Meeting Local Worker Demand

Labor Market Outcomes for Missoula College

MONTANA UNIVERSITY SYSTEM

Montana Department of LABOR & INDUSTRY

MISSOULA COLLEGE
UNIVERSITY OF MONTANA

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Executive Summary

Meeting Local Worker Demand: Labor Market Outcomes for Missoula College

The State of Montana is committed to producing a high quality workforce that meets the demands of our employers. With Montana anticipating a worker shortage in the upcoming years, and with the costs of education continuing to escalate, the Montana Department of Labor and Industry (DLI) and the Office of the Commissioner of Higher Education (OCHE) have joined forces to share data and create analytics that can be used by our state's community colleges to ensure that our workforce training systems are aligned with our economic needs. Utilizing this data will help students progress through educational programs and join the labor market quickly and efficiently, saving money for students, employers, and taxpayers.

Missoula College volunteered to be the subject of our analysis as a part of an exploratory pilot project of providing greater data for program evaluation. This report provides information on the expected job demand for the region served by the Missoula College, and provides analytics on whether students of Missoula College are graduating within in-demand fields, obtaining jobs quickly after graduation, and experiencing wage progression during their post-graduation careers. This data will help Missoula College evaluate their talent pipeline, ensuring that their programs match the workforce needs in the business community. The information on successful job placement and wage progression will also help students choose programs that will result in the most career success with the best returns to the cost of education. This report is intended to be a starting point for continued evaluations, and any suggestions to improve the report data, analysis, or presentation are warmly welcomed.

The OCHE provided MT DLI with data on the graduates of Missoula College from 2001 to 2015, including data on roughly 4,000 individuals through 30 different academic programs. These data were matched to employment projections and wage records to answer three research questions:

1) Are Missoula College graduates completing the right programs to fill the types of jobs required by regional employers?

2) Do Missoula College graduates remain in the Missoula area and retain employment, thus helping to meet local worker demand?

3) Are Missoula College graduates experiencing stable employment and wage progression post-graduation?

In addition to these primary research questions, the report also provides additional information on the demographics, program growth, and educational outcomes of Missoula College students that allows a more complete understanding of how the college is serving the community. Data were transferred and matched securely, and results were aggregated so that no individual student's outcomes could be identified.

The report is organized into four sections, with the first reviewing the demographic and program attendance information, answering the question "What are Missoula College students like?" The second section, "How do Missoula College graduates Fare in the World of Work?," provides the employment and wage outcomes of graduates, including breakdowns by geography and industry. Continuing the evaluation, the third section answers the primary research question "Does the Supply of Graduates Match the Demand from Employers?," with supply and demand gap analysis from four different perspectives. Information from all four perspectives is needed to overcome flaws in the data and methodology, ensuring that the research results are robust and consistent under different assumptions. The fourth section concludes the report. The methodology is presented in the appendix.

UNDERSTANDING SUPPLY AND DEMAND ANALYSIS THROUGH FOUR DIFFERENT LENSES

This report presents three different supply and demand analyses – by industry, by occupation, and by program of study to determine if Missoula College is meeting local workforce needs. These analyses are supplemented with a fourth analysis of employment and wage outcomes by program to confirm the results. Each type of analysis on its own has flaws, but interpreting the results through all four lenses provides greater confidence in the results.

INDUSTRY

Demand: Estimated annual employment growth by industry in the Northwest

Supply: The number of Missoula College graduates who find employment in the industry one year after graduation.

PROGRAM OF STUDY

Demand: The sum of estimated annual employment growth for all occupations graduates from the program would be qualified to fill.

Supply: The annual average number of graduates from the program over the last three academic years.

OCCUPATION

Demand: Estimated annual employment growth by occupation for high-demand occupations in the Northwest that require an Associate's Degree or post-secondary award.

Supply: Average annual number of Missoula College graduates over the last three academic years who graduate from programs that prepare them to work in the occupation.

EMPLOYMENT AND WAGES BY PROGRAM OF STUDY

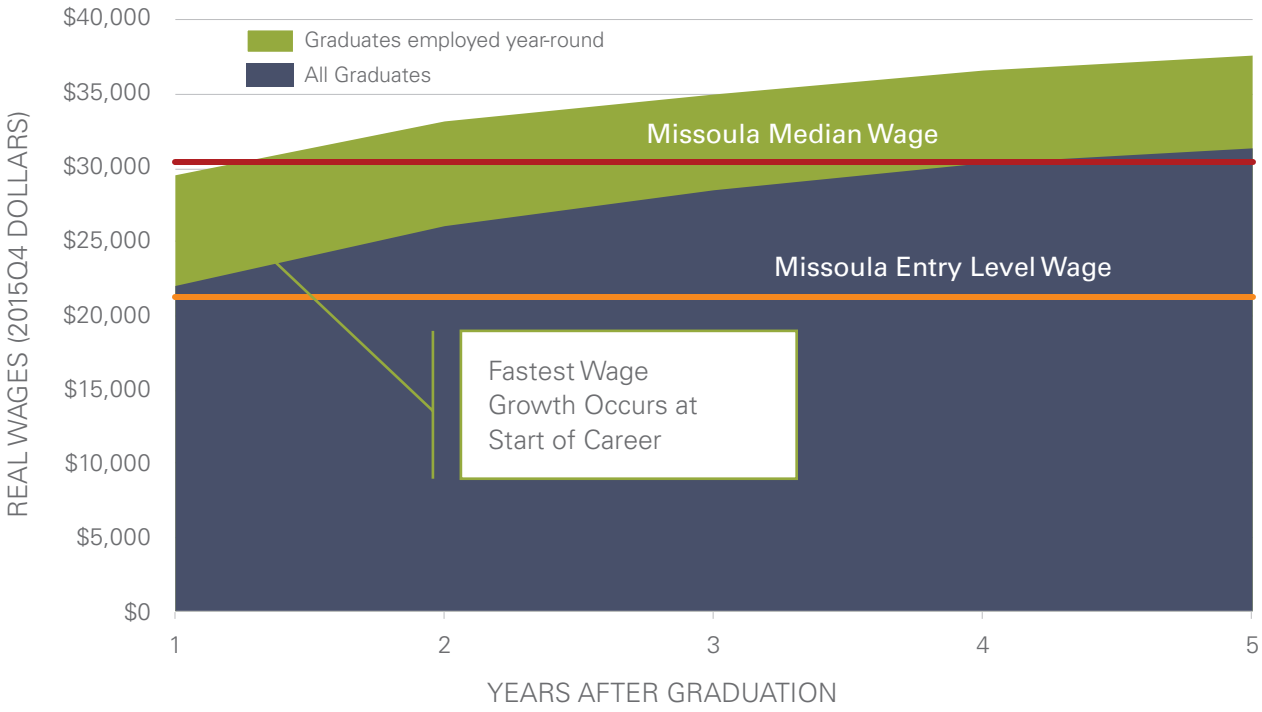
Employment and wage outcomes for graduates confirm conclusions of the other three supply and demand analyses. Under-supplied programs have better outcomes than over-supplied programs.

The analysis faces some drawbacks due to data limitations. Only Montana wage data is included in this analysis. While this helps to determine whether the worker remains in Montana post-graduation, the lack of data from other states likely places downward bias on the percent of graduates employed, with greater bias for programs that help fill national talent pools. Further, the wage data does not include the number of hours worked, preventing calculations of hourly wages. If the graduate has higher wage earnings after graduation, the difference may be due to working more hours, not to higher hourly wages. Despite these limitations, important insights were gained from this analysis. Highlights are provided below.

Missoula College Graduates start earning more than the Missoula entry-level wage within a year after graduation, and earn more than the median within five years. Workers working year-round have even better outcomes.

FIGURE 2.4 illustrates the average real wages of Missoula College graduates in the first five years after graduation, compared to the 2014 median and entry-level wage levels in Missoula County. Average real wages of employed graduates start at roughly $22,000 in the first year after graduation to $31,500 five years after graduation. Graduates who were employed in all four quarters had an average real wage of $29,540 one year after graduation, roughly $7,500 more than the average for all graduates. Year-round workers earn above the median for Missoula in their second year after graduation. 37% of employed graduates had wage earnings in all four quarters in the five years after graduation. (See Section 2.3 and 2.4)

FIGURE 2.4 REAL WAGE EARNINGS FOR MISSOULA COLLEGE GRADUATES SINCE FALL 2001



Source: MT DLI and OCHE MUS graduate data wage match excluding spring 2015 graduates. Graduate wages in real 2015Q4 dollars. Entry and median wages from the 2014 Occupational Employment Statistics.

Most graduates quickly find employment in the Missoula area after graduation, making the college an important resource for the local economy.

Roughly 79% of Missoula College graduates found employment with a Montana employer within two quarters after graduation, with 83% of graduates finding employment after a year. Of those who were employed, 67% were working in Missoula County a year after graduation, with an additional 7% working in Ravalli County (for a total of 74% of graduates employed in the Missoula College service area). The large number of graduates employed in the local area suggest that Missoula College is filling an important role in the regional economy. (See Section 2.2)

Roughly 11% of projected employment growth in the Northwest will be for occupations requiring a post-secondary award or associate's degree.

The majority of occupational employment growth in the Northwest region of Montana will require only a high school degree or less to fill, with approximately 71% of growth at this education level. Among the twenty occupations with the most job openings, registered nurses, nursing assistants, heavy and tractor trailer truck drivers, and elementary school teachers are the only ones requiring at least some college education. The high-demand occupations that require an associate's degree or post-secondary award are shown in FIGURE 4.2, categorized based on whether Missoula College graduates are meeting or exceeding local worker demand.

The College is graduating fewer registered nurses than expected demand, suggesting a program expansion would be supported by the economy. Paralegals, radiologic techs, respiratory therapists, and drafters currently have more graduates than expected demand, but these programs may be helping to meet worker demand in other areas of the state. There are also a few high-demand occupations where there is no Missoula College program. These are potential areas of expansion for the College, although a variety of factors need to be considered in addition to this information.

FIGURE 4.2 HIGH-DEMAND OCCUPATIONS IN THE NORTHWEST THAT REQUIRE AN ASSOCIATE'S DEGREE OR POST-SECONDARY AWARD BY LEVEL OF SUPPLY

Missoula College Produces Fewer Graduates than Demanded	Missoula College Meets Current Demand	High Demand, but no Program at Missoula College (Along with Expected Annual Openings)	More Graduates than Needed, Likely Filling Statewide Worker Demand
• Registered Nurses	• Forest and Conservation Technicians • Licensed Practical and Vocational Nurses • Medical Assistants	• Nursing Assistants (56) • Heavy Truck and Tractor-Trailer Drivers (51) • Medical Records and Health Information Technicians (22) • EMTs and Paramedics(17) • Dental Assistants (15) • Hairdressers and Cosmetologists (15) • **Firefighters (11)** • **Dental Hygienists (10)** • **Web Developers (10)** • Preschool Teachers (9) • Medical and Clinical Lab Technicians (7) • **Medical Equipment Repairers (4)**	• Paralegals and Legal Assistants • **Radiologic Technologists** • **Respiratory Therapists** • **Architectural and Civil Drafters**

Source: MT DLI and OCHE MUS graduate data wage match. MT DLI employment projections 2014-2024. Bolded high-wage occupations.

Over 35% of Missoula College employed graduates work in the health care industry, but these workers only fill 22% of health care demand in the Northwest region of Montana.

Over 35% of Missoula College employed graduates are employed by the health care industry one year after graduation, with the percentage increasing to nearly 39% after five years. Graduates entering work in the health care industry earned average wages of $36,890 after five years, the second highest industry wage for graduates after the mining industry.

However, because health care is both a large employer and growing at an above-average pace, Missoula College graduates are only filling 22% of expected demand from the health care industry in the Northwest region. Health care is expected to need over 430 workers per year just to fill new positions, although some of this worker demand will require education levels higher than an associate's degree.

Other industries that employ large numbers of Missoula College graduates a year after graduation include the retail industry (12% of graduates), accommodation and food services (9%), and administrative and waste services (7%). In general, Missoula College graduates tend to move into higher-paying industries over time.

Registered nursing graduates have the best wage and employment outcomes among graduates and are undersupplied in the local labor market

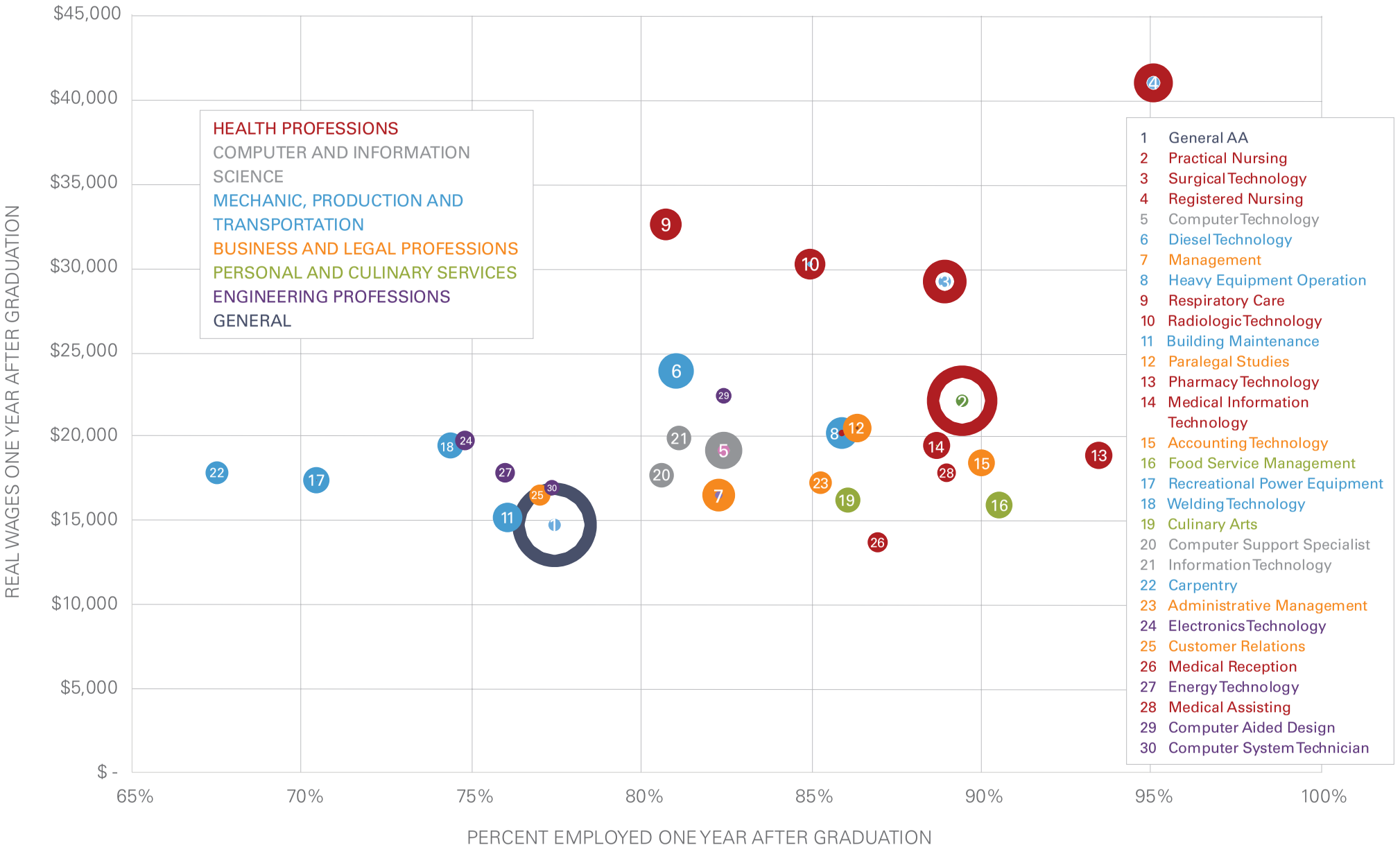
FIGURE 3.8 illustrates the employment and wage outcomes of Missoula College graduates by program. Registered nursing graduates have superior employment outcomes, with 95% of graduates employed within one year and earning real wages over $41,000 per year. The above-average employment and wage outcomes confirm the results of the supply and demand analysis that the program is under-supplying the market. While an undersupply is also found for other Missoula College programs, registered nurses require an associate's degree to enter the profession, making the program a higher target for expansion than other programs that fill occupations that do not require a post-secondary education.

Other medical fields, shown in red in FIGURE 3.8, also have better than average workforce outcomes. In contrast, graduates in the mechanic, production, and transportation categories (shown in blue) have lower placement rates and lower wages than many other programs. The general studies program is illustrated by the large navy bubble, with graduates having below average wages and lower placement rates. The size of the bubble represents the number of employed graduates since 2001.

Culinary arts, customer relations, and accounting technology are programs where the supply of graduates is much less than expected worker demand, but these jobs can be filled by workers without an associate's degree.

Including all jobs that could be filled by someone with a degree from Missoula College, the customer relations and culinary arts programs have the largest gaps between the number of graduates and the expected demand. However, the demand for these types of jobs does not require workers to have an associate's degree or post-secondary award – they could be filled by workers with a high school diploma or equivalent and work experience. In fact, graduates from these programs have lower wage outcomes than other graduates, possibly because they are over-qualified. That being said, having more education than the minimum usually results in faster wage progression and better career advancement.

FIGURE 3.8 EMPLOYMENT AND REAL WAGE OUTCOMES ONE YEAR AFTER GRADUATION BY PROGRAM



Source: MT DLI and OCHE MUS graduate data wage match. The size of the bubble represents the total number of graduates in each program since 2001, while the color of the bubble categorizes programs based on their CIP codes. The legend is also ordered by size of program, with the first program having the most graduates. Wages are in real 2015Q4 dollars.

The largest program at Missoula College is the general studies program, but this program has below-average wage and employment outcomes, and is not linked to any in-demand jobs.

The largest program at Missoula College is the general studies program, with about 600 students enrolled in the 2014-2015 academic year and 100 graduates on average per year since summer of 2011. Roughly 1/3 of all Missoula College students are enrolled in the general studies program. However, the supply and demand analysis suggests that that there are too many graduates compared to local employer demand. According to the Bureau of Labor Statistics training information, there are very few occupations that someone with a general studies associate's degree is prepared to fill and none of the occupations require an Associate's degree. Furthermore, the occupations associated with a general studies degree are not expected to grow in the Northwest. (See Section 3.3)

Perhaps due to this over-supply, the wage and employment outcomes for general studies graduates fall below those of other programs. Graduates with a general studies degree earn roughly $29,570 five years after graduation, less than the $31,350 earned by all graduates. Only 77% of general studies graduates are employed one year after graduation, compared to 83% for all graduates. General studies graduates are also less likely to work in year-round jobs, with graduates working 2.57 quarters per year after one year compared to 2.9 quarters per year for all graduates. (See Section 3.4) In all metrics measured in this report, general studies graduates have poorer workforce outcomes than average. Given the size of this program, the poor wage outcomes are of particular concern, and are likely weighing down the overall performance averages for the college as a whole.

The general studies program is often thought of as preparation for a bachelor's degree program, but the data does not suggest that the pursuit of higher education explains the differences in wage outcomes. Roughly 66% of general studies students transfer to another MUS institution, but only 38% achieve a bachelor's degree. (See Section 2.1) Even with greater bachelor's degree attainment compared to other fields, general studies students still face lower average wages.

Roughly 10% of graduates pursue higher education after achieving their degree.

About 1% of Missoula College graduates continued on to higher education in Montana without entering employment between their degree programs. There are also about 9% of graduates who have both wages and continued education, who may have been working while pursuing a second degree. Graduates in the general studies program are most likely to hold a bachelor's degree or higher from an MUS institution in addition to their degree from Missoula College, with 38% of general studies graduates obtaining a bachelor's degree or higher. The paralegal studies and computer technology programs also had over 20% of their graduates also holding a bachelor's degree or above. (Section 2.1)

100% of Missoula College programs allow graduates to recover the cost of education within a year.

In a system of escalating education costs, Missoula College provides a good value. Every program allows employed graduates to reclaim tuition costs within a year, given the average cost of tuition and the average wages earned in the first year after graduation. The cost recovery estimate shown in FIGURE 3.11 shows the number of months it takes the average employed graduate to earn wages equal to the average tuition paid by program. Surgical technology, heavy equipment operation, and registered nursing graduates recover tuition costs the fastest, with average wage earnings higher than tuition costs within five months after graduation. The program with the longest time to cost recovery is medical reception. Graduates in the medical reception field take 9.7 months of working at their average wage before their wages exceed the $11,034 average program cost. (See Section 3.7.)

FIGURE 3.11 ESTIMATED COST RECOVERY BY DEGREE FOR EMPLOYED MISSOULA COLLEGE GRADUATES

Major	Average Credits to Degree	Cost Per Degree	Real Wage After 1 Year of Graduation	Average Number of Months to Recover Cost
Surgical Technology	69.2	$10,219	$29,292	4.2
Heavy Equipment Operation	30.0	$7,230	$20,258	4.3
Registered Nursing	106.8	$15,768	$41,127	4.6
Recreational Power Equipment	48.1	$7,099	$17,364	4.9
Building Maintenance	43.5	$6,414	$15,244	5.0
Diesel Technology	70.8	$10,458	$23,928	5.2
Computer Aided Design	67.2	$9,917	$22,498	5.3
Pharmacy Technology	58.2	$8,598	$18,851	5.5
Respiratory Care	109.3	$16,140	$32,588	5.9
Radiologic Technology	106.9	$15,775	$30,226	6.3
Welding Technology	70.6	$10,416	$19,407	6.4
Information Technology	74.9	$11,050	$19,952	6.6
Computer Support Specialist	67.0	$9,896	$17,755	6.7
Medical Information Technology	76.9	$11,353	$19,427	7.0
Practical Nursing	88.0	$12,996	$22,185	7.0
Medical Assisting	75.1	$11,088	$17,903	7.4
Electronics Technology	82.9	$12,243	$19,753	7.4
Computer Technology	81.5	$12,026	$19,227	7.5
Accounting Technology	83.5	$12,331	$18,422	8.0
Customer Relations	77.6	$11,454	$16,572	8.3
Paralegal Studies	97.0	$14,319	$20,560	8.4
Energy Technology	84.4	$12,457	$17,767	8.4
Administrative Management	82.0	$12,109	$17,265	8.4
Culinary Arts	76.8	$11,344	$16,148	8.4
Carpentry	85.0	$12,545	$17,820	8.4
General AA	71.1	$10,493	$14,685	8.6
Computer System Technician	82.5	$12,179	$16,970	8.6
Food Service Management	80.8	$11,925	$15,859	9.0
Management	90.1	$13,302	$16,550	9.6
Medical Reception	74.7	$11,034	$13,666	9.7

Source: MT DLI and OCHE MUS graduate data wage match, and OCHE MUS cost per credit and time to completion data for Missoula College. Cost recovery calculated for average wages and average tuition for the program. Average cost of tuition for each program is the product of the average cost per credit across all programs by the average number of credits for program completion.

Missoula College students are becoming younger and more female due to success of dual enrollment and pre-nursing programs

Females comprise 56.1% of the student population at Missoula College, over 4% higher than the working age population in the Missoula area. Women tend to be concentrated in the medical fields, with the gender distribution in most programs following traditional gender roles. The percentage of students who are teenagers aged 13 to 17 has more than doubled in the last five years, with 10.7% of the student body in this age group compared to 5% of the student body during the 2010-2011 academic year.

Table of Contents

Introduction

Due to our aging demographics and strong job growth since the recession, Montana is expecting a worker shortage in the next ten years. Our working age population is expected to plateau, and continued job growth will result in tight labor markets.[1] As workers become increasingly hard to find, the time spent out of the workforce to obtain education and job training becomes more expensive for workers, businesses, and our economy. At the same time, the cost of the education system continues to increase for both students and taxpayers.[2] Part of the solution for both of these challenges is to ensure that students are choosing career paths that lead them to the occupations most in-demand by employers, and that the training program is efficiently and effectively providing a skilled workforce for the Montana economy.

Recognizing these global forces, the Montana Department of Labor & Industry (MT DLI) and the Office of the Commissioner of Higher Education (OCHE) have joined forces to share data and create analytics that can be used by our state's community colleges to ensure that our workforce training systems are aligned with our economic needs. While many colleges have attempted to generate their own internal analysis at the local level, the state agencies charged with overseeing education and workforce training are in a unique position to provide evaluation data for all schools in a uniform manner, and provide comparative statistics so that colleges can evaluate themselves compared to statewide averages.

Missoula College volunteered to be the first college in this exploratory pilot project of providing greater data for program evaluation. This report is intended to be a starting point for continued evaluations, and any suggestions to improve the report data, analysis, or presentation are warmly welcomed. The goal is to provide similar analysis to other community colleges in the state throughout the year, and to gather suggestions to improve this report for future years.

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[1] Wagner et al. 2015. "2015 Labor Day Report" published by the Montana Department of Labor and Industry. Available at http://lmi.mt.gov/Publications/PublicationsContainer/ArtMID/34826/ArticleID/2311/Labor-Day-Report-2015.

[2] Pew Charitable Trusts. "Federal and State Funding of Higher Education: A Changing Landscape" June 11, 2015. Available at www.pewtrusts.org/en/research-and-analysis/issue-briefs/2015/06/federal-and-state-funding-of-higher-education. Accessed on Feb. 26, 2016.

HOW DO YOU KNOW HOW MANY WORKERS WILL BE NEEDED?

Projections of industry and occupational worker demand come from the Montana Department of Labor & Industry 2014-2024 projections. The projected worker demand is for the full Northwest region, not just for the Missoula area. Therefore, Missoula College is not expected to meet the total demand for workers – other institutions will also help train workers.

Worker demand comes from two sources: workers needed to fill new jobs, and workers needed to fill openings created by workers retiring or taking other jobs. Missoula College is considered to have met worker demand if the supply of workers falls within the range of the expected new jobs and the total expected worker supply (including replacements).

FIGURE 0.1 MAP OF NORTHWEST REGION OF MONTANA

The data for this report comes from the MT DLI employment projections for the Northwest region of the state, with analysts matching the educational programs at Missoula College to the occupations graduates can fill with a degree in the program. Educational Programs and occupations were matched based on U.S. Department of Labor (U.S. DOL) and Department of Education guidelines. The forecast of worker demand from employers was then compared to the supply of workers graduating from each program using administrative data from OCHE. The supply and demand analysis identifies gaps where our education and training systems are not meeting the worker and skill needs of local employers. Missoula College is not expected to meet all of the worker demand for the Northwest because other institutions also train workers for regional employers.

The local labor market served by Missoula College was determined to be the Northwest region of Montana. The Northwest region is illustrated in FIGURE 0.1. Regional employment projections for the Northwest area were used to determine the employer demand for Missoula College graduates. The Northwest region employs over 140,000 Montanans, the most of any region in the state. The region's employment is currently most concentrated in the healthcare industry, followed by retail trade, accommodation and food service, and education.

