Montana Employment and Labor Force Projections

Job Growth from 2018 to 2028

Montana Department of
LABOR & INDUSTRY

Montana Employment and Labor Force Projections:

Job Growth from 2018 to 2028

State of Montana
Steve Bullock, Governor

Montana Department of Labor & Industry
Galen Hollenbaugh, Commissioner

Created by:
Research & Analysis Bureau
Emily Trautman, Senior Economist

For more information contact:
Research & Analysis Bureau
P.O. Box 1728
Helena, MT 59624-1728
(406)444-4100
lmi.mt.gov

Montana Department of
LABOR & INDUSTRY

Table of Contents

Executive Summary 4
Figure 1: Statewide and Regional Projections Summary, 2018-2028 4
About Employment and Labor Force Projections 5
Overview of Montana's 2018-2028 Projections 6
Figure 2: Montana Jobs Added Over Prior Year, Total and Payroll, ... 6
Historic (2001-2018) and Projected (2019-2028) 6
Figure 3: Historical and Projected Annual Employment Growth by Region 7
Figure 4: Projected Employment Growth by Region, 2018-2028 8
Figure 5: Projected Labor Force, Employment, and Unemployment Rate 8
Industry Growth 9
Figure 6: Montana Compounding Annual Employment Growth, Historic and Projected 9
Occupational Demand 10
Figure 7: Annual Projected Occupational Demand 2018-2028 by Large Occupation Group 11
Figure 8: Top Ten Detailed Occupations with the Most Job Openings, 2018-2028 12
Occupational Demand – High Wage Jobs 12
Figure 9: Jobs Earning Over $45,000 with the Most Job Openings, 2018-2028 13
Figure 10: Jobs Earning Over $65,000 with the Most Job Openings, 2018-2028 13
Occupational Demand – Education Level 14
Figure 11: Worker Demand by Education Level, 2018-2028 14
Figure 12: Montana Jobs by Minimum Education Required, Current and Projected 14
Figure 13: 2028 Number of Projected Jobs by Minimum Education 15
and Typical Education 15
Figure 14: Most Job Openings for Jobs that Require a Bachelor's Degree or Higher, 2018-2028 16
Figure 15: Jobs Requiring Some Postsecondary Education, but Less Than a Bachelor's Degree, ... 17
2018-2028 17
Figure 16: Jobs Earning Over $45,000 that Require a High School Diploma or Less, 2018-2028 18
Figure 17: Jobs Earning Over $45,000 that Require Some Postsecondary Education, but Less Than a Bachelor's Degree, 2018-2028 18
Occupational Demand – by Career Cluster 19
Figure 18: Montana Employment Projections by Career Cluster, 2018-2028 19
Occupational Demand – by Soft Skill 21

Figure 19: Annual Job Openings by Most Commonly Used Soft Skill, 2018-2028 21
Occupational Demand – Healthcare Occupations 21
Figure 20: Top 20 Healthcare Jobs with the Most Annual Openings, 2018-2028 22
Figure 21: Top 20 Non-Healthcare Jobs within the Healthcare Industry, 2018-2028 23
Occupational Demand – STEM 24
Figure 22: Worker Demand for Science, Technology, Engineering, and Math Jobs, 2018-2028 24
Occupational Demand - Apprenticeships 25
Figure 23: Montana's Apprenticeable Occupations with the Most Projected Job Openings, ... 25
2018-2028 25
Figure 24: U.S. Apprenticeable Occupations in a STEM field with the Most Projected Job Openings, 2018-2028 26
Conclusion 26
Appendix A - Methodology 27
Labor Force Projections 27
Employment Projections 27
Forecast Error 29
Appendix B – Accuracy of Past Forecasts 31
Figure 25: Accuracy of 2017-2027 One Year After Forecast 31
Appendix C – Job Postings Data 32
Figure 26: Top Ten Occupations for Job Postings and Projections, 2018 32
Figure 27: MontanaWorks.gov Job Postings compared with Total Employment, 2013-2018 33

Executive Summary

One of the goals of the Montana Department of Labor and Industry is to help develop and maintain a highly skilled workforce. Employment and labor force projections help achieve this goal by providing insight into the occupational and skill needs of Montana's growing and changing workforce. Employers, educational institutions, and workforce training institutions use projections to anticipate in-demand training programs, while individuals use projections to investigate career paths. The Montana Department of Labor and Industry's employment projections from 2018 to 2028 include the following highlights:

- Through 2028, Montana is expected to add 3,890 jobs annually. This slow growth is expected due to a tight labor market and worker shortages.

- Montana's labor force growth is estimated to grow slowly through 2023 with a projected growth of 3,400 people. After 2023 labor force growth is projected to grow faster adding about 4,400 people each year. Unemployment rates have the potential to drop to 3.1% by 2023, and then increase back to about 3.5% by 2028.

- Employment growth is expected in all five regions. The fastest growth is anticipated in the Southwest and Northwest regions of the state. Figure 1 shows a summary of statewide and regional employment growth.

Figure 1: Statewide and Regional Projections Summary, 2018-2028

Region	Annual Change	Annual Growth Rate
Northwest	1,512	1.0%
Southwest	1,729	1.1%
North Central	47	0.1%
South Central	564	0.5%
Eastern	39	0.1%
Montana	**3,892**	**0.7%**

Source: Montana Department of Labor and Industry Employment Projections. 2018-2028

- Total job openings are projected to be just over 62,300 openings each year, slightly higher than the 61,7000 for the 2017-2027 projections. Both years' estimates are significantly higher than the 17,500 total openings projected in 2016. This difference reflects a change in methodology from the Bureau of Labor Statistics, not a change in the Montana labor market.

About Employment and Labor Force Projections

Every year, the Montana Department of Labor and Industry (MTDLI) produces employment projections in conjunction with the U.S. Department of Labor. Employment projections are produced over a two-year and ten-year time frame, by industry and occupation, and for the state and five sub-state regions. The MTDLI also produces labor force projections every year, but only for the state (not for regions). The labor force projections are estimated by age and gender to help provide insight into Montana's changing workforce demographics. Together, the employment and labor force projections are used by a variety of groups and individuals to help plan workforce development.

Employment forecasts are an estimate of the future demand for workers based on historical employment data and the knowledge that is available at the time of the forecast. Because the economy is constantly changing, the forecasts are not going to be exactly right. Instead, projections should be viewed as the most likely employment growth outcome, given the current knowledge and information about the economy. Additionally, projections focus on long-term employment growth and labor force trends, rather than short-term and temporary fluctuations in the business cycle. Therefore, employment forecasts are published as a linear average over the two-year and ten-year period, even though the underlying forecast may include variations from that trend.

The 2017-2027 projections were the first to reflect methodology changes implemented by the U.S. Bureau of Labor Statistics to calculate total job openings that better capture the dynamic workforce. This change in methodology resulted in significantly higher estimated job openings than in the past (61,710 annual projected job openings for 2017-2027 projections compared to 17,500 for the 2016-2026 projections). The 2018-2028 projections continue to use this new methodology. Because of these changes, projections from the past that use the old methodology should not be compared with projections derived from the new methodology. A more detailed explanation of the methodology change is in the Occupational Demand section.

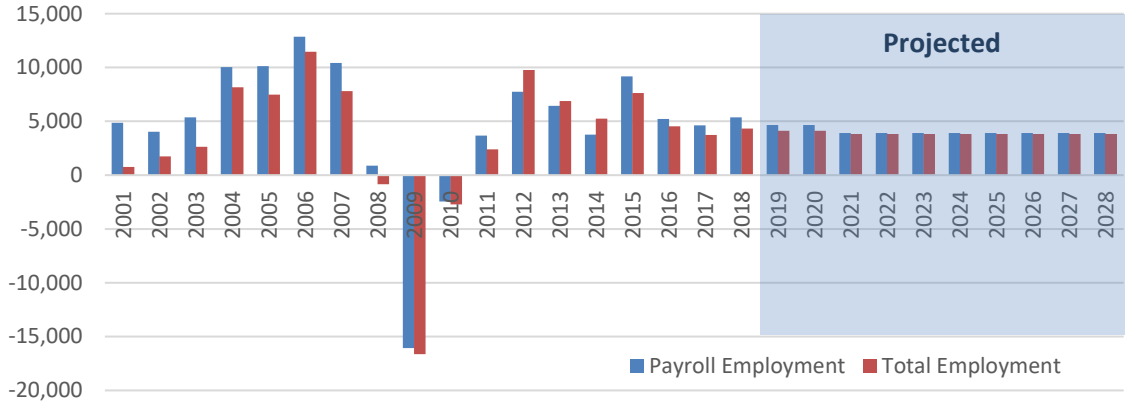
The remainder of this report provides a broad overview of this year's statewide and regional projections along with commonly requested tables of high-opening jobs by specific categories such as jobs requiring a bachelor's degree, jobs that pay higher than $65,000, and apprenticeable jobs. For detailed information on methodology, see Appendix A. For information of past forecast accuracy, see Appendix B. For a comparison of job postings data to job projections, see Appendix C.

Overview of Montana's 2018-2028 Projections

Over the next two years, total employment in Montana is expected to grow by 4,130 jobs annually. Projections through 2020 are slighlty higher than previous short-term estimates due to the temporary hiring of workers for the 2020 Census. After 2020, Montana is expected to grow by about 3,830 jobs per year through 2028.[1] The long-term estimated growth follows the recent trend of slowing employment growth – Montana added 4,330 jobs in 2018, slower than the five-year annual average of about 5,100 jobs per year. Projections over the ten-year period are slightly slower than the long-term average. Montana's average annual growth from 2000 to 2018 was 0.8%, and annual projected job growth is 0.7% through 2028.

