



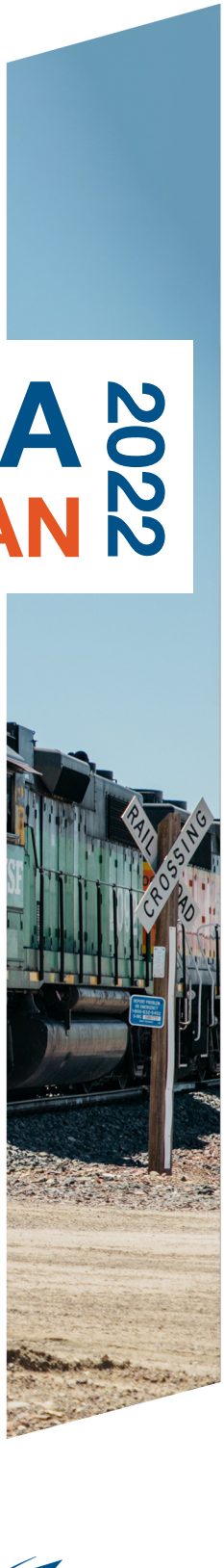

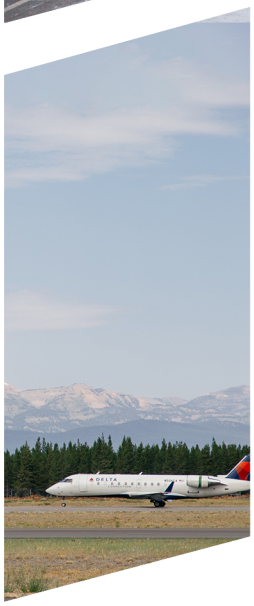



MONTANA FREIGHT PLAN 2022

MONTANA
Department of Transportation

Montana State Freight Plan
2022

Montana Department of Transportation
2701 Prospect Avenue
Helena, MT 59601

Freight Partners and Stakeholders

MDT would like to thank all the agencies and businesses below that contributed their expertise, time, and commitment to the development of the 2022 State Freight Plan.

City of Billings

City of Hamilton

City of Missoula

Dick Irvin, Inc.

Idaho Department of Transportation

Missoula Metropolitan Planning Organization

Montana Department of Transportation

Montana West Economic Development

Montana Wheat and Barley Committee

Montana Trucking Association

North Dakota Department of Transportation

South Dakota Department of Transportation

Wyoming Department of Transportation

Survey Takers

Freight Plan Technical Advisory Committee

Motor Carrier Services Division, including the Motor Carrier Safety Assistance Program

Traffic & Safety Bureau

Maintenance Division

Rail, Transit, & Planning Division

Federal Highway Administration

MDT Districts

Bridge Bureau

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List of Abbreviations and Acronyms

ABC	Accelerated Bridge Construction
AFB	Air Force Base
AGSL	Alder Gulch Short Line Railroad
ARM	Administrative Rules of Montana
ATA	American Trucking Association
AV	Autonomous Vehicle
BAP	Butte, Anaconda and Pacific Railroad
BBER	Bureau of Business and Economic Research
BNSF	BNSF Railway
BrM	Bridge Structure Management System
CAV	Connected and Autonomous Vehicle
CHSP	Comprehensive Highway Safety Plan
CMAQ	Congestion, Mitigation, Air Quality

CMV	Commercial Motor Vehicle
CP	Canadian Pacific Railroad
CRFC	Critical Rural Freight Corridors
CUFC	Critical Urban Freight Corridors
CVSP	Commercial Vehicle Safety Plan
DEQ	Montana Department of Environmental Quality
DLI	Montana Department of Labor and Industry
DMVT	Daily Vehicle Miles Traveled
DMVW	Dakota, Missouri Valley, and Western
DOT	Department of Transportation
EPA	Environmental Protection Agency
FAA	Federal Aviation Administration
FAF	Freight Analysis Framework
FAST	Fixing America's Surface Transportation Act
FEMA	Federal Emergency Management Administration
FHWA	Federal Highway Administration
FMCSA	Federal Motor Carrier Safety Administration
GHG	Greenhouse Gas
GDP	Gross Domestic Product
GNC	Great Northern Corridor
GRGL	Global Rail Group
GVWR	Gross Vehicle Weight Rating
HOS	Hours of Service
HSIP	Highway Safety Improvement Program
I-15	Interstate 15
I-90	Interstate 90
I-94	Interstate 94
IIJA	Infrastructure Investment and Jobs Act
IRI	International Roughness Index
ISTEA	Intermodal Surface Transportation Efficiency Act
ITD	Innovative Technology Deployment
LCPA	Lincoln County Port Authority
LOS	Level of Service
LRTP	Long Range Transportation Plan
MCA	Montana Code Annotated
MCS	Motor Carrier Services
MCSAP	Motor Carrier Safety Assistance Program
MDT	Montana Department of Transportation
MEPA	Montana Environmental Policy Act
MHP	Montana Highway Patrol
MMT	Mission Mountain Railroad
MPO	Metropolitan Planning Organization
MRL	Montana Rail Link
MS4	Small Municipal Separate Storm Sewer System

MSA	Metropolitan Statistical Area
MTA	Montana Trucking Association
NAFTA	North American Free Trade Agreement
NEC	Not Elsewhere Classified
NEPA	National Environmental Policy Act
NHFN	National Highway Freight Network
NHFP	National Highway Freight Program
NHS	National Highway System
NHTSA	National Highway Traffic Safety Administration
NMFN	Interim National Multimodal Freight Network
NOx	Nitrogen Oxides
OS/OW	Oversize / Overweight
PHFS	Primary Highway Freight System
PDA	Preliminary Damage Assessment
PHMSA	Pipeline Hazardous Materials Safety Administration
PM	Port of Montana
PNM	Port of Northern Montana
PRB	Powder River Basin
PvMS	Pavement Management System
Px3	Performance Programming Process
RHGCP	Rail Highway Grade Crossing Program
RI	Ride Index
ROW	Right-of-Way
SAFETEA	Safe, Accountable, Flexible, Efficient Transportation Equity Act
SIAP	Systems Impact Action Process
SFY	State Fiscal Year
SHSP	Strategic Highway Safety Plan
STRACNET	Strategic Rail Corridor Network
STRAHNET	Strategic Highway Network
TAMP	Transportation Asset Management Plan
TAPCO	Traffic and Parking Control Company
TBWG	Transportation Border Working Group
TEA-21	Transportation Equity Act for the 21st Century
TEDDY	The Electric Driverless Demonstration in Yellowstone
TIP	Transportation Improvement Program
TRRZ	Transco Railway Products
TRQ	Tariff Rate Quota
TTTR	Truck Travel Time Reliability
U.S.C	United States Code
UAV	Unmanned Aerial Vehicle
UP	Union Pacific Railroad
US 212	United States Highway 212
US 87	United States Highway 87
US 93	United States Highway 93

USDOT	United States Department of Transportation
USMCA	U.S.-Mexico-Canada Agreement
VMT	Vehicle Miles Traveled
WBWG	Western Border Working Group
WSFC	Western States Freight Coalition

Executive Summary

Introduction

Montana's 2022 State Freight Plan describes Montana's freight transportation system, its role in the state's economy, and current and emerging industry trends. It gives an account of overall freight performance on the transportation network, highlights freight related issues and needs, and seeks to address needs by identifying effective strategies and goals.

The Freight Plan was developed in accordance with 49 USC §70202, the Fixing America's Surface Transportation (FAST) Act, and the Infrastructure, Investments, and Jobs Act (IIJA). It is in alignment with MDT's long range multi-modal policy plan, TranPlanMT, and supports national multimodal freight policy. This plan will be updated, as required, every four years.

Montana freight stakeholders, adjacent states, and MDT subject matter experts were invited and provided input and advisement throughout the plan's development. A draft Freight Plan was also made available to the public for a 30-day public review process.

Montana Freight Facts

The transportation of goods is the backbone of Montana's economy therefore its critical to invest in efforts that promote safe, reliable, and efficient freight movements. In Montana, these movements primarily occur by truck, pipeline, rail, and air.

- Truck: In 2020, commercial vehicles traveled approximately 3.35 million vehicle miles daily in Montana. Freight transportation by truck is forecasted to grow the most, out of all modes, by 2050.
- Rail: Montana's rail network comprises over 3,500 miles of active track. BNSF owns and maintains 2,437 of these miles. Rail serves an essential role in transporting bulk materials, such as agricultural and energy products.
- Pipeline: Montana's pipeline network exceeds 15,500 miles in length, moving crude oil, hydrocarbon gas liquids, natural gas (interstate and intrastate), as well as other derivatives of coal and petroleum.
- Air: Montana's aviation network consists of 126 public-use airports, including 13 commercial and 106 general aviation airports. Population growth and e-commerce trends have resulted in significant increases in air cargo since the 2017 Freight Plan. Between 2017 and 2020, cargo increased by 34 percent.

Montana Stakeholder Identified Transportation Needs and Concerns

In the development of this plan, freight stakeholders and MDT subject matter experts identified concerns and issues, impacting freight movement. The following needs were identified:

- Commercial vehicle safety: Ensuring drivers and vehicles are provided with safe and reliable roads and informational services continues to be a need.
- Truck parking: A lack of safe and secure truck parking still exists in certain areas of the state.

- Infrastructure condition: Many of Montana's older bridges are nearing their useful service life and were not originally designed to accommodate modern vehicle designs and heavy or oversized loads. The preservation of roadways, especially those that experience increased travel from heavy loads, can incur a higher rate of deterioration and require additional design components and increased maintenance to maximize service life.
- Network reliability and mobility.

The overall approach to addressing Montana's key freight issues and needs can be found outlined in state and federal policies that guide MDT's decisions, such as the National Multimodal Freight Policy, established by the FAST Act, and Montana's long range transportation plan, TranPlanMT. Although TranPlanMT provides state-wide guidance for transportation-based decisions beyond that of freight, the two share several overarching goals as identified in Figure 1 below. MDT also works in collaboration with regional partners and local governments to coordinate freight planning efforts and strategies.

Montana Freight-Related Goals and National Multimodal Freight Policy

Goals that support the safe and efficient movement of freight across Montana's highway network are primarily identified in Montana's TranPlanMT and the state's Freight Plan. It's important that these goals be in alignment with National Multimodal Freight Policy which strives to improve the condition and performance of the National Highway Freight Network to ensure that the United States is able to effectively compete in a global economy (23 USC §167).

Figure 1: Shared Goals of Federal and MDT State Policy

Technological innovation also plays a crucial role in MDT's achievement of a safe, secure, and efficient freight network. Technology has been deployed in the areas of credentialing and vehicle clearance, route planning and traffic conditions, road system enhancements, and more. These advancements help to make roads safer for travelers and improve efficiency of the highway systems.

The National Highway Freight Program funds projects that support the efficient movement of freight on the National Highway Freight Network (NHFN). At present, Montana's portion of eligible network includes Interstate routes: I-15 and I-90. All NHFP projects must be consistent with the eligibilities established for the NHFP and be fundable.

The goals of this Freight Plan further seek to emphasize the importance of the safe and efficient movement of freight on Montana's highway network and are identified below:

- Safety: Improve safety for freight operators and the traveling public.
- System Preservation and Maintenance: Preserve and maintain existing transportation infrastructure, thereby ensuring infrastructure resiliency and the efficient movement of freight.
- System Reliability: Provide Efficient, cost-effective management and operation to accelerate transportation project delivery and ensure system reliability.
- Environmental Stewardship: Support MDT's transportation mission through regulatory compliance and responsible stewardship of the built and natural environment.
- Network Resiliency: Support programs and efforts that promote network resiliency in response to the effects of extreme weather, and natural phenomenon.

Progress towards the above goals will be monitored through the reporting of federal performance measures for safety, reliability, and asset condition (bridge and pavement) as well as through the implementation of the National Highway Freight Program (NHFP). Success in implementing NHFP projects will be evidence of further progress in achieving the goals outlined in this Plan.

Looking to the future, freight is expected to continue to grow. Projections estimate that freight will grow by 30 percent by 2050, in Montana alone. Montana's freight plan and investment of NHFP funds are steps toward ensuring a safe and efficient transportation system that will accommodate and support Montana's growing economy.

Freight Plan Purpose

MDT's mission is to plan, build, operate, and maintain a safe and resilient transportation infrastructure to move Montana forward. Fulfilling this mission benefits all who travel to jobs, healthcare, shopping, recreation, and daily activities as well as those who rely on transportation to move goods into, out of, and within the state. Purposes of this Freight Plan include:

- A brief description of Montana's economy, in relation to freight and economic demand;
- Detailing freight movements by mode;
- Identifying significant freight system concerns and needs in Montana and strategies for improvement;
- Identifying mechanisms to ensure reliability and redundancy within the transportation network;
- Addressing the impacts of freight on the environment;
- Providing a framework to guide freight-related transportation investment decisions; and
- Informing the public and stakeholders as to how MDT manages the transportation system specifically related to freight.

Data Years Reflected in This Plan

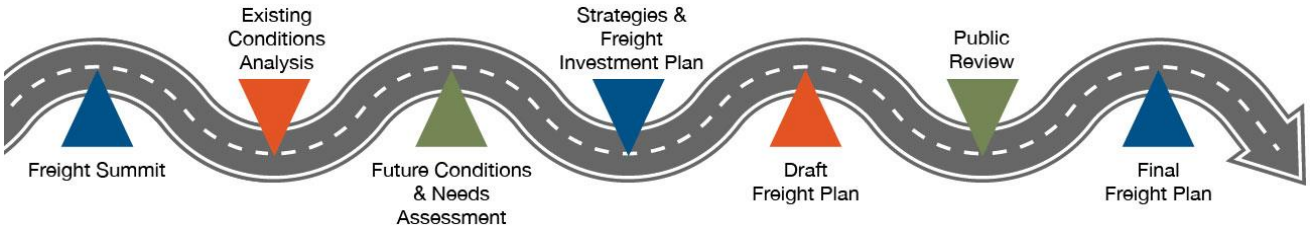
Due to the effects of the COVID-19 pandemic on the economy in 2020 and 2021, and the variability that it brought, a base year of 2019 was selected to present data, whenever possible. Additional data are presented to demonstrate trends where necessary, with varying years reported based on the most recent data availability. Data years incorporated into this plan are:

- Infrastructure inventory: 2019-2021, depending on mode;
- Trade and cross-border data: historical trends through 2020;
- Commodity flows and values: 2017 data, (based on the Commodity Flow Survey conducted by the Bureau of Transportation Statistics and U.S. Census Bureau and made available by the by the Federal Highway Administration in 2020); and
- Data forecasts: Out to 2050 (Based on the Freight Analysis Framework Version 5 forecasting analysis).

Public Outreach and the Planning Process

The development of this Plan took approximately a year and a half and included stakeholder engagement, advisement from a Technical Advisory Committee, and a public comment review period. The planning process for the freight plan update is illustrated in the figure below.

Figure 2: Montana Freight Plan Planning Process



Four key engagement efforts were completed during the update of the Freight Plan, in addition to the routine consultation of the Technical Advisory Committee. These efforts included:

- Teleconference discussion with MDT Districts, conducted on October 4, 2021;
- Virtual Freight Summit to inform and solicit input from freight stakeholders, hosted on October 26, 2021;
- Online freight survey, posted on the Freight Plan's website from October 7, 2021, through November 5, 2021; and
- 30-Day public review period of the draft Freight Plan in August 2022.

Engaging stakeholders and the public in freight-based discussions is key to a successful Freight Plan update. Input and perspectives provided by freight stakeholders in Montana helps MDT identify critical issues and needs and to identify strategies that are most effective in addressing them.

The Freight Plan project team also met with the Freight Plan Technical Advisory Committee routinely, throughout the development of the plan, to ensure accuracy and completeness of the Plan's contents.

1. Freight Plan Overview

Federal Requirements and Policies for Freight Plans

Federal efforts establishing state freight plan requirements originated through the Fixing America's Surface Transportation Act and the Infrastructure Investment and Jobs Act. The purpose of this effort was to ensure that priority be given to the National Highway Freight Network to ensure that goods are safely and efficiently moved across the nation's multi-modal transportation network through effective planning and funding.

Fixing America's Surface Transportation (FAST) Act of 2015

The FAST Act, signed into law December 4, 2015, recognized the need to improve the condition and performance of the National Highway Freight Network (NHFN) and to ensure goods are transported safely, reliably, and efficiently. The FAST Act provided approximately $305 billion in funding between federal fiscal years 2016 and 2020. To support these goals, the FAST Act created the National Highway Freight Program (NHFP). The NHFP supports overarching national policy for maintenance of the NHFN and includes the following goals (23 USC §167):

- Improving the contribution of the freight transportation system to the economy;
- Reducing congestion on the freight transportation system;
- Reduce the cost of freight transportation;
- Improving the safety, security, and resiliency of the freight transportation system;
- Improving the state of good repair of the freight transportation system;
- Using advanced technology, performance management, innovation, competition, and accountability in operating and preserving the freight transportation system; and
- Reducing adverse environmental and community impacts of freight transportation.

Freight plans address immediate and long-range planning activities and investments of a state, with respect to freight, as well as describe how a state will improve its ability to meet the goals of national freight policy. Pursuant to the FAST Act, state freight plans are required to include the following components (49 USC §70202):

- Identification of significant freight system trends, needs, and issues;
- Description of freight policies, strategies, and performance measures that guide freight-related transportation investments;
- A list of state designated multimodal critical rural freight facilities and corridors designated under 49 CFR 70103, when applicable (not applicable to Montana);
- A list of state designated critical rural and urban freight corridors, when applicable (not applicable to Montana);
- A description of the state's ability to meet national multimodal freight goals;
- Innovative technologies and operational strategies that improve the safety and efficiency of freight movement;
- Improvements to reduce or impede the deterioration of roadways traveled by heavy vehicles;
- An inventory of facilities with freight mobility issues and strategies to address these issues at state owned or operated facilities;
- Significant congestion or delay caused by freight movements and mitigation strategies;
- Consultation with the state freight advisory committee, if applicable (not applicable to Montana); and
- A freight investment plan.

Infrastructure Investment and Jobs Act of 2021

More recently, the Infrastructure Investment and Jobs Act (IIJA), was signed into law on November 15, 2021, and built on the existing foundation of freight policy and goals described in its predecessor, the FAST Act, by including requirements for freight plans. These requirements include:

- The most recent commercial motor vehicle parking facilities assessment conducted by the state;
- The most recent supply chain cargo flows in the state, expressed by mode of transportation;
- An inventory of commercial ports in the state;
- If applicable, consideration of the findings or recommendations made by any multi-State freight compact (not applicable to Montana);
- The impacts of e-commerce on freight infrastructure in the state;
- Considerations of military freight; and
- Strategies and goals to decrease the impacts of:
    - Severe weather and natural disaster on freight mobility;
    - The impact of freight movement on air pollution;
    - The impacts of freight movement on flooding and stormwater runoff; and
    - The impact of freight on wildlife habitat loss.

IIJA further emphasizes the need to discuss how states enhance reliability or redundancy of freight transportation or incorporate the ability to rapidly restore access and reliability of freight transportation

within state freight plans. Lastly, IIJA increases the frequency of freight plan updates from every 5 years to every 4 and adjusts the minimum planning horizon from five years to eight years. Within this plan, the planning horizon is forecasted to 2040.

To assist in demonstrating that federal requirements have been met in this plan, Table 1 displays the respective locations of each requirement within this document.

Freight Plan Reference Guide for Federal Code Requirements

The table below provides a refence to core sections and areas of the Freight Plan which address federal code requirements.

Table 1: Freight Plan Reference Guide

Freight Plan Federal Code Requirement	Location(s) in the Freight Plan
An identification of significant freight system trends, needs, and issues with respect to the state.	• Chapter 1 • Chapter 2 • Chapter 3 • Chapter 4 • Chapter 8
A description of freight policies, strategies, and performance measures that will guide the freight-related transportation investment decisions of the state.	• Chapter 6 • Chapter 7 • Chapter 8 • Chapter 10
When applicable, a listing of (A) multimodal critical rural freight facilities and corridors designated within the state under section 70103 of title 49 (National Multimodal Freight Network); and (B) CRFCs and CUFCs designated within the state under 23 U.S.C. 167 (National Highway Freight Program).	• Not applicable
A description of how the plan will improve the ability of the state to meet the national multimodal freight policy goals described in 49 U.S.C. 70101(b) and the national highway freight program goals described in 23 U.S.C. 167.	• Chapter 7 • Chapter 8, subsection *MDT Processes and Plans that Support National Multimodal Freight Policy* • Chapter 10
A description of how innovative technologies and operational strategies, including freight intelligent transportation systems, that improve the safety and efficiency of the freight movement, were considered.	• Chapter 5 • Chapter 7, subsection *System Reliability*
In the case of roadways on which travel by heavy vehicles, including mining, agricultural, energy cargo or equipment, and timber vehicles, is projected to substantially deteriorate the condition of the roadways, a description of improvements that may be required to reduce or impede the deterioration.	• Chapter 7, subsection *Pavement Condition* • Chapter 8, subsections *Transportation Asset Management Plan (TAMP)* and *Px3 Performance Measures*
An inventory of facilities with freight mobility issues, such as bottlenecks, within the state, and for those facilities that are state owned or operated, a description of the strategies the state is employing to address those freight mobility issues.	• Chapter 3, subsection *Stakeholder Identified Concerns* • Chapter 6; subsection *TranPlanMT, Montana's Long Range Transportation Plan* • Chapter 7, subsection *System Reliability* • Chapter 8
Consideration of any significant congestion or delay caused by freight movements and any strategies to mitigate congestion or delay.	• Chapter 3, subsections *Montana Rail* and *Stakeholder Identified Concerns* • Chapter 8, subsections *Freight Mobility* and *Mitigating Delay Caused by Freight*
A freight investment plan that, subject to 49 U.S.C. §70202, including a list of priority projects and how funds made available to carry out 23 U.S.C. §167 would be invested and matched.	• Chapter 10
The most recent commercial motor vehicle parking facilities assessment conducted by the State.	• Chapter 7, subsection *Rest Area and Truck Parking* • Chapter 8, subsection *Montana Rest Area Plan (Truck Parking)*

Freight Plan Federal Code Requirement	Location(s) in the Freight Plan
The most recent supply chain cargo flows in the State, expressed by mode of transportation.	• Chapter 3, subsection *Major Freight Sectors*
An inventory of commercial ports in the state.	• Chapter 3, subsection *Montana's Intermodal Facilities*
If applicable, consideration of the findings or recommendations made by any multi-State freight compact to which the State is a party under section 70104.	• Not Applicable
The impacts of e-commerce on freight infrastructure in the State.	• Chapter 3, subsection *Montana Air* • Chapter 4, subsection *E-Commerce*
Considerations of military freight.	• Chapter 3, subsection *Military Freight in Montana*
Strategies and goals to decrease: (1) the severity of impacts of extreme weather and natural disasters on freight mobility; (2) the impacts of freight movement on local air pollution; (3) the impacts of freight movement on flooding and stormwater runoff; and (4) the impacts of freight movement on wildlife habitat loss.	• Chapter 6, subsection *Environmental Stewardship* • Chapter 7, subsection *Environmental Stewardship and Strategies that Reduce Freight Impacts on the Environment*
Include requirement that State will either (1) enhance reliability or redundancy of freight transportation; or (2) incorporate the ability to rapidly restore access and reliability with respect to freight transportation.	• Chapter 6, TranPlanMT goal listed in subsection *TranPlanMT, Montana's Long Range Transportation Plan* Chapter 7, subsections *System Reliability* (first paragraph), *Environmental Impacts on Freight – Weather and Natural Phenomenon* (first paragraph), and *Measures of Reliability on the NHS* – first paragraph
Consultation with the State Freight Advisory Committee, if applicable.	• Not applicable

2. Freight and Montana's Economy

According to the University of Montana's Bureau of Business and Economic Research (BBER), growth in Montana is widespread across major industries including healthcare, professional business services, agriculture, mining, tourism, and recreation. Many of the sectors and industries that saw strong growth in the early 2010s have now changed course, attributed to changing global economic forces.[1]

Economic Overview

Montana labor markets have remained tight with unemployment rates trending below 4 percent, increasing for a time, only in 2022 due to the COVID-19 pandemic. While the unemployment rate is low, labor shortages introduce challenges across multiple sectors, including the freight industry. As is the case nationwide, a shortage of truck drivers has been felt throughout Montana[2].

A key pillar of Montana's economy, the extraction of fossil fuels (coal, oil, and natural gas) declined by an average of 31 percent between 2017 and 2020. After experiencing a major increase in production between 2010 and 2015, crude oil production declined to levels not previously seen since the early 2000s[3]. Meanwhile, renewable energy sources grew by 16 percent in the same period, with wind providing the largest portion of this growth[4].

The agriculture industry has experienced peaks and valleys since 2017. Prolonged drought and tariffs introduced by renegotiated trade agreements have impacted crop prices. Notwithstanding, crop and livestock production continued to grow, with strong annual harvest for wheat, pulses, and hay as well as overall production in beef[5].

Home prices in Montana have continued to escalate quickly. The BBER's 2019 Economic Report states that between 2015 and 2019, home prices in Montana increased by an average of 20 percent.[6] This is most clearly evident in urban areas in the western part of the state, notably Bozeman, Missoula, and Kalispell.

High agricultural prices and the shale oil boom in the Bakken Formation led to rapid growth in income and employment in resource-rich counties in eastern Montana. This ended with the drop in oil prices in 2014, and the cattle and wheat price declined shortly after. Although the oil bust was not as severe as first projected, the urban and western counties within the state now lead in terms of real wage growth and employment[7].

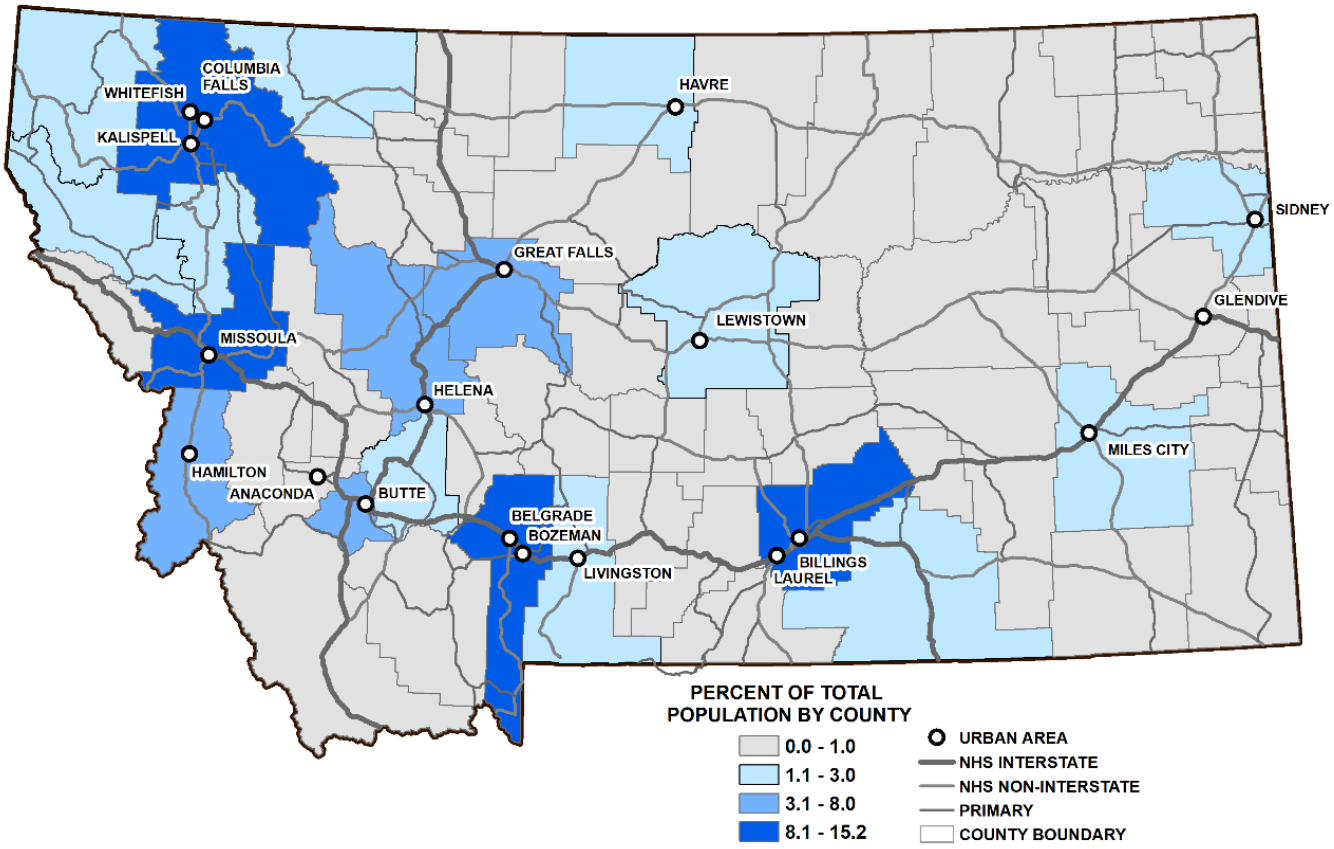
As Montana moves forward, its economy is projected to diversify as trends move toward a service-based economy. This diversification is projected to lead to faster and more stable economic growth over the long-term. The movement to service-based industries has increased demand for high-skilled workers, especially in the professional services and healthcare industries.

These trends will continue to make Montana a desirable place to live, work, and play. Per capita income is projected to increase, which may exacerbate trends such as housing affordability, urban growth, and an economic shift from the eastern to the western areas of the state. These trends will undoubtedly impact the transportation network and goods movement systems, including increased freight movement by truck, pipeline, and air.

Population and Demographics

The fourth largest state by land mass (approx. 147,000 square miles), Montana ranks 44th in population with just over 1 million residents, according to the 2020 Census. Averaging 7.4 people per square mile, Montana ranks 50th in population density (per square mile)[8], of fifty-two states and territories including the District of Columbia and Puerto Rico. Since publication of the 2017 plan, the population of Montana has grown by 3.2 percent. This trend is nearly double that of the national growth rate, which grew by 1.8 percent during the same period. Figure 3 shows the population density (per square mile) by county throughout Montana.

Figure 3: Montana Population Density by County (2020)



Source: U.S. Census Bureau & MDT Geospatial Information Section

Urban Areas

Montana's population is skewed towards urban centers in the western half of the state. According to the U.S. Census Bureau, just over half of Montana's population resides within urban areas, with approximately 35 percent of the population living in the seven largest cities (Billings, Bozeman, Butte, Great Falls, Helena, Kalispell, and Missoula), as shown in Figure 3 above.

As Montana continues to be known as a premier tourism and economic destination, the trend towards urban areas is expected to continue.

From a freight perspective, the early stages of urbanization and densification could have a net positive effect on volume and efficiency. More people in a particular area allows for consolidation and makes deliveries more efficient. However, as these trends intensify, negative externalities of urban densification may emerge. More residents lead to the need for more goods and services, which in turn can lead to increased traffic congestion and bottlenecks that negatively impact the freight transportation network.

As was the case in 2017, Montana has three metropolitan planning organizations (MPOs) – Billings, Great Falls, and Missoula. Although the designation has not yet been made, a preliminary review of 2020 census data indicates that Bozeman and Helena exceeded 50,000 residents and may meet the threshold for becoming an MPO.[9]

Race

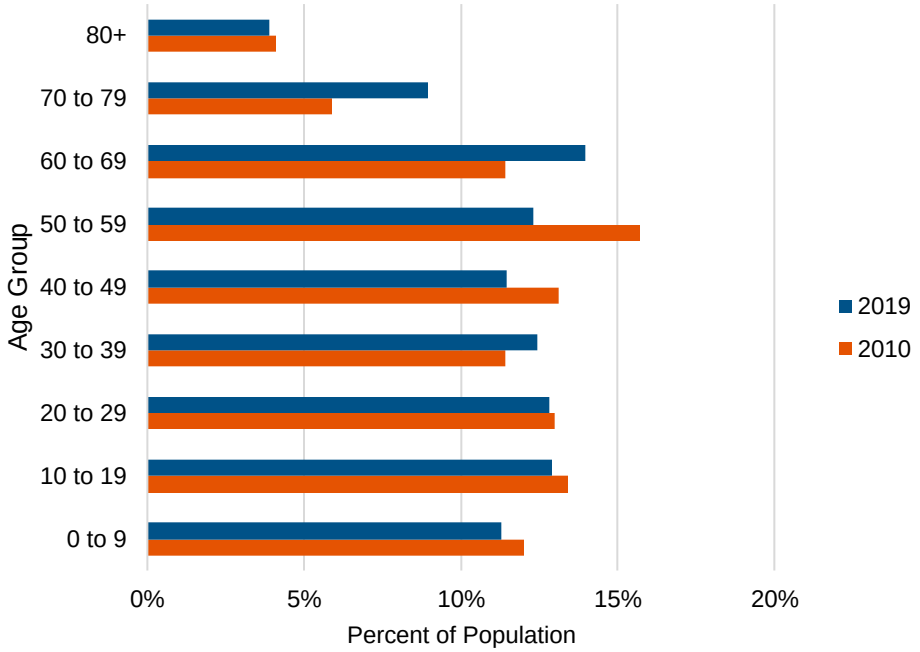
Unchanged since 2017, approximately 86 percent of the state's population is white. The largest minority group in Montana, those who identify as American Indian or Alaska Natives, represents approximately six percent of the population. Small percentages of other races make up eight percent. Although racial diversity in Montana has remained relatively unchanged in the past three national censuses, the white population has shown a slight decline while other races have shown slight increases.[10]

Age

As was the case in the 2017 Freight Plan, Montana's population is aging. The median age in Montana has increased by 2 percent, from 39.8 in 2017 to 40.5 in 2020. This makes Montana the oldest median aged state, ahead of neighboring states such as Wyoming, Idaho, North Dakota, and South Dakota.

As shown in Figure 4, 50 percent of Montana's population was over the age of forty in 2019. This represents the same percentage as observed in 2010. However, the percentage of Montanans over the age of sixty has increased by nearly 28 percent between 2010 and 2019.

Figure 4: Montana Population by Age Group (2010-2019)



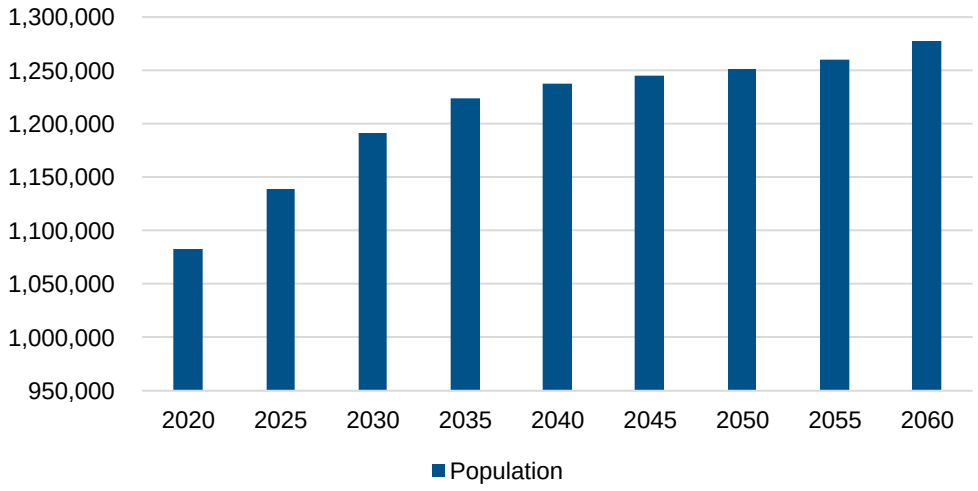
Source: U.S. Census, American Community Survey

Population Projections

Montana's population is anticipated to grow steadily through 2060. As shown in Figure 5, the rate of growth is projected to be highest through 2035, and then continue at a more gradual rate through 2060.

Research from the Montana Bureau of Labor and Industry has shown that Montana has experienced net positive migration patterns for several years. This trend, coupled with the prevalence of remote work and Montana's proximity to outdoor recreation opportunities and large open spaces, may cause the state's population to increase faster than previously projected.[11]

Figure 5: Montana Population Projections (2020-2060)



Source: REMI Population Projections

Jobs and Income

While Montana's economic growth has been steady over the last several years, employment growth has slowed due to tight labor markets, increasing rate of retirements, and a constrained supply of workers. Job projections anticipate that tight labor markets will continue to affect employment growth over the next ten years. As shown in Table 2, total employment is projected to slow to 0.7 percent average annual growth from 2020 to 2028.

Despite a slow overall projection in job growth, several regions within the state are expected to see a more positive increase in job growth regionally. The southwest region, including Bozeman, Helena, and Butte, is projected to grow the fastest at an average annual rate of 1.1 percent. The northwest region, including Missoula and Kalispell, is expected to grow at an average annual rate of 1.0 percent. Economic growth has been strong in these regions as they both benefit from job gains associated with higher population density and the presence of large educational institutions. Both regions posted strong job gains in construction, professional services, and other consumer-based industries. Projections anticipate that strong job growth in these industries will continue.

The southcentral region, which includes Billings, is projected to grow at 0.5 percent over the next ten years. Declines in the mining industry, over the past few years, have negatively impacted growth in the southcentral region. Looking forward, the overall decline in coal demand is expected to have a continued impact on the southcentral region.

The northcentral and eastern regions have experienced slower growth than the rest of the state and are projected to continue to experience slow growth. Both regions are projected to grow at an annual rate of 0.1 percent. Economic losses in the agricultural industry have impacted both regions. Generally, losses in any industry contribute to lower spending and economic activity. Fluctuations in the mining industry also impact these regions, particularly the eastern region.[12]

Table 2: Growth Rates by Industry (2018-2028) [13]

Industry	Long-term Annual Growth Rate 1990-2018	2013-2018 Annual Growth Rate	2018-2020 Annual Growth Rate	2020-2028 Annual Growth Rate	2018-2020 Average Job Gain Per Year	2020-2028 Average Job Gain Per Year
Healthcare	2.8%	1.7%	1.2%	1.3%	888	1,037
Accommodation and Food	2.1%	2.0%	1.0%	1.1%	549	609
Construction	3.7%	4.0%	3.0%	1.5%	881	474
Professional	3.8%	2.3%	2.3%	1.7%	526	418
Retail Trade	1.3%	1.1%	0.1%	0.4%	81	219
Other	2.3%	1.9%	0.6%	0.9%	116	172
Local Government	2.4%	1.3%	0.8%	0.7%	164	158
Admin and Support	3.4%	0.3%	1.7%	0.8%	301	147
Arts and Entertainment	3.7%	1.7%	1.2%	1.1%	143	146
Education	1.1%	0.4%	0.3%	0.3%	103	133
Manufacturing	0.4%	2.3%	1.1%	0.5%	224	110
Transportation	1.0%	0.7%	0.6%	0.6%	93	90
Finance and Insurance	1.5%	0.4%	0.7%	0.5%	109	80
State Government	0.7%	-0.7%	0.8%	0.6%	98	77
Agriculture	1.7%	3.8%	1.1%	1.2%	63	76
Real Estate	1.7%	2.5%	1.5%	0.8%	93	52
Wholesale Trade	0.9%	0.2%	0.2%	0.2%	42	32
Management	2.8%	0.9%	1.8%	0.9%	39	20
Mining	0.2%	-5.6%	0.2%	0.2%	16	13
Postal Service	-0.5%	-0.1%	-0.2%	-0.1%	-4	-1
Information	0.0%	-1.6%	-0.6%	-0.3%	-40	-22
Utilities	-1.1%	-2.3%	-4.7%	-1.4%	-128	-35
Federal Government	-1.1%	0.2%	3.2%	-0.9%	304	-86
Total Payroll	**1.9%**	**1.2%**	**1.0%**	**0.8%**	**4,662**	**3,920**
Total Jobs	1.1%	1.0%	0.8%	0.7%	4,134	3,831

Varying levels of job growth is expected in the majority of sectors in Montana. Similar to conditions documented in the 2017 Freight Plan, professional and technical services, healthcare, construction, the arts, and agriculture are expected to experience the fastest rates of growth of all employment sectors over the next ten years.

Table 3 shows the demand for major occupation groups in Montana between 2020 and 2030, expressed as the total number of annual openings. The occupation group most associated with freight transportation and logistics, transportation and material moving occupations, was the fourth most in-demand group with 4,755 annual openings. For sectors that are both in-demand and high-wage, truck drivers have the highest demand of this group with approximately 780 openings per year over the next ten years and median wage of $48,900.[14] It is also critical to note that railroads employ approximately 2,500 people in Montana[15]. The Association of American Railroads estimates that each freight rail job supports 4.5 jobs elsewhere in the economy[16].

Table 3: Annual Projected Occupational Demand by Major Occupation Group (2020-2030)[17]

Occupation	Annual Openings				
	New Jobs	Exits	Transfers	Total Openings	2020 MT Annual Average Wage
Food Preparation and Serving Related Occupations	1,222	3,751	4,913	9,886	$25,350
Office and Administrative Support Occupations	299	3,139	3,547	6,985	$37,100
Sales and Related Occupations	250	2,825	3,756	6,830	$39,360
Transportation and Material Moving Occupations	351	1,813	2,591	4,755	$41,410
Construction and Extraction Occupations	367	1,137	2,440	3,943	$51,450
Building and Grounds Cleaning and Maintenance Occupations	308	1,360	1,544	3,211	$31,270
Healthcare Support Occupations	461	1,178	1,154	2,793	$31,210
Education, Training, and Library Occupations	284	1,226	1,158	2,668	$44,760
Personal Care and Service Occupations	216	1,114	1,212	2,541	$28,910
Business and Financial Operations Occupations	261	703	1,371	2,335	$65,360
Healthcare Practitioners and Technical Occupations	518	874	878	2,269	$84,360
Installation, Maintenance, and Repair Occupations	227	725	1,305	2,257	$50,150
Management Occupations	152	858	1,244	2,253	$95,590
Production Occupations	130	754	1,243	2,127	$43,190
Community and Social Service Occupations	206	351	604	1,160	$42,210
Protective Service Occupations	83	423	479	986	$49,500
Arts, Design, Entertainment, Sports, and Media Occupations	34	359	545	937	$38,980
Farming, Fishing, and Forestry Occupations	52	219	561	832	$38,220
Computer and Mathematical Occupations	154	162	448	765	$71,540
Life, Physical, and Social Science Occupations	67	160	517	744	$60,160
Architecture and Engineering Occupations	73	202	362	637	$75,730
Legal Occupations	41	123	167	331	$73,070

3. Montana Freight Economic Profile

Chapter 3 presents current economic, freight, trade, and infrastructure conditions in Montana. The state is a diverse economic landscape ranges from information and finance to manufactured goods and natural resources. As a neighbor to resource-rich south-central Canada, the state plays a vital role in international trade and supply chain connectivity. This makes Montana a highly goods-oriented state economically.

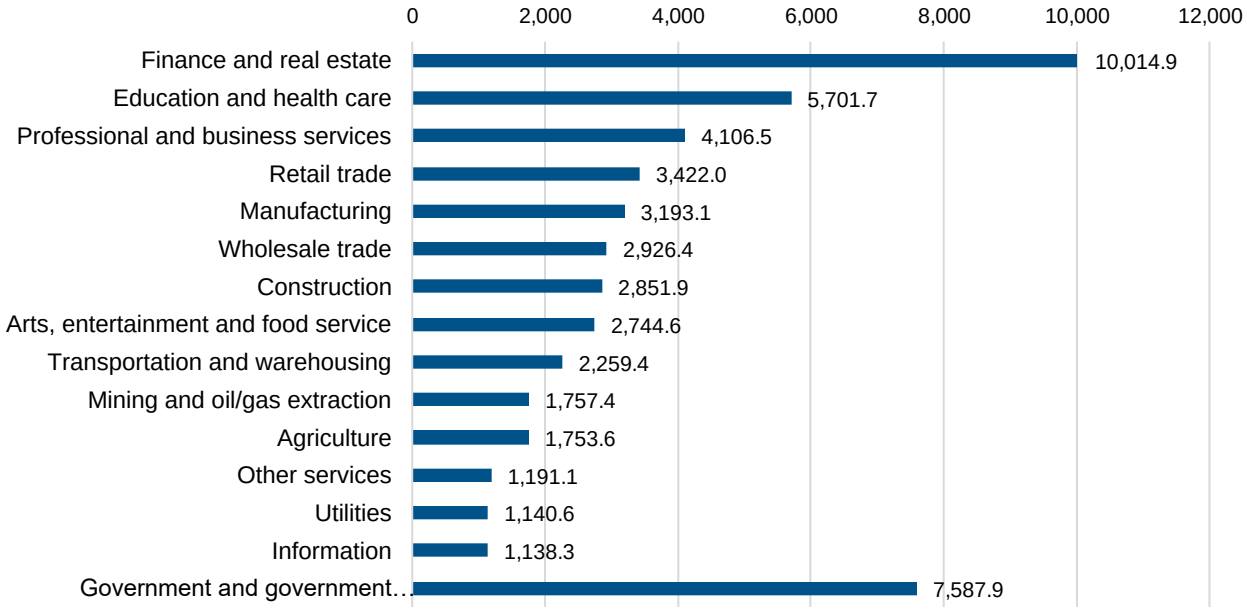
In 2019, Montana's Gross Domestic Product (GDP) was $51.8 billion, with finance ($10.0 billion), education and healthcare ($5.7 billion), and professional businesses services ($4.1 billion) leading private-sector GDP. Government activities represented $7.6 billion, approximately 14.4 percent of total Montana GDP.

Freight-generating industries in Montana are primarily those that extract or manufacture materials and goods. These include manufacturing, mining and oil/gas extraction, agriculture, and construction. These four industries make up $9.6 billion of the state's 2019 GDP, equivalent to 18.5 percent of total GDP. Including wholesale trade and transportation and warehousing, industries with substantial freight handling and activity, total GDP among all these freight-related industries is $14.7 billion, or 28.5 percent of state GDP.

Figure 6: Montana GDP by Industry (millions USD) (2019)

Figure 6 shows the total GDP for the state by industry. Notably, the industries contributing the most are information and service industries (finance and real estate, government and government enterprises, education and healthcare, and professional and business services), which do not typically deal directly with freight, but often engage with the coordination and delivery of freight goods in the form of industry supplies.

