at a rate of 1.5%. This decreasing rate aims for a vision-based target following the Caltrans' SHSP.

Figure 3
Caltrans Number of Serious Injuries Target Setting

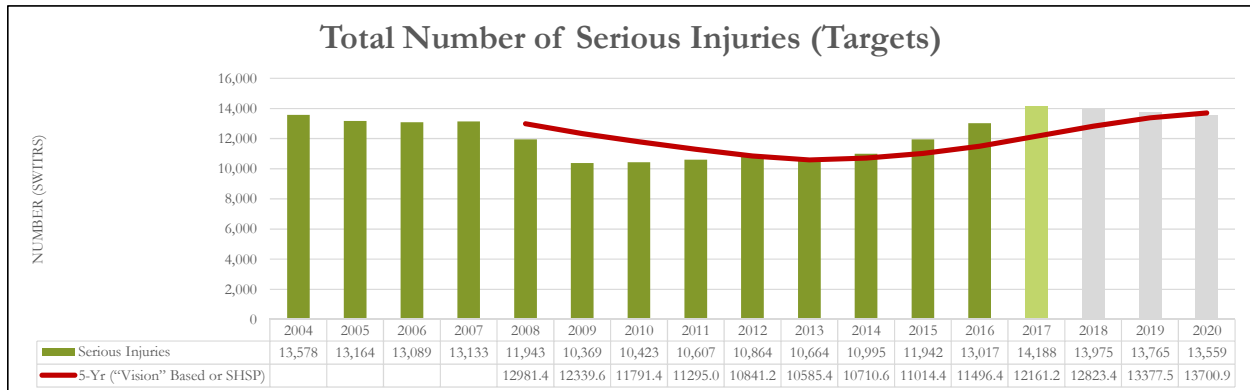
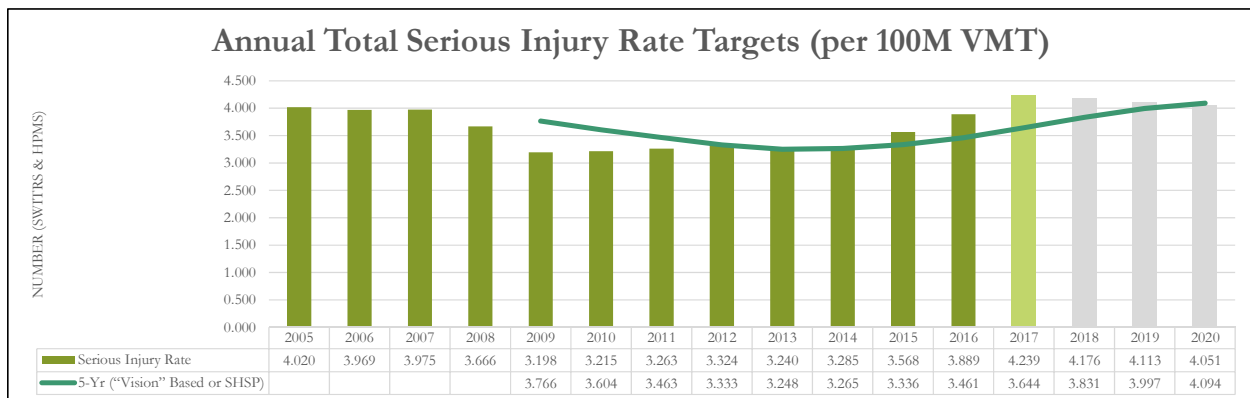
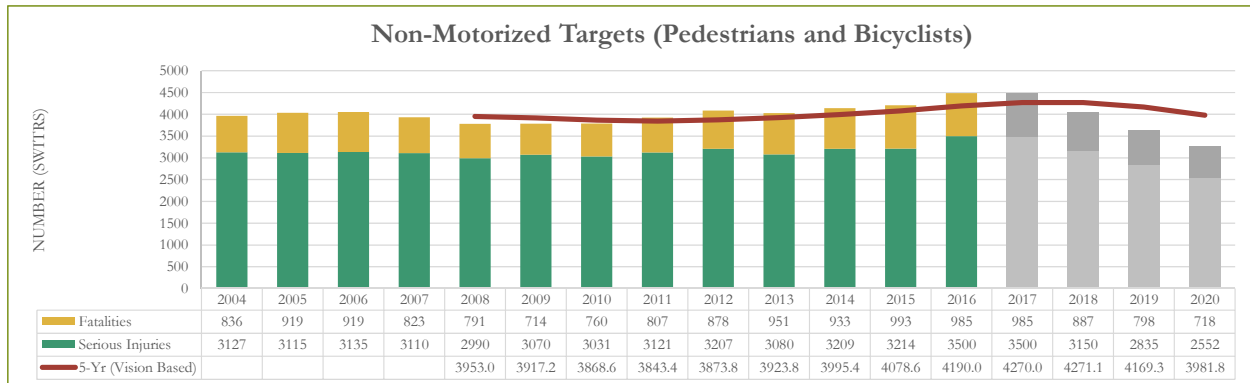


