Maine Transportation by the Numbers

MEETING THE STATE'S NEED FOR SAFE, SMOOTH AND EFFICIENT MOBILITY

FEBRUARY 2021

TRIP | A National Transportation Research Nonprofit

TRIPNET.ORG

Founded in 1971, TRIP ® of Washington, DC, is a nonprofit organization that researches, evaluates and distributes economic and technical data on surface transportation issues. TRIP is sponsored by insurance companies, equipment manufacturers, distributors and suppliers; businesses involved in highway and transit engineering and construction; labor unions; and organizations concerned with efficient and safe surface transportation.

MAINE KEY TRANSPORTATION FACTS

THE HIDDEN COSTS OF DEFICIENT ROADS

Driving on Maine roads that are deteriorated, congested and that lack some desirable safety features costs Maine drivers a total of $1.3 billion each year. TRIP has calculated the cost to the average motorist in the state's largest urban areas in the form of additional vehicle operating costs (VOC) as a result of driving on rough roads, the cost of lost time and wasted fuel due to congestion, and the financial cost of traffic crashes. The chart below details the cost of deficient roads statewide and for the average driver in the state's largest urban areas.

Location	VOC	Congestion	Safety	TOTAL
Bangor	$522	$541	$498	$1,561
Lewiston-Auburn	$374	$451	$448	$1,273
Portland	$531	$568	$293	$1,392
Maine Statewide	**$563 Million**	**$250 Million**	**$497 Million**	**$1.3 Bilion**

MAINE ROADS PROVIDE A ROUGH RIDE

Due to inadequate state and local funding, 44 percent of major roads and highways in Maine are in poor or mediocre condition. Driving on rough roads costs the average Maine driver $541 annually in additional vehicle operating costs – a total of $563 million statewide. The chart below details pavement conditions on major roads in the state's largest urban areas and statewide.

Location	Poor	Mediocre	Fair	Good
Bangor	24%	17%	12%	47%
Lewiston-Auburn	14%	17%	13%	56%
Portland	22%	24%	15%	40%
Maine Statewide	**23%**	**21%**	**14%**	**42%**

MAINE BRIDGE CONDITIONS

Thirteen percent of Maine's bridges are rated in poor/structurally deficient condition, the sixth highest rate in the nation. Bridges that are rated poor/structurally deficient have significant deterioration of the bridge deck, supports or other major components. Fifty-five percent of the state's bridges are rated in fair condition and the remaining 32 percent are in good condition. Most bridges are designed to last 50 years before major overhaul or replacement, although many newer bridges are being designed to last 75 years or longer. In Maine, 59 percent of the state's bridges were built in 1969 or earlier, the fifth highest share in the U.S. The chart below details bridge conditions statewide and in the state's largest urban areas.

	Number Poor/ Structurally Deficient	Share Poor/ Structurally Deficient	Number Fair	Share Fair	Number Good	Share Good	Total Bridges
Bangor	38	13%	175	60%	81	28%	294
Lewiston-Auburn	10	8%	62	47%	60	45%	132
Portland	27	8%	185	55%	124	37%	336
Maine Statewide	**325**	**13%**	**1,362**	**55%**	**786**	**32%**	**2,473**

MAINE ROADS ARE INCREASINGLY CONGESTED

Congested roads choke commuting and commerce and cost Maine drivers $250 million each year in the form of lost time and wasted fuel. In the most congested urban areas, drivers lose up to $568 and as many as 28 hours per year sitting in congestion. Due to the Covid-19 pandemic, vehicle travel in Maine dropped by as much as 40 percent in April 2020 (as compared to vehicle travel during the same month the previous year), but rebounded to 12 percent below the previous year's volume in November 2020. The TRIP report identifies Maine's 20 most congested corridor segments during typical morning and evening peak travel periods. The top ten are below.

Rank	Urban Area	Facility	From	To
1	Portland	Congress Street	I-295	Eastern Promenade
2	Portland	I-295	Route 1	Washington Ave.
3	Portland	Route 114	Route 112	Laurel Ridge Road
4	Portland	Route 25B (New Gorham Rd/Main St.)	Bartlett Road	Rochester St.
5	Portland	Route 22 (County Road)	Plowman Road	Sawmill Lane
6	Portland	Western Avenue	Maine Mall Road	I-295
7	Portland	Route 302	Brook Street	I-295
8	Portland	Route 1 Alt 1/Commercial St.	Fore River Pkwy	India Street
9	Portland	Route 100	Eastern Avenue	Route 100 Toll Plaza
10	Portland	Alt Route 1/Franklin Street	I-295	Commercial Street

MAINE TRAFFIC SAFETY AND FATALITIES

From 2015 to 2019, 783 people were killed in traffic crashes in Maine, an average of 157 fatalities each year. In 2019, Maine had 1.06 traffic fatalities for every 100 million miles traveled, lower than the national average of 1.11. In 2018, the fatality rate on Maine's non-interstate rural roads was more than three-and-a-half times higher than on all other roads in the state (1.39 fatalities per 100 million vehicle miles of travel vs. 0.37).

Traffic crashes imposed a total of $1.5 billion in economic costs in Maine in 2019 and traffic crashes in which a lack of adequate roadway safety features were likely a contributing factor imposed $497 million in economic costs. The chart below details the average number of people killed annually in traffic crashes in the state's largest urban areas between 2015 and 2019, and the cost of traffic crashes per driver.

