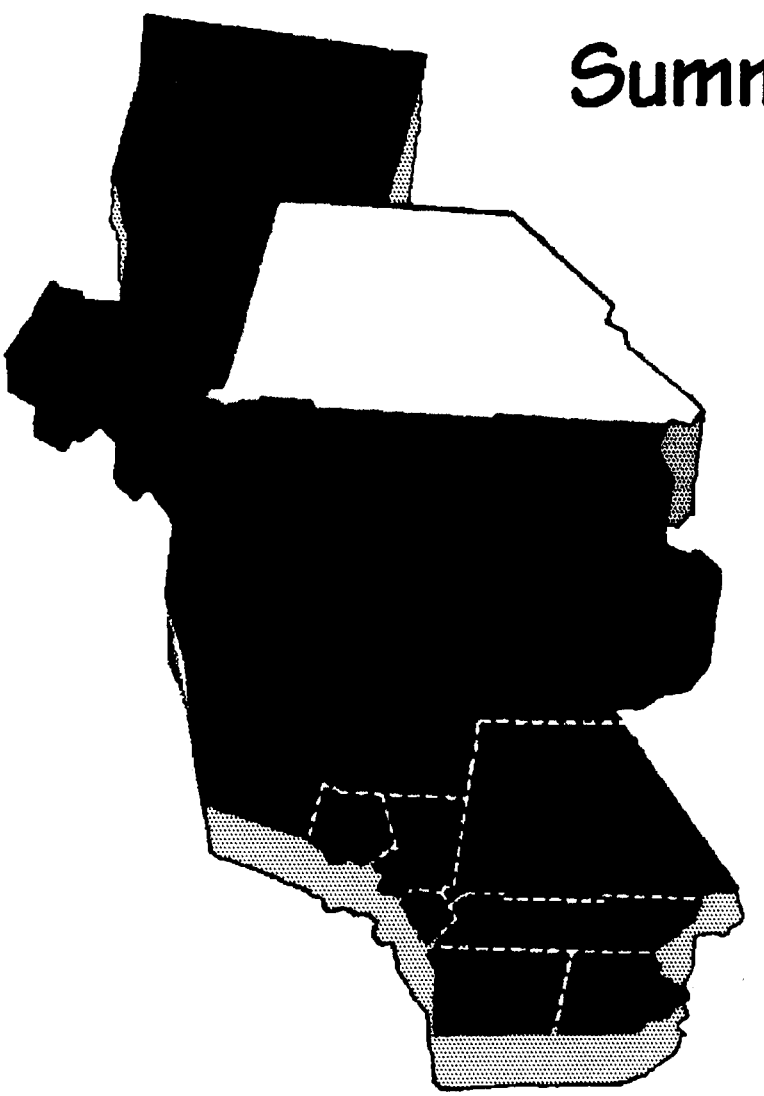
1991 Southern California Origin-Destination Survey

Summary Findings



Southern California Association of Governments

This Summary Report presents preliminary findings from the 1991 Origin-Destination Survey coordinated by the Southern California Association of Governments on behalf of the five participating counties: Los Angeles, Orange, Riverside, San Bernardino, and Ventura. This study would not have been possible without the support of the following individuals and agencies, and we would like to express our appreciation to them:

- Mr. Neil Peterson
  Executive Director
  Los Angeles County Transportation Commission

- Mr. Roger Stanton
  Supervisor, District 3
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- Mr. Jack Reagan
  Executive Director
  Riverside County Transportation Commission

- Mr. Wes McDaniel
  Executive Director
  San Bernardino Associated Governments

- Ms. Ginger Gherardi
  Executive Director
  Ventura County Transportation Commission

This report includes a series of tables and graphs addressing the issues that are believed to be of most interest to transportation planners. The report does not exhaust the questions that could be answered with the data set, but it was felt that making available an initial set of analyses was more important than waiting until every possible question had been analyzed. It is hoped that this report will spur interest in the further inspection and use of these data.

Dr. Arnold Sherwood
Southern California Association of Governments
February, 1993

Acknowledgements

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF FIGURES (Continued)

LIST OF FIGURES (Continued)

LIST OF TABLES

LIST OF TABLES (Continued)

LIST OF TABLES (Continued)

I. INTRODUCTION

This report presents the findings from the 1991 Southern California Origin-Destination Survey. The survey was coordinated and managed by the Southern California Association of Governments (SCAG) for the following 5 agencies representing their respective counties:

- Los Angeles County Transportation Commission;
- Orange County Environmental Management Agency;
- Riverside County Transportation Commission;
- San Bernardino Associated Governments; and,
- Ventura County Transportation Commission.

The survey data collection, expansion and analyses were conducted by a private organization, the Applied Management & Planning Group, under the direction of SCAG.

STUDY SAMPLE

The 1991 survey collected data from a total sample of 16,086 households using a computer-assisted telephone interviewing (CATI) system between April and June. The survey was based on a random sample of 320 households within each of 49 Regional Statistical Areas (RSA) in the 5 county region covered by SCAG. Within each county, the sample of households was stratified on 3 household characteristic variables:

- Household Size -- Total number of persons in the household (1,2,3,4,5+)
- Vehicle Ownership -- Total number of motorized vehicles owned (0,1,2+)
- Housing -- Multiple or single housing unit.

Households were contacted by telephone and recruited to participate by having each member over the age of 5 in the household complete a one-day activity diary. Activity data were collected for weekdays only.

A total of 36,037 households were contacted to participate in the survey; 30,255 (84 percent) agreed to participate; and, of these, 16,086 (53 percent) provided complete data. A complete analysis of response rates and the survey methods is presented in *1991 Southern California Origin-Destination Survey: Project Documentation*.

STUDY AREA

The five county area included in the survey contains almost half of California's population (48.8 percent according the 1990 Census). Roughly 30 percent of the State's residents live in Los Angeles County; Orange County, with 8 percent, is the State's second most populated county. The five counties surveyed rank in the top ten most populated counties in the state. Included within the study area are 177 cities, one of which, Los Angeles, is the second most populous city in the nation.

The RSAs included in the 1991 survey did not exactly correspond to those in the SCAG region, those in the SCAG transportation modeling area, or those used in previous surveys. **Table 1** presents the correspondence between the SCAG region, the SCAG modeling area and the 1991 survey study area.

Table 1
Correspondence Between 1991 Survey Study Area, SCAG Region and SCAG Modeling Area

County	Number of RSAs			Specific RSAs NOT Included	
	Total RSAs	RSAs in SCAG Modeling Area	RSAs in 1991 Survey Study Area	RSAs NOT in SCAG Modeling Area	RSAs NOT in 1991 Survey Study Area
Imperial	1	0	0	55	55
Los Angeles	21	21	20	--	11
Orange	10	10	10	--	--
Riverside	10	6	9	51,52,53,54	54
San Bernardino	7	3	5	31,32,33,34	31,34
Ventura	6	6	5	--	1
Total	55	47	49		

SURVEY METHOD NOTES

The 1991 survey was conducted using an "activity" focused travel diary instead of the traditional trip diary. In an activity diary, respondents are asked about each activity they did during the day. Travel is assessed as the process of getting from one activity to another. Therefore, the trips reported in this document were generated by pairing activities together to form a trip origin and destination.

This approach treats changes in travel mode while going from one activity to another as part of one trip. Thus, the "trip" that involves driving a car to a park-n-ride, taking a train, and walking, would emerge from an activity diary as one trip. Under a traditional trip-diary method, each change in mode is treated as a separate trip. Thus a comparison of trips between an activity diary and a trip diary will, by definition, yield slightly higher trips under the trip diary method, when comparing raw trip data.

PREVIOUS SURVEYS

There have been three previous home interview travel surveys in the Southern California area -- in 1976, 1967 and 1960. The 1976 survey used a home interview process to collect data from 7,619 households in all six counties of the SCAG region. In the 1976 report, the data from Riverside and San Bernardino counties were presented combined; accordingly, where comparisons between the 1976 and 1991 data are desired, the totals for those two counties are combined. The 1976 survey sample also included households in Imperial County, which was not included in the 1991 survey. Complete findings from the 1976 survey were presented in *1976 Urban and Rural Travel Survey: Volume IV, Summary of Findings, Travel Data*.

The 1967 survey was much larger, with a total sample of 30,800 households using home and roadside interviews. The 1967 report separated Riverside and San Bernardino counties, but, similar to the 1991 survey, did not include Imperial County. The 1967 survey is described in *LARTS Base Year Report: 1967 Origin-Destination Survey*.

Comparison of the studies performed in 1967, 1976 and 1991 is useful for the purpose of observing changes in the demographic and travel behaviors of households in the Southern California region. However, because the methods employed in each of the three studies differ considerably, comparison of the data is approached cautiously in this report. As noted earlier, the 1991 survey includes RSAs in Riverside and San Bernardino counties that are outside the SCAG modeling region, and excludes RSAs within Los Angeles and Ventura counties that had few households (refer to Table 1 for a list of the RSAs not included). The county totals that are presented in this report reflect the total RSAs in the 1991 survey area, not the entire county, with the exception of Orange County.

Additionally, there were no precise definitions of the variables (e.g. persons, whether to include all persons in the household or only those over 5 years old) reported in the 1976 and 1967 surveys. Thus the validity of comparisons of previous survey results to the 1991 survey results is uncertain because it is not clear if variables of the same name are calculated using the same types of data.

As mentioned earlier, the 1976 survey combined Riverside and San Bernardino Counties. Therefore, where these counties are referred to in this report, the numbers represent a combined number for 1976 and individual county statistics for 1991. For

further clarification of the values of variables presented, please refer to the Glossary contained at the end of this document.

SURVEY VALIDATION

To check the validity of the expansion factors, the expanded household totals were compared to the actual household counts per county as prepared by SCAG from the 1990 Census data (refer to **Appendix A** for a discussion of the expansion method and a comparison of the expanded household totals to actual household counts). This comparison indicated less than 2 percent error for all three variables of housing type, household size, and vehicle ownership.

To validate the expanded survey data against an external data source, the total population based on the expanded households was compared to the 1991 population totals developed by the California Department of Finance (DOF). The expanded population total was determined by multiplying the total number of persons in each household, regardless of age, by the expansion factors. The comparison value was derived by multiplying the 1991 DOF county population totals (Report E-6, July, 1991) by the ratio of the survey area to total county population from the 1990 Census data developed by SCAG. As may be seen from **Table 2**, expanded population totals are less than 5 percent different from the actual population in the study area in all 5 counties. The difference between the expanded and actual population is primarily an artifact of the expansion methodology which yielded a single expansion factor for all households with 5 or more persons.

Table 2
Comparison of the 1991 Origin-Destination Survey Expanded Population With the Actual Population in the Survey Area

(1990 Survey Area/1990 Total County) * 1991 DOF = 1991 Survey Area Population						
County	**1990 Census Population for Survey Area**	**1990 Census Population for Total County**	**1991 Dept. of Finance Total County Population**	**1991 Survey Area Population**	**Expanded Population**	**Percent Difference**
Los Angeles	8,852,393	8,856,074	9,003,500	8,999,758	9,386,474	+4.3
Orange	2,410,554	2,410,554	2,477,700	2,477,700	2,532,849	+2.2
Riverside	1,152,074	1,170,411	1,267,300	1,247,445	1.272,872	+2.0
San Bernardino	1,396,422	1,418,379	1,510,100	1,486,723	1,517,017	+2.0
Ventura	668,145	669,016	680,300	679,414	702,185	+3.4

II. SUMMARY FINDINGS

This chapter provides an overview of the basic findings of the study, including travel-related and demographic statistics. All data presented in this report have been expanded from the survey sample to the population of the areas surveyed. The reader is encouraged to carefully review the Glossary (Section XI) for detailed definitions of each variable.

KEY FINDINGS

In this section, we present an overview of the key findings from the 1991 Origin-Destination Survey. Each of these findings is supported by detailed data analyses presented in later sections of this report.

- In comparison to the 1976 data, households in 1991 were larger and owned more vehicles, but made fewer trips per vehicle.

- The percentage of vehicle driver home-work (H-W) and other-work (O-W) trip purposes increased in all study areas between 1976 and 1991. Other-work trips increased slightly across all county study areas, while home-shop trips decreased slightly.

- Home-work trips had the lowest average vehicle occupancy rate (1.10) and, correspondingly, the highest percentage of drive-alone trips, 93 percent. Compared to 1976, vehicle occupancy for H-W trips decreased slightly.

- The largest percentage of total trips ended at "home" (36 percent); work was the second most frequent trip destination (16 percent). The remaining 49 percent of trips ended at "other" locations.

- Self-reported home-work vehicle driver travel times increased between 1976 and 1991 in all counties studied. Ventura County respondents reported the lowest average vehicle driver travel time at 24.9 minutes, and Riverside respondents reported the longest travel time at 31.6 minutes.

- Compared to 1976, there were slightly more vehicle driver trips, and slightly fewer vehicle passenger trips.

- Trip start times indicated that the peak periods of home-work travel may have widened, with the am peak extending from 6:00 am to 9:00 am, and the pm peak starting earlier at 3:00 pm and continuing until after 6:00 pm. When non-home-work trips are included, the region appears to have a relatively flat peak that lasts throughout the day, with a slight lull in the late morning.

SUMMARY DATA

Table 3 presents the total number of households, persons, vehicles, and trips per county study area.

Table 3
1991 Summary Data By County Study Area[1]

	Los Angeles	Orange	Riverside	San Bernardino	Ventura
Households:	3,010,597	837,276	413,371	471,269	220,145
Persons (all ages):	9,386,483	2,532,849	1,272,872	1,517,017	702,189
Persons (5 or older):	8,384,875	2,305,180	1,155,628	1,378,231	640,617
Total Trips:	23,530,056	8,137,079	3,486,280	4,573,060	2,406,4
Vehicle Trips:	19,255,828	7,224,525	2,985,158	3,970,975	2,112,2
Vehicle Driver Trips:	14,684,514	5,557,245	2,258,729	2,876,986	1,589,4
Vehicles:	5,234,470	1,673,007	775,450	908,565	457,466

[1] Note that these summary data do not correspond to county boundaries as indicated in Table 1.

A summary of findings for the 1991 study area, as well as comparison data from the 1976 survey can be found in **Table 4**. The average household in the 1991 study area contained 3.1 persons, included 1.0 full-time employees, and had 1.6 licensed drivers. Comparison of the two studies suggests that the size of households, the number of vehicles per household, and the number of full-time employees per household increased between 1976 and 1991.

Table 4
Comparison of 1991 Summary Characteristics to 1976 Summary Characteristics

	1976	1991
Persons per Household[1] (All ages)	2.8	3.1
Vehicles per Household	1.6	1.8
Full Time Employees per Household	0.9	1.0
Licensed Drivers per Household	1.7	1.6
Vehicle Driver Trips per Household	5.7	5.4
Vehicle Passenger Trips per Household	2.1	1.8
Transit Trips per Household	0.2	0.2
Total Trips per Household	8.1	7.6[2]
Total Trips per Person	2.9	2.4[2]

(1) Based on persons of all ages in the household
(2) For the purposes of comparison to the 1976 figures, which do not include walk and bicycle trips, these figures are presented without walk and bicycle trips

Table 5 presents statistics by household, vehicle, and person for each county study area. The main findings are:

- Comparison of household size between 1976 and 1991 suggests that households are getting larger; the number of persons per household has increased in all county study areas except Riverside;

- Vehicle ownership has slowly increased, but the average number of vehicle trips per vehicle has decreased from 1976 to 1991;

- Taking into account the differences in study area and method, Table 5 indicates that the number of trips per household increased in all study areas between 1976 and 1991.

Table 5
Statistics per Household, Vehicle, and Person By County Study Area
Comparison to 1976 and 1967

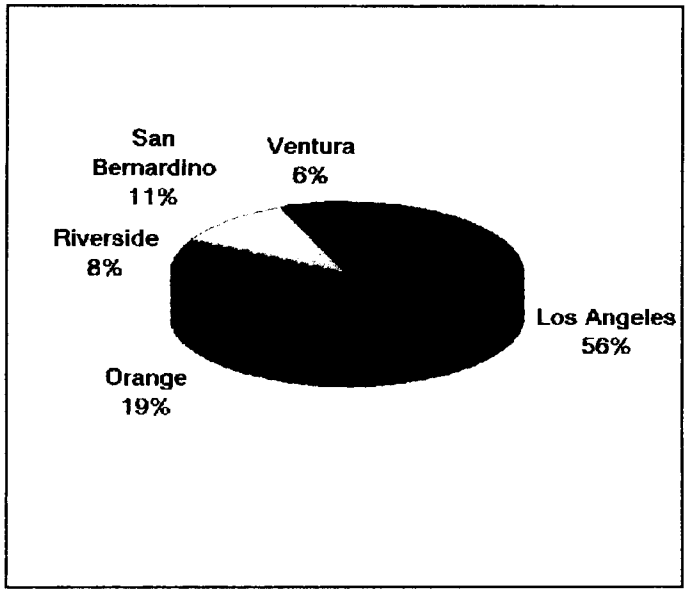
Statistic	Year	Los Angeles	Orange	Riverside	San Bernardino	Ventura
Persons/Household: (All ages in Household)	1967:	2.9	3.2	N/A	N/A	3.3
	1976:	2.8	2.8	3.1	3.1	3.0
	1991:	3.1	3.0	3.1	3.2	3.2
Vehicles/Household:	1967:	1.4	1.6	N/A	N/A	1.5
	1976:	1.6	1.8	1.7	1.7	1.8
	1991:	1.7	2.0	1.9	1.9	2.1
Vehicle Trips/Vehicle:	1967:	4.9	5.5	N/A	N/A	6.1
	1976:	4.9	4.9	4.9	4.9	5.3
	1991:	3.7	4.3	3.8	4.4	4.6
"Trips/Household"[(1)]:	1967:	6.4	8.3	N/A	N/A	8.5
	1976:	7.8	8.9	8.4	8.4	9.6
Total Trips/Household(All Trips):	1991:	7.8	9.7	8.4	9.7	10.9
Driver Trips/Household:	1967:	4.6	5.9	N/A	N/A	5.9
	1976:	5.5	6.5	5.8	5.8	6.9
	1991:	4.9	6.6	5.5	6.1	7.2
Trips/Person(All Trips): (All ages in Household)	1967:	N/A	N/A	N/A	N/A	N/A
	1976:	2.8	3.1	2.7	2.7	3.2
	1991:	2.5	3.2	2.7	3.0	3.4

[(1)]Trips per household as reported in the *1976 Urban and Rural Travel Survey: Summary of Findings.*

III. TRAVEL BEHAVIOR

This section presents detailed analyses of weekday travel behavior by the household sample characteristics: vehicle ownership; housing type; and, household size. Household trip rates by income level are also presented.

Figure 1
Percentage of Total Trips



The percentage of total trips and the percentage of vehicle trips per day is detailed in **Figure 1** and **Figure 2**. More than 50 percent of total trips in the Southern California study area occurred in Los Angeles County. The distribution of total trips across county study areas is the same as that of the distribution of vehicle driver trips, except for small differences in Los Angeles and Orange Counties.

Figure 2
Percentage of Vehicle Driver Trips

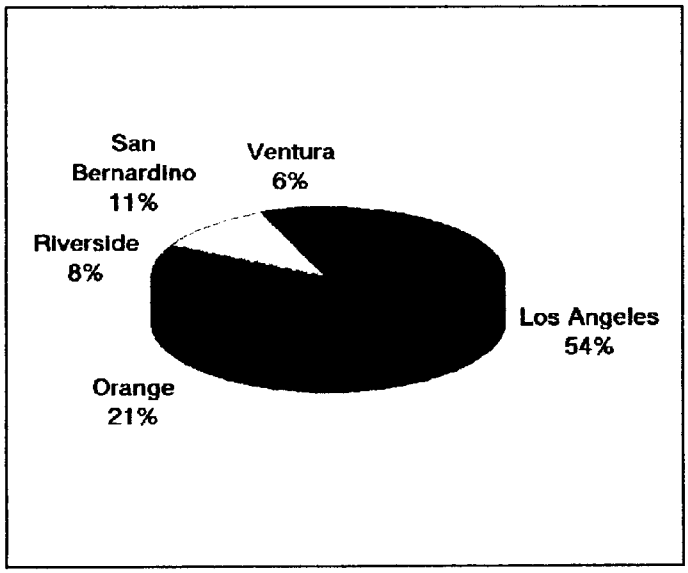


Table 6 presents the number of total trips and vehicle driver trips per household as a function of vehicle ownership for each county study area. Ventura County had the lowest trip rates for zero-vehicle-owning households and the highest trip rates for 3 or more vehicle-owning households. As expected, the total trips made per household increased as vehicle ownership increased. A small number of vehicle driver trips were made by individuals in zero-vehicle-owning households, presumably using a car not owned by the household, e.g. borrowed a vehicle or used a company car. **Figure 3** provides a graphic illustration of total trips as a function of vehicle ownership for each county study area.

