Rural Connections: Challenges and Opportunities in America's Heartland

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TRIP
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Executive Summary

America's rural heartland plays a vital role as home to a significant share of the nation's population, many of its natural resources and the primary source of the energy, food and fiber that supports America's economy and way of life. The strength of the nation's rural economy relies greatly on the quality of its transportation system, particularly its roadways, which link rural America with the rest of the U.S. and to markets in other nations. The economy of rural America, which supports the quality of life for the approximately 50 million Americans living in small communities and rural areas, rides on the quality and connectivity of the rural transportation system. But roads, highways and bridges in the nation's heartland face a number of significant challenges: they carry growing levels of traffic and commerce, lack adequate capacity, fail to provide needed levels of connectivity to many communities, are not built to adequate standards to accommodate growing freight travel in many corridors, have significant deficiencies, lack many desirable safety features, and experience serious traffic crashes at a rate far higher than all other roads and highways. This report looks at the condition, use and safety of the nation's rural transportation system, particularly its roads, highways and bridges, and identifies needed improvements to America's rural transportation system.

The following are the most critical findings of the report.

Rural America plays a vital role in the U.S. as home to a significant share of the nation's population, natural resources and as the primary source of the energy, food and fiber which drives the U.S. economy.

- Rural America is defined as all places and people living in areas outside of urban areas with a population of 5,000 or greater.

- Rural America is home to approximately 50 million people, accounting for approximately 17 percent of the nation's population. Rural America contains roughly 83 percent of the land in the U.S. and is home to the vast majority of the nation's 2.2 million farms.

- The nation's rural population increased approximately 4.5 percent between 2000 and 2010, which was a slower rate of growth than urban America, which increased by approximately 11 percent during the same period.

- Population growth in rural areas has been uneven, with growth being strongest in the South and West, and rural areas in the Upper Plain and Central states more likely to see population losses.

- A significant movement of retiring baby boomers to rural America is considered likely over the next decade as aging Americans seek out communities that offer affordable housing, small-town quality of life, desirable natural amenities and which are often within a short drive of larger metropolitan areas.

The quality of life in America's small communities and rural areas and the health of the nation's rural economy, based largely on the production of energy, food and fiber, is highly reliant on the quality of the nation's transportation system, particularly its roads, highways and bridges, which provide the first and last link in the supply chain from farm to market.

- The annual value of agricultural production in the U.S. is $2.2 trillion

- While farming accounts for just six percent of all jobs in rural America, for every person employed in farming there are seven other jobs in the agribusiness, including wholesale and retail trade, processing, marketing, production, and distribution.

- A recent report by the United States Department of Agriculture (USDA) found that "an effective transportation system supports rural economies, reducing the prices farmers pay for inputs such as seeds and fertilizers, raising the value of their crops and greatly increasing market access.

- Trucks provide the majority of transportation for agricultural products, providing 46 percent of total ton miles of travel compared to 36 percent by rail and 12 percent by barge.

- Trucks account for the vast majority of transportation for perishable agricultural items, carrying 91 percent of ton miles of all fruit, vegetables, livestock, meat, poultry and dairy products in the U.S.

- The Council of State Governments recently found that "rural highways provide many benefits to the nation's transportation system, including serving as a bridge to other states, supporting the agriculture and energy industries, connecting economically challenged citizens in remote locations to employers, enabling the movement of people and freight and providing access to America's tourist attractions."

- The importance of a reliable, safe and well-maintained transportation system to economic growth in rural America was highlighted during the recent White House Rural Economic Forum, which was hosted by President Barack Obama on August 16th, 2011 in Peosta, Iowa.

- U.S. Transportation Secretary Ray LaHood, who hosted a breakout session on transportation and infrastructure at the Forum, wrote the following day on his blog, "We know that affordable transportation choices in our rural communities give residents better access to jobs and health care, and provide an incentive for much-needed economic development. And continued federal investments in rural communities will create construction jobs and ensure that farmers and ranchers have the roads, rail lines, and ports they need to move their products to market."

- Transportation is becoming an even more critical segment of the food distribution network. While food demand is concentrated mostly in urban areas, food distribution is the most dispersed segment of the economy.

- A report by the Pacific Economic Cooperation Council recommends that governments improve the quality of their transportation systems serving the movement of goods from rural to urban regions as a strategy to lower food costs and increase economic prosperity.

- A report on agricultural transportation by the USDA found it likely that market changes and shifts in consumer preferences would further increase the reliance on trucking to move U.S. agricultural products.

- Travel and tourism in the U.S. generated over $700 billion in revenues in 2009 and the nation's national parks, which are largely located in rural areas, receive 300 million visitors per year, many in personal vehicles.

Increases in domestic energy extraction and the production of renewable energy are increasing the demand on the nation's rural highway system.

- Ethanol production in the U.S. increased from 1.7 billion gallons in 2000 to 10.6 billion gallons in 2010. Federal mandates require that production of renewable fuels, including biofuels and cellulosic fuels, reach 36 billion gallons per year by 2022.

- The number of bio-refineries in the U.S. increased from 89 to nearly 500 between 2000 and 2010.

- The development of significant new oil and gas fields in the North Central Plains is placing significant increased loads on the highways in those regions.

Rural Transportation Challenge: Connectivity

Growing demand for rural mobility, combined with the failure to significantly expand the nation's rural transportation system, particularly its network of modern highways, has resulted in a lack of adequate connectivity, which is impeding the potential for economic growth in many rural areas.

- Travel per-lane mile on rural Interstate routes increased by 34 percent from 1990 to 2009. During the same timeframe, travel per-lane mile on the nation's non-Interstate rural roads increased by 15 percent.

- Sixty-six cities of 50,000 or more in the U.S. do not have direct access to the Interstate Highway System. A list of the 66 cities can be found in Appendix A.

- Since the routes for the Interstate Highway System were designated in 1956, the nation's population has nearly doubled from 165 million to 311 million.

- The abandonment of more than 100,000 miles of rail lines in recent decades, mostly in rural areas, has reduced access in many rural communities and increased reliance on trucking for freight movement.

- A recent report by the American Association of State Highway and Transportation Officials found that connectivity is particularly poor in rural portions of Western states because of the significant distance between Interstate highway routes and the lack of adequate rail service.

