

# NCHRP 8-84

## *Rural & Long-Distance Travel Parameters*

*presented to*

**Tennessee Model User Group**

*presented by*

**Cambridge Systematics, Inc.**

**Robert G. Schiffer, AICP**

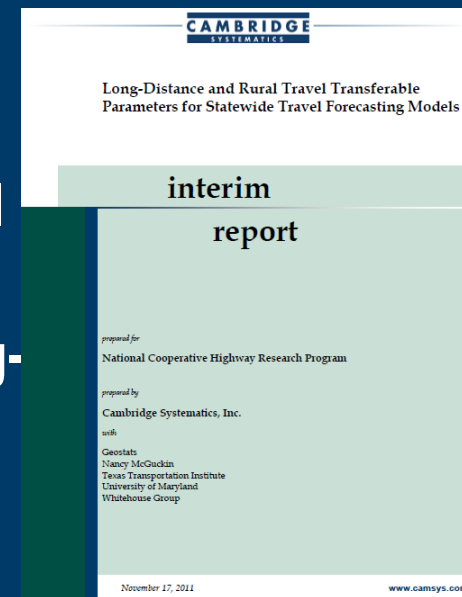
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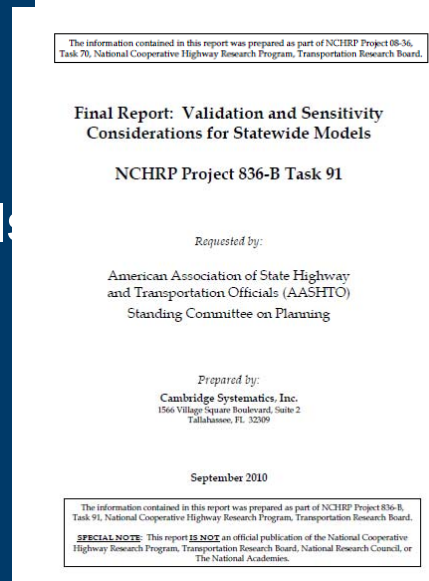
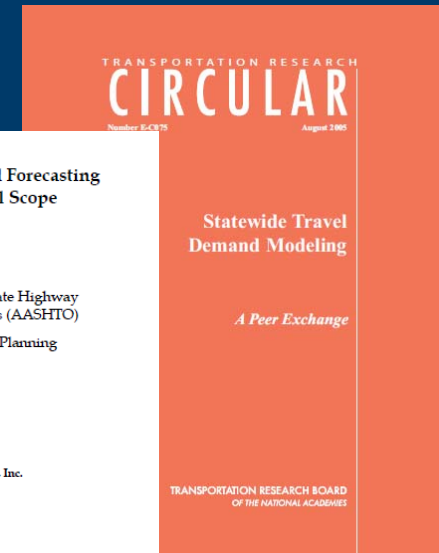
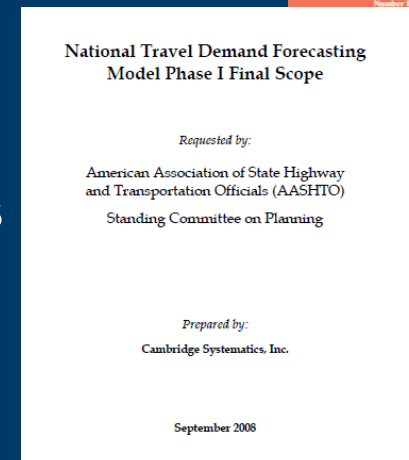
# NCHRP 8-84: Presentation Overview

- Recent history of statewide model research
- Differences in rural and long-distance travel
- Statewide model statistics on rural and long-distance travel
- Transferability of model parameters
- Consideration of other trip characteristics
- Process for developing model parameters



