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Abstract: Report to the public concerning travel behavior as derived from household surveys conducted in 1997 and roadside surveys conducted in 1998.

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INTRODUCTION

To reveal the nature of travel that occurs in the Denver region, the Denver Regional Council of Governments (DRCOG) conducted surveys in late 1997 and 1998 as part of an overall Travel Behavior Inventory (TBI) project. The TBI surveys provide a snapshot view of travel data for a specific time and can be used to better assess the demands placed on the transportation system. The results also aid planners in forecasting travel. Local and regional decisionmakers can use travel behavior characteristics to assist in allocating resources for improving transportation facilities. The TBI surveys were sponsored by DRCOG, the Regional Transportation District (RTD), the Colorado Department of Transportation (CDOT), and the Regional Air Quality Council (RAQC).

This report presents the results from two of the surveys conducted for the TBI. Section 1 presents results from the household travel survey. The eight-county household survey area is depicted in Figure 1. Section 2 presents results from roadside surveys that were conducted near the external borders of the Denver region. A survey of commercial vehicle travel was also conducted and will be reported separately. Two supplementary studies of transit users and survey non-respondents were also conducted.
The household survey sample data was expanded to reflect estimated regional totals, and the roadside survey was factored to reflect estimated total traffic volumes at the survey sites. The statistical validity of both surveys was examined. It can be inferred that both surveys provide reasonable data, as presented in this report, that is representative of the region during the survey period. Values for key variables from both surveys were found to fall within a “95 percent confidence range” of the statistical estimates. The statistical confidence for some truck categories in the roadside survey did not fall within that confidence range. Complete technical documentation of these surveys is provided in the DRCOG TBI reports “Household Survey Report” and “Front Range Travel Survey”.

Section 1 Household Survey Results

Chapters 1-8 present results for travel done by people who live in households in the Denver region. This survey represented a snapshot of household demographics and travel characteristics for an average weekday in the fall of 1997. Daily travel surveys were completed for the occupants of 3,824 randomly selected households. In addition, historical trends based on household surveys conducted in 1959, 1971, and 1985 are presented.

Key Points to Remember Regarding the Household Survey Data

- The data represents an average weekday in the fall of 1997.
- The data were tabulated based only on responses of persons who live in households.
- Persons who reside in group quarters such as nursing homes, correctional facilities, or dormitories or in households without a phone were not surveyed.
- The data are for persons of all ages, unless otherwise noted.
- The data does not include non-household based travel such as commercial vehicles operating internally to the region, and tourists or businesspeople staying in hotels.
- The data are primarily presented for total “person trips” which include all modes of travel (e.g. motor vehicle driver or passenger, bus, light rail vehicle, bicycle, walking, taxi, etc.), unless otherwise noted.
- A glossary of definitions of specific data items is provided for reference.

Section 2 Roadside Survey Results

Chapter 9 presents results from the external roadside survey. Completed surveys were obtained from the drivers of 9,659 vehicles near the border of the Denver region. Information was obtained on travelers coming into, going out of, or going through the Denver region.

Important Findings from the Surveys

Overall Survey Data and Trends for the Denver Region

- The average number of motor vehicles per household continued to increase.
- There are now more household motor vehicles than licensed drivers.
- There were over 42,000 households that did not have a motor vehicle.
- Sport utility vehicles made up nearly 15 percent of all household motor vehicles (one in seven vehicles).
In the Denver Region on a Typical Weekday:

- Over 88 percent of all trips were made in motor vehicles.
- Of the total household population, 57 percent drove a motor vehicle, 28 percent were a passenger in motor vehicles, 14 percent made a trip by walking or bicycling, 4 percent rode on an RTD bus or light rail vehicle, and 11 percent did not travel.
- The typical (median) trip was 3.4 miles in distance and took 14 minutes.
- The average household motor vehicle was driven about 28 miles.
- About 21 percent of household motor vehicles were not driven at all.
- Trips to work took the longest time (averaging 22 minutes) and trips to shop were the shortest (12 minutes).
- Over 65 percent of all trips began and ended in the suburban areas of the region.
- The afternoon rush hour really lasted for three hours.
- Nearly 8 percent of all trips were made by walking or bicycling.
- About 9 percent of all households had someone that used RTD transit.
- About 79 percent of workers drive to work alone.
- The average occupancy for household motor vehicle trips was 1.38 persons.
- The average walk trip took eight minutes.
- The average bicycle trip took 13 minutes.
- Over 15 percent of the vehicles traveling into/out of the Denver region were large trucks.
- About 9 percent of the vehicles entering the Denver region were passing through.

Data Implications

The surveys verified several current thoughts on travel in the Denver region and also shed light on current or upcoming trends.

The number of motor vehicles per household has continued to increase. The private motor vehicle is the most common method of travel and its use is growing faster than the population. This has caused travel demand to exceed the capacity of the highway system in many parts of the Denver region. Severe congestion affects vehicles, goods, and people (drivers, passengers, and pedestrians), often for much longer than the traditional rush hours. Clear traffic peaks also occur around the noon hour.

Suburb-to-suburb travel is a significant portion of the travel in the Denver region. The “through-road” system in many suburban areas is not adequate enough to efficiently handle the number of people in vehicles that desire to travel between places in the suburban areas. Demand for suburb-to-suburb transit service exists, but it is often difficult to provide in an efficient manner due to the lower densities of housing and more widespread employment sites.

