Northeast Minnesota

CAREER & TECHNICAL EDUCATION

—

Workforce Trends & Careers of Tomorrow

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RealTime Talent
Using data to build the
world's best workforce

Workforce Trends & Careers of Tomorrow
Overview

A year and a half after COVID-19 first appeared, the impacts of shutdowns, business closures, and shifting workforce needs worldwide have been ongoing and cumulative. Approximately 1.5 million Minnesotans have made initial unemployment claims since the beginning of the COVID-19 pandemic—about 47% of the state's employed workforce just before the pandemic hit.[1] Many of the economic impacts of the COVID-19 pandemic will be felt far into the future, and in ways that may still be yet unknown.

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. Each of the six regional reports—and statewide report—include:

- 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
    - Certification gaps
    - Skill gaps
- An origin-to-gateway-to-target model analysis for how to help move students from entrypoints into their field of interest into other aligned careers, taking into account automation, remote work, and the changing work environment
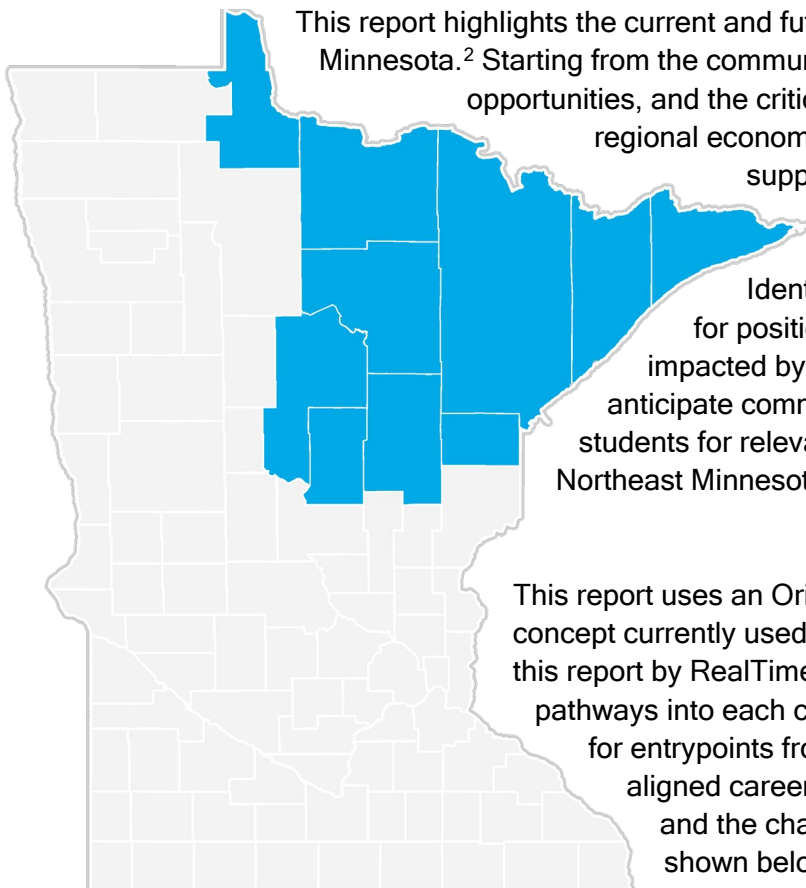- A word on remote work and jobs of the future

About This Report

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[1] Unemployment Statistics, MN Department of Employment and Economic Development. March 16, 2020 - August 27, 2020. Accessed 9/4/2020 at https://mn.gov/deed/data/data-tools/unemployment-insurance-statistics/

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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 vulnerabilities and opportunities, and the critical occupations and industries underpinning the regional economy, this macroeconomic overview is intended to support educators and administrators who seek to go beyond compliance to impact both student lives and local businesses most pressing needs. Identifying the skills, certifications, and qualifications for positions today–and how they have been disparately impacted by the pandemic–will help the education community anticipate community needs and ensure that curriculum prepares students for relevant job opportunities of the future here in Northeast Minnesota.

This report uses an Origin-to-Gateway-to-Target Occupation model, a concept currently used by the Rework America Alliance and modified in this report by RealTime Talent, illustrates promising likely and aligned pathways into each career field. This model supports students looking for entrypoints from an initial occupation of interest into other aligned careers, taking into account 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 ($42,000 – 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 (<$42,000/year)
Low skill (no credential)
Low demand (over 5% unemployment, low growth, low replacement demand, and/or low job postings)

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. In all, about 422,074 people live in Northeast Minnesota, according to 2015-2019 American Community Survey Estimates–an increase of about 200 people from the prior year's estimates. Based on year-over-year population growth, about 422,864 people are estimated to live in the region as of 2021. Approximately 20% of

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

Northeast Minnesota's population are minors under 18 years of age. Overall, the region's median age is six years older (44 years) than the statewide median (38 years), mostly attributable to a larger share of adults over 55 years of age in the region.

Resident Population of Northeast Minnesota

Source: JobsEQ®, ESRI.
American Community Survey 2015-2019
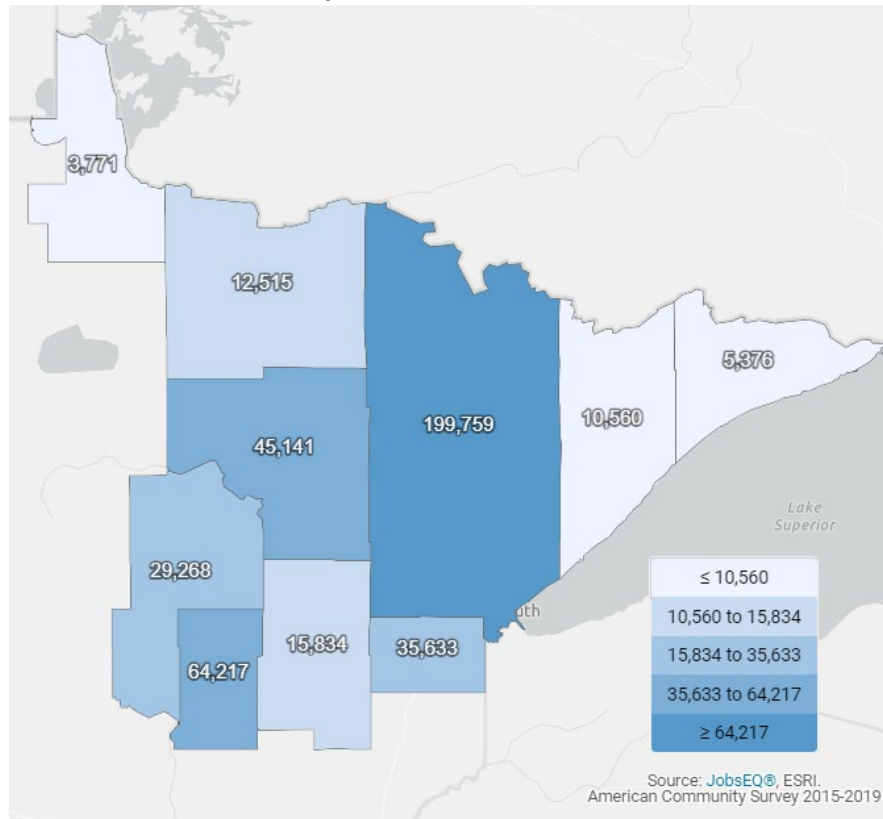
Community Profile

Demographics

Population diversity increased between the two most recent population estimates statewide by half of a percentage point, but in the Northeast by only 0.1 percentage point, primarily in the Brainerd area. Across the region overall, 7.8% of the population identify as Black, Asian, American Indian, Native Hawaiian, or some other race. The demographic makeup of communities across the Northeast are fairly similar, though Brainerd has a greater share of American Indian residents than the other larger cities in the region. Approximately 1.6% of Northeast Minnesota's residents are Hispanic or Latinx (for comparison, about half the share of the population that is Hispanic/Latinx in the Northwest). Approximately 1.7% of Northeast Minnesota's residents are Hispanic or Latinx (for comparison, about half the share of the population that is Hispanic/Latinx in the Northwest). This was an increase of 0.1 percentage point from last year's estimates.

Population Race, All Ages

Grand Rapids	92.8%
Brainerd	92.2%
Duluth	92.0%
Northeast	92.2%
Minnesota	82.8%

Legend:
- ■ White
- ■ Black or African American
- ■ American Indian or Alaska Native
- ■ Asian
- ■ Native Hawaiian or Other Pacific Islander
- ■ Some Other Race
- ■ Two or More Races
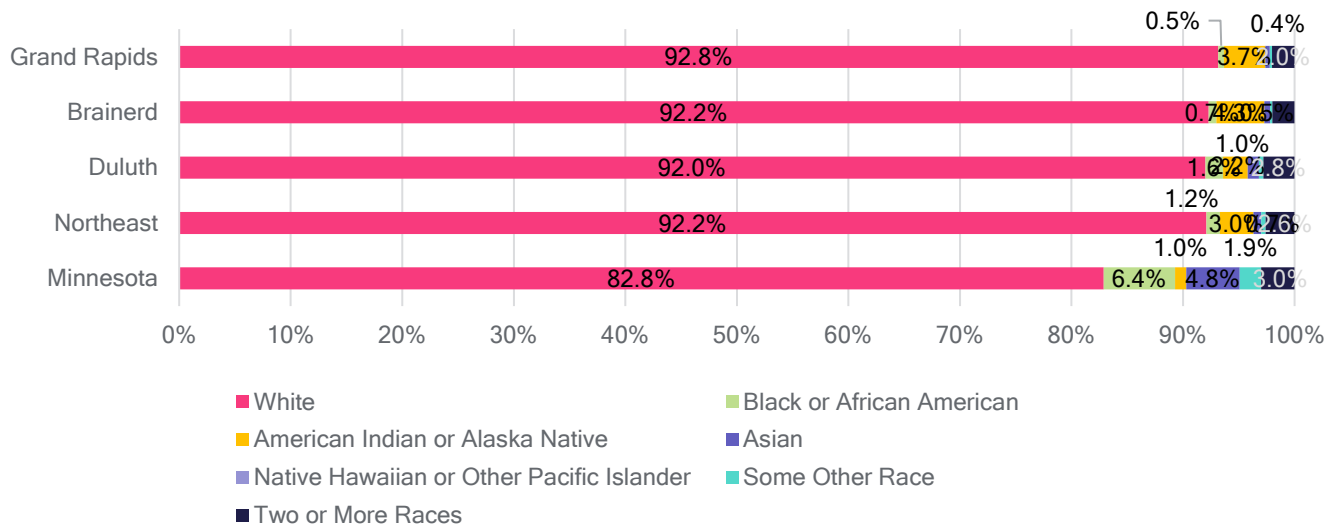
American Community Survey 2015-2019.

Population Ethnicity, All Ages

	Non-Hispanic White	Hispanic/Latinx, Any Race
Grand Rapids	98.5%	1.5%
Brainerd	98.3%	1.7%
Duluth	98.3%	1.7%
Northeast	98.3%	1.7%
Minnesota	94.6%	5.4%

- ■ Non-Hispanic White
- ■ Hispanic/Latinx, Any Race
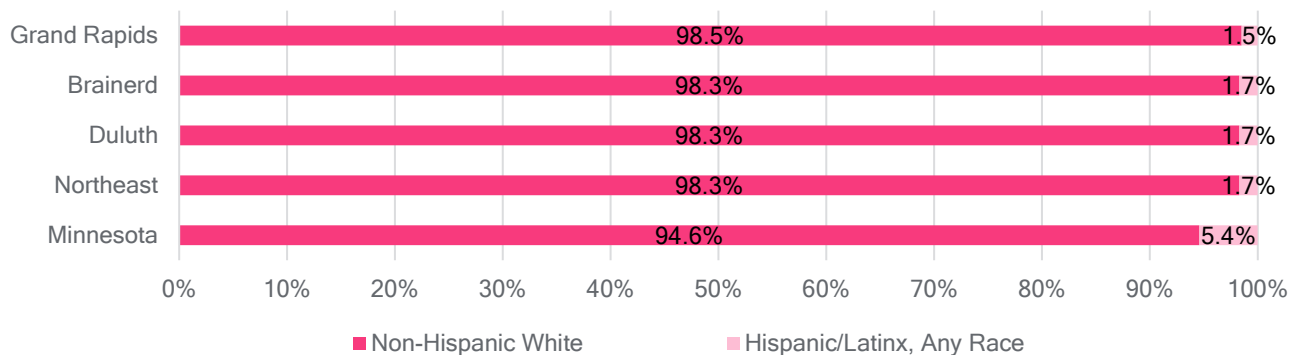
American Community Survey 2015-2019.

Community Demographics

Demographics	Percent			Value		
	Northeast Minnesota	Minnesota	USA	Northeast Minnesota	Minnesota	USA
Population (ACS)	–	–	–	422,074	5,563,378	324,697,795
Male	50.4%	49.8%	49.2%	212,922	2,770,873	159,886,919
Female	49.6%	50.2%	50.8%	209,152	2,792,505	164,810,876
Median Age[2]	–	–	–	44.0	38.0	38.1
Under 18 Years	20.0%	23.3%	22.6%	84,224	1,295,848	73,429,392
18 to 24 Years	9.5%	9.0%	9.4%	39,895	500,630	30,646,327
25 to 34 Years	10.8%	13.6%	13.9%	45,707	756,337	45,030,415
35 to 44 Years	10.9%	12.5%	12.6%	46,057	697,077	40,978,831
45 to 54 Years	12.1%	12.7%	13.0%	51,036	708,668	42,072,620
55 to 64 Years	15.7%	13.4%	12.9%	66,448	746,120	41,756,414
65 to 74 Years	12.1%	8.8%	9.1%	51,002	490,739	29,542,266
75 Years, and Over	8.9%	6.6%	6.5%	37,705	367,959	21,241,530
Race: White	92.2%	82.8%	72.5%	388,973	4,609,049	235,377,662
Race: Black or African American	1.2%	6.4%	12.7%	4,922	356,515	41,234,642
Race: American Indian and Alaska Native	3.0%	1.0%	0.8%	12,511	58,011	2,750,143
Race: Asian	0.7%	4.8%	5.5%	3,086	268,181	17,924,209
Race: Native Hawaiian and Other Pacific Islander	0.0%	0.0%	0.2%	131	2,194	599,868
Race: Some Other Race	0.4%	1.9%	4.9%	1,479	104,032	16,047,369
Race: Two or More Races	2.6%	3.0%	3.3%	10,972	165,396	10,763,902
Hispanic or Latino (of any race)	1.7%	5.4%	18.0%	6,985	299,556	58,479,370

American Community Survey 2015-2019 unless noted otherwise.

Employment

As of 2020Q1, total employment in Northeast Minnesota was 199,664 (based on a four-quarter moving average). 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 2021Q1, employment declined an average of 5.7% in the region.
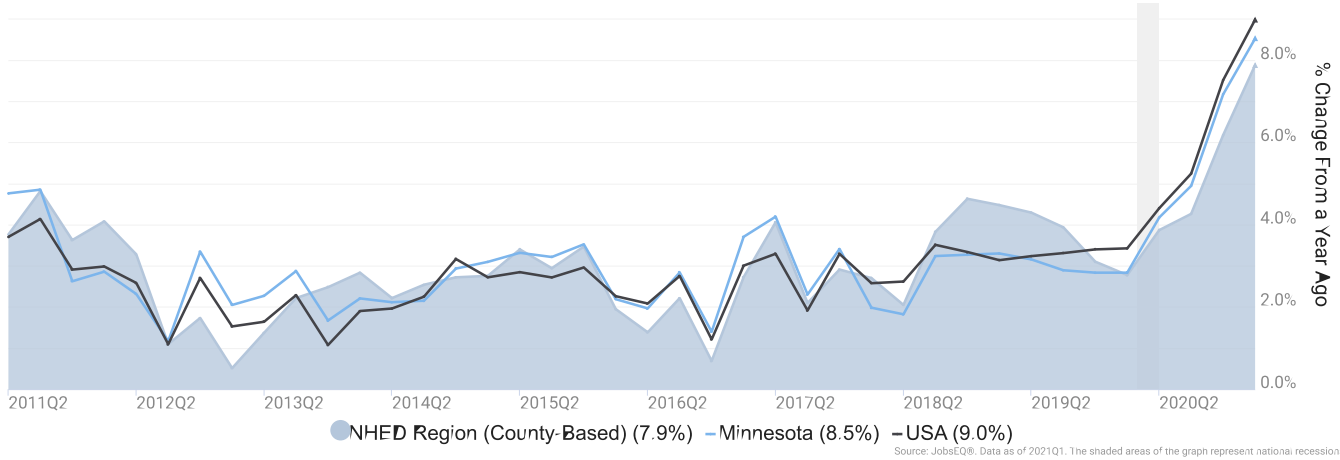
Employment for Northeast Minnesota
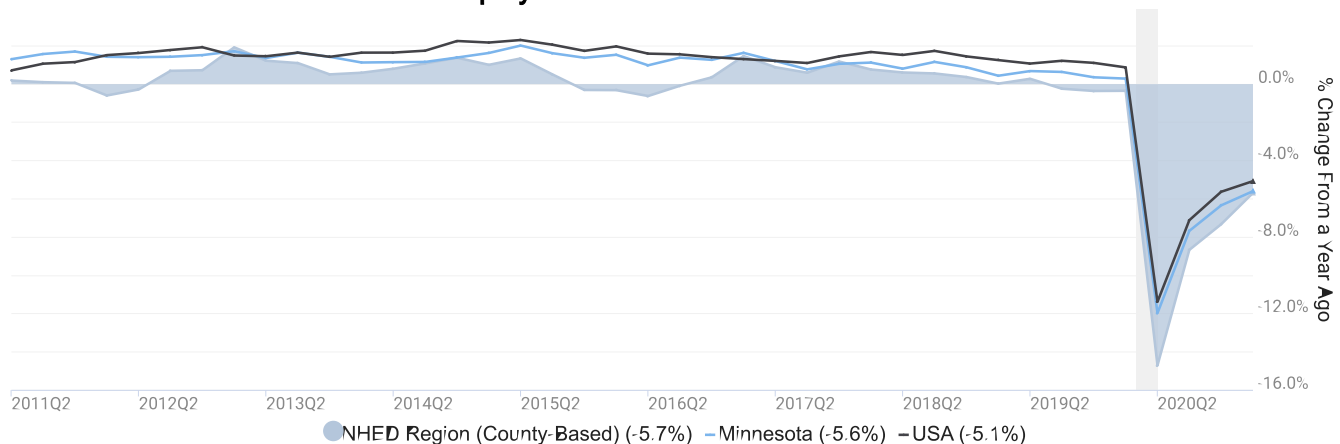
Employment data are derived from the Quarterly Census of Employment and Wages, provided by the Bureau of Labor Statistics and imputed where necessary. Data are updated through 2020Q4 with preliminary estimates updated to 2021Q1.

The average worker in Northeast Minnesota earned annual wages of $47,759 as of 2021Q1, an increase of about $3,400 from one year prior, 2020Q1. Average annual wages per worker increased 7.9% in the region over the preceding four quarters. Wages rose similarly nationwide, where annual average wages were $63,393 as of 2021Q1 compared to $57,624 as of 2020Q1. This is due in parge part to the loss of low-wage workers during the COVID-19 pandemic and the ongoing challenge of recruiting and hiring talent for entry-level, lower-wage jobs, particularly in sectors like hospitality, tourism, retail that were hit hardest by the pandemic.

Average Annual Wages for Northeast Minnesota

NHED Region (County-Based) (7.9%) — Minnesota (8.5%) — USA (9.0%)

Source: JobsEQ®. Data as of 2021Q1. The shaded areas of the graph represent national recessions.

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 2020Q4 with preliminary estimates updated to 2021Q1.

Labor Force Participation Rate

- In Labor Force   - Not in Labor Force

American Community Survey 2015-2019 unless noted otherwise.
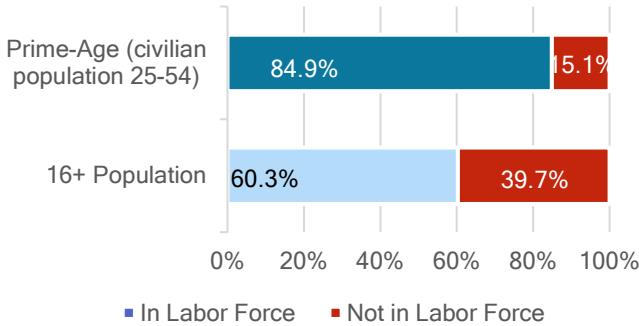
The region has a civilian labor force of 209,327 with a participation rate of 60.3%, which lags Minnesota's labor force participation rate for the population over 16 by just over 9 percentage points. This is due primarily to the older age of residents in Northeast Minnesota. However, the participation rate of the prime working age population (between the ages of 25 and 64) is also behind the statewide rate—84.9% compared to the statewide 88.4%.

The Northeast area has a higher share of veterans in the region, at 5.4% of the regional population compared to

3.8% broadly across the state. Veteran labor force participation is also lower in the region, 69.2% compared to 80.4% statewide. Similarly, the Northeast has a higher share of persons with a disability, 12.0% compared to 8.7% statewide, and a lower labor force participation rate for the population with a disability, 44.1% compared to 53% statewide. The Northeast region overall has a similar share of disconnected youth (1.9% of youth) compared to statewide (1.8%) but below national rates (2.5%), with variation between communities. While just 0.2% of Grand Rapids youth are disconnected from school, training, or work, while in Brainerd about 3% are disconnected.

Economic and Social Characteristics of Northeast Minnesota

Economic and Social Characteristics	Percent			Values		
	Northeast Minnesota	Minnesota	USA	Northeast Minnesota	Minnesota	USA
Labor Force Participation Rate and Size (civilian population 16 years and over)	60.3%	69.6%	63.2%	209,327	3,069,730	163,555,585
Prime-Age Labor Force Participation Rate and Size (civilian population 25-54)	84.9%	88.4%	82.1%	120,891	1,908,936	104,634,905
Armed Forces Labor Force	0.1%	0.1%	0.4%	519	2,514	1,073,907
Veterans, Age 18-64	5.4%	3.8%	4.6%	13,391	130,320	9,143,042
Veterans Labor Force Participation Rate and Size, Age 18-64	69.2%	80.4%	76.6%	9,273	104,731	7,003,778
Median Household Income[2]	–	–	–	$55,769	$71,306	$62,843
Per Capita Income	–	–	–	$31,168	$37,625	$34,103
Poverty Level (of all people)	12.8%	9.7%	13.4%	52,469	526,065	42,510,843
Households Receiving Food Stamps/SNAP	9.5%	7.9%	11.7%	17,225	172,477	14,171,567
Enrolled in Grade 12 (% of total population)	1.2%	1.4%	1.4%	5,106	80,319	4,422,344
Disconnected Youth[3]	1.9%	1.7%	2.5%	400	4,961	423,273
Children in Single Parent Families (% of all children)	32.8%	28.1%	34.1%	25,828	350,236	23,790,005
Uninsured	4.3%	4.5%	8.8%	17,778	246,184	28,248,613
With a Disability, Age 18-64	12.0%	8.7%	10.3%	29,617	293,656	20,187,604
With a Disability, Age 18-64, Labor Force Participation Rate and Size	44.1%	53.0%	42.2%	13,052	155,592	8,509,463
Foreign Born	2.0%	8.5%	13.6%	8,538	472,849	44,011,870

American Community Survey 2015-2019 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

95.1% of prime working age adult residents have at least a high school diploma or GED.

In Northeast Minnesota, 4.9% of adults between the ages of 25 and 64 do not have a high school diploma or equivalent, and about 26.6% have a high school diploma as their highest level of education (compared with 21.7% statewide). Nationwide, 10.9% 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 and Grand Rapids have a smaller share of residents with lower educational attainment.

Educational Characteristics of Northeast Minnesota

Educational Characteristics	Percent			Values		
	Northeast Minnesota	Minnesota	USA	Northeast Minnesota	Minnesota	USA
No High School Diploma	4.9%	6.1%	10.9%	10,182	178,196	18,550,150
High School Graduate	26.6%	21.7%	25.7%	55,589	632,253	43,627,868
Some College, No Degree	26.2%	21.0%	20.7%	54,812	610,250	35,174,790
Associate's Degree	15.7%	12.9%	9.1%	32,857	374,770	15,526,064
Bachelor's Degree	18.4%	25.6%	21.2%	38,421	744,024	35,997,848
Postgraduate Degree	8.3%	12.7%	12.3%	17,387	368,709	20,961,560

American Community Survey 2015-2019 unless noted otherwise.

Educational Attainment, Age 25-64
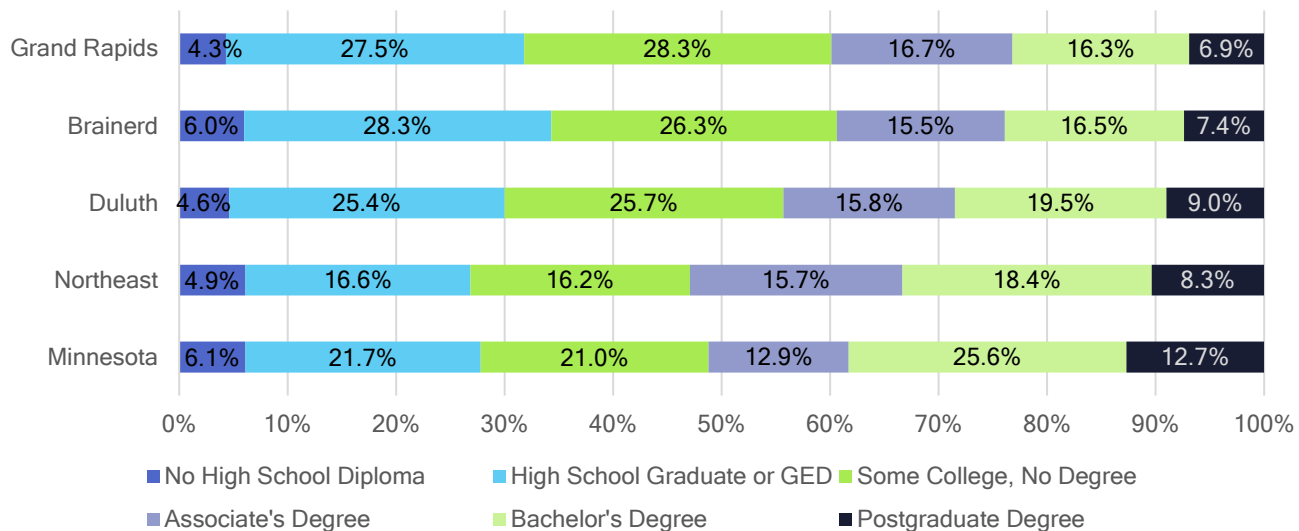
American Community Survey 2015-2019.

Regional Colleges and Universities

Northeast Minnesota has twelve institutions of higher education that offer non-degree awards, two-year degrees, and four-year degrees. The table below shows these postsecondary institutions sorted by enrollment size in during the 2017-18 school year.