Location	Average Fatalities 2015-2019	Safety Costs per Diver
Bangor	18	$498
Lewiston-Auburn	12	$448
Portland	21	$293

MAINE TRANSPORTATION FUNDING

The Maine State Legislature's Blue Ribbon Commission to Study and Recommend Funding Solutions for the State's Transportation System found the state faces an annual transportation funding shortfall of approximately $232 million. Assuming the federal government continues to provide approximately one-third of Maine's transportation funding, the state will need to address an annual funding gap of approximately $160 million, about two-thirds of $232 million. If the annual transportation funding need is met, the Commission recommended that Maine's existing reliance on bonding to supplement transportation funding should be reduced in a fiscally responsible manner.

The ability of revenue from Maine's motor fuel tax – a critical source of state transportation funds – to keep pace with the state's future transportation needs is likely to erode as a result of increasing vehicle fuel efficiency and the increasing use of electric vehicles. The average fuel efficiency of U.S. passenger vehicles increased from 20 miles per gallon in 2010 to 24.5 miles per gallon in 2020. Average fuel efficiency is expected to increase another 31 percent by 2030, to 32 miles per gallon, and increase 51 percent by 2040, to 37 miles per gallon. The share of electric vehicles of total passenger vehicle sales in the U.S. is expected to increase to five percent by 2023 and to 60 percent by 2040, by which time they will represent approximately 30 percent of the passenger vehicle fleet.

The current federal transportation legislation, Fixing America's Surface Transportation Act (FAST Act), was set to expire on September 30, 2020. Congress extended it by one year to September 30, 2021. The FAST Act is a major source of funding for road, highway and bridge repairs in Maine. Throughout the FAST-Act – fiscal years 2016 to 2021 – the program provided $1.2 billion to Maine for road repairs and improvements, an average of $197 million per year. From 2014 to 2018, the federal government provided $1.05 for road improvements in Maine for every $1.00 state motorists paid in federal highway user fees, including the federal state motor fuel tax.

From 2014 to 2018, federal funds provided for highway improvements were the equivalent of 45 percent of the amount of Maine state capital outlays on road, highway and bridge projects, including construction, engineering and right-of-way acquisition.

TRANSPORTATION AND ECONOMIC DEVELOPMENT

The health and future growth of Maine's economy is riding on its transportation system. Each year, $80.5 billion in goods are shipped to and from sites in Maine. The value of freight shipped to and from sites in Maine, in inflation-adjusted dollars, is expected to increase 99 percent by 2045 and 69 percent for goods shipped by trucks, placing an increased burden on the state's already deteriorated and congested network of roads and bridges. This anticipated growth in freight transport in Maine and the rest of the U.S. is a result of further economic growth, changing business and retail models, increasing international trade, and rapidly changing consumer expectations that place an emphasis on faster deliveries, often of smaller packages or payloads.

According to a report by the American Road & Transportation Builders Association, the design, construction and maintenance of transportation infrastructure in Maine support approximately 18,400 full-time jobs across all sectors of the state economy. These workers earn $609 million annually. Approximately 283,000 full-time jobs in Maine in key industries like tourism, retail sales, agriculture and manufacturing are completely dependent on the state's transportation network.

Sources of information for this report include the Federal Highway Administration (FHWA), the Maine State Legislature, the American Association of State Highway and Transportation Officials (AASHTO), the Bureau of Transportation Statistics (BTS), the U.S. Census Bureau, the Texas Transportation Institute (TTI), the American Road & Transportation Builders Association (ARTBA), and the National Highway Traffic Safety Administration (NHTSA). Coverage page photo credit: Thinkstock.

INTRODUCTION

Maine's roads, highways and bridges form vital transportation links for the state's residents, visitors and businesses, providing daily access to homes, jobs, shopping, natural resources and recreation. Modernizing Maine's transportation system is critical to quality of life and economic competitiveness in the Pine Tree State. Inadequate transportation investment, which will result in deteriorated transportation facilities and diminished access, will negatively affect Maine's economic competitiveness and quality of life.

The necessity of a reliable transportation system in Maine has been reinforced during the coronavirus pandemic, which has placed increased importance on the ability of a region's transportation network to support a reliable supply chain.

To accommodate population and economic growth, maintain its level of economic competitiveness and achieve further economic growth, Maine will need to maintain and modernize its roads, highways and bridges by improving the physical condition of its transportation network and enhancing the system's ability to provide efficient, reliable and safe mobility for residents, visitors and businesses. Making needed improvements to Maine's roads, highways, bridges and transit systems could also provide a significant boost to the state's economy by creating jobs in the short term and stimulating long-term economic growth as a result of enhanced mobility and access.

This report examines the condition, use and safety of Maine's roads, highways and bridges, and the state's future mobility needs. Sources of information for this report include the Federal Highway Administration (FHWA), the Maine State Legislature, the American Association of State Highway and Transportation Officials (AASHTO), the Bureau of Transportation Statistics (BTS), the U.S. Census Bureau, the Texas Transportation Institute (TTI), the American Road & Transportation Builders Association (ARTBA), and the National Highway Traffic Safety Administration (NHTSA).

In addition to statewide data, the TRIP report includes regional data for the Bangor, Lewiston-Auburn and Portland urban areas. An urban area is defined as a region's municipalities and surrounding suburbs for pavement condition and congestion data; bridge and traffic fatality data include a region's major counties.[1]

POPULATION, TRAVEL AND ECONOMIC TRENDS IN MAINE

Maine motorists and businesses require a high level of personal and commercial mobility. To foster quality of life and spur continued economic growth, it is critical that the state provide a safe and modern transportation system that can accommodate future growth in population, tourism, business, recreation and vehicle travel.

