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22nd Annual Highway Report on the Performance of State Highway Systems (1984–2013)

by David T. Hartgen, Ph.D., P.E. and M. Gregory Fields, Ph.D.
Project Director: Baruch Feigenbaum

Reason Foundation

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Executive Summary

Reason Foundation's *22nd Annual Highway Report* tracks the performance of the 50 state-owned highway systems. States are ranked in 11 categories including Interstate and rural primary road pavement conditions, deficient bridges, traffic congestion, fatality rates, unsafe narrow rural arterial lanes, capital costs per mile, administrative costs per mile, maintenance costs per mile and total highway expenditures per mile. The study is based on spending and performance data that state highway agencies provided to the federal government for 2013, with the exception of traffic congestion data, which are from Texas A&M Transportation Institute and use data from 2014.

Although individual highway sections (roads, bridges, pavements) steadily deteriorate over time due to age, use, traffic and weather, they are also periodically improved by maintenance and reconstruction. As a result, system performance can improve even as individual roads and bridges deteriorate. Table ES1 summarizes recent system trends for key indicators at the national level. While bridge conditions and fatality rates continued to improve, the overall condition of the U.S. state-owned highway system worsened slightly from 2012 to 2013.

From 2012 to 2013, total revenues for state-administered highways increased almost 5%. However, nationally, expenditures for capital and bridges, maintenance and administration all dropped, possibly as states reduced outlays while waiting for federal action on a long-term transportation bill. The passage of the five-year federal transportation Fixing America's Surface Transportation (FAST) Act added long-term certainty and additional funding to transportation. However, there is no guarantee that states will spend the additional money wisely.

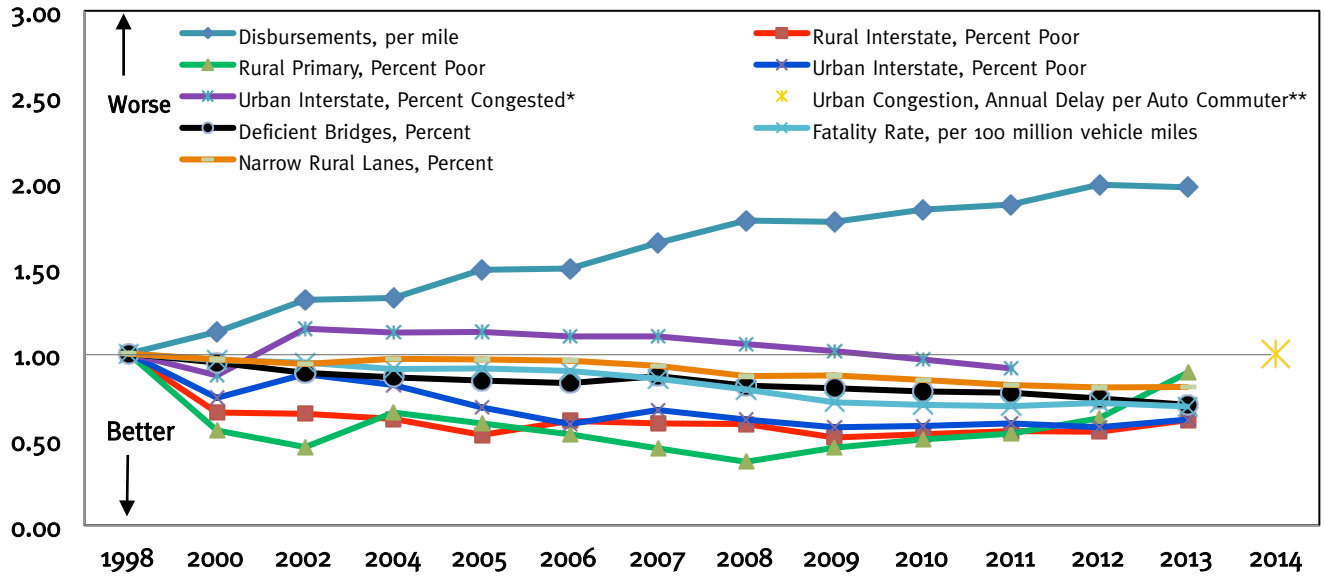
Having said that, the report shows that many states continued to make steady progress, and that declines in performance seem to be concentrated in just a few states.

Table ES1: Performance of State-Owned Highways, 2011–2013

Statistic	2011	2012	2013	2014	Percent Change 2012–13	Percent Change 2011–13
Mileage under State Control (Thousands)	813.69	814.28	815.02		0.09	0.16
Total Revenues, All Sources, $ Billions	126.69	132.86	139.16		4.74	9.84
Total Expenditures, $ Billions	124.16	132.01	131.22		-0.60	5.69
Expenditures, Capital/Bridges, $ Billions	66.60	70.15	68.86		-1.84	3.39
Expenditures, Maintenance, $ Billions	20.45	21.24	21.19		-0.24	3.62
Expenditures, Administration, $ Billions	8.49	8.61	8.19		-4.88	-3.53
Consumer Price Index (1984=1. 00)	2.165	2.210	2.242		1.45	3.56
Rural Interstate, Percent Poor Condition	1.78	1.78	2.00		12.36	12.36
Urban Interstate, Percent Poor Condition	5.18	4.97	5.37		8.05	3.67
Rural Arterial, Percent Poor Condition	0.77	0.89	1.27		42.70	64.94
Urbanized Area, Annual Delay per Auto Commuter	42.15*	NA	NA	51.40*	NA	NA
Bridges, Percent Deficient	22.52	21.52	20.44		-5.02	-9.24
Fatality Rate per 100 Million Vehicle-Miles	1.10	1.13	1.10		-2.65	0.00
Rural Other Principal Arterials, Percent Narrow Lanes	9.02	8.89	8.91		0.22	-1.22

*The Federal Highway Administration is no longer publishing the traffic congestion data used in previous editions of the *Annual Highway Report*, so the traffic congestion method has changed from "percent of freeways congested" to "annual hours of delay per commuter." Traffic congestion measures are not comparable with previous reports. See Appendix for full details.

Figure ES1: Trends in U.S. State Highway Performance, 1998–2013*



* Data for "Urban Interstate, Percent Congested" stops at 2011 due to the change in metric; see Appendix.

**Data for "Urban Congestion, Annual Delay per Auto Commuter" is for 2014 and is compared to 2014 instead of 1998.

South Carolina led the *Annual Highway Report*'s overall cost-effectiveness ratings for the first time since 1995. South Carolina has been a consistent top performer, ranking in the top 10 since 2003.

South Dakota, Kansas, Nebraska and Maine round out the top five in the overall rankings.

While smaller, more-rural states make up the top five, several large urban states (Ohio—9th, Missouri—12th, North Carolina—15th, and Texas—19th) are ranked in the top 20 overall.

At the bottom of the overall rankings are Alaska, New Jersey, Hawaii, Rhode Island and Massachusetts.

While most states deliver a high-quality road network cost effectively, several states have major state highway system performance problems:

- Half (50%) of the rural Interstate mileage in poor condition can be found in just five states: Alaska, California, Colorado, Washington and Indiana.
- Almost half (48%) of the urban Interstate mileage rated in poor condition is in five states: California, New York, Texas, Michigan and Louisiana.
- Over half (54%) of the rural primary mileage in poor condition is in five states: Alaska, Iowa, Minnesota, Texas and Wisconsin.
- Traffic congestion in eight states (New Jersey, New York, California, Virginia, Maryland, Massachusetts, Illinois and Washington) causes over 50 hours of delay annually per auto commuter.
- Although bridge conditions are steadily improving, six states (Massachusetts, Connecticut, New York, Pennsylvania, Rhode Island and Hawaii) report more than one-third of their bridges as deficient.
- Fatality rates continue to improve, but four states (South Carolina, Mississippi, West Virginia and Montana) have fatality rates greater than 1.5 per 100 million vehicle-miles.
- Four states (West Virginia, Virginia, Pennsylvania and Vermont) report that more than one-third of their rural principal arterial roads have narrow lanes that may be unsafe for today's vehicles and use.

A widening performance gap seems to be emerging between most states that are making progress and a few states that are finding it difficult to improve. There is also increasing evidence that higher-level road systems (Interstates, other freeways and principal arterials) are in better shape than lower-level road systems, particularly local roads.

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Part 1

State Highway Performance Ranks

The *Annual Highway Report* ranks state highway systems on cost-effectiveness and quality. Since states have different budgets, highway system sizes, traffic patterns and geographical circumstances, their comparative performance depends on both system performance and the resources available. To determine relative performance, state highway system budgets (per mile of responsibility) are compared with system performance, state by state. States with high ratings typically have better-than-average system conditions—low numbers of deficient bridges, smooth pavement conditions, etc. (good for road users)—along with relatively low per-mile expenditures on metrics such as administrative costs (good for taxpayers).

The following table shows the overall highway performance of the state highway systems for 2013, the most recent year with complete data available. **This year's best overall states are South Carolina, South Dakota, Kansas, Nebraska and Maine.** At the bottom of the overall rankings are Alaska, New Jersey, Hawaii, Rhode Island and Massachusetts.

The top-performing states in the overall rankings this year are rural states with limited traffic congestion (Tables 1, 2, 3, 4, and Figure 1). But several states with large urban areas also rank highly: Ohio (9th), Missouri (12th), North Carolina (15th) and Texas (19th), for example. A careful review suggests that numerous factors—terrain, climate, geography, truck traffic volume, urbanization, highway system age, long-term maintenance prioritization, budget priorities, unit cost differences, overall state budget circumstances and management philosophies are likely also affecting overall performance. The remainder of this report reviews the statistics underlying these overall ratings in more detail.

Table 1: Overall Highway Performance Ratings, 2013

State	Overall
South Carolina	1
South Dakota	2
Kansas	3
Nebraska	4
Maine	5
Montana	6
North Dakota	7
Wyoming	8
Ohio	9
Mississippi	10
New Mexico	11
Missouri	12
Utah	13
Kentucky	14
North Carolina	15
Idaho	16
Oklahoma	17
Tennessee	18
Texas	19
Alabama	20
Georgia	21
Nevada	22
Oregon	23
Arizona	24
West Virginia	25
New Hampshire	26
Minnesota	27
Wisconsin	28
Illinois	29
Virginia	30
Michigan	31
Florida	32
Arkansas	33
Louisiana	34
Colorado	35
Indiana	36
Delaware	37
Maryland	38
Pennsylvania	39
Iowa	40
Vermont	41
California	42
Washington	43
Connecticut	44
New York	45
Massachusetts	46
Rhode Island	47
Hawaii	48
New Jersey	49
Alaska	50

Table 2: Overall Highway Performance Ratings in Alphabetical Order, 2013

State	Overall
Alabama	20
Alaska	50
Arizona	24
Arkansas	33
California	42
Colorado	35
Connecticut	44
Delaware	37
Florida	32
Georgia	21
Hawaii	48
Idaho	16
Illinois	29
Indiana	36
Iowa	40
Kansas	3
Kentucky	14
Louisiana	34
Maine	5
Maryland	38
Massachusetts	46
Michigan	31
Minnesota	27
Mississippi	10
Missouri	12
Montana	6
Nebraska	4
Nevada	22
New Hampshire	26
New Jersey	49
New Mexico	11
New York	45
North Carolina	15
North Dakota	7
Ohio	9
Oklahoma	17
Oregon	23
Pennsylvania	39
Rhode Island	47
South Carolina	1
South Dakota	2
Tennessee	18
Texas	19
Utah	13
Vermont	41
Virginia	30
Washington	43
West Virginia	25
Wisconsin	28
Wyoming	8

