Keep Moving Montana Forward:

Progress and Challenges in Achieving a 21st Century Transportation System

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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

Executive Summary

Montana's extensive system of roads, highways and bridges provides the state's residents, visitors and businesses with a high level of mobility. As the backbone of the Treasure State's economy, Montana's surface transportation system plays a vital role in the state's economic well-being and is an integral part of what makes Montana an attractive place to live, work and do business.

Despite additional state and federal transportation investment, some segments of Montana's transportation system are deteriorated, lack some desirable roadway safety features or do not have the level of reliability needed to fully support economic development, particularly on routes that are relied upon by the state's growing energy extraction industry or its tourism industry, creating challenges for Montana's residents, visitors, businesses and state and local governments. This report looks at the condition and use of Montana's system of roads, highways and bridges and provides information on the state's top 20 transportation challenges and the improvements needed to address them.

An adequate and reliable source of transportation funding is critical to providing the system of roads, highways and bridges that can support commerce within Montana and connect the state to markets around the globe, while providing the safe, smooth and efficient mobility that residents require. The increased transportation funding provided by the state legislature's passage of HB 473 in 2017 (the Bridge and Road Safety and Accountability Act -BaRSAA), combined with additional federal funding provided by the passage of the federal Infrastructure Investment and Jobs Act (IIJA) in 2021, has allowed Montana to accelerate projects to improve traffic safety, relieve congestion and improve the condition of roads, highways and bridges. But, while current transportation investment levels have allowed Montana to make progress, the state still faces challenges in accommodating growing passenger and freight traffic, and providing needed roadway safety improvements and road, highway and bridge repairs.

As Montana works to build and support a robust and diverse economy, it will need to modernize its transportation system by improving the physical condition of its roads, highways and bridges, and enhancing the system's ability to provide safe, efficient and reliable mobility to the state's residents, visitors and businesses. Making needed improvements to Montana's roads, highways and bridges would provide a significant boost to the state's economy by stimulating short and long-term economic growth.

TRIP's "Keep Moving Montana Forward" report examines the mobility, efficiency, condition and safety of Montana's surface transportation system, the impact of HB 473, the impact of the federal Infrastructure Investment and Jobs Act and the challenges Montana faces to accommodate future transportation growth and sustain adequate state funding. Sources of information for this report include the Montana Department of Transportation (MDT), the Federal Highway Administration (FHWA), 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).

MONTANA'S TRANSPORTATION FUNDING & CHALLENGES

Investment in Montana's roads, highways and bridges is funded by local, state and federal governments. Montana faces significant challenges on many of the state's most critical transportation routes, including the need to add capacity to support economic development, to improve roadway safety and to address pavement and bridge deterioration.

To address a lack of adequate transportation funding, in 2017, the Montana legislature passed the Bridge and Road Safety and Accountability Act (BaRSAA), which incrementally increased motor fuel taxes

over a period of six years. The revenue generated from this increase is restricted solely for the construction and maintenance of Montana's state and local roads and bridges. Local governments are eligible for 65 percent of the new revenue, while the Montana Department of Transportation (MDT) receives the remaining 35 percent to provide matching funds for Federal Aid Highway dollars. When fully implemented, BaRSAA is estimated to generate approximately $40 million in additional road and bridge funding annually, providing critical infrastructure funding for local governments and enabling MDT to match and leverage more than $100 million in federal funds.

In June 2022, significant flooding occurred in Southwest and South-Central Montana as a result of heavy rains and an unusually high June snowpack, washing out portions of roadways and damaging bridges, resulting in $2.9 million in damages to routes including US 89 and 212, MT 78 and Highway 419 (Nye Road).

The level of highway investment in Montana is likely to increase further as a result of the five-year federal Infrastructure Investment and Jobs Act (IIJA), signed into law by President Biden in November 2021. The IIJA will provide $3.26 billion in state funds for highway, bridge and transit investments in Montana over the next five years, including a 33% funding increase in FY 2022. IIJA investment in Montana's roads and transit system will add an additional $627 million in state GDP each year. The increased economic activity will benefit Montana residents – increasing disposable income by $230 million each year, an average of $478 per household.

MDT has identified the 20 projects below as its top challenges. A full description of each project is included in the body of the report.

RANK	ROUTE	LOCATION	NEEDED IMPROVEMENT
1	Load Posted Bridges	Statewide	Bridge replacement or rehabilitation to address deterioration and aging
2	US 191	Four Corners to Beaver Creek	Capacity expansion and improvements
3	Culvert Replacement	Statewide	Culverts across the state need replacement due to poor condition
4	I-90	Billings	Capacity expansion, new interchanges
5	I-90	St. Regis to Missoula	Pavement rehabilitation and preservation, bridge replacement and deck treatments
6	I-90	Hardin to Wyoming	Pavement rehabilitation and preservation, bridge replacement and deck treatments
7	I-90	Idaho to St. Regis	Pavement rehabilitation, preservation and reconstruction
8	I-15	Great Falls to Sweetgrass	Bridge replacements, interchange capacity expansion and roadway improvement
9	I-94	Miles City to North Dakota	Pavement rehabilitation and preservation, bridge replacement and deck treatments
10	I-90	Bozeman	Capacity improvements to address seasonal congestion
11	I-15	Helena to Great Falls	Interchange capacity and roadway deterioration, bridge replacement and deck treatments
12	US 89	Livingston to Gardner	Capacity improvements to address seasonal congestion
13	US 2	Kalispel to East Glacier	Pavement rehabilitation, bridge replacements
14	MT 287	Virginia City to Sheridan	Major capital improvements needed to bring roadway to current design standards
15	Billings Bypass	Billings	Additional bypass segments need to be completed
16	US 93	Idaho to Florence	Pavement rehabilitation and reconstruction, bridge replacement
17	MT 7		Reconstruction projects to bring roadway to current design standards
18	US 12	Lewis & Clark County	Capacity improvement and pavement rehabilitation
19	US 191	Mobridge	Due to re-occurring landslides, one segment of this road is a gravel surface, three areas need reconstruction
20	US 87	Armington Jct. to Raynesford	Improvements to enhance capacity, reduce hazards and address deterioration

