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California's Freeway Service Patrol Program: Management Information Systems Annual Report Fiscal Year 2015-2106

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INSTITUTE OF TRANSPORTATION STUDIES
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California's Freeway Service Patrol Program

Management Information Systems Annual Report Fiscal Year 2015-2106

Michael Mauch
Alex Skabardonis

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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 2016, there were fourteen participating FSP Programs operating in California, deploying over 340 tow trucks and covering over 1,800 (center-line) 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 2015-2016. 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 2015-16

Prepared for the California Department of Transportation

Traffic Operations Division

Prepared by

Institute of Transportation Studies
University of California at Berkeley

Final Report, February 28, 2017

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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 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 2015-16**:**

(1) In fiscal year 2015-16, the roving tow trucks of the FSP program provided over 682,000 assists on California's highway system. This is approximately 2.4 percent (%) increase over the previous year. Just over 45% of total statewide assists were provided by the Los Angeles County FSP program. The next largest was the nine county San Francisco Bay Area FSP program which provided about 12.9% of total statewide assists, followed by the San Diego program with about 11.6% of the statewide assists.

(2) The estimated benefit/cost ratios for FSP programs ranged from 1-to-1 (for the Santa Barbara and San Joaquin County FSP programs) to 12-to-1 for Orange 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 2015-16 was about 15 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 2015-16 the state's fourteen FSP programs operated 188 beats with 340 trucks (during the PM peak period) covering over 1,750 centerline freeway miles. Together they provided about 794,000 total truck hours of service. On average, California's FSP trucks in FY 2015-16 supplied almost one assist for every hour of service (0.86 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 (18.2%), for mechanical problems including electrical problems and overheated vehicles (16.7%), and assistance with flat tires (16.5%).

(5) The number of FSP trucks and truck hours the state and its partner agencies can deploy is determined by funding availability. In FY 2015-16, 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 2015-16, 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 Sacramento/Yolo 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 provides 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	17	17	96	27,688	37,997	10.1	1.37	8.0
3	Placer	3	3	25	3,660	3,276	11.7	0.90	5.0
3	El Dorado	1	1	11	1,342	813	11.0	0.61	3.0
4	Bay Area Counties	31	69	500	131,790	88,289	18.4	0.67	7.0
5	Monterey	2	2	22	3,370	1,913	19.5	0.57	3.0
5	Santa Cruz	2	2	16	3,726	1,537	16.4	0.41	3.0
5	Santa Barbara	4	2	22	2,928	417	10.6	0.14	1.0
6	Fresno	4	4	30	5,040	6,013	10.1	1.19	5.0
7	Los Angeles	39	123	474	357,291	308,600	16.2	0.86	9.0
8	Riverside	9	21	81	38,316	46,120	10.7	1.20	11.0
8	San Bernardino	8	16	70	26,882	35,280	7.5	1.31	8.0
10	San Joaquin	3	6	37	13,785	8,535	9.0	0.62	3.0
11	San Diego	31	31	244	99,932	79,494	10.1	0.80	4.0
12	Orange	34	34	135	78,583	64,144	23.3	0.82	12.0
Total or Average		**188**	**340**	**1,762**	**794,333**	**682,424**	**15.1**	**0.86**	**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	1,155,194	4.5%	757,000	2.6%	185,523	4.7%
3	Placer	301,518	0.9%	151,798	0.5%	0	0.0%
3	El Dorado	111,721	0.4%	27,930	0.1%	0	0.0%
4	Bay Area Counties	6,215,146	24.4%	8,594,236	29.9%	957,267	24.1%
5	Monterey	171,195	0.7%	42,799	0.1%	0	0.0%
5	Santa Cruz	230,127	0.9%	128,261	0.4%	0	0.0%
5	Santa Barbara	190,000	0.7%	45,236	0.2%	0	0.0%
6	Fresno	346,334	1.4%	87,374	0.3%	92,783	2.3%
7	Los Angeles	8,504,100	33.4%	11,465,841	39.9%	1,268,661	31.9%
8	Riverside	1,599,523	6.3%	687,402	2.4%	279,765	7.0%
8	San Bernardino	1,495,171	5.9%	695,556	2.4%	279,765	7.0%
10	San Joaquin	0*	0.0%	0*	0.0%	0	0.0%
11	San Diego	2,526,600	9.9%	755,777	2.6%	469,952	11.8%
12	Orange	2,704,902	10.6%	5,328,682	18.5%	446,524	11.2%
Total or Average		**25,479,000**	**100.0%**	**28,768,492**	**100.0%**	**3,980,240**	**100.0%**

* San Joaquin (SJCOG) used all prior year funding for FSP in FY 2015-16, as they had remaining funds carried over.

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	720,342	1,238,268	58.28	697.58	31.41	11.24	10,896,762	166.75	451.64
3-Placer	55,956	96,189	4.53	54.19	2.44	0.87	846,463	12.95	35.08
3-El Dorado	13,535	23,266	1.09	13.11	0.59	0.21	204,739	3.13	8.49
4-Bay Area	2,860,421	4,917,064	231.41	2,770.03	124.71	44.62	43,270,159	662.16	1,793.43
5-Monterey	32,546	55,947	2.63	31.52	1.42	0.51	492,334	7.53	20.41
5-Santa Cruz	44,655	76,762	3.61	43.24	1.95	0.70	675,502	10.34	28.00
5-Santa Barbara	13,050	22,433	1.06	12.64	0.57	0.20	197,409	3.02	8.18
6-Fresno	126,382	217,251	10.22	122.39	5.51	1.97	1,911,808	29.26	79.24
7-Los Angeles	8,279,807	14,232,988	669.84	8,018.17	361.00	129.16	125,250,297	1,916.69	5,191.27
8-Riverside	1,061,539	1,824,786	85.88	1,027.99	46.28	16.56	16,058,119	245.74	665.56
8-San Bernardino	604,080	1,038,413	48.87	584.99	26.34	9.42	9,138,036	139.84	378.75
10-San Joaquin	89,965	154,649	7.28	87.12	3.92	1.40	1,360,912	20.83	56.41
11-San Diego	768,968	1,321,856	62.21	744.67	33.53	12.00	11,632,329	178.01	482.13
12-Orange	2,800,768	4,814,521	226.58	2,712.26	122.11	43.69	42,367,782	648.35	1,756.03
Statewide	17,472,014	30,034,392	1,413.49	16,919.90	761.78	272.56	264,302,651	4,044.60	10,954.60

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 2015-16, the FSP program provided over 682,000 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 2015-16 Management Information System (MIS) databases
2) Produce FSP 2015-16 California Local Program Report(s)
3) Produce FSP 2015-16 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 2015-16 MIS Databases

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

1) Solicit and collect the 2015-16 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 2015-16 California Local Program Report

The development of the FSP 2015-16 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 2015-16 California Statewide MIS Program Report

The development of the FSP 2015-16 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 2015-16 report. Create the shell of the FSP 2015-16 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 2015-16 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 682,000 records for the fiscal year 2015-16. 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 2011travel 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 2015-16 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 only nominally, by about 2.4% (from 666,686 in FY 2014-15 to 682,424 in FY 2015-16). 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%