- Only 60 percent of rural counties nationwide have public transportation available and 28 percent of those have very limited service.

Rural Transportation Challenge: Safety

Traffic fatalities on the nation's rural roads occur at a rate more than three times higher than all other roads. A disproportionate share of fatalities take place on rural roads compared to the amount of traffic they carry.

- Rural roads have a traffic fatality rate that is more than three times higher than all other roads. In 2009, non-Interstate rural roads had a traffic fatality rate of 2.31 deaths for every 100 million vehicle miles of travel, compared to a fatality rate on all other roads of 0.76 deaths per 100 million vehicle miles of travel.

- Crashes on the nation's rural, non-Interstate routes resulted in 17,075 fatalities in 2009, accounting for more than half – 51 percent – of the nation's 33,808 traffic deaths in 2009.

- Rural, non-Interstate routes accounted for 25 percent of all vehicle miles of travel in the U.S. in 2009.

- While fatality rates on all roads have decreased in recent years, the drop in the fatality rate on rural roads has lagged behind that of all other roads from 2000 to 2009. From 2000 to 2009, the fatality rate on all roads, excluding non-Interstate rural roads, decreased by 28 percent (1.05 fatalities per 100 million vehicle miles of travel to .76). However, during the same timeframe, the traffic fatality rate on rural, non-Interstate routes declined by only 13 percent (2.65 fatalities per 100 vehicle miles of travel to 2.31).

- The chart below details the twenty states that led the nation in the number of rural non-Interstate traffic deaths in 2009. Data for each state is available in Appendix B.

STATE	2009 RURAL NON-INTERSTATE TRAFFIC DEATHS
Texas	1,490
California	1,164
North Carolina	907
Florida	906
South Carolina	791
Pennsylvania	611
Ohio	601
Kentucky	584
Missouri	533
Georgia	527
New York	524
Tennessee	519
Mississippi	464
Alabama	449
Oklahoma	444
Arkansas	418
Virginia	371
Michigan	369
Indiana	365
Wisconsin	363

- The chart below details the states with the highest rate of rural non-Interstate traffic fatalities per 100 million miles of travel in 2009 and fatality rate per 100 million vehicle miles of travel on all other roads in the state in 2009. Data for each state is available in Appendix C.

STATE	NON-INTERSTATE RURAL	ALL OTHER ROADS
South Carolina	4.70	.32
Florida	3.47	.98
Rhode Island	2.99	.89
Arkansas	2.89	.89
California	2.86	.68
Texas	2.83	.89
Kentucky	2.82	.78
Arizona	2.78	.98
Montana	2.76	1.14
North Dakota	2.75	.48
North Carolina	2.74	.43
Oklahoma	2.71	.96
Tennessee	2.68	.92
West Virginia	2.62	1.21
Louisiana	2.57	1.49
Kansas	2.50	.57
Delaware	2.41	.79
Oregon	2.34	.53
Nevada	2.33	.98
Missouri	2.31	.75

Inadequate roadway safety design, longer emergency vehicle response times and the higher speeds traveled on rural roads compared to urban roads are factors in the higher traffic fatality rate found on rural, non-Interstate routes.

- Rural roads are more likely than urban roads to have poor roadway design, including narrow lanes, limited shoulders, sharp curves, exposed hazards, pavement drop-offs, steep slopes and limited clear zones along roadsides.

- Because many rural routes have been constructed over a period of years, they often have inconsistent design features for such things as lane widths, curves, shoulders and clearance zones along roadsides.

- Rural roads are more likely than urban roads to be two-lane routes. Seventy percent of the nation's urban non-freeway arterial and collector roads have two-lanes, compared to 94 percent of rural non-freeway, arterial and collector routes having two-lanes.

- Rural roads are more likely than urban roads to have narrow lanes. A desirable lane width for collector and arterial roadways is at least 11 feet. But, 24 percent of rural collector and arterial roads have lane widths of 10 feet or less, compared to 18 percent of urban collector and arterial roads with lane widths of 10 feet or less.

- In 2009, 34 percent of all fatal crashes on non-Interstate rural roads involved a vehicle leaving the roadway, whereas only 21 percent of fatal traffic crashes on all other routes involved a vehicle leaving the roadway.

- In 2009, vehicles driving on rural roads were nearly twice as likely as vehicles on all other roads to be involved in a fatal traffic accident while attempting to negotiate curves. In 2009, 23 percent of all vehicle occupants killed in rural, non-Interstate crashes involved a vehicle attempting to negotiate a curve, while only 12 percent of vehicle occupants killed in all other crashes involved a vehicle attempting to negotiate a curve.

- Vehicles driving on non-Interstate rural roads are far more likely than vehicles traveling on all other roads to be involved in a fatal head-on collision. In 2009, 15 percent of rural fatal multi-vehicle crashes were head-on collisions, compared to eight percent of all other traffic crashes.

- While the vast majority of rural roads are two-lane facilities, very few rural traffic fatalities occurred while one vehicle was trying to pass another. In 2009, only three percent of all vehicle occupants killed in rural, non-Interstate crashes died in crashes where one vehicle was trying to pass another vehicle.

- Most head-on crashes on rural, non-Interstate roads are likely caused by a motorist making an unintentional maneuver as a result of driver fatigue, being distracted or driving too fast in a curve.

- While driver behavior is a significant factor in traffic crash rates, both safety belt usage and impaired driving rates are similar in their involvement rate as a factor in urban and rural traffic crashes.

Numerous roadway safety improvements can be made to reduce serious crashes and traffic fatalities. These improvements are designed largely to keep vehicles from leaving the correct lane and to reduce the consequences of a vehicle leaving the roadway.

- The type of safety design improvements that are appropriate for a section of rural road will depend partly on the amount of funding available and the nature of the safety problem on that section of road.

- Low-cost safety improvements include installing rumble strips along the centerline and sides of roads, improving signage and pavement/lane markings including higher levels of retroreflectivity, installing lighting, removing or shielding roadside obstacles, using chevrons and post-mounted delineators to indicate roadway alignment along curves, adding skid resistant surfaces at curves and upgrading or adding guardrails.

- Moderate-cost improvements include adding turn lanes at intersections, resurfacing pavements and adding median barriers.

