



The HELM Report

Washington State Higher Education & Labor Market Report 2023



Table of Contents

Summary and Highlights	3
Key Trends and Insights	3
Introduction	6
The Broader Context - National Trends	6
The Washington Landscape	8
The Advance of Workplace Automation is Changing the Landscape of the Labor Market	11
The Midlevel Labor Market.....	12
Occupations Driving Demand for Workers with Midlevel Education	12
Selected Midlevel Occupations.....	14
Meeting Demand at the Midlevel.....	15
Midlevel Reskilling and Upskilling – Career Pathways.....	16
The Labor Market at the Bachelor’s and Above Level	17
Selected Occupations at the Bachelor’s Level and Above	18
Meeting Demand at the Bachelor’s and Master’s Level.....	20
Regional Profiles	21
Capital Region (ESD 113).....	21
North Central Region	24
Northeast Region	27
Northwest Region	30
Olympic Region	33
Puget Sound Region	36
Southeast Region	39
Southwest Region	42
Yakima Valley Region	45
Concluding Observations	48
References	49

Authors and Collaborators

Washington Student Achievement Council

Daryl Monear, Ph.D., Associate Director of Research

Isaac Kwakye, Deputy Executive Director

Mark Lundgren, Associate Director of Research

Rebecca Byrne, Research Data Analyst

State Board for Community and Technical Colleges

Summer Kenesson, Interim Director, Policy Research

Travis Dulany, Policy Research Associate

Workforce Training and Education Coordinating Board

David Wallace, Research Director

Terje Gjertsen, Principal Researcher

Association of Washington Business

Erika Borg, AWB Institute Consultant

Kristofer Johnson, President and CEO

Purpose of the Report

The Washington Student Achievement Council (WSAC) has prepared this analysis in collaboration with the State Board for Community and Technical Colleges (SBCTC), the Workforce Training and Education Coordinating Board (Workforce Board), and the Association of Washington Business, as part of a broad educational needs assessment outlined in RCW 28B.77.080. The report has four primary purposes: (1) to assess how well the state's postsecondary education system is aligned with the demands of the labor market, (2) to identify key drivers of employer demand in the various occupational clusters, (3) to highlight industries and occupational fields in which students and adult learners may find expanding employment opportunities, and (4) to explore factors, such as the advance of workplace automation, which may be impacting the labor market.

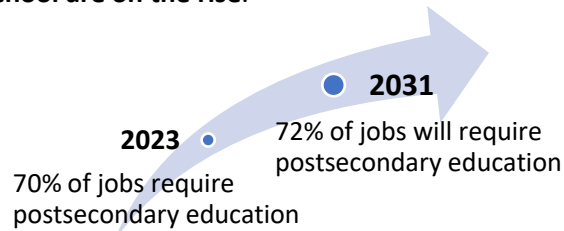
Summary and Highlights

Labor market demand for skilled workers in Washington’s dynamic and innovative economy continues to grow. The state’s challenge is to raise educational attainment levels to meet employer needs for middle- and high-skill workers with postsecondary credentials and to give Washington’s residents the opportunity to qualify for high-wage jobs with good benefits and opportunities for career advancement. Employer demand for skilled workers with credentials beyond high school is strong in all regions of the state, in rural as well as urban areas.

Key Trends and Insights

Jobs requiring postsecondary education beyond high school are on the rise.

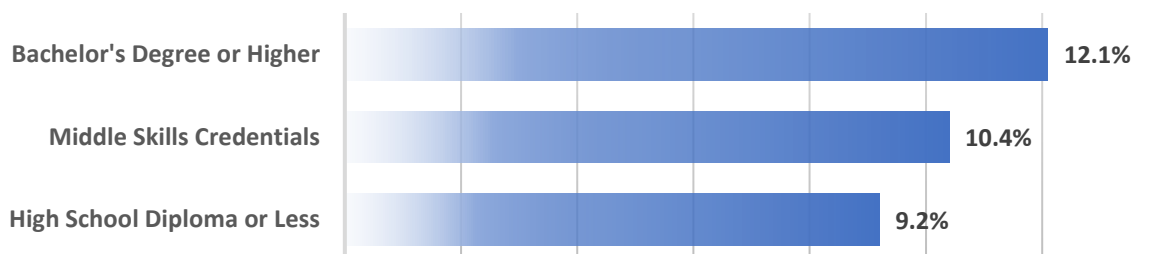
#5 Washington is ranked 5th among the top states for share of jobs requiring postsecondary education. (Georgetown Center, 2023)



Over the next several years, jobs in fields that require more educated workers are projected to grow at a faster rate than those that require less education.

As shown in Figure 1, jobs in occupations for which one can qualify with a high school diploma will grow by 9.2 percent by 2031. But those that require some college or a postsecondary certificate (middle skills) will grow by 10.4 percent, and jobs that require a bachelor’s degree will grow even faster, by 12.1 percent.

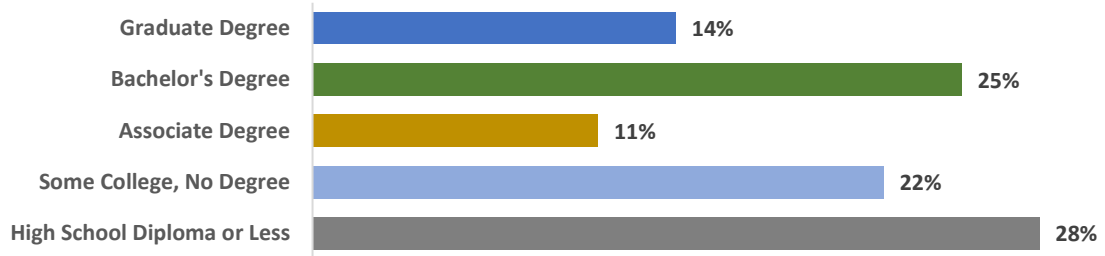
Figure 1: Projected Growth in Jobs and Required Education Levels by 2031



Source: Georgetown Center on Education and the Workforce, 2023

Projections of annual job openings reflect the trend of increasing demand for workers with postsecondary education and training. Figure 2 shows the percentage of annual job openings at each education level for 2031.

Figure 2: Percentage of Projected Annual Openings at Minimum Education Levels by 2031



Source: Georgetown Center on Education and the Workforce, 2023

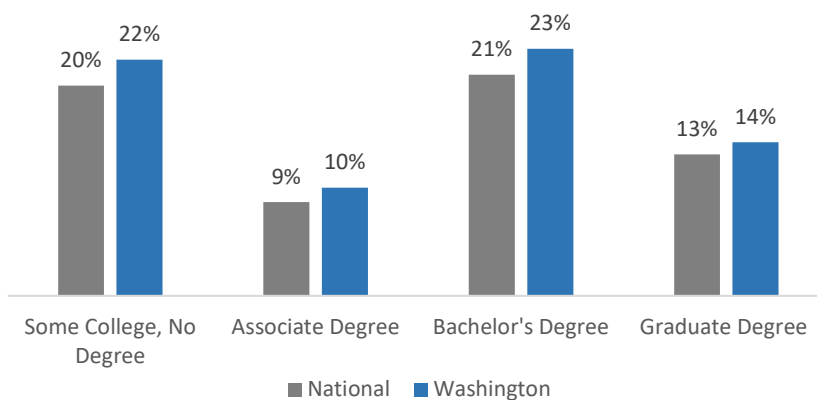
#2

Difficulty finding qualified workers is a rising challenge for Washington employers.

The Association of Washington Business (AWB) conducts a quarterly survey. In their fall 2023 survey, a lack of qualified workers for job openings moved up to the **#2 position** in a list of the greatest challenges they face, with 53 percent of respondents listing it as a major problem (AWB Institute, 2023).

Washington’s education attainment levels exceed the national averages in all postsecondary categories but still fall short of meeting employer demand for educated workers in the state. Figure 3 shows the percentage of the state’s population aged 25 and over who have attained various postsecondary education levels. **Some College, No Degree** is a key category here. Twenty-two percent of Washington residents have taken some college credits without completing a degree. And many have not obtained a program certificate or any other credential beyond high school, which they will need to compete for good high-wage jobs with benefits.

Figure 3: Washington Postsecondary Attainment Levels Compared to National Averages Population Aged 25 and Over



Source: Lightcast Q4 2023 Data Set; U.S. Census Bureau American Community Survey

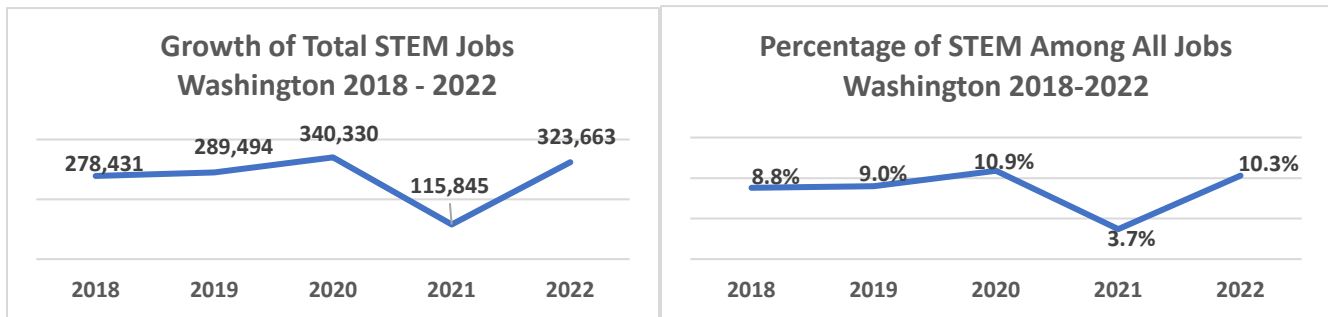
The disparity between employer demand for skilled workers with postsecondary credentials and the number of graduates completing programs each year is particularly pronounced in several broad occupational fields (see Figure 4). Healthcare, computer and information technology, engineering, and education are all areas in which annual openings exceed annual completions by a considerable margin. These gaps are present at both the *midlevel*, which includes jobs requiring postsecondary certificate credentials up to associate degrees, and the *bachelor’s and above level*.

Figure 4: Selected fields in which annual program completions are not keeping pace with job openings



The STEM jobs sector is a vital piece of Washington’s innovative economy and is a prominent and rapidly growing component of the labor market in all regions of the state. STEM and STEM-related fields such as healthcare are prominently represented among the areas where more graduates trained to fill expanding job openings are needed. Figure 5 shows the growth of jobs in this sector from 2018 – 2022, both in the number of total jobs and in the percentage of STEM jobs among all jobs. Even with the significant employment plunge during the heart of the pandemic, **STEM jobs grew from 8.8 percent in 2018 to 10.3 percent of all jobs in the state in 2022.**

Figure 5: Growth of STEM jobs in Washington



Source: AWB Institute Vitals, 2023

The Advance of Artificial Intelligence and Automation is Changing the Labor Market Landscape

Ongoing innovations in artificial intelligence and automation are having far-ranging effects on workplace environments and will impact a wide range of occupations. Most of the jobs at high risk of automation require only a high school diploma or less and involve routine activities. They include occupations in the food service, agricultural, and assembly industries. At the other end of the spectrum, jobs at lower risk of automation are those that require higher levels of education and

are not restricted to performing routine tasks. They typically involve using more high-level critical and managerial skills in adapting to changes in circumstances. However, though workers in jobs at this end of the spectrum may be at low risk of their jobs being replaced by automation, they are predicted to be exposed to automation by the advance of generative artificial intelligence, such as ChatGPT, which may fundamentally change the way they approach their work.

High Risk Jobs at **high risk** of automation tend to be those that require less education and center on predictable and repetitive activities.



Low Risk Jobs at **low risk** of automation tend to be those that require more education and center on non-routine activities involving analytical and critical problem-solving skills.



Introduction

One trend that has remained constant in recent decades, despite fluctuations in the economy or changes in aspects of the labor market that may occur from year to year, is the benefit that workers gain from postsecondary education. For anyone seeking work in or looking to advance their career in professional, managerial, or technical fields, postsecondary education is a necessity and higher levels of education hold distinct advantages. Even for those seeking work in the blue-collar, skilled trades economy, some credentials beyond high school are increasingly becoming a requirement. Whatever economic sector a worker is employed in, postsecondary credentials are a clear advantage for advancement and an essential key to earning a family-sustaining or middle-class wage.

The Broader Context - National Trends

Postsecondary enrollments are down despite clear economic advantages of postsecondary credentials.

During the COVID pandemic, postsecondary enrollments declined sharply. They began to level off in the fall of 2022. But as of May 2023, they had not yet fully recovered. Enrollments are still substantially below pre-pandemic levels. At the national level, compared to spring 2022, undergraduate enrollments are down by about 1.09 million students (National Student Clearinghouse Research Center 2023).



Total postsecondary enrollments remain well below pre-pandemic levels.


A significant part of the recent drop in higher education enrollment is understandably due to the societal effects of the pandemic. But data show the declines are part of a longer-term pattern that is driven by other factors as well. A recent national survey of high school students revealed that a significant number are pursuing nondegree postsecondary options



MORE YOUNG PEOPLE ARE QUESTIONING THE RETURN ON INVESTMENT FROM POSTSECONDARY DEGREE PROGRAMS

(Edge Research and HCM Strategists, 2022). Almost half (47%) indicated they have taken or are currently taking classes via YouTube and approximately one-quarter have taken or are currently enrolled in certificate programs (22%) or courses leading to a license (25%). Respondents tended to make their decisions about postsecondary education options based on their perceptions of labor market value and return on investment.

Despite these perceptions, postsecondary education is still one of the best drivers of economic and social mobility. The U.S. labor market continues to recover from the effects of the COVID-19 pandemic. Although the national economy may reflect a volatile and evolving landscape, the relationship between postsecondary education and the labor market remains consistent, with higher levels of education conferring distinct advantages. More education tends to lift wages and reduce the risk of unemployment.

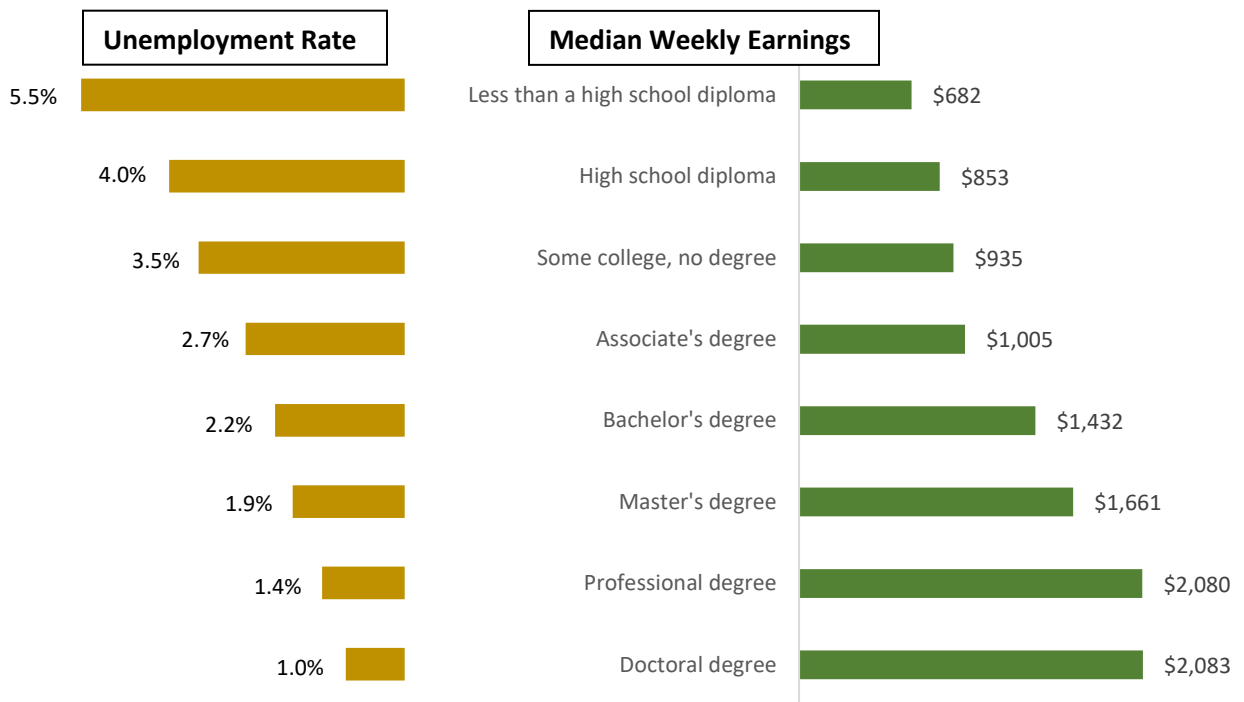


However, the data show that even in this changing economic landscape, postsecondary education retains its value.

Figure 6 illustrates this relationship. Wages tend to rise with education beyond high school, with earnings increasing significantly at each level. Median weekly earnings for those with a high school diploma are \$853 while those with an associate degree (\$1,005), bachelor's degree (\$1,432) or graduate degree (\$1,661-\$2,083) are substantially higher.

Conversely, unemployment rates tend to decline at each education level, ranging from a high of 5.5% for those with less than a high school diploma to 2.7% and 2.2% for those with an associate or bachelor’s degree to a low of 1% for those with a doctorate.

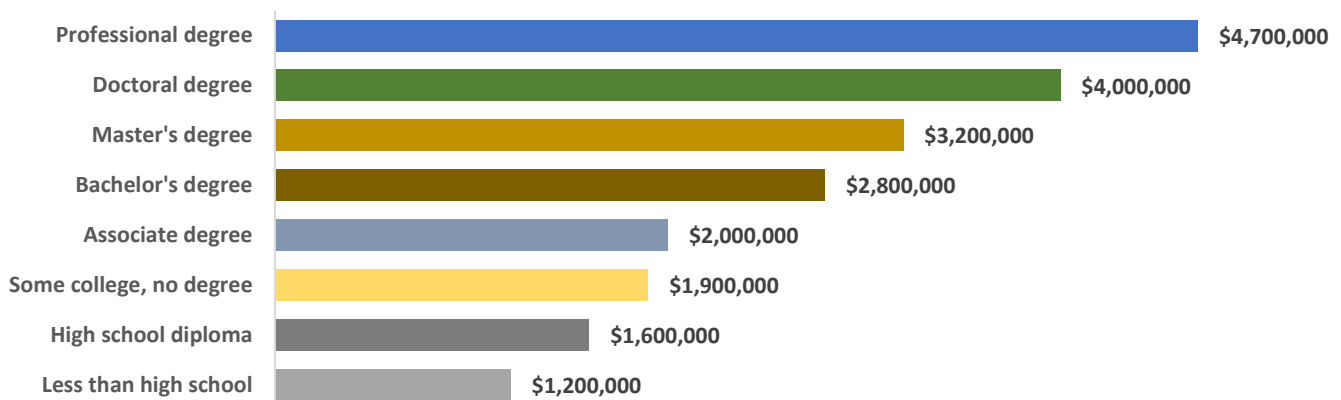
Figure 6: U.S. Median weekly earnings and unemployment rates by educational level, 2022



Note: Data are for persons aged 25 and over. Earnings are for full-time wage and salary workers.
 Source: U.S. Bureau of Labor Statistics, Current Population Survey.

The advantage of postsecondary education and credentials are also clearly revealed in lifetime earnings. Figure 7 shows a steep increase in earnings differentials at each level. Workers at the midlevel, with some college (\$1.9 million) or an associate degree (\$2.0 million), can expect to earn substantially more over their working lives than those with a high school diploma (1.6 million). The upward trend for total earnings continues for those with a bachelor’s degree (\$2.8 million) or higher (Carnevale et al, 2023).

Figure 7: Median Lifetime Earnings by Education Level

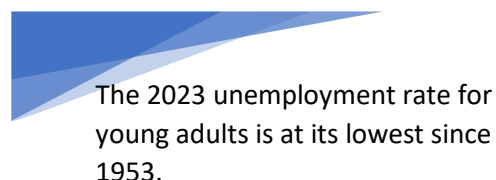


Source: : Georgetown University Center on Education and the Workforce analysis of the US Census Bureau, American Community Survey (ACS), 2009–2019

An associate degree typically increases lifetime earnings over a high school diploma by 25 percent and a bachelor’s degree tends to earn 75 percent more than those with only a high school diploma. It should be noted, however, that this is a general trend. Individual earnings may vary by a number of factors, including field of study, occupation, gender, race, and ethnicity (Carnevale et al, 2021).

Nationally, young adults are graduating into a strong labor market in 2023

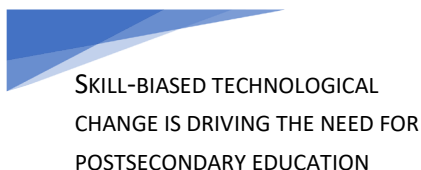
In 2023, high school students and postsecondary students are graduating into a stronger labor market than last year, as measured by lower unemployment and under-employment rates. Historically, the unemployment rate for young people aged 16–24 is about 2.6 times higher than people aged 25 and older. Young adults (aged 16-24) are back to pre-pandemic labor market conditions, a much faster bounce back than any recovery in recent history (Gould et al. 2023).



The Percentage of Jobs that Require Postsecondary Education Continues to Grow

In recent decades, technological innovations have shifted the economy toward skilled labor and away from unskilled labor. This movement is known as *skill-biased technological change*, a structural shift that results in increased relative demand for educated and skilled labor, leading generally to higher wages for workers with more education and declines for those with less (Violante, 2008).

This trend is clearly seen in the current national labor market, where workers face an increasing need for education and training beyond high school to succeed in the modern economy. Projections show that this trend will continue. Nationally, in 2023, about 68 percent of all jobs require at least some postsecondary education. Over the next decade, Postsecondary credentials will be needed for 72 percent of all jobs (Carnevale et al, 2023).



The Washington Landscape

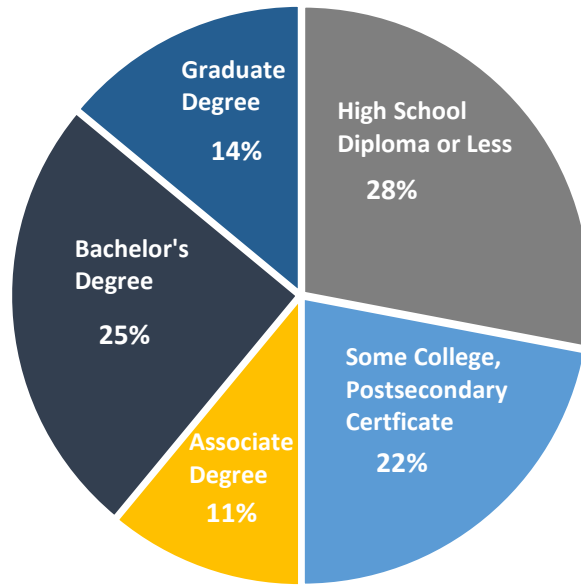
The trend toward increasing complexity in the workplace and the need for more skilled and educated workers, as observed in recent national studies, are clearly reflected in Washington’s employment outlook.

State Educational Attainment is Not Keeping Pace with Continuing Demand for Workers with Postsecondary Credentials

Currently, a clear majority of all projected job openings require at least some education beyond high school, about 70 percent (WSAC, 2021). Sixty percent require at least a postsecondary certificate involving a year or more of education and training. But recent projections show that the trend toward increasing numbers of jobs that require postsecondary credentials to qualify will continue to rise. As shown in Figure 8, by 2031 the percentage of job openings requiring a credential beyond high school will rise to 72 percent (Carnevale et al, 2023b). Around 33 percent of open positions will call for workers educated at the middle-skills level. This category includes jobs requiring postsecondary education leading to an apprenticeship, training certificates of one year or more, or an associate degree.

Demand for workers with bachelor’s and graduate degrees is also projected to be strong. Overall, 39 percent of employment opportunities will be aimed at workers who have bachelor’s degrees or above, with about 25 percent of openings requiring a baccalaureate at minimum. At the other end of the spectrum, the percentage of projected job openings for workers with only a high school education or less will be around 28 percent.