The Northwest region suffered significant employment losses during the recession, largely because of the area's reliance on the hard-hit industries of construction and manufacturing when compared to other areas of the state. Employment in the Northwest was slow to recover from the over 9,000 jobs lost during the recession, but has posted strong employment growth since 2012. The Northwest regained its pre-recession peak in 2015. Payroll employment data from the first two quarters of 2015 indicate strong job growth in the Northwest, with gains in the consumer-based industries of construction, trade, and leisure activities. Wage growth has picked up in the area, which will add even more momentum to job growth. Average wages in the Northwest are lower than the state average, at $35,030 in 2014 compared to a statewide average of $38,880.

The administrative data on students and graduates available through OCHE were also matched by MT DLI to wage and employment records collected through the unemployment insurance (UI) program. This research was governed by the security requirements outlined in the Memorandum of Understanding between the MT DLI and OCHE designed to protect the confidentiality of the unemployment insurance wage files and protect the privacy of graduates. The resulting information provides insight on how quickly each graduate finds a job and whether the student is experiencing wage progression in the five years after graduation. The wage matching is critical to the understanding and confirmation of the supply and demand analysis, as the in-demand fields should have higher job placement and better wages than occupations where Missoula College is over-supplying the local labor market. The match also provides information on if

graduates are employed in the local area, thus helping local businesses meet their worker demands and growing the local economy, or if the graduates leave the Missoula area after graduation. For Missoula College, most graduates are employed in the local economy.

Finally, employment outcome information is helpful for students searching for a degree program that ensures their employability after college. This report also provides analysis on how quickly graduates recover their costs of tuition (at the average cost), finding that Missoula College graduates' wages exceed the cost of education within a year.

The report is organized into four sections, with the first reviewing the demographic and program attendance information and answering the question "What are Missoula College students like?" The second section, "How do Missoula College graduates Fare in the World of Work?," provides the employment and wage outcomes of graduates, including breakdowns by geography and industry. Continuing the evaluation, the third section answers the primary research question "Does the Supply of Graduates Match the Demand from Employers?" with supply and demand gap analysis from four different perspectives. The wages by program are presented, along with the time it takes graduates to recover their costs, providing helpful information for students choosing degree programs and businesses who are seeking workers. The fourth section concludes. The methodology is presented in the appendix. Utilizing the supply and demand analysis will help students join the labor market quickly and efficiently, saving money for students, employers, and taxpayers.

The analysis faces some drawbacks due to data limitations. Only Montana wage data is included in this analysis. While this helps to determine whether the worker remains in Montana post-graduation, the lack of data from other states likely places downward bias on the percent of graduates employed, with greater bias for programs that help fill national talent pools. Further, the wage data does not include the number of hours worked, preventing calculations of hourly wages and making it difficult to determine whether workers are "better off" post-graduation. If the graduate has higher wage earnings after graduation, the difference may be due to working more hours, not to higher hourly wages. However, the insight provided through the partial wage match was deemed valuable enough to share with these limitations.

DATA LIMITATIONS:

- Graduates employed in other states and self-employed are not included in the data, placing downward bias on percent employed.
- Wages reported are total wage earnings from all employers. Wage increases may be due to more hours worked or working multiple jobs.

Section 1
What are Missoula College Students Like?

Missoula College students are more female, younger, and more educated at the associate's degree level than the local labor force. For comparison purposes, demographic characteristics of the working population living in the Missoula College local service area are shown in FIGURE 1.1.

By race, Missoula College students were about 80% white during the 2014-15 fall and spring semesters. Six percent were American Indian, and 5% were some other ethnicity. There were 10% of students where the race was unknown. The Missoula College student population is more racially diverse than the local workforce. Like most of Montana, the local workforce is predominantly white, with 95% of the working population in Missoula and Ravalli Counties identifying as white and 2% identifying as American Indian or Alaska Native. In Montana as a whole, roughly 8% of the population identifies as American Indian alone or in combination with another race.[3]

FIGURE 1.1 DEMOGRAPHICS OF LOCAL AREA WORKING POPULATION

	Share of Working Population
Worker Age	
Age 29 or younger	23.9%
Age 30 to 54	53.4%
Age 55 or older	22.6%
Worker Earnings	
$1,250 per month or less	30.2%
$1,251 to $3,333 per month	38.6%
More than $3,333 per month	31.2%
Worker Educational Attainment	
Less than high school	6.9%
High school or equivalent, no college	24.5%
Some college or Associate degree	25.9%
Bachelor's degree or advanced degree	18.8%
Not available (workers aged 29 or younger)	23.9%
Worker Gender	
Female	52.0%
Male	48.0%
Worker Race	
White	95.2%
American Indian or Alaska Native	1.9%
Two or More Races	1.3%
Other	1.6%

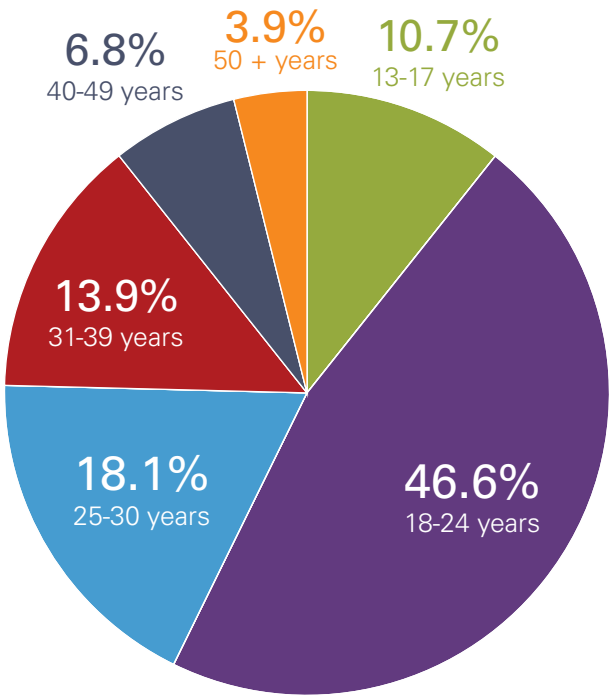
Source: OnTheMap, LEHD, U.S. Census Bureau, 2002Q2-2013Q4. Area includes Missoula and Ravalli Counties.

[3] 2014 American Community Survey 5-year estimates.

1.1 Success of Dual Enrollment Initiative Results in Younger Student Body

The Missoula College student body has also become younger over the last few years, largely because of the dual enrollment initiative aimed to give high school students a head start on obtaining post-secondary degrees. The majority of Missoula College students are under the age of 30. FIGURE 1.2 illustrates the age breakdown of students in the 2014-15 academic year, with 46.6% of students in the traditional age for post-secondary education, and 18.1% of students between the ages of 25 to 30. Roughly a quarter of students are over the age of 30. In comparison, over half of the workforce in Missoula and Ravalli County are between the ages of 30 and 54 years old.

FIGURE 1.2 AGE DISTRIBUTION OF RECENT STUDENTS, 2014-15



Source: OCHE MUS data on Missoula College students during the 2014-2015 academic year.

Recently, the share of students aged 13 to 17 has increased at Missoula College, marking the success of the dual enrollment initiatives at the state and local levels. Currently, 10.7% of the student body is in the 13 to 17 age group; this percentage was closer to 6% just three years earlier and at 5% in the 2010-2011 academic year. The overwhelming majority of these young students are still in high school and are therefore enrolled in the nondegree program, although there are a handful enrolled in specific degrees.

1.2 Missoula College Student Population is Becoming More Female

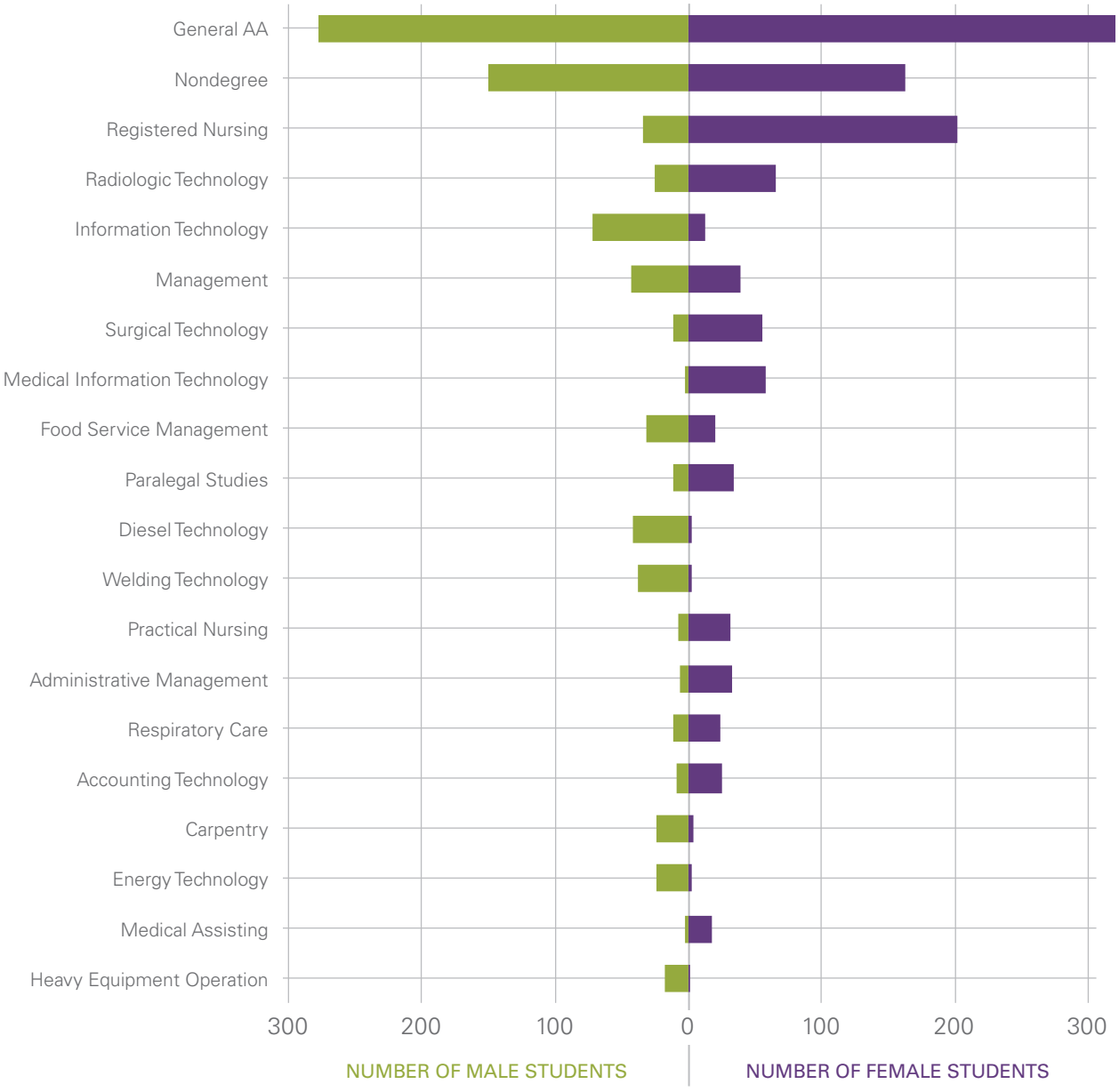
The student population of Missoula College has a higher female share than the local workforce, with a 56.1% female student body during the 2014-15 academic year, compared to 52% female for the working population in the Missoula area (FIGURE 1.1). In general, females tend to have slightly higher educational attainment at the some college and associate's degree level then males in Montana.[4]

The share of students that are female has increased at Missoula College over the last three years, with the female share growing from 54.5% during the 2010-2011 academic year to the current 56.1% level.

[4] 2014 American Community Survey 5-year estimates.

The shifting demographics likely is due to the increased enrollment in the pre-nursing program, which has over 85% female enrollment. FIGURE 1.3 illustrates the number of students by program and gender during the 2014-15 academic year, including fall and spring semesters only. Pre-nursing is included with registered nursing in FIGURE 1.3. Many of the programs demonstrate traditional gender roles, with women being more prevalent in healthcare and administrative programs, while men have greater shares of enrollment in many of the trade programs.

FIGURE 1.3 STUDENTS BY SELECT PROGRAM AND GENDER, 2014-15

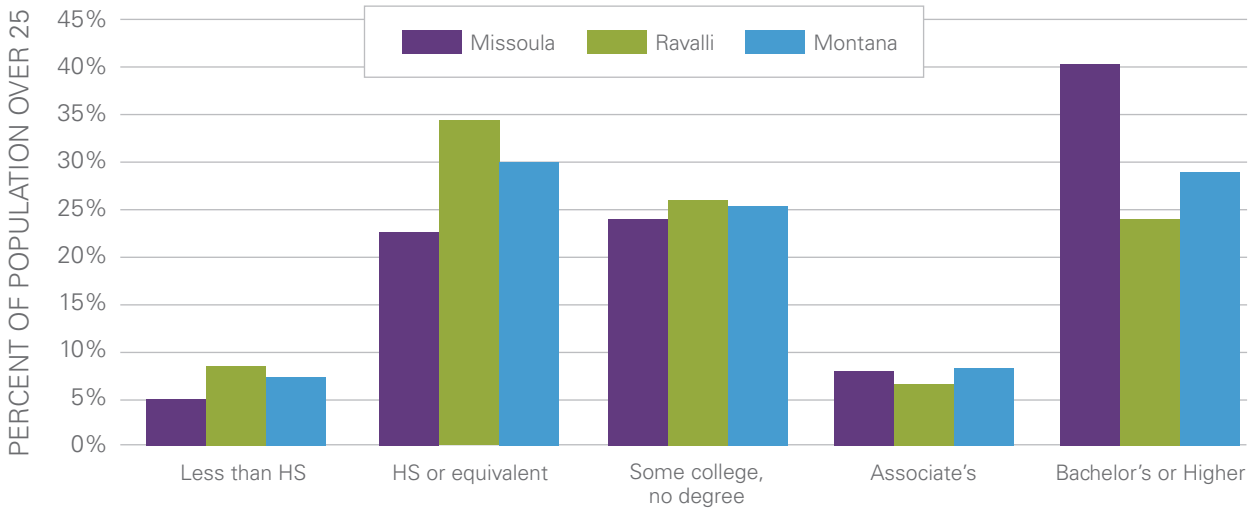


Source: OCHE MUS data on Missoula College students during the 2014-2015 academic year. Chart includes pre-program students in the relevant program. For example, registered nursing includes pre-nursing. Programs with less than 20 students are excluded.

1.3 How does the Educational Attainment of Missoula College Graduates compare to the rest of Montana?

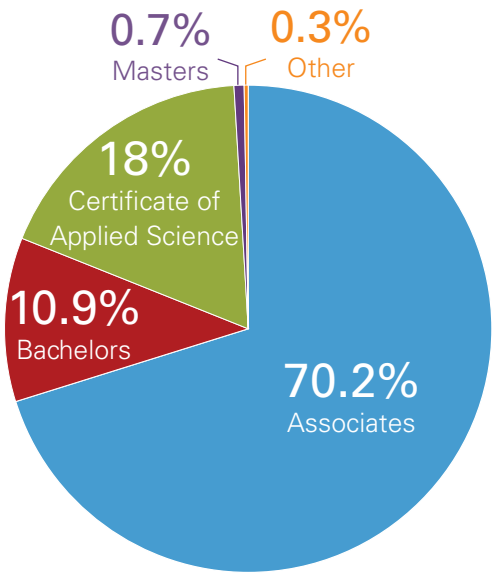
Roughly a quarter of the working population in the Missoula labor market who are over 30 years old has an associate's degree as their highest level of educational attainment (FIGURE 1.1). FIGURE 1.4 illustrates the educational attainment of population in Missoula and Ravalli County compared to the statewide average. Over 90% of the population in all three areas have obtained a high school diploma or equivalent. Missoula County has higher educational attainment than Ravalli County and the state as a whole, with 40% of the population with a Bachelor's degree or higher. Ravalli County has a higher share of the population in the lower three educational categories than the state average.

FIGURE 1.4 EDUCATIONAL ATTAINMENT FOR POPULATION OVER 25



Source: 2014 5-Year American Community Survey U.S. Census Bureau.

FIGURE 1.5 HIGHEST DEGREE EARNED BY MISSOULA COLLEGE GRADUATES



Source: OCHE MUS data on graduates. Excludes graduates after the 2010-11 academic year to allow time for graduates to achieve a higher degree. Only includes degrees earned from MUS institutions.

In comparison, graduates of Missoula College primarily hold associate's degrees, which is unsurprising given that the highest degree offered at Missoula College is an associate's degree. About 8% of the college's local service area holds an associate's degree as their highest level of educational attainment, compared to over 70% of Missoula College graduates. Missoula College graduates are less likely than the general population to hold a bachelor's degree. FIGURE 1.5 illustrates degree attainment by Missoula College graduates. Data is not available to determine if graduates received a higher degree from an out-of-state or private college, so FIGURE 1.5 may underestimate educational attainment.

By degree program, graduates in the general studies program are most likely to also have a bachelor's degree in addition to their degree from Missoula College. The general studies program is often thought of as preparation for a bachelor's degree program. However, only 66% of general studies students transfer to another Montana University System (MUS) institution and only 38% achieve a bachelor's degree from an MUS institution. Bachelor's degree attainment by program is discussed in Section 2.1.

1.4 Where do Students Come From?

Missoula College students are primarily recruited from Montana, but students come to Missoula from every state. FIGURE 1.6 illustrates the home state of the high school attended by Missoula College students from the fall 2010-2011 semester through summer 2015. If a student attended multiple semesters, they would be counted multiple times in the data.

Although every state has been represented in the Missoula College student body over the last five years, the same cannot be said for every county in Montana. Most Missoula College students graduate from high schools located in the western portion of Montana. Six Montana counties did not have anyone from their high schools pursuing a degree at Missoula College from fall 2010-2011 semester through summer 2015. FIGURE 1.7 illustrates the Missoula College student body by county of their high school.

1.5 What are the most Popular Programs at Missoula College?

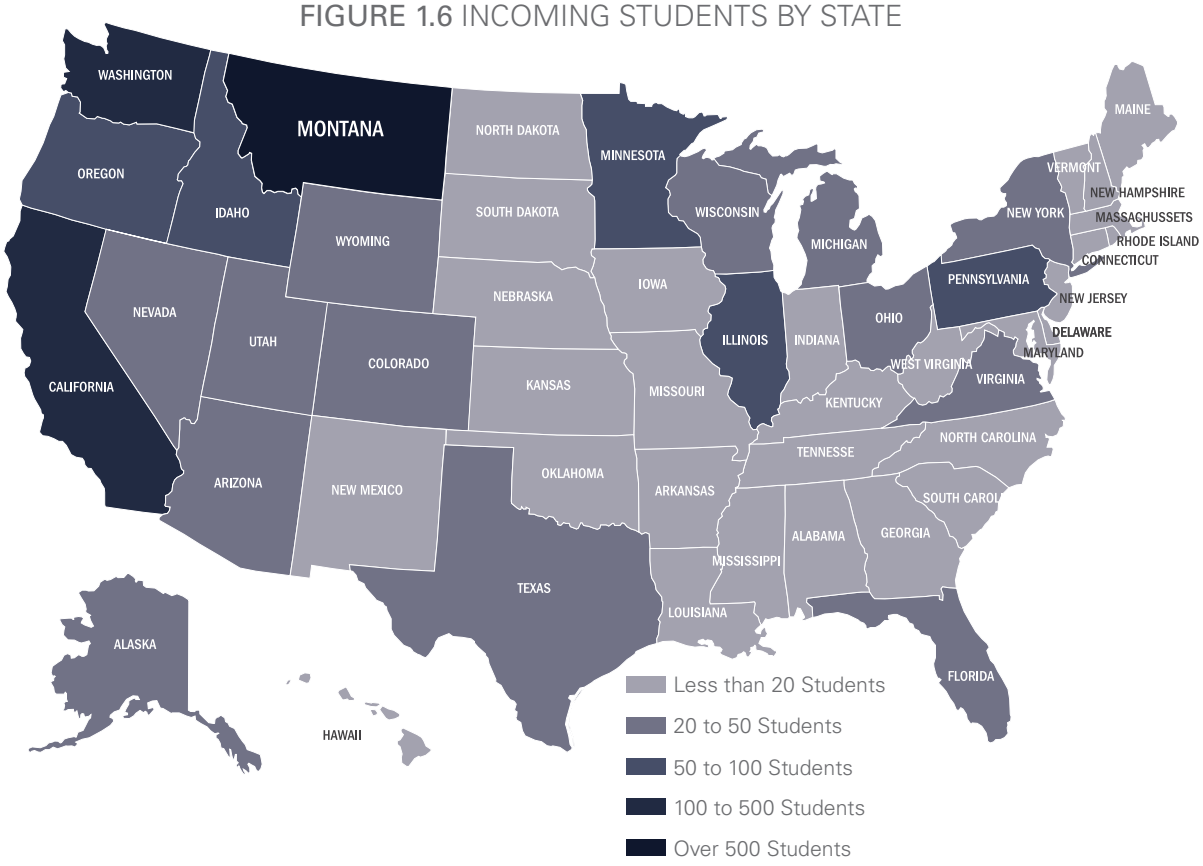
FIGURE 1.8 illustrates the number of graduates by program at Missoula College. General studies and registered nursing have the most graduates from spring 2012 to summer 2014 respectively. The AAS is the most common degree type.

General studies has produced the most graduates and has the most enrolled students, with about 600 students in the program during the 2014-2015 academic year. The nondegree program is the next largest program for current students. Most dual-enrollment high school students are in the nondegree program, and the expansion of the nondegree program over the last few years is partially due to the increased popularity of the dual enrollment program. Nondegree students do not graduate in the nondegree program, and generally choose a more specific major prior to graduation. Nondegree students may also be attending college for reasons other than obtaining a degree, or may be students who plan to transfer to obtain a degree elsewhere. There were roughly 440 nondegree students in fall of 2014, and 181 nondegree students in the spring of 2015.

The nondegree program is also one of the fastest growing programs over the last few years. FIGURE 1.9 illustrates the changing enrollment trends for students by program. The nondegree area has been expanding since 2010, reaching 439 students in fall 2014. The growth in the nondegree program makes up for most of the decline in share from the general studies program.

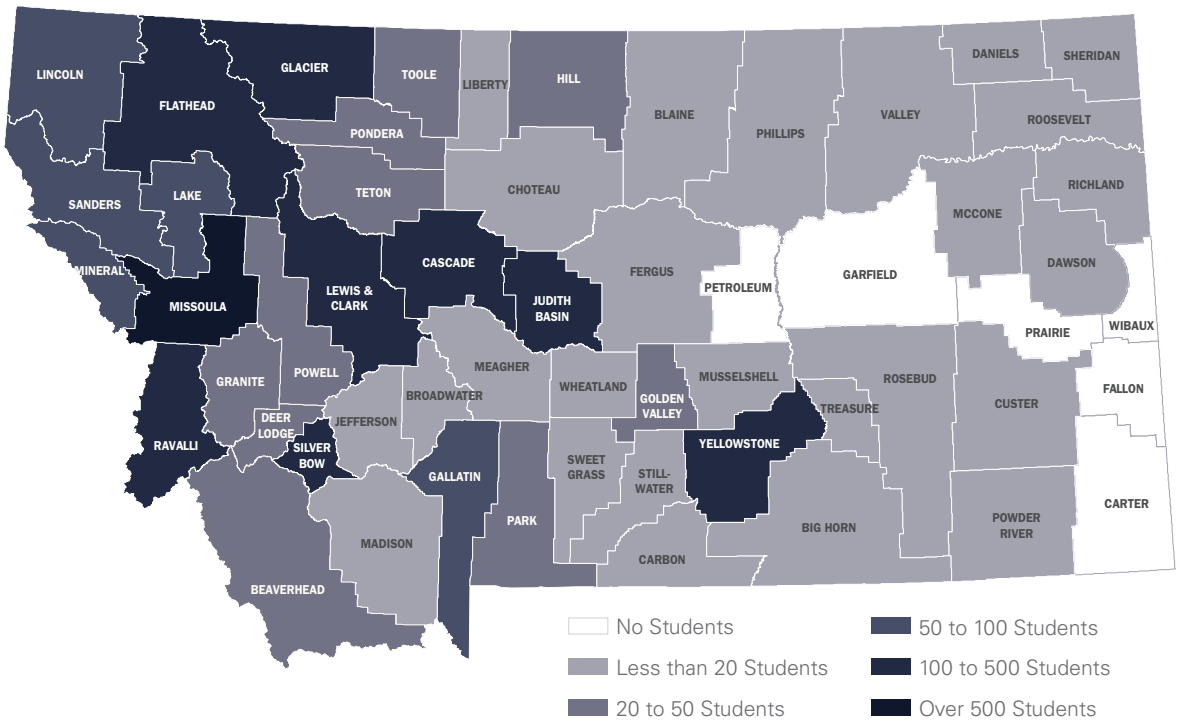
General studies students are also declining in share over the last few years, although it remains both the largest program and the program with the most number of graduates. As described in later sections, one finding from this report is that general studies students have lower wage and employment outcomes than other students, and that moving these students into more specific degree fields may improve

FIGURE 1.6 INCOMING STUDENTS BY STATE



Source: OCHE MUS data on current students. Location based on the high school of graduation. Includes Missoula College students from fall 2010 through summer 2015.