Table 3: Highway Performance Ratings by Category, 2013

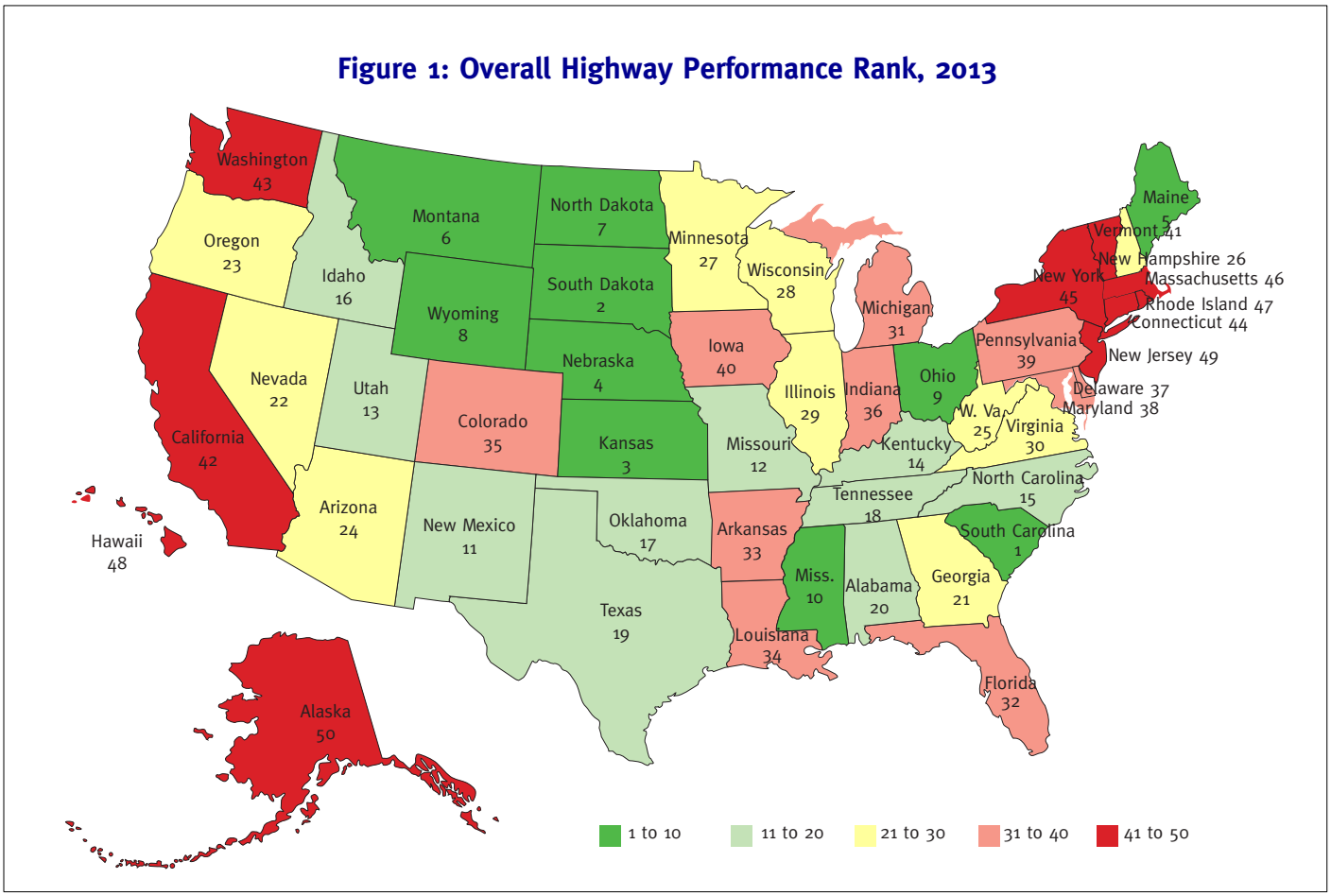
State	Overall	Total Disbursements per mile	Capital & Bridge Disbursements per mile	Maintenance Disbursements per mile	Administrative Disbursements per mile	Rural Interstate Pavement Condition	Urban Interstate Pavement Condition	Rural Arterial Pavement Condition	Urbanized Area Congestion*	Deficient Bridges	Fatality Rates	Narrow Rural Arterial Lanes
Alabama	20	27	30	18	35	34	37	16	9	25	36	6
Alaska	50	20	23	30	23	48	31	50	21	20	25	23
Arizona	24	40	37	26	44	29	9	18	41	3	41	1
Arkansas	33	12	21	10	3	42	44	25	14	18	43	46
California	42	44	40	43	47	45	48	29	48	1	10	32
Colorado	35	33	31	39	31	46	27	31	33	15	22	31
Connecticut	44	47	42	32	50	24	26	44	31	46	9	12
Delaware	37	38	20	49	30	NA	45	4	34	22	27	15
Florida	32	49	49	44	40	7	12	5	29	11	35	16
Georgia	21	24	17	17	33	33	22	12	37	16	28	38
Hawaii	48	42	44	41	49	NA	50	46	40	48	21	24
Idaho	16	16	22	24	15	36	28	32	12	17	37	13
Illinois	29	39	43	36	37	1	1	11	44	9	16	37
Indiana	36	36	39	40	20	44	36	33	28	21	19	33
Iowa	40	19	24	22	25	37	46	48	4	35	20	28
Kansas	3	15	13	14	18	1	3	1	20	13	31	10
Kentucky	14	10	11	13	1	15	13	14	23	43	38	40
Louisiana	34	18	16	6	14	43	49	45	25	40	45	25
Maine	5	11	8	27	4	11	6	9	3	38	23	35
Maryland	38	43	46	42	36	27	40	36	46	32	6	21
Massachusetts	46	48	48	45	48	38	30	42	45	45	1	29
Michigan	31	34	36	33	22	40	41	24	35	31	18	39
Minnesota	27	25	19	35	29	39	39	41	36	6	2	17
Mississippi	10	14	27	4	16	32	25	17	19	23	48	14
Missouri	12	4	4	12	2	20	20	13	26	34	29	43
Montana	6	5	7	9	11	21	17	34	2	14	50	20
Nebraska	4	9	10	16	6	1	18	15	10	26	30	7
Nevada	22	32	29	21	41	30	24	2	30	5	26	30
New Hampshire	26	31	26	20	42	31	4	37	13	39	24	1
New Jersey	49	50	50	50	46	28	43	47	50	36	3	1
New Mexico	11	13	6	1	43	18	15	26	18	8	34	26
New York	45	46	41	48	39	35	47	19	49	47	13	45
North Carolina	15	3	5	8	9	19	21	23	15	42	33	42
North Dakota	7	17	33	2	7	12	7	38	8	19	44	11
Ohio	9	29	34	25	21	13	14	6	22	2	8	36
Oklahoma	17	21	28	15	17	14	34	39	38	28	42	18
Oregon	23	23	15	31	34	25	29	28	39	27	14	22
Pennsylvania	39	28	18	34	26	17	16	21	24	49	32	49
Rhode Island	47	45	45	47	45	1	5	49	32	50	7	34
South Carolina	1	1	1	5	5	9	11	7	17	24	47	27
South Dakota	2	6	12	3	12	10	8	10	5	33	46	8
Tennessee	18	22	32	23	24	16	19	8	27	10	40	41
Texas	19	30	35	28	10	23	35	22	42	12	39	19
Utah	13	37	25	46	28	6	2	3	11	4	5	1
Vermont	41	26	14	38	38	8	10	43	6	41	17	50
Virginia	30	7	3	29	13	22	42	20	47	29	12	48
Washington	43	41	47	37	27	47	33	27	43	37	4	44
West Virginia	25	2	2	7	8	1	23	35	7	44	49	47
Wisconsin	28	35	38	19	32	41	38	40	16	7	11	9
Wyoming	8	8	9	11	19	26	32	30	1	30	15	1

*2014 data

Table 4: Overall Highway Performance Rating Trends, 2011–2013

				Change in Rank	
State	2011	2012	2013	2012-2013	2011-2013
Alabama	28	21	20	1	8
Alaska	48	49	50	-1	-2
Arizona	21	19	24	-5	-3
Arkansas	37	35	33	2	4
California	46	45	42	3	4
Colorado	29	33	35	-2	-6
Connecticut	43	44	44	0	-1
Delaware	35	37	37	0	-2
Florida	33	31	32	-1	1
Georgia	11	13	21	-8	-10
Hawaii	49	50	48	2	1
Idaho	8	30	16	14	-8
Illinois	30	27	29	-2	1
Indiana	41	36	36	0	5
Iowa	12	18	40	-22	-28
Kansas	3	5	3	2	0
Kentucky	26	10	14	-4	12
Louisiana	24	40	34	6	-10
Maine	18	16	5	11	13
Maryland	38	39	38	1	0
Massachusetts	45	46	46	0	-1
Michigan	36	32	31	1	5
Minnesota	31	28	27	1	4
Mississippi	10	8	10	-2	0
Missouri	13	12	12	0	1
Montana	9	9	6	3	3
Nebraska	2	2	4	-2	-2
Nevada	16	24	22	2	-6
New Hampshire	23	23	26	-3	-3
New Jersey	47	48	49	-1	-2
New Mexico	6	7	11	-4	-5
New York	44	43	45	-2	-1
North Carolina	17	20	15	5	2
North Dakota	7	6	7	-1	0
Ohio	19	14	9	5	10
Oklahoma	32	22	17	5	15
Oregon	15	26	23	3	-8
Pennsylvania	40	41	39	2	1
Rhode Island	50	47	47	0	3
South Carolina	5	4	1	3	4
South Dakota	1	3	2	1	-1
Tennessee	20	17	18	-1	2
Texas	14	11	19	-8	-5
Utah	27	29	13	16	14
Vermont	39	38	41	-3	-2
Virginia	22	25	30	-5	-8
Washington	42	42	43	-1	-1
West Virginia	34	34	25	9	9
Wisconsin	25	15	28	-13	-3
Wyoming	4	1	8	-7	-4

Figure 1: Overall Highway Performance Rank, 2013



The overall ranking in 2013 for most states was not dramatically different from 2012. The average change was only four spots (i.e. 26th to 22nd). Only five states saw ratings that improved or worsened by double digits:

- **Utah improved 16 spots, from 29th to 13th,** as total disbursements decreased (relative to the U.S. average) and its bridge condition and urban congestion improved.
- **Idaho improved 14 spots, from 30th to 16th,** as total disbursements increased slightly (relative to the U.S. average), but the state's road conditions improved across the board.
- **Maine improved 11 spots, from 16th to 5th,** as total disbursements decreased slightly (relative to the U.S. average) but the state's road conditions improved.
- **Iowa fell 22 spots, from 18th to 40th,** as per mile spending decreased but mileage in poor condition (on urban and rural Interstates and rural arterials) worsened considerably.
- **Wisconsin fell 13 spots, from 15th to 28th,** as per mile spending decreased but road conditions (on urban and rural Interstates and rural arterials) worsened.

Part 2

Background Data

State highway system sizes range from approximately 1,000 miles in Hawaii to more than 80,000 miles each in Texas and North Carolina. States with larger geographic areas and larger populations tend to have larger systems. Some states, such as North Carolina, maintain all of their roads on the state level, except for subdivision (roads in local housing subdivisions) and other local roads. The amount of state-controlled highway mileage and number of state highway agency miles are not included directly in the state-by-state rankings, which evens the playing field by using per-mile data. They are included in this report as background information and are used to weight the financial data.

State-Controlled Miles

State-controlled mileage includes state highway systems, state-agency toll roads, some ferry services, and smaller systems serving universities and state-owned properties. It includes the Interstate Highway System, the National Highway System, and most federal aid system roads. Nationwide, in 2013 about 815,024 miles were under state control (Table 5, State-Controlled Highway Mileage), about 740 miles more than in 2012 (814,284).

Small annual fluctuations in state-controlled miles are to be expected, as state systems are expanded to meet increasing needs. At times local jurisdictions assume responsibility for mileage previously under state control.

The smallest state-owned road systems continue to be Hawaii (1,016 miles) and Rhode Island (1,139 miles); the largest are Texas (80,490 miles) and North Carolina (80,453 miles).

Table 5: State-Controlled Highway Mileage

2013 Rank	State	Mileage
1	Texas	80,490
2	North Carolina	80,453
3	Virginia	58,474
4	South Carolina	41,587
5	Pennsylvania	41,128
6	West Virginia	34,689
7	Missouri	33,892
8	Kentucky	28,167
9	Ohio	20,361

Table 5: State-Controlled Highway Mileage		
2013 Rank	State	Mileage
10	California	18,535
11	Georgia	18,092
12	Illinois	16,737
13	Louisiana	16,725
14	New York	16,491
15	Arkansas	16,411
16	Washington	15,797
17	Tennessee	14,243
18	Minnesota	13,525
19	Oklahoma	13,370
20	New Mexico	12,222
21	Florida	12,186
22	Wisconsin	11,902
23	Mississippi	11,548
24	Montana	11,345**
25	Indiana	11,175
26	Alabama	11,071
27	Kansas	10,537
28	Nebraska	10,068
29	Colorado	9,911
30	Michigan	9,726
31	Iowa	9,503
32	South Dakota	9,392
33	Maine	8,698
34	Oregon	8,338
35	Alaska	7,940
36	Wyoming	7,787
37	North Dakota	7,397
38	Arizona	7,192**
39	Utah	6,385
40	Nevada	5,692
41	Delaware	5,464
42	Maryland	5,449
43	Idaho	4,982*
44	Connecticut	4,079
45	New Hampshire	4,025
46	Massachusetts	3,658
47	New Jersey	3,352
48	Vermont	2,678
49	Rhode Island	1,139
50	Hawaii	1,016
	U.S. Total	815,024
	Average	16,300

* State Highway Agency only data;

** 2012 data plus change in State Highway Agency

State Highway Agency (SHA) Miles

State highway agency roads are generally the Interstates and other major US-numbered and state-numbered roads. A few states also manage major portions of their rural road systems. In 2013, about 779,235 miles were the responsibility of the 50 individual State Highway Agencies (Table 6, State Highway Agency Mileage), about 488 more miles than in 2012 (778,747).

The average number of lanes per mile is 2.40 lanes, but a few states (New Jersey, Florida, California and Massachusetts) manage significantly wider roads, averaging more than 3.0 lanes per mile.