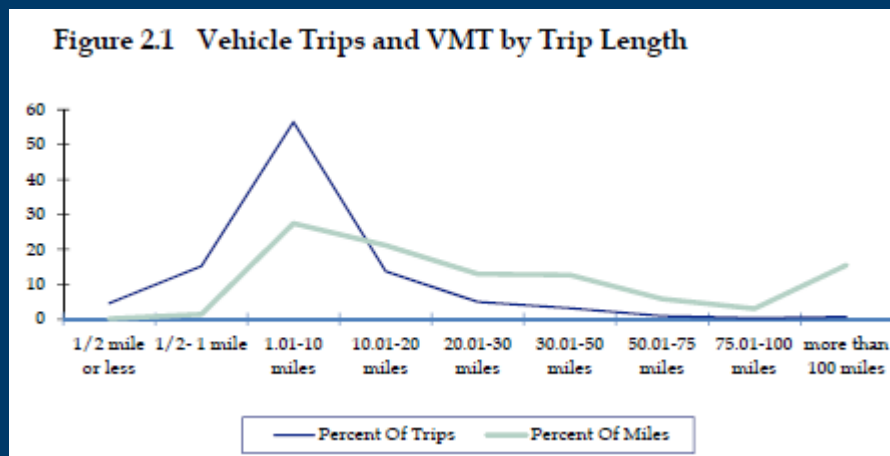
# Recent History of Statewide Model Research

- **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
- **NCHRP 8-61 on urban parameters**



# Differences in Rural and Long-Distance Travel

- Rural/long-distance trips have small impact on *most\** urban models but great impact on statewide/national models
- While the greatest percent of trips occurs within urban model geography, percent of miles extends way beyond
- Study is focused on documenting, obtaining, and analyzing available data sources for rural and long-distance trips



*\*however, long-distance and rural travelers have a significant impact on Florida's regional models; use of these transferable parameters could enhance our regional models*

# Differences in Rural and Long-Distance Travel (Cont'd)

- 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 (Florida, Hawaii, Oregon)
  - » National and State Park surveys

Table 2.1 Preliminary Comparative Statistics from ATS and NHTS

Parameter Summary	1995 ATS More Than 100 Miles	2001 NHTS More Than 100 Miles*
<b>Percent of Trips by Mode</b>		
Private Vehicle	78.51	87.13
Air	18.02	9.23
Other	3.47	3.64
<b>Percent of Trips by Purpose</b>		
Business and Bus/Pleasure	22.42	25.69
Visit Friends/Relatives	32.58	26.31
Leisure	30.53	26.21
Personal/Family or Medical	11.93	9.56
Other	2.54	12.22
<b>Overall Mean Trip Length in Miles (One-Way All Modes)<sup>b</sup></b>		
Mean Trip Length - Air	1,005.21	2,088.78*
Mean Trip Length - Private Vehicle	276.53	301.54
Mean Trip Length - All Other	404.02	482.02
<b>Mean Trip Length by Purpose in Miles (One-Way All Modes)</b>		
Business and Bus/Pleasure	467.89	480.93
Visit Friends/Relatives	398.77	478.60
Leisure	406.70	516.44
Personal/Family or Medical	376.05	409.80
Other	316.03	276.28
<b>Overall Travel Party Size (All Modes)</b>		
Travel Party Size - Air	2.98	N/A
Travel Party Size - Private Vehicle	2.42	N/A
Travel Party Size - All Other	9.34	N/A
<b>Travel Party Size by Purpose</b>		
Business and Bus/Pleasure	2.12	N/A
Visit Friends/Relatives	2.81	N/A
Leisure	3.93	N/A
Personal/Family or Medical	2.91	N/A
Other	6.34	N/A

\* NHTS 2001 includes trips of 50 miles and more. For this analysis only trips of 100 miles and longer one-way were included.

