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California's Freeway Service Patrol Program: Management Information System Annual Report Fiscal Year 2016-17

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Authors

Mauch, Michael, PhD
Skabardonis, Alex, PhD

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California's Freeway Service Patrol Program:
Management Information System Annual Report Fiscal
Year 2016-17

Michael Mauch, Institute of Transportation Studies, University of California, Berkeley

Alex Skabardonis, Institute of Transportation Studies, University of California, Berkeley

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16. Abstract <p>The Freeway Service Patrol (FSP) is an incident management program implemented by Caltrans, the California Highway Patrol and local partner agencies to quickly detect and assist disabled vehicles and reduce non-recurring congestion along the freeway during peak commute hours. The first FSP program was piloted in Los Angeles, and was later expanded to other regions by state legislation in 1991. As of June 2017, there were fourteen participating FSP Programs operating in California, deploying 324 tow trucks and covering over 1,718 (center-line) miles of congested California freeways.</p> <p>The purpose of this research project was to evaluate the effectiveness of the Caltrans FSP program in reducing incident durations and removal of other obstructions that directly contribute to freeway congestion for Caltrans fiscal year 2016-2017. The project provides valuable information to agencies managing the FSP program so that resources are distributed within the various statewide FSP operations in the most efficient and cost-effective manner possible. The tools used and the operational performance measures provided by this research effort will significantly contribute on the ongoing agencies' efforts to improve the efficiency and effectiveness of the FSP program.</p>					
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CALIFORNIA'S FREEWAY SERVICE PATROL PROGRAM

Management Information System Annual Report
Fiscal Year 2016-17

*Prepared for the California Department of Transportation
Traffic Operations Division*



Prepared by

Institute of Transportation Studies
University of California at Berkeley

Final Report, November 2018

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Section 1: Executive Summary

1.1 Introduction

The Freeway Service Patrol (FSP) is a program run jointly by Caltrans, the California Highway Patrol (CHP) and local transportation agencies. Whether fixing a flat tire, towing a disabled vehicle to a safe location, clearing debris from a lane of traffic, or providing a gallon of gasoline to a motorist that has run out of fuel, California's fleet of FSP roving tow trucks have two primary benefits. First, the patrolling trucks of the FSP find congestion-causing incidents and clear them quickly. Second, tow truck drivers provide direct assistance to stranded motorists, increasing safety and security for them in a moment of need. This service reduces delay for other motorists by maintaining the capacity of our highway system and increases safety for motorists by clearing hazards that may cause secondary incidents. The operational performance measures contained in this report were developed for program managers at Caltrans and partner agencies as tools for improving the efficiency and effectiveness of the FSP program.

This report seeks to increase the information available to state and local agencies running the FSP programs so that resources are distributed within the various statewide FSP operations in the most cost-effective manner possible.

1.2 FSP Data & Performance Summary

The bulk of the data used to develop the measures contained in this report were obtained directly from each FSP program. Each FSP assist dataset was standardized to the greatest extent possible to allow data comparability between FSP programs. Unfortunately, the majority of the FSP programs collect and records their operational data in somewhat different formats.

The following points summarize the primary outputs of the FSP programs into the statewide Management Information System (MIS) databases for fiscal year 2016-17:

- (1) In fiscal year 2016-17, the roving tow trucks of the FSP program provided over 673,000 assists on California's highway system. This is approximately 1.3 percent (%) decrease over the previous year. Nearly 47% of total statewide assists were provided by the Los Angeles County FSP program. The next largest was the San Diego FSP program which provided about 12.8% of total statewide assists, followed by nine county San Francisco Bay Area FSP program with about 11.8% of the statewide assists.
- (2) The estimated benefit/cost ratios for FSP programs ranged from 2-to-1 (for the El Dorado County FSP program) to 10-to-1 for Los Angeles County. The statewide average B/C ratio was 8-to-1.
- (3) Once a driver spots an incident, they are instructed to work for up to 10 to 15 minutes to get the stranded vehicle moving or provide a tow to a safe location. The average assist duration for the statewide FSP in 2016-17 was about 16 minutes, although the time spent on an individual assist can vary quite widely.

- (4) The speed at which FSP locates and clears incidents is determined in part by the number of FSP trucks patrolling a stretch of road and the amount and type of traffic on that road. In FY 2016-17 the state's fourteen FSP programs operated 186 beats with 324 trucks (during the PM peak period) covering over 1,700 centerline freeway miles. Together they provided about 745,000 total truck hours of service. On average, California's FSP trucks in FY 2016-17 supplied almost one assist for every hour of service (0.90 assists per tow truck-hour). These assists were primarily given to automobiles and vans, which constituted 69 percent of all assists. The three most common types of motorist's assists provided were and vehicle collisions (19.3%), for mechanical problems including electrical problems and overheated vehicles (16.6%), and assistance with flat tires (16.4%).
- (5) The number of FSP trucks and truck hours the state and its partner agencies can deploy is determined by funding availability. In FY 2016-17, the state allocated about \$25.5 million to the locally run FSP programs and another \$4 million to CHP for field supervisors, monitoring and training activities. The local transportation agency partners that run each program are required to provide 25 percent matching funds. In FY 2016-17, the local partner transportation agencies provided over \$28 million in matching funds – over a 100 percent match. Some of the smaller FSP programs did not surpass the 25 percent local match requirement. The Orange County program had the highest proportion of local match funding. All matching funds are used by the contributing local transportation agencies for their own FSP operations.

Table 1-a displays a program level summary of the FSP data and selected FSP program performance measures. Table 1-b provides a summary of FSP overall program costs and funding allocation information. Table 2 lists additional environmental benefits attributable to the California FSP program such as motorist delay savings, fuel savings and mobile source emission reductions.

Table 1-a: Statewide FSP Program Annual Summary (Combined Weekday and Weekend Service)

Caltrans District	County or Region	Number of Weekday Beats	Number of Peak Period Trucks	Weekday Center-line Miles	Total Truck Hours	Total FSP Assists	Average Assist Duration (min.)	Average Assist Rate ₁	Average B/C Ratio
3	Sacramento / Yolo	15	15	143	26,278	39,218	9.6	1.49	7.0
3	Placer	3	2	25	3,660	3,061	12.3	0.84	3.0
3	El Dorado	1	1	11	1,342	929	9.2	0.69	2.0
4	Bay Area Counties	31	69	446	130,775	79,195	20.5	0.61	7.0
5	Monterey	2	2	22	3,332	1,556	16.0	0.47	5.0
5	Santa Cruz	2	2	16	4,278	1,370	19.0	0.32	4.0
5	Santa Barbara	4	2	22	2,928	694	19.0	0.24	3.0
6	Fresno	4	4	30	5,040	4,923	10.1	0.98	5.0
7	Los Angeles	39	123	474	337,253	315,975	16.0	0.94	10.0
8	Riverside	9	21	88	36,456	41,011	10.9	1.12	8.0
8	San Bernardino	8	17	84	27,309	33,197	7.6	1.22	8.0
10	San Joaquin	3	2	13	4,881	4,753	0.0	0.97	4.0
11	San Diego	31	30	215	81,536	86,464	9.7	1.06	5.0
12	Orange	34	34	132	79,722	61,004	37.6	0.77	9.0
Total or Average		186	324	1,718	744,790	673,350	16.4	0.90	8.0

Notes: 1 – Assist Rate = Total Assists divided by Total Truck Hours.

Table 2-b: Statewide FSP Program Annual Summary (Combined Weekday and Weekend Service)

Caltrans District	County or Region	State FSP Funds (\$)	Percent of State FSP Funds	Local Match Funds (\$)	Percent of Local Match Funds	CHP Allocation (\$)	Percent of CHP Allocation
3	Sacramento / Yolo	1,148,346	4.5%	757,000	2.6%	178,000	4.9%
3	Placer	235,961	0.9%	151,798	0.5%	0	0.0%
3	El Dorado	105,780	0.4%	27,930	0.1%	0	0.0%
4	Bay Area Counties	5,815,480	22.8%	8,594,236	29.8%	919,560	25.3%
5	Monterey	228,732	0.9%	42,799	0.1%	0	0.0%
5	Santa Cruz	158,630	0.6%	128,861	0.4%	0	0.0%
5	Santa Barbara	256,471	1.0%	45,236	0.2%	0	0.0%
6	Fresno	535,847	2.1%	87,374	0.3%	89,024	2.5%
7	Los Angeles	8,361,682	32.8%	11,465,841	39.7%	1,204,305	33.2%
8	Riverside	1,597,450	6.3%	687,402	2.4%	180,781	5.0%
8	San Bernardino	1,481,671	5.8%	695,556	2.4%	180,781	5.0%
10	San Joaquin	445,130	1.7%	113,000	0.4%	0	0.0%
11	San Diego	2,572,824	10.1%	755,777	2.6%	449,713	12.4%
12	Orange	2,534,995	9.9%	5,328,682	18.5%	430,341	11.8%
Total or Average		25,479,000	100.0%	28,881,492	100.0%	3,632,505	100.0%

Table 3: Statewide FSP Program Annual Summary (Combined Weekday and Weekend Service)

Caltrans District And County (or Region)	Total Vehicle Delay Savings (veh-hr)	Total Fuel Savings (gallons)	Total ROG Reductions (kg)	Total CO Reductions (kg)	Total NOx Reductions (kg)	Total PM10 Reductions (kg)	Total CO2 Reductions (kg)	Total N2O Reductions (kg)	Total CH4 Reductions (kg)
3-Sacramento & Yolo	678,879	1,166,994	54.92	657.43	29.60	10.59	10,269,544	157.15	425.64
3-Placer	38,719	66,558	3.13	37.50	1.69	0.60	585,708	8.96	24.28
3-El Dorado	9,186	15,790	0.74	8.90	0.40	0.14	138,951	2.13	5.76
4-Bay Area	2,739,068	4,708,458	221.59	2,652.51	119.42	42.73	41,434,430	634.07	1,717.34
5-Monterey	45,516	78,241	3.68	44.08	1.98	0.71	688,524	10.54	28.54
5-Santa Cruz	55,926	96,137	4.52	54.16	2.44	0.87	846,003	12.95	35.06
5-Santa Barbara	19,208	33,019	1.55	18.60	0.84	0.30	290,563	4.45	12.04
6-Fresno	114,001	195,967	9.22	110.40	4.97	1.78	1,724,513	26.39	71.48
7-Los Angeles	9,847,881	16,928,508	796.69	9,536.69	429.37	153.63	148,970,871	2,279.69	6,174.42
8-Riverside	914,204	1,571,517	73.96	885.32	39.86	14.26	13,829,347	211.63	573.19
8-San Bernardino	665,520	1,144,029	53.84	644.49	29.02	10.38	10,067,459	154.06	417.27
10-San Joaquin	43,398	74,601	3.51	42.03	1.89	0.68	656,490	10.05	27.21
11-San Diego	927,291	1,594,013	75.02	897.99	40.43	14.47	14,027,315	214.66	581.39
12-Orange	2,268,665	3,899,835	183.53	2,196.98	98.91	35.39	34,318,547	525.17	1,422.41
Statewide	18,367,462	31,573,666	1,485.93	17,787.05	800.82	286.53	277,848,264	4,251.88	11,516.03

1.3 Summary of Recommendations

FSP Assist Data Collection Procedures

Caltrans Headquarters, the FSP agency partners and CHP should continue working to keep current with best practices for data management technologies and for monitoring the activities of the FSP tow providers. With Wi-Fi/Bluetooth /cell phone technical advancements, new and very affordable GPS enabled data collection systems are readily available. These technologies help to enable the FSP management teams (local agencies and CHP) to monitor the activity of the FSP tow providers in real time, and ease the tasks of preparing FSP performance reports.

