This study was conducted in cooperation with the U.S. Department of Transportation, Federal Highway Administration.

**Abstract**

This review of travel indicators in Washington State aims to understand similarities and differences between the state and the nation and to detect changes or special conditions that need to be considered in the future. The work is intended to support general transportation policies and future state-level transportation plans.

None of the travel indicators reviewed strongly suggests that travel conditions in the state stand out in the national context. Two factors are prime in their association with travel demand: household income and development density. Stagnant income explains why the demand for car travel has slowed over the recent past, yet future demand for car travel may increase if the economy improves. On the other hand, demand could remain stable if development density continues to increase.

Residential and population densities are positively associated with demand for modes other than single-occupancy vehicle (SOV) travel. Living in more compact residential areas and in alternative housing types, and renting versus owning a home, also relate to lower demand for SOV travel.

Even at the aggregate level of national data, the Puget Sound region’s transportation context differs from that of rural or other urbanized regions in the state. State policies need to recognize at least three different markets for transportation, which are found in rural, small town, and metropolitan areas.

Overall, Washington State needs to stay tuned to national projections about the likely impacts on travel demand and transportation of general economic trends, the slow down in household formation, growth in car ownership among new immigrants, an aging population with changing driving patterns, and population growth in densely populated areas --where transportation systems investments and land-use policies can affect future travel behavior.
Contents

• How Different Are We? Washington State Versus the Nation

• PART I: Washington State 2001 Travel Indicators Related to Demographic Factors Land-Use Factors

• PART II: Trends 1980-2000 and Beyond
### How Different Are We?

#### Travel Indicators

Washington State Versus the Nation

**NHTS 2001**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Household VMT</td>
<td>Below average</td>
</tr>
<tr>
<td>Household Vehicle Count</td>
<td>Above average</td>
</tr>
<tr>
<td>Person Distance to Work</td>
<td>Slightly below average</td>
</tr>
<tr>
<td>Person Public Transit Use</td>
<td>Average</td>
</tr>
<tr>
<td>Person Number of Walking trips</td>
<td>Slightly above average</td>
</tr>
<tr>
<td>Person Number of Biking trips</td>
<td>Below average</td>
</tr>
</tbody>
</table>
How Different Are We?
Average VMT per Household

Low: New York—High: Alabama
How Different Are We?

Average Vehicle Count per Household

Low: New York—High: Utah
How Different Are We?

Average Number of Bicycle Trips per Person per Week

Low: Texas—High: Florida
PART I
Washington State
2001 Travel Indicators
From the National Household Transportation Survey (NHTS 2001)

- Demographic Factors
- Land-Use Factors
### Washington State 2001 Travel Indicators

#### Demographic Factors NHTS 2001

<table>
<thead>
<tr>
<th>Average Household VMT</th>
</tr>
</thead>
<tbody>
<tr>
<td>HH Income</td>
</tr>
<tr>
<td>Home Ownership</td>
</tr>
<tr>
<td>Life Cycle</td>
</tr>
<tr>
<td>Race</td>
</tr>
<tr>
<td>Place of Birth</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>HH Income</th>
<th>Home Ownership</th>
<th>Life Cycle</th>
<th>Race</th>
<th>Place of Birth</th>
</tr>
</thead>
<tbody>
<tr>
<td>VMT steadily increases with higher household incomes and peaks at $75,000</td>
<td>VMT is higher for households that own their own home than for household that rent.</td>
<td>VMT generally increases with the number of adults and with the presence of older children. Only couples with small children have lower VMT than couples without children.</td>
<td>Standard errors are high, yet non-white households may have lower VMT than white</td>
<td>na</td>
</tr>
</tbody>
</table>


