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# FRONT RANGE TRAVEL COUNTS: FORT CARSON HOUSEHOLDS

## *Summary Report*



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# NuStats

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# INTRODUCTION

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The Front Range Travel Counts Survey (FRTC) is a comprehensive study of the demographic and travel behavior characteristics of Colorado Front Range residents across four MPO regions: North Front Range, Denver, Pikes Peak, and Pueblo. The objective of the survey effort is to document demographic and travel behavior characteristics across the Front Range in order to support travel demand modeling and answer travel-related questions. The main metric obtained are “trip rates,” which are defined as the total number of trips reported at the household and/or person level for a given weekday. The survey data set obtained through this effort will support updates for several regional travel demand models, as well as support the development of new models.

As part of the FRTC household travel survey for the Pikes Peak Area Council of Governments, a portion of the households will have one or more members of the household serving at Fort Carson. This report summarizes the data collected from 60 Fort Carson households.

Throughout all the regions, the FRTC household travel survey was conducted using standard travel survey methods and computer-aided telephone interviewing (CATI) technology. It entailed the collection of activity and travel information for all household members during a specific 24-hour weekday period. The survey relied on the willingness of regional households to (1) provide demographic information about the household, its members, and its vehicles and (2) have all household members record all travel-related details for a specific 24-hour period, including information for all locations visited, trip purpose, mode, and travel times. Incentives were offered to targeted, hard-to-reach demographic groups (low-income, households comprised of one person who works, and large households) in order to minimize unit non-response and provide a more representative data set. Incentives were offered to Fort Carson households as well. Initially the incentive amount was \$25 per household; this was later increased to \$50 per household.

Survey work began with a pilot in Spring 2009, followed by the North Front Range survey effort in Fall 2009. The other MPO regions, including Pikes Peak, were surveyed starting in January 2010. For the Fort Carson effort, the travel data included in this report was collected from January 31 through July 6, 2010.



# SURVEY METHODS

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This section of the report provides details about the methodology used to conduct the survey.

## SURVEY DESIGN

The survey employs a generally accepted research method for documenting household travel behavior, in which all household members recorded all trips for a specified 24-hour period (focusing on weekdays, with each “travel day” beginning at 3 a.m. and ending at 2:59 a.m.) using a specially designed travel diary. In the survey materials and interview scripts, respondents were assured that their responses would be kept confidential and that their responses would be analyzed in the aggregate only. As a result, the data files were structured such that a 7-digit unique identifier (“sample number”) is provided to link each household’s data together across the files and documentation prepared to ensure the public use data files would be stripped of all identifying information prior to its release.

Households were randomly assigned to non-Holiday weekdays for recording their travel (Monday-Friday).

## SAMPLE DESIGN

The general approach to the sample design is that of a random population sample, proportionate across the study area and with oversampling of the hard-to-reach demographic groups including low-income, Hispanics, large households, and 1-person/worker households. Socioeconomic stratifications were also used, in which household size and employment status of the members in the household were stratified into the following strata:

- 1-person worker households
- 1-person non-worker households
- 2-person households with at least one worker
- 2-person non-worker households
- 3-or-more person households

The stratified sampling method assumed the following:

1. **Study Universe:** The survey universe was defined as all households in the Pikes Peak area. The study universe comprises 227,910 households.
2. **Sampling Frame:** A multi-sampling frame was used that combined the strengths of two sampling frames – address-based frame and Random Digit Dial (RDD) frame. The address-based sample was randomly drawn from a current listing of all deliverable city and rural route residential postal addresses for the study area as contained in a direct mail database maintained by ADVO, Inc. The RDD sample was randomly generated by deriving unique blocks based on area code, exchange, and the 4th and 5th digits of known telephone number (e.g., 303-927-12). The last two digits were randomly generated, and each number was purged against known business listings and pre-dialed to purge non-working numbers.
3. **Fort Carson Sample<sup>1</sup>:** Zip codes with higher proportions of military households were oversampled.

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<sup>1</sup> The majority of households participating in the Front Range Travel Counts Survey were recruited via outbound telephone calls. Unlisted and cell phone only households are more difficult to reach; thus to the extent that Fort Carson households are unlisted or cell phone only/cell phone mostly, they are difficult to contact and recruit into the survey.