The majority of the FSP programs have migrated to using customized applications with laptop, iPad or some other portable device for collecting FSP assist data. Sacramento's FSP program was one of the first programs to automate this process. Sacramento County developed and has been using *FSPTrack* for several years now. *FSPTrack* is a Google Android application with server support that enables FSP managers to monitor FSP tow truck activity. *FSPTrack* also allows FSP tow truck drivers to log incidents via the Android app which is uploaded to a database on a server, thus making the FSP assist data available to FSP management in near real time. Orange County (OCTA) and the Bay Area FSP program managed by MTC have an advanced FSP management system called *LATA-Trax*.

A few of the FSP programs (Los Angeles MTA, Santa Barbara SBCAG, San Diego SANDAG and Fresno COG) are still using manual paper-form based FSP assist data collection technologies. The Los Angeles MTA and San Diego SANDAG FSP program managers are looking into electronic data collection options. Appendix B contains additional information on the FSP data management systems currently being used to collect and manage the California FSP assist data.

It is recommended that Caltrans Headquarters continue to work with the FSP managers in their efforts as they update their data management practices and as they make changes to the FSP assist data that is being collected by the FSP tow truck drivers/providers. One recent concern that has been raised is "How is it tracked when multiple FSP tow trucks respond to a single incident?" Do these multiple FSP responses to a single incident result in an over reporting of incidents (i.e., duplicate incident records) in the FSP tracking databases? The over-reporting of freeway incidents could result in an over-reporting of FSP delay savings.

Performance Based Management Practices

Additionally, there are concerns about efficiencies in the allocation of FSP tow trucks to FSP beats, the currently assigned FSP hours of operation, and levels of FSP service being provided. Basically, the questions boil down to: 1) How many FSP tow trucks should we have? 2) Where should the tow truck be? And, 3) When should they be operating?

To address these concerns and to improve the FSP program's performance, a method should be developed that compares the allocation of FSP tow trucks (and truck-hours) to the need for FSP service. The need for FSP service could be measured using other freeway utilization & performance indicators such as freeway corridor vehicle miles of travel (VMT), vehicle hours of travel (VHT), vehicle hours of delay, and accident/incident rates. These indicators provide the means for comparisons between the demand for FSP services and the supply of FSP resources,

which would facilitate FSP managers to allocate the FSP resources in proportion to the demand for FSP service. The method of matching FSP service to the need for tow assistance should be temporal as well as geographical – that is it should provide information on FSP operating hours (and number of tow trucks required by time of day) as well as showing how the required number of tow trucks varies by freeway segments. This tool could also be utilized to identify freeway segments where new FSP service would most probably be cost effective.

When implementing changes to the FSP service, the effects of these changes on the performance of the FSP program should be closely monitored to assure that the changes (improvements) to the FSP program actually deliver the expected increases in performance. This need for follow through and performance monitoring holds true whether the changes to FSP service is extending FSP hours of operation, new weekend or midday FSP service, increases or reductions to the number of FSP tow trucks on a beat or FSP service on a new beat. Tracking FSP performance metrics using “Before and After” techniques and/or by the use of control groups needs to accompany implementing changes in FSP service otherwise it cannot be shown that the expected gains in FSP performance are actually realized (in the real world) as forecasted in planning exercises.

Section 2: Introduction

2.1 Background

The FSP program is a free motorist assistance service using contracted tow trucks that patrol designated routes on congested urban California freeways. Typically, the FSP operates Monday through Friday during peak commute hours. In heavily congested freeway corridors, FSP service is provided during the midday and on weekends/holidays in addition to the weekday peak period service.

The goal of the FSP is to maximize the efficiency of the freeway transportation system. The FSP is a traffic congestion management tool that strategically addresses non-recurring traffic problems by quickly finding and removing disabled/stranded vehicles or roadway obstructions from the freeway system. Deployment of FSP trucks is driven by congestion windows and traffic patterns in major metropolitan areas.

The rapid removal of freeway obstructions has a positive effect on traffic conditions by reducing incident durations and removal of other obstructions that directly contribute to non-recurrent congestion. In fiscal year 2016-17, the FSP program provided over 673,000 assists from the fourteen FSP programs across nine of the twelve Caltrans districts.

Because the traffic conditions of the state's freeway system and the demand for its services are constantly changing, it is necessary for the FSP program to respond to these changing and increasing needs for traffic mitigation. This report seeks to centralize and summarize the information available to state and local agencies managing the FSP programs so that resources are distributed within the various statewide FSP operations in the most efficient and cost-effective manner possible. The database constructed for this project was used to generate a series of indicators that measured and compared the performance of each FSP program. The following provides an overview of the scope of work for this project:

2.2 Project Scope

The project scope included FSP assist data collection and data validation, estimating summary statistics for reporting purposes using the FSP assist database and the annual report generation. The project objectives were accomplished in four phases:

- 1) Develop FSP 2016-17 Management Information System (MIS) databases
- 2) Produce FSP 2016-17 California Local Program Report(s)
- 3) Produce FSP 2016-17 California Statewide MIS Program Report
- 4) Make Recommendations for future data collection policies, procedures and report content.

Each phase is described in more detail in the following sections.

2.2.1 Develop FSP 2016-17 MIS Databases

The development of the FSP MIS databases consisted of the following sub-tasks:

- 1) Solicit and collect the 2016-17 FSP program data from each of the FSP Programs.

- 2) Analyze the data for consistency and accuracy. Clean the data as necessary to correct any inconsistencies and/or inaccuracies.
- 3) Compile the cleaned data into a set of databases, with each database containing the data for individual FSP programs.

2.2.2 Produce FSP 2016-17 California Local Program Report

The development of the FSP 2016-17 California Local Program Report consisted of the following sub-tasks:

- 1) Compile each local program data into summary tables that will identify how each program is performing in the customer defined set of performance areas.
- 2) Format the resulting set of tables and graphs so they are consistent in format and easily understandable.
- 3) Load the formatted tables and graphs into the report with the content of each table or graph identified by the section heading. This report will not contain any text or state summary data. It will only contain summarized FSP program data.

2.2.3 Produce FSP 2016-17 California Statewide MIS Program Report

The development of the FSP 2016-17 California Statewide MIS Program Report consisted of the following sub-tasks:

- 1) Generate database queries for the statewide database to compile FSP program data into summary tables that will identify how the FSP statewide program is performing in the customer defined set of performance areas.
- 2) Format the resulting set of tables and graphs so they are consistent in format and easily understandable.
- 3) Use the format of the previous FSP MIS annual report as a template for the FSP 2016-17 report. Create the shell of the FSP 2016-17 report.
- 4) Add all relevant text and tables from the previous FSP annual report. There is no need to recreate information that has already been created and will stay the same from yearly report to yearly report.
- 5) Load the formatted state summary tables and graphs into the report with the content of each table or graph identified by the caption heading.
- 6) Fill in all the report information that is unique to the FSP 2016-17 Fiscal Year.

2.2.4 Make Recommendations for Improving FSP Program Reporting

The development of recommendations to improve the California FSP Program's data collection, storage and reporting consisted of the following sub-tasks:

- 1) Take notes when collecting and compiling the received FSP data. The notes should contain references to problems and inconsistencies with the received FSP data.
- 2) Compile those notes into a complete set of meaningful recommendations that will help the state and local FSP Program representatives collect, process and report FSP data that is both accurate and consistent across all programs.

Section 3: FSP Data Compilation Methodology

3.1 *FSP MIS Development Methodology*

Each local program's raw data was cleaned, and standardized. In the final databases there are over 673,000 records for the fiscal year 2016-17. They are stored in and manipulated using Microsoft Excel. Each FSP program's dataset is stored in its own database file. The following sections provide the statewide summary tables and graphs based on these final databases.

3.2 *FSP Evaluation Methodology*

The effectiveness of the FSP Program is assessed by calculating the annual benefit/cost (B/C) ratio of each FSP beat. First the annual savings in incident delay, fuel consumption and air pollutant emissions due to FSP service are calculated based on the number of assists, beat geometries and traffic volumes. The savings are then translated into benefits using monetary values for delay (\$18.00/vehicle-hour) and fuel consumption (\$2.92/gallon).

The value of time for motorists was obtained from the Caltrans 2011 Performance Mobility Report (MPR) which states that for 2011 travel time is priced at \$18.00 for each vehicle hour of delay for year 2011. (The Caltrans 2011 MPR was the most up-to-date MPR at the time of the FSP cost effectiveness evaluation and the production of this report.)

The California statewide annual average fuel costs of \$2.92/gallon of gasoline for FY 2016-17 was estimated from weekly California statewide average prices are compiled by the U.S. Department of Energy's Energy Information Administration (EIA) from a telephone survey that includes a sample of 38 California gasoline stations. These stations were sampled with a likelihood equal to the company's proportional size to the total annual volume of gasoline, by grade, sold in California.

The annual FSP program costs include the annual capital, operating and administrative costs for providing FSP service. The FSP evaluation methodology has been incorporated into an Excel spreadsheet. Input data requirements consist of beat geometries (number of lanes, presence of shoulders), traffic volumes, and the number and characteristics of FSP assists.

Section 4: FSP Performance Summary

4.1 Statewide Total Assists by Fiscal Year

Table 3 shows that the annual statewide total assists decreased only nominally, by about 1.3% (from 682,424 in FY 2015-16 to 673,350 in FY 2016-17). This is shown graphically in Figure 1.

Table 4: Total Assists and Annual Change by Fiscal Year

Fiscal Year	Total Assists	Annual Change (percent)
1991-92	152,526	0.0%
1992-93	295,613	93.8%
1993-94	452,018	52.9%
1994-95	448,170	-0.9%
1995-96	540,874	20.7%
1996-97	587,941	8.7%
1997-98	583,699	-0.7%
1998-99	568,276	-2.6%
1999-00	625,090	10.0%
2000-01	631,161	1.0%
2001-02	643,607	2.0%
2002-03	651,710	1.3%
2003-04	646,749	-0.8%
2004-05	618,440	-4.4%
2005-06	669,895	8.3%
2006-07	666,612	-0.5%
2007-08	668,142	0.2%
2008-09	638,880	-4.4%
2009-10	649,155	1.6%
2010-11	655,686	1.0%
2011-12	672,472	2.6%
2012-13	651,315	-3.1%
2013-14	651,441	0.0%
2014-15	666,686	2.3%
2015-16	682,424	2.4%
2016-17	673,350	-1.3%