Table 6: State Highway Agency Mileage, by average number of lanes/mile

Rank	State	SHA Miles	SHA Lane-Miles	Ratio
1	Alaska	5,591	11,377	2.03
2	West Virginia	34,407	70,946	2.06
3	Maine	8,378	17,568	2.10
4	New Hampshire	3,921	8,422	2.15
5	North Carolina	79,546	171,310	2.15
6	Virginia	58,411	126,363	2.16
7	South Carolina	41,396	90,371	2.18
8	Delaware	5,386	11,829	2.20
9	Pennsylvania	39,787	88,329	2.22
10	Kentucky	27,620	61,836	2.24
11	Missouri	33,887	76,277	2.25
12	Nebraska	9,948	22,484	2.26
13	Montana	11,006	25,087	2.28
14	Vermont	2,628	5,999	2.28
15	South Dakota	7,767	17,875	2.30
16	North Dakota	7,378	17,034	2.31
17	Kansas	10,298	23,971	2.33
18	Arkansas	16,411	38,357	2.34
19	Wyoming	6,751	15,783	2.34
20	Louisiana	16,689	39,340	2.36
21	Oregon	7,661	18,592	2.43
22	Texas	80,323	195,245	2.43
23	New Mexico	12,034	29,307	2.44
24	Idaho	4,982	12,294	2.47
25	Oklahoma	12,265	30,354	2.47
26	Minnesota	11,811	29,262	2.48
27	Wisconsin	11,766	29,652	2.52
28	Nevada	5,318	13,444	2.53
29	Colorado	9,061	22,931	2.53
30	New York	15,034	38,220	2.54
31	Mississippi	10,899	27,875	2.56
32	Iowa	8,883	22,793	2.57
33	Ohio	19,226	49,395	2.57
34	Indiana	11,175	28,792	2.58
35	Washington	7,054	18,435	2.61
36	Rhode Island	1,103	2,891	2.62
37	Hawaii	948	2,489	2.63
38	Illinois	15,986	42,176	2.64
39	Connecticut	3,720	9,834	2.64
40	Tennessee	13,899	37,093	2.67
41	Georgia	17,926	48,606	2.71
42	Utah	5,869	16,099	2.74
43	Alabama	10,902	29,979	2.75
44	Michigan	9,664	27,454	2.84
45	Maryland	5,158	14,769	2.86
46	Arizona	6,800	19,510	2.87
47	Massachusetts	3,018	9,577	3.17
48	California	15,104	51,326	3.40
49	Florida	12,099	43,357	3.58
50	New Jersey	2,341	8,549	3.65
	U.S. Total	**779,235**	**1,870,859**	**2.40**
	Weighted Average	**15,585**	**37,417**	

Part 3

Performance Indicators

The *Annual Highway Report* ranks every state in each of 11 categories. Four of the categories measure total spending: Capital and Bridge Disbursements, Maintenance Disbursements, Administrative Disbursements and Total Disbursements. Seven of the categories measure highway system performance: Rural Interstate Pavement Condition, Urban Interstate Pavement Condition, Rural Other Principal Arterial Pavement Condition, Urban Interstate/Freeway Congestion, Deficient Bridges, Fatality Rates and Narrow Rural Other Principal Arterial Lanes. The four spending categories are totaled together and divided by four to get one overall spending score. The seven performance categories are totaled together and divided by seven to get one overall performance score. Then the spending and performance composite scores are added together, weighted by the number of metrics, and averaged to create one total score for each state. Therefore each measure, whether spending efficiency or system performance, is weighted equally.

Detailed data and trends in rankings for each of the states are shown in the attached tables. Selected system condition measures are also shown in the attached maps.

(*For a detailed look at overall state ranks and the comparative performance of each state's highway system, please go to the Reason Foundation website, www.reason.org.)*

Capital and Bridge Disbursements

Capital and bridge disbursements are the costs to build new and widen existing highways and bridges.

Capital and bridge disbursements made up 52.5% of total disbursements in 2013. Capital and bridge disbursements for state-owned roads totaled $68.87 billion in 2013, about 1.8% less than in 2012 ($70.15 billion).

On a per-mile basis, capital and bridge disbursements decreased about 1.1%, from $86,153 per mile in 2012 to $84,494 per mile in 2013 (Table 7, Capital and Bridge Disbursements per State-Controlled Mile, 2013). Some of this decrease in capital and bridge spending may be related to state and federal delays in enacting new funding legislation, or in disbursing new funds for specific projects. However, since 1984, capital and bridge disbursements per mile have increased over 322%, while the Consumer Price Index (CPI) increased 124%.[1]

In 2013, South Carolina, West Virginia, Virginia and Missouri reported the lowest per-mile capital and bridge expenditures.

New Jersey, Florida, Massachusetts and Washington reported the highest per-mile capital and bridge expenditures. The states with the largest percentage shifts from 2012 to 2013 were Arkansas, which increased per-mile expenditures by more than 40%, and Utah and Vermont, which each decreased per-mile expenditures by more than 40%.

Some of the disbursements per state-controlled mile can vary widely due to legislative funding actions and long-term infrastructure project schedules.

Table 7: Capital and Bridges Disbursements per State-Controlled Mile, 2013

1	South Carolina	$20,722
2	West Virginia	$21,182
3	Virginia	$27,122
4	Missouri	$28,496
5	North Carolina	$32,828
6	New Mexico	$33,508
7	Montana	$38,426
8	Maine**	$43,691
9	Wyoming	$47,805
10	Nebraska	$48,066
11	Kentucky	$49,186
12	South Dakota	$50,865
13	Kansas	$56,482
14	Vermont	$56,853
15	Oregon	$62,664
16	Louisiana	$62,991
17	Georgia	$64,910
18	Pennsylvania	$72,011
19	Minnesota	$72,376
20	Delaware	$73,728
21	Arkansas	$73,846
22	Idaho	$73,987
23	Alaska	$74,601
24	Iowa	$77,359
25	Utah	$77,621
26	New Hampshire*	$79,385
27	Mississippi	$81,023
28	Oklahoma	$82,815
29	Nevada	$87,778
30	Alabama	$88,280
31	Colorado	$89,788
32	Tennessee	$95,982
33	North Dakota	$107,016
34	Ohio	$107,188
35	Texas	$108,359
36	Michigan	$111,170
37	Arizona	$117,703
38	Wisconsin	$121,023
39	Indiana	$137,003
40	California	$169,960
41	New York**	$174,030
42	Connecticut	$194,845
43	Illinois	$201,686
44	Hawaii	$204,022
45	Rhode Island	$216,632

Table 7: Capital and Bridges Disbursements per State-Controlled Mile, 2013		
46	Maryland	$221,536
47	Washington	$242,838
48	Massachusetts*	$290,854
49	Florida	$380,040
50	New Jersey	$838,691
	Weighted Average	**$84,494**

*2010 disbursement data; ** 2011 disbursement data

Maintenance Disbursements

Maintenance disbursements are the costs to perform routine highway and state road upkeep, such as filling in potholes and repaving roads.

Maintenance disbursements comprised about 16.1% of total disbursements in 2013, about the same as in 2012. Maintenance disbursements decreased slightly, dropping from $21.24 billion in 2012 to $21.19 billion in 2013. On a per-mile basis, maintenance disbursements averaged about $25,996 in 2013, down less than 1% from $26,079 in 2012 (Table 8, Maintenance Disbursements per State-Controlled Mile, 2013).

Over the long-term, since this report began in 1984, per-mile maintenance disbursements have increased 252%, total disbursements have increased 333% and the Consumer Price Index (CPI) has increased 124%.

In 2013, the lowest per-mile maintenance disbursement was $3,321 in New Mexico, which spent far less per mile than any other state. The highest maintenance costs per mile were $232,761 in New Jersey, which was more than twice as high as the next highest per mile maintenance spending.

Table 8: Maintenance Disbursements per State-Controlled Mile, 2013		
1	New Mexico	$3,231
2	North Dakota	$5,692
3	South Dakota	$6,458
4	Mississippi	$7,029
5	South Carolina	$7,474
6	Louisiana	$7,739
7	West Virginia	$8,532
8	North Carolina	$10,072
9	Montana	$11,115
10	Arkansas	$11,633
11	Wyoming	$11,998
12	Missouri	$13,397
13	Kentucky	$14,410
14	Kansas	$14,662
15	Oklahoma	$14,852
16	Nebraska	$15,333
17	Georgia	$15,361
18	Alabama	$16,156
19	Wisconsin	$18,094
20	New Hampshire*	$19,906
21	Nevada	$20,175
22	Iowa	$20,452
23	Tennessee	$20,620

Table 8: Maintenance Disbursements per State-Controlled Mile, 2013		
24	Idaho	$20,671
25	Ohio	$21,711
26	Arizona	$21,825
27	Maine**	$24,327
28	Texas	$24,846
29	Virginia	$27,757
30	Alaska	$28,470
31	Oregon	$28,937
32	Connecticut	$29,001
33	Michigan	$29,869
34	Pennsylvania	$34,978
35	Minnesota	$37,529
36	Illinois	$41,501
37	Washington	$42,192
38	Vermont	$45,831
39	Colorado	$46,845
40	Indiana	$62,485
41	Hawaii	$63,482
42	Maryland	$63,994
43	California	$64,262
44	Florida	$77,258
45	Massachusetts*	$78,313
46	Utah	$83,751
47	Rhode Island	$86,014
48	New York**	$91,853
49	Delaware	$95,075
50	New Jersey	$232,761
	Weighted Average	**$25,996**

*2010 disbursement data; ** 2011 disbursement data

Administrative Disbursements

Administrative disbursements are typically thought of as office costs, which include general and main office expenditures in support of state-administered highways. They do not include project-related costs, such as planning and preliminary engineering, but occasionally include "parked" funds, which are funds from bond sales or asset sales awaiting later expenditure. As a result, administrative disbursements can therefore vary quite widely from year to year.

Administrative disbursements for state-owned roads totaled $8.2 billion in 2013, about 5.0% less than the $8.6 billion spent in 2012. Administrative disbursements per mile averaged $10,051, a decline of 5% from $10,579 in 2012. Administrative disbursements accounted for 6.5% and 6.2% of total disbursements for 2013 and 2012 respectively.

Since 1984, administrative disbursements per mile have increased about 285%, less than the 333% increase in total disbursements, but more than twice the 124% increase in the Consumer Price Index (CPI).

On a per-mile basis, 2013 administrative disbursements averaged $10,051 per mile. The lowest administrative spending was in Kentucky, at $1,107 per mile. In contrast, Connecticut spent $83,282 in administrative costs and Hawaii spent $77,962 per mile. (Table 9, Administrative Disbursements per State-Controlled Mile, 2013).

Table 9: Administrative Disbursements per State-Controlled Mile, 2013		
1	Kentucky	$1,107
2	Missouri	$2,024
3	Arkansas	$2,107
4	Maine**	$2,409
5	South Carolina	$2,452
6	Nebraska	$2,565
7	North Dakota	$2,954
8	West Virginia	$3,267
9	North Carolina	$3,551
10	Texas	$3,762
11	Montana	$4,254
12	South Dakota	$4,865
13	Virginia	$5,376
14	Louisiana	$5,821
15	Idaho	$5,832
16	Mississippi	$5,903
17	Oklahoma	$6,053
18	Kansas	$6,514
19	Wyoming	$7,124
20	Indiana	$8,654
21	Ohio	$8,687
22	Michigan	$10,105
23	Alaska	$10,150
24	Tennessee	$12,044
25	Iowa	$12,392
26	Pennsylvania	$12,516
27	Washington	$12,556
28	Utah	$13,672
29	Minnesota	$13,677
30	Delaware	$14,058
31	Colorado	$14,228
32	Wisconsin	$15,609
33	Georgia	$15,937
34	Oregon	$16,160
35	Alabama	$17,763
36	Maryland	$18,015
37	Illinois	$18,068
38	Vermont	$21,815
39	New York**	$22,320
40	Florida	$22,514
41	Nevada	$22,897
42	New Hampshire*	$23,607
43	New Mexico	$25,826
44	Arizona	$29,991
45	Rhode Island	$39,685
46	New Jersey	$44,780
47	California	$47,487
48	Massachusetts*	$74,924
49	Hawaii	$77,962
50	Connecticut	$83,282
	Weighted Average	**$10,051**

*2010 disbursement data; ** 2011 disbursement data

Total Disbursements

Since capital and bridge, maintenance and administrative disbursements make up the majority of expenditures, the *Annual Highway Report* measures them both individually and collectively. Total disbursements typically include capital and bridge spending, maintenance expenditures and office costs, plus other areas such as bond principal and interest.

In total, the 50 states disbursed about $131.2 billion for state-owned roads in 2013, less than a 1% decrease from $132.1 billion in 2012.

Since 1984, per-mile total disbursements have increased about 333%, while the Consumer Price Index (CPI) has increased at a much slower rate—124%.

In 2013 disbursements averaged $160,997 per state-controlled mile (Table 10, Total Disbursements per State-Controlled Mile, 2013).

South Carolina ($35,286) edged out West Virginia ($36,451) as the lowest spending state per mile. According to data the state submitted to the Federal Highway Administration, New Jersey spent $2,186,447 per mile in 2013 on state highways, far more than the next highest state, Florida, which spent $741,292 per mile. The New Jersey Department of Transportation has claimed it spends a much lower number—$274,000 per mile, which would have ranked 36th. We requested supporting data for that claim but have not yet received it, thus we used the data the New Jersey DOT submitted to FHWA.