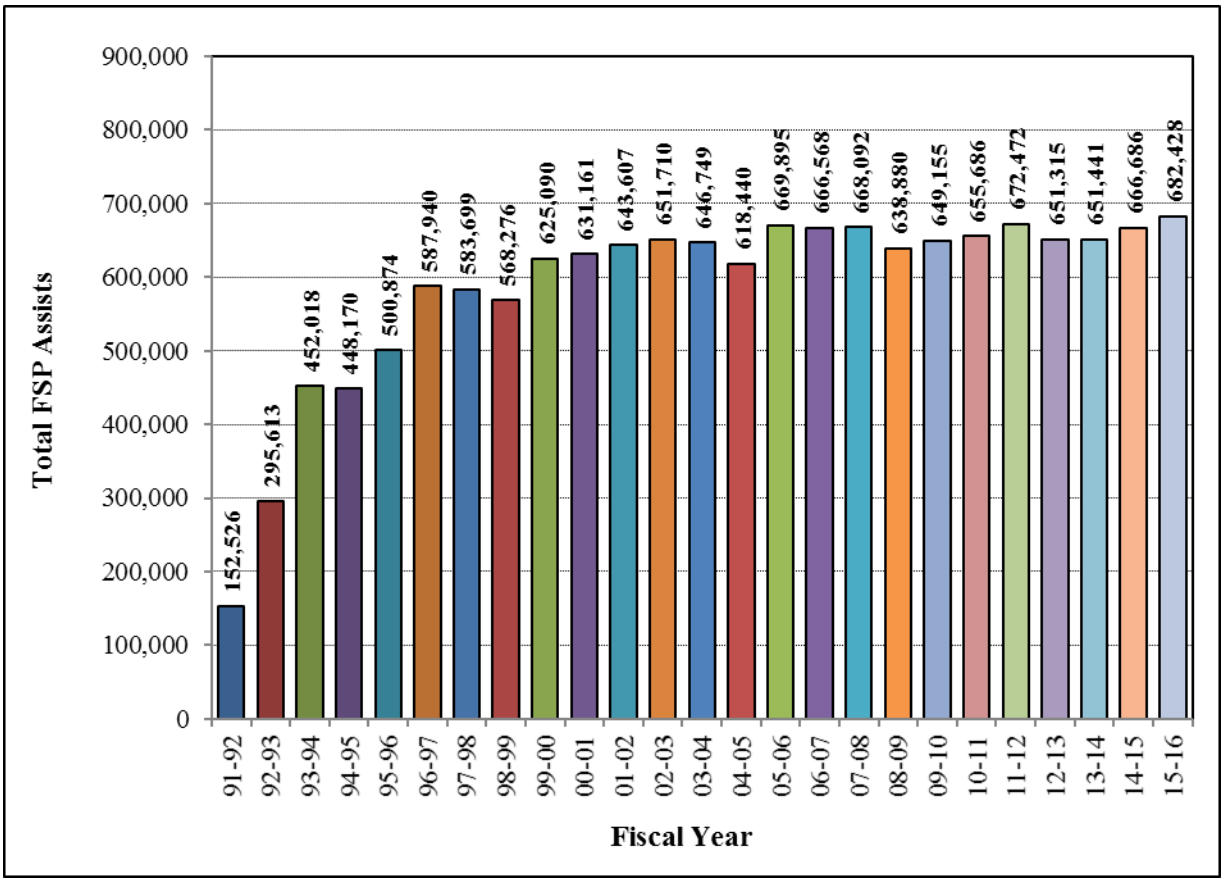

Figure 1: Bar Chart – Total FSP Assists by Fiscal Year

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	2.0	8.0
3	Placer	5.0	-	5.0	-	5.0
3	El Dorado	3.0	-	3.0	-	3.0
4	Bay Area Counties	7.0	2.0	7.0	1.0	7.0
5	Monterey	3.0	-	3.0	4.0	3.0
5	Santa Cruz	3.0	-	3.0	4.0	3.0
5	Santa Barbara	1.0	-	1.0	-	1.0
6	Fresno	5.0	-	5.0	-	5.0
7	Los Angeles	11.0	6.0	10.0	4.0	9.0
8	Riverside	11.0	-	11.0	-	11.0
8	San Bernardino	8.0	-	8.0	-	8.0
10	San Joaquin	3.0	-	3.0	2.0	3.0
11	San Diego	5.0	1.0	4.0	1.0	4.0
12	Orange	13.0	9.0	12.0	6.0	12.0
Statewide		**9.0**	**5.0**	**9.0**	**3.0**	**8.0**

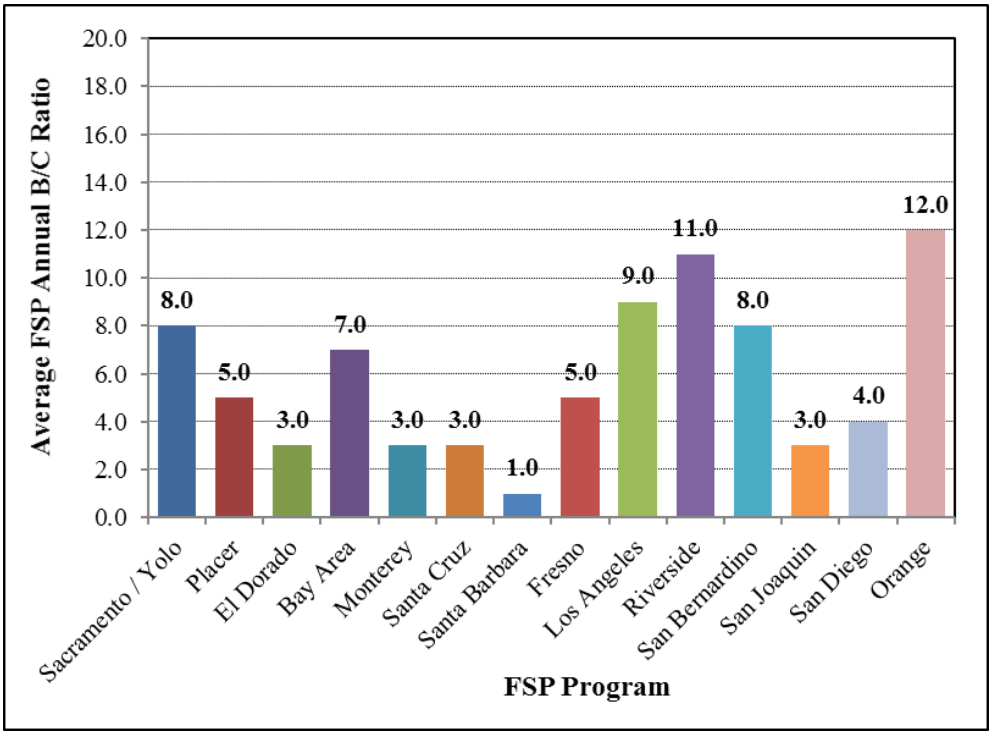

Figure 2: Bar Chart of FSP Benefit/Cost Ratios by Program

4.3 *Statewide FSP Total Assists by Quarter & Program*

Table 6: Total Assists by Quarter & Program

		Jul 15 - Sep 15	Oct 15 - Dec 15	Jan 16 - Mar 16	Apr 16 - Jun 16		
Caltrans District	**County or Region**	**Quarter 3**	**Quarter 4**	**Quarter 1**	**Quarter 2**	**Total Assists**	**Percent**
3	Sac & Yolo	8,868	8,075	9,524	11,530	37,997	5.6%
3	Placer	808	719	835	914	3,276	0.5%
3	El Dorado	170	150	296	197	813	0.1%
4	Bay Area	25,194	20,357	19,701	23,037	88,289	12.9%
5	Monterey	597	470	461	385	1,913	0.3%
5	Santa Cruz	432	350	334	421	1,537	0.2%
5	Santa Barbara	133	102	85	97	417	0.1%
6	Fresno	1,780	1,647	1,201	1,385	6,013	0.9%
7	Los Angeles	81,406	72,067	74,674	80,453	308,600	45.2%
8	Riverside	12,760	10,461	11,178	11,721	46,120	6.8%
8	San Bernardino	8,817	8,369	8,529	9,565	35,280	5.2%
10	San Joaquin	2,541	2,047	1,840	2,107	8,535	1.3%
11	San Diego	23,506	15,682	19,242	21,064	79,494	11.6%
12	Orange	16,151	14,190	16,551	17,252	64,144	9.4%
Total Assists		**176,484**	**183,163**	**154,686**	**164,451**	**180,128**	**682,428**
% of Total Assists		**26.8%**	**22.7%**	**24.1%**	**26.4%**	**100.0%**	