## DATA COLLECTION

Data collection activities for the Fort Carson households began in January. These activities centered around five main stages: advance notification, recruitment, placement of materials, travel data retrieval, and processing. The details regarding each stage are provided in this section.

**Advance Notification.** A study letter and brochure were mailed to a portion of all households prior to the recruitment call. This mailing served as advance notification to the household that it had been randomly selected and would be receiving a call regarding the study; they were also provided the option of calling in to participate in the study.

**Recruitment.** The recruitment interview was administered using a computer-assisted telephone interviewing (CATI) program. Each sampled household was telephoned by an interviewer to invite them to participate in the study. If the household agreed, demographic information was collected including income, household size, vehicle ownership, and other household characteristics. In addition, demographic characteristics were obtained for each member of the household such as age, gender, and employment and school status.

**Packet Mailout.** The day following recruitment, the demographic information was processed into the master data set, and packets were assembled for each recruited households. These packets included a cover letter, travel diary, sample travel log, and a postage-paid envelope to return the completed logs after the retrieval interview. Travel days were scheduled 7 to 10 days after recruitment to allow for sufficient time for packets to reach the households using first-class mail.

**Reminder Call.** The night prior to the assigned travel day, reminder calls were made to the households. This reminder call served three key purposes:

1. Confirm that the household received the packet and answer any questions respondents might have about using the log to track their travel.
2. Schedule an appointment to conduct the retrieval interview.
3. Increase the likelihood that the household will follow through with recording their travel by reiterating the importance of the study and the household's commitment to participate.

For those instances where an answering machine was reached, the interviewers left brief messages that referenced a toll-free number for respondents to call if they had questions.

**Retrieval.** The day after an assigned travel day or at an agreed-upon time, telephone calls were made to retrieve the travel data recorded by each eligible household member in his/her travel diary. The interviews were guided using CATI programs of the retrieval instrument.

**Processing.** Data processing took place throughout the study, beginning with the creation of the advance notification mailout, continuing with the release of sample for recruitment, processing recruitment data for the respondent mailout, appending the retrieval data to the master tables, and performing initial quality control measures on the data. A master control file tracked the progress of each household through the various survey stages, with codes to allow immediate identification of problem cases that were not progressing according to schedule, as well as confirmation that cleared cases moved along as appropriate. A complete list of data checks is detailed in the FRTC Quality Control Plan. Example data checks from that more comprehensive list include the following:

- Data range checks to ensure data were inside the expected ranges for each variable and that there was agreement across data files (for example, if the household had 4 persons and 2 vehicles, there should be 4 records in the person file and 2 records in the vehicle file).
- If a person reported no travel, the household was flagged for manual review to confirm the reason for non-travel was appropriate based on the demographic characteristics of the household member.

Those cases where the reason for non-travel was suspect or did not make sense within the context of the available demographic information were flagged and returned to PTV DataSource for confirmation or replacement.

- Within the travel data itself, several items were checked. The following are examples of conditions researched within the trip data:
  - Did each trip begin and end at a different location? Loop trips (those that have the same origin and destination) might be neighborhood walks, which were treated as at-home non-work activities rather than a trip.
  - Did each person return home at the end of the travel day? If not, did the final recorded destination make sense within the context of the household and person characteristics?
  - For all instances where a respondent reported traveling with other household members, was the shared trip reported for all other household members?
  - For all trips with “auto-driver” as the reported mode, was the respondent a licensed driver?
  - For all trips reported as “auto-passenger,” did another household member report the same trip as an auto-driver? If not, did the passenger report riding in a non-household vehicle with at least one other person making the trip?

**Real-Time Geocoding with TripTracer.** All trip-ends and habitual addresses were geocoded during the retrieval telephone interview using the TripTracer software. The TripTracer software was designed to provide interviewers with study area details (road names, landmark references). Interviewers used this additional detail to confirm respondent-reported locations in real time. An additional benefit of the use of the TripTracer software was that once the interview was completed, full address information, with matching x/y coordinates, for 100% of the locations, was immediately available. The availability of the location data at the x/y coordinate level means that data users can map to various geographies (such as traffic analysis zones or census tracts, using GIS software).