Figure 4
Caltrans Rate of Serious Injuries Target Setting



The last safety performance target includes the number of non-motorized fatalities and non-motorized serious injuries shown on Figures 5. Non-motorized fatalities are sourced from FARS and non-motorized serious injuries are from SWITRS. The target is an aggregate of both fatalities and serious injuries from non-motorized modes (i.e. pedestrian and bicyclists). As part of the “Toward Zero Deaths” vision-based target setting, the 2016 to 2017 forecast is held constant (0.00% increase) and a reduction rate of 10.0% per year from 2017 to 2020 for both non-motorized fatalities and serious injuries.

**Figure 5
Caltrans Number of Non-Motorized Fatalities and Serious Injuries Target Setting**



KCAG Safety Planning and Programming

As mentioned above, MPOs can elect to support the statewide targets, adopt region-specific targets, or do a combination of the two options. MPOs are required to report and document with Caltrans annually, 180 days after statewide safety targets are officially adopted. The safety performance management targets (PM 1) are set annually and the first annual deadline for reporting to PM 1 targets to Caltrans is February 27, 2018. These targets must also be incorporated into their RTP and TIP development.

Consistent with other MPOs of similar size to KCAG throughout the state, KCAG has elected to support the 2018 Caltrans statewide safety performance targets (SPMTs) by planning and programming projects that contribute to these goals.

Safety is central to the KCAG planning and programming process and is an initial statement in the Overall Goal of the RTP Policy Element:

“To develop a transportation system that encourages and promotes safe and efficient development, management, and operation of surface transportation systems...”

Safety is incorporated into many of the policies and objectives within the RTP, which guides transportation planning and programming.

Public safety is a criteria used in evaluating projects and is integral in KCAG’s decision-making forums, which include KCAG’s Transportation Policy Committee (TPC) and Technical Advisory Committee (TAC). KCAG conducts monthly public meetings through its TPC and TAC, working closely with member agencies (cities and county) and the Caltrans in identifying safety issues such as nominating projects for the State Highway Operations and Protection Program and the Highway Safety Improvement Program.

Many transportation projects within the region address safety issues. The following are highlighted projects which improved safety:

- **SR 198 / 12th Avenue Interchange** – Upgraded an existing interchange which was equipped with signals and challenged by the cumulative residential and commercial growth. The purpose of the project was to alleviate future congestion and to improve safety and traffic operations.
- **Cinnamon Drive Bicycle/Pedestrian Project** – Within the City of Lemoore, Cinnamon Drive is a busy collector roadway that is a common route used to access schools and parks. This project constructed a Class 2 bicycle facility and ADA compliant pedestrian facilities including local bus stop facilities.
- **SR 198 / 19th Avenue Interchange** – Originally an at-grade crossing, this project constructed a graded interchange with a Class 2 bicycle lane and pedestrian facilities included on the overcrossing.
- **Kettleman City Safe Routes to School Project** – In Kettleman City, this project constructed curbs, gutters, sidewalks, signs, roadway improvements and lighted crosswalks in front of and around Kettleman City Elementary School.