One out of every seven residents of the Denver region made a walking or bicycling trip each weekday. These comprised nearly 8 percent of the trips made in the region and do not include segments of multimodal trips, such as walking to or from the bus. It is important that comfortable and safe on-street and off-street accommodations are provided for bicyclists and pedestrians.

The number of elderly persons has increased greatly and will continue to do so. Persons aged 65 and over now account for about 10 percent of the population, which is expected to increase to over 14 percent by 2020. Different types of transportation service needs must be considered for this population, especially as the elderly population increases in the more difficult to serve suburban and rural areas. Safety and wheelchair friendly design features must also be incorporated as part of street, transit and pedestrian facilities, and private developments.

Sixty percent of the Denver Central Business District workers drove alone to work, while 84 percent of workers in the suburban areas drove alone. This suggests that such factors as parking supply and cost and more efficient transit service due to highly concentrated employment sites, and pedestrian and bicycle facilities can help reduce the number of single occupant vehicles.
SECTION ONE

TRAVEL WITHIN THE REGION
Results from the 1997 Household Survey
THE TRAVELERS

The characteristics of population, households, and employment influence travel behavior. For example, a person's age, the household size, or the family life cycle stage may influence travel patterns. Life cycles are the different family stages of life as defined as households composed of working age adults only, households that include children, and households with retired adults only.

For this report, population is defined as those people residing in households (as opposed to group quarters such as dormitories, nursing homes, and jails).

<table>
<thead>
<tr>
<th>Age 0-4</th>
<th>5-15</th>
<th>16-21</th>
<th>22-35</th>
<th>36-64</th>
<th>65+</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>27,700</td>
<td>18,700</td>
<td>11,100</td>
<td>38,700</td>
<td>88,000</td>
<td>46,500</td>
<td>230,700</td>
</tr>
<tr>
<td>114,600</td>
<td>343,000</td>
<td>104,700</td>
<td>392,000</td>
<td>852,000</td>
<td>130,500</td>
<td>1,936,800</td>
</tr>
<tr>
<td>142,300</td>
<td>361,700</td>
<td>115,800</td>
<td>430,700</td>
<td>940,000</td>
<td>177,000</td>
<td>2,167,500</td>
</tr>
</tbody>
</table>

The total population in households in the region was estimated at 2,169,400 (as of January 1, 1998). While most people made at least one trip on a typical day, 230,700, or about 11 percent, did not travel. The age group with the highest percentage of non-travelers, 27 percent, was those persons aged 65 and over.

Since 1970, the proportion of the region's total population aged 65 or over has increased from 7.7 percent to 10.0 percent. By 2020 it is expected to reach 14.3 percent.*

* Source: U.S. Census data and DRCOG estimates.
There were 916,200 households in the Denver region. Most households (66 percent) had no children under the age of 18. About 11 percent of households had retired adults only.

*Single parent households accounted for about one-fifth of all households with children.*

The average number of persons per household has been declining. The average household size in the survey was found to be 2.4, down from 3.4 in 1959.

*The national average household size recorded by the U.S. Census has dropped from 3.3 in 1960 to 2.6 in 1997.*

### HOUSEHOLD LIFE CYCLE AND HOUSEHOLD SIZE

<table>
<thead>
<tr>
<th>Adults</th>
<th>Adult(s) with Child(ren)</th>
<th>Adult(s) Retired</th>
</tr>
</thead>
<tbody>
<tr>
<td>5+ Persons</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>64,640</td>
<td>115,030</td>
<td>101,010</td>
</tr>
<tr>
<td>330</td>
<td>3,400</td>
<td>30,890</td>
</tr>
<tr>
<td>490</td>
<td>53,700</td>
<td>43,930</td>
</tr>
</tbody>
</table>

### TREND OF AVERAGE HOUSEHOLD SIZE

- **Persons per Household**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>5+ Persons</td>
<td>3.4</td>
<td>3.1</td>
<td>2.5</td>
<td>2.4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**FIGURE 3**

Notes: Data represents households in the eight-county Denver region. Children = persons under the age of 18.

Source: 1997 household survey, DRCOG.

**FIGURE 4**

Notes: Data represents all households in the surveyed area. The areas varied among each survey. There are also minor definitional variations among the surveys.

Household income also affects travel behavior. The survey showed that 39 percent of households earned less than $35,000 in 1996, while 22 percent earned $75,000 or more.

Travel patterns are influenced greatly by employees traveling to work and students traveling to school. About 58 percent of the population was employed. Approximately 8 percent of persons employed had two or more jobs. Only 0.7 percent reported only working-at-home instead of going to work on the survey day. Others may have worked both at the job site and at home on the same day. Full-time students made up 24 percent of the total household population. Note that this data does not include dormitory residents.

Average household sizes varied significantly, from 1.2 in the Denver CBD to 2.5 persons per household in the rural/mountains area. About three-quarters of the region’s households were located in the suburban area.