# Differences in Rural and Long-Distance Travel (Cont'd)

Figure 2.8 Long-Distance Trip Travel Modes from Ohio Long-Distance Travel Survey

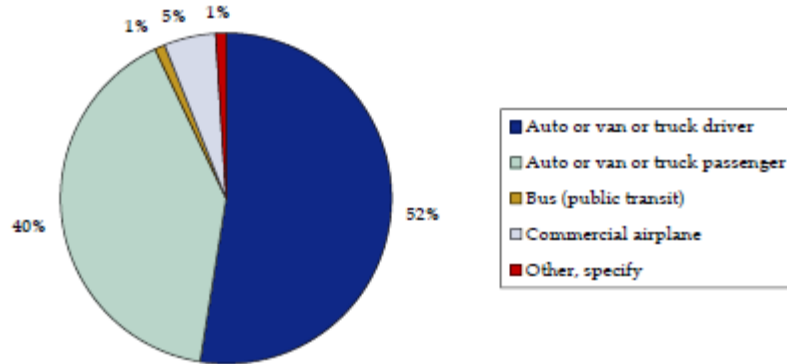


Figure 2.10 Michigan Travel Counts Long-Distance Travel Mode

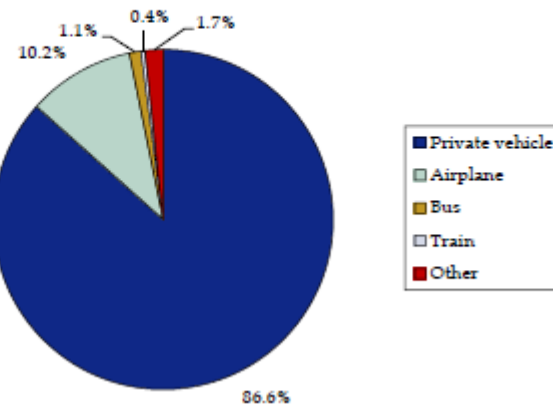
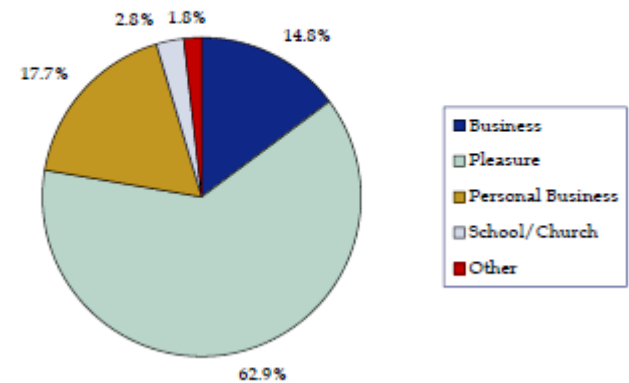


Figure 2.9 Michigan Travel Counts Long-Distance Trip Purpose



# Differences in Rural and Long-Distance Travel (Cont'd)

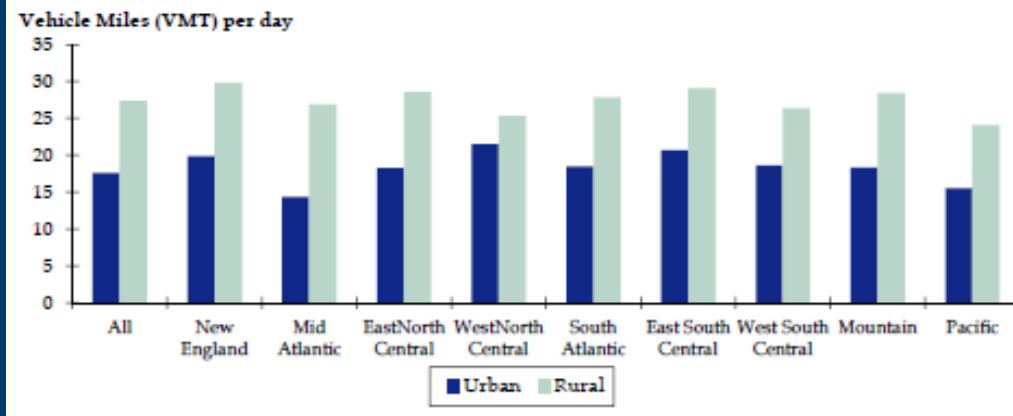
- Rural travel surveys
  - » 2009 NHTS
  - » Statewide household surveys
  - » Recent GPS HHTS data collection

Table 2.2 NHTS 2009 Sample of Rural Households

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

\* Includes Add-on samples.

Figure 2.3 VMT per Person for Urban and Rural Households by Census Division



# Statewide Model Statistics

- **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

	Average Trip Length				
	By Purpose (Minutes or Miles <sup>a</sup> )			Total Minutes	Total Miles
	Business	Tourist	Other		
Arizona (Passenger)	-	-	-	213	206
Arizona (Truck)	-	-	-	228	257
Florida	-	-	-	127	-
Georgia	-	-	-	131	-
Indiana	-	-	-	121	-
Louisiana	-	-	-	168	-
Texas (Miles)	200	-	199	-	200
Utah	89	-	81	85	-
Virginia (Interstate)	284	308	318	303	-
Virginia (Intrastate)	127	124	126	126	136

<sup>a</sup> Listed in minutes unless indicated otherwise.