Summary

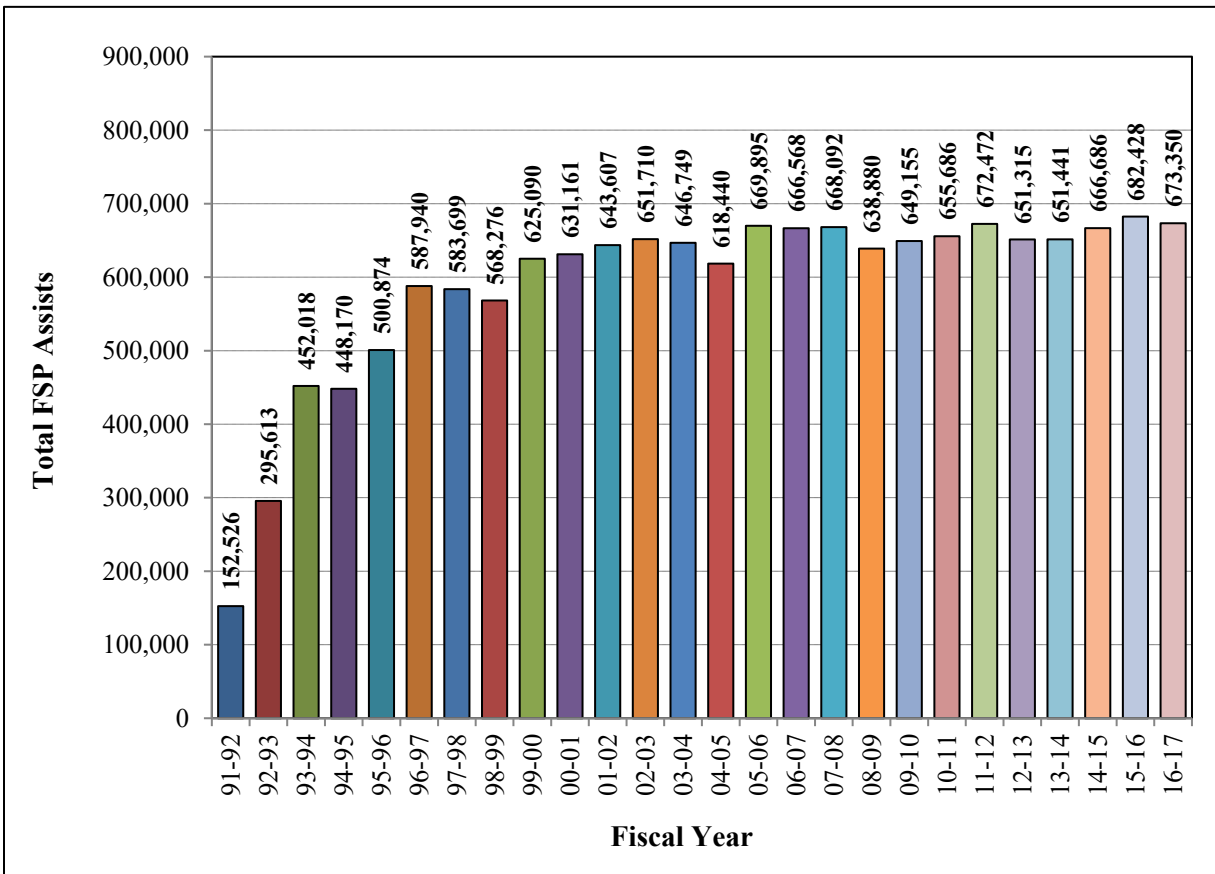


Figure 1: Bar Chart – Total FSP Assists by Fiscal Year

Summary

4.2 Benefit/Cost Ratios for FSP Programs

Table 5: B/C Ratio for Each FSP Program

Caltrans District	Counties or Region	Peak Weekday B/C Ratio	Midday Weekday B/C Ratio	Weekday (Pk+Md) B/C Ratio	Weekend B/C Ratio	Annual (Total) B/C Ratio
3	Sacramento / Yolo	7.0	-	7.0	1.0	7.0
3	Placer	3.0	-	3.0	-	3.0
3	El Dorado	2.0	-	2.0	-	2.0
4	Bay Area Counties	7.0	-	7.0	3.0	7.0
5	Monterey	5.0	-	5.0	5.0	5.0
5	Santa Cruz	4.0	-	4.0	3.0	4.0
5	Santa Barbara	3.0	-	3.0	-	3.0
6	Fresno	5.0	-	5.0	-	5.0
7	Los Angeles	12.0	8.0	11.0	6.0	10.0
8	Riverside	8.0	-	8.0	-	8.0
8	San Bernardino	8.0	-	8.0	-	8.0
10	San Joaquin	4.0	-	4.0	-	4.0
11	San Diego	6.0	2.0	6.0	1.0	5.0
12	Orange	9.0	8.0	9.0	7.0	9.0
Statewide		9.0	7.0	9.0	5.0	8.0

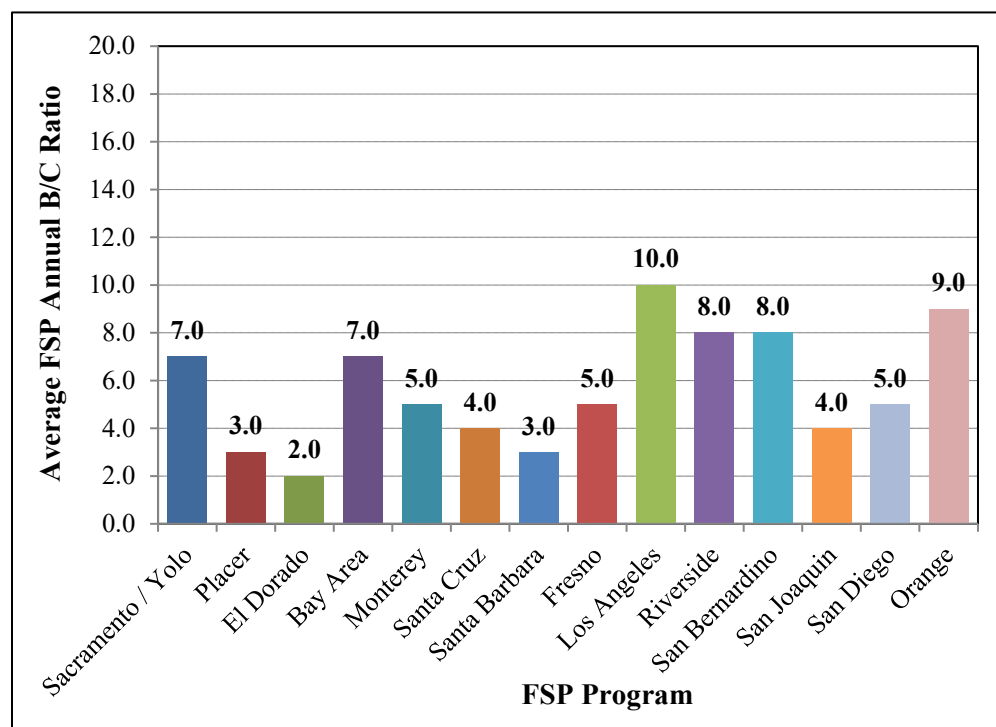


Figure 2: Bar Chart of FSP Benefit/Cost Ratios by Program

Summary

4.3 Statewide FSP Total Assists by Quarter & Program

Table 6: Total Assists by Quarter & Program

		Jul 16 - Sep 16	Oct 16 - Dec 16	Jan 17 - Mar 17	Apr 17 - Jun 17		
Caltrans District	County or Region	Quarter 3	Quarter 4	Quarter 1	Quarter 2	Total Assists	Percent
3	Sac & Yolo	12,310	9,335	8,235	9,338	39,218	5.8%
3	Placer	902	801	645	713	3,061	0.5%
3	El Dorado	333	193	144	259	929	0.1%
4	Bay Area	20,567	18,185	19,183	21,260	79,195	11.8%
5	Monterey	440	409	328	379	1,556	0.2%
5	Santa Cruz	382	324	307	358	1,370	0.2%
5	Santa Barbara	318	147	139	90	694	0.1%
6	Fresno	1,388	1,128	1,167	1,240	4,923	0.7%
7	Los Angeles	82,802	69,399	79,466	84,308	315,975	46.9%
8	Riverside	11,235	9,366	9,905	10,505	41,011	6.1%
8	San Bernardino	8,486	7,074	7,902	9,735	33,197	4.9%
10	San Joaquin	1,264	1,170	1,144	1,175	4,753	0.7%
11	San Diego	22,741	20,279	21,291	22,153	86,464	12.8%
12	Orange	15,514	13,561	15,744	16,185	61,004	9.1%
Total Assists		178,682	151,371	165,600	177,698	673,350	100.0%
% of Total Assists		26.5%	22.5%	24.6%	26.4%		100.0%

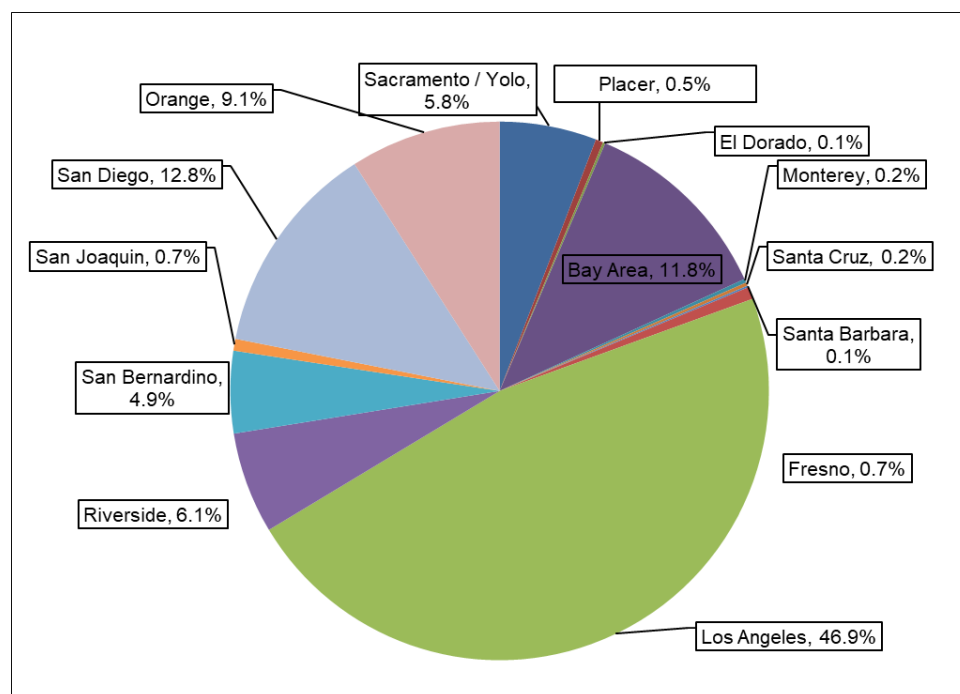


Figure 3: Pie Chart of Total Assists by Program

Summary

4.4 Statewide FSP Total Assists by Problem Type

Table 7: Total Assists by Problem Type

Problem Type	Total Assists	Percent
Abandoned	26,458	3.9%
Accident	129,639	19.3%
Debris Removed	17,147	2.5%
Flat Tire	110,695	16.4%
Mechanical Problems	123,320	18.3%
Other*	177,085	26.3%
Out of Gas	53,727	8.0%
Over Heated	35,278	5.2%
Total Assists	673,350	100.0%

* "Other" includes the assist records for refused service, informational assistance, unable to locate, drive off, service en-route, and/or incidents with too little information.