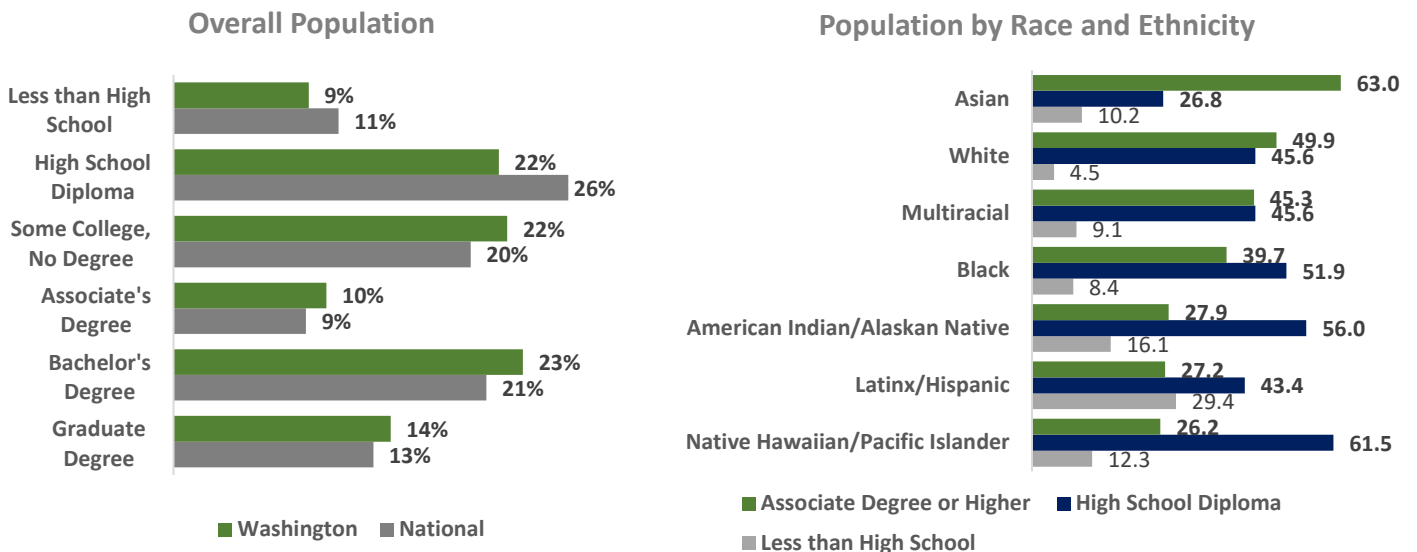
Figure 8. Percentage of Projected Openings at Minimum Education Levels in Washington by 2031



Source: Georgetown Center on Education and the Workforce; Carnevale et al, 2023b

In comparison with national figures, Washington’s education levels look encouraging. As shown in the left side of Figure 9, they lead national percentages for associate (10 percent compared to 9 percent), bachelor’s (23 percent compared to 21 percent), and graduate degrees (14 percent compared to 13 percent).

Figure 9: Highest Education Attainment Levels as of 2022 (Population Aged 25 and Over)



Source: Lightcast Q4 2023 Data Set; U.S. Census Bureau American Community Survey

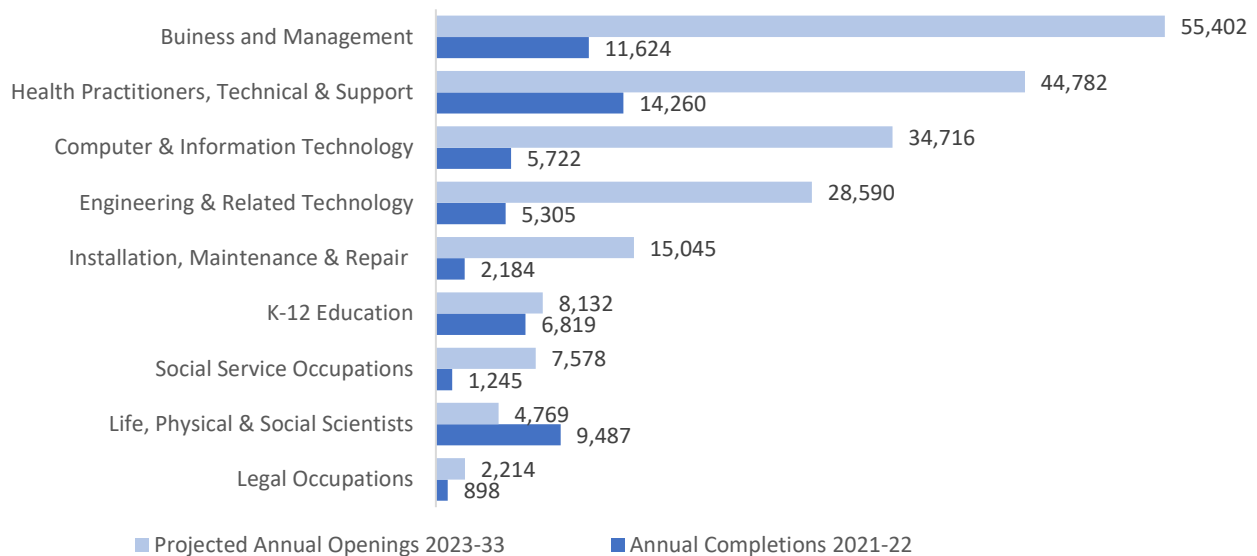
But many of those in the “some college/ no degree” category have not earned a credential during their postsecondary education. And in the state’s dynamic and evolving economy, credentials are becoming increasingly important in obtaining jobs that pay a living or family sustaining wage.

On the right side of Figure 9 is a breakout of highest educational attainment by race and ethnicity. Postsecondary attainment of an associate degree or above varies widely across racial and ethnic groups. Groups with the lowest rates of postsecondary degree completion are American Indian/Alaska Native (27.9 percent), Latinx/Hispanic (27.2 percent), Native Hawaiian/Pacific Islander (26.2 percent). Leading the groups with the highest levels of degree completion are Asian (63 percent), followed by White (49.9 percent), Multiracial (45.3 percent), and Black (39.7 percent).

This provides a crucial view of disparities across the various groups, reflecting important differences in the challenges and barriers their members face. In addition, an important component of postsecondary education is the range of credentials at the midlevel below the associate degree, including short- and long-term certificate programs and apprenticeships. Many of these programs can lead to well paid jobs and can be used as steppingstones to postsecondary degrees. In recognition of their value in supporting state residents’ educational pursuits, the Washington College Grant was designed to apply to the full range of these credential programs.

In the Washington labor market, postsecondary credentials are a clear advantage to jobseekers. But educational attainment levels currently do not match demand in key fields. Figure 10 shows the number of projected annual job openings in Washington compared with annual postsecondary program completions in a range of occupational fields at both the midlevel and the bachelor’s and above level. In each field, job openings exceed annual completions by a substantial margin. The gaps are especially large in the fields of healthcare, computer and information technology, engineering, K-12 education, installation, maintenance & repair, and social service occupations. All sectors of postsecondary education will need to work toward closing these gaps. Increasing the numbers of credentials awarded in these fields will help narrow the difference and give more Washington residents an opportunity to compete for in-demand jobs. Beyond this, filling the gaps may need to rely to some extent on in-migration of workers who already have the requisite education and training.

Figure 10: Selected Fields - Projected Annual Openings 2023 - 2033 and Annual Degree & Certificate Completions 2021-22



Source: Lightcast Q4 2023 Data Set; Washington State Employment Security Department (ESD); IPEDS

The Advance of Workplace Automation is Changing the Landscape of the Labor Market

A number of jobs are at risk of workplace automation in the foreseeable future, which may result in fewer workers employed in those occupations or those jobs being completely eliminated. The jobs that are projected to be at higher risk of this form of technological unemployment tend to be those that require less education and training.

The jobs listed in Figure 11 are based on an analysis of an automation index developed by Lightcast, a labor market analytics firm. Their index in turn was in part based on a recent study that provided a systematic estimation of automation susceptibility for 702 different occupations (Frey and Osborne, 2017).

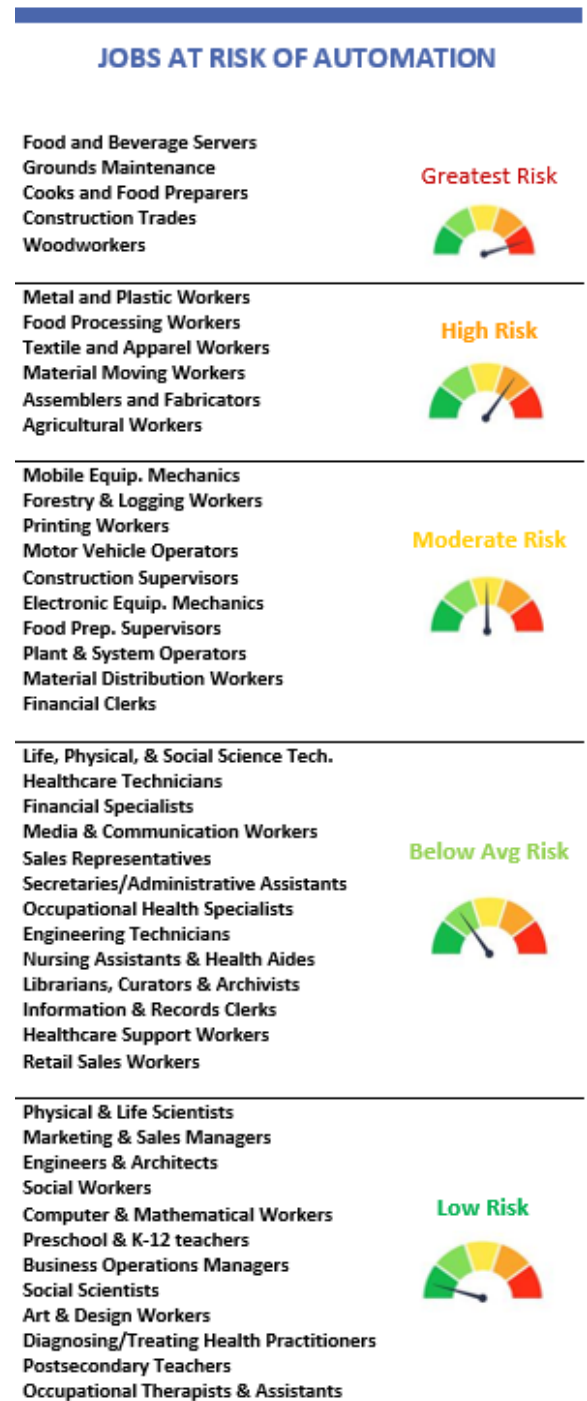
Most of the jobs at the upper end of the scale, at higher risk, are those that require only a high school diploma or equivalent for entry level positions. The group at **greatest risk** includes food servers, cooks, and food preparers, for example. Many workers in the construction trades are certified through apprenticeships, but these jobs are among those facing the most risk as well. Jobs at **high risk** include metal and plastic workers, textile and apparel workers, assemblers and fabricators, and agricultural workers. Those at **moderate risk** include equipment mechanics, plant & system operators, and financial clerks.

On the other end of the scale, the jobs at lower risk of being replaced by the advance of automation tend to be those that require postsecondary education, either at the midlevel or at the bachelor's level and above. These jobs are not centered on repetitive tasks and typically involve critical and analytical problem-solving skills. **Low risk** jobs include occupations in the area of physical and life science, engineering, computer and information technology, and K-12 and postsecondary teachers.

However, the advance of artificial intelligence is predicted to have far-ranging effects on many jobs that require higher levels of education as well. Workers in jobs at this low end of the risk spectrum may not be susceptible to their jobs being replaced in the near future, but many of them will nevertheless be exposed to the effects of generative artificial intelligence (GenAI). GenAI, such as ChatGPT, incorporates large language models to generate text or images in response to prompts. This extension of artificial intelligence is already beginning to fundamentally change the way many approach their work (Kochhar, 2023).

Workplace automation is an evolving trend, and how it impacts various occupational fields will likely continue to change over time. Some occupations that currently appear to be at high risk and susceptible to potential job displacement may be modified with the addition of automation, introducing increased efficiency without large scale job loss. This is a trend that warrants continued monitoring.

Figure 11: Jobs at Risk of Automation



Source: WSAC analysis of Lightcast Automation Index data; Q4 2023 data set.

The Midlevel Labor Market

This category includes jobs requiring education beyond high school but less than a bachelor’s degree. Credentials include short-term or long-term certificates (length of 1 Year or more), apprenticeships, and associate degrees. Table 1 shows a selected range of middle skills jobs that are in demand in Washington requiring a postsecondary certificate as the typical education needed for an entry level position, along with the median hourly wage.

Table 1: Selected Midlevel Occupations – Some College / Postsecondary Certificate

Job Title	Typical Education Needed For Entry Level Position	Median Hourly Wage
HVAC Mechanics and Installers	Postsecondary Certificate	\$29.29
Heavy & Tractor Trailer Truck Drivers	Postsecondary Certificate	\$28.21
Medical Records Specialists	Postsecondary Certificate	\$26.34
Automotive Technicians & Mechanics	Postsecondary Certificate	\$23.85
Bookkeeping & Accounting Clerks	Postsecondary Certificate	\$23.59
Medical Assistants	Postsecondary Certificate	\$23.44
Teaching Assistants: Preschool & K-12	Some College/Certificate	\$20.68
Nursing Assistants	Postsecondary Certificate	\$19.58

Table 2 shows selected midlevel occupations that are in demand in Washington that typically require an associate degree for an entry level job

Table 2: Selected Midlevel Occupations – Associate Degree

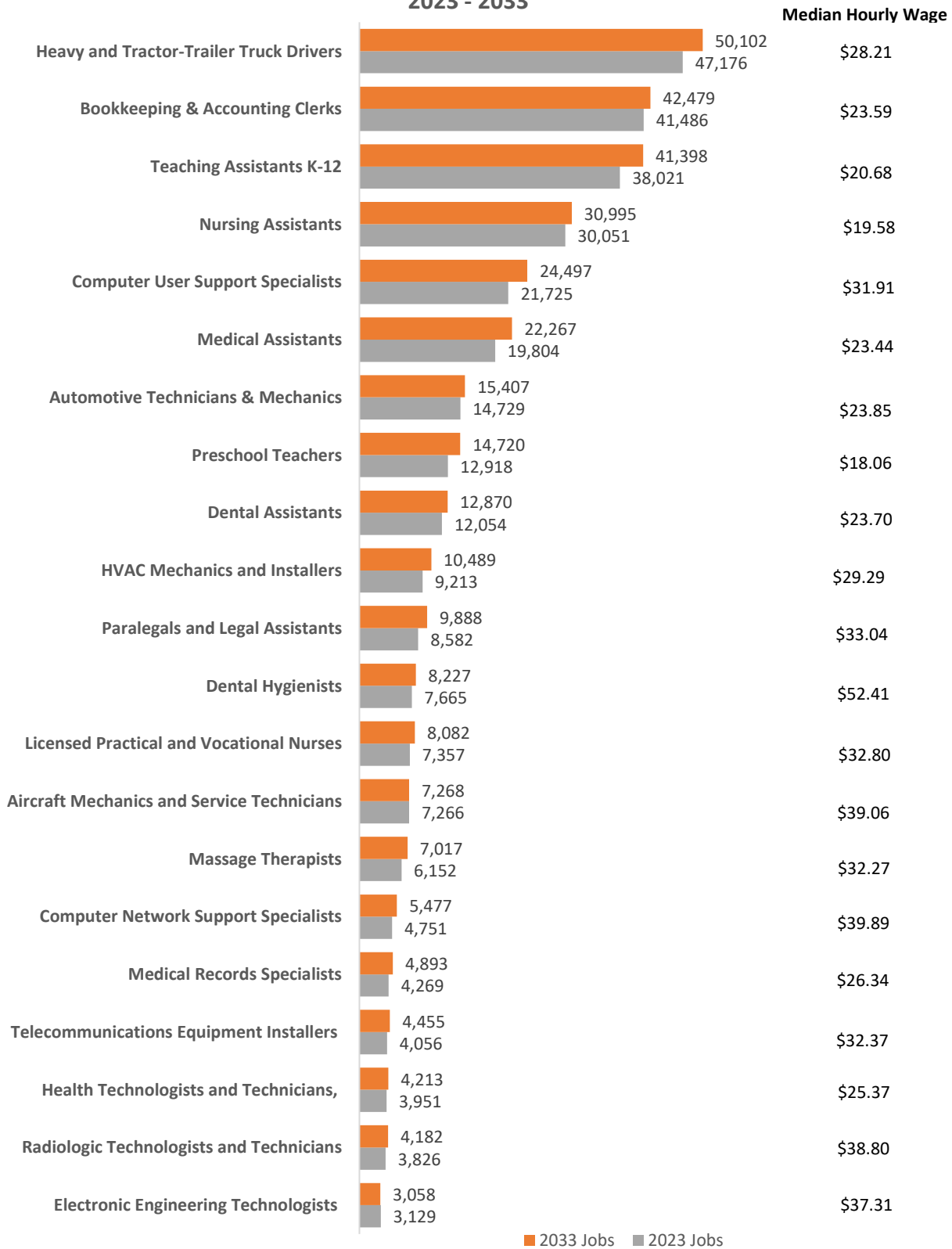
Job Title	Typical Education Needed For Entry Level Position	Median Hourly Wage
Computer Network Support Specialists	Associate Degree	\$39.91
Computer User Support Specialists	Associate Degree	\$31.94
Licensed Practical Nurses	Associate Degree	\$28.21
Electronic Engineering Technologists	Associate Degree	\$23.85
Dental Hygienists	Associate Degree	\$23.59
Massage Therapists	Associate Degree	\$23.44
Health Technologists	Associate Degree	\$19.58

Source: WSAC analysis of Lightcast Q4 2023 Data Set; ESD; BLS Typical education required for entry level

Occupations Driving Demand for Workers with Midlevel Education

Figure 12 displays a range of occupations that are driving demand for workers educated and credentialed at the midlevel. It includes twenty occupations employing the greatest number of midlevel workers showing the number of jobs in these fields in 2023 and projected growth through 2033. Among the fields with the most jobs are heavy and tractor-trailer truck drivers, bookkeeping & accounting clerks, teaching assistants, nursing assistants, computer support specialists, and medical assistants.

**Figure 12: Top 20 Midlevel Occupations - Washington Statewide
2023 - 2033**



Source: Lightcast Q4 2023 Data Set, Washington State Employment Security Department (ESD)

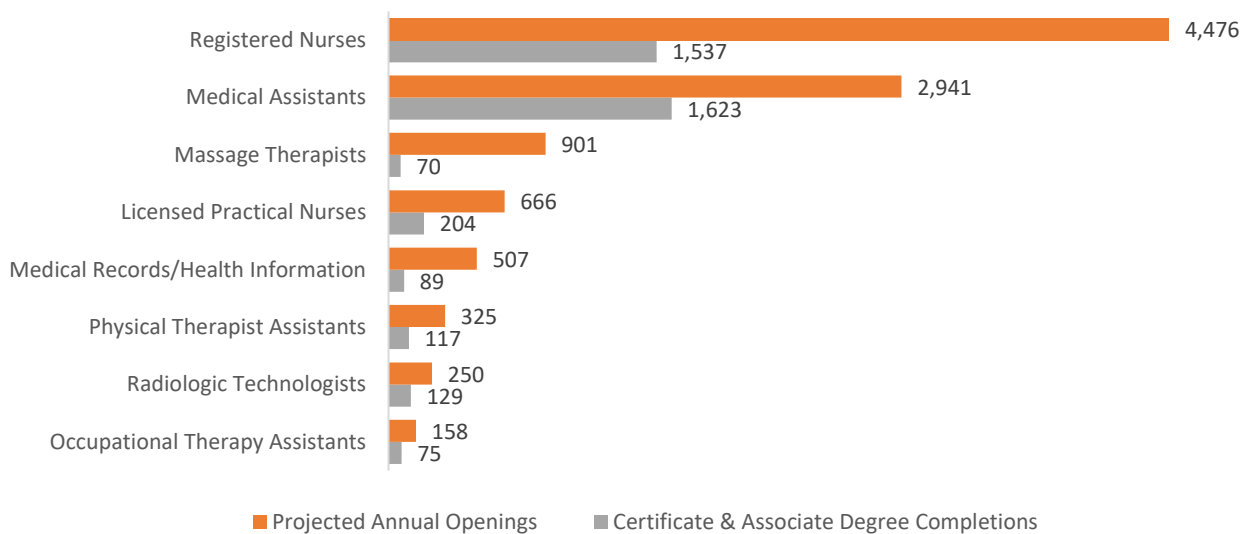
Selected Midlevel Occupations

In a number of occupational clusters at the midlevel, annual job openings exceed annual program completions. Disparities between openings and completions in the fields of health, computer and information technology, and technical and mechanical services are highlighted in the charts below.

Health

As shown in figure 13, the widest supply and demand gaps in health are in the areas of nursing, medical assisting, massage therapy, and medical records. Workers can qualify for medical assistant positions with a postsecondary certificate, but annual job openings in this field exceed annual program completions by 81 percent. The gap in nursing is large as well. However, while an associate degree in nursing is the minimum education requirement, many employers prefer nurses with a bachelor's degree, so some of the demand in this field is addressed by students completing bachelor's programs. Gaps are also seen for physical therapist assistants, radiologic technologists, and occupational therapy assistants.

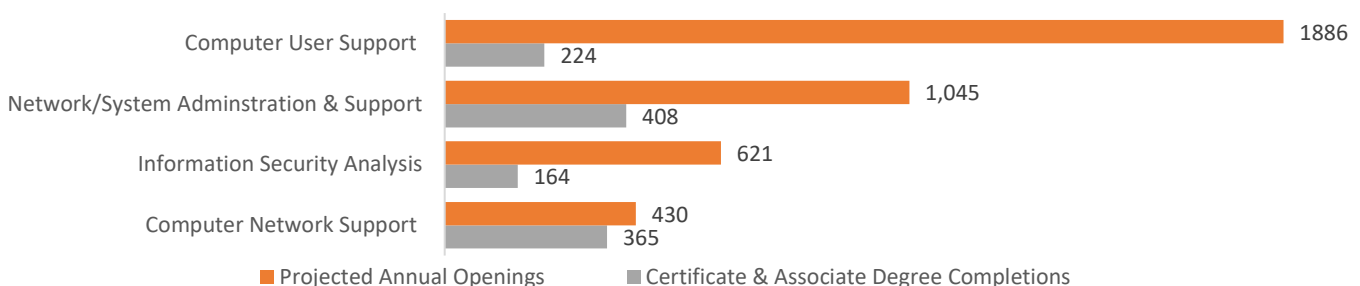
**Figure 13: Selected Midlevel Health Occupations
Projected Annual Openings and Annual Completions 2021-22**



Computer and Information Technology

Figure 14 displays a range of midlevel information technology occupations where job openings are outpacing annual completions.

**Figure 14: Selected Midlevel Computer Occupations
Projected Annual Openings and Annual Completions 2021-22**



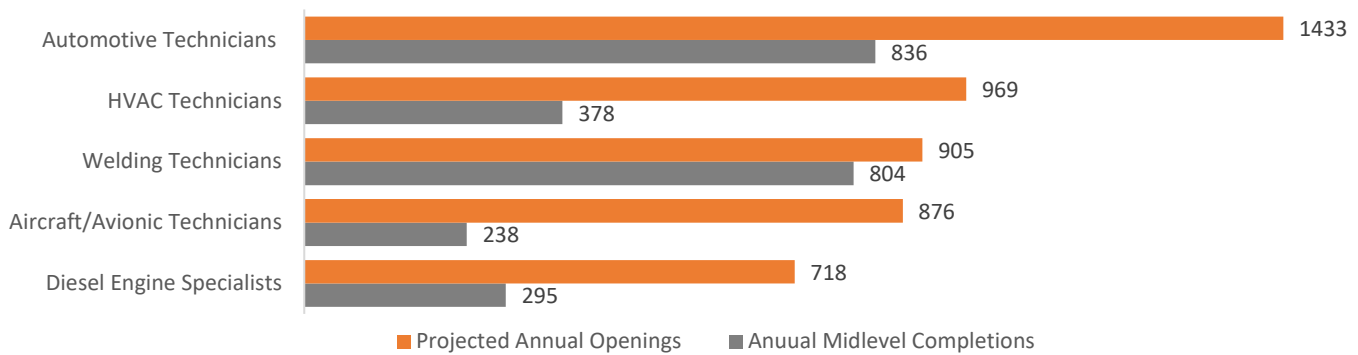
Source: Lightcast Q4 2023 Data Set; ESD; Integrated Postsecondary Education Data System

The number of annual openings for computer user support specialists is more than eight times greater than the number of annual completions, and there is a substantial gap between completions and openings for network support specialists and network/system administrators. Demand for information security analysts is growing rapidly and completions in this area are falling behind.

Technical and Mechanical Services

Another occupational cluster at the midlevel in which annual job openings tend to outpace the rate of completions is in maintenance and repair services (see Figure 15). Figure 15 shows substantial gaps, with openings exceeding program completions for automotive technicians (by 71 percent), HVAC technicians (by 156 percent), welding technicians (by 13 percent), aircraft technicians (by 268 percent), and diesel engine specialists (by 143 percent).

