

Long Distance Passenger Origin-Destination Data

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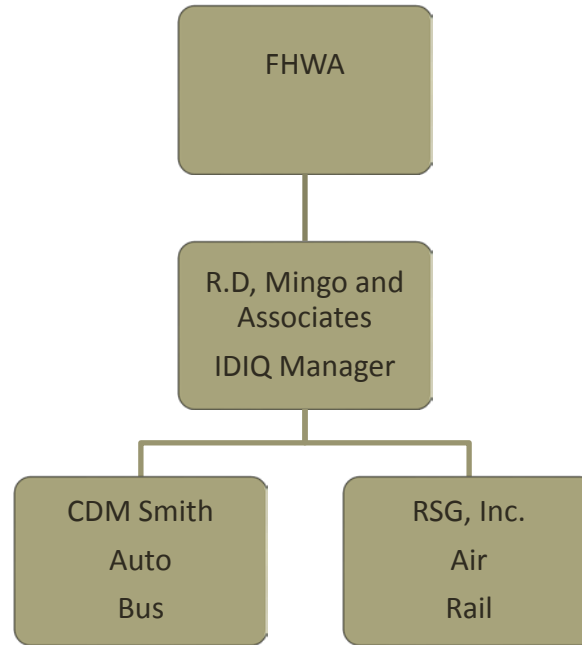


Project Objective and Deliverables

- Provide baseline passenger travel information for analyzing projects of regional and national significance, corridors, policy initiatives, interstate commerce, and Federal programs.
- Highway (auto and bus), rail, and air modes
- Long-distance (over 100 miles) inter-regional multimodal passenger travel origin destination matrix for 2008 and 2040
 - Person-trip tables done at county level.
- A set of documented and transparent methodologies to expedite future development



Project Team



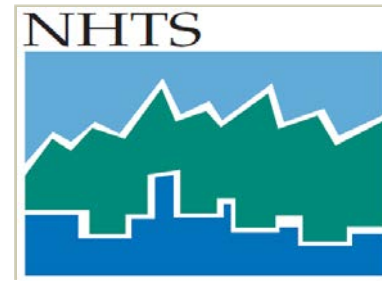
Expert Panel

- USDOT (OST, FHWA, FAA, FRA, and RITA)
- State DOTs
- MPOs
- Academia
- Private sector (Amtrak, ABA, I-95 corridor coalition)



Data Examined

- 1995 ATS
- 2001 NHTS
- DK Shifflet (2008)
- California Long Distance Survey (2011)
- Ohio Long Distance Survey (2002-2003)
- American Bus Association Motor Coach Survey Data
- Federal Motor Carrier Safety Administration Data
- Russell's National Motor Coach Guide
- Bureau of Transportation Statistics (BTS) Data (especially for air travel)
- Amtrak data



Data Examination Conclusions

- No existing data are readily available to cover the base year of 2008 for the entire nation
- Base year 2008 OD data – need to be synthesized
- 2040 OD data – need to be forecasted (synthesized)
- The only national comprehensive data available is the 1995 ATS



AUTO/BUS TRIP DEVELOPMENT



Trip Productions and Attractions

- Trip Productions
 - Business = $0.47692 \times \text{Population}$ ($R^2 = 0.90$)
 - Non Business = $2.19893 \times \text{Population}$ ($R^2 = 0.95$)
- Based on 1995 State level ATS and Census Population data



Trip Productions and Attractions

- Trip Attractions
 - Business = $1.09773 \times \text{QCEW Employment}$ ($R^2 = 0.89$)
 - Non Business = $6.573 \times \text{QCEW Leisure \& Hospitality and Service Providing industry Employment}$ ($R^2 = 0.91$)
- Based on 1995 State level ATS and QCEW data



2008 and 2040 Trip Productions and Attractions

Trip Productions

Business = $0.47692 \times \text{Population}$

Non Business = $2.19893 \times \text{Population}$

Population data are from Census for 2008 and from Woods and Poole for 2040

Trip Attractions

Business = $1.09773 \times \text{QCEW Employment}$

Non Business = $6.573 \times \text{QCEW Leisure \& Hospitality and Service Providing industry Employment}$

QCEW data from BLS for 2008 and Woods and Poole employment data for 2040



Trip Distribution – Formation of OD Pair

- Destination Choice Formulation

- $Business_j = 0.536 * (\ln(Households_i) + 2 * \ln(Employment_j)) - 2.81 * \ln(Distance_{ij})$

- $Non\ Business_j = 0.584 * (\ln(Households_i) + 2 * \ln(Employment_j)) - 2.47 * \ln(Distance_{ij})$

$$BusinessTrips_{ij} = BusinessProductions_i \frac{\exp(Business_j)}{\sum_{j' \in Zones} \exp(Business_{j'})}$$

$$NonBusinessTrips_{ij} = NonBusinessProductions_i \frac{\exp(NonBusiness_j)}{\sum_{j' \in Zones} \exp(NonBusiness_{j'})}$$

- The utilities are applied at the county level to obtain county to county flow table



Special Generators

- National Parks
 - Obtain 2008 national park visitors
 - Obtain percent of national park visits that come from 100 +miles from NPS surveys (collected between 2003 to 2011)
- International Borders (Canada and Mexico)
 - Obtain 2008 inbound passengers from BTS
 - Calculate percent of long distance trips from Statistics Canada border crossing information



