Title

California's Freeway Service Patrol Program:Management Information System Annual Report Fiscal Year 2018-19

Authors

Mauch, Michael
Skabardonis, Alex

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California's Freeway Service Patrol Program:

Management Information System Annual Report Fiscal Year 2018-19

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

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 2018, there were fourteen participating FSP Programs operating in California, deploying 328 tow trucks and covering over 1,823 (centerline) miles of congested California freeways.

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 2018-2019. 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.

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CALIFORNIA'S FREEWAY SERVICE PATROL PROGRAM

Management Information System Annual Report

Fiscal Year 2018-19

Prepared for the California Department of Transportation

Traffic Operations Division

Prepared by

Institute of Transportation Studies
University of California at Berkeley

Final Report, March 2020

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

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 FSP trucks patrolling their beats 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 collects 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 2018-19**:**

(1) In fiscal year 2018-19, the roving tow trucks of the FSP program provided over 690,000 assists on California's highway system. This is approximately 0.6 percent (%) increase over the previous year. Over 44% of total statewide assists were provided by the Los Angeles County FSP program. The next largest was the San Diego's FSP program which provided about 13% of total statewide assists, followed by San Francisco Bay area's FSP program with about 12% of the statewide assists.

(2) The estimated benefit/cost ratios for FSP programs ranged from 2-to-1 (for the Santa Barbara County FSP program) to 11-to-1 for Los Angeles County. The statewide average B/C ratio was 10-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 2018-19 was about 13 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 2018-19 the state's fourteen FSP programs operated 206 (up from 181 in the previous fiscal year) beats with 328 trucks during the PM peak period covering over 1,800 centerline freeway miles. Together they provided almost 748,000 total truck hours of service. On average, California's FSP trucks in FY 2018-19 supplied almost one assist for every hour of service (0.92 assists per tow truck-hour). These assists were primarily given to automobiles and vans, which constituted 66 percent of all assists. The three most common types of motorist's assists provided were for mechanical problems including electrical problems and overheated vehicles (21.2%), vehicle collisions (17.0%) and assistance with flat tires (15.0%).

(5) The number of FSP trucks and truck hours the state and its partner agencies can deploy is determined by funding availability. In FY 2018-19, 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 2018-19, the local partner transportation agencies provided over $23.6 million in matching funds – over a 93 percent match. Some of the smaller FSP programs did not surpass the 25 percent local match requirement. The Los Angeles 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: Statewide FSP Service 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	16	16	143	24,893	30,674	10.1	1.23	8.0
3	Placer	3	3	25	3,660	2,371	13.4	0.65	4.0
3	El Dorado	1	1	11	1,342	965	10.9	0.72	3.0
4	Bay Area Counties	29	63	445	127,124	84,386	9.3	0.66	8.0
5	Monterey	4	4	59	4,036	4,864	10.9	1.21	6.0
5	Santa Cruz	2	2	16	3,782	1,458	15.6	0.36	4.0
5	Santa Barbara	5	3	23	3,705	910	16.8	0.25	2.0
6	Fresno	4	4	30	5,040	2,462	10.1	0.98	6.0
7	Los Angeles	39	123	474	337,253	307,745	15.7	0.91	11.0
8	Riverside	12	26	136	42,700	48,841	10.4	1.14	7.0
8	San Bernardino	8	17	84	50,071	58,848	10.4	1.18	9.0
10	San Joaquin	5	2	26	2,423	4,587	15.4	1.89	3.0
11	San Diego	30	30	221	69,338	89,332	8.5	1.29	4.0
12	Orange	48	34	132	73,097	52,673	16.1	0.72	6.0
Total or Average		**206**	**328**	**1,823**	**747,882**	**690,116**	**12.6**	**0.92**	**10.0**

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

Table 2: Statewide FSP Annual Funding Summary (Combined Weekday and Weekend Service)

Caltrans District	County or Region	Regular State FSP Funds ($)	Percent of Regular State FSP Funds	SB-1 Funds ($)	Percent of SB-1 Funds	Local Match Funds ($)	Percent of Local Match Funds	CHP Allocation ($)	Percent of CHP Allocation
3	Sacramento & Yolo	1,174,859	4.7%	580,426	4.8%	748,000	9.4%	162,417	4.1%
3	Placer	254,981	1.0%	125,966	1.0%	95,237	1.2%	33,992	0.8%
3	El Dorado	111,406	0.4%	0	0.0%	27,851	0.1%	15,253	0.4%
4	Bay Area Counties	5,999,385	23.8%	2,964,072	24.4%	4,772,091	60.0%	1,108,265	27.7%
5	Monterey	241,767	1.0%	121,121	1.0%	60,442	0.3%	0	0.0%
5	Santa Cruz	160,974	0.6%	79,525	0.7%	130,221	0.6%	0	0.0%
5	Santa Barbara	100,000	0.4%	0	0.0%	25,513	0.3%	0	0.0%
6	Fresno	360,361	1.4%	0	0.0%	44,287	0.6%	107,051	2.7%
7	Los Angeles	8,203,655	32.6%	4,053,278	33.3%	11,663,521	51.0%	1,070,802	26.8%
8	Riverside	1,591,464	6.3%	786,232	6.5%	1,432,688	18.0%	328,652	8.2%
8	San Bernardino	1,484,167	5.9%	733,232	6.0%	752,028	3.2%	328,652	8.2%
10	San Joaquin	491,524	2.0%	242,822	2.0%	174,426	2.2%	0	0.0%
11	San Diego	2,532,051	10.1%	1,250,957	10.3%	658,363	8.3%	428,924	10.7%
12	Orange	2,472,405	9.8%	1,221,526	10.0%	3,045,397	13.3%	415,992	10.4%
Total or Average		**25,179,000**	**100.0%**	**12,159,155**	**100.0%**	**23,630,065**	**100.0%**	**4,000,000**	**100.0%**

Table 3: Statewide FSP Annual Delay, Fuel and Emission Saving 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	513,832	883,278	20.6	256.9	61.7	3.1	7,772,846	118.9	322.2
3-Placer	56,178	96,571	2.2	28.1	6.7	0.3	849,823	13.0	35.2
3-El Dorado	14,984	25,757	0.6	7.5	1.8	0.1	226,662	3.5	9.4
4-Bay Area	2,682,863	4,611,841	107.3	1,341.4	321.9	16.1	40,584,202	621.1	1,682.1
5-Monterey	66,550	114,399	5.4	64.4	2.9	1.0	1,006,713	15.4	41.7
5-Santa Cruz	49,923	85,818	2.0	25.0	6.0	0.3	755,198	11.6	31.3
5-Santa Barbara	11,627	19,987	0.5	5.8	1.4	0.1	175,883	2.7	7.3
6-Fresno	56,548	97,206	2.3	28.3	6.8	0.3	855,413	13.1	35.5
7-Los Angeles	8,358,627	14,368,480	334.3	4,179.3	1,003.0	50.2	126,442,623	1,934.9	5,240.7
8-Riverside	922,895	1,586,457	36.9	461.4	110.7	5.5	13,960,823	213.6	578.6
8-San Bernardino	1,047,525	1,800,695	41.9	523.8	125.7	6.3	15,846,116	242.5	656.8
10-San Joaquin	57,993	99,689	2.3	29.0	7.0	0.3	877,265	13.4	36.4
11-San Diego	541,744	931,257	21.7	270.9	65.0	3.3	8,195,065	125.4	339.7
12-Orange	1,386,376	2,383,180	55.5	693.2	166.4	8.3	20,971,985	320.9	869.2
Statewide	**15,767,665**	**27,104,615**	**633.4**	**7,915.0**	**1,887.0**	**95.2**	**238,520,616**	**3,650.1**	**9,886.0**

1.3 *Summary of Recommendations*

FSP Assist Data Collection Procedures

Caltrans Headquarters, 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 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 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, 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 FSP is to maximize the efficiency of the freeway transportation system. 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 2018-19, the FSP program provided over 690,000 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 2018-19 Management Information System (MIS) databases
2) Produce FSP 2018-19 California Local Program Report(s)
3) Produce FSP 2018-19 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 2018-19 MIS Databases

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

1) Solicit and collect the 2018-19 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 2018-19 California Local Program Report

The development of the FSP 2018-19 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 2018-19 California Statewide MIS Program Report

The development of the FSP 2018-19 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 2018-19 report. Create the shell of the FSP 2018-19 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 2018-19 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 690,000 records for the fiscal year 2018-19. 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 ($21.79/vehicle-hour) and fuel consumption ($3.52/gallon).

