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Rural Highways

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Summary

Of the nation's 4.1 million miles of public access roads, 2.9 million, or 71%, are in rural areas. Rural roads account for about 30% of national vehicle miles traveled. However, with many rural areas experiencing population decline, states increasingly are struggling to maintain roads with diminishing traffic while at the same time meeting the needs of growing rural and metropolitan areas.

Federal highway programs do not generally specify how much federal funding is used on roads in rural areas. This is determined by the states. Most federal highway money, however, may be used only for a designated network of highways. While Interstate Highways and other high-volume roads in rural areas are eligible for these funds, most smaller rural roads are not. It is these roads, often under the control of county or township governments, that are most likely to have poor pavement and deficient bridges.

Rural roads received about 37% of federal highway funds during FY2009-FY2015, although they accounted for about 30% of annual vehicle miles traveled. As a result, federal-aid-eligible rural roads are in comparatively good condition: 49% of rural roads were determined to offer good ride quality in 2016, compared with 27% of urban roads. Although 1 in 10 rural bridges is structurally deficient, the number of deficient rural bridges has declined by 41% since 2000. When it comes to safety, on the other hand, rural roads lag; the fatal accident rate on rural roads is over twice the rate on urban roads.

The Federal Highway Administration has generally urged states to select highway projects based on a broad view of transportation benefits; the FHWA has asserted that transportation can shape development but cannot create development where there is no demand. However, an April 2018 statement by the U.S. Department of Transportation (DOT) contended "underinvestment in rural transportation systems has allowed a slow and steady decline in the transportation routes that connect rural American communities." DOT said that it intends to favor rural areas in awarding discretionary grants for highway projects.

If it seeks to focus on the condition of rural roads and bridges, Congress could expand the network of federal-aid highways to include more local roads; could create new programs that would specifically target transportation in rural areas; and/or could fund an expansion of the Interstate System. Without an increase in overall funding levels, however, such measures might cause states to spread their federal highway funds across wider networks of highways, making it more difficult for them to marshal the funds needed to undertake large and costly projects. Alternatively, given the population loss in some rural areas, Congress might provide incentives for states and counties to close or pulverize underused roads back to gravel and close underused and structurally deficient rural bridges, encouraging them to devote more of their resources to more heavily used roads.

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Introduction

Despite steady urbanization, some 71% of U.S. road mileage is in rural areas. In recent decades, though, many rural areas have lost population, leaving state and local governments with the financial burden of maintaining roads that may carry diminishing traffic yet still be important to a particular community or to a local industry, such as agriculture. Rural roads received about 37% of federal highway funds during FY2009-FY2015, although they accounted for about 30% of annual vehicle miles traveled.

This report examines the special challenges of maintaining rural roads and presents data on their use and condition. It also looks at federal spending on rural roads and discusses relevant policy issues for Congress.

There is no single definition of "rural," and different definitions may lead to different conclusions about conditions in rural America:

- The Census Bureau defines rural areas to be those outside urbanized areas with populations of 50,000 or more or urban clusters that have populations of at least 2,500. Under this definition, many urban fringe counties and rural areas within urban counties are treated as rural. Some 97% of the land area of the United States, home to about 60 million people or 19% of the U.S. population, is rural under the Census Bureau definition. People who live in areas that are defined as rural in this way are more likely to own single-family homes, to reside in their state of birth, to be older, and to have somewhat lower household incomes than those living in urban areas.[1]
- The Department of Agriculture's Economic Research Service (ERS) uses a definition established by the Office of Management and Budget, under which rural counties do not have urbanized areas of 50,000 or more people and are not tied to urbanized areas by labor commuting patterns. This definition, which encompasses 72% of U.S. land area and 46 million residents, treats many urban fringe areas as urbanized, in contrast to the Census Bureau's definition. ERS finds the median household income in rural areas to be about 25% lower than in urban areas, although it says this gap is mitigated by differences in the cost of living. ERS also finds that median household farm income exceeded median U.S. household income by 29%, suggesting that farm households fare better economically than other rural households.[2]
- The Federal Highway Administration (FHWA) uses definitions of urban and rural areas similar to those of the Census Bureau, but sets a higher population threshold to qualify as an urban area (over 5,000 residents, as opposed to 2,500). FHWA's definition also considers population density. These differences mean that a larger area is considered rural by FHWA than by the Census Bureau.

[1] U.S. Census Bureau, *New Census Data Show Differences Between Urban and Rural Populations*, December 8, 2016, https://www.census.gov/newsroom/press-releases/2016/cb16-210.html. The median age in rural areas is 51, versus 45 in urban areas.

[2] U.S. Department of Agriculture. Economic Research Service, *Income and Wealth in Context*, May 11, 2018, https://www.ers.usda.gov/topics/farm-economy/farm-household-well-being/income-and-wealth-in-context/#uscompare.

In general, rural residents are more dependent on automobiles than urban residents and have little access to public transportation. Automobile commuting is more common for workers living outside of metropolitan areas (91%) compared with commuters living in a large central city (78%). Generally, vehicle availability rates are high in rural areas: only 2.3% of workers who live outside of a principal city lack access to a vehicle.[3] Despite this, a high proportion of low-income rural households are characterized by "carlessness." According to 2017 National Household Travel Survey data, nearly 20% of rural households with incomes below $15,000 lack access to a vehicle.[4]

Agriculture and mining continue to be major rural industries but because of productivity increases and more rapid growth of other sectors, agriculture (2%) and mining (3%) together provide less than 5% of wage and salary jobs in rural counties.[5] The leading sources of rural employment are education and health (25%); trade, transportation, and utilities (20%); manufacturing (15%); and leisure and hospitality (11%).[6] Increased oil and gas drilling has been an important source of rural job growth in recent years. Most other industries added jobs in rural areas at rates below nationwide trends between 2001 and 2015. Rural manufacturers, who are concentrated in the eastern states, shed 700,000 jobs over that period. Nonetheless, manufacturing still provides a higher share of jobs and earnings in nonmetropolitan areas than in metropolitan areas. Manufacturing and mining workers have the highest median wages in rural areas.[7]

Population Loss: Pre- and Postrecession

Prior to the 2007-2009 recession, some rural counties had experienced population losses for decades. These population-loss counties were concentrated in the agriculture-dependent plains states in the center of the country (**Figure 1**). Overall, the rural population continued to grow.

That trend appears to have changed. The July 2010 through July 2016 period was the first multiyear period to show overall population decline in rural counties (as defined by the Economic Research Service).[8] Fertility rates in rural counties declined due to the outmigration of young adults and a lower birth rate among rural women of childbearing age. Increased mortality among working-age adults, in part related to opioid and heroin overdoses, has also affected population totals.

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[3] Brian McKenzie, *Who Drives to Work? Commuting by Automobile in the United States: 2013*, U.S. Census Bureau, American Community Survey Reports, Washington, DC, August 2015, pp. 4, 17, https://www.census.gov/library/publications/2015/acs/acs-32.html.

[4] Federal Highway Administration, *National Household Travel Survey: 2017*, Washington, DC, https://nhts.ornl.gov/.

[5] Including self-employed farm owners with wage and salary workers, increases agriculture and mining's share of rural employment from 5% to 9%.

[6] John Cromartie, *Rural America at a Glance, 2017 Edition*, Department of Agriculture, Economic Research Service, Economic Information Bulletin 182, Washington, DC, November 2017, p. 4, https://www.ers.usda.gov/webdocs/publications/85740/eib-182.pdf?v=43054.

[7] Sarah A. Low, *Rural Manufacturing at a Glance, 2017 Edition*, Department of Agriculture, Economic Research Service, Economic Information Bulletin 177, Washington, DC, August 2017, pp. 1-5, https://www.ers.usda.gov/publications/pub-details/?pubid=84757.