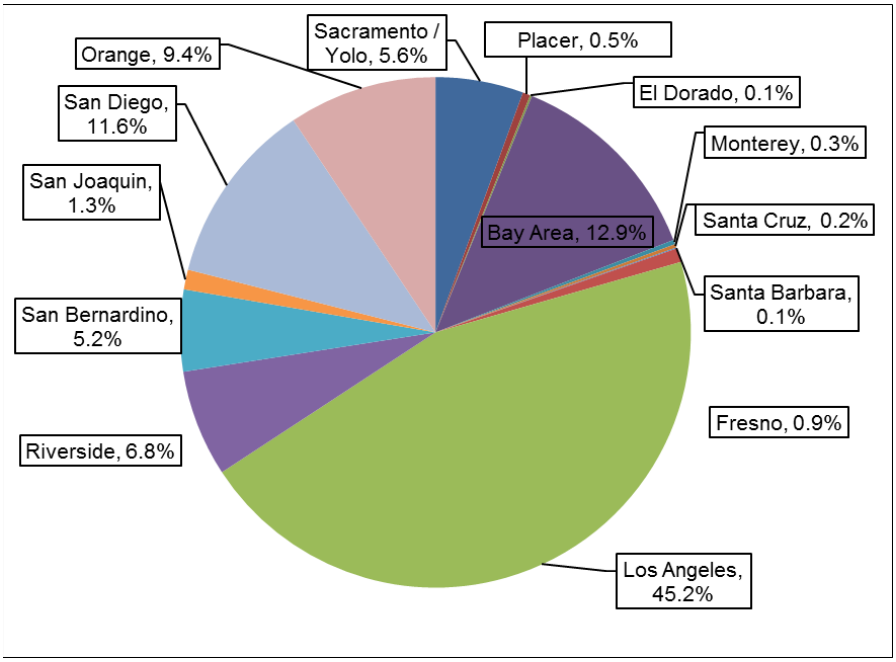

Figure 3: Pie Chart of Total Assists by Program

4.4 *Statewide FSP Total Assists by Problem Type*

Table 7: Total Assists by Problem Type

Problem Type	Total Assists	Percent
Abandoned	26,899	3.9%
Accident	123,958	18.2%
Debris Removed	18,506	2.7%
Flat Tire	112,851	16.5%
Mechanical Problems	126,473	18.5%
Other*	179,436	26.3%
Out of Gas	55,246	8.1%
Over Heated	39,059	5.7%
Total Assists	**682,428**	**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.