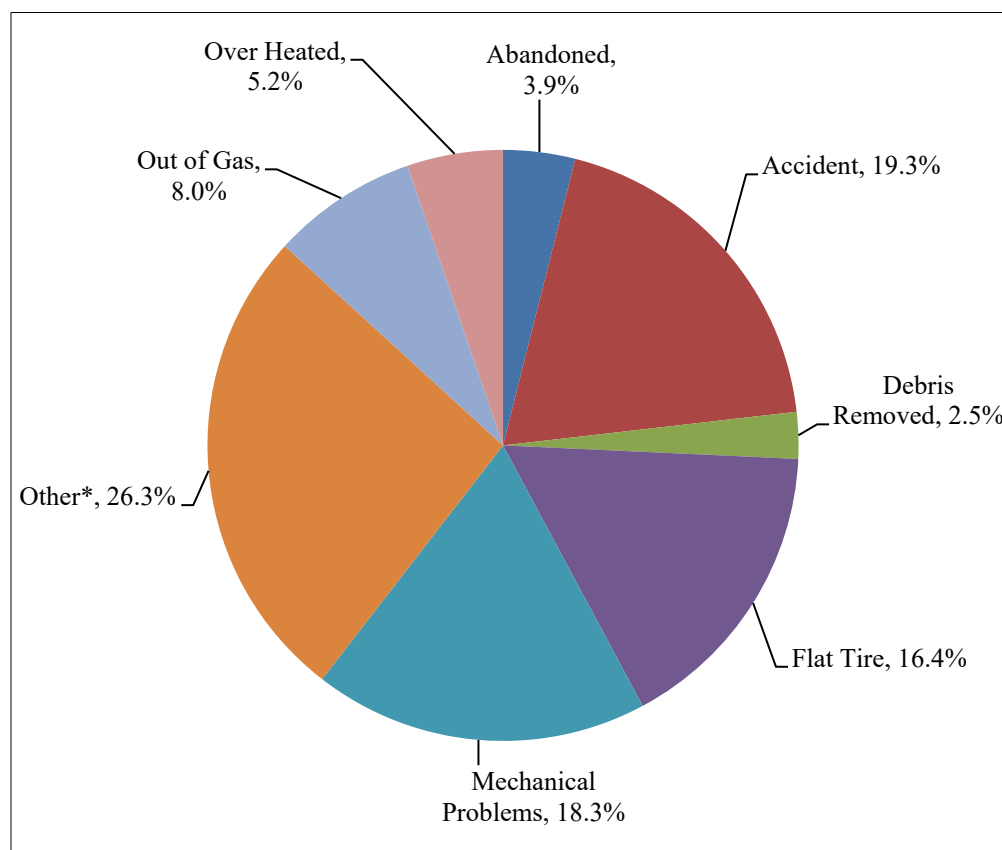


Figure 4: Pie Chart of Total Assists by Problem Type

Summary

4.5 Statewide FSP Total Assists by Problem Type & Program

Table 8: Total Assists by Problem Type & Program

Caltrans District	Counties or Region	Abandoned	Accident	Debris Removed	Flat Tire	Mechanical Problems	Other*	Out of Gas	Over Heated	Total Assists
3	Sac & Yolo	1,520	17,508	1,791	5,468	6,974	2,811	2,547	599	39,218
3	Placer	309	937	34	513	722	284	223	39	3,061
3	El Dorado	110	142	38	150	281	122	63	23	929
4	Bay Area	5,690	12,955	1,159	15,603	19,168	13,999	6,350	4,271	79,195
5	Monterey	53	347	129	228	342	205	176	76	1,556
5	Santa Cruz	87	297	77	157	286	269	117	81	1,370
5	Santa Barbara	37	150	9	118	166	107	49	58	694
6	Fresno	496	1,484	60	557	1,294	108	916	9	4,923
7	Los Angeles	5,468	68,839	4,303	52,226	52,521	89,978	22,491	20,149	315,975
8	Riverside	2,174	4,073	2,061	6,200	7,980	13,354	2,647	2,522	41,011
8	San Bernardino	2,562	3,401	1,960	5,054	5,779	11,015	2,010	1,416	33,197
10	San Joaquin	270	610	319	972	711	694	906	271	4,753
11	San Diego	5,453	8,771	1,908	14,498	15,169	26,878	9,751	4,036	86,464
12	Orange	2,230	10,126	3,299	8,951	11,927	17,261	5,482	1,728	61,004
Total Assists		26,458	129,639	17,147	110,695	123,320	177,085	53,727	35,278	673,350
Average %		3.9%	19.3%	2.5%	16.4%	18.3%	26.3%	8.0%	5.2%	100.0%

* "Other" includes assist records for refused service, informational assistance, unable to locate, drive off, service en-route, and/or incidents with too little information.

Table 9: Total Assists by Problem Type & Program (in Percent)

Caltrans District	Counties or Region	Abandoned	Accident	Debris Removed	Flat Tire	Mechanical Problems	Other*	Out of Gas	Over Heated	Total Assists (percent)
3	Sac & Yolo	3.9%	44.6%	4.6%	13.9%	17.8%	7.2%	6.5%	1.5%	5.8%
3	Placer	10.1%	30.6%	1.1%	16.8%	23.6%	9.3%	7.3%	1.3%	0.5%
3	El Dorado	11.8%	15.3%	4.1%	16.1%	30.2%	13.1%	6.8%	2.5%	0.1%
4	Bay Area	7.2%	16.4%	1.5%	19.7%	24.2%	17.7%	8.0%	5.4%	11.8%
5	Monterey	3.4%	22.3%	8.3%	14.7%	22.0%	13.2%	11.3%	4.9%	0.2%
5	Santa Cruz	5.3%	21.6%	1.3%	17.0%	23.9%	15.5%	7.0%	8.3%	0.2%
5	Santa Barbara	6.3%	21.7%	5.6%	11.5%	20.9%	19.6%	8.5%	5.9%	0.1%
6	Fresno	10.1%	30.1%	1.2%	11.3%	26.3%	2.2%	18.6%	0.2%	0.7%
7	Los Angeles	1.7%	21.8%	1.4%	16.5%	16.6%	28.5%	7.1%	6.4%	46.9%
8	Riverside	5.3%	9.9%	5.0%	15.1%	19.5%	32.6%	6.5%	6.1%	6.1%
8	San Bernardino	7.7%	10.2%	5.9%	15.2%	17.4%	33.2%	6.1%	4.3%	4.9%
10	San Joaquin	5.7%	12.8%	6.7%	20.5%	15.0%	14.6%	19.1%	5.7%	0.7%
11	San Diego	6.3%	10.1%	2.2%	16.8%	17.5%	31.1%	11.3%	4.7%	12.8%
12	Orange	3.7%	16.6%	5.4%	14.7%	19.6%	28.3%	9.0%	2.8%	9.1%
Average %		3.9%	19.3%	2.5%	16.4%	18.3%	26.3%	8.0%	5.2%	100.0%

Summary

4.6 Statewide FSP Total Assists by Vehicle Type

Table 10: Total Assists by Vehicle Type

Vehicle Type	Total Assists	Percent
Auto / Van	463,640	68.9%
Big Rig	26,269	3.9%
Other / Unknown	41,375	6.1%
SUV / Pickup	128,160	19.0%
Trucks	13,906	2.1%
Total Assists	673,350	100.0%

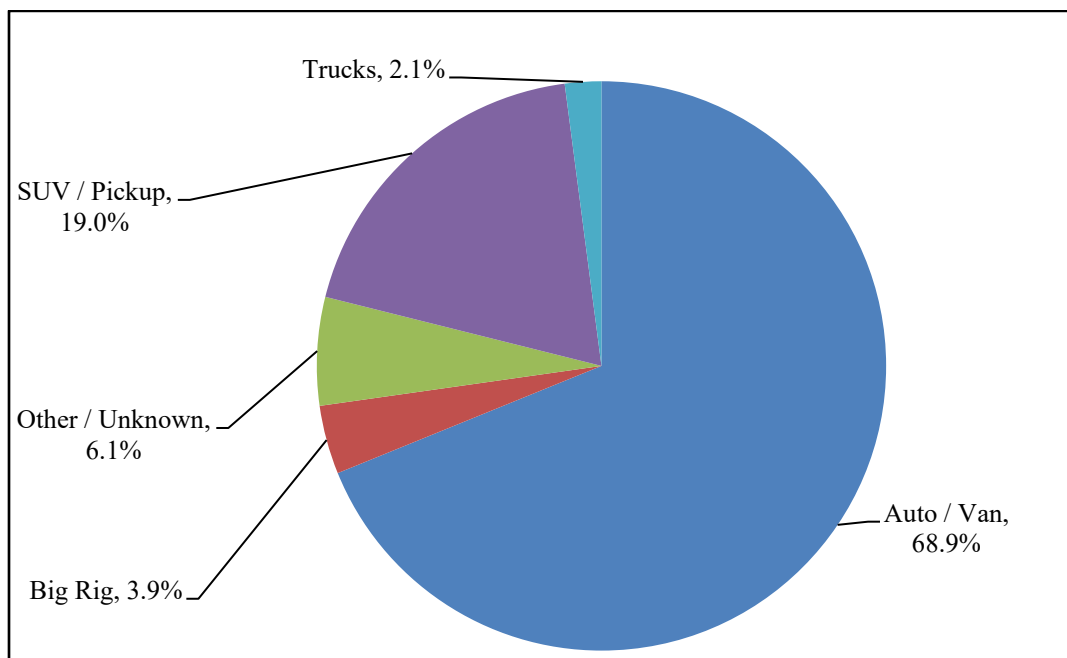


Figure 5: Pie Chart of Total Assists by Vehicle Type

Summary

4.7 Statewide FSP Total Assists by Vehicle Type & Program

Table 11: Total Assists by Vehicle Type & Program

Caltrans District	Counties or Region	Auto / Van	Big Rig	Other / Unknown	SUV / Pickup	Trucks	Total Assists
3	Sac & Yolo	22,263	566	5,086	10,589	714	39,218
3	Placer	1,682	105	141	1,060	73	3,061
3	El Dorado	477	10	72	336	34	929
4	Bay Area	58,719	37	6,959	10,641	2,839	79,195
5	Monterey	1,026	47	209	239	35	1,556
5	Santa Cruz	1,003	26	141	187	13	1,370
5	Santa Barbara	519	9	44	109	13	694
6	Fresno	3,682	64	133	1,012	33	4,923
7	Los Angeles	242,307	10,464	13,522	44,714	4,968	315,975
8	Riverside	23,860	5,400	2,494	7,214	2,043	41,011
8	San Bernardino	18,160	6,424	2,551	4,543	1,519	33,197
10	San Joaquin	3,391	32	502	790	38	4,753
11	San Diego	49,660	462	6,350	29,349	643	86,464
12	Orange	36,891	2,623	3,172	17,377	941	61,004
Total Assists		463,640	26,269	41,375	128,160	13,906	673,350
Average %		68.9%	3.9%	6.1%	19.0%	2.1%	100.0%

Table 12: The Percent of Total Assists by Vehicle Type & Program

Caltrans District	Counties or Region	Auto / Van	Big Rig	Other / Unknown	SUV / Pickup	Trucks	Total Assists
3	Sac & Yolo	56.8%	1.4%	13.0%	27.0%	1.8%	5.8%
3	Placer	54.9%	3.4%	4.6%	34.6%	2.4%	0.5%
3	El Dorado	51.3%	1.1%	7.8%	36.2%	3.7%	0.1%
4	Bay Area	74.1%	0.0%	8.8%	13.4%	3.6%	11.8%
5	Monterey	65.9%	3.0%	13.4%	15.4%	2.2%	0.2%
5	Santa Cruz	73.2%	1.9%	10.3%	13.6%	0.9%	0.2%
5	Santa Barbara	74.8%	1.3%	6.3%	15.8%	1.9%	0.1%
6	Fresno	74.8%	1.3%	2.7%	20.6%	0.7%	0.7%
7	Los Angeles	76.7%	3.3%	4.3%	14.2%	1.6%	46.9%
8	Riverside	58.2%	13.2%	6.1%	17.6%	5.0%	6.1%
8	San Bernardino	54.7%	19.4%	7.7%	13.7%	4.6%	4.9%
10	San Joaquin	71.3%	0.7%	10.6%	16.6%	0.8%	0.7%
11	San Diego	57.4%	0.5%	7.3%	33.9%	0.7%	12.8%
12	Orange	60.5%	4.3%	5.2%	28.5%	1.5%	9.1%
Average %		68.9%	3.9%	6.1%	19.0%	2.1%	100.0%

Summary

4.8 Statewide FSP Total Assists by Vehicle Location

Table 13: Total Assists by Vehicle Location

Vehicle Location	Total Assists	Percent
In Lane	67,595	10.0%
On Left Shoulder	28,071	4.2%
On Right Shoulder	503,693	74.8%
Other	34,084	5.1%
Ramp / Connector	21,068	3.1%
Unable to Locate	18,838	2.8%
Total Assists	673,350	100.0%