The relatively slow projected growth is due to the tight labor market. Tight labor markets are characterized by few workers available to fill open jobs, which is occuring due to the combination of strong and consistent economic growth and an aging workforce. Strong economic growth leads to job creation, but an aging workforce leads to workers retiring and dropping out of the labor force making it difficult to fill the new and vacant job openings. This shortage of available workers constrains businesses ability to expand and add more jobs, therefore leading to slower job growth. Figure 2 shows actual and projected employment growth from 2001 to 2028.

Figure 2: Montana Jobs Added Over Prior Year, Total and Payroll, Historic (2001-2018) and Projected (2019-2028)



Source: Historic total employment data is from the Local Area Unemployment Statistics. Historic payroll employment data is from the Quarterly Census of Employment and Wages plus an estimate for railroad jobs. Projected data is from the Montana Department of Labor and Industry 2018-2028 Employment Forecasts.

Job growth is expected in all regions as shown on the map in Figure 4. The Southwest Region, including Bozeman, Helena, and Butte, is projected to grow the fastest at an average annual rate of 1.1%, or about 1,730 jobs per year. The Northwest Region, including Missoula and Kalispell, is expected to grow second fastest at an average annual rate of 1.0%, or approximately 1,510 jobs per year. Both regions had strong economic growth and consistent job gains over the last several years. Job growth in the Southwest grew at an average annual rate of 2.1%, or 3,085 jobs, from 2013 to 2018. Over that the time,

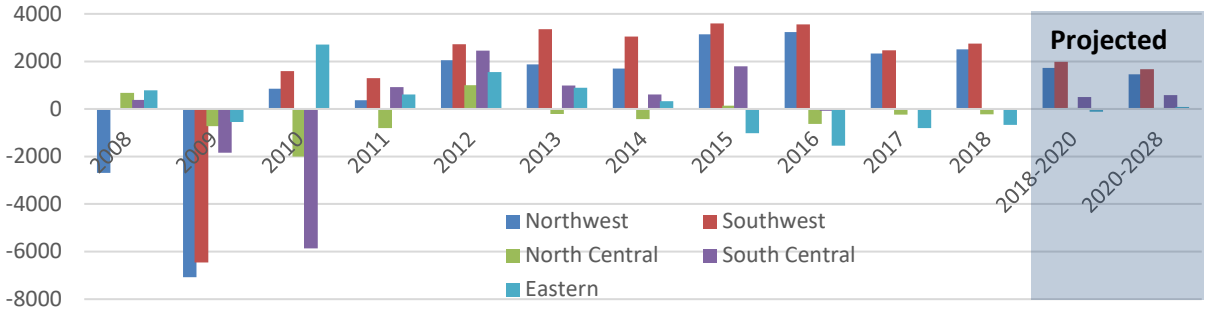
[1] Total employment includes payroll, self-employed, and agriculture.

the Northwest grew at an average annual rate of 1.8%, or 2,580 jobs per year. Part of the reason economic growth has been strong in these regions is because they both benefit from job gains associated with high population density and the presence of large educational institutions. Both regions posted strong job gains in construction, professional services, and other consumer-based industries, and projections anticipate strong job growth in these industries will continue.

Jobs in the South Central Region, including Billings, are projected to grow at an annual average rate of 0.5%, or 560 jobs per year over the next ten years. This relatively slow projected growth is due to the combination of slow job growth over the last several years and expected fluctuations in the mining and utilities industry. This region serves as a retail and commerce center for Montana's energy development areas, which means the region is affected by the fluctuations in the mining industry. When the mining industry is strong, there is higher labor income circulating in the area leading to stronger economic growth. Higher income in the area particularly impacts the retail trade and leisure activities industries. When the mining industry is not strong, then there is less labor income in the area, which has been the case over the last few years. This decline in the mining industry has impacted the South Central Region, and job growth in the region has slowed significantly as a result. Average annual job growth from 2013 to 2018 was about 0.4%, or 450 jobs per year. Looking forward, the closure of Colstrip units 1&2 and the overall decline in coal demand is expected to have a negative impact on the South Central Region.

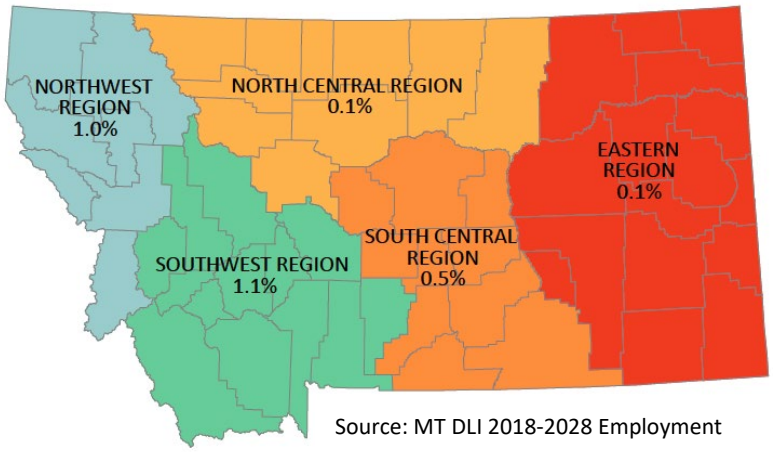
The North Central and Eastern Regions have experienced slower growth than the rest of the state, and both are projected to continue to experience slow grow. Over the last five years, jobs in the North Central Region declined by an average annual rate of 0.4%, a loss of nearly 280 per year. During that same time, jobs in the Eastern Region declined by an average annual rate of 1.9%, or a loss of 740 jobs per year. Economic losses in the agricultural industry negatively impacted both regions as losses in any industry contribute to lower spending and lower economic activity in general. Fluctuations in the mining industry also impact these regions, particularly the Eastern region. These challenges will continue over the next few years with the closure of Colstrip units 1&2 directly impacting the Eastern Region. Because of these events, both regions are estimated to grow at an annual rate of 0.1%, which is about 50 jobs per year in the North Central Region and 40 jobs in the Eastern Region.

Figure 3: Historical and Projected Annual Employment Growth by Region



Source: Historical data from Local Area Unemployment Statistics. Projected data from the MT DLI 2018-2028 Employment Projections.

Figure 4: Projected Employment Growth by Region, 2018-2028

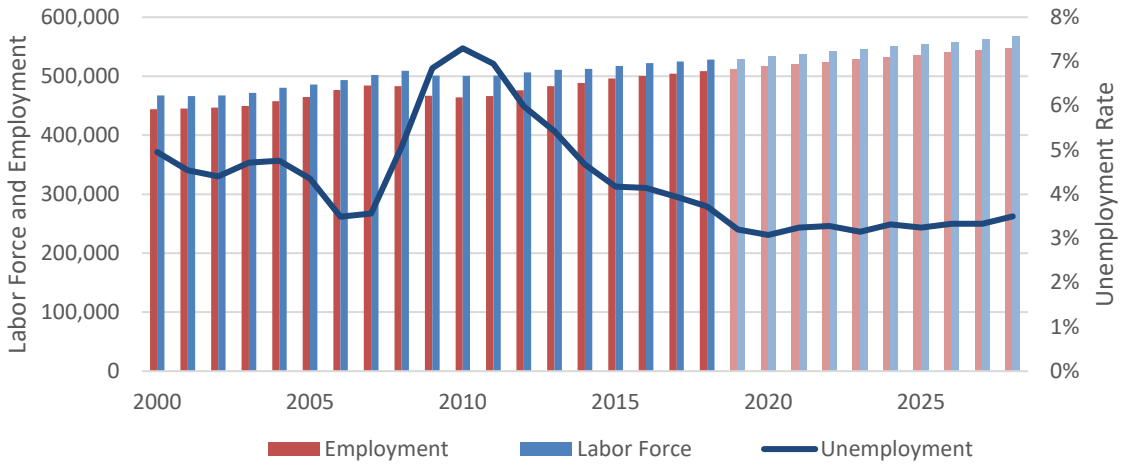


Source: MT DLI 2018-2028 Employment Projections.

Over the next 10 years Montana's labor force is projected to grow by just over 39,000 workers, at about 3,900 workers per year for a rate of 0.7%. Overall, labor force growth is nearly equal to projected employment growth, leading to a projected unemployment rate of 3.5% in 2028, down from 3.7% in 2018. Figure 5 shows the historical and projected labor force, employment, and unemployment rate.

For the upcoming years through 2023 labor force growth is projected to be below employment growth, with almost 3,400 new workers expected per year compared to about 3,900 jobs added each year. However, as retirements among the baby boomer generation begin to taper off and labor force participation for younger workers increases that trend will reverse, and labor force growth will begin to outpace employment growth. From 2023 to 2028 about 4,400 workers are expected to join the labor force each year, which combined with projected employment growth of 3,900 jobs will lead to slight increases in the unemployment rate.

Figure 5: Projected Labor Force, Employment, and Unemployment Rate



Source: Historical data from LAUS. Projected from the MT DLI Labor Force Projections.

Industry Growth

Figure 6 shows Montana's long-term and projected employment growth rates by industry.[2] The healthcare industry is the largest industry and is also expected to add the most jobs over the next ten years. Historically, job growth in healthcare has been strong and consistent, but it slowed significantly in 2018. From 2013 to 2018 average annual job growth was strong at 1,180 new jobs per year, but job growth in 2018 was only 240 new jobs. A large share of this slowdown is from a nearly 350 job loss in the nursing and residential care subindustry. Despite the slowdown, job projections are optimistic that this industry will continue to grow close to its historical trend as the large baby boomer population continues to age and demand more healthcare services. Healthcare growth is expected to be strongest in the Northwest and Southwest Regions, and more moderate in the South Central Region.

Figure 6: Montana Compounding Annual Employment Growth, Historic and Projected

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

Source: MT DLI Industry Projections 2018-2028

Note: The healthcare and social assistance industry and the educational services industry include both private and public employment. All other public employment is included in federal, state, or local government. The transportation industry and payroll employment include an estimate for railroad jobs in addition to QCEW payroll employment. Long-term growth for state government and management is from 2000 to 2018.