**Figure 15: Selected Midlevel Maintenance and Repair Occupations
Annual Program Completions and Projected Annual Openings
2023 - 2033**

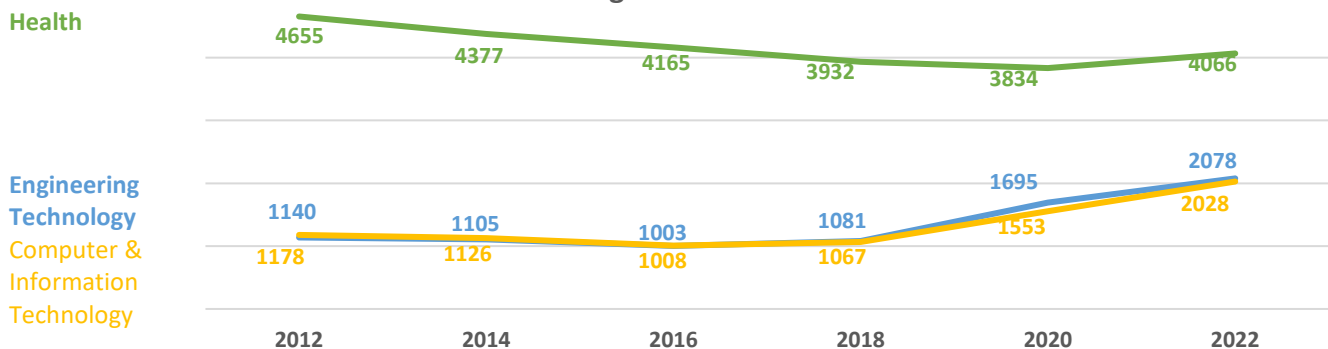


Source: Lightcast Q4 2023 Data Set; ESD; Integrated Postsecondary Education Data System

Meeting Demand at the Midlevel

Figure 16 shows the history of midlevel certificate and degree completions in key fields from 2012 - 2022. Midlevel certificate and degree production in computer & information technology and engineering technology declined slightly from 2012 – 2018 but increased significantly from 2018 - 2022. Overall, during this ten-year period, engineering technology completions grew by 82 percent and computer and information completions by 72 percent. Health completions at the midlevel declined steadily from 2012 – 2016 then leveled off and began to increase through 2022. It is notable that these upturns in completions occurred during a time of overall enrollment declines at the community and technical colleges.

**Figure 16. Midlevel Certificate and Degree Completions History
Washington 2012-2022**



Source: Integrated Postsecondary Education Data System (IPEDS)

Midlevel Reskilling and Upskilling – Career Pathways

Reskilling or upskilling through midlevel postsecondary education and training is an essential resource for many workers. Those who have only a high school diploma or who have completed some college but did not acquire a credential may find themselves in low-paying jobs with little chance for advancement. Reskilling and upskilling pathways offer vital avenues through stackable credentials to advance their careers. Students can build upon skills acquired in successive postsecondary programs from short-term certificates to associate degrees. The skills and credentials they earn can in turn be used to continue on to pursue bachelor's and graduate degrees.

Reskilling: Learning a new set of skills or obtaining a credential in a separate field with the goal of transitioning to a new job or different industry

Upskilling: Acquiring additional skills or new credentials with the goal of advancing to a more responsible position and higher wages in the same general line of work.

Figure 17 shows examples of midlevel reskilling and upskilling career pathways in three different fields. Annual job openings are substantial for all of the occupations. Beginning with short-term certificate programs, these pathways allow one to gain progressively higher credentials and qualify for positions within the field for higher wages. Washington College Grant funds can be applied to all of these programs, including the short-term certificate programs.

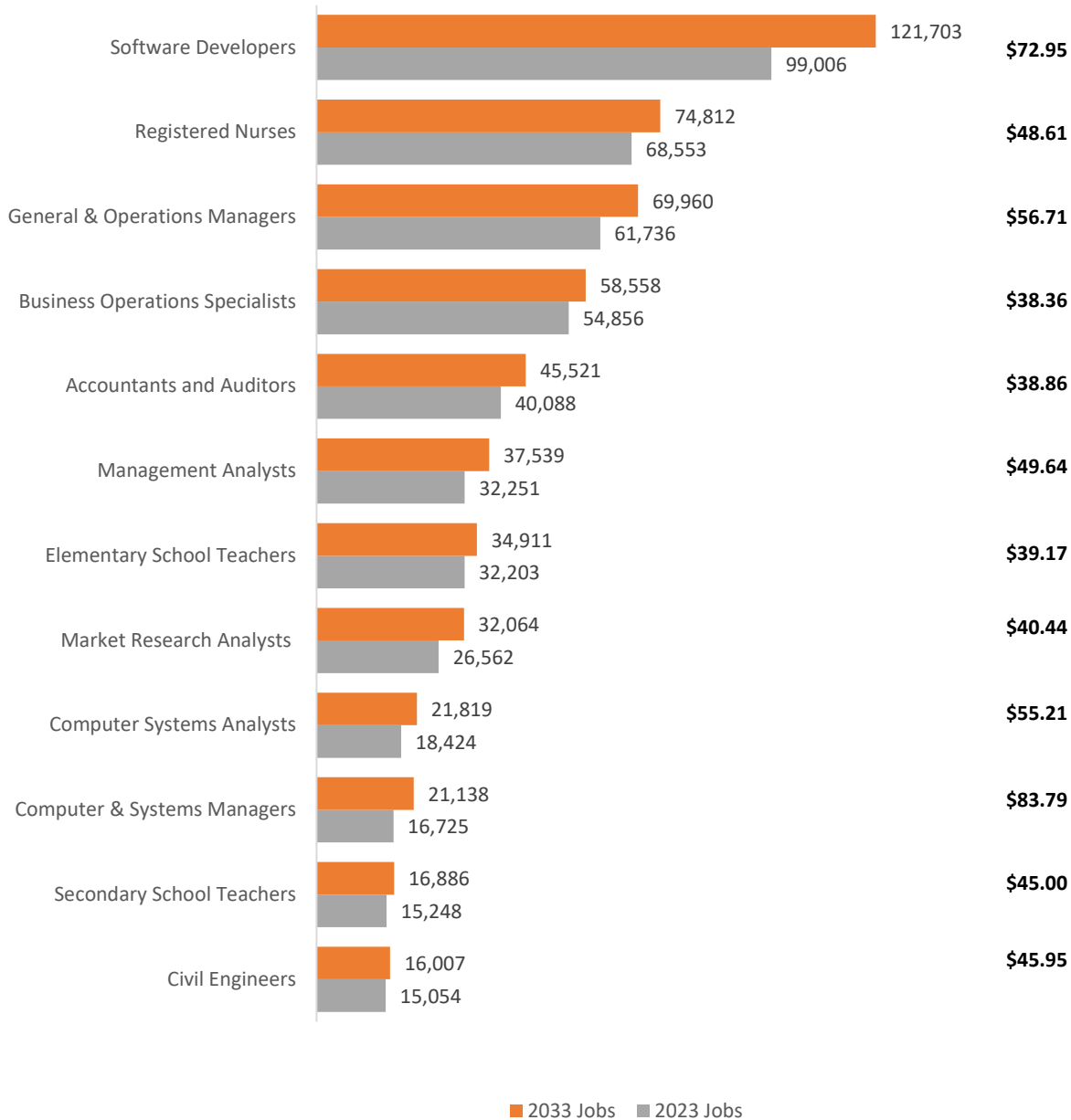
Figure 17: Examples of Midlevel Reskilling and Upskilling Career Pathways

	Entry Level Job	Next Step Jobs	
Health Occupations NURSING	Nursing Assistant Annual Job Openings 30,051 Certificate Program: Short-Term - One Quarter Median Hourly Wage \$19.59	Licensed Practical Nurse Annual Job Openings 7,357 Certificate Program – Typically Four Quarters Median Hourly Wage \$32.82	Registered Nurse Annual Job Openings 4,408 Associate Degree Program Median Hourly Wage \$48.62
Business Occupations ACCOUNTING	Bookkeeping/Accounting Clerk Annual Job Openings 41,486 Certificate Program: 1 Year Median Hourly Wage \$23.59	Payroll Specialist Annual Job Openings 434 Certificate Program: Short-Term – One Quarter Median Hourly Wage \$24.76	Accountant Annual Job Openings 3,554 Associate Degree Program Median Hourly Wage \$38.90
Transportation Technology AUTOMOTIVE	Auto Repair Technician Annual Job Openings 1,856 Certificate Program: 79 Credits Median Hourly Wage \$23.68	Automotive Mechanic Annual Job Openings 1,433 Associate Degree Program Median Hourly Wage \$26.30	Diesel Engine Specialist Annual Job Openings 718 Certificate Program – 73 Credits Median Hourly Wage \$30.58

The Labor Market at the Bachelor's and Above Level

Figure 17 displays a range of occupations that are driving demand for workers educated and credentialed with a bachelor's degree or above. It includes occupations that are employing the greatest number of workers at this level, showing the number of jobs in these fields in 2023 and projected growth through 2033. Among the fields with the most jobs are software developers, registered nurses, general and operations managers, computer systems analysts, elementary and secondary school teachers, and civil engineers.

**Figure 17: Top Occupations at the Bachelor's and Above Level
Washington Statewide 2023 - 2033**



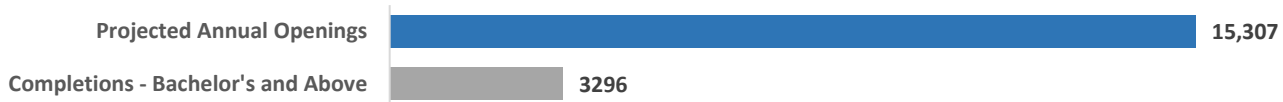
Source: Lightcast Q4 2023 Data Set; Washington State Employment Security Department (ESD)

Selected Occupations at the Bachelor's Level and Above

Computer and Information Technology

The typical entry level education for many occupations in computer and information technology is a bachelor's degree, and employer demand for workers with computer science skills is strong across the field. Figure 18 compares projected annual openings in computer occupations at the bachelor's or graduate level with annual completions of bachelor's and graduate degrees. A wide gap is evident.

Figure 18: Computer and Information Technology - Bachelor's and Graduate Level Annual Job Openings Compared to Certificate and Degree Completions 2023-2033

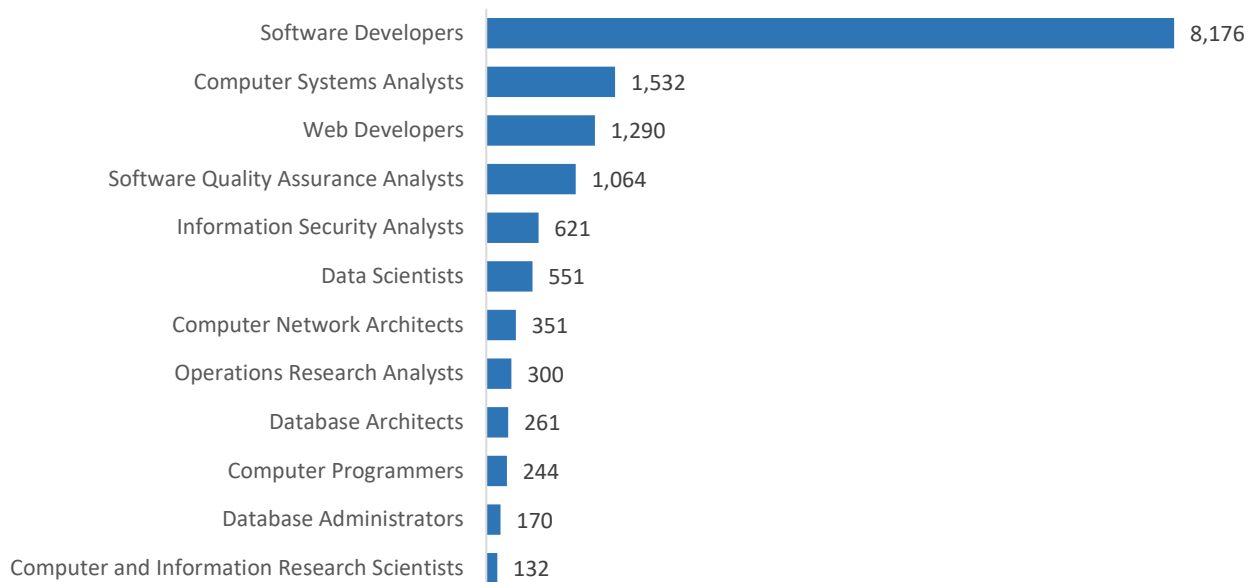


Source: Lightcast Q4 2023 Data Set; ESD; Integrated Postsecondary Education Data System (IPEDS)

The occupations that are driving demand in the computer and information field at this level are outlined in Figure 19. The most openings by far are in software development. In fact, 56 percent of all annual job openings over the next ten years are projected to be in this field. The exceptionally strong demand for software developers is consistent with recent national trends, which show that demand in this occupation roughly doubled in 2021 (Scott, 2021). Industry observers conclude that the advance of GenAI may have a significant impact on this field. Recent reports have suggested that, at least in the near future, the primary impact on software developers will be in reshaping how the work is carried out and enhancing productivity rather than on job losses (Gownder et al, 2023; Stockler, 2024). However, in the long term, as GenAI continues to improve and evolve, the potential impact on employment may become greater.

Other occupations with projections of expanding annual openings are for computer systems analysts, web developers, software quality assurance analysts, and information security analysts.

Figure 19: Computer & Information Science Occupations Projected Annual Openings 2023-33 Bachelor's Level and Above



Source: Lightcast Q4 2023 Data Set; Washington State Employment Security Department (ESD)

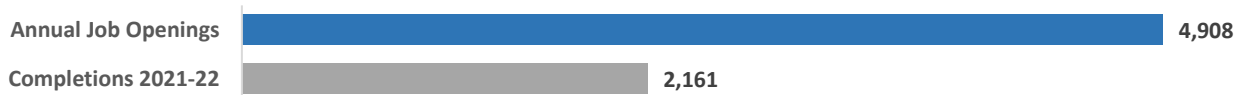
Overall, the broad-based need for workers educated and skilled in computer science seen in these data reflects not only the state’s innovative economic spirit, but also the extent to which companies are generally incorporating digital technology in the workforce. Nationally, nine out of ten jobs in computer & information technology are in companies outside the tech sector (Burning Glass Technologies, 2019). Washington jobs data reflects this same trend. In fact, most information technology jobs are in industries such as professional and scientific services, finance and insurance, retail, healthcare, and manufacturing. Operations in all these industries are becoming increasingly digital, requiring workers skilled in Information technology (STEM Education Innovation Alliance, 2023).

The deep demand for individuals with software development skills reflects the dynamic nature of Washington’s technology industries. Software developers focus on analyzing user needs and designing software to perform a given range of required functions. This field includes systems software developers, who specialize in computer operating systems, and applications software developers, who focus on various applications, such as games, video editors, word processors, and databases.

Nursing

Job openings for registered nurses are the primary driver of demand in the nursing field at the bachelor’s and graduate level. A recent survey of health facilities in the state reported that registered nurses are among the top occupations for which clinics, hospitals, and nursing facilities are experiencing exceptionally long vacancy times (Washington’s Health Workforce Sentinel Network, 2023). This occupational cluster also includes a range of advanced practice nursing occupations, such as nurse practitioners, nurse anesthetists, nurse midwives, and clinical nurse specialists. Positions in any of these fields require at least a master’s degree. Figure 20 shows that annual job openings in nursing (4,908) are projected to be more than double the number of annual completions (2,161) over the next ten years.

**Figure 20: Nursing - Bachelor's and Graduate Level
Annual Job Openings Compared to Certificate and Degree Completions
2023 - 2033**



Engineering

Figure 21 shows the gap between projected annual job openings in engineering over the next ten years and annual certificate and degree completions in 2021-22. Labor Market demand for engineers is strong across all areas of specialization, but some occupations stand out. Leading the demand are jobs for civil engineers, which represent 26 percent of all openings in the field, followed by electrical engineers (17 percent), industrial engineers (16 percent), and mechanical engineers (15 percent).

**Figure 21: Engineering - Bachelor's and Graduate Level
Annual Job Openings Compared to Certificate and Degree Completions
2023 - 2033**



Source: Lightcast Q4 2023 Data Set; ESD; Integrated Postsecondary Education Data System (IPEDS)

Education

K-12 education is another field where gaps between job openings and degree completions are present (see Figure 22). Elementary, middle school, and secondary teachers are in strong demand in Washington. According to a recent study by a national education research firm, Washington is among states with the greatest teacher shortage. The state ranks 39th in the nation in the ratio of teachers to students in public schools (Scholaroo, 2023). The primary drivers of demand are teacher shortages in the areas of special education, elementary, and secondary education, particularly in CTE-STEM and mathematics (PESB, 2024).

**Figure 22: K-12 Education - Bachelor's and Graduate Level
Annual Job Openings Compared to Certificate and Degree Completions
2023-2033**

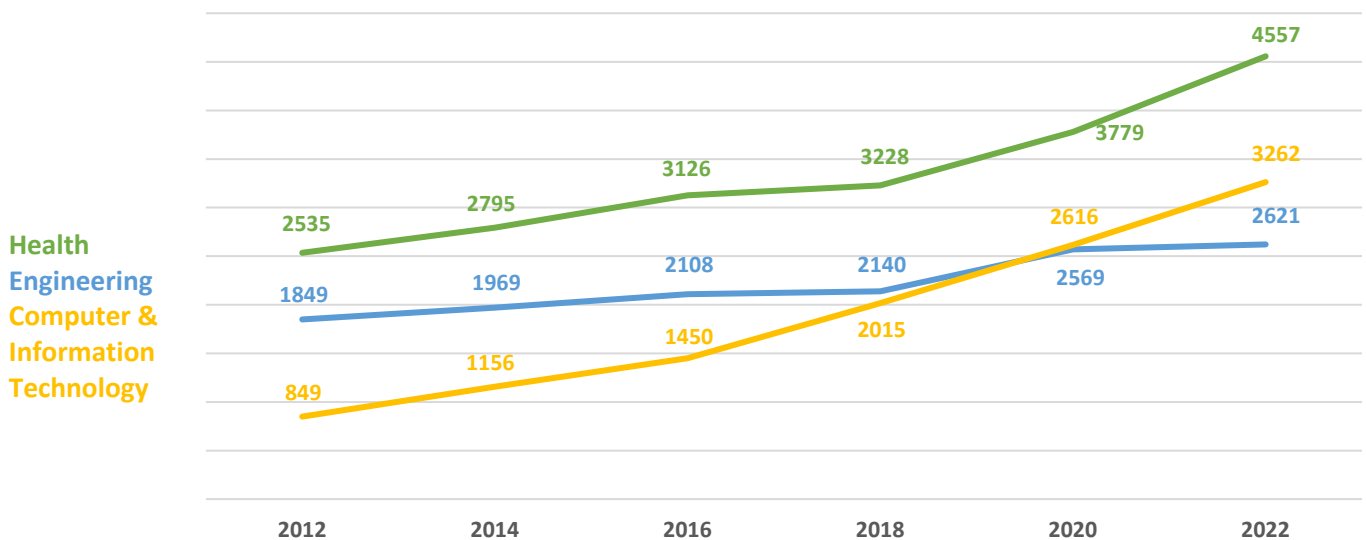


Source: Lightcast Q4 2023 Data Set; Integrated Postsecondary Education Data System (IPEDS)

Meeting Demand at the Bachelor’s and Master’s Level

Figure 23 shows the history of certificate and degree completions in key fields at the bachelor’s and master’s degree level from 2012 - 2022. Completions in the fields of health, computer and information technology, and engineering all increased steadily during this time period. Overall, during this ten-year period, health completions grew by 80 percent and engineering completions by 38 percent. Completion growth in computer & information technology at the bachelor’s and master’s level was even stronger, rising steadily from 849 in 2012 to 3262 in 2022.

**Figure 23. Bachelor's & Master's Degree Completions History in key fields
Washington 2012-2022**



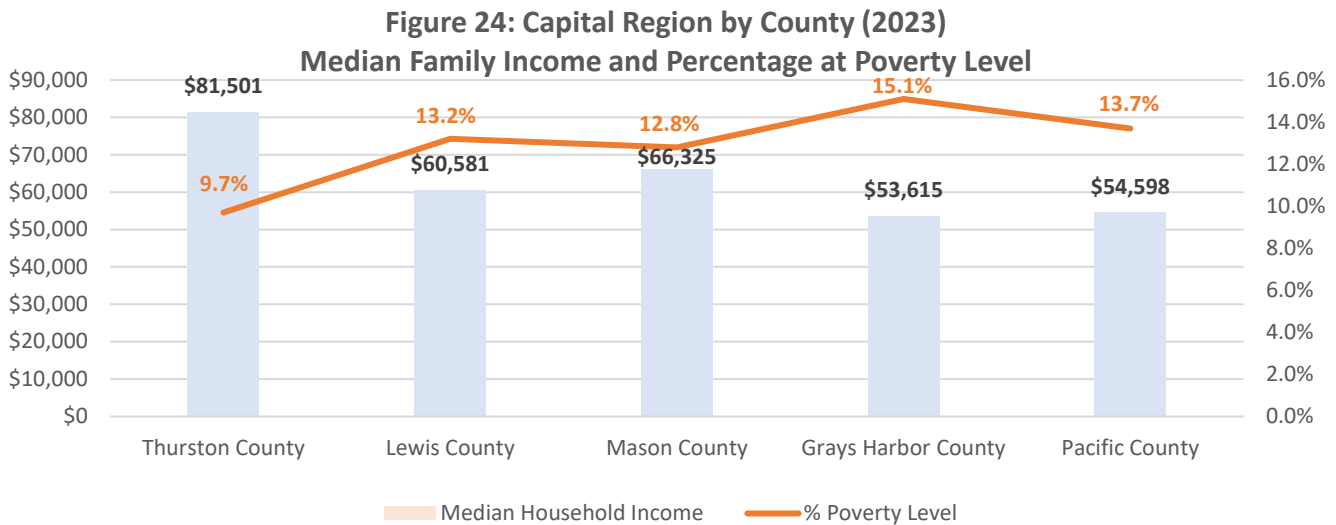
Source: Integrated Postsecondary Education Data System (IPEDS)

Regional Profiles

Washington has nine diverse regions, ranging from densely populated cities and sprawling suburbs in the Puget Sound area to more sparsely populated rural areas in the central and southwestern parts of the state. Each region has distinct characteristics, with its own set of prominent industries and employers and postsecondary institutions that provide local opportunities for residents to prepare for and advance in their careers. The regions used in this report are by county groups, corresponding roughly to the state’s nine educational service districts: the Capital, North Central, Northeast, Northwest, Olympic, Puget Sound, Southeast, Southwest, and Yakima Valley areas.

Capital Region (ESD 113)

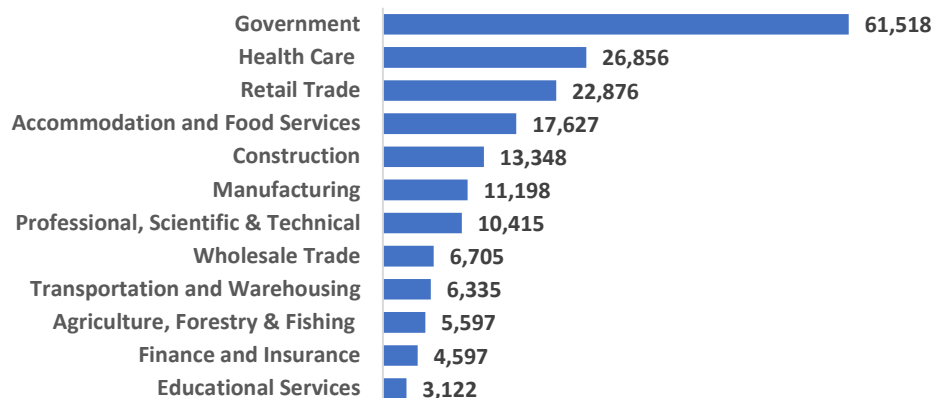
Economic Overview. The Capital Region includes Grays Harbor, Lewis, Mason, Pacific, and Thurston counties and extends from the southern Puget Sound area westward to the Pacific coast. Olympia, the largest city in Thurston County, is the state capital. As of the 4th quarter of 2023, the population was 561,663, which has increased by 6.7 percent over the last five years, since 2018 (Lightcast, Q4 2023). Figure 24 shows median family incomes for each of the counties in the region, ranging from a low of \$53,615 in Grays Harbor to \$81,501 in Thurston County. Grays Harbor has the highest poverty rate, with 15.1 percent of residents living in poverty, while Thurston has the lowest rate at 9.7 percent.



Source: Lightcast Q4 2023 Data Set; American Community Survey

Figure 25 lists the top industries in the region and the number of workers employed in each. Leading the list of industries employing the largest number of workers are government, followed by health care, retail trade, accommodation & food services, construction, manufacturing, and professional, scientific & technical services.