Figure 6: Montana GDP by Industry (millions USD) (2019) [18]

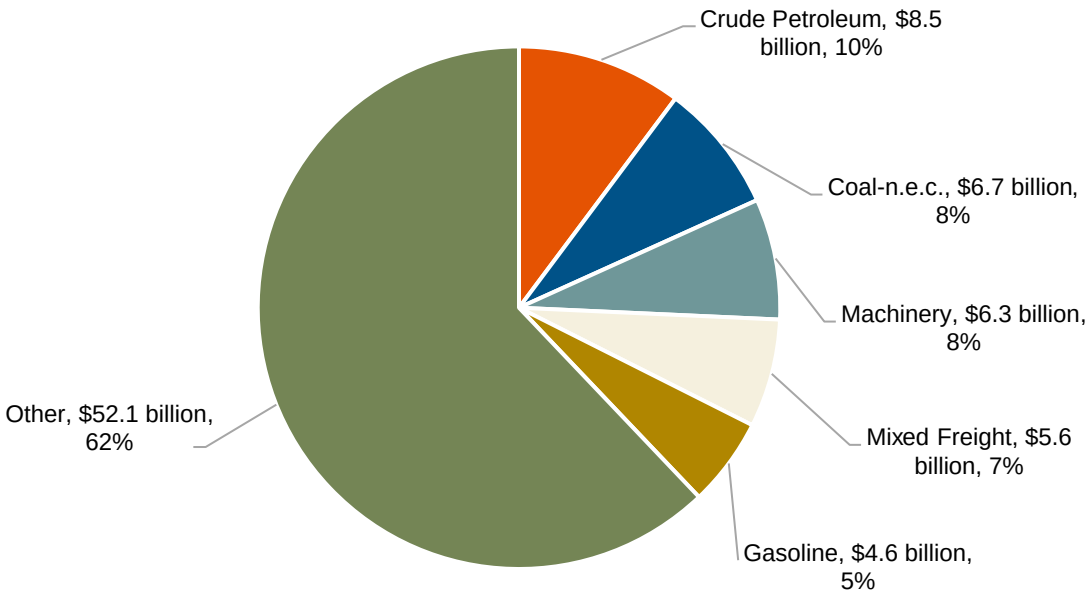


Top Montana Commodities

Montana freight systems are highly influenced by the mining and extraction industries. Figure 7 and Figure 8 show Montana's freight commodities by value and weight, respectively, based on the

Federal Highway Administrations (FHWA) Freight Analysis Framework Version 5 (FAF 5). These figures display the extent to which raw and processed natural resources impact freight activity in the state.

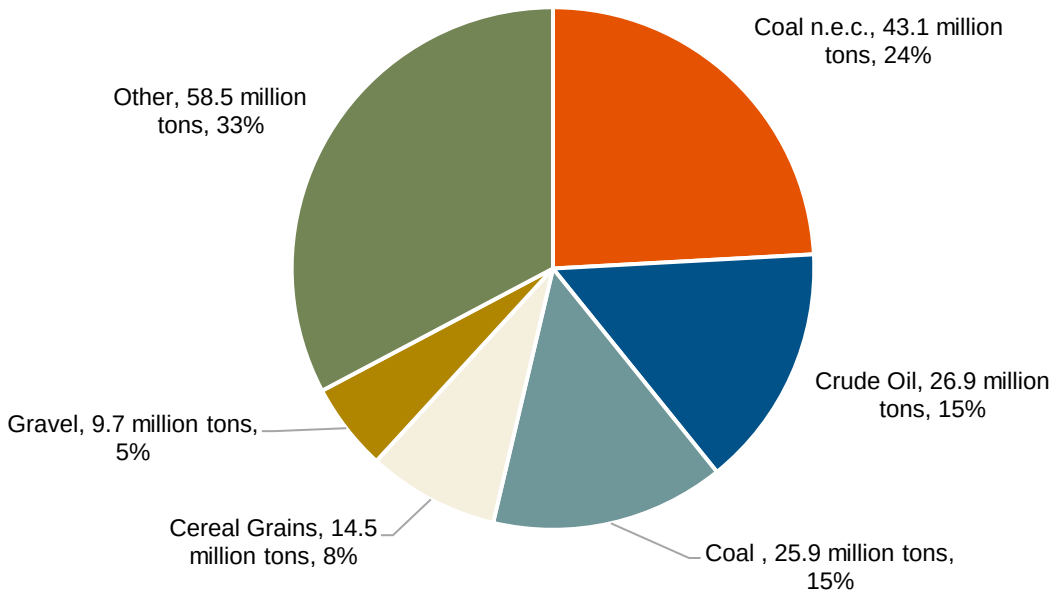
Figure 7: Top Commodities by Value (2017)



Source: FHWA Freight Analysis Framework, Version 5.. Coal-n.e.c. refers to crude petroleum and coal products that do not fall under crude petroleum, coal, fuels, or fuel oils.

Of the top five freight commodities by weight, four are either mining or oil/gas related. Coal-n.e.c. (not elsewhere classified) is the single largest commodity by weight, representing nearly one quarter of all freight movements. The total weight of the top five freight commodities—which include coal-n.e.c., crude oil, coal, cereal grains, and gravel—represents two thirds of the freight by weight in the state, equivalent to over 121 million tons of material. This shows the importance of diversity in freight commodities and the value added from the manufacturing of goods.

Figure 8: Top Commodities by Weight (2017)



Source: FHWA Freight Analysis Framework, Version 5. Coal-n.e.c. refers to crude petroleum and coal products that do not fall under crude petroleum, coal, fuels, or fuel oils.

Major Freight Sectors

Three major sectors of freight (by weight) in Montana include the energy, agriculture, and constructions industries. Each sector represents a unique area of the state and plays a critical role in the designation and development of the state's freight infrastructure and economy.

Energy

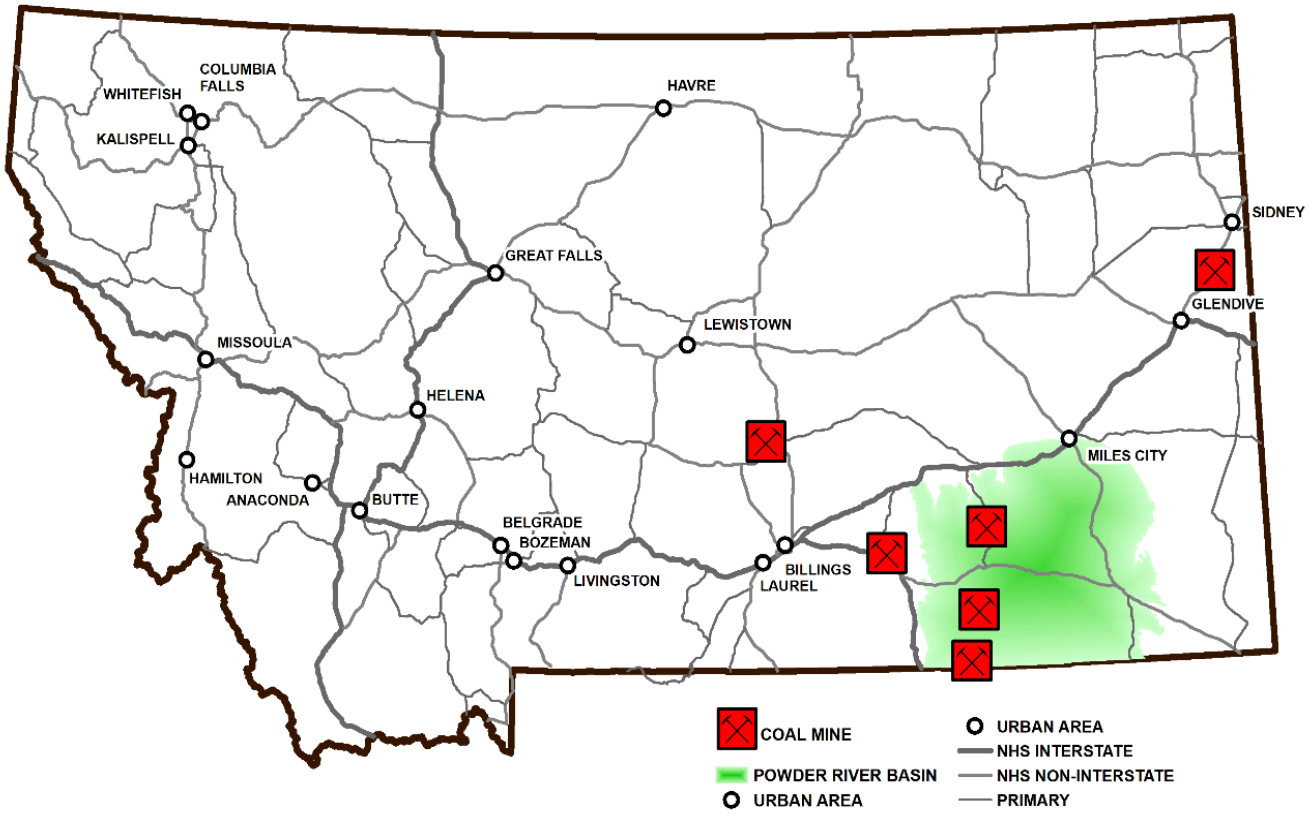
Coal

Montana, for many years, has been among the top producers of coal in the U.S. The state is home to the largest recoverable coal reserves in the nation, representing approximately 30 percent of the U.S. total recoverable coal.[19]

The majority of coal is extracted from the Powder River Basin (PRB) located in southeast Montana and northeast Wyoming. In 2019, Montana ranked sixth in coal production in the U.S., accounting for 5 percent of all coal production. Mining through the same coal vein in the PRB, Wyoming ranked first in coal production and accounted for nearly 40 percent of total U.S. coal production.

The low-sulfur content of the coal mined from the PRB makes it a highly sought-after form of energy production as it burns cleaner than other forms of coal by releasing less sulfur oxide. Figure 9 shows the PRB extent in Montana and the coal mine locations throughout the state.

Figure 9: Montana Coal Mining Areas[20]

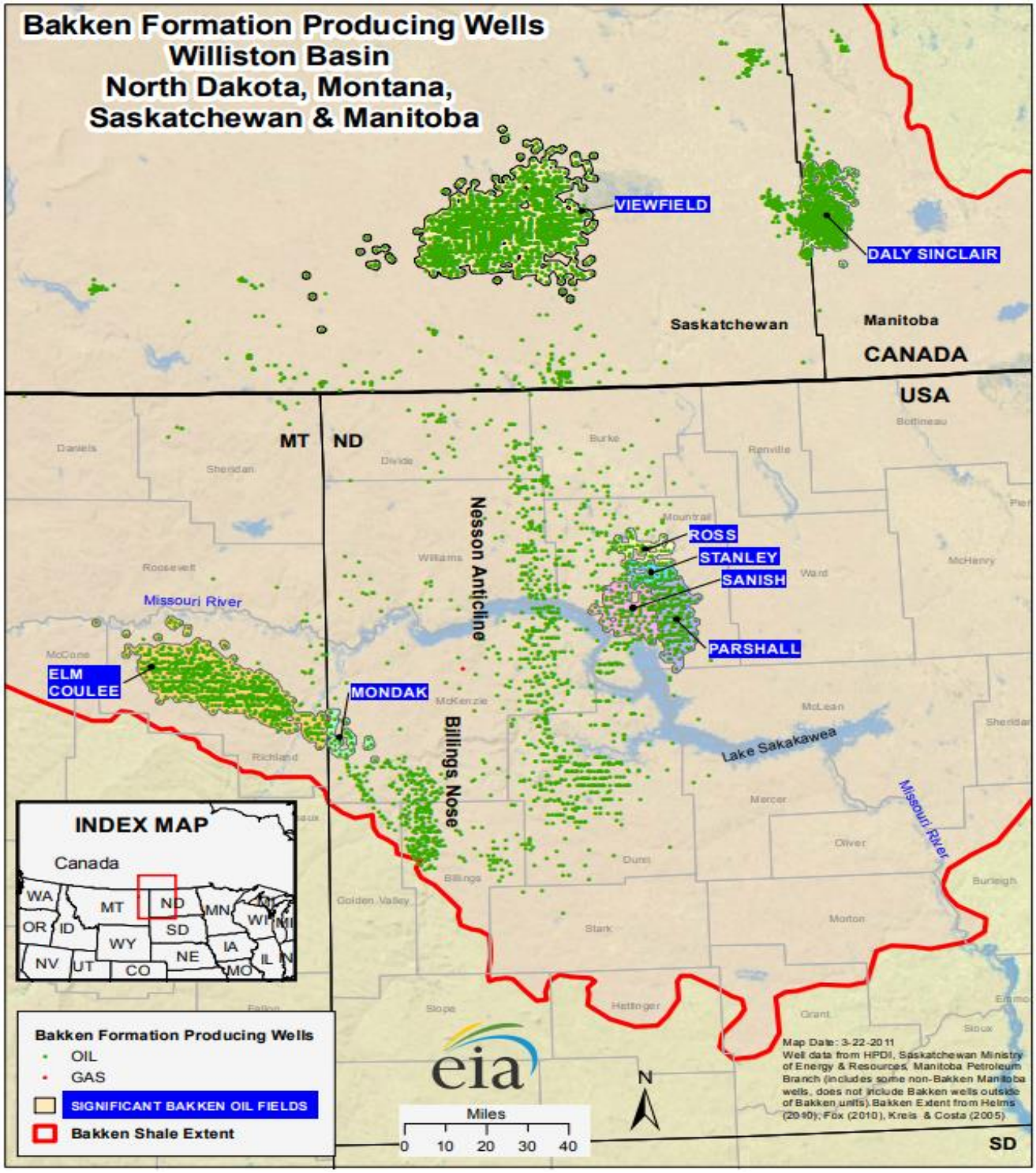


Crude Oil

According to the U.S. Energy Information Administration, Montana accounts for less than 1 percent of U.S. total proven crude oil reserves. As shown in Figure 10, most of Montana's oil production comes from the Bakken Formation in the northeastern part of the state along the border with North Dakota. The state's oil production has declined from its 2006 peak as drilling activity moved to North Dakota. In 2019, Montana's annual oil production increased slightly for the second year in a row. However, the state's oil production declined in 2020. This decline coincided with the decline in petroleum demand and oil prices as a result of the economic effects of the COVID-19 pandemic.

Montana has four oil refineries: three in the Billings area and one in Great Falls. The refineries receive crude oil mainly from Canada and Wyoming and produce a wide range of refined products. Pipelines and railroads are used to ship crude oil to the refineries and to transport the facilities' refined products throughout Montana and to nearby states.[21]

Figure 10: Montana Oil Extraction Locations[22]



The Energy Supply Chain

Pipeline, rail, and highway modes support energy activity, including movement of oversize cargo and personnel. Almost half of energy movement in Montana remains within in the state. By 2050, energy commodities in Montana are expected to increase by 18 percent. This increase will be driven by growth in crude petroleum, which supports plastics and other non-energy supply chains. The figures below describe the energy sector supply chain, including key commodities, transportation modes, and state destinations.

Figure 11: Energy Sector Supply Chain by Mode

Commodity	Truck	Rail	Pipeline	Air	Other or Multiple Modes
Coal	○	●			●
Crude petroleum	○		●		
Fuel oils	●	○	●		
Gasoline	○		●		○
Not elsewhere classified	○		●		○

Legend: ● *Primary Modes (25% of tonnage or more)* ○ *Supporting Modes*

In addition to the movement of commodities, project cargo for wind farms and oil, gas, and coal extraction support energy supply chains in Montana. These movements rely on oversize trucking and rail. Windmill components in particular require carefully orchestrated movements due to their significant lengths (upwards of 325 feet) and overall weight. This energy production further supports Montana jobs with over 15,000 workers employed in traditional energy positions statewide.[23]

Figure 12: Energy Commodity Breakdown

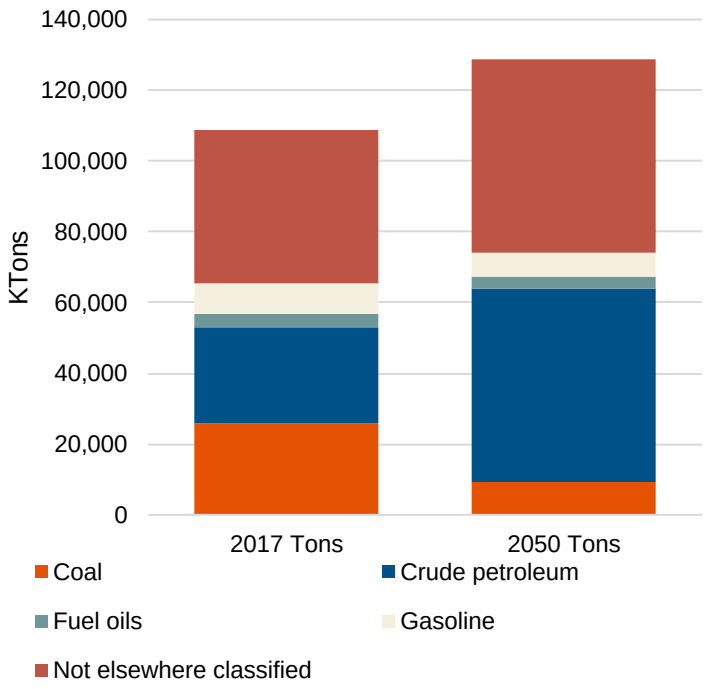
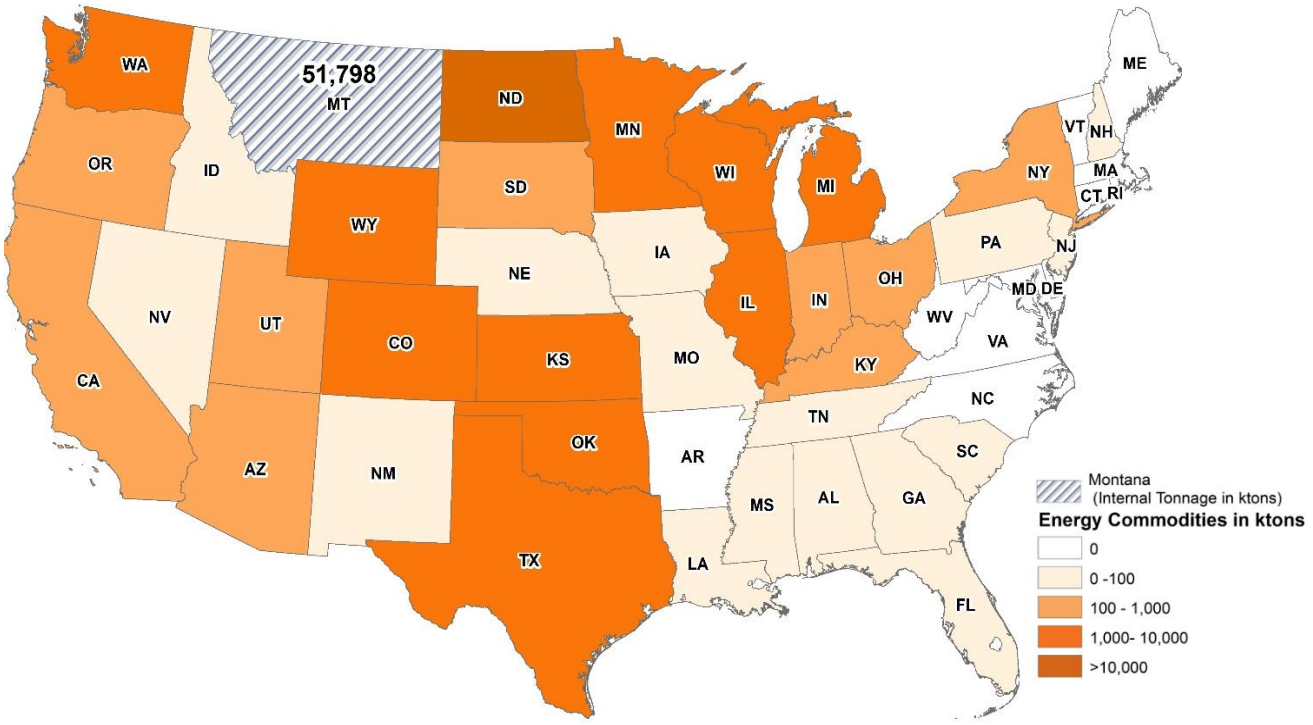


Figure 13: Montana Energy Commodities by Direction



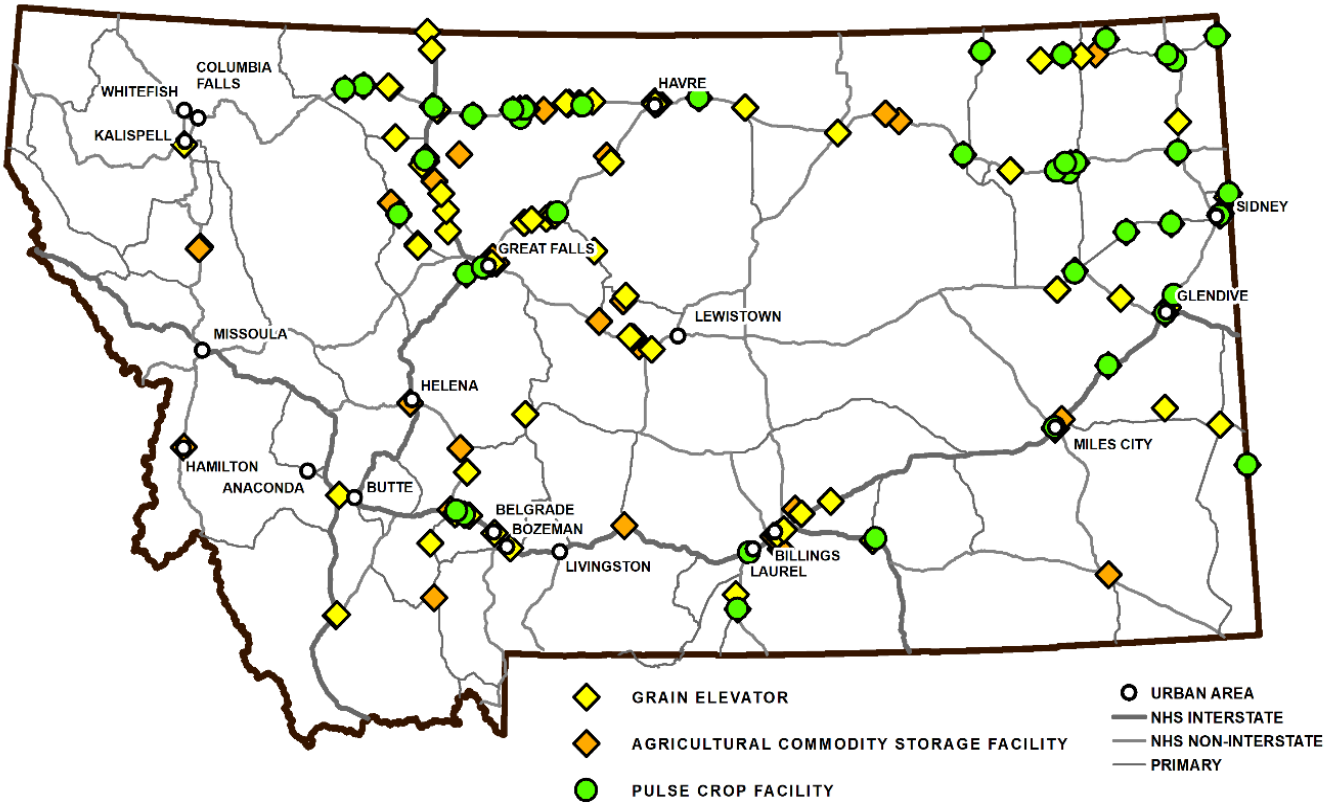
Agriculture

The agricultural sector in Montana plays an important role in the state's economy. In 2019 the value of crop production increased to $4.6 billion, a nearly 15 percent increase from 2017[24]. Approximately $1.6 billion of this production is attributed to animal agriculture, with another $1.5 billion attributed to crop production. Wheat is the largest crop measured by both acreage and value, contributing almost $1.1 billion in production value.

Land devoted to farming and ranching comprises over 62 percent of total acreage in Montana, down from 64 percent in 2017. The state has approximately 26,900 agricultural operations, a decrease of just over 3 percent from the 27,800 registered in 2017. The average size of an operation increased slightly from 2,147 acres each to 2,156 acres each[25].

Montana ranks third in the country for wheat production. In 2018, approximately 5.4 million acres of wheat worth approximately $1.1 billion was harvested in the state[26]. Approximately 25 percent of Montana's grain and 75 percent of pulse crops are exported out of the United States. These products generally move via truck from farms to rail loading facilities for shipment to west coast ports and other destinations. Montana livestock is transported almost exclusively by truck. Livestock shipments and crop harvest times are seasonal in nature, resulting in periods of increased truck traffic around ranches, farms, grain elevators, and rail loading facilities. Figure 14 shows locations of prominent grain elevators, pulse crop facilities, and agricultural commodity storage facilities.

Figure 14: Montana Grain and Pulse Crop Locations



Source: MDT Geospatial Information Section

The Agricultural Sector Supply Chain

Agriculture is one of the top industries in the state of Montana and roughly one out of every six Montana workers is employed in an agriculture-related field. With cattle and wheat representing three-fourths of the state's agricultural cash receipts, these commodities are critical to the economic wellbeing of the state.[27]

Over 27,000 farms on nearly 58 million acres annually support over 2 million cattle, 200 million bushels of wheat, 243 million pounds of milk, and other commodities.[28] Pulses, such as dried beans, chickpeas, and lentils, have increasingly been used by Montana farmers in crop rotations, reducing idle seasons and resulting in more frequent freight movements throughout the year. Montana became the leading U.S. producer of pulses in 2011.[29] The figures below describe the agricultural sector supply chain, including key commodities, transportation modes, and state destinations.

Figure 15: Agricultural Commodity Breakdown

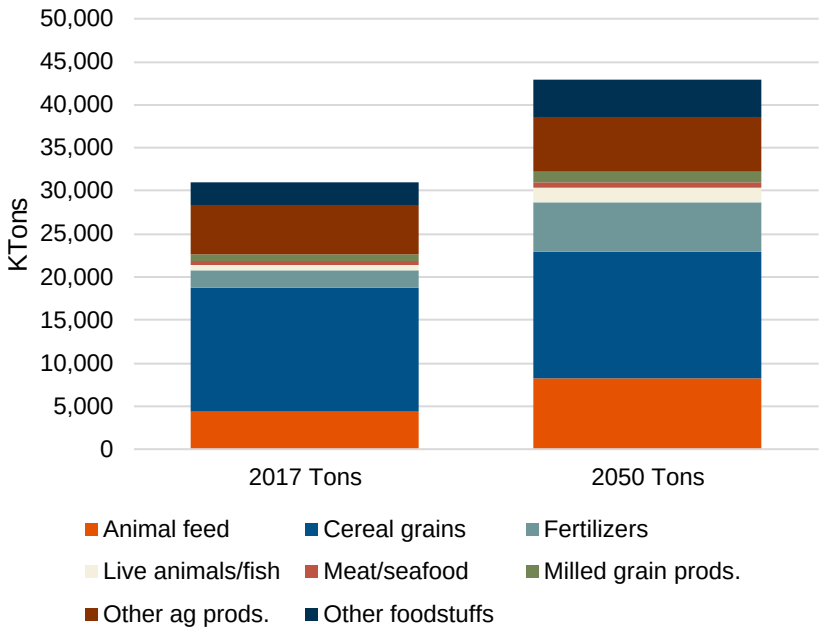
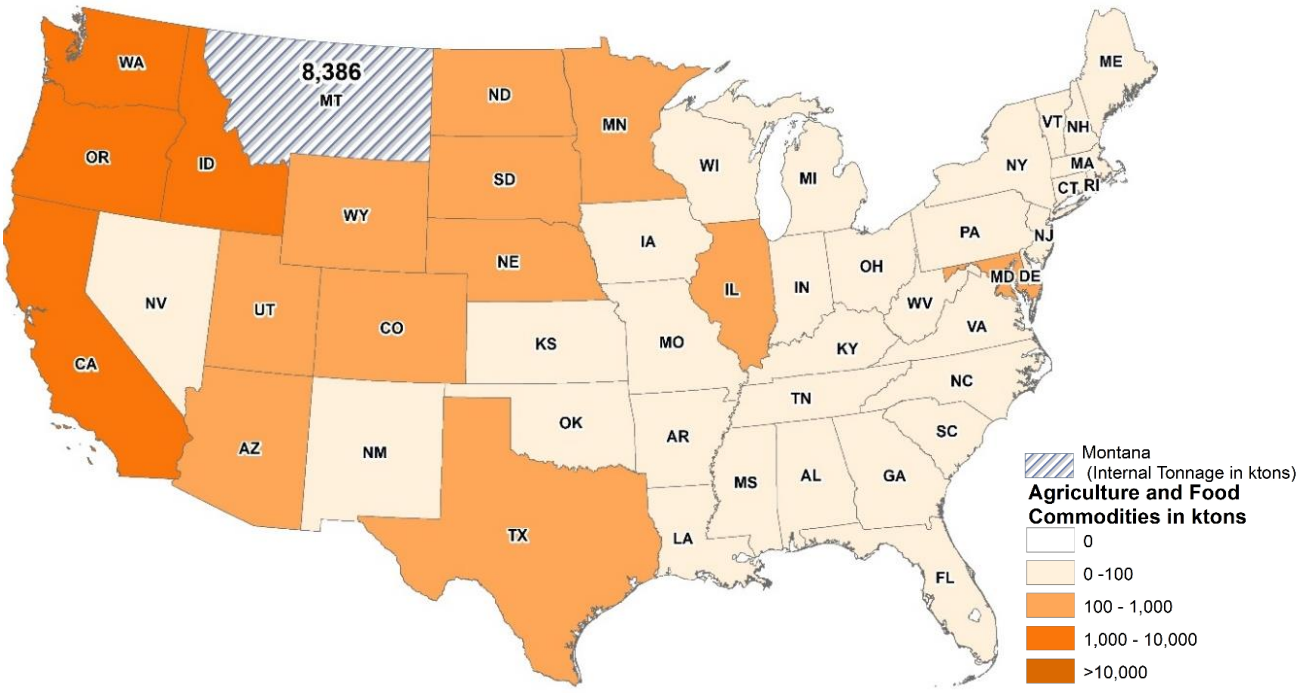


Figure 16: Agricultural Sector Supply Chain by Mode

Commodity	Truck	Rail	Pipeline	Air	Other or Multiple Modes
Animal Feed	●	○			
Cereal Grains	●	○			●
Fertilizers	●	●			
Live Animals/Fish	●				
Meat/Seafood	●				
Milled Grain Products	●	○			
Other Ag Products	●	○			○
Other Foodstuffs	●	○			○

Legend: ● *Primary Modes (25% of tonnage or more)* ○ *Supporting Modes*

Figure 17: Agricultural Commodities by Direction



Construction

Montana's population is steadily growing. With positive growth, comes the need for both residential and commercial development. Montana's average annual growth rate for jobs in the construction industry is currently at 4%, which makes it a top growing industry. In 2019, residential and nonresidential construction within the state was a $1.4 billion industry with 3,561 building permits issued.[30]

Montana's rich history of mineral and gemstone resources led to the creation of the Treasure State nickname. Its non-metallic minerals contribute greatly to the construction industry, including construction of residential, commercial, industrial, and transportation infrastructure. The U.S. Geological Survey reports nearly 12 million tons of sand and gravel and 3 million tons of crushed ton sold or used in Montana in 2018.[31] Together these commodities are estimated to be worth $111 million. In regard to the logging and wood product industry, Montana's nearly 20 million acres of timberland help to support a variety of businesses, including log manufacturers, furniture manufacturers, lumber facilities, and plywood plants. As of 2018, the forest industry supported nearly 8,000 jobs with earnings of $364 million to generate sales of $553 million in forest products.[32]

The Construction Sector Supply Chain

Construction is a very freight dependent industry, relying on goods and resources, such as metals, stone, wood products, heavy equipment, and more. In 2017 construction materials accounted for 16 percent of total tonnage moved in Montana with almost two-thirds of construction material movement remaining within in the state. By 2050, construction material commodities in Montana are expected to increase by 56 percent. This increase will be driven by growth in building stone, nonmetallic minerals, and gravel. The figures in this section describe the construction sector supply chain, including key commodities, transportation modes, and state destinations.

Figure 18: Construction Sector Commodity Breakdown

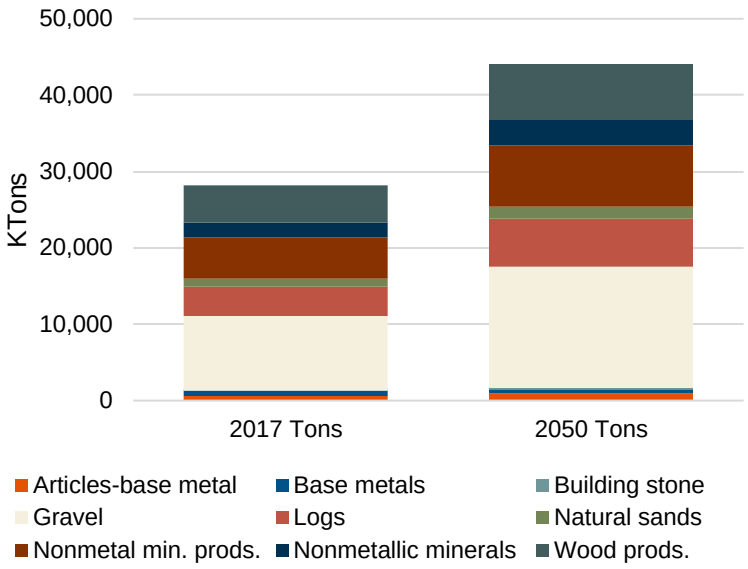
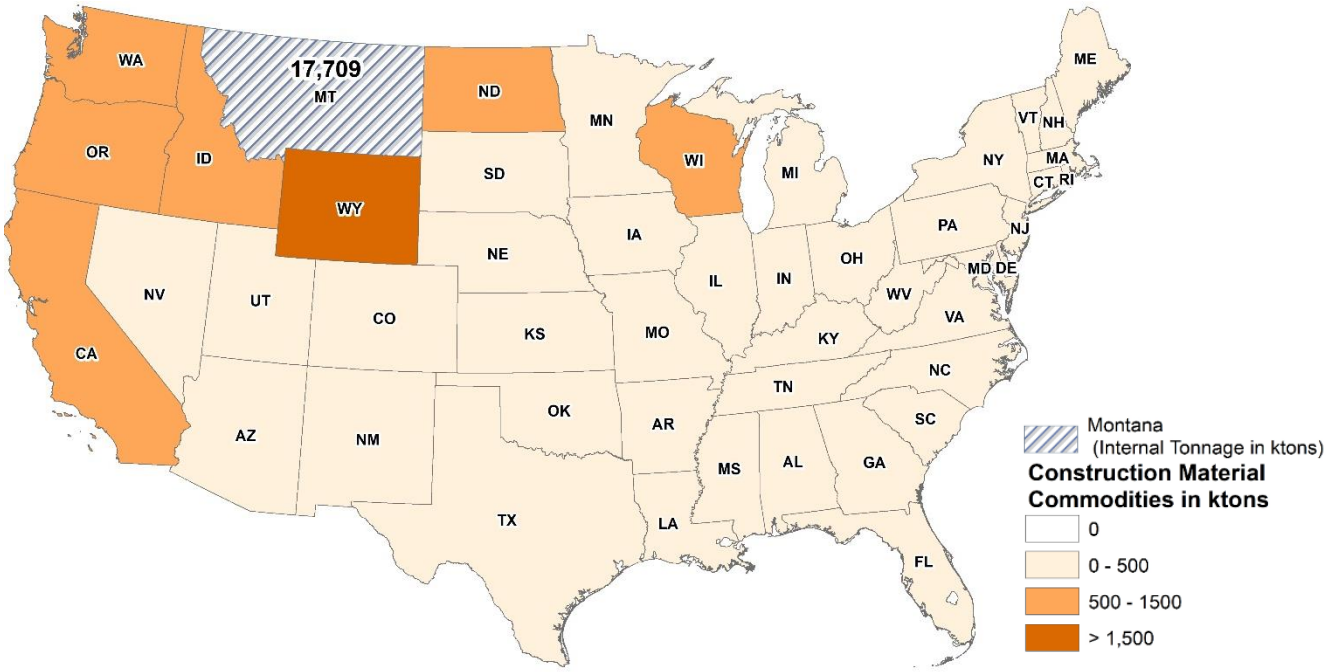


Figure 19: Construction Sector Supply Chain by Mode

Commodity	Truck	Rail	Pipeline	Air	Other or Multiple Modes
Articles – base metal	●	○			
Base metal	●	○			●
Building Stone	●				
Gravel	●	○			
Logs	●				
Natural Sands	●	●			
Nonmetal min. prods.	●	○			
Nonmetallic Minerals	●	○			○
Wood Products	●	○			○

Legend: ● *Primary Modes (25% of tonnage or more)* ○ *Supporting Modes*

Figure 20: Construction Sector Commodities by Direction



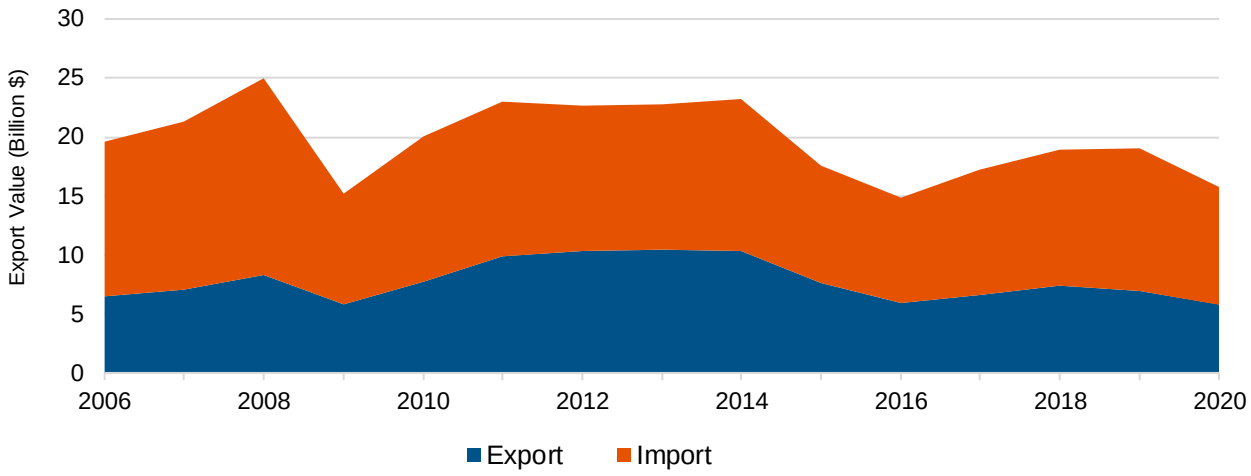
Freight Flows and International Trade

Trade is a vital part of Montana's economy. Exports support industry and jobs, while imports provide access to goods.

Montana as a Gateway

Montana ports-of-entry handled $15.7 billion in trade with its North American partners in 2020. For the three years prior to the COVID-19 pandemic, Montana ports averaged $18.4 billion per year. Imports made up between 60 and 65 percent of trade value in Montana during the same period. The Bureau of Transportation Statistics (BTS) does not publish export weights for all modes; however, it does provide value-based trade statistics. Figure 21, below, displays the value of freight goods that originated in another state and left the United States through a Montana land or air-port-of-entry.[33]

Figure 21: Historical Trend of North American Import and Export Value through Montana Ports (All Modes, 2006-2020) [34]



Exports from Montana

The FHWA FAF 5 data tabulation tool provides insight into commodities exported from Montana to international markets, excluding through traffic exports from other states. Montana's top exports by weight include coal, minerals and mineral products, agricultural products, and cereal grains. These are heavy, low-value commodities produced in the state.

Other than coal, refined products lead exports, by value. These include basic chemicals, tobacco products, textiles/leather, and other agricultural products as the top five.

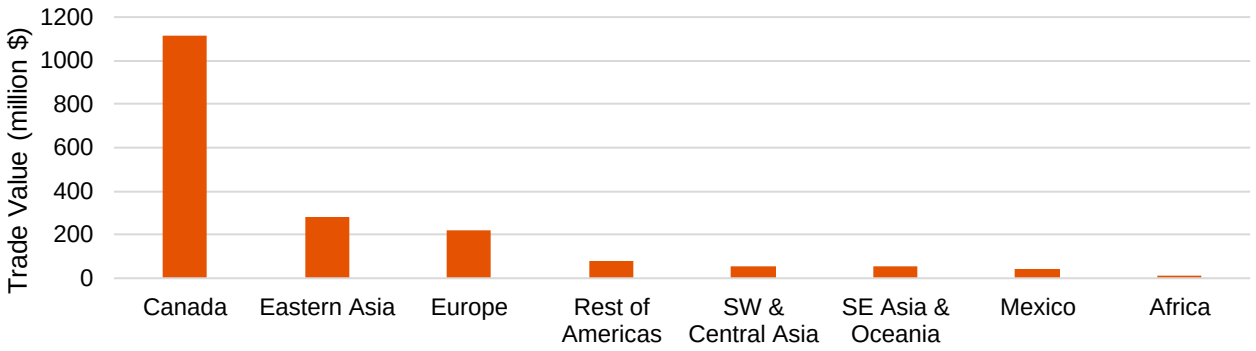
Notably, coal comprises 68 percent of exports by weight, but only 11 percent by value. Other top value commodities include small, lightweight products such as instruments and pharmaceuticals. Table 4 summarizes Montana's top export commodities.

Table 4: Top Export Commodities (2017)

Top Weight Exports	Thousands of Tons	Top Value Exports	Millions of Dollars
Coal	2,553	**Basic Chemicals**	$233
Nonmetal Mineral Products	263	**Tobacco Products**	$220
Other Ag Products	228	**Coal**	$205
Nonmetallic Minerals	173	**Textiles/Leather**	$202
Cereal Grains	144	**Other Ag Products**	$177
Crude Petroleum	79	**Machinery**	$140
Wood Products	60	**Precision Instruments**	$99
Gasoline	53	**Pharmaceuticals**	$56
Basic Chemicals	51	**Nonmetal Mineral Products**	$55
Milled Grain Products	37	**Live Animals/Fish**	$48
All Others	140	**All Others**	$423
Total	3781	**Total**	$1,858

Canada is Montana's largest export market, comprising 60 percent of $1.8 billion in exports in 2017. The remaining export markets are primarily accessed through ports in Washington state. The FAF 5 estimates that more than half of Montana's exports to countries other than Canada travel through Washington. By weight, more than 90 percent of Montana exports are sent to Canada. No other market received more than 2.5 percent of export weight. Figure 22 displays export markets by value in 2017.

Figure 22: Top Export Markets by Value (2017)



Source: FHWA Freight Analysis Framework, Version 5

Imports to Montana

Energy products play a significant role in Montana imports. Crude petroleum and coal byproducts (coal not elsewhere classified), fertilizers, wood products, and cereal grains comprise the top import commodities by weight. Over half of import tonnage in 2017 was in crude petroleum. By value, many of the same commodity groups are represented in the top import commodities. Some high-value manufactured products are also present: machinery, motorized vehicles, and electronics. Table 5 summarizes the top import commodities in Montana by weight and value in 2017.

Table 5: Top Import Commodities (2017)

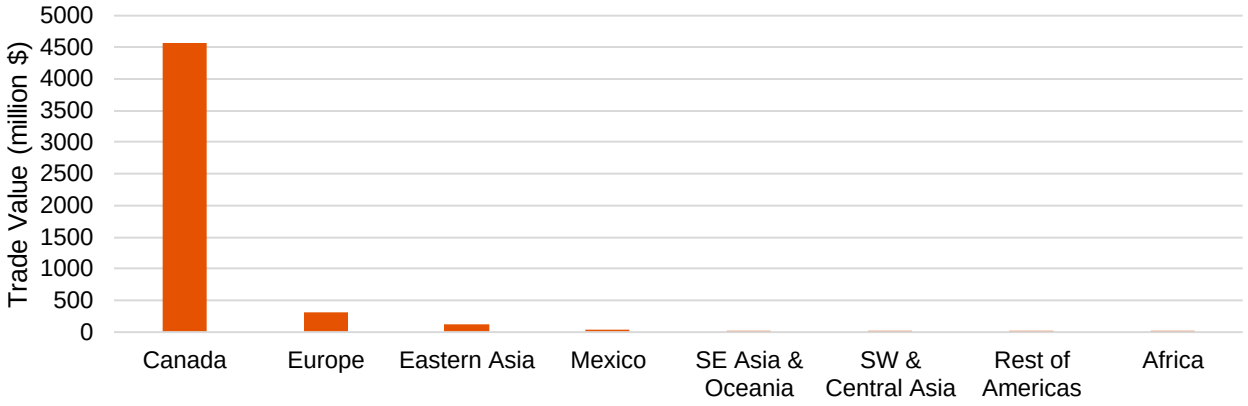
Top Weight Imports	Thousands of Tons	% of Weight	Top Value Imports	Millions of Dollars	% of Value
Crude Petroleum	9,372	52%	**Crude Petroleum**	$3,023	60%
Coal-n.e.c.*	7,192	40%	**Coal-n.e.c.***	$691	14%
Fertilizers	477	3%	**Waste/Scrap**	$291	6%
Wood Products	192	1%	**Machinery**	$131	3%
Cereal Grains	147	<1%	**Motorized Vehicles**	$116	2%
Fuel Oils	86	<1%	**Fertilizers**	$114	2%
Basic Chemicals	78	<1%	**Wood Products**	$91	2%
Animal Feed	50	<1%	**Articles-Base Metal**	$57	1%
Nonmetal Mineral Products	43	<1%	**Electronics**	$53	1%
Waste/Scrap	39	<1%	**Textiles/leather**	$43	<1%
All Others	191	1%	**All Others**	$444	9%
Total	17,867	100%	**Total**	$5,054	100%

Source: FHWA Freight Analysis Framework, Version 5, 2021.

**Coal-n.e.c. refers to crude petroleum and coal products that do not fall under crude petroleum, coal, fuels, or fuel oils.*

Nearly all of Montana's imports came from Canada in 2017: 99 percent of weight and 90 percent of value. Imports from Europe and other markets entered the U.S. through gateways in Texas, Washington, and New Jersey before reaching end markets in Montana. Figure 23 displays Montana's top import partners by value for 2017.