Table 3.3 Auto Occupancy Rates in Statewide Models

	Auto Occupancy Rates			
	By Purpose (Minutes or Miles)			Average
	Business	Tourist	Other	
California	-	-	-	1.34
Florida	1.10	2.60	-	1.85
Indiana	-	-	-	3.06
Louisiana	1.86	3.44	2.64	2.65
Mississippi (Interstate)	1.39	2.55	2.05	2.00
Mississippi (Intrastate)	1.50	2.55	2.26	2.10
Utah	1.33	-	2.06	1.70
Virginia	1.82	2.69	2.69	1.82



# Transferability of Model 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 it is being used**

**Table 3.7 2001 Long-Distance Trips by Purpose and Mode**

LD Purpose	Percent by Purpose	Percent Trips by Mode				
		Personal Vehicle	Air	Bus	Train	Other
Pleasure	55.5%	90.4%	6.7%	2.2%	0.5%	0.2%
Business	15.9%	79.3%	17.8%	0.8%	1.6%	0.5%
Commuting	12.6%	96.4%	1.5%	0.5%	1.7%	0.0%
Personal Business	12.6%	89.3%	4.7%	5.6%	0.3%	0.1%
Other	3.4%	96.6%	1.9%	0.5%	0.0%	1.0%
<b>Total</b>	<b>100.0%</b>	<b>89.5%</b>	<b>7.4%</b>	<b>2.1%</b>	<b>0.8%</b>	<b>0.2%</b>

# Transferability of Model 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

# Consideration of Other 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

Distance	Trips
50-499 Miles	90.0%
500-900 Miles	5.0%
More Than 1,000 Miles	5.0%

Table 3.9 2001 Long-Distance Trips by Geography and Mode

	Personal Vehicle	Air	Other Modes
Urban	87.0%	9.0%	4.0%
Rural	95.0%	3.0%	2.0%

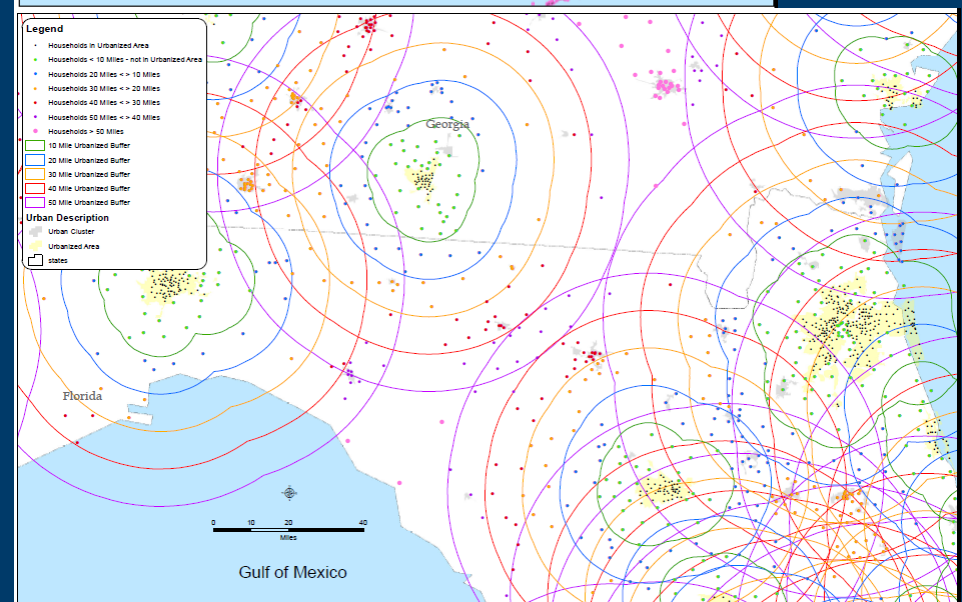
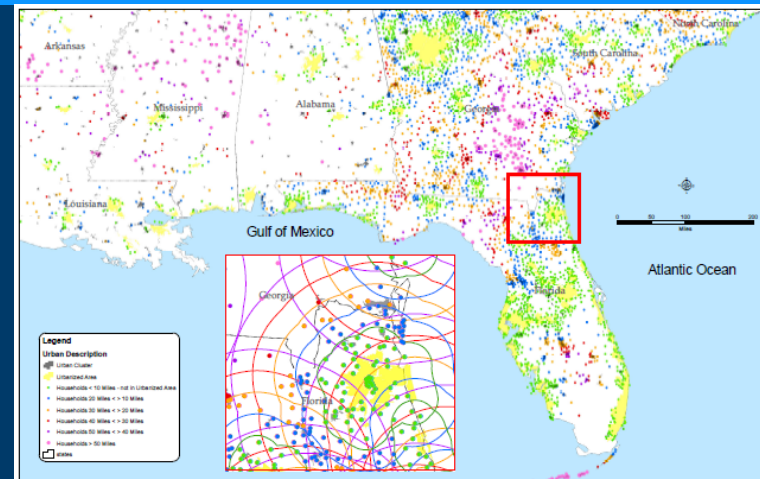
Table 3.11 2001 Long-Distance Trips by Income and Mode

