

# CHAPTER TWO: CHANGES IN VEHICLE MILES OF TRAVEL

## Key Findings

- Vehicle trip growth and vehicle miles of travel growth substantially exceeded growth in person trips and person miles of travel. Vehicle rates of growth were approximately double the person rates. Total person trip growth between 1983 and 1990 was a product of vehicle trip growth.
- The decline in all alternatives to the private vehicle was a major factor, as was the decline in average vehicle occupancies.
- Vehicle trip lengths grew faster than person trip lengths, adding further to total vehicle travel growth.



As noted earlier, person miles of travel grew substantially in the 1983-1990 period. But this growth was rather dramatically exceeded by growth in personally operated vehicle (POV) trips and personally operated vehicle miles of travel (VMT). Overall, vehicle trips grew by 25 percent between 1983 and 1990 and vehicle miles of travel grew by 40 percent—both more than doubling the person travel trend.

The factors that affected person trips and person miles of travel obviously also affected vehicle trips and vehicle miles of travel. Several additional factors influenced the growth in personally operated vehicle activity:

1. Changes in choice of mode, particularly shifts to POV from transit and walking.
2. Changes within POV activity, specifically shifts in vehicle occupancy as passengers

3. Particularized changes in the PMT factors, such as specific population changes related to vehicles, vehicle-specific trip length changes, and vehicle-specific trip rate changes.

These factors will be briefly examined here to help localize the nature of the growth trends affecting private vehicles.

### **Mode Choice**

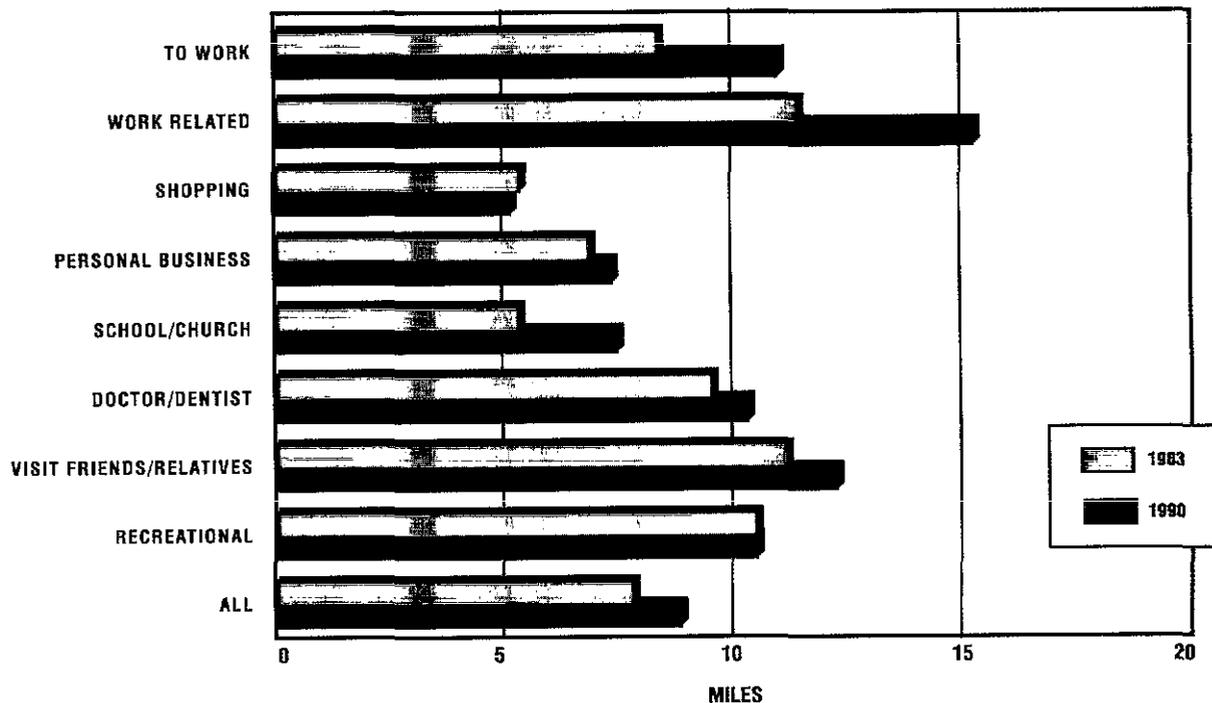
Although the nature of modal shares can vary depending upon definitions used, at the broadest level POV use accounted for 82 percent of all travel in 1983, rising by 5 percentage points to 87 percent in 1990. As noted in

other sections, this was the product of declines in all alternatives to the private vehicle—transit, walking, and working at home. Major factors in these declines were shifts in trip patterns poorly

