MONTANA AIRPORTS ECONOMIC IMPACT STUDY

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Final Report

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January 2017

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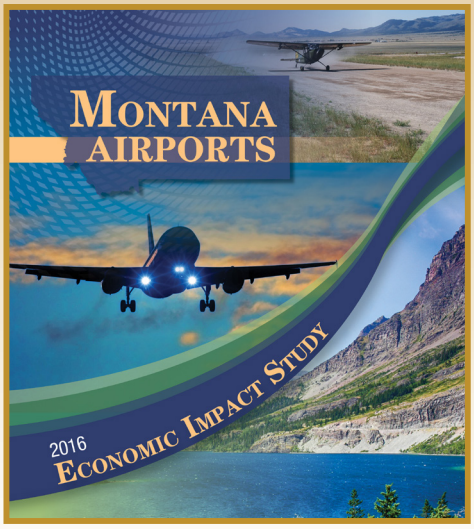

RESEARCH PROGRAMS

MDT

Montana Airports
2016 Economic Impact Study

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This study updated the previous Montana airport economic impact study conducted in 2007 and 2008.

16. Abstract

The Montana Airports 2016 Economic Impact Study analyzed the qualitative and quantitative impacts of the Montana airport system, including aviation- and non-aviation-related businesses, visitor spending, capital expenditures on construction, and additional spin-off (or "multiplier") effects. Specific activities and uses at each airport were also examined to understand and communicate the wide range of impacts and benefits derived from airport operations. Data was gathered via an extensive surveying effort and supplementary secondary data sources to complete data gaps. Economic modeling utilized the IMPLAN and vFreight™ software platforms. The study determined that Montana's airport system generates a $2.8 billion in total economic impact, supports nearly 24,000 jobs, and generates approximately $839 million in payroll. The results of the project can be used to support decision-making at all levels; promote economic activity and development; and provide a more comprehensive understanding of how broader economic, demographic, and other trends have affected aviation in Montana. This study updated a previous economic impact study conducted in 2007 and 2008.

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1. Introduction

The Montana Department of Transportation (MDT) teamed with Kimley-Horn, Inc. (Kimley-Horn); the Economic Development Research Group, Inc. (EDR Group); Kadrmas, Lee, and Jackson, Inc. (KLJ Engineering); and the University of Montana Bureau of Business and Economic Research (UM BBER) to update the Montana 2007-2008 State Aviation System Plan, Economic Impacts of Airports in Montana. This update quantified the economic contributions of aviation to the state and summarized the benefits that airports provide throughout Montana.

Montana's airports play an integral role in the state's transportation system by providing air service within the state, across the country, and across the world. Airports also offer significant economic benefits to communities by supporting jobs; generating payroll; paying taxes; and triggering spending at local, regional, and state levels.

The importance of airports goes beyond transportation and economics. Airports offer access, services, and other attributes of value to Montanans that cannot always be easily measured in dollars and cents. Residents and visitors use airports for leisure and business travel, and airports serve as the base for a wide range of critical activities such as wildland firefighting, search and rescue operations, and training for future aviators. Airports are the starting point for aircraft that conduct utility inspections, provide medical evacuation services, and transport staff and executives for business activity.

1.1 Objective of Study

MDT conducted a comprehensive study of the state's aviation facilities to better understand the value of Montana's airports from the perspective of both economics and community benefits. This study analyzed the contributions of airports within the Montana system with measurable economic outputs, including on-airport aviation- and non-aviation-related businesses, visitor spending, capital expenditures on construction, and additional spin-off (or "multiplier") effects or benefits.[1] This study also examined specific activities and uses at each airport to identify how these facilities support Montana's residents and visitors. Based on extensive surveying efforts and in-person discussions with airport managers, tenants, and users, Montana's airport system:

- Supports nearly 24,000 jobs
- Generates approximately $839 million in annual payroll
- Generates $2.8 billion in total annual economic impacts

Of the airports included in this economic impact study, 13 are categorized as commercial service airports and 64 are general aviation airports. This distinction is important because different types

[1] The glossary in Appendix A and Chapter 3: Analysis Approach provides more detailed definitions of the economic terminology used in this report.

of airports generate different types of economic impacts. Airports excluded from the study do not significantly impact the statewide economic impact.[2]

Commercial service airports are typically publicly owned facilities that have at least 2,500 passenger enplanements (defined as passengers that board aircraft) each calendar year and receive scheduled passenger service. Commercial service airports are categorized by the Federal Aviation Administration (FAA) as small, medium, large, and non-hub facilities dependent upon passenger enplanement levels. At commercial service airports, tenants often consist of airlines; fixed-base operators (FBOs); rental car, retail, and food and beverage companies; non-aviation businesses; and others. Commercial service airports also accommodate activity by general aviation aircraft which support jobs and other activities at the airports.

General aviation airports are typically public-use airports without scheduled service or less than 2,500 annual passenger enplanements. Approximately 88 percent of airports included in the FAA's National Plan of Integrated Airport Systems (NPIAS) are classified as general aviation facilities. At general aviation airports, typical tenants include charter flight companies, FBOs, aerial applicators, aircraft maintenance companies, aerial wildland firefighting agencies, and non-aviation businesses.

1.2 Overview of Approach

The total economic impact of each airport was quantified based on information regarding total employment (jobs), payroll, visitor spending, and capital expenditures on construction. It should be noted that employment and jobs do not have the same meaning for this economic impact study. The previous 2007-2008 study defined jobs based on a full-time equivalent methodology (Wilbur Smith Associates 2009); however, this study defines jobs by a headcount. A headcount methodology was used because the results indicate an actual count of employment at the airport, instead of generating a fractional figure for airport jobs.

For example, if two employees work at an airport, one working full-time earning $100,000 per year and the other working part-time earning $50,000 per year, then:

- Full-time equivalent methodology equates to 1.5 jobs
- Headcount methodology equates to two jobs while simultaneously accounting for both employees' wages

The first step of the Economic Impact Study was to identify the airports in the state that would be used to quantify the overall economic impact of airports. A total of 77 airports in the Montana system with specific measurable economic impacts were included in the final analysis. Excluded airports did not significantly impact total statewide impacts. Once these airports were

[2] Big Sky Field, Dillion, Riddick Field, and Winifred airports were excluded due to lack of airport manager participation in the study process. Economic impacts were estimated based on secondary data sources. The analysis indicated that all facilities except Dillion Airport did not have significant economic impacts.

determined, 50 were selected to be inventoried via on-site surveys. Appendix B provides a list of all airports included in the final study and provides airport-specific impacts and spin-off effects.

Once the airports were selected, economic impact terminology was confirmed with MDT to ensure transparency and clarity throughout the inventory, economic impact data analyses, and documentation processes. In the 2007-2008 study, the terms "first-round" and "second-round" impacts were used to measure economic impact. For this study, these terms were updated to "direct impacts" and "spin-off effects," respectively. Spin-off effects can be further defined as "indirect" or "induced".

Direct impacts include on-airport jobs, capital expenditures on construction, and off-airport visitor spending. Spin-off effects are caused when a portion of direct business revenues are used to purchase goods and services in Montana (i.e., indirect effects) and when the portion of revenues paid as wages to workers are spent within the state (i.e., induced effects). For example, an indirect effect occurs when an on-airport aircraft maintenance company purchases tools from a local vendor, which then recirculates the revenue from the maintenance company into the local economy. An induced impact occurs as an airport employee spends a portion of his or her wages at a local grocery store.

1.3 Summary of Findings

The economic contribution of Montana's aviation system to the state economy is based on on-airport businesses, non-aviation tenants, off-airport businesses serving airport visitors, capital expenditures on construction, and airport-reliant businesses. These business activities generate additional economic activity such as business orders to suppliers (i.e., indirect effects) and business sales generated by the spending of workers' incomes on consumer purchases (i.e., induced effects).

Combined, direct impacts and spin-off effects represent the net contribution that Montana airports provide to the state economy. In total, Montana's airports annually generate nearly $2.8 billion in business sales, almost 24,000 jobs, and $839 million in payroll to Montana residents, as shown in Table 1.

Table 1. Total Annual Economic Contribution of Montana's Aviation System

Impact Type	Jobs	Payroll ($)	Economic Impacts ($)
On-airport	5,260	$271,531,000	$911,144,000
Off-airport visitor spending	9,360	$198,309,000	$717,784,000
Capital expenditures on construction	413	$18,365,000	$61,147,000
Spin-off effects	8,816	$350,305,000	$1,089,040,000
Total Contribution	**23,849**	**$838,510,000**	**$2,779,115,000**

Sources: General aviation, commercial passenger, on-airport, and airport managers surveys; MDT; and IMPLAN 2014. Calculations by EDR Group.

2. Overview of Montana Economy

Montana entered 2015 with concerns for how moderating commodity prices would affect some of the state's key industries, including energy, mining, and agriculture. Yet even though these obstacles to growth were real, the strength in other parts of the economy was strong enough to overcome them, and the state economy went on to post a very good year.

In 2015, wage and salary employment covered by unemployment insurance in Montana was up by more than 9,000 jobs, and total wages grew by an inflation-adjusted $754 million over the previous year. Job growth was significantly stronger than in 2014, and growth in total wages was almost five percent. Together with falling unemployment rates and surging tax revenues, 2015 shaped up to be a year that saw the Montana economy operate much closer to full employment.

Figure 1 illustrates the percent change in covered employment and inflation-corrected wages in Montana between 2012 and 2015.

Figure 1. Percent Change in Covered Employment and Inflation-corrected Wages in Montana, (2012-2015)

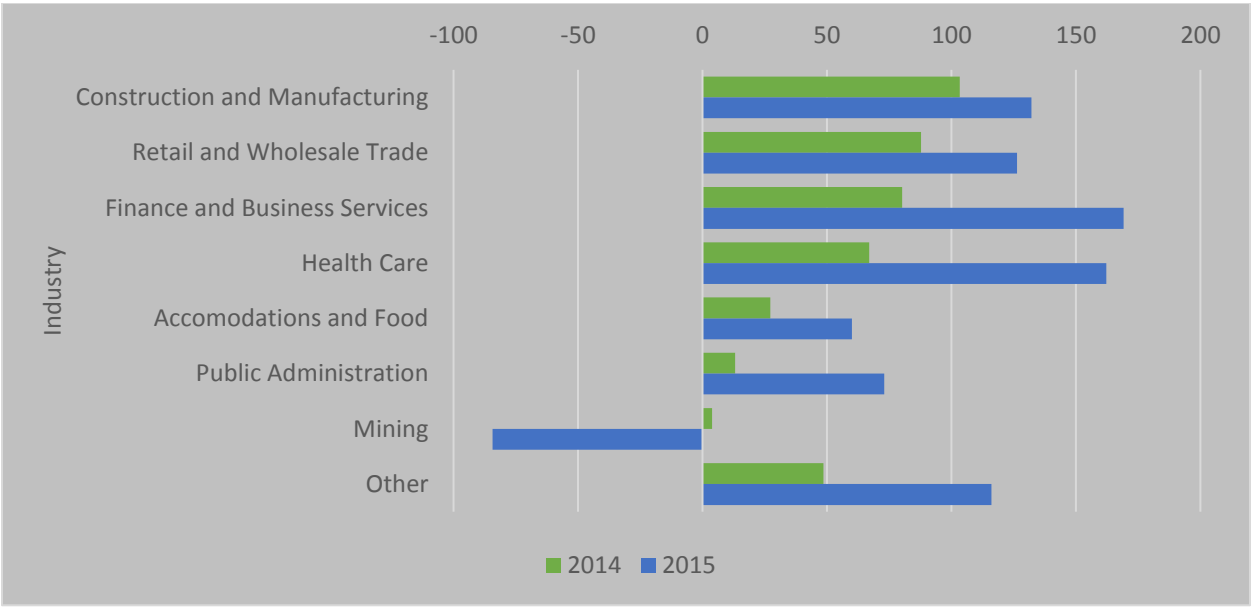
Sources: U.S. Bureau of Labor Statistics 2016 and U.S. Bureau of Economic Analysis 2016.

While full-year data for 2016 are not yet available, early indications are that growth has not been as good as 2015. A slowdown in state income tax collections that began with the calendar year, for instance, suggests weaker wage growth. For the state's fiscal year ending in June, income tax receipts were just 0.8 percent higher than the previous 12-month period.

Looking at wage growth in some major industry categories in 2015 gives some insights on the industries that were the biggest drivers of overall growth. Except for declines in mining wages due to setbacks in both oil production and metal mining, most of Montana's industries experienced faster growth in 2015. The construction and healthcare sectors were especially strong with percentage growth rates of 8.5 and 6.2 percent, respectively.

Figure 2 provides an overview of the growth in inflation-corrected wages in Montana (presented in millions of dollars) by industry.

Figure 2. Growth in Inflation-corrected Wages in Montana (2014-2015)



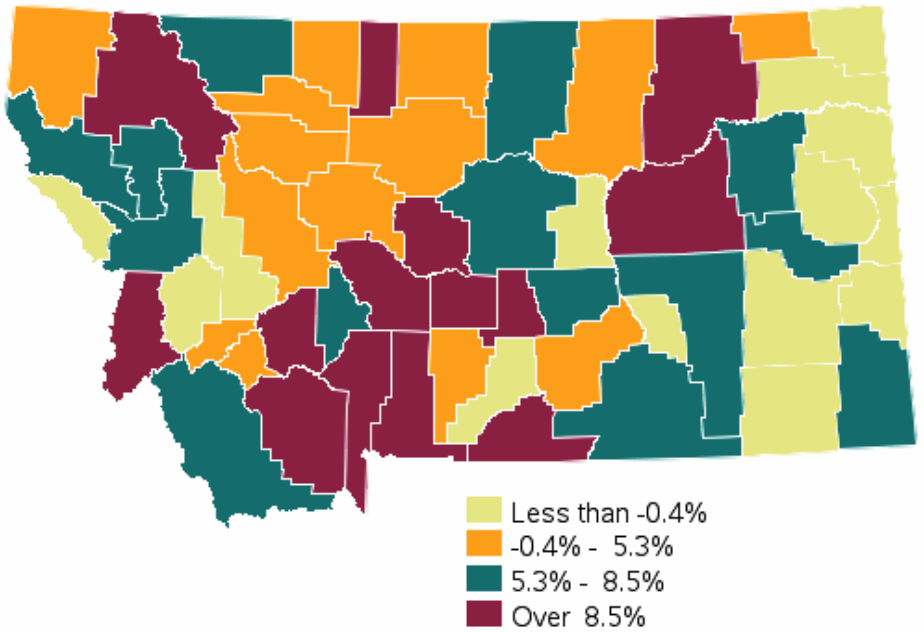
Sources: U.S. Bureau of Labor Statistics 2016 and U.S. Bureau of Economic Analysis 2016.

The growth in construction wages does not signal a rebound in single-family home construction, which has only begun to increase after almost six years of very depressed levels. Instead, construction wages have been driven largely by multi-family residential, commercial, industrial, and civil construction projects. Western Montana is seeing more residential construction, particularly in Bozeman. Billings construction activity is tilted more towards commercial and industrial projects.

Signs of the steep decline in crude oil prices since mid-2014 are apparent in the economic performance of the oil-patch counties on the eastern edge of the state, which have declined after years of very strong growth. It is too soon to register the impact of lower wheat prices on activity in counties with a high grain farming presence. On the other hand, the strength of the retail trade and accommodations industries is consistent with estimates of higher spending by non-resident visitors.

There was greater balance in economic growth in 2015, both across communities and across industries. Except for Butte-Silver Bow, whose economy has been buffeted by lower commodity prices, growth in western Montana continues to improve, with the torrid growth in the east decreasing significantly. The largest contiguous group of underperforming Montana counties in terms of recent wage growth is the formerly fast-growing counties that straddle the North Dakota border. Figure 3 depicts inflation-correction wage growth by county between the fourth-quarter of 2014 and the fourth-quarter of 2015.

Figure 3. Inflation-corrected Wage Growth by County
(Fourth-quarter of 2014 thru Fourth-quarter of 2015)



Source: U.S. Bureau of Labor Statistics 2016 and U.S. Bureau of Economic Analysis 2016.

2.1 Major Economic Events of 2015

The major economic events affecting Montana in 2015 included:

- Montana joined the list of 31 states that have adopted some form of Medicaid expansion under the Affordable Care Act when the Montana legislature passed Senate Bill 405 (SB 405) in May. SB 405 extended the health benefits of the federal-state program to families earning up to 138 percent of the federal poverty line. The expansion, which will expire in 2017 unless renewed by a future legislature, began taking enrollment in the fall of 2015 and has more than 50,000 enrollees to date.
- The fall in grain prices, most notably wheat prices, became more pronounced in 2015, effectively ending a nearly seven-year run of above-average prices. Lower exports, caused in part by a higher dollar and strong wheat production abroad, ended an era that had allowed Montana farmers and the communities that depend on grain production to thrive.
- NorthWestern Energy, the state's largest investor-owned utility, completed its purchase of 11 hydroelectric dams from PPL Montana (now Talen Energy) after acquiring the dams' prior owner, Montana Power. Even after the Confederated Salish and Kootenai Tribes (CSKT) exercised their option to purchase the 194-megawatt Kerr Dam in September 2015, the purchase moved NorthWestern much closer to the ability to meet its customers' daily electric energy needs with its own generation assets.
- The slowdown in oil- and gas-related energy activity that began with big declines in crude oil prices at the end of 2014 continued. Drilling rig counts fell to near zero in

eastern Montana and to less than half of 2014 levels in North Dakota. Crude oil prices moved below $40 per barrel—more than 60 percent lower than the triple-digit prices of early 2014.

- The U.S. Environmental Protection Agency (EPA) announced its final rules as part of the Clean Power Plan aimed at reducing greenhouse gas emissions from electric power plants. Montana's emissions rate target for year 2030 is 44 percent lower than the 2012 baseline rate—a larger reduction than any other state. However, those rules have been temporarily stayed by an order from the U.S. Supreme Court.

2.2 Montana's Regions and Cities

Table 2 presents average annual growth rates of real non-farm earnings for the entire state, as well as the eight largest counties for four time periods that roughly correspond to the decades beginning with the 1970s. Real non-farm earnings are the broad measure of economic performance traditionally used to measure local-area economic performance.

Table 2. Real Non-farm Earnings, Average Annual Percent Growth (1970-2013)

	1970 - 1980		1980 - 1990		1990 – 2000		2000 - 2013	
Rank	County	Annual Growth (%)	County	Annual Growth (%)	County	Annual Growth (%)	County	Annual Growth (%)
1	Gallatin	7.1	Gallatin	4.1	Ravalli	10.0	Gallatin	4.9
2	Yellowstone	7.1	Ravalli	2.6	Gallatin	9.4	Butte-Anaconda area	4.6
3	Missoula	6.7	Flathead	2.0	Missoula	5.7	Flathead	3.2
4	Flathead	6.7	Missoula	11	Flathead	5.7	Lewis and Clark	3.0
5	Lewis and Clark	5.8	Lewis and Clark	0.9	Lewis and Clark	5.2	Yellowstone	3.0
6	Ravalli	5.6	Yellowstone	0.4	Yellowstone	4.3	Cascade	1.8
7	Cascade	1.5	Cascade	-0.4	Butte-Anaconda area	2.7	Missoula	1.4

Source: U.S. Bureau of Economic Analysis 2015.

Even though statewide growth rates experienced a significant decline followed by a rebound over the three decades from the 1970s to 1990s, the same six counties were ranked in the top six spots over the 30-year period. Only their rank order changed from one period to the next. In three of the four decades presented, Gallatin County ranked number one in growth. The one exception was the 1990 to 2000 period when it ranked second. Ravalli County ranked sixth in the 1970s, second in the 1980s, and first in the 1990s. Yellowstone County was second in the 1970s, then dropped to sixth in the next two decades.

The post-2000 period is the real exception. Missoula and Ravalli counties, which were solidly in the upper echelon from 1970 to 2000, experienced the slowest growth after 2000. Conversely, the Butte-Anaconda area, which was last during each of the three earliest decades, rose to number two after 2001.

It should be noted that declines in the wood product, log home, and construction industries were the most important reason for the downward shifts in the Missoula and Ravalli counties economies. In particular, the housing bust hit the log home and construction industries, and the closure of the Smurfit-Stone Container's plant in Missoula eliminated 500 very well paying jobs. On the other hand, the improved ranking of the Butte-Anaconda economy may be due to the worldwide commodity boom that led to the reopening of an old Anaconda mine. However, the future of the mine may be uncertain considering the recent reversal in global commodity prices.

2.3 Changing Migration Trends

Table 3 presents annual average net migration for Montana and the seven largest urban areas in the state between 2001 and 2014. A positive number in net migration means that more people moved in than out. A negative number means more people moved out than in. The time periods roughly correspond to phases of the two most recent business cycles. The periods 2001-2002 and 2009 are recession years, while 2003-2007 and 2011-2014 correspond to recovery phases of the cycle.

Table 3. Average Annual Net Migration, Montana and Major Urban Areas (Selected Periods)

Area	2001 – 2002	2003 – 2007	2009	2011 - 2014
Montana (statewide)	635	6,445	2,754	4,977
Cascade County	-569	-417	-207	-167
Flathead County	1,012	1,780	51	663
Gallatin County	957	1,956	-343	1,286
Lewis and Clark County	103	597	554	360
Missoula County	400	502	478	388
Ravalli County	663	631	-157	183
Yellowstone County	552	1,028	1,437	1,143
Butte-Anaconda area	-595	-34	0	126

Source: U.S. Census Bureau 2015.

Statewide net migration is highly correlated with economic growth. Net migration dipped to 635 persons per year during the 2001-2002 recession. It also declined into the low point of the 2007-2009 recession, to a net of 2,754 new arrivals statewide in 2009. During the periods of economic growth in the years 2003-2007 and 2011-2014, net migration ranged between 5,000 and 6,500 people per year.

It must be noted that the lowest net migration occurred during the relatively mild 2001-2002 recession rather than the 2008-2009 downturn. One contributing factor could be that the 2001-

2002 recession was concentrated in the high-tech sector, much of which was in California. With more than 30 million residents and located relatively nearby, California has traditionally been a major source of migration to Montana. Because mobility typically declines during poor economic times, fewer Californians may have migrated to the state during this period.

The net migration trends for the state's major urban areas are much more difficult to categorize than statewide trends. For example, the 2009 recession impacts were much greater than those in 2001-2002 in Flathead, Gallatin, and Ravalli counties. Conversely, Missoula County experienced a relatively stable number of annual net arrivals of new residents during both recession and recovery periods.

2.4 Conclusion

While the pace of growth accelerated in 2015 in Montana, the pattern of growth, both geographically and across industries, continued to change. Overall, growth has picked up in the more populous western portion of the state, while the once-booming counties along the eastern edge of Montana have suffered from an energy-related contraction. Recent data suggest that faster growth in 2015 did not carry forward into the current year.

3. Analysis Approach

The consultant team approached the statewide economic impact analysis of Montana's airports by assembling direct economic impacts of airports and applying the IMPLAN modeling package to further calculate spin-off effects, including:

- ***Indirect effects,*** which is when employment and payroll are generated from portions of direct business revenues are used to purchase goods and services from Montana businesses (i.e., suppliers)
- ***Induced effects,*** when the portion of direct and indirect reviews that are workers' wages are spent on consumer purchases in Montana communities. Both indirect and induced effects generate business revenues (economic impacts), which enables additional labor income and jobs for Montana residents. To minimize economic jargon, indirect and induced will be referred to as "spin-off effects" in this report.

The economic impact analysis is based on primary data collected by surveying airport managers, airport tenants, and visitors who traveled to Montana by commercial service or by general aviation aircraft. While primary data were the core of the economic impact analysis, missing values and industry-specific information was assembled by using secondary data sources, including the U.S. Department of Agriculture (USDA) and the University of Montana's Institute for Tourism and Recreation Research (Grau 2016). To address missing responses from airport tenant surveys, private databases and geographic information systems (GIS) were used, including Hoovers/Dun and Bradstreet and ESRI.

These primary and secondary data collected for Montana airports provided the direct impacts that drove the economic modeling effort for this study. The IMPLAN modeling system was used to calculate the total contribution (direct impacts plus the modeled spin-off effects) of airports in the Montana economy. Additional information about the IMPLAN modeling system is provided in Appendix C.

3.1 Data Elements for Economic Modeling

The primary and secondary data assembled to drive the economic modeling effort are summarized below:

- **Airport administration:** Jobs, payroll, and expenditures
- **Airport tenants:** Jobs and payroll by type of business on Montana airports
- **Construction:** Annual capital expenditures on construction at an airport. Three-year averages were used to avoid extreme annual variations.
- **Visitor spending:** Spending by commercial visitors and general aviation visitors per trip by levels of spending on lodging, food, and drink; off-airport transportation; entertainment; and retail
- **Air cargo:** Value of domestic and international cargo flown into and out of Montana

Surveys of airport managers and tenants were used to collect airport-specific data, including jobs by industry, capital budgets, and airport operating expenses. In cases where responses were not obtained from all tenants at an airport, the consultant team used databases assembled by business establishments (e.g., Hoovers/Dun and Bradstreet) or GIS tools with an industry overlay (i.e., ESRI) to supplement the survey data and furnish complete coverage of Montana airport employment. Once assembled, employment data were sent to each airport for final review and confirmation. The survey methodology is described in Section 4 Survey and Data Collection Methods.

Visitor spending data were estimated by administering visitor intercept surveys to passengers at commercial airports and pilots and passengers at general aviation airports statewide. These surveys enabled the consultant team to develop estimates of off-airport spending by visitors to Montana who arrive through the state's airports to then apply to the estimates of the number of visitors at each airport. The passenger intercept surveys were conducted during the winter of 2015-2016. To adjust the survey findings to accurately reflect annualized spending and visitor travel patterns, the consultant team applied seasonality adjustments based on the annual report of tourism developed and published by the Institute for Tourism and Recreation Research at the University of Montana (Grau 2016).

The number of visitors varies between commercial service and general aviation airports and activities. Visitor estimates were obtained from multiple sources. For commercial service airports, the Market Resident Visitor Report was purchased from Data Base Products, Inc., a firm that analyzes raw data from the U.S. Department of Transportation's (DOT) airline passenger traffic and financial datasets (2015). This report provides an estimate of the number of commercial airline passengers that were visitors during an identified period. For general aviation activity, which occurs at both commercial service and general aviation airports, airport managers were asked to estimate the percentage of general aviation operational activity related to visitors. These percentages were applied to counts of itinerant or non-local operations provided by the FAA for airports with an air traffic control tower or by airport operators for airports without towers. MDT reviewed the estimates and either confirmed or modified the estimates based on knowledge of the individual airports.

The contribution of air cargo to the economy of Montana was estimated though vFreight™. vFreight was developed by the EDR Group to evaluate the economic significance of domestic and international freight movement by mode. The data are national in scope and use county-level economic models to spatially down-allocate broader freight flows to the industries that are involved in their production and consumption. Coverage includes the two-digit Standard Classification of Transported Goods (SCTG) Commodity Classification by mode with a county level of detail for domestic movements and a port level of detail for international freight flows. Table 4 reports the foundational components of vFreight.

Table 4. Core Components of vFreight

Data Sources	Geographical Coverages	Types of Data	Measures
WiserTrade, based on U.S. Census Foreign Trade Division and agreements with international government trade agencies	International imports and exports by U.S. states, ports of exit and entrance, and international trading partners	Commodity (International Harmonized System) and industry (three-digit North American Industry Classification System [NAICS] code)	Weight and values
Freight Analysis Framework, U.S. DOT	Domestic flows among metro areas and states	Commodity (two-digit SCTG)	Weight and values
IMPLAN county-level data	County-to-county flows (no mode detail)	Commodities and industries based on 536 sectors	Values
U.S. Department of Energy (DOE) Oak Ridge National Laboratory	Intercounty impedances	Time and distance matrix	Minutes

Source: EDR Group.