KCAG Safety Targets

KCAG, electing to support the statewide targets, is not required to submit specific numerical safety targets for the region. During the statewide target setting process, Caltrans and FHWA held various workshops pertaining to their methodology. Several issues regarding MPO level target setting were identified over the course of the workshops, including FHWA not evaluating MPO targets and consistency and completeness of the data among Caltrans and MPOs. One issue in particular was the variability of data at the smaller MPO level, which can be seen in the data for the Kings County region.

However, as part of KCAG's efforts in planning and programming towards supporting the Caltrans statewide safety targets, KCAG will track the region's performance in the five safety indicators annually using the Caltrans' established methodology explained above, bearing in mind the variability of the data. Safety performance management targets for the KCAG region are presented in Table 3. Figures 6 – 10 show the target setting graphs consistent with Caltrans' methodology.

TABLE 3

KCAG Safety Performance Management Targets

KCAG 2018			
Measures	Data Source	Target*	Percent Reduction
Number of Fatalities	FARS	34.5	-7.69%
Rate of Fatalities (per 100M VMT)	FARS & HPMS	2.179	-7.69%
Number of Severe Injuries	SWITRS	63.3	-1.5%
Rate of Severe Injuries (per 100M VMT)	SWITRS & HPMS	4.019	-1.5%
Number of Non-Motorized Fatalities and Severe Injuries	FARS & SWITRS	10.0	-10%

