

Project Name

**Exploring Transit's Contribution to Livability in Rural Communities:
Guidebook and Exercises**

Technical Memorandum 1

**LITERATURE REVIEW:
TRANSIT AND LIVABILITY
IN RURAL AMERICA**

Prepared for

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and

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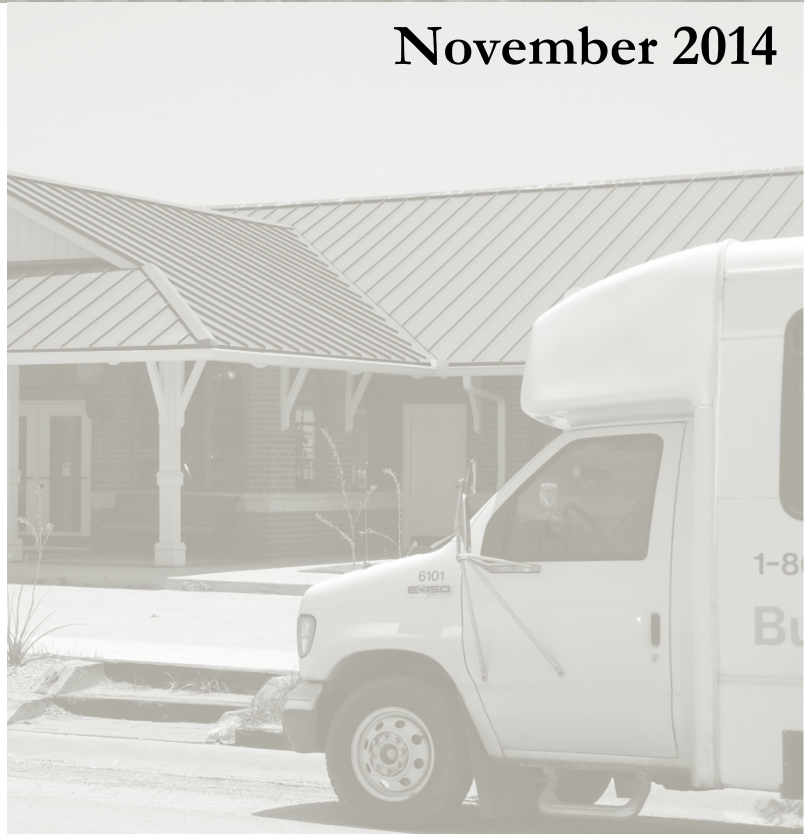


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Introduction

Transit is one of many factors that influence livability of rural areas in the United States. Some rural communities do not have public transit services of any kind, while others operate a wide variety of services. The demographic, social, and economic fabrics of rural communities also vary widely.

This technical memorandum is a review of literature and brief discussion of the nature of rural transit and trends in rural America. This document is the product of the early stages of a study to evaluate the role of transit in livability of rural American communities. This research builds on a previous Federal Transit Administration (FTA) project, *Transit Livability Performance Measures: Rural Transit Livability Performance Measures Suitable for Use at National Level* (RTLPM Study). The FTA-sponsored study identified a set of performance measures connecting livability to transit in rural communities on a macro-scale—by county, by agency, and by state. The RTLPM Study evaluated potential measures by investigating rural transit agencies in eight case study states.

The present study is sponsored by the United States Department of Transportation (USDOT) University Transportation Centers (UTC) Program and the Texas A&M Transportation Institute (TTI). The purpose is to investigate the nexus of transit and livability at the community level. The bulk of the study effort consists of conducting a pilot case study and then additional case studies in a variety of rural communities.

The research will result in both documentation of case study findings about the nexus of livability and transit in rural America and a guidebook with accompanying exercise materials of immediate benefit to transit agencies, rural communities, and policy makers. Researchers will use a webinar to share study findings and guidebook materials. All survey materials and other tools used by researchers will be available on TTI's website at the conclusion of the study.

Three research institutions will collaborate to conduct the research:

- Texas A&M University System, Texas A&M Transportation Institute (lead agency).
- University of South Florida, National Center for Transit Researcher (NCTR).
- North Dakota State University, Small Urban and Rural Transit Center (SURTC).

Study Organization

The study consists of two phases of effort. Phase 1 of the study is to review literature, draft an outreach strategy, select a pilot case study, conduct the pilot case study, document findings, and refine an outreach strategy for further case studies in Phase 2. Phase 1 tasks are:

- Task 1.1: Conduct literature review, select strategy and materials, identify potential case studies.
- Task 1.2: Receive Institutional Research Board (IRB) human subject research approval.
- Task 1.3: Conduct pilot case study.
- Task 1.4: Refine outreach strategy and materials.

Phase 2 of the study is to conduct several more community case studies, document findings, refine the outreach strategy and materials again, and share findings and resources. Phase 2 tasks are:

- Task 2.1: Conduct additional case studies.
- Task 2.2: Create deliverable of case study findings: "The Story."
- Task 2.3: Create deliverable of guidebook with final strategy and materials.
- Task 2.4: Create deliverable of webinar and social media.

TTI will coordinate with study partners NCTR and SURTC to conduct additional case studies in Phase 2. NCTR, NDSU, and TTI each anticipate conducting at least one case study during Phase 2. While partner agencies will be responsible for outreach, data collection, and analysis in their case studies, TTI researchers will be gauging how well the refined outreach materials/instruments work when implemented by another organization.

TTI will lead a collaborative effort to combine the findings from all case study communities in a brief, engaging deliverable describing the nexus of transit and livability in each rural community, making observations about potential implications for transit in rural America at large. In addition, the team will further refine the outreach strategy and materials so that rural transit stakeholders can use the same tools to conduct their own outreach to answer questions about transit and livability in rural America.

Researchers will write an implementation guidebook to accompany the strategy and materials. The target audience of the guidebook will be local/regional governments and rural transit operators. As such, the guidebook will document the study impetus, goals, process, and findings and will be written with a view for easy replication, either in whole or pieces, by other agencies. TTI, NCTR, and NDSU will collaborate to host a 1-hour webinar about the process and findings of the study. The webinar will be made available in the same online locations as all other deliverables. Researchers will encourage webinar participation by reaching out to rural transit stakeholders via social media, professional associations, and other contact lists (as available).

Study Timeline

The study team began research efforts in early summer 2014 and anticipates completion in 2015. This technical memorandum represents the progress of the TTI research team for the literature review portion of the first task of Phase 1. Researchers will write a second technical memorandum for the second portion of Phase 1, Task 1 on case study selection, outreach preparation, and human subject IRB review.

Phase 2 collaboration between TTI, NCTR, and SURTC will consist of additional case studies in 2015.

Literature Review

This part of the technical memorandum summarizes the literature review effort of TTI researchers.

Purpose and Methodology

The purpose of the literature review was to explore the concept of livability in rural America and to develop a useful framework for a pilot case study community. The review covers information presented from universities; research organizations; local/regional, state, and national governments; and periodic articles. Researchers focused on the following topics to holistically review literature:

- **Defining Rural:** How is rural defined? What are the characteristics, attributes, and/or typologies used for classifying rural communities?
- **Defining Rural Livability:** What does rural livability mean? How is livability defined?
- **Rural Issues and Trends:** What issues do rural communities face? Are there trends in rural area population and land area changes?
- **Transit Influence on Livability:** What are transit strategies that promote livability?
- **Measuring Livability and Transit:** What are the methods and metrics that have been used to measure transit influence on livability?

Researchers concluded the literature review by developing a vision for rural livability and opportunities for transit to impact the vision. The vision and opportunities as well as information found in the literature review will be used by researchers to conduct a pilot community case study.

Role of TTI's Previous FTA Study

The research team drew heavily from previous project work on the FTA-sponsored RTLPM Study, entitled *Transit Livability Performance Measures: Rural Transit Livability Performance Measures Suitable for Use at National Level*. Suzie Edrington, Jonathan Brooks, Linda Cherrington, and Dr. Eric Dumbaugh authored the FTA RTLPM Study. Ms. Edrington, Mr. Brooks, and Ms. Cherrington are involved in the current UTC-sponsored study. Dr. Dumbaugh is now with Florida Atlantic University.

The following subsections briefly summarize the unpublished FTA study.

Background

Providing livable communities is one of the five strategic goals of the USDOT. Building more livable communities is also a goal of the FTA. Traditional transit performance measures focus on indicators of effectiveness, efficiency, and quality of the transit service and do not necessarily measure how well transit is meeting the livability needs of the communities it serves. The FTA and other federal, state, and local stakeholders need transit livability performance measures to effectively gauge and communicate the role of rural public transit in creating more livable rural communities.

Objectives

Research objectives included identifying, testing, and recommending a national set of performance measures that characterize the contributions of rural transit systems to livability in the communities they serve. The measurement criteria included deriving the measures from existing national datasets, developing measures that transit can influence, and developing measures that consider the needs of the aging and individuals with disabilities. To provide a balanced approach to meet a variety of livability goals, the objective was to select one measure for each of the six federal Partnership for Sustainable Communities (PSC) livability principles.

Findings and Conclusions

The research resulted in a national set of metrics to assist FTA and stakeholders in evaluating rural transit livability efforts. The research also provided additional tools to plan, communicate, and gauge rural transit's contribution to livability. The outcomes of the research include:

- **Rural Transit Livability Relationship Statements**—to communicate the connection between the PSC principles and rural transit.
- **Matrix of 70+ Measures Considered**—to use as a local community resource in livability measurement.
- **Rural Transit Livability Measures**—to provide practical and relevant metrics to gauge the effectiveness of rural transit on the livability of rural communities.
- **Rural Transit Livability Index (RTLTI)**—to combine the measures into a single index to measure changes over time.

A common theme found was that transit is one component of a livable community, and planning for livability takes collaboration to meet local priorities, policies, and funding and for livability efforts to be successful. Researchers provided suggestions for future data collection and research efforts.

Status

Rural transit livability performance measures and the RTLTI provide a means for decision makers to assess the contribution that rural transit has on rural livability. The final report for the RTLPM Study has not yet been published. TTI researchers will use the information and experience to inform the research described in this scope. For example, researchers conducted a case study of applying rural transit livability performance measures in eight case study states (Figure 1). Researchers also developed relational statements as a model of discussing the nexus between the larger concept of livability and the sphere of influence of rural transit.

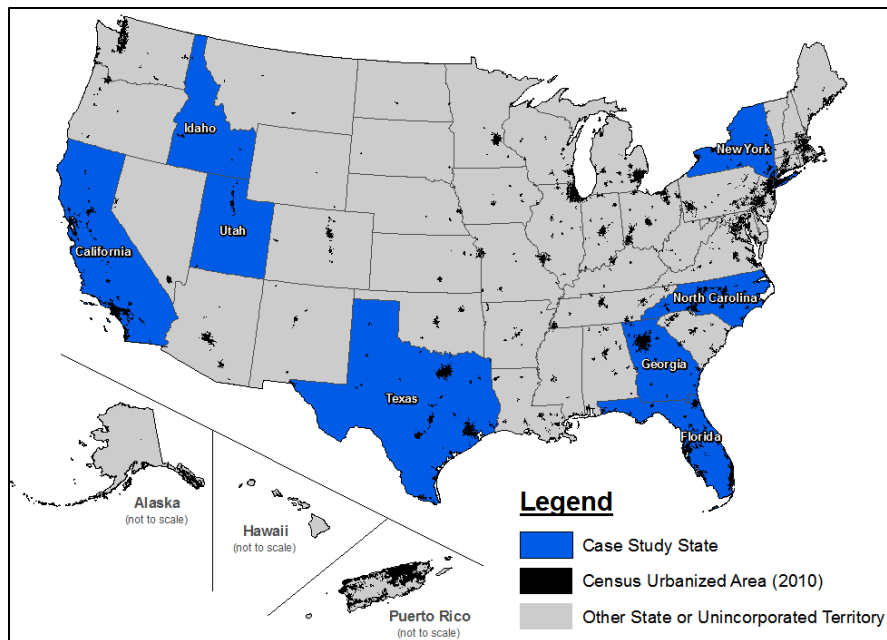


Figure 1. Case Study States for FTA Transit Livability Performance Measures Study.

Literature Concerning Urban/Rural Definitions

In this section, researchers present a review of literature to determine how rural is defined and rural areas are classified.

Rural Definitions

Rural areas are often ambiguously defined by what is *not* geographically considered urban. According to Cromartie and Bucholtz, there are three different concepts of urban—administrative, land-use, and economic concepts. Each of these concepts of urban leads to very different boundary definitions and thus to very different rural definitions (Cromartie & Bucholtz, 2008).

The **administrative concept**, used by many United States Department of Agriculture (USDA) rural development programs, defines urban along municipal or other jurisdictional boundaries. Typically, an administrative definition of rural is used for determining program eligibility (populations living inside or outside of the jurisdictional boundary) in providing rural funding assistance to or through local governments.

The **land-use concept**, used by the Census Bureau, identifies urban areas based on how densely settled the area is—“the picture of settlement you get from an airplane.” This concept is helpful in targeting where assistance is needed for infrastructure planning.

The FTA uses this land-use concept to define urbanized areas (UZAs) and non-urbanized areas (rural) based on population and population density of the most recent decennial census. The FTA uses the Census Bureau delineations to define rural areas for apportionment of Section 5311 Non-Urbanized Area (rural) program funds to states for the purpose of supporting public transportation in rural areas with a population of less than 50,000.

Under current definitions, the Census Bureau delineates UZAs according to population densities of census blocks and block groups and their proximity to an urban core—with the sum of the population for these geographic units equaling 50,000 people or more. Similarly, urban areas of less than 50,000 people are designated as urban clusters (UCs). For the purposes of transit funding, all UZAs are considered urbanized, while all areas outside of UZAs (including UCs) are considered non-urbanized.

The **economic concept**, used in most rural research applications, recognizes the influence of cities on labor, trade, and media markets that extend well beyond densely settled cores to include broader commuting areas. The most widely used rural definition based on the economic concept consists of nonmetropolitan (nonmetro) counties lying outside metro boundaries. Metropolitan (metro) areas are county-based entities that account for the economic influence of cities. The Office of Management and Budget defines a metro area as containing a core urban area of 50,000 or more in population. Each metro area consists of one or more counties and includes the counties containing the core urban area, as well as any adjacent counties that have a high degree of social and economic integration (as measured by commuting to work) with the urban core.

Cromartie and Bucholtz suggest that researchers need to carefully analyze and report the implications of any rural definitional choice: “Who is included in the study and who is left out? What information is being masked by using large geographical building blocks, such as counties? How does this rural geography vary by state?”

Rural Area Classification

Within these rural geographic boundary definitions, rural areas differ in community attributes and characteristics. Rural areas may be further classified by multiple factors including industry factors, demographics, natural environment, proximity to urban areas, size and density, number of

hamlets/villages, existence/features of town centers, density/consistency of roadway networks, land-use characteristics, and major destinations (historical sites, major hospitals, recreational areas, colleges, outlet malls). Researchers reviewed literature to determine rural area factors and methodologies used in classifying rural areas.

Each of the following eight sections reviews a source of information relevant to urban and rural classification.

USDA Economic Research Service (ERS)

USDA ERS developed several classification systems for rural areas including:

- County-level typology codes.
- Rural-urban continuum code system.
- Urban influence code system.
- Rural-urban commuting area code system.

The **county-level typology codes** are based on an area's economic and social characteristics. The 2004 County Typology Codes were developed for all 3,141 counties, county equivalents, and independent cities in the United States. Their primary function is to help differentiate among nonmetro counties, but metro counties are also coded to facilitate comparisons. Metropolitan and nonmetropolitan are those designated by the Office of Management and Budget in 2003, based on population and commuting data from the 2000 Census. The 2004 County Typology classifies all U.S. counties according to six non-overlapping categories of economic dependence and seven overlapping categories of policy-relevant themes. Economic dependence categories of farming, mining, federal/state government, manufacturing, service, and non-specialized dependence are based on labor and proprietors' earnings by place of work as a percent of total labor and proprietors' earnings in the county. Policy-relevant classifications are based on census data for specified years on housing stress, low education, low employment, persistent poverty, population loss, and retirement destination (United States Department of Agriculture, 2004).

As most rural transit agency boundaries are defined by county, these typologies may be useful to determining rural transit influences. However, because the county-level economic typology codes are based on earnings by place of work, some care should be taken when classifying for transit purposes, as high-earning areas may not reflect the land use. A cross-check of land use may be advisable for transit classifying purposes.

