APPENDIX A
Montana's Critical Infrastructure Sectors

Critical infrastructures are assets that are essential for the functioning of a society's economy, governance, health, and security. In Montana, the majority of critical infrastructures are owned and operated by private industry. Critical Infrastructures are vulnerable to or easily disrupted from natural, technological, and man-made disasters. Montana's 15 critical infrastructure sectors are considered below:

Chemical Sector – In 2020, the chemicals sector was Montana's largest exporting manufacturing sector and was the third fastest-growing sector in terms of firm creation (2021 Montana Manufacturing Report), which accounted for $278 million of Montana's total merchandise exports in 2020. According to the Environmental Protection Agency (EPA), 8 companies have reported to the EPA as treating, storing, and disposing chemicals and 33 have reported generating large quantities of chemicals. Roughly 1,666 in Montana have reported to the EPA as being handlers of hazardous waste chemicals through the EPAs RCRAINFO Search Database.

Commercial Facilities Sector – In Montana, the commercial facilities sector operates on the principle of public access which has a diverse range of sites that draw large crowds of people for shopping, business, entertainment, recreation, or lodging and moving freely at these sites without the deterrent of highly visible security barriers. The Commercial Facilities Sector in Montana consists of the following eight subsectors:

- Entertainment and Media (e.g., motion picture studios, broadcast media).
- Gaming (e.g., casinos).
- Lodging (e.g., hotels, motels, conference centers).
- Outdoor Events (e.g., theme and amusement parks, fairs, campgrounds, parades).
- Public Assembly (e.g., arenas, stadiums, aquariums, zoos, museums, convention centers).
- Real Estate (e.g., office and apartment buildings, condominiums, mixed use facilities, self-storage).
- Retail (e.g., retail centers and districts, shopping malls).
- Sports Leagues (e.g., professional sports leagues and federations).

Communications Sector – In Montana, commercial communications services are provided based on the ability of the population to support profitability. As such, rural areas in Montana may have minimal telecommunications service. The communications sector is highly interconnected and many businesses, public safety organizations, and government rely upon communication services as an integral component of the economy and underlying operations. The types of communications infrastructure in Montana are wireline communications, wireless communications, satellite communications, cable, and broadcasting. High-speed cable, fiber-

optic phone lines, and other telecommunication transmission networks are other essential components of this sector.

An assessment by the Federal Emergency Management Agency (FEMA)[1] has found that the Montana Statewide Public Safety Communications System is the State's Very High Frequency (VHF) LMR network. Its core sites are in Helena and Billings. The network utilizes 63 sites, most of which are maintained locally by counties. In addition to the Statewide Public Safety Communications System, several other systems are in place, including some with a statewide footprint and others regionally operated. These include:

- DNRC VHF network, which is primarily used during wildfire response activities but may be used to supplement other communications during disaster response operations. The conventional VHF network is supported by 31 repeaters and 13 remotely linked base stations on 41 mountain top sites, along with 22 office base station sites. More than 1000 handheld, mobile and fixed base stations are used by wildland firefighters, foresters and administrative staff.
- Montana Department of Transportation (MDT) VHF network, which is a statewide VHF hybrid network with conventional and trunked capability in areas where it is connected to the Montana Public Safety Communications System. MDT has approximately 2600 subscriber units that utilize 29 tower sites, 20 bases stations, and 65 fixed repeaters.
- MHP VHF network has a statewide footprint with dispatch and tactical channels assigned by district and used solely by the MHP.
- Montana's Department of Corrections (COR) has campus-based VHF systems for its correctional facilities across the state.
- Montana Civil Air Patrol (CAP) has HF and VHF stations at squadron locations across the state and can provide airborne repeater support for Montana agencies upon request through CAP's National Operations Center.