People’s travel patterns can be influenced by the location of their household. Those living in the Denver Central Business District (CBD), for example, typically exhibit different tripmaking behavior than people living in a suburban setting. Different “development areas” were designated for this report so that demographic and travel variations can be presented.
### HOUSEHOLD RESIDENT CHARACTERISTICS BY DEVELOPMENT AREAS

<table>
<thead>
<tr>
<th>Measure</th>
<th>Denver CBD</th>
<th>Urban</th>
<th>Suburban</th>
<th>Freestanding</th>
<th>Rural/Mountains</th>
<th>Regional Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Persons per household</td>
<td>1.2</td>
<td>2.0</td>
<td>2.4</td>
<td>2.2</td>
<td>2.5</td>
<td>2.4</td>
</tr>
<tr>
<td>Share of all households</td>
<td>0.4%</td>
<td>13.2%</td>
<td>75.3%</td>
<td>4.8%</td>
<td>6.3%</td>
<td>100.0%</td>
</tr>
<tr>
<td>Share of households with less than $35,000 annual income</td>
<td>64.9%</td>
<td>51.5%</td>
<td>36.8%</td>
<td>53.6%</td>
<td>25.2%</td>
<td>38.9%</td>
</tr>
<tr>
<td>Share of residents age 65 or over</td>
<td>5.2%</td>
<td>8.5%</td>
<td>7.1%</td>
<td>5.6%</td>
<td>11.2%</td>
<td>8.2%</td>
</tr>
<tr>
<td>Share of residents that do not travel in typical day</td>
<td>3.7%</td>
<td>12.4%</td>
<td>10.5%</td>
<td>8.5%</td>
<td>10.9%</td>
<td>10.6%</td>
</tr>
<tr>
<td>Share of households in which no one travels on a typical day</td>
<td>3.7%</td>
<td>6.3%</td>
<td>4.7%</td>
<td>1.5%</td>
<td>4.3%</td>
<td>4.8%</td>
</tr>
</tbody>
</table>

**Notes:** Data represents households and persons living in households within the eight-county Denver region. Development areas are shown in Figure 6.

**Source:** 1997 household survey, DRCOG.
The means by which people traveled included walking, bicycling, transit services, and the most common means, in a household motor vehicle. Access to a motor vehicle is a major travel determinant.

For this report, a motor vehicle is defined as a motorized vehicle available to a household for travel. Commercial vehicles are not included (unless garaged at the household).

There were 1,697,000 motor vehicles available to households at the time of the survey. Nearly 64 percent of all households had access to two or more motor vehicles. There were over 42,000 households, or about 5 percent, that did not have a vehicle.

About 55 percent of the motor vehicles were 1990 or newer models; 36 percent were 1980s vintage.

The number of motor vehicles per household has steadily increased since the 1970s. The trend of more vehicles per household and fewer people per household indicates an increased potential for travel.

The Denver region availability of 1.85 motor vehicles per household is slightly higher than the national average of 1.78 vehicles per household.*

* Source: National Personal Transportation Study (NPTS), 1995.
Most households have an equal number of licensed drivers and motor vehicles. Nearly 17 percent of all households have more vehicles than drivers. These households have recreational vehicles, motorcycles, collector vehicles, or extra cars for pleasure purposes. The average number of motor vehicles per licensed driver is 1.06.

Sedans and station wagons (autos) form the majority of motor vehicle types. Sport utility vehicles constitute about 15 percent of all vehicles in the region. Nationally, about 7 percent of all vehicles are sport utility vehicles (1995 NPTS).

Among the five development areas, motor vehicle availability varies significantly. Households in the Denver CBD have few motor vehicles while those in the rural/mountains area have the most motor vehicles per household.
The amount of travel can be reported in many ways, including the number of trips, trip time duration, trip distance, and motor vehicle miles traveled. These measures can be described with regional totals or on a “per trip” or “per person” basis.

For this report, the travel data represents an average weekday. Unless otherwise noted, trips are defined as the movement of a person of any age from one place to another by any means of travel. Motor Vehicle driver trips are also displayed in some charts. These represent trips made as a driver of a motor vehicle available to the household.

Vehicle-miles-traveled (VMT) is one measure of travel. It represents all of the travel on our roadways, including non-household motor vehicles. Since 1960, daily VMT grew by about 4.7 percent annually, surpassing the growth rates of population (2.3 percent) and employment (3.5 percent). Motor vehicles grew by 4.9 percent annually.
The number of trips that people made per day varied considerably. While two trips a day was the most common (28 percent of the population), almost as many people (24 percent) made 6 or more trips per day.

*About 8,236,500 total person trips were made within the region each day by household members and guests.*

On average, people made significantly more trips per day in 1997 than in previous survey years. Between 1959 and 1997 the rate nearly doubled, from 2.2 to 3.8 trips per day per person. Many factors account for this increase, and it is not just due to “people driving more.” For example, in 1959, children under the age of 16 made up a much greater proportion of the population in the Denver region, 34 percent, compared to 24 percent in 1998.

*Nationally, according to the National Personal Transportation Studies, the daily trip rate per person increased 14 percent between 1990 and 1995.*
Income has a strong effect on travel. Trip rates tended to increase with higher household income, even among households with the same number of workers.

The number of trips per person increased as the number of motor vehicles per household increased. Persons living in households without access to a motor vehicle made significantly fewer trips.
Households with children (under age 18) made slightly more trips per person than those without. The lower tripmaking of single retired persons compared to households with 2+ retired persons may have been due to the slightly higher average age (71.2 versus 68.4). It also supports the view that retired couples may be more active than retired persons living alone.

*The average person made 3.8 trips per day.*

Most trips were relatively short. As the distance increased, the number of trips decreased steadily.