The value of time for motorists was derived from value of time parameters from the Caltrans Office of State Planning, Economic Analysis Branch website. The website's travel time and vehicle operation cost parameters are in units of "2016 Current Dollar Value"

- Auto/Truck Composite (Weighted-Average) = $18.95 (dollars per person hour)
- Average Peak Vehicle Occupancy Rate = 1.15 persons per vehicle

The resulting $21.79 per vehicle-hour cost parameter used in the FSP performance evaluation was derived from combining the ($18.95 /person-hour) and the (1.15 persons/vehicle).

The California statewide annual average fuel costs of $3.52/gallon of gasoline for FY 2018-19 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 increased by about 0.6% (from 686,211 in FY 2017-18 to 690,116 in FY 2018-19). This is shown graphically in Figure 1.

Table 4: Total Assists and Annual Change by Fiscal Year

Fiscal Year	Total Assists	Annual Change (percent)	Fiscal Year	Total Assists	Annual Change (percent)
1991-92	152,526	0.0%	2010-11	655,686	1.0%
1992-93	295,613	93.8%	2011-12	672,472	2.6%
1993-94	452,018	52.9%	2012-13	651,315	-3.1%
1994-95	448,170	-0.9%	2013-14	651,441	0.0%
1995-96	540,874	20.7%	2014-15	666,686	2.3%
1996-97	587,941	8.7%	2015-16	682,424	2.4%
1997-98	583,699	-0.7%	2016-17	673,350	-1.3%
1998-99	568,276	-2.6%	2017-18	686,211	1.9%
1999-00	625,090	10.0%	2018-19	690,116	0.6%
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%			

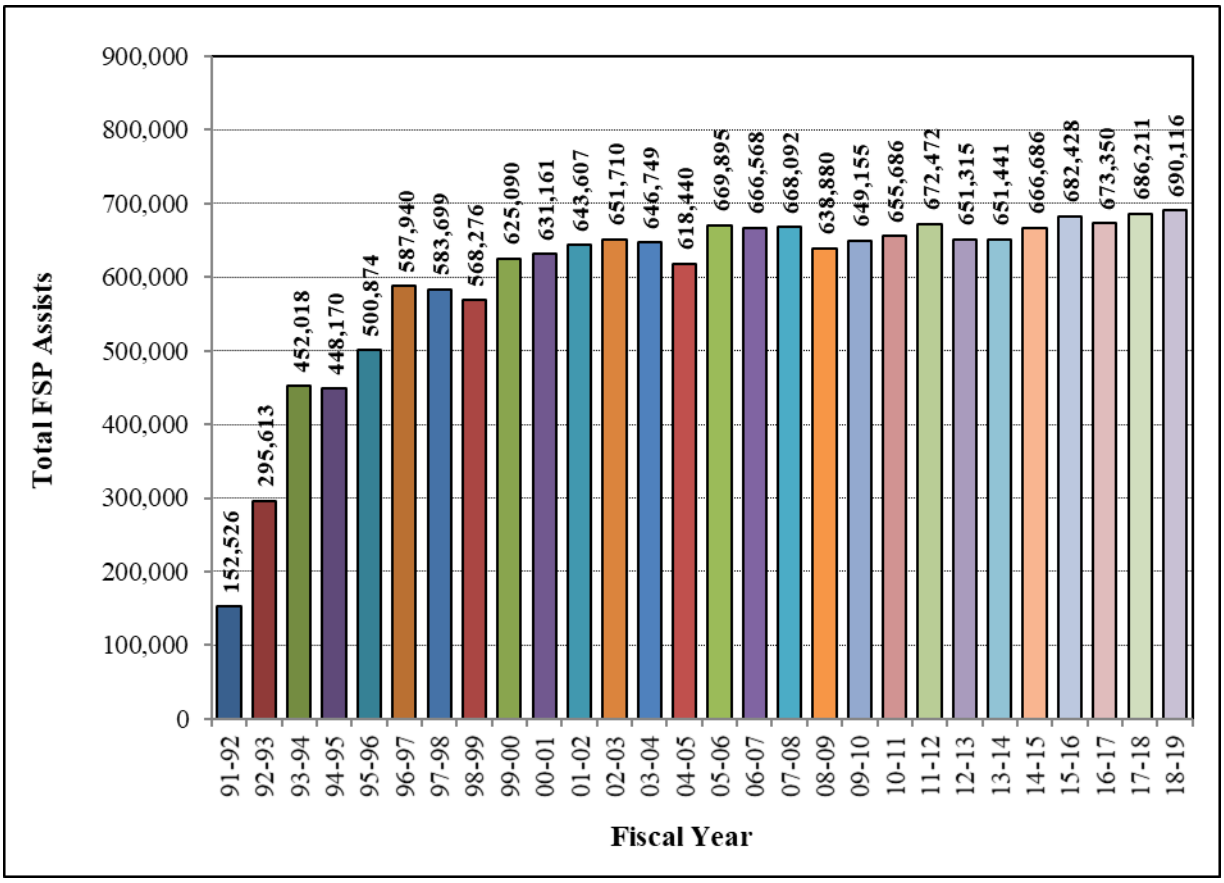

Figure 1: Bar Chart – Total FSP Assists by Fiscal Year

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	8.0	-	8.0	5.0	8.0
3	Placer	4.0	-	4.0	-	4.0
3	El Dorado	3.0	-	3.0	-	3.0
4	Bay Area Counties	8.0	-	8.0	1.0	8.0
5	Monterey	6.0	-	6.0	15.0	6.0
5	Santa Cruz	4.0	-	-	-	4.0
5	Santa Barbara	2.0	-	2.0	-	2.0
6	Fresno	6.0	-	-	-	6.0
7	Los Angeles	12.0	9.0	11.0	6.0	11.0
8	Riverside	7.0	-	7.0	-	7.0
8	San Bernardino	10.0	-	10.0	6.0	9.0
10	San Joaquin	4.0	-	4.0	1.0	3.0
11	San Diego	4.0	1.0	4.0	-	4.0
12	Orange	7.0	5.0	6.0	3.0	6.0
Statewide		**10.0**	10.0	9.0	10.0	6.0