Table 10: Total Disbursements per State-Controlled Mile, 2013

1	South Carolina	$35,286
2	West Virginia	$36,451
3	North Carolina	$54,205
4	Missouri	$59,745
5	Montana	$59,862
6	South Dakota	$66,144
7	Virginia	$70,122
8	Wyoming	$72,459
9	Nebraska	$73,183
10	Kentucky	$76,018
11	Maine**	$78,973
12	Arkansas	$98,152
13	New Mexico	$101,478
14	Mississippi	$103,706
15	Kansas	$113,132
16	Idaho	$119,783
17	North Dakota	$120,324
18	Louisiana	$120,900
19	Iowa	$123,034
20	Alaska	$123,242
21	Oklahoma	$127,922
22	Tennessee	$130,766
23	Oregon	$135,185
24	Georgia	$136,658
25	Minnesota	$142,536

Table 10: Total Disbursements per State-Controlled Mile, 2013		
26	Vermont	$149,249
27	Alabama	$151,687
28	Pennsylvania	$160,447
29	Ohio	$168,697
30	Texas	$177,357
31	New Hampshire*	$186,194
32	Nevada	$186,374
33	Colorado	$188,696
34	Michigan	$205,106
35	Wisconsin	$208,291
36	Indiana	$231,215
37	Utah	$241,858
38	Delaware	$250,351
39	Illinois	$305,546
40	Arizona	$323,497
41	Washington	$366,205
42	Hawaii	$405,269
43	Maryland	$411,544
44	California	$419,090
45	Rhode Island	$425,646
46	New York**	$461,827
47	Connecticut	$477,875
48	Massachusetts*	$675,939
49	Florida	$741,292
50	New Jersey***	$2,186,447
	Weighted Average	**$160,997**

*2010 disbursement data; ** 2011 disbursement data; ***New Jersey DOT reported a much lower number ($274,000/mile) in March 2015. We requested supporting data but have not yet received it. Therefore we used the data the state DOT submitted to FHWA.

Rural Interstate Condition

Rural Interstates are typically four- to six-lane roadways connecting less populated regions to urban areas. One key measurement of roadway condition is pavement condition. In most states road pavement condition is measured using special machines that determine the roughness of road surfaces. A few states continue to use (visual) ratings of pavement distress.

In 2013, states reported the pavement on about 2% of U.S. rural Interstates—588 miles out of 29,385—to be in poor condition. (Table 11, Percent Rural Interstate Mileage in Poor Condition, 2013, and Figure 2). This is a slight worsening from 2012, when 537 miles out of 30,204, about 1.78%, of rural Interstates were rated in poor condition.

The amount of poor-condition rural Interstate mileage varied widely by state. In 2013, five states reported zero rural Interstate mileage in poor condition, and 16 other states reported less than 1% of their rural Interstate mileage was in poor condition.

Meanwhile, four states (California, Colorado, Washington and Alaska) reported more than 5% of their rural Interstate mileage was in poor condition. These four states together have about 11% of U.S. Interstate rural mileage (3,302 miles of 29,385), but have over 45% of the rural Interstate mileage in poor condition.

Several states reported a shift of two percentage points or more in the percentage of poor-condition rural Interstate mileage from 2012 to 2013. The amount of poor mileage increased most significantly in Wisconsin, Colorado and Iowa.

Hawaii reclassified all six miles of its previously categorized rural Interstates as urban Interstates. As a result, Hawaii joins Delaware as the only states with no rural Interstate mileage in their state highway systems.

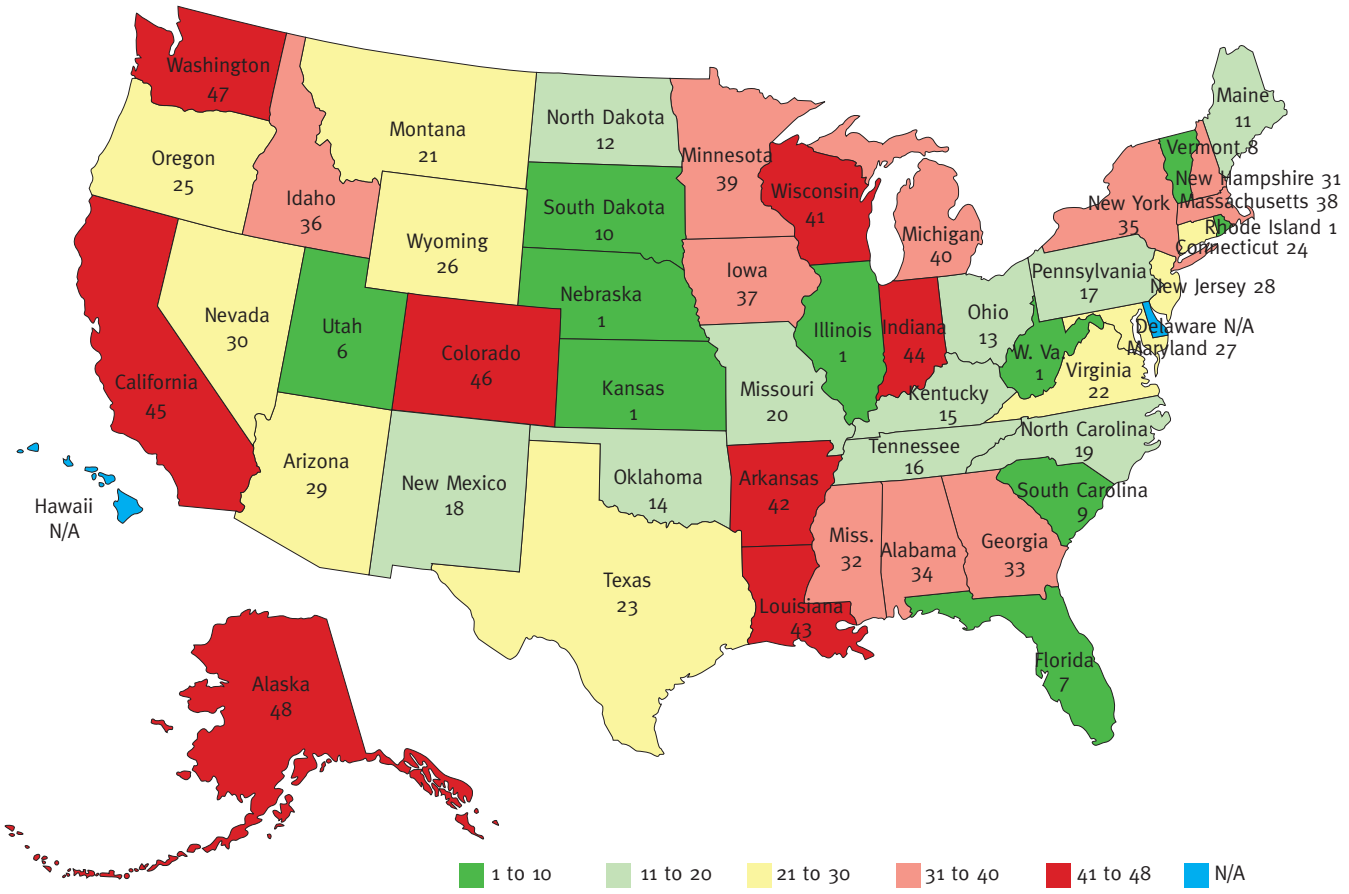
Table 11: Percent Rural Interstate Mileage in Poor Condition, 2013

NA	Delaware*	NA
NA	Hawaii*	NA
1	Illinois	0.00
1	Kansas	0.00
1	Nebraska	0.00
1	Rhode Island	0.00
1	West Virginia	0.00
6	Utah	0.06
7	Florida	0.07
8	Vermont	0.07
9	South Carolina	0.08
10	South Dakota	0.14
11	Maine	0.14
12	North Dakota	0.18
13	Ohio	0.19
14	Oklahoma	0.30
15	Kentucky	0.41
16	Tennessee	0.45
17	Pennsylvania	0.48
18	New Mexico	0.59
19	North Carolina	0.66
20	Missouri	0.71
21	Montana	0.85
22	Virginia	1.02
23	Texas	1.21
24	Connecticut	1.25
25	Oregon	1.33
26	Wyoming	1.45
27	Maryland	1.54
28	New Jersey	1.56
29	Arizona	1.57
30	Nevada	1.58
31	New Hampshire	1.76
32	Mississippi	1.81
33	Georgia	1.94
34	Alabama	2.32
35	New York	2.50
36	Idaho	2.55
37	Iowa	2.64
38	Massachusetts	2.76
39	Minnesota	2.89
40	Michigan	3.40
41	Wisconsin	3.71

Table 11: Percent Rural Interstate Mileage in Poor Condition, 2013		
42	Arkansas	3.79
43	Louisiana	3.80
44	Indiana	4.62
45	California	6.52
46	Colorado	7.23
47	Washington	7.26
48	Alaska	10.76
	Weighted Average	**2.00**

*Delaware and Hawaii have no rural Interstate mileage.

Figure 2: Percent of Rural Interstates in Poor Condition, 2013



Note: Hawaii and Delaware have no rural Interstates.

Urban Interstate Condition

Urban Interstates consist of major, multi-lane Interstates in, and near, urbanized areas.

Nationally, the condition of the urban Interstate system worsened slightly from 2012 to 2013. (Table 12, Percent Urban Interstate Mileage in Poor Condition, 2013, and Figure 3). In 2013, 945 of the 17,618 miles of

the country's urban Interstates were rated as poor, compared to 813 miles out of 16,371 miles being listed in poor condition in 2012.

Between 2012 and 2013, the percentage of poor-condition urban Interstate mileage decreased in 24 states, increased in 24 states and remained the same in the two remaining states. However, more than half of the shifts were minor—one percentage point or less. California and Arkansas led the states in roadway improvement in this category, reducing urban Interstate mileage in poor condition by 2.1 percentage points each. Virginia and Iowa saw the most significant increases in the amount of urban Interstate mileage in poor condition—gaining over five percentage points.

This year, every state reported at least a small percentage of its urban Interstate mileage in poor condition. In the past 10 years at least two states have reported no mileage in poor condition (two in 2012, four in 2011 and nine in 2009). Eleven states had less than 1% of urban Interstate mileage listed in poor condition, led by Illinois with 0.07. Six states (Delaware, Iowa, New York, California, Louisiana and Hawaii) reported more than 10% of their urban Interstate mileage to be in poor condition. These six states, collectively, only have about 15% of the total urban Interstate mileage in the U.S. (2,652 of 17,618 miles), but have over 37% of the urban Interstate mileage in poor condition (349 of 945 miles).

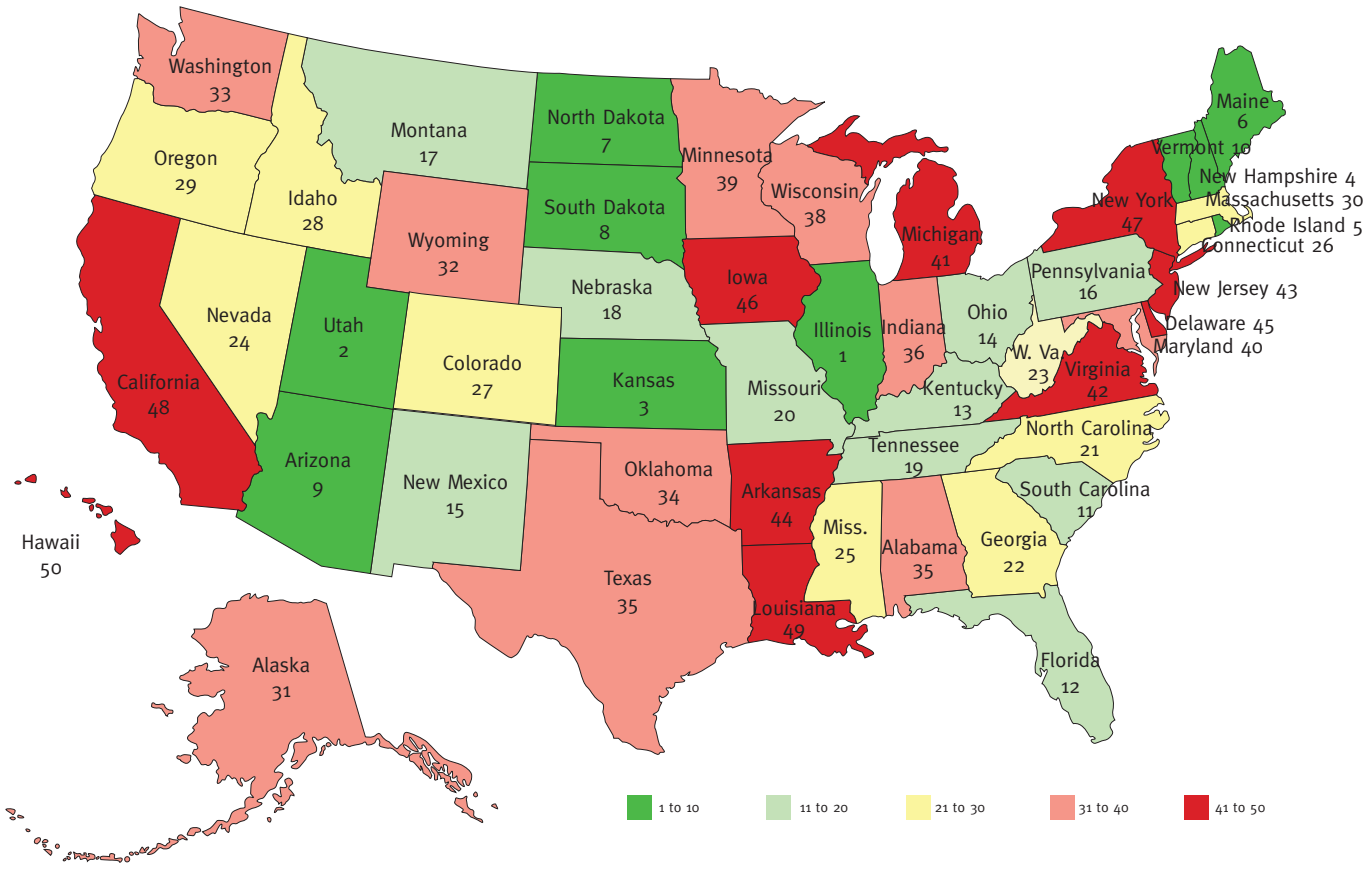
It should be noted that as cities grow, the urbanized areas around them grow as well. As this occurs, Interstates near cities are often reclassified from rural to urban. If these expressways were in poor condition already, their reclassification has the effect of increasing the percentage of urban Interstates in poor condition. This occurred in Hawaii, where all six miles of Interstates that had been categorized as rural were reclassified as urban.