Maine's population grew to approximately 1.3 million residents in 2019, a five percent increase since 2000.[2] Maine had approximately one million licensed drivers in 2019.[3] From 2000 to 2019, Maine's gross domestic product (GDP), a measure of the state's economic output, increased by 21 percent, when adjusted for inflation.[4] U.S. GDP increased 45 percent during the same period.[5] In 2019, the state's transportation system carried 14.9 billion annual vehicle miles of travel (VMT), a five percent increase since 2013.[6] Due to the Covid-19 pandemic, vehicle travel in Maine dropped by as much as 40 percent in April 2020 (as compared to vehicle travel during the same month the previous year), but rebounded to 12 percent below the previous year's volume in November 2020.[7]

CONDITION OF MAINE ROADS

The life cycle of Maine's roads is greatly affected by the state and local governments' ability to perform timely maintenance and upgrades to ensure that road and highway surfaces last as long as possible.

The pavement data in this report, which is for all arterial and collector roads and highways, is provided by the Federal Highway Administration (FHWA), based on data submitted annually by the Maine Department of Transportation on the condition of major state and locally maintained roads and highways. Pavement data for Interstate highways and other principal arterials is collected for all system mileage, whereas pavement data for minor arterial and all collector roads and highways is based on sampling portions of roadways as prescribed by FHWA to insure the data collected is adequate to provide an accurate assessment of pavement conditions on these roads and highways.

Statewide, 44 percent of Maine's major roads are in poor or mediocre condition. Twenty-three percent of Maine's major locally and state-maintained roads are in poor condition and 21 percent are in mediocre condition.[8] Fourteen percent of Maine's major roads are in fair condition and the remaining 42 percent are in good condition.[9]

Twenty-six percent of Maine's major locally and state-maintained urban roads and highways have pavements rated in poor condition and 25 percent are in mediocre condition.[10] Sixteen percent

of Maine's major urban roads are rated in fair condition and the remaining 33 percent are rated in good condition.[11]

Twenty-two percent of Maine's major locally and state-maintained rural roads and highways have pavements rated in poor condition and 20 percent are in mediocre condition.[12] Fourteen percent of Maine's major rural roads are rated in fair condition and the remaining 44 percent are rated in good condition.[13]

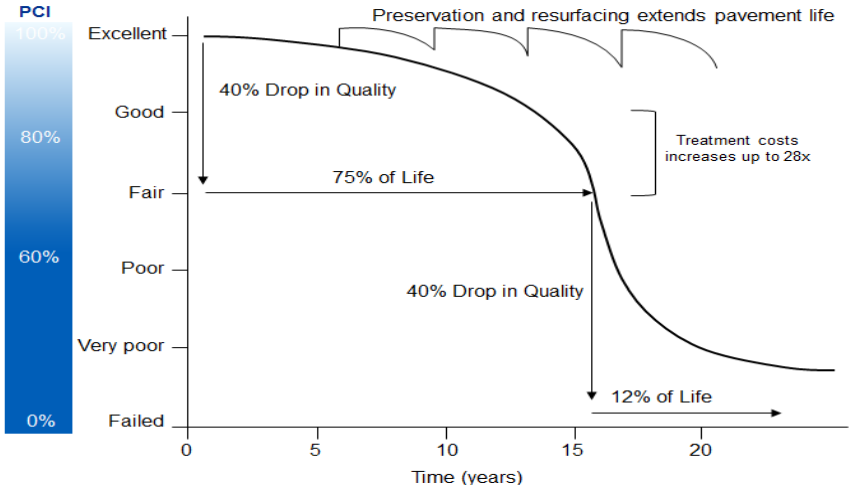
Chart 1. Pavement conditions on major roads in Maine's largest urban areas and statewide.

	Poor	Mediocre	Fair	Good
Rural Pavement	22%	20%	14%	44%
Urban Pavement	26%	25%	16%	33%
Statewide Pavement	**23%**	**21%**	**14%**	**42%**

Source: TRIP analysis of Federal Highway Administration data.

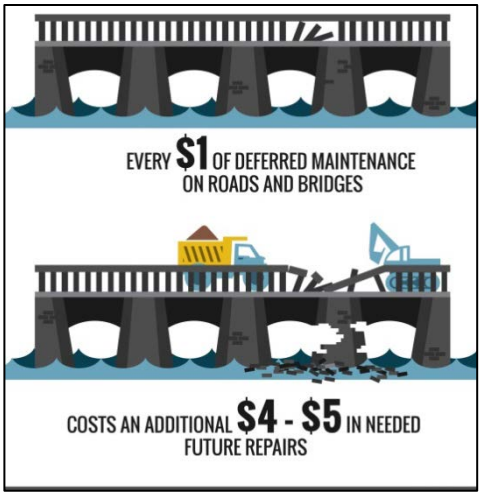
Pavement failure is caused by a combination of traffic, moisture and climate. Moisture often works its way into road surfaces and the materials that form the road's foundation. Road surfaces at intersections are more prone to deterioration because the slow-moving or standing loads occurring at these sites subject the pavement to higher levels of stress. It is critical that roads are fixed before they require major repairs because reconstructing roads costs approximately four times more than resurfacing them.[14] As roads and highways continue to age, they will reach a point of deterioration where routine paving and maintenance will not be adequate to keep pavement surfaces in good condition and costly reconstruction of the roadway and its underlying surfaces will become necessary.

Chart 2. Pavement Condition Cycle Time with Treatment and Cost.



Source: North Carolina Department of Transportation (2016). 2016 Maintenance Operations and Performance Analysis Report

Long-term repair costs increase significantly when road and bridge maintenance is deferred, as road and bridge deterioration accelerates later in the service life of a transportation facility and requires more costly repairs. A report on maintaining pavements found that every $1 of deferred maintenance on roads and bridges costs an additional $4 to $5 in needed future repairs.[15]



THE COST TO MOTORISTS OF ROADS IN INADEQUATE CONDITION

TRIP has calculated the additional cost to motorists of driving on roads in poor, mediocre or fair condition. When roads are in poor, mediocre or fair condition – which may include potholes, rutting or rough surfaces – the cost to operate and maintain a vehicle increases. These additional vehicle operating costs (VOC) include accelerated vehicle depreciation, additional vehicle repair costs, increased fuel consumption and increased tire wear. TRIP estimates that additional VOC borne by Maine motorists as a result of deteriorated road conditions is $563 million annually, an average of $541 per driver statewide.[16] The chart below details additional VOC per motorist in the state's largest urban areas.