[8] John Cromartie, *Rural Areas Show Overall Population Decline and Shifting Regional Patterns of Population Change*, Department of Agriculture; Economic Research Service, Washington, DC, September 5, 2017, https://www.ers.usda.gov/amber-waves/2017/september/rural-areas-show-overall-population-decline-and-shifting-regional-patterns-of-population-change/. Data from 2016-2017 population estimates indicate that nonmetro counties adjacent to metro counties have shown a slight increase for the first time in six years.

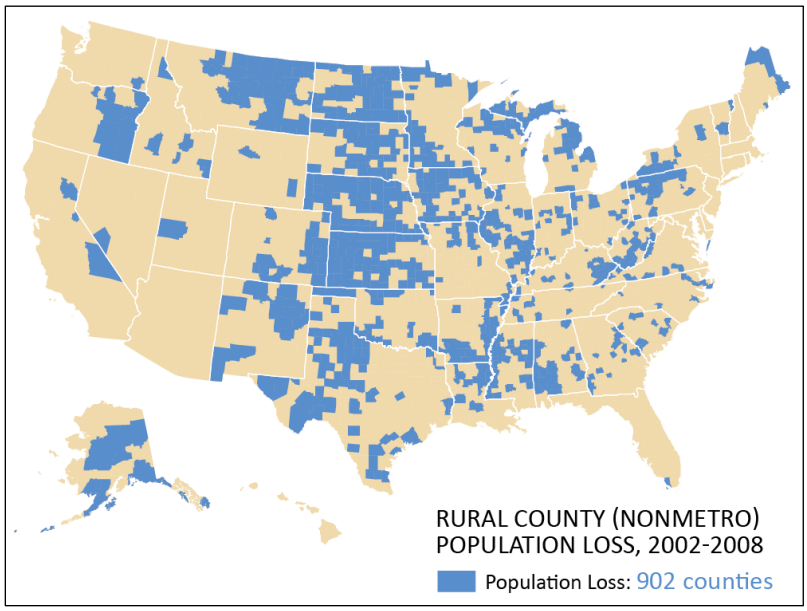
During the 2010-2016 period, rural population loss spread geographically, especially in the eastern United States (**Figure 2**). In the eastern United States, 18 of the 23 states whose rural areas had been growing during 2002-2008 lost rural population during 2010-2016. Much of the postrecession population loss in rural parts of the eastern states is related to the loss of manufacturing jobs. The statistics also are affected by the reclassification of counties from rural to urban due to population growth on the fringes of metropolitan areas; this results in the fastest-growing counties no longer being counted as rural, leaving counties with slower average population growth rates in the rural category.[9] The maps in **Figure 1** and **Figure 2** do not highlight rural areas that are on the fringes of urban counties, which are likely to be within commuting distance of urban areas that have more employment opportunities than nonmetropolitan counties.

The geographic breadth of population decline raises the question of whether some areas undergoing long-term population loss now have too many roads and bridges. This, in turn, leads to a policy question: should states and counties redirect highway funding away from underused roads and bridges in population loss areas and toward growth areas?

[9] John Cromartie, *Rural America at a Glance*, Department of Agriculture. Economic Research Service, 2017 Edition, Washington, DC, November 2017, pp. 2-3, https://www.ers.usda.gov/publications/pub-details/?pubid=85739.

Figure 1. Rural County Population Loss: Prerecession

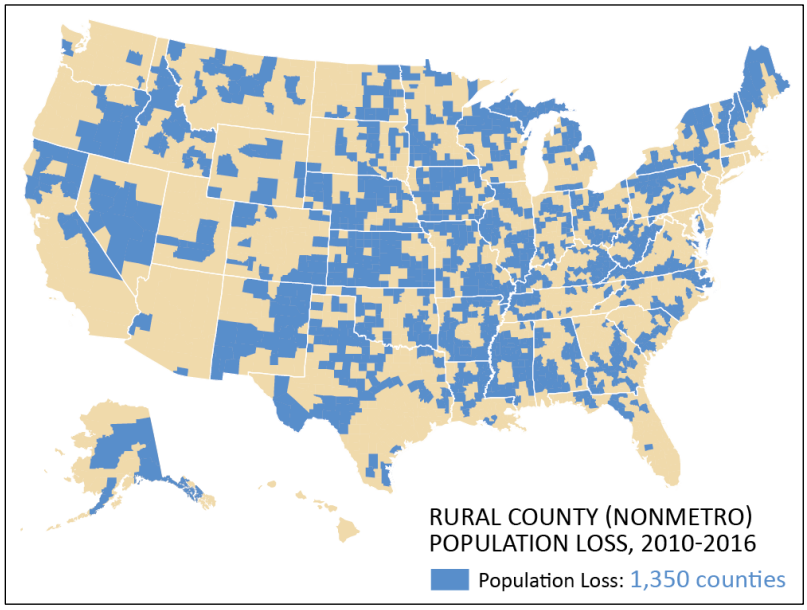
Nonmetropolitan Counties



Source: Created by CRS using Census Bureau and Department of Agriculture, Economic Research Service data.

Figure 2. Rural County Population Loss: Postrecession

Nonmetropolitan Counties



Source: Created by CRS using Census Bureau and Department of Agriculture, Economic Research Service data.

Rural Road Characteristics and Usage

Conceptually, the national roadway system serves two fundamental travel needs: access and mobility. Within these concepts, each road is assigned a classification that defines its role in serving the flow of traffic through the network.

Functional Classification of Roads

Roads are categorized under three broad road types: arterials, collectors, and local. All classification categories exist in both urban and rural areas.[10]

Arterials are divided into four functional classifications:

Interstates. Limited-access divided highways for long-distance travel and mobility to connect major urban areas.

Other Freeways and Expressways. These roadways also have travel lanes separated by some form of barrier and limited on- and off-ramp access and egress or a very few at-grade intersections. Like Interstates, these roads are designed to maximize mobility and do not directly serve the land uses that abut them.

Other Principal Arterials. These are heavily used roads that may serve abutting land uses. They may have at-grade intersections.

Minor Arterials. These roads provide for moderate trip lengths and serve smaller geographic areas than higher arterials and provide connectivity to the higher arterial system. Rural minor arterials are spaced so that developed areas are within a reasonable distance of a higher arterial and are designed for relatively high travel speeds.

Collectors generally serve intracounty rather than statewide travel and for shorter trips than would be typical on arterials.

Major Collectors generally cover moderately long distances, and have higher speed limits, higher traffic volume, and more travel lanes than smaller roads. In rural areas, major collectors provide service to any county seat or larger towns not on an arterial route, or to traffic generators such as schools, parks, mining or agricultural areas, or important intracounty travel corridors.

Minor Collectors serve land access and traffic circulation in lower density residential and commercial locations in urban areas. In rural areas minor collectors provide service to smaller communities not served by higher-class facilities and link locally important traffic generators with their rural hinterlands.

Local Roads represent the largest percentage of all roads in terms of mileage. They are not meant for long-distance travel and are to provide for direct access to abutting land. In rural areas, local roads serve primarily to provide access to adjacent land and to facilitate travel over short distances.

According to Federal Highway Administration statistics, 2.9 million miles, or 71%, of the 4.1 million miles of public-access roads in the United States are rural roads. Roughly 45% (1.3 million miles) of this rural mileage is unpaved. More than three-quarters of rural road mileage comprises minor collectors and local roads, which are generally not eligible for federal funds.[11] About 23% of the nation's rural roads are eligible for federal funding under the Federal-Aid Highway Program (FAHP).[12] **Table 1** sets forth the scope of rural road categories relative to the national totals.

