
Financial Impacts of RUCs on Urban and Rural Households:

Summary of Findings

RUC West Steering Committee

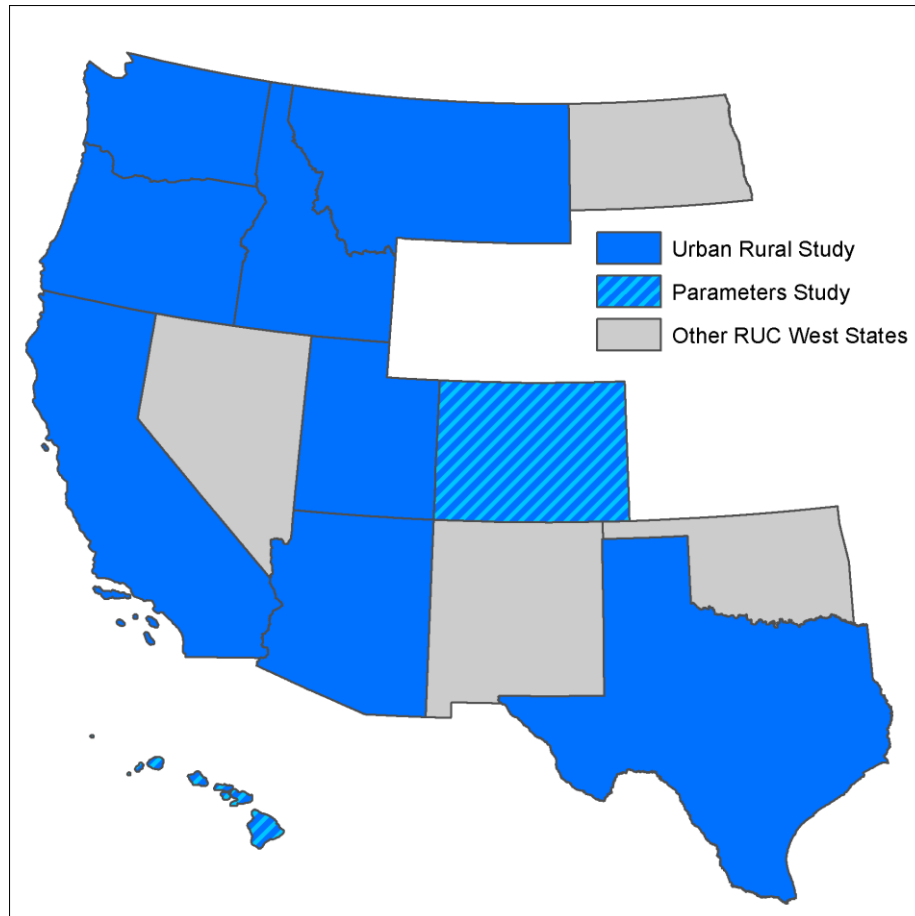
September 20, 2017

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Economic Development Research Group, Inc.

Study Objectives

Financial Impacts of Road User Charges on Drivers in Rural and Urban Counties – *Western Road User Charge Consortium (RUC West)*

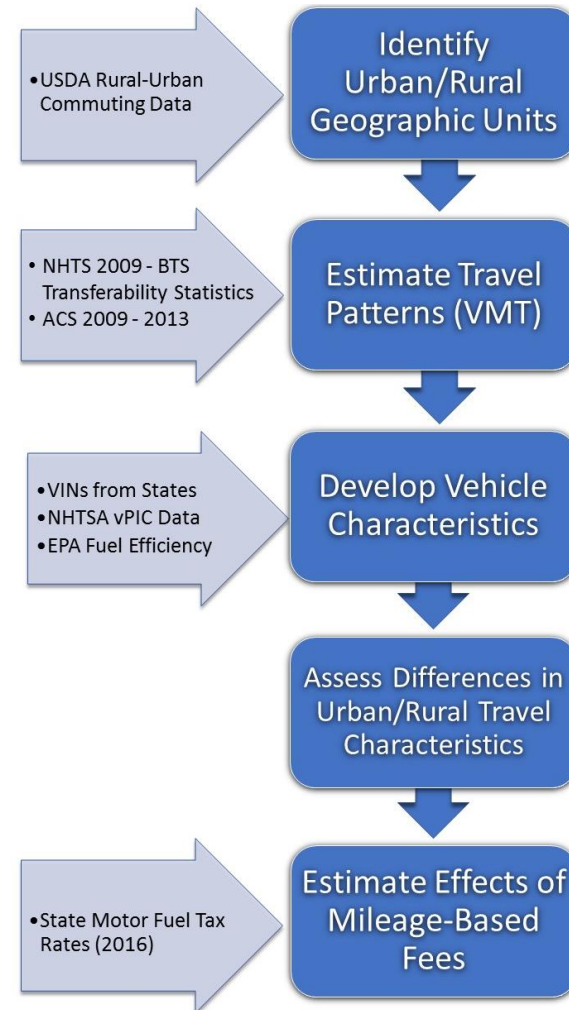
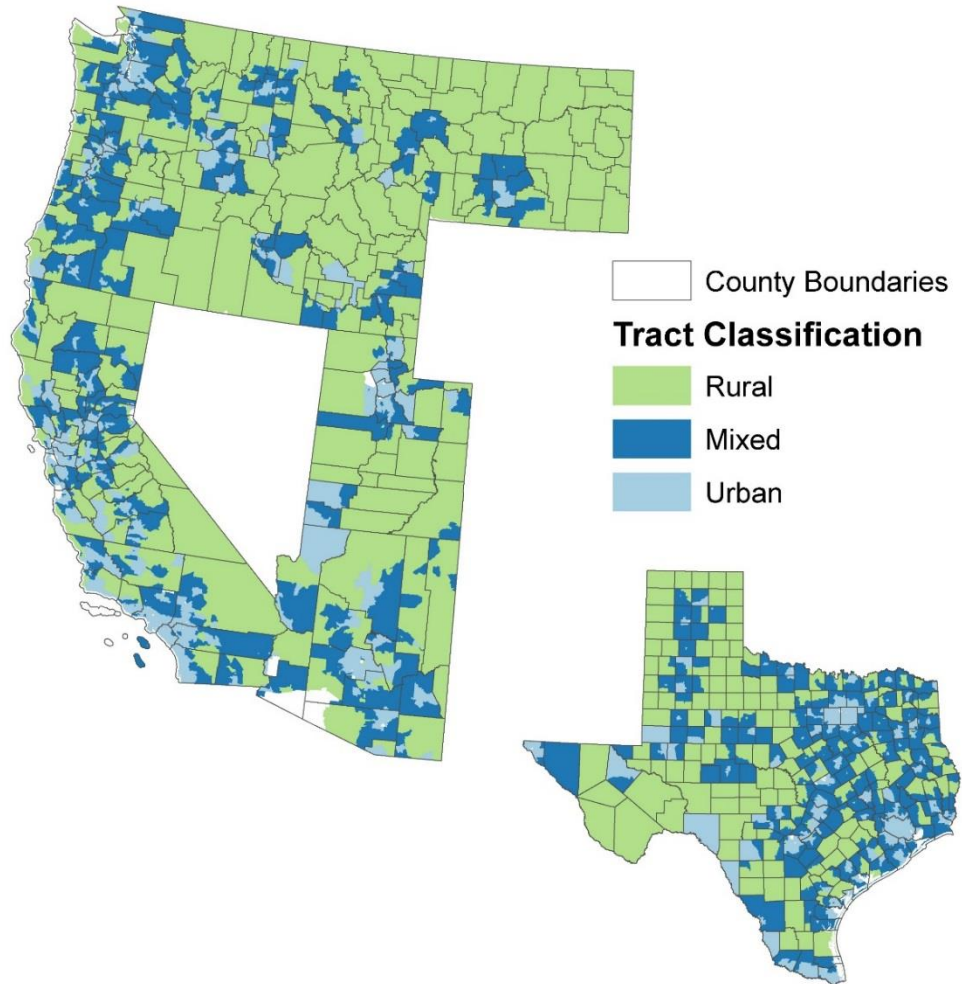


- “ . . . compile and analyze . . . direct costs to road users under a mileage-based RUC compared to the current gas tax structure, stratifying road users into urban, rural, and ‘mixed’ groups.”
- Provided state-by-state assessments for eight states (Arizona, California, Idaho, Montana, Oregon, Texas, Utah, and Washington)
- Created tools to replicate analysis of other RUC West states

Questions Addressed

- What is the average cost of the current state gas tax to individual drivers in urban, rural, and mixed areas?
- What are the revenue neutral mileage-based fees that would replace the current gas tax on passenger and light-duty vehicles, excluding diesel-powered vehicles?
- What effects do non-gas-powered passenger vehicles and light-duty vehicles have on instituting mileage-based user fees?
- Do the greater distances traveled by rural residents mean that they are at a disadvantage relative to urban residents when mileage-based user fees replace gas taxes?
- Are there generally available data that can be used, updated and consistently applied to multiple states to assess the potential impacts of instituting a mileage-based fee
- Are mileage-based user fees unfair to rural residents when compared to their urban counterparts?

Study Process

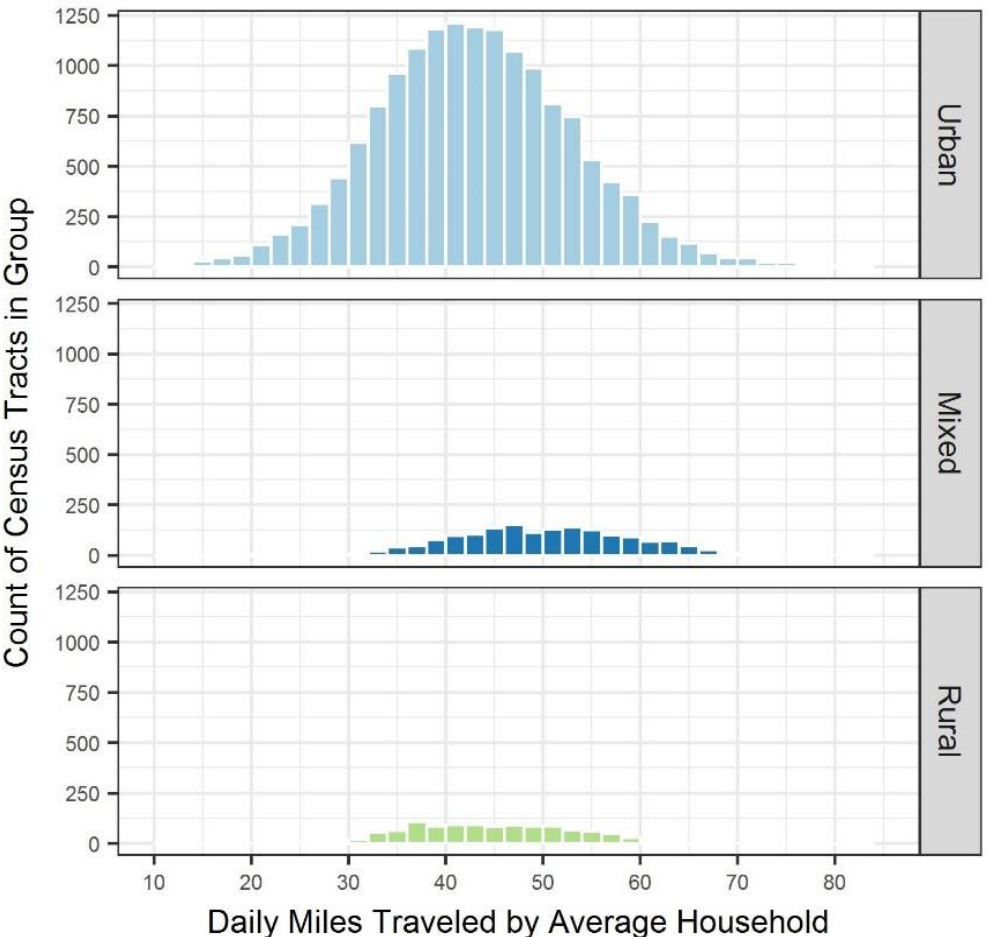


Factors Influencing Revenue Neutral RUC Levels

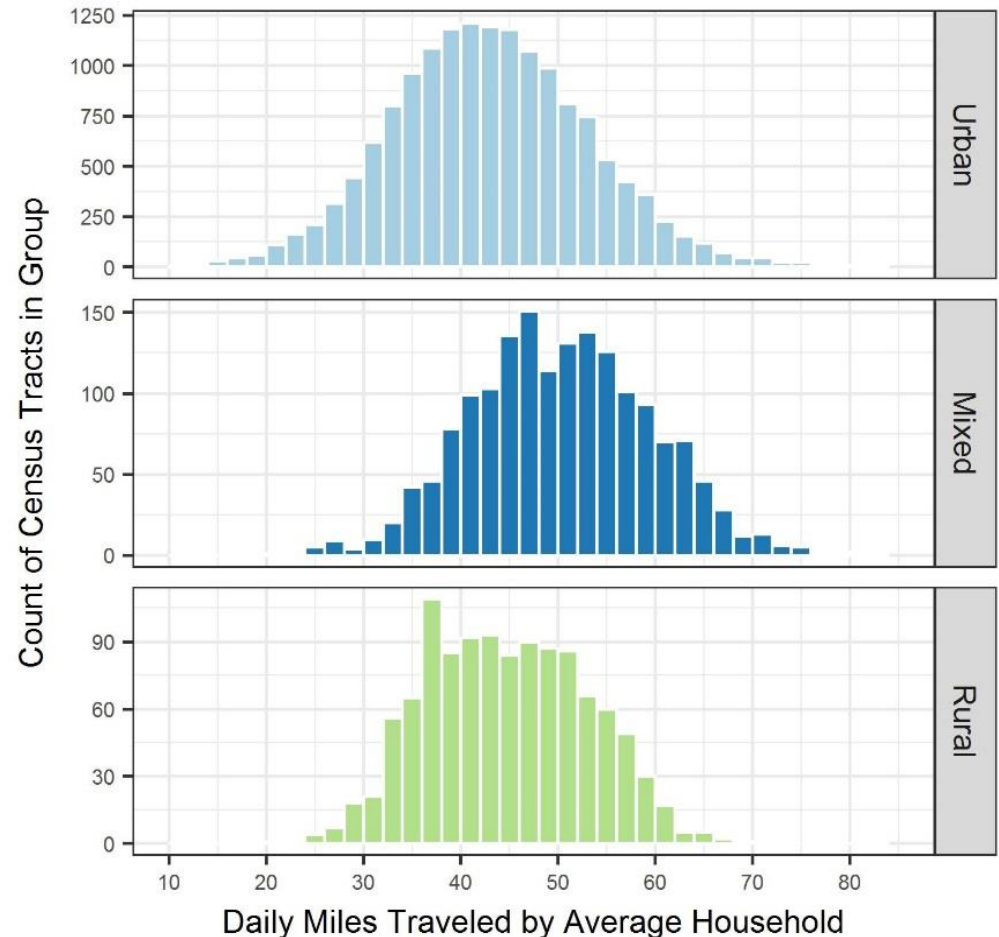
- Vehicle fleet mix
 - Gasoline-powered share of fleet
 - Penetration of non-electric flex and bio-fueled vehicles
 - Prevalence of electric/hybrid vehicles
- Travel patterns
 - Trip frequency
 - Trip length
 - Total vehicle miles traveled
- Current gas tax levels
 - Revenue neutral RUC reflects level of current fuel-derived revenues
- Factors differ by state as well as by urban, rural and mixed areas
 - Differences vary by state and by geography explain results

Urban Areas Dominate Vehicle Miles Traveled

Daily VMT for U/M/R – Same Vertical Scale
 Estimated Trip Making Behavior (Distance) in 8 States

