Presentation Outline

- Overview of Project
  - Background
  - Objectives

- Differences in rural and long-distance travel

- Statewide model statistics on rural and long-distance travel
Transferability of rural and long-distance model parameters

Consideration of other trip characteristics

Process for developing model parameters

Study Findings

Long-Distance Travel Data... where do we go from here?
Overview of Project Background

- **NCHRP 8-84: Rural/LD Parameters**
  - Statewide Model Peer Exchange
    - September 2004, Longboat Key, FL
    - SWM information exchange
    - Identification of problem statements for future funding
    - Transportation Research Circular
  - Funded problem statements
    - National Model Scoping Project
    - Validation and Sensitivity Considerations for Statewide Models
    - **Rural and Long-Distance Travel Parameters**
Rural/long-distance trips have small impact on most* urban models but great impact on statewide, multi-state, and national models.

While the greatest percent of trips occurs within urban model geography, percent of miles extends way beyond.

*however, long-distance and rural travelers can have a significant impact on regional models where:
- Tourists/visitors are a large component of travelers OR
- Regional models include large rural territory within them.

Figure 1. Vehicle Trips and VMT by Trip Length
Long-distance travel surveys

- 1995 ATS + 2001 NHTS
- Statewide household surveys
- Recent GPS HHTS data collection
Rural travel surveys

- 2009 NHTS
- Statewide household surveys
- Recent GPS HHTS data collection

Table 2.2 NHTS 2009 Sample of Rural Households

<table>
<thead>
<tr>
<th>Item</th>
<th>Rural Samples*</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Rural (National)</td>
<td>43,583</td>
</tr>
<tr>
<td>New England</td>
<td>1,560</td>
</tr>
<tr>
<td>Mid-Atlantic</td>
<td>5,721</td>
</tr>
<tr>
<td>East North Central</td>
<td>2,355</td>
</tr>
<tr>
<td>West North Central</td>
<td>2,684</td>
</tr>
<tr>
<td>South Atlantic</td>
<td>19,293</td>
</tr>
<tr>
<td>East South Central</td>
<td>1,570</td>
</tr>
<tr>
<td>West South Central</td>
<td>6,228</td>
</tr>
<tr>
<td>Mountain</td>
<td>1,727</td>
</tr>
<tr>
<td>Pacific</td>
<td>2,445</td>
</tr>
</tbody>
</table>

* Includes Add-on samples.

Figure 2.3 VMT per Person for Urban and Rural Households by Census Division
Project Overview: Rural/LD Travel Parameters

Objectives

- NCHRP 8-84 focused on documenting, obtaining, and analyzing available data on rural and long-distance trips

  • Long-Distance travel surveys
    - 1995 American Travel Survey (ATS)
    - 2001 National Household Travel Survey (NHTS) – includes large sample of long-distance trips
    - Statewide household surveys (Michigan, Ohio, Oregon)
    - Recent GPS HHTS data collection (Denver, Atlanta, Chicago, Massachusetts)
    - Tourism surveys (FL, HI, OR)
    - National and State Park surveys

  • Rural travel surveys
    - 2009 NHTS
    - Statewide household surveys
    - Recent GPS HHTS data collection
Statewide Model Statistics on Rural/LD Travel

- SWM statistics on rural and long-distance travel
  - Fill data gaps
  - Identify long-distance trip thresholds used
  - Assess reasonableness of survey analysis

**Table 3.2** Average Trip Length of Long-Distance Trips in Statewide Models

<table>
<thead>
<tr>
<th>State</th>
<th>Average Trip Length By Purpose (Minutes or Miles*)</th>
<th>Total Minutes</th>
<th>Total Miles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arizona (Passenger)</td>
<td>-</td>
<td>-</td>
<td>213</td>
</tr>
<tr>
<td>Arizona (Truck)</td>
<td>-</td>
<td>-</td>
<td>228</td>
</tr>
<tr>
<td>Florida</td>
<td>-</td>
<td>-</td>
<td>127</td>
</tr>
<tr>
<td>Georgia</td>
<td>-</td>
<td>-</td>
<td>131</td>
</tr>
<tr>
<td>Indiana</td>
<td>-</td>
<td>-</td>
<td>121</td>
</tr>
<tr>
<td>Louisiana</td>
<td>-</td>
<td>-</td>
<td>165</td>
</tr>
<tr>
<td>Texas (Miles)</td>
<td>200</td>
<td>199</td>
<td>-</td>
</tr>
<tr>
<td>Utah</td>
<td>89</td>
<td>81</td>
<td>85</td>
</tr>
<tr>
<td>Virginia (Interstate)</td>
<td>284</td>
<td>308</td>
<td>313</td>
</tr>
<tr>
<td>Virginia (Intrastate)</td>
<td>127</td>
<td>124</td>
<td>126</td>
</tr>
</tbody>
</table>

* Listed in minutes unless indicated otherwise.