3.2 Economic Modeling Process

The IMPLAN model was used in two ways. First, it was used to fill in missing direct metrics from incomplete survey responses for payroll and business revenues (output). Similarly, IMPLAN was used to estimate jobs and payroll generated from visitor expenditures within the statewide economy. Job-to-payroll and payroll-to-business sales relationships by region and type of industry were used to fill in the gaps in coverage from data collected by surveys. This process is necessary to calculate the full range of economic contribution associated with aviation activity.

Relationships between jobs and payroll, jobs and business sales, and income and business sales were applied at a regional level to reflect regional industry dynamics and more accurately reflect different levels of productivity. MDT classified the state into the following five regions:

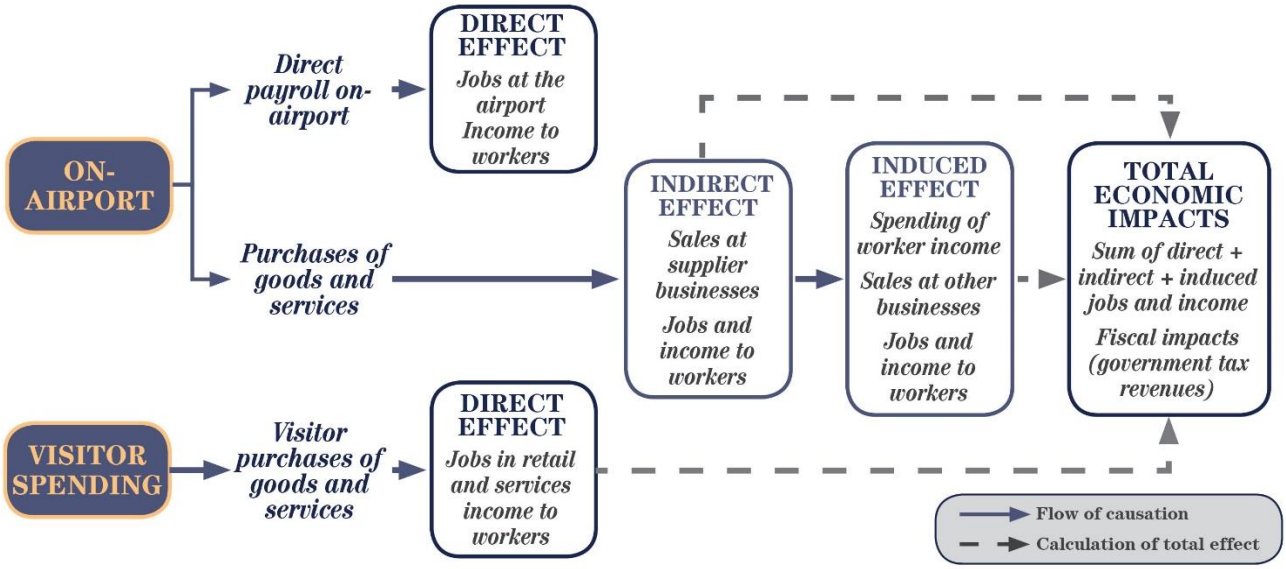
- Northwestern Montana
- Southwestern Montana
- North-central Montana
- Northeastern and southeast Montana
- Central and south-central Montana

Secondly, IMPLAN was used to derive indirect and inducted spin-off effects (also known as "multipliers"). Including these additional waves of activity in the analysis enables a comprehensive evaluation of how Montana's aviation system is a catalyst for generating

additional economic activity. These dollars re-circulate throughout the state's economy, supporting additional employment, payroll, and spending. These spin-off effects were applied at a state level to be consistent with the goal of providing a single, statewide economic impact analysis.

The intertwined relationship of direct, indirect, and induced impacts is illustrated in Figure 4. Note that due to space limitations, Figure 4 shows only airport and visitor spending effects. However, these principles are consistent for construction activity.

Figure 4. Flow of Direct Impacts and Spin-Off Effects



Source: EDR Group.

3.2.1 Margining for Retail

Retail sales include the cost of goods sold, defined as the price at which they were purchased from a supplier or wholesaler. Because retail sales are "re-selling" products produced elsewhere, the value of the sale includes the cost of producing products and subsequent wholesale costs to retail establishments, the costs of transportation of the products to retail establishments, and the mark-up from those costs by the retailers.

Only the mark-up that produces revenue for retailers and revenue generated by that mark-up supports employee wages and operating costs of business (e.g., rents, utilities, business machines, and other business expenses)—not gross revenue collected by the retail business or industry. For example, if retail sales total $1 million, only $200,000 of these sales may be revenues earned by retail establishments, since it may have cost the stores $800,000 to purchase the items for sale from wholesalers or distributors.

3.2.2 Rounding to Account for False Precision

All final totals for visitor spending and on-airport impacts were rounded to the nearest thousand.[3] By rounding to the closest thousand-dollar unit, the study enhances maximum reliability and avoids misleading readers in giving the appearance of more accuracy than warranted by the data.[4] All job estimates are in terms of headcount (i.e., persons); additional information about the headcount methodology is provided in Section 1.2 Overview of Approach.

3.3 Economic Impacts for Employment, Payroll, and Revenues

Economic impacts are measured in terms of actual economic activities or transactions for both households and businesses. The economic outcomes measured in this study include:

- *Jobs:* Number of full- and part-time jobs
- *Payroll:* Labor income earned by employees, which includes gross wages and benefits paid by employers on behalf of workers (This is sometimes referred to as "total compensation".)
- *Economic Impacts:* The value of output produced associated with a business or industry linked to Montana's aviation system

Airports in Montana function as regional and statewide job centers, providing services to airlines, airline passengers, and general aviation pilots and their aircraft. In total, airports support about 24,000 jobs and $839,000 in payroll for state residents (Table 5).

Montana's airport system also facilitates visits by business travelers and vacationers from outside of the state. Off-airport spending by these visitors on lodging, food, retail goods, entertainment, and local transportation supports the state's hospitality industries. Visitors to Montana using commercial air and general aviation services generate about 13,500 jobs through spending at hotels, restaurants, retail establishments, entertainment venues, and off-airport transportation (further details about spending are provided in Table 9 for commercial service and Table 12 for general aviation in the following section).

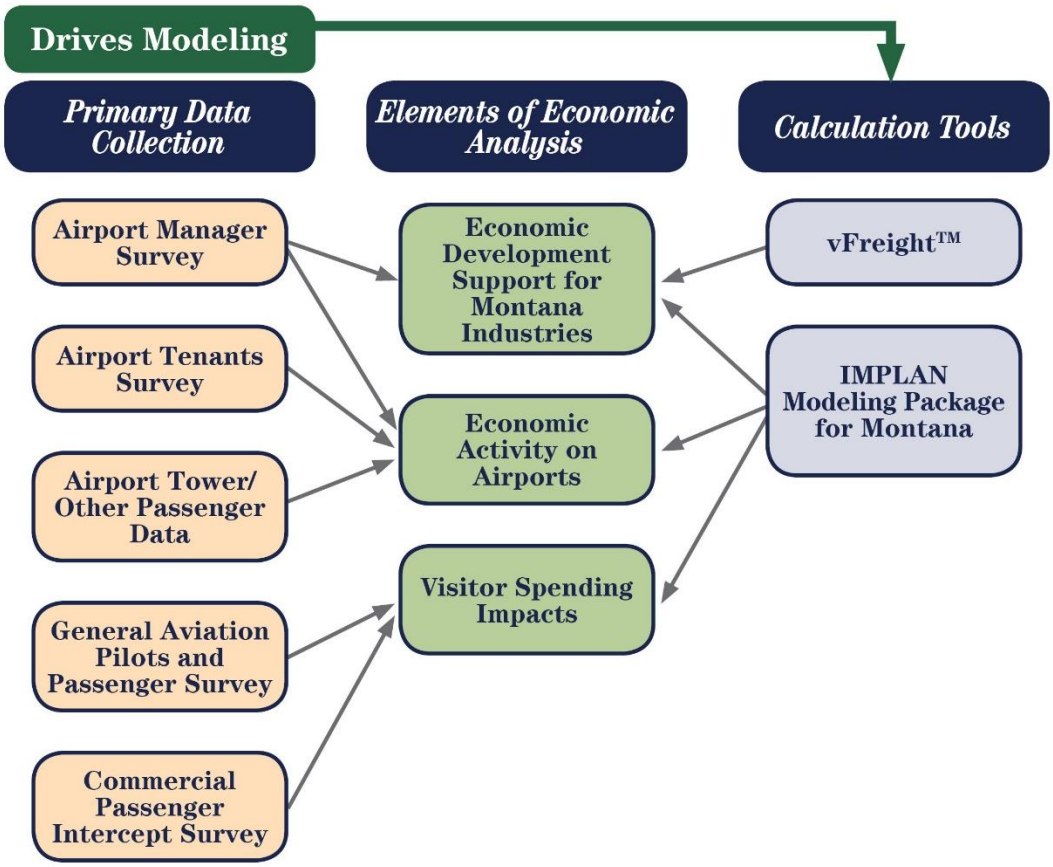
Airports also connect Montana industries to markets across the U.S. and the world. By supporting technology and other industries in state, airports return a high value to Montana via outbound air cargo and enable the timely acquisition of commodities by Montana industries for inputs into production processes and sales via inbound air cargo. In total, Montana's airport system facilitates the movement of about $156 million of goods between the state and the rest of the world.

[3] Dollars presented in the tables in this section are rounded to the nearest thousand. As a result, columns and rows may not add up due to this rounding.

[4] False precision carries with it an implication of high accuracy, which is not necessarily true. As conveyed in the text of the report, for example, "payroll" and "business sales," as well as spin-off effects, are based on state averages by industry in Montana. As averages, they do not necessarily convey the exact wages or sales by airport tenants or that are generated though multiplier effects, which may be higher or lower than industry averages at individual business establishments.

Each of the attributes associated with the economic role of Montana airports is discussed in the sections below. Figure 5 illustrates the intertwining of data collection[5], utilization of economic calculation tools, and resulting economic analyses.

Figure 5. Data Collection Plus Calculation Process



Source: EDR Group.

3.3.1 On-Airport Employment Activity

On-airport tenants are involved in activities such as FBOs, fuel sales, flight schools, rental car agencies, food vendors, agricultural sprayers, and other businesses that serve passengers, airlines, and general aviation pilots and aircraft. Airports with commercial services also support a wide variety of aviation-related jobs in transportation, concessions, government, and other services. Examples of jobs found on airports include:

- Freight services, including dedicated cargo aviation, courier, delivery, custom broker, and trucking

[5] Secondary data from third-party sources including Hoovers/Dun and Bradstreet, ESRI, Data Base Products, Inc., and the Institute of Tourism and Recreation Research at the University of Montana were used to supplement primary data collection.

- Air terminal operations, including security, building maintenance, and facilities management
- Federal government services, including the FAA, Transportation and Security Administration (TSA), Customs and Border Protection (CBP), U.S. Citizenship and Immigration Services (USCIS), and the Drug Enforcement Administration (DEA)
- Airline support services, including catering, in-flight entertainment, aircraft handling, fueling, and maintenance
- Concessionaire services, including restaurants and retail stores
- Ground transportation, including rental cars, taxis, and limousine companies
- Military activities, including air reserve stations, air refueling, and airlift wings

In addition, there are non-aviation-related businesses located on-airport that rely upon airport property for their operations. In such cases, airports function as business and industrial parks with available infrastructure and support the economic development of communities and regions. The economic contributions of these non-aviation related businesses are also included in the analysis. Table 5 summarizes the economic contributions of on-airport employment activity.

Table 5. Economic Contribution of On-airport Tenants, Airport Operations, and Employees

Impact Type	Jobs (number)	Payroll ($)	Economic Impacts ($)
On-airport tenants	4,984	$255,461,000	$874,364,000
Airport operations and employees	276	$16,070,000	$36,780,000
Spin-off effects (indirect and induced)	4,403	$181,197,000	$553,346,000
Total contribution	**9,663**	**$452,728,000**	**$1,464,490,000**

Sources: On-airport survey, airport managers survey, and IMPLAN 2014. Calculations by EDR Group.

3.3.2 Commercial Service Visitor Spending Employment Impacts

In 2015, over 850,000 visitors came to Montana using commercial air services (Table 6). As previously discussed, the number of visitors was estimated through a report obtained from Data Base Products, Inc. that analyzes U.S. DOT airline traffic and financial datasets (2016). Ninety-four percent of all commercial service airport visitors utilized the top five airports; the other eight airports composed the remaining seven percent.

Table 6. Annual Commercial Service Visitors in 2015

City	Airport	Visitors (quantity)	Total (percent)
Bozeman	Bozeman Yellowstone International	272,765	32%
Billings	Billings Logan International	167,919	20%
Missoula	Missoula International	151,247	18%
Kalispell	Glacier Park International	124,839	15%
Great Falls	Great Falls International	74,145	9%
Helena	Helena Regional	34,994	4%
Butte	Bert Mooney	11,295	1%
West Yellowstone	Yellowstone	6,688	1%
Sidney	Sidney-Richmond Municipal	4,148	0.5%
Wolf Point	L. M. Clayton	1,586	0.2%
Glasgow	Glasgow International	1,555	0.2%
Havre	Havre City-County	966	0.1%
Glendive	Dawson Community	921	0.1%
	Total	**853,067**	**100%**

Source: Data Base Products, Inc. 2015.

Table 7 profiles visitor spending by airport and spending category. Visitors arriving through Bozeman Yellowstone International Airport and Yellowstone Airport averaged the highest spending per visitor with over $1,000 spent per trip, followed by visitors arriving through Missoula International Airport ($749 per visitor) and Glacier Park International Airport ($634 per visitor). Visitors arriving in Montana through Billings Logan International Airport, Bert Mooney Airport, Helena Regional Airport, and Great Falls International Airport spent about $500 per trip. Visitors arriving in Montana via all other commercial airports in the state average approximately $240 per visitor per trip.

Table 7. Commercial Visitor Spending by Airport and Spending Category

City	Airport	Spending Category ($)					Total ($)
		Lodging	Food and Beverage	Ground Transport	Entertainment	Retail	
Bozeman	Bozeman Yellowstone International	$103	$182	$12	$397	$324	$1,018
West Yellowstone	Yellowstone	$103	$182	$12	$397	$324	$1,018
Missoula	Missoula International	$94	$168	$11	$228	$247	$749
Kalispell	Glacier Park International	$96	$140	$6	$168	$225	$634
Billings	Billings Logan International	$93	$146	$8	$90	$169	$505
Butte	Bert Mooney	$93	$150	$3	$93	$166	$505
Helena	Helena Regional	$93	$150	$3	$93	$166	$505
Great Falls	Great Falls International	$62	$134	$6	$91	$183	$475
Glasgow	Glasgow International	$31	$68	$3	$46	$93	$241
Havre	Havre City-County	$31	$68	$3	$46	$93	$241
Wolf Point	L. M. Clayton	$31	$68	$3	$46	$93	$241
Glendive	Dawson Community	$44	$69	$4	$43	$80	$241
Sidney	Sidney-Richland Municipal	$44	$69	$4	$43	$80	$241

Sources: Commercial passenger survey and Grau 2016.

Using the spending profiles by airport reported in Table 7, visitor spending contributes $622 million in sales revenue (Table 8**)**. Approximately 45 percent of the spending is associated with Bozeman Yellowstone International Airport. The next seven airports (Missoula International, Billings Logan International, Glacier Park International, Great Falls International, Helena Regional, Yellowstone, and Bert Mooney) contribute a combined 55 percent of total spending. The remaining five commercial service airports (Sidney-Richland Municipal, L. M. Clayton, Glasgow International, Havre City-County, and Dawson Community) combine for the remaining 0.4 percent.

Table 8. Commercial Service Visitors and Visitor Spending

City	Airport	Visitors (quantity)	Direct output ($)	Total (percent)
Bozeman	Bozeman Yellowstone International	272,765	$277,654,000	45%
Missoula	Missoula International	151,247	$113,219,000	18%
Billings	Billings Logan International	167,919	$84,810,000	14%
Kalispell	Glacier Park International	124,839	$79,169,000	13%
Great Falls	Great Falls International	74,145	$35,222,000	6%
Helena	Helena Regional	34,994	$17,662,000	3%
West Yellowstone	Yellowstone	6,688	$6,807,000	1%
Butte	Bert Mooney	11,295	$5,701,000	1%
Sidney	Sidney-Richland Municipal	4,148	$1,000,000	0.2%
Wolf Point	L. M. Clayton	1,586	$382,000	0.1%
Glasgow	Glasgow International	1,555	$375,000	0.1%
Havre	Havre City-County	966	$233,000	0.0%
Glendive	Dawson Community	921	$222,000	0.0%
	Total	**853,067**	**$622,456,000**	**100%**

Sources: Commercial passenger survey and Grau 2016. Calculations by the EDR Group.

The $622.5 million in visitor spending across a variety of spending hospitality industries support employees who work for these businesses. Table 9 indicates that over 8,000 jobs and nearly $169 million in payroll is generated by out-of-state visitor spending. Including spin-off effects adds an additional 3,500 jobs, $136 million in payroll, and over $432 million in business sales. Combined, visitor spending facilitated by Montana's commercial service airports supports over 11,600 jobs, $305 million in payroll, and $1.05 billion in business sales within the state. Additional details on spin-off effects by airport are included in Appendix B.

Table 9. Direct and Spin-Off Economic Contribution of Commercial Service Visitor Spending

City	Airport	Jobs (quantity)	Labor income ($)	Business sales ($)
Bozeman	Bozeman Yellowstone International	3,564	$78,426,000	$277,654,000
Missoula	Missoula International	1,482	$29,290,000	$113,219,000
Billings	Billings Logan International	1,094	$22,929,000	$84,810,000
Kalispell	Glacier Park International	1,012	$20,396,000	$79,169,000
Great Falls	Great Falls International	455	$8,985,000	$35,222,000
Helena	Helena Regional	237	$4,636,000	$17,662,000
West Yellowstone	Yellowstone	87	$1,923,000	$6,807,000
Butte	Bert Mooney	75	$1,690,000	$5,701,000
Sidney	Sidney-Richland Municipal	13	$265,000	$1,000,000
Wolf Point	L. M. Clayton	5	$98,000	$382,000
Glasgow	Glasgow International	5	$96,000	$375,000
Havre	Havre City-County	3	$59,000	$233,000
Glendive	Dawson Community	3	$59,000	$222,000
Subtotal: Direct impacts of commercial visitor spending		8,035	$168,852,000	$622,456,000
Spin-off effects: Supplier and income re-spending		3,567	$136,479,000	$432,318,000
Total contribution		**11,602**	**$305,331,000**	**$1,054,774,000**

Sources: Commercial passenger survey, Grau 2016, and IMPLAN 2014. Calculations by EDR Group.

3.3.3 General Aviation Visitor Spending Employment Impacts

General aviation services available at Montana airports also facilitate visitors to the state. Visitors include general aviation pilots and passengers who arrive through airports that serve both commercial passenger and general aviation aircraft, and airports that provide only general aviation services. In 2015, almost 487,000 general aviation operations were estimated to have been conducted at the study airports. Overall, about 50 percent of these operations were transient (i.e., visitors, distinct from locally based aircraft), with an average of 2.7 passengers per operation. Combining each of these values by airport with the assumption that each visitor arrives and departs at the same airport results in an estimated 338,000 visitors using general aviation air service to arrive in Montana in 2015. Data from the general aviation passenger survey were used to develop the estimated spending profile for average visitors.

General aviation passenger surveys were not conducted at all airports, nor were responses received for all airports. Because passenger surveys on visitor spending for general aviation activity included only a sub-set of airports, modified spending profiles were developed for five categories of airport types based on the Montana State Aviation Systems Plan (MT SASP) (Morrison Maierle 2015). Two of the five categories include airports that also provide

commercial passenger service, and three categories comprise airports that provide only general aviation service. The classification structure is summarized in Table 10. Appendix D provides a complete break-down of spending of airport spending profiles by MT SASP classification.

Spending per general aviation visitor is considerably larger at airports that also provide commercial passenger service (categories one and two) than those that solely offer general aviation service (categories two through five). Spending is highest for general aviation visitors arriving in Montana through Bozeman Yellowstone International Airport, Glacier Park International Airport, and Kalispell City Airport, who spend an average of nearly $500 per visit. General aviation visitors arriving through the state's remaining four primary commercial service airports (Billings International Airport, Great Falls International Airport, Helena Airport, and Missoula International Airport) spend an average of $339 per trip.

The third category of airport types are commercial service airports with Essential Air Service (EAS) and general aviation level 1 airports (Morrison Maierle 2015). Visitors arriving at this type of airport spend an average $184 per trip. General aviation levels two and three are combined for another 35 airports with an average spending of $43, followed lastly by general aviation level four with an average of $14 in visitor spending.

Table 10. General Aviation Visitor Spending Profiles based on Modified MT SASP Classifications

Modified MT SASP Classification	Visitor Spending Per Trip ($)	Airports (number)	Total (percent)
Bozeman Yellowstone International Airport, Glacier Park International Airport, and Kalispell City Airport	$496	3	4%
Primary commercial service: Billings International Airport, Great Falls International Airport, Helena Airport and Missoula International Airport	$339	4	5%
EAS / General aviation level 1	$184	31	40%
General aviation levels 2 and 3	$43	35	45%
General aviation level 4	$14	4	6%
	Total	**77**	**100%**

Sources: Morrison Maierle 2015 and general aviation passenger survey. Calculations by EDR Group.

Applying these five spending profiles to the estimated number of visitors for each of the airports in the study resulted in over $95 million in business sales across all categories of spending. As shown Table 11, spending in lodging and food and beverage by general aviation visitors support over 55 percent of all business sales.

Table 11. General Aviation Visitor Spending by Spending Type

Spending Type	Business Sales ($)	Percent of Total (%)
Accommodations	$29,254,000	31%
Food and beverage	$22,848,000	24%
Ground transportation	$15,937,000	17%
Entertainment	$10,873,000	11%
Retail	$16,418,000	17%
Total	**$95,330,000**	**100%**

Sources: Airport managers survey, general aviation passenger survey, MDT, and IMPLAN 2014. Calculations by EDR Group.

Based on industry profiles of labor and business sales productivity, visitors using general aviation support approximately 1,300 jobs for Montanans with direct payroll of more than $29 million. Including the additional economic activity of supplier purchase and employee spending (spin-off effects), Montana's visitors support an additional 500 jobs, nearly $21 million in payroll, and $65 million in economic impacts (see Table 12**)**. Appendix B provides impacts by airport.

Table 12. Economic Contribution of General Aviation Visitor Spending

Impact Type	Jobs (quantity)	Labor Income ($)	Business Sales ($)
General aviation visitor spending	1,325	$29,457,000	$95,328,000
Spin-off effects: Supplier and income respending	530	$20,706,000	$65,208,000
Total Contribution	**1,855**	**$50,163,000**	**$160,536,000**

Sources: Airport managers survey, general aviation passenger survey, MDT, and IMPLAN 2014. Calculations by EDR Group.

3.4 Air Cargo Reliance

Air service supports Montana businesses by facilitating the long-distance and time-efficient movement of goods for incoming commodities and outgoing products. As shown in Table 13**,** over 5,000 metric tons of air cargo valued at more than $621 million was shipped to and from Montana domestically and internationally. About 28 percent of the value of these goods was sold to domestic and international external markets (*total air cargo shipped,* Table 13). About 71 percent were shipped to Montana (*total air cargo received*, Table 13), consisting of both produced goods ready for purchase (durable and non-durable), as well as goods used as inputs to production.

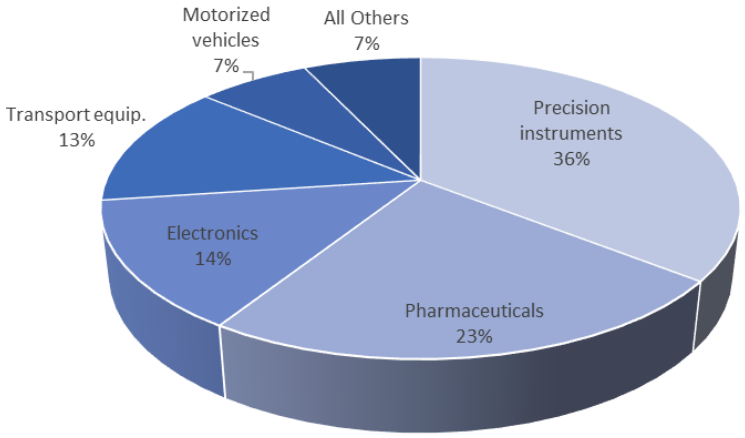
Table 13. Air Cargo Tonnage and Value by Direction Flow To and From Montana

Directional Flow	Tonnage (metric tons)	Value ($millions)	Percent of Total by Value (%)
Domestic inbound	3,177	$360	58%
International import	469	$84	14%
Total air cargo received	***3,646***	***$444***	***71%***
Domestic outbound	943	$78	13%
International export	439	$98	16%
Total air cargo shipped	***1,382***	***$176***	***28%***
Total received and shipped	**5,028**	**$621**	**100%**

Sources: World Institute for Strategic Economic Research 2016, U.S. Department of Transportation Federal Highway Administration 2016, Minnesota IMPLAN Group 2014, and Oak Ridge National Laboratory 2009 aggregated through vFreight. Calculations by EDR Group.

More than 4,120 metric tons of goods valued at $438 million were shipped both to and from Montana by producers or for customers within the U.S. (domestic inbound plus domestic outbound, Table 13). As depicted in Figure 6, approximately 86 percent of these commodities consist of precision instruments (36 percent), pharmaceuticals (23 percent), electronics (14 percent), and transportation equipment (13 percent).

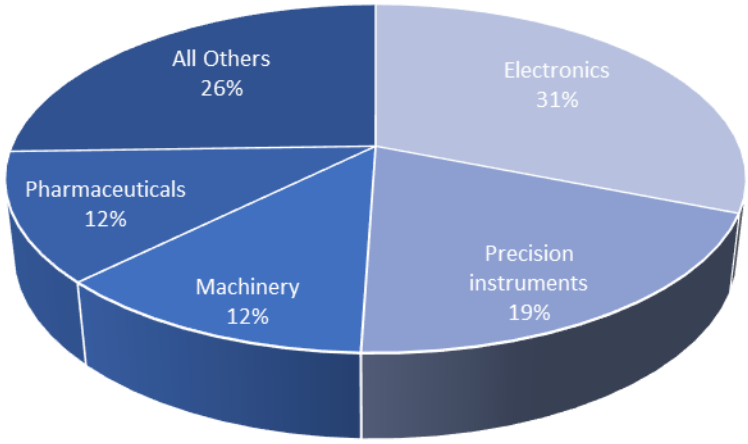
Figure 6. Commodity Profile of Domestic Shipments To and From Montana



Sources: World Institute for Strategic Economic Research 2016, U.S. Department of Transportation Federal Highway Administration 2016, IMPLAN 2014, and Oak Ridge National Laboratory 2009 aggregated through vFreight. Calculations by EDR Group.

In addition, 908 metric tons of goods with a value of over $182 million were shipped to and from Montana and international markets (*international inbound plus international outbound*, Table 13). The type of commodities transported via air to international markets had a similar profile as domestic commodities, including electronics (31 percent), precision instruments (19 percent), machinery (12 percent), pharmaceuticals (12 percent), and all other remaining categories of goods (26 percent), as shown in Figure 7.

Figure 7. Commodity Profile of International Shipments To and From Montana



Sources: World Institute for Strategic Economic Research 2016, U.S. Department of Transportation Federal Highway Administration 2016, Minnesota IMPLAN Group 2014, and Oak Ridge National Laboratory 2009 aggregated through vFreight. Calculations by EDR Group.

Without the services offered by airports, companies in Montana that produce and ship products would find markets limited and market shares curtailed. Consequentially, economic activity in the state associated with the production of goods shipped via air service would be reduced.

