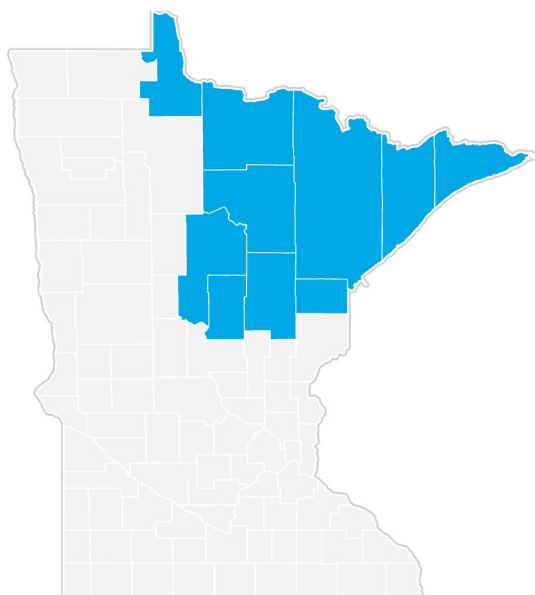


Workforce Trends

CAREER & TECHNICAL EDUCATION



Northeast Minnesota

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Overview

Recent years have brought seismic shifts in the world of work, driven forward by ongoing economic uncertainties, dramatic talent shortages, workforce misalignments, and rapidly evolving technology. These dynamics make forecasting future labor market needs and supply uniquely challenging. But despite the turbulence, several pivotal shifts have begun to materialize, illuminating the path ahead in inclusive workplaces, skills-based hiring, and the digital workplace. The continuing effects of the pandemic, domestic and international unrest, and shifting economic models have been felt in disparate ways across the nation. The job market is undoubtedly cooling but is still experiencing significant talent shortages plaguing every industry and career cluster.

This report unpacks the current workforce landscape of Minnesota and the regional nuances of talent demand by career field. We aim to support Minnesota Perkins Consortia in navigating changes in their local labor market and guide their understanding of how these changes may impact enrollment, industry, career advancement, and the needed programs of study by region.¹ Each report includes:

- Regional economic and demographic overview
- Career field and cluster analysis including regional importance of each sector, key labor market statistics, and forecasting for future demand in the six career fields:
 - Health Science Technology
 - Engineering, Manufacturing, and Technology
 - Arts, Communications, and Information Systems
 - Agriculture, Food, and Natural Resources
 - Business, Management, and Administration
 - Human Services
- Gap analysis in each of the six career fields, including:
 - Occupation gaps (i.e., talent shortages)
 - Award gaps
- An Origin-to-Gateway-to-Target model analysis for how to help move students from entry points into their field of interest into other aligned careers, taking into account automation, remote work, and the changing work environment
- A word on remote work and jobs of the future

About This Report

This report was developed by RealTime Talent for the Career and Technical Education Consortia of Minnesota with funding provided by Minnesota State. The contents of this publication were made possible through the Strengthening Career and Technical Education for the 21st Century Act (Perkins V) Federal grant from the United States Department of Education administered through Minnesota State Colleges and Universities. If you have questions about the data found in this report, or are interested in learning more, please contact the Director of Strategic Research Erin Olson at erin@realtimentalentmn.org.

¹ All labor market data in this report comes from Chmura Economics JobsEQ Dataset 2023Q2 unless otherwise noted. www.jobseq.com



Table of Contents

Overview	1
About This Report	1
Northeast Minnesota	4
Introduction	4
Community Profile	6
Demographics	6
Employment	8
Education	11
Labor Market.....	14
Workforce Forecast.....	14
Quantifying Talent Shortages.....	16
Occupation Gaps	16
Award Gaps	17
Job Posting Trends in Northeast Minnesota	20
Career Fields.....	22
Career Cluster Detail	23
Priorities by Career Field	25
Health Science Technology	26
Human Services.....	33
Arts, Communications, and Information Systems.....	41
Business, Management, and Administration	48
Engineering, Manufacturing, and Technology	56
Agriculture, Food, and Natural Resources	63
Conclusion.....	71



Data Notes 72

Definitions and Methodology 74



Northeast Minnesota

Introduction

This report highlights the current and future talent needs in the ten counties of Northeast Minnesota.² Starting from the community demographics, unique opportunities, and the critical occupations and industries underpinning the regional economy, this macroeconomic overview is intended to support educators and administrators who aim to increase alignment between educational programming and local businesses' most pressing needs. Identifying the skills, certifications, and qualifications for positions today will help the education community anticipate community needs and ensure that curriculum best prepares students for relevant job opportunities of the future here in Northeast Minnesota.

This report uses an Origin-to-Gateway-to-Target Occupation model, used by the Rework America Alliance and modified in this report by RealTime Talent, and illustrates promising likely and aligned pathways into each career field. This model supports students looking for entry points from an initial occupation of interest into other aligned careers, considering automation, remote work, and the changing work environment. The model itself is shown below, along with the definitions of each grouping of occupations.

Origin-to-Gateway-to-Target (OGT) Model

Target Occupations

High wage (above regional average)

High-skill (require some credential)

High-demand (2/4 indicators: under 3% unempl, higher than average 5-year growth, total 5-year demand >50% of current empl, high job posting volume)

*Often also high occupation gap and award gap

Gateway Occupations

Mid-wage (\$45,000 – regional average)

Low-middle skills (HS diploma, some OJT)

Sufficient demand (3-5% unemployment and/or high volumes of current opportunities)

Origin Occupations

Low wage (<\$45,000/year)

Low skill (no credential)

Low demand (over 5% unemployment, low growth, low replacement demand, and/or low job postings)

² Aitkin, Carlton, Cass, Cook, Crow Wing, Itasca, Koochiching, Lake, Lake of the Woods, and St. Louis Counties.



Origin Occupations are roles that are low-wage (<\$37,000 per year) or mid-wage (\$37,000-\$45,000) that have high unemployment locally among workers without four-year degrees.

Gateway Occupations are good jobs that can lead to Target Occupations as skills and experience are developed. These typically offer between \$45,000 up to the regional average wage (\$57,900 in the Northeast). Gateway occupations offer a wage uplift to those previously employed in Origin Occupations and offer longer-term economic mobility and career advancement opportunities. These are most often best suited for adult workforce programming and first postsecondary experiences.

Target Occupations refer to high-wage occupations that pay at or above the region's average wage (\$57,900 in the Northeast). These positions are also high-skill—meaning that they require an industry credential, certification, or higher education—and high-demand. Many of these Target Occupations are also facing Opportunity Gaps and Award Gaps locally, labeled below as “OG” and “AG” respectively.

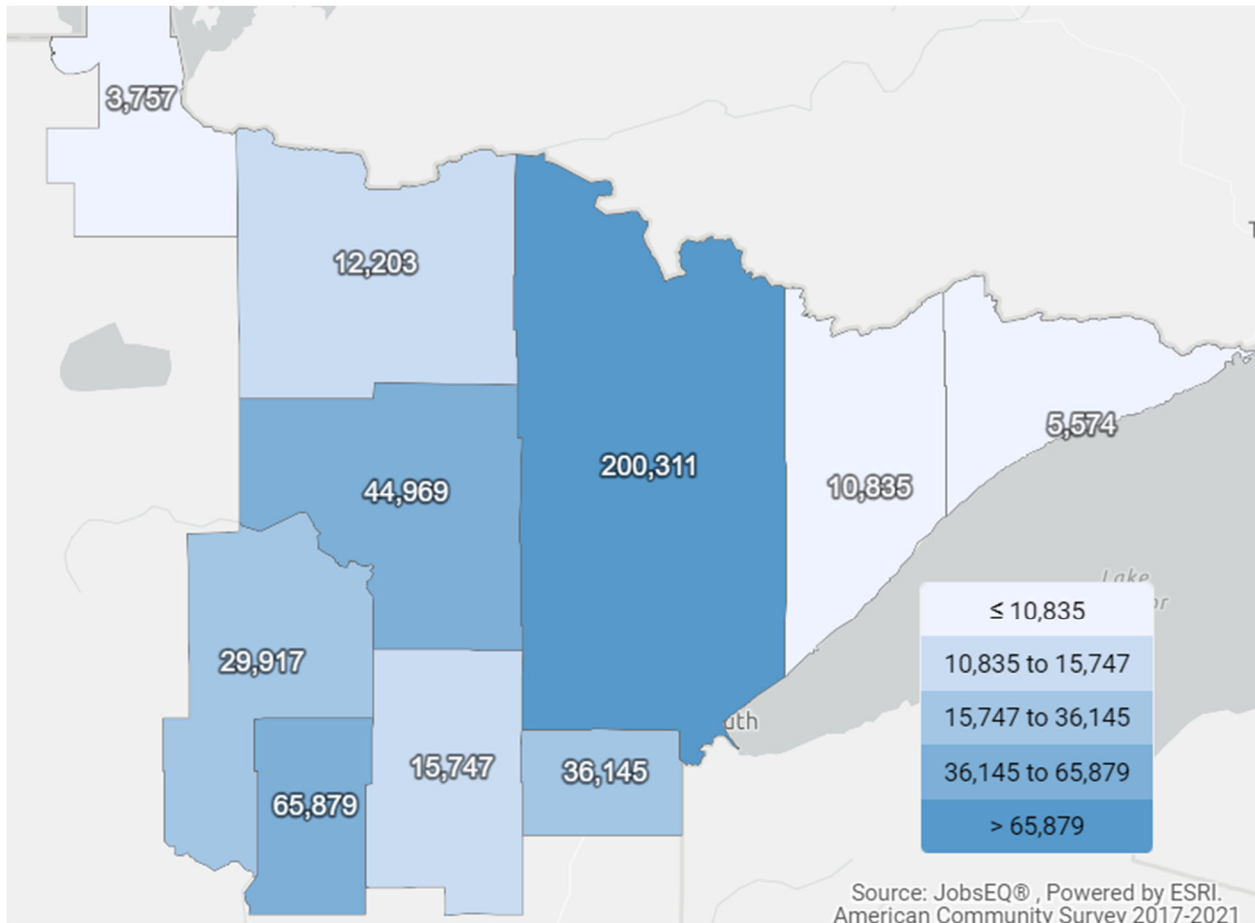


Community Profile

Demographics

The Northeast is home to about 7.5% of Minnesota’s total population. In all, about 425,337 people live in Northeast Minnesota, according to 2017-2021 American Community Survey Estimates—an increase of nearly 3,000 people from the prior year’s estimates. Based on year-over-year population growth, about 429,155 people are estimated to live in the region as of 2022. Approximately 20% of Northeast Minnesota’s population are minors under 18 years of age. Overall, the region’s median age is 5.7 years older (43.9 years) than the statewide median (38.2 years), mostly attributable to a larger share of adults over 55 years of age in the region. The cities of Duluth, Brainerd, Grand Rapids, Hibbing, and Virginia are home to the largest local concentrations of population and are economic hubs for the region. St. Louis County is home to 47.1% of the region’s population.

Resident Population of Northeast Minnesota

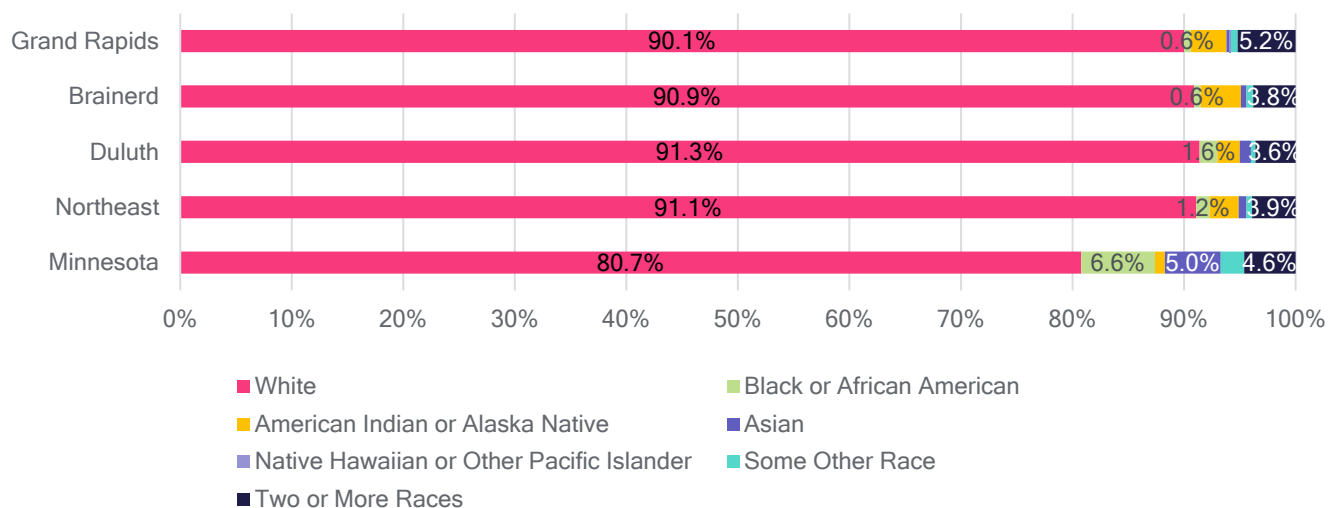


Population diversity increased between the two most recent population estimates statewide by 1.2 percentage points from 2019 to 2020 estimates, and by another 0.9 percentage points between 2020 and 2021 estimates. In the Northeast, the share of the population that is BIPOC increased only moderately, by 0.9 percentage points between 2019



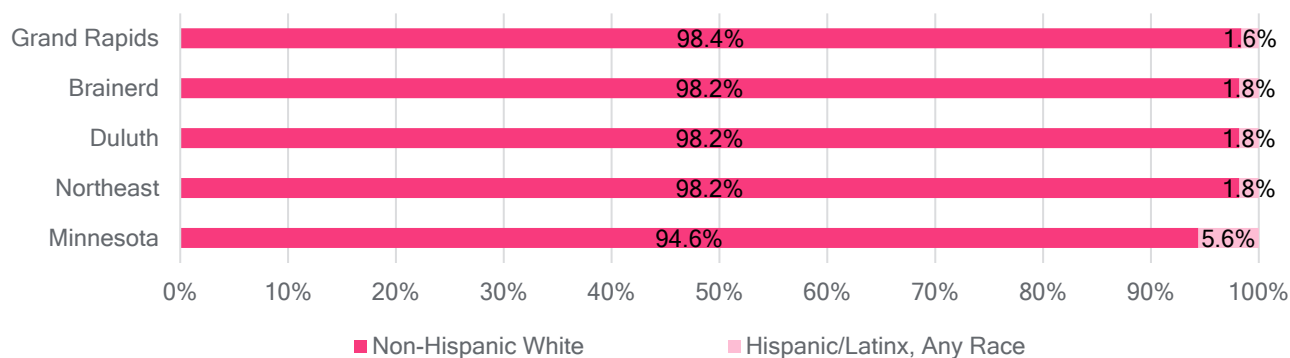
and 2020 estimates, and by another 0.2 percentage points between 2020 and 2021. Across the region overall, 8.9% of the population identify as Black, Asian, American Indian, Native Hawaiian, or some other race other than White (BIPOC). The region has a higher relative share of American Indian residents than many other regions of Minnesota. The three largest cities in the region saw similar increases in diversity, though Brainerd continues to have a greater share of American Indian residents than the other larger cities in the region at 3.6% of the population (the same from the prior year's estimates). The share of African American and American Indian residents decreased slightly or remained the same between the most recent years' estimates, with a slight increase of 0.1 percentage point for Grand Rapids. Those that identify as "some other race" or "two or more races" increased again in all major cities of the Northeast—by well over one percentage point in Grand Rapids. The share of the population that is BIPOC in Duluth increased from 8.0% in 2019 estimates to 8.7% in 2020 and remained at 8.7% for 2021. In Brainerd BIPOC population increased from 8.9% to 9.1% and in Grand Rapids from 8.3% to 9.9%. Approximately 1.8% of Northeast Minnesota's residents are Hispanic or Latinx. This increased by 0.1% point from last year's estimates.

Population Race, All Ages



American Community Survey 2017-2021.

Population Ethnicity, All Ages



American Community Survey 2017-2021.



Community Demographics

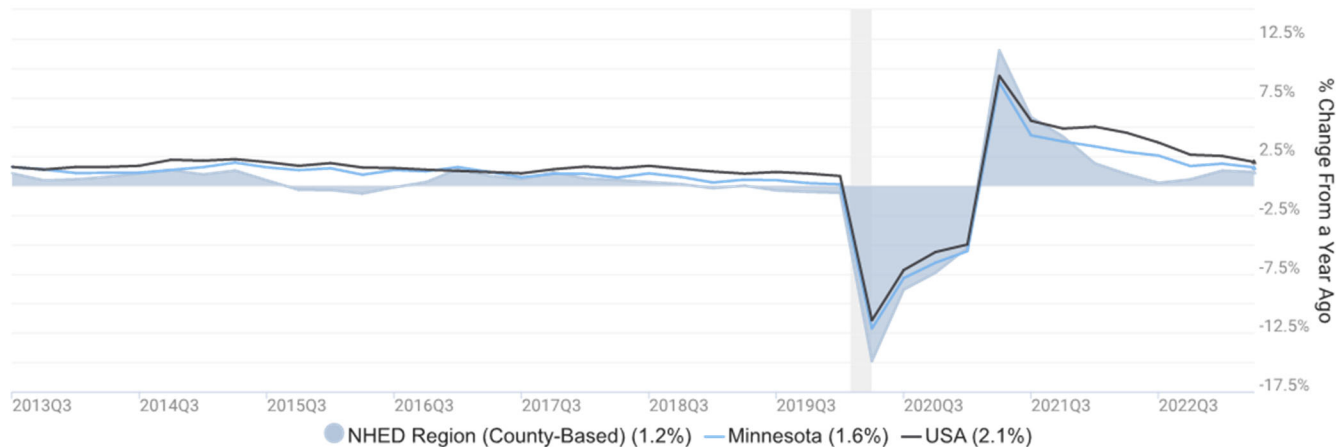
Demographics	Percent			Percent			Value		
	Duluth, MN-WI MSA	Brainerd, MN μSA	Grand Rapids, MN μSA	Northeast Minnesota	Minnesota	USA	Northeast Minnesota	Minnesota	USA
Population (ACS)	—	—	—	—	—	—	425,337	5,670,472	329,725,481
Male	50.7%	50.5%	50.7%	50.7%	50.1%	49.5%	215,785	2,839,135	163,206,615
Female	49.3%	49.5%	49.3%	49.3%	49.9%	50.5%	209,552	2,831,337	166,518,866
Median Age ²	—	—	—	—	—	—	43.9	38.2	38.4
Under 18 Years	19.6%	21.5%	20.9%	19.9%	23.3%	22.5%	84,770	1,323,569	74,234,075
18 to 24 Years	11.0%	6.4%	6.7%	9.3%	8.8%	9.2%	39,721	499,402	30,339,089
25 to 34 Years	11.5%	10.3%	9.4%	10.7%	13.3%	13.8%	45,385	756,215	45,360,942
35 to 44 Years	12.0%	10.8%	11.4%	11.4%	13.0%	12.9%	48,430	738,714	42,441,883
45 to 54 Years	11.6%	11.4%	11.7%	11.4%	12.1%	12.6%	48,631	688,596	41,631,458
55 to 64 Years	15.0%	16.0%	16.2%	15.6%	13.4%	13.0%	66,247	762,459	42,829,413
65 to 74 Years	11.6%	14.1%	14.3%	13.0%	9.4%	9.6%	55,231	535,592	31,590,619
75 Years, and Over	7.7%	9.5%	9.4%	8.7%	6.5%	6.5%	36,922	365,925	21,298,002
Race: White	91.3%	90.9%	90.1%	91.1%	80.7%	68.2%	387,327	4,576,758	224,789,109
Race: Black or African American	1.6%	0.6%	0.6%	1.2%	6.6%	12.6%	5,001	376,406	41,393,012
Race: American Indian and Alaska Native	2.0%	3.6%	3.2%	2.6%	0.9%	0.8%	11,235	52,695	2,722,661
Race: Asian	1.0%	0.5%	0.3%	0.7%	5.0%	5.7%	3,048	283,382	18,782,924
Race: Native Hawaiian and Other Pacific Islander	0.0%	0.0%	0.1%	0.0%	0.0%	0.2%	79	2,338	615,557
Race: Some Other Race	0.4%	0.6%	0.6%	0.5%	2.1%	5.6%	2,136	120,011	18,382,796
Race: Two or More Races	3.6%	3.8%	5.2%	3.9%	4.6%	7.0%	16,511	258,882	23,039,422
Hispanic or Latino (of any race)	1.8%	1.8%	1.6%	1.8%	5.6%	18.4%	7,568	319,828	60,806,969

American Community Survey 2017-2021 unless noted otherwise.

Employment

By 2021Q1, employment was hit hard by the COVID-19 pandemic and dropped to 181,573 (based on a four-quarter moving average). Over the year ending 2022Q2, employment increased by 2.1% in the region. As of 2023Q2, total employment in Northeast Minnesota was 193,357, increasing by 1.6% from the prior year.

Employment for Northeast Minnesota

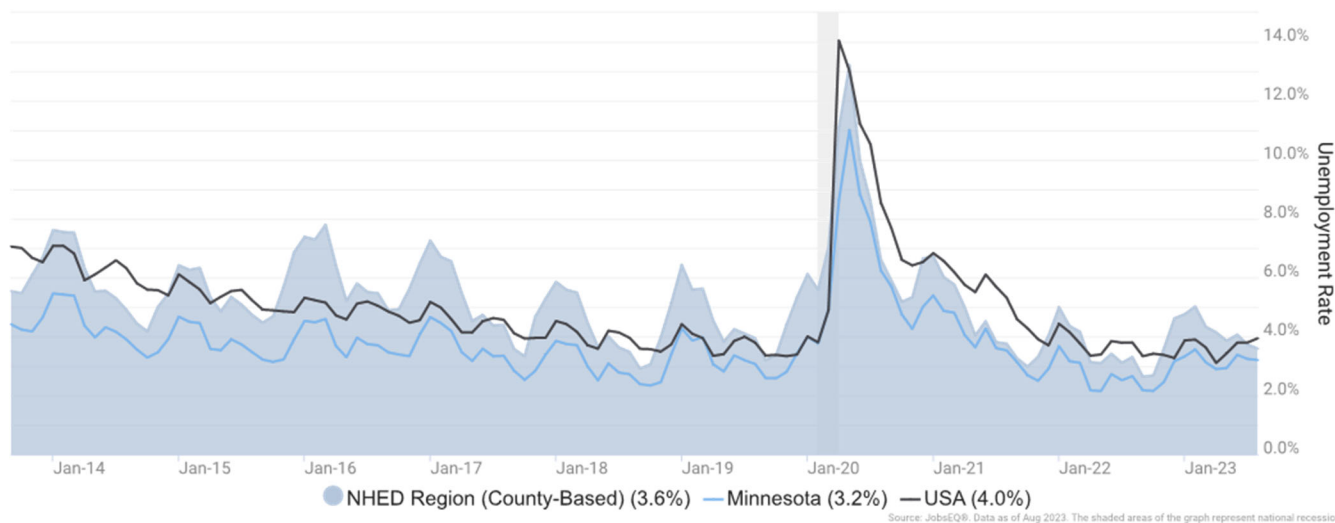


Employment data are derived from the Quarterly Census of Employment and Wages, provided by the Bureau of Labor Statistics and imputed where necessary. Data are updated through 2023Q1 with preliminary estimates updated to 2023Q2.



The unemployment rate in Northeast Minnesota was 3.6% as of August 2023. The regional unemployment rate was higher than the statewide rate (3.2%), but lower than the national rate of 4%. One year earlier, in August 2022, the unemployment rate in Northeast Minnesota was 3.3%.

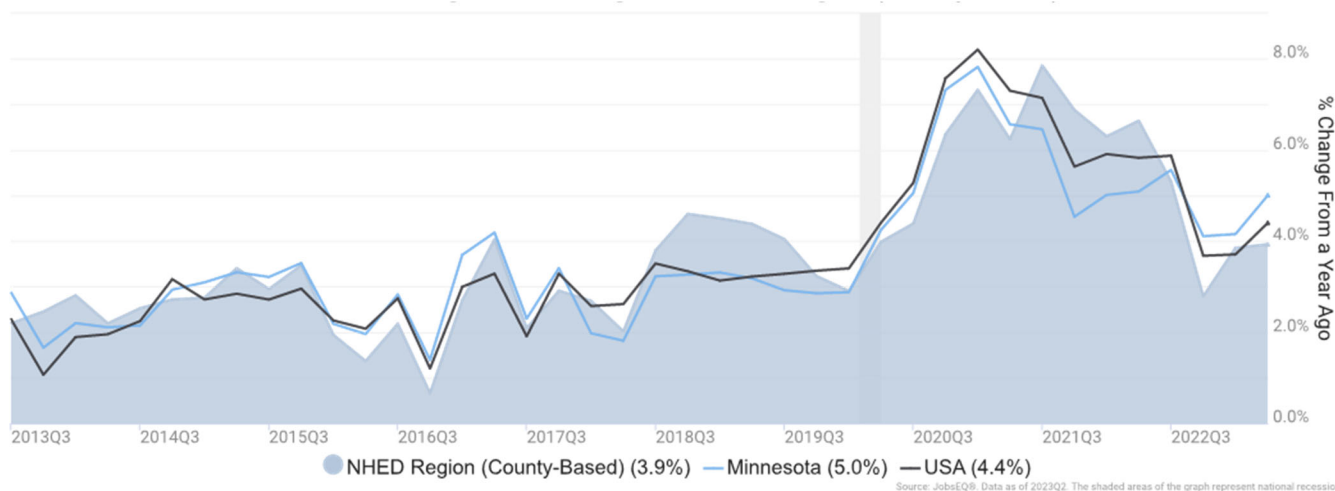
Unemployment for Northeast Minnesota



Unemployment rate data are from the Local Area Unemployment Statistics, provided by the Bureau of Labor Statistics and updated through August 2023.

The average worker in Northeast Minnesota earned annual wages of \$53,232 as of 2023Q2, an increase of \$2,013 from 2022Q2 (\$51,219), which follows an increase of \$3,500 from 2021Q2 (\$47,759). Average annual wages per worker increased 3.9% (compared to last year’s increase of 6.8%) in the region over the preceding four quarters. Wages rose similarly nationwide, where annual average wages were \$70,318 as of 2023Q2 (compared to \$67,777 as of 2022Q2 and \$63,393 as of 2021Q1).

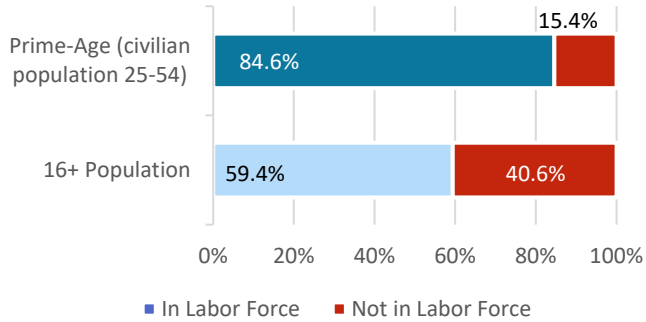
Average Annual Wages for Northeast Minnesota



Annual average wages per worker data are derived from the Quarterly Census of Employment and Wages, provided by the Bureau of Labor Statistics and imputed where necessary. Data are updated through 2023Q1 with preliminary estimates updated to 2023Q2.



Labor Force Participation Rate



The region has a civilian labor force of 208,203 (down about 1,500 workers from the prior year's estimates) with a participation rate of 59.4%, which lags Minnesota's labor force participation rate for the population over 16 by nearly 10 percentage points. This is due primarily to the older age of residents in Northeast Minnesota. However, the participation rate of the prime working age population (between the ages of 25 and 64) also continues to lag the statewide rate—84.6% compared to the statewide 88.4%.

American Community Survey 2017-2021 unless noted otherwise.

The Northeast region has a higher share of veterans than observed statewide, at 5.0% of the regional population compared to 3.6% broadly across the state. Veteran labor force participation is lower in the region than observed statewide, and decreased slightly from the prior year's estimates to 71.6% compared to last year's 72.3%. Statewide veteran labor force participation is at 80.6%. The Northeast also has a higher share of people with disabilities, 13.0% compared to 9% statewide, and a lower labor force participation rate for the population with a disability, 45.3% compared to 53.5% statewide. The Northeast region overall has a similar share of disconnected youth (1.6% of youth) compared to statewide (1.8%) but below national rates (2.5%), with variation between communities. While 3.3% of Grand Rapids youth are disconnected from school, training, or work (up significantly from 1.4% in the prior year's estimates), in Brainerd about 2.7% of youth are disconnected, down one percentage point from last year.