*Overall, vehicle trips grew by 25 percent between 1983 and 1990 and vehicle miles of travel grew by 40 percent—both more than doubling the person travel trend.*

**FIGURE 4**

**Vehicle Trip Length Trends  
NPTS Selected Purposes  
1983 - 1990**



Source: NPTS

served by alternatives and increased vehicle availability, especially to rural and low income populations. A review of total trip activity changes reveals that all trip increases between 1983 and 1990 were accounted for by vehicle trip increases. The total vehicle trip increase of over 30 million trips exceeded the total increase in person trips by more than 5 million trips.

**Vehicle Occupancy**

Average vehicle occupancies for all trips declined from 1.9 in 1977 to 1.7 in 1983 and to 1.6 in 1990. A separate section describes and explains the causes of these trends. Primarily, they are a product of decreasing family size and

increasing vehicle availability. The decline in vehicle occupancy between 1983 and 1990 means that an increase in vehicles of about 6 percent is required to serve the same set of riders.

**Vehicle Trip Length**

As noted in the section on person miles of travel, person trip lengths rose by almost 9 percent. However, vehicle trip lengths grew by considerably more than that—12.3 percent. Conjecture on why vehicle trip lengths had such substantial growth is possible. Figure 4 indicates that the increase in trip length is pervasive across all purposes—only shopping trips declined slightly in length. In terms of rates of growth, as in person

trip length changes, there is a group of relatively stable purposes and a group that grew substantially.

Those purposes with under 10 percent growth were shopping, doctor/dentist, and visits to friends and relatives. Those with growth over 25 percent were work, work-related, and school/church trips. Some confusion on the part of respondents about the distinctions between the definitions of work trips and work-related trips may have affected the large increase of 29 percent in work trip lengths, but that would have had only limited effect. Refer to the Glossary for definitions of work trip and work-related trip.

### Components of VMT Growth

Using a parallel formula to the person trip formula of population times vehicle trips per capita times average vehicle trip length, shown in Figure 5, yields the following:

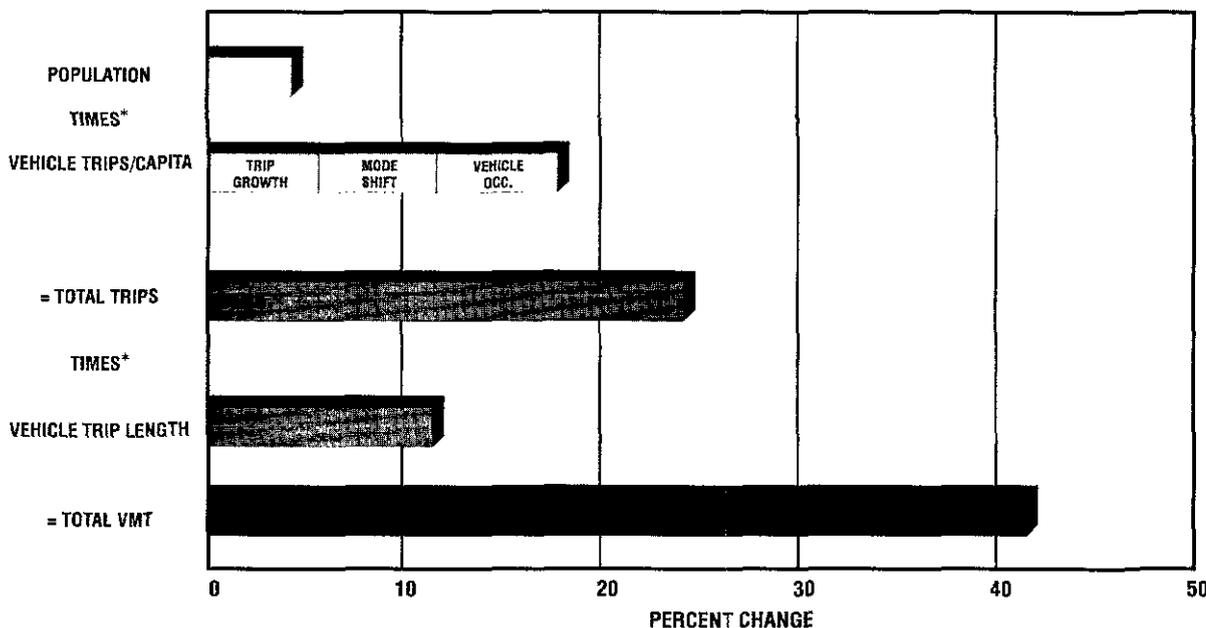
The first three changes—7 percent due to growth in person trips per person, 5 percent due to shifts in modal choice, and 6 percent due to vehicle occupancy changes, and the cumulative effects of these three factors on each other, indicate a 20 percent increase in vehicle trips per capita. The increase in trips per capita, coupled with the 4 percent increase in population, explains the 25 percent increase in vehicle trips. The dramatic increase in vehicle trip lengths of about 12 percent, added to the 25 percent increase in vehicle trips, falls just short of explaining fully the 40 percent increase in vehicle miles of travel. Figure 6 displays these elements as percents of total VMT growth.