[10] Federal Highway Administration, *Highway Functional Classification Concepts, Criteria and Procedures: 2013 Edition*, FHWA-PL-13-026, Washington, DC, 2013, pp. 1-19, https://www.fhwa.dot.gov/planning/processes/statewide/related/highway_functional_classifications/fcauab.pdf.

[11] Of the total 1,022,815 miles of FAHP eligible roads 666,722 miles or about 65% are rural roads.

[12] Federal Highway Administration, *Public Road Length, 2016: Miles by Functional System and Federal-Aid Highways; National summary*, Table HM-18, Washington, DC, September 18, 2017, https://www.fhwa.dot.gov/policyinformation/statistics/2016/hm18.cfm.

Table 1. U.S. Rural Public Road Lengths, 2016

Centerline Miles

		FAHP Rural		Non-FAHP Rural			
Attribute	**Rural Total**	**Miles**	**%**	**Miles**	**%**	**Rural & Urban Total**	**Rural % of Total**
Road length	**2,928,054**	**666,722**	**23%**	**2,261,332**	**77%**	**4,140,108**	**71%**
Interstate System	29,133	29,133	100%	0	0%	48,191	60%
Other Major Highways	96,106	96,106	100%	0	0%	174,498	55%
Minor Arterials	133,809	133,809	100%	0	0%	246,193	54%
Major Collectors	407,650	407,650	100%	0	0%	536,823	76%
Minor Collectors	258,477	6	<0.1%	258,471	100%	275,438	94%
Local	2,002,878	18	<0.1%	2,002,860	100%	2,858,963	70%

Source: Federal Highway Administration, Table HM-18, *Public Road Length—2016: Miles by Functional System and Federal-Aid Highways; National Summary*, https://www.fhwa.dot.gov/policyinformation/statistics/2016/hm18.cfm. Totals may not add due to rounding.

Notes: FAHP refers to roads eligible for Federal-Aid Highway Program funding. Territorial and Puerto Rico roads are not included. The "Other Major Highways" category includes non-Interstate freeways and other principal arterial highways. Calculating the share based on lane miles results in a 69% rural share of public road capacity, 2% lower than calculating centerline miles.

Over the last 30 years the share of centerline miles of road categorized as rural has declined from 82% to 71%, primarily because of road reclassification due to urbanization.

Based on the 2016 National Bridge Inventory, there are 443,610 bridges over 20 feet long on rural roads. These bridges make up 72% of the national total of 614,386 bridges. Roughly 57% of these rural bridges are not considered part of the federal-aid highway system, but all bridges in the inventory are eligible for FAHP funding.

Although rural roads account for 71% of road mileage, only about 30% of annual vehicle miles traveled (VMT) are on rural roads. The usage of rural roads differs substantially from that of urban roads (**Table 2**). Cars and other light vehicles account for 84.5% of vehicle miles traveled on rural roads, whereas they account for 92% of VMT on urban roads. Over 20% of rural Interstate System VMT is driven by combination trucks, compared with 7.5% on urban Interstates. In absolute terms, the majority of combination truck VMT occurs on rural Interstate Highways.

Table 2. Road Usage by Vehicle Type

Millions of Motor Vehicle Miles Traveled (2016)

Road Type	Cars & Light Vehicles	Motorcycles	Buses	Single-unit Trucks	Combination Trucks	Total
Rural Interstate	183,546	1,095	1,740	9,905	50,430	246,716
Travel Share	74.4%	0.4%	0.7%	4%	20.4%	100%
Other Rural Arterials	317,691	2,633	2,116	16,371	28,794	367,605
Travel Share	86.4%	0.7%	0.6%	4.5%	7.8%	100%
Other Rural	302,483	2,856	1,946	15,563	12,375	335,224
Travel Share	90.2%	0.9%	0.6%	4.6%	3.7%	100%
Total Rural	**803,721**	**6,583**	**5,802**	**41,839**	**91,599**	**949,545**
Travel Share	84.6%	0.7%	0.6%	4.4%	9.7%	100%
Total Urban	**2,045,996**	**13,862**	**10,548**	**71,499**	**82,958**	**2,224,863**
Travel Share	92%	0.6%	0.5%	3.2%	3.7%	100%
Urban Interstate	492,361	2,939	2,542	18,555	41,991	558,388
Travel Share	88.2%	0.5%	0.5%	3.3%	7.5%	100%

Source: Federal Highway Administration, *Highway Statistics—2016*, Table VM-1, https://www.fhwa.dot.gov/policyinformation/statistics/2016/vm1.cfm.

Notes: Share percentages may not add due to rounding.

Road Conditions

FHWA requires the monitoring of pavement conditions on Federal-Aid highways. Using this information FHWA characterizes the quality of ride as good, fair, or poor. Any Federal-Aid road with either good or fair quality of ride is considered to be in acceptable condition.[13] These data are used in FHWA's biannual *Conditions & Performance* report to assess the condition of pavement on rural and urban systems. The most recent report, with data for 2012, found that pavement conditions on the Federal-Aid highways were generally better in rural areas with 92.8% of rural miles traveled being on roads of acceptable ride quality compared with 78.1% for urban roads.[14]

Interstate System highways are in the best condition of all road types and have continued to improve since 2012. More recent road roughness measurements recorded between 2013 and 2016 show that rural Interstates continue be well maintained (see **Table 3**). In 2016, 2.0% of rural Interstate miles traveled were on highways rated as poor.

[13] The Highway Pavement Monitoring System (NPMS) excludes off-system roads (roads classified as rural minor collector, rural local, or urban local, which are not reported in the NPMS.

[14] Department of Transportation, *2015 Status of the Nation's Highways, Bridges and Transit: Conditions and Performance: Report to Congress*, 2017, Exhibit 3-6.

Table 3. Percentages of Poor Ride Quality: 2013, 2016

Based on miles by measured pavement roughness

	2013	2016	Change
Functional System	**Poor Pavement Condition**		
Rural Interstate	2.0%	2.0%	0.0%
Rural Other Freeway	2.3%	2.5%	+0.2%
Rural Other Principal Arterial	3.9%	4.4%	+0.5%
Rural Minor Arterial	7.4%	8.0%	+0.6%
Rural Major Collector	19.7%	22.0%	+2.3%
Subtotal Rural Poor	**12.6%**	**14%**	**+1.4%**
Urban Interstate	5.4%	5.2%	-0.2%
Urban Other Freeway	7.9%	8.5%	+0.6%
Urban Other principal Arterial	27.4%	26.8%	-0.6%
Urban Minor Arterial	38.0%	36.1%	-1.9%
Urban Collector	53.5%	50.8%	-4.6%
Subtotal Urban Poor	**35.3%**	**35%**	**-0.3%**
Total Poor	**19.6%**	**21.2%**	**1.6%**

Source: FHWA, *Highway Statistics*, Tables HM-63, HM-64, for years 2013, 2016, https://www.fhwa.dot.gov/policyinformation/statistics.cfm.

Notes: For percentages of Good, Fair, and Poor ride quality for FY2013 through FY2016, see **Appendix A**. Percentages may not add due to rounding. Total miles categorized vary from year to year.

During 2013-2016, the percentage of rural roads eligible for federal aid that were in poor pavement condition increased, mainly because of rural major collectors being downgraded from fair to poor condition. As of 2016, the percentage of rural road mileage rated poor, 14%, was lower than the 35% of urban road mileage rated poor. This was true for all types of roads, but the discrepancy was greatest for minor arterials (8% of rural mileage was rated poor compared with 36.1% in urban areas). The discrepancy was also relatively large for other principal arterials (4.4% of rural mileage was rated poor compared with 26.8% in urban areas).