Average Household VMT by Home Ownership

- **Own**: 24,066
- **Rent**: 17,649
- **Provided by job or military**: 18,368

Washington State 2001 Travel Indicators

Demographic Factors NHTS 2001
## Demographic Factors

<table>
<thead>
<tr>
<th>HH Income</th>
<th>Home Ownership</th>
<th>Life Cycle</th>
<th>Race</th>
<th>Place of Birth</th>
</tr>
</thead>
<tbody>
<tr>
<td>The number of vehicles owned per household steadily increases with higher household income and peaks at $75,000</td>
<td>Households that own their own home own a greater number of vehicles than those that rent.</td>
<td>The number of vehicles owned per household increases with the number of adults and the number of children over the age of 5.</td>
<td>Non-white households own fewer vehicles per household than white households.</td>
<td>Foreign born household respondents may travel shorter distances to work. However, large standard errors make these differences statistically insignificant.</td>
</tr>
</tbody>
</table>
Washington State 2001 Travel Indicators

Demographic Factors

Average Person Distance to Work by Household Income

NHTS 2001
Washington State 2001 Travel Indicators

**Demographic Factors** NHTS 2001

Average Number of Walk Trips per Person per Week

<table>
<thead>
<tr>
<th>Income</th>
<th>Home Ownership</th>
<th>Life Cycle</th>
<th>Race</th>
<th>Place of Birth</th>
</tr>
</thead>
<tbody>
<tr>
<td>No recognizable pattern</td>
<td>Those who own their homes appear to walk slightly less than those who rent</td>
<td>Standard errors are high, yet singles may walk more than couples except when their children are very young or between the ages of 16-21.</td>
<td>Standard errors are high, yet white households may make more walking trips than non-white households</td>
<td>Standard errors are high, yet US born households may make more walking trips than foreign born households</td>
</tr>
</tbody>
</table>
# Washington State 2001 Travel Indicators

## Demographic Factors

### Average Person Distance to Work

<table>
<thead>
<tr>
<th>HH Income</th>
<th>Home Ownership</th>
<th>Life Cycle</th>
<th>Race</th>
<th>Place of Birth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distance to work increases with income and peaks at $50,000 to $75,000 range</td>
<td>Persons in households that own their home own work at distances 30% higher than those who rent</td>
<td>Distance to work increases with the number of adults in the household</td>
<td>Standard errors are high</td>
<td>Distance to work is 30% shorter for those who are foreign born than those born in the US</td>
</tr>
</tbody>
</table>
## Washington State 2001 Travel Indicators

### Demographic Factors NHTS 2001

**Average Number of Bicycle Trips per Person per Week**

<table>
<thead>
<tr>
<th>HH Income</th>
<th>Home Ownership</th>
<th>Life Cycle</th>
<th>Race</th>
<th>Place of Birth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard errors are high</td>
<td>Standard errors are high, but those who own their home may bike more</td>
<td>Standard errors are high yet it appears singles may walk more than couples.</td>
<td>No recognizable pattern</td>
<td>na</td>
</tr>
</tbody>
</table>
## Washington State 2001 Travel Indicators

### Land-Use Factors

#### Average Household VMT

<table>
<thead>
<tr>
<th>Housing Unit Density</th>
<th>Population Density</th>
<th>Home Type</th>
<th>Urban/ Rural</th>
<th>Size of MSA</th>
</tr>
</thead>
<tbody>
<tr>
<td>VMT generally decreases with higher densities up to 5000 housing units per square mile</td>
<td>VMT generally decreases with higher densities up to 25,000 person per square mile</td>
<td>Households living in mobile and SF homes have highest VMT; those in town-homes or row houses have lower VMT, and those in apts and condos have the lowest VMT.</td>
<td>Households in rural areas have higher VMT than those in urban areas.</td>
<td>Not much difference between different sized MSAs, however VMT is greater for households living outside of MSAs</td>
</tr>
</tbody>
</table>
Washington State 2001 Travel Indicators

**Land-Use Factors** NHTS 2001

Average Household VMT by Urban or Rural Location

- **Urban**: 21024.79
- **Rural**: 25410.52
- **Urban (95% CI)**: 20283.29 to 21766.29
- **Rural (95% CI)**: 24139.92 to 26681.19
## Washington State 2001 Travel Indicators