# KEY FINDINGS

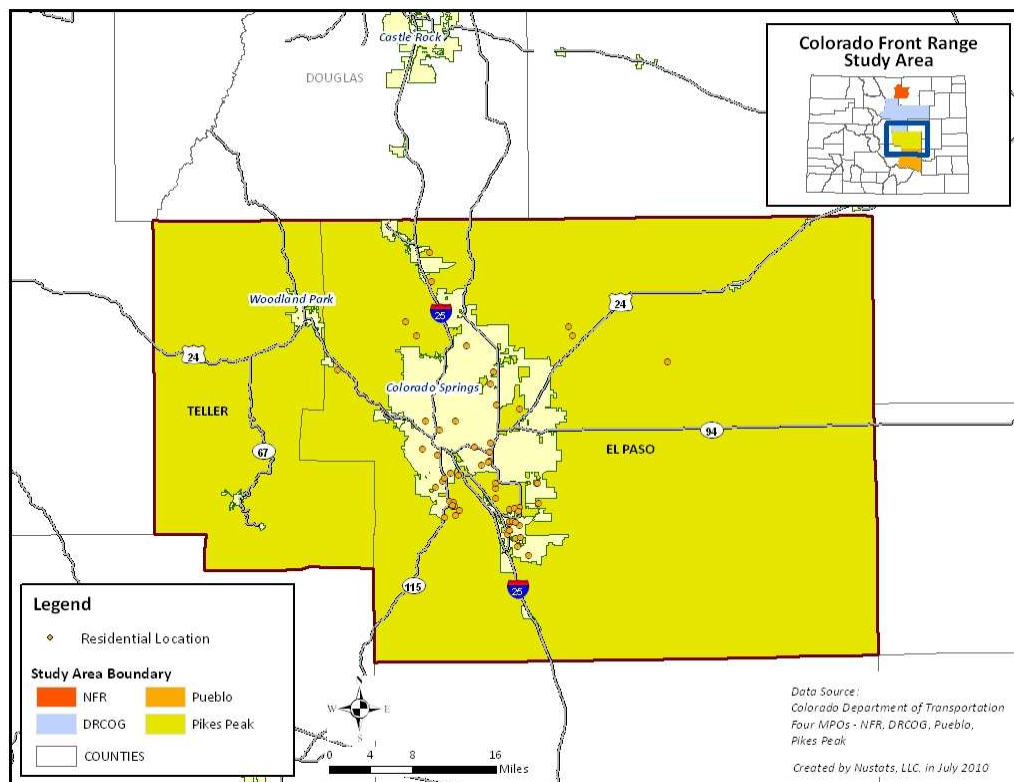
As of July 6, a total of 60 Fort Carson military households have completed the travel survey in Pikes Peak study area. Table 1 presents key demographic statistics for these households. Overall, the Fort Carson households who participated in the survey averaged 3.72 persons, 1.65 workers, and 2.48 vehicles.

**TABLE 1: KEY HOUSEHOLD STATISTICS**

KEY HOUSEHOLD STATISTICS	TOTAL
Total Households	60
Total Persons	233
Persons per HH	3.72
Total Workers	99
Workers per HH	1.65
Total Vehicles	149
Vehicles per HH	2.48

The geographic distribution of participating households is shown in Figure 1.

**FIGURE 1. GEOGRAPHIC DISTRIBUTION OF PARTICIPATING FORT CARSON HOUSEHOLDS**



## HOUSEHOLD CHARACTERISTICS

In comparison with general households in Pikes Peak area, Fort Carson households that participated in the survey, are more likely to have three or more persons and to own more vehicles (2 or more) than the general population in the Pikes Peak study area. The number of workers in the household is larger than the general households in the study area. Nearly three quarters of the participating Fort Carson households reported household income of \$50,000 or greater.

**TABLE 2: KEY HOUSEHOLD DEMOGRAPHIC CHARACTERISTICS**

DEMOGRAPHICS	Fort Carson	FULL STUDY AREA*
<b>Total households</b>	60	227,910
<b>Household Size</b>		
One	1.67%	26.30%
Two	13.33%	34.00%
Three	23.33%	16.40%
Four or more	61.67%	23.30%
<b>Household Vehicle</b>		
Zero	0.00%	4.82%
One	8.33%	29.59%
Two	58.33%	42.52%
Three or more	33.33%	23.06%
<b>Household Workers</b>		
Zero	0.00%	20.37%
One	41.67	41.73%
Two	51.67	32.65%
Three or more	6.67	5.25%
<b>Income</b>		
Less than \$29,999	3.45%	23.42%
\$30,000-\$49,999	20.69%	19.58%
\$50,000-\$74,999	46.55%	20.67%
More than \$75,000	29.31%	36.33%
<i>Refused</i>	3.33%	-