Figure 25: Largest Industries in Capital Region 2023

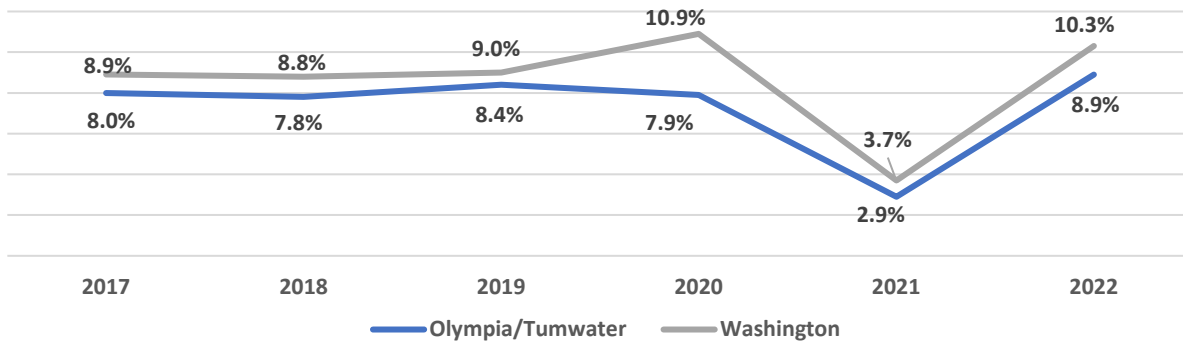


Source: Lightcast Q4 2023 Data Set; Washington State Employment Security Department (ESD)

The STEM Sector. A key aspect of any region’s economy in Washington is the range of jobs that center on science, technology, engineering, and math (STEM). STEM occupations are critical to development of the state’s dynamic and innovative economy and offer opportunities for high-wage jobs with good benefits. STEM industries tend to be concentrated in urban areas. The largest urban sector in the region is the Olympia-Tumwater metro area in Thurston County.

Figure 26 shows STEM jobs in this area as a percentage of all jobs over a five-year period from 2017-2022. STEM jobs presence in the area is below statewide levels, but the overall trend is an upward trajectory. The exception was a dip during the height of the pandemic impact, followed by a recovery and continued STEM growth.

**Figure 26: Olympia/Tumwater Metro Area
STEM Jobs as a Percentage of All Jobs**



Source: AWB Institute Vitals 2023 Data Set

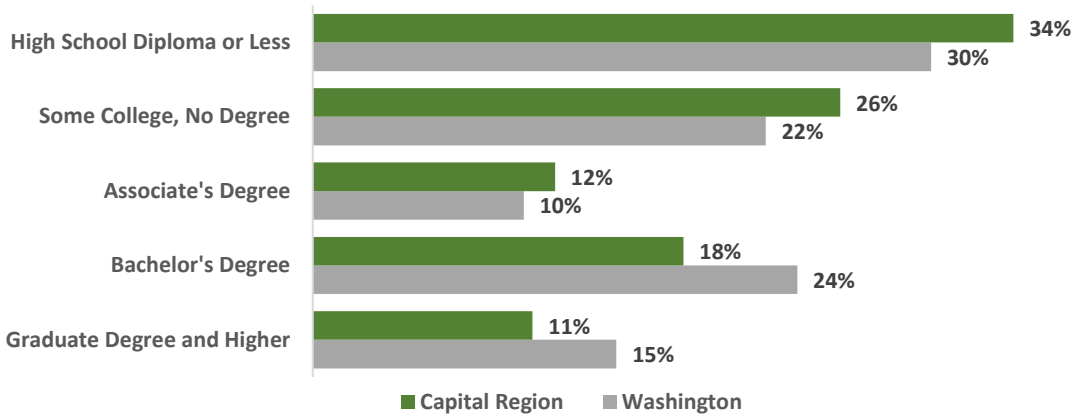
Postsecondary Education Overview. The Capital Region is serviced by five local postsecondary institutions. They include three community colleges: Centralia College, Grays Harbor College, and South Puget Sound Community College. The area’s four-year campuses include St. Martin’s University, a private institution, and the Evergreen State College. Table 3 lists these institutions and the number of program completions for each in 2022, to provide a sense of their relative size. South Puget Sound Community College is the largest institution in the region, with twice the number program completions as Evergreen State College, the next largest campus.

Table 3: Capital Region Postsecondary Institutions	Completions in 2022
South Puget Sound Community College	1,329
The Evergreen State College	657
Centralia College	555
Saint Martin's University	459
Grays Harbor College	427

Source: Lightcast Q4 2023 Data Set; Integrated Postsecondary Education Data System (IPEDS)

Educational Attainment. Figure 27 shows the highest educational levels that residents in the region aged 25 and over have attained. Overall, educational attainment in the region is lower than statewide levels. A higher percentage (34 percent) have only completed a high school diploma or less. Larger percentages have completed some college without a degree (26 percent) or an associate degree (12 percent) and fewer have completed a bachelor’s degree (18 percent compared to 24% statewide) or a graduate degree (11 percent compared to 15 percent statewide).

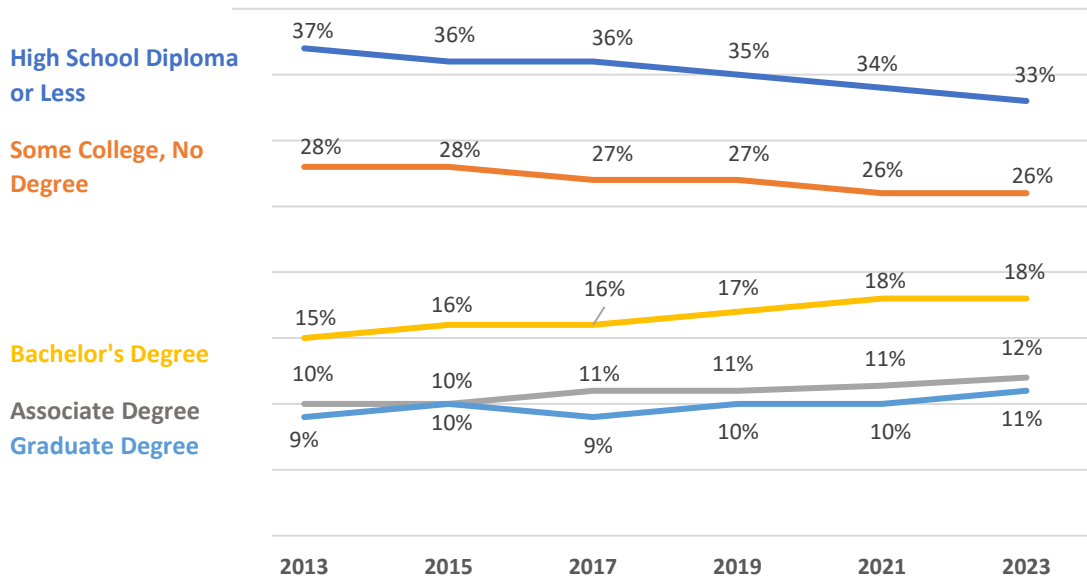
**Figure 27: Capital Region
Highest Educational Attainment Levels 2023
(Population Aged 25 and Over)**



Source: Lightcast Q4 2023 Data Set; U.S. Census Bureau American Community Survey

Figure 28 shows the educational attainment levels over the last 10 years. The changes over time are relatively modest, but the trajectories at the lower end and the upper segments of the scale are notable. The percentage of those with less education, a high school diploma or some college, have declined over this time period. For example, Capital residents with a high school diploma as their highest education level declined from 37 percent to 33 percent. Conversely, those who have completed a bachelor's degree increased from 15 percent to 18 percent.

**Figure 28: Capital Region
Highest Educational Attainment Levels 2013-2023
Population 25 and Over**



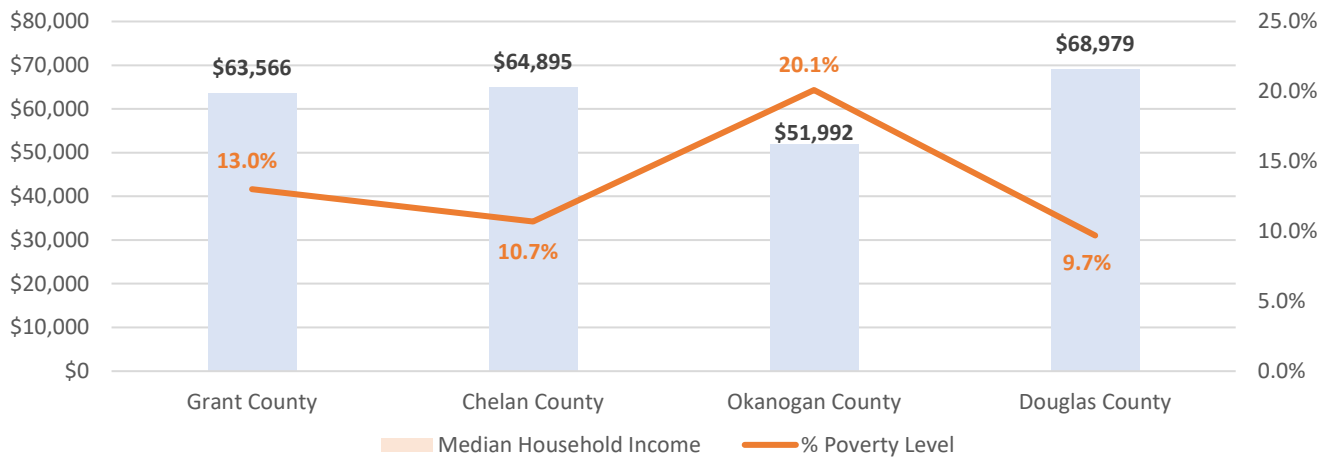
Source: Lightcast Q4 2023 Data Set; U.S. Census Bureau American Community Survey

North Central Region

The North Central Region is a predominantly rural area extending from Okanogan County bordering on Canada to Douglas and Grant counties in the central part of the state, and Chelan County, which includes Wenatchee, the largest city with a population of 35,508 as of 2020. In the 4th quarter of 2023, the regional population was 272,322, which increased by 5.7 percent over the last five years, since 2018 (Lightcast, Q4 2023).

Figure 29 shows median family incomes for each of the counties in the region, ranging from a low of \$51,992 in Okanogan to \$68,979 in Douglas County. Okanogan has the highest poverty rate, with 20.1 percent of residents living in poverty, while Douglas County has the lowest rate at 9.7 percent.

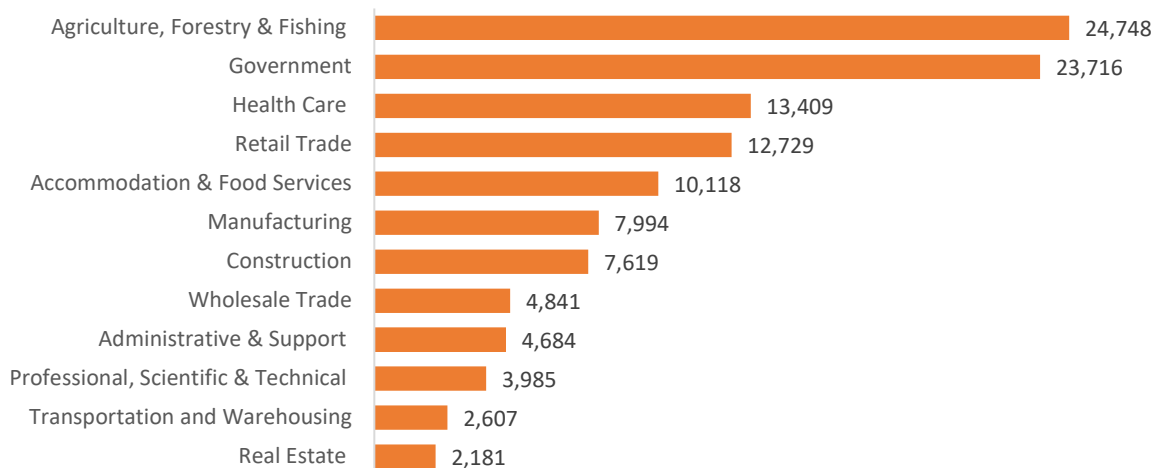
**Figure 29: North Central Region by County (2023)
Median Family Income and Percentage at Poverty Level**



Source: Lightcast Q4 2023 Data Set; American Community Survey

Figure 30 lists the top industries in the North Central region and the number of workers employed in each. Leading the list of industries employing the largest number of workers is agriculture, forestry & fishing, reflecting the rural nature of the area. This is followed by government, health care, retail trade, accommodation & food services, manufacturing, and construction.

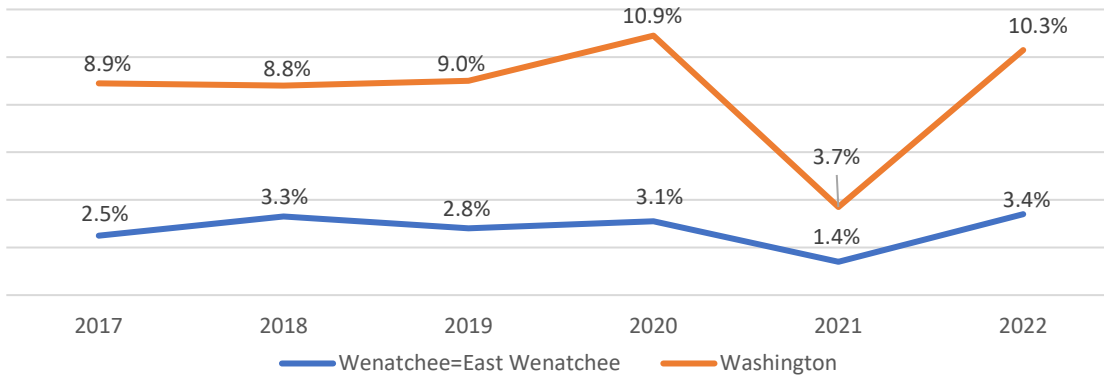
Figure 30: Largest Industries in North Central Region 2023



Source: Lightcast Q4 2023 Data Set; Washington State Employment Security Department (ESD)

The STEM Sector. The largest urban sector in the region is the Wenatchee-East Wenatchee area in Chelan County. Figure 31 shows STEM jobs in this area as a percentage of all jobs over a five-year period from 2017-2022. The percentages are low compared to statewide figures, but overall STEM jobs are on the rise. They increased from 2.5 percent of all jobs in 2017 to 3.4 percent in 2022, despite a steep decline in 2021 as a result of the pandemic.

**Figure 31: Wenatchee-East Wenatchee Metro Area
STEM Jobs as a Percentage of All Jobs**



Source: AWB Institute Vitals 2023 Data Set

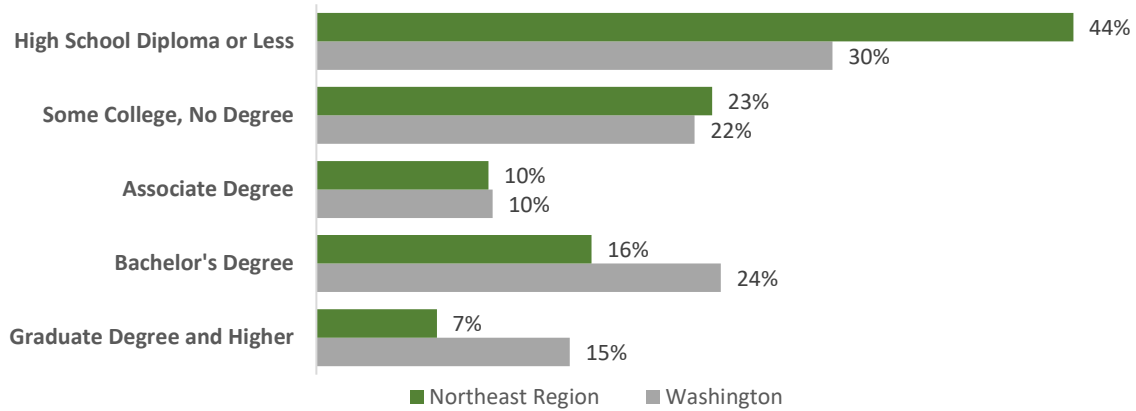
Postsecondary Education Overview. The North Central Region is serviced by two community colleges: Wenatchee Valley College and Big Bend Community College (see Table 4). They are primarily two-year institutions, but both offer a range of applied baccalaureate programs. Wenatchee Valley College has bachelor’s degree programs in nursing, engineering technology, and teaching. Big Bend has a bachelor’s program in applied management. However, students or adult learners seeking a four-year degree in other subject areas would need to look outside the region. The nearest four-year institution is Central Washington University in Ellensburg in Kittitas County.

Table 4: North Central Region Postsecondary Institutions		Completions in 2022
Wenatchee Valley College		926
Big Bend Community College		630

Source: Lightcast Q4 2023 Data Set; Integrated Postsecondary Education Data System (IPEDS)

Educational Attainment. Figure 32 shows the highest educational levels that residents in the region aged 25 and over have attained. Overall educational attainment in the North Central Region is lower than statewide levels. A larger percentage of residents have only completed a high school diploma (44 percent compared to 30 percent statewide) or some college without a degree (23 percent). At the other end of the spectrum, fewer have completed a bachelor’s degree (16 percent compared to 24% statewide) or a graduate degree (7 percent compared to 15 percent statewide).

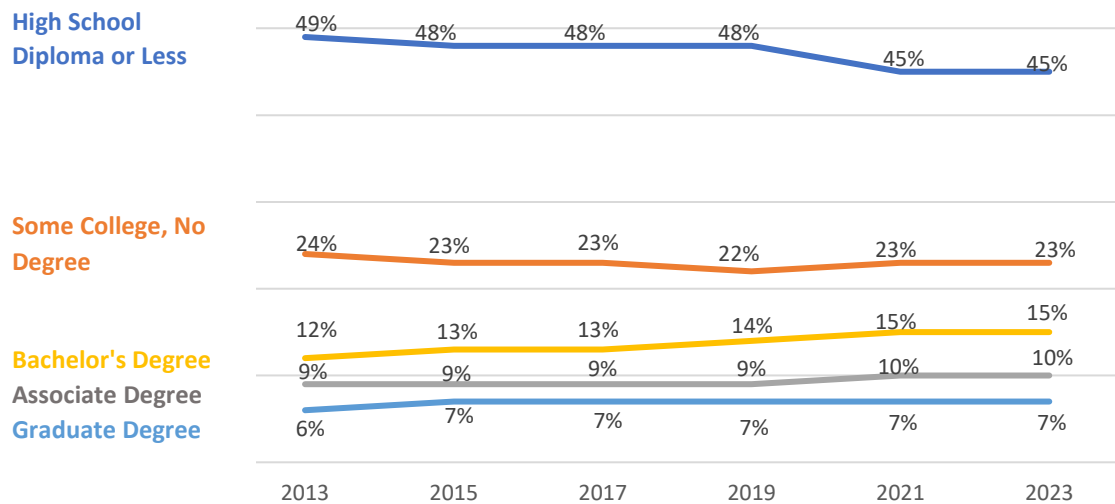
**Figure 32: North Central Region
Highest Educational Attainment Levels 2023
(Population Aged 25 and Over)**



Source: Lightcast Q4 2023 Data Set; U.S. Census Bureau American Community Survey

Figure 33 shows the trend in educational attainment levels in the region over the last 10 years. The changes over time are relatively modest, but the trajectories at the lower end and the upper segments of the scale are significant. The percentage of those with less education, a high school diploma or some college, have declined over this time period. For example, residents with a high school diploma as their highest education level declined from 49 percent in 2013 to 45 percent by 2023. Conversely, those who have completed a bachelor's degree increased from 12 percent to 15 percent.

**Figure 33: North Central Region
Highest Educational Attainment Levels 2013-2023
(Population Aged 25 and Over)**



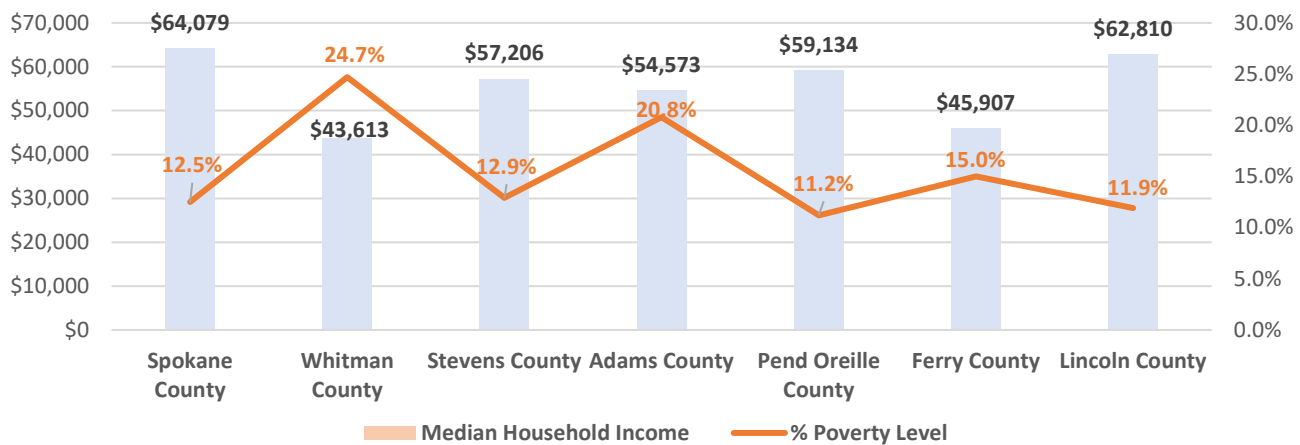
Source: Lightcast Q4 2023 Data Set; U.S. Census Bureau American Community Survey

Northeast Region

Economic Overview. The Northeast Region contains a mix of urban and large rural areas. It includes Adams, Ferry, Lincoln, Pend Oreille, Spokane, Stevens, and Whitman counties. As of the 4th quarter of 2023, the population is 710,003, which has grown by 7.5 percent over the last five years (Lightcast, Q4 2023). Spokane is the largest city in the region, with a population of 228,989 at the 2020 census. The Spokane Metropolitan Area is substantially larger, with a population of nearly 598,000 (U.S. Census Bureau, 2019).

Figure 34 shows median family incomes for each of the counties in the region, ranging from a low of \$43,613 in Whitman County to \$64,079 in Spokane County. Whitman has the highest poverty rate, with 24.7 percent of residents living in poverty, while Pend Oreille County has the lowest rate at 11.2 percent.

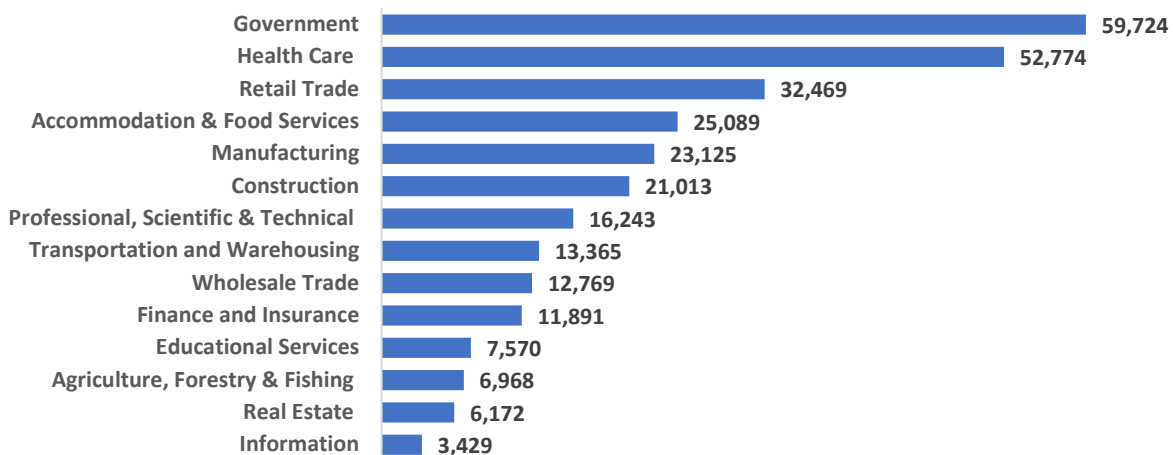
**Figure 34: Northeast Region by County (2023)
Median Family Income and Percentage at Poverty Level**



Source: Lightcast Q4 2023 Data Set; American Community Survey

Figure 35 lists the top industries in the Northeast region and the number of workers employed in each. Leading the list of industries employing the largest number of workers is government, health care, retail trade, accommodation & food services, manufacturing, construction, and professional, scientific & technical.

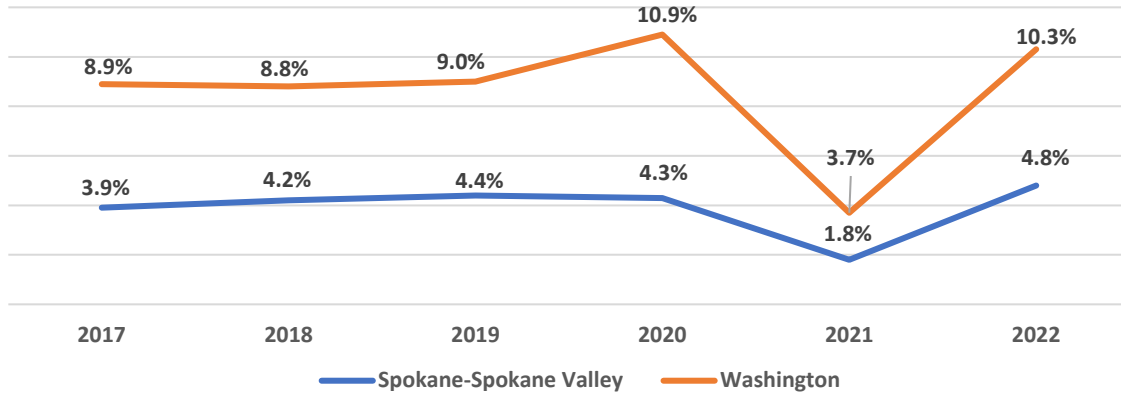
Figure 35: Largest Industries in Northeast Region 2023



Source: Lightcast Q4 2023 Data Set; Washington State Employment Security Department (ESD)

The STEM Sector. The largest urban sector in the region is the Spokane and Spokane Valley metropolitan area. Figure 36 shows STEM jobs in this area as a percentage of all jobs over a five-year period from 2017-2022. The percentages are lower than the statewide figures, but overall STEM jobs are rising in the area. The numbers reveal a sharp decline in STEM jobs in 2021, reflecting the impact of the pandemic. But overall, the trend points to increasing STEM industry presence and growth in STEM jobs. They increased from 3.9 percent of all jobs in 2017 to 4.8 percent in 2022.