Table 12: Percent Urban Interstate Mileage in Poor Condition, 2013

1	Illinois	0.07
2	Utah	0.15
3	Kansas	0.19
4	New Hampshire	0.36
5	Rhode Island	0.40
6	Maine	0.44
7	North Dakota	0.50
8	South Dakota	0.70
9	Arizona	0.71
10	Vermont	0.75
11	South Carolina	0.84
12	Florida	1.11
13	Kentucky	1.15
14	Ohio	1.48
15	New Mexico	1.65
16	Pennsylvania	1.78
17	Montana	1.82
18	Nebraska	1.90
19	Tennessee	2.32
20	Missouri	2.40
21	North Carolina	2.46
22	Georgia	2.85
23	West Virginia	2.86
24	Nevada	3.30
25	Mississippi	3.43
26	Connecticut	3.85
27	Colorado	4.14

Table 12: Percent Urban Interstate Mileage in Poor Condition, 2013		
28	Idaho	4.25
29	Oregon	4.72
30	Massachusetts	5.01
31	Alaska	5.57
32	Wyoming	5.61
33	Washington	6.09
34	Oklahoma	6.17
35	Texas	6.61
36	Indiana	6.69
37	Alabama	6.99
38	Wisconsin	7.24
39	Minnesota	7.26
40	Maryland	7.55
41	Michigan	7.76
42	Virginia	8.42
43	New Jersey	9.39
44	Arkansas	9.46
45	Delaware	10.34
46	Iowa	11.13
47	New York	11.70
48	California	13.32
49	Louisiana	14.71
50	Hawaii	31.51
	Weighted Average	**5.37**

Figure 3: Percent of Urban Interstates in Poor Condition, 2013



Rural Other Principal Arterial Pavement Condition

Rural other principal arterial roads are best defined as state and U.S.-numbered roads outside of metropolitan areas.

The condition of the rural other principal arterial roads worsened from 2012 to 2013, by about 0.38 percentage points. Overall, about 1.27% of the rural other principal arterial (ROPA) system—1,126 miles out of 88,550—was reported to be in poor condition in 2013 (Table 13, Percent Rural Other Principal Arterial Mileage in Poor Condition, 2013, and Figure 4). This is the highest level of poor condition mileage since before 2000. This compares with about 0.89% (798 of 89,700 miles) listed in poor condition in 2012.

It should be noted that as cities grow, the urbanized area around them grows as well. As this occurs, roads near cities are often reclassified from rural to urban. If the roads reclassified as urban were in good condition, their reclassification can have the effect of increasing the percentage of a state's rural roads in poor condition.

Between 2012 and 2013 most states saw minor changes in ROPA pavement condition. Forty-four states saw decreases or increases of poor condition mileage of one percentage point or less, with 23 states seeing decreases and 21 experiencing increases. Of the remaining six states, three had significant changes: the percentage of the ROPA system in poor condition in Hawaii improved by 9.4 percentage points, while the poor mileage in Iowa and Alaska worsened by 5.0 and 10.4 percentage points, respectively.

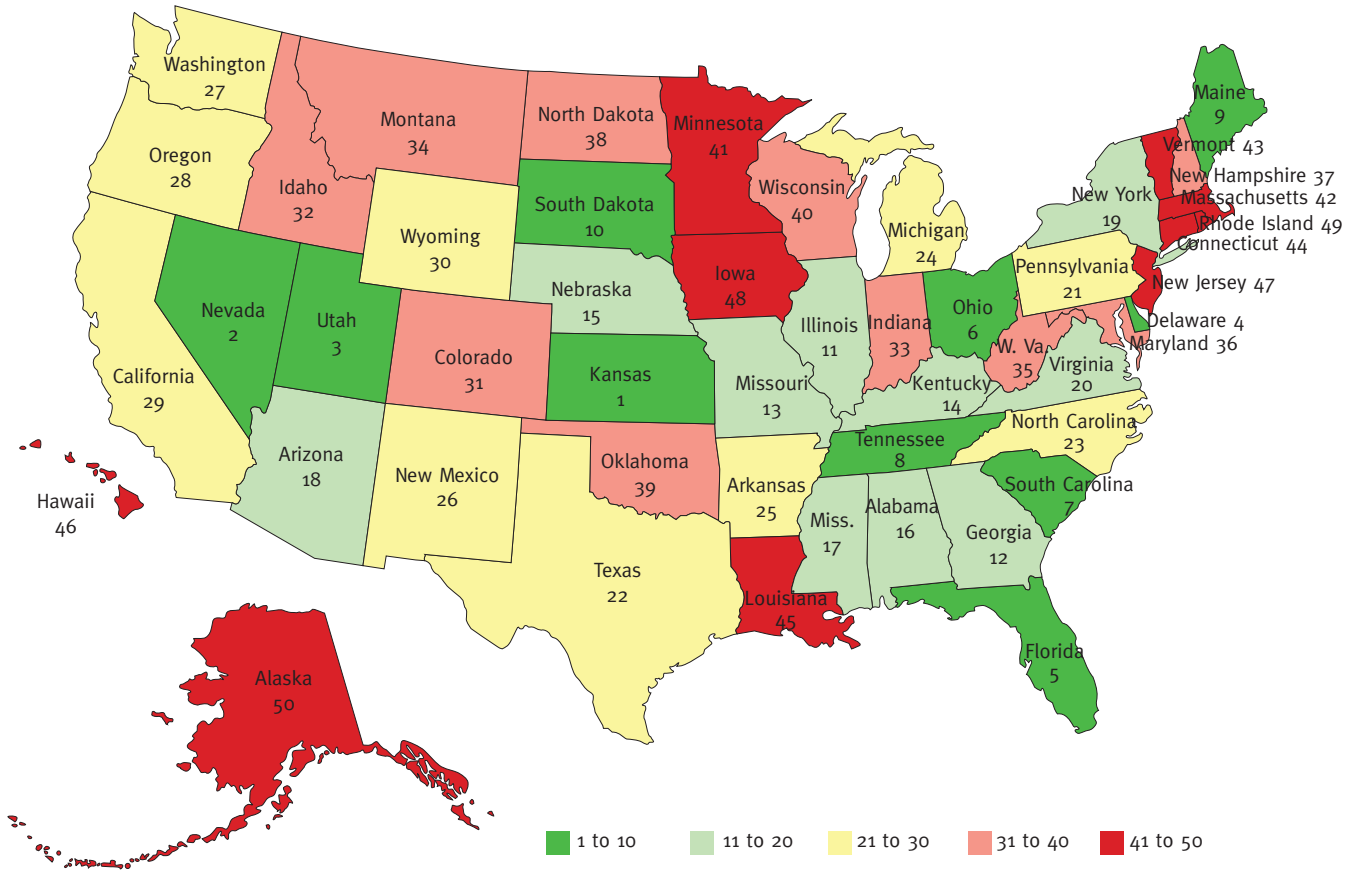
One state (Kansas) reported no poor condition ROPA mileage in 2013 (as compared to one state in 2012, two in 2011 and three in 2009), and 29 other states had 1% or less of ROPA miles in poor condition. On the other hand, four states (New Jersey, Iowa, Rhode Island and Alaska) reported more than 5% of their rural other principal arterial mileage to be in poor condition. These four states have 4% of the total U.S. ROPA mileage, but are home to 38% of the nation's mileage that is in poor condition. Alaska's ROPA system has the most significant problem. By itself it has 22% of the poor rural other arterial principal mileage in the country.

Table 13: Percent Rural Other Principal Arterial Mileage in Poor Condition, 2013

1	Kansas	0.00
2	Nevada	0.01
3	Utah	0.02
4	Delaware	0.17
5	Florida	0.18
6	Ohio	0.23
7	South Carolina	0.24
8	Tennessee	0.25
9	Maine	0.34
10	South Dakota	0.48
11	Illinois	0.48
12	Georgia	0.50
13	Missouri	0.50
14	Kentucky	0.51
15	Nebraska	0.54
16	Alabama	0.55

Table 13: Percent Rural Other Principal Arterial Mileage in Poor Condition, 2013		
17	Mississippi	0.57
18	Arizona	0.59
19	New York	0.59
20	Virginia	0.65
21	Pennsylvania	0.67
22	Texas	0.69
23	North Carolina	0.72
24	Michigan	0.75
25	Arkansas	0.77
26	New Mexico	0.78
27	Washington	0.80
28	Oregon	0.85
29	California	0.97
30	Wyoming	1.00
31	Colorado	1.12
32	Idaho	1.16
33	Indiana	1.24
34	Montana	1.25
35	West Virginia	1.38
36	Maryland	1.42
37	New Hampshire	1.52
38	North Dakota	1.60
39	Oklahoma	1.64
40	Wisconsin	1.68
41	Minnesota	1.75
42	Massachusetts	2.22
43	Vermont	2.52
44	Connecticut	2.60
45	Louisiana	2.61
46	Hawaii	3.48
47	New Jersey	5.09
48	Iowa	6.43
49	Rhode Island	9.62
50	Alaska	30.40
	Weighted Average	**1.27**

Figure 4: Percent of Rural Other Principal Arterials in Poor Condition, 2013



Urbanized Area Congestion

There is not a universally accepted definition of traffic congestion. In reporting congestion data to the federal government, the states have traditionally used peak-hour traffic volume-to-capacity (V/C) ratios, as calculated in the Transportation Research Board's *Highway Capacity Manual*, as a congestion measure. Through 2009, the Federal Highway Administration (FHWA) summed up these V/C calculations to determine the state mileage in various congestion categories. Since 2009, however, FHWA has not published this information. Instead, FHWA reported quarterly congestion statistics based on estimated travel delays from drivers' mobile-devices. These data are only gathered and published for selected regions and roads. They do not include statewide congestion information.

This change by FHWA has necessitated changes in how the *Annual Highway Report* details state-level congestion. The *21st Annual Highway Report* used the Texas A&M Transportation Institute's *Urban Mobility Report* (*UMR*),[2] to calculate a metric that could be most similar to the V/C metric previously used by FHWA. The measure developed was the "percentage of the urban Interstate and freeway system that is congested." This metric is a measure that calculates the degree of the urban congestion problem, but congestion has three dimensions (intensity, duration and extent). So a better metric is needed to capture more fully these three aspects. New data from mobile devices provide this opportunity.

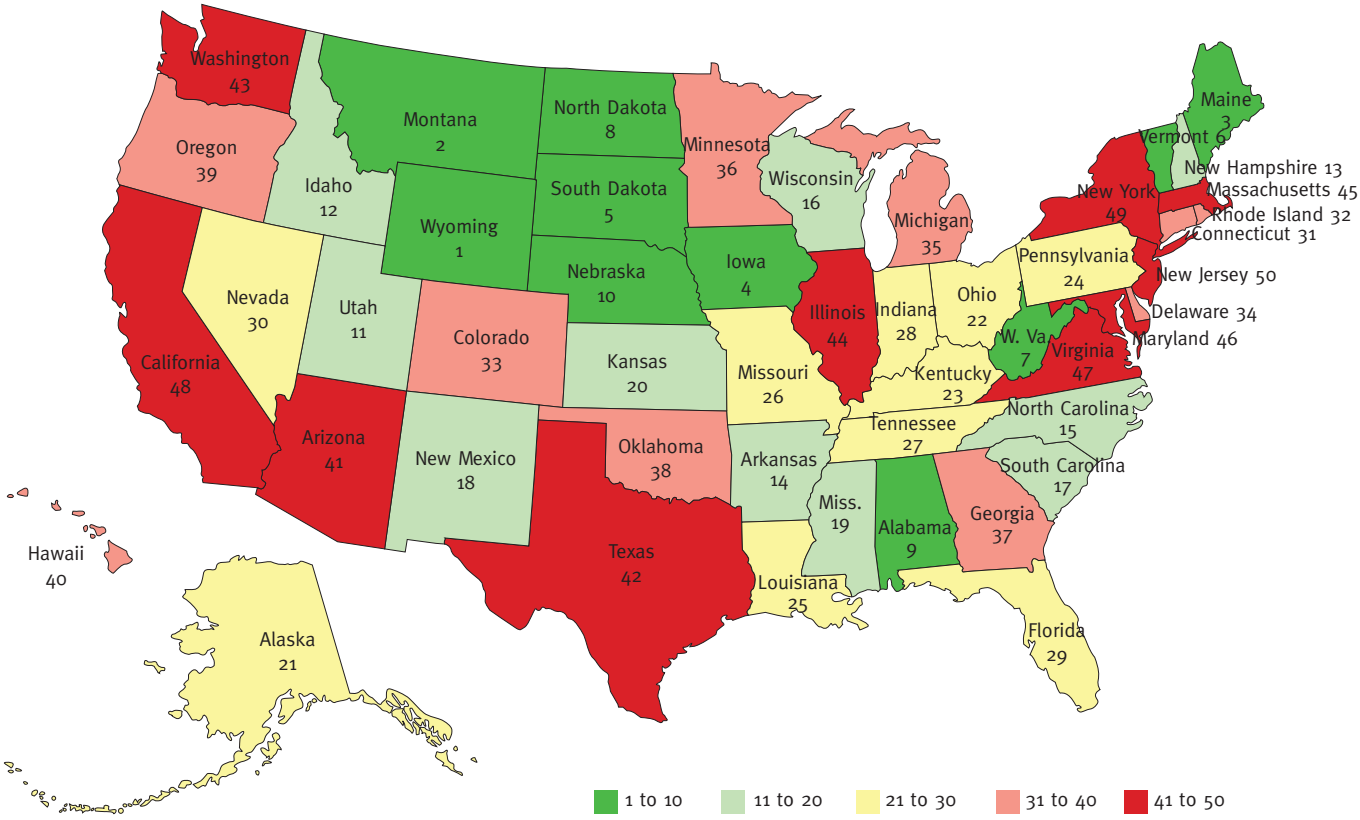
The congestion measure used for this year's report is also derived from the *Urban Mobility Report*. The latest version, the *2015 Urban Mobility Scorecard* (*UMS*), was published jointly by the Texas A&M Transportation Institute and INRIX in August 2015, and reports data for 2014.[3] This congestion measure, the average annual delay per auto commuter (in hours), captures traffic delays in all three dimensions of congestion. It also has the advantages of being straightforward and relevant to the average commuter, is easily calculated, and is more current than previous data. This measure, however, does have its limitations. It considers only urbanized areas (congestion in cities and towns with populations below 50,000 is excluded), and it is based on speed reductions obtained from vehicles with participating mobile-devices, rather than from all traffic. Further, the data must be totaled for each state. Since this newer measure is different from the congestion measures used in previous editions of this report, direct comparisons from previous reports are not possible. With this new measure, some states will see gains and others will see declines and it may take a few years for this measure and congestion rankings to stabilize.