Road conditions data for off-system roads are not compiled at the federal level. However, off-system roads, which tend to be minor roads, are more likely to be in unacceptable/poor condition than federal-aid highways. One reason for this is that the almost 1.3 million miles of unpaved rural roads are considered to have unacceptable ride quality.

Bridge Conditions[15]

The vast majority (roughly 82%) of structurally deficient bridges in the United States are in rural areas.[16] These bridges tend to be small and relatively lightly traveled. Bridges on the least-used rural roads, rural minor collectors or rural local roads, account for 76% of these structurally deficient rural bridges. Urban bridges, while far fewer in number, are generally much larger and

[15] CRS Report R44459, *Highway Bridge Conditions: Issues for Congress*, by Robert S. Kirk and William J. Mallett.

[16] A bridge is considered structurally deficient "if significant load-carrying elements are in poor condition due to deterioration or damage, or if the waterway opening of the bridge causes intolerable roadway traffic interruptions."

more expensive to fix: almost 57% of the deck area of structurally deficient bridges is on urban bridges. Bridges on roads carrying heavy traffic loads, particularly Interstate Highway bridges, are generally more likely to be in a state of good repair than those on more lightly traveled routes (**Table 4**).

Table 4. Deficient Bridges by Functional Classification

(data as of December 31, 2017)

Bridge Classification	Bridge Total	Structurally Deficient	% Structurally Deficient
Rural Interstate (IS)	25,031	704	2.8%
Rural Principal Arterial (non-IS)	36,903	968	2.6%
Rural Minor Arterial	37,838	1,803	4.8%
Rural Major Collector	91,400	7,226	7.9%
Rural Minor Collector	47,676	4,662	9.8%
Rural Local	202,683	29,130	14.4%
Subtotal Rural	**441,531**	**44,493**	**10.1%**
Urban Interstate	32,149	1,084	3.4%
Urban Freeway (non-IS)	20,790	537	2.3%
Urban Other Principal Arterial	29,494	1,570	5.3%
Urban Minor Arterial	31,404	2,045	6.5%
Urban Collector	23,360	1,731	7.4%
Urban Local	33,925	2,798	8.2%
Subtotal Urban	**171,122**	**9,765**	**5.7%**
Total	**612,653**	**54,258**	**8.9%**

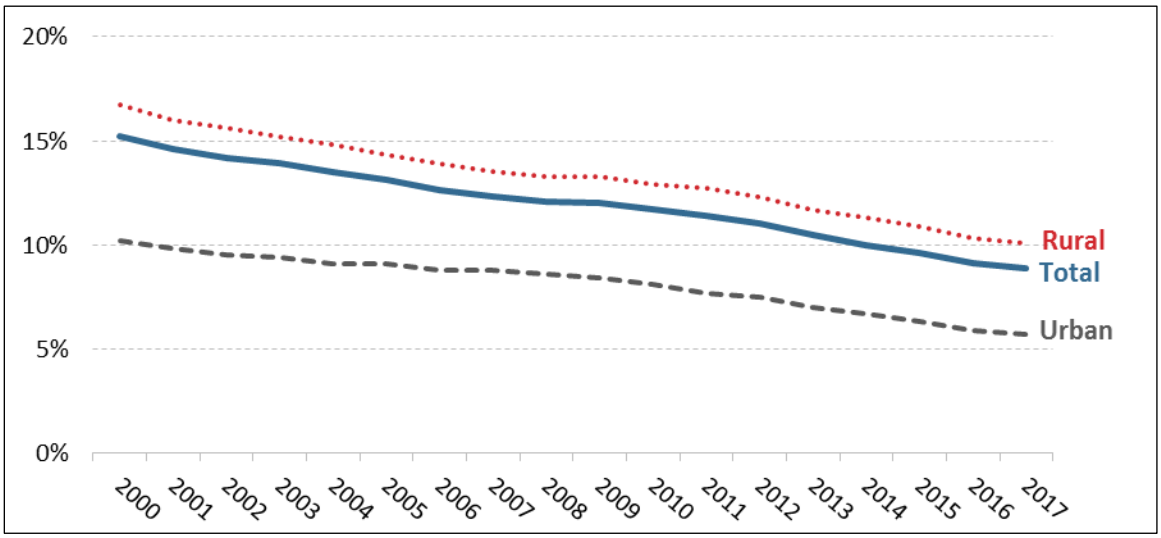
Source: Federal Highway Administration, National Bridge Inventory (NBI). Count of Deficient Bridges by Functional Classification, https://www.fhwa.dot.gov/bridge/fc.cfm.

Notes: Includes the 50 states and the District of Columbia. Puerto Rico has 2,325 bridges on the NBI of which 301 are structurally deficient.

Despite the relatively large number of deficient bridges in rural areas, both the number of deficient rural bridges and their deficiency rate have been declining for many years. Since 2000 the number of rural bridges that are structurally deficient has declined by 41% (from 75,793 in 2000 to 44,678 in 2017). During the same period, the number of structurally deficient urban bridges declined from 13,442 to 9,882 or by 26% (**Figure 3**). Some of the decline in structurally deficient rural bridges may have been due to reclassification of rural bridges to urban following the 2010 census.

Figure 3. Percentage of Structurally Deficient Rural and Urban Bridges: 2000-2017

Percentages of all bridges in category



Source: Federal Highway Administration, National Bridge Inventory. *Count of Deficient Bridges by Functional Classification*, https://www.fhwa.dot.gov/bridge/fc.cfm.

Despite the improvement, the number of deficient rural bridges is still relatively large. These bridges are mostly on minor roads—those not on the Federal-Aid Highway System—and are concentrated in counties with sparse populations and low tax revenues. Off-system bridges are eligible for federal assistance under one of the programs that distributes federal highway funds to the states by formula, the Surface Transportation Block Grant Program (STBG).[17] States are required to spend an amount at least equal to 15% of their highway bridge apportionment for FY2009 from their annual STBG funds on off-system bridges, but may spend more if they wish. However, spending more funds on off-system bridges means spending less on other STBG-eligible projects throughout a state. The minimum nonfederal funding share for off-system bridges is 20%, and many states require the counties to provide all or part of the local match for off-system bridge projects. Some counties have difficulty coming up with the local match.

Bridge Postings and Closures

A bridge classified as structurally deficient is not necessarily unsafe, but may require the posting of a vehicle weight restriction. When officials determine that a bridge is unsafe, they are to close it to traffic immediately. The actual closing of a bridge is usually done by the state but in some states closures are under the authority of county commissioners. The recent failure of local officials in Mississippi to close unsafe bridges until the state was threatened with the withholding of federal funds suggests that unsafe bridge closures do not always happen immediately.[18]

[17] 23 U.S.C. §133(f).

[18] Cameron McWhirter, "Mississippi Gov. Bryant Orders More than 100 Bridges Closed," *Wall Street Journal*, April 12, 2018, https://www.wsj.com/articles/mississippi-gov-bryant-orders-more-than-100-bridges-closed-1523541600.

Road Performance

Rural Traffic Congestion

Traffic congestion in rural areas is much less common than in metropolitan areas. Much rural traffic congestion is "nonroutine" (i.e., non-rush-hour), caused by traffic accidents, bad weather, oversized loads, or passing delays in hilly areas. More routine traffic congestion in certain rural areas often tends to be seasonal or weekend-related, such as beach traffic or summer traffic near popular national parks. Some Interstate System highways and turnpikes that traverse rural areas but connect major metropolitan areas can sustain traffic volumes similar to those in urban areas.

