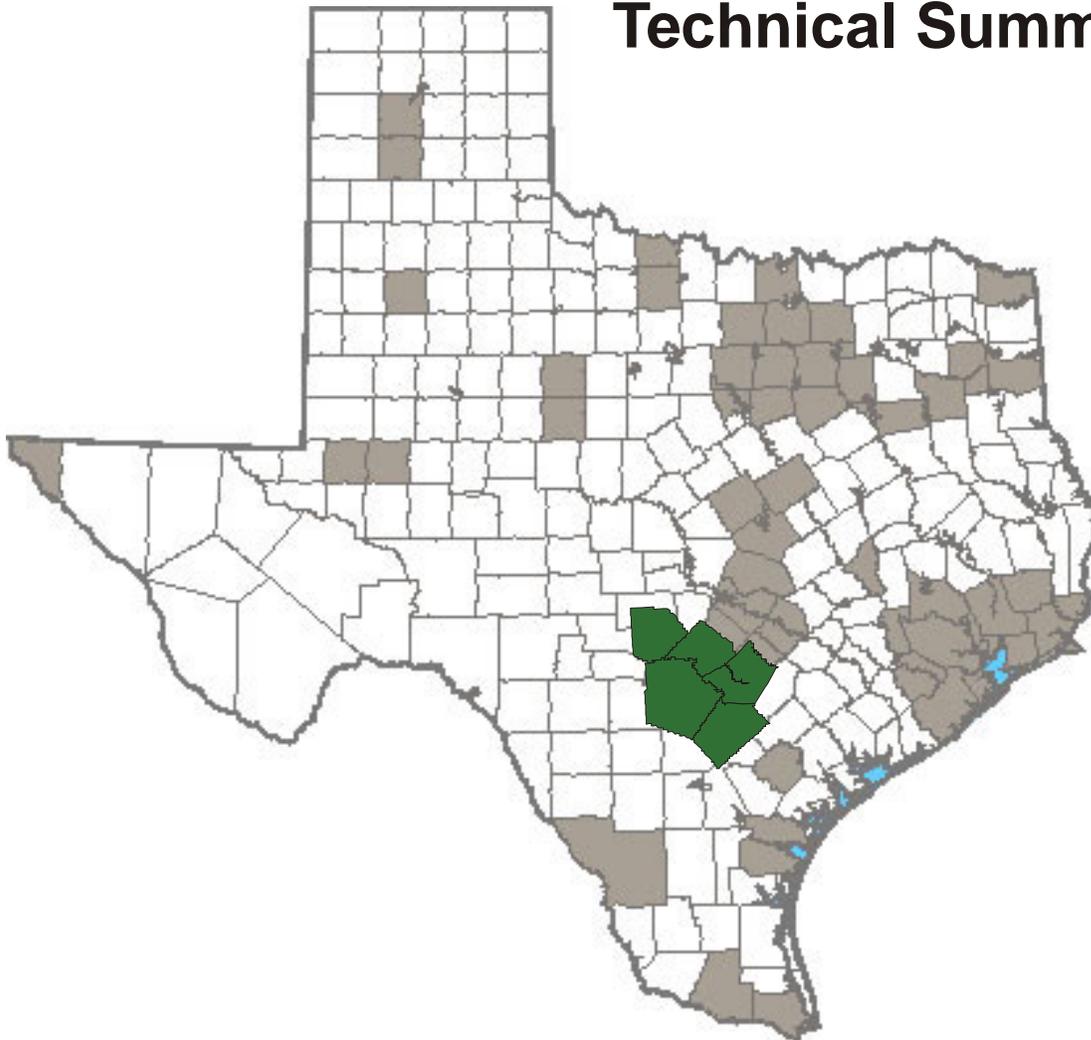


# 2006 San Antonio Area Metropolitan Planning Organization Household Travel Survey Technical Summary



Prepared by the  
Texas Transportation Institute  
February 2008



**2006 San Antonio-Bexar County  
Metropolitan Planning Organization  
Household Travel Survey  
Technical Summary**

**Texas Department of Transportation Travel Survey Program**

By

Debbie Spillane  
Assistant Transportation Researcher  
Texas Transportation Institute

and

David F. Pearson, Ph.D., P.E.  
Research Engineer  
Texas Transportation Institute

Performed in cooperation with the  
Texas Department of Transportation  
and the  
Bexar County Metropolitan Planning Organization  
and the  
Federal Highway Administration

February 2008

TEXAS TRANSPORTATION INSTITUTE  
The Texas A&M University System  
College Station, Texas 77843-3135



## **DISCLAIMER**

The contents of this report reflect the views of the author who is responsible for the data, findings, and conclusions presented herein. The contents do not necessarily reflect the official views or policies of the Federal Highway Administration, the Texas Department of Transportation (TxDOT), or the Bexar County Metropolitan Planning Organization. This report does not constitute a standard, specification, or regulation. Debbie Spillane was the author of this report and David F. Pearson, Ph.D., P.E., was the study supervisor. Charlie Hall of the TxDOT Planning and Programming Division was the project director.

## **ACKNOWLEDGMENTS**

This project was conducted in cooperation with the Texas Department of Transportation (TxDOT) and the San Antonio-Bexar County Metropolitan Planning Organization (SA-BC MPO). The authors provide special thanks to Mr. Charlie Hall, the TxDOT project director, for his guidance on this report and for his continuing direction of the TxDOT's Travel Survey Program. The authors also acknowledge the contributions of Mr. Gary Lobaugh, of the Texas Transportation Institute, for preparation of the graphics and for editing the report.

## TABLE OF CONTENTS

List of Figures .....	vii
List of Tables .....	ix
Introduction.....	1
Household Survey Results .....	5
Key Points Regarding Household Survey Data .....	5
Findings of the Survey .....	5
Household Characteristics .....	6
Household Size .....	6
Household Life Cycle .....	8
Household Income .....	9
Household Vehicle Availability and Licensed Drivers .....	10
Household Employment .....	13
Ethnicity .....	16
Traveler Characteristics .....	17
Household Trip Rates and Vehicle Occupancy .....	17
Travel by Age Cohort .....	22
Mode of Travel .....	22
Amount of Travel.....	24
Trip Distance.....	24
Trip Duration .....	26
Vehicle Miles of Travel (VMT).....	27
Time of Travel .....	28
Travel Purpose .....	29
Trip Purpose.....	30
Type of Place at Trip Destination .....	31
Where People Traveled.....	33
Terminology.....	49
Appendix A Comparison of the 1990 San Antonio Area Household Travel Survey with the 2006 San Antonio-Bexar County Household Travel Survey.....	51
Introduction.....	53
Household Characteristics .....	56
Household Size .....	57
Household Income .....	58
Traveler Characteristics .....	59
Household Trip Rates .....	59
Travel by Age Cohort .....	61
Mode of Travel .....	62
Amount of Travel.....	63
Internal and External Person Trips .....	63
Trip Purpose.....	65
Trip Distance.....	67
Trip Duration .....	69
Vehicle Miles of Travel .....	70
Summary .....	71



## LIST OF FIGURES

Figure 1.	San Antonio – Bexar County MPO Household Survey Area.....	3
Figure 2.	Distribution of Households by Household Size.....	7
Figure 3.	Distribution of Households by Life Cycle.....	8
Figure 4.	Distribution of Households by Household Income Range. ....	9
Figure 5.	Distribution of Households by Number of Vehicles Available.....	10
Figure 6.	Distribution of Households by Number of Licensed Drivers.....	11
Figure 7.	Distribution of Households by Licensed Drivers and Vehicle Availability.....	12
Figure 8.	Distribution of Households by Number of Persons Employed. ....	13
Figure 9.	Distribution of Persons by Employment Status.....	14
Figure 10.	Distribution of Employed Persons by Employer Type.....	15
Figure 11.	Distribution of Persons by Ethnicity.....	16
Figure 12.	Household Trip Rates by Household Size. ....	17
Figure 13.	Household Trip Rates by Household Income Range.....	18
Figure 14.	Household Trip Rates by Number of Vehicles Available. ....	19
Figure 15.	Distribution of Person Trips by Mode of Travel. ....	23
Figure 16.	Distribution of Person Trips by Trip Distance in Miles. ....	24
Figure 17.	Distribution of Vehicle Trips by Trip Distance in Miles.....	25
Figure 18.	Distribution of Person Trips by Trip Duration in Minutes.....	26
Figure 19.	Distribution of Vehicle Trips by Trip Duration in Minutes. ....	27
Figure 20.	Distribution of Person Trip Start Times by Hour of the Day. ....	28
Figure 21.	Distribution of Person Trips by Trip Destination Purpose. ....	29
Figure 22.	Distribution of Person Trips by Internal Trip Purpose. ....	30
Figure 23.	Distribution of Vehicle Driver Trips by Internal Trip Purpose.....	31
Figure 24.	Bexar County and the Sub-Regions within Bexar County. ....	35
Figure 25.	Person Trip Interchanges between Area 1 and Areas 2 through 12. ....	36
Figure 26.	Person Trip Interchanges between Area 2 and Areas 1 and 3 through 12.....	36
Figure 27.	Person Trip Interchanges between Area 3 and Areas 1 and 2 and 4 through 12.....	37
Figure 28.	Person Trip Interchanges between Area 4 and Areas 1 through 3 and 5 through 12.....	37
Figure 29.	Person Trip Interchanges between Area 5 and Areas 1 through 4 and 6 through 12.....	38
Figure 30.	Person Trip Interchanges between Area 6 and Areas 1 through 5 and 7 through 12.....	38
Figure 31.	Person Trip Interchanges between Area 7 and Areas 1 through 6 and 8 through 12.....	39
Figure 32.	Person Trip Interchanges between Area 8 and Areas 1 through 7 and 9 through 12.....	39
Figure 33.	Person Trip Interchanges between Area 9 and Areas 1 through 8 and 10 through 12.....	40
Figure 34.	Person Trip Interchanges between Area 10 and Areas 1 through 9 and 11 through 12.....	40
Figure 35.	Person Trip Interchanges between Area 11 and Areas 1 through 10 and 12.....	41
Figure 36.	Person Trip Interchanges between Area 12 and Areas 1 through 11. ....	41
Figure 37.	Percent of Trips that Remain in Areas 1 through 12. ....	42

Figure 38. Five-County San Antonio - Bexar County MPO Study Area.....	43
Figure 39. Person Trip Interchanges between Bexar County and Kendall, Comal, Guadalupe, and Wilson Counties. ....	44
Figure 40. Person Trip Interchanges between Kendall County and Bexar, Comal, Guadalupe, and Wilson Counties. ....	44
Figure 41. Person Trip Interchanges between Comal County and Bexar, Kendall, Guadalupe, and Wilson Counties. ....	45
Figure 42. Person Trip Interchanges between Guadalupe County and Bexar, Kendall, Comal, and Wilson Counties. ....	45
Figure 43. Person Trip Interchanges between Wilson County and Bexar, Kendall, Comal, and Guadalupe Counties. ....	46
Figure 44. Percent of Person Trips that Remain within Each County. ....	46
Figure 45. San Antonio - Bexar County MPO 1990 Household Survey Area. ....	54
Figure 46. Five-County San Antonio - Bexar County MPO 2006 Household Survey Area.....	55
Figure 47. Distribution of Households by Household Size.....	57
Figure 48. Distribution of Households by Household Income Range. ....	58
Figure 49. Household Trip Rates by Household Size. ....	59
Figure 50. Distribution of Person Trips by Mode of Travel. ....	62
Figure 51. Distribution of Person Trips by Internal Trip Purpose. ....	65
Figure 52. Distribution of Auto-Driver Trips by Internal Trip Purpose. ....	66
Figure 53. Distribution of Person Trips by Trip Distance in Miles. ....	67
Figure 54. Distribution of Vehicle Trips by Trip Distance in Miles.....	68
Figure 55. Distribution of Person Trips by Trip Duration in Minutes. ....	69
Figure 56. Distribution of Vehicle Trips by Trip Duration in Minutes. ....	70

## LIST OF TABLES

Table 1.	Estimated Number of 2006 Households, Number of Households Surveyed, and Percent of Surveyed Households, Stratified by Household Size and Income Range. ....	4
Table 2.	Person Trip Rates by Household Size and Household Income.....	20
Table 3.	Average Vehicle Occupancy by Household Size and Household Income. ....	21
Table 4.	Number of Persons, Percent of Persons, and Percent of Persons Making Zero Trips by Age Cohort. ....	22
Table 5.	Number Person Trips and Distribution of Person Trips by Type of Place at Trip Destination. ....	32
Table 6.	Comparative Travel Survey Data for Selected Texas Urban Areas. ....	48
Table 7.	Estimated Population, Households, and Persons per Household.....	56
Table 8.	Person Trip Rates by Household Size and Household Income.....	60
Table 9.	Percent of Persons and Percent of Persons Making Zero Internal Trips. ....	61
Table 10.	The Number and Distribution of 1990 and 2006 Internal and External-Local Trips. ....	64



## **INTRODUCTION**

In 2006, the Transportation Planning and Programming Division (TPP) of the Texas Department of Transportation (TxDOT) funded a comprehensive set of travel surveys in Bexar, Comal, Guadalupe, Kendall, and Wilson counties. These five counties were surveyed for modeling purposes. The purpose of these travel surveys was to provide information on the characteristics of household travel into, out of, and within this five-county area. The San Antonio – Bexar County Metropolitan Planning Organization (SA-BC MPO) planning area includes Bexar County and parts of Comal and Guadalupe counties. The remaining areas of those counties as well as Kendall and Wilson counties were included in the travel survey area due to the large volume of travel between these two counties and the three counties in the SA-BC MPO planning area. The surveys were designed to measure the amount of household travel and the characteristics of this travel for a typical Monday through Friday weekday during the school year.

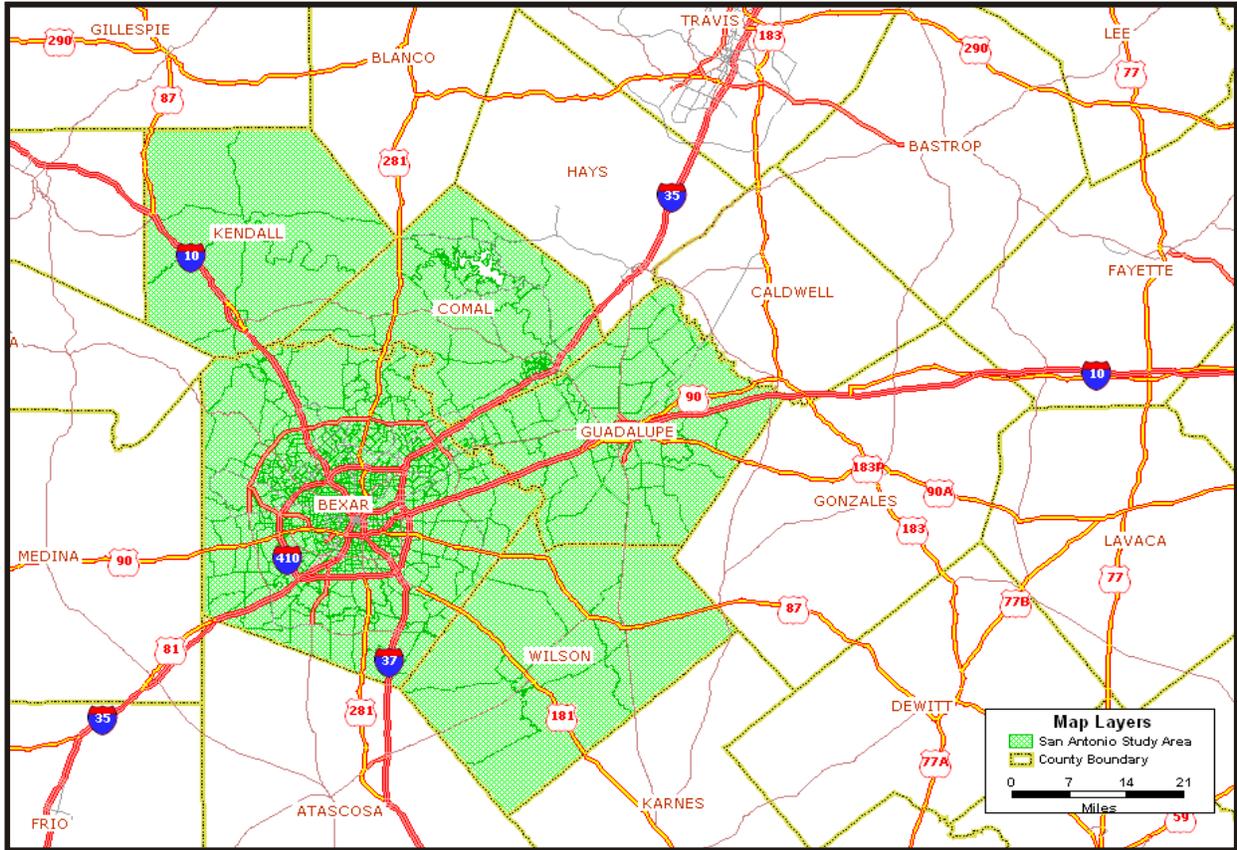
The travel surveys were designed and conducted to measure household travel within the five-county area that included a Global Positioning System (GPS) component. The travel surveys also included a commercial vehicle survey, an external station survey, a work place survey, and a peak and off-peak period travel time and delay survey by type of roadway.

This report summarizes the results of the household survey for the five-county area. A variety of household summary information is presented in this report. The summary information is subject to modification as the survey data are further evaluated and analyzed within the context of all the travel surveys conducted.

The household survey sample design is based on obtaining travel information from a pre-determined number of households within certain ranges of household income and household size. The desired number of surveyed households in any household size/income range is not proportional to the estimated number of households in the cell. Rather, the number of households to be surveyed in each cell was based on the total estimated number of households in the area

and the expected number of trips the households will make during a typical school-year weekday.

The survey design is based on a desired level of accuracy of +/- 10 percent with a confidence level of 90 percent for the total person trips in the survey area. Figure 1 shows the survey area. The number of households in the five-county area in 2006 was estimated from the 2000 census and the Texas State Data Center (TSDC) population projections for Bexar, Comal, Guadalupe, Kendall, and Wilson counties. Table 1 shows the estimated number of households in the study area in 2006, the number of households surveyed, and the distribution of the number of households surveyed stratified by household size and household income range.



**Figure 1. San Antonio – Bexar County MPO Household Survey Area.**

A total of 2,000 households were surveyed. The minimum number of households surveyed in any household size/income range cell was 24 and the maximum number surveyed was 169. The higher number of households surveyed in household sizes one and two is highly desirable due to the high number of households with one or two persons. Of the estimated 641,487 households in the five-county area, 23 percent are households with one person and 30 percent are households with two persons — 53 percent of the households are one or two person households.

**Table 1. Estimated Number of 2006 Households, Number of Households Surveyed, and Percent of Surveyed Households, Stratified by Household Size and Income Range.**

Income Range	Household Size					Total
	1	2	3	4	5+	
<b>Estimated 2006 Number of Households</b>						
\$0 to \$19,999	64,149	36,565	18,603	15,396	12,188	<b>146,901</b>
\$20,000 to \$34,999	39,722	37,206	21,169	19,886	16,037	<b>134,070</b>
\$35,000 to \$49,999	19,245	34,640	20,528	18,603	16,679	<b>109,695</b>
\$50,000 to \$74,999	14,113	41,055	26,301	23,093	20,528	<b>125,090</b>
\$75,000 +	7,698	43,621	25,659	26,301	22,452	<b>125,731</b>
<b>Totals</b>	<b>144,977</b>	<b>193,087</b>	<b>112,260</b>	<b>103,279</b>	<b>87,884</b>	<b>641,487</b>
<b>Number of Households Surveyed</b>						
\$0 to \$19,999	112	114	42	26	24	<b>318</b>
\$20,000 to \$34,999	79	153	70	51	46	<b>399</b>
\$35,000 to \$49,999	73	125	74	66	36	<b>374</b>
\$50,000 to \$74,999	45	157	95	83	42	<b>422</b>
\$75,000 +	41	169	116	89	72	<b>487</b>
<b>Totals</b>	<b>350</b>	<b>718</b>	<b>397</b>	<b>315</b>	<b>220</b>	<b>2,000</b>
<b>Percent of Households Surveyed</b>						
\$0 to \$19,999	5.60	5.70	2.10	1.30	1.20	<b>15.90</b>
\$20,000 to \$34,999	3.95	7.65	3.50	2.55	2.30	<b>19.95</b>
\$35,000 to \$49,999	3.65	6.25	3.70	3.30	1.80	<b>18.70</b>
\$50,000 to \$74,999	2.25	7.85	4.75	4.15	2.10	<b>21.10</b>
\$75,000 +	2.05	8.45	5.80	4.45	3.60	<b>24.35</b>
<b>Totals</b>	<b>17.50</b>	<b>35.90</b>	<b>19.85</b>	<b>15.75</b>	<b>11.0</b>	<b>100</b>

Source: Five-County Household Travel Survey and Texas Transportation Institute (TTI) Analysis.

## **HOUSEHOLD SURVEY RESULTS**

This survey represents a sample of household demographic and travel characteristics for a Monday through Friday weekday during the school year in the fall of 2005 and the spring of 2006. The survey data was collected from travel diaries completed on a specified travel day for all occupants of 2,000 households located in the five-county area, Figure 1.

### **Key Points Regarding Household Survey Data**

- The survey data is for an average weekday in the fall of 2005 and the spring of 2006.
- The survey data were tabulated only for persons who lived in the surveyed households. Persons living in group quarters, such as nursing homes, correctional facilities, or dormitories, or in households without phone service were not surveyed.
- The survey data are for persons of all ages unless otherwise noted.
- The survey data do not include non-household-based travel such as tourists or persons staying in hotels.
- The estimates for population and number of households are based on the expanded survey data and may differ from population and household estimates developed by other agencies.
- The survey data is for trips that began and ended within the five-county area. Trips that began inside the five-county area and ended outside the planning area or vice versa are summarized in the external station survey report.

### **Findings of the Survey**

For the five-county area:

- 97 percent of the households had a vehicle available.
- 97 percent of the households had a licensed driver.
- Trip rates per household increased with household size, with household income, and with vehicle availability.
- The average vehicle occupancy was 1.52 persons per vehicle.
- Over 91 percent of all person trips were made in a personal-use vehicle.

- Of the household population that traveled, 63 percent drove a vehicle, 28 percent rode as a passenger in a vehicle, 4 percent rode in a school bus, 4 percent walked, and less than 1 percent used public transportation or rode a bicycle.
- Just over 15 percent of the total household population did not make an internal trip within the planning area on their survey day.
- On average, each person made 3.31 person trips per day and each household made 9.25 person trips per day.
- The average person trip length was 7.0 miles and the average person trip duration was 12.4 minutes.
- The average vehicle trip length was 7.4 miles and the average vehicle trip duration was 13.2 minutes.
- The peak hour for household travel was from 7:01 a.m. to 8:00 a.m. during which 13 percent of the trip starts occurred. The second highest hour for household trip starts was from 3:01 p.m. to 4:00 p.m. when 10 percent of the daily trip starts occurred.
- Weekday school year household travel internal to the study area accounted for an estimated 25 million vehicle miles of travel (VMT).

## **HOUSEHOLD CHARACTERISTICS**

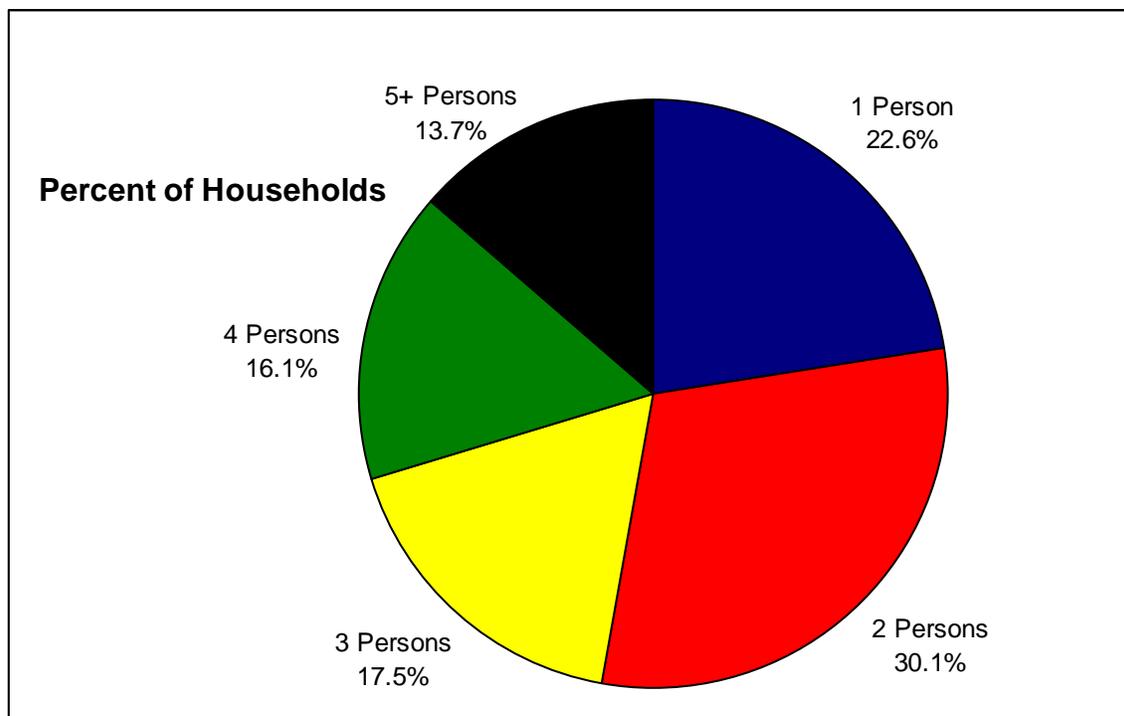
Characteristics of the household influence travel behavior. For example, household size, income, vehicles available, number of persons employed, and family life cycle affect the amount and the time-of-day that trips are made. For this survey, households include only those persons living in residences, and do not include persons living in group quarters. The figures in this section are for the expanded survey data.