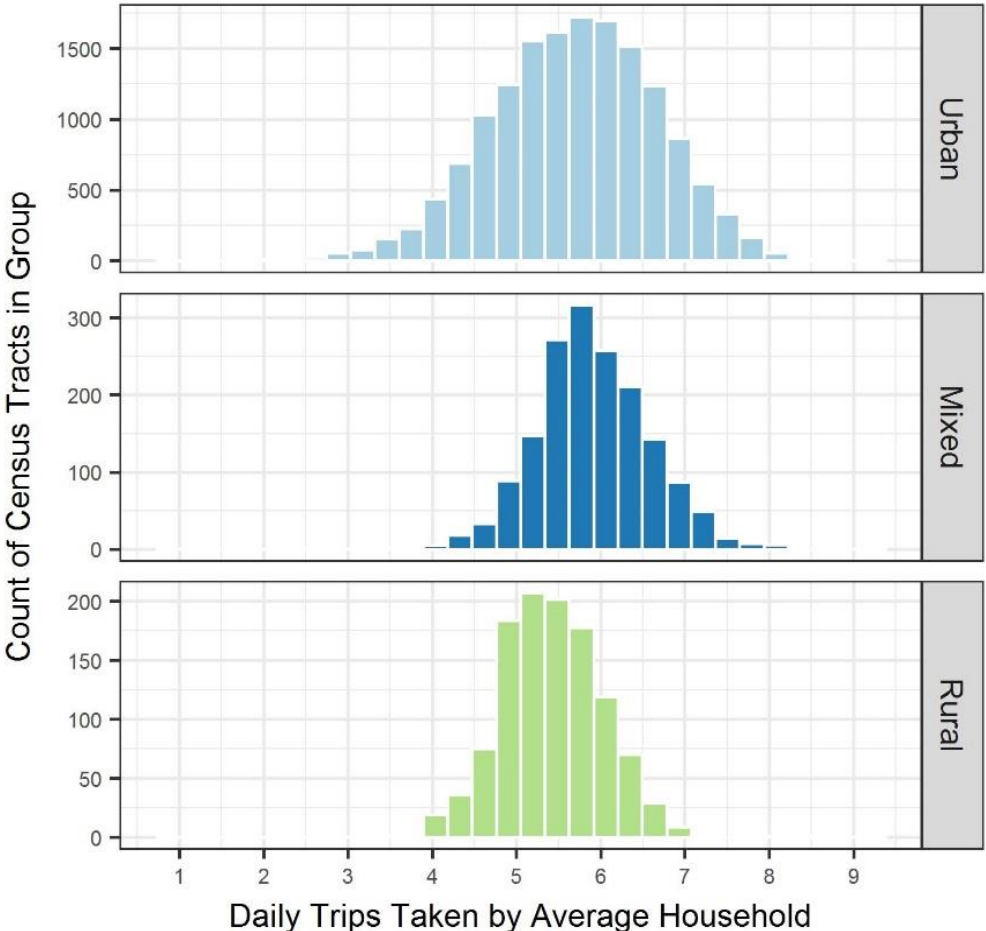


Daily VMT for U/M/R – Adjusted Vertical Scale
 Estimated Trip Making Behavior (Distance) in 8 States

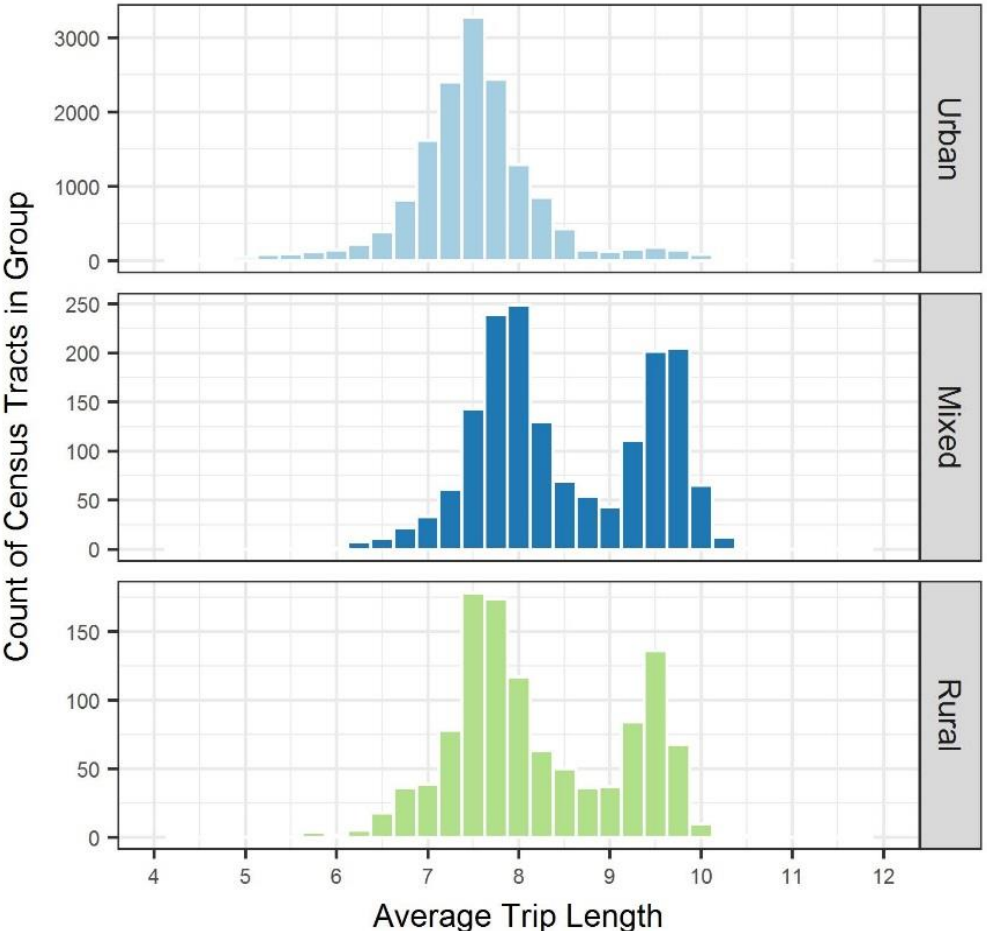


Trip Length and Frequency Vary by U/M/R

Estimated Daily Trips Taken in 8 States



Estimated Average Trip Length in 8 States



Vehicle Record Processing

State	Registration Records Received	Removed from Analysis because:			Location Rebalance	Final Vehicle Count by State
		Not Standard Passenger Vehicles	No Fuel Type ID'd	No Fuel Economy ID'd		
Arizona	5,917,640	8%	1%	10%	2%	4,618,996
California	27,559,122	17%	3%	0%	1%	21,588,525
Idaho	2,746,499	13%	0%	3%	4%	2,194,713
Montana	700,000	10%	1%	8%	5%	528,872
Oregon	3,782,748	0%	0%	33%	0%	2,524,951
Texas	24,203,117	15%	0%	6%	4%	18,047,380
Utah	2,330,852	6%	1%	7%	1%	1,979,521
Washington	5,130,387	1%	0%	15%	0%	4,315,254

Total Household VMT

State	Daily HH VMT <i>(in millions)</i>	Non-Gas VMT <i>(in millions)</i>	Non-Gas Share of VMT
Arizona	91.0	9.03	9.9%
California	529.8	25.64	4.8%
Idaho	26.5	2.19	8.2%
Montana	17.5	3.52	20.1%
Oregon	58.9	7.69	13.1%
Texas	443.4	84.46	19.1%
Utah	43.0	6.38	14.9%
Washington	109.5	8.42	7.7%
Total	1,319.6	147.33	11.2%

Non-Gas VMT Percentages

State	Electric/ Hydrogen	Hybrid	Flex fuel/ Biofuel	Other Fossil	Diesel	Total Non-Gas
Arizona	0.08%	1.92%	6.70%	0.01%	1.21%	9.92%
California	0.39%	2.06%	1.24%	0.08%	1.07%	4.84%
Idaho	0.01%	0.86%	5.07%	0.01%	2.29%	8.24%
Montana	0.00%	1.23%	5.35%	0.02%	13.49%	20.09%
Oregon	0.00%	2.82%	4.49%	0.01%	5.73%	13.05%
Texas	0.15%	0.22%	13.07%	2.49%	3.12%	19.05%
Utah	0.08%	1.67%	7.27%	0.14%	5.70%	14.86%
Washington	0.13%	2.28%	3.19%	0.00%	2.09%	7.69%

More Vehicle Characteristics

State	Urban	Mixed	Rural
Arizona	10%	11%	12%
California	5%	5%	5%
Idaho	8%	9%	9%
Montana	16%	20%	24%
Oregon	12%	17%	18%
Texas	17%	25%	28%
Utah	14%	20%	23%
Washington	7%	9%	9%

Percent Non-Gas

State	Urban	Mixed	Rural
Arizona	9.2	9.8	10.7
California	9.5	10.0	11.0
Idaho	13.6	14.2	14.7
Montana	13.0	13.3	13.2
Oregon	10.7	12.9	13.6
Texas	9.1	9.5	9.9
Utah	9.5	10.2	10.7
Washington	12.2	13.0	13.6

Vehicle Age

State	Urban	Mixed	Rural
Arizona	22.7	22.1	20.9
California	27.0	26.3	25.2
Idaho	21.7	21.2	20.8
Montana	23.8	23.6	22.9
Oregon	21.3	20.3	19.9
Texas	21.6	20.5	19.9
Utah	22.8	21.8	21.1
Washington	22.6	21.5	21.2

Fuel Efficiency
(Gas Tax Only)

Change in Payments

Comparison of Fuel Tax to “Revenue Neutral” RUC

State	Fuel Tax (\$ / Gal)	RUC (\$ / Mi)
AZ	0.180	0.0077
CA	0.300	0.0110
ID	0.320	0.0145
MT	0.270	0.0112
OR	0.300	0.0139
TX	0.200	0.0087
UT	0.294	0.0125
WA	0.445	0.0195

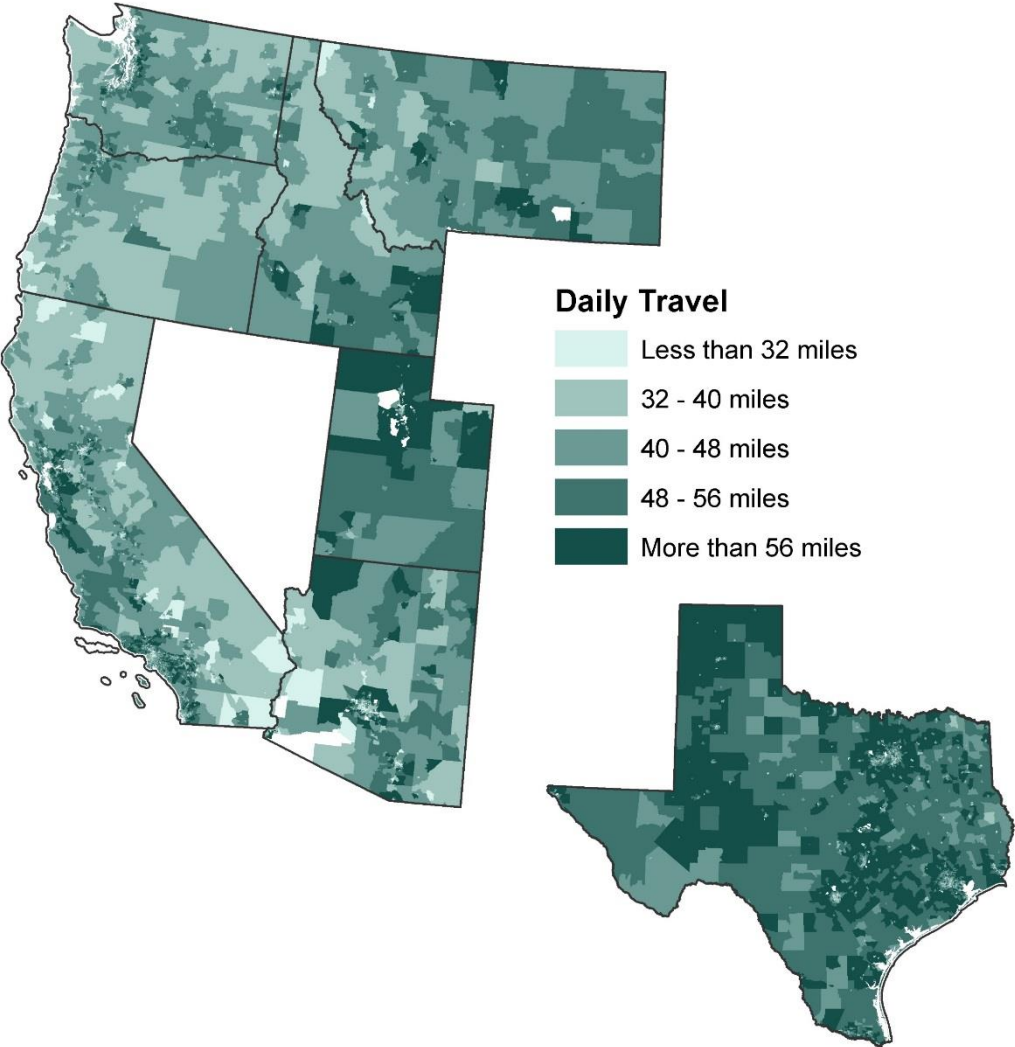
- Revenue neutral RUC rates highly correlated with gas tax but also affected by average fuel efficiency.
- Currently are too few non-gas/non-diesel vehicles to significantly affect rates.

Percent Change in Payments Under a RUC

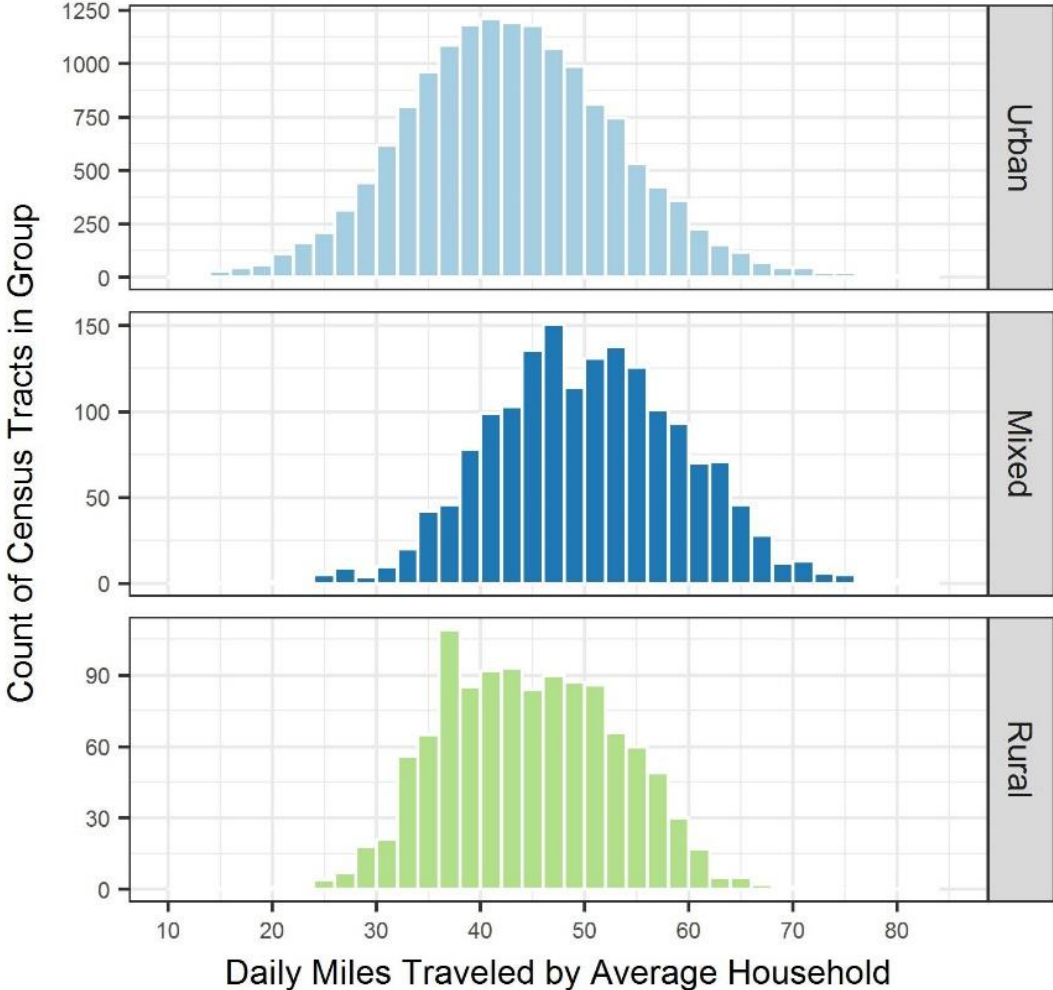
State	Urban	Mixed	Rural
AZ	0.7%	-1.7%	-6.1%
CA	0.3%	-2.4%	-6.3%
ID	1.0%	-0.9%	-3.1%
MT	1.4%	0.4%	-1.9%
OR	1.0%	-2.9%	-4.8%
TX	0.5%	-1.6%	-3.1%
UT	0.6%	-3.4%	-5.5%
WA	1.0%	-3.6%	-4.8%