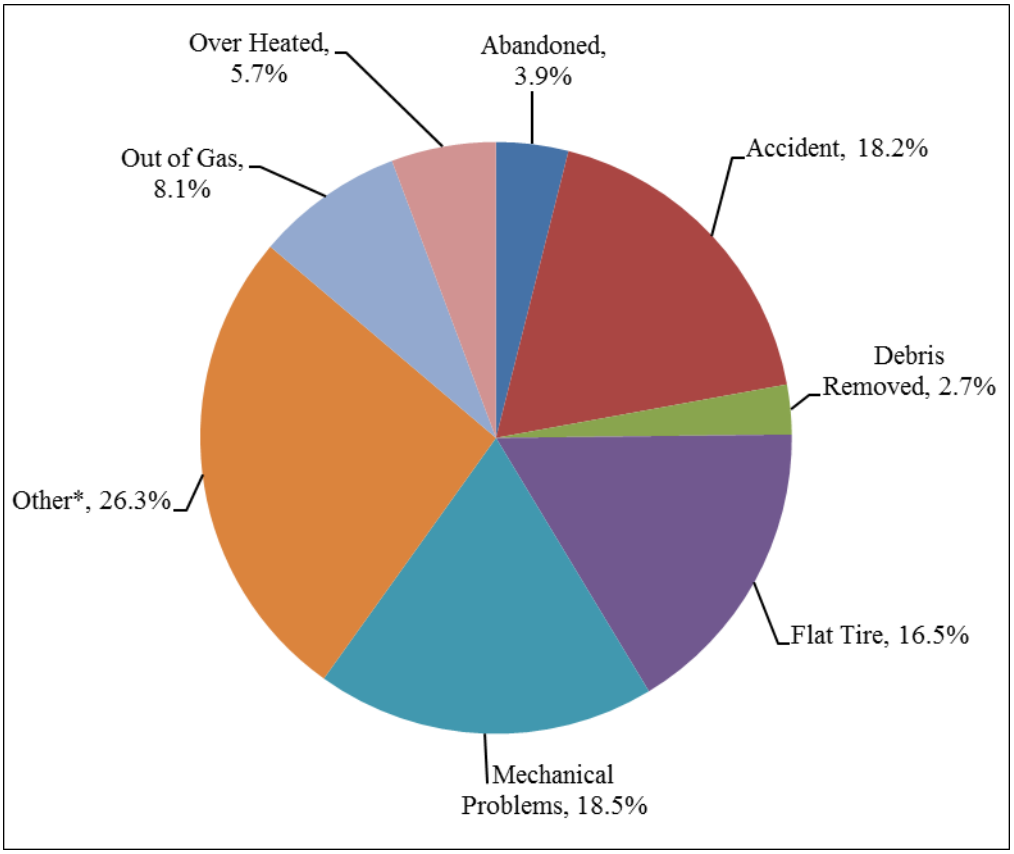

Figure 4: Pie Chart of Total Assists by Problem Type

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	1,538	15,048	1,373	5,650	7,380	3,599	2,502	907	37,997
3	Placer	207	939	86	600	811	346	223	64	3,276
3	El Dorado	46	89	48	106	280	143	84	17	813
4	Bay Area	6,273	14,842	2,259	17,012	20,999	14,409	7,172	5,323	88,289
5	Monterey	86	370	211	273	351	339	199	84	1,913
5	Santa Cruz	91	288	106	187	342	307	110	106	1,537
5	Santa Barbara	16	62	8	80	108	47	71	25	417
6	Fresno	596	1,830	73	677	1,579	133	1,114	11	6,013
7	Los Angeles	5,164	64,541	4,662	52,572	51,744	85,379	23,081	21,457	308,600
8	Riverside	1,933	4,440	2,019	7,057	9,261	15,307	2,967	3,136	46,120
8	San Bernardino	2,664	3,108	2,112	5,512	6,126	12,057	2,116	1,585	35,280
10	San Joaquin	373	1,160	578	1,843	1,373	1,150	1,588	470	8,535
11	San Diego	5,388	7,845	1,923	12,521	14,320	25,450	8,028	4,019	79,494
12	Orange	2,524	9,396	3,048	8,762	11,798	20,769	5,991	1,856	64,144
Total Assists		**26,899**	**123,958**	**18,506**	**112,851**	**126,473**	**179,436**	**55,246**	**39,059**	**682,428**
Average %		**3.9%**	**18.2%**	**2.7%**	**16.5%**	**18.5%**	**26.3%**	**8.1%**	**5.7%**	**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	4.0%	39.6%	3.6%	14.9%	19.4%	9.5%	6.6%	2.4%	4.0%
3	Placer	6.3%	28.7%	2.6%	18.3%	24.8%	10.6%	6.8%	2.0%	6.3%
3	El Dorado	5.7%	10.9%	5.9%	13.0%	34.4%	17.6%	10.3%	2.1%	5.7%
4	Bay Area	7.1%	16.8%	2.6%	19.3%	23.8%	16.3%	8.1%	6.0%	7.1%
5	Monterey	4.5%	19.3%	11.0%	14.3%	18.3%	17.7%	10.4%	4.4%	4.5%
5	Santa Cruz	3.8%	14.9%	1.9%	19.1%	26.0%	11.3%	17.0%	5.9%	3.8%
5	Santa Barbara	5.9%	18.7%	6.9%	12.1%	22.3%	20.0%	7.2%	6.9%	5.9%
6	Fresno	9.9%	30.4%	1.2%	11.3%	26.3%	2.2%	18.5%	0.2%	9.9%
7	Los Angeles	1.7%	20.9%	1.5%	17.0%	16.8%	27.7%	7.5%	7.0%	1.7%
8	Riverside	4.2%	9.6%	4.4%	15.3%	20.1%	33.2%	6.4%	6.8%	4.2%
8	San Bernardino	7.6%	8.8%	6.0%	15.6%	17.4%	34.2%	6.0%	4.5%	7.6%
10	San Joaquin	4.4%	13.6%	6.8%	21.6%	16.1%	13.5%	18.6%	5.5%	4.4%
11	San Diego	6.8%	9.9%	2.4%	15.8%	18.0%	32.0%	10.1%	5.1%	6.8%
12	Orange	3.9%	14.6%	4.8%	13.7%	18.4%	32.4%	9.3%	2.9%	3.9%
Average %		**3.9%**	**18.2%**	**2.7%**	**16.5%**	**18.5%**	**26.3%**	**8.1%**	**5.7%**	**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	469,587	68.8%
Big Rig	27,801	4.1%
Other / Unknown	43,240	6.3%
SUV / Pickup	127,398	18.7%
Trucks	14,401	2.1%
Total Assists	**682,428**	**100.0%**

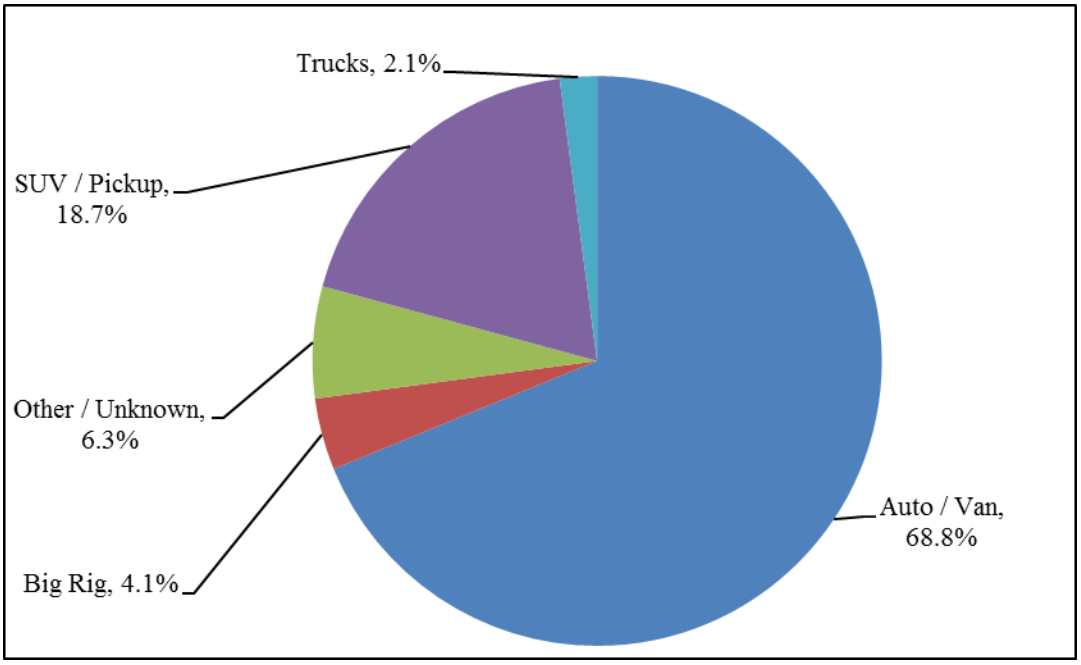

Figure 5: Pie Chart of Total Assists by Vehicle Type

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	21,140	465	5,204	10,294	894	37,997
3	Placer	1,811	85	231	1,041	108	3,276
3	El Dorado	399	25	78	275	36	813
4	Bay Area	65,146	1,286	7,175	11,903	2,779	88,289
5	Monterey	1,288	35	253	280	57	1,913
5	Santa Cruz	1,100	26	171	216	24	1,537
5	Santa Barbara	341	3	24	45	4	417
6	Fresno	4,509	76	159	1,227	42	6,013
7	Los Angeles	236,421	8,827	14,022	44,397	4,933	308,600
8	Riverside	27,037	5,800	3,086	8,040	2,157	46,120
8	San Bernardino	18,743	7,332	2,678	4,908	1,619	35,280
10	San Joaquin	6,151	54	869	1,407	53	8,534
11	San Diego	46,115	597	6,193	25,972	617	79,494
12	Orange	39,386	3,190	3,097	17,393	1,078	64,144
Total Assists		**469,587**	**27,801**	**43,240**	**127,398**	**14,401**	**682,428**
Average %		**68.8%**	**4.1%**	**6.3%**	**18.7%**	**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	55.6%	1.2%	13.7%	27.1%	2.4%	5.6%
3	Placer	55.3%	2.6%	7.1%	31.8%	3.3%	0.5%
3	El Dorado	49.1%	3.1%	9.6%	33.8%	4.4%	0.1%
4	Bay Area	73.8%	1.5%	8.1%	13.5%	3.1%	12.9%
5	Monterey	67.3%	1.8%	13.2%	14.6%	3.0%	0.3%
5	Santa Cruz	71.5%	1.7%	11.2%	14.0%	1.6%	0.2%
5	Santa Barbara	81.8%	0.7%	5.7%	10.9%	0.9%	0.1%
6	Fresno	75.0%	1.3%	2.6%	20.4%	0.7%	0.9%
7	Los Angeles	76.6%	2.9%	4.5%	14.4%	1.6%	45.2%
8	Riverside	58.6%	12.6%	6.7%	17.4%	4.7%	6.8%
8	San Bernardino	53.1%	20.8%	7.6%	13.9%	4.6%	5.2%
10	San Joaquin	72.1%	0.6%	10.2%	16.5%	0.6%	1.3%
11	San Diego	58.0%	0.8%	7.8%	32.7%	0.8%	11.6%
12	Orange	61.4%	5.0%	4.8%	27.1%	1.7%	9.4%
Average %		**68.8%**	**4.1%**	**6.3%**	**18.7%**	**2.1%**	**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	68,470	10.0%
On Left Shoulder	32,193	4.7%
On Right Shoulder	512,572	75.1%
Other	33,035	4.8%
Ramp / Connector	32,496	4.8%
Unable to Locate	3,659	0.5%
Total Assists	**682,428**	**100.0%**