### **Household Size**

Figure 2 shows the distribution of households by household size for 2006. Household size and household income range are the two household variables used to stratify the household trip rates calculated from the household travel survey. When forecasting future travel, the forecast population must be estimated by household size and household income range. Average household size in the five-county study area in 2006 estimated from the survey was 2.76 persons per household down from 2.89 persons per household in 1990. This means that as the population

grows, the number of households is increasing at a slightly faster rate than the population, since there are fewer persons per household. For the five-county travel model, three variables — household size, household income, and the number of persons employed in the household, were used to stratify trip rates for the home-based work (HBW) trip purpose. For the home-based non-work (HBNW) and the non-home based (NHB) trip purposes, two variables — household size and household income — were used to stratify trip rates.

A typical household makes a certain number of trips on most days to meet household needs, for example, to purchase food and other necessities, to earn an income, to attend school, to visit friends and family, to receive medical care, to attend events, etc. For this reason, the number of households is a better predictor of future travel than using the number of persons.

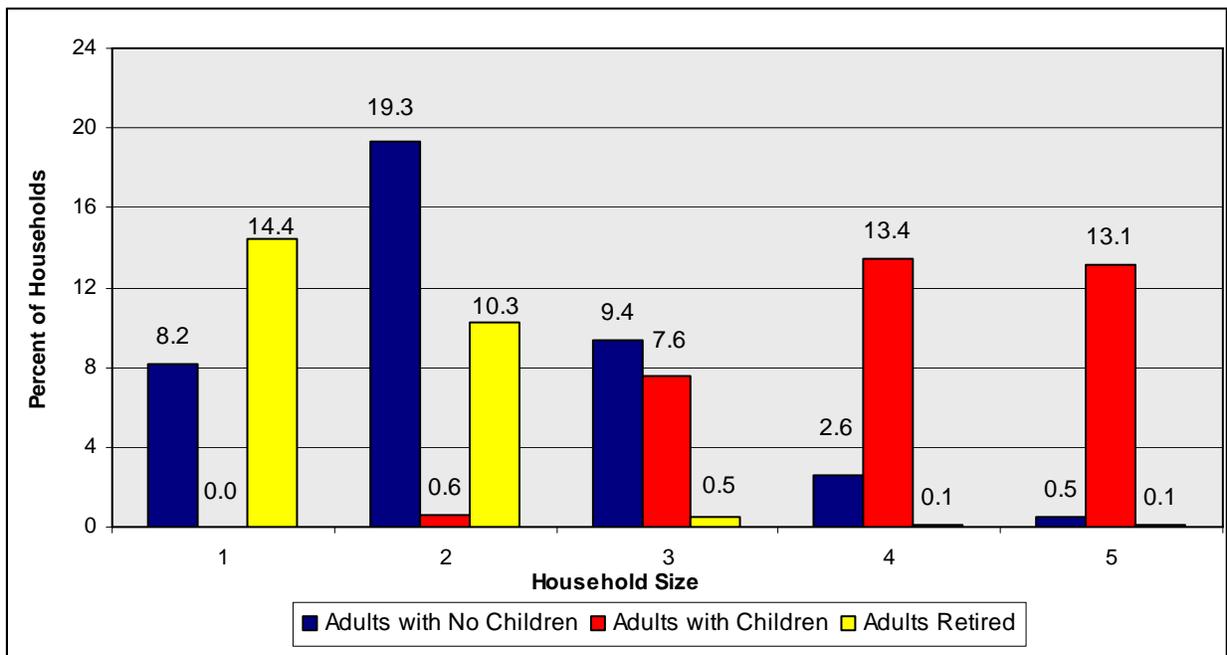


Source: Five-County Household Travel Survey.

**Figure 2. Distribution of Households by Household Size.**

## Household Life Cycle

Household life cycle influences the amount and time of travel. For example, households with children tend to make more trips than households without children. Households with working adults tend to make more trips than households with retired adults. There were an estimated 641,487 households in the five-county travel area in 2006. Figure 3 shows the distribution of these 641,487 households by those with no children and not retired, those with children, and those with only retired persons. Over one third of the households (35 percent) have children, 40 percent of the households have no children, and 25 percent of the households were retired persons.

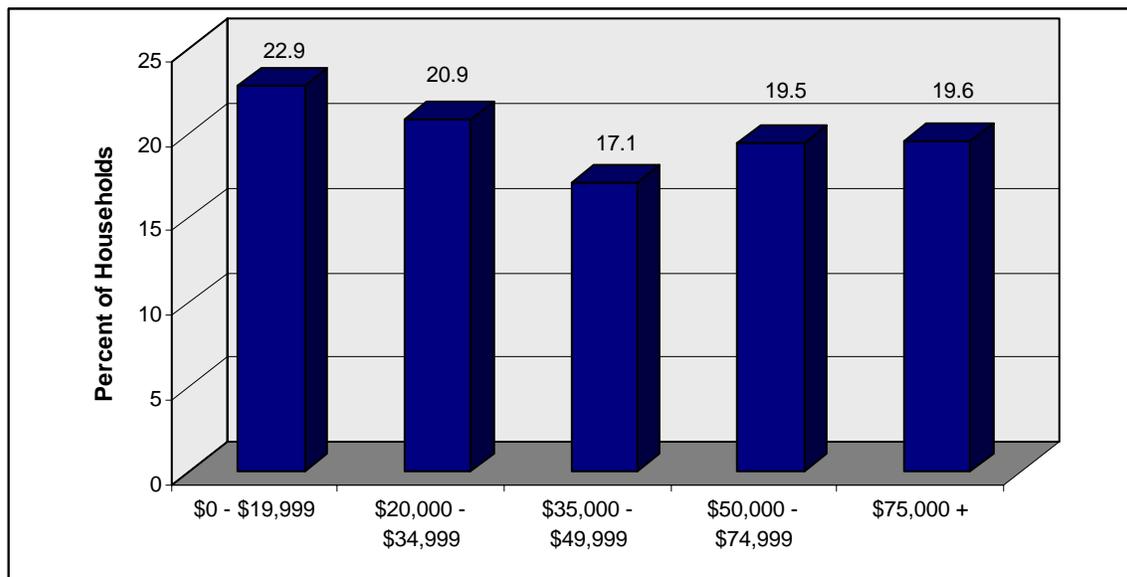


Source: Five-County Household Travel Survey and TTI Analysis. Note: The data represents households within the five-county travel survey area. The data does not include residents who did not report age. Adults are persons 18 years of age and older. Retired households have only retired persons. If one person in the household was retired and the other adult was employed, that household was not counted as a retired household.

**Figure 3. Distribution of Households by Life Cycle.**

## Household Income

Household income and household size are the two primary variables used to estimate household trip rates. As household income increases, the amount of household travel tends to increase. Additionally, as income increases, vehicle ownership tends to increase and additional financial resources are available to the household to support increased travel. Figure 4 shows the distribution of the 641,487 expanded households in the survey by the combined annual household income range.

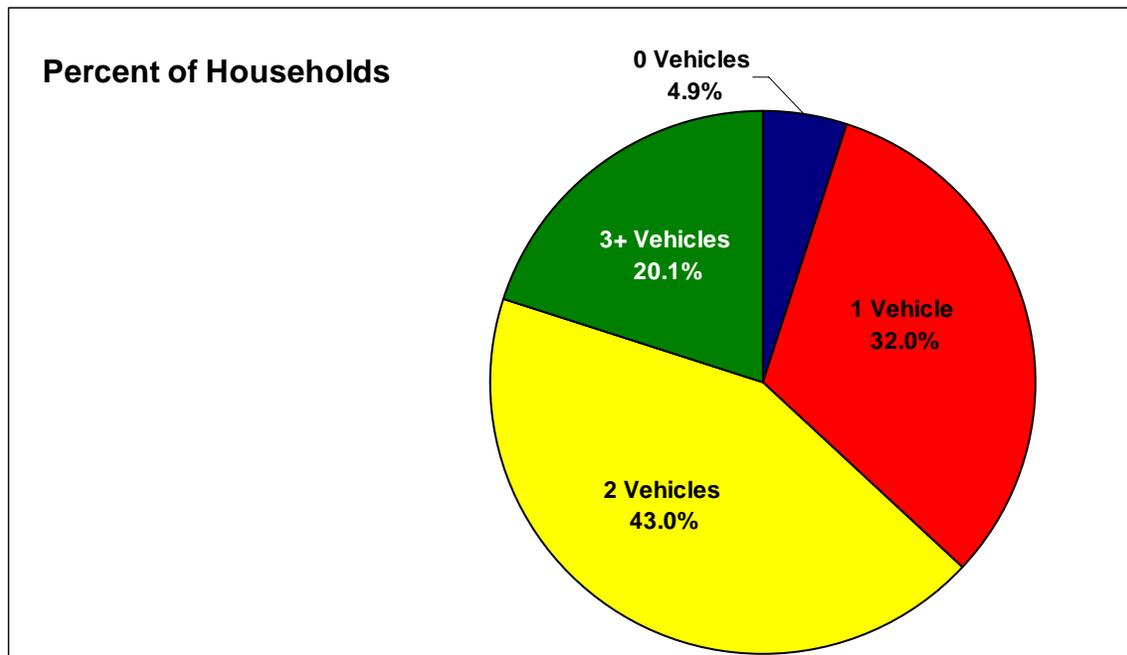


Source: Five-County Household Travel Survey and TTI Analysis.

**Figure 4. Distribution of Households by Household Income Range.**

## Household Vehicle Availability and Licensed Drivers

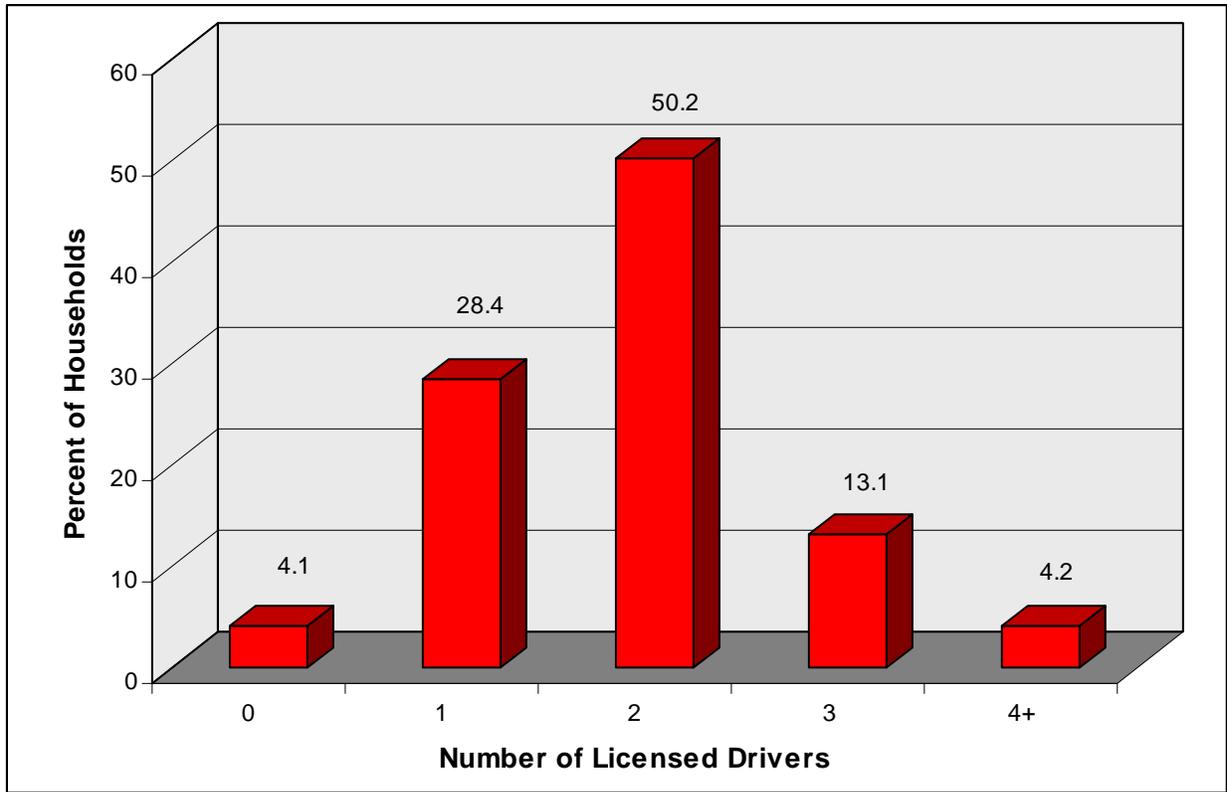
In general, as the number of vehicles available to the household increases, daily household travel increases. This household characteristic also impacts forecasting the demand for public transportation. As household vehicle availability increases, the household demand for public transportation tends to decrease. Figure 5 shows the distribution of the 641,487 expanded households in the survey by the number of vehicles available. Less than 5 percent of the households did not have a vehicle available. The average number of vehicles available per household was 1.84.



Source: Five-County Household Travel Survey and TTI Analysis. Note: A household vehicle is any motorized vehicle available to a household for travel including motorcycles, trucks, vans, automobiles, sport utility vehicles, etc.

**Figure 5. Distribution of Households by Number of Vehicles Available.**

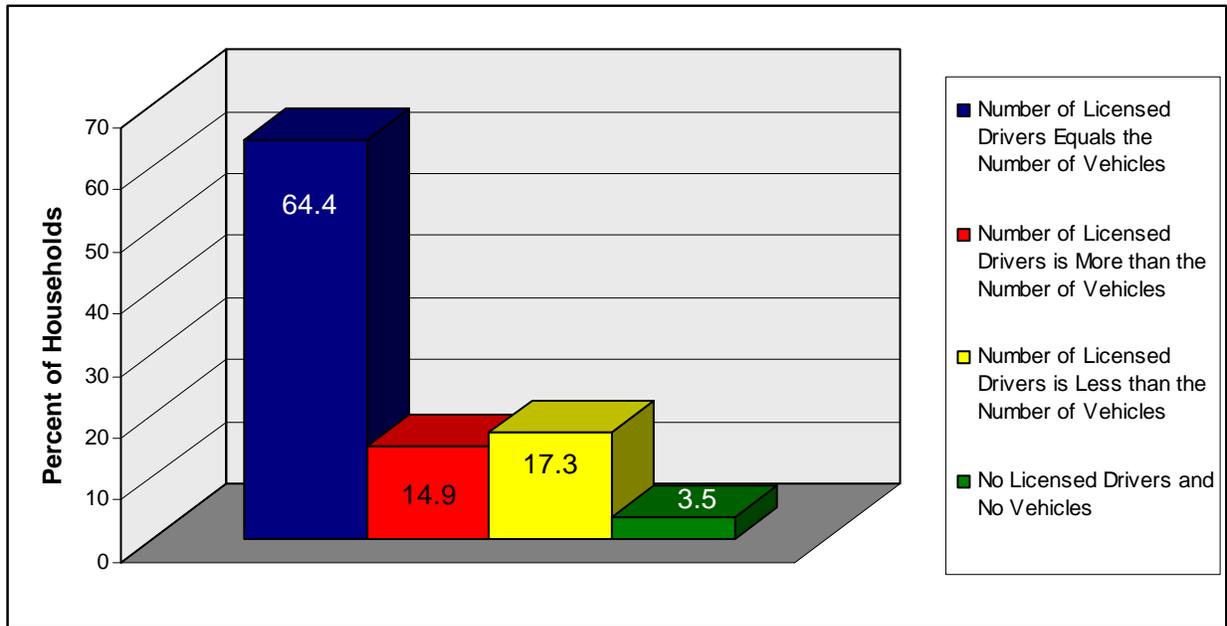
Figure 6 shows the distribution of the 641,487 expanded households by the number of licensed drivers per household. Approximately 4 percent of the households did not have a licensed driver.



Source: Five-County Household Travel Survey and TTI Analysis.

**Figure 6. Distribution of Households by Number of Licensed Drivers.**

Figure 7 shows the distribution of the 641,487 expanded households by the number of licensed drivers and the number of vehicles available. For the majority of households, 64 percent, the number of licensed drivers and the number of vehicles available is equal. For 17 percent of the households, the number of licensed drivers is less than the number of vehicles available. Less than 4 percent of the households have neither a licensed driver nor a vehicle available.

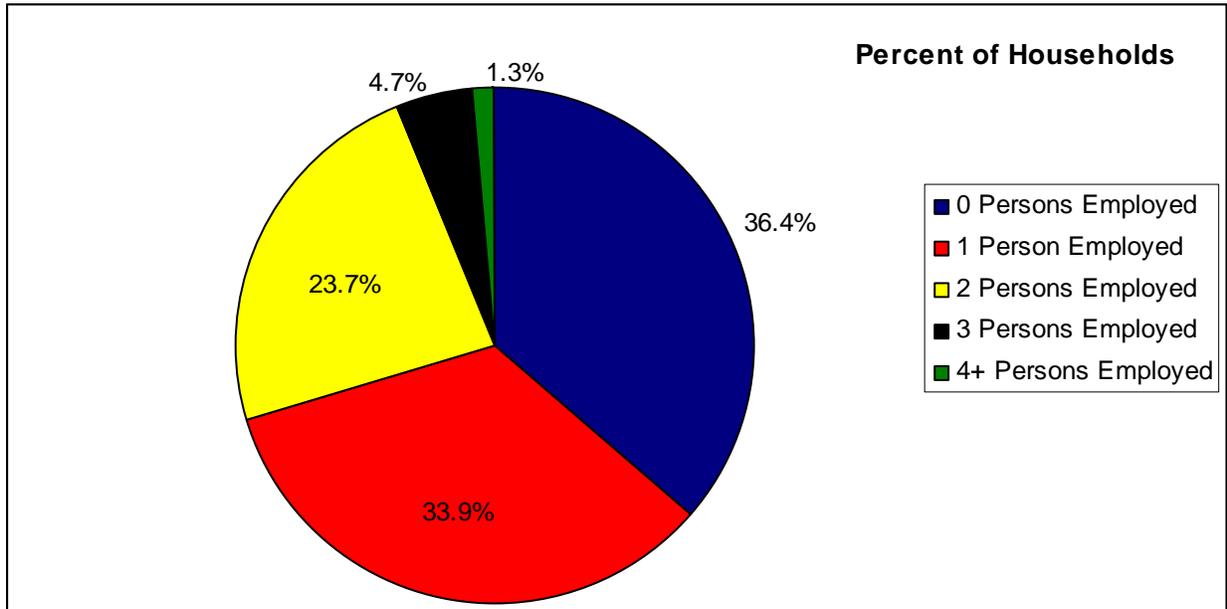


Source: Five-County Household Travel Survey and TTI Analysis.

**Figure 7. Distribution of Households by Licensed Drivers and Vehicle Availability.**

## Household Employment

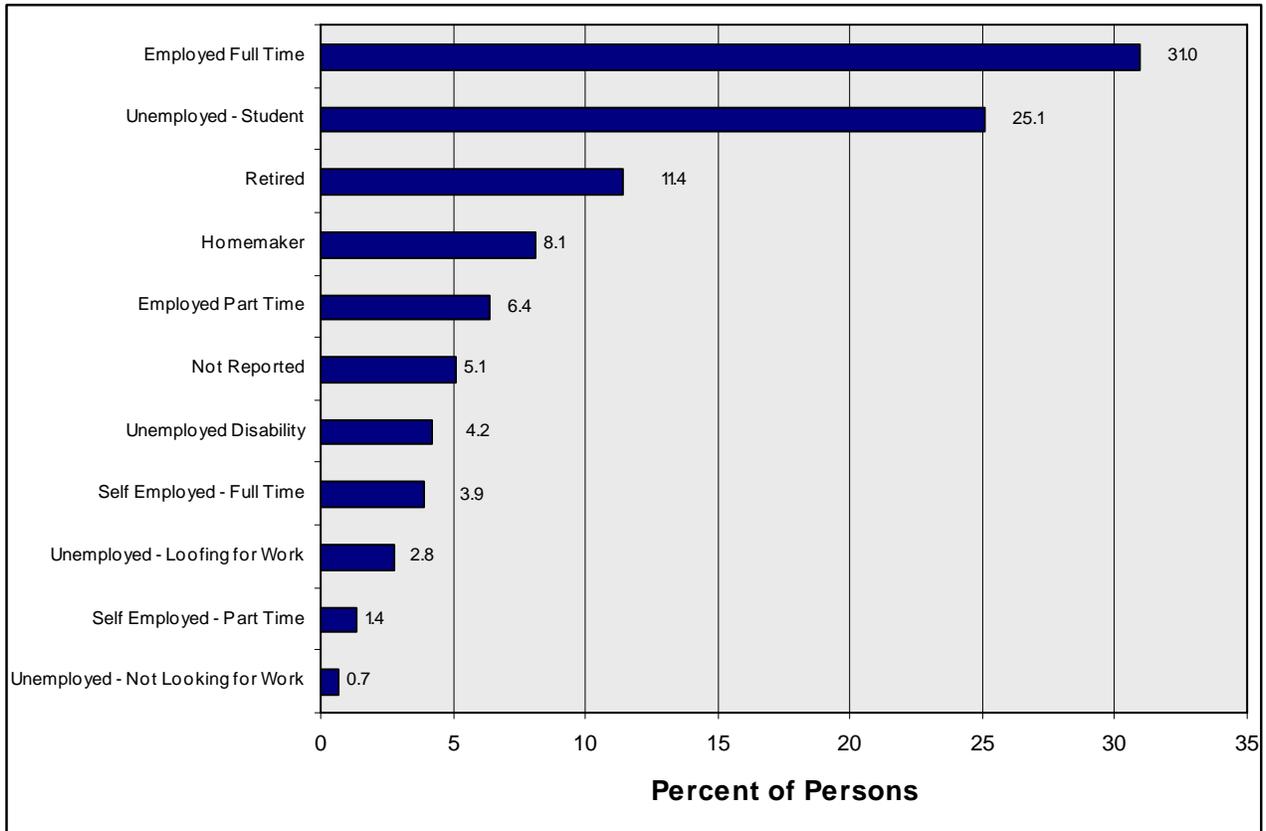
The 641,487 expanded households included 1,792,044 persons for an average of 2.79 persons per household. Figure 8 shows the distribution of the 641,487 expanded households by the number of persons employed.



Source: Five-County Household Travel Survey and TTI Analysis.

**Figure 8. Distribution of Households by Number of Persons Employed.**

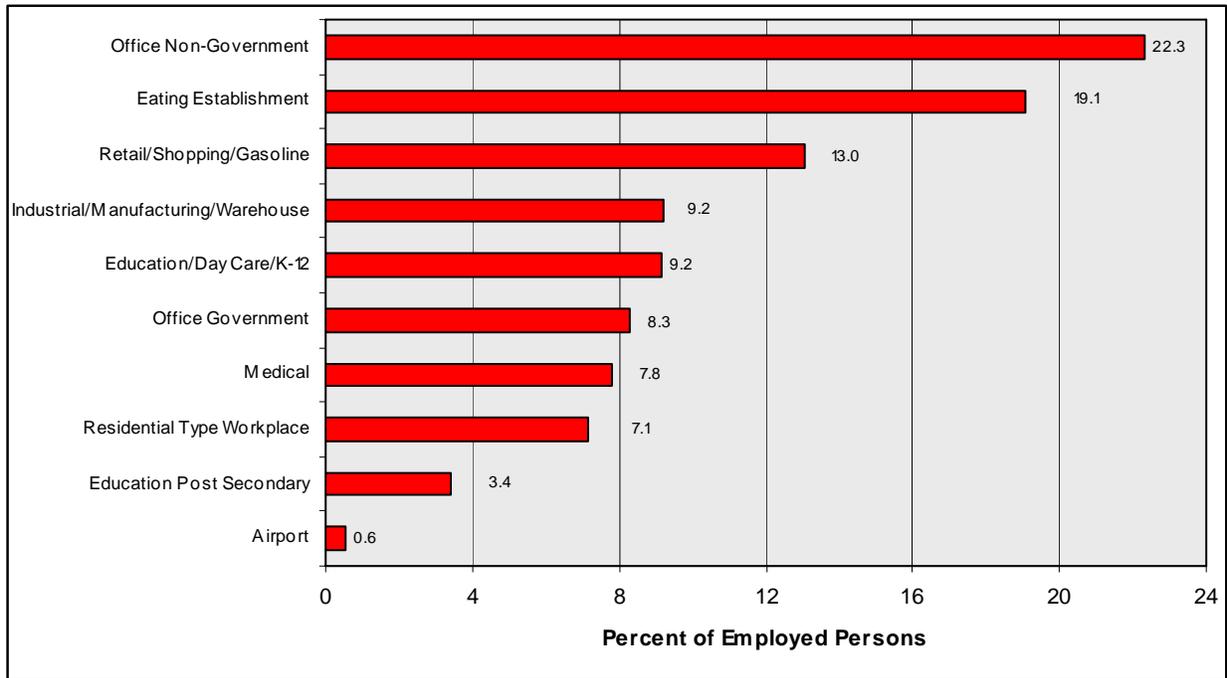
Figure 9 shows the distribution of all persons regardless of age by employment status. Almost one-third of the population is employed full time and 25 percent of the population is students. Slightly more than 10 percent of the population is retired.