In 2014, the average annual delay per auto commuter in urbanized areas across the United States was 51.40 hours (see Table 14, Urban Interstate Congestion, and Figure 5). Annual hours of delay ranged from 10.71 in Wyoming to 67.21 in New Jersey.

As would be expected, the urban congestion problem is concentrated in heavily populated cities and states. Only the bottom eight states exceed the U.S. average of 51.40 annual hours of delay. Those congestion totals skew the national average of hours of delay upward. However, commuters in more than 40 states, including places such as North Dakota and Idaho, now waste at least 20 hours a year stuck in traffic. And commuters in more than 20 states suffer annual congestion delays of at least 40 hours per year, meaning they lose the equivalent of a full workweek to traffic jams.

Table 14: Annual Delay per Auto Commuter (in hours), 2014		
1	Wyoming	10.71
2	Montana	13.06
3	Maine	13.48
4	Iowa	13.96
5	South Dakota	14.27
6	Vermont	16.64
7	West Virginia	16.72
8	North Dakota	21.40
9	Alabama	26.91
10	Nebraska	28.67
11	Utah	28.90
12	Idaho	29.28
13	New Hampshire	29.28
14	Arkansas	29.81
15	North Carolina	29.90
16	Wisconsin	31.17
17	South Carolina	32.26
18	New Mexico	32.44
19	Mississippi	33.24
20	Kansas	34.62
21	Alaska	34.76
22	Ohio	35.12
23	Kentucky	37.50
24	Pennsylvania	38.45
25	Louisiana	38.49
26	Missouri	38.81
27	Tennessee	38.88
28	Indiana	39.68
29	Florida	41.69
30	Nevada	42.65
31	Connecticut	42.71
32	Rhode Island	42.77
33	Colorado	43.30
34	Delaware	44.11
35	Michigan	44.30
36	Minnesota	44.92
37	Georgia	45.83
38	Oklahoma	46.57
39	Oregon	46.73
40	Hawaii	48.25
41	Arizona	48.69
42	Texas	49.62
43	Washington	55.49
44	Illinois	56.85
45	Massachusetts	57.10
46	Maryland	59.70
47	Virginia	60.65
48	California	65.84
49	New York	66.54
50	New Jersey	67.21
	Weighted Average	**51.40**

Figure 5: Average Annual Delay per Auto Commuter (in hours), 2014



Deficient Bridges

Federal law mandates the uniform inspection of all bridges for structural and functional adequacy at least every two years. Bridges rated "deficient" are eligible for federal repair dollars. The *National Bridge Inventory* (NBI) is the source of the bridge data in this report, which also uses summaries provided in *Better Roads* (see Appendix). Since the NBI contains some recent inspections and some as old as two years, the age of the "average" inspection is about one year old. So, a "December 2014" summary from the NBI would represent, on average, bridge condition as of 2013.

The condition of the nation's highway bridges continued to improve in 2013. Of the 607,885 highway bridges reported, 124,265 (about 20.44%) were rated deficient for 2013 (Table 15, Percent of Bridges in Deficient Condition, 2013, and Figure 6). This represents a 5% improvement over 2012 when 131,083 of 609,233 (21.52%) were rated as deficient.

California and Ohio reported the lowest percentage of deficient bridges, 5.96% and 6.99%, respectively, but their data may be skewed in comparison to other states since they did not include "functionally obsolete" bridges in their reporting. Functionally obsolete can describe bridges that are no longer adequate for a variety of reasons—lack of shoulder space, insufficient vertical clearance for today's vehicles, etc.

Arizona reported the lowest percentage of total deficient bridges, which includes both functionally obsolete and structurally deficient bridges. Rhode Island reported the highest percentage of deficient bridges in the country, with over half of its bridges being functionally obsolete or structurally deficient.

Most states (36 of 50) reported at least some improvement in the percentage of deficient bridges from 2012 to 2013. New York and Massachusetts made the most improvement, decreasing their deficient bridges by 3.1 and 2.5 percentage points, respectively. Ohio also saw a huge improvement in deficient bridges, 14.4%, but as noted above, did not include functionally obsolete bridges in the 2013 totals.

Four states reported no change in their bridges, and two states—Mississippi and Nevada—did not report data in 2014, so 2013 data are used.

Of the 10 states that reported a higher percentage of deficient bridges, only Wyoming saw more than a percentage point change, 10.0 points. This substantial increase was due to a decision by Wyoming to include bridges that are rated acceptable by the FHWA select list criteria as structurally deficient or functionally obsolete for state-specific reasons.

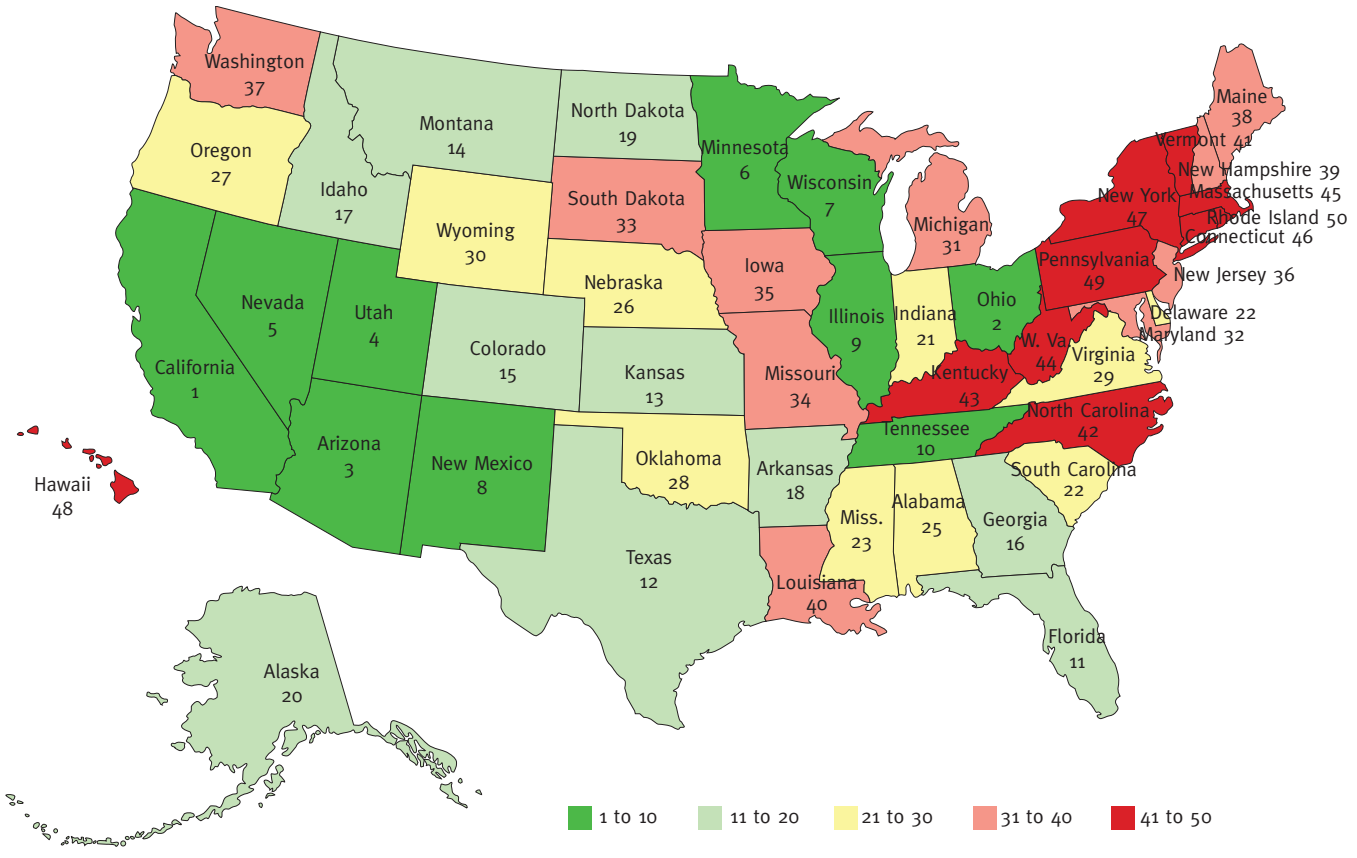
Table 15: Percent of Bridges in Deficient Condition, 2013

1	California	5.96**
2	Ohio	6.99**
3	Arizona	10.18
4	Utah	10.96
5	Nevada	11.15*
6	Minnesota	11.99
7	Wisconsin	13.79
8	New Mexico	14.99
9	Illinois	15.58
10	Tennessee	15.59
11	Florida	15.61
12	Texas	16.23
13	Kansas	16.31
14	Montana	16.43
15	Colorado	16.43
16	Georgia	16.74
17	Idaho	17.79
18	Arkansas	18.22
19	North Dakota	19.08
20	Alaska	19.79
21	Indiana	20.00
22	Delaware	20.07
23	Mississippi	20.65*
24	South Carolina	20.68
25	Alabama	20.70
26	Nebraska	22.08
27	Oregon	22.19
28	Oklahoma	22.40
29	Virginia	22.87
30	Wyoming	23.15
31	Michigan	23.40
32	Maryland	23.61
33	South Dakota	23.74
34	Missouri	23.95
35	Iowa	24.96

Table 15: Percent of Bridges in Deficient Condition, 2013		
36	New Jersey	25.54
37	Washington	26.01
38	Maine	26.02
39	New Hampshire	27.74
40	Louisiana	27.87
41	Vermont	28.06
42	North Carolina	28.77
43	Kentucky	29.59
44	West Virginia	33.10
45	Massachusetts	35.59
46	Connecticut	35.72
47	New York	35.77
48	Hawaii	36.80
49	Pennsylvania	38.07
50	Rhode Island	51.12
	Weighted Average	**20.44**

*2012 Data; ** Does not include functionally obsolete bridges in deficient bridge total

Figure 6: Percent of Bridges in Deficient Condition, 2013



Fatality Rates

Fatality rates are an important overall measure of each state's road performance.

The nation's highway fatality rate improved from 1.13 in 2012 to 1.10 in 2013, (Table 16, Fatality Rate per 100 Million Vehicle-Miles, 2013, and Figure 7). This decrease continues a decades-long downward trend in fatalities per 100 million vehicle-miles, with the small increase in 2012 being an aberration. In 2013, 32,699 fatalities were reported, fewer than the 33,546 fatalities reported in 2012, even as vehicle-miles of travel increased to 2.99 trillion from 2.97 trillion in 2012.