Examples of airport-dependent businesses include retailers that ship freight via airports or retrieve freight from airports, technology manufacturers, or traditional manufacturers that receive production inputs "just-in-time". Table 14 depicts the industry business sales dependence on Montana's system of airports. The columns are defined as follows:

- *Industry Sector:* Industries that receive and export commodities. Service industries refer to products used in those industries. For example, "health care and social assistance" refers to products such as surgical instruments
- *Inbound/Import:* Value of commodities entering Montana by air transportation
- *Outbound/Export:* Value added in Montana by producing products reliant on commodities received via Montana's airports (*inbound/import column*) that are then shipped via air for sale out of state
- *Total Aviation Dependency:* Total value of sales by industry attributable to Montana airports
- *Total Jobs:* Total number of jobs in Montana supported by the industry's total aviation dependency
- *Total Payroll:* Labor payroll portion of the industry's total aviation dependency earned by the workers (*total jobs column*)

Table 14 also shows that over $156 million in business sales are reliant on airports to receive necessary inputs for production or to ship manufactured goods to customers. More business sales are reliant on imports shipped via air to Montana to produce $134 million in sales versus $21 million in sales that are shipped or exported outside the state.

Table 14. Industry Business Sales Dependence on Montana's Aviation System

Industry Sector	Inbound/ Import ($millions)	Outbound/ Export ($millions)	Total Aviation Dependency ($millions)	Total Jobs (number)	Total Payroll ($millions)
Health care and social assistance	$27	$0	$27	232	$14
Construction and buildings	$18	$0	$18	103	$4
Miscellaneous manufacturing	$4	$9	$13	66	$3
Chemical manufacturing	$6	$5	$12	13	$1
Transportation equipment manufacturing	$10	$0	$10	29	$2
Rail transportation	$9	$0	$9	19	$2
Computer and electronic manufacturing	$4	$3	$7	16	$1
Machinery manufacturing	$4	$1	$5	13	$1
Animal production	$5	$0	$5	35	$1
Fabricated metal manufacturing	$4	$1	$5	21	$1
All others	$43	$1	$44	317	$12
Total	**$134**	**$21**	**$156**	**863**	**$42**

Sources: World Institute for Strategic Economic Research 2016, U.S. Department of Transportation Federal Highway Administration 2016, Minnesota IMPLAN Group 2014, and Oak Ridge National Laboratory 2009 aggregated through vFreight. Calculations by EDR Group.

The $156 million of total aviation dependency (Table 14) accounts for 0.4 percent of Montana's total economy. However, three to five percent of the annual business sales of transportation equipment, computer and electronic, and other manufacturing industries rely on aviation to transport imports or finished goods. In addition, service-oriented sectors such as health care and social services are reliant on air service to purchase and receive critical medication, tools, equipment, and other necessary materials to meet the health and social needs of the region. Table 15 shows the industry sectors that are most dependent on air cargo flown into and out of the state's airports.

Table 15. Montana's Dependence on Air Cargo Service by Industry

Industry Sector	Percent of Total Industry Output (%)
Transportation equipment manufacturing	5.2%
Miscellaneous manufacturing	2.7%
Computer and electronic manufacturing	2.7%
Machinery manufacturing	1.0%
Fabricated metal manufacturing	0.7%
Rail transportation	0.7%
Chemical manufacturing	0.6%
Health care and social assistance	0.4%
Construction and buildings	0.2%
Animal production	0.2%
All others	0.1%
Total	0.2%

Sources: World Institute for Strategic Economic Research 2016, U.S. Department of Transportation Federal Highway Administration 2016, Minnesota IMPLAN Group 2014, and Oak Ridge National Laboratory 2009 aggregated through vFreight. Calculations by EDR Group.

3.5 Capital Expenditures on Construction

Capital investments are necessary to support continued operations, provide safe working conditions, and, in some cases, expand operational capacity for increasing demand in aviation service. The airport managers survey asked airport managers to report total capital expenditures for 2013, 2014, and 2015. The data for each airport were averaged across all three years to mitigate the impacts of any year-over-year spikes or declines in construction costs. Combined, Montana's airports averaged $61.2 million in capital investments (i.e., business sales) per year.

The IMPLAN software model was then used to estimate the number of jobs required to support this level of construction activity by region and the associated amount of wages paid to these employees. As presented in Table 16, an estimated 400 jobs and over $18 million in income was generated from the $61 million in capital expenditures on construction. Spin-off effects generated from purchasing supplies and services and industry sales associated with employee

spending result in an additional 300 jobs, nearly $12 million in payroll, and $38 million in business sales.

Table 16. Economic Contribution of Capital Expenditures on Construction

Impact Type	Jobs (number)	Payroll ($)	Economic Impacts ($)
Capital expenditures on construction	413	$18,365,000	$61,147,000
Spin-off effects: Supplier and income re-spending	316	$11,923,000	$38,168,000
Total contribution	**729**	**$30,288,000**	**$99,315,000**

Source: Airport managers survey. Calculations by EDR Group.

3.6 Comparison With Previous Economic Study

This report is a current economic impact assessment of aviation in Montana. The preceding economic impact study was developed in 2007-2008 by Wilbur Smith Associates (2009). As shown in Table 17, the current study (i.e., 2016) reports a significantly higher total economic impact, jobs, and payroll associated with Montana's airport system, indicating growth in all categories since the previous study.

Table 17. Comparison of Total Economic Impacts, 2007-2008 versus 2016

Economic Contribution	Report Year		Percent Change (%)
	2007-2008	2016	
Jobs	18,743.5	23,849	27%
Payroll	$598,897,800	$838,510,000	40%
Economic Impact	$1,555,988,000	$2,779,115,000	79%

Sources: Wilbur Smith 2009, EDR Group, and Kimley-Horn.

The 2016 total economic impact of Montana's airports is 79 percent higher than reported in 2007-2008. During that same time period, Montana's gross domestic product (GDP) steadily grew, rising from $36 billion in 2007 to over $45 billion in 2015 (U.S. Department of Commerce Bureau of Economic Analysis 2017).

While this upward economic trend is partially responsible for the increase in economic impacts associated with Montana airports, there are other factors that influenced the study results. An adjustment in the methodological approach, as well as changes in socio-economic conditions within the state, contributed to a higher estimate of economic activity associated with Montana's aviation system. It is important to consider these differences and other contributing factors when making comparisons of impacts over time to understand the role aviation plays in Montana's economy. Key factors for consideration include:

- **Headcount methodology.** As discussed in Section 1.2 Overview of Approach, the 2007-2008 study defined jobs based on a full-time equivalent methodology (Wilbur Smith Associates 2009); however, this study defines jobs by a headcount. A headcount

methodology was used because the results indicate an actual count of employment at the airport instead of generating a fractional figure for airport jobs.

- **Inclusion of non-aviation businesses at airports.** The 2007-2008 study excluded all non-aviation businesses from its analyses. Since non-aviation businesses also rely on airport property for their operations, these businesses were also included in the scope of the study.
- **Economic changes.** Economic changes that affect the aviation industry are numerous and far-reaching. Aviation can be impacted by supply-chain issues, the shifting preferences of air travelers as certain types of vacations fall in and out of favor, changing spending patterns, or a natural disaster. All potential factors are virtually impossible to enumerate, much less quantify, particularly when considering induced and indirect spin-off effects.
- **Changes in productivity.** Over time, improved business processes and advances in technology enable employees to produce more output. These changes in productivity are captured in models that include industry forecasts (e.g., Moody's) and can affect the spin-off effects related to tenant and visitor spending impacts.

4. Surveys and Data Collection Methods

The total economic impact per airport was summed to determine the outcome for the statewide total economic impact. As such, it was critical to accurately identify the direct impacts at each of the airports in the study. The direct impacts are a key factor in generating spin-off effects because they provide the framework for the total economic impact of Montana's airports. Spin-off effects are dependent on multiple variables that need to be accounted for to produce the highest degree of accuracy.

All information provided by the airports, tenants, and users was taken into consideration during the development of this study. Every email, phone conversation, and hard-copy survey was documented, reviewed, and archived to create a large pool of data to be used throughout the economic impact study process. The direct economic impact and job estimates for each airport in the study were sent to the responsible airport representative for final review and comment prior to calculating the spin-off effects.

Multiple methodologies were employed to gather data at airports in Montana. These included on-site inventories and interviews at 50 airports through the state; phone interviews; and electronic, hard-copy, and in-person surveys for airport managers, airport tenants, and commercial and general aviation visiting passengers. These methods were applied to gain as much data from all elements of airport operations as possible. MDT notified airport sponsors and representatives of the economic impact study surveying efforts to increase awareness and participation, as well as address any concerns regarding the detailed financial questions included in the surveys.

4.1 Airport Manager Surveys

Airport manager surveys provide great insight to the activity, functionality, and business presence at individual airports. The airport management surveys were administered between November 2015 and September 2016. Airport managers were asked to provide specific data on their airport's operation and management, as well as information on the airport's tenants that have employees at the airport. Surveys regarding the following issues were sent to managers at all airports in the study to obtain input on:

- Airport information (airport name and manager contact information)
- Airport employment information (number of full- and part-time employees)
- Airport expenditures (payroll, capital improvements on construction, and operating expenses)
- Airport activity (commercial and general aviation operations, number of transient aircraft, and average number of commercial and general aviation passengers)
- Aviation activities (types of activity and descriptions)
- Special attributes of the airport
- Modes of transportation provided by the airport
- Airport tenants, based aircraft, and local and non-local businesses utilizing the airport

To generate accurate data, it is imperative to receive responses from 100 percent of airport representatives. Follow-up calls and emails were conducted to all airports that did not initially provide feedback. Four airports were deemed non-responsive after initial contact and several subsequent follow-up efforts. To determine if there were significant business activities at these airports, general estimates of economic activity were determined based on data from the 2007-2008 study and information provided in the ESRI Business Analyst On-Line (BAO) database. It was determined that three of the four non-responsive airports had no significant economic impacts. One additional airport was removed from the study due to insufficient economic output. In total, 77 airports were included in the final analysis.

4.1.1 Approach

The MDT Aeronautics Division notified the managers of all airports included in this study. MDT approved a survey distributed to all airport managers via U.S. mail with follow up e-mails. Airport managers returned the completed survey to the consultant via multiple methods including U.S. mail, e-mail, and facsimile transmittal and phone conversations. Airport manager responses were recorded in a master spreadsheet. Once all airport manager surveys were received, the spreadsheet was completed and used for all components of the study. Follow-up phone interviews, e-mails, and facsimile transmittals were employed to collect any additional follow-up information as needed.

4.1.2 Key Data

The airport managers survey included multiple building blocks for the economic impact study. Responses to the survey provided airport-specific information including:

- Airport employees (both part-time and full-time)[6]
- Total annual payroll paid to all employees in 2015
- Airport capital expenditures on construction in 2013, 2014, and 2015
- Operating expenses in 2015
- Contact information for on-airport tenants
- Estimated number general aviation operations in 2015
- Percentage of transient operations
- Average number of passengers per operation

This information was used to assess the economic contribution of airport operations and capital expenditures on construction on the state economy. In addition, airport managers were asked to estimate the percentage of transient operations and average number of passenger per operation. These data, in combination with data from the passenger visitor surveys, were used to estimate the amount and type of expenditures associated with visitors who used commercial service and general aviation aircraft to travel to Montana.

[6] Airport employees include only those employees who administer and operate airports, include airport managers. This category does not include the employees of airport tenants.

4.2 Airport Tenant Surveys

Each tenant at all airports in the study were surveyed to obtain specific information about their on-airport business. The results of the survey provided a strong sense of the economic impact that the company has at the airport and in the local and state economies.

Airport managers primarily provided general tenant information and contacts. Additional tenant information was obtained via on-site inventories, phone calls, emails, and hard-copy surveys disseminated to individual tenants. When responses were not received from a tenant, assumptions were developed based on regional demographic and economic information, airport manager estimates, and other factors. The number of tenants that did not participate in the survey process was extremely small.

4.2.1 Approach

Similar to the airport manager surveys, airport tenant surveys were approved by MDT and sent to tenants with direction to return to the consultant upon completion via e-mail. As the tenant surveys were received, a master tenant spreadsheet was created to compile all responses into one document. The spreadsheet information was sorted per the survey questions and referenced continually while conducting each airport's individual economic impact analysis. Tenant participation in the survey process was very high, and general employment and economic impact estimates were developed for the limited number of tenants unable or unwilling to participate.

4.2.2 Key Data

Using the contact information provided by airport managers, each tenant located on airport property received a survey to provide the follow key data:

- Basic company information
- Type of business activity
- Number of full- and part-time employees in 2015
- Total annual payroll to employees at the airport in 2015
- Total real estate taxes paid in 2015
- Estimated business-spent expenditures for capital improvements in 2013, 2014, and 2015
- Any additional economic benefits or services that the business provides to the local community (open-ended question)

This information provided the basis for estimating industry-specific jobs and the amount of labor income supported by aviation- and non-aviation-related businesses located on airport property. The industry classification is particularly important because the relationship of total economic impacts, including direct impacts and spin-off effects, varies by economic sector.

When known tenants did not respond to the survey, the consultant team reached out to the respective airport managers to identify the number of employees, which is the minimum data needed for the economic analysis. This was successful in almost all cases. In the few cases in

which data were unavailable via these methods, the consultant team utilized establishment-level databases assembled by Hoovers/Dun and Bradstreet and ESRI to determine the tenant's employment base.

4.3 Commercial Passenger Surveys

Because commercial service airports serve as a gateway to Montana for hundreds of thousands of visitors each year, non-aviation businesses at airports offer significant economic benefits. Visitors utilize aviation services to conduct business or vacation in Montana, leading to additional spending in hospitality sectors such as food and beverage, lodging, ground transportation, retail, and entertainment.

The passenger surveys determined spending profiles for commercial airports. This figure was then compared with passenger enplanements, data on the number of visitors as provided by Data Base Products, Inc., and other factors to assist with the development of direct economic impacts.

4.3.1 Approach

An extensive surveying effort was conducted to accurately represent the economic impact of commercial service airports in Montana. In-person surveys were conducted at seven commercial service airports in Montana for approximately three days. For the other six smaller commercial service airports, hard-copy surveys with paid return postage were left with airline personnel and on airline ticket counters for approximately two months. Hard-copy surveys were also left at the airports surveyed in-person to obtain additional input. Posters inviting passengers to complete online surveys were also made available.

In total, over 350 commercial service passenger surveys were completed and recorded. It should be noted that the survey was administered to departing passengers to capture expenses that had already occurred. The commercial passenger surveys were compiled on a separate master spreadsheet like the airport manager and tenant surveys. The master spreadsheet was set-up per the survey questions and sorted and coded to clearly display the passenger information received.

4.3.2 Key Data

After verifying that participating respondents were not residents of Montana, visitors were asked to categorize the following information:

- Montana or non-Montana resident, visitor, or connecting passengers counts
- Total number of people in the party
- Purpose of the trip (i.e., business, convention, personal, or vacation)
- Major product or service provided by the company being visited, as applicable
- Number of nights spent in Montana
- Type of lodging (e.g., hotel/motel, private residence, camping)
- Itemized amounts of money spent the trip
- Effect on the trip if the airport was not available

- Additional comments or recommendations regarding Montana's airports (open-ended question)

The results of this survey were used to develop a statistically valid average spending profile of visitors who used commercial airline service to arrive in Montana.

The passenger visitor surveys were conducted during the winter of 2015-2016 when visitation to Montana is significantly lower than the spring, summer, and fall seasons. The limited visitor traffic curbed total responses. Consequently, while the number of valid survey responses were sufficient for a statewide estimate for all of Montana in the winter, the responses could not be extended to each airport and did not incorporate seasonality. These concerns were addressed in two ways.

As discussed in Section 3.1, data from the University of Montana Institute for Tourism and Recreation Research was used to adjust the commercial visitor spending profiles to account for seasonality and reflect spending year-round (i.e., annualization) (Grau 2016). These adjustments were made for each of the 13 airports in Montana that provide commercial service.

Secondly, standard General Services Administration (GSA) per diem rates for Montana were used to align visitor spending profiles to the regional economies of the Sidney-Richland Municipal Airport, Dawson Community Airport (Glendive), Glasgow International Airport, Havre City-County Airport, and L. M. Clayton Airport (Wolf Point) areas. These are smaller commercial service airports in Montana that returned a limited number of visitor surveys when solicited in the winter. Per diem rates included estimates for lodging, meals, incidental, and car rental expenditures.

4.4 General Aviation Passenger Surveys

The general aviation passenger survey was like the commercial passenger survey except it focused on passengers on transient general aviation aircraft, including pilots. A transient aircraft is one that is not based at the arrival airport or one that arrived from another airport. The general aviation passenger survey measured the economic impact of general aviation visitors and pilots.

4.4.1 Approach

To conduct the general aviation passenger survey, hard copies and posters inviting passengers to complete an online version were disseminated to approximately 30 FBOs throughout the state at both commercial service and general aviation airports. FBO managers were contacted prior to surveys being administered with instructions to post surveys and posters in highly visible and high-traffic areas at their facilities to promote participation. The responses were gathered and documented similarly to the airport manager and tenant surveys by recording all responses in one master spreadsheet. The spreadsheet was sorted by the survey questions and used frequently during the economic impact data collection effort.

4.4.2 Key Data

Visitors to Montana were asked to categorize:

- Location where the survey was received
- Home zip code
- Location of based aircraft
- Number of people in the party
- Purpose of the trip (i.e., business, convention, personal, or vacation)
- Major product or service provided by their company, as applicable
- Major product or service provided by the company they were visiting, as applicable
- Number of nights spent in Montana during the trip
- Type of lodging
- Itemized amounts of money spent the trip
- Effect on the trip if the airport was not available
- Transportation mode that would have been used if the airport was not available

The results of this survey were used to develop average spending profiles of transient visitors who used general aviation to fly into Montana.

5. Hospital Use of Montana's Airports

Medical flights provide a critical, and oftentimes lifesaving, service for Montanans, especially those residents who live in remote areas of the state without access to major medical facilities. Airports host emergency evacuation services and healthcare practitioners who fly to communities to provide routine and specialty medical care. Many rural airports accommodate regularly scheduled medical flights that offer care for residents who cannot receive required medical attention in their local communities. Medical flights are particularly vital for patients in critical condition without immediate access to specialized medical attention. Medical transport, either for doctors flying to patients or patients necessitating transport for advanced medical care, is one of the most significant qualitative benefits of Montana's airports.

As part of the Montana Airports Economic Impact Study, a survey was conducted by the University of Montana's Bureau of Business and Economic Research (UM BBER) to evaluate the extent to which and type of Montana airport used by hospitals in the state. A survey was administered to 61 hospitals that are members of the Montana Hospital Association from June to August 2016. Thirty-nine responses were received for a 64 percent response rate. Because the entire population of Montana hospitals was included in the study, the data reflects no sampling error. An overview of the questions and responses is provided below. The full Montana Hospital Survey Analysis is included as Appendix E.

Does your facility use air cargo or air express shipment for any of the following purposes: drug shipments, supply shipments, diagnostics or testing, equipment shipments, document shipments?

The thirty-nine hospitals in the study indicated the following:

- Drug shipments (41 percent)
- Supply shipments (41 percent)
- Diagnostics or testing (39 percent)
- Equipment shipments (31 percent)
- Document shipments (26 percent)

Does your facility have a helipad?

Nearly 67 percent of hospitals responded they have a helipad. The average (mean) helipad is used 14.7 times per month; however, a small proportion of helipads are used more frequently. One hospital reported 80 uses in a one-month period.

Are patients transferred to or from your facility via air ambulance?

Almost 88 percent of Montana hospitals transport at least some patients via air ambulances. The Billings Clinic (Billings), St. Vincent's Hospital (Billings), and Benefis Hospital (Great Falls) reported the highest percentage of patients transported via air ambulance.

Does your facility host specialty clinics, for example cardiology or oncology clinics? Do specialists travel to your facility via aircraft for these clinics?

Over 51 percent of Montana hospitals host specialty clinics. Of these, approximately 15 percent of hospitals host specialty clinics that require medical professionals who travel via air to deliver services.

Does your facility conduct specialty clinics at offsite locations that require your staff to fly to the offsite location?

One responding hospital conducts five offsite clinics with five doctors per month using both commercial service and general aviation facilities. These clinics support the rural communities of Glendive; Glasgow; and Williston, ND.

In summary, these hospital survey responses support the information gathered during the airport manager survey, which underlined the value Montanans place on aerial transport. Rapid, reliable access to advanced medical care for patients suffering from serious injuries or medical conditions can literally mean the difference between life and death. Medical flights also transport patients to facilities outside of the state, such as Salt Lake City and Seattle, for advanced medical expertise. Offsite clinics also allow Montana residents who require specialized medical attention to remain in their homes and communities instead of relocating to larger towns or cities for care.

6. Wildland Firefighting

Aerial wildland firefighting is the use of fixed-wing aircraft and helicopters to combat wildfires using water, foams, and gels. This also includes smokejumpers who parachute and firefighters who rappel from helicopters into wildfires. Aerial wildland firefighting is an integral component of aviation throughout the state of Montana. The service protects lives, property, and natural resources of all wildlands in Montana.

Many airports in Montana serve as a base of operation for the Bureau of Land Management (BLM), U.S. Forest Service (USFS), and Montana Department of Natural Resources and Conservation (DNRC), the three agencies that provide the main defense to wildland fires in Montana. Table 18 provides an overview of the aerial wildland firefight bases in Montana's airport system.

Table 18. Montana Aerial Wildland Firefighting Bases

City	Airport Name	Type of Aerial Wildland Firefighting Facility
Baker	Baker Municipal	BLM, USFS SEAT
Big Timber	Big Timber	USFS SEAT
Billings	Billings Logan International	BLM large tankers, SEAT, light fixed-wing, helo; DNRC helo; USFS
Broadus	Broadus	USFS SEAT
Colstrip	Colstrip	USFS SEAT
Ekalaka	Ekalaka	USFS SEAT
Hamilton	Ravalli County	USFS SEAT
Helena	Helena Regional	DNRC helo, Cessna 182 aerial recon; USFS
Jordan	Jordan	USFS SEAT
Kalispell	Glacier Park International	USFS SEAT
Kalispell	Kalispell City	DNRC helo, Cessna 182 aerial recon
Laurel	Laurel Municipal	BLM
Lewistown	Lewistown Municipal	BLM SEAT, light fixed-wing, helo; USFS SEAT
Miles City	Frank Wiley Field	BLM SEAT, light fixed-wing, helo; DNRC helo; USFS SEAT
Missoula	Missoula International	DNRC Cessna aerial recon, USFS
Plains	Plains	USFS SEAT
Ronan	Ronan	USFS SEAT
West Yellowstone	Yellowstone	USFS SEAT

Note: Single-engine air tanker (SEAT); helicopter (helo); Confederated Salish and Kootenai Tribes (CSKT).
Sources: Monzie 2016, Flesch 2016, and USDA Forest Service 2013.

While these agencies do not have a presence at every airport in Montana, many airports in the state accommodate aerial wildland firefighting operations on a full- or part-time basis. Approximately 47 airports were identified as supporting aerial wildland firefighting operations, either as a base or alternate airport suitable for wildland firefighting. It should also be noted that

wildland firefighting agencies are inherently mobile. Agencies typically follow fires and move their aircraft to different airport locations throughout the state as necessary.

6.1 Responsible Agencies

The BLM Montana/Dakotas Branch of Fire and Aviation is responsible for fire management on over 9.9 million acres of public lands across Montana and the Dakotas, including wildland fire protection, suppression, and fuels management. BLM fire management staff not only provides wildland firefighting for the protection of resources, but also serves as a management tool to mitigate the threat and negative impacts of unplanned wildland fires. In addition to protection services, the BLM is community-oriented and provides fire safety services to all constituencies. The BLM has full-time services available at five airports in Montana including:

- Baker Municipal Airport
- Billings Logan International Airport
- Laurel Municipal Airport
- Lewistown Municipal Airport
- Frank Wiley Field Airport

The BLM's aircraft fleet comprises large tankers, single-engine air tankers (SEAT), light fixed-wing, and helicopters.

The Montana DNRC Fire and Aviation Management Bureau provides resources, leadership, and coordination to Montana's wildland fire services to protect lives, property, and natural resources. In addition to directly protecting 5.2 million acres of state, federal, and private land, the agency works with local, tribal, state, and federal partners to ensure wildland fire protection across the state (Montana Department of Natural Resources and Conservation n.d.). The agency has a strong presence at four airports:

- Billings Logan International Airport
- Helena Regional Airport
- Kalispell City Airport
- Missoula International Airport

The DNRC's aircraft fleet at these airports includes helicopters and Cessna 182s for aerial reconnaissance.

The USFS Fire and Aviation Management Program also provides wildland fire management, operations, and research. The program closely works with other firefighting agencies, including the BLM and DNRC, to combat wildfires and promote safety and environmental awareness. The USFS has locations at 15 Montana airports and operates and maintains multiple SEATS and helicopters.

The CSKT also has an aerial wildland firefighting base at Ronan Airport. The tribal wildland firefighting agency works side-by-side with federal agencies to combat wildfires in the region.

The agency's mission is to "enhance the quality of life, promote economic opportunity, and to carry out the responsibility to protect and improve the trust assets of the Confederated Salish, Kootenai and Pend d'Oreille Tribes of the Flathead Indian Reservation" (CSKT n.d.).

While multiple agencies are responsible for providing fire protection across the state, the Bureau of Indian Affairs (BIA); BLM; county and local, state, and USFS agencies were the primary responders to wildland fires in Montana in 2015. According to a representative of the National Interagency Fire Center, "it doesn't matter the amount of resources each agency has, whoever is closest to the fire will be the first responders using resources from any available agency" (National Interagency Fire Center n.d.).

Over the past five years (2011-2015), all agencies have responded to a total of 8,404 fires, with each year experiencing an ever-increasing number of wildland fires in Montana. Table 19 presents the number of wildland fires and number of acres burned in 2015 by responding agency.

Table 19. Montana Wildland Fires and Acres Burned (2015)

Agency	Number of Fires	Burned Area (acres)
BIA	437	27,206
BLM	94	14,925
County and local agencies	839	68,678
U.S. Fish and Wildlife Service (FWS)	6	704
National Park Service (NPS)	20	23,859
State agencies	339	3,511
USFS	697	212,381
Total	**2,432**	**351,264**

Source: National Interagency Coordination Center n.d.

6.2 Benefits

Aerial wildland firefighting has a significant direct impact on Montana's airports and local communities. According to the Airport Cooperative Research Program (ACRP) *Synthesis 32 Report: Managing Aerial Firefighting Activities on Airports*, "airport operators estimated that from three to eight percent of the local economy is generated by government activities directly related to wildland firefighting suppression activities." The report notes that "the primary source of cost recovery for the airports came in the form of fuel flowage and landing fees. Additional income generators for the airport were rental cars, commercial flights by firefighting agencies, ground/property rental, and fuel sales by the airport and/or the airport's FBOs" (Phillips 2012, 9).

In addition to these direct economic impacts, the same ACRP report notes that spin-off effects can significantly bolster local economies, particularly in areas without a diverse and robust economic base:

> *[The] positive economic benefits to a community resulting from an aerial wildland firefighting operation (either permanent or transient), include increased use of hotels, restaurants, grocery stores, gas stations, laundromats, rental car leasing, catering services, portable restrooms, and equipment rental.* (Phillips 2012, 18)

In addition to these direct impacts and spin-off effects, Montana's aerial firefighting operations help to ensure the safety of residents and visitors, protect property and natural resources, and reduce the risk of catastrophic wildfires that can negatively impact air quality and key industries such as tourism. Aerial wildland firefighting is also typically safer than ground operations for firefighters. Because wildland fires spread rapidly, ground crews can be caught off-guard. An aerial approach can mitigate these circumstances.