The **rural-urban continuum code system** is a classification scheme that distinguishes metropolitan counties by the population size of their metro area and nonmetropolitan counties by degree of urbanization and adjacency to a metro area or areas. The metro and nonmetro categories have been subdivided into three metro and six nonmetro groupings, resulting in a nine-part county codification. Metro counties are distinguished by population size of the metropolitan statistical area of which they are part. Nonmetro counties are classified according to the aggregate size of their urban population. Within the three urban size categories, nonmetro counties are further identified by whether or not they have some functional adjacency to a metro area or areas. A nonmetro county is defined as adjacent if it physically adjoins one or more metro areas and has at least 2 percent of its employed labor force commuting to central metro counties. Nonmetro counties that do not meet these criteria are classified as nonadjacent (United States Department of Agriculture, 2003a).

The **urban influence code system** was developed to capture differences in economic opportunities. Metro counties are divided into two groups by the size of the metro area, and nonmetro micropolitan counties are divided into three groups by their adjacency to metro areas; nonmetro noncore counties

are divided into seven groups by their adjacency to metro or micro areas and whether or not they have their own town of at least 2,500 residents (United States Department of Agriculture, 2003b).

The **rural-urban commuting area** (RUCA) code system is a detailed and flexible scheme for delineating sub-county components of the U.S. settlement system. Population density, urbanization, and daily commuting variables are used to identify urban cores and adjacent territories that are economically integrated with those cores. Census tracts, instead of counties, are used as building blocks because RUCA codes provide a different and more detailed geographic pattern of settlement classification (United States Department of Agriculture, 2000).

Multi-Resolution Land Characteristics

The Multi-Resolution Land Characteristics (MRLC) program is founded on the premise that a range of requirements supports the need for land cover and land-use data. A host of federal institutions participate in MRLC including the U.S. Geological Survey, Environmental Protection Agency (EPA), National Oceanic and Atmospheric Administration, and U.S. Forest Service. Data are classified into 15 categories, including water, residential, commercial/industrial, agricultural, natural vegetated, wetlands, and rock/sand. The data represent some of the most comprehensive data available for broad-area land-use planning and analysis within the United States. The classification hierarchy is tailored to the physical landscape. Details are generalized, especially in urban areas, due to the broad regional extent of the dataset (United States Environmental Protection Agency, 2001). MRLC may provide insight on the environmental conditions that influence transit needs in rural areas.

Urban-Rural Classification: Identifying a System Suitable for Transit

Ripplinger, Beck, and Hough, in their study entitled *Urban-Rural Classification: Identifying a System Suitable for Transit*, analyzed five urban-rural classification systems for consideration as potential tools to assist in delineating geographic differences relevant to transit policy formulation:

- Metropolitan statistical areas (MSAs).
- Urbanized area, urban cluster, and rural area.
- Rural-urban continuum.
- Urban influence.
- Rural-urban commuting codes (Ripplinger, Beck, & Hough, 2008).

Researchers determined that these existing classification systems suffered from deficiencies for the purpose of transit policy because the systems offered too few classes, had uncertainty in geographic boundaries within county variability, and included commuting behavior coding that was not relevant to transit.

In response to the determined shortcomings of existing classification systems, Ripplinger, Beck, and Hough developed the *Urban Population–Rural Density Code System*, which codes urban portions of a county with a numeric code and rural portions with an alphabetic code. The urban population numeric classification classifies areas based on urban populations to identify the size of urban areas within the county boundaries. The rural density alphabetic classification classifies counties based on densities in the rural areas of the county. Researchers found that the Urban Population–Rural Density Code System resulted in high levels of association with the presence of fixed-route, demand-response, and intercity bus services.

Transit Cooperative Research Program (TCRP) Report 141: Methodology for Performance Measurement and Peer Comparison in the Public Transportation Industry

Although TCRP Report 141 was developed for grouping urban areas for transit, some of the factors used and evaluated (outside of specific transit agency factors) may be applicable to rural area groupings.

TCRP Report 141 researchers elected to not include rural peer grouping mainly due to National Transit Database (NTD) data not being available but mentioned that the methodology should be adaptable to a rural peer grouping methodology. In 2010, a mechanism for grouping urban peer groups for transit was developed and allows users to identify peers through the web-based Florida Transit Information System (FTIS) software (Kittelison & Associates Inc., Center for Urban Transportation Research, Texas Transportation Institute, Nakanishi Research & Consulting LLC, and Lehman Center for Transportation Research, 2010). The FTIS software provides a free, user-friendly interface with the full National Transit Database. Up to 14 peer-grouping factors are used to identify transit agency peer comparisons:

- Urban area population.
- Total annual vehicle miles operated.
- Annual operating budget.
- Population density.
- Service area type (e.g., urban, central city only, commuter service into city).
- State capital.
- Percent college students.
- Population growth rate.
- Percent low-income population.
- Annual roadway delay (hours) per traveler.
- Freeway lane miles per capita.
- Percent service demand-responsive.
- Percent service purchased, distance.

Data elements considered but removed from consideration after testing include median household income and percent of households earning less than \$35,000, automobiles per capita and percent zero-car households, percent of population less than 18 and percent of population 65 or older, arterial miles per capita and freeway miles per capita, parking cost, Sprawl Index, USDA plant hardiness zones and National Oceanic and Atmospheric Administration annual precipitation, Cost of Living Index, park-and-ride spaces, and bicycle friendly community rating. Researchers provided reasons for the inclusion and exclusion of variables. Although further research is needed, especially in the area of service area type, these variables may be relevant in further classifying areas for rural transit.

Peer Grouping and Performance Measurement to Improve Rural and Urban Transit in Texas

The purpose of the research entitled *Peer Grouping and Performance Measurement to Improve Rural and Urban Transit in Texas* was to identify peer groups, performance benchmarks, and strategies used by successful transit providers to achieve high performance (Arndt, Edrington, Sandidge, Quadrifoglio, & Perkins, 2011). The research project identified peer groups based on the transit environment within which each agency operates so that agencies could be compared to other operators who face similar environments. A cluster analysis was conducted to establish reasonable peer groupings of rural transit agencies. The following variables used in this analysis are representative of the kinds of data used in other research efforts to define the degree to which development and demographics are conducive to use of transit.

- Population.

- Service area size.
- Service area density.
- Percent of service area population that is age 65 or older.
- Percent of households with zero automobiles.
- Percent of population below poverty level.
- Percent of population age 21 to 64 that is disabled.
- Service area located in a border area.
- Service area located within/adjacent to a metropolitan area having a dedicated transit sales tax.

Although these peer-grouping outcomes were useful, the large differences in transit agency service area boundaries included a wide variation of development and demographic variables within the service area. Some of these wide variations may be diluted when calculated on an aggregate level by a transit agency as a whole. For example, Panhandle Community Services (PCS) provides service throughout a 26-county service area of over 25,749 square miles and has a population of 223,550. The PCS service area includes a diverse agriculture-based economy, including farm- and ranch-related industries, that has seen consistent employment. County characteristics differ throughout the transit agency service area. The counties of Castro and Deaf Smith are reported to have the most heads of cattle in the United States along with pockets of dense housing areas filled with a low-income agriculture workforce that uses transit to get to major meatpacking plants, whereas Roberts County has a low-density residential, higher-income level demographic with little demand for transit. The entire 26-county area development and demographic characteristics are aggregated to one number for each of the factors that may skew transit agency comparisons. This research is useful in pointing to demographics and area characteristics that influence rural transit and points to the possible need to determine the sub-area classifications within transit-area boundaries.

Rural Policy Research Institute (RUPRI)

RUPRI produced a Rural Policy Brief that includes a description of ongoing work on rural county demand types that influence transportation (Dabson, Johnson, & Fluharty, 2011). Although these county types are derived for transportation as a whole, some of these factors may be relevant for classifying rural areas for transit demand. Eleven county demand types were identified (see Table 1).

Table 1. RUPRI County Demand Types and Characteristics.

County Demand Types	Transportation Demand Characteristics
Growing population	Rising incomes, higher auto ownership, rising aggregate levels of travel.
Agriculture dependence	Movement of heavy machinery; high levels of truck traffic from farm to processors/aggregators and markets.
High levels of freight production	Movement of heavy raw materials and products associated with mining, forestry, and manufacturing; distribution/logistics hubs.
Tourism dependence	Seasonal demands for auto access.
High rates of poverty (or low income)	Longer commuting distances, less fuel-efficient vehicles, high proportion of income spent on transportation.
High percentage of rural residents	Dispersed population, which means higher auto usage for all employment, health, shopping, personal needs. Few options for transit.
High rates of retirement	Increasing demand for transit to access health and personal needs.
High percentage of rural youth (aged below 18)	Travel to school, recreation constrained by limited transport options.
High rates of residents without automobiles	Associated with low incomes leading to isolation and limited economic opportunities without transit options.
High rates of poor health	Demands for access to primary and specialized health care facilities.
High rates of physical disabilities	Access to employment and degrees of independence limited by transportation options. Demands for access to primary and specialized health care facilities.

Smart Mobility Framework

The California Department of Transportation’s (Caltrans’) Smart Mobility Framework was initiated by the award of the U.S. EPA Smart Growth Implementation Assistance grant. Caltrans’ study entitled *Smart Mobility 2010—A Call to Action for the New Decade* provides a framework and tools for transportation planning. Funding for this study came from Caltrans, USDOT, U.S. Environmental Protection Agency, California Governor’s Office of Planning and Research, and Department of Housing and Community Development.

The Smart Mobility Framework includes seven place types for general classifications of towns, cities, and larger areas for planning, investment, and management. The seven place types are urban centers, close-in compact communities, compact communities, suburban communities, rural and agricultural lands, protected lands, and special use areas (see Table 2). These place types are further classified as anchored places—those planned to remain as their present type—and transitional places—those that will be targeted for significant change evolving over time to different place type. These place types are used to provide a distinct context for transportation investment to gain smart mobility benefits. Key principles were developed to direct transportation investment including location efficiency, reliable mobility, health and safety, environmental stewardship, social equity, and robust economy. The location efficiency principle is of particular interest, as it integrates transportation and land use in order to achieve high levels of non-motorized travel and transit use, reduced vehicle trip making, and short average trip length while providing a high level of accessibility (California Department of Transportation, 2010).

Table 2. Caltrans’ Smart Mobility Framework—Place Types.

Place Types	Summary Description
1. Urban Centers	High-density, mixed-use places with high job-housing ratios overall, well-connected street networks, high levels of transit service, and pedestrian supportive environments. Transit-oriented development fits into all the urban place types. This place type includes urban cores and urban centers.
2. Close-In Compact Communities	Located near urban cores or urban centers, close-in compact communities are primarily made up of housing but have scattered mixed-use centers and arterial corridors forming the skeleton of the transportation system. Housing is varied in density and type. Transit is available to connect neighborhoods to multiple destinations, with an emphasis on serving commute trips. Residents may think of these communities as suburban, but the Smart Mobility Framework differentiates them from suburban communities because of the greater presence of location efficiency factors. This place type includes close-in centers, close-in corridors, and close-in neighborhoods.
3. Compact Communities	Historic cities and towns as well as newer places characterized by strong presence of community design elements. While most compact communities are outside of metropolitan regions, some are on the periphery of metropolitan regions.
4. Suburban Communities	Communities characterized by a low level of integration of housing with jobs, retail, and services; poorly connected street networks; low levels of transit service; large amounts of surface parking; and inadequate walkability. Suburban communities include: <ul style="list-style-type: none"> • Centers—mid-size and small downtowns, lifestyle centers, or other activity centers embedded within suburban communities. • Corridors—arterial streets with a variety of fronting development types, frequently characterized by inadequate walk and bike environments, low land-use efficiency, and poor aesthetics. • Dedicated Use Areas—large tracts of land used for commercial purposes such as business or industrial park or warehousing, or for recreational purposes such as golf courses. • Neighborhoods—residential subdivisions and complexes including housing, public facilities, and local-serving commercial uses, typically separated by arterial corridors.
5. Rural and Agricultural Lands	Settlement pattern with widely spaced towns separated by farms, vineyards, orchards, or grazing lands. The rural and agricultural place type may include tourist and recreation destinations that can significantly affect land uses, character, and mobility needs. Rural and agricultural lands include rural towns and rural settlements/agricultural lands. These are described below.
5a. Rural Towns	Rural towns provide a mix of housing, services, and public institutions in compact forms that serve surrounding rural areas. They vary in size from crossroads with single clusters of commercial uses to towns offering a full range of retail and service businesses. Towns may host, or be gateways to, recreational activities.
5b. Rural Settlements and Agricultural Lands	Scattered dwelling units and supporting commercial uses and public facilities, no significant subdivisions and limited non-agricultural industrial or commercial land use, and lands in agricultural or grazing use.
6. Protected Lands	Lands protected from development by virtue of ownership, long-term regulation, or resource constraints. Protected lands include national forests, national parks, and lands held in perpetuity by land trusts.
7. Special Use Areas	Large tracts of single-use lands that are outside of, or poorly integrated with, their surroundings. Special use areas include airports, large industrial facilities, military installations, and some universities.

These place types may be useful in applying to rural areas to determine the transit service that may best promote community livability. The challenge is in finding national level data sets that are readily available to classify areas into place types described.

Putting Smart Growth to Work in Rural Communities

Putting Smart Growth to Work in Rural Communities is a publication by International City/County Management Association (ICMA) designed to provide rural decision makers with a resource for balancing competing goals while creating more vibrant, sustainable rural communities (ICMA Knowledge Network, 2010). Five categories of rural communities are defined: gateway communities, resource-dependent communities, edge communities, traditional main street communities, and second home/retirement communities. Categories are developed to characterize rural communities to help identify common challenges faced as well as opportunities that may help to adopt a sustainable approach to growth and development.

1. Gateway communities are adjacent to high-amenity recreational areas such as national parks, national forests, and coastlines. They provide food, lodging, and associated services. Increasingly popular places to live, work, and play, gateway communities often struggle with strains on infrastructure and the natural environment.
2. Resource-dependent communities are often home to single industries, such as farming or mining, so their fortunes rise and fall with the market value of that resource. A key challenge facing resource-dependent communities is diversifying the economy while maintaining their rural quality of life and character.
3. Edge communities are located at the fringe of metropolitan areas and are typically connected to them by state and interstate highways. They provide their residents with access to economic opportunities, jobs, and services. More affordable housing and access to urban amenities have made many of these edge areas grow at a faster pace than their metropolitan areas as a whole. However, precisely because they are such attractive places to settle, edge communities often face pressure to continue to provide more housing and services to new residents.
4. Traditional Main Street communities enjoy a compact street design that is often accessible to a transportation hub. In addition, historically significant architecture and public spaces provide valuable resources upon which to build. Still, these communities often struggle to compete for tenants and customers with office parks, regional malls, and big-box stores.
5. Second home and retirement communities may overlap with some of the above groups, particularly edge communities and traditional Main Street communities. Like gateway communities, second home and retirement communities struggle to keep pace with new growth while maintaining the quality of life that drew in residents in the first place.

Defining and Measuring Livability

During the literature review, researchers sought definitions for livability in general. The challenge was to find a definition of livability that was not focused on agency purpose or limited to one type of community. According to the Federal Highway Administration (FHWA), federal agency and other national initiatives have developed the following definitions of livability (Federal Highway Administration, 2011):

- **USDOT Secretary LaHood.** “Livability means being able to take your kids to school, go to work, see a doctor, drop by the grocery or post office, go out to dinner and a movie, and play with your kids in a park, all without having to get in your car” (Partnership for Sustainable Communities, 2012).

- **USDOT Strategic Plan Fiscal Year 2010-2015.** “Livable communities are places where transportation, housing, and commercial development investments have been coordinated so that people have access to adequate, affordable, and environmentally sustainable travel options” (U.S. Department of Transportation, 2010).
- **American Association of State Highway and Transportation Officials’ (AASHTO’s) Road to Livability.** “The American Association of State Highway and Transportation Officials’ livability objective is to use transportation investments to improve the standard of living, environment, and quality of life for all communities, rural, suburban, and urban... providing more transportation choices for families, by walking, biking, and transit;...driving is also a legitimate transportation choice” (American Association of State Highway and Transportation Officials, 2010).
- **American Institute of Architects’ Livability 101.** Livability is best defined at the local level. Broadly speaking, a livable community recognizes its own unique identity and places a high value on the planning processes that help manage growth and change to maintain and enhance its community character (American Institute of Architects, 2005).
- **American Association for Retired Persons (AARP’s) Beyond 50.05.** A livable community is one that has affordable and appropriate housing, supportive community features and services, and adequate mobility options, which together facilitate personal independence and the engagement of residents in civic and social life (American Association of Retired Persons, 2005).
- **Notice of Funding Availability for National Infrastructure Investments under the Fiscal Year 2010 Appropriations Act.** Livability involves fostering livable communities through place-based policies and investments that increase transportation choices and access to transportation services for people in communities across the United States (Federal Highway Administration, 2011).