ROAD CONDITIONS & EXTRA VEHICLE OPERATING COSTS IN MONTANA

Statewide, 30 percent of Montana's major roads are in poor or mediocre condition. Thirteen percent of Montana's major locally and state-maintained roads are in poor condition and 17 percent are in mediocre condition. Sixteen percent of Montana's major roads are in fair condition and the remaining 54 percent are in good condition. Driving on rough roads costs the average Montana driver $526 annually in additional vehicle operating costs – a total of $427 million statewide. These additional vehicle operating costs (VOC) include accelerated vehicle depreciation, additional vehicle repair costs, increased fuel consumption and increased tire wear.

The chart below details pavement conditions on major roads in the state's largest urban areas and the extra vehicle operating costs associated with driving on rough roads.

Location	Poor	Mediocre	Fair	Good	VOC
Billings	32%	21%	13%	33%	$743
Great Falls	31%	23%	10%	36%	$731
Missoula	29%	20%	9%	42%	$678
MONTANA STATEWIDE	**13%**	**17%**	**16%**	**54%**	**$526**

BRIDGE CONDITIONS IN MONTANA

Seven percent of Montana's bridges are rated in poor/structurally deficient condition. Bridges that are rated poor/structurally deficient have significant deterioration of the bridge deck, supports or other major components. Sixty-two percent of the state's bridges are rated in fair condition and the remaining 31 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 Montana, 41 percent of the state's bridges are 50 years old or more. The chart below details bridge conditions statewide and in the state's largest urban areas.

	POOR/STRUCTURALLY DEFICIENT		FAIR		GOOD		TOTAL
	Number	Share	Number	Share	Number	Share	BRIDGES
Billings	2	1%	212	74%	70	24%	288
Great Falls	7	4%	105	56%	75	40%	187
Missoula	17	8%	112	54%	77	37%	206
MONTANA STATEWIDE	**367**	**7%**	**3,287**	**62%**	**1,624**	**31%**	**5,278**

TRAFFIC SAFETY IN MONTANA

From 2017 to 2021, 1,008 people were killed in traffic crashes in Montana. The state's 2021 traffic fatality rate of 1.77 fatalities for every 100 million miles traveled is the fifth highest rate in the country and significantly higher than the national average in 2021 of 1.35. The fatality rate on Montana's non-Interstate rural roads in 2020 was more than two and a half times higher than all other roads in the state (2.58 per 100 million vehicle miles of travel vs. 0.96). And, while 49 percent of vehicle travel in the state takes place on rural non-Interstate roads, 72 percent of fatalities occur on rural non-Interstate Montana roads.

Improving safety on Montana'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.

Nationwide, traffic fatalities began to increase dramatically in 2020 even as vehicle travel rates plummeted due to the COVID-19 pandemic, and the number of fatalities continued to increase in 2021. The number of fatalities in Montana increased 32 percent from 2019 to 2021, from 184 to 243, and the state's fatality rate per 100 million VMT increased by 24 percent during that time, from 1.43 to 1.77. This dramatic increase in the number of fatalities and the rate of fatalities per 100 million VMT happened while vehicle travel in the state increased by seven percent overall from 2019 to 2021.

MONTANA TRAFFIC FATALITY AND VEHICLE MILES OF TRAVEL (VMT) DATA				
	2019	2020	2021	2019-2021 Change
Traffic Fatalities	184	213	243	+32%
Fatalities per 100 Million VMT	1.43	1.76	1.77	+24%
VMT (Billions)	12.9	12.1	13.8	+7%

In early 2022 the U.S. Department of Transportation adopted a comprehensive National Roadway Safety Strategy, a roadmap for addressing the nation's roadway safety crisis based on a Safe System approach. The Safe System approach, which is also being adopted by state and local transportation agencies has five objectives: Safer People, Safer Roads, Safer Vehicles, Safer Speeds, and improved Post-Crash Care.

Traffic crashes in Montana imposed a total of $1.2 billion in economic costs in 2020. TRIP estimates that roadway features, while not the primary factor, were likely a contributing factor in approximately one-third of all fatal traffic crashes, resulting in $400 million in economic costs in Montana in 2020. These costs include work and household productivity losses, property damage, medical costs, rehabilitation costs, legal and court costs, congestion costs, and emergency services.

TRAFFIC RELIABILITY IN MONTANA

Congested roads, highways and bottlenecks choke commuting and commerce and keep Montana residents and visitors from efficiently getting to their destination. From 2000 to 2019, vehicle travel in Montana increased by 30 percent. Due to the COVID-19 pandemic, vehicle travel in Montana dropped by as much as 31 percent in April 2020 (as compared to vehicle travel during the same month the previous year) but in 2021 increased to seven percent above 2019 levels.