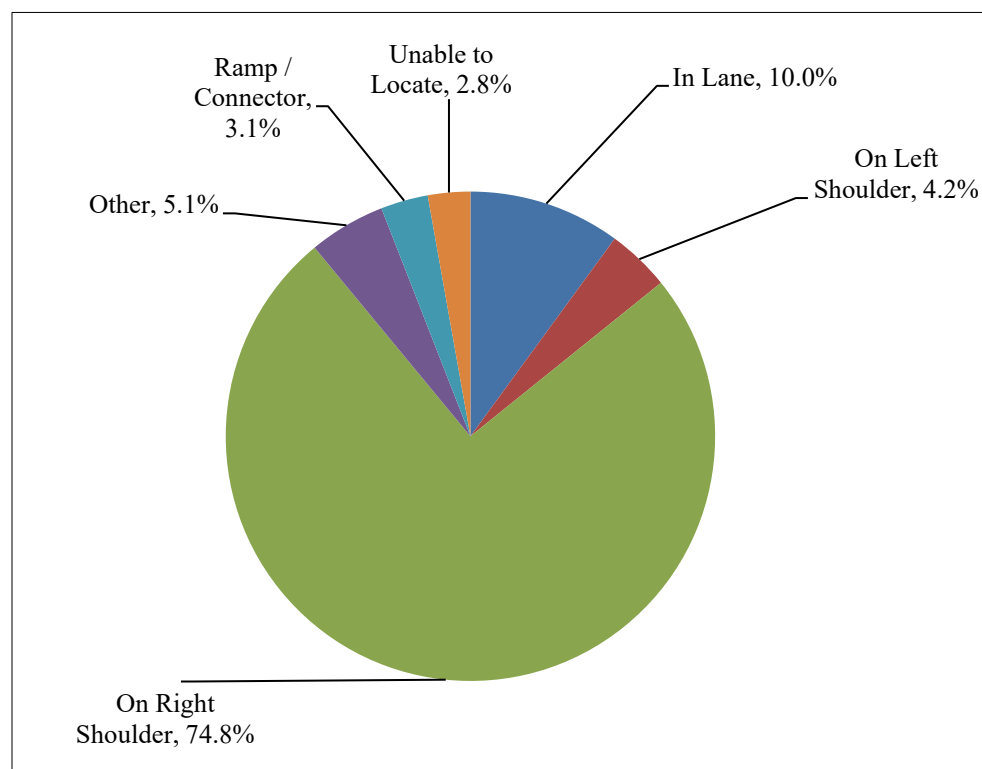


Figure 6: Pie Chart of Total Assists by Vehicle Location

Summary

4.9 Statewide FSP Total Assists by Vehicle Location & Program

Table 14: Total Assists by Vehicle Location & Program

Caltrans District	Counties or Region	In Lane	On Left Shoulder	On Right Shoulder	Other	Ramp / Connector	Unable to Locate	Total Assists
3	Sac & Yolo	5,879	3,314	24,017	3,557	2,405	46	39,218
3	Placer	147	262	2,429	14	209	0	3,061
3	El Dorado	55	50	765	1	55	3	929
4	Bay Area	5,306	186	58,261	0	327	15,115	79,195
5	Monterey	251	192	890	48	168	7	1,556
5	Santa Cruz	266	90	814	8	113	79	1,370
5	Santa Barbara	55	68	511	40	21	0	694
6	Fresno	670	432	3,433	0	387	2	4,923
7	Los Angeles	35,367	10,124	238,203	26,483	3,214	2,584	315,975
8	Riverside	4,548	1,679	31,546	0	3,238	0	41,011
8	San Bernardino	3,385	1,329	25,485	0	2,998	0	33,197
10	San Joaquin	143	672	3,424	0	514	0	4,753
11	San Diego	4,259	6,964	65,784	3,273	5,182	1,002	86,464
12	Orange	7,265	2,710	48,131	660	2,238	0	61,004
Total Assists		67,595	28,071	503,693	34,084	21,068	18,838	673,350
Average %		10.0%	4.2%	74.8%	5.1%	3.1%	2.8%	100.0%

Table 15: The Percent of Total Assists by Vehicle Location & Program

Caltrans District	Counties or Region	In Lane	On Left Shoulder	On Right Shoulder	Other	Ramp / Connector	Unable to Locate	Total Assists
3	Sac & Yolo	15.0%	8.5%	61.2%	9.1%	6.1%	0.1%	5.8%
3	Placer	4.8%	8.6%	79.4%	0.5%	6.8%	0.0%	0.5%
3	El Dorado	5.9%	5.4%	82.3%	0.1%	5.9%	0.3%	0.1%
4	Bay Area	6.7%	0.2%	73.6%	0.0%	0.4%	19.1%	11.8%
5	Monterey	16.1%	12.3%	57.2%	3.1%	10.8%	0.4%	0.2%
5	Santa Cruz	19.4%	6.6%	59.4%	0.6%	8.2%	5.8%	0.2%
5	Santa Barbara	7.9%	9.7%	73.6%	5.7%	3.0%	0.0%	0.1%
6	Fresno	13.6%	8.8%	69.7%	0.0%	7.9%	0.0%	0.7%
7	Los Angeles	11.2%	3.2%	75.4%	8.4%	1.0%	0.8%	46.9%
8	Riverside	11.1%	4.1%	76.9%	0.0%	7.9%	0.0%	6.1%
8	San Bernardino	10.2%	4.0%	76.8%	0.0%	9.0%	0.0%	4.9%
10	San Joaquin	3.0%	14.1%	72.0%	0.0%	10.8%	0.0%	0.7%
11	San Diego	4.9%	8.1%	76.1%	3.8%	6.0%	1.2%	12.8%
12	Orange	11.9%	4.4%	78.9%	1.1%	3.7%	0.0%	9.1%
Average %		10.0%	4.2%	74.8%	5.1%	3.1%	2.8%	100.0%

Summary

4.10 Statewide FSP Average Assist Duration by Program

Table 16: The Average Assist Duration by Program

Caltrans District	Counties or Region	Average Duration (minutes)
3	Sac & Yolo	9.6
3	Placer	12.3
3	El Dorado	9.2
4	Bay Area	20.5
5	Monterey	16.0
5	Santa Cruz	19.0
5	Santa Barbara	19.8
6	Fresno	10.1
7	Los Angeles	16.0
8	Riverside	10.9
8	San Bernardino	10.9
10	San Joaquin	20.2
11	San Diego	9.7
12	Orange	32.0
Average Duration		16.0

Note: Only records with assist durations greater than zero minutes were included in average duration calculations.

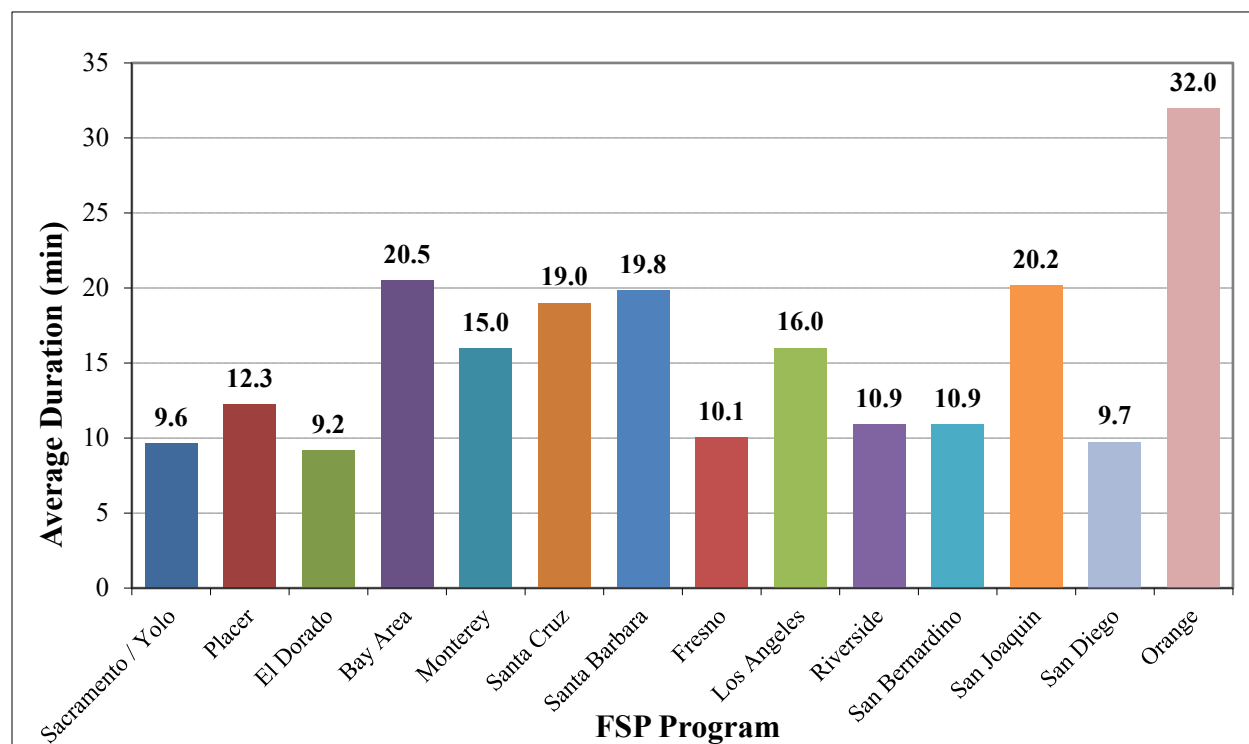


Figure 7: Bar Chart of Average Assist Duration by Program

Summary

4.11 Statewide FSP Average Assist Duration by Problem Type & Program

Table 17: The Average Assist Duration by Problem Type & Program

Caltrans District	Counties or Region	Abandoned	Accident	Debris Removed	Flat Tire	Mechanical Problems	Other*	Out of Gas	Over Heated	Average Duration
3	Sac & Yolo	4.8	8.6	3.1	13.5	14.6	5.3	7.3	11.7	9.6
3	Placer	3.8	13.9	10.9	14.8	15.4	6.6	8.2	13.9	12.3
3	El Dorado	2.9	12.2	2.3	11.8	12.6	3.9	6.1	9.3	9.2
4	Bay Area	9.4	29.0	11.2	23.0	24.5	11.1	15.7	20.6	20.5
5	Monterey	6.6	26.5	9.8	16.0	17.0	8.4	9.7	14.7	16.0
5	Santa Cruz	6.9	27.3	8.7	22.7	21.3	12.7	22.1	12.5	19.0
5	Santa Barbara	9.4	29.6	7.0	20.7	24.2	9.7	13.8	14.1	19.8
6	Fresno	4.6	16.4	8.7	8.9	8.3	7.6	5.9	10.0	10.1
7	Los Angeles	9.5	22.5	10.5	17.9	18.6	9.6	12.4	16.8	16.0
8	Riverside	5.9	15.7	6.0	15.8	17.4	4.4	9.2	14.1	10.9
8	San Bernardino	5.6	10.2	5.6	11.8	11.3	4.4	8.2	10.7	7.6
10	San Joaquin	10.5	20.2	14.9	24.5	23.3	13.2	22.2	23.4	20.2
11	San Diego	5.7	14.3	7.5	12.9	13.2	6.1	7.8	11.2	9.7
12	Orange	27.6	34.7	26.8	32.8	38.9	27.9	28.4	32.1	32.0
Average Duration		9.1	21.0	11.5	18.5	20.1	10.2	13.1	16.9	16.0

Note:

- ❖ Only records with assist durations greater than zero minutes were included in the average duration calculations.
- ❖ The “Other*” category includes the assist records for refused service, informational assistance, unable to locate, drive off, service en route, and/or incidents with too little information.