Figure 23: Top Import Markets by Value (2017)

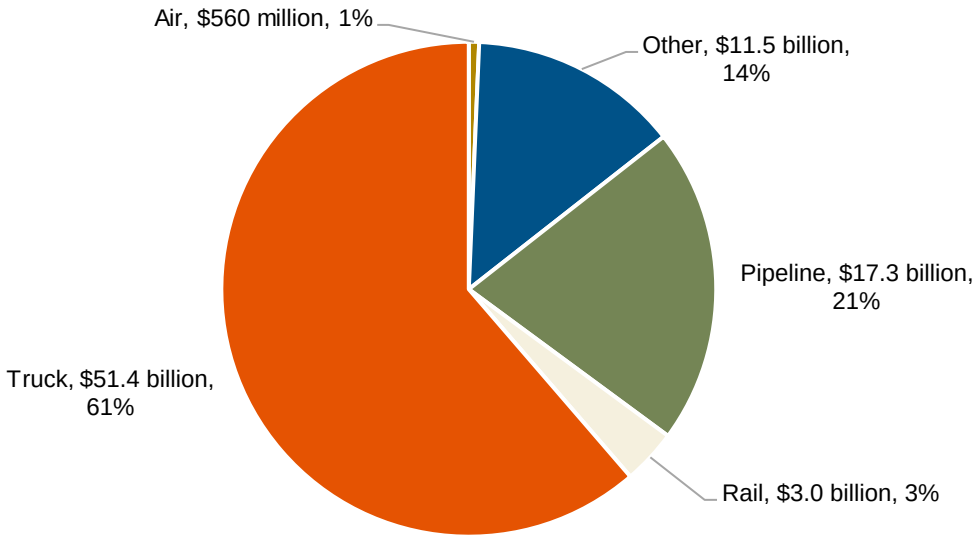


Source: FHWA Freight Analysis Framework, Version 5

Freight Transportation by Mode

The majority of freight in Montana is moved by three modes of travel: truck, rail, and pipeline. Figure 24 shows the mode split by the value of goods transported. In 2017, approximately $84 billion worth of goods were transported into and out of Montana. By value, trucking is the dominant form of freight transportation in the state, transporting approximately $51 billion of goods in 2017.[35] "Other" includes shipments that utilize multiple modes and usually involve trucking at some point, such as truck to rail intermodal transport.

Figure 24: Freight Shipments by Mode and Value (2017)



Source: FHWA Freight Analysis Framework, Version 5
Note: Includes inbound, outbound, and within state freight movements

Table 6. below, shows the average value per ton transported for each mode. Though air cargo represents 1 percent of all freight movement by value and tonnage, it has the highest value per ton and should not be ignored given consumer trends.

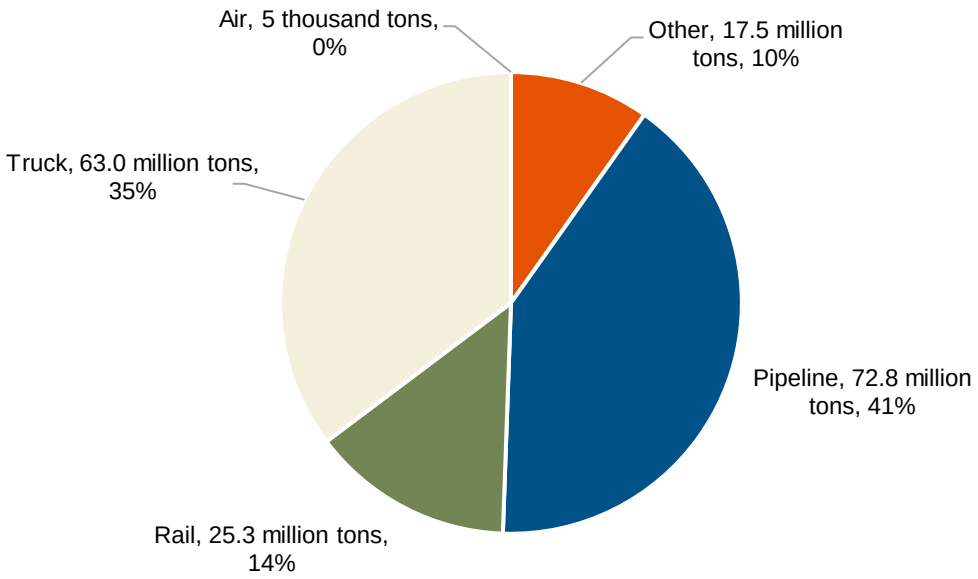
Table 6: Freight Mode Value per Ton (2017)

Mode	Value Per Ton
Air	$109,800
Other	$1,140
Truck	$820
Pipeline	$240
Rail	$120
Total:	**$112,120**

Source: FHWA Freight Analysis Framework, Version 5, 2021

Figure 25 shows the mode split by the weight of goods transported. In 2017 approximately 179 million tons were transported into and out of Montana. Rail and pipeline typically move low-value and often bulk commodities across long distances, as shown by the high proportion of freight moved when measured by weight and low proportion of freight moved when measured by value. Rail and pipeline movement in Montana is above the national average by weight. Nationally, pipelines move only 18 percent of total freight tonnage while rail moves just 8 percent compared to moving 41 percent and 14 percent of tonnage in Montana, respectively.[36]

Figure 25: Freight Shipments by Mode and Weight (2017)



Source: FHWA Freight Analysis Framework, Version 5
Note: Includes inbound, outbound, and within state freight movements

Montana Highways

Highways and trucking are the backbone of the freight transportation system in Montana, moving 61 percent of freight by value and 35 percent by weight[37]. The extent of Montana's highway system includes over 73,000 centerline miles with approximately 78 percent of the state's roadway mileage is in jurisdictions designated as rural. Table 7, below, shows Montana's centerline road mileage.

The National Highway System (NHS) and Primary road systems represent 53 percent of MDT's route mileage, yet these two systems carry 83 percent of the traffic. Approximately 91 percent of the commercial truck traffic in Montana occurred on NHS roads in 2019.[38]

Table 7: Centerline Road Mileage (2019)

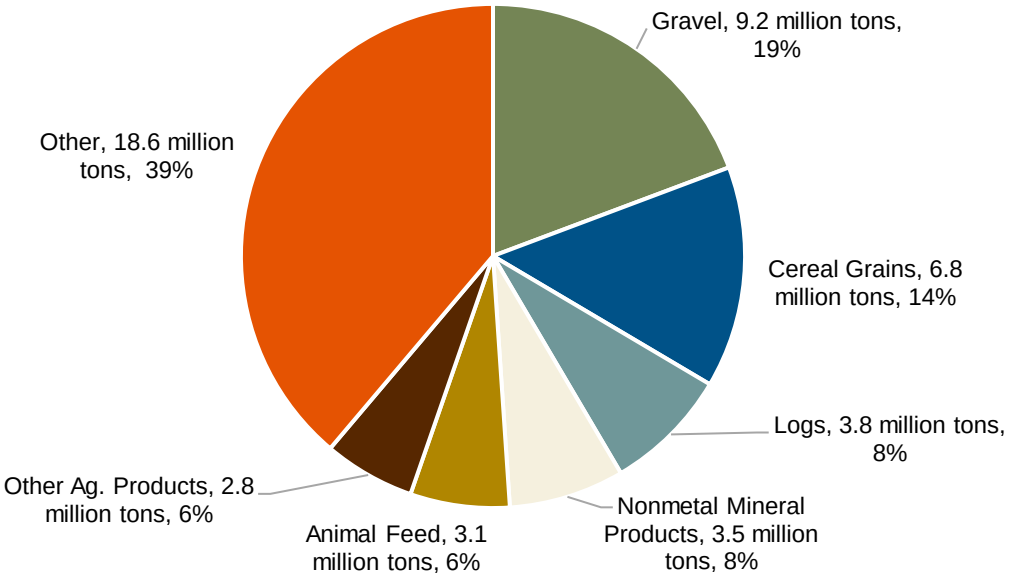
Road Type	Total Miles
NHS Interstate	1,192
Non-Interstate NHS	2,995
Primary	2,657
Secondary	4,503
Urban	433
State Highway	1,143
Local Roads (Urban)	3,446
Local Roads (Rural)	57,279
Total:	**73,648**

Source: MDT Geospatial Information Section

Commodities Moved by Truck

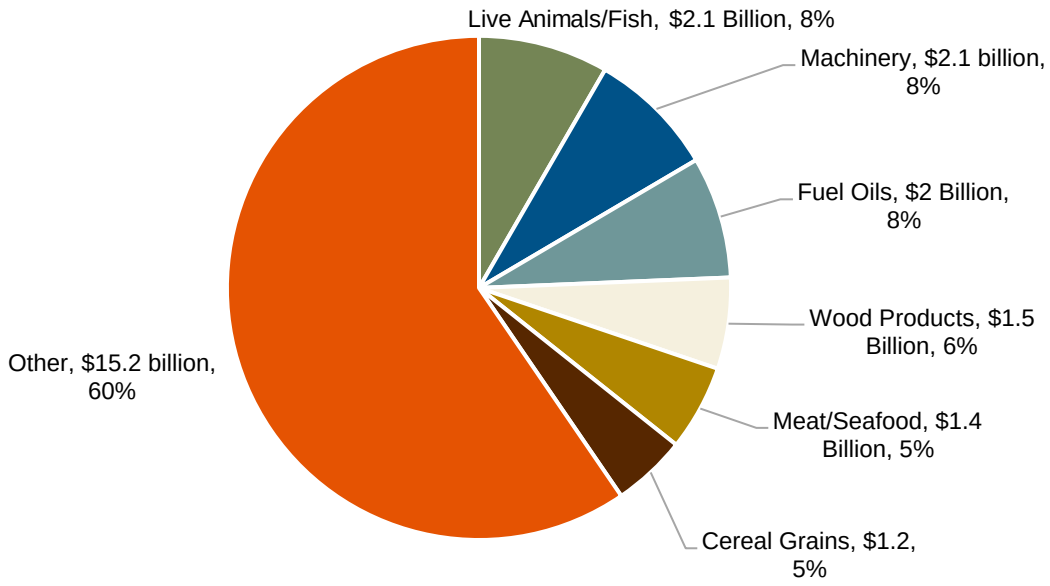
Figure 26 and Figure 27 show the top commodities shipped via truck by weight and value, respectively. The most common commodities moved by weight and value include material products such as gravel and other nonmetal minerals, cereal grains, animal feed, meat/seafood, and live animals/fish. These commodities represent some of the largest industries in Montana, namely the extraction and agriculture industries. It's worth noting that gravel is the top commodity moved via truck by weight but is not one of the most valuable commodities transported when considering value. The opposite is true for live animals/fish and machinery, which are not top commodities by weight, but are the leading commodities transported by truck when measuring value. Finally, the top six commodities, moved by truck, represent 61 percent of the total tonnage, but the top six commodities by value represent just 40 percent of the total value moved by, truck.

Figure 26: Top Commodity Shipments by Truck in Tons (2017)



Source: FHWA Freight Analysis Framework, Version 5
Note: Includes inbound, outbound, and within state freight movements

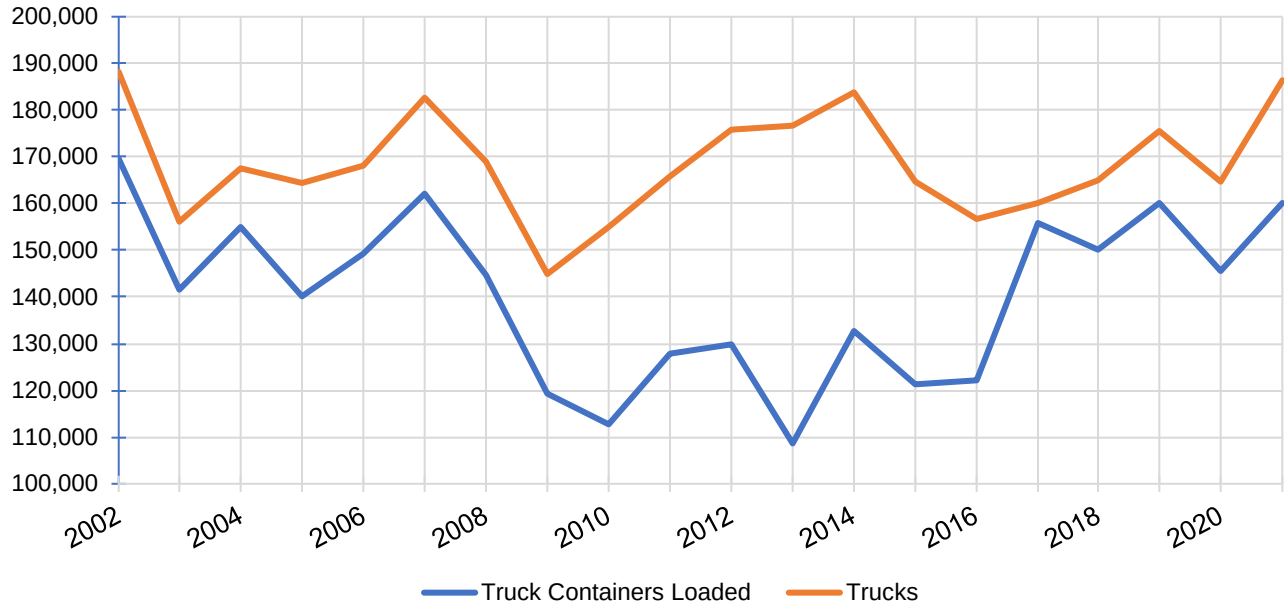
Figure 27: Top Commodities by Truck by Value (2017)



Source: FHWA Freight Analysis Framework, Version 5
Note: Includes inbound, outbound, and within state freight movements

Figure 28 shows the number of trucks and loaded truck containers that have entered Montana between 2002 and 2020.[39] In 2020 at the beginning of the COVID-19 pandemic, approximately 164,000 trucks entered Montana. Despite a dip in truck and container traffic from 2019 to 2020 (likely driven by the pandemic), there has been overall growth in loaded containers (3 percent) and cross border truck traffic (16 percent), entering the state, since 2017.

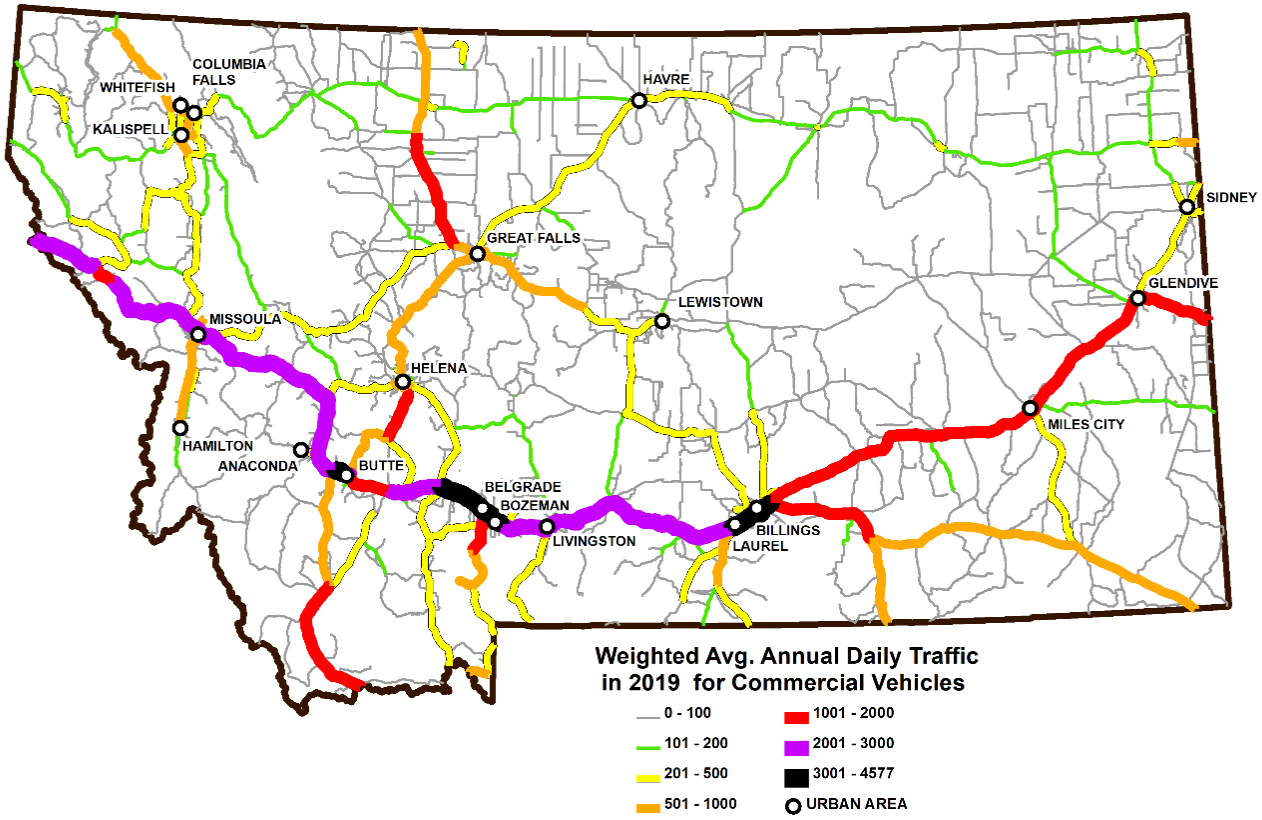
Figure 28: Border Crossing Entry of Loaded Containers and Trucks (2002-2021)



Source: BTS, Border Crossing/Entry Data

In 2020 commercial vehicles traveled approximately 3.35 million vehicle miles daily in Montana, representing a 2.7 percent increase in daily vehicle miles traveled (DMVT) compared to 2019.[40] The majority of commercial truck traffic occurred on interstate and non-interstate National Highway System (NHS) roads. Figure 29 shows average annual daily traffic for commercial vehicles.[41] Interstate-90 (I-90) is the most heavily traveled road, with the highest concentrations of truck traffic between Billings and Butte. Interstate 94 (I-94), Interstate 15 (I-15), United States Highway 212 (US 212), United States Highway 87 (US 87), and United States Highway 93 (US 93) also had higher levels of traffic.

Figure 29: Montana Commercial Truck Traffic (2019)

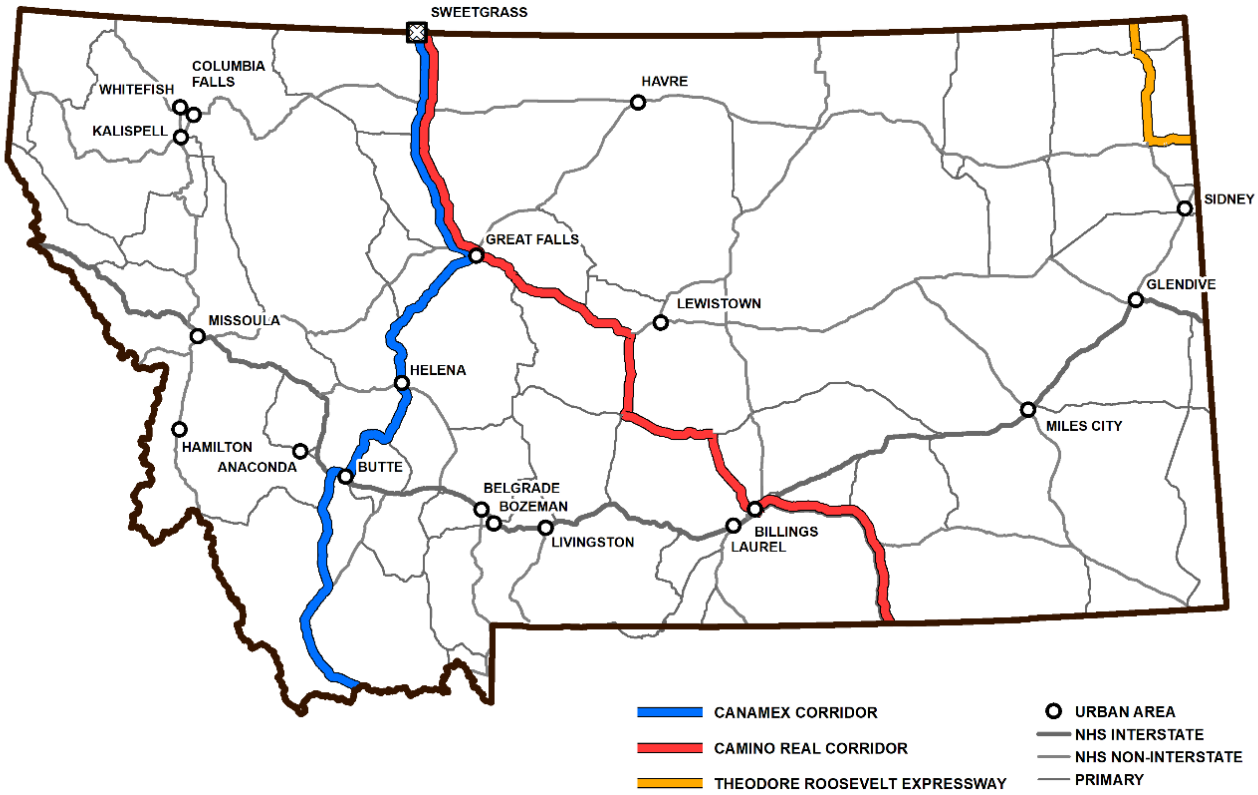


Source: MDT Geospatial Information Section and Traffic Data Collection Section

Designations of Montana's Transportation Network

Beginning with the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA), corridors have been designated in federal transportation legislation as high priority corridors on the National Highway System (NHS).There are three congressionally designated high priority corridors in Montana[42], shown in Figure 30., including the Canamex corridor, following I-15, the Camino Real corridor running north-south along I-90, US 87, and I-15, and the Theodore Roosevelt Expressway running along US 2 and Montana State Route 16 from North Dakota to the Canadian border.

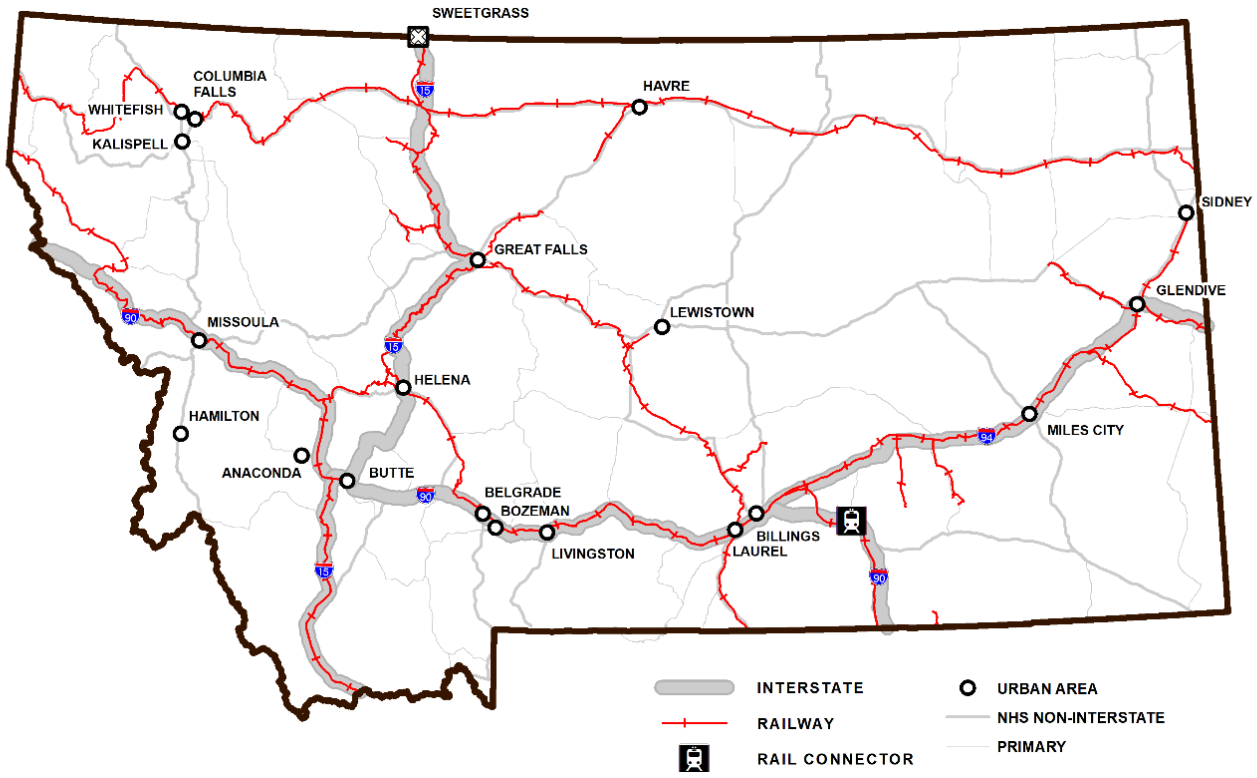
Figure 30: Montana Federally Designated Corridors



Source: MDT Geospatial Information Section

The United States Department of Transportation (USDOT) published the Interim National Multimodal Freight Network (NMFN), in June 2016, as required under 49 USC §70103. The network addresses all modes of freight transportation, which is highway and rail for Montana.[43] Figure 31 shows the proposed Interim NMFN for Montana. As of the date of this freight plan, the USDOT has not finalized the NMFN and it remains in interim status.

Figure 31: Interim National Multimodal Freight Network in Montana



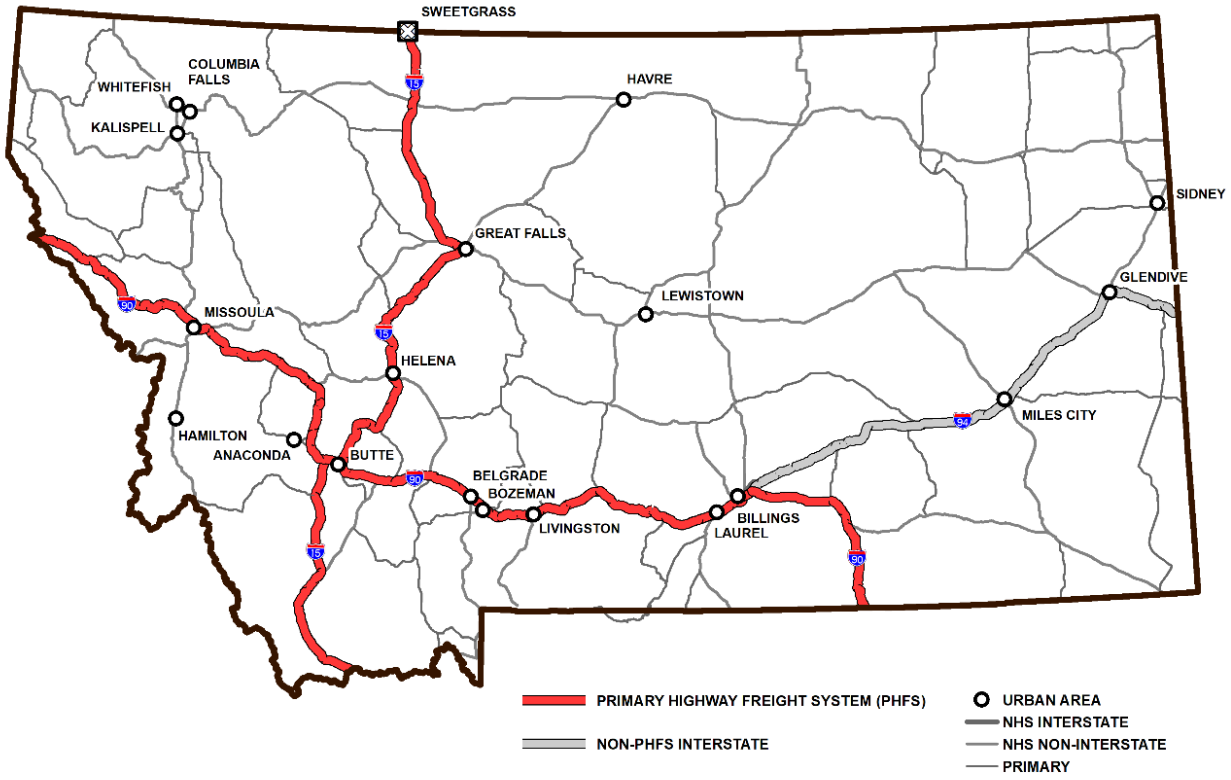
Source: MDT Geospatial Information Section

The National Highway Freight Network (NHFN) strategically directs federal resources and policies toward improved performance of highway portions of the U.S. freight transportation system. The NHFN includes the following roadway subsystems:

- Primary Highway Freight System (PHFS): This is a network of highways identified as the most critical highway portions of the U.S. freight transportation system determined by measurable and objective national data. In Montana, I-15 and I-90 are designated as interstates on the PHFS. Currently, Montana's National Highway Freight Program (NHFP) funding is dedicated to projects on the PHFS.
- Other Interstate portions not on the PHFS: These highways consist of the remaining portion of Interstate not included in the PHFS. These routes provide important continuity and access to freight transportation facilities. In Montana, this includes I-94.
- Critical Rural Freight Corridors (CRFCs): These are public roads in non-urban areas which provide access and connection to the PHFS and Interstates with other important ports, public transportation facilities, or other intermodal freight facilities. Currently, Montana does not have any CRFC's designated within the state.
- Critical Urban Freight Corridors (CUFCs): These are public roads in urban areas which provide access and connection to the PHFS and Interstates with other ports, public transportation facilities, or other intermodal transportation facilities. Currently, Montana does not have any CUFC's designated within the state.

Figure 32 shows the currently designated NHFN within the state. Designation of highways as part of the NHFN and PHFS is important for the allocation and use of NHFP funding for projects on the interstate, in Montana.

Figure 32: Montana National Highway Freight Network

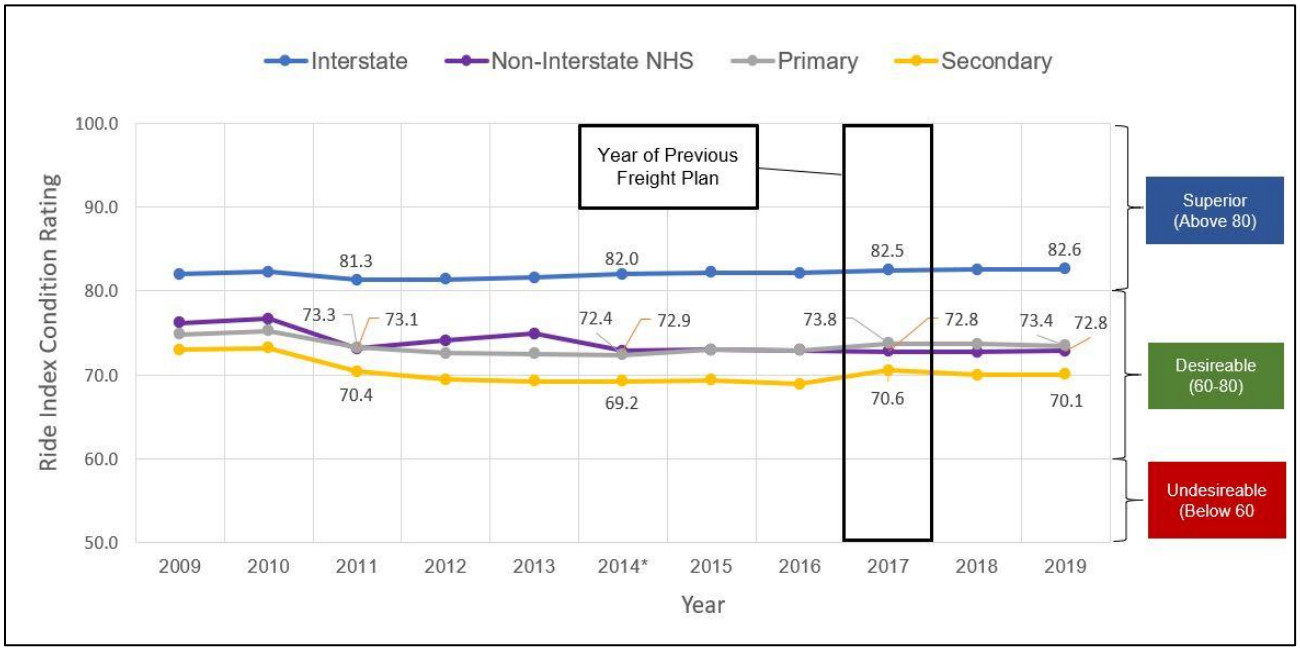


Source: MDT Geospatial Information Section

Pavement Condition and Ride Index

MDT collects data on pavement quality in order to understand and track the condition of roadways across the state. MDT uses several metrics to evaluate pavement condition including Ride Index (RI), which is a measure of perceived ride smoothness. It is calculated by converting the International Roughness Index (IRI) in inches per mile to a zero to one hundred scale. MDT assigns superior/desirable/undesirable levels as shown in Figure 33. MDT has a performance goal of maintaining an Average Ride Index Condition Rating in the desirable or superior range with less than 3 percent of roadway miles in unsatisfactory condition.[44]

Figure 33: Montana Pavement Ride Index (2009 – 2019)



Source: MDT Geotechnical and Pavement Bureau (2021).
**NHS system expanded in 2013 due to changes in Federal law.*

Data is collected by MDT by using vehicles equipped with a road profiling system, lasers, and 3D cameras. The Pavement Management System (PvMS) provides methods to analyze multiple data types. Examples of pavement condition are shown in Figure 34. Figure 35 shows the condition of roads in Montana by system, expressed as a percentage of centerline miles.

Figure 34: Montana Pavement Ride Index Pavement Examples

Good

Visible traffic wear with low severity cracking and minimal rutting

Fair

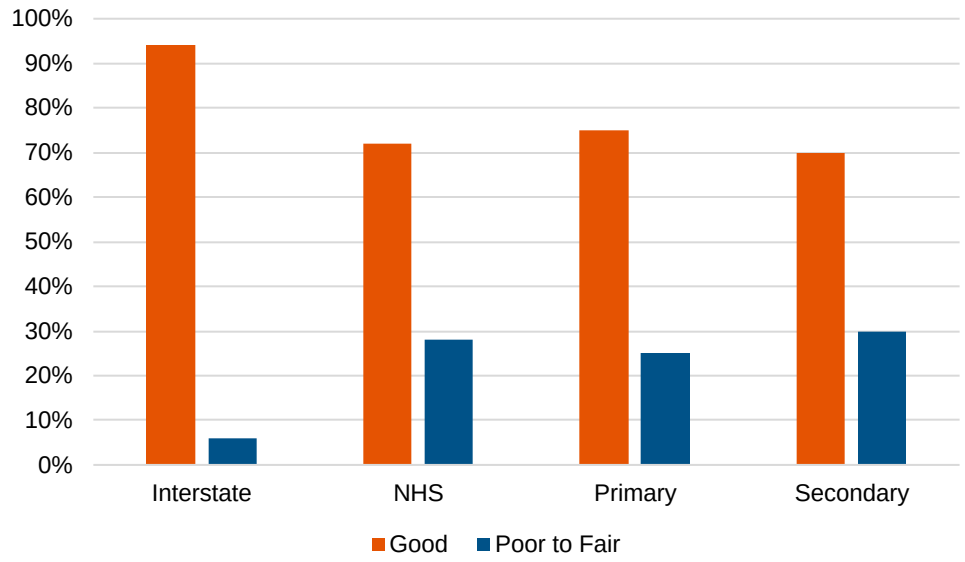
Moderate cracking in extent and severity, slight rutting and aggregate loss

Poor

Prevalent cracking in extent and severity, heavy rutting, patching

Source: MDT Fact Book 2020

Figure 35: Montana Pavement Condition (2019)



Source: MDT Fact Book 2020

Montana's Rest Areas and Truck Parking

A major national safety concern related to freight is the lack of truck parking. This poses two primary safety challenges. First, it can lead to fatigued drivers because they are not able to find a place to rest. Secondly, it may also lead drivers to park in undesignated and potentially unsafe areas for rest. Title 23 USC §120 addresses this issue by incorporating "Jason's Law", which surveyed truck parking availability and developed metrics to understand shortages. Based on the survey, conducted in 2014, Montana had the highest number of truck parking spaces per 100,000 miles of daily combination VMT in the nation. Based on an updated survey, conducted in 2019, Montana continued to rank in the top 5 states with the most spaces relative to truck VMT.[45]

Together with the private sector in the state and Motor Carrier Services, MDT is working to address the needs of truck parking and rest areas. Providing adequate truck parking is an effective solution for improving safety conditions on key freight corridors. Additional discussions on truck parking needs are discussed further in Chapters 7 and 8.

Montana Rail

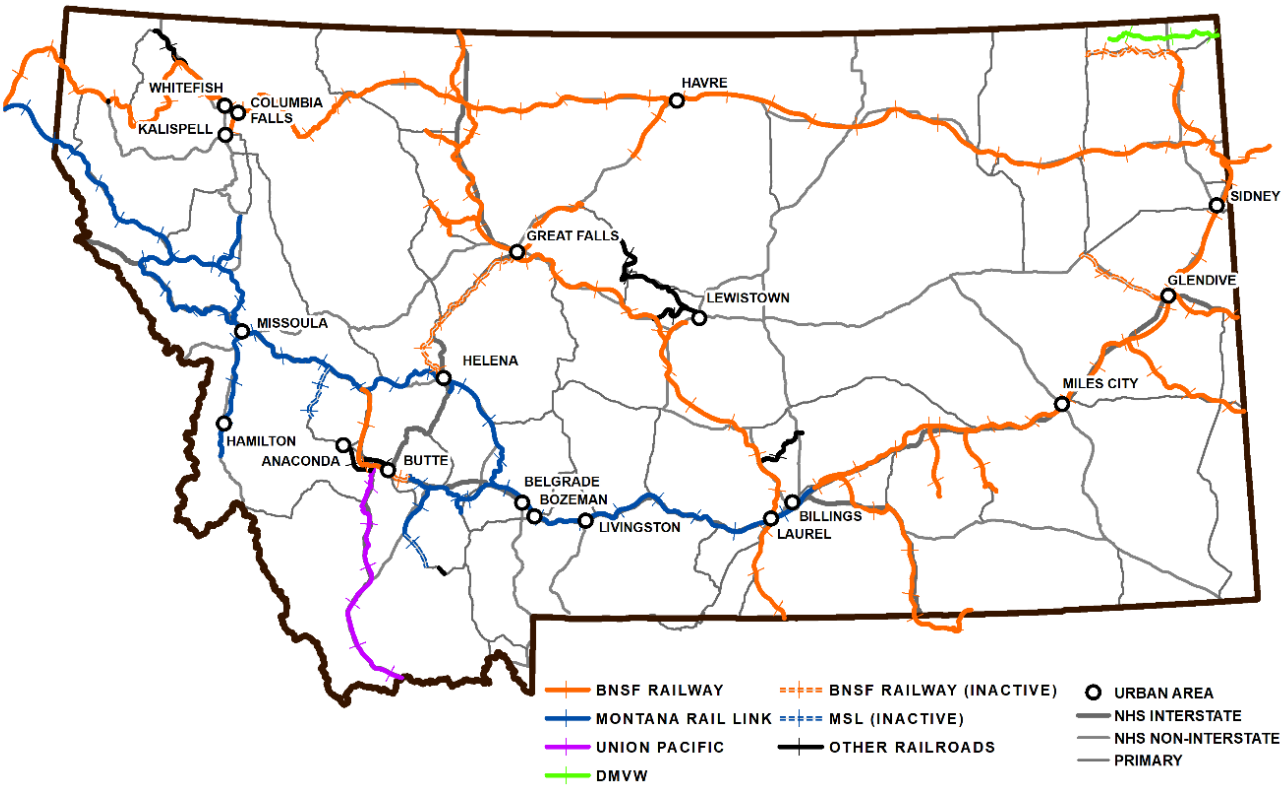
Montana's rail network comprises over 3,500 miles of active track. Railroads are categorized by the Surface Transportation Board based on annual operating revenues, with Class I railroads generating the largest revenues (over $900 million annually).[46]

The primary Class I railroad in Montana is BNSF Railway (BNSF). BNSF's network spans much of the western United States and provides connections to markets throughout the country. The east-west corridor through northern Montana (along U.S. Highway 2) runs from Seattle to Chicago, with service to intermodal facilities in Seattle, Spokane, St. Paul, and Chicago. The north-south route through central Montana (Sweet Grass to south of Laurel) connects the Sweet Grass border crossing in Canada to other intermodal facilities in larger metropolitan areas of the mountain west.

Class II and III railroads provide regional and local connections. While these railroads may have lower volumes, they can be critical for supporting industry and providing access to markets. Montana Rail Link (MRL) is the second largest carrier in Montana behind BNSF operating and leasing nearly 900 miles of BNSF track. MRL serves as a bridge for BNSF's former Northern Pacific transcontinental route across southern Montana, connecting Billings to Sandpoint Idaho paralleling I-90 and Montana Highway 200. However, in 2021, BNSF initiated preliminary steps in purchasing MRL, the largest class II railroad in the state. As of the date of this plan, BNSF has yet to submit an official filing with

the Surface Transportation Board regarding the purchase. Montana's rail network is shown in Figure 36, and active track miles by operator are shown in Table 8.

Figure 36: Montana Rail System Operators



Source: MDT Geospatial Information Section

Table 8: Rail Operators and Active Track Miles

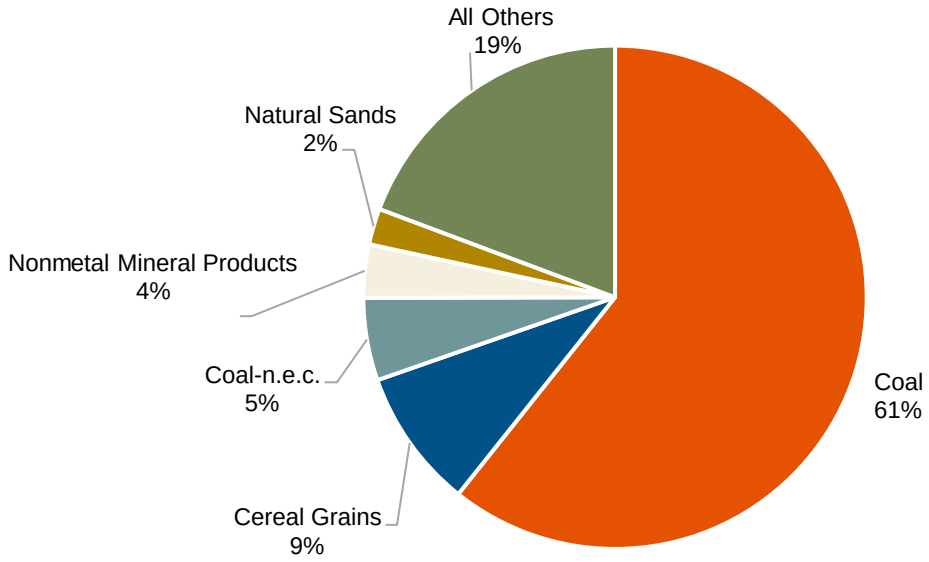
Railroad	Length (Miles)
Class I	**2,437.20**
BNSF	2,311.50
Union Pacific Railroad (UP)	125.7
Class II / Regional Railroad	**930.3**
Dakota, Missouri Valley, and Western (DMVW)	56.4
Montana Rail Link (MRL)	873.9
Class III / Local Railroad	**177.3**
Butte, Anaconda and Pacific Railway (BAP)	28.7
Central Montana Rail (CM)	89
Global Rail Group (GRGL)	30.2
Mission Mountain Railroad (MMT)	24.1
Transco Railway Products (TRRZ)	3.8
Tourist Railroad	
Alder Gulch Short Line Railroad	1.5
Total Active	**3,544.80**
Inactive	**145.7**
Total	**3,690.50**

Source: Montana Open Data Portal, Montana Railroads, 2021: https://gis-mdt.opendata.arcgis.com/

Commodities Moved by Rail

The primary commodity carried by rail in Montana is coal. In 2017, coal accounted for 61 percent of weight and 9 percent of the value of freight moved by rail to, from, and within Montana. Other coal and petroleum products (such as oils, liquefied natural gas, or petroleum coke) were a second energy-related commodity group commonly moved by rail. In addition to moving coal and related products, rail also provides important connections for agriculture in Montana. Cereal grains (such as wheat or barley) were the next largest rail commodity by weight and the top rail commodity by value. Nonmetallic mineral products (such as cement, ceramics, or glass) and natural sand products also ranked in the top five commodities by weight (Figure 37 and Table 9).

Figure 37: Top Rail Commodity Shipments by Weight (2017)



Source: FHWA Freight Analysis Framework, Version 5, 2021. Coal-n.e.c. stands for "not elsewhere classified," and includes various coal and petroleum products.

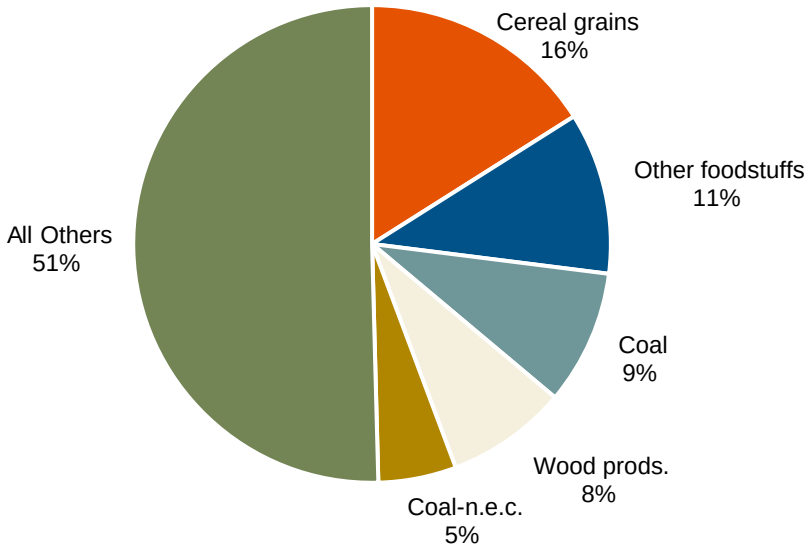
Table 9: Top Rail Commodities by Tonnage (2017)

Commodity Group	Thousands of Tons
Coal	15,396
Cereal Grains	2,272
Coal-n.e.c.	1,346
Nonmetal Mineral Products	867
Natural Sands	589
All Others	4,894
Total:	**25,364**

Source: FHWA Freight Analysis Framework, Version 5. Coal-n.e.c. stands for "not elsewhere classified," and includes various coal and petroleum products.

By value, additional types of freight ranked in the top commodities moved by rail in Montana. Other foodstuffs (such as oils, flours, or sugars) were the second highest commodity group by value (Figure 38 and Table 10). Railroads in Montana also move a large value of wood products (such as wood chips or timber). Both of these commodity groups were not ranked among the top five by weight, but they include refined products that have a higher value per ton than raw materials.

Figure 38: Top Commodity Shipments by Rail by Value (2017)



Source: FHWA Freight Analysis Framework, Version 5. Coal-n.e.c. stands for "not elsewhere classified," and includes various coal and petroleum products.