Trip Length Distribution

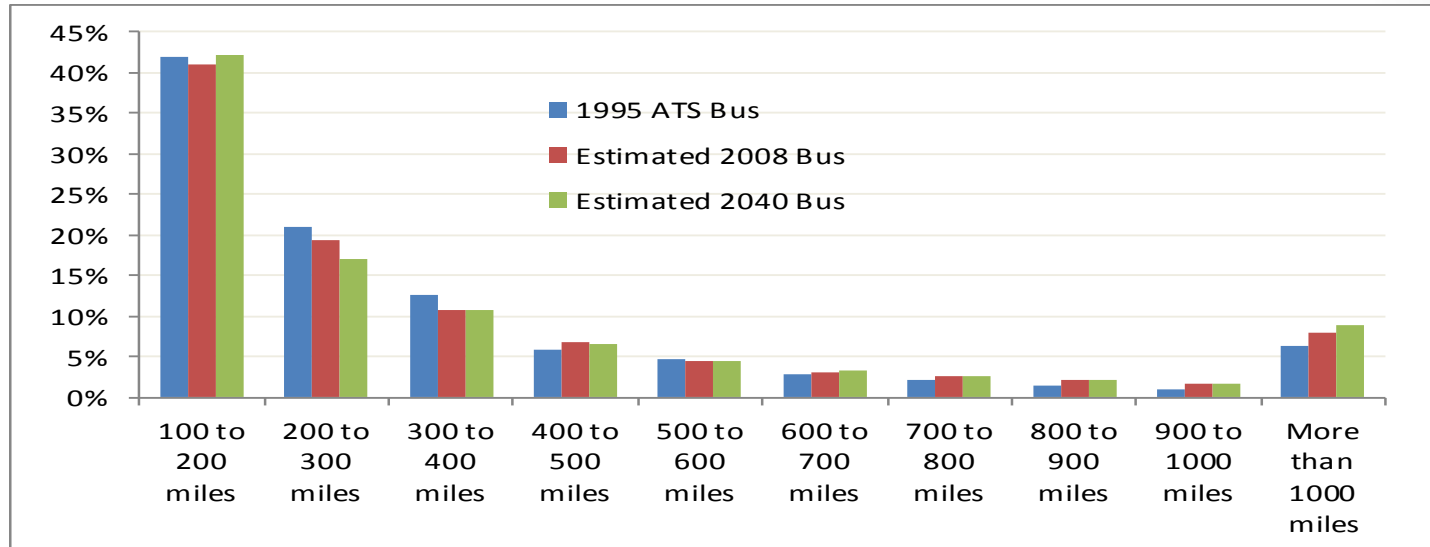
Auto

Distance Bin	Estimated 2008 Auto	1995 ATS Auto	2002/2003 Ohio Long Distance Survey	2008/2011 California Long Distance Survey (Enhanced)	2008/2011 California Long Distance Survey (Reduced)	Estimated 2040 Auto
100 to 200 miles	52.6%	54.9%	59.7%	59.3%	60.1%	50.5%
200 to 300 miles	18.8%	20.8%	15.2%	13.9%	13.6%	18.0%
300 to 400 miles	10.1%	8.9%	9.7%	19.6%	19.2%	9.8%
400 to 500 miles	6.2%	4.5%	5.5%	6.4%	6.2%	5.9%
500 to 600 miles	4.3%	2.8%	3.6%	0.7%	0.9%	4.1%
600 to 700 miles	3.1%	1.8%	1.9%	0.1%	0.1%	3.0%
700 to 800 miles	2.2%	1.3%	1.8%	0.0%	0.0%	2.2%
800 to 900 miles	1.6%	1.0%	1.1%	0.0%	0.0%	1.7%
900 to 1000 miles	1.2%	0.7%	0.7%	0.0%	0.0%	1.3%
More than 1000 miles	2.6%	3.3%	0.8%	0.0%	0.0%	3.5%



Trip Length Distribution

Bus



Total Trip Summary

	Auto	Air	Rail	Bus
1995 ATS	813,858,000	161,165,000	4,994,000	20,445,000
2008 Estimate	1,225,711,728	221,161,444	11,980,162	190,665,970
2040 Estimate	1,749,657,865	370,826,826	17,420,775	285,708,005
Share 1995	81.3%	16.1%	0.5%	2.0%
Share 2008	74.3%	13.4%	0.7%	11.6%
Share 2040	72.2%	15.3%	0.7%	11.8%
Total Growth (1995 to 2008)	50.6%	37.2%	139.9%	832.6%
Annual Total Growth (1995 to 2008)	3.2%	2.5%	7.0%	18.7%
Total Growth (2008 to 2040)	42.7%	67.7%	45.4%	49.8%
Annual Total Growth (2008 to 2040)	1.1%	1.6%	1.2%	1.3%



Top OD pairs (auto and bus)

- Intrastate trips between large counties in Southern California (Los Angeles, Riverside, San Bernardino, and San Diego)
- Interstate trips between Southern California counties and Clark Co., NV (Las Vegas)
- Interstate trips between Clark Co., NV and Maricopa Co., AZ (Phoenix)
- Interstate trips between Southern California counties and Maricopa Co., AZ



Other OD Pair (Highway) Highlights

- Intrastate trips between King Co., WA (Seattle) and Olympic NP
- Intrastate trips between Los Angeles Co. and Yosemite, Kings Canyon, and Sequoia NP counties
- Intrastate trips in the Texas triangle: Dallas and Tarrant Counties (Dallas-Ft. Worth area), Bexar Co. (San Antonio), and Harris Co. (Houston)
- Highest east coast OD pair: Philadelphia Co., PA to Kings Co., NY (Brooklyn)



Data available (years 2008 and 2040)

- Auto person trips
 - Business
 - Non-business
- Bus person trips
- Air person trips
- Rail person trips

Data will be available soon on the FHWA Office of Highway Policy Information page:

<http://www.fhwa.dot.gov/policyinformation/index.cfm>



What's Next

- USE THE DATA
- Share your uses with FHWA



Questions and Comments

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