7. Airports and the Agricultural Sector

Montana's airports directly link with and contribute to the state's agriculture industry. Montana's airports contribute more than $671 million of total business revenues and more than 3,300 jobs, including the employment and business revenues generated by pilots and the value of agriculture preserved due to aerial application. The economic impact presented in this section includes only the portion of acreage that could not be used if it was trampled by ground application vehicles.

7.1 Crops Treated by Aerial Applicators

According to the National Agricultural Aviation Association (NAAA), there are approximately 1,350 aerial application businesses located in 46 states. Seventy-six aerial applicators are currently registered with the Montana Department of Agriculture (MDA) (Johns 2016). Measured in acreage, the USDA Economic Research Service estimates that 70 percent of U.S. cropland is treated with pesticides, a quarter of which is accomplished by the aviation industry (National Agricultural Aviation Association n.d.). An estimated 221,500 acres of farmland in Montana are treated by aerial applications. This estimate is based on data describing:

- Montana's major crops
- National pesticide application rates for each of Montana's major crops
- National share of cropland treated by aerial applicators

The USDA's Agricultural Chemical Use Survey collects data about pesticide application by major crop category (USDA National Agricultural Statistics Service 2016b). Because past surveys do not include Montana, it is assumed that application rates in Montana are like states that grow the same major crops. In 2014, nearly all the corn, barley, and potato acreage represented in the survey received a pesticide application from all types of applicators.

Applying the application percentages to the acres harvested in Montana in 2015, an estimated 48,500 acres of corn, 11,200 acres of oat, 816,000 acres of barley, and over 10,000 acres of potato received some type of pesticide application. Oat is the least-treated crop among Montana's major crops, with only 51 percent of acreage receiving application.

The MDA, Montana Office of the National Agricultural Statistics Services, and Montana Aerial Applicators Association do not maintain the number of acres that annually receive aerial treatment.[7] The National Agricultural Aviation Association estimates that 25 percent of all treated crops use aerial applicators (National Agricultural Aviation Association n.d.). By applying this national average, an estimated 12,125 acres of corn, 2,805 acres of oat, 204,000 acres of barley, and 2,616 acres of potato in Montana receive aerial application (Table 20).

[7] Based on phone interviews by EDR staff with representatives of each of these organizations.

Table 20. Montana Crop Production and Yields (2015)

Crop	Area Harvested (acres)	All Methods of Application[8]		Aerial Application	
		Acres Treated (percent)	Estimated Area Treated (acres)	Acres Treated (percent)	Estimated Area Treated (acres)
Corn	50,000	97%	48,500	25%	12,125
Oat (small grains)	22,000	51%	11,220		2,805
Barley (wheat)	850,000	96%	816,000		204,000
Potato (roots and tubers)	10,900	96%	10,464		2,616
Totals	**932,900**	**95%**	**886,184**	**25%**	**221,546**

Sources: USDA National Agricultural Statistics Service 2016b; USDA Economics, Statistics and Market Information System 2016; and National Agricultural Aviation Association n.d.

It must be noted that applying this national ratio may be challenging due to the size of the state. Montana is the fourth largest state in the continental U.S. in total land area and ninth in total cropland (USDA Economic Research Service 2011).[9] While the efficiency of spraying over long distances lends itself to widespread use of aerial spraying, staff at the MDA indicated that the level of aerial applications depends on multiple factors, including weather, size of farms, and proximity to other farms.

7.2 Value of Aerial-Treated Crops

Using the crop production information contained in **Table 20** combined with average per acre crop yields, average dollar value by crop, and dollar loss due to crop trample produces an estimate of the agricultural value of aerial treatment in Montana. Trampling occurs when tractors equipped with pesticide sprayers decrease yields through soil compaction. Zero crop trample is one of the primary advantages of planes.

Average yields for corn are 110 bushels per acre, meaning that the 12,125 aerial-treated acres from Table 20 translate to an estimated 1.3 million bushels treated by aerial spraying. Priced at $4.05 per bushel in Montana, the estimated value of the state's aerial-treated corn crop in 2015 was $5.3 million. Using the same methodology, the aerial-treated oat crop is valued at $520 thousand, barley at $62.1 million, and potato at $11.3 million. The total annual value of Montana's major aerial-treated crops is an estimated $79.2 million. Table 21 provides an overview of Montana's crop yields and 2015 dollar value.

[8] Includes herbicides, insecticides, fungicides, and other pesticides.

[9] Data are from 2007.

Table 21. Montana Crop Yields and Dollar Value (2015)

Crop	Per Acre Yield	Aerial-Treated Cropland Yield Units (million)	Price per Unit, 2015 average ($)	Value of Aerial-Treated Cropland ($)
Corn	110 bushels	1.3	$4.05	$5,300,000
Oat	53 bushels	0.149	$3.50	$520,000
Barley (wheat)	52 bushels	10.6	$5.85	$62,100,000
Potato	320 hundredweight (cwt)	0.837	$13.50	$11,300,000
Total, major crops		**12.886**	**$6.15**	**$79,200,000**

Sources: USDA National Agricultural Statistics Service 2016a and USDA Economics, Statistics and Market Information System 2016.

Average yield loss due to trampling is three percent. As a result, an estimated 40,013 bushels of corn, 4,460 bushels of oat, 318,240 bushels of barley, and 25,114 cwt of potato would have been lost if not for aerial application in Montana. This equates to $162,000 of corn protected by aerial application in 2015. Using the same methodology, it is estimated that aerial application protected $16,000 of oat, $1.9 million of barley, and $339,000 of potato. As shown in Table 21, the annual crop value protected by Montana aerial applicators is an estimated $2.4 million.

Table 22. Effect of Trampling on Montana Crop Yields and Dollar Value (2015)

Crop	Aerial-Treated Cropland Yield (unit)	Average Yield Loss Due to Trampling (%)	Estimated Units Loss Due to Trampling (unit)	Value per Unit ($)	Value of Loss Due to Trampling ($)
Corn	1,333,750 bushels	3%	40,013 bushel	$4.05	$162,000
Oat	148,665 bushels		4,460 bushel	$3.50	$16,000
Barley (wheat)	10,608,000 bushels		318,240 bushel	$5.85	$1,900,000
Potato	837,120 cwt		25,114 cwt	$13.50	$339,000
Total, major crops			**387,827 units**	**$6.19**	**$2,400,000**

Sources: Gasper 2015 and USDA National Agricultural Statistics Service 2016a.

7.3 Value of the Aerial Application and Agriculture Industries

Data assembled by IMPLAN indicate that the industry providing support activities for Montana's agriculture and forestry sectors employs approximately 3,200 workers and generates over $186 million in annual output (business sales).[10] According to the NAAA, the average operator employs 5.1 workers and deploys 2.1 aircraft.[11] This means that there is an average of 2.4 employees per aircraft. Assuming that Montana operators are like operators in other states, the state's 76 registered applicators (aircraft) support an estimated total of 160 jobs. Using average state- and industry-specific output per worker values, these jobs are associated with an estimated $9.5 million in annual economic output.

Crop production provides an important contribution to Montana's economy (Table 23). Montana's grain farming industry, which includes oat and barley harvesting, provides nearly 4,500 jobs and generates an estimated $1.6 billion in annual output (based on 2014 data). This industry provides $38.6 million in employee payroll and $71.3 million in owner income, an amount that likely reflects high rates of self-ownership in the agriculture sector.

Together, the grain farming industry contributes $109.9 million in annual labor income (dollars that are spent elsewhere in the economy). The vegetable and melon farming industry (which includes corn and potato) makes a smaller economic contribution than grain farming; this industry supports less than 400 jobs through its $51.9 million estimated annual output. Of this output, $11 million is employee compensation and $16.2 million is owner income for a total of $27.2 million in annual labor income.

7.3.1 Aerial Application

Because aerial application covers only a portion of all cropland in Montana, the direct economic contribution of grain farming and vegetable and melon farming are adjusted using the acreage shares calculated from the values presented in Table 20. The oat and barley acreage treated by aerial applicators compose 23.7 percent of all acreage harvested (for those crops). Similarly, the corn and potato acreage treated by aerial applicators compose 24.2 percent of all acreage harvested. These percentages are applied to the total contribution of each industry to arrive at the value of farms receiving aerial application only. These farms generate an estimated $392 million in annual output that supports almost 1,200 jobs and $32.6 million in payroll (Table 23).

[10] IMPLAN data come primarily from the U.S. Department of Agriculture, U.S. Department of Commerce, and U.S. Department of Labor. Visit http://implan.com/index.php?option=com_content&view=article&id=414&Itemid=1878 for more information.

[11] A small sample (N=11) of Montana operators surveyed employed 2.9 workers on average.

Table 23. Direct Economic Contribution of Industries Producing Montana's Major Crops by Total Aerial-Treated Crop Production (2015)

Industry	Employment (number)	Payroll ($)	Output ($)
Grain farming	4,468	$109.9 million	$1.6 billion
Vegetable and melon farming	368	$27.2 million	$51.9 million
Total, all crop production	**4,836**	**$137.1 million**	**$53.5 million**
Grain farming	1,081	$27.1 million	$379.2 million
Vegetable and melon farming	89	$6.6 million	$12.6 million
Total, aerial-treated crop production	**1,170**	**$33.7 million**	**$391.8 million**

Sources: IMPLAN 2014. Calculations by EDR Group.

7.3.2 Total Impacts of Aerial Spraying on the Montana Economy

The total contribution of aerial spraying to the Montana state economy amounts to more than $671 million in annual economic output and 3,300 jobs (Table 24). This included $401 million in direct business sales and over 1,300 direct jobs. These direct activities required the purchase of almost $200 million in supplies and services (indirect effects) that generate an additional 1,400 jobs. Spending of $96 million on earnings by workers due to these direct and indirect activities leads to $71 million of consumer spending and almost 600 jobs (induced effects).

Table 24. Total Contribution of Aerial Application to the Montana Economy

Impact Type	Employment (number)	Labor Income ($)	Output ($)
Direct impact	1,329	$39,917,000	$401,254,000
Indirect effect	1,403	$56,053,000	$199,207,000
Induced effect	597	$22,167,000	$71,003,000
Total effect	**3,329**	**$118,136,000**	**$671,464,000**

Source: Calculations by EDR Group using IMPLAN 2014.

8. Business Use of Montana Airports

Montana's airports provide a critical link in the state's business networks by connecting people and goods with markets within Montana, throughout the U.S., and across the globe. As one clear indicator, over 5,000 tons of incoming commodities and outgoing products were transported in Montana in 2015.

To better understand the economic relationship between the Montana business community and airport system, UM BBER conducted a survey of industries across the state as part of the Montana Airports Economic Impact Study. The survey results provide information that broadly describes the magnitude and types of Montana airport use by the state's business community and gauges the importance of Montana airports to the success of these businesses.

The survey found that a significant number of Montana businesses depend on commercial service and/or general aviation to transport clients, employers, and air cargo. Key findings of the Montana business survey include:

- 37 percent of firms have clients or vendors who use commercial airlines to visit business sites
- 46 percent of firms have employees who take commercial airline trips for business purposes
- 52 percent of firms use air cargo service
- 15 percent of firms have clients or vendors who use general aviation aircraft to travel to local business sites

Within these topline results, businesses are not equally represented; instead, the extent to which and type of aviation use varies among industry sector and business size. Montana employers with more than 21 employees depend more heavily on airports in all categories except air cargo services. The manufacturing sector is most reliant on airports, with more annual client and employee enplanements and year-over-year growth in airport use than other industry sectors.

The full Montana Business Survey Report is included as Appendix F.

8.1 Methods

The survey was administered between June and July 2016 to 1,877 employers with three or more employees in all industries excluding public administration (i.e., local, county, state, and federal government institutions), schools and school districts, and airports. In total, 604 questionnaires were received back for a 32 percent response rate and a +/-4 percent sampling error rate.

These responding businesses represent the entire range of Montana's businesses community. Table 25 summarizes the characteristics of responding business sorted by the NAICS categories. NAICS categories 51-56 (information; finance and insurance; real estate, rental, and leasing; professional, scientific, and technical services; management of companies and enterprises; administrative, support, and waste management and remediation services) provided the most

responses at 132. NAICS categories 31-33 (manufacturing) are least represented in the survey at seven.

Table 25. Selected Characteristics of Responding Businesses

2012 NAICS Code	Description	Responding Employers			Average annual salary of Montana employees ($)
		Total (number)	Percent Overall (%)	Montana employees (number)	
11	Agriculture, forestry, fishing, and hunting	23	3.8%	138	$31,066
21, 22, 23	Mining, quarrying, and oil and gas extraction; utilities; construction	99	16.3%	1,366	$58,662
31, 32, 33	Manufacturing	7	1.3%	591	$45,754
42, 44-45, 48-49	Wholesale trade, retail trade, transportation and warehousing	127	21.0%	1,556	$35,870
51-56	Information; finance and insurance; real estate, rental, and leasing; professional, scientific, and technical services; management of companies and enterprises; administrative, support, and waste management and remediation services	132	21.9%	2,076	$47,868
62	Health care and social assistance	70	11.6%	844	$42,085
71, 72	Arts, entertainment, and recreation; accommodation and food services	88	14.6%	4,401	$17,884
81	Other services (except public administration)	57	9.5%	392	$41,049
	Totals	**604**	**100%**	**11,364**	**$34,932**

Sources: U.S. Department of Commerce Bureau of Economic Analysis 2016 and UM BBER.

According to the Montana Department of Labor and Industry Unemployment Insurance Division, the survey estimated statistics for a population of employers with approximately 347,457 workers during the data collection period (2016). Thus, this survey represents employers that employ approximately 77 percent of all non-public administration (i.e., local, county, state, and federal government institutions), schools and school districts, and airport workers in the state.

8.2 Results

Facilitating client and vendor travel to sites within Montana is one of the most important benefits of the state's aviation system. More than one-third of Montana business (37 percent) have clients or vendors who use commercial airlines to visit their business sites; that percentage increases to over 52 percent for the state's largest employers. Reflecting this same trend, larger employers

report that clients or vendors take a significantly higher number of trips overall when compared to smaller firms. Businesses with over 21 persons take a median number of 24 annual trips; businesses with three to five employees report six trips per year.

Industries that depend on tourism or business travel, specifically the arts, entertainment, recreation, accommodation, or food services industries (NAICS code 71-72), report the most annual commercial air visits from clients or vendors. While the median yearly air trips for this industry sector (100) is ten times the state median (10), the mean is 1,389. The manufacturing industry also reports a median number of yearly client or vendor air visits (14) that exceeded the state median (10).

Respondents were asked to indicate their reliance on commercial air service for business trips taken by Montana-based employees. Over 46 percent of Montana employees take commercial air trips for business. More than 60 percent of employers with more than 11 employees use commercial service for business-related air travel.

On average, employees at responding businesses take a median of five annual commercial airline trips. Based on the number of employees represented by this survey, Montana employers generated 0.4935 business-related, commercial airline trips per employee over the past 12 months. By applying this figure to the 347,457 employees represented by this survey, Montana businesses yielded approximately 171,470 business-related, commercial airline enplanements during that same time period. Nearly all (99 percent) of these business-related air trips were to domestic locations.

In additional to commercial service airports, almost 50 percent of Montana businesses depend on general aviation airports. Two industry sectors exceed the statewide percentage of businesses that report clients or vendors use general aviation to visit their businesses. One-quarter of employers in the arts, entertainment, recreation, accommodation, or food service sectors report that clients or vendors use general aviation to visit their businesses. One-fifth of employers in the wholesale, retail, warehousing, or transportation sectors indicate that clients or vendors use general aviation to visit their businesses.

In addition to transporting people, nearly 52 percent of businesses rely on aviation to ship documents, parcels, and freight. It is interesting to note that Montana businesses with three to 10 employees are somewhat more likely to use air cargo services than larger businesses. While between 29 percent and 33 percent of smaller businesses report using air cargo, businesses with 11 or more employees reported air cargo use rates between 11 and 26 percent (percent ranges due to size of business and package type [i.e., documents, parcels, freight]).

Finally, specific types of Montana businesses are more dependent on Montana airports than others. Key findings include:

- Almost 67 percent of manufacturing businesses and 53 percent of the tourism-oriented arts, entertainment, recreation, accommodation, or food services firms have clients or vendors who use commercial airlines to visit Montana business sites.

- The manufacturing sector most often reports that employees who take commercial air trips for business (over 71 percent).
- Employers in the manufacturing sector (12 trips per year) and the information, finance, real estate, professional, scientific and technical sector (10 trips per year) generate more total business-related air trips over the previous year when compared with the state median (5 trips per year).

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Appendix A. Glossary

Direct impacts stem from activity that is directly related to the provision of aviation services, visitor spending, or the activity of aviation-reliant businesses. As defined in this study, direct impacts occur in the industry immediately affected whether on- or off-airport. These include on-airport activities, spending by air visitors off-airport, and air cargo activities.

Economic impacts are effects on the level of economic activity in each region or state. Economic impacts in this report are shown as (1) jobs; (2) labor income, labeled as "payroll" in this study, and (3) output (essentially business sales and expenditures by public agencies), labeled as "economic impacts" in this study.

Indirect and induced spin-off (or "multiplier") effects are not defined uniformly across economic studies. As defined in this study, indirect effects measure the purchase of supplies and services needed to produce directly supplied products and services. Induced effects measure the effects of changes in household income, meaning the effects from the spending of wages earned by workers of directly and indirectly affected industries. Total impacts are the summation of direct impacts and spin-off (indirect and induced) effects.

Intermediate commodities are imports that are used as part of a U.S. company's production process, such as imported fabric used by furniture makers. They are not sold as final goods or services.

Input/Output tracks the relationships between the industries of an economy by estimating the scale of what each industry sells to other industries and what each industry buys from other industries. This includes what industries sell to households and what is purchased from industries by households. The circulation of dollars from these purchases and sales is how spin-ff effects are generated.

Jobs are the sum of full-time and part-time jobs. This concept is also known as "headcount", where one full-time job and one part-time job equals two jobs. This definition is consistent with the U.S. Bureau of Economic Analysis and the Bureau of Labor Statistics Covered Employment and Wages and is part of the IMPLAN modeling system (as well as RIMS II multipliers). In this study, jobs include wage and salary jobs, sole proprietorships, and individual general partners, but not unpaid family workers nor volunteers (this is consistent with BEA).

Labor income includes total compensation for work, including gross wages, salaries, proprietor income, employer-provided benefits, and taxes paid to governments on behalf of employees.

Margin is sales receipts minus the cost of the goods received from the producer, leaving the markup by retailers plus any taxes (e.g., sales taxes) collected by the retail establishment. Employment and payroll generated by retail sales are based on mark-ups and do not include the cost of the good to retailers that must be payed to the producer.

NAICS (North American Industrial Classification System) is the means used by federal statistical agencies to classify business establishments for collecting, analyzing, and publishing statistical data related to the U.S. business economy. NAICS is organized by sectors and each sector is numbered. The specificity of a sector is analogous to the number of "digits" represented by that sector. For example, sector 48-49 (considered a two-digit sector) is "transportation and warehousing"; sector 481 is "air transportation"; and sector 4811 is "scheduled passenger transportation".

On-airport activities broadly include airside activities, terminal services to passengers (including concessions), air-related services by government agencies, construction, and airport administration. Non-aviation businesses can also be located on the airport premises, as well.

Payroll is based on labor income for the purposes of this study, including total compensation for work, including gross wages, salaries, proprietor income, employer-provided benefits, and taxes paid to governments on behalf of employees.

Spin-off effects are sometimes called multiplier impacts and are the sum or indirect and induced effects (defined above).

Visitor spending is defined as off-airport spending by visitors who arrive in Montana using commercial or general aviation air service. Typical spending categories are retail purchases, food and drink, entertainment, lodging, and off-airport transportation services including car rental services.

Appendix B. Economic Impacts by Airport

The following tables are provided in this section:

- Table B.1. Economic Impacts by Airport, Tenants, and Employees
- Table B.2. Economic Impacts by Airport, Construction
- Table B.3. Economic Impacts by Airport, Visitor Spending at Commercial Airports
- Table B.4. Economic Impacts by Airport, Visitor Spending at General Aviation Airports
- Table B.5. Economic Impacts of Airport, Summary Results

Table B.1. Economic Impacts by Airport, Tenants, and Employees

Airport City	Airport	Direct Impacts			Spin-off Effects			Total Impacts		
		Jobs	Payroll ($)	Economic Impacts ($)	Jobs	Payroll ($)	Economic Impacts ($)	Jobs	Payroll ($)	Economic Impacts ($)
Anaconda	Bowman Field Airport	1	$20,000	$20,000	0	$7,000	$19,000	1	$27,000	$39,000
Baker	Baker Municipal Airport	6	$316,000	$2,189,000	12	$482,000	$1,471,000	18	$798,000	$3,660,000
Big Sandy	Big Sandy Airport	3	$60,000	$1,599,000	11	$516,000	$1,455,000	14	$576,000	$3,054,000
Big Timber	Big Timber Airport	4	$138,000	$1,005,000	4	$187,000	$570,000	8	$325,000	$1,575,000
Bigfork	Ferndale Airfield	1	$42,000	$133,000	1	$44,000	$122,000	2	$86,000	$255,000
Billings	Billings Logan International Airport	721	$39,761,000	$148,365,000	715	$29,415,000	$89,954,000	1,436	$69,176,000	$238,319,000
Bozeman	Bozeman Yellowstone International Airport	733	$27,664,000	$122,027,000	630	$25,858,000	$80,397,000	1,363	$53,522,000	$202,424,000
Bridger	Bridger Municipal Airport	1	$37,000	$57,000	0	$19,000	$53,000	1	$56,000	$110,000
Broadus	Broadus Airport	1	$1,000	$20,000	0	$7,000	$19,000	1	$8,000	$39,000
Butte	Bert Mooney Airport	76	$3,091,000	$14,636,000	75	$3,095,000	$9,358,000	151	$6,186,000	$23,994,000
Chester	Liberty County Airport	12	$405,000	$918,000	4	$170,000	$561,000	16	$575,000	$1,479,000
Chinook	Edgar G. Obie Airport	1	$49,000	$74,000	1	$25,000	$69,000	2	$74,000	$143,000
Choteau	Choteau Airport	1	$49,000	$49,000	0	$16,000	$46,000	1	$65,000	$95,000
Circle	Circle Town County Airport	1	$85,000	$328,000	1	$46,000	$151,000	2	$131,000	$479,000
Colstrip	Colstrip Airport	0	$0	$30,000	0	$10,000	$28,000	0	$10,000	$58,000
Columbus	Woltermann Memorial Airport	2	$75,000	$251,000	2	$76,000	$213,000	4	$151,000	$464,000
Conrad	Conrad Airport	2	$51,000	$139,000	1	$49,000	$144,000	3	$100,000	$283,000
Cut Bank	Cut Bank International Airport	5	$317,000	$695,000	4	$166,000	$509,000	9	$483,000	$1,204,000
Deer Lodge	Deer Lodge-City-County Airport	2	$46,000	$143,000	1	$48,000	$132,000	3	$94,000	$275,000
Dillon	Dillon Airport	3	$113,000	$367,000	3	$113,000	$316,000	6	$226,000	$683,000
Dutton	Dutton Airport	4	$113,000	$192,000	1	$32,000	$104,000	5	$145,000	$296,000
Ekalaka	Ekalaka Airport	1	$13,000	$38,000	0	$13,000	$35,000	1	$26,000	$73,000
Ennis	Ennis - Big Sky Airport	5	$190,000	$549,000	3	$170,000	$477,000	8	$360,000	$1,026,000
Eureka	Eureka Airport	1	$2,000	$13,000	0	$4,000	$12,000	1	$6,000	$25,000
Fairfield	Fairfield Airport	1	$49,000	$50,000	0	$17,000	$47,000	1	$66,000	$97,000
Fairview	Fairview Airport	2	$104,000	$105,000	1	$35,000	$98,000	3	$139,000	$203,000
Forsyth	Tillitt Field Airport	4	$196,000	$363,000	2	$108,000	$323,000	6	$304,000	$686,000
Fort Benton	Fort Benton Airport	31	$1,469,000	$8,270,000	22	$883,000	$2,756,000	53	$2,352,000	$11,026,000
Fort Peck	Fort Peck Airport	0	$0	$2,000	0	$1,000	$2,000	0	$1,000	$4,000
Gardiner	Gardiner Airport	1	$38,000	$40,000	0	$13,000	$37,000	1	$51,000	$77,000
Geraldine	Geraldine Airport	2	$29,000	$49,000	0	$8,000	$27,000	2	$37,000	$76,000
Glasgow	Glasgow International Airport	41	$4,002,000	$24,390,000	130	$5,363,000	$16,379,000	171	$9,365,000	$40,769,000
Glendive	Dawson Community Airport	14	$454,000	$939,000	7	$295,000	$844,000	21	$749,000	$1,783,000
Great Falls	Great Falls International Airport	863	$49,573,000	$118,099,000	501	$19,825,000	$63,876,000	1,364	$69,398,000	$181,975,000
Hamilton	Ravalli County Airport	50	$2,996,000	$5,816,000	30	$1,199,000	$3,662,000	80	$4,195,000	$9,478,000
Hardin	Big Horn County Airport	1	$5,000	$10,000	0	$3,000	$9,000	1	$8,000	$19,000
Harlem	Harlem Airport	0	$0	$22,000	0	$7,000	$20,000	0	$7,000	$42,000

Airport City	Airport	Direct Impacts			Spin-off Effects			Total Impacts		
		Jobs	Payroll ($)	Economic Impacts ($)	Jobs	Payroll ($)	Economic Impacts ($)	Jobs	Payroll ($)	Economic Impacts ($)
Harlowton	Wheatland County at Harlowton Airport	0	$0	$1,000	0	$0	$1,000	0	$0	$2,000
Havre	Havre City-County Airport	13	$402,000	$1,667,000	8	$353,000	$1,018,000	21	$755,000	$2,685,000
Helena	Helena Regional Airport	912	$42,640,000	$164,214,000	598	$24,000,000	$75,673,000	1,510	$66,640,000	$239,887,000
Hot Springs	Hot Springs Airport	0	$0	$0	0	$0	$0	0	$0	$0
Hysham	Hysham Airport	0	$0	$0	0	$0	$0	0	$0	$0
Jordan	Jordan Airport	1	$52,000	$148,000	1	$54,000	$153,000	2	$106,000	$301,000
Kalispell	Glacier Park International Airport	268	$10,619,000	$48,775,000	224	$9,261,000	$27,699,000	492	$19,880,000	$76,474,000
Kalispell	Kalispell City Airport	22	$646,000	$2,392,000	11	$493,000	$1,454,000	33	$1,139,000	$3,846,000
Laurel	Laurel Municipal Airport	22	$763,000	$5,938,000	26	$1,089,000	$3,343,000	48	$1,852,000	$9,281,000
Lewistown	Lewistown Municipal Airport	253	$11,344,000	$23,462,000	120	$4,466,000	$14,616,000	373	$15,810,000	$38,078,000
Libby	Libby Airport	16	$456,000	$1,279,000	5	$210,000	$656,000	21	$666,000	$1,935,000
Lincoln	Lincoln Airport	0	$0	$0	0	$0	$0	0	$0	$0
Livingston	Mission Field Airport	3	$97,000	$731,000	3	$152,000	$461,000	6	$249,000	$1,192,000
Malta	Malta Airport	3	$60,000	$280,000	2	$84,000	$244,000	5	$144,000	$524,000
Miles City	Frank Wiley Field Airport	19	$1,330,000	$1,801,000	10	$378,000	$1,183,000	29	$1,708,000	$2,984,000
Missoula	Missoula International Airport	868	$59,877,000	$174,181,000	1,057	$45,038,000	$130,197,000	1,925	$104,915,000	$304,378,000
Plains	Plains Airport	0	$0	$10,000	0	$3,000	$9,000	0	$3,000	$19,000
Plentywood	Sher-Wood Airport	4	$178,000	$287,000	1	$69,000	$217,000	5	$247,000	$504,000
Polson	Polson Airport	15	$351,000	$1,642,000	4	$178,000	$588,000	19	$529,000	$2,230,000
Poplar	Poplar Municipal Airport	3	$156,000	$427,000	4	$158,000	$442,000	7	$314,000	$869,000
Red Lodge	Red Lodge Airport	2	$68,000	$284,000	2	$81,000	$232,000	4	$149,000	$516,000
Ronan	Ronan Airport	53	$2,884,000	$4,299,000	26	$1,015,000	$3,222,000	79	$3,899,000	$7,521,000
Roundup	Roundup Airport	1	$108,000	$613,000	1	$62,000	$203,000	2	$170,000	$816,000
Saint Ignatius	Saint Ignatius Airport	2	$113,000	$401,000	1	$54,000	$171,000	3	$167,000	$572,000
Scobey	Scobey Airport	8	$316,000	$930,000	8	$341,000	$958,000	16	$657,000	$1,888,000
Seeley Lake	Seeley Lake Airport	0	$0	$7,000	0	$2,000	$7,000	0	$2,000	$14,000
Shelby	Shelby Airport	2	$57,000	$230,000	2	$77,000	$215,000	4	$134,000	$445,000
Sidney	Sidney-Richland Municipal Airport	33	$1,030,000	$2,716,000	22	$943,000	$2,658,000	55	$1,973,000	$5,374,000
Stanford	Stanford Airport/Biggerstaff Field	1	$1,000	$1,000	0	$0	$1,000	1	$1,000	$2,000
Stevensville	Stevensville Airport	24	$547,000	$3,374,000	13	$512,000	$1,568,000	37	$1,059,000	$4,942,000
Superior	Mineral County Airport	1	$4,000	$20,000	0	$7,000	$19,000	1	$11,000	$39,000
Terry	Terry Airport	0	$0	$6,000	0	$2,000	$5,000	0	$2,000	$11,000
Thompson Falls	Thompson Falls Airport	0	$0	$5,000	0	$2,000	$5,000	0	$2,000	$10,000
Three Forks	Three Forks Airport	18	$731,000	$4,194,000	22	$919,000	$2,753,000	40	$1,650,000	$6,947,000
Townsend	Canyon Ferry Airport	6	$136,000	$288,000	2	$64,000	$207,000	8	$200,000	$495,000
Townsend	Townsend Airport	0	$0	$7,000	0	$2,000	$7,000	0	$2,000	$14,000
Turner	Turner Airport	4	$30,000	$50,000	0	$17,000	$47,000	4	$47,000	$97,000
Twin Bridges	Twin Bridges Airport	5	$188,000	$620,000	4	$190,000	$534,000	9	$378,000	$1,154,000

Airport City	Airport	Direct Impacts			Spin-off Effects			Total Impacts		
		Jobs	Payroll ($)	Economic Impacts ($)	Jobs	Payroll ($)	Economic Impacts ($)	Jobs	Payroll ($)	Economic Impacts ($)
Valier	Valier Airport	0	$0	$0	0	$0	$0	0	$0	$0
West Yellowstone	Yellowstone Airport	54	$3,608,000	$7,428,000	39	$1,566,000	$4,805,000	93	$5,174,000	$12,233,000
White Sulphur Springs	White Sulphur Springs Airport	1	$2,000	$4,000	0	$1,000	$4,000	1	$3,000	$8,000
Wolf Point	L. M. Clayton Airport	26	$1,184,000	$6,440,000	25	$1,029,000	$3,476,000	51	$2,213,000	$9,916,000
Total		**5,260**	**$271,531,000**	**$911,144,000**	**4,403**	**$181,197,000**	**$553,346,000**	**9,663**	**$452,728,000**	**$1,464,490,000**

Sources: General aviation survey, commercial passenger survey, on-airport survey, airport managers survey, MDT, and IMPLAN 2014. Calculations by EDR Group.