1-Montana Emergency Communications Annex to the Region VIII Emergency Communications Plan

Critical Manufacturing Sector – According to the 2021 Montana Manufacturing Report (which was published by the Montana Manufacturing Extension Center (MMEC) in collaboration with the Bureau of Business and Economic Research (BBER) reports over 3,900 manufacturers are in Montana (both sole proprietors and employees). Overall Montana consisting of the following subsectors:

- Apparel
- Beverage & Tabacco
- Chemicals
- Computer & Electronics
- Electrical Equipment & Appliances
- Fabricated Metals
- Food
- Furniture & Related

- Leather & Allied Products
- Machinery
- Miscellaneous
- Nonmetallic Minerals
- Paper
- Petroleum & Coal
- Plastic & Rubber
- Primary Metals
- Printing & Related
- Textile Mills
- Transport Equipment
- Wood Products

The largest manufacturing subsectors in Montana are petroleum, coal, and wood product manufacturing. These large manufacturing subsectors in Montana are not among the seven largest sectors nationally, which demonstrates how Montana's manufacturing sector differs substantially from the rest of the country. Montana manufacturers are active in global markets as well. The three largest export subsectors for Montana in 2020 were: chemicals, machinery, and transportation equipment (note: Food, beverages, and tobacco fell out of second place during the pandemic). By far the largest export market is Canada, accounting for almost 30% of Montana's manufactured exports. In 2020, the remaining large export markets were: China (2), South Korea (3), Belgium (4), and Japan (5). Below are some summary facts about Montana manufacturing from the 2021 Montana Manufacturing Report:

- Over 3,900 manufacturing firms are in operation in Montana, including sole proprietors
- Manufacturing accounts for roughly 16% of Montana's economic base
- Manufacturing jobs paid about $52,111 in earnings, compared to the state average of $46,743
- Accounts for 5.1% of total private state income equaling $1.1 billion
- Employs 4.3% of Montana's nonfarm workforce, with about 20,400 employees
- Produced 6.1% of Montana's output with a value of $3.1 billion
- Grew more than double the national average in employment, income and output

Dams Sector - According to the 2018 Dams in Montana Report, the National Inventory of Dams (NID), administered by the Army Corp of Engineers, there are 3,259 dams in the State of Montana. Dams are included in the NID if they store at least 50-acre feet of water or are at least 25 feet high. However, this does not count the small dams on private property. Montana's dams hold approximately 34.5 million acre-feet of water – roughly the amount of water it would take to cover the states of Maine, New Hampshire, and Vermont in water one foot deep. Of the 3,259 dams listed:

- 2,487 are privately owned
- 408 are federally owned
- 152 are state owned
- 102 are reservation owned

- 88 are owned by local governments
- 22 are owned by public utilities

Defense Industrial Base Sector - This sector provides products and services that are essential to mobilize, deploy, and sustain military operations and is an industrial complex that enables research and development, as well as design, production, delivery, and maintenance of military weapons systems, subsystems, and components or parts, to meet U.S. military requirements. Though not manufactured in Montana, many of the military weapon's systems, subsystems, and components or parts are transported through Montana on the railroad and highway systems.

Emergency Services Sector - Encompassing a wide range of emergency response functions, the primary mission of the Emergency Services Sector is to save lives, protect property and the environment, assist communities impacted by disasters, and aid in recovery from emergencies. The five disciplines in the Emergency Services Sector are law enforcement, fire services, emergency management, emergency medical services, and public works.

- Law Enforcement agencies in Montana include police departments, county sheriffs' offices, state and federal agencies whose employees have the power of arrest, university police, tribal law enforcement, airport police, and airport security. In 2020, the Montana Board of Crime Controls Law Enforcement Personnel Report reported there were 103 law enforcement agencies employing 2,966 personnel. Out of 2,966 personnel, 1,676 are sworn employees and 1,287 are civilian employees. The Montana Board of Crime Control also reported an average of 1.41 law enforcement personnel per 1,000 capita.
- Fire Services are public or private organization that provides predominantly emergency firefighting and rescue services for a certain jurisdiction, which is typically a municipality, county, or fire protection district. There are approximately 389 fire departments in Montana. In 2024, the U.S. Fire Administration reported that 82.3% of the fire departments in Montana are volunteer, 11% mostly volunteer, 1.8% mostly career, and 5% career. Table A-1 depicts the specialized services offered by fire departments across Montana:

Table A-1 Fire Department Specialized Services

Percentage	Specialty
15.6%	Advanced Life Support
16.7%	Airport / Aviation
46.1%	Basic Life Support
25.9%	Departmental (in-house) training academy
13.8%	Emergency Medical Services (EMS) Ambulance Transport
31.9%	EMS non-transport response
0.7%	Fireboat
56.0%	Fire/Injury prevention/Public education
24.8%	Fire inspection/Code enforcement