*The average trip distance was 5.8 miles; the median trip distance was 3.4 miles (half were less and half were more than 3.4 miles).*

**FIGURE 17**

Notes: Data represents all trips made entirely within the eight-county Denver region by all persons living in or visiting households.

Source: 1997 household survey, DRCOG.

**FIGURE 18**

Notes: Data represents all trips made entirely within the eight-county Denver region by all persons living in or visiting households. Distance data from survey is still being reviewed and subject to future minor adjustments.

Source: 1997 household survey, DRCOG.
Notes: Data represents trips made entirely within the eight-county Denver region by all persons living in or visiting households. Source: 1997 household survey, DRCOG.

DAILY TRIPS BY DURATION

As with the trip distance, the number of trips also decreased as the travel time duration went up. Trips made in motor vehicles actually peaked at the 5-10 minute interval, since many short 0-5 minute trips were made by walking.

The average trip time duration was 16 minutes. The median duration was 14 minutes.

PERCENT OF VEHICLES BY DAILY MILES DRIVEN

About 21 percent of the household motor vehicles were not driven at all on the typical survey day. Another 14 percent were driven 10 miles or less.

The median number of miles driven per motor vehicle per day (of those vehicles that were driven) was 27 miles. There were 7,257,000 trips made in motor vehicles (drivers or passengers) per day in the region.

Notes: Data represents all trips made entirely within the eight-county Denver region by all persons living in or visiting households. Distance data from survey is still being reviewed and subject to future minor adjustments. Source: 1997 household survey, DRCOG.
WHY WE TRAVELED

Trips are made for a variety of purposes. These include home, work, school, shopping, dropping-off or picking-up passengers, personal business, social/recreation, and dining. For this report, the trip destination is used to define the purpose of a trip.

The most common trip destination was to home, at about 34 percent of all trips. Trips to work accounted for nearly 17 percent of all trips.

### TRIPS BY PURPOSE

<table>
<thead>
<tr>
<th>Purpose</th>
<th>Percentage of Trips</th>
</tr>
</thead>
<tbody>
<tr>
<td>Home</td>
<td>34.0%</td>
</tr>
<tr>
<td>Work</td>
<td>16.9%</td>
</tr>
<tr>
<td>Shopping</td>
<td>11.5%</td>
</tr>
<tr>
<td>Drop-off/Pickup</td>
<td>9.2%</td>
</tr>
<tr>
<td>Personal Business</td>
<td>8.7%</td>
</tr>
<tr>
<td>Social/Recreation</td>
<td>7.0%</td>
</tr>
<tr>
<td>School</td>
<td>6.2%</td>
</tr>
<tr>
<td>Dining</td>
<td>4.6%</td>
</tr>
<tr>
<td>Other</td>
<td>1.8%</td>
</tr>
</tbody>
</table>

The number of work-oriented trips (trips from home to work and from work to home) per person more than doubled between 1959 and 1997. This was partially because a larger percentage of the population is employed (from 37 percent in 1959 to 58 percent in 1997) and also because the percentage of population under age 16 is also much less than it was in 1959.

### TREND OF WORK ORIENTED TRIPS PER PERSON

<table>
<thead>
<tr>
<th>Year</th>
<th>Daily Trips per Person</th>
</tr>
</thead>
<tbody>
<tr>
<td>1950</td>
<td>0.5</td>
</tr>
<tr>
<td>1960</td>
<td>0.8</td>
</tr>
<tr>
<td>1970</td>
<td>1.1</td>
</tr>
<tr>
<td>1980</td>
<td>1.3</td>
</tr>
<tr>
<td>1990</td>
<td></td>
</tr>
<tr>
<td>2000</td>
<td></td>
</tr>
</tbody>
</table>

Notes: Data represents all trips made entirely within the eight-county Denver region by all persons living in or visiting households.
Source: 1997 household survey, DRCOG.
Males and females exhibited different trip-making patterns. Females made significantly more trips for purposes such as shopping and dropping-off/picking-up passengers, while males made more trips for work.

*Overall, females made 4.2 trips per day and males made 3.6 trips per day.*

The longest (in time) type of trips people made were for work, averaging 22 minutes. Shopping trips were the shortest, averaging 12 minutes.

*The overall average trip time duration was 16 minutes.*
WHERE WE TRAVELED

Where people traveled is revealed by the geographic distribution of trips. These patterns are highly related to where people lived and where they worked. For this chapter, the most populated part of the Denver region was divided into 14 subregions to illustrate typical geographic patterns of person trips. Trips could take place between the subregions or stay entirely within individual subregions.

FIGURE 25
Suburb-to-suburb trips comprised the highest portion of travel between the subregions. Over 65 percent of the trips made between different subregions began and ended in the suburban (non-urban) subregions.
The Boulder and Longmont subregions had the highest proportion of their trips that stayed within their respective subregions. In contrast, the Denver CBD and northeast metro subregions had large proportions of their trips destined to or originating from other subregions. This pattern is typical of areas that have many more jobs than households, or vice versa.

Varying tripmaking patterns were evident in the designated development areas. Trips in the suburban area predominated since that is where most households and jobs were located. Only 26 percent of trips originating in the Denver CBD ended there, while over 85 percent of the trips that began in the suburban area also ended there.