Transportation for America derived a definition of livability based on 12 case studies of rural and small towns:

Livability is about providing people, including seniors and those who cannot afford to drive everywhere, better choices about how to travel throughout their regions. It is about encouraging growth in historic small town Main Streets across America and a high quality of life with ample green space, biking or walking paths, and shopping, restaurants, or health care located nearby and easily accessible (Barry, 2010).

The Federal Highway Administration/Federal Transit Administration’s *Livability in Transportation Guidebook: Planning Approaches That Promote Livability* offers the following definition:

Livability in transportation is about using the quality, location, and type of transportation facilities and services available to help achieve broader community goals such as access to good jobs, affordable housing, quality schools, and safe streets. This includes:

- Addressing road safety and capacity issues through better planning and design.
- Using travel demand management approaches in system planning and operations.
- Maximizing and expanding new technologies such as intelligent transportation systems and quiet pavements.
- Developing high quality public transportation to foster economic development.
- Community design that offers residents and workers the full range of transportation choices.
- Strategically connecting the modal pieces—bikeways, pedestrian facilities, transit services, and roadways—into a truly intermodal, interconnected system (Rue, et al., 2010).

The 2011 Federal Highway Administration State of the Practice Summary provides an update to the above livability definition:

Livability in transportation is about leveraging the quality, location, and type of transportation facilities and services available to help achieve broader community goals such as access to a variety of jobs, community services, affordable housing, quality schools, and safe streets. This includes:

- Addressing road safety and capacity issues through better planning, design, and construction.
- Integrating health and community design considerations into the transportation planning process to create more livable places where residents and workers have a full range of transportation choices.
- Using travel demand management approaches and operations and maintenance strategies to maximize the efficiency of transportation investments.
- Maximizing and expanding new technologies such as intelligent transportation systems, green infrastructure, and quiet pavements.
- Developing fast, frequent, dependable public transportation to foster economic development and accessibility to a wide range of housing choices.
- Strategically connecting the modal pieces—bikeways, pedestrian facilities, transit services, and roadways—into a truly intermodal, interconnected system.
- Enhancing the natural environment through improved storm water mitigation, enhanced air quality, and decreased greenhouse gases (Federal Highway Administration, 2011).

Researchers also conducted a literature review of approaches used to measure livability. Following is an overview of the literature and lessons learned.

Measuring the Performance of Livability Programs is an analysis intended to assist livability programs in structuring performance measurement and selection of measurement types (Fabish & Haas, 2010).

Seven criteria were used to evaluate livability program performance measures:

- Is customer focused: Reflects customer and organization needs, and is accepted and meaningful to the customer. Customer satisfaction is measured.
- Is aligned with strategy, goals, and objectives: Indicates the degree to which goals and objectives are being met.
- Is clear and unambiguous: Is simple to understand, logical, easily interpretable, clear to intended audience, and unambiguously defined.
- Is efficiently and accurately measurable: Allows for economic data collection and analysis, is based on reliable and credible underlying data, and is repeatable.
- Is balanced: Comprises a balanced set of a limited vital few measures, reflects a broad range of issues, and is broadly applicable.
- Is decision oriented: Provides an agreed-upon basis for decision making; produces timely, accessible, and useful reports; is sensitive and trended; and indicates where changes are needed.
- Addresses key stakeholder perspectives: Supports relationships with stakeholders and is accepted by stakeholders.

Lessons learned from this analysis include the following:

- In developing case study protocol with outreach tools, start by asking what decisions the measurement will support, and design the measures to provide the data and analysis needed to support those decisions.
- Provide a variety of reports—visual and statistical—to appeal to all audiences.
- Investigate factors outside the organization’s jurisdiction to assure that all program goals are achieved.
- Evaluate the project after it is implemented to determine if the livability goals were achieved and whether the measures should be adapted.
- Include measures that may run counter to one another—for example, affordability and land value appreciation.
- Balance quantifiable and qualitative measures; concentrating on one can lead to imbalance.

The appendix of TCRP Report 22 discusses both quantifiable and qualitative approaches to measuring livability (Project for Public Spaces Inc., 1997). Three different research approaches for measuring livability and quality of life are discussed, including statistical, perceptual, and place-based approaches. In the statistical approach, quality of life and livability can be measured statistically through variables available from census data, climate information, economic measurements, demographics, and other government statistics. The perceptual approach relies on surveys that ask people to actually rate quality of life in their own city or region. Geographers and many urban experts argue that something is still missing from the statistical and perceptual approaches: an approach to defining quality of life and livability that includes people’s often deep attachment to the places where they live and work. The place-based approach offers livability as the interactive relationship between places and people. Livability is therefore measured by the interactions between places and people.

The Rural Work Group draft document *Partnership for Sustainable Communities* recommends that outcome-based measures be used to document how rural communities and the rural landscape are changing in places where the federal government is investing resources and/or doing work, and for rural communities to communicate progress toward their own sustainability goals (Rural Work Group [HUD-DOT-EPA], 2011). The Rural Work Group developed a list of implementation measures that focus on the development/implementation of plans or policies that can shape outcomes on the ground.

Smart Mobility 2010 developed 17 smart growth performance measures (California Department of Transportation, 2010). The degree of emphasis applied to the performance measures is dependent on the place type, and the priority applied varies as a function of place type.

Draft Recommendation Memo #2 Livability and Quality of Life Indicators provides examples of the application of quality of life and livability indicators, focusing on examples of how indicators have been used by jurisdictions to evaluate actions during transportation system planning (VanZerr & Seskin, 2011). This document provides an examination of how transportation plans and projects are being measured in terms of their impacts on community livability and quality of life. These indicators forecast the impacts of transportation plan or project alternatives *prior* to implementation rather than performance measures that monitor changes after implementation.

Kevin Ramsey, Ph.D., of the U.S. Environmental Protection Agency Office of Sustainable Communities provided the *Performance Measurement for Sustainable Communities Presentation* on May 26, 2011 (Ramsey, 2011). The presentation provided an overview of performance measurement, a framework for performance measurement, examples, online tools, and resources.

Sustainable community performance measures are described as *outcomes* over time or space that document change in the following:

- Built environment.
- Human behavior.
- Demographics.
- Economic trends.

These indicators measure the effectiveness of policies, programs, or investments at promoting desired outcomes. The uses of performance measures are to:

- Evaluate needs and baseline conditions.
- Compare planning scenarios.
- Prioritize capital improvement projects.
- Measure outcomes/progress over time.
- Compare progress in difference places.
- Communicate progress.

The framework described for performance measures is divided into the following four parts:

- Strategies (expand high-quality transit service to employment centers).
- Performance measures (percentage of all jobs well served by transit).
- Progress indicators (transit trips per capita, percentage of commute trips made by transit, and vehicle miles traveled per capita).
- Broad outcomes (enhanced accessibility to jobs and services, lower household transportation costs, improved public health, improved air quality, and reduced greenhouse gas emissions).

Rural area performance measures are provided, including the performance measure, data source, and tool for measurement.

Greenfield Case Study Charrette is a theoretical exercise intended to be a model for future greenfield development in Calgary (Design Centre for Sustainability University of British Columbia, 2008). The case study charrette explores the consequences of applying the 11 sustainability principles approved in 2007. A set of indicators that measure progress toward the objectives and principles was developed. Although these measures are not transit specific, goals for the indicators are relevant to the development of transit-related livability measures, and indicators may be applicable to transit livability and possible measurement calculation. The goal for the indicators is to be:

- Relevant to catalyzing and driving design decisions (as opposed to measuring performance after design has been completed).
- Easily measureable.
- Reliably measurable.
- Connected to local priorities.
- Sensitive to alternative approaches and related to “where we want to be.”
- Multipurpose to serve multiple objectives.

The Greater Portland-Vancouver Indicator collaborative project drafted a framework for regional indicators. In 2010, nine categories were identified for indicators to track the region’s well-being. Nine results teams each developed a list of emerging indicators that reflected the thinking of the team and then reduced their lists to five to seven key indicators per team. The remaining indicators served as either context to key indicators or potential key indicators in future cycles.

The teams included the following:

- Access and Mobility.
- Arts and Culture.
- Civic Engagement.
- Economic Opportunity.
- Education.
- Healthy Natural Environment.
- Healthy People.
- Quality Housing and Communities.
- Safe People (VanZerr & Seskin, 2011).

A RUPRI Rural Policy Brief—Rethinking Federal Investments in Rural Transportation suggests a three-dimensional approach for transportation policy making using the following:

- Rural county demand typologies to describe transportation demand characteristics.
- County capacity and performance indicators to describe transportation supply characteristics.
- County outcome indicators to describe outcomes and impacts of the transportation system (Dabson, Johnson, & Fluharty, 2011).

U.S. DOT Strategic Plan FY 2010–FY 2015 offers transportation strategic goals of safety, state of good repair, economic competitiveness, livable communities, and environmental sustainability (U.S. Department of Transportation, 2010). The mission is to develop transportation policies and programs that contribute to providing fast, safe, efficient, and convenient transportation at the lowest cost, consistent with those and other national objectives, including efficient use and conservation of the resources of the United States. Each of these strategic goals has specified strategies for meeting goals, desired outcomes, and performance measures for evaluation.

Performance-Based Transit-Oriented Development Typology Guidebook advocates using performance measures paired with transit-oriented development typology to compare transit zones of different place types (Center for Transit-Oriented Development, 2010). Normative metrics are provided by place type in the typology. The metrics are meant to give an overall sense of the characteristics of each place type. These metrics are applied to case studies for evaluation. Although these metrics are focused on transit-oriented development, this methodology and some of the metrics are applicable to rural transit areas.

Defining Rural Livability

In this section, researchers present a review of literature to determine what rural livability means and how livability is defined in general. Although publications are limited on the subject specific to rural livability, commentary and initial studies have been produced to tackle the complexity of defining rural livability.

Rural livability may have different meanings to different rural communities. Rural livability may mean a vibrant downtown with preserved historical buildings or a walkable Main Street with compact surrounding neighborhoods. It may mean housing options that support a variety of financial means, access to education, health care, and job opportunities. Rural livability may mean preservation and enhancement of working lands and natural lands. Researchers explored the literature to better understand the meaning of rural livability.

Gary Toth and Hannah Twaddell recently wrote an essay for the Project for Public Spaces entitled *What Is “Rural Livability”?* (Toth & Twaddell, 2010). The authors pointed to the challenge of defining rural livability: “Is rural life typified by a family farm in Nebraska, Iowa or Mississippi? Is it living on an

unpaved road in an isolated part of northern Vermont? Is it living in a small village on the mid-coast of Maine, the bayous of Louisiana, the lakes region of Minnesota or the foothills of the Sierras? Is it living in one of the 19 Native American Pueblos of New Mexico? Or is shopping, visiting or even living in one of the many great small cities that support rural living?” Toth and Twaddell stated that rural areas are systems—interconnections where farms depend on villages, which depend on each other, which depend on cities, which depend on farms, which depend on tourism, which depend on business.

The authors stated that rural state officials fear that livable transportation initiatives apply only to urban areas, as most solutions emphasize walkability and transit and de-emphasize auto travel, which is feared to translate to less roads in rural areas. The authors argued that there needs to be a move from the build-more-roads approach to a community understanding of the cost this approach has, which includes:

- “High consumption of open land and rural landscapes.
- Cookie cutter development, which bears no resemblance to existing towns, farmsteads, geography, or natural assets.
- Separated land uses, which make transit or walking all but impossible.
- Loss of the sense of uniqueness of the existing place.
- Loss of the opportunity for everyday socialization that typified rural communities and those that have recently been built for cars (the Project for Public Spaces would describe this as the disappearance of the art of placemaking).
- Congestion, congestion, and more congestion.
- High infrastructure costs for new roads, new sewers, schools, new sources of water, etc., caused by the spreading out of development leading to inability to leverage what has already been built.”

Toth and Twaddell suggested that the tools exist to integrate transportation and land use to better understand how different transportation and community investment programs shape the way people live: “In rural areas, transportation solutions will need to be packaged in ways that address the communities unique context and desires for the future.” In other words, solutions need to be context sensitive.

Partnership for Sustainable Communities—Rural Work Group Draft Report

The U.S. Department of Housing and Urban Development (HUD)-USDOT-EPA Partnership for Sustainable Communities, along with the USDA, formed a Rural Work Group. The group was charged to “assess the Livability Principle’s application to small towns and rural communities and to explore how the Partnership’s work can contribute to more resilient economies, healthy environments, and high quality of life in rural America” (Partnership for Sustainable Communities Rural Work Group, 2011). The Partnership for Sustainable Communities recognized that livability and quality of life are locally driven concepts. The Partnership did not explicitly define rural livability but provided elements that define the meaning of rural livability by the six livability principles, and also provided strategies to promote these elements (see Table 3).

Table 3. PSC Rural Work Group—Rural Livability and Strategy.

Livability Principle	Meaning of Rural Livability and Strategy for Attaining
Enhance economic competitiveness	<p>Livability: Support of residents’ ability to achieve a decent standard of living.</p> <p>Strategy:</p> <ul style="list-style-type: none"> • Support rural communities’ efforts to identify the unique rural area competitive advantage.
Support existing communities	<p>Livability: Support of rural American community relationship to the agricultural and natural landscape, beauty and utility of surrounding landscape, and viability of economic resources/agricultural operations.</p> <p>Strategy:</p> <ul style="list-style-type: none"> • Conserve working and natural lands. • Support small-town redevelopment and revitalization of main streets to support economic vitality, revitalized infrastructure, and housing opportunities without sacrificing the beauty and utility of the surrounding landscape. • Invest in broadband and health- and safety-related improvements to water and wastewater systems to support the efforts of farm families to ensure, for example, the viability of agricultural operations for their children.
Provide more transportation choices	<p>Livability: Presence of bicycle and pedestrian mobility and intercity bus service infrastructure.</p> <p>Strategy:</p> <ul style="list-style-type: none"> • Foster neighborhood efforts to provide convenient walking, bicycling, and public transportation infrastructure where feasible. • Foster traditional rural community compact, mixed-use designs with interconnected street networks that allow for walking or bicycling between neighborhoods and downtown. • Foster village centers for a regional transit service to pick up passengers. • Look at rural transportation through an intra- and inter-community lens. • Provide access to regional job markets, facilitating transport of locally made goods to markets and bringing tourists into the community.
Value communities and neighborhoods	<p>Livability: Support of rural communities and small towns with unique and historic features.</p> <p>Strategy:</p> <ul style="list-style-type: none"> • Conserve and build upon existing resources, such as historic downtowns, main streets, and important natural features, to better maintain and enhance quality of life for their residents. • Promote historic preservation and adaptive reuse and designs that complement local character to protect existing communities and contribute to economic vitality.
Promote equitable, affordable housing	<p>Livability: Support of rural communities with housing options to include energy efficiency.</p> <p>Strategy:</p> <ul style="list-style-type: none"> • Foster communities that offer a variety of housing types (single family, townhouses/duplexes, and apartments) in varying price ranges to attract and retain residents at all life phases—from single-person households to young families to retirees. • Locate new housing to provide a competitive advantage, as housing that is located near existing schools, jobs, shopping, and services reduces combined housing/transportation costs. Housing integrated into commercial areas, for example, residences above first-floor businesses in Main Street settings, is as positive an influence in rural communities as it is in cities, as the presence of residential uses supports retail and other commercial endeavors.

Livability Principle	Meaning of Rural Livability and Strategy for Attaining (Continued)
Coordinate policies and leverage investments	<p>Livability: Promotion of community investment planning to support community goals and coordination across agencies.</p> <p>Strategy:</p> <ul style="list-style-type: none"> • Provide resources to create plans and policies that codify community goals. Support rural communities’ efforts to craft visions for future growth and to create and help implement plans and policies that can guide public and private investments. • Coordinate housing, transportation, and environmental policies and funding to get better results for communities. • Remove barriers to collaboration and provide opportunities to leverage funding, for example, in places where renewable energy development is taking place, to create opportunities in recreation and tourism areas, broadband, and local and regional food systems.

Rural Issues and Trends

Researchers reviewed literature to understand what issues rural communities face and what trends in population and land area changes are found in rural America.

Rural Population and Migration

The USDA Economic Research Service (ERS) produced a brief entitled *Rural Population and Migration* (United States Department of Agriculture, 2007). This brief describes the rural area environment and future challenges. This section provides direct excerpts/quotes taken from this brief to provide an overview of the rural area population analysis. The brief includes a discussion of six factors that impact rural area populations including:

1. Population increase in rural metro areas (edge communities).
2. Geographic concentration of migration growth in nonmetro areas.
3. Restructuring of economic influences in nonmetro areas.
4. Substantial growth linked to urban proximity and scenic landscapes of nonmetro areas.
5. Declining populations in about half of the nonmetro counties.
6. Aging population.