Table 6
Total Trips and Vehicle Driver Trips
Per Household By Vehicle Ownership By County Study Area

Trip Type	County Study Area	Vehicle Ownership			
		Zero	One	Two	Three+
Total Trips	Los Angeles	4.63	6.10	9.08	10.56
	Orange	3.92	6.35	10.73	13.12
	Riverside	3.49	6.17	9.68	11.26
	San Bernardino	4.84	6.96	10.66	13.10
	Ventura	2.69	6.71	12.00	14.64
Vehicle Driver Trips	Los Angeles	0.75	3.64	6.03	7.47
	Orange	0.57	4.20	7.30	9.56
	Riverside	0.78	3.82	6.37	7.84
	San Bernardino	0.76	4.40	6.77	8.73
	Ventura	0.43	4.51	7.63	10.27

Figure 3
Total Trips as a Function of Vehicle Ownership By County Study Area

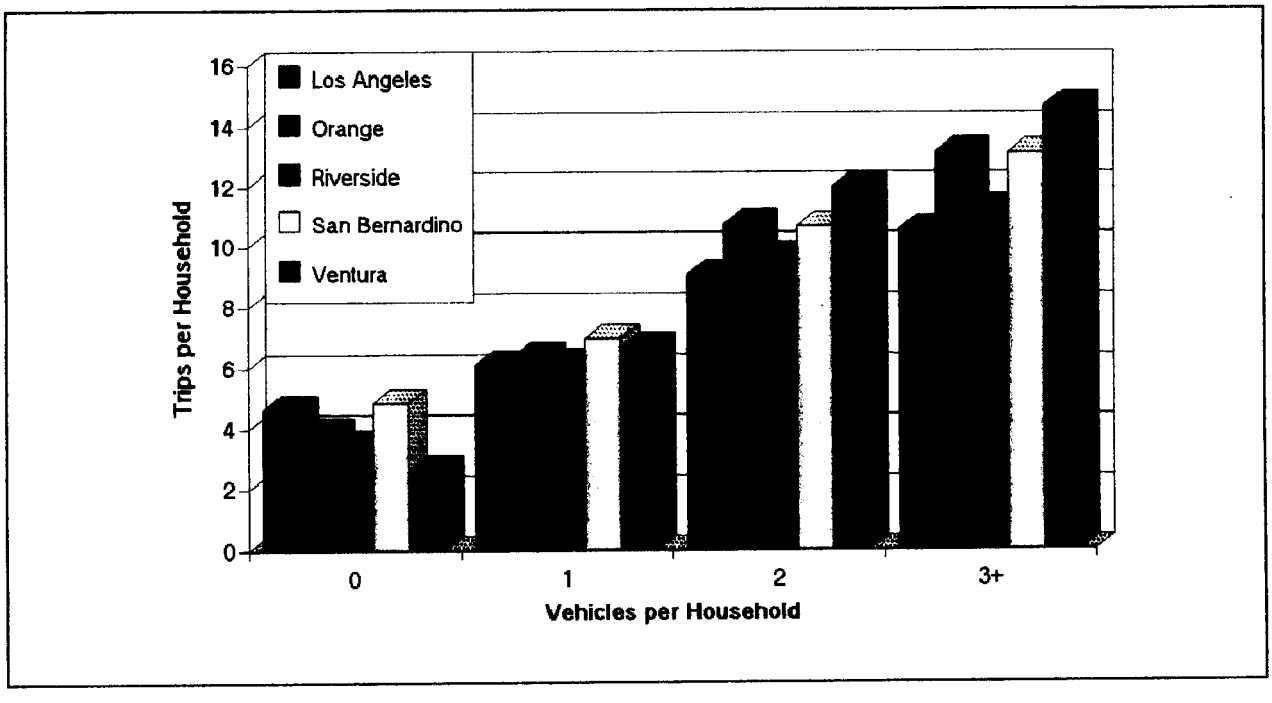


Figure 4
Total Trips By Vehicle Ownership and Housing Type

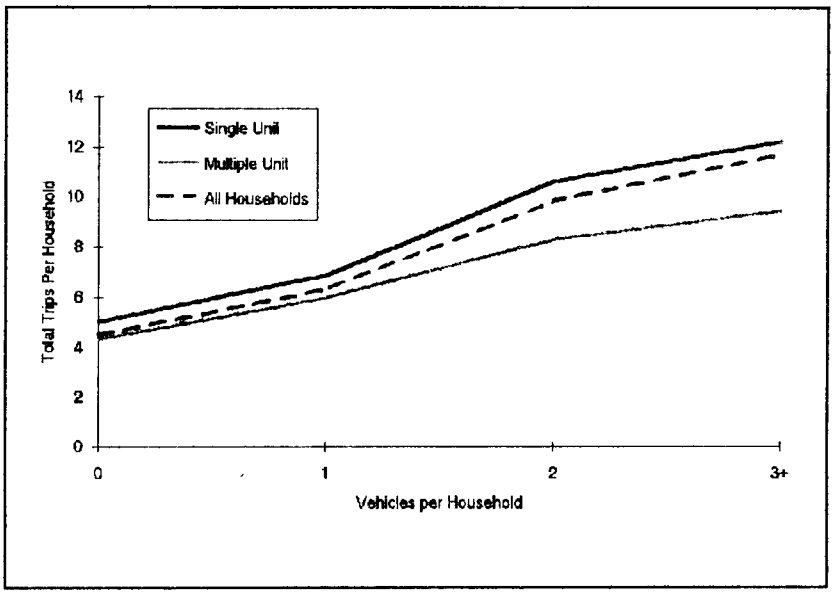


Figure 4 and **Table 7** present total trips per household as a function of housing unit type and vehicle ownership. Generally, multiple housing units had fewer trips per household than single housing units, regardless of the number of vehicles available to the household. The only exceptions were in the Orange and San Bernardino County study areas where the zero-vehicle-owning households had more trips per household in multiple housing units than in single housing units.

Table 7
Average Total Trips Per Household
By Housing Unit Type By Vehicle Ownership By County Study Area

County Study Area	Housing Unit Type	Vehicle Ownership			
		Zero	One	Two	Three+
Los Angeles	Single	5.55	6.55	9.79	10.97
	Multiple	4.35	5.88	7.95	9.08
	Total	4.63	6.10	9.08	10.56
Orange	Single	3.04	7.01	12.10	14.00
	Multiple	4.15	6.09	8.73	9.99
	Total	3.92	6.35	10.73	13.12
Riverside	Single	4.26	6.70	10.06	11.54
	Multiple	2.96	5.48	8.00	8.75
	Total	3.49	6.17	9.68	11.26
San Bernardino	Single	3.08	7.44	11.04	13.37
	Multiple	5.89	6.32	8.43	10.67
	Total	4.84	6.96	10.66	13.10
Ventura	Single	2.94	7.29	12.49	15.16
	Multiple	2.62	6.29	10.59	10.25
	Total	2.69	6.71	12.00	14.64

Table 8 provides vehicle driver trips as a function of housing unit type and vehicle ownership for each county study area. Multiple housing units had a lower vehicle driver trip rate per household than single housing units, with the exception of single-vehicle-owning households in the San Bernardino County study area.

Table 8
Average Vehicle Driver Trips Per Household
By Housing Unit Type By Vehicle Ownership By County Study Area

County Study Area	Housing Unit Type	Vehicle Ownership			
		Zero	One	Two	Three+
Los Angeles	Single	1.89	3.93	6.37	7.93
	Multiple	0.40	3.49	5.49	5.85
	Total	0.75	3.64	6.03	7.47
Orange	Single	1.19	4.38	7.92	10.15
	Multiple	0.41	4.13	6.41	7.44
	Total	0.57	4.20	7.30	9.56
Riverside	Single	1.75	3.89	6.56	8.03
	Multiple	0.11	3.73	5.49	6.15
	Total	0.78	3.82	6.37	7.84
San Bernardino	Single	0.85	4.25	6.94	8.89
	Multiple	0.71	4.59	5.75	7.29
	Total	0.76	4.40	6.77	8.73
Ventura	Single	0.66	4.69	7.70	10.68
	Multiple	0.36	4.39	7.41	6.79
	Total	0.43	4.51	7.63	10.27

Table 9 and **Figure 5** and **Figure 6** on the following pages present total trips and vehicle driver trips as a function of household size and housing unit type. As would be expected, the number of trips per household increased with the number of people living in the household. However, as can be seen from the graphics, driver trips in multiple housing units reached a peak at 3 persons per household, where the driver trips per household begin to drop. Comparatively, total trips per household for multiple housing units did not increase at the same pace as single housing units once the household size reached 3.

Table 9
Total Trips and Vehicle Driver Trips Per Household
By Household Size By Housing Unit Type By County Study Area

County Study Area	Household Size	Total Trips			Vehicle Driver Trips		
		Housing Unit Type			Housing Unit Type		
		Single	Multi	Total	Single	Multi	Total
Los Angeles	One	3.96	4.06	4.04	3.18	2.72	2.83
	Two	6.69	6.56	6.62	5.30	4.45	4.87
	Three	9.25	8.38	8.91	6.50	4.51	5.71
	Four	11.91	8.86	10.83	7.39	4.42	6.34
	Five +	12.86	10.25	12.05	7.12	3.50	6.00
Orange	One	4.18	4.25	4.24	3.54	3.45	3.47
	Two	8.15	7.27	7.67	6.53	5.54	5.99
	Three	10.97	10.20	10.68	8.00	6.74	7.53
	Four	14.75	12.28	14.11	9.62	6.93	8.92
	Five +	18.42	11.08	16.88	10.78	4.00	9.36
Riverside	One	3.35	3.89	3.64	2.78	2.90	2.84
	Two	6.48	5.88	6.30	4.93	3.96	4.63
	Three	9.86	9.14	9.72	7.24	5.69	6.96
	Four	12.63	9.38	12.33	7.69	4.96	7.44
	Five +	15.12	10.84	14.45	7.75	5.24	7.36
San Bernardino	One	3.40	4.07	3.73	2.70	3.20	2.95
	Two	7.28	7.17	7.25	5.84	5.14	5.65
	Three	10.15	9.15	9.89	7.31	5.86	6.93
	Four	13.08	10.98	12.83	7.66	5.42	7.38
	Five +	17.69	15.14	17.48	8.75	3.42	8.31
Ventura	One	4.55	4.02	4.20	3.79	3.19	3.40
	Two	8.15	7.35	7.83	6.49	5.58	6.12
	Three	11.99	11.30	11.83	8.55	6.97	8.18
	Four	17.00	16.56	16.95	10.46	8.34	10.18
	Five +	17.11	17.41	17.14	9.50	8.36	9.41

Figure 5
Total Trips Per Household By Household Size and Housing Type

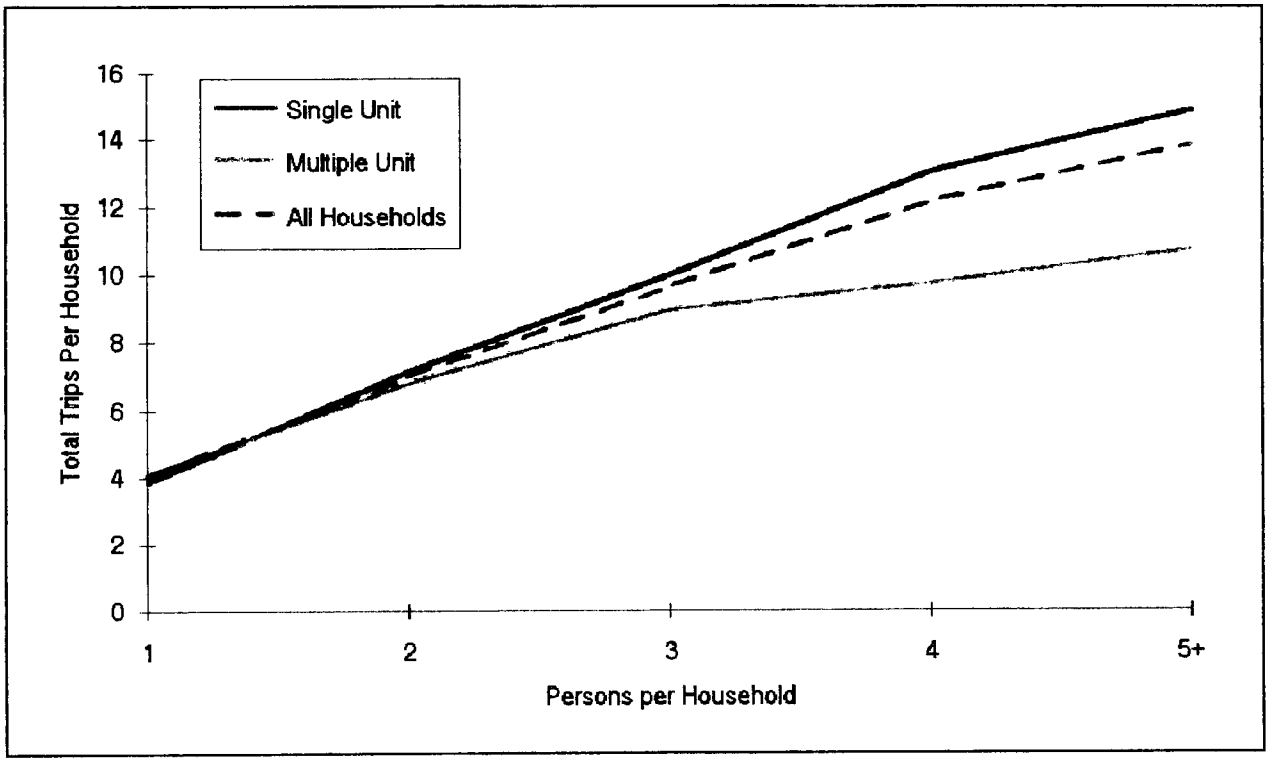


Figure 6
Vehicle Trips Per Household By Household Size and Housing Type

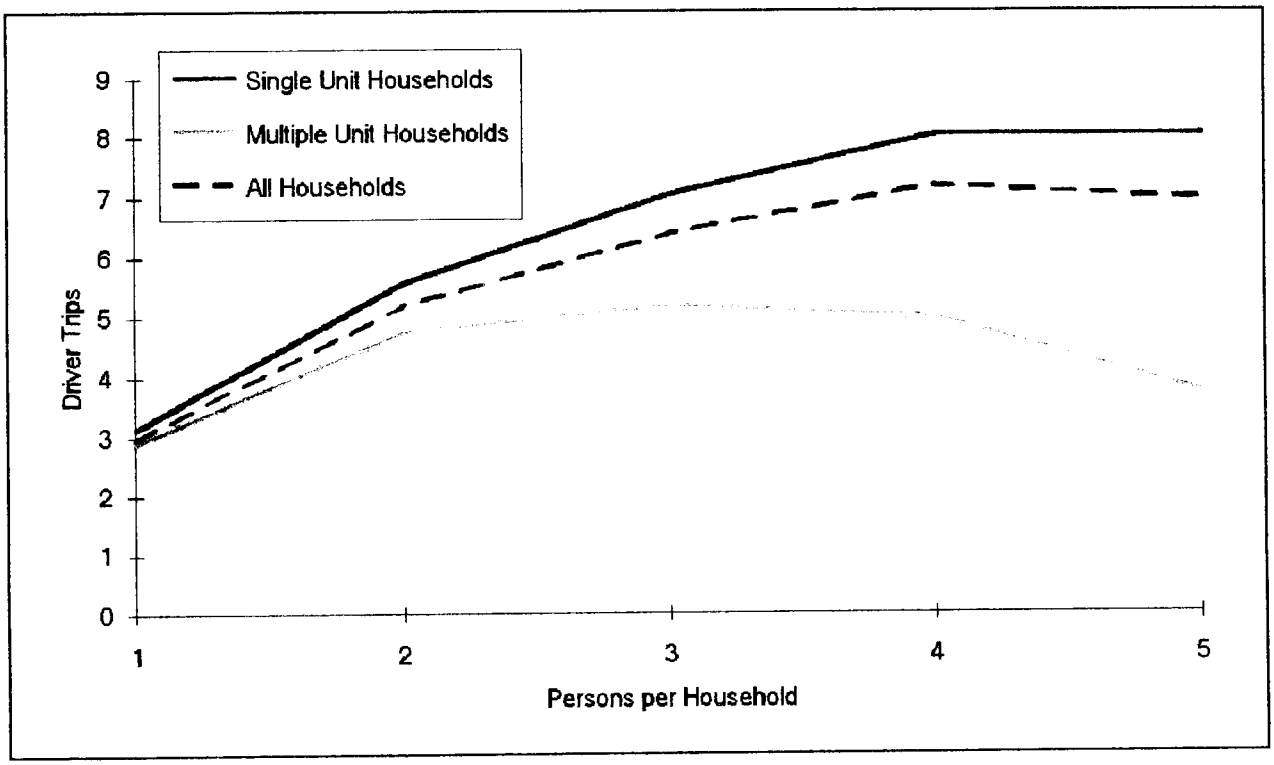


Figure 7
Total Trips Per Household
By Income and Housing Type

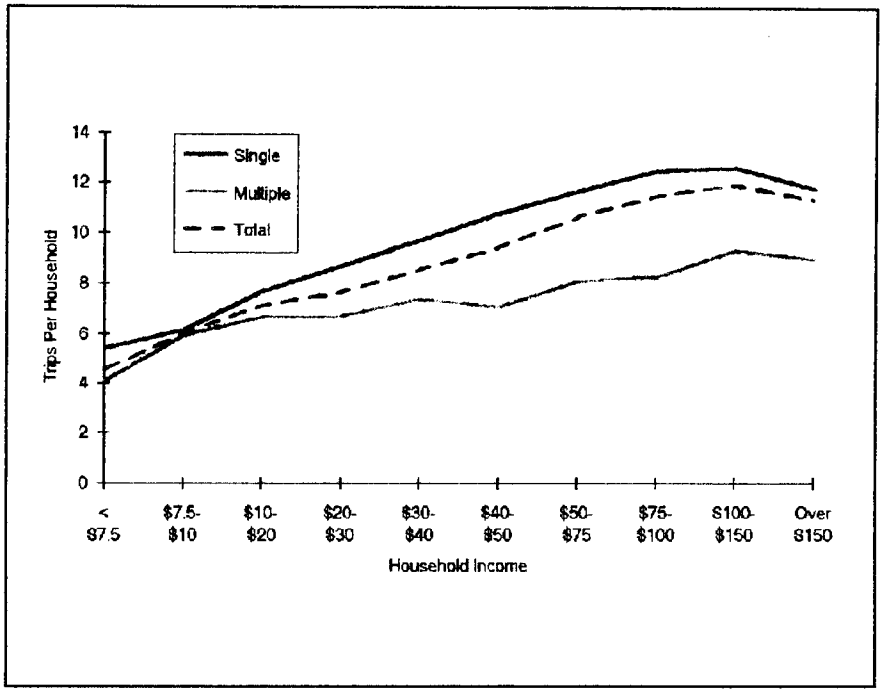


Figure 7 and **Figure 8** and **Table 10** and **Table 11** present total and vehicle driver trips as a function of household income by housing unit type. Analysis of the data indicates that the number of vehicle trips per household increased as household income increased, to a peak at approximately $100,000 household income. The slight drop in the number of trips per household for incomes over $150,000 is due to a decrease in the size of those households.

Figure 8
Vehicle Driver Trips Per Household
By Income and Housing Type

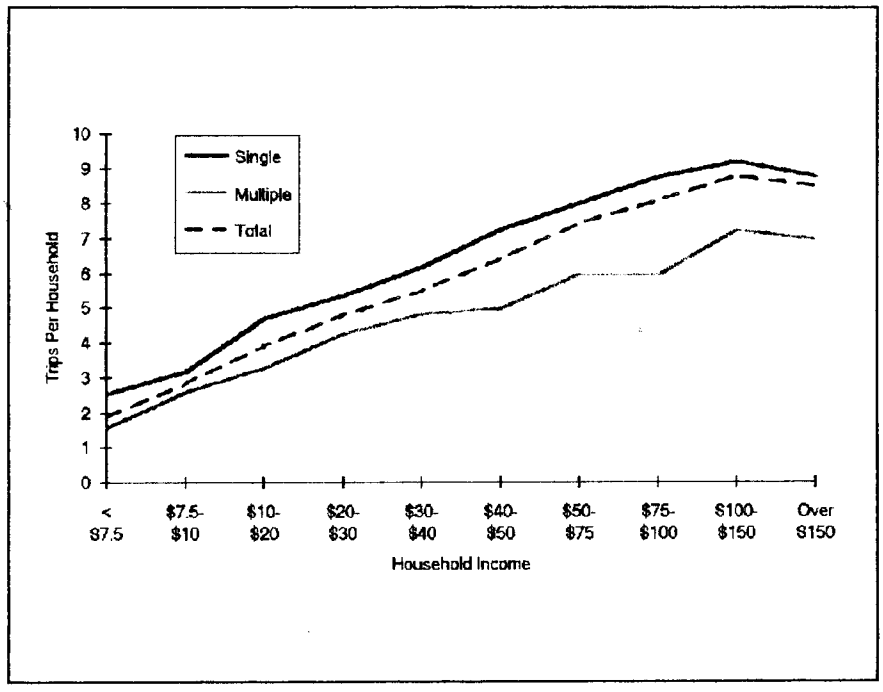


Table 10
Total Trip Rates Per Household
By Income Level and Housing Unit Type By County Study Area

County Study Area	Housing Unit Type	Income										
		Less Than $7,500	$7,501-$15,000	$15,001-$20,000	$20,001-$30,000	$30,001-$40,000	$40,001-$50,000	$50,001-$75,000	$75,001-$100,000	$100,001-$150,000	Over $150,000	Total
Los Angeles	Single	5.40	6.04	7.03	8.30	9.29	10.04	11.08	11.10	12.46	11.27	9.40
	Multiple	4.19	6.06	6.70	6.34	7.22	6.45	8.00	10.17	9.38	8.87	6.56
	All	4.56	6.06	6.83	7.20	8.09	8.49	10.04	10.17	11.70	10.85	7.97
Orange	Single	6.77	5.40	7.68	8.21	10.23	11.57	13.07	14.54	12.83	12.49	11.82
	Multiple	3.90	5.59	6.65	7.77	7.51	8.25	8.23	8.94	9.55	9.43[1]	7.44
	All	4.77	5.55	7.05	7.91	8.64	9.95	11.42	13.35	12.12	12.05	9.76
Riverside	Single	6.15	6.73	8.21	8.75	8.90	10.84	10.92	12.66	11.21	6.31	9.54
	Multiple	4.51	4.72	5.83	6.80	7.08	6.96	7.91	8.35	9.37[2]	8.53[3]	6.14
	All	5.24	5.83	7.22	8.16	8.48	10.19	10.48	12.07	11.05	6.60	8.59
San Bernardino	Single	4.59	6.76	9.59	10.28	11.04	11.88	11.64	11.98	13.26	6.51[4]	10.56
	Multiple	4.19	7.10	7.74	7.04	9.64	8.45	7.14	8.86	5.57[3]	no data	7.17
	All	4.35	6.90	8.98	9.16	10.70	11.32	11.25	11.72	12.77	6.51[4]	9.68
Ventura	Single	3.25	5.59	9.57	10.47	10.60	12.37	13.17	16.04	15.00	20.22	12.45
	Multiple	2.25	5.40	6.97	8.44	8.42	8.97	10.58	9.86	9.57	9.62[3]	7.82
	All	2.54	5.47	8.21	9.48	9.81	11.37	12.65	15.58	14.24	19.21	10.93

[1] This cell represents 64 households in the unexpanded sample.
[2] This cell represents 41 households in the unexpanded sample.
[3] These cells represent 30 or fewer households in the unexpanded sample.
[4] These cells represent 39 households in the unexpanded sample.

Table 11
Vehicle Driver Trip Rates Per Household
By Income and Housing Unit Type By County Study Area

County Study Area	Housing Unit Type	Income										
		Less Than $7,500	$7,501-$15,000	$15,001-$20,000	$20,001-$30,000	$30,001-$40,000	$40,001-$50,000	$50,001-$75,000	$75,001-$100,000	$100,001-$150,000	Over $150,000	Total
Los Angeles	Single	2.53	2.95	4.47	5.04	5.87	6.94	7.59	8.21	8.88	8.52	6.21
	Multiple	1.43	2.49	3.08	3.92	4.48	4.51	5.70	5.75	7.32	6.70	3.80
	All	1.77	2.64	3.63	4.41	5.07	5.89	6.95	7.45	8.49	8.20	4.99
Orange	Single	3.03	3.69	4.84	5.65	7.25	7.58	9.12	9.68	9.54	8.98	8.10
	Multiple	1.90	2.98	3.77	5.00	5.36	6.06	6.39	6.83	7.40	7.98[1]	5.13
	All	2.24	3.14	4.18	5.21	6.15	6.84	8.18	9.08	9.08	8.84	6.70
Riverside	Single	2.85	3.75	4.65	5.44	5.69	7.37	7.31	8.25	9.37	5.90	6.15
	Multiple	2.29	2.62	3.22	4.57	5.28	4.68	6.06	4.02	6.80[2]	6.93[3]	3.90
	All	2.54	3.24	4.05	5.18	5.60	6.92	7.13	7.68	9.14	6.03	5.53
San Bernardino	Single	2.59	3.28	5.39	6.02	6.57	7.62	8.08	8.18	9.79	5.67[4]	6.64
	Multiple	2.44	3.11	4.26	5.37	6.19	5.33	5.54	6.06	4.99[3]	no data	4.48
	All	2.50	3.21	5.02	5.80	6.48	7.24	7.86	8.00	9.49	5.67[4]	6.08
Ventura	Single	1.10	3.77	5.92	6.90	6.27	7.90	8.72	10.94	10.70	14.26	8.17
	Multiple	1.12	3.18	4.30	5.24	6.22	6.10	8.15	6.98	5.98	5.20[3]	5.27
	All	1.11	3.40	5.07	6.09	6.25	7.38	8.61	10.64	10.04	13.39	7.22

[1] This cell represents 64 households in the unexpanded sample.
[2] This cell represents 41 households in the unexpanded sample.
[3] These cells represent 30 or fewer households in the unexpanded sample.
[4] These cells represent 39 households in the unexpanded sample.