- Moderate to high-cost improvements include improving roadway alignment, reducing the angle of curves, widening lanes, adding or paving shoulders, adding intermittent passing lanes or adding a third or fourth lane.

- The use of Roadway Safety Assessments (RSAs) is a proven approach that can improve roadway safety on rural roads. Improved data collection on rural road safety can help to identify roadway segments with dangerous characteristics.

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- Systemic installation of cost effective safety solutions and devices in rural areas helps to improve safety not just by targeting problem points ("black spots") on a road, but also making entire segments safer by improving those roadway segments that exhibit the characteristics that typically result in fatal or serious-injury crashes.

Rural Transportation Challenge: Deficient Conditions

The nation's rural roads, highways and bridges have significant deficiencies.

- In 2008, 12 percent of the nation's major rural roads (arterials and collectors) were rated in poor condition and another 43 percent were rated in fair condition.

- The chart below details the states with the greatest percentage of major rural roads in poor condition in 2008. Rural pavement conditions for all states can be found in the Appendix D.

STATE	PERCENT POOR
Vermont	36
Idaho	31
Oklahoma	30
Rhode Island	30
Hawaii	29
Kansas	28
West Virginia	27
Arkansas	23
New Hampshire	21
New Mexico	21
Alaska	20
Missouri	20
Connecticut	19
Maine	19
California	18
Pennsylvania	17
South Dakota	17
Michigan	16
Illinois	16
Mississippi	15

- In 2010, 13 percent of the nation's rural bridges were rated as structurally deficient. A bridge is structurally deficient if there is significant deterioration of the bridge deck, supports or other major components. Structurally deficient bridges are often posted for lower weight or closed to traffic, restricting or redirecting large vehicles, including commercial trucks, school buses and emergency services vehicles.

- In 2010, 10 percent of the nation's rural bridges were rated as functionally obsolete. Bridges that are functionally obsolete no longer meet current highway design standards, often because of narrow lanes, inadequate clearances or poor alignment.

- The chart below details the states with the highest share of rural bridges rated structurally deficient in 2010. Rural bridge conditions for all states can be found in Appendix E.

STATE	PERCENT STRUCTURALLY DEFICIENT
Pennsylvania	28
Rhode Island	26
Oklahoma	23
Iowa	23
South Dakota	21
Nebraska	19
Missouri	18
North Dakota	17
Mississippi	16
Hawaii	16
New Hampshire	15
Maine	15
Louisiana	15
North Carolina	14
New York	14
Michigan	14
West Virginia	14
South Carolina	14
California	14
New Jersey	13

Transportation Opportunities in Rural America

America must adopt transportation policies that will improve rural transportation connectivity, safety and conditions to provide the nation's small communities and rural areas with the a level of safe and efficient access that will support quality of life and enhance economic productivity.

The following recommendations by TRIP for an improved rural transportation system are also based partially on findings and recommendations made recently by the American Association of State Highway and Transportation Officials (AASHTO),the National Highway Cooperative Research Program (NCHRP), the Council of State Governments (CSG) and the Ports-to-Plains Alliance.

Improve access and connectivity in America's small communities and rural areas

- ✓ Widen and extend key highway routes, including Interstates, to increase connectivity to smaller and emerging communities to facilitate access to jobs, education and healthcare while improving access for agriculture, energy, manufacturing, forestry, tourism and other critical segments of the rural economy.

- ✓ The NCHRP report found that the construction of an additional 30,000 lane miles of limited access highways, largely along existing corridors, is needed to address the nation's need for increased rural connectivity.

- ✓ Modernize major two-lane roads and highways so they can accommodate increased personal and commercial travel.

- ✓ Improve public transit service in rural America to provide improved access for people without access to private vehicles, including older people.

Improve rural traffic safety

- ✓ Adequately fund needed rural roadway safety improvements and provide enhanced enforcement, education and improved emergency response to reduce the rate of rural traffic fatalities.

- ✓ Implement cost-effective roadway safety improvements, including rumble strips, shoulder improvements, lane widening, curve reductions, skid resistant surfaces at curves, passing lanes, intersection improvements and improved signage, pavement markings and lighting, guardrails and barriers, and improved shielding of obstacles.

Improve the condition of rural roads, highways and bridges

- ✓ Adequately fund local and state transportation programs to insure sufficient preservation of rural roads, highways and bridges to maintain transportation service and also to accommodate large truck travel, which is needed to support the rural economy.

All data used in this report is the most current available. Sources of information for this report include: The Federal Highway Administration, the National Highway Traffic Safety Administration, the National Cooperative Highway Research Program, the American Association of State Highway and Transportation Officials, the United States Department of Agriculture, the Council of State Governments and the U.S. Census Bureau.

Introduction

America's rural heartland is a vital part of the country, as a place to live or visit and as a cultural and economic resource. The nation's rural transportation system plays a critical role in supporting the economy of rural America and connecting the nation's heartland to its urban regions.

Roads, bridges and highways remain the backbone of the nation's rural transportation system, supporting its growing economy and providing daily mobility for residents, businesses and visitors. The level of safety and efficiency and the condition of the nation's rural roads and bridges all play a critical role in the quality of life in rural and urban America. The nation's rural transportation system provides mobility for rural residents and visitors while linking America's urban areas with the source of much of its food supply and other natural resources.

The importance of rural transportation is likely to increase in the future as more people choose to live in rural America and the reliance on roads to transport products and people in and out of rural communities increases. Making needed improvements to the nation's rural transportation system will be critical in supporting the quality of life and economic development of rural America and the entire nation.

This report examines roadway safety, travel and population trends in rural America and recommends steps to improve the safety, efficiency and condition of the nation's rural transportation system.