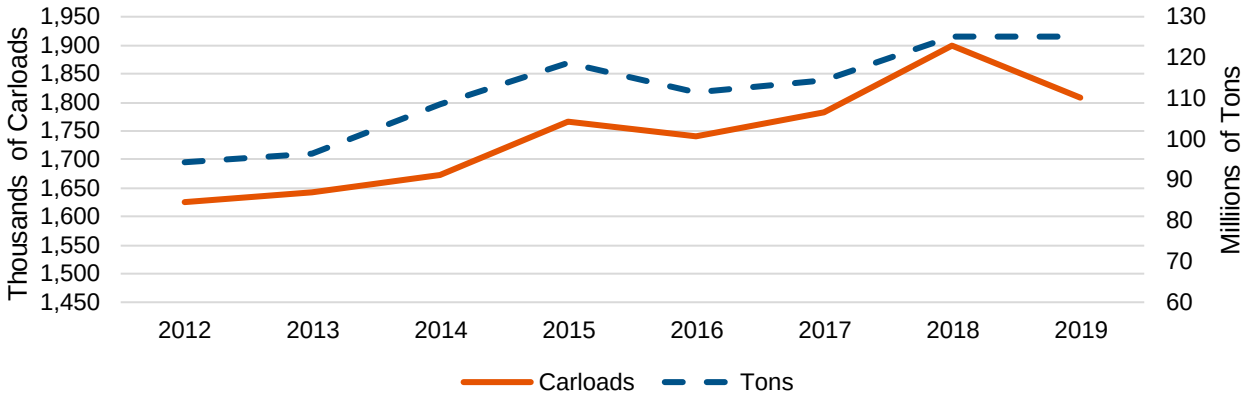
Table 10: Top Rail Commodities by Value (2017)

Commodity Group	Millions of Dollars
Cereal Grains	$480
Other Foodstuffs	$328
Coal	$273
Wood Products	$245
Coal-n.e.c.	$158
All Others	$1,510
Total:	**$2,994**

Source: FHWA Freight Analysis Framework, Version 5. Coal-n.e.c. stands for "not elsewhere classified," and includes various coal and petroleum products.

Since 2012, the Surface Transportation Board has published carloads and rail tonnage moving to, from, or through each state. Carloads in Montana grew by 11 percent between 2012 and 2019, and tonnage increased by 33 percent (Figure 39.).

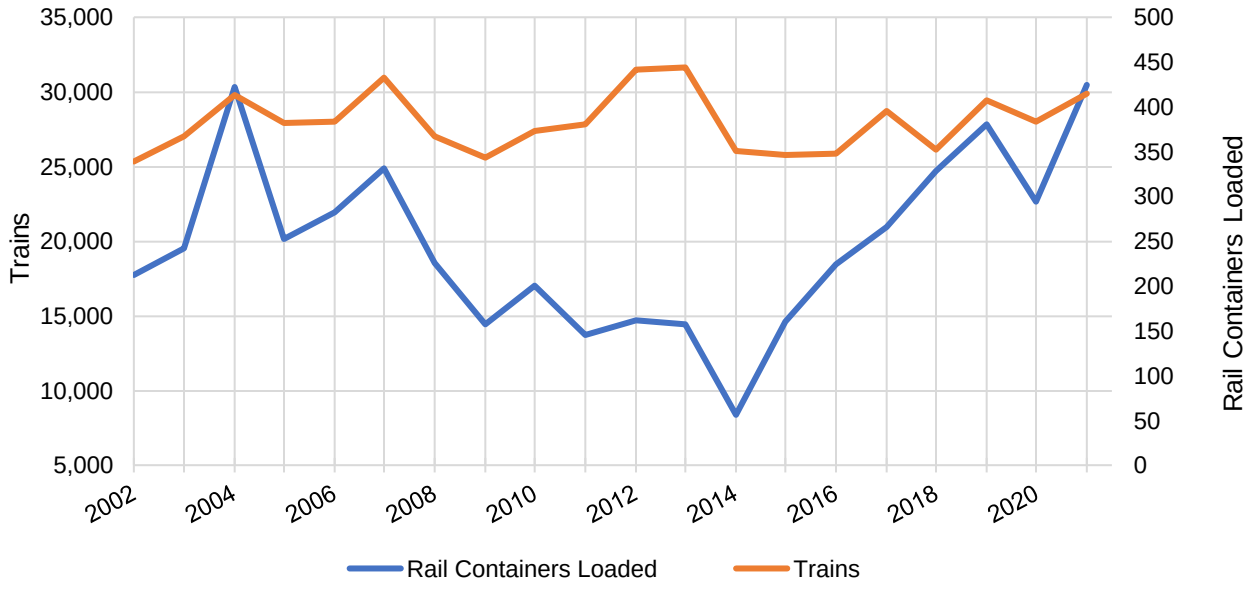
Figure 39: Montana Carloads and Rail Tonnage (2012-2019) [47]



Includes carloads and tons that originate, terminate, or pass through each state.

The BNSF Sweet Grass rail subdivision extends to the Sweetgrass-Coutts border crossing at the northern end of the I-15 corridor, where it exchanges with Canadian Pacific Railroad (CP) to continue on to Canadian markets. The Sweetgrass port-of-entry is the only international rail crossing in Montana. Currently, at least one train per day, on average, enters the U.S. through Montana. Train entries into the U.S. through the port-of-entry have historically fluctuated between 300 and 500 trains per year, and the same is true for the most recent decade (Figure 40). Container entries are more varied. Since 2014, container entries have grown rapidly, returning to volumes not seen since before the 2008 recessionary period.

Figure 40: Montana Border Crossing Entry of Loaded Containers and Trains (2002-2021) [48]



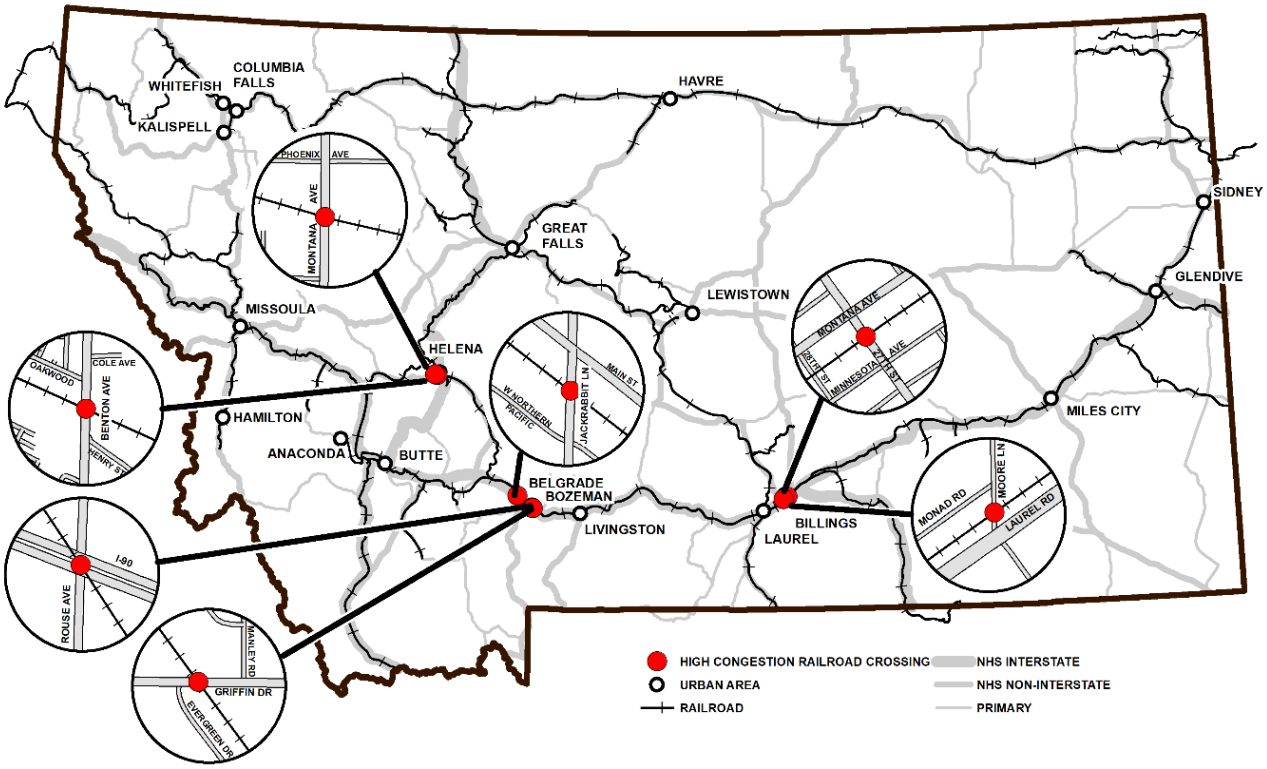
At-Grade Highway-Rail Crossings

Train traffic can cause delay to motor vehicles as well as increase traffic safety risks and possible collisions between train equipment and motor vehicles. Increased safety risks occur most notably at at-grade highway-rail crossings.

There are over 1,350 public at-grade crossings in Montana. In 2016, the Montana Rail Grade Separation Study sought to identify the most active and congested at-grade rail crossings for the purposes of evaluating them for the feasibility of grade separation. The screening process involved analyzing vehicular and freight traffic, average train speed, and bridge clearance (if applicable) and

resulted in identifying ten crossings which could benefit from grade separation.[49] Seven out of the ten at-grade crossings, which experience the most congestion are found in Billings, Bozeman, Belgrade, and Helena and are identified in Figure 41 below. Currently, MDT is seeking federal discretionary funding to help address some of the at-grade rail crossing issues identified in the 2016 Rail Grade Separation Study.

Figure 41: Montana High Congestion Rail Crossings



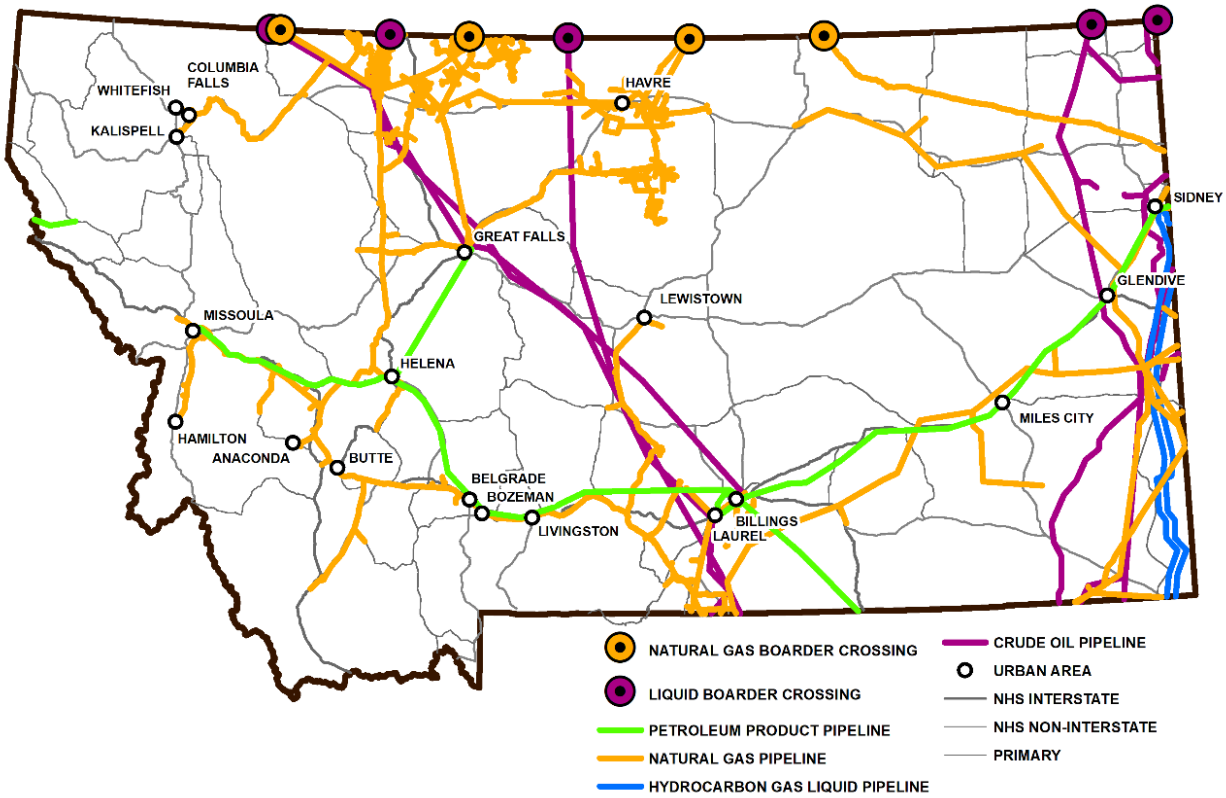
Source: MDT Geospatial Information Section

Montana Pipeline

Montana's pipeline network exceeds 15,500 miles in length, moving crude oil, hydrocarbon gas liquids, natural gas (interstate and intrastate), as well as other derivatives of coal and petroleum. The Interstate Natural Gas' network in Montana serves as a gateway from Canada and spans to the Central and Midwestern U.S., providing connections to markets throughout the country (Figure 42). Natural gas pipelines are the largest component of the pipeline network with 80 percent of the state mileage.

Since the 2017 Freight Plan, the U.S. Department of Agriculture's Forest Service issued a decision to remove part of the abandoned Yellowstone Pipeline through the Lolo National Forest, though some of the abandoned infrastructure still remains physically in place.[50] The decision was issued in September 2019 and is reflected in the gap visible between Missoula and Thompson Falls. At the time of the decision, local reporting indicated that rail service had replaced the pipeline.[51]

Figure 42: Montana Pipeline System



Source: U.S. Energy Information Administration, Interactive State Map. Does not include distribution pipelines.

In Montana, pipelines are privately owned but regulated through a partnership between the Montana Public Service Commission and the Pipeline Hazardous Materials Safety Administration (PHMSA) to assure pipeline operators are meeting requirements for safe, reliable, and environmentally sound operation of their facilities. Table 11 lists the pipeline companies operating major pipelines and miles of associated pipeline. Distribution pipelines which serve businesses and residences are not included in this data source. According to the inventory collected by the U.S. Energy Information Administration, Northwestern Energy Co. operates 38 percent of Montana's major intrastate pipeline network with WBI Energy Transmission operating 930 miles of interstate pipeline (13 percent of Montana's major pipeline network).[52]

Table 11: Pipeline Companies and Commodities in Montana

Pipeline Operators by Commodity	Sum of Length (miles)
Crude Oil	**1,727**
Phillips 66 Pipeline	326
CHS Energy	304
Spectra Energy	295
Kinder Morgan	246
Bridger Pipeline	234
Butte Pipeline	97
True Oil	90
Plains All American Pipeline	72
Enbridge	63
Hydrocarbon Gas Liquids	**361**

Pipeline Operators by Commodity	Sum of Length (miles)
ONEOK	361
Natural Gas: Interstate	**1,660**
WBI Energy Transmission	930
Northern Natural Gas Co	299
Northern Border PL Co	182
Grasslands Pipeline	145
Bison Pipeline	93
Shoshone Pipeline	10
Colorado Interstate Gas Co	1
Natural Gas: Intrastate	**2,837**
Northwestern Energy Co	2,837
Petroleum Products	**793**
Phillips 66 Pipeline	511
CHS Energy	282
Total	**7,378**

Source: U.S. Energy Information Administration, Interactive State Map

Commodities Moved by Pipeline

Most of the pipeline flows reported in FAF5 are domestic movements (59 percent), with more than half of domestic tonnage moving within Montana. Imports comprise 41 percent of pipeline tonnage flows. Export holds a very small portion of the state's pipeline tonnage flow totaling less than one percent.

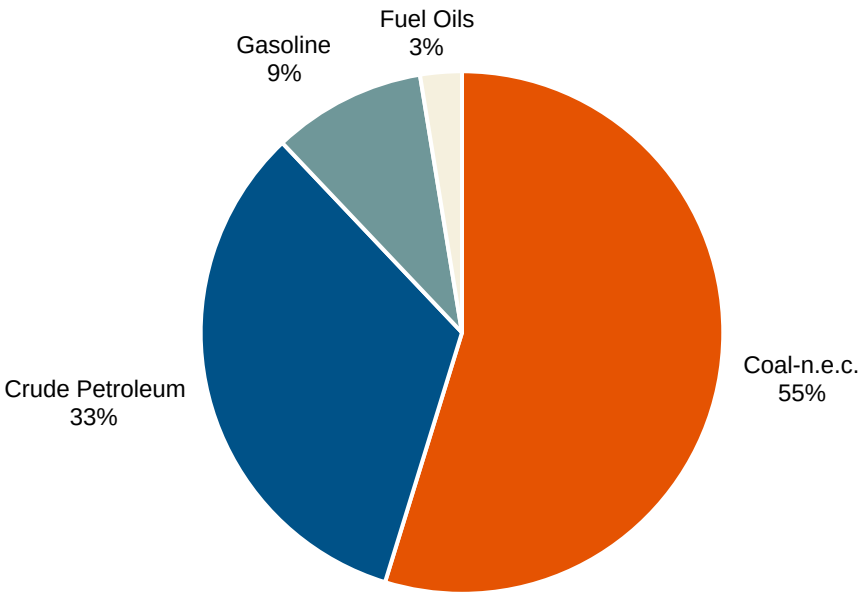
Table 12: Pipeline Flows by Weight (2017)

Thousands of Tons by Direction	Domestic Only	Export	Import	Total
Inbound	4,893		16,460	21,353
Outbound	15,634	0.1		15,634
Within	22,382			22,382
Through Export from Other State		221		221
Through Import to Other State			13,256	13,256
Total:	**42,909**	**221**	**29,716**	**72,846**

Source: FHWA Freight Analysis Framework, Version 5

Pipelines move fluid commodities such as liquids, gases, and slurries. In Montana, crude petroleum comprises one-third of pipeline commodities by weight, while gasoline and fuel oils are each less than 10 percent of all pipeline weight. Other coal and petroleum products outside of these major commodity categories make up more than half of pipeline tonnage. Figure 43 and Table 13 summarize pipeline movements by weight. Water is also transported by pipeline, though this commodity is not captured in available databases. This movement is important for energy production as well as other industrial and residential land uses.

Figure 43: Top Pipeline Commodity Shipments by Weight (2017)



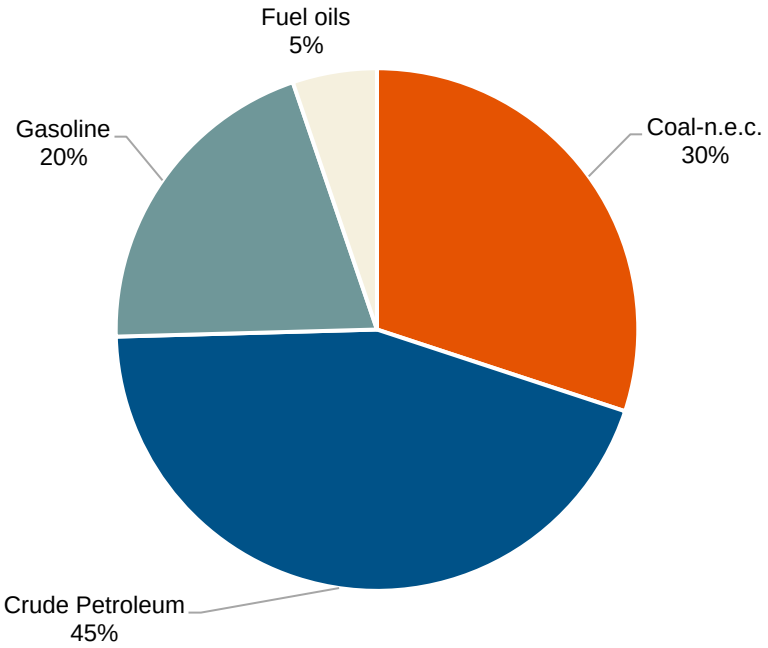
Source: FHWA Freight Analysis Framework, Version 5. Coal-n.e.c. stands for "not elsewhere classified," and includes various coal and petroleum products.

Table 13: Top Pipeline Commodities by Weight (2017)

Commodity Group	Thousands of Tons
Coal-n.e.c.	39,890
Crude Petroleum	24,162
Gasoline	6,918
Fuel oils	1,876
Total:	**72,846**

Although crude petroleum comprises only one-third of pipeline weight, it makes up 45 percent of pipeline value. Gasoline and fuel oils, both higher value refined products, make up a larger share of value than weight. Gasoline comprises 20 percent of Montana pipeline value, and fuel oils comprise 5 percent. Other coal and petroleum products make up 30 percent of pipeline value. Figure 44 and Table 14 summarize pipeline commodities by value.

Figure 44: Top Commodity Shipments by Pipeline by Value (2017)



Source: FHWA Freight Analysis Framework, Version 5. Coal-n.e.c. stands for "not elsewhere classified," and includes various coal and petroleum products.

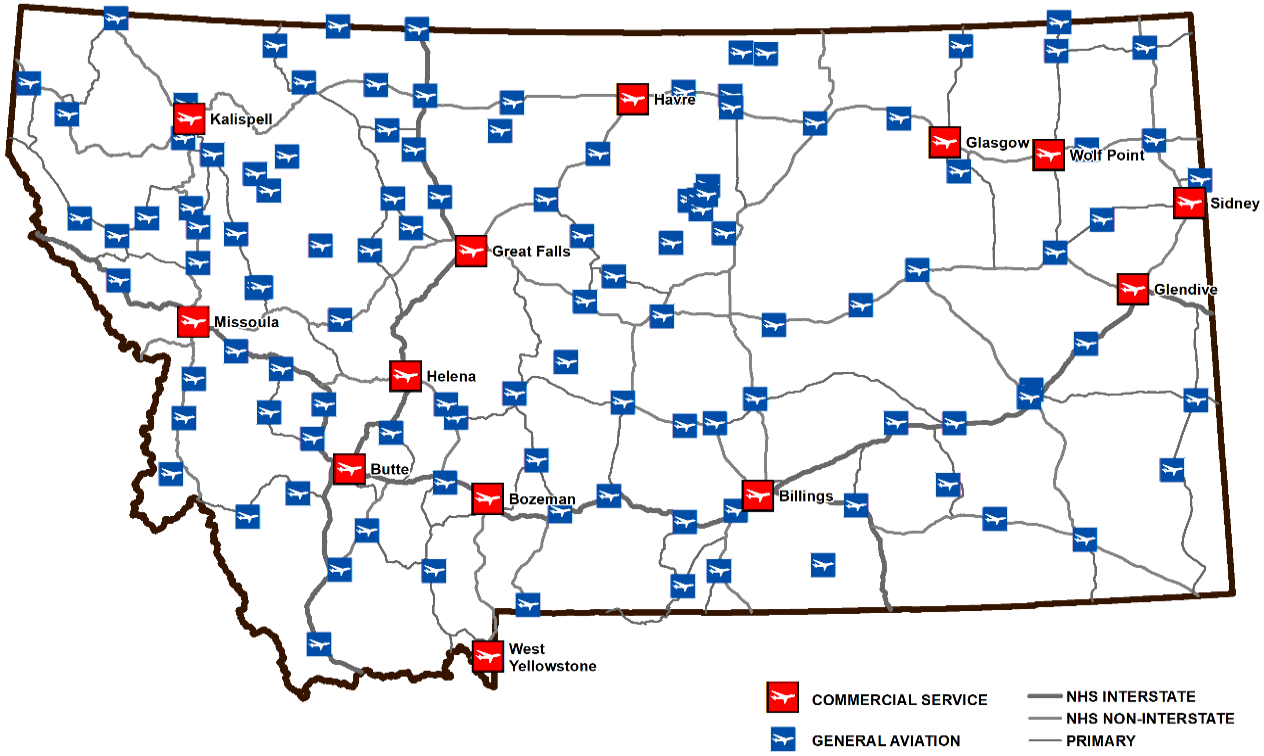
Table 14: Top Pipeline Commodities by Value (2017)

Commodity Group	Millions of Dollars
Crude Petroleum	$7,713
Coal-n.e.c.	$5,211
Gasoline	$3,502
Fuel oils	$905
Total:	**$17,331**

Montana Air

Montana's aviation network consists of 126 public-use airports, including 13 commercial service and 106 general aviation airports (Figure 45). Billings-Logan International Airport handles more cargo than any other airport in the state with 66 percent of 2019's total tonnage. Great Falls International Airport is the second largest cargo airport handling 29 percent of tonnage and is federally designated as a foreign trade zone. According to the Federal Aviation Administration (FAA) Air Carrier Statistics, these two airports handle 95 percent of Montana's air cargo.[53]

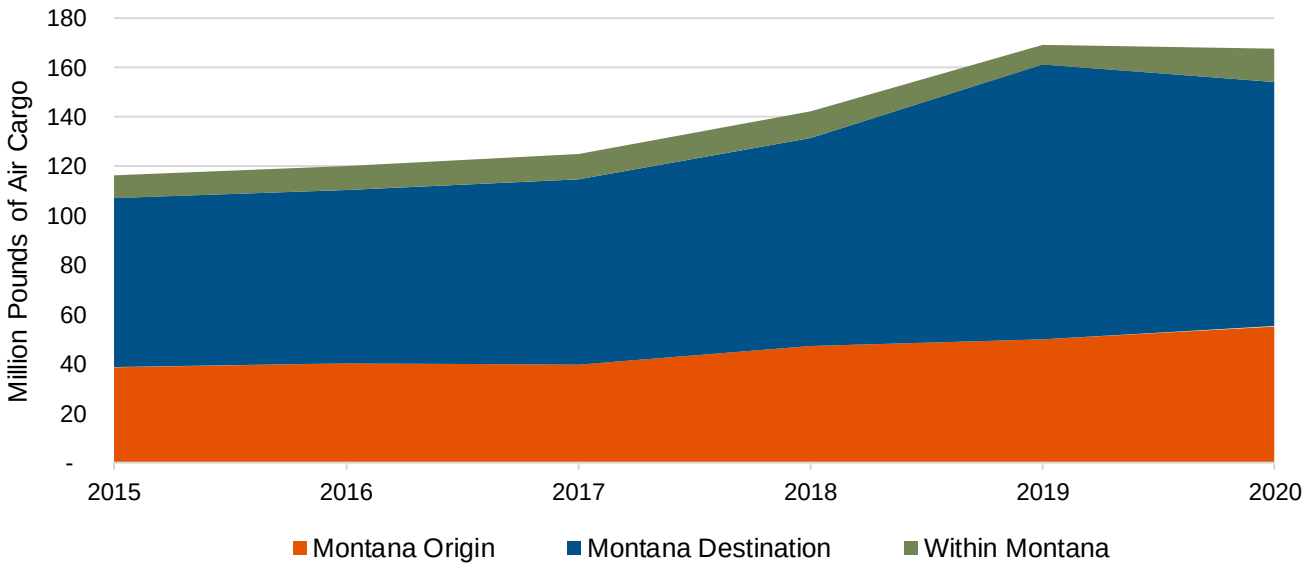
Figure 45: Montana Air Service Locations



MDT Geospatial Information Section

Population growth and e-commerce trends have resulted in significant increases in air cargo since 2017. Between 2017 and 2020, cargo increased by 34 percent (Figure 46). Most air cargo in Montana is inbound (66 percent), followed by outbound (29 percent). Less than 10 percent of air cargo, by weight, is moved within the state of Montana. Additionally, most of the air freight arriving in Montana is transported to the final destination by truck.

Figure 46: Growth in Air Cargo in Montana (2015-2020)

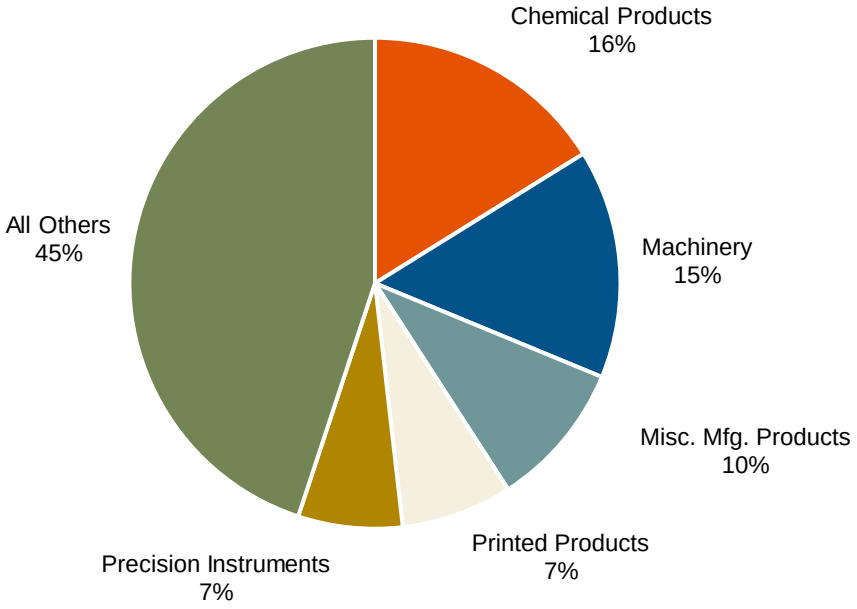


Federal Aviation Administration, T-100/Form 41 data

Commodities Moved by Air

Air transportation is the fastest but most expensive mode, therefore air cargo is used for high-value or time-sensitive cargo. In Montana, the top commodities by weight are chemical products and machinery with 16 percent and 15 percent of tonnage respectively. These commodity groups and precision instruments, another of Montana's top air cargo commodities, support industrial activity in the state. Miscellaneous manufactured products comprise 10 percent of tonnage and include various consumer products. Figure 47 and Table 15 summarize the top air cargo commodities by weight in Montana.

Figure 47: Top Air Cargo Commodity Shipments by Weight (2017)



Source: FHWA Freight Analysis Framework, Version 5. Miscellaneous manufactured products include various consumer goods.

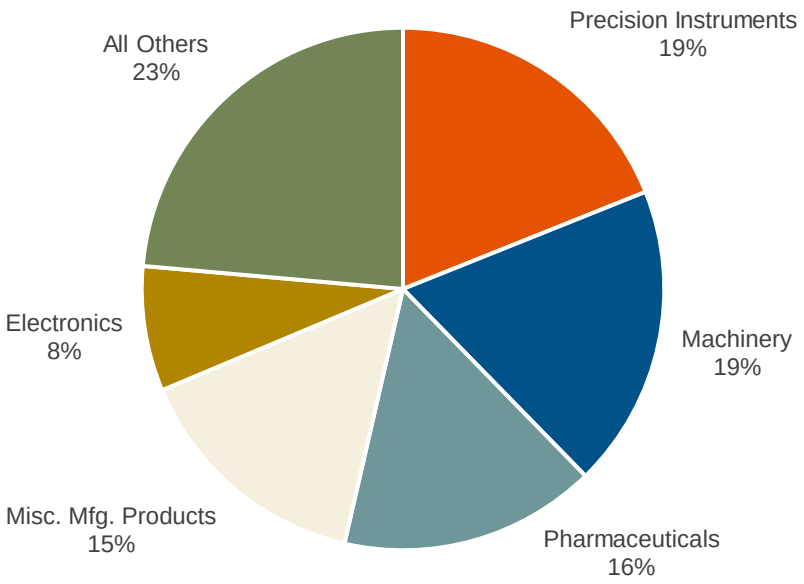
Table 15: Top Air Cargo Commodities by Tonnage (2017)

Commodity Group	Thousands of Tons
Chemical Products	0.83
Machinery	0.77
Miscellaneous Manufactured Products	0.49
Printed Products	0.37
Precision Instruments	0.35
All Others	2.30
Total:	**5.11**

The top air cargo commodities by value in Montana include several of the top commodities by weight. Precision instruments and machinery make up the largest share of value with 19 percent each. Pharmaceuticals are the third largest commodity group by value. This commodity type is very lightweight and highly valuable. Additionally, pharmaceuticals and medical products are critical to support the health and wellbeing of the state's population. Manufactured products and electronics are

the remaining top commodities. These categories can include both consumer products and industrial products. Figure 48 and Table 16 summarize the top air cargo commodities in Montana by value.

Figure 48: Top Commodity Shipments by Air by Value (2017)



Source: FHWA Freight Analysis Framework, Version 5

Table 16: Top Air Cargo Commodities by Value (2017)

Commodity Group	Millions of Dollars
Precision Instruments	$106
Machinery	$105
Pharmaceuticals	$89
Miscellaneous Manufactured Products	$85
Electronics	$43
All Others	$133
Total:	**$561**

Montana's Intermodal Facilities

Intermodal and transload facilities are involved in the movement and transfer of goods from one mode to another, such as between highway, rail, and air. Because Montana does not have any waterway ports, the transfer of freight primarily occurs between truck - train, truck – plane, or vice versa. Transloading increases the efficiency of goods movement by allowing freight to travel by the most economical mode at a given segment along its journey. Montana has several facilities that allow consolidation and transfer of freight to and from different modes. Although not exhaustive, Table 17 provides an inventory of Montana's intermodal facilities.

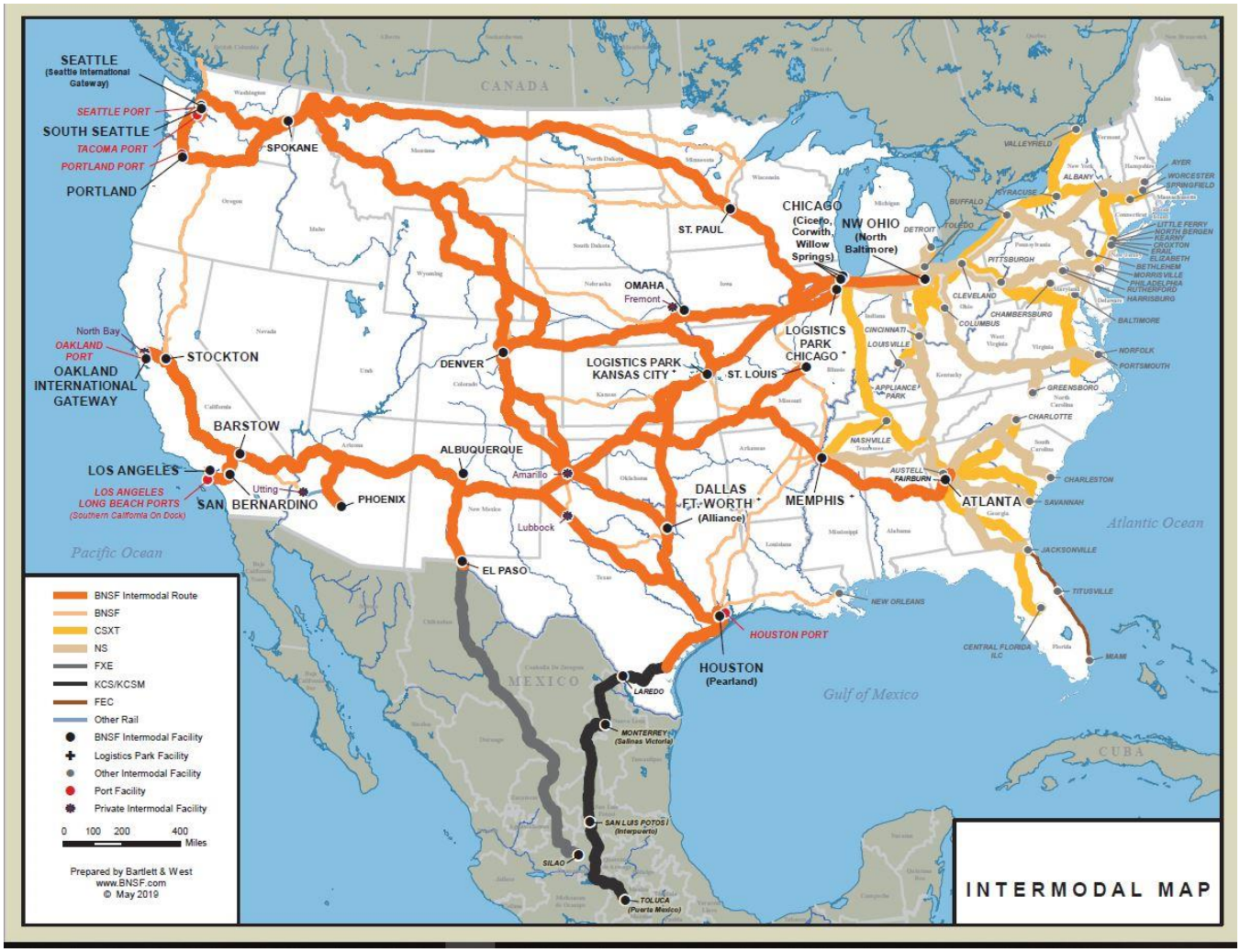
Table 17: Montana's Intermodal Facilities[54,55,56,57,58,59,60]

Facility	Type	Function	Location
Port of Northern Montana	Rail (BNSF) -Truck	Transload handling of various bulk commodities, Foreign Trade Zone	Shelby
Port of Montana	Rail (BNSF & UP) - Truck	Warehousing, logistics, transloading of various bulk commodities, designated foreign trade zone	Butte
Lincoln County Port Authority	Rail (BNSF) -Truck	Intermodal handling of various bulk commodities	Libby
Baker Transfer & Storage	Rail (BNSF) -Truck	Transloading, transportation services, and storage	Billings
Billings Logan International Airport	Air-Truck	Airline and mail cargo	Billings
Great Falls International Airport	Air-Truck	Airline and mail cargo, Foreign Trade Zone	Great Falls
BNSF Laurel Vehicle Facility	Rail (BNSF & MRL) - Truck	Automotive Distribution Facility	Laurel
Missoula International Airport	Air-Truck	Airline and mail cargo	Missoula
Bozeman Yellowstone International Airport	Air-Truck	Airline and mail cargo	Belgrade
Central Valley Ag Shuttle Train Loading Facility	Truck – Train (BNSF)	Bulk agriculture commodities	Laurel
Central Montana Coop	Truck – Train (BNSF)	Bulk agriculture commodities	Kershaw
Peavy Company	Truck – Train (BNSF)	Bulk agriculture commodities	Billings
Columbia Grain Inc.	Truck – Train (BNSF)	Bulk agriculture commodities	Carter
Mountain View Coop	Truck – Train (BNSF)	Bulk agriculture commodities	Collins
CHS, Inc.	Truck – Train (BNSF)	Bulk agriculture commodities	Glendive
United Harvest, LLC	Truck – Train (BNSF)	Bulk agriculture commodities	Grove
Columbia Grain, Inc.	Truck – Train (BNSF)	Bulk agriculture commodities	Harlem
ADM/CHS, LLC	Truck – Train (BNSF)	Bulk agriculture commodities	Havre
ADM/CHS, LLC	Truck – Train (BNSF)	Bulk agriculture commodities	Havre
Columbia Grain	Truck – Train (BNSF)	Bulk agriculture commodities	Kasa Point

Facility	Type	Function	Location
CHS Inc.	Truck – Train (BNSF)	Bulk agriculture commodities	Macon
Peavy Co.	Truck – Train (BNSF)	Bulk agriculture commodities	Moore
United Harvest, LLC	Truck – Train (BNSF)	Bulk agriculture commodities	Pompeys Pillar
Columbia Grain Inc.	Truck – Train (BNSF)	Bulk agriculture commodities	Rudyard
CHS Inc.	Truck – Train (BNSF)	Bulk agriculture commodities	Shelby
CGI	Truck – Train (BNSF)	Bulk agriculture commodities	Plentywood
Gavilon	Truck – Train (BNSF)	Bulk agriculture commodities	Huntley

BNSF continues to expand its rail and intermodal facilities across Montana to meet freight shipping needs. Since 2019, BNSF has been instrumental in locating 7 new or expanded facilities in the state, including the Oneok (natural gas service provider) expansion at Sidney, new loading capabilities for pulse crops at the CGI facility (pulse crop and grain processing facility) in Plentywood, and relocation and expansion of Gavilon (grain facility) in Huntley. BNSF also works to identify strategically located rail-served, privately-owned industrial sites that are ready for immediate customer development, saving shippers time and money. BNSF currently has privately owned certified industrial sites in Libby, Shelby, and Great Falls.[61] Figure 49 displays a map that denotes BNSF's intermodal designated routes through the state and the rest of the nation.[62] These intermodal rail routes service Montana's ports and transload facilities and are a component of the Strategic Rail Corridor Network and portions of the National Multimodal Freight Network.

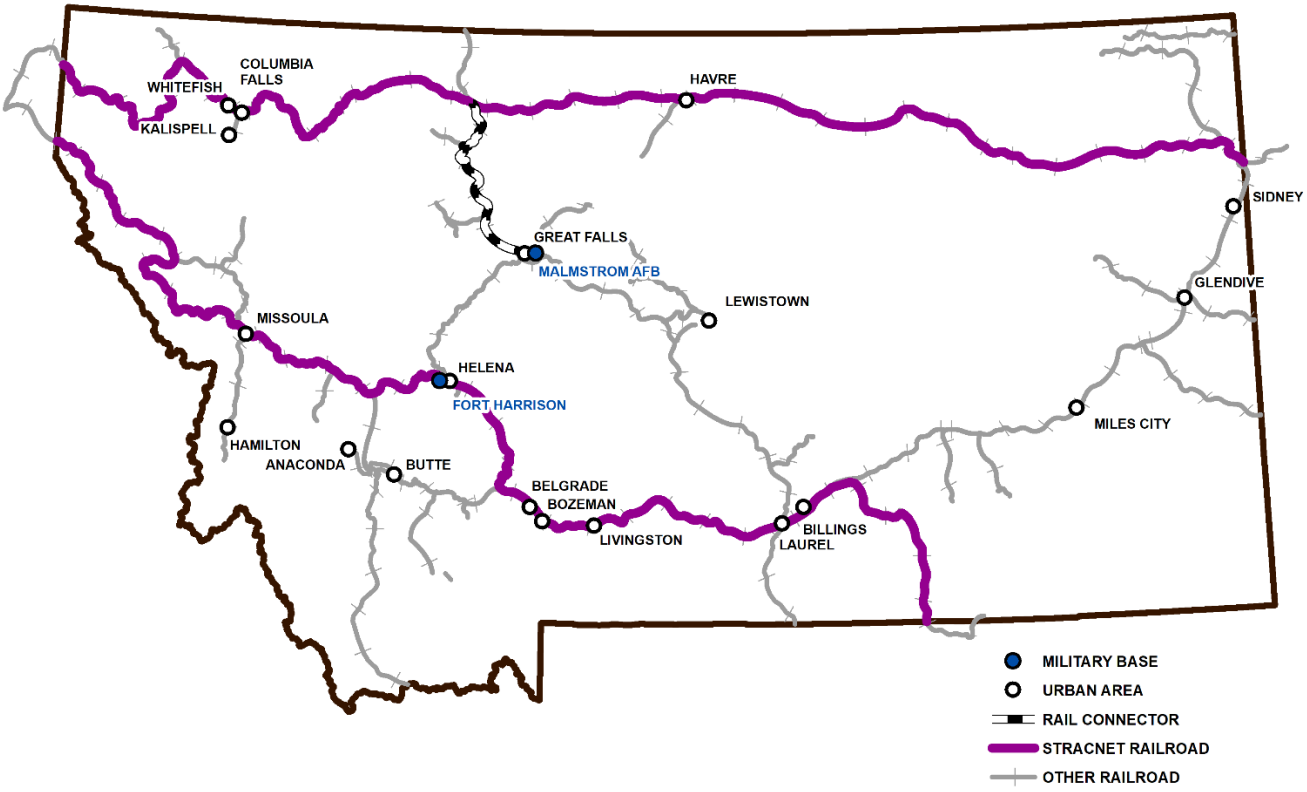
Figure 49: BNSF Intermodal Rail Routes[63]



Military Freight in Montana

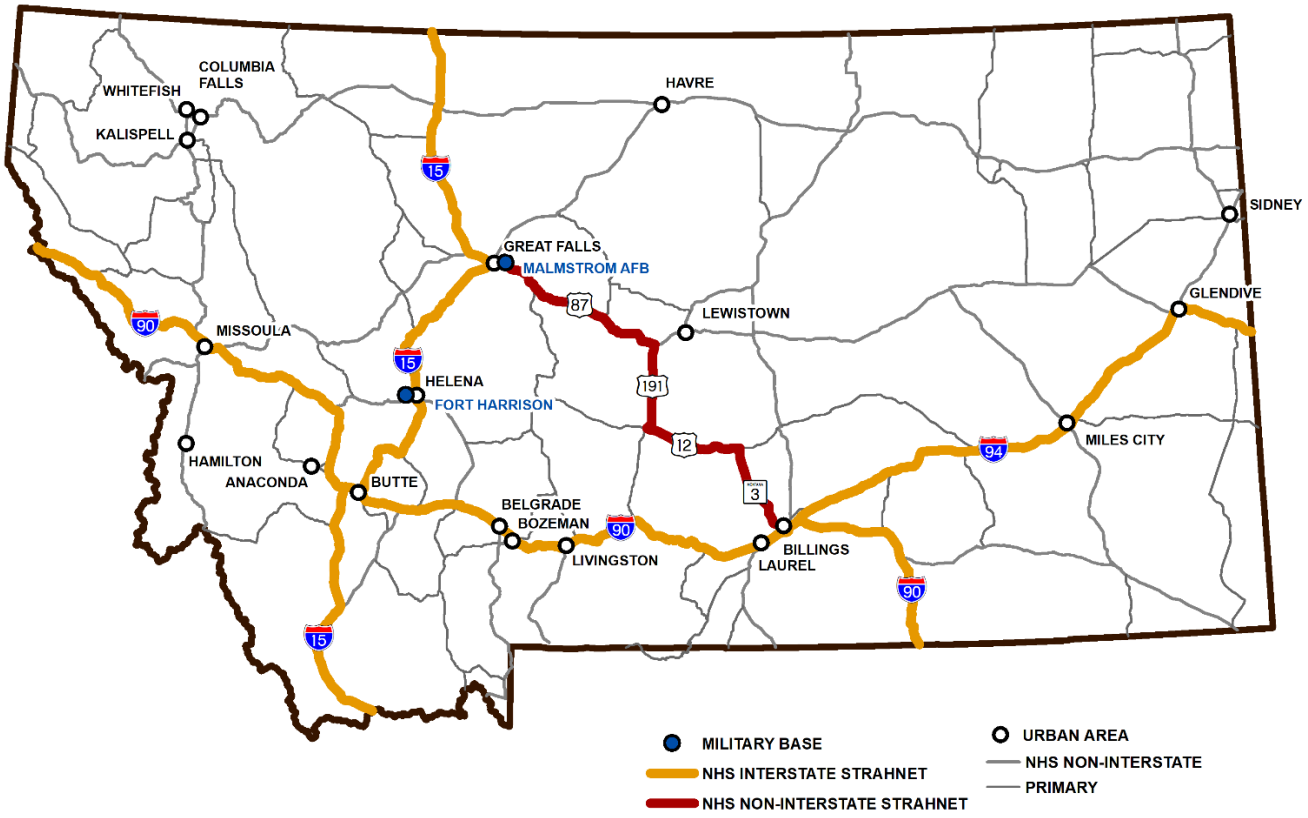
Similar to the National Multimodal Freight Network (NMFN), which consists of infrastructure of national and international significance, the United States Military has designated segments of the highway and rail systems as part of their strategic military networks. The Strategic Highway Network (STRAHNET) and Strategic Rail Corridor Network (STRACNET) are also designated to prioritize infrastructure and connectivity needs for national defense. Figure 50 and Figure 51 show segments of both the STRAHNET and STRACNET currently designated in Montana.