- Changes are small relative to total annual gas tax payments in all states.
- Much more fuel tax revenue comes from urban households due to urban VMT

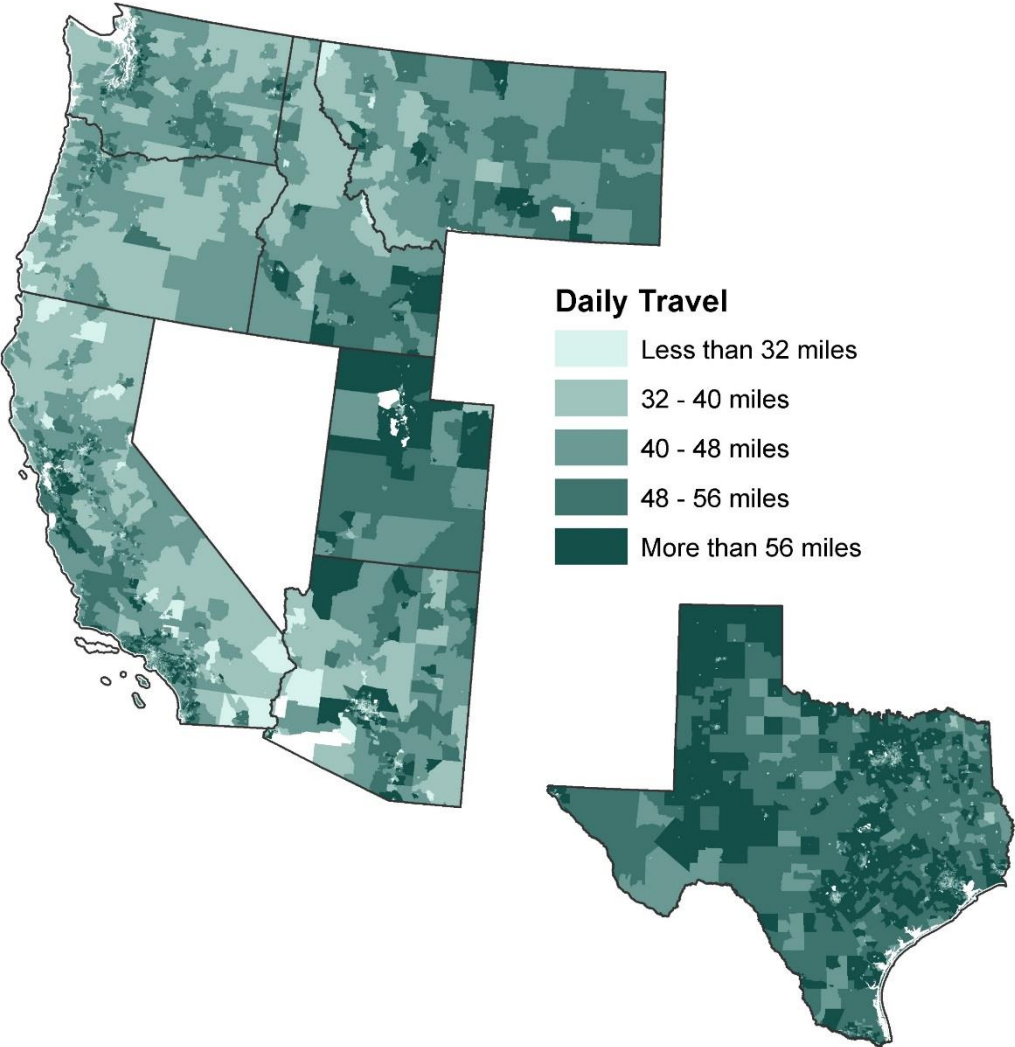
Daily VMT by Household



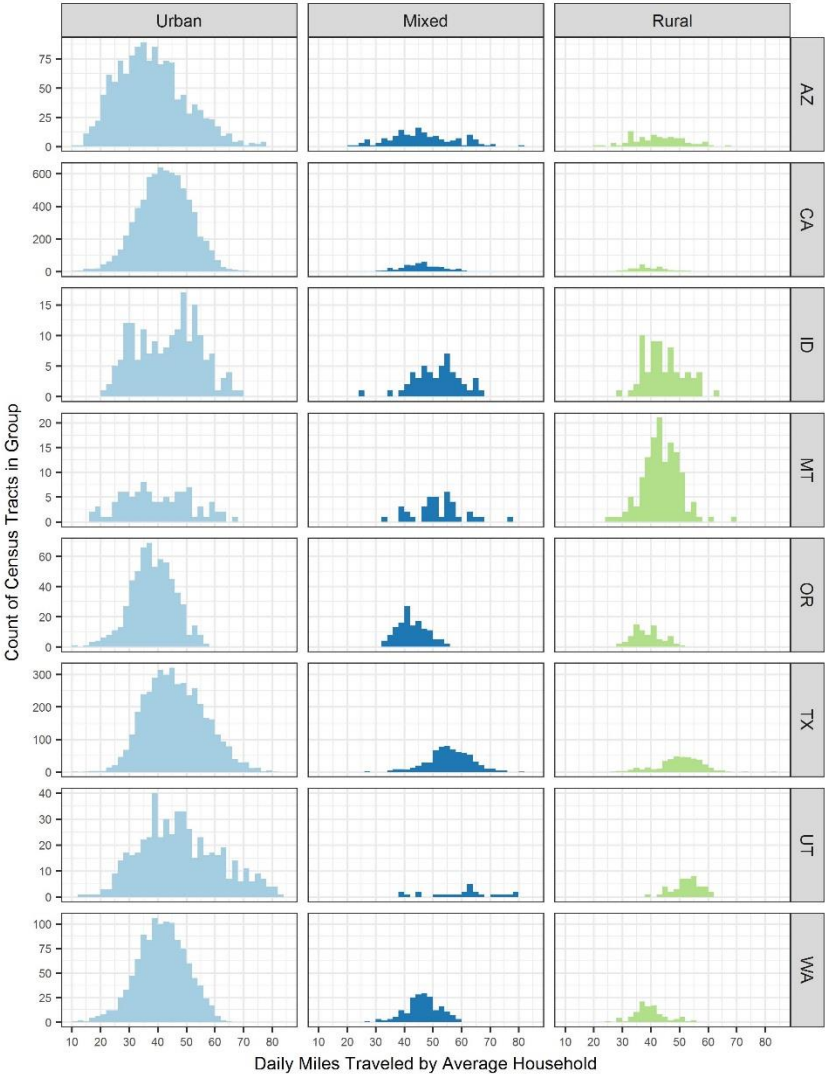
Estimated Trip Making Behavior (Distance) in 8 States



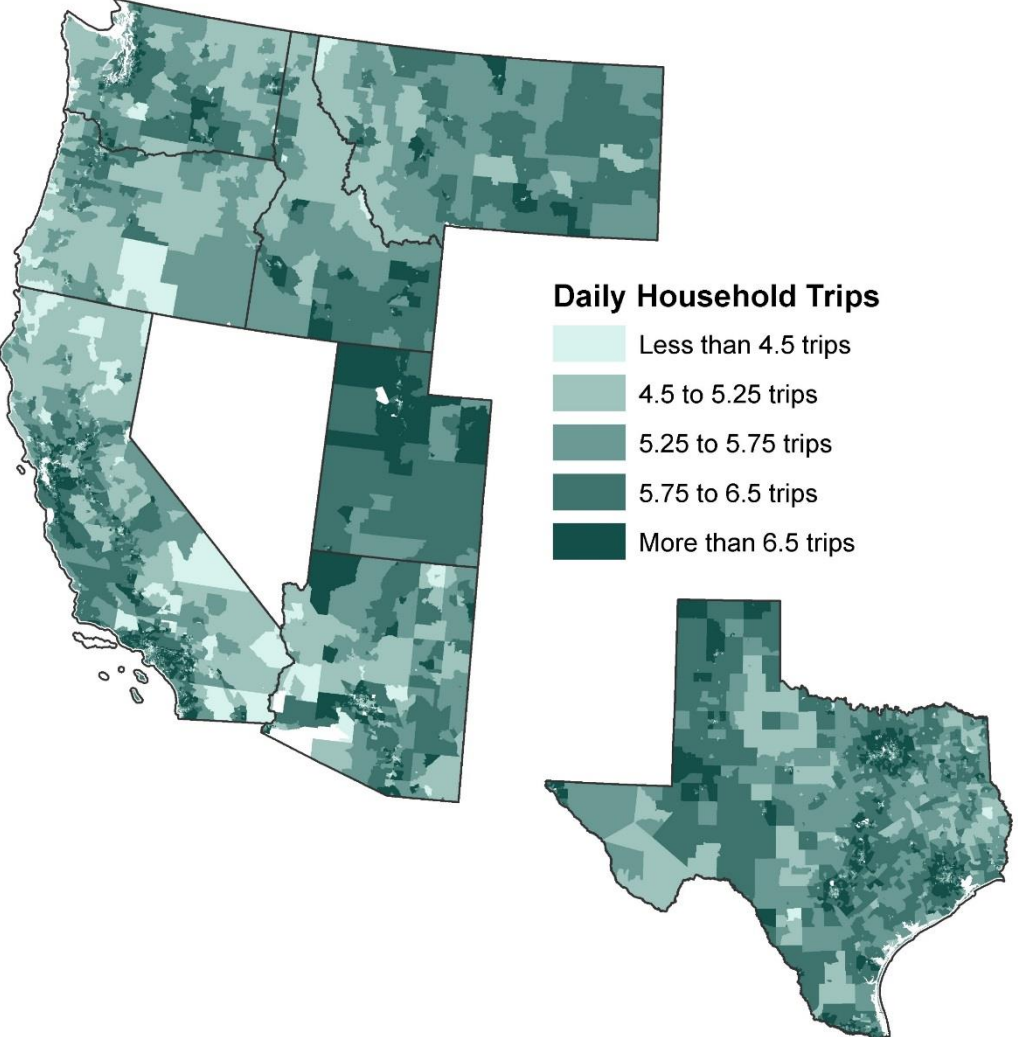
Daily VMT by Household



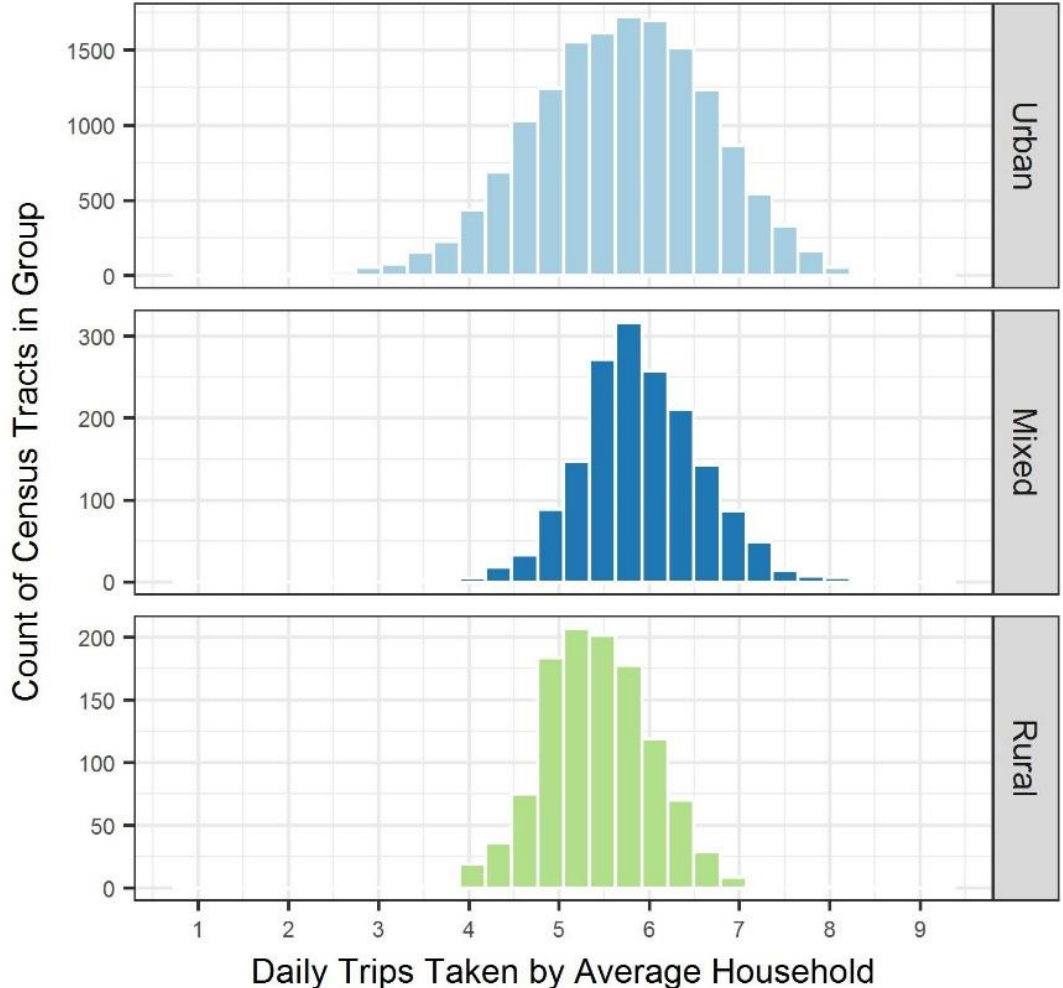
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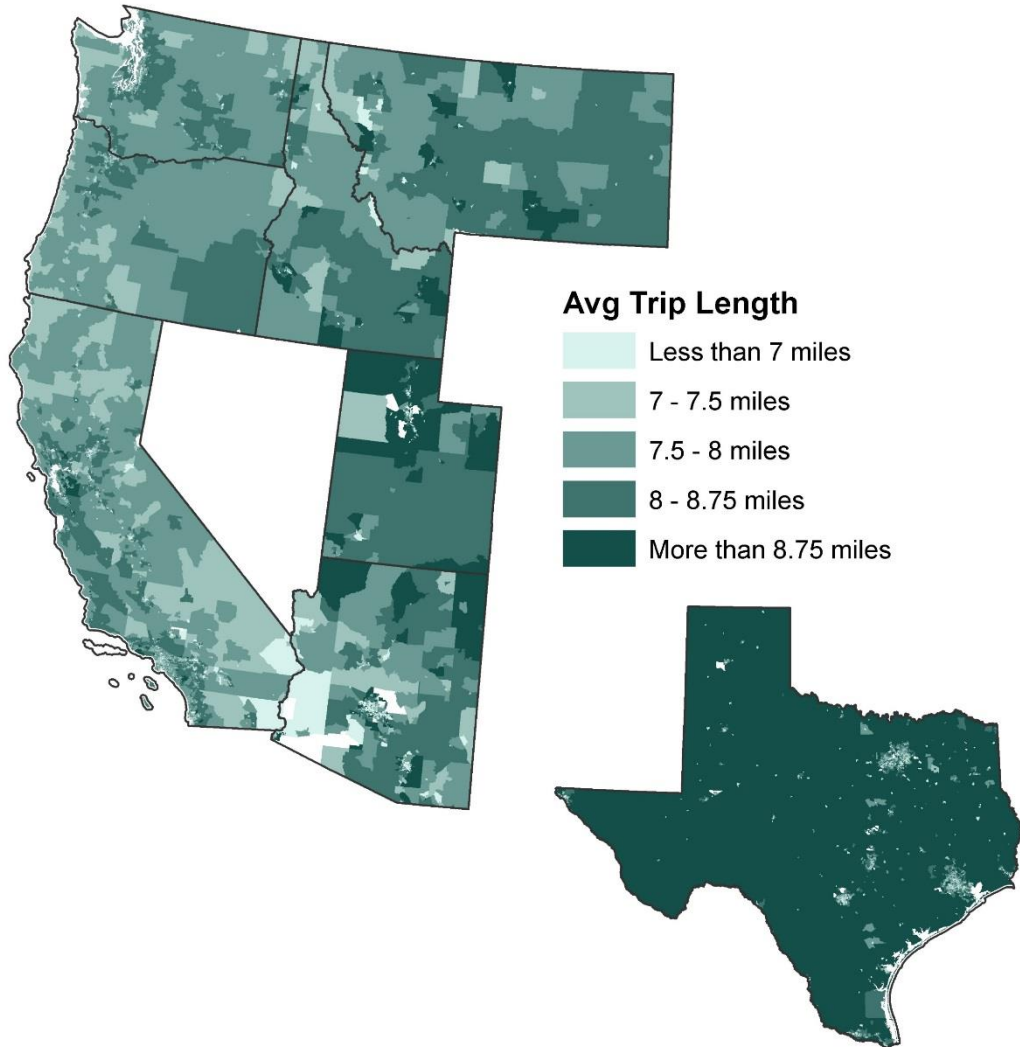
Daily Trips by Household