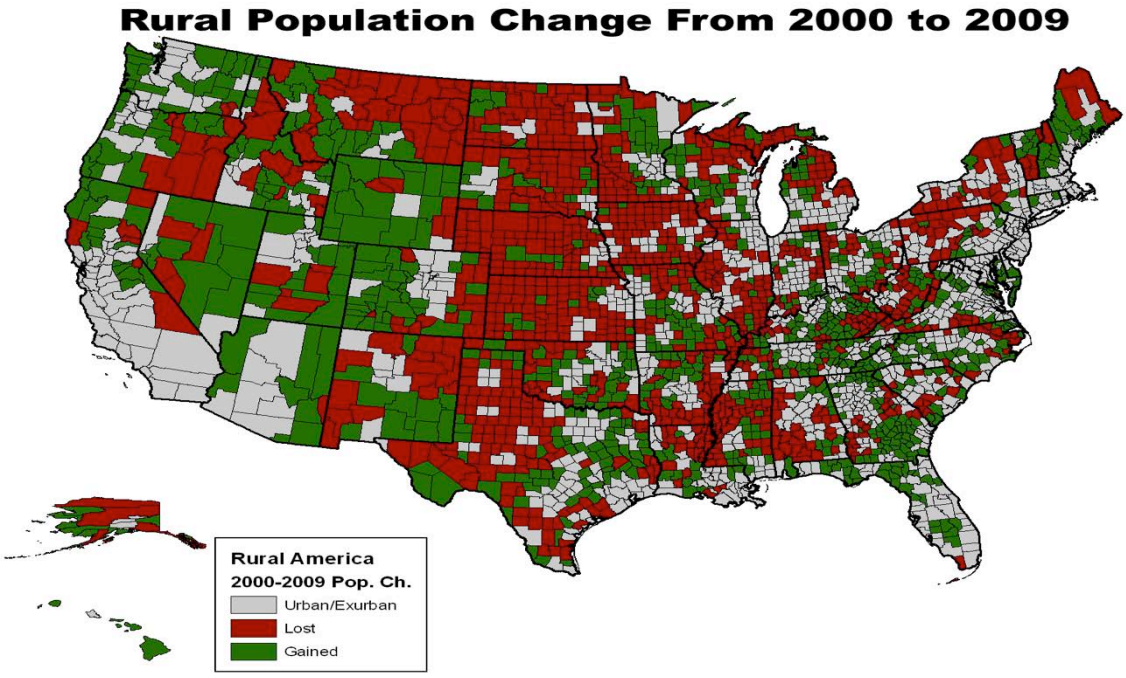
America's Heartland

Roughly 50 million people - approximately 17 percent of the nation's population -live in rural areas in the U.S. Rural America contains approximately 83 percent of the land in the U.S. and is home to the vast majority of the nation's 2.2 million farms.[1] Rural America is defined as all places and people living in areas outside of urban areas with a population of 5,000 or greater.

The nation's rural population increased approximately 4.5 percent between 2000 and 2010, which was a slower rate of growth than urban America, which increased by approximately 11 percent during the same period.[2]

Population growth in rural areas was uneven, with growth occurring in the South and the West, and rural areas in the Upper Plains and Central states more likely to see population losses.

Chart 1. Rural Population Change 2000-2009 by County



Source: Center for Rural Strategies

Growth in rural areas, particularly in the South and West, has been fueled by significant domestic and international migration to regions that offer affordable housing, small-town quality of life and desirable natural amenities or climate, yet are within commuting distances of larger metropolitan areas.[3] A significant movement of retiring baby boomers to rural America is considered likely over the next decade as aging Americans seek out communities that have these qualities.[4]

There are several reasons for the continued modest growth in rural populations. The lower cost of living, the proximity to natural resources such as lakes and mountains, and a less stressful quality of life significant attractions to many Americans and recent immigrants. The United States Department of Agriculture (USDA) notes that many rural areas have experienced recent growth as a result of the arrival of many people who have moved into a region for non-economic reasons.[5] While some of these recent arrivals to rural America are retired, most of them are still of working age. Increased geographic flexibility for many workers, largely as a result of improved technology, has also allowed many people to move or build second homes in rural areas that are close to desirable recreation areas.

Transportation's Critical Importance to the Rural Economy

The quality of life in America's small communities and rural areas, and the health of the nation's rural economy, based largely on the production of energy, food and fiber, is highly reliant on the quality of the nation's transportation system. This is especially true of America's rural roads, highways and bridges, which provide the first and last link in the supply chain from farm to market and other retail outlets. An effective rural transportation system supports rural

economies by reducing the prices farmers pay for such items as seed and fertilizer, raising the value of their crops and greatly increasing their market access. As agriculture thrives, so does its supporting community. Providing effective transportation for a rural region stimulates the farms and businesses served, improving the standard of living in a region.[6]

A recent 2010 report by the USDA found that "an effective transportation system supports rural economies, reducing the prices farmers pay for inputs such as seeds and fertilizers, raising the value of their crops and greatly increasing market access. The economics of rural areas are intertwined. As agriculture thrives, so does its supporting communities. An efficient system of freight transportation is an important foundation for a vibrant rural economy, including rural manufacturing."[7]

While farming accounts for just six percent of all jobs in rural America, for every person employed in farming there are seven other jobs in agribusiness, including wholesale and retail trade, processing, marketing, production and distribution.[8]

The annual value of agricultural production in the U.S. is $2.2 trillion. [9] Trucks provide the majority of transportation for agricultural products, providing 46 percent of total ton-miles of travel compared to 36 percent by rail and 12 percent by barge. [10] Trucks account for the vast majority of transportation for perishable agricultural items, carrying 91 percent of ton-miles of all fruit, vegetables, livestock, meat, poultry and dairy products in the U.S.[11]

The Council of State Governments found in a 2011 report that "rural highways provide many benefits to the nation's transportation system, including serving as a bridge to other states, supporting the agriculture and energy industries, connecting economically challenged citizens in remote locations to employers, enabling the movement of people and freight and providing access to America's tourist attractions."[12]

The importance of a reliable, safe and well-maintained transportation system to economic growth in rural America was highlighted during the recent White House Rural Economic Forum, which was hosted by President Barack Obama on August 16th, 2011 in Peosta, Iowa.