[2] For projections, the healthcare and social assistance industry and the educational services industry include both private and public employment. All other public employment is included in federal, state, or local government.

The accommodation and food services industry is expected to add the second highest number of jobs through 2028. On average, this industry added over 1,030 jobs per year over the last five years, but only about 680 jobs in 2018. Projections estimate a growth of 550 jobs over the next two years because of this recent slowdown. However, longer-term projections estimate slightly higher at 610 new jobs through 2028. Over the next ten years, the expected growth rate is 1.1%, consistent with national projections.[3]

Construction is expected to add the third most jobs per year and is expected to grow at a rate of 1.8%, tied with the professional services industry for the fastest growing industries. Over the last five years, construction added 1,030 jobs per year on average, and increased to nearly 1,370 jobs in 2018. This trend is projected to continue with 880 jobs added over the next two years, and then slow to 470 through 2028. Construction employment is still below its 2007 peak, and is not expected to hit its 2007 employment level until 2024.

The professional, scientific, and technical services industry is tied with the construction industry as the fastest growing over the long-term, at a rate of 1.8% over the next ten years. This industry has grown particularly fast in the past couple years in the Northwest, Southwest, and South Central Regions. This line of work typically consists of workers providing accounting, legal, consulting, research, and other professional services. Workers in these fields typically require a significant amount of training.

Occupational Demand

Industry projections estimate nearly 3,900 new jobs per year, which means Montana needs workers to fill these future vacancies. However, new jobs only account for about 6% of total projected job openings each year. Another 25,400 job openings are from people exiting the labor force, possibly due to retiring, attending school full-time, or staying home to care for family. An additional 33,000 job openings are projected due to people transitioning into a new career.[4] There are projected to be over 62,000 annual job openings from the combination of new jobs, exits, and transfers. Figure 7 shows the ten-year annual expected openings due to new jobs, exits, and transfers by large occupational group.

Exits refer to people who leave their job and exit the labor force, such as to retire or to enroll in school.

Transfers are workers who leave one occupation for a different occupation, like a career change or promotion.

[3] U.S. Department of Labor, Bureau of Labor Statistics. In the U.S., annual growth in the accommodation and food services industry was 2.0% from 2008 to 2018. The BLS projects this rate to slow to an average of 1.0% between 2018 and 2028.

[4] The U.S. Department of Labor methodology estimates job transfers as people moving from one major occupational group to a different major occupational group. The methodology focuses on the changes from one major occupational group to another to focus on long-term career changes that create job openings for new workers. The methodology does not count job openings when workers change jobs at the detailed occupational level as that typically doesn't lead to opportunities for new workers. Instead, job changes at the detail level represent a fixed pool of workers shifting positions. For more information on methodology see https://www.bls.gov/opub/mlr/2018/article/occupational-separations-a-new-method-for-projecting-workforce-needs.htm

Figure 7: Annual Projected Occupational Demand 2018-2028 by Large Occupation Group

Large Occupational Group		Annual Openings				2018 MT Annual Average Wage
		New Jobs	Exits	Transfers	Total Openings	
1	Food Preparation and Serving Related	514	3,736	5,009	9,259	$23,550
2	Sales and Related	189	3,789	4,697	8,675	$36,020
3	Office and Administrative Support	213	3,554	3,936	7,703	$34,990
4	Construction and Extraction	429	1,302	2,431	4,162	$49,010
5	Transportation and Material Moving	194	1,548	2,179	3,920	$39,750
6	Building and Grounds Cleaning and Maintenance	261	1,564	1,587	3,412	$29,450
7	Personal Care and Service	255	1,595	1,556	3,405	$26,300
8	Education, Training, and Library	129	1,246	1,171	2,547	$43,120
9	Installation, Maintenance, and Repair	160	853	1,493	2,506	$47,750
10	Healthcare Practitioners and Technical	470	907	865	2,242	$78,270
11	Management	63	1,041	1,083	2,188	$91,370
12	Production	79	747	1,286	2,112	$40,900
13	Business and Financial Operations	198	643	1,260	2,101	$61,700
14	Healthcare Support	201	875	829	1,905	$30,720
15	Community and Social Service	108	389	654	1,151	$41,020
16	Protective Service	45	399	423	867	$45,930
17	Farming, Fishing, and Forestry	23	206	621	849	$32,760
18	Arts, Design, Entertainment, Sports, and Media	30	336	478	844	$37,800
19	Computer and Mathematical	133	176	488	797	$65,390
20	Life, Physical, and Social Science	60	206	484	750	$55,970
21	Architecture and Engineering	93	190	359	641	$72,380
22	Legal	47	113	161	321	$70,070
	Total	**3,892**	**25,416**	**33,049**	**62,356**	**$43,860**

Source: Montana Department of Labor and Industry Employment Projections. 2018-2028

Figure 8 shows the top ten detailed occupations with the most job openings over the next ten years. Most of these jobs fall into the two largest categories – food preparation and serving related occupations and sales occupations. The high number of expected openings in these fields is partially because they are some of the largest employing occupations, and partially due to high turnover. Because these jobs are typically entry-level jobs requiring short-term on-the-job training only, there is little planning needed by a worker to work in one of these occupations. Bookkeeping, accounting, and auditing clerks is the only job that requires some education past high school. None of the jobs in the list pay higher wages than the statewide average of $36,310.

Figure 8: Top Ten Detailed Occupations with the Most Job Openings, 2018-2028

Occupation		Minimum Requirements		Annual Openings				2018 MT Annual Average Wage
		Edu.	Work Exp.	New Jobs	Exits	Transfers	Total Openings	
1	Cashiers	<HS	ST OJT	22	1,706	1,665	3,393	$22,930
2	Retail Salespersons	<HS	ST OJT	59	1,133	1,420	2,612	$28,500
3	Combined Food Prep & Serving, *Including Fast Food*	<HS	ST OJT	190	1,031	1,079	2,300	$22,380
4	Waiters and Waitresses	<HS	ST OJT	90	791	1,212	2,093	$20,990
5	Office Clerks, General	HSE	ST OJT	3	833	812	1,648	$33,350
6	Maids & Housekeeping Cleaners	<HS	ST OJT	104	634	478	1,216	$25,420
7	Janitors and Cleaners, *Except Maids & Housekeeping Cleaners*	<HS	ST OJT	73	547	529	1,150	$29,790
8	Personal Care Aides	HSE	ST OJT	140	505	381	1,026	$24,250
9	Cooks, Restaurant	<HS	MT OJT	79	366	500	945	$25,230
10	Bookkeeping, Accounting, and Auditing Clerks	SC ND	MT OJT	4	521	404	929	$36,310

Source: Montana Department of Labor and Industry Employment Projections. 2018-2028

Notes: <HS = less than high school diploma; HSE = High school diploma or equivalent; SC ND = Some college no degree; ST OJT = short-term on-the-job training; MT OJT = medium-term on-the-job training

Figure 8 provides an important summary of occupational growth, but there are many other ways to use occupational projections data. One of the reasons for producing employment projections is to help with long-term career planning. There are many different pathways that can train or educate people into the workforce including two-year and four-year postsecondary programs, certifications or other nondegree awards, apprenticeship, and other forms of on-the-job training. To help provide an idea of in-demand jobs that typically require longer training requirements, top jobs by postsecondary education, jobs that are apprenticeable, and jobs by career cluster are provided. Lists for high wages jobs, STEM jobs, and skills needed are also included along with several other tables.

Occupational Demand – High Wage Jobs

For individuals looking to maximize their earning potential, Figures 9 and 10 show jobs with the most openings earning over $45,000 and $65,000, respectively. Half of the jobs earning over $45,000 typically require experience and a high school diploma. For example, training to be an electrician typically requires going through an apprenticeship program, and first-line supervisors usually requires five or more years of experience to work up to that career. Nearly all the top jobs earning $65,000 or more require at least a bachelor's degree.

The education and work experience listed in the tables are the minimum required to enter the profession as determined by the U.S. Department of Labor, Bureau of Labor Statistics. For occupations without a clear path to entry, the BLS determines the typical path based on the current minimum qualifications of workers filling those positions. At these minimums, the worker will likely be earning less than the average wage for the industry.

Figure 9: Jobs Earning Over $45,000 with the Most Job Openings, 2018-2028

Occupation		Minimum Requirements		Annual Openings				2018 MT Annual Average Wage
		Edu.	Work Exp.	New Jobs	Exits	Transfers	Total Openings	
1	Registered Nurses	Bach		164	332	252	749	$67,450
2	Heavy and Tractor-Trailer Truck Drivers	PS ND	ST OJT	35	284	421	740	$46,100
3	General & Operations Managers	Bach	5+ yrs	47	106	305	458	$98,990
4	Operating Engineers & Other Construction Equipment Operators	HSE	MT OJT	32	143	262	437	$51,580
5	Sales Representatives, Wholesale and Manufacturing, *Except Technical & Scientific Products*	HSE	MT OJT	28	132	268	428	$57,470
6	First-Line Supervisors of Construction Trades & Extraction Workers	HSE	5+ yrs	46	122	241	409	$69,470
7	Business Operations Specialists, *All Other*	Bach		28	126	232	387	$66,290
8	Accountants and Auditors	Bach		49	113	221	384	$66,410
9	First-Line Supervisors of Office & Administrative Support Workers	HSE	<5 yrs	14	136	203	353	$53,770
10	Electricians	HSE	Appren.	40	90	193	323	$58,990

Source: Montana Department of Labor and Industry Employment Projections. 2018-2028
Notes: HSE = High school diploma or equivalent; PS ND = postsecondary nondegree award; Bach = Bachelor's degree; 5+ yrs = five or more years of experience; <5 yrs = less than five years of experience; ST OJT = short-term on-the-job training; MT OJT = medium-term on-the-job training; Appren. = Apprenticeship