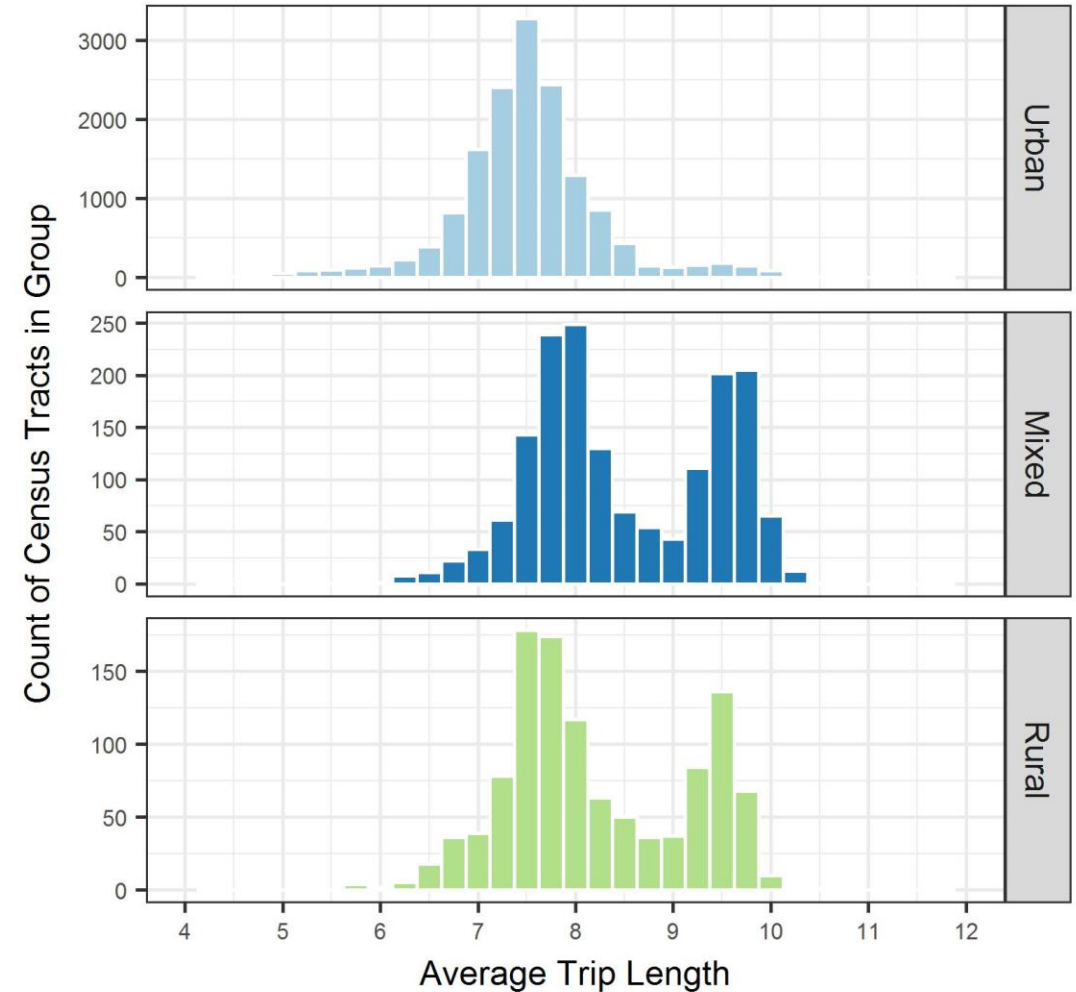
Estimated Daily Trips Taken in 8 States



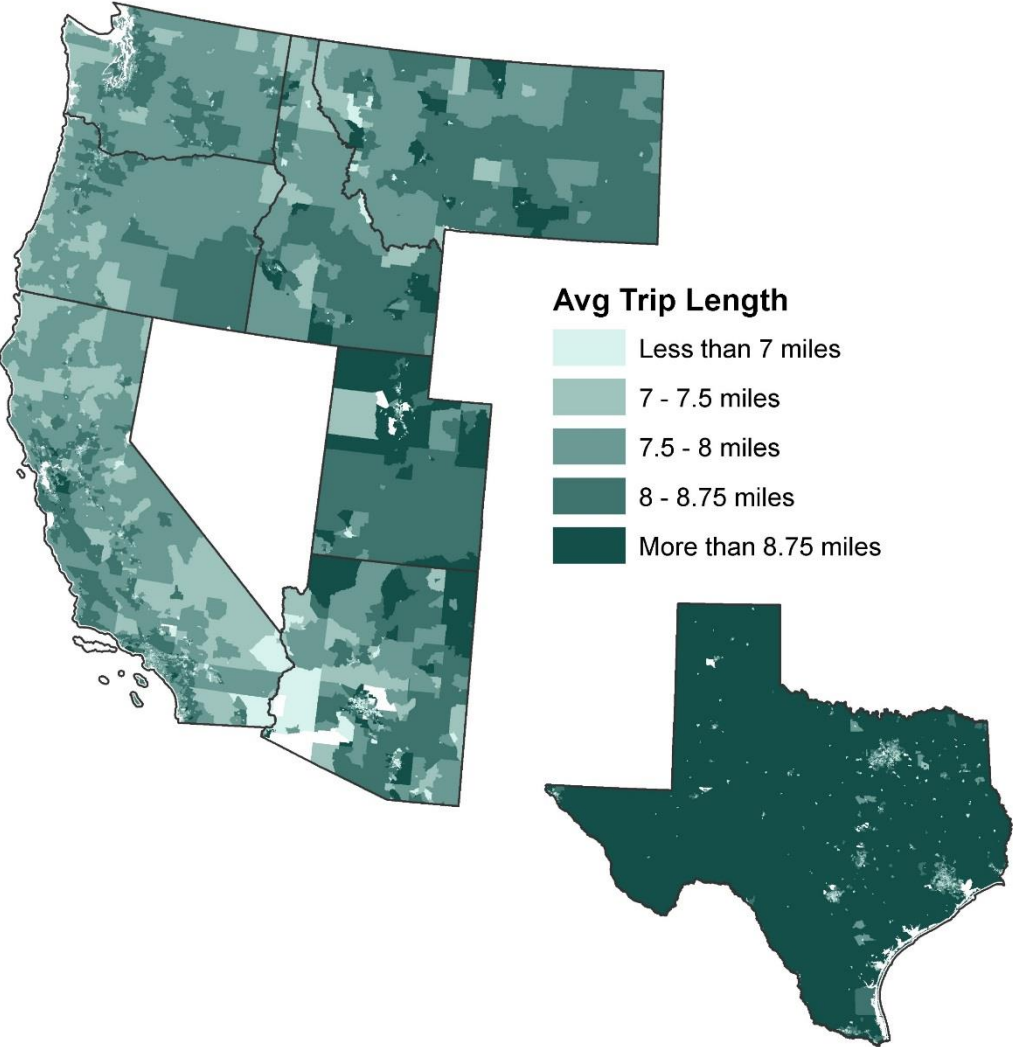
Average Trip Length



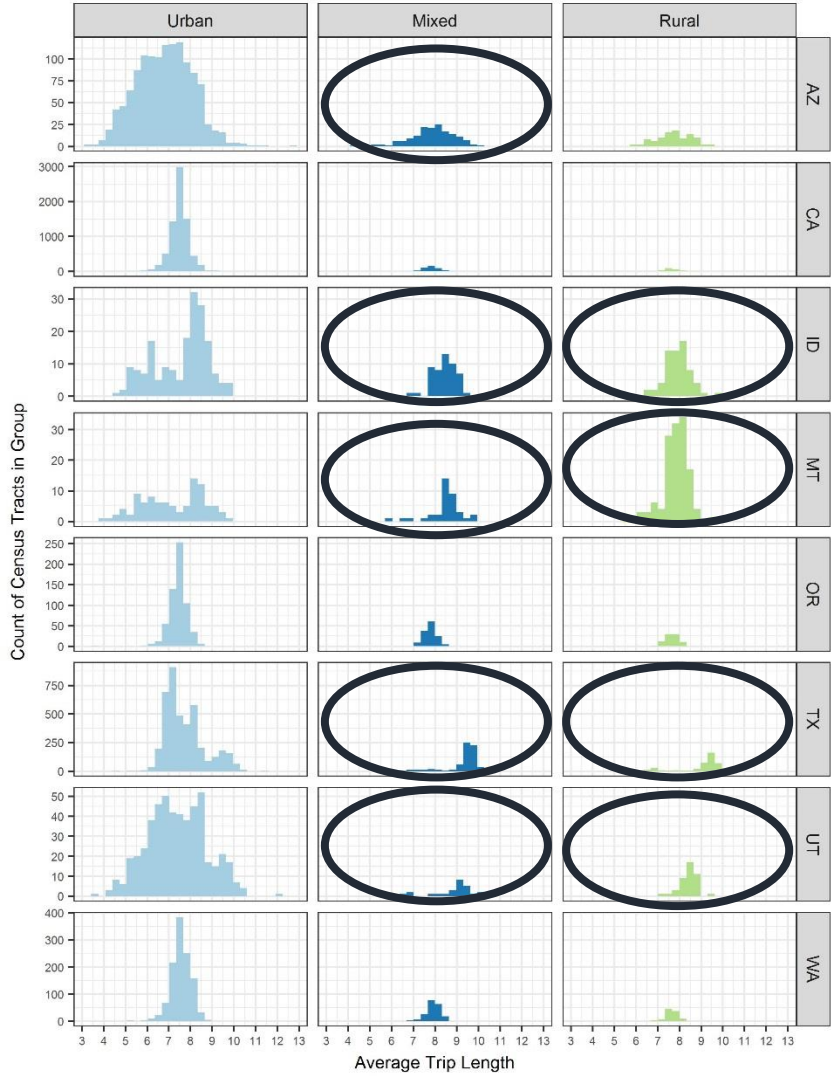
Estimated Average Trip Length in 8 States



Average Trip Length



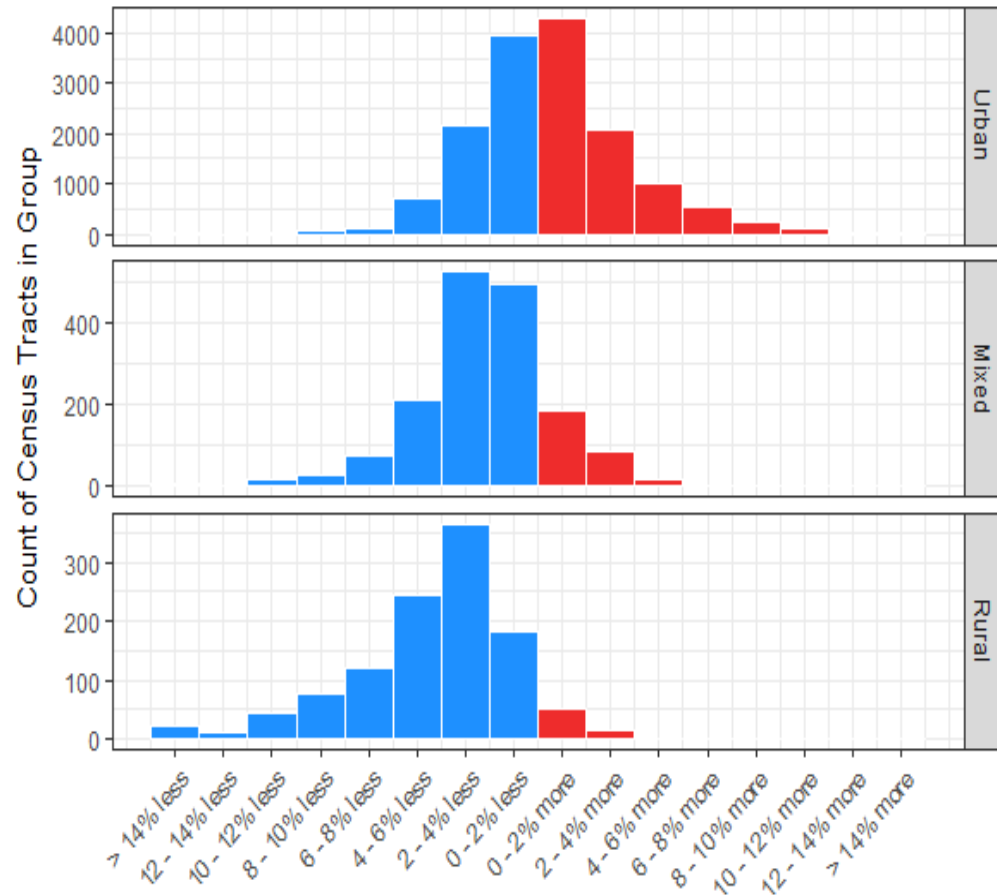
Estimated Average Trip Length in 8 States



RUC Charges by U/M/R Census Tracts

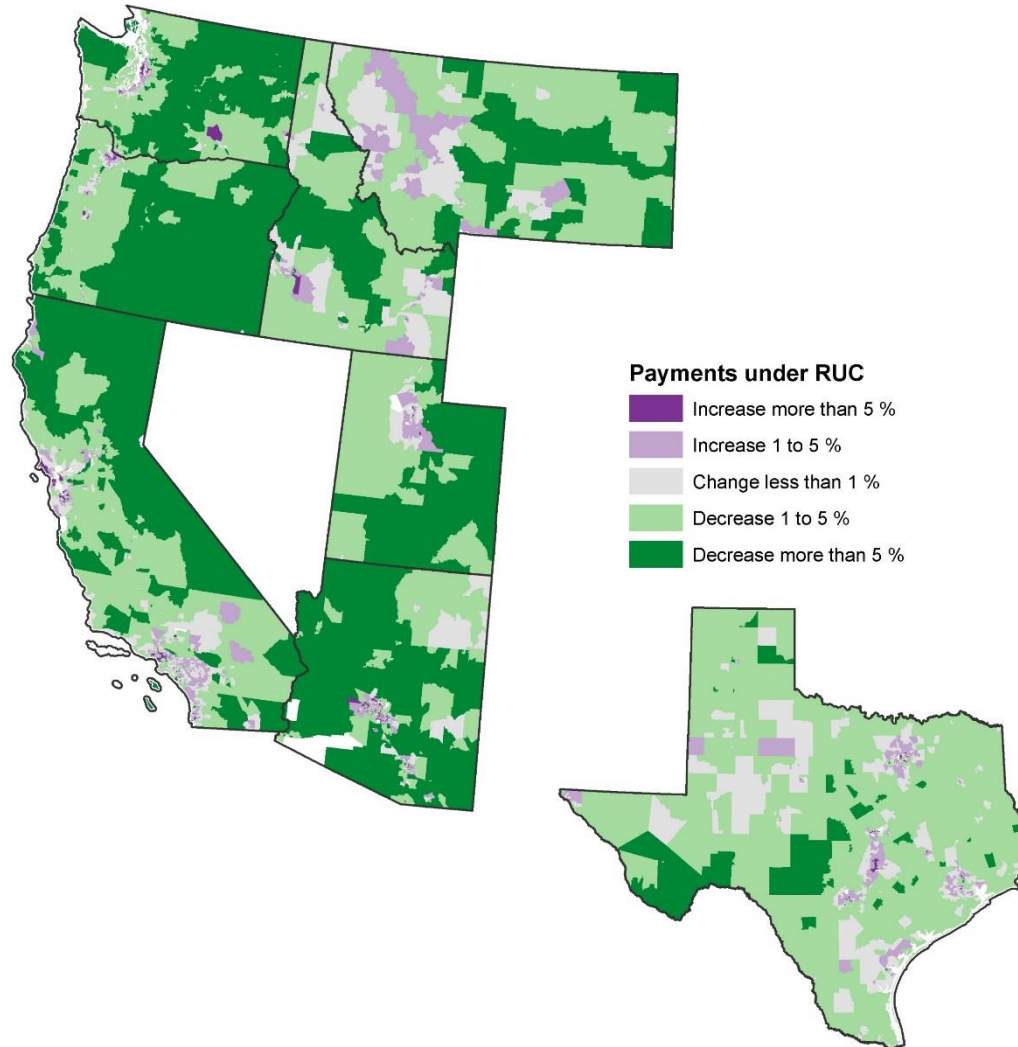
Effect of a RUC on Household Payments in 8 States