U.S. Transportation Secretary Ray LaHood, who hosted a breakout session on transportation and infrastructure at the Forum, wrote the following day on his blog, on his blog, "We know that affordable transportation choices in our rural communities give residents better access to jobs and health care, and provide an incentive for much-needed economic development. And continued federal investments in rural communities will create construction jobs and ensure that farmers and ranchers have the roads, rail lines, and ports they need to move their products to market."[13]

The importance of a good rural transportation system to the efficiency of a region's economic performance is increasing as food distribution becomes increasingly dependant on reliable transportation. A report by the Pacific Economic Cooperation Council found that transportation is becoming an even more critical segment of the food distribution network as food distribution is the most dispersed segment of the economy while food demand is concentrated mostly in urban areas. The report recommends that governments improve the quality of their transportation systems serving the movement of goods from rural to urban regions as a strategy to lower food costs and increase economic prosperity.[14]

A report on agricultural transportation by the USDA found it likely that market changes and changes in consumer preferences would further increase the reliance on trucking to move U.S. agricultural products. The USDA report found that future, foreign demand for U.S. agricultural products will increasingly be for processed products, such as flour, which rely on increased domestic transportation. Consumer demands in the U.S. and the need for greater

traceability of where and how an agricultural product was produced will also increase the need for smaller, time-sensitive delivery. The USDA report found that for agricultural products, "movements toward lower volumes of trait-specific commodities will likely favor trucks as the primary mode of transport."[15]

The condition and quality of the nation's highway system also plays a critical role in providing access to America's many tourist destinations, particularly its scenic parks and recreational areas, which are mostly located in rural areas. Travel and tourism in the U.S. generated over $700 billion in revenues in 2009 and the nation's national parks receive 300 million visitors per year.[16]

Rural Transportation Challenge: Connectivity

Growing demand for rural mobility combined with the failure to significantly expand the nation's rural transportation system, particularly its network of modern highways, has resulted in a lack of adequate connectivity. This lack of mobility and connectivity is impeding the potential for economic growth in many rural areas.

Travel on the nation's rural roads, particularly on its Interstate highways, has increased significantly since 1990. The continued increase in travel on rural roads is a result of increased rural population as well as the growing reliance of agriculture on trucks for farm-to-market transport. Travel per-lane mile on rural Interstate routes increased by 34 percent from 1990 to 2009.[17] Travel per-lane mile on the nation's non-Interstate rural roads increased by 15 percent from 1990 to 2009.[18]

The Interstate Highway System is the most critical highway link for commerce and intercity travel in rural America. But many rural and smaller communities in the U.S. are not adequately served by the Interstate system. Since the routes for the Interstate Highway System were designated in 1956, the nation's population has nearly doubled from 165 million to 311 million and is projected to increase to 420 million people by 2050.[19]

A 2010 report by the American Association of State Highway and Transportation Officials found that there are 66 areas in the United States with populations of at least 50,000 people that are not connected to the Interstate System.[20] A list of the 66 U.S. urban areas of at least 50,000 people that are not connected to the Interstate System can be found in Appendix A. This lack of connection to the nation's major highway system reduces the economic competitiveness of these communities and their surrounding rural areas. "Maintaining connectivity is essential not only to serve rural communities, but also to support the shifting agricultural and energy extraction and production needs of a growing population and economy," the report found.[21]

The 2010 report by the American Association of State Highway and Transportation Officials also found that connectivity is particularly poor in rural portions of Western states because of the significant distance between Interstate highway routes and the lack of adequate rail service.[22]

The lack of connectivity in rural America has been exacerbated by the continued reduction in the areas served by railroads as a result of the abandonment of un-profitable or lightly used rail lines. Over the last few decades, more than 100,000 miles of rail lines have been abandoned, mostly in rural areas, reducing access in many rural communities and increasing reliance on trucking for freight movement.[23]

This loss of rail service reduces transport options, particularly for farmers, and the lack of adequate rural public transit, which is needed to provide access for people without access to private vehicles, including those with lower incomes and the 9.6 million older people who live in rural America.[24]

Rural transit, which often takes the form of specialized services such as van pools tailored to access employment and healthcare, often fails to meet the needs of rural Americans. Only 60 percent of rural counties nationwide have public transportation available and 28 percent of those have very limited service.[25]

Rural Transportation Challenge: Safety

Traffic crashes are a major source of fatalities in the U.S., particularly in rural America. The nation's rural, non-Interstate roads have the highest rate of traffic fatalities. . TRIP analyzed traffic fatalities on rural roads based on data obtained from the National Highway Traffic Safety Administration (NHTSA). Information was obtained for all fatal traffic crashes that occurred in 2009 on all rural roads and highways in the U.S., excluding the Interstate system. Rural Interstate routes were excluded from the safety analysis in this report because they are built to very high safety standards, and do not have the significant traffic safety problems common on many rural roads.

In 2009, 33,808 people died in traffic crashes in the U.S. Traffic crashes on the nation's non-Interstate rural roads resulted in 17,075 fatalities in 2009, 51 percent of all traffic fatalities in the U.S. This is despite the fact that the nation's non-Interstate rural roads carried only 25 percent of all vehicle miles of travel in 2009.[26]

The fatality rate on rural non-Interstate routes in 2009 was 2.31 deaths for every 100 vehicle miles of travel, more than three times higher than the fatality rate of 0.76 fatalities per 100 million vehicle miles of travel on all other routes.[27] The combined fatality rate for all U.S. roads in 2009 was 1.14 fatalities per 100 vehicle miles of travel.[28] The five states with the largest number of fatalities in crashes on rural, non-Interstate roads in 2009 were Texas, California, North Carolina, Florida and South Carolina. State-by-state data on the number of traffic fatalities occurring on rural, non-Interstate routes in 2009 and their share of overall fatalities and vehicle miles of travel can be found in Appendix B.

Chart 2. States with most fatalities in crashes on non-Interstate, rural roads in 2009.