*Based on 5-year rolling averages

**Figure 6
KCAG Number of Fatalities Target Setting**

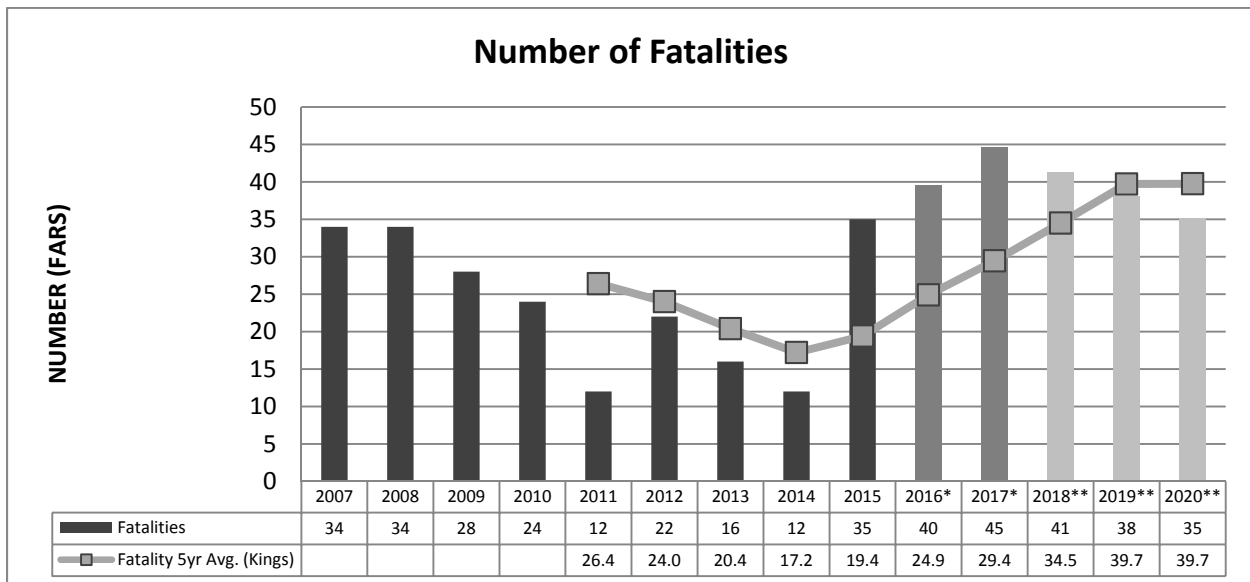
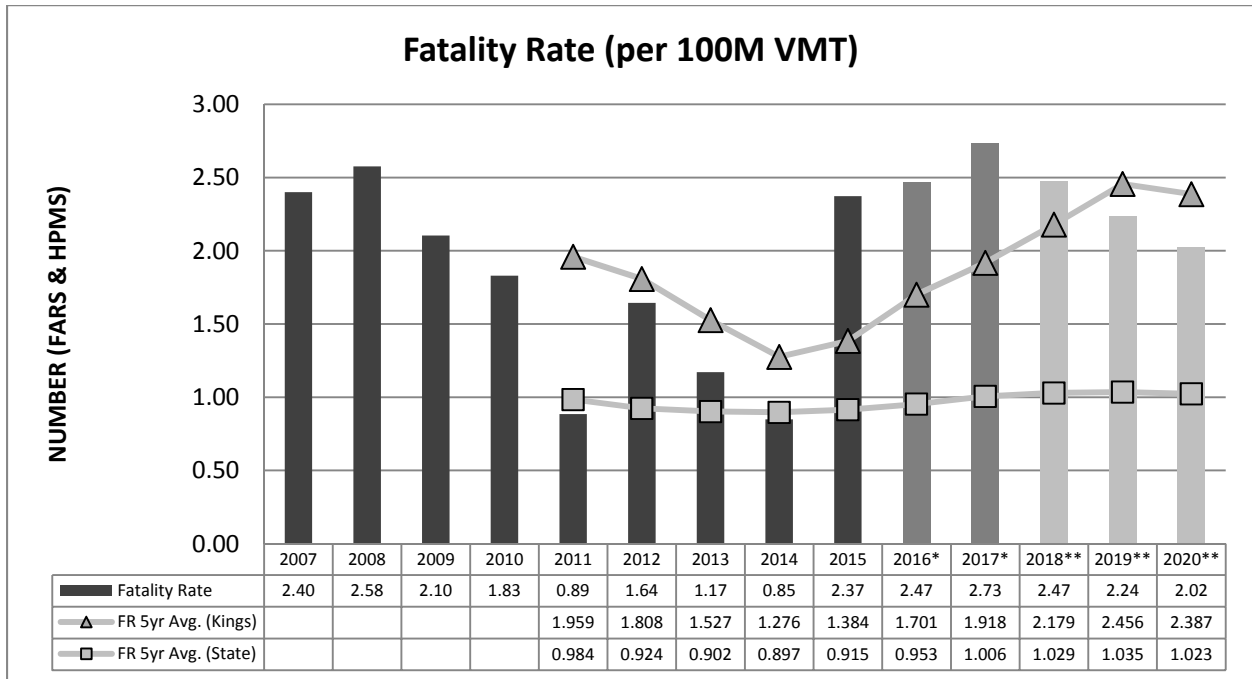