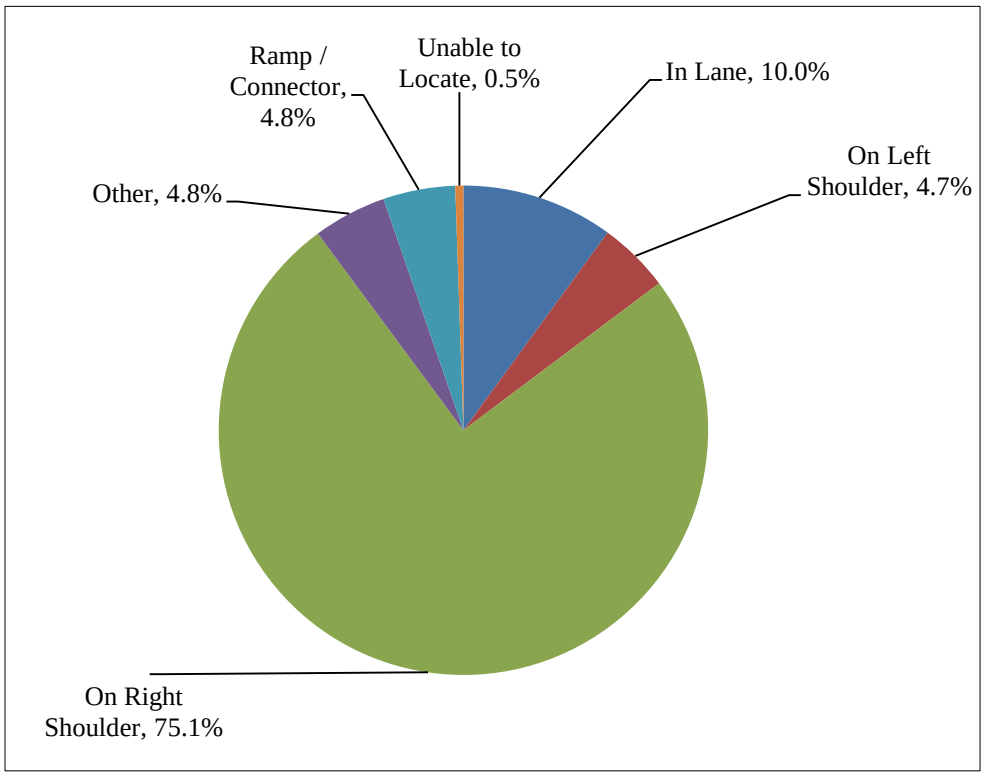

Figure 6: Pie Chart of Total Assists by Vehicle Location

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	4,779	2,953	23,454	4,013	2,726	72	37,997
3	Placer	208	223	2,518	63	261	3	3,276
3	El Dorado	97	38	650	3	25	0	810
4	Bay Area	7,627	5,142	63,294	0	11,243	983	88,289
5	Monterey	275	195	1,224	11	206	2	1,913
5	Santa Cruz	277	118	900	11	170	60	1,537
5	Santa Barbara	47	29	249	33	59	0	417
6	Fresno	819	527	4,204	0	460	3	6,013
7	Los Angeles	33,596	10,090	234,864	25,508	2,618	1,924	308,600
8	Riverside	5,454	1,690	35,353	0	3,623	0	46,120
8	San Bernardino	3,199	1,495	27,343	0	3,243	0	35,280
10	San Joaquin	647	1,082	6,110	0	696	0	8,535
11	San Diego	4,036	6,195	60,659	3,314	4,678	612	79,494
12	Orange	7,409	2,417	51,752	79	2,487	0	64,144
Total Assists		**68,470**	**32,193**	**512,575**	**33,035**	**32,496**	**3,659**	**682,428**
Average %		**10.0%**	**4.7%**	**75.1%**	**4.8%**	**4.8%**	**0.5%**	**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	12.6%	7.8%	61.7%	10.6%	7.2%	0.2%	5.6%
3	Placer	6.3%	6.8%	76.9%	1.9%	8.0%	0.1%	0.5%
3	El Dorado	12.0%	4.7%	79.9%	0.4%	3.1%	0.0%	0.1%
4	Bay Area	8.6%	5.8%	71.7%	0.0%	12.7%	1.1%	12.9%
5	Monterey	14.4%	10.2%	64.0%	0.6%	10.8%	0.1%	0.3%
5	Santa Cruz	18.0%	7.7%	58.6%	0.7%	11.1%	3.9%	0.2%
5	Santa Barbara	11.3%	6.9%	59.8%	7.8%	14.2%	0.0%	0.1%
6	Fresno	13.6%	8.8%	69.9%	0.0%	7.7%	0.0%	0.9%
7	Los Angeles	10.9%	3.3%	76.1%	8.3%	0.8%	0.6%	45.2%
8	Riverside	11.8%	3.7%	76.7%	0.0%	7.9%	0.0%	6.8%
8	San Bernardino	9.1%	4.2%	77.5%	0.0%	9.2%	0.0%	5.2%
10	San Joaquin	7.6%	12.7%	71.6%	0.0%	8.2%	0.0%	1.3%
11	San Diego	5.1%	7.8%	76.3%	4.2%	5.9%	0.8%	11.6%
12	Orange	11.6%	3.8%	80.7%	0.1%	3.9%	0.0%	9.4%
Average %		**10.0%**	**4.7%**	**75.1%**	**4.8%**	**4.8%**	**0.5%**	**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	11.7
3	El Dorado	11.0
4	Bay Area	18.4
5	Monterey	19.5
5	Santa Cruz	16.4
5	Santa Barbara	11.4
6	Fresno	10.1
7	Los Angeles	16.2
8	Riverside	10.7
8	San Bernardino	7.5
10	San Joaquin	9.0
11	San Diego	10.1
12	Orange	23.3
Average Duration		**15.1**