**Figure 36: Spokane-Spokane Valley Metro Area
STEM Jobs as a Percentage of All Jobs**



Source: AWB Institute Vitals 2023 Data Set

Postsecondary Education Overview. The Northeast Region is serviced by several postsecondary campuses, including both two-year and four-year institutions (see table 5). However, they are concentrated in just two counties, Spokane and Whitman. As a result, the distribution of postsecondary opportunities are not as convenient to towns in some of the more distant rural areas. Two-year institutions include Spokane Community College and Spokane Valley Community College. The region has two public universities: Washington State University and Eastern Washington University. Washington State University has a main campus in Pullman in Whitman County and a branch campus, WSU Health Sciences Spokane. Eastern Washington University is located in Cheney, about 17 miles south of Spokane. The region also has two private four-year institutions, Gonzaga University and Whitworth University, both located in Spokane.

Table 5: Northeast Region Postsecondary Institutions	Completions in 2022
Washington State University Pullman and Spokane	5,106
Eastern Washington University	3,324
Gonzaga University	2,174
Spokane Community College	1,969
Spokane Falls Community College	1,248
Whitworth University	797

Source: Lightcast Q4 2023 Data Set; Integrated Postsecondary Education Data System (IPEDS)

Educational Attainment. Figure 37 shows the highest educational levels that residents in the region aged 25 and over have attained. The percentage of residents who have completed some college without obtaining a degree is higher than the statewide. And more have completed an associate degree as their highest education level (13 percent compared to 10 percent). But above the midlevel, fewer residents have obtained bachelor’s degrees (20 percent compared to 24 percent statewide) or graduate degrees (12 percent compared to 15 percent statewide).

**Figure 37: Northeast Region
Highest Educational Attainment Levels 2023
(Population Aged 25 and Over)**

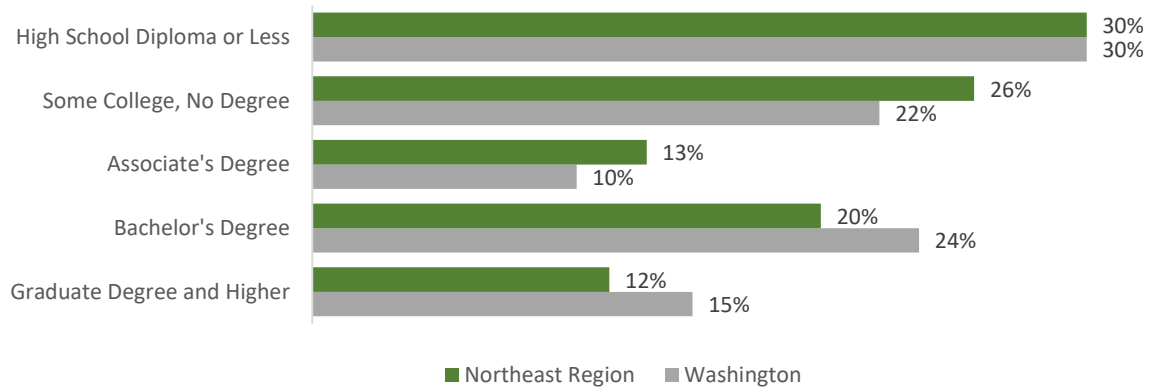
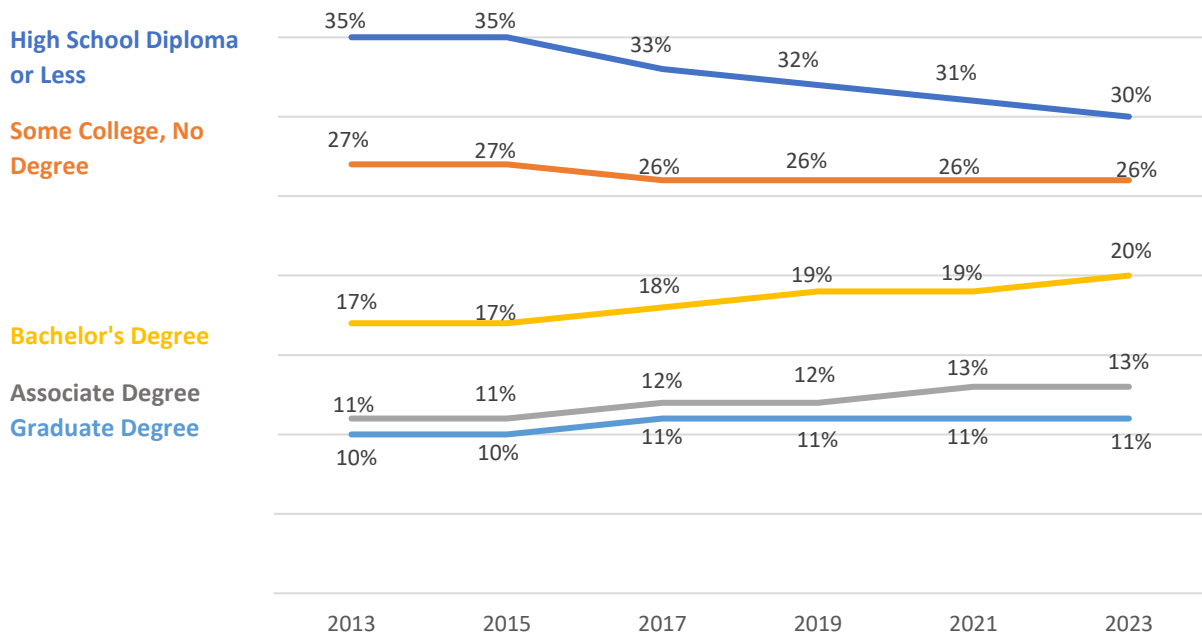


Figure 38 shows the trend in educational attainment levels in the region over the last 10 years. Similar to some of the other regions, the changes over time are relatively modest. But they are moving in a generally promising direction. The percentage of those with less education, a high school diploma or some college, have declined over this time period. For example, residents with a high school diploma as their highest education level declined from 35 percent in 2013 to 30 percent by 2023. Conversely, education attainment at the higher end of the spectrum is rising slowly but steadily. Those who have completed a bachelor's degree increased from 17 percent in 2013 to 20 percent in 2023.

**Figure 38: Northeast Region
Highest Educational Attainment Levels 2013-2023
(Population 25 and Over)**



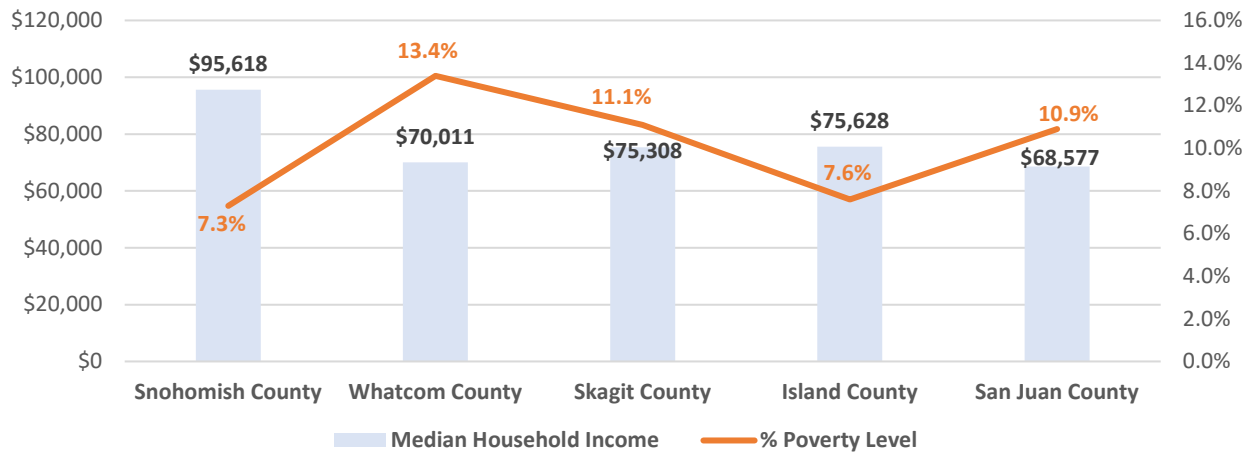
Source: Lightcast Q4 2023 Data Set; U.S. Census Bureau American Community Survey

Northwest Region

Economic Overview. The Northwest Region contains a mix of urban and rural areas, along with island communities in Puget Sound. It includes Island, San Juan, Skagit, Snohomish, and Whatcom counties. As of the 4th quarter of 2023, the population was 1,317,274, which has grown by 3.9 percent over the last five years (Lightcast, Q4 2023). The two largest cities in the region are Everett in Snohomish County, with a population of 110,629 and Bellingham in Whatcom county with a population of 91,482 (2020 census). The Spokane Metropolitan Area is substantially larger, with a population of nearly 598,000 (U.S. Census Bureau, 2019).

Figure 39 shows median family incomes for each of the counties in the region, ranging from a low of \$68,577 in San Juan County to \$95,618 in Snohomish County. Whatcom has the highest poverty rate, with 13.4 percent of residents living in poverty, while Snohomish has the lowest rate at 7.3 percent.

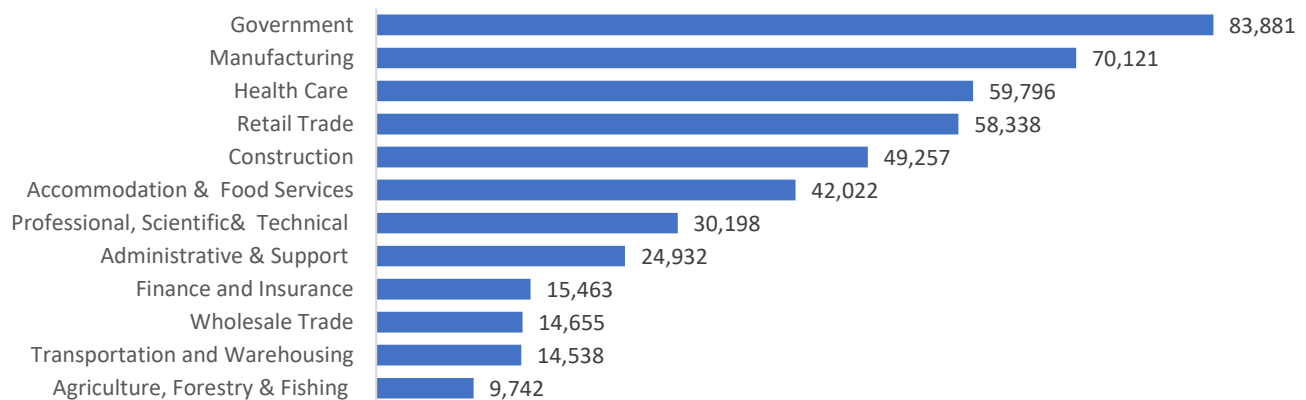
**Figure 39: Northwest Region by County (2023)
Median Family Income and Percentage at Poverty Level**



Source: Lightcast Q4 2023 Data Set; American Community Survey

Figure 40 lists the top industries in the North Central region and the number of workers employed in each. Leading the list of industries employing the largest number of workers is government, manufacturing, health care, retail trade, construction, accommodation & food services, and professional, scientific & technical services.

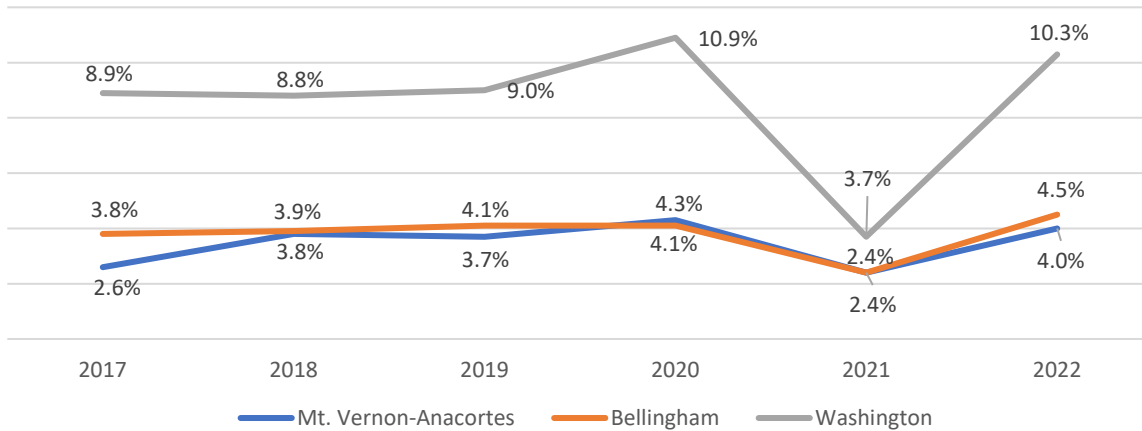
Figure 40: Largest Industries in Northwest Region 2023



Source: Lightcast Q4 2023 Data Set; Washington State Employment Security Department (ESD)

The STEM Sector. There are two metropolitan statistical areas in the northwestern part of the state, one centered around Bellingham and the other in the Mt. Vernon/Anacortes area. Figure 41 shows STEM jobs in these MSA as a percentage of all jobs over a five-year period from 2017-2022. STEM job percentages in both MSAs are below the statewide levels. However, in both areas, despite a notable decline in 2021, STEM employment is increasing. The percentages are lower than the statewide figures, but overall STEM jobs are rising in the area. In the Mt. Vernon-Anacortes area, they rose from 2.6 percent of all jobs in 2017 to 4.0 percent in 2022. In Bellingham they from 3.8% to 4.5 % during the same time period.

**Figure 41: Bellingham and Mt. Vernon-Anacortes Metro Area
STEM Jobs as a Percentage of All Jobs**



Source: AWB Institute Vitals 2023 Data Set

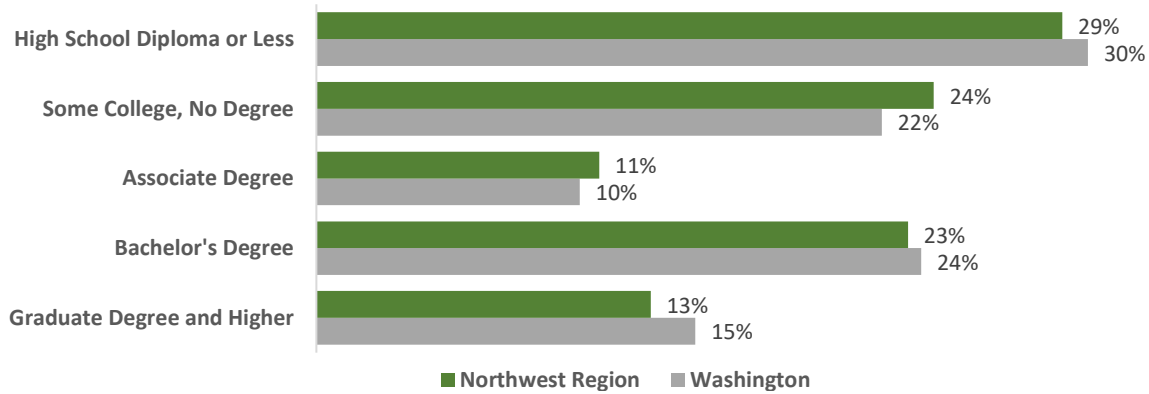
Postsecondary Education Overview. The Northwest Region has five community and technical colleges that are spread out geographically to provide more convenient access to residents (see Table 6). They include Whatcom Community College, Bellingham Technical College, Skagit Valley College, Everett Community College, and Edmonds College. While these institutions are primarily two-year campuses, Edmonds, Whatcom, and Bellingham Technical Colleges also offer a range of applied bachelor’s degree programs. Bellingham is also home to Northwest Indian College, a public tribal land-grant community college. In addition, the region has one public four-year postsecondary institution, Western Washington University.

Table 6: Northwest Region Postsecondary Institutions	Completions in 2022
Western Washington University	3,819
Everett Community College	1,579
Edmonds College	1,204
Whatcom Community College	1,193
Skagit Valley College	974
Bellingham Technical College	835
Northwest Indian College	120
Washington State University Everett	99

Source: Lightcast Q4 2023 Data Set; Integrated Postsecondary Education Data System (IPEDS)

Educational Attainment. Figure 42 shows the highest educational levels that residents in the region aged 25 and over have attained. The proportion of residents who have completed some college without obtaining a degree (24 percent) or who have completed an associate degree (11 percent) are slightly higher than we see in the statewide figures. And more have completed an associate degree as their highest education level (13 percent compared to 10 percent). But above the midlevel, fewer residents have obtained bachelor’s degrees (23 percent compared to 24 percent statewide) or graduate degrees (13 percent compared to 15 percent statewide).

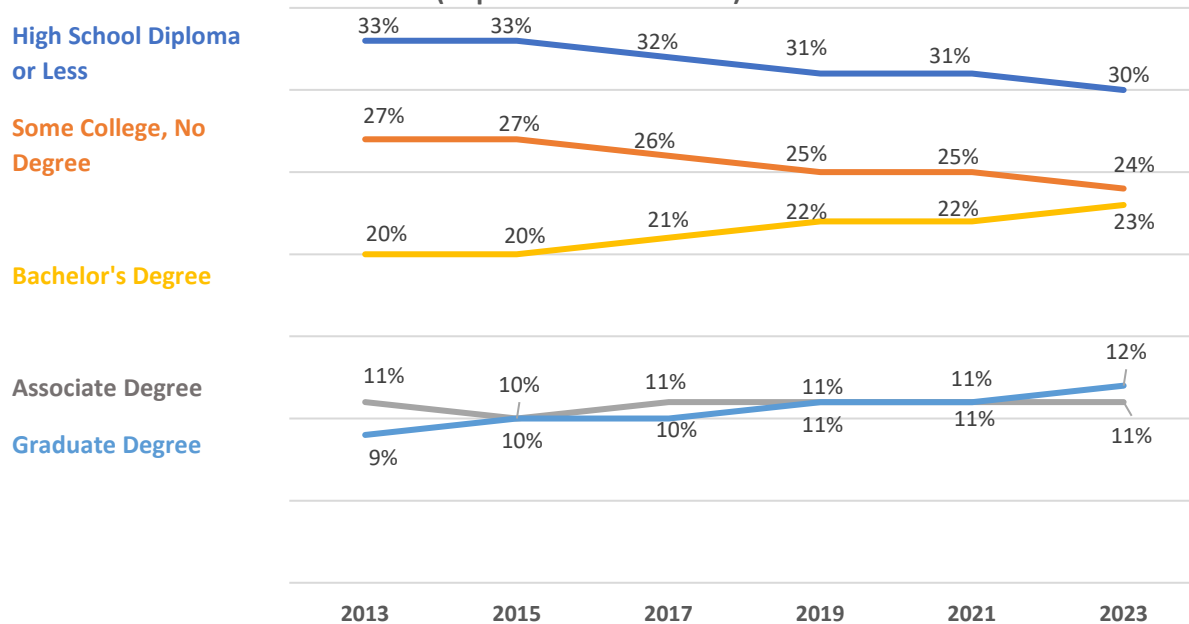
**Figure 42: Northwest Region
Highest Educational Attainment Levels 2023
(Population Aged 25 and Over)**



Source: Lightcast Q4 2023 Data Set; U.S. Census American Community Survey.

Figure 43 shows the trend in educational attainment levels in the region over the last 10 years. Similar to some of the other regions, the changes over time are relatively modest. But they are moving in a generally promising direction. The percentage of those with less education, a high school diploma or some college, have declined over this time period. For example, residents with a high school diploma as their highest education level declined from 33 percent in 2013 to 30 percent by 2023. Conversely, education attainment at the higher end of the spectrum is rising slowly but steadily. The number who had completed a bachelor's degree in 2013 represented 20 percent of the population. But this number increased in subsequent years, reaching 23 percent in 2023.

**Figure 43: Northwest Region
Highest Educational Attainment Levels 2013-2023
(Population 25 and Over)**

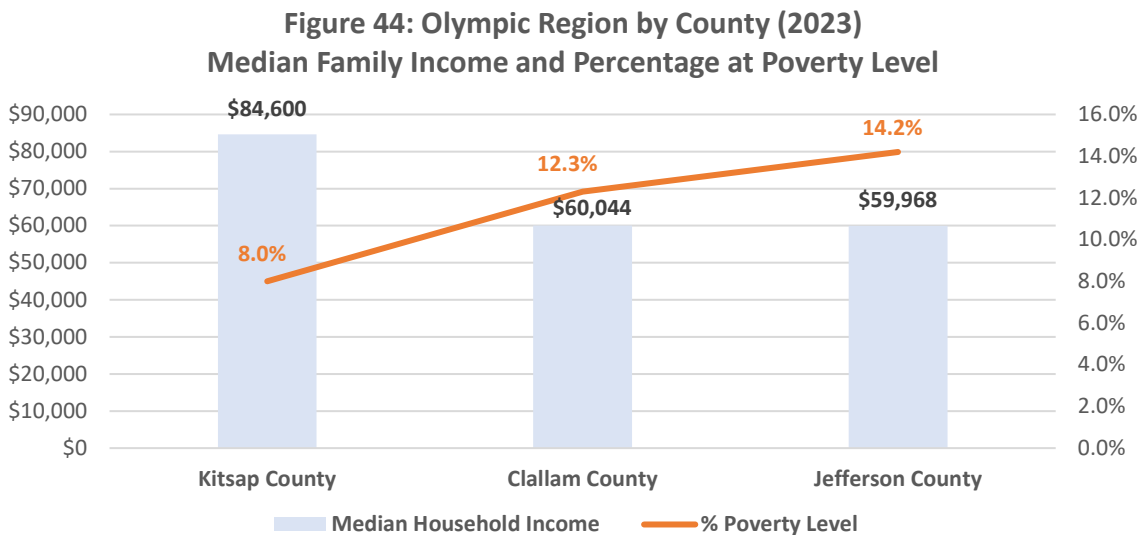


Source: Lightcast Q4 2023 Data Set; U.S. Census Bureau American Community Survey

Olympic Region

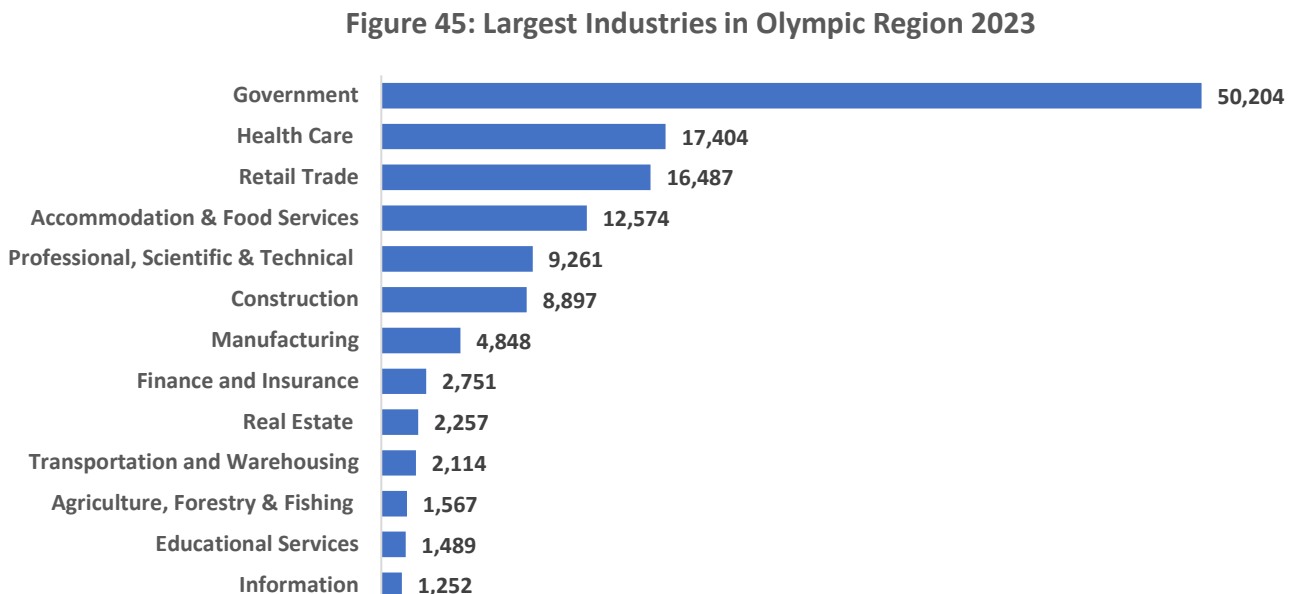
Economic Overview. The Olympic Region includes Clallam and Jefferson counties on the Olympic peninsula and Kitsap County. At the 2020 census, the overall population was 392,459, having grown by 3.8 percent over the previous five years (Lightcast, Q4 2023). It has a mix of small cities and rural areas.

