

## Rural Multimodal Planning

*Why and How to Improve Travel Options in Small Towns and Rural Communities*

8 August 2018

Todd Litman

*Victoria Transport Policy Institute*



*Many rural communities and small towns are improving walking, cycling, public transit and taxi services to provide mobility for non-drivers, improve public fitness and health, and support economic development.*

### Summary

Multimodal planning creates communities where it is possible to get around by walking, cycling and public transportation. This provides various direct and indirect benefits to individuals and communities. This report explores why and how to implement more multimodal planning in rural areas and small towns. Various trends are increasing the importance of multimodal transportation in rural communities including isolation and high transportation costs, aging populations, rising poverty, growing health and safety concerns, and growing tourist industries. Various strategies can help rural communities improve and connect walking, cycling, public transport, including innovative facilities and services, and Smart Growth development policies. New planning resources described in this report can help rural communities and small towns develop integrated multimodal plans and programs.

Todd Alexander Litman © 2001-2018

You are welcome and encouraged to copy, distribute, share and excerpt this document and its ideas, provided the author is given attribution. Please send your corrections, comments and suggestions for improvement.

## Preface

Our car-free family enjoys visiting rural areas. Whenever possible we rely on walking, cycling and public transit, which is challenging but often rewarding. For example, a few years ago we took a car-free winter holiday to Washington State's Olympic Peninsula, a rural area famous for giant trees and romantic vampires. We had a terrific time!

We were able to make this trip because the Washington State Department of Transportation has a special program to support rural public transit services, including funding for local and interregional bus services, coordination among local transit agencies, development of bus terminals in small towns, and construction of park and ride lots along rural highways. Although the services were limited, with only a few buses per day on some routes, it was sufficient to meet our needs as car-free tourists.



*Our family enjoyed riding local buses around Washington State's Olympic Peninsula. Because the state supports rural transit services, residents and tourists can travel affordably. This provides various direct and indirect benefits.*

*Well done Washington State!*

Part of the fun of public transit tourism is to interact with locals. For example, on a bus we met Mike, an older man with medical problems who was returning from Port Angeles, where he had made use of the regional public swimming pool, back to his home in Neah Bay. Although he owns a truck, he could not afford the fuel or the stress of driving the 150-mile round trip on a winding and wet highway. We became friends; Mike showed us around Neah Bay and helped us find food (the best smoked salmon on earth!) and our accommodations.

In this case, the state's investment in multimodal rural transportation provided these benefits:

- Supports tourist industries, increasing business activity in economically depressed areas.
- Affordable and safe access to shopping and recreation for isolated rural residents.
- Reduced crash risk on a dangerous rural roadway.
- Affordable and enjoyable holidays for our family.
- Increased understanding and friendship between urban and rural residents.

Thank you, Washington State! We hope other jurisdictions follow this example.

## Introduction

To be efficient and fair a transportation system must be diverse in order to serve diverse demands. For example, it needs *active transport* (walking and cycling) for local trips, exercise and enjoyment; *public transportation* to provide affordable mobility for non-drivers, and *automobile travel* when it really is the best mode for a particular trip, considering all impacts.

This principle is often overlooked. Conventional planning and funding practices tend to favor automobile travel over other modes, creating automobile-dependent communities where it is difficult to get around without a car. To respond to unmet transportation needs many jurisdictions are now applying more multimodal planning, which recognizes the important roles that walking, bicycling, public transit, and variants such as shared mobility services play in an efficient and equitable community. Multimodal planning is widely applied in cities, and is now starting to be used in small towns and rural communities. It can provide many direct and indirect benefits to users (the people who use non-automobile modes), motorists and communities. Current demographic and economic trends are increasing the importance of multimodal planning in rural communities.

This report explores these issues. It examines the roles that walking, cycling and public transit play in smaller communities, discusses multimodal planning concepts and practices, identifies resources available for multimodal rural planning, and describes examples of rural multimodal planning programs. This report should be useful to public officials, planners and citizens who are interested in creating more diverse mobility options in rural communities.

## Multimodal Planning

Multimodal planning involves an integrated set of improvements to non-automobile modes so non-drivers have affordable independent mobility. It requires changing many common planning practices to give more consideration to non-automobile transport options. This usually includes collecting more information on active and public transport travel demands, more funding for non-automobile modes, and better planning for active and public transport, “complete streets” policies that integrate multiple modes into roadway planning. Smart Growth development policies create more multimodal communities, for example, by allow more density and mix, and locating more housing within convenient walking distance of common services such as stores and schools.

Success can be evaluated based on *inputs* (resources devoted to alternative modes), *outputs* (changes in the quantity and quality of travel options) and *outcomes* (changes in travel activity and associated costs), as summarized below.

**Table 1** Multimodal Performance Indicators

Inputs →	Outputs →	Outcomes
<i>Resources devoted to each mode</i>	<i>Use of each mode</i>	<i>Ultimate results</i>
Increased investments in non-automobile modes (active and public transport)	Increased quantity and quality of non-automobile modes, improved user information, more accessible development	Increased non-automobile travel, reduced automobile ownership and use, reduced transport cost burdens, reduced crashes and pollution emissions.

*Various indicators can be used to evaluate multimodal planning success.*

## Rural Community Multimodal Transport Needs

*Transport demands* (also called *needs*) refers to the amount and type of travel that people want to use, including *latent demands*, which are travel options people do not currently use but would if they were available. Current demographic and economic trends are increasing rural multimodal travel demands, as summarized in Table 2 and discussed in more detail below.

**Table 2 Trends Affecting Rural Multimodal Travel Demands**

Trend	Impact on Multi-modal Demands
<i>Isolation.</i> Rural non-drivers experience social and economic isolation. This increases as rural services consolidate.	Rural non-drivers need independent mobility options to participate in social and economic opportunities, and avoid imposing chauffeuring burdens.
<i>Population aging and disability.</i> Many rural areas are experiencing population aging and high disability rates.	Many residents want to age in place, which requires mobility options for older and disabled people.
<i>High transportation costs.</i> Many rural households spend a large portion of their budgets on motor vehicles.	Many rural residents want affordable mobility options, including public transit services suitable for commuting, shopping and socializing.
<i>Poverty.</i> Many rural areas have high poverty rates.	
<i>Changing travel preferences.</i> Many residents, particularly youths, want alternatives to driving.	Many rural residents want improved walking, cycling and public transit options.
<i>High traffic fatality rates.</i> Rural areas have high traffic death rates, and many traffic safety programs depend on some travelers' ability to reduce their driving.	Improving travel options, particularly for youths, people with disabilities, and law abiding drinkers can help increase traffic safety.
<i>Poor public fitness and health.</i> Many rural residents are sedentary and overweight, and suffer associated health problems including diabetes and heart diseases.	Improving and encouraging active modes (walking and cycling) is an effective strategy for improving public fitness and health.
<i>Economic opportunity and development.</i> Many rural areas want to help residents improve their education and employment opportunities, and support local industries.	Improving travel options can increase economic opportunity and development by providing access to schools and jobs, and by supporting industries such as tourism and retirement services.

*Various demographic and economic trends are increasing demands for walking, cycling and public transit.*

### *Geographic Isolation*

Because rural areas are dispersed and automobile dependent, non-drivers tend to be isolated. This increases as public services, such as healthcare, shops and schools, are consolidated for efficiency sake. Because of this isolation, rural residents travel more than urban peers: overall, rural *residents* drive about 33% more, rural *workers* about 38% more, and *lower-income rural workers* 59% more annual miles, than in urban areas (Brown and Schafft 2011).

In a typical community 20-40% of residents cannot or should not drive; if alternative travel options are unavailable, non-drivers will lack independent mobility, require chauffeuring, bear excessive transportation cost burdens, or move to another community that offers better travel option, as indicated in Table 3. Many rural communities are experiencing aging populations, which increases the number of residents who need rides and reduces the number who can offer rides. As a result, improving rural travel options can provide large benefits to both users and

other community members, such as reduced chauffeuring burdens imposed on drivers, and more tourist business activity.

**Table 3**      **Types of Non-Drivers**

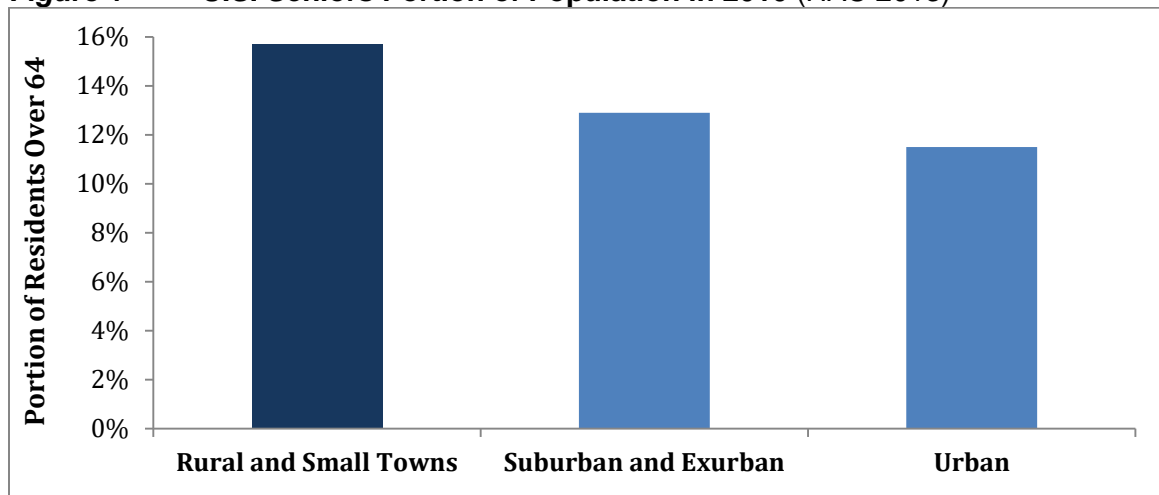
Types	Prevalence	Consequences if Suitable Options are Unavailable
Seniors who do not or should not drive	10-20% of residents and increasing	Lack mobility, require chauffeuring (special vehicle travel to transport a non-driver), or move to another community with better transport options
People with disabilities	3-5% of residents	
Adolescents (12-20 years)	5-15% of residents	
Stay-at-home parents in single-vehicle household	Varies	
Low-income households	20-40% of households	Lack mobility or bear excessive transport cost burdens
Drivers who temporarily lack a vehicle	Varies	Lack mobility, require chauffeuring or bear high costs
Tourists and visitors	Varies	Lack mobility or visit other areas with better travel options
Law-abiding drinkers	Varies	Drive impaired, risking citations and crashes

*Many groups cannot or should not drive. Without suitable travel options they are unable to access the activities and service they need, require chauffeuring, continue driving despite unaffordable cost burdens or crash risks, or move to other communities that offer better mobility options.*

### *Seniors and People With Disabilities*

Senior populations are growing, particularly in rural and small town communities (Werner 2011), as illustrated in figures 1-3. Rural and small-town census tracts contain 21% of the total U.S. population but approximately 25% of all seniors, and 21 of the 25 “oldest” counties are rural (HAC 2014).

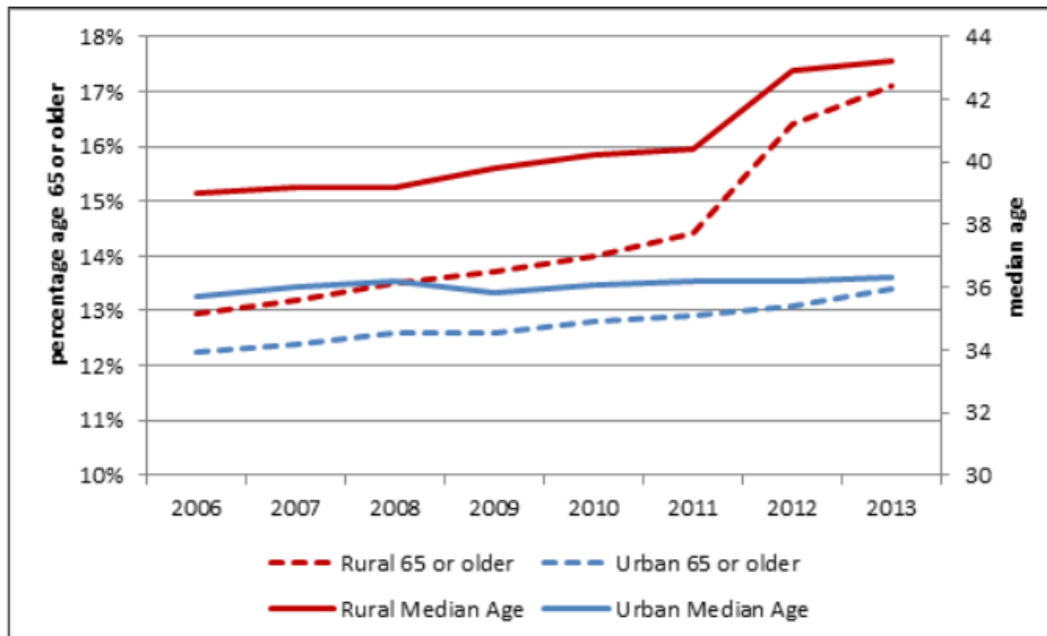
**Figure 1**      **U.S. Seniors Portion of Population in 2010 (HAC 2013)**



*A relatively large portion of rural and small town residents are over 64 years of age.*



**Figure 2** Rural and Urban Age Trends (Mattson 2015)

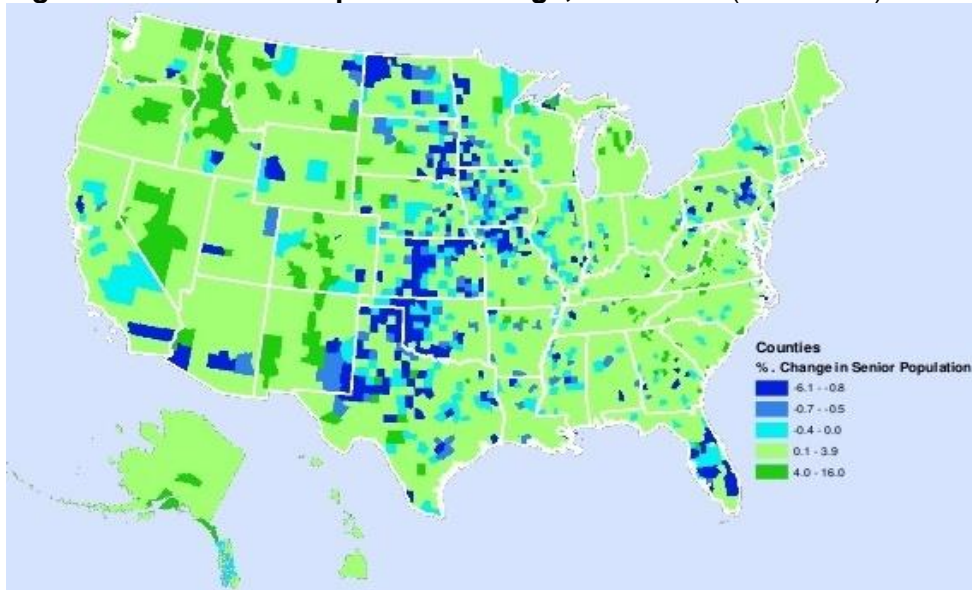


**Figure 1.** Median Age and Percentage of Population Aged 65 or Older, 2006-2013

Source: American Community Survey 1-Year Estimates, 2006-2013

*Rural population median age and portion of residents 65 years or over are increasing rapidly.*

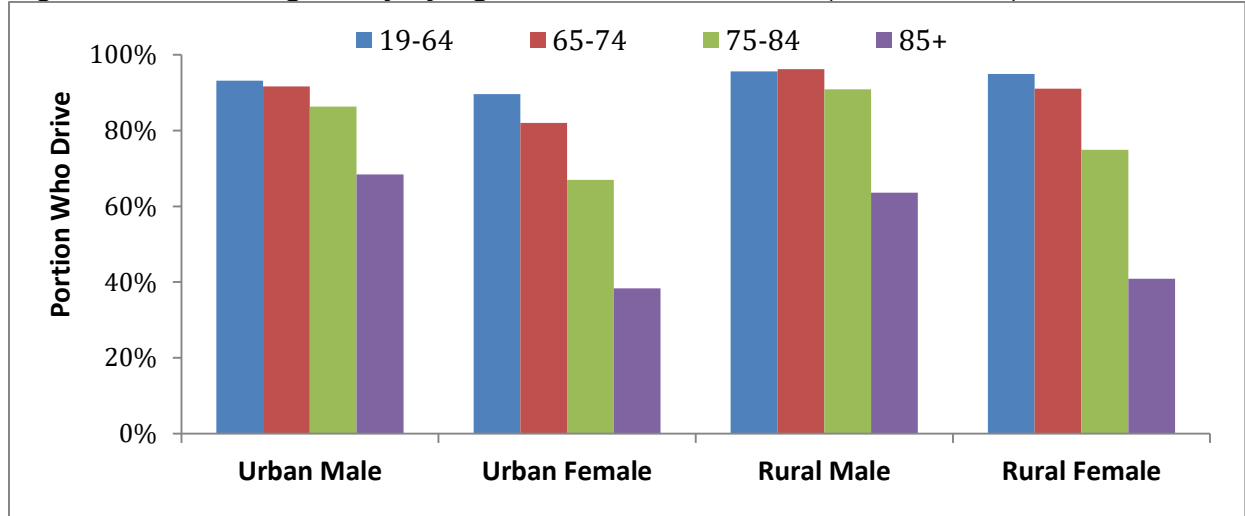
**Figure 3** Senior Population Change, 2000-2010 (HAC 2014)



*Many rural areas are experiencing rapid senior population growth.*

Although many seniors drive safely, as people age, particularly over 75 years, their driving ability tends to decline, as illustrated in Figure 4. By choice or necessity, many seniors must rely on alternative modes, including walking and public transit (Wood, et al. 2016).