Economic and Social Characteristics of Northeast Minnesota

Economic and Social Characteristics	Percent			Percent			Values		
	Duluth, MN-WI MSA	Brainerd, MN μSA	Grand Rapids, MN μSA	Northeast Minnesota	Minnesota	USA	Northeast Minnesota	Minnesota	USA
Labor Force Participation Rate and Size (civilian population 16 years and over)	61.2%	59.2%	55.8%	59.4%	69.1%	63.4%	208,203	3,105,784	166,672,597
Prime-Age Labor Force Participation Rate and Size (civilian population 25-54)	84.5%	85.9%	83.1%	84.6%	88.4%	82.5%	120,205	1,926,180	106,173,534
Armed Forces Labor Force	0.2%	0.1%	0.0%	0.1%	0.1%	0.5%	502	4,029	1,196,529
Veterans, Age 18-64	4.8%	5.4%	5.9%	5.0%	3.6%	4.4%	12,284	122,885	8,848,937
Veterans Labor Force Participation Rate and Size, Age 18-64	73.2%	73.6%	66.6%	71.6%	80.6%	77.0%	8,801	99,030	6,809,906
Median Household Income ²	—	—	—	—	—	—	\$60,678	\$77,706	\$69,021
Per Capita Income	—	—	—	—	—	—	\$33,636	\$41,204	\$37,638
Poverty Level (of all people)	12.7%	10.9%	11.1%	12.2%	9.2%	12.6%	50,255	512,312	40,661,636
Households Receiving Food Stamps/SNAP	9.9%	8.7%	10.2%	9.4%	7.5%	11.4%	16,727	167,348	14,105,231



Enrolled in Grade 12 (% of total population)	1.2%	1.2%	1.2%	1.2%	1.4%	1.3%	5,077	78,960	4,425,322
Disconnected Youth ³	1.2%	2.7%	3.3%	1.6%	1.8%	2.5%	348	5,245	432,389
Children in Single Parent Families (% of all children)	33.6%	34.6%	26.8%	32.9%	28.4%	34.0%	26,063	361,209	23,909,672
Uninsured	4.2%	6.4%	4.9%	4.7%	4.6%	8.8%	19,840	258,292	28,489,142
With a Disability, Age 18-64	12.5%	13.0%	14.5%	13.0%	9.0%	10.3%	31,944	306,405	20,537,729
With a Disability, Age 18-64, Labor Force Participation Rate and Size	45.3%	46.2%	43.7%	45.3%	53.5%	44.2%	14,461	164,030	9,068,973
Foreign Born	2.1%	1.2%	0.7%	1.7%	8.5%	13.6%	7,245	479,231	44,844,808

American Community Survey 2017-2021 unless noted otherwise.

*Median values for certain aggregate regions (such as MSAs) may be estimated as the weighted averages of the median values from the composing counties.

**Disconnected Youth are 16-19 year olds who are (1) not in school, (2) not high school graduates, and (3) either unemployed or not in the labor force.

Education

In Northeast Minnesota, 5.3% of adults between the ages of 25 and 64 do not have a high school diploma or equivalent (up 0.3 percentage points from last year), and about 25.8% have a high school diploma as their highest level of education (compared with 21.2% statewide). Nationwide, 10.3% of U.S. residents between the ages of 25 and 64 never completed high school or obtained an equivalent credential. The prime working age population of Brainerd has a larger share of residents with a high school diploma or less, while Duluth has nearly 10% of its population with a postgraduate degree.

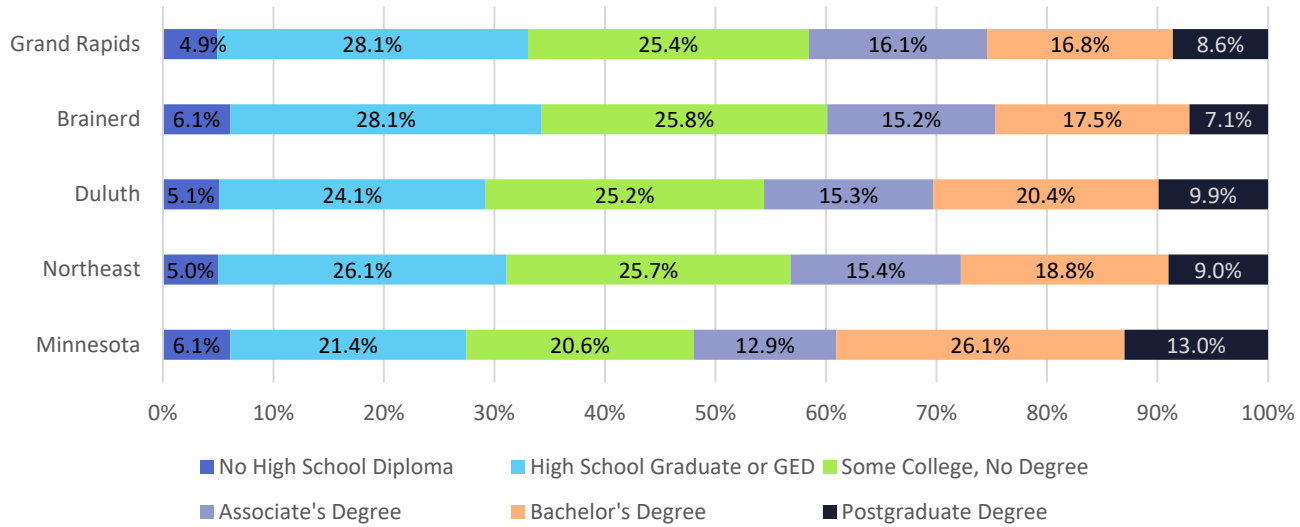
Educational Characteristics of Northeast Minnesota

Educational Characteristics	Percent				Percent			Values		
	Duluth, MN-WI MSA	Brainerd, MN μSA	Grand Rapids, MN μSA	Northeast Minnesota	Minnesota	USA	Northeast Minnesota	Minnesota	USA	
No High School Diploma	5.1%	6.1%	4.9%	5.3%	6.0%	10.3%	11,090	176,696	17,756,046	
High School Graduate	24.1%	28.1%	28.1%	25.8%	21.2%	25.3%	53,927	623,436	43,535,564	
Some College, No Degree	25.2%	25.8%	25.4%	25.4%	20.2%	20.1%	52,965	593,618	34,637,141	
Associate's Degree	15.3%	15.2%	16.1%	15.4%	12.9%	9.3%	32,052	379,909	15,944,395	
Bachelor's Degree	20.4%	17.5%	16.8%	19.1%	26.5%	22.0%	39,870	780,055	37,890,674	
Postgraduate Degree	9.9%	7.1%	8.6%	9.0%	13.3%	13.1%	18,789	392,270	22,499,876	

American Community Survey 2017-2021 unless noted otherwise.



Educational Attainment, Age 25-64



American Community Survey 2017-2021.

Regional Colleges and Universities

Northeast Minnesota has eight institutions of higher education that offer non-degree awards, two-year degrees, and four-year degrees.³ The table below shows these postsecondary institutions sorted by total awards conferred during SY2021-22. There were a total of 7,004 awards conferred in the region in SY2021-22, compared to 7,062 awards conferred in the region in SY2020-21.

School	Certificate < 1 Yr	Certificate 1+ but < 2 Yr	Associate's	Certificate 2+ but < 4 Yr	Bachelor's	Post-Bacc	Master's	Post Master's/ Doctorate	Total Awards	Total School Enrollment	Avg Net Price*
University of Minnesota-Duluth	31	0	0	0	2,218	3	215	1	2,468	9,884	\$16,960
The College of Saint Scholastica	15	0	0	0	761	145	294	249	1,464	3,512	\$25,744
Minnesota North College	163	151	643	74	0	0	0	0	1,031	859	\$9,151
Lake Superior College	177	102	672	48	0	0	0	0	999	4,373	\$13,682
Central Lakes College-Brainerd	106	194	503	53	0	0	0	0	856	4,448	\$12,279
Fond du Lac Tribal and Community College	18	12	124	0	0	0	0	0	154	1,525	\$10,307
Leech Lake Tribal College	0	2	19	0	0	0	0	0	21	156	\$9,947
Cosmetology Careers Unlimited College of Hair Skin and Nails	0	11	0	0	0	0	0	0	11	27	\$9,202
Total	510	472	1,961	175	2,979	148	509	250	7,004		

* Average net price represents full-time beginning undergraduate students who paid the in-state or in-district tuition rate and were awarded grant or scholarship aid from federal, state or local governments, or the institution. Data as of the 2020-2021 academic year.

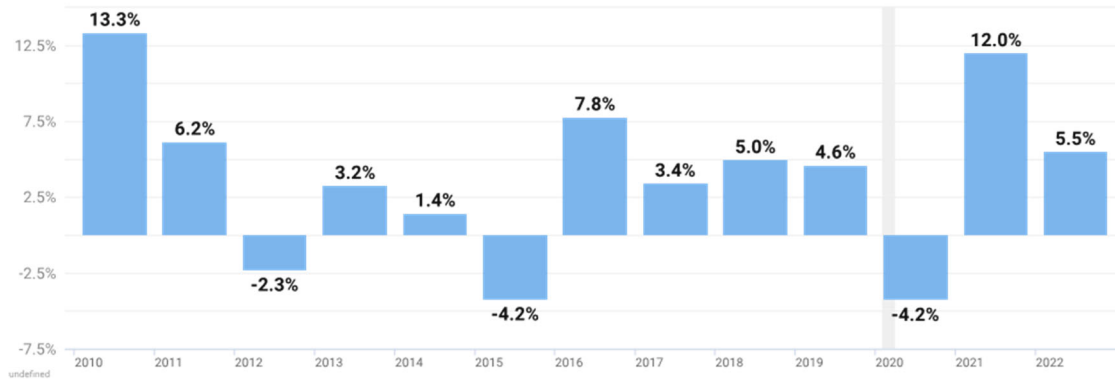
³ This was the first year where five campuses in the Minnesota State system were reported together as Minnesota North College, dropping the total number of schools down from 12 to 8. There still remain multiple campuses for Minnesota North College.



Economic Indicators

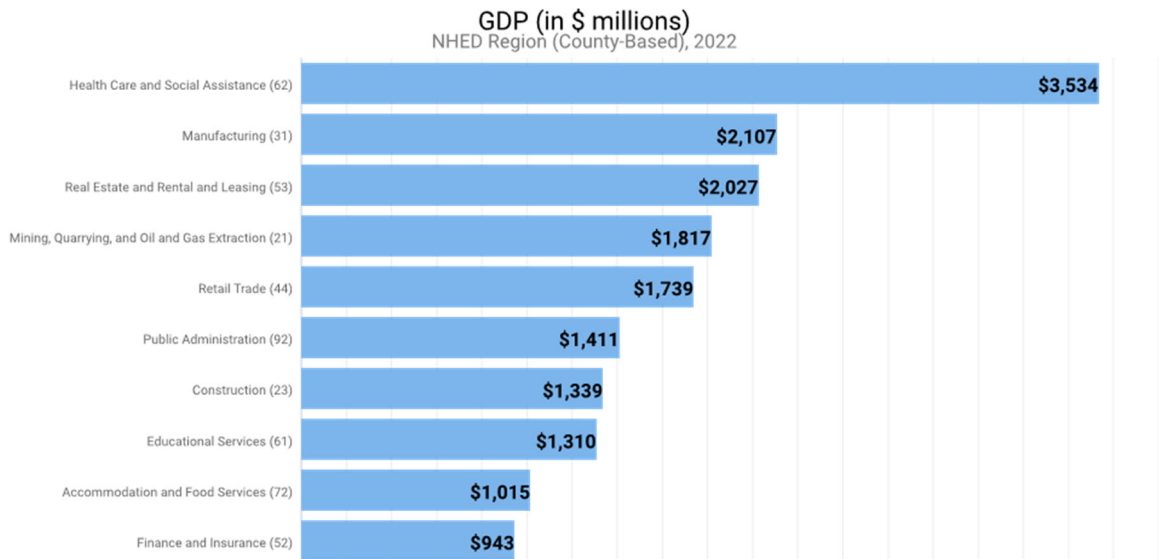
Gross Domestic Product (GDP) is the total value of goods and services produced by a region. In 2022, nominal GDP in the Northeast region grew by 5.5%. This follows an expansion of 12% in 2021, and a contraction of 6.6% in 2020. As of 2022, total GDP in the region was \$22,159,053,000—of which \$15,879,509 is attributed to the Duluth MSA.

One-Year % Change in GDP, Northeast Minnesota



Gross Domestic Product data are provided by the Bureau of Economic Analysis, imputed by Chmura where necessary, updated through 2022.⁴

Of the industries represented in the Northeast, Health Care and Social Assistance continued to contribute the largest portion of GDP in 2022, \$3,534,193,000. The next-largest contributions came from Manufacturing (\$2,107,182,000); Real Estate and Rental and Leasing (\$2,026,965,000); and Mining, Quarrying, and Oil and Gas Extraction (\$1,817,479,000 - a decrease from last year's \$859,569,000). All industries in the region saw increased output except for Mining, Quarrying, Oil and Gas Extraction, which dropped from second place to fourth place in 2020.



Gross Domestic Product data are provided by the Bureau of Economic Analysis, imputed by Chmura where necessary, updated through 2022.

⁴ GDP estimates by Chmura Economics. GDP data is revised every year, and there are typically small changes over time, with more recent years being more likely to be revised. Additionally, Chmura's detailed GDP estimates are modeled from industry employment and wage data, which is also subject to revision with each update. In general, with the exception of the most recent 2 or 3 years, historical revisions should be relatively small, only fractions of a percentage point.

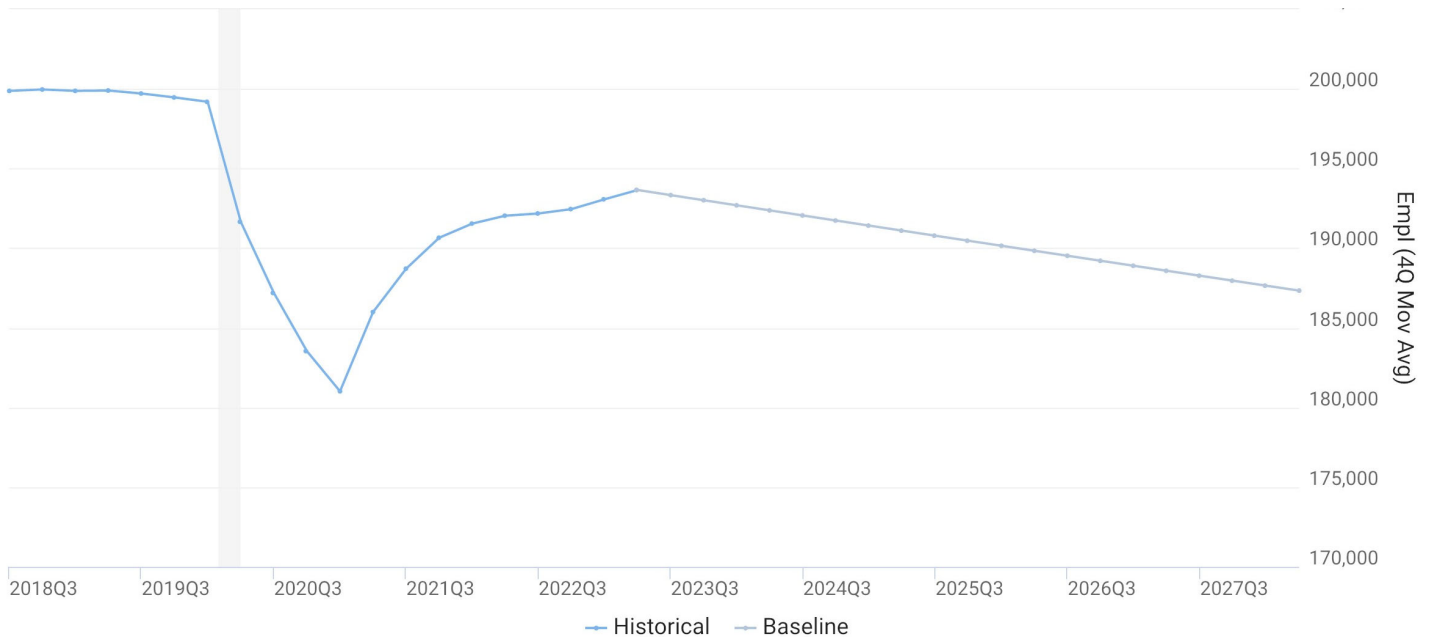


Labor Market

Workforce Forecast

Employment rose by 1.2% in the region between 2022Q2 and 2023Q2, lower than the previous estimates from one year prior of 3.5%. An estimated 3.6% of the Northeast Minnesota workforce being unemployed by August 2023 (about 7,621 people). Employment in the region is forecast to decline by -0.7% on average annually through 2028 in a baseline scenario.

5-Year Forecast in Northeast Minnesota

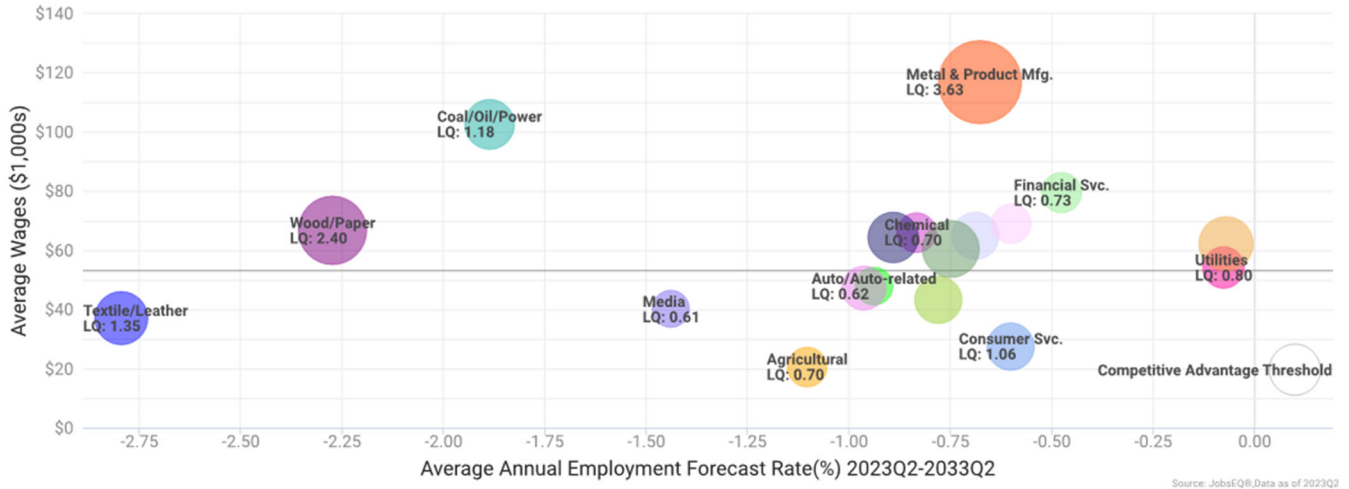


Source: JobsEQ® Data as of 2023Q2

Employment forecasts vary considerably by industry. An industry cluster is a geographic concentration of interrelated industries or occupations. The industry cluster in the Northeast region with the highest relative concentration remains Metal and Product Manufacturing with a location quotient of 3.63 a slight decrease in local concentration from estimates in 2022. This cluster employs 5,103 workers in the region (a decrease of about 350 workers from 2022) with an average wage of \$116,863—an increase of nearly \$6,000 in average sector wages from 2022 estimates. Employment in the Metal and Product Manufacturing cluster is now projected to contract in the region by about -0.7% on average annually over the next ten years. Between 2022Q2 and 2023Q2 estimates, most industries saw decline in forecasted employment change – notably, there are no industries with a positive value of average employment growth forecasted.



Industry Clusters for Northeast Minnesota as of 2023Q2



Quantifying Talent Shortages

Occupation Gaps

The pandemic's acceleration of critical talent shortages through shifts in demand, supply chains, and resource availability resulted in dramatic upticks in demand for very specifically trained talent with some college, an industry credential, a two year degree, or a bachelor's degree amidst a severe constriction of talent available for these same middle-skill, middle-wage roles. This section highlights the most critical talent shortages now apparent statewide, the industries that define each region of Minnesota, and the top Gateway Occupations that are in high demand and low talent supply regionally.

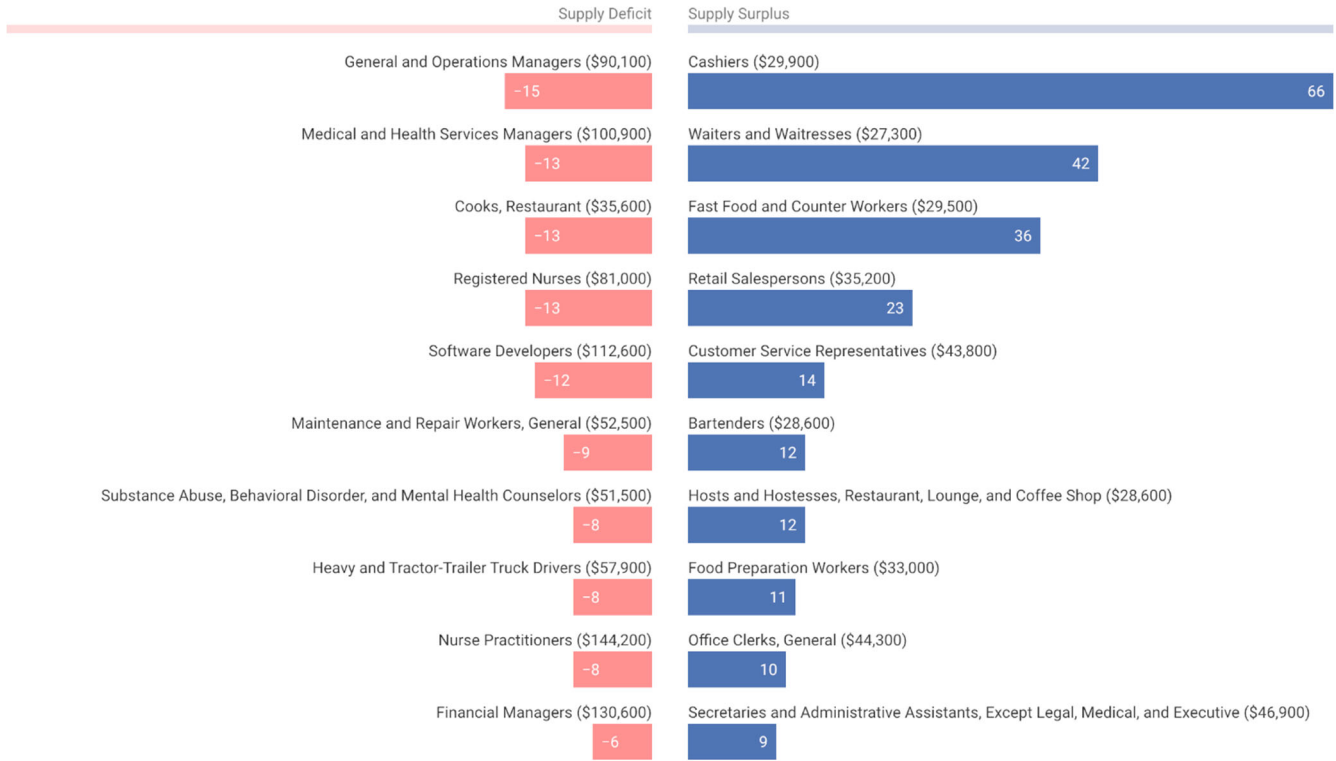
The chart below shows the potential average annual talent gaps over ten years. Many variables go into this analysis, but at its core it is based on a forecast comparing occupation demand growth to the local population growth and the projected educational attainment of those residents, then matched to specific related programs offered locally. When an area, for example, has an occupation expected to grow quickly but the educational requirement for the occupation does not match well with the educational attainment of its residents, there is a high potential for an occupation shortfall in the region. Alternatively, slow-growing or contracting occupations often represent potential supply surpluses. While this an important analysis for determining local occupation needs, the occupation gap should be considered along with other regional data including growth and separation forecasts, unemployment rates, wage trends, and award and skill gap analyses.

Several occupations forecasting high talent surpluses in 2022 have continued to grow in the estimated size of talent surplus in 2023 (shown in blue below), including Cashiers, Waiters and Waitresses, Fast Food and Counter Workers, Retail Workers, and Customer Service Representatives.

Following a break in trend with 2020 and 2021 where Restaurant Cooks jumped up from a low forecasted shortage into the number one occupation of shortage by volume in the Northeast in 2022, it is now the second occupation of greatest forecasted shortage. Medical and Health Services Managers are tied with Restaurant Cooks as the second highest forecasted shortage. General and Operations Managers jumped up to the occupation of greatest forecasted shortage. The other occupations of highest forecasted shortage in the Northeast (and statewide) have remained relatively consistent since the last analysis in October 2022, still showing that there is a shortage of local Nurses and Maintenance Workers, among other critical healthcare, information technology, and management occupations. Among high contact-intensity roles in shortage, Registered Nurses and Nurse Practitioners still make the top ten list of occupations in highest shortage, while Hospitality and Tourism roles are largely forecast to have a surplus of talent except for Restaurant Cooks and General Managers from Hospitality Services.



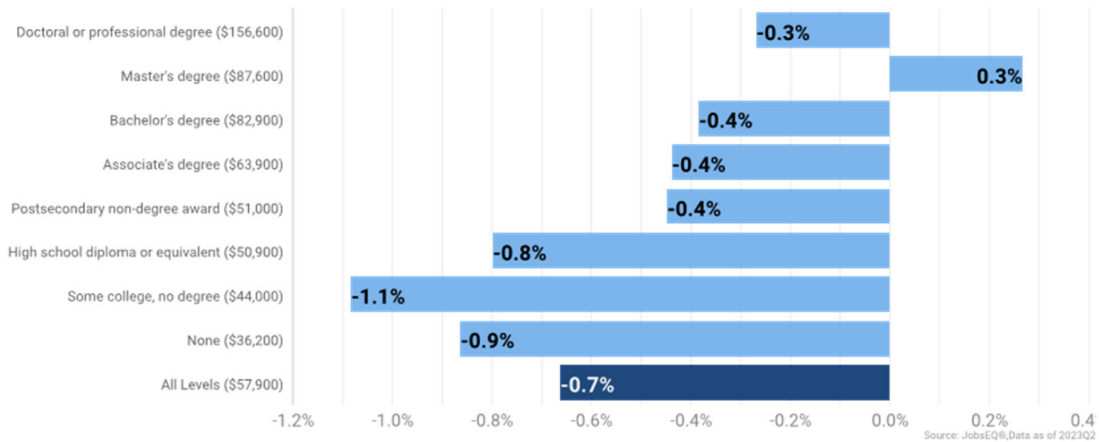
Average Annual Occupation Gaps (i.e. Talent Shortage), 2023Q2 through 2033Q2



Award Gaps

Expected growth rates for occupations vary by the education and training required. The employment outlook declined for the Northeast region from 2022 estimates, contracting -0.7% over the next ten years. Occupations typically requiring a doctoral degree are now expected to contract -0.3% per year, whereas those requiring a master’s degree are expected to grow by 0.3%. Those requiring either a bachelor’s degree or a two-year degree or certificate are forecast to contract by -0.4% per year. Estimated wages have increased across careers at each education level requirement.

Annual Average Projected Job Growth by Training Required for Northeast Minnesota, 2023Q2

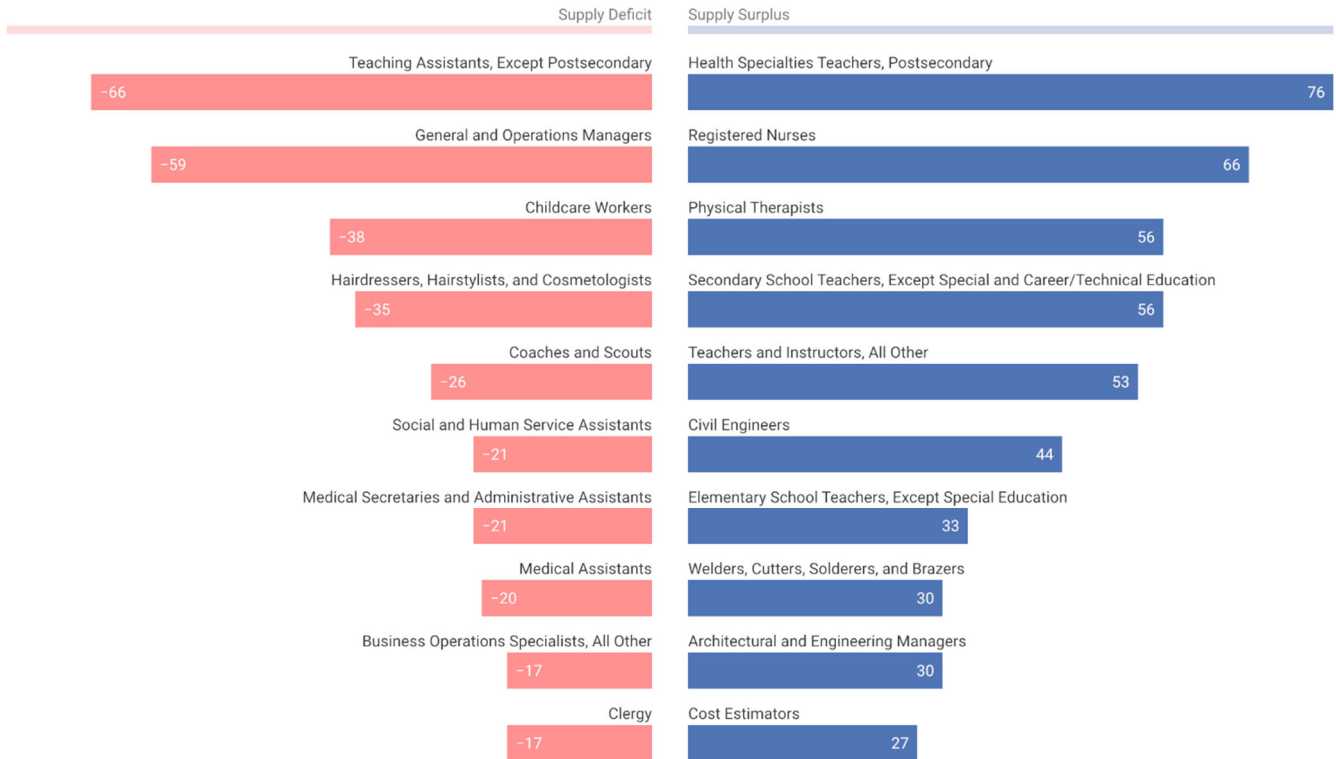


Employment by occupation data are estimates as of 2023Q2. Education levels of occupations are based on BLS assignments. Forecast employment growth uses national projections from the Bureau of Labor Statistics adapted for regional growth patterns.