Chart 3. Vehicle operating costs per motorist as a result of driving on deteriorated roads.

Location	VOC
Bangor	$522
Lewiston-Auburn	$374
Portland	$531
Maine Statewide	**$563 Million**

Source: TRIP estimates.

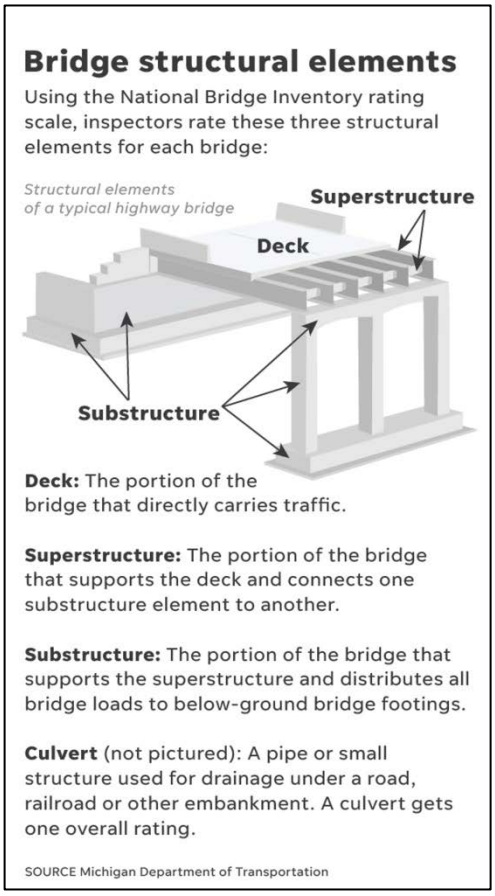
Additional vehicle operating costs have been calculated in the Highway Development and Management Model (HDM), which is recognized by the U.S. Department of Transportation and more than 100 other countries as the definitive analysis of the impact of road conditions on vehicle operating costs. The HDM report is based on numerous studies that have measured the impact of various factors, including road conditions, on vehicle operating costs.[17] The HDM study found that road deterioration increases ownership, repair, fuel and tire costs. The report found that deteriorated roads accelerate the pace of depreciation of vehicles and the need for repairs because the stress on the vehicle increases in proportion to the level of roughness of the pavement surface. Similarly, tire wear

and fuel consumption increase as roads deteriorate since there is less efficient transfer of power to the drive train and additional friction between the road and the tires.

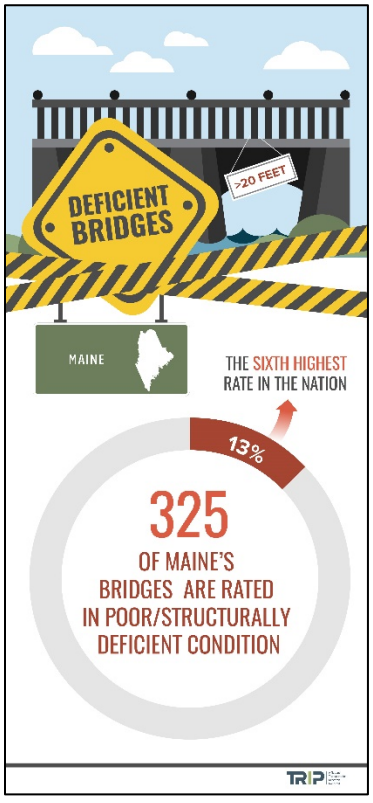
TRIP's additional VOC estimate is based on taking the average number of miles driven annually by a motorist, calculating current VOC based on AAA's driving cost estimates and then using the HDM model to estimate the additional VOC paid by drivers as a result of substandard roads.[18] Additional research on the impact of road conditions on fuel consumption by the Texas Transportation Institute (TTI) is also factored into TRIP's vehicle operating cost methodology.

BRIDGE CONDITIONS IN MAINE

Maine's bridges form key links in the state's highway system, providing communities and individuals access to employment, schools, shopping and medical facilities, and facilitating commerce and access for emergency vehicles.



Thirteen percent (325 of 2,473) of Maine's locally and state-maintained bridges are rated in poor/structurally deficient condition, the sixth highest share in the U.S.[19] This includes all bridges that are 20 feet or more in length. A bridge is deemed poor/structurally deficient if there is significant deterioration of the bridge deck, supports or other major components.



Bridges that are poor/structurally deficient may be posted for lower weight limits or closed if their condition warrants such action. Deteriorated bridges can have a significant impact on daily life. Restrictions on vehicle weight may cause many vehicles – especially emergency vehicles, commercial trucks, school buses and farm equipment – to use alternate routes to avoid posted bridges. Redirected trips also lengthen travel time, waste fuel and reduce the efficiency of the local economy.

Fifty-five percent of Maine's locally and state-maintained bridges have been rated in fair condition.[20] A fair rating indicates that a bridge's structural elements are sound but minor deterioration has occurred to the bridge's deck, substructure or superstructure. The remaining 32 percent of the state's bridges are rated in good condition.[21]

The chart below shows the condition of bridges statewide and in Maine's largest urban areas.

Chart 4. Bridge conditions statewide and in Maine's largest urban areas.