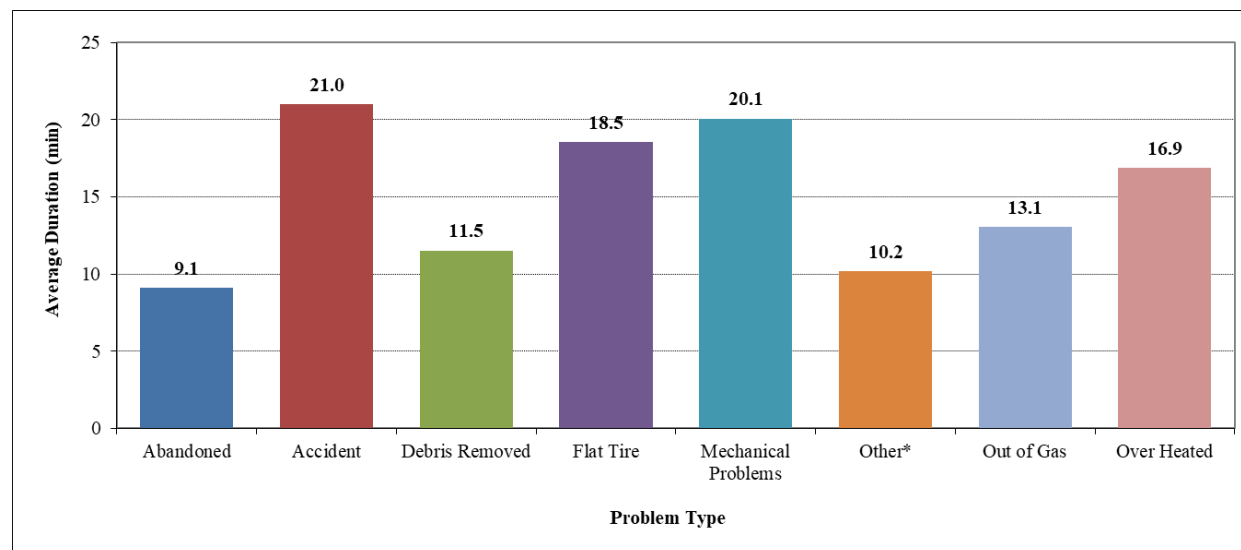


Figure 8: Bar Chart of Average Assist Duration by Problem Type and Program

Summary

4.12 Statewide FSP Average Assist Duration by Vehicle Type & Program

Table 18: The Average Assist Duration by Vehicle Type & Program

Caltrans District	Counties or Region	Auto / Van	Big Rig	Other / Unknown	SUV / Pickup	Trucks	Average Duration
3	Sac & Yolo	10.2	9.0	6.4	9.9	11.3	9.6
3	Placer	12.4	9.3	14.2	12.2	10.4	12.3
3	El Dorado	9.7	6.3	6.0	9.1	10.1	9.2
4	Bay Area	20.6	21.8	22.4	18.3	21.2	20.5
5	Monterey	16.3	19.9	11.8	16.8	19.5	16.0
5	Santa Cruz	18.3	26.6	20.2	20.4	24.6	19.0
5	Santa Barbara	18.6	70.2	26.0	19.0	19.6	19.8
6	Fresno	8.9	8.9	8.8	9.1	10.2	10.1
7	Los Angeles	16.4	12.9	12.9	15.5	N/A	16.0
8	Riverside	12.3	7.0	7.2	11.0	8.5	10.9
8	San Bernardino	8.6	5.9	6.0	7.6	6.8	7.6
10	San Joaquin	20.5	15.4	18.9	19.7	21.1	20.2
11	San Diego	10.1	9.4	8.8	10.3	9.2	9.7
12	Orange	32.4	27.7	28.9	32.3	32.6	32.0
Average Duration		16.7	11.4	13.6	15.8	9.8	16.0

Note: Only records with assist durations greater than zero minutes were included in average duration calculations.

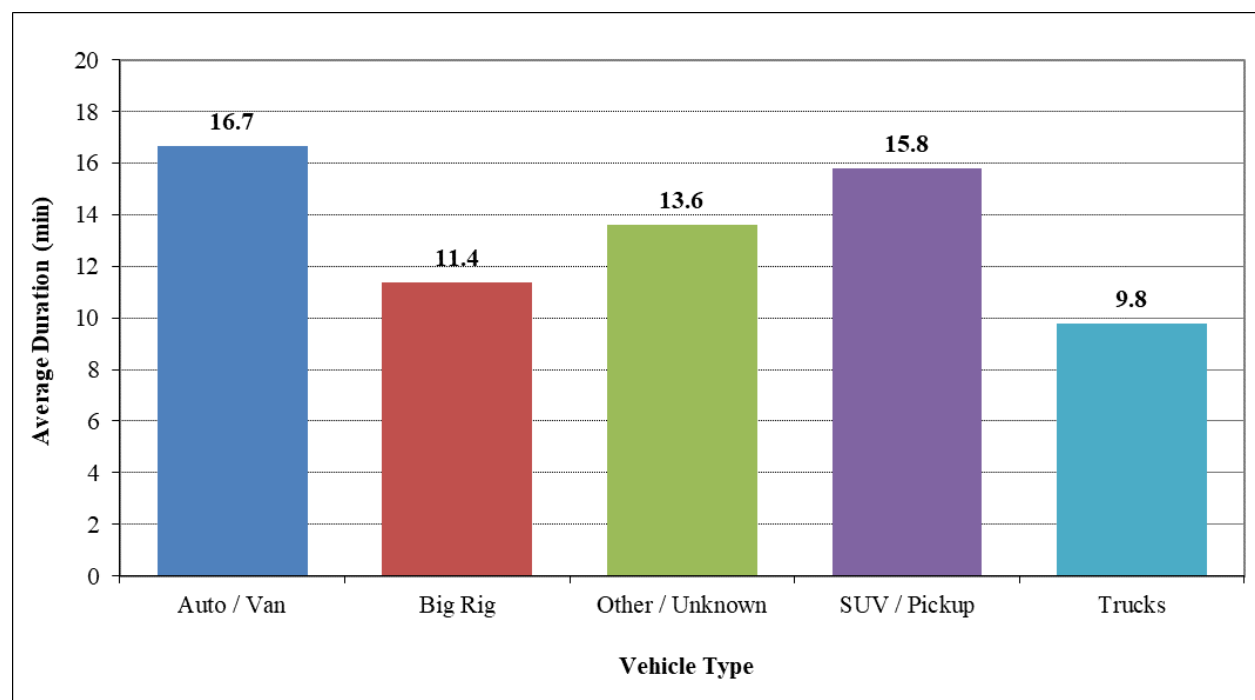


Figure 9: Bar Chart of Average Assist Duration by Vehicle Type

Summary

4.13 Statewide FSP Average Assist Rate by Program

Table 19: The Average Assist Rate by Program

Caltrans District	Counties or Region	Annual Assists	Annual Truck-Hours	Assist Rate
3	Sac & Yolo	39,218	26,278	1.49
3	Placer	3,061	3,660	0.84
3	El Dorado	929	1,342	0.69
4	Bay Area	79,195	130,775	0.61
5	Monterey	1,556	3,332	0.47
5	Santa Cruz	1,370	4,278	0.32
5	Santa Barbara	694	2,928	0.24
6	Fresno	4,923	5,040	0.98
7	Los Angeles	315,975	337,253	0.94
8	Riverside	41,011	36,456	1.12
8	San Bernardino	33,197	27,309	1.22
10	San Joaquin	4,753	4,881	0.97
11	San Diego	86,464	81,536	1.06
12	Orange	61,004	79,722	0.77
	Statewide	744,790	673,350	0.90

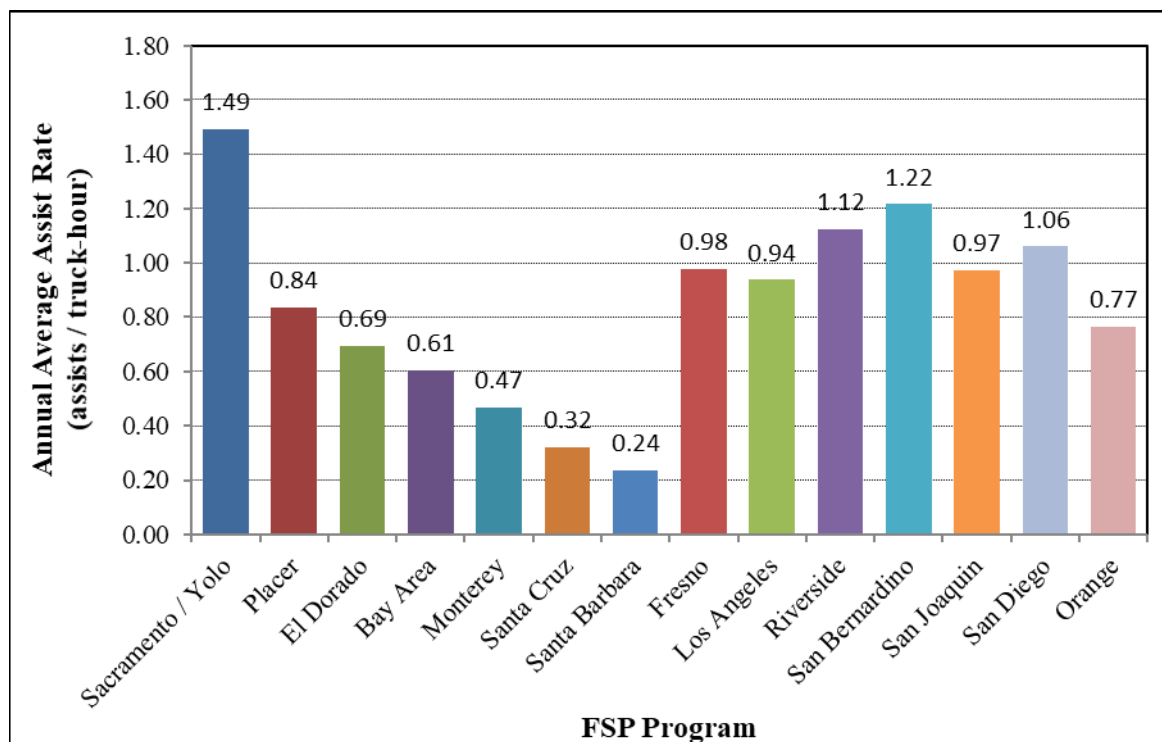


Figure 10: Bar Chart of Average Weekday Assist Rate by Program

Section 5: Statewide Reporting Procedures

This section reports on the FSP assist reporting procedures that were agreed upon by the FSP partner agencies in the 2004/05 FSP review and annual meeting. The statewide motorist aid committee recommended reporting procedures are listed first, and followed by observed data discrepancies.

5.1 *Consistent Assist Record set of Description Fields*

At a minimum, the following fields for each and every FSP Assist Record are required.

- FSP Program
- Beat
- Assist Date
- Arrival Time
- Departure Time
- Problem Type
- Vehicle Type
- Vehicle Location on Road
- Tow To
- How vehicle was found

5.2 *Data Coding and Categories*

Based on an agreement of the FSP technical committee, the standardized motorist assist description codes used to process the FSP program assist data is shown in the tables in the following sections.

5.2.1 Vehicle Type

Table 20: Standardized Vehicle Type Category

Code	Vehicle Type
1	Auto /Van
2	Motorcycle
3	SUV /Pickup
4	Truck
5	Big Rig
6	Other

5.2.2 Problem Type

Table 21: Standardized Problem Type Category

Code	Problem Type
1	Abandoned
2	Accident
3	Debris Removal
4	Drive Off
5	Electrical Problem
6	Flat Tire
7	Help En Route
8	Locked Out
9	Mechanical Problem
10	Other
11	Out of Gas
12	Over Heated
13	Refuse Service
14	Rollover
15	Unable to Locate
16	Vehicle Fire

5.2.3 Vehicle Location Category

Table 22: Standardized Disabled Vehicle Location Category

Code	Disabled Vehicle Location
1	In Freeway Lane
2	Left Shoulder
3	Other
4	Ramp/Connector
5	Right Shoulder
6	Unable to Locate

5.2.4 “Towed To” Location

Table 23: Standardized “Towed To” Location Category

Code	Towed to Location
1	Shoulder
2	Off Freeway
3	No Tow

5.2.5 Vehicle Found Category

Table 24: Standardized Found Category

Code	Found Category
1	Dispatched
2	Found by FSP Driver
3	Other

5.3 Data Entry Errors

During the processing of the FSP 2016-17 assist data, occasional random data errors were encountered. The errors were in the beat IDs, dates, times and some descriptive code categories. The errors consisted of data entries that were not within the range of valid pre-defined values. For example, assist records had invalid assist dates and start times that were after the end times. Many of the FSP Arrival and FSP Departure time errors resulted in negative durations that could not be used in the calculation of the average assist durations. Upon review of these errors, it appears these problems are most likely the result of data entry errors. These errors have become less frequent over the years as automated data management techniques have become more common.