In the past, rural roads accounted for a greater share of highway use, in terms of VMT. Rural VMT for all vehicles in 1987 was roughly 41% of total VMT, compared with 30% in 2016.[19] During this 30-year period rural VMT grew 21.5% compared with 95% for urban VMT. Some of this statistical change reflects the reclassification of rural road mileage to urban due to urbanization. During this period, road capacity, in terms of total lane miles, grew only slightly. Because VMT growth was much lower for rural roads than urban roads, the congestion impact was much larger for the urban roads.[20]

Road-use factors such as VMT and traffic congestion can be important indicators of where spending for road expansion projects might have the greatest benefit in terms of savings in travel time.[21] However, in terms of use, the vast majority of rural roads are inherently below capacity because they serve thinly populated areas. Spending to keep these roads in a state of good repair or for improvements may still be justified for policy reasons other than heavy use, such as connectivity and safety.

Also, it is possible that some rural roads will become more congested in the future. If population trends that existed before the 2007-2009 recession return, this could cause faster growth in suburban and exurban counties and greater spending for recreation and tourism. This could create growth areas that would eventually need increased rural road capacity.[22] Rapid population growth, however, could mean that some of these areas would no longer be classified as rural.

Freight Traffic on Rural Roads

Patterns of freight movement and economic development activities can also lead to concentrations of truck traffic in some rural areas.[23] The general reliance on trucking for freight movement has grown over the last 30 years. Trucking accounts for 73.1% of freight by value, 71.3% of freight by weight, and 42% of all ton-miles.[24] The majority of combination truck traffic occurs on rural roads.

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[19] Federal Highway Administration, *Annual Vehicle Miles of Travel and Related Data - 1987*, Highway Statistics Table VM-1, October 1988, p. 171.

[20] Congressional Budget Office, *Approaches to Making Federal Highway Spending More Productive*, February 2016, p. 8, https://www.cbo.gov/publication/50150.

[21] Ibid, pp. 10-11.

[22] For an example of long term congestion prospects see, Bureau of Transportation Statistics, *Freight Facts and Figures: 2015*, Figure 4-3: Peak-Period Congestion on the National Highway System 2040, p. 59.

[23] CRS Report R44367, *Federal Freight Policy: In Brief*, by John Frittelli.

[24] Bureau of Transportation Statistics and U.S. Census Bureau, *2012 Commodity Flow Survey*, EC12TCF-US, February 2015, p. 1, https://www.census.gov/econ/cfs/2012/ec12tcf-us.pdf.

Counties that are entirely rural may have significant farm-to-market or mine-to-processor traffic. The consolidation of grain elevators into larger facilities, sometimes not served by rail, has increased the use of trucks and leads to heavy harvest-season traffic in some rural areas.[25] Logging activities, for example in Maine, have become more reliant on trucks and less so on short-line railroads, increasing logging traffic.

Changing patterns of energy development also have affected road use in rural areas. In response to federal renewable fuels standards the number of ethanol refineries has grown to almost 500. Most of these plants have been built in corn-producing areas and receive feed stocks by truck. Natural gas and shale oil production in North Dakota, Pennsylvania, Texas, and other states generates truck trips to support drilling and, in some cases, to move oil to pipelines or railroads.[26] Rural warehousing of both agricultural and retail goods has increased in scale and has also led to increases in truck traffic near these facilities.

Off-system bridges are an especially important issue for most rural counties given that trucks hauling grain, milk, coal, ore, stone, and such can require bridges and roads designed for heavy vehicles even where traffic is limited or seasonal. In general, for rural freight routes, congestion is less of an issue than wear and tear from truck use.

Rural Road Safety

In 2016, there were 36,166 highway fatalities in the United States. Of these, 18,553 fatalities, slightly more than half the total, occurred on rural roads, although rural roads accounted for 30% of the vehicle miles traveled. Hence, the fatal accident rate on rural roads was more than twice the rate on urban roads (1.95 fatalities per million rural miles traveled, compared with 0.79 per million urban miles traveled).[27]

Although some causes of the higher rural fatality rate are behavioral differences (higher typical speeds, lower seat belt use, and higher driver fatigue rates) or more distance from emergency medical services, some factors are infrastructure-related.[28] High-speed roads, roads with no median, narrow shoulders, side ditches, and roadside obstructions are examples of design elements common on rural roads that may factor into the high rural fatality rate. As is true with urban roads, the roads with the lowest fatality rates are the Interstate System highways. However, some comparatively inexpensive infrastructure changes could have positive effects on smaller rural roads, such as adding side striping, expanding shoulders, adding rumble strips, and increasing the use of roundabouts.[29]

Federal Aid for Rural Roads

Highway construction has involved a federal-state partnership since passage of the Federal Aid Road Act of 1916 (39 Stat. 355). The initial program was specifically created for the "construction of rural post roads." However, not all rural roads are eligible for federal assistance.

[25] U.S. Department of Agriculture, *Transportation of U.S. Grains*, October 2017, https://www.ams.usda.gov/sites/default/files/media/ModalOctober2017.pdf.

[26] Mike Lee, "Permian Basin: Truck Traffic Tangles with Holidays, Life in Tiny Boom Town," *E & E News*, December 18, 2017, pp. 1-4.

[27] Federal Highway Administration, *Highway Statistics*, Tables FI-20 and FI-30, October 2017, https://www.fhwa.dot.gov/policyinformation/statistics/2016/.

[28] CRS Report R43026, *Federal Traffic Safety Programs: In Brief*, by David Randall Peterman.

[29] Federal Highway Administration, *Improving Safety on Rural Local and Tribal Roads: Safety Toolkit*, FHWA-SA-14-072, Washington, DC, August 2014, pp. 1-88, https://safety.fhwa.dot.gov/local_rural/training/fhwasa14072/isrltrst.pdf.

State highway agencies own 610,674 miles of rural roads, of which 426,675 (64%) are federal-aid eligible. These roads include the Interstate System highways, most of the National Highway System highways, and most other roads marked as state routes. Of the 1,576,416 miles of rural county roads, 216,362 miles (13.7%) are eligible for federal aid.

Most off-system county roads are maintained with local funds, sometimes supplemented with state funds. Another 556,325 rural road miles are the responsibility of township or municipal governments. Of these roads, 11,033 miles are federal-aid eligible.

In addition, 133,349 miles of rural roads are under federal ownership. This includes roads in national parks, national forests, and other federal lands; 5,953 miles are eligible under FHWA's programs. The rest are funded by the federal agencies that own them.[30]

Most federal highway funds are apportioned to the states by formula. Within broad guidelines, decisions about which road and bridge construction projects to undertake with this money are left primarily to state departments of transportation, which determine how much of their federal funding should be spent in rural or urban areas. The states are required to provide 20% of the cost of non-Interstate System projects and 10% for Interstate System projects.

State departments of transportation largely determine which projects are funded, let the contracts, and oversee project development and construction.

A limited amount of federal money is distributed through grants awarded at the discretion of the U.S. Secretary of Transportation. Local public entities, as well as states, may apply for these grants under the Nationally Significant Freight and Highway Projects program and the Better Utilizing Investments to Leverage Development (BUILD) program (formerly known as the TIGER program).[31] Of 41 TIGER grants approved in FY2017, 26 were for projects in rural areas, according to DOT.[32] The department stated in April 2018 that "underinvestment in rural transportation systems has allowed a slow and steady decline in the transportation routes that connect rural American communities," and that it "intends to award a greater share of BUILD Transportation Discretionary Grant funding to projects located in rural areas that align well with the selection criteria than to such projects in urban areas."[33] The Consolidated Appropriations Act, 2018 (P.L. 115-141) requires that at least 30% of BUILD funds must be awarded to projects located in rural areas, and allows DOT to pay more than 80% of the cost of such projects. The Consolidated Appropriations Act, 2018 also appropriated $225 million for a discretionary bridge grant program, which is limited to states with a population density of fewer than 100 people per square mile.