Figure 44 shows median family incomes for each of the counties in the region, ranging from a low of \$59,968 in Jefferson County to \$84,600 in Kitsap County. Jefferson County has the highest poverty rate, with 14.2 percent of residents living in poverty, while Kitsap has the lowest rate at 8.0 percent.



Source: Lightcast Q4 2023 Data Set; American Community Survey

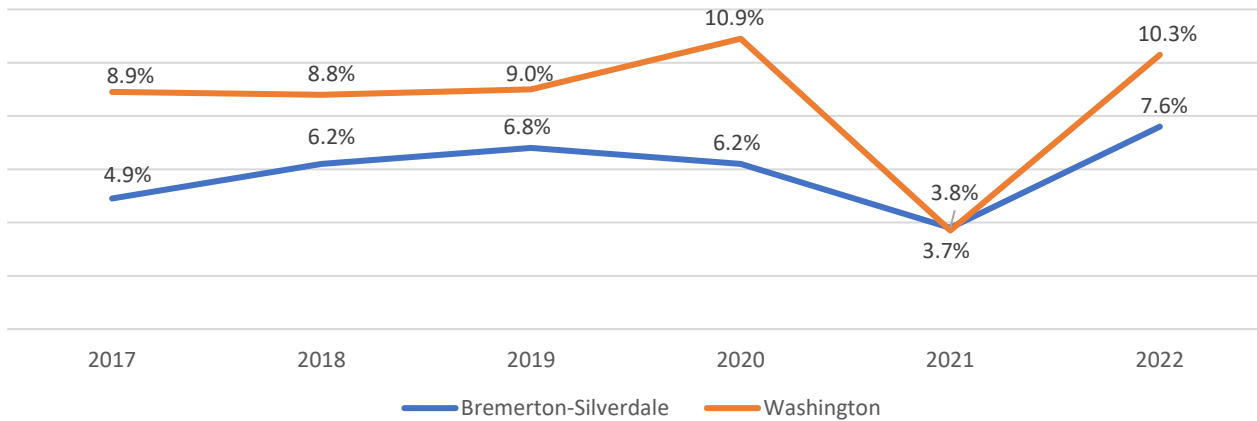
Figure 45 lists the top industries in the Olympic region employing the largest number of workers. Leading the list of industries is government, owing in part to the presence of the third largest naval base in the U.S. on the Kitsap Peninsula. This is followed by health care, retail trade, accommodation & food services, professional, scientific & technical services, construction, and manufacturing.



Source: Lightcast Q4 2023 Data Set; Washington State Employment Security Department (ESD)

The STEM Sector. STEM occupations are critical to development of the state’s dynamic and innovative economy and offer opportunities for high-wage jobs with good benefits. STEM industries tend to be concentrated in urban areas and the largest urban sector in the Olympic region is the Bremerton-Silverdale metro area in Kitsap County. Figure 46 shows STEM jobs in this area as a percentage of all jobs over a five-year period from 2017-2022. The STEM jobs presence in the area is below the statewide levels, but the overall trend is on an upward trajectory. In 2013, 4.9 percent of jobs were in STEM occupations, but by 2022 they represented 7.6 percent of all jobs.

**Figure 46: Bremerton-Silverdale Metro Area
STEM Jobs as a Percentage of All Jobs**



Source: AWB Institute Vitals 2023 Data Set

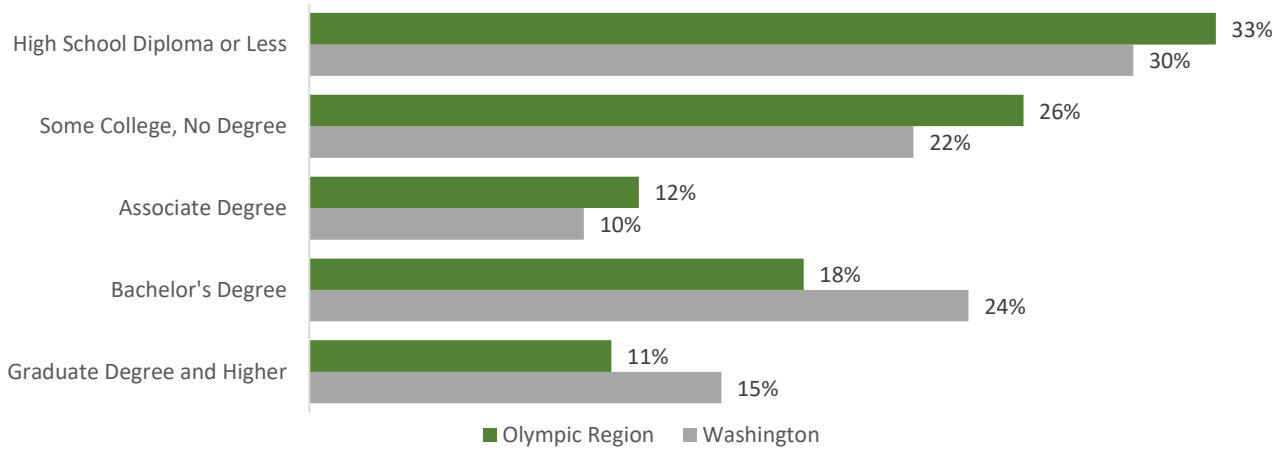
Postsecondary Education Overview. The Olympic Region has two public postsecondary institutions (see Table 7). Olympic College is located in Bremerton in Kitsap County and also has campuses in Poulsbo and Shelton. The main campus of Peninsula College is located in Port Angeles in Clallam County, with additional campuses in Forks and Port Townsend in Jefferson County. Both Colleges are primarily two-year institutions but also offer applied bachelor’s degree programs in a range of subjects. The region has no four-year higher education institutions.

Table 7: Olympic Region Postsecondary Institutions		Completions in 2022
Olympic College		2,461
Peninsula College		502

Source: Lightcast Q4 2023 Data Set; Integrated Postsecondary Education Data System (IPEDS)

Educational Attainment. Figure 47 shows the highest educational levels that residents in the region aged 25 and over have attained. The percentages of the population with their highest level of education at the lower end of the spectrum are all greater than the statewide percentages. For example, a larger proportion have only a high school diploma (33 percent) than the population statewide (30 percent). Similarly, 26 percent have completed some college without earning a degree compared to 22 percent statewide. Looking at the higher end of the education spectrum, we see that fewer residents in the region have completed a bachelor’s degree, 18 percent compared to 24 percent in the population statewide.

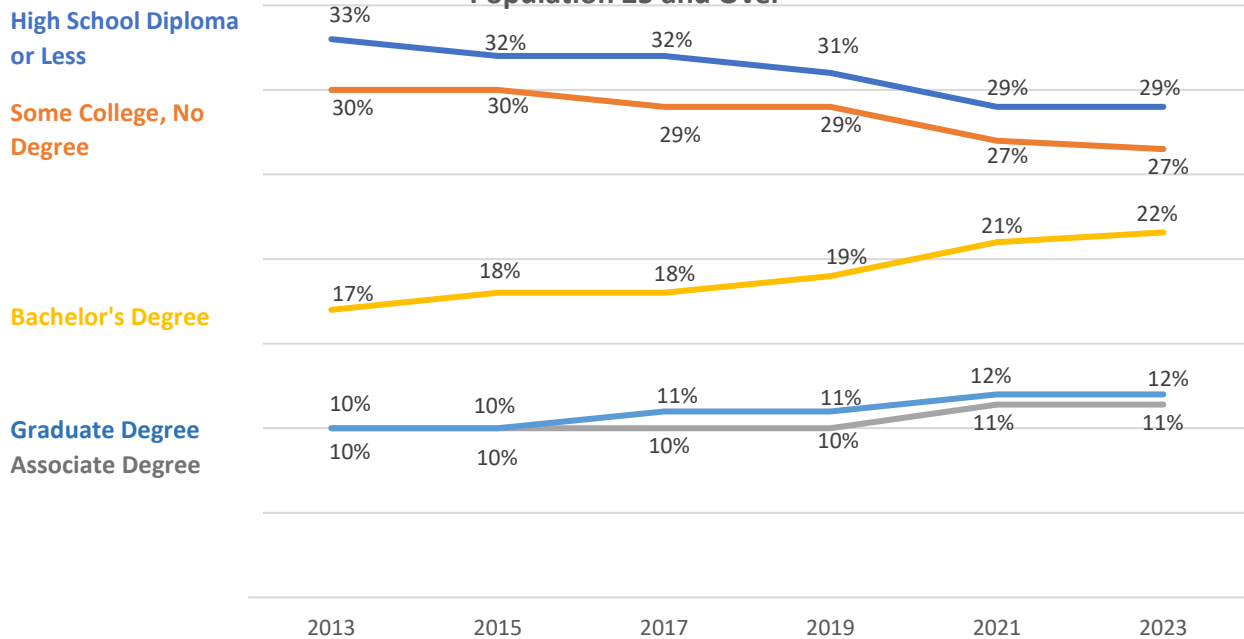
**Figure 47: Olympic Region
Highest Educational Attainment 2023
(Population Aged 25 and Over)**



Source: Lightcast Q4 2023 Data Set; U.S. Census American Community Survey.

Figure 48 shows the trend in educational attainment levels in the region over the last 10 years. Similar to some of the other regions, the changes over time are relatively modest. But they are moving in a generally promising direction. The percentage of those with less education, a high school diploma or some college, have declined over this time period. For example, residents with a high school diploma as their highest education level declined from 33 percent in 2013 to 29 percent by 2023. Conversely, education attainment at the higher end of the spectrum is rising slowly but steadily. The proportion who had completed a bachelor's degree in 2013 increased from 17 percent of the population to 22 percent in 2023.

**Figure 48: Olympic Region
Highest Educational Attainment Levels 2013-2023
Population 25 and Over**



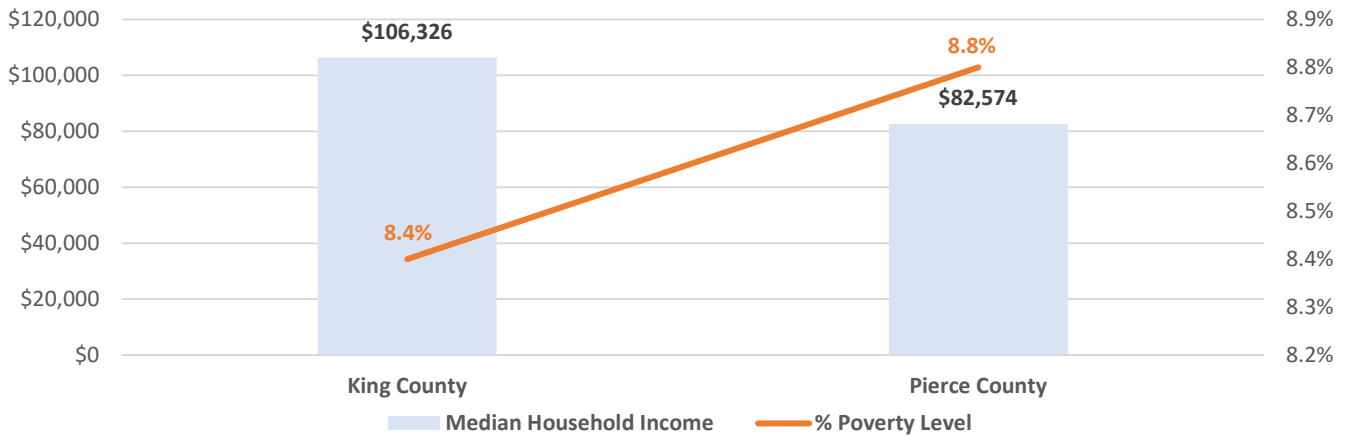
Source: Lightcast Q4 2023 Data Set; U.S. Census Bureau American Community Survey

Puget Sound Region

Economic Overview. The Puget Sound Region includes King and Pierce counties. It is the most densely populated area in the state with a population of 3,205,478 at the 2020 census. Seattle, Tacoma, and Bellevue are the area’s largest cities. This metro area has a population of 4,018,762 (U.S. Census Bureau, 2020).

Figure 49 shows median family incomes (MFI) for each of the counties in the region. The MFI for Pierce County is \$82,574 and for King County it is \$106,326. Pierce County has a slightly higher percentage of residents living in poverty at 8.8 percent, compared to King County at 8.4 percent.

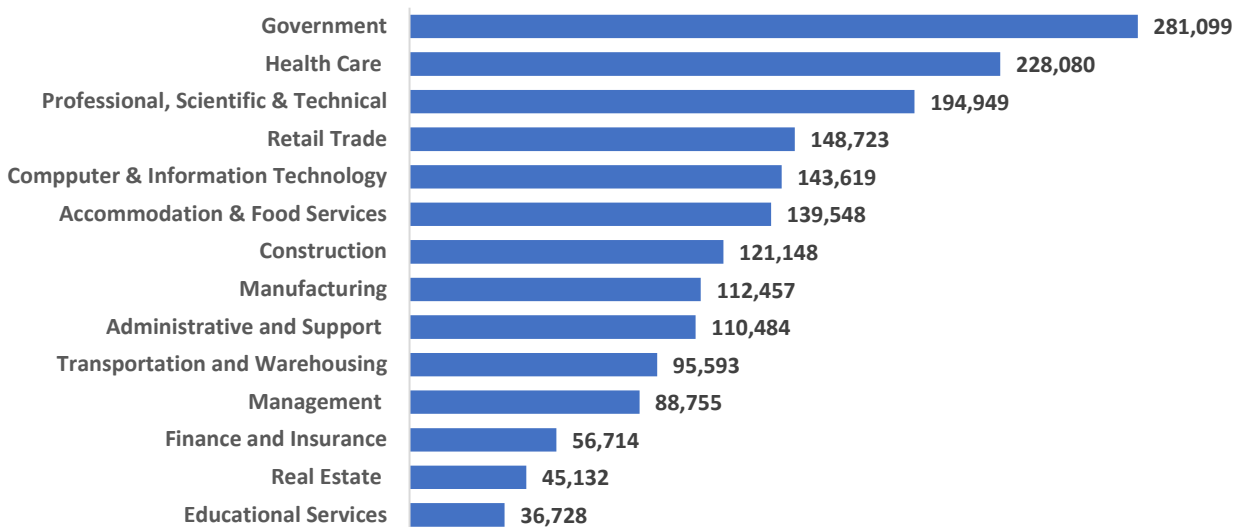
**Figure 49: Puget Sound Region by County (2023)
Median Family Income and Percentage at Poverty Level**



Source: Lightcast Q4 2023 Data Set; American Community Survey

Figure 50 lists the top industries in the Puget Sound region, employing the largest number of workers. Leading the list of industries is government, followed by health care, professional, scientific & technical services, retail trade, computer & information technology, accommodation and food services, construction, and manufacturing.

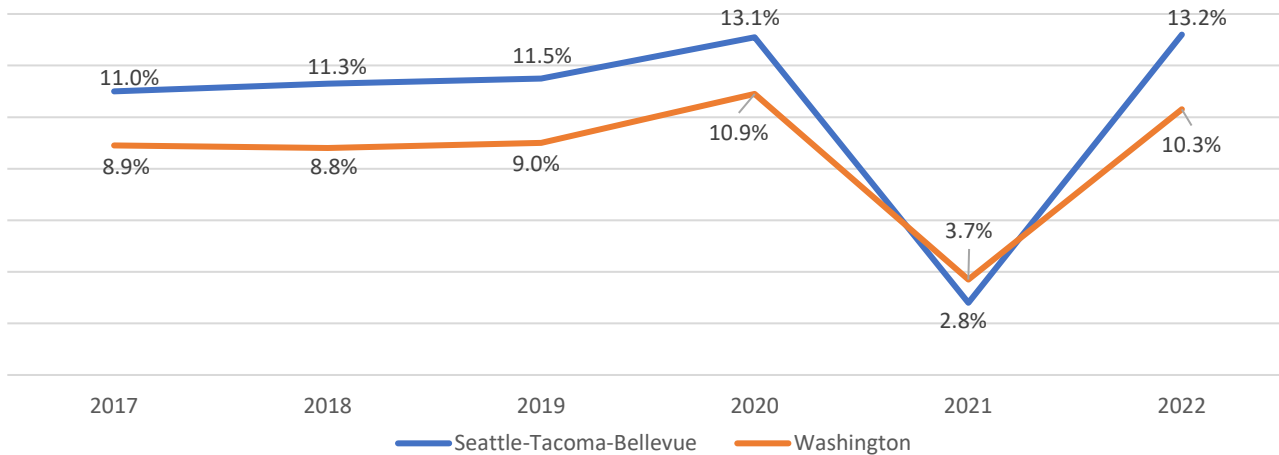
Figure 50: Largest Industries in the Puget Sound Region 2023



Source: Lightcast Q4 2023 Data Set; Washington State Employment Security Department (ESD)

The STEM Sector. STEM industries are critical to development of the state’s innovation economy. And the Seattle-Tacoma-Bellevue metro area has a high concentration of STEM jobs, with an array of prominent tech companies located there. Figure 51 shows STEM jobs in this area as a percentage of all jobs over a five-year period from 2017-2022. The STEM jobs presence in the area is substantially above the statewide levels, and the overall trend is on an upward trajectory. In 2017, 11.0 percent of jobs were in STEM occupations. The pandemic years led to a sharp drop but by 2022 STEM represented 13.2 percent of all jobs.

**Figure 51: Seattle-Tacoma-Bellevue Metro Area
STEM Jobs as a Percentage of All Jobs**



Source: AWB Institute Vitals 2023 Data Set

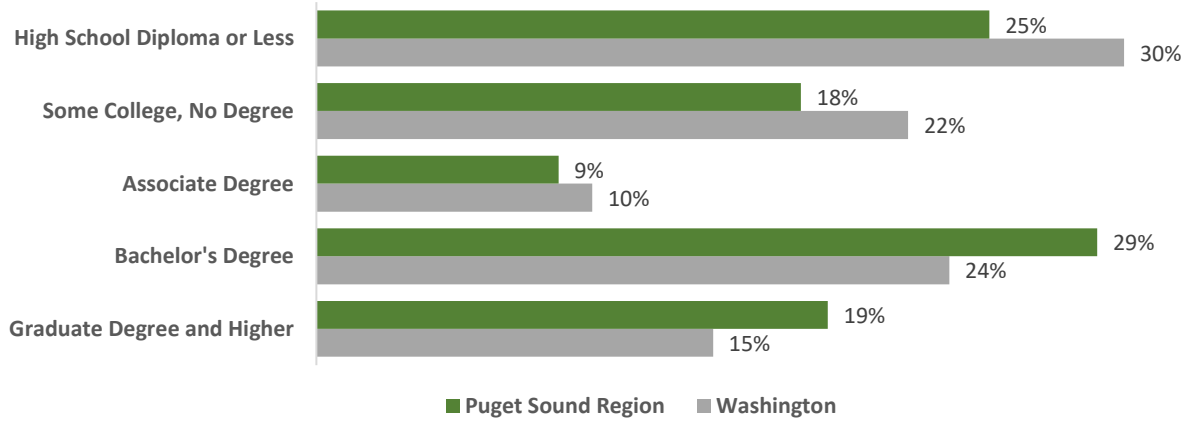
Postsecondary Education Overview. The Puget Sound Region has a number of public community and technical colleges and universities (see Table 8). Two-year institutions include North Seattle College, Seattle Central College, South Seattle College, Bellevue College, Pierce College, Green River College, Tacoma Community College, Clover Park Technical College, and Lake Washington Institute of Technology. Public universities include the University of Washington Seattle and its branch campuses in Bothell and Tacoma. Private institutions include Seattle University and a number of smaller campuses.

Table 8: A Partial List of Postsecondary Institutions in the Puget Sound Region	Completions in 2022
University of Washington-Seattle	15,655
Bellevue College	2,387
Seattle University	2,306
University of Washington-Bothell	2,103
Pierce College	1,952
University of Washington-Tacoma	1,859
Green River College	1,768
Tacoma Community College	1,717
Clover Park Technical College	1,633
Lake Washington Institute of Technology	1,272

Source: Lightcast Q4 2023 Data Set; Integrated Postsecondary Education Data System (IPEDS)

Educational Attainment. Figure 52 shows the highest educational levels that residents aged 25 and over have attained. Overall, educational attainment levels in the Puget Sound region substantially exceed statewide levels. For example, 29 percent of Puget sound residents have attained a bachelor’s degree, compared to 24 percent statewide. And 19 percent have attained a graduate degree. Four percentage points higher than the state residents as a whole.

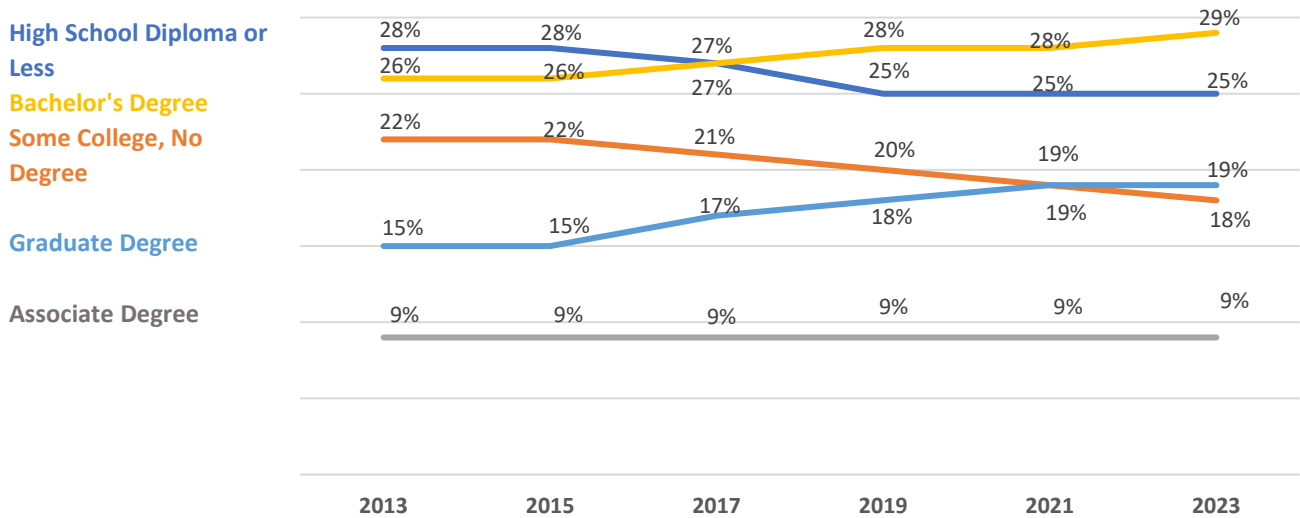
**Figure 52: Puget Sound Region
Highest Educational Attainment Levels 2023
(Population Aged 25 and Over)**



Source: Lightcast Q4 2023 Data Set; U.S. Census Bureau American Community Survey

Figure 53 shows the trend in educational attainment levels in the region over the last 10 years. The percentage of residents with higher levels of educational attainment have been increasing steadily over this time period. The proportion with a bachelor’s degree increased from 26 percent in 2013 to 29 percent in 2023. Similarly, the proportion who have earned a graduate degree increased from 15 percent in 2013 to 19 percent in 2023.

**Figure 53: Puget Sound Region
Highest Educational Attainment Levels 2013-2023
(Population 25 and Over)**



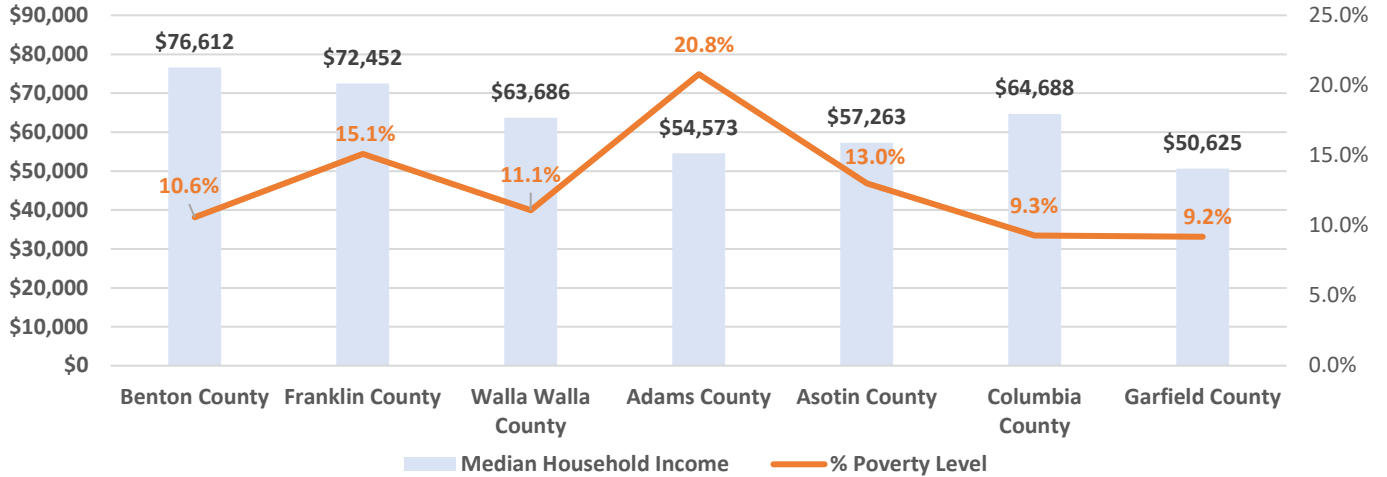
Source: Lightcast Q4 2023 Data Set; U.S. Census Bureau American Community Survey

Southeast Region

Economic Overview. The Southwest Region includes Adams, Asotin, Benton, Columbia, Franklin, Garfield, and Wall Walla counties. At the 2020 census, the overall population was 429,443. It is largely rural with a metropolitan area centered on Kennewick, Pasco, and Richland in Benton County.