Source: Five-County Household Travel Survey and TTI Analysis.

**Figure 9. Distribution of Persons by Employment Status.**

Figure 10 shows the distribution of the employed persons by the type of employer. The 641,487 households had 763,755 employed persons for an average of 1.19 employed persons per household. The office non-government employer type accounted for the largest percentage of employed persons, reporting slightly more than 22 percent. The eating establishment employer type is a very close second, providing jobs for almost 19 percent of those the employed.

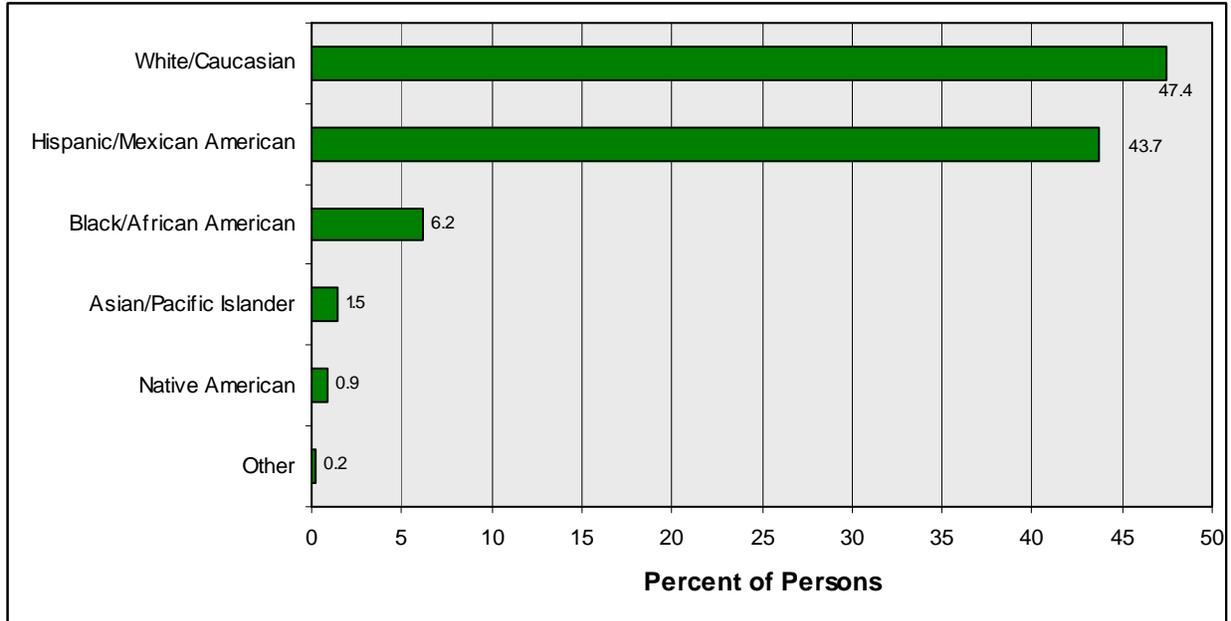


Source: Five-county Household Travel Survey and TTI Analysis.

**Figure 10. Distribution of Employed Persons by Employer Type.**

## Ethnicity

Figure 11 shows the distribution of the 1,777,081 persons by ethnicity.



Source: Five-county Household Travel Survey and TTI Analysis.

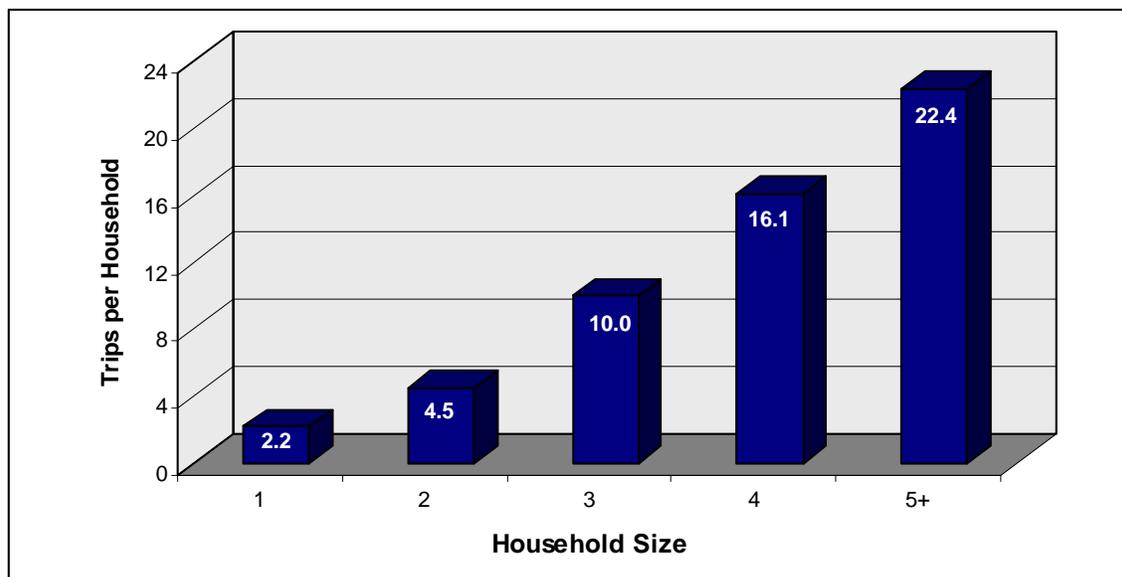
**Figure 11. Distribution of Persons by Ethnicity.**

## TRAVELER CHARACTERISTICS

The previous section reported on a variety of household and person characteristics obtained from the household travel survey. In this section, these household and person characteristics are related to household travel characteristics. Household size, household income, household life cycle, household vehicle availability, household licensed drivers, and household employment all affect the amount of household travel.

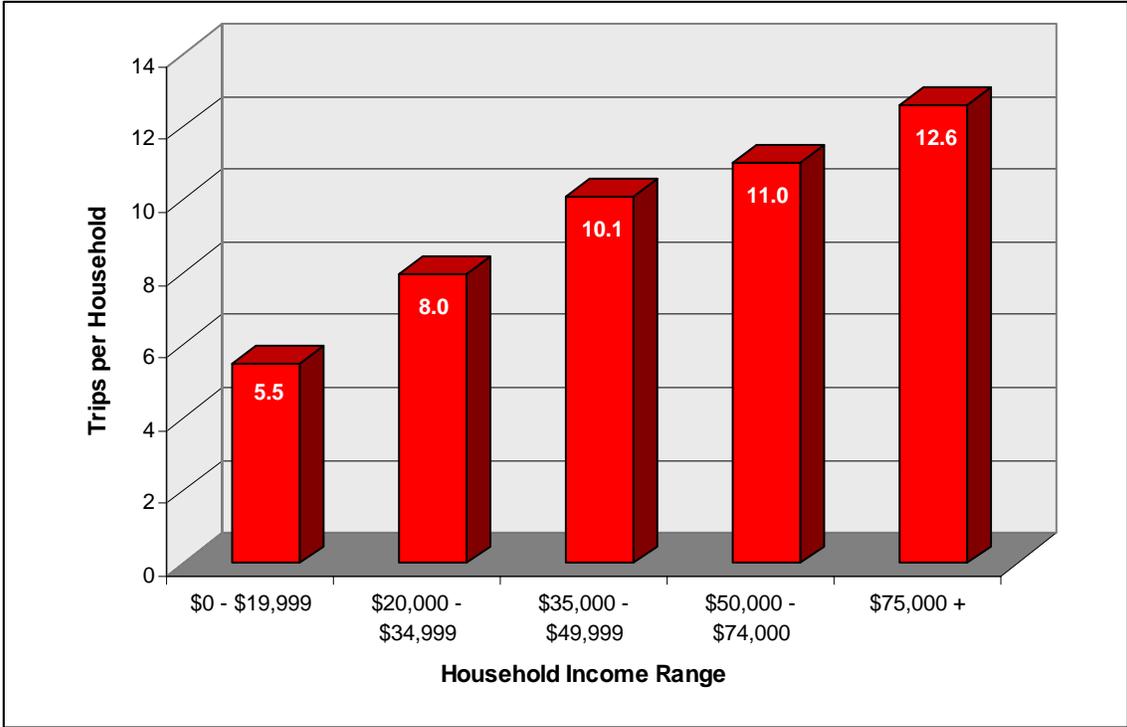
### Household Trip Rates and Vehicle Occupancy

The household trip rates in this section are for person trips made in a vehicle either as the driver or as a passenger. Figure 12 shows household trip rates as a function of household size. As the household size increases, household trip rates increase and become large for large household sizes. For travel forecasting applications, households with five or more household members are grouped and an average trip rate is used for the group. Figure 13 shows the household trip rates as a function of the household income range. As expected, as household income increases, the household trip rate increases.



Source: Five-County Household Travel Survey and TTI Analysis.

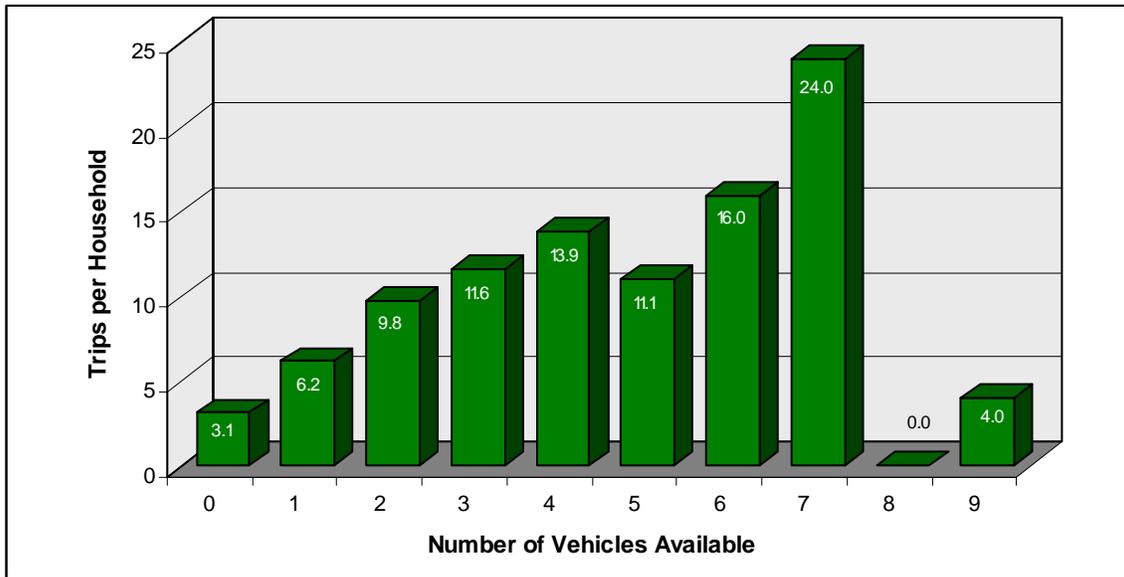
**Figure 12. Household Trip Rates by Household Size.**



Source: Five-County Household Travel Survey and TTI Analysis.

**Figure 13. Household Trip Rates by Household Income Range.**

Figure 14 shows the household trip rates as a function of the number of vehicles available to household members for travel. Again, as expected, as the number of vehicles available to the household increase, the household trip rate increases, but the rate increases very little after two vehicles. Notice that households with no vehicle available do make a meaningful number of trips. The apparent anomaly in trip rates for households with 5, 6, and 7 vehicles available is due to the very small sample sizes for these households.



Source: Five-County Household Travel Survey and TTI Analysis.

**Figure 14. Household Trip Rates by Number of Vehicles Available.**

Table 2 shows the person trip rates cross classified by household size and household income for all internal trip purposes combined, that is, trips that begin and end inside the five-county household travel survey area. These trip rates are for all trips by all modes including transit, bicycle, and walk trips. For travel forecasting applications, the cross-classified trip rates are disaggregated by trip purpose into HBW trips, HBNW trips, and NHB trips. (See the terminology section for the definitions of these terms.) As a part of the travel forecasting process, the person trips are divided among the modes during the mode split step. The average, internal to the five-county area, person trip rate for all households was 9.3 trips per household.

**Table 2. Person Trip Rates by Household Size and Household Income.**

Household Income Range	Household Size				
	1	2	3	4	5 +
\$0 - \$19,999	1.79	3.39	7.74	12.22	19.56
\$20,000 - \$34,999	2.29	4.37	10.82	14.45	18.49
\$35,000 - \$49,999	2.89	4.79	9.44	17.09	21.88
\$50,000 - \$74,999	2.45	4.44	10.49	16.35	24.69
\$75,000 +	2.39	5.43	10.86	18.61	25.00

Source: Five-County Household Travel Survey and TTI Analysis.

Table 3 shows the average vehicle occupancy for person trips made in private vehicles by household size and by household income range. The average vehicle occupancy for all households was 1.52 persons per vehicle.

**Table 3. Average Vehicle Occupancy by Household Size and Household Income.**

Household Income Range	Household Size				
	1	2	3	4	5 +
\$0 - \$19,999	1.20	1.39	1.43	1.82	1.88
\$20,000 - \$34,999	1.04	1.36	1.41	1.57	1.87
\$35,000 - \$49,999	1.20	1.30	1.45	1.55	1.87
\$50,000 - \$74,999	1.06	1.25	1.31	1.60	1.81
\$75,000 +	1.25	1.26	1.29	1.53	1.84

Source: Five-county Household Travel Survey and TTI Analysis.

## Travel by Age Cohort

A total of 1,791,418 persons who reported their age were represented in the expanded household survey. Table 4 shows the number of persons and distribution of persons by age cohort that did not make any internal trips on their survey day. As expected, older persons are less likely to travel than are younger persons, but the older population is mobile and contribute significantly to the amount of household travel. The rather high percentage of persons making zero internal trips in the 20-24 age cohort probably is due to under reporting or not reporting of trips by this age cohort.

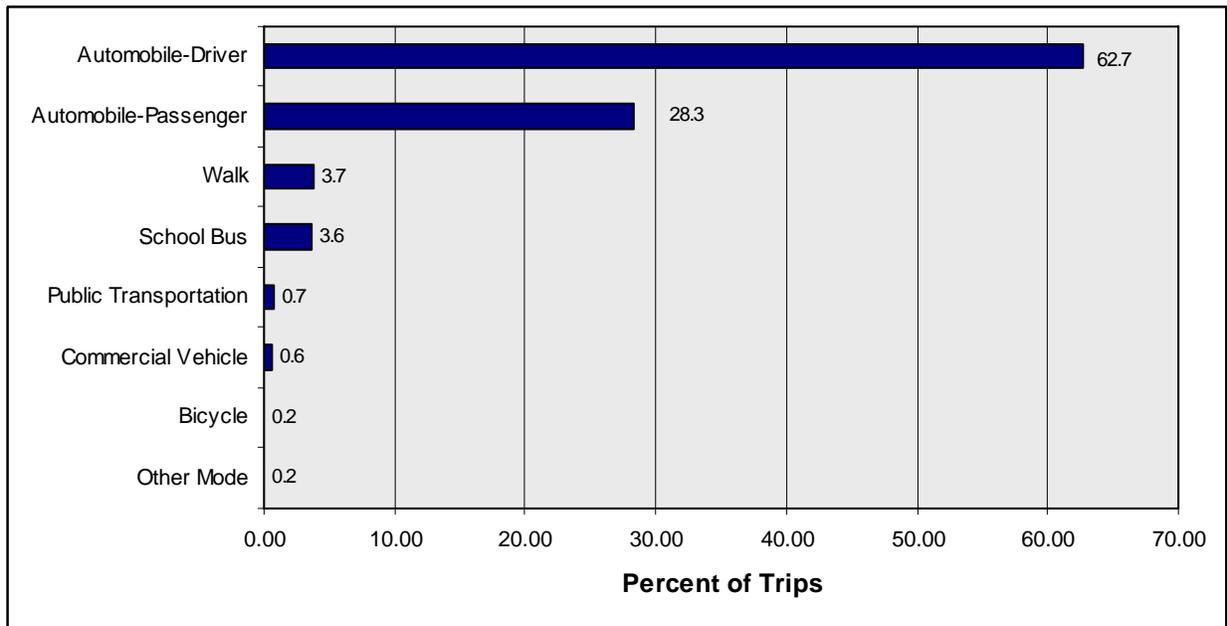
**Table 4. Number of Persons, Percent of Persons, and Percent of Persons Making Zero Trips by Age Cohort.**

Age Cohort	Number of Persons	Percent of Persons	Number of Persons Making Trips	Number of Persons Making Zero Internal Trips	Percent of Persons Making Zero Internal Trips
0-15	419,204	23.40	376,880	42,324	10.10
16-19	130,260	7.27	115,709	14,551	11.17
20-24	128,513	7.17	98,396	30,117	23.43
25-29	127,336	7.11	112,786	14,550	11.43
30-34	129,536	7.23	107,578	21,957	16.95
35-39	125,517	7.01	108,142	17,375	13.84
40-44	136,526	7.62	120,928	15,598	11.42
45-49	128,062	7.15	111,397	16,664	13.01
50-54	112,902	6.30	95,324	17,578	15.57
55-59	91,460	5.11	76,967	14,493	15.85
60-64	74,056	4.13	59,159	14,897	20.16
65-69	56,457	3.15	44,565	11,892	21.06
70-74	45,238	2.53	35,963	9,274	20.50
75-79	37,105	2.07	27,409	9,696	26.13
80 +	49,246	2.75	30,100	19,146	38.88
<b>Total</b>	<b>1,791,418</b>	<b>100</b>	<b>1,521,305</b>	<b>270,113</b>	<b>15.08</b>

Source: Five-county Household Travel Survey and TTI Analysis.

## MODE OF TRAVEL

The modes of travel were household automobile-driver, household automobile-passenger, school bus, walk, public transportation, bicycle, carpool/vanpool, and commercial vehicle. Figure 15 shows the distribution of person trips by mode. Automobile travel accounted for 91 percent of the person trips. “School bus trips” and “walk” modes of travel each accounted for almost 4 percent of the person trips. The surveyed households made little use of public transportation, less than 1 percent of the person trips.



Source: Five-County Household Travel Survey and TTI Analysis.

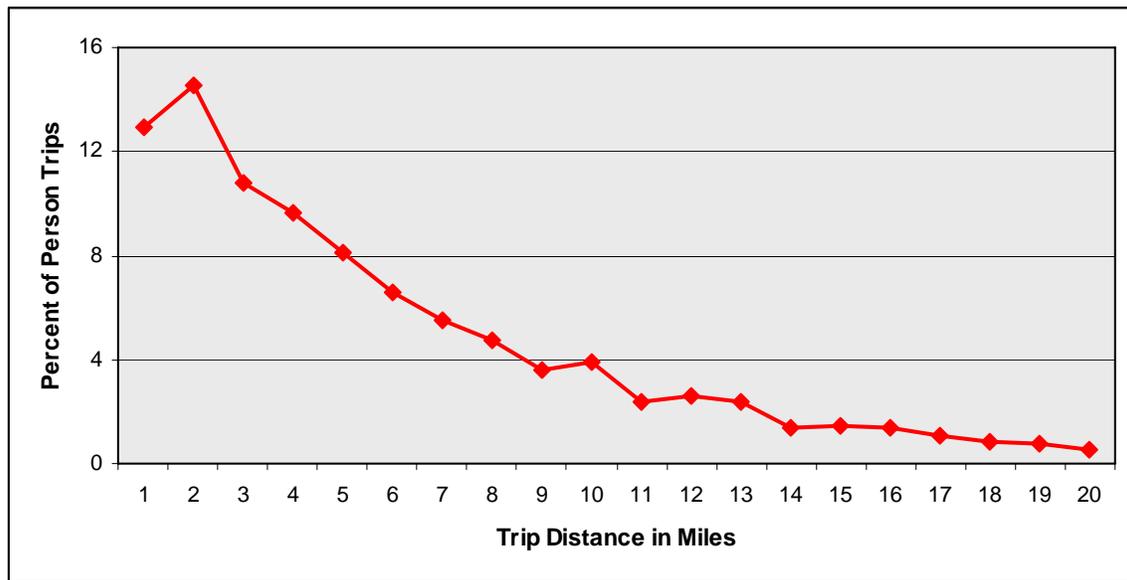
**Figure 15. Distribution of Person Trips by Mode of Travel.**

## AMOUNT OF TRAVEL

Several measures are used to record the amount of travel — the number of person trips, the number of vehicle trips, the trip distances in miles, the trip durations or travel times in minutes, and the vehicle miles of travel (VMT).

### Trip Distance

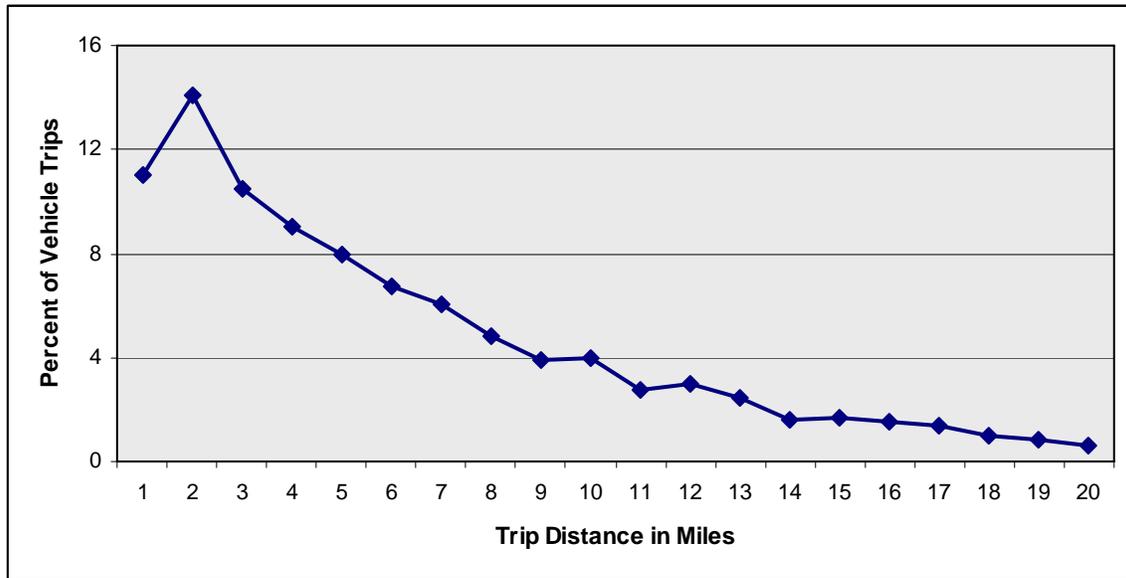
Figure 16 shows the distribution of person trips by the length of the trip in miles. The distribution is for internal person trips, trips beginning and ending inside the five-county study area. The average person trip length was 7.0 miles.



Source: Five-County Household Travel Survey and TTI Analysis.

**Figure 16. Distribution of Person Trips by Trip Distance in Miles.**

Figure 17 shows the distribution of vehicle trips by the length of the trip in miles. The average vehicle trip length was 7.4 miles. For travel demand modeling purposes, the travel modeler needs data about the distribution of vehicle trips in miles and the average vehicle trip length in miles for each internal trip purpose. Distributions similar to Figure 17 are prepared for each internal trip purpose.

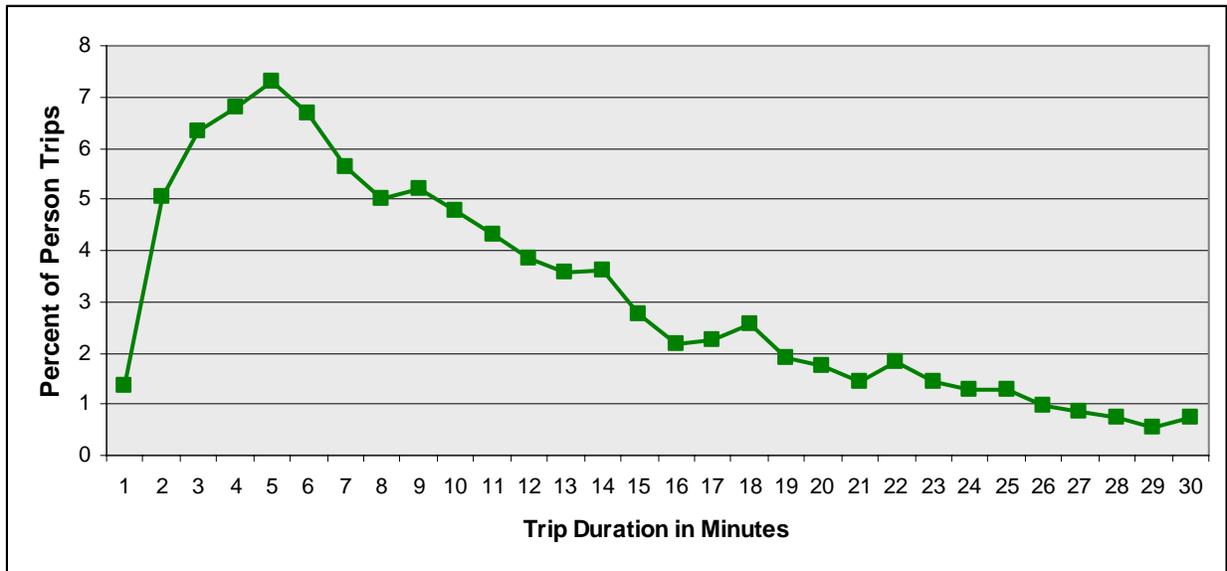


Source: Five-County Household Travel Survey and TTI Analysis.