The following block quotation is direct from the brief and provides additional detail about each of the six factors listed above. Researchers did not paraphrase as the text was information rich and paraphrasing was not appropriate.

Population Increase in Rural Metro Areas

There are a growing number of places not easily characterized as entirely urban or rural, largely because of two conditions:

- Suburbanization continues to extend the economic influence of large cities and to blur urban and rural landscapes along their periphery.
- The redistribution of population and services from smaller towns and villages to larger towns and regional centers makes long-established population thresholds dividing rural and urban places, such as the 2,500 population threshold, less relevant.

Today, millions of open country and village residents who live within the borders of metro counties and who are rural by the Census definition are excluded from research and policy making that focuses exclusively on nonmetro counties. Therefore, although the word “rural” is

commonly substituted for “nonmetro” in speech and writing, it is becoming increasingly misleading in regard to the official Census definition.

In Census 2000, the nation reached the point where, for the first time, slightly more than half of its rural residents live in metro areas—30.1 million in 2000, or 50.8 percent. Close to 400 metro counties were primarily or completely rural in population in 2000, accounting for over a third of all metro counties and containing 13 million total residents. From 2000 to 2005, the rural metro counties grew by 7.4 percent, well above the metro average and over three times the nonmetro rate. Thus, although it is common to think of most rural areas as slow growing or declining, this particular group makes up the fastest growing segment along the entire continuum from metro central cities to rural, isolated settings.

Geographically Concentrated Nonmetro Growth from Migration

Nonmetro counties had 50 million residents as of July 1, 2007, as estimated by the Census Bureau, an increase of 2.4 percent since the April 1, 2000, decennial Census tally, compared with a 7.2 percent rise in metro counties. Natural increase (an excess of births over deaths) accounted for about 70 percent (827 thousand) of the 1.1 million nonmetro population increase, foreign immigration contributed 378,000 new residents, and a modest net influx of people from U.S. metro areas contributed an increase of 133,000. Nonmetro growth from migration was much more geographically concentrated than growth from natural increase. Thus, migration choices largely determine the uneven pattern of population change across nonmetro counties.

Restructuring of Economic Influences in Nonmetro America

Recent economic restructuring has affected population change in different regions and local contexts throughout nonmetro America. On the one hand, precipitous loss of manufacturing jobs from 1996 to 2002, especially in textiles, dampened population prospects in once-thriving counties throughout the nonmetro northeast and south. On the other hand, immigrants attracted to low-skill jobs in meatpacking and other food-and-fiber industries have revived population growth in otherwise declining Midwestern counties and added to growth in a number of southern manufacturing centers. Other developments, including the widespread practice of putting new prisons in rural settings and the expansion of casinos throughout the country, has affected new growth in many sparsely settled areas.

Substantial Nonmetro Growth Linked to Urban Proximity and Scenic Landscapes

Economic restructuring trends, and the traditional sectoral divisions between farm and factory, play smaller roles in explaining the selectivity of population growth than in the past. Rapid population growth in rural and small-town America mostly relies on the availability of urban and natural amenities. Patterns continue to be linked to certain county characteristics: substantial growth in retirement and recreation counties; higher-than-average growth in most counties with urban centers or adjacent to metro areas; and loss as a continuing characteristic of counties that are still agriculturally dependent, lacking in urbanization, and remote from large cities.

Along with fluctuations over time, rates of nonmetro population change vary widely by region and county type. Population in nonmetro areas as a whole grew 2.2 percent during 2000–05, but the distribution of growth was highly uneven. Half the nation’s 2,051 nonmetro counties lost population, while the 1,021 nonmetro counties that did increase their population added 1.5 million people. In addition, most of this increase was concentrated in just 204 rapid-growth

counties, defined as growing 3 times or more the overall nonmetro rate. Not only is nonmetro population growth concentrated, it has favored the same types of counties for an extended period. Geographic patterns of rapid population growth remain entrenched, primarily because they are strongly linked with two county characteristics, urban proximity (adjacent to metro areas) and scenic landscapes.

The average growth of the metro-adjacent counties was 3 percent from 2000 to 2005, compared with just 0.7 percent in nonadjacent counties. The line of counties skirting the southern edge of the Dallas-Fort Worth metro area in northeastern Texas typifies rapid nonmetro growth, combining low outmigration with an influx of commuters and other urban residents seeking lower housing costs, access to open space, or other rural amenities. The persistent spread of metro influence into nonmetro territory also can be seen around Minneapolis-St. Paul, Nashville, San Antonio, and Atlanta, but it is certainly not limited to these cities. Found throughout the country and often given the pejorative label “urban sprawl,” metro expansion actually occurs to a great extent in nonmetro counties.

Spectacular scenery and diverse recreation opportunities have attracted migrants to small towns and cities throughout the Rocky Mountains, the region with the highest concentration of rapid-growth, nonmetro counties. Other areas that attract empty-nesters, retirees, and those with more footloose ties to the national economy include the upper Great Lakes, southern Appalachia, the Missouri Ozarks, the Hill Country in central Texas, and central New Hampshire. These and other rural playgrounds are likely to attract increasing numbers of Baby Boomers over the next 20 years as that sizable cohort ages toward retirement. From 2000 to 2005, counties that were active retirement destination in the 1990s were the fastest growing nonmetro county type (8.3 percent increase). About half of these 277 counties are also classified in the ERS county typology as recreation counties, for many areas with natural attractions draw both retirees and vacationers. The recreation county group grew by 6.5 percent. Growth in both types came primarily from people moving in, rather than from an excess of births over deaths.

Residents in rapid-growth counties face a distinct set of economic development issues and policy choices. In most cases, population growth driven by the pull of natural amenities or urban fringe development contributes to rural well-being, as measured by increased job opportunities, income, reductions in poverty, and improved education and health. Rural policy debates and programs are rightly focused on areas of economic distress and persistent population loss, areas that usually lack the competitive advantages. However, areas with recreation development or increasing urban influence may experience increased land and housing costs, sprawl-like settlement patterns, and traffic congestion. Strains on public finances arise when new service and infrastructure costs outrun increased tax revenues. These impacts vary substantially across the rural landscape, partly depending on the characteristics of new residents and the addition of other factors favoring rapid growth.

Declining Populations in About Half of the Nonmetro Counties

Population in an estimated 1,027 out of 2,051 nonmetro counties (about half) declined in population. For the most part, the newly declining counties are found in and among the large agriculture-dependent zones of the Great Plains and Corn Belt that lost people in the 1990s. But counties with declining populations also include Appalachian mining areas and a number of Southern counties that have relied heavily on manufacturing. Population decreased overall in both farming and mining county types during 2000–05.

For over a generation now, deaths have outnumbered births in many U.S. counties, contributing to overall population loss. In affected counties, the combined result of these changes was a substantial rise in the average age of the population to the point where deaths exceeded births. In general, populations with a median age of 40 or older (or even in the high 30s) cannot produce more births than deaths. We now have hundreds of such counties. Natural decrease is most common in the Great Plains and Corn Belt where the fewest job alternatives to farm work have been generated. In extreme cases, some counties now have twice as many deaths as births.

Decreases in childbearing and agricultural labor requirements were as great in many parts of the south and east as in the Midwestern Farm Belt. However, natural decrease was generally avoided in the south and east, at least until more recently, for two reasons:

- New work developed in manufacturing or services to offset the job losses in farming.
- More cities were accessible for rural people to commute to for employment without moving.

In a small number of nonmetro areas of natural population decrease, natural decrease coincided with net immigration for retirement to attractive rural and small locales. Despite the high average age of residents and the numerous deaths of elderly people, these county populations are typically still growing, often substantially, because the continued influx of newcomers more than offsets the excess births over deaths. These counties are most likely to be in locations with mountains, lakes, or other appealing natural terrain rather than in the agricultural heartland.

More common is the situation of the 498 nonmetro counties, nearly a fourth of all nonmetro counties, that were declining in population between 2000 and 2005 both from natural decrease and net outmigration. The most common of this type of county is the thinly settled, entirely rural farming and ranching county with fewer than 10,000 people. But a number of much more populous counties experienced combined natural decrease and net outmigration due to prolonged industrial and/or mining decline. Stabilizing population levels will be particularly difficult for these areas unless they attract substantial additional employment. They did not acquire older age structures and low birth rates overnight, and developments that lead to rapid infusions of adults of childbearing age or higher fertility seem likely to be few. Since 2000, Maine, Pennsylvania, West Virginia, and Virginia have all had statewide natural decrease in their nonmetro population.

The role of population aging in U.S. domestic policy debates, such as those on the future of Social Security and Medicare, will intensify as the 65-and-older population increases rapidly. Conditions and trends affecting nonmetro older Americans have long been major research and policy issues, for several reasons:

- Nonmetro areas have a larger share of older people (15 percent who were older than 65 in 2004) than the country as a whole (12 percent).
- Compared with their metro counterparts, nonmetro older Americans generally have less income, lower educational attainment, and a higher dependence on social security income, creating greater demand for medical, social, and financial assistance.
- Service delivery is more difficult because of fewer service providers per capita and higher per capita costs in sparsely populated, remote areas; attracting doctors, nurses, and other service professionals is difficult for many rural areas.

Aging Nonmetro Population

The population 65 and older living in nonmetro areas numbered just under 7.5 million in 2004, according to the most recent age-specific county population estimates. Two processes contributing to nonmetro aging will accelerate over the next several years:

- Aging in place: The number of people turning 65 each year reached a low point in the first half of this decade, reflecting the low birth cohorts during the height of the Great Depression in the 1930s, but the number is poised to increase rapidly beginning this year. Growth rates from aging-in-place alone will triple among the nonmetro older population, from 6 percent in this decade to 18 percent in the 2010s.
- Net migration: The propensity to migrate to rural settings increases among empty nesters and retirees, and their numbers are rising as the Baby Boom generation enters this lifecycle stage. Baby Boomers exhibited a marked affinity for moving to rural destinations during the dot com boom of the 1990s, long before reaching traditional retirement ages. The trend will likely pick up as Boomers reach their 60th birthday beginning in 2006.

The higher concentration of rural elderly is due to a persistent pattern of net outmigration among rural youth. In almost all settings, the propensity to migrate is highest among individuals ages 20–30, and rural-to-urban migration among young adults always outnumbers its counter-stream. Rural net immigration of those 65 and older has also added to a high concentration of elderly, especially during the past decade. However, the impact is not as substantial as the impact of continuous outmigration of young adults. Rural youth outmigration will likely continue to exceed immigration, but its impact on the share of elderly is diminishing because the numbers and rates of rural outmigration are much lower than in the past.

Aging-in-place and net migration affect older nonmetro populations differently. On average, older Americans are less well off in nonmetro compared with metro areas. However, nonmetro counties are increasingly diverse, for two reasons:

- Population growth from aging-in-place and net migration happen in different areas.
- The nonmetro, aging-in-place population is less well-off socioeconomically than are recent older immigrants to rural areas.

Therefore, among nonmetro counties with above-average elderly concentrations, it is possible to distinguish two very different types. The majority (288 out of 536) are also classified as ERS population-loss counties: Their high elderly concentration results from long-term young-adult outmigration, a trend that for most of these counties continues to this day. Among the remaining high-elderly counties, a majority (141) are classified as ERS retirement-destination counties. High net immigration of retirees explains the high elderly proportions among these counties.

Retiree-age newcomers to nonmetro areas tend to be better educated, wealthier, and more likely to be married rather than living alone, compared with the nonmetro aging-in-place population. In addition, they often relocate to nonmetro counties that contain, or are adjacent to, large cities containing a broader range of services important to this age group.

For the aging-in-place population, the range of nonmetro health care services is narrower, health services are less accessible and more costly to deliver, and fewer health care providers offer specialized services. These locational disadvantages are hard to address in areas that are still losing younger working-age people and experiencing declining population and tax bases. On

the other hand, retirement areas often benefit from growth, as immigrating retirees boost the tax base and help sustain local businesses. Taking into account these locational differences could enhance the effectiveness of policies and programs for the older population.

ICMA Putting Smart Growth to Work in Rural Communities

ICMA Putting Smart Growth to Work in Rural Communities echoes these rural community trends (ICMA Knowledge Network, 2010). Some rural communities change gradually over time; other rural communities experience periods of rapid change. Challenges facing rural communities include:

- Fewer farms and fewer farmers.
- Loss of forest land.
- Rapid growth at metropolitan edges.
- Shrinking population in other areas.
- Access to jobs and services and lack of transportation options.
- Limited planning capacity.

Transit Influence on Livability

Transit options in rural communities vary depending on the population and land characteristics. Although demand-response transit is most common in rural areas, fixed-route circulators, flex routes, and commuter service are all viable options in the right setting. Transit can be vital to serving regional universities and employment centers, acting as a catalyst to recreational tourist areas and providing a connection to health care and social services.

Rural Transit Overview

Existing transit in rural areas is quite different from urban area transit. In 2007, the National Rural Transit Assistance Program and the Community Transportation Association of America updated the TCRP F-12 database of rural transit providers, providing a listing of 1,498 transit providers in the United States (National Rural Transit Assistance Program and the Community Transportation Association of America, 2008). Slightly less than half (49.3 percent) of Section 5311 recipients were local governments (city or county), 10.7 percent were regional transit authorities, 31.4 percent were nonprofit organizations, 1.2 percent were Indian tribal organizations, and 7.4 percent were other (nonprofit public corporations, university transit systems, transit systems directly operated by regional planning agencies or economic development districts or for-profit operators).

Unlike urban transit, which operates primarily fixed-route services, in 2007, 89 percent of Section 5311 recipients provided demand-response services. Rural transit providers also reported that 31 percent provided fixed-route services, 25 percent provided subscription services, and 18 percent provided route or point deviations. Rural transit providers were unique in that 7.5 percent utilized volunteers in service delivery. Overwhelmingly, rural transit systems operated at the county level or multi-county level (about 66 percent): municipal transit systems represented about 20 percent, multiple town systems represented about 9 percent, other (portion of county or municipality) represented 4 percent, and tribal reservation represented 1 percent. Almost 20 percent also served an urbanized area. More than 75 percent of rural system vehicles were wheelchair accessible. Rural transit systems delivered an estimated 173.6 million passenger trips over 700.7 million annual vehicle miles.

Rural Transit Influence on Rural Livability

Researchers reviewed existing literature to determine how transit in general and rural transit specifically influence livability. Evidence of how rural transit can improve livability is found in several reports.

TCRP Report 22: The Role of Transit in Creating Livable Metropolitan Communities explores the relationship between transit and livability (Project for Public Spaces Inc., 1997). Although focused on metropolitan communities, many elements of this report apply to rural communities, as the report describes a place-making approach to livability by exploring the relationship between transit and livability.

A focus on place-making can bring the ridership goals of the transit agency and the livability goals of the community together. For transit operators, this means that each decision made to provide service, locate a station or stop and maintain a station should be made in the context of how transit can contribute positively to the experience of that place. Mobility options must be developed and improved in response to expressed as well as observed community needs. These transportation options also must be regarded as a set of alternatives (cars, buses, trains, vans, bicycles, walking) that fit into a community's broader vision as well as its self-image.

The report points to the fact that transportation is tied into our daily lives, which provides the perfect opportunity to address the livability concerns of our communities. Transit strategies that impact livability are presented in two categories: design oriented and service oriented. Design-oriented strategies enhance the comfort and convenience of transit users while having a positive influence on the surrounding area, and service-oriented strategies are transit services that increase mobility within a community. These design- and service-oriented strategies act as a stimulus for development and renewal, and they facilitate connection of residents to jobs, shops, services, medical appointments, day care, schools, and social services. Case studies are presented, providing examples of how transit impacts livability, including:

- Transit's role in creating places for community life by bringing people to locations that influence the use and activity of these spaces and making them work effectively.
- Transit's role as a catalyst for downtown and neighborhood renewal by providing priority access to buses and enhanced waiting areas, bus transfer centers/terminals, circulators and shuttles, and trolley services.
- Transit's role in creating opportunity for entrepreneurship and economic development by bringing customers to support and promote local businesses and by providing access for employees (especially transit dependent), development of passenger service centers with businesses (intercity bus terminals), and vending programs.
- Transit's role in improving safety and amenity by developing approaches to improve safety and security for persons awaiting transit.