33.7%	Fire investigation/Fire cause determination
11.7%	Hazardous materials team
6.7%	Juvenile fire setter intervention program
24.1%	Technical/Specialized rescue
68.8%	Vehicle extraction
90.8%	Wildfire/Wildland Urban Interface3

- Emergency Management - In Montana, the Department of Military Affairs/Disaster & Emergency Services (DES) division is the lead agency coordinating comprehensive emergency management in Montana. On a local level, the responsibility of implementing a local emergency management program rests with the chief elected officials who may appoint an emergency manager or DES Coordinator to oversee the emergency management program in their behalf. Generally, all 56 counties and 8 Tribal Nations appoint emergency managers/DES coordinators.
- Emergency Medical Services are a type of emergency service dedicated to providing out-of-hospital acute medical care, transport to definitive care, and other medical transport to patients with illnesses and injuries. In 2014, Montana had 105 non-transporting units, 138 ground transporting ambulance services, 7 rotor-wing flight services and 9 fixed-wing flight services. There are approximately 5 licensed EMTs per 1,000 capita, of which 73% of are volunteers (refer to the EMS Agency and Hospital Location Map).
- Public Works is the combination of physical assets, management practices, policies, and personnel necessary for all levels of government within Montana to provide and sustain structures and services essential to the welfare and acceptable quality of life for its citizens. When it comes to public works in Montana, there is no one size fits all, which is why all levels of government and each incorporated city/town and county within Montana has their own unique framework for carrying out public works.

Energy Sector – The energy sector in Montana supplies fuels to the transportation industry, electricity to households and businesses, and other sources of energy that are integral to growth and production across Montana. Montana's energy consumption per capita is the 11th highest in the U.S. Major industrial sectors in Montana include several energy-intensive industries, such as manufacturing, agriculture and livestock processing, mining, and petroleum and natural gas production and processing. Montana's electricity system is becoming increasingly reliant on renewables and hydroelectric generation as its legacy coal-fired facilities are retired. Montana is largely dependent on natural gas and propane for heating needs and to a lesser extent biomass and electricity.

- Electricity – Montana electricity consumers are served by a mix of 33 utilities. Montana exports approximately 40 percent of the energy generated in the state, and yet is a relatively small player in the larger western U.S. electricity market. Montana generators in total produced 3,278 aMW (average Megawatts) from 2006 to 2010, 3,325 aMW from 2011 to 2015, and 3,075 aMW from 2016 to 2020. Montana usage accounts for just over half of total in-state production, or about 1,700 aMW. Transmission line losses account for less than 10 percent of total electricity produced. The rest of Montana

electricity production is contractually exported west to Idaho, Washington and Oregon via the Colstrip transmission lines, or north to Alberta and south into Wyoming via other high voltage lines.