FIGURE 1.7 INCOMING STUDENTS BY MONTANA COUNTY

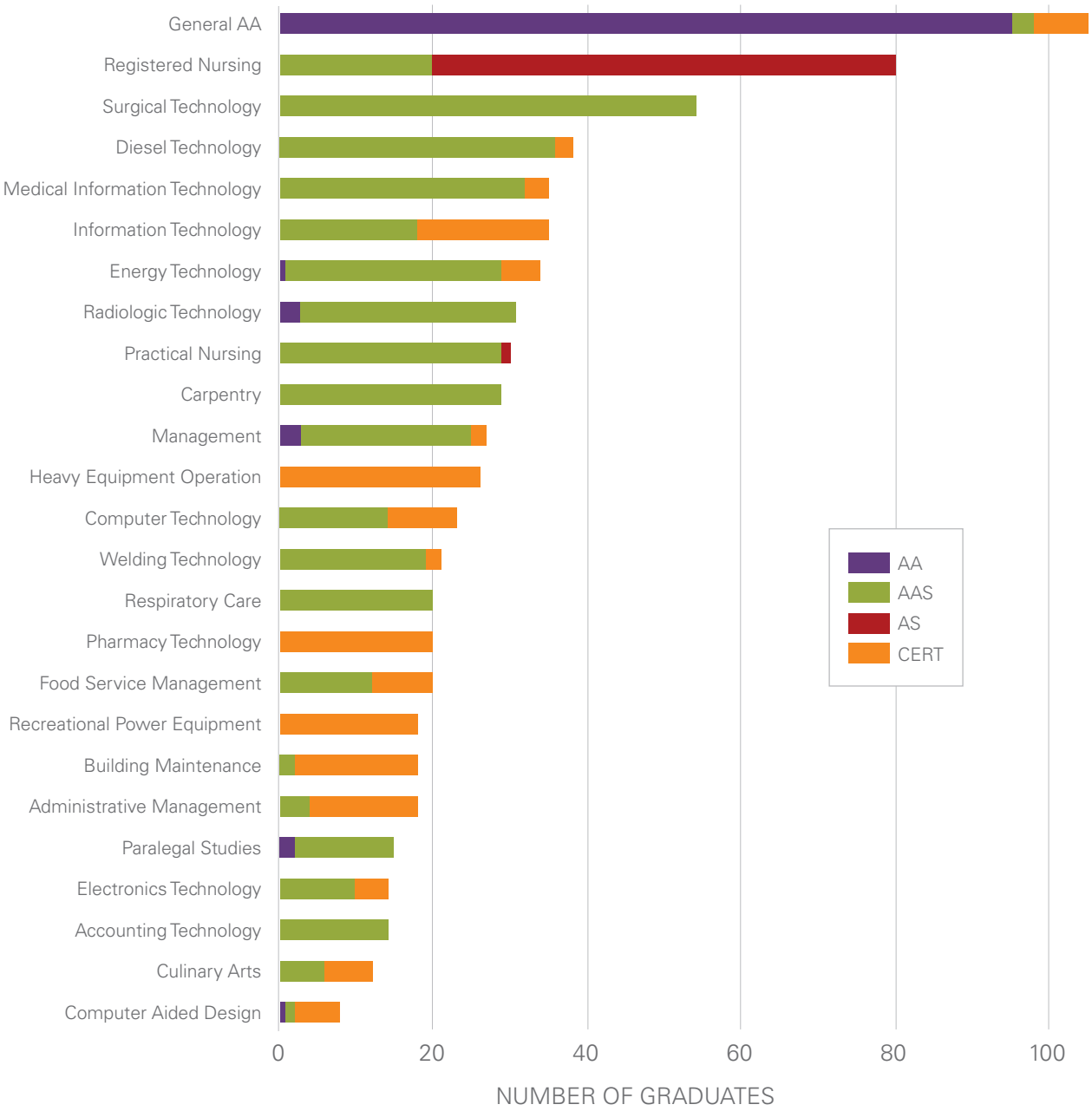


Source: OCHE MUS data on current students. Location based on high school of graduation. Includes Missoula College students from fall 2010 through summer 2015.

employment outcomes for graduates. The size of the general studies program makes this an important task. However, the share of students enrolled in general studies has been shrinking in recent years, suggesting that efforts to direct students to specific careers may already be underway.

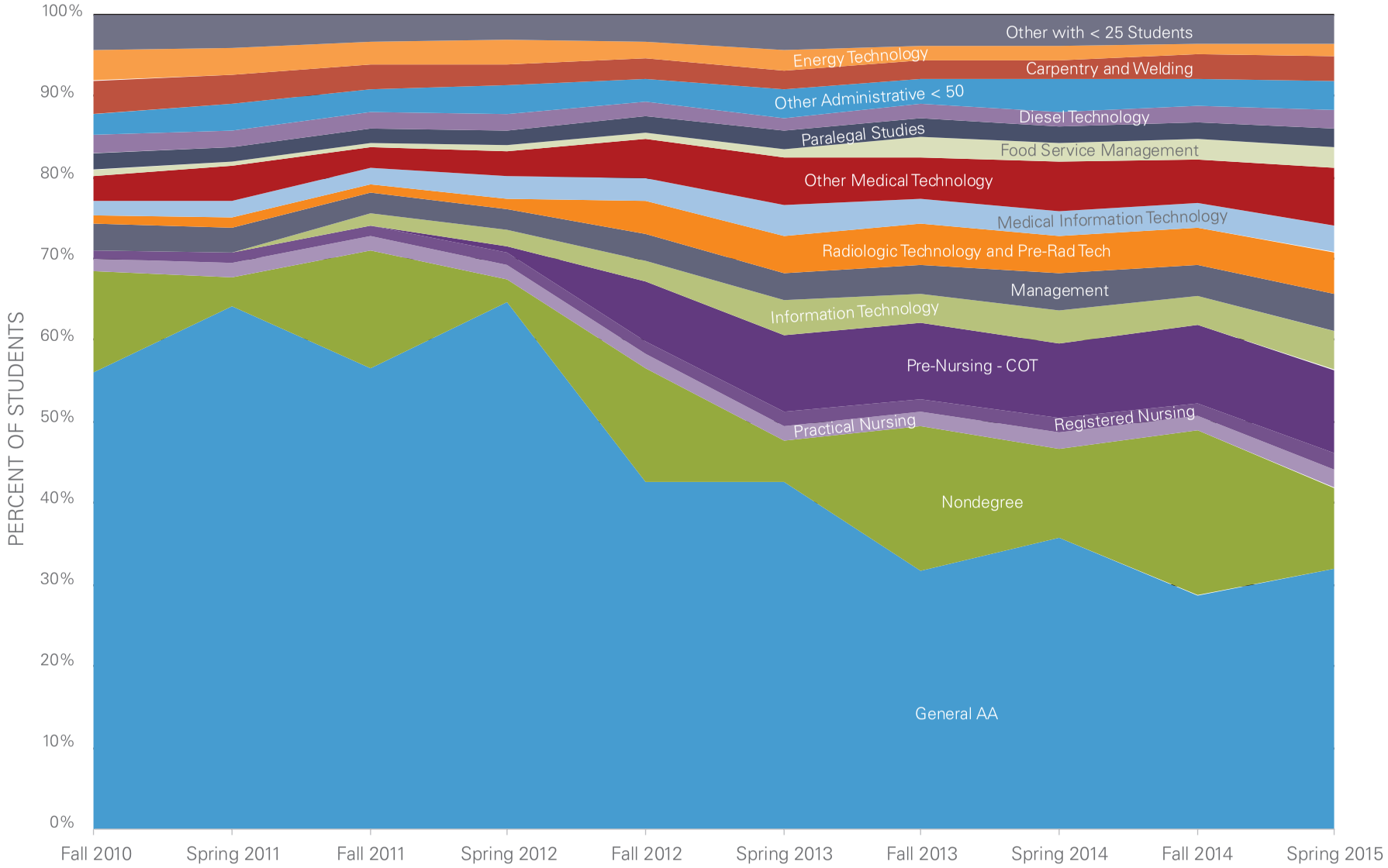
Other programs of interest is the growing nursing programs, and the smaller but growing area of information technology. Both of these fields have above average wages in Montana, and students seem to be responding to these market signals by entering these programs at higher rates.

FIGURE 1.8 GRADUATES BY PROGRAM AND DEGREE TYPE FROM SPRING 2012 THROUGH SUMMER 2014



Source: OCHE MUS graduation data from spring 2012 through summer 2014. Excludes programs with less than five graduates.

FIGURE 1.9 STUDENTS BY PROGRAM, FALL 2010 TO SPRING 2015



Source: OCHE MUS data on students by program during fall 2010 to spring 2015.

SECTION 1 HIGHLIGHTS

- Dual enrollment is making Missoula College student population younger, while the expansion of the nursing program is increasing the share of students who are female.
- Missoula College recruitment is fairly diverse geographically, with every state represented.
- The general studies program is the largest program by far, although its share of the student body has been decreasing in recent years. The nondegree program and pre-nursing are growing in terms of share of students.
- General studies, nursing, and surgical technology are the largest programs for graduates.

WANT MORE INFORMATION ON THE DEMOGRAPHICS OF MISSOULA COLLEGE STUDENTS?

The Office of the Commissioner of Higher Education has made data available with cross-tabs based on a variety of variables, including age, race, program, terms to degree, math and writing scores, and more. Please review the data included with the report or visit www.oche.mt.gov for more details.

Section 2
Entering the Workplace – How do Missoula College Graduates Fare in the World of Work?

Matching the education data from the Office of the Commissioner of Higher Education with the wage data from the Montana Department of Labor & Industry provides insights that go beyond the few years students spend in school. This section evaluates what happens to Missoula College graduates post-graduation, and how their degree impacts their economic success.

Remember only data from Montana employers and the Montana University System were available for this analysis. Graduates employed in other states, self-employed, or studying in a non-MUS school would have unknown status.

2.1 Do Missoula College Graduates Work or Continue Their Education After Graduation?

Most Missoula College graduates find employment quickly after graduation. Approximately 79% of Missoula College graduates are employed in Montana two quarters after graduation, with 83% of graduates employed after one year. 88% of graduates worked in Montana at some point after obtaining their degree.

83% of graduates had earnings within a year after graduation.

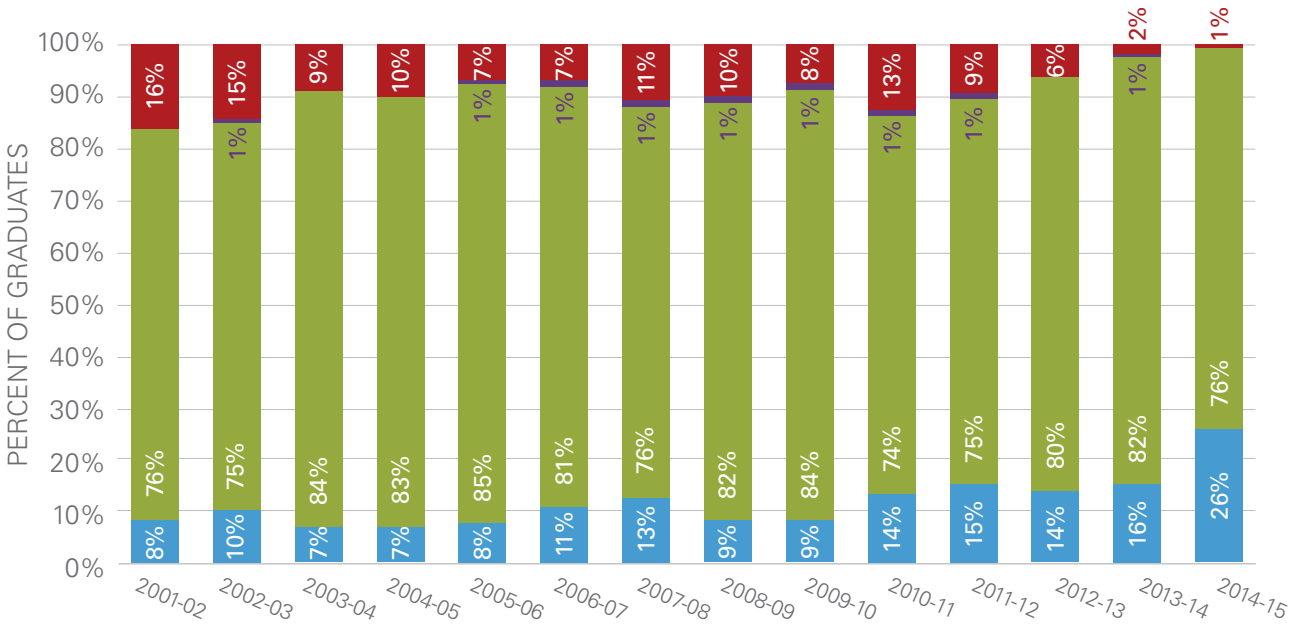
However, employment is not the only possible outcome after graduation. About 1% of Missoula College graduates continued on to higher education in Montana without entering employment between their degree programs. There are also about 9% of graduates who earned wages after graduation and continued on to higher education, not necessarily at the same time. The outcomes for the remaining 12% of graduates are unknown. The individuals with unknown outcomes may have moved out of the state, may be self-employed,

10% pursued a higher degree above their Missoula College degree.

may have enrolled in a tribal or private college in Montana, or may be out of both the labor force and the education system.

FIGURE 2.1 outlines educational and employment outcomes for Missoula College graduates by cohort. The outcomes are based on the full time period, so graduates in the earlier cohorts have had more time to obtain both a higher degree and gain work experience. The higher education category illustrates those that have obtained a degree, not those who are currently continuing their education. Graduates from more recent cohorts who are currently pursuing a degree would be included in the unknown group. Graduates in the employee category were employed in Montana at some point after graduating from Missoula College, but have not obtained a higher degree from an MUS institution. Graduates in the higher education and employee category were employed in Montana and obtained a higher degree after graduation.

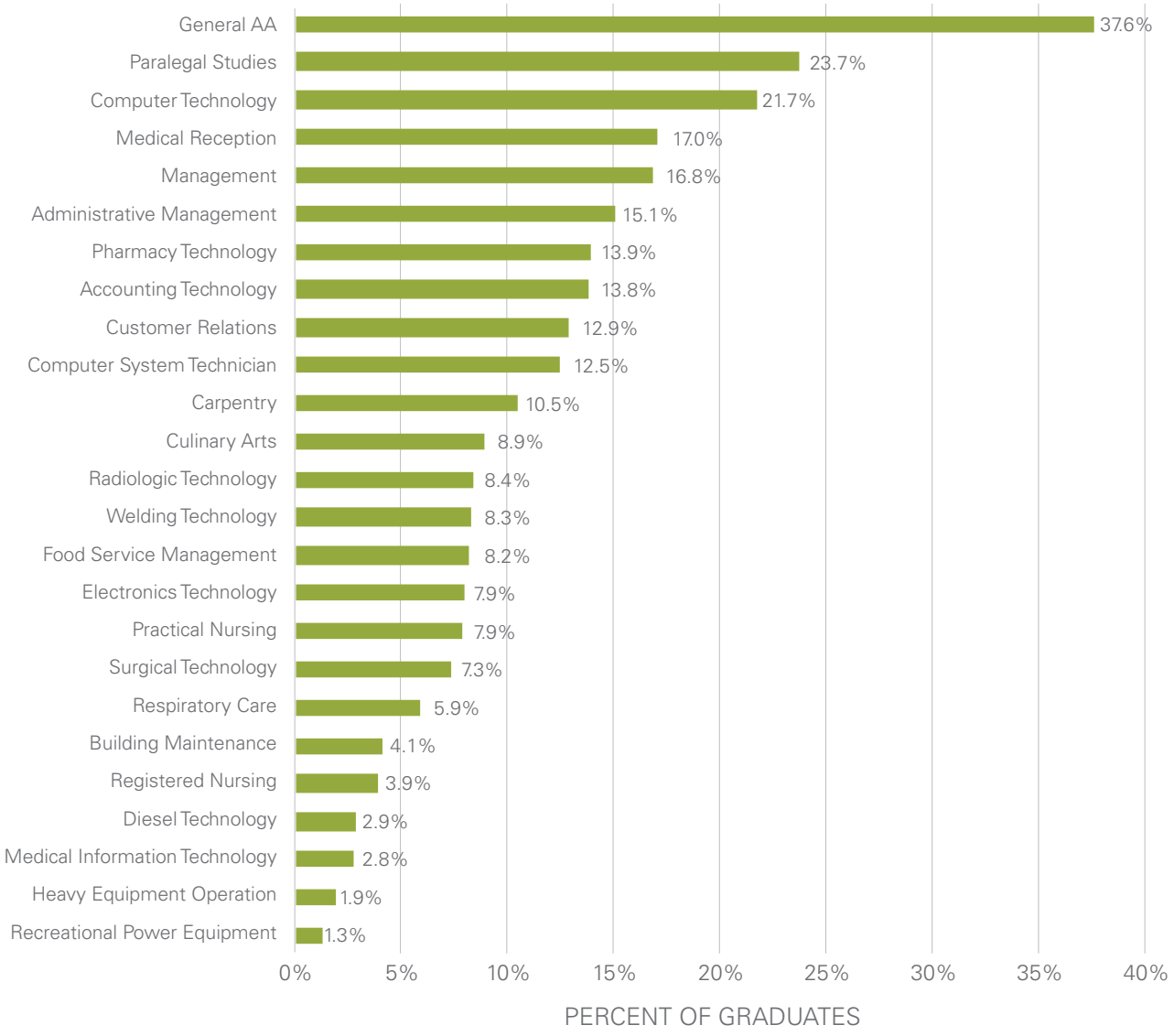
FIGURE 2.1 EDUCATION AND EMPLOYMENT OUTCOMES FOR GRADUATES BY GRADUATION COHORT



Source: MT DLI and OCHE MUS graduate data wage match. Cohort defined using the most recent degree earned from Missoula College. Higher ed means that the graduate obtained a higher degree after graduating from Missoula College. Higher Ed/Employee are graduates who have both worked and pursued an additional degree, not necessarily at the same time. 2001-2002 cohort considers only graduates in the fall of 2001 and spring of 2002. Wage data is not yet available for the spring 2015 graduates.

The percent of students obtaining higher education differs by program, with the general studies, paralegal studies, and computer technology programs having the highest percent of graduates holding a bachelor's degree or higher. The percent of students holding a bachelor's or higher degree in addition to their Missoula College degree is shown in FIGURE 2.2, separated by program. Note that the graphic illustrates the graduates that hold both a bachelor's degree and a degree or certificate from Missoula College. It is possible that a graduate held the higher degree prior to graduating from Missoula College, although the majority likely took the traditional path of pursuing higher education after graduation.

FIGURE 2.2 PERCENT OF GRADUATES HOLDING A BACHELOR'S DEGREE OR HIGHER BY PROGRAM



Source: MT DLI and OCHE MUS graduate data wage match, excluding graduates after the 2010-2011 academic year. Graduates could have obtained the bachelor's or higher degree before or after graduating from Missoula College. Only includes degrees earned from MUS institutions.

The percent of graduates obtaining further education is likely influenced by wage levels. For example, medical reception and general studies graduates tend to have lower wages than average post-graduation. Taking time out of the labor force to obtain further education costs less to low-earning graduates, and the wage premium of a bachelor's degree likely outweighs the costs. In contrast, registered nursing graduates earn relatively high wages post-graduation, making the opportunity cost of higher education more expensive. Wage outcomes by program are presented in Section 3.4.

There are also greater wage differentials for bachelor's degrees compared to associate's degrees in some fields than others. Registered nursing graduates may not obtain significantly higher wages with a bachelor's degree compared to an associate's degree. Yet computer technology graduates have a large wage premium to a bachelor's degree. Computer technology graduates with an associate's degree from Missoula College have average wages of about $34,000 five years after graduation. While this level is above the average for all Missoula College graduates, the average wage in Montana is around $60,000 per year for most computer fields that could be filled with a bachelor's degree.[5] The wage gains from obtaining a bachelor's degree in this field likely outweigh the costs of further education, explaining the high level of continuing education.

The program with the largest number of graduates, general studies, is often marketed as a pathway into obtaining a bachelor's degree at a four-year MUS school. However, only 66% of general studies students enter into bachelor's degree programs at MUS schools, and only 38% obtain a bachelor's degree. While general studies has the highest bachelor's degree obtainment rate by program, the rate is lower than expected given the low wage levels experienced by most general studies graduates. The low wage outcomes and few graduates pursuing further education in Montana in this program is of particular concern since general studies produces more graduates than any other program.

2.2 Where do Missoula College Graduates Work?

Missoula College students tend to remain in the region post-graduation and join the local labor force. Approximately 67% of Missoula College graduates who found employment in Montana were working in Missoula County, with an additional 7% working in Ravalli County (for a total of 74% of graduates employed in the Missoula College service area). Graduates also have sizeable gatherings in the counties with larger cities (Cascade, Yellowstone, Silver Bow, Flathead, and Lewis and Clark), but few graduates work in Montana's more remote counties. Graduates were generally employed in the western region of the state. FIGURE 2.3 illustrates the geographical distribution of the employers of Missoula College graduates one year after graduation, with the darker colors representing more graduates.

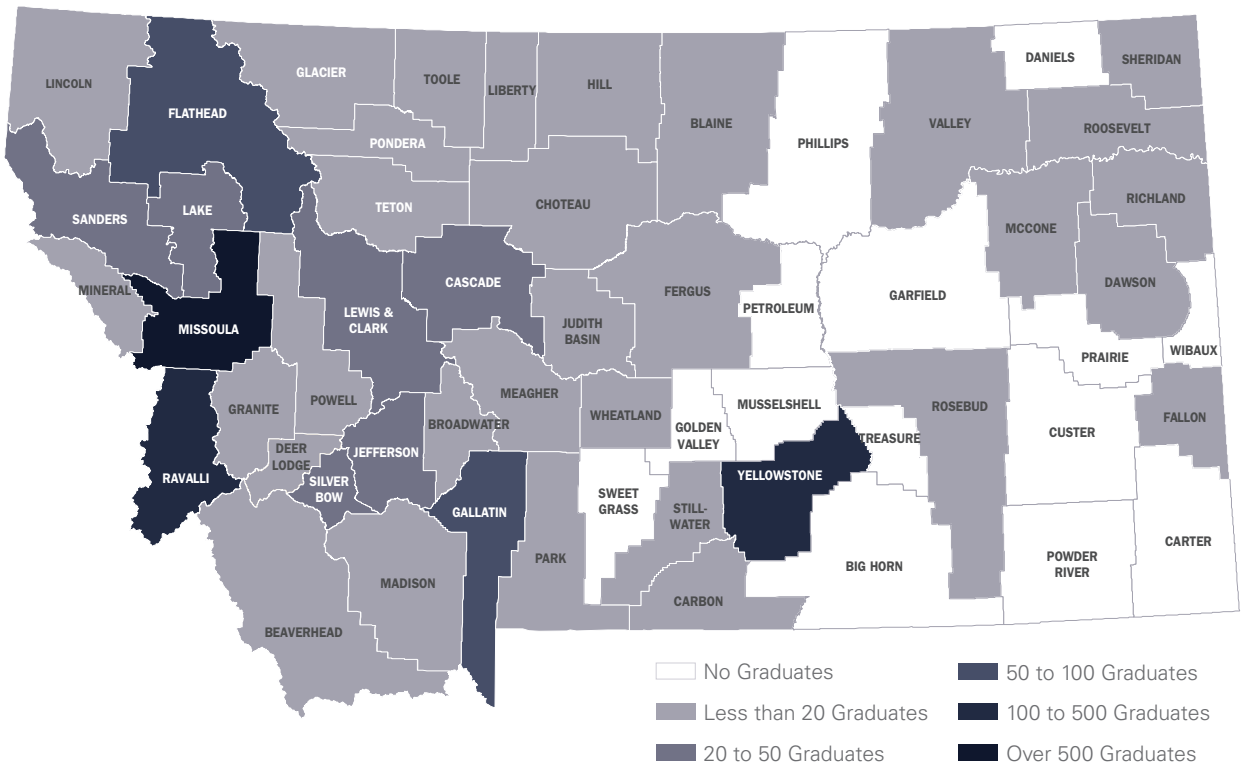
74% of employed Missoula College graduates join the local workforce after graduation, making them an important economic asset for the Missoula region.

Over time, graduates tend to be less concentrated in Missoula and Ravalli County, with the percentage of graduates in Missoula County falling from 67% one year after graduation to 58% five years later. Maps showing the employment location of graduates for the three and five year timeframes can be found in Appendix B. The decline of the share of graduates in Missoula County is both because workers become more dispersed throughout Montana over the five years, but also because more and more graduates leave the state or drop out of the labor force each year.[6] Even with the dispersion, Missoula and Ravalli County still have the highest concentration of graduates five years after graduation. The western portion of the state also retains a larger gathering of graduates.

[5] Occupational Employment Statistics, 2014. Average wage for all computer and mathematical occupations is $58,120, with specific fields exceeding $60,000.

[6] FIGURE 2.3 includes graduates through the summer of 2014, only graduates through the summer of 2012 are included three years after graduation, and only graduates through the summer of 2010 are included five years after graduation.

FIGURE 2.3 LOCATION OF GRADUATES EMPLOYED IN MONTANA ONE YEAR AFTER GRADUATION



Source: MT DLI and OCHE MUS graduate data wage match, excluding spring 2015 graduates. 2014 graduates identified using only two quarters of data, rather than full year for other included graduates. Graduate location based on the location of their primary employer.

2.3 Do Graduates find jobs quickly?

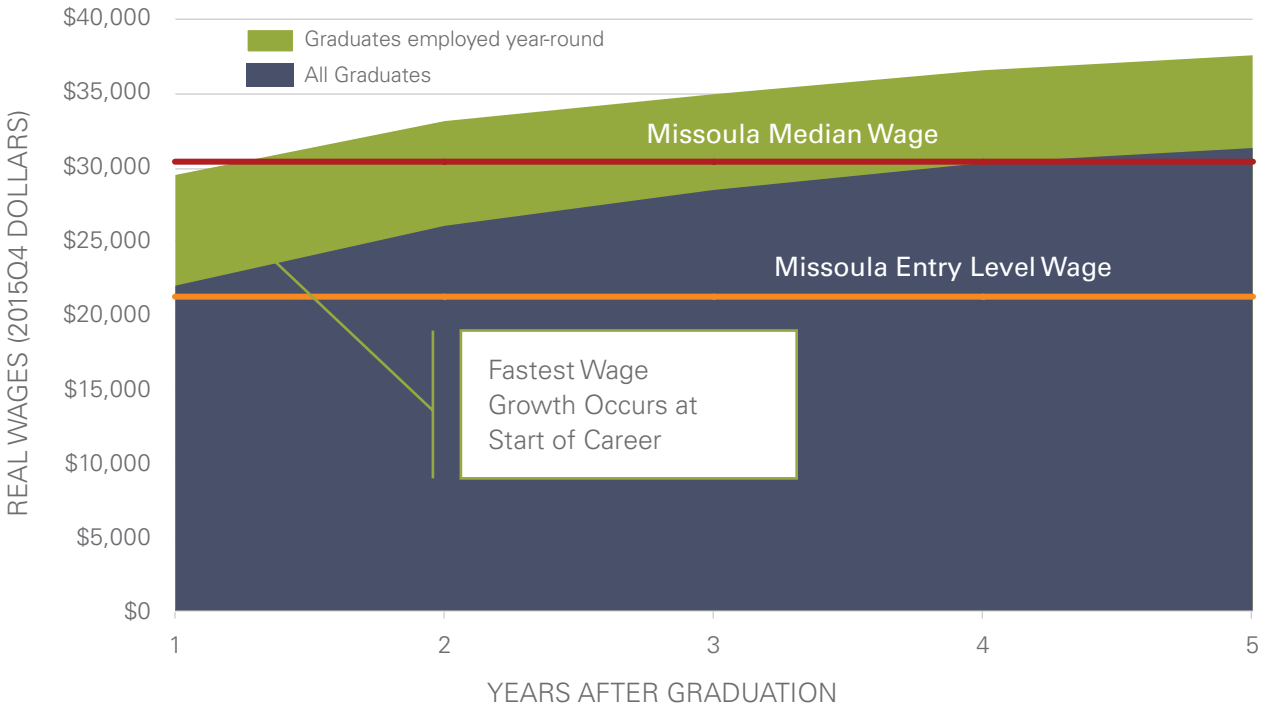
Overall, 79% of graduates had earnings two quarters after graduation, 83% of graduates had wage earnings one year after graduation, 74% had earnings after three years, and 70% of graduates had wage earnings after five years. The drop-off of percentage of graduates with wages in the five-year timeframe is expected as more graduates move out of state or drop out of the labor force to have a family, go back to school, or make other life choices.

83% of graduates had earnings within a year after graduation.

79% had Montana wage earnings two quarters after graduation.