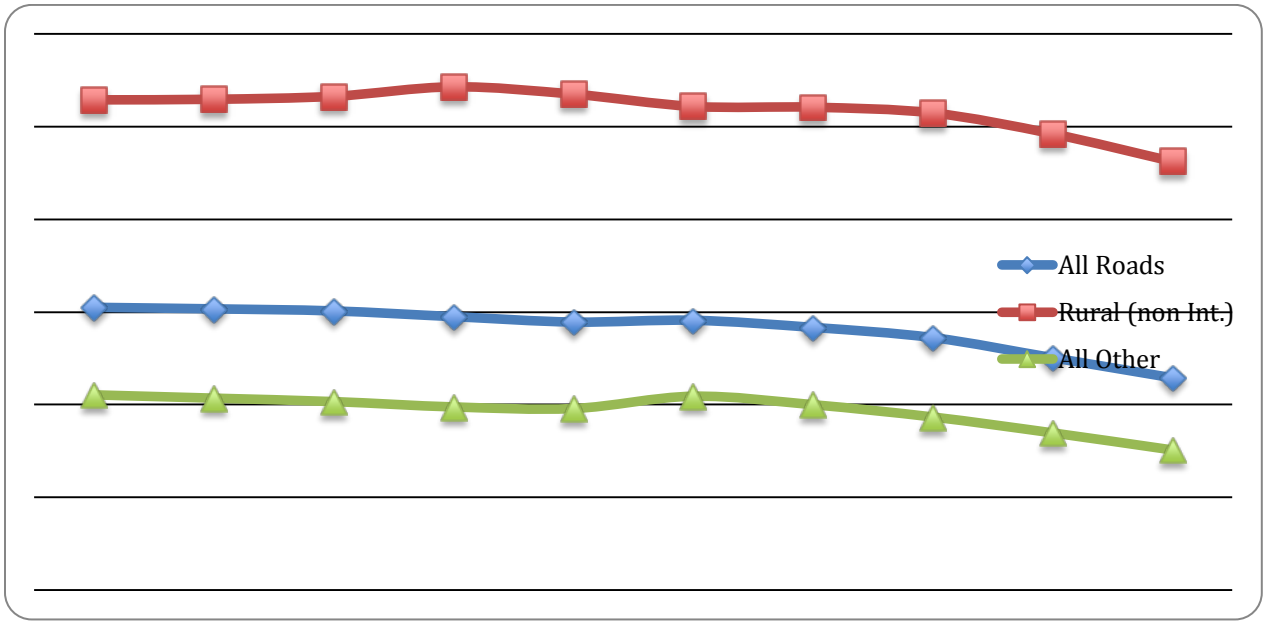
STATE	2009 RURAL NON-INTERSTATE TRAFFIC DEATHS
Texas	1,490
California	1,164
North Carolina	907
Florida	906
South Carolina	791
Pennsylvania	611
Ohio	601
Kentucky	584
Missouri	533
Georgia	527
New York	524
Tennessee	519
Mississippi	464
Alabama	449
Oklahoma	444
Arkansas	418
Virginia	371
Michigan	369

Indiana	365
Wisconsin	363

Source: TRIP analysis of National Highway Traffic Safety Administration data

While overall fatality rates have decreased in recent years, the fatality rate on rural, non-Interstate roads has come down at a slower rate. From 2000 to 2009, the fatality rate on all roads nationally decreased by 25 percent from 1.53 fatalities per 100 million vehicle miles of travel to 1.14.[29] But on rural, non-Interstate routes, the traffic fatality rate has declined by only 13 percent from 2000 to 2009, from 2.65 fatalities per 100 vehicle miles of travel to 2.31[30]. The fatality rate on all other roads decreased by 28 percent from 2000 to 2009, decreasing from 1.05 fatalities per 100 million vehicle miles of travel to 0.76 in 2009.[31]

Chart 3. Fatalities per 100 million vehicle miles of travel for all roads, rural, non-Interstate routes and all other routes, 2000 to 2009.



Source: TRIP analysis of National Highway Traffic Safety Administration and Federal Highway Administration data

The state with the highest rate of traffic fatalities on its non-Interstate, rural routes in 2009 was South Carolina, with 4.70 traffic fatalities per every 100 million vehicle miles of travel.[32] Florida, Rhode Island, Arkansas and California experienced the next highest rates of traffic fatalities on their non-Interstate, rural roads.

Chart 4. States with highest rate of traffic fatalities on rural, non-Interstate routes per 100 million vehicle miles of travel in 2009 and fatality rate on all other roads in the state in 2009

STATE	NON-INTERSTATE RURAL	ALL OTHER ROADS
South Carolina	4.70	.32
Florida	3.47	.98
Rhode Island	2.99	.89
Arkansas	2.89	.89
California	2.86	.68
Texas	2.83	.89
Kentucky	2.82	.78
Arizona	2.78	.98
Montana	2.76	1.14
North Dakota	2.75	.48
North Carolina	2.74	.43
Oklahoma	2.71	.96
Tennessee	2.68	.92
West Virginia	2.62	1.21
Louisiana	2.57	1.49
Kansas	2.50	.57
Delaware	2.41	.79
Oregon	2.34	.53
Nevada	2.33	.98
Missouri	2.31	.75

Source: TRIP analysis of National Highway Traffic Safety Administration and Federal Highway Administration data

State-by-state data on traffic fatality rates on rural, non-Interstate routes and all other routes can be found in Appendix C.

Traffic Safety Factors

Key factors that contribute to fatal traffic crashes include the following: human behavior, safety features of the vehicle, medical care of the victims and the safety design of the roadway. [33] Human behavioral issues can include the use of safety belts, driver impairment due to alcohol or drugs, distracted or drowsy driving, and speeding. Because rural roads have fewer intersections than urban roads and are more likely to provide travel between urban areas, they often have higher speed limits than many urban routes. Because rural traffic crashes often occur in more remote locations than urban crashes, emergency medical care following a serious accident is often slower, contributing to a higher traffic fatality rate on rural roads.

Traffic fatality rates on rural roads are also higher than on urban roads, partly because rural roads are less likely to have adequate safety features and are more likely than urban roads to have two lanes. Seventy percent of the nation's non-freeway, urban roads are two-lane routes, while 94 percent of rural, non-freeway roads are two-lane routes.[34]

Rural routes have often been constructed over a period of years and as a result, often have inconsistent design features for such things as lane widths, curves, shoulders and clearance zones along roadways.[35] Many rural roads have been built with narrow lanes, limited shoulders, excessive curves and steep slopes alongside roadways.[36]

While a desirable lane width for collector and arterial roadways is at least 11 feet, 24 percent of rural collector and arterial roads have lane widths of 10 feet or less, compared to 18 percent of urban collector and arterial roads with lane widths of 10 feet or less.[37] With passenger

vehicle, heavy truck and commercial farming traffic increasing, the safety inadequacies of these rural roads are contributing to the higher rate of fatal crashes on rural roads.