A lack of traffic reliability on Montana's major highways and roads hampers the state's ability to support economic development and quality of life by reducing the reliability and efficiency of personal and commercial travel, including the transport of goods and services. Traffic congestion robs commuters of time and money and imposes increased costs on businesses, shippers and manufacturers, which are often passed along to consumers. Increased levels of congestion can also reduce the attractiveness of a location when a company is considering expansion or deciding where to locate a new facility.

FREIGHT TRANSPORTATION IN MONTANA

The health and future growth of Montana's economy is riding on its surface transportation system. Each year, 82.4 million tons of freight are shipped to, from or through Montana. Sixty percent of the goods shipped annually to and from sites in Montana are carried by truck and another 14 percent are carried by courier services or multiple-mode deliveries, which include trucking.

The amount of freight transported in Montana and the rest of the U.S. is expected to increase significantly as 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.

THE IMPACT OF TRANSPORTATION INVESTMENT ON ECONOMIC GROWTH IN MONTANA

According to a report by the American Road & Transportation Builders Association, the design, construction and maintenance of transportation infrastructure in Montana supports approximately 17,000 full-time jobs across all sectors of the economy. These workers earn $586 million annually. Approximately 214,000 full-time jobs in Montana 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 Montana Department of Transportation (MDT), the American Association of State Highway and Transportation Officials (AASHTO), the American Road and Transportation Builders Association (ARTBA), the Bureau of Transportation Statistics (BTS), the U.S. Census Bureau, the Texas Transportation Institute (TTI) and the National Highway Traffic Safety Administration (NHTSA). All data used in the report are the most recent available. Cover photo credit: Mark Fagan.

Introduction

Montana's surface transportation system provides a vital link for the state's residents, visitors and businesses, providing daily access to homes, jobs, shopping, natural resources and recreation. Supporting quality of life and a robust economy in Montana requires that the state provide an efficient, safe and well-maintained transportation system that allows for a high level of accessibility, connectivity and safety.

Montana relies on a diverse economy including tourism, agriculture, forestry, mining and energy extraction. A safe, well-maintained and reliable network of roads and bridges is critical to each of these sectors and to the economic health of the state and the nation. Deteriorated roads, highways and bridges, a lack of adequate roadway safety features, and highways that lack adequate capacity to support economic development opportunities are a detriment to the state's residents, visitors and businesses because they hamper mobility and cause delays, reduce economic productivity and competitiveness, and increase costs of operating vehicles for individuals and businesses because of the increased wear and tear caused by deficient pavements.

Adequate investment in Montana's transportation network will help enhance economic development opportunities, improve business productivity, and make it easier and more reliable for the public to get to and from destinations including work, home, school, shopping and social events.

Population, Travel and Economic Trends in Montana

Montana residents and businesses require a high level of personal and commercial mobility. Population increases and economic growth in the state have resulted in an increase in vehicle miles of travel (VMT) and an increased demand for mobility and connectivity. To foster quality of life and spur continued economic growth, it will be critical that Montana provide an efficient, safe and modern transportation system that can accommodate future growth in population, tourism, business, recreation and vehicle travel.

Montana's population has grown steadily, reaching approximately 1.1 million residents in 2021, a 22 percent increase since 2000.[1] Montana experienced the third highest rate of population growth from 2020 to 2021, at 1.7 percent, according to the U.S. Census Bureau.[2] Montana had approximately 827,000 licensed drivers in 2020.[3]

From 2000 to 2021, Montana's gross domestic product (GDP), a measure of the state's economic output, increased by 48 percent when adjusted for inflation.[4] U.S. GDP, adjusted for inflation, increased 48 percent during this period.[5]

From 2000 to 2019 (the last year not impacted by the pandemic), annual VMT in Montana increased by 30 percent, from approximately 9.9 billion miles traveled annually to approximately 12.9 billion miles traveled annually.[6] Montana vehicle travel decreased to 12.1 billion miles traveled in 2020 as a result of the pandemic, then rebounded in 2021 to seven percent above 2019 pre-pandemic levels at 13.8 billion miles traveled.[7]

Road Conditions in Montana

The life cycle of Montana's roads is greatly affected by 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 MDT 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

ensure the data collected is adequate to provide an accurate assessment of pavement conditions on these roads and highways.

Thirteen percent of Montana's major locally and state-maintained roads and highways have pavements rated in poor condition and 17 percent are in mediocre condition.[8] Sixteen percent of Montana's major roads are rated in fair condition and the remaining 54 percent are rated in good condition.[9]

Ten percent of Montana's major locally and state-maintained rural roads and highways have pavements rated in poor condition and 17 percent are in mediocre condition.[10] Sixteen percent of Montana's major rural roads are rated in fair condition and the remaining 57 percent are rated in good condition.[11]

Forty-one percent of Montana's major locally and state-maintained urban roads and highways have pavements rated in poor condition and 20 percent are in mediocre condition.[12] Eleven percent of Montana's major urban roads are rated in fair condition and the remaining 28 percent are rated in good condition.[13] The chart below details pavement conditions on major roads in the state's largest urban areas and statewide.[14]