IV. TRIP PURPOSE

Trip purpose is defined as a combination of origin and destination pairs as follows (refer to the Glossary for a definition of these purposes):

- Home-other (H-O)
- Home-work (H-W)
- Other-other (O-O)
- Other-work (O-W)
- Home-shop (H-S).

This section presents analyses of total and vehicle driver trips by trip purpose.

Figure 9 presents the percentage of each trip purpose for each of the county study areas. Percentages from county to county for home-other trips varied from 41 to 46 percent; home-work trips varied from 16 to 22 percent; other-other trips varied from 15 to 19 percent; other-work trips varied from 11 to 15 percent; and, home-shop trips varied from 8 to 9 percent. **Table 12** on the following page presents the actual distribution of trip purpose for each of the five county study areas. **Table 13** presents the total number of trips for each trip purpose by county study area.

Figure 9
Percent of Total Trips By Trip Purpose By County Study Area

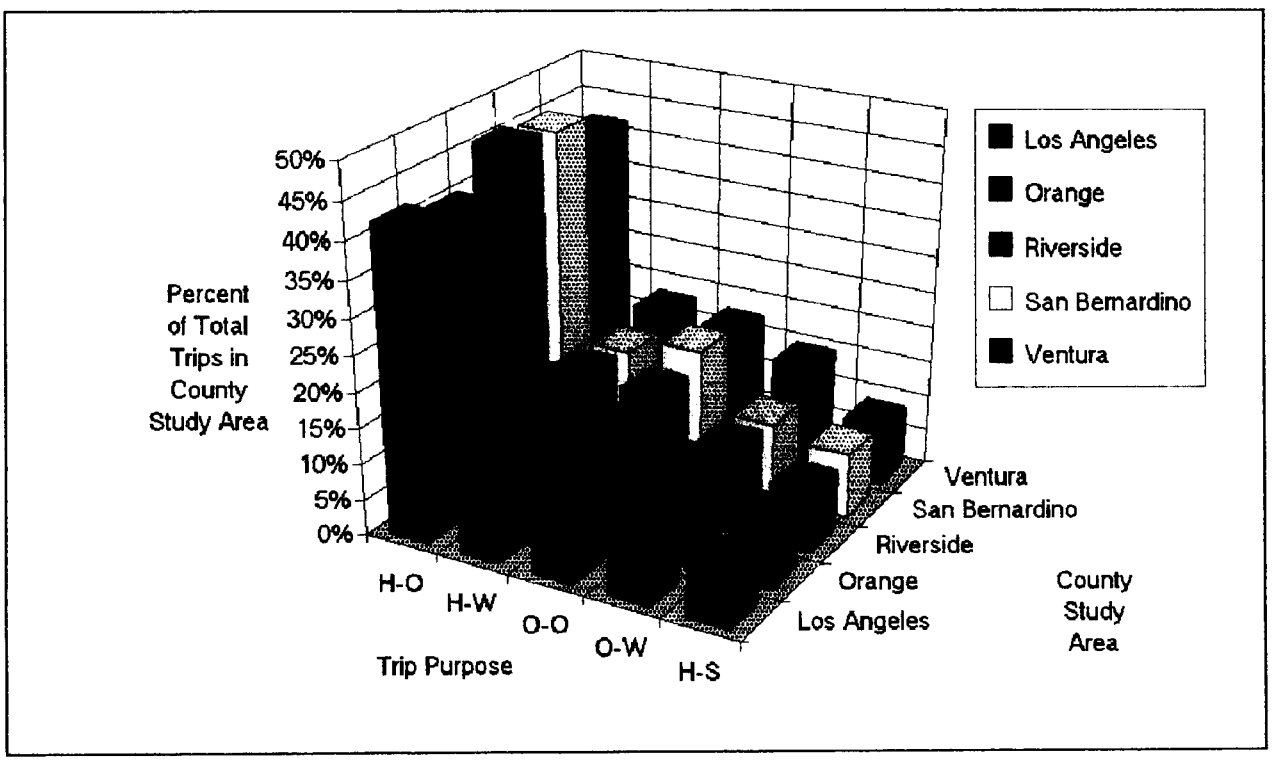


Table 12
Distribution of Total Trips By Trip Purpose By County Study Area

County Study Area	Home-Other	Percent	Home-Work	Percent	Other-Other	Percent	Other-Work	Percent	Home-Shop	Percent	Total	Percent
Los Angeles	9,963,295	42%	5,092,317	22%	3,537,338	15%	2,986,535	13%	1,950,570	8%	23,530,055	100%
Orange	3,303,351	41%	1,622,697	20%	1,342,410	16%	1,110,872	14%	757,750	9%	8,137,080	100%
Riverside	1,601,608	46%	600,122	17%	585,341	17%	400,306	11%	298,903	9%	3,486,280	100%
San Bernardino	2,060,886	45%	748,232	16%	858,658	19%	488,419	11%	416,865	9%	4,573,060	100%
Ventura	1,001,036	42%	431,643	18%	418,900	17%	351,490	15%	203,417	8%	2,406,486	100%
Total	17,930,176	43%	8,495,011	20%	6,742,647	16%	5,337,622	13%	3,627,505	9%	42,132,961	100%

Table 13
Vehicle Driver Trips By Trip Purpose By County Study Area

County Study Area	Home-Other	Percent	Home-Work	Percent	Other-Other	Percent	Other-Work	Percent	Home-Shop	Percent	Total	Percent
Los Angeles	5,062,969	34%	3,900,571	27%	2,212,259	15%	2,261,992	15%	1,246,723	8%	14,684,514	100%
Orange	1,869,689	34%	1,361,170	24%	900,737	16%	907,859	16%	517,790	9%	5,557,245	100%
Riverside	814,444	36%	511,604	23%	385,226	17%	339,630	15%	207,825	9%	2,258,729	100%
San Bernardino	1,020,916	35%	628,233	22%	544,113	19%	393,005	14%	290,718	10%	2,876,985	100%
Ventura	527,635	33%	361,955	23%	266,774	17%	293,037	18%	140,008	9%	1,589,409	100%
Total	9,295,653	34%	6,763,533	25%	4,309,109	16%	4,195,523	16%	2,403,064	9%	26,966,882	100%

Figure 10
Distribution of Trip Purposes for Total Trips
Comparison Between 1976 and 1991

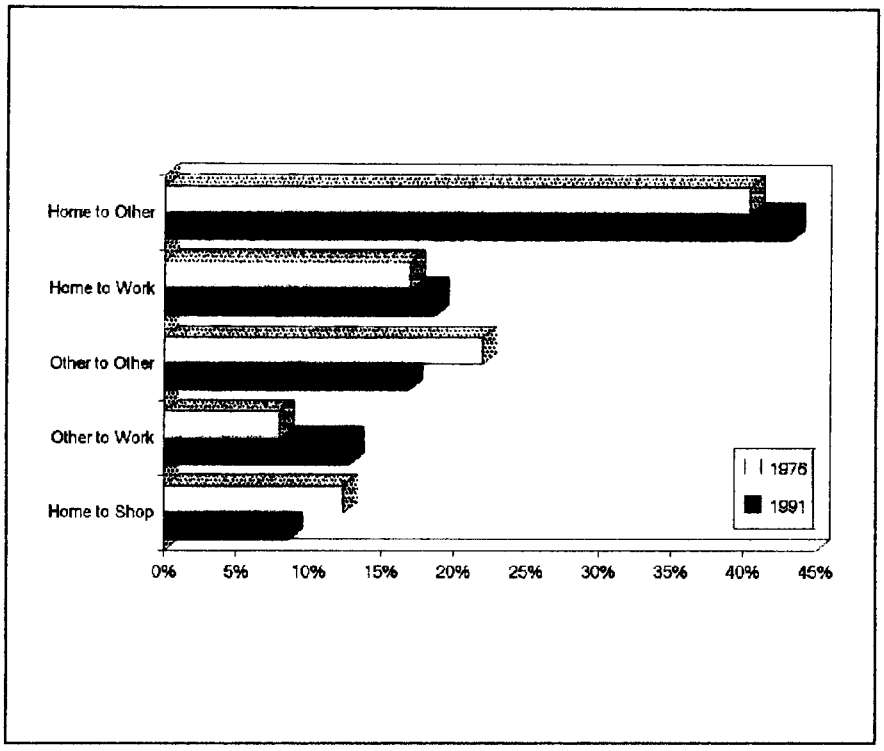


Figure 11
Distribution of Trip Purposes for Vehicle Driver Trips
Comparison Between 1976 and 1991

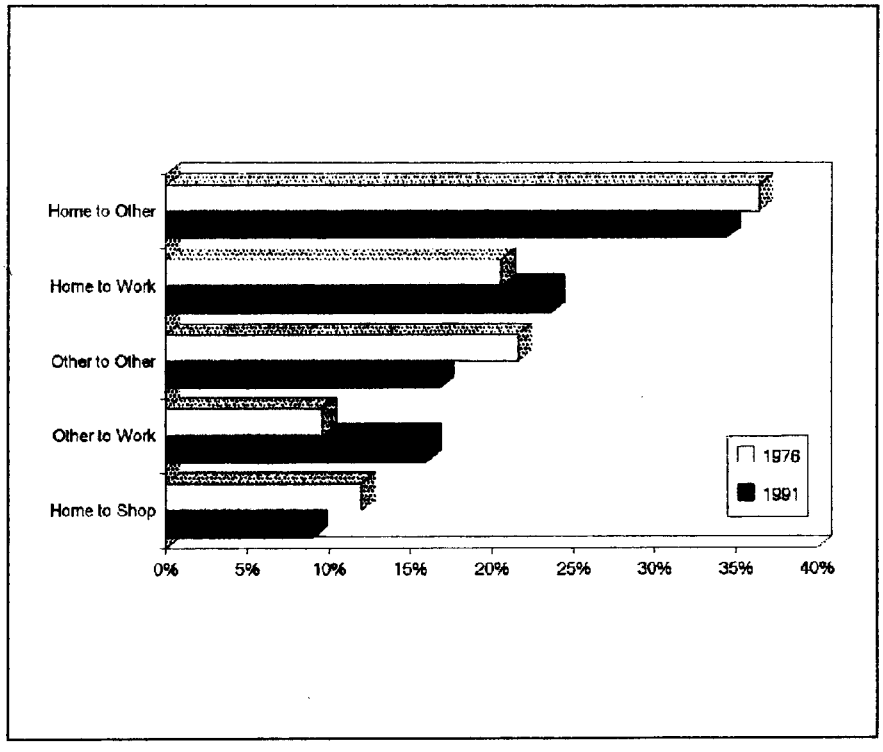


Figure 10 and **Figure 11** present a comparison of the distribution of trip purposes for total trips and for vehicle driver trips for 1976 and 1991. For total trips, the percentage of home-shop and other-other trips decreased, while the percentage of home-other, home-work, and other-work trips increased from 1976 to 1991. The same changes took place for vehicle driver trips, with the exception that home-other trips decreased slightly. The most significant change in total trips and vehicle driver trips was an increase in other-work trips.

Table 14 contains a comparison of the distribution of trip purpose for 1976 and 1991 by county study area. The data indicate that the shifts in the distribution of trip purpose seen in Figure 9 and Figure 11 are consistent across all county study areas. Among the most significant changes was a 5 percent increase in home-work trips in the Los Angeles County study area.

Table 14
Trip Purpose Trends By County Study Area

	County Study Area	Trip Purpose									
		Home-Other		Home-Work		Other-Other		Other-Work		Home-Shop	
		1976	1991	1976	1991	1976	1991	1976	1991	1976	1991
Total Trips	Los Angeles	41%	42%	17%	22%	22%	15%	8%	13%	12%	8%
	Orange	38%	41%	20%	20%	21%	16%	9%	14%	13%	9%
	Riverside	41%	46%	16%	17%	22%	17%	7%	11%	13%	9%
	San Bernardino	41%	45%	16%	16%	22%	19%	7%	11%	13%	9%
	Ventura	41%	42%	16%	18%	23%	17%	9%	15%	12%	8%
	Total	40%	43%	18%	20%	22%	16%	8%	13%	12%	9%
Vehicle Driver Trips	Los Angeles	37%	34%	21%	27%	21%	15%	10%	15%	12%	8%
	Orange	34%	34%	23%	24%	20%	16%	10%	16%	12%	9%
	Riverside	37%	36%	20%	23%	22%	17%	9%	15%	13%	9%
	San Bernardino	37%	35%	20%	22%	22%	19%	9%	14%	13%	10%
	Ventura	37%	33%	19%	23%	23%	17%	10%	18%	11%	9%
	Total	37%	34%	21%	25%	21%	16%	10%	16%	12%	9%

Figure 12 and **Table 15** present vehicle driver trips per household by trip purpose by vehicle ownership. The most significant differences in vehicle driver travel occurred for home-other trips between zero-vehicle-owning and one-vehicle-owning households (1.06 more trips), and between one-vehicle-owning and two-vehicle-owning households (0.89 more trips). Additionally, 0.81 more home-work trips were made by two- as compared to one-vehicle-owning households. **Table 16** provides total trips per household for each trip purpose by vehicle ownership for each county study area.

Figure 12
Vehicle Driver Trips Per Household By Trip Purpose By Vehicle Ownership

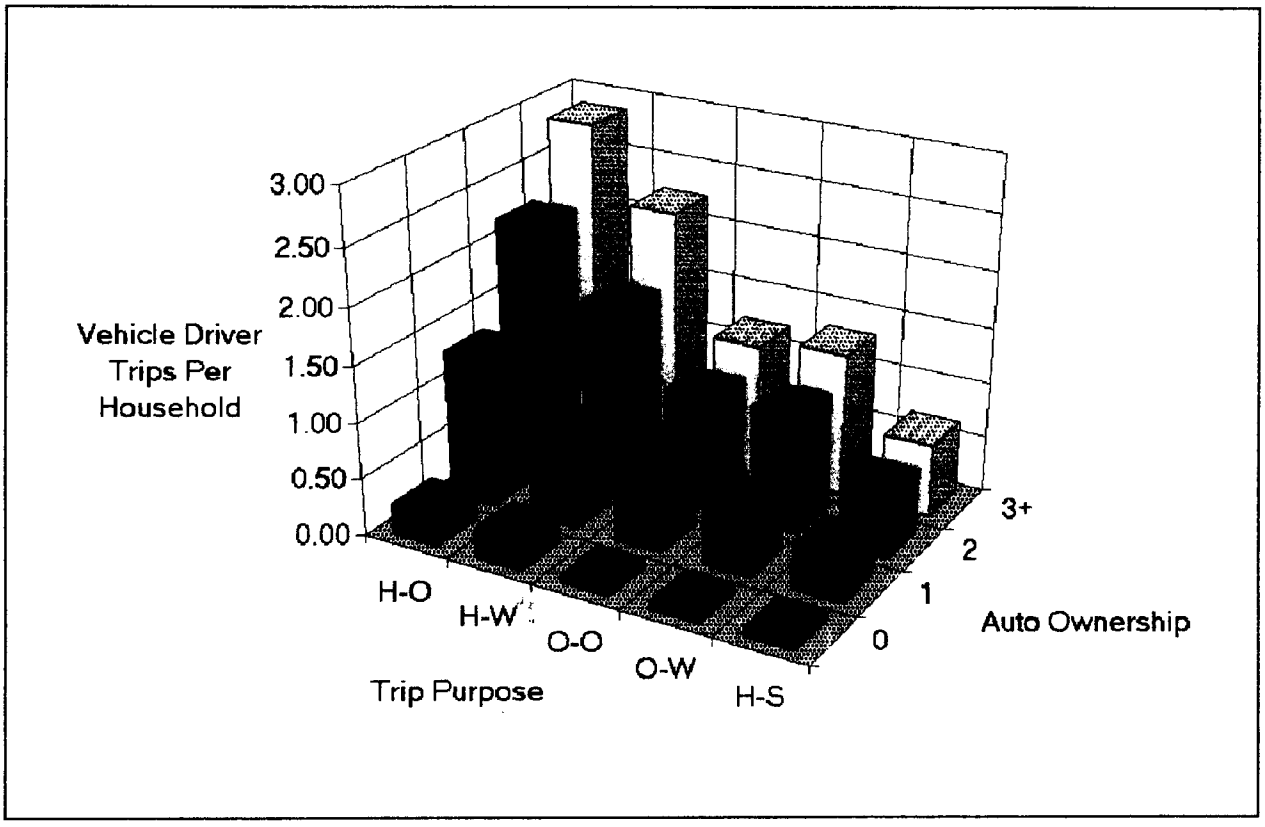


Table 15
Vehicle Driver Trips Per Household By Trip Purpose By Vehicle Ownership

Vehicle Ownership	Trip Purpose				
	Home-Other	Home-Work	Other-Other	Other-Work	Home-Shop
Zero	0.26	0.26	0.07	0.07	0.07
One	1.32	0.82	0.73	0.56	0.40
Two	2.21	1.63	1.01	1.05	0.57
Three +	2.86	2.22	1.19	1.28	0.65

Table 16
Total Trips Per Household By Trip Purpose
By Housing Type By Vehicle Ownership By County Study Area

County Study Area	Housing Unit	Vehicle Ownership	Trip Purpose				
			H-O	H-W	O-O	O-W	H-S
Los Angeles	Single	Zero	2.72	1.30	0.68	0.33	0.52
		One	3.00	1.20	1.00	0.72	0.63
		Two	4.42	1.83	1.56	1.20	0.78
		Three +	4.53	2.63	1.52	1.49	0.80
	Multiple	Zero	1.86	0.98	0.58	0.26	0.67
		One	2.46	1.22	0.97	0.78	0.45
		Two	2.84	1.99	1.20	1.25	0.67
		Three +	3.85	2.36	1.10	1.20	0.57
Orange	Single	Zero	1.10	1.36	0.36	0.03	0.18
		One	2.88	1.00	1.40	0.91	0.82
		Two	5.49	1.90	2.03	1.67	1.01
		Three +	5.65	3.09	2.20	1.80	1.25
	Multiple	Zero	1.56	1.01	0.55	0.19	0.84
		One	2.19	1.24	1.16	0.85	0.66
		Two	3.27	2.04	1.31	1.36	0.75
		Three +	3.55	2.59	1.41	1.49	0.95
Riverside	Single	Zero	2.35	0.47	0.81	0.03	0.60
		One	3.36	0.84	1.19	0.61	0.69
		Two	4.56	1.77	1.68	1.26	0.79
		Three +	5.31	2.30	1.64	1.45	0.84
	Multiple	Zero	1.54	0.29	0.54	0.11	0.49
		One	2.38	0.77	1.23	0.55	0.56
		Two	3.24	1.64	1.41	1.00	0.71
		Three +	3.96	1.92	1.21	0.94	0.72
San Bernardino	Single	Zero	1.47	0.38	0.63	0.02	0.58
		One	3.24	1.05	1.70	0.57	0.87
		Two	4.95	1.82	2.00	1.23	1.03
		Three +	6.19	2.30	2.39	1.52	0.98
	Multiple	Zero	3.39	0.33	1.19	0.26	0.73
		One	2.66	0.95	1.26	0.82	0.64
		Two	3.71	1.74	1.35	1.02	0.61
		Three +	4.43	2.56	1.77	1.14	0.77
Ventura	Single	Zero	1.03	0.39	0.85	0.06	0.62
		One	2.79	1.21	1.41	0.93	0.93
		Two	5.66	2.04	2.15	1.62	1.03
		Three +	6.16	2.83	2.66	2.42	1.08
	Multiple	Zero	0.99	0.35	0.40	0.28	0.59
		One	2.39	1.16	1.17	0.95	0.61
		Two	4.23	2.27	1.68	1.65	0.75
		Three +	3.29	2.05	1.48	2.20	1.23

V. TRIP DESTINATION PURPOSE

This section includes analyses of trips by the following trip destination purposes: work; work-related; school; pick up/drop off; shopping; recreation; social activities; eat out; banking/personal business; and home. There were two other trip destination purposes that are not reported here: working at home and out of town.

Figure 13
Total Trip Destination Purposes

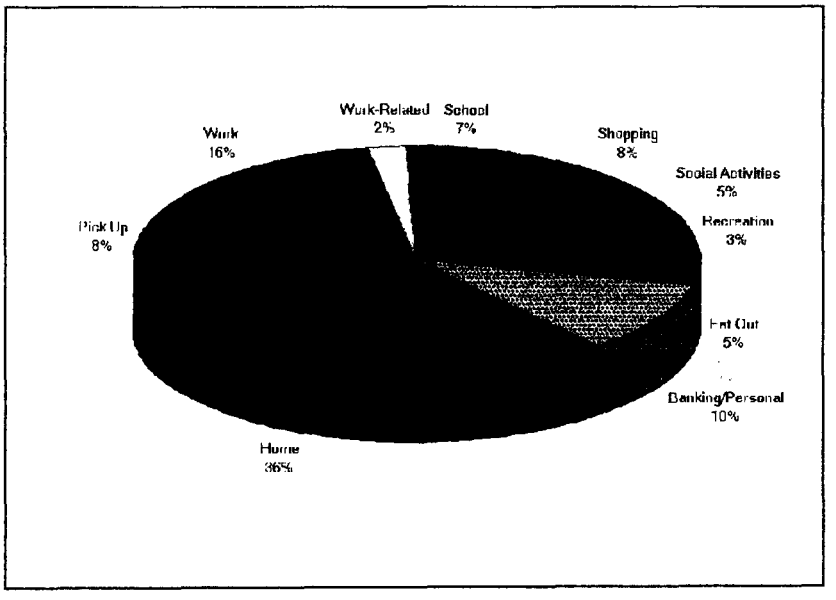
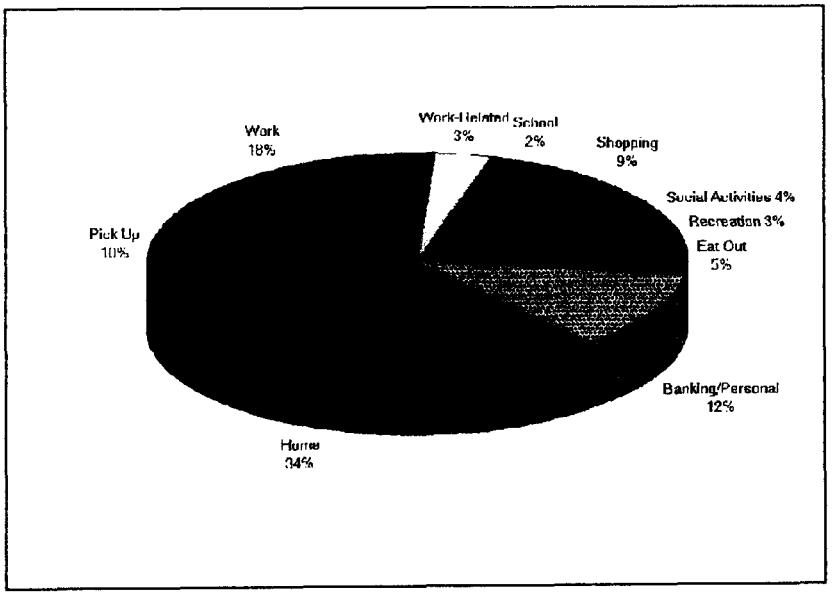


Figure 14
Vehicle Driver Trip Destination Purposes



The distribution of trip destination purposes for total trips and for vehicle driver trips is reported in **Figure 13** and **Figure 14**. The distributions are virtually identical with a few exceptions. The overall percentage of school trips is lower for vehicle driver trips (2 percent versus 7 percent for total trips), which would be expected because alternative modes of transportation such as transit, bicycles, and walking are accessible to children. The percentage of work and work-related trips, shopping, banking/personal business, and pick-up or drop-off trips was slightly higher for vehicle driver trips.