School	Certificates and 2yr Awards	4yr Awards	Total School Enrollment	Avg Net Price
University of Minnesota-Duluth	39	2,165	11,024	$16,993
Lake Superior College	1,221	0	5,281	$12,339
The College of Saint Scholastica	14	1,014	4,043	$24,007
Central Lakes College-Brainerd	817	0	4,029	$12,173
Fond du Lac Tribal and Community College	253	0	1,982	$9,631
Itasca Community College	340	0	1,195	$11,487
Mesabi Range College	252	0	1,188	$6,540
Hibbing Community College	330	0	1,118	$9,431
Vermilion Community College	165	0	660	$11,383
Rainy River Community College	58	0	236	$9,085
Leech Lake Tribal College	64	0	173	$8,811
Cosmetology Careers Unlimited College of Hair Skin and Nails	17	0	31	$10,957
Total	**3,570**	**3,179**	**30,960**	**n/a**

Economic Indicators

Gross Domestic Product (GDP) is the total value of goods and services produced by a region. In 2020, nominal GDP in the Northeast region contracted 6.1%. This follows growth of 6.0% in 2019. As of 2020, total GDP in the region was $19,543,367,000–of which $15,051,300,000 is attributed to the Duluth MSA.
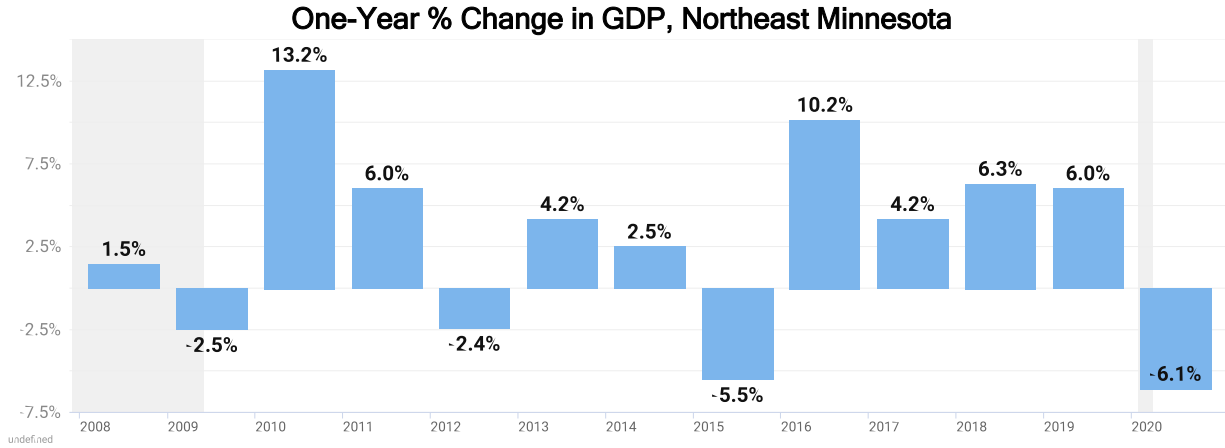
One-Year % Change in GDP, Northeast Minnesota

Gross Domestic Product data are provided by the Bureau of Economic Analysis, imputed by Chmura where necessary, updated through 2020.

Of the industries represented in the Northeast, Health Care and Social Assistance contributed the largest portion of GDP in 2020, $2,995,091,000 The next-largest contributions came from Mining, Quarrying, and Oil and Gas Extraction ($2,542,586,000); Manufacturing ($1,802,774,000); and Real Estate and Rental and Leasing ($1,507,647,000).
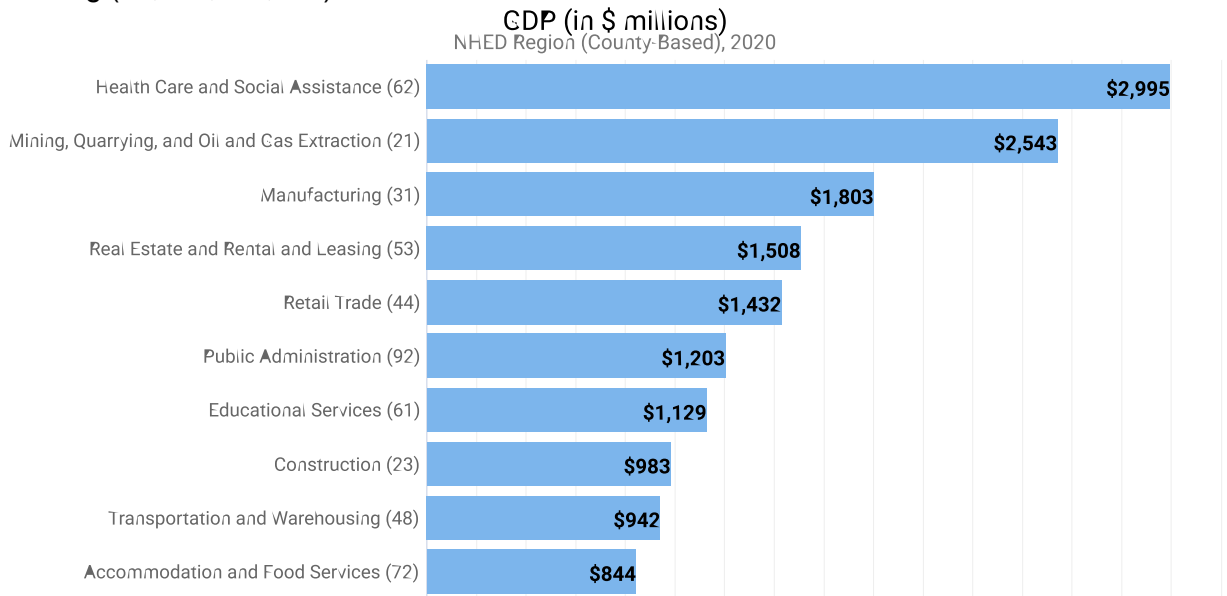
GDP (in $ millions)
NHED Region (County-Based), 2020

Industry	GDP
Health Care and Social Assistance (62)	$2,995
Mining, Quarrying, and Oil and Gas Extraction (21)	$2,543
Manufacturing (31)	$1,803
Real Estate and Rental and Leasing (53)	$1,508
Retail Trade (44)	$1,432
Public Administration (92)	$1,203
Educational Services (61)	$1,129
Construction (23)	$983
Transportation and Warehousing (48)	$942
Accommodation and Food Services (72)	$844

Gross Domestic Product data are provided by the Bureau of Economic Analysis, imputed by Chmura where necessary, updated through 2020.

The Workforce of Today and Tomorrow
Workforce Forecast

The pandemic has been anything but "sharp and short." Instead, many businesses have sustained ongoing impacts which have translated into business closures and reduction in workforce. Additionally, some individuals have chosen to exit the workforce entirely to care for family members or support children who are attending school remotely. Employment dropped by -9.2% between 2020Q1 and 2021Q1, with an estimated 7.5% of the Northeast region's population being unemployed by 2021Q1. Future growth in jobs in the region is forecasted to grow by about 1.1% averaged annually through 2025 in the most optimistic scenario shown below in black, though lagging behind employment in prior years considerably. A pessimistic forecast based on baseline data from the Bureau of Labor Statistics and the MN Department of Employment and Economic Development, assuming the pandemic's effects do not worsen nor get better, puts employment declining by an annual average of -0.5%

5-Year Forecast Comparison in Northeast Minnesota
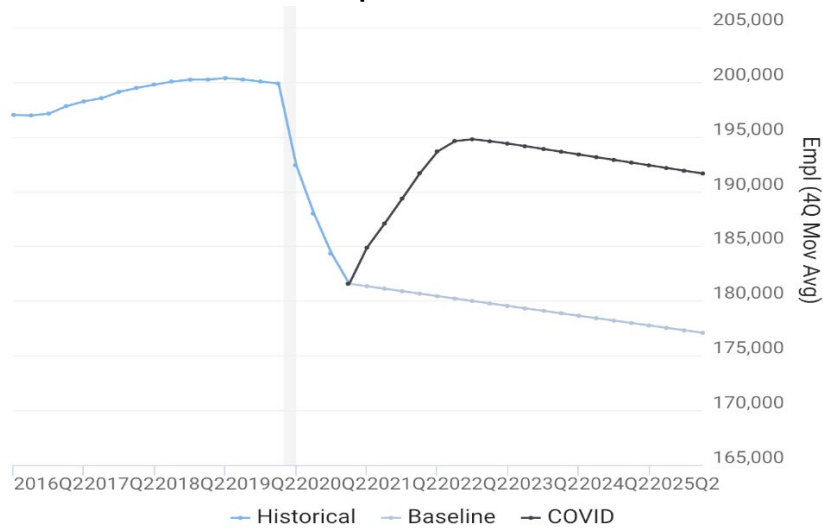
Source: JobsEQ®,Data as of 2021Q1

An industry cluster is a geographic concentration of interrelated industries or occupations. The industry cluster in the Northeast region with the highest relative concentration is Metal & Product Manufacturing with a location quotient of 3.64. This cluster employs 4,947 workers in the region with an average wage of $95,026. Employment in the Metal & Product Manufacturing cluster is projected to expand in the region about 0.2% per year over the next ten years.

Industry Clusters for Northeast Minnesota as of 2021Q1
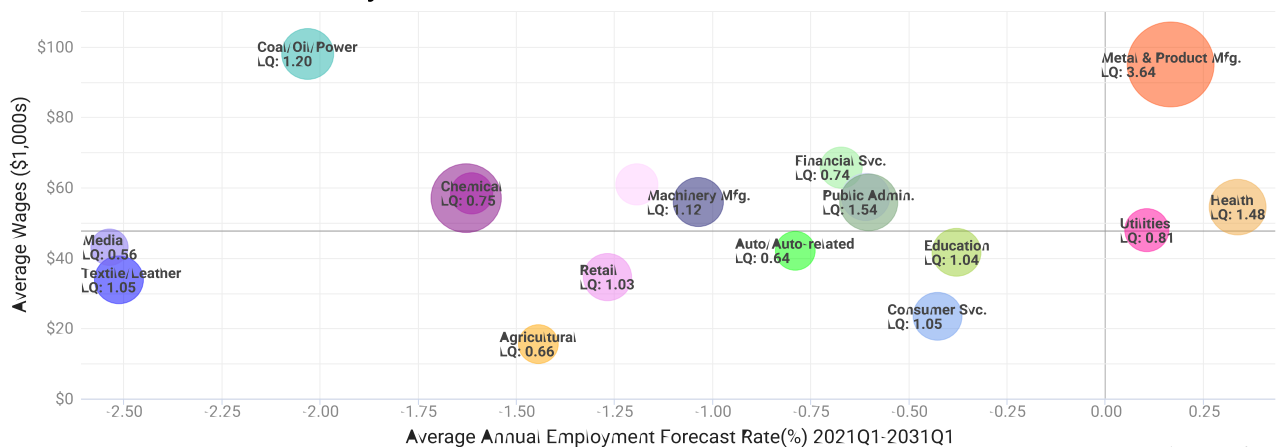
Source: JobsEQ®,Data as of 2021Q1

Mid-Term Occupational Impacts

HIGH CONTACT-INTENSITY OCCUPATIONS

The pandemic has had some surprising impacts on talent demand due to changing healthcare, human services, supply chain, and customer service needs. For roles that require close contact with the public, high growth was forecast in the Northeast just prior to the pandemic, but quickly shifted as businesses temporarily or permanently closed their doors. One year ago, we had estimated that about 5,032 (-8.9%) of the 56,751 people employed locally in high contact-intensity roles during 2020Q1 would lose their employment by 2021Q1. Instead, employment in these high contact-intensity roles dropped to 50,671 across the region closer to 6,000 in losses. About 4,400 people are now unemployed but skilled in these high contact-intensity positions locally, a combined unemployment rate across these positions of 8.3%.

Roles that saw some of the biggest losses in employment were Waiters and Waitresses (-1,286 or -31.4%) and Bartenders (-530 or -29.6%). These occupations also have the highest estimated unemployment rates along with Passenger Vehicle Drivers (20.6% estimated unemployment). None of the top 15 high contact-intensity roles increased in employment counts between 2020Q1 and 2021Q1.

Top 15 High Contact-Intensity Occupations by Total Employment with Optimistic COVID-19 Modeled Forecast, 2021Q1

SOC	Occupation	2021Q1						1-Year History		Optimistic 5-Year Forecast				
		Empl	Mean Ann Wages[2]	LQ	Unempl	Unempl Rate	Online Job Ads[3]	Empl Change	Ann %	Total Demand	Exits	Transfers	Empl Growth	Ann % Growth
29-1141	Registered Nurses	6,401	$71,300	1.73	115	1.9%	922	-394	-5.8%	1,663	885	822	-44	-0.1%
31-1122	Personal Care Aides	4,635	$27,900	1.50	265	5.6%	201	-29	-0.6%	4,013	1,867	1,640	506	2.1%
35-3023	Fast Food and Counter Workers	4,175	$24,800	1.02	591	12.4%	325	-546	-11.6%	5,388	2,069	2,437	881	3.9%
35-3031	Waiters and Waitresses	2,811	$28,800	1.29	657	20.0%	37	-1,286	-31.4%	4,099	1,201	2,141	757	4.9%
31-1131	Nursing Assistants	2,759	$34,000	1.63	139	5.0%	471	-150	-5.1%	1,649	757	813	79	0.6%
53-3032	Heavy and Tractor-Trailer Truck Drivers	2,127	$54,400	0.89	153	6.3%	178	-126	-5.6%	1,194	433	771	-11	-0.1%
31-1121	Home Health Aides	1,613	$27,900	1.49	85	5.1%	51	-206	-11.3%	1,159	474	509	176	2.1%
25-2021	Elementary School Teachers, Except Special Education	1,533	$61,900	0.98	68	4.3%	6	-134	-8.0%	665	247	343	75	1.0%
35-3011	Bartenders	1,261	$27,700	2.36	451	26.9%	32	-530	-29.6%	2,056	407	1,116	534	7.3%
25-2031	Secondary School Teachers, Except Special and Career/Technical Education	1,193	$60,200	1.04	36	3.0%	20	-95	-7.4%	494	174	261	59	1.0%
39-9011	Childcare Workers	1,151	$27,100	1.12	160	12.4%	88	-107	-8.5%	1,105	474	481	150	2.5%
29-2061	Licensed Practical and Licensed Vocational Nurses	1,113	$46,100	1.35	34	3.0%	231	-65	-5.5%	472	193	239	40	0.7%
35-1012	First-Line Supervisors of Food Preparation and Serving Workers	1,112	$37,800	1.06	114	9.6%	324	-259	-18.9%	1,261	292	723	246	4.1%
53-3058	Passenger Vehicle Drivers, Except Bus Drivers, Transit and Intercity	986	$38,000	1.12	249	20.6%	43	-192	-16.3%	878	407	291	180	3.4%
	High Contact-Intensity Occupations	50,671	$49,900	1.23	4,400	8.3%	4,927	-5,735	-10.2%	36,156	13,595	17,779	4,782	1.8%
	Total - All Occupations	181,573	$51,100	1.00	14,347	7.5%	11,807	-18,295	-9.2%	119,482	42,658	66,770	10,055	1.1%

SEVERE OCCUPATION GAPS

Estimation of mid-term and long-term recovery of critical local occupations is based on our most reasonable hypothesis given current conditions. In Northeast Minnesota, an analysis of local labor market occupational gaps as of the first quarter of 2020 showed that there is a shortage of local Nurses, Therapists, LPNs, Physicians, Health Practitioner Support Techonlogists, and other careers in health and education. By the first quarter of 2021, forecasted talent gaps for each of these occupations remained, but with some changes to the volume of anticipated gaps. Among high contact-intensity roles in shortage, Registered Nurses remained ranked as the occupation with highest forecasted shortages, but Mental Health Counselors and Medical Services Managers jumped up to second and third place. A large number of retail and food service roles are forecast to have a surplus of talent. Based on forecasted growing demand for health, education, human services, and remote work-friendly management positions, these occupations of shortage are likely to rebound and grow in demand as the pandemic subsides, possibly beyond initial forecasts. All of the top ten positions of highest forecasted talent shortage pay wages over $48,500 per year. Most occupations of shortage require an Associate's degree or higher.

Conversely, none of the ten positions forecast to have the highest surplus of talent in the Northeast as of the first quarter of 2020 or 2021 typically require an advanced degree, and only one of the ten pays over $43,000 on average. Six out of ten of these positions typically cannot be done remotely, and eight out of ten of these positions are considered high contact-intensity. Given the impacts of the COVID-19 pandemic on local industry, these occupations of anticipated high talent excess will likely decline in overall local demand and shift dramatically in how work is done on a daily basis.

Average Annual Occupation Gaps (i.e. Talent Shortage), 2021Q1 through 2031Q1

Occupation	Gap
Registered Nurses ($71,300)	-41
Substance Abuse, Behavioral Disorder, and Mental Health Counselors ($48,600)	-13
Medical and Health Services Managers ($94,800)	-13
General and Operations Managers ($94,700)	-13
Software Developers and Software Quality Assurance Analysts and Testers ($88,500)	-10
Maintenance and Repair Workers, General ($45,300)	-9
Licensed Practical and Licensed Vocational Nurses ($46,100)	-9
Nurse Practitioners ($116,900)	-8
Police and Sheriff's Patrol Officers ($65,100)	-8
Project Management Specialists and Business Operations Specialists, All Other ($61,900)	-8
Office Clerks, General ($38,600)	8
Hosts and Hostesses, Restaurant, Lounge, and Coffee Shop ($24,600)	9
Amusement and Recreation Attendants ($29,000)	9
Team Assemblers ($35,500)	9
Bartenders ($27,700)	10
Customer Service Representatives ($38,100)	12
Retail Salespersons ($32,000)	31
Waiters and Waitresses ($28,800)	38
Fast Food and Counter Workers ($24,800)	45
Cashiers ($26,000)	89

Source: JobsEQ®,Data as of 2021Q1 except wages which are as of 2020

Expected growth rates for occupations vary by the education and training required. While all employment in Northeast Minnesota is projected to contract 0.5% over the next ten years under baseline estimates, occupations typically requiring a postgraduate degree are expected to grow 0.1% per year, those requiring a bachelor's degree are forecast to contract 0.3% per year, and occupations typically needing a 2-year degree or certificate are expected to contract 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

Training Required	Growth
Postgraduate degree ($106,900)	0.1%
Bachelor's degree ($74,000)	-0.3%
2-year degree or certificate ($48,400)	-0.4%
Previous work experience, no award ($54,000)	-0.7%
Long-term training, no exp, no award ($57,100)	-0.6%
Moderate-term OJT, no exp, no award ($48,400)	-0.9%
Short-term OJT, no exp, no award ($32,200)	-0.5%
All Levels ($51,000)	-0.5%

Source: JobsEQ®,Data as of 2021Q1
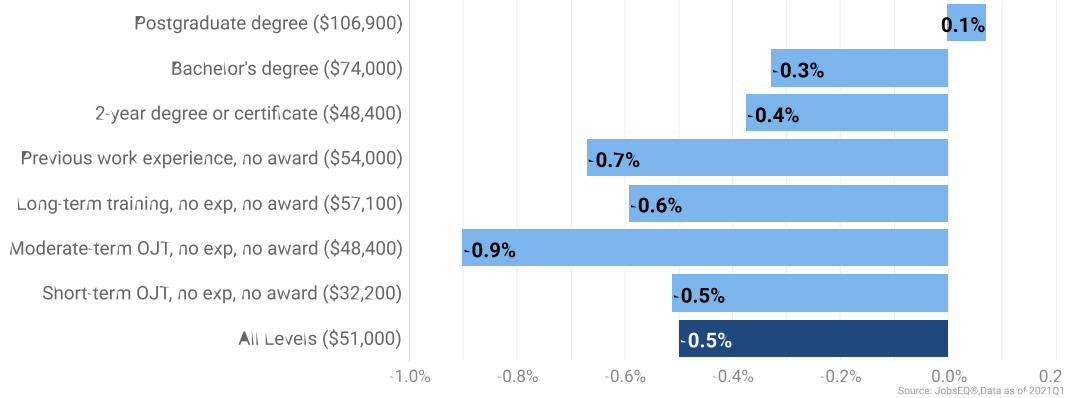
Employment by occupation data are estimates are as of 2021Q1. Education levels of occupations are based on BLS assignments. Forecast employment growth uses national projections from the Bureau of Labor Statistics adapted for regional growth patterns.

EMERGING CAREER PATHS

Online job posting data can tell us a lot about employer demand for certain skills, certifications, qualifications, and occupational competencies. Too often jobseekers limit their search to careers matching prior job titles or formal education. However, taking a non-traditional education path doesn't mean a person doesn't have the skills necessary for in-demand jobs or career paths outside their formal education. And increasingly, employers are more focused on skills than degrees.

Total Jobs Advertised Monthly in Northeast Minnesota, September 2019 – 2021
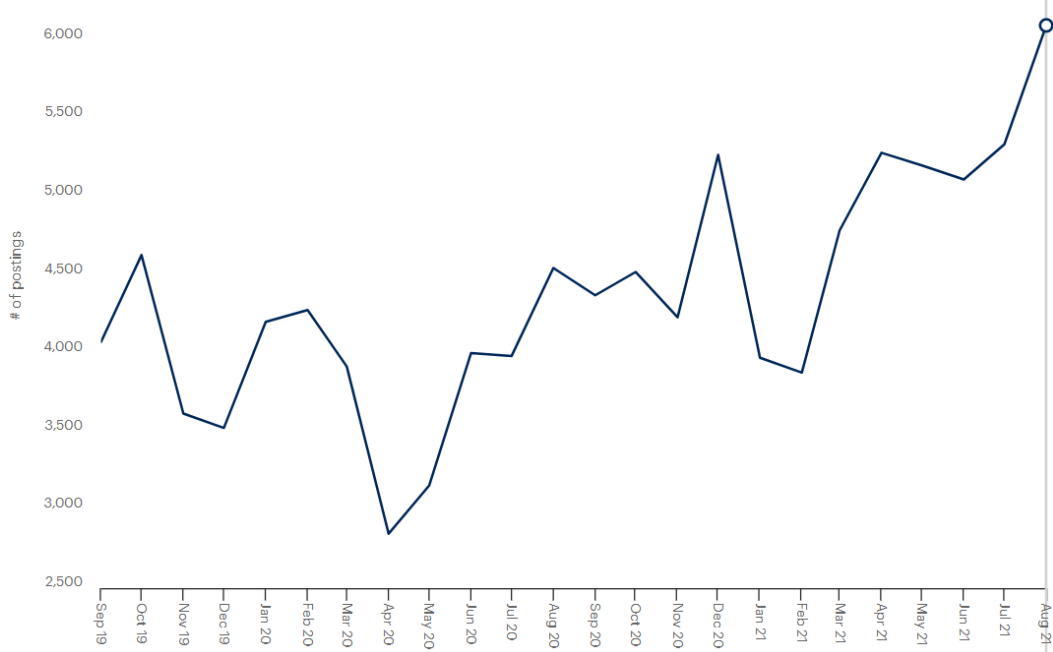
During the first six months of the COVID-19 pandemic,[3] there were 30,150 new jobs advertised in the region–a decrease of about 3% from the same six months in 2019. The top three positions advertised by volume were for Heavy Truck Drivers, Registered Nurses, and Personal Care Aides. Insurance Sales Agents postings grew by 75% between 2020 and 2019. This reflects the sudden and growing local demand for Finance Cluster talent, particularly those with at least a 2-year degree in a related area of study.

Over the past 12 months, several of these occupations have continued to see growth in postings, including Software Developers, general computer occupations, Truck Drivers, and Laborers. Additionally, health and finance roles have continued to spike in volume considerably, showing much higher demand since March 2021 compared to early months of the pandemic. Registered Nurse, Nursing Assistant, and Medical Assistant job posting volumes are over two times where they were this time last year.

Top Emerging Occupations in Northeast Minnesota, March 1-August 31, 2021
compared to the same dates in 2020 (high-growth occupations by order of volume of postings)
1. Registered Nurses (+102%)
2. Nursing Assistants (+143%)
3. Licensed Practical and Licensed Vocational Nurses (+139%)
4. Social and Human Services Assistant (+56%)
5. Supervisors of Retail Salesworkers (+45%)
6. Medical Assistants (+140%)
7. Supervisors of Office and Administrative Support Workers (+38%)
8. Medical Secretaries (+83%)
9. Software Developers, Applications (+162%)
10. Maintenance and Repair Workers (+53%)

Top Sustaining Occupations in Northeast Minnesota September 2020 – 2021
1. Customer Service Representatives (+10%)
2. Laborers and Freight, Stock, and Material Movers (+233%)
3. Light Truck or Delivery Services Drivers (+169%)
4. Software Developers, Applications (+134%)
5. Heavy and Tractor-Trailer Truck Drivers (+65%)

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 with postsecondary planning, workforce development, and employer talent strategy.

[3] March 15-June 15, 2020.

The certifications and technical skills in demand locally match in particular to the customer service, and entry-level health care positions available in high volumes in the region, with Commercial Drivers Licenses, Registered Nurse Certification, and HAZMAT Certification appeared in high volumes in local job postings during this period compared to a full year prior. Human skills and other competencies like scheduling, managing a flexible work environment, and handling general healthcare needs were mentioned in job postings as required competencies for candidates in higher volumes from March through August in comparison to early 2020 or any point in 2019, but declined moderately from September 2020 through August 2021. The majority of rising skills are focused in Health Science Technology capacities.

Top Emerging Skills in Northeast Minnesota in Order of Frequency, with percent change from prior year
in Job Postings, September 2020 - 2021
1. Life Support (+51%)
2. Intervening (+72%)
3. Delegation (+84%)
4. Nursing Process (+82%)
5. Sorting (+205%)

Telecommuting and work-from-home continues to appear in job posting requirements locally, increasing 52% in the past 12 months (September 2020-2021) compared to the prior year (September 2019-2020).

Trends in Remote Work Opportunities Advertised Online, Northeast Minnesota2021Q1
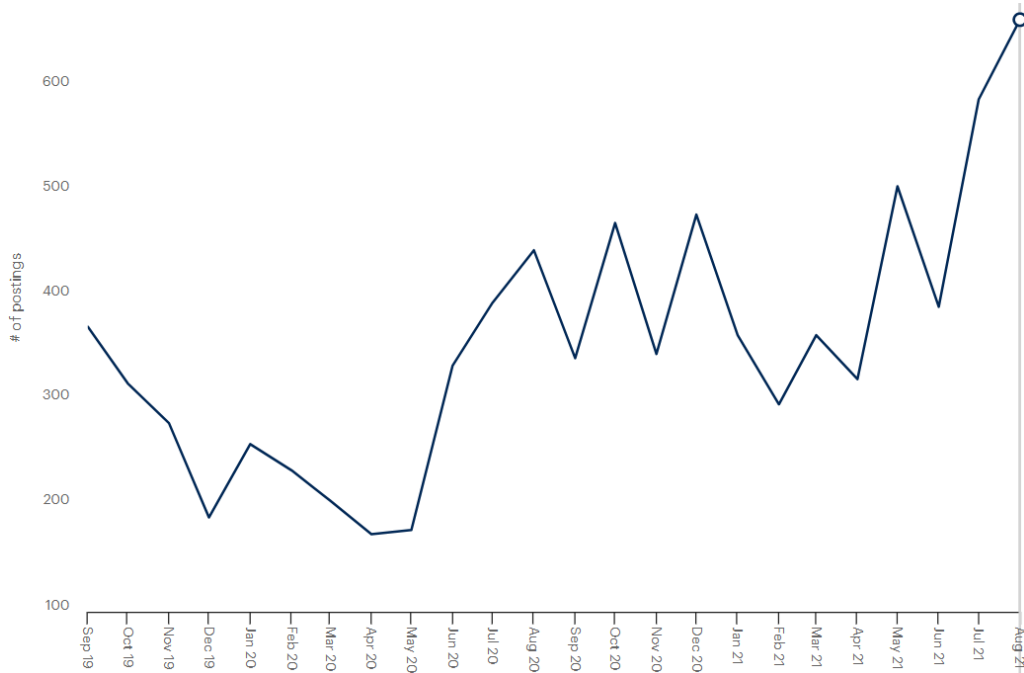
Remote work opportunities increased significantly among Business, Management, and Administration, Health Science, and Information Technology roles over the past 12 months compared to the 12

months prior. The volume of remote Software Developer roles also increased by 275% during this period—and for remote Human Resources Specialists by 560%.