- Coal-Fired Generation - Between 1986 and 2020, coal-fired generation provided the majority of the electricity produced in the state. This coal-dominated era started when Colstrip Unit 4 was completed in 1986. But now the future of coal generation in Montana is changing. Montana-Dakota shuttered the 44 MW coal-fired Lewis and Clark Generating Station in 2021 after the utility's economic analysis found the Sidney plant could no longer compete with other resources. That closure was preceded by shut down of Colstrip Units 1 and 2 in 2020 after owners Talen and Puget Sound Energy determined that operation of both 307 MW plants was no longer economical. As of June 2022, there was a total of 1,630 MW of coal-fired generating capacity in Montana, representing 29 percent of the state's nameplate generating capacity. In comparison in 2020, coal generated a total of 8,490 GWh, representing 36 percent of all in-state electricity generation. In 2015, coal generation was even higher totaling 16,013 GWh, representing 55 percent of all in-state electric generation.
- Natural Gas – Montana is home to six natural-gas fired generation plants. Two are in the Butte area, and the other four are in the eastern part of the state on the Eastern U.S. grid. Three of the four plants in the eastern part of the state are owned by Montana-Dakota and run infrequently. The other two are owned by or under contract with NorthWestern Energy.
- Hydropower - Hydroelectric dams are an important resource in Montana's energy generation mix and produced half of the state's net electric generation in 2021. There are currently 32 operating hydroelectric facilities in Montana and six of the state's ten-largest generating plants are water powered. At more than 562 MW of nameplate capacity, Noxon Rapids is the largest hydroelectric facility in Montana and is located on the Clark Fork River in Sanders County. Nearly all of its power is exported out of state. In 2021, Montana ranked sixth among all states for power generated by hydroelectric dams. Ownership of hydropower dams in Montana includes utilities and federal agencies. One of the largest facilities, the Seli'š Ksanka Qlispe' Dam (207 MW; formerly the Kerr Dam) was purchased by the Confederated Salish and Kootenai Tribes in 2015. This is the first Tribally owned hydroelectric dam in the United States
- Wind Power - Montana's large geographic area and high plains regions make it one of the highest ranked states for utility wind generation potential in the United States. The National Renewable Energy Laboratory estimates Montana's wind potential at 80 meters above ground to be 679,000 MW, ranking Montana second in total wind energy production potential. Despite this potential, Montana's distance from large population centers (energy loads) and its transmission constraints have resulted in the state only developing a small fraction of its utility scale wind potential. As of 2022, Montana had 1,124 MW of installed wind energy capacity. This puts Montana at 22nd out of 50 states for installed wind capacity in the United States. Wind accounted for about 13 percent of Montana's net electricity generation in 2020.
- Solar Power - Utility-scale solar photovoltaic (PV) generating systems are an emerging energy supply in Montana, but still represent a small slice of Montana's generating mix.

Distributed utility customer-sited PV systems have been gradually installed in Montana over the past decade. Utility-scale solar farms developed to sell power directly into the grid have only come online in the last five years. The combined output from solar PV systems in Montana represents about 0.04 percent of statewide electricity sales. That puts Montana ahead of neighboring Wyoming, North Dakota and South Dakota on the basis of energy supplied from solar, but behind Idaho. By comparison, states with the highest levels of solar energy development in the country are currently supplying 3 to 13 percent of their electricity from solar PV installations

- Petroleum – According to the U.S. Energy Information Administration, Montana holds less than 1% of U.S. total proved crude oil reserves, and the state accounts for about 1 in every 200 barrels of U.S. oil produced annually. Most of Montana's crude oil production comes from the Bakken Formation in the northeastern corner of the state along the border with North Dakota. Montana has 4 refineries with a combined crude oil processing capacity of about 205,000 barrels per calendar day. The three largest refineries are in the Billings area. There is a smaller refinery in Great Falls that in early 2023 finished an expansion project that allowed it to make renewable aviation fuel from animal fat and vegetable oil. The refineries receive crude oil mainly from Canada and Wyoming and produce a wide range of refined products, including motor gasoline, ultra-low sulfur diesel fuels, aviation fuels, butane, propane, petroleum coke, and asphalt. 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.

Financial Services Sector - Financial institutions in Montana vary widely in size and presence. The Banking & Financial Sector in Montana consists of state-chartered banks, state-chartered trust companies, state-chartered credit unions, residential mortgage lenders, mortgage brokers, mortgage loan originators, consumer loan companies, and sales finance companies escrow businesses. According to the Federal Deposit Insurance Corporation's (FDIC) First Quarter 2024 Banking Profile for Montana, the largest banking deposit markets reside in Billings (14 Institutions), Missoula (11 Institutions), and Great Falls (12 Institutions). The majority of bank institution loans are concentrated to commercial real estate, nonresidential real estate, and residential real estate. Figure A-1 displays the asset distributions among banking institutions across Montana:

Table A-2: Montana Banking Asset Distribution

Asset Distribution	Banking Institutions
< $100 million	9 (24.3%)
$100 million - $250 million	13 (35.1%
$250 million - $1 billion	9 (24.3%)
$1 billion to $10 billion	4 (10.8%)
$10 billion	2 (5.4%)