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

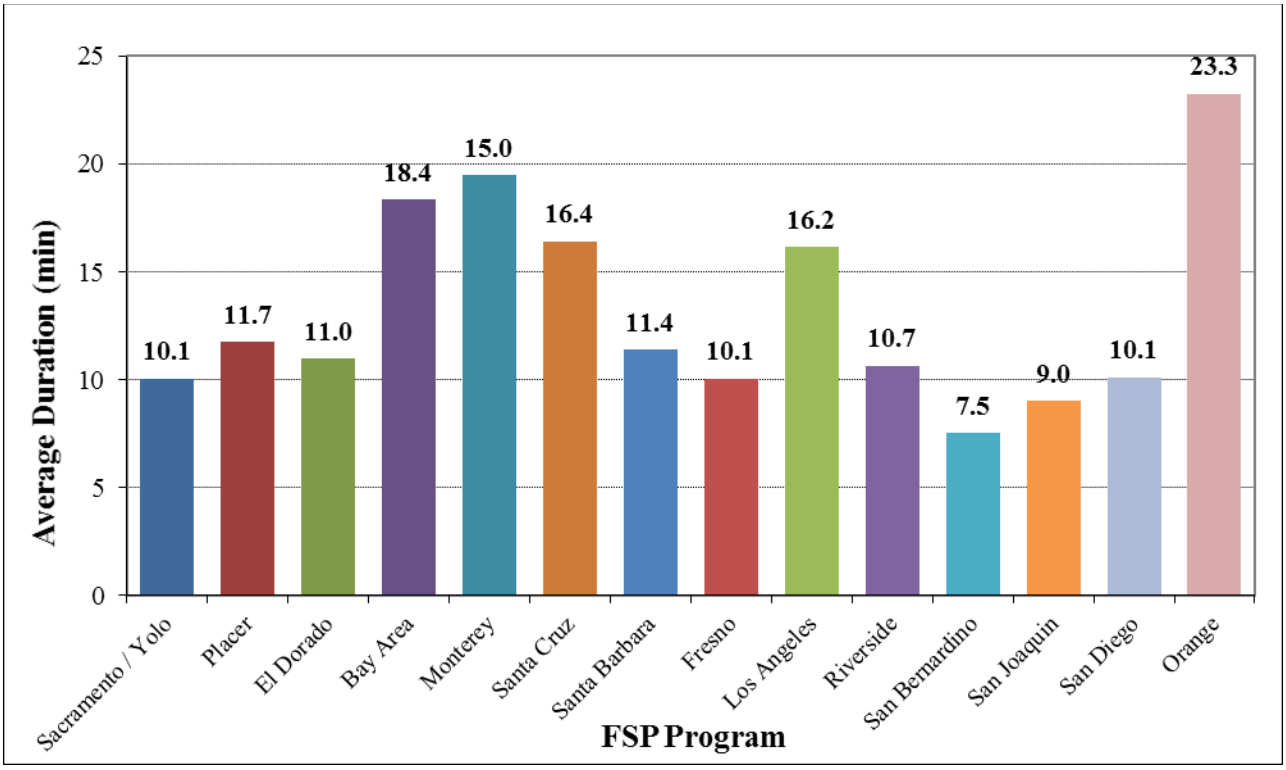

Figure 7: Bar Chart of Average Assist Duration by Program

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	5.2	8.9	3.1	14.0	14.8	4.4	7.8	12.2	10.1
3	Placer	3.9	13.1	7.6	14.6	14.6	4.7	8.0	8.8	11.7
3	El Dorado	4.9	15.6	3.3	12.6	16.3	2.7	8.5	8.0	11.0
4	Bay Area	9.1	26.1	15.8	20.9	21.7	9.1	13.8	18.7	18.4
5	Monterey	9.4	30.2	19.2	21.2	19.8	13.3	9.4	25.1	19.5
5	Santa Cruz	7.9	23.4	8.4	16.3	20.7	12.8	10.1	16.6	16.4
5	Santa Barbara	8.9	18.7	5.4	11.5	12.6	5.8	7.9	12.2	11.4
6	Fresno	4.6	16.4	8.7	8.9	8.3	7.6	5.9	10.0	10.1
7	Los Angeles	9.6	22.4	11.5	17.8	19.0	9.9	12.6	16.8	16.2
8	Riverside	6.0	14.5	5.6	15.1	17.1	4.5	9.3	13.9	10.7
8	San Bernardino	5.2	9.9	5.6	11.9	11.3	4.3	8.1	10.6	7.5
10	San Joaquin	5.3	8.5	2.7	12.6	14.0	3.7	6.7	13.2	9.0
11	San Diego	5.7	15.2	7.9	13.2	14.2	6.1	8.1	11.8	10.1
12	Orange	19.4	24.2	20.1	26.0	31.4	19.0	20.0	23.5	23.3
Average Duration		**8.4**	**20.0**	**10.9**	**17.6**	**19.1**	**9.4**	**12.0**	**16.2**	**15.1**

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.

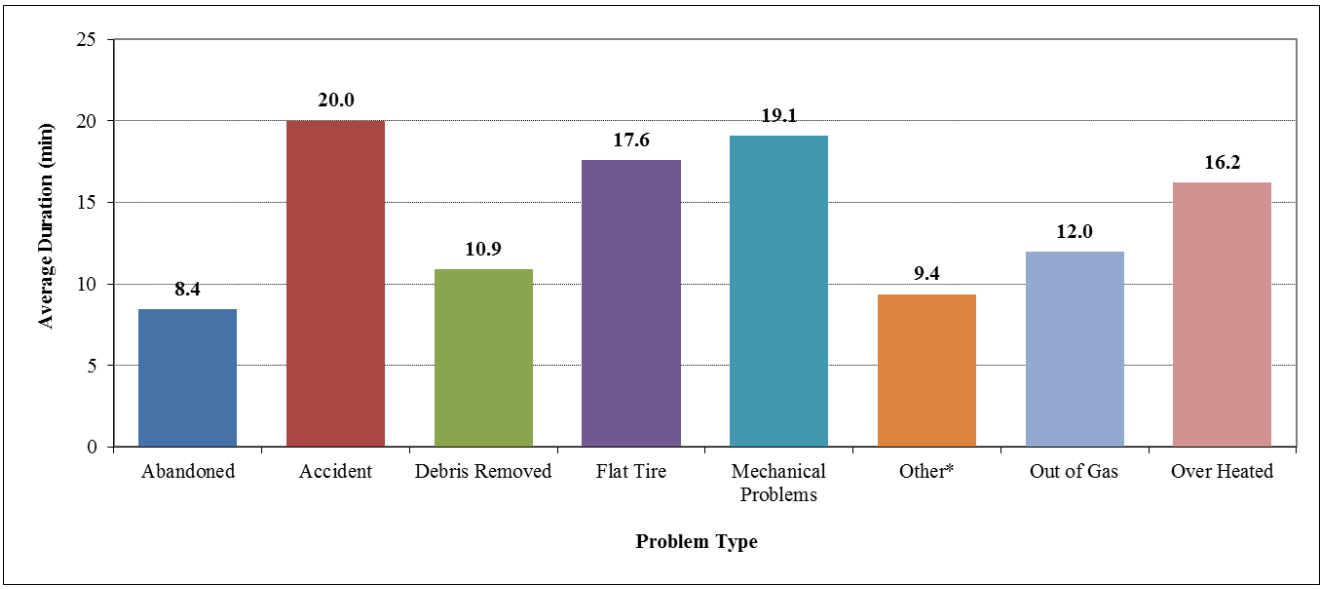

Figure 8: Bar Chart of Average Assist Duration by Problem Type and Program

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	11.6	7.4	10.2	10.3	10.1
3	Placer	12.0	9.1	9.4	12.2	9.9	11.7
3	El Dorado	12.7	4.7	5.1	11.0	8.8	11.0
4	Bay Area	18.7	18.5	17.6	17.0	18.6	18.4
5	Monterey	20.3	15.8	20.1	15.6	18.1	19.5
5	Santa Cruz	17.4	22.9	13.4	13.6	12.5	16.4
5	Santa Barbara	11.9	14.7	8.0	9.9	6.8	11.4
6	Fresno	8.9	8.9	8.8	9.1	10.2	10.1
7	Los Angeles	16.5	14.3	13.3	15.5	N/A	16.2
8	Riverside	12.0	7.0	7.1	10.8	8.4	10.7
8	San Bernardino	8.6	5.6	6.1	7.6	6.5	7.5
10	San Joaquin	9.3	12.0	5.6	9.4	11.4	9.0
11	San Diego	10.4	9.8	9.7	8.7	7.8	10.1
12	Orange	23.5	19.3	21.5	24.0	21.4	23.3
Average Duration		**15.8**	**11.1**	**12.3**	**14.2**	**8.4**	**15.1**