Rural Transit Achievements: Assessing the Outcomes of Increased Funding for Rural Passenger Services under SAFETEA-LU is a descriptive report documenting public expenditures in rural public transportation and presenting case studies of areas where funding was increased (KFH Group, 2009). Benefits of increased rural transit funding included aspects that improved livability in rural areas, mainly in that more rural transit service resulted in hours, days of service, expansion of service area, and frequency, resulting in increased numbers of trips provided and people served. Transit benefits that related to livability included serving new employment-related destinations, providing service between communities, reducing automobile travel, and increasing coordination (reducing duplicative service).

Impacts of Funding and Allocation Changes on Rural Transit in Texas is a research study that includes documentation of the impact of the change in allocation of federal and state rural transit funds (Edrington & Brooks, 2011). Researchers found that with increased federal funding, rural transit

providers introduced new transit services that reached longer distances or more remote areas as well as operation of service on more days, expanded hours, and increased frequency.

TCRP Report 101 provides insight from rural transportation professionals on the benefits of coordinating transit service in rural areas (Burkhardt, Nelson, Murray, & Koffman, 2004). Benefits of coordinating transit in rural areas that relate to livability include:

- Access to a greater level of funding and to more funding sources.
- Access to the specialized expertise of a wide variety of transportation providers, human service agencies, and state agencies.
- Lower trip costs for riders and agencies.
- Transportation services provided in areas formerly without service (allowing some people to remain independent in their own homes for a longer time than would otherwise have been possible and reducing both personal and social costs of institutionalization).
- Transportation services provided for a wider variety of trip purposes than in the past.
- Transportation services provided more frequently than in the past, with an overall increase in the number of trips provided within the community.
- Reduced vehicle travel and less duplicative services.
- Greater productivity.
- Better access to jobs, health care, and shopping.
- Increased local business activity.
- Stronger support and funding commitments from local elected officials and key leaders in the social service network.

The Impact of Federal Programs on Transportation for Older Adults combines descriptive statistics derived from the census with a summary of federal programs that provide public transportation services to older adults (Koffman, David, & Weiner, 2004). This report emphasizes that the ability to travel within communities is essential to maintaining independence, health, and social connections:

Rural public transportation services are of particular importance to older residents. For many older individuals, these public transportation services provide vital links to medical care and other essential services. Persons age 60 and older account for nearly one-third of rural riders—far more than their 19 percent share of the rural population. The 2001 *American Housing Survey*, which tabulates data for households with a householder age 65 and older, found that 74 percent of households in rural areas had no public transportation available.

This report discusses a number of trends that are likely to make it even more important to plan for the transportation needs of older persons. Trends affecting older persons include people driving later in life than they used to, rapid growth in the older population, the increasing numbers of older people living in suburban areas with limited transportation alternatives, aging in place, and the tendency for veterans to live in more suburban and rural contexts post-military service. Solutions discussed include creating communities that provide a greater ability for those who no longer drive to get around on foot; better access to goods and services; greater independence; safer travel environments for both drivers and pedestrians; and reduced social isolation.

Case Studies on Transit and Livable Communities in Rural and Small Town America is a collection of 12 case studies that provide examples of how small cities, towns, and rural regions across the country are transforming themselves into more livable communities (Barry, 2010). Examples include the following:

- In Huron, South Dakota, many older residents are able to access groceries and services because of People's Transit, and the town is now home to its first-ever transit center.

- The Menominee Tribe in rural Wisconsin partnered with local schools and health providers to help residents navigate its sparse reservation while maintaining good stewardship of the land.
- Through a unique community planning process called Envision Cache Valley, residents in Cache Valley, Utah, established strong benchmarks for preserving farmland, maintaining clean air, and welcoming new development and housing.
- Laconia, New Hampshire, worked with the U.S. EPA on three neighborhood plans to enhance the safety and accessibility of the streets and add more vitality to the community.
- Davidson, North Carolina, faced a surge in population by revitalizing its town center and improving transportation options, earning the 2004 National Award for Smart Growth Achievement from the U.S. EPA.
- Breckenridge, Colorado, is a resort destination for thousands of vacationers every year but was unaffordable to the people working in the community until an effort between the EPA and the Colorado Department of Health launched new affordable housing options.
- Meridian, Mississippi, revitalized its downtown and became a transit hub for rural Mississippi and the southern U.S., improving quality of life for residents and visitors.
- Lancaster County, Pennsylvania, officials preserved acres of open space and planned effectively for future development with significant input from the community.
- Facing a decline in population and lagging job growth, North Dakota’s governor initiated a long-range process to attract new employers and prepare North Dakotans for the 21st century.
- The State of Wyoming put together a blueprint for getting infrastructure up to date and preparing for new business while preserving its unique quality of life.
- McCall, Idaho, officials worked with the EPA on effective planning along the town’s major corridor, resulting in new businesses and preserved open space.
- The EPA helped Taos, New Mexico, officials improve access for bicyclists and pedestrians, make streets safer, and pursue commercial and residential growth that fit with the town’s character.

Synthesizing Rural Livability Literature Findings

To date, most of the discussion on livability has focused on urban areas and has typically emphasized strategies such as increasing developmental densities, mixing land uses, and connecting the street network. Yet, as a normative model, such a conception of livability is urban in nature; it seeks to concentrate people, jobs, and services together to promote a vibrant street life. Rural livability is a more complicated matter. Rural areas are not simply small urban areas, and addressing rural livability necessitates more than simply applying urban concepts to rural areas. While this review sought to examine the literature on rural livability, a major conclusion was that the concept of rural livability is, at best, poorly defined. Unlike urban livability, which has long been the focus of groups such as the Congress of the New Urbanism and the Project for Public Spaces Inc., there has been little corresponding consideration of the nature of rural livability.

Performance measures are meaningful only to the extent that they are tied to clearly defined goals and objectives. The development of meaningful measures of rural transit livability thus requires a clearer understanding of what rural livability is. For the purposes of this effort, rural areas are defined as those areas located outside of census-designated urban areas. While these areas may have economic ties to major urban areas—often through jobs centered around agriculture or light industry—they typically lack ready access to the diverse array of household-supporting jobs, services, health care, or recreational opportunities found in urban areas. As such, rural transportation issues are often more basic than those found in urban environments. While urban transportation has increasingly focused on the social and aesthetic outcomes of transportation investments, such as their impacts on health, physical activity, or

the aesthetic character of the built environment, rural transportation continues to be focused on the challenges associated with providing basic mobility options for transportation-disadvantaged households.

Yet, rural transportation can, and should, move beyond simply providing basic mobility. Doing so, however, necessitates a normative vision of rural livability. As a preliminary framework for such a vision, this section seeks to detail the structure and logic of rural development to identify those features that may enhance rural livability and support multimodal travel, as well as those forces and factors that may prevent such outcomes. Just as contemporary notions of urban livability are derived, in large part, from examinations of traditional urbanism, there is also much to be gained by revisiting the logic and structure of traditional rural development patterns. The sections below detail the economic and structural logic of rural settlements and proceed to distill them into principles that can serve as a point of departure for defining measures to support rural transit livability in the next phase of this effort.

The Economic and Structural Logic of Rural Settlements

As rural areas move beyond subsistence agriculture, their economies become increasingly focused on exporting goods to metropolitan regions. These goods typically consist of crops, livestock, or manufacturing activities that have been transplanted from metropolitan areas, such as automobile assembly. Because their economies are tied to metropolitan regions, highways play a particularly critical role in rural economies, permitting the transport of rural goods either directly to metropolitan areas or to the water, rail, or air connections that are ultimately bound for metropolitan markets.

While rural farms and households are often dispersed across large geographic areas, most other rural activities have typically clustered together into agglomerations located along major trade routes. Churches, schools, grocers, general merchandise shops, mills, blacksmiths, and governmental buildings, such as county courthouses, typically cluster together. Such uses are often accompanied by inns, taverns, and cafés that cater to regional travelers but may also serve rural residents.

In terms of their physical configurations, these agglomerations may be nothing more than a small hamlet containing several shops located at the intersection of two rural highways (see Figure 2), or they may evolve into a rural village or town containing a broader array of shops, services, and households. Larger towns may also develop specialized main streets (see Figure 3) or be organized around a central square, particularly in areas once governed by the Laws of the Indies. Many of these centralized squares have subsequently become the locations for governmental uses, resulting in the creation of courthouse-square configurations, a common rural development pattern found throughout the southern and southwestern United States (see Figure 4). Nonetheless, what is a consistent feature of each of these rural developments—and essential for addressing rural livability—is that they are invariably located along the major highways that carry trade through the region and, in many cases, are located at the intersection of two highways or the intersection of a highway and a secondary mode of transportation, such as water or rail.



Figure 2. A Rural Hamlet: Marathon, TX (Source: Dumbaugh).



Figure 3. A Rural Main Street: Bastrop, TX (Source: Dumbaugh).



Figure 4. A Rural Courthouse Square: Johnson City, TX (Source: Dumbaugh).

As such, necessitating rural livability entails, at a minimum, understanding the role and function of rural highways. Highways are often viewed as being auto-oriented facilities and are typically regarded as being incompatible with livability. Indeed, in conventional usage in the United States, the word *highway* is regarded as being synonymous, or nearly so, with the word *freeway*. Yet the root word—*heiwig*—is an Old English word referring to the elevated roadbeds developed by the Roman army during its occupation of Britannia between 40 and 400 A.D. These roadways were sloped, elevated, and paved to ensure that they were resistant to mud and rain, and they were built with such care that the remains of these roadways are still present today (see Figure 5). Being major trade routes, rural highways were natural locations for inns, taverns, merchants, mills, blacksmiths, and other activities intended to support agricultural life. It is this orientation to the rural highways that has led main streets to be referred to as high streets in England; the term *high street* refers specifically to the rural highways along which shopping and services naturally cluster. The traditional Roman highways had a standard width of 23 feet, although they were often widened inside of villages to permit herds of livestock to pass.



Figure 5. Roman Highway in Britain (Source: Nigel Homer).

Rural environments in the United States are likewise focused around highways, although their shape and configuration, like the rest of America, have been increasingly oriented toward the needs of high-speed automobile travel. Much of this is attributable to the advent of state bureaus of public roads, and later, state departments of transportation. The Federal Aid Road Act was adopted in 1916 to pave and reconfigure rural roadways to aid farmers in getting their goods to market. Rather than combining road-building activities with other transportation functions at the national level, as was done in most European nations, the Federal Aid Road Act instead delegated this activity to the individual states, which were tasked with creating state agencies focused on road building in order to be eligible for federal funding.

As trucks became the primary means of transporting goods along rural highways, state bureaus of public roads became increasingly oriented toward ensuring that these highways were designed to be accommodating to trucks. Unlike traditional rural highways, where multiple roadway users could share the right of way due to the low travel speeds of individuals and livestock, the goal of modern highway design was to reconfigure rural highways to allow trucks to travel at high speeds with little or no interference from other traffic. This resulted in the division of rural highways into individual lanes, with the ideal configuration containing a minimum of two lanes in each direction, thus allowing higher-speed traffic to pass slower traffic. Thus, rural highways were not only paved but were redesigned using trucks as the primary basis of design (see Figure 6). Twelve-foot lanes are the current standard width for rural

highway lanes, a standard currently adopted as one of 12 controlling criteria used as the basis for determining a project's eligibility for the use of federal highway funds. While the standard Roman highway was only 23 feet, a contemporary four-lane rural highway with a median is typically 60 feet or greater.

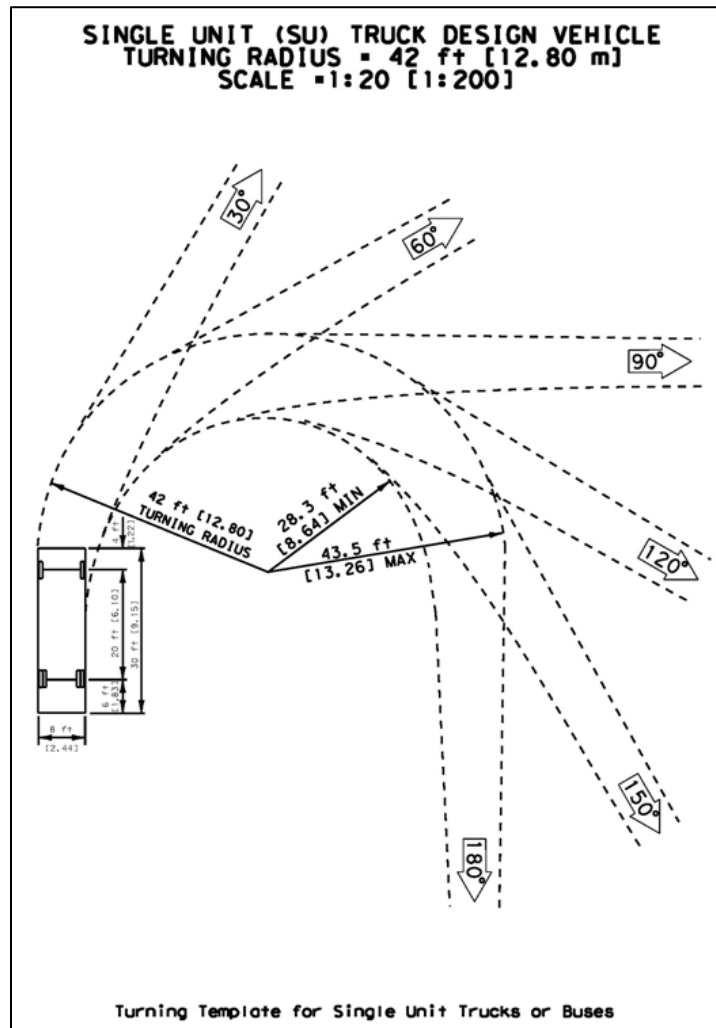


Figure 6. The Single Unit Truck Is the Basis of Rural Highway Design (AASHTO, 2004).

While these design practices are effective at increasing the travel speeds of goods and passenger movement through rural areas, they have nonetheless proven to be a major barrier to rural livability. During much of the 20th century, little consideration was given to how specific design dimensions may relate to the rural hamlets and towns through which they traveled. Instead, the standard practice was to simply maintain high-speed alignments for rural highways as they traveled through rural hamlets and villages. Because truck movement is the primary focus of contemporary highway design, the pedestrian realm has been increasingly eroded to develop more and wider lanes for truck traffic, leading to a diminished and inadequate public realm that is difficult to cross and unsafe for pedestrians (see Figure 7).



Figure 7. Main Streets Converted to Multi-Lane Highways.
Left: Palmetto, Georgia. Right: Fredericksburg, Texas (Source: Dumbaugh).

The erosion of rural hamlets and villages by state highways does not mean that their traditional functions have been lost. Instead, they have been transformed into auto-oriented uses. The typical configuration is a multipurpose gas station containing a general store and one or more fast food restaurants. Firms such as Travelcenters of America (TA) have developed specialized variants catering to long-haul truckers, including truck parking, showers, and entertainment such as digital slot machines and movie rentals, in addition to the gas, food, and general merchandise typically found in a gas station. Likewise, Wal-Mart has begun to incorporate a host of services catering toward rural residents. In addition to providing retail and groceries, rural Wal-Marts have begun to include banking, health care, vision, and dentistry services as well. They have also sought to attract rural travels by adopting an unofficial policy of allowing RV travelers to park overnight in their parking lots, unless they are specifically prohibited from doing so by a local ordinance (see Figure 8). Because smaller rural areas often lack local economies that can sustain multiple shops and services, these uses often supplant the functions originally provided by rural hamlets, towns, and main streets.



Figure 8. RV Parking at Wal-Mart (Source: www.rv-roadtrips.thefuntimesguide.com).

Livable Rural Regions

Considered as a whole, design practices adopted by state departments of transportation have diminished the social and civic character of rural main streets, while new business practices adopted by chain retailers such as Wal-Mart and TA have sought to compete with the business activities of local merchants. The result has been the decline and abandonment of many main streets and town centers in rural America.

Given these trends, what policies and practices may be put in place to enhance the livability of rural areas, and what role might transit and other transportation investments play? It is useful to start by examining a model for a livable rural region. The Cotswolds provides such a model. The Cotswolds is a 450-square-mile rural region located west of London. The region's economy is principally agricultural, with major export products including cereal grains, cattle, sheep, and wool. The region itself contains roughly 200 hamlets and villages located principally along rural highways (see Figure 9 and Figure 10).



Figure 9. Village at Intersection of Two Rural Highways (Source: Dumbaugh).

Yet, what is of interest, from a transportation perspective, is the region's ability to accommodate multimodal travel. The concentration of rural activities into villages and town centers creates a series of nodes around which transit can focus. Intercity rail connects London to several of the larger villages in the Cotswolds, which are in turn connected with each other through regional bus service (see Figure 10). Such a configuration allows the region to take advantage of conventional, fixed-route transit service, rather than relying solely on the more costly option of demand-response transit. It further allows these transit trips to serve multiple users and trip ends. Because the region's villages and hamlets contain multiple uses, a single trip can often enable a person to accomplish multiple trip ends.