Change in Volume of Remote Work Opportunities by Occupation in Northeast Minnesota, September 2020-2021 Compared to 12 months prior
1. Customer Service Representatives (+122%)
2. Insurance Sales Agents (+64%)
3. Medical and Health Services Managers (+24%)
4. Registered Nurses (+60%)
5. Computer Occupations, All Other (+141%)
6. Software Developers, Applications (275%)
7. Medical Secretaries (+291%)
8. Management Analysts (+70%)
9. Human Resources Specialists (+560%)
10. Computer User Support Specialists (+111%)

Currently, the occupations with highest estimated unemployment rates in Northeast Minnesota are Dancers (42.0%), Choreographers (41.3%), Crossing Guards and Flaggers (31.9%), Umpires and Referees (31%), and Actors (30.3%). Waiters and Waitresses (20.0% unemployment) may have a moderately high level of alignment in skills and experience for several career pathways and high-skill, high-demand occupations in the region in the Health Science and Human Services field. Likely transitions for local entry-level Waiters and Waitresses include Orderlies, Home Health Aides, and Personal Care Aides. Other aligned positions that could support movement into entirely different high-shortage career paths with some additional training or education include Preschool Teachers, Nursing Assistants, Manicurists, and Massage Therapists.

Career Field Insights

Analysis of the sixteen CTE Clusters provides an entryway into career pathways, summarizing where opportunities are greatest among hundreds of occupations.

Of sixteen career clusters used by Career and Technical Education (CTE), fourteen are forecast in a worst-case scenario model to decline in overall employment over the next ten years. The only two clusters forecasting growth are Human Services (8.9%) and Health Science (0.1%) in a worst-case scenario (only two industries have forecasted growth in the region: Healthcare and Social Assistance, and Mining). Ten of the sixteen career clusters have average wages above the average occupation wage in the region ($51,100 in 2020–an increase from $48,800 as of 2019).[4]

Comparing current baseline forecasts to the same forecasts modeled one year ago, all but Manufacturing are forecasting lower baseline employment growth over ten years than what was estimated last year.

Baseline Worst-Case Scenario 10-Year Forecasts by Career Cluster, Northeast Minnesota 2021Q1
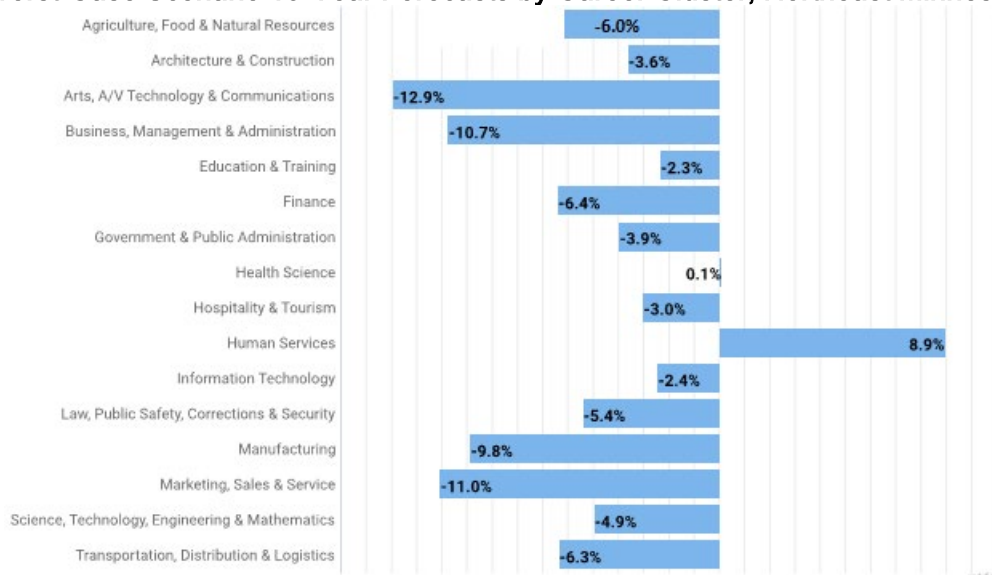
Cluster forecasts estimated using Chmura, JobsEQ, based on 2020Q1 employment data. All clusters are distinct occupations except for Agriculture, Food, and Natural Resources, which overlaps with other clusters.

An accurate assessment of future occupation demand requires that both future growth and the number of people retiring be taken into account. In the Northeast, Hospitality & 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.

Science, Technology, Engineering & Mathematics has the highest wages of the Career Clusters followed by the Information Technology and Finance clusters.

Career Cluster	Employment	Avg Ann Wages	Job Ads	Baseline 10-Year Forecasted Empl Change	Ann Empl Growth	Ann Total Demand
Science, Technology, Engineering & Mathematics	2,173	$88,900	119	-4.9%	-11	153

[4] 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.

Career Cluster	Employment	Avg Ann Wages	Job Ads	Baseline 10-Year Forecasted Empl Change	Ann Empl Growth	Ann Total Demand
Information Technology	2,970	$76,900	255	-2.4%	-7	209
Finance	4,837	$68,900	322	-6.4%	-32	405
Health Science	22,748	$67,700	3,558	0.1%	1	1,711
Government & Public Administration	2,178	$58,800	54	-3.9%	-9	182
Agriculture, Food & Natural Resources*	9,821	$56,100	293	-6.0%	-38	334
Law, Public Safety, Corrections & Security	5,790	$57,700	234	-5.4%	-32	479
Architecture & Construction	14,095	$57,500	273	-3.6%	-52	1,450
Education & Training	11,583	$55,600	348	-2.3%	-28	1,020
Business, Management & Administration	26,424	$54,500	1,261	-10.7%	-299	2,459
Arts, A/V Technology & Communications	2,335	$50,300	113	-12.9%	-32	210
Manufacturing	13,281	$48,700	512	-9.8% (+)	-138	1,231
Transportation, Distribution & Logistics	12,065	$48,400	507	-6.3%	-79	1,282
Marketing, Sales & Service	19,559	$41,400	1,595	-11.0%	-229	2,413
Human Services	13,912	$39,100	899	8.9%	119	1,887
Hospitality & Tourism	24,440	$29,900	1,659	-3.0%	-75	3,836
Total - All Occupations	**181,573**	**$51,100**	**11,776**	**-5.0%**	**-912**	**19,290**

*Cluster forecasts estimated using Chmura, JobsEQ, based on 2021Q1 employment data. All clusters are distinct occupations except for Agriculture, Food, and Natural Resources, which overlaps with other clusters. (+) indicates an improved forecast from 2020Q1 estimates.

HEALTH SCIENCE TECHNOLOGY

Health Science Technology is a critical Career Field to secure the public health of the entire state. The COVID-19 pandemic has made this reality even more clear, and further strained the workforce challenges faced in this sector.

Over the next three years, under a pessimistic baseline forecast, Health Science Technology employment is forecast to remain flat. In the most optimistic scenario feasible based on employer demand, and given the existing talent shortage and talent pipelines in place, employment growth of 0.8% annually in this field could be possible.

Baseline Worst-Case Scenario 3-Year Forecast for Health Science Technology Careers, Northeast Minnesota 2021Q1
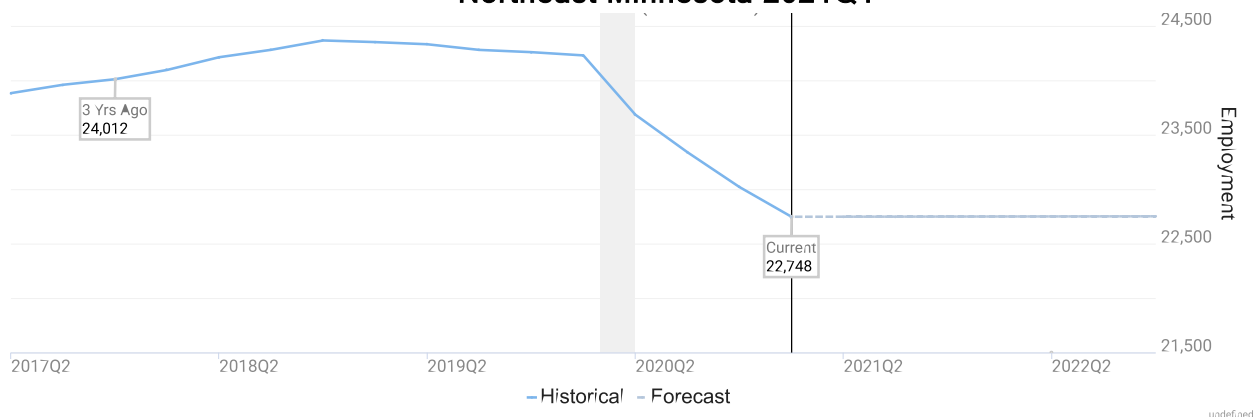
Top Ten Health Science Technology Occupations by Employment Volume in Northeast Minnesota, 2021Q1

6-Digit Occupation	Empl	Avg Mean Wages	LQ	Historical 3-Year Empl Change	Annual Demand	Baseline Forecast Ann Growth
Registered Nurses	6,401	$71,300	1.73	-135	309	-0.5%
Nursing Assistants	2,759	$34,000	1.63	-203	297	-0.3%
Home Health Aides	1,613	$27,900	1.49	-540	220	1.8%
Licensed Practical and Licensed Vocational Nurses	1,113	$46,100	1.35	-112	83	-0.1%
Medical Secretaries and Administrative Assistants	837	$40,400	1.13	-40	91	-0.2%
Medical and Health Services Managers	669	$94,800	1.32	2	68	1.7%
Medical Assistants	650	$42,400	0.74	-15	78	0.8%
Pharmacy Technicians	589	$36,600	1.16	-27	42	-0.7%
Physicians, All Other; and Ophthalmologists, Except Pediatric	541	$251,500	1.10	-10	13	-0.5%
Pharmacists	512	$128,400	1.28	-20	15	-1.3%
Remaining Component Occupations	7,064	$77,200	1.18	-251	488	0.0%
Health Science (CTE Cluster)	**22,748**	**$67,700**	**1.34**	**-1,349**	**1,711**	**0.0%**

"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).

Most talent in Northeast Minnesota that is working in Health Science Technology roles are employed by General Medical and Surgical Hospitals (46.9%) or Nursing Care Facilities (9.2%). In comparison, in the metro, just under 30% of Health Science Technology talent is employed by hospitals.

Health Science Technology Field Employment by Industry, 2021Q1, Northeast Minnesota

Industry Title	% of Career Field Empl	Career Field Empl	10-Year Separations	10-Year Empl Growth	10-Year Total Demand
General Medical and Surgical Hospitals	46.9%	10,663	6,864	-549	6,315
Nursing Care Facilities (Skilled Nursing Facilities)	9.2%	2,082	1,807	-205	1,602
Offices of Physicians	7.3%	1,663	1,179	83	1,262
Continuing Care Retirement Communities and Assisted Living Facilities for the Elderly	4.3%	987	1,041	190	1,231
Residential Intellectual and Developmental Disability, Mental Health, and Substance Abuse Facilities	4.2%	965	968	104	1,072
Offices of Dentists	3.7%	838	695	-26	670
Individual and Family Services	3.4%	783	941	283	1,224
Offices of Other Health Practitioners	2.5%	559	413	65	478
Health and Personal Care Stores	2.2%	506	325	-77	247
Outpatient Care Centers	2.2%	497	376	84	460
Home Health Care Services	2.1%	472	441	97	538
Other Professional, Scientific, and Technical Services	1.7%	379	346	29	375
Psychiatric and Substance Abuse Hospitals	1.2%	281	215	-4	211
Executive, Legislative, and Other General Government Support	1.1%	256	189	-6	183
Other Residential Care Facilities	1.0%	236	206	-24	182
Elementary and Secondary Schools	0.9%	209	125	-1	124
Colleges, Universities, and Professional Schools	0.7%	156	105	-8	98
Other Ambulatory Health Care Services	0.5%	124	104	22	126
Insurance Carriers	0.5%	116	75	7	82
Administration of Environmental Quality Programs	0.5%	114	73	-12	61
All Others	3.8%	860	620	-27	593

Career Field Demographics

The Health Science Technology field is predominantly female (77.6%) and white (93.8%). The age distribution of talent in Health Science Technology is relatively even from age 25 through 64.

Age
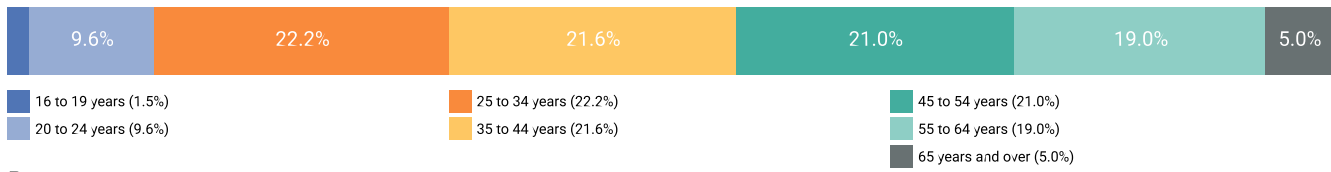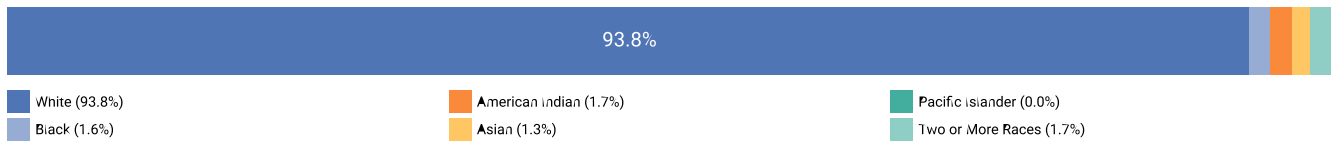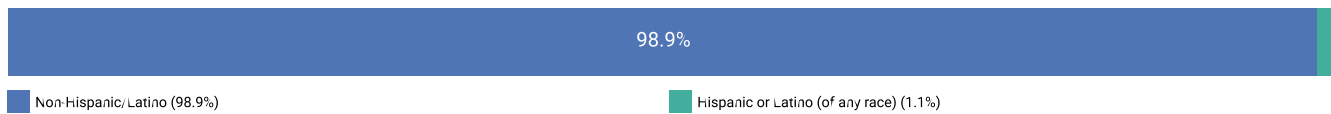
9.6%	22.2%	21.6%	21.0%	19.0%	5.0%

- 16 to 19 years (1.5%)
- 20 to 24 years (9.6%)
- 25 to 34 years (22.2%)
- 35 to 44 years (21.6%)
- 45 to 54 years (21.0%)
- 55 to 64 years (19.0%)
- 65 years and over (5.0%)

Race

93.8%			

- White (93.8%)
- Black (1.6%)
- American Indian (1.7%)
- Asian (1.3%)
- Pacific Islander (0.0%)
- Two or More Races (1.7%)

Ethnicity

98.9%	

- Non-Hispanic/Latino (98.9%)
- Hispanic or Latino (of any race) (1.1%)

Gender

22.4%	77.6%

- Male (22.4%)
- Female (77.6%)

Educational Attainment and Requirements

The stacked bar chart here illustrates the estimated mix of educational attainment of the workers in this career field in aggregate. In general, the Northeast Minnesota Health Science Technology workforce has a close match to the education and training required for existing roles. For example, just 16.8% of Health Science Technology positions require no educational award, and about 13.8% of the workforce holds only a high school diploma or less. About 28.9% of the Health Science Technology workforce hold a two-year degree and 16.1% completed some college (such as a certificate), or 45.0% in all, compared to about 34.1% of local jobs in Health Science Technology that typically require a certificate two-year degree. The table below indicates typical education and training requirements rather than the mix of attainment of workers in such positions.

Educational Attainment
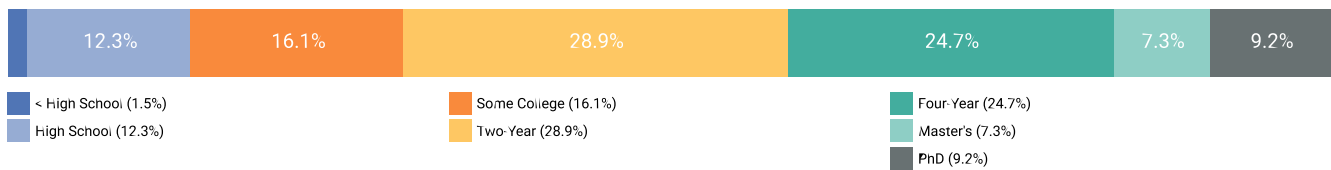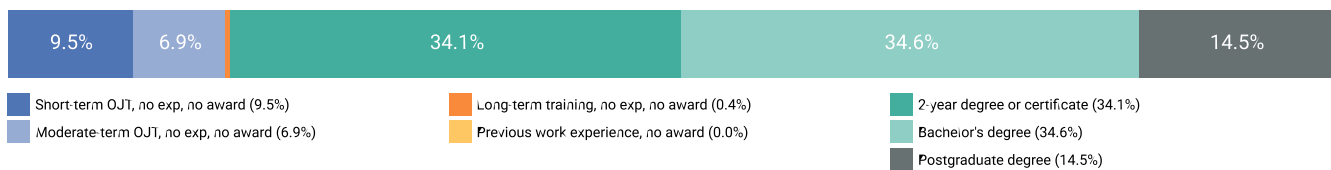
12.3%	16.1%	28.9%	24.7%	7.3%	9.2%

- < High School (1.5%)
- High School (12.3%)
- Some College (16.1%)
- Two-Year (28.9%)
- Four-Year (24.7%)
- Master's (7.3%)
- PhD (9.2%)

Education and Training Requirements

9.5%	6.9%	34.1%	34.6%	14.5%

- Short-term OJT, no exp, no award (9.5%)
- Moderate-term OJT, no exp, no award (6.9%)
- Long-term training, no exp, no award (0.4%)
- Previous work experience, no award (0.0%)
- 2-year degree or certificate (34.1%)
- Bachelor's degree (34.6%)
- Postgraduate degree (14.5%)

Typical Education Requirements for Top Occupations by Volume, 2021Q1

Occupation	Typical Entry-Level Education	Previous Work Experience	Typical On-the-Job Training
Registered Nurses	Bachelor's degree	None	None
Nursing Assistants	Postsecondary non-degree award	None	None
Home Health Aides	High school diploma or equivalent	None	Short-term on-the-job training
Licensed Practical and Licensed Vocational Nurses	Postsecondary non-degree award	None	None
Medical Secretaries and Administrative Assistants	High school diploma or equivalent	None	Moderate-term on-the-job training
Medical and Health Services Managers	Bachelor's degree	Less than 5 years	None
Medical Assistants	Postsecondary non-degree award	None	None
Pharmacy Technicians	High school diploma or equivalent	None	Moderate-term on-the-job training
Physicians, All Other; and Ophthalmologists, Except Pediatric	Doctoral or professional degree	None	Internship/residency
Pharmacists	Doctoral or professional degree	None	None

Occupation Gaps

The chart below shows the potential average annual 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.

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.

In Health Science Technology, Registered Nurses are the occupation with the greatest annual shortages in the Northeast and #1 statewide. This critical talent shortage is due in large part to forecasted employment growth and replacement demand needs due to retirements combined with insufficient talent coming through Registered Nursing programs at both the 2-year and 4-year levels.

Annual Average Occupation Gaps (i.e. Talent Shortages) for the next 10 Years in Health Science Technology, Northeast Minnesota 2021Q1
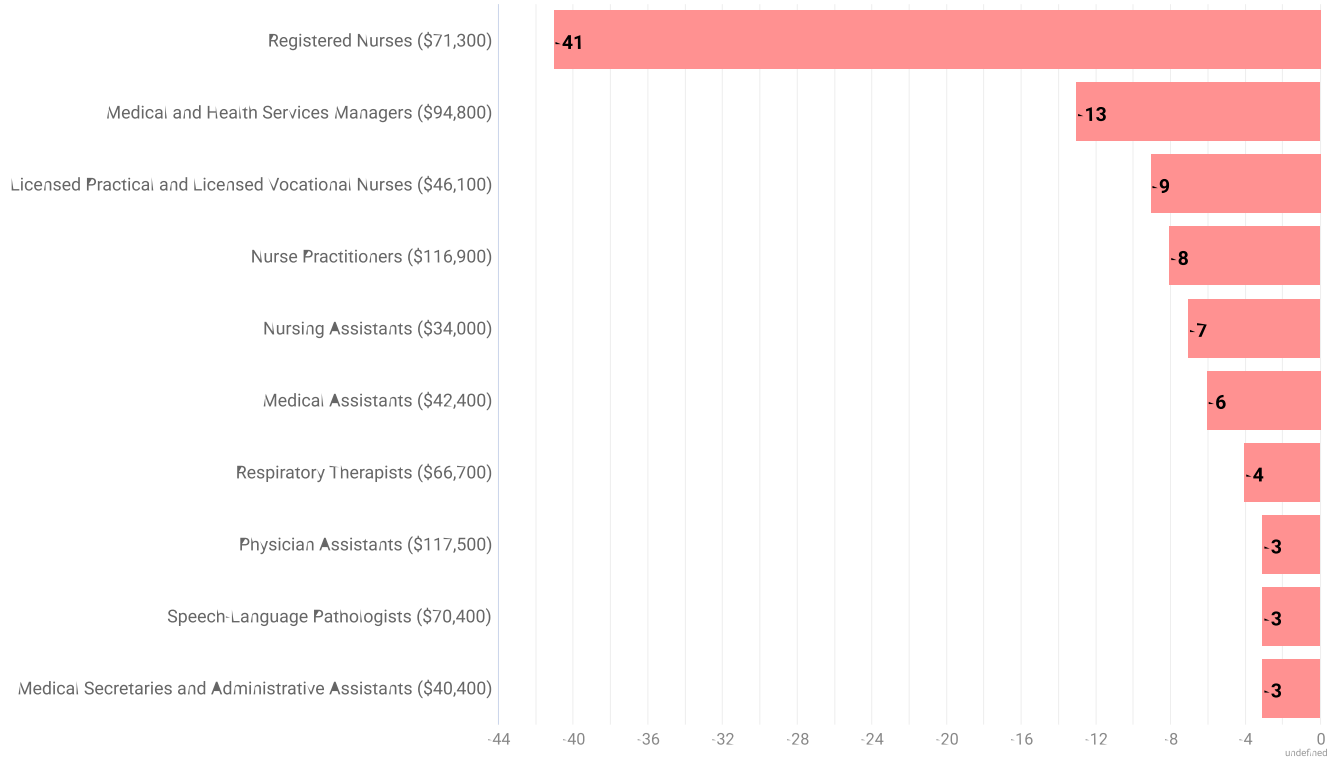
Occupation	Gap
Registered Nurses ($71,300)	-41
Medical and Health Services Managers ($94,800)	-13
Licensed Practical and Licensed Vocational Nurses ($46,100)	-9
Nurse Practitioners ($116,900)	-8
Nursing Assistants ($34,000)	-7
Medical Assistants ($42,400)	-6
Respiratory Therapists ($66,700)	-4
Physician Assistants ($117,500)	-3
Speech-Language Pathologists ($70,400)	-3
Medical Secretaries and Administrative Assistants ($40,400)	-3

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. For instance, Northeast colleges and universities are underproducing about 41 graduates annually that are needed to fill Nurse Practitioner positions open with employers in the region. Several occupations that typically require a certificate or 2-year program also have local award gaps, including Medical Assistants and Medical Secretaries. 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. 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 2021Q1

Occupation	Gap
Nurse Practitioners	-23
Medical Assistants	-19
Medical Secretaries and Administrative Assistants	-16
Pharmacists	-15
Physicians, All Other; and Ophthalmologists, Except Pediatric	-13
Physician Assistants	-12
Pharmacy Technicians	-8
Medical and Clinical Laboratory Technologists	-7
Diagnostic Medical Sonographers	-7
Psychiatric Technicians	-7
Medical Scientists, Except Epidemiologists	9
Medical Dosimetrists, Medical Records Specialists, and Health Technologists and Technicians, All Other	13
Dental Assistants	14
Occupational Therapists	20
Licensed Practical and Licensed Vocational Nurses	26
Speech-Language Pathologists	33
Medical and Health Services Managers	40
Physical Therapists	49
Nursing Assistants	72
Registered Nurses	187

Source: JobsEQ®,Data as of 2021Q1

Certification Gaps

Similar to award gaps, an analysis of certification gaps identify where the existing talent pool lacks particular credentials in comparison to current openings. However, this analysis uses real-time labor market data in the form of online candidate profiles and job postings to analyze the alignment between the available workforce and local opportunities. In the table below, it is apparent that the programs aligned to the occupations above as well as shorter training programs are both needed to connect local talent with opportunities.

Top 10 Certification Gaps in the Northeast, September 2021

Name	Candidates	Openings	Gap
Advanced Cardiac Life Support Certification (ACLS)	49	70	-21
Emergency Medical Technician (EMT)	5	17	-13
Certified Pharmacy Technician (CPT)	7	17	-10
Emergency Nursing Pediatric Course (ENPC)	3	13	-10
Trauma Nursing Core Course (TNCC)	10	19	-9
Medical Technologist (Medical Technologists)	4	12	-8
Medical Laboratory Technician (MLT)	4	11	-6
Registered Respiratory Therapist (RRT)	2	8	-6

Top 10 Certification Gaps in the Northeast, September 2021

Name	Candidates	Openings	Gap
Registered Medical Assistant	2	8	-6
Certified Dental Assistant (CDA)	5	9	-4

Skill Gaps
Likewise, there is a degree of misalignment between the skills of the available workforce and the skills advertised by local employers. The ten skills listed below are examples of the skills in most high demand among Northeast employers hiring Health Science Technology talent that potential candidates have not indicated in their professional networking platforms as a strength.

Top 10 Skill Gaps in the Northeast, September 2021

Name	Candidates	Openings	Gap
Mathematics	9	33	-24
Inventory Control	3	20	-17
Unity	4	14	-10
Cash Handling (Cashier)	7	16	-9
Electrocardiogram (ECG, EKG)	13	22	-9
Hearing Aids	1	7	-6
Direct Marketing	0	5	-5
Home Health Care	89	93	-4
Geriatric	12	15	-3
Inventory Management	2	5	-3

Promising Pathways
This section offers an origin-to-gateway-to-target model analysis for how to help move students from entrypoints into their field of interest into both likely and other aligned careers, taking into account automation, remote work, and the changing work environment.