Figure 54 shows median family incomes for each of the counties in the region, ranging from a low of \$50,625 in Garfield County to \$76,612 in Benton County. Adams County has the highest poverty rate, with 20.8 percent of residents living in poverty, while Garfield has the lowest rate at 9.2 percent.

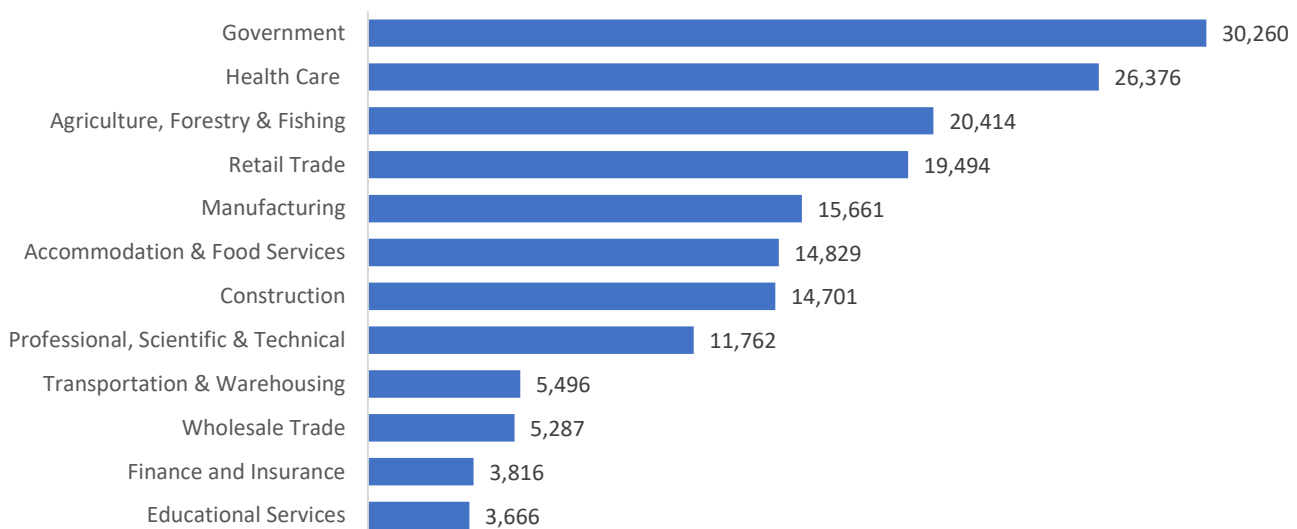
**Figure 54: Southeast Region by County (2023)
Median Family Income and Percentage at Poverty Level**



Source: Lightcast Q4 2023 Data Set

Figure 55 lists the top industries in the Southeast region, employing the largest number of workers. Leading the list of industries is government, followed by health care, agriculture, forestry & fishing, retail trade, manufacturing, accommodation & food services, construction, and professional, scientific & technical services.

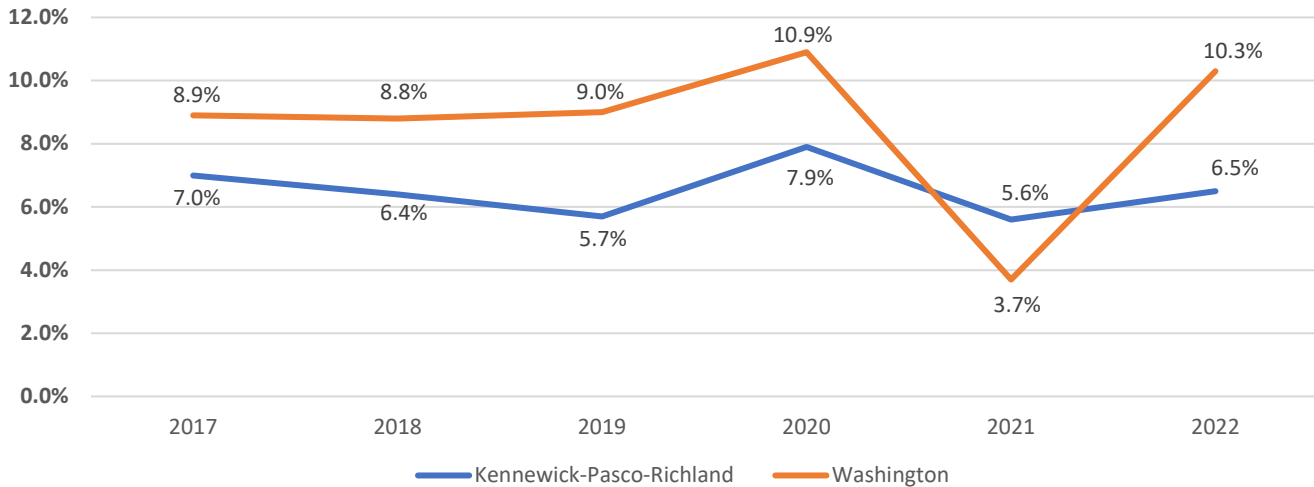
Figure 55: Largest Industries in the Southeast Region 2023



Source: Lightcast Q4 2023 Data Set; Washington State Employment Security Department (ESD)

The STEM Sector. The Kennewick-Pasco-Richland metro area has the highest concentration of STEM jobs in the region. Figure 56 shows STEM jobs in the area as a percentage of all jobs over a five-year period from 2017-2022. STEM employment in the area is below statewide levels, but the overall trend is for growth in this sector. From 2017 to 2020 the percentage of STEM jobs rose from 7.0 percent to nearly 8.0 percent, before a decline as a result of the pandemic in 2021. Since that time, STEM employment shows signs of recovery and jobs are once again on the rise.

**Figure 56: Kennewick-Pasco-Richland Metro Area
STEM Jobs as a Percentage of All Jobs**



Source: AWB Institute Vitals 2023 Data Set

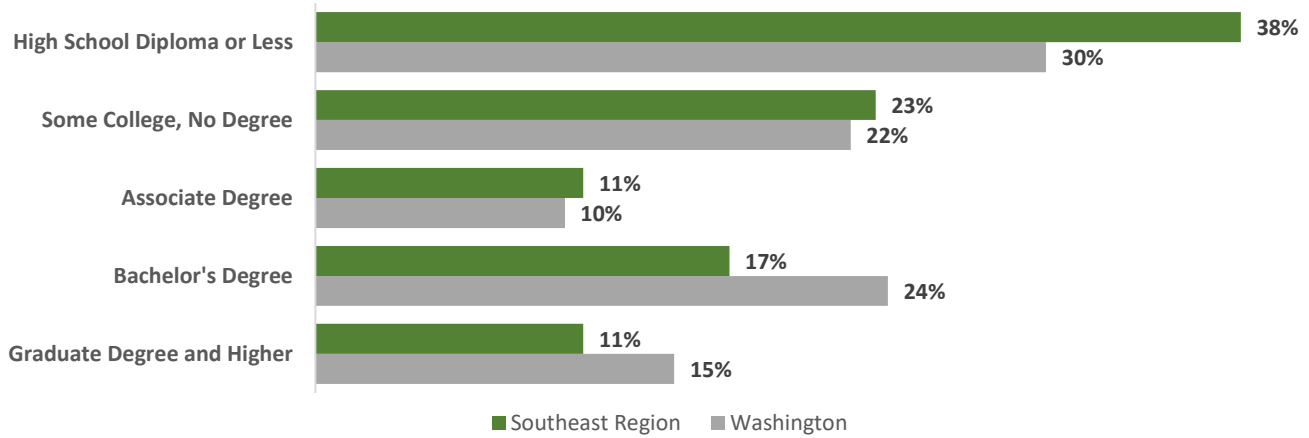
Postsecondary Education Overview. The Southeast Region has two public community and technical colleges, Columbia Basin College, and Walla Walla Community College (see Table 9. Public universities include the Washington State University Tri-Cities campus. The region also has two private liberal arts colleges: Whitman College, and Walla Walla University.

Table 9: A Partial List of Postsecondary Institutions in the Southeast Region	Completions in 2022
Columbia Basin College	1,599
Walla Walla Community College	813
Walla Walla University	422
Whitman College	389
Washington State University Tri-Cities	378

Source: Lightcast Q4 2023 Data Set; Integrated Postsecondary Education Data System (IPEDS)

Educational Attainment. Figure 57 shows the highest educational levels that residents in the region aged 25 and over have attained. The education levels in the Southeast are generally lower than the statewide figures. A larger proportion have only a high school diploma (38 percent) compared to the population statewide (30 percent). A larger percentage have not attained a postsecondary degree. 23 percent have completed some college without earning a degree compared to 22 percent statewide. Looking at the higher end of the education spectrum, we see that fewer residents in the region have completed a bachelor’s degree, 17 percent compared to 24 percent in the population statewide.

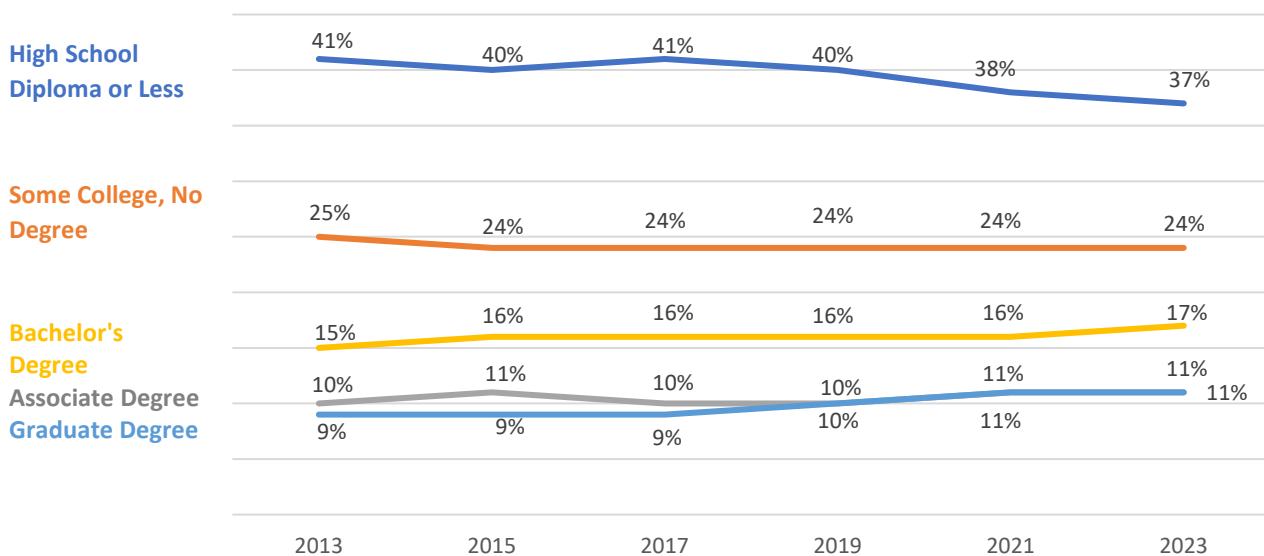
**Figure 57: Southeast Region
Highest Educational Attainment Levels 2023
(Population Aged 25 and Over)**



Source: Lightcast Q4 2023 Data Set; U.S. Census Bureau American Community Survey

Figure 58 shows the trend in educational attainment levels in the region over the last 10 years. Similar to some of the other regions, the changes over time are relatively modest. But they are moving in a generally promising direction. The percentage of those with less education, a high school diploma or some college, have declined over this time period. For example, residents with a high school diploma as their highest education level declined from 41 percent in 2013 to 37 percent by 2023. Conversely, education attainment at the higher end of the spectrum is rising slowly but steadily. The proportion who have completed a bachelor’s degree increased from 15 percent of the population in 2013 to 17 percent in 2023.

**Figure 58: Southeast Region
Highest Educational Attainment Levels 2013-2023
(Population 25 and Over)**



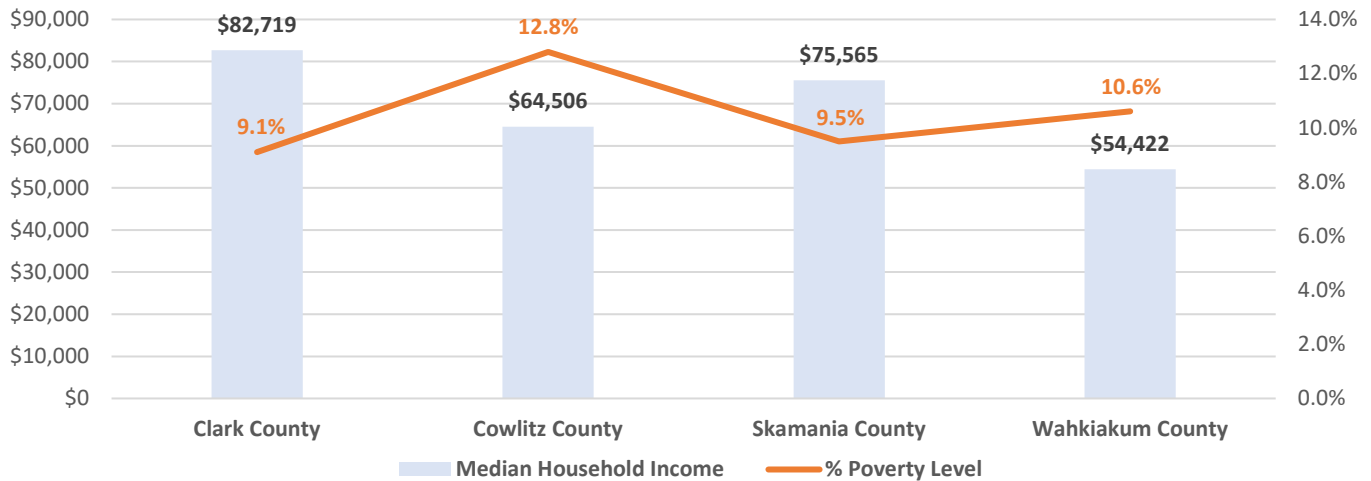
Source: Lightcast Q4 2023 Data Set; U.S. Census Bureau American Community Survey

Southwest Region

Economic Overview. The Southwest Region includes Clark, Cowlitz, Skamania, and Wahkiakum counties. At the 2020 census, the overall population was 658,340. It is largely rural with a metropolitan area centered on Vancouver and Hillsboro in Clark County that extends into the Portland vicinity.

Figure 59 shows median family incomes for each of the counties in the region, ranging from a low of \$54,422 in Wahkiakum County to \$82,719 in Clark. Cowlitz County has the highest poverty rate, with 12.8 percent of residents living in poverty, while Clark has the lowest rate at 9.1 percent.

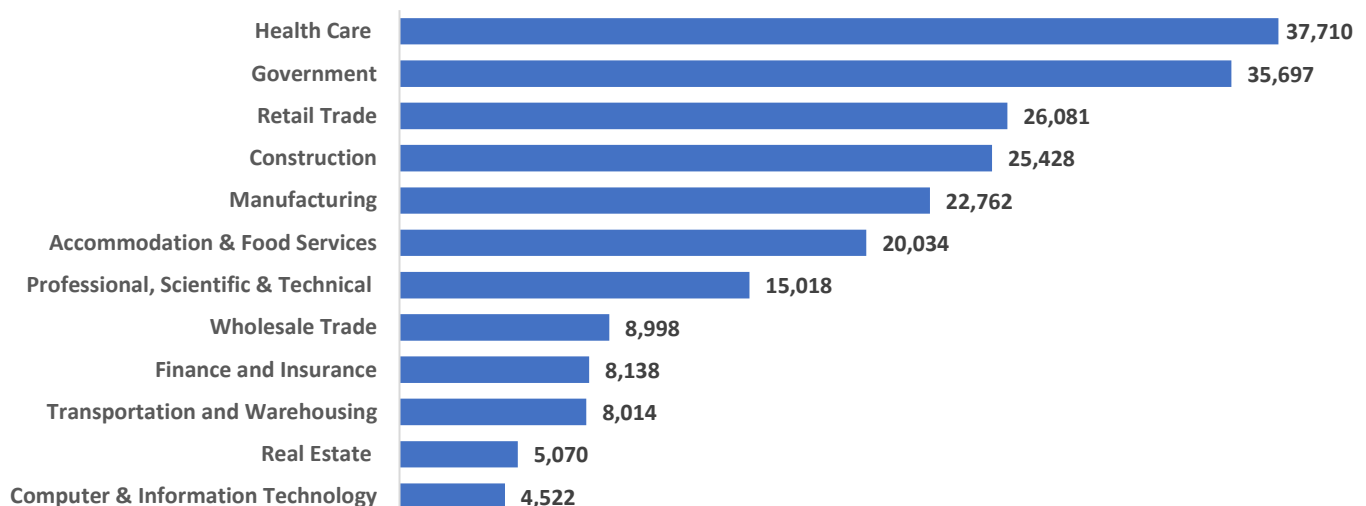
**Figure 59: Southwest Region by County (2023)
Median Family Income and Percentage at Poverty Level**



Source: Lightcast Q4 2023 Data Set

The top industries in the Southwest employing the largest number of workers are outlined in Figure 60. Leading the list of industries is health care, followed by government, retail trade, construction, manufacturing, accommodation & food services, and professional, scientific & technical services.

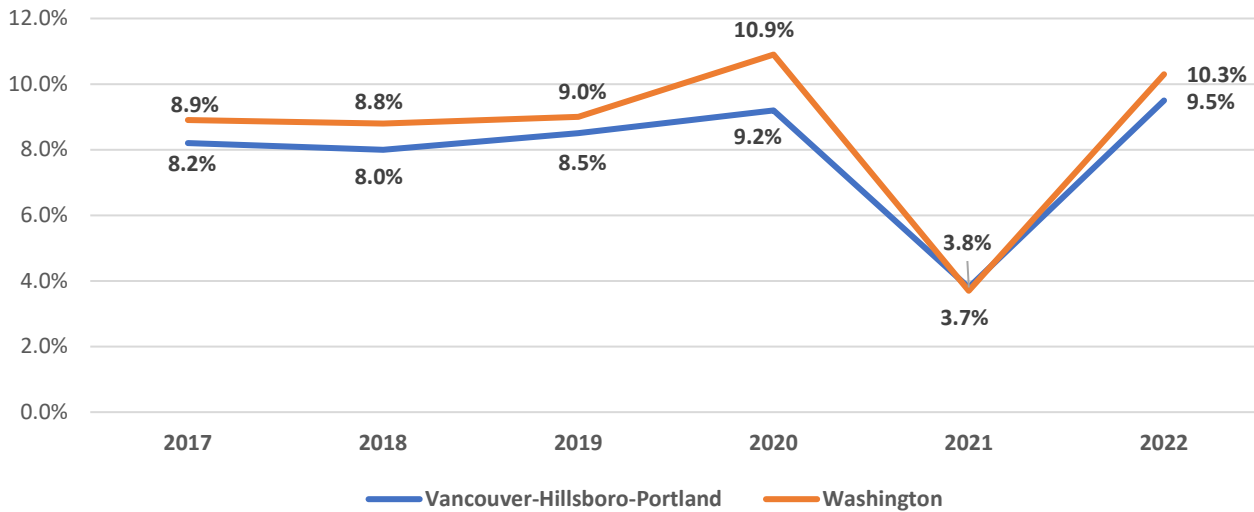
Figure 60: Largest Industries in the Southwest Region 2023



Source: Lightcast Q4 2023 Data Set; Washington State Employment Security Department (ESD)

The STEM Sector. The Vancouver-Hillsboro-Portland metro area has the highest concentration of STEM jobs in the region. Figure 61 shows STEM jobs in the area as a percentage of all jobs over a five-year period from 2017-2022. STEM employment in the area is below statewide levels, but the overall trend is for growth in this sector. From 2017 to 2022 the percentage of STEM jobs rose from 8.2 percent to 9.5 percent, with the exception of a sharp pandemic-induced decline in 2021.

**Figure 61: Vancouver-Hillsboro-Portland Metro Area
STEM Jobs as a Percentage of All Jobs**



Source: AWB Institute Vitals 2023 Data Set

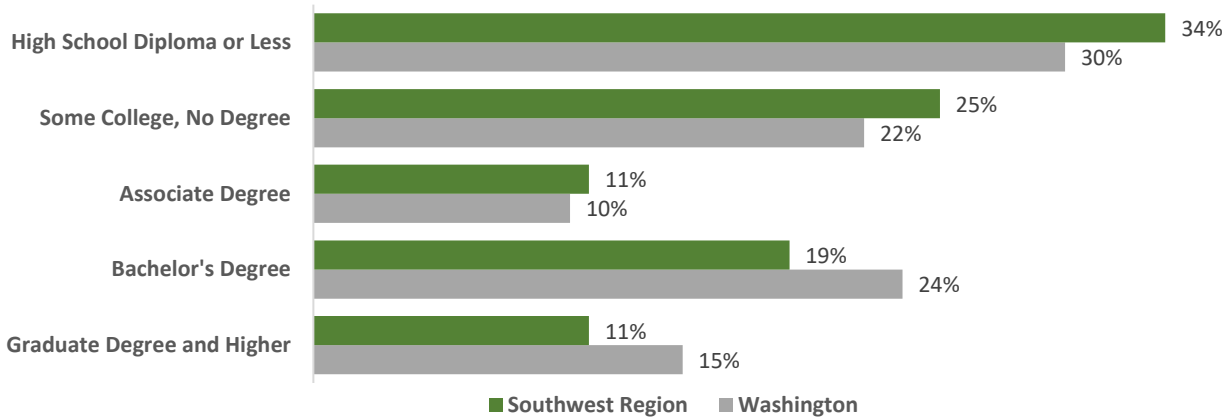
Postsecondary Education Overview. The Southwest Region has two public community and technical colleges: Clark College in Clark County and Lower Columbia College in Cowlitz County (see Table 10). Public universities include the Washington State University Vancouver campus.

Table 10: Postsecondary Institutions in the Southwest Region	Completions in 2022
Clark College	1,596
Washington State University Vancouver	951
Lower Columbia College	565

Source: Lightcast Q4 2023 Data Set; Integrated Postsecondary Education Data System (IPEDS)

Educational Attainment. The highest education levels that residents in the region aged 25 and over have attained are generally lower than the statewide figures (see Figure 62). For example, a larger proportion have only a high school diploma (34 percent) compared to the population statewide (30 percent). And a larger percentage of southwestern residents have not attained a postsecondary degree. 25 percent have completed some college without earning a degree compared to 22 percent statewide. Looking at the higher end of the education spectrum, we see that fewer residents in the region have completed a bachelor’s degree, 19 percent compared to 24 percent in the population statewide. Similarly, 11 percent have earned a graduate degree compared to 15 percent statewide.