Table 17 presents the number of total trips and vehicle driver trips for each trip destination purpose by county study area.

Table 17
Total Trips and Vehicle Driver Trips By Trip Destination Purpose By County Study Area

	County Study Area	Trip Purpose										
		Home	Pick Up/Drop Off	Work	Work-Related	School	Shopping	Social	Recreation	Eat Out	Banking/ Personal Business	Total
Total Trips	Los Angeles	8,342,666	1,969,864	3,727,741	504,187	1,698,968	1,871,051	1,120,001	774,964	1,189,102	2,232,667	23,431,211
		36%	8%	16%	2%	7%	8%	5%	3%	5%	10%	100%
	Orange	2,800,578	624,982	1,215,485	240,672	473,278	730,432	397,553	302,612	461,832	860,615	8,108,039
		35%	8%	15%	3%	6%	9%	5%	4%	6%	11%	100%
	Riverside	1,236,535	287,150	447,434	80,378	241,315	302,993	197,312	105,801	184,867	390,562	3,474,347
		36%	8%	13%	2%	7%	9%	6%	3%	5%	11%	100%
	San Bernardino	1,591,780	365,133	568,985	74,886	343,355	423,823	253,456	153,560	244,380	539,331	4,558,689
		35%	8%	12%	2%	8%	9%	6%	3%	5%	12%	100%
	Ventura	795,420	195,566	342,473	82,193	160,118	209,069	112,590	92,767	122,409	277,833	2,390,438
		33%	8%	14%	3%	7%	9%	5%	4%	5%	12%	100%
	Total	14,967,576	3,447,359	6,305,897	982,575	2,917,034	3,537,625	2,080,911	1,429,703	2,203,146	4,301,562	42,173,388
Vehicle Driver Trips	Los Angeles	4,989,189	1,541,635	2,820,148	422,588	363,314	1,243,876	600,590	386,034	658,440	1,584,218	14,610,032
		34%	11%	19%	3%	2%	9%	4%	3%	5%	11%	100%
	Orange	1,844,148	521,825	1,003,658	217,957	101,881	524,220	232,947	164,397	278,318	643,870	5,533,221
		33%	9%	18%	4%	2%	9%	4%	3%	5%	12%	100%
	Riverside	756,785	229,679	379,869	72,597	33,953	217,712	108,831	50,204	112,336	287,490	2,249,456
		34%	10%	17%	3%	2%	10%	5%	2%	5%	13%	100%
	San Bernardino	957,626	297,759	466,136	63,234	62,208	305,397	121,949	71,566	144,196	375,606	2,865,677
		33%	10%	16%	2%	2%	11%	4%	2%	5%	13%	100%
	Ventura	495,304	159,587	282,688	73,606	34,989	147,229	57,367	45,717	76,716	201,792	1,574,995
		31%	10%	18%	5%	2%	9%	4%	3%	5%	13%	100%
	Total	9,066,555	2,729,795	4,929,406	814,591	592,423	2,417,480	1,114,669	710,028	1,254,903	3,051,016	26,680,866

VI. MODE CHOICE

Mode choice in this section is defined as the dominant travel mode among the following options:

- Car, van, light truck;
- Public transit, including local, express and Blue Line service;
- Walk;
- Bicycle;
- School bus;
- Motorcycle or moped;
- Taxi/Shuttle bus; and,
- Amtrak.

Mode analyses are also presented according to the following trip type categories (refer to the Glossary for specific definitions):

- Vehicle Driver (car, van, light truck only);
- Vehicle Passenger (car, van, light truck only);
- Transit Passenger (local, express and Blue Line service); and,
- Other (all remaining travel modes).

Figure 15
Comparison of Trip Types - 1976 and 1991

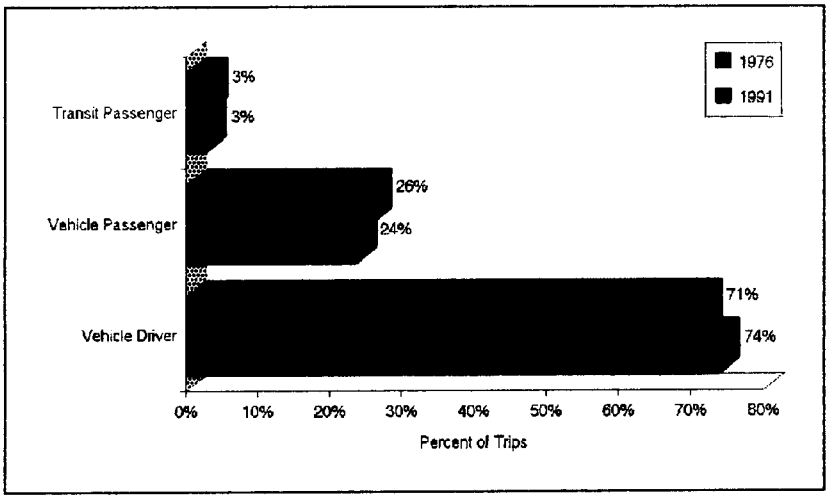


Figure 15 presents a comparison of trip types for 1976 and 1991. From 1976 to 1991, vehicle driver trips increased, vehicle passenger trips decreased, and transit passenger trips remained the same. Note that for comparison purposes, the trip type "other" was excluded from this figure.

Table 18 presents the total trips made by trip type and travel mode within each county study area. Los Angeles County had the highest percentage of public transit trips (4 percent) and San Bernardino had the lowest percentage of drive alone trips (67 percent) among the five county study areas.

Table 18
Total Number of Trips By Trip Type and Travel Mode By County Study Area

Trip Types		County									
		Los Angeles		Orange		Riverside		San Bernardino		Ventura	
		Total	%	Total	%	Total	%	Total	%	Total	%
Vehicle Driver Trips	Drive Alone	10,629,229	72%	4,002,722	72%	1,568,788	69%	1,919,117	67%	1,133,594	71%
	With 1 Passenger	2,473,602	17%	1,018,770	18%	412,362	18%	569,877	20%	270,971	17%
	With 2 or more Passengers	1,581,683	11%	535,753	10%	277,579	12%	387,992	13%	184,845	12%
	Total	14,684,514	63%	5,557,245	68%	2,258,729	65%	2,876,986	63%	1,589,410	66%
Vehicle Passenger Trips[1]		4,571,314	19%	1,667,280	20%	726,429	21%	1,093,989	24%	522,867	22%
Public Transit Trips		824,370	4%	86,379	1%	21,863	1%	33,687	1%	9,130	0%
Other Trips	Walk	2,694,166	80%	562,380	68%	251,621	53%	329,657	58%	187,089	66%
	Bicycle	225,109	7%	121,127	15%	41,130	9%	34,793	6%	46,531	16%
	School Bus	240,333	7%	85,251	10%	143,248	30%	165,250	29%	34,664	12%
	Motorcycle	112,411	3%	34,390	4%	9,773	2%	22,015	4%	3,642	1%
	Taxi/Shuttle	29,874	1%	3,139	0%	1,755	0%	4,444	1%	3,346	1%
	Amtrak	489	0%	1,327	0%	0	0%	0	0%	0	0%
	Other	75,193	2%	18235	2%	28,348	6%	11,742	2%	9,808	3%
	Total	3,377,575	14%	825,849	10%	475,875	14%	567,901	12%	285,080	12%

[1] Because of the manner in which the data was collected, Vehicle Passenger Trips are presented separately and are not inclusive of Vehicle Driver Trips with one or two or passengers. Passenger information for Vehicle Driver Trips was collected from the driver of a vehicle. If a respondent was a passenger in a vehicle, no other information, such as the occupancy of the vehicle, was collected.

Figure 16
Home-work Trip Travel Modes
By County Study Area

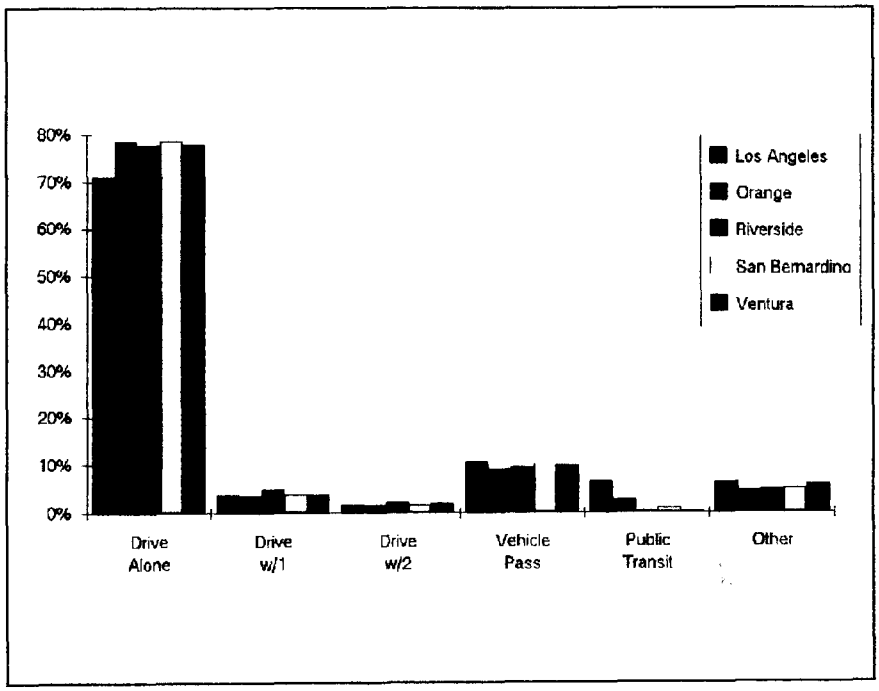
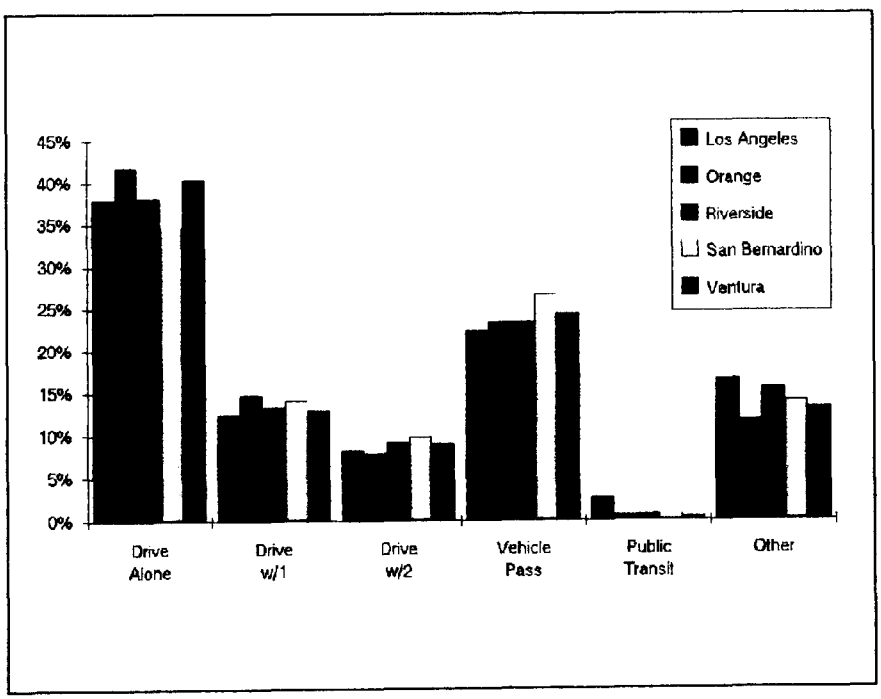


Figure 17
Non-Home-work Trip Travel Modes
By County Study Area



The distribution of travel modes for home-work and non-home-work trips by county study area are presented in **Figure 16** and **Figure 17**. Non-home-work trips include all trip purposes except home-work. Drive alone trips accounted for an average of 74 percent of all home-work trips and 39 percent of all non-home-work trips. Vehicle trips with a driver and at least one passenger accounted for an average of 16 percent of home-work trips and 45 percent of non-home-work trips. The Los Angeles County study area had the lowest percentage of drive alone home-work trips of all the county study areas (71 percent compared to 79 percent in the Orange and San Bernardino County study areas).

The Los Angeles County study area had the highest percentage of public transit trips for all trip types (7 percent). In contrast, the Riverside and Ventura County study areas had no public transit home-work trips. Home-work trips and non-home-work trips by trip type and travel mode for the five county study areas are presented in **Table 19** and **Table 20**.

Table 19
Home-work Trips By Trip Type and Travel Mode By County Study Area

Trip Types and Travel Modes		County									
		Los Angeles		Orange		Riverside		San Bernardino		Ventura	
		Total	%	Total	%	Total	%	Total	%	Total	%
Vehicle Driver Trips	Drive Alone	3,623,509	93%	1,277,989	94%	467,321	91%	587,766	94%	336,652	93%
	With 1 Passenger	198,923	5%	57,092	4%	29,979	6%	28,496	5%	16,728	5%
	With 2 or more Passengers	78,139	2%	26,089	2%	14,304	3%	11,972	2%	8,576	2%
	Total	3,900,571	77%	1,361,170	84%	511,604	85%	628,234	84%	361,956	84%
Vehicle Passenger Trips[1]		538,291	11%	144,682	9%	56,849	9%	76,578	10%	42,830	10%
Public Transit Trips		331,616	7%	43,553	3%	2,518	0%	6,284	1%	1,612	0%
Other Trips	Walk	212,787	66%	34,856	48%	16,004	55%	18,353	49%	15,541	62%
	Bicycle	51,199	16%	18,014	25%	4,224	15%	7,335	20%	5,949	24%
	School Bus	5,013	2%	3,061	4%	669	2%	560	2%	187	1%
	Motorcycle	35,831	11%	10,853	15%	3,434	12%	6,534	18%	1,637	6%
	Taxi/Shuttle	355	0%	262	0%	0	0%	1,720	5%	250	1%
	Amtrak	0	0%	1,090	1%	0	0%	0	0%	0	0%
	Other	16,655	5%	5,155	7%	4,515	16%	2,634	7%	1,683	7%
	Total	321,840	6%	73,291	5%	28,846	5%	37,136	5%	25,247	6%

[1] Because of the manner in which the data was collected, Vehicle Passenger Trips are presented separately and are not inclusive of Vehicle Driver Trips with one or two or passengers. Passenger information for Vehicle Driver Trips was collected from the driver of a vehicle. If a respondent was a passenger in a vehicle, no other information, such as the occupancy of the vehicle, was collected.

Table 20
Non-Home-work Trips By Trip Type and Travel Mode By County Study Area

Trip Types and Travel Modes		County									
		Los Angeles		Orange		Riverside		San Bernardino		Ventura	
		Total	%	Total	%	Total	%	Total	%	Total	%
Vehicle Driver Trips	Drive Alone	7,005,721	65%	2,724,733	65%	1,101,467	63%	1,331,351	59%	796,942	65%
	With 1 Passenger	2,274,679	21%	961,678	23%	382,383	22%	541,381	24%	254,243	21%
	With 2 or more Passengers	1,503,544	14%	509,664	12%	263,276	15%	376,020	17%	176,269	14%
	Total	10,783,944	59%	4,196,075	64%	1,747,126	61%	2,248,752	59%	1,227,454	62%
Vehicle Passenger Trips[1]		4,033,023	22%	1,522,598	23%	669,580	23%	1,017,411	27%	480,037	24%
Public Transit Trips		492,754	3%	42,826	1%	19,345	1%	27,402	1%	7,518	0%
Other Trips	Walk	2,481,379	81%	527,523	70%	235,617	53%	311,304	59%	171,548	66%
	Bicycle	173,911	6%	103,113	14%	36,906	8%	27,458	5%	40,582	16%
	School Bus	235,320	8%	82,190	11%	142,579	32%	164,690	31%	34,477	13%
	Motorcycle	76,581	3%	23,537	3%	6,339	1%	15,481	3%	2,005	1%
	Taxi/Shuttle	29,520	1%	2,877	0%	1,755	0%	2,724	1%	3,096	1%
	Amtrak	489	0%	237	0%	0	0%	0	0%	0	0%
	Other	58,538	2%	13,081	2%	23,833	5%	9,109	2%	8,125	3%
	Total	3,055,738	17%	752,558	12%	447,029	16%	530,766	14%	259,833	13%

[1] Because of the manner in which the data was collected, Vehicle Passenger Trips are presented separately and are not inclusive of Vehicle Driver Trips with one or two or passengers. Passenger information for Vehicle Driver Trips was collected from the driver of a vehicle. If a respondent was a passenger in a vehicle, no other information, such as the occupancy of the vehicle, was collected.

PUBLIC TRANSIT

Analyses of trip purpose and trip destination were conducted for public transit trips, which include local, express, and Blue Line service.

The distribution of trip purposes for public transit trips among the five county study areas can be seen in **Figure 18** and **Table 21**. Home-other and home-work trips are the most prevalent across each of the county study areas. The Orange County and Los Angeles study area had the highest percentage of home-work trips at 50 percent and 40 percent, respectively, and the Riverside County study area had the lowest percentage at 12 percent. Riverside and San Bernardino County study areas had the highest percentage of home-other trips at 55 percent and 52 percent, respectively. The Ventura County study area had the highest percentage of home-shop trips (19 percent) and the Los Angeles County study area had the lowest percentage (7 percent). The large percentage of home-other trips in the Riverside County study area are predominantly school and banking/personal business trips.

Figure 18
Distribution of Trip Purposes for Public Transit Trips
By County Study Area

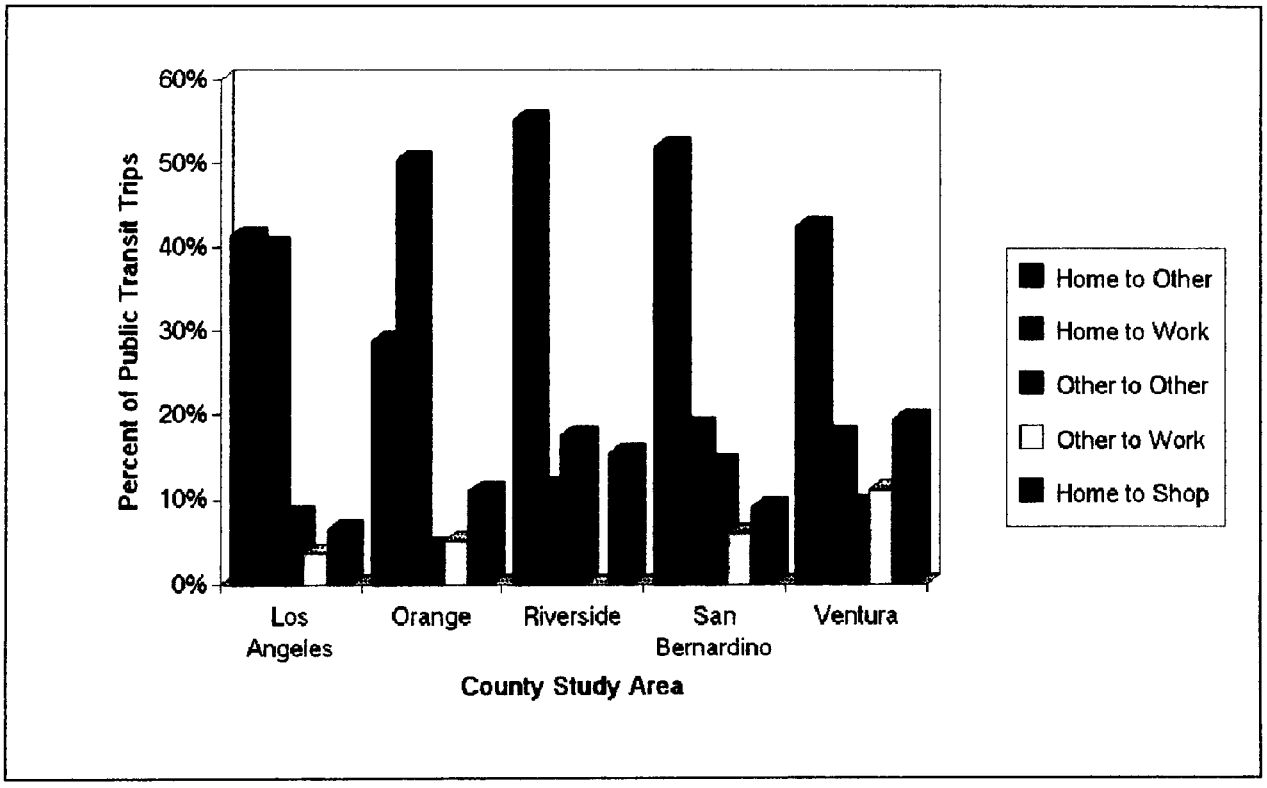
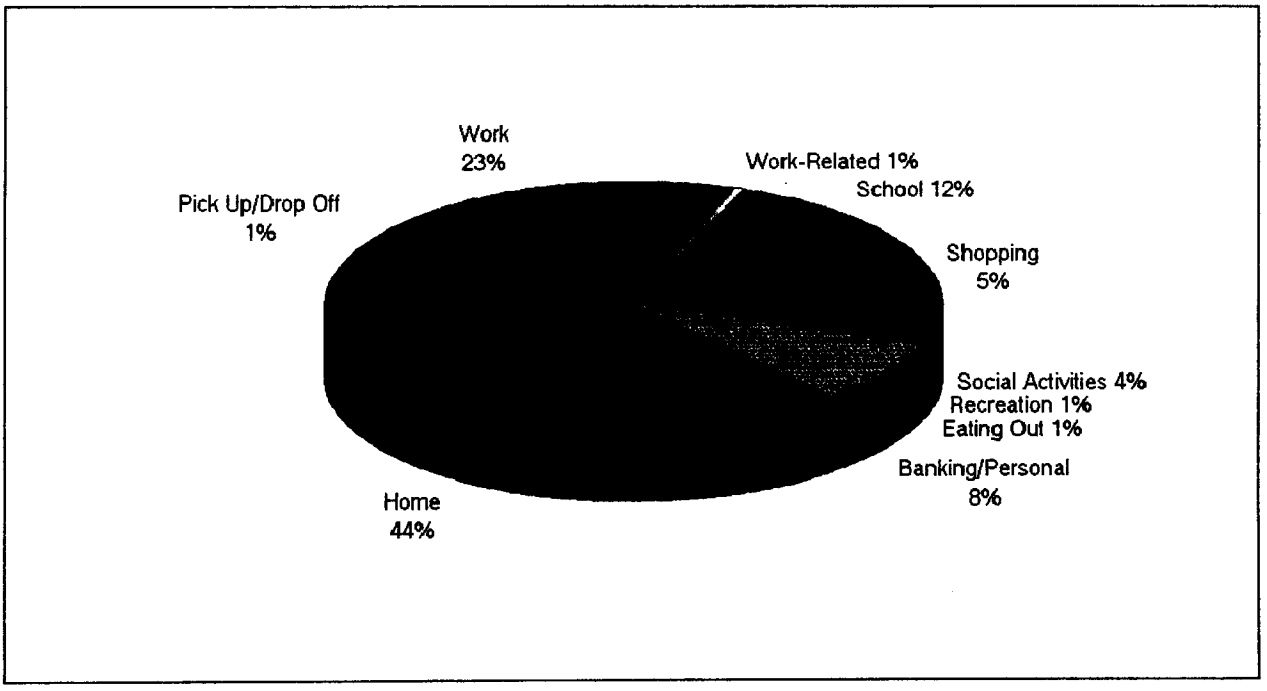


Table 21
Public Transit Trip Purposes By County Study Area

Trip Purpose	Los Angeles	Orange	Riverside	San Bernardino	Ventura
Home-other	341,305	24,967	12,099	17,527	3,878
	41%	29%	55%	52%	42%
Home-work	331,616	43,553	2,518	6,284	1,612
	40%	50%	12%	19%	1%
Other-other	67,482	3,963	3,862	4,767	852
	8%	5%	18%	14%	9%
Other-work	29,468	4,364	0	2,039	1,014
	4%	5%	0%	6%	4%
Home-shop	54,499	9,532	3,385	3,069	1,775
	7%	11%	15%	9%	19%
Total	824,370	86,379	21,864	33,686	9,131

The distribution of public transit trip destination purposes for total trips is presented in **Figure 19**. Work trips accounted for almost one-quarter of all public transit trips. Approximately 12 percent of all public transit trips were school trips and 5 percent were shopping trips.