### Land-Use Factors

**Average Household Vehicle Count**

<table>
<thead>
<tr>
<th>Housing Unit Density</th>
<th>Population Density</th>
<th>Home Type</th>
<th>Urban/ Rural</th>
<th>Size of MSA</th>
</tr>
</thead>
<tbody>
<tr>
<td>The number of vehicles owned decreases with higher densities.</td>
<td>The number of vehicles owned gradually decreases with higher densities.</td>
<td>Households living in SF and mobile homes own a greater number of vehicles than those living in apts and condos. Standard errors are high, but households living in row houses and townhomes may own fewer vehicles</td>
<td>Households living in rural areas own a greater number of vehicles than those in urban areas.</td>
<td>Not much difference in vehicle ownership between households living in different sized MSAs, nor between households living inside or outside of an MSA.</td>
</tr>
</tbody>
</table>
Washington State 2001 Travel Indicators

**Land-Use Factors** NHTS 2001

Average Household Vehicle Count by Urban or Rural Location

- **Urban:** 1.92
- **Rural:** 2.47

2001 Travel Indicators

Land-Use Factors NHTS 2001

Average Household Vehicle Count by Urban or Rural Location

- **Urban:** 1.92
- **Rural:** 2.47

## Washington State 2001 Travel Indicators

### Land-Use Factors NHTS 2001

#### Average Household Vehicle Count by Home Type

<table>
<thead>
<tr>
<th>Home Type</th>
<th>Average Household Vehicle Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Detached single house</td>
<td>2.3</td>
</tr>
<tr>
<td>Duplex</td>
<td>1.71</td>
</tr>
<tr>
<td>Row house or townhouse</td>
<td>1.81</td>
</tr>
<tr>
<td>Apartment, condominium</td>
<td>1.12</td>
</tr>
<tr>
<td>Mobile home or trailer</td>
<td>1.97</td>
</tr>
<tr>
<td>Other</td>
<td>2.02</td>
</tr>
</tbody>
</table>
## Washington State 2001 Travel Indicators

### Land-Use Factors  
*NHTS 2001*

### Average Person Distance to Work

<table>
<thead>
<tr>
<th>Housing Unit Density</th>
<th>Population Density</th>
<th>Home Type</th>
<th>Urban/Rural</th>
<th>Size of MSA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard errors are high, but on average, households living at higher densities may travel shorter distances to work</td>
<td>Standard errors are high, but distance to work indicates interesting patterns. For instance, it remains almost constant at the lowest densities, increases at densities with 500 to 1000 people per sq. mile, and drops at densities greater than 1000 people per sq. mile. This same pattern occurs with distances increasing slightly at 10,000-25,000 people per sq. mile and then dropping considerably again at 25,000 people per sq. mile.</td>
<td>Standard errors are large, but households living in rowhouses and townhomes may have the shortest distances to work and households living in mobile homes the longest distance to work.</td>
<td>na</td>
<td>Standards errors for the different sized MSAs are too large to draw any conclusion</td>
</tr>
</tbody>
</table>
## Washington State 2001 Travel Indicators

### Land-Use Factors  
NHTS 2001

### Average Number of Walk Trips per Person per Week

<table>
<thead>
<tr>
<th>Housing Unit Density</th>
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<th>Size of MSA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard errors are high, but the number of walking trips taken by people living in low density areas appears to be higher than those living in higher density areas until densities become very high, greater than 5000 housing units per sq. mile.</td>
<td>Standard errors are high, but the number of walking trips taken by people living in low density areas appears to be higher than those living in high density areas until densities become very high, greater than 10,000 people per sq. mile.</td>
<td>Large standard errors prevent conclusions to be drawn, however, a greater number of walking trips may be made by households living in rowhouses, townhouses and apartments than by households living in single-family and mobile homes.</td>
<td>na</td>
<td>No recognizable pattern</td>
</tr>
</tbody>
</table>
Washington State 2001 Travel Indicators

Land-Use Factors NHTS 2001

Average Number of Bicycle Trips per Person per Week

Standard errors are too large to draw conclusions
PART II
Washington State
Trends 1980-2000 and Beyond