Also, 10% of the secured loans, loan guarantees, and lines of credit provided under the Transportation Infrastructure Finance and Innovation Act Program (TIFIA) are set aside to assist rural projects.

A considerable share of the funds distributed through several other programs, including the Tribal Transportation Program, the Federal Lands Transportation Program, the Federal Lands Access

[30] Federal Highway Administration, *Highway Statistics--2016*, Table HM-16, September 18, 2017, https://www.fhwa.dot.gov/policyinformation/statistics/2016/hm16.cfm.

[31] U.S. Department of Transportation, *BUILD Discretionary Grants*, April 25, 2018, https://www.transportation.gov/BUILDgrants.

[32] U.S. Department of Transportation, "TIGER IX Awards."

[33] U.S. Department of Transportation, "Notice of Funding Opportunity for the Department of Transportation's National Infrastructure Investments Under the Consolidated Appropriations Act, 2018," 83 *Federal Register* 18651, April 27, 2018.

Program, the Appalachian Development Highway System, and the Construction of Ferry Boats and Ferry Facilities Program, is spent in rural areas as well.[34]

Funding

Published nationwide funding statistics that distinguish between rural and urban road spending are limited. **Table 5** sets forth the obligation of federal funds by rural or urban functional classification for FY2009 through FY2015. In 2016, FHWA began using geospatial data to determine whether projects were rural or urban. Adjustments made for FY2016 and FY2017 created data not comparable to the data in previous years. Because of these data issues the figures in **Table 5** are limited to FY2009-FY2015.

Annually, rural roads received an average of 37.4% of federally obligated highway funds during FY2009-FY2015. This is more than rural roads' 29% share of VMT on Federal-Aid highways but less than the roughly 65% of Federal-Aid highway centerline miles that are classified as rural. The data also indicate that the rural share of obligations was relatively stable across these years.

Table 5. Obligation of Federal Funds: Rural and Urban

Millions in current and FY2009 inflation adjusted dollars

	FY2009	FY2010	FY2011	FY2012	FY2013	FY2014	FY2015
Rural	21,615	16,409	14,179	14,331	14,327	13,668	14,002
Urban	35,136	29,452	23,816	21,865	24,186	24,549	23,082
Total	56,750	45,861	37,995	36,196	38,513	38,216	37,084
Rural %	**38.1%**	**35.8%**	**37.3%**	**39.6%**	**37.2%**	**35.8%**	**37.8%**
			Inflation Adjusted 2009 Chained Dollars				
Rural	21,615	16,233	13,499	12,992	12,583	11,821	12,072
Urban	35,136	29,135	22,673	19,822	21,243	21,281	19,901
Total	56,750	45,368	36,172	32,814	33,826	33,051	31,973

Source: FHWA, *Highway Statistics*, Table FA-4C, for fiscal years 2009-2014. According to FHWA there are no plans to issue Table FA-4C for FY2015 or later years. FY2015 current dollar amount was provided by FHWA as technical assistance to CRS. Cost adjustments calculated by CRS using Bureau of Economic Analysis *Price Indexes for Gross Government Fixed Investment by Type.* National Income and product Accounts Table 5.9.4B, Line 40: State and local highways and streets. Weighted average used to approximate fiscal years. Totals may not add due to rounding.

Notes: Includes the 50 states and the District of Columbia. Totals are based on U.S. totals for all rural and urban columns in Table FA-4C. Their combined total is not adjusted for the "other" column, which does not distinguish between urban and rural. FHWA indicated Table FA-4C will not be published for FY2015 and future years. FY2009 and FY2010 figures reflect the obligation of funds provided under the American Recovery and Reinvestment Act of 2009 (ARRA; P.L. 111-5).

Table 6 sets forth the outlays by the states for capital expenditures on FAHP rural and urban roads. The data indicate that, on average, spending per vehicle mile traveled on rural roads is approximately 10% higher than on urban roads. This spending pattern shows up in evaluations of pavement quality: 2.1% of rural Interstate Highway miles were judged to be in poor condition in 2014, compared with 5.3% of miles on urban Interstates (see **Appendix A**).

[34] CRS Report R44359, *Highways and Highway Safety on Indian Lands*, by William J. Mallett.

Table 6. Capital Outlays for FAHP Rural and Urban Roads: by Type of Road

FY2014, State agency capital outlays (includes federal funds)

Road Category	Capital Outlay	Lane Miles	$ per Lane Mile	Vehicle Miles Traveled (millions)	Cents per Vehicle Mile
Rural Interstate	$7,203,573,000	118,688	$60,693	231,372	3.1
Rural Other Arterial	$14,380,862,000	528,933	$27,188	355,119	4.0
Rural Collectors	$5,403,122,000	1,340,635	$4,030	207,589	2.6
Subtotal Rural	**$26,987,557,000**	**1,986,434**	**$13,586**	**794,080**	**3.4**
Urban Interstate	$18,102,203,000	102,541	$176,536	519,843	3.5
Urban Other Arterial	$21,021,693,000	573,545	$36,652	684,986	3.1
Urban Collectors	$2,242,877,000	298,099	$7,524	222,207	1.0
Subtotal Urban	**$41,366,773,000**	**974,185**	**$42,463**	**1,326,935**	**3.1**
Total Arterials & Collectors	$68,355,330,000	2,960,619	$23,088,189	2,121,015	3.2

Source: FHWA, *Highway Statistics*, 2014 Tables SF-12A, VM-1, VM-2, and 2016 Table HM-260.

Notes: 2014 state capital outlay figures are the most recent available.

Off-System Roads

States and localities spend relatively large amounts for capital projects on off-system roads and bridges, but national data broken down by rural and urban roads are not available. For FY2014, capital outlays by the states on non-FAHP roads totaled $13.4 billion.[35] Local government capital outlays for streets and highways in FY2014 totaled $23.4 billion.

Public-Private Partnerships and Tolling

The federal government and many states have supported increased use of public-private partnerships (P3s) as a means of improving roads and bridges and building new ones. However, relatively few transportation projects are suitable for large-scale private investment, and investors often insist that the public sector retain the risk that traffic volumes may be below expectations.

P3s supported by tolls are likely to be of limited use in rural areas, primarily because such projects must have sufficient traffic to generate a funding stream to pay for construction and operation, including the cost of toll collection, as well as providing a reasonable return to investors.[36] The funding streams for P3s are usually tolls. However, relatively few rural roads have sufficient traffic volumes to fully cover the cost of building and maintaining a road with toll revenues. The highest rural traffic volumes are on Interstate Highways, but most existing rural Interstate mileage remains under a tolling prohibition under federal law.[37] In many cases, P3s in

[35] Federal Highway Administration, *Highway Statistics*, Table SF-12B, Washington, DC, February 2016, https://www.fhwa.dot.gov/policyinformation/statistics/2014/sf12b.cfm.

[36] CRS In Focus IF10735, *Risks and Rewards of Transportation Public-Private Partnerships (P3s), with Lessons from Texas and Indiana*, by William J. Mallett.

[37] CRS Report R44910, *Tolling U.S. Highways and Bridges*, by Robert S. Kirk.

rural areas will require availability payments—guaranteed funds from state or local governments—to be viable, rather than relying solely on tolls.

Rural Road Issues and Options

Nationwide data indicate that federal-aid highways in rural areas are generally in acceptable condition. The condition of rural roads not on the federal-aid system is less clear, due largely to the lack of comparable data. Although traffic congestion exists in some rural areas, it is not equal in intensity or duration to that in urban areas. Deficient rural bridges, however, remain a problem since states and counties have trouble raising the funds to fix them.