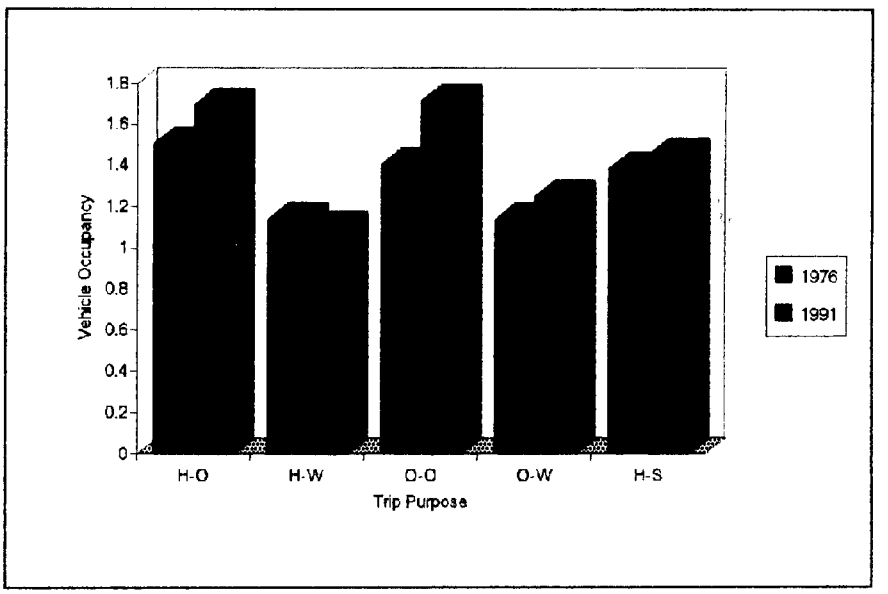
Figure 19
Trip Destination Purposes for Public Transit Trips



VII. VEHICLE OCCUPANCY

This section presents analyses of average vehicle occupancy by trip purpose and trip type. Vehicle occupancy was measured for those trips that utilized a car, van, or pick-up truck. A comparison of average vehicle occupancy rates for total trips by trip purpose for 1976 and 1991 is presented in **Figure 20** and **Table 22**.

Figure 20
Average Vehicle Occupancy
By Trip Purpose for Total Trips
Comparison Between 1976 and 1991



There was an increase in vehicle occupancy from 1976 to 1991 for all trip purposes except home-work trips, which decreased from 1.14 to 1.10.

Table 22
Average Vehicle Occupancy
By Trip Purpose for Total Trips, 1976 and 1991

Trip Purpose	1976	1991
Home-other	1.51	1.70
Home-work	1.14	1.10
Other-other	1.40	1.72
Other-work	1.14	1.25
Home-shop	1.39	1.46
Total	1.36	1.46

Table 23 and **Figure 21** present average vehicle occupancy by trip purpose for each county study area. The Orange County study area had the lowest overall average vehicle occupancy (AVO) at 1.43 and San Bernardino had the highest at 1.56. The Orange County study area had the lowest home-work AVO at 1.09 and Riverside had the highest (1.13). The highest vehicle occupancy rate was 1.87 for home-other trips in the San Bernardino County study area.

Table 23
Average Vehicle Occupancy By Trip Purpose By County Study Area

County Study Area	Home-Other	Home-Work	Other-Other	Other-Work	Home-Shop	Total
Los Angeles	1.68	1.10	1.73	1.25	1.44	1.45
Orange	1.64	1.09	1.69	1.25	1.44	1.43
Riverside	1.76	1.13	1.73	1.26	1.46	1.51
San Bernardino	1.87	1.10	1.71	1.25	1.57	1.56
Ventura	1.70	1.11	1.76	1.25	1.47	1.47

Figure 21
Average Vehicle Occupancy By Trip Purpose By County Study Area

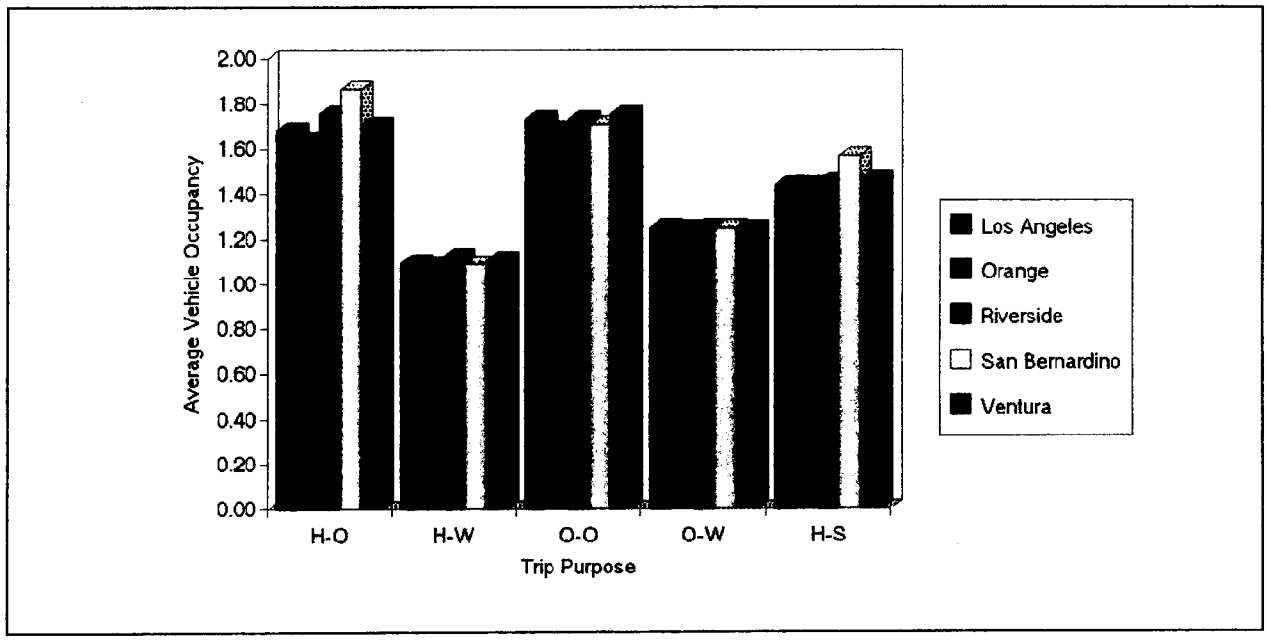
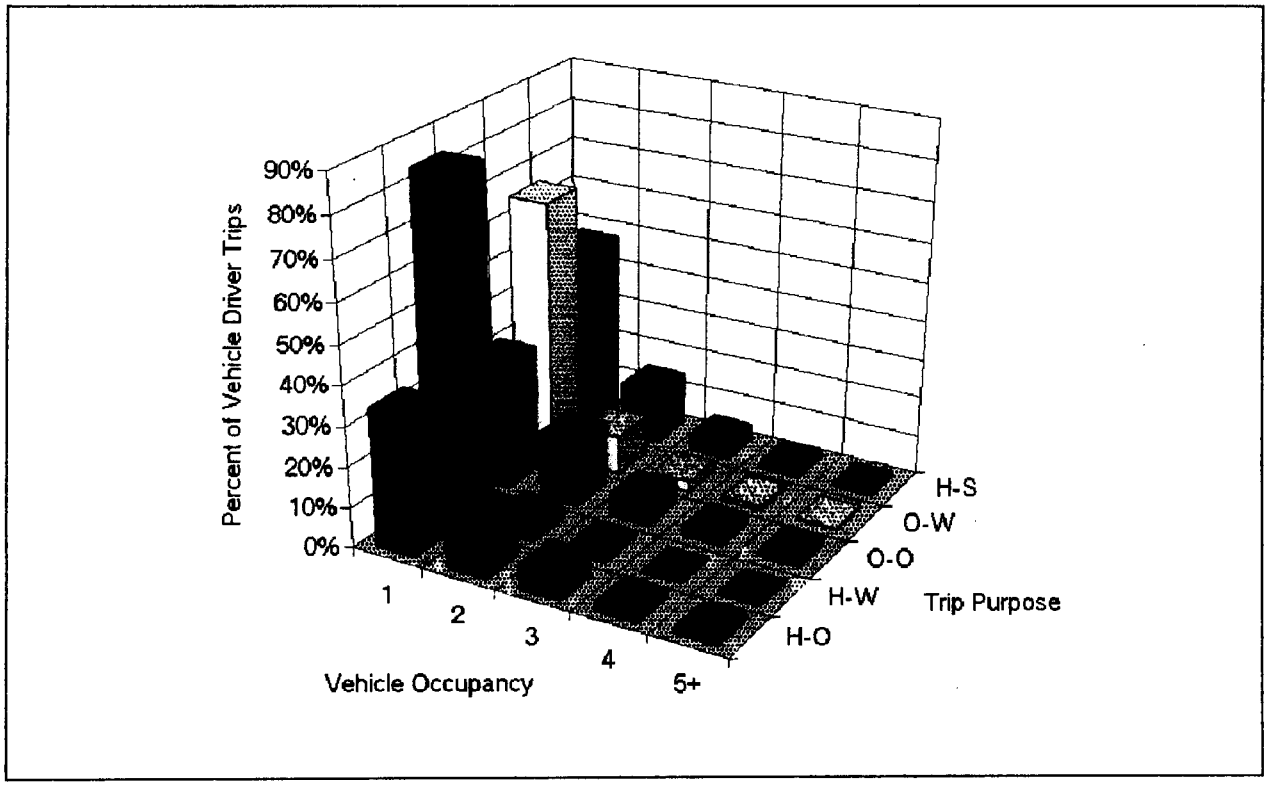


Table 24 and **Figure 22** present the distribution of the actual number of persons per vehicle for vehicle driver trips by trip purpose for 1991. Home-work trips had the highest percentage of drive alone trips at 93 percent, and other-other trips had the lowest percentage of drive alone trips at 55 percent. Forty-four percent of other-other trips, 41 percent of home-other, and 30 percent of home-shop trips had 2 or more persons per vehicle . Vehicle occupancy of 2 or more persons for home-work trips was 7 percent.

Table 24
Vehicle Occupancy By Trip Purpose

Trip Purpose	Vehicle Occupancy				
	One	Two	Three	Four	Five+
Home-other	59%	24%	10%	4%	3%
Home-work	93%	5%	2%	0%	0%
Other-other	55%	28%	10%	4%	2%
Other-work	83%	12%	3%	1%	1%
Home-shop	69%	20%	6%	3%	1%

Figure 22
Actual Vehicle Occupancy
By Trip Purpose for Vehicle Driver Trips



VIII. TRAVEL TIME

This section presents the average reported travel time in minutes between one activity and the next. Note that all travel times are self-reported.

Figure 23
Travel Time in Minutes

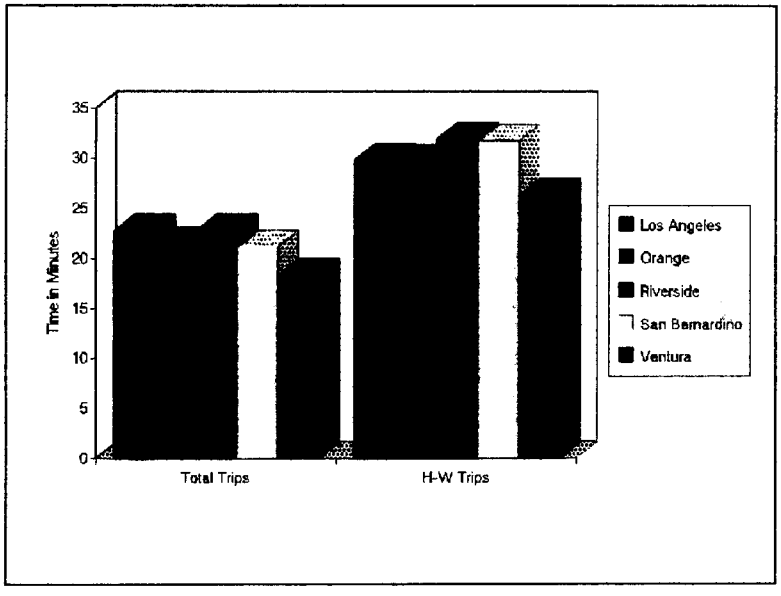


Figure 23 and **Table 25** show the average travel time for total trips and home-work trips for all modes of travel for each county study area. The Ventura County study area had the shortest travel times; the Riverside and San Bernardino County study area respondents reported the longest home-work trips (over 30 minutes on average).

Table 25
Average Travel Time in Minutes[1]
Total Trips and Home-work Trips for All Travel Modes

County Study Area	All Purposes All Travel Modes	Home-Work Trips All Travel Modes
Los Angeles	22.1	30.0
Orange	20.5	29.7
Riverside	22.5	32.0
San Bernardino	20.6	31.8
Ventura	17.1	26.4
Study Area Total	21.4	30.1

[1]Minutes as reported by respondents.

Figure 24
Home-Work Travel Time
By Trip Type By County Study Area

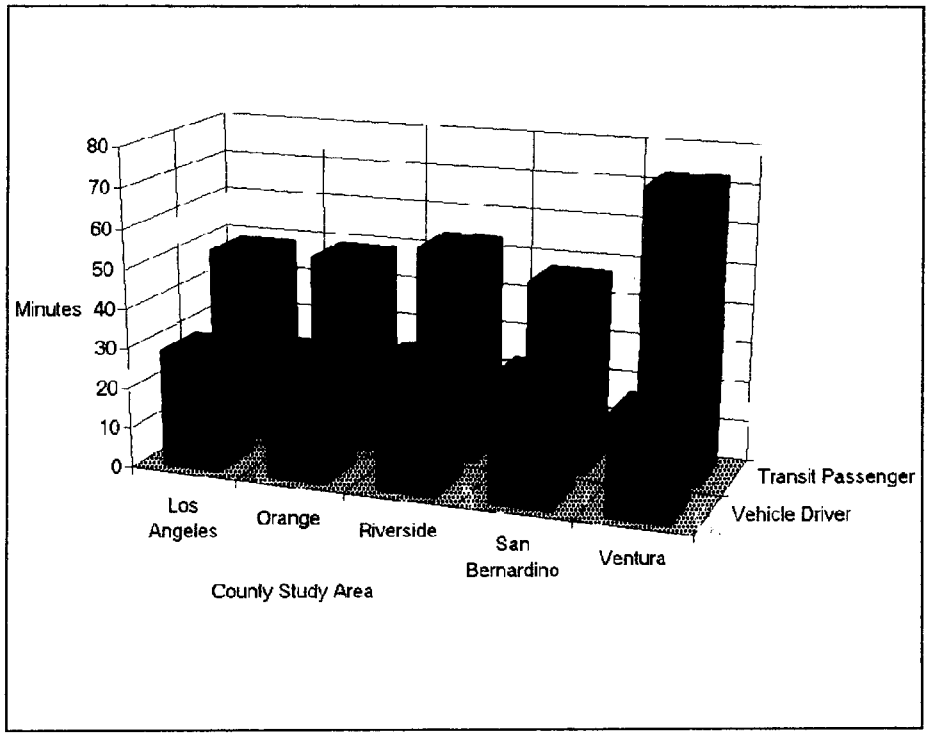


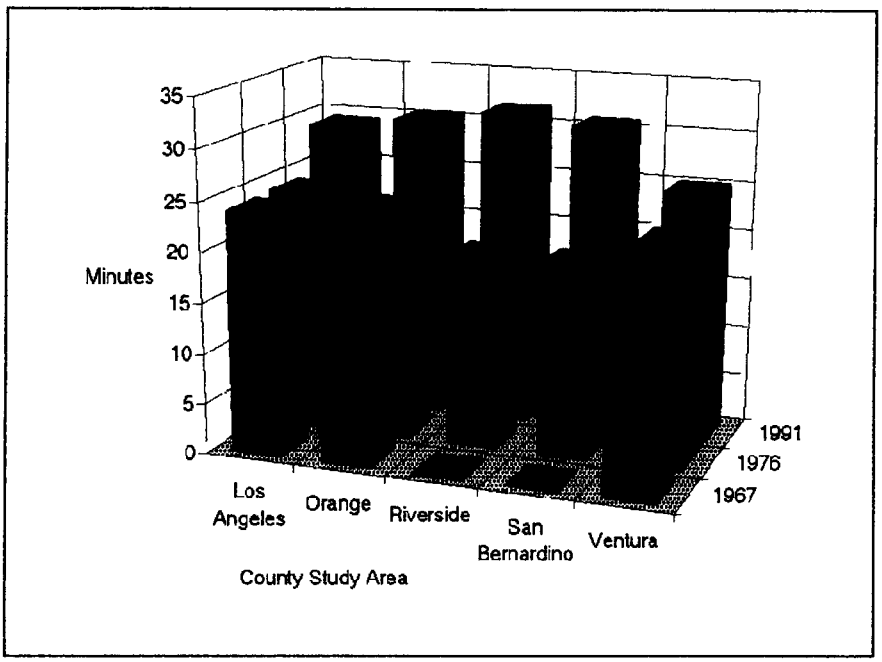
Figure 24 and **Table 26** show average reported travel time in minutes for home-work trips for vehicle driver and transit passenger trips. The average home-work vehicle driver trip took the least amount of time in the Ventura County study area (25 minutes) and the most amount of time in the Riverside County study area (32 minutes). Home-work public transit trips took significantly longer, 49 minutes on average.

Table 26
Average Home-work Travel Times in Minutes By Trip Type

County Study Area	Vehicle Driver Trips	Public Transit Trips
Los Angeles	29.2	48.6
Orange	30.3	48.9
Riverside	31.6	53.5[1]
San Bernardino	30.6	48.2[1]
Ventura	24.9	72.7[1]
Study Area Total	29.5	48.8

[1] The data in these cells are based on 10 or fewer trips in the unexpanded sample.

Figure 25
Comparison of Average Home-Work Travel Times
For Vehicle Driver Trips - 1967, 1976, 1991

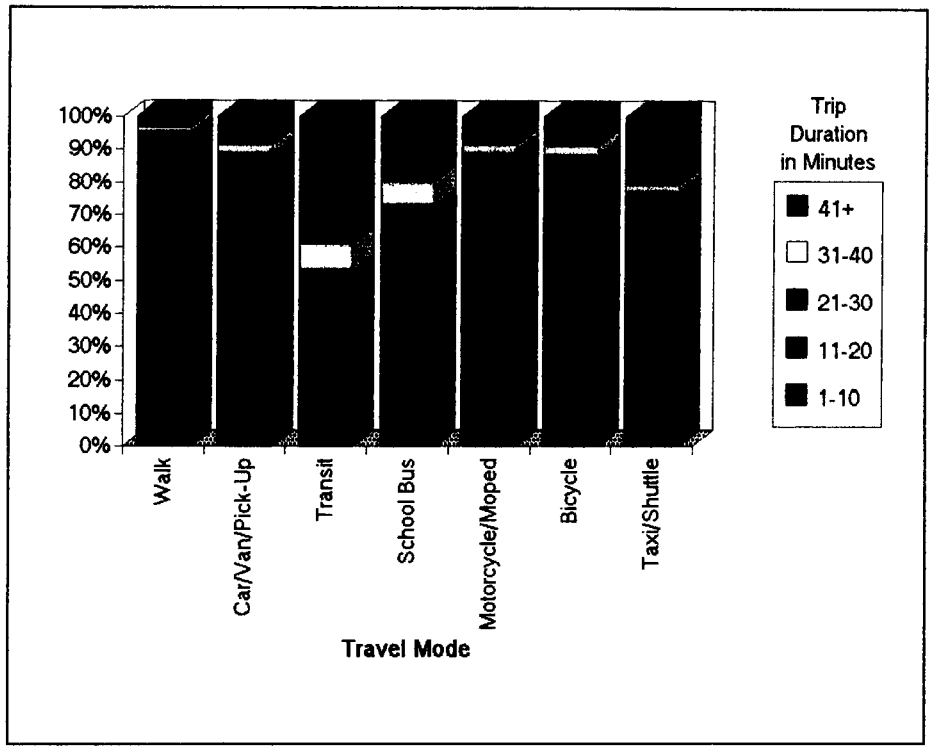


A comparison between the 1967, 1976, and 1991 average home-work travel times for vehicle driver trips is presented in **Figure 25** and **Table 27** (note that data for Riverside and San Bernardino Counties were presented combined in the 1976 report). The percent change from the 1967 study to the 1976 study was slight, with Ventura County experiencing the most change (11 percent increase in travel time). In 1976, Los Angeles experienced the smallest change with a less than one percent increase in travel time over 1967. However, results in 1991 indicate that a significant change in home-work travel time has taken place. The most significant change occurred in the Riverside and San Bernardino County study areas, where travel times increased by over 10 minutes. The Ventura County study area, the county with the largest increase in travel time from 1967 to 1976, had the smallest increase in travel time (11.7 percent) from 1976 to 1991.

Table 27
Comparison of Average Home-Work Vehicle Driver Trip Travel Times
1967, 1976, and 1991

County Study Area	1967	1976	1991
Los Angeles	24.0	24.4	29.2
Orange	21.8	23.2	30.3
Riverside	N/A	19.1	31.6
San Bernardino	N/A	19.1	30.6
Ventura	19.5	22.0	24.9

Figure 26
Distribution of Travel Time in Minutes By Travel Mode



The distribution of travel times for selected modes of transportation is depicted in **Figure 26** and **Table 28**. The data indicate that the majority of walk trips took 10 minutes or less (61 percent) and 79 percent of bicycle trips and 71 percent of motorcycle or moped trips took 20 minutes or less. Almost half (47 percent) of all automobile trips took 10 minutes or less, and 76 percent of all automobile trips took 20 minutes or less. Comparatively, public transit trips took longer, with 46 percent taking more than 30 minutes and 39 percent taking more than 40 minutes.