\* Full study area statistics source: American Community Survey 2006-2008

## PERSON CHARACTERISTICS

Looking at person demographic characteristics in comparison with general population in Pikes Peak area in Table 3, Fort Carson household members are less likely to fall in the 55 or older age ranges, slightly more likely to be male and more likely to be employed. The Fort Carson households who participated are also more likely than the general population to have children in the household and to have enrolled students.

**TABLE 3: KEY PERSON DEMOGRAPHIC CHARACTERISTICS**

DEMOGRAPHICS	Fort Carson	FULL STUDY AREA*
<b>Total Persons</b>	233	609,903
<b>Age</b>		
0-17	44.80%	25.80%
18-24	7.24%	9.80%
25-34	21.27%	14.90%
35-54	26.24%	29.80%
55-64	0.45%	10.20%
65+	0.00%	9.40%
DK/RF	0.90%	-
<b>Gender</b>		
Male	52.02%	49.76%
Female	47.98%	50.24%
<b>Disability</b>		
Yes	4.48%	-
No	95.52%	-
<b>Work Status (age 16+)</b>		
Yes	76.74%	66.79%**
No	23.26%	33.21%**
<b>Student Status</b>		
Yes	49.10%	28.81%***
No	50.90%	71.19%***

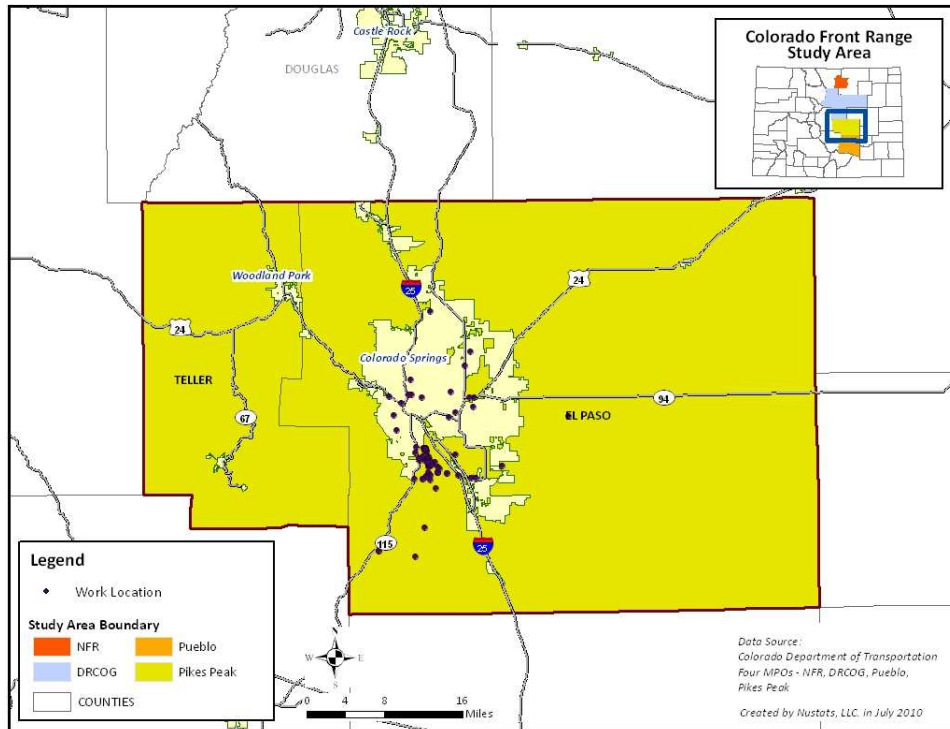
\* Full study area statistics source: American Community Survey 2006-2008

\*\*Work Status data excludes Teller County due to limited number of cases.