Origin-to-Gateway-to-Target Occupations for Health Science Technology, Northeast Minnesota 2021Q1
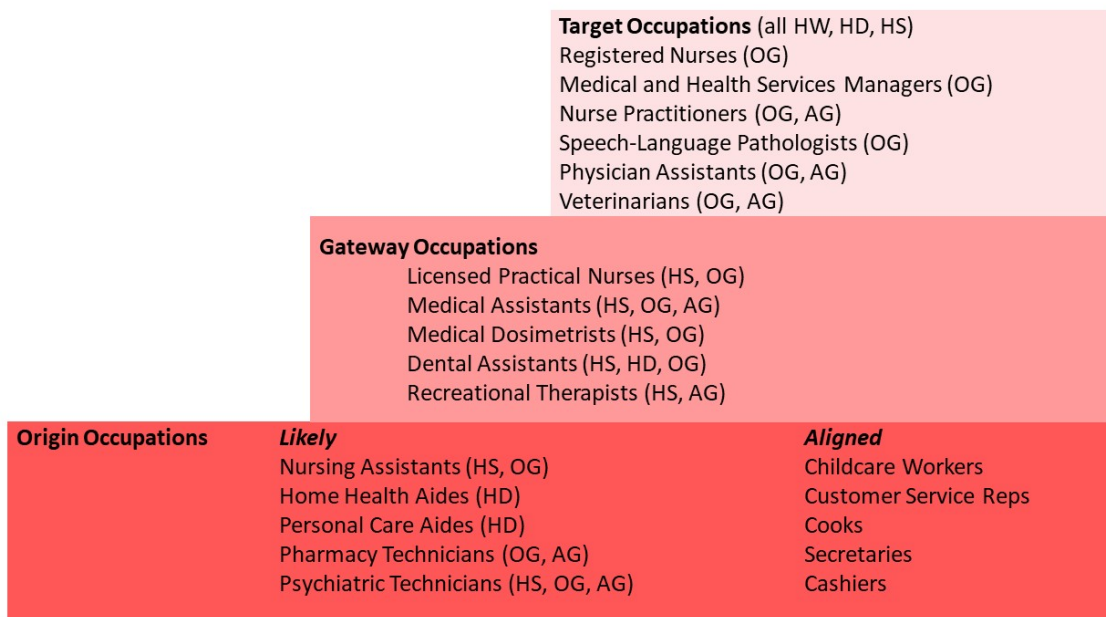
Target Occupations (all HW, HD, HS)
Registered Nurses (OG)
Medical and Health Services Managers (OG)
Nurse Practitioners (OG, AG)
Speech-Language Pathologists (OG)
Physician Assistants (OG, AG)
Veterinarians (OG, AG)

Gateway Occupations
Licensed Practical Nurses (HS, OG)
Medical Assistants (HS, OG, AG)
Medical Dosimetrists (HS, OG)
Dental Assistants (HS, HD, OG)
Recreational Therapists (HS, AG)

Origin Occupations

Likely
Nursing Assistants (HS, OG)
Home Health Aides (HD)
Personal Care Aides (HD)
Pharmacy Technicians (OG, AG)
Psychiatric Technicians (HS, OG, AG)

Aligned
Childcare Workers
Customer Service Reps
Cooks
Secretaries
Cashiers

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

Origin Occupations are roles that are low-wage (<$37,000 per year) or mid-wage ($37,000-$42,000) that have high unemployment locally among workers without 4-year degrees. Below are a few Origin Occupations that are likely entrypoints into Health Science Technology locally, or aligned opportunities that share a large number of skillsets in-demand in Health Science Technology.

Likely Origins	Aligned Origins
Home Health Aides	Customer Service Representatives
Personal Care Aides	Childcare Workers
Nursing Assistants	Secretaries or Executive Assistants
Pharmacy Aides / Pharmacy Technicians	Cashiers
Psychiatric Technicians	Cooks

Gateway Occupations are good jobs that can lead to Target Occupations as skills and experience are developed. These typically offer between $42,000 up to the regional average wage ($51,100 in the Northeast). Below are a few Gateway Occupations in Health Science Technology locally. 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.

Likely Gateways	Aligned Gateways
Licensed Practical and Licensed Vocational Nurses	Postsecondary Teachers
Medical Assistants	Social and Human Services Assistants
Medical Dosimetrists	Supervisors of Office and Administrative Support Workers
Dental Assistants	Eligibility Interviewers
Recreational Therapists	Residential Advisors

Target Occupations refer to high-wage occupations that pay at or above the region's average wage ($51,100 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.

Top Target Occupations in Health Science Technology, Northeast Minnesota 2021Q1

SOC	Occupation	2021Q1 Empl	Mean Ann Wages[2]	High-Wage	High-Skill	High-Demand	OG	AG
29-1141	Registered Nurses	6,401	$71,300	HW	HS	HD	OG	
11-9111	Medical and Health Services Managers	669	$94,800	HW	HS	HD	OG	
29-1171	Nurse Practitioners	260	$116,900	HW	HS	HD	OG	AG
29-1127	Speech-Language Pathologists	202	$70,400	HW	HS	HD	OG	
29-1071	Physician Assistants	151	$117,500	HW	HS	HD	OG	AG
29-1131	Veterinarians	117	$89,000	HW	HS	HD	OG	AG
31-2021	Physical Therapist Assistants	109	$56,200	HW	HS	HD	OG	
31-2011	Occupational Therapy Assistants	48	$53,400	HW	HS	HD		AG
29-1129	Therapists, All Other	41	$56,500	HW	HS	HD	OG	AG
29-1181	Audiologists	17	$83,700	HW	HS	HD		

Registered Nurses, as the number-one occupation of shortage in the region, while also being high-wage, high-skill, high-demand (though not experiencing an award gap) is analyzed below in more detail for better understanding of occupation "gain and drain." The chart below illustrates the national profiles of current and past people in this occupation. The left column shows job transitions from other occupations to Registered Nursing. The right column shows job transitions from Registered Nursing to other occupations.

Registered Nurse Talent Gain and Drain, 2021Q3 Candidate Profile Analysis
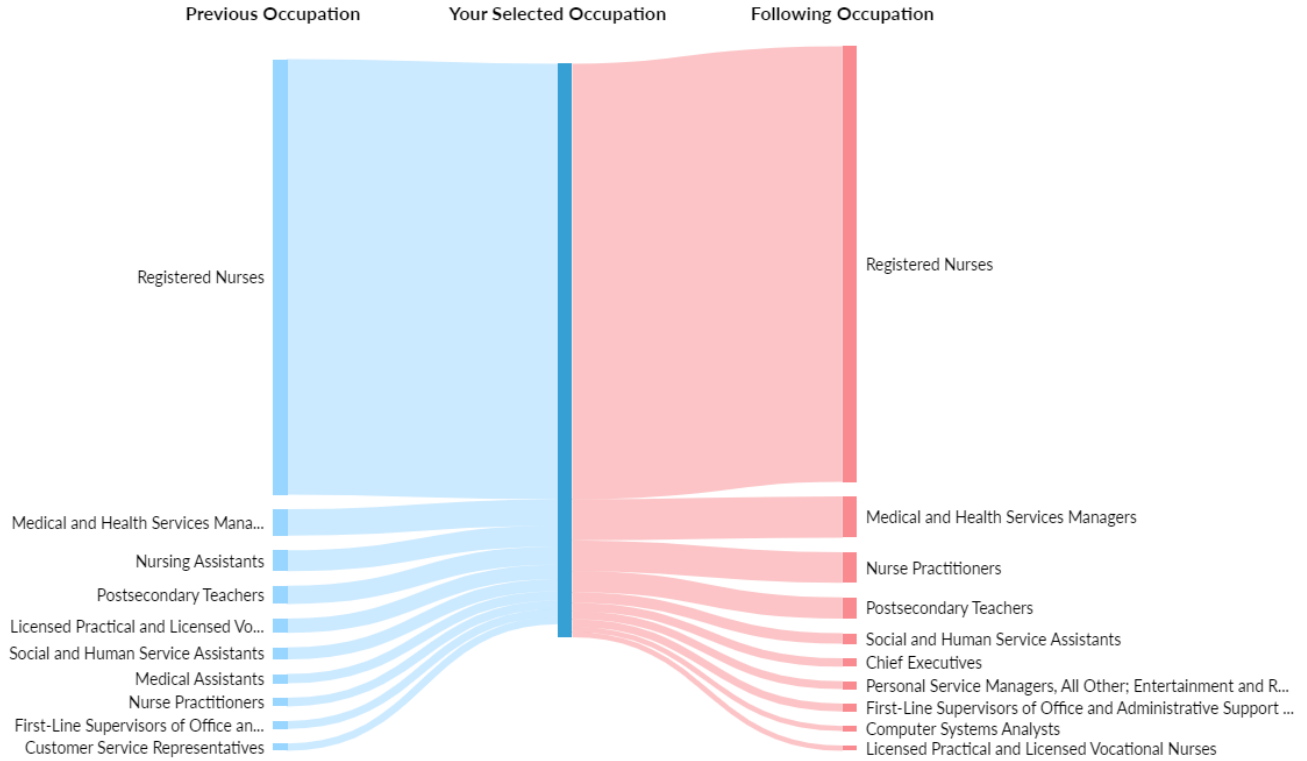
Candidate profile analysis from Emsi 2021Q3 national dataset.

Graduate Pipeline for Registered Nurses, Northeast Minnesota 2021

5 Programs

Of the programs that can train for this job, 5 have produced completions in the last 5 years.

642 Completions (2020)

The completions from all regional institutions for all degree types.

344 Openings (2020)

The average number of openings for an occupation in the region is 29.

2020 IPEDS Completions Data; Visualizations from Emsi 2021Q3 dataset.

HUMAN SERVICES

Human Services is the career field forecast to grow the most over the next ten years. Over the next three years, under a pessimistic baseline forecast, Human Services employment is forecast to grow by 0.1% annually. In the most optimistic scenario feasible based on employer demand, and given the existing talent shortage and talent pipelines in place, employment growth of 2.0% annually in this field could be possible.

Baseline Worst-Case Scenario 3-Year Forecast for Human Services Careers, Northeast Minnesota 2021Q1
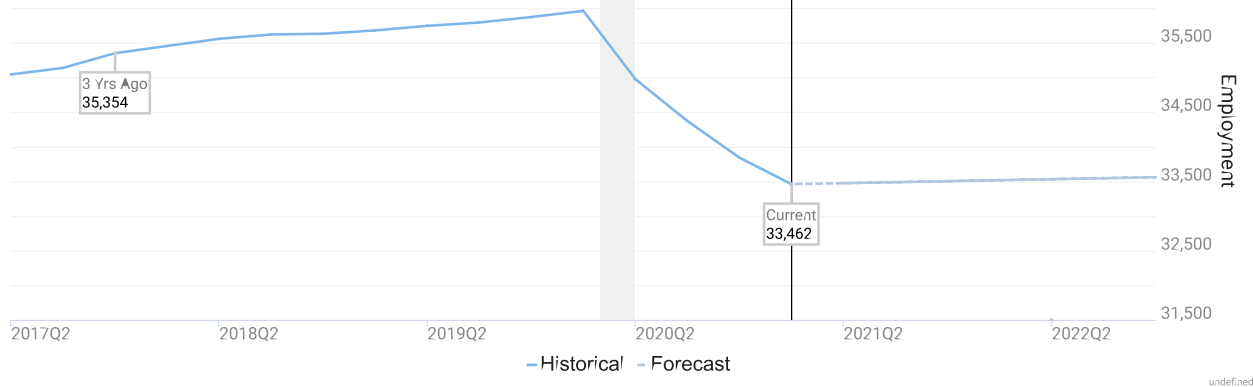
Top Ten Human Services Occupations by Employment Volume in Northeast Minnesota, 2021Q1

6-Digit Occupation	Empl	Avg Mean Wages	LQ	Historical 3-Year Empl Change	Annual Demand	Baseline Forecast Ann Growth
Personal Care Aides	4,635	$27,900	1.50	248	765	1.8%
Teaching Assistants, Except Postsecondary	2,122	$31,700	1.43	-200	213	-0.3%
Elementary School Teachers, Except Special Education	1,533	$61,900	0.98	-139	105	-0.4%
Secondary School Teachers, Except Special and Career/Technical Education	1,193	$60,200	1.04	-96	78	-0.4%
Childcare Workers	1,151	$27,100	1.12	-68	162	-0.5%
Police and Sheriff's Patrol Officers	1,130	$65,100	1.47	-18	76	-0.2%
Social and Human Service Assistants	1,074	$38,200	2.16	-58	142	1.0%
Substance Abuse, Behavioral Disorder, and Mental Health Counselors	911	$48,600	2.29	42	113	1.6%
Court, Municipal, and License Clerks	775	$47,100	4.12	-20	68	-0.3%
Security Guards	712	$36,100	0.56	-156	83	-0.8%
Remaining Component Occupations	18,225	$56,800	1.10	-1,527	1,755	-0.2%
Human Services (CTE Field)	**33,462**	**$49,300**	**1.15**	**-1,996**	**3,560**	**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 the Northeast that is working in Human Services roles are employed by Elementary and Secondary Schools (22.1%) or Individual and Government Support institutions (14.2%). However, Individual and Family Services is forecasted to grow at a higher rate and have more replacement demand needs.

Human Services Field Employment by Industry, 2021Q1, Northeast Minnesota

Industry Title	% of Career Field Empl	Career Field Empl	10-Year Separations	10-Year Empl Growth	10-Year Total Demand
Elementary and Secondary Schools	22.1%	7,386	6,403	-308	6,095
Executive, Legislative, and Other General Government Support	14.2%	4,763	4,084	-129	3,956
Individual and Family Services	8.8%	2,949	4,271	1,030	5,300
Residential Intellectual and Developmental Disability, Mental Health, and Substance Abuse Facilities	7.5%	2,500	3,265	255	3,520
Colleges, Universities, and Professional Schools	3.7%	1,250	1,090	-35	1,056
Other Residential Care Facilities	3.5%	1,182	1,366	-134	1,232
Religious Organizations	3.2%	1,086	1,224	-21	1,203
Child Day Care Services	2.4%	803	984	-64	920
Junior Colleges	2.3%	771	688	13	701
General Medical and Surgical Hospitals	2.3%	756	734	-48	686
Personal Care Services	2.0%	670	792	-22	770
Other Schools and Instruction	2.0%	667	827	57	884
Continuing Care Retirement Communities and Assisted Living Facilities for the Elderly	2.0%	658	982	153	1,134
Justice, Public Order, and Safety Activities	1.9%	629	525	-56	469
Legal Services	1.5%	517	366	-48	319
Administration of Environmental Quality Programs	1.5%	510	425	-48	377
Outpatient Care Centers	1.4%	482	514	33	548
Home Health Care Services	1.4%	473	709	111	820
Offices of Other Health Practitioners	1.3%	432	454	74	528
Civic and Social Organizations	1.2%	396	571	-17	554
All Others	13.7%	4,583	4,985	-217	4,768

Career Field Demographics

The Human Services field is predominantly female (63.5%) and white (93.2%). About 21.6% of the Human Services workforce in the region is between the ages of 45 and 54.

Age
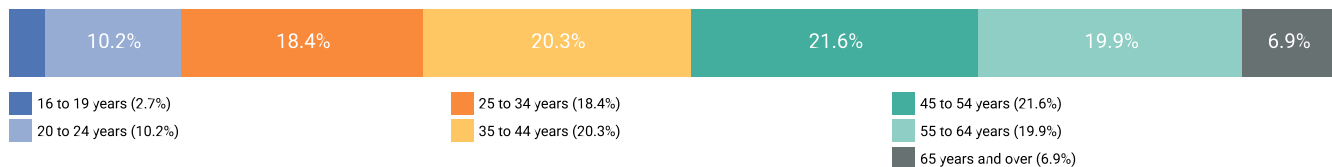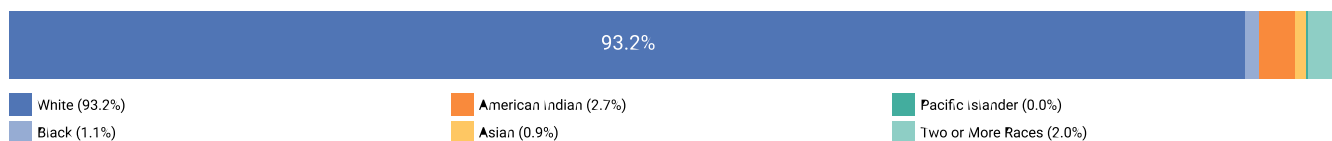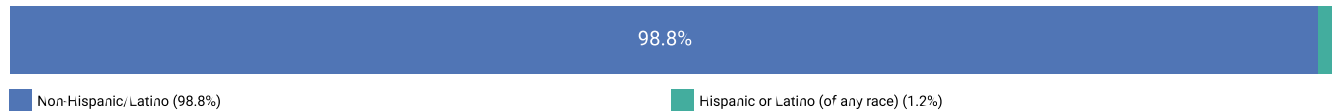
10.2%	18.4%	20.3%	21.6%	19.9%	6.9%

- 16 to 19 years (2.7%)
- 20 to 24 years (10.2%)
- 25 to 34 years (18.4%)
- 35 to 44 years (20.3%)
- 45 to 54 years (21.6%)
- 55 to 64 years (19.9%)
- 65 years and over (6.9%)

Race

93.2%

- White (93.2%)
- Black (1.1%)
- American Indian (2.7%)
- Asian (0.9%)
- Pacific Islander (0.0%)
- Two or More Races (2.0%)

Ethnicity

98.8%	
Non-Hispanic/Latino (98.8%)	Hispanic or Latino (of any race) (1.2%)

Gender

36.5%	63.5%
Male (36.5%)	Female (63.5%)

Educational Attainment and Requirements

The stacked bar chart here illustrates the estimated mix of educational attainment of the workers in this career field in aggregate. In general, the Northeast Human Services workforce is overskilled for the typical credentials of entry-level positions. For example, 2.1% of the Human Services workforce has no diploma at all, and 15.1% hold a high school diploma as their highest credential. In contrast, about 47.7% of positions in this field do not require any kind of postsecondary award. The table below indicates typical education and training requirements rather than the mix of attainment of workers in some key positions in this field.

Educational Attainment

	15.1%	16.9%	15.9%	28.3%	16.3%	5.5%

< High School (2.1%)	Some College (16.9%)	Four-Year (28.3%)
High School (15.1%)	Two-Year (15.9%)	Master's (16.3%)
		PhD (5.5%)

Education and Training Requirements

33.7%	6.9%	4.8%	8.8%	29.9%	13.7%

Short-term OJT, no exp, no award (33.7%)	Long-term training, no exp, no award (2.3%)	2-year degree or certificate (8.8%)
Moderate-term OJT, no exp, no award (6.9%)	Previous work experience, no award (4.8%)	Bachelor's degree (29.9%)
		Postgraduate degree (13.7%)
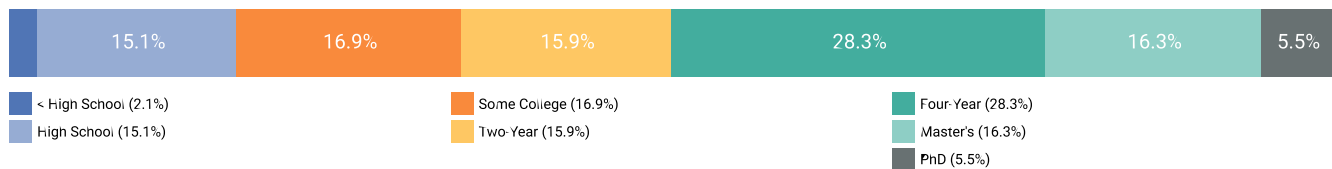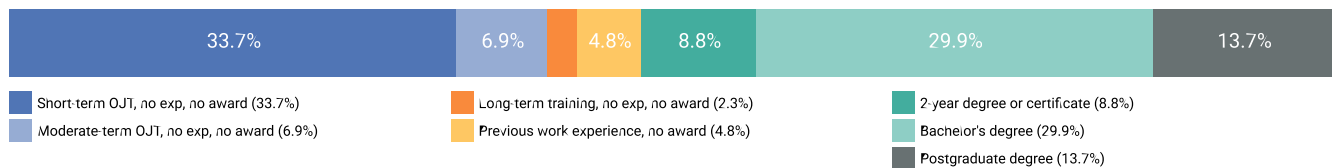
Typical Education Requirements for Top Occupations by Volume, 2021Q1

Occupation	Typical Entry-Level Education	Previous Work Experience	Typical On-the-Job Training
Personal Care Aides	High school diploma or equivalent	None	Short-term on-the-job training
Teaching Assistants, Except Postsecondary	Some college, no degree	None	None
Elementary School Teachers, Except Special Education	Bachelor's degree	None	None
Secondary School Teachers, Except Special and Career/Technical Education	Bachelor's degree	None	None
Childcare Workers	High school diploma or equivalent	None	Short-term on-the-job training
Police and Sheriff's Patrol Officers	High school diploma or equivalent	None	Moderate-term on-the-job training
Social and Human Service Assistants	High school diploma or equivalent	None	Short-term on-the-job training
Substance Abuse, Behavioral Disorder, and Mental Health Counselors	Bachelor's degree	None	None
Court, Municipal, and License Clerks	High school diploma or equivalent	None	Long-term on-the-job training

Occupation	Typical Entry-Level Education	Previous Work Experience	Typical On-the-Job Training
Security Guards	High school diploma or equivalent	None	Short-term on-the-job training

Occupation Gaps

The chart below shows the potential average annual gaps over ten years. In Human Services, Mental Health Counselors and Police Officers are the top occupations of shortage in the region. This critical talent shortage is 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 2021Q1
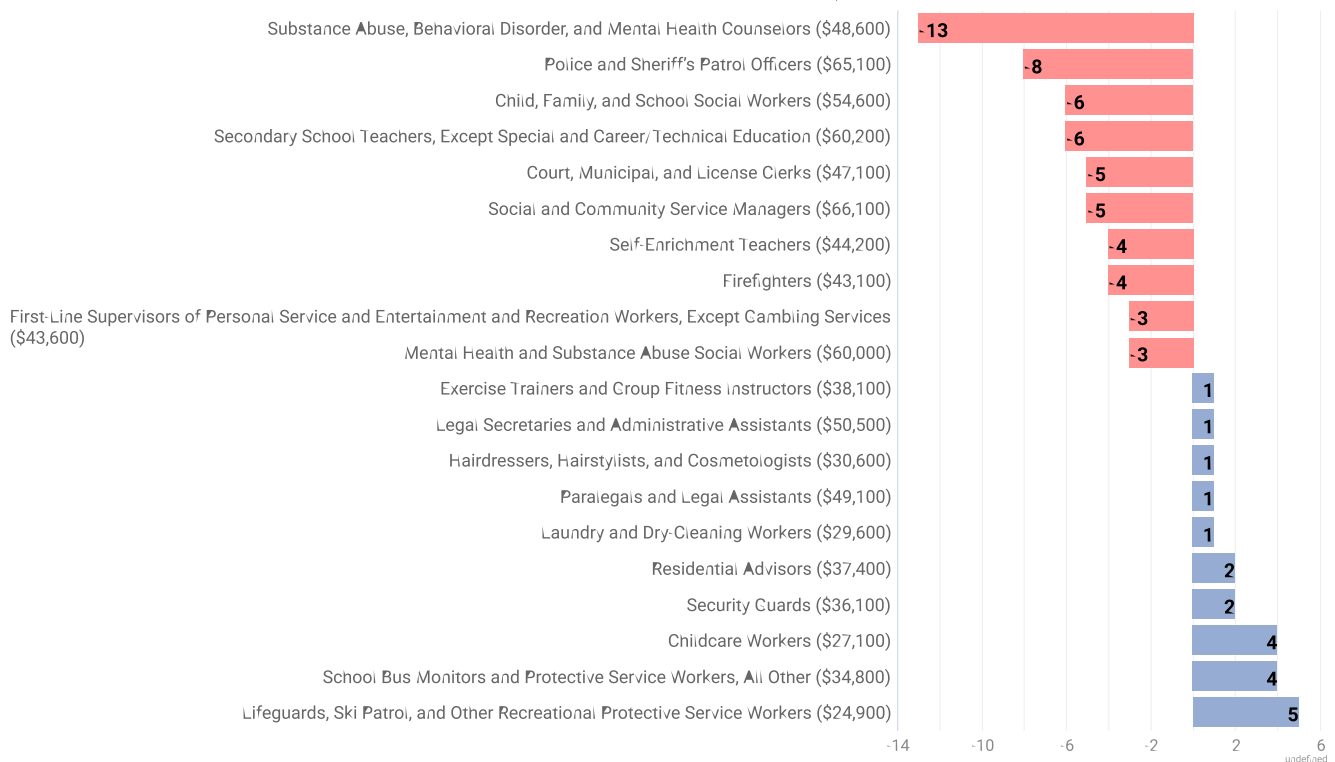
Award Gaps

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 24 graduates annually that are needed to fill Lawyer positions open with employers based in the region. Several occupations that typically require a certificate or industry credential also have local award gaps, including hairdressers, childcare workers, and coaching roles. 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 2021Q1

Hairdressers, Hairstylists, and Cosmetologists	-35
Childcare Workers	-30
Coaches and Scouts	-27
Lawyers	-24
Self-Enrichment Teachers	-24
Clergy	-22
Social and Human Service Assistants	-21
Preschool Teachers, Except Special Education	-19
Education Administrators, Kindergarten through Secondary	-15
Crematory Operators and Personal Care and Service Workers, All Other	-15
Occupational Health and Safety Specialists	6
Nursing Instructors and Teachers, Postsecondary	7
Fish and Game Wardens	11
Police and Sheriff's Patrol Officers	12
Biological Science Teachers, Postsecondary	18
Secondary School Teachers, Except Special and Career/Technical Education	21
Exercise Trainers and Group Fitness Instructors	35
Middle School Teachers, Except Special and Career/Technical Education	36
Health Specialties Teachers, Postsecondary	72
Elementary School Teachers, Except Special Education	90

Source: JobsEQ®,Data as of 2021Q1

Certification Gaps

Similar to award gaps, an analysis of certification gaps identify where the existing talent pool lacks particular credentials in comparison to current openings. However, this analysis uses real-time labor market data in the form of online candidate profiles and job postings to analyze the alignment between the available workforce and local opportunities. In the table below, it is apparent that the programs aligned to the occupations above as well as shorter training programs are both needed to connect local talent with opportunities.

Top 10 Certification Gaps in the Northeast September 2021

Name	Candidates	Openings	Gap
Child Development Associate (CDA)	12	46	-34
Basic Life Support (BLS)	16	23	-7
Secret Clearance	2	8	-6
Licensed Professional Counselor (LPC)	9	14	-5
Licensed Clinical Social Worker (LCSW)	12	17	-5
AFAA Personal Fitness Trainer	1	5	-4
Certified Alcohol and Drug Counselor (ADC)	2	6	-3
AED Essentials	9	11	-2
Advanced Cardiac Life Support Certification (ACLS)	4	6	-2
First Responder Certification	2	4	-2

Skill Gaps

Likewise, there is a degree of misalignment between the skills of the available workforce and the skills advertised by local employers. The ten skills listed below are examples of the skills in most high demand among Northeast Minnesota employers hiring Human Services talent that potential candidates have not indicated in their professional networking platforms as a strength.

Top 10 Skill Gaps in the Northeast, September 2021

Name	Candidates	Openings	Gap
Medication Administration	196	308	-112
Caregiving	37	96	-59
Teaching/Training, School	544	586	-42
Sports Coaching	14	31	-17
Legal Terminology	5	20	-15
Personal Computers (PC)	33	48	-15
CSS	2	16	-15
Client Relations	1	12	-11
Child Care/Babysitting	70	81	-11
Budgeting	11	22	-10

Promising Pathways

This section offers an origin-to-gateway-to-target model analysis for how to help move students from entrypoints into their field of interest into both likely and other aligned careers, taking into account automation, remote work, and the changing work environment.