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

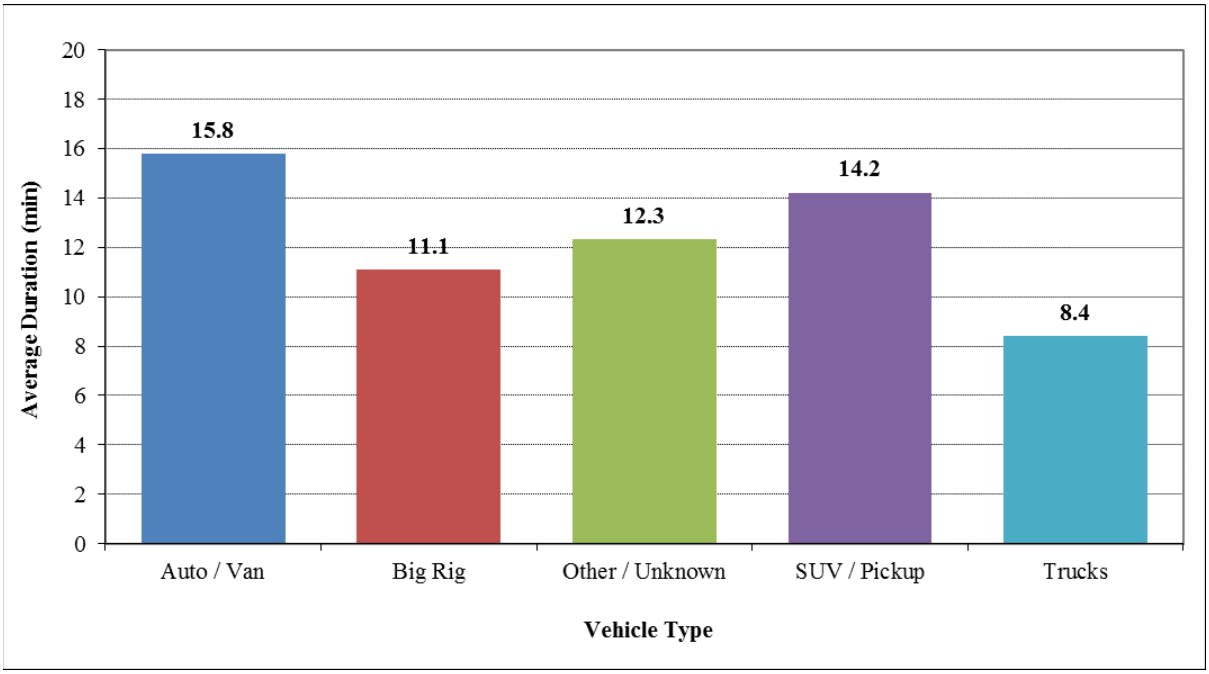

Figure 9: Bar Chart of Average Assist Duration by Vehicle Type

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	27,688	37,997	1.37
3	Placer	3,660	3,276	0.90
3	El Dorado	1,342	813	0.61
4	Bay Area	131,790	88,289	0.67
5	Monterey	3,380	1,913	0.57
5	Santa Cruz	3,726	1,537	0.41
5	Santa Barbara	2,928	417	0.14
6	Fresno	5,040	6,013	1.19
7	Los Angeles	357,291	308,600	0.86
8	Riverside	38,316	46,120	1.20
8	San Bernardino	26,882	35,280	1.31
10	San Joaquin	13,785	8,535	0.62
11	San Diego	99,932	79,494	0.80
12	Orange	78,583	64,144	0.82
Statewide		**794,342**	**682,428**	**0.86**

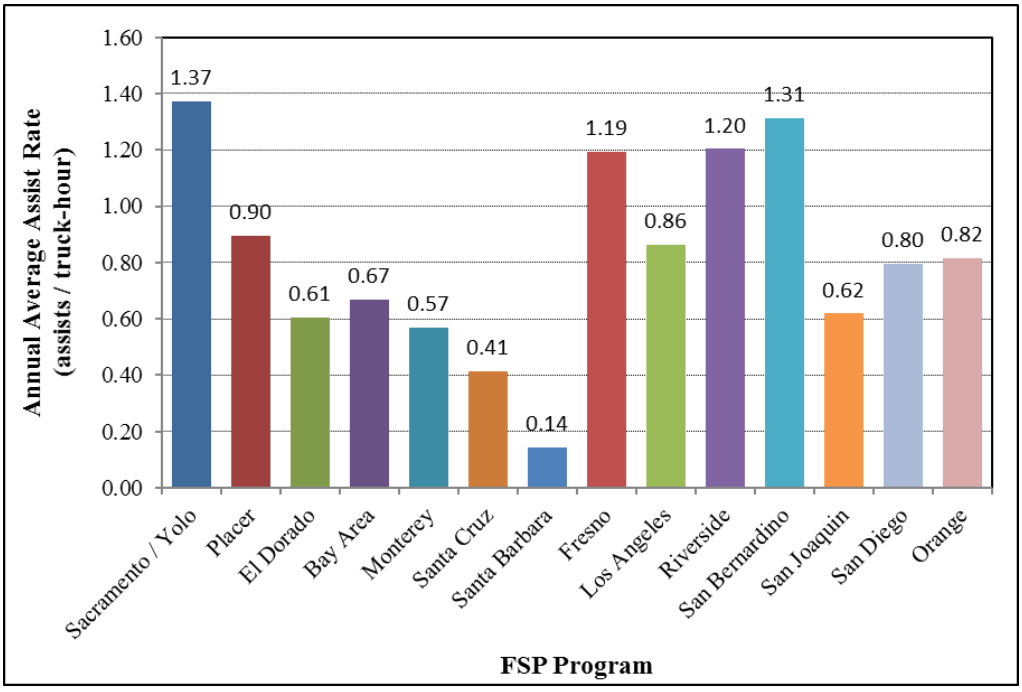

Figure 10: Bar Chart of Average Weekday Assist Rate by Program

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 2015-16 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 2015-16 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 24 "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 25: "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 26: "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 27: "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 28: "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 2015-16 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	4.0	-	4.0	2.0	4.0
106	2.0	-	2.0	-	2.0
108	17.0	-	17.0	-	17.0
108A	3.0	-	3.0	-	3.0
150	12.0	-	12.0	-	12.0
151	13.0	-	13.0	-	13.0
152	6.0	-	6.0	-	6.0
153	7.0	-	7.0	-	7.0
153A	11.0	-	11.0	-	11.0
181	2.0	-	2.0	-	2.0
182	4.0	-	4.0	-	4.0
182A	6.0	-	6.0	-	6.0
184	24.0	-	24.0	-	24.0
184A	9.0	-	9.0	-	9.0
191A	8.0	-	8.0	-	8.0
192	5.0	-	5.0	-	5.0
193	8.0	-	8.0	2.0	8.0
Average Benefit/Cost Ratio	**4.0**	**-**	**4.0**	**2.0**	**4.0**

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	5.0	-	5.0	-	5.0
281	4.0	-	4.0	-	4.0
281-A	6.0	-	6.0	-	6.0
Average Benefit/Cost Ratio	**5.0**	**-**	**5.0**	**0.0**	**5.0**

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	3.0	-	3.0	-	3.0
2	3.0	2.0	3.0	0.0	3.0
3	3.0	2.0	3.0	-	3.0
4	6.0	4.0	6.0	-	6.0
5	14.0	-	14.0	-	14.0
6	9.0	1.0	7.0	-	7.0
7	15.0	-	15.0	-	15.0
8	4.0	-	4.0	-	4.0
9	28.0	-	28.0	-	28.0
10	12.0	-	12.0	-	12.0
11	8.0	1.0	6.0	-	6.0
12	4.0	-	4.0	-	4.0
13	7.0	-	7.0	-	7.0
14	2.0	-	2.0	-	2.0
15	7.0	-	7.0	-	7.0
16	14.0	-	14.0	3.0	12.0
17	1.0	-	1.0	0.0	1.0
19	10.0	-	10.0	-	10.0
20	10.0	-	10.0	-	10.0
21	5.0	-	5.0	-	5.0
22	9.0	-	9.0	-	9.0
23	4.0	-	4.0	-	4.0
25	6.0	-	6.0	-	6.0
26	7.0	-	7.0	-	7.0
27	1.0	-	1.0	-	1.0
28	7.0	-	7.0	-	7.0
29	3.0	-	3.0	-	3.0
32	5.0	-	5.0	-	5.0
33	1.0	-	1.0	-	1.0
34	2.0	-	2.0	-	2.0
35	2.0	-	2.0	-	2.0
Average Benefit/Cost Ratio	**7.0**	**2.0**	**7.0**	**1.0**	**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	2.0	-	2.0	4.0	2.0
2	5.0	-	5.0	5.0	5.0
Average Benefit/Cost Ratio	**3.0**	**-**	**3.0**	**4.0**	**3.0**