Table 28
Distribution of Travel Time in Minutes by Travel Mode

Travel Mode	Minutes				
	1-10	11-20	21-30	31-40	41+
Walk	61%	27%	8%	1%	3%
Car/Van/Pick-Up	47%	29%	13%	3%	8%
Transit	10%	19%	24%	7%	39%
School Bus	12%	33%	29%	7%	20%
Motorcycle/Moped	44%	27%	18%	3%	8%
Bicycle	49%	30%	9%	3%	9%
Taxi/Shuttle	30%	37%	11%	2%	21%

Figure 27
Distribution of Travel Time in Minutes for Total Trips By Trip Type

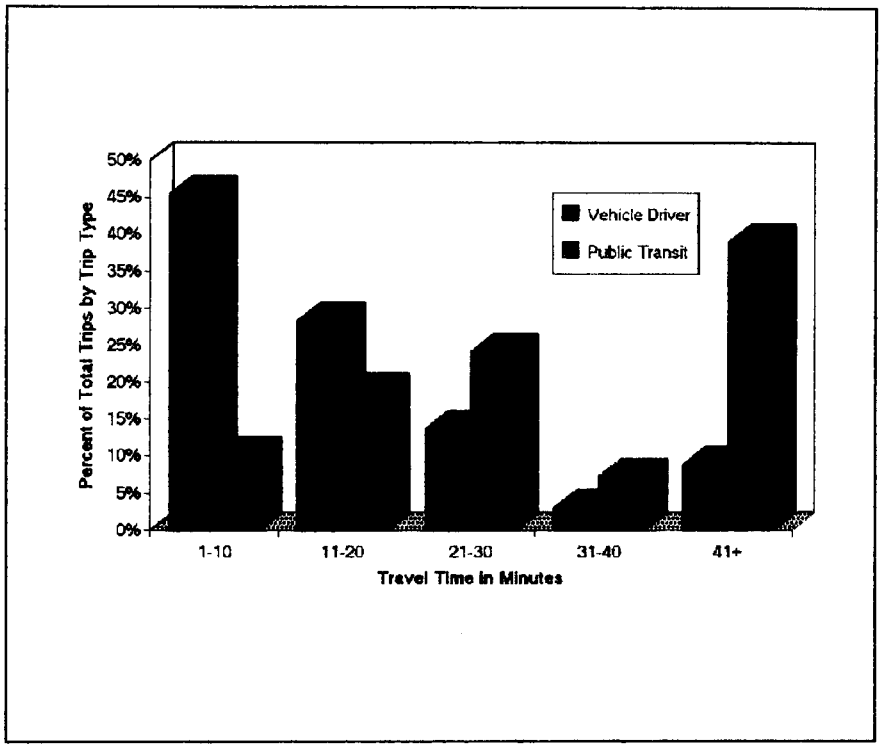


Figure 27 and **Table 29** presents travel time in minutes for total trips by trip type. The majority of vehicle driver trips (75 percent) took 20 minutes or less. Approximately 9 percent of vehicle driver trips took more than 40 minutes as compared to 39 percent of public transit trips.

Table 29
Travel Time in Minutes By Trip Type

Trip Type	Minutes				
	1-10	11-20	21-30	31-40	41+
Vehicle Driver	46%	29%	14%	3%	9%
Public Transit	10%	19%	24%	7%	39%

IX. TRIP START TIMES

This section presents analyses of trip purposes, trip types, and selected modes of transportation by start time.

Figure 28
Distribution of Vehicle Driver Trips By Start Time

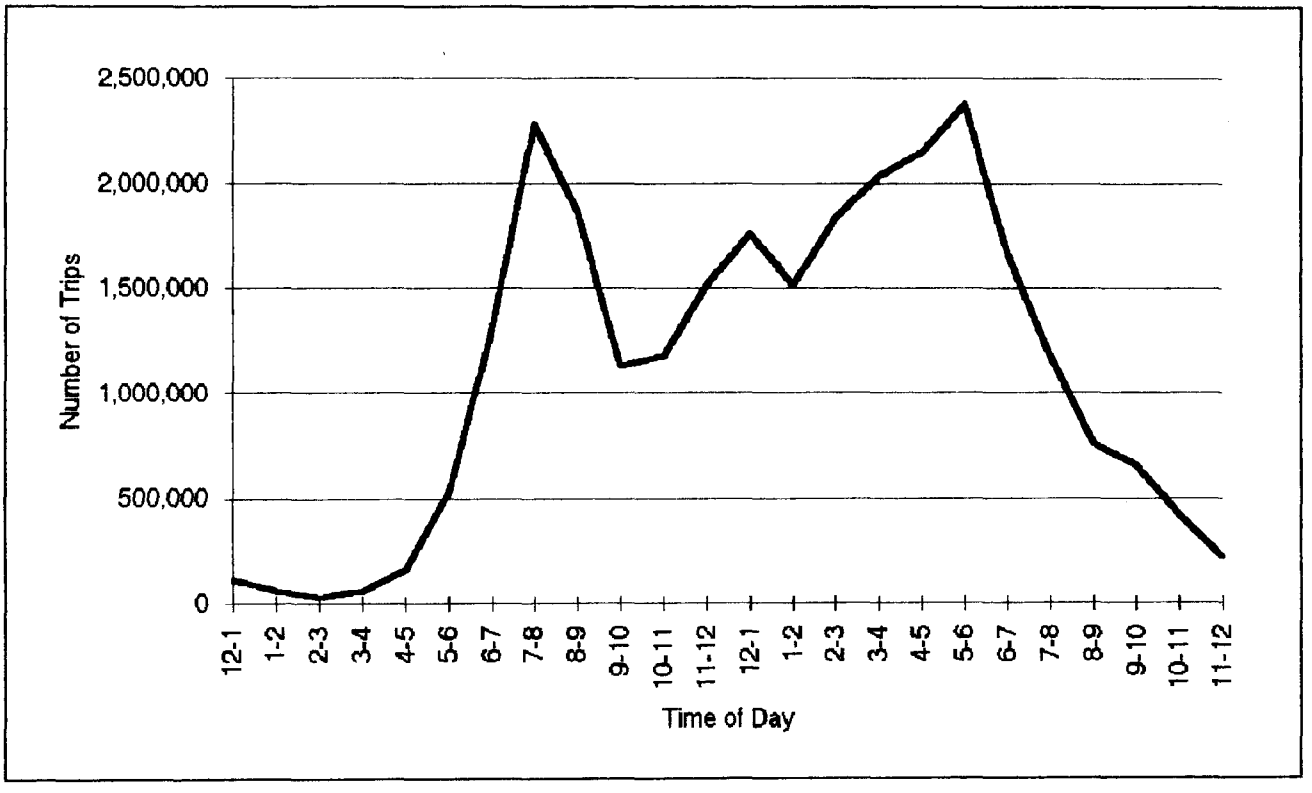


Figure 28 illustrates the distribution of vehicle driver trips by trip start time. The morning peak travel occurred between 6:00am and approximately 8:30am, and midday travel peaked between 11:00am and 2:00pm. The evening peak period began at about 3:00pm and lasted until just after 6:00pm, and at the highest point comprised almost 250 million trips.

Figure 29
Distribution of Home-Work and Non-Home-Work Trips
By Trip Start Time

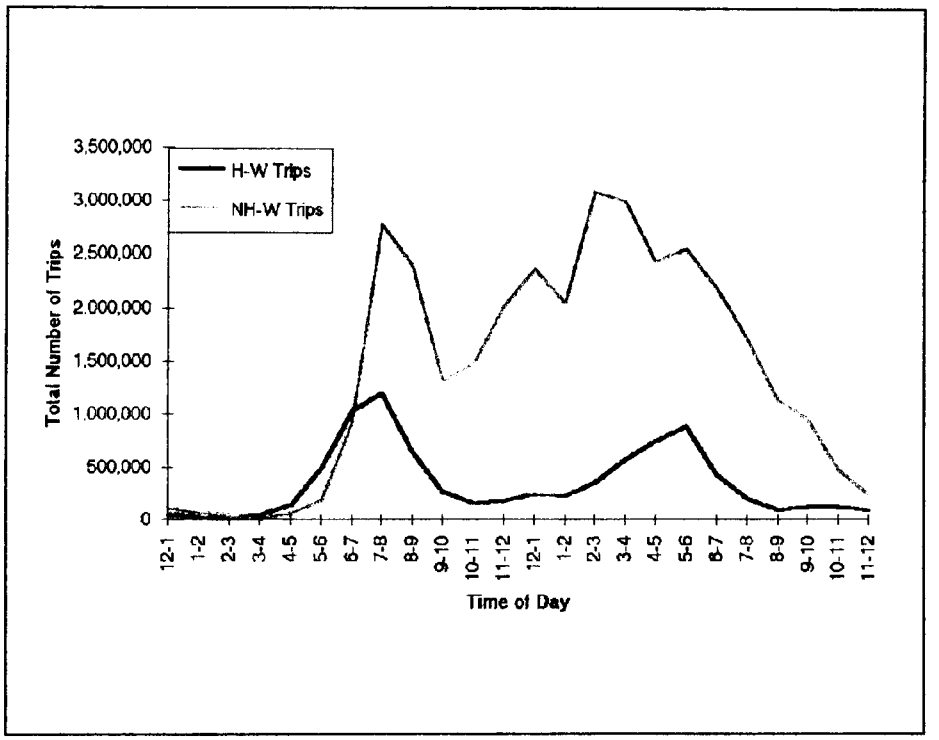
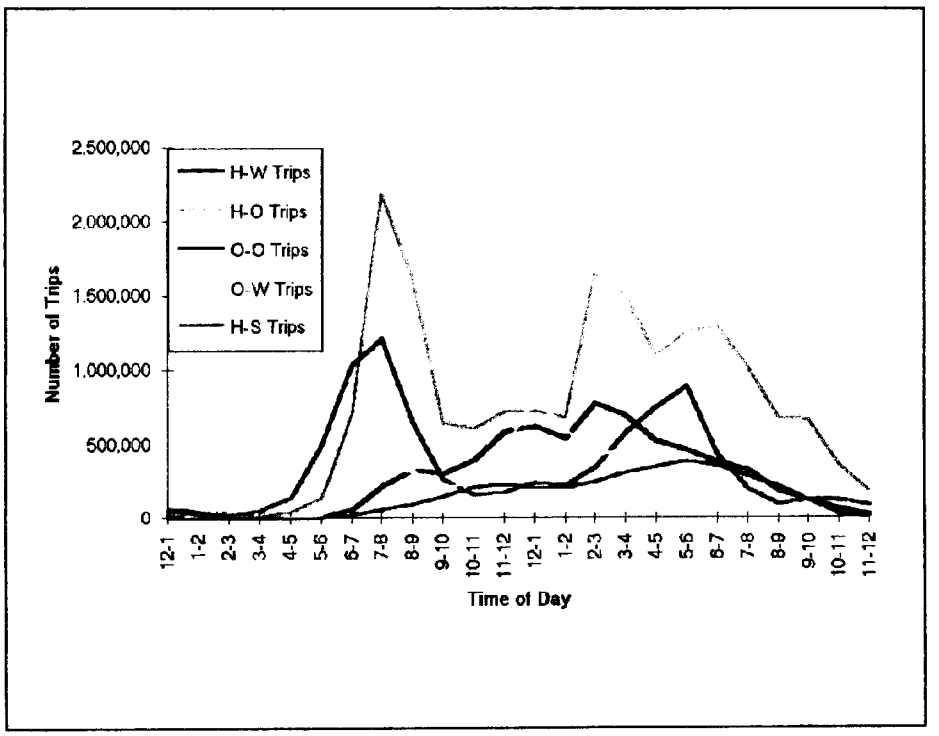


Figure 30
Distribution of Start Times By Trip Purpose



The graphics presented on this page and the following page were created specifically with regard to issues of air quality and traffic congestion. **Figure 29** presents trip start times for home-work and non-home-work trips. Non-home-work trips include all trip purposes except home-work. The morning peak period for home-work trips was shorter than the evening peak period, lasting from approximately 4:00pm to 7:00pm. Non-home-work trips accounted for a larger volume of traffic (more than one and a half million more trips than home-work trips in the evening peak). As can be seen in **Figure 30**, compared to all other trip purposes, home-other trips accounted for the largest number of trips in the morning and evening peak periods.

Figure 31
Trip Start Times
for Selected Modes of Transportation

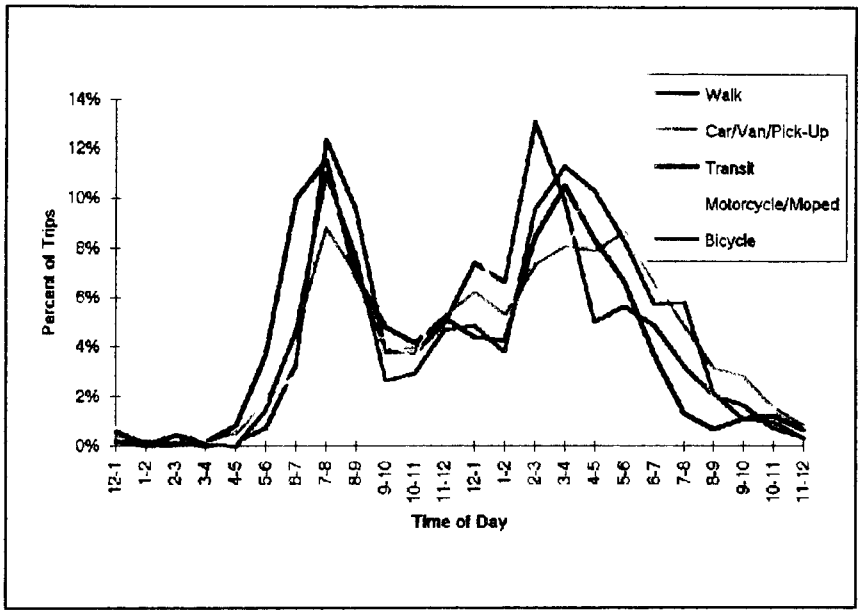


Figure 32
Trip Start Times By Trip Type for Total Trips

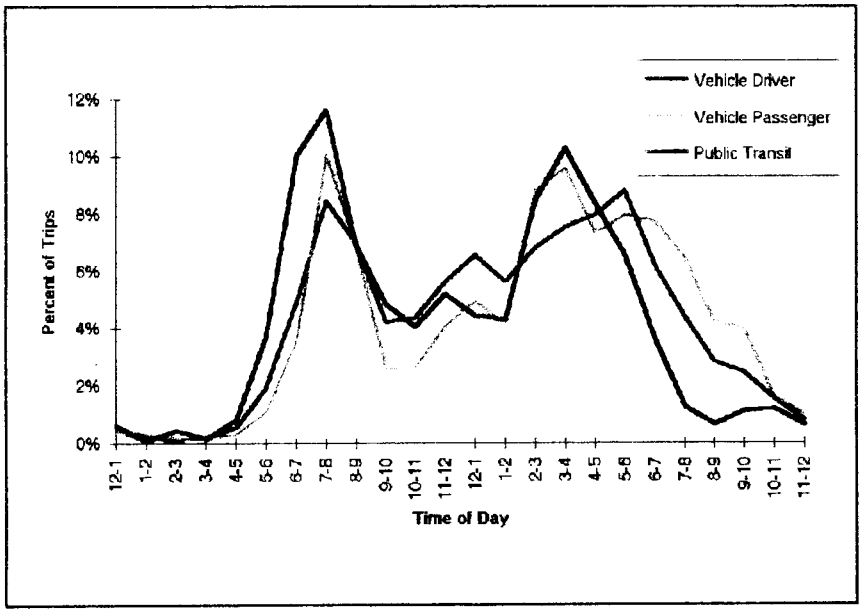


Figure 31 presents the distribution of trip start times for those trips utilizing selected modes of transportation; specifically, those modes that are targeted with respect to trip reduction ordinances. The highest peak for morning trip start times occurred at the same time for all modes, 7:00am to 8:00am; however, evening peak trip start times differed a great deal. The evening peak for walk trips was from 2:00pm to 3:00pm, and for bicycle and transit trips from 3:00pm to 4:00pm. Evening motorcycle trips peaked from 4:00pm to 5:00pm, and auto trips peaked from 5:00pm to 6:00pm. Of all walk trips, 45 percent occurred in the peak periods, 22 percent from 7:00am to 9:00am, and 23 percent from 2:00pm to 4:00pm.

The distribution of trip start times for each trip type is presented in **Figure 32**, and the trends across trip type are similar to those seen in Figure 31. Trip start times peak at the same time for all trip types in the morning, from 7:00am to 8:00am. The peak in the middle of the day is from 12:00pm to 1:00pm for vehicle driver and vehicle passenger trips, while the peak for public transit trips occurs one hour earlier. Trip start times in the evening peak earlier for public transit and vehicle passengers, from 3:00pm to 4:00pm, while vehicle driver trips peak from 5:00pm to 6:00pm. Of all public transit trips, 49 percent occurred in the peak periods, 22 percent from 6:00am to 8:00am, and 27 percent from 2:00pm to 5:00pm.

X. DEMOGRAPHIC PROFILE

This chapter presents detailed information regarding the demographic characteristics collected from households in the 1991 survey study area. Sections on households, income, vehicle ownership, licensed drivers, and employment are included. It should be noted that this information has been provided for the purposes of reviewing the results of the study, and that additional data regarding these characteristics can be found in the 1990 Census.

HOUSEHOLDS

Table 30 provides a breakdown of various household characteristics. Notable characteristics include the following:

- Households with two vehicles are most prevalent, except in Los Angeles County. Households with 3 or more vehicles far exceeded households with no vehicle in all counties.
- Los Angeles and Orange County had a larger portion of multiple housing units than the other three counties.
- Over 60 percent of Orange, San Bernardino, and Ventura County households owned two or more vehicles, compared to 50 percent in Los Angeles.

Table 30
Distribution of Households By County Study Area

		Los Angeles	Orange	Riverside	San Bernardino	Ventura
TOTAL HOUSEHOLDS		100.0%	100.0%	100.0%	100.0%	100.0%
HOUSING TYPE	Single Dwelling Unit	50.2%	53.2%	72.2%	74.5%	67.8%
	Multiple Dwelling Unit	49.8%	46.8%	27.8%	25.5%	32.2%
VEHICLE OWNERSHIP	0	11.0%	4.7%	6.2%	6.5%	4.4%
	1	35.9%	29.5%	34.2%	31.4%	26.1%
	2	33.2%	41.0%	38.2%	38.0%	42.3%
	3+	19.9%	24.9%	21.4%	24.1%	27.2%
HOUSEHOLD SIZE	1	23.3%	20.0%	19.5%	17.5%	17.1%
	2	23.0%	26.1%	27.1%	23.3%	24.9%
	3	15.0%	17.8%	15.1%	17.2%	16.9%
	4	16.4%	17.1%	16.8%	19.5%	20.5%
	5+	22.3%	19.0%	21.5%	22.5%	20.9%

- Los Angeles had the highest percentage of households with no vehicles, 11 percent.

- Ventura County had the smallest percentage of one-person households; Los Angeles had the highest percentage of one-person households; and, Los Angeles and San Bernardino had the highest percentage of five-or-more person households.

Table 31
Persons Per Household By County Study Area
Compared to 1976 Results

	1976	1991*
Los Angeles	2.79	3.12
Orange	2.85	3.02
Riverside	3.07	3.08
San Bernardino	3.07	3.22
Ventura	3.04	3.20
Study Area	2.84	3.11

*** Based on the number of persons in the household of all ages**

Table 31 is a comparison of household sizes in 1976 and 1991. The figures indicate that the average household size has increased in all counties. The largest increase in size occurred in Los Angeles County, where the average household size increased from 2.79 persons per household to 3.12 persons per household.

Figure 33
Distribution of Total Persons Per Household
By Housing Unit Type

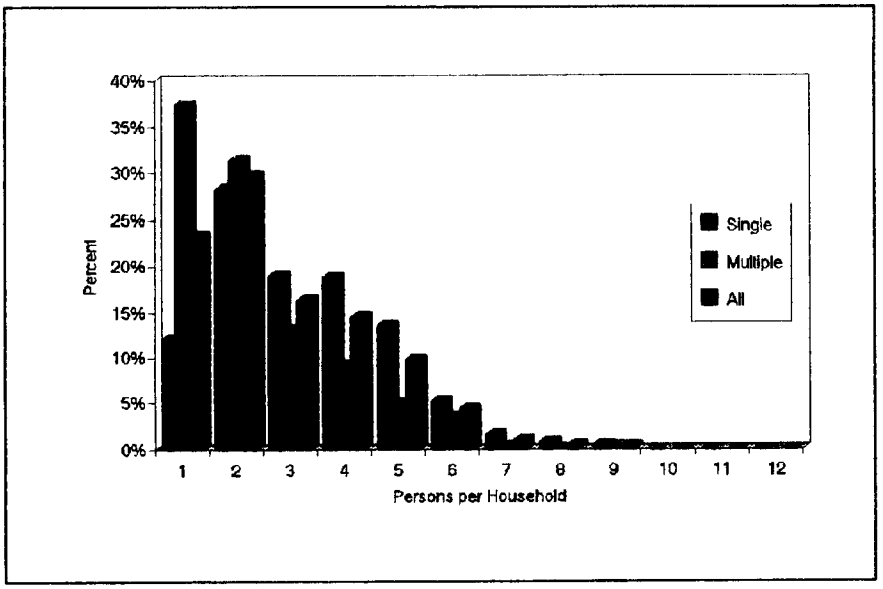


Figure 33 presents the distribution of total persons per household for single, multiple, and all housing unit types. **Table 32** presents the total number of households for each household size by housing unit type for each of the five counties surveyed.

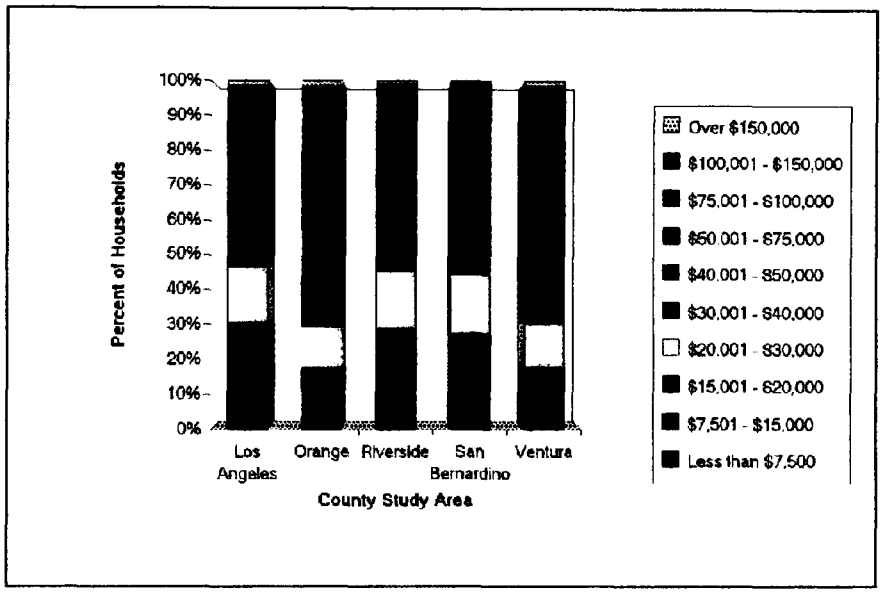
Table 32
Total Number of Households By
Household Size By Housing Unit Type By County Study Area

County Study Area	Housing Unit Type	Household Size[1]				
		One	Two	Three	Four	Five +
Los Angeles	Single	188,259	418,583	287,757	269,608	346,629
	Multiple	576,767	432,369	187,967	147,172	155,486
	All	765,026	850,952	475,724	416,780	502,115
Orange	Single	45,491	124,579	91,100	92,063	92,441
	Multiple	130,094	149,880	54,812	32,403	24,415
	All	175,585	274,459	145,912	124,466	116,856
Riverside	Single	40,577	95,205	53,365	56,175	53,146
	Multiple	45,253	41,944	11,908	5,820	9,979
	All	85,830	137,149	65,273	61,995	63,125
San Bernardino	Single	44,942	100,980	62,138	71,960	70,974
	Multiple	44,820	36,691	22,369	9,952	6,442
	All	89,762	137,671	84,507	81,912	77,416
Ventura	Single	13,516	40,523	30,795	32,300	32,128
	Multiple	25,598	28,070	9,605	4,877	2,732
	All	39,114	68,593	40,400	37,177	34,860

[1] Number of People in Household Over the age of Five.