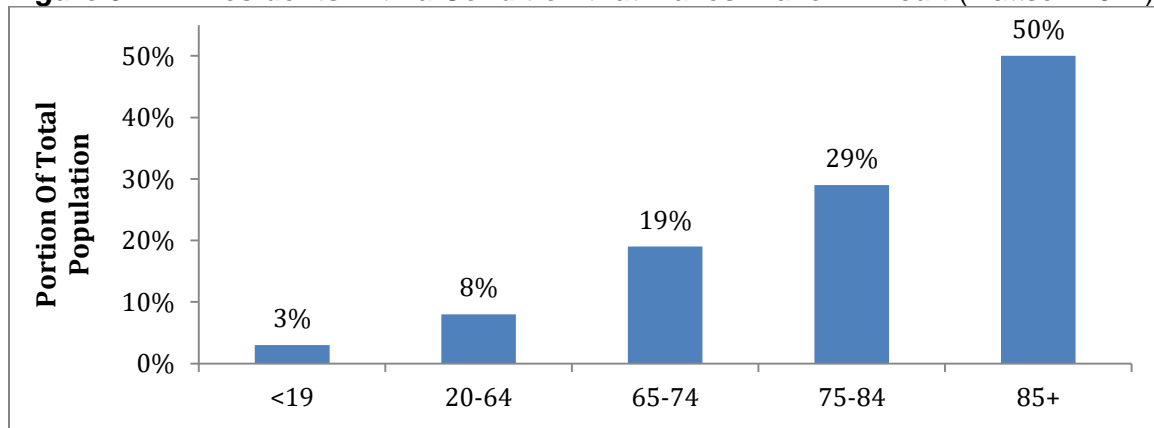
**Figure 4** Driving Ability by Age, Location and Gender (Mattson 2012)



*The ability to drive decreases with age.*

At some points in their lives, most people have temporary or long-term disabilities that limit their ability to drive. A growing number of rural residents have disabilities due to aging population (disability rates tend to increase with age, as illustrated in Figure 5), and therefore require more community-based services.

**Figure 5** Residents with a Condition that Makes Travel Difficult (Mattson 2012)



*The chance that people have a condition that makes travel difficult increases with age.*

Many people with disabilities who would previously have been institutionalized now live in regular homes in residential neighborhoods, reflecting the principle of *community integration*. This tends to provide a better quality of life and overall cost savings, but to be successful requires support services, including appropriate public transportation. Even if they live in

automobile-owning households, people with disabilities often want transit services in order to be independent and minimize the chauffeuring burdens they may impose on family members who drive.

Surveys indicate that most seniors want to *age in place*, that is, continue living in their current communities as they grow older. To make this possible, rural communities and small towns need appropriate mobility options (Farber and Shinkle 2011). As Lydia Morken and Mildred Warner explain in their report, *Planning for the Aging Population: Rural Responses to the Challenge* (Morken and Warner 2011),

“Whether older adults can age in place hinges largely on transportation. Can they reach the services available to them, get to a routine doctor’s appointment, or attend a social event? Older adults’ diverse mobility needs present some of the most pressing challenges for rural communities. Most people will outlive their ability to drive, and many will face isolation when they can no longer get behind the wheel. Older adults in rural and suburban areas will feel this acutely as communities designed for the car offer few other transportation options.”

There is a particularly urgent need for public transit that serves disabled military veterans living in rural communities (Ellis, et al. 2013). Almost 30% of total veterans, and 41% of those enrolled in the Department of Veterans Affairs Health Administration system, live in rural areas (Peterson 2014). Rural veterans tend to have more severe disabilities (such as service-connected disability ratings above 50%) and so tend to require more and more specialized healthcare services than those in urban areas (Burkhardt et al. 2011). Rural locations create challenges for veterans and their families, including more isolation and longer travel distances to obtain services.

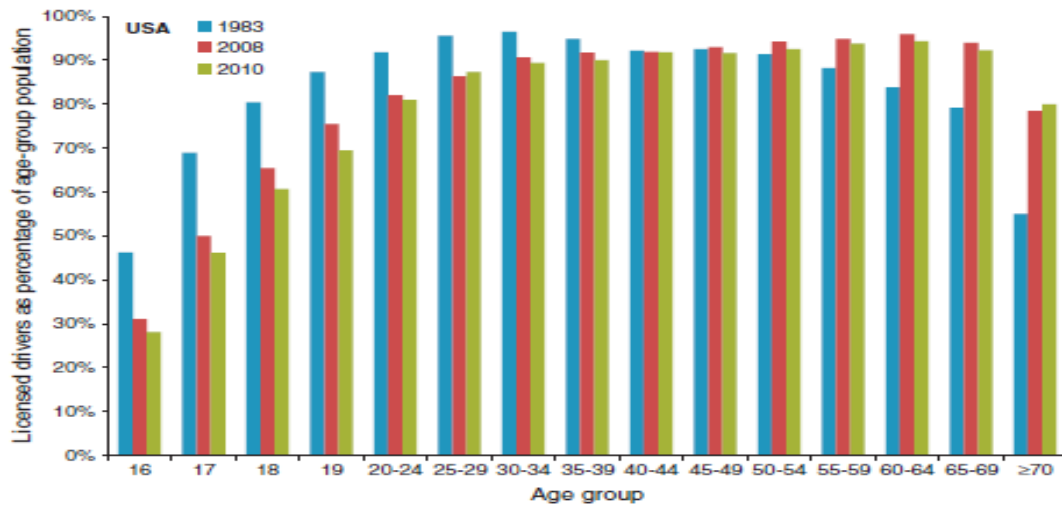
To address these needs, rural communities need special mobility services for people with severe disabilities, and other public transportation services, such as local and intercity public transportation suitable for veterans, their families, and their healthcare workers (VA 2014). Rural communities tend to have the greatest gaps in senior transportation services (NCST 2010; Wood, et al. 2016). By better serving these demands, rural communities can attract and retain more seniors and the economic activity they generate, which helps support local economic development.

### *Changing Travel Preferences*

Many people, particularly youths between 15 and 25 years of age, want to drive less and rely more on alternative modes for enjoyment and financial savings. The portion of young people that have driver’s licenses and own cars has declined steadily during the last three decades (Figure 6), in part due to changing needs and preferences (APTA 2013; Interrante 2014; McDonald 2015). For example, although only about 10% of rural youths use public transit during a typical week, more than half (54%) want more transit services in their communities (Villwock-Witte and Clouser 2016). Rural communities that want to retain these residents will need to improve travel options.



**Figure 6 Drivers Licensure Rates by Age** (Sivak and Schoettle 2012)



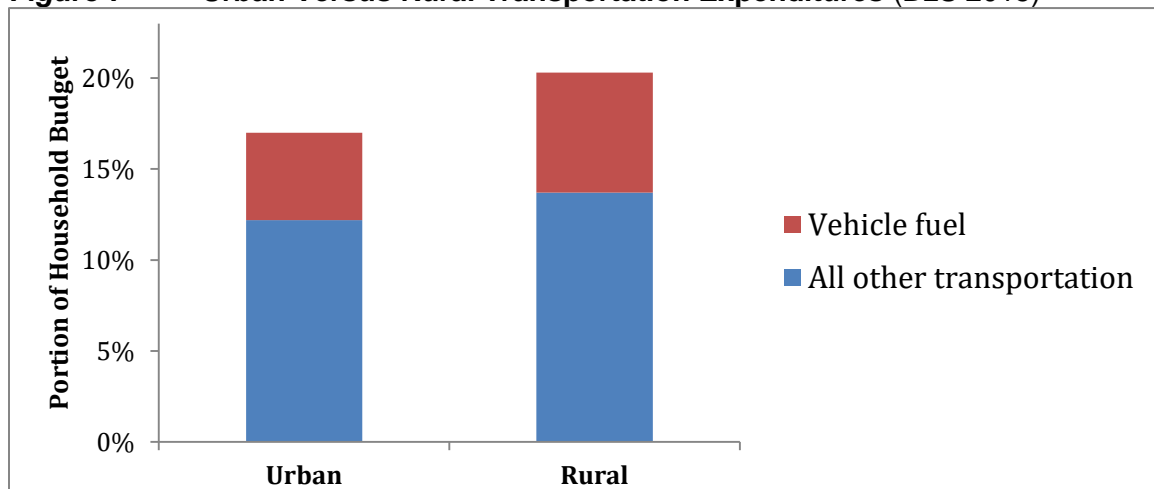
Driver licensure rates for adolescents declined significantly during the last three decades.

### Rural Poverty

Rural areas tend to have lower incomes and higher poverty rates than urban areas. In 2012, median household incomes were \$41,198 in rural areas, 22% less than the \$52,988 in urban areas (USDA 2014).

As a result of lower incomes and higher vehicle mileage, rural households spend a much greater portion of their budgets on transportation than urban households. In 2013, rural households spend 20% of their budgets on transport, 19% more than the portion (17%) spent by urban household, and rural households spend 38% more of their budget on fuel than urban households (Figure 7).

**Figure 7 Urban Versus Rural Transportation Expenditures** (BLS 2015)

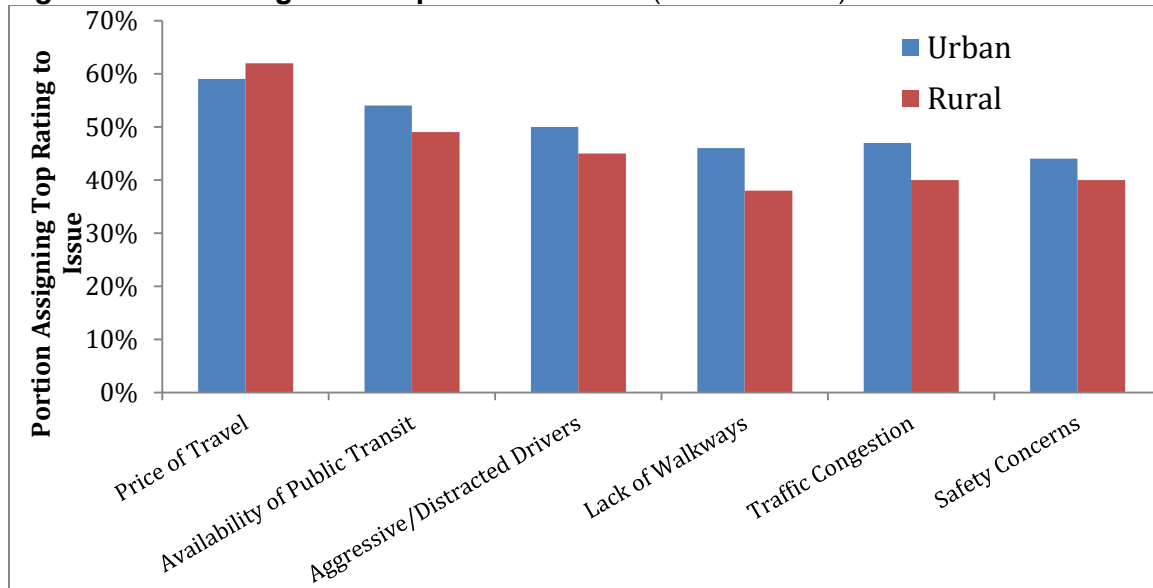


Rural household spend 19% more on transportation and 38% more on vehicle fuel than urban households.

This combination of low incomes and long travel distances make motor vehicle expenses a major financial burden to many lower-income rural households, sometimes leaving residents with insufficient money to purchase other essential goods such as utilities, medicine and healthy foods. Although lower-income motorists use various strategies to minimize expenses, such as owning older vehicles, performing some of their own repairs, and purchasing minimal insurance coverage, owning and legally operating an automobile usually costs several thousand dollars annually, sometimes including large unplanned expenses from mechanical failures or accidents.

The 2009 *National Household Travel Survey* asked respondents to rate the importance of various transportation planning issues. Of these, “Price of travel” rated highest by a significant margin, particularly for rural respondents, 62% of whom assigned it the highest rating, slightly higher than the 59% of urban respondents, and “Access or availability of public transit” rated second highest, as illustrated in Figure 8.

**Figure 8** Rating of Transportation Issues (Mattson 2012)



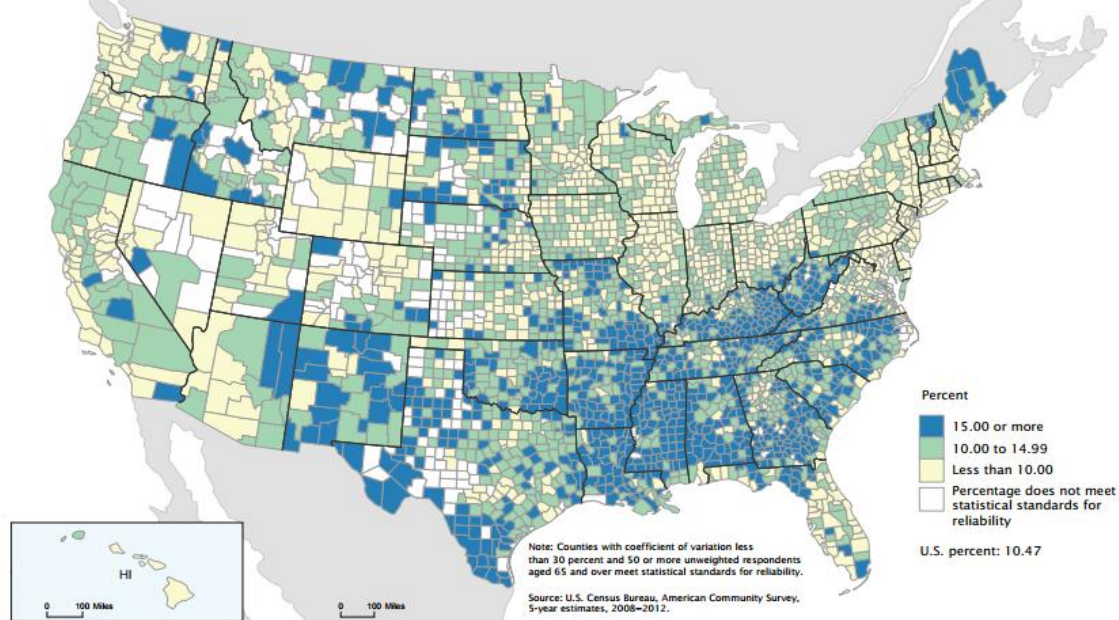
*High transportation costs (inaffordability) and inadequate public transit services were the two most important transport issues identified by 2009 National Household Travel Survey respondents.*

This indicates that transportation affordability is particularly important for rural residents. Many factors affect transportation affordability. Minimizing vehicle operating costs, such as fuel, parking fees and road tolls, provide some savings, but these are a minor portion of total vehicle expenses. Depreciation, financing, maintenance and repairs, insurance and registration fees tend to be much larger in total. As a result, true affordability requires that households be able to reduce their vehicle ownership, for example, reducing from three to two, or two to one motor vehicle, or becoming car free. As a result, having alternative modes, including adequate public transit services required to meet daily needs, can be a financial lifesaver. For example, lower-income rural residents may use transit to save fuel and vehicle wear when travelling to another community, to avoid the need to own a second car, and as an emergency option when their vehicle is temporarily unavailable. The ability to survive with fewer vehicles tends to be

particularly important for households that are experiencing crises, such as a job loss, vehicle failure, traffic accident or fuel price spike.