**Figure 17. Distribution of Vehicle Trips by Trip Distance in Miles.**

## Trip Duration

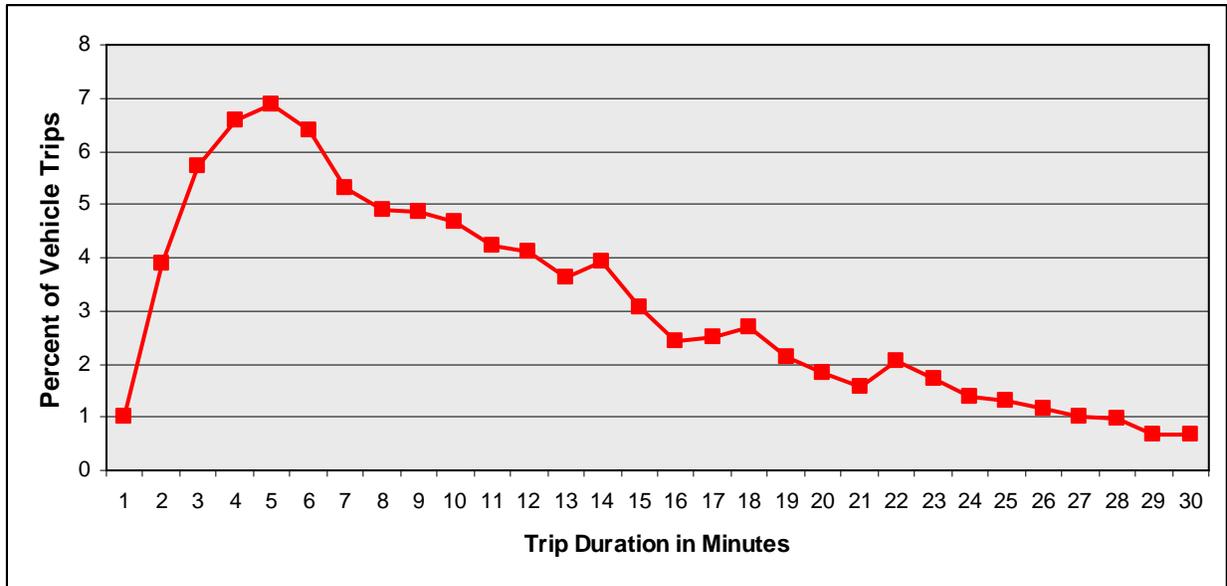
Figure 18 shows the distribution of person trips by the duration of the trip in minutes. The distribution is for internal person trips, trips beginning and ending inside the five-county study area. The average person trip length was 12.5 minutes.



Source: Five-County Household Travel Survey and TTI Analysis.

**Figure 18. Distribution of Person Trips by Trip Duration in Minutes.**

Figure 19 shows the distribution of vehicle trips by the duration of the trip in minutes. The average vehicle trip duration was 13.3 minutes.



Source: Five-County Household Travel Survey and TTI Analysis.

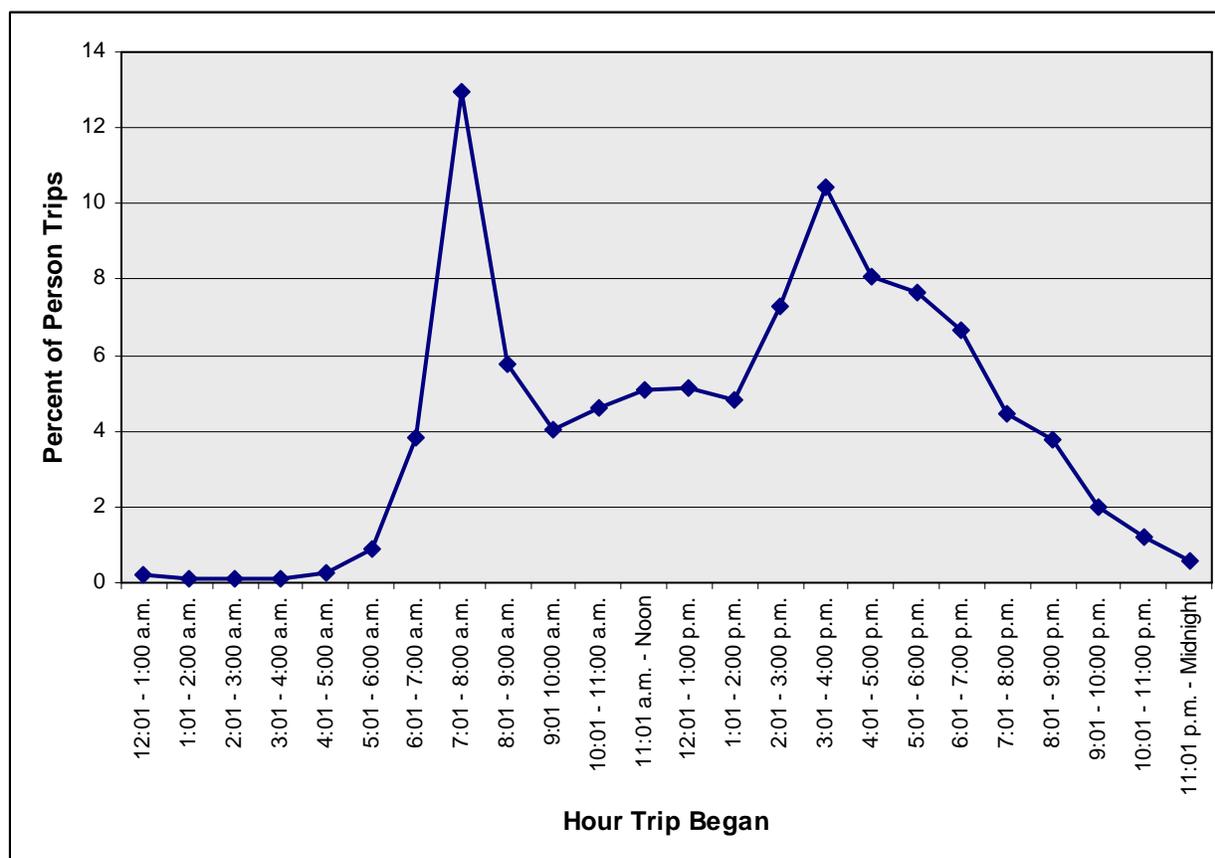
**Figure 19. Distribution of Vehicle Trips by Trip Duration in Minutes.**

### Vehicle Miles of Travel (VMT)

VMT is calculated as the product of the average vehicle trip length in miles and the number of vehicle trips. For household trips internal to the five-county study area, the estimated VMT is 24,820,000 miles per school-year weekday. This is not the total VMT for the study area, as the VMT associated with external-local, external-through, commercial vehicle, visitor travel, and intrazonal trips are not included in the estimate.

## TIME OF TRAVEL

The time of travel is a function of the activity to be accomplished. The start times for trips to work and to school are dictated by the time that work and school begin. For other activities, such as trips to shop or for recreation, the trip start times are flexible. As travel during peak periods becomes more congested, some drivers choose to make trips earlier or later to avoid the most congested travel time. Figure 20 shows the distribution of trip start times for a 24-hour weekday during the school year. The morning peak period, 7:01 a.m. to 8:00 a.m., has the highest percentage of daily trip starts, 12.94 percent. During the morning peak period, trips from home to work and from home to school are the primary destinations. The second highest hour for trip starts is 3:01 p.m. to 4:00 p.m. (10.46 percent), which are trips from school to home. Trip starts from 4:01 p.m. to 5:01 p.m., usually the starting time whereby trips from work to home are the primary destinations, has the third highest percentage of daily trips (8.06 percent).

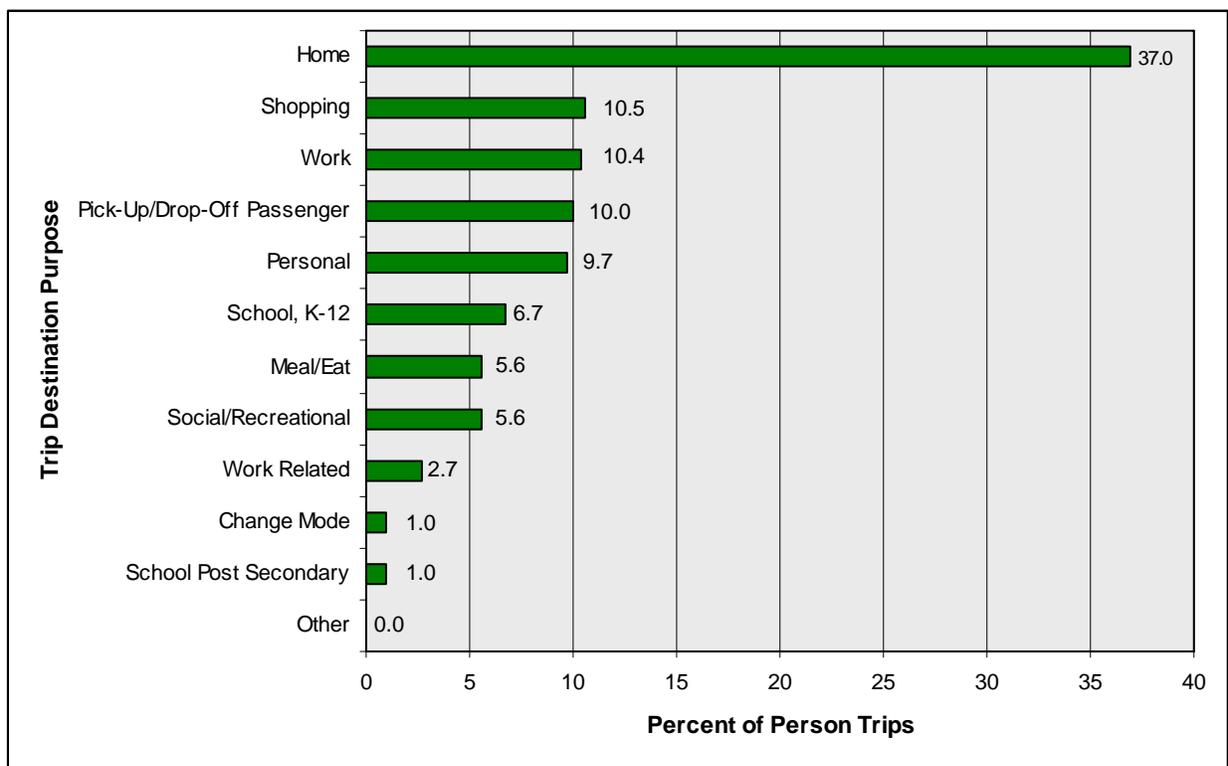


Source: Five-County Household Travel Survey and TTI Analysis.

**Figure 20. Distribution of Person Trip Start Times by Hour of the Day.**

## TRAVEL PURPOSE

As a part of their travel diary, each household member was asked to identify from a list of choices what they did at each trip destination. The information about the trip destination was used to categorize the trip by trip purpose. In travel demand modeling, typically there are three internal trip purposes — HBW, HBNW, and NHB trips. Figure 21 shows the distribution of person trips by the trip destination purposes used in the survey. As would be expected, the most frequent trip destination was the return home trip.

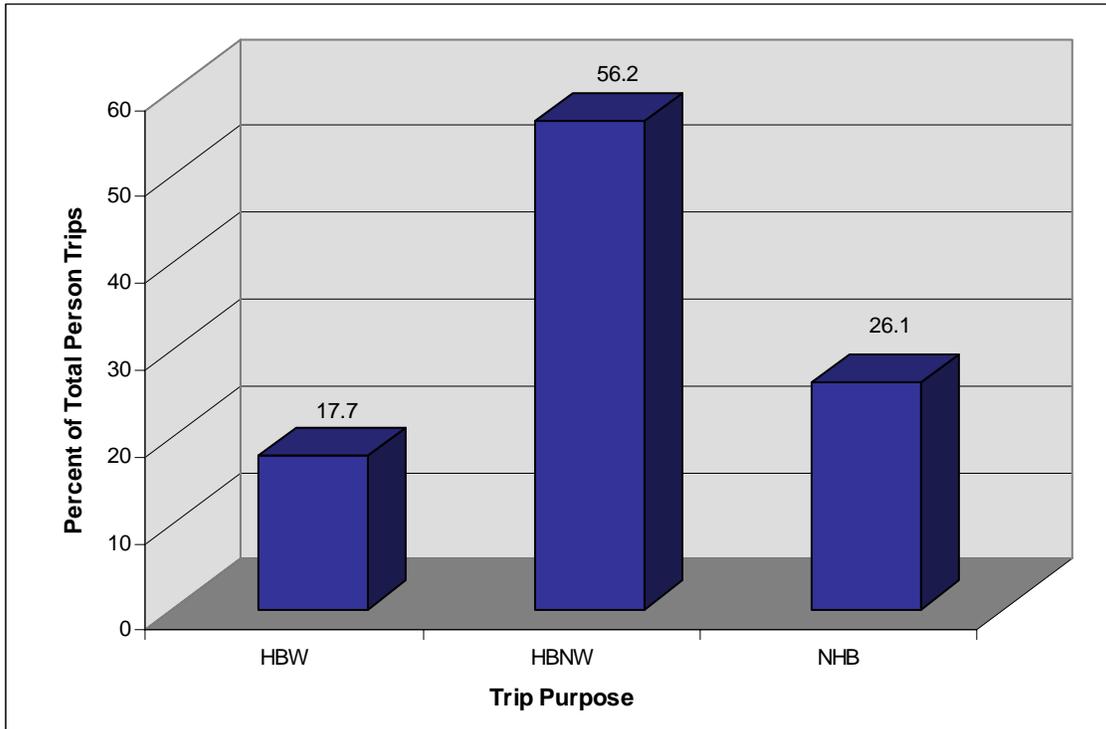


Source: Five-County Household Travel Survey and TTI Analysis.

**Figure 21. Distribution of Person Trips by Trip Destination Purpose.**

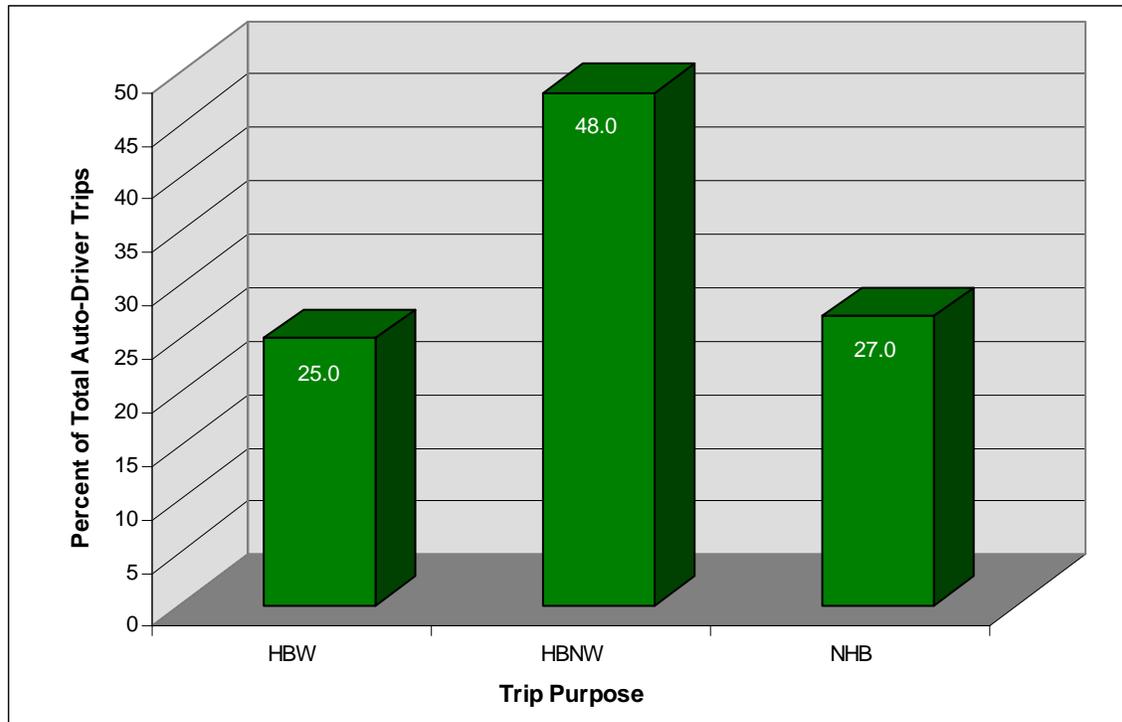
## Trip Purpose

Figures 22 and 23 illustrate the 2006 data for percent of total person trips and total vehicle driver trips for the three internal trip purposes – HBW, HBNW, and NHB.



Source: Five-County Household Travel Survey and TTI Analysis.

**Figure 22. Distribution of Person Trips by Internal Trip Purpose.**



Source: Five-County Household Travel Survey and TTI Analysis.

**Figure 23. Distribution of Vehicle Driver Trips by Internal Trip Purpose.**

### **Type of Place at Trip Destination**

Closely related to the travel purpose and what the traveler did at the destination end of the trip is information on the type of place or business that was at the destination end of the trip. This information is used by the travel demand modeler to develop trip attraction rates for various types of land use. In travel demand modeling, attractions are typically grouped into three categories — basic, retail, and service. Table 5 shows the distribution of person trips by the types of places identified in the survey for the destination end of the trip.

**Table 5. Number Person Trips and Distribution of Person Trips by Type of Place at Trip Destination.**

<b>Type of Place</b>	<b>Person Trips</b>	<b>Percent of Person Trips</b>
Residential	426,425	7.18
Residential Type Work Place	44,909	0.76
Construction Site	28,386	0.48
Transportation Stop	71,691	1.21
Automotive Dealer/Repair	86,652	1.46
Bank/Financial Institution	108,081	1.82
Barber/Beauty/Nail Salon	37,189	0.63
Bookstore/Newsstand	11,151	0.19
Convenience/Drug Store	98,486	1.66
Government Offices	207,269	3.49
Offices Non-Government	312,850	5.27
Grocery	451,429	7.60
Health Club	71,014	1.20
Medical Facility/Hospital	319,401	5.38
Movie Theater/Cinema	16,701	0.28
Restaurant/Fast food, Bar and Grill	610,859	10.29
Educational – 12 <sup>th</sup> Grade or Lower	1,560,355	26.29
Educational – College, Trade, Etc.	145,616	2.45
Shopping Mall/Department Store	547,645	9.23
Gas Station	88,972	1.50
Airport	17,434	0.29
Other	672,916	11.34
<b>Total</b>	<b>5,935,431</b>	<b>100.00</b>

Source: Five-County Travel Survey and TTI Analysis.

## **WHERE PEOPLE TRAVELED**

The geographic distribution of internal person trips within the study area is shown in Figures 24 through 44. Figures 24 through 37 show the geographic distribution of internal person trips within Bexar County and sub-regions of the county. Figures 38 through 44 show the geographic distribution of internal trips within the five-county study area.

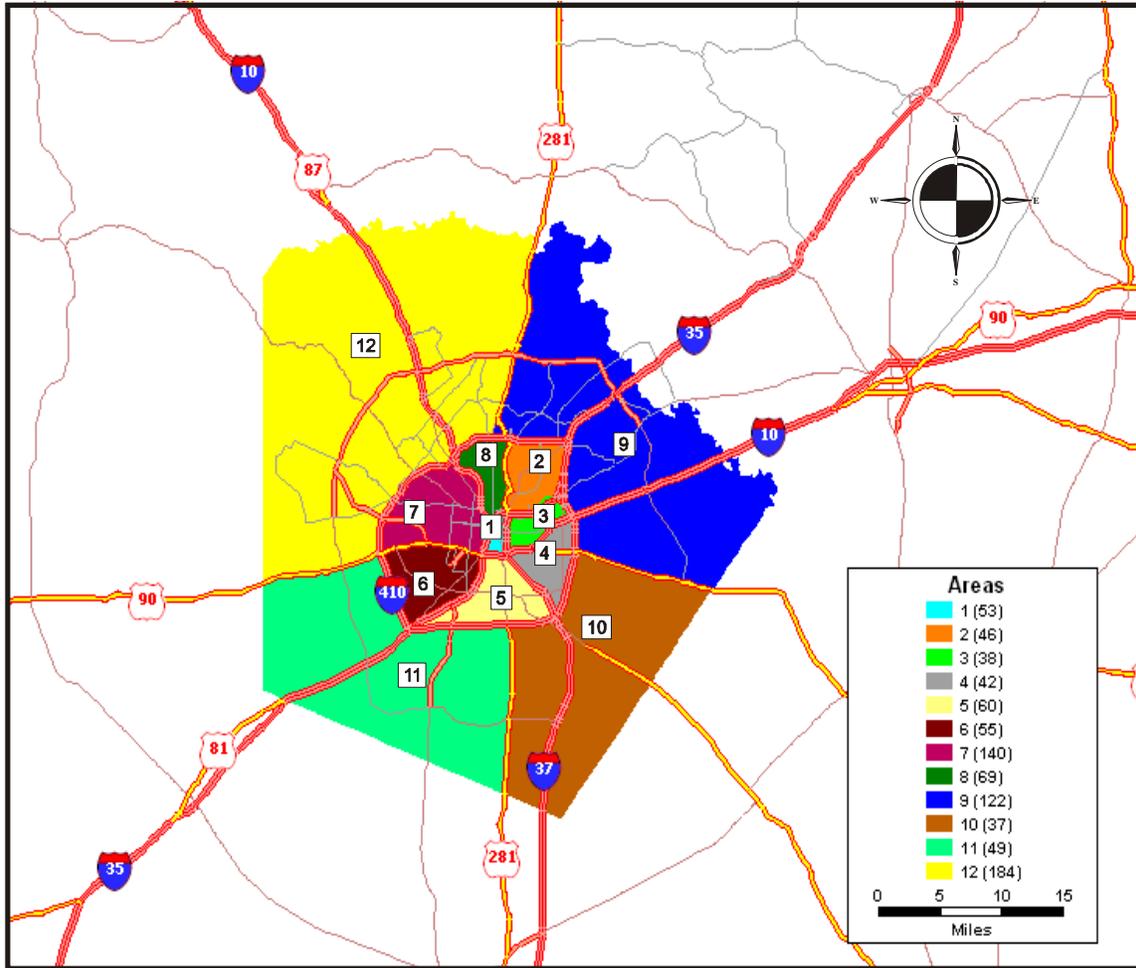
Figure 24 shows the 12 sub-regions in Bexar County. Figure 25 shows the number of person trip interchanges between Area 1 and Areas 2-12. Figure 26 shows the number of person trip interchanges between Area 2 and Area 1 and Areas 3 through 12. Figure 27 shows the number of person trip interchanges between Area 3 and Areas 1 and 2 and Areas 4 through 12. Figure 28 shows the number of person trip interchanges between Area 4 and Areas 1 through 3 and Areas 5 through 12. Figure 29 shows the number of person trip interchanges between Area 5 and Areas 1 through 4 and Areas 6 through 12. Figure 30 shows the number of person trip interchanges between Area 6 and Areas 1 through 5 and Areas 7 through 12. Figure 31 shows the number of person trip interchanges between Area 7 and Areas 1 through 6 and Areas 8 through 12. Figure 32 shows the number of person trip interchanges between Area 8 and Areas 1 through 7 and Areas 9 through 12. Figure 33 shows the number of person trip interchanges between Area 9 and Areas 1 through 8 and Areas 10 through 12. Figure 34 shows the number of person trip interchanges between Area 10 and Areas 1 through 9 and Areas 11 and 12. Figure 35 shows the number of person trip interchanges between Area 11 and Areas 1 through 10 and Area 12. Figure 36 shows the number of person trip interchanges between Area 12 and Areas 1 through 11. Figure 37 shows the percent of person trips that remain within each sub-area.

Following is a description of the Bexar County Sub-Regions.

- Area 1 — The Central Business District of San Antonio is bounded by IH-37 on the east; IH-10 and US-90 on the south; and IH-35 on the west and north
- Area 2 — is bounded by IH-35 on the east and south; US-281 on the west; and Loop-410 on the north.
- Area 3 — is bounded by Loop-410 on the east; IH-10 and US-90 on the south; IH-37 on the west; and IH-35 on the north.

- Area 4 — is bounded by Loop-410 on the east; US-37 on the southeast; and IH-10 and US-90 on the north.
- Area 5 — is bounded by US-37 on the east; Loop-410 on the south; IH-35 on the west; and IH-10 on the north.
- Area 6 — is bounded by IH-35 on the east/southeast; Loop-410/SH-16 on the west/northwest; and US-90 on the north.
- Area 7 — is bounded by IH-10 on the east; US-90 on the south; and Loop-410/SH-16 on the west/northwest.
- Area 8 — is bounded by SH-281 on the east; IH-35 on the south; IH-10/US-87 on the west; and Loop-410 on the north.
- Area 9 — is bounded by Bexar County line on the north, east, and southeast; US-87 on the south; Loop-410 and SH-281 on the west.
- Area 10 — is bounded by US-87 on the north/northeast; Bexar County line on the east/southeast; SH-281 on the west, and Loop-410 on the north/northwest.
- Area 11 — is bounded by SH-281 on the east; Bexar County line on south/southwest; Bexar County line on the west; US-90 on the north; and Loop-410 on the northeast.
- Area 12 — is bounded by SH-281 on the east; Loop-410 on the southeast; US-90 on the south; and the Bexar County line on the west and north.