Award gaps quantify the total number of postsecondary award completions in a region tied to an occupation benchmarked against national rates. In the Northeast region, local postsecondary programs are likely underproducing Teaching Assistants, General and Operations Managers, and Childcare Workers. There is an oversupply of Postsecondary Health Specialties Teachers and Registered Nurses completing local postsecondary programs compared to national volumes.

Award Gaps, All Occupations, Northeast Minnesota, 2023Q2



Several occupations have zero unemployed talent in the Northeast as of 2023Q2 estimates, resulting in an estimated unemployment rate of 0%. The occupations listed below have nonexistent unemployed talent at the regional level and 75 people or more working in these positions locally. Some of these roles have low volumes of online job postings due to unique methods of recruiting talent for specialty roles, while others show high posting volumes which indicates unmet demand and significant likely shortages. All but one of these roles pay well over the regional average of \$57,900 annually.

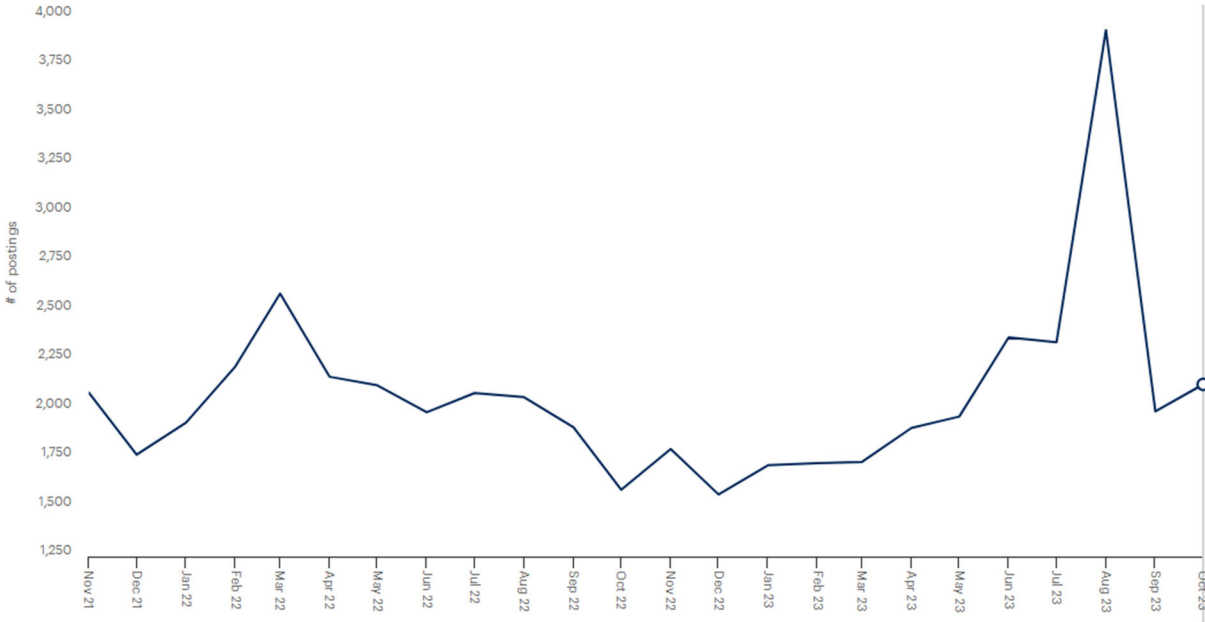
Occupations with No Unemployed Workforce and Employing over 75 Workers, Northeast Minnesota 2023Q2

SOC	Occupation	Current						5-Year History		5-Year Forecast				
		Empl	Mean Ann Wages ²	LQ	Unempl	Unempl Rate	30-Day Online Job Ads ³	Empl Change	Ann %	Total Demand	Exits	Transfers	Empl Change	Ann % Change
11-3012	Administrative Services Managers	306	\$116,600	1.06	0	n/a	1	57	4.2%	117	49	75	-7	-0.5%
21-2021	Directors, Religious Activities and Education	230	\$61,500	1.18	0	n/a	n/a	-30	-2.4%	109	47	70	-8	-0.7%
49-9043	Maintenance Workers, Machinery	176	\$61,000	2.31	0	n/a	2	-11	-1.2%	83	42	48	-6	-0.7%
47-5022	Excavating and Loading Machine and Dragline Operators, Surface Mining	154	\$63,300	3.58	0	n/a	n/a	-13	-1.6%	73	23	54	-4	-0.5%
29-1215	Family Medicine Physicians	138	\$306,100	1.06	0	n/a	54	-9	-1.2%	16	13	6	-3	-0.5%
53-4031	Railroad Conductors and Yardmasters	128	\$72,000	2.67	0	n/a	2	-8	-1.2%	48	14	39	-5	-0.8%
29-1216	General Internal Medicine Physicians	127	\$295,500	1.41	0	n/a	10	4	0.7%	13	12	6	-4	-0.6%
19-3033	Clinical and Counseling Psychologists	115	\$90,100	1.36	0	n/a	10	7	1.3%	40	18	20	3	0.5%
19-2041	Environmental Scientists and Specialists, Including Health	106	\$77,900	1.17	0	n/a	6	-4	-0.8%	44	11	36	-3	-0.6%
29-1131	Veterinarians	106	\$104,300	0.99	0	n/a	3	10	2.0%	24	11	7	6	1.1%
13-2081	Tax Examiners and Collectors, and Revenue Agents	90	\$60,900	1.44	0	n/a	26	0	0.0%	35	18	20	-3	-0.7%
11-1031	Legislators	84	\$63,000	1.69	0	n/a	n/a	0	0.1%	30	13	20	-2	-0.5%
19-3034	School Psychologists	77	\$79,900	1.05	0	n/a	17	-26	-5.8%	26	8	20	-2	-0.5%
51-9041	Extruding, Forming, Pressing, and Compacting Machine Setters, Operators, and Tenders	75	\$47,700	1.08	0	n/a	n/a	-4	-1.1%	30	12	24	-5	-1.5%
00-0000	Total - All Occupations	192,894	\$52,500	1.00	6,119	3.2%	11,793	-5,395	-0.6%	106,416	42,501	63,932	-17	0.0%

Job Posting Trends in Northeast Minnesota

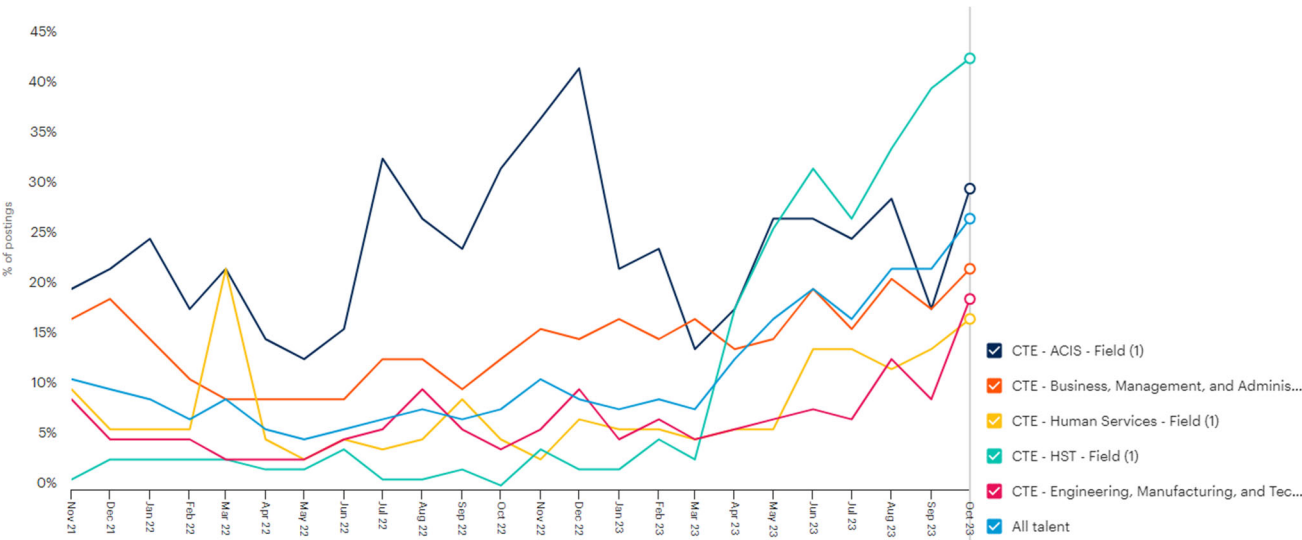
Online job posting data reveals much about employer demand for certain skills, certifications, qualifications, and occupational competencies. From November 1, 2022, through October 31, 2023, there were 25,174 unique job postings advertised online in Northeast Minnesota on job boards, according to analysis using Gartner TalentNeuron Plan (compared to 512,054 postings statewide). This was 3% higher than the 12 months prior. About 16% of all positions advertised were explicitly listed as remote or telecommute roles—either permanently or temporarily—an increase of six percentage points from the prior year. Remote positions doubled for all talent from the 12 months prior. The share of remote work opportunities has increased significantly among Information Technology careers and Human Service roles in the last year (by six and five percentage points respectively).

Total Jobs Advertised Monthly in Northeast Minnesota, October 2022-2023



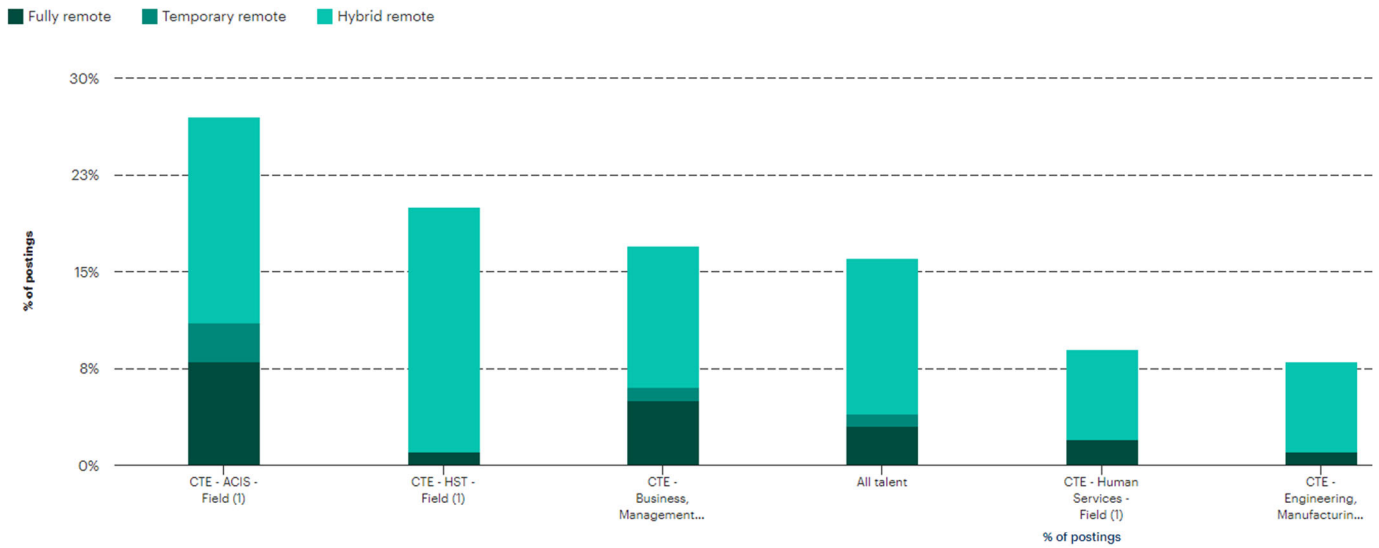
SOURCE: Gartner TalentNeuron Plan accessed 11/1/2023

Total Remote Job Postings Advertised Monthly in Northeast Minnesota, October 2022-2023



SOURCE: Gartner TalentNeuron Plan accessed 11/1/2023

Remote Job Postings by Career Field Advertised in Northeast Minnesota, October 2022-2023



Talent Profile	Unspecified /Onsite	Total remote	Fully remote	Temporary remote	Hybrid remote
CTE - ACIS - Field (1)	73% ▼ -5 pp	27% ▲ 5 pp	8% ▼ -7 pp	3% ▲ 2 pp	16% ▲ 10 pp
CTE - HST - Field (1)	80% ▼ -18 pp	20% ▲ 18 pp	1% ▲ 0 pp	0% ▲ 0 pp	19% ▲ 18 pp
CTE - Business, Management, and Administration - Field	83% ▼ -4 pp	17% ▲ 4 pp	5% ▼ -3 pp	1% ▲ 0 pp	11% ▲ 7 pp
All talent	84% ▼ -8 pp	16% ▲ 8 pp	3% ▼ -2 pp	1% ▲ 1 pp	12% ▲ 9 pp
CTE - Human Services - Field (1)	91% ▼ -1 pp	9% ▲ 1 pp	2% ▼ -3 pp	0% ▼ -1 pp	7% ▲ 5 pp
CTE - Engineering, Manufacturing, and Technology - Field (1)	92% ▼ -3 pp	8% ▲ 3 pp	1% ▼ -1 pp	0% ▲ 0 pp	7% ▲ 4 pp

SOURCE: Gartner TalentNeuron Plan accessed 11/1/2023

Talent accumulates valuable skills in many different ways beyond just work and education, from self-study to apprenticeships/internships, as well as workforce training programs and general life experience all develop relevant skills. Assessing experience in terms of skills unearths a person’s qualifications and more clearly identifies training needs. It also helps people recognize the abilities and knowledge they don’t know they have. For example, servers trying to move beyond a likely transition (bartending, retail sales, and other hospitality jobs) to an aligned transition like public relations specialist, skills tell us where their current qualifications align and where there are gaps. This kind of gap analysis is possible at the occupation level and supports postsecondary planning, workforce development, and employer talent strategy. Most of the newest skills on the rise in regional job postings include specialized technical skills. Core skills have remained relatively consistent with human skills such as communication and relationship management ranking in high importance.

Top Evolving Skills in Northeast Minnesota, October 2022-2023

New

- Direct current DC motors
- GE Energy Positive Sequence L...
- Television programming

New skills whose future is uncertain.

Emerging

- Parsing

Relatively new skills that are becoming more prevalent.

Growing

There are no Growing skills in the market

Fast-growing skills that are becoming core skills.

Core

- Communication
- Relationships
- Nursing

Skills that have been present in a high percentage of job postings for some time.

Declining

- Dependability
- Compassion

Skills that used to be essential but are becoming obsolete.

Career Fields

The Business, Management, and Administration field accounts for the largest share of employment by career field in the Northeast region yet are no more concentrated locally than found nationally on average. Health Science Technology careers and Human Services careers are slightly more concentrated in the Northeast region than what is typically observed nationwide (LQ of 1.28 and 1.14, respectively). Arts, Communications, and Information Systems careers are smallest in local employment volume, but offer the highest average entry-level wages. Health Science Technology careers offer the highest average annual wages at all experience levels.

Unemployment is high in Business, Management, and Administration careers and Engineering, Manufacturing, and Technology careers overall as of 2023Q2, both at 4.4%. This is largely due to high unemployment in the Hospitality and Tourism cluster as well as the Architecture and Construction career pathways. The Northeast region can expect moderate talent shortages in all career fields except Health Science Technology.

CTE Field Employment and Wages in Northeast Minnesota, 2023Q2¹

CTE Field (occupation overlap exists, will not sum)	Current 2023Q2 Estimates							5-Year History	
	2023 Avg 2023Q2 Empl	2023 Avg Entry-Level Wages	2023 Avg Ann Wages	LQ	Unempl	Unempl Rate	Online Job Ads 10/1/2023- 11/1/2023 ³	Empl Change	Ann %
Health Science Technology	22,619	\$37,900	\$80,700	1.28	491	2.2%	2,676	-1,649	-1.4%
Human Services	34,287	\$39,900	\$54,200	1.14	1,011	2.9%	1,587	-690	-0.4%
Arts, Communications, and Information Systems	5,548	\$51,000	\$77,900	0.62	168	3.0%	369	-174	-0.6%
Business, Management, and Administration	83,421	\$33,600	\$50,500	0.97	3,772	4.4%	3,943	-2,598	-0.6%
Engineering, Manufacturing, and Technology	44,650	\$43,700	\$60,500	0.94	2,069	4.4%	1,574	-90	0.0%
Agriculture, Food, and Natural Resources*	9,460	\$41,900	\$58,800	0.94	353	3.6%	357	-22	0.0%
Total - All Occupations	193,658	\$30,400	\$57,900	1.00	7,621	3.9%	10,245	-5,441	-0.6%

Data as of 2023Q2 unless noted otherwise

Note: Figures may not sum due to rounding. Employment by place of work.

1. Data based on a four-quarter moving average unless noted otherwise.

2. Wage data represent the average for all Covered Employment

3. Data represent found online ads active within the last thirty days in the selected region. Due to alternative county-assignment algorithms, ad counts in this analytic may not match that shown in RTI (nor in the popup window ad list). Ad counts for ZCTA-based regions are estimates.

CTE Field Baseline Employment Forecast for Northeast Minnesota, 2028Q2

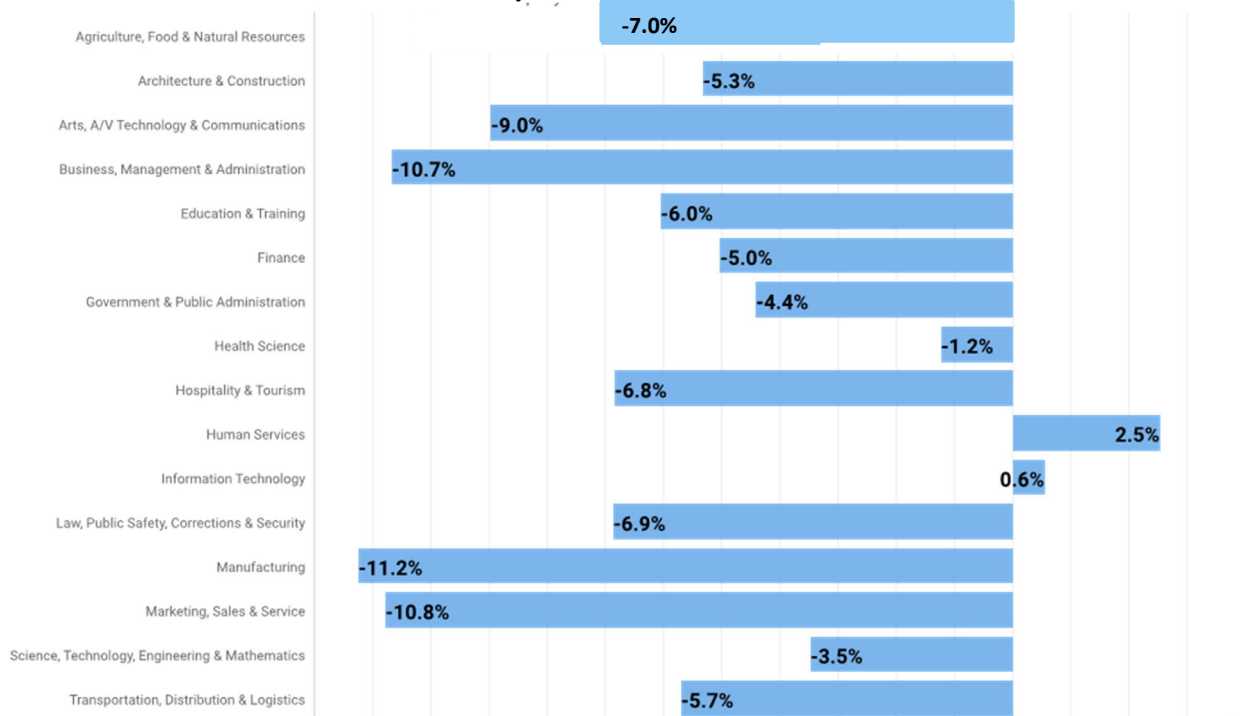
CTE Field (occupation overlap exists, will not sum)	Current	5-Year Growth 2028Q2				
	2023Q2 Empl	Total Demand	Exits	Transfers	Empl Change	Ann % Change
Health Science Technology	22,619	7,978	3,185	3,867	926	1.0%
Human Services	34,287	17,591	8,352	9,696	-457	-0.3%
Arts, Communications, and Information Systems	6,080	2,200	828	1,481	-109	-0.4%
Business, Management, and Administration	82,435	50,943	23,583	31,290	-3,931	-1.0%
Engineering, Manufacturing, and Technology	44,493	21,195	8,498	14,375	-1,678	-0.8%
Agriculture, Food, and Natural Resources*	9,639	4,985	1,942	3,371	-328	-0.7%
Total - All Occupations	193,658	102,900	46,336	62,914	-6,350	-0.7%

*Supply gaps in parentheses indicate the number of trained workers we expect to fall short of the baseline talent needed to see the employment growth officially forecasted by the Bureau of Labor Statistics (BLS) and MN DEED. Represents skill mismatch in the region. Positive number indicates likely unemployment due to talent surplus. ** This focused, or narrow definition of Agriculture, Food, and Natural Resources (AFNR) aligns with classic definitions of the sector by MN DEED and BLS Agriculture, Fishing, and Forestry specific roles. The sector analysis found further in this report highlights a broader, more inclusive definition of AFNR, which is reflected in the sub-industry definition of AFNR included here.

Career Cluster Detail

Of the sixteen career clusters used by Career and Technical Education (CTE), fourteen are forecast to decline in overall employment over the next ten years as of 2023Q2 estimates. The only two clusters forecasting growth are Human Services (2.5%) and Information Technology (0.6%). All clusters except Information Technology, Health Science, and Business, Management, and Technology saw fairly substantial declines in forecast employment outlook. Ten of the sixteen career clusters have average wages above the average occupation wage in the region (\$57,900 in 2023—an increase of \$5,400 from 2022).⁵

Baseline 10-Year Forecasts by Career Cluster, Northeast Minnesota, 2023Q2



Cluster forecasts estimated using Chmura, JobsEQ, based on 2023Q2 employment data. All clusters are distinct occupations except for Agriculture, Food, and Natural Resources, which overlaps with other clusters.

An accurate assessment of future occupation demand requires that future growth, retirements, and other job exits be considered. In the Northeast, Hospitality and Tourism, Business, Management, and Administration, and Marketing, Sales, and Service clusters are expected to have the highest annual job demand by volume of opportunities—due to retirements and job changes.

The Science, Technology, Engineering and Mathematics cluster has the highest wages of the Career Clusters followed by the Information Technology and Health Science clusters.

⁵ Clusters paying an average salary higher than the regional average occupation wage include Science, Technology, Engineering, and Mathematics, Information Technology, Finance, Health Science, Government and Public Administration, Law, Public Safety, Corrections, and Security, Business, Management, and Administration, and Architecture and Construction.



Employment, Wages, and Forecast by Career Cluster, 2023Q2

Career Cluster	Employment	Avg Ann Wages	Job Ads	Baseline 10-Year Forecasted Empl Change	Ann Empl Change	Ann Total Demand
Science, Technology, Engineering & Mathematics	2,342	\$96,200	198	-10.3%	-9	152
Information Technology	3,117	\$90,000	240	0.6% (+)	1	221
Health Science	22,619	\$80,700	2,676	-1.2% (+)	-29	1,824
Finance	5,176	\$80,000	273	-5.0%	-27	411
Architecture & Construction	15,643	\$65,000	344	-5.3%	-86	1,442
Government & Public Administration	2,075	\$64,600	96	-4.4%	-9	191
Business, Management & Administration	30,439	\$63,300	1,105	-6.9% (+)	-344	2,962
Law, Public Safety, Corrections & Security	5,794	\$62,800	293	-7.0%	-41	497
Arts, A/V Technology & Communications	2,431	\$62,300	128	-9.0%	-23	222
Education & Training	12,087	\$58,800	418	-6.0%	-76	1,018
Agriculture, Food & Natural Resources*	9,460	\$58,800	364	-7.0%	-62	999
Manufacturing	14,230	\$56,000	509	-11.2%	-172	1,293
Transportation, Distribution & Logistics	12,435	\$53,400	523	-5.7%	-74	1,382
Marketing, Sales & Service	19,429	\$47,400	1,087	-10.8%	-222	2,322
Human Services	14,331	\$45,400	780	2.5%	35	1,820
Hospitality & Tourism	28,377	\$33,500	1,478	-6.8%	-202	4,592
Total - All Occupations	193,658	\$57,900	10,245	-7.0%	-1,293	20,716

*Cluster forecasts estimated using Chmura, JobsEQ, based on 2023Q2 employment data. All clusters are distinct occupations except for Agriculture, Food, and Natural Resources, which overlaps with other clusters. (+) indicates an improved forecast from 2022Q2 estimates.



Priorities by Career Field

Health Science Technology

Critical Issues:

- Largest volumes of occupations forecasting shortages
- Continued shortage of nurses (projected annual talent shortage of at least 13 Registered Nurses in most favorable scenario)
- Unique high local concentration
- Aging workforce in management and leadership roles

Human Services

Critical Issues:

- Smaller volumes of new talent entering pipeline than needed to meet demand
- High share of workforce over-credentialed for the roles they currently hold
- Critical occupations of shortage such as Mental Health Counselors
- Aging workforce and increasing retirement rates

Arts, Communications, and Information Technology

Critical Issues:

- Occupations in this field offer the highest average entry-level wages
- Continued shortage of software developers expected

Business, Management, and Administration

Critical Issues:

- Largest share of employment by career field
- High unemployment (4.4%)
- Moderate growth and retirement rates are outpacing demand
- Shortages in management roles – there is a need for a pathway
- Underproducing at least 59 graduates annually needed to fill open General and Operations Managers in the region

Engineering, Manufacturing, and Technology

Critical Issues:

- Nine out of the ten top occupations by employment volume have forecasted declines over the next three years
- High unemployment (4.4%)
- Aging talent signaling exacerbation of talent shortage due to upcoming retirements with 50% of workers in this field 45 years or older

Agriculture, Food, and Natural Resources

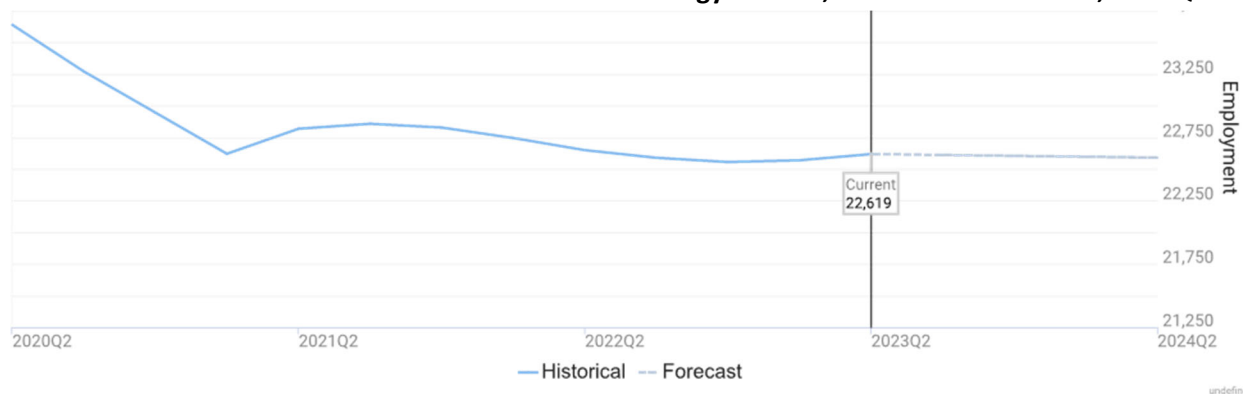
Critical Issues:

- Zero trained Veterinarians in the region are unemployed
- No gateway occupation on the pathway to becoming a Veterinarian means a longer on-ramp for bringing in new talent
- Nine out of the ten top occupations by employment volume have forecasted declines over the next three years

Health Science Technology

Over the next three years, Health Science Technology employment is forecast to decline by -0.1% on average annually, a drop from last year's projected 0.2% growth.

Baseline 3-Year Forecast for Health Science Technology Careers, Northeast Minnesota, 2023Q2



Top Ten Health Science Technology Occupations by Employment Volume in Northeast Minnesota, 2023Q2

6-Digit Occupation	Empl	Avg Mean Wages	LQ	Historical 3-Year Empl Change	Annual Demand	Baseline Forecast Ann Change
Registered Nurses	6,093	\$81,000	1.61	-205	310	-0.5%
Nursing Assistants	2,317	\$39,700	1.43	-345	325	-0.6%
Home Health Aides	1,605	\$33,000	1.37	-441	195	0.8%
Licensed Practical and Licensed Vocational Nurses	1,054	\$53,000	1.36	-190	78	-0.5%
Medical Secretaries and Administrative Assistants	965	\$46,100	1.16	37	106	-0.4%
Medical and Health Services Managers	774	\$100,900	1.28	8	75	1.5%
Medical Assistants	681	\$45,700	0.74	65	98	0.4%
Pharmacy Technicians	584	\$42,400	1.09	3	49	-0.5%
Pharmacists	501	\$136,900	1.27	-4	17	-0.4%
Dental Assistants	400	\$55,700	0.90	26	56	-0.2%
Remaining Component Occupations	7,644	\$112,900	1.20	20	511	0.0%
Health Science (CTE Field)	22,619	\$80,700	1.28	-1,021	1,824	-0.1%

"Annual Demand" is the projected need for new entrants into an occupation. New entrants are needed due to expected growth and to replace workers who left the occupation due to factors such as retirement or switching careers.