### GEOGRAPHIC DISTRIBUTION OF TRIPS BY DEVELOPMENT AREAS

<table>
<thead>
<tr>
<th>Measure</th>
<th>Denver CBD</th>
<th>Urban</th>
<th>Suburban</th>
<th>Freestanding</th>
<th>Rural/Mountains</th>
<th>Regional Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Share of regional trips generated</td>
<td>3%</td>
<td>12%</td>
<td>74%</td>
<td>5%</td>
<td>6%</td>
<td>100%</td>
</tr>
<tr>
<td>Source of work trips destined to the Denver CBD</td>
<td>17%</td>
<td>20%</td>
<td>58%</td>
<td>1%</td>
<td>4%</td>
<td>100%</td>
</tr>
<tr>
<td>Share of trips that stay within the development area</td>
<td>26%</td>
<td>47%</td>
<td>87%</td>
<td>56%</td>
<td>52%</td>
<td>n/a</td>
</tr>
</tbody>
</table>

Notes: Data represents all trips made entirely within the eight-county Denver region by all persons living in or visiting households. Development areas are shown in Figure 6.
Source: 1997 household survey, DRCOG.
WHEN WE TRAVELED

Overall tripmaking follows distinct and consistent time-of-day patterns. These patterns vary by trip purpose. Most of the trips that we make are associated with routine or scheduled daily activities such as work, day care, or school. Fewer trips are discretionary in nature, which are flexible and don’t have to be made on a routine basis. Shopping and social trips can often occur spontaneously or be canceled or delayed, such as because of bad weather.

The phenomenon of “rush” hour can be seen in the distribution of trips by start time. The morning peak spikes higher on the chart, indicating a more pronounced travel peak than in the afternoon. The two peaks in the afternoon were mostly due to ending times at school and work. The afternoon peak was largely attributed to return trips to home, while the morning peak was mostly due to trips to work and school.

Daily tripmaking time patterns have remained reasonably consistent over time. The most recent survey showed a more pronounced and later morning peak of trip start times. It also revealed a greater spreading of the afternoon peak to an earlier hour.
How We Traveled

People travel by a variety of means: they drive, ride as passengers in motor vehicles, take RTD transit or a school bus, walk, or ride a bicycle. These methods of traveling are also referred to as travel modes.

In this report, a single occupant motor vehicle trip is termed drive alone. Trips with a driver and passenger in a household motor vehicle are termed shared ride. RTD transit refers to trips using RTD bus and light rail services available to the general public. Walk and bicycle constitute non-motorized trips.

Nearly 90 percent of all trips were made in motor vehicles. About 7.6 percent, or 623,000, were made by walking or bicycling. RTD transit carried 164,000 trips each day, or about 2 percent of all trips.

Almost 9 percent of households had a household member that used RTD transit each day.

For selected trip destination purposes, the percent of daily trips by driving alone, shared ride, and all other travel modes are shown. Over 79 percent of work trips were made by driving alone, while about 11 percent were by shared rides in carpools. Sharing a ride was the most common mode for trips to school, and social/recreation activities.
Workers in the Denver CBD had the lowest rate of driving alone to work. More than 40 percent got to work via alternative modes such as carpooling, RTD transit, walking, or bicycling. In contrast, nearly 84 percent of the people that worked in the suburban area drove alone to work.

The average motor vehicle occupancy varies considerably among the eight trip purposes. The lowest motor vehicle occupancy was for trips to work. Not including drop-off/pick-up trips, dining trips had the highest motor vehicle occupancy.

*On average, 28 percent of all motor vehicle trips had more than one occupant.*
The average motor vehicle occupancy in 1997 for all motor vehicle trips was 1.38; for trips to work it was 1.08. Motor vehicle occupancies have generally decreased since the 1960s due to factors such as smaller household sizes and increasing vehicle availability.

In 1997, 2.1 percent of all trips and 4.0 percent of work trips were made using RTD transit. In 1959, the respective percentages were more than twice as high.

Nationally, public transit is used for 1.8 percent of all trips, and 3.5 percent of trips to work.
There were 555,000 walk trips and 68,000 bicycle trips made daily. Other than returning home, school, work, and social/recreation were the major destinations for walk and bicycle trips.
BICYCLE AND WALK TRIP DURATION

<table>
<thead>
<tr>
<th>Walk</th>
<th>Bicycle</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Trip Mode</th>
<th>Number of People</th>
<th>Share of Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drive a motor vehicle</td>
<td>1,235,105</td>
<td>56.9%</td>
</tr>
<tr>
<td>Passenger in a motor vehicle</td>
<td>608,490</td>
<td>28.0%</td>
</tr>
<tr>
<td>Ride RTD Transit</td>
<td>91,786</td>
<td>4.2%</td>
</tr>
<tr>
<td>Ride a bicycle</td>
<td>36,692</td>
<td>1.7%</td>
</tr>
<tr>
<td>Walk somewhere</td>
<td>265,598</td>
<td>12.2%</td>
</tr>
<tr>
<td>Don't travel</td>
<td>230,826</td>
<td>10.6%</td>
</tr>
</tbody>
</table>

Notes: Data represents all walk and bicycle trips made by persons living in households in the eight-county Denver region.
Source: 1997 household survey, DRCOG.

Most walk trips were very short, with an average time of eight minutes. Over 41 percent of walk trips were five minutes or less. Bicycle trips tended to be longer, averaging 13 minutes. Less than 18 percent of bicycle and walk trips were more than 15 minutes in duration.

The average walk trip distance was three-quarters of a mile. The average bicycle trip length was 2.1 miles.