Figure 38 shows the five-county San Antonio-Bexar County study area. Figure 39 shows the person trip interchanges between Bexar County and Kendall, Comal, Guadalupe, and Wilson counties. Figure 40 shows the person trip interchanges between Kendall County and Bexar, Comal, Guadalupe, and Wilson counties. Figure 41 shows the person trip interchanges between Comal County and Bexar, Kendall, Guadalupe, and Wilson counties. Figure 42 shows the person trip interchanges between Guadalupe County and Bexar, Kendall, Comal, and Wilson counties. Figure 43 shows the person trip interchanges between Wilson County and Bexar, Kendall, Comal, and Guadalupe counties. Figure 44 shows the percent of person trips that remain within each county.



**Figure 24. Bexar County and the Sub-Regions within Bexar County.**

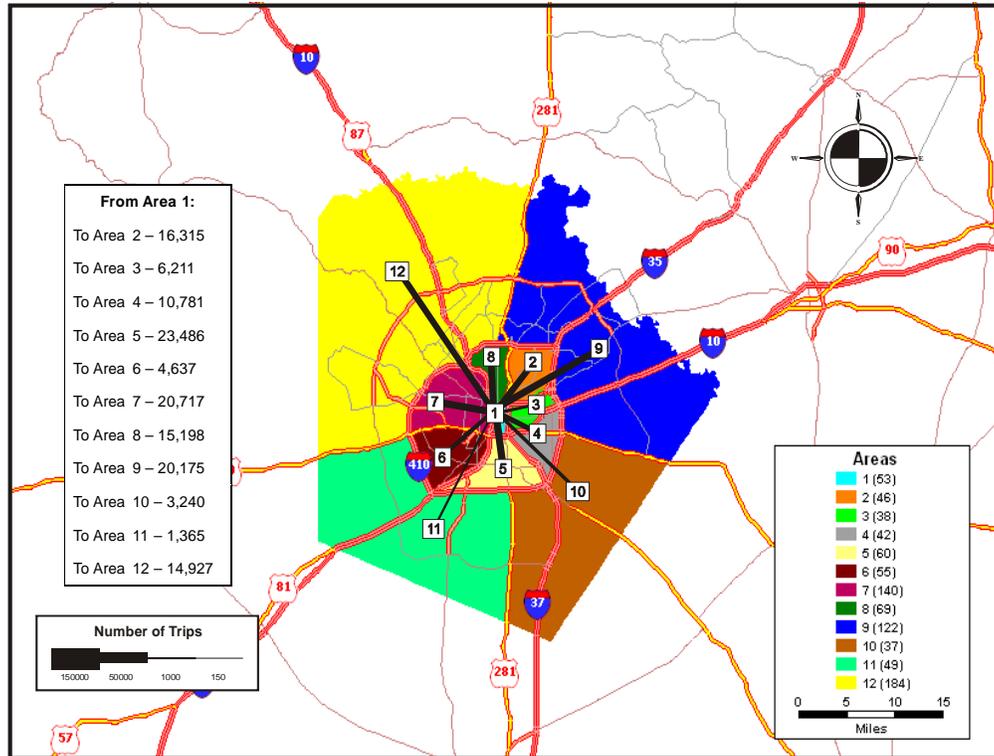


Figure 25. Person Trip Interchanges between Area 1 and Areas 2 through 12.

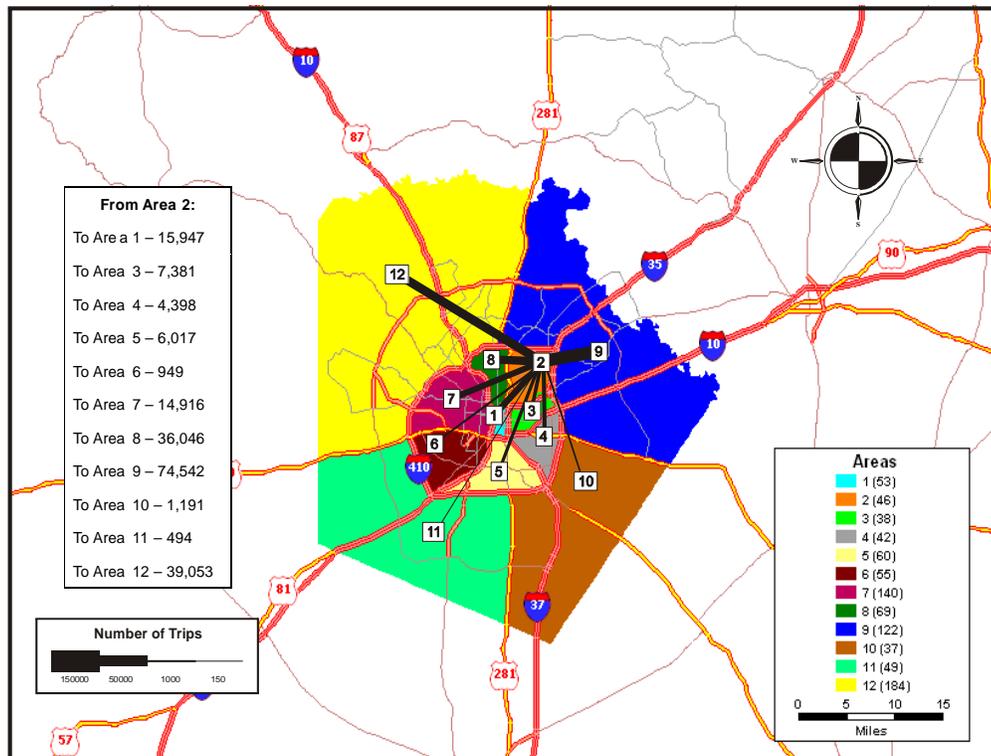
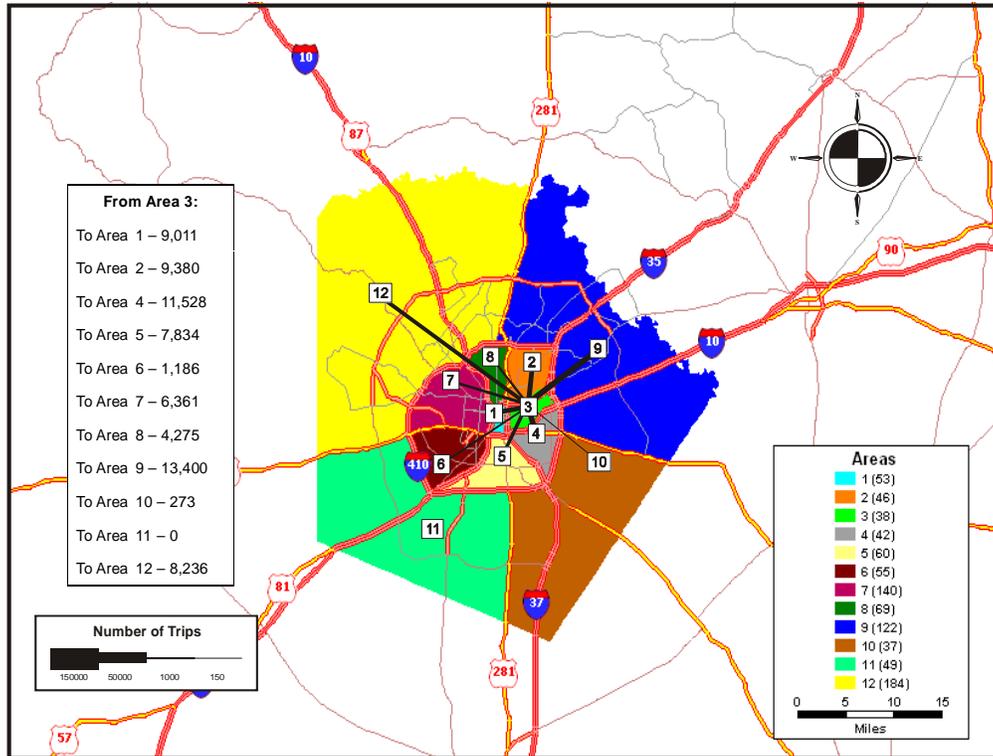
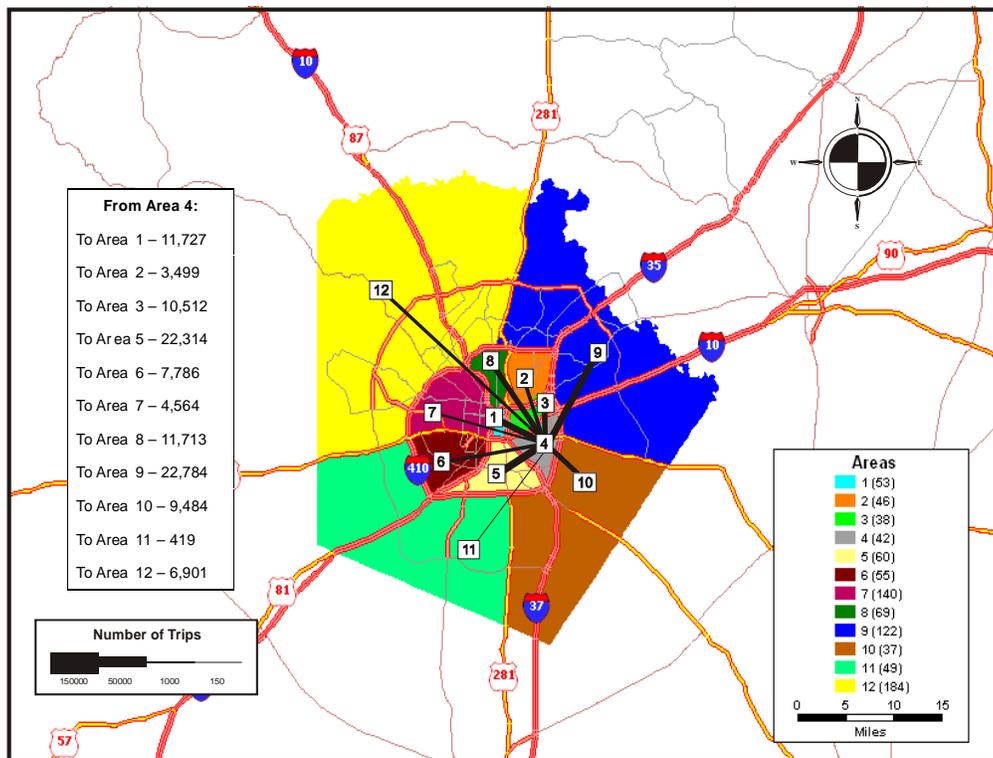


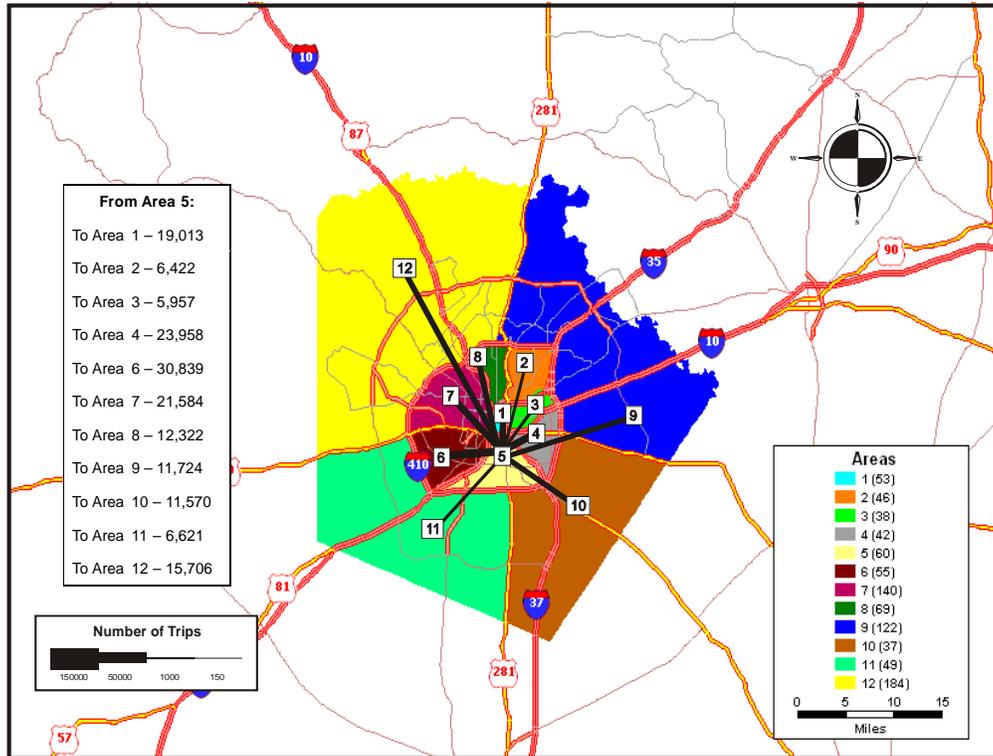
Figure 26. Person Trip Interchanges between Area 2 and Areas 1 and 3 through 12.



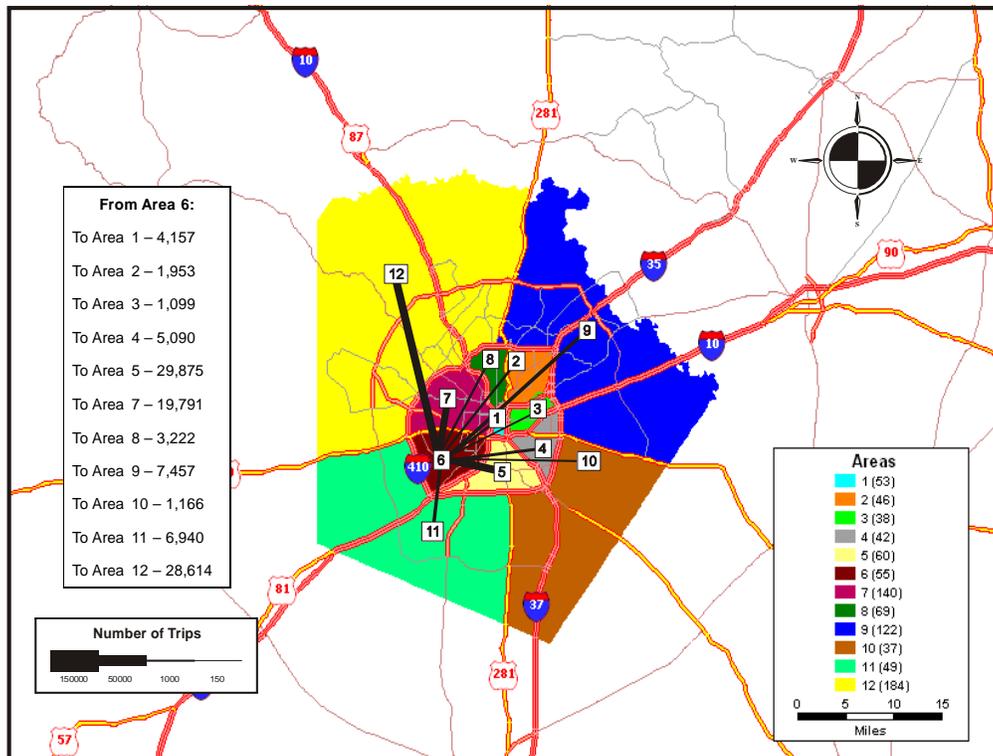
**Figure 27. Person Trip Interchanges between Area 3 and Areas 1 and 2 and 4 through 12.**



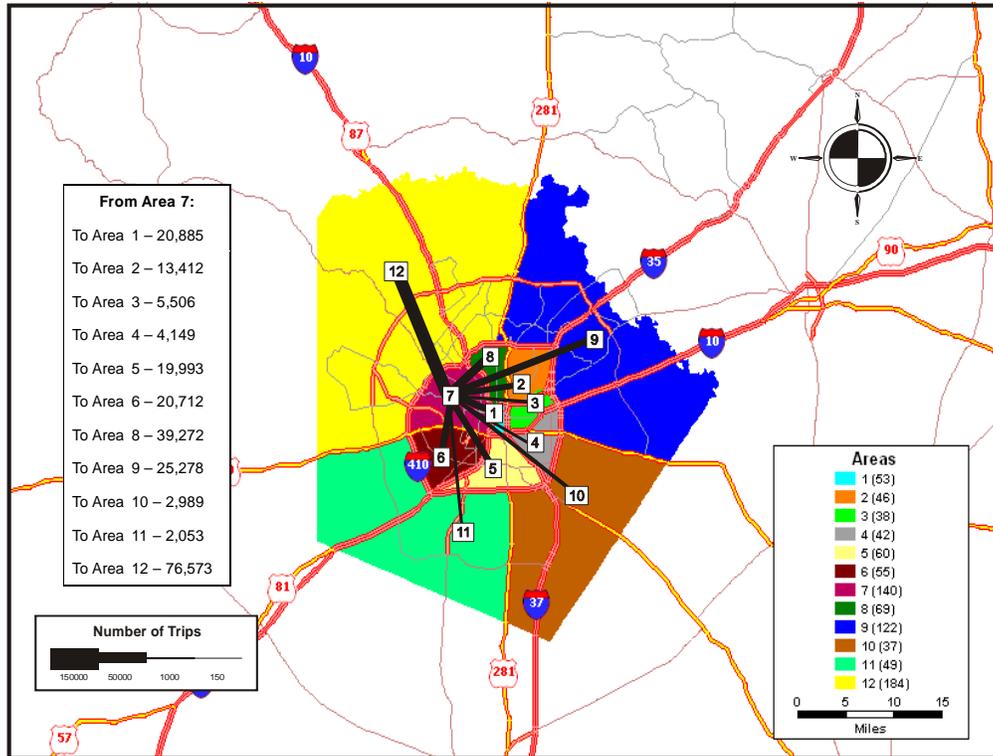
**Figure 28. Person Trip Interchanges between Area 4 and Areas 1 through 3 and 5 through 12.**



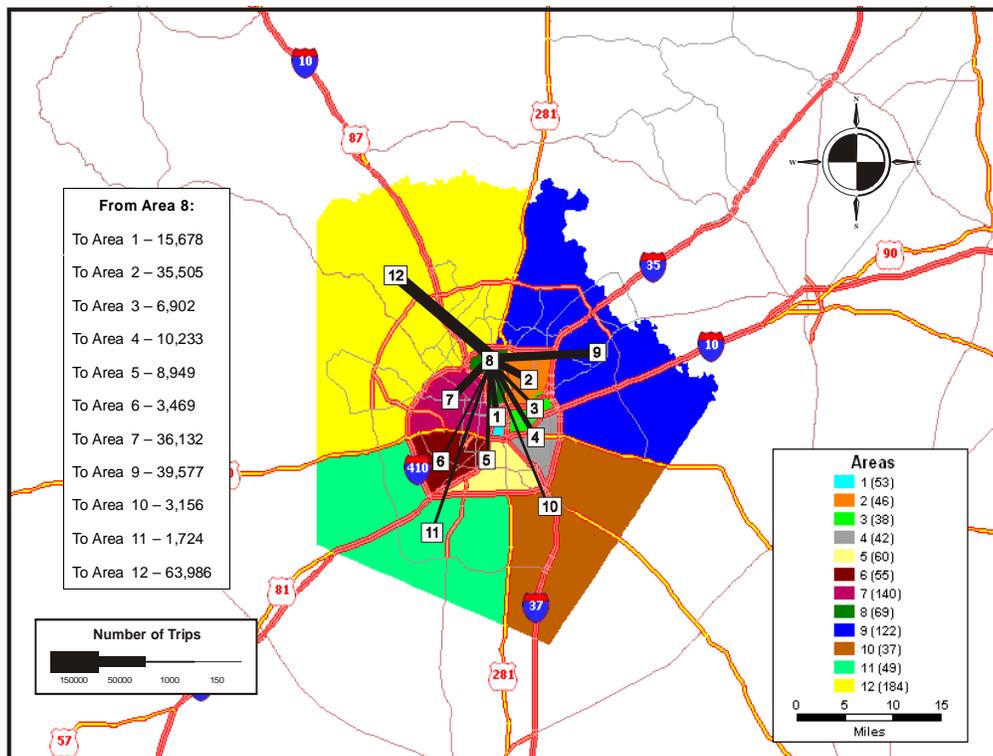
**Figure 29. Person Trip Interchanges between Area 5 and Areas 1 through 4 and 6 through 12.**



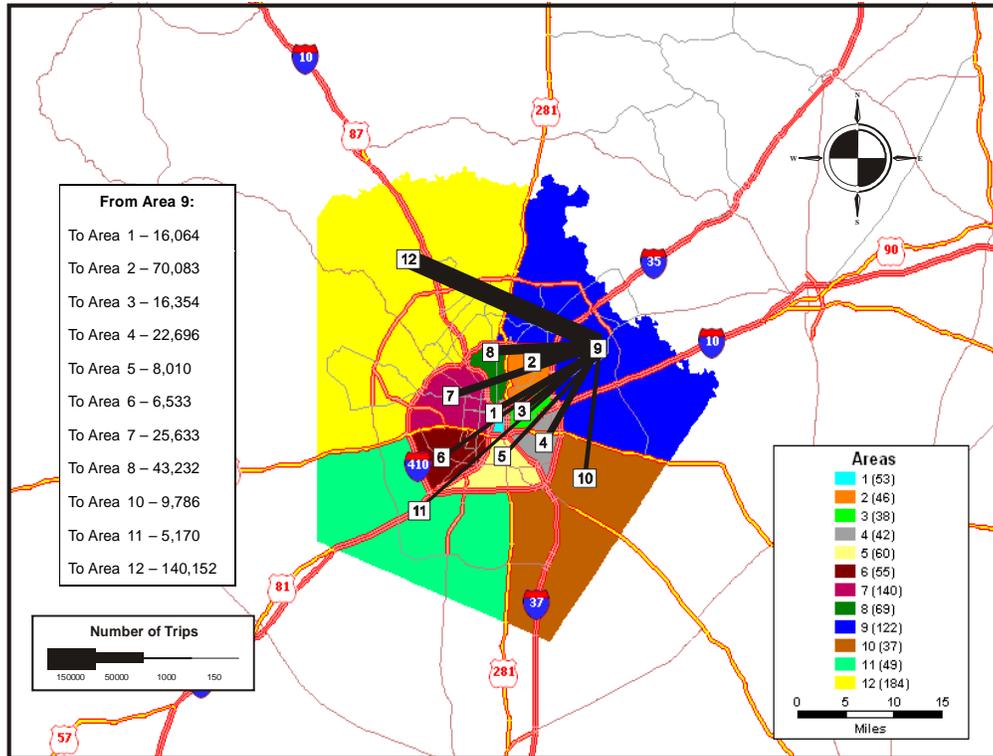
**Figure 30. Person Trip Interchanges between Area 6 and Areas 1 through 5 and 7 through 12.**



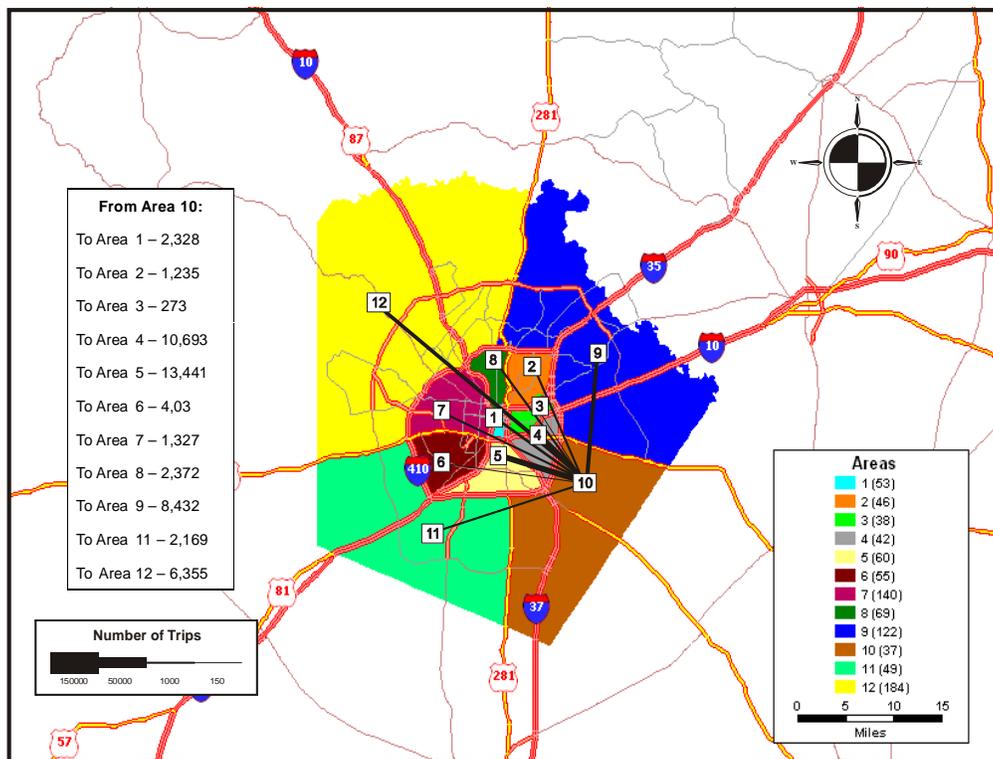
**Figure 31. Person Trip Interchanges between Area 7 and Areas 1 through 6 and 8 through 12.**



**Figure 32. Person Trip Interchanges between Area 8 and Areas 1 through 7 and 9 through 12.**



**Figure 33. Person Trip Interchanges between Area 9 and Areas 1 through 8 and 10 through 12.**



**Figure 34. Person Trip Interchanges between Area 10 and Areas 1 through 9 and 11 through 12.**

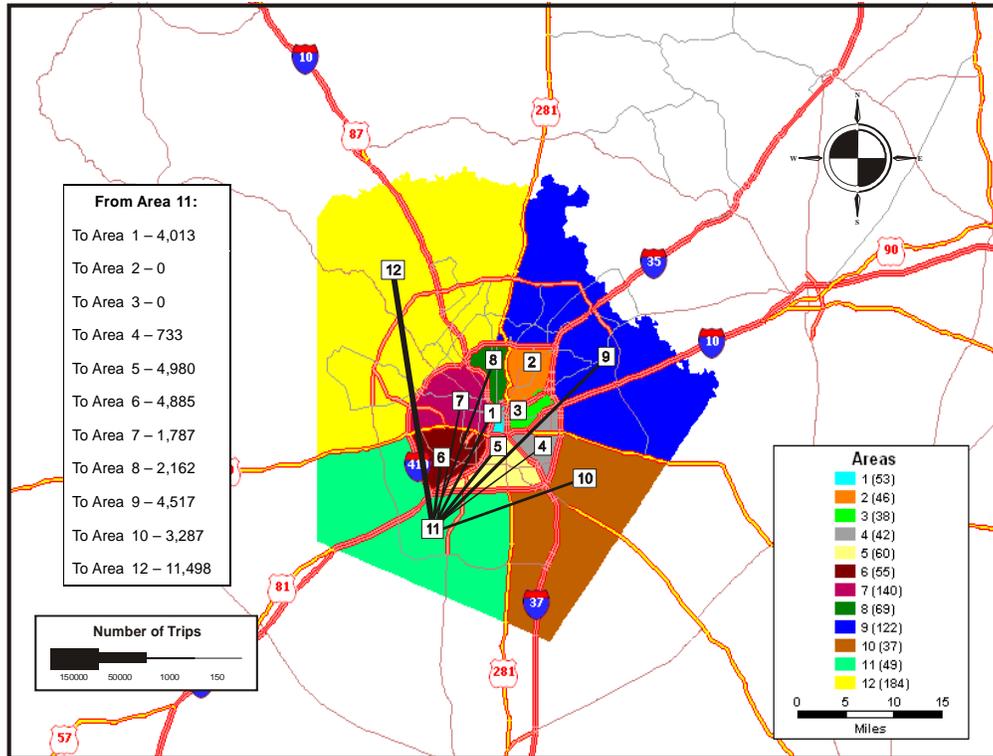


Figure 35. Person Trip Interchanges between Area 11 and Areas 1 through 10 and 12.