"Forecast Ann Growth" is the expected baseline (most pessimistic) yearly change in employment due to national, long-term trend projections (per the BLS) as well as local factors such as industry mix, labor force participation rates, and population growth (as computed and modeled by RealTime Talent in JobsEQ).

Most talent in Northeast Minnesota that is working in Health Science Technology roles are employed by General Medical and Surgical Hospitals (47.5%, decreased slightly from last year's 48.2%) or Office of Physicians (9.1%), taking second place from Nursing Care Facilities (now 7.5%).



Health Science Technology Field Employment by Industry, Northeast Minnesota, 2023Q2

Industry Title	% of Career Field Empl	Career Field Empl	10-Year Separations	10-Year Empl Change	10-Year Total Demand
General Medical and Surgical Hospitals	47.5%	10,743	7,655	-384	7,270
Offices of Physicians	9.1%	2,064	1,549	17	1,566
Nursing Care Facilities (Skilled Nursing Facilities)	7.5%	1,702	1,781	-186	1,595
Offices of Dentists	4.0%	906	870	-17	853
Residential Intellectual and Developmental Disability, Mental Health, and Substance Abuse Facilities	3.8%	864	844	-22	822
Individual and Family Services	3.7%	830	963	170	1,133
Continuing Care Retirement Communities and Assisted Living Facilities for the Elderly	3.6%	825	973	52	1,025
Offices of Other Health Practitioners	2.7%	619	489	51	540
Outpatient Care Centers	2.5%	567	463	76	539
Health and Personal Care Retailers	2.2%	489	359	-41	317
Other Professional, Scientific, and Technical Services	1.6%	372	396	49	445
Home Health Care Services	1.5%	334	324	42	365
Psychiatric and Substance Abuse Hospitals	1.2%	277	241	-15	227
Executive, Legislative, and Other General Government Support	1.1%	254	205	-9	196
Elementary and Secondary Schools	1.1%	249	172	-12	161
Other Residential Care Facilities	1.0%	221	219	-17	202
Colleges, Universities, and Professional Schools	0.7%	155	106	-5	102
Other Ambulatory Health Care Services	0.6%	128	121	11	132
All Others	4.5%	1,020	775	-38	738

Career Field Demographics

The Health Science Technology field is predominantly female (78.9%) and white (93.5%), but racial diversity grew by another 0.4 percentage points from the prior years' estimates due to growth in the field's workforce identifying with two or more races or as Asian. The age distribution of talent in Health Science Technology aged from prior estimates, with an additional 0.2 percentage points of the population 55 or older compared to the prior years' estimates. Over the past four years, the share of the Health Science Technology workforce that is female has increased by 1.3 percentage points annually in the Northeast.

Age

NHED Region (County-Based)



Minnesota



16 to 19 years (1.3%)
20 to 24 years (9.6%)

25 to 34 years (20.9%)
35 to 44 years (22.7%)

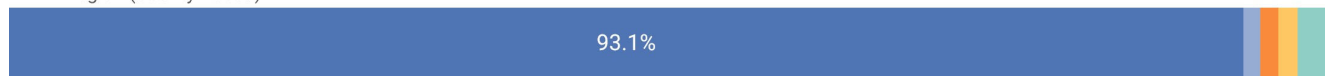
45 to 54 years (20.4%)
55 to 64 years (19.3%)
65 years and over (5.8%)

Data for Health Science (CTE Cluster)
Source: JobsEQ®. Data as of 2023Q2.

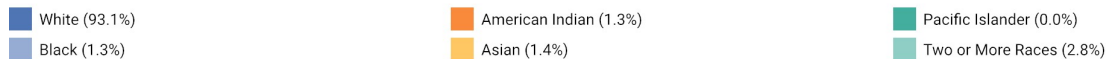


Race

NHED Region (County-Based)



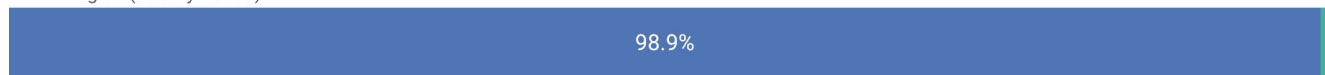
Minnesota



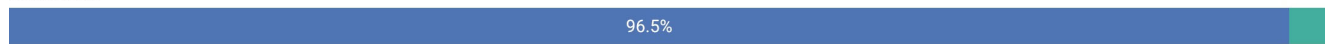
Data for Health Science (CTE Cluster)
Source: JobsEQ®. Data as of 2023Q2.

Ethnicity

NHED Region (County-Based)



Minnesota



Data for Health Science (CTE Cluster)
Source: JobsEQ®. Data as of 2023Q2.

Gender

NHED Region (County-Based)



Minnesota



Data for Health Science (CTE Cluster)
Source: JobsEQ®. Data as of 2023Q2.

Educational Attainment and Requirements

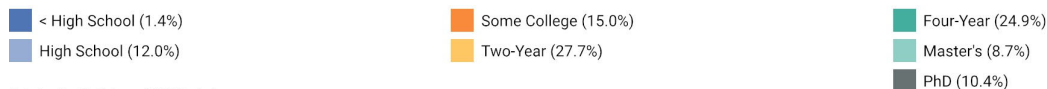
The stacked bar charts here illustrate the estimated mix of educational attainment of the workers in this career field in aggregate, followed by the typical education and training requirements in the field. Generally, the Northeast Minnesota Health Science Technology workforce has a fairly close match to the education and training required for existing roles. For example, 17.6% of Health Science Technology positions require no educational award (up 0.3 percentage points from the prior years' estimates), and about 13.4% of the workforce holds only a high school diploma or less. About 27.7% of the Health Science Technology workforce hold a two-year degree and 15.0% completed some college (such as a certificate), or 42.7% in all, compared to about 31.9% of local jobs in Health Science Technology that typically require a certificate two-year degree.

Educational Attainment

NHED Region (County-Based)



Minnesota



Data for Health Science (CTE Cluster)
Source: JobsEQ®. Data as of 2023Q2.



Education and Training Requirements

NHED Region (County-Based)



Minnesota



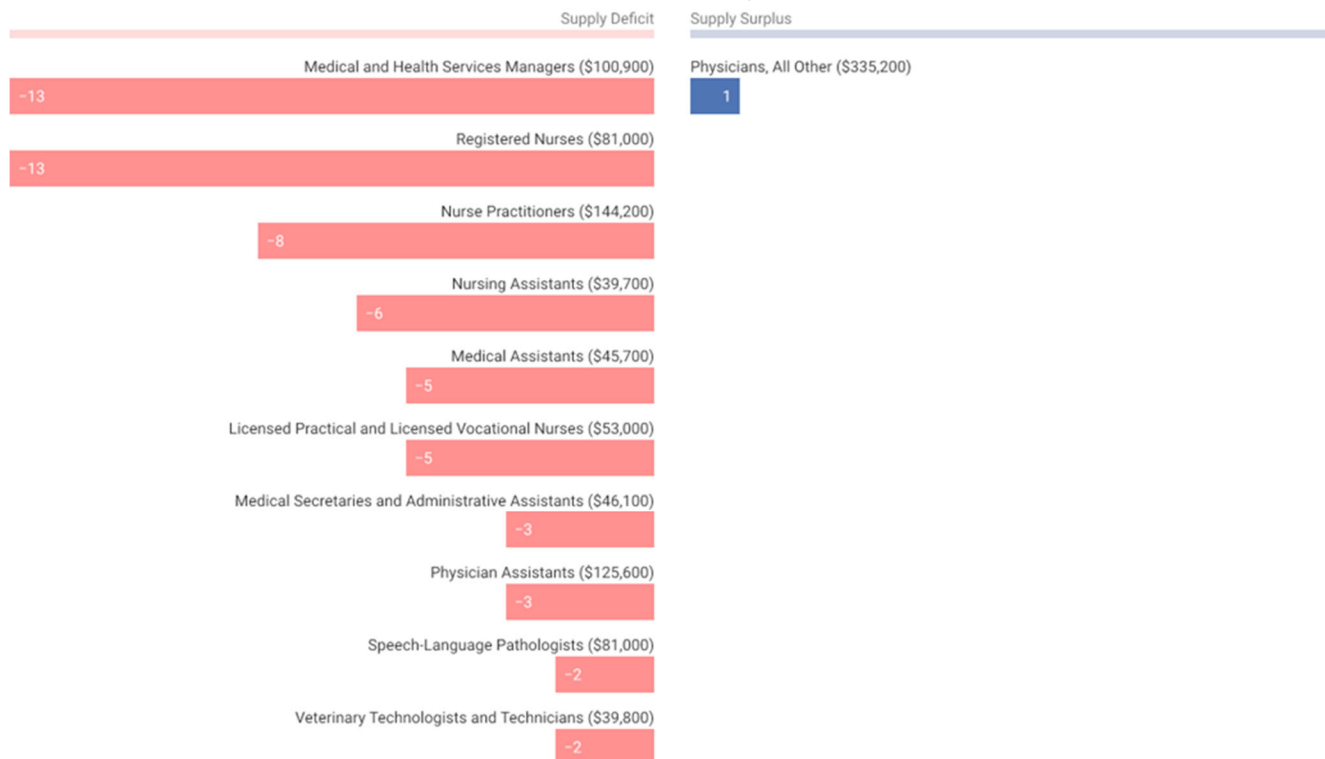
- Short-term OJT, no exp, no award (9.6%)
- Moderate-term OJT, no exp, no award (7.5%)
- Long-term training, no exp, no award (0.5%)
- Previous work experience, no award (0.0%)
- 2-year degree or certificate (31.9%)
- Bachelor's degree (33.6%)
- Postgraduate degree (16.9%)

Data for Health Science (CTE Cluster)
Source: JobsEQ®. Data as of 2023Q2.

Occupation Gaps

In Health Science Technology, Medical and Health Service Managers and Registered Nurses are the two occupations with the greatest annual shortages in the Northeast, Other occupations of high shortage have remained consistent with prior estimates. There is no longer a slight surplus of Pharmacists or Medical Transcriptionists.

Annual Average Occupation Gaps (i.e. Talent Shortages) for the next 10 Years in Health Science Technology, Northeast Minnesota, 2023Q2



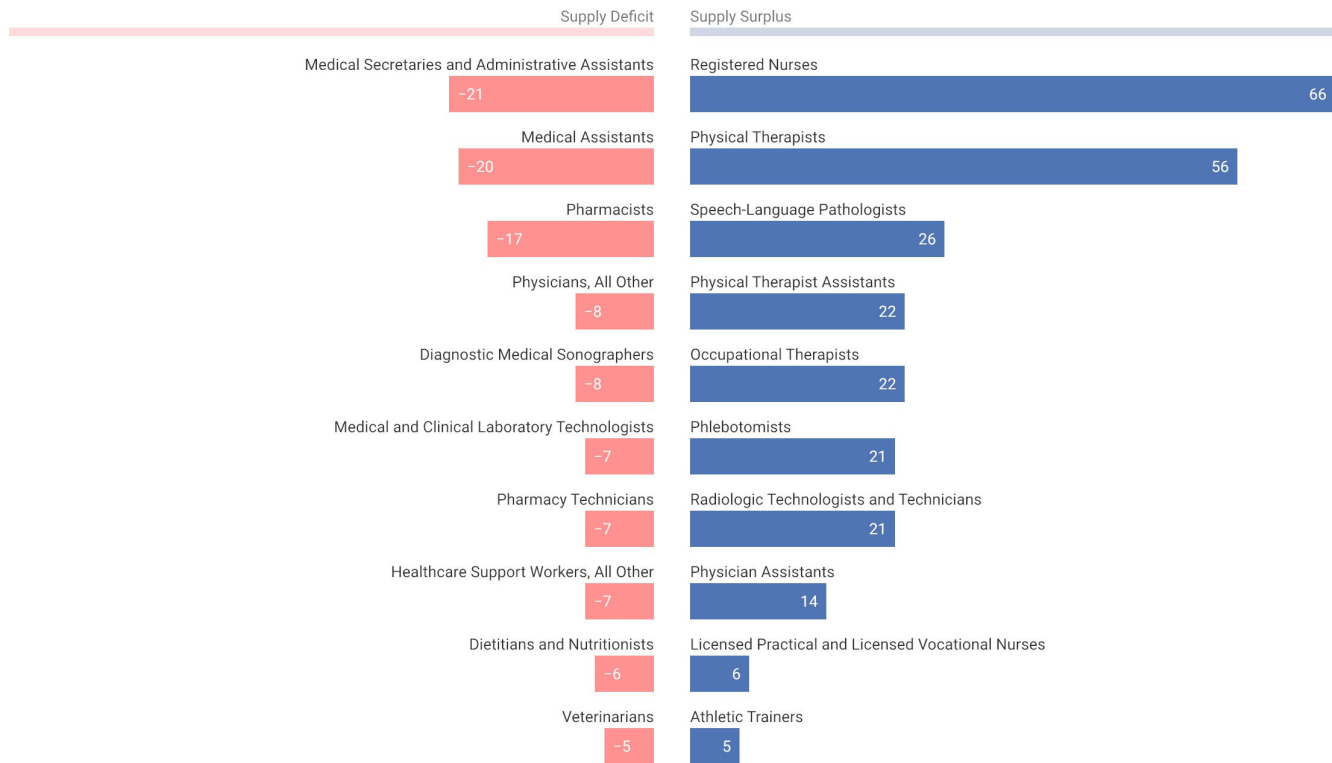
Award Gaps

A comparison of the graduate talent pipeline through certificate and other postsecondary degree programs to the current estimated openings by occupation illuminate a few moderate shortages and some general misalignments. The Northeast has several Health Science Technology award gaps, meaning that the region is underproducing local talent in relation to employer demand. Northeast colleges and universities are underproducing about 21 Medical Secretaries and Administrative Assistant graduates and about 20 Medical Assistant graduates annually that are needed to fill positions open with employers in the region. A broad



number of other roles that typically require a two-year professional degree are forecasting local shortages. Occupations that show higher awards given than what is currently needed in the local talent market are examples of programs that serve other parts of the state where talent demand is high but relevant programs may not exist, such as Registered Nurses and Physical Therapists. The oversupply of graduates in the Northeast is likely helping to meet award gaps found in the 7-county MSP Metro and elsewhere.

Award Gaps in Health Science Technology, Northeast Minnesota, 2023Q2

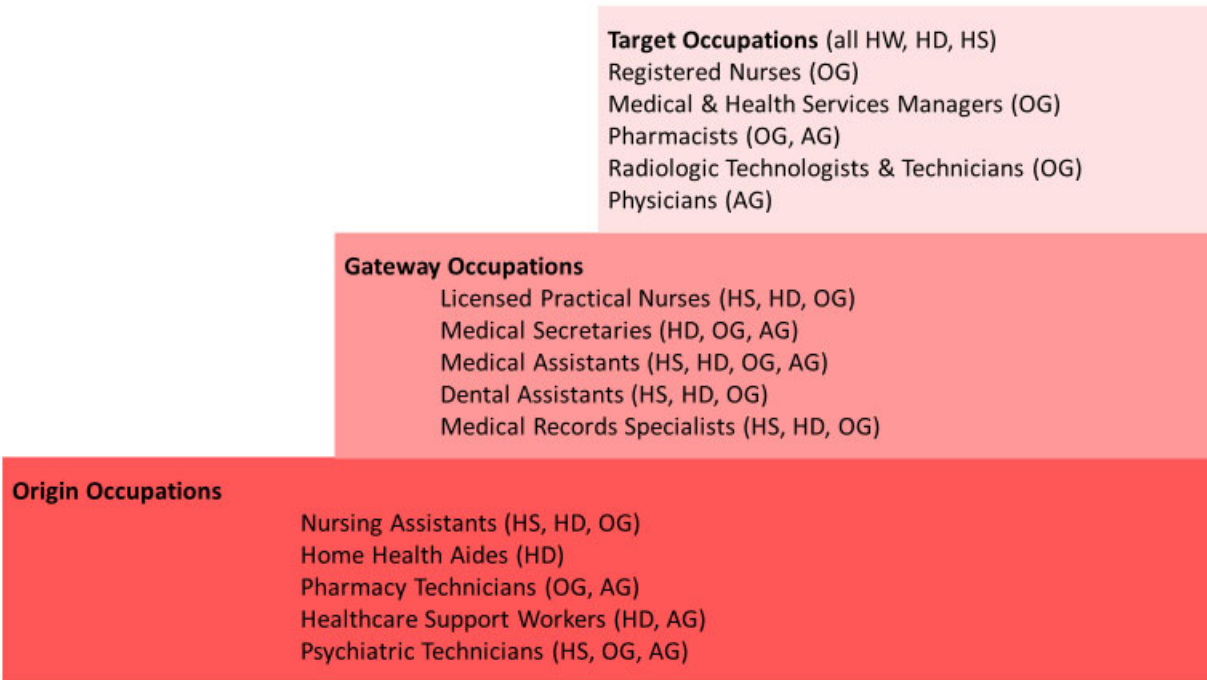


Origin, Gateway, and Target Occupations

This section offers an Origin-to-Gateway-to-Target model analysis for how to help move students from entry points into their field of interest into both likely and other aligned careers, considering automation, remote work, and the changing work environment.



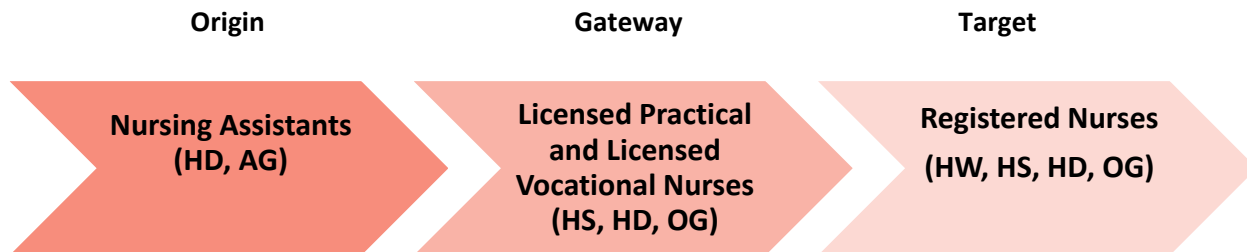
Origin-to-Gateway-to-Target Occupations for Health Science Technology, Northeast Minnesota, 2023Q2



HW = High-Wage; HS=High-Skill; HD=High-Demand; OG=Occupation Gaps; AG=Award Gaps

Featured Pathway

A promising Health Science Technology pathway in the Northeast region is the pathway to become a Registered Nurse. The Target occupation of Registered Nurse is highly concentrated in the Northeast region with a location quotient of 1.61. This role is in high demand and currently experiencing an occupation gap. Licensed Practical and Licensed Vocational Nurses are also locally concentrated in the Northeast region (LQ 1.36) and are also experiencing an occupation gap and are in high demand. The Origin occupation of Nursing Assistant is an example of a potential feeder occupation into these roles, given overlapping foundational skillsets and training required. Stackability of credentials is vital to building viable career pathways up to Registered Nursing positions at the AS, BSN, or MSN levels.



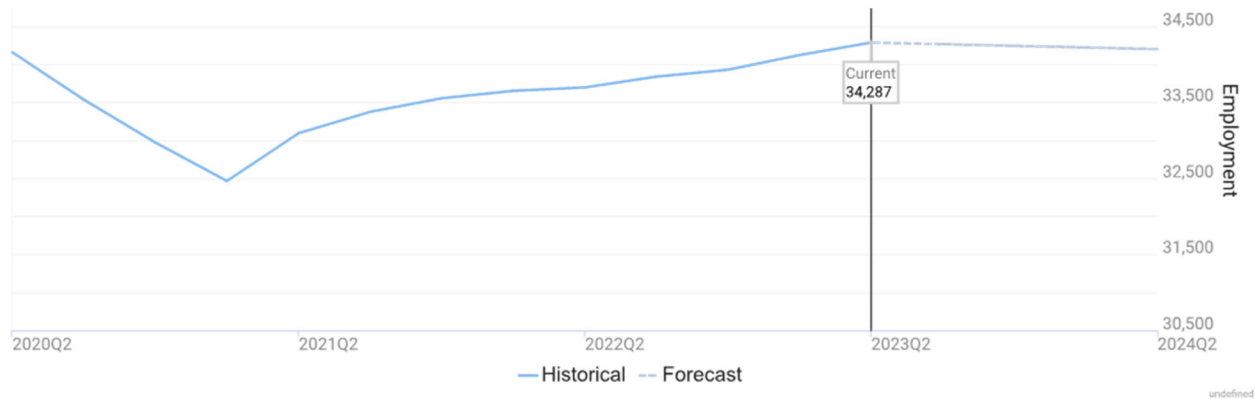
OGT Wages and Experience Level Requirements, Health Science Technology, Northeast Minnesota, 2023Q2

SOC	Occupation	Empl	Mean	Entry Level	Experienced	10%	25%	50% (Median)	75%	90%	Typical Entry-Level Education	Previous Work Experience	Typical On-the-Job Training
29-1141	Registered Nurses	6,093	\$81,000	\$65,400	\$88,800	\$64,900	\$68,600	\$81,100	\$88,500	\$102,400	BA	None	None
11-9111	Medical and Health Services Managers	774	\$100,900	\$69,500	\$116,600	\$64,300	\$80,400	\$97,900	\$109,000	\$134,300	BA	<5 years	None
29-1051	Pharmacists	501	\$136,900	\$115,000	\$147,900	\$108,600	\$126,600	\$138,900	\$149,500	\$170,300	PhD	None	None
29-2034	Radiologic Technologists and Technicians	385	\$72,300	\$61,900	\$77,400	\$61,000	\$64,200	\$68,800	\$80,200	\$85,600	AS	None	None
29-1229	Physicians, All Other	367	\$335,200	\$93,100	\$456,200	\$92,400	\$111,100	\$317,500	\$371,700	\$443,400	PhD	None	Internship/residency
29-2061	Licensed Practical and Licensed Vocational Nurses	1,054	\$53,000	\$45,900	\$56,500	\$44,600	\$48,400	\$52,100	\$58,400	\$62,400	Certificate	None	None
43-6013	Medical Secretaries and Administrative Assistants	965	\$46,100	\$38,900	\$49,700	\$38,700	\$40,200	\$45,800	\$49,900	\$52,800	HS/GED	None	Mod-term OJT
31-9092	Medical Assistants	681	\$45,700	\$37,800	\$49,700	\$36,800	\$40,100	\$45,600	\$52,400	\$55,000	Certificate	None	None
31-9091	Dental Assistants	400	\$55,700	\$45,800	\$60,600	\$43,600	\$49,800	\$53,500	\$62,600	\$65,300	Certificate	None	None
29-2072	Medical Records Specialists	218	\$53,600	\$44,500	\$58,100	\$42,000	\$48,700	\$52,300	\$58,700	\$64,900	Certificate	None	None
31-1131	Nursing Assistants	2,317	\$39,700	\$34,200	\$42,500	\$32,500	\$36,900	\$38,400	\$43,300	\$47,400	Certificate	None	None
31-1121	Home Health Aides	1,605	\$33,000	\$28,500	\$35,200	\$27,700	\$30,100	\$32,500	\$36,100	\$37,800	HS/GED	None	Short-term OJT
29-2052	Pharmacy Technicians	584	\$42,400	\$35,600	\$45,700	\$33,900	\$38,600	\$40,600	\$47,400	\$51,600	HS/GED	None	Mod-term OJT
31-9099	Healthcare Support Workers, All Other	296	\$40,100	\$31,300	\$44,400	\$29,100	\$35,100	\$39,500	\$45,900	\$50,400	HS/GED	None	None
29-2053	Psychiatric Technicians	229	\$42,400	\$31,700	\$47,800	\$30,800	\$34,100	\$44,600	\$47,100	\$54,500	Certificate	< 5 years	Short-term OJT

Human Services

Over the next three years, Human Services employment is forecast to decline by -0.3% annually – a dip from last year’s 2022Q2 estimated 0.5% growth. A total of 34,287 people are employed in Human Services roles regionally, accounting for 17.7% of all regional employment. The field’s average wage is \$54,200 somewhat below the regional average across all occupations (\$57,900).

Baseline 3-Year Forecast for Human Services Careers, Northeast Minnesota, 2023Q2



Top Ten Human Services Occupations by Employment Volume in Northeast Minnesota, 2023Q2

6-Digit Occupation	Empl	Avg Mean Wages	LQ	Historical 3-Year Empl Change	Annual Demand	Baseline Forecast Ann Change
Personal Care Aides	4,543	\$33,000	1.37	221	676	0.8%
Teaching Assistants, Except Postsecondary	2,195	\$37,300	1.47	8	233	-0.7%
Elementary School Teachers, Except Special Education	1,647	\$63,400	1.00	20	104	-0.8%
Secondary School Teachers, Except Special and Career/Technical Education	1,243	\$66,100	1.01	16	73	-0.8%
Police and Sheriff's Patrol Officers	1,106	\$70,500	1.43	-7	82	-0.5%
Childcare Workers	1,099	\$29,500	1.13	-60	169	-0.8%
Social and Human Service Assistants	1,049	\$44,500	2.11	-22	123	0.3%
Substance Abuse, Behavioral Disorder, and Mental Health Counselors	859	\$51,500	1.80	6	90	1.0%
Child, Family, and School Social Workers	709	\$66,200	1.69	0	67	0.2%
Middle School Teachers, Except Special and Career/Technical Education	696	\$64,600	0.97	8	44	-0.8%
Remaining Component Occupations	19,142	\$60,000	1.13	-60	1,853	-0.4%
Human Services (CTE Field)	34,287	\$54,200	1.14	127	3,521	-0.3%

“Annual Demand” is the projected need for new entrants into an occupation. New entrants are needed due to expected growth and to replace workers who left the occupation due to factors such as retirement or switching careers.

“Forecast Ann Growth” is the expected baseline (most pessimistic) yearly change in employment due to national, long-term trend projections (per the BLS) as well as local factors such as industry mix, labor force participation rates, and population growth (as computed and modeled by RealTime Talent in JobsEQ).



The largest share of regional Human Services talent in the Northeast is employed by Elementary and Secondary Schools (23.4%, an increase from last year's 22.5%) or Executive, Legislative, and Other General Government Support (13.8%). Individual and Family Services continues to have high forecasted growth and replacement demand needs.

Human Services Field Employment by Industry, Northeast Minnesota, 2023Q2

Industry Title	% of Career Field Empl	Career Field Empl	10-Year Separations	10-Year Empl Change	10-Year Total Demand
Elementary and Secondary Schools	22.5%	7,637	6,351	16	6,367
Executive, Legislative, and Other General Government Support	13.9%	4,732	4,114	-73	4,041
Individual and Family Services	9.7%	3,304	4,585	1,078	5,663
Residential Intellectual and Developmental Disability, Mental Health, and Substance Abuse Facilities	6.9%	2,351	2,965	185	3,149
Colleges, Universities, and Professional Schools	3.7%	1,254	1,165	-4	1,161
Other Residential Care Facilities	2.9%	973	1,071	-128	943
Religious Organizations	2.7%	932	988	-3	985
Child Care Services	2.6%	896	1,031	-3	1,028
Personal Care Services	2.4%	833	968	158	1,126
Junior Colleges	2.4%	818	777	34	811
General Medical and Surgical Hospitals	2.3%	774	740	-19	721
Other Schools and Instruction	2.2%	752	977	189	1,166
Continuing Care Retirement Communities and Assisted Living Facilities for the Elderly	1.8%	611	899	127	1,027
Justice, Public Order, and Safety Activities	1.7%	594	502	-55	447
Legal Services	1.6%	544	389	-27	363
Administration of Environmental Quality Programs	1.6%	533	440	-53	387
Outpatient Care Centers	1.4%	472	467	30	496
Civic and Social Organizations	1.3%	457	726	150	876
Home Health Care Services	1.3%	450	652	74	727
Offices of Other Health Practitioners	1.2%	416	385	43	428
All Others	13.8%	4,683	5,205	194	5,399

Career Field Demographics

The Human Services field is predominantly female (62.7%) and white (92.9%). The share of the Human Services workforce that is female declined by 0.3 percentage points from the 2022Q2 estimates. About 22.1% of the Human Services workforce in the region is between the ages of 45 and 54, an increase of one percentage point – the 35 to 44 age group also increased by about one percent. Last year, the age group that saw the greatest increase from the prior year, those in the workforce that are 65 or older (7.9% increase last year) saw a decrease of one percent – likely due to those retiring.

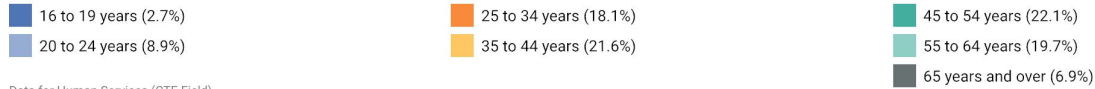


Age

NHED Region (County-Based)



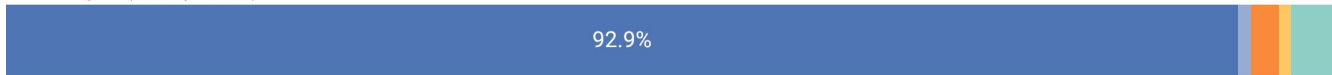
Minnesota



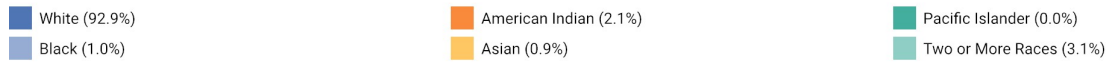
Data for Human Services (CTE Field)
Source: JobsEQ®. Data as of 2023Q2.