Origin-to-Gateway-to-Target Occupations for Human Services, Northeast Minnesota 2021Q1

Target Occupations (all HW, HD, HS)
Social and Community Service Managers (OG)
Healthcare Social Workers (OG, AG)
Tutors and Teachers and Instructors, All Other
Educational, Guidance, and Career Counselors (OG)
Mental Health and Substance Abuse Social Workers (OG)

Gateway Occupations
Substance Abuse, Behavioral Disorder, and Mental Health Counselors (HS, HD, OG)
Court, Municipal, and License Clerks (OG)
Firefighters (HS, OG)
Self-Enrichment Teachers (HD, OG, AG)
Clergy (HS, HD, OG, AG)

Origin Occupations

Likely
Personal Care Aides (HD, AG)
Home Health Aides (HD)
Teaching Assistants (HS, HD)
Childcare Workers (HD, AG)
Social and Human Service Assistants (HD, AG)

Aligned
Tellers
Retail Sales Workers
Waiters and Waitresses
Cashiers
Cooks

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

Origin Occupations are roles that are low-wage (<$37,000 per year) or mid-wage ($37,000-$42,000) that have high unemployment locally among workers without 4-year degrees. Below are a few Origin

Occupations that are likely entrypoints into Human Services locally, or aligned opportunities that share a large number of skillsets in-demand in Human Services.

Likely Origins	Aligned Origins
Personal Care Aides	Tellers
Home Health Aides	Retail Sales Workers
Teaching Assistants	Waiters and Waitresses
Childcare Workers	Cashiers
Social and Human Service Assistants	Cooks

Gateway Occupations are good jobs that can lead to Target Occupations as skills and experience are developed. These typically offer between $42,000 up to the regional average wage ($51,100 in the Northeast). Below are a few Gateway Occupations in Human Services locally. 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.

Likely Gateways	Aligned Gateways
Substance Abuse, Behavioral Disorder, and Mental Health Counselors	Supervisors of Office and Administrative Support Workers
Court, Municipal, and License Clerks	Medical Secretaries
Firefighters	Human Resources Assistants
Self-Enrichment Teachers	Financial Advisors
Clergy	
Supervisors of Personal Service and Entertainment and Recreation Workers	

Target Occupations refer to high-wage occupations that pay at or above the region's average wage ($51,100 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.

Top Target Occupations in Human Services, Northeast Minnesota 2021Q1

SOC	Occupation	2021Q1 Empl	Mean Ann Wages[2]	High-Wage	High-Skill	High-Demand	OG	AG
11-9151	Social and Community Service Managers	386	$66,100	HW	HS	HD	OG	
21-1022	Healthcare Social Workers	348	$54,600	HW	HS	HD	OG	AG
25-3097	Tutors and Teachers and Instructors, All Other	324	$52,400	HW	HS	HD		
21-1012	Educational, Guidance, and Career Counselors and Advisors	321	$57,000	HW	HS	HD	OG	
21-1023	Mental Health and Substance Abuse Social Workers	314	$60,000	HW	HS	HD	OG	
25-9031	Instructional Coordinators	233	$73,300	HW	HS	HD	OG	AG
25-1071	Health Specialties Teachers, Postsecondary	199	$100,200	HW	HS	HD	OG	
25-2012	Kindergarten Teachers, Except Special Education	180	$56,000	HW	HS	HD		AG
25-4022	Librarians and Media Collections Specialists	177	$60,200	HW	HS	HD	OG	AG
21-2021	Directors, Religious Activities and Education	174	$55,400	HW	HS	HD		AG

Social and Community Service Managers is a high-skill, high-demand, high-wage occupation forecasting shortages in the Northeast. This role is analyzed below in more detail for better understanding of occupation "gain and drain." The chart below illustrates the national profiles of current and past people in this occupation. The left column shows job transitions

from other occupations to Social and Community Service Managers. The right column shows job transitions from this role to other occupations.

Social and Community Service Manager Talent Gain and Drain, 2021Q3 Candidate Profile Analysis

Candidate profile analysis from Emsi 2021Q3 national dataset.
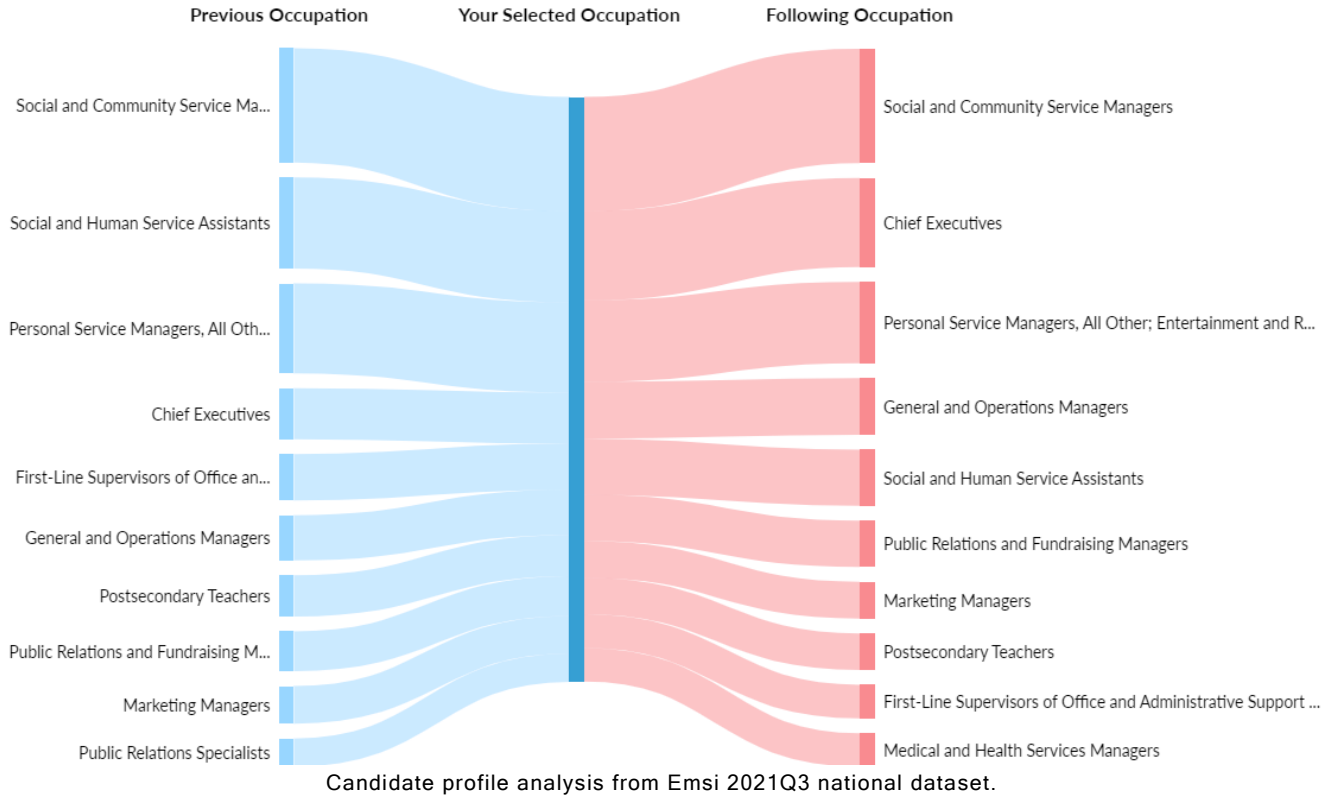
Graduate Pipeline for Social and Community Service Managers, Northeast Minnesota 2021

6 Programs

Of the programs that can train for this job, 6 have produced completions in the last 5 years.

286 Completions (2020)

The completions from all regional institutions for all degree types.

38 Openings (2020)

The average number of openings for an occupation in the region is 29.

2020 IPEDS Completions Data; Visualizations from Emsi 2021Q3 dataset.

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, which experienced somewhat diverging trends during over the course of the COVID-19 pandemic thus far. Over the next three years, under a pessimistic baseline forecast, Arts, Communications, and Information Systems Field employment is forecast to decline by -0.8% annually. In the most optimistic scenario feasible based on employer demand, and given the existing talent shortage and talent pipelines in place, employment growth of 1.4% annually in this field could be possible.

Baseline Worst-Case Scenario 3-Year Forecast for Arts, Communications, and Information Systems Careers, Northeast Minnesota 2021Q1
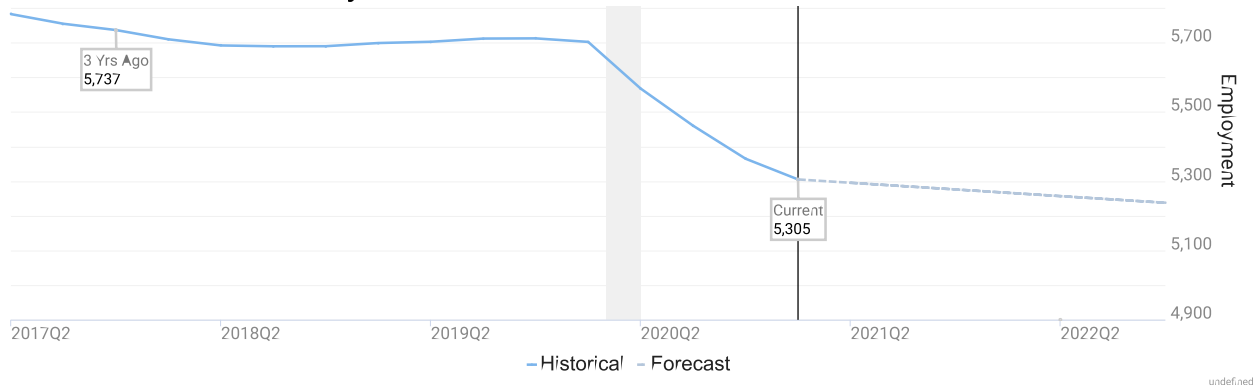
Top Ten Arts, Communications, and Information Systems Occupations by Employment Volume in Northeast, 2021Q1

6-Digit Occupation	Empl	Avg Mean Wages	LQ	Historical 3-Year Empl Change	Annual Demand	Baseline Forecast Ann Growth
Software Developers and Software Quality Assurance Analysts and Testers	758	$88,500	0.41	-2	60	0.7%
Computer Systems Analysts	618	$80,500	0.85	-26	39	-0.6%
Computer User Support Specialists	457	$52,600	0.58	-26	34	-0.5%
Graphic Designers	268	$43,900	0.85	-18	20	-1.9%
Network and Computer Systems Administrators	260	$73,600	0.62	-26	16	-0.8%
Computer Occupations, All Other	202	$72,400	0.42	-5	14	-0.7%
Computer Network Support Specialists	194	$62,300	0.85	-11	15	-0.5%
Printing Press Operators	191	$40,100	0.96	-11	14	-2.6%
Musicians and Singers	184	$52,200	0.93	-27	20	-0.6%
Telecommunications Equipment Installers and Repairers, Except Line Installers	156	$52,800	0.66	-12	15	-1.1%
Remaining Component Occupations	2,017	$60,400	0.81	-240	174	-1.2%
Arts, Communications, & Information Systems (CTE Field)	**5,305**	**$65,200**	**0.63**	**-405**	**417**	**-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).

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 (6.3%). Overall, employment is relatively spread out across a number of different industries.

Arts, Communications, and Information Systems Field Employment by Industry, 2021Q1, Northeast Minnesota

Industry Title	% of Career Field Empl	Career Field Empl	10-Year Separations	10-Year Empl Growth	10-Year Total Demand
Computer Systems Design and Related Services	9.7%	512	404	78	482
Independent Artists, Writers, and Performers	6.3%	333	344	-29	315
Printing and Related Support Activities	4.7%	249	245	-64	181
Wired and Wireless Telecommunications Carriers	4.7%	247	219	-46	173
Radio and Television Broadcasting	4.5%	236	241	-21	220
General Medical and Surgical Hospitals	4.0%	211	151	-19	132
Religious Organizations	3.9%	206	227	-5	222
Depository Credit Intermediation	3.7%	194	139	-9	130
Executive, Legislative, and Other General Government Support	3.6%	192	147	-9	138
Newspaper, Periodical, Book, and Directory Publishers	3.2%	170	140	-75	65
Insurance Carriers	2.6%	136	101	3	104
Colleges, Universities, and Professional Schools	2.5%	132	104	-11	93
Management of Companies and Enterprises	2.3%	124	92	-3	90
Other Professional, Scientific, and Technical Services	2.1%	111	104	-7	97
Architectural, Engineering, and Related Services	2.1%	111	80	-8	72
Elementary and Secondary Schools	1.8%	97	76	-6	70
Other Miscellaneous Manufacturing	1.7%	91	82	-14	68
Agencies, Brokerages, and Other Insurance Related Activities	1.5%	78	58	2	60
Aerospace Product and Parts Manufacturing	1.4%	76	53	-5	49
Specialized Design Services	1.4%	73	66	-15	51
All Others	32.5%	1,727	1,467	-111	1,356

Career Field Demographics
The Arts, Communications, and Information Systems field is predominantly male (72.1%) and white (94.2%). About one-third of the Arts, Communications, and Information Systems workforce in the region is between the ages of 20 and 34 (33.7%).

Age
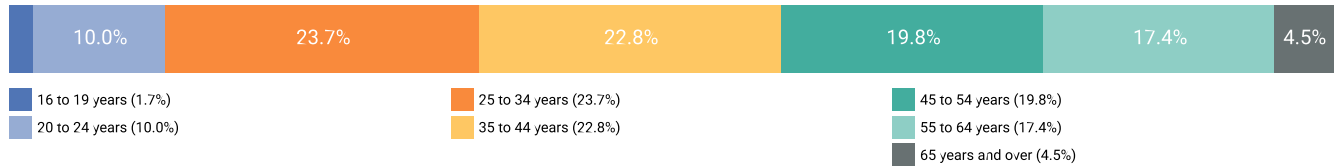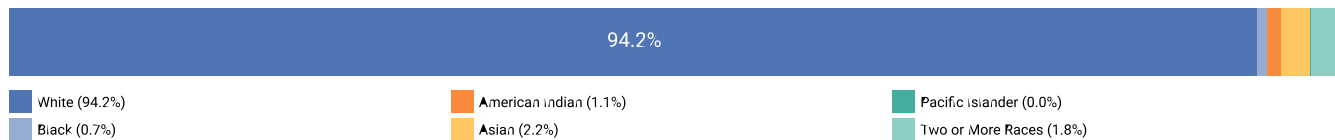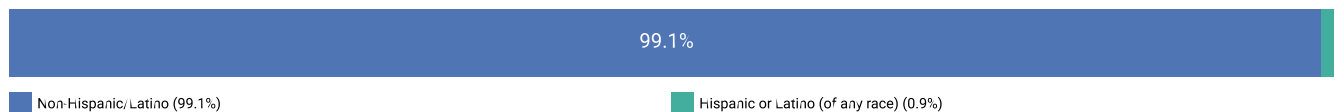
10.0%	23.7%	22.8%	19.8%	17.4%	4.5%

- 16 to 19 years (1.7%)
- 20 to 24 years (10.0%)
- 25 to 34 years (23.7%)
- 35 to 44 years (22.8%)
- 45 to 54 years (19.8%)
- 55 to 64 years (17.4%)
- 65 years and over (4.5%)

Race

94.2%		

- White (94.2%)
- Black (0.7%)
- American Indian (1.1%)
- Asian (2.2%)
- Pacific Islander (0.0%)
- Two or More Races (1.8%)

Ethnicity

99.1%	

- Non-Hispanic/Latino (99.1%)
- Hispanic or Latino (of any race) (0.9%)

Gender

72.1%	27.9%

- Male (72.1%)
- Female (27.9%)

Educational Attainment and Requirements
The stacked bar chart here illustrates the estimated mix of educational attainment of the workers in this career field in aggregate. Nearly 63% of all occupations in this field require a Bachelor's degree, while 44.3% of the workforce hold a four-year degree as their highest credential. Another 14.1% hold a Master's or PhD.

Educational Attainment
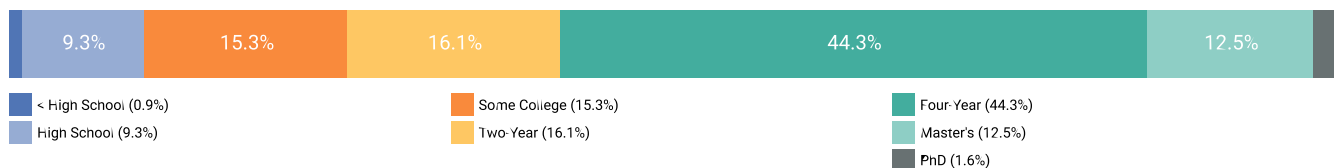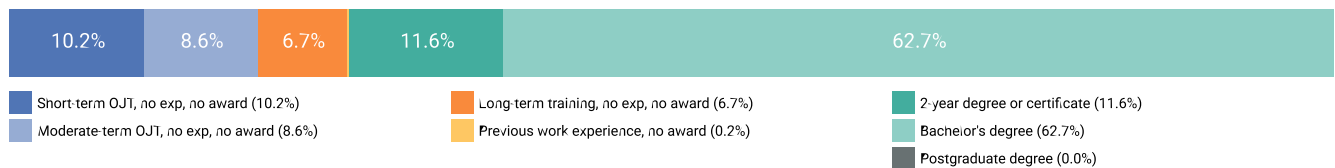
9.3%	15.3%	16.1%	44.3%	12.5%	

- < High School (0.9%)
- High School (9.3%)
- Some College (15.3%)
- Two-Year (16.1%)
- Four-Year (44.3%)
- Master's (12.5%)
- PhD (1.6%)

Education and Training Requirements

10.2%	8.6%	6.7%	11.6%	62.7%

- Short-term OJT, no exp, no award (10.2%)
- Moderate-term OJT, no exp, no award (8.6%)
- Long-term training, no exp, no award (6.7%)
- Previous work experience, no award (0.2%)
- 2-year degree or certificate (11.6%)
- Bachelor's degree (62.7%)
- Postgraduate degree (0.0%)

Typical Education Requirements for Top Occupations by Volume, 2021Q1

Occupation	Typical Entry-Level Education	Previous Work Experience	Typical On-the-Job Training
Software Developers and Software Quality Assurance Analysts and Testers	Bachelor's degree	None	None
Computer Systems Analysts	Bachelor's degree	None	None
Computer User Support Specialists	Some college, no degree	None	None
Graphic Designers	Bachelor's degree	None	None
Network and Computer Systems Administrators	Bachelor's degree	None	None
Computer Occupations, All Other	Bachelor's degree	None	None
Computer Network Support Specialists	Associate's degree	None	None
Printing Press Operators	High school diploma or equivalent	None	Moderate-term on-the-job training
Musicians and Singers	None	None	Long-term on-the-job training
Telecommunications Equipment Installers and Repairers, Except Line Installers	Postsecondary non-degree award	None	Moderate-term on-the-job training

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 ten 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.

Annual Average Occupation Gaps (i.e. Talent Shortages) for the next 10 Years in Arts, Communications. And Information Systems, Northeast Minnesota 2021Q1

Occupation	Gap
Software Developers and Software Quality Assurance Analysts and Testers ($88,500)	-10
Computer Systems Analysts ($80,500)	-3
Photographers ($46,200)	-1
Musicians and Singers ($52,200)	-1
Producers and Directors ($58,400)	-1
Database Administrators and Architects ($94,600)	-1
Network and Computer Systems Administrators ($73,600)	-1
Computer Occupations, All Other ($72,400)	-1
Computer Network Support Specialists ($62,300)	-1
Information Security Analysts ($88,700)	-1
Floral Designers ($31,600)	1
Graphic Designers ($43,900)	1
Editors ($49,100)	1
News Analysts, Reporters, and Journalists ($50,200)	1
Print Binding and Finishing Workers ($39,400)	1
Printing Press Operators ($40,100)	2

Award Gaps

A comparison of the graduate talent pipeline obtaining a certificate or postsecondary degree to the current estimated openings by occupation illuminate a number of 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, 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 2021Q1

Occupation	Value
Photographers	-7
Art Directors	-5
Dancers	-2
Choreographers	-2
Audio and Video Technicians	-2
Agents and Business Managers of Artists, Performers, and Athletes	-1
Craft Artists	-1
Special Effects Artists and Animators	-1
Fashion Designers	-1
Set and Exhibit Designers	-1
Commercial and Industrial Designers	2
Music Directors and Composers	2
Broadcast Announcers and Radio Disc Jockeys	2
Technical Writers	2
Producers and Directors	3
Writers and Authors	3
Musicians and Singers	4
Prepress Technicians and Workers	9
Printing Press Operators	9
Graphic Designers	15

Source: JobsEQ®,Data as of 2021Q1

Certification Gaps

Similar to award gaps, an analysis of certification gaps identify where the existing talent pool lacks particular credentials in comparison to current openings. However, this analysis uses real-time labor market data in the form of online candidate profiles and job postings to analyze the alignment between the available workforce and local opportunities. In the table below, it is apparent that the programs

aligned to the occupations above as well as shorter training programs are both needed to connect local talent with opportunities.

Top 10 Certification Gaps in the Northeast, September 2021

Name	Candidates	Openings	Gap
Project Management Professional (PMP)	0	2	-2
Cisco Certified Internetwork Expert (CCIE)	1	1	-1
Cisco Certified Network Associate (CCNA)	6	7	-1
Certified Information Systems Security Professional (CISSP)	2	3	-1
Certified Information Systems Auditor (CISA)	0	1	-1
Certified Ethical Hacker (C/EH)	0	1	0
Certified Information Security Manager (CISM)	1	1	0
Certified Cloud Security Professional (CCSP)	1	1	0
Certified Technology Specialist (CTS)	1	1	0
Commercial Driver's License (CDL)	1	0	0

Skill Gaps

Likewise, there is a degree of misalignment between the skills of the available workforce and the skills advertised by local employers. The ten skills listed below are examples of the skills in most high demand among Northeast Minnesota employers hiring Arts, Communications, and Information Systems talent that potential candidates have not indicated in their professional networking platforms as a strength.

Top 10 Skill Gaps in the Northeast, September 2021

Name	Candidates	Openings	Gap
Career Development/Professional Development	0	5	-5
Microsoft Outlook	7	12	-4
Telecommunications	7	11	-4
SQL Server Integration Services (SSIS)	4	7	-4
Microsoft SQL Server Reporting Services (SSRS)	3	7	-4
Customer Relationship Management (CRM)	6	10	-3
Photography	20	23	-3
Microsoft Excel	22	25	-3
Piano	4	7	-3
Salesforce	6	9	-3

Promising Pathways

This section offers an origin-to-gateway-to-target model analysis for how to help move students from entrypoints into their field of interest into both likely and other aligned careers, taking into account automation, remote work, and the changing work environment.

Origin-to-Gateway-to-Target Occupations for Arts, Communications, and Information Systems, Northeast Minnesota 2021Q1

Target Occupations (all HW, HD, HS)
Software Developers (OG)
Computer Programmers
Producers and Directors (OG)
Information Security Analysts (AG)
Art Directors (AG)

Gateway Occupations
Graphic Designers (HS)
Photographers (OG, AG)
Editors (HS)
News Analysts, Reporters, and Journalists (HS)
Music Directors and Composers (HS, HD)

Origin Occupations

Likely	*Aligned*
Printing Press Operators	Library Technicians
Floral Designers	Recreation Attendants
Audio and Video Technicians (HS, HD, OG, AG)	Hosts and Hostesses
Broadcast Announcers & Radio Disc Jockeys (HS)	Customer Service Reps
Broadcast Technicians (HS, HD, AG)	Machine Operators

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

Origin Occupations are roles that are low-wage (<$37,000 per year) or mid-wage ($37,000-$42,000) that have high unemployment locally among workers without 4-year degrees. Below are a few Origin Occupations that are likely entrypoints into Arts, Communications, and Information Systems careers locally, or aligned opportunities that share a large number of skillsets in-demand in the field.

Likely Origins	Aligned Origins
Printing Press Operators	Library Technicians
Floral Designers	Amusement and Recreation Attendants
Audio and Video Technicians	Hosts and Hostesses
Broadcast Announcers and Radio Disc Jockeys	Customer Service Representatives
Broadcast Technicians	Photo Process Machine Operators

Gateway Occupations are good jobs that can lead to Target Occupations as skills and experience are developed. These typically offer between $42,000 up to the regional average wage ($51,100 in the Northeast). Below are a few Gateway Occupations in Arts, Communications, and Information Systems locally. 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.

Likely Gateways	Aligned Gateways
Graphic Designers	Supervisors of Office and Administrative Support Workers
Photographers	Product Demonstrators
Editors	Machinists
News Analysts, Reporters, and Journalists	Painting, Coating, and Decorating Workers
Music Directors and Composers	

Target Occupations refer to high-wage occupations that pay at or above the region's average wage ($51,100 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.

Top Target Occupations in Arts, Communications, and Information Systems, Northeast Minnesota 2021Q1

SOC	Occupation	2021Q1 Empl	Mean Ann Wages[2]	High-Wage	High-Skill	High-Demand	OG	AG
15-1256	Software Developers and Software Quality Assurance Analysts and Testers	758	$88,500	HW	HS	HD	OG	
15-1251	Computer Programmers	111	$88,800	HW	HS	HD		
27-2012	Producers and Directors	109	$58,400	HW	HS	HD	OG	
15-1212	Information Security Analysts	80	$88,700	HW	HS	HD	OG	
27-1011	Art Directors	77	$94,900	HW	HS	HD		AG
27-1014	Special Effects Artists and Animators	46	$66,400	HW	HS	HD		AG
27-1013	Fine Artists, Including Painters, Sculptors, and Illustrators	23	$55,400	HW	HS	HD		
27-4031	Camera Operators, Television, Video, and Film	21	$51,900	HW	HS	HD		
27-4032	Film and Video Editors	16	$66,700	HW	HS	HD		
27-1022	Fashion Designers	15	$68,000	HW	HS	HD		AG

Software Developers is both the number-one occupation of shortage in the career field and and the high-wage, high-skill, high-demand occupation in highest volume in the region. Below, this occupation is analyzed in more detail for better understanding of occupation "gain and drain." The chart below illustrates the national profiles of current and past people in this occupation. The left column shows job transitions from other occupations to Software Developer. The right column shows job transitions from Software Developer to other occupations.