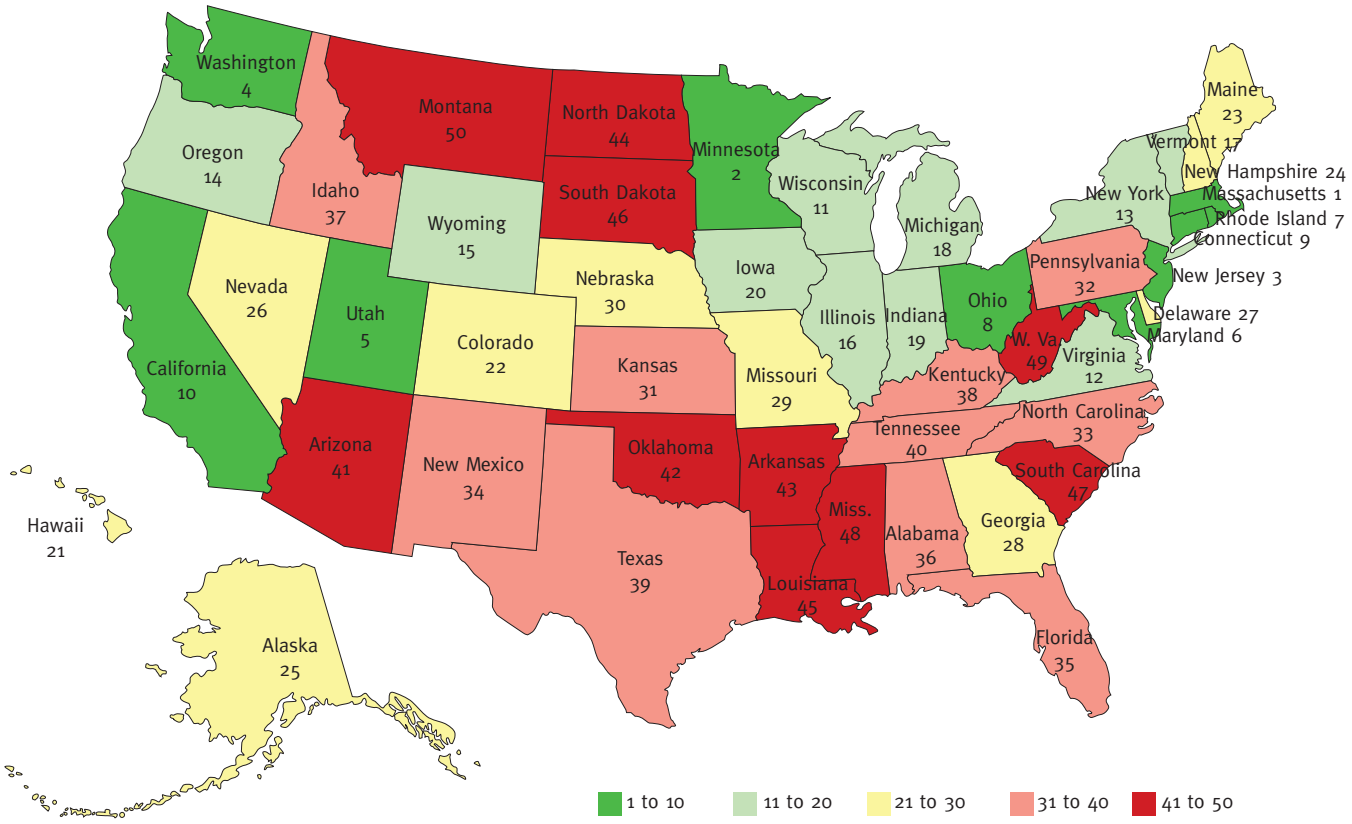
For 2013, Massachusetts reported the lowest fatality rate, 0.58, while Montana reported the highest, 1.90. Most states (36 of 50) reported a reduction in their fatality rate compared to 2012, led by Wyoming and Hawaii, which improved 0.39 and 0.24 points, respectively. Fourteen states saw their fatality rate increase, with both Idaho and New Hampshire reporting rate increases of 0.21 points.

Table 16: Fatality Rate per 100 Million Vehicle-Miles, 2013

1	Massachusetts	0.58
2	Minnesota	0.68
3	New Jersey	0.73
4	Washington	0.76
5	Utah	0.81
6	Maryland	0.82
7	Rhode Island	0.84
8	Ohio	0.88
9	Connecticut	0.89
10	California	0.91
11	Wisconsin	0.91
12	Virginia	0.92
13	New York	0.92
14	Oregon	0.93
15	Wyoming	0.93
16	Illinois	0.94
17	Vermont	0.97
18	Michigan	1.00
19	Indiana	1.00
20	Iowa	1.00
21	Hawaii	1.01
22	Colorado	1.02
23	Maine	1.03
24	New Hampshire	1.05
25	Alaska	1.05
26	Nevada	1.06
27	Delaware	1.06
28	Georgia	1.08
29	Missouri	1.09
30	Nebraska	1.09
31	Kansas	1.16
32	Pennsylvania	1.22
33	North Carolina	1.23
34	New Mexico	1.24
35	Florida	1.25
36	Alabama	1.31
37	Idaho	1.34

Table 16: Fatality Rate per 100 Million Vehicle-Miles, 2013		
38	Kentucky	1.36
39	Texas	1.38
40	Tennessee	1.40
41	Arizona	1.40
42	Oklahoma	1.41
43	Arkansas	1.44
44	North Dakota	1.47
45	Louisiana	1.47
46	South Dakota	1.48
47	South Carolina	1.57
48	Mississippi	1.58
49	West Virginia	1.73
50	Montana	1.90
	Weighted Average	**1.10**

Figure 7: Fatality Rates per 100 Million Vehicle-Miles, 2013



Rural Other Principal Arterials with Narrow Lanes

Narrow lanes on major rural primary roads have sight visibility and design issues that create safety problems. The national standard for lane width on major rural roads is generally 12 feet, and few major rural primary roads could be improved without widening lanes to that standard.

In 2013, about 8.91% of the nation's rural other principal arterials (7,837 miles out of 87,946) had lanes narrower than 12 feet (Table 17, Percent of Rural Other Principal Arterials (ROPA) with Narrow Lanes, 2013, and Figure 8). This is slightly worse than the 8.89% in 2012, but better than the 9.02% in 2011 and the 9.66% in 2009.

In 2013, five states reported no narrow-lane ROPA mileage, while two states (Vermont and Pennsylvania) reported at least 40% of their ROPA networks had narrow-lane mileage. In 2013, a majority of states (34 of 50) reported ROPA narrow-lane mileage increasing or remaining constant. Of all the states with an increase in ROPA mileage with narrow lanes, only one state, Vermont, saw a double-digit percentage point increase. Vermont has a small rural primary system under state control, so small changes can yield large percentage increases.

The remaining 16 states saw some improvement, led by double-digit increases in Hawaii and Maine, also relatively small systems where small improvements can make a big difference.

On the whole, however, the percentage of the nation's rural primary system with narrow lanes has decreased significantly over the last 20 years.

Between 2012 and 2013, Georgia and Wyoming changed measurement methods. However, their data was so different from previous years that we decided to use the 2012 data until their numbers stabilize. Alaska did not report any mileage data for 2013, so 2012 data was used instead.

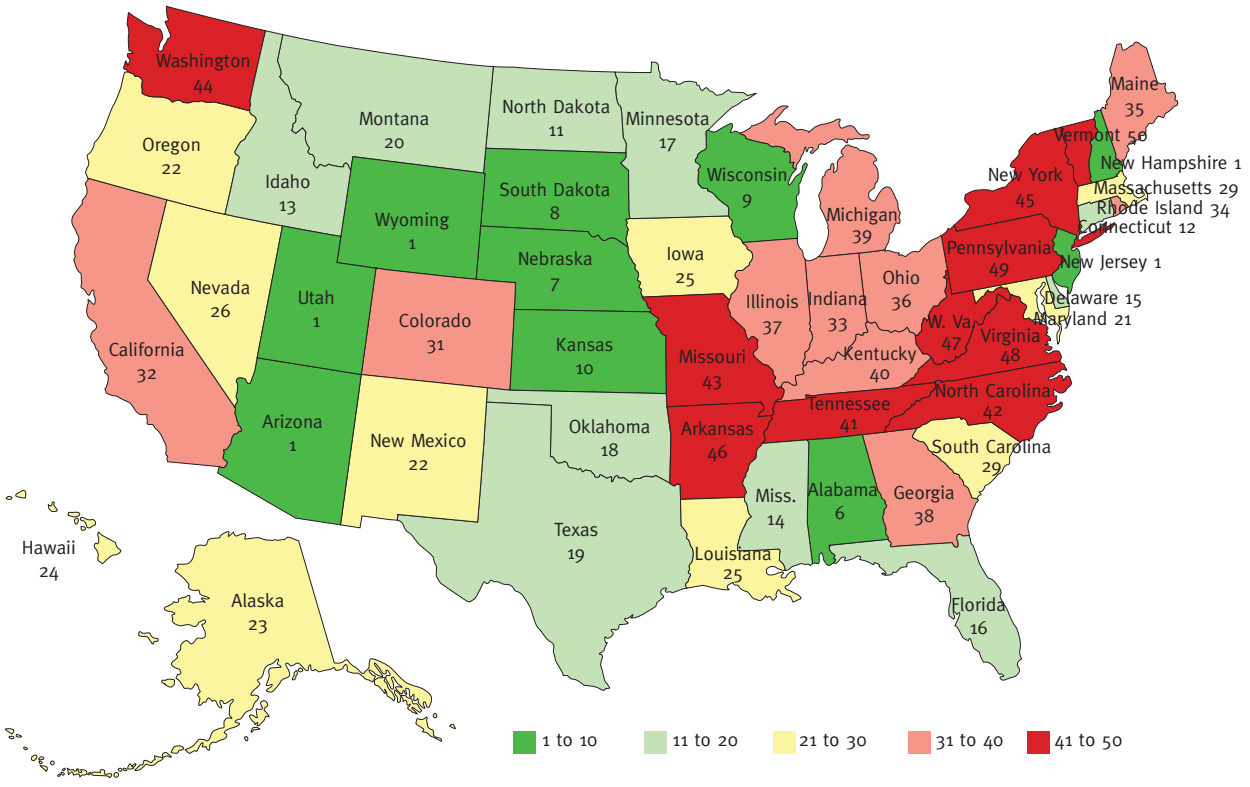
Table 17: Percent of Rural Other Principal Arterials with Narrow Lanes, 2013

1	Arizona	0.00
1	New Hampshire	0.00
1	New Jersey	0.00
1	Utah	0.00
1	Wyoming	0.00*
6	Alabama	0.02
7	Nebraska	0.17
8	South Dakota	0.23
9	Wisconsin	0.74
10	Kansas	0.83
11	North Dakota	0.91
12	Connecticut	0.97
13	Idaho	1.45
14	Mississippi	1.82
15	Delaware	1.86
16	Florida	1.91
17	Minnesota	2.46
18	Oklahoma	2.97
19	Texas	2.98
20	Montana	3.01
21	Maryland	3.10
22	Oregon	3.40

Table 17: Percent of Rural Other Principal Arterials with Narrow Lanes, 2013		
23	Alaska	3.91*
24	Hawaii	4.28
25	Louisiana	4.29
26	New Mexico	4.29
27	South Carolina	5.86
28	Iowa	5.87
29	Massachusetts	5.89
30	Nevada	7.13
31	Colorado	7.65
32	California	9.58
33	Indiana	9.65
34	Rhode Island	10.38
35	Maine	11.13
36	Ohio	11.20
37	Illinois	13.18
38	Georgia	13.62*
39	Michigan	16.23
40	Kentucky	19.39
41	Tennessee	19.52
42	North Carolina	20.34
43	Missouri	20.77
44	Washington	26.25
45	New York	32.12
46	Arkansas	33.26
47	West Virginia	35.39
48	Virginia	36.25
49	Pennsylvania	44.94
50	Vermont	49.51
	Weighted Average	**8.91**

* 2012 data

Figure 8: Percent of Rural Other Principal Arterials with Narrow Lanes, 2013



Appendix: Technical Notes

This brief technical appendix summarizes the definitions and sources of the data used in this assessment. The discussion is based on the assumption that comparative cost-effectiveness requires data on system condition or performance, information on the costs to operate and improve the system, and an understanding of the relationship between economic activity and tax revenues.

This report relies heavily on the Highway Statistics series, which is compiled by the Federal Highway Administration (FHWA) from data reported by each state. We also use bridge condition data and highway fatality rates reported by each state. For congestion, we use data from the Texas A&M Transportation Institute. This assessment compares states with one another based on self-reported data. In general, we use the data as posted in the various data tables. We do not attempt to audit the data; instead, we assume the data to be correct. In cases where the data are clearly incorrect, however, we made appropriate adjustments to the data and footnote the changes made.

Measures of Mileage

In general, larger highway systems require more resources to build and maintain than smaller systems. Accordingly, it is important to weight systems so that states can be compared accurately. In this study, mileage is the basic measure for bringing the states to a common baseline. Highway width is also important in differentiating system size (number of lanes), as more pavement generally requires more resources. This study does not rank states based on the size of their highway systems. However, it does use average highway width differences, as derived from State Highway Agency lane width measures, to measure overall financial performance.

***"State-Owned" Highway Mileage*:** In each state, the "state-owned" highway system consists of the State Highway System and other systems such as toll roads, state parks, universities, prisons, medical facilities, etc. Each state's responsibility for roads varies. In some, for instance North Carolina, the state is responsible for almost all roads outside of municipalities, while in others, such as New Jersey, the state is responsible for primarily the major multiple-lane roads. In addition, other features such as bridges also vary, with some states having many and others few.

The source of data for the state-owned mileage is Table HM-10, Highway Statistics 2013 (http://www.fhwa.dot.gov/policyinformation/statistics.cfm) and includes both State Highway Agency mileage and other jurisdiction mileage controlled by the state.