Race

NHED Region (County-Based)



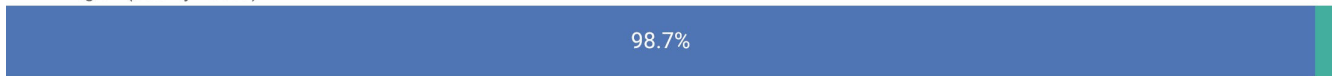
Minnesota



Data for Human Services (CTE Field)
Source: JobsEQ®. Data as of 2023Q2.

Ethnicity

NHED Region (County-Based)



Minnesota



Data for Human Services (CTE Field)
Source: JobsEQ®. Data as of 2023Q2.

Gender

NHED Region (County-Based)



Minnesota



Data for Human Services (CTE Field)
Source: JobsEQ®. Data as of 2023Q2.

Educational Attainment and Requirements

The stacked bar charts here illustrate the estimated mix of educational attainment of the workers in this career field in aggregate, followed by the typical education and training requirements in the field. In general, the Northeast Human Services workforce is overskilled for the typical credentials of entry-level positions. For example, 2.0% of the Human Services workforce have no diploma at all, and 14.5% hold a high school diploma as their highest credential. In contrast, about 46.6% of positions in this field do not require any kind of postsecondary award or credential – up 0.3 percentage points from the prior year estimates.



Educational Attainment

NHED Region (County-Based)



Minnesota

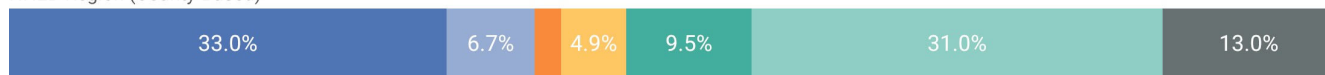


- < High School (2.0%)
- Some College (15.2%)
- Four-Year (29.0%)
- High School (14.5%)
- Two-Year (15.3%)
- Master's (18.2%)
- PhD (5.8%)

Data for Human Services (CTE Field)
Source: JobsEQ®. Data as of 2023Q2.

Education and Training Requirements

NHED Region (County-Based)



Minnesota



- Short-term OJT, no exp, no award (33.0%)
- Long-term training, no exp, no award (2.0%)
- 2-year degree or certificate (9.5%)
- Moderate-term OJT, no exp, no award (6.7%)
- Previous work experience, no award (4.9%)
- Bachelor's degree (31.0%)
- Postgraduate degree (13.0%)

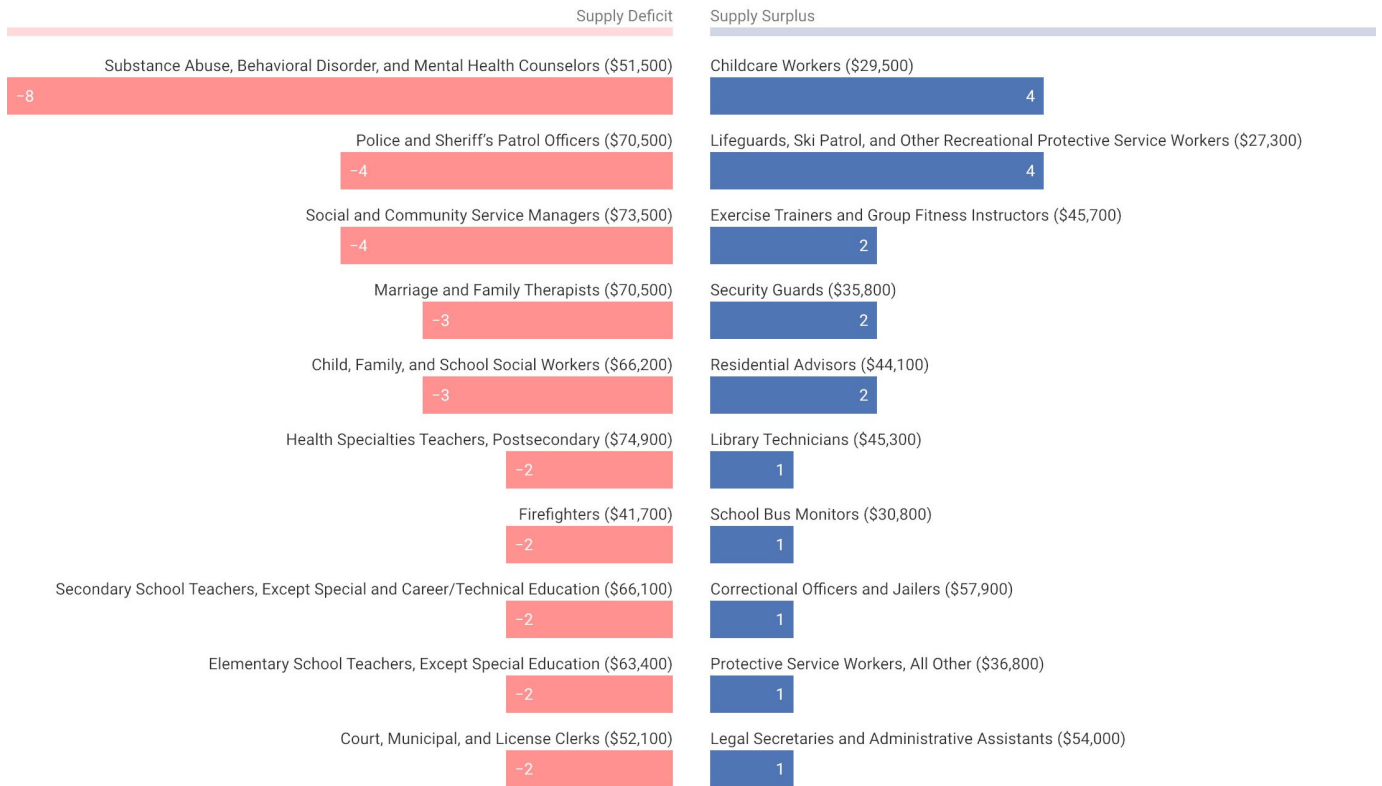
Data for Human Services (CTE Field)
Source: JobsEQ®. Data as of 2023Q2.

Occupation Gaps

The chart below shows the potential average annual gaps over ten years. In Human Services, Mental Health Counselors, Police Officers, and Community Service Managers are the top occupations of shortage in the region (Police Officers dropped out of the second-highest occupation of highest forecasted shortage last year, but is in second place again this year). These critical talent shortages in mental health counseling have shifted due in large part to forecasted employment growth and replacement demand needs due to retirements combined with insufficient talent coming through both secondary education and mental health counseling programs.



Annual Average Occupation Gaps (i.e. Talent Shortages) for the next 10 Years in Human Services, Northeast Minnesota, 2023Q2

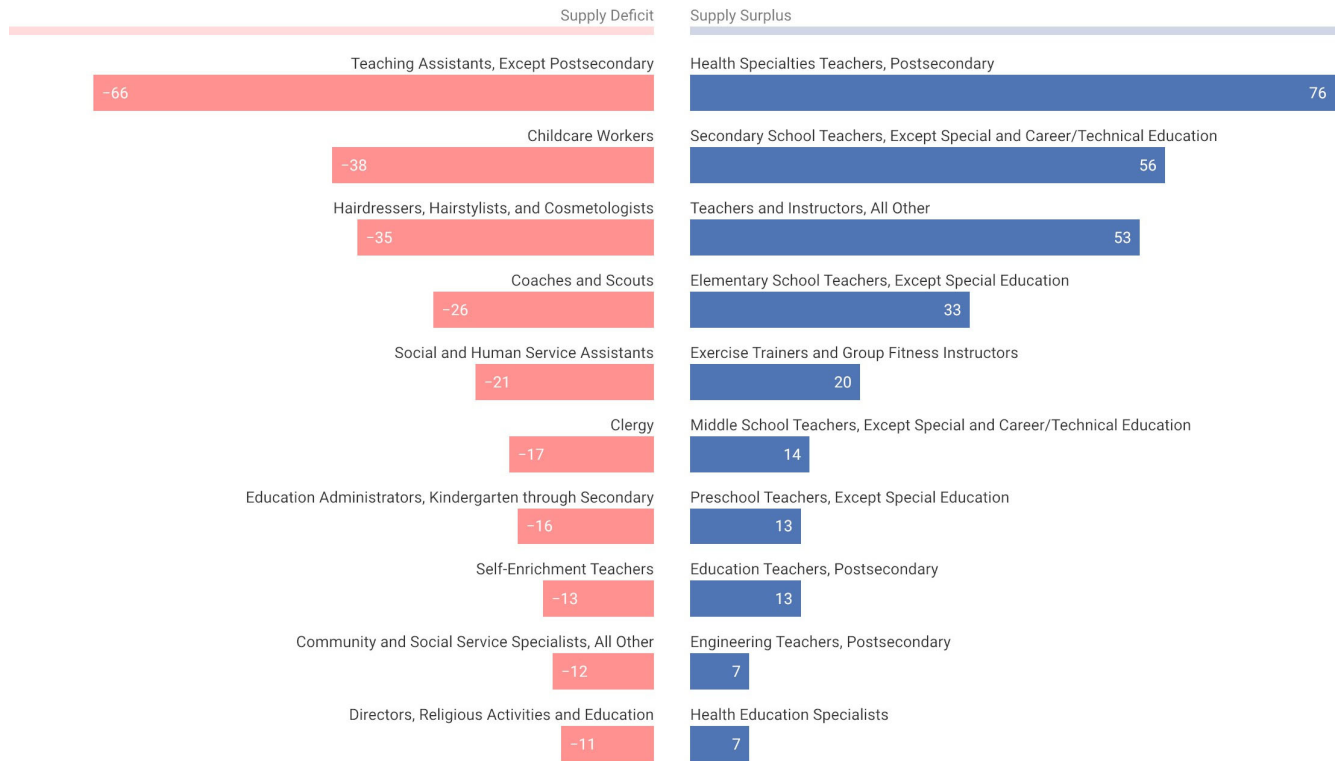


Award Gaps

A comparison of the graduate talent pipeline through certificate and other postsecondary degree programs to the current estimated openings by occupation illuminate a number of shortages. Northeast Minnesota faces several notable Human Services award gaps, meaning that the region is underproducing local talent in relation to employer demand. Northeast colleges and universities are underproducing about 66 graduates annually that are needed to fill Teaching Assistant positions open with employers based in the region, an increase of 11 graduates from last year's estimates. They are also underproducing at least 38 Childcare Worker roles, and at least 35 Cosmetologists. Occupations that show higher awards given than what is currently needed in the local talent market are examples of programs that serve other parts of the state where talent demand is high but relevant programs may not exist.



Award Gaps in Human Services, Northeast Minnesota, 2023Q2



Origin-Gateway-Target

This section offers an Origin-to-Gateway-to-Target model analysis for how to help move students from entry points into their field of interest into both likely and other aligned careers, considering automation, remote work, and the changing work environment.



Origin-to-Gateway-to-Target Occupations for Human Services, Northeast Minnesota, 2023Q2

Target Occupations (all HW, HD, HS, OG)

Child, Family, & School Social Workers
Lawyers (AG)
Social & Community Service Managers
Compliance Officers
Social Workers, All Others

Gateway Occupations

Substance Abuse, Behavioral Disorder, & Mental Health Counselors (HS, HD, OG)
License Clerks (HD, OG)
Correctional Officers
Exercise Trainers & Group Fitness Instructors (HD)
Clergy (HS, HD, OG, AG)

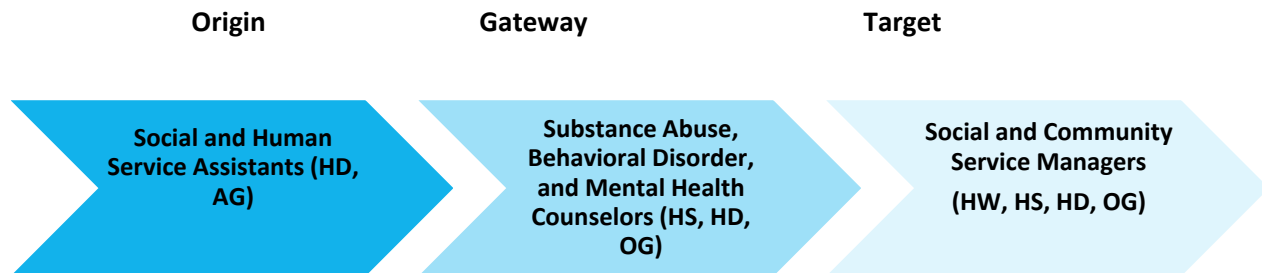
Origin Occupations

Personal Care Aides (HD, AG)
Teaching Assistants (HS, AG)
Childcare Workers (AG)
Social & Human Service Assistants (HD, AG)
Preschool Teachers (HS, HD, OG)

HW = High-Wage; HS=High-Skill; HD=High-Demand; OG=Occupation Gaps; AG=Award Gaps

Featured Pathway

A potential pathway to explore in the Northeast region is Social and Community Service Managers. The Target occupation of Social and Community Service Managers is extremely concentrated in the Northeast region with a location quotient of 2.36. This role is in high demand and currently experiencing an occupation gap. Substance Abuse, Behavioral Disorder, and Mental Health Counselors are relatively locally concentrated in the region and are also experiencing an occupation gap and are in high demand (LQ 1.8). Forecast employment growth coupled with replacement demand due to retirement and insufficient graduate supply make this an important pathway to explore. Social and Human Service Assistants are very highly concentrated in the Northeast region with a location quotient of 2.11 – this Origin occupation also forecasts high demand and is experiencing a shortage of graduates needed to fill these roles in the Northeast region.



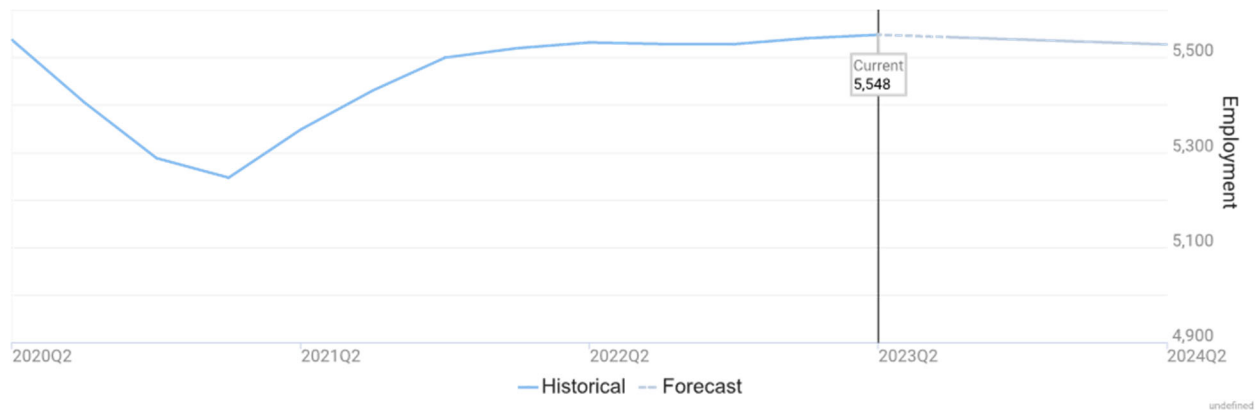
OGT Wages and Experience Level Requirements, Human Services, Northeast Minnesota, 2023Q2

SOC	Occupation	Empl Count	Mean	Entry Level	Experienced	10%	25%	50% (Median)	75%	90%	Typical Entry-Level Education	Previous Work Experience	Typical On-the-Job Training
21-1021	Child, Family, and School Social Workers	709	\$66,200	\$46,900	\$75,900	\$43,300	\$54,000	\$64,800	\$78,600	\$81,700	BA	None	None
23-1011	Lawyers	567	\$116,000	\$73,300	\$137,300	\$67,900	\$84,800	\$103,600	\$136,400	\$166,900	JD	None	None
11-9151	Social and Community Service Managers	498	\$73,500	\$49,800	\$85,400	\$46,300	\$57,000	\$68,100	\$83,600	\$104,600	BA	<5 years	None
13-1041	Compliance Officers	360	\$73,900	\$48,600	\$86,500	\$44,600	\$56,900	\$71,700	\$92,500	\$101,500	BA	None	Mod-term OJT
21-1029	Social Workers, All Other	293	\$62,600	\$47,700	\$70,000	\$46,200	\$51,000	\$57,300	\$71,900	\$85,200	BA	None	None
21-1018	Substance Abuse, Behavioral Disorder, and Mental Health Counselors	859	\$51,500	\$40,600	\$57,000	\$40,200	\$42,500	\$48,900	\$59,100	\$66,800	BA	None	None
43-4031	Court, Municipal, and License Clerks	678	\$52,100	\$40,700	\$57,800	\$40,000	\$43,300	\$51,400	\$59,900	\$63,100	HS/GED	None	Long-term OJT
33-3012	Correctional Officers and Jailers	524	\$57,900	\$48,400	\$62,600	\$46,800	\$51,500	\$56,000	\$63,800	\$68,700	HS/GED	None	Mod-term OJT
39-9031	Exercise Trainers and Group Fitness Instructors	361	\$45,700	\$31,200	\$53,000	\$29,900	\$33,800	\$40,000	\$52,600	\$68,300	HS/GED	None	Short-term OJT
21-2011	Clergy	344	\$54,300	\$37,700	\$62,600	\$35,200	\$42,900	\$54,100	\$63,000	\$73,200	BA	None	Mod-term OJT
31-1122	Personal Care Aides	4,543	\$33,000	\$28,500	\$35,200	\$27,700	\$30,100	\$32,500	\$36,100	\$37,800	HS/GED	None	Short-term OJT
25-9045	Teaching Assistants, Except Postsecondary	2,195	\$37,300	\$29,700	\$41,100	\$28,900	\$32,000	\$38,300	\$41,200	\$44,400	Certificate	None	None
39-9011	Childcare Workers	1,099	\$29,500	\$25,200	\$31,600	\$24,400	\$26,600	\$28,400	\$30,200	\$36,100	HS/GED	None	Short-term OJT
21-1093	Social and Human Service Assistants	1,049	\$44,500	\$34,600	\$49,400	\$33,200	\$37,300	\$40,800	\$52,400	\$61,300	HS/GED	None	Short-term OJT
25-2011	Preschool Teachers, Except Special Education	691	\$38,300	\$28,100	\$43,400	\$26,800	\$30,500	\$36,600	\$42,600	\$53,600	AS	None	None

Arts, Communications, and Information Systems

Arts, Communications, and Information Systems is a diverse career field with artistic careers as well as Information Technology career paths. Information Technology careers saw nearly no drop in total employment in 2020 and saw boosted demand during 2021 and 2022, but employment growth rates are now beginning to cool. Over the next three years, Arts, Communications, and Information Systems Field employment is forecast to decline by -0.4% annually, a further decline from last year’s projection of -0.1%. Current employment sits at 5,548 for talent in this field, with about 168 unemployed, trained professionals in the region (3.0% unemployment rate, an increase of 0.6 percentage points from last year). Among careers in Information Technology, growth is forecast to continue to be high. Software Developers continues to be the occupation of largest employment in the region for this field; in 2021Q1 employment of Software Developers was 758 workers, rising to 1,240 as of 2022Q2, and now dropping to 902 as of 2023Q2. An additional 72 Software Developers are forecast to be added to local businesses annually over the next three years.

Baseline 3-Year Forecast for Arts, Communications, and Information Systems Careers, Northeast Minnesota 2023Q2



Top Ten Arts, Communications, and Information Systems Occupations by Employment Volume in Northeast, 2023Q2

6-Digit Occupation	Empl	Avg Mean Wages	LQ	Historical 3-Year Empl Change	Annual Demand	Baseline Forecast Ann Change
Software Developers	902	\$112,600	0.47	74	72	1.2%
Computer User Support Specialists	501	\$60,200	0.58	7	34	-0.7%
Computer Systems Analysts	470	\$88,700	0.76	-12	31	-0.3%
Computer Network Support Specialists	268	\$71,100	1.29	-5	19	-0.5%
Graphic Designers	267	\$56,000	0.83	5	21	-0.8%
Network and Computer Systems Administrators	210	\$87,300	0.53	-9	12	-0.9%
Computer Occupations, All Other	206	\$87,400	0.39	-2	14	-0.3%
Musicians and Singers	188	\$86,800	0.92	-11	23	-0.7%
Printing Press Operators	185	\$44,700	1.01	-2	15	-2.0%
Photographers	184	\$49,900	1.04	9	15	-0.3%
Remaining Component Occupations	2,164	\$71,300	0.73	-42	188	-0.8%
Arts, Communications, & Information Systems (CTE Field)	5,548	\$77,900	0.62	11	441	-0.4%

“Annual Demand” is the projected need for new entrants into an occupation. New entrants are needed due to expected growth and to replace workers who left the occupation due to factors such as retirement or switching careers.

“Forecast Ann Growth” is the expected baseline (most pessimistic) yearly change in employment due to national, long-term trend projections (per the BLS) as well as local factors such as industry mix, labor force participation rates, and population growth (as computed and modeled by RealTime Talent in JobsEQ).



The largest share of talent in the Northeast that is working in Arts, Communications, and Information Systems roles are employed by IT Companies (9.7%) or working as independent artists (5.9%). Overall, employment is relatively spread out across a number of different industries.

Arts, Communications, and Information Systems Field Employment by Industry, Northeast Minnesota, 2023Q2

Industry Title	% of Career Field Empl	Career Field Empl	10-Year Separations	10-Year Empl Change	10-Year Total Demand
Computer Systems Design and Related Services	9.7%	538	396	62	458
Independent Artists, Writers, and Performers	5.9%	326	329	-15	314
Printing and Related Support Activities	4.7%	259	249	-55	194
Wired and Wireless Telecommunications (except Satellite)	4.5%	250	231	-9	222
Executive, Legislative, and Other General Government Support	3.5%	196	144	-9	135
Depository Credit Intermediation	3.5%	192	135	5	140
General Medical and Surgical Hospitals	3.5%	192	135	-9	126
Religious Organizations	3.5%	192	204	-13	191
Other Professional, Scientific, and Technical Services	3.0%	168	143	-3	140
Newspaper, Periodical, Book, and Directory Publishers	2.6%	144	130	-32	98
Colleges, Universities, and Professional Schools	2.2%	125	94	-8	86
Management of Companies and Enterprises	2.2%	122	90	6	96
Radio and Television Broadcasting Stations	2.1%	115	100	-26	74
Architectural, Engineering, and Related Services	2.1%	115	82	0	82
Insurance Carriers	2.0%	110	77	1	78
Elementary and Secondary Schools	1.9%	104	76	-10	66
Aerospace Product and Parts Manufacturing	1.9%	103	71	3	74
Media Streaming Distribution Services, Social Networks, and Other Media Networks and Content Providers	1.7%	93	84	-3	81
Other Miscellaneous Manufacturing	1.5%	84	74	-2	72
Advertising, Public Relations, and Related Services	1.5%	83	80	0	81
All Others	36.7%	2,037	1,690	-82	1,608

Career Field Demographics

The Arts, Communications, and Information Systems field is predominantly male (71.1%, decreasing by 1.7 percentage points from the prior year) and white (92.4%), although diversity increased with now 7.6% of talent in the field BIPOC by race compared to 7.1% in the year prior. About one-third of the Arts, Communications, and Information Systems workforce in the region is between the ages of 20 and 34 (33.1%, decreasing by 0.6 percentage points from the prior year).

Age

NHED Region (County-Based)



Minnesota



16 to 19 years (1.5%)
20 to 24 years (8.7%)

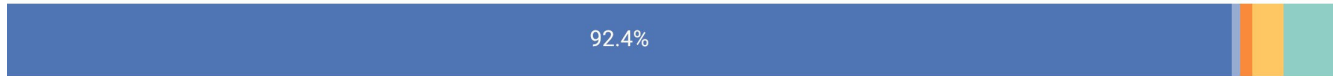
25 to 34 years (22.9%)
35 to 44 years (23.4%)

45 to 54 years (19.6%)
55 to 64 years (18.1%)
65 years and over (5.9%)



Race

NHED Region (County-Based)



Minnesota



- White (92.4%)
- Pacific Islander (0.0%)
- Black (0.6%)
- Asian (2.4%)
- Two or More Races (3.7%)
- American Indian (0.9%)

Data for Arts, Communications, & Information Systems (CTE Field)
Source: JobsEQ®. Data as of 2023Q2.

Ethnicity

NHED Region (County-Based)



Minnesota



- Non-Hispanic/Latino (99.0%)
- Hispanic or Latino (of any race) (1.0%)

Data for Arts, Communications, & Information Systems (CTE Field)
Source: JobsEQ®. Data as of 2023Q2.

Gender

NHED Region (County-Based)



Minnesota



- Male (71.1%)
- Female (28.9%)

Data for Arts, Communications, & Information Systems (CTE Field)
Source: JobsEQ®. Data as of 2023Q2.

Educational Attainment and Requirements

The stacked bar charts here illustrate the estimated mix of educational attainment of the workers in this career field in aggregate, followed by the typical education and training requirements in the field. The share of all occupations in this field requiring a Bachelor’s degree decreased this year from 65.2% down to 63.1%, while 44.5% of the workforce hold a four-year degree as their highest credential. Another 15.8% hold a Master’s or PhD, increasing by 1.7% from the year prior.

Educational Attainment

NHED Region (County-Based)



Minnesota



- < High School (0.8%)
- Four-Year (44.5%)
- High School (9.2%)
- Two-Year (15.9%)
- Master's (13.9%)
- Some College (13.8%)
- PhD (1.9%)

Data for Arts, Communications, & Information Systems (CTE Field)
Source: JobsEQ®. Data as of 2023Q2.



Education and Training Requirements

NHED Region (County-Based)



Minnesota



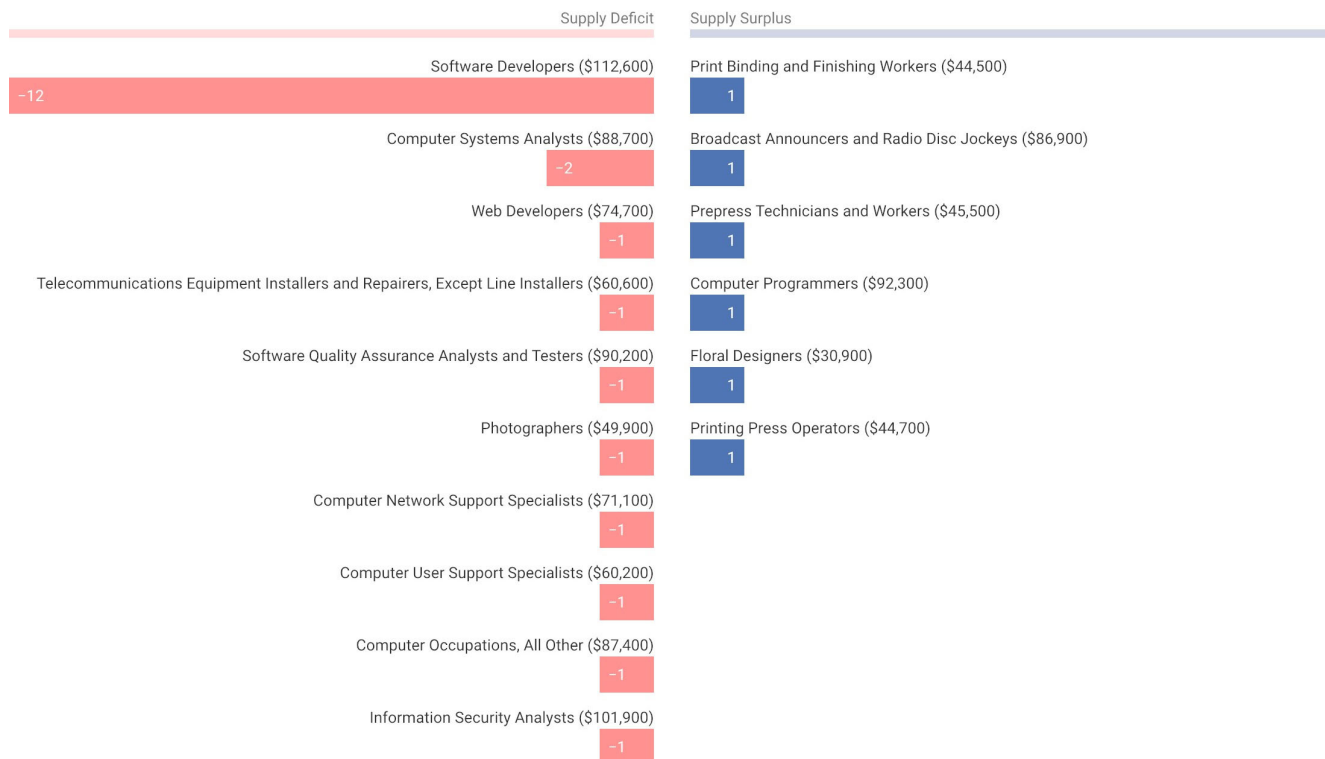
- Short-term OJT, no exp, no award (1.5%)
- Moderate-term OJT, no exp, no award (17.8%)
- Long-term training, no exp, no award (6.9%)
- Previous work experience, no award (0.2%)
- 2-year degree or certificate (10.5%)
- Bachelor's degree (63.1%)
- Postgraduate degree (0.0%)

Data for Arts, Communications, & Information Systems (CTE Field)
Source: JobsEQ®. Data as of 2023Q2.

Occupation Gaps

The chart below shows the potential average annual gaps over ten years. Software Developers are the top occupation of shortage in this field, falling short at least twelve skilled workers needed annually (averaged over the next ten years) to meet employer demand. This moderate talent shortage is primarily due to employment growth which is outpacing the growth in supply of trained software professionals in this region. Computer Systems Analysts has the second greatest forecasted shortage and Web Developers are also newly forecast to have shortages.