Income	Personal Vehicle	Air	Bus <sup>a</sup>
Less Than \$75,000	91.0%	5.0%	4.0%
More Than \$75,000	84.0%	14.0%	2.0%

<sup>a</sup> Income ranges of less than \$25,000 and more than \$25,000 were used for bus trips.

# Process for Developing Model Parameters

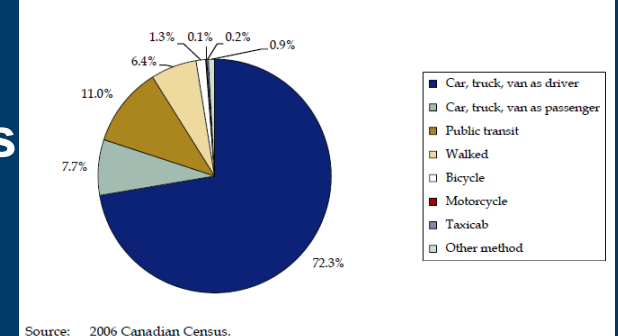
- Process for developing transferable parameters
  - » Comparisons – rural vs. urban vs. long-distance
  - » Typologies – household characteristics, density, proximity, purpose/type, length of trip
  - » Geographies – proximity to urbanized areas, small urban vs. agrarian, tourist, etc.
  - » Time periods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



# Process for Developing Model 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*)
  - » Rural typologies
  - » Trip purposes/types
  - » Statistical analysis for each survey
  - » Coordinate with Canada on their findings
  - » Document findings/recommendations
  - » Prepare Guidebook

Figure B.2 Commute by Transportation Mode  
2006 Canadian Census



# NCHRP 8-84: Rural & Long-Distance Travel Transferable Parameters for Statewide Models

- **Questions?**

**Table 2.3** Travel Parameters for Urban and Rural Households by Census Division, 2009 NHTS

	Person Trips per Person		Average Vehicle Trip Length (Miles)		VMT per Household		VMT per Person	
	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural
All	3.8	3.6	8.0	12.0	43.5	72.1	17.6	27.4
New England	3.8	3.9	9.0	11.7	47.7	79.5	19.9	29.8
Mid-Atlantic	3.8	3.7	7.7	11.6	35.6	70.9	14.3	26.9
East North Central	4.0	3.6	7.7	11.8	43.2	75.9	18.3	28.6
West North Central	4.1	3.6	8.2	10.6	48.3	63.2	21.5	25.3
South Atlantic	3.7	3.6	8.3	12.6	44.4	72.0	18.5	27.8
East South Central	3.8	3.4	8.7	13.3	46.7	75.0	20.7	29.1
West South Central	3.8	3.7	8.2	12.3	47.0	72.6	18.6	26.3
Mountain	4.0	3.8	7.6	12.0	46.0	76.6	18.3	28.5
Pacific	3.8	3.7	7.4	10.6	42.1	64.6	15.6	24.1

Source: Author's analysis of 2009 NHTS, includes travel on weekends and holidays.

**Figure 2.3** VMT per Person for Urban and Rural Households by Census Division