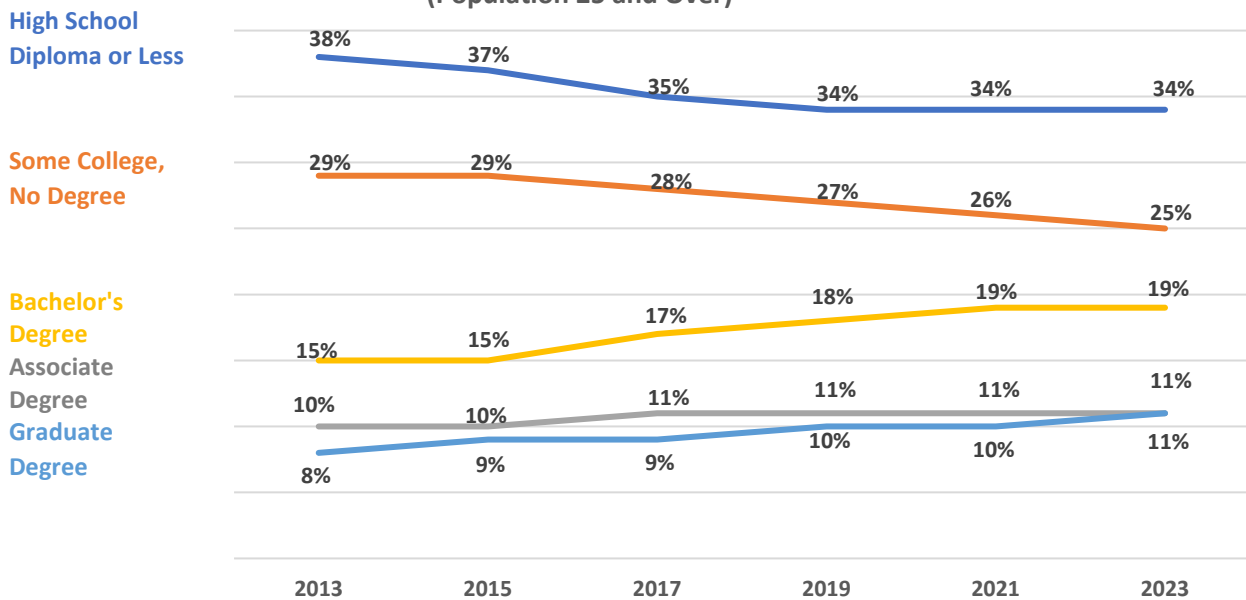
**Figure 62: Southwest Region
Highest Educational Attainment Levels 2023
(Population Aged 25 and Over)**



Source: Lightcast Q4 2023 Data Set; U.S. Census Bureau American Community Survey

Figure 63 shows the trend in educational attainment levels in the region over the last 10 years. As in some of the other regions, the changes over time have been relatively modest. But they are moving in a generally positive direction. The percentage of those with less education, a high school diploma or some college, have declined over this time period. For example, residents with a high school diploma as their highest education level declined from 38 percent in 2013 to 34 percent by 2023. Conversely, education attainment at the higher end of the spectrum is rising slowly but steadily. The proportion who have completed a bachelor's degree increased from 15 percent of the population in 2013 to 19 percent in 2023. The percentage of those who have earned a graduate degree rose from 8 percent to 11 percent during this time period.

**Figure 63: Southwest Region
Highest Educational Attainment Levels 2013-2023
(Population 25 and Over)**



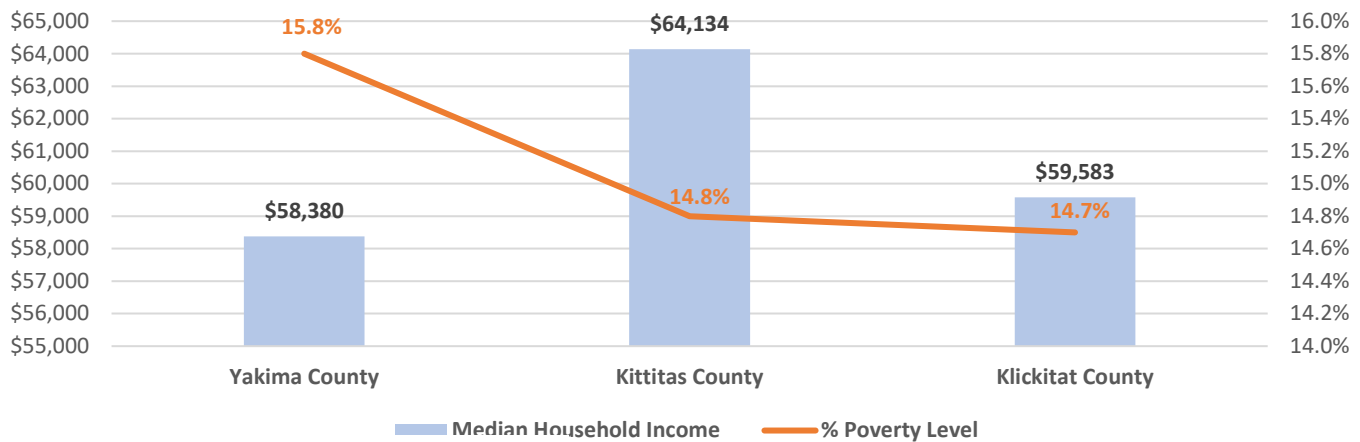
Source: Lightcast Q4 2023 Data Set; U.S. Census Bureau American Community Survey

Yakima Valley Region

Economic Overview. The Yakima Valley region is in the southern central part of the state. It includes Yakima, Kittitas, and Klickitat counties. As of the 2020 census, the overall population was 327,625. The region contains large expanses of rural areas. The largest city is Yakima, with a population of 96,968. The surrounding metro area has a population of 256,728.

Figure 64 shows median family incomes for each of the counties in the region, ranging from a low of \$58,380 in Yakima County to a high of \$64,134 in Kittitas. Yakima County has the highest poverty rate, with 15.8 percent of residents living in poverty, while Klickitat has the lowest rate at 14.7 percent.

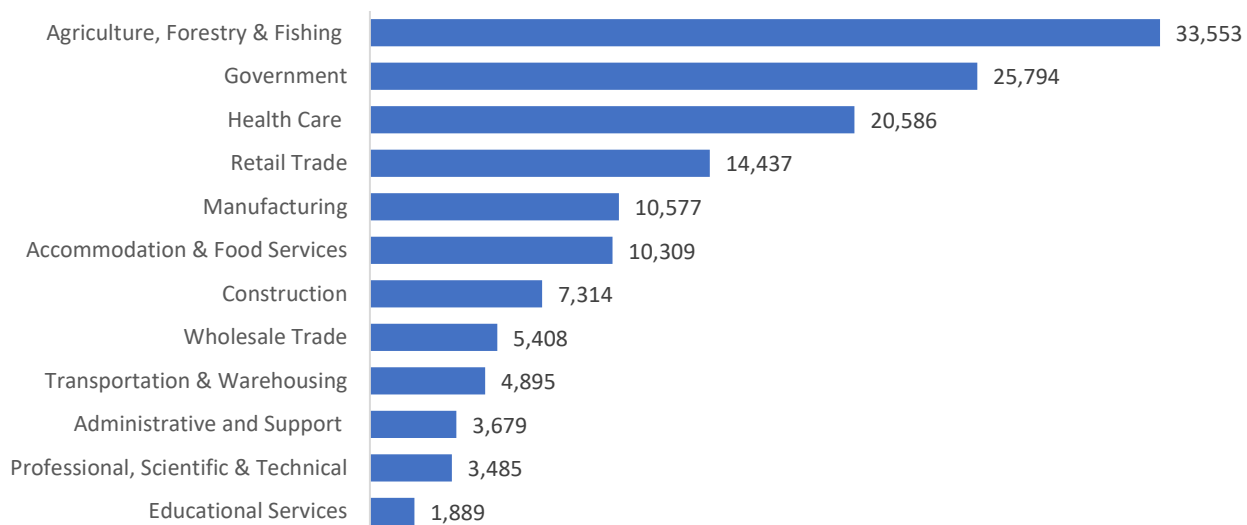
**Figure 64: Yakima Valley Region by County (2023)
Median Family Income and Percentage at Poverty Level**



Source: Lightcast Q4 2023 Data Set

The top industries in the Yakima Valley, employing the largest number of workers, are outlined in Figure 65. Leading the list of industries is agriculture, forestry & fishing, reflecting the rural character of the territory. This is followed by government, health care, retail trade, manufacturing, accommodation & food services, and construction.

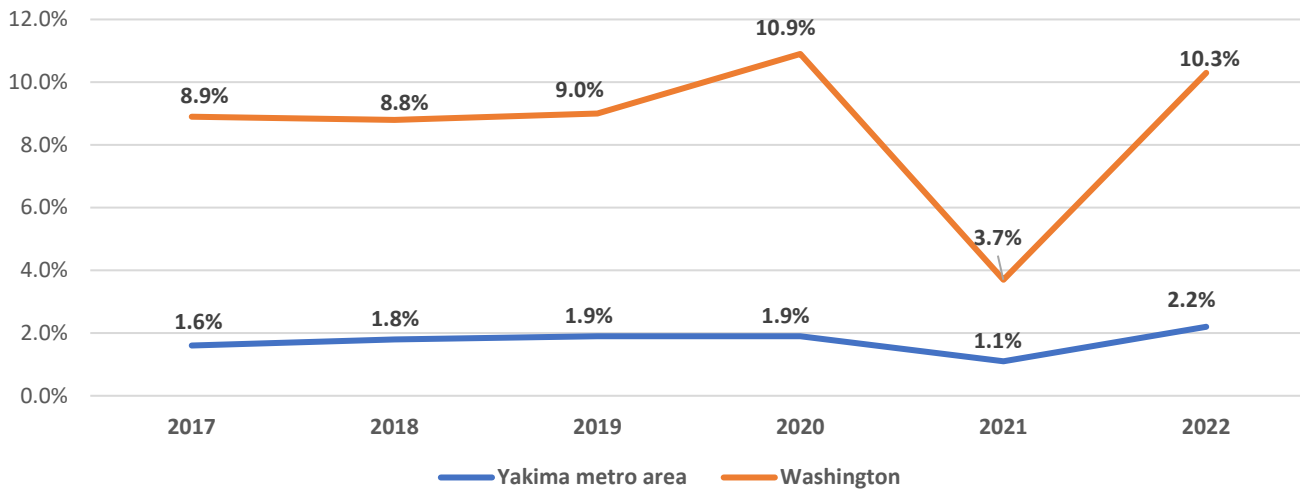
Figure 65: Largest Industries in the Yakima Valley Region 2023



Source: Lightcast Q4 2023 Data Set; Washington State Employment Security Department (ESD)

The STEM Sector. The STEM employing sector in the Yakima Valley region is relatively small, compared to the state as a whole. The Yakima metro area has the highest concentration of STEM jobs in the region. Figure 66 shows STEM jobs in the area as a percentage of all jobs over a five-year period from 2017-2022. STEM employment in the area is below statewide levels, but the overall trend is for growth in this sector. From 2017 to 2022 the percentage of STEM jobs rose from 1.6 percent to 2.2 percent, with the exception of a pandemic-induced decline in 2021.

**Figure 66: Yakima Metro Area
STEM Jobs as a Percentage of All Jobs**



Source: AWB Institute Vitals 2023 Data Set

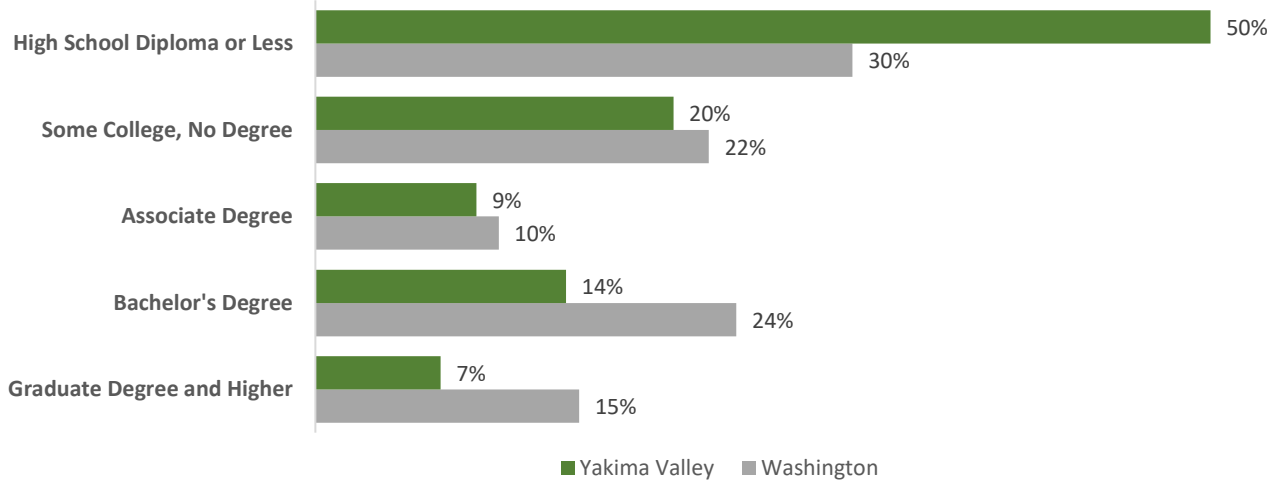
Postsecondary Education Overview. The Yakima Valley Region has one public two-year institution, Yakima Valley college, and one private non-profit technical trade school, Perry Technical Institute (see Table 11). Perry offers training in various fields ranging from short-term certificate to two-year programs. The region also has one public four-year institution, Central Washington University, located in Ellensburg in Kittitas County. In addition, Heritage University is a private university on the Yakama Indian reservation in the city of Toppenish.

Table 11: Postsecondary Institutions in the Yakima Valley Region	Completions in 2022
Central Washington University	2,960
Yakima Valley College	1,136
Perry Technical Institute	461
Heritage University	252
Pacific Northwest University of Health Sciences	177

Source: Lightcast Q4 2023 Data Set; Integrated Postsecondary Education Data System (IPEDS)

Educational Attainment. Educational attainment levels in the region for residents aged 25 and over are generally lower than the statewide figures (see Figure 67). For example, a larger proportion have only a high school diploma (50 percent) compared to the population statewide (30 percent). 20 percent have completed some college without earning a degree. Looking at the higher end of the education spectrum, we see that fewer residents in the region have completed a bachelor’s degree: 14 percent compared to 24 percent in the population statewide. Similarly, fewer residents have earned a graduate degree: 7 percent compared to 15 percent statewide.

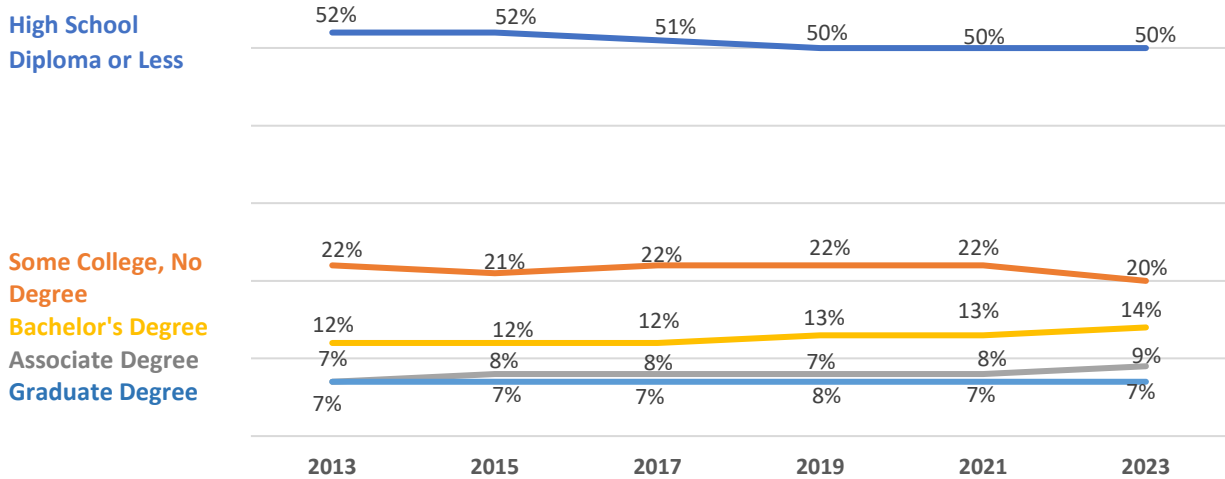
**Figure 67: Yakima Valley Region
Highest Educational Attainment Levels 2023
(Population Aged 25 and Over)**



Source: Lightcast Q4 2023 Data Set; U.S. Census Bureau American Community Survey

Figure 68 shows the trend in educational attainment in the region over the last 10 years. Changes over time have been relatively modest, but they are moving in a generally promising direction. The percentage of those with less education, a high school diploma or some college with no degree, have declined over this time period. For example, residents with a high school diploma as their highest education level declined from 52 percent in 2013 to 50 percent by 2023. Those with some college but no degree declined from 22 percent to 20 percent. At the higher end of the education spectrum there has been a corresponding rise in attainment. From 2013 to 2023, the proportion who completed a bachelor’s degree increased from 12 percent to 14 percent in 2023.

**Figure 68:Yakima Valley Region
Highest Educational Attainment Levels 2013-2023
(Population 25 and Over)**



Source: Lightcast Q4 2023 Data Set; U.S. Census Bureau American Community Survey

Concluding Observations

Washington is a state of diverse regions, each with unique geographic, demographic, and labor market characteristics. Some are largely rural while others are primarily urban, with local economies that reflect these differences. The major industries and employers in each region are shaped by these unique features. However, despite differences, the regions also share some common elements. One common feature is the need for more workers with postsecondary credentials. Currently, around 70 percent of all jobs in the state require some form of credential beyond a high school diploma, and it is projected that in less than ten years it will be around 72 percent (Georgetown Center, 2023).

One area where a lack of credentialed workers is particularly felt is at the midlevel. Washington has a considerable number of adult workers who have completed some postsecondary education but who have not earned a credential. This is a critical group who would be greatly assisted in advancing their careers through progressive stackable certificate programs on their way to an associate degree and beyond. Efforts are ongoing in this area. The Washington Student Achievement Council has emphasized the importance of increasing enrollment and support for working-age adults pursuing postsecondary credentials as a key priority in its 2024 Strategic Action Plan (WSAC, 2024). The State Board for Community and Technical Colleges has also made re-engagement with adult learners a priority in their strategic enrollment plan and is working to expand stackable non-degree credentials that can be applied toward completion of degree programs (SBCTC, 2019). The Workforce Board has developed a state workforce plan that prioritizes improving opportunities for youth and working-age adults to earn industry-valued credentials and ensure education and training pathways to living-wage jobs (Workforce Training & Education Coordinating Board, 2024). The state needs to continue to support efforts in this area.

Another critical issue that warrants continued focus is the gap between the supply of STEM-skilled workers and STEM labor market demand, which is seen in all regions and across all education levels. The highest concentration of STEM jobs is seen in the more densely populated Puget Sound region and in the state's larger metro areas in the Northeast, Southeast, Southwest and Northwest. Industries and employers in this sector offer high-wage jobs with good benefits, providing good career opportunities for jobseekers and a vital component to a thriving economy. Washington is among the elite states in the nation for innovation and research development, with a high percentage of STEM and STEM-related jobs (Washington State STEM Education Innovation Alliance, 2023). But annual certificate and degree completions are not keeping pace with rising labor market demand in key fields, such as computer science and information technology, engineering, health, and other fields associated with science and technology. Advancing STEM education in the state is an ongoing challenge.

Despite overall progress during the last decade in increasing numbers of students completing degree programs, more gains are needed if we are to meet rising employer demand in a range of fields. Significant employer workforce needs are seen at both the middle skills level and the bachelor's and graduate level. Among the areas facing the greatest labor market pressures are the fields of computer & information technology, engineering, and health. PreK-12 education is also facing recruitment and retention challenges in high-need fields—in areas like science, math, special education and in hard-to-staff schools in urban and rural districts.

Further studies are needed to illuminate equity gaps

Additional investigations could illuminate how equity gaps in higher education and the labor market are affecting our ability to meet workforce demand in Washington. It is beyond the scope of this current study. But additional analyses are needed to disaggregate more of the data by race, ethnicity, and gender to give a more complete picture of how education attainment levels are related to jobs in the various industries, wages, and unemployment trends. Examining the relationships between education attainment, workforce demand, wages, and unemployment through an equity lens will provide a deeper perspective on Washington's complex labor market. Closing education and workforce equity gaps should play a key role in our efforts to prepare the state's residents to meet employer workforce demand and seize promising employment opportunities in our state's innovative economy.

References

- AWB Institute Vitals. (2023). <https://www.awbinstitute.org/vitals/>.
- Burning Glass Technologies. (2019). Beyond Tech: Rising Demand for IT Skills in Non-Tech Industries. https://www.burningglass.com/wp-content/uploads/BGT_Oracle_BeyondTech_v7.pdf.
- Carnevale, A., Cheah, B., Wenzinger, E. (2021) The College Payoff: More Education Doesn't Always Mean More Earnings. Georgetown Center on Education and the Workforce. https://cew.georgetown.edu/wp-content/uploads/cew-college_payoff_2021-fr.pdf.
- Carnevale, A., Campbell, K., Cheah, B., Gulish, A., Quinn, M., Strohl, J. (2022) How Limits to Educational Affordability, Work-Based Learning, and Career Counseling Impede Progress toward Good Jobs. Georgetown Center on Education and the Workforce. https://cew.georgetown.edu/wp-content/uploads/chase-uncertain_pathway_1-fr.pdf.
- Carnevale, A., Smith, N., Van Der Werf, M., Quinn, M. (2023a). After Everything: Projections of Jobs, Education, and Training requirements through 2031. Georgetown Center on Education and the Workforce. <https://cew.georgetown.edu/wp-content/uploads/projections2031-national-report.pdf>.
- Carnevale, A., Smith, N., Van Der Werf, M., Quinn, M. (2023b). After Everything: Projections of Jobs, Education, and Training requirements through 2031, State Report. Georgetown Center on Education and the Workforce. https://cew.georgetown.edu/wp-content/uploads/Projections_2031-State-Report.pdf.
- Edge Research and HCM Strategists. (2022) Where are the Students? New Research into College Enrollment Declines. Bill & Melinda Gates Foundation. <https://usprogram.gatesfoundation.org/news-and-insights/articles/gates-foundation-probes-college-enrollment-decline>.
- Frey, C.B., Osborne, M.A (2017). The Future of Employment: How Susceptible are Jobs to Computerization? *Technological Forecasting and Social Change*, 114(1), 254-280. <https://www.sciencedirect.com/science/article/abs/pii/S0040162516302244>.
- Gould, E., Kandra, J., DeCourcy, K. (2023). Young adults are graduating into a strong labor market. *Economic Policy Institute*. <https://www.epi.org/blog/class-of-2023-young-adults-are-graduating-into-a-strong-labor-market/>.
- Gownder, J.P., O'Grady, M. (2023) Forrester's 2023 Generative AI Jobs Impact Forecast, US: generative AI will reshape Far More Jobs than it Eliminates. <https://www.forrester.com/report/forresters-2023-generative-ai-jobs-impact-forecast-us/RES179790>.
- Kochhar, R. (2023). Which U.S. Workers are More Exposed to AI on Their Jobs? Pew Research Center. <https://www.pewresearch.org/social-trends/2023/07/26/which-u-s-workers-are-more-exposed-to-ai-on-their-jobs/>.
- National Student Clearinghouse Research Center (2023). Spring 2023 Current Term Enrollment Estimates. <https://nscresearchcenter.org/current-term-enrollment-estimates/>.
- Professional Educator Standards Board (PESB). (2024). Washington State Educator Shortage Report: School Year 2022-23. <https://drive.google.com/file/d/1xDI2vSTHkt9qKAP5UJ1Vq-rdNbx3dfnb/view>.
- Scholaroo. (2023). The U.S. Teacher Shortage 2023: A State-by-State Breakdown. <https://scholaroo.com/report/teacher-shortage-by-state/>.
- Scott, C. (2022). Demand for software developers doubled in 2021. InfoWorld, March 2022. <https://www.infoworld.com/article/3654480/demand-for-software-developers-doubled-in-2021.html>.
- State Board for Community and Technical Colleges (SBCTC). (2019). WACTC Strategic Enrollment Task Force: Final Recommendations. <https://www.sbctc.edu/resources/documents/about/task-forces-work-groups/sem/strategic-enrollment-task-force-report.pdf>.
- STEM Education Innovation Alliance. (2023). Washington State STEM Education Report Card Update 2023. https://wsac.wa.gov/sites/default/files/2023-STEM_Report_Card_Update.pdf.
- Stockler, E. (2024) GenAI: Unpacking Promises and Risks for Software Development Jobs. *Netconomy*. <https://netconomy.net/blog/genai-risks-promises-software-development-jobs/#replacesoftware>.

U.S. Census Bureau. (2019). Populations and Housing Unit Estimates Tables 2019.

U.S. Bureau of Labor Statistics. (2023) Education Pays, 2022. <https://www.bls.gov/careeroutlook/2023/data-on-display/education-pays.htm>.

Violante, G. (2008). "Skill-Biased Technological Change." *The New Palgrave Dictionary of Economics*, 2nd Edition (Steven Durlauf and Lawrence Blume, Editors). https://violante.mycpanel.princeton.edu/Books/sbtc_january16.pdf.

Washington State STEM Education Innovation Alliance. (2023). 2023 STEM Education Report Card Update. https://wsac.wa.gov/sites/default/files/2023-STEM_Report_Card_Update.pdf.

Washington Student Achievement Council (WSAC). (2021). Washington's Skilled and Educated Workforce Report, 2021. <https://wsac.wa.gov/sites/default/files/2021-22.WashingtonsSkilledandEducatedWorkforceReport.pdf>.

Washington Student Achievement Council (WSAC). (2024). 2024 Strategic Action Plan: Increasing Postsecondary Educational Attainment and Equity in Washington State. <https://wsac.wa.gov/sites/default/files/2024.Strategic-Action-Plan.pdf>.

Workforce Training & Education Coordinating Board (WTB). (2024). Talent and Prosperity For All: Washington's Workforce Plan. <https://wtb.wa.gov/planning-programs/washington-state-workforce-plan/>.