Annual Average Occupation Gaps (i.e. Talent Shortages) for the next 10 Years in Arts, Communications. And Information Systems, Northeast Minnesota, 2023Q2

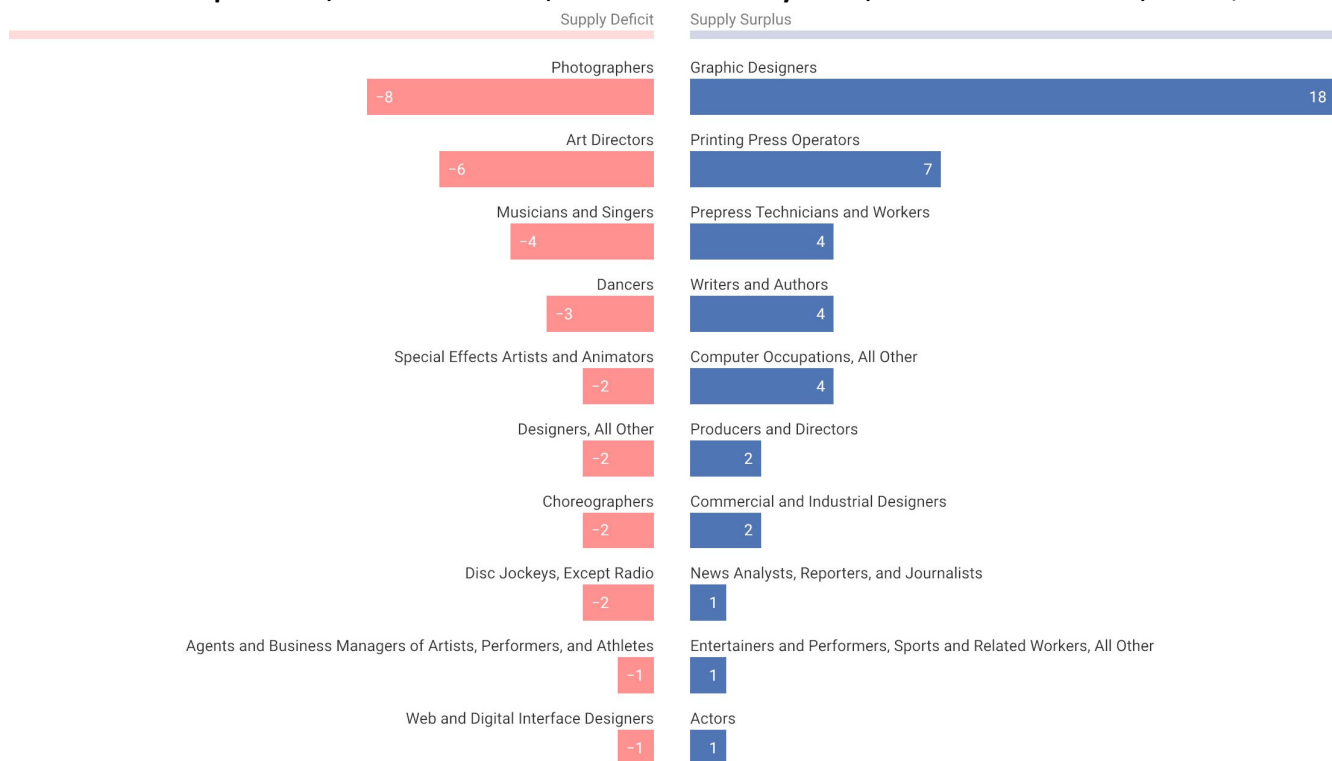




Award Gaps

A comparison of the graduate talent pipeline obtaining a certificate or postsecondary degree to the current estimated openings by occupation reveal several regional shortages. The Northeast is underproducing graduates in several Arts, Communications, and Information Systems programs in comparison to national benchmarks, meaning that the region is underproducing local talent in relation to what a typical community with a similar local mix of job opportunities would have. Northeast Minnesota colleges and universities are underproducing trained Photographers, Art Directors, Musicians, and Dancers measured against national benchmarks. Very few Information Technology careers make the list of award gaps or surpluses. Occupations that show higher awards given than what is currently needed in the local talent market are examples of programs that serve other parts of the state where talent demand is high but relevant programs may not exist.

Award Gaps in Arts, Communications, and Information Systems, Northeast Minnesota, 2023Q2



Origin-Gateway-Target

This section offers an Origin-to-Gateway-to-Target model analysis for how to help move students from entry points into their field of interest into both likely and other aligned careers, considering automation, remote work, and the changing work environment.



Origin-to-Gateway-to-Target Occupations for Arts, Communications, and Information Systems, Northeast Minnesota, 2023Q2

Target Occupations (all HW, HD, HS, OG)

Software Developers
 Computer Systems Analysts
 Computer Network Support Specialists
 Computer Occupations, All Other
 Telecommunications Equipment Installers

Gateway Occupations

Graphic Designers (HS)
 Photographers (OG, AG)
 Audio & Video Technicians (HS, AG)
 Prepress Technicians & Workers (HS)
 Designers, All Other (HS, HD, AG)

Origin Occupations

Printing Press Operators
 Floral Designers
 Print Binding & Finishing
 Disc Jockeys, Except Radio (HD, AG)
 Dancers (HD, AG)

HW = High-Wage; HS=High-Skill; HD=High-Demand; OG=Occupation Gaps; AG=Award Gaps

Featured Pathway

With a projected occupation gap, high wages, and high demand, the occupation of Computer Network Support Specialists is a promising pathway to explore in the Northeast region. This occupation is highly concentrated in the region with a location quotient of 1.29. Another Target occupation with related skillsets is Computer Network Support Specialists. This occupation is relatively concentrated locally and there is an occupation gap and high demand for this role. The Gateway occupation of Audio and Visual Technicians is a potential feeder occupation into both of these roles, has a projected shortage of graduates to fill these roles, and is considered high skill. There are not in-field Origin occupations, but entry-level customer services and office support roles may have transferrable skills.



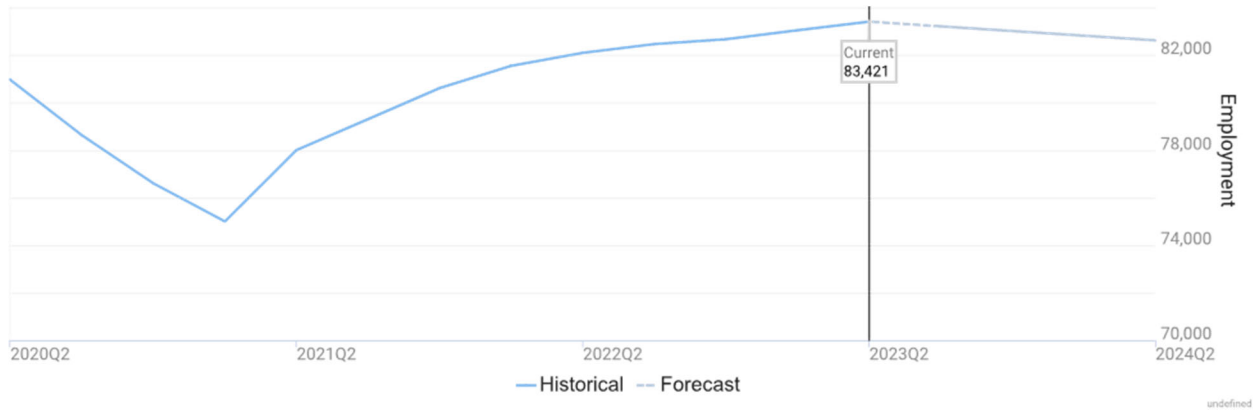
OGT Wages and Experience Level Requirements

SOC	Occupation	Empl Count	Mean	Entry Level	Experienced	10%	25%	50% (Median)	75%	90%	Typical Entry-Level Education	Previous Work Experience	Typical On-the-Job Training
15-1252	Software Developers	902	\$112,600	\$75,900	\$131,000	\$72,900	\$84,500	\$105,400	\$134,700	\$161,000	BA	None	None
15-1211	Computer Systems Analysts	470	\$88,700	\$65,700	\$100,200	\$65,100	\$70,300	\$88,900	\$94,500	\$108,200	BA	None	None
15-1231	Computer Network Support Specialists	268	\$71,100	\$46,100	\$83,700	\$39,600	\$55,900	\$71,900	\$81,000	\$102,100	AS	None	Mod-term OJT
15-1299	Computer Occupations, All Other	206	\$87,400	\$53,300	\$104,400	\$46,000	\$66,200	\$86,400	\$107,400	\$125,200	BA	None	None
49-2022	Telecommunications Equipment Installers and Repairers, Except Line Installers	132	\$60,600	\$41,900	\$69,900	\$40,200	\$46,700	\$59,500	\$76,300	\$80,100	Certificate	None	Mod-term OJT
27-1024	Graphic Designers	267	\$56,000	\$37,600	\$65,100	\$36,500	\$41,400	\$54,100	\$65,100	\$76,700	BA	None	None
27-4021	Photographers	184	\$49,900	\$29,800	\$59,900	\$28,600	\$32,400	\$41,300	\$61,000	\$81,900	HS/GED	None	Mod-term OJT
27-4011	Audio and Video Technicians	73	\$52,500	\$36,000	\$60,700	\$33,300	\$41,000	\$52,100	\$60,700	\$71,800	Certificate	None	Short-term OJT
51-5111	Prepress Technicians and Workers	51	\$45,500	\$32,500	\$52,000	\$31,800	\$35,100	\$45,300	\$51,400	\$60,300	Certificate	None	None
27-1029	Designers, All Other	37	\$55,600	\$32,300	\$67,300	\$30,400	\$36,000	\$44,700	\$70,400	\$100,300	BA	None	None
51-5112	Printing Press Operators	185	\$44,700	\$33,500	\$50,200	\$31,800	\$36,700	\$41,000	\$52,700	\$61,800	HS/GED	None	Mod-term OJT
27-1023	Floral Designers	67	\$30,900	\$25,300	\$33,700	\$24,100	\$27,000	\$30,200	\$33,000	\$38,000	HS/GED	None	Mod-term OJT
51-5113	Print Binding and Finishing Workers	50	\$44,500	\$34,600	\$49,500	\$34,500	\$36,500	\$46,000	\$49,600	\$57,600	HS/GED	None	Mod-term OJT
27-2091	Disc Jockeys, Except Radio	30	\$42,600	\$25,300	\$51,200	\$23,000	\$27,400	\$36,900	\$50,500	\$78,700	HS/GED	None	Short-term OJT
27-2031	Dancers	20	\$38,400	\$24,600	\$45,300	\$22,900	\$26,100	\$34,600	\$46,100	\$61,100	None	None	Long-term OJT

Business, Management, and Administration

Business, Management, and Administration is a diverse career field with Hospitality and Tourism, Finance, Administration, Human Resources, and Marketing careers, which all experienced different timing of recovery from the pandemic’s impacts. Compared to the forecast provided in 2021Q1, the recovery of this field’s careers is impressive, rising from 75,259 employed in Business, Management, and Administration careers in the region in 2021Q1 to 82,435 employed in the field in 2022Q2, and now 83,421 in 2023Q2. Over the next three years, Business, Management, and Administration Field employment is forecast to decline by -1.0%, a drop from -0.2% forecast one year ago.

Baseline 3-Year Forecast for Business, Management, and Administration Careers, Northeast Minnesota 2023Q2



Top Ten Business, Management, and Administration Systems Occupations by Employment Volume in Northeast Minnesota, 2023Q2

6-Digit Occupation	Empl	Avg Mean Wages	LQ	Historical 3-Year Empl Change	Annual Demand	Baseline Forecast Ann Change
Retail Salespersons	5,180	\$35,200	1.16	105	666	-1.1%
Cashiers	5,122	\$29,900	1.28	11	813	-1.8%
General and Operations Managers	4,094	\$90,100	0.98	461	323	-0.6%
Fast Food and Counter Workers	3,666	\$29,500	0.90	108	737	-0.8%
Waiters and Waitresses	3,539	\$27,300	1.34	142	648	-1.1%
Office Clerks, General	3,243	\$44,300	1.03	-65	335	-1.6%
Stockers and Order Fillers	2,872	\$36,200	0.84	304	476	-0.2%
Customer Service Representatives	2,788	\$43,800	0.80	106	321	-1.7%
Janitors and Cleaners, Except Maids and Housekeeping Cleaners	2,625	\$37,600	0.93	-40	333	-0.8%
Maids and Housekeeping Cleaners	2,338	\$33,100	1.85	-56	295	-0.9%
Remaining Component Occupations	47,950	\$57,500	1.22	1,373	5,324	-0.9%
Business, Management, & Administration (CTE Field)	83,421	\$50,500	0.97	2,448	10,269	-1.0%

“Annual Demand” is the projected need for new entrants into an occupation. New entrants are needed due to expected growth and to replace workers who left the occupation due to factors such as retirement or switching careers.

“Forecast Ann Growth” is the expected baseline (most pessimistic) yearly change in employment due to national, long-term trend projections (per the BLS) as well as local factors such as industry mix, labor force participation rates, and population growth (as computed and modeled by RealTime Talent in JobsEQ).



Employment in Business, Management, and Administration careers is spread across many different industries. In the Northeast, the industries with the greatest share of Business, Management, and Administration talent are Restaurants (15.3%, same as prior year) Traveler Accommodation (6.4%, up 0.2 percentage points), reflecting the importance of the Hospitality and Tourism career cluster in this region. These two industries account for a substantial amount of talent demand over the next ten years (restaurants alone accounts for well over half of future positions needing to be filled in this field), but overall both current employment and future growth are relatively spread out over many different industries.

Business, Management, and Administration Field Employment by Industry, Northeast Minnesota, 2023Q2

Industry Title	% of Career Field Empl	Career Field Empl	10-Year Separations	10-Year Empl Change	10-Year Total Demand
Restaurants and Other Eating Places	15.3%	12,800	22,398	-881	21,517
Traveler Accommodation	6.4%	5,305	7,861	-290	7,571
Warehouse Clubs, Supercenters, and Other General Merchandise Retailers	3.5%	2,957	4,334	-318	4,015
Grocery and Convenience Retailers	3.5%	2,889	4,477	-312	4,165
Gasoline Stations	3.2%	2,646	4,220	-378	3,842
Executive, Legislative, and Other General Government Support	3.0%	2,471	2,870	-263	2,607
General Medical and Surgical Hospitals	3.0%	2,462	2,933	-264	2,668
Depository Credit Intermediation	2.6%	2,204	2,021	-224	1,797
Building Material and Supplies Dealers	2.6%	2,167	2,971	-163	2,808
Elementary and Secondary Schools	1.9%	1,561	1,965	-210	1,755
Other Amusement and Recreation Industries	1.7%	1,440	2,559	-25	2,534
Agencies, Brokerages, and Other Insurance Related Activities	1.7%	1,387	1,366	-1	1,366
Drinking Places (Alcoholic Beverages)	1.5%	1,225	1,987	-92	1,894
Department Stores	1.4%	1,207	1,760	-149	1,612
Gambling Industries	1.4%	1,197	1,699	-233	1,466
Civic and Social Organizations	1.3%	1,121	1,610	-82	1,528
Services to Buildings and Dwellings	1.3%	1,119	1,407	-92	1,315
Continuing Care Retirement Communities and Assisted Living Facilities for the Elderly	1.2%	1,012	1,502	6	1,508
Sporting Goods, Hobby, and Musical Instrument Retailers	1.1%	918	1,199	-102	1,096
Automobile Dealers	1.0%	859	1,019	-86	933
All Others	41.3%	34,472	37,440	-3,386	34,054

Career Field Demographics

The Business, Management, and Administration field is about 93.9%, seeing racial diversity decline by 1.2% from the prior year's estimates. Ethnic diversity also declined slightly from prior estimates. By gender, the field flipped from being majority male in 2021 to being 55.4% females employed in 2022, and now 58.6% females employed in 2023Q2. About 49.4% of workers in Business, Management, and Administration roles are over 45 years old, an increase of 6% from the prior year.

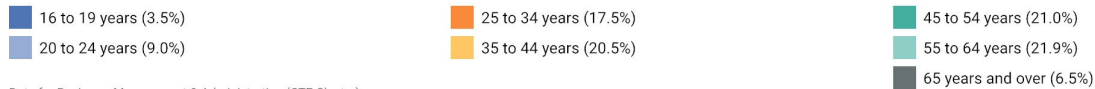


Age

NHED Region (County-Based)



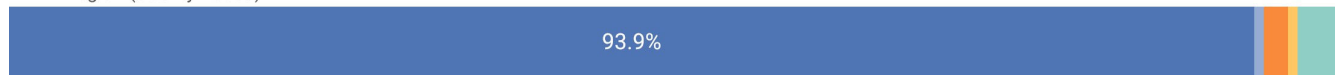
Minnesota



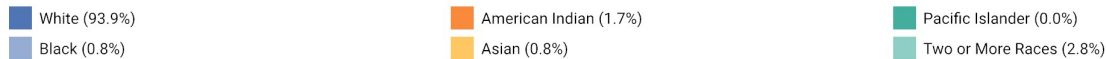
Data for Business, Management & Administration (CTE Cluster)
Source: JobsEQ®. Data as of 2023Q2.

Race

NHED Region (County-Based)



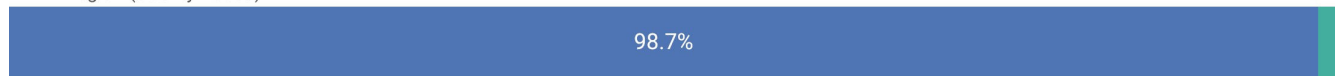
Minnesota



Data for Business, Management & Administration (CTE Cluster)
Source: JobsEQ®. Data as of 2023Q2.

Ethnicity

NHED Region (County-Based)



Minnesota



Data for Business, Management & Administration (CTE Cluster)
Source: JobsEQ®. Data as of 2023Q2.

Gender

NHED Region (County-Based)



Minnesota



Data for Business, Management & Administration (CTE Cluster)
Source: JobsEQ®. Data as of 2023Q2.

Educational Attainment and Requirements

The stacked bar charts here illustrate the estimated mix of educational attainment of the workers in this career field in aggregate, followed by the typical education and training requirements in the field. In general, consistent with data from 2022Q2, the Northeast Minnesota Business, Management, and Administration workforce is more likely to have a two-year degree than what is in demand. While 18.5% of the workforce holds a two-year degree, just 0.5% of the occupations in this field require a two-year degree. Nearly two-thirds of all positions in this field (55.5%) require no degree, no experience, and only short-term on-the-job training. Another 6.5% require experience or some on-the-job training, but still no degree. In contrast, only 1.6% of the



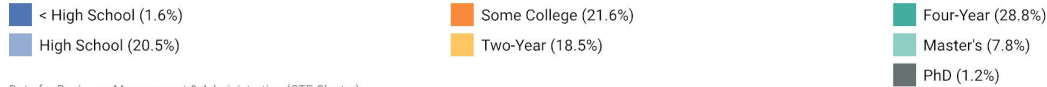
workforce in this field has no degree at all, and 20.5% hold a high school diploma as their highest credential. Overall, the share of local jobs requiring a Bachelor's degree increased by 18.4 percentage points.

Educational Attainment

NHED Region (County-Based)



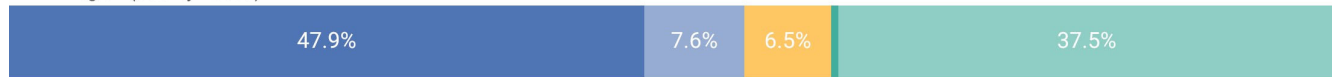
Minnesota



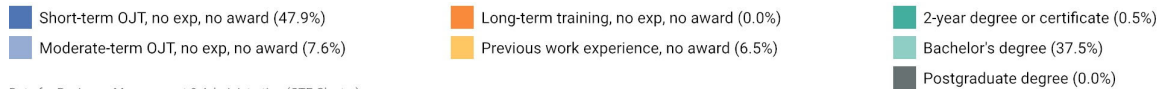
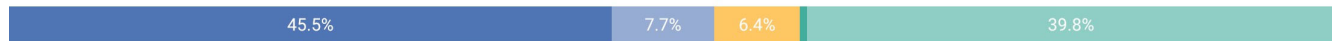
Data for Business, Management & Administration (CTE Cluster)
Source: JobsEQ®. Data as of 2023Q2.

Education and Training Requirements

NHED Region (County-Based)



Minnesota



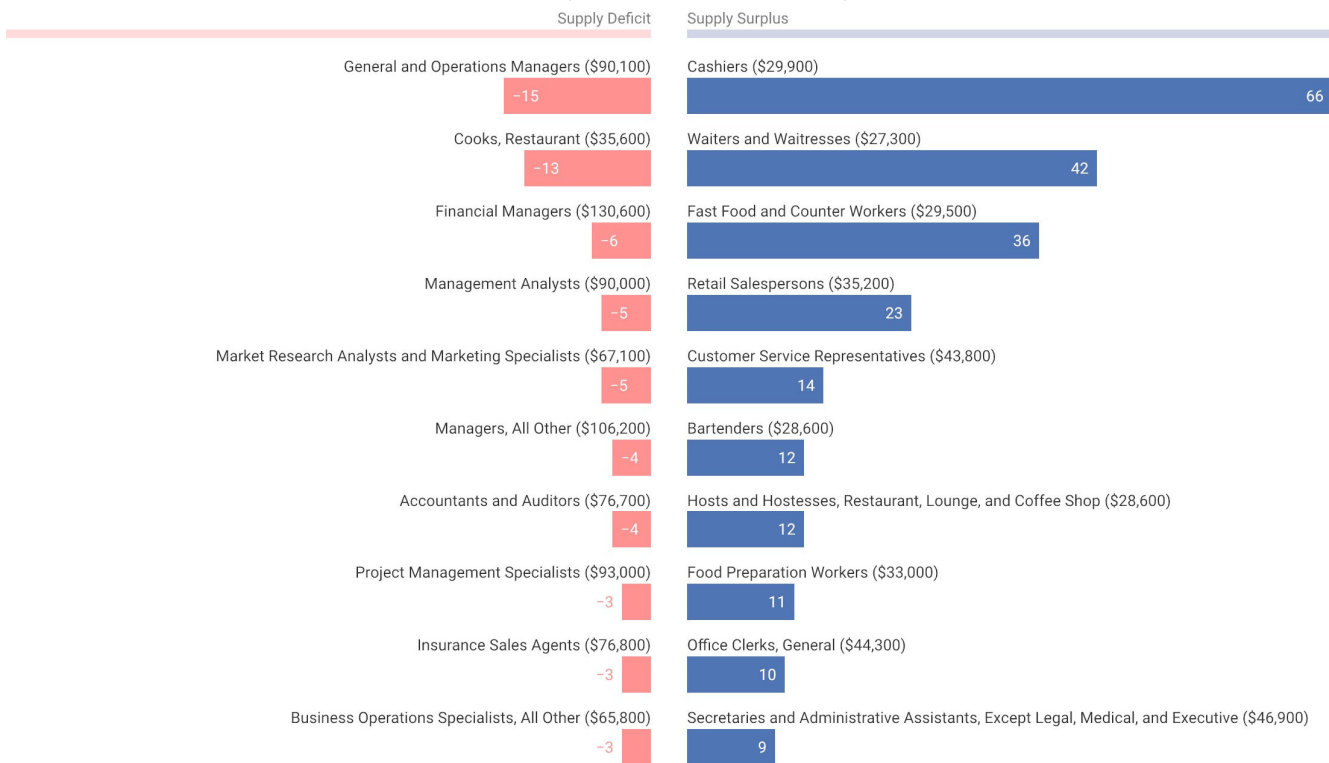
Data for Business, Management & Administration (CTE Cluster)
Source: JobsEQ®. Data as of 2023Q2.

Occupation Gaps

The chart below shows the potential average annual gaps over ten years. Many management roles indicate significant shortages in the years ahead, with the General and Operations Manager talent pool likely falling short at least 15 skilled workers needed annually (averaged over the next ten years) to meet employer demand—a decrease of five short estimated the year prior. Hospitality and Tourism cluster careers have rebounded from the pandemic and several are now forecasting talent shortages, with Cooks jumping into first place as of 2022Q2 and in second place as of 2023Q2. This critical talent shortage is primarily due to moderate growth and retirements which far outpace demand.



Annual Average Occupation Gaps (i.e. Talent Shortages) for the next 10 Years in Business, Management, and Administration, Northeast Minnesota, 2023Q2

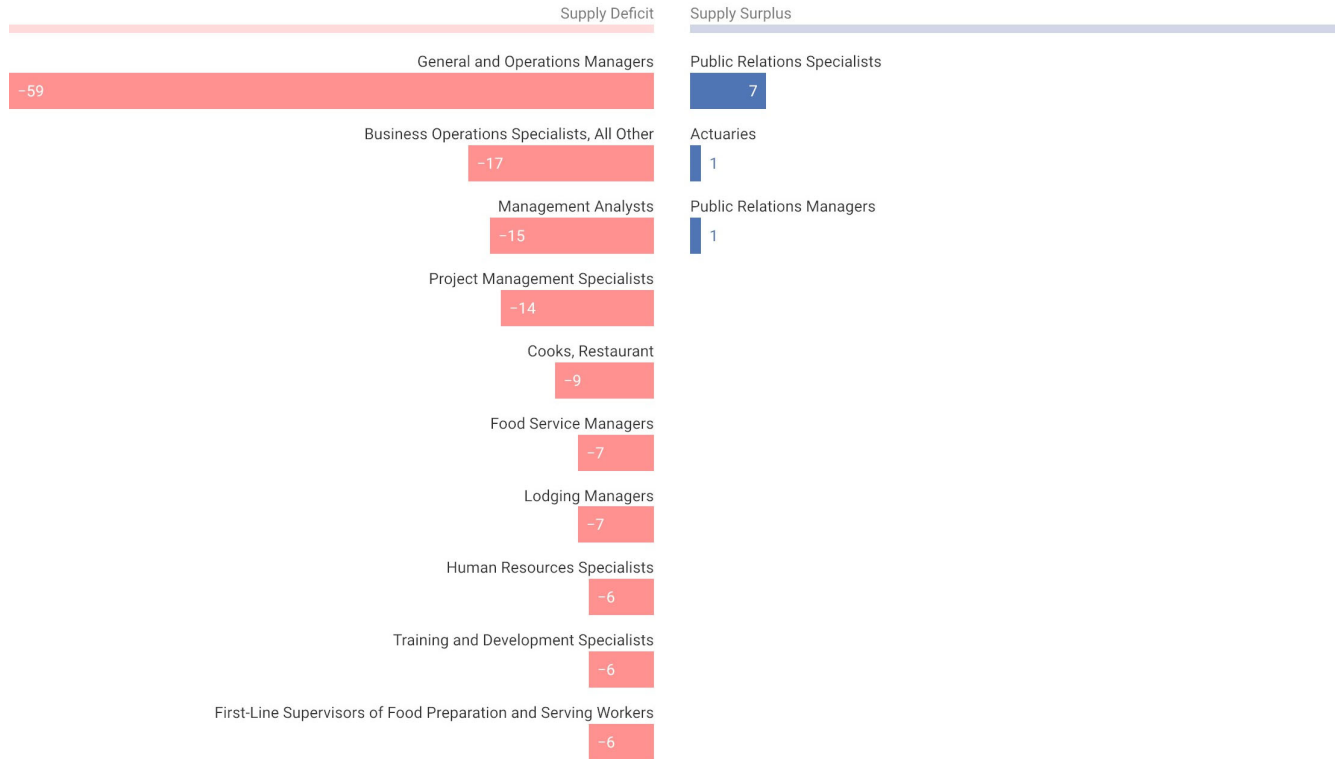


Award Gaps

A comparison of the graduate talent pipeline through certificate and other postsecondary degree programs to the current estimated openings by occupation illuminate a few shortfalls in graduate awards needed to meet local demand for credentialed talent. Colleges and universities in the Northeast currently under-train talent in Business, Management, and Administration when compared to national benchmarks. Specifically, regional colleges and universities are underproducing around 59 graduates annually that are needed to fill General and Operations Manager positions open with employers based in the Northeast alone. This is a dramatic uptick from last year's estimated shortage of 24 graduates for General and Operations Manager positions.



Award Gaps in Business, Management, and Administration, Northeast Minnesota, 2023Q2



Promising Pathways

This section offers an Origin-to-Gateway-to-Target model analysis for how to help move students from entry points into their field of interest into both likely and other aligned careers, considering automation, remote work, and the changing work environment.



Origin-to-Gateway-to-Target Occupations for Business, Management, and Administration, Northeast Minnesota, 2023Q2

Target Occupations (all HW, HD, HS, OG)
 General & Operations Managers (AG)
 Accountants & Auditors
 Managers, All Other
 Business Operations Specialists (AG)
 Market Research Analysts & Marketing Specialists

Gateway Occupations

Secretaries & Administrative Assistants (AG)
 Supervisors of Retail Workers (HD)
 Bookkeeping, Accounting, & Auditing Clerks (HS, AG)
 Billing & Posting Clerks (HD)
 Supervisors of Housekeeping & Janitorial Workers (HD, OG)

Origin Occupations

Retail Salespersons (HD)
 Cashiers
 Fast Food & Counter Workers (HD)
 Waiters & Waitresses
 Office Clerks, General

HW = High-Wage; HS=High-Skill; HD=High-Demand; OG=Occupation Gaps; AG=Award Gaps

Featured Pathway

With a projected occupation gap, a projected award gap, and high demand the Target occupation of General and Operations Managers is a promising pathway to explore in the Northeast region. This occupation is relatively concentrated in the region with a location quotient of 0.98. The Gateway occupation of First-Line Supervisors of Retail Sales Workers is highly concentrated locally (LQ 1.21) and is also in high demand. The Origin occupation that feeds into that Gateway occupation is also high concentrated locally (LQ of 1.16) and also in high demand. These retail Origin and Gateway occupations are a potential entry point for the Target occupation of General Operations Managers, recognizing that this role typically has an education requirement of a Bachelor's degree, but that there is a shift towards skill-based hiring across the state.