Food & Agriculture Sector – According to the United States Department of Agriculture 20223 Census of Agriculture Data, There were 24,266 farms and ranches in Montana, down 10.3%

from 2017 on 57.6 million acres a decrease of 1%. Family-owned and operated farms accounted for 92.8% of all Montana farms and operated 80% of land in farms. Montana farms and ranches produced $4.54 billion in agricultural products, up from $3.52 billion in 2017. The majority (55%) of the sales were from crop sales. The Grains, oilseeds, dry beans, and dry peas category led with 43.0% of all sales, followed by Cattle (38.6%). With farm production expenses of $4.36 billion, Montana farms had net cash income of $1.14 billion. Average farm income rose to $46,889. In 2022, 931 Montana farms sold directly to consumers, with sales of $15.7 million. Value of sales increased .3% from 2017. The 1,080 farms with sales of $1 million or more were 4.5% of Montana farms and represented 98.7% of sales and government payments. The 13,723 Montana farms (57%) with sales of $50,000 or less accounted for 2.6% of sales and government payments in Montana.

Government Facilities Sector - The Montana government facilities sector includes a wide variety of buildings that are government owned or leased. Many government facilities are open to the public for business activities, commercial transactions, or recreational activities. These facilities include general-use office buildings, courthouses, historical property, state parks, and structures that may house critical equipment, systems, networks, and functions.

Healthcare & Public Health Sector

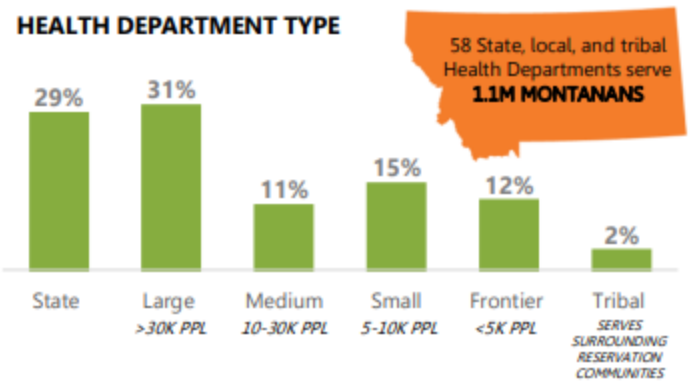
Taken as a whole (ambulatory health care services, assisted living facilities, community health centers, home health agencies, hospitals, nursing residential care facilities, personal care agencies, and skilled nursing facilities). According to the Montana Department of Labor and Industry (MT DLI) the health care industry in Montana has over 74,000 payroll employees and projects healthcare to continue to make up a significant portion of employment growth, adding an average of 1,330 jobs per year through 2030. Across all industries, Montana is projected to add an average of 5,170 jobs per year through 2030, with 25% of job growth occurring in the healthcare industry

According to the University of Montana Bureau of Business and Economic Research (BBER), Montana hospitals generate considerable economic prosperity, not only for the communities in which they are located, but for the state as a whole. In terms of measurable economic activity, the BBER finds that the state's hospitals ultimately support:

- About 83,900 permanent, year-round jobs across the state.
- Over $6.3 billion of annual, recurring income received by Montana households, of which $5.7 billion is disposable, after-tax income.
- State tax and nontax revenues of approximately $1.5 billion per year.
- Over $16 billion in added economic output annually.
- About 147,500 additional state residents.

According to the Montana Public Health Training Center, 58 state, local, and tribal Health Departments serve 1.1 million Montanans. Figure A-1 displays the type and amount of Health Departments serving Montana.

Figure A-1: Population Percentage Served by Department Type



The Rural Health Information Hub reports rural Montana having 50 critical access hospitals (CAH), 63 rural health clinics (RHC), 55 federally qualified health centers (FQHC), and 3 short term / Prospective Payment System (PPS) hospitals. CAH is a designation given to eligible rural hospitals by the Centers for Medicare & Medicaid Services (CMS). The CAH designation is designed to reduce the financial vulnerability of rural hospitals and improve access to healthcare by keeping essential services in rural communities. The RHC program is intended to increase access to primary care services for patients in rural communities. RHCs can be public, nonprofit, or for-profit healthcare facilities. To receive Centers for Medicare & Medicaid Services (CMS) certification, they must be located in a rural area that is designated as an underserved or shortage area. FQHCs are outpatient clinics that qualify for specific reimbursement systems under Medicare and Medicaid. A short-term hospital is a medical center that specializes in short-term medical treatment of patient and PPS is a method of reimbursement in which Medicare payment is made based on a predetermined, fixed amount.