Over 55 percent of the residents of the Denver region drove a motor vehicle on a typical day. Over 4 percent made a transit trip. Nearly 37,000 people rode a bicycle to a destination, and over 265,000 people walked somewhere. Just over 10 percent of the population did not travel at all.
Table 5 presents a summary of basic travel characteristics obtained from the 1997 household survey of travel behavior.

### REGIONAL TRAVEL STATISTICS

**Demographics**

<table>
<thead>
<tr>
<th>Metric</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Household Population</td>
<td>2,169,400</td>
</tr>
<tr>
<td>Licensed Drivers</td>
<td>1,604,500</td>
</tr>
<tr>
<td>Number of Households</td>
<td>916,200</td>
</tr>
<tr>
<td>Average Household Size</td>
<td>2.37</td>
</tr>
<tr>
<td>Household Residents Employed</td>
<td>1,259,600</td>
</tr>
<tr>
<td>Employees per Household</td>
<td>1.37</td>
</tr>
<tr>
<td>Number of Motor Vehicles</td>
<td>1,697,400</td>
</tr>
<tr>
<td>Motor Vehicles per Household</td>
<td>1.85</td>
</tr>
</tbody>
</table>

**Numbers of Daily Trips by Mode**

<table>
<thead>
<tr>
<th>Mode</th>
<th>Trips</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Person Trips</td>
<td>8,236,500</td>
<td>100%</td>
</tr>
<tr>
<td>Drive-Alone Trips</td>
<td>3,962,900</td>
<td>48.1%</td>
</tr>
<tr>
<td>Shared-Ride Trips</td>
<td>3,293,500</td>
<td>40.0%</td>
</tr>
<tr>
<td>School Bus Trips</td>
<td>172,600</td>
<td>2.1%</td>
</tr>
<tr>
<td>RTD Transit Trips</td>
<td>164,400</td>
<td>2.0%</td>
</tr>
<tr>
<td>Walk Trips</td>
<td>555,000</td>
<td>6.7%</td>
</tr>
<tr>
<td>Bicycle Trips</td>
<td>68,000</td>
<td>0.8%</td>
</tr>
<tr>
<td>Other Modes</td>
<td>20,100</td>
<td>0.2%</td>
</tr>
<tr>
<td>Trips Made in Motor Vehicles</td>
<td>7,257,400</td>
<td></td>
</tr>
<tr>
<td>(except transit)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Motor Vehicle Driver Trips</td>
<td>5,384,600</td>
<td></td>
</tr>
<tr>
<td>Motor Vehicle Passenger Trips</td>
<td>1,871,800</td>
<td></td>
</tr>
</tbody>
</table>

**Numbers of Daily Trips by Destination Purpose**

<table>
<thead>
<tr>
<th>Purpose</th>
<th>Trips</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trips to Home</td>
<td>2,803,100</td>
<td>34.0%</td>
</tr>
<tr>
<td>Trips to Work</td>
<td>1,391,300</td>
<td>16.9%</td>
</tr>
<tr>
<td>Trips to Shop</td>
<td>947,400</td>
<td>11.5%</td>
</tr>
<tr>
<td>Trips to Drop-off/Pick-up</td>
<td>757,600</td>
<td>9.2%</td>
</tr>
<tr>
<td>Workplace Passenger</td>
<td>717,000</td>
<td>8.7%</td>
</tr>
<tr>
<td>Trips for Social/Recreation</td>
<td>577,800</td>
<td>7.0%</td>
</tr>
<tr>
<td>Trips to School</td>
<td>510,700</td>
<td>6.2%</td>
</tr>
<tr>
<td>Trips to Eat Meal</td>
<td>379,800</td>
<td>4.6%</td>
</tr>
<tr>
<td>Other Trips</td>
<td>151,800</td>
<td>1.9%</td>
</tr>
<tr>
<td>Total Trips</td>
<td>8,236,500</td>
<td>100%</td>
</tr>
</tbody>
</table>

**Daily Trip Rates**

<table>
<thead>
<tr>
<th>Rate</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trips per Person</td>
<td>3.8</td>
</tr>
<tr>
<td>Trips per Household</td>
<td>9.0</td>
</tr>
<tr>
<td>Trips Made in Motor Vehicles</td>
<td>3.3</td>
</tr>
<tr>
<td>per Person</td>
<td></td>
</tr>
<tr>
<td>Trips Made in Motor Vehicles</td>
<td>7.9</td>
</tr>
<tr>
<td>per Household</td>
<td></td>
</tr>
<tr>
<td>Motor Vehicle Driver Trips</td>
<td>5.9</td>
</tr>
</tbody>
</table>

**Trip Durations**

<table>
<thead>
<tr>
<th>Duration</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Travel Time - Average (minutes)</td>
<td>16</td>
</tr>
<tr>
<td>Travel Time - Median (minutes)</td>
<td>14</td>
</tr>
<tr>
<td>Work Trip Travel Time - Average (minutes)</td>
<td>23</td>
</tr>
<tr>
<td>Work Trip Travel Time - Median (minutes)</td>
<td>18</td>
</tr>
<tr>
<td>Trip Distance - Average (miles)*</td>
<td>5.8</td>
</tr>
<tr>
<td>Trip Distance - Median (miles)*</td>
<td>3.4</td>
</tr>
<tr>
<td>Work Trip Distance - Average (miles)*</td>
<td>8.2</td>
</tr>
<tr>
<td>Work Trip Distance - Median (miles)*</td>
<td>6.3</td>
</tr>
</tbody>
</table>