Figure 50: STRACNET Designation in Montana



Source: MDT Geospatial Information Section

Figure 51: STRAHNET Designation in Montana



Source: MDT Geospatial Information Section

Malmstrom Air Force Base (AFB), the only operating military base in Montana, is located just east of Great Falls, and has direct access to the STRAHNET, including I15 and US 87. The base employs over 3,000 active-duty members, 600 civilians, and is a driving force to the regional economy. In 2012, Malmstrom AFB's economic impact, both direct and indirect, totaled over $330 million and expenditures for construction, services, materials, equipment, and supplies totaled approximately $69 million.

The AFB is reliant on an efficient and secure goods movement network to transport goods to and from the base. In particular, the AFB relies on roadway connections to Great Falls International Airport, which is a key component of the military transportation network as well as being the location of the Montana Air National Guard Facilities.[64]

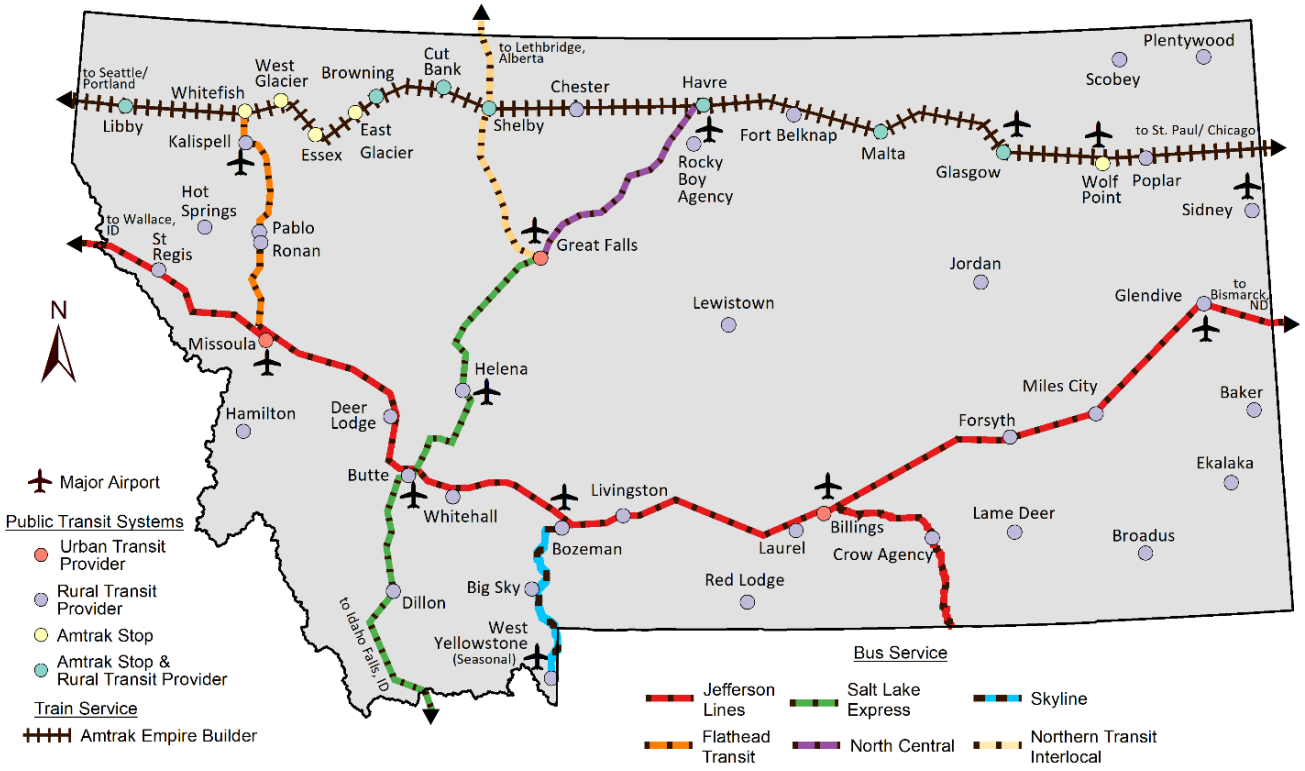
Malmstrom AFB lies within the study area of Great Falls MPO's Long Range Transportation Plan (LRTP) and is an active member of the Technical Advisory Committee of the MPO[65],which also includes MDT. The LRTP prioritizes the optimization of the transportation system for the base within the LRTP's Objectives, ensuring that the base's freight and transportation needs continue to be met.

Transit

It is estimated that forty transit operators conduct business in Montana[66]. Because of the state's large geographic size, rural nature, and aging population, transit services are an important mode of transportation. A minor amount of freight is shipped on transit vehicles in Montana. Intercity transit providers, Jefferson Lines, Flathead Transit, Salt Lake Express, and Northern Transit Interlocal, may move freight, but detailed information is not available for inclusion in this plan. Amtrak's Empire Builder offers express service that allows shipment of goods such as fresh flowers, fish, and medical

supplies between cities along the Hi-Line. Figure 52 shows Montana's transit system, including the Empire Builder.

Figure 52: Statewide Public Transit Map



Source: MDT Geospatial Information Section

Key Freight Concerns

Stakeholder Identified Concerns

MDT engaged stakeholders and MDT subject matter experts, throughout the freight plan development to solicit comment and input. There were a variety of topics discussed and key concerns that arose from stakeholder discussions are identified below:

- Increased demand for qualified workers has caused strong competition throughout many freight-related industries and has led to challenges in finding and keeping employees. Industries that are not able to successfully compete for workers, by offering competitive wages and benefits, may struggle to maintain a skilled work force.
- Challenges with truck parking in areas of the state, particularly on non-interstate NHS, increases unauthorized truck parking in areas such as on the sides of on/off ramps. Limited areas to park can also lead to safety issues when drivers are not able to sufficiently find places to rest.
- Functionally outdated bridge designs, that are narrow, and/or have height and weight limits, impact the movement of freight, especially with oversized/wide loads. Bridges with such restrictions can force drivers to obtain load permits or use alternative routes that are less efficient and add significant trip miles as well as lead to increased road congestion and wear on more localized road systems.
- At-Grade crossings lead to increased congestion, delays, and incidents involving truck traffic.
- Interchanges, in urban areas, often experience traffic congestion, bottlenecks, or delay struggle to meet capacity needs, and are further impacted by narrow bridges.

- Extreme events such as blizzards, avalanches, wildfires, floods, and dust storms can have impacts on freight movements. Dust and smoke, which reduces visibility, can temporarily close roadways or pose additional safety risks for drivers. Extreme high winds, in certain parts of the state, can also pose a safety risk for high profile vehicles, such as truck and trailer vehicle combinations. Floods and extreme rainfall events can cause landslides and rockslides which can temporarily close critical routes.

Funding

The majority of MDT's revenue is derived from the State and Federal Special Revenue sources. Table 18**,** below, outlines the percentage of funds received from each source.[67]

Table 18: MDT Revenue Sources

Source	2020
Proprietary	5%
State Special Revenue	30%
Federal Special Revenue	65%

Source: MDT Fact Book 2020

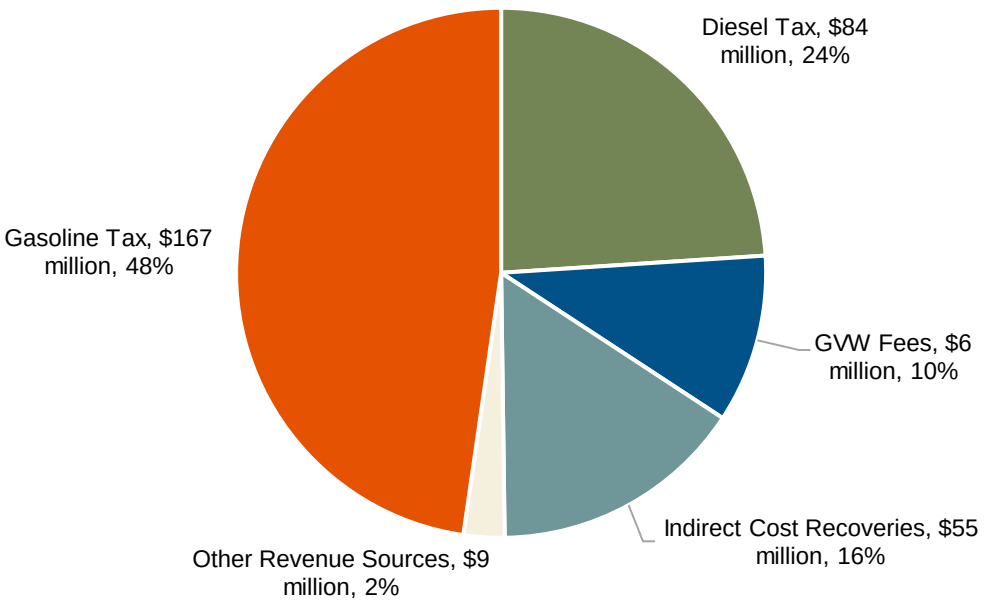
In State Fiscal Year (SFY) 2020, special revenues sources contributed approximately $351 million to MDT's total budget.[68]

State special revenues include programs such as the diesel and fuel taxes and gross vehicle weight (GVW) fees, as shown in Figure 53, below. Effective July 1, 2017, the Montana fuel tax rate was raised to 31.5 cents per gallon for gasoline (previously 27 cents per gallon) and 29.25 cents per gallon for special fuel (previously 27.75 cents per gallon). Beginning in SFY 2020, this rate increases annually through SFY 2023 reaching 33 cents per gallon for gasoline and 29.75 cents per gallon for special fuel. This is the first state fuel tax increase since 1994.

Additionally, MDT issued 68,216 commercial motor carrier permits, in SFY 20, netting the state approximately $7 million in revenue.

Funding challenges for MDT include maintenance activities ineligible for federal funds and ensuring enough state revenue is available to meet federal matching requirements.

Figure 53: SFY 20 State Special Revenue Account Sources



Source: MDT Fact Book 2020

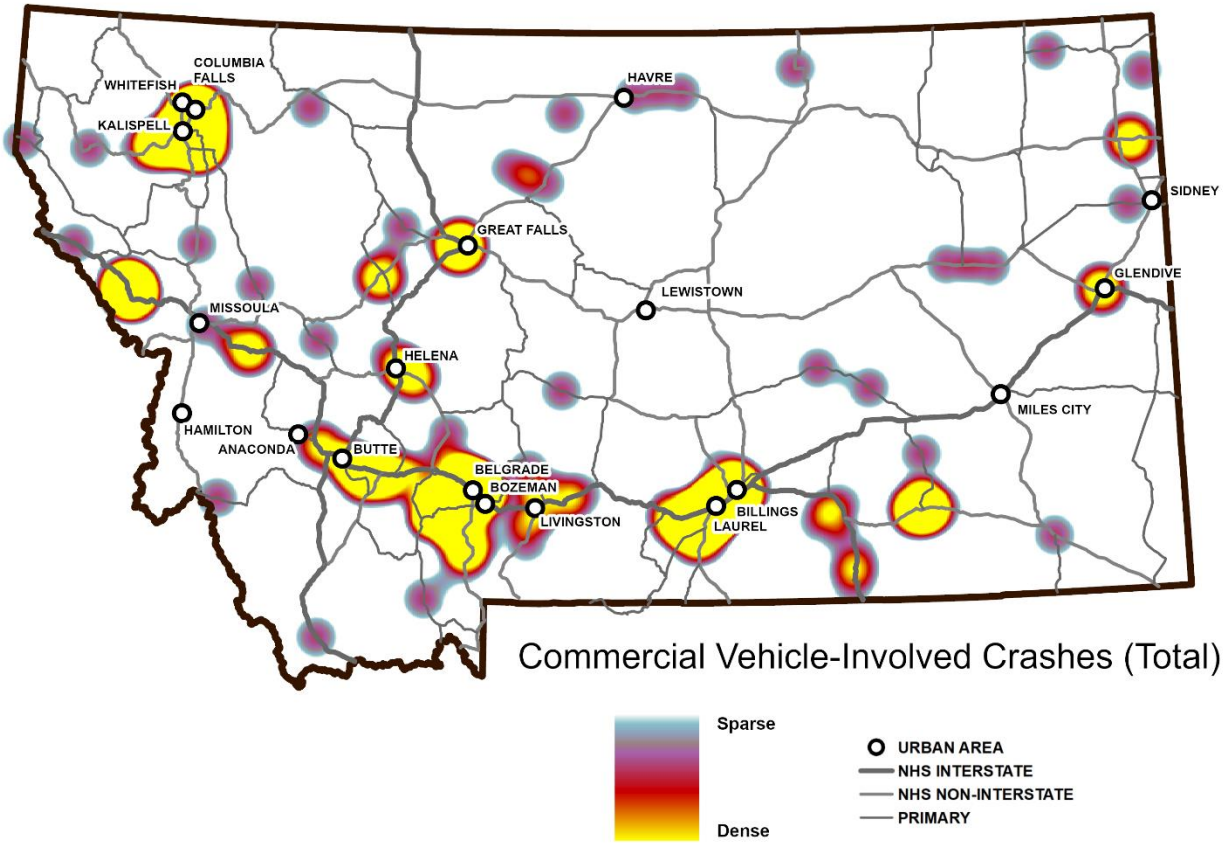
Safety

Safety for commercial truck drivers and for all users of the transportation network in Montana is a priority for MDT. It was also identified as a concern by freight stakeholders. Figure 54 shows the density of commercial vehicle crashes in Montana that occurred between 2015 and 2020. Over this timespan Montana experienced 6,512 crashes involving commercial vehicles, of which 109 were fatal[69]. The maps shows that the highest crash densities occurred in areas that contain major population centers. Approximately 33 percent of all commercial vehicle-involved crashes occurred in one of the following counties[70]:

- Flathead (Whitefish, Columbia Falls, and Kalispell)
- Gallatin (Bozeman)
- Missoula (Missoula)
- Silver Bow (Butte)
- Yellowstone (Billings)

In addition to crashes occurring predominantly in urban areas, weather conditions and animals in the roadway contributed to a combined average of 28 percent of all crashes.[71]

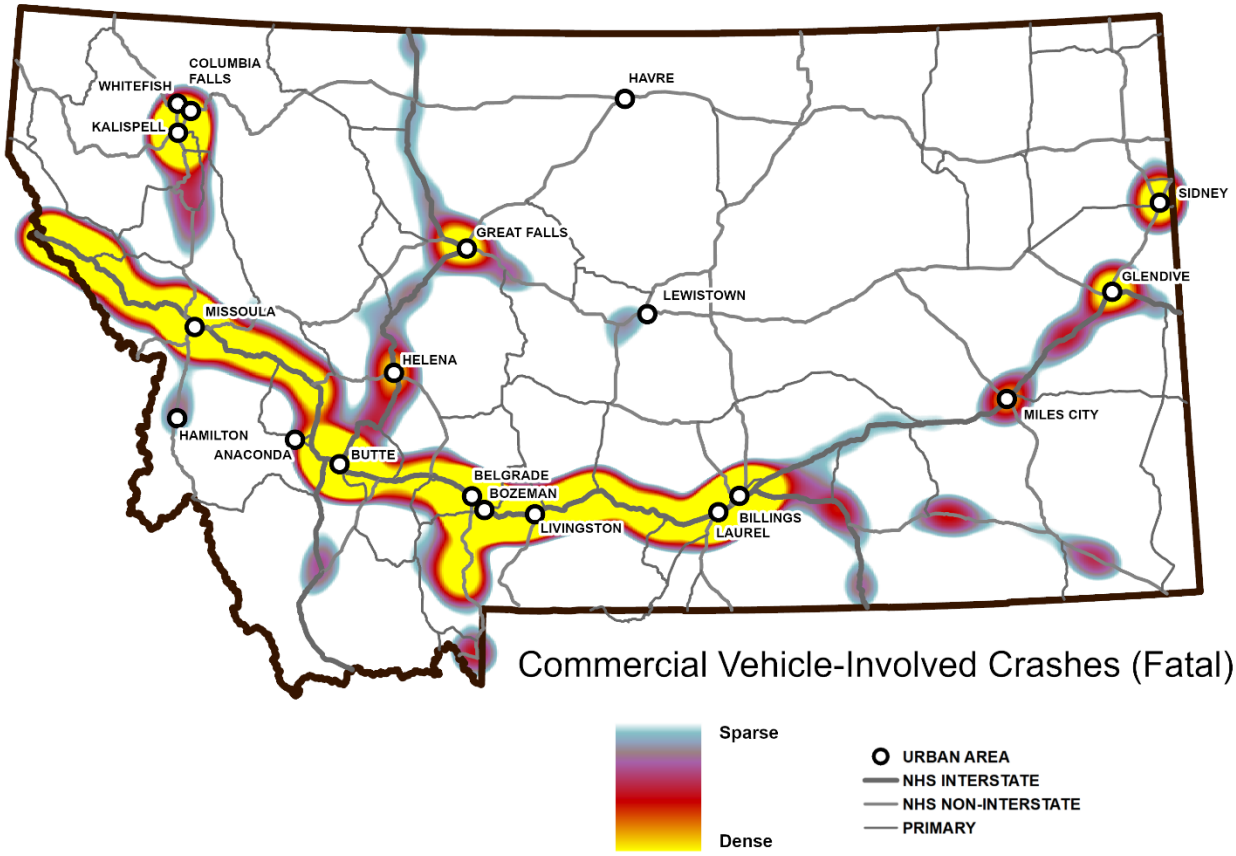
Figure 54: Montana Commercial Vehicle-Involved Crashes: Total Incidents (2015-2020)



Source: MDT Traffic Data Collection Section and Geospatial Information Section

Figure 55 shows the density of commercial vehicle-involved crashes resulting in fatal injuries. The highest densities of fatal crashes (approximately 57 percent) are found on major interstates and highways, including I-90, I-15, I-94, and US 93. Approximately 5 percent (321) of commercial vehicle-involved crashes resulted in fatal or serious injuries between 2015 and 2020.[72]

Figure 55: Montana Commercial Vehicle-Involved Crashes - Fatal Incidents (2015-2020)



Source: MDT Traffic Data Collection Section and Geospatial Information Section

Truck Parking and Rest Areas

Rest areas and truck parking play a vital role in moving freight across the state. Rest areas and truck parking areas provide safe stopping opportunities along Montana's highways, for resting, sleeping, eating, or to use a mobile device. Additionally, it gives drivers a safe place to stop, during extreme weather and road closures. MDT is responsible for maintaining 36 public rest areas and 10 public parking areas within the state[73].

As the trucking industry adjusts to a growing economy and changing federal regulations, the need for truck parking continues to increase. Pursuant to federal law, truck drivers are required to stop driving after a certain number of hours due to the federal hours of service (HOS) requirements. These requirements often result in drivers searching for parking at predictable time intervals. This puts a strain on key freight corridors that have insufficient truck parking relative to demand. When drivers cannot find spaces at designated truck parking areas, they are faced with:

- Parking in unauthorized and unsafe locations, such as abandoned parking lots or on freeway shoulders that put personal safety of the driver and the public at risk, or
- Continuing to drive which puts a driver at risk of being cited for driving past the maximum allowable hours of service or driving while fatigued.

Together with the private sector and other stakeholders, MDT is working to address the needs of truck parking and rest areas.

Commercial Truck Driver Shortage

Labor shortages have been a national issue for the manufacturing, industrial, and logistics industries for several years, but the effects of these shortages have been exacerbated by the COVID-19 pandemic. Much of this attention has focused on the shortage of truck drivers, specifically those who make long-haul truck deliveries, which are trips that require the driver to spend one or more nights away from home. In October 2021, the American Trucking Association (ATA) estimated that the national truck driver shortage hit an all-time high of 80,000 in 2021 and the shortage could surpass 160,000 by 2030 based on driver demographic trends and expected freight growth.[74]

There are several factors contributing to the shortage of drivers. In the *2019 Truck Driver Shortage Analysis Report*[75], the ATA identified the following as key factors impacting the amount of ready-to-hire commercial drivers:

1. Age: The high median age of long-haul truck drivers is 46, compared with the median age of all U.S. workers at 42. As drivers begin to retire, companies find it increasingly difficult to fill vacant positions.
2. Gender: The percent of female truck drivers (between 4.5 percent to 6.6 percent) is much lower than the national average of all U.S. workers (approximately 47 percent). Some companies have placed an emphasis on hiring more female drivers, but this remains a large, untapped share of the U.S. workforce.
3. Lifestyle: Long-haul drivers are often assigned routes that keep them on the road for extended periods of time. Many spend several weeks away from home at any given time. This type of lifestyle makes it even more challenging to recruit new drivers into the industry.
4. Competitive Job Market: Low unemployment rates, new openings in growing industries, and better pay elsewhere often attract current truck drivers away from the field.
5. Strict hiring criteria: Many companies are highly selective of the drivers that they hire. This ensures that companies maintain high degrees of safety and professionalism but can severely limit the number of qualified drivers available for certain positions.

4. Future Trends of Freight

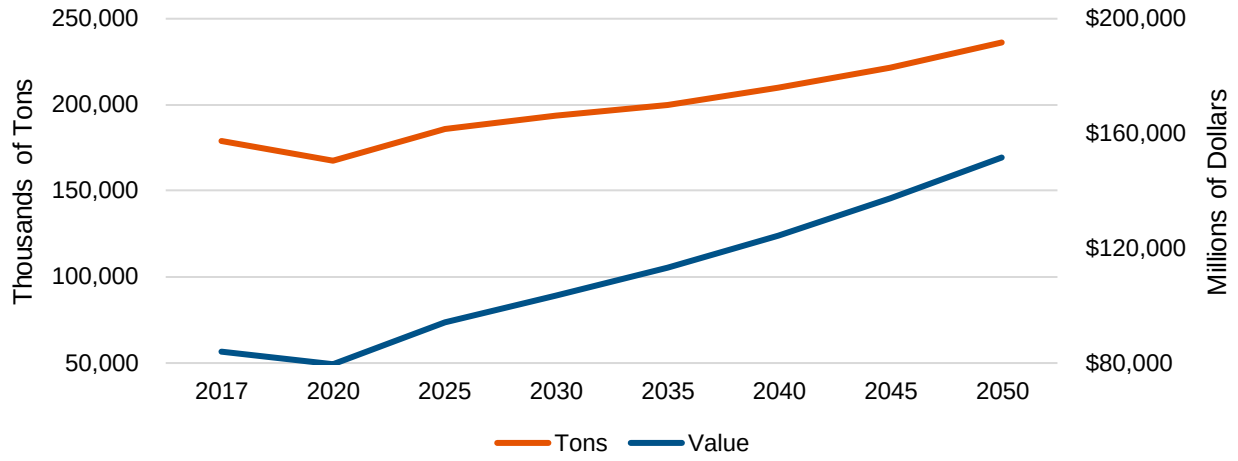
The freight industry has experienced significant challenges in recent years, including changes in shipper and consumer demand, declining workforce, the COVID-19 pandemic, and commodity level changes. This section describes the projected movements of freight in Montana based on commodity flow forecasts and anticipated freight trends.

Commodity Forecasts

The Freight Analysis Framework version 5 (FAF5) is the latest commodity flow database released by the FHWA. FAF5 is based on 2017 survey data and forecasts years intermittently between 2020 and 2050. The commodity forecasts in the FAF5 are helpful for understanding how demand for commodities may change over time.

FAF5 data presented in Figure 56 reflects freight traffic that either originates or terminates in Montana; it does not include through traffic. Total freight volume by weight for traffic either originating or terminating in Montana is forecast to grow by 32 percent between 2017 and 2050, from 179 million tons to 236 million tons. By monetary value, freight movements are projected to increase by 81 percent, from $84 billion to $152 billion.

Figure 56: Total Freight Tonnage and Value in Montana, 2017-2050



Source: Freight Analysis Framework, version 5

Freight by Direction

Information regarding origin and final destination is helpful when analyzing freight movements, and to assess general trends, such as weight and monetary value. Freight produced outside of the state that is transported within the state is defined as "inbound." Freight produced within the state and remains within the state is defined as "within Montana." Freight produced within the state that is transported out of the state is defined as "outbound." According to FAF5 the total amount of transported freight, as well as its monetary value, is forecasted to increase in Montana between 2017 and 2050 (Figure 57 and Figure 58).

Figure 57: Freight Tonnage by Direction, 2017-2050[76]

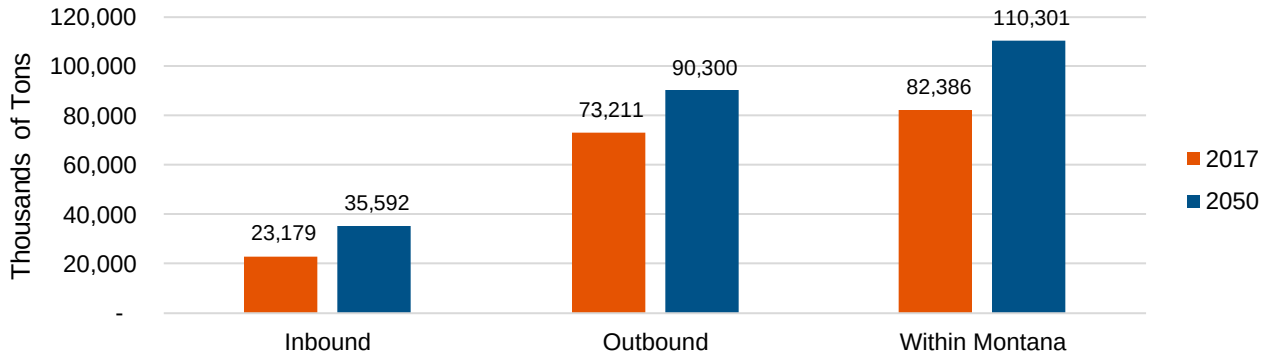
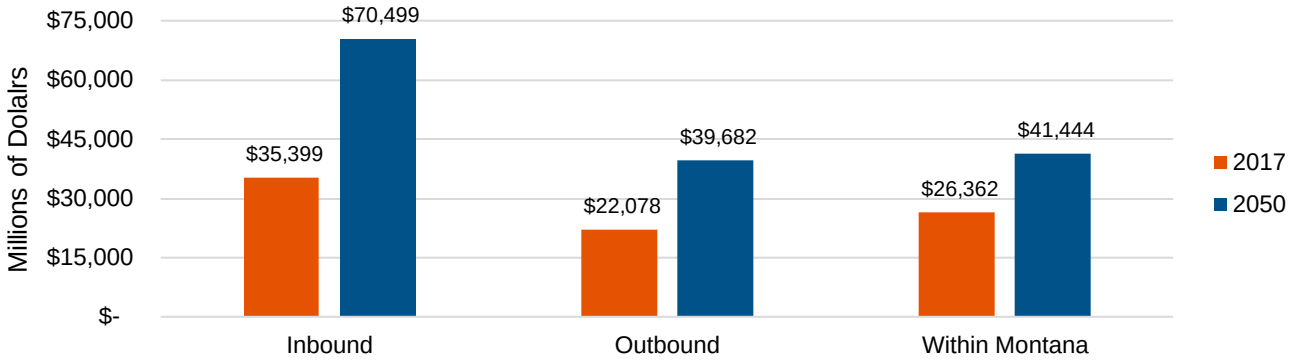


Figure 58: Freight Monetary Value by Direction, 2017-2050[77]



Freight by Mode

Figure 59 shows tons of freight by mode for the 2017 base year and the 2050 forecast year. The data shows that pipelines and trucks moved the greatest share of product by weight compared to other modes of transportation in Montana in 2017. By 2050, products transported by pipeline are forecasted to increase by 47 percent. Crude and refined energy products, which are dense and best moved by pipelines, are among the top commodities in Montana. Goods moved by truck are forecasted to experience the greatest increase between 2017 and 2050 by an estimated 51 percent. Air transport, which moves the smallest amount of freight by weight is forecasted to also increase by 100 percent. Rail and Other modes however are expected to decline by 21 percent on average, by 2050.

Figure 59: Mode Share by Tonnage, 2017-2050[78]

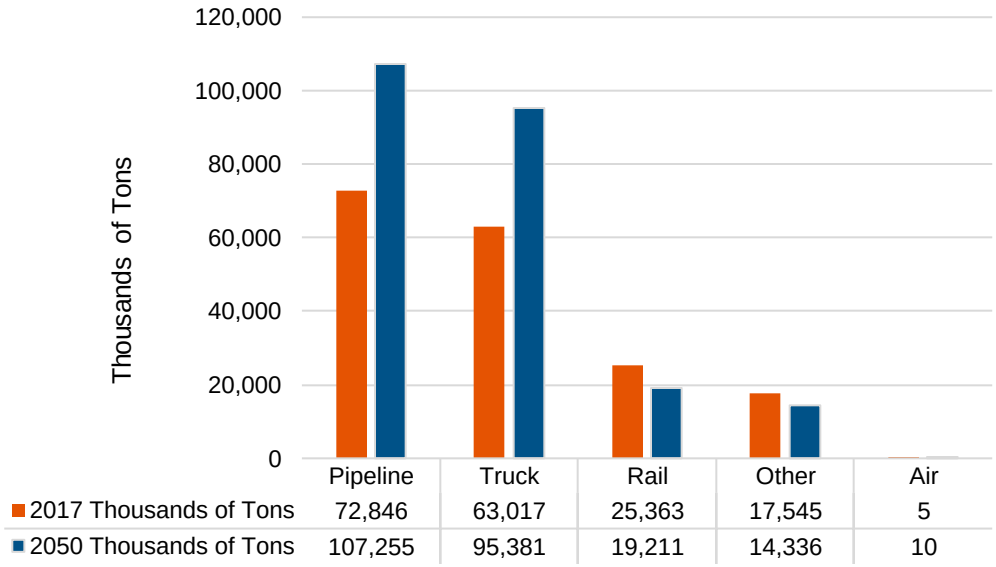
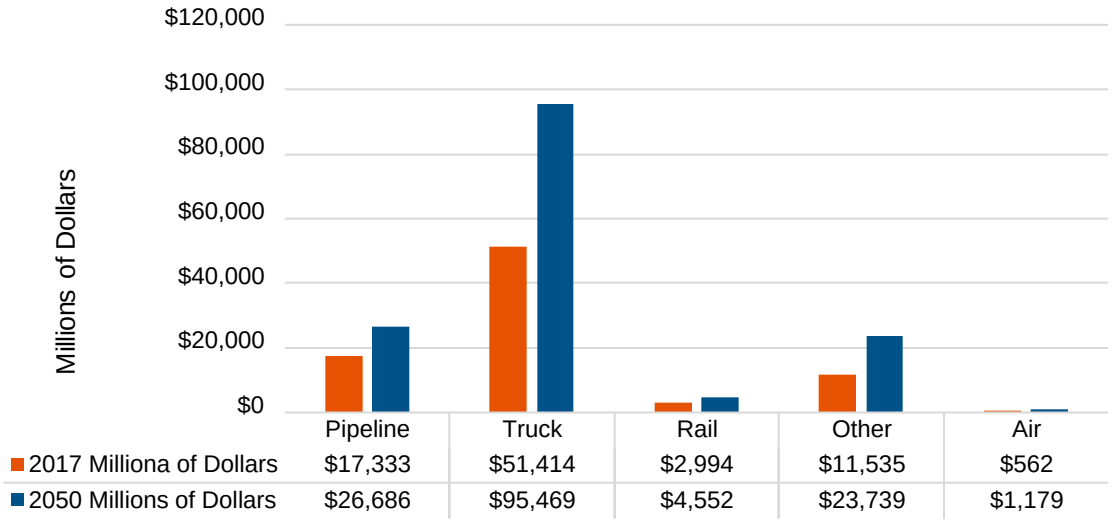


Figure 60 shows monetary value of freight by mode for the 2017 base year and the 2050 forecast year. While pipeline is the number one transporter of goods by weight within the state, trucking is the number one mode by monetary value both in 2017 and into 2050. Collectively, all modes are forecasted to see a significant increase in monetary value by 2050 with air transport doubling from 2017 levels.

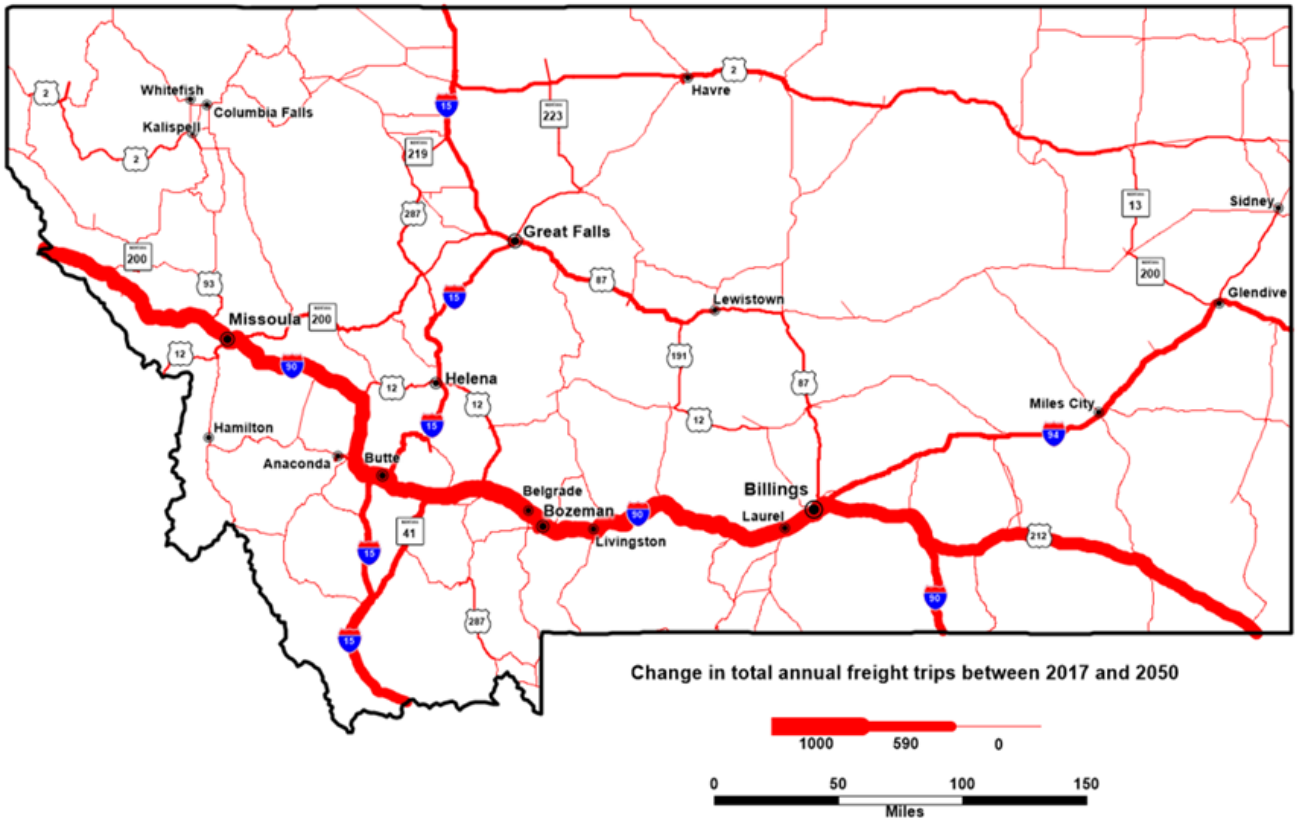
Figure 60: Mode Share by Monetary Value, 2017-2050[79]



	Pipeline	Truck	Rail	Other	Air
2017 Milliona of Dollars	$17,333	$51,414	$2,994	$11,535	$562
2050 Millions of Dollars	$26,686	$95,469	$4,552	$23,739	$1,179

FHWA's Freight Analysis Framework provides forecast data on estimated truck flows for years 2017, 2022, and 2050. Based on this information, Figure 61 displays the FAF's forecasted change in commercial truck flows in Montana between 2017 and 2050. Consistent with currents trends, I-90 will continue to remain the dominant route for truck movements in Montana as well as experience the largest increase in annual truck trips, by 2050. Interstate 90 is essential in connecting inland ports and transloading facilities to the major coastal ports in Washington. Other routes which demonstrate a modest increase are I-15, I-94, and US 2. Interstate 15 north leads to the Sweetgrass Border crossing into Canada, and I-94 provides the most direct route access to the ports and large industrial hubs in Minnesota. US 2 is a strategic highway, running east-west along the most northern portion of the state. This highway runs parallel to BNSF's rail line, called the Hi-Line.

Figure 61: Forecasted Change in Annual Commercial Truck Trips To, From, and Within Montana between 2017 and 2050



Top Freight Commodities

Table 19 displays the top 10 commodities (by weight) of Montana in 2050. Looking forward, these commodities are forecasted to remain as the top 10 in 2050, with coal and petroleum nec, and crude petroleum, holding their ranks in first and second place. By 2050 gravel, animal feed, nonmetallic mineral products, and wood products are also expected to remain in the top 10 and also advance in their rating. Coal however it is forecasted to experience a significant 64 percent reduction in demand by 2050.

Table 19: Top Commodities by Tonnage, 2017 and 2050[80]

Commodity	2050 Rank	Change from 2017 Rank	Thousands of Tons, 2017	Thousands of Tons, 2050
Coal and Petroleum, n.e.c.	1	-	43,146	54,612
Crude Petroleum	2	-	26,939	54,540
Gravel	3	↑ 2	9,726	15,877
Cereal Grains	4	-	14,537	14,706
Coal	5	2 ↓	25,888	9,268
Animal Feed	6	↑ 4	4,298	8,258
Nonmetal Mineral Products	7	↑ 1	5,335	7,943
Wood Products	8	↑ 1	4,949	7,417
Gasoline	9	3 ↓	8,768	6,814

Commodity	2050 Rank	Change from 2017 Rank	Thousands of Tons, 2017	Thousands of Tons, 2050
Other Ag Products	10	3 ↓	5,623	6,454
All Others	-	-	29,567	50,303
Total	**-**	**-**	**178,776**	**236,192**

Table 20 displays the top 10 commodity groups by value in 2050. Crude petroleum is expected to remain the number one commodity while coal and petroleum products, n.e.c., is expected to drop to sixth place by 2050. However, live animals/fish, pharmaceuticals, and plastics/rubbers are forecasted to take a significant leap into the top 10 commodities of Montana.

Table 20: Top Commodities by Monetary Value, 2017 and 2050[81]

Commodity	2050 Rank	Change from 2017 Rank	Millions of Dollars, 2017	Millions of Dollars, 2050
Crude Petroleum	1	-	$8,569	$17,461
Machinery	2	↑ 1	$6,273	$11,970
Mixed Freight	3	↑ 1	$5,615	$10,671
Misc. Manufactured Products	4	↑ 3	$4,069	$10,528
Motorized Vehicles	5	↑ 1	$4,417	$9,791
Coal and Petroleum, n.e.c.	6	4 ↓	$6,726	$9,450
Electronics	7	↑ 1	$3,309	$7,323
Live Animals/Fish	8	↑ 6	$2,288	$7,266
Pharmaceuticals	9	↑ 7	$1,883	$6,223
Plastics/Rubber	10	↑ 8	$1,830	$4,189
All Others	-	-	$28,495	$46,366
Total	**-**	**-**	**$73,474**	**$141,238**

Fastest Growing Commodities

Out of the 42 commodity groups identified in FAF5, Table 21 identifies the ten fastest growing commodities in Montana between 2017 and 2050 by weight. The majority of the products support the expectation of a growing population in Montana as many of the goods are consumer and need driven. The percent of Montanans that are between the ages of 50 to 59 are also forecasted to increase the fastest, out of all age groups, which continues to support an increased need in pharmaceuticals.

These commodities involve most of Montana's freight modes, including trucking and rail for consumer and industrial products and air for lightweight products such as pharmaceuticals and electronics. The fastest growing commodities by tonnage also include the fastest growing commodities by monetary value (Table 22).

Table 21: Fastest Growing Commodities by Tonnage, 2017 and 2050[82]

Commodity	Thousands of Tons, 2017	Thousands of Tons, 2050	Change, 2017 to 2050
Pharmaceuticals	13	43	218%
Fertilizers	1,866	5,634	202%
Basic Chemicals	1,253	3,604	188%
Live Animals/Fish	633	1,820	188%

Commodity	Thousands of Tons, 2017	Thousands of Tons, 2050	Change, 2017 to 2050
Misc. Manufactured Products	390	1,062	172%
Motorized Vehicles	429	1,057	146%
Electronics	214	520	143%
Chemical prods.	685	1,628	138%
Plastics/rubber	468	1,034	121%
Alcoholic beverages	499	1,050	111%
Total:	**6,450**	**17,452**	

Table 22: Fastest Growing Commodities by Monetary Value, 2017 and 2050[83]

Commodity	Millions of Dollars, 2017	Millions of Dollars, 2050	Change, 2017 to 2050
Pharmaceuticals	$1,883	$6,223	231%
Live animals/fish	$2,288	$7,266	218%
Fertilizers	$696	$1,982	185%
Basic chemicals	$1,136	$3,069	170%
Misc. mfg. prods.	$4,069	$10,528	159%
Chemical prods.	$1,586	$3,763	137%
Plastics/rubber	$1,830	$4,189	129%
Motorized vehicles	$4,417	$9,791	122%
Electronics	$3,309	$7,323	121%
Alcoholic beverages	$837	$1,759	110%
Total:	**$22,051**	**$55,893**	

Evolving Trends in Freight

E-Commerce

E-commerce and the trend toward omni-channel distribution (i.e., the Amazon business model) continue to change the way freight moves all over the country. Consumers in cities and rural areas have access to a larger range of goods, and they are ordering a wider variety of goods online. Online shopping now extends to groceries, clothing purchase and retail, prescription drugs, and more. The shift toward these business models offers consumers more options and greater access, particularly for those with limited access or mobility due to location, car ownership, disability, or other factors impacting personal mobility.

The model of buying and selling has changed the way retailers and consumers interact with each other as purchasing goods online typically means bypassing traditional brick-and-mortar stores and traveling directly from a warehouse or distribution center to consumers' homes, or vice versa when product returns are necessary. Some of this shift represents the last mile trip for consumer goods now being made by a delivery truck rather than store-to-home trips by consumers.

Online sales of most products, from clothing to perishable items like groceries, are experiencing growth. This means an increased emphasis on the reliability and timeliness of truck transportation, changing truck delivery patterns, an increase in shorter trips, and a greater strain on local infrastructure.

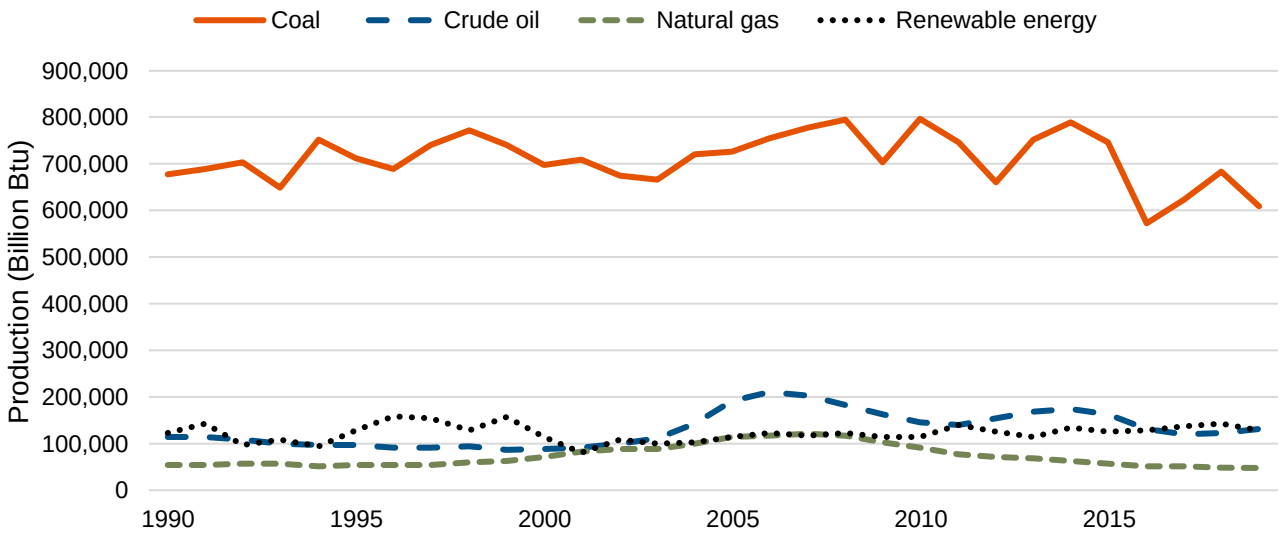
Related effects of this migration towards e-commerce include an increased demand for air cargo, due to the demand for next-day or two-day deliveries and changing land use development patterns, such as locating inventory and distribution hubs closer to population centers.

Energy Diversification

Energy production from coal in the United States has experienced a sharp decline in the last decade due to low natural gas prices and increased renewable energy production.[84]

Coal is one of Montana's top commodities, and it is a staple commodity of railroads throughout the nation. Figure 62 shows that coal production in Montana has decreased, most notably since 2014.[85] Declining coal production presents opportunities to utilize rail capacity for higher value goods and new markets, and railroads are seeking opportunities to diversify and increase their customer bases. Intermodal container service and pre-certified industrial sites for rail service are two common pathways for expanding the rail customer base.

Figure 62: Annual Energy Production in Montana 1990 – 2020 (Billion Btu)[86]



Increased renewable energy development has short- and long-term impacts on both highway and rail networks. During initial development, wind farms require oversize and overweight shipments of blades and turbines, which are commonly moved by truck or rail. However, once renewable energy sites are in production, little freight movement is required for routine operations. As the national and state energy profile shifts between energy sources, freight demand on all modes will also fluctuate.

U.S.-Mexico-Canada Agreement

The U.S.-Mexico-Canada Agreement (USMCA), effective July 1, 2020, replaced the North American Free Trade Agreement (NAFTA) as the continent's governing trade agreement. Many of the agreement's provisions are aimed at increasing U.S. competitiveness and domestic production. Two key provisions are most likely to impact Montana due to its proximity to Canada and agricultural economy: grading and price structures for dairy and wheat products.[87]

These changes may lead to greater U.S. exports to Canada and/or lower Canadian imports due to changes in relative cost. Many USMCA provisions will be phased in. For example, the tariff-rate quotas (TRQs) for a wide variety of milk products will be increased in year six of the agreement, meaning that a larger quantity of products can be exported to Canada duty free. After year six, the duty-free quantity will increase by one percent per year for thirteen years.[88] Other changes will take place within the first year, such as more favorable pricing for U.S. dairy in Canada. Staggered transition periods are likely to reduce sudden changes in trade and freight movement.

Containerization of Agriculture

Containerization of agriculture products, which ship in smaller batches, is a departure from traditional bulk shipping methods. With containers, grain and other products can move seamlessly from truck to rail to ship to reach customers throughout the world. Many factors influence the ability to containerize agricultural products. The availability of containers and shipping costs are key considerations when choosing between bulk or containerized transport. Products best suited for containerization are packaged (including bags or pallets), processed and have a high value-to-weight ratio to offset the increased cost of shipping associated with containerization compared to bulk.[89] Containerization can provide market access for shippers with volumes too low to benefit from the economies of scale of bulk shipping options or whose customers are too dispersed for efficient bulk shipping. In Montana, pulse crops (e.g., lentils) are being considered for containerized transport.