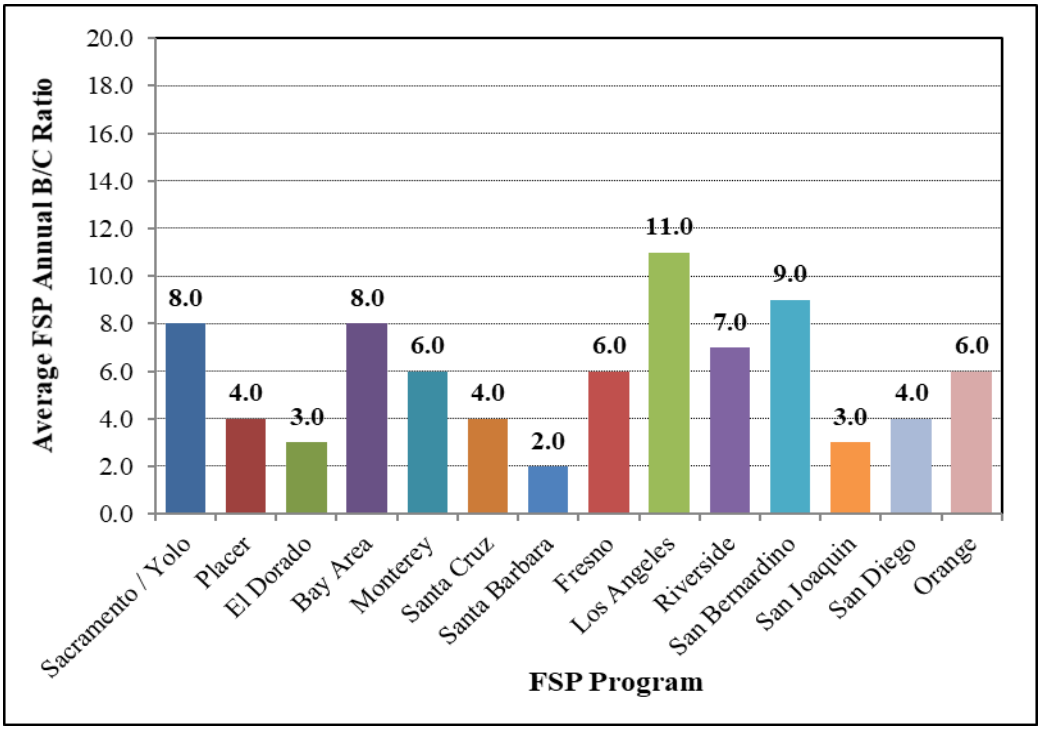

Figure 2: Bar Chart of FSP Benefit/Cost Ratios by Program

4.3 *Statewide FSP Total Assists by Quarter & Program*

Table 6: Total Assists by Quarter & Program

		Jul 18 - Sep 18	Oct 18 - Dec 18	Jan 19 - Mar 19	Apr 19 - Jun 19		
Caltrans District	**County or Region**	**Quarter 3**	**Quarter 4**	**Quarter 1**	**Quarter 2**	**Total Assists**	**Percent**
3	Sac & Yolo	8,822	7,072	6,078	8,702	30,674	4.4%
3	Placer	568	575	568	660	2,371	0.3%
3	El Dorado	242	176	274	273	965	0.1%
4	Bay Area	22,352	19,615	19,872	22,547	84,386	12.2%
5	Monterey	1,639	1,320	837	1,068	4,864	0.7%
5	Santa Cruz	402	297	366	394	1,458	0.2%
5	Santa Barbara	56	313	235	306	910	0.1%
6	Fresno	694	564	584	620	2,462	0.4%
7	Los Angeles	75,350	74,394	76,465	81,536	307,745	44.6%
8	Riverside	12,334	11,016	11,671	13,820	48,841	7.1%
8	San Bernardino	17,243	12,845	13,202	15,558	58,848	8.5%
10	San Joaquin	1,196	1,297	986	1,108	4,587	0.7%
11	San Diego	23,428	21,037	22,117	22,750	89,332	12.9%
12	Orange	13,281	12,025	13,604	13,763	52,673	7.6%
Total Assists		**177,607**	**162,545**	**166,859**	**183,104**	**690,116**	**100.0%**
% of Total Assists		**25.7%**	**23.6%**	**24.2%**	**26.5%**		**100.0%**

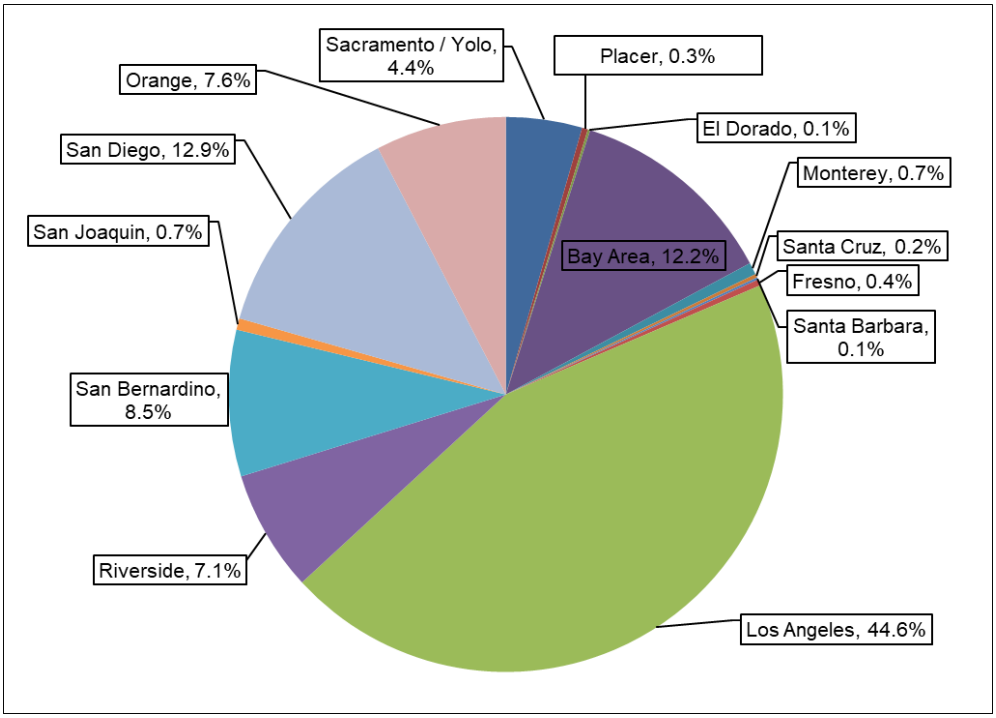

Figure 3: Pie Chart of Total Assists by Program

4.4 *Statewide FSP Total Assists by Problem Type*

Table 7: Total Assists by Problem Type

Problem Type	Total Assists	Percent
Abandoned	25,664	3.7%
Accident	117,529	17.0%
Debris Removed	19,137	2.8%
Flat Tire	103,412	15.0%
Mechanical Problems	114,643	16.6%
Other*	216,444	31.4%
Out of Gas	61,471	8.9%
Over Heated	31,816	4.6%
Total Assists	**690,116**	**3.7%**

* "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.