Figure 10: Jobs Earning Over $65,000 with the Most Job Openings, 2018-2028

Occupation		Minimum Requirements		Annual Openings				2018 MT Annual Average Wage
		Edu.	Work Exp.	New Jobs	Exits	Transfers	Total Openings	
1	Registered Nurses	Bach		164	332	252	749	$67,450
2	General & Operations Managers	Bach	5+ yrs	47	106	305	458	$98,990
3	First-Line Supervisors of Construction Trades & Extraction Workers	HSE	5+ yrs	46	122	241	409	$69,470
4	Business Operations Specialists, *All Other*	Bach		28	126	232	387	$66,290
5	Accountants and Auditors	Bach		49	113	221	384	$66,410
6	First-Line Supervisors of Mechanics, Installers, & Repairers	HSE	<5 yrs	14	69	109	192	$69,050
7	Managers, All Other	Bach	<5 yrs	7	55	85	147	$76,990
8	Software Developers, Applications	Bach		36	24	85	145	$87,120
9	Civil Engineers	Bach		22	36	81	139	$77,480
10	Medical & Health Services Managers	Bach	<5 yrs	23	40	71	133	$96,180

Source: Montana Department of Labor and Industry Employment Projections. 2018-2028. Notes: HSE = High school diploma or equivalent; Bach = Bachelor's degree; 5+ yrs = five or more years of experience; <5 yrs = less than five years of experience

Occupational Demand – Education Level

Most new job openings in the next ten years are expected at lower education levels. In 2019 and 2020, there are over 45,400 projected job openings annually that require a high school diploma or less (approximately 73% of total job openings). Occupations requiring a bachelor's degree make up another 13% of annual openings, which is the most among occupations requiring postsecondary education. Wages generally increase with education levels. Figure 11 shows worker demand by education level.

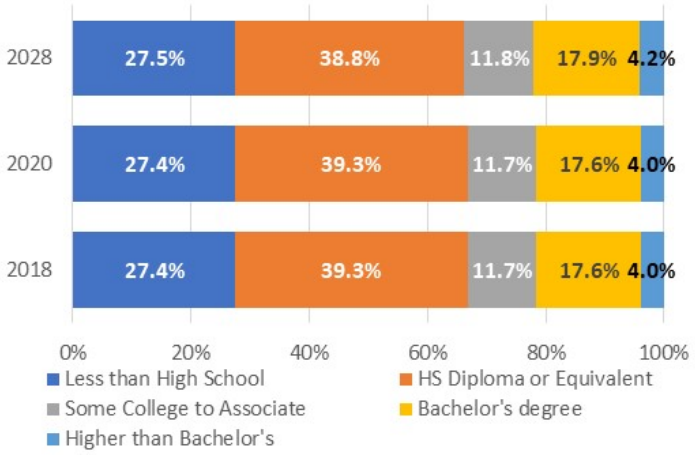
Figure 11: Worker Demand by Education Level, 2018-2028

Education Level	Annual Openings, 2018-2020				Annual Openings, 2018-2028				2018 MT Annual Average Wage
	New Jobs	Exits	Transfers	Total Openings	New Jobs	Exits	Transfers	Total Openings	
Less than High School	1,073	9,374	11,703	22,150	1,078	9,661	12,059	22,798	$26,777
HS Diploma or Equivalent	1,585	9,416	12,288	23,288	1,220	9,625	12,596	23,442	$40,278
Some college, no degree	68	781	716	1,564	54	787	726	1,567	.
Postsecondary award	259	1,451	1,770	3,479	304	1,506	1,833	3,642	$39,742
Associate degree	132	385	602	1,119	132	402	623	1,156	$47,760
Bachelor's degree	799	2,778	4,353	7,930	845	2,876	4,516	8,237	$63,394
Master's degree	107	251	379	736	121	264	400	785	$63,200
Doctoral or Prof. degree	115	281	284	679	138	295	297	730	$114,522

Source: Montana Department of Labor and Industry Employment Projections. 2018-2028

One reason that Montana expects a high number of job openings in occupations requiring a high school diploma or less is because a significant portion of the workforce is currently employed in these occupations. Figure 12 shows Montana's jobs by minimum education required for 2018, and projected jobs for 2020 and 2028. As the figure shows, this distribution is expected to remain relatively constant over the next ten years. Another reason most job openings are at lower education levels is because these jobs typically pay lower wages and therefore have higher turnover as workers seek to move up the career ladder into higher paying jobs.

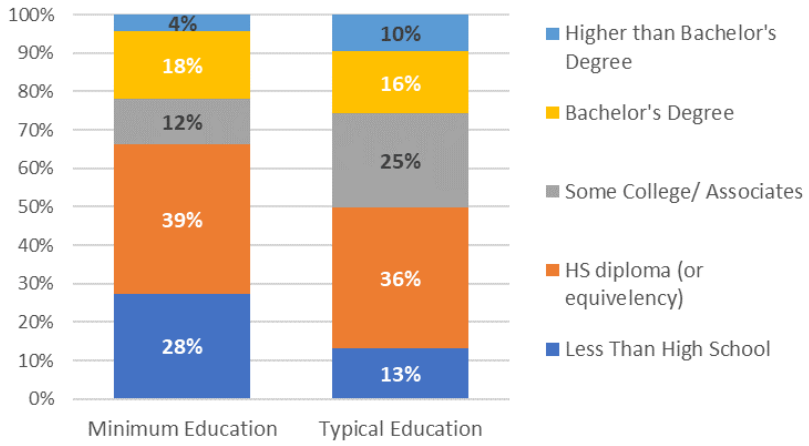
Figure 12: Montana Jobs by Minimum Education Required, Current and Projected



Source: MT DLI Employment Projections, 2018-2028

Minimum job requirements suggest that only about one-third of jobs require postsecondary education. However, typical education levels show that about 50% of jobs are held by workers with postsecondary education as shown in Figure 13. This difference suggests that some workers are employed in jobs with lower educational requirements than the worker has obtained. However, this difference doesn't necessarily mean Montana's workers are underemployed. Instead, workers may need higher education levels than the minimum to advance up their career ladder. Therefore, if employers want future workers with the same skill and education levels as the existing workforce, roughly 50% of jobs will require a postsecondary degree or credential.

Figure 13: 2028 Number of Projected Jobs by Minimum Education and Typical Education



Source: MT DLI Employment Projections, 2018-2028.

Total Job Openings – A Change in Methodology

The U.S. Bureau of Labor Statistics recently changed its job openings methodology to better capture the dynamic workforce. The past methodology, known as the "replacements" methodology, was developed in the early 1990s and relied on movement between age cohorts to estimate people exiting an occupation. This method primarily captured job openings from retirements and deaths under the assumption that workers entered an occupation at a young age and worked in that occupation until retirement.

The new methodology, known as the "separations" methodology, updates this process to account for workers who have multiple occupations throughout their lifetimes. It uses longitudinal data from the Current Population Survey to estimate the probability of a worker leaving their job based on characteristics of that worker. The results are expressed as "Exits" (people who leave the labor force completely, possibly to retire, enroll in school, or take care of family), and "Transfers" (people who leave their job in one field to start a job in a different field). The 2017-2027 projections were the first year to use the separations methodology.

Total job openings are the sum of change (new jobs), exits, and transfers. The number of openings is significantly higher than in the past (62,350 annual openings for 2018-2028 compared with 17,500 for the 2016-2026 projections). This difference reflects that change in methodology rather than conceptual factors. Because of these changes, projections from the past that use the replacements methodology should not be compared with projections derived from the separations methodology. For a more technical explanation, please see https://www.bls.gov/emp/documentation/separations-methods.htm.

Although there are fewer projected job openings requiring postsecondary education, these occupations receive significant attention by workforce planners because of the time it takes to train workers for these occupations. Figure 14 shows jobs with the most openings requiring a bachelor's degree or higher. Registered nurses top this list. Education is another in-demand field with three different types of teachers making this list: elementary teachers, secondary teachers, and substitute teachers. Figure 15 shows jobs with the most openings requiring more than a high school diploma, but less than a bachelor's degree. One more education related job is on this list (teacher assistants), along with four different jobs related to healthcare (nursing assistants, licensed practical and licensed vocational nurses, medical assistants, and dental assistants).