Figure 7
KCAG Rate of Fatalities Target Setting



*13% increase based on State trend

** 7.69% reduction based on “Toward Zero Deaths” vision

Figure 8
KCAG Number of Serious Injuries Target Setting

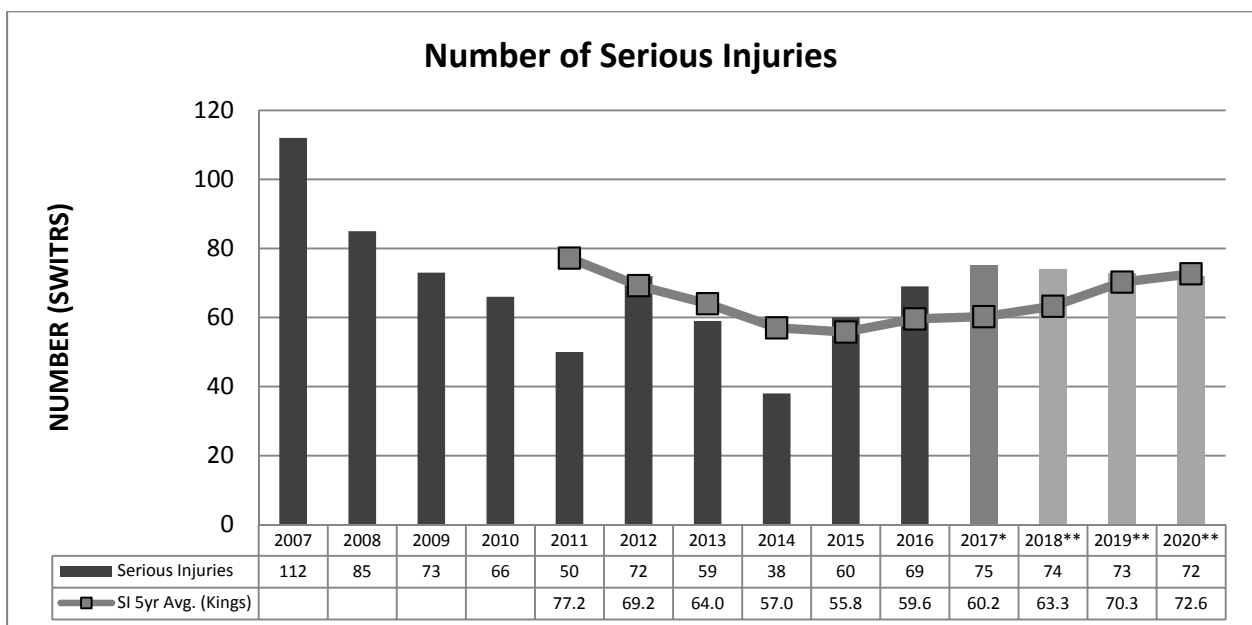
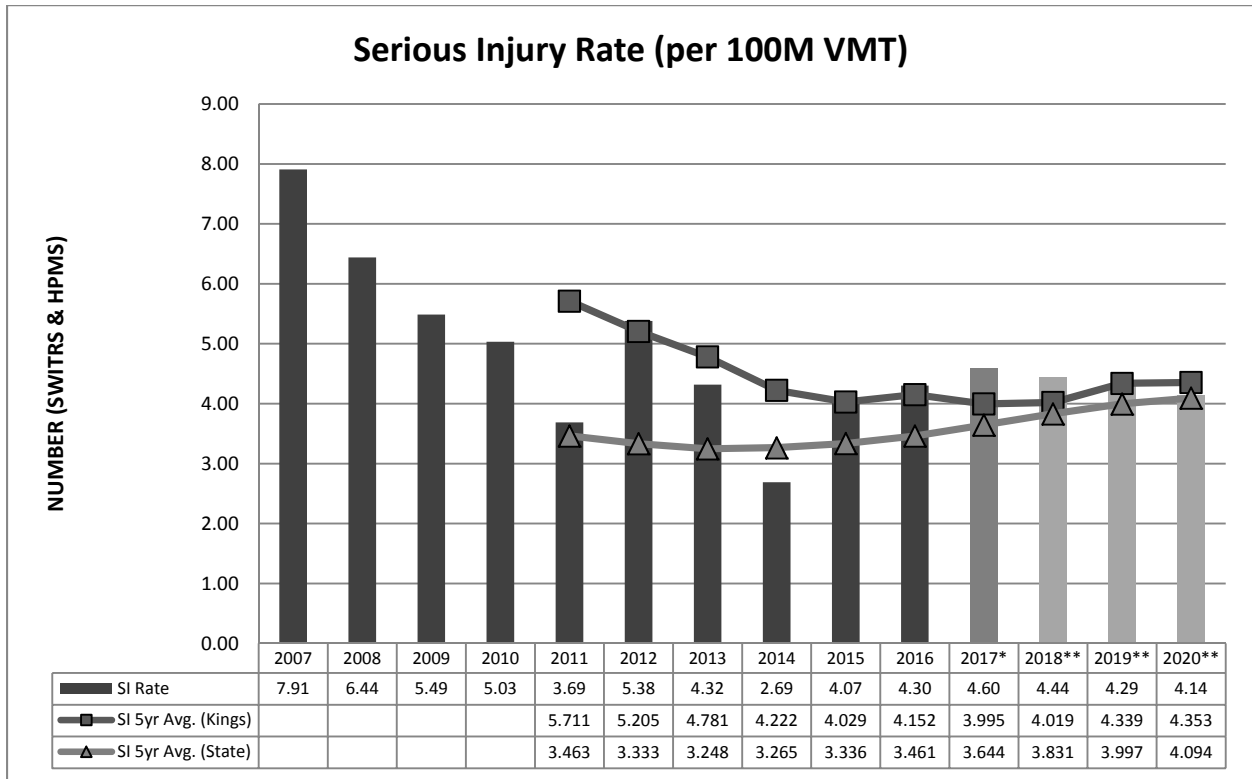