Software Developer Talent Gain and Drain, 2021Q3 Candidate Profile Analysis
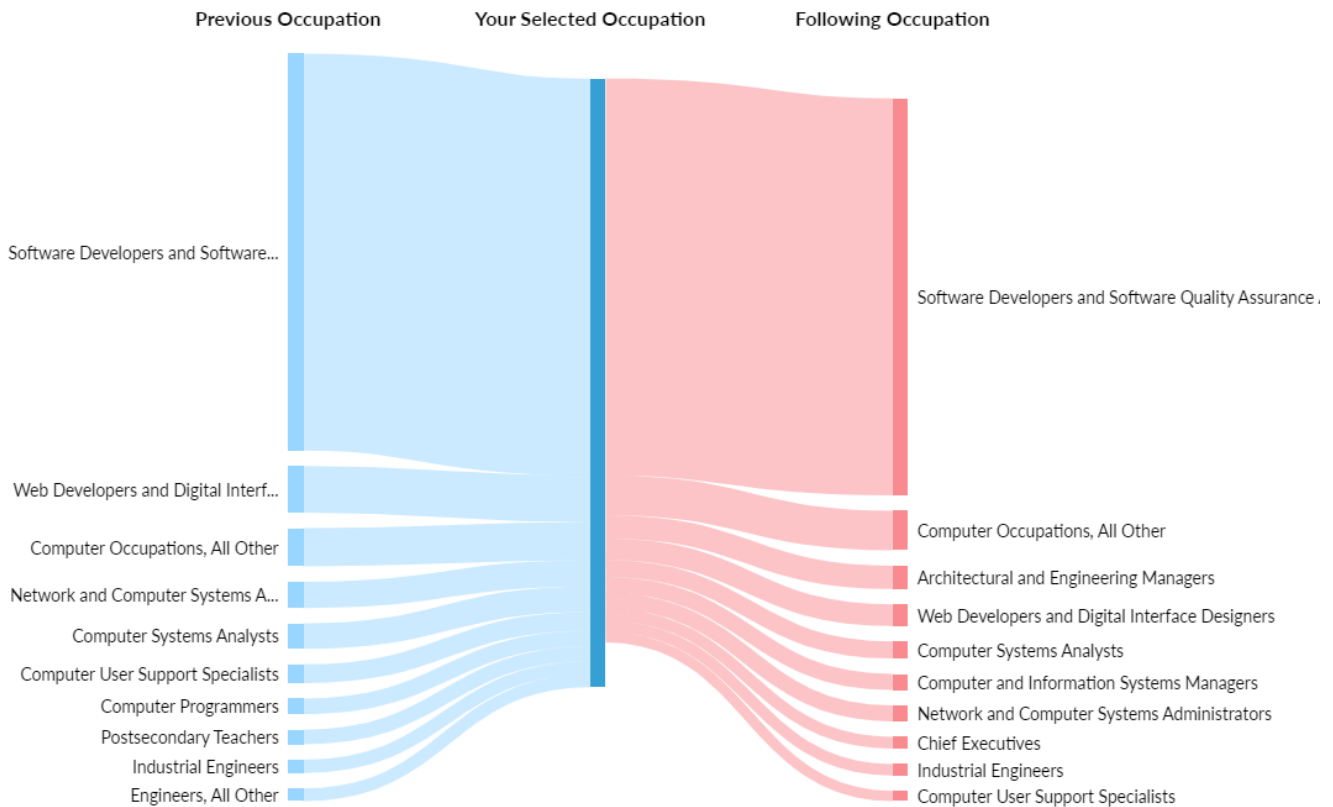
Candidate profile analysis from Emsi 2021Q3 national dataset.

Graduate Pipeline for Software Developers, Northeast Minnesota 2021

10 Programs

34 programs can train for this job, while only 10 programs have produced completers in this region.

123 Completions (2020)

The completions from all regional institutions for all degree types.

49 Openings (2020)

The average number of openings for an occupation in the region is 29.

2020 IPEDS Completions Data; Visualizations from Emsi 2021Q3 dataset.

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 somewhat diverging trends during over the course of the COVID-19 pandemic thus far. Over the next three years, under a pessimistic baseline forecast, Business, Management, and Administration Field employment is forecast to decline by -0.9%. In the most optimistic scenario feasible based on employer demand, and given the existing talent shortage and talent pipelines in place, employment growth of 3.2% annually in this field could be possible. Most of the growth is attributable to the Hospitality and Tourism Cluster careers in this field.

Baseline Worst-Case Scenario 3-Year Forecast for Business, Management, and Administration Careers, Northeast Minnesota 2021Q1
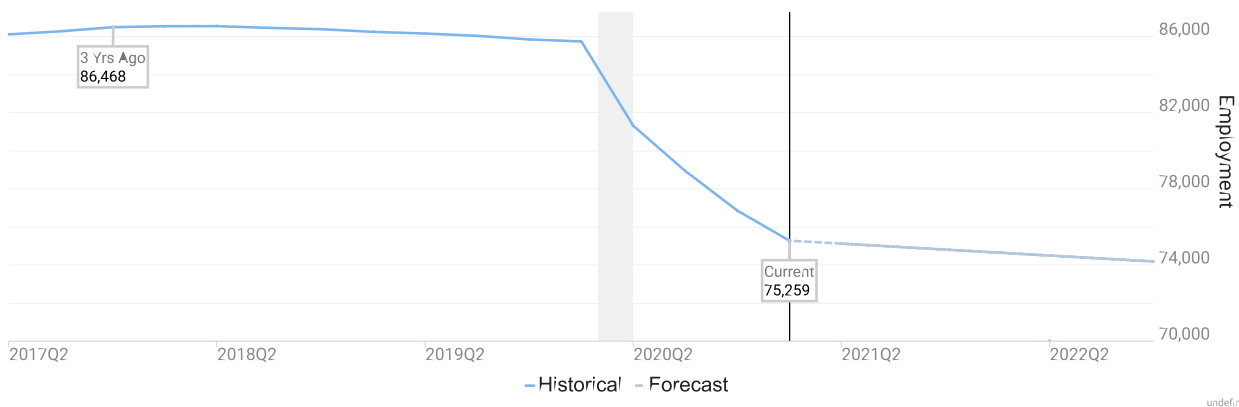
Top Ten Business, Management, and Administration Systems Occupations by Employment Volume in Northeast Minnesota, 2021Q1

6-Digit Occupation	Empl	Avg Mean Wages	LQ	Historical 3-Year Empl Change	Annual Demand	Baseline Forecast Ann Growth
Cashiers	5,541	$26,000	1.35	-545	895	-1.6%
Retail Salespersons	5,464	$32,000	1.19	-734	713	-1.0%
Fast Food and Counter Workers	4,175	$24,800	1.02	-527	765	0.1%
Office Clerks, General	2,935	$38,600	0.85	-286	296	-1.4%
Waiters and Waitresses	2,811	$28,800	1.29	-1,393	515	-0.5%
Stockers and Order Fillers	2,527	$30,700	0.92	-165	303	-0.9%
Customer Service Representatives	2,517	$38,100	0.73	-157	279	-1.5%
Janitors and Cleaners, Except Maids and Housekeeping Cleaners	2,512	$33,500	0.97	-348	315	-0.4%
Maids and Housekeeping Cleaners	2,288	$29,300	1.92	-531	282	-0.8%
General and Operations Managers	2,217	$94,700	0.77	-77	181	-0.4%
Remaining Component Occupations	42,274	$51,200	1.19	-6,494	4,551	-0.9%
Business, Management, & Administration (CTE Field)	**75,259**	**$44,100**	**0.96**	**-11,261**	**9,097**	**-0.9%**

"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 out across a number of different industries. In the Northeast, the industries with the greatest share of Business, Management, and Administration talent are Restaurants (13.3%) Traveler Accommodation (5.5%), 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 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, 2021Q1, Northeast Minnesota

Industry Title	% of Career Field Empl	Career Field Empl	10-Year Separations	10-Year Empl Growth	10-Year Total Demand
Restaurants and Other Eating Places	13.3%	10,028	16,983	-99	16,884
Traveler Accommodation	5.5%	4,172	5,931	-344	5,587
Grocery Stores	3.8%	2,863	4,196	-313	3,882
General Merchandise Stores, including Warehouse Clubs and Supercenters	3.8%	2,847	3,977	-335	3,642
Gasoline Stations	3.4%	2,596	4,218	-306	3,912
General Medical and Surgical Hospitals	3.3%	2,493	2,897	-268	2,629
Executive, Legislative, and Other General Government Support	3.2%	2,419	2,802	-192	2,610
Depository Credit Intermediation	3.0%	2,247	2,166	-263	1,903
Building Material and Supplies Dealers	2.6%	1,987	2,629	-199	2,430
Elementary and Secondary Schools	2.0%	1,532	1,903	-151	1,752
Agencies, Brokerages, and Other Insurance Related Activities	1.8%	1,361	1,348	-62	1,286
Gambling Industries	1.7%	1,303	1,845	-225	1,620
Department Stores	1.5%	1,104	1,533	-143	1,390
Services to Buildings and Dwellings	1.4%	1,089	1,374	-24	1,351
Continuing Care Retirement Communities and Assisted Living Facilities for the Elderly	1.4%	1,070	1,661	159	1,819
Other Amusement and Recreation Industries	1.4%	1,020	1,771	30	1,801
Automobile Dealers	1.2%	920	1,113	-79	1,035
Nursing Care Facilities (Skilled Nursing Facilities)	1.1%	834	1,104	-111	993
Drinking Places (Alcoholic Beverages)	1.1%	830	1,363	-47	1,316
Religious Organizations	1.1%	825	946	-66	880
All Others	42.1%	31,720	34,779	-2,994	31,784

Career Field Demographics

The Business, Management, and Administration field has a slightly higher concentration of male workers (54.8%) than female, and is 93.7% White. About 43% of workers in Business, Management, and Administration roles are over 45 years old.

Age
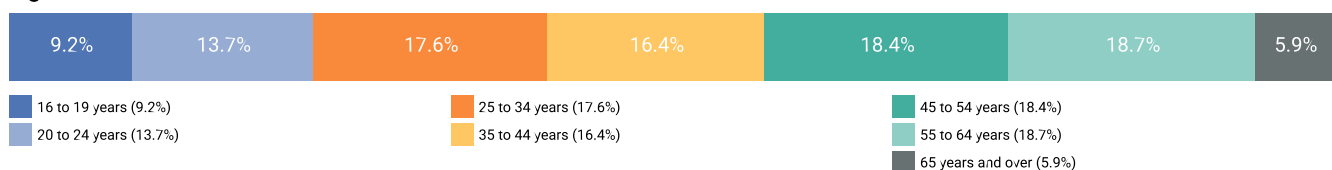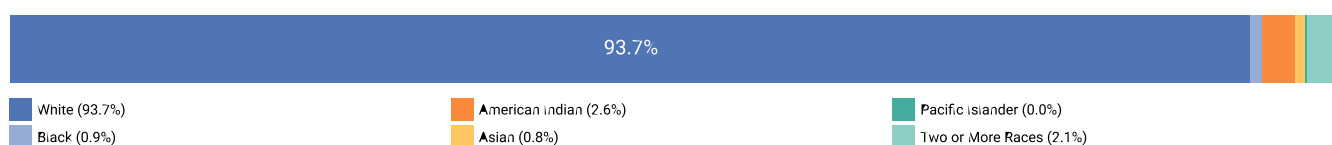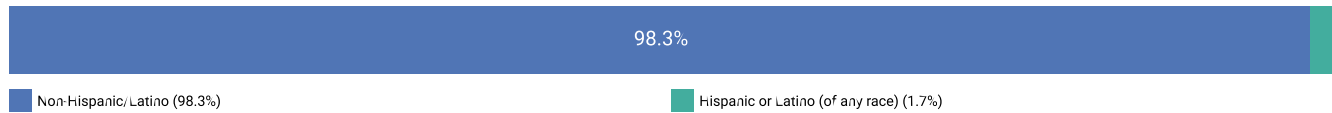
9.2%	13.7%	17.6%	16.4%	18.4%	18.7%	5.9%

16 to 19 years (9.2%)
20 to 24 years (13.7%)
25 to 34 years (17.6%)
35 to 44 years (16.4%)
45 to 54 years (18.4%)
55 to 64 years (18.7%)
65 years and over (5.9%)

Race

93.7%		

White (93.7%)
Black (0.9%)
American Indian (2.6%)
Asian (0.8%)
Pacific Islander (0.0%)
Two or More Races (2.1%)

Ethnicity

Non-Hispanic/Latino (98.3%)   98.3%   Hispanic or Latino (of any race) (1.7%)

Gender

Male (45.2%)   45.2%   54.8%   Female (54.8%)

Educational Attainment and Requirements

The stacked bar chart here illustrates the estimated mix of educational attainment of the workers in this career field in aggregate. In general, the Northeast Minnesota Business, Management, and Administration workforce is more likely to have a 2-year degree than what is in demand. While 16.7% of the workforce holds a 2-year degree, just 0.2% of the occupations in this field require a 2-year degree. Nearly two-thirds of all positions in this field (62.1%) require no degree, no experience, and only short-term on-the-job training. Another 8.0% require experience or some on-the-job training, but still no degree. In contrast, only 4.3% of the workforce in this field has no degree at all, and 27.0% hold a high school diploma as their highest credential. The table below indicates typical education and training requirements rather than the mix of attainment of workers in some key positions in this field.

Educational Attainment

| 27.0% | 22.8% | 16.7% | 23.6% | 4.9% |

< High School (4.3%)   Some College (22.8%)   Four-Year (23.6%)
High School (27.0%)   Two-Year (16.7%)   Master's (4.9%)
                                              PhD (0.7%)

Education and Training Requirements

| 62.1% | 8.0% | 11.0% | 18.1% |

Short-term OJT, no exp, no award (62.1%)   Long-term training, no exp, no award (0.6%)   2-year degree or certificate (0.2%)
Moderate-term OJT, no exp, no award (8.0%) Previous work experience, no award (11.0%)   Bachelor's degree (18.1%)
                                                                                            Postgraduate degree (0.0%)
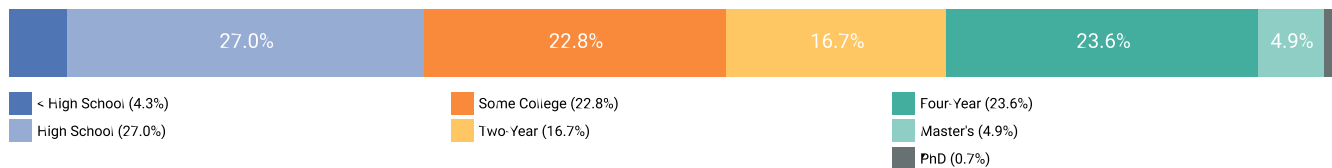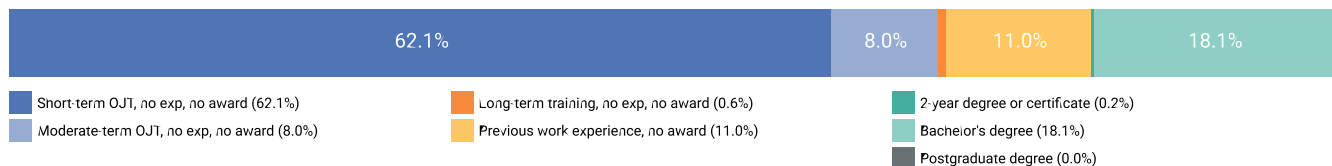
Typical Education Requirements for Top Occupations by Volume, 2021Q1

Occupation	Typical Entry-Level Education	Previous Work Experience	Typical On-the-Job Training
Cashiers	None	None	Short-term on-the-job training
Retail Salespersons	None	None	Short-term on-the-job training
Fast Food and Counter Workers	None	None	Short-term on-the-job training
Office Clerks, General	High school diploma or equivalent	None	Short-term on-the-job training
Waiters and Waitresses	None	None	Short-term on-the-job training
Stockers and Order Fillers	High school diploma or equivalent	None	Short-term on-the-job training
Customer Service Representatives	High school diploma or equivalent	None	Short-term on-the-job training
Janitors and Cleaners, Except Maids and Housekeeping Cleaners	None	None	Short-term on-the-job training
Maids and Housekeeping Cleaners	None	None	Short-term on-the-job training
General and Operations Managers	Bachelor's degree	5 years or more	None

Occupation Gaps

The chart below shows the potential average annual gaps over ten years. A number of management roles indicate significant shortages in the years ahead, with the General and Operations Manager talent pool likely falling short at least 13 skilled workers needed annually (averaged over the next ten years) to meet employer demand. 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 2021Q1

Occupation	Gap
General and Operations Managers ($94,700)	-13
Project Management Specialists and Business Operations Specialists, All Other ($61,900)	-8
Financial Managers ($104,400)	-7
Accountants and Auditors ($72,500)	-6
Cooks, Restaurant ($30,700)	-6
Market Research Analysts and Marketing Specialists ($73,200)	-5
Management Analysts ($77,300)	-5
Human Resources Specialists ($61,000)	-3
Personal Service Managers, All Other; Entertainment and Recreation Managers, Except Gambling; and Managers, All Other ($99,900)	-3
Insurance Sales Agents ($68,300)	-2
Office Clerks, General ($38,600)	8
Food Preparation Workers ($30,100)	8
Hosts and Hostesses, Restaurant, Lounge, and Coffee Shop ($24,600)	9
Amusement and Recreation Attendants ($29,000)	9
Bartenders ($27,700)	10
Customer Service Representatives ($38,100)	12
Retail Salespersons ($32,000)	31
Waiters and Waitresses ($28,800)	38
Fast Food and Counter Workers ($24,800)	45
Cashiers ($26,000)	89

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 24 graduates annually that are needed to fill General and Operations Manager positions open with employers based in the Northeast alone.

Award Gaps in Business, Management, and Administration, Northeast Minnesota 2021Q1

Occupation	Gap
General and Operations Managers	-24
Food Service Managers	-14
Cooks, Restaurant	-13
First-Line Supervisors of Food Preparation and Serving Workers	-11
Bookkeeping, Accounting, and Auditing Clerks	-11
Operations Research Analysts	-7
Secretaries and Administrative Assistants, Except Legal, Medical, and Executive	-7
Lodging Managers	-6
Training and Development Specialists	-6
Fundraising Managers	-5
Personal Financial Advisors	1
Financial and Investment Analysts, Financial Risk Specialists, and Financial Specialists, All Other	3
Sales Managers	4
Marketing Managers	9
Accountants and Auditors	10
Public Relations Specialists	11
Market Research Analysts and Marketing Specialists	28

Source: JobsEQ®,Data as of 2021Q1

Certification Gaps

Similar to award gaps, an analysis of certification gaps identify where the existing talent pool lacks particular credentials in comparison to current openings. However, this analysis uses real-time labor market data in the form of online candidate profiles and job postings to analyze the alignment between the available workforce and local opportunities. In the table below, it is apparent that the programs aligned to the occupations above as well as shorter training programs are both needed to connect local talent with opportunities.

Top 10 Certification Gaps in the Northeast, September 2021

Name	Candidates	Openings	Gap
Basic Life Support (BLS)	2	12	-10
Certified Public Accountant (CPA)	28	36	-8
HAZMAT	1	9	-7
Class A Commercial Driver's License (CDL-A)	4	9	-6
Project Management Professional (PMP)	6	10	-5
Senior Professional in Human Resources (SPHR)	3	5	-2
First Responder Certification	0	2	-2
Program Management Professional (PgMP)	0	2	-2
Six Sigma Green Belt Certification (SSGB)	1	3	-2
Certified Facility Manager (CFM)	0	1	-1

Skill Gaps

Likewise, there is a degree of misalignment between the skills of the available workforce and the skills advertised by local employers. The ten skills listed below are examples of the skills in most high demand among Northeast Minnesota employers hiring Business, Management, and Administration talent that potential candidates have not indicated in their professional networking platforms as a strength.

Top 10 Skill Gaps in the Northeast, September 2021

Name	Candidates	Openings	Gap
Retail Sales	407	652	-245
Merchandising	171	297	-126
Cash Registers	259	334	-75
People Skills	117	190	-74
Mathematics	169	210	-40
Hospitality	152	187	-35
Word Processing	108	140	-33
Bilingual	25	43	-17
Parachutes	0	15	-15
Aviation	2	16	-15

Promising Pathways

This section offers an origin-to-gateway-to-target model analysis for how to help move students from entrypoints into their field of interest into both likely and other aligned careers, taking into account automation, remote work, and the changing work environment.

Origin-to-Gateway-to-Target Occupations for Business, Management, and Administration, Northeast Minnesota 2021Q1

Target Occupations (all HW, HD, HS)
General and Operations Managers (OG, AG)
Project Management Specialists (OG, AG)
Financial Managers (OG)
Market Research Analysts & Marketing Specialists (OG)
Public Relations Specialists (OG)

Gateway Occupations
Supervisors of Retail Sales Workers- (AG)
Food Service Managers (HD, OG, AG)
Insurance Claims and Policy Processing Clerks
Supervisors of Housekeeping and Janitorial Workers (HD, OG)
Labor Relations Specialists (HS, AG)
Postal Service Mail Sorters and Processing Machine Operators

Origin Occupations

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

Aligned
Library Technicians
Eligibility Interviewers
Childcare Workers

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

Origin Occupations are roles that are low-wage (<$37,000 per year) or mid-wage ($37,000-$42,000) that have high unemployment locally among workers without 4-year degrees. Below are a few Origin Occupations that are likely entrypoints into Business, Management, and Administration roles locally, or aligned opportunities that share a large number of skillsets in-demand in the field.

Likely Origins	Aligned Origins
Cashiers	Library Technicians
Retail Salespersons	Eligibility Interviewers
Fast Food and Counter Workers	Childcare Workers
Office Clerks, General	
Waiters and Waitresses	

Gateway Occupations are good jobs that can lead to Target Occupations as skills and experience are developed. These typically offer between $42,000 up to the regional average wage ($51,100 in the Northeast). Below are a few Gateway Occupations in Business, Management, and Administration locally. 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.

Likely Gateways	Aligned Gateways
Supervisors of Retail Sales Workers	Graphic Designers
Food Service Managers	Editors
Insurance Claims and Policy Processing Clerks	Medical Secretaries
Supervisors of Housekeeping and Janitorial Workers	Computer User Support Specialists
Labor Relations Specialists	Writers
Postal Service Mail Sorters and Processing Machine Operators	Ge

Target Occupations refer to high-wage occupations that pay at or above the region's average wage ($51,100 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.

Top Target Occupations in Business, Management, and Administration, Northeast Minnesota 2021Q1

SOC	Occupation	2021Q1 Empl	Mean Ann Wages[2]	High-Wage	High-Skill	High-Demand	OG	AG
11-1021	General and Operations Managers	2,217	$94,700	HW	HS	HD	OG	AG
13-1198	Project Management Specialists and Business Operations Specialists, All Other	1,463	$61,900	HW	HS	HD	OG	AG
11-3031	Financial Managers	599	$104,400	HW	HS	HD	OG	
13-1161	Market Research Analysts and Marketing Specialists	535	$73,200	HW	HS	HD	OG	
27-3031	Public Relations Specialists	278	$66,200	HW	HS	HD	OG	
13-2052	Personal Financial Advisors	155	$128,000	HW	HS	HD	OG	
13-1131	Fundraisers	134	$63,000	HW	HS	HD	OG	
15-2031	Operations Research Analysts	87	$62,800	HW	HS	HD	OG	AG
11-2033	Fundraising Managers	62	$110,700	HW	HS	HD	OG	
15-2011	Actuaries	17	$98,500	HW	HS	HD		

General and Operations Management roles are in-demand, high-wage, and high-skill opportunities in the Northeast that are forecast to be in shortage. In addition, regional colleges and universities underproduce General and Operations Management-aligned program graduates in comparison to national benchmarks. Below, this occupation is analyzed in more detail for better understanding of occupation "gain and drain." The chart below illustrates the national profiles of current and past people in this occupation. The left

column shows job transitions from other occupations to General and Operations Manager. The right column shows job transitions from this role to other occupations. Clearly, there are a number of likely entrypoints, such as Marketing Manager or Sales Manager, but there are also a few aligned occupations that may not be initially associated with Operations Management: Personal Service Managers, Financial Managers, and Computer and Information Systems Managers.

General and Operations Manager Talent Gain and Drain, Northeast Minnesota 2021Q3 Candidate Profile Analysis
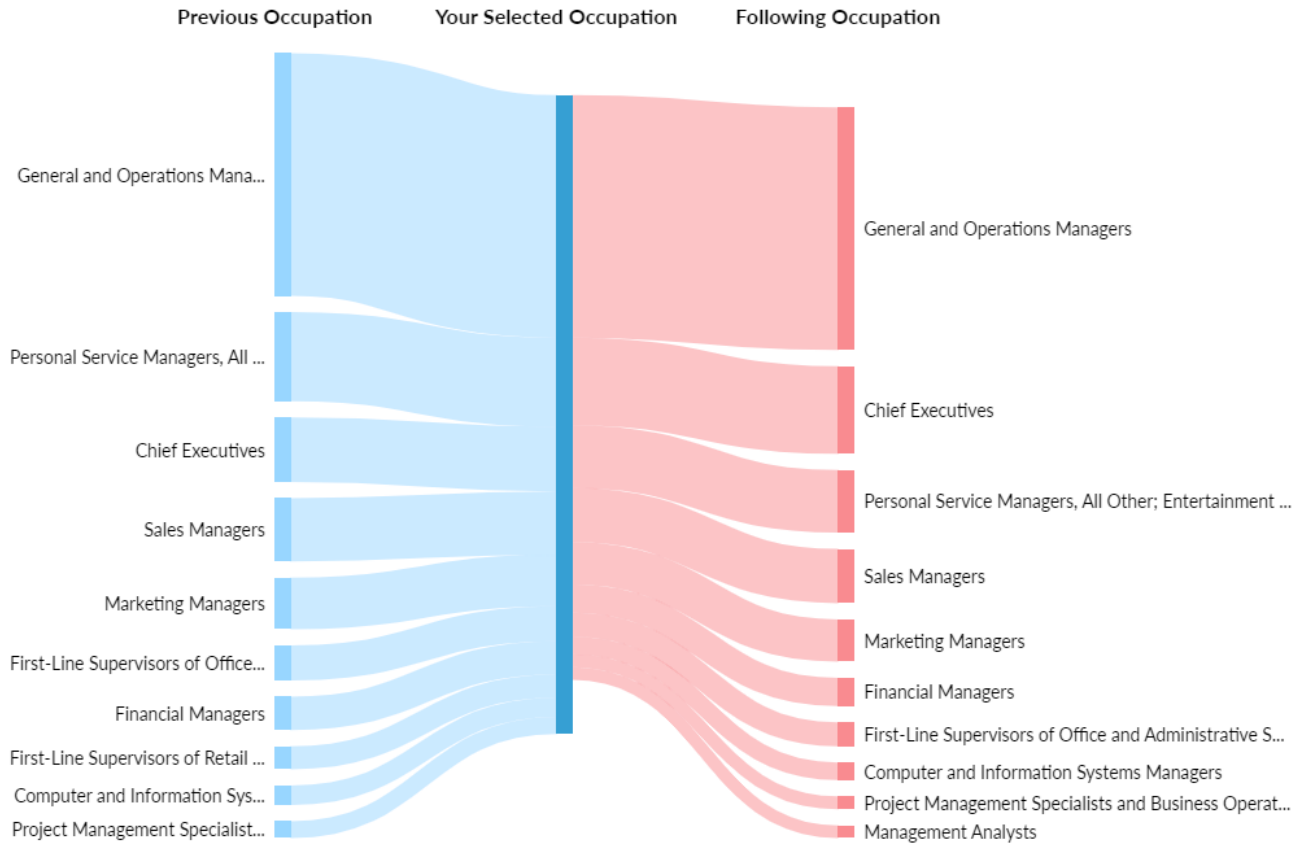
Candidate profile analysis from Emsi 2021Q3 national dataset.

Graduate Pipeline for General and Operations Managers, Northeast Minnesota 2021

22 Programs

39 programs can train for this job, while only 22 programs have produced completers in this region.

1,583 Completions (2020)

The completions from all regional institutions for all degree types.