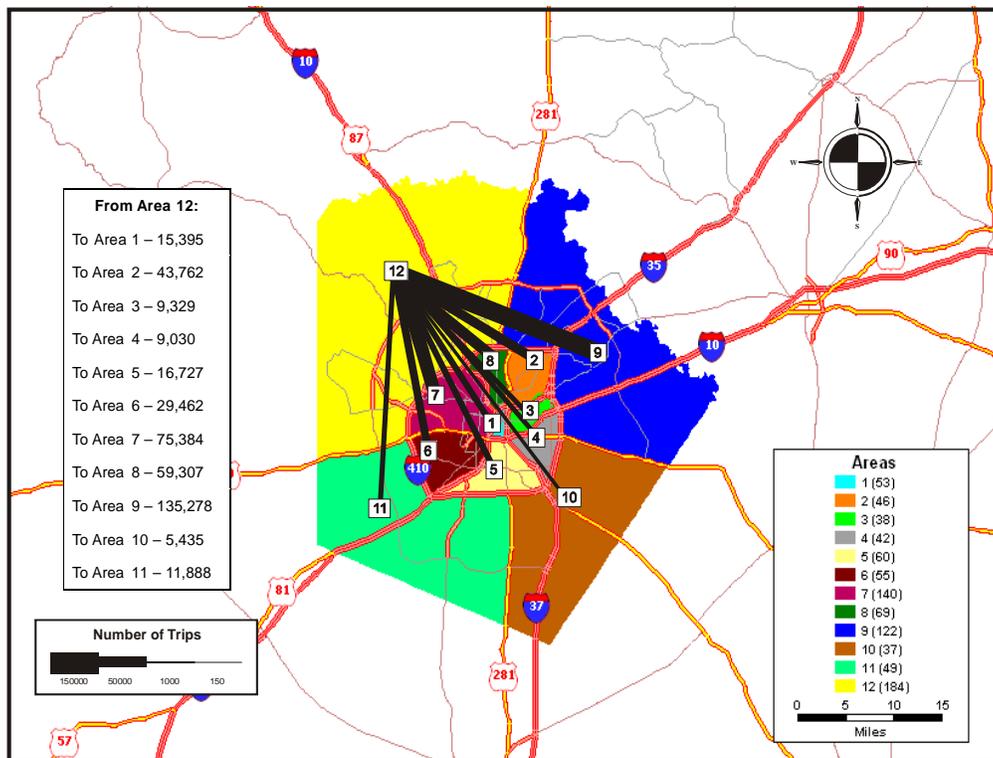
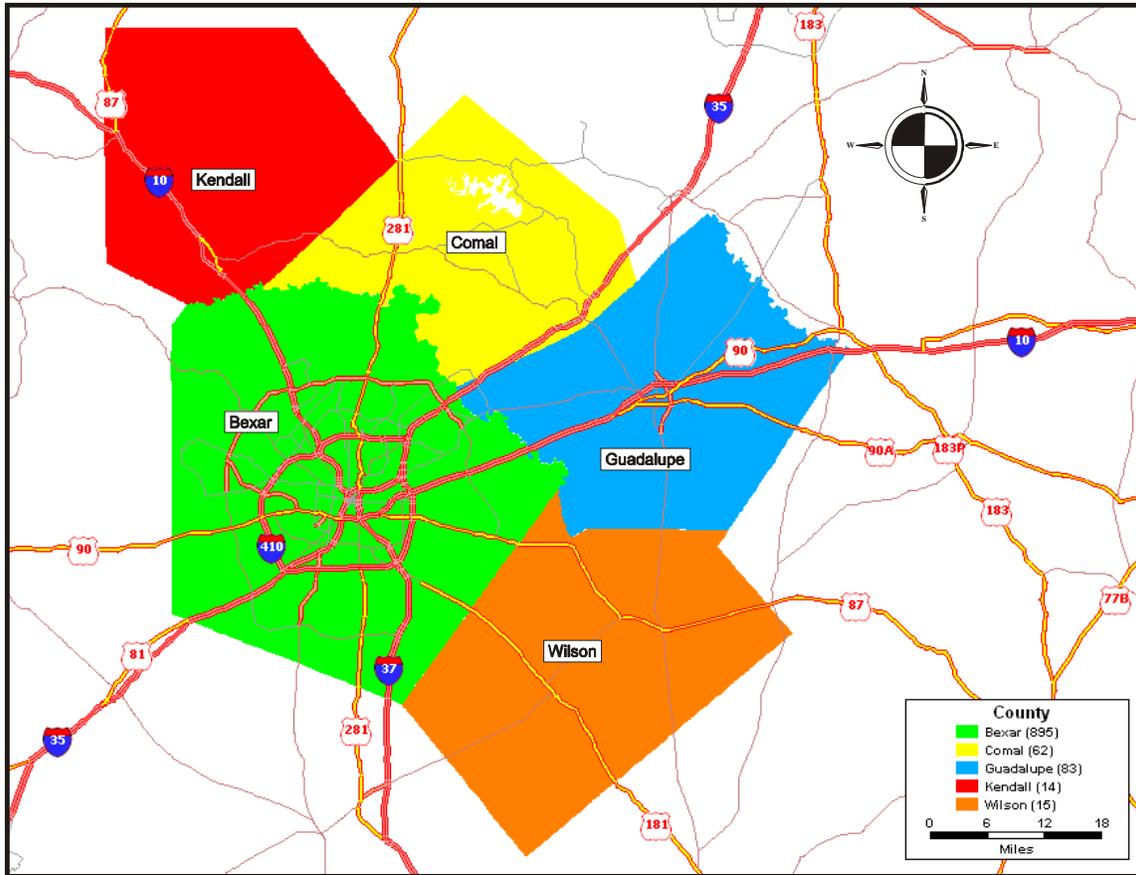
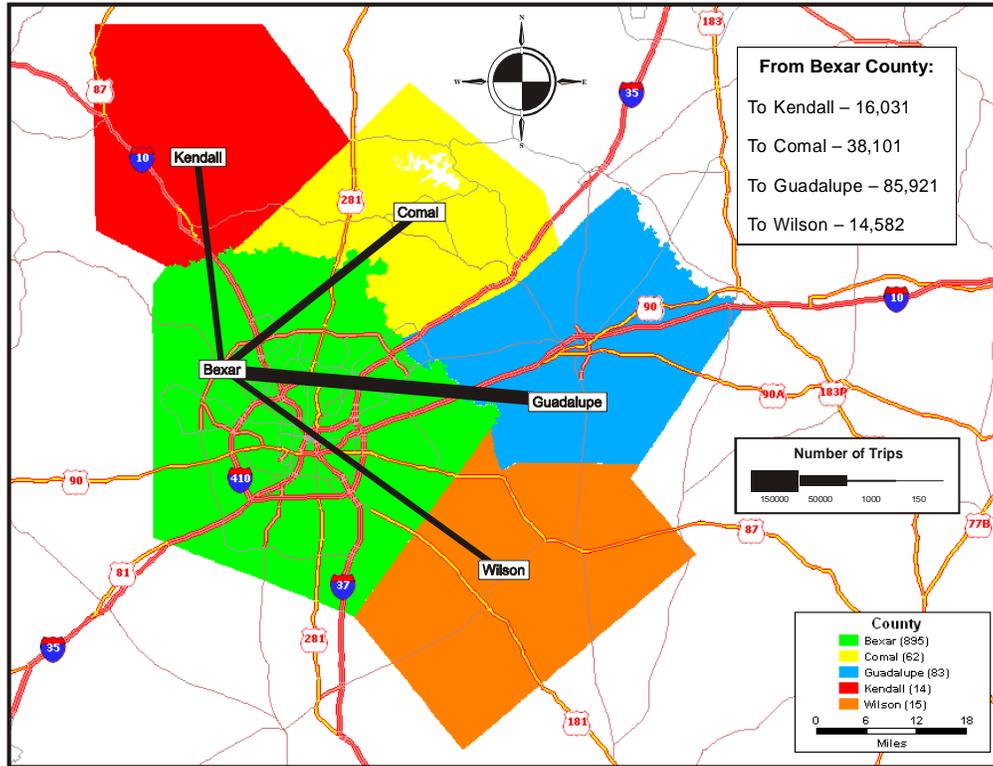


Figure 36. Person Trip Interchanges between Area 12 and Areas 1 through 11.

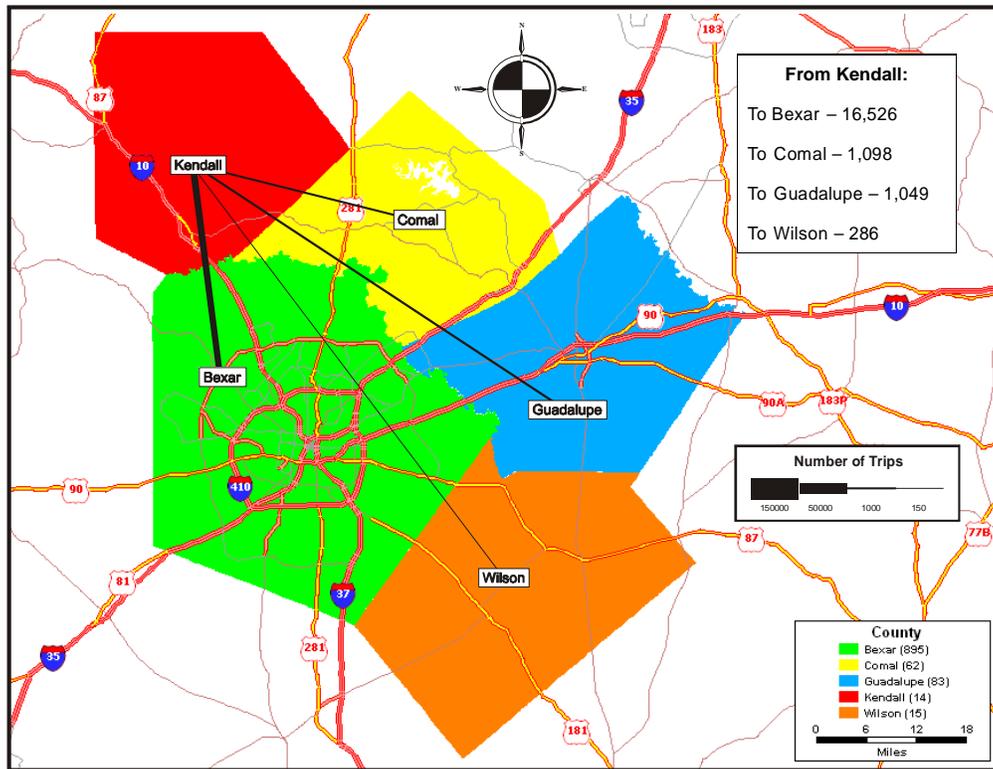




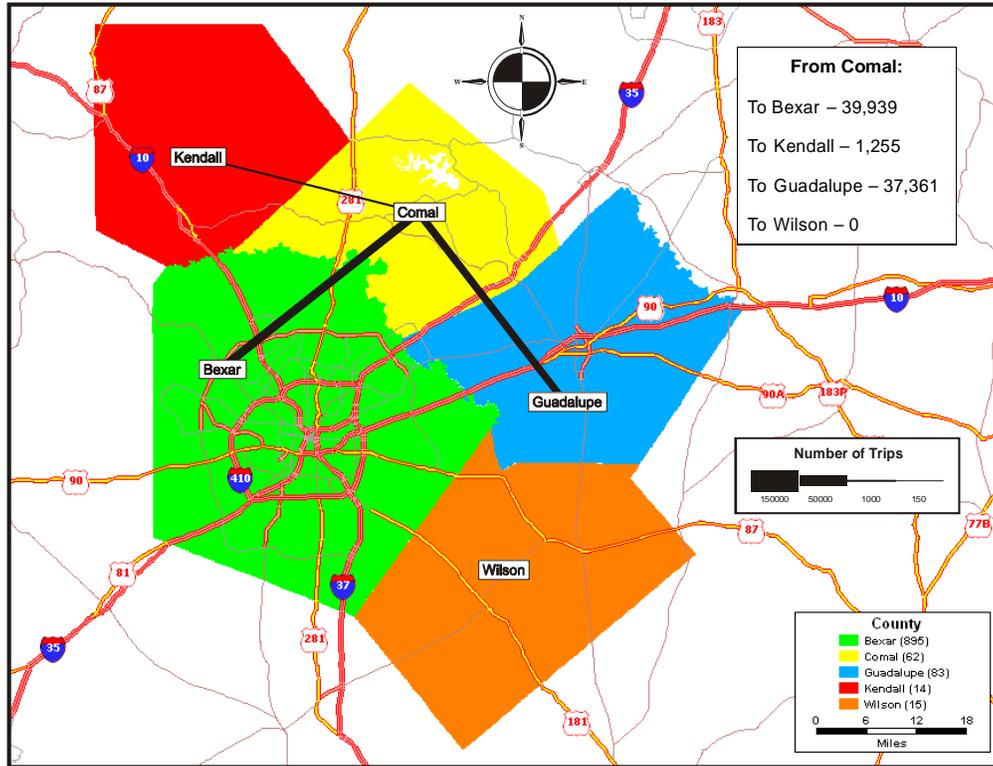
**Figure 38. Five-County San Antonio - Bexar County MPO Study Area.**



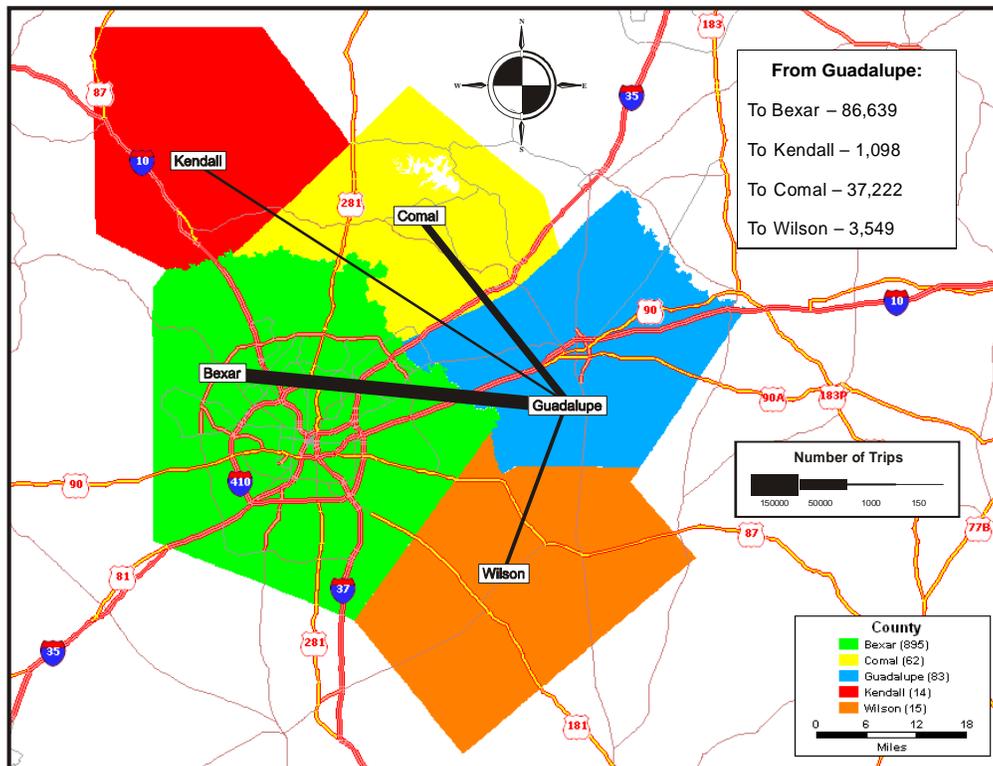
**Figure 39. Person Trip Interchanges between Bexar County and Kendall, Comal, Guadalupe, and Wilson Counties.**



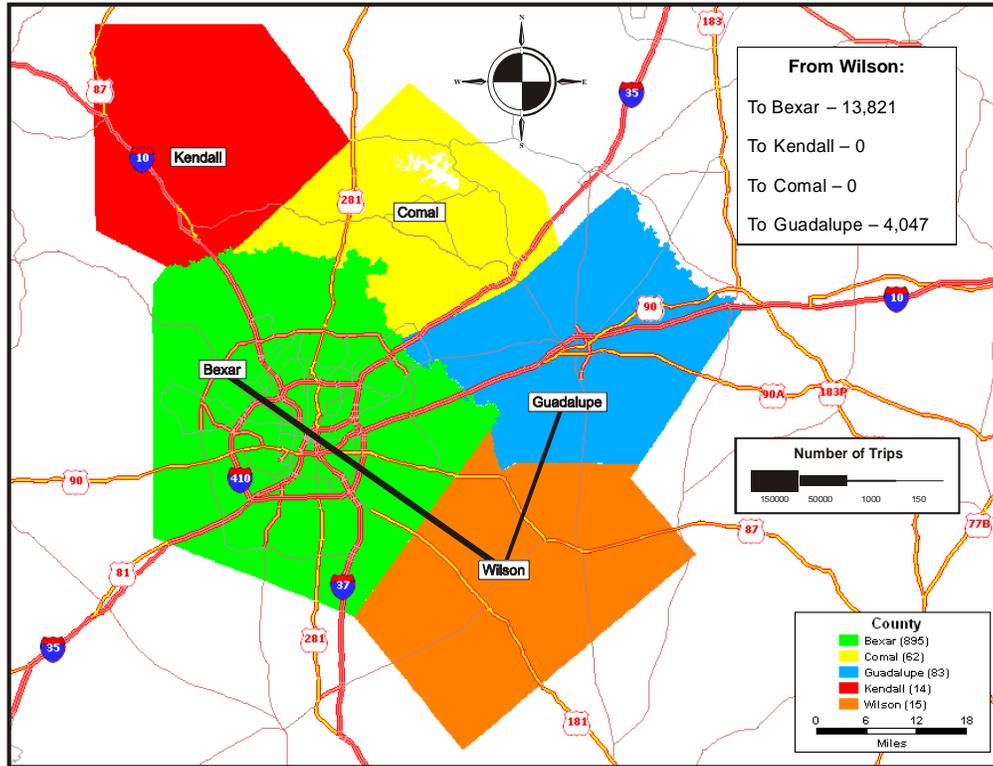
**Figure 40. Person Trip Interchanges between Kendall County and Bexar, Comal, Guadalupe, and Wilson Counties.**



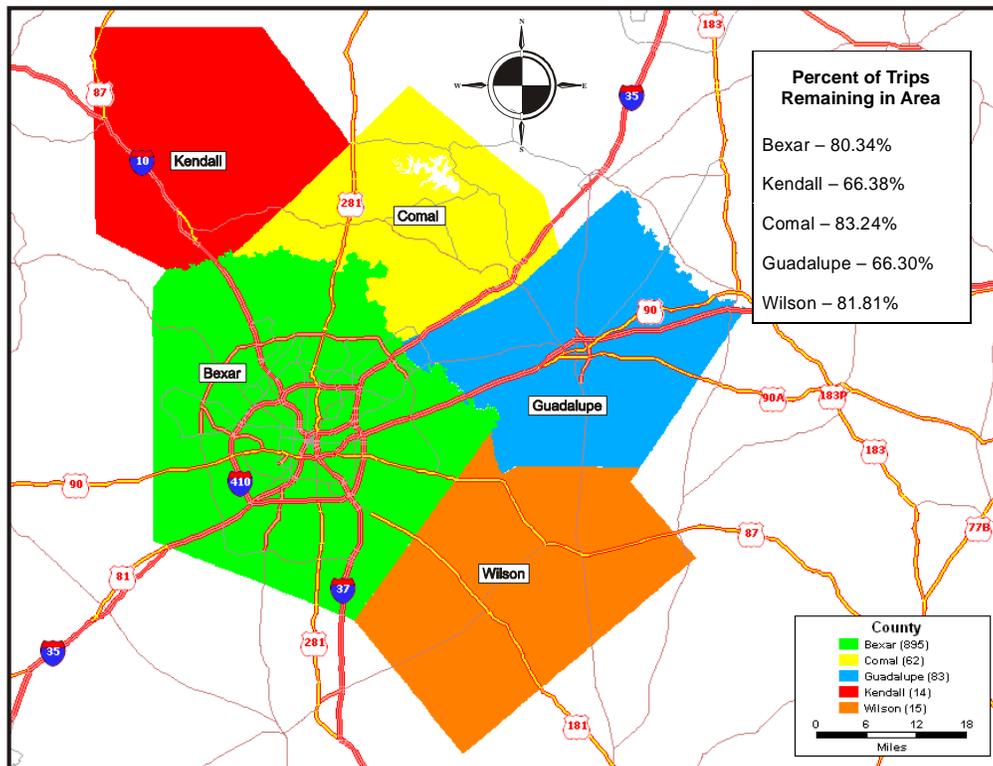
**Figure 41. Person Trip Interchanges between Comal County and Bexar, Kendall, Guadalupe, and Wilson Counties.**



**Figure 42. Person Trip Interchanges between Guadalupe County and Bexar, Kendall, Comal, and Wilson Counties.**



**Figure 43. Person Trip Interchanges between Wilson County and Bexar, Kendall, Comal, and Guadalupe Counties.**



**Figure 44. Percent of Person Trips that Remain within Each County.**

## **SUMMARY DATA**

Table 6 provides household survey comparison data for: the five-county study area, the Rio Grande Valley Region (Cameron and Hidalgo counties), and the five-county planning area of the Capital Area Metropolitan Organization (CAMPO). The (CAMPO) *planning* area includes Hays, Travis, and Williamson counties. Bastrop and Caldwell counties were included in the travel survey area due to the large volume of travel between these two counties *and* the three counties in the CAMPO planning area. More detailed data than that provided in this report has been provided to TxDOT's TPP Division for their use in updating the five-county study area travel demand model.

**Table 6. Comparative Travel Survey Data for Selected Texas Urban Areas.**

Urban Area	Bexar, Comal, Guadalupe, Kendall, and Wilson Counties	Cameron and Hidalgo Counties	Bastrop, Caldwell, Hays, Travis, and Williamson Counties
<b>Demographics</b>			
Household Population	1,791,418	1,030,139	1,486,117
Licensed Drivers	1,187,489	585,035	1,060,436
Number of Households	641,487	294,825	574,225
Average Household Size	2.76	3.49	2.59
Number of Motor Vehicles	1,237,425	555,443	1,065,898
Motor Vehicles per Household	1.84	1.88	1.86
<b>Number of Daily Trips by Mode</b>			
Total Person Trips	5,935,476	3,583,480	5,093,023
Automobile-Driver Trips	3,720,350	2,023,295	3,353,404
Motor Vehicle Passenger Trips	1,677,538	1,243,681	1,292,793
School Bus Trips	216,088	188,781	138,951
Walk Trips	221,605	93,337	189,256
Public Transit Trips	42,868	9,889	43,475
Bicycle Trips	11,993	6,571	31,470
Commercial Vehicle Trips	34,162	14,250	37,962
Other Modes/Taxi	9,137	3,709	5,712
<b>Number of Daily Trips by Destination/Purpose</b>			
Trips to Home	2,193,323	1,322,199	1,866,466
Trips to Work	614,988	353,105	661,624
Trips Work Related	162,585	109,126	158,955
Trips to Shop	625,747	333,674	489,085
Trips to Pick-Up/Drop Off Passenger	592,170	410,936	434,359
Trips for Personal Business	573,779	228,654	356,953
Trips for Social/Recreation	329,141	276,680	359,071
Trips for School K-12	399,655	292,203	302,415
Trips for School Post Secondary	56,547	46,762	56,962
Trips for Meal/Eat	330,357	171,603	325,699
Trips to Change Mode	56,550	24,622	76,436
Other Trips	588	3,596	4,986
<b>Daily Trip Rates</b>			
Person Trips per Person	3.31	3.48	3.42
Person Trips per Household	9.25	12.15	8.87
<b>Trip Lengths and Durations</b>			
Average Person Trip Length in Miles	6.9	6.5	7.8
Average Vehicle Trip Length in Miles	7.4	7.0	8.4
Average Person Trip Duration in Minutes	12.5	9.2	12.8
Average Vehicle Trip Duration in Minutes	13.3	9.8	13.8
<b>Vehicle Miles of Travel (VMT)</b>			
Household Internal VMT	24,820,000	14,245,000	26,463,000

Source: Selected Travel Surveys and TTI Analysis.