Public transit tends to be particularly important for people with both disabilities *and* low incomes. Figure 9 shows the percentage of seniors (over 65 years) who have disabilities and live in low-income households (below 150 Percent of poverty threshold).

**Figure 9** Percent Seniors That Are Both Disabled and Poor (He and Larsen 2014)



*Many rural counties have many seniors who have a disability and live in poverty.*

### *Safety and Security*

Rural communities tend to have high traffic casualty (death and injury) rates. Although rural areas have only 19% of the U.S. population they accounted for 54% of traffic fatalities, and rural vehicle travel averages 1.88 deaths per 100 million vehicle miles traveled (VMT), 2.6 times the 0.73 rate in urban areas (NHTSA 2014). Traffic safety is therefore particularly important in rural areas. Multimodal planning can help reduce traffic risks.

Many traffic safety strategies, such as special senior driver testing requirements, graduated licenses for young drivers, and campaigns to discourage impaired and distracted driving, depend on reducing higher-risk driving. To be effective and fair, this requires suitable mobility options, so higher risk groups can reduce their driving without giving up independence and activities. For example, seniors need transport to healthcare services, stores and social activities; young people need transport to school, jobs and recreation; and drinkers need transport home from restaurants and bars.

### *Public Fitness and Health Goals*

Health experts are increasingly concerned about health problems caused by sedentary (lack of physical exercise) lifestyles and associated increases in obesity, which tend to increase healthcare and disability costs, and reduce longevity. These problems tend to be particularly

severe in rural communities. For example, 22% of rural children are obese, compared to 17% of urban children, and 40% of rural adults are obese, compared to 33% of urban adults (Hansen and Hartley 2015).

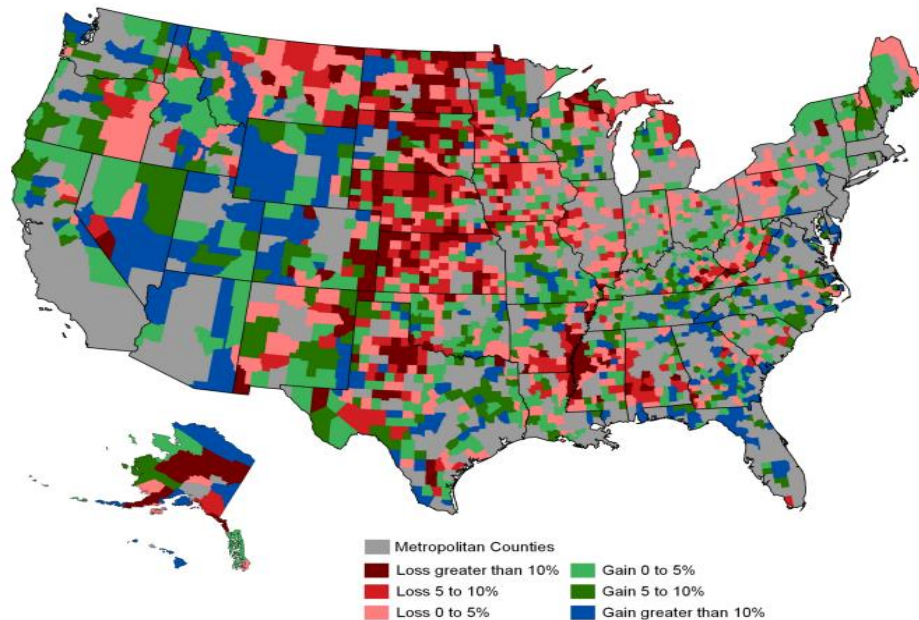
To address these risks, public health officials encourage more physical activity, and many people want to lead more active lifestyles. Although there are many ways to be active, including organized sports and exercise programs, these usually require special time and expense, which tends to discourage participation, particularly by people who are currently sedentary and overweight, and so have the greatest risks. One of the most effective ways to increase physical fitness and health is to increase active transport (walking and cycling) for both utilitarian and recreational travel. Many people, especially young people, prefer to rely on active transportation, including cycling and skateboards, as a substitute for automobile travel. In response, many communities are improving pedestrian and cycling conditions by building sidewalks and bike lanes, developing paths, and implementing complete streets policies.

Public transit supports, and is supported by, these trends. For example, improving sidewalks and cycling paths tends to increase walking and cycling activity, and makes it easier for residents to walk to and from bus stops. Since most transit trips include walking and cycling links, residents who switch from driving to public transit tend to get more exercise.

#### *Economic Opportunity and Development*

Many rural communities are experiencing economic shifts. Resource industries such as logging, fishing, mining and farming are increasingly automated, which reduces employment, and many experience boom and bust cycles which can lead to layoffs and lower incomes. These contribute to the population and economic declines occurring in many rural communities (Figure 10).

**Figure 10** Nonmetropolitan Population Change, 2000 to 2010 (Johnson 2012)



*Many rural communities and small towns have declining population.*

In response, many of these communities are working to diversify their economies by attracting new industries. Public transit can support these efforts by expanding the pool of potential employees available to businesses, particularly lower-income residents, youths and working seniors, and residents of adjacent communities, which can be particularly important for industries such as tourism, senior services, farming and food processing. Supporting such industries can help rural communities grow. Between 2000 and 2010, 277 rural counties considered retiree destinations on average gained 13% population, and 299 rural counties considered recreational destinations on average gained 11% population (Johnson 2012).

Multimodal transportation planning can help rural economies in several ways:

- It helps attract and retain residents who cannot drive, including seniors, young people, people with disabilities and lower-incomes, and therefore supports local businesses that serve these residents, including stores, restaurants, professionals, and institutions such as hospitals and schools.
- It helps non-drivers access jobs, which increases residents' incomes and expands the pool of employees available to businesses, allowing them to be more productive.
- It helps consumers reach local shops, restaurants, and services, rather than driving to more distant commercial centers.
- It helps attract tourists and the business activity they support.
- It can help businesses reduce their parking costs, which is particularly important for redeveloping older downtowns, and for developing large institutions such as colleges and hospitals.

As a result, public transit can provide significant economic benefits to rural communities (Burkhardt, Hedrick and McGavock 1998). For example, one hundred retirees will typically spend more than a million dollars in the local economy each year, and one hundred tourists will typically spend tens of thousands of dollars during their visits, supporting local businesses, their employees and public services. This helps support local businesses, which might otherwise close down, and their employees who might otherwise move away.

### *Summary of Trends*

Most communities, including small towns and rural areas, have significant demand for walking, cycling, public transit and their variants. These demands, and the benefits of serving these demands, are increasing due to demographic and economic trends. Although specifics vary, during the next two decades most rural areas and small towns can expect the number of seniors to approximately double, with even larger increases in low-income seniors. In addition, many rural communities will have more residents with disabilities, more poverty, more economic shifts, more disincentives for high-risk driving, increased preferences for healthier lifestyles, and more demand for car-free tourism. While the need for rides is increasing, the portion of rural residents who can offer rides is decreasing, so communities that previously relied on informal transport to serve non-drivers will increasingly require more formal transit services. As a result, rural public transit demands will be several times higher in the future than in the past.

*Benefits of Serving Diverse Rural Transport Demands*

Serving these increasing multimodal travel demands can provide various benefits to users, motorists and local economies, as summarized in Table 4.

**Table 4 Potential Rural Transit Benefits**

Users	Motorists	Local Communities
<ul style="list-style-type: none"> <li>• More independent mobility</li> <li>• Financial savings</li> <li>• Improved fitness and enjoyment</li> <li>• Reduced accident risk</li> <li>• Reduced impaired driving citation or accident risk</li> </ul>	<ul style="list-style-type: none"> <li>• Reduced chauffeuring burdens</li> <li>• Reduced traffic risks due to less higher-risk driving</li> <li>• Reduced traffic and parking congestion</li> <li>• Improved mobility option for times when they cannot drive</li> </ul>	<ul style="list-style-type: none"> <li>• Improved public fitness and health</li> <li>• Retains and attract more residents</li> <li>• Supports industries such as tourism</li> <li>• Helps attract major employers such as colleges and hospitals</li> </ul>

*Serving multimodal travel demand can provide various direct and indirect benefits.*

Considering all economic impacts, investments to improve walking, cycling and public transit are often cost effective: their benefits exceed their total costs. Rural area and small town public transit services typically cost \$20-40 annual per capita (Lynott 2014; Mattson and Hough 2015; TROUT 2015). This is low compared with automobile association membership fees (transit services are similar to automobile association memberships in that they provide a mobility option that motorists can use if their vehicle fails or they cannot drive for other reasons). These are lower than national per capita transit spending, or total costs of owning and operating automobile, including vehicle, fuel, road and parking facility costs. Alternative modes are often cheaper overall than driving. For example, a typical 5-mile rural transit trip costs about \$7.00 in total (driver, fuel and vehicle expenses). That is cheaper than:

- A taxi fare for the same trip (typically \$10-15 for a 5-mile trip).
- Total costs to own and operate an automobile for infrequent use (\$3,000 annual costs divided by 150 annual trips equals \$20 per trip).
- Total vehicle operation and time costs for driver to chauffeur a passenger 5 miles to a destination and return alone (10 miles at 50¢ per mile equals \$5 in vehicle operating costs, plus 20 minutes charged at \$15 per hour equals \$5 in time costs).
- The accident costs of a higher-risk (youth, senior or impaired) driver forced to drive due to inadequate alternatives.

As a result, public transit investments can provide positive return on investment (a dollar spent on public transit services provides more than a dollar in total savings and benefits) if it reduces even a small amount of automobile travel, or provides small increases in local economic activity.

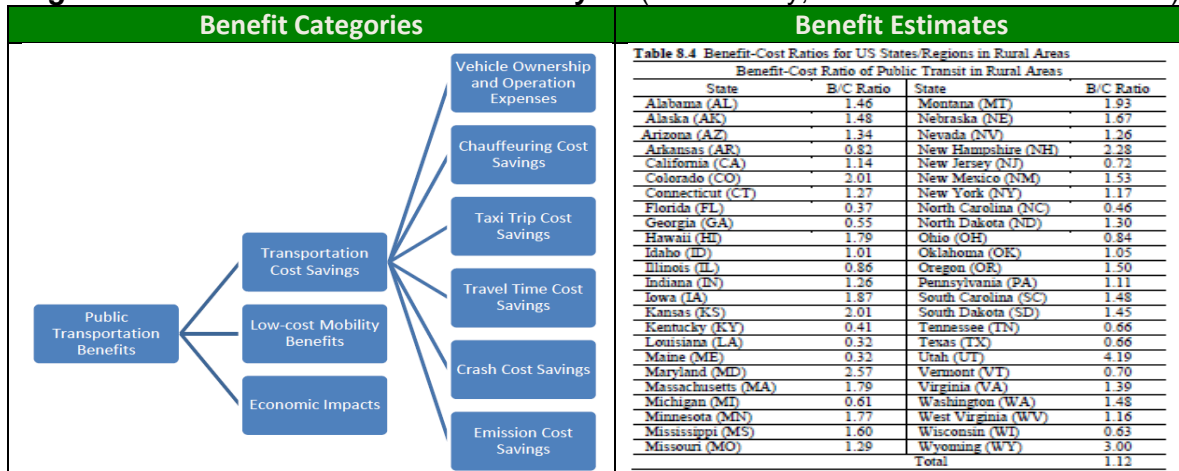
Public transit services can also help government agencies and businesses save money. For example, it can reduce the costs for healthcare and social service programs that pay client travel expenses, and reduce the number of parking spaces that governments and businesses must provide in a commercial area for customers and employees.



Public transit investments may also be economically justified if they help attract and retain more residents and businesses in a community, and therefore increase local economic activity and tax revenues. For example, if inadequate public transit services cause 100 households to leave a community, it will lose about one million dollars each year in local economic activity (assuming household spend \$10,000 annually on local goods, services and taxes), contributing to further declines in population, employment, public services, and economic activity. Public transit can increase total employment by expanding the pool of potential employees available to businesses and the pool of potential jobs available to willing workers.

Several recent studies have estimated benefit-cost ratios for various types of transit services (Ferrell 2015). They indicate that public transit investments generally provide positive economic returns, that is, each dollar spent on transit services provides more than a dollar in economic benefits. Although the highest benefit-cost ratios tend to be found in larger urban areas, most rural transit economic studies indicate that they provide net monetary benefit. In their report, *Cost-Benefit Analysis of Rural and Small Urban Transit*, Godavarthy, Mattson and Ndembe (2014) estimated the benefit/cost ratio for rural public transit services in each U.S. state, considering various categories of benefits, as illustrated in Figure 11. Because that study only considered a portion of transit benefits (for example, it ignores parking cost savings, and the value that non-drivers place on having independent mobility rather than being forced to depend entirely on rides by family members and friends), total benefits are probably greater.

**Figure 11 Rural Transit Benefit Analysis** (Godavarthy, Mattson and Ndembe 2014)



This figure illustrates the categories of benefits, and benefit estimate results for each U.S. state.

Similarly, some studies indicate that, considering all impacts, pedestrian and cycling improvements are often cost effective.

Conventional transportation planning tends to overlook or undervalue many of these benefits. As a result, few rural areas invest in public transit to the degree justified by comprehensive economic evaluation.

## Rural Multimodal Planning

*This chapter describes appropriate types of public transit for rural communities and small towns.*

### *Multimodal Planning Reforms*

Multimodal planning often starts with basic changes to planning and funding practices that:

- Recognizes the roles that walking, cycling and public transit play in an efficient and equitable transport systems, and therefore the importance of improving these modes.
- Collects more data on walking, cycling and public transit demands, activities, services and facilities in travel surveys, geographic information systems and travel models.
- Evaluates transportation system performance based on *accessibility* (people's ability to reach desired services and activities) rather than just *mobility* (physical travel) and so recognizes the impacts that walkability, transport network connectivity and land use development patterns.
- Integrates planning between modes (such as improving walking and cycling connections to public transit stops), and between transport and land use development.

### **Resources**

AARP *Livable Communities* ([www.aarp.org/ppi/issues/livable-communities](http://www.aarp.org/ppi/issues/livable-communities)) website provides guidance on policies and planning practices to create safe, accessible, affordable and vibrant communities.

William Dieber, et al. (2014), *Planning Transportation To Meet The Needs Of An Aging Illinois: An Assessment*, Voorhees Center for Neighborhood and Community Improvement; at <http://bit.ly/1QgAako>.