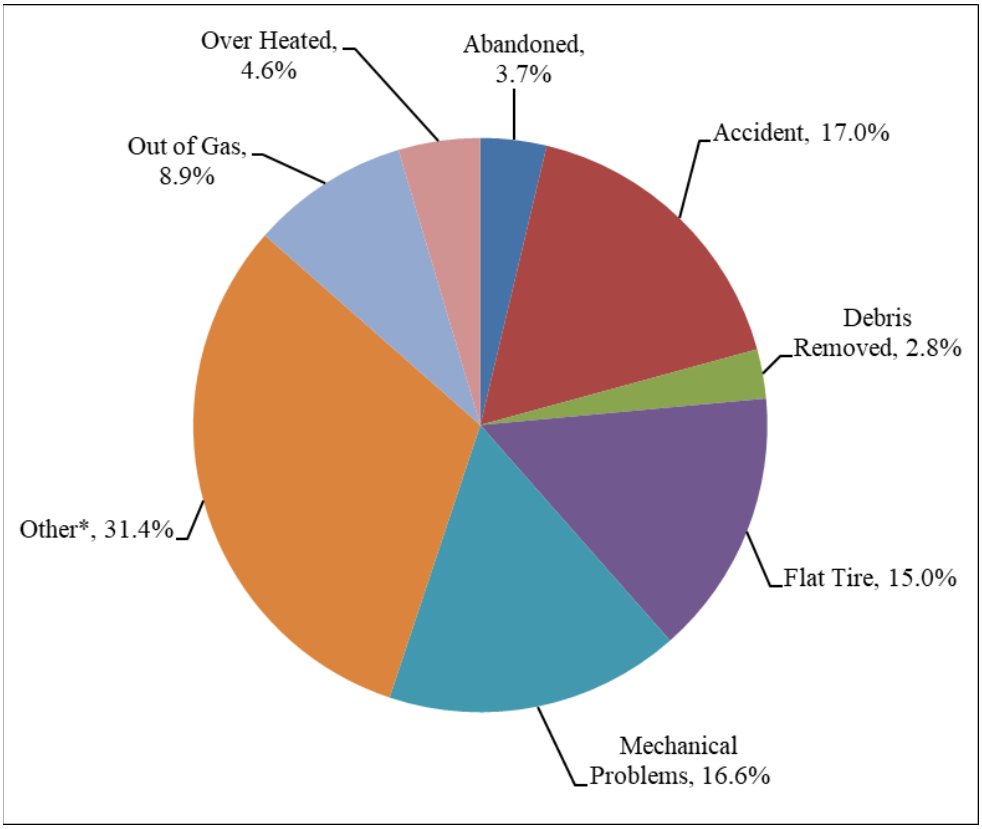

Figure 4: Pie Chart of Total Assists by Problem Type

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	1,313	12,428	951	4,541	5,984	2,331	2,568	558	30,674
3	Placer	299	666	44	379	529	213	213	28	2,371
3	El Dorado	129	129	40	128	269	135	95	40	965
4	Bay Area	5,208	13,572	1,738	16,512	20,119	15,275	7,393	4,569	84,386
5	Monterey	299	639	1,077	381	411	1,697	291	69	4,864
5	Santa Cruz	112	224	86	178	295	327	150	87	1,458
5	Santa Barbara	22	157	78	154	230	94	132	43	910
6	Fresno	248	742	30	279	647	54	458	5	2,462
7	Los Angeles	5,202	64,957	4,515	44,325	46,051	100,351	25,492	16,852	307,745
8	Riverside	2,448	4,131	2,339	6,978	8,445	18,847	3,588	2,065	48,841
8	San Bernardino	3,249	4,976	2,822	7,985	9,176	23,512	4,319	2,809	58,848
10	San Joaquin	509	479	124	1,163	1,230	509	396	177	4,587
11	San Diego	5,086	7,022	1,917	12,603	11,590	37,200	10,488	3,426	89,332
12	Orange	1,540	7,407	3,376	7,806	9,667	15,900	5,888	1,089	52,673
Total Assists		**25,664**	**117,529**	**19,137**	**103,412**	**114,643**	**216,444**	**61,471**	**31,816**	**690,116**
Average %		**3.7%**	**17.0%**	**2.8%**	**15.0%**	**16.6%**	**31.4%**	**8.9%**	**4.6%**	**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	4.3%	40.5%	3.1%	14.8%	19.5%	7.6%	8.4%	1.8%	4.4%
3	Placer	12.6%	28.1%	1.9%	16.0%	22.3%	9.0%	9.0%	1.2%	0.3%
3	El Dorado	13.4%	13.4%	4.1%	13.3%	27.9%	14.0%	9.8%	4.1%	0.1%
4	Bay Area	6.2%	16.1%	2.1%	19.6%	23.8%	18.1%	8.8%	5.4%	12.2%
5	Monterey	6.1%	13.1%	22.1%	7.8%	8.4%	34.9%	6.0%	1.4%	0.7%
5	Santa Cruz	2.4%	17.2%	8.6%	16.9%	25.3%	10.3%	14.5%	4.7%	0.2%
5	Santa Barbara	7.7%	15.4%	5.9%	12.2%	20.2%	22.4%	10.3%	6.0%	0.1%
6	Fresno	10.1%	30.1%	1.2%	11.3%	26.3%	2.2%	18.6%	0.2%	0.4%
7	Los Angeles	1.7%	21.1%	1.5%	14.4%	15.0%	32.6%	8.3%	5.5%	44.6%
8	Riverside	5.0%	8.5%	4.8%	14.3%	17.3%	38.6%	7.3%	4.2%	7.1%
8	San Bernardino	5.5%	8.5%	4.8%	13.6%	15.6%	40.0%	7.3%	4.8%	8.5%
10	San Joaquin	11.1%	10.4%	2.7%	25.4%	26.8%	11.1%	8.6%	3.9%	0.7%
11	San Diego	5.7%	7.9%	2.1%	14.1%	13.0%	41.6%	11.7%	3.8%	12.9%
12	Orange	2.9%	14.1%	6.4%	14.8%	18.4%	30.2%	11.2%	2.1%	7.6%
Average %		**3.7%**	**17.0%**	**2.8%**	**15.0%**	**16.6%**	**31.4%**	**8.9%**	**4.6%**	**100.0%**

4.6 *Statewide FSP Total Assists by Vehicle Type*

Table 10: Total Assists by Vehicle Type

Vehicle Type	Total Assists	Percent
Auto / Van	457,396	66.3%
Big Rig	40,228	5.8%
Other / Unknown	43,160	6.3%
SUV / Pickup	132,533	19.2%
Trucks	16,797	2.4%
Total Assists	**690,116**	**100.0%**

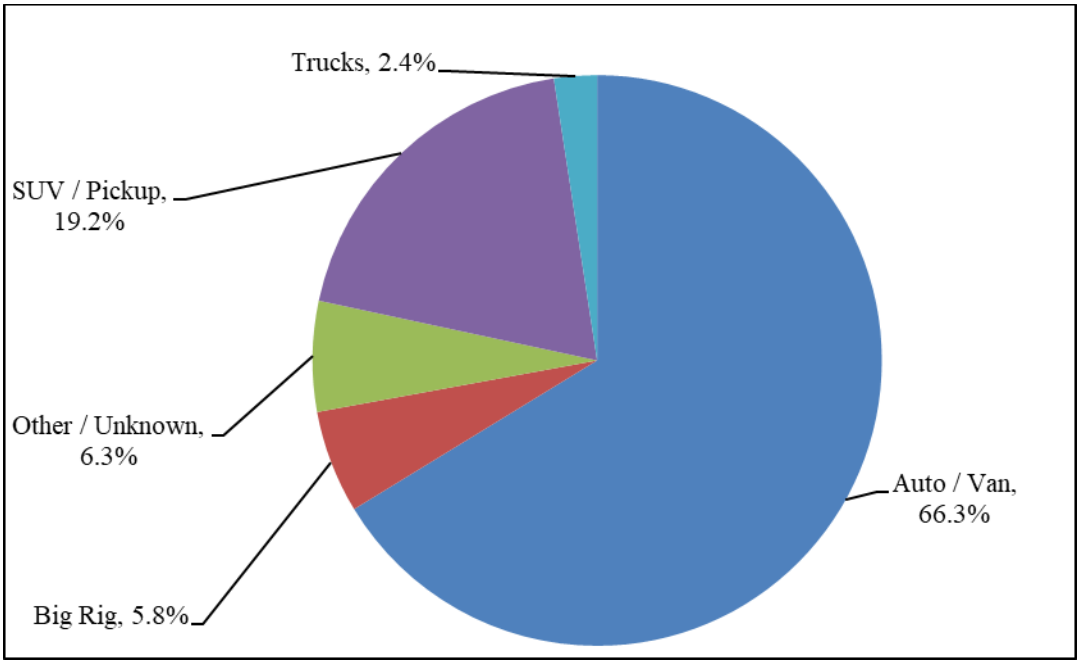

Figure 5: Pie Chart of Total Assists by Vehicle Type

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	18,048	387	3,032	8,801	406	30,674
3	Placer	1,241	68	152	846	64	2,371
3	El Dorado	412	19	91	383	60	965
4	Bay Area	61,475	53	7,897	11,984	2,977	84,386
5	Monterey	2,494	208	1,241	695	226	4,864
5	Santa Cruz	1,065	9	166	188	30	1,458
5	Santa Barbara	449	7	103	321	30	910
6	Fresno	1,841	32	66	506	16	2,462
7	Los Angeles	229,319	12,499	14,545	46,244	5,138	307,745
8	Riverside	25,006	9,329	2,888	8,361	3,257	48,841
8	San Bernardino	30,277	14,419	3,376	7,994	2,781	58,847
10	San Joaquin	2,842	132	252	1,227	134	4,587
11	San Diego	50,937	1,537	6,552	29,318	988	89,332
12	Orange	31,990	1,529	2,799	15,666	689	52,673
Total Assists		**457,396**	**40,228**	**43,160**	**132,533**	**16,797**	**690,116**
Average %		**66.3%**	**5.8%**	**6.3%**	**19.2%**	**2.4%**	**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	58.8%	1.3%	9.9%	28.7%	1.3%	4.4%
3	Placer	52.3%	2.9%	6.4%	35.7%	2.7%	0.3%
3	El Dorado	42.7%	2.0%	9.4%	39.7%	6.2%	0.1%
4	Bay Area	72.8%	0.1%	9.4%	14.2%	3.5%	12.2%
5	Monterey	51.3%	4.3%	25.5%	14.3%	4.6%	0.7%
5	Santa Cruz	73.1%	0.6%	11.4%	12.9%	2.1%	0.2%
5	Santa Barbara	49.3%	0.8%	11.3%	35.2%	3.3%	0.1%
6	Fresno	74.8%	1.3%	2.7%	20.6%	0.7%	0.4%
7	Los Angeles	74.5%	4.1%	4.7%	15.0%	1.7%	44.6%
8	Riverside	51.2%	19.1%	5.9%	17.1%	6.7%	7.1%
8	San Bernardino	51.5%	24.5%	5.7%	13.6%	4.7%	8.5%
10	San Joaquin	62.0%	2.9%	5.5%	26.7%	2.9%	0.7%
11	San Diego	57.0%	1.7%	7.3%	32.8%	1.1%	12.9%
12	Orange	60.7%	2.9%	5.3%	29.7%	1.3%	7.6%
Average %		**66.3%**	**5.8%**	**6.3%**	**19.2%**	**2.4%**	**100.0%**