5.4 Reporting of “Other/Unknown/Blank” Problem Type

The Problem Type category “Other/Unknown/Blank” category contains the count of not only the empty and unknown problem types but also the count of the problem types that do not easily fall in the condensed set of reported problem type categories. Combining these two different groupings of problem types takes information away from the data shown on the Problem Type statistical tables and graphs. The Problem Type category could be split into “Other” and “Unknown” for more accurate FSP Assist reporting.

5.5 FSP Data Collection Reporting Categories by FSP Program

The FY 2016-17 FSP assist data were visually inspected to determine the FSP assist data categories used by the FSP programs. All FSP programs collect the assist data for the following required FSP assist data categories:

- FSP Program
- Beat
- Assist Date
- Arrival Time
- Departure Time

There are some minor differences between the FSP programs for the FSP Assist data categories that describe the type of problem, FSP service provided, the vehicle's location and vehicle type. FSP assist data reporting categories are summarized in Tables 24 through 28:

- Table 24: Vehicle Type
- Table 25: Problem Type
- Table 26: Vehicle Location on Road
- Table 27: Towed-to Location
- Table 28: How Vehicle Was Found

The Sacramento/Yolo County (STA) and the Placer County (PCTPA) FSP programs use the same reporting technology and procedures (i.e., the same system and app). Similarly, the Riverside County (RCTC) and the San Bernardino County (SANBAG) FSP programs use the same reporting technology and procedures. As such, the Sacramento County (STA) & Placer County (PCTPA) programs are represented in a single column in Tables 24-28, as are the Riverside County (RCTC) & San Bernardino County (SANBAG) FSP programs.

Table 25: “Vehicle Type” Category

Vehicle Type	D-03 Sacramento & Placer Counties	D-03 El Dorado County	D-04 Bay Area Counties	D-05 Monterey County	D-05 Santa Cruz County	D-05 Santa Barbara County	D-06 Fresno County	D-07 Los Angeles County	D-08 Riverside & San Bernardino Counties	D-10 San Joaquin County	D-11 San Diego County	D-12 Orange County
Motorcycle	•	•	•	•	•	•	n/a	•	•	•	•	•
Auto	•	•	•	•	•	•	n/a	•	•	•	•	•
Van		•		•			•	•	n/a	•	•	•
SUV	•	•		•	•		n/a		•	•	•	•
Pickup Truck	•	•	•	•	•	•	n/a	•	•	•	•	•
Truck – LTE 1 Ton	•		•			•	n/a	•	•	•	•	•
Truck – Over 1 Ton	•		•			•	n/a	•	•	•		
RV / Motorhome	•						n/a					•
Bus							n/a					•
Big Rig			•	•	•	•	n/a	•	•	•	•	•
No Assist Oversize		•					n/a	•	•	•	•	
Other / Unknown		•	•	•	•	•	n/a	•	•	•	•	•
Debris				•	•		n/a		•	•		•

Notes:

All FSP Programs track “Debris Removal” as a category in the “Vehicle Problem” question.
 D-11 San Diego County and D-12 Orange County only have one truck category – “Box Truck”.

Table 26: “Problem Type” Category

Problem Type	D-03 Sacramento & Placer Counties	D-03 El Dorado County	D-04 Bay Area Counties	D-05 Monterey County	D-05 Santa Cruz County	D-05 Santa Barbara County	D-06 Fresno County	D-07 Los Angeles County	D-08 Riverside & San Bernardino Counties	D-10 San Joaquin County	D-11 San Diego County	D-12 Orange County
Abandoned	•	•	•	•	•	•	n/a	•	•	•	•	•
Accident	•	•	•	•	•	•	n/a	•	•	•	•	•
Debris Removal	•	•	•	•	•	•	n/a	•	•	•	•	•
Dead Battery			•			•	n/a					•
Drove Off			•	•	•		n/a				•	
Electrical	•	•		•	•		n/a	•	•	•	•	
Fire		•		•	•	•	n/a	•	•	•	•	
Flat Tire	•	•	•	•	•	•	n/a	•	•	•	•	•
Help En-route			•	•	•		n/a				•	
Info				•	•		n/a		•	•		•
Locked Out	•	•		•	•		n/a	•	•	•	•	
Mechanical	•	•	•	•	•	•	n/a	•	•	•	•	•
Other	•	•	•	•	•	•	n/a	•				
Out of Gas	•	•	•	•	•	•	n/a	•	•	•	•	•
Over Heat	•	•	•	•	•	•	n/a	•	•	•	•	•
Refused Service	•		•	•	•		n/a				•	•
Unable to Locate			•	•	•		n/a		•	•		•

Notes:

The “Refused Service” category includes the “None – Service Not Needed” and “No Service Provided” categories.

Table 27: “Vehicle Location” Category

Vehicle Location	D-03 Sacramento & Placer Counties	D-03 El Dorado County	D-04 Bay Area Counties	D-05 Monterey County	D-05 Santa Cruz County	D-05 Santa Barbara County	D-06 Fresno County	D-07 Los Angeles County	D-08 Riverside & San Bernardino Counties	D-10 San Joaquin County	D-11 San Diego County	D-12 Orange County
Freeway Lane(s)	•	•	•	•	•	•	n/a	•	•	•	•	•
Left Shoulder	•	•	•	•	•	•	n/a	•	•	•	•	•
Right Shoulder	•	•	•	•	•	•	n/a	•	•	•	•	•
Ramp / Connector	•	•	•	•	•	•	n/a	•	•	•	•	•
Other	•	•		•	•	•	n/a	•	•	•	•	•
Unable to Locate	•			•	•	•	n/a	•	•		•	•

Notes:

D-07 Los Angeles County and D-12 Orange County had separate category for “Center Median”.

Table 28: “Towed To” Location or “Did You Tow” Category

Did You Tow Categories	D-03 Sacramento & Placer Counties	D-03 El Dorado County	D-04 Bay Area Counties	D-05 Monterey County	D-05 Santa Cruz County	D-05 Santa Barbara County	D-06 Fresno County	D-07 Los Angeles County	D-08 Riverside & San Bernardino Counties	D-10 San Joaquin County	D-11 San Diego County	D-12 Orange County
No Tow		•	•	•		•	n/a	•	•	•	•	•
Off Fwy Or Drop Zone	•	•	•	•	•	•	n/a	•	•	•	•	•
Pushed			•		•		n/a		•	•	•	
Shoulder						•	n/a	•	•	•	•	•
Other Location		•		•	•	•	n/a					
Unknown							n/a					•

Notes:

D-05 Monterey County and D-05 Santa Cruz County tracked “Towed To” by individual drop zone locations.

Table 29: “Vehicle Found” or “How Found” Category

How Found Categories	D-03 Sacramento & Placer Counties	D-03 El Dorado County	D-04 Bay Area Counties	D-05 Monterey County	D-05 Santa Cruz County	D-05 Santa Barbara County	D-06 Fresno County	D-07 Los Angeles County	D-08 Riverside & San Bernardino Counties	D-10 San Joaquin County	D-11 San Diego County	D-12 Orange County
CHP	•	•	n/a	•	•	•	n/a	•	•	•	•	n/a
FSP – Found by You	•	•	n/a	•	•	•	n/a	•	•	•	•	n/a
Other	•		n/a	•	•		n/a	•				n/a
Partner Assist	•	•	n/a				n/a					n/a
Revisit	•		n/a				n/a					n/a

Notes:

D-04 Bay Area Counties and D12 Orange County do not collect “How Found” Information.

Appendix A

FSP Beat Benefit/Cost Ratio Summaries (Fiscal Year 2016-17 Analysis)

FSP Beat Benefit/Cost Ratio Summary

District 3: Sacramento & Yolo Counties

Beat	Peak Period Weekday B/C Ratio	Midday Weekday B/C Ratio	Weekday B/C Ratio	Weekend B/C Ratio	Combined B/C Ratio
10	7.0	-	7.0	1.0	6.0
106	4.0	-	4.0	-	4.0
108	12.0	-	12.0	-	12.0
108A	13.0	-	13.0	-	13.0
150	13.0	-	13.0	-	13.0
151	3.0	-	3.0	-	3.0
152	5.0	-	5.0	-	5.0
153	8.0	-	8.0	-	8.0
153A	4.0	-	4.0	-	4.0
181	4.0	-	4.0	-	4.0
182	8.0	-	8.0	-	8.0
182A	6.0	-	6.0	-	6.0
184	5.0	-	5.0	-	5.0
184A	8.0	-	8.0	-	8.0
191A	8.0	-	8.0	-	8.0
192	7.0	-	7.0	1.0	7.0
193	7.0	-	7.0	1.0	6.0
Average Benefit/Cost Ratio	7.0	-	7.0	-	7.0

FSP Beat Benefit/Cost Ratio Summary

District 3: Placer County

Beat	Peak Period Weekday B/C Ratio	Midday Weekday B/C Ratio	Weekday B/C Ratio	Weekend B/C Ratio	Combined B/C Ratio
265	4.0	-	4.0	-	4.0
281	3.0	-	3.0	-	3.0
281-A	7.0	-	7.0	-	7.0
Average Benefit/Cost Ratio	3.0	-	3.0	-	3.0

FSP Beat Benefit/Cost Ratio Summary

District 3: El Dorado County

Beat	Peak Period Weekday B/C Ratio	Midday Weekday B/C Ratio	Weekday B/C Ratio	Weekend B/C Ratio	Combined B/C Ratio
1	2.0	-	2.0	-	2.0
Average Benefit/Cost Ratio	2.0	-	2.0	-	2.0

FSP Beat Benefit/Cost Ratio Summary

District 4: Bay Area Counties

Beat	Peak Period Weekday B/C Ratio	Midday Weekday B/C Ratio	Weekday B/C Ratio	Weekend B/C Ratio	Combined B/C Ratio
1	5.0	-	5.0	-	5.0
2	4.0	-	4.0	2.0	3.0
3	6.0	-	6.0	5.0	6.0
4	9.0	-	9.0	5.0	8.0
5	17.0	-	17.0	-	17.0
6	5.0	-	5.0	3.0	4.0
7	16.0	-	16.0	-	16.0
8	7.0	-	7.0	-	7.0
9	21.0	-	21.0	-	21.0
10	10.0	-	10.0	-	10.0
11	5.0	-	5.0	2.0	4.0
12	7.0	-	7.0	-	7.0
13	7.0	-	7.0	-	7.0
14	1.0	-	1.0	-	1.0
15	5.0	-	5.0	-	5.0
16	12.0	-	12.0	4.0	10.0
17	1.0	-	1.0	0.0	1.0
19	6.0	-	6.0	-	6.0
20	7.0	-	7.0	-	7.0
21	4.0	-	4.0	-	4.0
22	5.0	-	5.0	-	5.0
23	4.0	-	4.0	-	4.0
25	6.0	-	6.0	-	6.0
26	4.0	-	4.0	-	4.0
27	1.0	-	1.0	-	1.0
28	2.0	-	2.0	-	2.0
29	4.0	-	4.0	-	4.0
32	8.0	-	8.0	-	8.0
33	1.0	-	1.0	-	1.0
34	5.0	-	5.0	-	5.0
35	2.0	-	2.0	-	2.0
Average Benefit/Cost Ratio	7.0	-	7.0	3.0	7.0