Noxon (2009), *Improving Travel Options in Small & Rural Communities*, Transport Canada ([www.tc.gc.ca](http://www.tc.gc.ca)); at [www.tc.gc.ca/media/documents/ITOSRC.pdf](http://www.tc.gc.ca/media/documents/ITOSRC.pdf).

*Rural Transportation* (<http://nationalcenterformobilitymanagement.org/by-topic-rural-transportation>), National Center for Mobility Management.

*Rural Assistance Center Transportation Topic Page* ([www.raonline.org/topics/transportation](http://www.raonline.org/topics/transportation)) provides practical information on ways to improve transport options in rural communities.

*Rural Transportation Planning Clearinghouse* ([www.ruraltransportation.org](http://www.ruraltransportation.org)) serves as the national professional association for rural transport planning professionals, policymakers and other stakeholders.

### *Active Transportation (Walking and Cycling)*

Active transportation provides affordable basic mobility for non-drivers and healthy exercise. Because many residents are overweight and sedentary, active transportation improvements can provide large public fitness and health benefits in rural areas. Although there are many possible ways to be physically active, including organized sports and gym exercise, these generally require special time and expenses, which discourages their use. For many overweight and sedentary people, more walking and cycling are the most practical way to achieve regular, lifelong exercise. More multimodal planning can help create communities where this is possible.

Active transportation planning includes development of sidewalks, crosswalks, bike lanes, paths, plus education and encouragement programs, generally including both utilitarian and recreation uses. In rural areas, pedestrians and cyclists often travel on road shoulders. The Oregon DOT developed these recommended road shoulder width standards.

**Table 5 Minimum Road Shoulder Widths by Traffic Volume (Meters)**

	ADT < 250	ADT 250-400	ADT 400-DHV 100	DHV 100-200	DHV 200-400	DHV >400
Rural Arterials	1.2	1.2	1.8	1.8	2.4	2.4
Rural Collectors	0.6	0.6	1.2	1.8	2.4	2.4
Rural Local Routes	0.6	0.6	1.2	1.8	1.8	2.4

*ADT = Average Daily Traffic; DHV = Design Hour Volume*

### **Resources**

FHWA (2016), *Small Town and Rural Multimodal Networks*, Federal Highway Administration ([www.fhwa.dot.gov](http://www.fhwa.dot.gov)); at [www.fhwa.dot.gov/environment/bicycle\\_pedestrian/publications/small\\_towns/fhwahep17024\\_lg.pdf](http://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/small_towns/fhwahep17024_lg.pdf). This report provides ideas and resources to help small towns and rural communities support safe, accessible, comfortable, and active travel for people of all ages and abilities. It provides a bridge between existing guidance on bicycle and pedestrian design and rural practice, encourage innovation in the development of safe and appealing networks for bicycling and walking in small towns and rural areas, and show examples of peer communities and project implementation that is appropriate for rural communities.

Noxon (2009), *Improving Travel Options in Small & Rural Communities*, Transport Canada ([www.tc.gc.ca](http://www.tc.gc.ca)); at [www.tc.gc.ca/media/documents/ITOSRC.pdf](http://www.tc.gc.ca/media/documents/ITOSRC.pdf).

*Rural Transportation* (<http://nationalcenterformobilitymanagement.org/by-topic-rural-transportation>), National Center for Mobility Management.

USEPA (2015), *Smart Growth Self-Assessment for Rural Communities*, U.S. Environmental Protection Agency ([www.epa.gov](http://www.epa.gov)); at <http://1.usa.gov/1QIOIZy>.

### *Public Transportation*

Public transit, and variants such as ridesharing and ridehailing services, provide affordable basic mobility, and is particularly important for longer trips, such as international travel. Although public transit generally serves a small portion of total travel in rural areas, these trips tend to be particularly important.

Certain types of transit services tend to be most suitable for smaller communities, as summarized in Table 6. Many communities use a combination of these services, with subsidized taxis and community buses serving people with special needs, demand response in moderate-density areas, fixed-route buses connecting local destinations, and intercity bus and train routes connecting towns and cities.

**Table 6 Public Transit Services Suitable for Smaller Communities**

Name	Description	Service Quality	User Costs	Government Costs
Taxi and ridehailing subsidies	Taxi and ridehailing services (such as Uber and Lyft) receive subsidies for certain types of trips. Users usually pay a portion of fares.	Moderate to high, depending on local taxi service availability.	Varies depending on size of subsidy and length of trip.	Varies.
Volunteers driving their own vehicles	Non-profit organizations coordinate volunteer drivers who provide rides in their own vehicles.	Low. Limited to what volunteers can provide.	Users may be asked to help pay for gas.	Varies. May help reimburse drivers.
Community buses	Non-profit organizations use volunteer or paid drivers to offer rides in subsidized vehicles (usually vans).	Low to moderate, depending on resources.	Varies. Users may be asked to help pay expenses.	Low. Helps fund vehicles.
Paratransit (demand response)	Non-profit organizations or government agencies coordinate paid drivers using vans or small buses.	Moderate, depending on resources.	Varies. Generally requires a fare of several dollars.	High.
Vanpool services	A government agency or business group organizes vanpools	Good for longer commute trips	Low compared with driving a private vehicle	Very low. Vanpools are generally self-supporting
Fixed route transit bus services	Government agencies or contractors operate buses on scheduled routes.	High in service area, depending on resources.	Generally requires moderate fares.	Moderate to high.
Integrated regional transit services	Local and regional agencies coordinate transit services to connect communities.	High, depending on funding: more funding allows more service.	Generally requires moderate fares.	Moderate to high.

*Various types of public transit services can be appropriate in rural areas and small towns.*

Public transit services are often provided through partnerships that involve various organizations and government agencies. For example, many rural communities use a combination of funding sources to support local non-profit organizations or government agencies that provide public transit services (NCMM 2015). In many cases, federal and state funds are available to help communities establish and operate mobility services to meet special needs, such as mobility for disabled veterans (Peterson 2014).

## **Resources**

Elizabeth Ellis and Brian McCollom (2014), *Guidebook for Rural Demand-Response Transportation: Measuring, Assessing, and Improving Performance*, TCRP Report 136, TRB; at <http://bit.ly/1Lj51OB>.

Ranjit Godavarthy, Jeremy Mattson and Elvis Ndembe (2014), *Cost-Benefit Analysis of Rural and Small Urban Transit*, Upper Great Plains Transportation Institute ([www.ugpti.org](http://www.ugpti.org)); at [www.nctr.usf.edu/wp-content/uploads/2014/07/77060-NCTR-NDSU03.pdf](http://www.nctr.usf.edu/wp-content/uploads/2014/07/77060-NCTR-NDSU03.pdf).

Kenneth I. Hosen and S. Bennett Powell (2014), *Innovative Rural Transit Services: A Synthesis of Transit Practice*, TCRP Synthesis 94, Transportation Research Board ([www.trb.org](http://www.trb.org)); at <http://bit.ly/1JAXMdm>.

KFH Group (2014), *Effective Approaches to Meeting Rural Intercity Bus Transportation Needs*, TCRP Report 79; at [http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp\\_rpt\\_79.pdf](http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp_rpt_79.pdf).

*National Rural Transit Assistance Program Website* (<http://nationalrtap.org>), Federal Transit Administration.

Reconnecting America (2012), *Putting Transit to Work in Main Street America: How Smaller Cities and Rural Places Are Using Transit and Mobility Investments to Strengthen Their Economies and Communities*, Reconnecting America ([www.reconnectingamerica.org](http://www.reconnectingamerica.org)) and Community Transportation Association ([www.ctaa.org](http://www.ctaa.org)); at <http://reconnectingamerica.org/assets/PDFs/201205ruralfinal.pdf>.

*Rural Transportation* (<http://nationalcenterformobilitymanagement.org/by-topic-rural-transportation>), National Center for Mobility Management.

*Rural Assistance Center Transportation Topic Page* ([www.raonline.org/topics/transportation](http://www.raonline.org/topics/transportation)) provides practical information on ways to improve transport options in rural communities. *Rural Transportation Planning Clearinghouse* ([www.ruraltransportation.org](http://www.ruraltransportation.org)) serves as the national professional association for rural transport planning professionals, policymakers and other stakeholders.

*Small Urban & Rural Transit Center* ([www.surtc.org](http://www.surtc.org)) at North Dakota State University.

### *Shared Mobility Services*

Shared Mobility Services include taxis, ridesharing (car- and vanpooling), and ridehailing services (also called *ridesourcing* and Transportation Network Company, or TNC) such as Uber and Lyft.

*Carpooling* generally uses participants' own automobiles. *Vanpooling* generally uses rented vans (often supplied by employers, non-profit organizations or government agencies). Most vanpools are self-supporting – operating costs are divided among members. Vanpooling is particularly suitable for longer commutes (10 miles or more each way). *Dynamic ridesharing* refers to apps and services that match travelers for individual trips. Ridesharing has minimal incremental costs because it makes use of vehicle seats that would otherwise be unoccupied. It tends to have lower costs per vehicle-mile than public transit because it does not require a paid driver and avoids empty backhauls.

**Table 7      Comparing Travel Modes**

	Driver	Vehicle Ownership	Vehicle Size	User Schedule Flexibility
Conventional Public Transit	Paid	Public	Large	Flexible
Paratransit	Paid	Public	Medium	Some flexibility
Vanpool	Unpaid	Group Rental	Medium	Inflexible
Carpool	Unpaid	Personal	Small	Inflexible
Taxi	Paid	Business	Small	Flexible

*Different modes have different attributes. Modes with paid drivers tend to have relatively high operating costs. Vanpooling and carpooling have low cost per passenger-mile, but are only suitable for prescheduled trips, such as commuting.*

Ridesharing is one of the most common and cost effective alternative modes, particularly in areas that are not well served by public transit. Many commuters can rideshare part-time, for example, twice a week. Ridematching is a common component of Commute Trip Reduction programs intended to reduce urban traffic problems, and is also an important mobility option for non-drivers, particularly in small towns and rural areas, where notices are often posted on bulletin boards and travel needs are shared through informal networks.

Rideshare programs typically provide carpool matching, vanpool sponsorship, marketing programs, and incentives to reduce driving. Some employers offer incentives such as a cash payment to employees who carpool, or a voucher that covers vanpool fees, provided as an alternative to a free parking space. Because they have significant economies of scale (the more people who register, the more effective they are at successfully matching riders), it is helpful if one well-publicized ridematching program serves an entire geographic region.

### **Resources**

Natalie Delgadillo (2017), "How an Eco-Friendly Rideshare Is Changing Life in a Tiny Rural Town," *Governing Magazine* ([www.governing.com](http://www.governing.com)); at [www.governing.com/topics/transportation-infrastructure/gov-eco-friendly-rideshare-cantua-creek-rural-california-unincorporated.html](http://www.governing.com/topics/transportation-infrastructure/gov-eco-friendly-rideshare-cantua-creek-rural-california-unincorporated.html).

CTA (2009), *Rural Transportation*, Community Transportation Association ([www.ctaa.org](http://www.ctaa.org)); at <http://web1.ctaa.org/webmodules/webarticles/anmviewer.asp?a=19&z=40>. Provides information on various programs that provide transportation services in rural areas.



Michael Ennis (2010), *Vanpools in the Puget Sound Region: The Case for Expanding Vanpool Programs to Move the Most People for the Least Cost*, Washington Policy Center for Transportation ([www.washingtonpolicy.org](http://www.washingtonpolicy.org)); at [www.trpc.org/DocumentCenter/Home/View/941](http://www.trpc.org/DocumentCenter/Home/View/941).

Michael Kodransky and Gabriel Lowenstein (2014), *Connecting Low-Income People to Opportunity with Shared Mobility*, Institute for Transportation and Development Policy ([www.itdp.org](http://www.itdp.org)) and Living Cities ([www.livingcities.org](http://www.livingcities.org)); at [www.itdp.org/wp-content/uploads/2014/10/Can-Shared-Mobility-Help-Low-Income-People-Access-Opportunity-.pdf](http://www.itdp.org/wp-content/uploads/2014/10/Can-Shared-Mobility-Help-Low-Income-People-Access-Opportunity-.pdf).

Mike Mangan (2018), "The Value of Vanpooling as a Strategic, Cost-effective, and Sustainable Transportation Option," *ITE Journal*, Vol. 88, Iss. 2, pp. 36-39; at <https://bit.ly/2pxiMTb>.

Ryan McCauley (2017), "Determining the Feasibility of Shared Mobility Services in Low-Income, Rural Areas," *Government Technology* ([www.govtech.com](http://www.govtech.com)); at [www.govtech.com/fs/Determining-the-Feasibility-of-Shared-Mobility-Services-in-Low-Income-Rural-Areas.html](http://www.govtech.com/fs/Determining-the-Feasibility-of-Shared-Mobility-Services-in-Low-Income-Rural-Areas.html).

Caroline Rodier (2018), *The Effects of Ride Hailing Services on Travel and Associated Greenhouse Gas Emissions*, A National Center for Sustainable Transportation White Paper, Institute for Transportation Studies, UC Davis (<https://ncst.ucdavis.edu>); at <https://bit.ly/2qTLXja>.

Dan Ryan (2015), *Vanpools are a Success Story*, Seattle Transit Blog (<http://seattletransitblog.com>); at <http://seattletransitblog.com/2015/03/14/vanpools-are-a-success-story>.

### *Complete Streets*

*Complete Streets* policies ensure that public roads are designed to accommodate diverse users and uses, including walking, cycling, public transport, plus nearby businesses and residents. In rural communities this tends to justify wider road shoulders to safely accommodate walking and cycling, plus more sidewalks, crosswalks and bike lanes where roadways pass through towns, reduced traffic speeds, and bus stops and park & ride facilities.

### **Resources**

AARP (2015), *Evaluating Complete Streets Projects: A Guide for Practitioners*, National Complete Streets Coalition and Smart Growth America ([www.smartgrowthamerica.org](http://www.smartgrowthamerica.org)); at <http://bit.ly/1D7vQvK>.

CALTRANS (2013), *Main Street, California A Guide for Improving Community and Transportation Vitality*, California Department of Transportation ([www.dot.ca.gov](http://www.dot.ca.gov)); at [www.dot.ca.gov/hq/LandArch/mainstreet/main\\_street\\_3rd\\_edition.pdf](http://www.dot.ca.gov/hq/LandArch/mainstreet/main_street_3rd_edition.pdf).

DEA & Associates (1999), *Main Street...When a Highway Runs Through It*, Transportation and Growth Management Program, Oregon DOT and Dept. of Environmental Quality (<http://egov.oregon.gov/LCD/TGM/publications.shtml>); at <http://egov.oregon.gov/LCD/TGM/publications.shtml>.

Peter Lagerwey, et al. (2015), *Pedestrian and Bicycle Transportation Along Existing Roads—ActiveTrans Priority Tool Guidebook*, NCHRP Report 803, Transportation Research Board ([www.trb.org](http://www.trb.org)); at [http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp\\_rpt\\_803.pdf](http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_803.pdf).

National Complete Streets Coalition ([www.completestreets.org](http://www.completestreets.org)) promotes adoption of policies to ensure communities effectively accommodate multiple modes and support local planning objectives in all transportation projects.

NCSC (2012), *It's a Safe Decision: Complete Streets in California*, National Complete Streets Coalition ([www.completestreets.org](http://www.completestreets.org)); at [http://lgc.org/wordpress/docs/freepub/community\\_design/guides/cs-in-california.pdf](http://lgc.org/wordpress/docs/freepub/community_design/guides/cs-in-california.pdf).

Michael K. Park (2013), "Livable Streets: Lee's Summit (Part I and II)," *ITE Journal* ([www.ite.org](http://www.ite.org)), November and December; at [www.ite.org/membersonly/itejournal/pdf/2014/JB14BA22.pdf](http://www.ite.org/membersonly/itejournal/pdf/2014/JB14BA22.pdf) and [www.ite.org/membersonly/itejournal/pdf/2013/JB13LA44.pdf](http://www.ite.org/membersonly/itejournal/pdf/2013/JB13LA44.pdf).