Calculated by Census Tract for the Average Household



- Even within similar geographic groups (e.g., urban, mixed and rural), households in some census tracts pay more, and other less
- Most pay in a range of +/- 4% of their current gas tax
 - Average annual gas taxes paid per vehicle range from \$160 per year in AZ to \$340 per year in WA
 - Average for the 8 states is \$250 per year
- There were over 14,000 census tracts in the 8-state study area.
 - Households in less than 100 rural census tracts and less than 300 mixed census tracts would pay more under a RUC

Geographic Distribution of Results

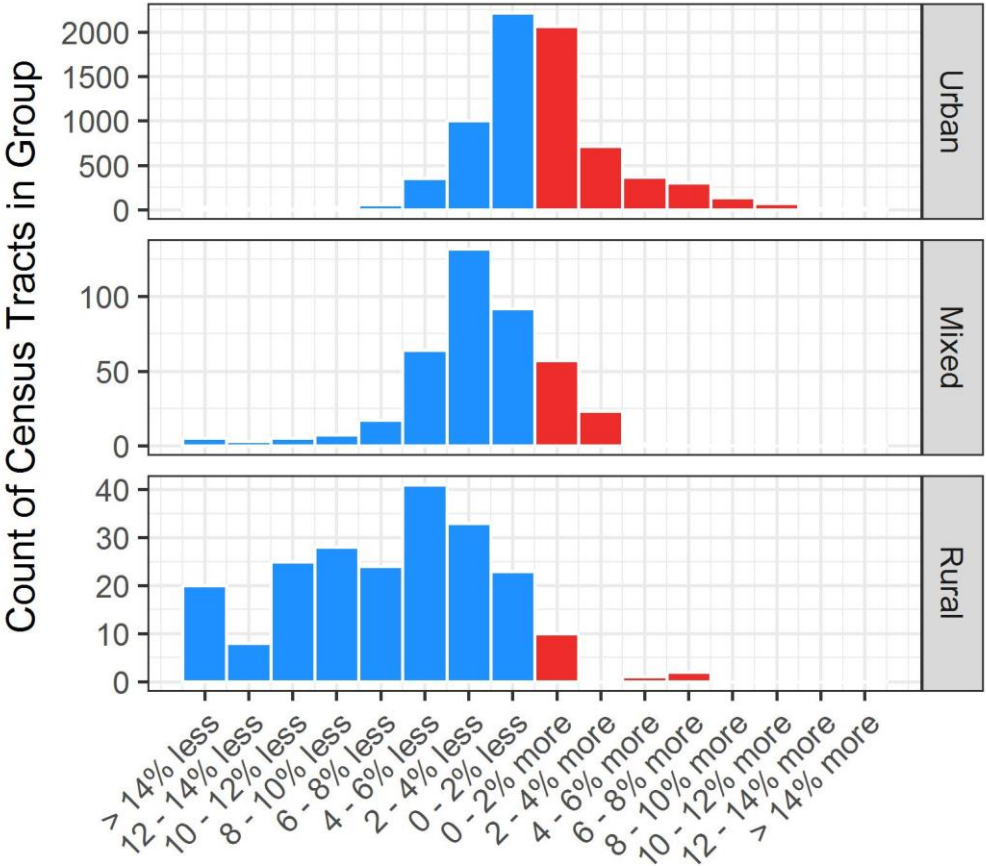


- Increases more than five percent primarily occur in urban areas where fuel efficient gas vehicles, hybrids and electric vehicles are most common
- Decreases of more than five percent accrue to households in rural areas with predominantly gas-powered vehicles
- Vehicle fleet composition, frequency of travel and length of trips determine the relative costs of a RUC
- Most RUC-based revenues are generated in urban areas since most vehicular travel (total vehicle miles traveled) occurs there

California and Texas – Large Urban VMT

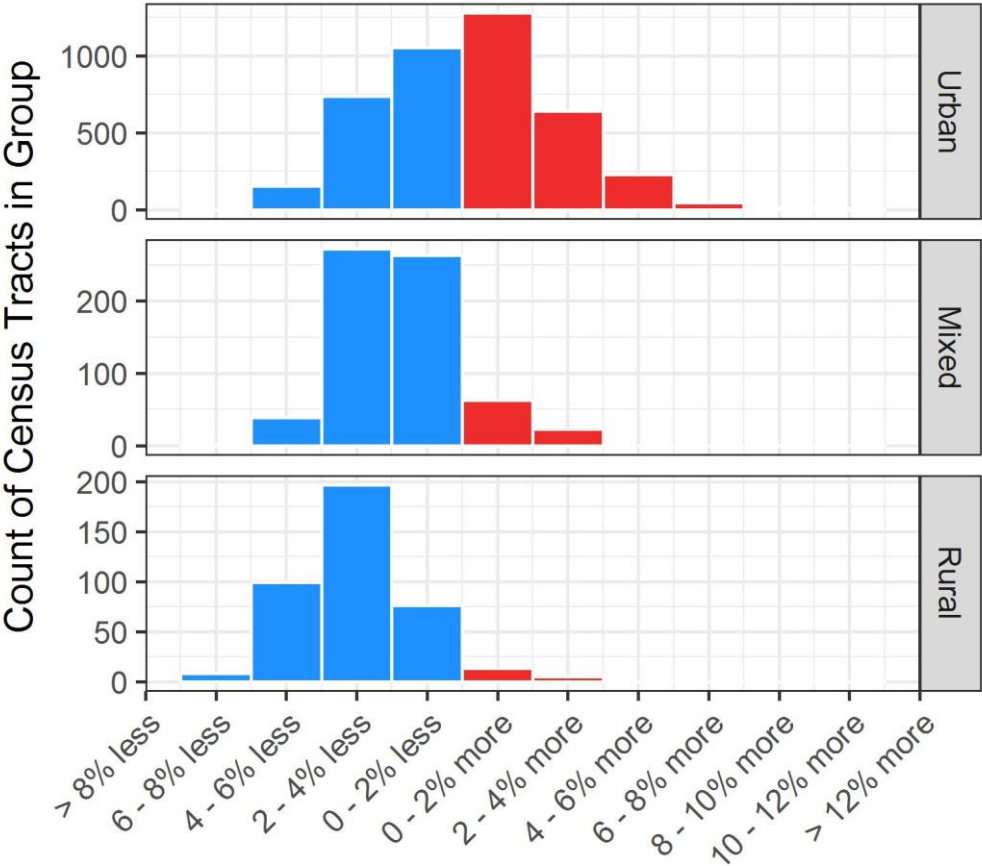
Effect of a RUC on Payments in CA

Calculated by Census Tract for the Average Household

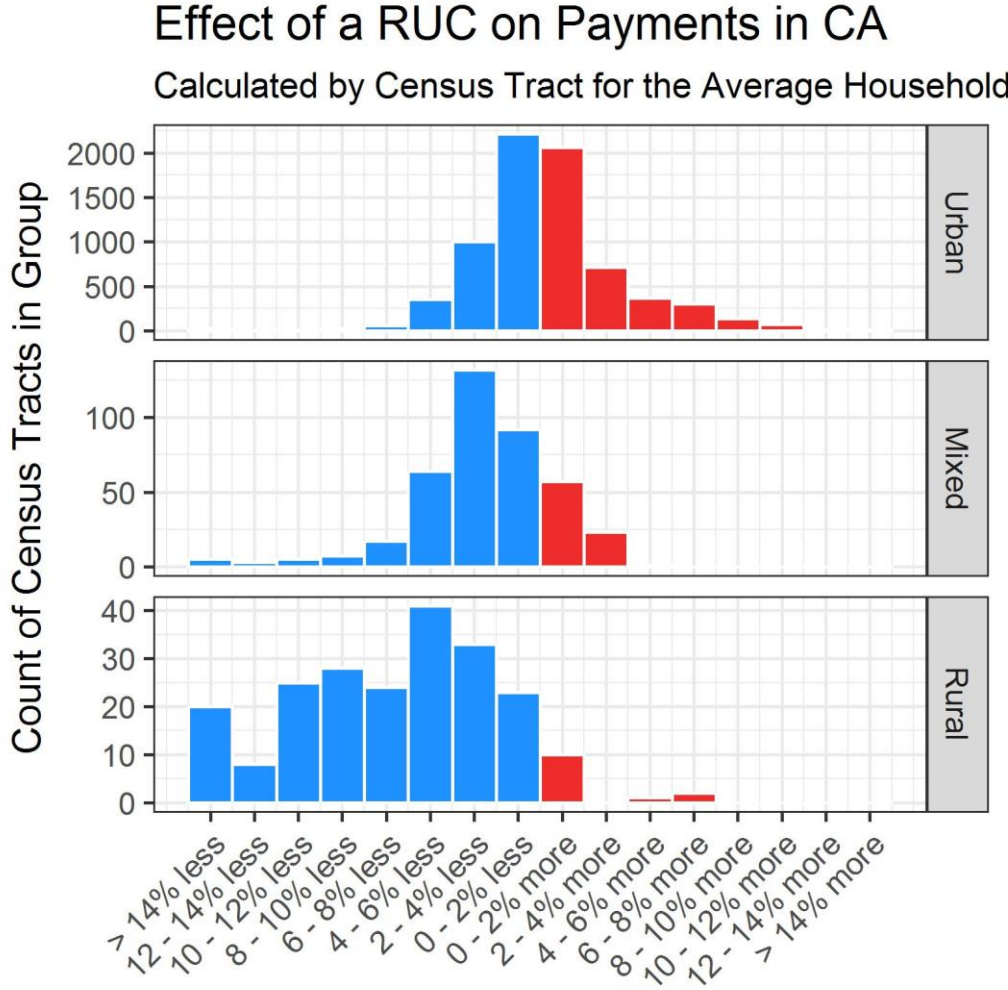
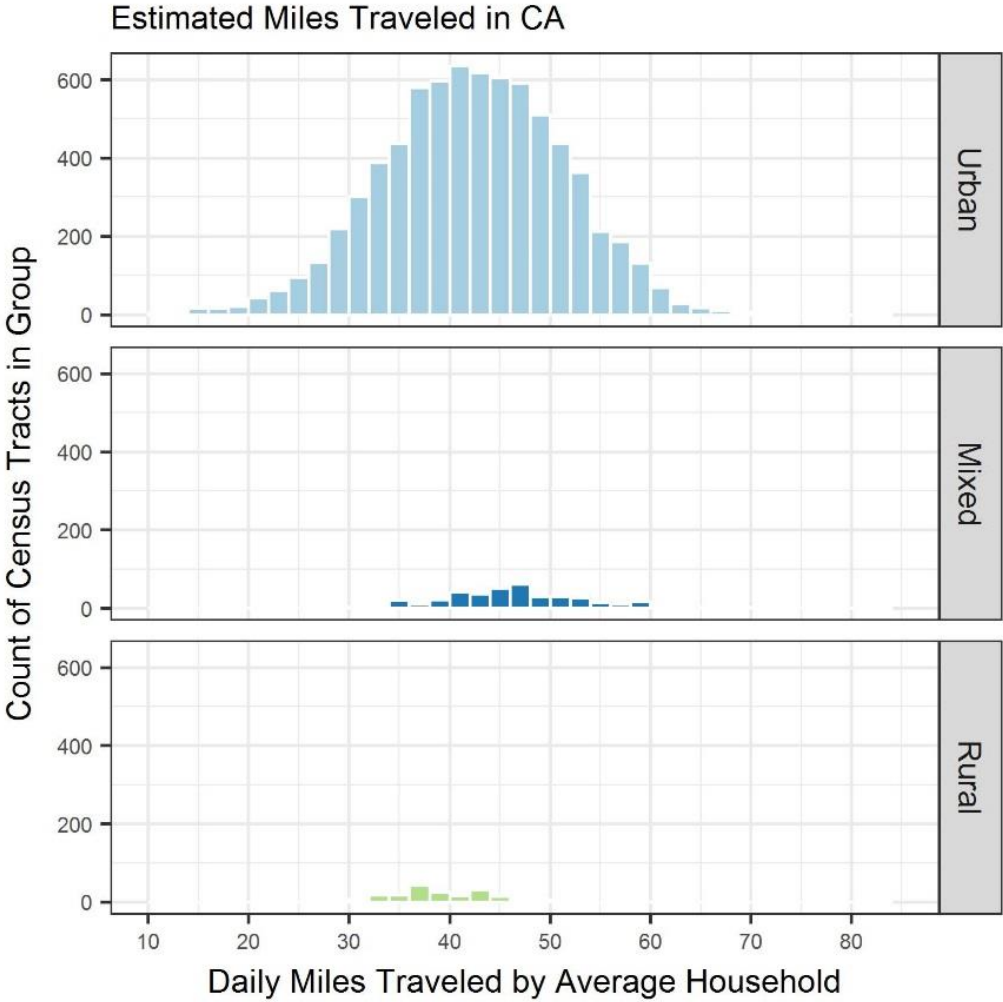