198 Openings (2020)

The average number of openings for an occupation in the region is 29.

2020 IPEDS Completions Data; Visualizations from Emsi 2021Q3 dataset.

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 during over the course of the COVID-19 pandemic thus far. Over the next three years, under a pessimistic baseline forecast, this career field's employment is forecast to decline moderately (-0.7%annually). In the most optimistic scenario feasible based on employer demand, and given the existing talent shortage and talent pipelines in place, employment growth of 1.2% annually in this field could be possible. Most of the growth is attributable to maintenance, transportation, construction, and landscaping careers in this field.

Baseline Worst-Case Scenario 3-Year Forecast for Engineering, Manufacturing, and Technology Careers, Northeast Minnesota 2021Q1
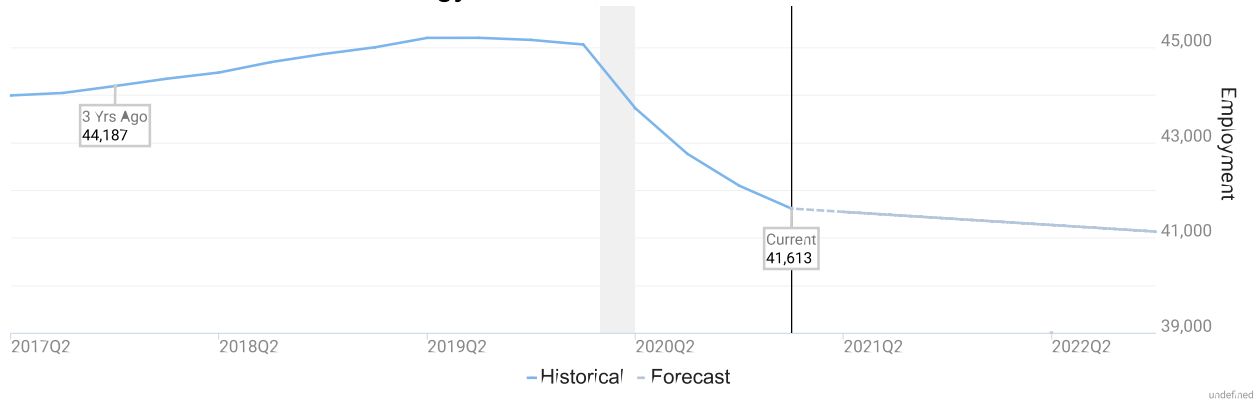
Top Ten Engineering, Manufacturing, and Technology Occupations by Employment Volume in the Northeast, 2021Q1

6-Digit Occupation	Empl	Avg Mean Wages	LQ	Historical 3-Year Empl Change	Annual Demand	Baseline Forecast Ann Growth
Heavy and Tractor-Trailer Truck Drivers	2,127	$54,400	0.89	-33	221	-0.7%
Laborers and Freight, Stock, and Material Movers, Hand	1,830	$37,800	0.52	-142	237	-0.6%
Maintenance and Repair Workers, General	1,798	$45,300	1.07	-252	167	-0.3%
Construction Laborers	1,558	$43,200	0.95	52	164	-0.4%
Carpenters	1,354	$51,400	1.15	-95	122	-0.9%
Landscaping and Groundskeeping Workers	1,303	$33,700	0.95	-61	175	0.3%
Passenger Vehicle Drivers, Except Bus Drivers, Transit and Intercity	986	$38,000	1.12	-252	118	-0.1%
Automotive Service Technicians and Mechanics	922	$44,100	1.06	-71	74	-1.2%
Team Assemblers	908	$35,500	0.70	-33	72	-2.7%
Light Truck Drivers	905	$39,700	0.71	1	96	-0.5%
Remaining Component Occupations	27,918	$58,800	1.22	-1,833	2,661	-0.7%
Engineering, Manufacturing, & Technology (CTE Field)	**41,613**	**$53,700**	**0.92**	**-2,728**	**4,107**	**-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 Engineering, Manufacturing, and Technology talent in the Northeast. Locally, the industries with the greatest share of this field's talent are Metal Ore Mining (7.9%) 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.
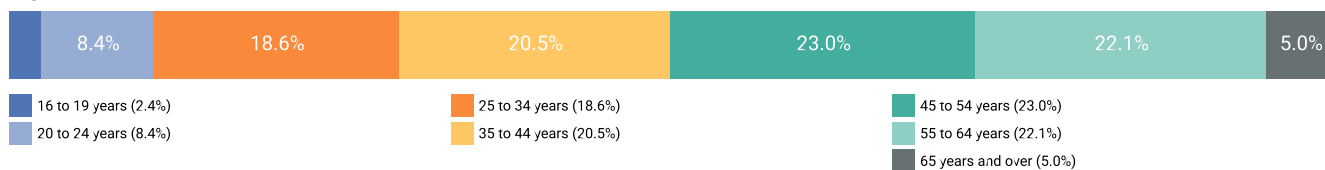
Engineering, Manufacturing, and Technology Field Employment by Industry, 2021Q1, Northeast Minnesota

Industry Title	% of Career Field Empl	Career Field Empl	10-Year Separations	10-Year Empl Growth	10-Year Total Demand
Metal Ore Mining	7.9%	3,298	3,715	199	3,913
Executive, Legislative, and Other General Government Support	4.5%	1,871	1,983	-36	1,947
Building Equipment Contractors	4.0%	1,665	1,778	-43	1,735
Residential Building Construction	3.3%	1,364	1,302	-80	1,222
Pulp, Paper, and Paperboard Mills	3.2%	1,321	1,308	-184	1,124
Other Specialty Trade Contractors	3.1%	1,276	1,365	-66	1,299
Highway, Street, and Bridge Construction	3.0%	1,240	1,317	-38	1,279
Foundation, Structure, and Building Exterior Contractors	2.9%	1,189	1,217	-75	1,142
Architectural, Engineering, and Related Services	2.4%	1,011	827	-97	730
Electric Power Generation, Transmission and Distribution	2.3%	971	785	-226	559
Automotive Repair and Maintenance	2.3%	946	983	-72	911
Building Finishing Contractors	2.2%	902	883	-79	804
General Freight Trucking	2.0%	844	907	-92	815
Services to Buildings and Dwellings	2.0%	820	1,032	19	1,051
Automobile Dealers	1.6%	647	701	-54	647
Couriers and Express Delivery Services	1.5%	637	777	-5	772
Rail Transportation	1.4%	581	533	-76	457
Nonresidential Building Construction	1.3%	540	528	-15	512
Other General Purpose Machinery Manufacturing	1.3%	523	514	-60	454
Aerospace Product and Parts Manufacturing	1.2%	518	445	-63	382
All Others	46.7%	19,447	20,716	-1,542	19,174

Career Field Demographics

Engineering, Manufacturing, and Technology field is heavily male (86.2%) and White (94.6%). 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
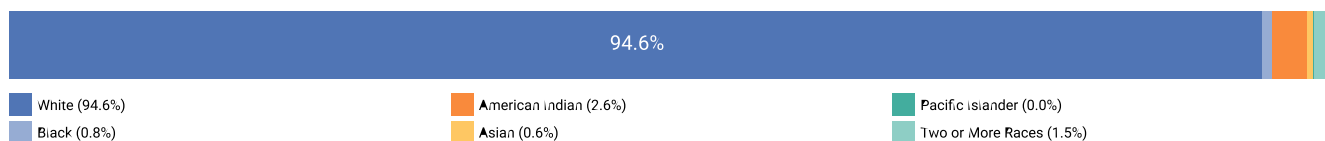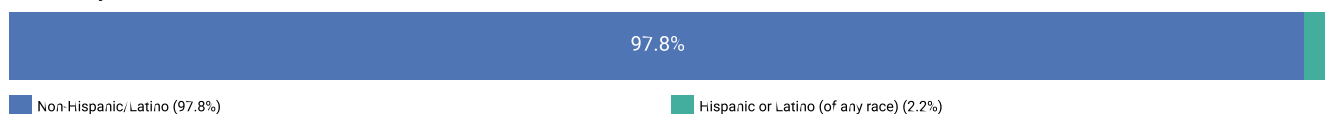
16 to 19 years (2.4%)	25 to 34 years (18.6%)	45 to 54 years (23.0%)
20 to 24 years (8.4%)	35 to 44 years (20.5%)	55 to 64 years (22.1%)
		65 years and over (5.0%)

Race

White (94.6%)	American Indian (2.6%)	Pacific Islander (0.0%)
Black (0.8%)	Asian (0.6%)	Two or More Races (1.5%)

Ethnicity

Non-Hispanic/Latino (97.8%)   Hispanic or Latino (of any race) (2.2%)

Gender

86.2%	13.8%

■ Male (86.2%) ■ Female (13.8%)

Educational Attainment and Requirements

The stacked bar chart here illustrates the estimated mix of educational attainment of the workers in this career field in aggregate. In general, the Northeast Minnesota Engineering, Manufacturing, and Technology workforce is well-aligned for the typical credentials of entry-level positions. Just under 1 in 4 of all positions in this field (23.2%) require no degree, no experience, and only short-term on-the-job training. About 42.2% require experience or some on-the-job training, but still no degree. Almost 1 in 10 of the workforce in this field has no degree at all (7.8%), and just over 1 in 3 (38.7%) hold a high school diploma as their highest credential. In all, 68.2% of the Engineering, Manufacturing, and Technology workforce have not completed a postsecondary credential. The table below indicates typical education and training requirements rather than the mix of attainment of workers in some key positions in this field.

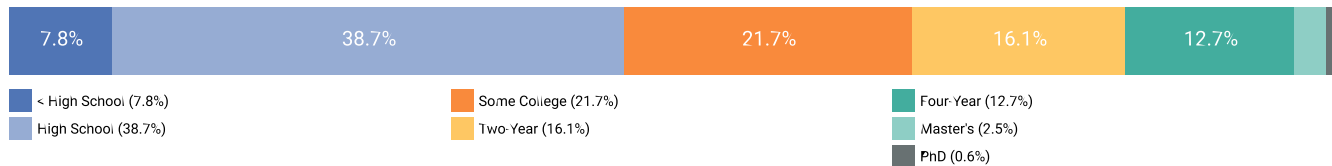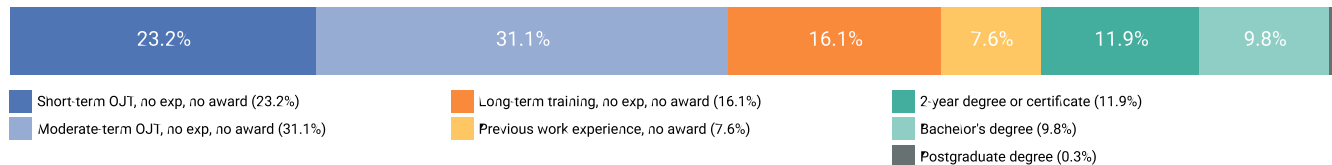### Educational Attainment

7.8%	38.7%	21.7%	16.1%	12.7%		

■ < High School (7.8%)   ■ Some College (21.7%)   ■ Four-Year (12.7%)
■ High School (38.7%)   ■ Two-Year (16.1%)   ■ Master's (2.5%)
                                                          ■ PhD (0.6%)

Education and Training Requirements

23.2%	31.1%	16.1%	7.6%	11.9%	9.8%	

■ Short-term OJT, no exp, no award (23.2%)   ■ Long-term training, no exp, no award (16.1%)   ■ 2-year degree or certificate (11.9%)
■ Moderate-term OJT, no exp, no award (31.1%)   ■ Previous work experience, no award (7.6%)   ■ Bachelor's degree (9.8%)
                                                                                                    ■ Postgraduate degree (0.3%)

Typical Education Requirements for Top Occupations by Volume, 2021Q1

Occupation	Typical Entry-Level Education	Previous Work Experience	Typical On-the-Job Training
Heavy and Tractor-Trailer Truck Drivers	Postsecondary non-degree award	None	Short-term on-the-job training
Laborers and Freight, Stock, and Material Movers, Hand	None	None	Short-term on-the-job training
Maintenance and Repair Workers, General	High school diploma or equivalent	None	Moderate-term on-the-job training
Construction Laborers	None	None	Short-term on-the-job training
Carpenters	High school diploma or equivalent	None	Apprenticeship
Landscaping and Groundskeeping Workers	None	None	Short-term on-the-job training
Passenger Vehicle Drivers, Except Bus Drivers, Transit and Intercity	None	None	Short-term on-the-job training
Automotive Service Technicians and Mechanics	Postsecondary non-degree award	None	Short-term on-the-job training
Team Assemblers	High school diploma or equivalent	None	Moderate-term on-the-job training
Light Truck Drivers	High school diploma or equivalent	None	Short-term on-the-job training

Occupation Gaps

The chart below shows the potential average annual gaps over ten years. A number of 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 9 skilled workers needed annually (averaged over the next ten years) to meet employer demand. This talent shortage is primarily due to growth in demand and retirements which far outpace the talent pipeline.

Annual Average Occupation Gaps (i.e. Talent Shortages) for the next 10 Years in Engineering, Manufacturing, and Technology, Northeast Minnesota 2021Q1
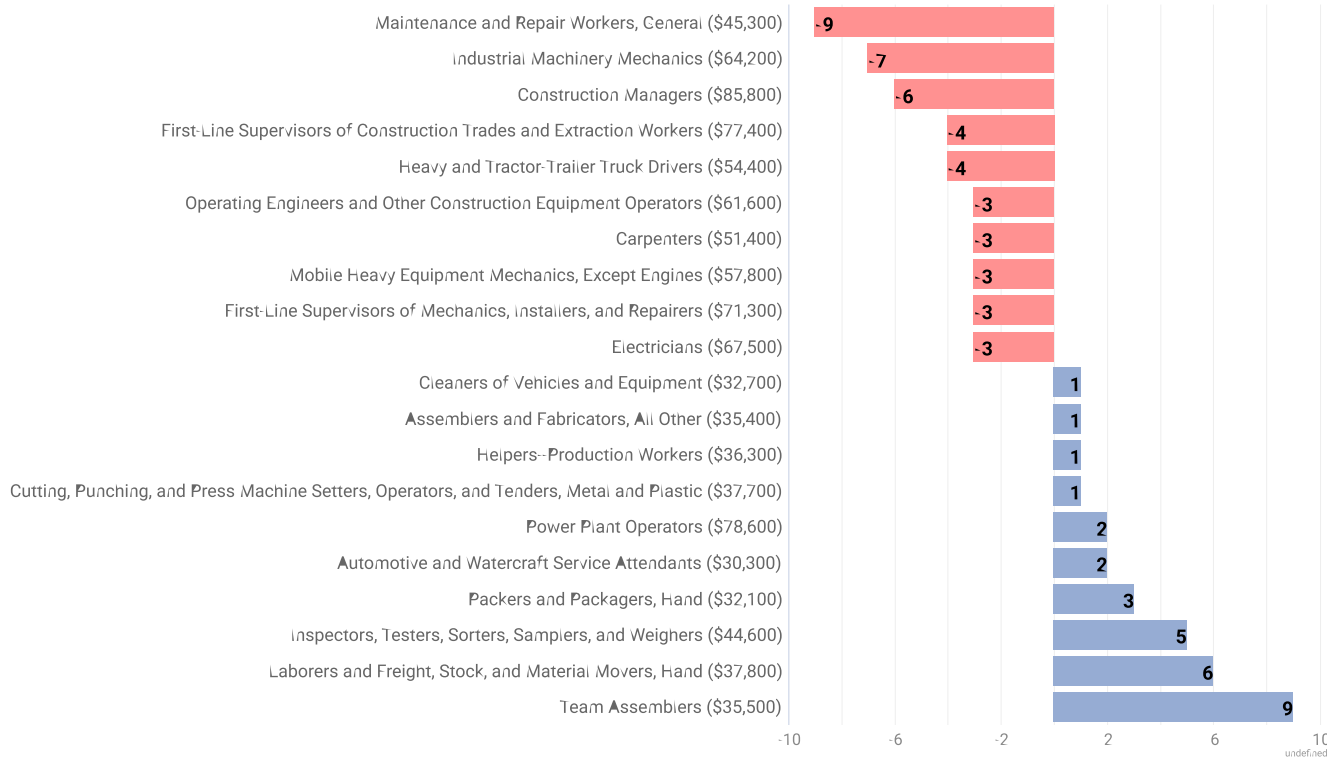
Award Gaps

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 important shortages. The Northeast currently under-trains some talent in Engineering, Manufacturing, and Technology when compared to national benchmarks. Northeast Minnesota colleges and universities are underproducing around 14 graduates annually that are needed to fill Automotive Service Technician positions open with employers based in this region alone. Second, there are at least 8 fewer HVAC Mechanics and Installers graduating locally annually than what employers currently need to support demand.

Award Gaps in Engineering, Manufacturing, and Technology, Northeast Minnesota 2021Q1

Occupation	Gap
Automotive Service Technicians and Mechanics	-14
Heating, Air Conditioning, and Refrigeration Mechanics and Installers	-8
Construction Managers	-7
Mining and Geological Engineers, Including Mining Safety Engineers	-7
Engineers, All Other	-7
Architects, Except Landscape and Naval	-6
Interior Designers	-6
First-Line Supervisors of Production and Operating Workers	-5
Architectural and Civil Drafters	-4
Installation, Maintenance, and Repair Workers, All Other	-4
Biochemists and Biophysicists	8
Aircraft Mechanics and Service Technicians	9
Mechanical Engineering Technologists and Technicians	11
Environmental Scientists and Specialists, Including Health	15
Architectural and Engineering Managers	21
Electrical Engineers	21
Cost Estimators	30
Civil Engineers	34
Mechanical Engineers	37
Welders, Cutters, Solderers, and Brazers	39

Source: JobsEQ®,Data as of 2021Q1

Certification Gaps

Similar to award gaps, an analysis of certification gaps identify where the existing talent pool lacks particular credentials in comparison to current openings. However, this analysis uses real-time labor market data in the form of online candidate profiles and job postings to analyze the alignment between the available workforce and local opportunities. In the table below, it is apparent that the programs aligned to the occupations above as well as shorter training programs are both needed to connect local talent with opportunities.

Top 10 Certification Gaps in the Northeast, September 2021

Name	Candidates	Openings	Gap
Class B Commercial Driver's License (CDL-B)	18	23	-5
HAZMAT	12	15	-3
Certified Welder	4	6	-2
Automobile Technician: Engine Repair (Test A1)	0	1	-1
Certified Electronic Systems Technician (EST)	0	1	-1
ASNT Central Certification Program Level II - Liquid Penetrant Testing (ACCP-PT)	0	1	-1

Top 10 Certification Gaps in the Northeast, September 2021

Name	Candidates	Openings	Gap
API 653 Aboveground Storage Tanks Inspector Certification	0	1	0
API 510 Pressure Vessels Inspector Certification	0	1	0
Transportation Worker Identification Credential (TWIC)	3	3	0
EPA Section 608 Certification (EPA 608)	2	2	0

Skill Gaps

Likewise, there is a degree of misalignment between the skills of the available workforce and the skills advertised by local employers. The ten skills listed below are examples of the skills in most high demand among Northeast Minnesota employers hiring Engineering, Manufacturing, and Technology talent that potential candidates have not indicated in their professional networking platforms as a strength.

Top 10 Skill Gaps in the Northeast, September 2021

Name	Candidates	Openings	Gap
Aviation	5	32	-27
Telecommunications	7	33	-26
Parachutes	0	19	-19
Forklifts	179	197	-18
Microsoft Excel	165	182	-17
Tankers	30	46	-16
Microsoft Outlook	61	77	-16
Boilers	60	73	-13
Computer Aided Design Software (CAD Software)	42	54	-12
Plumbing	154	166	-12

Promising Pathways

This section offers an origin-to-gateway-to-target model analysis for how to help move students from entrypoints into their field of interest into both likely and other aligned careers, taking into account automation, remote work, and the changing work environment.

Origin-to-Gateway-to-Target Occupations for Engineering, Manufacturing, and Technology, Northeast Minnesota Metro 2021Q1

Target Occupations (all HW, HD, HS)
Engineers, All Other(OG, AG)
Environmental Scientists and Specialists (OG)
Wind Turbine Service Technicians (OG)
Medical Equipment Repairers (AG)
Captains, Mates, and Pilots of Water Vessels (AG)
CNC Tool Programmers

Gateway Occupations
Maintenance and Repair Workers, General (HD, OG, AG)
Construction Laborers
Automotive Service Technicians and Mechanics (HS, AG)
Inspectors, Testers, Sorters, Samplers, and Weighers
Highway Maintenance Workers (OG)
Bus and Truck Mechanics and Diesel Engine Specialists (OG)

Origin Occupations

Likely	*Aligned*
Laborers and Freight, Stock Movers	Parking Lot Attendants
Landscaping and Groundskeeping Workers (HD)	Retail Sales Workers
Passenger Vehicle Drivers (HD, AG)	Stockers and Order Fillers
Team Assemblers	Janitors and Cleaners
Light Truck Drivers	Personal Services Managers

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

<u>Origin Occupations</u> are roles that are low-wage (<$37,000 per year) or mid-wage ($37,000-$42,000) that have high unemployment locally among workers without 4-year degrees. Below are a few Origin Occupations that are likely entrypoints into Engineering, Manufacturing, and Technology roles locally, or aligned opportunities that share a large number of skillsets in-demand in the field.

Likely Origins	Aligned Origins
Laborers and Freight, Stock, and Material Movers, Hand	Parking Lot Attendants
Landscaping and Groundskeeping Workers	Retail Sales Workers
Passenger Vehicle Drivers	Stockers and Order Fillers
Team Assemblers	Janitors and Cleaners
Light Truck Drivers	Customer Service Representatives

<u>Gateway Occupations</u> are good jobs that can lead to Target Occupations as skills and experience are developed. These typically offer between $42,000 up to the regional average wage ($51,100 in the Northeast). Below are a few Gateway Occupations in Engineering, Manufacturing, and Technology locally. 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.

Likely Gateways	Aligned Gateways
Maintenance and Repair Workers, General	Parking Lot Attendants
Construction Laborers	Product Demonstrators
Automotive Service Technicians and Mechanics	General Managers
Inspectors, Testers, Sorters, Samplers, and Weighers	Computer User Support Specialists
Highway Maintenance Workers	Software Developers
Bus and Truck Mechanics and Diesel Engine Specialists	

Target Occupations refer to high-wage occupations that pay at or above the region's average wage ($51,100 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.
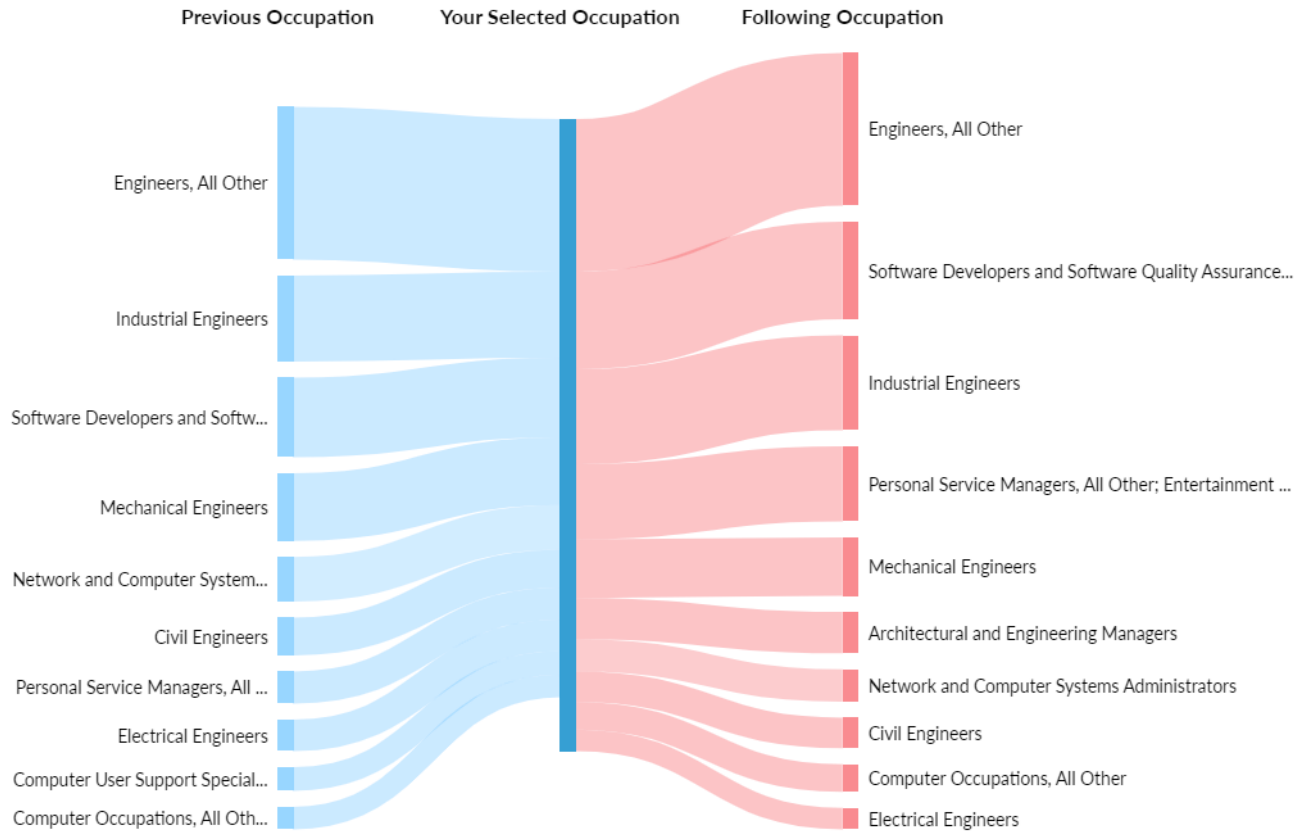
Top Target Occupations in Engineering, Manufacturing, and Technology, Northeast Minnesota 2021Q1

SOC	Occupation	2021Q1 Empl	Mean Ann Wages[2]	High-Wage	High-Skill	High-Demand	OG	AG
17-2199	Engineers, All Other	133	$85,400	HW	HS	HD	OG	AG
19-2041	Environmental Scientists and Specialists, Including Health	97	$72,000	HW	HS	HD	OG	
49-9081	Wind Turbine Service Technicians	56	$60,900	HW	HS	HD	OG	
49-9062	Medical Equipment Repairers	50	$53,100	HW	HS	HD		AG
53-5021	Captains, Mates, and Pilots of Water Vessels	43	$92,600	HW	HS	HD		AG
51-9162	Computer Numerically Controlled Tool Programmers	40	$64,700	HW	HS	HD		
17-3021	Aerospace Engineering and Operations Technologists and Technicians	39	$64,300	HW	HS	HD		AG
15-2041	Statisticians	36	$78,600	HW	HS	HD	OG	
19-2042	Geoscientists, Except Hydrologists and Geographers	35	$105,300	HW	HS	HD		

Although the Northeast is not a hotspot for Manufacturing and Automation Engineers (note that the occupation is listed as "Engineers, All Other"), the region will need more of these engineers in the years ahead, and there are not sufficient graduates coming out of local educational programs to meet that demand. Wages are high for the region, but significantly lower than wages for the same position nationally.

Below, this occupation is analyzed in more detail for better understanding of occupation "gain and drain." The chart below illustrates the national profiles of current and past people in this occupation. The left column shows job transitions from other occupations to Manufacturing Engineer. The right column shows job transitions from Manufacturing or Automation Engineering to other occupations–including both likely transitions and aligned transitions.