Chris Porter, et al. (2016), *Achieving Multimodal Networks: Applying Design Flexibility and Reducing Conflicts*, FHWA-HEP-16-055, Federal Highway Administration ([www.fhwa.dot.gov/environment/bicycle\\_pedestrian](http://www.fhwa.dot.gov/environment/bicycle_pedestrian)); at <https://bit.ly/2cj27h7>.

### *Smart Growth*

Smart Growth development policies create more accessible and multimodal communities. In rural areas this typically involves planning that locates more public services such as shops, schools, healthcare facilities and housing into villages and small towns, so residents can walk or bike to more activities.

### **Resources**

AARP *Livable Communities* ([www.aarp.org/ppi/issues/livable-communities](http://www.aarp.org/ppi/issues/livable-communities)) website provides guidance on policies and planning practices to create safe, accessible, affordable and vibrant communities.

ICMA (2010), *Putting Smart Growth to Work in Rural Communities*, International City/County Management Association ([www.icma.org](http://www.icma.org)); at <http://icma.org/Documents/Document/Document/301483>.

Brian J. Morton, Joseph Huegy, and John Poros (2014), *Close to Home: A Handbook for Transportation-Efficient Growth in Small Communities and Rural Areas*, Web-Only Document 211, National Cooperative Highway Research Program (NCHRP); at [http://onlinepubs.trb.org/onlinepubs/nchrp/NCHRP\\_W211.pdf](http://onlinepubs.trb.org/onlinepubs/nchrp/NCHRP_W211.pdf).

SGA (2017), *Providing Well-Placed Affordable Housing in Rural Communities Toolkit*, Smart Growth America (<https://smartgrowthamerica.org>); at <https://smartgrowthamerica.org/resources/providing-well-placed-affordable-housing-rural-communities-toolkit>.

USEPA (2015), *Smart Growth Self-Assessment for Rural Communities*, U.S. Environmental Protection Agency ([www.epa.gov](http://www.epa.gov)); at <http://1.usa.gov/1QIOIZy>.

## Performance Indicators and Targets

It is useful to define specific performance indicators, in order to define problems, evaluate potential solutions, set targets and evaluate progress (Anderson and Khan 2014). Below are indicators suitable for rural multimodal transport planning.

### *Planning and Funding*

This indicator measures the amount that non-automobile modes are considered in a transport planning process, and the amount of funding invested in these modes. This can be measured relative to demands; for example, areas with more senior or poor residents, who tend to rely on walking, cycling and public transit, should rationally spend more on these modes than areas where demand is lower.

### *Facilities and Service Coverage*

Service coverage refers to where and when transit service is offered. Service coverage analysis can be used to understand service gaps, and to align transit service with planning objectives, such as providing basic mobility for non-drivers, increasing employment opportunities, or support for tourism. The following factors can be considered when evaluating coverage:

- **Area.** Fixed-route transit can generally only serve a limited area, generally around urban centers and along major highways. Demand response and subsidized taxi services may serve a much larger area, but in rural communities there are often some areas unserved.
- **Population and jobs.** With GIS tools it is possible to measure the portion of households and jobs that are served, and even the portion of transit-dependent residents.
- **Schedules.** Rural transit often operates with limited schedules, such as only during weekdays, and for some routes, only once or twice weekly.
- **Restrictions.** Many transit services must limit the amount of service they can provide to certain users, for example, the number of demand-response trips that people with disabilities may take each week or month.
- **Demand types.** Public transit may serve various types of demands, including basic mobility for people with disabilities and low incomes, commute trips, intercity transit, recreation and tourist trips. Analysis can investigate the degree the transit system serves these demands.

### *Portion of Need Served and User Satisfaction*

By comparing transit service coverage with demands it is possible to identify the portion of demands that are served, define gaps, and set targets. It is also useful to survey users and community members to evaluate their satisfaction, and identify barriers and problems with existing and proposed transit services.

### *Supply (Transit Trips or Vehicle-Revenue-Miles Per Capita)*

Standard transit service performance indicators include vehicle *revenue-miles* (mileage when vehicles are actually in service), *revenue hours*, and *unlinked transit trips* per capita. Currently, smaller community transit systems (communities with fewer than 60,000 residents), average 5-10 vehicle revenue-miles per capita, and 2-6 annual transit trips per capita.

The following factors should be considered when establishing service targets:

- The number of seniors, people with disabilities, immigrants, and lower income households.

- Industries that attract non-drivers, such as a college or university, retirement community or tourist industry.
- Whether the community has goals to create more compact, multimodal communities.

Table 8 indicates various indicators that can be used to evaluate the effectiveness of multimodal planning.

**Table 8      Multimodal Planning Performance Indicators**

<b>Inputs</b>	<b>Outputs</b>	<b>Outcomes</b>
<i>Planning process effects</i>	<i>How users respond</i>	<i>Ultimate results</i>
<ul style="list-style-type: none"> <li>• Spending on walking, cycling and public transit.</li> <li>• Quantity of sidewalks, paths and transit services.</li> </ul>	<ul style="list-style-type: none"> <li>• Changes in travel activity, such as increases in walking, cycling and public transit travel, and reductions in driving.</li> </ul>	<ul style="list-style-type: none"> <li>• Changes in non-drivers' participation in activities (school, jobs, healthcare, etc.), household cost burdens, physical fitness and health, traffic accidents, chauffeuring costs, etc.</li> </ul>

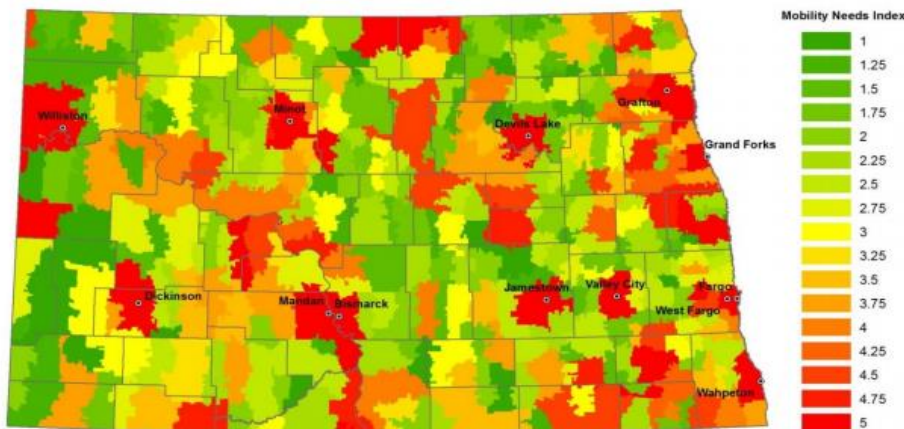
## Examples

*This section describes examples of rural public transit planning and program development.*

### North Dakota

A study, *Identifying and Satisfying the Mobility Needs of North Dakota's Transit System*, by the Upper Great Plains Transportation Institute (Mattson and Hough 2015) analyzed demographic and economic trends that affect transit demands, and surveyed various service providers, to identify existing and future transit service gaps and estimate the additional funding required to satisfy future needs. It calculated a *Mobility Need Index* rating for each county, based on projected growth in total population, residents aged 65 or older, people with disabilities and low incomes, workers without access to a vehicle, and population densities (Figure 12). Each number represents a quintile (20% of total areas), so for example, the areas rated 1 represent the 20% with the lowest transit need, and those rated 5 represent the 20% with the highest need.

**Figure 12** Mobility Needs Index Map (Mattson and Hough 2015)



*The Mobility Needs Index indicates where transit demand is projected to increase due to growth in population groups that rely on public transportation. Each number represents a quintile (20% of total areas). Higher ratings indicate greater projected future transit demands.*

The analysis indicates that demand for both conventional transit and specialized mobility services will increase significantly, particularly in areas experiencing population growth. Many areas need longer service hours, weekend service, and more services in rural areas, particularly for medical and work trips.

The study evaluated four possible scenarios:

1. Each region meets at least *one* of the three benchmark values (per capita vehicle-miles, vehicle-hours or passenger-trips compared with peer transit agencies).
2. Transit services increase at a rate equal to or greater than growth in total and senior population, although days and hours of service are limited.
3. Requires that each region meet at least *two* of the three benchmarks.
4. Requires that each region increase service by at least 10%.

The results were used to project service, staffing, facility, vehicle and funding needs for each scenario, as summarized in Table 9. This analysis indicates that the state's rural transit funding must increase 30-63% in order to meet future needs, although, since rural transit services are a small portion of total transit programs, this only represents a 9-18% increase in total statewide transit funding needs. Under the highest growth scenario, annual funding must increase by \$3.9 million (\$1.5 million local and \$1.9 million state), or about \$11.50 total additional annual expenditures per rural resident (according to the U.S. Census, rural North Dakota has about 300,000 residents).

**Table 9 Funding Increases Required (Mattson and Hough 2015)**

	Scenario 1	Scenario 2	Scenario 3	Scenario 4
<b>Rural Transit</b>				
Annual operating expense	\$2,836,425	\$4,026,537	\$5,657,762	\$5,957,448
% increase over 2012	30%	42%	60%	63%
Vehicle expense (one-time cost)	\$1,800,000	\$2,550,000	\$3,600,000	\$3,800,000
<b>Urban Fixed-Route Transit</b>				
Annual operating expense	\$2,173,276	\$2,622,757	\$3,244,377	\$3,276,157
% increase over 2012	7%	9%	11%	11%
Vehicle expense (one-time cost)	\$6,750,000	\$8,100,000	\$9,450,000	\$9,450,000
<b>Urban Demand-Response Transit</b>				
Annual operating expense	\$0	\$345,648	\$345,648	\$382,239
% increase over 2012	0%	2%	2%	3%
Vehicle expense (one-time cost)	\$0	\$260,000	\$260,000	\$260,000
<b>Total</b>				
Annual operating expense	\$5,009,701	\$6,994,942	\$9,247,787	\$9,615,844
% increase over 2012	9%	13%	17%	18%
Vehicle expense (one-time cost)	\$8,550,000	\$10,910,000	\$13,310,000	\$13,510,000

*This table estimates the additional funding required to achieve various future service targets.*

#### *Montana (Farber and Shinkle 2011)*

Montana has made a concerted effort to provide public transit in rural communities. The number of rural transit systems increased from nine in 2008 to almost 40 in 2015. To achieve this, the state government partnered with local councils on aging that offered community bus services. Montana Department of Transportation transit section supervisor Audrey Allums explained, "We went to these Councils on Aging and said, 'You're already running a senior bus service; if you open your doors to everyone, print a schedule and follow the FTA guidelines, we will help you pull it all together and receive FTA funding.'"

Local governments provided matching funds using Older Americans Act funding, property taxes, donations and other local government money. Sanders County in northwest Montana established public transportation services after a resident died because she was unable to access cancer treatments. The community responded by saying, "Never again in our town."



## *Washington State*

### **Travel Washington Intercity Bus Program**

For many years, Washington State's intercity bus service was declining, leaving many rural communities without scheduled public transportation to other towns and cities. In response, Washington State created the Travel Washington Intercity Bus Program which contracts with private companies to provide services to many rural communities (Figure 13). It relies largely on Federal grants and so requires minimal state funds. The State Department of Transportation works with communities to design the program and select service providers (Lynott 2014). Program Manager, Steve Abernathy, says that this approach has garnered strong community support. "When the Gold Line (northeastern Washington) was announced, communities were falling over each other to see who could bring the most to the ribbon cutting."

**Figure 13** Washington Intercity Bus Network ([www.wsdot.wa.gov/transit/intercity](http://www.wsdot.wa.gov/transit/intercity))



*Washington State supports an intercity bus network that serves rural areas and smaller towns.*

The intercity buses connect to local transit services and are catalysts for private investment. Homes, hotels and banks are being developed around transit centers, and their parking lots are sometimes used for farmers' markets and concerts. Abernathy describes the program as, "allowing people to stay where they want to live, yet still have the mobility, connections and access to the state, national and international transportation network. It allows older adults to stay in the communities where they have friends, where they raised their children and where they are part of a community."

### **Washington State Rural Public Transit**

Washington State has several programs to help rural communities plan, coordinate and fund local public transit services (USDOT 2011). Public transit is provided through government agencies, and community transportation providers which include private non-profit, private for-profit and Tribal organizations. These organizations can access various federal, state and local funds, including voter-approved special taxes. The Washington State Department of Transportation provides administrative and technical assistance to regional transportation planning organizations and public transit service providers.

As a result of these resources, most rural counties in Washington State have coordinated public transit services, which provide travel to and within most communities. For example, it is possible to travel around the Olympic Peninsula, visiting many small communities, Indian reservations and tourist destinations, using the Olympic Transit Loop, which consists of six different but coordinated local public transit agencies (OPTC 2012), as illustrated in Figure 14.

**Figure 14** Olympic Peninsula Public Transportation  
([www.olympicpeninsula.org/sites/default/files/onp\\_transit\\_guide\\_2012.pdf](http://www.olympicpeninsula.org/sites/default/files/onp_transit_guide_2012.pdf))



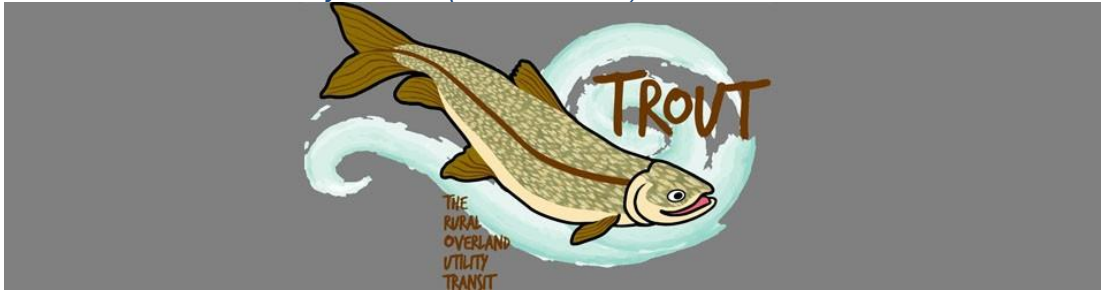
*It is possible to circle the Olympic Peninsula and visit most communities using integrated local public transit services.*

### *Rural and Small Town Transit Service Innovations*

Many rural areas and small towns are implementing transit service partnerships and management innovations (Hosen and Powell 2014):

- Some communities offer TaxiBus service: passengers must reserve a ride, and are carried between numerous fixed stop locations in the community by taxis which can pick up other passengers during the same trip (<http://citso.org/en/taxibus-service>).
- Some small towns offer once- or twice-a-week bus services to regional centers to allow residents to access healthcare services and stores.
- Some community transportation organizations provide seasonal or special bus services to recreation activities, such as beaches or ski hills, and to special events such as fairs and festivals.
- Some small towns support vanpooling or commuter bus service to help residents commute to nearby cities.

*The Rural Overland Utility Transit (TROUT 2015)*



The Rural Overland Utility Transit (TROUT) provides public transport services in eight rural municipalities with approximately 15,000 permanent residents in central Ontario, Canada. It supports various types of transportation services, including scheduled regional routes, door-to-door demand response, special event and charter transport, depending on community needs and resources. The program has a \$300,000 total annual budget (about \$20 annual per capita), of which \$60,000 is generated by fares and \$240,000 (\$16 per capita) by public subsidies.

*Idaho (Mattson and Hough 2015)*

The Community Transportation Association of Idaho (CTAI) is a non-profit organization which supports the development of multi-modal transportation services in Idaho communities, including fixed route, demand response and ridesharing services. CTAI helps distribute federal and state funds. Agencies must have a coordinated plan in order to receive these funds. To accomplish the the state is divided into 17 local networks that meet to discuss community needs and implementation strategies. The CTAI employs a full-time mobility manager in each of Idaho's six transportation districts. These managers facilitate the coordinated planning process and bring together key stakeholders, elected officials and leaders from the senior center or agency on aging. Executive director Heather Wheeler explains, "One of the key things the CTAI is doing is trying to bring mobility options to the rural communities so individuals can maintain their rural lifestyle and have access to health care, work, school or other necessary appointments."