Effect of a RUC on Payments in TX

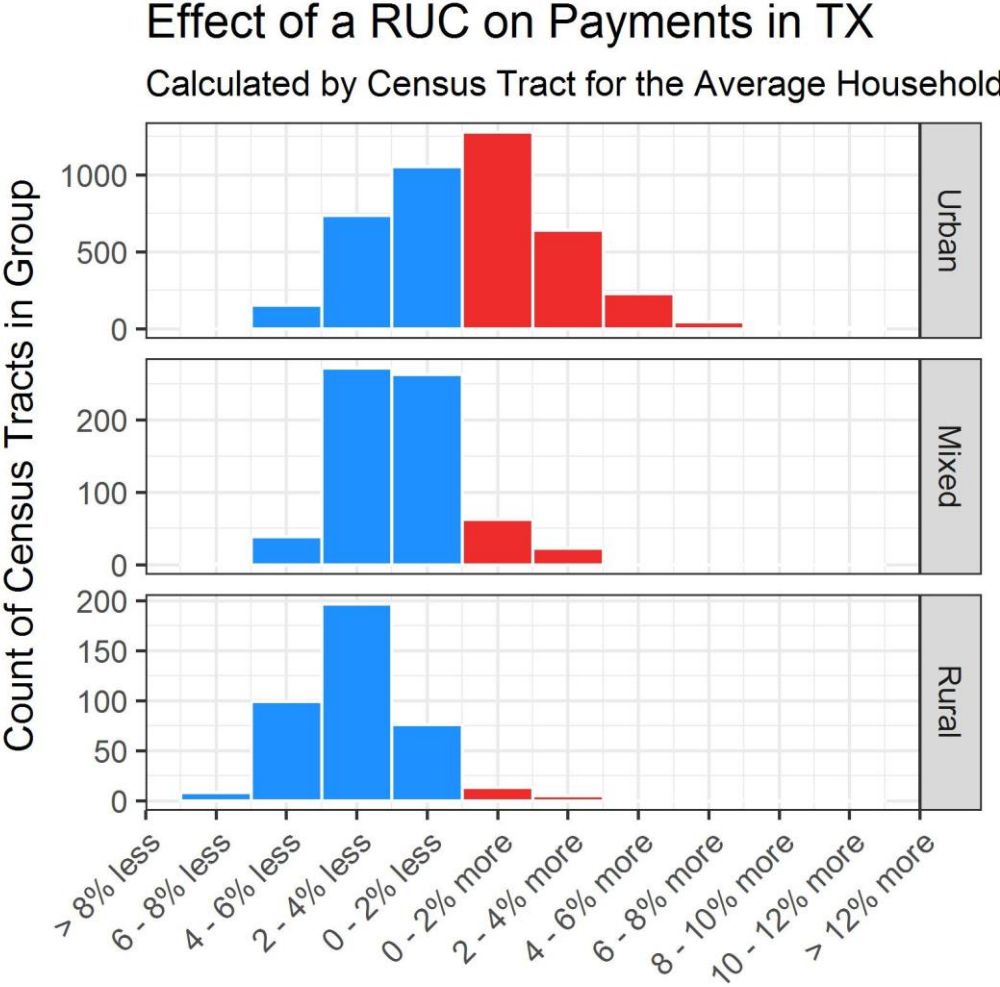
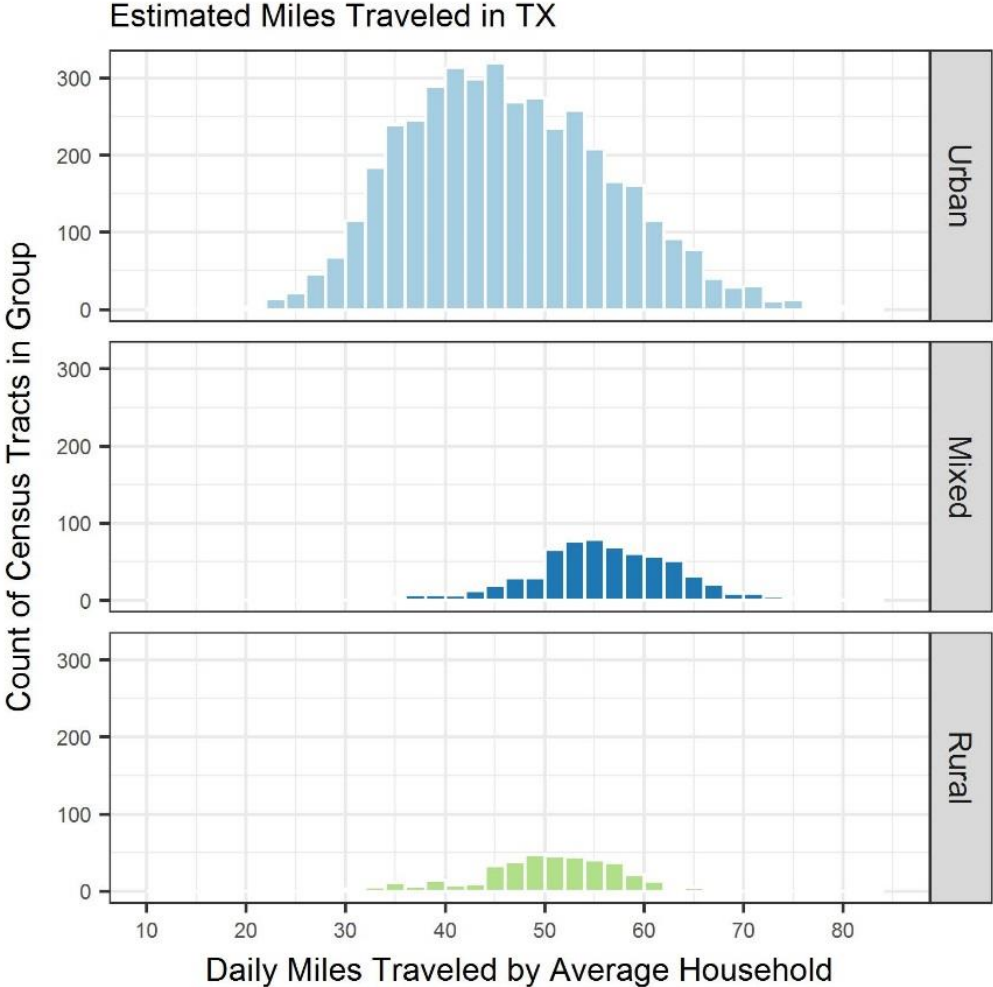
Calculated by Census Tract for the Average Household



California VMT and RUC Payments



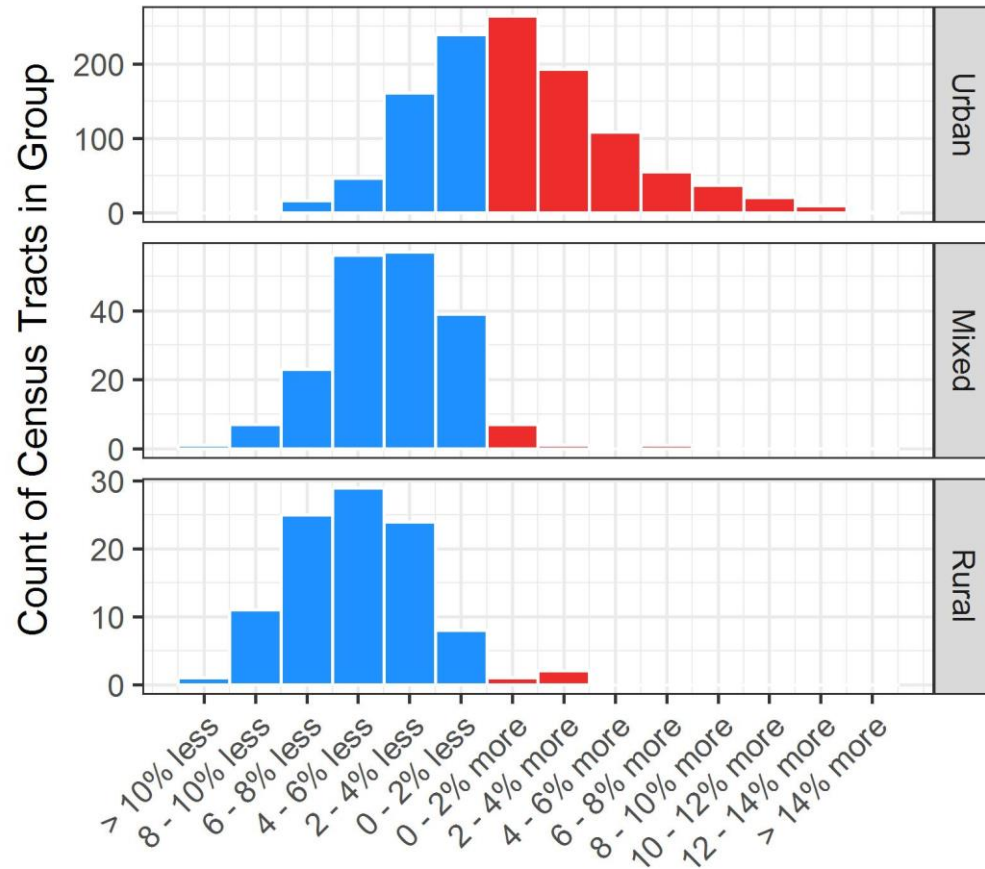
Texas VMT and RUC Payments



WA and OR – High Urban VMT+More Non-Gas

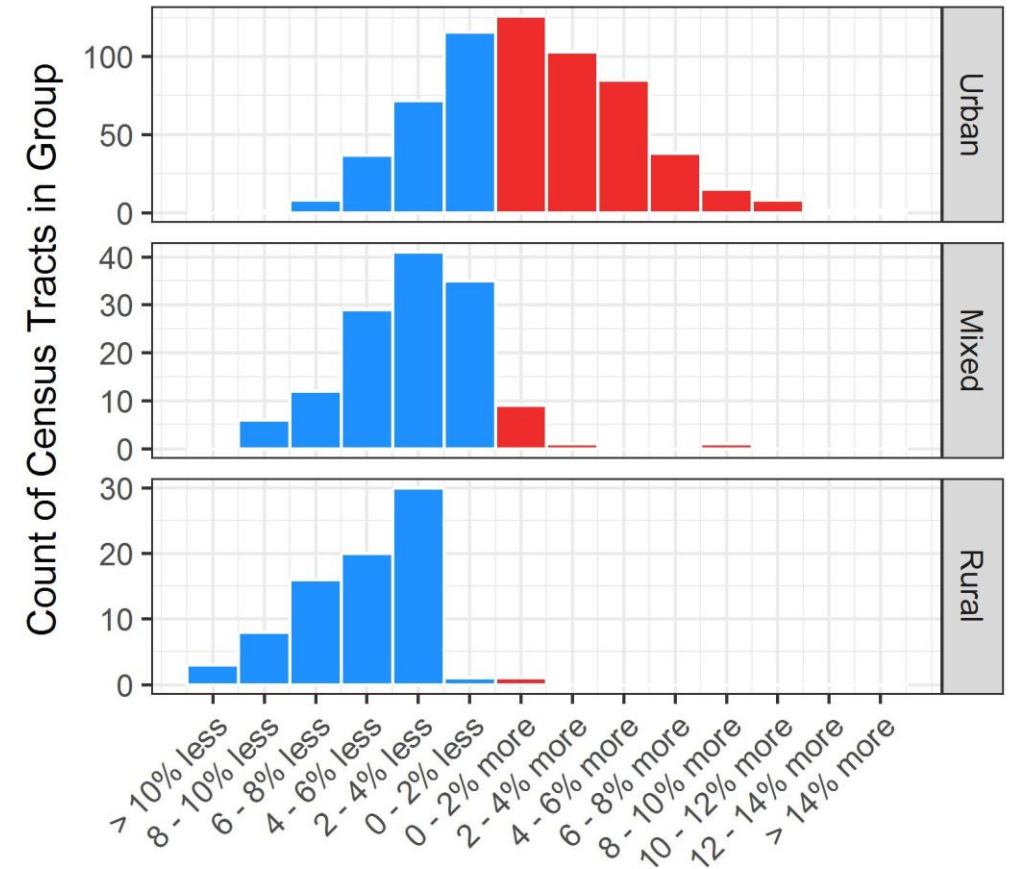
Effect of a RUC on Payments in WA

Calculated by Census Tract for the Average Household



Effect of a RUC on Payments in OR

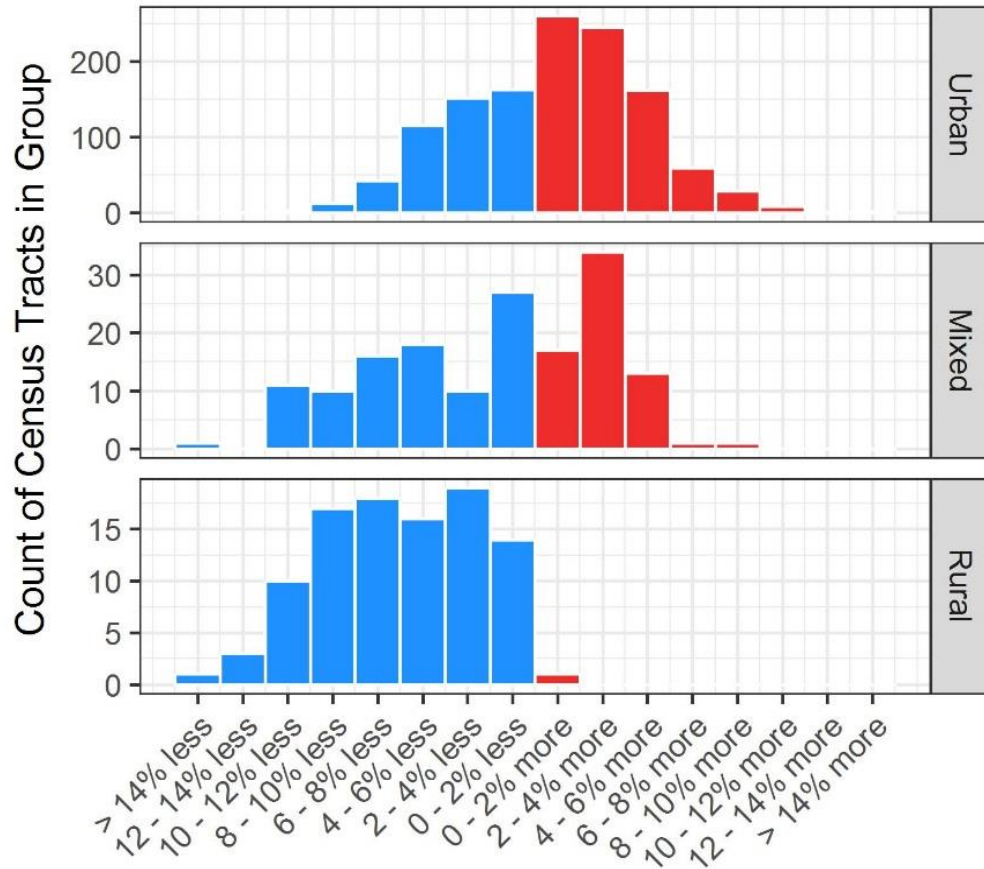
Calculated by Census Tract for the Average Household



AZ and UT – High VMT in Urban Census Tracts

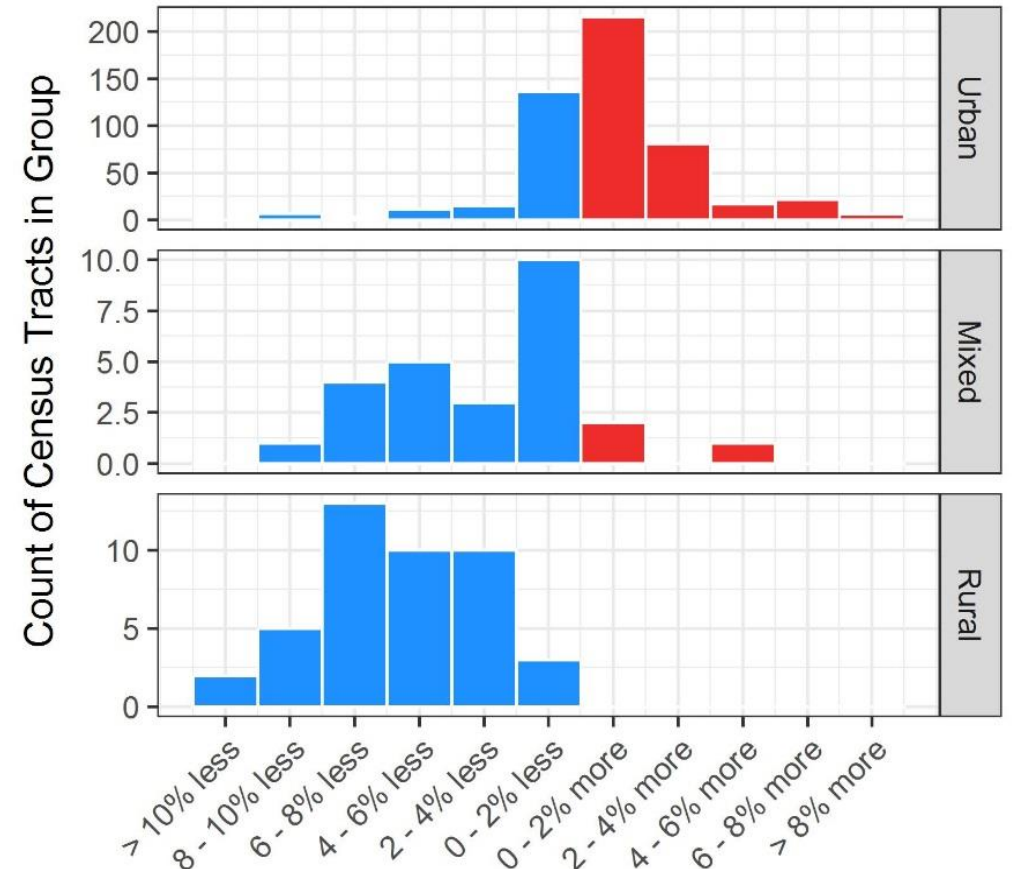
Effect of a RUC on Payments in AZ

Calculated by Census Tract for the Average Household



Effect of a RUC on Payments in UT

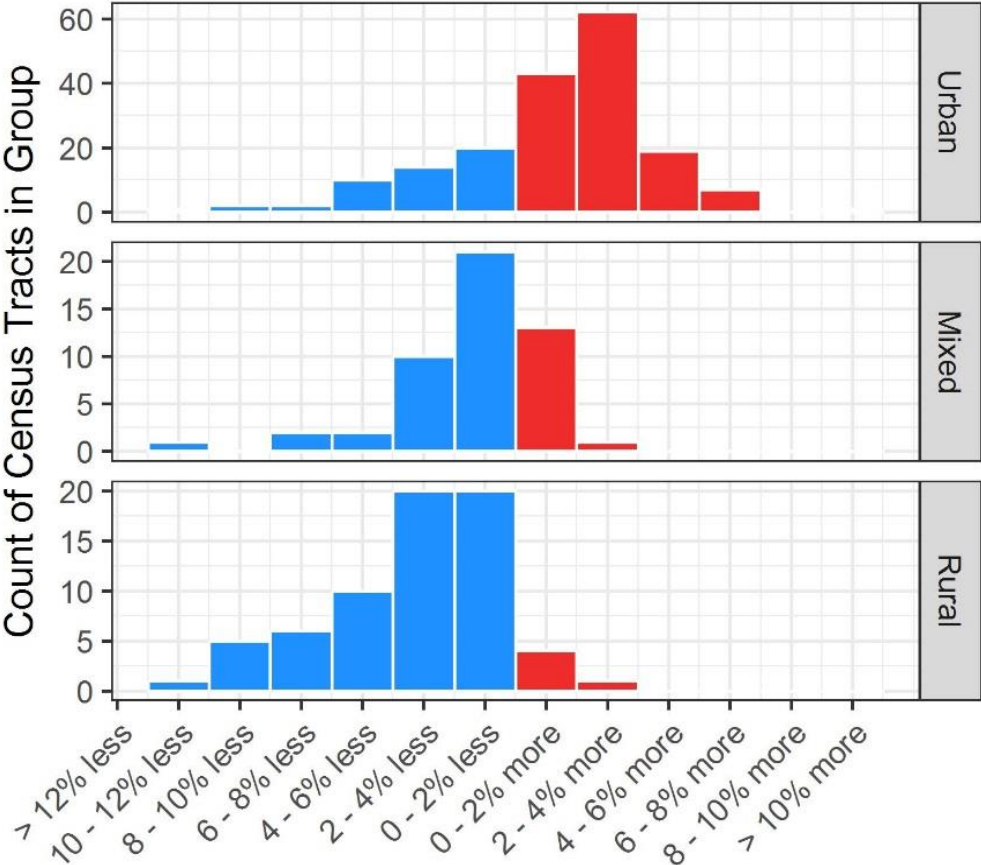
Calculated by Census Tract for the Average Household