	Number Poor/ Structurally Deficient	Share Poor/ Structurally Deficient	Number Fair	Share Fair	Number Good	Share Good	Total Bridges
Bangor	38	13%	175	60%	81	28%	294
Lewiston-Auburn	10	8%	62	47%	60	45%	132
Portland	27	8%	185	55%	124	37%	336
Maine Statewide	**325**	**13%**	**1,362**	**55%**	**786**	**32%**	**2,473**

Source: TRIP analysis of Federal Highway Administration National Bridge Inventory (2018).

Most bridges are designed to last 50 years before major overhaul or replacement, although many newer bridges are being designed to last 75 years or longer. In Maine, 59 percent of the state's bridges were built in 1969 or earlier, the fifth highest share in the nation.[22]

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

TRAFFIC SAFETY IN MAINE

A total of 783 people were killed in Maine traffic crashes from 2015 to 2019, an average of 157 fatalities per year.[23]

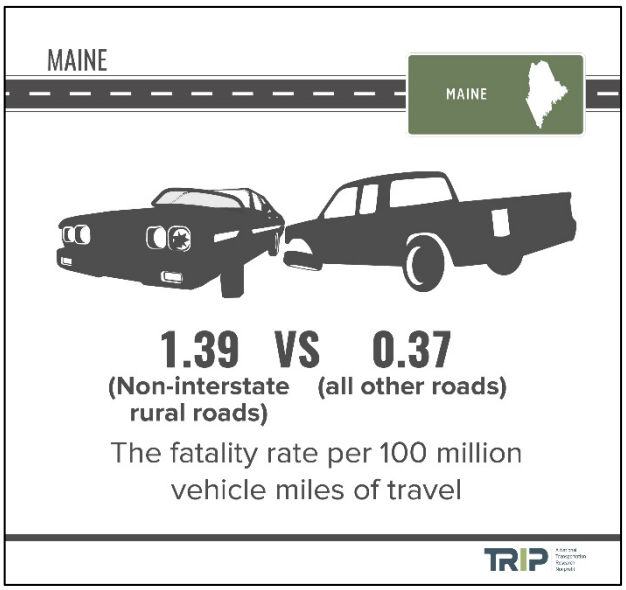
Chart 5. Traffic Fatalities in Maine 2015 – 2019.

Year	Fatalities
2015	156
2016	161
2017	172
2018	137
2019	157
TOTAL	**783**
AVERAGE	**157**

Source: National Highway Traffic Safety Administration.

Three major factors are associated with fatal vehicle crashes: driver behavior, vehicle characteristics and roadway features. It is estimated that roadway features are likely a contributing factor in approximately one-third of fatal traffic crashes. Roadway features that impact safety include the number of lanes, lane widths, lighting, lane markings, rumble strips, shoulders, guard rails, other shielding devices, median barriers and intersection design.

Maine's overall traffic fatality rate of 1.06 fatalities per 100 million vehicle miles of travel in 2019 is lower than the national average of 1.11.[24] The traffic fatality rate on the state's rural roads is disproportionately high. The fatality rate on Maine's non-interstate rural roads was more than three-and-a-half times higher than on all other roads in the state in 2018 (1.39 fatalities per 100 million vehicle miles of travel vs. 0.37).[25]



The chart below details the average number of people killed annually in traffic crashes in the state's largest urban areas between 2015 and 2019, and the cost of traffic crashes per driver.

Chart 6. Average fatalities between 2015 and 2019 and crash cost per driver.

Location	Average Fatalities 2015-2019	Safety Costs per Diver
Bangor	18	$498
Lewiston-Auburn	12	$448
Portland	21	$293

Source: TRIP analysis.

Traffic crashes in Maine imposed a total of $1.5 billion in economic costs in 2019.[26] TRIP estimates that roadway features were likely a contributing factor in approximately one-third of all fatal traffic crashes, resulting in $497 million in economic costs in Maine in 2019.[27] According to a 2015 National Highway Traffic Safety Administration (NHTSA) report, the economic costs of traffic crashes includes work and household productivity losses, property damage, medical costs, rehabilitation costs, legal and court costs, congestion costs and emergency services.[28]

Improving safety on Maine's roadways can be achieved through further improvements in vehicle safety; improvements in driver, pedestrian, and bicyclist behavior; and, a variety of improvements in roadway safety features. The severity of serious traffic crashes could be reduced through roadway improvements, where appropriate, such as converting intersections to roundabouts; removing or shielding roadside objects; the addition of left-turn lanes at intersections; the signalization of intersections; adding or improving median barriers; improved lighting; adding centerline or shoulder rumble strips; providing appropriate pedestrian and bicycle facilities, including sidewalks and bicycle lanes; providing wider lanes, wider and paved shoulders; upgrading roads from two lanes to four lanes; providing better road and lane markings; and updating rail crossings.

The U.S. has a $146 billion backlog in needed roadway safety improvements, according to a 2017 report from the AAA Foundation for Traffic Safety. The report found implementing these cost-effective and needed roadway safety improvements on U.S. roadways would save approximately 63,700 lives and reduce the number of serious injuries as a result of traffic crashes by approximately 350,000 over 20 years.

TRAFFIC CONGESTION IN MAINE

Increasing levels of traffic congestion cause significant delays in Maine, particularly in its larger urban areas, choking commuting and commerce. Traffic congestion robs commuters of time and money and imposes increased costs on businesses, shippers and manufacturers, which are often passed along to the consumer. Increased levels of congestion can also reduce the attractiveness of a location to a company when considering expansion or where to locate a new facility.

Based on data in the TTI Urban Mobility Report 2019, TRIP estimates the total value of lost time and wasted fuel in Maine is approximately $250 million a year. The chart below shows the number of hours lost annually for each driver in the state's largest urban areas, and the per-driver cost of lost time and wasted fuel due to congestion.