Alternative Fuels Technologies

Vehicle Electrification

Vehicle electrification is the process of powering vehicles using electricity instead of conventional sources such as gasoline and diesel. While this technology is currently more prevalent in passenger vehicles, early adopters have begun to use electric powered freight trucks. Companies, such as Volvo Trucks, Daimler (Freightliner), and Tesla have developed electric semi and box trucks for commercial use. Length of haul varies based on trailer size and the weight of the cargo. As an example, Volvo's box truck version advertises a range of 150 miles on a single charge, with the ability to charge to 80 percent capacity in 70 minutes.[90]

Electric freight vehicles pose potential benefits both to the environment and to public health. However, they will also need to overcome several challenges if they are to become a viable alternative to petroleum based fueled vehicles in Montana. Adverse winter weather, subfreezing temperatures, and mountain passes will all require additional demand on the batteries, thereby reducing vehicle range. According to an American Automobile Association study, using an electric vehicle's heater when it is 20 degrees outside can reduce the range by 41 percent.[91] Cold ambient temperatures also increase the rate of time batteries need to be charged. For instance, at 77 degrees, a fast charge will charge a battery to 80 percent in 30 minutes however at 32 degrees, the battery will only be charged to 52 percent.[92] Shorter driving ranges will require high driver confidence that they will be able to find and use charging locations, as well as accounting for the time to charge in daily movements. Given current technologies, electric freight trucks are more suitable for an urban environment versus long haul trips, as well as for drayage operations (transport of goods over a short distance) and on-site operations at intermodal facilities.

Train Electrification

The technology for fully electrified freight rail operations continues to expand and become more readily available. Some systems rely on electric power supplied through overhead catenary systems (overhead power lines used to supply electricity to a locomotive), while others use "dual-mode" combinations to propel trains where catenaries are unavailable. The electric operation of trains using stationary power sources is common across the globe; however, the capital costs in doing so are high and may be cost prohibitive. Thus, in the United States, the focus is on technologies that are less capital intensive. Among the alternative energy sources that exhibit the most potential to achieve meaningful technical and economic feasibility are batteries and hydrogen fuel cells. Trials have been launched with both technologies in freight and passenger applications in the U.S., including by BNSF and UP.[93, 94]

Hydrogen Fuel Cells

Electric vehicle technology has led the passenger market for alternative fuels and power for years. However, hydrogen fuel cell technology is emerging as an option in the zero-emissions vehicle arena for trucks and trains that require large heavy batteries and long charging times. Hydrogen cell trucks

are currently being used in limited applications, such as in a demonstration project in Los Angeles drayage operations.[95] Hydrogen cell equipment development has focused on reducing vehicle weight and the retrofitting of existing vehicles to make the technology more accessible and affordable. Range, power, investment in charging or fueling locations, and technology advances will all influence the future market share of battery and hydrogen fuel cell freight vehicles.

Connected and Autonomous Vehicles (CAVs)

Currently, Montana has no laws specifically permitting or prohibiting the use of autonomous and connected vehicles on roadways. The Montana Legislature approved House Joint Resolution No. 10 (HJ10) in the 2021 Regular Session, which provides for a committee to conduct an interim study regarding autonomous vehicle use on Montana's roadways. This committee is tasked with:

- Analyzing the legal framework and the statues involving the use of autonomous vehicles, including platooning in Montana
- Examining federal, state, and local polices that relate to the operation of autonomous vehicles, including model state policy and current and possible federal regulatory tools
- Reviewing potential impacts to tax collections and road maintenance in Montana
- Analyzing regulatory changes necessary to address liabilities that could arise by allowing autonomous vehicles on public highways
- Recommending the role of autonomous vehicle technology and infrastructure in contributing to the state's economic and quality of life[96]

The deployment of CAVs is growing in national interest that may impact how freight movements across the country will be conducted. Therefore, clear guidance will be essential in ensuring a streamlined integration of CAV technologies onto roadways shared with the traveling public and other transportation providers.

Based on data from the National Highway Traffic Safety Administration (NHTSA), 94 percent of serious crashes are due to human error. By reducing the opportunity for human error, less crashes and roadway congestion may result along with improved air quality and fuel efficiency.[97] This is particularly important in rural areas of the state where alternative routes are not readily available should a serious incident occur.

While autonomous vehicles have yet to be deployed in Montana, portions of Yellowstone National Park conducted an autonomous shuttle pilot program in the summer of 2021. As part of the Federal Lands Transportation Program in partnership with FHWA, this $360,000 pilot utilized driverless, electric vehicles to transport visitors in Canyon Village. The demonstration project, called The Electric Driverless Demonstration in Yellowstone (TEDDY), aimed to guide long-term management decisions regarding transportation in national parks.[98] While this deployment focused on the movement of passengers, it facilitates the increased use of such technologies for other uses, such as freight while simultaneously demonstrating the impact autonomous vehicles have on the environment around them.

Alternative Delivery Systems

Advances in vehicle technology have paved the way for new delivery methods, most notably drone deliveries. Drones are lightweight aircraft that operate remotely without a pilot physically onboard. The concept of drone delivery for freight purposes began in 2013 with an announcement from Amazon that unmanned aerial vehicles (UAVs) would be used to deliver lightweight commercial products.[99] While drones have not advanced to replace entire tractor-trailers on the nation's roadways, they have the potential to be advantageous for last mile deliveries. MDT and the state are monitoring how innovative technologies used to transport freight continue to evolve.

5. Innovative Technologies

Intelligent transportation systems (ITS) are a form of innovative or advanced technologies and services that support modes of transport and traffic management. It allows users to be better informed and to make a safer, more efficient, use of the transportation network. Examples of ITS include, but are not limited to:

- Technologies used for calling emergency services when an accident occurs;
- Using cameras to enforce traffic laws or signs that mark speed limit changes depending on conditions;
- Synchronizing traffic lights along a segment of roadway to ensure maximum flow of vehicles; and
- Weather and road information.

Under MDT leadership, the Montana Statewide Regional Intelligent Transportation Systems Architecture was prepared and most recently updated in 2021. The main goal of the statewide architecture is to guide the implementation of ITS in Montana and coordinate funding, deployment, information sharing, and operations of ITS. The main ITS focus areas for MDT include enhanced traveler safety; accurate and timely traveler information; coordinated incident management; effective maintenance of the roadway system; efficient commercial vehicle operations; and integrated data management.[100] This chapter highlights some of the many innovative and ITS technologies implemented by MDT.

Credentials and Vehicle Clearance

MDT streamlines its permitting and vehicle safety programs by using automated programs including the electronic Permit, Audit, Registration, Tax (ePART) system, Weigh Station Bypass Systems, ramp screening technologies, and roadside safety inspection concepts.

The ePART system is used to issue International Registration Plan (IRP) vehicle registrations, International Fuel Tax Agreement (IFTA), fuel licensing/ tax returns, and oversize overweight (OS/OW) permits. ePART is available online for qualifying motor carriers and third-party providers to self-issue credentials online at any time of day.[101] The ability to process multiple transactions online in this manner has reduced the time for permitting from up to four hours down to mere minutes, saving time for all parties involved.[102]

PrePass Safety Alliance, (formerly HELP, Inc.) which Montana has been a member of since 1997, is a public/private partnership of electronic weigh station bypass and screening systems. PrePass uses Automatic Vehicle Identification to identify enrolled vehicles pre-cleared for safety and credentials. Montana's PrePass system also integrates weigh-in-motion (WIM) systems to weigh trucks for compliance as part of the bypass screening criteria. Deployment of these technologies improves weigh station operations through more efficient freight movements for compliant CMVs, while providing law enforcement officers the ability to focus on vehicles that are not compliant. Montana currently employs PrePass at seven locations that are compatible with the app and/or transponder and an additional four locations that only work with the PrePass app.[103] The newest locations in Montana include Clearwater Junction and Lima. Like ePART, PrePass saves truck drivers a significant amount of time and resources. Since 1997 it is estimated that drivers spent 666,602 fewer hours on the road and saved nearly 3.2 million gallons of fuel, by using PrePass.[104]

Drivewyze, a privately operated ITS service, is in operation throughout Montana and provides additional weigh station bypass capabilities for trucks, utilizing the platform. Drivewayze allows trucks to bypass weigh stations by automatically assessing the vehicle's safety record, weight, and credentials. If a truck can demonstrate that it complies, then the vehicle can bypass the weigh station. This can save time and money for the driver as well as reduce congestion and delay at weigh stations.

Ramp Screening

Montana deploys ramp screening technologies at it most congested weigh stations to improve freight mobility. Ramp screening systems include license plate and USDOT number readers, Optical Character Recognition (OCR) software, and use a consolidated safety and credentials database to provide results immediately. This allows officers to focus on vehicles and drivers most likely to have safety and/or credentialing issues.

Road Condition Information and Route Planning

MDT publishes, maintains, and provides both fixed and variable information about route conditions and suitability for freight passage. Travelers use a variety of means to receive traveler information for MDT's highway system, both pre-trip and enroute.

Online Traveler Services Information

MDT's Traveler Information System provides travelers with timely and accurate roadway information. The traveler information program is continually evolving but currently includes the following:

- 511 toll-free phone system;
- Traveler information website;
- Mobile app;
- More than 73 Road Weather Information System (RWIS)/cameras statewide;
- Highway Advisory Radios (HAR);
- Permanent and portable variable message signs; and
- Snowplow cameras.

MDT's website, www.mdt511.com, and the "MDT Travel Info" mobile application are widely used. These sources provide information about weather, construction and maintenance, reported incidents, road conditions, load and speed limit restrictions, and rest area locations. The website also provides real time imagery from roadway webcams as well as dash mounted snowplow cameras. While snowplows are in operation, the camera captures images approximately every half mile, which are then made available to the public via MDT's website and mobile app. This technology helps travelers determine conditions based on firsthand observations and allows them to plan accordingly.

Some travelers use MDT's 511 phone service also, which provides route specific forecasting, regional reports, facility information, and surrounding state access.

Construction and Work Zone Planning

MDT's Work Zone Safety and Mobility Policy uses best management practices by minimizing or reducing impacts before they occur. During the project pre-construction phase, a project-specific Transportation Management Plan (TMP) is developed to address demand management, corridor/network management, construction zone safety management, and traffic/incident management. One goal of the TMP is to recognize impacts of construction activities on the freight activities and mitigate those impacts as feasible.

Emergency Response

Maintaining and restoring transportation routes caused by destructive events is crucial. MDT has measures in place to respond to such events. In coordination with other Montana state agencies, MDT has the following plans prepared to ensure swift and efficient response:

- Emergency Notification and Personal Security – continuity of operations plan;

- Emergency Vehicle Management – Transportation Injury Mapping System (TIMS), getting to the scene, maps for routing, detouring for incidents, flagging at emergency zones, and traffic control;
- Disaster Response and Evacuation http://readyandsafe.mt.gov/Emergency; and
- MDT Emergency Operations and Disaster Plan: http://mdtinfo.mdt.mt.gov/maint/docs/des_manual/mdt_emergency_disaster_plan.pdf

Road System Enhancements

MDT has undertaken studies and installed technologies, including ITS features, which benefit overall system safety and operations, including freight passage.

Real-Time Traffic Control

MDT uses several traffic control technologies including visibility sensors on I-15 northbound, which warn vehicles of reduced visibility and associated route impacts (detour/closure), wind sensors deployed at various locations to determine when high-profile vehicles should be required to detour or reroute.

Sequential Dynamic Curve Warning System

This system, manufactured by Traffic and Parking Control Company (TAPCO), uses a vehicle activated radio-based wireless chevron sign to warn and guide motorists through a curve. MDT has installed two of these systems – one near Beaverhead Rock on MT Highway 41 north of Dillon and one on MacDonald Pass US Highway 12 west of Helena, to assist motorist.

Active Intersection Warning Devices

These vehicle-activated devices give drivers additional information to assist in collision avoidance. MDT has installed several active warning devices at un-signalized intersections to warn motorists of crossing traffic or the need to stop ahead. Installations include Bowman's Corner and U.S. Highway 2 & Spring Creek/Dern Road near Kalispell. Each system uses a location-specific design to address the unique crash trends of the intersection.

Warning Flashers

MDT regularly installs advance warning flashers at high-speed signalized intersections. These installations consist of a "Be Prepared to Stop When Flashing" sign and advance warning beacons that are interconnected to traffic signals and provide motorists with a warning that the green indication is about to terminate. These are particularly useful for heavy vehicles that require longer stopping distances.

Signal Synchronization

Proper traffic signal timing promotes safe and efficient traffic flow. A well-timed traffic signal system can reduce fuel consumption and emissions, eliminate unnecessary stops and delays, and increase safety. MDT Congestion Mitigation and Air Quality Improvement Program funds are for projects that improve corridor operations through upgrading traffic signal hardware and reviewing traffic signal timing.

Rotator Bases

MDT has installed special signal poles at some intersections with super load traffic. These poles can rotate at the base to move the mast arm and the signal heads out of the way to allow super loads to easily pass through.

6. Laws and Policy Regarding Freight

MDT's goal of improving the safety, security, efficiency, and resiliency of freight transportation is guided by both federal and state laws as well as MDT policies, strategies, and performance measures. The following sections highlight the most relevant of these to MDT's freight planning efforts.

Federal Laws and Policy

The FAST Act, signed into law December 4, 2015, recognized the need to improve the condition and performance of the NHFN and to ensure goods are transported safely, reliably, and efficiently. To support these goals, the FAST Act created the National Highway Freight Program (NHFP). The NHFP outlines the goals specific to maintaining the NHFN (23 USC 167), which is the nation's most critical interstates for freight transportation. These goals include:

- Improving the contribution of the freight transportation system to the economy;
- Reducing congestion on the freight transportation system;
- Reduce the cost of freight transportation;
- Improving the safety, security, and resiliency of the freight transportation system;
- Improving the state of good repair of the freight transportation system;
- Using advanced technology, performance management, innovation, competition; and accountability in operating and preserving the freight transportation system;
- Reducing adverse environmental and community impacts of freight transportation.

In addition, the NHFP makes funds available to states for projects that help meet the goals described above. However, for states to be eligible for these funds and to participate in the NHFP, states are required to develop and maintain state freight plans. Freight plans are designed to provide a comprehensive plan for the immediate and long-range planning activities and investments of a state, with respect to freight, as well as describe how a state will improve its ability to meet the goals of national freight policy.

More recently, the IIJA, was signed into law on November 15, 2021, and was built on the existing foundation of freight policy and goals described in its predecessor, the FAST Act. IIJA promulgated further additions and requirements for freight plans as well as emphasizes the need for states to commit to ensuring reliability or redundancy of freight transportation or incorporate the ability to rapidly restore access and reliability of freight transportation within state freight plans. Additionally, IIJA increases the frequency of freight plan updates from every five years to every four, and to adjust the planning horizon from five years to eight years.

Montana Legislation and Rules

Various state codes and rules also govern freight-related transportation activities within Montana. The following includes pertinent statutes and administrative rules. However, others may apply that are not included here.

Montana Constitutional Constraints

Article VIII, Part VIII, Section 6 of the Montana Constitution requires GVW fees and excise and license taxes (except general sales and use taxes) on gasoline, fuel, and other energy sources used to propel vehicles on public highways to be used as authorized by the legislature, after deduction of statutory refunds and adjustments, solely for:

- Payment of obligations incurred for construction, reconstruction, repair, and operation;

- Payment of county, city, and town obligations on streets, roads, and bridges; and
- Enforcement of highway safety, driver education, tourist promotion, and administrative collection costs.[105]

Montana Code Annotated (MCA)

Size and weight statutory requirements pertaining to motor carriers and freight movement are contained in MCA 61-10. MCA 61-10-1011 enacts the Multistate Highway Transportation Agreement, which promotes uniformity in allowable vehicle size and weight. Participation is open to all jurisdictions. Current member states include Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming. This agreement does not formally direct freight-related investment decisions, although Article IV, Section 1(d) indicates the cooperating committee may recommend improvements in highway operations, vehicular safety, and in state administration of highway transportation laws.

Administrative Rules of Montana (ARM)

MDT's Motor Carrier Services (MCS) is charged with protecting the highway network and ensuring safety for users through uniform regulation of the commercial motor carrier industry. MCS enforces all state and federal commercial motor carrier laws, rules, and regulations. MCS is responsible for the state's commercial motor vehicle (CMV), commercial driver safety, and oversize/overweight permit programs. MCS operates under the Administrative Rules of Montana contained in Chapter 18. As with MCA 61-10, ARM 18.8 specifically addresses the requirements placed upon CMV carriers to lawfully operate in Montana.

These rules are designed to minimize over dimensional freight vehicle interactions with passenger vehicles to improve safety and mobility on Montana highways.

TranPlanMT, Montana's Long Range Transportation Plan (LRTP)

MDT's long range multimodal policy plan, TranPlanMT, provides state-wide guidance for transportation-based decisions. Originally adopted in 1995 as TranPlan21 and most recently updated in 2017, this long-range plan is an essential component of a continuing state-wide planning process focused on assisting MDT in developing and implementing policy goals and actions. TranPlanMT provides MDT an opportunity to work with stakeholders and the public to identify and achieve transportation goals. TranPlanMT reflects input from the public, MDT staff, transportation stakeholders, local and tribal governments, resource agencies, and others around the state that guide efforts to plan Montana's transportation future effectively and efficiently. The plan identifies goals and strategies for a 20-year future time frame.

The Montana Freight Plan is in alignment with TranPlanMT for the support of overall movement of freight and is consistent with MDT's long-range policies. The following sections describe TranPlanMT policy areas as they relate to the efficient and safe movement of freight.

Safety

Safety is central to MDT's guiding mission. The department actively emphasizes safety through its programs and coordinates efforts with partners in education, enforcement, engineering, and emergency medical response. MDT maintains a focus on enabling all users to safely access Montana's transportation system. While not specific to freight, MDT's vision of zero fatalities and zero serious injuries on Montana's roadways includes all modes and users of the transportation system. Analysis for this freight plan includes crashes involving trucks, as well as at-grade crossing concerns.

System Preservation and Maintenance

MDT employs a risk-based asset management approach to monitor performance and develop an optimal investment plan, ensuring like conditions throughout the state. Using this asset management

approach and a “Right Treatment at the Right Time” philosophy provides a program of activities that preserve highway system investments. Optimized utilization of limited resources ensures Montana’s highways will continue to support efficient movement of freight through and within the state.

Mobility and Economic Vitality

Facilitating the movement of people and goods and recognizing the importance of economic vitality are important for Montana’s transportation system. A well-maintained transportation network of all modes allows people, goods, and services to move freely, reducing “friction” and allowing the economy to thrive. Montana’s economy is closely tied to transportation because of the lengthy distances between population centers within the state and to markets for Montana products. All modes contribute to freight mobility and economic competitiveness in Montana, each serving markets and supply chains with different cost and time-to-delivery constraints.

Together, trucking and rail modes carry about half of all freight tonnage within the state. These modes are critical to ensuring freight is adequately and efficiently moved throughout Montana and the nation. MDT regularly monitors and studies freight commodities and travel patterns. MDT also considers effects to freight modes as investments are being made to the transportation network. MDT will continue to enhance the freight network with targeted investments in infrastructure and operational improvements to highways such as highway and bridge preservation, congestion reduction, improved safety, and improved reliability.

Accessibility and Connectivity

MDT’s goal is to preserve access to the transportation system and connectivity within and between modes. On a project-by-project basis, MDT evaluates the needs of all users and modes within the project, using a context-sensitive approach appropriate for the area and the community. From a freight perspective access and connectivity can mean connections between producers and markets, modes, and access to larger markets through intermodal or international connections.

Environmental Stewardship

MDT works to optimize planning and design decisions by balancing transportation needs with responsible, cost-effective stewardship of the environment. This process involves regulatory compliance with the intent to incorporate environmental sensitivity and sustainability as integral aspects of project decisions and design. While not specific to movement of freight, environmental stewardship is an underlying goal that informs decision-making at a broad level within MDT.

Business Operation and Maintenance

It is vital that MDT develop and implement a long-range multimodal transportation improvement program that addresses Montana's statewide transportation needs, is consistent with the statewide long-range transportation plan and management system output and maximizes the use of federal funds to ensure a cost-effective, efficient, and safe transportation system that supports the movement of freight. To do this, MDT strives to recruit and retain a qualified workforce. MDT also exercises sound financial management to ensure matching funds for the federal aid program and adequate state funding for system maintenance and operations. All of this must be done while ensuring compliance with rules and regulations.

7. Goals and Strategies Addressing Freight System Needs

Through discussions with private and public stakeholders, and subject matter experts, key freight system needs were identified. In general, they include infrastructure condition, freight mobility and

reliability of the network, and commercial vehicle safety. These needs, coupled with federal priorities for freight, helped guide the development of the following Freight Plan goals:

Table 23: Montana Freight Plan Goals

Montana Freight Plan Goals	
Safety	Improve safety for freight operators and the traveling public.
System Preservation & Maintenance	Preserve and maintain existing transportation infrastructure, thereby ensuring infrastructure resiliency and the efficient movement of freight.
System Reliability	Provide Efficient, cost-effective management and operation to accelerate transportation project delivery and ensure system reliability.
Environmental Stewardship	Support MDT's transportation mission through responsible stewardship of the built and natural environment.
Network Resiliency	Support programs and efforts that promote network resiliency in response to the effects of extreme weather and natural phenomenon.

The above goals seek to address freight-related needs identified through the development of the Freight Plan. Within each goal section, discussed below, strategies deployed by MDT are highlighted in greater detail.

Commercial Motor Vehicle Safety

Commercial motor vehicle safety, as well as safety for the traveling public, is a number one priority for MDT. Montana experienced 6,512 crashes involving commercial vehicles between 2015 and 2020, of which 109 were fatal.[106] MDT addresses roadway safety strategies and goals in its Comprehensive Highway Safety Plan and (CHSP) and Commercial Vehicle Safety Plan (CVSP). Strategies in the CHSP include:

- Influencing human behavior related to speeding, fatigued driving, distracted driving; and unrestrained vehicle occupants;
- Increased enforcement of traffic laws; and
- Improved data collection and accessibility for planning and engineering activities.

In addition to these programmatic approaches that help to reduce crashes and fatalities, MDT uses location-specific interventions to alert drivers to roadway hazards and to improve commercial vehicle inspections. MDT deployment-based strategies include:

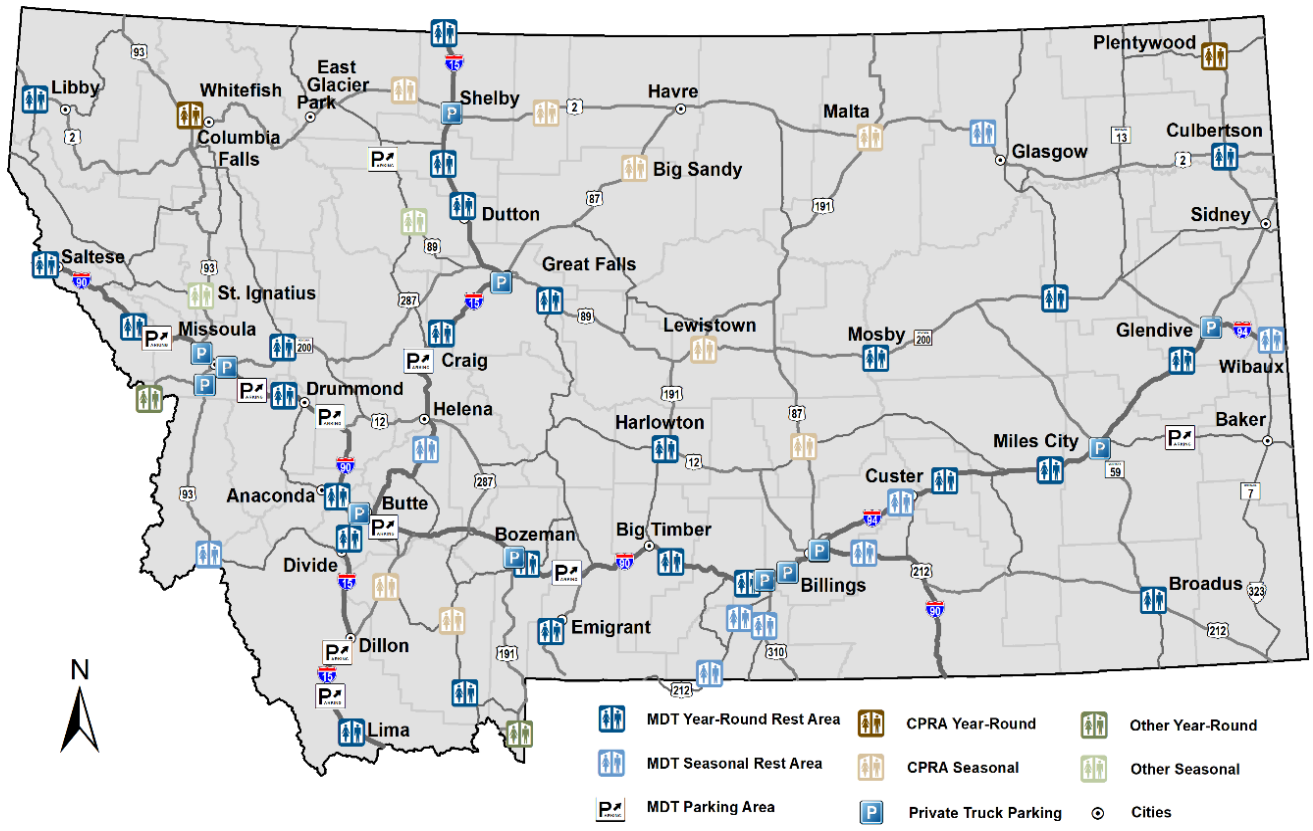
- Sequential Dynamic Curve Warning Systems: These systems reduce the likelihood of rollovers or roadway departure by alerting drivers to successive horizontal curves, increasing driver awareness and compliance with posted speed warnings.
- Active warning devices at intersections, locations prone to queuing, and low bridges provide drivers with increased awareness of traffic conditions and allow the driver to begin reacting before an obstruction or hazard can be seen. Each of these interventions is particularly helpful for commercial vehicle drivers due to the longer stopping distance, higher center of gravity, and rollover susceptibility.
- Commercial vehicle inspections improve compliance with safety requirements and MDT is increasingly using technology to improve the efficiency and efficacy of inspections.
- Utilization of pre-screening programs, PrePass and DriveWyze, allows inspection staff to focus inspection time on carriers with previous safety violations in addition to random inspections of program participants, while carriers with a positive safety record may receive a signal to bypass the inspection.
- Deployed 360SmartView technologies improve screening by implementing license plate recognition, seat belt usage detection, distracted driver detection, tire anomaly and infrared brake inspection, hub and tire screening, and over-height detection. Better identification of driver and vehicle violations improves safety for the traveling public.

Rest Area and Truck Parking

A major national safety and stakeholder concern related to freight is the lack of truck parking. Title 23 USC §120 addresses this issue by incorporating “Jason’s Law”, which surveyed truck parking availability and developed metrics to understand shortages. Based on the survey, conducted in 2014, Montana had the highest number of truck parking spaces per 100,000 miles of daily combination VMT in the nation. Based on an updated survey, conducted in 2019, Montana continued to rank in the top 5 states with the most spaces

MDT can only address public rest stop and truck parking facility needs. However, when evaluating both private and public options for truck parking, the level of service within the state greatly improves. Where there may be gaps or increased demand for public truck and rest stops, private truck stops can help to fill the gap (and vice versa). Figure 63 below, displays a map that includes all known private and public rest and truck stops. Together, these efforts are helping to meet the traveling needs of the public and freight operators.

Figure 63: Map of Public and Private Rest Stops and Truck Stops Within the State[107, 108]



Despite Montana's robust network of public and private rest and truck stops, needs still exist. During the development of this plan and in consultation with Motor Carrier Services, stakeholders and MDT subject matter experts identified truck parking as a continuing challenge in certain parts of the state. Three Forks and Butte were two specific locations identified as needing additional parking capacity. Unauthorized parking on non-Interstate NHS routes was also identified as an issue.

In order to address the evolving need for truck parking within the state the following strategies are being implemented:

- Emphasize rest area preservation to extend the service life of existing facilities and utility systems and identify improvements to meet parking and building demands.[109]
- Assess and consider updates to existing rest area facilities or additions to facilities in corridor studies, when appropriate.
- When conducting corridor studies or other planning studies, include freight stakeholders in the public process to help identify truck parking needs and issues, when appropriate.
- Seek to implement the use of a parking availability system to notify drivers in advance of available truck parking spaces at rest areas, through the pursuit of discretionary opportunities.[110]
- Rest area projects along the Primary Highway Freight System (PHFS) that help to address freight needs are eligible for funding consideration through the National Highway Freight Program.

To help drivers plan their trips efficiently and identify available parking locations in advanced, MDT is seeking to implement an Innovative Technology Deployment (ITD) project for truck parking availability. Specifically, for the 2022 ITD grant, the project is to deploy parking stall identification and availability systems at the Columbus I-90 Westbound rest area and Homestake I-90 Eastbound Truck Parking area. These two areas are the first truck parking locations, in Montana, where the technology

will be installed. MDT is also looking at instrumenting additional locations with future ITD grants and other funding resources. Goals of this project are to improve safety, by ensuring drivers get required rest, reducing illegal truck parking, and minimizing CO2 emissions. MDT is working with surrounding jurisdictions to provide an integrated and standardized platform for truck parking information.

System Preservation and Maintenance

Maintaining transportation infrastructure that is safe and reliable is imperative to all who travel on Montana's roadways. Maintaining a state of good repair and applying the right treatment at the right time principals help MDT manage its assets effectively. Pavements and bridge conditions are two major assets across the network that MDT is committed to maintaining.

Pavement Condition

There are over 73,000 center lane miles open to public travel in Montana with over 12 billion vehicle miles travelled annually.[111] More than half the miles travelled occur on just nine percent of the NHS road network, which MDT maintains. Pavement condition is a key consideration for efficient and safe movement of freight. If pavements are not properly managed, then poor pavement conditions may result which can slow travel, cause delays or incidents, and damage vehicles and goods in transit.

Strategies that MDT implements to maintain statewide goals for pavement management include[112]:

- Preservation of the existing system. This approach provides the right treatment at the right time. This active approach manages pavements using cost-effective treatments. Activities include crack seal, seal and cover, rut fill, mill/fill, overlay, micro-surfacing, cold-in-place recycle, and hot-in-place recycle treatments.
- Mobility improvement projects that include major rehabilitation and reconstruction treatments to address level-of-service deficiencies by adding lanes and/or shoulder width.
- Safety and other improvements. Maintaining pavement condition to ensure safety for the traveling public. Activities related to safety include rut-fill, chip seal, and concrete diamond grind.
- Applying the right pavement design. Effective pavement design is an important element of roadway project design. Montana predominantly utilizes flexible pavements (commonly referred to as asphalt or plant mix surfacing). In rare instances, where conditions warrant, MDT uses rigid pavement commonly referred to as Portland cement concrete pavement[113]. Compared to flexible pavement, rigid pavement is more resilient to changing climatic conditions observed on mountain passes which experience a higher degree of snow, ice, heavy truck loads, and wear and tear from chained vehicles and trucks.

Heavy Vehicles and Road Deterioration

MDT utilizes a comprehensive pavement management system to identify and prioritize pavement improvement projects. The weight of heavy commercial vehicles compared to passenger vehicles has exponentially greater impacts on pavement performance and can decrease the roadway's useful service life. As modern commercial vehicle designs continue to change and heavier loads become more common, road deterioration from heavy trucks will need to be addressed.

One way to address road deterioration from heavier loads, such as commercial vehicles, is to construct or reconstruct roadways with greater structural capacities or add additional capacity to existing roads. Roadways targeted for additional structural capacity are NHS routes, which experience the highest truck volumes and vehicle weights. For instance, the minimum thickness of flexible pavement on interstates (6 inches minimum) is more than what would be applied on non-interstate road systems. Agents, such as polymers, might also be added to the pavement to make it stiffer and more resilient to the wear and tear of heavier vehicle loads.

When designing pavements for NHS routes, the highest reliability factor is used in the methodology for determining pavement design. The reliability factor is a means of incorporating some degree of

certainty into the design process to ensure that the pavement will last through the design life and accounts for variations in both traffic and performance prediction.[114]

Bridges and Commercial Motor Vehicles

The reliability of Montana's roads is tied to Montana's bridges, since almost every road in Montana has at least one bridge. There are 4,477 bridges in Montana, some of which can be a "choke point" for commercial vehicles, especially those that are carrying over-sized or over-weight (OS/OW) loads. A bridge with a load, height, or width limit has the potential to require a route detour and/or require the need for a load permit to ensure safety of the vehicle and driver as well as the structural integrity of the bridge.

Most of Montana's legacy bridges, built around the mid to early twentieth century, are nearing their useful service life (70 years) and were also not designed for today's types of truck loads and designs. Additionally, anti-icing applications on roadways and bridge decks can lead to corrosion in steel reinforcement and deteriorate concrete over time. Due to these factors, Montana's older bridges require additional maintenance and are often load limited and/or are unable to accommodate modern and larger vehicle designs. As a result, OS/OW loads may need to acquire load permits which can lead to further delays and safety issues on the road. Therefore, MDT recognizes the need for effective strategies to address Montana's aging bridges. Strategies currently being implemented are identified below:

- Bridge Structure Management System (BrM): Montana's BrM is used to track and report system-wide conditions and perform analysis that support bridge function decisions.[115] The BrM seeks to:
    - Protect safety of the traveling public by identifying bridges with limited capacities and determining safe posting limits.
    - Help in the prioritization of rehabilitation or replacement projects.
    - Assist in overweight vehicle permit review.
    - Satisfy federal requirements that require all bridges in the National Bridge Inventory (NBI) to be load rated and restricted, if necessary.
- Bridge Load Posting Program: This program helps to ensure public safety while protecting bridge integrity and longevity by limiting vehicles of a certain weight to prevent bridge overload and damage. The program is being updated to reflect the most recent safety-based bridge engineering evaluations, new vehicle types, and FHWA guidance.[116]
- New Bridge Designs: New bridge designs provide for higher load rating compared to older bridge designs. This approach reduces the amount of possible damage that heavy loads may cause as well as increase the reliability and efficiency of the network by accommodating much heavier loads and by reducing the need for vehicle detours.
- Dynamic Message Signs: Proactively incorporating technology can improve safety for all road users. Signs with messages directed to heavy trucks can be implemented to reroute them if there is an upcoming bridge that cannot accommodate the truck's width/weight/height.
- Accelerated Bridge Construction (ABC): Considering ABC, when feasible, can help to accelerate bridge construction in critically time sensitive situations, such as when detours are not possible, and the road is fully closed to all traffic. Restoring service, as soon as possible, under this situation is very important. ABC is effective because it uses pre-cast and pre-formed bridge components. This allows for much quicker bridge construction due to less construction needing to be done on sight. As a result, service can be restored more quicky.[117]
- Bridge Bundling**:** Bridge bundling is a tactic that combines multiple bridge projects into a single project to ensure efficiency and to address multiple bridge needs in a single effort.

System Reliability

A reliable transportation network and efficient freight movement is critical in ensuring economic competitiveness and safety of all transportation users. MDT and the state are therefore committed to enhancing reliability for freight and the overall transportation network.

Freight mobility issues occur when travel is halted, impeded, or congested and can be either recurring or non-recurring. Recurring restrictions routinely and/or predictably restrict the free flow of freight by any mode. Non-recurring sources of mobility issues are random in nature. To understand highway facilities with freight mobility issues in Montana, it is important to consider whether the sources are recurring or non-recurring, as depicted in the table below.

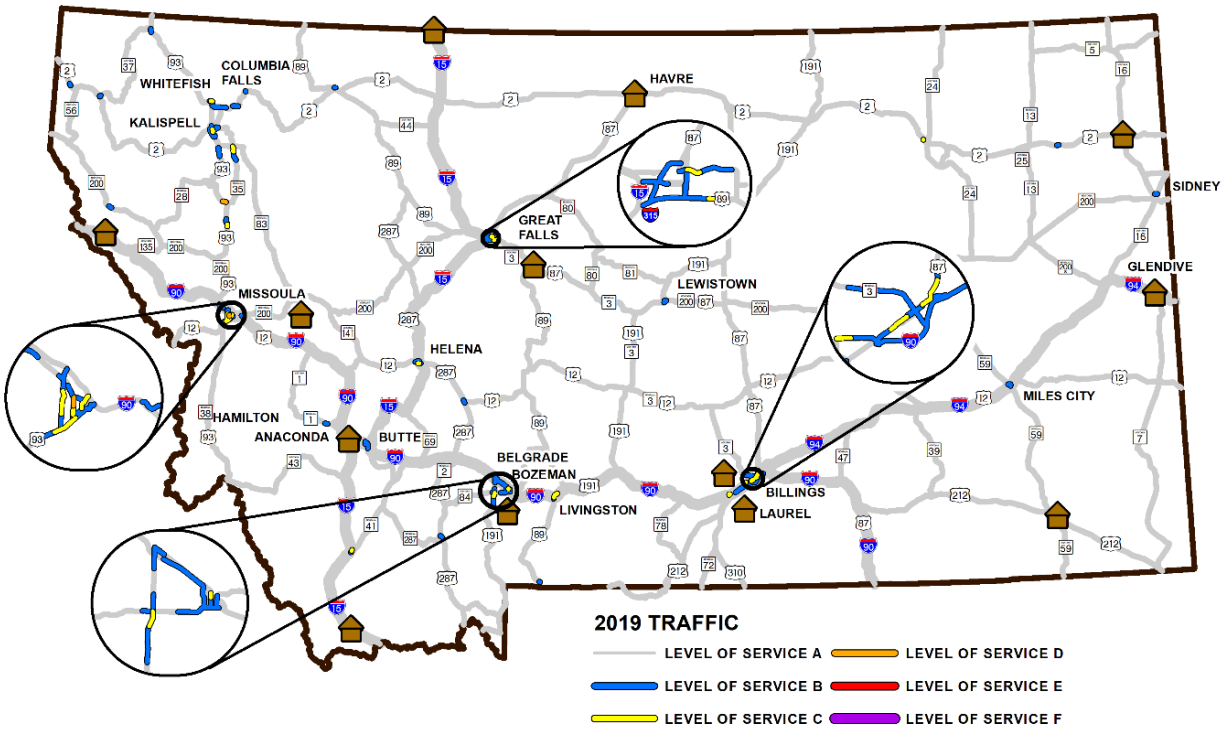
Table 24: Sources of Highway Freight Mobility Issues

Sources of Highway Freight Mobility Issues	
Recurring	**Non-Recurring**
Limited physical capacity (e.g., bottlenecks)	Work zones
Poorly functioning traffic signals	Inclement weather
Seasonal agriculture harvests	Special events
Seasonal tourism	Oversized loads
Manufacturing facilities	Infrastructure failures
	Wildfires, flooding, and other natural phenomenon
	At-grade rail crossings

All highway facilities in Montana are exposed to non-recurring freight mobility issues, although some areas are more susceptible than others. Acts of nature such as extreme weather and wildfires are common and happen at relatively unpredictable times and locations throughout Montana. Other non-recurring events tend to occur in specific areas, for example, traffic congestion after a concert at the Billings Metra Park. Few areas in Montana are considered to have significant freight mobility issues. Recurring freight mobility issues occur in areas with physical limitations and are generally associated with small areas of insufficient capacity or areas that experience swells of traffic due to events such as agricultural harvests and tourism seasons.

One way that MDT identifies areas of recurring delay and congestion is by calculating a level of service (LOS) index based on the Highway Capacity Manual (HCM). LOS measures the quality of motor vehicle traffic service and is reported on a scale of A to F, with A being free-flow traffic and F being severe congestion. MDT established LOS targets by functional classification. The target LOS for the Interstate System is LOS B. Principal arterials (NHS non-Interstate) and minor arterials have a target LOS of C.[118] Figure 64 shows areas of LOS on the NHS and Primary Highway Systems. Areas with freight mobility issues are highlighted. As observed, the areas which experience a decreased LOS are primarily located within heavily populated urban centers, such as Billings, Bozeman, Missoula, and Great Falls, where capacity struggles to keep up with roadway demands.

Figure 64: Montana Roadway Level of Service (2019)



Source: MDT Geospatial Information Section

Strategies that Address Recurring Congestion

MDT employs various methods and strategies to minimize recurring congestion and delay, including design and capacity considerations, PrePass, international border crossing agreements, traffic planning, and permitting. In addition, bottlenecks can cause freight mobility issues, contribute to air pollution, and decrease the reliability of the road network in certain areas. Bottlenecks are categorized into three areas: infrastructure, institutional, and financial.

Strategies to address infrastructure bottlenecks include:

- Reducing congestion to improve performance of the transportation system;
- Improving safety, security, and resiliency of the transportation system;
- Facilitating intermodal connectivity;
- Identifying major trade gateways, multimodal freight networks and corridors, and working with freight stakeholders and partners to improve mobility in these areas;
- Mitigating impacts of freight projects and movements on communities; and
- Supporting research and promoting adoption of new technologies and best practices.

Strategies to address institutional bottlenecks include:

- Streamlining project planning, review, prioritization, permitting, and approval;
- Fostering multijurisdictional, multimodal collaboration and solutions;
- Facilitating coordination between public and private stakeholders;
- Improving data sources and modelling; and
- Succession planning for the transportation workforce.

Strategies to alleviate financial bottlenecks include:

- Ensuring maximum utilization of federal funding programs;
- Exploring other funding sources including federal discretionary opportunities; and
- Exploring public-private partnerships.

Strategies that Address Non-Recurring Congestion

Non-recurring congestion that causes delay are caused by random events such as traffic incidents, construction, special events, acts of nature, and oversized loads. While the timing and occurrence of these causes may be unpredictable, measures must be in place to respond to such events to alleviate freight mobility issues associated with state owned highways.

Impacts to the transportation network, caused by weather and other natural events can cause disruptions in freight movements, thereby decreasing network reliability and resiliency. Such disruptions, depending on how severe, pose a threat to freight movement and economic vitality. National freight policy recently recognized the value of addressing these issues through the IIJA's updated freight planning requirements to consider the ability of states to respond to and recover from system disruptions.

Strategies used by MDT to help address types of common non-recurring congestion are identified in the table below.

Table 25: MDT Strategies for Addressing Incidents that Cause Non-Recurring Congestion

Incident Type	Strategy
Crashes and Incidents	When requested by the Montana Highway Patrol, MDT assists with traffic control until the investigation is complete, and the roadway is cleared.
	MDT maintains an Emergency Operations and Disaster Plan. This plan outlines the procedures to follow in times of emergency in order to efficiently restore transportation movements.
Winter Storms/Extreme Weather	Implementation of a Winter Maintenance Service Guidelines which establishes priorities between maintenance areas.
	Approximately 700 maintenance personnel available for clearing snow and ice from roadways
	Application of de-icing agents and sand where appropriate
Infrastructure Failure	When infrastructure fails (e.g., due to rock falls, floods, and fires), MDT initiates an incident management team to establish a detour followed by a second team to quickly implement repairs.
Wildfires/Flooding	Debris removal on or near impacted roadways.
	MDT ensures that evacuation routes are safe, and that critical route information is communicated to the proper authorities and to the public.
Oversized/Overweight Loads	An online permitting system for oversized and overweight loads reduces delay in obtaining permits.
	Maps and information on load posted bridges and trip planning resources is made available online, for individuals planning their routes.
Construction and Maintenance	MDT implements a Work Zone Safety & Mobility Toolbox for MDT and MDT contractors to utilized, during all phases of a project.

The Innovative Technologies section discussed in Chapter 5 identifies a myriad of technological tools and applications for communicating essential route and road information to the traveling public, which includes freight operators. In addition to the strategies discussed above, these technologies are just as important in communicating information that can offer proactive means for avoiding delays, detours, road closures, and unsafe traveling conditions along Montana's roadways.

Rail Freight Mobility Issues

Data on locations of specific railroad bottlenecks and mobility issues for Montana's largest carriers, BNSF and MRL, is proprietary information and therefore is unavailable. Geographical obstructions and limitations, including mountain passes, tunnels, and snow sheds exist, mostly in the western part of the state. These encumbrances pose challenging issues for the railroads, as solutions may be costly and environmentally prohibitive. BNSF is continually investing in rail infrastructure investments such as positive train control technology, grade crossing maintenance and improvements, technology, and equipment. In 2019, BNSF expanded facility operations and invested more than $72 million within the state.[119]

Mitigating Delay Caused by Freight

Based on the LOS analysis presented earlier and consultation with freight stakeholders and MDT district personnel, congestion and delay caused by freight movement is minimal in Montana. While not considered significant by most standards, the following are sources of recurring congestion and delay caused by freight movements in the state and mitigation strategies.

Harvest/Natural Resources

Cyclical surges in freight movements associated with industries such as agriculture, timber, and mining cause congestion and delay at transloading and processing facilities. This congestion is generally limited to non-NHS routes. Mitigation strategies that are the responsibility of private entities include:

- Construction of additional truck parking and storage facilities on private property;
- Extension of operating hours; and
- Partnering with rail service providers to ensure availability of equipment.

Weigh Scales

Freight traffic at weigh scales infrequently causes congestion and delay. This delay can be both before and after the scale location and is caused by overcrowding of trucks going into the scale and the speed differential after the scale as trucks merge into traffic. Mitigation strategies to address delay at weigh stations include the installation of bypass systems, such as PrePass or Drivewyze. These systems reduce the number of trucks utilizing the scale facility. Bypass systems allow qualified motor carriers to comply with safety, weight, and credential requirements while traveling at highway speeds, eliminating the need to stop at designated weigh stations and ports-of-entry. This strategy improves safety by reducing congestion around inspection facilities and enables state inspection and law enforcement teams to focus efforts on carriers and trucks that demand more attention. This method also improves air quality, reduces emissions from idling trucks, and reduces congestion.

International Border Crossings

Delay is sometimes present at U.S./Canada border crossings, although this delay is not always attributed to freight movements. Passenger vehicles make up a large percentage of traffic leaving the U.S. Operational strategies to alleviate delay are implemented by U.S. Customs and Border Protection. MDT partners with authorities in both the U.S. and Canada to optimize port of entry highway facilities. Freight and resource efficiencies are realized by a joint weigh station agreement between Montana and Alberta. Montana has joint weigh station operational agreements in bordering states, as well, that include Idaho and Wyoming.

At-Grade Railroad Crossings

Train traffic can cause congestion and delay when vehicles must wait for trains to pass at highway-rail crossings. The 2016 Montana Rail Grade Separation Study identified grade separation solutions that may be feasible for railroad crossings in Billings, Bozeman, and Helena. Additionally, five grade-separated crossings were identified for further investigation due to vertical or horizontal clearance

and/or roadway geometry issues. The results of this study can help MDT determine if improvements at these locations are viable and cost effective.