***State Highway Agency (SHA) Mileage*:** The total numbers of miles and lane-miles for the SHA system is available for each state. From this data, the average lane-miles per centerline-mile is calculated and then used to weight overall financial performance. The source of data for SHA mileage is Table HM-81, Highway Statistics 2013 (http://www.fhwa.dot.gov/policyinformation/statistics.cfm).

Disbursements for State-Owned Highways

There are several types of disbursements for state-administered highways: capital and bridge work, maintenance and highway services, administration, research and planning, law enforcement and safety, interest (on bond payments) and bond retirement. Disbursement data are collected for the first three categories (capital and bridge work, maintenance activities, administration) as well as for the total expenditures. Disbursements by state-administered agencies fund the State Highway Agency, other toll and turnpike state agencies, and state universities, parks, prisons, etc.

The source of all this data is Table SF-4, Highway Statistics 2013 (http://www.fhwa.dot.gov/policyinformation/statistics.cfm). These disbursements are divided by "mileage under state control" to arrive at a relative measure of expenditure per unit of responsibility. The national average is the weighted average, obtained by summing the financial numbers for all states, then dividing by the sum of all state-administered mileage. Since large per-mile expenditures are also a burden on taxpayers, the states are ranked inversely by this measure, with the highest per-mile expenditures being rated lowest. (In cases where states have not reported current disbursement data, the most recent available disbursement data are divided by the most recent available mileage data to derive the disbursements per mile.)

***Capital and Bridge Disbursements and Maintenance Disbursements*:** "Capital" actions are those intended to reconstruct or improve the system, whereas "maintenance" actions are those intended to preserve or repair the system, but not improve it. However, the definitions of these categories vary somewhat between the states. Most states use private sector contracts to build and reconstruct the system, although in some cases they may also use their own workforces for some projects. Most states also conduct maintenance largely with agency forces and the work is generally light in character, but some also conduct some major repairs such as thick overlays using contracted forces from the private sector.

***Administrative Disbursements*:** Administrative disbursements are intended to include all non-project-specific disbursements, and typically include most main-office and regional-office costs, research, planning and similar activities. Sometimes, this category also includes bond restructurings and other non-project-specific financial actions. As a result, administrative disbursement can sometimes vary widely from year to year.

***Total Disbursements*:** Total disbursements represent total state outlays for state-administered roads, and include several categories not detailed above. Usually, states disburse about 2% to 3% less in funds than they collect, the difference resulting from timing differences and delays in getting projects completed. However, states sometimes collect revenues that are not immediately expended, such as major bond sales, which show up as major increases in "receipts" without a similar increase in disbursements. And sometimes, later-year disbursements can be higher than receipts as states transfer money into projects without increasing revenues.

Measures of System Performance

There are seven measures of road conditions: Rural Interstate Poor Condition Mileage, Urban Interstate Poor Condition Mileage, Rural Other Principal Arterial Poor Condition Mileage, Urbanized Area Congestion, Deficient Bridges, Narrow Lanes on Rural Other Principal Arterials and Fatality Rates.

***Poor Condition Mileage*:** Perhaps no measure is more fundamental to road performance than road condition. There are numerous ways of defining road condition, but the one used for the U.S. higher-road system is the International Roughness Index (IRI), a measure of surface "bumpiness" in inches of vertical deviation per mile of length. The states use a variety of procedures in gathering this data, but most use mechanical or laser equipment driven over the road system. They often supplement this data with detailed information on road distress features, but this information is not generally used in federal reporting. A few states, however, still use visual ratings as the basis of their reports. Lower "roughness index" scores equate to a smoother road. Roads classified as poor typically have visible bumps and ruts leading to a rough ride. Long, smooth sections (greater than one mile in length) tend to dampen out short rough ones, so if a state has long, smooth sections in its database it can report very little "rough mileage" as a percent of the system.

The source of road roughness data is Table HM-64, Highway Statistics 2013 (http://www.fhwa.dot.gov/policyinformation/statistics.cfm), which shows miles by roughness, for several functional classes, for each state. This mileage is then converted into a percent, to account for different sizes of systems (rural Interstate, urban Interstate and rural other principal arterials) in each state. The national average is the weighted average, obtained by dividing the sum of all poor-rated mileage by the sum of all state-administered mileage.

***Rural Interstate Poor-Condition Mileage*:** Rural Interstate mileage is all mileage outside of urban areas. By convention, Interstate sections with an IRI roughness of greater than 170 inches of roughness per mile (about

three inches of vertical variation per 100 feet of road) are classified as "poor" in most reports. By comparison, sections with less than 60 inches of roughness per mile (about one inch of vertical deviation per 100 feet) would be classified as "excellent." (Delaware and Hawaii have no rural Interstate mileage and are not rated on this measure).

***Urban Interstate Poor-Condition Mileage*:** Urban Interstate mileage is all mileage inside census-defined urban areas. It is calculated the same way as rural Interstate mileage is calculated. The IRI cutoff for urban Interstates is the same as for rural Interstates: 170 inches per mile or higher, for "poor" mileage.

***Rural Other Principal Arterial Poor-Condition Mileage*:** Rural other principal arterials (ROPAs) are the major inter-city connectors, off the Interstate system, connecting different regions. They can be US-numbered and state-numbered roads, and sometimes toll roads or parkways. This system is generally a top priority of most state highway agencies because of its importance to the economic competitiveness of the state. By convention, ROPA sections with an IRI greater than 220 inches per mile of roughness (about four inches of vertical deviation per 100 feet) are classified as "poor" in most reports. The cutoff is higher than for Interstates since speeds on these roads are typically lower, resulting in a smoother trip.

Urbanized Area Congestion

Urbanized Area Congestion is measured as the "annual delay per auto commuter" (in hours). It is the extra time vehicles spend traveling at congested speeds rather than free-flow speeds. This delay typically occurs during peak periods and is measured for private vehicles. This metric was adopted because it provides a more complete measure of the effects of congestion, capturing aspects of the intensity, the duration and the extent of the congestion problem. In addition, this measure uses more-current data and is straightforward in both calculation and interpretation.

This measure of congestion differs from the two measures used in previous years, both of which focused only on the extent of urban congestion. In the prior (21st) *Annual Highway Report*, congestion was measured as the percent of the urban freeway system (Interstates plus freeways and expressways) that experienced operating speeds less than 85% of free-flow speeds during the peak periods (6:00–10:00 AM and 3:00–7:00 PM). These percentages were calculated using data from the *2012 Urban Mobility Report* (*UMR*) and several tables in the 2013 Highway Statistics series (HM-60, HM-71 and HM-73). In all reports prior to the *21st Annual Highway Report*, congestion was assessed for Interstates only (freeways and other expressways were not included) and was based on the ratio of traffic volume to the maximum carrying capacity of each road section. This ratio was calculated from data in Table HM-42 or Table HM-61 of the Highway Statistics series, tables which are no longer being published.

There are two data sources required to calculate the new metric: the *2015 Urban Mobility Scorecard* (*UMS*) and its supporting materials (http://mobility.tamu.edu/ums), and the 2010 US Census

(https://www.census.gov/geo/reference/ua/urban-rural-2010.html). The *UMS*, published jointly by the Texas A&M Transportation Institute and INRIX, provides 2014 empirical congestion data for 101 urbanized areas across the nation, as well as 2014 data estimates for the other 370 urbanized areas with populations above 50,000. Data items include "total delay" and "delay per auto commuter" for each urbanized area. The Census data are used to allocate the total delay for multi-state cities to each of the appropriate states.

Of the 471 urbanized areas in the *UMS*, 11 are in Puerto Rico and one is the District of Columbia, which we do not study. The Puerto Rico cities are excluded from the calculations, since this report is an assessment of state highway systems. Of the remaining 460 urbanized areas, 68 (including D.C.) are located in two or more states. Although D.C. is not a state, we do include the Maryland and Virginia portions of the urbanized area in the Maryland and Virginia congestion statistics. The percentages of the urbanized area populations in each state (as determined from Census data) are used to allocate the congestion data to the various states.

Once the urban area congestion data are proportioned by state, the "total delay" and the "delay per auto commuter" (weighted by the "total delay") for the urbanized areas within each state are totaled by state using MS Excel pivot tables. The weighted "delay per auto commuter" is then divided by the "total delay" to derive the state "delay per auto commuter."

Deficient Bridges

As a result of several major bridge disasters in the 1960s and 1970s, states are required to inspect bridges biennially (every year if a bridge is rated structurally deficient) and maintain uniform records of inspections. This data source, titled the *National Bridge Inventory* (*NBI*), provides information on deficient bridges. Bridges are classified as "deficient" if their structural elements score poorly ("structural deficient") or if they are no longer functionally adequate ("functionally inadequate") for the road system. On average, about one-half of "deficient" bridges are in each category. Since the *NBI* contains a mixture of bridges inspected at different times, some as long as two years ago, the "average" inspection age is about one year. So, a December 2014 summary from the Inventory would represent, on average, bridge condition as of December 2013.

While deficient bridge data are in the *NBI*, we have used the annual summary of bridge deficiencies prepared by *Better Roads*, a trade publication, as our source. This summary, published since 1979, contains very recent information, gathered from each state shortly before the end of each calendar year, using a proprietary survey sent to state bridge engineers. The 2014 *Better Roads* Bridge Inventory (http://www.equipmentworld.com/2014-better-roads-bridge-inventory/) contains data collected through October 2014.

Narrow Lanes on Rural Other Principal Arterials (ROPAs)

Narrow lanes on rural roads are a surrogate measure for safety, since data on other features such as sight distance, shoulder width or pavement edge drop-offs are not readily available. The standard lane width for most major rural roads is 12 feet, and it is unlikely that a major rural road would be improved without widening its lanes to that standard.

The source of lane width data is Table HM-53, Highway Statistics 2013 (http://www.fhwa.dot.gov/policyinformation/statistics.cfm), which shows the mileage of roads, by functional class, in various lane-width categories, by state. For our purpose, we use the percentage of mileage on the ROPA system with less than 12-foot lanes, to adjust for different system lengths in different states. The national average is a weighted average across all states. For 2013, Georgia and Wyoming used a different methodology to calculate lane widths than in previous years, methodologies that yielded significant changes in the percentage of narrow lanes. After contacting the respective state DOTs,[4] we found that they were still fine-tuning their methodologies, so we decided to use 2012 data for these two states to give time for the new methods to be fully integrated.

Fatality Rates

Road safety is a very important measure of system performance, and fatality rates are a key measure of safety. The overall state fatality rate has long been seen as a measure of state performance in road safety.

The fatality rate includes two components: a count of fatalities and a measure of travel, i.e. vehicle-miles. The sources of each are Tables FI-20 and VM-2, Highway Statistics 2013 (http://www.fhwa.dot.gov/policyinformation/statistics.cfm). Table FI-20 provides a count of fatalities by state and highway functional class and Table VM-2 provides an estimate of annual vehicle-miles of travel for each state by functional class. The national average fatality rates are the weighted averages across the states.

Overall Ratings

The 2013 overall ratings for each state are developed in several steps:

- First, the relative performance of each state on each of 11 performance measures is determined, by computing each state's "performance ratio." This is defined as the ratio of each state's measure to the weighted U.S. mean for the measure. The mathematical structure is as follows:

M_{is} = Measure "i" for state "s" (e.g., percent of rural Interstates in poor condition, for North Carolina)

R_{is} = Performance Ratio for measure "i", state "s"
= M_{is}/**M,** where **M** is the weighted average of M_{is} across the 50 states.

- The four financial performance ratios are combined to calculate the average financial performance. Here the performance ratios are adjusted for the average width of each state's system, on the belief that states with wider roads (those with more lanes per mile, on average) should be given some credit for their extra per-centerline-mile costs.

  Financial Performance (FP) for state "s" $= ((\sum_{1}^{4} R_{is})/4)^* (\mathbf{L}/L_s)$

  where L_s is the average SHA lanes-per-mile for measure "i" for state "s", and **L** is the weighted average of the SHA lanes-per-mile, over 50 states.

- The seven system performance ratios (six for Delaware and Hawaii, which have no rural Interstates) are combined to calculate the average system performance.

  System Performance (SP) for state "s" $= (\sum_{1}^{7} R_{is})/7$

- Then, financial performance and system performance are combined into an overall performance measure:

  Overall Performance for state "s" = (FP*4 + SP*7)/11

  (In lieu of 7 and 11, Delaware and Hawaii use 6 and 10 since they have no rural Interstates.)

  In final weighting, the average financial performance is weighted equally with the average system performance.

Since several state agencies are included in each state's reports, this report should *not* be viewed as a cost-effectiveness comparison of the state highway departments. Instead, it should be viewed as an assessment of how the state, as a whole, is managing the state-owned roads.

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Endnotes

1 S. Davis et al, Transportation Energy Data Book, Edition 33, Oak Ridge National Laboratory, July 2014. At www.cta.ornl.gov/data.

2 T. Lomax and D. Shrank, *2012 Urban Mobility Report*, Texas A & M University, College Station TX, March 2012. At http://mobility.tamu.edu/ums/.

3 D. Shrank, B. Eisele, T. Lomax and J. Bak, *2015 Urban Mobility Scorecard*, Texas A & M University, College Station TX, August 2015. At http://mobility.tamu.edu/ums/.

4 Correspondence with Scott Fusten at Georgia DOT on April 29, 2015, and Mark Wingate at Wyoming DOT on April 2, 2015.

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