Figure 14: Most Job Openings for Jobs that Require a Bachelor's Degree or Higher, 2018-2028

Occupation		Minimum Requirements		Annual Openings				2018 MT Annual Average Wage
		Edu.	Work Exp.	New Jobs	Exits	Transfers	Total Openings	
1	Registered Nurses	Bach		164	332	252	749	$67,450
2	Substitute Teachers	Bach		22	311	239	572	$22,680
3	General & Operations Managers	Bach	5+ yrs	47	106	305	458	$98,990
4	Business Operations Specialists, *All Other*	Bach		28	126	232	387	$66,290
5	Accountants and Auditors	Bach		49	113	221	384	$66,410
6	Elementary School Teachers, *Except Special Education*	Bach		13	133	150	296	$52,360
7	Secondary School Teachers, *Except Special and Career/Technical Ed.*	Bach		12	106	129	246	$50,670
8	Coaches and Scouts	Bach		15	85	115	214	$27,580
9	Child, Family, and School Social Workers	Bach		15	55	97	167	$38,210
10	Human Resources Specialists	Bach		9	44	99	152	$53,980

Source: Montana Department of Labor and Industry Employment Projections. 2018-2028
Notes: Bach = Bachelor's degree; 5+ yrs = five or more years of experience

Figure 15: Jobs Requiring Some Postsecondary Education, but Less Than a Bachelor's Degree, 2018-2028

Occupation		Minimum Requirements		Annual Openings				2018 MT Annual Average Wage
		Edu.	Work Exp.	New Jobs	Exits	Transfers	Total Openings	
1	Bookkeeping, Accounting, and Auditing Clerks	SC ND	MT OJT	4	521	404	929	$36,310
2	Nursing Assistants	PS ND		70	426	354	850	$29,110
3	Heavy and Tractor-Trailer Truck Drivers	PS ND	ST OJT	35	284	421	740	$46,100
4	Teacher Assistants	SC ND		13	202	168	382	$26,630
5	Automotive Service Technicians and Mechanics	PS ND	ST OJT	15	118	226	358	$39,920
6	Computer User Support Specialists	SC ND		37	53	135	226	$46,060
7	Licensed Practical and Licensed Vocational Nurses	PS ND		20	96	95	211	$43,770
8	Forest and Conservation Technicians	Associate		4	72	134	209	$37,100
9	Medical Assistants	PS ND		32	68	95	196	$34,520
10	Dental Assistants	PS ND		15	75	84	175	$37,310

Source: Montana Department of Labor and Industry Employment Projections. 2018-2028
Notes: SC ND = Some college no degree; PS ND = Postsecondary nondegree award; Associate = Associate degree; ST OJT = short-term on-the-job training; MT OJT = medium-term on-the-job training

On average, wages generally increase with education levels. However, there are higher paying jobs at the high school to associate degree level. Instead of a bachelor's degree or higher, many of these jobs require on-the-job training or prior experience in the industry. Figure 16 shows higher wage jobs with minimum education requirements of a high school diploma or less. Figure 17 shows higher wage jobs with minimum education requirements of some college, postsecondary nondegree award (like a certification), or an associate degree. Higher wage in these charts means the job pays on average $45,000 per year or more, which is above the statewide average wage of $43,410.

Figure 16: Jobs Earning Over $45,000 that Require a High School Diploma or Less, 2018-2028

Occupation		Minimum Requirements		Annual Openings				2018 MT Annual Average Wage
		Edu.	Work Exp.	New Jobs	Exits	Transfers	Total Openings	
1	Operating Engineers & Other Construction Equipment Operators	HSE	MT OJT	32	143	262	437	$51,580
2	Sales Representatives, Wholesale and Manufacturing, *Except Tech and Scientific Products*	HSE	MT OJT	28	132	268	428	$57,470
3	First-Line Supervisors of Construction Trades and Extraction Workers	HSE	5+ yrs	46	122	241	409	$69,470
4	First-Line Supervisors of Office & Administrative Support Workers	HSE	<5 yrs	14	136	203	353	$53,770
5	Electricians	HSE	Appren.	40	90	193	323	$58,990
6	Plumbers, Pipefitters, & Steamfitters	HSE	Appren.	40	85	157	283	$60,940
7	Sales Representatives Services, *All Other*	HSE	MT OJT	16	55	149	220	$50,720
8	Insurance Sales Agents	HSE	MT OJT	21	81	107	209	$63,620
9	First-Line Supervisors of Mechanics, Installers, & Repairers	HSE	<5 yrs	14	69	109	192	$69,050
10	First-Line Supervisors of Production & Operating Workers	HSE	<5 yrs	11	53	107	172	$61,590

Source: Montana Department of Labor and Industry Employment Projections. 2018-2028 Notes: HSE = High school diploma or equivalent; MT OJT = Medium-term on-the-job training; 5+ yrs = 5 or more years' experience; <5 yrs = less than 5 years of experience; Appren = Apprenticeship

Figure 17: Jobs Earning Over $45,000 that Require Some Postsecondary Education, but Less Than a Bachelor's Degree, 2018-2028

Occupation		Minimum Requirements		Annual Openings				2018 MT Annual Average Wage
		Edu.	Work Exp.	New Jobs	Exits	Transfers	Total Openings	
1	Heavy & Tractor-Trailer Truck Drivers	PS ND	ST OJT	35	284	421	740	$46,100
2	Computer User Support Specialists	SC ND		37	53	135	226	$46,060
3	Heating, Air Conditioning, & Refrigeration Mechanics & Installers	PS ND	LT OJT	24	31	75	130	$48,740
4	Radiologic Technologists	Assoc		13	24	23	60	$54,700
5	Telecommunications Equipment Installers and Repairers, *Except Line Installers*	PS ND	MT OJT	-4	21	44	60	$61,290
6	Firefighters	PS ND	LT OJT	7	17	32	57	$49,230
7	Dental Hygienists	Assoc		8	29	18	55	$74,350
8	Architectural and Civil Drafters	Assoc		7	16	29	51	$46,020
9	Surgical Technologists	PS ND		8	17	23	48	$49,440
10	Web Developers	Assoc		8	11	29	48	$49,510

Source: Montana Department of Labor and Industry Employment Projections. 2018-2028; Notes: SC ND = some college, no degree; PS ND = postsecondary nondegree; Assoc = Associate degree; ST OJT = Short-term on-the-job training; MT OJT = Medium-term on-the-job training; LT OJT = Long-term on-the-job training

Occupational Demand – by Career Cluster

Career clusters are groups of occupations that share common features and provide a framework to connect academics to real-world applications. Demand for workers in hospitality and tourism, business management and administration, and marketing are estimated to be the largest of all the career clusters over the next ten years, with about 13,300 annual job openings in hospitality and tourism, 7,700 annual job openings business management and administration, and 6,850 in marketing. Figure 18 illustrates expected worker demand by career cluster and educational level.

Figure 18: Montana Employment Projections by Career Cluster, 2018-2028

Career Clusters	Education Level	Annual Openings, 2018-2028			
		New Jobs	Exits	Transfers	Total Openings
Agriculture, Food & Natural Resources	<HS	36	192	559	787
	HSE	-65	757	480	1,171
	Associate	12	90	173	275
	Bachelor's	19	52	127	197
Total		*0*	*1,091*	*1,338*	*2,430*
Architecture & Construction	<HS	203	747	1,334	2,285
	HSE	297	956	1,763	3,016
	Associate	10	26	46	83
	PS ND, Bachelor's	.	.	.	.
Total		*511*	*1,729*	*3,143*	*5,383*
Arts, Audio/Video Technology & Communications	<HS	0	27	22	49
	HSE	1	71	102	174
	Bachelor’s	8	141	202	352
	SCND, PSND, Associate	.	.	.	.
Total		*9*	*240*	*327*	*575*
Business Management & Administration	HSE	63	2,396	2,687	5,147
	SC ND	4	521	404	929
	Associate	-1	13	21	33
	Bachelor's	140	466	986	1,591
Total		*205*	*3,396*	*4,098*	*7,700*
Education & Training	HSE	9	45	34	88
	SC ND	13	202	168	382
	PS ND	4	34	22	59
	Associate	3	49	61	114
	Bachelor's	57	505	594	1,156
	Master's	18	106	136	261
	Phd or Prof	26	103	106	235
Total		*131*	*1,043*	*1,121*	*2,294*
Finance	HSE	38	198	308	544
	PS ND, Bachelor’s	.	.	.	.
Total		*38*	*198*	*308*	*544*
Government & Public Administration	Master’s	2	3	10	15
	HSE, Bachelor's	.	.	.	.
Total		*2*	*3*	*10*	*15*
Health Science	HSE	141	462	462	1,065
	PS ND	185	794	777	1,755
	Associate	65	117	115	297
	Bachelor's	198	394	347	939
	Master's	61	57	77	195
	Phd or Prof	81	121	102	305

Figure 18: Montana Employment Projections by Career Cluster, 2018-2028

Total		*731*	*1,946*	*1,878*	*4,555*
Hospitality & Tourism	<HS	667	4,895	5,791	11,353
	HSE	126	665	1,152	1,943
	PS ND	.	.	.	.
Total		*793*	*5,561*	*6,943*	*13,296*
Human Services	HSE	191	1,104	994	2,288
	PS ND	19	129	96	243
	Associate	1	7	10	18
	Bachelor's	57	213	352	621
	Master's	35	91	160	286
	Phd or Prof	6	15	23	44
	< HS	.	.	.	.
Total		*308*	*1,558*	*1,635*	*3,501*
Information Technology	SC ND	37	53	135	226
	Bachelor's	79	100	292	471
	Associate	.	.	.	.
Total		*116*	*153*	*428*	*697*
Law, Public Safety, Corrections & Security	<HS	3	64	37	104
	HSE	40	373	425	838
	Associate	20	40	77	136
	Bachelor's	5	19	27	52
	Phd or Prof	25	56	63	144
	PS ND	.	.	.	.
Total		*93*	*552*	*629*	*1,273*
Manufacturing	<HS	0	55	65	120
	HSE	155	928	1,608	2,691
	PS ND	-1	8	17	24
	Associate	9	29	49	87
	Bachelor's	-1	17	31	47
	SC ND	.	.	.	.
Total		*162*	*1,036*	*1,770*	*2,968*
Marketing	<HS	92	3,046	3,376	6,515
	Bachelor's	42	85	204	332
	HSE	.	.	.	.
Total		*135*	*3,131*	*3,581*	*6,847*
Science, Technology, Engineering & Mathematics	Associate	0	5	9	15
	Bachelor's	60	111	271	442
	Master's	5	6	17	28
	Phd or Prof	1	1	2	3
Total		*66*	*122*	*299*	*487*
Transportation, Distribution & Logistics	<HS	74	565	808	1,447
	HSE	134	840	1,211	2,185
	PS ND	55	434	699	1,188
	Bachelor's	1	5	12	19
	Associate	.	.	.	.
Total		*263*	*1,844*	*2,731*	*4,838*

Source: Montana Department of Labor and Industry Employment Projections. 2018-2028

Notes: <HS = less than high school diploma; HSE = High school diploma or equivalent; SC ND = Some college no degree; PS ND = Postsecondary nondegree award; Associate = Associate degree; Bachelor's = Bachelor's degree; Master's = Master's degree; Phd or Prof = Doctoral or professional degree; Total is the sum of the disclosable jobs.