Environmental Stewardship and Strategies that Reduce Freight Impacts on the Environment

As earlier identified in this chapter, it is a goal of Montana's Freight Plan to practice environmental stewardship, seeking to minimize negative impacts of commercial vehicles on communities, wildlife and climate, through its own programs or in collaboration with other agencies, and to meet state and federal environmental laws. Discussed below are some of the strategies and practices that MDT uses to achieve these goals.

Air Pollution

Overall, Montana is fortunate to experience relatively good air quality. Montana's urban areas, located in air basins, however, can experience increased poor air quality due to the increase in human activities that result in the combustion of fossil and biomass fuels (e.g., home heating, vehicles, and commercial/industrial activities). When these activities occur under a strong weather inversion, air pollutants can get trapped and require additional efforts by public agencies to address. Public agencies may employ regulatory or incentive-based efforts to improve air quality.

To address climate change, several of Montana's cities have adopted climate action plans. These cities include Missoula, Bozeman, Helena, and Red Lodge. Climate action plans outline efforts and strategies to reduce greenhouse gases (GHG) and may include both regulatory and voluntary efforts of its citizens and businesses. Currently, MDT is working on the development of a Carbon Reduction Program.

Statewide, in 2020, Montana contributed an estimated 0.05% of energy related GHG's to the national GHG inventory. Out of all the states and the District of Columbia, Montana ranked within the ten least states that contributed to the national GHG inventory.[120] This percentage includes GHGs generated from the transportation, industrial, residential, electric power, and commercial sectors.

The state takes its air quality very seriously, wanting to preserve and ensure a healthy natural environment. In some instances, Montana cannot prevent the formation of air pollution, such as from wildfires, but it can help to reduce or mitigate anthropogenic sources of air pollution through its programs. A highlighted list of MDT strategies that work to address air pollution include:

- Cooperate with state and regional planning partners to address air pollution through air quality programs and the environment review process.
- Assist planning partners in meeting conformity requirements for areas designated as non-attainment for criteria pollutants.
- Prioritize projects for funding in the NHFP that help to minimize vehicle congestion and delay.
- Implement innovative technologies that improve freight traffic flow, such as the reduction of commercial vehicle idling, unnecessary truck start/stopping, and delays.

Below is a more detailed discussion on efforts that incorporate the strategies identified above.

Cooperating with Regional Planning Partners to Reduce Air Pollution

Addressing air quality issues within the state requires a coordinated effort with many of its local and regional jurisdictions.

Congestion Mitigation Air Quality Program

MDT implements the Congestion Mitigation and Air Quality (CMAQ) Improvement program. This program is a way for MDT to meet transportation conformity regulations and supports surface transportation projects and other related efforts that contribute to air quality improvements and provide congestion relief. While some CMAQ funds provided to the state of Montana are directed to

Missoula due to its designation of non-attainment standard under the Clean Air Act, MDT has the flexibility to prioritize the remainder of CMAQ funds to statewide projects that provide the greatest benefits in addressing air quality or congestion issues. In recent years, MDT also utilized a portion of these discretionary funds to purchase air quality equipment (in PM10 areas) and to improve intersections and signal synchronization to reduce carbon monoxide hotspots.

MDT is currently working to establish an interactive air quality planning process that considers air pollution reductions and transportation needs at the same time. Ongoing coordination between MDT, Department of Environmental Quality, and local and regional planners can help develop cost effective transportation strategies to meet conformity requirements; help establish criterion to prioritize CMAQ funds; and ensure that emissions inventories, emissions budgets, and transportation control measures are appropriate and consistent with the transportation vision of a particular area/region.

Corridor Planning and Studies

MDT conducts corridor planning studies to identify solutions that address transportation needs along a corridor or in a particular location(s). Local government and stakeholder representatives are invited to assist in identifying corridor issues and concerns, environmental impacts, potentially affected resources, and a range of options to improve transportation safety and operations.

Corridor studies and plans can be an effective resource at identifying solutions for particular challenges or needs on the transportation network, such as evaluating locations that experience impeded freight and vehicle movements. Such a study was conducted in 2016 and is called the 2016 Rail Grade Separation Study.

MDT's rail grade separation study reviewed at grade highway-rail crossings, in part, to identify Montana's most busy crossings and to provide potential options for improvement, such as grade separation. At grade highway-rail crossings that experience a lot of vehicle traffic have the potential to cause significant vehicular delay. The study, which utilized a data-driven evaluation process (e.g., number of daily trains, VMT, duration the crossing is closed per train crossing, emissions generated from vehicle delay and idling, and etc.) identified a list of at grade highway-rail crossings and potential feasible improvements, to improve traffic flow.[121] The study has since resulted in MDT currently seeking federal grant funds to further evaluate a grade separation project at one of the identified at grade crossings in Belgrade. In the evaluation of this one crossing, if a grade separation project was done, it would result in 4.7 tons of reduced criteria pollutants and 535 short tons of carbon dioxide equivalent over the project life, by eliminating vehicle idling. Out of these totals, an average of 95% of the emission reductions would result from the avoided idling of commercial vehicles at the grade crossing.

Analyzing Air Quality Impacts of MDT Proposed Transportation Projects

Air quality impacts of MDT projects must be evaluated and addressed pursuant to federal and state environmental review requirements. Chapter 42 (Air Quality Impacts and Transformation Conformity) of MDT's Environmental Manual provides this guidance. The manual outlines procedures for evaluating, analyzing, and documenting air quality impacts of proposed MDT projects to ensure compliance with federal and state environmental review requirements and air quality laws, regulations, and policies. It also outlines guidance for addressing conformity of proposed transportation projects with state air quality implementation plans.

State Grants to Reduce Emissions from Freight Moving Vehicles and Equipment

The Montana Department of Environmental Quality (DEQ) was designated by the Governor to administer funds allocated to Montana from the Volkswagen Environmental Mitigation Trust for State Beneficiaries ("State Mitigation Trust").[122] According to the Trust, the funds are to be used to undertake actions to reduce nitrogen oxide (NOx) emissions, from mobile sources in Montana. Nitrogen oxides are a main contributor to the formation of ground level ozone which can cause health related impacts to humans as well as other biological organisms, including plants and animals. Eligible actions, under the Trust, to reduce NOx, include engine and vehicle replacements or repowers, idle reduction technologies, and exhaust controls. Eligible vehicles and equipment include:

- Large heavy duty local freight trucks (Class 8);
- School, shuttle, and transit buses (Class 4-8);
- Freight switcher locomotives;
- Ferries and tugs (engine replacement only);
- Medium heavy duty local freight trucks;
- Airport Ground Support Equipment (all-electric replacement only);
- Forklifts with a lift capacity greater than 8,000 pounds and port cargo handling equipment;
- Light Duty Zero Emission Vehicle Supply Equipment—charging stations; and
- Actions available to states under the Diesel Emissions Reduction Act funding.

Prioritizing Projects in the NHFP that Reduce Congestion and Vehicle Delay

The National Highway Freight Program (NHFP) makes funds available for transportation projects along the National Highway Freight Network (NHFN). The goal of the program is to promote the safe and efficient movement of freight. Freight that can move efficiently across the freight network will generate less tailpipe emissions compared to freight that is forced to slow down or idle due to traffic congestion or bottlenecking. Idling commercial diesel vehicles have the potential to generate exponentially higher amounts of criteria pollutants, toxic pollutants, and greenhouse gases versus passenger vehicles that have much smaller combustion engines. Therefore, when evaluating MDT projects for NHFP funding, projects that address congestion and delay or improve efficiencies at weigh stations shall receive extra consideration in the review process.

Innovative Technologies that Improve Freight Flow

As discussed in greater detail in Chapter five, innovative technologies can promote the efficient movement of freight and commercial vehicles. Freight that moves efficiently experiences less delay. Idling and stop/start actions from commercial vehicles contribute to air pollution that can be avoided. Therefore, MDT's ability to streamline weigh station and border crossing processes with innovative technologies is an ongoing effort. These efforts include automating electronic load permits, audits, registration, weigh station bypass systems, ramp screening technologies, and roadside safety inspections concepts. All of these technologies help to reduce commercial motor vehicle delay and idling that contribute to increased levels of air pollution.

Traffic management, through the use of intelligent transportation systems, is an effective way to improve the movement of freight and avoid unnecessary delays, which has a positive impact on air quality. An example of this is synchronized traffic lights that ensure the maximum flow of vehicles.

Noise Pollution

During the rapid expansion of the Interstate highway system and other roadways in the 20th century, communities began to recognize highway traffic noise and construction noise as important environmental impacts. As part of the general environmental review process associated with all projects, MDT or its consultants are required to evaluate whether the project needs a noise analysis, and if it does, whether predicted noise levels could result in traffic noise impacts. For federal-aid projects, if noise impacts are identified then the consideration of reasonable and feasible noise abatement measures are required.[123]

Measures and strategies to help reduce noise pollution include:

- Acquisition of property to serve as a buffer zone to protect developed areas from the impacts of traffic noise.
- Implement traffic management measures including, but not limited to, traffic control devices and signing for prohibition of certain vehicle types, time-use restrictions for certain vehicle types, modified speed limits, and exclusive lane designations.

- Use of alternative pavement types to reduce roadway noise.
- Acoustical and engineering considerations when developing a project. For instance, topography, access, drainage, safety, other noise sources, may be evaluated to determine if a substantial noise reduction can be achieved.

If project design modifications are not feasible or cannot provide the necessary noise mitigation, MDT will consider noise abatement in the form of a noise barrier (wall or earth berm) within the highway project's right-of-way or easements.

Stormwater Runoff

Stormwater runoff occurs when precipitation from rain or snowmelt flows over the ground. Impervious surfaces like roads and highways prevent stormwater from naturally absorbing into the ground. Stormwater and flood waters can pick up debris, chemicals, dirt, and other pollutants caused by freight transport and vehicles, and flow into a storm sewer system or directly into a lake, stream, river, wetland, or aquatic resource.

MDT's Environmental Services Bureau provides information on mechanisms to address stormwater through guidance and technical support to MDT Engineering, Construction and Maintenance. The purpose is to incorporate stormwater pollution prevention and water resource protection considerations into MDT projects and maintenance activities. Goals of the program are to[124]:

- Prevent adverse water quality impacts and minimize unavoidable impacts by developing, implementing, and enforcing practices and procedures to reduce erosion, sedimentation, and pollution in highway runoff.
- Protect areas that provide water quality benefits (e.g., wetlands, aquatic ecosystems, riparian areas, wellhead sites, etc.), and protect areas that are susceptible to erosion (e.g., unstable soils, landslide areas, fragile stream banks).
- Promote the use of vegetative and other feasible methods to control erosion, reduce pollutant loadings, and prevent or minimize the amount of sediment reaching surface waters.
- Provide assistance, guidance, and training on erosion and sediment control, water pollution prevention, and stormwater management.
- Conduct construction project reviews to assist project managers and provide guidance for compliance with stormwater regulations and permit conditions.
- Develop, implement, and maintain a stormwater management program for compliance with the Small Municipal Separate Storm Sewer System (MS4) permit program.

Wildlife and Wildlife Habitat

Efforts to assess MDT's environmental stewardship goals identified in TranPlanMT are achieved through the Biennial Report process. The goals outlined in TranPlanMT address the impacts of freight transportation on wildlife and the environment, collectively with all road users. During the 2019-2020 biennium, MDT's environmental stewardship focus areas and accomplishments included:[125]

- The development of a new Wildlife Accommodation Process for evaluation and identification of wildlife friendly features and accommodations on projects. Incorporating wildlife accommodations on projects to address human safety and wildlife connectivity concerns.
- A Memorandum of Agreement with Montana Fish Wildlife & Parks to formalize the working relationship to protect Montana's citizens and wildlife.
- Created a Montana Wildlife and Transportation Partnership in association with Montana Fish Wildlife & Parks and Montanans for Safe Wildlife Passage to collaboratively address wildlife and transportation issues in Montana.
- Reuse and recycle construction materials by providing materials such as timber stringers, asphalt millings, guard rail, and aluminum sign sheeting to other agencies.

- Continued development of aquatic mitigation and purchase of credits to support project delivery.
- Greater emphasis on contextual design methodology to balance design standards and environmental sensitivity.

Needs included in this freight plan were also identified in TranPlanMT's biennial report. Based on past accomplishments and current needs in the environmental stewardship area, MDT identified the following strategies and goals for the 2021-2022 biennium:

- Continue to expand public involvement efforts to increase engagement and awareness of MDT projects and business practices.
- Continue coordination and communication with resource and regulatory agencies.
- Continue to look for opportunities to create efficiencies in environmental processes.
- Develop an umbrella agreement with the US Army Corps of Engineers for creation and management of aquatic mitigation banks.
- Continue coordination with the Montana Contractors Association to improve environmental compliance during construction activities.
- Revise MDT geometric design standards and methodology to allow for greater flexibility for contextual design.

These focus areas will continue to advance Montana's Freight Plan goals of balancing the development of transportation infrastructure and freight activity with the need to mitigate impacts to wildlife and the environment.

Public Outreach – Wildlife Friendly Fencing

MDT ensures continued sensitivity to wildlife by working to minimize the conflict between wildlife movements and the traveling public by distributing informational materials to landowners to promote the use of wildlife friendly fencing along highway rights-of-way and elsewhere. Wildlife friendly fencing can reduce the number of animal/vehicle conflicts by reducing the chance of wildlife being trapped in the right-of-way (ROW) and the time that animals spend in the ROW. Based on the design of wildlife friendly fencing, it also reduces the number of injuries or fatalities during attempts by wildlife to cross over or under the fence and allows wildlife more freedom of movement.[126]

Accommodating Wildlife Through Design

Below are strategies that MDT incorporates into the transportation infrastructure design process where appropriate and when feasible[127]:

- Longer bridges allow room for wildlife passage underneath;
- Animal detection systems with signage along wildlife corridors;
- Designing culvert size for targeted species;
- Tree and brush clearing along highway zones;
- Wildlife exclusion fencing; and
- Wildlife crossing structures.

Compliance with State and Federal Environmental Policy

There are numerous federal, state, and tribal environmental laws that affect and shape MDT's decisions. The National Environmental Policy Act (NEPA) and Montana Environmental Policy Act (MEPA) are procedural laws that provide a framework for addressing various applicable environmental statutes, regulations, policies, rules, executive orders, and agreements. NEPA and

MEPA set the tone for MDT's environmental ethic by recognizing the need for systematic, interdisciplinary planning and decision-making that considers all environmental factors for federal and state actions that could significantly affect the quality of the human and natural environment. NEPA and MEPA provide processes for sound decision-making based on thorough environmental analysis and public disclosure and review.

The guiding principles of NEPA and MEPA have been incorporated into MDT's transportation planning and project development process, as well as maintenance and operations of the state transportation system.

Network Resiliency

Resiliency means the capacity or the ability to quickly overcome difficulties. In reference to the transportation network, this means the ability to quickly overcome adverse conditions which may be brought about by weather and natural phenomenon, such as winter weather, flooding, land/rockslides, winds, and wildfires. Working to maintain a resilient transportation highway network seeks to ensure safe traveling conditions and reliability within the network itself.

Weather and Natural Phenomenon

Montana is no stranger to extreme changes in climatic conditions and natural phenomena that can compromise the state's surface transportation network. In winter, it is not uncommon for Montana to experience plunging frigid temperatures well into the minus thirties and snow squalls. Warm chinooks can quickly melt snowpacks, causing winter-time flooding. Spring snowmelts can result in ice dams on rivers and flooding in lower areas of terrain and extreme wind events, reaching 70 miles per hour can often cause perilous wildfire conditions not just in summer but even in winter months when dry grasses and low humidity values persist.

Coupled with Montana's potential for extreme weather is the state's diverse and varying landscape which boasts 67 distinct mountain ranges[128]. To the east of the Rocky Mountains lie the sprawling and vast Great Plains. Winds sweep down the eastern slopes of the Rockies over the plains, often making for a dry and arid climate. Covered in sage brush and prairie grasses, the plains are particularly vulnerable to fast moving and devastating wildfires caused by lightening or other bio- and anthropogenic means.

Because of Montana's diverse natural environment, MDT and the state are therefore committed to enhancing reliability for freight and the overall transportation network by responding in an effective manner to restore service to affected areas as soon as possible.

***Safety** and **Resiliency** of the transportation network are goals of this freight plan. Effective planning, innovative technologies, system maintenance, designing state facilities to be more durable, and quickly responding to extreme weather events that compromise the network are some of the strategies that MDT employs to keep freight operators and the traveling public moving safely and efficiently.*

Clearing snow and preventing ice on the roadways require equipment staging and a substantial seasonal labor force to operate equipment. Frost heaving in the spring, which cause roads to sag, make roads extremely vulnerable to deterioration. The sagging can cause road surfaces to flex and distort, possibly leading to cracking. In this instance, MDT or local road authorities may temporarily limit loads on such roads until ground conditions improve enough to sustain heavier vehicles.

Figure 65: Hwy 191 near West Yellowstone

Extreme flooding can destroy roads and bridges, and result in temporary to long term closures and detours. Freight stakeholders have also reported that agricultural practices resulting in increased dust and periodic dust storms can close county roads that support agriculture and rural access. Stakeholders mentioned that lowering operating speeds in areas with high winds can help to prevent and mitigate incidents.

Wildfires are a part of the natural landscape of Montana. However, wildfires have the potential to cause damage to transportation infrastructure, delay freight movements (due to threat of fire or smoke), and cause damage or destruction to freight generating facilities. For instance, in December 2021, the West Wind fire swept through the small town of Denton, Montana destroying two bridges (one rail and one roadway), the town's grain elevator, and more than 25 homes. The loss of the bridge effectively cut off western access to the community. In order to quickly restore access, MDT established a detour around the bridge within two days and began preparations for bridge reconstruction.[129]

With numerous areas of mountainous terrain, the potential for rock slopes to negatively impact MDT roadways is a constant concern for MDT. Therefore, MDT has implemented a Rockfall Asset Management Program to guide decision making in addressing this concern. In 2005, 10,800 center-line miles were screened for potential rockfall sites, and rockfall history and behavior information was gathered for many sites.[130] The initial study was updated in 2017, using an updated asset management-based approach to assist MDT in managing these sites.

Localized flooding, blizzards, and high winds can shut down major freight corridors and require heavy duty vehicles to either wait out the event or use alternate routes that are safer. In some instances, severe flooding from excessive rainfall and/or snow melt can cause significant damage to bridges or undercut roadways. The ability to quickly respond to such events as well as effectively communicate alternate route options is essential to freight operators. The innovative technologies, discussed in Chapter 5, highlight these efforts by MDT. Truck parking facilities and rest areas also play an essential role when drivers are forced to delay their movements due to adverse weather conditions.

For incidents that require an emergency response, MDT follows its *Emergency Operations and Disaster Plan* in order to effectively restore transportation to a road or network[131]. This plan defines the process and procedures, roles, and responsibilities by which MDT and other coordinating agencies work to effectively restore the transportation network. It outlines an effective process for responding to natural disasters such as earthquakes, floods, blizzards, fires, avalanches, and landslides as well as manmade incidents.

In extreme cases, if it is apparent that a Presidential disaster declaration is necessary to assist in the recovery of an impacted area, then the state or Indian tribal government may contact the Federal Emergency Management Agency (FEMA) Regional Office and request a joint Federal, State/Tribal Preliminary Damage Assessment (PDA). If the PDA demonstrates that the disaster is of such severity and magnitude that effective response is beyond the capabilities of the state, the affected local governments, or Indian tribal government then supplemental federal assistance may be deemed necessary.[132]

Strategies that promote network resiliency:

- Respond quickly to emergency road and highway situations.
- Design new facilities for durability and longer life cycles using state-of-the-art materials and methods.
- Perform winter maintenance activities to provide consistent levels of service and enable wintertime mobility.
- Accelerate bridge construction and repairs in critically time sensitive situations, such as when detours are not possible, and the road is fully closed to all traffic.
- Implement innovative technologies which help the traveling public to avoid dangerous traveling conditions and to provide alternative route options.

Performance Measures

States establish targets (or goals) for areas of performance (e.g., safety, reliability, pavement, and bridge) and are a way to measure progress with meeting goals and ensure compliance with federal law. There are several performances criteria that MDT is required to address through many of its transportation programs.

These performance measures work to address the overall performance of the highway system and therefore are pertinent to the safe, efficient, and reliable movement of freight. Below is a discussion on performance measures broken down by focus area:

Safety Performance Measures

Transportation Safety

Under the CHSP, MDT annually leads transportation safety partners and stakeholders in discussions on safety performance of the highway system, including an evaluation of safety performance measures required under federal regulation. MDT has established the target-setting methodology for the national performance measure for the five-year life of the plan. The five federally required safety performance measures include the number of fatalities, fatality rate, number of serious injuries, serious injury rate, and number of non-motorized fatalities and serious injuries. The annual reduction for all fatalities and serious injuries (not limited to commercial vehicle crashes) set in the 2020 CHSP are:[133]

- Fatalities: 3;
- Fatality Rate: 0.041 fatalities per 100 million vehicle miles traveled (VMT);
- Serious Injuries: 41;
- Serious Injury Rate: 0.114 serious injuries per 100 million VMT; and
- Non-Motorized Fatalities & Serious Injuries: 1.

Commercial Motor Vehicle Safety Performance Goals

MDT's Motor Carrier Service Division prepares the CVSP. The 2020 CVSP identifies a primary performance measure for commercial vehicle crash reduction: large truck fatal crashes per 100 million VMT.[134] The crash rate presented in the CVSP fluctuates year-to-year due to a relatively small number of large truck-involved fatalities (fewer than 30 per year); however, the linear trend from 2000 through 2017 shows a declining crash rate.

Reliability Performance Measures

Measures of Reliability on the NHS

MDT is committed and required to maintain a reliable freight network. MDT establishes freight performance targets through federal transportation performance activities and TranPlanMT along the NHS. Targets are established for two- and four-year intervals, to ensure that system reliability and truck travel time reliability (TTTR) are met (23 CFR 490.105 & 107). As demonstrated in Table 26, the state's interstate experienced an overall reliability of 99.9 percent in 2020 and a TTTR of 1.23. Federal code identifies TTTR's of less than 1.50 as reliable. These metrics demonstrate that the state is meeting its targets and what federal code deems as reliable.

Table 26: Freight Performance Targets and 2018 – 2021 Performance

Performance Measure	2-Year Target	2-Year Performance	4-Year Target	4-Year Performance*
Percent of Person-Miles Traveled on the Interstate That Are Reliable	98.0%	99.9%	98.0%	TBD

Performance Measure	2-Year Target	2-Year Performance	4-Year Target	4-Year Performance*
Percent of Person-Miles Traveled on the non-Interstate NHS That Are Reliable	N/A	84.2%	80.0%	TBD
Truck Travel Time Reliability Index	1.30	1.23	1.30	TBD

*As of the date of this plan, 4-year performance measures have not yet been reported and data is still pending.

Asset Management Performance

Px3 Performance Measures

Performance measures are integral to MDT's annual Px3 performance measurement and subsequent project selections. Px3 is a performance-based asset management strategy, seeking to ensure that MDT efficiently spends its money on long-term transportation infrastructure investments that achieve established performance goals. MDT uses the performance measures and targets shown in **Error! R eference source not found.** to help guide these investment decisions. Approximately 70 percent of MDT's capital funding is allocated via Px3 with the remaining funding distributed according to program-specific requirements.[135] When establishing performance measures and targets, it is important to consider freight movements, both to ensure efficiency and resiliency within the network itself.

Table 27: Px3 Performance Measures

Goal Area	Objective	Measure	Target
Pavement	• Preserve highway pavement condition at existing or higher levels in the interstate, NHS, and primary systems • No significant difference in ride condition between MDT Districts	• Ride Index • % Interstate pavement in good/poor condition • % NHS pavement in good/poor condition	• Interstate – Maintain current ride index • NHS – improve current ride index • Primary system – maintain current ride index (if possible)
Bridge	Maintain or improve the condition of the bridges on the NHS	• % Of NHS bridge deck area in good condition • % Of NHS bridge deck area in poor condition	• Increase % of good NHS bridges • Decrease % of poor NHS bridges
Safety	Improve safety of the state's highway system	• Number of fatalities • Number of serious injuries	Reduce the number of fatalities and serious injuries by half, by 2030.

Pavement condition is a key consideration for efficient and safe movement of freight. Heavy vehicles introduce excessive wear on the highway network, especially in contexts not originally designed to accommodate large trucks. Poor pavement conditions can slow travel, cause delays or incidents, and damage vehicles and goods in transit. MDT collects pavement condition data annually and uses a Pavement Management System (PvMS) to manage condition data and analyze trends that support statewide strategic priorities. MDT defines specific pavement goals through Px3.

In order to ensure that the goals for pavement condition on the NHS are achieved, MDT is federally required to report on its progress of performance measures, for pavement condition, in part biennially and in whole every 4-years (23 CFR 490.107). Performance measures that MDT is required to report on include:

- Percentage of pavement on the Interstate System in good condition;
- Percentage of pavement on the Interstate System in poor condition;
- Percentage of pavement on the non-Interstate NHS System in good condition; and
- Percentage of pavement on the non-Interstate NHS System in poor condition.

MDT's Bridge Program supports preservation goals established in TranPlanMT and selects bridge projects to balance competing needs and minimize life cycle costs. A large portion of MDT's bridges are nearing or are at the end of their useful service life. This does not mean that they are unsafe, however it does mean an increase in bridge maintenance and replacement over future years.

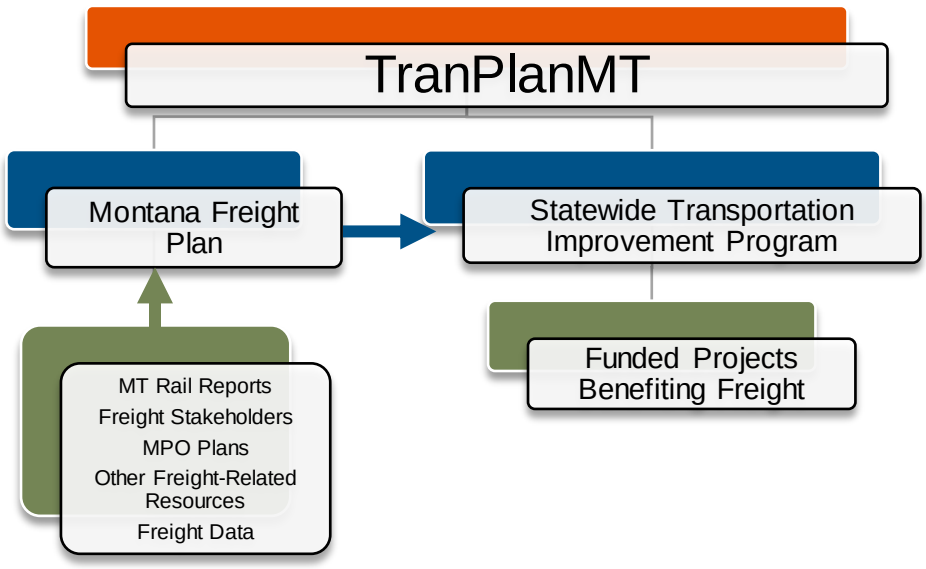
In addition to reporting to the FHWA on pavement condition along the NHS, MDT is federally required to report on its progress of performance measures for bridge condition, in part biennially and in whole every 4-years (23 CFR 490.107). Performance measure that MDT are required to report on include:

- Percentage of NHS bridge deck area classified in good condition; and
- Percentage of NHS bridge deck area classified in poor condition.

8. MDT Efforts that Support Freight and National Multimodal Freight Policy

The Montana Freight Plan serves as the guiding document for freight-related issues in Montana by providing a review of historical conditions, forecasting existing and emerging trends, and outlining the state's goals and priorities for the future. The Freight Plan also supports Montana's over-arching long-range planning policy, TranPlanMT, which establishes goals and strategies that help address a myriad of transportation needs across the network. Below is a chart which outlines MDT's planning efforts and how they support each other.

Figure 66: TranPlanMT in Relation to the Freight Plan



Subject-specific plans and programs, developed and implemented by MDT, also address freight needs. The following discussion describes how freight is integrated into other planning efforts at MDT. They are organized, below, based on area of focus. Icons are included to identify which goals the plan or program primarily supports.

Safety Driven Efforts

Safety for the traveling public and freight operators is a top priority for MDT and requires the implementation of several plans and programs.

Montana Comprehensive Highway Safety Plan (CHSP)

Under Part 924 of Title 23 USC, states are required to complete a Strategic Highway Safety Plan (SHSP) to receive federal highway safety funding through the Highway Safety Improvement Program (HSIP). The SHSP identifies statewide highway safety problems and analyzes opportunities to address them.

In Montana, the SHSP is referred to as the Montana Comprehensive Highway Safety Plan (CHSP). The CHSP was initially developed in 2006 and is updated every five years, most recently in 2020. CHSP grew out of an existing policy goal described in TranPlanMT as well as from the *Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (2005)*, which established a requirement for states to develop and maintain a strategic highway safety plan.

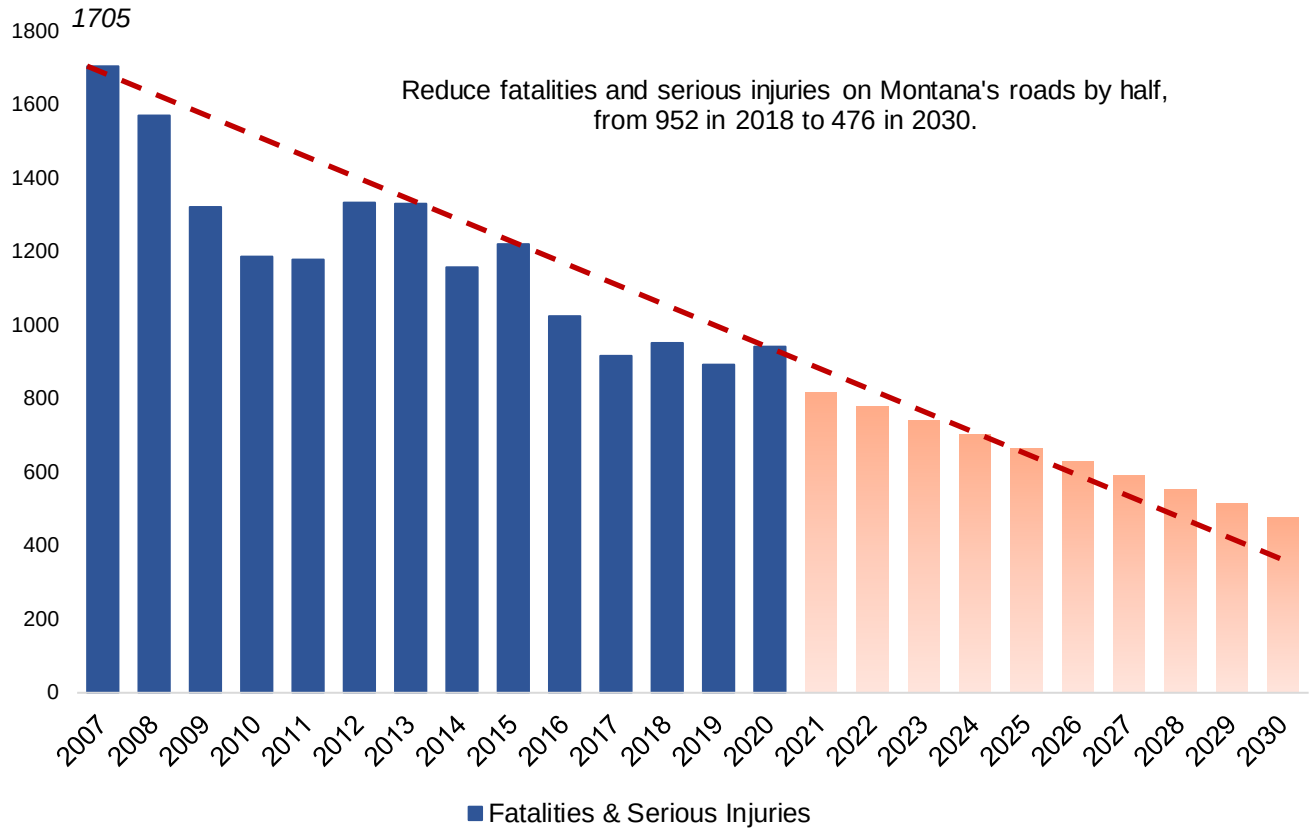
Montana's CHSP mission is to *focus our resources strategically, where opportunities for saving lives are greatest, through collaborative process to reduce deaths and life changing motor vehicle injuries in Montana by using education, enforcement, emergency response and engineering strategies to improve the health and lives of Montanans*.[136]

The objectives of CHSP are to:

- Establish quantifiable safety-related goals, objectives, and performance measures relevant to travel on Montana's highways;
- Address issues at all levels of jurisdiction with specific attention to local and tribal entities;
- Establish a mechanism for interagency coordination and develop the necessary partnering processes;
- Identify candidate safety strategies and evaluate their potential benefits, costs, and ability to attain performance objectives;
- Establish a process for prioritizing identified strategies based on their likely benefits relative to the identified safety goals and objectives; and
- Develop a strategic implementation plan, including action items for deployment in MDT's plans and programs as well as by other partnering agencies with roles in highway safety.

While the vision for Montana's CHSP is Vision Zero: zero fatalities, zero serious injuries on all public roadways, the CHSP uses an interim goal to track progress in reducing fatalities and serious injuries. The CHSP interim goal is to reduce fatal and serious injuries from 952 in 2018 to 476 by 2030. In 2020, Montana experienced 212 fatalities and 730 serious injuries (942 total)[137]. This is a decrease of fatalities and serious injuries reported in the 2017 Freight Plan (previous plan reported 224 fatalities and 1,000 serious injuries in 2015).

Figure 67: CHSP Interim Goal



The 2020 CHSP update identified an ongoing opportunity to track and consider the implementation of advances in automated vehicle and roadway technologies, in regard to transportation policy and planning, for the traveling public and freight operators.

Commercial Vehicle Safety Plan (CVSP)

The CVSP complements the CHSP and relates more directly to trucking and freight. It outlines the state's objectives, strategies, activities, and performance measures required in federal code. The CVSP is developed by MCS and is submitted to the Federal Motor Carrier Safety Administration (FMCSA) for comments and approval. The plan enables funding for Montana's Motor Carrier Safety Assistance Program (MCSAP) to operate. MCS operations continue to have a positive effect on commercial motor vehicle (CMV) crash reduction goals, specifically through conducting CMV inspections in accordance with national standards, carrier safety audits, and carrier educational programs. Montana's CMV crash data set reflects a downward trend over the course of a 16-year period.[138]

Motor Carrier Safety Assistance Program

The MCSAP is a federal grant program that provides financial assistance to states to reduce the number and severity of crashes and hazardous materials incidents involving CMV. The MCSAP is administered as a cooperative effort between MCS, Montana Highway Patrol (MHP), and FMCSA.[139]

Highway and Rail Grade Crossing Safety Programs

MDT's safety program is called the Highway Safety Improvement Program (HSIP) and it includes the Rail Highway Grade Crossing Program (RHGCP). Both of these programs are implemented pursuant to federal code and are data driven. Their purpose is to identify safety improvements to the public road system.[140] While neither program is specifically focused on safety improvements for freight, both

include freight-related safety issues in their respective evaluations, which may ultimately lead to safety improvements. Both the HSIP and RHGCP generate safety enhancements across the state that benefit all modes. Examples of freight related safety improvements generated by these programs include active protection at rail crossings, over-height detection systems, and curve speed warnings targeted at larger vehicles.

Montana Rest Area Plan (Truck Parking)

MDT's Rest Area Plan represents its commitment to preserve and enhance the existing public rest area facility system. The plan considers state-maintained rest areas, state-maintained parking areas, city park rest areas, and a few other sites maintained by other entities. This plan conducts a thorough analysis of existing state rest areas and includes an:

1. Inventory of services provided at each of Montana's public parking facilities and rest areas;
2. The number of truck and passenger vehicle parking spaces at each location;
3. An assessment of parking space demand at each location; and
4. Forecasted future demand for passenger and truck parking spaces at each location.

The Montana Rest Area Plan, which addresses public rest area demands and needs, recommends approximately one hour of travel time between rest areas (including major resting locations), which is consistent with AASHTO guidelines. All National Highway System (NHS) and Primary System routes, and select Secondary System routes, were also included in the study, with corridor segment endpoints defined at rest areas, truck parking areas, and urban areas. An analysis distance of 70 miles was used to approximate one hour of travel time on the NHS Non-Interstate and Primary systems and 80 miles was used to approximate one-hour travel time on the Interstate system.

In an initial spacing scenario, all public statewide rest areas and parking facilities were considered, including nearby out-of-state rest areas and cities. Analysis results are intended to assist MDT in identifying potential locations for new rest areas and locations where services may need to be modified. For example, a corridor segment more than double the 70-mile analysis distance may benefit from construction of a new rest area. Figure 68 displays the results of the analysis conducted. Segments of highways, highlighted in yellow, are identified as exceeding 70 miles in length between rest areas. The figure also identifies public rest areas that have been constructed or reconstructed since 2000 and those rest areas that are proposed for construction or reconstruction, as identified in the 2019 update to the Montana Rest Area Plan. Table 28, further provides the list of corridor segments that currently experience a greater than 70-mile segment gap.[141]

Figure 68: Map of Existing and Proposed Rest Areas

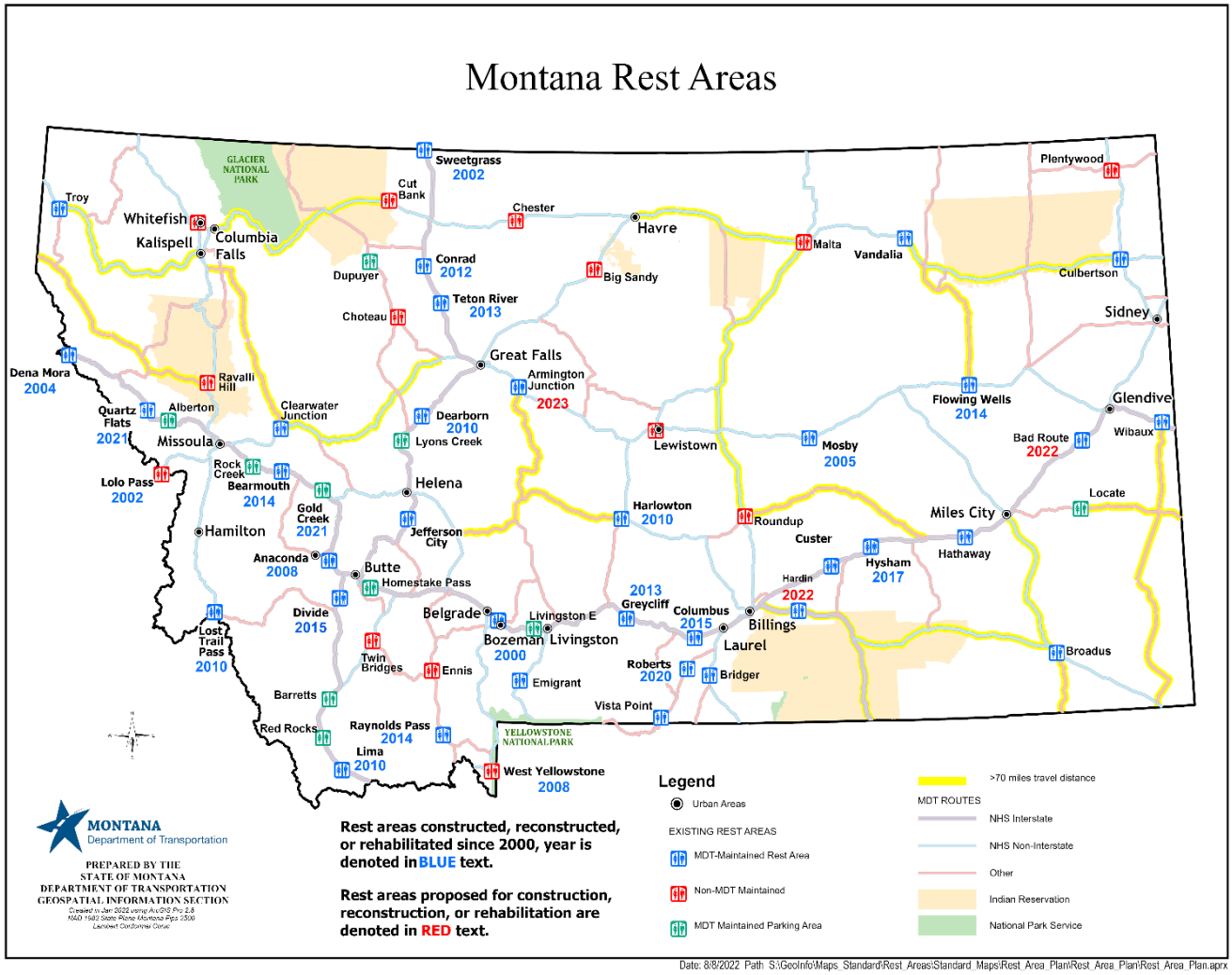


Table 28: Corridor Segments Exceeding 70 Miles (Public Rest/Truck Parking Areas)

Signed Route	Corridor	Beginning Location	Ending Location	Mileage
NHS Interstate				
I-90	C000090W	Sheridan, WY Rest Area	Hardin (West) Rest Area	103
I-90	C000090E	Hardin (East) Rest Area	Sheridan, WY Rest Area	103
NHS Non-Interstate				
US-191, MT-19, US-87	C000061N	Malta City Park Rest Area	Roundup City Park Rest Area	157
US-2	C000001E	Culbertson Rest Area	Vandalia Rest Area	118
MT-200	C000024E	Clearwater Junction Rest Area	Great Falls (Urban Area)	107
US-2	C000001E	Troy Rest Area	Kalispell (Urban Area)	103
US 212	C000037E	Broadus Rest Area	Crow Agency (City/Town)	103
US -212	C000023S	Broadus Rest Area	Belle Fourche, SD (City/Town)	93

Signed Route	Corridor	Beginning Location	Ending Location	Mileage
US-2	C000001E	Malta City Park Rest Area	Havre (Urban Area)	88
MT-200	C000057E	Flowing Wells Rest Area	Mosby Rest Area	88
US-93	C000005N	Ravalli Hill Parking Area	Kalispell (Urban Area)	83
US-191	C000050N	West Yellowstone Rest Area	Bozeman (Urban Area)	82
US-191, US-87	C000057E	Armington Junction Rest Area	Lewiston (Urban Area)	80
MT-59	C000023S	Broadus Rest Area	Miles City (Urban Area)	79
US-87, MT-200	C000057E	Mosby Rest Area	Lewiston (Urban Area)	77
US-310	C000004N	Bridger Rest Area	Greybull, WY Rest Area	77
MT-200	C000057E	Flowing Wells Rest Area	Glendive (Urban Area)	77
US-87, MT-200	C000010N	Big Sandy City Park Rest Area	Great Falls (Urban Area)	76
Primary				
US-12	C000002E	Locate Parking Area	Mobridge, SD (City/Town)	248
MT-200	C000006E	Ravalli Hill Parking Area	Sandpoint, ID (City/Town)	149
US-12	C000014E	Roundup City Park Rest Area	Forsyth (City/Town)	101
US-12	C000014E	Harlowton Rest Area	Townsend (City/Town)	101
MT-83	C000083N	Clearwater Junction Rest Area	Bigfork (City/Town)	91

Furthermore, in the update to the Montana Rest Area Plan, MDT invited private and public stakeholders to participate and to provide comment. Additionally, the MDT Statewide Rest Area Prioritization Plan Committee meets regularly to discuss and advance the progress and priority of rest area projects and topics that affect rest area strategy. The committee employs an asset management approach to decision making and is driven by defined objectives and credible data from systematic assessments to justify investment decisions. This process allows MDT to develop an optimal investment plan and measure progress toward strategic transportation system goals.[142] Ultimately however, funding will be prioritized to rest areas adjacent to higher order and higher volume roadways in order to work under existing funding constraints.

Asset Management Programs and Project Implementation

Effectively managing assets, with constrained resources, is essential and requires a performance based, data driven approach. For instance, how and when pavement projects are determined, across approximately 13,000 centerline miles of MDT maintained roads in Montana requires a systematic approach that maximizes the use of resources while ensuring a reliable and safe transportation network statewide.

Performance Programming Process (Px3)

MDT uses a performance-based funding allocation process known as Px3 to determine how to allocate Montana's limited transportation resources. The Px3 process helps MDT optimize its

spending to maintain and improve pavement and bridges on the state's National Highway System (NHS), and Primary Highway System (Primary System).

The goals of Px3 are meant to align with the TranPlanMT which include goals for system preservation and maintenance, mobility and economic vitality, accessibility, and connectivity. Goals in Px3 address pavement condition, bridge condition, and highway safety.

Px3 is influenced by federal laws that establish performance measure requirements that are meant to address pavement and bridge condition as well as travel time reliability and freight movements.[143]

Transportation Asset Management Plan (TAMP)

MDT's TAMP outlines a formal process for identifying, assessing, and prioritizing risks to Montana's surface transportation infrastructure for the purpose of managing assets using constrained resources. The TAMP is a risk-based asset management plan that is based on statewide policy and planning goals, including Px3. The TAMP supports the achievement of short-term performance targets and making progress toward MDT's vision for NHS pavement and bridges.[144]

Statewide Transportation Improvement Program (STIP)

The STIP is developed in accordance with the requirements identified in 23 USC §135 through a coordinated effort of MDT, state and federal agencies, local and tribal governments, metropolitan planning organizations, public agencies, transportation providers, citizens, and other interested parties. The STIP identifies highway, rail, aeronautic, and other multi-modal improvements to preserve, renovate, and improve Montana's transportation system.

Projects in the STIP are developed via nominations from MDT district and program managers. Nominations are prioritized and ranked by surface condition, rideability, traffic safety, and geometrics consistent with strategies identified in MDT's asset management program. The STIP supports policy goals established in TranPlanMT and include freight-related investment and improvement projects.

Studies and Planning Efforts

Studies are an important first step in understanding project areas in greater detail, as well as identifying particular issues and/or possible solutions. It also allows the public and stakeholders to participate in the planning process.

Corridor Planning

MDT conducts corridor planning studies to determine cost-effective solutions such as addressing transportation needs along a corridor. Local government and stakeholder representatives are invited to assist in identifying corridor issues and concerns, environmental impacts, potentially affected resources, and a range of options to improve transportation safety and operations. MDT uses the *Montana Business Process* to link Planning Studies and National Environmental Policy Act and Montana Environmental Policy Act Reviews to guide the corridor planning process.

2016 Montana Rail Grade Separation Study

In 2016, MDT completed a rail grade separation study to review at-grade and grade-separated railroad crossings. The study utilized a data-driven evaluation process to identify a list of at-grade and grade-separated railroad crossings and potential feasible improvements.[145]

The evaluation process included a two-tiered screening and selection process to identify a final list of crossings. A databased methodology was used to identify these locations from a total of more than 5,200 at-grade crossings and more than 400 grade-separated crossings throughout the state. For each of the final ten at-grade crossings, potential grade-separated alternatives were identified and conceptual plans, planning-level cost estimates, and benefit-cost analyses were developed. Potential improvements were also identified for selected grade-separated crossings.