*Campus Transportation Management (Van Heeke, Sullivan and Baxandall 2014)*

Many small towns have colleges and universities that are implementing campus transportation management programs to encourage students and staff to reduce automobile travel in order to help address local traffic and parking problems, increase affordability and safety, improve the community's quality of life. These programs usually include a combination of campus shuttle buses, public transit service improvements, discounted or free transit services, walking and cycling improvements, plus incentives to reduce driving such as parking pricing reforms.

For example, the University of North Carolina at Chapel Hill (town population 57,233) provides financial support to enable fare-free transit service throughout the community. Between 1997 and 2011, the proportion of students using transit to commute to campus more than doubled, from 21% to 53%. Morgantown, West Virginia (population 29,660) operates twenty bus routes, which are free for university and high school students, including one between the University of West Virginia campus and downtown which operates until midnight, in order to discourage drunk driving. Similarly, the University of Arkansas in Fayetteville (population 73,580) has ten bus routes that are free for students, plus a *Safe Ride* program that provides students who feel threatened or impaired a free ride home from any location within the city limits.

*People's Transit (Barry 2010)*

Huron, population 12,000, is the county seat of Beadle County, at the midpoint of eastern South Dakota. Temperatures can drop as low as 25 degrees below zero, and with a large senior population, many residents were worried about how their older neighbors in this rural community could access life's essentials without transportation options. This led, thirty years ago, to the establishment of People's Transit, started as a pilot program for the state of South Dakota in the mid-1970s, receiving most of its funding from the Older Americans Act. The service quickly expanded, bringing seniors to meals, recreational activities and health services. In 1975, Huron officials added the first wheelchair-accessible van to the fleet.

In the late 1990s, a building committee was established. Then-City Commissioner and current Mayor, David McGirr, worked with community members to locate a site for today's transit center, called Huron's Great Station. Given South Dakota's frigid winters, the center had to be energy efficient just to pay the bills. It takes a lot of work to shovel through the parking lot and thaw buses before they go out on the road, but the community has come to heavily rely on the system. McGirr explains, "Transit service is a critical element in our infrastructure. Without People's Transit, there would be a lot of people here living a lower standard of life. If ever they went away, I don't know how we'd replace them."

*Small Community Transit Service and Ridership Targets (CUTA 2009)*

In 2009, the Canadian Urban Transportation Association (CUTA) identified existing public transit service and ridership rates in various size communities, and used this information to set targets for 2040 to accommodate growing demands associated with demographic and economic trends such as aging population and rising future fuel prices, as illustrated in Table 10.

**Table 10      Small Community Transit Service and Ridership Targets (CUTA 2010)**

	Current	2040 Targets
Service: annual per capita vehicle-hours	0.7	1.3
Ridership: annual per capita passenger trips	21	40

*This indicates service and ridership targets to meet projected rural and small town transit needs.*

*Transit's Contribution Rural Community Livability (Godavarthy and Mattson 2016)*

A study of Valley City and Dickinson, North Dakota found that residents believe that transit should be provided in their community as a transportation option for seniors, people with disabilities, those who cannot or choose not to drive. Transit riders in both cities indicated that transit is very important to their quality of life, and stakeholders from both communities said transit is a critical lifeline for people who are elderly and/or have a disability, individuals with no vehicle, and those who cannot drive. The study indicates that public transit services make important contributions to rural community livability.

*Ride to Wellness (Ducote and Ducote 2016)*

Rides to Wellness (R2W) is a non-emergent medical transport program available to residents of Union County in rural Oregon. Community Connection of Northeast Oregon (CCNO), a non-profit, operates the program through its subsidiary organization Northeast Oregon Public Transit (NEOPT). An evaluation found that the program is highly valued, effective, and underutilized in Union County. The program provides 3,000-14,000 annual round trips in an area with an estimated 1,100-5,000 residents who lack transportation to medical services. This is estimated to provide benefits \$2.2-9.8m annual net benefits.

*Norway (ITF 2015)*

The Norwegian government provides financial support for developing new public transport systems in rural districts in Norway. This has resulted in several types of demand-responsive service being developed in sparsely populated areas. The services vary in the types of passengers served, frequency and flexibility. All require travelers to request the service by phone at least two hours in advance.

An example is Østfold in the south-eastern region. In addition to regular express bus services from the municipality to nearby cities, the inhabitants of more sparsely populated areas have access to a local demand-responsive service. The service was initially restricted to older users but has expanded to serve all residents. It offers two different routes: One serves the northern part of the area three days a week, the other serves the southern part on the two other weekdays. The buses can deviate up to two kilometres from their specified route to passenger's homes. There are two departures on each service day. The first departure is at about 10 o'clock, after the school transport is finished, the second service runs about 3 hours later. This makes it possible to carry out errands in the municipality centre. If nobody demands the service at least two hours in advance of scheduled departures, there will be no trip. Depending on the number of passengers and their special needs (for example, due to wheelchair) the lines will be serviced by minibuses or regular taxis, owned and administrated by the local taxi central. The service was meant to replace subsidized taxis for people with special needs.

Another demand-response model was developed for a large and sparsely populated municipality in the eastern part of Norway (Hedmark). The public authorities introduced it as a new public transport concept with departures from the municipality centre every hour, if requested at least two hours in advance, using regular taxis. The service has fixed stops but there is some flexibility in routes. The passengers have to be at the bus stop at specified time. As the stops are fixed, the service is not intended to replace services for people with special needs. The structure of the time schedule is based on the time of departure from, and arrivals to, the municipality centre: Every route starts from, and arrives at, the municipality centre half past every hour. The operating time is between seven o'clock in the morning and ten o'clock in the evening on workdays and between nine and seven o'clock on weekends. From the centre, it is possible to change to railway and express bus services for trips that cross the border of the municipality. The fares are regular and equal to ordinary public transport tickets.

User surveys indicate that demand response services are popular. Key user groups include young and older people without a driver's license. Some parents also expressed appreciation because the service relieves them from having to chauffeur children.

## Communicating Multimodal Planning Benefits

Public transportation can provide a variety of direct and indirect benefits. Table 11 identifies ways in which various constituents will benefit from public transportation.

**Table 11 Pro-Transit Arguments For Various Stakeholders**

Interest Group	Reasons to Support Public Transit
Seniors and people with disabilities	<ul style="list-style-type: none"> <li>• Improves their independence and ability to participate in activities</li> <li>• Saves money compared with car ownership and taxi travel</li> <li>• Supports “aging in place,” which allows non-drivers to remain in an area.</li> </ul>
Youths	<ul style="list-style-type: none"> <li>• Improves their independence and ability to participate in activities</li> <li>• Saves money compared with car ownership</li> </ul>
Motorists	<ul style="list-style-type: none"> <li>• Reduces chauffeuring burdens</li> <li>• Provides a mobility option if their vehicle fails or they are unable to drive</li> <li>• Reduces crash risk to all road users</li> </ul>
Business leaders	<ul style="list-style-type: none"> <li>• Helps attract and retain residents, and their business activity</li> <li>• Expands the pool of lower-wage employees</li> <li>• Allows non-driving tourists to visit</li> <li>• Reduces parking costs</li> </ul>
Transportation professionals	<ul style="list-style-type: none"> <li>• Serving non-drivers’ travel demands is an important and growing responsibility for transportation professionals</li> <li>• Reduces crash risks</li> <li>• Reduces traffic and parking congestion</li> </ul>
Public health professionals	<ul style="list-style-type: none"> <li>• Reduces crash risks</li> <li>• Encourages physical activity (since most transit trips include walking links)</li> <li>• Reduces hitchhiker assault risk</li> </ul>

*Reasons to support public transit can be tailored to the concerns of various interest groups.*



## Responding to Rural Multimodal Planning Criticisms

*This section addresses common criticisms of rural transit.*

### *Myth #1: Public Transit Is Only Justified In Large Cities*

Public transit serves various roles in an efficient and equitable transportation system. In large cities, it provides space-efficient mobility on major travel corridors, which reduces traffic and parking congestion. In both large and small communities, it provides basic mobility for non-drivers, affordable transportation for lower-income households, transportation for tourists, and support for local economic development. Although it only serves a smaller portion of total travel in most rural communities, those trips tend to be particularly important, including travel for healthcare, basic shopping, school, work, and tourism. Public transit can help reduce many of the problems facing rural communities and small towns, including population and economic declines, poverty and high traffic fatality rates.

Many smaller towns and rural villages are quite walkable and have good local services, and so are well suited for non-drivers, provided that there are appropriate options for travelling to other communities in the region. Public transit can serve this need.

### *Myth #2: Public Transit Is Costly and Inefficient*

Public transit services are sometimes criticized for being costly, particularly in rural areas where low ridership and dispersed development results in high costs per passenger-mile and low cost recovery (portion of total costs financed by fares). However, public transit can actually be very cost effective compared with alternatives. For example, a typical 5-mile rural transit trip costs about \$7.00 in total expenses, which is cheaper than many alternatives, including taxi fares for the same trip, the total costs to own and operate an automobile for infrequent use, chauffeuring driver time and vehicle costs, and accident costs, particularly for higher-risk (youth, senior or impaired) travelers forced to drive due to inadequate alternatives.

As previously discussed, per capita transit expenses are small in rural areas compared with larger cities, with motor vehicle costs, and even compared with Automobile Association memberships, which motorists join in order to have assistance if their vehicle fails. Public transit serves a similar function; it provides a mobility option that residents can use if their vehicle fails, they lose their ability to drive or become impaired. Even residents who do not currently use that option may value having it available.

Considering all of these factors, public transit investments are cost effective if they result in even small reductions in motor vehicle expenses. For example, residents would benefit overall if \$30 annual transit funding allows them to save just 1% of their vehicle, road and parking facility costs.

### *Myth #3: Transit is subsidized, unlike roads which motorists finance through user fees*

Many people assume that roads are fully financed by user fees such as fuel taxes and road tolls. Although user fees finance most highway costs, city and county roads are financed primarily by general taxes (Henchman 2013). Of the \$221 billion spent on U.S. roadways (about \$712 per capita), only \$105 billion (about \$338 per capita) was financed by user fees (FHWA 2012, HF-10), the rest was financed by general taxes which residents pay regardless of how much they drive.

As a result, people who drive less than average tend to subsidize the roadway costs of people who drive more than average. For example, if two residents both pay \$300 annually in local taxes to finance local roads, one who does not drive and only travels 1,000 annual miles subsidizes the roadway costs of their neighbor who drives 20,000 annual miles. Public transit subsidies offset these cross subsidies; they ensure that residents who do not drive receive a share of government transportation spending.

*Myth #4: Buses Run Empty*

People sometimes complain that transit vehicles (buses and vans) often appear empty. It is true that transit vehicles often operate with extra capacity due to fluctuating demand, just as private vehicles generally operate with empty seats, but most transit also have times when vehicles are nearly or completely full.

*Myth #5: Small towns and rural communities rely on informal transport services*

Although rural and small town residents tend to be generous, and often offer rides to their non-driving family members and friends, this cannot fully satisfy all travel demands. Informal travel arrangements can be unreliable or uncomfortable. Formal transit services offer reliable, professional service with fixed schedules and amenities such as wheelchair lifts and bike racks. As a result, non-drivers often prefer paying for public transit rather than relying entirely on the generosity of family and friends.

The need for more formal public transit is increasing in many communities. As rural populations age, the portion of residents who require rides increases while the portion who can offer rides declines, resulting in unmet needs. Many rural community organizations are finding that they cannot serve growing demand with volunteers.

*Myth #6: Self-driving cars will soon eliminate the need for public transit*

Some people argue that autonomous (self-driving) cars will soon eliminate the need for communities to subsidize public transit services. Such claims are unrealistic. Although vehicle manufactures are making progress developing self-driving technologies, it will be several years before such vehicles can operate reliably under all travel conditions – for example, no current technologies can navigate safely in heavy rain and snow – and even longer before they are affordable enough for lower-income households to purchase such a vehicle on the second-hand market. Even when they operate reliably, many people with disabilities and children will still need human assistance or supervision when traveling by motor vehicle. As a result, it is unlikely that self-driving cars will replace public transit services before the 2030s, and subsidies will still be needed to provide basic mobility for people with disabilities and low-incomes.

## Conclusions

More multimodal planning can help rural communities become more efficient and equitable. It helps ensure that all residents, including non-drivers, enjoy independent mobility and receive a fair share of public spending on transport facilities and services. Serving these demands can provide multiple benefits. However, current planning practices tend to overlook or undervalue many of these benefits, as summarized in Table 12. More multimodal planning recognizes these additional benefits, providing more support for walking, cycling, public transit and their variants.

**Table 12 Multimodal Transportation Benefits**

Benefit Category	Degree Considered In Current Planning
<b>Users</b>	
More independent mobility	Seldom included in formal economic evaluation
Financial savings compared with private automobile or taxi travel	Generally overlooked
Reduced accident and assault risk	Generally overlooked
Less risk of impaired driving citation or accident	Generally overlooked
<b>Motorists</b>	
Reduced chauffeuring burdens	Sometimes recognized by individuals but seldom included in formal economic evaluation
Reduced traffic risks (less higher-risk driving)	Generally overlooked
Reduced traffic and parking congestion	Generally overlooked
Provides a mobility option when they cannot drive	Generally overlooked
<b>Local Economy</b>	
Retains and attracts more residents	Seldom included in formal economic evaluation
Supports industries such as tourism	Seldom included in formal economic evaluation
Helps attract major employers such as colleges	Seldom included in formal economic evaluation

*Rural public transit can provide various benefits to users and communities. Many of these benefits tend to be overlooked, so public transit improvements are often worth far more than recognized.*

Although walking, cycling and public transit serve only a minor portion of total rural travel, many of those trips are important, for example, allowing seniors and people with disabilities to access healthcare and stores, young people to reach school and jobs, and allows car-free tourism. Failing to serve these needs can be costly. If suitable mobility options are unavailable, residents miss medical appointments and lose jobs, or must be chauffeured by drivers. Automobile-dependent community planning demonstrates that non-drivers are unimportant and unwelcome. As a result, some households with seniors, people with disabilities and youths, and tourists who lack cars, may choose other communities that provide better mobility services. This contributes to the spiral of declining population and economic activity that threatens many rural areas. Public transit is not the only solution to these problems, but it can make important contributions.

Current demographic and economic trends are increasing rural transit demands, and the benefits of serving these demands. Aging population, more residents with disabilities, industrial shifts and rising poverty, increasing restrictions on higher-risk driving, and changing consumer preferences are increasing the number of residents who cannot, should not, or prefer not to drive. Many residents who previously *offered* rides are now reaching the age at which they *require* rides, so informal transportation networks and volunteer programs can satisfy a declining portion of mobility needs. Communities that serve the growing demand for alternative modes and “carfree” or “carlite” lifestyles can attract and retain more residents and visitors, and the economic activity they generate. Motorists also benefit from reduced chauffeuring burdens and chances of being injured by a higher risk driver.

Analysis in this report indicates that during the next two decades, rural multimodal travel demands will increase several fold, so for example, if a community currently operates 5 transit revenue vehicle-miles (RVM) per capita (a typical low value), it should plan to provide 10 to 50 in the future. New planning and funding practices will be needed to meet these needs.

Of course, rural communities are diverse, and so are their mobility needs. There are many possible ways that rural communities can provide mobility services ranging from volunteer programs operated by local charities, subsidized taxi services, community transport, demand response and fixed-route bus services. Many rural communities have demonstrated that with creativity and good management it is possible to significantly improve public transit services with modest investments.

Rural transit spending is currently low, particularly compared with:

1. Per capita spending on transit in urban areas.
2. What many motorists pay for Automobile Association memberships.
3. What motorists spend on automobiles.
4. What governments and businesses spend on roads and parking facilities.
5. The potential benefits of such investments.