Occupational Demand – by Soft Skill

Education and training programs are focused on teaching workers the technical skills they will need to succeed in a career. However, a good worker must also have strong soft skills, such as communication, time management, and the ability to follow directions. Figure 19 categorizes expected job openings by the soft skill most frequently used in the occupation. Montana workers need to have developed coordination, service orientation, and time management to successfully fill jobs in the future. The demand for projected soft skills is similar to the current skills of workers in Montana's workforce.

Figure 19: Annual Job Openings by Most Commonly Used Soft Skill, 2018-2028

Soft Skills	Level of Skill		
	Low	Medium	High
Coordination - Adjusting to others' actions	13,586	3,556	30
Service Orientation - Actively looking for ways to help people	13,223	4,249	0
Complex Problem Solving - Identifying problems, evaluating options, and implementing solutions	3,771	961	.
Time Management - Managing own time and time of others	3,118	277	0
Social Perceptiveness - Being aware and understanding others' reactions	2,316	3,153	972
Judgement and Decision Making - Considering the relative costs and benefits of potential actions	540	1,248	189
Instruction - Teaching others	462	2,351	303
Management of Personnel Resources - Determining how money will be spent and accounting for expenses	341	159	43
Systems Analysis - Determining how a system should work, and how changes will affect outcomes	13	523	0
Negotiation - Bringing people together to reconcile differences	0	755	2
Systems Evaluation - Identifying measures of indicators of system performance	0	481	.
Management of Financial Resources - Determining hos money will be spent and accounting for expenses	0	332	59
Persuasion - Persuading others to change their minds of behavior	.	3,306	131

Source: Montana Department of Labor and Industry Employment Projections. 2018-2028

Occupational Demand – Healthcare Occupations

The healthcare industry is Montana's largest employing industry, with over 72,000 employees. Healthcare employment has increased continuously throughout the last few decades, even adding jobs during the recession. Because of this growth, significant effort has been made to ensure the availability of an adequate workforce. Estimates for the healthcare industry indicate annual growth of 1,010 jobs over the next ten years.

Occupations within the healthcare industry are primarily organized into two general occupational groups, (1) healthcare practitioners and technical occupations and (2) healthcare support occupations. Figure 20 shows the top twenty healthcare jobs with the most annual openings. Most of the largest growing healthcare occupations require at least some postsecondary education. Nursing assistants top the list, with an estimated 850 annual openings every year through 2028.

Figure 20: Top 20 Healthcare Jobs with the Most Annual Openings, 2018-2028

Occupation		Minimum Requirements		Annual Openings				2018 MT Annual Average Wage
		Edu,	Work Exp.	New Jobs	Exits	Transfers	Total Openings	
1	Nursing Assistants	PS ND		70	426	354	850	$29,110
2	Registered Nurses	Bach		164	332	252	749	$67,450
3	Home Health Aides	HSE	ST OJT	40	103	86	228	$25,940
4	Licensed Practical and Licensed Vocational Nurses	PS ND		20	96	95	211	$43,770
5	Medical Assistants	PS ND		32	68	95	196	$34,520
6	Dental Assistants	PS ND		15	75	84	175	$37,310
7	Medical Records and Health Information Technicians	PS ND		18	41	41	100	$39,500
8	Pharmacy Technicians	HSE	MT OJT	13	33	45	91	$34,780
9	Veterinary Assistants and Laboratory Animal Caretakers	HSE	ST OJT	12	27	44	82	$27,000
10	Physical Therapists	Phd/Prof		27	24	26	77	$79,050
11	Pharmacists	Phd/Prof		13	27	23	63	$112,290
12	Radiologic Technologists	Assoc		13	24	23	60	$54,700
13	Physician Assistants	Master's		20	12	25	58	$106,130
14	Emergency Medical Technicians and Paramedics	PS ND		10	14	32	56	$33,020
15	Dental Hygienists	Assoc		8	29	18	55	$74,350
16	Psychiatric Technicians	PS ND	ST OJT	7	20	27	54	$27,280
17	Nurse Practitioners	Master's		19	13	19	51	$103,510
18	Phlebotomists	PS ND		8	18	24	49	$32,240
19	Surgical Technologists	PS ND		8	17	23	48	$49,440
20	Psychiatric Aides	HSE	ST OJT	.	.	.	.	$29,350

Source: Montana Department of Labor and Industry Employment Projections. 2018-2028
Notes: HSE = High school diploma or equivalent; PS ND = Postsecondary nondegree award; Assoc = Associate degree; Bach = Bachelor's degree; Master's = Master's degree; PhD/Prof = Doctoral or professional degree; ST OJT = short-term on-the-job training; MT OJT = medium-term on-the-job training

In addition to the occupations that provide healthcare services, there are other job duties that must be performed in the healthcare industry, such as medical secretaries, housekeeping cleaners, cooks and childcare workers. These non-healthcare jobs have become increasingly important because healthcare providers are evaluated on patient experience as well as health outcomes. Patient experience includes factors such as quality of food, cleanliness of rooms, and staff responsiveness and friendliness.

The top twenty non-healthcare occupations within the healthcare industry with the largest projected job growth are shown in Figure 21. The occupations are ranked from most job openings to least job openings within the healthcare industry. The annual total openings listed in Figure 21 include all projected job openings for that occupation, not just those within the healthcare industry. The average annual wage listed for each occupation is the average for that occupation across all industries, and is not specific to the healthcare industry.

Figure 21: Top 20 Non-Healthcare Jobs within the Healthcare Industry, 2018-2028

Occupation		Min. Requirements		Annual Openings				2018 MT Annual Average Wage
		Edu.	Work Exp.	New Jobs	Exits	Transfers	Total Openings	
1	Personal Care Aides	HSE	ST OJT	140	505	381	1,026	$24,250
2	Medical Secretaries	HSE	MT OJT	54	171	167	392	$32,540
3	Medical & Health Managers	Bach	<5 yrs	23	40	71	133	$96,180
4	Maids & Housekeeping Cleaners	<HS	ST OJT	104	634	478	1,216	$25,420
5	Receptionists and Information Clerks	HSE	ST OJT	19	164	175	358	$27,450
6	Billing and Posting Clerks	HSE	MT OJT	19	68	87	174	$35,870
7	Social and Human Service Assistants	HSE	ST OJT	14	65	104	183	$30,420
8	Cooks, Institution & Cafeteria	<HS	ST OJT	8	133	182	323	$27,060
9	Food Servers, Nonrestaurant	<HS	ST OJT	10	81	76	166	$22,340
10	Healthcare Social Workers	Master's	Intern	11	23	41	75	$49,570
11	Mental Health Counselors	Master's	Intern	12	28	50	91	.
12	Child, Family, and School Social Workers	Bach		15	55	97	167	$38,210
13	Recreation Workers	HSE	ST OJT	20	131	201	352	$29,300
14	Mental Health and Substance Abuse Social Workers	Master's	Intern	7	18	31	56	$37,950
15	Interviewers, *Except Eligibility and Loan*	HSE	ST OJT	7	52	61	119	$31,580
16	Maintenance and Repair Workers, General	HSE	MT OJT	51	198	271	521	$37,720
17	First-Line Supervisors of Office & Admin Support Workers	HSE	<5 yrs	14	136	203	353	$53,770
18	Janitors and Cleaners, *Except Maids & Housekeeping Cleaners*	<HS	ST OJT	73	547	529	1,150	$29,790
19	Substance Abuse & Behavioral Disorder Counselors	Bach		8	17	31	56	.
20	Clinical, Counseling, and School Psychologists	Phd/Prof	Intern	6	15	23	44	$63,720

Source: Montana Department of Labor and Industry Employment Projections. 2018-2028. Notes: <HS = less than high school diploma; HSE = High school diploma or equivalent; Bach = Bachelor's degree; Master's = Master's degree; Phd/Prof = Doctoral or professional degree; <5 yrs = less than five years of experience; ST OJT = short-term on-the-job training; MT OJT = medium-term on-the-job training

Occupational Demand – STEM

Figure 22 contains the demand for occupations that require specialized knowledge of science, technology, engineering, and math (STEM) subjects. These STEM occupations are of interest to many students and educators. Projected openings are organized based on the discipline (field of study), domain, and occupation type. The most projected openings by discipline is biology, by domain is health, and by occupation type is research and development, design, and practitioners. STEM professions typically pay high wages, with all groupings in Figure 22 showing wages higher than the statewide average.

Figure 22: Worker Demand for Science, Technology, Engineering, and Math Jobs, 2018-2028

		Annual Openings, 2018-2020				Annual Openings, 2018-2028				2018 MT Annual Average Wage
	Career Field	New Jobs	Exits	Transfers	Total Openings	New Jobs	Exits	Transfers	Total Openings	
Discipline	Biology	449	1,031	1,274	2,753	529	1,090	1,339	2,958	$78,558
	Computer Science	304	503	1,089	1,895	298	530	1,145	1,973	$71,604
	Math	254	467	957	1,678	255	491	1,006	1,752	$81,060
	Engineering	270	423	989	1,681	259	447	1,039	1,745	$74,862
	Chemistry	252	512	771	1,535	276	541	810	1,627	$91,923
	Physics	221	396	727	1,343	233	421	765	1,418	$78,748
	Economics & Accounting	135	277	465	877	144	291	488	923	$104,308
Domain	Health	405	909	900	2,214	502	964	955	2,421	$77,681
	Life & Physical Science, Engineering, Math, and IT	308	555	1,296	2,159	292	584	1,354	2,230	$69,305
	Social Science	.	.	.	.	.	.	.	.	$67,765
	Architecture	.	.	.	.	.	.	.	.	.
Occupation Type	R&D, Design, or Practitioner	461	788	1,151	2,400	525	840	1,222	2,586	$87,335
	Technologist & Technician	217	611	936	1,764	231	638	972	1,842	$48,010
	Managerial	34	59	127	220	37	63	135	235	$102,138
	Postsecondary Teaching	17	63	67	147	19	66	69	154	$73,169
	Sales	3	10	21	34	3	10	22	34	$92,222

Source: Montana Department of Labor and Industry Employment Projections. 2018-2028

Occupational Demand - Apprenticeships

The on-the-job training method of apprenticeships has grown rapidly in Montana. The number of traditional apprenticeships, such as the programs to train plumbers and electricians, have grown steadily while new apprenticeship programs, in healthcare and information technology, have been created in response to employer demand. Figure 23 shows Montana's apprenticeable occupations with the most projected job openings through 2028.