*Notes: Distance data from the survey is still being reviewed and subject to future minor adjustments.*
SECTION TWO

TRAVEL INTO, OUT OF, AND THROUGH THE REGION

Results from the 1998 Roadside Survey
survey included residents of the Denver region and also included non-residents traveling near the border. The roadside survey conducted in April and May of 1998 revealed information about the following topics:
- Types of motor vehicles
- Amount and location of cross-border travel (vehicle trips)
- Through trip percentage
- Trip purposes
- Motor vehicle occupancy
- Time-of-day of trips

Small vehicles (automobiles, vans, pickups, and sport utility vehicles) accounted for about 84 percent of the motor vehicles traveling near the region’s border. Large trucks (combination tractor-trailers and single-unit trucks) form the remainder.

A component of travel that occurs in the Denver region is travel in motor vehicles into, out of, and through the eight-county Denver region. The inter-regional travelers who responded to the roadside survey included residents of the Denver region.

Four northern highways carried almost half of the approximately 200,000 vehicles a day that traveled near the region’s border. Another quarter of the inter-regional traffic crossed on southern I-25. I-70 in Clear Creek County had about 12 percent of the border traffic.
Notes: Data is for all small vehicle samples at the outbound and inbound survey sites.
Small Vehicles = automobiles, pick-ups, sport utility vehicles, vans, minivans, and motorcycles.
Through-Trips = Vehicles crossing the Denver region’s border which are passing through without stopping in the region.
Source: 1998 roadside survey, DRCOG.

**TABLE 6**

<table>
<thead>
<tr>
<th>Roadside Survey Location</th>
<th>Through Trip Share Crossing Border</th>
</tr>
</thead>
<tbody>
<tr>
<td>I-25 North, Mead</td>
<td>10.5%</td>
</tr>
<tr>
<td>I-25 South, El Paso County</td>
<td>10.3%</td>
</tr>
<tr>
<td>I-70 East of Byers</td>
<td>26.8%</td>
</tr>
<tr>
<td>I-70 West of Idaho Springs</td>
<td>11.3%</td>
</tr>
<tr>
<td>I-76 East of Hudson</td>
<td>12.8%</td>
</tr>
<tr>
<td>SH-86, Elizabeth</td>
<td>3.4%</td>
</tr>
<tr>
<td>US-285, Pine Junction</td>
<td>2.8%</td>
</tr>
<tr>
<td>US-287, Larimer County</td>
<td>2.0%</td>
</tr>
<tr>
<td>US-85, Platteville</td>
<td>5.7%</td>
</tr>
<tr>
<td>All Sites</td>
<td>9.3%</td>
</tr>
</tbody>
</table>

**FIGURE 40**

Notes: Data represents all outbound vehicles passing through the survey sites.
Source: 1998 external survey, DRCOG.

About 9 percent of all the small vehicles surveyed were passing through the region. On I-70 east of Denver, more than 25 percent of the small vehicles were passing through. Only 2 percent of the trips on US-287 at the Larimer County line were passing through.

The purpose of most trips surveyed near the region’s border was to go to work or return home. Social/recreation trips accounted for about 16 percent.

About 26 percent of all vehicles passing through the survey sites were being used for business purposes such as deliveries or other work tasks.
About two-thirds of the small vehicles that traveled near the border had only a single occupant, a driver. The average occupancy was 1.45 persons.

Trips near the region's borders had a different time-of-day pattern than household based internal trips presented earlier. The afternoon peak is similar, but the strong morning peak that occurs for internal trips does not take place. This is due to the lower number of school, and drop-off/pick-up passenger trips.
The abbreviations and technical terms used in this report are described below.

**ABBREVIATION/TERM**

**Adult:** See Family Life Cycle.

**Adult Retired:** See Family Life Cycle.

**Adult(s) with Children(s):** See Family Life Cycle.

**Commercial Vehicles:** Motor vehicles owned by businesses or governments and used to transport freight or carry people.

**Council:** Denver Regional Council of Governments or DRCOG.

**Current Year:** The household survey was conducted in fall of 1997; the roadside survey was conducted in spring of 1998. The population and other demographic estimates reflect January 1, 1998.

**Daily:** The period of a typical 24-hour weekday.

**Demographics:** The characteristics of population, households, and employment.

**Denver CBD:** The Denver central business district, one of five designated development areas.

**Destination:** The ending place of a trip.

**Development Areas:** Geographic areas designated for this report comparing and contrasting travel characteristics.

**Dining:** See Trip purpose.

**Drive-alone:** The mode of travel of driving a motor vehicle with no passengers.

**Drop-off/Pick-up:** The trip purpose of dropping-off or picking up people or goods.

**DRCOG:** Denver Regional Council of Governments (See Council).

**Employed:** A person is considered employed if he/she worked or volunteered, either full-time or part-time, regardless of location.

**Family Life Cycle:** The stages or cycles of a family as it progresses from one person, through marriage, children, and finally to retirement. The household family life cycle stages as used in this report are:

- **Adult(s):** Household comprised of only person(s) age 18 or older and excluding adult retired households.
- **Adult(s) retired:** Household comprised of only adults reporting themselves as (a) retired or (b) not employed out of the home and over 60 years of age.
- **Adult(s) with child(ren):** Household comprised of one or more adults and one or more children (persons under the age of 18).