FSP Beat Benefit/Cost Ratio Summary

District 5: Monterey County

Beat	Peak Period Weekday B/C Ratio	Midday Weekday B/C Ratio	Weekday B/C Ratio	Weekend B/C Ratio	Combined B/C Ratio
1	5.0	-	5.0	5.0	5.0
2	5.0	-	5.0	-	5.0
Average Benefit/Cost Ratio	5.0	-	5.0	5.0	5.0

FSP Beat Benefit/Cost Ratio Summary

District 5: Santa Cruz County

Beat	Peak Period Weekday B/C Ratio	Midday Weekday B/C Ratio	Weekday B/C Ratio	Weekend B/C Ratio	Combined B/C Ratio
1	5.0	-	5.0	3.0	4.0
2	3.0	-	3.0	2.0	3.0
Average Benefit/Cost Ratio	4.0	-	4.0	3.0	4.0

FSP Beat Benefit/Cost Ratio Summary

District 5: Santa Barbara County

Beat	Peak Period Weekday B/C Ratio	Midday Weekday B/C Ratio	Weekday B/C Ratio	Weekend B/C Ratio	Combined B/C Ratio
1	3.0	-	3.0	-	3.0
2	2.0	-	2.0	-	2.0
3	4.0	-	4.0	-	4.0
4	2.0	-	2.0	-	2.0
Average Benefit/Cost Ratio	3.0	-	3.0	-	3.0

FSP Beat Benefit/Cost Ratio Summary

District 6: Fresno County

Beat	Peak Period Weekday B/C Ratio	Midday Weekday B/C Ratio	Weekday B/C Ratio	Weekend B/C Ratio	Combined B/C Ratio
1	6.0	-	6.0	-	6.0
2	3.0	-	3.0	-	3.0
3	5.0	-	5.0	-	5.0
4	5.0	-	5.0	-	5.0
Average Benefit/Cost Ratio	5.0	-	5.0	-	5.0

FSP Beat Benefit/Cost Ratio Summary

District 7: Los Angeles County

Beat	Peak Period Weekday B/C Ratio	Midday Weekday B/C Ratio	Weekday B/C Ratio	Weekend B/C Ratio	Combined B/C Ratio
1	14.0	13.0	14.0	2.0	13.0
2	16.0	11.0	15.0	5.0	14.0
3	6.0	6.0	6.0	14.0	7.0
4	7.0	7.0	7.0	3.0	7.0
5	8.0	10.0	8.0	3.0	7.0
6	12.0	9.0	12.0	10.0	11.0
7	10.0	10.0	10.0	25.0	12.0
8	7.0	8.0	7.0	2.0	6.0
9	5.0	8.0	6.0	3.0	5.0
10	5.0	8.0	5.0	3.0	5.0
11	9.0	6.0	8.0	2.0	8.0
12	12.0	10.0	12.0	7.0	11.0
13	21.0	19.0	21.0	16.0	21.0
14	9.0	2.0	8.0	2.0	7.0
16	31.0	29.0	31.0	34.0	31.0
17	7.0	8.0	7.0	10.0	8.0
18	17.0	16.0	16.0	8.0	16.0
19	19.0	10.0	17.0	10.0	17.0
20	6.0	6.0	6.0	2.0	6.0
21	14.0	7.0	13.0	4.0	12.0
23	13.0	9.0	12.0	1.0	10.0
24	8.0	1.0	7.0	0.0	6.0
27	15.0	3.0	13.0	3.0	11.0
28	6.0	9.0	7.0	3.0	6.0
29	9.0	5.0	8.0	1.0	7.0
30	14.0	11.0	13.0	1.0	12.0
31	8.0	6.0	8.0	5.0	8.0
33	11.0	1.0	9.0	0.0	8.0
34	14.0	5.0	12.0	0.0	11.0
36	3.0	0.0	2.0	0.0	2.0
37	12.0	7.0	12.0	3.0	11.0
38	7.0	3.0	6.0	3.0	6.0
39	17.0	11.0	16.0	4.0	14.0
40	20.0	12.0	19.0	4.0	15.0
41	17.0	10.0	15.0	16.0	15.0
42	21.0	7.0	19.0	4.0	17.0
43	12.0	6.0	11.0	5.0	10.0
50	6.0	2.0	5.0	1.0	5.0
51	10.0	7.0	9.0	7.0	9.0
Average Benefit/Cost Ratio	12.0	8.0	11.0	6.0	10.0

FSP Beat Benefit/Cost Ratio Summary

District 8: Riverside County

Beat	Peak Period Weekday B/C Ratio	Midday Weekday B/C Ratio	Weekday B/C Ratio	Weekend B/C Ratio	Combined B/C Ratio
1	11.0	-	11.0	-	11.0
2	12.0	-	12.0	-	12.0
4	17.0	-	17.0	-	17.0
7	5.0	-	5.0	-	5.0
8	4.0	-	4.0	-	4.0
18	5.0	-	5.0	-	5.0
19	4.0	-	4.0	-	4.0
25	7.0	-	7.0	-	7.0
26	4.0	-	4.0	-	4.0
Average Benefit/Cost Ratio	8.0	-	8.0	-	8.0

FSP Beat Benefit/Cost Ratio Summary

District 8: San Bernardino County

Beat	Peak Period Weekday B/C Ratio	Midday Weekday B/C Ratio	Weekday B/C Ratio	Weekend B/C Ratio	Combined B/C Ratio
1	5.0	-	5.0	-	5.0
2	8.0	-	8.0	-	8.0
3	8.0	-	8.0	-	8.0
4	7.0	-	7.0	-	7.0
5	8.0	-	8.0	-	8.0
6	9.0	-	9.0	-	9.0
7	8.0	-	8.0	-	8.0
8	9.0	-	9.0	-	9.0
Average Benefit/Cost Ratio	8.0	-	8.0	-	8.0

FSP Beat Benefit/Cost Ratio Summary

District 10: San Joaquin County

Beat	Peak Period Weekday B/C Ratio	Midday Weekday B/C Ratio	Weekday B/C Ratio	Weekend B/C Ratio	Combined B/C Ratio
1	4.0	-	4.0	-	4.0
Average Benefit/Cost Ratio	4.0	-	4.0	-	4.0

FSP Beat Benefit/Cost Ratio Summary

District 11: San Diego County

Beat	Peak Period Weekday B/C Ratio	Midday Weekday B/C Ratio	Weekday B/C Ratio	Weekend B/C Ratio	Combined B/C Ratio
851	4.0	0.0	3.0	0.0	2.0
852	6.0	-	6.0	-	6.0
501	3.0	1.0	2.0	5.0	3.0
503	7.0	-	7.0	-	7.0
541	4.0	1.0	3.0	2.0	3.0
125	10.0	-	10.0	-	10.0
941	10.0	0.0	7.0	0.0	5.0
505	4.0	-	4.0	-	4.0
151	9.0	1.0	6.0	1.0	5.0
152	8.0	-	8.0	-	8.0
163	8.0	1.0	5.0	1.0	5.0
522	10.0	-	10.0	-	10.0
801	7.0	1.0	5.0	2.0	4.0
802	7.0	-	7.0	-	7.0
506	8.0	2.0	6.0	1.0	5.0
521	5.0	-	5.0	-	5.0
853	10.0	3.0	8.0	1.0	6.0
508	6.0	2.0	4.0	1.0	4.0
509	1.0	-	1.0	-	1.0
153	3.0	0.0	2.0	0.0	2.0
154	3.0	-	3.0	-	3.0
781	-	10.0	10.0	-	10.0
951	2.0	-	2.0	-	2.0
100	9.0	-	9.0	-	9.0
200	6.0	-	6.0	-	6.0
300	6.0	-	6.0	-	6.0
400	6.0	-	6.0	-	6.0
500	8.0	-	8.0	-	8.0
600	8.0	-	8.0	-	8.0
700	5.0	-	5.0	-	5.0
800	6.0	-	6.0	-	6.0
Average Benefit/Cost Ratio	6.0	2.0	6.0	1.0	5.0

FSP Beat Benefit/Cost Ratio Summary

District 12: Orange County

Beat	Peak Period Weekday B/C Ratio	Midday Weekday B/C Ratio	Weekday B/C Ratio	Weekend B/C Ratio	Combined B/C Ratio
910	9.0	-	9.0	-	9.0
911	6.0	-	6.0	-	6.0
912	20.0	-	20.0	-	20.0
913	16.0	-	16.0	-	16.0
914	3.0	-	3.0	-	3.0
915	4.0	-	4.0	-	4.0
916	8.0	-	8.0	-	8.0
220	4.0	-	4.0	-	4.0
221	10.0	-	10.0	-	10.0
222	8.0	-	8.0	-	8.0
401	-	6.0	6.0	-	6.0
405	12.0	-	12.0	-	12.0
406	19.0	-	19.0	-	19.0
407	4.0	-	4.0	-	4.0
408	4.0	-	4.0	-	4.0
409	6.0	-	6.0	-	6.0
410	13.0	-	13.0	-	13.0
411	10.0	-	10.0	-	10.0
501	12.0	-	12.0	-	12.0
502	6.0	-	6.0	-	6.0
503	14.0	-	14.0	-	14.0
504	10.0	-	10.0	-	10.0
505	8.0	-	8.0	-	8.0
506	10.0	-	10.0	-	10.0
507	8.0	-	8.0	-	8.0
508	23.0	-	23.0	-	23.0
509	6.0	-	6.0	-	6.0
510	6.0	-	6.0	-	6.0
570	3.0	-	3.0	-	3.0
571	4.0	-	4.0	-	4.0
572	2.0	-	2.0	-	2.0
551	4.0	-	4.0	-	4.0
552	14.0	-	14.0	-	14.0
553	21.0	-	21.0	-	21.0
554	14.0	-	14.0	-	14.0
223	-	8.0	8.0	-	8.0
224	-	6.0	6.0	-	6.0
225	-	-	-	13.0	13.0
500	-	7.0	7.0	-	7.0
511	-	-	-	7.0	7.0
512	-	-	-	5.0	5.0
513	-	14.0	14.0	-	14.0
550	-	5.0	5.0	-	5.0
555	-	6.0	6.0	-	6.0
573	-	15.0	15.0	-	15.0
922	-	-	-	2.0	2.0
Average B/C Ratio	9.0	8.0	9.0	7.0	9.0

Appendix B

Current FSP Assist Data Collection & Management Technologies

FSP Program	Paper or Electronic Reporting	AVL Vehicle Tracking	Data Transfer Technology (Tow provider to Managing Agency)
Sac/Yolo STA	small business solution (mobile workforce management)	yes	electronic, real-time
Placer PCTPA	small business solution (mobile workforce management)	yes	electronic, real-time
El Dorado EDCTC	small business solution (mobile workforce management)	yes	electronic, real-time
Bay Area MTC	enterprise system	yes	electronic, real-time
Monterey TAMC	iPad mini with app (small business solution)	yes	electronic, twice daily (end of shift)
Santa Cruz SCCRTC	iPad mini with app (small business solution)	yes	electronic, twice daily (end of shift)
Santa Barbara SBCAG	paper form (with motorist survey)	no	paper, monthly
Fresno Fresno-COG	paper form	no	paper, monthly
Los Angeles LAMTA	paper (scantron)	no	paper, monthly
Riverside RCTC	small business solution (mobile workforce management)	yes	electronic, real-time
San Bernardino SANBAG	small business solution (mobile workforce management)	yes	electronic, real-time
San Joaquin SJCOG	small business solution (mobile workforce management)	no	electronic, daily
San Diego SANDAG	paper (scantron) & CHP data logs	no	paper, monthly
Orange OCTA	enterprise system	yes	electronic, real-time