4.8 *Statewide FSP Total Assists by Vehicle Location*

Table 13: Total Assists by Vehicle Location

Vehicle Location	Total Assists	Percent
In Lane	66,927	9.7%
On Left Shoulder	25,711	3.7%
On Right Shoulder	530,871	76.9%
Other	32,436	4.7%
Ramp / Connector	15,061	2.2%
Unable to Locate	19,110	2.8%
Total Assists	**690,116**	**100.0%**

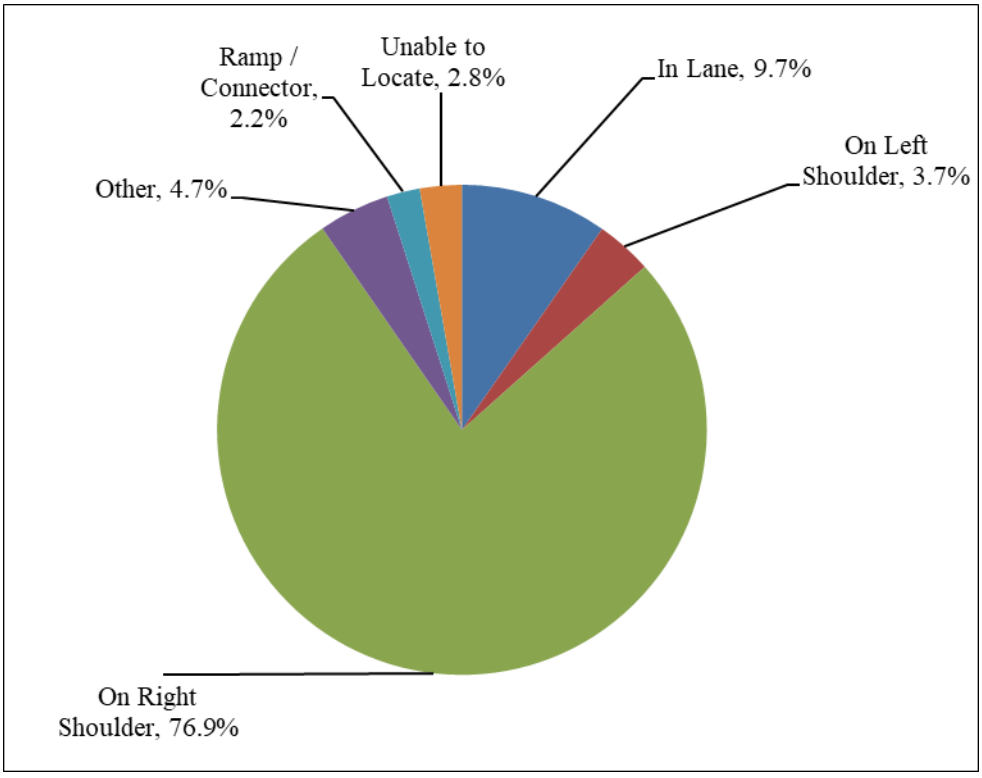

Figure 6: Pie Chart of Total Assists by Vehicle Location

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	3,984	2,410	20,112	1,891	2,225	52	30,674
3	Placer	188	207	1,685	50	239	2	2,371
3	El Dorado	46	45	726	43	105	0	965
4	Bay Area	6,130	303	61,759	0	514	15,680	84,386
5	Monterey	1,136	323	2,752	60	542	51	4,864
5	Santa Cruz	222	96	929	19	129	63	1,458
5	Santa Barbara	44	91	580	195	0	0	910
6	Fresno	335	216	1,716	0	193	1	2,462
7	Los Angeles	32,392	8,150	234,789	26,072	3,903	2,439	307,745
8	Riverside	5,211	2,364	41,266	0	0	0	48,841
8	San Bernardino	6,798	3,219	48,832	0	0	0	58,849
10	San Joaquin	159	527	3,554	43	282	22	4,587
11	San Diego	3,861	5,499	70,272	4,054	4,846	800	89,332
12	Orange	6,421	2,261	41,899	9	2,083	0	52,673
Total Assists		**66,927**	**25,711**	**530,871**	**32,436**	**15,061**	**19,110**	**690,116**
Average %		**9.7%**	**3.7%**	**76.9%**	**4.7%**	**2.2%**	**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	13.0%	7.9%	65.6%	6.2%	7.3%	0.2%	4.4%
3	Placer	7.9%	8.7%	71.1%	2.1%	10.1%	0.1%	0.3%
3	El Dorado	4.8%	4.7%	75.2%	4.5%	10.9%	0.0%	0.1%
4	Bay Area	7.3%	0.4%	73.2%	0.0%	0.6%	18.6%	12.2%
5	Monterey	23.4%	6.6%	56.6%	1.2%	11.1%	1.0%	0.7%
5	Santa Cruz	15.2%	6.6%	63.7%	1.3%	8.8%	4.3%	0.2%
5	Santa Barbara	4.8%	10.0%	63.7%	21.5%	0.0%	0.0%	0.1%
6	Fresno	13.6%	8.8%	69.7%	0.0%	7.9%	0.0%	0.4%
7	Los Angeles	10.5%	2.6%	76.3%	8.5%	1.3%	0.8%	44.6%
8	Riverside	10.7%	4.8%	84.5%	0.0%	0.0%	0.0%	7.1%
8	San Bernardino	11.6%	5.5%	83.0%	0.0%	0.0%	0.0%	8.5%
10	San Joaquin	3.5%	11.5%	77.5%	0.9%	6.1%	0.5%	0.7%
11	San Diego	4.3%	6.2%	78.7%	4.5%	5.4%	0.9%	12.9%
12	Orange	12.2%	4.3%	79.5%	0.0%	4.0%	0.0%	7.6%
Average %		**9.7%**	**3.7%**	**76.9%**	**4.7%**	**2.2%**	**2.8%**	**100.0%**

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	10.1
3	Placer	13.4
3	El Dorado	10.9
4	Bay Area	9.3
5	Monterey	10.9
5	Santa Cruz	14.9
5	Santa Barbara	16.8
6	Fresno	10.1
7	Los Angeles	15.7
8	Riverside	10.4
8	San Bernardino	10.4
10	San Joaquin	15.4
11	San Diego	8.5
12	Orange	16.1
Average Duration		**12.6**