## TERMINOLOGY

Within the context of the household travel survey, a number of terms are used. These terms are defined in this section.

Person Trip – A person trip is the movement of an individual from one location to another location. In the household survey, trips were recorded for all persons in a surveyed household.

Automobile Driver Trip – An automobile driver trip is the movement of a vehicle from one location to another location. These trips are recorded for the person driving the vehicle. These are also referred to as vehicle trips.

Trip Purpose – The trip purpose is stated in terms of the purpose at the location the trip began and the purpose at the location the trip ended. For example, a trip that began at home and ended at work would be referred to as a home-based work (HBW) trip. There were 11 trip purposes used in the household survey.

Trip Activity – The trip activity is stated in terms of the activity at the location the trip began and/or the location the trip ended. There were 22 activities used in household survey. The activities were recorded in the survey and post processed to identify the trip purpose associated with each trip activity.

Vehicle Availability – Vehicle availability is the number of vehicles available to members of a household for making trips.

Vehicle Occupancy – Vehicle occupancy is the number of occupants in a vehicle during a vehicle trip including the driver of the vehicle.

Mode of Travel – Mode of travel is the physical means used by the household member to make a trip. The modes are walk, vehicle driver, vehicle passenger, carpool driver, carpool passenger, vanpool driver, vanpool passenger, commercial vehicle driver, commercial vehicle passenger, public transportation, school bus, taxi/paid limousine, bicycle, motorcycle/moped, and other.

Home-Based Work (HBW) Trip – An HBW trip is a trip that has one end of the trip at home and the other end of the trip at work. An HBW trip is non-directional in terms of the trip activity/trip purpose, i.e., a trip from home to work or from work to home is defined as an HBW trip.

Home-Based Non-Work (HBNW) Trip – An HBNW is a trip with one end of the trip at home and the other of the trip at a location other than the work location. An HBNW trip is non-directional in terms of the trip activity/trip purpose.

Non-Home-Based (NHB) Trip – An NHB trip is a trip with neither end of the trip at home.

Trip Productions – Trip productions are the number of trips produced by members of a household. Trip productions are calculated by trip purpose and mode of travel. Production rates are the number of trip productions divided by the number of households that produced those trips.

Trip Attractions – Trip attractions are the number of trips attracted to a particular category of land use. Trip attractions are calculated by trip purpose and mode of travel for different land use categories.

**APPENDIX A**  
**COMPARISON OF THE 1990 SAN ANTONIO AREA HOUSEHOLD**  
**TRAVEL SURVEY WITH THE 2006 SAN ANTONIO-BEXAR COUNTY**  
**HOUSEHOLD TRAVEL SURVEY**



## **INTRODUCTION**

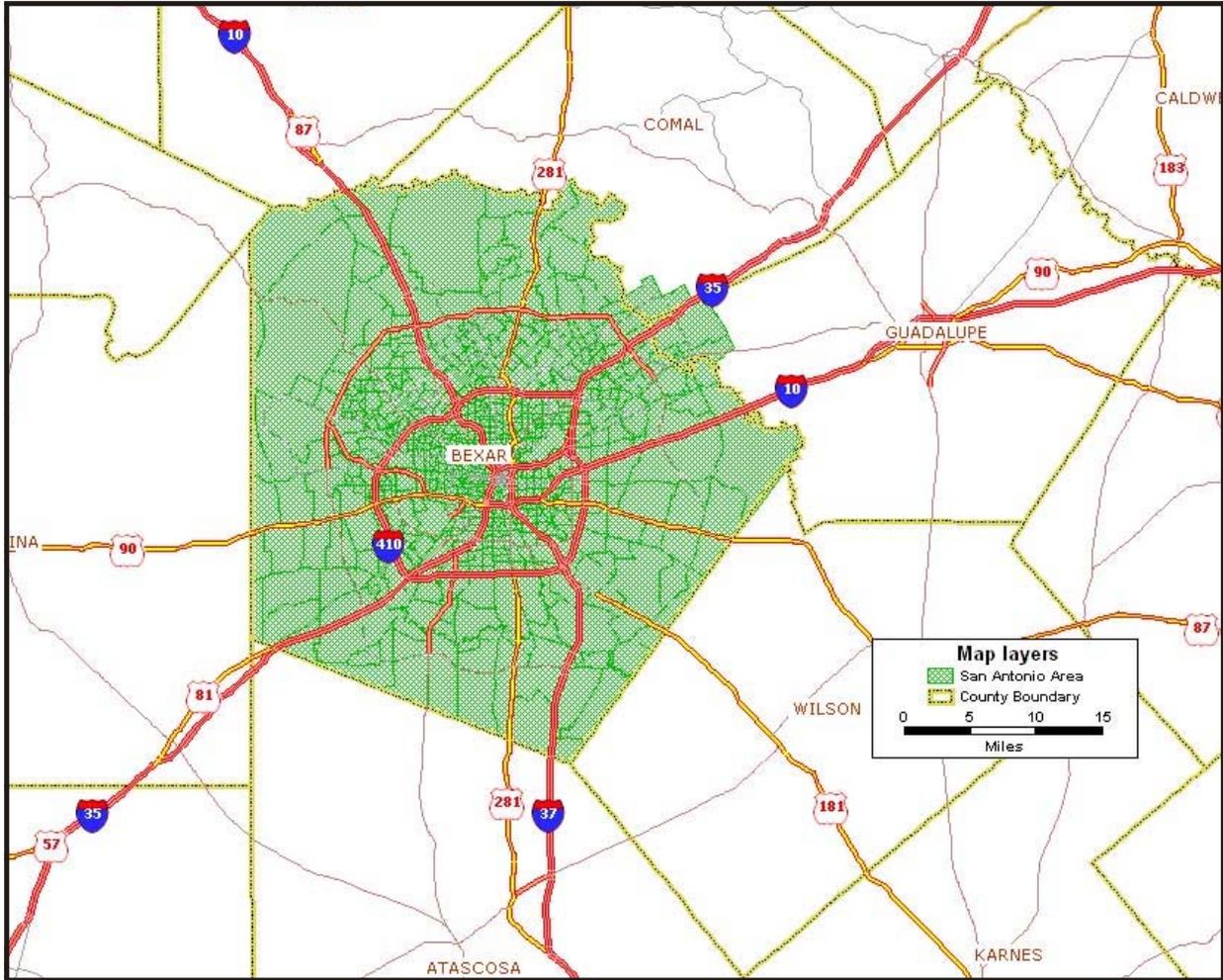
Comprehensive travel surveys were conducted in five urban areas in Texas in 1990 and 1991, including San Antonio. The 1990 San Antonio Household Travel Survey included Bexar County and small portions of Comal and Guadalupe counties known as the Randolph sub-region. (Figure 45). The 2006 San Antonio – Bexar County Household Travel Survey included Bexar County, in addition to four adjacent counties to the north and east – Kendall, Comal, Guadalupe, and Wilson (Figure 46).

There are several reasons why four additional counties were included in the 2006 household travel survey. The most important of these reasons is to support development of a more accurate travel demand model that can be used to forecast future travel demand in all five counties. Since the 1990 household survey, travel among the five counties has increased. A significant number of household members commute each weekday from Comal and Guadalupe counties to Bexar county for work, shopping, recreation, and for access to variety of services.

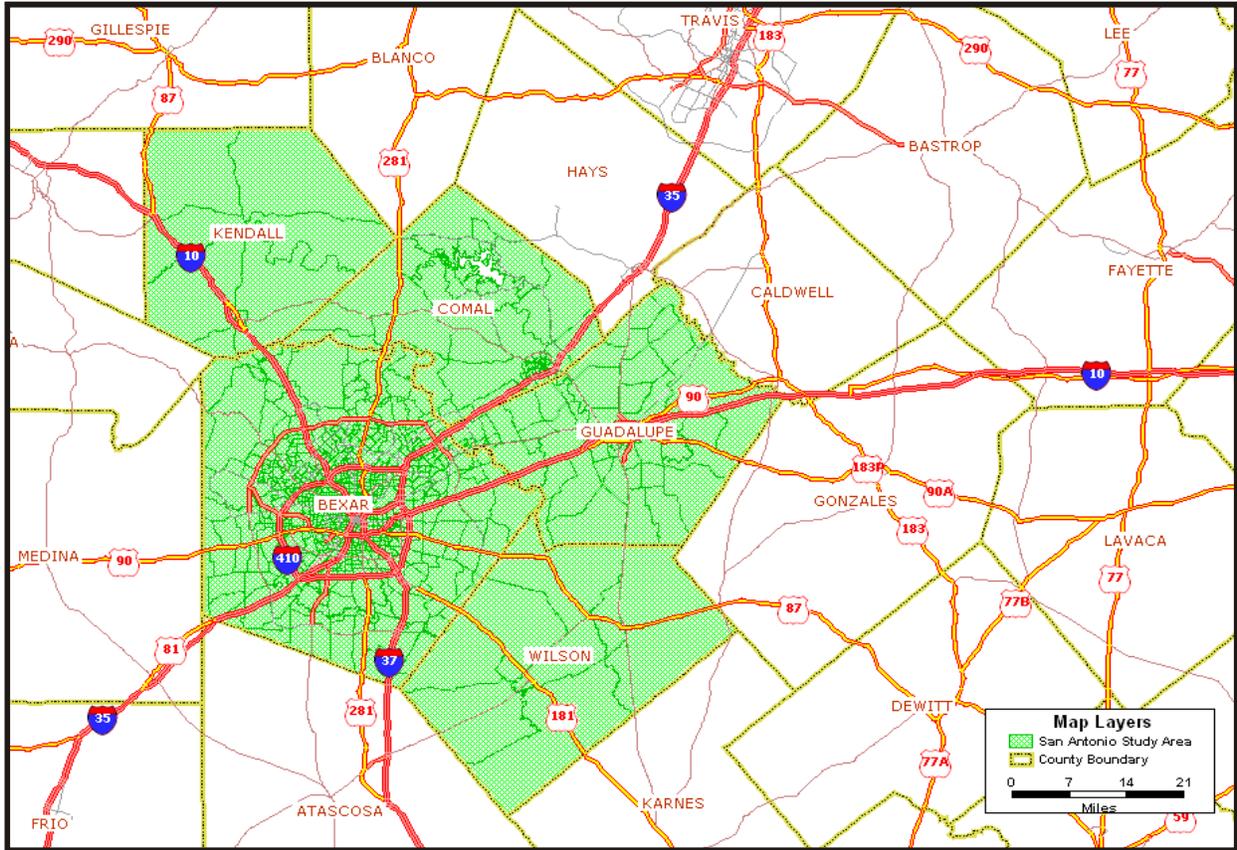
By expanding the geographic area included in the household travel survey, these commute trips are treated within the travel demand model as internal (HBW, HBNW, and NHB) trips rather than external-local trips. The cross-classification trip production models used for forecasting internal trips are judged to be significantly more accurate than the growth factor models used for forecasting external-local trips.

The five-county travel demand model can be used by TxDOT staff for planning transportation system improvements in all five counties.

The household travel survey comparisons provided in this appendix are not strictly comparable since the 1990 survey was for Bexar County exclusively and the 2006 survey was for five counties. However, the comparisons in many categories will provide San Antonio MPO with better planning data.



**Figure 45. San Antonio - Bexar County MPO 1990 Household Survey Area.**



**Figure 46. Five-County San Antonio - Bexar County MPO 2006 Household Survey Area.**

## HOUSEHOLD CHARACTERISTICS

Characteristics of the household influence travel behavior. In this section, selected household characteristics from the 1990 household survey are compared to the 2006 household survey.

Table 7 shows the estimated population, households, and persons per household for 1990 and 2006. The decline in the average number of persons per household from 1990 to 2006 is significant as it shows that the number of households is growing at a faster rate than the population. Travel demand is more closely correlated with the number of households than with the total population. The travel demand model uses household size and household income as the independent variables in the trip production models. Consequently, the travel demand forecasts are very sensitive to the independent forecast of these two household characteristics.

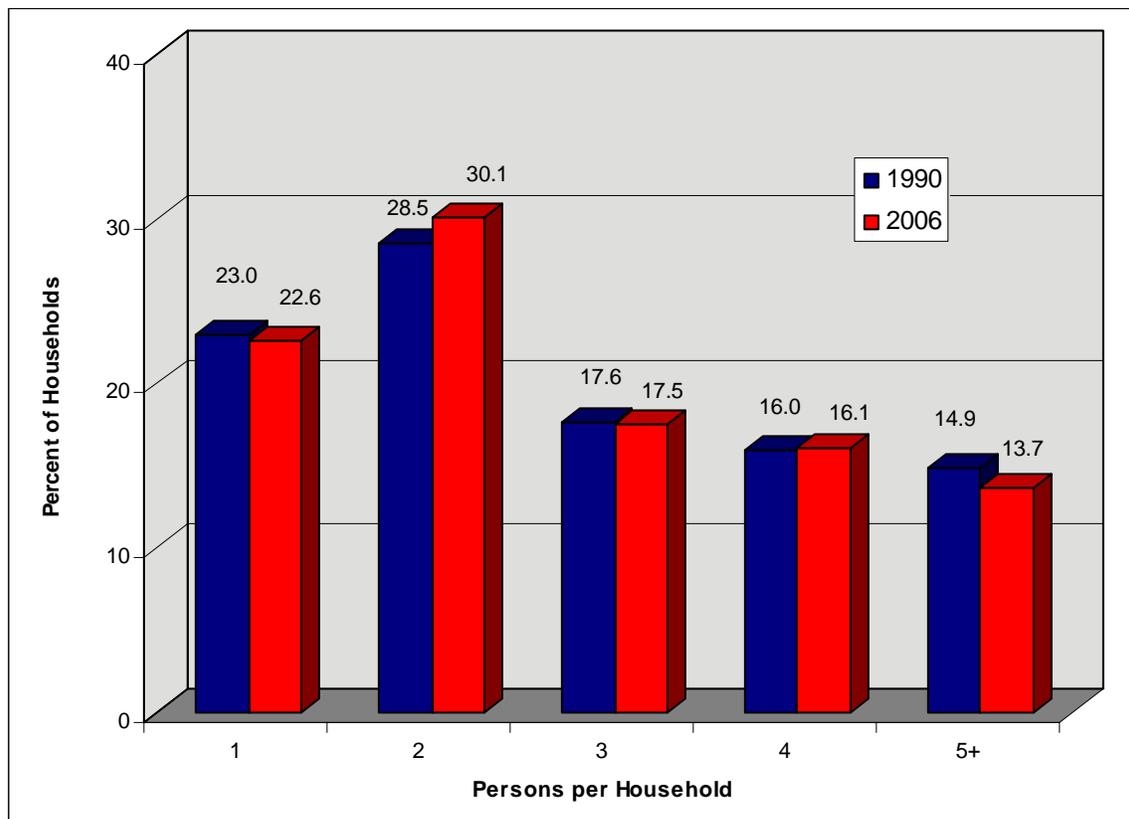
**Table 7. Estimated Population, Households, and Persons per Household.**

<b>Geographic Area</b>	<b>Year</b>	<b>Population</b>	<b>Number of Households</b>	<b>Persons per Household</b>
Bexar County Area	1990	1,185,394	409,606	2.89
Five-County Area	1990	1,339,338	463,844	2.82
Bexar County Area	2006	1,555,592	535,164	2.82
Five-County Area	2006	1,791,418	641,487	2.79

Source: U.S. Census Bureau for 1990 and TTI Analysis for 2006.

## Household Size

Figure 47 shows the distribution of households by household size estimated from the 1990 household travel survey and the 2006 household travel survey. The percentage of households with one and five plus persons per household decreased and the percentage of two-person households increased from 1990 to 2006, while three- and four-person households remained the same. In 1990 the average persons per household was 2.89 compared to the 2006 average persons per household of 2.79.

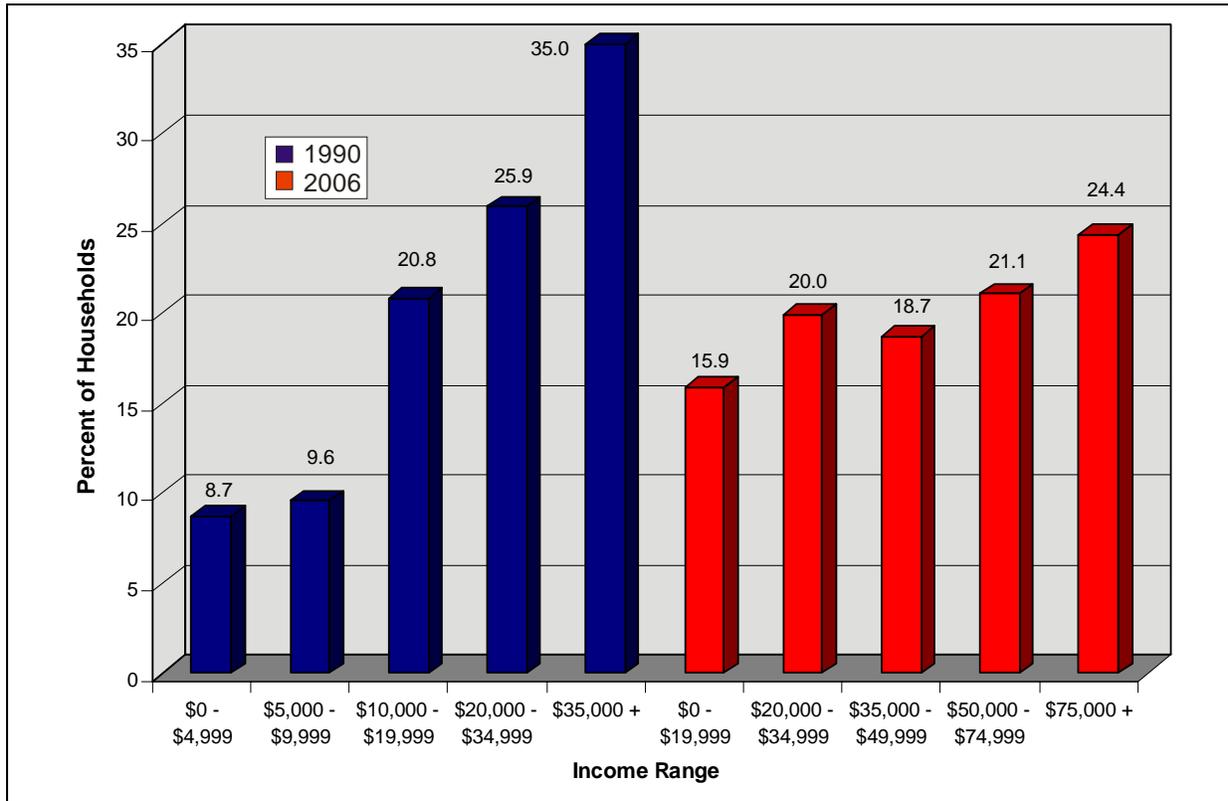


Source: 1990 and 2006 San Antonio Household Travel Survey data.

**Figure 47. Distribution of Households by Household Size.**

## Household Income

Figure 48 shows the distribution of households by household income range estimated from the 1990 household travel survey and the 2006 household travel survey data



Source: 1990 and 2006 San Antonio Household Travel Survey data.

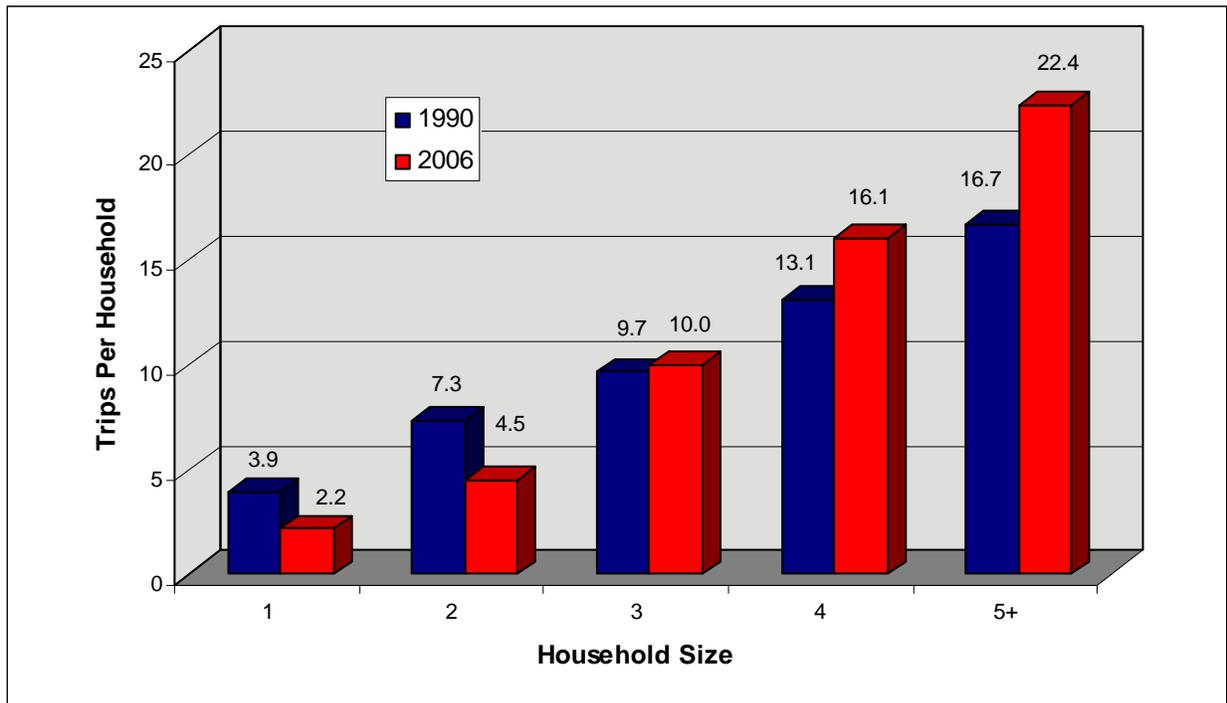
**Figure 48. Distribution of Households by Household Income Range.**

## TRAVELER CHARACTERISTICS

Traveler characteristics are related to the household and personal characteristics of the traveler. The most important traveler characteristics estimated from the household travel survey are trip rates by trip purpose. In this section, trip rates for all trip purposes combined are related to the household characteristics of size and income. For the travel demand model trip rates are estimated for each trip purpose separately (HBW, HBNW, and NHB). HBNW trips may be further divided into HBNW educational, HBNW retail and HBNW other, etc.

### Household Trip Rates

Figure 49 shows the internal person trip rates by household size estimated from the 1990 and 2006 household travel surveys. The average internal person trip rate for all trip purposes combined was 9.50 trips per day per household in 1990 and 9.25 trips per day per household in 2006 suggesting a possible 3 percent decline in the average household trip rate.



Source: 1990 and 2006 San Antonio Household Travel Survey data.

**Figure 49. Household Trip Rates by Household Size.**

Table 8 shows the person trip rates cross classified by household size and household income for all internal trip purposes combined. The household income ranges used for the 1990 survey are different than the household incomes ranges used for the 2006 survey. For travel forecasting applications, the cross-classified trip rates are disaggregated by trip purpose.

**Table 8. Person Trip Rates by Household Size and Household Income.**

Household Income Range		Household Size				
		1	2	3	4	5 +
<b>1990</b>	\$0 - \$4,999	1.91	3.33	7.33	8.73	9.79
	\$5,000 - \$9,999	3.53	4.58	6.39	8.54	12.78
	\$10,000 - \$19,999	4.32	7.14	9.62	12.89	15.71
	\$20,000 - \$34,999	4.61	7.65	9.58	12.29	16.72
	\$35,000 +	4.73	8.24	10.72	14.85	19.30
<b>2006</b>	\$0 - \$19,999	1.79	3.39	7.74	12.22	19.56
	\$20,000 - \$34,999	2.29	4.37	10.82	14.45	18.49
	\$35,000 - \$49,999	1.20	1.30	1.45	1.55	1.87
	\$50,000 - \$74,999	2.45	4.44	10.49	16.35	24.69
	\$75,000 +	2.39	5.43	10.86	18.61	25.00

Source: 1990 and 2006 San Antonio Household Travel Survey data.

## Travel by Age Cohort

A total of 1,040,531 persons were represented in the 1990 household travel survey and a total of 1,791,418 persons were represented in the 2006 household travel survey. Table 9 shows the distribution of these persons by age cohort and the percent of persons making zero trips on their survey day by age cohort. The distribution of persons by age cohort and the percent of persons making zero trips by age cohort are remarkably similar for the two surveys. There appears to be some under reporting of trips by persons in the 20-24 and 30-34 age cohorts in both surveys and some under reporting of trips in the 25-29 age cohort category in the 1990 survey.