Table B.2. Economic Impacts by Airport, Construction

Airport City	Airport	Direct Impacts			Spin-off Effects			Total Impacts		
		Jobs	Payroll ($)	Economic Impacts ($)	Jobs	Payroll ($)	Economic Impacts ($)	Jobs	Payroll ($)	Economic Impacts ($)
Anaconda	Bowman Field Airport	0	$9,000	$32,000	0	$6,000	$20,000	0	$15,000	$52,000
Baker	Baker Municipal Airport	10	$483,000	$1,522,000	8	$297,000	$950,000	18	$780,000	$2,472,000
Big Sandy	Big Sandy Airport	3	$131,000	$450,000	2	$88,000	$281,000	5	$219,000	$731,000
Big Timber	Big Timber Airport	1	$70,000	$225,000	1	$44,000	$140,000	2	$114,000	$365,000
Bigfork	Ferndale Airfield	0	$0	$0	0	$0	$0	0	$0	$0
Billings	Billings Logan International Airport	48	$2,285,000	$7,296,000	38	$1,422,000	$4,554,000	86	$3,707,000	$11,850,000
Bozeman	Bozeman Yellowstone International Airport	29	$1,256,000	$4,214,000	22	$821,000	$2,630,000	51	$2,077,000	$6,844,000
Bridger	Bridger Municipal Airport	0	$5,000	$16,000	0	$3,000	$10,000	0	$8,000	$26,000
Broadus	Broadus Airport	0	$4,000	$13,000	0	$3,000	$8,000	0	$7,000	$21,000
Butte	Bert Mooney Airport	22	$966,000	$3,241,000	17	$632,000	$2,023,000	39	$1,598,000	$5,264,000
Chester	Liberty County Airport	0	$19,000	$67,000	0	$13,000	$42,000	0	$32,000	$109,000
Chinook	Edgar G. Obie Airport	2	$104,000	$357,000	2	$70,000	$223,000	4	$174,000	$580,000
Choteau	Choteau Airport	2	$69,000	$235,000	1	$46,000	$147,000	3	$115,000	$382,000
Circle	Circle Town County Airport	0	$5,000	$14,000	0	$3,000	$9,000	0	$8,000	$23,000
Colstrip	Colstrip Airport	2	$121,000	$380,000	2	$74,000	$237,000	4	$195,000	$617,000
Columbus	Woltermann Memorial Airport	1	$37,000	$119,000	1	$23,000	$74,000	2	$60,000	$193,000
Conrad	Conrad Airport	1	$26,000	$88,000	0	$17,000	$55,000	1	$43,000	$143,000
Cut Bank	Cut Bank International Airport	23	$973,000	$3,333,000	17	$650,000	$2,081,000	40	$1,623,000	$5,414,000
Deer Lodge	Deer Lodge-City-County Airport	1	$40,000	$140,000	1	$27,000	$87,000	2	$67,000	$227,000
Dillon	Dillon Airport	0	$0	$0	0	$0	$0	0	$0	$0
Dutton	Dutton Airport	0	$0	$0	0	$0	$0	0	$0	$0
Ekalaka	Ekalaka Airport	2	$82,000	$257,000	1	$50,000	$161,000	3	$132,000	$418,000
Ennis	Ennis - Big Sky Airport	6	$261,000	$875,000	5	$171,000	$546,000	11	$432,000	$1,421,000
Eureka	Eureka Airport	2	$71,000	$249,000	1	$49,000	$155,000	3	$120,000	$404,000
Fairfield	Fairfield Airport	0	$1,000	$5,000	0	$1,000	$3,000	0	$2,000	$8,000
Fairview	Fairview Airport	0	$0	$0	0	$0	$0	0	$0	$0
Forsyth	Tillitt Field Airport	5	$225,000	$710,000	4	$138,000	$443,000	9	$363,000	$1,153,000

Airport City	Airport	Direct Impacts			Spin-off Effects			Total Impacts		
		Jobs	Payroll ($)	Economic Impacts ($)	Jobs	Payroll ($)	Economic Impacts ($)	Jobs	Payroll ($)	Economic Impacts ($)
Fort Benton	Fort Benton Airport	4	$171,000	$587,000	3	$114,000	$367,000	7	$285,000	$954,000
Fort Peck	Fort Peck Airport	0	$3,000	$8,000	0	$2,000	$5,000	0	$5,000	$13,000
Gardiner	Gardiner Airport	0	$0	$0	0	$0	$0	0	$0	$0
Geraldine	Geraldine Airport	0	$12,000	$41,000	0	$8,000	$25,000	0	$20,000	$66,000
Glasgow	Glasgow International Airport	18	$872,000	$2,749,000	14	$536,000	$1,716,000	32	$1,408,000	$4,465,000
Glendive	Dawson Community Airport	4	$220,000	$693,000	4	$135,000	$433,000	8	$355,000	$1,126,000
Great Falls	Great Falls International Airport	27	$1,129,000	$3,867,000	20	$754,000	$2,413,000	47	$1,883,000	$6,280,000
Hamilton	Ravalli County Airport	1	$51,000	$179,000	1	$35,000	$112,000	2	$86,000	$291,000
Hardin	Big Horn County Airport	10	$474,000	$1,512,000	8	$295,000	$944,000	18	$769,000	$2,456,000
Harlem	Harlem Airport	1	$48,000	$164,000	1	$32,000	$102,000	2	$80,000	$266,000
Harlowton	Wheatland County at Harlowton Airport	0	$0	$0	0	$0	$0	0	$0	$0
Havre	Havre City-County Airport	8	$331,000	$1,133,000	6	$221,000	$707,000	14	$552,000	$1,840,000
Helena	Helena Regional Airport	16	$681,000	$2,333,000	12	$455,000	$1,456,000	28	$1,136,000	$3,789,000
Hot Springs	Hot Springs Airport	0	$3,000	$10,000	0	$2,000	$6,000	0	$5,000	$16,000
Hysham	Hysham Airport	0	$0	$0	0	$0	$0	0	$0	$0
Jordan	Jordan Airport	0	$24,000	$77,000	0	$15,000	$48,000	0	$39,000	$125,000
Kalispell	Glacier Park International Airport	18	$709,000	$2,495,000	13	$486,000	$1,557,000	31	$1,195,000	$4,052,000
Kalispell	Kalispell City Airport	0	$0	$0	0	$0	$0	0	$0	$0
Laurel	Laurel Municipal Airport	2	$108,000	$345,000	2	$67,000	$215,000	4	$175,000	$560,000
Lewistown	Lewistown Municipal Airport	3	$143,000	$455,000	2	$89,000	$284,000	5	$232,000	$739,000
Libby	Libby Airport	2	$61,000	$214,000	1	$42,000	$133,000	3	$103,000	$347,000
Lincoln	Lincoln Airport	1	$24,000	$81,000	0	$16,000	$51,000	1	$40,000	$132,000
Livingston	Mission Field Airport	2	$76,000	$256,000	1	$50,000	$160,000	3	$126,000	$416,000
Malta	Malta Airport	3	$152,000	$479,000	2	$93,000	$299,000	5	$245,000	$778,000
Miles City	Frank Wiley Field Airport	9	$462,000	$1,458,000	8	$284,000	$910,000	17	$746,000	$2,368,000
Missoula	Missoula International Airport	45	$1,794,000	$6,313,000	33	$1,231,000	$3,940,000	78	$3,025,000	$10,253,000
Plains	Plains Airport	0	$11,000	$40,000	0	$8,000	$25,000	0	$19,000	$65,000
Plentywood	Sher-Wood Airport	2	$113,000	$356,000	2	$69,000	$222,000	4	$182,000	$578,000
Polson	Polson Airport	2	$96,000	$337,000	2	$66,000	$211,000	4	$162,000	$548,000
Poplar	Poplar Municipal Airport	2	$116,000	$365,000	2	$71,000	$228,000	4	$187,000	$593,000
Red Lodge	Red Lodge Airport	0	$20,000	$65,000	0	$13,000	$40,000	0	$33,000	$105,000
Ronan	Ronan Airport	1	$35,000	$122,000	1	$24,000	$76,000	2	$59,000	$198,000
Roundup	Roundup Airport	3	$161,000	$512,000	3	$100,000	$320,000	6	$261,000	$832,000
Saint Ignatius	Saint Ignatius Airport	0	$6,000	$20,000	0	$4,000	$12,000	0	$10,000	$32,000
Scobey	Scobey Airport	1	$40,000	$125,000	1	$24,000	$78,000	2	$64,000	$203,000
Seeley Lake	Seeley Lake Airport	0	$0	$0	0	$0	$0	0	$0	$0
Shelby	Shelby Airport	9	$383,000	$1,311,000	7	$256,000	$818,000	16	$639,000	$2,129,000
Sidney	Sidney-Richland Municipal Airport	10	$485,000	$1,530,000	8	$298,000	$955,000	18	$783,000	$2,485,000

Airport City	Airport	Direct Impacts			Spin-off Effects			Total Impacts		
		Jobs	Payroll ($)	Economic Impacts ($)	Jobs	Payroll ($)	Economic Impacts ($)	Jobs	Payroll ($)	Economic Impacts ($)
Stanford	Stanford Airport/Biggerstaff Field	2	$79,000	$252,000	1	$49,000	$157,000	3	$128,000	$409,000
Stevensville	Stevensville Airport	2	$89,000	$314,000	2	$61,000	$196,000	4	$150,000	$510,000
Superior	Mineral County Airport	2	$90,000	$316,000	2	$62,000	$198,000	4	$152,000	$514,000
Terry	Terry Airport	1	$37,000	$115,000	1	$22,000	$72,000	2	$59,000	$187,000
Thompson Falls	Thompson Falls Airport	1	$20,000	$71,000	0	$14,000	$45,000	1	$34,000	$116,000
Three Forks	Three Forks Airport	1	$56,000	$187,000	1	$37,000	$117,000	2	$93,000	$304,000
Townsend	Canyon Ferry Airport	0	$19,000	$64,000	0	$13,000	$40,000	0	$32,000	$104,000
Townsend	Townsend Airport	0	$0	$0	0	$0	$0	0	$0	$0
Turner	Turner Airport	2	$71,000	$243,000	1	$47,000	$152,000	3	$118,000	$395,000
Twin Bridges	Twin Bridges Airport	30	$1,298,000	$4,355,000	22	$849,000	$2,719,000	52	$2,147,000	$7,074,000
West Yellowstone	Yellowstone Airport	5	$233,000	$781,000	4	$152,000	$488,000	9	$385,000	$1,269,000
White Sulphur Springs	White Sulphur Springs Airport	2	$72,000	$240,000	1	$47,000	$150,000	3	$119,000	$390,000
Wolf Point	L. M. Clayton Airport	1	$44,000	$139,000	1	$27,000	$87,000	2	$71,000	$226,000
Total		**413**	**$18,365,000**	**$61,147,000**	**316**	**$11,923,000**	**$38,168,000**	**729**	**$30,288,000**	**$99,315,000**

Source: Airport managers survey. Calculations by EDR Group.

Table B.3. Economic Impacts by Airport, Visitor Spending at Commercial Airports

Airport City	Airport	Visitors	Direct Impacts			Spin-off Effects			Total Impacts		
			Jobs	Payroll ($)	Economic Impacts ($)	Jobs	Payroll ($)	Economic Impacts ($)	Jobs	Payroll ($)	Economic Impacts ($)
Billings	Billings Logan International Airport	194,217	1,212	$25,470,000	$93,728,000	531	$20,491,000	$64,865,000	1,743	$45,961,000	$158,593,000
Bozeman	Bozeman Yellowstone International Airport	317,991	3,885	$86,034,000	$300,089,000	1,725	$65,692,000	$208,027,000	5,610	$151,726,000	$508,116,000
Butte	Bert Mooney Airport	18,063	93	$2,100,000	$6,947,000	39	$1,515,000	$4,795,000	132	$3,615,000	$11,742,000
Glasgow	Glasgow International Airport	6,075	17	$355,000	$1,207,000	7	$264,000	$833,000	24	$619,000	$2,040,000
Glendive	Dawson Community Airport	1,371	4	$85,000	$305,000	1	$67,000	$211,000	5	$152,000	$516,000
Great Falls	Great Falls International Airport	82,727	495	$9,799,000	$38,132,000	217	$8,388,000	$26,558,000	712	$18,187,000	$64,690,000
Havre	Havre City-County Airport	6,591	17	$378,000	$1,269,000	7	$277,000	$874,000	24	$655,000	$2,143,000
Helena	Helena Regional Airport	54,369	325	$6,473,000	$24,232,000	137	$5,294,000	$16,748,000	462	$11,767,000	$40,980,000
Kalispell	Glacier Park International Airport	141,257	1,132	$23,005,000	$87,314,000	499	$19,165,000	$60,633,000	1,631	$42,170,000	$147,947,000
Missoula	Missoula International Airport	206,100	1,736	$34,593,000	$131,820,000	753	$28,899,000	$91,476,000	2,489	$63,492,000	$223,296,000
Sidney	Sidney-Richland Municipal Airport	10,128	29	$607,000	$2,101,000	12	$458,000	$1,449,000	41	$1,065,000	$3,550,000
West Yellowstone	Yellowstone Airport	13,728	105	$2,349,000	$8,103,000	46	$1,776,000	$5,621,000	151	$4,125,000	$13,724,000
Wolf Point	L. M. Clayton Airport	1,642	5	$101,000	$392,000	2	$86,000	$273,000	7	$187,000	$665,000
Total		**1,054,259**	**9,055**	**$191,349,000**	**$695,639,000**	**3,976**	**$152,372,000**	**$482,363,000**	**13,031**	**$343,721,000**	**$1,178,002,000**

Note: Table B.3 includes general aviation spending at commercial airports. Sources: Commercial passenger survey, Grau 2016, and IMPLAN 2014. Calculations by EDR Group.

Table B.4. Economic Impacts by Airport, Visitor Spending at General Aviation Airports

Airport City	Airport	Visitors	Direct Impacts			Spin-off Effects			Total Impacts		
			Jobs	Payroll ($)	Economic Impacts ($)	Jobs	Payroll ($)	Economic Impacts ($)	Jobs	Payroll ($)	Economic Impacts ($)
Anaconda	Bowman Field Airport	596	1	$36,000	$110,000	1	$24,000	$75,000	2	$60,000	$185,000
Baker	Baker Municipal Airport	5,425	15	$310,000	$999,000	6	$218,000	$687,000	21	$528,000	$1,686,000
Big Sandy	Big Sandy Airport	446	0	$6,000	$19,000	0	$4,000	$13,000	0	$10,000	$32,000
Big Timber	Big Timber Airport	760	1	$43,000	$140,000	1	$31,000	$96,000	2	$74,000	$236,000
Bigfork	Ferndale Airfield	1,250	0	$6,000	$17,000	0	$4,000	$11,000	0	$10,000	$28,000
Bridger	Bridger Municipal Airport	1,050	1	$15,000	$45,000	0	$9,000	$30,000	1	$24,000	$75,000
Broadus	Broadus Airport	112	0	$2,000	$5,000	0	$1,000	$3,000	0	$3,000	$8,000
Chester	Liberty County Airport	2,468	1	$34,000	$105,000	1	$22,000	$70,000	2	$56,000	$175,000
Chinook	Edgar G. Obie Airport	1,200	1	$17,000	$51,000	0	$11,000	$34,000	1	$28,000	$85,000
Choteau	Choteau Airport	960	2	$55,000	$177,000	1	$39,000	$122,000	3	$94,000	$299,000
Circle	Circle Town County Airport	750	0	$11,000	$32,000	0	$7,000	$21,000	0	$18,000	$53,000
Colstrip	Colstrip Airport	25	0	$0	$1,000	0	$0	$1,000	0	$0	$2,000
Columbus	Woltermann Memorial Airport	1,620	1	$23,000	$69,000	0	$14,000	$46,000	1	$37,000	$115,000
Conrad	Conrad Airport	338	0	$5,000	$14,000	0	$3,000	$10,000	0	$8,000	$24,000
Cut Bank	Cut Bank International Airport	1,140	3	$65,000	$210,000	1	$46,000	$144,000	4	$111,000	$354,000
Deer Lodge	Deer Lodge-City-County Airport	1,500	4	$85,000	$276,000	2	$60,000	$190,000	6	$145,000	$466,000
Dutton	Dutton Airport	38	0	$1,000	$2,000	0	$0	$1,000	0	$1,000	$3,000
Ekalaka	Ekalaka Airport	128	0	$2,000	$5,000	0	$1,000	$4,000	0	$3,000	$9,000
Ennis	Ennis - Big Sky Airport	15,372	40	$931,000	$2,831,000	16	$618,000	$1,946,000	56	$1,549,000	$4,777,000
Eureka	Eureka Airport	750	1	$42,000	$138,000	1	$30,000	$95,000	2	$72,000	$233,000
Fairfield	Fairfield Airport	150	0	$2,000	$6,000	0	$1,000	$4,000	0	$3,000	$10,000
Fairview	Fairview Airport	75	0	$0	$1,000	0	$0	$1,000	0	$0	$2,000
Forsyth	Tillitt Field Airport	900	0	$13,000	$38,000	0	$8,000	$25,000	0	$21,000	$63,000
Fort Benton	Fort Benton Airport	1,053	3	$60,000	$194,000	1	$42,000	$133,000	4	$102,000	$327,000
Fort Peck	Fort Peck Airport	38	0	$1,000	$2,000	0	$0	$1,000	0	$1,000	$3,000
Gardiner	Gardiner Airport	1,360	1	$20,000	$58,000	0	$12,000	$38,000	1	$32,000	$96,000
Geraldine	Geraldine Airport	10	0	$0	$0	0	$0	$0	0	$0	$0
Hamilton	Ravalli County Airport	33,215	88	$1,876,000	$6,117,000	34	$1,335,000	$4,204,000	122	$3,211,000	$10,321,000
Hardin	Big Horn County Airport	350	0	$5,000	$15,000	0	$3,000	$10,000	0	$8,000	$25,000
Harlem	Harlem Airport	680	0	$9,000	$29,000	0	$6,000	$19,000	0	$15,000	$48,000
Harlowton	Harlowton Airport	900	0	$13,000	$38,000	0	$8,000	$25,000	0	$21,000	$63,000
Hot Springs	Hot Springs Airport	120	0	$2,000	$5,000	0	$1,000	$3,000	0	$3,000	$8,000
Hysham	Hysham Airport	165	0	$1,000	$2,000	0	$0	$1,000	0	$1,000	$3,000
Jordan	Jordan Airport	2	0	$0	$0	0	$0	$0	0	$0	$0
Kalispell	Kalispell City Airport	3,450	26	$548,000	$1,711,000	9	$366,000	$1,152,000	35	$914,000	$2,863,000
Laurel	Laurel Municipal Airport	4,000	10	$228,000	$737,000	4	$161,000	$506,000	14	$389,000	$1,243,000
Lewistown	Lewistown Municipal Airport	13,600	34	$774,000	$2,505,000	14	$547,000	$1,721,000	48	$1,321,000	$4,226,000

Airport City	Airport	Visitors	Direct Impacts			Spin-off Effects			Total Impacts		
			Jobs	Payroll ($)	Economic Impacts ($)	Jobs	Payroll ($)	Economic Impacts ($)	Jobs	Payroll ($)	Economic Impacts ($)
Libby	Libby Airport	875	2	$49,000	$161,000	1	$35,000	$111,000	3	$84,000	$272,000
Lincoln	Lincoln Airport	800	0	$11,000	$34,000	0	$7,000	$23,000	0	$18,000	$57,000
Livingston	Mission Field Airport	4,250	12	$257,000	$783,000	4	$171,000	$538,000	16	$428,000	$1,321,000
Malta	Malta Airport	1,000	1	$14,000	$43,000	0	$9,000	$28,000	1	$23,000	$71,000
Miles City	Frank Wiley Field Airport	1,875	4	$107,000	$345,000	2	$75,000	$237,000	6	$182,000	$582,000
Plains	Plains Airport	540	0	$8,000	$23,000	0	$5,000	$15,000	0	$13,000	$38,000
Plentywood	Sher-Wood Airport	206	0	$3,000	$9,000	0	$2,000	$6,000	0	$5,000	$15,000
Polson	Polson Airport	1,875	4	$106,000	$345,000	2	$75,000	$237,000	6	$181,000	$582,000
Poplar	Poplar Municipal Airport	3,440	10	$197,000	$634,000	4	$138,000	$435,000	14	$335,000	$1,069,000
Red Lodge	Red Lodge Airport	304	0	$4,000	$13,000	0	$3,000	$9,000	0	$7,000	$22,000
Ronan	Ronan Airport	900	2	$51,000	$166,000	1	$36,000	$114,000	3	$87,000	$280,000
Roundup	Roundup Airport	1,650	4	$94,000	$304,000	2	$66,000	$209,000	6	$160,000	$513,000
Saint Ignatius	Saint Ignatius Airport	1,000	1	$14,000	$43,000	0	$9,000	$28,000	1	$23,000	$71,000
Scobey	Scobey Airport	340	0	$19,000	$63,000	0	$14,000	$43,000	0	$33,000	$106,000
Seeley Lake	Seeley Lake Airport	1,706	1	$24,000	$73,000	0	$15,000	$48,000	1	$39,000	$121,000
Shelby	Shelby Airport	300	0	$17,000	$55,000	0	$12,000	$38,000	0	$29,000	$93,000
Stanford	Stanford Airport/Biggerstaff Field	1,000	1	$14,000	$43,000	0	$9,000	$28,000	1	$23,000	$71,000
Stevensville	Stevensville Airport	7,492	19	$423,000	$1,380,000	8	$301,000	$948,000	27	$724,000	$2,328,000
Superior	Mineral County Airport	105	0	$1,000	$4,000	0	$1,000	$3,000	0	$2,000	$7,000
Terry	Terry Airport	540	0	$8,000	$23,000	0	$5,000	$15,000	0	$13,000	$38,000
Thompson Falls	Thompson Falls Airport	2,700	1	$38,000	$115,000	1	$24,000	$76,000	2	$62,000	$191,000
Three Forks	Three Forks Airport	3,250	9	$197,000	$599,000	3	$131,000	$411,000	12	$328,000	$1,010,000
Townsend	Canyon Ferry Airport	588	0	$3,000	$8,000	0	$2,000	$5,000	0	$5,000	$13,000
Townsend	Townsend Airport	2,520	1	$38,000	$108,000	1	$22,000	$71,000	2	$60,000	$179,000
Turner	Turner Airport	240	0	$3,000	$10,000	0	$2,000	$7,000	0	$5,000	$17,000
Twin Bridges	Twin Bridges Airport	120	0	$7,000	$22,000	0	$5,000	$15,000	0	$12,000	$37,000
White Sulphur Springs	White Sulphur Springs Airport	829	0	$12,000	$35,000	0	$7,000	$23,000	0	$19,000	$58,000
Total		**136,441**	**305**	**$6,960,000**	**$22,145,000**	**121**	**$4,813,000**	**$15,163,000**	**426**	**$11,773,000**	**$37,308,000**

Sources: Airport managers survey, general aviation passenger survey, MDT, and IMPLAN 2014. Calculations by EDR Group.