Many federal and state programs support rural transit, although local communities must usually provide matching funds. Examples described in this report indicate that many rural communities are using innovative partnerships and diverse funding sources to finance transit improvements. Overall, such programs are often very cost effective, considering all benefits and costs; each dollar invested often provides far more than a dollar in total savings and benefits.

Improving transit service requires broad community support. To build this support, proponents must create a vision of a more diverse transportation system, and demonstrate the resulting benefits to various stakeholders. It is important to have credible technical analysis about these benefits, but it is important to support such analysis with stories which vividly illustrate how transit can benefit local individuals, businesses and communities. To meet growing public transit demands, local leaders will need to overcome various obstacles including misunderstandings about the roles that transit plays in small towns and rural communities, and biases in transport planning and funding practices which undervalue and underinvest in public transit.

## References and Information Resources

- APTA (2012), *Rural Communities: Expanding Horizons*, American Public Transit Association ([www.apta.com](http://www.apta.com)); at [www.apta.com/resources/reportsandpublications/Documents/Rural-Communities-APTA-White-Paper.pdf](http://www.apta.com/resources/reportsandpublications/Documents/Rural-Communities-APTA-White-Paper.pdf).
- APTA (2013), *Millennials and Mobility: Understanding the Millennial Mindset*, American Public Transit Association ([www.apta.com](http://www.apta.com)); at <http://bit.ly/PolOnv>.
- APTA (2014), *Public Transportation Fact Book*, American Public Transit Association ([www.apta.com](http://www.apta.com)); at [www.apta.com/resources/statistics/Documents/FactBook/2014-APTA-Fact-Book.pdf](http://www.apta.com/resources/statistics/Documents/FactBook/2014-APTA-Fact-Book.pdf).
- Michael Anderson and Tahmina Khan (2014), "Performance Measures for the Analysis of Rural Public Transit in Alabama," *Journal of Public Transportation*, Vo. 17, No. 4, pp. 1-13 (DOI: <http://dx.doi.org/10.5038/2375-0901.17.4.1>); at <http://scholarcommons.usf.edu/jpt/vol17/iss4/2>.
- Sean Berry (2010), *Case Studies on Transit and Livable Communities in Rural and Small Town America*, Transportation for America ([www.reconnectingamerica.org](http://www.reconnectingamerica.org)); at <http://bit.ly/1KILZ88>.
- Jon E. Burkhardt, James L. Hedrick and Adam T. McGavock (1998), *Assessment of the Economic Impacts of Rural Public Transportation*, TCRP Report 34, Transportation Research Board ([www.trb.org](http://www.trb.org)); at [http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp\\_rpt\\_34.pdf](http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp_rpt_34.pdf).
- Jon E. Burkhardt, Joseph M. Rubino and Joohee Yum (2011), *Improving Mobility for Veterans*, TCRP Research Digest 99, Transit Cooperative Research Program, Transportation Research Board ([www.trb.org](http://www.trb.org)); at [http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp\\_rrd\\_99.pdf](http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp_rrd_99.pdf).
- Jon E. Burkhardt, Charles A. Nelson, Gail Murray And David Koffman (2004), *Toolkit for Rural Community Coordinated Transportation Services*, TCRP Report 101, TRB ([www.trb.org](http://www.trb.org)); at [http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp\\_rpt\\_101.pdf](http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp_rpt_101.pdf).
- BLS (2015), *Consumer Expenditure Survey*, Bureau of Labor Statistics ([www.bls.gov](http://www.bls.gov)); at [www.bls.gov/cex/2013/combined/population.pdf](http://www.bls.gov/cex/2013/combined/population.pdf).
- David L. Brown and Kai A. Schafft (2011), *Rural People and Communities in the 21st Century: Resilience and Transformation*, Polity Press ([www.polity.co.uk](http://www.polity.co.uk)).
- COIC (2013), *Central Oregon Regional Transit Master Plan*, Central Oregon Intergovernmental Council (<http://coic2.org>); at <http://coic2.org/transportation/rtmp>.
- CRPD (2016), *Rural Reality: City Transit, Rural Transit*, Minnesota Center for Rural Policy and Development ([www.ruralmn.org](http://www.ruralmn.org)); at [www.ruralmn.org/publications/rural-reality-city-transit-rural-transit](http://www.ruralmn.org/publications/rural-reality-city-transit-rural-transit).
- CTOD and CNT (2006), *The Affordability Index: A New Tool for Measuring the True Affordability of a Housing Choice*, Center for Transit-Oriented Development and the Center for Neighborhood Technology, Brookings Institute ([www.brookings.edu](http://www.brookings.edu)); at [www.brookings.edu/metro/umi/20060127\\_affindex.pdf](http://www.brookings.edu/metro/umi/20060127_affindex.pdf).

- CUTA (2009), *Transit Vision 2040 — From Vision To Action, Strategic Direction 2.5: Build Service In Smaller Communities*, Canadian Urban Transportation Association ([www.cutaactu.ca](http://www.cutaactu.ca)); at [www.cutaactu.ca/en/public-transit/publicationsandresearch/resources/2.5Build\\_service\\_in\\_smaller\\_communities.pdf](http://www.cutaactu.ca/en/public-transit/publicationsandresearch/resources/2.5Build_service_in_smaller_communities.pdf).
- Natalie Delgadillo (2017), “How an Eco-Friendly Rideshare Is Changing Life in a Tiny Rural Town,” *Governing Magazine* ([www.governing.com](http://www.governing.com)); at [www.governing.com/topics/transportation-infrastructure/gov-eco-friendly-rideshare-cantua-creek-rural-california-unincorporated.html](http://www.governing.com/topics/transportation-infrastructure/gov-eco-friendly-rideshare-cantua-creek-rural-california-unincorporated.html).
- Nicholas Ducote and Kelly Belton Ducote (2016), *Gap Analysis and Cost-Benefit Modeling: Northeast Oregon Public Transit’s Rides to Wellness Program*, Community Connection of Northeast Oregon and Northeast Oregon Public Transit ([www.neotransit.org](http://www.neotransit.org)); at [www.neotransit.org/upload/425703/documents/6ADB5B4A569524E2.pdf](http://www.neotransit.org/upload/425703/documents/6ADB5B4A569524E2.pdf).
- David W. Eby, et al. (2012), *Recommendations For Meeting The Mobility Needs Of Older Adults In Rural Michigan*, University of Michigan Transportation Research Institute ([www.umtri.umich.edu](http://www.umtri.umich.edu)); at [www.michigan.gov/documents/mdot/MDOT\\_Research\\_Report\\_RC1592\\_408044\\_7.pdf](http://www.michigan.gov/documents/mdot/MDOT_Research_Report_RC1592_408044_7.pdf).
- Elizabeth Ellis and Brian McCollom (2014), *Guidebook for Rural Demand-Response Transportation: Measuring, Assessing, and Improving Performance*, TCRP Report 136, Transportation Research Board ([www.trb.org](http://www.trb.org)); at [http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp\\_rpt\\_136.pdf](http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp_rpt_136.pdf).
- Elizabeth Ellis, et al. (2013), *Community Tools to Improve Transportation Options for Veterans, Military Service Members, and Their Families*, TCRP Report 164, Transportation Research Board ([www.trb.org](http://www.trb.org)); at [http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp\\_rpt\\_164.pdf](http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp_rpt_164.pdf).
- ERS (2014), *Rural America at a Glance*, Economic Research Services, U.S. Department of Agriculture ([www.ers.usda.gov](http://www.ers.usda.gov)); at [www.ers.usda.gov/media/1697681/eb26.pdf](http://www.ers.usda.gov/media/1697681/eb26.pdf).
- ERS (2015), *Geography of Poverty*, Economic Research Services, U.S. Department of Agriculture ([www.ers.usda.gov](http://www.ers.usda.gov)); at [www.ers.usda.gov/topics/rural-economy-population/rural-poverty-well-being/geography-of-poverty.aspx](http://www.ers.usda.gov/topics/rural-economy-population/rural-poverty-well-being/geography-of-poverty.aspx).
- Nicholas Farber and Douglas Shinkle (2011), *Aging in Place: A State Survey of Livability Policies and Practices*, National Conference of State Legislatures and the AARP Public Policy Institute ([www.aarp.org](http://www.aarp.org)); at <https://assets.aarp.org/rgcenter/ppi/liv-com/aging-in-place-2011-full.pdf>.
- Christopher E. Ferrell (2015), *The Benefits of Transit in the United States: A Review and Analysis of Benefit-Cost Studies*, Mineta Transportation Institute (<http://transweb.sjsu.edu>); at <http://transweb.sjsu.edu/PDFs/research/1425-US-transit-benefit-cost-analysis-study.pdf>.
- FHWA (2002), *Rural Transportation Planning*, Federal Highway Administration ([www.fhwa.dot.gov](http://www.fhwa.dot.gov)); at [www.fhwa.dot.gov/planning/processes/rural/index.cfm](http://www.fhwa.dot.gov/planning/processes/rural/index.cfm).
- FHWA (2012), *Highway Statistics*, Federal Highway Administration ([www.fhwa.dot.gov](http://www.fhwa.dot.gov)); at [www.fhwa.dot.gov/policyinformation/statistics/2012](http://www.fhwa.dot.gov/policyinformation/statistics/2012).
- Theresa Firestone (2011), *The U.S. Rural Population and Scheduled Intercity Transportation in 2010: A Five-Year Decline in Transportation Access*, U.S. Department of Transportation; at <http://1.usa.gov/1NICIGi>.



Gerard Fitzgerald (2012), *The Social Impacts Of Poor Access To Transport In Rural New Zealand*, Research Report 484, NZ Transport Agency ([www.nzta.govt.nz](http://www.nzta.govt.nz)); at [www.nzta.govt.nz/resources/research/reports/484/docs/484.pdf](http://www.nzta.govt.nz/resources/research/reports/484/docs/484.pdf).

FTA (2013), *National Transit Database Spreadsheet* (TS2.2TimeSeriesSysWideOpexpSvc.xls), 2012 data for transit systems in UZA with less than 60,000 residents; at <http://www.ntdprogram.gov/ntdprogram/data.htm>.

Stephen Fuller, John Robinson, Francisco Fraire and Sharada Vadali (2011), *Improving Intermodal Connectivity in Rural Areas to Enhance Transportation Efficiency: A Case Study*, University Transportation Center for Mobility (<http://utcm.tamu.edu>); at [http://utcm.tamu.edu/publications/final\\_reports/Fuller\\_07-07.pdf](http://utcm.tamu.edu/publications/final_reports/Fuller_07-07.pdf).

Ranjit Godavarthy, Jeremy Mattson and Elvis Ndembe (2014), *Cost-Benefit Analysis of Rural and Small Urban Transit*, Upper Great Plains Transportation Institute, North Dakota State University, for the U.S. Department of Transportation ([www.nctr.usf.edu](http://www.nctr.usf.edu)); at [www.nctr.usf.edu/wp-content/uploads/2014/07/77060-NCTR-NDSU03.pdf](http://www.nctr.usf.edu/wp-content/uploads/2014/07/77060-NCTR-NDSU03.pdf).

Ranjit Godavarthy and Jeremy Mattson (2016), *Exploring Transit's Contribution to Livability in Rural Communities: Case Study of Valley City, ND, and Dickinson, ND*, Upper Great Plains Transportation Institute, North Dakota State University, for the U.S. Department of Transportation ([www.nctr.usf.edu](http://www.nctr.usf.edu)); at [www.ugpti.org/resources/reports/downloads/sur1c16-004.pdf](http://www.ugpti.org/resources/reports/downloads/sur1c16-004.pdf).

HAC (2013), *Demographics of Senior and Veteran Housing in Rural America - Housing Assistance Council*, , Housing Assistance Council ([www.ruralhome.org](http://www.ruralhome.org)); at [www.slideshare.net/ruralhome/hac-seniors-may2013webinarpresentationweb](http://www.slideshare.net/ruralhome/hac-seniors-may2013webinarpresentationweb).

HAC (2014), *Housing an Aging Rural America*, Housing Assistance Council ([www.ruralhome.org](http://www.ruralhome.org)); at [www.ruralhome.org/storage/documents/publications/rrreports/ruralseniors2014.pdf](http://www.ruralhome.org/storage/documents/publications/rrreports/ruralseniors2014.pdf).

Anush Yousefian Hansen and David Hartley (2015), *Promoting Active Living in Rural Communities*, Active Living Research, Robert Wood Johnson Foundation (<http://activelivingresearch.org>); at <http://bit.ly/1Ov9s9e>.

Wan He and Luke J. Larsen (2014), *Older Americans With a Disability: 2008–2012*, American Community Survey Report, U.S. Census Bureau ([www.census.gov](http://www.census.gov)); at [www.census.gov/content/dam/Census/library/publications/2014/acs/acs-29.pdf](http://www.census.gov/content/dam/Census/library/publications/2014/acs/acs-29.pdf).

Joseph Henchman (2013), *Gasoline Taxes and Tolls Pay for Only a Third of State & Local Road Spending*, The Tax Foundation ([www.taxfoundation.org](http://www.taxfoundation.org)); at <http://taxfoundation.org/article/gasoline-taxes-and-tolls-pay-only-third-state-local-road-spending>.

Kenneth I. Hosen and S. Bennett Powell (2014), *Innovative Rural Transit Services: A Synthesis of Transit Practice*, TCRP Synthesis 94, Transportation Research Board ([www.trb.org](http://www.trb.org)); at [http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp\\_syn\\_94.pdf](http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp_syn_94.pdf).

ICMA (2010), *Putting Smart Growth to Work in Rural Communities*, International City/County Management Association ([www.icma.org](http://www.icma.org)); at <http://icma.org/Documents/Document/Document/301483>.

Erica Interrante (2014), *The Next Generation of Travel: Research, Analysis and Scenario Development*, FHWA Office of Policy Transportation Studies ([www.fhwa.dot.gov](http://www.fhwa.dot.gov)); at [www.fhwa.dot.gov/policy/otps/nextgen\\_finalreport.cfm](http://www.fhwa.dot.gov/policy/otps/nextgen_finalreport.cfm).

IPCS (2011), *Supporting Sustainable Rural Communities*, Interagency Partnership for Sustainable Communities, U.S. Department of Transportation, U.S. Department of Housing and Urban Development and U.S. Environmental Protection Agency ([www.epa.gov/smartgrowth](http://www.epa.gov/smartgrowth)); at [www.epa.gov/smartgrowth/pdf/2011\\_11\\_supporting-sustainable-rural-communities.pdf](http://www.epa.gov/smartgrowth/pdf/2011_11_supporting-sustainable-rural-communities.pdf).

ITF (2015), *International Experiences on Public Transport Provision in Rural Areas*, International Transport Forum ([www.internationaltransportforum.org](http://www.internationaltransportforum.org)); at [www.internationaltransportforum.org/Pub/pdf/15CSPA\\_RuralAreas.pdf](http://www.internationaltransportforum.org/Pub/pdf/15CSPA_RuralAreas.pdf).

C. Kirabo Jackson and Emily Greene Owens (2010), "One for the Road: Public Transportation, Alcohol Consumption, and Intoxicated Driving," *Journal of Public Economics*; at [http://works.bepress.com/cgi/viewcontent.cgi?article=1007&context=c\\_kirabo\\_jackson](http://works.bepress.com/cgi/viewcontent.cgi?article=1007&context=c_kirabo_jackson).

Kenneth M. Johnson (2012), *Rural Demographic Change in the New Century Slower Growth, Increased Diversity*, Carsey Institute (<http://scholars.unh.edu>); at <http://scholars.unh.edu/cgi/viewcontent.cgi?article=1158&context=carsey>.

JPT (2012), "Rural and Intercity Bus Special Issue" *Journal of Public Transportation*, Vol. 15, No. 3; at [www.nctr.usf.edu/wp-content/uploads/2012/10/jpt\\_15.3.pdf](http://www.nctr.usf.edu/wp-content/uploads/2012/10/jpt_15.3.pdf).