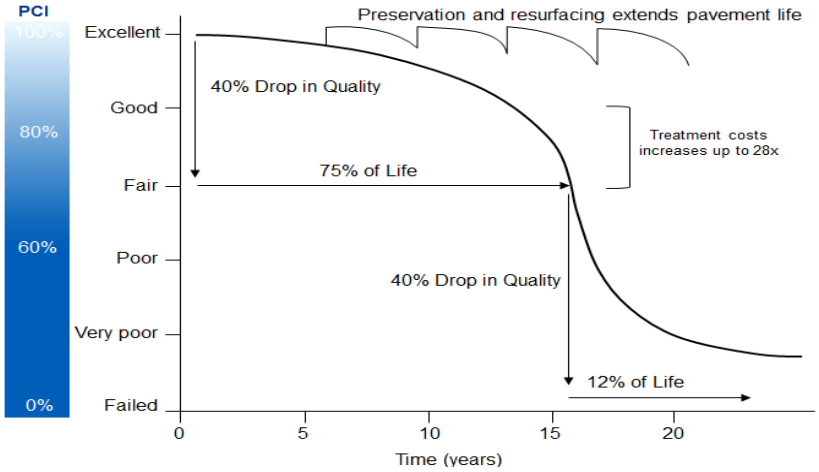
Chart 1. Pavement conditions on major roads in Montana's largest urban areas and statewide.

Location	Poor	Mediocre	Fair	Good
Billings	32%	21%	13%	33%
Great Falls	31%	23%	10%	36%
Missoula	29%	20%	9%	42%
MONTANA STATEWIDE	**13%**	**17%**	**16%**	**54%**

Source: TRIP analysis of Federal Highway Administration data.

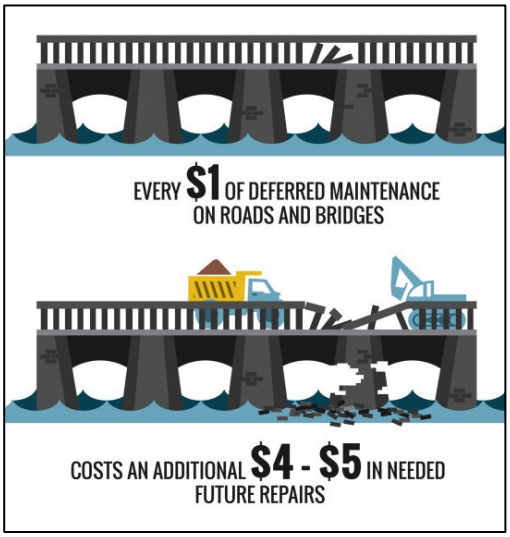
Pavement failure is caused by a combination of traffic, moisture and climate. Moisture often works its way into road surfaces and the materials that form the road's foundation. Road surfaces at intersections are more prone to deterioration because the slow-moving or standing loads occurring at these 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.[15] 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.[16]



The Costs 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 Montana motorists as a result of deteriorated road conditions is $427 million annually, an average of $526 per driver statewide.[17] The chart below shows additional VOC per motorist in the state's largest urban areas.

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

Location	VOC
Billings	$743
Great Falls	$731
Missoula	$678
Montana per Driver	**$526**
STATEWIDE TOTAL	**$427 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.[18] 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.[19] 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 Montana

Montana'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.

Seven percent (367 of 5,278) of Montana's locally and state-maintained bridges are rated in poor/structurally deficient condition.[20] 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. Sixty-two percent of Montana's locally and state-maintained bridges have been rated in fair condition.[21] 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 31 percent of the state's bridges are rated in good condition.[22]

The chart below shows the condition of bridges statewide and in Montana's largest urban areas.[23]

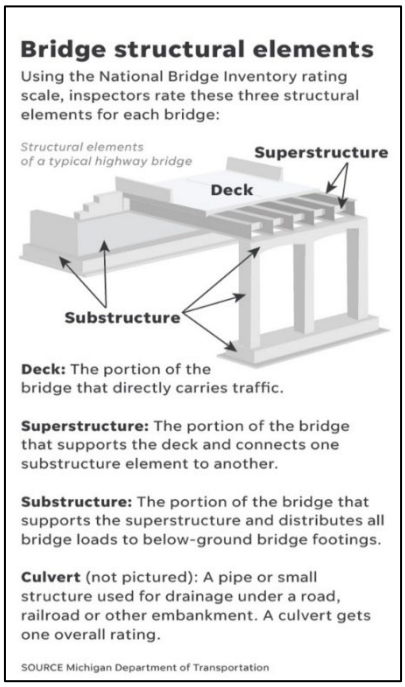


Chart 4. Bridge conditions statewide and in Montana's largest urban areas.

	POOR/STRUCTURALLY DEFICIENT		FAIR		GOOD		TOTAL
	Number	Share	Number	Share	Number	Share	BRIDGES
Billings	2	1%	212	74%	70	24%	288
Great Falls	7	4%	105	56%	75	40%	187
Missoula	17	8%	112	54%	77	37%	206
MONTANA STATEWIDE	**367**	**7%**	**3,287**	**62%**	**1,624**	**31%**	**5,278**

Source: TRIP analysis of Federal Highway Administration National Bridge Inventory (2022).