Figure 23: Montana's Apprenticeable Occupations with the Most Projected Job Openings, 2018-2028

Occupation		Min Requirements		Annual Openings				2018 MT Annual Average Wage
		Edu.	Work Exp.	New Jobs	Exits	Transfers	Total Openings	
1	Bookkeeping, Accounting, and Auditing Clerks	SC ND	MT OJT	4	521	404	929	$36,310
2	Nursing Assistants	PS ND		70	426	354	850	$29,110
3	Construction Laborers	<HS	ST OJT	83	237	448	767	$37,330
4	Carpenters	HSE	Appren	60	236	381	677	$42,480
5	Childcare Workers	HSE	ST OJT	6	342	260	608	$22,380
6	Maintenance and Repair Workers, General	HSE	MT OJT	51	198	271	521	$37,720
7	Operating Engineers and Other Construction Equipment Operators	HSE	MT OJT	32	143	262	437	$51,580
8	Automotive Service Technicians and Mechanics	PS ND	ST OJT	15	118	226	358	$39,920
9	Electricians	HSE	Appren	40	90	193	323	$58,990
10	Plumbers, Pipefitters, and Steamfitters	HSE	Appren	40	85	157	283	$60,940

Source: Montana Department of Labor and Industry Employment Projections. 2018-2028
Notes: <HS = less than high school diploma; HSE = High school diploma or equivalent; SC ND = Some college no degree; PS ND = Postsecondary nondegree award; ST OJT = short-term on-the-job training; MT OJT = medium-term on-the-job training; Appren = Apprenticeship

While the use of the apprenticeship training model has expanded into a variety of occupations, there are still many occupations that are apprenticeable by U.S. standards, but that do not yet exist in Montana. Figure 24 shows U.S. apprenticeable occupations in STEM fields with the most projected job openings. STEM occupations are targeted in this table as the apprenticeship model allows a way to access STEM occupations through on-the-job training, and some apprenticeships offer a way for their apprentices to earn a degree while training.

Figure 24: U.S. Apprenticeable Occupations in a STEM field with the Most Projected Job Openings, 2018-2028

Occupation		Min Requirements		Annual Openings				2018 MT Annual Average Wage
		Edu.	Work Exp.	New Jobs	Exits	Transfers	Total Openings	
1	Computer User Support Specialists	SC ND		37	53	135	226	$46,060
2	Licensed Practical & Licensed Vocational Nurses	PS ND		20	96	95	211	$43,770
3	Software Developers, Applications	Bach		36	24	85	145	$87,120
4	Medical and Health Services Managers	Bach	<5 yrs	23	40	71	133	$96,180
5	Medical Records & Health Information Technicians	PS ND		18	41	41	100	$39,500
6	Pharmacy Technicians	HSE	MT OJT	13	33	45	91	$34,780
7	Computer Programmers	Bach		1	22	56	79	$94,480
8	Radiologic Technologists	Assoc		13	24	23	60	$54,700
9	Emergency Medical Technicians & Paramedics	PS ND		10	14	32	56	$33,020
10	Computer & Information Systems Managers	Bach	5+ yrs	10	11	34	55	$104,630

Source: Montana Department of Labor and Industry Employment Projections. 2018-2028
Notes: HSE = High school diploma or equivalent; SC ND = Some college no degree; PS ND = Postsecondary nondegree award; Associate = Associate degree; Bachelor's = Bachelor's degree; 5+ yrs = five or more years of experience; <5 yrs = less than five years of experience; MT OJT = medium-term on-the-job training

Conclusion

Montana's employment outlook is strong, with approximately 3,890 expected jobs added per year. However, with only 3,400 workers expected to be added to the labor force over the next few years, businesses may find it difficult to recruit and retain the workers they need. Natural shifts in demographics may help ease tight labor markets as retirements among the baby boomer population begin to taper off and growth in the labor force is projected to be faster towards the end of the next ten years (4,400 new workers per year). However, businesses, educational institutions, and workforce training institutions are being proactive during these tight labor markets to ensure that the future workforce is prepared for projected job openings. This publication can be used by those institutions to learn about highly demanded jobs. In addition, individuals may benefit from employment projections by using the information to justify the cost and length of training of a given career path. No matter the use, employment and labor force projections are an important tool for Montana because they provide information about well-paying and in-demand occupations to improve job matching between employers and employees.

Appendix A - Methodology

The Research and Analysis Bureau of the Montana Department of Labor & Industry produces projections of employment growth by industry and occupation, and of labor force growth by gender and age group. For both projection types, the Department uses the methodologies recommended by the U.S. Department of Labor, ensuring accurate and consistent methodology across timelines and the most updated practices used among states.

Labor Force Projections

The Montana Department of Labor & Industry only recently began producing labor force projections on an annual basis, and the methodology has been updated and developed each year. The labor force projections start with population projections provided by the U.S. Census Bureau for Montana by age group and gender, available through the Census and Economic Information Center at the Montana Department of Commerce. These population projections include estimates for births, deaths, and net migration. The Montana Department of Labor & Industry analysts adjust these projections to remove the institutionalized and non-civilian populations that are not included in labor force estimates.

Then, historic information on labor force participation rates for each age group and gender is compiled, imputing missing values using national labor force participation rates. Future participation rates are estimated using time-series modeling with adjustments for economic conditions. The participation rates are then applied to the projected population, summing across age and gender groups to arrive at an estimate for the total labor force. This process is similar to the methodology used by the Bureau of Labor Statistics (BLS) when forecasting labor force participation rates, with adjustments for more limited data availability at the state level. More information about the BLS methodology can be found in the Handbook of Methods, available at http://www.bls.gov/opub/hom/pdf/homch13.pdf.

Employment Projections

The employment projections are produced as a part of a contract with the Employment and Training Administration of the U.S. Department of Labor using the nationally recommended methodology for employment forecasts and the programs provided by the Projections Managing Partnership. The employment projections are published on the state labor market information website at www.lmi.mt.gov, and are also published nationally on the Employment and Training Administration's website at www.projectionscentral.com. More information on the state employment projections program can be found at https://www.doleta.gov/business/projections/StateEmpProjProgram.cfm.

The projections are based on historic employment data from January 1990 to December 2018. The primary data source for the Montana industry employment projections is the Quarterly Census of Employment and Wages (QCEW), which is published jointly by the Bureau of Labor Statistics and the Montana Department of Labor & Industry. The QCEW covers payroll employment in Montana and is considered the most accurate data source because it is an actual count of employment from the wage records reported to Unemployment Insurance. The QCEW data is aggregated into the North American Industrial Classification System (NAICS) industries. For Montana's statewide industry employment

projections, three-digit NAICS industries are used, while regional forecasts are produced at the two-digit NAICS level.

All industries include only private employment except for the healthcare and education industries, which includes both public and private employment. Therefore, the government industry includes all public employment except for workers in the healthcare and education industries. The treatment of public healthcare and education employment is consistent with national recommendations from the Employment and Training Administration of the U.S. Department of Labor.

Industry forecasts are developed by comparing various functional forms of time series models, which use past employment trends to predict employment in the future, with fit and analyst insight determining the appropriate model. Fit is determined using historic data, a holdout period, and by comparing the first six months of forecast to the Current Employment Statistics (CES). The CES is an employer-based survey of employment that is published one month after the employment occurred, creating a six-month lag between the publication of CES employment and the more accurate QCEW data used to forecast employment. These six months of CES estimates are compared to the first six months of forecast to evaluate the fit of the time series forecasting model.

For certain industries, such as oil and gas mining and government, structural models are developed that utilize forecasted explanatory variables or leading indicators, including energy price forecasts, population projections, or job openings. Because of the increased unknown error introduced into the forecast from the use of forecasted explanatory variables, these structural models are primarily used to inform analyst opinion on which time series model is most appropriate. Industry projections are compared against the Montana forecasts developed by IHS Global Insight and against other publicly available employment forecasts.

The total employment level is also estimated using a time series model, and using combined time series and structural models to determine the robustness of the estimate and its sensitivity to differing economic scenarios. Data from the Local Area Unemployment Statistics (LAUS) is used to produce the total employment projection. The LAUS data is a model-based estimate that utilizes the national Current Population Survey to calculate the labor force and employment in Montana. Conceptually, the difference between the LAUS total employment estimate and the QCEW payroll employment number is the level of self-employment in Montana. Therefore, the difference between the two forecasts becomes the forecast for self-employment in Montana. The total employment and payroll employment forecasts are estimated using both a top-down and bottom-up approach with manual adjustment for internal consistency of forecasts.

Once industry forecasts are finalized, the industry employment is disaggregated into occupations using a third data source, the Occupational Employment Statistics (OES). The OES is a survey-based employment estimate that categorizes employment by occupation. The OES provides staffing patterns for each industry, which are used to disaggregate the industry projections into each occupation. For example, if registered nurses are currently 12% of the healthcare industry and 3% of the education industry, the

forecast for the occupation of registered nurses would sum 12% of the expected employment in healthcare and 3% of the expected employment in education.