The percentages in the above paragraph only consider if the individual has some wage earnings – the earnings may be very low. Average wages for graduates range from roughly $22,000 in the first year after graduation to $31,300 five years after graduation. FIGURE 2.4 illustrates the wage earnings for graduates in the five years after graduation compared to the median and entry level wage, with the wages expressed in 2015Q4 dollars. Missoula College graduates who work year-round have average wages that exceed the entry level wage in their first year, and exceed the Missoula median wage by their second year out of school. Across all graduates, including those in seasonal work positions, the average wages exceeds the median after five years, but is higher than the entry level wage after the first year.

FIGURE 2.4 REAL WAGE EARNINGS FOR MISSOULA COLLEGE GRADUATES SINCE FALL 2001



Source: MT DLI and OCHE MUS graduate data wage match excluding spring 2015 graduates. Graduate wages in real 2015Q4 dollars. Entry and median wages from the 2014 Occupational Employment Statistics.

FIGURE 2.5 EMPLOYMENT OUTCOMES FOR MISSOULA COLLEGE GRADUATES SINCE FALL 2001

	2 Quarters After Grad	1 Year After Grad	2 Years After Grad	3 Years After Grad	4 Years After Grad	5 Years After Grad
Employed in Montana (%)	78.7%	83.1%	78.3%	74.3%	71.4%	69.5%
Real Wages (All Graduates)	$11,058	$22,031	$26,147	$28,453	$30,236	$31,353
Wage Growth (All Graduates)	NA	NA	18.7%	8.8%	6.3%	3.7%
Quarters Worked (All Graduates)	1.6	2.9	2.8	2.7	2.6	2.6
Real Wages (Year-Round Employee)	$14,057	$29,541	$33,131	$35,073	$36,361	$37,677

Source: MT DLI and OCHE MUS graduate data wage match excluding spring 2015 graduates. Graduate wages in real 2015Q4 dollars. Excludes graduates employed outside of Montana, self-employed, or otherwise having no wages reported by Montana employers.

Individuals tend to progress more quickly and experience faster wage growth at the beginning of their career, with the most rapid wage growth in their second year after graduation. After the second year, the graduates' wage growth began to taper off to a growth rate more consistent with the statewide average. FIGURE 2.5 summarizes wage outcomes for graduates working in Montana. It is important to note that the figures represent total earnings and may not be a reflection of hourly wage growth. The wage growth could have occurred because of working more hours, including from working multiple jobs.

2.4 Are Graduates Employed in Year-round Jobs?

As mentioned above, working year-round has a large impact on wage earnings. Among employed graduates, 37% of workers worked all four quarters for five years after graduation. On average, Missoula College graduates who were employed worked about 2.8 quarters in every year, with little change in the number of quarters worked from their first year to fifth year. The average number of quarters worked is included in FIGURE 2.5.

37% of employed graduates had wage earnings in all four quarters in their fifth year after graduation.

Year-round employed graduates had an average real wages of $29,540 one year after graduation, roughly $7,500 more than the average for all graduates.[7] The difference in wage earnings for year-round and inconsistently employed workers decreases over time, but remains substantial. Consistently employed workers earn $37,677 five years after graduation, roughly $6,300 more than the average graduate. The increase in wages for the consistently employed compared to the average graduate is due to the hours worked; data is not available to indicate whether year-round workers also achieve higher hourly pay.

On average, Missoula College Graduates work 2.7 quarters per year. Year-round earnings makes a large impact on wage earnings, with year-round workers earning over $6,000 per year more than the average of all graduates.

2.5 Does Work Experience Make a Difference in Wages and Consistent Employment?

Missoula College graduates who held a job while they were in school benefitted from their work experience by obtaining better wages and employment outcomes than graduates that were not employed during school. On average, 69% of Missoula College graduates were considered incumbent workers, or students who worked an average of more than two quarters in a year over the five years before they received their degree. In the most recent graduation year, approximately 65% of graduates were incumbent workers.[8] FIGURE 2.6 shows the employment and wage outcomes for incumbent workers at Missoula College five years before through five years after graduation compared to graduates who did not work while they were in school.

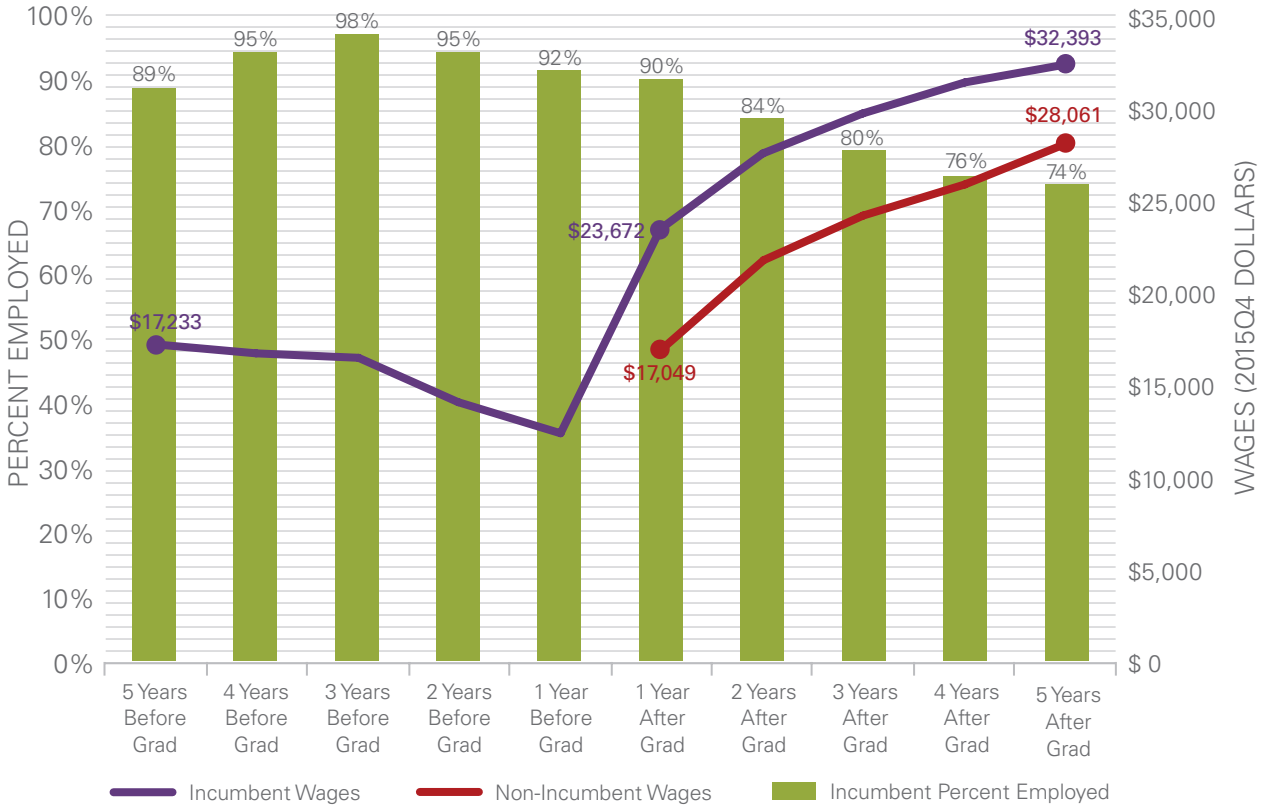
Incumbent worker graduates are more likely to find employment in Montana, and are more likely to remain employed in the state. On average, 87% of incumbent worker graduates were employed in Montana two quarters after graduation, 8% higher than the average across all graduates. One year after graduation, 90% of incumbent workers were employed, which is 7% higher than all graduates. While employment in Montana across all graduates had fallen to 70% after five years, employment for incumbent workers fell to only 74%.

Wages for incumbent workers grew after graduation, which could be due to an increase in work hours or an increase in pay rate. After graduation, incumbent workers earned more than graduates without work

[7] All graduate wages are reported in real 2015Q4 dollars, adjusted using the Consumer Price Index for Urban Consumers.

[8] An incumbent worker is a student who worked more than two quarters in a year on average over the five years before receiving their degree.

FIGURE 2.6 WORKFORCE OUTCOMES AT MISSOULA COLLEGE FOR INCUMBENT WORKERS



Source: MT DLI and OCHE MUS graduate data wage match. Incumbent workers are defined as any student who worked an average of more than two quarters in a year for the five years prior to graduation. Percent employed refers to the percent of incumbent graduates who were employees of Montana businesses.

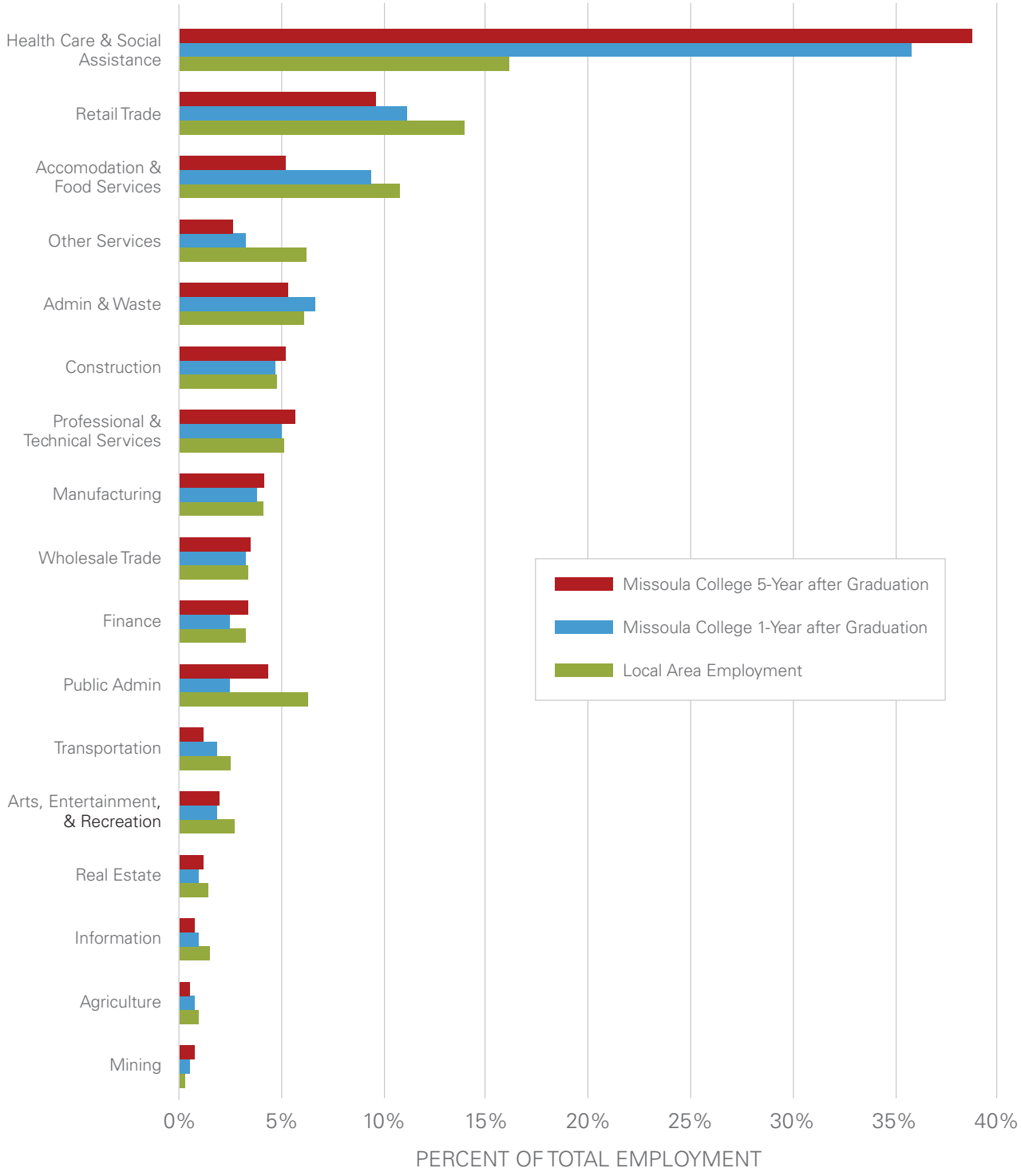
experience by about $5,500 per year. The wage premium for work experience is the highest one year after graduation, and slowly narrows over time as non-incumbent workers gain experience in the labor market. One year after graduation, incumbent workers earned an average of $23,670, and five years after graduation their wages grew to $32,390. Incumbent workers who were consistently employed after graduation had higher wages than the average incumbent worker. Incumbent workers who worked in every quarter after graduation earned approximately $37,790 five years after graduation.

2.6 What Industries Employ Missoula College Graduates?

Health care and retail trade are the two industries that employ the greatest number of Missoula College graduates. FIGURE 2.7 illustrates employment by industry for Missoula College graduates who were employed one year and five years after graduation, compared to the local area. The data are also presented in table form in FIGURE 2.8, along with the wage earnings of graduates and of the local workforce.

Over 35% of Missoula College employed graduates work in the health care industry one year after graduation, with the percentage increasing to nearly 39% after five years. In comparison, only 16% of the local workforce is employed in health care. Health care pays above average wages in Montana and in the Missoula area, making this field attractive to graduates. Graduates entering work in the health care industry earned average wages of $36,890 after five years, the second highest industry wage after the mining industry. However, the wage earnings are still slightly less than the industry average for the Missoula region, likely because the other jobs in the health care industry require higher levels of education and experience.

FIGURE 2.7 EMPLOYMENT BY INDUSTRY FOR LOCAL AREA COMPARED TO MISSOULA COLLEGE GRADUATES



Source: MT DLI and OCHE MUS graduate data wage match. Industry of employment was determined by the graduate's highest earning job. Local area employment from Quarterly Census of Employment and Wages Q3 2014 through Q2 2014 average employment by industry for Missoula and Ravalli County.

35% of employed Missoula College graduates are employed in the health care industry one year after graduation, with the percent increasing to 39% in five years.

In comparison, only 16% of the local workforce is employed in health care.

The retail trade industry employs another 11% of graduates one year after graduation. The share of Missoula College employment in retail trade a year after graduation is slightly less than the 15% share of employment in the local area. The wage earnings of graduates working in the retail trade industry is also less than the average for the local area. Employment in the retail trade industry decreased to 9.6% of graduates five years after college, suggesting that graduates improved their work skills with employment experience and then moved on to positions in higher-paying industries.

Missoula College graduates are also under-represented in the public administration industry, with only 4.4% of employed graduates within this industry after five years compared to 6.4% of the overall workforce. In general, public administration jobs tend to require higher degrees of education than other industries, which may contribute to this difference. However, the causes for the underrepresentation of Missoula College graduates in this industry are unclear.

Roughly 9% of graduates are employed in the accommodation and food service industry a year after graduation, with lower-than-average wages for the Missoula area. Although the accommodation and

FIGURE 2.8 EMPLOYMENT AND REAL WAGE OUTCOMES BY INDUSTRY FOR MISSOULA COLLEGE GRADUATES

Industry		One Year After Graduation		Five Years After Graduation		Local Area Average Annual Wage
		% of Employed Graduates	Wages	% of Employed Graduates	Wages	
11	Agriculture	0.7%	$19,386	0.6%	$30,852	$47,170
21	Mining	0.5%	$33,792	0.7%	$46,492	$52,589
23	Construction	4.7%	$19,975	5.2%	$28,201	$42,536
33	Manufacturing	3.8%	$21,885	4.2%	$31,829	$37,872
42	Wholesale Trade	3.2%	$26,902	3.5%	$33,651	$51,376
44	Retail Trade	11.2%	$16,110	9.6%	$25,365	$25,940
48	Transportation	1.9%	$24,165	2.0%	$30,783	$36,332
51	Information	1.0%	$21,252	0.8%	$34,266	$46,326
52	Finance	2.5%	$21,912	3.4%	$34,312	$57,166
53	Real Estate	1.0%	$15,700	1.2%	$25,694	$33,622
54	Professional & Technical Services	5.0%	$22,200	5.7%	$30,690	$58,157
56	Admin and Waste	6.6%	$15,317	5.3%	$26,026	$29,128
61	Educational Services	4.9%	$14,807	5.2%	$22,406	$21,776
62	Health Care & Social Assistance	35.8%	$29,287	38.8%	$36,893	$42,717
71	Arts, Entertainment, & Recreation	1.9%	$13,286	1.2%	$22,909	$17,948
72	Accommodation & Food Service	9.4%	$12,444	5.3%	$18,718	$15,759
81	Other Services	3.3%	$15,602	2.6%	$25,547	$24,800
92	Public Administration	2.5%	$23,673	4.4%	$31,221	$45,300

Source: MT DLI and OCHE MUS graduate data wage match. Industry of employment was determined by the graduate's highest earning job. The local area average wages from Q3 2014 through Q2 2015 in Missoula and Ravalli County according to the Quarterly Census of Employment and Wages. Wages are in real 2015Q4 dollars.

FIGURE 2.9 WHAT IS IN EACH INDUSTRY?

Super Sector	Code	Industry	Establishments primarily engaged in:	Examples
Agriculture	11	Agriculture	Raising crops or animals, harvesting timber, and harvesting animals from natural habitats.	Farms, ranches, greenhouses, orchards, hatcheries and logging operations
Mining and Utilities	21	Mining	Extracting mineral solids, liquids, and gases.	Oil and gas, coal and mineral mining, and associated support activities
	22	Utilities	Provision of power, natural gas, water supply, and sewage removal.	Utility companies, sewage removal
Construction	23	Construction	Construction of buildings, highways, or engineering projects.	Contractors, plumbing and electrical companies, highway construction
Manufacturing	31-33	Manufacturing	Transformation of materials into new products.	Food manufacturing, breweries, wood product manufacturers
Trade and Transportation	42	Wholesale Trade	Arranging the sale of nonconsumer goods and raw materials used in production	Manufacturers' sales representatives, merchant wholesalers
	44-45	Retail Trade	Selling merchandise to the general public.	Automotive dealers, office supply stores, gas stations, grocery stores, clothing stores
	48-49	Transportation	Transportation of passengers and cargo, sightseeing, warehousing and storage for goods	Trucking, air, rail and water transport, postal and delivery services
Information	51	Information	Producing, distributing, or transmitting information and entertainment	Newspapers, TV and radio, telecom and internet providers
Financial Activities	52	Finance	Facilitating financial transactions	Banks, investing, credit unions, insurance agencies
	53	Real Estate	Renting or leasing and related services.	Rentals of apartments, real estate, autos, or machinery goods
Business Services	54	Professional & Technical Services	Performing professional, scientific, and technical activities for others, typically to other businesses.	Legal, accounting, payroll, engineering, computer programing, advertising, R&D.
	55	Management of Companies	Manage the strategic role of the company or enterprise. Facilitate mergers.	Managing offices, holding companies
	56	Admin and Waste	Performing support activities for other businesses. Temp employment firms.	Recycling, janitorial, temporary employment firms, some payroll firms, collection agencies, security services
Healthcare and Education	61	Educational Services	Providing instruction and training. They may be private for-profit, non-profit or public.	Schools, colleges, universities, and training centers. Private testing centers.
	62	Health Care & Social Assistance	Delivering healthcare and social assistance from trained professionals.	Hospitals, elderly care facilities, childcare, mental health and family services
Leisure Activities	71	Arts, Entertainment, & Recreation	Cultural, entertainment, and recreational services	Casinos, museums, theatre, amusement parks, sports and recreation facilities
	72	Accommodation & Food Service	Providing lodging, meals, snacks, and beverages for immediate consumption.	Restaurants, hotels, bars, caterers, RV parks
Other	81	Other Services	Any other services not already classified.	Auto and machinery repair, religious and nonprofit organizations, dry-cleaning
Public Admin	92	Public Administration	Federal, state, local, or quasi-government agencies. Excludes education and public works construction classified above.	Local and state governments, police and fire protection

Source: North American Industry Classification System 2012.

food service industry is not one of the higher paid employment options for graduates, graduates have relatively high earnings in this industry after five years compared to the industry average, suggesting that their educational background helped advance the worker into higher level positions with higher pay levels than average.

The percentage employed in higher paying industries, like mining, healthcare, finance and insurance, and professional and scientific services, increased the longer individuals were in the job market. Employment in healthcare increased the most five years after graduation, from 35% to 39% of total employment. The percentage employed in lower-paying industries decreased the longer Missoula College graduates were in the job market. Employment in accommodation and food service, and retail trade decreased most dramatically five years after graduation. These industries include businesses like bars, restaurants, hotels, and other entry-level jobs that graduates may have obtained to help make ends meet while searching for a better job.

SECTION 2 HIGHLIGHTS

- Approximately 83% of graduates are employed in Montana within one year after graduation. 74% of employed graduates are employed within the Missoula local service area.
- Average real wages of employed graduates start at roughly $22,000 in the first year after graduation to $31,300 five years after graduation. The starting salary for all graduates is roughly equal to the Missoula entry-level wage in the first year, and roughly equal to the median wage four years after graduation.
- Wages for graduates who work all four quarters are roughly equal to the Missoula median wage in the first year after graduation, and are roughly $6,000 more per year than the average for all graduates.
- The majority of Missoula College graduates worked prior to receiving their degree. These graduates earned higher wages than those without work experience.
- Wages also vary significantly by industry and field of study. Graduates working in most industries earn less than the average worker in the area, but that likely reflects greater experience among the full workforce compared to the typical Missoula College graduate.
- Roughly 10% of students continue on to obtain additional education after graduating from Missoula College.

Section 3
Does the Supply of Missoula College Graduates Match the Local Demand from Employers?

The primary research question of this report considers how well Missoula College is meeting local employer demand, thus ensuring public tax dollars are achieving the greatest benefit for both students and local businesses. If employers are demanding more workers in a certain industry or occupation, it also suggests that a student will have consistent employment and growing wages after graduation.

This section of the report compares Missoula College supply to local demand through four perspectives – by industry, by occupation, by program of study, and by the outcome of wages and employment. Presenting supply and demand analysis from four different perspectives is necessary to overcome flaws inherent with this type of analysis and provide greater confidence in research conclusions.

For example, there are some data limitations associated with a supply and demand analysis that stem from graduates in any particular field being qualified to fill multiple positions in multiple industries. Since the fall of 2001, Missoula College has issued degrees to approximately 4,000 graduates in 30 different programs. These graduates were prepared to fill jobs in over 79 different occupations.[9] Graduates are therefore double-counted in the supply of workers by occupation, once in each occupation they are eligible to fill, but they would only be counted once in each program of study. Using four different perspectives for evaluation provides the most comprehensive look at the comparison between supply and demand, and provides greater confidence in the results because the same conclusions can be reached using different methods.

The local demand for workers is measured by the Northwest region employment projections developed by the Montana Department of Labor & Industry (MT DLI). The MT DLI produces employment

[9] The occupation to educational program match was completed using a CIP to SOC crosswalk provided by the U.S. Department of Education and the U.S. Department of Labor. Each program can match to multiple occupations, and vice versa. Details about the crosswalk can be found in Appendix A.1.2.

FIGURE 0.1 MAP OF NORTHWEST REGION OF MONTANA

projections by industry and occupation every year for the two-year and ten-year timeframes in Montana and each of the five regions of the state.[10] These projections include both new job growth by occupation (growth openings) and for the number of workers needed to replace workers who leave the occupation (replacement openings). Total openings are the sum of the openings due to growth plus the replacement openings. However, Missoula College is not expected to fulfill all of the worker demand for the Northwest – other colleges and training centers also serve the Northwest region of the state and will also help fill worker demand. Therefore, the projected worker demand is presented as a range, with the new jobs as the lower bound and total openings as the upper bound.

Missoula College is not expected to meet 100% of the worker demand for the region – other education and training organizations also help fill demand. Therefore, projected worker demand is presented as a range, with expected new openings due to growth as the lower bound and total openings as the upper bound.

GROWTH OPENINGS
(Low End of Target Range)

Worker Supply in This Range is Considered Meeting Employer Demand

TOTAL OPENINGS
Including both Replacements & Growth
(High End of Target Range)

This presentation of the employment projections assumes that other training organizations are producing enough workers to fill at least some of the openings created by people retiring or leaving the profession (termed replacement openings).

3.1 How Does Graduate Supply in each Industry compare to Expected Demand?

The Northwest region is expected have steady employment growth of 1%, adding over 1,500 jobs every year through 2024. FIGURE 3.1 illustrates the demand by industry in the Northwest. The largest growth is expected in the health care industry, adding over 400 jobs per year and representing 28% of total job growth. Health care is the largest employing private industry in the Northwest region and in Montana, and also is expected to grow at an above average pace, resulting in a large demand for workers. Further, health care employment has been consistently growing over the past ten years. Unlike other industries that had significant job losses during the recession, there is not an existing pool of already-trained, but currently unemployed, workers who are waiting to return to the industry when opportunities allow.

In contrast, the construction industry has posted rapid job growth recently, at 7.8% between 2014Q2 and 2015Q2, but the training needs are less severe due to the large number of workers displaced during the recession that could return to the industry. Construction lost about 35% of the total workforce during the

[10] More information about the employment projections can be found in Appendix A.1.1 and at lmi.mt.gov. The most recent projections cover the two-year period from 2014-2016 and the ten-year period from 2014-2024.

recession, and while the displaced workers have likely moved into new employment opportunities, some may wish to return to construction as job growth continues. Employment in the construction industry is expected to grow rapidly by about 1.9% annually, adding about 140 construction jobs every year in the Northwest.

FIGURE 3.1 CURRENT AND PROJECTED EMPLOYMENT GROWTH BY INDUSTRY IN THE NORTHWEST REGION

	Industry	Average Employment Over-the-Year	Employment Growth Over-the-Year	Projected Growth Rate	Annual Projected Employment Growth
11	Agriculture	1,361	7.8%	- 1.0%	- 12
22	Utilities	710	0.0%	0.7%	4
51	Information	1,597	- 3.5%	0.6%	11
21	Mining	467	- 9.1%	2.5%	14
53	Real estate	1,777	4.6%	0.8%	14
48	Transportation	3,367	1.3%	0.8%	26
81	Other services	5,146	5.1%	0.8%	39
33	Manufacturing	6,673	- 3.3%	0.6%	41
42	Wholesale trade	3,576	5.2%	1.1%	41
71	Arts, Entertainment, & Recreation	3,829	3.3%	1.4%	54
92	Public Admin	7,965	1.0%	0.6%	58
52	Finance	4,476	1.4%	1.4%	64
61	Educational Services	11,938	0.7%	0.6%	79
54	Professional & Technical Services	5,461	4.2%	1.7%	98
44	Retail Trade	17,649	4.1%	0.7%	127
56	Admin and Waste	6,516	- 7.1%	1.6%	129
23	Construction	7,071	7.8%	1.9%	140
72	Accommodation & Food Services	14,496	4.7%	1.4%	216
62	Health Care & Social Assistance	20,278	2.8%	2.0%	433

Source: Over-the-year employment gain from 2014Q2 to 2015Q2 from Quarterly Census of Employment and Wages. 2014-2024 Projections MT DLI.

Even though 35% of graduates work in the healthcare industry one year after graduation, these graduates represent only 22% of the workers needed by the industry each year.