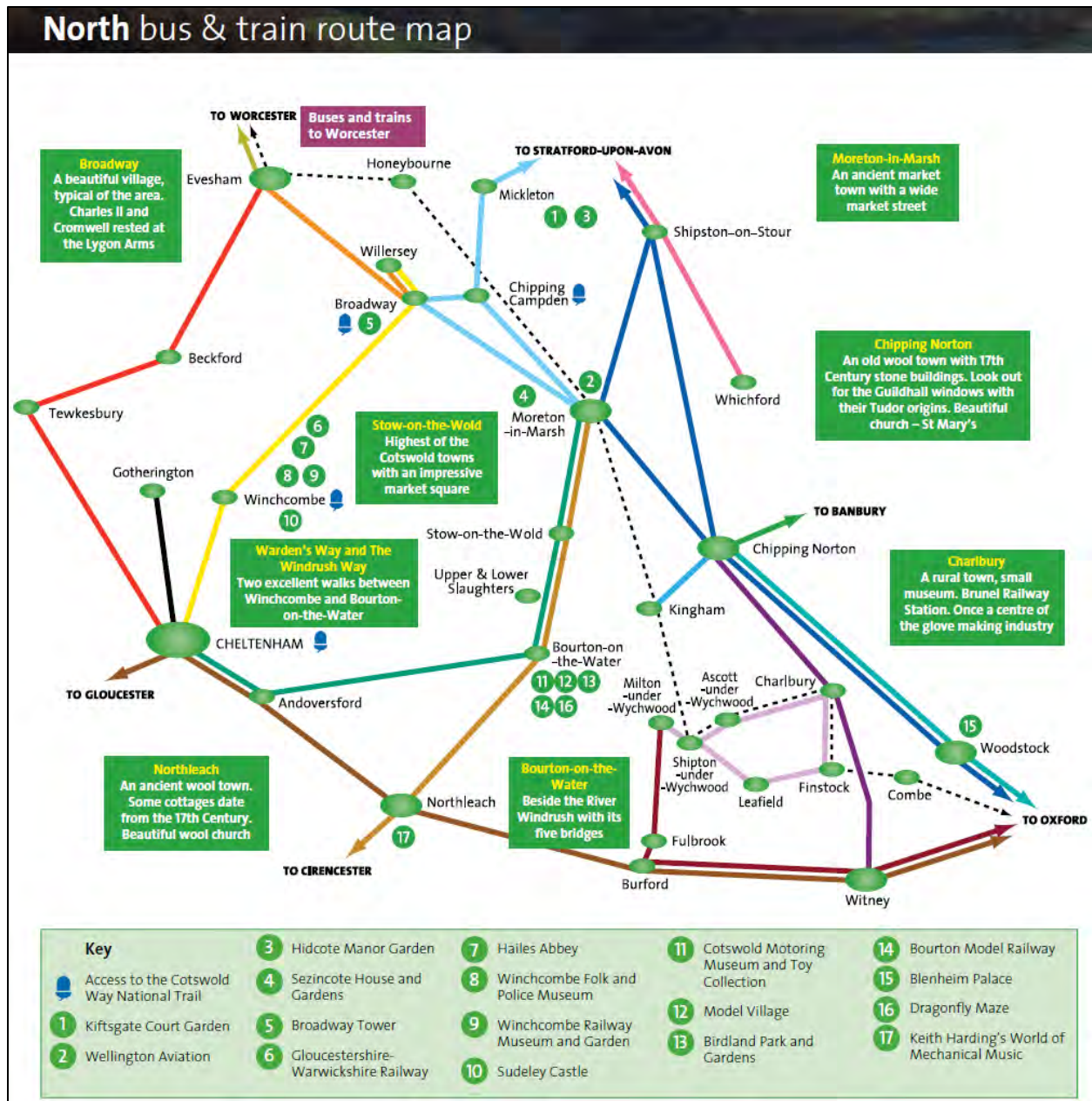


Figure 10. Transit in the Cotswolds (Source: Cotswold Conservation Board, 2011).

In addition to a transit system around rural villages and town centers, the region has an elaborate pedestrian way, containing more than 3,000 miles of pedestrian paths that travel through the region. These paths typically follow the shortest routes between villages, although they include numerous stems and forks that connect with houses in the countryside (see Figure 11). These footpaths often travel through active farm and pasture lands and are a legacy of the medieval ages, when property was owned by feudal lords rather than divided among multiple individual landowners. Nonetheless, they are maintained as public ways under contemporary English law. While such a framework varies from contemporary land ownership in the United States, property easements and tax incentives may be applied to encourage the development of such footpaths in the United States; indeed, such easements are already common for public utilities. The benefits of such paths are not only that they may help

encourage pedestrianism but also that they provide urban residents with a way to interact with rural landscapes, thus allowing them to serve as a major rural tourist attraction as well. Indeed, roughly 27 million visitors travel to the Cotswolds region each year—the majority being day trippers from the London region—and this tourism is estimated to be responsible for the creation of more than 11,000 jobs (Cotswold Conservation Board, 2010).



Figure 11. Rural Footpath Leading to Blockley.

While the Cotswolds benefits from being developed well in advance of the automobile, there is little reason why its transportation and design characteristics cannot inform the development of contemporary rural environments. Indeed, many rural towns have begun rediscovering their historic town centers, seeking to revitalize them to make them attractive places for tourism and reinvestment. While the low wages associated with rural economies are unlikely to allow specialized, private shopkeepers to be able to compete successfully with major chain companies, opportunities for revitalizing rural villages can occur by clustering rural services together in these areas, including health facilities, schools, and other civic infrastructures that can be directed by public agencies, as well as by providing flexible space to accommodate fairs, agricultural festivals, farmer’s markets, and other rural social events. Transit service can be coordinated with these events, and once established, it may also be effective at attracting tourism from metropolitan areas, particularly in rural areas that may have adjacent recreational or scenic attractions or are located along scenic roadways. This tourism can in turn serve as a catalyst for encouraging local restaurants, shops, and crafts catering to both local residents and metropolitan tourists. Yet, such an economic development strategy is contingent upon having a modicum of pedestrian-oriented infrastructure, including main streets and rural paths, coupled with the preservation of scenic rural landscapes. While transit is unlikely to be the primary driver of the creation of livable rural environments, rural transit services can nevertheless be made much more efficient through the development of rural hamlets and villages, and can both encourage their creation and help sustain them over time. Nonetheless, such efforts are likely to be meaningful only in conjunction with land-use and road-design policies intended to support livability.

Emerging Vision for Rural Livability and Transit

Based on the literature review, rural area trends, and work to define and measure rural livability, researchers crafted an emerging vision for rural livability to guide development of an outreach strategy to pilot case study rural transit’s contribution to livability.

Synthesis for Rural Livability Vision

Based upon the transportation advantages associated with traditional rural settlements and incorporation of the livability concepts emerging from this literature review, researchers propose the following as an organizing vision for addressing rural livability:

- Focus on *regional* ability to accommodate multimodal travel.
- Encourage rural economic development through connections to regional employers.
- Create a series of nodes by concentrating services, shopping, public and civic infrastructure, activities, and housing into villages and rural town centers.
- Create villages that contain multiple uses where a single trip can enable a person to accomplish multiple trip ends.
- Preserve the pedestrian character of rural main streets and town centers. Where such streets have been eroded by highway investments, restore their traditional pedestrian character.
- Preserve rural landscapes and agricultural land, particularly along rural highways traveling through the region.
- Establish multimodal connections between rural villages, including transit connections, rural footpaths, and bicycle routes.
- Coordinate planning and funding programs to maximize returns on investment.

Opportunities for Rural Transit

Based on this emerging vision, researchers identified opportunities for transit that reinforce this vision:

- Provide a network of intercity transit services that link town centers and villages with each other, as well as intercity routes that connect to major metropolitan areas.
- Provide a link in the regional multimodal strategy to connect pedestrians, bicyclists, and transit and vehicle travel.
- Tie to urban areas where transit can provide access to the diverse array of household-supporting jobs, services, health care, or recreational opportunities found in urban areas.
- Provide basic mobility options, which are increasingly important for older populations.
- Provide links between workers and rural area industries.
- Pool resources to more efficiently service regions and prevent service duplication.

Rural Transit Livability Relationship Statements

The FTA-sponsored RTLPM Study (*Transit Livability Performance Measures: Rural Transit Livability Performance Measures Suitable for Use at National Level*) structured findings around six livability principles established by the federal agency Partnership for Sustainable Communities.

The six PSC livability principles provide a balanced framework for developing livability measures for rural transit. TTI researchers identified the need for a link between the PSC livability principles and the rural transit industry. PSC established broad descriptive statements for each livability principle. The broad descriptive statements may or may not have a clear relationship to rural transit and livability. Therefore, researchers crafted a “relationship to rural transit livability” statement for each principle. The statements are the conceptual link between candidate rural transit livability performance measures and each of the six broad livability principles.

Because rural communities likely have a strong sense of identity—which may or may not help them understand what role rural transit, livability, and the federal government have in their area—the rural transit livability relationship statements are meant to speak to the concerns of both residents and local, state, and federal government officials.

Researchers crafted rural transit livability relationship statements to link the six PSC livability principles to rural transit. The relational statements were based on the emerging vision for rural livability and the identified opportunities for transit. The relational statements were then presented in the form of a Survey Monkey questionnaire to a panel of experts in rural transit, rural research, and/or performance measurement. The objective of the expert review panel was to garner expert review of the rural transit livability relationship statements as the conceptual connections to the broad descriptions of the six PSC livability principles.

The TTI team sent out the questionnaire to 27 identified experts. A total of 14 (or 52 percent) responded, representing rural transit, rural research, and/or performance measurement experts from California, North Dakota, Montana, North Carolina, Florida, Idaho, Utah, Wyoming, Texas, and Georgia. The rural transit livability relationship statements were revised based on feedback from the identified experts. Table 4 contains the final edition of the rural transit livability relationship statements. Each statement provides insight into how transit does or can contribute to livability in a community in rural America.

Table 4. Rural Transit Livability Relationship Statements.

PSC Livability Principle	Rural Transit Livability Relationship Statement
Support Existing Communities	Rural transit supports existing rural communities and rural community revitalization by contributing to collaborative planning (i.e., land use, infrastructure, and transportation) to encourage concentrations of activities for efficient use of local resources and effective delivery of transit services.
Coordinate Policies and Leverage Investment	Rural transit operators collaborate with federal, state, and local entities, including health and human service transportation providers, to maximize coordination, leverage funding, and increase the accountability and effectiveness of rural transit service in support of community goals.
Value Communities and Neighborhoods	Rural transit contributes value in communities and neighborhoods by providing mobility particularly for people with acute transportation needs, such as persons age 65 or older, individuals with disabilities, lower-income families, and people in remote areas, and for students, youth, tourists, recreational users, tribes, and the general population. Rural transit contributes to healthy, safe, and walkable rural communities by connecting people to essential goods, services, health care, education, and employment.
Provide More Transportation Choices	Rural transit is a safe, reliable, and economical transportation choice that can decrease household transportation costs, reduce the demand for fossil fuels, help to maintain or improve air quality, and promote public health by providing an alternative to a single-occupant automobile and by connecting different travel modes—walking, biking, bus, train, and auto.
Enhance Economic Competitiveness	Rural transit contributes to economic competitiveness in rural America by providing mobility and accessibility through available service (days of service and span of service), frequent service (or service capacity), and reliable service to a variety of destinations that support worker commute needs and provide all riders access to markets.
Promote Equitable and Affordable Housing	Rural transit increases mobility (connections between community and employment) and may decrease the combined cost of housing and transportation in rural communities by providing a lower-cost transportation alternative for people of all ages, incomes, races, and ethnicities, but particularly for people with acute transportation needs, such as persons age 65 or older, individuals with disabilities, lower-income families, and people in remote areas.

Description of Transit and Rural America

This portion of the technical memorandum supplements the literature review with additional relevant information in three areas, as follows:

- Defining urban/rural in practice.
- Reviewing demographic trends in rural America.
- Providing an overview of rural transit services in America.

Defining Urban/Rural in Practice

Understanding the definition of rural is important because different definitions lead to very different boundary definitions, and thus to very different rural definitions (Cromartie & Bucholtz, 2008). FTA uses the land-use concept to define urbanized areas and non-urbanized areas (rural) based on the population and population density of the most recent decennial census.

U.S. Census Land-Use-Based Definition of Urban/Rural

The census analyzes the entire United States to designate concentrations as one of three categories: urbanized area (population of 50,000 or more), urban cluster (population of less than 50,000), and rural (all remaining lands). FTA considers the latter two categories rural—in other words, any lands outside an urbanized area (meaning urban clusters and rural lands) are rural for apportionment of Section 5311 Non-Urbanized Area (rural) program funds to states for supporting rural public transportation. Figure 12 illustrates the land-use definition of rural, designating urbanized and non-urbanized areas.

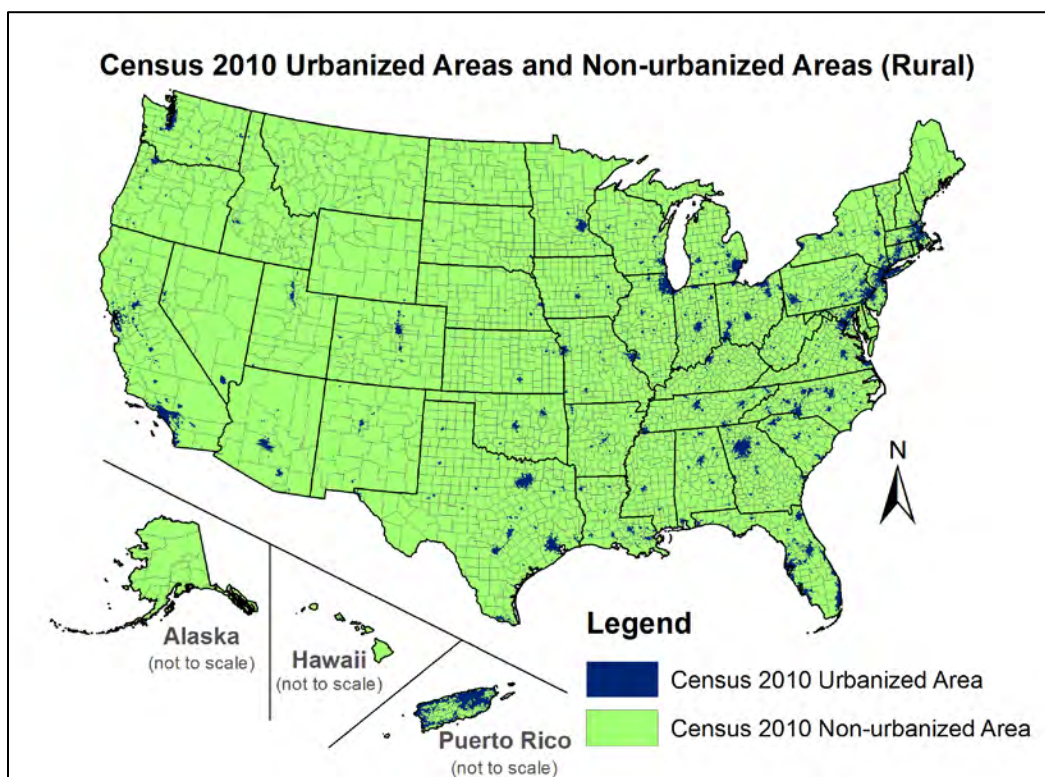


Figure 12. Census 2010 Urbanized Areas and Non-urbanized Areas.

Metropolitan Statistical Area Definition of Urban/Rural

The more common rural definition is based on the economic concept that considers rural to be outside MSAs. The economic concept recognizes the influence of cities on labor, trade, and media markets that extend well beyond densely settled cores to include broader commuting areas. The economic concept is based on regional economic relationships between counties. Based on this concept of urban/rural, rural counties are all counties not within an MSA or metro area. The U.S. Office of Management and Budget defines a metro area as containing a core urban area of 50,000 or more in population. Each metro area consists of one or more counties containing the core urban area and surrounding counties with a high degree of social and economic integration (as measured by commuting to work) with the urban core. Figure 13 illustrates the economic definition of rural using 2010 MSAs.