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 Montana, 41 percent of the state's bridges are 50 years old or more.[24] 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 Montana

A total of 1,008 people were killed in Montana traffic crashes from 2017 to 2021, an average of 202 fatalities per year.[25] From 2016 to 2020, nine percent of the state's traffic fatalities in crashes involving motorized vehicles were of pedestrians or bicyclists.[26]

Montana's overall traffic fatality rate of 1.77 fatalities per 100 million vehicle miles of travel in 2021 is the fifth highest rate in the nation and significantly higher than the national average of 1.35.[27] The fatality rate on Montana's non-interstate rural roads is the eighth highest rate in the nation and approximately two-and-a-half times greater than on all other roads in the state (2.58 fatalities per 100 million vehicle miles of travel vs. 0.96).[28] While only 49 percent of vehicle travel in Montana occurs on the state's rural non-Interstate roads, 72 percent of fatalities occur on rural non-Interstate roads.[29]

The number of fatalities in Montana increased 32 percent from 2019 to 2021, from 184 to 243, and the state's fatality rate per 100 million VMT increased 24 percent during that time, from 1.43 to 1.77.[30] Traffic fatalities began to increase dramatically in 2020 even as vehicle travel rates plummeted due to the COVID-19 pandemic. This dramatic increase in the number of fatalities and the rate of fatalities per 100 million VMT happened while vehicle travel in the state decreased between 2019 and 2020 due to the pandemic, then rebounded to seven percent above 2019 levels by 2021.

Chart 5. Montana traffic fatality and VMT data, 2019-2021.

MONTANA TRAFFIC FATALITY AND VEHICLE MILES OF TRAVEL (VMT) DATA				
	2019	2020	2021	2019-2021 Change
Traffic Fatalities	184	213	243	+32%
Fatalities per 100 Million VMT	1.43	1.76	1.77	+24%
VMT (Billions)	12.9	12.1	13.8	+7%

Source: National Highway Traffic Safety Administration and Federal Highway Administration.

The significant increase in traffic fatalities since the onset of the pandemic appears largely related to increased risks being taken by drivers. In an October 2021 report, the National Highway Traffic Safety Administration found that "after the declaration of the public health emergency in March 2020, driving patterns and behaviors in the United States changed significantly. Of the drivers who remained on the roads, some engaged in riskier behavior, including speeding, failure to wear seat belts, and driving under the influence of alcohol or drugs."[31]

The AAA Foundation for Traffic Safety (AAAFTS) drew similar conclusions about the role of increased risks being taken by drivers during the pandemic. A survey taken of drivers in October and November 2020 by the AAAFTS asked whether their level of driving had decreased, remained the same or increased since the beginning of COVID-19 related restrictions, and whether the motorist had engaged in a variety of risky driving behaviors in the previous 30 days.[32] In a February 2022 brief about the survey, the AAAFTS noted that drivers who maintained or increased their pre-COVID travel levels indicated that they were more likely to engage in risky driving behavior, including speeding, not wearing a seat belt, being impaired and driving aggressively. "It is possible that many of the individuals who were willing to travel—and even increase their travel—despite the health risks associated with the pandemic were already more willing than average to take other risks," the AAAFTS report found.[33]

In early 2022 the U.S. Department of Transportation adopted a comprehensive National Roadway Safety Strategy, a roadmap for addressing the nation's roadway safety crisis based on a Safe System approach that acknowledges the following: humans make mistakes and are physically vulnerable; traffic deaths and serious injuries are unacceptable; traffic deaths and serious injuries need to be reduced by the

provision of a redundant transportation system that reduces or minimizes crashes and ensures that, if crashes do occur, they do not result in serious injury or death.[34]

Chart 6. The Safe System Approach

Source: US Department of Transportation.

The Safe System approach, which is also being adopted by state and local transportation agencies has five objectives:

- Safer People: Encourage safe, responsible behavior by people who use our roads, and create conditions that prioritize their ability to reach their destination unharmed.
- Safer Roads: Design roadway environments to mitigate human mistakes and account for injury tolerances, to encourage safer behaviors, and to facilitate safe travel by the most vulnerable users.
- Safer Vehicles: Expand the availability of vehicle systems and features that help to prevent crashes and minimize the impact of crashes on both occupants and non-occupants.
- Safer Speeds: Promote safer speeds in all roadway environments through a combination of thoughtful, context-appropriate roadway design, targeted education and outreach campaigns, and enforcement.
- Post-Crash Care: Enhance the survivability of crashes through expedient access to emergency medical care, while creating a safe working environment for vital first responders and preventing secondary crashes through robust traffic incident management practices.

Improving safety on the nation's roadways will require that additional steps are taken to make further progress in achieving the Safe System's objectives. NHTSA, which provides states with roadway safety grants, requires states to submit annually a state highway safety plan. The state plans outline numerous steps states are taking to improve traffic safety. Elements of these state roadway safety plans aimed at addressing the Safe System objectives include:

- Safer People: education on speeding, impaired or disadvantaged driving; education on safe pedestrian and bicycling behavior; education on driving safely around large commercial vehicles; enforcement of commercial driver license and vehicle weight requirements; extension of safety belt laws and their enforcement to include all passenger vehicle occupants; enhancing enforcement action of speeding, impaired, aggressive and distracted driving, particularly at high-risk locations; increase penalties, particularly for repeat offender drivers; and increased enforcement at work zones.

- Safer Roads: converting intersections to roundabouts; removing or shielding roadside objects; the addition of left-turn lanes at intersections; improved signalization and lighting at intersections; adding or improving median barriers; improved roadway lighting; adding centerline or shoulder rumble strips; improving pedestrian and bicycle facilities, including sidewalks and bike lanes and providing pedestrian crossing islands; improved work zone safety measures; wider lanes and paved shoulders; upgrading roads from two lanes to four lanes; providing or improving lane markings; updating rail crossings; eliminating vertical pavement drop-offs; and providing large truck parking spaces.

- Safer Vehicles: Support the development, testing and deployment of connected and autonomous vehicle technology such as collision avoidance, lane departure avoidance systems and turning detection systems.