**Table 3.3** Auto Occupancy Rates in Statewide Models

<table>
<thead>
<tr>
<th>State</th>
<th>Auto Occupancy Rates By Purpose (Minutes or Miles)</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>California</td>
<td>-</td>
<td>1.34</td>
</tr>
<tr>
<td>Florida</td>
<td>1.10</td>
<td>1.85</td>
</tr>
<tr>
<td>Indiana</td>
<td>-</td>
<td>3.06</td>
</tr>
<tr>
<td>Louisiana</td>
<td>1.80</td>
<td>2.65</td>
</tr>
<tr>
<td>Mississippi (Interstate)</td>
<td>1.39</td>
<td>2.05</td>
</tr>
<tr>
<td>Mississippi (Intrastate)</td>
<td>1.50</td>
<td>2.26</td>
</tr>
<tr>
<td>Utah</td>
<td>1.33</td>
<td>1.70</td>
</tr>
<tr>
<td>Virginia</td>
<td>1.82</td>
<td>1.82</td>
</tr>
</tbody>
</table>
Transferability of Rural/LD Parameters

- Conditions conducive to transferability
  - Population densities
  - Median income
  - Available transportation modes
  - Key employment types/industries
  - Proximity to tourist destinations
  - Source of model parameters relative to where being used
Transferability of Rural/LD Parameters (Cont’d)

- Parameters considered for transferability
  - Daily rural trip rates per HH by rural trip purpose
  - Annual long-distance trips per HH by long-distance trip type/purpose
  - Friction factors for rural and long-distance purposes
  - Auto occupancy rates by rural trip purposes
  - Party size by long-distance types/purposes

- Reasonableness values/benchmarks
  - Percent rural trips by purpose
  - Percent long-distance trips by type
  - Average trip length by mode and rural trip purpose
  - Average trip length by mode and LD trip type
  - Percent of rural and LD trips by mode and travel distance

<table>
<thead>
<tr>
<th>LD Purpose</th>
<th>Percent by Purpose</th>
<th>Percent Trips by Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Personal Vehicle</td>
<td>Air</td>
</tr>
<tr>
<td>Plantation</td>
<td>55.5%</td>
<td>90.4%</td>
</tr>
<tr>
<td>Business</td>
<td>15.9%</td>
<td>89.3%</td>
</tr>
<tr>
<td>Commuting</td>
<td>12.6%</td>
<td>96.4%</td>
</tr>
<tr>
<td>Personal Business</td>
<td>12.6%</td>
<td>90.3%</td>
</tr>
<tr>
<td>Other</td>
<td>3.4%</td>
<td>96.6%</td>
</tr>
<tr>
<td>Total</td>
<td>100.0%</td>
<td>89.5%</td>
</tr>
</tbody>
</table>

Table 3.7: 2001 Long-Distance Trips by Purpose and Mode
Consideration of Other Rural/LD Trip Characteristics

- Temporal analysis considerations
  - Seasonal variations
  - Daily, monthly, or annually (for long-distance trips)
  - AADT (include weekends) vs. PSWADT (exclude weekends)
  - Time-of-day

- Other aspects of trip definition
  - Person vs. vehicle
  - Per capita vs. Household
  - Long-distance thresholds
  - Dealing with intermediate stops
  - Tours vs. trips

Table 3.8 2001 Long-Distance Trips by Trip Distance

<table>
<thead>
<tr>
<th>Distance</th>
<th>Trips</th>
</tr>
</thead>
<tbody>
<tr>
<td>50-499 Miles</td>
<td>90.0%</td>
</tr>
<tr>
<td>500-900 Miles</td>
<td>5.0%</td>
</tr>
<tr>
<td>More Than 1,000 Miles</td>
<td>5.0%</td>
</tr>
</tbody>
</table>

Table 3.9 2001 Long-Distance Trips by Geography and Mode

<table>
<thead>
<tr>
<th></th>
<th>Personal Vehicle</th>
<th>Air</th>
<th>Other Modes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban</td>
<td>87.0%</td>
<td>9.0%</td>
<td>4.0%</td>
</tr>
<tr>
<td>Rural</td>
<td>95.0%</td>
<td>3.0%</td>
<td>2.0%</td>
</tr>
</tbody>
</table>

Table 3.11 2001 Long-Distance Trips by Income and Mode

<table>
<thead>
<tr>
<th>Income</th>
<th>Personal Vehicle</th>
<th>Air</th>
<th>Bus*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less Than $25,000</td>
<td>91.0%</td>
<td>3.0%</td>
<td>4.0%</td>
</tr>
<tr>
<td>More Than $25,000</td>
<td>84.0%</td>
<td>14.0%</td>
<td>2.0%</td>
</tr>
</tbody>
</table>

*Income ranges of less than $25,000 and more than $25,000 were used for bus trips.
Process for Developing Rural/LD Parameters

- Process for developing transferable parameters
  - Comparisons – rural vs. urban vs. long-distance
  - Typologies – household characteristics, density, proximity, purpose/type, length of trip
  - Geographies – proximity to urbanized areas, small urban vs. agrarian, tourist, etc.
  - Time periods – weekday vs. weekend, daily vs. annual
Process for Developing Rural/LD Parameters (Cont’d)