**Flex-Time:** An employed person’s ability to shift their work start-time or end-time by 30 minutes or more as reported by the surveyed person.

**Free-Standing Community:** The areas of Boulder, Castle Rock, Brighton, and Longmont that form a designated development area for this report.

**Household Income:** Money earned annually by all members of the household, in 1996 dollars. (See Household.)

**Household Population:** The population residing in households (not group quarters). (See Household and Group quarters.)

**Household Size:** The number of persons or members of a household. Out-of-region overnight guests are not included in the household size.

**Licensed Driver:** Person with a valid full license or learner’s permit to drive a motor vehicle on the public roads.

**Mode:** A means of travel from one place to another. Basic travel modes include:

- **Drive-alone:** Travel in motor vehicles with no passengers;
- **Shared ride:** Travel in motor vehicles with passengers;
- **RTD Transit:** Travel by transit services operated by RTD that are available to the general public comprising the downtown Denver mall shuttle, bus service, light rail service, and access-a-Ride service;
Non-motorized: Pedestrian and bicycle travel.

Motor Vehicle: Motorized vehicles including autos, motorcycles, pickup trucks, sport utility vehicles, vans, minivans, and recreational vehicles.

NPTS: National Personal Transportation Study, conducted periodically by the United States Department of Transportation.

Non-Motorized: Travel by person walking or using a bicycle.

Occupancy: Number of persons in a motor vehicle. Computed as the average number of persons in a motor vehicle on a per trip or per travel segment basis.

Origin: The beginning place of a trip.

Overnight Guests: Out-of-region guests that stayed overnight with the surveyed household and who were included in the household survey.

Person: A person of any age residing in the household.

Person-Trip: A trip by one person from one place to another traveling by any travel mode (Household Survey).

Personal Business: The purpose of trips to banks, doctors, auto repair shops, barber shops, etc.

Place: Location where travel starts or stops for a trip.

Regular Workplace: Usual place that an employed person performs work.

Roadside Survey: Method used by DRCOG to survey the traffic entering and leaving the region. Selected traffic at a specific location along a roadway is directed to a survey area on the side of the roadway where the interviewers ask the driver about the trip.

RTD Transit: Transit services operated by RTD that are available to the general public comprising the downtown Denver mall shuttle, bus service, light rail service, and access-a-Ride service.

RTD: Regional Transportation District.

Rural/Mountains: A designated development area for this report.

Sample: A completed and usable survey.

School: Pre-school, K-12, college, university, and adult education.

Shared Ride: A motor vehicle trip with more than one person in the vehicle (excluding travel in transit vehicles).

Single-Unit Truck: All trucks with greater than one ton carrying capacity constructed on a single frame having two axles. Includes heavy delivery panel or step vans.

Small Vehicle: The subset of the roadside survey motor vehicles that includes automobiles, motorcycles, vans, minivans, sports utility vehicles and pickup trucks up to one ton carrying capacity. Used in reference to the roadside survey.

Statistical Confidence: The probability that the survey sample data represents the true population. The surveys were designed to meet the 95 percent statistical confidence level.

Student: A surveyed person who reported as enrolled full-time or part-time in pre-school, K-12, college, university, or adult education schools.

Suburban: A designated development area for this report.

Travel Behavior Inventory: Travel behavior inventory (TBI), sometimes called regional travel behavior inventory study. Consists of a collection of surveys to obtain data about the travel within, entering or exiting the eight-county Denver region.

Time-of-Day: The time of day of trips. Trips recorded by the household survey reference the start time of the trip; trips recorded by the roadside survey at the region’s borders reference the interview time.

Transit: The services provided by RTD, school districts and other agencies to move people from one place to another.

Transit User: A person who uses transit service to make a trip.

Travel Day: 24-hour weekday that the selected household reported travel.

Travel Segment: Portion of a trip made by a specific travel method. Trips may be composed of a walk segment from the trip origin to a bus stop, a bus segment, and another walk segment to the trip destination.

Trip: One-way travel from one place (origin) to another (destination). A round-trip in which the trip travels from place A to place B and returns to place A is counted as
two trips. A change of modes does not constitute a separate trip, for example, switching from motor vehicle to bus.

**Trip Duration:** Time it took to travel from one place to another, usually reported in minutes.

**Trip Purpose:** The reason a trip was made, and is defined on the basis of the trip destination. Trip purposes include:

- **Home:** returning to home;
- **Work:** to work;
- **Shopping:** to shop;
- **Drop-off/Pick-up:** dropping off or picking up people or goods;
- **Personal Business:** to banks, doctors, auto repair shops, barber shops, etc.;
- **Social/Recreation:** to social, recreation, and entertainment activities;
- **School:** to pre-school, K-12, college, university, and adult education;
- **Dining:** to eat a meal.

**Trip Rate:** Number of person trips or motor vehicle driver trips made per day by a person or a household.

---

**REFERENCES**

**DENVER REGIONAL COUNCIL OF GOVERNMENTS:**

**DENVER REGIONAL COUNCIL OF GOVERNMENTS:**
Draft “Denver Regional Travel Behavior Inventory: Front Range Travel Survey,” May 2000.

**DENVER REGIONAL COUNCIL OF GOVERNMENTS:**

**COLORADO DEPARTMENT OF HIGHWAYS:**

**JOIN Regional PLANNING PROGRAM:**

**USDOT:**