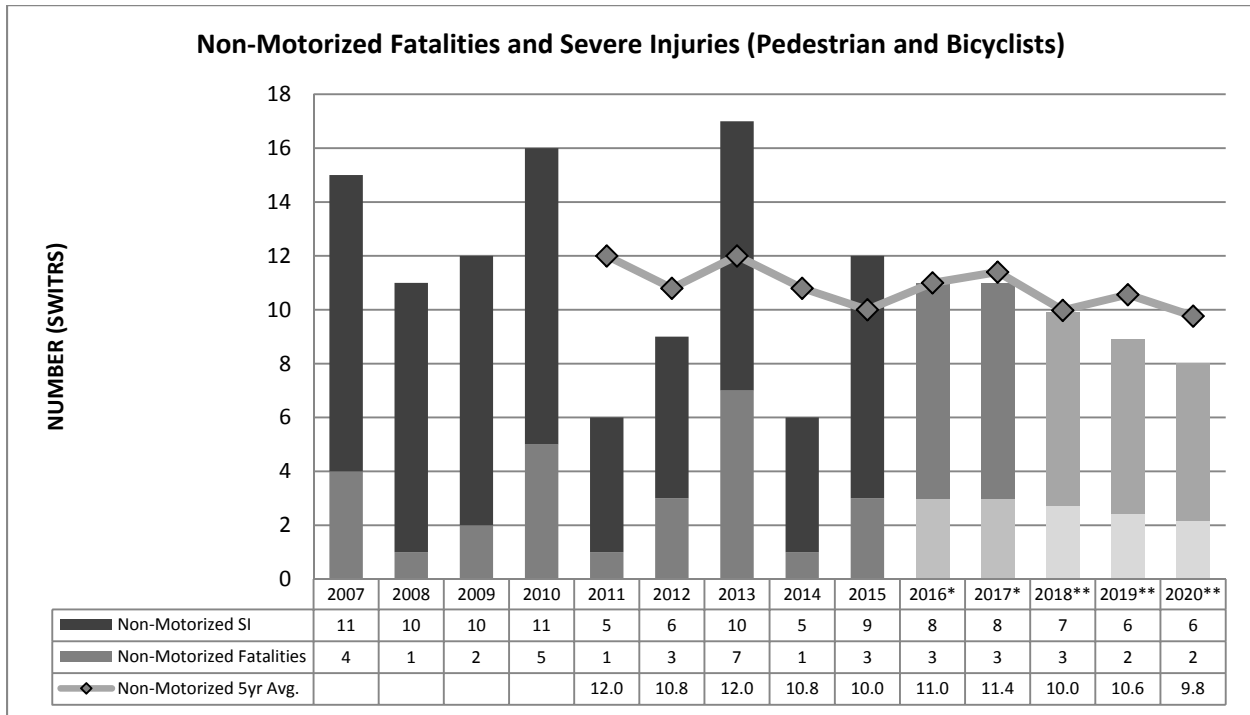
Figure 9
KCAG Rate of Serious Injuries Target Setting



* 9% increase based on State trend

** 1.5% reduction based on Caltrans Strategic Highway Safety Plan

Figure 10
Number of Non-Motorized Fatalities and Serious Injuries Target Setting



* Held constant in accordance to Caltrans' methodology

** 10% reduction based on "Toward Zero Deaths" and Strategic Highway Safety Plan

The data for the five safety targets do exhibit a bit of connection between occurrences and economic conditions, such as the great recession and recovery seen in years around and on 2008. As noted above, there is variability in the data due to the small population size of Kings County which is noticeable with the drops in 2014 and sudden rises in occurrences in 2015 and around 2013. Due to the small sample sizes, there is no decipherable trend to inform an evidence-based approach.