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

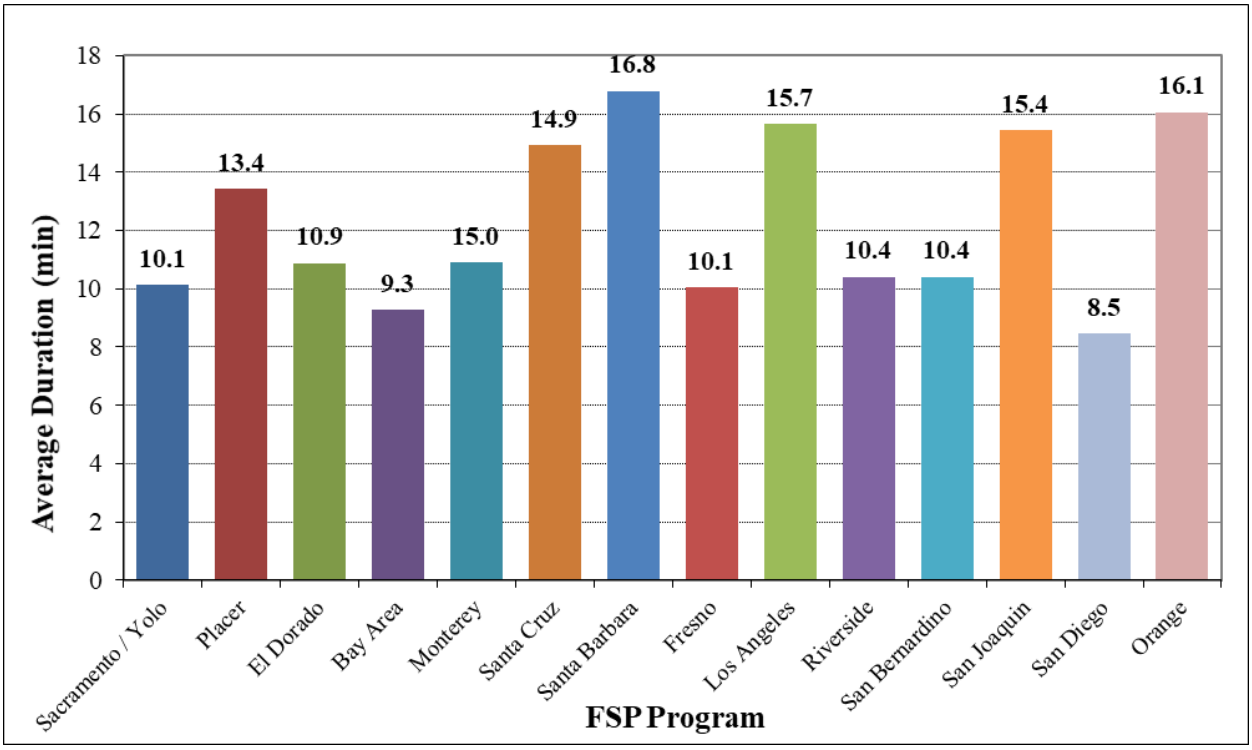

Figure 7: Bar Chart of Average Assist Duration by Program

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	5.5	9.2	2.7	13.5	14.7	5.1	7.6	11.6	10.1
3	Placer	4.4	17.9	6.1	16.7	16.4	6.3	8.5	10.3	13.4
3	El Dorado	5.3	13.5	3.2	15.7	15.6	3.7	8.2	12.2	10.9
4	Bay Area	4.7	11.7	5.7	10.6	11.9	4.7	5.7	9.9	9.3
5	Monterey	5.7	29.2	5.0	15.8	17.9	6.0	9.3	12.6	10.9
5	Santa Cruz	9.4	25.3	6.9	15.1	21.3	8.3	10.0	14.9	14.9
5	Santa Barbara	8.4	22.4	9.1	17.4	20.3	8.5	14.9	19.3	16.8
6	Fresno	4.6	16.4	8.7	8.9	8.3	7.6	5.9	10.0	10.1
7	Los Angeles	9.0	23.2	10.4	17.8	18.9	9.3	12.3	16.8	15.7
8	Riverside	6.4	14.9	5.7	16.3	17.3	5.1	9.3	14.4	10.4
8	San Bernardino	6.0	9.6	5.3	12.7	11.8	4.5	8.6	11.4	7.4
10	San Joaquin	7.1	22.7	6.9	18.2	18.7	7.5	10.3	19.6	15.4
11	San Diego	5.3	12.7	6.8	12.3	12.3	5.8	7.4	10.5	8.5
12	Orange	11.6	12.8	12.8	19.7	25.9	12.4	12.2	16.0	16.1
Average Duration		**6.6**	**18.2**	**8.0**	**15.4**	**16.6**	**7.6**	**9.9**	**14.4**	**12.6**

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.

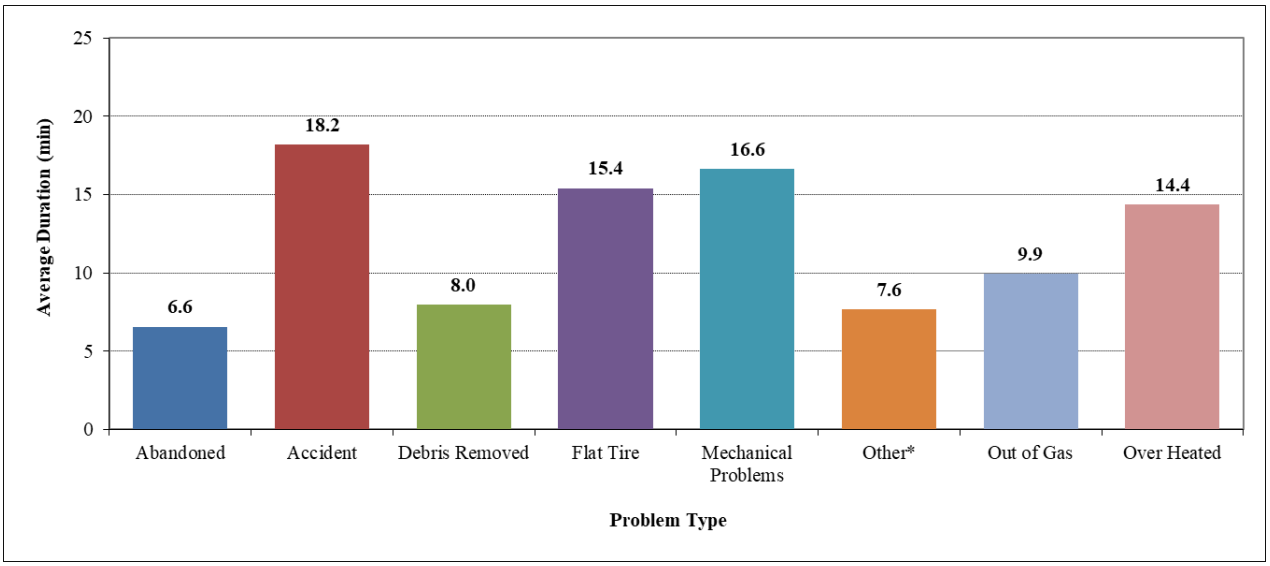

Figure 8: Bar Chart of Average Assist Duration by Problem Type and Program

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	10.6	12.1	6.4	10.4	9.9	10.1
3	Placer	13.4	14.4	12.1	13.4	17.1	13.4
3	El Dorado	12.2	5.7	6.3	10.7	11.4	10.9
4	Bay Area	9.3	20.2	9.1	8.9	10.0	9.3
5	Monterey	13.5	11.7	6.2	9.7	10.1	10.9
5	Santa Cruz	15.3	33.9	9.8	16.1	15.8	14.9
5	Santa Barbara	16.6	32.9	10.0	18.0	27.4	16.8
6	Fresno	8.9	8.9	8.8	9.1	10.2	10.1
7	Los Angeles	16.2	12.1	12.5	14.9	N/A	15.7
8	Riverside	12.1	7.3	7.0	10.8	8.3	10.4
8	San Bernardino	8.5	6.1	5.6	7.2	6.6	7.4
10	San Joaquin	16.0	11.2	12.9	15.4	12.7	15.4
11	San Diego	8.7	8.4	7.9	5.8	6.7	8.5
12	Orange	16.3	12.3	12.6	16.7	13.6	16.1
Average Duration		**13.4**	**8.7**	**9.6**	**11.5**	**6.1**	**12.6**