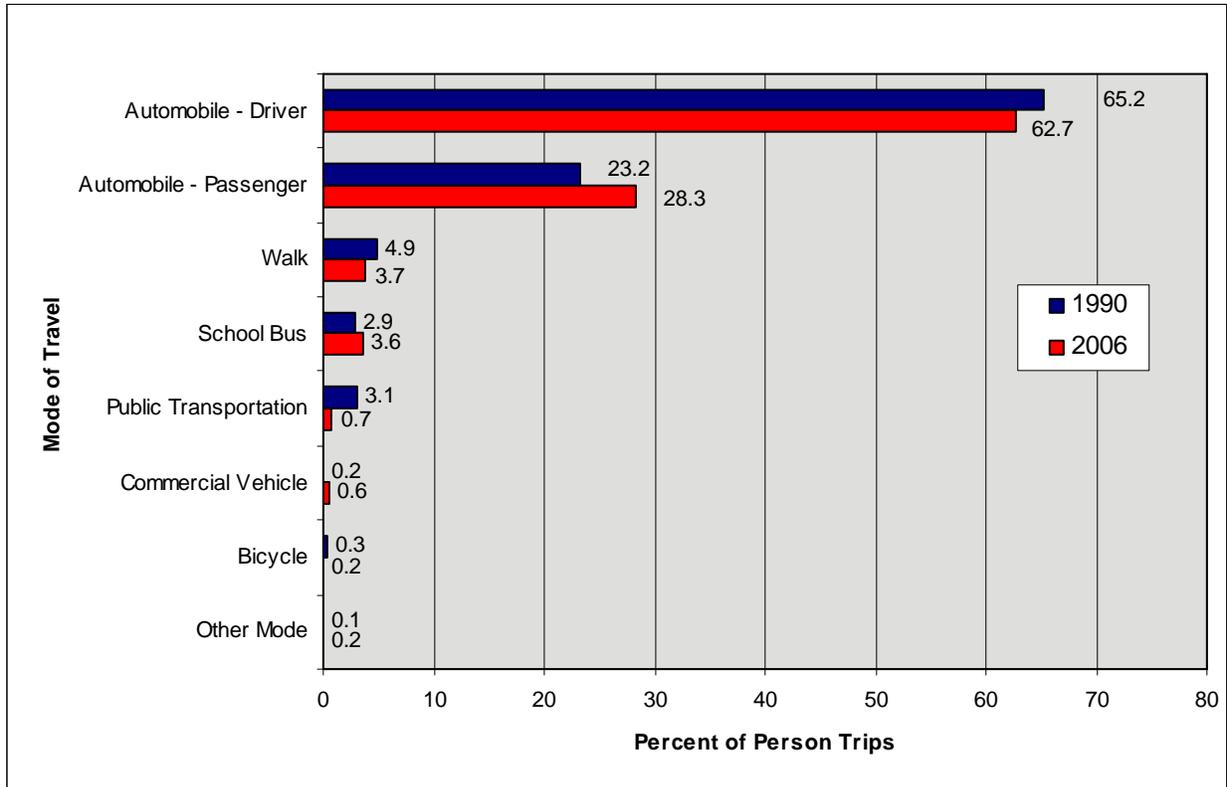
**Table 9. Percent of Persons and Percent of Persons Making Zero Internal Trips.**

Age Cohort	1990 Percent of Persons	2006 Percent of Persons	1990 Percent of Persons Making Zero Internal Trips	2006 Percent of Persons Making Zero Internal Trips
0-15	20.91	23.40	8.46	10.10
16-19	6.52	7.27	13.73	11.17
20-24	7.13	7.17	17.89	23.43
25-29	9.88	7.11	13.70	11.43
30-34	9.53	7.23	14.48	16.95
35-39	9.30	7.01	12.09	13.84
40-44	7.81	7.62	9.31	11.42
45-49	6.36	7.15	13.51	13.01
50-54	4.82	6.30	17.17	15.57
55-59	4.90	5.11	16.76	15.85
60-64	3.75	4.13	19.88	20.16
65-69	3.82	3.15	27.09	21.06
70-74	2.42	2.53	33.79	20.50
75-79	1.45	2.07	37.76	26.13
80 +	1.40	2.75	60.73	38.88
<b>Total</b>	<b>100.00</b>	<b>100.00</b>	<b>15.03</b>	<b>15.08</b>

Source: 1990 and 2006 San Antonio Household Travel Survey data.

## MODE OF TRAVEL

Figure 50 shows the distribution of person trips by mode. Automobile travel accounted for 89 percent of person trips in 1990 and 91 percent of person trips in 2006. The use of public transportation appears to have declined from 3.12 percent of person trips in 1990 to 0.72 percent of person trips in 2006. Note, however, Comal and Guadalupe counties were added to the household survey in their entirety in 2006 (not just the Randolph sub-region), in addition to both Kendall and Wilson counties. With limited public transportation available in these counties (compared to Bexar County), the apparent decline is misleading.



Source: 1990 and 2006 San Antonio Household Travel Survey data.

**Figure 50. Distribution of Person Trips by Mode of Travel.**

## **AMOUNT OF TRAVEL**

Several measures are used to record the amount of travel, the number of person trips, the number of vehicle trips, the trip distances in miles, the trip durations in minutes and the VMT.

### **Internal and External Person Trips**

Internal trips are produced and attracted to traffic analysis zones within the study area boundaries. External-local trips are produced outside the study and are attracted to traffic analysis zones inside the study area or vice versa. For example, persons commuting from Medina County into Bexar County for work are making external-local trips.

External-through trips pass through the study area without making any stops. For example, many trips being made on IH-10 and IH-35 pass through the study area without making any stops within the study area.

Travel demand models are better able to forecast internal trips than external-local and external-through trips. For internal trips, the travel demand modeler has knowledge of the household characteristics and trip production rates of the trip makers and knowledge of the workplace characteristics and their associated trip attraction characteristics. The modeler does not have this knowledge about travelers making external-local and external-through trips.

One reason that four additional counties were included in the 2006 household travel survey was to minimize the proportion of the total trips that are external-local trips, thereby improving the ability of the travel demand model to forecast future travel. Between the 1990 household survey and the 2006 household survey, the number of household members commuting among Comal, Guadalupe, Kendall, and Wilson counties increased significantly. Table 10 shows the distribution of internal and external person trips from the 1990 and 2006 household surveys.

The external-local trips shown in Table 10 are external-local trips made by households within the study area. External-local trips and external-through trips made by travelers not residing within the study area are estimated from the external station survey and are not included in Table 10. The number of external-local trips made by households within the study area was less than 2 percent.

**Table 10. The Number and Distribution of 1990 and 2006 Internal and External-Local Trips.**

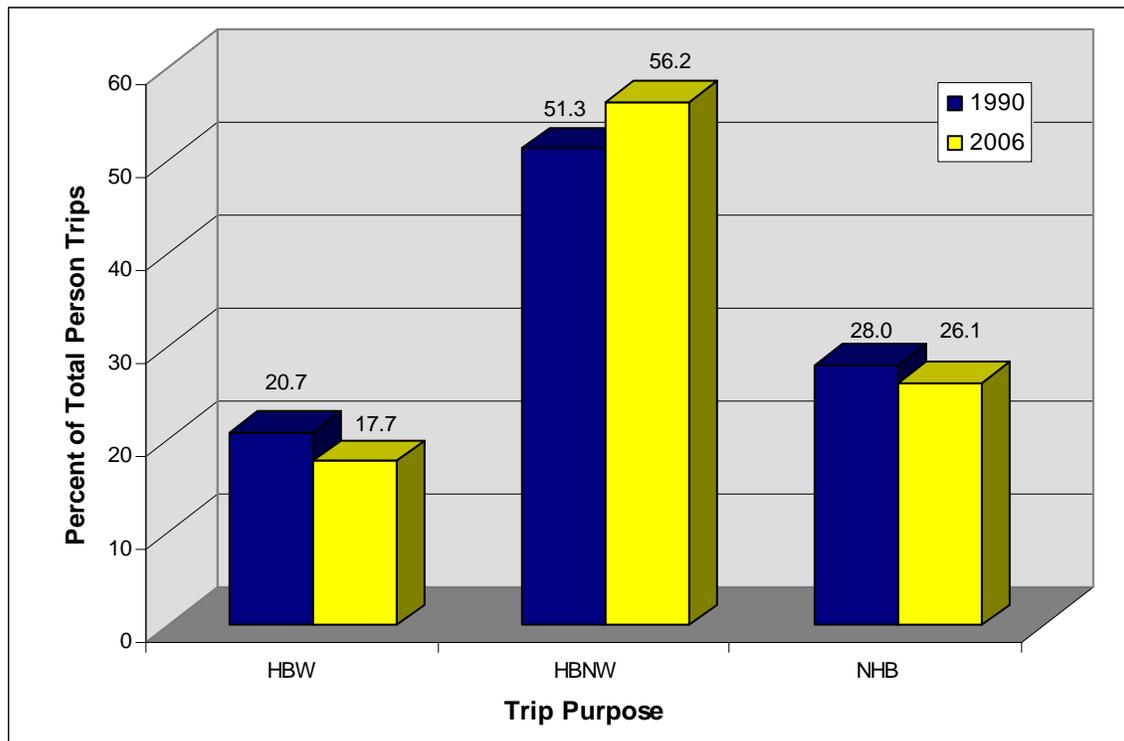
<b>Trip Purpose</b>	<b>1990 Person Trips</b>	<b>2006 Person Trips</b>	<b>Distribution of 1990 Person Trips</b>	<b>Distribution of 2006 Person Trips</b>
Internal Trips	3,756,703	5,835,072	98.80%	98.31%
External-Local Trips	45,706	100,404	1.20%	1.69%
Total Trips	3,802,409	5,935,476	100.00%	100.00%

Source: 1990 and 2006 San Antonio Household Travel Survey data.

Note: The external-local trips shown are for households within the respective study areas. External-local trips made by households outside the study area are estimated from the external station surveys.

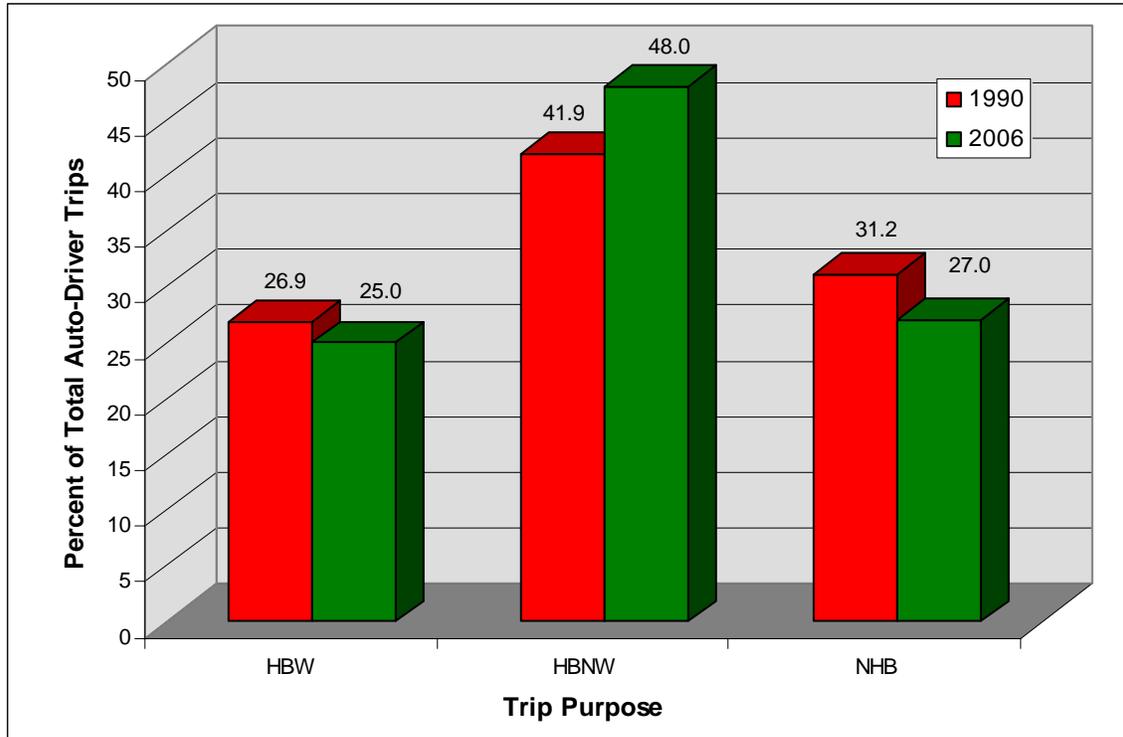
## Trip Purpose

Figures 51 and 52 illustrate the 1990 and 2006 comparison data for percent of total person trips and total vehicle driver trips for the three internal trip purposes – HBW, HBNW, and NHB. In both HBW and NHB categories, the percent of total person and vehicle driver trips decreased from 1990 to 2006, however, HBNW trips increased from 1990 to 2006.



Source: 1990 and 2006 San Antonio Household Travel Survey data.

**Figure 51. Distribution of Person Trips by Internal Trip Purpose.**

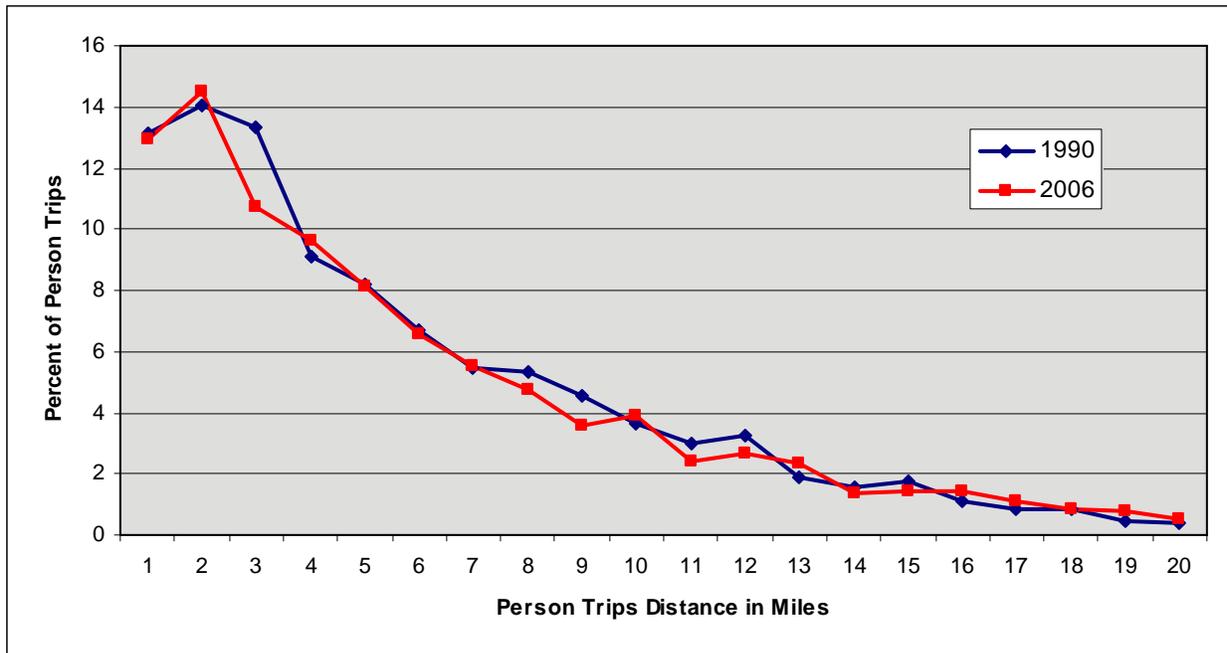


Source: 1990 and 2006 San Antonio Household Travel Survey data.

**Figure 52. Distribution of Auto-Driver Trips by Internal Trip Purpose.**

## Trip Distance

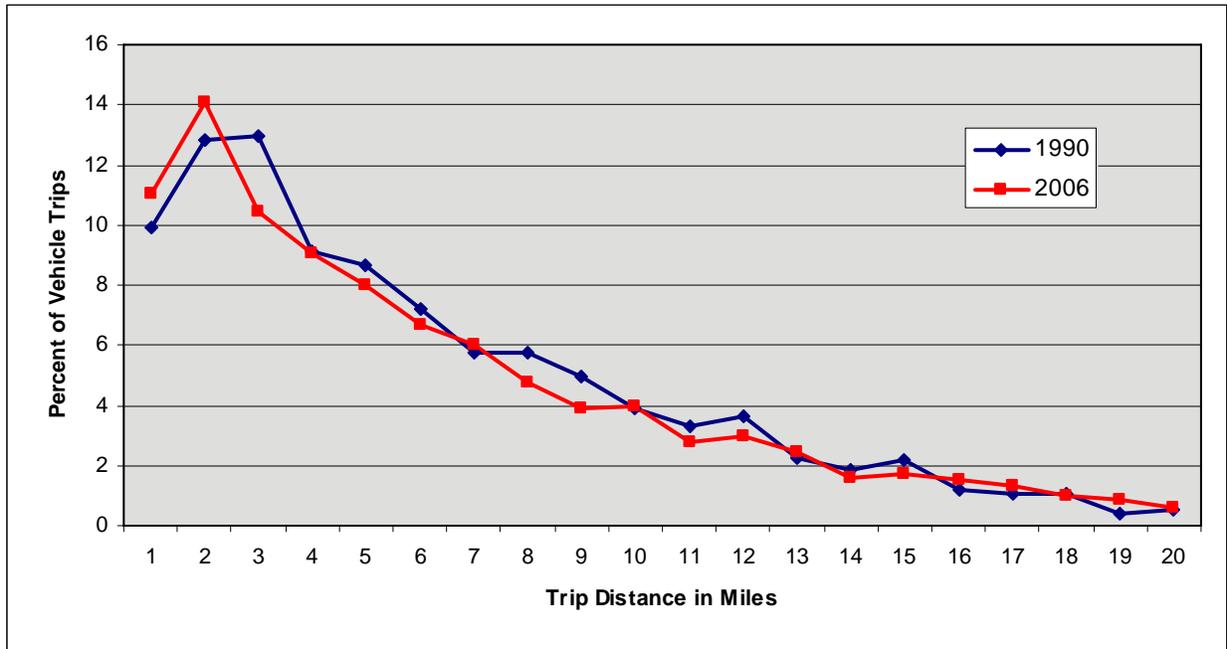
Figure 53 shows the distribution of internal person trips by the length of the trip in miles for the 1990 and 2006 household travel surveys. The average person trip length was 6.0 miles for the 1990 household travel survey and 7.0 miles for the 2006 household travel survey.



Source: 1990 and 2006 San Antonio Household Travel Survey data.

**Figure 53. Distribution of Person Trips by Trip Distance in Miles.**

Figure 54 shows the distribution of internal vehicle trips by the length of the trip in miles for the 1990 and 2006 household travel surveys. The average vehicle trip length was 6.5 miles for the 1990 household travel survey and 7.4 miles for the 2006 household travel survey.

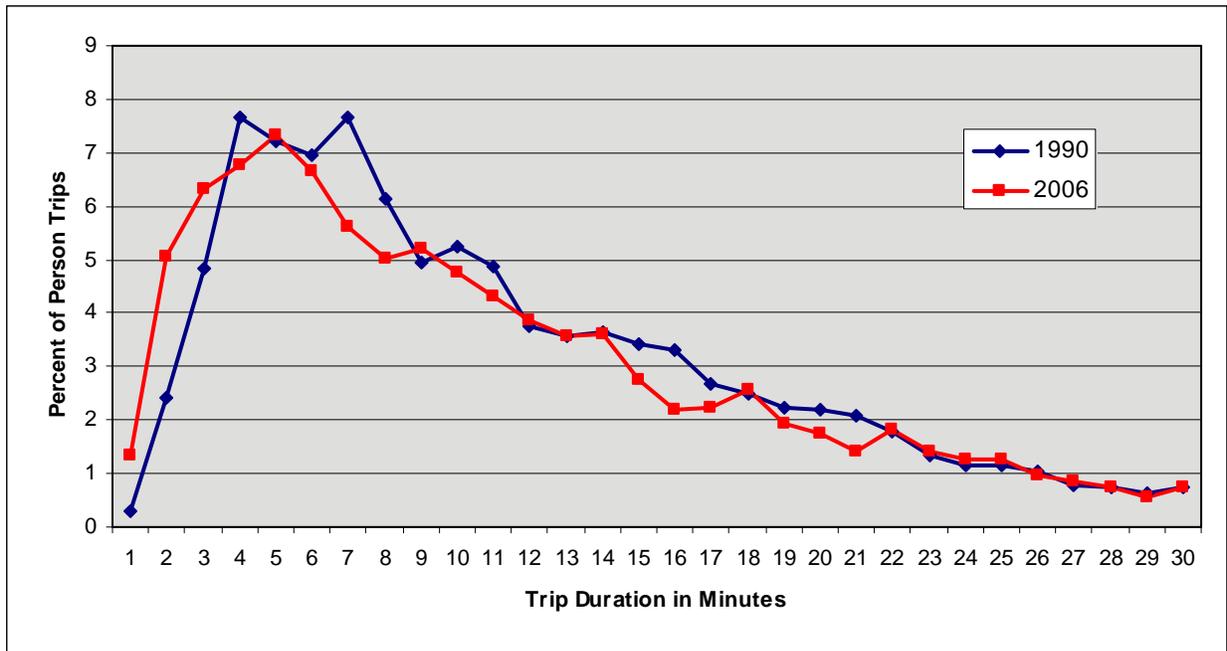


Source: 1990 and 2006 San Antonio Household Travel Survey data.

**Figure 54. Distribution of Vehicle Trips by Trip Distance in Miles.**

## Trip Duration

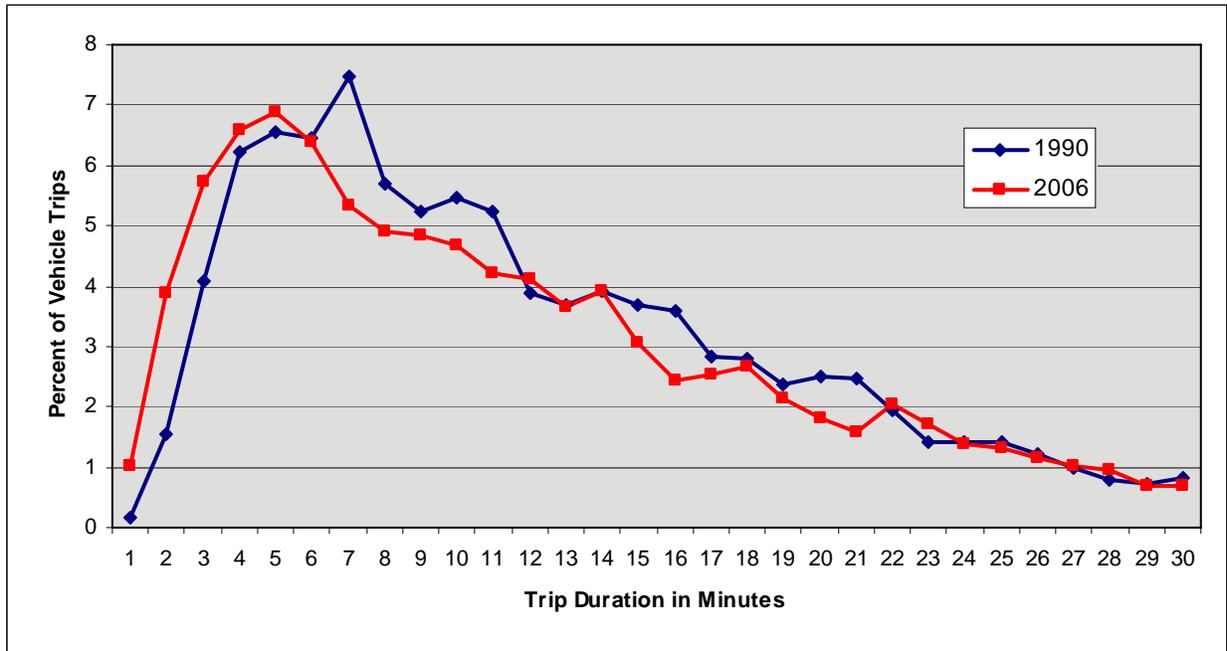
Figure 55 shows the distribution of internal person trips by the duration of the trip in minutes for the 1990 and 2006 household travel surveys. The average person trip duration was 11.9 minutes for the 1990 household travel survey and 12.5 minutes for the 2006 household travel survey.



Source: 1990 and 2006 San Antonio Household Travel Survey data.

**Figure 55. Distribution of Person Trips by Trip Duration in Minutes.**

Figure 56 shows the distribution of internal vehicle trips by the duration of the trip in minutes for the 1990 and 2006 household travel surveys. The average vehicle trip duration was 12.7 minutes for the 1990 household travel survey and 13.3 minutes for the 2006 household travel survey.



Source: 1990 and 2006 San Antonio Household Travel Survey data.

**Figure 56. Distribution of Vehicle Trips by Trip Duration in Minutes.**

### Vehicle Miles of Travel

The VMT was 16,500,000 for vehicle trips internal to the San Antonio study area (Bexar County and portions of Comal and Guadalupe counties) in the 1990 household travel survey and 24,820,000 for vehicle trips internal to the five-county study area in the 2006 household travel survey.

## **SUMMARY**

The 1990 and 2006 trip rates cross classified by household size and household income are similar. The travel demand model assumes that household trip rates by trip purpose do not significantly change during the 20-year forecast. What does change over time is the number of households, the household size, the household income, and the geographic location of the households.

Travel demand forecasts are very dependent on the accuracy of the household demographic and household location forecasts. In reality, there are some changes in trip rates over time even accounting for changes in household size and household income, thus the need to periodically update household travel surveys.