MDT Processes and Plans that Support National Multimodal Freight Policy

Table 29 outlines the relationship of MDT's overarching policies, goals, and strategic planning efforts that support national multimodal goals. An "X" in the table indicates MDT activities that demonstrate support for national goals.

Table 29: MDT Polices, Plans, and Strategies, in Relationship to National Multimodal Freight Goals

MDT Policy, Plan, or Strategy	Strengthen & Improve Economic Competitiveness, Efficiency, & Increase Productivity	Reduce Congestion	Improve Safety, Security, Efficiency, & Resiliency	Improve State of Good Repair on Freight Network	Use Innovation &Technology to Improve Freight Network	Improve Flexibility to Promote Multi-State Corridor Planning	Reduce Env. Effects of Freight Movement
TranPlanMT	X	X	X	X	X	X	X
Statewide Planning	X	X	X	X	X		X
Freight Related State Legislation and Rules			X	X			
Statewide Transportation Improvement Program	X	X	X	X	X	X	X
Montana Comprehensive Highway Safety Plan			X				
Performance Planning Process (Px3)		X	X	X	X	X	
Transportation Asset Management Plan	X	X	X	X	X	X	
Corridor Planning	X	X	X	X	X		X
Rest Area Plan and Truck Parking	X		X	X			
Regional Freight Planning Efforts	X		X		X	X	
Coordination with Local Governments	X	X	X	X	X		X
Coordination with Montana Freight-Related Institutions (Motor Carriers of Montana	X		X			X	
Maintain Freight Movement Reliability	X	X	X	X	X	X	X
Traffic Safety			X		X		
Pavement Condition	X		X	X			

MDT Policy, Plan, or Strategy	Strengthen & Improve Economic Competitiveness, Efficiency, & Increase Productivity	Reduce Congestion	Improve Safety, Security, Efficiency, & Resiliency	Improve State of Good Repair on Freight Network	Use Innovation &Technology to Improve Freight Network	Improve Flexibility to Promote Multi-State Corridor Planning	Reduce Env. Effects of Freight Movement
Bridge Condition	X		X	X			

Source: MDT Rail, Transit and Planning Division

9. Coordination

MDT works with various organizations to advance the safe and efficient movement of freight in the state, region, and nation.

Special Transportation Authorities

Montana is home to two major inland ports. The Port of Northern Montana (PNM) located in Shelby. PNM is a 120-acre multimodal facility providing direct access to the BNSF mainline as well as I-15. The facility offers a range of services including consolidation, distribution, and transloading facilities.

The Port of Montana (PM) near Butte provides access to BNSF and Union Pacific railroads as well as access to I-90 and I-15. The Port of Montana offers transload, distribution, and warehouse/storage services.

MDT has no direct regulatory authority over port facilities unless the ports propose infrastructure improvements that impact state highway facilities. In the past, MDT has supported port efforts to obtain federal discretionary funding to complete needed intermodal improvements through the Montana Essential Freight Rail Loan Program.

North/West Passage Corridor

In February 2002, state representatives from Idaho, Minnesota, Montana, North Dakota, South Dakota, Washington, Wisconsin, and Wyoming met to develop a program to help states along I-90 and I-94 coordinate the development, deployment, and integration of ITS projects. The vision of the North/West Passage Corridor is to focus on developing effective methods for sharing, coordinating, and integrating traveler information and operational activities across state and provincial borders.

Western States Freight Coalition

The Western States Freight Coalition (WSFC) is a partnership between the department of transportation freight program personnel in 11 western states, including Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming. The WSFC serves as a forum for peer exchange between states. WSFC representatives discuss on-going freight-related initiatives or projects in each state.

Western Border Working Group

The Western Border Working Group (WBWG) was established in the spring of 2015 and was originally called the Inland Border Working Group. WBWG includes Manitoba Infrastructure and Transportation, Saskatchewan Ministry of Highways and Infrastructure, Alberta Transportation, British Columbia Ministry of Transportation and Infrastructure, Minnesota Department of Transportation, North Dakota Department of Transportation, MDT, Idaho Transportation Department, and Washington State Department of Transportation. The WBWG was established to foster communication and information sharing among jurisdictions and discuss western perspectives related to bi-national border transportation planning issues. WBWG participates directly with the Canada-United States Transportation Border Working Group (TBWG).

Great Northern Corridor Coalition

The Great Northern Corridor (GNC) is the east-west freight corridor between Chicago and the Pacific Northwest that supports the economic vitality of more than 38 million Americans across eight states bordering Canada. The states of Oregon, Washington, Idaho, Montana, North Dakota, Minnesota, and Wisconsin have been collaborating informally for several years on the development of the Great Northern Corridor Coalition. This multi-state cooperative is comprised of state departments of transportation, ports, BNSF, and others interested in freight movement between the Pacific Northwest and the Great Lakes.

Local Governments

MDT works closely with communities across the state to develop long-range transportation plans (LRTP). Billings, Great Falls, and Missoula are the three MPOs in Montana, representing urban areas with populations of at least 50,000. The MPOs are required to develop long-range plans outlining specific strategies and projects to address identified needs within the urban boundary. Non-metropolitan communities may also elect to develop an LRTP to identify and address transportation needs based on public input and technical analysis.

In accordance with federal requirements each of the MPOs has a current LRTP that, among other goals, directly or indirectly supports the safe and efficient movement of freight. Table 30 provides a listing of freight-related goals contained in the respective LRTPs.

Table 30: Montana MPO Long Range Transportation Plans

MPO / Document	Year LRTP Updated	LRTP Freight Related Goals
Missoula Connect 2050 Long Range Transportation Plan	2021	Improve safety and promote health to enhance quality of life
		Advance sustainability and community resilience to protect natural resources and address climate change
		Expand mobility choices to improve efficiency and accessibility for people and goods
		Maintain assets and invest strategically to boost economic vitality
Billings Urban Area Long Range Transportation Plan	2020	Develop a safe transportation system
		Optimize, preserve, and enhance the existing transportation system
		Identify and prioritize projects that mitigate deficiencies, maximize the use of existing facilities, and balance anticipated needs with available funding
		Ensure adequate transportation facilities to support the existing local economy and connect Billings to local, regional, and national commerce
Great Falls Great Falls Area Long Range Transportation Plan	2018	Maintain the existing transportation system
		Improve the efficiency, performance, and connectivity of a balanced transportation system
		Promote consistency between land use and transportation plans to enhance mobility and accessibility

MPO / Document	Year LRTP Updated	LRTP Freight Related Goals
		Provide a safe and secure transportation system
		Support economic vitality of the community
		Maximize the cost effectiveness of transportation

Source: Missoula MPO, Yellowstone County MPO, Great Falls MPO.

MDT works closely with local governments and communities to mitigate freight-related impacts and to inform the selection of freight-related investments. Within the three MPOs, all federal aid eligible projects must be included in the Transportation Improvement Program (TIP). Any MDT proposed freight-related investments within the MPO boundaries must be included in both the STIP and TIP.

Additionally, MDT has coordinated with local governments to mitigate impacts to communities resulting from freight activities. Recent examples include installing specialized hardware that allows signage and signal poles to be removed or rotated by oversize load movers allowing these loads to move through a community with greater efficiency. These freight-related investments minimize the disruption to traffic flows within the community.

Montana Trucking Association

The Montana Trucking Association (MTA) is comprised of over 300 companies representing trucking companies, passenger carriers, garbage haulers, and construction and excavating companies plus others.[146] MTA is a key stakeholder, during MDT's evaluation of infrastructure improvements that may impact the freight industry and was invited to participate in stakeholder activities, during the development of the Montana Freight Plan.

Private Sector Plans

MDT's Systems Impact Action Process (SIAP) coordinates the review and assessment of impacts resulting from projects initiated by private developers and others. The SIAP team provides a coordinated review of projects that may significantly and permanently impact the state's transportation system. The review process aims to provide private developers with a single point of contact for requesting access to the state's highway system while also protecting taxpayers' investment in a safe and efficient transportation system.

SIAP's coordinated review allows MDT to identify adverse transportation impacts early in the planning and review phases. With SIAP, MDT and local government agencies concurrently review the project to provide a more complete review of the proposal and coordinate efforts in addressing those impacts. Once impacts are identified, the developer must implement approved mitigation measures to minimize effects on the transportation system. Mitigation measures are established as conditions a developer must meet before permits are issued. Projects that may substantially impact the transportation system through increased traffic, traffic delays, safety, etc., are included. Freight-related examples include, but are not limited to:

- Railroad at-grade and grade-separated crossings;
- Pipelines;
- Major developments; and
- Oversize vehicle transportation projects requiring ground-disturbing road or utility improvements.

10. National Highway Freight Program

The National Highway Freight Program (NHFP) funds projects that support the efficient movement of freight on the National Highway Freight Network (NHFN). At present, Montana's eligible portion of NHFN occurs on the PHFS and include Interstates I-15 and I-90. Therefore, MDT's efforts focus on these two routes, when selecting projects for NHFP funds. Goals of the NHFP include but are not limited to:

- Investing in operational improvements to reduce congestion;
- Improving the safety, security, efficiency, and resiliency of freight transportation;
- Improving state of good repair of the NHFN;
- Using innovation and advanced technology to improve NHFN safety, efficiency, and reliability;
- Improving the efficiency and productivity of the NHFN; and
- Reducing environmental impacts of freight movement on the NHFN

Currently, Montana does not have any designated critical urban or rural freight corridors, and so only interstates on the PHFS are eligible for the NHFP. However, MDT evaluates the need for designating critical rural or freight corridor(s), during freight plan updates, every four years.

Eligibility requirements for NHFP funds are outlined in 23 USC §167 and 49 USC §70202. In addition to meeting eligibility requirements found in federal code, projects must also be identified in a Freight Investment Plan, which is a component of the freight plan, to receive funding.

Currently, NHFP funds are a key source of federal funding and allow for increased investment for projects which support national multimodal freight policy, including but not limited to bridge condition, increased interstate capacity, safety, and preservation projects that ensure freight reliability. Additionally, all projects must be deemed fundable—given anticipated NHFP apportionment and obligations.

Through the FAST Act, Montana received approximately $65 million in funds for federal fiscal years (FFY) 2016 through 2020. Through IIJA, Montana's apportionment of funds is approximately $74 million for FFY's 2022 through 2026 and average out to $14.8 million a year, after federal set asides. Non-federal matching funds are anticipated to be paid with Highway State Special Revenue Funds.

Freight Investment Plan and Priority Projects

To ensure that national multimodal freight policy goals are prioritized, and that funding is effectively obligated to projects, eligible projects are numerically scored and ranked. Scoring is based on the number of national multimodal freight goals and eligibility criteria that each project meets. The more criteria that a project meets, the higher the score. Additional considerations may be given to projects which address key freight needs and that need NHFP funding to be viable.

Goals/Criteria by which projects are scored include:

1. Increases Capacity and Reduces Bottlenecks
2. Increases Safety
3. Improves Operational Issues
4. Bridge Preservation/Rehabilitation
5. Improves Connectivity
6. Improves Access
7. Increases System Reliability

Table 31 provides a brief overview of projects that have been identified for NHFP funding within the Freight Investment Plan.

Table 31: NHFP Project Overview

FFY	Project	Interstate	Brief Description	NHFP Criteria Met
2022	Wolf Creek – N & S	I-15	Rehabilitation. Remove and replace asphalt surfacing, dig outs, fencing, add new guardrail, signing, and markings.	• Increases safety • Improves operational Issues • Increases system Reliability
2023	BBP-Johnson Lane Interchange (Intch.)	I-90	Reconstruct existing I-90 Johnson Lane interchange, including interstate bridge and ramps.	• Increases capacity/reduces bottlenecks • Improves connectivity • Increases safety • Improves operational issues • Increases system reliability • Decreases air pollution
2023	Gregson Intch. – Nissler Intch.	I-90	Rehabilitation. Highway resurfacing and new signage.	• Increases safety • Improves operational issues • Increases system reliability
2024	Taft - West	I-90	Pavement preservation. Replacing roadway surface with concrete and addressing safety issues to reduce crashes.	• Increases safety • Improves operational issues • Increases system reliability • Decreases air pollution
2025	I-90 Structures – W Alberton	I-90	Bridge replacement	• Bridge preservation/rehabilitation • Increases safety • Improves operational issues • Increases system reliability
2026	Gore Hill Interchange – GTF	I-15	Bridge replacement, roundabout, realignment of frontage road, and addition of climbing lanes.	• Bridge preservation/rehabilitation • Improves operational issues • Increases capacity/reduces bottlenecks • Increases safety • Improves connectivity • Increases system reliability • Decreases air pollution

Appendix A includes Montana's Freight Investment Plan for federal fiscal years 2022 through 2026. The plan includes funding obligations and sources of nonfederal match funds. The Freight Investment Plan also includes illustrative projects if unanticipated funding were to become available. This might occur, for instance, if a project, approved for NHFP funds, were to be significantly delayed to where it needed to be pulled from the program. Illustrative projects were evaluated and scored under the same criteria, yet other factors, such as a project's timing or a lower score, may have kept it from being prioritized for funding.

Appendix A: Montana's Freight Investment Plan

2022 NHFP Investment Plan[1] National Freight Program Funds - Montana					
Estimated Apportionment	FFY 2022	FFY 2023	FFY 2024	FFY 2025	FFY 2026
Prior Year Federal Carry-Over	$ 12.7	$ 13.5	$ 2.7	$ 4.6	$ 6.3
Federal Apportionment[2]	$ 13.9	$ 14.2	$ 14.5	$ 14.8	15.1
Transfer In(Out)	$ -	$ -	$ -	$ -	$ -
Total Federal Apportionment Available	$ 26.6	$ 27.7	$ 17.2	$ 19.4	$ 21.4
Proposed Federal Obligations	$ 13.1	$ 25.0	$ 12.6	$ 13.1	$ 13.0
Ending Federal Apportionment Balance	$ 13.5	$ 2.7	$ 4.6	$ 6.3	$ 8.4
Obligation Authority					
Obligation Authority Rate	$ 0.9	$ 0.9	$ 0.9	$ 0.9	$ 0.9
Obligation Authority Allocation					
Transfer In (Out)					
Total Obligation Allocation	$ 13.0	$ 13.0	$ 13.0	$ 13.0	$ 14.0
Proposed Federal Obligations	$ 13.1	$ 25.0	$ 12.6	$ 13.1	$ 13.0
Ending Federal Obligation Authority Balance	$ (0.1)	$ (12.0)	$ 0.4	$ (0.1)	$ 1.0
Estimated NHFP Project Obligations[3 & 4]					
Wolf Creek - N & S (Estimated Total Cost $31.0; NHFP state match $1.3; NHPP $12.1; CARES II $3.3)	$ 13.1				
BBP - Johnson Lane Intch (Estimated Total Cost $45.4; NHFP state match $1.5; NHPP $22.4; CMAQ $6.2; STBGP $2.4)		$ 12.9			
Gregson Intch - Nissler Intch (Estimated Total Cost $13.5; NHFP state match $1.4)		$ 12.1			
Taft - West (Estimated Total Cost $60.8; NHFP state match $2.0; NHPP $45.7)			$ 12.6		
I-90 Structures - W Alberton (Estimated Total Cost $57.7; NHFP state match $1.3; NHPP $43.4)				$ 13.1	
Gore Hill Interchange - GTF (Estimated Total Cost $17.6, NHFP state match $2.0, NHPP $15.6)					$ 13.0
Pavement Preservation Projects (state of good repair)	2022 - 2026				

Illustrative Projects[5]		**Estimated NHFP Funds**
I-90 Quinn Creek Rd Structures	2022	TBD
I-90 BR PRES MP 117-149	2022	TBD
Boulder Hill Guardrail	2023	TBD
Clark Fork - 5 M E Alberton - Bridge	2023	TBD
I-90 Bridge Rehab - Alberton	2023	TBD
I-15 BR Rehab - Jefferson City	2023	TBD
I-15 BR Rehab - Clancy Area	2023	TBD
Mossmain Interchange - West BLGS Intch	2024	TBD
Sieben Interchange - North	2025	TBD
Butte Area NHS Structures	>2026	TBD

[1] In millions.

[2] Less federal set-asides.

[3] NHPP, CARES II, CMAQ, and STBGP totals include state match.

[4] The federal share for this program will typically be 91.24% with an 8.76% in state match.

[5] Project priorities to move forward into the fiscally constrained investment plan if funding becomes available.

References

[1] Bureau of Business and Economic Resources, University of Montana. (n.d.). *2021 Annual Report.* Reviewed August 15, 2022. 2021 Annual Report (umt.edu)
[2] University of Montana Bureau of Business and Economic Research. (n.d.) *2019 Montana Economic Report: An Analysis and Assessment of Montana's Economic Performance*. Reviewed August 15, 2022. https://www.bber.umt.edu/pubs/Seminars/2019/EconRpt2019.pdf
[3] Energy Information Administration (n.d.). *Montana Field Production of Crude Oil. U.S.* Reviewed August 15, 2022. https://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s=MCRFPMT2&f=M
[4] U.S. Energy Information Administration. (n.d.). *Montana Renewable Energy Profile Analysis.* Reviewed August 15,2022. https://www.eia.gov/state/analysis.php?sid=MT
[5] University of Montana Bureau of Business and Economic Research (n.d.). *2019 Montana Economic Report: An Analysis and Assessment of Montana's Economic Performance*. Reviewed August 15,2022. https://www.bber.umt.edu/pubs/Seminars/2019/EconRpt2019.pdf
[6] University of Montana Bureau of Business and Economic Research. (n.d.). *2019 Montana Economic Report: An Analysis and Assessment of Montana's Economic Performance.* Reviewed August 15,2022. https://www.bber.umt.edu/pubs/Seminars/2019/EconRpt2019.pdf
[7] University of Montana Bureau of Business and Economic Research (n.d.). *2019 Montana Economic Report: An Analysis and Assessment of Montana's Economic Performance.* Reviewed August 15,2022. https://www.bber.umt.edu/pubs/Seminars/2019/EconRpt2019.pdf
[8] U.S. Census Bureau. (n.d.). *Historical Population Density Data*. Reviewed August 15,2022. https://www.census.gov/data/tables/time-series/dec/density-data-text.html
[9] Shelly, Nora. (May 6, 2021). *As census results near, Bozeman preparing for increased regional planning. Bozeman Daily Chronicle.* Bozeman Daily Chronicle. https://www.bozemandailychronicle.com/news/city/as-census-results-near-bozeman-preparing-for-increased-regional-planning/article_37912841-aacb-5e88-b53e-8999493de8bb.html
[10] Dietrich, Eric. (2021, August 11). *Census releases detailed 2020 Census counts with an asterisk.* Montana Free Press. https://montanafreepress.org/2021/08/12/census-releases-detailed-montana-population-data/
[11] Bradley, Christopher. (2019, September). *Destination Montana. Migration Patterns To, From, and Within Montana*. Montana Department of Labor & Industry. https://lmi.mt.gov/_docs/Publications/EAG-Articles/0919-MigrationInMT.pdf
[12] Klungtvedt, Emily. (2019, August). *Jobs of Tomorrow: Montana Job Projections 2018 to 2028.*Montana Department of Labor & Industry https://lmi.mt.gov/_docs/Publications/EAG-Articles/0819-Projections.pdf
[13] Klungtvedt, Emily. (2019, August). *Jobs of Tomorrow: Montana Job Projections 2018 to 2028.* Montana Department of Labor and Industry. https://lmi.mt.gov/_docs/Publications/EAG-Articles/0819-Projections.pdf
[14] Holom, Nick. 2021, July). *Planning for the Future: Montana's Job Projections.* Montana Department of Labor and Industry. https://lmi.mt.gov/_docs/Publications/EAG-Articles/0721-Projections2021.pdf
[15] Railserve. (n.d). *Montana Railroad Jobs*. Retrieved August 15, 2022. https://www.railserve.com/Railroad_Employment_Jobs/montana_railroad_jobs.html
[16] American Association of Railroads. (2022, May). *The Economic Impact of America's Freight Railroads.* https://www.aar.org/wp-content/uploads/2020/08/AAR-Economic-Impact-Fact-Sheet.pdf
[17] Holom, Nick and Marvin, Rob. (n.d.) *Montana Employment and Labor Force Projections – Job Growth from 2020 to 2030*. Montana Department of Labor and Industry. Reviewed August 15, 2022. https://lmi.mt.gov/_docs/Publications/LMI-Pubs/Labor-Market-Publications/Projections2018-28.pdf#:~:text=The%202020-2030%20employment%20projections%20include%20the%20following%20highlights%3A,and%20stimulus%20spending%20from%20the%20American%20Recovery%20Act.
[18]Bureau of Economic Analysis. (n.d.). *GDP and Personal Income.* Reviewed August 15, 2022. https://apps.bea.gov/iTable/iTable.cfm?reqid=70&step=1&isuri=1&acrdn=1#reqid=70&step=1&isuri=1&acrdn=1
[19] U.S. Energy Information Administration. (2022, March 17). *Montana - State Energy Profile Overview.* - https://www.eia.gov/state/analysis.php?sid=MT
[20] U.S> Energy Information Administration. (n.d.). *U.S. States – State Profiles and Energy* Reviewed August 15, 2022) https://www.eia.gov/state/maps.php?v=Coal
[21] U.S. Energy Information Administration. (2022, March 17). Montana *State Profile and Energy Estimates.* https://www.eia.gov/state/analysis.php?sid=MT

[22] U.S. Energy Information Administration. (2011, March 22) *Bakken Formation Producing Wells, Williston Basin, North Dakota, Montana, Saskatchewan, & Manitoba. .* https://www.eia.gov/oil_gas/rpd/shaleoil1.pdf
[23] U.S. Department of Energy. (n.d.). Energy Employment by State: 2021 Reviewed August 15, 2022). https://www.energy.gov/sites/default/files/2021-07/USEER%202021%20State%20Reports.pdf
[24] United States Department of Agriculture. (2020 October). *Montana Agricultural Statistics*.https://www.nass.usda.gov/Statistics_by_State/Montana/Publications/Annual_Statistical_Bulletin/2020/Montana-Annual-Bulletin-2020.pdf
[25] National Agricultural Statistics Service. (2021, April). *Montana Agricultural Facts: 2020*.https://www.nass.usda.gov/Statistics_by_State/Montana/Publications/Special_Interest_Reports/agfacts.pdf
[26] Chard II, Thomas and Sommer, Eric. (2019). *Montana Agricultural Statistics 2019*. U.S. Department of Agriculture. https://www.nass.usda.gov/Statistics_by_State/Montana/Publications/Annual_Statistical_Bulletin/2019/Montana-Annual-Bulletin-2019.pdf
[27] National Association of State Departments of Agriculture. (n.d.)*Montana Department of Agriculture.* Reviewed August 15,2022) https://www.nasda.org/organizations/montana-department-of-agriculture
[28] U.S. Department of Agriculture. (n.d.) *2021 State Agricultural Overview*. Reviewed August 15, 2022. https://www.nass.usda.gov/Quick_Stats/Ag_Overview/stateOverview.php?state=montana
[29] Montana Department of Agriculture. (n.d.) *Peas, Dry Beans, Lentils, and Chickpeas*. Reviewed August 15,2022. https://agr.mt.gov/Pulse-Crop-Programs
[30] IBISWorld. (n.d.) *Montana – State Economic Profile*. Reviewed August 10, 2022. https://www.ibisworld.com/united-states/economic-profiles/montana/#:~:text=Therefore%2C%20construction%20trends%20are%20important%20indicators%20of%20the,which%20places%20Montana%2038%20in%20the%20United%20States.
[31] U.S. Geological Survey. (2021, April 8). *USGS Aggregates Time Series Data by State, Type, and End Use*. . https://www.usgs.gov/media/files/usgs-aggregates-time-series-data-state-type-and-end-use
[32] Bureau of Business and Economic Research. (n.d.). Montana's Forest Products Industry and Timber Harvest, 2018. Reviewed August 15,2022. http://www.bber.umt.edu/pubs/forest/fidacs/MT2018%20Tables.pdf
[33] U.S. Department of Transportation. (n.d.). *Overview of U.S. – North American Freight by Port, Commodity Group, and Mode* . Reviewed August 15,2022. https://explore.dot.gov/views/Dashboard_PortbyCommodity/Overview?:iid=3&:isGuestRedirectFromVizportal=y&:embed=y
[34] U.S. Department of Transportation. (n.d.). *Trend in U.S. – North America Freight Since January 2006 to June 2022.* Reviewed August 15,2022. https://explore.dot.gov/views/Dashboard_PortbyCommodity/HistoricalTrend?%3Aiid=3&%3AisGuestRedirectFromVizportal=y&%3Aembed=y
[35] Oak Ridge National Laboratory (n.d.). *Freight Analysis Framework, Version 5*. Reviewed August 15, 2022.. https://faf.ornl.gov/faf5/Default.aspx
[36] Oak Ridge National Laboratory (n.d.). *Freight Analysis Framework, Version 5*. Reviewed August 15, 2022. https://faf.ornl.gov/faf5/Default.aspx
[37] Oak Ridge National Laboratory (n.d.). *Freight Analysis Framework, Version 5*. Reviewed August 15, 2022.https://faf.ornl.gov/faf5/Default.aspx
[38] Montana Department of Transportation. (n.d.). *2020 Fact Book.* Reviewed August 15,2022. https://www.mdt.mt.gov/publications/docs/brochures/factbook.pdf
[39] Bureau of Transportation Statistics. (n.d.). *Border Crossing/Entry Data*. Reviewed August 15, 2022. https://www.bts.gov/browse-statistical-products-and-data/border-crossing-data/border-crossingentry-data
[40] Montana Department of Transportation. (n.d.) *Montana's 2021 Traffic Statistics*. Reviewed August 15, 2022. https://mdt.maps.arcgis.com/apps/MapSeries/index.html?appid=71c3f510d09540688b437f38290532ff
[41] MDT Geospatial Information Section and Traffic Data Collection Section *(2021).*
[42] Federal Highway Administration. (2012, October). *National Highway System.* U.S. Department of Transportation. https://www.fhwa.dot.gov/planning/national_highway_system/high_priority_corridors/
[43] US Department of Transportation. (n.d.). *National Freight Strategic Plan*. Reviewed August 15,2022.https://www.transportation.gov/sites/dot.gov/files/2020-09/NFSP_fullplan_508_0.pdf
[44] Montana Department of Transportation. (n.d.). *2020 Fact Book*. Reviewed August 15, 2022. https://www.mdt.mt.gov/publications/docs/brochures/factbook.pdf

[45]Federal Highway Administration. (December 1, 2020). *Jason's Law Commercial Motor Vehicle Parking Survey and Comparative Assessment*. US Department of Transportation. https://ops.fhwa.dot.gov/freight/infrastructure/truck_parking/workinggroups/2020/mtg/jasons_law_results.pdf
[46] Surface Transportation Board. (n.d.) *Economic Data*. Reviewed August 15, 2022. https://www.stb.gov/reports-data/economic-data/
[47] Surface Transportation Board. (n.d.). *Carloads and Tons by State 2012-2020.* Reviewed August 15, 2022. https://www.stb.gov/wp-content/uploads/CARSSTATE-2020.xlsx
[48] U.S. Department of Transportation. (n.d.) *Border Crossing Entry Data – Annual Data. Reviewed August 15, 2022.* https://explore.dot.gov/views/BorderCrossingData/Annual?:isGuestRedirectFromVizportal=y&:embed=y
[49] Montana Department of Transportation. (. Montana Public At-Grade Railroad Crossings. August 2021.
[50] USDA Forest Service. Yellowstone Pipe Out-of-Service Abandonment Project. 2019. https://www.fs.usda.gov/nfs/11558/www/nepa/97431_FSPLT3_4839981.pdf
[51] Lundquist, Laura. (2019, September 23). *Yellowstone Pipeline will Remain Buried Beneath Lolo National Forest, Flathead Reservation*. https://missoulacurrent.com/outdoors/2019/09/yellowstone-pipeline/
[52] U.S. Energy Information Administration. (n.d.). *Maps.* Reviewed August 15, 2022.https://www.eia.gov/maps/layer_info-m.php
[53] Bureau of Transportation Statistics. (n.d.). *TranStats. Reviewed August 15, 2022)* https://www.transtats.bts.gov/Fields.asp?gnoyr_VQ=FJD
[54] Port of Montana. (n.d.). *Home*. Reviewed August 12, 2022. https://www.portofmontana.org/
[55] Port of Northern Montana. (n.d.). *Services & Facilities.* Reviewed August 12, 2022. http://www.pnmshelby.com/services-facilities/
[56] BNSF. (n.d.). *Facilities.* Reviewed August 12,2022. https://www.bnsf.com/ship-with-bnsf/support-services/facility-listings.page
[57] LCPA. (n.d.). *Kootenai Business Park.* Reviewed August 12, 2022. https://lincolncountyportauthority.com/
[58] BNSF. (n.d.). *Shuttle Train Elevators on BNSF*. Reviewed August 12, 2022. https://www.bnsf.com/customers/grain-facilities/shuttles/#MT
[59] Todd & Sargent. (n.d.). *Shuttle Train Loading Facility.* Reviewed August 12, 2022. https://tsargent.com/projects/detail/agrex-inc-0
[60]Todd & Sargent. (n.d). *Shuttle Train Loading Facility.* Reviewed August 12, 2022. https://tsargent.com/projects/detail/chs-inc-central-montana-coop
[61] BNSF. (2019). *BNSF Montana State Fact Sheet.*
[62] BNSF. (n.d.). *Rail Network Maps.* (Reviewed August 15, 2022). https://www.bnsf.com/ship-with-bnsf/maps-and-shipping-locations/rail-network-maps.page
[63] BNSF. (n.d.). *Rail Network Maps.* (Reviewed August 15, 2022). https://www.bnsf.com/ship-with-bnsf/maps-and-shipping-locations/rail-network-maps.page
[64] Great Falls MPO. (n.d.). *Great Falls Area Long Range Transportation Plan – 2018 Update*. Reviewed July 26, 2022. greatfallslrtp_final_amendment1_reduced.pdf (greatfallsmt.net)
[65] Great Falls MPO. (n.d.). *Great Falls Urban Area Transportation Planning Technical Advisory Committee Members*. Reviewed July 26, 2022. Great Falls Urban Area Transportation Planning (greatfallsmt.net)
[66] Montana Department of Transportation. (n.d.) *Montana Public Transportation Systems*.). Reviewed August 15, 2022. https://www.mdt.mt.gov/publictransit/
67 MDT 2020 Fact Book. Montana Department of Transportation (MDT). 2020. https://www.mdt.mt.gov/publications/docs/brochures/factbook.pdf
[68] MDT 2020 Fact Book. Montana Department of Transportation (MDT). 2020. https://www.mdt.mt.gov/publications/docs/brochures/factbook.pdf
[69] Montana Department of Transportation Engineering Division. Commercial Vehicle-Involved Crashes (2016-2020). 2021.
[70] Montana Department of Transportation Engineering Division. Commercial Vehicle-Involved Crashes (2016-2020). 2021.
[71] Montana Department of Transportation Engineering Division. Commercial Vehicle-Involved Crashes (2016-2020). 2021.
[72] Montana Department of Transportation Engineering Division. Commercial Vehicle-Involved Crashes (2016-2020). 2021.
[73] Montana Department of Transportation. (n.d.) *2020 Fact Book*. Reviewed August 15, 2022. https://www.mdt.mt.gov/publications/docs/brochures/factbook.pdf

[74] Economics Department. (2021, October 25). *Driver Shortage Update 2021*. American Trucking Association. https://www.trucking.org/sites/default/files/2021-10/ATA%20Driver%20Shortage%20Report%202021%20Executive%20Summary.FINAL_.pdf
[75] Costello, Bob. (2019, July). *Truck Driver Shortage Analysis 2019.* American Trucking Associationhttps://www.trucking.org/sites/default/files/2020-01/ATAs%20Driver%20Shortage%20Report%202019%20with%20cover.pdf
[76] Oak Ridge National Laboratory (n.d.). *Freight Analysis Framework, Version 5*. Reviewed August 15, 2022. https://faf.ornl.gov/faf5/dtt_total.aspx
[77] Oak Ridge National Laboratory (n.d.). *Freight Analysis Framework, Version 5*. Reviewed August 15, 2022. https://faf.ornl.gov/faf5/dtt_total.aspx
[78] Oak Ridge National Laboratory (n.d.). *Freight Analysis Framework, Version 5*. Reviewed August 15, 2022. https://faf.ornl.gov/faf5/dtt_total.aspx
[79] Oak Ridge National Laboratory (n.d.). *Freight Analysis Framework, Version 5*. Reviewed August 15, 2022. https://faf.ornl.gov/faf5/dtt_total.aspx
[80] Oak Ridge National Laboratory (n.d.). *Freight Analysis Framework, Version 5*. Reviewed August 15, 2022. https://faf.ornl.gov/faf5/dtt_total.aspx
[81] Oak Ridge National Laboratory (n.d.). *Freight Analysis Framework, Version 5*. Reviewed August 15, 2022. https://faf.ornl.gov/faf5/dtt_total.aspx
[82] Oak Ridge National Laboratory (n.d.). *Freight Analysis Framework, Version 5*. Reviewed August 15, 2022. https://faf.ornl.gov/faf5/dtt_total.aspx
[83] Oak Ridge National Laboratory (n.d.). *Freight Analysis Framework, Version 5*. Reviewed August 15, 2022.. https://faf.ornl.gov/faf5/dtt_total.aspx
[84] U.S. Energy Information Administration. (n.d.). *Energy Production Declined by Record Amounts in Several States in* 2020. Today in Energy. Reviewed August 12, 2022.https://www.eia.gov/todayinenergy/detail.php?id=53359
[85] Montana Department of Environmental Quality. (n.d.). *Coal Production by State and Coal Rank, 2019*. Reviewed August 12, 2022. https://view.officeapps.live.com/op/view.aspx?src=https%3A%2F%2Fdeq.mt.gov%2Ffiles%2FEnergy%2FDocuments%2FEnergy_Statistics%2FCoalTables2021_Final.xlsx&wdOrigin=BROWSELINK
[86] U.S. Energy Information Administration. (n.d.) *Montana State Profile and Energy Estimates.* Reviewed August 15, 2022. https://www.eia.gov/state/?sid=MT#tabs-3
[87] International Trade Administration. (n.d.) *USMCA vs. NAFTA*. Reviewed August 15, 2022. https://www.trade.gov/usmca-vsnafta
[88] Office of the United States Trade Representative. (n.d.) *UNITED STATES–MEXICO–CANADA TRADE FACT SHEET Agriculture: Market Access and Dairy Outcomes of the USMC Agreement*. Reviewed August 15, 2022. https://ustr.gov/trade-agreements/free-trade-agreements/united-states-mexico-canada-agreement/fact-sheets/market-access-and-dairy-outcomes
[89] Rodrigue, Jean-Paul and Notteboom, Theo. (n.d.). *The Containerization of Commodities*. Geography of Transport Systems. Reviewed August 15, 2022. https://transportgeography.org/?page_id=8394
[90] Ramey, Jay. (2021, April 22). *Electric Semi-Trucks Are on Their Way, At Last.* Autoweek. https://www.autoweek.com/news/green-cars/a36201258/electric-semi-trucks-arrive/.
[91] Dodds, Marie. (2019, February 7). *AAA Study: What's the Real Range of Electric Vehicles.* AAA. https://info.oregon.aaa.com/aaa-study-whats-the-real-range-of-electric-vehicles/#:~:text=The%20AAA%20research%20finds%20that%20in%20cold%20weather%2C,chance%20of%20being%20stranded%20by%20a%20dead%20battery.
[92] Hatch, Cory. (2018, June 30). *EV Charging in Cold Temperatures Could Pose Challenges for Drivers.* Idaho National Laboratory. EV charging in cold temperatures could pose challenges for drivers - INL.
[93] Watbec Corp. (2022, January 28). *Union Pacific Railroad Makes Largest Investment in Wabtec's FLXdrive Battery-Electric Locomotive.* Reviewed August 15, 2022). https://www.wabteccorp.com/newsroom/press-releases/union-pacific-railroad-makes-largest-investment-in-wabtec-s-flxdrive-battery-electric-locomotive.
[94] Clinnick, Richard. (2021, December 21). *BNSF, Caterpillar and Chevron to trial a hydrogen-powered locomotive*. International Railway Journal. https://www.railjournal.com/fleet/bnsf-caterpillar-and-chevron-to-trial-a-hydrogen-powered-locomotive/.
[95] Adler, Alan. (2021, August 30). *ACT Expo: Exclusive first ride in Hyzon hydrogen-powered fuel cell truck*. Freight Waves. https://www.freightwaves.com/news/act-expo-exclusive-first-ride-in-hyzon-hydrogen-powered-fuel-cell-truck

[96] 67th Legislature. (2021, April 7). *House Joint Resolution No. 10*. https://leg.mt.gov/bills/2021/HouJoint/HJ0010_1.pdf.
[97] National Highway Traffic Safety Administration. (2022, March). *Automated Vehicles for Safety*. Reviewed August 15, 2022. https://www.nhtsa.gov/technology-innovation/automated-vehicles-safety
[98] Frank, Jacob W. (2022, January 20). *Automated Shuttle Pilot.* National Park Service, Yellowstone National Park *https://www.nps.gov/yell/learn/management/automated-shuttle-pilot.htm.*
[99] BBC News. (2013, December 2). *Amazon Testing Drones for Deliveries.* https://www.bbc.com/news/technology-25180906
[100] Montana Department of Transportation. (2021, May). *Montana Department of Transportation Statewide ITS Architecture Update Report, May 2021.* Reviewed August 5, 2022. https://www.mdt.mt.gov/publications/docs/brochures/statewide-its-architecture.pdf
[101] Montana Department of Transportation. (n.d.). *Instructions/Why Apply?* Montana Department of Transportation Internet Application for Online Access/ePART. Reviewed August 5, 2022. https://app.mt.gov/ipermit/Help/Instructions.
[102] America's Transportation Awards. *Montana Department of Transportation—Electronic Permit, Audit, Registration, and Tax System (ePART).* Reviewed August 15, 2022. https://americastransportationawards.org/2017-washto-region-projects/montana-department-of-transportation-electronic-permit-audit-registration-and-tax-system-epart/
[103] PrePass. (n.d.). *PrePass.* Reviewed August 15, 2022. https://prepass.com/.
[104] PrePass. (2021, June) *PrePass Fact Sheet – Montana*. http://www.prepassalliance.org/wp-content/uploads/2018/03/Fact-Sheet_MT_Jun-2021.pdf.
[105] Montana Legislature. (n.d.). *Montana Code Annotated 2021*. Reviewed August 15, 2022. https://leg.mt.gov/bills/mca/title_0000/article_0080/part_0010/section_0060/0000-0080-0010-0060.html
[106] Montana Department of Transportation Engineering Division. (2021). Commercial Vehicle-Involved Crashes (2016-2020).
[107] American Truck Parking. (n.d.). *Find Truck Parking*. Reviewed December 7, 2021. http://www.americantruckparking.com/
[108] Montana Department of Transportation, (n.d.). *Montana Rest Areas GIS Data Portal*. Reviewed August 15, 2022. https://gis-mdt.opendata.arcgis.com/datasets/mdt::montana-rest-areas/explore?location=46.794079%2C-110.015195%2C7.59
[109] Montana Department of Transportation. (n.d.). *Montana Rest Area Plan.* Reviewed June 10, 2022. https://www.mdt.mt.gov/pubinvolve/restareaplan/
[110] Montana Department of Transportation. (n.d.).. *Headwaters Rest Area Project Overview.* Reviewed June 10, 2022. Headwaters Rest Area | Montana Department of Transportation (MDT) (mt.gov)
[111] Montana Department of Transportation. (n.d.). *MDT Fact Book 2020*. Review August 12, 2022. https://www.mdt.mt.gov/publications/docs/brochures/factbook.pdf
[112] Montana Department of Transportation. (2019, June 24). *Transportation Asset Management Plan*. https://www.mdt.mt.gov/publications/docs/plans/2019-tamp-report.pdf
[113] Montana Department of Transportation. (2018, November). *Pavement Design Manual*. https://www.mdt.mt.gov/other/webdata/external/pavementanalysis/pavementdesignmanual.pdf
[114] Montana Department of Transportation. (2018, November). *Pavement Design Manual*. https://www.mdt.mt.gov/other/webdata/external/pavementanalysis/pavementdesignmanual.pdf
[115] Montana Department of Transportation. (n.d.). *Permits for Commercial Motor Carriers.* Reviewed June 2, 2022. https://www.mdt.mt.gov/business/mcs/permits.aspx
[116] Montana Department of Transportation. (n.d.). *Fact Book 2020.* *https://www.mdt.mt.gov/publications/docs/brochures/factbook.pdf*
[117] Brandenberger, Stephanie. May 5 & 6, 2022. *Challenges with Montana's Aging Bridges* [Conference Session]. 2022 Preconstruction Conference. Helena, MT.
[118] Montana Department of Transportation. (n.d.). *Appendix E: Level of Service Criteria - Road Design Manual*. Reviewed August 15, 2022. https://www.mdt.mt.gov/other/webdata/external/cadd/RDM/20-RDM-AppendixE-LOS-Criteria.pdf
[119] BNSF. (2019). *Montana Fact Sheet*.
[120] U.S. Energy Information Administration. (n.d.). *Environment: Data*. U.S. Energy Information Administration. https://www.eia.gov/environment/emissions/state/. Reviewed January 25, 2023.
[121] Montana Department of Transportation. (2016, May). *2016 Montana Rail Grade Separation Study Final Report*. https://www.mdt.mt.gov/publications/docs/brochures/MDT-RGSS-Final-Report-2016.pdf

[122] Montana Department of Environmental Quality. (2018, July). *State of Montana Final Beneficiary Mitigation Plan Volkswagen Environment Mitigation Trust.* Montana Department of Quality Energy Office. (Reviewed August 15, 2022. Final_Montana_Beneficiary_Mitigation_Plan_110118.pdf (mt.gov)
[123] Montana Department of Transportation Environmental Services Bureau. (2016, December 7). *Traffic Noise Analysis and Abatement Policy.* https://www.mdt.mt.gov/business/contracting/docs/MDT-Noise-Policy.pdf
[124] Montana Department of Transportation. (n.d.). *Stormwater Information – Purpose and Goals*. Reviewed June 6, 2022. Stormwater Information – Purpose and Goals | Montana Department of Transportation (MDT) (mt.gov)
[125] Montana Department of Transportation. (n.d.). *2019-2020 Biennial Report.* Reviewed August 15,2022. https://www.mdt.mt.gov/tranplan/docs/2019-2020-BIENNIAL-REPORT.pdf
[126] Montana Department of Transportation. (n.d.). *Wildlife Friendly Fence.* Reviewed June 10, 2 022). https://www.mdt.mt.gov/publications/docs/brochures/friendlyfences.pdf
[127] Semmens, Bill and Wambach, Deborah. May 5 & 6, 2022. *Take a Walk on the Wild Side* [Conference Session]. 2022 Preconstruction Conference. Helena, MT.
[128] University of Montana. (n.d.). *Montana Weather, Terrain Offers Land of Extreme.* Reviewed December 23, 2022. *https://www.umt.edu/this-is-montana/columns/stories/montana-weather-13.php*
[129] Montana Department of Transportation. (2022, March 10). *Denton Bridge Reconstruction*. Denton Bridge Reconstruction | Montana Department of Transportation (MDT) (mt.gov)
[130] Montana department of Transportation. (n.d.). *Rockfall Management System*. Reviewed August 15, 2022. https://www.mdt.mt.gov/research/projects/geotech/rockfall.aspx.
[131] Montana Department of Transportation. (n.d.). *Montana Department of Transportation Emergency Operations and Disaster Plan.* Reviewed June 2, 2022. Emergency Operation Plan (mt.gov)
[132] FEMA. (n.d.). *How a Disaster Gets Declared.* Reviewed July 28, 2022. How a Disaster Gets Declared | FEMA.gov
[133] Montana Department of Transportation. (n.d.). *Comprehensive Highway Safety Plan*. (Reviewed August 15, 2022). https://www.mdt.mt.gov/visionzero/plans/chsp.aspx.
[134] Montana Department of Transportation. (n.d.). *Commercial Vehicle Safety Plan*. https://www.fmcsa.dot.gov/sites/fmcsa.dot.gov/files/2020-06/FY2020%20Montana%20eCVSP%20-%20Final.pdf.
[135] Montana Department of Transportation. (2019, December 12). *Performance Programming Process*. https://www.mdt.mt.gov/publications/docs/brochures/tranplanp3.pdf.
[136] Montana Department of Transportation. (n.d.). *Comprehensive Highway Safety Plan*. Reviewed May 26, 2022. https://mdt.mt.gov/visionzero/plans/docs/chsp/current-chsp.pdf
[137] Montana Department of Transportation. (n.d.). *Comprehensive Highway Safety Plan*. Reviewed May 26, 2022. https://mdt.mt.gov/visionzero/plans/docs/chsp/current-chsp.pdf
[138] Montana Department of Transportation. (n.d.) *Commercial Vehicle Safety Plan.* Reviewed October 21, 2021. https://www.fmcsa.dot.gov/sites/fmcsa.dot.gov/files/2020-06/FY2020%20Montana%20eCVSP%20-%20Final.pdf
[139] Montana Department of Transportation. (n.d.). *Montana's Motor Carrier Safety Assistance Program*. Reviewed June 13, 2022. https://www.mdt.mt.gov/visionzero/plans/mcs.aspx
[140] Montana Department of Transportation. (n.d.). *MDT's Safety Program.* Reviewed May 26, 2022. https://www.mdt.mt.gov/visionzero/plans/mcs.aspx
[141] Montana Department of Transportation. (n.d.). *Montana Rest Area Plan Update, Appendix B Technical Memorandum*. Reviewed August 1, 2022). https://www.mdt.mt.gov/pubinvolve/restareaplan/docs/appendixb.pdf
[142] Montana Department of Transportation. (May 27, 2022) *Montana Rest Area Plan.* https://www.mdt.mt.gov/pubinvolve/restareaplan/
[143] Montana Department of Transportation. (2019, December 12). *Performance Programming Process*. https://www.mdt.mt.gov/publications/docs/brochures/tranplanp3.pdf.
[144] Montana Department of Transportation. 2019. *Transportation Asset Management Plan*. 2019 Transportation Asset Management Plan (mt.gov)
[145] Montana Department of Transportation. (2016, May). *2016 Montana Rail Grade Separation Study Final Report*. https://www.mdt.mt.gov/publications/docs/brochures/MDT-RGSS-Final-Report-2016.pdf
[146] Montana Trucking Association. (n.d.). *About MTA*. Reviewed June 13, 2022. About | Montana Trucking Association | United States (mttrucking.org)

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