INCOME

Figure 34
Distribution of Household Income By County Study Area



Distribution of household income is presented in **Figure 34** and **Table 33** for all five counties. Orange and Ventura Counties exhibited fairly similar patterns, with less than 20 percent of households reporting incomes of less than $20,000, and more than 40 percent of households reporting incomes of more than $50,000. Conversely, approximately 30 percent of Los Angeles, Riverside, and San Bernardino households reported incomes of less than $20,000 and less than 30 percent of households reporting incomes of more than $50,000.

In Los Angeles County the largest percentage of income fell in the $20,001-$30,000 range for 16 percent of the population; Orange County's largest percentage was $50,001-$75,000 at 23 percent; Riverside County had the greatest percentage of its population (16 percent) in the $50,001-$75,000 range; San Bernardino had 17 percent of its population in the $20,001-$30,000 range; and Ventura County had 24 percent in the $50,001-$75,000 range.

Table 33
Distribution of Household Income Across County Study Areas

Income	Los Angeles	Orange	Riverside	San Bernardino	Ventura
Less than $7,500	8.5%	3.3%	6.1%	7.7%	3.3%
$7,501 - $15,000	12.9%	7.4%	14.2%	11.3%	8.0%
$15,001 - $20,000	9.0%	6.7%	8.6%	8.4%	6.4%
$20,001 - $30,000	15.8%	11.9%	16.2%	16.6%	12.5%
$30,001 - $40,000	14.2%	14.4%	15.5%	16.1%	12.9%
$40,001 - $50,000	11.0%	13.5%	13.2%	14.4%	17.0%
$50,001 - $75,000	15.2%	22.7%	16.4%	16.3%	23.5%
$75,001 - $100,000	7.9%	12.8%	6.7%	6.2%	10.0%
$100,001 - $150,000	4.3%	5.5%	2.5%	2.8%	4.9%
Over $150,000	1.3%	1.8%	0.5%	0.1%	1.3%

Figure 35
Distribution of Households
By Household Income and Vehicle Ownership

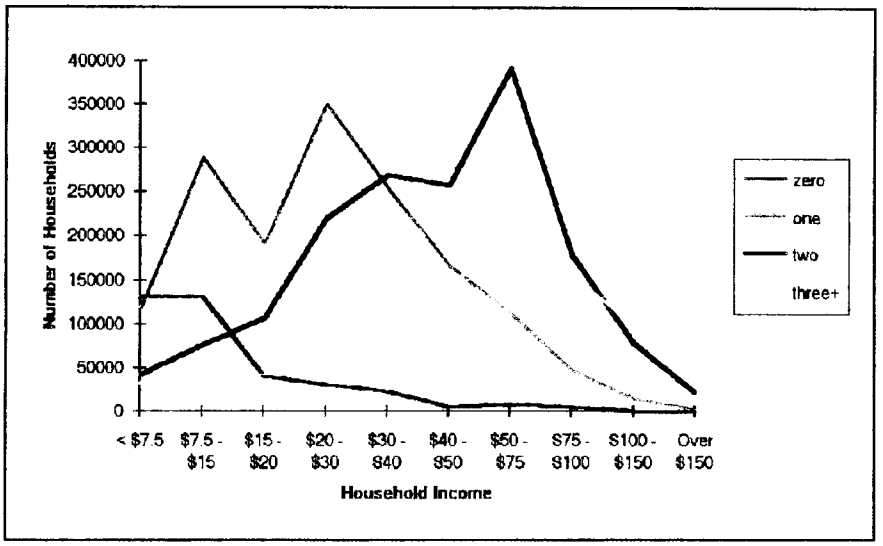


Figure 35 presents the distribution of households by household income and vehicle ownership. **Table 34** presents the number of households by income by vehicle ownership for the entire study area. As expected, the larger the household income the greater the number of vehicles owned.

Table 34
Number of Households
By Annual Household Income and Vehicle Ownership

Income	Vehicle Ownership				
	Zero	One	Two	Three +	Total
Less than $7,500	131,704	117,976	42,911	32,248	324,839
$7,501 - $15,000	131,880	289,638	76,889	35,503	533,910
$15,001 - $20,000	40,519	191,324	107,807	44,072	383,722
$20,001 - $30,000	30,725	351,113	221,444	88,360	691,642
$30,001 - $40,000	23,498	255,635	270,403	113,266	662,802
$40,001 - $50,000	6,006	167,496	258,263	127,267	559,032
$50,001 - $75,000	8,191	113,376	393,655	266,610	781,832
$75,001 - $100,000	6,140	47,547	180,110	157,970	391,767
$100,001 - $150,000	410	14,343	79,320	98,560	192,633
Over $150,000	0	3,060	21,860	31,135	56,055
Refused	18,755	72,632	86,057	43,779	221,223
Don't Know	38,125	49,564	35,304	30,208	153,201
Total	435,953.00	1,673,704.00	1,774,023.00	1,068,978.00	4,952,658

VEHICLE OWNERSHIP

Table 35 presents vehicle ownership for housing unit types in each county study area. Across all counties, multiple housing units were more likely to own zero or one car, and single housing units were more likely to own two or more vehicles.

Table 35
Vehicle Ownership
By Housing Unit Type By County Study Area

County Study Area	Housing Unit Type	Vehicle Ownership			
		Zero	One	Two	Three +
Los Angeles	Single	78,258	349,738	616,075	466,767
	Multiple	252,783	730,339	384,795	131,844
	All	331,040	1,080,077	1,000,870	598,610
Orange	Single	8,235	71,014	203,488	162,935
	Multiple	30,762	175,727	139,560	45,554
	All	38,997	246,741	343,048	208,490
Riverside	Single	10,386	79,672	128,842	79,567
	Multiple	15,156	61,813	28,947	8,989
	All	25,542	141,485	157,789	88,556
San Bernardino	Single	11,515	84,457	153,148	101,875
	Multiple	19,210	63,504	25,964	11,597
	All	30,724	147,961	179,112	113,472
Ventura	Single	2,288	24,074	69,344	53,558
	Multiple	7,362	33,366	23,860	6,293
	All	9,650	57,440	93,204	59,851

As can be seen in **Table 36**, 58 percent of all the vehicles owned in the Southern California study area were located in Los Angeles County. In the entire region, more vehicles were owned by occupants of single family dwellings as compared to multiple family dwellings.

Table 36
Total Vehicles Owned
By Housing Unit Type By County Study Area

County Study Area	Housing Unit Type			
	Single	Multiple	Total	Percent of Total
Los Angeles	3,278,666	1,955,796	5,234,462	58%
Orange	1,062,788	610,225	1,673,013	18%
Riverside	623,929	151,521	775,450	9%
San Bernardino	752,755	155,810	908,565	10%
Ventura	355,195	102,271	457,466	5%
Total	6,073,333	2,975,623	9,048,956	100%

Figure 36
Percent Distribution of Vehicles Owned

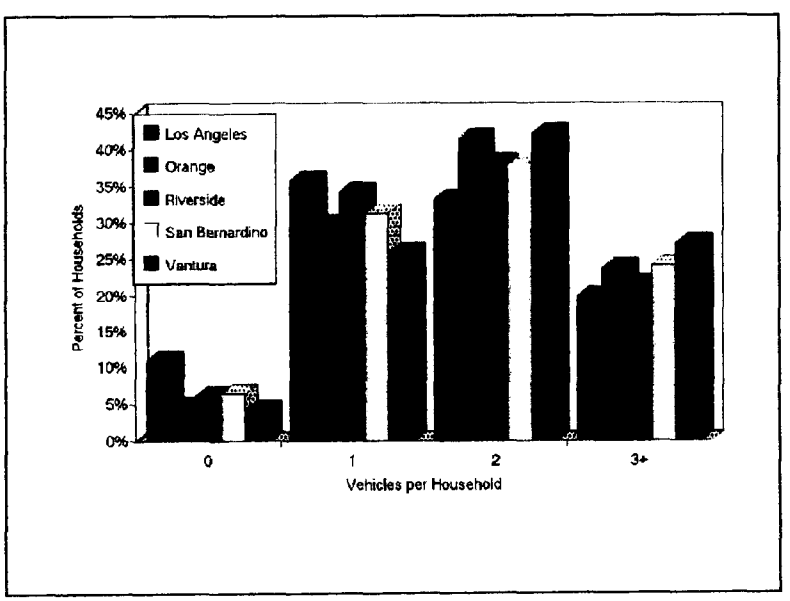


Figure 36 shows the percent distribution of vehicles per household for the five counties. **Figure 37** on the following page presents vehicles per household as a function of income. As expected, the number of vehicles per household increased as the household income increased. However, single family households with an income of less than $7,500 per year had a higher than expected number of vehicles per household.

Vehicles per person, vehicles per licensed driver, and vehicles per household for each county for 1967, 1976, and 1991 are presented in **Table 37**. The number of vehicles available within households across all counties increased, the largest increase being in San Bernardino County. Ventura County had the highest number of vehicles per household at 2.08. Vehicles per person increased slightly across all counties except Los Angeles County, most significantly in the Riverside County study area.

Figure 37
Vehicles Per Household as a Function of Income

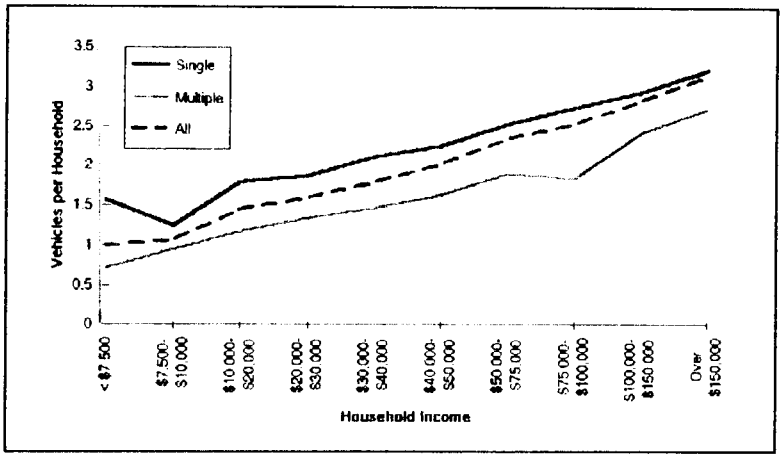


Table 37
Vehicles Per Person, Per Licensed Driver, and Per Household By County, 1967, 1976, and 1991

County Study Area	Year	Vehicles Per Person*	Vehicles Per Licensed Driver	Vehicles Per Household
Los Angeles	1967	0.48	N/A	1.36
	1976	0.57	N/A	1.58
	1991	0.56	1.14	1.74
Orange	1967	0.50	N/A	1.61
	1976	0.64	N/A	1.82
	1991	0.66	1.07	1.96
Riverside	1967	N/A	N/A	N/A
	1976	0.54	N/A	1.66
	1991	0.61	1.10	1.88
San Bernardino	1967	N/A	N/A	N/A
	1976	0.54	N/A	1.66
	1991	0.60	1.10	1.93
Ventura	1967	0.47	N/A	1.56
	1976	0.60	N/A	1.83
	1991	0.65	1.10	2.08

* Vehicles per person is based on persons of all ages in the household

LICENSED DRIVERS

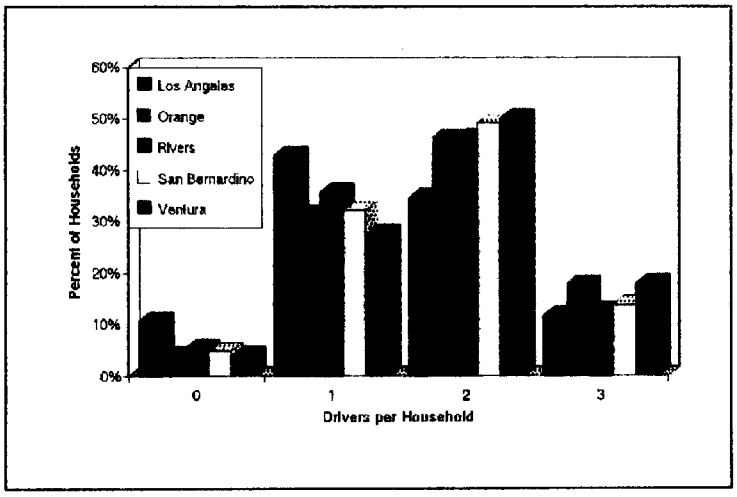
The total number of licensed drivers in the Southern California region has increased by 20 percent since 1976 as can be seen from **Table 38**. There was a 94 percent increase in the number of licensed drivers in San Bernardino and Riverside Counties, a 44 percent increase in Ventura County, and a 34 percent increase in Orange County. The Los Angeles County study area had an increase of only 2 percent in the number of licensed drivers, as compared to 1976.

Table 38
Licensed Drivers By County Study Area, 1976 and 1991

County Study Area	1976 Licensed Drivers	Percent	1991 Licensed Drivers	Percent	Percent Change
Los Angeles	4,496,000	67%	4,580,383	57%	2%
Orange	1,148,500	17%	1,563,142	19%	34%
Riverside and San Bernardino*	790,400	12%	1,532,388	19%	94%
Ventura	289,200	4%	415,697	5%	44%
Total	6,724,100	100%	8,091,610	100%	20%

* Riverside and San Bernardino are presented combined for comparison purposes with 1976.

Figure 38
Licensed Drivers Per Household



The percentage of households by number of licensed drivers for each county is presented in **Figure 38**. The Los Angeles County study area had the largest number of households with none or one licensed drivers and the smallest number of households with two or more licensed drivers.

Licensed drivers per household for 1976 and 1991 are presented in **Table 39**. The number of licensed drivers per household increased slightly in Orange, San Bernardino, and Ventura counties; the number of licensed drivers in Los Angeles and Riverside counties decreased. The highest number of licensed drivers per household was found in Orange and Ventura Counties.

Table 40
Licensed Drivers Per Household, 1976 and 1991

County Study Area	1976 Licensed Drivers Per Household	1991 Licensed Drivers Per Household
Los Angeles	1.68	1.52
Orange	1.86	1.87
Riverside	1.73	1.70
San Bernardino	1.73	1.76
Ventura	1.87	1.89
Total Study Area	1.71	1.63

Figure 39
Licensed Drivers Per Household
By Housing Unit Type

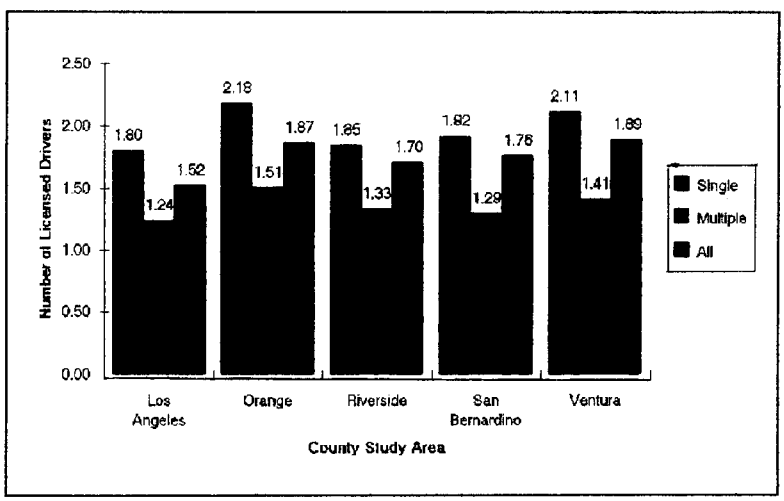


Figure 39 and **Table 40** present licensed drivers per household by housing unit type for each county. The highest number of licensed drivers per household was found in single family households in Orange and Ventura Counties, with over 2 licensed drivers per household. The lowest number of licensed drivers per household was found in Los Angeles and Riverside Counties, at 1.24 and 1.29 licensed drivers per multiple family household, respectively.

Table 39
Licensed Drivers Per Household
By Housing Unit Type By County Study Area

County Study Area	Single	Multiple	All
Los Angeles	1.80	1.24	1.52
Orange	2.18	1.51	1.87
Riverside	1.85	1.33	1.70
San Bernardino	1.92	1.29	1.76
Ventura	2.11	1.41	1.89

EMPLOYMENT

Information about employment was collected using the household form that was sent to participants along with their diaries. Full-time and part-time employees, as presented in this section of the report, were calculated based on the total number of people in each household who reported that they were employed part-time or full-time. Where the total number of workers is presented, this is the total number of full-time and part-time employees. Because the status "self-employed" was not specific to part-time or full-time, it was not included in the total.

Table 41 indicates that the total number of employed persons in the Southern California region increased since 1976 by more than one million workers. It also indicates a marginal increase in the working population in Los Angeles County, and a significant increase in the number of workers in Orange, San Bernardino, Riverside, and Ventura Counties. **Table 42** shows that the majority of those working were employed in the service industry. The total number of households with full-time employees for each county study area is presented in **Table 43**.

Table 41
Employed Persons By County Study Area, 1976 and 1991

County	Full-Time				Part-Time				Total			
	1976	1976 Percent	1991	1991 Percent	1976	1976 Percent	1991	1991 Percent	1976	1976 Percent	1991	1991 Percent
Los Angeles	2,508,100	69%	2,880,683	60%	623,300	67%	637,971	57%	3,131,400	68%	3,518,654	60%
Orange	630,900	17%	879,438	18%	173,200	19%	220,067	20%	804,100	18%	1,099,505	19%
Riverside & San Bernardino[1]	376,000	10%	772,292	16%	96,100	10%	196,192	18%	472,100	10%	968,484	16%
Ventura	145,900	4%	237,923	5%	35,800	4%	58,820	5%	181,700	4%	296,743	5%
Total Study Area	3,660,900	100%	4,770,336	100%	928,400	100%	1,113,050	100%	4,589,300	100%	5,883,386	100%

(1) Riverside and San Bernardino Counties have been combined for the purposes of comparison.

Table 42
Employment Industry By County Study Area*

Industry	Los Angeles	Orange	Riverside	San Bernardino	Ventura
Finance/Insurance/Real Estate	8.9%	8.9%	7.9%	6.2%	7.1%
Retail Trade	10.4%	11.2%	14.0%	12.4%	10.8%
Service	44.2%	43.5%	38.2%	38.2%	39.6%
Agriculture/Mining	0.6%	0.8%	2.2%	0.7%	3.2%
Construction	5.6%	6.5%	10.5%	8.0%	8.2%
Wholesale Trade	2.6%	2.9%	2.4%	1.7%	2.1%
Government	10.0%	8.7%	11.5%	17.2%	13.9%
Manufacturing	13.8%	13.5%	8.8%	10.2%	12.4%
Transportation/Communications/Utilities	3.9%	4.1%	4.6%	5.5%	2.7%

* Figures represent the industry for respondents who answered full-time, part-time, or self-employed.

Table 43
Number of Households with Full-Time Employees
By County Study Area, 1976 and 1991

County Study Area	Full-Time Workers	1976	1976 Percent	1991	1991 Percent
Los Angeles	Zero	835,300	31%	969,402	32%
	One	1,270,500	47%	1,356,594	45%
	Two	506,200	19%	571,427	19%
	Three +	70,500	3%	112,883	4%
	TOTAL	**2,682,500**	**100%**	**3,010,306**	**100%**
Orange	Zero	142,700	23%	243,086	29%
	One	334,600	54%	359,865	43%
	Two	123,600	20%	192,531	23%
	Three +	15,700	3%	41,795	5%
	TOTAL	**616,600**	**100%**	**837,277**	**100%**
Riverside and San Bernardino	Zero	170,800	37%	328,943	37%
	One	206,500	45%	370,877	42%
	Two	72,400	16%	161,731	18%
	Three +	8,100	2%	23,090	3%
	TOTAL	**457,800**	**100%**	**884,641**	**100%**
Ventura	Zero	44,400	29%	58,302	26%
	One	78,500	51%	99,756	45%
	Two	27,900	18%	52,473	24%
	Three +	3,600	2%	9,615	4%
	TOTAL	**154,400**	**100%**	**220,146**	**100%**

Table 44 presents a comparison of the number of full-time employees per household for each county study area in 1976 and 1991. The table indicates that the number of full-time employees per household increased in all county study areas, with the exception of Riverside County where it stayed the same. Overall, the number of full-time employees per household increased from 0.93 to 0.96.

Table 44
Full-Time Employees Per Household
By County Study Area, 1976 and 1991

County Study Area	1976	1991
Los Angeles	0.93	0.96
Orange	1.02	1.05
Riverside	0.82	0.82
San Bernardino	0.82	0.92
Ventura	0.94	1.08
Total Study Area	0.93	0.96

The total number of persons who reported working at home is presented in **Table 45**. Respondents were asked to report working at home in two places: the cover of the activity diary where respondents were asked if they regularly work at home; and in their diary if they actually worked at home on their diary day. The definition of working at home was anyone who works at home instead of going to a regular workplace. However, review of the data implies that some respondents replied positively to this item when they were working at home in the evening after going to their regular workplace during the day.

Table 45
Number of Persons Working at Home By County Study Area

County Study Area	Number of People Indicating They Regularly Work at Home	Percent of Population	Number of People Reporting Working at Home on Diary Day	Percent of Total Trips
Los Angeles	641,097	6.4%	206,496	0.5%
Orange	164,726	1.6%	71,491	0.2%
Riverside	96,849	1.0%	38,204	0.1%
San Bernardino	121,318	1.2%	44,601	0.1%
Ventura	46,498	0.5%	25,009	0.1%

XI. GLOSSARY

This chapter presents detailed definitions of all terms and variables used in this report. All trip-related variables presented in this report were based only on those trips that involved a valid change of location, i.e., they do not include "trips" from home to working at home or trips where either the origin or destination type were missing.

AVERAGE VEHICLE OCCUPANCY - Average vehicle occupancy is the average number of people arriving at a particular destination divided by the average number of cars, vans, or pick-up trucks arriving at that destination.

COUNTY STUDY AREA - County study areas refer to the portions of each of the five counties surveyed. None of the five counties included in this study were surveyed in their entirety, with the exception of Orange County. For a geographical description of the study area, see Table 1 in Chapter I.

DOMINANT MODE - The activity diary permitted respondents to indicate multiple modes of transportation while going from one activity to another; for example, took a car, then an express bus, then walked. A separate variable called "dominant mode" was created to categorize these trips into one mode. The definition was as follows: 1) if only one mode was used, this was the dominant mode; 2) if more than one mode was used, dominant mode was assigned in the following priority: school bus, Amtrak, Blue Line, express bus, local bus, car/van/pick-up, walk; 3) if more than one mode was used, a secondary access mode was assigned to the dominant mode as walk access, car access, or transit access.

EMPLOYEES - Full-time and part-time employees were calculated based on the total number of people in the household who reported that they were employed part-time or full-time (as reported on the household form). This variable does not include those who reported that they were self-employed.