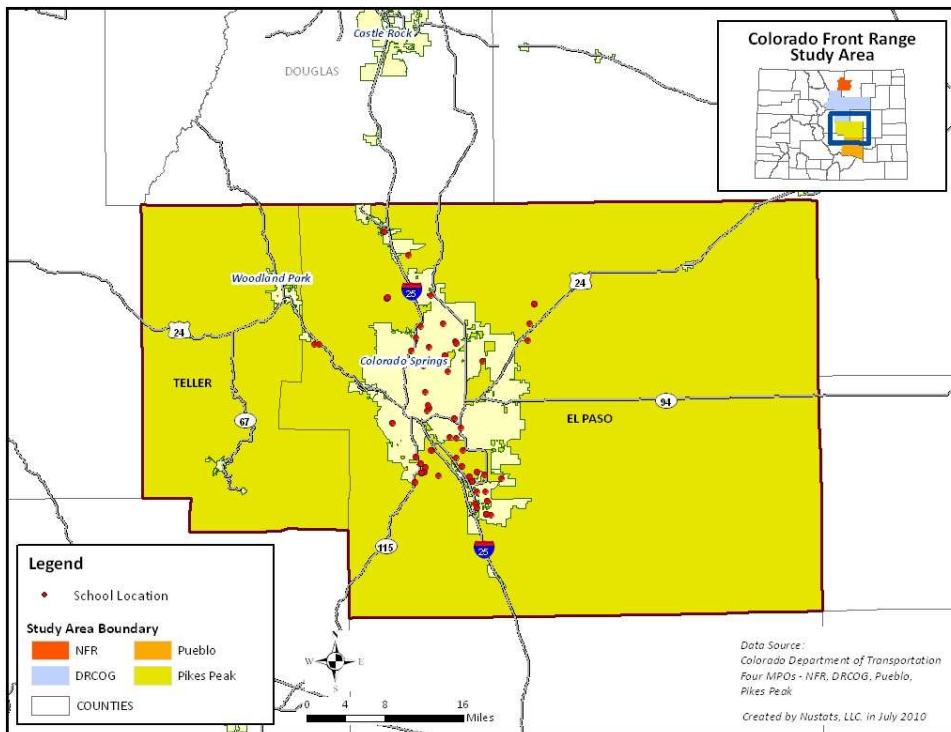
\*\*\*Student Status data of ACS is based on age 3 or over while Fort Carson survey data for student status is based on all ages.

Work locations of all Fort Carson household members are shown in Figure 2, and school locations are shown in Figure 3.

**FIGURE 2. GEOGRAPHIC DISTRIBUTION OF WORK LOCATION**



**FIGURE 3. GEOGRAPHIC DISTRIBUTION OF SCHOOL LOCATION**



## TRAVEL/ACTIVITY PATTERNS

Table 4 contains key trip statistics for Fort Carson households whose members reported making a total of 726 trips on their assigned travel day. Overall, the average daily trip rate was 12.10 trips per household and 3.26 trips per person.

**TABLE 4: KEY TRIP STATISTICS**

KEY TRIP STATISTICS	Total
Total Person Trips	726
Mean Trips per HH	12.10
Mean Trips per Person	3.26

The majority of the trips (86.91%) are auto trips (driver or passenger). As a reflection of the number of children in the participating Fort Carson households, 6.61% of trips were made by school bus. Walk trips account for 6.34% of all trips. No transit trips were made by Fort Carson households (see Table 5).

**TABLE 5: MODE OF TRAVEL**

MODE OF TRAVEL	Frequency	%
Walk	46	6.34%
Auto / van / truck driver	394	54.27%
Auto / van / truck passenger	237	32.64%
School Bus	48	6.61%
Other	1	0.14%
Total	726	100.00%

The distribution of primary trip purpose/activity is presented in Table 6. The main purposes for trips were ‘all other home activities’ (i.e. returning home), ‘work/job’, and ‘attending classes’.