Health care employs the most Missoula College graduates of any industry. Over the last three years, roughly 97 graduates per year found employment in the health care industry, but that only fills 22% of the expected jobs. However, some of the expected job growth cannot be filled directly by Missoula College because it stems from occupations requiring higher than an Associate's degree.

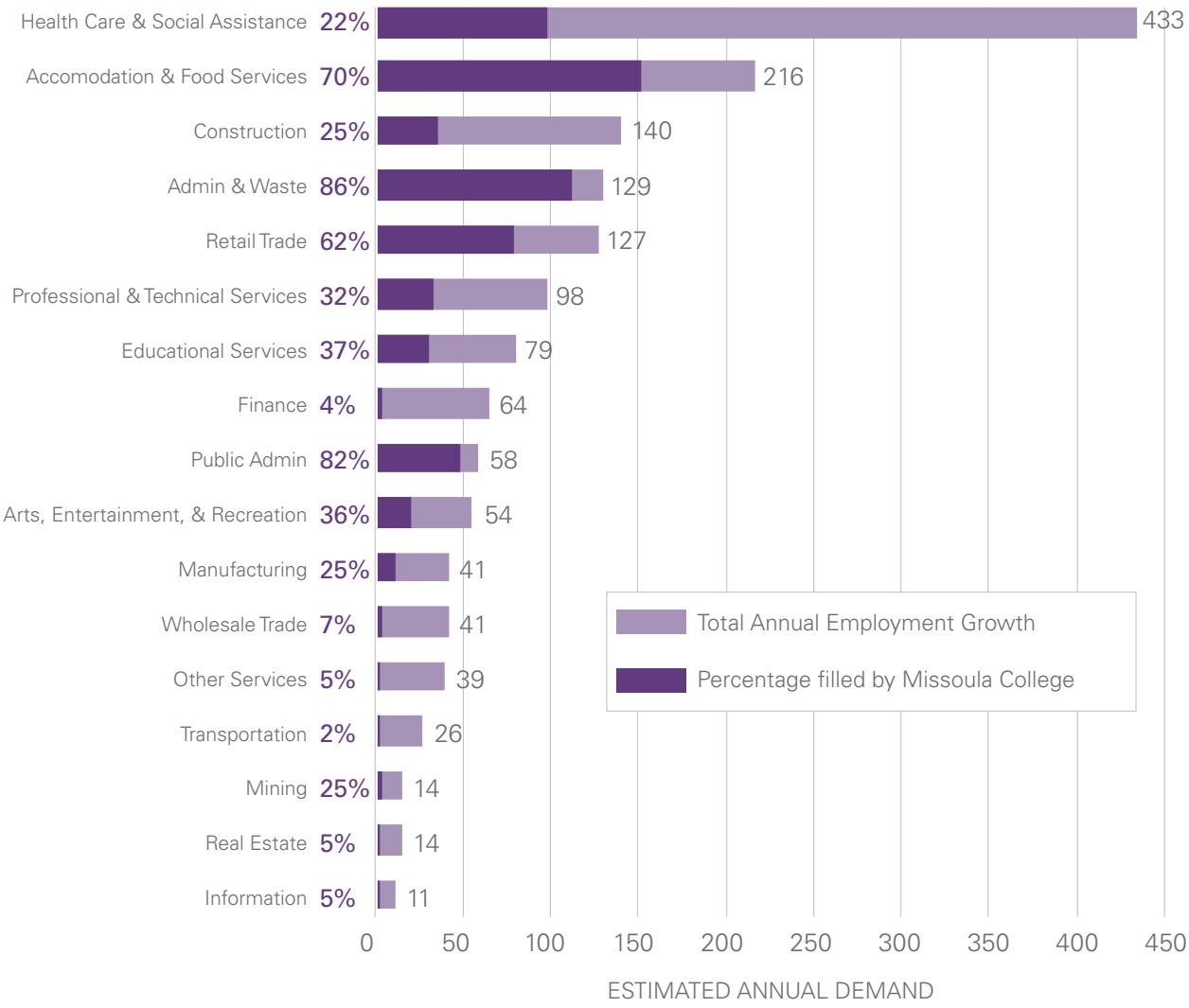
FIGURE 3.2 illustrates the percentage of worker demand by industry that is filled by Missoula College graduates based on the industry the graduate is employed in one year after graduation.[11] The chart uses the average placement of graduates over the last three years to smooth variations in worker supply by year. While 83% of graduates are employed one year after graduation, this percentage decreases as more workers move out of state or leave the labor force for other life pursuits. Therefore, the percentages shown in FIGURE 3.2 would decrease over time.

[11] The industry supply from Missoula College is the number of graduates per year employed in the industry one year after graduation. The supply is averaged over the last three academic years in order to smooth annual variations.

Administrative and waste services has the largest percentage of their worker demand filled by Missoula College graduates at 86% of demand filled, with total industry demand of 129 positions. This industry includes temporary service firms that may have more employment options for an entry-level worker directly after finishing a degree, explaining the higher percentage. Public administration also has a high percentage of worker demand filled by Missoula College at 82% of expected growth. As illustrated in previous sections of the report, only 2.5% of Missoula College graduates are employed in public administration one year after graduation, but these graduates fill 82% of expected openings because of slow growth in government employment.

Wholesale trade, real estate, information, finance, and transportation are all industries where Missoula College supplies less than 10% of total annual demand for workers. However, all of these industries also have relatively low demand for workers. For example, real estate is expected to need only 14 new workers per year, and transportation is expected to need only 26 workers per year – much lower than the 433 workers per year needed by the health care industry. Although the low percent of demand filled may suggest Missoula College should supply more graduates to these industries, the costs involved in

FIGURE 3.2 PERCENT OF NORTHWEST INDUSTRY DEMAND SUPPLIED BY MISSOULA COLLEGE



Source: MT DLI 2014-2024 Employment Projections. MT DLI and OCHE MUS graduate data wage match. Supply calculated as the average annual number of graduates who went to work in the industry a year after graduation over the last three academic years. Industry demand is the total annual projected job openings in the industry.

expanding training options for these industries may be too great for such a small number of workers. In addition, it is possible that the reason for low fulfillment of worker demand is because the types of jobs in the industry require workers with education and training higher than the associate's degree or certificates awarded by Missoula College. To further our understanding of whether Missoula College graduates are able to fill certain jobs, we must look at the supply and demand of workers by occupation.

3.2 Does Missoula College Supply enough Graduates for High-Demand Occupations?

There are 548 occupations with expected job growth in the Northwest region of Montana. A full list of the employment projections for all occupations is provided in Appendix C. An analysis examining all 548 occupations is not plausible, nor helpful, so the occupational analysis focuses only on occupations that require some college education, but less than a bachelor's degree, to enter the profession. Further, the occupational analysis focuses only on high-demand occupations. High-demand occupations are those in the top 25 percent of occupations for total projected openings in the Northwest over the next ten years.

The large-growth industries of healthcare, accommodation and food service, construction, administration, and retail trade greatly influence the occupations needed in the Northwest region in the next ten years, with nurses and food service workers both having significant job growth. FIGURE 3.3 lists the top twenty

FIGURE 3.3 TOP 20 OCCUPATIONS WITH THE MOST PROJECTED TOTAL ANNUAL JOB GROWTH IN THE NORTHWEST

Occupation	Minimum Education Required	Projected Total Annual Openings NW	Projected Annual Growth Openings NW	Projected Growth Rate	Montana 2014 Median Wages
Cashier	<HS degree	235	20	0.4%	$19,300
Retail Salesperson	<HS degree	215	49	1.0%	$22,140
Food Prep and Serving Workers	<HS degree	170	56	2.0%	$18,740
Waiters and Waitresses	<HS degree	167	32	1.0%	$18,270
Registered Nurses	Associates	90	40	1.0%	$59,860
Customer Service Representatives	HS or equiv.	87	37	2.0%	$27,780
Bookkeeping, Accounting, Auditing Clerks	HS or equiv.	75	42	1.0%	$31,860
Janitors and Cleaners	<HS degree	73	26	1.0%	$23,030
Bartenders	<HS degree	72	22	2.0%	$18,570
Secretaries and Admin Assistants	HS or equiv.	70	34	1.0%	$28,890
Maids and Housekeeping Cleaners	<HS degree	67	26	1.0%	$19,470
Personal Care Aides	<HS degree	65	53	3.0%	$21,610
Nursing Assistants	PS Award	56	25	1.0%	$24,080
Cooks, Restaurant	<HS degree	55	28	2.0%	$21,110
Construction Laborers	<HS degree	52	22	1.0%	$32,410
Childcare Workers	HS or equiv.	51	13	0.9%	$19,070
Heavy and Tractor-Trailer Truck Drivers	PS Award	51	22	1.0%	$41,440
Office Clerks	HS or equiv.	49	10	0.5%	$27,210
Elementary School Teachers	Bachelors	48	14	0.9%	$46,280
Dishwashers	<HS degree	47	9	1.0%	$18,310

Source: Montana Department of Labor & Industry Employment Projections, 2014-2024. Occupational Employment Statistics (OES) wages. Total annual openings include both growth openings from new job growth and replacement openings from retiring workers. Abbreviations: HS or Equiv. = High School diploma or equivalent; < HS degree = Less than High School; PS Award = Post-secondary non-degree award.

occupations for job growth in the Northwest from 2014 to 2014, along with the educational requirements and wage rates for each job. The occupations are listed in order of the number of total annual job openings projected. Total openings include both openings due to job growth and openings that occur when individuals retire or leave the occupation for a different job.

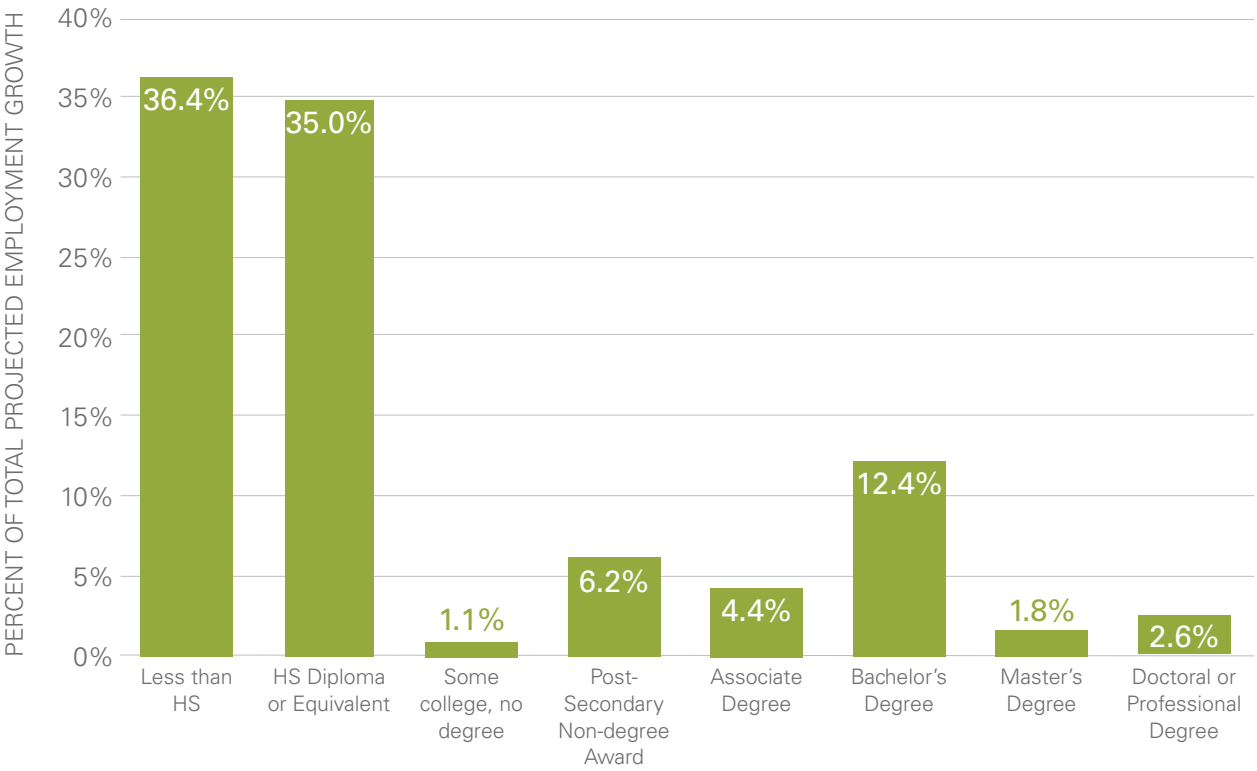
Most of the occupations with a large number of job openings do not require a college degree. Registered nurses, nursing assistants, heavy and tractor trailer truck drivers, and elementary school teachers are the only occupations in FIGURE 3.3 requiring at least some college education.

TO BE INCLUDED IN THE OCCUPATIONAL ANALYSIS, OCCUPATIONS MUST:

- Require at least some college education, but less than a bachelor's degree;
- Be in the top 25% of occupations for projected openings in the next ten years;

Most of the projected job demand in the Northwest region are in occupations that do not require post-secondary education. FIGURE 3.4 shows the projected occupational employment growth by minimum degree required for the occupation including all occupations. Approximately 71% of occupational employment growth in the Northwest is projected to occur in occupations requiring a high school degree or less. Food preparation and serving related occupations, office and administrative support occupations, and sales occupations make up the majority of projected demand in Northwest, and these occupations generally do not require a college degree.

FIGURE 3.4 PROJECTED EMPLOYMENT GROWTH BY EDUCATIONAL LEVEL IN THE NORTHWEST REGION



Source: Montana Department of Labor and Industry employment projections 2014-2024. Minimum education requirements for occupations determined by the U.S. Bureau of Labor Statistics.

Approximately 11% of the projected occupational employment growth in the Northwest are for occupations requiring a post-secondary award or associate's degree. The occupational analysis focuses on 20 occupations that require a post-secondary award or associate's degree and that also meet our criteria for being in high demand. Information on the demand for these 20 occupations are presented in FIGURE 3.5, along with the supply of graduates coming from Missoula College that have the training required to fill positions in these occupations. The annual supply of graduates is averaged over the last three years in order to smooth variations by year. The occupational analysis suggests that Missoula College is not producing enough graduates to meet the demand for registered nurses, but is meeting demand or is over-supplied for the remaining occupations.

The two occupations with the highest demand in the Northwest for which Missoula College has training programs for are registered nurses and licensed practical and vocational nurses. Missoula College appears to be meeting the regional demand for licensed practical nurses, producing exactly equal to demand at 37 per year. In fact, once the graduates from other colleges are included, it is possible that this occupation could be at projected demand or over-supplied in the Northwest. The supply of registered nurses is below the projected annual employment growth, graduating 35 per year compared to demand for 90 workers. The undersupply of registered nurses suggests that the economy would support an expansion to the registered nursing program; however, other regional colleges also help meet worker supply. More information about graduates from other schools would need to be gathered before making conclusions about program expansion.

There are 12 high-demand, associate-level occupations in the Northwest that are not served by any training programs at Missoula College. These occupations may be good targets for new programs to add to the degrees currently offered. The 12 occupations with high-demand and no existing training program are shown in FIGURE 3.5 with the "no program" indication, and include dental hygienists, web developers, nursing assistants, and firefighters. This analysis only suggests that these occupations are potential targets; the development of new programs would require additional evaluation, including determining whether other regional training organizations are meeting business demand.

Also of note is the occupation of forest conservation technicians, which is a very-high demand occupation in the Northwest. All of the worker demand for forest conservation technicians is expected to occur due to replacements, not new job growth. Although Missoula College does not have a program for this occupation, the college is still considered to meet demand for the occupation because of the definitions chosen in this study. This study considers a training program to meet demand if there are sufficient graduates to fill projected growth openings, assuming that other regional training organizations are providing sufficient supply to fill expected replacement openings.

HOW DO YOU KNOW WHAT EDUCATION LEVEL IS REQUIRED TO FILL A POSITION?

The U.S. Department of Labor determines the *minimum education requirements* needed to enter each occupation based on the education levels of the current workers in the profession. However, some occupations have changing skill requirements, and the minimum education requirement may not be the education level that is most common among new hires. For example, many hospitals now require registered nurses to have a bachelor's degree before hire, but this requirement is relatively new. Among people currently working in the profession, there are still more workers with associate's degrees than bachelor's degrees. Therefore, the minimum education requirement for nurses is an associate's degree.

That being said, workers with education levels higher than the minimum requirement will likely have better career success with faster wage progression.

Occupations earning more than $20 per hour are indicated by bolded text in FIGURE 3.5. This corresponds to an annual wage of roughly $42,000.

FIGURE 3.5 GAP ANALYSIS FOR HIGH-DEMAND OCCUPATIONS IN THE NORTHWEST

	Minimum Education Required	Occupation	Total Annual Opening	Total Growth Openings	Missoula College Supply	GAP Analysis
Very-High Demand (Top 10% of occupations)	Associate's Degree	Registered Nurses	90	40	35	Under Supplied
		Dental Hygienists	10	5	0	No Program
		Web Developers	10	4	0	No Program
		Preschool Teachers	9	3	0	No Program
		Forest and Conservation Technicians	34	0	0	Meets Demand
	Post-Secondary Award	Nursing Assistants	56	25	0	No Program
		Heavy and Tractor-Trailer Truck Drivers	51	22	0	No Program*
		Licensed Practical and Licensed Vocational Nurses	37	17	37	Meets Demand
		Medical Records and Health Information Technicians	22	9	0	No Program
High Demand (Top 25% of occupations)	Associate's Degree	Paralegals and Legal Assistants	8	4	10	Slight Over Supply
		Medical and Clinical Lab Techicians	7	3	0	No Program
		Radiologic Technologists	ND	ND	11	Over Supplied
		Respiratory Therapists	4	2	11	Over Supplied
		Medical Equipment Repairers	4	2	0	No Program
		Architectural and Civil Drafters	4	1	7	Over Supplied
	Post-Secondary Award	EMTs and Paramedics	17	8	0	No Program
		Dental Assistants	15	7	0	No Program
		Medical Assistants	11	6	6	Meets Demand
		Firefighters	11	3	0	No Program
		Hairdressers and Cosmetologists	15	3	0	No Program

Source: Montana Department of Labor and Industry 2014-2024 employment projections and MT DLI and OCHE MUS graduate data wage match. Occupations in bold are high-wage occupations. Supply is calculated as the sum of graduates from programs tied to the occupation averaged over the last three years. Minimum education requirements are set by the US Department of Labor.

*Missoula College began a CDL program in Spring 2015. Five students have completed the program since June 2015. These graduates aren't captured yet in the OCHE MUS data.

Meets Demand – The College's average annual supply of graduates falls within a range, where the upper bound is the projected total annual openings and the lower bound is total projected annual growth openings in the Northwest.

Under Supply – The average annual supply of graduates trained to work in the occupation is less than the projected annual growth openings in the Northwest.

Slight Over Supply – On average, the college produces one or two more graduates trained to work in the occupation than the projected number of total annual openings in the Northwest.

Over Supply – The average annual supply from the college for the occupation exceeds the projected number of total annual openings by at least three graduates.

No Program – The College does not train graduates to work in the high-demand occupation. These occupations may be good targets for potential new program development at the college, particularly those that provide high wages as well.

It is also important to recognize which of the targeted occupations also are high wage, as these occupations often are targets for local economic development organizations. Occupations that are also considered high-wage are denoted in bold in FIGURE 3.5, using the high-wage definition of wages $20 per hour or more.[12] Dental hygienists, registered nurses, and web developers are all occupations meeting the high wage definition.

FIGURE 3.5 also lists several occupations that are over-supplied, or where Missoula College is producing more graduates than expected jobs. These occupations include paralegals, radiologic technologists, respiratory therapists, and architectural and civil drafters. An over-supply of graduates for these fields would result in graduates struggling to find employment, with slower wage growth than other occupations. However, in this case, graduates from programs that train for these occupations tend to have better employment and wage outcomes than average, suggesting that graduates may be leaving the Northwest region to find employment. The next sections present the supply and demand analysis by program and evaluates the wage and employment outcomes by program in order to supplement our understanding of the gaps between worker supply and demand.

3.3 Which Missoula College Programs graduate enough Workers to Meet Demand?

When reviewing the supply and demand by industry, there were a number of industries, including health care, where the supply of graduates from Missoula College did not fully meet demand. When examining the supply and demand by occupation, not enough registered nursing students were graduating to fill demand, while radiologic technologists, paralegals, and architectural and civil drafters were over-supplied with graduates (although it seems that these students are finding employment in other regions of the state based on their wage outcomes). The occupational analysis also highlighted some high-demand occupations that are not currently included in the Missoula College program offerings.

This program supply and demand analysis evaluates whether the number of graduates from each program is enough to fill regional worker demand. If a program is producing too many graduates to fill all of the available jobs associated with that degree program, graduates may have difficulty finding a job within the local area, reducing the local labor supply. Worse, the graduate may have to accept a position in a field where their degree is not applicable, representing an under-utilization of human capital and likely reducing the return on the cost of education. Understanding the gaps and level of worker supply by program can help identify programs in need of expansion and help establish priorities between programs for the college.

For most programs, graduates have multiple career options to pursue after graduation because the program is broad enough to meet the training requirements for multiple occupations. Unlike the occupational analysis, which included only occupations in high-demand, this analysis includes all occupations that Missoula College graduates are qualified to fill with their degree. Occupations linking to more than one program at Missoula College are included as demand for both programs. Because all potential occupations are included, the supply and demand analysis by program includes openings that require less than an associate's degree to fill, but that could also be filled by someone with an associate's degree.

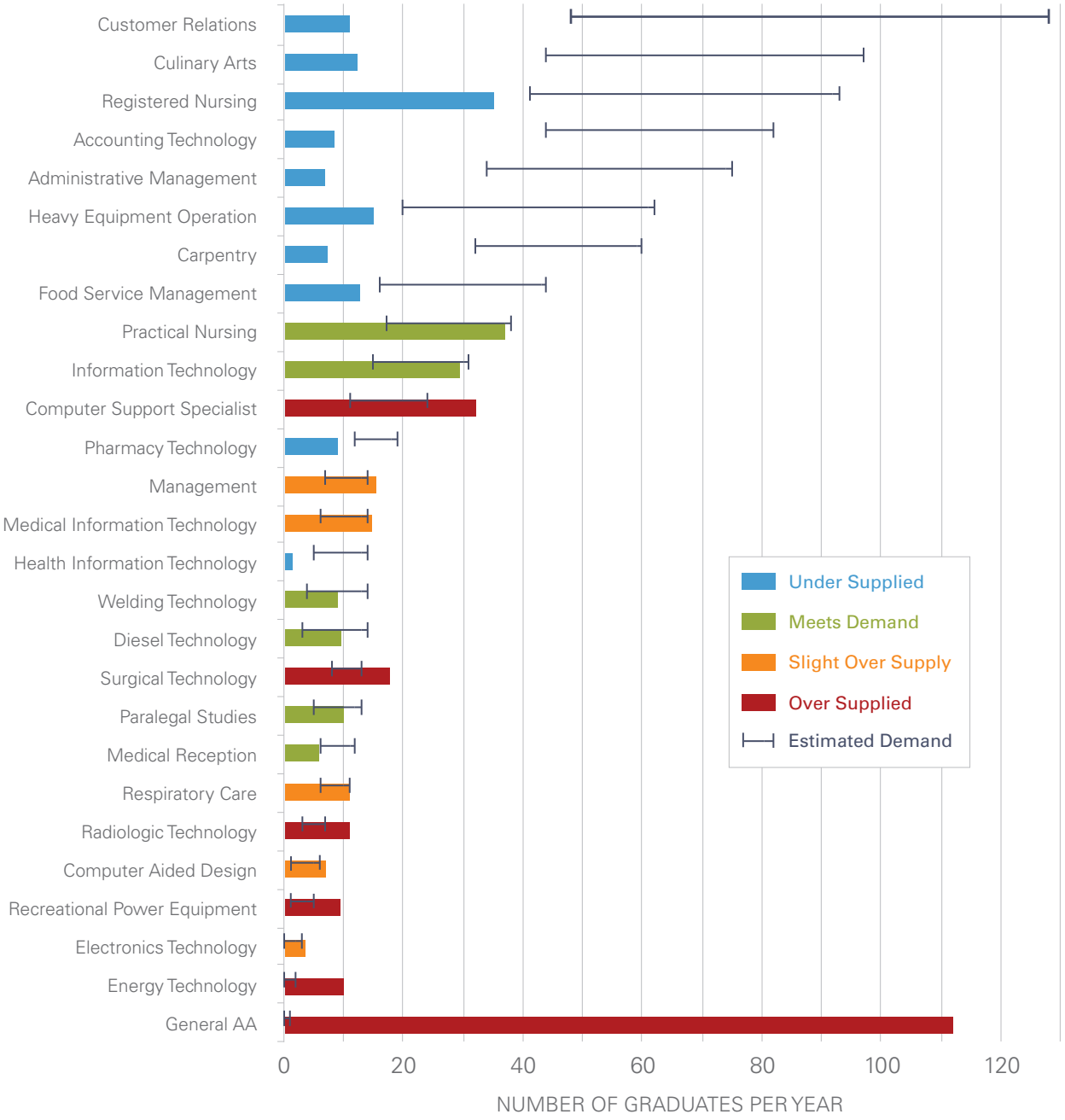
HOW DO GRADUATES CHOOSE WHICH JOBS TO FILL?

First and foremost, students choose their field of study and future jobs according to their interests and knowledge about how those interests are fulfilled in a variety of jobs. After graduation, workers make career decisions based on wage and benefit packages, interest in the mission of the organization, and work-life balance. However, we can assume that if a graduate is qualified for multiple occupations, more graduates will choose the higher paying job than the lower paying job. Therefore, double-counting the graduates as worker supply for multiple occupations likely results in an accurate measure of worker supply for high-paying occupation, but an overestimate of supply for low-paying occupations.

[12] Wages for bolded occupations can be found in Appendix A.1.1 FIGURE A2.

The analysis by program is summarized in FIGURE 3.6, with the same information also provided in table form in FIGURE 3.7. The customer relations program has the largest potential demand for occupations that could be filled with a degree from that program. Customer relations graduates are needed in nearly every industry, particularly the large industry of retail, and they also can fill a number of different occupations. The demand for workers in each program is represented as a range in FIGURE 3.6, with the total growth openings as the bottom of the range, and the total openings including both growth and

FIGURE 3.6 GAP ANALYSIS FOR MISSOULA COLLEGE PROGRAMS



Source: Montana Department of Labor and Industry 2014-2024 Employment projections and MT DLI and OCHE MUS graduate data wage match. Projected demand range includes all occupations that a graduate from the program would be qualified to fill, including those with less than a two-year degree. Supply calculated as the average graduates per year by program over the last three academic years. The computer technology and building maintenance programs did not match to any occupations so they are not included in the gap analysis. Computer system technician program excluded because it hasn't produced graduates in three years.

replacement openings as the top of the range. There are enough jobs for roughly 50 to 130 customer relations graduates per year, but there are only 11 graduates in this program per year (over the last three years).