According to the latest data compiled by Nursinghomedatabase.com, Montana has a total of 60 active skilled nursing facilities with 4,325 total beds. The Indian Health Services (IHS), which provides health services to members of federally-recognized tribes, reports having 9 health centers and 3 hospitals facilities in Montana, located in the communities of Crow, Blackfeet, Flathead, Fort Belknap, Fort Peck, Northern Cheyenne, and Rocky Boy.

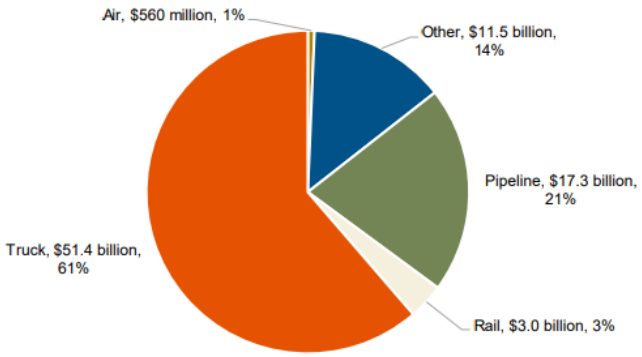
Information Technology Sector – IT infrastructure refers to the composite hardware, software, network resources and services required for the existence, operation and management of an enterprise IT environment. Typically, a standard IT infrastructure consists of hardware, software, networks, and meat ware (e.g. human users such as network administrators). Information technology (IT) employment in Montana totals more than 17,000 workers, according to CompTIA, the leading trade association for the global IT industry. Net tech employment stood at 17,880 at the end of 2024, accounting for an estimated 3.2% of the state's total workforce. There are 3,574 tech business establishments in Montana. The Montana tech sector accounts for $2.4 billion in economic activity, or 3.9% of the state's economy.

Transportation Systems Sector – Montana's extensive transportation system provides the state's residents, visitors and businesses with a high level of mobility and is the backbone of the state's economy. The Montana Department of Transportation (MDT) 2022 Factbook reports the Montana transportation system consisting of 73,571 miles of road open to the public, including 12,916 miles of MDT routes. 76% of annual vehicle miles traveled is on the MDT routes.

The 2022 Montana Freight Plan reported that 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. 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. 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. 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.

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 A-3 displays the shipments by mode and value.

Figure A-2: Freight Shipments by Mode and Value (2017)



Water, Wastewater, and Solid Waste Systems Sector – The Report Card for Montana's Infrastructure (2018) reports there are 2,162 water systems in operation in the State. The breakdown of those systems is as follows:

- 34% are communities (~737)

- 53% are transient systems (e.g., restaurants, motels, campgrounds)
- 13% are non-community/non-transient systems (e.g. schools, offices, businesses, and parks)

Over than 400,000 people (39%) are served by just 12 of these community systems. Another 210,000 people (over 20%) are served by another 100 of these community systems. The remaining 41% of the population is served by the remaining small community and individual private systems. Over 359,000 (about 34%) of the State's population rely on surface water as their primary source of drinking water, typically from the Yellowstone, Missouri, and Milk Rivers. The remaining population relies on groundwater sources for their drinking water.

Municipalities and districts own and operate approximately 229 public wastewater systems in Montana serving approximately 62% of State's population of 1,050,000 people. The 229 public wastewater systems include 149 public lagoons systems, 41 public mechanical treatment plants, and 26 lagoon systems owned by tribal governments or other organizations. The remainder of the population is served by private septic tanks and drain fields.

The solid waste infrastructure in Montana consists of landfills, transfer facilities and recycling/waste diversion facilities. The State of Montana generates approximately 1.6 million tons of solid waste annually. Approximately 1.3 million tons of this waste is landfilled annually with the remainder being diverted. Montana currently has 32 licensed Class II landfills spread across the State which accept between 1,500 and 350,000 tons/year. The majority of these facilities are operated by local government entities but there are also several private Class II facilities in the State. The state's facilities have approximately 38 years of capacity remaining. Other solid waste facilities licenses and regulated by the State include:

- Class III landfills (inert wastes).
- Class IV landfills (construction and demolition waste).
- Large transfer stations.
- Composting facilities.
- Industrial waste landfills.
- Land farms.
- Recycling facilities.