Table B.5. Economic Impacts of Airport, Summary Results

Airport City	Airport	Direct Impacts			Spin-off Effects ($)	Total Impacts		
		On-Airport	Visitor Spending	Construction		Jobs	Payroll ($)	Economic Impacts ($)
Anaconda	Bowman Field Airport	$20,000	$110,000	$32,000	$162,000	3	$102,000	$276,000
Baker	Baker Municipal Airport	$2,189,000	$999,000	$1,522,000	$4,710,000	57	$2,106,000	$7,818,000
Big Sandy	Big Sandy Airport	$1,599,000	$19,000	$450,000	$2,068,000	19	$805,000	$3,817,000

Airport City	Airport	Direct Impacts			Spin-off Effects ($)	Total Impacts		
		On-Airport	Visitor Spending	Construction		Jobs	Payroll ($)	Economic Impacts ($)
Big Timber	Big Timber Airport	$1,005,000	$140,000	$225,000	$1,370,000	12	$513,000	$2,176,000
Bigfork	Ferndale Airfield	$133,000	$17,000	$0	$150,000	2	$96,000	$283,000
Billings	Billings Logan International Airport	$148,365,000	$93,728,000	$7,296,000	$249,389,000	3,265	$118,844,000	$408,762,000
Bozeman	Bozeman Yellowstone International Airport	$122,027,000	$300,089,000	$4,214,000	$426,330,000	7,024	$207,325,000	$717,384,000
Bridger	Bridger Municipal Airport	$57,000	$45,000	$16,000	$118,000	2	$88,000	$211,000
Broadus	Broadus Airport	$20,000	$5,000	$13,000	$38,000	1	$18,000	$68,000
Butte	Bert Mooney Airport	$14,636,000	$6,947,000	$3,241,000	$24,824,000	322	$11,399,000	$41,000,000
Chester	Liberty County Airport	$918,000	$105,000	$67,000	$1,090,000	18	$663,000	$1,763,000
Chinook	Edgar G. Obie Airport	$74,000	$51,000	$357,000	$482,000	7	$276,000	$808,000
Choteau	Choteau Airport	$49,000	$177,000	$235,000	$461,000	7	$274,000	$776,000
Circle	Circle Town County Airport	$328,000	$32,000	$14,000	$374,000	2	$157,000	$555,000
Colstrip	Colstrip Airport	$30,000	$1,000	$380,000	$411,000	4	$205,000	$677,000
Columbus	Woltermann Memorial Airport	$251,000	$69,000	$119,000	$439,000	7	$248,000	$772,000
Conrad	Conrad Airport	$139,000	$14,000	$88,000	$241,000	4	$151,000	$450,000
Cut Bank	Cut Bank International Airport	$695,000	$210,000	$3,333,000	$4,238,000	53	$2,217,000	$6,972,000
Deer Lodge	Deer Lodge-City-County Airport	$143,000	$276,000	$140,000	$559,000	11	$306,000	$968,000
Dillon	Dillon Airport	$367,000	$0	$0	$367,000	6	$226,000	$683,000
Dutton	Dutton Airport	$192,000	$2,000	$0	$194,000	5	$146,000	$299,000
Ekalaka	Ekalaka Airport	$38,000	$5,000	$257,000	$300,000	4	$161,000	$500,000
Ennis	Ennis - Big Sky Airport	$549,000	$2,831,000	$875,000	$4,255,000	75	$2,341,000	$7,224,000
Eureka	Eureka Airport	$13,000	$138,000	$249,000	$400,000	6	$198,000	$662,000
Fairfield	Fairfield Airport	$50,000	$6,000	$5,000	$61,000	1	$71,000	$115,000
Fairview	Fairview Airport	$105,000	$1,000	$0	$106,000	3	$139,000	$205,000
Forsyth	Tillitt Field Airport	$363,000	$38,000	$710,000	$1,111,000	15	$688,000	$1,902,000
Fort Benton	Fort Benton Airport	$8,270,000	$194,000	$587,000	$9,051,000	64	$2,739,000	$12,307,000
Fort Peck	Fort Peck Airport	$2,000	$2,000	$8,000	$12,000	0	$7,000	$20,000
Gardiner	Gardiner Airport	$40,000	$58,000	$0	$98,000	2	$83,000	$173,000
Geraldine	Geraldine Airport	$49,000	$0	$41,000	$90,000	2	$57,000	$142,000
Glasgow	Glasgow International Airport	$24,390,000	$1,207,000	$2,749,000	$28,346,000	227	$11,392,000	$47,274,000
Glendive	Dawson Community Airport	$939,000	$305,000	$693,000	$1,937,000	34	$1,256,000	$3,425,000
Great Falls	Great Falls International Airport	$118,099,000	$38,132,000	$3,867,000	$160,098,000	2,123	$89,468,000	$252,945,000
Hamilton	Ravalli County Airport	$5,816,000	$6,117,000	$179,000	$12,112,000	204	$7,492,000	$20,090,000
Hardin	Big Horn County Airport	$10,000	$15,000	$1,512,000	$1,537,000	19	$785,000	$2,500,000
Harlem	Harlem Airport	$22,000	$29,000	$164,000	$215,000	2	$102,000	$356,000
Harlowton	Wheatland County at Harlowton Airport	$1,000	$38,000	$0	$39,000	0	$21,000	$65,000
Havre	Havre City-County Airport	$1,667,000	$1,269,000	$1,133,000	$4,069,000	59	$1,962,000	$6,668,000
Helena	Helena Regional Airport	$164,214,000	$24,232,000	$2,333,000	$190,779,000	2,000	$79,543,000	$284,656,000
Hot Springs	Hot Springs Airport	$0	$5,000	$10,000	$15,000	0	$8,000	$24,000

Airport City	Airport	Direct Impacts			Spin-off Effects ($)	Total Impacts		
		On-Airport	Visitor Spending	Construction		Jobs	Payroll ($)	Economic Impacts ($)
Hysham	Hysham Airport	$0	$2,000	$0	$2,000	0	$1,000	$3,000
Jordan	Jordan Airport	$148,000	$0	$77,000	$225,000	2	$145,000	$426,000
Kalispell	Glacier Park International Airport	$48,775,000	$87,314,000	$2,495,000	$138,584,000	2,154	$63,245,000	$228,473,000
Kalispell	Kalispell City Airport	$2,392,000	$1,711,000	$0	$4,103,000	68	$2,053,000	$6,709,000
Laurel	Laurel Municipal Airport	$5,938,000	$737,000	$345,000	$7,020,000	66	$2,416,000	$11,084,000
Lewistown	Lewistown Municipal Airport	$23,462,000	$2,505,000	$455,000	$26,422,000	426	$17,363,000	$43,043,000
Libby	Libby Airport	$1,279,000	$161,000	$214,000	$1,654,000	27	$853,000	$2,554,000
Lincoln	Lincoln Airport	$0	$34,000	$81,000	$115,000	1	$58,000	$189,000
Livingston	Mission Field Airport	$731,000	$783,000	$256,000	$1,770,000	25	$803,000	$2,929,000
Malta	Malta Airport	$280,000	$43,000	$479,000	$802,000	11	$412,000	$1,373,000
Miles City	Frank Wiley Field Airport	$1,801,000	$345,000	$1,458,000	$3,604,000	52	$2,636,000	$5,934,000
Missoula	Missoula International Airport	$174,181,000	$131,820,000	$6,313,000	$312,314,000	4,492	$171,432,000	$537,927,000
Plains	Plains Airport	$10,000	$23,000	$40,000	$73,000	0	$35,000	$122,000
Plentywood	Sher-Wood Airport	$287,000	$9,000	$356,000	$652,000	9	$434,000	$1,097,000
Polson	Polson Airport	$1,642,000	$345,000	$337,000	$2,324,000	29	$872,000	$3,360,000
Poplar	Poplar Municipal Airport	$427,000	$634,000	$365,000	$1,426,000	25	$836,000	$2,531,000
Red Lodge	Red Lodge Airport	$284,000	$13,000	$65,000	$362,000	4	$189,000	$643,000
Ronan	Ronan Airport	$4,299,000	$166,000	$122,000	$4,587,000	84	$4,045,000	$7,999,000
Roundup	Roundup Airport	$613,000	$304,000	$512,000	$1,429,000	14	$591,000	$2,161,000
Saint Ignatius	Saint Ignatius Airport	$401,000	$43,000	$20,000	$464,000	4	$200,000	$675,000
Scobey	Scobey Airport	$930,000	$63,000	$125,000	$1,118,000	18	$754,000	$2,197,000
Seeley Lake	Seeley Lake Airport	$7,000	$73,000	$0	$80,000	1	$41,000	$135,000
Shelby	Shelby Airport	$230,000	$55,000	$1,311,000	$1,596,000	20	$802,000	$2,667,000
Sidney	Sidney-Richland Municipal Airport	$2,716,000	$2,101,000	$1,530,000	$6,347,000	114	$3,821,000	$11,409,000
Stanford	Stanford Airport/Biggerstaff Field	$1,000	$43,000	$252,000	$296,000	5	$152,000	$482,000
Stevensville	Stevensville Airport	$3,374,000	$1,380,000	$314,000	$5,068,000	68	$1,933,000	$7,780,000
Superior	Mineral County Airport	$20,000	$4,000	$316,000	$340,000	5	$165,000	$560,000
Terry	Terry Airport	$6,000	$23,000	$115,000	$144,000	2	$74,000	$236,000
Thompson Falls	Thompson Falls Airport	$5,000	$115,000	$71,000	$191,000	3	$98,000	$317,000
Three Forks	Three Forks Airport	$4,194,000	$599,000	$187,000	$4,980,000	54	$2,071,000	$8,261,000
Townsend	Canyon Ferry Airport	$288,000	$8,000	$64,000	$360,000	8	$237,000	$612,000
Townsend	Townsend Airport	$7,000	$108,000	$0	$115,000	2	$62,000	$193,000
Turner	Turner Airport	$50,000	$10,000	$243,000	$303,000	7	$170,000	$509,000
Twin Bridges	Twin Bridges Airport	$620,000	$22,000	$4,355,000	$4,997,000	61	$2,537,000	$8,265,000
West Yellowstone	Yellowstone Airport	$7,428,000	$8,103,000	$781,000	$16,312,000	253	$9,684,000	$27,226,000
White Sulphur Springs	White Sulphur Springs Airport	$4,000	$35,000	$240,000	$279,000	4	$141,000	$456,000
Wolf Point	L. M. Clayton Airport	$6,440,000	$392,000	$139,000	$6,971,000	60	$2,471,000	$10,807,000
Total		**$911,144,000**	**$717,784,000**	**$61,147,000**	**$1,690,075,000**	**23,849**	**$838,510,000**	**$2,779,115,000**

Sources: General aviation survey, commercial passenger survey, on-airport survey, airport managers survey, MDT, and IMPLAN 2014. Calculations by EDR Group.

Appendix C. IMPLAN Sector Usage

To determine the full range of direct economic impacts and indirect and induced (i.e., spin-off) economic effects, this study utilized the IMPLAN model system of IMPLAN, LLC. IMPLAN is the most widely used input-output economic modeling system in the U.S., with a client list of 500 public and private agencies including several federal and numerous state agencies. It utilizes the U.S. Commerce Department's National Income and Product Accounts data on inter-industry relationships (also known as input-output structural matrices), countywide employment and income data from the Bureau of Economic Analysis (BEA) and Bureau of Labor Statistics (BLS), and its own industry- and county-specific estimates of local purchasing rates (i.e., regional purchase coefficients).

IMPLAN is enhanced over most other input-output models in that it also includes coverage of public-sector and consumer activity reflected in its social accounting matrix. The industry detail is at the level of 536 industries and is based on the categories of the U.S. Bureau of Economic Analysis (BEA), which correspond to the two- to five-digit groups in the North American Industry Classification System (NAICS).

For this study, the direct job, payroll, and business revenue impacts for on-airport activity, visitor spending, and capital expenditures on construction was documented through surveys, then assigned to specific sector groups based on the EDR Group's experience in aviation. Industry relationships between jobs and payroll and payroll and output were applied using regional ratios to more accurately reflect differing levels of productivity for different regions of Montana.

Statewide multipliers were used to estimate spin-off (i.e., indirect and induced) effects to reflect all additional economic activity supported by the statewide aviation system. Montana airports facilitation of air cargo and support of air-reliant industries was based on the two and three-digit NAICS. Assessment of retail impacts was adjusted to account for retail markup margins and the concentration of sales in airports and in visitor industries when modeling for retail effects were driven by gross business sales (when retail analyses were driven by retail employment, it was assumed that employment is based on "after-margin" effects). Retail portions of multiplier effects also incorporate these margins.

The classification schemes used for this study for on-airport (including construction) and visitor spending impacts are shown in Table C.1 and Table C.2. Some non-aviation related tenants were assigned to one of the 536 available industry sectors per the specific service or product they provide.

Table C.1. Industry Classification of On-Airport Industries

Airport Tenants Classification	IMPLAN Sectors Used
Agricultural spraying	Support activities for agriculture and forestry
Passenger airlines	Air transportation
Freight airlines	Air transportation and couriers
Fixed-based operator (FBO)	Support activities for transportation
Aerospace	Aircraft engine and parts manufacturing and repair
Military	Employment and payroll of federal government military
Local government	State and local government
State government	
Federal government	Immigration, TSA, FBI
	U.S. Customs and Border Patrol (CBP)
	National Weather Service
Distribution	Trucking / warehousing
Wholesale	Wholesale trade business
Security	Security aviation firms
Construction	Highways and streets
	Commercial structures
	Non-residential structures
	Maintenance and repair
Retail	Electronics / appliance stores Food and beverage Health and labor care Clothing stores Sporting goods stores Miscellaneous retail
Food and beverage (includes catering firms)	Full-service restaurants Limited-service restaurants All other food and drinking places
Car rental	Car rental
Ground transportation (including taxis, limos, buses, vans, and transit)	Transit and ground passenger transportation
Banking and financial Services	Depository credit Securities and commodities Funds and trusts
Travel agency	Travel arrangement and reservation services
Services	Educational institutions Electronic repair services Insurance Medical services Other support services Telecommunications Waste management

Airport Tenants Classification	IMPLAN Sectors Used
	Health care services
Reliant services	Architectural / engineering Business support Computer systems design services Facilities support Financial services Management, scientific, and technical Parking and miscellaneous

Source: IMPLAN 2014.

Table C.2. Industry Classification of Visitor-Serving Industries

Visitor Spending Classification	IMPLAN Sectors Used
Retail	Electronics / appliance stores
	Food and beverage
	Health and labor
	Clothing stores
	Sporting goods
	General merchandise
	Miscellaneous retail
Entertainment	Performing arts
	Spectator sports
	Artists, writers, and performers
	Museums, zoos, and parks
	Amusement parks and arcades
	Gambling industries
	Fitness and recreational sports centers
	Bowling centers
	Other amusement / recreation
Restaurant	Full-service restaurants
	Limited-service restaurants
	All other food and drinking places
Hotel	Hotels and motels
	Other accommodations
Transportation	Transit and ground passenger transportation
	Scenic and sightseeing
	Support activities
	Gas stations

Source: IMPLAN 2014.

Appendix D. Visitor Spending Profiles by Montana State Aviation Systems Plan Classification

Table D.1 provides a complete break-down of spending of airport spending profiles by Montana State Aviation Systems Plan classification.

Table D.1. Airport Spending Profiles by Montana State Aviation System Plan Classification

City	Airport	Spending per Visitor ($)
Primary commercial service		
Bozeman	Bozeman Yellowstone International	$496
Kalispell	Glacier Park International	$496
Billings	Billings Logan International	$339
Great Falls	Great Falls International	$339
Helena	Helena Regional	$339
Missoula	Missoula International	$339
EAS commercial service		
Butte	Bert Mooney	$184
Glendive	Dawson Community	$184
Glasgow	Glasgow International	$184
Havre	Havre City-County	$184
Wolf Point	L. M. Clayton	$184
Lewistown	Lewistown Municipal	$184
Miles City	Miles City	$184
Sidney	Sidney-Richland Municipal	$184
West Yellowstone	Yellowstone	$184
General aviation level 1		
Baker	Baker Municipal	$184
Big Timber	Big Timber	$184
Anaconda	Bowman Field	$184
Choteau	Choteau	$184
Cut Bank	Cut Bank Municipal	$184
Deer Lodge	Deer Lodge-City-County	$184
Dillon	Dillon	$184
Ennis	Ennis - Big Sky	$184
Eureka	Eureka	$184
Fort Benton	Fort Benton	$184
Kalispell	Kalispell City	$184
Laurel	Laurel Municipal	$184
Libby	Libby	$184
Livingston	Mission Field	$184
Poison	Poison	$184

City	Airport	Spending per Visitor ($)
Poplar	Poplar Municipal	$184
Hamilton	Ravalli County	$184
Ronan	Ronan	$184
Roundup	Roundup	$184
Scobey	Scobey	$184
Shelby	Shelby	$184
Stevensville	Stevensville	$184
Three Forks	Three Forks	$184
Twin Bridges	Twin Bridges	$184
General aviation level 2		
Broadus	Broadus	$43
Circle	Circle Town County	$43
Colstrip	Colstrip	$43
Columbus	Columbus (Wolterman Memorial)	$43
Conrad	Conrad	$43
Chinook	Edgar G. Obie	$43
Ekalaka	Ekalaka	$43
Gardiner	Gardiner	$43
Chester	Liberty County	$43
Malta	Malta	$43
Superior	Mineral County	$43
Plains	Plains	$43
Red Lodge	Red Lodge	$43
Plentywood	Sher-Wood	$43
St. Ignatius	St. Ignatius	$43
Stanford	Stanford	$43
Forsyth	Tillitt Field	$43
Townsend	Townsend	$43
Harlowton	Wheatland County	$43
General aviation level 3		
White Sulphur Springs	White Sulphur Springs	$43
Hardin	Big Horn County	$43
Big Sandy	Big Sandy	$43
Bridger	Bridger Municipal	$43
Dutton	Dutton	$43
Fairfield	Fairfield	$43
Fort Peck	Fort Peck	$43
Harlem	Harlem	$43
Hot Springs	Hot Springs	$43
Jordan	Jordan	$43

City	Airport	Spending per Visitor ($)
Lincoln	Lincoln	$43
Seeley Lake	Seeley Lake	$43
Terry	Terry	$43
Thompson Falls	Thompson Falls	$43
Turner	Turner	$43
General aviation level 4		
Townsend	Canyon Ferry	$14
Bigfork	Ferndale Airfield	$14
Harlem	Fort Belknap Agency	$14
Geraldine	Geraldine	$14
Hysham	Hysham	$14

Source: Morrison Maierle 2015 and general aviation passenger survey. Calculations by EDR Group.

Appendix E. Hospital Survey Analysis

Executive Summary

A survey of Montana hospitals conducted by University of Montana's Bureau of Business and Economic Research (UM BBER) found that essentially all hospitals in the state depend on airports for their operations. The survey found that:

- 87.2 percent of Montana hospitals transport at least some patients to or from their facilities via air ambulance
- 66.7 percent of all Montana hospitals have a helipad
- 41 percent of Montana hospitals use air cargo for drug shipments and supply shipments
- 38.5 percent of Montana airports use air cargo or express shipping for diagnostics or testing
- 30.8 percent of Montana airports use air cargo or express shipping for equipment

Introduction

This component of the Montana Airports 2016 Economic Impact Study presents the results of a survey of Montana hospitals conducted by University of Montana's Bureau of Business and Economic Research (BBER). The survey results provide information that broadly describes the magnitude and types of Montana airport use by the state's hospitals and gauges the importance of Montana airports to hospitals.

The findings of the hospital survey are presented in three sections. The first section briefly describes the methods used for this survey and presents a description of the responding hospitals. The second section presents the results of the survey administered to hospitals. The third section presents the questionnaire in full and provides complete topline results.

Methods

Data for this survey were collected through the administration of a questionnaire via mail and the Internet conducted by UM BBER. Data were collected during the period from June 27, 2016 through August 5, 2016. The questionnaire was developed and formatted based on a version administered in 2008. The survey population included 61 hospitals that are members of the Montana Hospital Association. The population list was provided by the Montana Hospital Association.

Thirty-nine completed questionnaires were collected from Montana hospitals, which reflects a 64 percent response rate. It should be noted that the 2008 study had a response rate of 54 percent. Because the entire population of Montana hospitals was surveyed, there is no sampling error in the data presented by this report. Following receipt and entry of the survey responses, data-appropriate variable and value labels were added to the data set. A statistical analysis of the survey was conducted that utilized frequencies, cross-tabulations, standard measures of central tendency (i.e., mean, median, and mode), sums, and ratios.

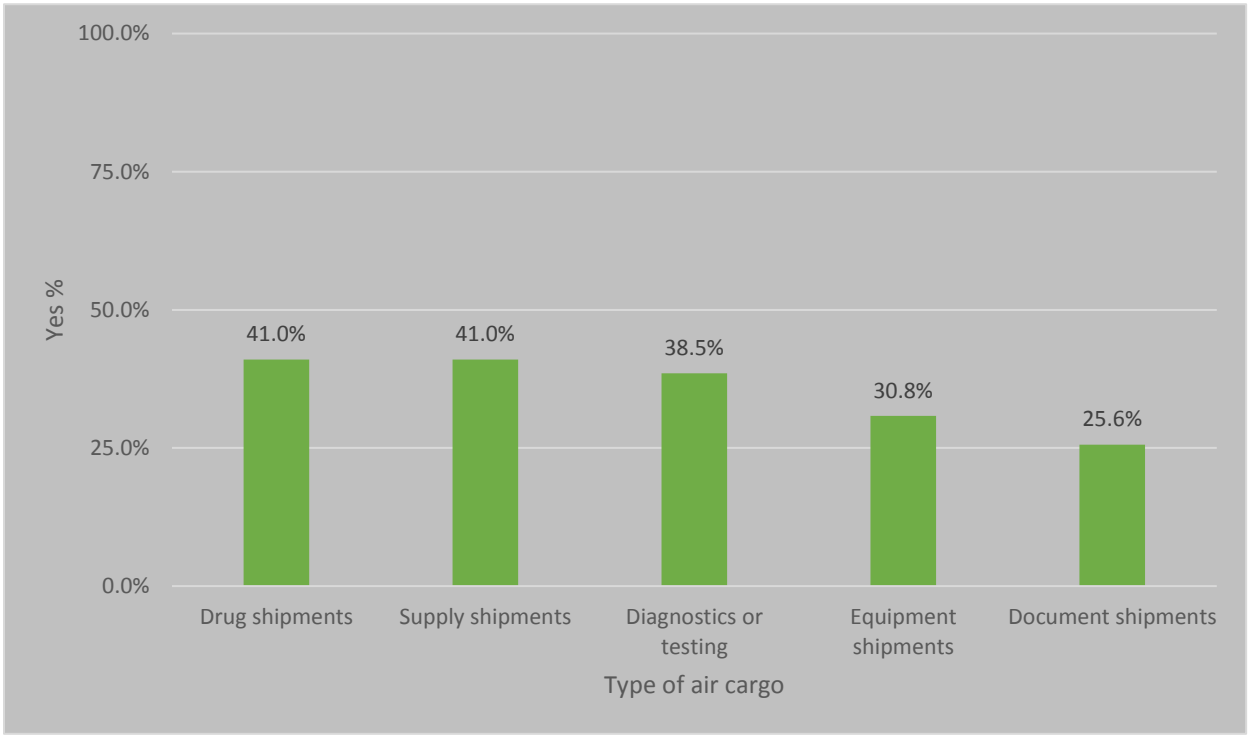
Results

Does your facility use air cargo or air express shipment for any of the following purposes?

- Drug shipments
- Supply shipments
- Diagnostics or testing
- Equipment shipments
- Document shipments

A substantial proportion of Montana's hospitals rely upon air cargo transportation. Two of every five Montana hospitals (41 percent) use air cargo for drug shipments and supply shipments. A nearly identical proportion (38.5 percent) use air cargo or express shipping for diagnostics or testing. Three in every 10 Montana hospitals (30.8 percent) use air cargo or express shipping for equipment. One-quarter of Montana hospitals use air cargo or express shipping for documents. Figure E.1**Error! Reference source not found.** illustrates these findings.

Figure E.1. Type of Air Cargo Used by Montana Hospitals

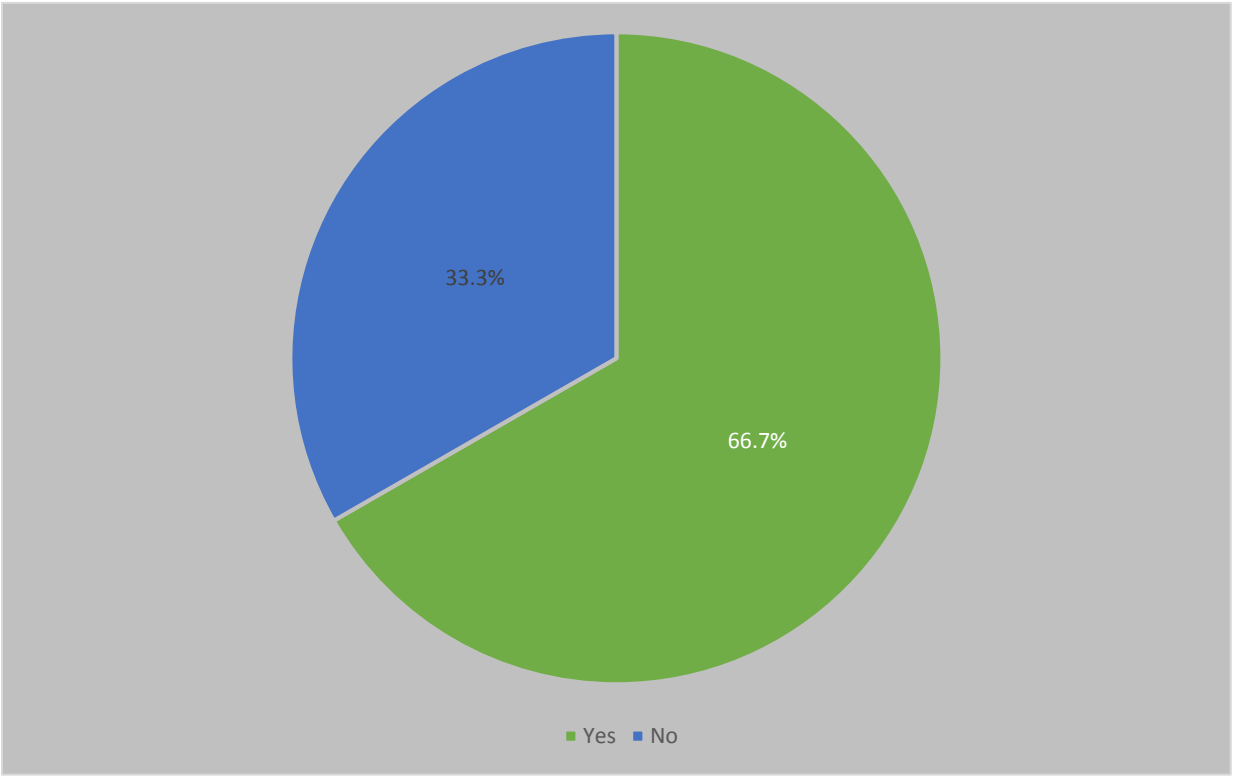


Source: Hospital survey. Analysis by UM BBER.

Does your facility have a helipad?

As shown in Figure E.2, two-thirds of all Montana hospitals (66.7 percent) have a helipad. Over the broad range of hospitals, in terms of beds per hospital and location, the average (mean) Montana hospital helipad is used 14.7 times per month. However, a small proportion of Montana hospital helipads are used considerably more frequently. The maximum reported number of uses over a one-month period was 80.

Figure E.2. Proportion of Montana Hospitals with a Helipad



Source: Hospital survey. Analysis by UM BBER.

Are patients transferred to or from your facility via air ambulance?

A large proportion of Montana hospitals (87.2 percent) transport at least some patients to or from their facilities via air ambulance. The top three facilities that transfer patients via air ambulance are:

- Billings Clinic, Billings
- St. Vincent's Hospital, Billings
- Benefis Hospital, Great Falls

Table E.1 presents the full rankings of facilities that transfer patients via air ambulance. Ties in rankings are noted when present.