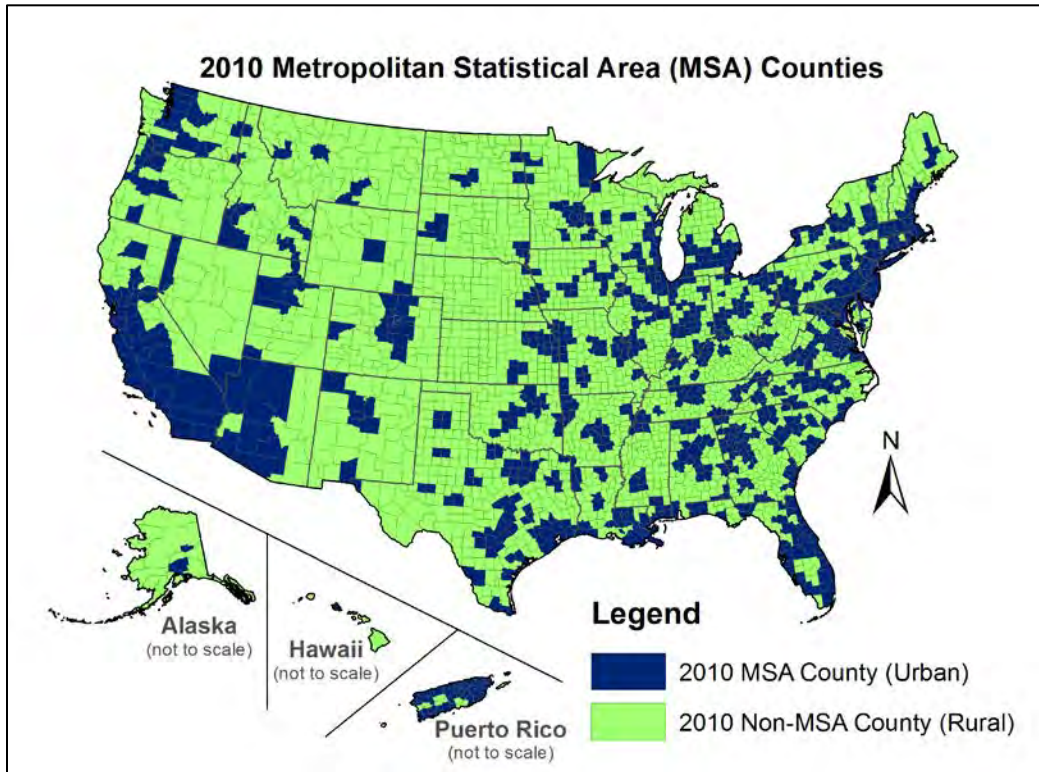


Figure 13. 2010 Metropolitan Statistical Area Counties.

The comparison of the non-urbanized and the nonmetro/non-MSA rural definitions illustrates the real land area differences depending on the definition used. The non-urbanized definition of rural includes much more land area compared to the nonmetro definition of rural.

Two other concepts of rural worth mentioning are frontier status and U.S. Department of Agriculture urban influence codes. Both frontier status and urban influence codes are valuable in terms of thinking about rural character by county that may influence rural livability.

Frontier Counties

Frontier counties are typically defined as counties with a population density of seven persons or less—in other words, extremely low. Such a low population density may indicate exceptionally remote location, low population, few essential goods and services available, or other potential difficulties for residents. Figure 14 illustrates counties considered frontier.

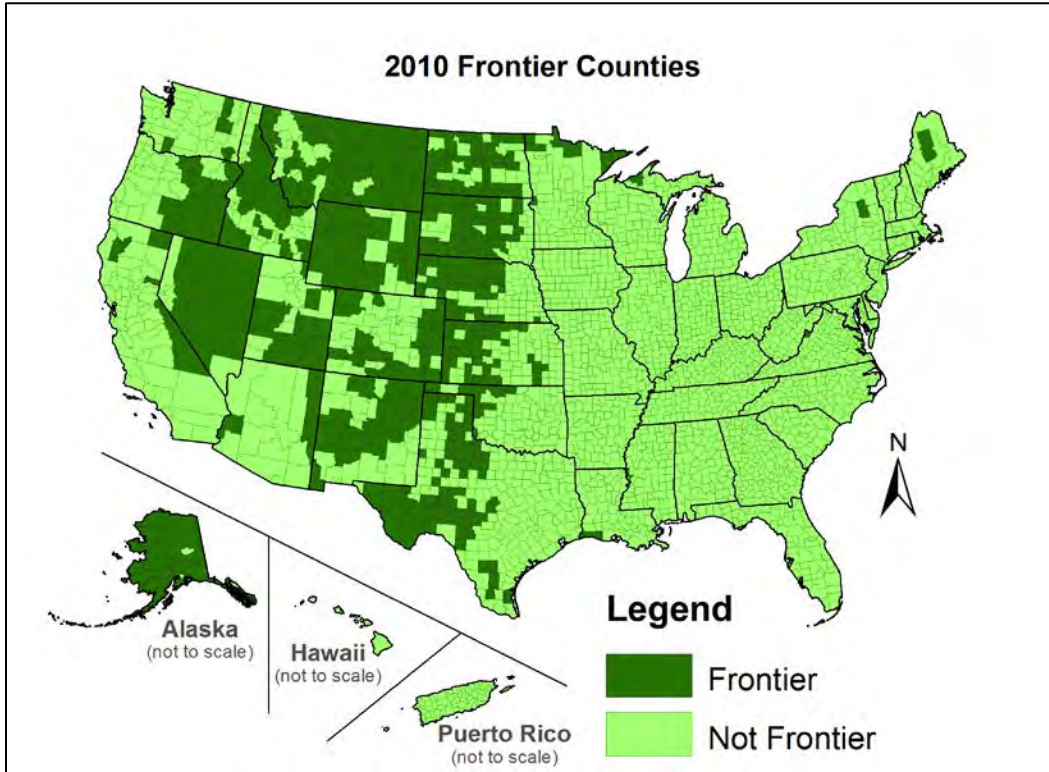


Figure 14. 2010 Frontier Counties.

USDA Urban Influence Codes

Every 5 years or so, the U.S. Department of Agriculture looks at county-level data and determines how strongly each county is influenced by an urban area on a scale of 1 to 12. The scale is as follows:

- 1 indicates the most urban influence and is called “large—in a metro area with at least 1 million residents or more.”
- 6 indicates medium urban influence and is called “noncore adjacent to a small metro with town of at least 2,500 residents.”
- 12 indicates the least urban influence and is called “noncore not adjacent to a metro/micro area and does not contain a town of at least 2,500 residents.”

Figure 15 illustrates the 2003 urban influence codes across the United States.

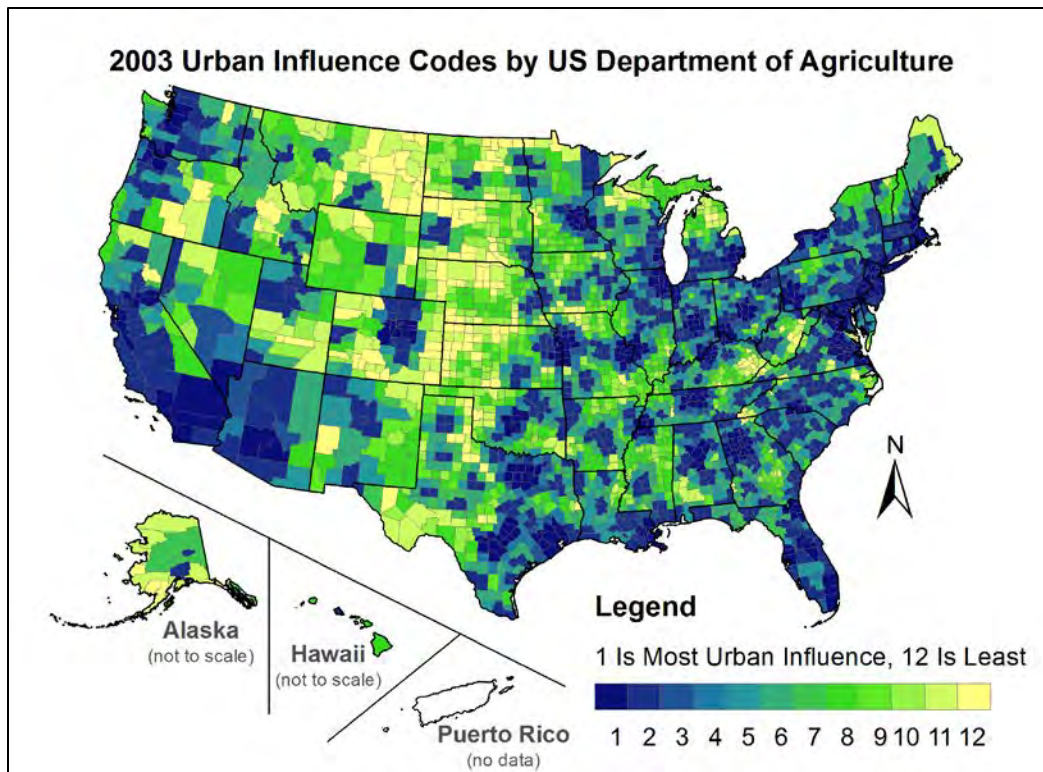


Figure 15. 2003 Urban Influence Codes.

Demographic Trends in Rural America

Researchers reviewed recent results of Census 2010 and the rural conditions and trend studies to identify those aspects of population, demographics, built and natural environments, and economic changes that might influence livability and the provision of transit. In 2007, the USDA ERS produced a brief entitled *Rural Population and Migration* (United States Department of Agriculture, 2007). The brief provides a detailed overview of the following rural trends (using the economic definition of rural); these trends are important because many of them impact rural livability and the delivery of transit service:

- Declining population in about half of the rural (nonmetro) counties from 2000 to 2005.
- Substantial growth in rural counties linked to urban proximity and scenic landscapes.
- Aging rural population.
- Population increases occurring in edge communities.
- Geographic concentration of migration growth.
- Restructuring of economic influences.

TTI compared the USDA ERS 2007 brief with Census 2010 results for nonmetro counties. The findings are consistent with the results of Census 2010.

Population Change

Figure 16 shows the percentage of population change for rural counties (or nonmetro counties) from Census 2000 to Census 2010. There are 2,054 rural nonmetro counties or county equivalents of the 3,221 counties in the United States. Consistent with the findings in the USDA ERS 2007 brief, approximately 46 percent of rural nonmetro counties decreased in population from Census 2000 to Census 2010.

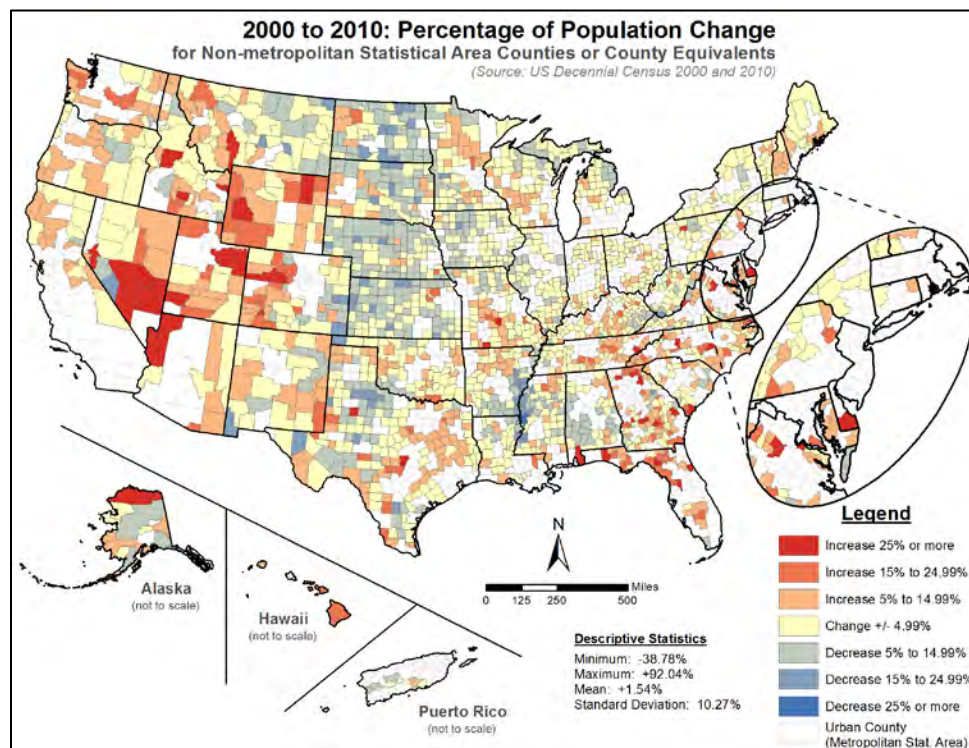


Figure 16. Percentage of Rural County Population Change.

TTI researchers reviewed rural nonmetro county population changes from Census 2000 to Census 2010 in the following three categories:

- **Decrease in population of 5 percent or more:** 23 percent had between a 5 and 39 percent decrease in population. Population decreases were most concentrated in the Great Plains, a bit in the lower Mississippi River valley, and some in the Texas Panhandle and parts of Appalachia.
- **Population change between 5 percent increase or decrease:** 48 percent had less than a 5 percent change in population.
- **Increase in population of 5 percent or more:** 29 percent had between a 5 and 92 percent increase in population. Rural county population increases were concentrated mostly in inter-mountain western and Atlantic Coast states.

According to the USDA ERS 2007 brief, for many rural nonmetro counties, deaths outnumbered births, contributing to overall population loss. The significant population declines were tied to economic declines in the large agriculture-dependent zones of the Great Plains and Corn Belt, the mining areas of Appalachia, and manufacturing areas in southern U.S. counties. Conversely, counties with rural industries attracting low-skill jobs such as meatpacking and other food-and-fiber industries had “revived population growth in otherwise declining Midwestern counties and added to growth in a number of southern manufacturing centers.” Other economic developments affecting new population growth included “the widespread practice of putting new prisons in rural settings and the expansion of casinos throughout the country.” Decreases in the south and east were also mitigated by commutable distances to jobs without persons having to move from rural areas.

Rural nonmetro county population growth could be linked to two county characteristics, urban proximity (adjacent to metro areas) and scenic landscapes. The fastest-growing populations were those in edge communities where suburbanization expanded just outside the urban area with access to urban area jobs. Rural population increases occurred in scenic landscape and natural recreational amenity areas with mountains, lakes, or other appealing natural terrain rather than in the agricultural heartland.

Aging Rural Population

Figure 17 illustrates the percentage of the rural nonmetro county population that was 65 years or older in Census 2010. One of the more striking demographic factors is that there was a larger share of population age 65 or older in rural areas than in urban areas, and the proportion was growing. In Census 2000, approximately 15 percent of rural counties had 20 percent or more of the population age 65 or older. In Census 2010, the figure had grown; approximately 22 percent of rural counties had 20 percent or more of the population age 65 or older. In the majority of rural counties, the increasing share of the older population was due to Baby Boomers hitting 65 or older (aging in place), the propensity of the older population to retire to rural settings, and the outmigration of rural youth.

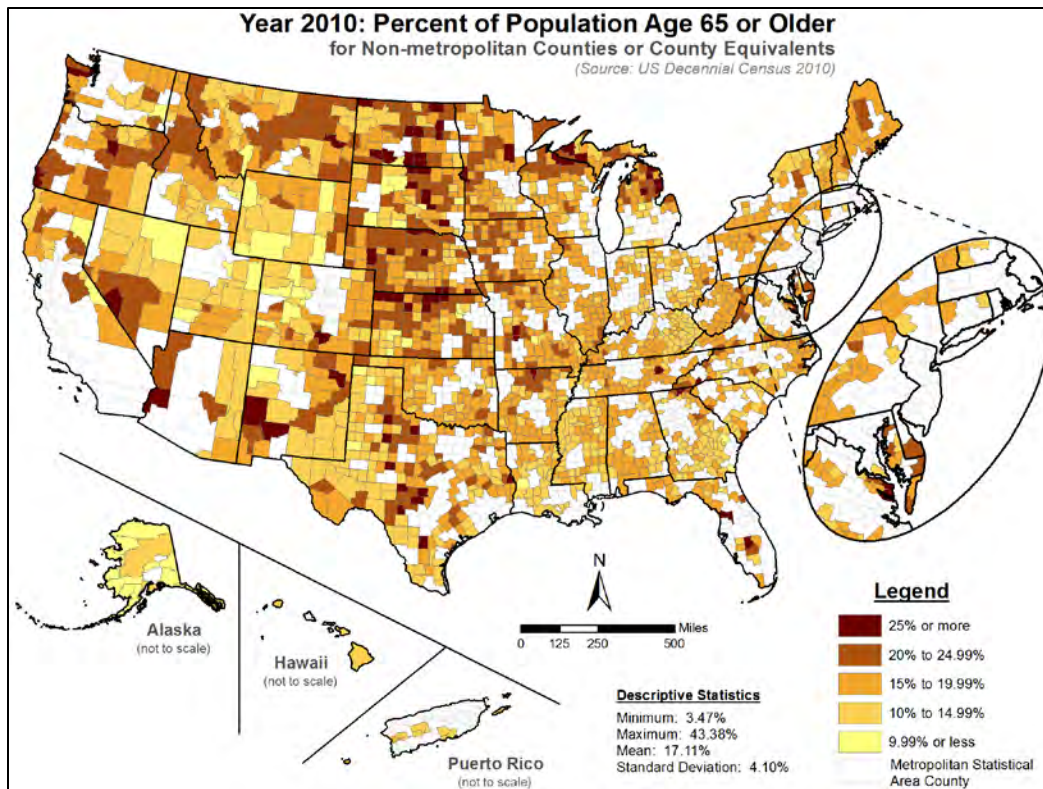


Figure 17. Rural Percent of Population Age 65 or Older.