From the Neighborhood Change Database (NCDB) 1970-2000
Travel Time to Work

- Commute trip is getting longer
- Average commute trip in the Puget Sound has increased by 3.6 minutes from 1990 to 2000 (higher than 3.1-minute national average)
- The proportion of workers commuting “more than 45 minutes” has increased over time in all study areas.
- The proportion of workers working at home has increased over time in all study areas.
Public Transportation in Travel to Work

- Nationwide, proportion of commute to work by public transportation has decreased over the two decades.
- In Puget Sound, proportion of workers using public transportation is higher than the national average, while Spokane and statewide averages are lower.
- In Washington State, proportion of commute trips by public transportation reached their lowest point in 1990 but slightly increased by 2000.
- Increases in transit use 1990 –2000 in Puget Sound bring Washington State’s average to the same level as the national average, marking an increase in the use of transit in the state while the nation experienced a decrease.
Percentage of Commuters Using Public Transportation

- U.S.
- WA
- Puget Sound
- Spokane
Conclusions
Washington State
The Future
• Washington State has car ownership rates that are higher than the nation's average (2.01 vs. 1.89 per household), but this does NOT translate into VMTs that are higher than the national average (21,800 vs. 24,000 miles per household per year)
Washington State — The Future
The State Versus the Nation

- Washington travel indicators are not very different from those of the nation as a whole
- There are no “red” flags in travel and demographic trends that are specific to the state
Washington State — The Future
The State Versus the Nation
A State Agenda

• Stay tuned to national socio-economic projections
• Monitor factors affecting travel demand:
  – Income and wealth
  – New influx of immigrants
  – Changing distribution of young and old in population
• Monitor and influence land-use patterns as they affect travel demand
  – Growth will take place in metropolitan areas
  – Recognize that rural, small towns, and large metropolitan areas have different transportation needs
The consistently strong relationship of income and development density with travel (VMT and car ownership) may explain the leveling of demand for car travel in the early part of the 21st century, as reported by Todd Litman.

Future demand for travel will likely increase if the economy improves, but it could stay level if development density continues to increase.
Washington State — The Future
Income and Development Density
Keeping Ahead of Demand for Travel

- Monitor increases in income and wealth to identify future growth in travel demand
- Work with growth management laws and programs to keep track of metropolitan growth and land development patterns.
Washington State — The Future

New Influx of Immigrants

From Pisarski 2002

• Nationwide, immigrants gain access to automobile ownership more rapidly than in the past
• Increases in the number of immigrants may increase demand for automobile travel faster than anticipated
Older adults (>64 years) tend to drive less than their younger counterparts

Demand for automobile travel may decrease or stop increasing as the population ages
Washington State — The Future

Population Distribution by Age

Persons 65+
Persons 18-64
Persons 5-17

1980
1990
2000

U.S.
WA
Puget Sound
Spokane
U.S.
WA
Puget Sound
Spokane
U.S.
WA
Puget Sound
Spokane

10.4% 9.7% 9.5% 11.5% 9.7% 10.7% 12.4% 11.2% 10.2% 12.5%
9.7% 10.7% 11.8% 12.5% 11.9% 11.8% 11.2% 11.0% 10.5% 12.5%
9.5% 12.5% 11.8% 12.5% 11.8% 11.8% 11.2% 11.0% 10.5% 12.5%
11.5% 12.5% 11.8% 12.5% 11.8% 11.8% 11.2% 11.0% 10.5% 12.5%
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11.5% 12.5% 11.8% 12.5% 11.8% 11.8% 11.2% 11.0% 10.5% 12.5%
11.5% 12.5% 11.8% 12.5% 11.8% 11.8% 11.2% 11.0% 10.5% 12.5%
11.5% 12.5% 11.8% 12.5% 11.8% 11.8% 11.2% 11.0% 10.5% 12.5%
11.5% 12.5% 11.8% 12.5% 11.8% 11.8% 11.2% 11.0% 10.5% 12.5%
Washington State — The Future
Location-Specific Demand for Travel
One Size Does NOT Fit All

• Travel indicators differ by location
• Future policies need to separately address rural/urban and Spokane/Puget Sound demand for travel
End