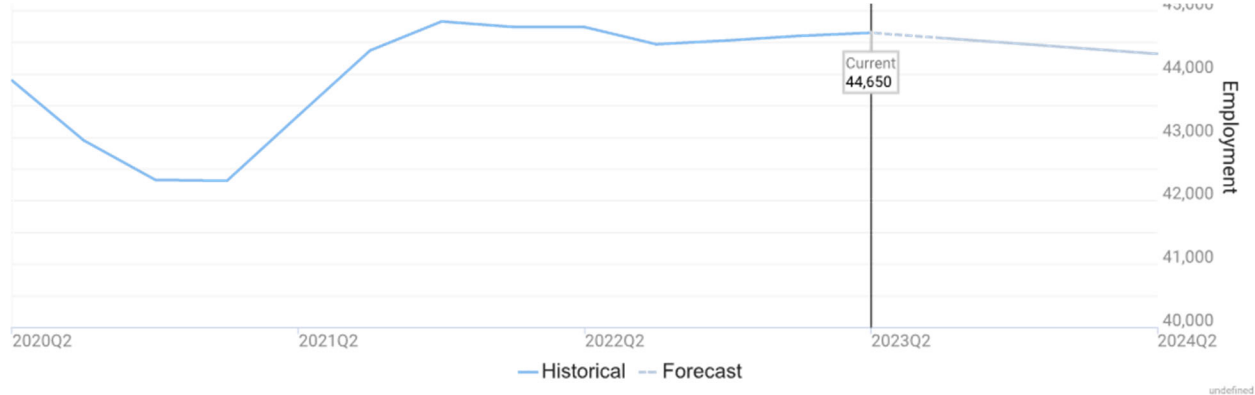
OGT Wages and Experience Level Requirements, Business, Management, and Administration, Northeast Minnesota, 2023Q2

SOC	Occupation	Empl Count	Mean	Entry Level	Experienced	10%	25%	50% (Median)	75%	90%	Typical Entry-Level Education	Previous Work Experience	Typical On-the-Job Training
11-1021	General and Operations Managers	4,094	\$90,100	\$43,600	\$113,300	\$38,900	\$52,700	\$76,300	\$113,500	\$157,600	BA	5+ years	None
13-2011	Accountants and Auditors	1,421	\$76,700	\$51,800	\$89,100	\$49,200	\$57,600	\$68,500	\$86,400	\$108,600	BA	None	None
11-9199	Managers, All Other	1,042	\$106,200	\$65,400	\$126,600	\$61,500	\$76,300	\$107,400	\$126,800	\$158,000	BA	< 5 years	None
13-1199	Business Operations Specialists, All Other	985	\$65,800	\$43,600	\$76,900	\$41,000	\$49,700	\$62,700	\$77,900	\$97,300	BA	None	None
13-1161	Market Research Analysts and Marketing Specialists	835	\$67,100	\$42,000	\$79,600	\$39,000	\$48,700	\$62,500	\$80,600	\$102,200	BA	None	None
43-6014	Secretaries and Administrative Assistants, Except Legal, Medical, and Executive	2,176	\$46,900	\$34,900	\$52,900	\$32,900	\$39,100	\$45,700	\$51,400	\$59,700	HS/GED	None	Short-term OJT
41-1011	First-Line Supervisors of Retail Sales Workers	2,020	\$47,800	\$34,800	\$54,300	\$32,700	\$38,800	\$45,100	\$52,500	\$64,700	HS/GED	< 5 years	None
43-3031	Bookkeeping, Accounting, and Auditing Clerks	1,710	\$47,200	\$34,500	\$53,600	\$32,100	\$38,900	\$46,200	\$54,000	\$63,000	Certificate	None	Mod-term OJT
43-3021	Billing and Posting Clerks	342	\$47,400	\$38,500	\$51,800	\$37,200	\$41,400	\$46,500	\$51,700	\$61,500	HS/GED	None	Mod-term OJT
37-1011	First-Line Supervisors of Housekeeping and Janitorial Workers	315	\$47,700	\$33,200	\$55,000	\$30,900	\$37,500	\$45,000	\$57,800	\$66,200	HS/GED	< 5 years	None
41-2031	Retail Salespersons	5,180	\$35,200	\$26,200	\$39,700	\$24,600	\$28,500	\$31,600	\$37,600	\$49,000	None	None	Short-term OJT
41-2011	Cashiers	5,122	\$29,900	\$25,400	\$32,100	\$24,400	\$27,100	\$29,400	\$31,600	\$35,900	None	None	Short-term OJT
35-3023	Fast Food and Counter Workers	3,666	\$29,500	\$25,400	\$31,500	\$24,100	\$27,300	\$29,100	\$30,400	\$35,900	None	None	Short-term OJT
35-3031	Waiters and Waitresses	3,539	\$27,300	\$23,200	\$29,300	\$23,200	\$23,300	\$24,500	\$28,800	\$35,500	None	None	Short-term OJT
43-9061	Office Clerks, General	3,243	\$44,300	\$31,300	\$50,700	\$29,600	\$34,800	\$41,900	\$50,900	\$62,300	HS/GED	None	Short-term OJT

Engineering, Manufacturing, and Technology

Engineering, Manufacturing, and Technology is a wide career field with transportation, logistics, STEM, architecture, construction, manufacturing, and machining careers, which all experienced somewhat diverging trends in the early months of the COVID-19 pandemic. Over the next three years, this career field’s employment is forecast to decline moderately (-0.8% annually), a drop from the -0.4% forecast estimated in 2022Q2. Previously, employment sat at 44,493 in this field, which has rebounded further to 44,650 as of 2023Q2 in the Northeast. All occupations with the exception of Light Truck Drivers have forecasted declines over the next three years.

3-Year Forecast for Engineering, Manufacturing, and Technology Careers, Northeast Minnesota 2023Q2



Top Ten Engineering, Manufacturing, and Technology Occupations by Employment Volume in the Northeast, 2023Q2

6-Digit Occupation	Empl	Avg Mean Wages	LQ	Historical 3-Year Empl Change	Annual Demand	Baseline Forecast Ann Change
Construction Laborers	2,354	\$53,000	1.37	233	218	-0.4%
Maintenance and Repair Workers, General	2,239	\$52,500	1.17	35	199	-0.6%
Laborers and Freight, Stock, and Material Movers, Hand	2,199	\$44,200	0.63	100	286	-0.6%
Heavy and Tractor-Trailer Truck Drivers	2,105	\$57,900	0.80	-24	226	-0.7%
Landscaping and Groundskeeping Workers	1,500	\$39,400	1.08	102	187	-0.4%
Carpenters	1,380	\$56,400	1.23	59	115	-0.7%
First-Line Supervisors of Construction Trades and Extraction Workers	1,084	\$85,300	1.11	94	93	-0.6%
Team Assemblers	1,056	\$43,700	0.71	46	97	-1.8%
Light Truck Drivers	1,033	\$47,400	0.76	42	120	0.0%
Automotive Service Technicians and Mechanics	958	\$50,800	1.02	-45	84	-0.7%
Remaining Component Occupations	28,742	\$65,000	1.41	106	2,635	-0.9%
Engineering, Manufacturing, & Technology (CTE Field)	44,650	\$60,500	0.94	756	4,263	-0.8%

“Annual Demand” is the projected need for new entrants into an occupation. New entrants are needed due to expected growth and to replace workers who left the occupation due to factors such as retirement or switching careers.

“Forecast Ann Growth” is the expected baseline (most pessimistic) yearly change in employment due to national, long-term trend projections (per the BLS) as well as local factors such as industry mix, labor force participation rates, and population growth (as computed and modeled by RealTime Talent in JobsEQ).



Many different industries employ Engineering, Manufacturing, and Technology talent in the Northeast. Locally, the industries with the greatest share of this field's talent are Metal Ore Mining (7.1%, a decline from last year's 7.8%) and Executive, Legislative, and Other General Government Support (4.5%). Most industries employing talent in this field only touch less than 1% of total talent skilled in this field, suggesting that education and training programs will need to build broad strategies that cross each of these sectors.

Engineering, Manufacturing, and Technology Field Employment by Industry, 2023Q2, Northeast Minnesota

Industry Title	% of Career Field Empl	Career Field Empl	10-Year Separations	10-Year Empl Change	10-Year Total Demand
Metal Ore Mining	7.1%	3,154	3,221	-155	3,066
Executive, Legislative, and Other General Government Support	4.5%	2,008	2,051	-88	1,963
Building Equipment Contractors	4.5%	1,992	1,929	-84	1,845
Residential Building Construction	3.5%	1,573	1,406	-84	1,321
Other Specialty Trade Contractors	3.0%	1,336	1,300	-76	1,224
Pulp, Paper, and Paperboard Mills	2.9%	1,313	1,218	-421	797
Highway, Street, and Bridge Construction	2.9%	1,299	1,245	-71	1,175
Foundation, Structure, and Building Exterior Contractors	2.8%	1,248	1,151	-92	1,059
Automotive Repair and Maintenance	2.2%	977	994	-61	932
Architectural, Engineering, and Related Services	2.1%	960	771	-61	710
Building Finishing Contractors	2.1%	934	809	-62	747
Electric Power Generation, Transmission and Distribution	2.1%	920	757	-173	584
Services to Buildings and Dwellings	1.9%	864	1,034	-49	984
Aerospace Product and Parts Manufacturing	1.8%	798	714	-68	646
Nonresidential Building Construction	1.7%	763	686	-39	648
Couriers and Express Delivery Services	1.6%	727	929	57	986
General Freight Trucking	1.5%	675	765	-37	728
Rail Transportation	1.4%	646	588	-53	536
Automobile Dealers	1.4%	615	665	-30	635
Traveler Accommodation	1.3%	568	592	-5	587
All Others	47.7%	21,280	22,863	-1,570	21,293

Career Field Demographics

The Engineering, Manufacturing, and Technology field is heavily male (85.2% male; female representation increased by 0.5 percentage points) and White (93.7%), with no increase this year in the share of talent that is BIPOC by race or Hispanic or Latinx from the prior years' estimates. Just over 50% of workers in this field are 45 years or older, signaling potential exacerbation of the talent shortage due to impending retirements.

Age

NHED Region (County-Based)



Minnesota



16 to 19 years (2.7%)

25 to 34 years (17.9%)

45 to 54 years (21.5%)

20 to 24 years (8.6%)

35 to 44 years (20.9%)

55 to 64 years (22.2%)

65 years and over (6.2%)

Data for Engineering, Manufacturing, & Technology (CTE Field)
Source: JobsEQ®. Data as of 2023Q2.



Race

NHED Region (County-Based)



Minnesota



- White (93.7%)
- Pacific Islander (0.0%)
- Black (0.6%)
- Asian (0.6%)
- Two or More Races (2.7%)
- American Indian (2.4%)

Data for Engineering, Manufacturing, & Technology (CTE Field)
Source: JobsEQ®. Data as of 2023Q2.

Ethnicity

NHED Region (County-Based)



Minnesota



- Non-Hispanic/Latino (97.6%)
- Hispanic or Latino (of any race) (2.4%)

Data for Engineering, Manufacturing, & Technology (CTE Field)
Source: JobsEQ®. Data as of 2023Q2.

Gender

NHED Region (County-Based)



Minnesota



- Male (85.2%)
- Female (14.8%)

Data for Engineering, Manufacturing, & Technology (CTE Field)
Source: JobsEQ®. Data as of 2023Q2.

Educational Attainment and Requirements

The stacked bar charts here illustrate the estimated mix of educational attainment of the workers in this career field in aggregate, followed by the typical education and training requirements in the field. In general, the Northeast Minnesota Engineering, Manufacturing, and Technology workforce is well-aligned for the typical credentials of entry-level positions. Just under one in four of all positions in this field (24.9%) require no degree, no experience, and only short-term on-the-job training. About 54.2% require experience or some on-the-job training, but still no degree. Almost one in ten people working in this field have no degree at all (7.6%), and just over one in three (39.2%) hold a high school diploma as their highest credential. In all, 67.2% of the Engineering, Manufacturing, and Technology workforce have not completed a postsecondary credential.

Educational Attainment

NHED Region (County-Based)



Minnesota



- < High School (7.6%)
- Four-Year (13.2%)
- High School (39.2%)
- Two-Year (16.3%)
- Master's (2.7%)
- Some College (20.4%)
- PhD (0.6%)

Data for Engineering, Manufacturing, & Technology (CTE Field)
Source: JobsEQ®. Data as of 2023Q2.



Education and Training Requirements

NHED Region (County-Based)



Minnesota



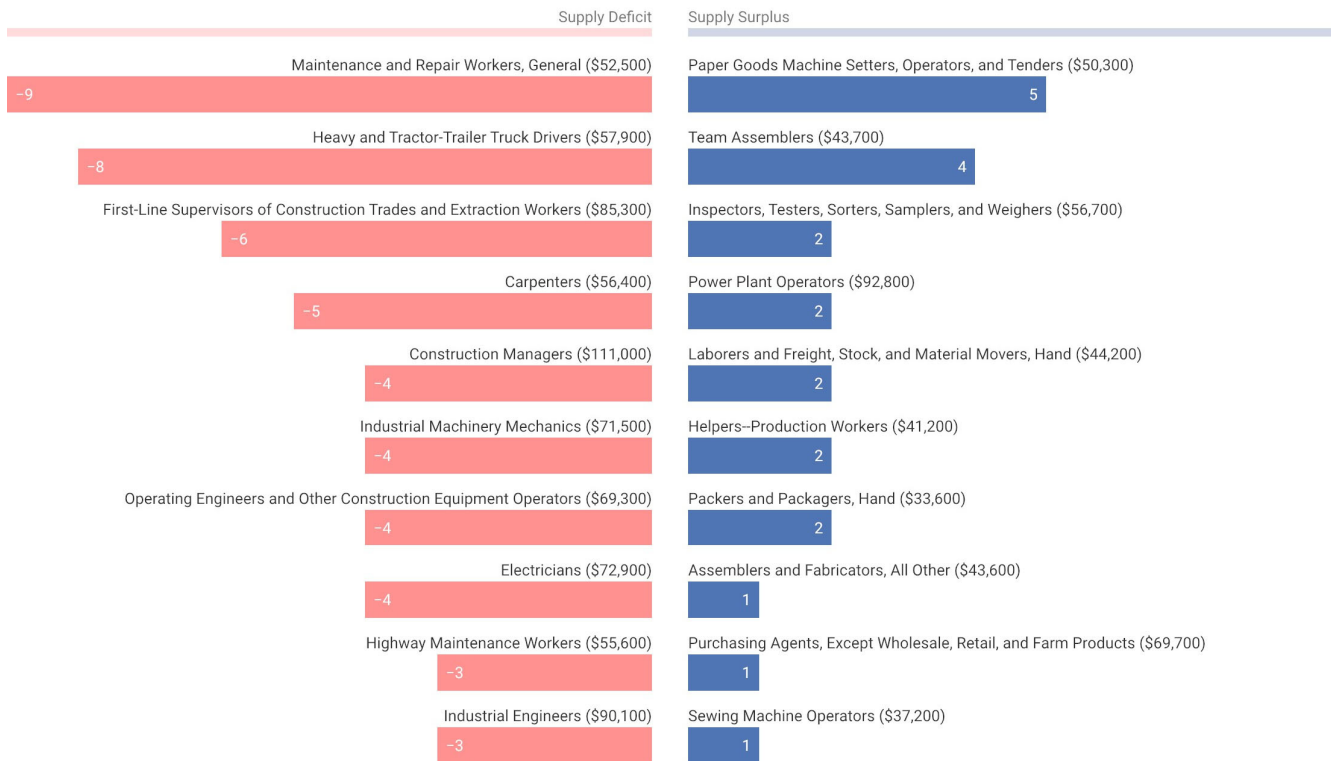
- Short-term OJT, no exp, no award (24.9%)
- Moderate-term OJT, no exp, no award (30.2%)
- Long-term training, no exp, no award (15.0%)
- Previous work experience, no award (9.0%)
- 2-year degree or certificate (11.1%)
- Bachelor's degree (9.6%)
- Postgraduate degree (0.3%)

Data for Engineering, Manufacturing, & Technology (CTE Field)
Source: JobsEQ®. Data as of 2023Q2.

Occupation Gaps

The chart below shows the potential average talent shortages over ten years. Several management, maintenance, construction, and automotive roles indicate shortages in the years ahead, with the Maintenance and Repair Worker talent pool likely falling short at least nine skilled workers needed annually (averaged over the next ten years) to meet employer demand (decreased slightly from last year). This talent shortage is primarily due to growth in demand and retirements which far outpace the talent pipeline. The Heavy and Tractor-Trailer Truck Driver forecasted shortage doubled from last year's estimate and is now falling short of at least eight workers needed annually to meet employer demand (up from the four projected last year). All other forecasted shortages and talent surpluses are fairly similar to what was observed in 2022Q2.

Annual Average Occupation Gaps (i.e. Talent Shortages) for the next 10 Years in Engineering, Manufacturing, and Technology, Northeast Minnesota 2023Q2



Source: JobsEQ®
Data as of 2023Q2



Award Gaps

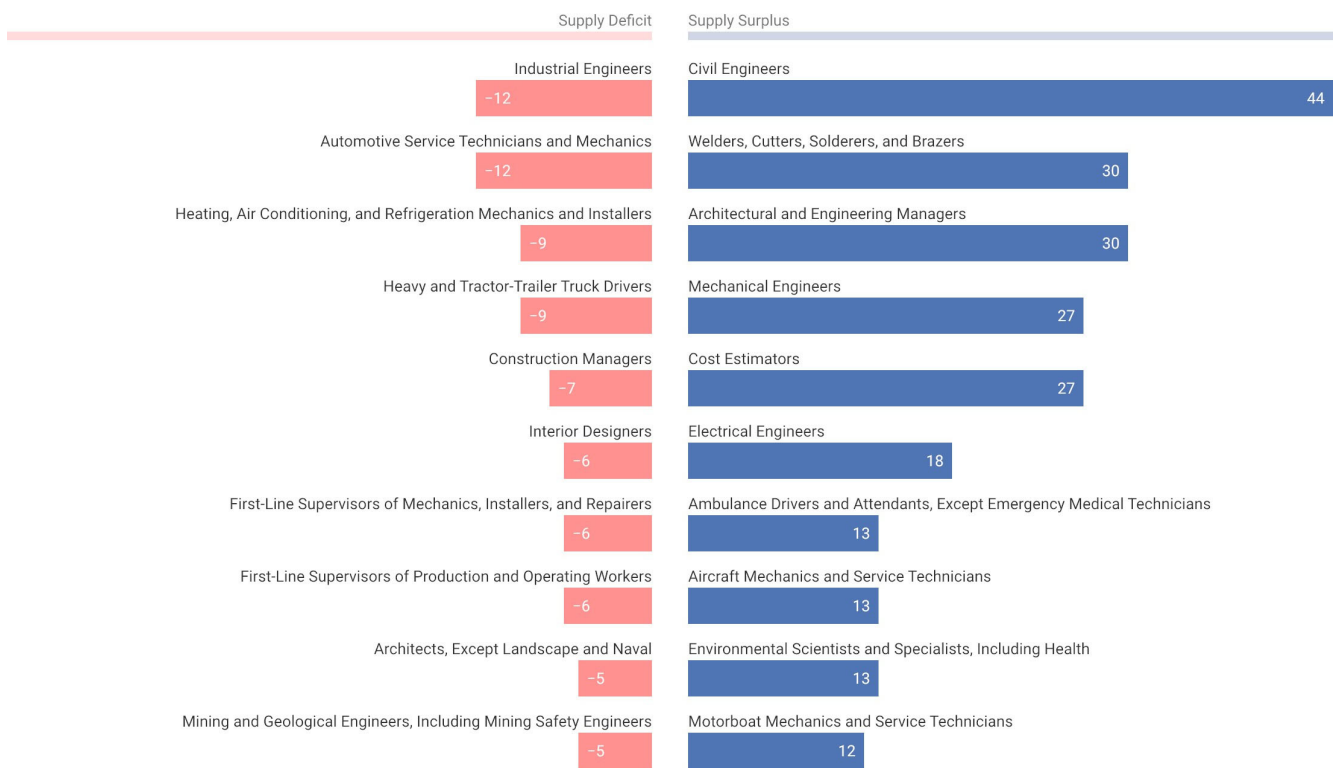
A comparison of the graduate talent pipeline through certificate and other postsecondary degree programs to the current estimated openings by occupation shows several important shortages. The Northeast currently under-trains some talent in Engineering, Manufacturing, and Technology when compared to national benchmarks. Top Award gaps are forecasted for Industrial Engineers, Automotive Service Technicians and Mechanics, and HVAC Technicians.

Northeast Minnesota colleges and universities are underproducing around 12 graduates annually that are needed to fill Industrial Engineer and Automotive Service Technicians and Mechanics positions open with employers based in this region alone.

Award Gaps in Engineering, Manufacturing, and Technology, Northeast Minnesota, 2023Q2

Award Gaps

NHED Region (County-Based)



Promising Pathways

This section offers an Origin-to-Gateway-to-Target model analysis for how to help move students from entry points into their field of interest into both likely and other aligned careers, considering automation, remote work, and the changing work environment.



Origin-to-Gateway-to-Target Occupations for Engineering, Manufacturing, and Technology, Northeast Minnesota, 2023Q2

Target Occupations (all HW, HD, HS, OG)

Construction Managers (AG)
 Industrial Engineers (AG)
 HVAC Mechanics (AG)
 Civil Engineers
 Mechanical Engineers

Gateway Occupations

Construction Laborers
 Maintenance & Repair Workers, General (OG, AG)
 Heavy & Tractor Trailer Drivers (HS, OG, AG)
 Carpenters (OG)
 Light Truck Drivers (HD, AG)

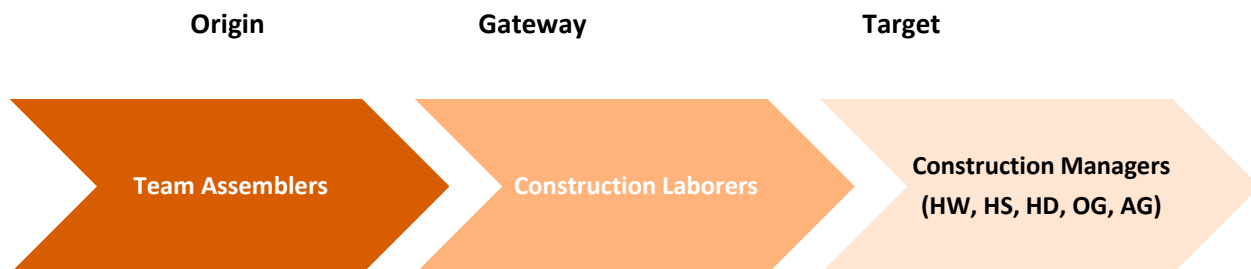
Origin Occupations

Laborers & Freight, Stock Movers (HD)
 Landscaping & Groundskeeping Workers (HD)
 Team Assemblers
 Packers & Packagers, Hand
 Shuttle Drivers and Chauffeurs (HD, AG)

HW = High-Wage; HS=High-Skill; HD=High-Demand; OG=Occupation Gaps; AG=Award Gaps

Featured Pathway

With a projected occupation gap, a projected award gap, and high demand, expanding opportunities for talent to become Construction Managers should be considered in the Northeast region. This Target occupation is highly concentrated in the region with a location quotient of 1.54. The related Gateway occupation of Construction Laborers is also highly concentrated in the region (location quotient of 1.37). Several Origin occupations in the construction trades may serve as strong entry points into this pathway given the overlap in skillsets. Team Assemblers is an Origin occupation in high number in the region that could be a source for talent to grow in this pathway.



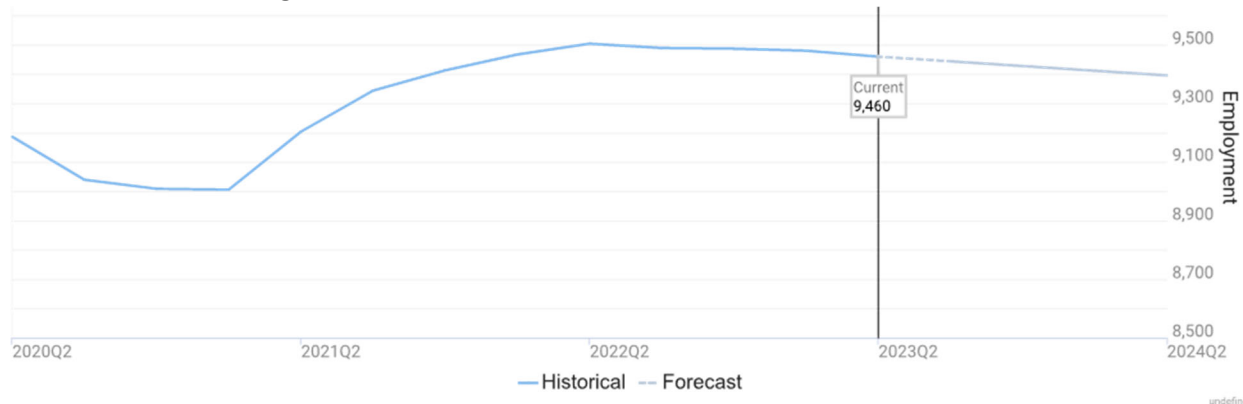
OGT Wages and Experience Level Requirements, Engineering, Manufacturing, and Technology, Northeast Minnesota, 2023Q2

SOC	Occupation	Empl Count	Mean	Entry Level	Experienced	10%	25%	50% (Median)	75%	90%	Typical Entry-Level Education	Previous Work Experience	Typical On-the-Job Training
11-9021	Construction Managers	670	\$111,000	\$72,800	\$130,100	\$69,100	\$82,000	\$101,700	\$122,300	\$149,300	BA	None	Mod-term OJT
17-2112	Industrial Engineers	611	\$90,100	\$66,100	\$102,200	\$60,900	\$75,700	\$85,800	\$104,800	\$122,300	BA	None	None
49-9021	Heating, Air Conditioning, and Refrigeration Mechanics and Installers	380	\$64,200	\$42,100	\$75,300	\$38,000	\$49,700	\$62,800	\$76,600	\$96,300	Certificate	None	Long-term OJT
17-2051	Civil Engineers	307	\$96,200	\$69,200	\$109,700	\$64,800	\$78,500	\$93,800	\$108,300	\$132,800	BA	None	None
17-2141	Mechanical Engineers	272	\$85,000	\$63,500	\$95,800	\$62,800	\$67,300	\$81,800	\$96,500	\$110,900	BA	None	None
47-2061	Construction Laborers	2,354	\$53,000	\$38,000	\$60,500	\$36,800	\$41,300	\$49,100	\$64,400	\$74,600	None	None	Short-term OJT
49-9071	Maintenance and Repair Workers, General	2,239	\$52,500	\$35,000	\$61,300	\$32,300	\$40,100	\$50,800	\$64,400	\$75,600	HS/GED	None	Mod-term OJT
53-3032	Heavy and Tractor-Trailer Truck Drivers	2,105	\$57,900	\$43,900	\$65,000	\$40,700	\$49,700	\$56,100	\$66,600	\$76,400	Certificate	None	Short-term OJT
47-2031	Carpenters	1,380	\$56,400	\$41,700	\$63,800	\$39,200	\$46,800	\$53,900	\$64,700	\$75,500	HS/GED	None	Apprenticeship
53-3033	Light Truck Drivers	1,033	\$47,400	\$31,300	\$55,500	\$27,100	\$36,900	\$45,400	\$53,800	\$76,100	HS/GED	None	Short-term OJT
53-7062	Laborers and Freight, Stock, and Material Movers, Hand	2,199	\$44,200	\$31,500	\$50,500	\$30,000	\$34,600	\$40,500	\$50,300	\$64,300	None	None	Short-term OJT
37-3011	Landscaping and Groundskeeping Workers	1,500	\$39,400	\$28,700	\$44,700	\$27,300	\$31,400	\$37,700	\$45,500	\$53,700	None	None	Short-term OJT
51-2092	Team Assemblers	1,056	\$43,700	\$34,100	\$48,500	\$32,700	\$37,000	\$41,500	\$49,300	\$58,400	HS/GED	None	Mod-term OJT
53-7064	Packers and Packagers, Hand	399	\$33,600	\$25,200	\$37,700	\$24,500	\$26,600	\$33,400	\$39,700	\$41,000	None	None	Short-term OJT
53-3053	Shuttle Drivers and Chauffeurs	348	\$33,100	\$26,800	\$36,200	\$25,800	\$28,600	\$32,700	\$36,300	\$39,500	None	None	Short-term OJT

Agriculture, Food, and Natural Resources

There are eight career pathways within Agriculture, Food, and Natural Resources: 1) Food Products and Processing Systems, 2) Plant Systems, 3) Animal Systems, 4) Natural Resources Systems, 5) Agribusiness Systems, 6) Environmental Services Systems, 7) Power, Structural and Technical Systems, and 8) Biotechnology Systems. These roles represent positions that are at least 50% or more concentrated in Agriculture, Food, and Natural Resources industries, and as such exclude some occupations that are critical to the industry but may have smaller in-industry employment numbers (such as Ag Loan Officers, Ag Financing, or some trades). Over the next three years, this career field’s employment is forecast to decline by about -0.7% in the Northeast, a drop from last year’s forecast of -0.3%.