Despite the challenges in forecasting and identifying trends for a small population such as Kings County, KCAG will continue to track the region's progress in the five safety indicators. KCAG will continue to follow and participate in Caltrans' statewide safety target setting process.

In March 2018, Caltrans began reassessing the approach to the safety target setting process. Caltrans is exploring different scenarios for setting the 2019 Safety Performance Management Targets and will be working with MPOs in exploring new approaches. KCAG will continue to work with Caltrans and follow the development of the 2019 safety performance targets.

Infrastructure Performance Measures (PM 2)

The second group of TPM known as "Performance Management 2" or PM 2 is for infrastructure performance, more specifically pavement and bridges, made effective May 20, 2017. These measures assess the conditions of transportation systems and help identify statewide investments to maintain pavement and bridges on the National Highway System (NHS). PM 2

targets are for the purpose of carrying out the National Highway Performance Program (NHPP). There are six federally mandated performance measures:

1. Percentage of Interstate pavements in Good condition
2. Percentage of Interstate pavements in Poor condition
3. Percentage of non-Interstate NHS pavement in Good condition
4. Percentage of non-Interstate NHS pavements in Poor condition
5. Percentage of NHS bridges in Good condition
6. Percentage of NHS bridges in Poor condition

Conditions are based on standardized metrics defined by the federal performance management regulations, which outlines measurements and calculation methods for each metric resulting in a “Good”, “Fair”, or “Poor” condition. For pavement conditions, there are four metrics: roughness (based on the international roughness index or IRI), cracking, rutting, and faulting (for concrete pavement). A pavement segment is in “Good” condition when all the metrics are rated as “Good”, “Poor” condition when two or more metrics are rated as “Poor”, and “Fair” for any other combination of ratings.

Bridge conditions are based on the National Bridge Inventory (NBI) rating scale which considers the condition rating of: deck, superstructure, substructure, and culverts. The NBI rating scale runs from 0 to 10 where 7 or above is “Good”, 6 to 5 is “Fair”, and 4 or below is “Poor”.

Statewide PM 2 Targets

Caltrans developed the California Transportation Asset Management Plan (TAMP), adopted in March 2018, which implemented the PM 2 framework established by FHWA. The TAMP assesses the current conditions of California’s transportation assets, establishes performance measures and identifies statewide investment strategies to achieve the performance measures. As part of FHWA’s TAMP requirements, State DOTs must specify their desired state of repair for the 10-year analysis period of the TAMP. Table 4 shows the statewide 10-year NHS asset performance targets.

**Table 4
Statewide NHS Asset Performance Targets**

10-Year Desired State of Repair				
Asset (unit of measure)	Good	Fair	Poor	
Interstate Pavement (lane miles)	60.0%	39.0%	1.0%	
Non-Interstate NHS Pavement (lane miles)	34.2%	60.9%	5.0%	
On the SHS	57.6%	40.9%	1.5%	
Off the SHS	7.0%	84.0%	9.0%	
NHS Bridge (deck area)	83.5%	15.0%	1.5%	
On the SHS	83.5%	15.0%	1.5%	
Off the SHS	83.5%	15.0%	1.5%	

Caltrans is required to establish 2- and 4- year performance management targets for pavement and bridge conditions (PM 2) by May 20, 2018. PM 2 targets were not included in the initial cycle due to the target setting deadline being less than six months before the initial TAMP submission deadline (April 20, 2018). As of March 2018, Caltrans is currently developing statewide PM 2 targets and its target-setting methodology.