ID and MT – Rural VMT/Rural Non-Gas

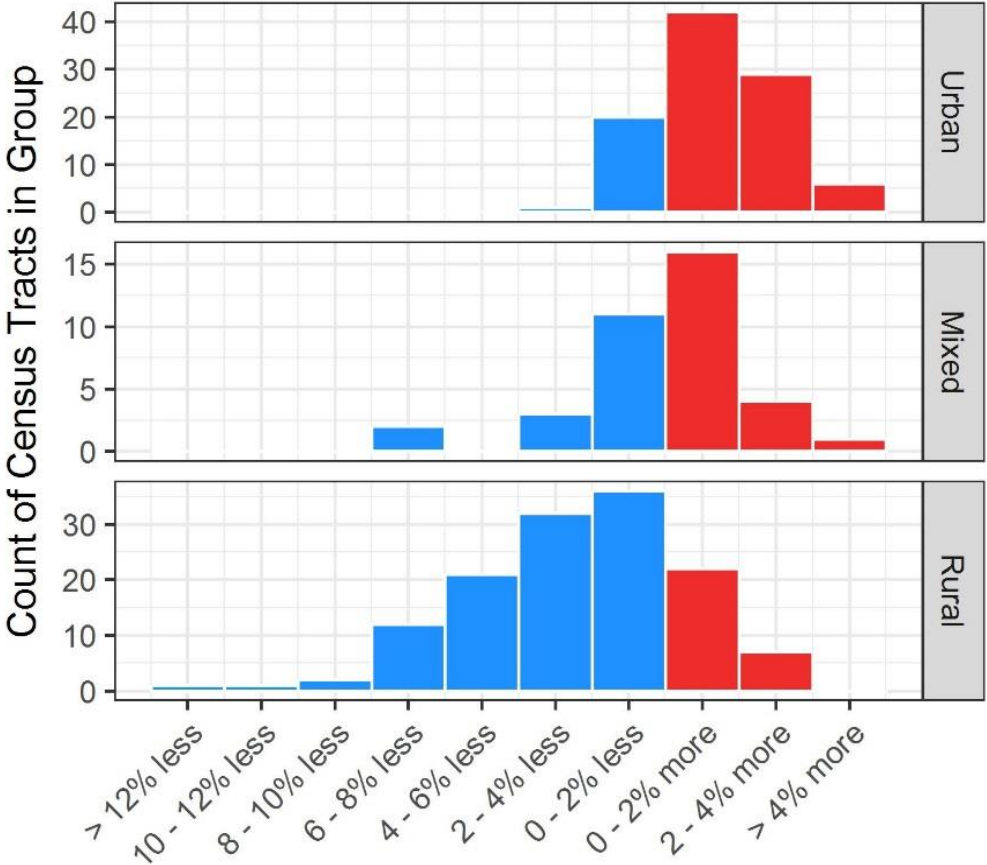
Effect of a RUC on Payments in ID

Calculated by Census Tract for the Average Household

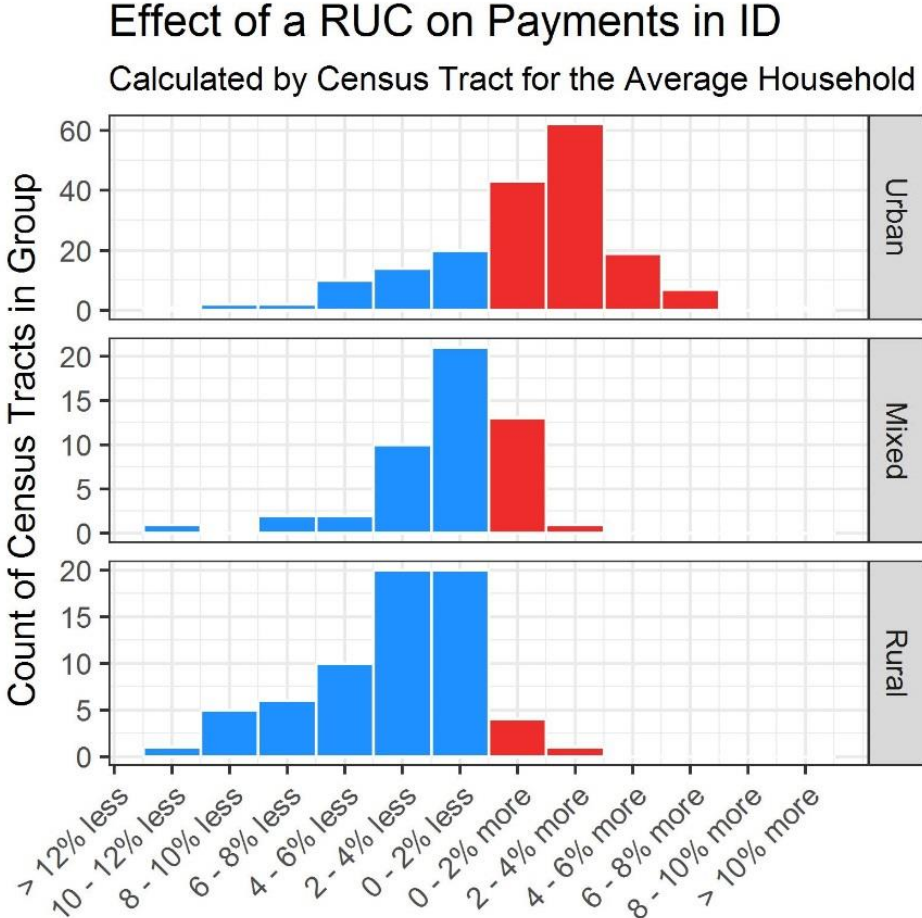
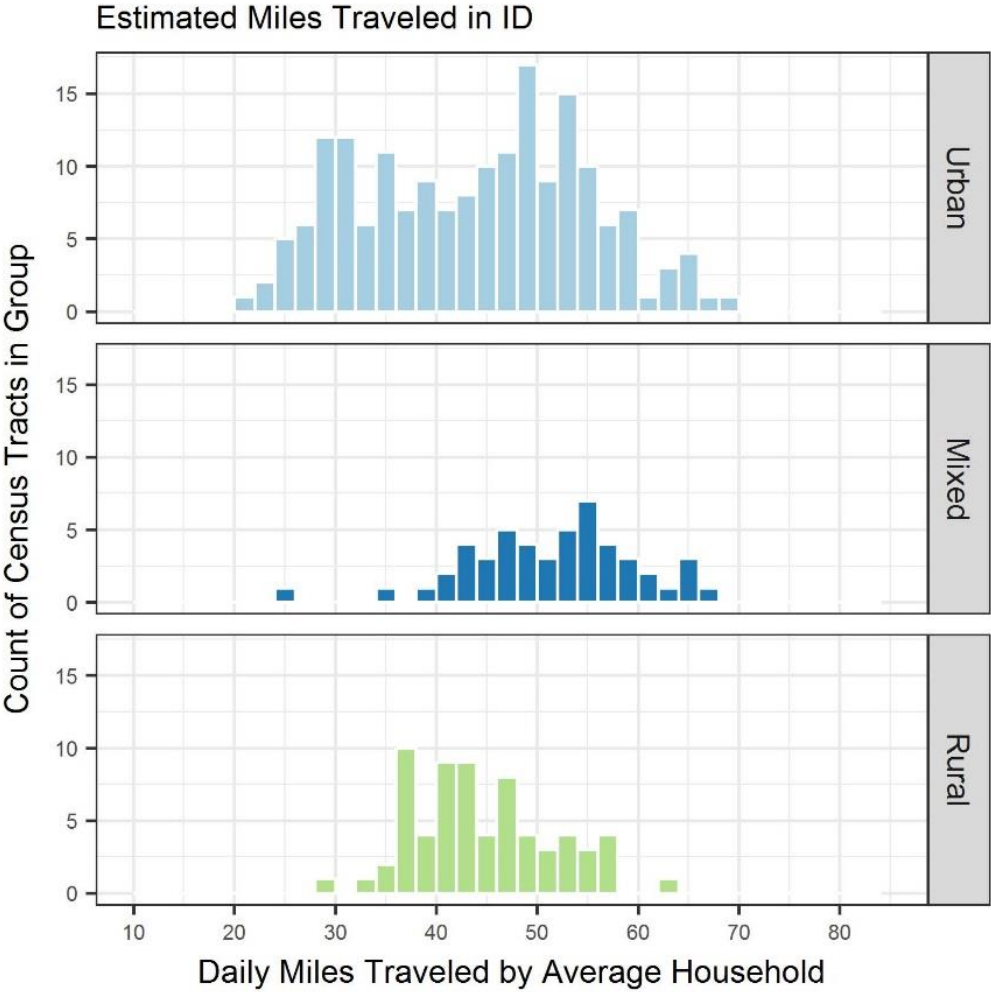


Effect of a RUC on Payments in MT

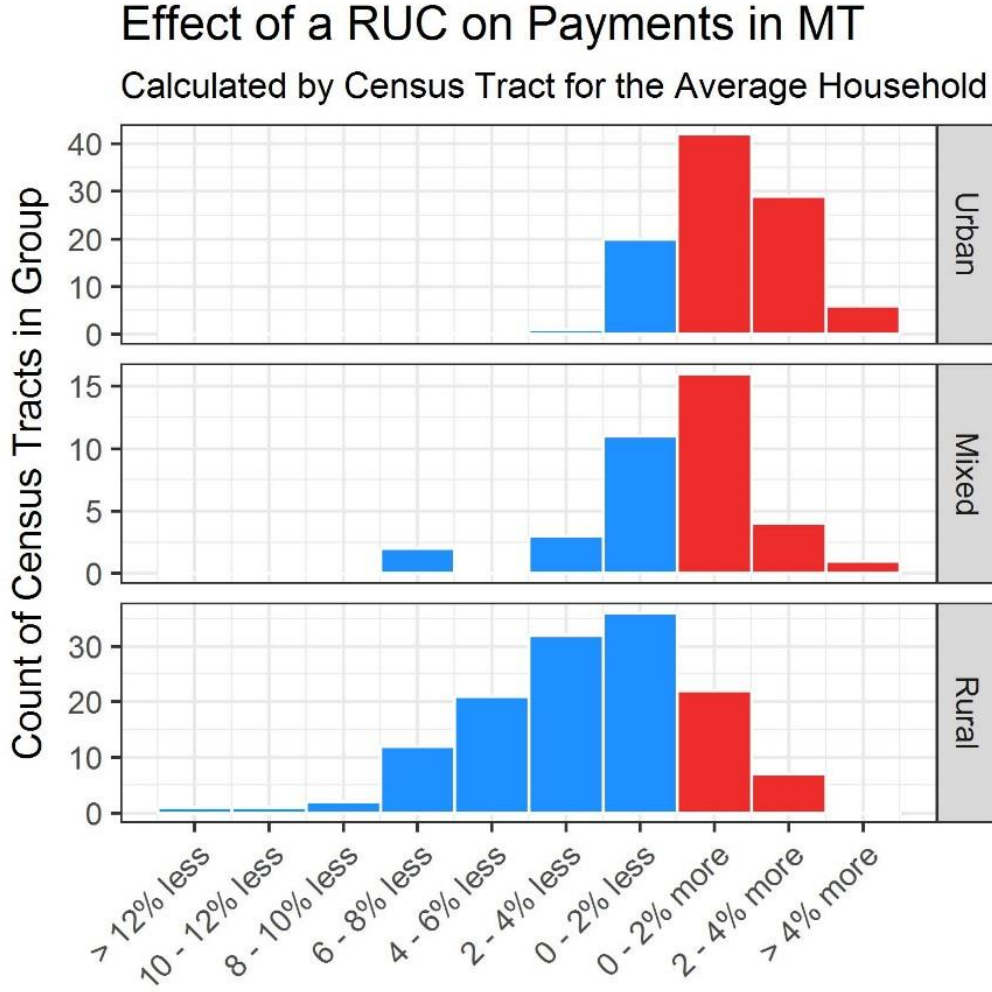
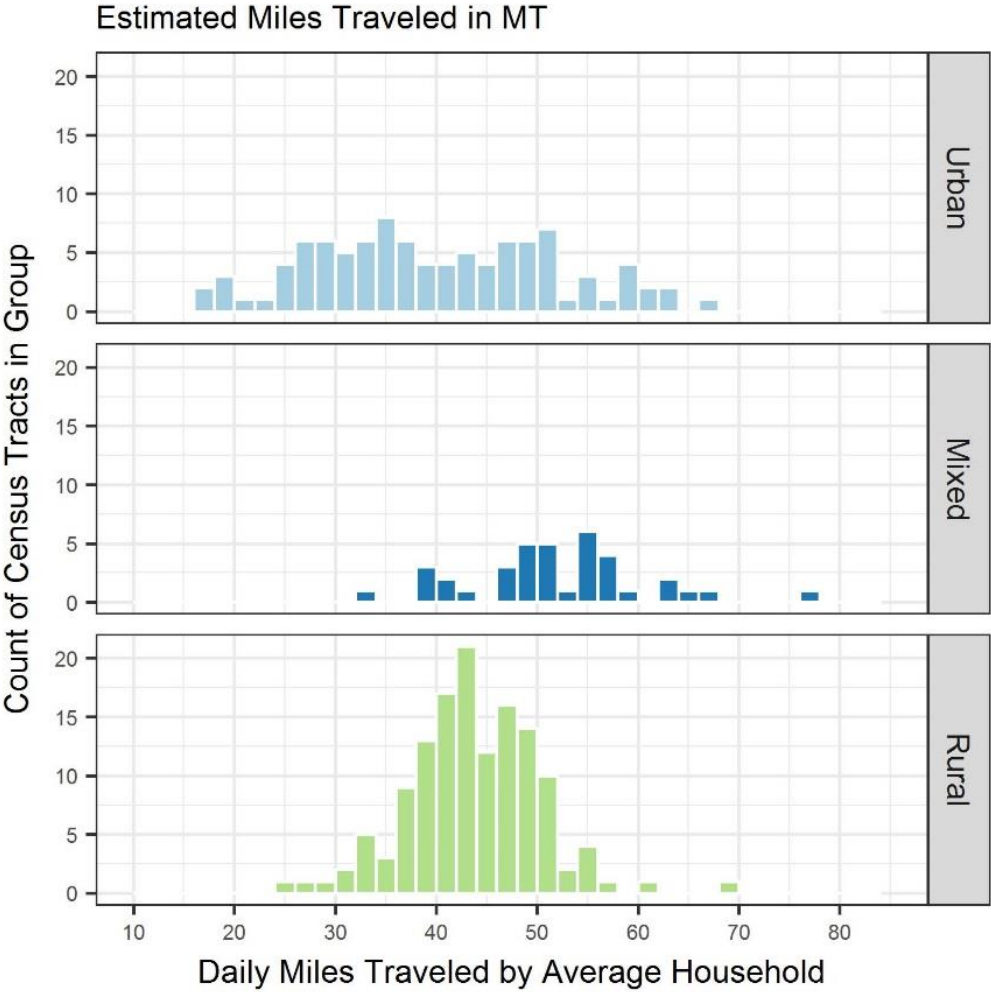
Calculated by Census Tract for the Average Household