**TABLE 6: PRIMARY TRIP PURPOSE**

PRIMARY TRIP PURPOSE	Frequency	%
ALL OTHER HOME ACTIVITIES	272	37.47%
WORK/JOB	72	9.92%
ATTENDING CLASS	59	8.13%
ROUTINE SHOPPING	56	7.71%
DROP OFF PASSENGER FROM CAR	34	4.68%
INDOOR RECREATION/ENTERTAINMENT	29	3.99%
EAT MEAL OUTSIDE OF HOME	26	3.58%
PICKED UP PASSENGER	20	2.75%
WORK/BUSINESS RELATED	19	2.62%
HEALTH CARE (DOCTOR, DENTIST)	16	2.20%
VISIT FRIENDS/RELATIVES	15	2.07%
DRIVE THRU (ATM, BANK, FAST FOOD, ETC)	14	1.93%

OUTDOOR RECREATION/ENTERTAINMENT	14	1.93%
CHANGE TYPE OF TRANSPORTATION/TRANSFER	11	1.52%
SERVICE PRIVATE VEHICLE	11	1.52%
HOUSEHOLD ERRANDS	9	1.24%
SHOPPING FOR MAJOR PURCHASES	8	1.10%
PERSONAL BUSINESS	7	0.96%
CIVIC/RELIGIOUS ACTIVITIES	7	0.96%
ALL OTHER ACTIVITIES AT SCHOOL	6	0.83%
OTHER ACTIVITIES WHILE TRAVELING	6	0.83%
ALL OTHER ACTIVITIES AT WORK	5	0.69%
OTHER	5	0.69%
ON-LINE SCHOOL ACTIVITIES	3	0.41%
WORKING AT HOME	2	0.28%
Total	726	100.00%

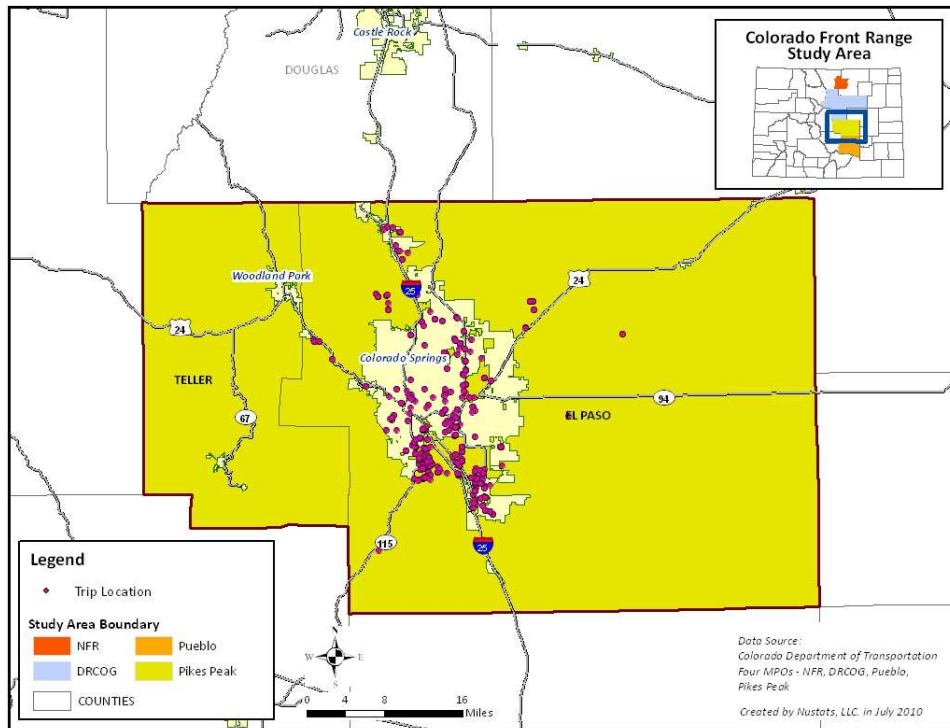
Table 7 shows trip distribution of by time of day. Midday (10am to 3:59pm) is the time when the largest number of trips occurred for participating households. Only 7.30% of trips occurred after 8 pm.

**TABLE 7: TRIP DISTRIBUTION BY TIME OF DAY**

TRIP DISTRIBUTION	Frequency	%
AM Peak (6am to 9:59am)	192	26.45%
Midday (10am to 3:59pm)	324	44.63%
PM Peak (4pm to 7:59pm)	157	21.63%
Evening (8pm to 10:59pm)	24	3.31%
Late night/early morning (11pm to 5:59am)	29	3.99%
Total	726	100.00%

Trip destinations for Fort Carson households are shown in Figure 4.

**FIGURE 4. GEOGRAPHIC DISTRIBUTION OF TRIP DESTINATION**



This report is based on Fort Carson households who completed the travel survey as of July 6. Data collection for the entire Pikes Peak area will end in December 2010.