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	3.0	-	3.0	-	3.0
2	4.0	-	4.0	4.0	4.0
Average Benefit/Cost Ratio	**3.0**	**-**	**3.0**	**4.0**	**3.0**

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-A	1.0	-	1.0	-	1.0
1-B	1.0		1.0		1.0
2	1.0	-	1.0	-	1.0
3	2.0	-	2.0	-	2.0
Average Benefit/Cost Ratio	**1.0**	**-**	**1.0**	**-**	**1.0**

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	4.0	-	4.0	-	4.0
3	6.0	-	6.0	-	6.0
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	37.0	19.0	34.0	28.0	34.0
2	25.0	15.0	23.0	6.0	21.0
3	15.0	11.0	14.0	3.0	13.0
4	7.0	6.0	7.0	2.0	6.0
5	8.0	7.0	8.0	2.0	7.0
6	9.0	8.0	9.0	10.0	9.0
7	10.0	10.0	10.0	16.0	10.0
8	2.0	2.0	2.0	2.0	2.0
9	6.0	8.0	6.0	4.0	6.0
10	1.0	1.0	1.0	2.0	1.0
11	5.0	3.0	5.0	1.0	4.0
12	8.0	6.0	8.0	4.0	7.0
13	3.0	1.0	3.0	1.0	3.0
14	10.0	2.0	9.0	2.0	8.0
16	23.0	19.0	23.0	15.0	22.0
17	9.0	8.0	8.0	14.0	9.0
18	15.0	12.0	14.0	5.0	13.0
19	17.0	8.0	16.0	5.0	15.0
20	3.0	3.0	3.0	4.0	3.0
21	10.0	4.0	9.0	2.0	8.0
23	20.0	10.0	19.0	2.0	15.0
24	4.0	0.0	3.0	0.0	3.0
27	11.0	3.0	10.0	2.0	10.0
28	2.0	2.0	2.0	4.0	2.0
29	10.0	6.0	9.0	1.0	8.0
30	13.0	6.0	12.0	1.0	11.0
31	6.0	5.0	6.0	4.0	6.0
33	20.0	0.0	17.0	0.0	15.0
34	19.0	2.0	16.0	1.0	15.0
36	4.0	0.0	3.0	0.0	3.0
37	5.0	3.0	5.0	1.0	4.0
38	6.0	1.0	5.0	1.0	5.0
39	18.0	12.0	17.0	3.0	15.0
40	12.0	5.0	11.0	2.0	9.0
41	2.0	0.0	2.0	1.0	2.0
42	15.0	3.0	13.0	2.0	12.0
43	9.0	5.0	9.0	2.0	8.0
50	9.0	3.0	8.0	2.0	7.0
51	9.0	5.0	8.0	5.0	8.0
Average Benefit/Cost Ratio	**11.0**	**6.0**	**10.0**	**4.0**	**9.0**

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	6.0	-	6.0	-	6.0
2	8.0	-	8.0	-	8.0
4	23.0	-	23.0	-	23.0
7	7.0	-	7.0	-	7.0
8	5.0	-	5.0	-	5.0
18	28.0	-	28.0	-	28.0
19	5.0	-	5.0	-	5.0
25	5.0	-	5.0	-	5.0
26	6.0	-	6.0	-	6.0
Average Benefit/Cost Ratio	**11.0**	**-**	**11.0**	**-**	**11.0**

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	9.0	-	9.0	-	9.0
2	10.0	-	10.0	-	10.0
3	2.0	-	2.0	-	2.0
4	3.0	-	3.0	-	3.0
5	8.0	-	8.0	-	8.0
6	17.0	-	17.0	-	17.0
7	2.0	-	2.0	-	2.0
8	12.0	-	12.0	-	12.0
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	1.0	-	1.0	-	1.0
2	6.0	-	6.0	3.0	6.0
3	0.0	-	0.0	0.0	0.0
Average Benefit/Cost Ratio	**3.0**	**-**	**3.0**	**2.0**	**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
851	2.0	0.0	2.0	0.0	1.0
852	11.0	-	11.0	-	11.0
501	2.0	0.0	1.0	0.0	1.0
503	5.0	-	5.0	-	5.0
541	1.0	0.0	1.0	0.0	1.0
125	8.0	-	8.0	-	8.0
941	4.0	1.0	3.0	0.0	2.0
505	7.0	-	7.0	-	7.0
151	11.0	1.0	7.0	1.0	6.0
152	3.0	-	3.0	-	3.0
163	7.0	1.0	6.0	1.0	5.0
522	6.0	-	6.0	-	6.0
801	7.0	1.0	5.0	1.0	4.0
802	3.0	-	3.0	-	3.0
506	7.0	2.0	5.0	1.0	4.0
521	6.0	-	6.0	-	6.0
853	4.0	1.0	3.0	0.0	3.0
508	2.0	2.0	2.0	1.0	2.0
509	1.0	-	1.0	-	1.0
153	2.0	0.0	2.0	0.0	1.0
781	-	4.0	4.0	2.0	3.0
951	2.0	-	2.0	-	2.0
100	8.0	-	8.0	-	8.0
200	6.0	-	6.0	-	6.0
300	4.0	-	4.0	-	4.0
400	5.0	-	5.0	-	5.0
500	6.0	-	6.0	-	6.0
600	4.0	-	4.0	-	4.0
700	3.0	-	3.0	-	3.0
800	1.0	-	1.0	-	1.0
Average Benefit/Cost Ratio	**5.0**	**1.0**	**4.0**	**1.0**	**4.0**

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	4.0	-	4.0	-	4.0
911	17.0	-	17.0	-	17.0
912	5.0	-	5.0	-	5.0
913	16.0	-	16.0	-	16.0
573	-	9.0	9.0	-	9.0
225	-	-	-	10.0	10.0
914	4.0	-	4.0	-	4.0
915	4.0	-	4.0	-	4.0
916	5.0	-	5.0	-	5.0
922	-	-	-	3.0	3.0
220	4.0	-	4.0	-	4.0
221	10.0	-	10.0	-	10.0
222	12.0	-	12.0	-	12.0
223	-	5.0	5.0	-	5.0
224	-	15.0	15.0	-	15.0
405	18.0	-	18.0	-	18.0
406	10.0	-	10.0	-	10.0
407	0.0	-	0.0	-	0.0
408	3.0	-	3.0	-	3.0
409	9.0	-	9.0	-	9.0
410	22.0	-	22.0	-	22.0
411	4.0	-	4.0	-	4.0
501	9.0	-	9.0	-	9.0
502	9.0	-	9.0	-	9.0
500	-	6.0	6.0	-	6.0
503	68.0	-	68.0	-	68.0
504	26.0	-	26.0	-	26.0
505	23.0	-	23.0	-	23.0
506	20.0	-	20.0	-	20.0
511	-	-	-	7.0	7.0
512	-	-	-	5.0	5.0
513	-	8.0	8.0	-	8.0
507	8.0	-	8.0	-	8.0
508	39.0	-	39.0	-	39.0
509	10.0	-	10.0	-	10.0
510	4.0	-	4.0	-	4.0
570	2.0	-	2.0	-	2.0
571	5.0	-	5.0	-	5.0
572	2.0	-	2.0	-	2.0
551	6.0	-	6.0	-	6.0
552	40.0	-	40.0	-	40.0
555	-	5.0	5.0	-	5.0
553	7.0	-	7.0	-	7.0
554	12.0	-	12.0	-	12.0
550	-	14.0	14.0	-	14.0
Average B/C Ratio	**13.0**	**9.0**	**12.0**	**6.0**	**12.0**

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