Table E.1. Facilities to Which Montana Hospitals Transfer Patients Via Air

Rank	Location (Hospital, City)
1	Billings Clinic, Billings
1	St Vincent's, Billings
3	Benefis, Great Falls
4	Kalispell Regional, Kalispell
5	St Patrick's, Missoula
6	Harborview, Seattle
6	University of Utah, Salt Lake City
8	Community Medical Center, Missoula
9	Holy Rosary, Miles City
9	Bozeman Health Deaconess, Bozeman
9	Northern Montana Hospital, Havre
9	St. Peters, Helena

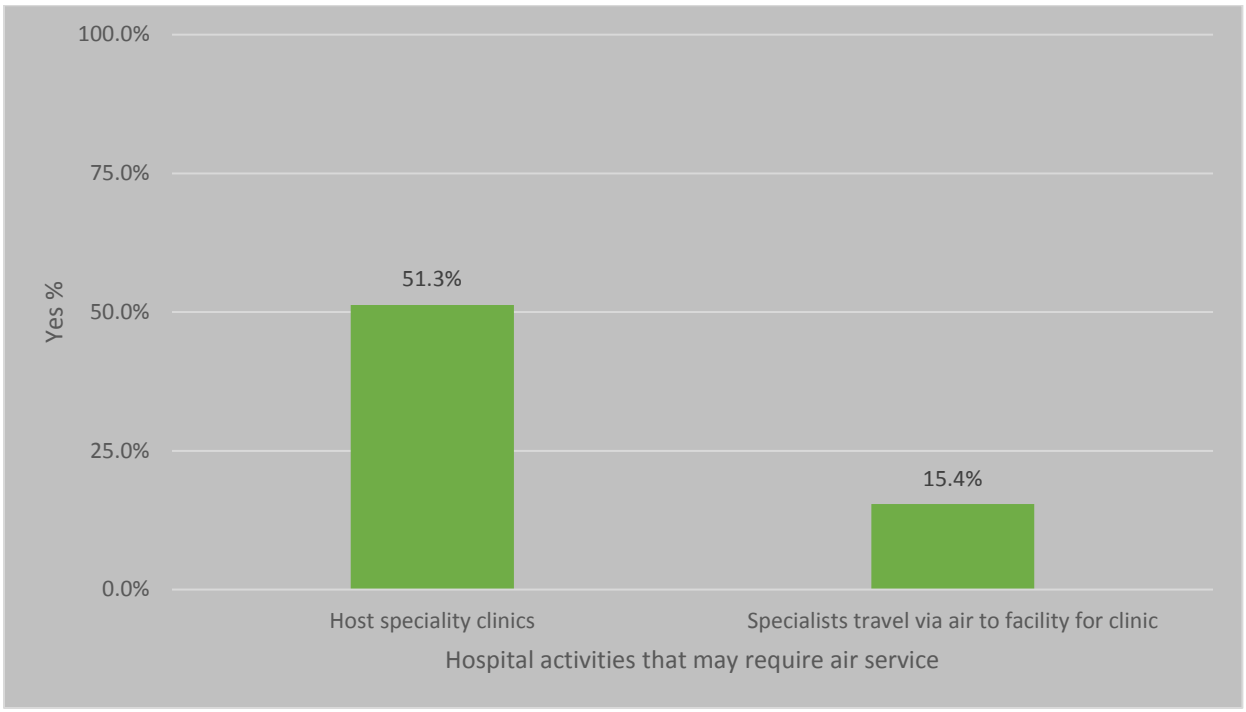
Source: Hospital survey. Analysis by UM BBER.

Does your facility host specialty clinics, for example cardiology or oncology clinics? Do specialists travel to your facility via aircraft for these clinics?

A majority of Montana hospitals (51.3 percent) host specialty clinics (e.g., cardiology or oncology). Just under one of every seven Montana hospitals (15.4 percent) host specialty clinics that require medical professionals who travel via air to deliver services. **Error! Reference s ource not found.**Figure E.3 presents these survey results.

Glacier Park International Airport and Billings Logan International Airport are most frequently used by medical professionals to travel to these specialty clinics.

Figure E.3. Proportion of Montana Hospitals that Fly Specialists to their Facilities to Host Specialty Clinics



Source: Hospital survey. Analysis by UM BBER.

Does your facility conduct specialty clinics at offsite locations that require your staff to fly to the offsite location?

One Montana hospital conducts specialty clinics at offsite locations that require hospital staff to fly-in to deliver services using commercial service and general aviation facilities. The target communities are small and rural. Communities supported by these offsite specialty clinics are:

- Glendive, MT
- Glasgow, MT
- Williston, ND

The responding hospital reported that it conducts five offsite clinics per month with a total of five doctors.

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Appendix F. Business Use of Montana Airports

Executive Summary

Montana's businesses depend heavily on the state's airports. This is the primary conclusion drawn from the survey of Montana businesses conducted in 2016 by the University of Montana's Bureau of Business and Economic Research (UM BBER) as a part of the Montana Airports Economic Impact Study. The survey of 604 randomly sampled Montana businesses found that:

- More than one-third of Montana businesses (36.7 percent) have clients or vendors who use commercial airlines to visit Montana business sites
- Just under half of all Montana employers (46.1 percent) have employees who take commercial airline trips for business
- A majority of Montana businesses (51.9 percent) reported using some type of air cargo service
    - About three in ten Montana businesses (30.3 percent) use air cargo service for documents weighing less than two pounds
    - Nearly two-fifths of Montana businesses (39.1 percent) use air cargo service to ship or receive parcels weighing between two and 70 pounds
    - Just over one in ten Montana businesses (11.7 percent) use air cargo service for freight that weighs over 70 pounds
- 15.1 percent of all employers reported that clients or vendors use general aviation aircraft to visit their local business sites
- The most common airports from which visitors originate via commercial service are Seattle–Tacoma, Denver, Minneapolis St. Paul, Salt Lake City, and Chicago O'Hare international airports.
- The most common airports from which visitors originate via general aviation service are Billings Logan International, Denver International, Seattle–Tacoma International, Great Falls International and Helena Regional airports.

The survey also found that larger Montana businesses depend more heavily on airports than do smaller businesses in all categories except the use of air cargo services. For the purposes of this survey business size was defined by number of employees. The survey respondents reported that:

- More of Montana's largest businesses (52.2 percent), those businesses with 21+ employees, have clients or vendors who use commercial airlines to visit Montana business sites than do Montana's smallest businesses (29.6 percent), those with 3-5 employees
- Montana firms that employ 21 or more persons receive about 24 vendor or client air visits yearly; while firms that employ three to five persons receive six visits yearly

- While reports of use of various types of air cargo service range between 29.1 percent and 32.9 percent for businesses with 10 or fewer employees, businesses with 11 or more employees report air cargo use rates between 11.4 percent and 25.7 percent

Finally, specific types of Montana businesses are particularly reliant on airports. The survey found that:

- Two-thirds of Montana manufacturing businesses (66.7 percent) and a majority of the tourism-oriented arts, entertainment, recreation, accommodation, or food services firms (52.9 percent) have clients or vendors who use commercial airlines to visit Montana business sites
- Montana business in the manufacturing sector most often reported (71.4 percent) having employees who take commercial air trips for business
- Employers in the manufacturing sector (12 trips per year) and the information, finance, real estate, professional, scientific and technical sector (10 trips per year) reported generating more total business-related air trips over the previous year when compared with the state median (5)

Introduction

This component of the 2016 Montana Airports Economic Impact Study presents the results of a survey of Montana businesses. The survey results provide information that broadly describes the magnitude and types of Montana airport use by the state's business community and gauges the importance of Montana airports to the success of these businesses.

The findings of the business survey are presented in three sections. The first section briefly describes the methods used for this survey and the responding businesses. The second section presents results of the survey in the order of the questionnaire administered to businesses. The third section presents the questionnaire in full and provides complete topline results for the reader's reference.

Methods

Data Collection

The data for this survey were collected through the administration of a questionnaire via mail and the Internet conducted by University of Montana's Bureau of Business and Economic Research (BBER). Data were collected from June 20, 2016 through July 30, 2016. BBER used Qualtrics survey research software to manage this survey.

The population sample studied by this survey comprised all organizations that employ three or more persons in Montana excluding:

- Public administration (local, county, state, and federal government)
- All schools and school districts

- Airports

The sample was randomly selected from a current list of all organizations in Montana with employees. This list was provided by the Montana Department of Labor and Industry Unemployment Insurance Division and is the most complete and authoritative list available. At the time the sample was drawn, 17,356 active employers in Montana met the population definition listed above. From this population, 1,877 employers were randomly selected for survey administration.

In total, 604 completed questionnaires were received from Montana employers, which reflects a 32 percent response rate. This response yielded an overall survey sampling error rate of +/- 4 percent. Following receipt and entry of the survey responses, data-appropriate variable and value labels were added to the data set. Appropriate composite variables and flags were added to the data set to facilitate the analysis process.

The data from this survey were weighted by 2012 North American Industry Classification System (NAICS) category and by number of employees using population proportions derived from the Montana Department of Labor and Industry Unemployment Insurance Division's current list of active employers. A statistical analysis was conducted using statistical analysis computer software (SPSS version 23, ©2015, IBM Corporation). Data were analyzed using frequencies, cross-tabulations, standard measures of central tendency (i.e., mean, median, and mode), sums, and ratios.

The 604 Montana businesses that responded to the survey represent the entire range of Montana employers with three or more employees, excluding public administration, schools, and airports. Table F.1 describes the respondents of this survey.

Table F.1. Selected Characteristics of Responding Businesses

2012 NAICS Code	Description	Responding Employers			Average Annual Salary of Montana Employees ($)
		Total (number)	Percent Overall (%)	Montana Employees (number)	
11	Agriculture, forestry, fishing, and hunting	23	3.8%	138	$31,066
21, 22, 23	Mining, quarrying, and oil and gas extraction; utilities; construction	99	16.3%	1,366	$58,662
31, 32, 33	Manufacturing	7	1.3%	591	$45,754
42, 44-45, 48-49	Wholesale trade, retail trade, transportation and warehousing	127	21.0%	1,556	$35,870
51-56	Information; finance and insurance; real estate, rental, and leasing; professional, scientific, and technical services; management of companies and enterprises; administrative, support, and waste management and remediation services	132	21.9%	2,076	$47,868
62	Health care and social assistance	70	11.6%	844	$42,085
71, 72	Arts, entertainment, and recreation; accommodation and food services	88	14.6%	4,401	$17,884
81	Other services (except public administration)	57	9.5%	392	$41,049
	Totals	**604**	**100%**	**11,364**	**$34,932**

Sources: U.S. Department of Commerce Bureau of Economic Analysis 2016 and UM BBER.

The survey estimated statistics for a population of employers that employed approximately 347,457 workers during the data collection period, according to the Montana Department of Labor and Industry Unemployment Insurance Division figures (2016). Thus, this survey represents employers that employ approximately 77 percent of all workers in the state.

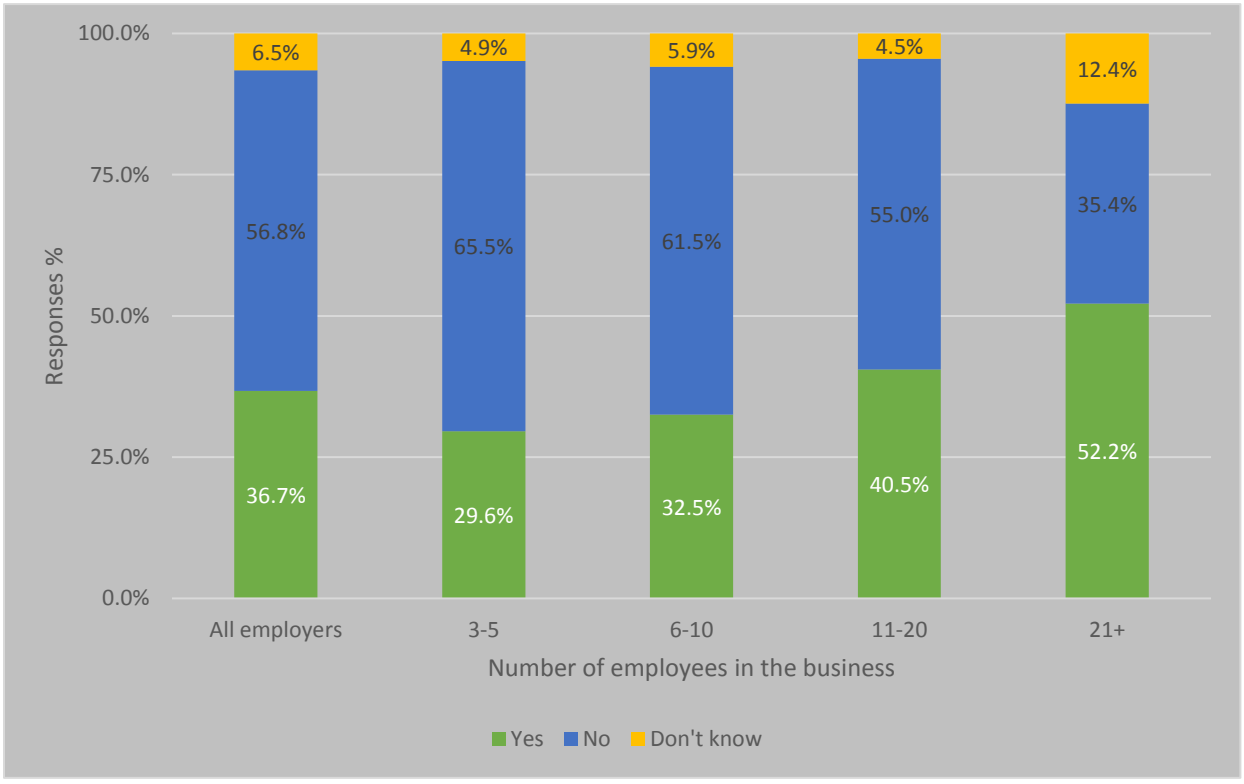
Results

Commercial Airline Transportation

Do any of your clients or vendors use commercial airline transportation to visit your local business site, or not?

More than one-third of Montana businesses (36.7 percent) have clients or vendors who use commercial airlines to visit Montana business sites (Figure F.1).

Figure F.1. Commercial Airline Use by Vendors or Clients of Montana Businesses by Total Number of Employees



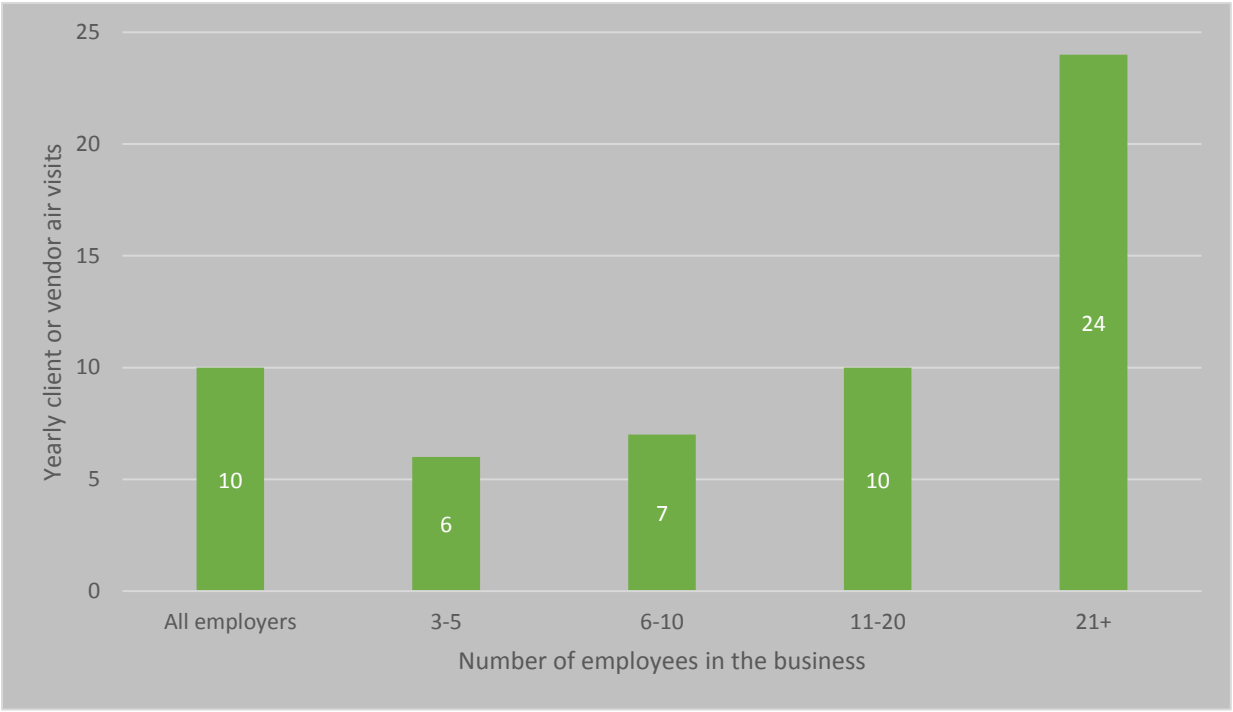
Source: Business survey. Analysis by UM BBER.

Error! Reference source not found. also demonstrates that more of Montana's largest b usinesses (52.2 percent), those businesses with 21+ employees, have clients or vendors who use commercial airlines to visit Montana business sites than do Montana's smallest businesses (29.6 percent), those with 3-5 employees. In addition, two-thirds of Montana manufacturing businesses (66.7 percent) and a majority of the tourism-oriented arts, entertainment, recreation, accommodation, or food services firms (52.9 percent) have clients or vendors who use commercial airlines to visit Montana business sites.

About how many air trips (visits) do clients or vendors make to your business in a year?

Clients or vendors make a median number of 10 annual commercial air trips to Montana businesses, with smaller businesses reporting fewer trips than the median and larger businesses reporting more trips than the median (Figure F.2).

Figure F.2. Total Yearly Client or Vendor Air Visits (Median) by Number of Employees



Source: Business survey. Analysis by UM BBER.

Large Montana businesses receive many more total yearly vendor or client visits via commercial airline than do smaller businesses. Montana firms that employ 21 or more persons receive about 24 vendor or client air visits yearly; firms that employ three to five persons receive six visits yearly.

Industries that depend on tourism or business travel, specifically arts, entertainment, recreation, accommodation, or food services industries (NAICS code 71-72), reported the most annual commercial air visits from clients or vendors. While the median yearly air trips received for this industry sector (100) is ten times the state median (10), the mean is a significant 1,389 air visits from clients yearly. In addition, a few respondents that own multiple business units in the accommodation industry reported over 10,000 total client air visits yearly. The manufacturing industry sector also reported a median number of yearly client or vendor air visits (14) that exceeded the state median (10).

What are the top three (3) locations from which your clients or vendors fly to visit your business?

Table F.2 lists the top 10 locations outside of Montana where clients or vendors of Montana businesses originate.

Table F.2. Top Out-of-State Locations From Which Clients or Vendors Originate

Rank	Location	Percent of Responding Businesses (%)
1	SEA	7.5%
2	DEN	6.6%
3	MSP	2.9%
4	SLC	2.8%
5	ORD	1.9%
6	LAX	1.8%
7	DCA/IAD	1.0%
8	GEG	0.9%
9	PHX	0.8%
10	SFO/OAK	0.6%

Source: Business survey. Analysis by UM BBER.

Denver was the most commonly reported commercial airline flight origin for clients or vendors of three industry sectors:

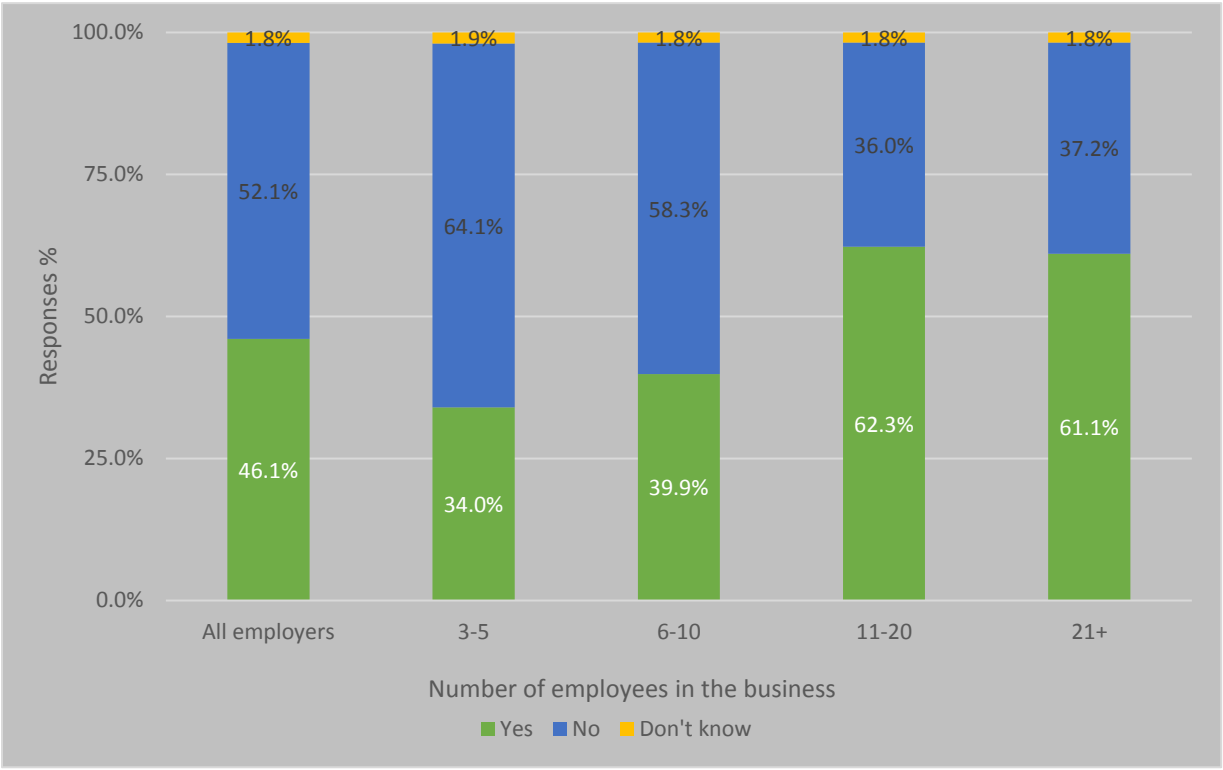
- Wholesale, retail, warehousing, or transportation
- Health care and social assistance
- Manufacturing

Seattle was the most commonly reported flight origin for clients or vendors of the information, finance, real estate, professional, scientific, or technical industry sector. Billings was the most commonly mentioned origin for vendors or clients of businesses in the mining, utility, or construction sector. Bozeman was the most commonly reported flight origin of clients or vendors for businesses in the tourism-related industry sector of arts, entertainment, recreation, accommodation, or food services.

Do any of your company's Montana-based employees take air trips for business, or not?

Just under half of all Montana employers (46.1 percent) have employees who take commercial airline trips for business. In addition, more than 60 percent of employers with 11 or more employees have employees who take air trips for business (Figure F.3).

Figure F.3. Employees that take Air Trips for Business by Total number of Montana Employees



Source: Business survey. Analysis by UM BBER.

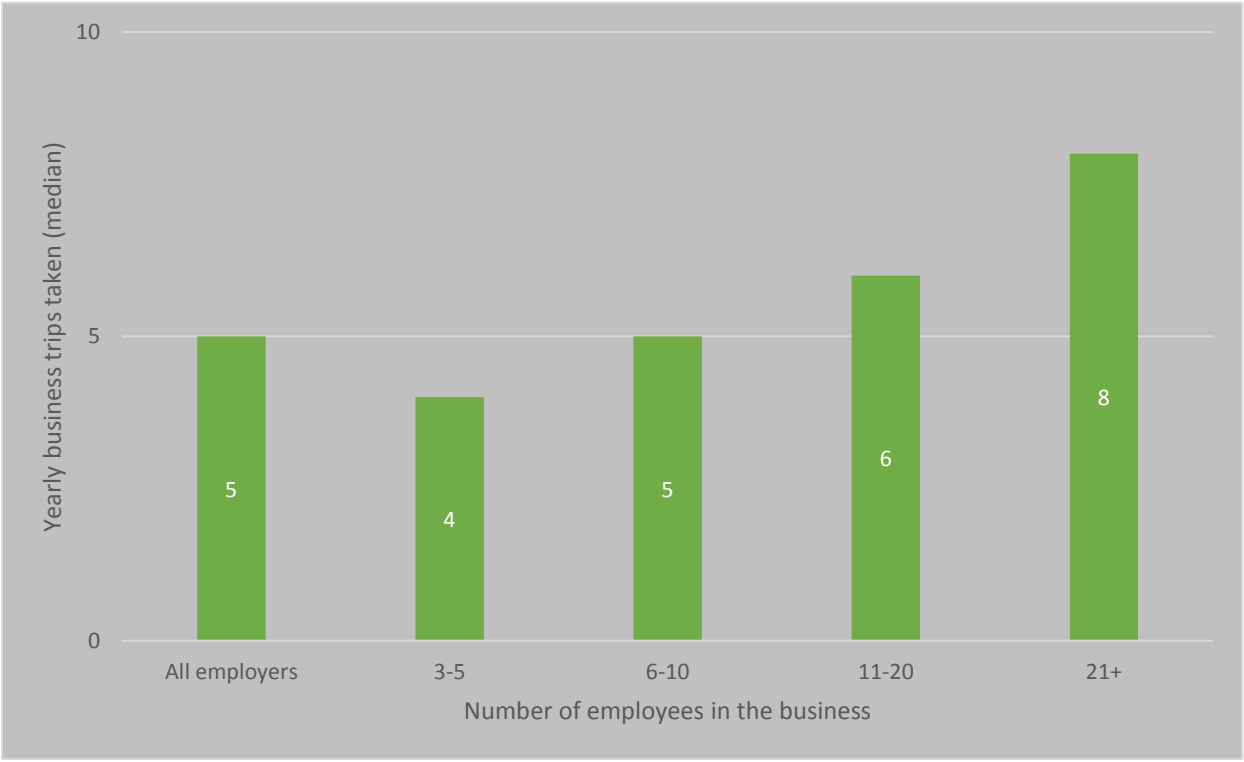
Montana business in the manufacturing sector most often reported (71.4 percent) employees who take commercial air trips for business. In addition, a majority of businesses in the following industries also reported employees who take air trips for business:

- Wholesale, retail, warehousing, transportation (55.9 percent)
- Health care and social assistance (54.4 percent)
- Arts, entertainment, recreation, accommodation, and food services (52.9 percent)

About how many air trips for business were taken by your Montana-based employees over the last year?

The median number of annual commercial airline trips for business per employer taken by Montana employees over the previous year was five. This estimate varies somewhat by the number of employees in each business (Figure F.4).

Figure F.4. Median Number of Yearly Business Trips Taken by Montana Employees by Total Number of Employees



Source: Business survey. Analysis by UM BBER.

The smallest employers (three to five employees) generated four business-related, commercial airline trips per year; the largest employers (21+ employees) generated eight business-related air trips per year. Employers in the manufacturing sector (12 trips per year) and the information, finance, real estate, professional, scientific and technical sector (10 trips per year) reported generating more total business-related air trips than the previous year when compared with the state median (5).

Over the past 12 months, Montana employers generated 0.4935 business-related, commercial airline trips per employee. The 2008 survey estimated that employers generated 0.65 trips per employee over a similar timeframe (Wilbur Smith Associates, 2009). It should be noted that the 2008 survey sampled businesses with 50 or more employees, so this year's decrease is expected. Applying the 2016 estimate of business-related, commercial airline trips per employee to the 347,457 employees represented by this survey yields an estimated 171,470 business-related,

commercial airline enplanements. Nearly all of these business-related air trips (99 percent) were to domestic locations.

General Aviation Transportation

About what percentage of your business's activity depends on the availability of general aviation airports?

A slight majority of Montana businesses (50.1 percent) reported that none of their business activity depends on the availability of general aviation airports, while 49.9 percent reported that some business activity depends on general aviation airports. Table F.3 lists the top 20 business sectors reporting that at least 50 percent of their business activity depends on the availability of general aviation airports.