Chart 7. Annual hours lost to congestion and congestion costs per driver.

Location	Hours Lost	Congestion Cost
Bangor	26	$541
Lewiston-Auburn	22	$451
Portland	28	$568

Source: Texas Transportation Institute Urban Mobility Report, 2019.

TRIP has identified and ranked the most congested corridors in Maine based on an analysis of delays during typical morning and evening peak travel periods, as reported by Google.[29] The 20 most congested corridors are listed below.

Chart 8. Most congested Maine corridors.

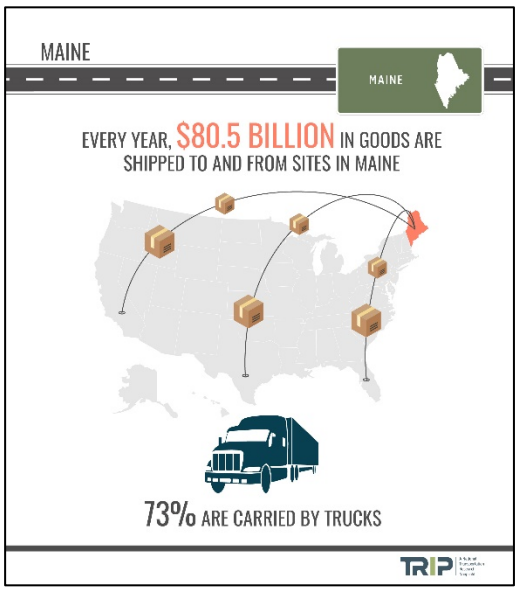
Rank	Urban Area	Facility	From	To
1	Portland	Congress Street	I-295	Eastern Promenade
2	Portland	I-295	Route 1	Washington Ave.
3	Portland	Route 114	Route 112	Laurel Ridge Road
4	Portland	Route 25B (New Gorham Rd/Main St.)	Bartlett Road	Rochester St.
5	Portland	Route 22 (County Road)	Plowman Road	Sawmill Lane
6	Portland	Western Avenue	Maine Mall Road	I-295
7	Portland	Route 302	Brook Street	I-295
8	Portland	Route 1 Alt 1/Commercial St.	Fore River Pkwy	India Street
9	Portland	Route 100	Eastern Avenue	Route 100 Toll Plaza
10	Portland	Alt Route 1/Franklin Street	I-295	Commercial Street
11	Bangor	Route 2/I-395	Target Industrial Cir.	I-95
12	Portland	Route 25 (William Clark Drive)	Bartlett Road	Westbrook Arterial
13	Portland	Route 26	Allen Ave.	I-295
14	Lewiston/Auburn	Court St./Main St.	Minot Avenue	Route 126
15	Portland	State Street	Forest Ave	York Street
16	Bangor	Main Street (Route 1A)	Old County Road	Route 2
17	Bangor	Route 2	6th Street	Broadway
18	Portland	Broadway	Route 1	Casco Bay Bridge
19	Portland	Route 1/9	Hagis Parkway	Maple Ave
20	Portland	Payne Road	Route 114	Western Ave

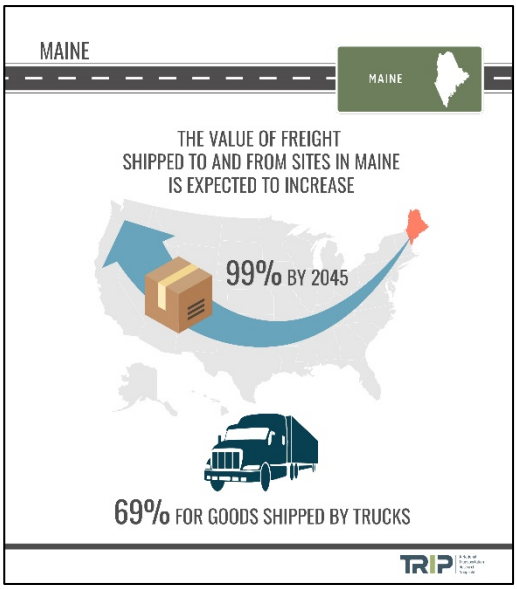
Source: TRIP analysis of typical morning and evening peak travel periods as reported by Google.

TRANSPORTATION AND ECONOMIC GROWTH

Today's culture of business demands that an area have well-maintained and efficient roads, highways and bridges if it is to remain economically competitive. Global communications and the impact of free trade in North America and elsewhere have resulted in a significant increase in freight movement, making the quality of a region's transportation system a key component in a business's ability to compete locally, nationally and internationally.

Businesses have responded to improved communications and the need to cut costs with a variety of innovations including just-in-time delivery, increased small package delivery, demand-side inventory management and e-commerce. The result of these changes has been a significant improvement in logistics efficiency as firms move from a push-style distribution system, which relies on large-scale warehousing of materials, to a pull-style distribution system, which relies on smaller, more strategic movement of goods. These improvements have made mobile inventories the norm, resulting in the nation's trucks literally becoming rolling warehouses.





Highways are vitally important to continued economic development in Maine. As the economy expands, creating more jobs and increasing consumer confidence, the demand for consumer and business products grows. In turn, manufacturers ship greater quantities of goods to market to meet this demand, a process that adds to truck traffic on the state's highways and major arterial roads.

Every year, $80.5 billion in goods are shipped to and from sites in Maine.[30] Seventy-three percent of the goods shipped annually to and from sites in Maine are carried by truck and another 17 percent are carried by courier services or multiple-mode deliveries, which include trucking.[31] The value of freight shipped to and from sites in Maine, in inflation-adjusted dollars, is expected to increase 99 percent by 2045 and 69 percent for goods shipped by trucks.[32]

The ability of the nation's freight transportation system to efficiently and safely accommodate the growing demand for freight movement could be hampered by inadequate transportation capacity, a lack of adequate safety features on some transportation facilities, institutional barriers to enhancing the nation's freight facilities, a lack of adequate funding for needed improvements to the freight network and a shortage of drivers.