Missoula College is estimated to meet regional demand for six of its programs: practical nursing, information technology, diesel technology, welding technology, paralegal studies, and medical reception. These programs are producing enough graduates to meet employer needs, and are color-coded green in FIGURE 3.6.

In contrast, registered nursing, pharmacy technology, and health information technology supply fewer graduates what is demanded by regional employers. These programs may be candidates for expansion. As we know from the previous section, registered nursing is a high-demand occupation that requires a

FIGURE 3.7 DETAILED SUPPLY AND DEMAND ANALYSIS FOR MISSOULA COLLEGE PROGRAMS

Program	Projected Northwest Total Annual Openings	Projected Northwest Annual Growth Openings	Missoula Colleg 3-Yr. Graduation Average	Percent of Demand from More than HS Occupations	GAP Analysis
Customer Relations	127	48	11	0%	Under Supply
Culinary Arts	96	44	12	0%	Under Supply
Registered Nursing	92	41	35	100%	Under Supply
Accounting Technology	81	44	8	0%	Under Supply
Administrative Management	74	34	7	0%	Under Supply
Heavy Equipment Operation	61	20	15	0%	Under Supply
Carpentry	59	32	7	0%	Under Supply
Food Service Management	43	16	13	0%	Under Supply
Practical Nursing	37	17	37	100%	Meets Demand
Information Technology	30	15	29	100%	Meets Demand
Computer Support Specialist	23	11	32	100%	Over Supply
Pharmacy Technology	18	12	9	33%	Under Supply
Diesel Technology	13	3	10	0%	Meets Demand
Welding Technology	13	4	9	0%	Meets Demand
Health Information Technology	13	5	1	100%	Under Supply
Medical Information Technology	13	6	15	100%	Slight Over Supply
Management	13	7	15	100%	Slight Over Supply
Paralegal Studies	12	5	10	67%	Meets Demand
Surgical Technology	12	8	18	100%	Over Supply
Medical Reception	11	6	6	100%	Meets Demand
Respiratory Care	10	6	11	100%	Slight Over Supply
Radiologic Technology	ND	ND	11	100%	Over Supply
Computer Aided Design	5	1	7	100%	Slight Over Supply
Recreational Power Equipment	4	1	9	0%	Over Supply
Electronics Technology	2	0	3	100%	Slight Over Supply
Energy Technology	1	0	10	100%	Over Supply
General AA	0	0	112	0%	Over Supply

Source: Montana Department of Labor and Industry 2014-2024 Employment projections and MT DLI and OCHE MUS graduate data wage match. Projected demand range includes all occupations that a graduate from the program would be qualified to fill, including those with less than a two-year degree. Supply calculated as the average graduates per year by program over the last three academic years. The computer technology and building maintenance programs did not match to any occupations so they are not included in the gap analysis. Computer system technician program excluded because it hasn't produced graduates in three years.

post-secondary education to fill. Over the last three years Missoula College has produced 35 registered nursing graduates per year, which is less than regional demand.

Missoula College also undersupplies graduates in customer relations, culinary arts, accounting technology, administrative management, carpentry, heavy equipment operation, and food service management programs. These programs all have substantial demand in the Northwest. However, none of these programs prepare graduates for occupations that require a post-secondary degree to fill. These programs primarily serve occupations that only require a high school diploma or equivalent and work experience. Therefore, they are not considered a priority for expansion because the occupations associated with the programs can be filled by people without a college degree.

Finally, there are several programs where the number of graduates far exceeds the expected demand for workers. Computer support specialist, surgical technology, radiologic technology, recreational power equipment, energy technology, and general studies all are producing more graduates than needed by local employers. Workers graduating in these fields be filling demand outside the Northwest region.

Of the programs with an oversupply of graduates, the most severe is general studies. According to the Bureau of Labor Statistics training information, there are few occupations that someone with a general studies associate degree is prepared to fill. None of the occupations tied to the general studies program are projected to grow in the Northwest region. The next section will illustrate the results of this over-supply, as graduates from the general studies program have lower wage and employment outcomes than other graduates.

3.4 What are the Wage Outcomes by Program?

Each of the different perspectives of supply and demand of workers highlighted different gaps between the training provided by Missoula College and the types of workers demanded by employers. However, it is important to examine the wage and employment outcomes of graduates to confirm the results of the analysis. Employment and wage outcomes vary significantly depending on the program of study. Missoula College has produced graduates in 30 different academic programs since 2001. These graduates went on to work in a variety of professions, with most experiencing positive employment and wage outcomes.

FIGURE 3.8 shows the employment and wage outcomes of graduates in each of the 30 academic programs one year after graduation. The size of the bubble represents the number of graduates from the program since 2001. The location of the bubble within the plot provides the average wage earnings on the vertical axis and the percent of graduates employed one year after graduation on the horizontal axis. Therefore, programs with positive wage outcomes appear in the top half of the chart, and those with good employment outcomes appear in the right side of the chart.

Graduates in the registered nursing (RN) program have the best employment and wage outcomes of any program at Missoula College. On average, 95% of RN graduates found employment within one year of graduation and earned $41,120 in wages after a year. Registered nurses have the most projected job openings among occupations requiring at least some college education in the Northwest region. The high demand for registered nurses is reflected in the improved employment and wage outcomes of RNs from Missoula College when compared to other programs. Five years after graduation, RN graduates earn about $50,460, above the statewide average wage. However, the average earnings of RN graduates from Missoula College remains below the average wage for all registered nurses in Montana, possibly due to lower experience levels or because many RNs are now entering the profession with bachelor's degrees. Neither explanation suggests a lack of adequate training through Missoula College.

FIGURE 3.8 also categorizes the programs into groups, with all health care professions shown with red bubbles. Graduates from the health professions programs tend to have better employment and wage outcomes one year after graduation than graduates from other categories.

In contrast, graduates in the mechanic, production and transportation category, shown in blue, fall in the lower left quadrant of the chart. Workers in these programs have lower wage and employment outcomes than graduates from other programs, with only 67% of graduates from the carpentry program employed one year after graduation. It is possible that FIGURE 3.8 under-represents the actual workforce outcomes of graduates from the mechanic, production, and transportation programs because this type of worker is often self-employed, and would not be included in the wage data used for this analysis. However, graduates that do obtain payroll employment in Montana have fairly low wage earnings, suggesting that others who are self-employed are likely also earning fairly low wage earnings. The lower wage earnings and lower employment outcomes suggest employer demand is not as high for graduates with these skill sets.

The data used to produce FIGURE 3.8 is also provided in FIGURE 3.9, along with some additional information about the average number of graduates per year for both the full timeframe and the most recent four years. The number of graduates per year helps to evaluate whether each program is expanding or shrinking in response to the wage outcomes of graduates. Despite having relatively low wage and employment outcomes for graduates, the number of general studies graduates has grown the most dramatically over the last four years. Registered nursing, culinary arts, information technology, and computer support specialist are also programs that have grown in recent years. All of these programs tend to have higher wage and employment outcomes compared to average, with graduates in the culinary arts program having good placement rates but low wage earnings. The medical assisting program, and the computer system technician program have not produced any graduates over the last four years.

FIGURE 3.9 also includes the percentage of graduates in each year who have previous wage earnings prior to graduation. The wage earnings may have been earned in internships or practical training required as a part of the curricula, but could simply be students working through college or workers who left the labor force to obtain higher education. The registered nursing program has the highest percentage of experienced workers, at 82%. Culinary arts, accounting technology, food service management, paralegal studies, radiologic technology, surgical technology and practical nursing programs all have at least 70% of their graduates working while they are earning their degree. The more connected students are to the local labor market upon graduation, the more likely they will be to find employment quickly in Montana and remain in the workforce in the years after graduation. The wage data also suggest that the higher experience levels result in higher wage outcomes for students.

INTERPRETING FIGURE 3.8

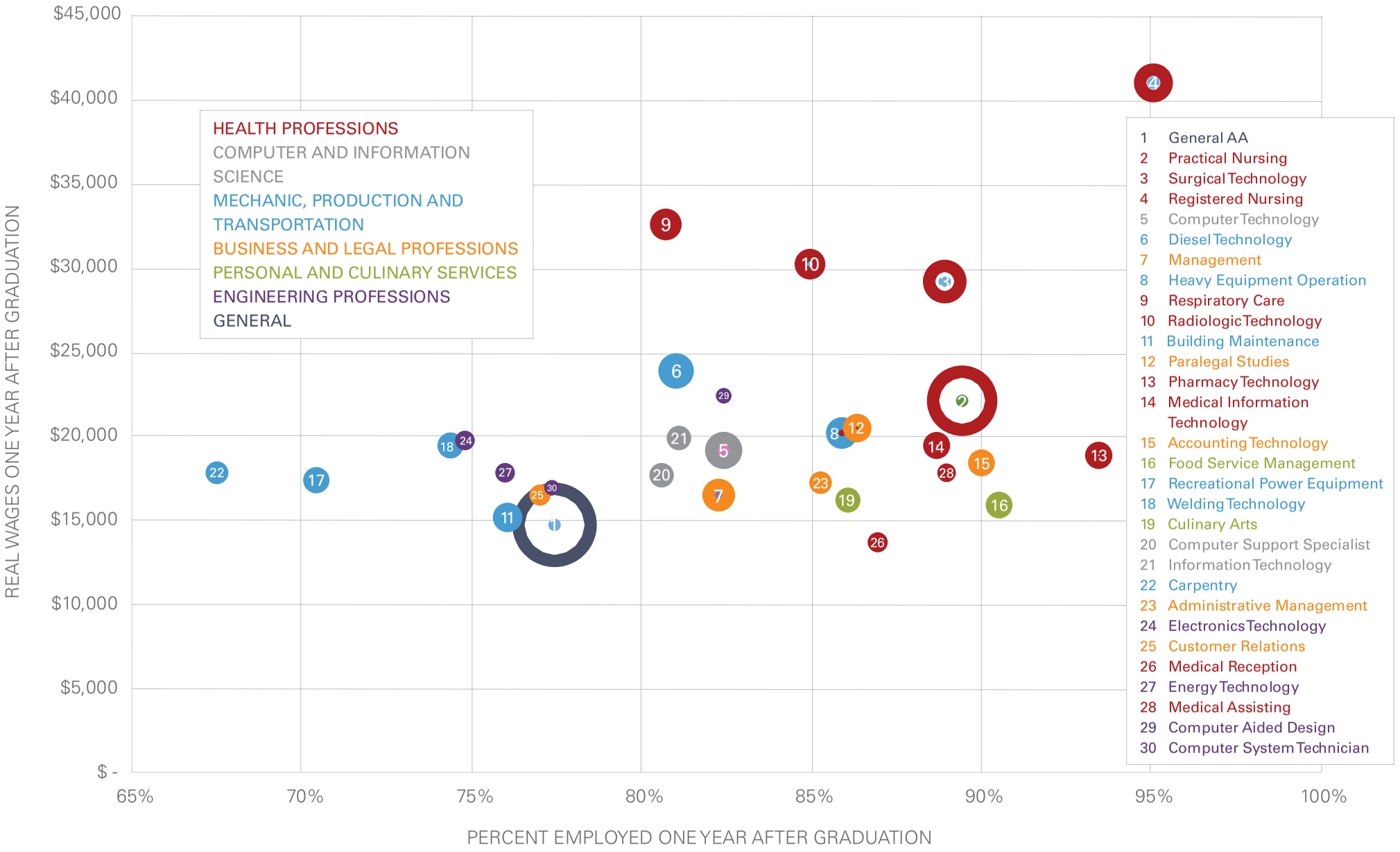
The size of the bubble represents the number of graduates in the program since 2001.

Programs with higher wages are shown on top. Programs with more graduates employed within a year after graduations are on the right.

Programs are color-coded into groupings:

- HEALTH PROFESSIONS
- COMPUTER AND INFORMATION SCIENCE
- MECHANIC, PRODUCTION AND TRANSPORTATION
- BUSINESS AND LEGAL PROFESSIONS
- PERSONAL AND CULINARY SERVICES
- ENGINEERING PROFESSIONS
- GENERAL

FIGURE 3.8 EMPLOYMENT AND REAL WAGE OUTCOMES ONE YEAR AFTER GRADUATION BY PROGRAM



Source: MT DLI and OCHE MUS graduate data wage match. The size of the bubble represents the total number of graduates in each program since 2001, while the color of the bubble categorizes programs based on their CIP codes. The legend is also ordered by size of program, with the first program having the most graduates. Wages are in real 2015Q4 dollars.

FIGURE 3.9 SUMMARY OF GRADUATE WORKFORCE OUTCOMES BY PROGRAM

Program	Average Annual Graduates	Average since 2011-12	Percent of Grads who are Incumbent	Percent Employment 1 Year After Grad	Real Wages 1 Year After Grad	Real Wages 3 Year After Grad	Real Wages 5 Year After Grad
General AA	46	100	57%	77%	$14,685	$22,815	$29,574
Practical Nursing	37	37	70%	89%	$22,185	$32,829	$36,298
Surgical Technology	20	19	73%	89%	$29,292	$31,842	$33,400
Registered Nursing	17	35	82%	95%	$41,127	$49,348	$50,462
Computer Technology	16	2	58%	82%	$19,227	$25,192	$34,029
Diesel Technology	15	14	60%	81%	$23,928	$30,322	$35,104
Management	13	14	68%	82%	$16,550	$24,595	$26,349
Heavy Equipment Operation	12	13	47%	86%	$20,258	$24,512	$30,406
Respiratory Care	12	12	61%	81%	$32,588	$41,352	$43,893
Radiologic Technology	12	11	74%	85%	$30,226	$37,567	$43,794
Building Maintenance	11	8	64%	76%	$15,244	$23,820	$25,072
Paralegal Studies	10	10	72%	86%	$20,560	$25,474	$25,596
Pharmacy Technology	9	10	69%	93%	$18,851	$23,799	$24,781
Medical Information Technology	9	13	59%	89%	$19,427	$23,042	$24,287
Accounting Technology	9	8	72%	90%	$18,422	$24,829	$26,539
Food Service Management	9	12	71%	90%	$15,859	$22,969	$22,612
Recreational Power Equipment	9	8	54%	70%	$17,364	$21,571	$26,024
Welding Technology	9	9	47%	74%	$19,407	$28,651	$26,513
Culinary Arts	8	12	73%	86%	$16,148	$22,197	$21,370
Computer Support Specialist	8	27	55%	81%	$17,755	$22,811	NA
Information Technology	8	27	53%	81%	$19,952	$37,712	NA
Carpentry	7	11	52%	67%	$17,820	$26,322	$28,791
Administrative Management	6	7	59%	85%	$17,265	$19,389	$22,092
Electronics Technology	6	4	68%	75%	$19,753	$25,729	$30,467
Customer Relations	6	10	56%	77%	$16,572	$21,352	$25,663
Medical Reception	5	5	54%	87%	$13,666	$19,243	$21,985
Energy Technology	5	12	61%	76%	$17,767	$21,471	$26,837
Medical Assisting	4	0	57%	89%	$17,903	$22,036	$27,145
Computer Aided Design	2	7	66%	82%	$22,498	$34,681	NA
Computer System Technician	2	0	59%	77%	$16,970	$26,187	$35,543

Source: MT DLI and OCHE MUS graduate data wage match. Average includes years with no graduates as zero, not missing. Wages in real 2015Q4 dollars.

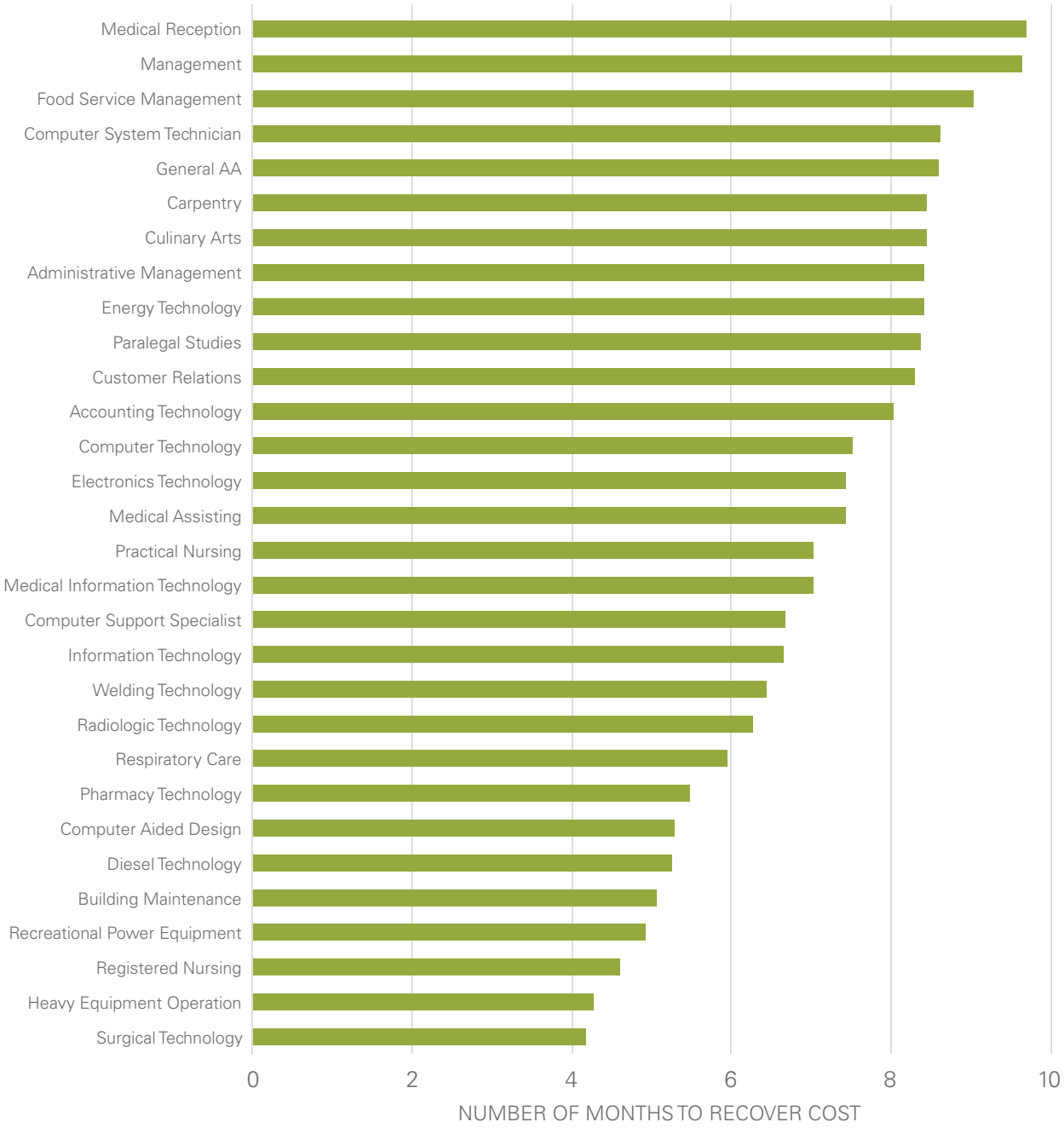
3.5 How do the Wages earned by Graduates compare to the Cost of Education?

Missoula College graduates in different programs have much different wages post-graduation. The differences in wage outcomes are due to market circumstances, with jobs that are in-demand and under-supplied having the best employment and wage outcomes. Healthcare occupations like registered nurses are in high demand, resulting in higher wages for graduates compared to the other programs. The minimum education required for an occupation also plays a role. For example, there are few graduates from the customer relations program compared to potential demand for jobs that could be filled with

someone with that degree, but most jobs associated with the customer relations degree only require a high school diploma (or equivalent) and work experience to fill. Therefore, the wage outcomes for customer service graduates are lower than average.

However, there is one final piece to the puzzle of whether Missoula College is meeting the demands of local employers, and that is whether the wages earned by graduates post-graduation justify the cost of their degree. If the market is not supporting wages that make education profitable, there will not be an incentive to obtain a degree. FIGURE 3.10 illustrates the number of months it takes the average graduate to earn real wages equal to the amount spent on tuition by program. FIGURE 3.11 provides the data in

FIGURE 3.10 AVERAGE NUMBER OF MONTHS TO RECOVER COSTS BY PROGRAM



Source: MT DLI and OCHE MUS graduate data wage match, and OCHE MUS cost per credit and time to completion data for Missoula College. Cost recovery calculated for average wages and average tuition for the program. Average cost of tuition for each program is the product of the average cost per credit across all programs by the average number of credits for program completion.

table form. All programs at Missoula College allow graduates to achieve wage earnings greater tuition costs within one year, assuming average wages and average tuition costs. If an individual graduate earned above average wages, or paid lower tuition costs than average for their program (due to scholarships or more efficient time to degree), the student would recover their tuition costs earlier than shown. Likewise, a graduate would take longer to recover the tuition costs if they took more classes or repeated more classes than the average for their program, if they did not quickly obtain a job after graduation, or if they had wages below the average for their program.

100% of Missoula College programs allow employed graduates to recover the cost of their tuition within a year.

FIGURE 3.11 ESTIMATED COST RECOVERY BY DEGREE FOR EMPLOYED MISSOULA COLLEGE GRADUATES

Major	Average Credits to Degree	Cost Per Degree	Real Wage After 1 Year of Graduation	Average Number of Months to Recover Cost
Surgical Technology	69.2	$10,219	$29,292	4.2
Heavy Equipment Operation	30.0	$7,230	$20,258	4.3
Registered Nursing	106.8	$15,768	$41,127	4.6
Recreational Power Equipment	48.1	$7,099	$17,364	4.9
Building Maintenance	43.5	$6,414	$15,244	5.0
Diesel Technology	70.8	$10,458	$23,928	5.2
Computer Aided Design	67.2	$9,917	$22,498	5.3
Pharmacy Technology	58.2	$8,598	$18,851	5.5
Respiratory Care	109.3	$16,140	$32,588	5.9
Radiologic Technology	106.9	$15,775	$30,226	6.3
Welding Technology	70.6	$10,416	$19,407	6.4
Information Technology	74.9	$11,050	$19,952	6.6
Computer Support Specialist	67.0	$9,896	$17,755	6.7
Medical Information Technology	76.9	$11,353	$19,427	7.0
Practical Nursing	88.0	$12,996	$22,185	7.0
Medical Assisting	75.1	$11,088	$17,903	7.4
Electronics Technology	82.9	$12,243	$19,753	7.4
Computer Technology	81.5	$12,026	$19,227	7.5
Accounting Technology	83.5	$12,331	$18,422	8.0
Customer Relations	77.6	$11,454	$16,572	8.3
Paralegal Studies	97.0	$14,319	$20,560	8.4
Energy Technology	84.4	$12,457	$17,767	8.4
Administrative Management	82.0	$12,109	$17,265	8.4
Culinary Arts	76.8	$11,344	$16,148	8.4
Carpentry	85.0	$12,545	$17,820	8.4
General AA	71.1	$10,493	$14,685	8.6
Computer System Technician	82.5	$12,179	$16,970	8.6
Food Service Management	80.8	$11,925	$15,859	9.0
Management	90.1	$13,302	$16,550	9.6
Medical Reception	74.7	$11,034	$13,666	9.7

Source: MT DLI and OCHE MUS graduate data wage match, and OCHE MUS cost per credit and time to completion data for Missoula College. Cost recovery calculated for average wages and average tuition for the program. Average cost of tuition for each program is the product of the average cost per credit across all programs by the average number of credits for program completion.

Medical reception is the degree that takes the longest to recover the cost of the degree. Graduates in the medical reception program take an average of 74.74 credits before graduation at a cost of $11,034. Graduates from the medical reception program have fairly high placement rates (with 87% of graduates employed within a year), but only make an average of $13,666 in their first year after graduation. Medical reception graduates therefore have average wages greater than tuition costs 9.7 months after graduation.

All of the programs from Missoula College reach cost recovery in less than a year. Graduates in surgical technology, heavy equipment operation, and registered nursing have the shortest time to cost recovery. Registered nursing and heavy equipment operation were found to be in the undersupply category in the program supply and demand analysis, which would suggest that the wages for these two fields will continue to be strong. The surgical technology field was listed as an over-supply, which may result in slower future wage growth unless these graduates find employment outside the Northwest region.

SECTION 3 HIGHLIGHTS

- There are 20 high-demand occupations in the Northwest requiring an Associate's degree or post-secondary award. Seven of these high-demand occupations are served by Missoula College programs. Potential new programs for development include web developers, medical equipment repairers, firefighters, and dental hygienists.
- Missoula College meets projected demand for LPNs and Medical Assistants, but more registered nurses are needed to meet regional demand.
- Healthcare employs 35% of Missoula College graduates, yet these graduates only meet 22% of demand.
- Missoula College supplies more than half the estimated demand in the administrative and waste services, government, accommodations and food service, and retail trade industries.
- Missoula College is estimated to meet the regional demand for six of its programs; practical nursing, information technology, diesel technology, welding technology, paralegal studies and medical reception.
- Missoula College could produce more graduates from the registered nursing, pharmacy technology, and health information technology programs. These programs produce less than regional demand on average, and the occupations served by the programs require at least some college education.
- Missoula College may be producing more surgical technology and radiologic technology graduates than demanded locally. However, above average employment and wage outcomes suggests these graduates may be meeting statewide demand.
- Helping general studies students find a more focused training program may help the college better prepare their graduates to meet regional workforce needs.

Section 4
Conclusion

Overall, Missoula College provides good value to its students. On average, employed graduates in all programs recover their education costs within a year of graduation. 83% of students are employed in Montana within a year after graduation, with average wages at the typical entry-level wage in Missoula. Graduates who are employed in all four quarters have wages equal to the median wage after one year.

Further, Missoula College is also doing a relatively good job meeting local employer demand. The largest worker demands are coming from the health care industry, which is expected to need over 430 new workers per year for the next 10 years in the Northwest. Missoula College is producing enough graduates to meet demand in practical nursing and medical reception. Missoula College is over-supplying the market in the health fields of surgical technology, radiologic technology, medical information technology, and respiratory care. However, these fields continue to have good wage and employment outcomes, suggesting they are helping to fill statewide worker demand. Finally, the market is signaling for a greater number of registered nurses, with the highest placement rate and wages of any program. The nursing programs have been expanding at Missoula College in response to this high demand. FIGURE 4.1 summarizes the outcomes of the supply and demand analysis, along with information on wage growth and job placement by program. Programs with below average outcomes, and programs that are over-supplied are denoted in red.

There are some programs where the over-supply of workers seems to be impacting placement rates and resulting in lower wages for graduates. Graduates in the energy technology program have placement rates of only 76% (compared to 83% for all programs), with lower average wages. Recreational power equipment program graduates face even lower wages, with a placement rate of only 70%. Very few of these graduates experience strong wage growth during the first few years.