Funding and Program Issues

Over the long term, the main constraint on spending Federal-Aid highway funds for rural projects is the amount of funding available rather than the structure of the federal aid. In most states, a major increase in federal funds under the current programs would lead to more spending on rural roads. Recent improvements in pavement condition and declines in the number of deficient rural bridges indicate that many states have kept rural roads in mind during their highway spending decisionmaking, even without a specific formula program devoted to rural roads and bridges.

New Interstate Highway Construction

A number of organizations have called for a major expansion of lane miles on the Interstate System and other National Highway System roads in rural areas. A 2007 Transportation Research Board report recommended adding a total of 173,000 lane miles to the National Highway System over a 30-year period at a cost in 2007 dollars of $3.1 trillion ($3.8 trillion in 2018 dollars). The proposal called for 73,600 lane miles of metropolitan road and bridge improvements and 68,000 lane miles of freight logistics improvements in both urban and rural areas, and also recommended adding 16,000 lane miles to existing Interstate System highways in rural areas.[38]

A less ambitious program might be to build on the existing system for designating future Interstate highways.[39] States and combinations of states may request additions to the Interstate System either by administrative procedure or by congressional action, and the designations are made on a case-by-case basis. New routes have to meet all the standards of a highway on the Interstate System and be a logical addition or connection to the Interstate System.[40] States may use funds from existing federal highway programs to finance construction of new Interstates. Only one addition has been completed.[41] Should Congress decide to create a separate program specifically to finance new Interstate Highways, it could distribute funds based on cost-to-complete estimates, as was the case with the original Interstate program. Even this would be an expensive program and would be as much an urban program as a rural one.[42]

[38] Transportation Research Board, *Future Options*, p. 21. American Association of State Highway and Transportation Officials, *Transportation Reboot*, 2010. pp. 35-40. TRIP, *Rural Connections*, 2017. pp. 12, 23-24.

[39] 23 C.F.R. §470.

[40] Federal Highway Administration, *NHS High Priority Corridors Designated as Future Interstates*, 2012, https://www.fhwa.dot.gov/Planning/national_highway_system/high_priority_corridors/hbcfi_lg.jpg.

[41] Interstate Route 376 in Pennsylvania.

[42] The FAST Act §6021 requires that TRB complete a study of Interstate System capacity needs by December 2018.

Expanding Federal-Aid Highways to Include More Rural Roads

The FHWA's road classification system is in part an attempt to come to grips with the question of the extent to which federal road spending should serve a national purpose. Major roads, such as Interstate System highways, are deemed to have a national purpose because they facilitate the interstate movement of goods and people. Congress has implicitly determined that local roads, neighborhood streets, and rural local collectors do not serve a national purpose and should not receive federal funding. The major exceptions to this are grants for off-system bridges and safety improvements.

Congress could address rural road conditions by allowing states to designate rural local connectors or certain other local rural roads as part of the Federal-Aid highway system or simply by allowing states to spend their federal funds on any public-access roads. There are, however, potential drawbacks to expanding the scope of Federal-Aid Highway system roads and bridges.

- Without a net increase in federal spending, expanding the system to include lightly traveled rural collector and local roads would cause the states to spread their federal funds more thinly across the expanded network. This could make it harder for states to concentrate federal funds on their more expensive or higher-priority road projects.
- Adding local roads and rural collectors to the federal-aid highway system could raise the costs of road improvements if local governments were required to comply with the same federal regulations and engineering standards that now apply to projects using federal funds.[43]

Incentives for Closing Lightly Used Rural Roads and Bridges

In states with declining rural populations there may be more roads and bridges in some areas than can be sustained financially. Closing lightly used roads and bridges or pulverizing their pavement back to gravel could save maintenance and resurfacing costs, allowing states and counties to devote their funds to maintaining a smaller, more heavily used network of local roads. While all of the roads and bridges that would be downgraded or abandoned would likely be off the federal-aid system, spending less money on them could have indirect effects on federal-aid spending in that the savings might make it more likely that counties could accumulate sufficient funds to, for example, provide the local match to federal aid for off-system bridge repairs. Congress could consider providing an incentive for pulverizing underused paved rural roads or permanently closing underused rural bridges that have nearby alternatives. For example, Congress could allow the use of federal funds to cover the cost of pulverizing a road or closing a bridge, or might offer a higher federal share for a rural bridge project that involves the permanent closure of a deficient bridge nearby.

Safety

The Highway Safety Improvement Program (HSIP), one of the formula programs administered by FHWA, was established to provide funding for highway infrastructure safety improvements. This funding can be used for improvements to any public-access road. These improvements can range from adding side striping or rumble strips to intersection reconfiguration. Congress could increase funding for safety projects on rural roads by altering the rules for state use of HSIP grants or by eliminating the ability of states to transfer HSIP funds to other highway programs.

[43] See CRS Report R44811, *Surface Transportation Devolution*, by Robert S. Kirk.

Program Flexibility

In the past, the Federal-Aid Highway Program incorporated numerous programs for specific purposes. Over time, Congress has reduced the number of programs; the Moving Ahead for Progress in the 21st Century Act (MAP-21; P.L. 112-141) of 2012, for example, reduced the number of programs by two-thirds to roughly 30 programs. Creating a separate program for rural roads would assure that federal funds are spent for this purpose, although this could be seen as reversing recent efforts to provide the states greater flexibility in the use of federal funding.

Economic Development

Federal regulations require the consideration of economic development in the statewide transportation planning process.[44] The FHWA has published a primer to provide guidance to state and local officials on how to do this.[45] The primer suggests that highway project decisions should be made based on their broader transportation benefits, not solely on expected job creation. It asserts that transportation can shape development but cannot create development where there is no demand.

In rural areas, particularly areas that are losing population or have experienced persistent poverty, it is common for local officials to focus on highway improvements as a means of attracting industry. For example, some states have gradually expanded two-lane state highways into limited-access four-lane roads for safety purposes but also in the hope that greater rural road capacity would lead to more economic development. If there are no other substantive reasons for employers to locate in a particular community, however, construction could produce little-used infrastructure which might provide few of the hoped-for benefits. There would be opportunity costs for not spending the highway funds elsewhere.[46]

Autonomous Vehicle Potential in Rural Areas

Fully autonomous vehicles that can navigate the entire public access road network could provide major benefits to rural areas. The vehicles have the potential to provide the kind of mobility to rural areas that public transportation does to urban areas. Getting elderly or carless rural residents to appointments, lowering accident rates, and increasing the efficiency of freight movements are examples of the kinds of benefits that autonomous vehicles could bring to rural areas.

Currently there are no fully autonomous vehicles available for public use. The availability of vehicles that can drive autonomously at all times on all rural roads is likely far into the future. However, autonomous vehicles that can safely and effectively operate within a limited domain of roads may come into use considerably sooner. In rural areas, Interstate System roads are likely to be the first roads on which autonomous vehicles operate because of their design uniformity. Unpaved rural roads may offer greater challenges to autonomous vehicles, due to the lack of road markings and uniform design features. The need for predictability of road design will make road design standards an important factor in the adoption of autonomous vehicles.

[44] 23 C.F.R. §250.206.

[45] Federal Highway Administration, *Supporting Economic Development with Highway Investment*, Final Report, November 2015, pp. 1-54.

[46] Congressional Budget Office, *Approaches to Making Federal Highway Spending More Productive*, 16, https://www.cbo.gov/publication/50150.