- Safer Speeds: Where appropriate, provide roadway features to encourage safer speeds, including traffic roundabouts and curb extensions; improved signage and dynamic speed signing at high-risk locations; education on the consequences of speeding; and increased speeding enforcement, particularly at high-risk locations.

- Post-Crash Care: Reduce crash response time including the use of emergency vehicle preemption technology; improve emergency response to multi-vehicle or hazardous material crashes; and increase access to level one or two trauma centers for seriously-injured crash victims.

Three major factors are associated with fatal vehicle crashes: driver behavior, vehicle characteristics and roadway features. It is estimated that roadway features, while not the primary factor, 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.

Traffic crashes in Montana imposed a total of $1.2 billion in economic costs in 2020.[35] TRIP estimates that roadway features, while not the primary factor, were likely a contributing factor in approximately one-third of all fatal traffic crashes, resulting in $400 million in economic costs in Montana in 2020.[36] 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.[37]

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 Reliability in Montana

Sources of traffic congestion come in two forms: recurring congestion, which occurs regularly as a result of a lack of adequate roadway capacity, traffic bottlenecks or poorly timed traffic signals; and non-recurring congestion which is caused by disruptions including traffic crashes, vehicle breakdowns, special events, weather or road construction. Nationally, recurring congestion accounts for 45 percent of congestion and non-recurring congestion accounts for 55 percent of traffic congestion. However, local and regional estimates for contributions from different sources of congestion can vary considerably from national estimates, from freeways to arterial corridors, and from urban to rural areas.[38]

While traffic congestion is largely constrained to the state's urban areas, a lack of reliability on some of Montana's major highways and roads hampers the state's ability to support economic development and quality of life by reducing the reliability and efficiency of commercial, personal and recreational travel, including the transport of goods and services. Traffic congestion costs commuters of time and money and imposes increased costs on businesses, shippers and manufacturers, which are often passed along to consumers. Increased levels of congestion can also reduce the attractiveness of a location when a company is considering expansion or deciding where to locate a new facility.

Transportation Funding and Priority Projects in Montana

Investment in Montana'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.

To address a lack of adequate transportation funding, in 2017, the Montana legislature passed the Bridge and Road Safety and Accountability Act (BaRSAA), which incrementally increased motor fuel taxes over a period of six years. The revenue generated from this increase is restricted solely for the construction and maintenance of Montana's state and local roads and bridges. Local governments are eligible for 65 percent of the new revenue, while MDT receives the remaining 35 percent to provide matching funds for Federal Aid Highway dollars. When fully implemented, BaRSAA is estimated to generate approximately $40 million in additional road and bridge funding annually, providing critical infrastructure funding for local governments and enabling MDT to match and leverage more than $100 million in federal funds.

In June 2022, significant flooding occurred in Southwest and South-Central Montana as a result of heavy rains and an unusually high June snowpack, washing out portions of roadways and damaging bridges, resulting in $2.9 million in damages to routes including US 89 and 212, MT 78 and Highway 419 (Nye Road).[39]

Most federal funds for highway and transit improvements in Montana 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).

The increased transportation funding provided by the state legislature's passage of BaRSAA in 2017, combined with additional federal funding, has allowed Montana to accelerate projects to improve traffic safety, relieve congestion and improve the condition of roads, highways and bridges. But, while current transportation investment levels have allowed Montana to make significant progress, the state still faces challenges in reliably accommodating growing passenger and freight traffic, and providing needed roadway safety improvements and road, highway and bridge repairs.

Revenue from the motor fuel tax – a critical source of 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.[40] 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 electric vehicles will represent approximately 30 percent of the passenger vehicle fleet.[41]

The level of highway investment in Montana is likely to increase further as a result of the five-year federal Infrastructure Investment and Jobs Act (IIJA), signed into law by President Biden in November 2021. The IIJA will provide $3.26 billion in state funds for highway, bridge and transit investments in Montana over the next five years, including a 33% funding increase in FY 2022.[42] IIJA investment in Montana's roads and transit system will add an additional $627 million in state GDP each year.[43] The increased economic activity will benefit Montana residents – increasing disposable income by $230 million each year, an average of $478 per household.[44]

Listed below are the top transportation challenges identified by the Montana Department of Transportation.

1. **Statewide Load Posted Bridges** Hundreds of Montana bridges are posted with load limits due to their poor condition. A large number of these bridges are timber bridges and are reaching end of useful life. Load limits have a significant impact on commercial trucking and agricultural commerce and disrupt the flow of goods from farm to market. Montana has bridges (large and small) that have fracture critical elements and are structurally deficient or are functionally obsolete.

2. **US 191 – Four Corners to Beaver Creek** A corridor study outlined over $350 Million of needed improvements; however, the design options are restricted given the topography along the corridor. The corridor experiences seasonal traffic queueing and congestion.

3. **Statewide Culverts** A multitude of large and small culverts across the state are in need of replacement due to their poor condition.

4. **Interstate 90 – Billings Areas** Additional capacity is needed in the Billings area along with new interchanges at Lockwood and Johnson Land. Major projects in this area are currently being constructed and designed, including I-90 Yellowstone River, Lockwood Interchange, Johnson Lane Interchange (BBP) and Mossmain - W. Billings Interchange.

5. **Interstate 90 –St. Regis to Missoula** Due to the age and condition of the pavement, rehabilitation is needed from St. Regis to Missoula. Several pavement preservation projects on this section of I-90 are being designed. Bridge replacements and deck treatments are needed throughout the corridor.