Finally, the general studies program is producing significantly more graduates than demanded, with no occupations that can be filled by the general studies program being in-demand or requiring an associate's degree to fill. The poor employment outcomes of general studies graduates likely weighs down the

FIGURE 4.1 SUMMARY OF SUPPLY AND DEMAND ANALYSIS AND WORKFORCE OUTCOMES BY PROGRAM

Program	Percent Employed 1 Year After Grad	Wages After Graduation		Average Quarters worked 1 yr after grad	Percent with wage growth 1-2 years	GAP Analysis	Percent Demand High-Skill Occupations
		1 Year	5 Years				
General AA	77%	$14,685	$29,574	2.6	51.4%	Over Supply	0%
Practical Nursing	89%	$22,185	$36,298	3.3	62.7%	Meets Demand	100%
Surgical Technology	89%	$29,292	$33,400	3.2	52.7%	Over Supply	100%
Registered Nursing	95%	$41,127	$50,462	3.6	68.9%	Under Supply	100%
Computer Technology	82%	$19,227	$34,029	2.8	57.3%	NA	NA
Diesel Technology	81%	$23,928	$35,104	2.7	53.0%	Meets Demand	0%
Management	82%	$16,550	$26,349	2.8	57.4%	Slight Over Supply	100%
Heavy Equipment Operation	86%	$20,258	$30,406	2.8	50.3%	Under Supply	0%
Respiratory Care	81%	$32,588	$43,893	2.9	57.1%	Slight Over Supply	100%
Radiologic Technology	85%	$30,226	$43,794	3.1	61.0%	Over Supply	100%
Building Maintenance	76%	$15,244	$25,072	2.4	60.9%	NA	NA
Paralegal Studies	86%	$20,560	$25,596	3.0	55.4%	Meets Demand	67%
Pharmacy Technology	93%	$18,851	$24,781	3.3	58.8%	Under Supply	33%
Medical Information Technology	89%	$19,427	$24,287	3.2	61.6%	Slight Over Supply	100%
Accounting Technology	90%	$18,422	$26,539	3.2	71.2%	Under Supply	0%
Food Service Management	90%	$15,859	$22,612	3.0	49.5%	Under Supply	0%
Recreational Power Equipment	70%	$17,364	$26,024	2.4	51.4%	Over Supply	0%
Welding Technology	74%	$19,407	$26,513	2.5	53.5%	Meets Demand	0%
Culinary Arts	86%	$16,148	$21,370	2.9	48.2%	Under Supply	0%
Computer Support Specialist	81%	$17,755	NA	2.8	51.0%	Over Supply	100%
Information Technology	81%	$19,952	NA	2.7	59.3%	Meets Demand	100%
Carpentry	67%	$17,820	$28,791	2.1	41.3%	Under Supply	0%
Administrative Management	85%	$17,265	$22,092	3.0	52.6%	Under Supply	0%
Electronics Technology	75%	$19,753	$30,467	2.7	55.8%	Slight Over Supply	100%
Customer Relations	77%	$16,572	$25,663	2.7	56.1%	Under Supply	0%
Medical Reception	87%	$13,666	$21,985	2.9	68.4%	Meets Demand	100%
Energy Technology	76%	$17,767	$26,837	2.6	52.1%	Over Supply	100%
Medical Assisting	89%	$17,903	$27,145	3.2	61.1%	NA	NA
Computer Aided Design	82%	$22,498	NA	2.9	90.0%	Slight Over Supply	100%
Computer System Technician	77%	$16,970	$35,543	2.4	59.1%	Under Supply	100%

Source: MT DLI and OCHE MUS graduate data wage match. MT DLI employment projections 2014-2024. High-skill is defined as occupations requiring at least some college education. Newer programs may be excluded due to lack of graduate wage data. Red indicates program falls below the overall average, or is over supplied.

overall employment and placement statistics for Missoula College because of the size of the program. Further, while general studies students do pursue higher education at greater rates than other programs, the higher degree attainment still does not result in higher wages of graduates. Missoula College may wish to address the poor employment outcomes of general studies students by encouraging students into more specific career fields.

There are also some in-demand jobs that are not currently being served by any Missoula College program. The status of the high-demand occupations that require an associate's degree or post-secondary award is summarized in FIGURE 4.2. Occupations with no program also have the expected annual openings included to suggest priorities. These programs may be potential targets for new programs at Missoula College, although additional research on the worker supply produced by other regional training organizations is needed to confirm this analysis.

As Montana enters a worker shortage, Missoula College offers to be part of the solution by providing cost effective training for students and a reliable supply of workers for regional businesses. The information provided in this report indicates that Missoula College is successful in meeting both student and local employer needs, but improvements can always be made. With the insights provided by this report, the administration at Missoula College is better prepared to plan for the future and design strategies for continual improvement.

FIGURE 4.2 HIGH-DEMAND OCCUPATIONS IN THE NORTHWEST THAT REQUIRE AN ASSOCIATE'S DEGREE OR POST-SECONDARY AWARD BY LEVEL OF SUPPLY

Missoula College Produces Fewer Graduates than Demanded	Missoula College Meets Current Demand	High Demand, but no Program at Missoula College (Along with Expected Annual Openings)	More Graduates than Needed, Likely Filling Statewide Worker Demand
• Registered Nurses	• Forest and Conservation Technicians • Licensed Practical and Vocational Nurses • Medical Assistants	• Nursing Assistants (56) • Heavy Truck and Tractor-Trailer Drivers (51) • Medical Records and Health Information Technicians (22) • EMTs and Paramedics(17) • Dental Assistants (15) • Hairdressers and Cosmetologists (15) • **Firefighters (11)** • **Dental Hygienists (10)** • **Web Developers (10)** • Preschool Teachers (9) • Medical and Clinical Lab Technicians (7) • **Medical Equipment Repairers (4)**	• Paralegals and Legal Assistants • **Radiologic Technologists** • **Respiratory Therapists** • **Architectural and Civil Drafters**

Source: MT DLI and OCHE MUS graduate data wage match. MT DLI employment projections 2014-2024. Bolded high-wage occupations.

Appendix A
Methodology

The supply and demand analysis conducted in this report is often referred to as a gap analysis because it identifies gaps in the supply of workers meeting business needs. This report generally avoids the use of the term gap analysis to reduce the level of jargon. However, the term gap analysis is used here for conciseness.

The primary data source used in this report is a matched individual-level data set compiled jointly between the Office of the Commissioner of Higher Education (OCHE) and the Montana Department of Labor and Industry (MT DLI). OCHE provided MT DLI with records of Missoula College graduates from 2001 to 2015, including program of study, degree awarded, date of graduation, and other degrees obtained by the graduate. MT DLI then matched the graduate data with wage files reported to the unemployment insurance (UI) program on an individual basis, allowing MT DLI to track each individual through their education program to their workforce outcome. All wages were inflated using the Consumer Price Index for Urban Consumers to 2015Q4 real dollars to allow for comparison across timeframes.

The match was governed by the security requirements outlined in the Memorandum of Understanding between the MT DLI and OCHE designed to protect the confidentiality of the UI wage files and protect the privacy of graduates. The matching dataset is referred to as MT DLI and OCHE MUS graduate data wage match.

A.1 Supply and Demand Analysis Methodology

The purpose of the gap analysis is to determine if there are enough graduates produced by Missoula College programs to meet the estimated demand for workers in the region surrounding Missoula College. The gap analysis uses the MT DLI 2014-2024 employment projections data as an estimate of workforce demand. Worker supply is estimated based on graduation data from the MT DLI and OCHE MUS graduate data wage match. The gap analysis is presented from four different viewpoints – by industry, by high-demand occupations, by program, and the equilibrium wage and employment outcomes of graduates. The gap analysis perspectives help confirm the robustness of the results and reduce the likelihood of mis-interpretation.

A.1.1 Description of Employment Projections Data

Every year, the Montana Department of Labor and Industry (MT DLI) produces employment forecasts for the state of Montana in conjunction with the U.S. Department of Labor. The employment forecasts are produced over a two-year and ten-year time frame, by industry and occupation, and either statewide or geographically by region. The projections are based on historic employment data from January 1990 to September 2014. 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 MT DLI.

The employment forecasts are an estimate of the future demand for workers based on historical employment data, coupled with 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, the employment forecasts should be seen as the most likely employment growth outcome of all possible outcomes, given the current knowledge and information about the economy.

Occupations are classified as either high demand, or very-high demand occupations based on the total openings projected. Very-high demand occupations are occupations with total annual openings in the top ten percent within an education level. Similarly, occupations with total annual openings in the top 25 percent of occupations in an educational level are considered high demand occupations. FIGURE A1 summarizes the threshold for very-high and high-demand occupations for each education level in the Northwest and statewide. For example, occupations in the Northwest requiring an associate's degree were considered to be in very-high demand if the projected total annual openings for the occupation are at or above nine openings. If an occupation is projected to have at least four but less than nine total annual openings, then the occupation is considered to be in high demand in the Northwest among occupations requiring an associate's degree.

FIGURE A1. JOB GROWTH THRESHOLDS FOR VERY-HIGH AND HIGH DEMAND BY REGION AND EDUCATION LEVEL

Minimum Education Requirement	Northwest Region		Montana	
	Very-High Demand	High Demand	Very-High Demand	High Demand
High school diploma or equivalent	15	5	52	18
Bachelor's degree	9	5	34	17
Associate's degree	9	4	32	11
Postsecondary non-degree award	22	11	58	31
Doctoral or professional degree	8	2	19	5
Less than high school	55	17	185	42
Master's degree	6	5	20	17
Some college, no degree	27	25	97	77

Source: Montana Department of Labor and Industry Employment Projections 2014-2024. The definition of very-high and high demand occupations is based on the distribution of total annual openings within an education level and within a region. The number shown for each region and education level is the minimum number of total annual openings an occupation in that category must have in order to be classified as very-high or high demand.

FIGURE A2 shows the high-demand and high-wage occupations in the Northwest region, only including those requiring an associate's degree or post-secondary award to enter the occupation. Registered Nurses have the largest demand for workers, with an annual wage approaching $60,000. Web developers and dental hygienists also have very high demand with high wages. All of the occupations in FIGURE A2 would be good fields for Missoula College students because they require a degree from the college, are in high-demand, and can provide graduates with above average wages.

FIGURE A2. HIGH-DEMAND, HIGH-SKILL AND HIGH-WAGE OCCUPATIONS IN THE NORTHWEST REGION

	Degree Required	Occupation	Total Annual Openings	Annual Growth Openings	Montana Median Wage
Very-High Demand	Associates	Registered Nurses	90	40	$59,860
		Web Developers	10	4	$51,030
		Dental Hygienists	10	5	$69,560
High Demand	Associates	Radiologic Technologists	ND	ND	$51,280
		Architectural and Civil Drafters	4	1	$45,940
		Respiratory Therapists	4	2	$51,870
		Medical Equipment Preparers	4	2	$54,380
	PS Award	Firefighters	11	3	$48,590

Source: Montana Department of Labor and Industry 2014-2024 Employment Projections. Wage data from the 2014 Occupational Employment Statistics. Degree required is the minimum required to enter the occupation according to the US Department of Labor. Growth Openings represent new jobs and reflect an increase in demand for the occupation. Total openings include both growth and replacement openings. PS Award stands for post-secondary non-degree award.

A.1.2 Crosswalk between College Programs and Occupations

In order to match Missoula College programs with their corresponding occupations, the U.S. Department of Labor and the U.S. Department of Education provide a crosswalk between the standard occupational classification (SOC) codes and the classification of instructional programs (CIP) codes. The crosswalk used in this report matches the 2010 SOC codes with the 2010 CIP codes. The crosswalk matches each program with the entire list of occupations an individual may be prepared to fill upon obtaining a degree in the program. Similarly, for each occupational code the crosswalk provides a list of programs that may train an individual to work in the occupation. The match is not one-to-one, meaning that a program may prepare a student for multiple occupations, and an occupation may be filled by students holding degrees from many different programs. For example, a student graduating with a practical nursing degree matches directly to the practical nursing occupation. However, a culinary arts graduates match to five different occupations.

The 30 academic programs at Missoula College match to 79 occupations projected in the Northwest region. There are two programs that do not tie to any occupations, Computer Technology and Building Maintenance. These programs were excluded from the gap analysis. Most occupations are served by a single program at the college. FIGURE A3 lists all the disclosable occupations served by Missoula College programs, and the number of college programs tied to each occupation.

The programs at Missoula College train graduates to fill 79 different occupations, with about half requiring at least some college education and 18 requiring a credential of a post-secondary award or associate's degree. The other half only require a high school diploma or less, although having more than the required education level likely improves wage outcomes. FIGURE A4 illustrates the breakdown of the 79 occupations tied to Missoula College by demand and minimum education required. Approximately 16% of the occupations associated with Missoula College programs are considered to be in very-high demand in the Northwest region, and another 19% are high-demand occupations. The table shown in Appendix C lists the estimated job openings for all disclosable occupations in the Northwest with at least five openings, sorted by the number of openings.

There are seven high-demand occupations in the Northwest Region that require an associate's degree or post-secondary award. A gap analysis was conducted for the seven high-demand and high-skill occupations served by Missoula College programs to determine if there are enough students graduating from the programs to meet employer demand (See Section 3.2).

FIGURE A3. LIST OF DISCLOSABLE OCCUPATIONS SERVED BY MISSOULA COLLEGE PROGRAMS

	Occupation	NW Demand	Minimum Education Required	Work Experience	Training Required	Number of Missoula College Programs
1	Marketing Managers		Bachelor's	5+ years	None	1
2	Sales Managers		Bachelor's	< 5 years	None	1
3	Computer and Information Systems Managers		Bachelor's	5+ years	None	1
4	Food Service Managers		HS or Equiv.	< 5 years	None	1
5	Medical and Health Services Managers	Very-High	Bachelor's	None	None	1
6	Social and Community Service Managers		Bachelor's	5+ years	None	1
7	Market Research Analysts and Marketing Specialists	High	Bachelor's	None	None	1
8	Tax Preparers		HS or Equiv.	None	MT-OJT	1
9	Computer Systems Analysts	High	Bachelor's	None	None	1
10	Information Security Analysts		Bachelor's	< 5 years	None	1
11	Software Developers, Applications	Very-High	Bachelor's	None	None	2
12	Software Developers, Systems Software	High	Bachelor's	None	None	1
13	Computer User Support Specialists		SCND	None	MT-OJT	1
14	Computer Network Support Specialists		Associate's	None	None	1
15	Computer Occupations, All Other		Bachelor's	None	None	1
16	Architectural and Civil Drafters	High	Associate's	None	None	1
17	Mechanical Drafters		Associate's	None	None	1
18	Electrical and Electronics Engineering Technicians		Associate's	None	None	2
19	Engineering Technicians, Except Drafters, All Other		Associate's	None	None	1
20	Community and Social Service Specialists, All Other		Master's	None	None	1
21	Paralegals and Legal Assistants	High	Associate's	None	None	1
22	Title Examiners, Abstractors, and Searchers		HS or Equiv.	None	ST-OJT	1
23	Legal Support Workers, All Other		HS or Equiv.	None	ST-OJT	1
24	Business Teachers, Postsecondary	High	PhD or Prof	None	None	1
25	Postsecondary Teachers, All Other		PhD or Prof	None	None	1
26	Respiratory Therapists	High	Associate's	None	None	1
27	Registered Nurses	Very-High	Associate's	None	None	1
28	Pharmacy Technicians	High	HS or Equiv.	None	MT-OJT	1
29	Surgical Technologists		PS Award	None	None	1
30	Licensed Practical and Licensed Vocational Nurses	Very-High	PS Award	None	None	1
31	Medical Assistants	High	PS Award	None	None	2
32	First-Line Supervisors of Food Preparation and Serving Workers	Very-High	HS or Equiv.	< 5 years	None	2
33	Cooks, Restaurant	Very-High	< HS	< 5 years	MT-OJT	1
34	Bookkeeping, Accounting, and Auditing Clerks	Very-High	HS or Equiv.	None	MT-OJT	1
35	Payroll and Timekeeping Clerks	High	HS or Equiv.	None	MT-OJT	1
36	Brokerage Clerks		HS or Equiv.	None	MT-OJT	1
37	Customer Service Representatives	Very-High	HS or Equiv.	None	ST-OJT	1
38	Eligibility Interviewers, Government Programs		HS or Equiv.	None	MT-OJT	1
39	Receptionists and Information Clerks	Very-High	HS or Equiv.	None	ST-OJT	1
40	Executive Secretaries and Executive Administrative Assistants		HS or Equiv.	< 5 years	None	1
41	Secretaries and Administrative Assistants, Except Legal, Medical, and Executive	Very-High	HS or Equiv.	None	ST-OJT	1

	Occupation	NW Demand	Minimum Education Required	Work Experience	Training Required	Number of Missoula College Programs
42	Logging Equipment Operators	High	HS or Equiv.	None	MT-OJT	1
43	First-Line Supervisors of Construction Trades and Extraction Workers	Very-High	HS or Equiv.	5+ years	None	1
44	Carpenters	Very-High	HS or Equiv.	None	Apprenticeship	1
45	Paving, Surfacing, and Tamping Equipment Operators		HS or Equiv.	None	MT-OJT	1
46	Operating Engineers and Other Construction Equipment Operators	Very-High	HS or Equiv.	None	MT-OJT	1
47	Highway Maintenance Workers		HS or Equiv.	None	MT-OJT	1
48	Earth Drillers, Except Oil and Gas		HS or Equiv.	None	MT-OJT	1
49	Mobile Heavy Equipment Mechanics, Except Engines	High	HS or Equiv.	None	LT-OJT	1
50	Outdoor Power Equipment and Other Small Engine Mechanics		HS or Equiv.	None	MT-OJT	1
51	Welders, Cutters, Solderers, and Brazers	High	HS or Equiv.	None	MT-OJT	1
52	Crane and Tower Operators		HS or Equiv.	< 5 years	MT-OJT	1
53	Excavating and Loading Machine and Dragline Operators		HS or Equiv.	< 5 years	MT-OJT	1

Source: Occupational Employment Statistics 2014. The definition of very-high and high demand occupations is based on the distribution of total annual openings within an education level and within a region from the MT DLI 2014-2024 employment projections. Abbreviation: HS or Equiv. = High School diploma or equivalent; SCND = Some College, no degree; PhD or Prof = Doctoral or Professional degree; ST-OJT = Short-term on-the-job training; MT-OJT = Moderate-term on-the-job training; LT-OJT = Long-term on-the-job training; PS Award = Post-Secondary non-degree award; < HS = Less than high school

FIGURE A4. NUMBER OF HIGH-DEMAND OCCUPATIONS THAT COULD BE TRAINED USING MISSOULA COLLEGE PROGRAMS

Minimum Education Requirement	Total Occupations	Northwest Region		Montana	
		Very-High Demand	High Demand	Very-High Demand	High Demand
High school diploma or equivalent	36	8	5	9	5
Bachelor's degree	15	2	3	2	4
Associate's degree	12	1	4	2	3
Postsecondary non-degree award	5	1	1	1	1
Doctoral or professional degree	4	0	2	0	2
Less than high school	4	1	0	1	0
Master's degree	2	0	0	0	1
Some college, no degree	1	0	0	0	1

Source: Montana Department of Labor and Industry 2014-2024 Employment Projections, MT DLI and OCHE MUS graduate data wage match. High demand and very-high demand occupations are determined based on the total projected annual openings. Minimum education requirements are set by the US Department of Labor.

A.1.3 Calculation of Supply by Occupation and Demand by Program

The supply of graduates by occupation is calculated as the sum of graduates from all programs that are connected to the occupation. The graduates are counted once in each occupation their program serves. Graduates can be counted multiple times across different occupations. However, an individual can only choose one occupation upon graduation, and then they are no longer available for the other occupations except as a potential future worker. As a result, the actual supply of students for each occupation may be less than what is estimated in this report. This concern is mitigated by focusing the analysis on high-wage, high-demand occupations because we can assume students will pursue careers that are most lucrative.

The demand for graduates from each of Missoula College's 30 academic programs is calculated as the sum of the projected job openings for each occupation a student graduating from the program is qualified to fill. In cases where multiple programs can prepare students for the same occupation, the demand for that occupation is counted once under each program it is associated with. The total demand for Missoula College programs does not equal the sum of the demand for each program because occupations linking to more than one program will be counted more than once. FIGURE A5 shows the number of occupations associated with each college program.

FIGURE A5. NUMBER OF OCCUPATIONS TIED TO COLLEGE PROGRAM

	Program	Number of Occupations
1	Accounting Technology	5
2	Administrative Management	2
3	Building Maintenance	0
4	Carpentry	2
5	Computer Aided Design	4
6	Computer Support Specialist	2
7	Computer System Technician	1
8	Computer Technology	0
9	Culinary Arts	5
10	Customer Relations	2
11	Diesel Technology	2
12	Electronics Technology	1
13	Energy Technology	2
14	Food Service Management	4
15	General AA	1
16	Health Information Technology	3
17	Heavy Equipment Operation	15
18	Information Technology	7
19	Management	5
20	Medical Assisting	1
21	Medical Information Technology	1
22	Medical Reception	1
23	Paralegal Studies	3
24	Pharmacy Technology	2
25	Practical Nursing	1
26	Radiologic Technology	1
27	Recreational Power Equipment	2
28	Registered Nursing	2
29	Respiratory Care	3
30	Surgical Technology	2
31	Welding Technology	2

Source: U.S. Department of Education program to occupation crosswalk.

A.2 Workforce Outcomes Methodology

Graduate data provided to MT DLI were constructed so that an individual earning multiple degrees or in multiple majors was listed multiple times. To analyze college-wide workforce outcomes, the dataset was manipulated so that each individual was represented by a single observation. For the analysis across all programs, only information on the most recent degree earned from the college, and the highest degree earned from any college, was retained for each individual. Approximately 85% of graduates earned only one degree from Missoula College, 14% earned two degrees, and less than 1% earned three or four degrees. Graduates' wages are evaluated based on their terminal (most recent) degree from Missoula College. Using the terminal degree includes an assumption that an individual's wages are most effected by the latest degree earned. A graduation year is defined by the academic calendar, from summer of a given year through spring of the following year.

FIGURE A6. SUMMARY OF GRADUATE DATA FROM MISSOULA COLLEGE

Timeframe Provided	2001-02 to 2014-2015
Number Years Included	14
Total Records	4,738
Individual Records	4,088
Average Graduates Per Year	290
Average Degrees Per Year	340
Percent Single Degree Holders	85%

Source: Office of the Commissioner of Higher Education MUS graduation data.

The graduation data from Missoula College covered 14 academic years from 2001-02 through 2014-15. Wage data is available from the first quarter of 2001 through the second quarter of 2015. Therefore, graduates in the 2001-02 year have only a year of pre-graduation wage information. Similarly, the 285 students with a spring 2015 graduation date do not have any post-graduation wage information available. All wages were inflated using the Consumer Price Index for Urban Consumers to 2015Q4 real dollars to allow for comparison across timeframes.

In order to analyze differences in wage outcomes for each college program, the data were reorganized so that each observation represents a single degree earned from Missoula College. Therefore, students earning multiple degrees from Missoula College are counted multiple times. Almost all (99%) of Missoula College graduates graduated with a single major, the remaining 1% of graduates graduated with a double major meaning their degree and subsequent wage earnings are associated with two programs. The number of students in each program is equal to the number of degrees issued where either the first or second major is in the program. Programs producing less than 10 graduates in the last fourteen years are excluded to protect graduates' privacy.

A.2.2 Timeframes Used to Match Wages

Graduates completed their programs in either the 2nd quarter (May), 3rd quarter (July), or 4th quarter (December) of each year. Graduation dates were determined based on the term of graduation. The date an individual is awarded their degree may not be at the end of their last term if, for example, the student had outstanding fees. No graduation term fell within the 1st quarter. The graduates' wages were

compared five years prior to graduation through five years after graduation. Graduates were matched to the wage files to determine total wages for the following time periods:

- the first two quarters after graduation,
- the first four quarters before and after graduation,
- quarters 5 through 8 (two years) before and after graduation,
- quarters 9 through 12 (three years) before and after graduation,
- quarter 13 through 16 (four years) before and after graduation, and
- quarters 17 through 20 (five years) before and after graduation.

The wage summaries are based on quarters before and after graduation to equally compare individuals across quarters. For example, a graduate in the second quarter of 2012 would have two quarters to find a job before 2013, but a graduate in the fourth quarter of 2012 would not have any time to find a job before the start of 2013. If we simply used graduation years in the analysis by pooling all graduates in 2012 together, we would be placing these two candidates in the same pool and evaluating whether they were employed in 2013, even though they had different amounts of time to find a job and earn higher wages. Instead, this analysis uses the quarters after graduation to calculate total wages in the four quarters after graduation. A 2012 second quarter graduate is evaluated on the four quarters after graduation of 2012Q3 through 2013Q2. A 2012 fourth quarter graduate is also compared on four quarters after graduation of 2013Q1 through 2013Q4. This distinction places the same evaluation timeframe on graduates with different quarters.

A.2.3 Wage Data Background

The wage data used in the match comes from the mandatory reporting of payroll wages by employers to the Montana Department of Labor and Industry for UI program purposes. The wages reported are the total amount of wages earned by a worker in a quarter. The wages reported cannot be used to assume an hourly or annual rate of pay because there is no information on the number of hours or months worked by the graduate, therefore the wages reported are better interpreted as wage earnings. Some workers will have higher wages due to overtime hours worked, while other workers will have low wages because they only worked a few hours or only part of a quarter. The presence of wages only suggests that the worker earned some wages from an employer.

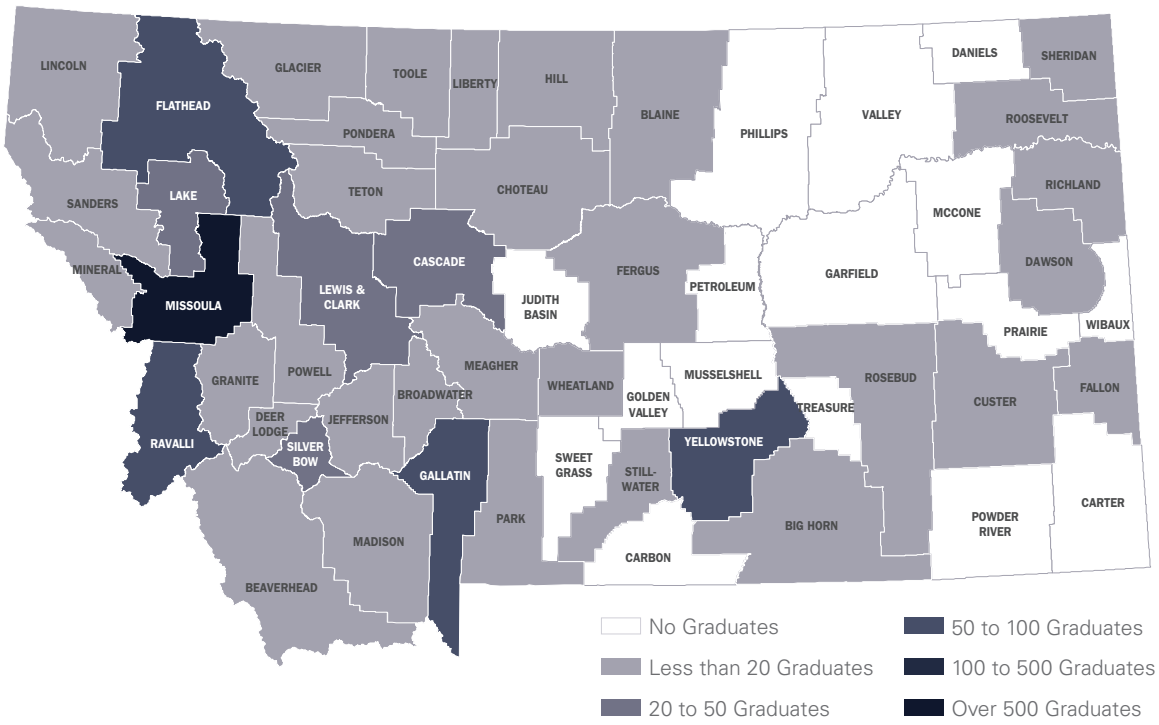
Not all wage earnings are reported to the Montana Department of Labor and Industry. Some payroll workers, such as migrant agriculture workers and railroad workers do not pay into the UI system. Some federal agencies report their payroll wages nationally instead of to each state. Self-employed workers or independent contractors are not payroll workers and are not required to pay into the UI system (although self-employed workers can opt into the system). All of these types of workers could be earning income in Montana that is not reported to the UI system and therefore will not show up in the matched data.