Table F.3. Top 20 Business-Types Reporting that at Least 50 percent of Their Business Activity Depends on the Availability of General Aviation Airports

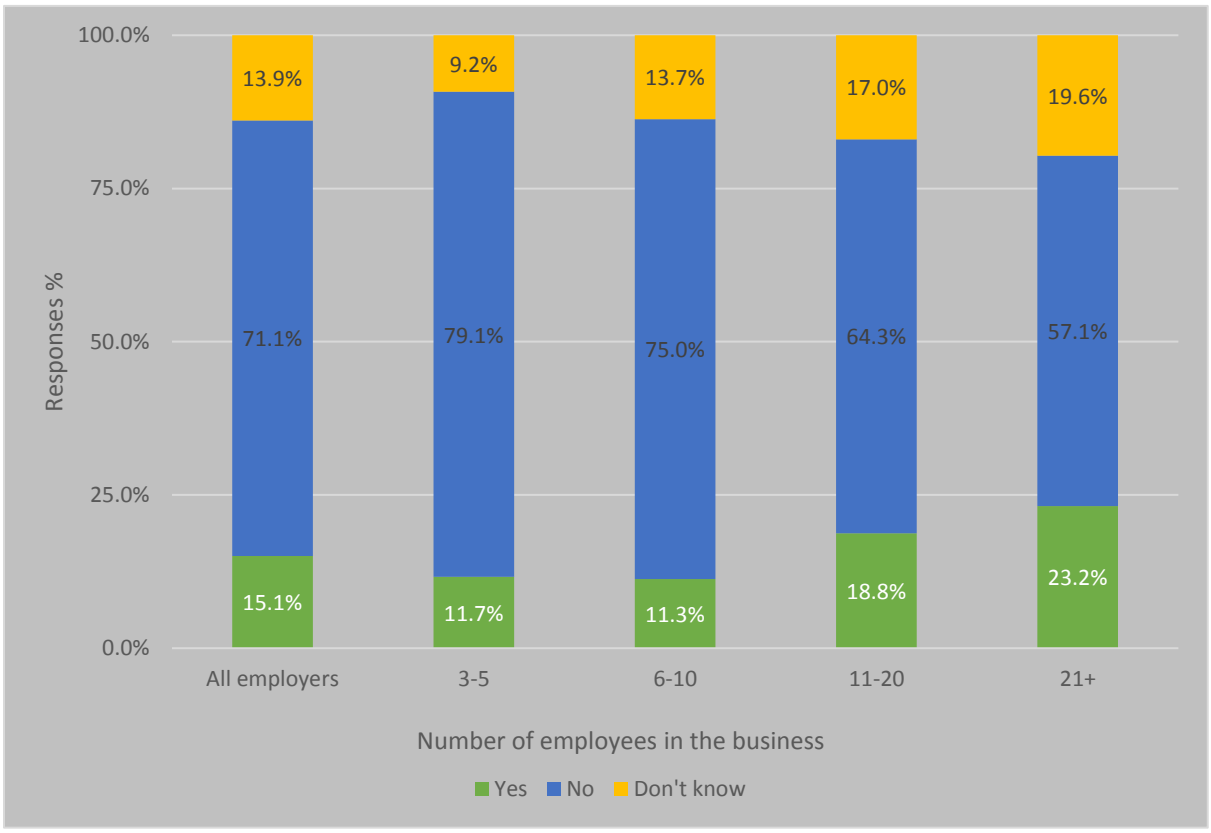
Rank	Industry Description	Number of Responding Businesses
1	Real estate	6
4	Motor vehicle and parts dealers	5
4	Food services and drinking places	5
4	Ambulatory health care services	5
9	Amusement, gambling, and recreation industries	3
9	Accommodation	3
9	Insurance carriers and related activities	3
9	Administrative and support services	3
9	Publishing industries (except internet)	3
19	Building material and supplies dealers	2
19	Furniture and home furnishings stores	2
19	Health and personal care stores	2
19	Merchant wholesalers, nondurable goods	2
19	Support activities for agriculture and forestry	2
19	Miscellaneous store retailers	2
19	Truck transportation	2
19	Professional, scientific, and technical services	2
19	Animal production and aquaculture	2
19	Construction of buildings	2
20	Gasoline stations	1

Source: Business survey. Analysis by UM BBER.

Do any of your clients or vendors use general aviation aircraft to visit your local business site?

15.1 percent of all employers reported that clients or vendors use general aviation aircraft to visit their local business sites. Businesses with more employees were more likely to report that clients or vendors use general aviation to visit their businesses than smaller employers. More than one-fifth (23.2 percent) of Montana's largest businesses (21+ employees) reported that clients or vendors use general aviation to visit their business, while 11.7 percent of the smallest businesses (three to five employees) said that clients or vendors use general aviation to visit (Figure F.5).

Figure F.5. Percent of Business whose Clients or Vendors Use General Aviation Aircraft



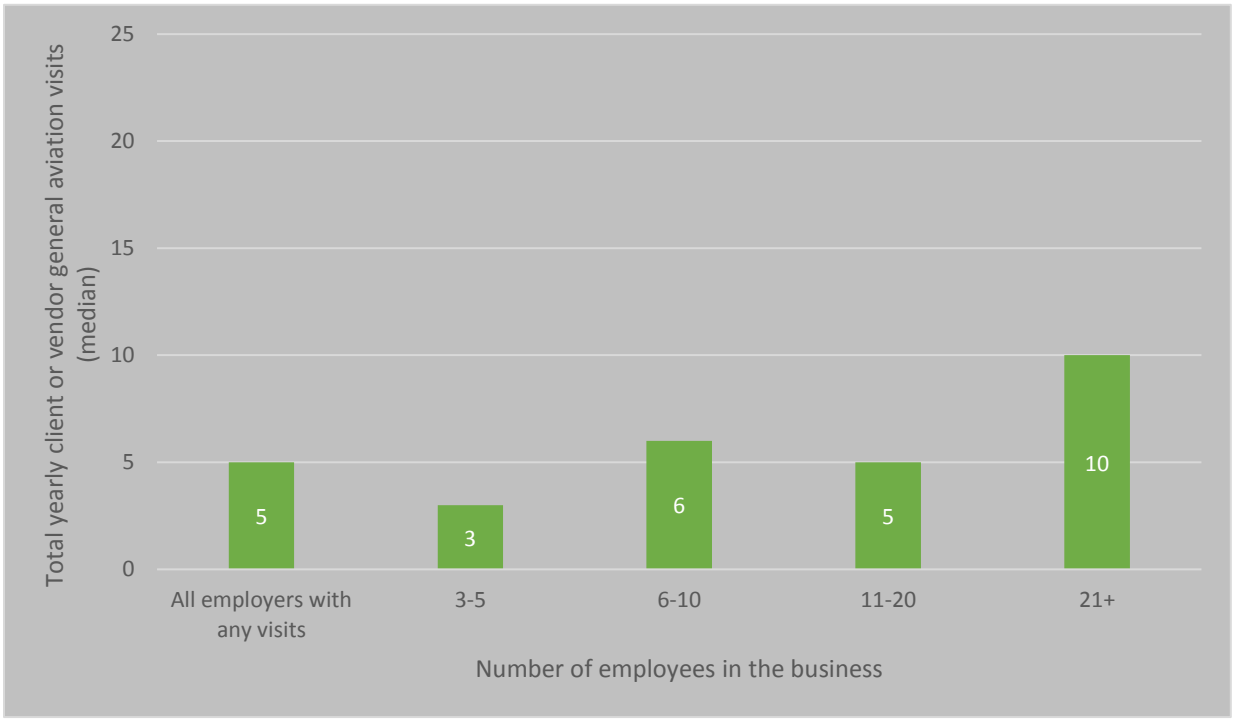
Source: Business survey. Analysis by UM BBER.

Two industry sectors exceeded the statewide percentage of businesses that reported clients or vendors using general aviation to visit their businesses. One-quarter of employers (25.3 percent) in the arts, entertainment, recreation, accommodation, or food service sectors reported that clients or vendors use general aviation to visit their businesses. One-fifth of employers (19.8 percent) in the wholesale, retail, warehousing, or transportation sectors said that clients or vendors use general aviation to visit their businesses. Only 3.4 percent of businesses in the other services (except public administration) sector said that clients or vendors use general aviation to visit their businesses.

About how many air trips (visits) do clients or vendors make to your business using general aviation aircraft in a year?

Of the 15.1 percent of employers reporting some level of vendor or client use of general aviation, the median number yearly general aviation of air visits by a vendor or client was five. The largest Montana employers were more likely than other employers to report a higher number of yearly client or vendor visits using general aviation (Figure F.6Figure F.6. Total Yearly Client or Vendor General Aviation Visits (Median) by
Number of Employees Among Businesses that Reported Having Visits).

Figure F.6. Total Yearly Client or Vendor General Aviation Visits (Median) by Number of Employees Among Businesses that Reported Having Visits



Source: Business survey. Analysis by UM BBER.

Among the 15.1 percent of businesses reporting any vendor or client use of general aviation, employers with the most employees (21+) received the most general aviation visits (median of 10). The smallest businesses (three to five employees) reported a median of three general aviation visits per business per year.

Manufacturing businesses reported the highest median yearly visits per firm via general aviation (12), and the arts, entertainment, recreation, accommodation, or food service industry sector reported 10 yearly vendor or client visits per firm per year.

What are the top three (3) locations from which your clients or vendors fly general aviation aircraft to visit your business?

Table F.4 lists the top 20 locations from which clients or vendors of Montana businesses originate using general aviation. It should be noted that the responses identified in Table F.4 are based on a total of 91 responses.

Table F.4. Top Locations From Which Clients or Vendors Originate via General Aviation

Rank	Location
1	BIL
2	DEN
3	SEA
4	GTF
5	HLN
6	MSP
7	BZN
8	LEH
9	LAX/ Los Angeles area
10	MSO
11	SLC
12	PHX
13	MLS
14	IAH
15	CTB
16	SBX
17	FCA
18	GEG
19	4U6
20	GDV

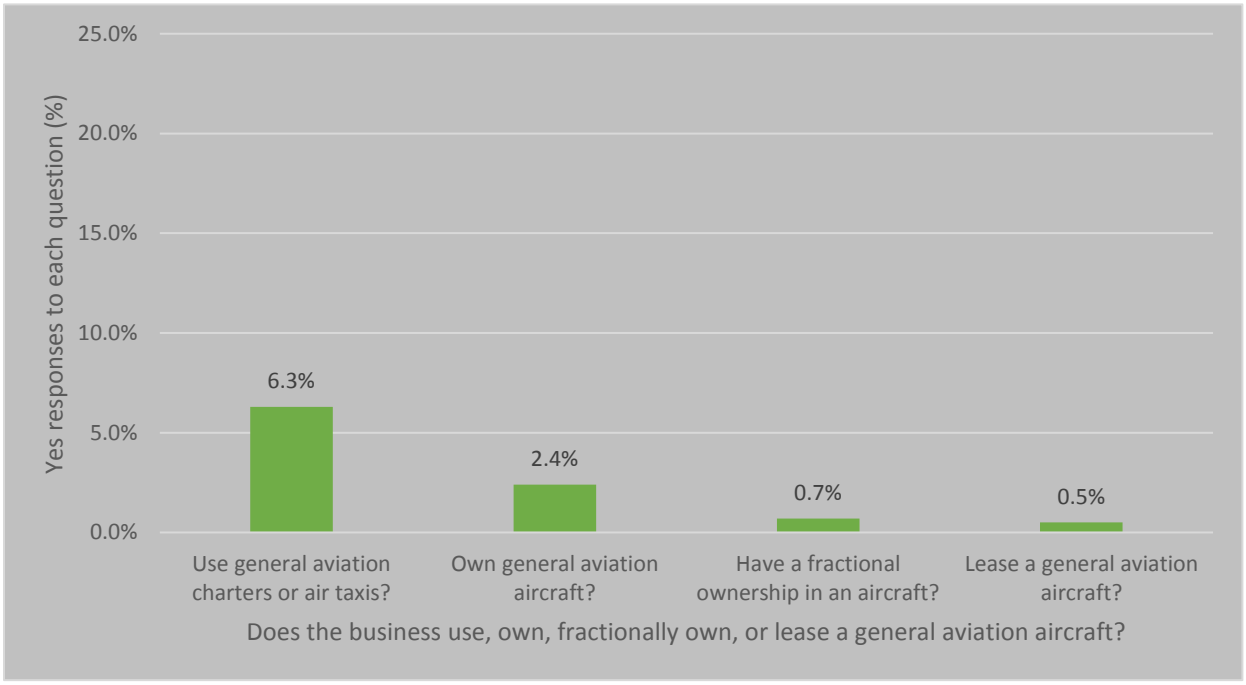
Source: Business survey. Analysis by UM BBER.

Does your company:

- Own general aviation aircraft?
- Use general aviation charters or air taxis?
- Lease a general aviation aircraft?
- Have a fractional ownership in an aircraft?

Figure F.7 presents specific information regarding Montana business ownership, charter, or leasing of general aviation aircraft. In general, less than 10 percent of respondents use, own, or lease general aviation aircraft.

Figure F.7. Montana Business Use, Ownership, or Leasing of General Aviation Aircraft



Source: Business survey. Analysis by UM BBER.

About 6.3 percent of Montana businesses reported using general aviation charters or air taxis. Approximately 2.4 percent own general aviation aircraft. Less than 1 percent answered have fractional ownership in (0.7 percent) or lease a general aviation aircraft (0.5 percent).

Montana's largest businesses, those with 21 or more employees, were more likely than other businesses (12.4 percent) to answer "yes" to one of the four questions illustrated by Figure 7. In addition, manufacturing employers (14.3 percent) and health care and social assistance employers (14.3 percent) were more likely than other industry sectors to answer "yes" to one of the questions summarized in Figure F.7.

Which Montana airports does your company use for general aviation?

Table F.5 lists the airports used for general aviation as reported by the businesses that answered "yes" to at least one of the four questions described in Figure F.7. Montana Business Use, Ownership, or Leasing of General Aviation Aircraft. Rankings of use by respondents are provided; it should be noted that only 64 businesses responded. Ties in rank are noted where they occur. These businesses reported a median of four yearly; the number of annual general aviation landings reported ranged from one to 365.

Table F.5. Airports Used by Montana Businesses that Own, Charter, or Lease General Aviation Aircraft

Rank	Location
1	BIL
2	MSO
3	BZN
3	GTF
3	LEH
6	6S8
6	9S2
6	CTB
6	SDY
10	4U6
10	HLN
12	6S5
12	8S1
12	BTM
15	6S1
15	9S5
15	FCA
15	GGW
15	MLS
15	S27
21	BHK
21	LWT

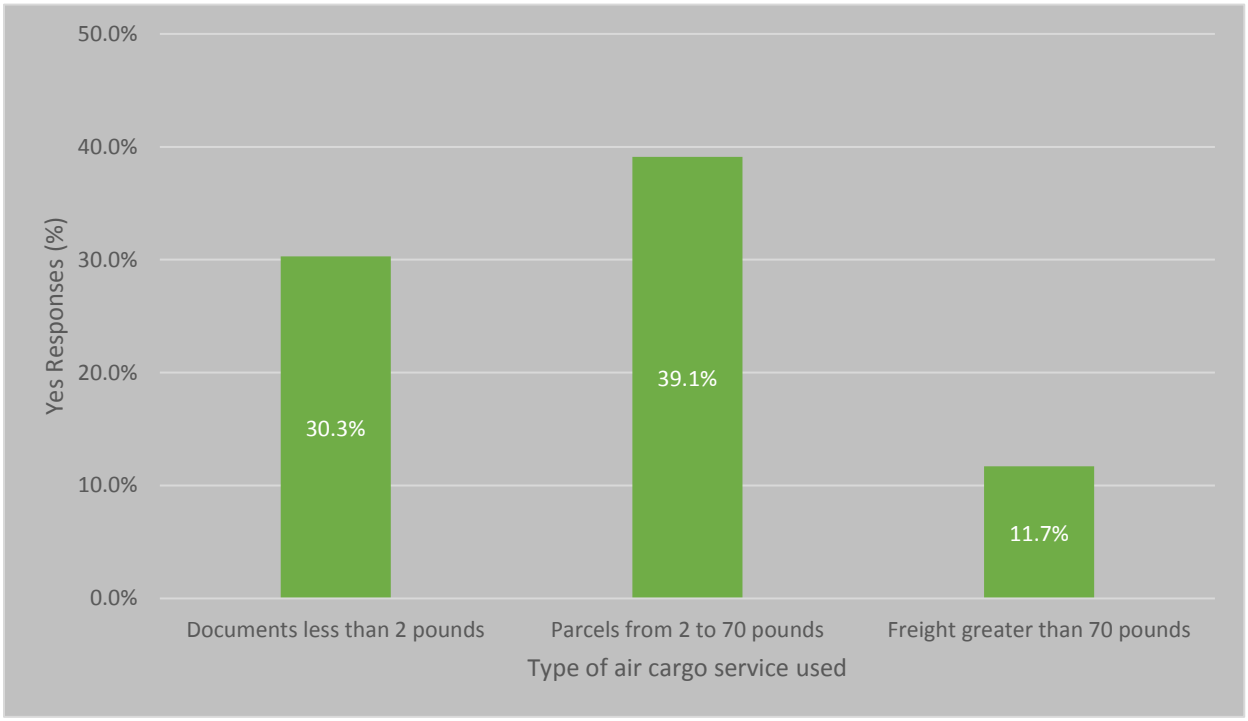
Source: Business survey. Analysis by UM BBER.

Which type(s) of air cargo services does your business use, if any?

- Documents less than 2 pounds?
- Parcels from 2 to 70 pounds?
- Freight greater than 70 pounds?

A majority of Montana businesses (51.9 percent) reported using some type of air cargo service. Figure F.8 presents the percentages of Montana businesses that reported using one of the three types of air cargo service.

Figure F.8. Percentage of Montana Businesses that Reported Using Some Type of Air Cargo Service

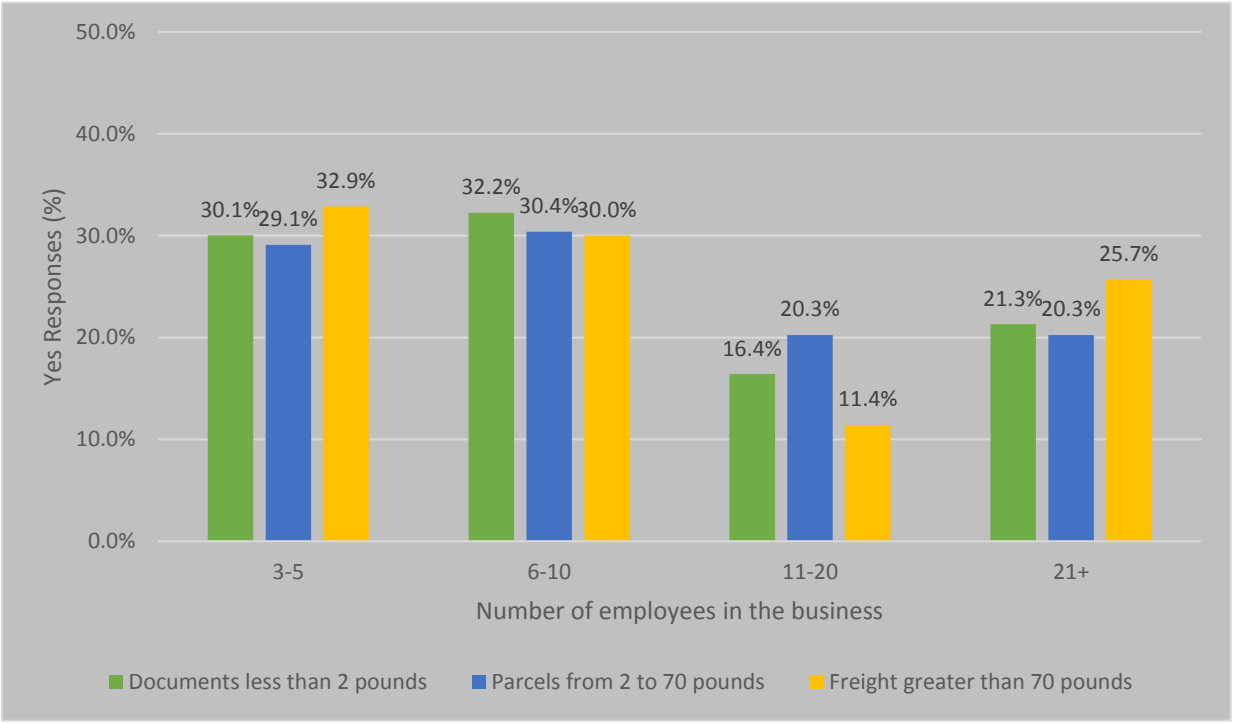


Source: Business survey. Analysis by UM BBER.

About three in ten Montana businesses (30.3 percent) use air cargo service for documents weighing less than two pounds. Nearly two-fifths of Montana businesses (39.1 percent) use air cargo service to ship or receive parcels weighing between two and 70 pounds. Just over one in 10 Montana businesses (11.7 percent) use air cargo service for freight that weighs over 70 pounds.

An interesting pattern emerges when examining reports of air cargo use by the number of employees in each business. In general, smaller Montana businesses are somewhat more likely to use air cargo services than larger businesses. Figure F.9 illustrates these findings.

Figure F.9. Percent of Businesses that Reported Using Some Type of Air Cargo Service by the Number of Employees in the Business



Source: Business survey. Analysis by UM BBER.

While reports air cargo service use ranged between 29.1 percent and 32.9 percent for businesses with 10 or less employees, businesses with 11 or more employees reported air cargo use rates between 11.4 percent and 25.7 percent.

Information, finance, real estate, professional, scientific, or technical businesses most often (33.2 percent) use air cargo service for documents weighing less than two pounds. Wholesale, retail, warehousing, or transportation firms (25.8 percent) and information, finance, real estate, professional, scientific, or technical businesses (20.3 percent) most frequently use air cargo service for parcels weighing from two to 70 pounds. Finally, wholesale, retail, warehousing, or transportation firms (23.6 percent) most commonly use air cargo for freight weighing in excess of 70 pounds.

Air Transportation and Business Expansion or Relocation

How important or unimportant would the following factors be to your business if it were considering expansion or relocation?

Montana employers were asked to rate the importance of various factors that might influence their organization's expansion or relocation plans. Table F.6 presents the results sorted in descending order of importance.

Table F.6. Montana's Employers' Ratings of the Importance of Various Business Expansion or Relocation Factors

Business Expansion or Relocation Factors	Very Important	Somewhat Important	Neither Important nor Unimportant	Somewhat Unimportant	Very Unimportant
Convenient highway access	48.0%	26.8%	18.9%	2.3%	4.0%
Availability of trained workforce	40.9%	38.2%	13.7%	2.4%	4.9%
Cost of living	34.4%	39.2%	19.8%	1.7%	5.0%
Tax incentives	31.7%	31.6%	24.2%	4.6%	7.8%
Proximity of suppliers	20.1%	38.2%	25.8%	5.7%	10.2%
Commercial airport	**29.5%**	**24.8%**	**24.2%**	**5.8%**	**15.8%**
Urban business district	14.6%	34.7%	29.6%	7.2%	13.9%
Academic or cultural centers	11.4%	32.0%	33.9%	6.4%	16.3%
Universities or research and development centers	9.9%	28.3%	36.5%	8.0%	17.3%
Historic location of business	10.3%	16.1%	45.7%	9.4%	18.5%
General aviation airport	**11.8%**	**19.7%**	**36.7%**	**9.4%**	**22.5%**
Raw materials/natural resources	9.1%	21.1%	36.2%	9.6%	24.0%
Rail transportation facilities	8.4%	15.1%	36.3%	9.5%	30.7%
Water transportation facilities	6.8%	8.9%	39.5%	4.4%	40.4%

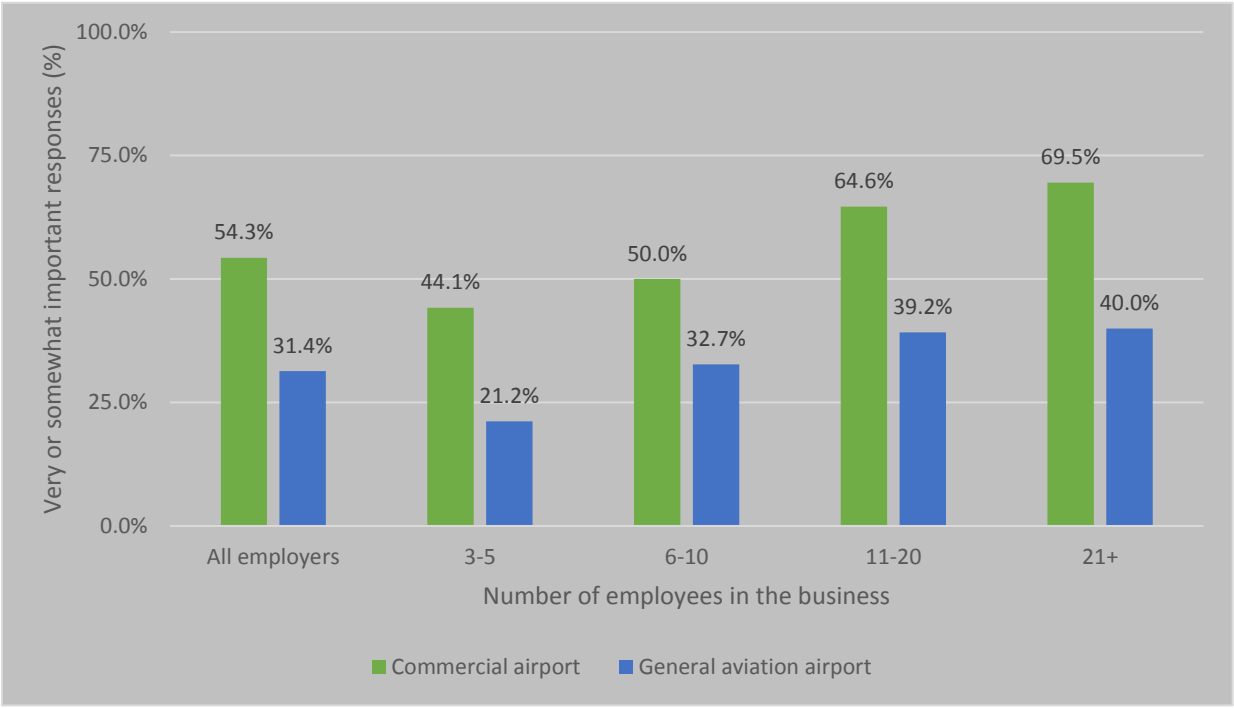
Source: Business survey. Analysis by UM BBER.

A majority of Montana businesses rated the following six expansion or relocation factors as very or somewhat important:

- Convenient highway access
- Availability of trained workforce
- Cost of living
- Tax incentives
- Proximity of suppliers
- Commercial airport

Larger Montana employers more often reported that airports were somewhat or very important as an expansion or relocation factor when compared to smaller employers. Figure F.10 displays these findings.

Figure F.10. Percent of Montana Employers that Rated Either Commercial or General Aviation Airports as a Somewhat or Very Important Expansion or Relocation Factor by Number of Employees



Source: Business survey. Analysis by UM BBER.

While 69.5 percent of Montana's employers with 21 or more employees rated commercial airports as a somewhat or very important expansion or relocation factor, only 44.1 percent of their peers with between three and five employees agreed. A similar pattern is evident when examining the perceived importance of general aviation airports as an expansion or relocation factor.

A majority of each of the following Montana industry sectors rated commercial airports somewhat or very important as an expansion or relocation factor:

- Arts, entertainment, recreation, accommodation, or food services (72.0 percent)
- Manufacturing (71.4 percent)
- Information, finance, real estate, professional, scientific, and technical (64.6 percent)
- Wholesale, retail, warehousing, and transportation (56.6 percent)

The arts, entertainment, recreation, accommodation, or food services industry rated general aviation airports as an important expansion or relocation factor (43.9 percent).

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