6. **Interstate 90 – Hardin to Wyoming** Due to the age and condition of the pavement, rehabilitation is needed from Hardin to Wyoming. Several pavement preservation projects are currently being designed on this section of I-90. Reconstruction is needed in the vicinity of Toluca due to subsurface movement that has dramatically reduced the condition of the roadway. Bridge replacements and deck treatments are needed throughout the corridor.

7. **Interstate 90 – Idaho to St. Regis** Due to age and condition of the pavement, rehabilitation is needed from Idaho to St. Regis. Several pavement preservation projects are currently being designed on this section of I-90 and a project to reconstruct a portion of this corridor with concrete surface is currently being designed.

8. **Interstate 15 – Great Falls to Sweetgrass** Bridge replacements and deck treatments are needed throughout the corridor, along with improvements to address a lack of interchange capacity and roadway deterioration.

9. **Interstate 94 – Miles City to North Dakota** Due to age and condition of the pavement, rehabilitation is needed from Miles City to North Dakota. Bridge replacements and deck treatments are needed throughout the corridor and several pavement preservation projects are currently being designed.

10. **Interstate 90 – Bozeman** Capacity improvements are needed to address seasonal traffic queuing, congestion and interchange function, particularly ramp queuing and bridge width at 19th and 7th Avenues, and capacity and performance issues between Three Forks and Rocky Canyon.

11. **Interstate 15 – Helena to Great Falls** Improvements are needed to address interchange capacity and roadway deterioration. Bridge replacements and deck treatments are needed throughout the corridor. Terrain constraints limit options at Wolf Creek Canyon.

12. **US 89 – Livingston to Gardner** Capacity improvements are needed to address seasonal traffic queuing and congestion. Existing corridor study outlines need for passing lanes, shoulder widening and spot treatments.

13. **US 2 – Kalispell to East Glacier** Due to age and condition of the pavement, rehabilitation is needed from Kalispel to East Glacier. Bridge replacements and deck treatments are needed throughout the corridor. Several pavement preservation projects are being designed for this section of US 2.

14. **MT 287 – Virginia City to Sheridan** The entire length of the corridor requires major capital improvement and total reconstruction projects in order to bring the roadway to current design standards.

15. **Billings Bypass** One segment of the Billings Bypass is complete and another is currently under construction. Two additional segments are nearly designed and in right of way phase.

16. **US 93 – Idaho to Florence** Due to age and condition of the pavement, rehabilitation is needed from Idaho to Florence along with bridge replacements and deck treatments. Pavement rehabilitation is needed due to age and condition of the pavement. A project to reconstruct a portion of the corridor south of Connor is currently being designed, along with several pavement preservation projects.

17. **MT 7** Multiple reconstruction projects are needed to bring the roadway to current design standards.

18. **US 12** Improvements are needed to address capacity issues and deterioration in Lewis and Clark County from the Broadwater County line to the Powell County line.

19. **US 191** A segment of this roadway near Mobridge is currently a gravel surface due to re-occurring landslides. Three areas currently need to be reconstructed.

20. **US 87** Improvements are needed to enhance capacity, reduce hazards and address deterioration southeast of Armington Junction to Raynesford.

The Importance of Transportation to Economic Growth in Montana

Investments in transportation improvements in Montana 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 17,000 full-time jobs across all sectors of the state economy, earning these workers approximately $586 million annually.[45] These jobs include approximately 8,000 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 9,000 full-time jobs in Montana.[46] Transportation construction in Montana contributes an estimated $107 million annually in state and local income, corporate and unemployment insurance taxes and the federal payroll tax.[47]

Approximately 214,000 full-time jobs in Montana 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 approximately $7.3 billion in wages and contribute an estimated $1.3 billion in state and local income, corporate and unemployment insurance taxes and the federal payroll tax.[48]

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 access has a significant impact on the competitiveness of a region's economy. In a 2022 survey of corporate executives by Area Development Magazine, highway accessibility was ranked fifth out of 28 selection factors in choosing a location.[49]

Freight Transportation in Montana

Today's culture of business demands that an area has 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, including its highways, railroads, air and maritime ports, 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 Montana. 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.

The amount of freight transported in Montana and the rest of the U.S. is expected to increase significantly as 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.

Each year, 82.4 billion tons of freight are shipped to, from or through Montana.[50] Sixty percent of the goods shipped annually to and from sites in Montana are carried by truck and another 14 percent are carried by courier services or multiple-mode deliveries, which include trucking.[51]

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.

Improving Transportation Safety, Resiliency and Efficiency

Recognizing that extreme weather, sea level change, and changes in environmental conditions may threaten the condition and longevity of the nation's transportation infrastructure, transportation agencies have begun to assess vulnerabilities and consider the resilience of their transportation assets during the transportation planning process. Transportation agencies across the country have begun to incorporate resilience in asset management plans, addressing resilience in project development and design and optimizing operations and maintenance practices.[52]

Based on the importance of maximizing the level and safety of mobility provided by its transportation system, transportation agencies are adopting Transportation Systems Management and Operations (TSMO) practices and incorporating improved resiliency into their transportation network. While a TSMO program does not eliminate the need for capacity expansions along some routes, it helps enhance the mobility of an existing corridor as much as possible.

A TSMO program adopts an integrated set of strategies to improve traffic flow and safety on a portion of a roadway, including work zone management, traffic incident management, freight management, traveler information, traffic signal coordination, ramp management, transit management and improved bicycle and pedestrian crossings.[53] The benefits of TSMO can include reduced traffic congestion, reduced fuel consumption and reduced emissions.