Idaho RUC and Underlying Travel Patterns



Montana RUC and Travel Patterns



Summary of Findings

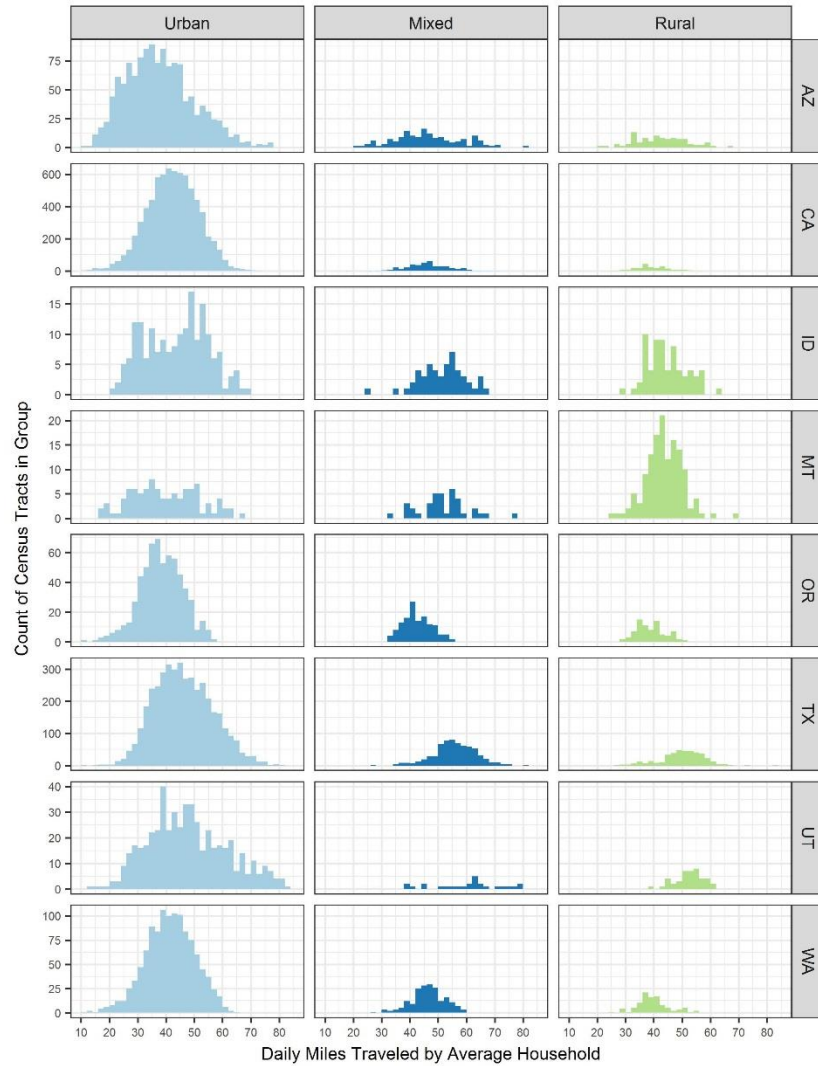
- Households in rural and mixed areas would pay slightly less than under existing gas taxes
 - Estimated annual gas taxes per vehicle range from \$157 (AZ) to \$340 (W)
- Mileage-based charges capture alternate-fuel vehicles not paying their share of costs
 - About 11% of VMT, but varies by state
- RUC-based revenues will not decline as fleet efficiency improves
 - Variations in VMT, including economic and travel innovations
- Amounts paid would depend more on travel behavior than choice of vehicle

Concluding Thoughts on RUCs

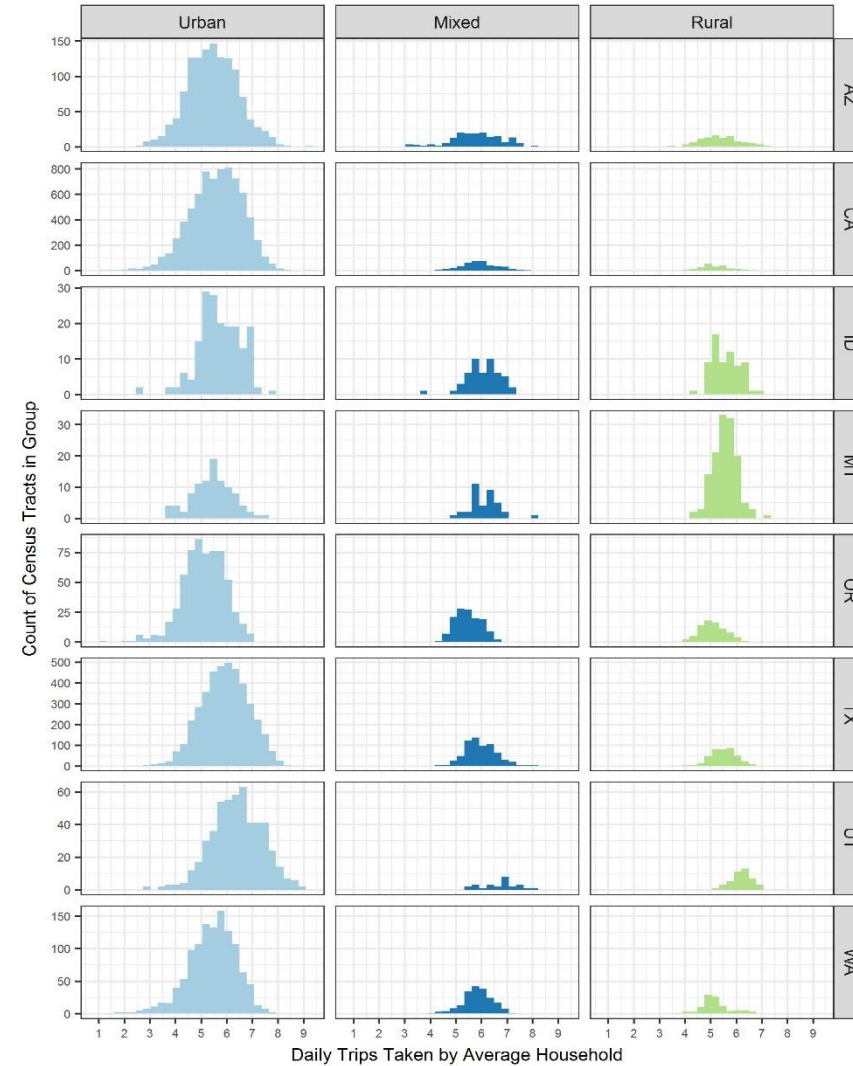
- Public understanding and education will be vital to transition
- Changes in fuel efficiency will continue to reduce current tax revenues
- Better registration and mileage information will be required
- Assuring privacy, fairness and accountability will be important policy considerations
- Coordination with other RUC West states will be needed for equitable distribution of RUC revenues for interstate travel

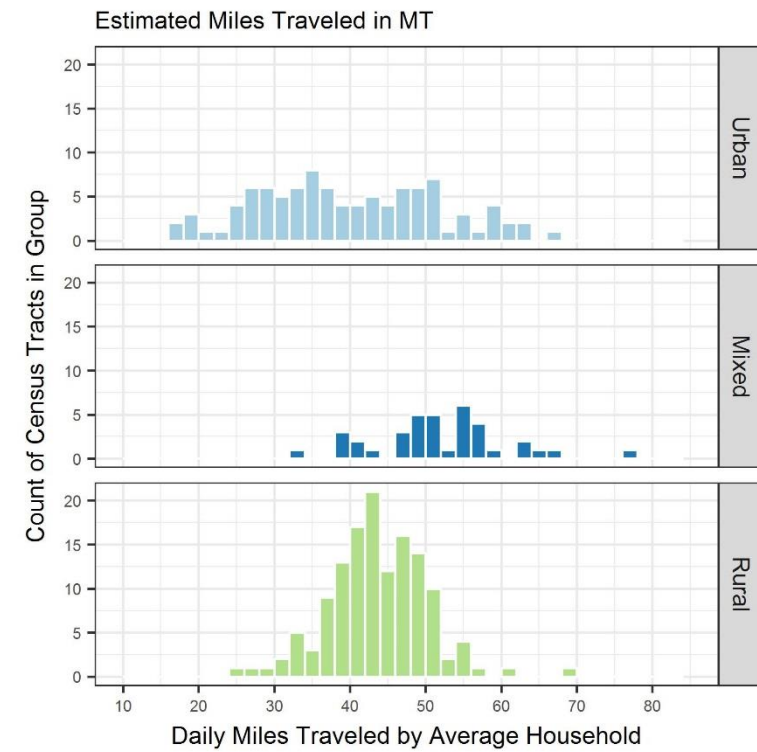
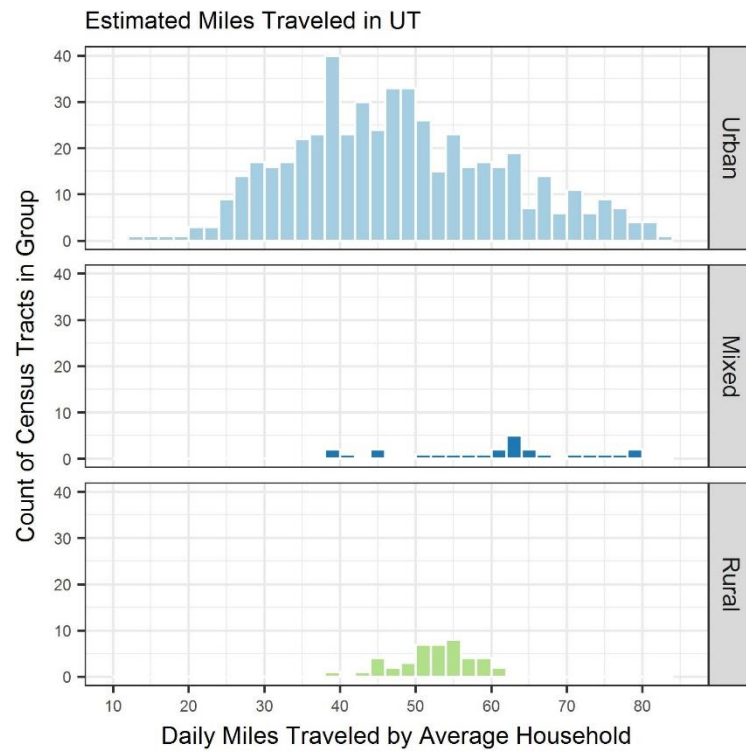


Estimated Trip Making Behavior (Distance) in 8 States

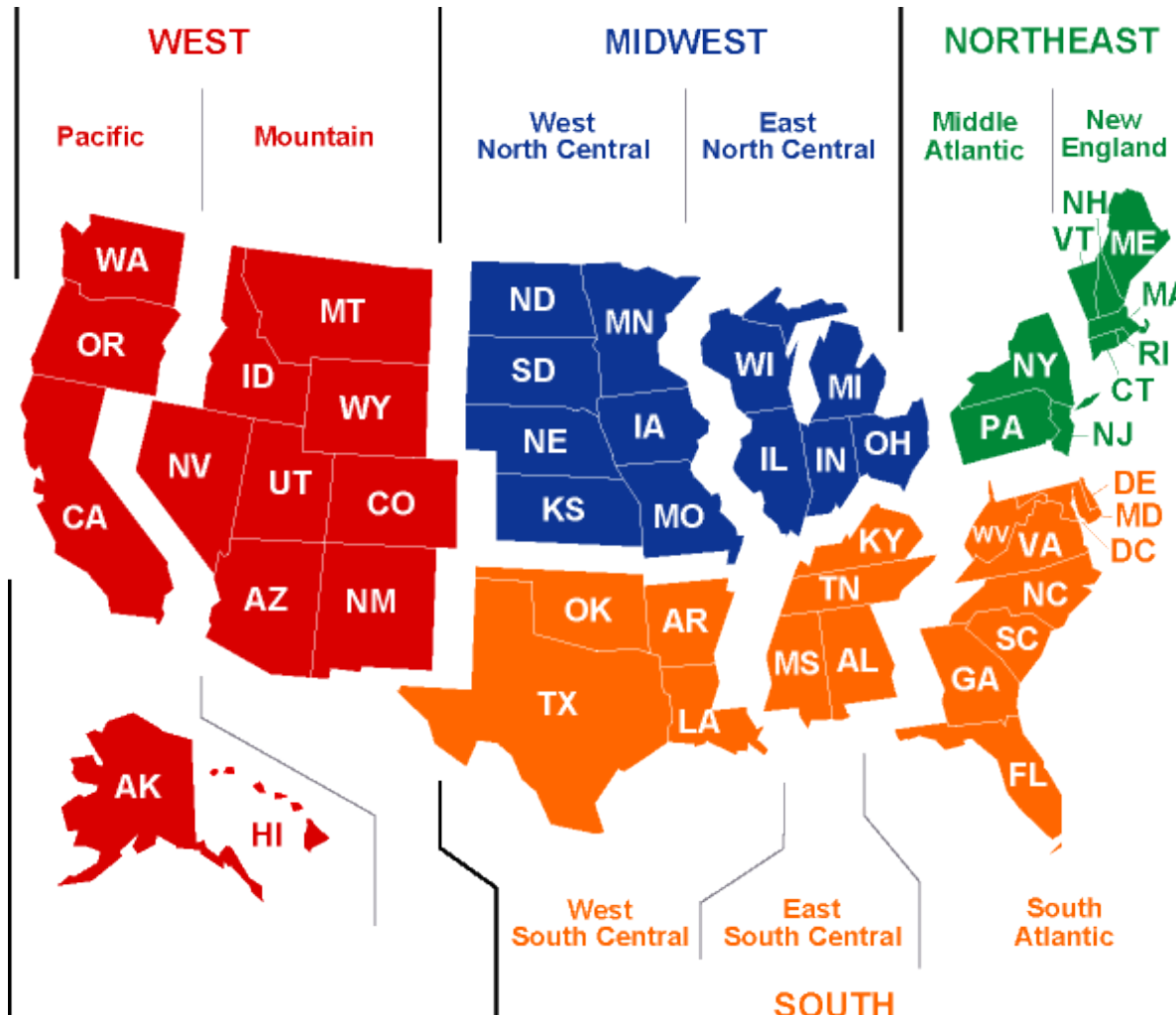


Estimated Daily Trips Taken in 8 States





Census Regions



Texas was the only state in the study to use regression estimates from the South Central area.

BTS grouped together two regions for their analysis, but TX represents a very significant portion of total samples due to its large population and an oversample as an add-on region of the NHTS.

Statewide VMT by Fuel Type (Billions Annually)

State	Electric/ Hydrogen	Hybrid	Flex fuel/ Biofuel	Other Fossil	Diesel	Total Non-Gas
Arizona	20.3	514.0	1,794.9	3.9	323.7	2,656.7
California	605.5	3,216.4	1,937.1	117.2	1,665.9	7,542.0
Idaho	1.1	67.4	395.3	0.7	178.3	642.9
Montana	0.0	63.5	275.9	0.8	695.0	1,035.1
Oregon	0.1	489.2	778.6	1.1	992.7	2,261.7
Texas	197.5	287.1	17,038.0	3,250.2	4,068.0	24,840.9
Utah	9.9	211.3	918.4	17.4	719.9	1,876.9
Washington	40.6	735.2	1,027.3	1.2	671.5	2,475.8