Appendix A. Percentages of Good, Fair, and Poor Ride Quality

Table A-1. Percentages of Good, Fair, and Poor Ride Quality

Based on miles by measured pavement roughness

	2013	2014	2015	2016	Change
Functional System		**Good Pavement Condition**			
Rural Interstate	82.2%	82.5%	83.4%	83.6%	+1.4%
Rural other Freeway	78.6%	79.2%	79.1%	77.7%	-0.9%
Rural other Principal Arterial	69.6%	68.7%	68.9%	68.8%	-1.7%
Rural Minor Arterial	54.5%	54.2%	55.7%	54.7%	+0.2%
Rural Major Collector	34.1%	33.9%	35.5%	33.8%	-0.3%
Subtotal Rural Good	**48.7%**	**48%**	**49.8%**	**49%**	**-0.3%**
Urban Interstate	69.3%	69.9%	71.8%	71.2%	+1.9%
Urban Other Freeway	57.0%	58.4%	60.8%	59.8%	+2.8%
Urban Other Principal Arterial	32.5%	34.8%	34.3%	34.3%	+1.8%
Urban Minor Arterial	18.1%	21.7%	20.4%	21.5%	+3.4%
Urban Collector	9.2%	11.5%	11.0%	11.7%	+2.5
Subtotal Urban Good	**25.7%**	**27.4%**	**26.7%**	**27%**	**+1.3%**
Total Good	**41.6%**	**41.5%**	**42%**	**41.4%**	**-0.2%**
Functional System		**Fair Pavement Condition**			
Rural Interstate	15.8%	15.4%	14.7%	14.5%	-1,3%
Rural Other Freeway	19.1%	18.4%	18.5%	19.8	+0.7%
Rural Other Principal Arterial	26.6%	27.6%	26.7%	26.8%	+0.2%
Rural Minor Arterial	38.1%	38.8%	36.4%	37.3%	-0.8%
Rural Major Collector	46.3%	45.9%	42.9%	44.2%	-2.1%
Subtotal Rural Fair	**38.7%**	**39.0%**	**36.5%**	**37.0%**	**-1.7%**
Urban Interstate	25.3%	24.8%	23.2%	23.6%	-1.7%
Urban Other Freeway	35.1%	33.4%	31.0%	31.7%	-3.4%
Urban Other Principal Arterial	40.1%	39.1%	38.0%	38.9%	-1.2%
Urban Minor Arterial	44.0%	42.7%	41.3%	42.4%	-1.6%
Urban Collector	37.4%	39.0%	36.8%	37.5%	+0.1%
Subtotal Urban Fair	**39.1%**	**38.9%**	**37.2%**	**38.0%**	**-1.1**
Total Fair	**38.8%**	**39.0%**	**36.7%**	**37.5%**	**-1.3%**
Functional System		**Poor Pavement Condition**			
Rural Interstate	2.0%	2.1%	1.9%	2.0%	0.0%
Rural Other Freeway	2.3%	2.4%	2.4%	2.5%	+0.2%

	2013	2014	2015	2016	Change
Rural Other Principal Arterial	3.9%	3.3%	4.4%	4.4%	+0.5%
Rural Minor Arterial	7.4%	7.1%	7.9%	8.0%	+0.6%
Rural Major Collector	19.7%	20.2%	21.5%	22.0%	+2.3%
Subtotal Rural Poor	**12.6%**	**13%**	**13.7%**	**14%**	**+1.4%**
Urban Interstate	5.4%	5.3%	5.0%	5.2%	-0.2%
Urban Other Freeway	7.9%	8.3%	8.2%	8.5%	+0.6%
Urban Other principal Arterial	27.4%	26.1%	27.7%	26.8%	-0.6%
Urban Minor Arterial	38.0%	35.6%	38.3%	36.1%	-1.9%
Urban Collector	53.5%	49.5%	52.2%	50.8%	-4.6%
Subtotal Urban Poor	**35.3%**	**33.8%**	**36.1%**	**35%**	**-0.3%**
Total Poor	**19.6%**	**19.5%**	**21.2%**	**21.2%**	**1.6%**

Source: FHWA, *Highway Statistics*, Tables HM-63, HM-64, for years 2013-2016, https://www.fhwa.dot.gov/policyinformation/statistics.cfm.

Notes: Percentages may not add due to rounding. Total miles categorized vary from year to year.

Appendix B. Structurally Deficient Rural Bridges by State

Table B-1. Structurally Deficient Rural Bridges by State

State	Interstate	Principal Arterial: Non-Interstate	Minor Arterial	Major Collector	Minor Collector	Local	Total Deficient	Rural Bridge Def. Rate
Alabama	10	16	29	124	192	698	1,069	8%
Alaska	13	5	4	20	10	92	144	11%
Arizona	15	9	15	26	22	62	149	3%
Arkansas	6	23	68	211	95	286	689	6%
California	65	37	53	201	142	435	933	8%
Colorado	34	17	43	46	63	180	383	6%
Connecticut	3	3	5	11	4	54	80	7%
Delaware	0	3	1	4	1	10	19	5%
Dist. of Col.	0	0	0	0	0	0	0	0%
Florida	5	2	12	34	34	111	198	4%
Georgia	2	9	24	94	80	352	561	6%
Hawaii	1	7	13	9	5	9	44	8%
Idaho	5	10	9	44	24	273	365	10%
Illinois	63	48	115	217	123	1,077	1,643	8%
Indiana	19	29	36	173	208	699	1,164	8%
Iowa	1	15	21	574	777	3,492	4,880	22%
Kansas	5	9	10	345	171	1,488	2,028	9%
Kentucky	13	9	31	111	205	616	985	8%
Louisiana	12	23	130	230	180	958	1,533	16%
Maine	6	10	20	59	35	140	270	14%
Maryland	1	4	12	20	36	107	180	7%
Massachusetts	2	3	13	23	12	50	103	10%
Michigan	12	22	39	279	64	489	905	12%
Minnesota	5	11	15	118	105	372	626	6%
Mississippi	4	24	35	358	56	1,430	1,907	12%
Missouri	25	39	94	627	160	1,778	2,723	14%
Montana	32	20	37	15	45	352	501	10%
Nebraska	0	44	54	163	143	1,830	2,234	15%
Nevada	1	1	0	5	4	11	22	3%
New Hampshire	1	12	8	27	18	130	196	12%

State	Interstate	Principal Arterial: Non-Interstate	Minor Arterial	Major Collector	Minor Collector	Local	Total Deficient	Rural Bridge Def. Rate
New Jersey	2	9	13	18	6	69	117	11%
New Mexico	10	14	18	38	47	84	211	7%
New York	59	46	62	138	197	651	1,153	12%
North Carolina	8	37	51	189	180	953	1,418	12%
North Dakota	3	5	6	35	2	555	606	15%
Ohio	5	23	19	147	219	901	1,314	6%
Oklahoma	8	20	46	820	0	2,074	2,968	15%
Oregon	3	15	12	73	60	200	363	6%
Pennsylvania	35	64	225	310	397	1,905	2,936	20%
Rhode Island	1	2	1	8	1	12	25	22%
South Carolina	17	44	90	198	33	321	703	10%
South Dakota	5	11	17	178	31	816	1,058	20%
Tennessee	22	21	56	56	157	465	777	5%
Texas	4	15	19	60	13	593	704	2%
Utah	0	1	1	11	8	40	61	4%
Vermont	3	4	10	24	9	86	136	5%
Virginia	21	28	49	103	53	365	619	6%
Washington	36	36	22	76	24	90	284	5%
West Virginia	34	56	83	322	82	579	1,156	19%
Wisconsin	24	31	54	237	105	634	1,085	10%
Wyoming	44	22	3	17	24	156	266	10%
Puerto Rico	19	8	30	33	26	68	184	15%
Total	724	976	1,833	7,259	4,688	29,198	44,678	10%

Source: Federal Highway Administration, National Bridge Inventory, Count of Deficient Bridges by Functional Classification 2017, and Highway Bridge Condition by Highway System 2017, https://www.fhwa.dot.gov/bridge/britab.cfm.

Notes: There are no rural bridges in the District of Columbia.

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