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

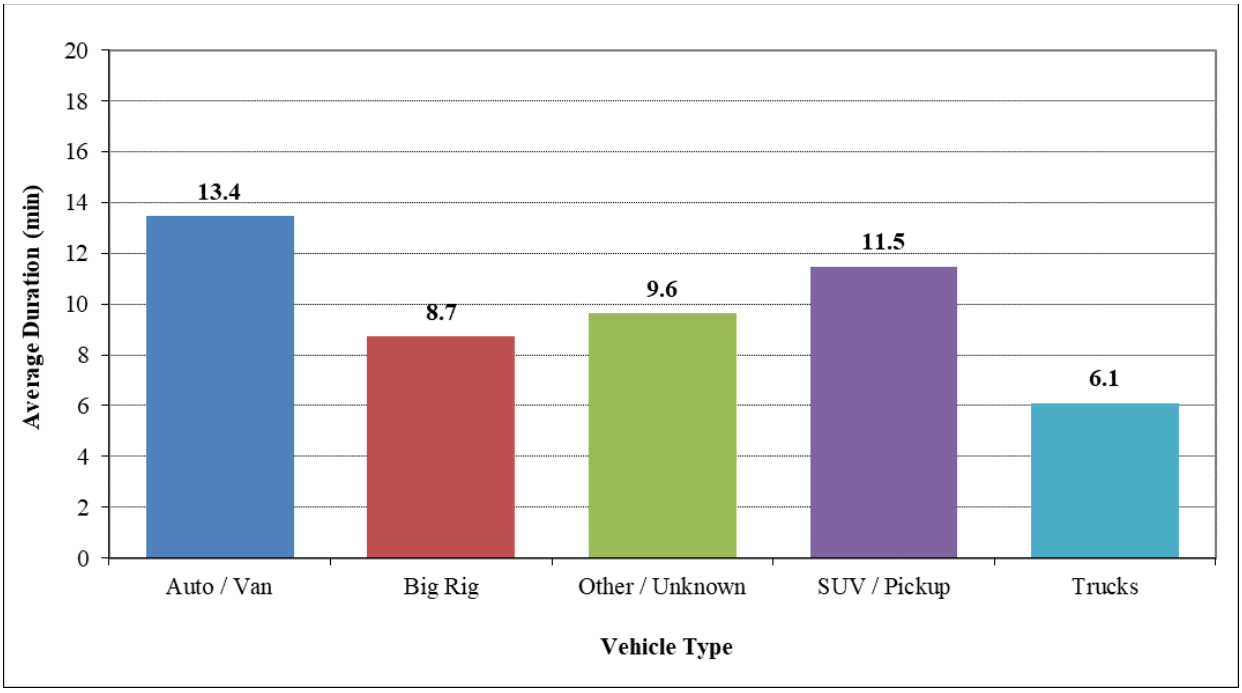

Figure 9: Bar Chart of Average Assist Duration by Vehicle Type

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	30,674	24,893	1.23
3	Placer	2,371	3,660	0.65
3	El Dorado	965	1,342	0.72
4	Bay Area	84,386	127,124	0.66
5	Monterey	4,864	4,036	1.21
5	Santa Cruz	1,458	3,754	0.39
5	Santa Barbara	910	3,705	0.25
6	Fresno	2,462	2,520	0.98
7	Los Angeles	307,745	337,253	0.91
8	Riverside	48,841	44,607	1.09
8	San Bernardino	58,848	50,071	1.18
10	San Joaquin	4,587	2,423	1.89
11	San Diego	89,332	69,338	1.29
12	Orange	52,673	73,097	0.72
Statewide		**690,116**	**747,882**	**0.92**

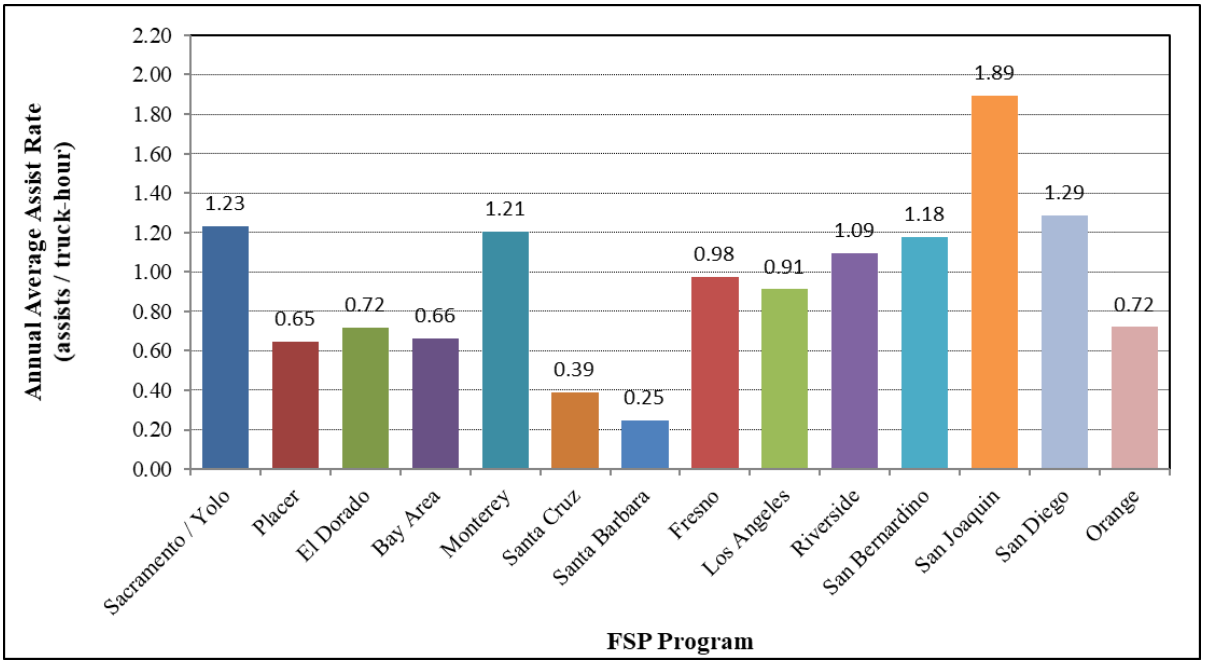

Figure 10: Bar Chart of Average Weekday Assist Rate by Program

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 2018-19 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 2018-19 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 2018-19 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	9.0	-	9.0	5.0	9.0
106	9.0	-	9.0	-	9.0
108	9.0	-	9.0	-	9.0
108A	13.0	-	13.0	-	13.0
150	10.0	-	10.0	-	10.0
151	9.0	-	9.0	-	9.0
152	4.0	-	4.0	-	4.0
153	9.0	-	9.0	-	9.0
153A	12.0	-	12.0	-	12.0
181	6.0	-	6.0	-	6.0
182	2.0	-	2.0	-	2.0
182A	11.0	-	11.0	-	11.0
184	8.0	-	8.0	-	8.0
191A	13.0	-	13.0	-	13.0
192	10.0	-	10.0	-	10.0
193	7.0	-	7.0	-	7.0
Average Benefit/Cost Ratio	**8.0**	**-**	**8.0**	**5.0**	**8.0**

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	7.0	-	7.0	-	7.0
281	3.0	-	3.0	-	3.0
281-A	1.0	-	1.0	-	1.0
Average Benefit/Cost Ratio	**4.0**	**-**	**4.0**	**-**	**4.0**

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	3.0	-	3.0	-	3.0
Average Benefit/Cost Ratio	**3.0**	**-**	**3.0**	**-**	**3.0**

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	2.0	-	2.0	1.0	2.0
3	6.0	-	6.0	-	6.0
4	6.0	-	6.0	-	6.0
5	14.0	-	14.0	-	14.0
6	8.0	-	8.0	-	8.0
8	8.0	-	8.0	-	8.0
9	18.0	-	18.0	-	18.0
10	13.0	-	13.0	-	13.0
11	20.0	-	20.0	-	20.0
12	12.0	-	12.0	-	12.0
13	4.0	-	4.0	-	4.0
14	4.0	-	4.0	-	4.0
15	3.0	-	3.0	-	3.0
16	15.0	-	15.0	3.0	13.0
17	1.0	-	1.0	0.0	1.0
19	7.0	-	7.0	-	7.0
20	3.0	-	3.0	-	3.0
21	4.0	-	4.0	-	4.0
22	9.0	-	9.0	-	9.0
23	4.0	-	4.0	-	4.0
25	8.0	-	8.0	-	8.0
26	17.0	-	17.0	-	17.0
27	3.0	-	3.0	-	3.0
29	7.0	-	7.0	-	7.0
32	12.0	-	12.0	-	12.0
33	0.0	-	0.0	-	0.0
34	4.0	-	4.0	-	4.0
35	4.0	-	4.0	-	4.0
Average Benefit/Cost Ratio	**8.0**	**-**	**8.0**	**1.0**	**8.0**

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-Tow	5.0	-	5.0	14.0	5.0
2-Service	13.0	-	13.0	-	13.0
2-Tow	7.0	-	7.0	16.0	8.0
3-Tow	3.0	-	3.0	-	3.0
Average Benefit/Cost Ratio	**6.0**	**-**	**6.0**	**15.0**	**6.0**