KFH Group (2014), *Effective Approaches to Meeting Rural Intercity Bus Transportation Needs*, TCRP Report 79, Transportation Research Board ([www.trb.org](http://www.trb.org)); at [http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp\\_rpt\\_79.pdf](http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp_rpt_79.pdf).

Clifford Krauss (2008), "Rural U.S. Takes Worst Hit as Gas Tops \$4 Average," *New York Times*, 9 June 2008; at [www.nytimes.com/2008/06/09/business/09gas.html?ref=business&r=0](http://www.nytimes.com/2008/06/09/business/09gas.html?ref=business&r=0).

Todd Litman (2013), *Evaluating Public Transit Benefits and Costs*, Victoria Transport Policy Institute ([www.vtpi.org](http://www.vtpi.org)); at [www.vtpi.org/tranben.pdf](http://www.vtpi.org/tranben.pdf).

Todd Litman (2014), "A New Transit Safety Narrative" *Journal of Public Transportation*, Vol. 17, No. 4, pp.121-142; at [www.nctr.usf.edu/wp-content/uploads/2014/12/JPT17.4\\_Litman.pdf](http://www.nctr.usf.edu/wp-content/uploads/2014/12/JPT17.4_Litman.pdf).

Todd Litman (2017), *Public Transportation's Impact on Rural and Small Towns: A Vital Mobility Link*, American Public Transportation Association ([www.apta.com](http://www.apta.com)); at [www.apta.com/rural](http://www.apta.com/rural).

Jana Lynott (2014), *Reconnecting Small-Town America by Bus: New Federal Transit Rules Spur Investment*, AARP Public Policy Institute, American Association of Retired Persons ([www.aarp.org](http://www.aarp.org)); at <http://tinyurl.com/pgtct9q>.

Noreen C. McDonald (2015), "Are Millennials Really the 'Go-Nowhere' Generation?" *Journal of the American Planning Association*, DOI: 10.1080/01944363.2015.1057196; summarized in "The Clearest Explanation Yet for Why Millennials Are Driving Less" ([www.citylab.com/commute/2015/07/the-clearest-explanation-yet-for-why-millennials-are-driving-less/398366](http://www.citylab.com/commute/2015/07/the-clearest-explanation-yet-for-why-millennials-are-driving-less/398366))

Nancy McGuckin and Jana Lynott (2012), *Impact of Baby Boomers on U.S. Travel, 1969 to 2009*, American Association of Retired Persons ([www.aarp.org](http://www.aarp.org)); at <http://bit.ly/1JwNmf4>.

Jeremy Mattson (2012), *Travel Behavior and Mobility of Transportation-Disadvantaged Populations: Evidence from the National Household Travel Survey*, Upper Great Plains Transportation Institute; at [www.ugpti.org/pubs/pdf/DP258.pdf](http://www.ugpti.org/pubs/pdf/DP258.pdf).

Jeremy Mattson (2016), *Rural Transit Fact Books*, Small Urban and Rural Transit Center ([www.surtc.org](http://www.surtc.org)), Upper Great Plains Transportation Institute; at [www.surtc.org/transitfactbook](http://www.surtc.org/transitfactbook).

Jeremy Mattson and Jill Hough, (2015), *Identifying and Satisfying the Mobility Needs of North Dakota's Transit System*, Upper Great Plains Transportation Institute ([www.ugpti.org](http://www.ugpti.org)); at [www.ugpti.org/pubs/pdf/DP280.pdf](http://www.ugpti.org/pubs/pdf/DP280.pdf).

Sue Mitchell and Ben Hamilton-Baillie (2011), *Traffic in Villages – Safety and Civility for Rural Roads: A Toolkit for Communities*, Dorset AONB Partnership ([www.dorsetaonb.org.uk](http://www.dorsetaonb.org.uk)); at [www.dorsetaonb.org.uk/assets/downloads/Rural\\_Roads\\_Protocol/trafficinvillages-web.pdf](http://www.dorsetaonb.org.uk/assets/downloads/Rural_Roads_Protocol/trafficinvillages-web.pdf).

Lydia Morken and Mildred Warner (2011), *Planning for the Aging Population: Rural Responses to the Challenge*, Department of City and Regional Planning, Cornell University prepared for the National Association of Area Agencies on Aging; at <http://s3.amazonaws.com/mildredwarner.org/attachments/000/000/196/original/de6841e2187c889cdf4a15a7b45512f4>.

NSMM (2015), *Rural Transportation*, National Center for Mobility Management (<http://nationalcenterformobilitymanagement.org>); at <http://nationalcenterformobilitymanagement.org/by-topic-rural-transportation>.

NCST (2010), *Transportation: The Silent Need. Results of a National Survey of Area Agencies on Aging*, National Center on Senior Transportation [www.a4aa.com/Transportation\\_TheSilentNeed.pdf](http://www.a4aa.com/Transportation_TheSilentNeed.pdf).

NHTSA (2014), *Rural/Urban Comparison*, National Highway Traffic Safety Administration ([www-nrd.nhtsa.dot.gov](http://www-nrd.nhtsa.dot.gov)); at [www-nrd.nhtsa.dot.gov/Pubs/812050.pdf](http://www-nrd.nhtsa.dot.gov/Pubs/812050.pdf).

Noxon (2009), *Improving Travel Options in Small & Rural Communities*, Transport Canada ([www.tc.gc.ca](http://www.tc.gc.ca)); at [www.tc.gc.ca/media/documents/ITOSRC.pdf](http://www.tc.gc.ca/media/documents/ITOSRC.pdf).

NRTAP (2015), *National Rural Transit Assistance Program Website* (<http://nationalrtpap.org>), Federal Transit Administration.

Ontario (2016), *Towards a Northern Ontario Multimodal Transportation Strategy; Discussion Paper*, Ontario Ministry of Transportation and Ontario Ministry of Northern Development and Mines; at <https://nomts.ca/discussion-paper>.

OPTC (2012), *Olympic Peninsula Transit Guide*, Olympic Peninsula Tourist Commission ([www.olympicpeninsula.org](http://www.olympicpeninsula.org)); at [www.olympicpeninsula.org/sites/default/files/onp\\_transit\\_guide\\_2012.pdf](http://www.olympicpeninsula.org/sites/default/files/onp_transit_guide_2012.pdf).

ORH (2014), *About Rural Veterans*, Office of Rural Health ([www.ruralhealth.va.gov](http://www.ruralhealth.va.gov)); at [www.ruralhealth.va.gov/about/rural-veterans.asp](http://www.ruralhealth.va.gov/about/rural-veterans.asp).

Kathleen Painter, Eric Jessup, Marcia Gossard and Ken Casavant (2007), "Demand Forecasting for Rural Transit: Models Applied to Washington State," *Transportation Research Record* 1997, pp. 35-40; at [www.trforum.org/forum/downloads/2007\\_4B\\_DemandEst\\_paper.pdf](http://www.trforum.org/forum/downloads/2007_4B_DemandEst_paper.pdf).

PATH (2006), *The PATH Guide: Planning Ideas, Tools And Examples To Achieve Transportation Access And Equity In Rural California*, Prepared by Natural Resources Services, A Division of Redwood Community Action Agency, Eureka, California, ([www.nrsrcaa.org/path](http://www.nrsrcaa.org/path)), with funding from The Caltrans Environmental Justice Program; at <https://bit.ly/2mDY5To>.

Del Peterson (2014), *Improving Veteran Mobility in Small Urban and Rural Areas*, Small Urban and Rural Transit Center, Upper Great Plains Transportation Institute, [www.nctr.usf.edu/wp-content/uploads/2015/01/77060-NCTR-NDSU02-508.pdf](http://www.nctr.usf.edu/wp-content/uploads/2015/01/77060-NCTR-NDSU02-508.pdf).

PSRC (2004), *Rural Town Centers & Corridors Project*, Puget Sound Regional Council ([www.psrc.org/projects/rural/reports.htm](http://www.psrc.org/projects/rural/reports.htm)). This project looked at how to identify and integrate rural highway corridor development needs with local town center development.

Reconnecting America (2012), *Putting Transit to Work in Main Street America: How Smaller Cities and Rural Places Are Using Transit and Mobility Investments to Strengthen Their Economies and Communities*, Reconnecting America ([www.reconnectingamerica.org](http://www.reconnectingamerica.org)) and Community Transportation Association ([www.ctaa.org](http://www.ctaa.org)); at <http://reconnectingamerica.org/assets/PDFs/201205ruralfinal.pdf>.

RTTC (2012), *Active Transportation Beyond Urban Centers: Walking and Bicycling in Small Towns and Rural America* Rails-to-Trails Conservancy ([www.railstotrails.org](http://www.railstotrails.org)); at <https://bit.ly/2JRTx5k>.

*Rural Transportation Planning Clearinghouse* ([www.ruraltransportation.org](http://www.ruraltransportation.org)) is the national professional association for rural transport planning professionals and stakeholders.

*Rural Transportation Planning Website* ([wwwcf.fhwa.dot.gov/planning/rural](http://wwwcf.fhwa.dot.gov/planning/rural)) by the US Federal Highway Administration provides a variety of resources and links.

*Rural Transportation Toolkit* ([www.ruralhealthinfo.org/toolkits/transportation](http://www.ruralhealthinfo.org/toolkits/transportation)) provides information on developing, implementing and evaluating rural transportation programs.

SACOG (2008), *Urban-Rural Connections Strategy*, Sacramento Area Council of Governments ([www.sacog.org](http://www.sacog.org)); at [www.edctc.org/1\\_ASSETS/CONTENT\\_FOLDERS/LIBRARY/RUCS.pdf](http://www.edctc.org/1_ASSETS/CONTENT_FOLDERS/LIBRARY/RUCS.pdf).

Katherine Shaver and Bill Turque (2015), "Suburbs such as Montgomery County Rethink Transit to Court Millennials," *Washington Post* ([www.washingtonpost.com](http://www.washingtonpost.com)); at <http://wapo.st/1xsAdnU>.

Michael Sivak and Brandon Schoettle (2012), "Update: Percentage of Young Persons With a Driver's License Continues to Drop," *Traffic Injury Prevention*, Vol. 13, Is. 4, p. 341; DOI: 10.1080/15389588.2012.696755

*Small Urban & Rural Transit Center* ([www.surtc.org](http://www.surtc.org)) at North Dakota State University's *Upper Great Plains Transportation Institute* works to increase the mobility of small urban and rural residents through improved public transportation.

Samina T. Syed, Ben S. Gerber, and Lisa K. Sharp (2013), "Traveling Towards Disease: Transportation Barriers to Health Care Access," *Journal of Community Health*, Vol. 38, No. 5, pp. 976–993; at [www.ncbi.nlm.nih.gov/pmc/articles/PMC4265215](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4265215).

Jim P. Stimpson, et al. (2014), "Share of Mass Transit Miles Traveled and Reduced Motor Vehicle Fatalities in Major Cities of the United States," *Journal of Urban Health: Bulletin of the New York Academy of Medicine*, (doi:10.1007/s11524-014-9880-9); at <https://bit.ly/2OdnW1b>.

TGM (2013), *Transit in Small Cities: A Primer for Planning, Siting and Designing Transit Facilities in Oregon*, Oregon Department of Transportation and Growth Management ([www.oregon.gov/LCD/TGM](http://www.oregon.gov/LCD/TGM)); at [www.oregon.gov/LCD/TGM/docs/fulltransitprimer4-4-13.pdf](http://www.oregon.gov/LCD/TGM/docs/fulltransitprimer4-4-13.pdf).

*Transit in Parks Technical Assistance Center* (TRIPTAC) ([www.triptac.org](http://www.triptac.org)) offers assistance for non-auto transportation planning by U.S. Federal Land Management Agencies and partners.

TRB (2012), *Rural Public Transportation Strategies for Responding to the Livable and Sustainable Communities*, Digest 375 National Cooperative Highway Research Program (NCHRP), TRB ([www.trb.org](http://www.trb.org)); at [http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp\\_rrd\\_375.pdf](http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rrd_375.pdf).

TRB (2013), *Methods for Forecasting Demand and Quantifying Need for Rural Passenger Transportation: Final Workbook*, Report 161, Transportation Research Cooperative Program, TRB ([www.trb.org](http://www.trb.org)); at [http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp\\_rpt\\_161.pdf](http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp_rpt_161.pdf).

TRB (2017), *Best Practices in Rural Regional Mobility*, National Cooperative Highway Research Program, TRB ([www.trb.org](http://www.trb.org)); at [www.nap.edu/24944](http://www.nap.edu/24944).

*TRB Committee on Rural Public and Intercity Bus Transportation* (AP055)

TROUT (2015), *About The TROUT*, The Rural Overland Utility Transit (<http://catchthetrout.ca>); at <http://catchthetrout.ca/tag/rural-public-transit>.

*Upper Great Plains Transportation Institute: Small Urban and Rural Transit Center* ([www.surtc.org](http://www.surtc.org)).

USDA (2014), *Rural America at a Glance: 2014 Edition*, U.S. Department of Agriculture ([www.ers.usda.gov](http://www.ers.usda.gov)); at [www.ers.usda.gov/media/1697681/eb26.pdf](http://www.ers.usda.gov/media/1697681/eb26.pdf).

USDOT (2011), "Washington Case Study," *Transit at the Table III*, USDOT ([www.transportation.gov](http://www.transportation.gov)); at <https://bit.ly/2uINETd>.

VA (2015), *Veterans Transportation Service*, Veterans Administration ([www.ruralhealth.va.gov](http://www.ruralhealth.va.gov)); at [www.va.gov/healthbenefits/vts](http://www.va.gov/healthbenefits/vts).

Tom Van Heeke, Elise Sullivan and Phineas Baxandall (2014), *A New Course: How Innovative University Programs Are Reducing Driving On Campus And Creating New Models For Transportation*, U.S. Public Interest Research Group ([uspirg.org](http://uspirg.org)); at <http://uspirg.org/reports/usp/new-course>.

Nagendra R. Velaga, et al. (2012), "The Potential Role of Flexible Transport Services in Enhancing Rural Public Transport Provision," *Journal of Public Transportation*, Vol. 15, No. 1, pp. 111-131; at [www.nctr.usf.edu/wp-content/uploads/2012/04/JPT15.1.pdf](http://www.nctr.usf.edu/wp-content/uploads/2012/04/JPT15.1.pdf).

Natalie Villwock-Witte and Karalyn Clouser (2016), *Mobility Mindset of Millennials in Small Urban and Rural Areas*, Small Urban and Rural Livability Center (<http://surlc.org>), Montana State University; at [http://surlc.org/wp-content/uploads/2016/10/Millennials\\_09282016\\_FINAL.pdf](http://surlc.org/wp-content/uploads/2016/10/Millennials_09282016_FINAL.pdf)

Carrie A. Werner (2011), *The Older Population: 2010 Census Briefs*, C2010BR-09, US Census ([www.census.gov](http://www.census.gov)); at [www.census.gov/prod/cen2010/briefs/c2010br-09.pdf](http://www.census.gov/prod/cen2010/briefs/c2010br-09.pdf).

Western Transportation Institute ([www.wti.montana.edu](http://www.wti.montana.edu)), is the country's largest National University Transportation Center focused on rural transportation issues

James P. Wood, et al. (2016), "Older Adult Transportation in Rural Communities: Results of an Agency Survey," *Journal of Public Transportation*, Vol. 19, No. 2, pp. 154-167 (<http://dx.doi.org/10.5038/2375-0901.19.2.9>); at <https://bit.ly/2A96BDB>.

WTI (2011), *Montana Intercity Bus Service Study*, Western Transportation Institute ([www.wti.montana.edu](http://www.wti.montana.edu)); at <https://bit.ly/1GLIfYK>.

[www.vtppi.org/rmp.pdf](http://www.vtppi.org/rmp.pdf)