However, this process is complicated by change factors, which adjust the staffing patterns for expected changes in occupational mix in the upcoming ten years. The change factors are calculated at the national level by the Bureau of Labor Statistics with some occupations edited at the state level to adapt to Montana's economic conditions. Change factors adjust the current staffing patterns for predicted changes in future business practices. For example, if registered nurses comprise 12% of the healthcare industry in the current timeframe but are expected to comprise 14% of the healthcare industry in future years, the change factor would slowly change the amount of projected healthcare employment dedicated to registered nurses over the ten-year time frame.

The self-employed staffing pattern is developed following the averages of the state and national occupational data adjusted for the likelihood of the occupation being self-employed. The staffing pattern is automatically generated using national and state level data, but is also manually adjusted using analyst insight. Analysts base those adjustments on self-employed occupation data from the Current Population Survey, data on farmers from the U.S. Department of Agriculture, and the Bureau of Economic Analysis's personal income accounts.

Forecast Error

The Montana Department of Labor & Industry does not produce error ranges for the employment forecasts, although greater consistency is one of the criteria used when selecting the appropriate time series model for each industry. Some industries and occupations have fairly stable growth paths that can be predicted with a great deal of certainty, while other industries are more susceptible to changing economic conditions. Employment growth in healthcare has continued a very steady pace over the last twenty years as Montana's population has aged and consumers have continued to demand more healthcare services. The constant steady growth gives greater confidence in the forecasted employment levels. In contrast, employment in the mining industry varies considerably with changing global prices for oil, energy, and commodities. Price changes at the global level are often difficult to predict, making the employment forecast for this industry fairly uncertain.

Further, forecasting error will be greater in the self-employed estimates compared to other industries because of the use of the LAUS data. The LAUS data series is a model-based estimate (rather than an actual count from the QCEW data used for other industries), which includes estimation error in the historic data. The estimation error is magnified as the employment is projected into the future, resulting in a fairly wide error range in the self-employed forecasts. There is also forecasting error in other industries, but the error range is smaller because the historic data is an actual count and therefore does not include historic estimation error. The occupational projections include the most uncertainty because both the industry projection and the OES estimate include some error. Regardless, uncertain occupational projections provide better expectations of future growth than the alternative of no forecast estimates.

Knowing about forecast uncertainty helps to interpret the employment forecasts more appropriately. As an example, the 2017-2027 employment forecasts suggested there will be about 765 openings annually for registered nurses. In comparison, we expect only 180 openings per year for dental assistants. While neither figure is likely to be exactly correct, it is clear that there is a greater demand for nurses than dental assistants (although both occupations are growing). The greater demand for nurses will persist even if the economy undergoes a structural shift or experiences a large recession. The relative demand of occupations is more stable and of greater certainty than the numerical demand.

Additional caveats are important to understand the projections as well. The employment projections do not account for current unfilled positions, but for the new job openings that are expected in the future. For example, if there were currently 500 unfilled openings for welders in Montana, and roughly 60 openings are expected next year, the worker demand here only presents the 60 openings expected, not the total 520 openings available for workers in the next year. In general, occupations with longer training times and faster expected growth will also be the occupations with current unfilled demand.

Appendix B – Accuracy of Past Forecasts

The Department of Labor and Industry has a good track record for accuracy in the overall total projections. After two years, the 2016 projections overestimated actual 2018 payroll employment by 1,630 (0.3%). After one year, the 2017 projections underestimated actual 2018 payroll employment by 1,050 jobs (0.2%). The consistent history suggests that the methodologies used for projections are working well.

On an industry basis, the industries with steady growth trends are more likely to have accurate forecasts, while industries with irregular spurts and business cycles generally have greater forecast error. Figure 25 shows the difference between predicted and actual employment levels by industry for the 2017-2027 projections cycle.

Figure 25: Accuracy of 2017-2027 One Year After Forecast

Industry	2017-2027 Projections for 2018	Actual 2018	Difference	% Difference
Agriculture & Forestry	5,725	5,843	-118	-2.0%
Mining	6,331	6,661	-330	-5.0%
Utilities	2,865	2,822	43	1.5%
Construction	28,327	29,077	-750	-2.6%
Manufacturing	20,094	20,560	-466	-2.3%
Wholesale Trade	17,218	17,196	22	0.1%
Retail Trade	59,242	58,989	253	0.4%
Transportation	15,880	15,745	135	0.9%
Information	6,345	6,350	-5	-0.1%
Finance & Insurance	15,173	15,253	-80	-0.5%
Real Estate	5,938	5,951	-13	-0.2%
Professional Services	22,303	22,519	-216	-1.0%
Management	2,091	2,063	28	1.3%
Admin & Waste Services	17,167	17,828	-661	-3.7%
Educational Services	40,197	40,161	36	0.1%
Healthcare & Social Assistance	73,448	72,330	1,118	1.5%
Arts, Entertainment, & Recreation	11,823	12,098	-275	-2.3%
Accommodation & Food Services	53,701	53,946	-245	-0.5%
Other Services	18,129	18,301	-172	-0.9%
Postal Service	2,116	2,116	0	0.0%
Federal Government	9,417	9,456	-39	-0.4%
State Government	12,723	12,219	504	4.1%
Local Government	20,977	20,567	410	2.0%
Payroll Employment	**467,230**	**468,279**	**-1,049**	**-0.2%**
Total Employment	**507,875**	**508,588**	**-713**	**-0.1%**

Source: MT DLI. QCEW and 2017-2027 Employment Projections

Appendix C – Job Postings Data

The MTDLI's employment projections are the primary tool the Department provides to the public to discuss future demand for workers. However, job postings data, specifically the MontanaWorks.gov online job posting board, is another source the Department has analyzed to understand the demand for current openings. The advantage of this data source is that it is generally available earlier than other data sources, which provide early insight into employer hiring needs. However, this data is not used when projecting employment for multiple reasons. First, projections data and job postings data already show similar employment demand. Figure 26 shows the top ten occupations for job postings and projections. Three of the ten most-posted jobs are also projected to have the most annual openings.

Figure 26: Top Ten Occupations for Job Postings and Projections, 2018

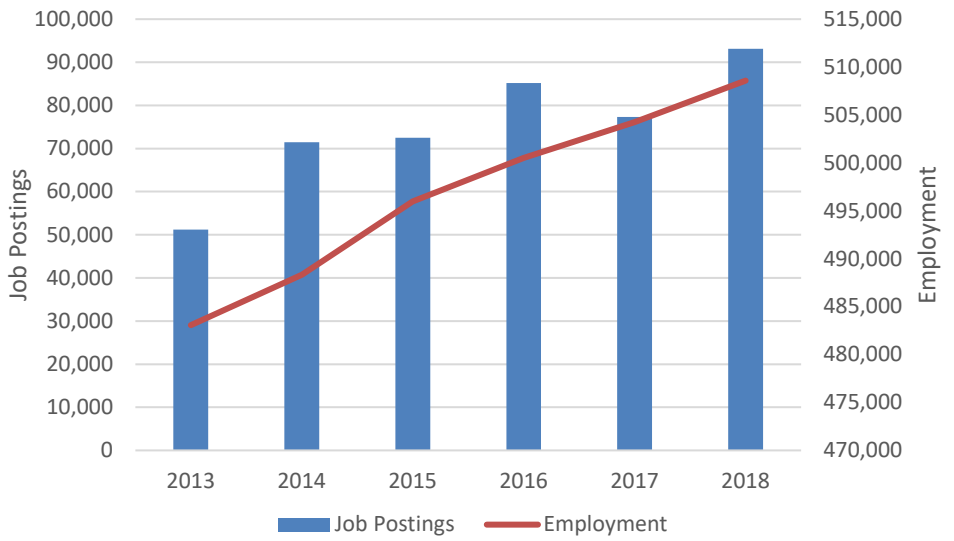
Job Postings Occupations	Rank	Projections Occupations
Truck Drivers, Heavy and Tractor-Trailer	**1**	Cashiers
Retail Salespersons	**2**	Retail Salespersons
Customer Service Representatives	**3**	Combined Food Preparation and Serving Workers
Home Health Aides	**4**	Waiters and Waitresses
Cashiers	**5**	Office Clerks, General
First-Line Supervisors/Managers of Retail Sales Workers	**6**	Maids and Housekeeping Cleaners
Maids and Housekeeping Cleaners	**7**	Janitors and Cleaners
Medical and Health Services Managers	**8**	Personal Care Aides
Truck Drivers, Light or Delivery Services	**9**	Cooks, Restaurant
Social and Human Service Assistants	**10**	Bookkeeping, Accounting, and Auditing Clerks

Source: Job postings from MontanaWorks.gov, Projections from the MT DLI.

Another reason that the projections methodology does not consider job postings data is that job postings data is affected by factors other than economic growth. One factor is that employers may post a job opening several times if it takes multiple attempts to find a qualified candidate, which overrepresents the number of job openings. Another factor is a change in the way employers hire. Not all job postings are put on the same job postings board, and not all job postings are even on the internet. Employers in towns with universities or other training providers may use those connections to find qualified applicants, and some employers may choose to use headhunters or recruiters. A change in recruiting behavior may impact the number of online job postings. As an example, Figure 27 shows the number of Montana job postings and total employment. The number of job postings remained relatively

flat between 2014 and 2015 even though employment was growing, demonstrating that noneconomic factors affect job postings making the postings less reliable for projections.[5]

Figure 27: MontanaWorks.gov Job Postings compared with Total Employment, 2013-2018



Source: Job postings from MontanaWorks.gov. Employment from BLS LAUS.

[5] All information in Appendix C is originally from the Economy as a Glance Article: Bradley, Christopher. 2017. "Online Job Postings as Economic Data" Montana Department of Labor and Industry. Numbers have been updated through 2018.