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	4.0	-	4.0	7.0	5.0
2	4.0	-	4.0	4.0	4.0
Average Benefit/Cost Ratio	**4.0**	**-**	**4.0**	**6.0**	**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	1.0	-	1.0	-	1.0
2	0.0	-	0.0	-	0.0
3	4.0	-	4.0	-	4.0
4	2.0	-	2.0	-	2.0
5	1.0	-	1.0	-	1.0
Average Benefit/Cost Ratio	**2.0**	**-**	**2.0**	**-**	**2.0**

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	7.0	-	7.0	-	7.0
2	4.0	-	4.0	-	4.0
3	6.0	-	6.0	-	6.0
4	6.0	-	6.0	-	6.0
Average Benefit/Cost Ratio	**6.0**	**-**	**6.0**	**-**	**6.0**

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	16.0	14.0	2.0	13.0
2	23.0	20.0	22.0	5.0	20.0
3	8.0	8.0	8.0	15.0	9.0
4	7.0	7.0	7.0	2.0	6.0
5	8.0	7.0	8.0	3.0	7.0
6	14.0	15.0	15.0	16.0	15.0
7	11.0	9.0	11.0	18.0	11.0
8	8.0	8.0	8.0	3.0	7.0
9	5.0	11.0	6.0	5.0	6.0
10	7.0	12.0	8.0	4.0	7.0
11	12.0	6.0	11.0	3.0	10.0
12	9.0	9.0	9.0	4.0	8.0
13	13.0	8.0	12.0	12.0	12.0
14	17.0	5.0	15.0	4.0	14.0
16	35.0	18.0	32.0	18.0	30.0
17	9.0	9.0	9.0	8.0	9.0
18	18.0	17.0	18.0	2.0	16.0
19	15.0	11.0	15.0	9.0	14.0
20	7.0	4.0	6.0	2.0	6.0
21	8.0	9.0	8.0	4.0	8.0
23	11.0	8.0	11.0	1.0	9.0
24	6.0	0.0	5.0	0.0	5.0
27	18.0	6.0	16.0	4.0	15.0
28	9.0	11.0	10.0	9.0	10.0
29	10.0	6.0	9.0	1.0	8.0
30	24.0	19.0	23.0	1.0	21.0
31	10.0	5.0	9.0	6.0	9.0
33	5.0	0.0	4.0	0.0	3.0
34	20.0	3.0	17.0	0.0	15.0
36	4.0	0.0	3.0	0.0	3.0
37	14.0	7.0	13.0	3.0	12.0
38	6.0	3.0	5.0	3.0	5.0
39	10.0	8.0	10.0	3.0	9.0
40	19.0	15.0	18.0	3.0	15.0
41	23.0	19.0	22.0	19.0	22.0
42	6.0	3.0	6.0	15.0	7.0
43	11.0	8.0	11.0	7.0	10.0
50	7.0	3.0	6.0	2.0	5.0
51	13.0	9.0	12.0	10.0	12.0
Average Benefit/Cost Ratio	**12.0**	**9.0**	**11.0**	**6.0**	**11.0**

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	5.0	-	5.0	-	5.0
2	11.0	-	11.0	-	11.0
4	9.0	-	9.0	-	9.0
7	8.0	-	8.0	-	8.0
8	6.0	-	6.0	-	6.0
18	9.0	-	9.0	-	9.0
19	4.0	-	4.0	-	4.0
20	4.0	-	4.0	-	4.0
25	14.0	-	14.0	-	14.0
26	4.0	-	4.0	-	4.0
34	6.0	-	6.0	-	6.0
35	2.0	-	2.0	-	2.0
Average Benefit/Cost Ratio	**7.0**	**-**	**7.0**	**-**	**7.0**

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
5	7.0	-	7.0	-	7.0
9	10.0	-	10.0	3.0	8.0
10	10.0	-	10.0	12.0	11.0
11	17.0	-	17.0	8.0	15.0
14	11.0	-	11.0	-	11.0
23	5.0	-	5.0	-	5.0
29	9.0	-	9.0	6.0	8.0
31	10.0	-	10.0	3.0	8.0
Average Benefit/Cost Ratio	**10.0**	**-**	**10.0**	**6.0**	**9.0**

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
603-14	5.0	-	5.0	2.0	4.0
603-15	3.0	-	3.0	1.0	3.0
662-6	2.0	-	2.0	-	2.0
662-25	4.0	-	4.0	-	4.0
662-502	3.0	-	3.0	-	3.0
Average Benefit/Cost Ratio	**4.0**	**-**	**4.0**	**1.0**	**3.0**

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
951	2.0	-	2.0	-	2.0
501	6.0	-	6.0	-	6.0
502	4.0	-	4.0	-	4.0
851	6.0	-	6.0	-	6.0
852	14.0	-	14.0	-	14.0
541	4.0	0.0	3.0	-	3.0
125	11.0	-	11.0	-	11.0
941	4.0	1.0	3.0	-	3.0
163	1.0	0.0	1.0	-	1.0
801	4.0	0.0	3.0	-	3.0
802	4.0	-	4.0	-	4.0
503	2.0	0.0	2.0	-	2.0
504	5.0	3.0	5.0	-	5.0
505	2.0	2.0	2.0	-	2.0
853	1.0	1.0	1.0	-	1.0
151	7.0	1.0	5.0	-	5.0
152	3.0	-	3.0	-	3.0
152	3.0	-	3.0	-	3.0
521	2.0	-	2.0	-	2.0
522	0.0	-	0.0	-	0.0
781	2.0	1.0	2.0	-	2.0
782	8.0	5.0	7.0	-	7.0
100	3.0	-	3.0	-	3.0
200	5.0	-	5.0	-	5.0
300	4.0	-	4.0	-	4.0
400	3.0	-	3.0	-	3.0
500	7.0	-	7.0	-	7.0
600	1.0	-	1.0	-	1.0
700	2.0	-	2.0	-	2.0
800	7.0	-	7.0	-	7.0
Average Benefit/Cost Ratio	**4.0**	**1.0**	**4.0**	**-**	**4.0**

FSP Beat Benefit/Cost Ratio Summary — District 12: Orange County

Beat	Pk Pd Weekday B/C Ratio	Midday B/C Ratio	Weekday B/C Ratio	Weekend B/C Ratio	Combined B/C Ratio
220	6.0	-	6.0	-	6.0
221	10.0	-	10.0	-	10.0
222	14.0	-	14.0	-	14.0
223	-	3.0	3.0	-	3.0
224	-	4.0	4.0	-	4.0
225	-	-	-	6.0	6.0
401	-	8.0	8.0	-	8.0
402	-	10.0	10.0	-	10.0
405	10.0	-	10.0	-	10.0
406	8.0	-	8.0	-	8.0
407	4.0	-	4.0	-	4.0
408	6.0	-	6.0	-	6.0
409	6.0	-	6.0	-	6.0
410	6.0	-	6.0	-	6.0
411	3.0	-	3.0	-	3.0
500	-	4.0	4.0	-	4.0
501	9.0	-	9.0	-	9.0
502	10.0	-	10.0	-	10.0
503	6.0	-	6.0	-	6.0
504	9.0	-	9.0	-	9.0
505	8.0	-	8.0	-	8.0
506	11.0	-	11.0	-	11.0
507	8.0	-	8.0	-	8.0
508	9.0	-	9.0	-	9.0
509	6.0	-	6.0	-	6.0
510	3.0	-	3.0	-	3.0
511	-	-	-	6.0	6.0
512	-	-	-	2.0	2.0
513	-	6.0	6.0	-	6.0
550	-	3.0	3.0	-	3.0
551	2.0	-	2.0	-	2.0
552	13.0	-	13.0	-	13.0
553	6.0	-	6.0	-	6.0
554	3.0	-	3.0	-	3.0
555	-	2.0	2.0	-	2.0
570	3.0	-	3.0	-	3.0
571	4.0	-	4.0	-	4.0
572	2.0	-	2.0	-	2.0
573	-	4.0	4.0	-	4.0
910	3.0	-	3.0	-	3.0
911	15.0	-	15.0	-	15.0
912	9.0	-	9.0	-	9.0
913	9.0	-	9.0	-	9.0
914	2.0	-	2.0	-	2.0
915	3.0	-	3.0	-	3.0
916	6.0	-	6.0	-	6.0
920	-	-	-	3.0	3.0
922	-	-	-	2.0	2.0
Avg B/C Ratio	7.0	5.0	6.0	3.0	6.0

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