The need to improve the U.S. freight network is occurring at a time when the nation's freight delivery system is being transformed by advances in vehicle autonomy, manufacturing, warehousing and supply chain automation, increasing e-commerce, and the growing logistic networks being developed by Amazon and other retail organizations in response to the demand for a faster and more responsive delivery and logistics cycle.

Investments in transportation improvements in Maine play a critical role in the state's economy. A report by the American Road & Transportation Builders Association found that the design, construction and maintenance of transportation infrastructure supports the equivalent of approximately 18,000 full-time jobs across all sectors of the state economy, earning these workers approximately $609 million annually.[33] These jobs include approximately 9,000 full-time jobs directly involved in transportation infrastructure construction and related activities. Spending by employees and companies in the transportation design and construction industry supports an additional 9,200 full-time jobs in Maine.[34] Transportation construction in Maine contributes an estimated $111 million annually in state and local income, corporate and unemployment insurance taxes and the federal payroll tax.[35]

Approximately 283,000 full-time jobs in Maine in key industries like tourism, retail sales, agriculture and manufacturing are dependent on the quality, safety and reliability of the state's transportation infrastructure network. These workers earn $10.1 billion in wages and contribute an estimated $1.8 billion in state and local income, corporate and unemployment insurance taxes, and the federal payroll tax.[36]

Local, regional and state economic performance is improved when a region's surface transportation system is expanded or repaired. This improvement comes as a result of the initial job creation and increased employment created over the long-term because of improved access, reduced transport costs and improved safety.

Increasingly, companies are looking at the quality of a region's transportation system when deciding where to re-locate or expand. Regions with congested or poorly maintained roads may see businesses relocate to areas with a smoother, more efficient and more modern transportation system. Highway accessibility was ranked the number one site selection factor in a 2020 survey of corporate executives by Area Development Magazine.[37]

TRANSPORTATION FUNDING IN MAINE

Investment in Maine's roads, highways and bridges is funded by local, state and federal governments. A lack of sufficient funding at all levels will make it difficult to adequately maintain and improve the state's existing transportation system.

The Maine State Legislature's Blue Ribbon Commission to Study and Recommend Funding Solutions for the State's Transportation System found the state faces an annual transportation funding shortfall of approximately $232 million. Assuming the federal government continues to provide approximately one-third of Maine's transportation funding need, the state will need to address a funding gap of approximately $160 million, about two-thirds of $232 million.[38] If the annual transportation funding need is met, the Commission recommended that Maine's existing reliance on bonding to supplement transportation funding should be reduced in a fiscally responsible manner.

Revenue from Maine's motor fuel tax – a critical source of state transportation funding -- is likely to erode as a result of increasing vehicle fuel efficiency and the increasing use of electric vehicles. The average fuel efficiency of U.S. passenger vehicles increased from 20 miles per gallon in 2010 to 24.5 miles per gallon in 2020. Average fuel efficiency is expected to increase another 31 percent by 2030, to 32 miles per gallon, and increase 51 percent by 2040, to 37 miles per gallon.[39] The share of electric vehicles of total passenger vehicle sales in the U.S. is expected to increase to five percent by 2023 and 60 percent by 2040, by which time they will represent approximately 30 percent of the passenger vehicle fleet.[40]

Most federal funds for highway and transit improvements in Maine are provided by federal highway user fees, largely an 18.4 cents-per-gallon tax on gasoline and a 24.4 cents-per-gallon tax on diesel fuel (additional revenue is generated by fees on the sale of large trucks, a highway use tax levied on vehicles in excess of 55,000 pounds and a tax on the sale of large truck tires). Since 2008 revenue into the federal Highway Trust Fund has been inadequate to support legislatively set funding levels so Congress has transferred approximately $53 billion in general funds and an additional $2 billion from a related trust fund into the federal Highway Trust Fund.[41]

Signed into law in December 2015, the five-year Fixing America's Surface Transportation Act (FAST Act) was scheduled to expire on September 30, 2020. Congress extended the legislation for one year to September 30, 2021. The FAST Act provides modest increases in federal highway and transit spending. The bill also provides states with greater funding certainty and streamlines the federal project approval process. But the FAST Act does not provide adequate funding to meet the nation's

need for highway and transit improvements and does not include a long-term and sustainable funding source.

The FAST-Act is a major source of funding for road, highway and bridge repairs in Maine. Throughout the FAST-Act – fiscal years 2016 to 2021 – the program provided $1.2 billion to Maine for road repairs and improvements, an average of $197 million per year. From 2014 to 2018, the federal government provided $1.05 for road improvements in Maine for every $1.00 state motorists paid in federal highway user fees, including the federal state motor fuel tax.

Federal funds are a critical source of highway investment in Maine and represent a significant share of funds used by the state for major road, highway and bridge repairs and improvements. From 2014 to 2018, federal funds provided for highway improvements were the equivalent of 45 percent of the amount of Maine state capital outlays on road, highway and bridge projects, including construction, engineering and right-of-way acquisition.

Maine federal-aid eligible roads, bridges and highways include the most critical routes in the state, including the Interstate Highway System, major highways and important rural and urban routes. Federal-aid eligible roadways in Maine account for 30 percent of state lane-miles and carry 82 percent of all vehicle miles of travel in the state. Fifty-five percent of Maine's bridges by count, and 82 percent of bridges measured by deck area are eligible for Federal aid.