3-Year Forecast for Agriculture, Food, and Natural Resources Careers, Northeast Minnesota 2023Q2



Top Ten Agriculture, Food, and Natural Resources Occupations by Employment Volume in the Northeast, 2023Q2

6-Digit Occupation	Empl	Avg Mean Wages	LQ	Historical 3-Year Empl Change	Annual Demand	Baseline Forecast Ann Change
Landscaping and Groundskeeping Workers	1,500	\$39,400	1.08	102	187	-0.4%
Farmers, Ranchers, and Other Agricultural Managers	962	\$65,400	1.04	-58	79	-1.7%
Plumbers, Pipefitters, and Steamfitters	598	\$74,200	1.03	39	55	-0.6%
Heating, Air Conditioning, and Refrigeration Mechanics and Installers	380	\$64,200	0.77	42	33	-0.4%
Animal Caretakers	278	\$32,500	0.69	37	54	0.6%
Logging Equipment Operators	278	\$48,700	6.62	-4	36	-1.7%
First-Line Supervisors of Landscaping, Lawn Service, and Groundskeeping Workers	266	\$58,200	0.97	22	26	-0.5%
Chefs and Head Cooks	241	\$54,600	1.16	29	31	-0.3%
Water and Wastewater Treatment Plant and System Operators	228	\$62,300	1.51	2	17	-1.6%
Refuse and Recyclable Material Collectors	216	\$44,700	1.25	8	29	-0.5%
Remaining Component Occupations	4,509	\$64,300	1.19	54	455	-0.7%
Agriculture, Food, and Natural Resources (CTE Field)	9,460	\$58,800	0.94	273	1,001	-0.7%

“Annual Demand” is the projected need for new entrants into an occupation. New entrants are needed due to expected growth and to replace workers who left the occupation due to factors such as retirement or switching careers.

“Forecast Ann Growth” is the expected baseline (most pessimistic) yearly change in employment due to national, long-term trend projections (per the BLS) as well as local factors such as industry mix, labor force participation rates, and population growth (as computed and modeled by RealTime Talent in JobsEQ).



Many different industries employ Agriculture, Food, and Natural Resources talent in the Northeast. Locally, the industries with the greatest share of this field's talent are Services to Buildings and Dwellings (8.8%) and Building Equipment Contractors (8.0%), removing Executive, Legislative, and other General Government Support from the industry with the second greatest share. Most industries employing talent in this field only touch less than 3% of total talent skilled in this field and span from animal production companies to logging and electric power generation.

Agriculture, Food, and Natural Resources Field Employment by Industry, Northeast Minnesota, 2023Q2

Industry Title	% of Career Field Empl	Career Field Empl	10-Year Separations	10-Year Empl Change	10-Year Total Demand
Services to Buildings and Dwellings	8.8%	833	1,019	-46	973
Building Equipment Contractors	8.0%	754	732	-32	700
Executive, Legislative, and Other General Government Support	7.4%	700	743	-39	704
Animal Production (Proprietors)	5.5%	517	503	-82	421
Crop Production (Proprietors)	4.7%	441	441	-71	370
Electric Power Generation, Transmission and Distribution	4.5%	426	355	-81	275
Metal Ore Mining	4.5%	422	384	-19	365
Other Professional, Scientific, and Technical Services	4.3%	408	467	52	520
Logging	4.1%	391	543	-67	476
Other Amusement and Recreation Industries	3.6%	339	429	-2	427
Grocery and Convenience Retailers	2.5%	234	289	-25	265
Architectural, Engineering, and Related Services	2.2%	204	189	-12	177
Other Personal Services	2.0%	188	333	20	353
Restaurants and Other Eating Places	1.9%	183	244	-6	238
Traveler Accommodation	1.6%	154	196	-1	195
Colleges, Universities, and Professional Schools	1.6%	149	150	-8	141
Wired and Wireless Telecommunications (except Satellite)	1.5%	145	160	2	162
Waste Collection	1.3%	128	175	-3	172
Administration of Environmental Quality Programs	1.1%	101	100	-9	91
Other Specialty Trade Contractors	1.1%	100	114	-6	108
All Others	28.0%	2,645	3,049	-187	2,862



Career Field Demographics

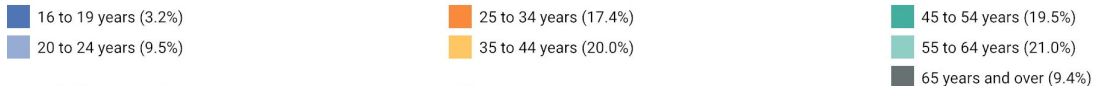
The Agriculture, Food, and Natural Resources field remains predominantly male (77.7%, an increase from last year's 76.5%) and White (93.5%, decreasing by 0.6 percentage points), but with variation by career pathway. Overall, the age of the workforce in this field is distributed evenly from 25 through 64 years, but key career pathways in Animal Systems and Food Products and Processing Systems in particular have a rapidly aging workforce with limited new talent entering.

Age

NHED Region (County-Based)

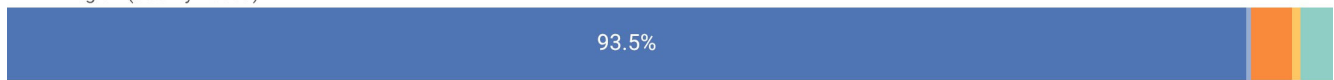


Minnesota



Race

NHED Region (County-Based)

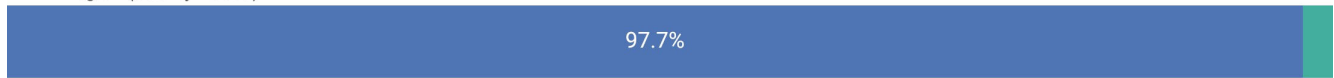


Minnesota



Ethnicity

NHED Region (County-Based)



Minnesota



Gender

NHED Region (County-Based)



Minnesota



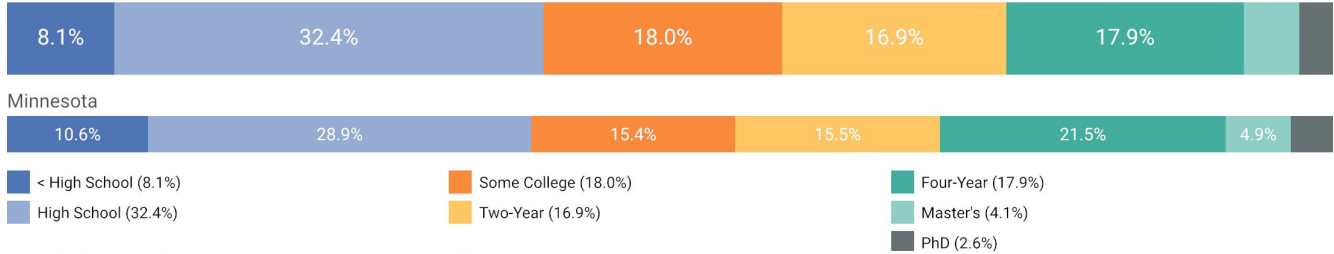


Educational Attainment and Requirements

The stacked bar charts here illustrate the estimated mix of educational attainment of the workers in this career field in aggregate, followed by the typical education and training requirements in the field. In general, Northeast Minnesota’s Agriculture, Food, and Natural Resources workforce remains well-aligned for the typical credentials of entry-level positions. Just over 1 in 4 of all positions in this field regionally (25.9%) require no degree, no experience, and only short-term on-the-job training. Almost half (49.2%) now require experience or some on-the-job training, but still no degree (up from 47.3% in last year’s estimates). About 8.1% of the workforce in this field has no degree at all, and about 1 in 3 (32.4%) hold a high school diploma as their highest credential, plus an additional 18.0% with some college experience. In all, 58.5% of the regional Agriculture, Food, and Natural Resources workforce have not completed a postsecondary credential. Compared to one year ago, the share of regional opportunities in this field that only require moderate-term on-the-job training and no experience saw the largest gains, representing 13.7% of all opportunities compared to 10.5% in the prior years’ estimates.

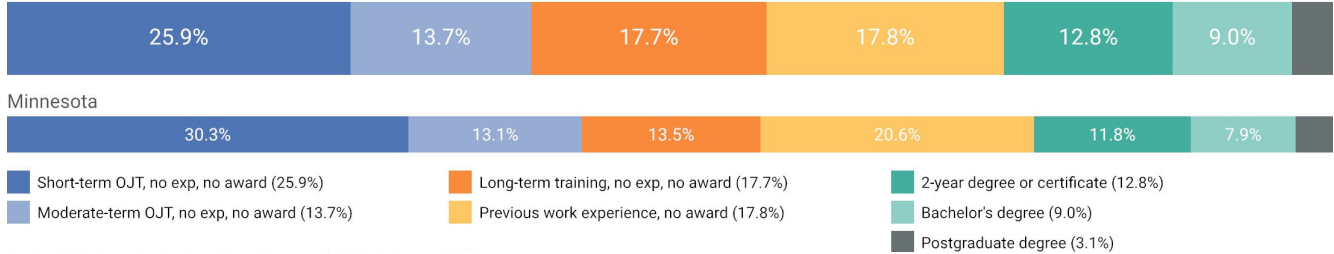
Educational Attainment

NHED Region (County-Based)



Education and Training Requirements

NHED Region (County-Based)

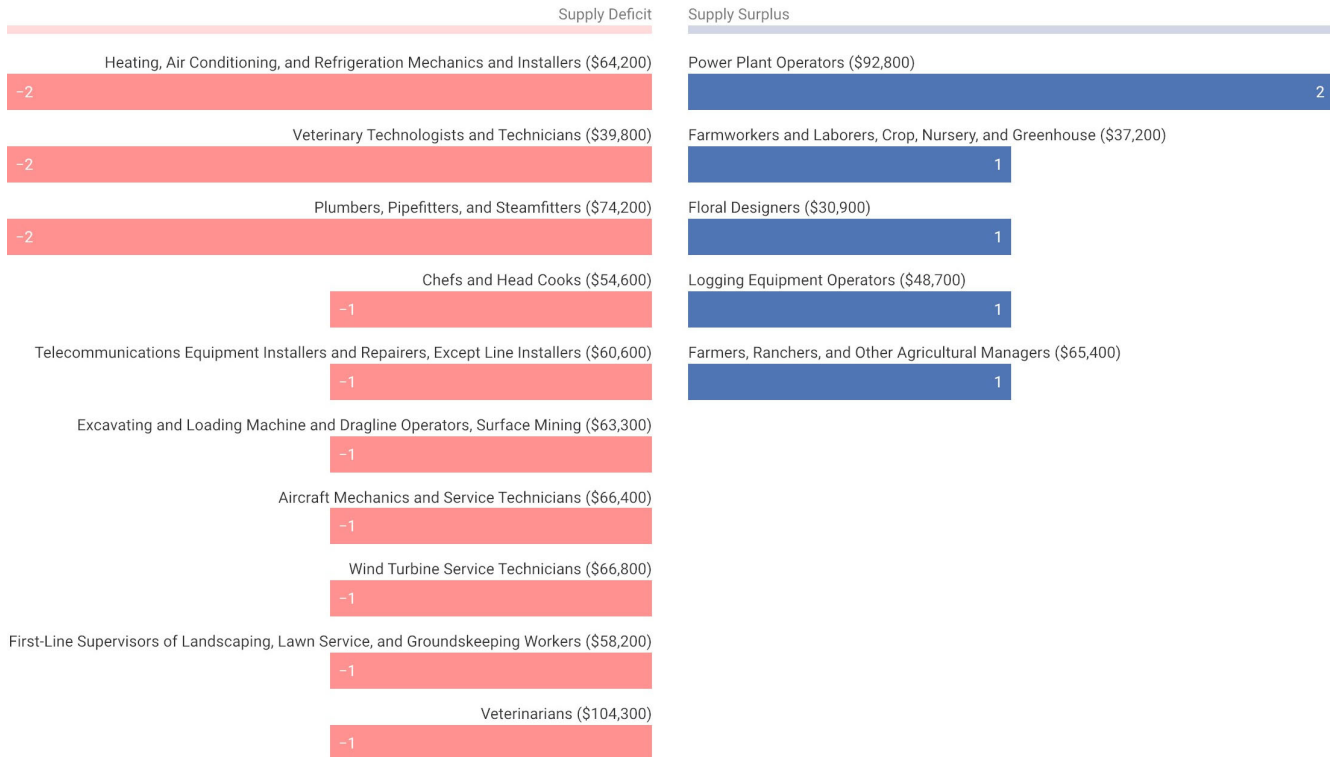




Occupation Gaps

The chart below shows the potential average annual gaps over ten years in a conservative estimate of talent shortfall. Several crucial trades, veterinary, environmental services, and natural sciences roles indicate shortages in the years ahead, matching with statewide shortages. Retirements and growing demand unmet by the local talent supply chain are both contributing factors. While forecasted growth remains small, there is continued demand for replacement talent to fill job openings that will be challenging to meet with the supply of local talent currently available.

Annual Average Occupation Gaps (i.e. Talent Shortages) for the next 10 Years in Agriculture, Food, and Natural Resources, Northeast Minnesota, 2023Q2

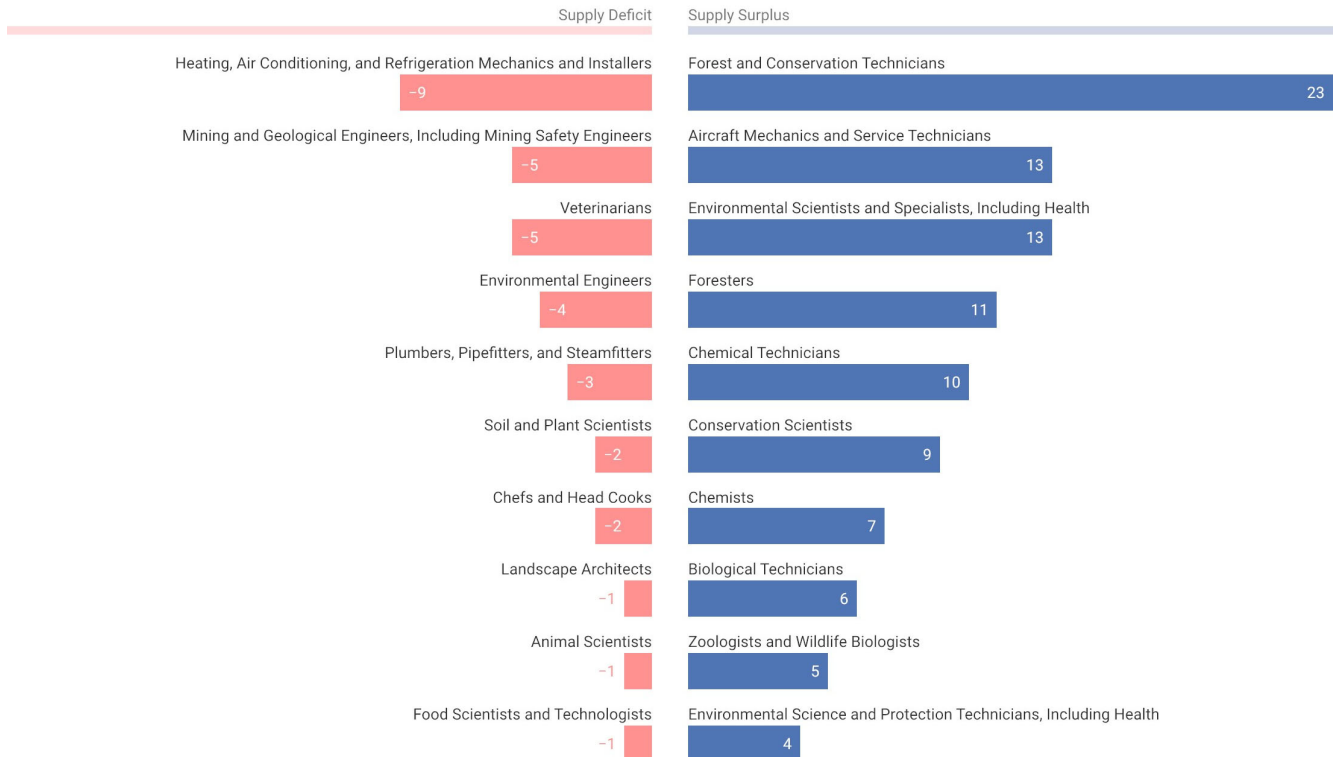


Award Gaps

A comparison of the graduate talent pipeline through certificate and other postsecondary degree programs to the current estimated openings by occupation illuminate a range moderate shortages. Postsecondary institutions in the Northeast currently prepare a smaller volume of talent in Agriculture, Food, and Natural Resources when compared to national benchmarks. Northeast Minnesota colleges and universities are underproducing at least nine graduates annually that are needed to fill HVAC Technician positions open with employers based in the Northeast. Veterinarians are also lagging in local graduate awards, as the majority of Animal Systems completions are made in the MSP Metro.



Award Gaps in Agriculture, Food, and Natural Resources, Northeast Minnesota, 2023Q2



Promising Pathways

This section offers an Origin-to-Gateway-to-Target model analysis for how to help move students from entry points into their field of interest into both likely and other aligned careers, considering automation, remote work, and the changing work environment.



Origin-to-Gateway-to-Target Occupations for Agriculture, Food, and Natural Resources, Northeast Minnesota, 2023Q2

Target Occupations (all HW, HD, HS)

HVAC Mechanics (OG, AG)
 Telecommunications Equipment Installers & Repairers (OG)
 Aircraft Mechanics & Service Technicians (OG)
 Chemical Technicians
 Surveyors

Gateway Occupations

Logging Equipment Operators
 Chefs & Head Cooks (HD, OG, AG)
 Tree Trimmers & Pruners (HD)
 Outdoor Power Equipment Mechanics (HD)
 Forest & Conservation Technicians (HS, HD)

Origin Occupations (All HD)

Landscaping & Groundskeeping Workers
 Animal Caretakers
 Refuse & Recyclable Material Collectors
 Veterinary Technologists & Technicians (HS, OG)
 Bakers (AG)

HW = High-Wage; HS=High-Skill; HD=High-Demand; OG=Occupation Gaps; AG=Award Gaps

Featured Pathway

There is an opportunity to develop a pipeline for Veterinarians. There is zero unemployment for the occupation of Veterinarian and there are no Gateway occupations for this pathway as the credentials for these roles don't stack. Each of the roles below shows a projected 5-year growth forecast of 1.1%. Veterinary Assistants and Laboratory Animal Caretakers have an average annual salary of \$33,600 and are in high demand. The Veterinary Technician and Technologists occupation, with an average annual salary of \$39,800, is both in high demand and considered a high skill role – there is also a uniquely high local concentration of Veterinary Techs in the Northeast region with a location quotient of 1.38.



OGT Wages and Experience Level Requirements, Agriculture, Food, and Natural Resources, Northeast Minnesota, 2023Q2

SOC	Occupation	Empl Count	Mean	Entry Level	Experienced	10%	25%	50% (Median)	75%	90%	Typical Entry-Level Education	Previous Work Experience	Typical On-the-Job Training
49-9021	Heating, Air Conditioning, and Refrigeration Mechanics and Installers	380	\$64,200	\$42,100	\$75,300	\$38,000	\$49,700	\$62,800	\$76,600	\$96,300	Certificate	None	Long-term OJT
49-2022	Telecommunications Equipment Installers and Repairers, Except Line Installers	132	\$60,600	\$42,500	\$66,900	\$42,700	\$44,100	\$53,400	\$70,500	\$84,500	Certificate	None	Mod-term OJT
49-3011	Aircraft Mechanics and Service Technicians	122	\$66,400	\$53,800	\$72,700	\$49,700	\$61,300	\$68,900	\$71,000	\$76,800	Certificate	None	None
19-4031	Chemical Technicians	84	\$60,900	\$49,100	\$66,800	\$43,100	\$58,300	\$60,400	\$63,500	\$76,100	AS	None	Mod-term OJT
17-1022	Surveyors	75	\$77,300	\$55,200	\$88,400	\$49,900	\$64,800	\$74,900	\$84,200	\$109,600	BA	None	Internship/Residency
45-4022	Logging Equipment Operators	278	\$48,700	\$40,000	\$53,000	\$40,400	\$41,200	\$50,000	\$50,700	\$58,900	HS/GED	None	Mod-term OJT
35-1011	Chefs and Head Cooks	241	\$54,600	\$36,200	\$63,800	\$33,300	\$41,700	\$51,000	\$65,300	\$82,100	HS/GED	< 5 years	None
37-3013	Tree Trimmers and Pruners	70	\$55,000	\$40,000	\$62,600	\$37,900	\$45,100	\$57,800	\$62,900	\$69,000	HS/GED	None	Short-term OJT
49-3053	Outdoor Power Equipment and Other Small Engine Mechanics	59	\$45,800	\$38,500	\$49,400	\$37,200	\$41,200	\$44,800	\$49,000	\$57,300	HS/GED	None	Mod-term OJT
19-4071	Forest and Conservation Technicians	52	\$50,000	\$36,100	\$56,900	\$35,100	\$39,300	\$48,900	\$59,600	\$66,300	AS	None	None
37-3011	Landscaping and Groundskeeping Workers	1,500	\$39,400	\$28,700	\$44,700	\$27,300	\$31,400	\$37,700	\$45,500	\$53,700	None	None	Short-term OJT
39-2021	Animal Caretakers	278	\$32,500	\$26,100	\$35,700	\$24,500	\$28,500	\$32,000	\$36,200	\$40,100	HS/GED	None	Short-term OJT
53-7081	Refuse and Recyclable Material Collectors	216	\$44,700	\$32,700	\$50,800	\$29,800	\$37,000	\$43,200	\$52,400	\$61,700	None	None	Short-term OJT
29-2056	Veterinary Technologists and Technicians	201	\$39,800	\$33,000	\$43,300	\$31,400	\$35,800	\$39,200	\$42,800	\$45,800	AS	None	None
51-3011	Bakers	201	\$36,100	\$28,700	\$39,800	\$27,600	\$30,900	\$35,800	\$38,400	\$44,800	None	None	Mod-term OJT

Conclusion

Some new occupations of need have emerged, signaling some rebounding and recovery following the pandemic, and reflecting the tight labor market across all levels of experience and education requirements, and through each industry sector. What continues to be true is that the most in-demand occupations of the future typically require a two-year degree or higher, offer higher average wages, and will likely experience talent shortages within the next three years and beyond due to low qualified talent pool located within the region. An exciting new development likely to have impact across all industries is the governor's decision to remove degree requirements from most Minnesota government jobs.

As the talent pool has tightened, Minnesota employers are struggling to find talent for Origin, Gateway, and Target roles across the spectrum, but with Gateway occupations posing the greatest opportunities for skills-based hiring innovations and workforce system strategies. Overall, digital skills, human skills, and business enablers will be the foundational skills of the future both in Minnesota and nationwide. Remote work opportunities are proving to be a more permanent change to the landscape of work in Minnesota.

In the Northeast region, there is particularly high unemployment in both the Business, Management, and Administration and Engineering, Manufacturing, and Technology career fields (both at 4.4% unemployment rates). Three out of the six career fields have aging workforces (Health Science Technology, Human Services, and Engineering, Manufacturing, and Technology). For the fields of Engineering, Manufacturing, and Technology, and Agriculture, Food, and Natural Resources, nine out of ten of the top occupations have forecasted declines by employment volume over the next three years. The region is poised to see changes in demand for talent over the next five years and beyond as the region continues to wrestle with deepening talent shortages and face the possibility of recession as interest rates continue to rise.

Data Notes

- This 2023 publication was compiled by Julia Diaz, Research Analyst for RealTime Talent in November 2023. She can be reached at julia@realtimetalentmn.org
- Occupation employment by default indicates employment by place of work. Occupation employment is as of 2023Q2 and based on industry employment and local staffing patterns calculated by Chmura and utilizing BLS OES data. Employment forecasts are by RealTime Talent using models provided by Chmura and are consistent with BLS national-level 10-year forecasts. Occupation wages (mean, median, and percentiles) are derived from BLS OES data as of 2022 and represent the average for all Covered Employment. Entry-level and experienced wages are derived from these source data, computed by Chmura.
- Industry employment is as of 2023Q2 and based upon BLS QCEW data that are imputed by Chmura where necessary and supplemented by additional sources including Census ZBP data.
- Education and training requirements are from the BLS. Educational attainment mix and other occupation demographics data are modeled by Chmura for 2023Q2 using regional occupation employment from JobsEQ, ZCTA-level demographics data from the Census Bureau, and national occupation-demographics patterns from the BLS.
- Postsecondary awards are per the NCES and for the 2021-2022 academic year. Any programs shown are linked with the occupation(s) being analyzed via the program-occupation crosswalk, which may not be comprehensive. Any programs shown reflect only data reported to the NCES; reporting is required of all Title IV schools. Training providers that do not report data to the NCES are not reflected.
- General job ads data are online job posts from the Real-Time Intelligence (RTI) data set, produced by Chmura and gleaned from over 40,000 websites. Data reflect ads active during September 2023 and advertised for any Zip Code Tabulation Area in or intersecting with the region for which this report was produced. Historical ad volume is revised as additional data are made available and processed. The sections on Employer Demand include Job ads data from Gartner TalentNeuron Plan, which allows for greater specificity on education, experience level, and employer names. Since many extraneous factors can affect short-term volume of online job postings, time-series data can be volatile and should be used with caution. All ad counts represent deduplicated figures.
- Occupation gaps are modeled by Chmura, indicating long-term potential supply and demand mismatches in a region due, in part, to job demand and labor pool dynamics, including educational attainment and projected growth.
- Occupation employment by place of residence is as of 2023Q2 and modeled by Chmura based upon occupation employment by place of work and commuting patterns. Commuting patterns are derived from source data from the Census Bureau, occupation-specific commuting tendencies, and updated to reflect more recent population and employment estimates.
- Annual demand is the sum of the annual projected growth demand and separation demand. Separation demand is the number of jobs required due to separations—labor force exits (including retirements) and turnover resulting from workers moving from one occupation into another. Note that separation demand does not include all turnover—it does not include when workers stay in the same occupation but switch employers. Growth demand is the increase or decrease of jobs expected due to expansion or contraction of the overall number of jobs.



- Career clusters and pathways have been identified for this report by the Source: National Career Clusters® Framework external site implemented by Department of Defense ASVAB Career Exploration Program, Advance CTE. <https://careertech.org/career-clusters> and viewable on ONET <https://www.onetonline.org/find/career?c=8>, but updated to the 2020 SOC classification system.
- Figures may not sum due to rounding.

Definitions and Methodology

High-Wage occupations are defined as occupations that have average annual wages greater than the overall regional average wage (\$57,900 in the region as of 2023Q2).

High-Skill

High-Skill occupations are those that typically require a certificate or other formal credential for employment. Occupation by educational attainment are regional data modeled by Chmura using U.S. Census Bureau Educational Attainment data projected to 2023Q2 along with source data from the BLS.

High-Demand

High-Demand occupations are defined as occupations that fulfill two or more of the following demand criteria: 1) high growth, 2) high total demand, 3) low unemployment, 4) high unemployment-to-posting ratio, and/or 5) high posting volume.

D1: 5-Yr Growth

An occupation is considered to have high growth in that occupation has forecasted 5-year growth that is greater than the overall regional forecasted 5-year pessimistic growth model.

D2: Total Demand

An occupation is considered to have high total demand if the total 5-year forecast employment growth, transfers, and exits combined is greater than 50% of total employment in that occupation as of 2023Q2 (i.e. high long-term demand)

D3: Unempl <3%

An occupation is considered to have low unemployment if the estimated unemployment rate for the occupation is below 3% in the region as of 2023Q2 (i.e. high employer retention demand)

D4: Unempl:Posting Ratio

An occupation is considered to have a strained unemployment-to-posting ratio if the estimated volume of unemployed individuals regionally exceeds the number of online job postings advertised in the month of October 2023 (i.e. ratio of unemployed-to-posts is greater than 1; low talent supply)

D5: Posting Volume

An occupation is considered to have high posting volumes if the volume of online job postings in August 2023 was greater than 200 in the region, the occupation is considered to have high job posting volumes (i.e. high immediate employer demand).

Occupation Gaps

Occupation gaps are developed by Chmura and use a multitude of data sources. Employment supply and demand projections are based on a starting date of 2023Q2 using baseline low-growth forecasts modeled from the Bureau of Labor Statistics (more pessimistic forecast outlook than utilized in D1 and D2). The potential supply shortfall is an underlying force that the market needs to resolve one way or another, such as by employers recruiting from further distances for these occupations, wages going up to attract more candidates, and/or increased demand and wages enticing more local residents to get training for these occupations. While this an important analysis for determining local occupation needs, the occupation gap should be considered along with other regional data including growth and separation forecasts, unemployment rates, wage trends, and award and skill gap analyses.

Award Gaps



This metric illustrates the difference between the number of awards conferred (which are post-secondary certificates or degrees) and the occupation demand in your region. Negative values represent the gap, or shortage, of degrees being awarded in the region to meet the demand for the occupations selected. The positive values represent the surplus of awards meaning that the number of awards awarded are greater than the target range of demand for the region. Awards data are based upon degrees conferred for the academic year 2021-2022 and are provided by the National Center for Education Statistics (NCES). Occupation employment data are derived from the most recent four quarters of industry employment (from the Bureau of Labor Statistics, updated quarterly) and the industry/occupation matrix available for the region. Occupation training concentrations and shortfalls are calculated by Chmura. The percent college educated are provided by the BLS per the Employment Projections Program.

Location Quotient

Location quotient is a measurement of concentration in comparison to the nation. An LQ of 1.00 indicates a region has the same concentration of an industry (or occupation) as the nation. An LQ of 2.00 would mean the region has twice the expected employment compared to the nation and an LQ of 0.50 would mean the region has half the expected employment in comparison to the nation. [Click here](#) to see the formula for LQ. Occupations with a LQ greater than or equal to 1.2 have been flagged in this analysis of having a unique specialization in the region.