### Further Work

The VMT trends and the relationship of VMT to issues of congestion, air quality, and the amount of time we are spending in our cars raise

**FIGURE 5**

### Factors Affecting Vehicle Travel Percent Change 1983 - 1990



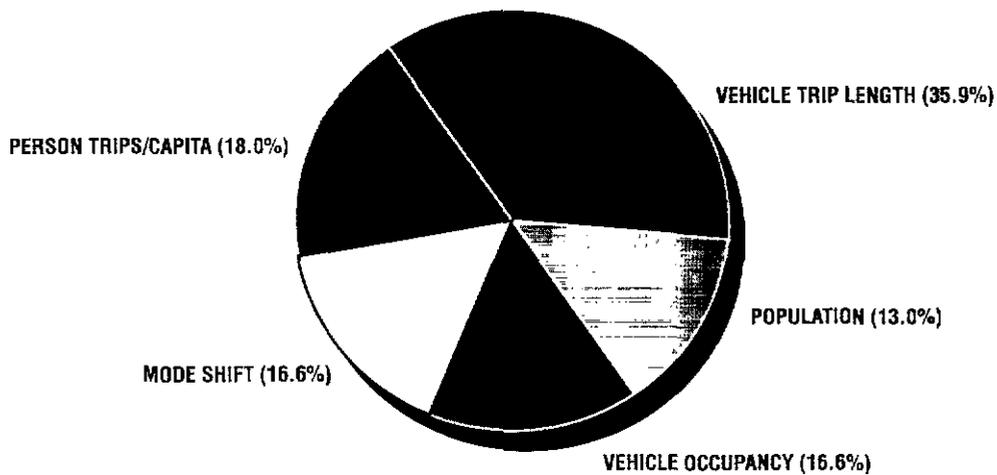
Source: NPTS

\*The formula shown above is correct when the actual values for population, trips per capita, etc. are being used. However, percent change is used in this chart in order to display the data graphically. When percent change is substituted for the actual values, the percent changes are added together instead of multiplied.

*The decline in vehicle occupancy between 1983 and 1990 means that an increase in vehicles of about 6 percent is required to serve the same set of riders.*

**FIGURE 6**

**Vehicle Miles of Travel  
Factors of Increase  
1983 - 1990**



Source: NPTS

numerous questions that require further research. The link between the demographics of our society and VMT changes needs extensive investigation. Driving by women, young people, and senior citizens is currently on the rise. Will this trend continue? Changes in trip length were a significant factor in VMT increases over time.

How do changes in land use patterns affect trip lengths? How do locational decisions of housing, jobs, and services affect other aspects of travel behavior? Research is also needed in the phenomenon of trip linking and the potential for increases in this behavior in the future.

# FACTORS IN GROWTH OF PERSONAL TRAVEL