MDT is implementing TSMO practices, which include the following: the implementation of a Transportation Management Center, which provides traveler information, including variable message signs regarding non-recurring congestion; the implementation of advanced traffic signal performance measures that will address non-recurring congestion by improving traffic signal reliability and addressing recurring congestion by providing information to allow the retiming of traffic signals.[54]

Conclusion

As Montana strives to support ongoing population and economic growth, it is critical that the state can provide a well-maintained, safe, and efficient 21st-century network of roads, highways, bridges, and transit to accommodate the mobility demands of modern society.

The passage of the Bridge and Road Safety and Accountability Act in 2017 and the 2021 approval of the federal Infrastructure Investment and Jobs Act has allowed Montana to move forward with numerous projects to improve the condition, safety and reliability of the state's transportation network. But, in order to continue to provide needed improvements, the state will need to make further increases in its level of transportation investment.

A safe and reliable transportation system that is maintained in good condition and offers improved mobility and accessibility to meet the needs of Montana residents, businesses, and tourists alike, is critical to moving Montana forward.

ENDNOTES

[1] U.S. Census Bureau (2021).
[2] U.S. Census Bureau news release: New Vintage 2021 Population Estimates Available for the Nation, States and Puerto Rico. December 21, 2021. https://www.census.gov/newsroom/press-releases/2021/2021-population-estimates.html
[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] U.S. Bureau of Economic Analysis (2020).
[6] U.S. Department of Transportation - Federal Highway Administration: Highway Statistics 2000 and 2019.
[7] Federal Highway Administration – Traffic Volume Trends. https://www.fhwa.dot.gov/policyinformation/travel_monitoring/tvt.cfm
[8] Federal Highway Administration Highway Statistics 2020.
[9] Federal Highway Administration Highway Statistics 2020.
[10] Ibid.
[11] Ibid.
[12] Ibid.
[13] Ibid.
[14] Ibid.
[15] Selecting a Preventative Maintenance Treatment for Flexible Pavements. R. Hicks, J. Moulthrop. Transportation Research Board. 1999. Figure 1.
[16] Pavement Maintenance, by David P. Orr, PE Senior Engineer, Cornell Local Roads Program, March 2006.
[17] TRIP calculation.
[18] Highway Development and Management: Volume Seven. Modeling Road User and Environmental Effects in HDM-4. Bennett, C. and Greenwood, I. 2000.
[19] Your Driving Costs. American Automobile Association. 2019.
[20] Federal Highway Administration National Bridge Inventory. 2022.
[21] Ibid.
[22] Ibid
[23] Bridge condition data for each urban area includes the following counties: Billings: Yellowstone County; Great Falls: Cascade County; Missoula: Missoula County.
[24] TRIP analysis of Federal Highway Administration National Bridge Inventory data (2021).
[25] Federal Highway Administration National Highway Traffic Safety Administration, 2016-2020.
[26] TRIP analysis of National Highway Traffic Safety Administration and Federal Highway Administration data (2022). Data is for 2020.
[27] TRIP analysis of National Highway Traffic Safety Administration and Federal Highway Administration data (2021).
[28] Ibid.
[29] Ibid.
[30] Ibid.
[31] Continuation of Research on Traffic Safety During the COVID-19 Public Health Emergency: January-June 2021. U.S. Department of Transportation National Highway Traffic Safety Administration.
[32] Self-Reported Risky Driving in Relation to Changes in Amount of Driving During the COVID-19 Pandemic. February 2022. AAA Foundation for Traffic Safety.
[33] Ibid.
[34] U.S. Department of Transportation National Roadway Safety Strategy, 2022. https://www.transportation.gov/NRSS

[35] TRIP estimate based on NHTSA report "The Economic and Societal Impact of Motor Vehicle Crashes, 2010 (Revised), 2016. P. 146.
[36] Ibid.
[37] 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
[38] Texas Transportation Institute (2021). Congestion Pie Chart for Different Sources of Congestion. https://static.tti.tamu.edu/tti.tamu.edu/documents/TTI-2021-2.pdf
[39] Montana Department of Transportation (2022). Response to TRIP survey.
[40] KPMG. (2019). Evaluating Sustainable Transportation Funding Options.
[41] BloombergNEF (2019) New Energy Outlook 2019. https://about.bnef.com/new-energy-outlook/
[42] American Road & Transportation Builders Association (2021). Economic Impact of the Infrastructure Investment & Jobs Act: Hawaii. https://www.artba.org/economics/iija-impact/states/?profile=HI
[43] Ibid
[44] Ibid.
[45] American Road & Transportation Builders Association (2015). The 2015 U.S. Transportation Construction Industry Profile. https://www.transportationcreatesjobs.org/pdf/Economic_Profile.pdf
[46] Ibid.
[47] Ibid
[48] Ibid.
[49] Area Development Magazine, Q1 2022. 36th Annual Corporate Survey. https://www.areadevelopment.com/Corporate-Consultants-Survey-Results/q1-2022/36th-annual-corporate-survey.shtml
[50] TRIP analysis of Bureau of Transportation Statistics, U.S. Department of Transportation. 2016 Commodity Flow Survey, State Summaries.
[51] Ibid.
[52] Federal Highway Administration (2019). Resilience. https://www.fhwa.dot.gov/environment/sustainability/resilience/
[53] Federal Highway Administration (2019). What is TSMO? https://ops.fhwa.dot.gov/tsmo/index.htm#q1
[54] Montana Department of Transportation (2022). Response to TRIP survey.