Overview of Rural Transit Services in America

Rural transit agencies themselves and the services they operate vary a great deal in terms of target ridership, size of service area, urban/rural context, and types of services operated. For example, many rural communities are faced with the trend of moving away from town centers to regionalized shopping, medical services, and employment centers. Other rural communities are agricultural-type communities, not adjacent to major metropolitan areas, where residents' travel needs are spread across a large region. Still other rural communities are adjacent to major metropolitan areas and have a growing need for rural transit to provide residents with connections to the urban economy. Some rural communities have retained small-town characteristics where shopping, schools, and services remain in a walkable town center.

Federal Transit Administration Definition of Rural Transit

The Federal Transit Administration supports rural area public transportation by providing funding to states through the Section 5311 Formula Grants for Other than Urbanized Areas. Rural transit is defined as public transportation provided in rural (non-urbanized) areas. Every 10 years, the Census Bureau redraws all urbanized areas and updates population and land area amounts. FTA apportions Section 5311 program funds to states by a statutory formula based on the latest U.S. decennial census non-urbanized population and land areas.

The federal government does not require state and local governments to establish rural transit agencies. In addition, about 20 percent of all rural transit services are actually provided by dual urban/rural agencies, which provide some services in and out of urbanized areas that are paid for by other FTA grant programs and state and local funds.

Number of FTA-Funded Rural Transit Agencies

In 2010, FTA collected rural transit service data from 1,461 agencies that operated solely rural service. The information for these rural-only transit agencies is collected and stored in the Rural National Transit Database (Rural NTD).

However, approximately 20 percent of transit agencies that receive Section 5311 funds operate both urban and rural services—these agencies can be referred to as dual urban/rural agencies. Dual urban/rural agencies report data about their services only through FTA’s Urban National Transit Database (Urban NTD).

Types of Rural Transit Agency Service Areas

A 2008 study by the National Rural Transit Assistance Program and Community Transportation Association of America revealed that about 66 percent of transit agencies serving rural areas have service areas defined at the county or multi-county level (about 66 percent): municipal transit systems represent about 20 percent, multiple town systems represent about 9 percent, other (portion of county or municipality) represent 4 percent, and tribal reservation agencies represent 1 percent (National Rural Transit Assistance Program and the Community Transportation Association of America, 2008). The study found that almost 20 percent indicated also serving an urbanized area.

The following subsections describe common types of service areas for rural transit agencies. The examples are meant for informational purposes only and may not represent every type of agency (rural transit is a diverse industry).

Regional Rural Agency

Many rural transit agencies are responsible for services throughout a multi-county region that may contain one or more communities of varying population, landform, and socio-economic conditions. Figure 19 illustrates an example regional rural transit service area.

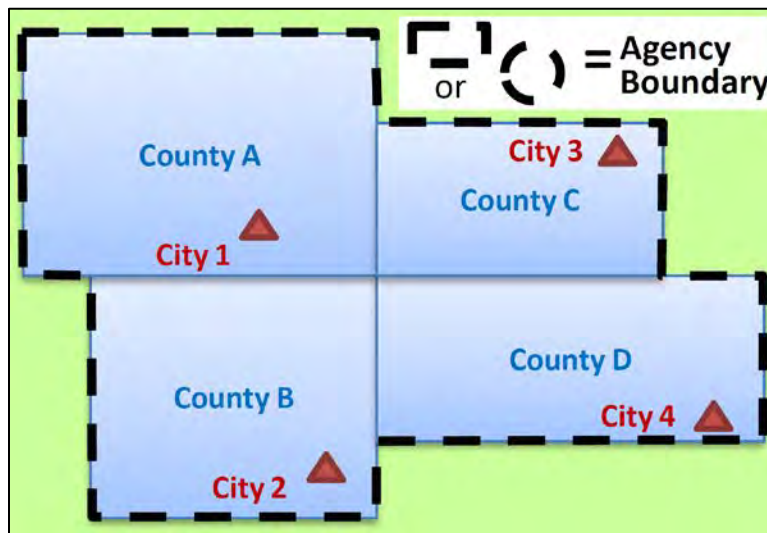


Figure 18. Example Regional Rural Transit Service Area.

City or County Agency

Many rural transit agencies are responsible for services in only one city or one county; city-based agencies may or may not be responsible for services throughout the remainder of the county. Figure 20 illustrates an example city or county rural transit service area.

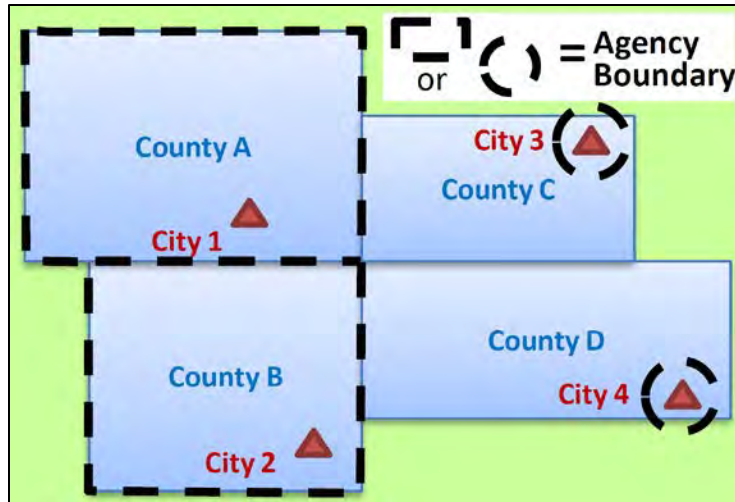


Figure 19. Example City or County Rural Transit Service Area.

Multiple City/County Agencies

In some rural areas, multiple transit agencies provide service to a community. The transit provider for a city and the transit provider for the county may operate in the same rural area to serve particular destinations or types of riders. Figure 21 illustrates an example multiple city or county rural transit service area.

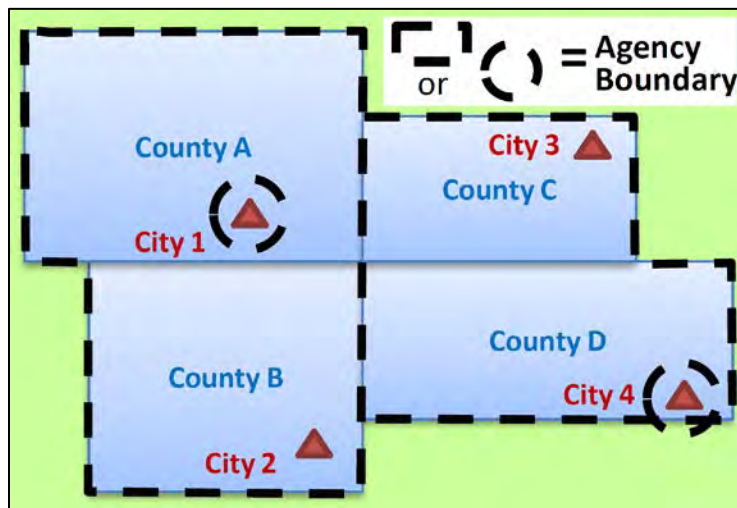


Figure 20. Example Multiple City/County Rural Transit Service Area.

Types of Transit Services in Rural America

In 2007, the National Rural Transit Assistance Program and the Community Transportation Association of America updated the TCRP F-12 database of rural transit providers, providing a listing of 1,498 rural transit providers in the United States (including agencies that operate dual urban/rural service) (National Rural Transit Assistance Program and the Community Transportation Association of America, 2008). Unlike urban transit, which operates mainly fixed-route services, in 2007, 89 percent of Section 5311 federally funded transit agencies provided demand-response services. Section 5311 funded agencies also reported that 31 percent provided fixed-route services, 25 percent provided subscription services, and 18 percent provided route or point deviations.

Figure 22 depicts three common types of transit services. The examples are meant for informational purposes only and may not represent every type of agency.

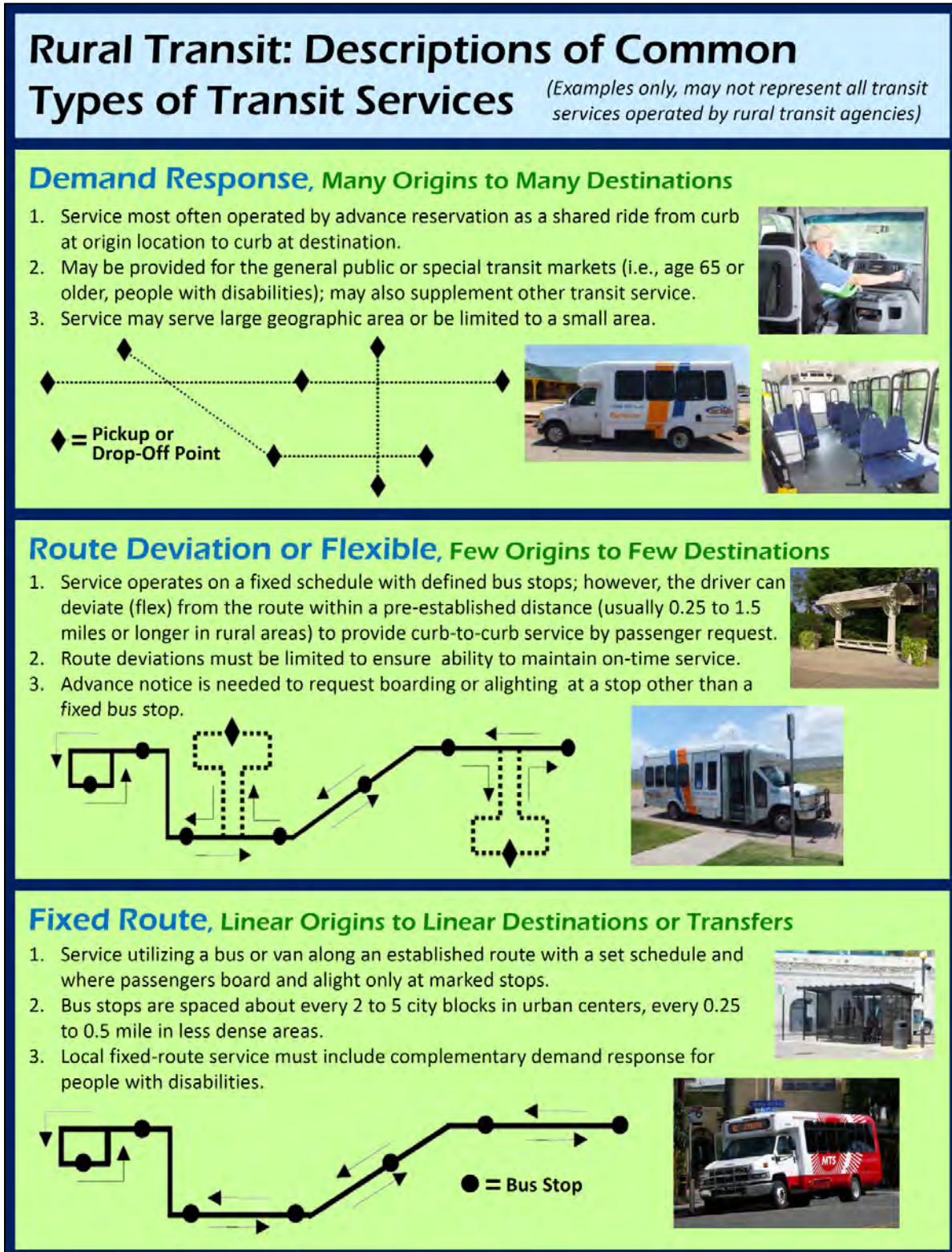


Figure 21. Common Types of Rural Transit Services.

In June 2014, the U.S. Government Accountability Office (GAO) released a report on rural and tribal transit services titled, “Federal Role Key to Rural and Tribal Transit”. GAO analyzed the FTA’s Rural National Transit Database (Rural NTD) for agencies in 2012 and found:

- 67 percent of all miles and 32 percent of all trips were for demand response services.
- 27 percent of all miles and 57 percent of all trips were for fixed or flexible/deviated fixed routes.
- 6 percent of all miles and 11 percent of all trips were for *other services.
 *Other includes vanpools, commuter buses, demand response taxis, and ferryboats

In addition, rural transit ridership increased 4 percent and operating costs increased 19 percent between 2009 and 2012 (U.S. Government Accountability Office, 2014). Both public and tribal rural transit providers indicated they placed high value on federal funding and technical support. Figure 22 is an excellent depiction of typical rural and tribal transit services.

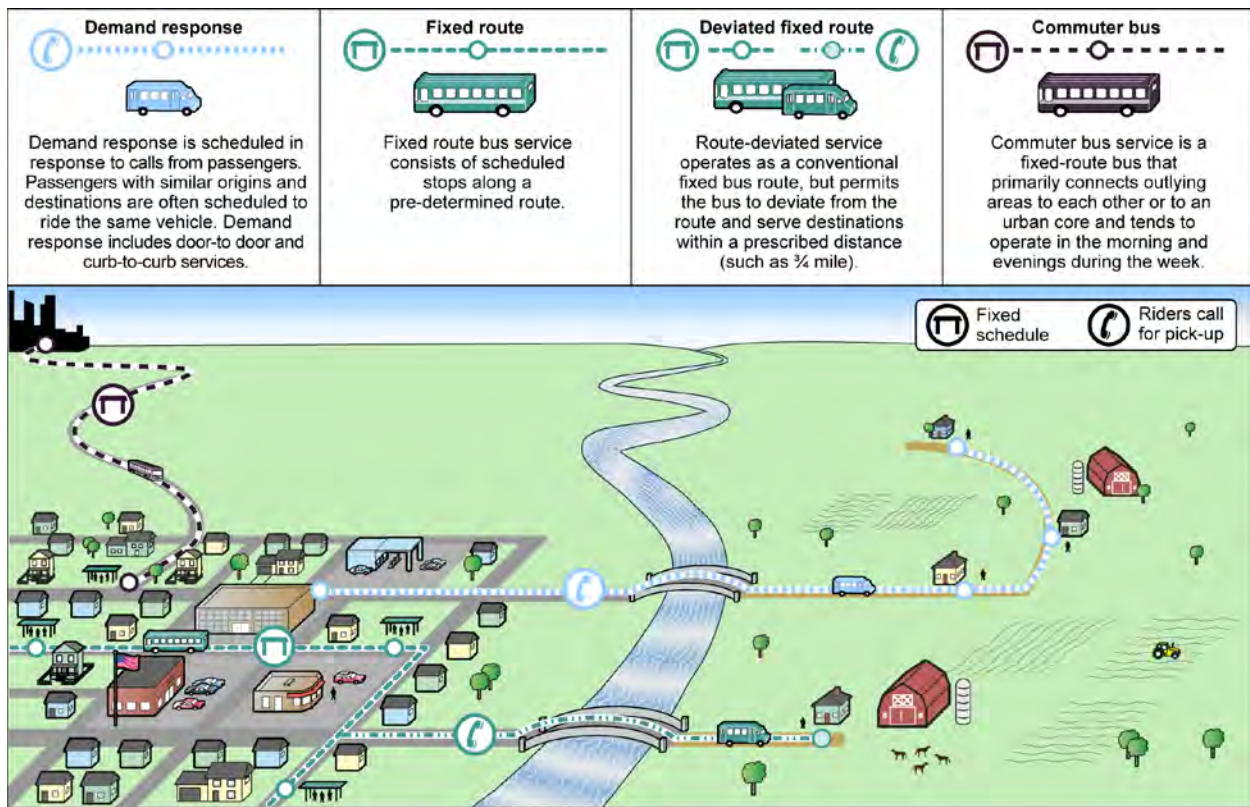


Figure 22. Variety of Rural Transit Services (U.S. Government Accountability Office, 2014).

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