Rural Traffic Crash Factors

The vast majority of rural, non-interstate traffic fatalities – 91 percent – occur on two-lane roads.[38] The majority of fatal traffic crashes in 2009 – 60 percent - occured in single-vehicle crashes, with the share being the same for crashes on rural, non-Interstate routes as all other routes.[39] But fatal rural, non-Interstate crashes are far more likely to involve a vehicle leaving the roadway than fatal crashes on all other routes. In 2009, 34 percent of fatalities in rural, non-Interstate crashes involved a vehicle leaving the roadway, compared to 21 percent of fatalities in crashes on all other routes.[40]

Vehicles driving on rural roads were nearly twice as likely as vehicles on all other roads to be involved in a fatal traffic accident while attempting to negotiate curves. In 2009, 23 percent of all vehicle occupants killed in rural, non-interstate crashes died in crashes that involved a vehicle attempting to negotiate a curve, while only 12 percent of vehicle occupants killed in all other crashes died in crashes that involved a vehicle attempting to negotiate a curve.[41]

Vehicles driving on non-Interstate rural roads are far more likely than vehicles traveling on all other roads to be involved in a fatal head-on collision. In 2009, 15 percent of rural fatal multi-vehicle crashes were head-on collisions, compared to eight percent of all other traffic crashes.[42]

While the vast majority of rural roads are two-lane routes, very few rural traffic fatalities occurred while one vehicle was trying to pass another. In 2009, only three percent of all vehicle

occupants killed in rural, non-Interstate crashes died in crashes where one vehicle was trying to pass another vehicle.[43]

A report on head-on collisions by the National Cooperative Highway Research Program found that "most head-on crashes are likely to result from a motorist making an 'unintentional' maneuver – the driver falls asleep, is distracted, or travels too fast in a curve."[44]

Making Rural Roads Safer

A report on rural road safety by the United States General Accounting Office (GAO) found that several factors hinder efforts to improve rural road safety. The GAO noted that these challenges include the large number of rural roads and the relatively low volume of traffic they carry, combined with the high cost of some desirable improvement. The GAO also found federal highway funding cannot be used on many rural roads, most of which are the responsibility of local governments, which may have limited resources.[45]

A variety of design improvements can help improve rural road safety. These improvements have as a goal keeping vehicles in the correct lane and minimizing the consequences of vehicles leaving the roadway.

The type of safety design improvements that are appropriate for a section on rural road will depend partly on the amount of funding available and the nature of the safety problem on that section of road. Several studies have classified rural safety improvements by both their effectiveness and their cost. These improvements include:

LOW COST:

Rumble strips – Rumble strips are raised or grooved patterns constructed on the roadway's shoulder that have been found to reduce run off the road crashes by between 25 to 43 percent.[46]

Centerline rumble strips – Several states have started to install centerline rumble strips to alert drivers who may be encroaching or have strayed into an opposing lane.

Improved signage and pavement markings including higher levels of retroreflectivity – Traffic signs and pavement markings represent the first line of crucial information for drivers and can help improve night-time visibility. Signs with greater retroreflectivity, more visible pavement markings and raised, reflective lane makings can all assist drivers to stay on a roadway, particularly at night.

Lighting – A recent study of the addition of street lighting at 49 isolated rural intersections in Minnesota found that nighttime crashes decreased by 35 percent after the addition of lighting.[47]

Removing or shielding road-side obstacles – Trees, large rocks, utility poles, heavy mail boxes and other road-side objects can be shielded, moved or moved away from the road to reduce the likelihood of a vehicle leaving the roadway from striking these objects.

Upgrade or add guardrails – Adding or improving guardrails has been found to reduce traffic fatality rates by between 50-58 percent.[48]

Chevrons and post-mounted delineators along curves – The use of chevrons or post-mounted delineators to indicate roadway alignment have been found to be effective in reducing crashes at curves by providing drivers with better visual cues about the presence and geometry of a curve.[49]

MODERATE COST:

Install median barriers – Median barriers have been found to reduce traffic fatality rates by 65 percent.[50]

Adding turn lanes at intersections – The addition of left turn lanes at rural intersections was found to reduce crashes by between 33 and 48 percent.[51] The addition of right turn lanes at intersections was found to reduce crashes by between eight and 26 percent.[52]

Resurfacing pavements - Resurfaced pavements have been found to result in a 25 percent reduction in fatal crashes. [53]

MODERATE TO HIGH COST:

Add or pave shoulders – Paving or widening shoulders has been found to reduce traffic fatality rates by 10 to 35 percent, depending on the width of the widening and the location.[54]

Improved roadway alignment – Realigning roadways has been found to average a 50 percent reduction in traffic fatality rates.[55]

Construct intermittent passing lanes or two-way left-turn lane – Adding passing lanes has been found to reduce traffic fatality rates by 20 percent and the addition of a two-way left-turn lane has been found to reduce traffic fatality rates by 30 percent.[56]

Widen lanes – Making lanes wider has been found to reduce traffic fatality rates by eight to 10 percent. [57]

Add lanes – A report on the likely safety benefit of converting two-lane rural roads into four-lanes routes, found that traffic accident rates would be reduced by between 40 to 60 percent.[58]

The use of Roadway Safety Assessments (RSAs) is a proven approach that can improve roadway safety on rural roads. Improved data collection on rural road safety can help to identify roadway segments with dangerous characteristics.

Systemic installation of cost effective safety solutions and devices in rural areas helps to improve safety not just by targeting problem points ("black spots") on a road, but also making

entire segments safer by improving those roadway segments that exhibit the characteristics that typically result in fatal or serious-injury crashes.

Rural Transportation Challenge: Road Conditions

The life cycle of America's rural roads is greatly affected by the ability of the responsible transportation agency to perform timely maintenance and upgrades to ensure that road and highway surfaces last as long as possible. The pavement condition of the nation's major roads is evaluated and classified as being in poor, fair or good condition.

In 2008, 12 percent of the nation's major rural roads were rated in poor condition and another 43 percent were rated in fair condition.[59] Roads rated poor may show signs of deterioration, including rutting, cracks and potholes. In some cases, poor roads can be resurfaced but often are too deteriorated and must be reconstructed. Roads rated in fair condition may show signs of significant wear and may also have some visible pavement distress. Most pavements in fair condition can be repaired by resurfacing, but some may need more extensive reconstruction to return them to good condition.