For most of the data provided in this report (with the exception of the match to employer location and industry), wages earned from all employers were summed into total earnings for the graduate. For example, if a graduate held two jobs, each earning $3,000 per quarter, the wage earnings per quarter were summed to reflect the total $6,000 earned per quarter. The earnings for that quarter would be added together with the earnings from the other three quarters in the year to reflect the wage earnings over the year timeframe.

Appendix B
Location of Graduates Three and Five years after Graduation

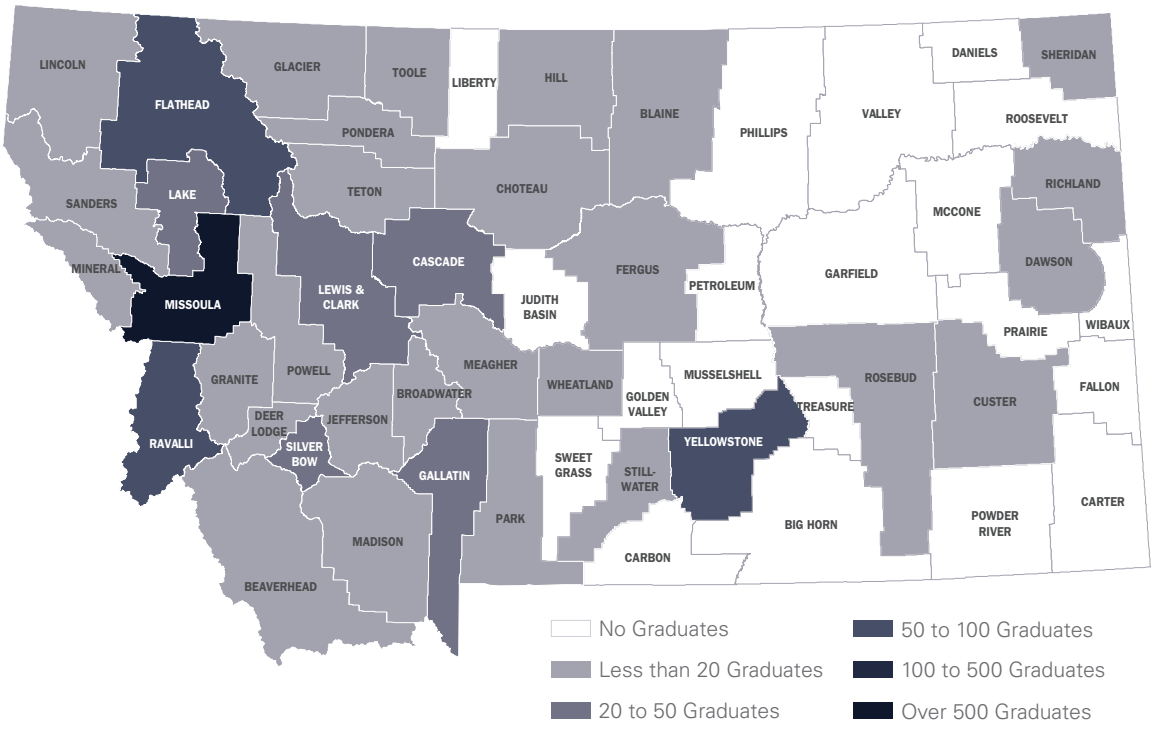
These maps illustrate the geographical dispersion of graduates three and five years after graduation. As time passes, graduates are less concentrated in the Missoula area. Graduates' locations are identified by their primary employer. Workers located at remote work locations may be identified in the employer's primary work county. FIGURE B1 includes 2001 through 2013 graduates, while FIGURE B2 includes 2001 through 2011 graduates.

FIGURE B1. LOCATION OF GRADUATES EMPLOYED IN MONTANA THREE YEARS AFTER GRADUATION



Source: MT DLI and OCHE MUS graduate data wage match. Data matched by MT DLI.
Notes: Excludes graduates after spring 2011 due to data availability. Graduate location based on the location of their primary employer.

FIGURE B2. LOCATION OF GRADUATES EMPLOYED IN MONTANA FIVE YEARS AFTER GRADUATION



Source: MT DLI and OCHE MUS graduate data wage match. Data matched by MT DLI.
Notes: Excludes graduates after spring 2011 due to data availability. Graduate location based on the location of their primary employer.

Appendix C
Projections by Occupation in the Northwest

FIGURE C.1 lists all occupational projections in the Northwest region of Montana, along with the estimated beginning wages, median wage, and mean wage for the state. The projections are sorted alphabetically.

Occupation	Mean Wage	Begin Wage	Median Wage	NW Annual Growth	NW Annual Replace	NW Annual Total
Accountants and Auditors	$61,100	$42,480	$54,720	12	28	40
Advertising Sales Agents	$38,400	$24,560	$38,250	1	5	6
Aircraft Mechanics and Service Technicians	$46,150	$35,230	$47,010	1	4	5
Amusement and Recreation Attendants	$21,300	$17,630	$18,820	4	13	17
Architects, Except Landscape and Naval	$68,890	$52,630	$66,310	2	4	6
Automotive Body and Related Repairers	$40,410	$31,760	$39,320	2	3	5
Automotive Service Technicians and Mechanics	$37,940	$25,870	$36,690	8	24	32
Bakers	$24,150	$19,760	$22,910	2	6	8
Bartenders	$19,510	$17,500	$18,570	22	50	72
Bill and Account Collectors	$31,500	$23,750	$29,630	5	8	13
Billing and Posting Clerks	$32,580	$26,820	$30,980	11	11	22
Biological Technicians	$35,810	$29,050	$32,690	0	5	5
Bookkeeping, Accounting, and Auditing Clerks	$33,040	$24,700	$31,860	42	33	75
Brickmasons and Blockmasons	$47,300	$40,280	$47,000	5	2	7
Bus and Truck Mechanics and Diesel Engine Specialists	$38,770	$29,560	$36,470	4	8	12
Bus Drivers, School or Special Client	$30,900	$23,120	$28,700	8	11	19
Business Operations Specialists, All Other	$56,990	$41,590	$53,590	4	7	11

Occupation	Mean Wage	Begin Wage	Median Wage	NW Annual Growth	NW Annual Replace	NW Annual Total
Butchers and Meat Cutters	$30,190	$23,790	$29,220	1	4	5
Cabinetmakers and Bench Carpenters	$33,130	$22,600	$30,490	6	4	10
Cargo and Freight Agents	$34,110	$25,510	$33,680	3	4	7
Carpenters	$39,620	$31,790	$37,610	22	22	44
Cashiers	$20,910	$17,910	$19,300	20	215	235
Cement Masons and Concrete Finishers	$36,780	$26,710	$35,400	3	2	5
Chief Executives	$115,510	$58,350	$99,730	1	8	9
Child, Family, and School Social Workers	$34,920	$26,620	$34,580	5	5	10
Childcare Workers	$20,830	$17,750	$19,070	13	38	51
Chiropractors	$59,500	$40,280	$55,530	2	3	5
Civil Engineers	$68,960	$55,470	$66,910	4	5	9
Claims Adjusters, Examiners, and Investigators	$50,230	$32,150	$43,090	4	7	11
Cleaners of Vehicles and Equipment	$22,150	$18,180	$20,000	4	11	15
Clergy	$42,010	$27,050	$37,450	2	5	7
Clinical, Counseling, and School Psychologists	$59,230	$41,250	$53,260	2	7	9
Coaches and Scouts	$27,970	$18,260	$20,950	4	17	21
Combined Food Preparation and Serving Workers, Including Fast Food	$19,890	$17,590	$18,740	56	114	170
Computer Programmers	$64,030	$44,260	$58,510	3	16	19
Computer Systems Analysts	$67,770	$54,060	$64,040	4	2	6
Computer User Support Specialists	$40,800	$31,470	$38,700	11	11	22
Conservation Scientists	$61,340	$47,910	$59,910	1	4	5
Construction Laborers	$33,880	$25,680	$32,410	22	30	52
Construction Managers	$85,860	$64,300	$78,040	3	6	9
Cooks, Fast Food	$19,190	$17,460	$18,500	4	15	19
Cooks, Institution and Cafeteria	$25,240	$20,820	$24,410	6	10	16
Cooks, Restaurant	$22,010	$18,570	$21,110	28	27	55
Correctional Officers and Jailers	$34,340	$28,820	$33,130	2	4	6
Cost Estimators	$53,010	$40,440	$51,000	5	7	12
Counter and Rental Clerks	$26,800	$18,560	$22,090	4	15	19
Counter Attendants, Cafeteria, Food Concession, and Coffee Shop	$19,040	$17,380	$18,320	2	20	22
Court, Municipal, and License Clerks	$30,060	$24,670	$29,370	3	3	6
Crossing Guards	$24,990	$21,520	$23,360	3	3	6
Customer Service Representatives	$29,710	$22,850	$27,780	37	50	87
Dental Assistants	$33,210	$27,450	$33,230	7	8	15
Dental Hygienists	$68,590	$63,190	$69,560	5	5	10
Dentists, General	$130,390	$72,090	$109,790	3	5	8
Dining Room and Cafeteria Attendants and Bartender Helpers	$18,930	$17,340	$18,250	4	11	15
Dishwashers	$18,700	$17,370	$18,310	9	38	47
Dispatchers, Except Police, Fire, and Ambulance	$40,260	$27,110	$35,090	2	5	7

Occupation	Mean Wage	Begin Wage	Median Wage	NW Annual Growth	NW Annual Replace	NW Annual Total
Driver/Sales Workers	$29,030	$18,410	$22,070	9	12	21
Education Administrators, Elementary and Secondary School	$74,320	$60,960	$74,810	1	6	7
Education Administrators, Postsecondary	$79,650	$48,930	$69,070	2	5	7
Educational, Guidance, School, and Vocational Counselors	$49,420	$35,130	$49,280	1	4	5
Electrical Power-Line Installers and Repairers	$76,600	$67,740	$77,410	3	7	10
Electricians	$60,700	$48,860	$59,190	12	14	26
Elementary School Teachers, Except Special Education	$46,720	$34,600	$46,280	14	34	48
Emergency Medical Technicians and Paramedics	$29,590	$23,160	$28,080	8	9	17
Farmworkers and Laborers, Crop, Nursery, and Greenhouse	$24,670	$19,180	$22,540	0	5	5
Financial Managers	$101,540	$70,000	$90,020	2	3	5
Firefighters	$47,580	$41,280	$48,590	3	8	11
First-Line Supervisors of Construction Trades and Extraction Workers	$62,640	$46,520	$58,030	10	5	15
First-Line Supervisors of Fire Fighting and Prevention Workers	$64,420	$52,920	$59,060	1	4	5
First-Line Supervisors of Food Preparation and Serving Workers	$32,370	$23,250	$29,030	15	23	38
First-Line Supervisors of Housekeeping and Janitorial Workers	$34,730	$25,430	$33,400	2	4	6
First-Line Supervisors of Mechanics, Installers, and Repairers	$60,870	$44,820	$60,030	4	11	15
First-Line Supervisors of Office and Administrative Support Workers	$49,070	$33,280	$43,350	14	27	41
First-Line Supervisors of Personal Service Workers	$33,660	$25,900	$31,160	3	3	6
First-Line Supervisors of Production and Operating Workers	$57,110	$38,190	$52,970	3	6	9
First-Line Supervisors of Retail Sales Workers	$39,760	$26,040	$34,410	14	29	43
First-Line Supervisors of Transportation and Material-Moving Machine and Vehicle Operators	$59,080	$41,100	$54,950	2	5	7
Fitness Trainers and Aerobics Instructors	$34,540	$25,220	$32,820	9	7	16
Food Batchmakers	$24,740	$20,460	$23,070	1	5	6
Food Preparation Workers	$20,230	$17,740	$19,040	5	23	28
Food Servers, Nonrestaurant	$19,590	$17,560	$18,670	5	8	13
Forest and Conservation Technicians	$35,350	$28,270	$31,630	0	34	34
Foresters	$52,450	$43,010	$52,550	2	3	5
Fundraisers	$48,140	$34,240	$43,970	2	3	5
General and Operations Managers	$86,210	$52,140	$75,610	13	20	33
Graphic Designers	$40,440	$27,970	$35,980	2	8	10

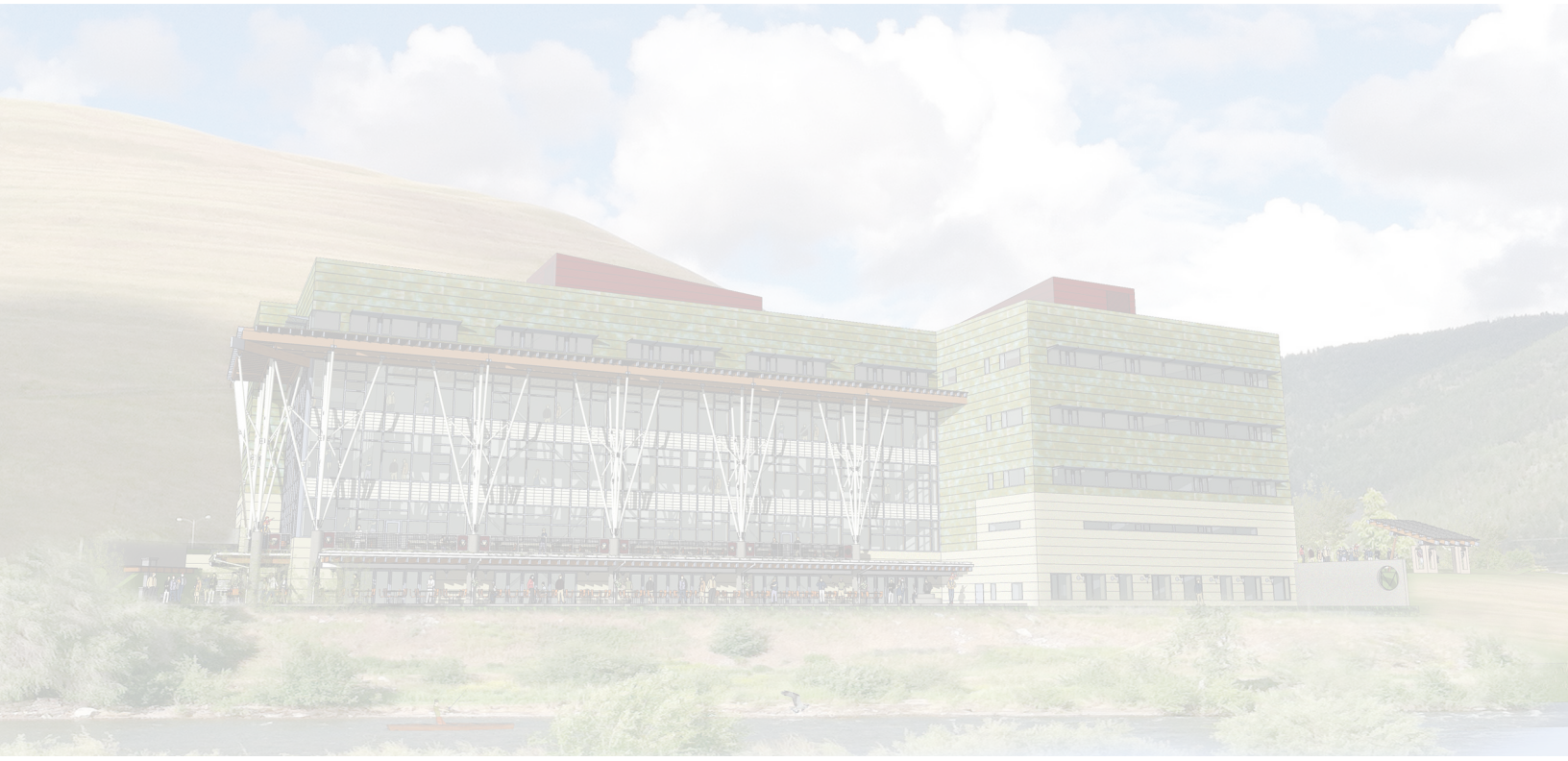
Occupation	Mean Wage	Begin Wage	Median Wage	NW Annual Growth	NW Annual Replace	NW Annual Total
Hairdressers, Hairstylists, and Cosmetologists	$29,860	$19,780	$26,860	3	12	15
Healthcare Social Workers	$47,480	$36,290	$45,420	3	3	6
Heating, Air Conditioning, and Refrigeration Mechanics and Installers	$49,630	$35,010	$48,890	3	4	7
Heavy and Tractor-Trailer Truck Drivers	$44,070	$33,680	$41,440	22	29	51
Helpers--Carpenters	$26,680	$22,040	$24,350	4	3	7
Home Health Aides	$22,400	$20,240	$22,100	28	13	41
Hosts and Hostesses, Restaurant, Lounge, and Coffee Shop	$18,510	$17,340	$18,250	3	21	24
Hotel, Motel, and Resort Desk Clerks	$21,550	$18,230	$20,140	11	25	36
Human Resources Specialists	$51,750	$37,730	$46,580	3	7	10
Industrial Machinery Mechanics	$54,330	$38,540	$53,420	2	3	5
Industrial Truck and Tractor Operators	$35,070	$24,720	$31,930	0	6	6
Information and Record Clerks, All Other	$36,840	$28,660	$34,950	0	5	5
Installation, Maintenance, and Repair Workers, All Other	$37,100	$26,950	$35,180	2	4	6
Insurance Claims and Policy Processing Clerks	$36,170	$28,180	$34,380	2	4	6
Insurance Sales Agents	$49,180	$26,690	$37,300	7	12	19
Janitors and Cleaners, Except Maids and Housekeeping Cleaners	$24,940	$19,080	$23,030	26	47	73
Kindergarten Teachers, Except Special Education	$44,520	$34,680	$42,850	2	4	6
Laborers and Freight, Stock, and Material Movers, Hand	$27,620	$21,490	$26,080	11	35	46
Landscaping and Groundskeeping Workers	$25,980	$20,250	$23,630	10	32	42
Laundry and Dry-Cleaning Workers	$21,780	$18,860	$21,150	2	10	12
Lawyers	$75,720	$49,780	$68,040	6	14	20
Librarians	$46,300	$34,170	$45,280	1	4	5
Library Technicians	$26,870	$22,290	$26,270	1	5	6
Licensed Practical and Licensed Vocational Nurses	$38,760	$33,560	$38,540	17	20	37
Lifeguards, Ski Patrol, and Other Recreational Protective Service Workers	$19,170	$17,350	$18,260	2	9	11
Light Truck or Delivery Services Drivers	$32,290	$21,370	$28,300	2	15	17
Loan Officers	$63,610	$43,280	$57,350	7	8	15
Lodging Managers	$43,080	$28,510	$34,120	1	4	5
Logging Equipment Operators	$40,000	$33,630	$37,640	0	13	13
Machinists	$35,720	$24,620	$34,290	4	6	10
Maids and Housekeeping Cleaners	$20,980	$17,930	$19,470	26	41	67
Maintenance and Repair Workers, General	$33,870	$24,050	$30,720	13	23	36
Managers, All Other	$74,650	$53,830	$69,870	2	14	16
Market Research Analysts and Marketing Specialists	$60,030	$40,890	$50,330	5	2	7
Mechanical Engineers	$79,110	$62,430	$74,400	2	5	7

Occupation	Mean Wage	Begin Wage	Median Wage	NW Annual Growth	NW Annual Replace	NW Annual Total
Medical and Clinical Laboratory Technicians	$38,360	$28,120	$34,260	3	4	7
Medical and Clinical Laboratory Technologists	$58,180	$50,640	$59,410	2	4	6
Medical and Health Services Managers	$81,140	$61,190	$79,020	6	7	13
Medical Assistants	$31,270	$26,670	$30,500	6	5	11
Medical Records and Health Information Technicians	$34,730	$26,280	$30,800	9	13	22
Medical Secretaries	$30,950	$25,230	$30,040	20	8	28
Meeting, Convention, and Event Planners	$41,450	$25,200	$34,710	3	2	5
Mental Health Counselors	$31,350	$20,810	$28,430	6	7	13
Middle School Teachers, Except Special and Career/Technical Education	$56,540	$41,640	$52,970	5	11	16
Mobile Heavy Equipment Mechanics, Except Engines	$49,750	$40,090	$51,200	3	10	13
Network and Computer Systems Administrators	$60,150	$48,360	$58,030	2	3	5
Nonfarm Animal Caretakers	$21,820	$18,140	$20,230	3	3	6
Nurse Practitioners	$92,800	$80,080	$90,400	3	2	5
Nursing Assistants	$24,900	$21,470	$24,080	25	31	56
Office and Administrative Support Workers, All Other	$32,850	$25,120	$29,230	2	4	6
Office Clerks, General	$28,620	$21,310	$27,210	10	39	49
Operating Engineers and Other Construction Equipment Operators	$46,400	$37,820	$45,350	13	21	34
Packers and Packagers, Hand	$20,960	$17,790	$19,040	0	6	6
Painters, Construction and Maintenance	$35,450	$27,860	$33,820	3	7	10
Paralegals and Legal Assistants	$44,180	$34,200	$41,380	4	4	8
Parts Salespersons	$32,130	$22,930	$29,560	3	8	11
Payroll and Timekeeping Clerks	$36,140	$28,450	$34,780	2	3	5
Personal Care Aides	$21,810	$19,630	$21,610	53	12	65
Pharmacists	$106,670		$110,790	6	10	16
Pharmacy Technicians	$33,410	$28,240	$32,860	8	4	12
Phlebotomists	$30,110	$24,340	$28,060	3	2	5
Physical Therapist Aides	$29,080	$24,180	$27,810	3	2	5
Physical Therapists	$69,590	$61,050	$69,860	11	10	21
Physician Assistants	$95,550	$82,660	$94,060	4	2	6
Physicians and Surgeons, All Other	$228,880	$185,140		4	7	11
Plumbers, Pipefitters, and Steamfitters	$52,300	$40,830	$51,260	7	6	13
Police and Sheriff's Patrol Officers	$47,730	$40,810	$47,410	5	14	19
Postal Service Mail Carriers	$49,940	$41,460	$55,280	0	8	8
Preschool Teachers, Except Special Education	$25,150	$20,410	$24,640	3	6	9
Property, Real Estate, and Community Association Managers	$39,610	$25,160	$35,550	2	12	14
Protective Service Workers, All Other	$31,370	$21,800	$28,880	0	13	13

Occupation	Mean Wage	Begin Wage	Median Wage	NW Annual Growth	NW Annual Replace	NW Annual Total
Public Relations Specialists	$49,660	$34,950	$45,740	2	3	5
Receptionists and Information Clerks	$26,330	$21,580	$25,600	11	29	40
Recreation Workers	$25,080	$18,920	$22,230	5	4	9
Registered Nurses	$61,810	$53,150	$59,860	40	50	90
Rehabilitation Counselors	$33,910	$25,650	$31,580	2	4	6
Retail Salespersons	$27,540	$18,710	$22,140	49	166	215
Roofers	$33,520	$27,730	$33,220	1	6	7
Sales Representatives, Services, All Other	$48,120	$25,220	$35,250	7	13	20
Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	$57,870	$33,080	$47,370	16	24	40
Sawing Machine Setters, Operators, and Tenders, Wood	$35,690	$28,980	$36,670	7	8	15
Secondary School Teachers, Except Special and Career/Technical Education	$49,110	$36,990	$48,040	2	23	25
Secretaries and Administrative Assistants, Except Legal, Medical, and Executive	$29,920	$23,720	$28,890	34	36	70
Securities, Commodities, and Financial Services Sales Agents	$75,190	$36,740	$56,840	3	4	7
Security Guards	$24,760	$19,740	$23,050	6	9	15
Self-Enrichment Education Teachers	$41,680	$24,680	$32,190	7	7	14
Septic Tank Servicers and Sewer Pipe Cleaners	$30,890	$24,090	$30,080	3	3	6
Shipping, Receiving, and Traffic Clerks	$29,330	$22,390	$27,230	1	9	10
Social and Human Service Assistants	$26,240	$20,180	$24,130	12	15	27
Social Workers, All Other	$39,710	$34,050	$34,800	2	3	5
Software Developers, Applications	$78,740	$58,130	$78,270	4	7	11
Software Developers, Systems Software	$75,720	$61,070	$73,740	2	3	5
Stock Clerks and Order Fillers	$24,360	$19,380	$22,810	0	40	40
Substance Abuse and Behavioral Disorder Counselors	$40,310	$33,180	$40,150	4	3	7
Substitute Teachers	$22,750	$18,650	$21,400	3	14	17
Surgical Technologists	$43,030	$34,040	$40,300	4	2	6
Taxi Drivers and Chauffeurs	$22,080	$18,050	$19,740	2	4	6
Teacher Assistants	$25,410	$20,510	$23,810	4	23	27
Team Assemblers	$31,000	$22,150	$27,880	5	6	11
Tellers	$25,020	$21,280	$24,120	5	35	40
Tire Repairers and Changers	$26,800	$21,950	$26,020	2	8	10
Training and Development Specialists	$47,780	$34,570	$43,550	3	3	6
Urban and Regional Planners	$60,870	$46,620	$56,410	1	4	5
Vocational Education Teachers, Postsecondary	$64,640	$36,910	$56,720	2	3	5
Waiters and Waitresses	$19,370	$17,350	$18,270	32	135	167
Water and Wastewater Treatment Plant and System Operators	$39,530	$28,820	$37,220	3	5	8

Occupation	Mean Wage	Begin Wage	Median Wage	NW Annual Growth	NW Annual Replace	NW Annual Total
Web Developers	$48,750	$31,750	$51,030	4	6	10
Welders, Cutters, Solderers, and Brazers	$38,940	$30,110	$35,970	3	8	11
Woodworking Machine Setters, Operators, and Tenders, Except Sawing	$35,460	$30,520	$34,950	6	2	8
Writers and Authors	$44,080	$29,420	$50,500	1	6	7
Zoologists and Wildlife Biologists	$60,470	$46,310	$55,900	1	4	5

Source: Montana Department of Labor and Industry 2014-2024 Employment Projections. Occupational Employment Statistics 2014.



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