According to the Status of the Nation's Highways, Bridges, and Transit, 23rd Edition, submitted to Congress by the United States Department of Transportation (USDOT) in 2019, the nation faces a $786 billion backlog in needed repairs and improvements to the nation's roads, highways and bridges.[42] This backlog includes $435 billion for highway rehabilitation; $125 billion for bridge rehabilitation; $120 billion for system expansion and $106 billion for system enhancement.[43] The USDOT report found that the nation's current $105 billion investment in roads, highways and bridges by all levels of government should be increased by 29 percent to $136 billion annually to improve the conditions of roads, highways and bridges, relieve traffic congestion and improve traffic safety.

CONCLUSION

As Maine works to enhance its thriving, growing and dynamic state, it will be critical that it is able to address the most significant transportation issues by providing a 21st century network of roads, highways, bridges and transit that can accommodate the mobility demands of a modern society and allow for economic recovery and growth.

Maine will need to modernize its surface transportation system by improving the physical condition of its transportation network and enhancing the system's ability to provide efficient, safe and reliable mobility for residents, visitors and businesses. Making needed improvements to the state's roads, highways, bridges and transit systems would provide a significant boost to the economy by creating jobs in the short term and stimulating long-term economic growth as a result of enhanced mobility and access.

Numerous projects to improve the condition and expand the capacity of Maine's roads, highways, bridges and transit systems will not be able to proceed without a substantial boost in local, state or federal transportation funding. If Maine is unable to complete needed transportation projects it will hamper the state's ability to improve the condition and efficiency of its transportation system or enhance economic development opportunities and quality of life.

# # #

ENDNOTES

[1] Bridge condition data and safety data for each urban area includes the counties noted: Bangor – Penobscot County; Lewiston-Auburn – Androscoggin County; Portland – Cumberland County.
[2] U.S. Census Bureau (2018).
[3]Highway Statistics (2019). Federal Highway Administration. DL-1C.
[4] TRIP analysis of Bureau of Economic Analysis data (2020). https://apps.bea.gov/itable/iTable.cfm?ReqID=70&step=1#reqid=70&step=1&isuri=1
[5] Ibid.
[6] U.S. Department of Transportation - Federal Highway Administration: Highway Statistics 2019 and analysis of Federal Highway Administration Traffic Volume Trends (2021) https://www.fhwa.dot.gov/policyinformation/travel_monitoring/tvt.cfm
[7] Federal Highway Administration – Traffic Volume Trends. https://www.fhwa.dot.gov/policyinformation/travel_monitoring/tvt.cfm
[8] Federal Highway Administration (2020). Pavement condition data is for 2019.
[9] Ibid.
[10] Ibid.
[11] Ibid.
[12] Ibid.
[13] Ibid.
[14] Selecting a Preventative Maintenance Treatment for Flexible Pavements. R. Hicks, J. Moulthrop. Transportation Research Board. 1999. Figure 1.
[15] Pavement Maintenance, by David P. Orr, PE Senior Engineer, Cornell Local Roads Program, March 2006.
[16] TRIP calculation.
[17] Highway Development and Management: Volume Seven. Modeling Road User and Environmental Effects in HDM-4. Bennett, C. and Greenwood, I. 2000.
[18] Your Driving Costs. American Automobile Association. 2019.
[19] Federal Highway Administration National Bridge Inventory. 2020.
[20] Ibid.
[21] Ibid
[22] TRIP analysis of Federal Highway Administration National Bridge Inventory data (2020).
[23] Federal Highway Administration National Highway Traffic Safety Administration, 2015-2019.
[24] TRIP analysis of National Highway Traffic Safety Administration and Federal Highway Administration data (2021). Data is for 2019.
[25] TRIP analysis of National Highway Traffic Safety Administration and Federal Highway Administration data (2020).
[26] TRIP estimate based on NHTSA report "The Economic and Societal Impact of Motor Vehicle Crashes, 2010 (Revised), 2016. P. 146.
[27] Ibid.
[28] The Economic and Societal Impact of Motor Vehicle Crashes, 2010 (Revised) (2015). National Highway Traffic Safety Administration. P. 1. https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/812013
[29] TRIP analysis based on typical morning and evening peak travel periods as reported by Google.
[30] TRIP analysis of Bureau of Transportation Statistics, U.S. Department of Transportation. 2016 Commodity Flow Survey, State Summaries.
[31] Ibid.
[32] Ibid.
[33] American Road & Transportation Builders Association (2015). The 2015 U.S. Transportation Construction Industry Profile. https://www.transportationcreatesjobs.org/pdf/Economic_Profile.pdf
[34] Ibid.
[35] Ibid
[36] Ibid.
[37] Area Development Magazine (2020). 34th Annual Survey of Corporate Executives: Availability of Skilled Labor New Top Priority. https://www.areadevelopment.com/Corporate-Consultants-Survey-Results/Q1-2020/34th-annual-corporate-survey-16th-annual-consultants-survey.shtml
[38] Office of Policy and Legal Analysis (2019). Blue Ribbon Commission to Study and Recommend Funding Solutions for the State's Transportation System. P. 6. https://legislature.maine.gov/doc/3813
[39] KPMG. (2019). Evaluating Sustainable Transportation Funding Options.

[40] BloombergNEF (2019) New Energy Outlook 2019. https://about.bnef.com/new-energy-outlook/
[41] "Surface Transportation Reauthorization and the Solvency of the Highway Trust Fund," presentation by Jim Tymon, American Association of State Highway and Transportation Officials (2014).
[42] United States Department of Transportation (2015). 2015 Status of the Nation's Highways, Bridges, and Transit: Conditions and Performance. Executive Summary, Chapter 8. https://www.fhwa.dot.gov/policy/2015cpr/es.cfm#8h
[43] Ibid.