MPOs must either support the statewide targets or establish their own regional targets by November 16, 2018. KCAG will continue to monitor the development of the PM 2 target setting methodology and will work with statewide and local partners to develop targets consistent with state and federal guidelines.

System Performance Measures (PM 3)

The final performance management category of TPM is “Performance Management 3” or PM 3, which consists of seven performance measures related to the performance of the Interstate and non-Interstate NHS pursuant to: the National Highway Performance Program (NHPP); assessing freight movement on the Interstate System; and assessing traffic congestion and on-road mobile source emissions for the purpose of carrying out the Congestion Mitigation and Air Quality (CMAQ) Improvement Program. The seven measures for PM 3 are:

Performance of the NHS

1. Percent of person-miles traveled on the Interstate that are reliable
2. Percent of person-miles traveled on the non-Interstate NHS that are reliable
3. Percent change in tailpipe CO2 emissions on the NHS compared to the calendar year 2017 level

Freight Movement on the Interstate System

4. Truck Travel Time Reliability (TTTR) Index

CMAQ Program Traffic Congestion and On-Road Mobile Sources

5. Annual Hours of Peak Hour Excessive Delay (PHED) Per Capita
6. Percent of Non-Single Occupancy Vehicle (SOV) Travel
7. Total Emissions Reduction

The first two measurements of PM 3 (Percent of person-miles traveled on the Interstate and non-Interstate NHS that are reliable) are measured by the Level of Travel Time Reliability (LOTTR). LOTTR is defined as "...a comparison, expressed as a ratio, of the 80th percentile travel time of a reporting segment to the "normal" (50th percentile) travel time of a reporting segment occurring throughout a full calendar year." A segment is considered unreliable when the LOTTR ratio is greater than 1.5.

Percent change in tailpipe CO2 emissions on the NHS compared to the calendar year 2017 level is the third measure among the PM 3 targets, referred to as the GHG measure. The GHG measure is described in the federal regulations as the change in the total tailpipe CO2 emissions on the NHS for the 2 preceding calendar years of the target setting year (2016/2017 for 2018 target setting).

Truck Travel Time Reliability (TTTR) Index is the fourth measure required under PM 3. This performance measure assesses freight movement on the Interstate System and uses metrics that considers truck travel times for each period of the day.

The fourth measure is Annual Hours of Peak Hour Excessive Delay (PHED) Per Capita, which is referred to as the PHED measure. Annual Hours of PHED is defined by federal regulations as "...the cumulative hours of excessive delay...experienced by all people traveling through all reporting segments during peak hours in the applicable urbanized area for the full reporting calendar year."

Percent of Non-SOV Travel is the fifth measure, which essentially is the percentage of travel that is not occurring by driving alone in a vehicle, including travel avoided by telecommuting.

The last measure of PM 3, Total Emissions Reduction, tracks the reductions from all projects reported to the CMAQ Public Access System, which is a database of projects funded by CMAQ with the goal of improving air quality and congestion. This measure consists of multiple targets for each applicable pollutant under the CMAQ program. These targets are calculated by summing the total estimated emissions reductions for each criteria pollutant and precursor, in kilograms per day, for all projects funded with CMAQ funds.

Statewide PM 3 Targets

Caltrans is required to establish performance targets for each PM 3 measure by May 20, 2018, and MPOs must either support the statewide targets or establish their own regional targets by November 16, 2018. For the GHG measure, Caltrans must establish targets no later than September 28, 2018 and MPOs must either support the statewide targets or establish their own regional targets by March 27, 2019.

As of March 2018, Caltrans is currently developing PM 3 statewide targets and its target-setting methodology. Caltrans convened a Technical Advisory Group (TAG) consisting of MPOs to address the different approaches for target-setting. KCAG has been participating in the TAG and attending workshops hosted by Caltrans. KCAG will continue to follow the development of the PM 3 statewide targets and work with statewide and local partners to develop targets consistent with and federal guidelines.