Vermont leads the nation in the share of its major rural roads with pavements in substandard condition with more than a third – 36 percent – of its major rural roads rated in poor condition.[60] Vermont is followed by Idaho, Oklahoma, Rhode Island and Hawaii as states with the highest share of their major rural roads with pavements in poor condition. Rural pavement conditions for all states can be found in Appendix D.

Chart 5. States with Highest Share of Major Rural Roads Rated in Poor Condition

STATE	PERCENT POOR
Vermont	36
Idaho	31
Oklahoma	30
Rhode Island	30
Hawaii	29
Kansas	28
West Virginia	27
Arkansas	23
New Hampshire	21
New Mexico	21
Alaska	20
Missouri	20
Connecticut	19
Maine	19
California	18
Pennsylvania	17
South Dakota	17
Michigan	16
Illinois	16
Mississippi	15

Source: TRIP analysis of Federal Highway Administration Data.

A desirable goal for state and local organizations that are responsible for road maintenance is to keep 75 percent of major roads in good condition.[61] In the U.S., only 45 percent of major rural roads had pavements that were in good condition in 2008.[62]

Pavement failure is caused by a combination of traffic, moisture and climate. Moisture often works its way into road surfaces and the materials that form the road's foundation. Road

surfaces at intersections are even more prone to deterioration because the slow-moving or standing loads occurring at these sites subject the pavement to higher levels of stress. It is critical that roads are fixed before they require major repairs because reconstructing roads costs approximately four times more than resurfacing them.[63]

As the nation's major rural roads and highways continue to age, they will reach a point where routine paving and maintenance will not be adequate to keep pavement surfaces in good condition and costly reconstruction of the roadway and its underlying surfaces will become necessary.

Rural Transportation Challenge: Bridge Conditions

The nation's rural bridges form key links in the nation's highway system, providing communities and individuals access to employment, schools, shopping and medical services, and facilitating commerce and access for emergency vehicles. In 2010, a total of 23 percent of the nation's rural bridges were rated as structurally deficient or functionally obsolete.[64]

Thirteen percent of the nation's rural bridges were rated as structurally deficient in 2010.[65] A bridge is structurally deficient if there is significant deterioration of the bridge deck, supports or other major components. Bridges that are structurally deficient may be posted for lower weight limits or closed if their condition warrants such action. Deteriorated bridges can have a significant impact on daily life. Restrictions on vehicle weight may cause many vehicles – especially emergency vehicles, commercial trucks, school buses and farm equipment – to use alternate routes to avoid posted bridges. Redirected trips lengthen travel time, waste fuel and reduce the efficiency of the local economy.

With more than a quarter of its rural bridges – 28 percent – rated structurally deficient, Pennsylvania leads the nation in the share of its rural bridges that are structurally deficient, ,followed by Rhode Island, Oklahoma, Iowa and South Dakota.[66] Rural bridge conditions for each state can be found in Appendix E.

Chart 6. States with Highest Share of Rural Bridges Rated Structurally Deficient (2010).

STATE	PERCENT STRUCTURALLY DEFICIENT
Pennsylvania	28
Rhode Island	26
Oklahoma	23
Iowa	23
South Dakota	21
Nebraska	19
Missouri	18
North Dakota	17
Mississippi	16
Hawaii	16
New Hampshire	15
Maine	15
Louisiana	15
North Carolina	14
New York	14
Michigan	14
West Virginia	14
South Carolina	14
California	14
New Jersey	13

Source: TRIP analysis of Federal Highway Administration data

Ten percent of the nation's rural bridges were rated functionally obsolete in 2010.[67] Bridges that are functionally obsolete no longer meet current highway design standards, often because of narrow lanes, inadequate clearances or poor alignment with the approaching roadway.

The service life of bridges can be extended by performing routine maintenance such as resurfacing decks, painting surfaces, ensuring that a facility has good drainage and replacing deteriorating components. But most bridges will eventually require more costly reconstruction or major rehabilitation to remain operable.

Transportation Opportunities in Rural America

Providing an adequate level of safe and efficient access in America's small communities and rural areas to support quality of life and enhance economic productivity will require that the nation adopt transportation policies that will improve rural transportation connectivity, safety and conditions.

The following recommendations by TRIP for an improved rural transportation system are also based partially on recommendations and findings of the American Association of State Highway and Transportation Officials (AASHTO), the National Cooperative Highway Research Program (NCHRP), the Council of State Governments (CSG) and the Ports-to-Plains Alliance.

Improve access and connectivity in America's small communities and rural areas

- ✓ Widen and extend key highway routes, including Interstates, to increase connectivity to smaller and emerging communities to facilitate access to jobs, education and healthcare while improving access for agriculture, energy, manufacturing, forestry, tourism and other critical segments of the rural economy.
- ✓ An NCHRP report found that the construction of an additional 30,000 lane miles of limited access highways, largely along existing corridors, is needed to address the nation's need for increased rural connectivity.

- ✓ Modernize major two-lane roads and highways so they can accommodate increased personal and commercial travel.

- ✓ Improve public transit service in rural America to provide improved access for people without access to private vehicles, including older people.

Improve rural traffic safety

- ✓ Adequately fund needed rural roadway safety improvements and provide enhanced enforcement, education and improved emergency response to reduce the rate of rural traffic fatalities.

- ✓ Roadway safety improvements may include rumble strips, shoulder improvements, lane widening, curve reductions, passing lanes, intersection improvements and improved signage and lighting, and improved shielding of obstacles.

Improve the condition of rural roads, highways and bridges

- ✓ Adequately fund local and state transportation programs to insure sufficient preservation of rural roads, highways and bridges to maintain transportation service and also to accommodate large truck travel, which is needed to support the rural economy.

Conclusion

Rural roads are a critical link in the nation's transportation system, providing access to many of its natural resources and the energy, food and fiber which drives the nation's economic engine. Rural roads play a critical role by connecting the nation's rural communities to America's urban areas, supporting commerce, commuting and tourism. But the nation's rural transportation system, particularly its roads and bridges face significant challenges. They carry increasing levels of traffic, fail to provide adequate connectivity for many communities, have

significant deficiencies and have significantly higher rates of serious traffic crashes than other roads.

Providing the nation with a rural transportation system which will support the nation's economic recovery and future development will require that the U.S. invest in rural transportation system that is safe, efficient, well-maintained and which provides adequate mobility and connectivity to the nation's smaller communities.

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