HOUSEHOLD SIZE - Total number of persons age 5 or older who reside in the household (as reported during the recruitment call).

INCOME - The income variable presented in this report is a combination of two questions asked during the survey. Each respondent was asked their total annual household income during the recruitment telephone call. The respondents were also asked to report their annual household income on the household form questionnaire that was included with the diaries. Because it was felt to be more reliable data, the income information collected on the household form was used in this report. It is important to note that a large number of households either indicated that they did not know their income or refused to answer the question. For those households, income information from the recruitment call was incorporated, which reduced the non-response rate to 7.6%.

LICENSED DRIVERS - Respondents reported on the household form how many persons living in the household had a valid driver's license. The total number of licensed drivers per household was then calculated by adding all positive responses to this question for each household.

MULTIPLE DWELLING UNIT - A household whose living quarters were reported as being an apartment, condo/townhouse, duplex/triplex, mobile home, group quarters, or other. Note that multiple dwelling units reported for the 1976 survey did not include mobile homes.

PERSONS PER HOUSEHOLD - Number of persons **age 5 and over** divided by the total number of households.

SINGLE DWELLING UNIT - A household whose living quarters were reported as being a single family house. Note that single dwelling units reported for the 1976 survey included mobile homes.

TOTAL HOUSEHOLDS - The number of households with complete information in the survey response files.

TOTAL PERSONS - Number of persons **of all ages** who resided in the household (as reported during the recruitment call).

TOTAL TRIPS - All trips made by all modes, including those made by walking or bicycling. Based only on those trips that involved a valid change of location, i.e., "trips" from home to working at home

or trips where either the origin or destination type were missing were excluded. The 1976 study defines "person trips", which was used for comparison purposes in this report, as all trips made either by transit, as a passenger in a vehicle, or as the driver of a vehicle. The comparable variable from the 1976 survey, "person trips", was defined as all trips made either by transit, as a passenger in a vehicle, or as the driver of a vehicle.

TRIP PURPOSE - SCAG defines 5 trip purposes which were based on a trip's origin and/or destination:

Home-work - Any trip where the origin or destination was HOME or WORKING AT HOME and the corresponding destination or origin was WORK or WORK-RELATED.

Home-other - Any trip where the origin or destination was HOME or WORKING AT HOME, and the corresponding destination or origin was <u>not</u> WORK, WORK-RELATED, or SHOPPING.

Other-other - Any trip where the origin or destination and corresponding destination or origin was PICK-UP, SCHOOL, SHOPPING, SOCIAL, RECREATION, EAT OUT, PERSONAL, or OTHER.

Other-work - Any trip where the origin or destination was WORK or WORK-RELATED and the corresponding destination or origin was <u>not</u> HOME or WORK AT HOME.

Home-shop - Any trip where the origin or destination was HOME or WORKING AT HOME and the corresponding destination or origin was SHOPPING.

TRIP TYPES - Trip types were based on the dominant mode of transportation used:

Vehicle Driver Trips - Those trips where the respondent's dominant mode of transportation was a car, van, or light truck, and the respondent was the driver. The 1976 study defines vehicle driver trips as those trrips made as a driver of a vehicle. The 1976 survey documentation defined vehicle driver trips as only those trips made as a driver of a vehicle.

Vehicle Passenger Trips - Those trips where the respondent's dominant mode of transportation was a car, van, or light truck, and the respondent was a passenger.

Public Transit Trips - Those trips where the respondent's dominant mode of transportation was a local bus, express bus, or the Blue Line.

Other Trips - Those trips where the respondent's dominant mode of transportation was Amtrak, taxi, shuttle bus, school bus, motorcycle, moped, walk, bicycle, or other.

VEHICLE OWNERSHIP - The number of cars, vans. or light trucks owned, leased, or used regularly by household members for travel.

VEHICLE TRIPS - Those trips where the respondent's dominant mode of transportation was a motorized vehicle, not including public transit, Amtrak, taxi/shuttle bus, school bus, or motorcycle/moped.

VEHICLE TRIPS PER PERSON - Number of trips in a four+ wheeled motorized vehicle divided by the total number of persons age 5 or older.

VEHICLES - Cars, vans, and light trucks only.

VEHICLES PER HOUSEHOLD - Number of cars, vans, and light trucks owned, leased, or used by household members; divided by the total number of households.

WORKING AT HOME - Respondents were asked to report working at home in two places; the cover of the activity diary, and during the diary day if they actually worked at home. A definition of working at home was given as anyone who works at home instead of going to a regular workplace. However, review of the data implies that many respondents replied positively to this question when working in the evening after going to their regular workplace during the day. Use of this data without further investigation is cautioned.

XII. APPENDICES

This section includes the following appendices:

Appendix A - Expansion Method

Appendix B - Data Reliability

APPENDIX A - Expansion Method

The methodology to expand the 1991 Origin-Destination Survey data consisted of two main steps: first, expanding the actual survey responses to represent the total household population; and, second, reweighting the expanded data to represent the proportion of households by household characteristics of size, housing type and vehicle ownership. Each of these steps is described in detail below; **Figure 40** on the following page presents a summary of the steps used..

Step 1: Expansion

The first step involved expanding the raw 1991 survey sample data to the total number of 1991 occupied housing units. The control figure was the 1990 Census as progressed forward by SCAG. In essence, this step involved calculating the ratio of the total occupied households in each RSA to the number of responding households in the RSA. The resulting expansion factor was then applied to all households in that RSA.

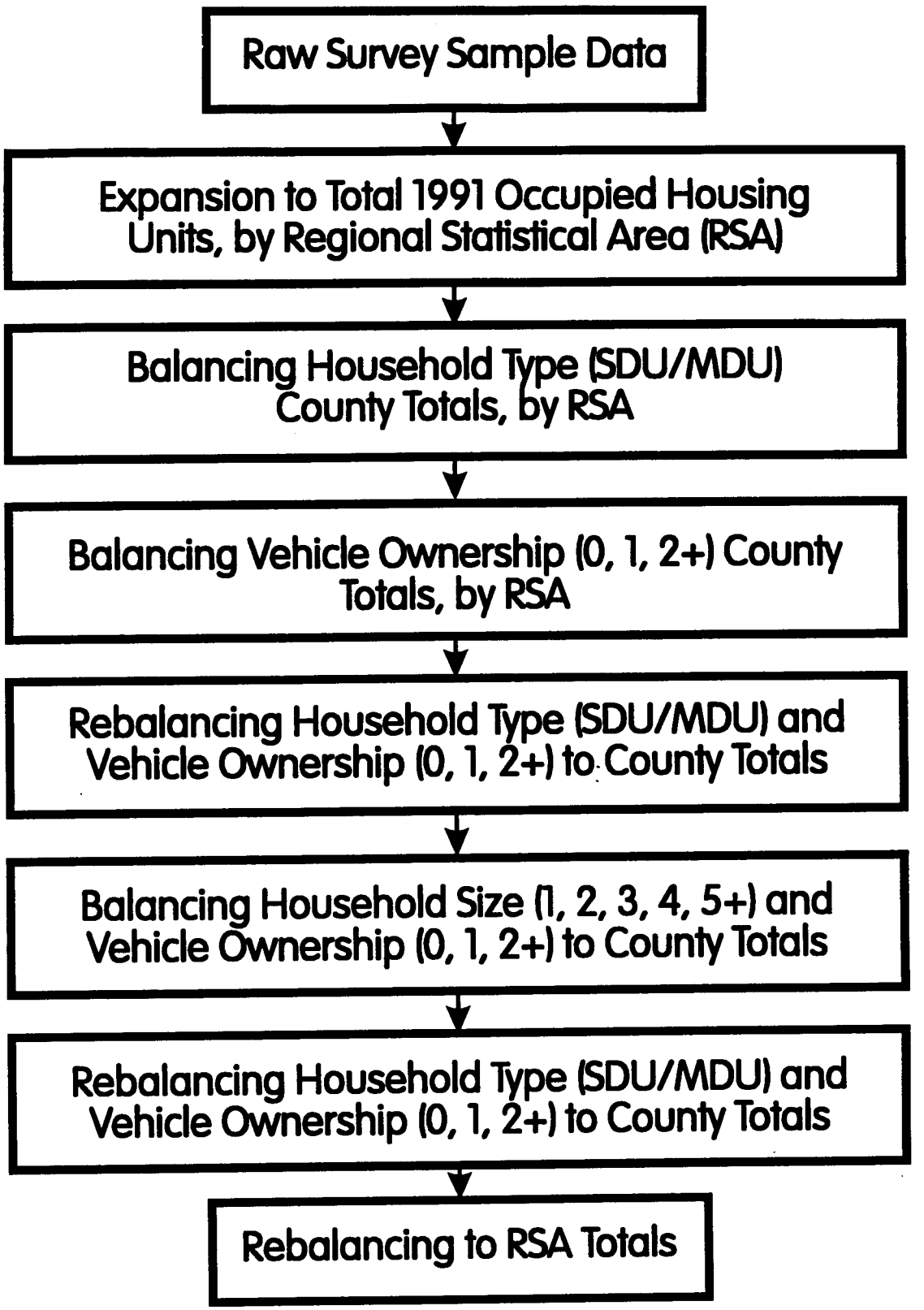
Step 2: Reweighting

The next steps involved weighting the expanded RSA data to the three variables used in the sampling: household size, housing type and vehicle ownership. Because complete three-way crosstabulations of these variables by RSA were not available at the time of this expansion effort, only the one-way totals for each were used as controls.

In each reweighting step, an iterative row-and-column balancing (the Furness Method) was used to correct the two-dimensional matrices obtained by taking each of the variables two at time. In this method, the row and column entries are balanced alternatively in iterative steps until the iterations converge on a stable set of cell values that sum to the desired row and column control totals. A set of weights are calculated from the stable cells that are then applied to expanded households at each step. The final weights represent the product of the expansion factor from Step 1, and the weights from each balancing process in Step 2.

The first reweighting was for dwelling unit type, using the RSA totals of SDUs and MDUs, adjusted for occupied units, as the control. Adjustment factors were obtained from the final iteration and these were multiplied through all cells to yield new totals of the expanded data, from which vehicle ownership statistics were obtained. The second reweighting was for vehicle ownership by RSA to obtain the desired distribution of vehicle ownership. The same row-and-column iterative process was used to obtain weights to balance each RSA for vehicle ownership. The resulting vehicle ownership adjustment factors were applied to the expanded and SDU/MDU weighted data.

Figure 40
Expansion Methods Flow Chart



Balancing the data to vehicle ownership, however, introduced an imbalance in the SDU/MDU distribution. To correct this imbalance, SDU/MDU and vehicle ownership were simultaneously balanced to county totals. The resulting factors were again applied to the previously weighted matrix.

Next, household size was factored in. First, household size and vehicle ownership were balanced to the countywide control totals. Second, housing type (SDU/MDU) and vehicle ownership were rebalanced to county totals.

In the final step, the composite factors were applied to the original sample data and the RSA household totals were rebalanced back to the total RSA expanded household population. The resulting expanded data, for all five county study areas, differed by less than one percent from the countywide Census control totals on each of the three variables. Comparison tables of expanded to census data are presented in **Table 46** on the following page.

Table 46
Comparison of Expanded Household to Control Totals

		LOS ANGELES			ORANGE			RIVERSIDE		
		EXPANDED DATA	CONTROL TOTALS	PERCENT DIFFERENCE	EXPANDED DATA	CONTROL TOTALS	PERCENT DIFFERENCE	EXPANDED DATA	CONTROL TOTALS	PERCENT DIFFERENCE
TOTAL HOUSEHOLDS		3,010,595	3,010,628	0.00%	837,275	837,274	0.00%	413,371	413,372	0.00%
HOUSING TYPE	SDU	1,510,835	1,517,091	-0.41%	445,672	445,671	0.00%	298,466	297,456	0.34%
	MDU	1,499,760	1,493,537	0.42%	391,603	391,603	0.00%	114,905	115,916	-0.87%
VEHICLE OWNERSHIP	0	331,040	337,559	-1.93%	38,997	38,997	0.00%	25,542	25,551	-0.04%
	1	1,080,077	1,078,983	0.10%	246,741	246,741	0.00%	141,485	142,681	-0.84%
	2+	1,599,478	1,594,086	0.34%	551,537	551,536	0.00%	246,345	245,140	0.49%
HOUSEHOLD SIZE	1	765,026	757,387	1.01%	175,585	175,585	0.00%	85,831	86,650	-0.95%
	2	850,951	844,549	0.76%	274,459	274,458	0.00%	137,149	137,988	-0.61%
	3	475,723	476,292	-0.12%	145,912	145,911	0.00%	65,273	64,812	0.71%
	4	416,779	418,549	-0.42%	124,465	124,465	0.00%	61,995	61,200	1.30%
	5+	502,115	513,852	-2.28%	116,855	116,855	0.00%	63,124	62,722	0.64%

		SAN BERNARDINO			VENTURA			STUDY AREA		
		EXPANDED DATA	CONTROL TOTALS	PERCENT DIFFERENCE	EXPANDED DATA	CONTROL TOTALS	PERCENT DIFFERENCE	EXPANDED DATA	CONTROL TOTALS	PERCENT DIFFERENCE
TOTAL HOUSEHOLDS		471,269	471,137	0.03%	220,145	220,142	0.00%	4,952,655	4,952,553	0.00%
HOUSING TYPE	SDU	350,995	350,863	0.04%	149,263	149,261	0.00%	2,755,231	2,760,342	-0.19%
	MDU	120,274	120,274	0.00%	70,882	70,881	0.00%	2,197,424	2,192,211	0.24%
VEHICLE OWNERSHIP	0	30,725	30,724	0.00%	9,650	9,650	0.00%	435,954	442,481	-1.48%
	1	147,961	147,831	0.09%	57,441	57,440	0.00%	1,673,705	1,673,676	0.00%
	2+	292,584	292,582	0.00%	153,055	153,052	0.00%	2,842,999	2,836,396	0.23%
HOUSEHOLD SIZE	1	89,762	89,632	0.15%	39,114	39,114	0.00%	1,155,318	1,148,368	0.61%
	2	137,671	137,670	0.00%	68,592	68,591	0.00%	1,468,822	1,463,256	0.38%
	3	84,507	84,507	0.00%	40,400	40,399	0.00%	811,815	811,921	-0.01%
	4	81,912	81,912	0.00%	37,177	37,177	0.00%	722,328	723,303	-0.13%
	5+	77,416	77,416	0.00%	34,862	34,861	0.00%	794,372	805,706	-1.41%

APPENDIX B - Data Reliability

Survey data are subject to two general types of error: sampling and non-sampling error. Sampling error is the difference between the sample estimate and the true population value, resulting from variation among households being sampled. This section addresses the degree of sampling error.

Non-sampling error is that error due to all other factors unrelated to variation in the population, including interviewer errors, poor recall on the part of respondents, key punch errors, etc. Both types of error should be considered when evaluating the survey results.

Table 47 presents the mean, variance, 5 percent confidence interval around the mean, the percentage of maximum relative error (MRE), and sample size for the key variables of vehicle ownership, dwelling unit type, and household size. The maximum relative error is a term that enables us to say, with 95 percent confidence, that we expect the true value to fall within an acceptable percentage above or below the mean. It is calculated by dividing the confidence interval by the estimate, and multiplying by 100. The formula for confidence interval is as follows:

$$\bar{x} - t_{(1-a/2)} \sqrt{\frac{s^2}{n}} < \mu < \bar{x} + t_{(1-a/2)} \sqrt{\frac{s^2}{n}}$$

were $\bar{x}$ is the sample mean, μ is an estimate of the true mean, n is the sample size, and s is the standard deviation of the population. The symbol $t_{(1-a/2)}$ is referred to as "Student's statistic," and depends upon the level of confidence (1-a) desired and the sample size n. The formula for maximum relative error is as follows:

$$\frac{t_{(1-a/2)} \sqrt{\frac{s^2}{n}}}{\bar{x}} \times 100 = \text{M.R.E.}$$

In general, comparing the confidence intervals and the maximum relative error across years, it can be seen that the estimates based on the 1991 data tend to be associated with a higher degree of precision than both the 1976 and 1967 data in Orange and Ventura counties, and with a higher precision than the 1976 data in Los Angeles County. No comparisons are possible with previous data for Riverside and San Bernardino Counties because those data were combined in 1976.

The sampling for the 1991 Origin-Destination Survey was conducted by sampling within Regional Statistical Areas (RSAs); and controlling to household size, vehicle ownership, and housing type at the county level. Because the sample of 320 surveys in each RSA represents a different proportion of the total RSA population, the RSA is the primary stratum of the sampling procedure and sampling errors are also calculated at the RSA level.

Table 47
1991 Reliability Estimates - Los Angeles County

Single Housing Units

		Family Size			Vehicle Ownership		
		1967	1976	1991	1967	1976	1991
Mean		3.39	3.23	2.83	1.64	1.92	2.17
Variance		3.20	2.41	1.47	0.78	1.01	0.51
Confidence Interval	Upper Limit	3.42	3.28	2.85	1.65	1.94	2.18
	Lower Limit	3.36	3.18	2.81	1.63	1.90	2.16
Maximum Relative Error (%)		0.88	1.95	1.32	0.90	2.13	1.01
Sample Size		13910	2329	4084	13910	2329	4084

Multiple Housing Units

		Family Size			Vehicle Ownership		
		1967	1976	1991	1967	1976	1991
Mean		2.06	2.15	2.12	0.93	1.11	1.53
Variance		1.74	1.37	0.76	0.58	0.69	0.44
Confidence Interval	Upper Limit	2.08	2.20	2.13	0.94	1.15	1.54
	Lower Limit	2.04	2.10	2.11	0.92	1.07	1.52
Maximum Relative Error (%)		1.30	3.88	1.61	1.67	5.30	1.69
Sample Size		9280	759	2495	9280	759	2495

All Housing Units

		Family Size			Vehicle Ownership		
		1967	1976	1991	1967	1976	1991
Mean		2.86	2.78	2.56	1.36	1.58	1.92
Variance		3.04	2.06	2.32	0.82	0.95	1.07
Confidence Interval	Upper Limit	2.88	2.82	2.59	1.37	1.60	1.93
	Lower Limit	2.84	2.74	2.53	1.35	1.56	1.91
Maximum Relative Error (%)		0.79	1.82	1.44	0.86	2.17	1.30
Sample Size		23190	3088	6579	23190	3088	6579

Table 47 (Continued)
1991 Reliability Estimates - Orange County

Single Housing Units

		Family Size			Vehicle Ownership		
		1967	1976	1991	1967	1976	1991
Mean		3.68	3.34	2.87	1.82	2.16	2.24
Variance		2.97	2.41	1.07	0.66	1.02	0.28
Confidence Interval	Upper Limit	3.73	3.41	2.89	1.83	2.19	2.24
	Lower Limit	3.65	3.29	2.86	1.81	2.14	2.24
Maximum Relative Error (%)		1.80	3.00	1.56	1.90	3.00	1.04
Sample Size		2666	895	1944	2666	895	1944

Multiple Housing Units

		Family Size			Vehicle Ownership		
		1967	1976	1991	1967	1976	1991
Mean		2.17	2.02	2.07	1.13	1.25	1.75
Variance		1.55	0.88	0.45	0.58	0.64	0.33
Confidence Interval	Upper Limit	2.22	2.09	2.08	1.15	1.32	1.76
	Lower Limit	2.15	1.99	2.06	1.12	1.22	1.74
Maximum Relative Error (%)		3.30	7.90	1.76	3.80	11.20	1.78
Sample Size		1168	129	1297	1168	129	1297

All Housing Units

		Family Size			Vehicle Ownership		
		1967	1976	1991	1967	1976	1991
Mean		3.22	2.85	2.55	1.61	1.82	2.05
Variance		3.02	2.06	1.60	0.74	1.16	0.68
Confidence Interval	Upper Limit	3.27	2.91	2.58	1.63	1.87	2.06
	Lower Limit	3.20	2.81	2.53	1.60	1.79	2.04
Maximum Relative Error (%)		1.70	3.00	1.71	3.10	4.00	1.39
Sample Size		3834	1024	3241	3834	1024	3241

Table 47 (Continued)
1991 Reliability Estimates - Ventura County

Single Housing Units

		Family Size			Vehicle Ownership		
		1967	1976	1991	1967	1976	1991
Mean		3.68	3.34	2.92	1.75	2.04	2.27
Variance		3.28	2.46	1.43	0.70	1.06	0.34
Confidence Interval	Upper Limit	3.79	3.45	2.95	1.77	2.09	2.27
	Lower Limit	3.62	3.27	2.90	1.74	2.01	2.27
Maximum Relative Error (%)		3.50	4.57	2.27	3.40	4.90	1.41
Sample Size		765	405	1251	765	405	1251

Multiple Housing Units

		Family Size			Vehicle Ownership		
		1967	1976	1991	1967	1976	1991
Mean		2.09	2.25	2.07	0.93	1.27	1.68
Variance		2.16	1.80	0.25	0.56	0.81	0.24
Confidence Interval	Upper Limit	2.28	2.50	2.08	0.99	1.40	1.69
	Lower Limit	2.02	2.11	2.07	0.91	1.18	1.68
Maximum Relative Error (%)		8.90	13.70	2.38	10.20	16.23	2.87
Sample Size		239	73	397	239	73	397

All Housing Units

		Family Size			Vehicle Ownership		
		1967	1976	1991	1967	1976	1991
Mean		3.30	3.04	2.72	1.56	1.83	2.13
Variance		3.47	2.42	1.83	0.79	1.06	0.69
Confidence Interval	Upper Limit	3.42	3.51	2.76	1.59	1.88	2.14
	Lower Limit	3.24	2.97	2.69	1.54	1.79	2.12
Maximum Relative Error (%)		3.50	4.59	2.40	3.50	5.03	1.88
Sample Size		1004	478	1648	1004	478	1648

Table 47 (Continued)
1991 Reliability Estimates - San Bernardino and Riverside Counties

Single Housing Units

		Family Size		Vehicle Ownership	
		San Bernardino	Riverside	San Bernardino	Riverside
Mean		2.71	2.66	2.18	2.08
Variance		1.92	1.86	0.47	0.61
Confidence Interval	Upper Limit	2.76	2.70	2.19	2.09
	Lower Limit	2.67	2.61	2.17	2.07
Maximum Relative Error (%)		2.79	2.17	1.71	1.59
Sample Size		1293	2134	1293	2134

Multiple Housing Units

		Family Size		Vehicle Ownership	
		San Bernardino	Riverside	San Bernardino	Riverside
Mean		2.08	2.03	1.57	1.57
Variance		0.32	0.55	0.24	0.44
Confidence Interval	Upper Limit	2.09	2.04	1.58	1.58
	Lower Limit	2.07	2.01	1.56	1.56
Maximum Relative Error (%)		2.83	2.47	3.25	2.85
Sample Size		397	842	397	842

All Housing Units

		Family Size		Vehicle Ownership	
		San Bernardino	Riverside	San Bernardino	Riverside
Mean		2.57	2.48	2.05	1.94
Variance		2.36	2.53	0.86	1.12
Confidence Interval	Upper Limit	2.64	2.54	2.07	1.96
	Lower Limit	2.52	2.41	2.04	1.92
Maximum Relative Error (%)		2.88	2.31	2.18	1.97
Sample Size		1642	2976	1642	2976

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TO MEET REGIONAL CHALLENGES
AND TO RESOLVE
REGIONAL DIFFERENCES.