- Limitations of datasets – ATS, NHTS 2001, NHTS 2009, Michigan, Ohio, GPS surveys
- Minimum amount of local data required – comparisons against statistics from statewide models, local surveys

Next steps (in progress or recently completed)
- Refine statistical analysis for each survey
- Refine preliminary findings/recommendations
- Prepare Guidebook/Final Report
Study Findings… *some might be obvious*

- Long distance trip rates are generally consistent among different databases; *pleasure trips land in the middle*

- Long distance trips are generally longer for business and shortest for personal business

- Auto occupancy rates are considerably higher for long-distance trips than urban or rural travel

- Auto is the primary mode for long distance trips, especially within a 300 mile range. Air travel begins to increase significantly over 300 miles
Study Findings (Cont’d)

- Rural trip rates vary somewhat among different sources; statewide HH survey trip rates (e.g., OH, MI) are generally lower than 2009 NHTS trip rates.

- Rural trip rates are generally lower than suburban area trip rates but otherwise not that different from urban rates.

- Rural work trips are a smaller percentage than found in most urban settings.

- Auto occupancy rates for rural areas are generally higher than small-to-medium sized urbanized areas, but lower than the largest metropolitan areas.
Long-Distance Travel Data
Where do we go from here? What’s out there now?

- **1995 American Travel Survey (ATS)**
  - 116,000 individuals
  - 556,000 trips
  - Trips > 100 miles

- **2001 National Household Travel Survey (NHTS)**
  - Included long-distance sample of 60,000 individuals
  - 124,000 trips
  - *New York and Wisconsin also purchased long-distance add-on samples*
  - Trips > 50 miles
Long-Distance Travel Data
What Are the Limitations of Currently Available Data?

- **1995 American Travel Survey (ATS)**
  - Age of data

- **2001 National Household Travel Survey (NHTS)**
  - Age of data, *although less so than 1995 ATS*
  - Smaller sample than 1995 ATS
  - Use of different mileage threshold from 1995 ATS
  - Impacts of 9/11 on long-distance travel patterns

- **2009 NHTS did not include a long-distance sample!**

Source: 1995 ATS and 2001 NHTS (post-9/11) trips of 100 miles or more one way, POV plus Air only.
Courtesy of Nancy McGuckin
Long-Distance Travel Data
What Are the Limitations of Currently Available Data? (continued)

Other data sets

- Statewide surveys – largely limited to states where data collected OR possibly states of a similar nature
- Recent GPS surveys – long-distance sample somewhat limited
- Tourism surveys – not household travel diaries, sampling concerns
- National and state park surveys – not household travel diaries
- Proprietary data – cost, sampling, not household travel diaries
Long-Distance Travel Data

What Are the Data Needs?

- We need something more recent than 1995 and 2001 datasets
- A full national sample, inclusive of those not making long-distance trips
- Potentially inclusive of 50-99 mile trips as well as 100+ mile trips
- Data on auto occupancy, in addition to party size

Source: McGuckin’s analysis of 2001 NHTS Long Distance, one-way distance.
Uses of new long-distance travel data

- National travel demand model
- Statewide travel demand models
- Planning for megaregions
- High-speed rail and other intercity rail
- Regional models and studies in high-tourist locations
Long-Distance Travel Data
Where Do We Go From Here?

- American Long-Distance Personal Travel Data and Modeling Program identified

- FHWA Exploratory Advanced Research Program
  - Design of a completely new approach for a national household-based long-distance travel survey instrument underway

- Better sampling techniques

- Use of new technology

Available Data Sources
- A. Base-Year Multimodal OD Matrix
- B. Aggregate Direct Demand Model
- C. Disaggregate Models of Travel Behavior
- D. Extensive New Data Collection for Analyzing Behavioral Dynamics
- E. Hybrid Aggregate-Disaggregate Demand Model
- F. Trip-based Four-Step Travel Demand Model

C. Disaggregate Models of Travel Behavior

Figure 4. Alternative Roadmaps toward a National Travel Demand Model

Source: A Review of Methodologies and Their Applicability to National Level Passenger Travel Analysis in the U.S., Lei Zhang, University of Maryland. Part of American LDPT Roadmap documentation.
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Questions?
NCHRP 8-84/Report 735 conclusions on long-distance travel:

• Long-distance trip rates are generally consistent among data sources and analysis years

• Percentage of long-distance trips by purpose is consistent between the 1995 ATS and 2001 NHTS long-distance component

• Long-distance trips are generally longest for business purposes, shortest for personal business, with pleasure trips in midrange

• Auto occupancy rates are considerably higher for long-distance trips than routine travel

• Auto occupancy rates are lowest for business long-distance trips and higher for other long-distance purposes

• Private automobile is the dominant transportation mode for long-distance travel

• Trip length and purpose figure prominently in shift to air travel