Engineer Talent Gain and Drain, Northeast Minnesota 2021Q3 Candidate Profile Analysis

Previous Occupation   Your Selected Occupation   Following Occupation

Engineers, All Other

Industrial Engineers

Software Developers and Softw...

Mechanical Engineers

Network and Computer System...

Civil Engineers

Personal Service Managers, All ...

Electrical Engineers

Computer User Support Special...

Computer Occupations, All Oth...

Engineers, All Other

Software Developers and Software Quality Assurance...

Industrial Engineers

Personal Service Managers, All Other; Entertainment ...

Mechanical Engineers

Architectural and Engineering Managers

Network and Computer Systems Administrators

Civil Engineers

Computer Occupations, All Other

Electrical Engineers

Candidate profile analysis from Emsi 2021Q3 national dataset.

Graduate Pipeline for Industrial Engineers, Northeast Minnesota 2021

12 Programs

47 programs can train for this job, while only 12 programs have produced completers in this region.

428 Completions (2020)

The completions from all regional institutions for all degree types.

11 Openings (2020)

The average number of openings for an occupation in the region is 29.

2020 IPEDS Completions Data; Visualizations from Emsi 2021Q3 dataset.

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. Over the next three years, under a pessimistic baseline forecast, this career field's employment is forecast to decline by about -0.7% in the Northeast. In the most optimistic scenario feasible based on employer demand, and given the existing talent shortage and talent pipelines in place, employment growth of 0.8% annually in this field could be possible. Most of the growth is attributable to Animal Systems, Plant Systems, and Food Products and Processing Systems.

Baseline Worst-Case Scenario 3-Year Forecast for Agriculture, Food, and Natural Resources Careers, Northeast Minnesota 2021Q1
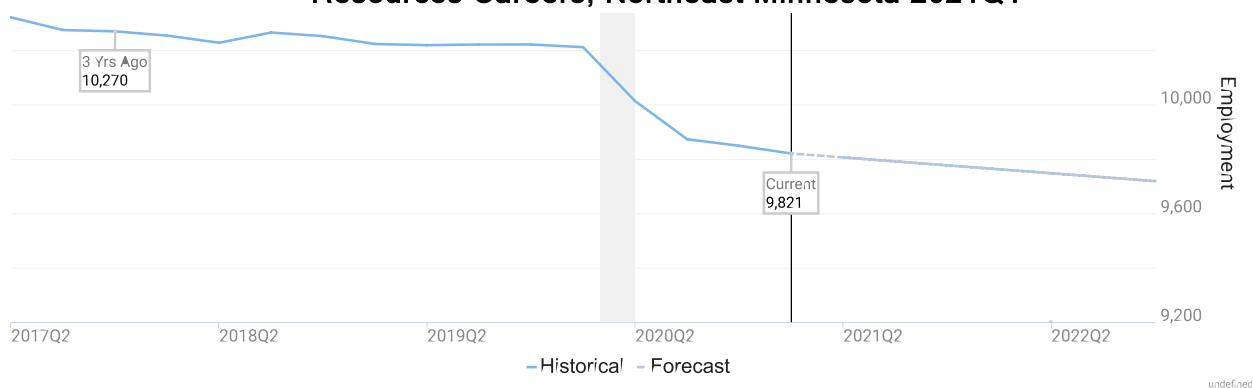
Top Ten Agriculture, Food, and Natural Resources Occupations by Employment Volume in the Northeast, 2021Q1

6-Digit Occupation	Empl	Avg Mean Wages	LQ	Historical 3-Year Empl Change	Annual Demand	Baseline Forecast Ann Growth
Landscaping and Groundskeeping Workers	1,303	$33,700	0.95	-61	175	0.3%
Farmers, Ranchers, and Other Agricultural Managers	1,087	$73,300	1.03	-72	79	-2.0%
Plumbers, Pipefitters, and Steamfitters	604	$66,200	1.07	20	63	-0.4%
First-Line Supervisors of Transportation and Material Moving Workers, Except Aircraft Cargo Handling Supervisors	403	$61,400	0.68	-12	40	-0.6%
Heating, Air Conditioning, and Refrigeration Mechanics and Installers	314	$57,800	0.69	22	28	-0.6%
Logging Equipment Operators	292	$46,400	6.53	-42	33	-3.0%
Earth Drillers, Except Oil and Gas; and Explosives Workers, Ordnance Handling Experts, and Blasters	235	$52,800	8.86	-32	33	0.5%
Refuse and Recyclable Material Collectors	233	$41,000	1.47	0	33	0.2%
Animal Caretakers	229	$26,600	0.70	-9	41	1.2%
Electrical Power-Line Installers and Repairers	227	$87,000	1.54	-31	13	-2.2%
Remaining Component Occupations	4,896	$57,800	1.29	-216	496	-0.6%
AFNR - Agriculture, Food, and Natural Resources (CTE Field - Updated 2021)	**9,821**	**$56,100**	**0.93**	**-433**	**1,030**	**-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 (8.2%) and Executive, Legislative, and other General Government Support (7.4%). 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.
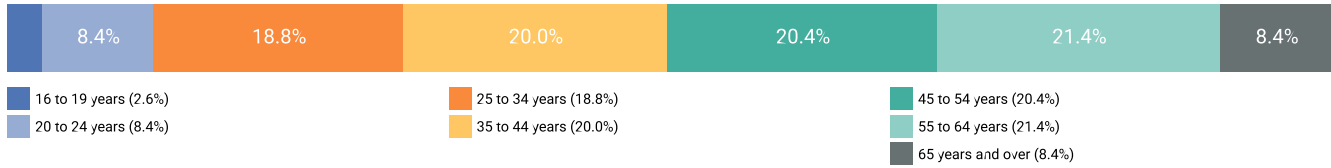
Agriculture, Food, and Natural Resources Field Employment by Industry, 2021Q1, Northeast Minnesota

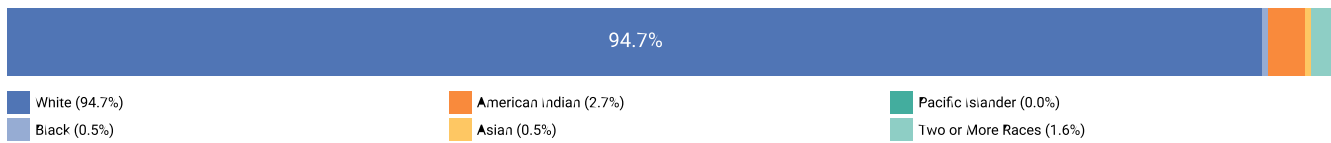| Industry Title	% of Career Field Empl	Career Field Empl	10-Year Separations	10-Year Empl Growth	10-Year Total Demand
Services to Buildings and Dwellings	8.2%	806	1,032	22	1,054
Executive, Legislative, and Other General Government Support	7.4%	724	778	-18	759
Building Equipment Contractors	7.3%	713	746	-24	722
Animal Production (Proprietors)	6.2%	604	539	-116	423
Metal Ore Mining	6.1%	601	681	35	716
Crop Production (Proprietors)	5.3%	523	508	-75	433
Electric Power Generation, Transmission and Distribution	5.0%	490	397	-124	274
Logging	4.4%	432	579	-115	464
Other Professional, Scientific, and Technical Services	4.2%	411	403	32	434
Grocery Stores	2.8%	278	337	-21	317
Other Amusement and Recreation Industries	2.3%	227	292	10	301
Architectural, Engineering, and Related Services	2.0%	197	179	-20	159
Colleges, Universities, and Professional Schools	1.7%	167	161	-10	152
Wired and Wireless Telecommunications Carriers	1.6%	155	159	-23	135
Other Personal Services	1.5%	147	248	30	278
Waste Collection	1.4%	139	196	10	206
Pulp, Paper, and Paperboard Mills	1.3%	123	118	-19	98
Administration of Environmental Quality Programs	1.1%	107	108	-11	97
General Medical and Surgical Hospitals	1.0%	98	102	-6	95
Utility System Construction	1.0%	98	105	0	105
All Others	28.3%	2,778	3,211	-123	3,088

Career Field Demographics

The Agriculture, Food, and Natural Resources field is predominantly male (77.9%) and White (94.7%), 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.
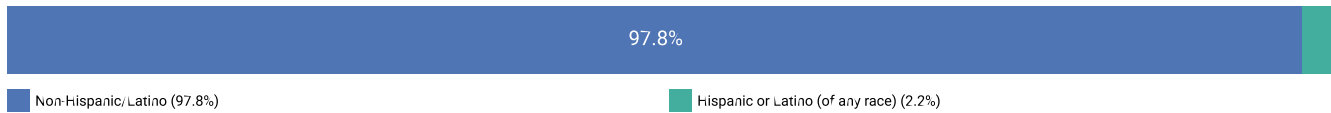
Age

8.4%	18.8%	20.0%	20.4%	21.4%	8.4%

- 16 to 19 years (2.6%)
- 20 to 24 years (8.4%)
- 25 to 34 years (18.8%)
- 35 to 44 years (20.0%)
- 45 to 54 years (20.4%)
- 55 to 64 years (21.4%)
- 65 years and over (8.4%)

Race

94.7%

- White (94.7%)
- Black (0.5%)
- American Indian (2.7%)
- Asian (0.5%)
- Pacific Islander (0.0%)
- Two or More Races (1.6%)

Ethnicity

97.8%

- Non-Hispanic/Latino (97.8%)
- Hispanic or Latino (of any race) (2.2%)

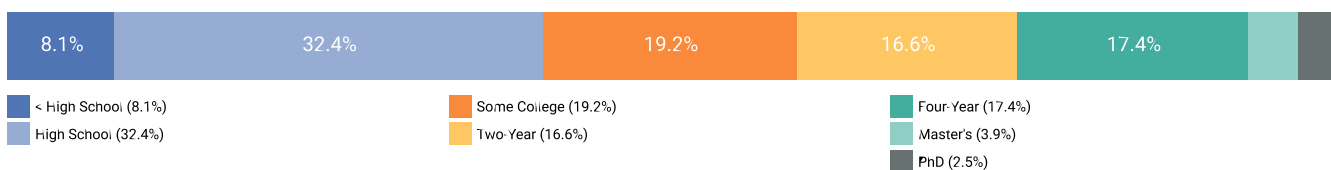### Gender

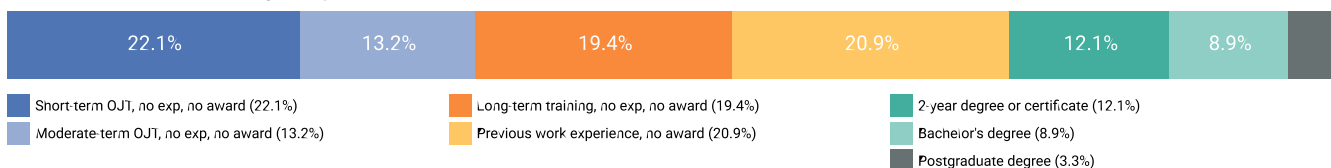| 77.9%	22.1%

- Male (77.9%)
- Female (22.1%)

Educational Attainment and Requirements

The stacked bar chart here illustrates the estimated mix of educational attainment of the workers in the career field in aggregate. In general, Northeast Minnesota's Agriculture, Food, and Natural Resources workforce is well-aligned for the typical credentials of entry-level positions. Just over 1 in 5 of all positions in this field regionally (22.1%) require no degree, no experience, and only short-term on-the-job training. About 1 in 3 (32.6%) require experience or some on-the-job training, but still no degree. 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. In all, 59.7% of the Agriculture, Food, and Natural Resources workforce have not completed a postsecondary credential. The table below indicates typical education and training requirements rather than the mix of attainment of workers in some key positions in this field.

Educational Attainment

8.1%	32.4%	19.2%	16.6%	17.4%		

- < High School (8.1%)
- High School (32.4%)
- Some College (19.2%)
- Two-Year (16.6%)
- Four-Year (17.4%)
- Master's (3.9%)
- PhD (2.5%)

Education and Training Requirements

22.1%	13.2%	19.4%	20.9%	12.1%	8.9%	

- Short-term OJT, no exp, no award (22.1%)
- Moderate-term OJT, no exp, no award (13.2%)
- Long-term training, no exp, no award (19.4%)
- Previous work experience, no award (20.9%)
- 2-year degree or certificate (12.1%)
- Bachelor's degree (8.9%)
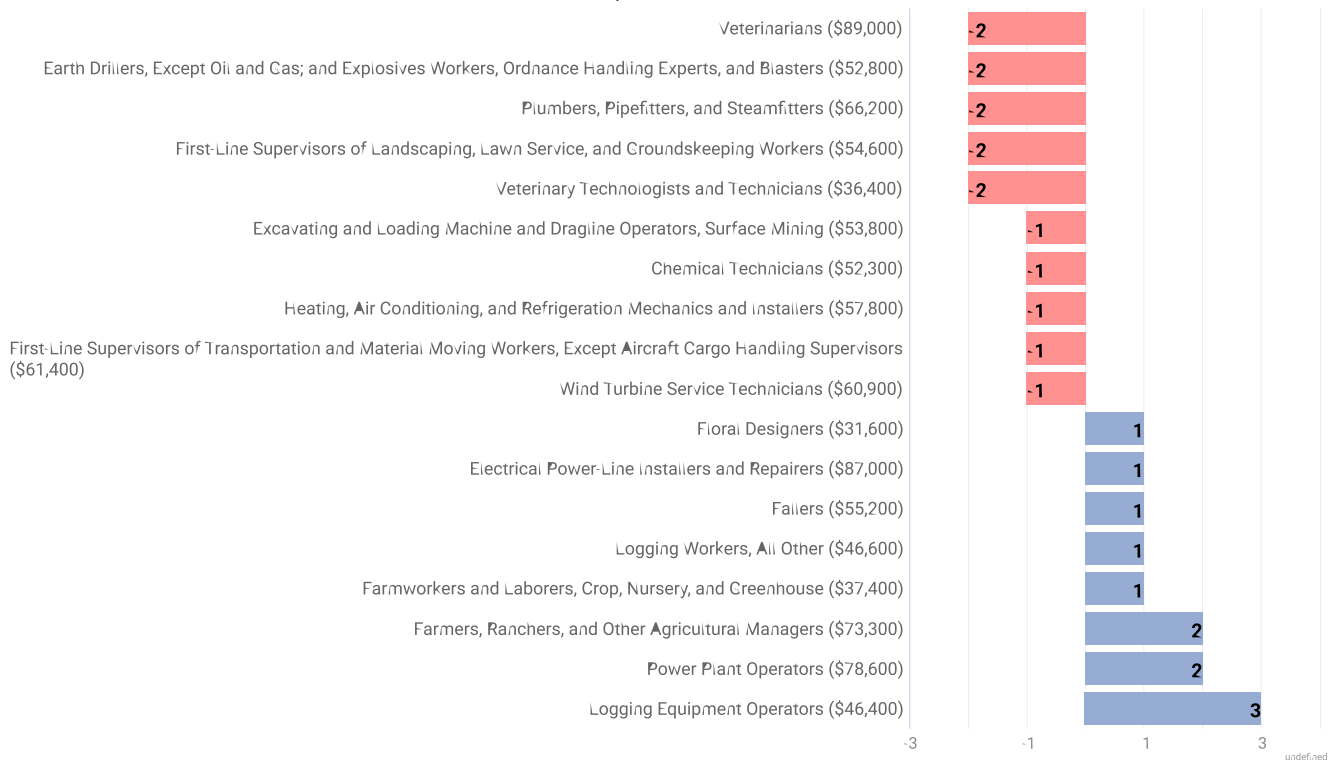- Postgraduate degree (3.3%)

Typical Education Requirements for Top Occupations by Volume, 2021Q1

Occupation	Typical Entry-Level Education	Previous Work Experience	Typical On-the-Job Training
Landscaping and Groundskeeping Workers	None	None	Short-term on-the-job training
Farmers, Ranchers, and Other Agricultural Managers	High school diploma or equivalent	5 years or more	None
Plumbers, Pipefitters, and Steamfitters	High school diploma or equivalent	None	Apprenticeship
First-Line Supervisors of Transportation and Material Moving Workers, Except Aircraft Cargo Handling Supervisors	High school diploma or equivalent	Less than 5 years	None
Heating, Air Conditioning, and Refrigeration Mechanics and Installers	Postsecondary non-degree award	None	Long-term on-the-job training
Logging Equipment Operators	High school diploma or equivalent	None	Moderate-term on-the-job training
Earth Drillers, Except Oil and Gas; and Explosives Workers, Ordnance Handling Experts, and Blasters	High school diploma or equivalent	Less than 5 years	Long-term on-the-job training
Refuse and Recyclable Material Collectors	None	None	Short-term on-the-job training
Animal Caretakers	High school diploma or equivalent	None	Short-term on-the-job training
Electrical Power-Line Installers and Repairers	High school diploma or equivalent	None	Long-term on-the-job training

Occupation Gaps

The chart below shows the potential average annual gaps over ten years. A number of crucial trades, veterinary, environmental services, and natural sciences roles indicate shortages in the years ahead, with the Plumber, mining, natural resources, and Vet Tech talent pools likely falling behind the most. Retirements and growing demand unmet by the local talent supply chain are both contributing factors.
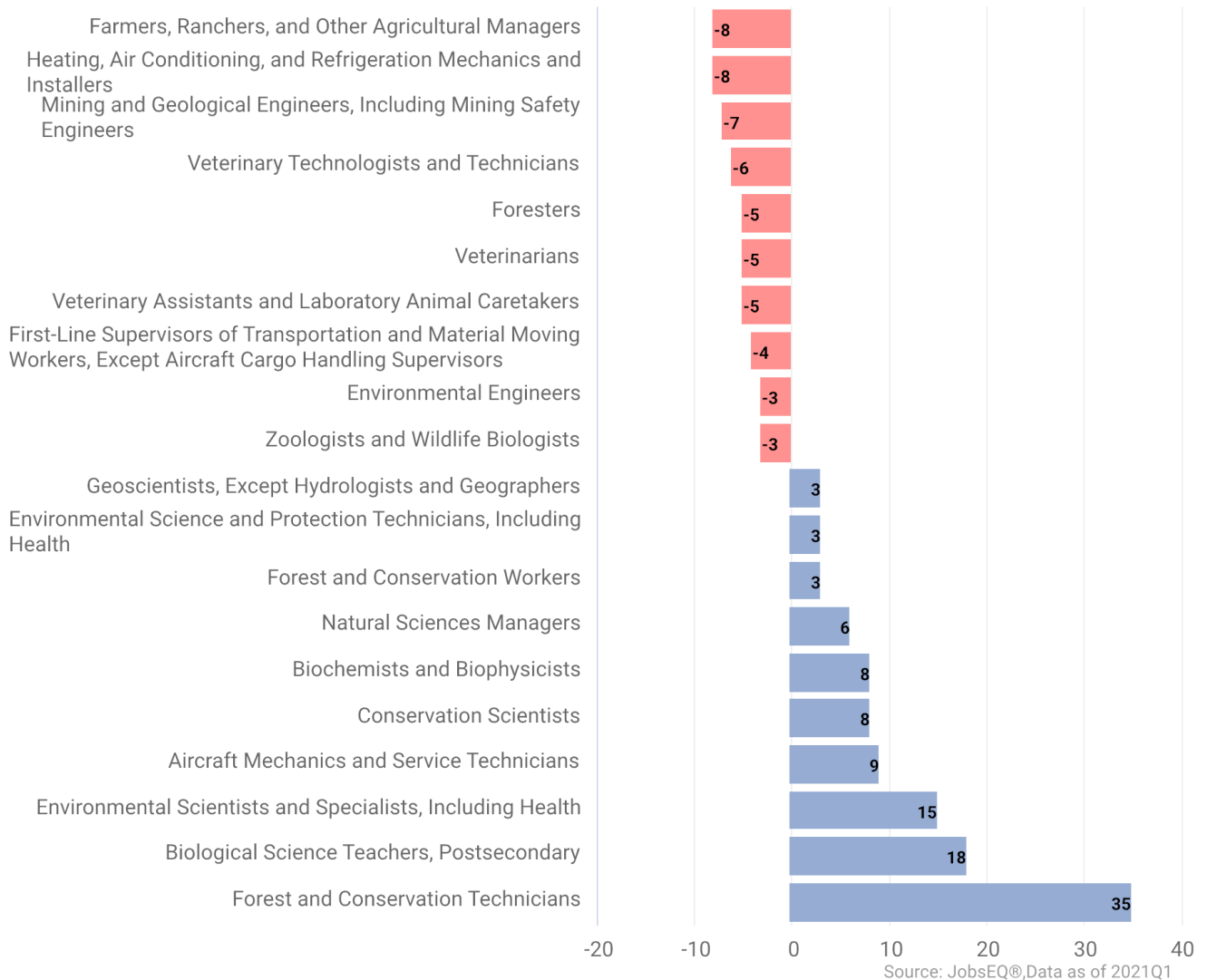
Annual Average Occupation Gaps (i.e. Talent Shortages) for the next 10 Years in Agriculture, Food, and Natural Resources, Northeast Minnesota 2021Q1

Occupation	Gap
Veterinarians ($89,000)	-2
Earth Drillers, Except Oil and Gas; and Explosives Workers, Ordnance Handling Experts, and Blasters ($52,800)	-2
Plumbers, Pipefitters, and Steamfitters ($66,200)	-2
First-Line Supervisors of Landscaping, Lawn Service, and Groundskeeping Workers ($54,600)	-2
Veterinary Technologists and Technicians ($36,400)	-2
Excavating and Loading Machine and Dragline Operators, Surface Mining ($53,800)	-1
Chemical Technicians ($52,300)	-1
Heating, Air Conditioning, and Refrigeration Mechanics and Installers ($57,800)	-1
First-Line Supervisors of Transportation and Material Moving Workers, Except Aircraft Cargo Handling Supervisors ($61,400)	-1
Wind Turbine Service Technicians ($60,900)	-1
Floral Designers ($31,600)	1
Electrical Power-Line Installers and Repairers ($87,000)	1
Fallers ($55,200)	1
Logging Workers, All Other ($46,600)	1
Farmworkers and Laborers, Crop, Nursery, and Greenhouse ($37,400)	1
Farmers, Ranchers, and Other Agricultural Managers ($73,300)	2
Power Plant Operators ($78,600)	2
Logging Equipment Operators ($46,400)	3

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 moderate shortages. The Northeast currently under-trains talent in Agriculture, Food, and Natural Resources when compared to national benchmarks. Northeast Minnesota colleges and universities are underproducing at least 8 graduates annually that are needed to fill farming and agricultural management positions open with employers based in the Northeast. A number of veterinary support roles 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 2021Q1

Occupation	Value
Farmers, Ranchers, and Other Agricultural Managers	-8
Heating, Air Conditioning, and Refrigeration Mechanics and Installers	-8
Mining and Geological Engineers, Including Mining Safety Engineers	-7
Veterinary Technologists and Technicians	-6
Foresters	-5
Veterinarians	-5
Veterinary Assistants and Laboratory Animal Caretakers	-5
First-Line Supervisors of Transportation and Material Moving Workers, Except Aircraft Cargo Handling Supervisors	-4
Environmental Engineers	-3
Zoologists and Wildlife Biologists	-3
Geoscientists, Except Hydrologists and Geographers	3
Environmental Science and Protection Technicians, Including Health	3
Forest and Conservation Workers	3
Natural Sciences Managers	6
Biochemists and Biophysicists	8
Conservation Scientists	8
Aircraft Mechanics and Service Technicians	9
Environmental Scientists and Specialists, Including Health	15
Biological Science Teachers, Postsecondary	18
Forest and Conservation Technicians	35

Source: JobsEQ®,Data as of 2021Q1

Certification Gaps

Similar to award gaps, an analysis of certification gaps identify where the existing talent pool lacks particular credentials in comparison to current openings. However, this analysis uses real-time labor market data in the form of online candidate profiles and job postings to analyze the alignment between the available workforce and local opportunities. In the table below, it is apparent that the programs

aligned to the occupations above as well as shorter training programs are both needed to connect local talent with opportunities.

Top 10 Certification Gaps in Northeast Minnesota, September 2021

Name	Candidates	Openings	Gap
Registered Veterinary Technician (RVT)	1	3	-2
Class B Commercial Driver's License (CDL-B)	5	6	-1
Class A Commercial Driver's License (CDL-A)	17	18	-1
Laboratory Animal Technician (LAT)	0	1	-1
Certified Professional Dog Trainer (CPDT)	0	1	-1
Forklift Certified	3	3	0
HAZMAT	1	2	0
EPA Section 608 Certification (EPA 608)	1	1	0
Engineer in Training (EIT)	1	1	0
ServSafe Food Protection Manager Certification	1	1	0

Skill Gaps

Likewise, there is a degree of misalignment between the skills of the available workforce and the skills advertised by local employers. The ten skills listed below are examples of the skills in most high demand among Northeast Minnesota employers hiring Agriculture, Food, and Natural Resources talent that potential candidates have not indicated in their professional networking platforms as a strength.

Top 10 Skill Gaps in Northeast Minnesota, September 2021

Name	Candidates	Openings	Gap
Plumbing	61	72	-11
Heavy Equipment Operation	12	17	-6
Microsoft Outlook	17	23	-5
Telecommunications	4	8	-4
Carpentry	3	6	-3
Routers	2	5	-3
Word Processing	7	10	-3
Production Management	4	7	-3
Generators	1	4	-3
Food Safety	3	5	-3

Promising Pathways

This section offers an origin-to-gateway-to-target model analysis for how to help move students from entrypoints into their field of interest into both likely and other aligned careers, taking into account automation, remote work, and the changing work environment.

Origin-to-Gateway-to-Target Occupations for Agriculture, Food, and Natural Resources, Northeast Minnesota 2021Q1

Target Occupations (all HW, HD, HS)
Veterinarians (OG, AG)
Environmental Scientists and Specialists (OG)
Biological Science Teachers, Postsecondary (OG)
Wind Turbine Service Technicians (OG)
Captains, Mates, and Pilots of Water Vessels (AG)
Geoscientists

Gateway Occupations
Logging Equipment Operators (HD)
Tree Trimmers and Pruners
Forest and Conservation Technicians (HS)
Biological Technicians (HS)
Logging Workers, All Other (HD)
Farm Equipment Mechanics and Service Technicians

Origin Occupations

Likely
Landscaping and Groundskeeping Workers (HD)
Refuse and Recyclable Material Collectors (AG)
Animal Caretakers (HD)
Veterinary Techs (HS, OG)
Bakers (HD, AG)

Aligned
Compliance Officers
Laborers and Freight Movers
Stockers and Order Fillers
Cooks
Customer Service Reps

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

Origin Occupations are roles that are low-wage (<$37,000 per year) or mid-wage ($37,000-$42,000) that have high unemployment locally among workers without 4-year degrees. Below are a few Origin Occupations that are likely entrypoints into Agriculture, Food, and Natural Resources roles locally, or aligned opportunities that share a large number of skillsets in-demand in the field.

Likely Origins	Aligned Origins
Landscaping and Groundskeeping Workers	Compliance Officers
Refuse and Recyclable Material Collectors	Laborers and Freight, Stock Movers
Animal Caretakers	Stockers and Order Fillers
Veterinary Technologists and Technicians	Cooks
Bakers	Customer Service Representatives

Gateway Occupations are good jobs that can lead to Target Occupations as skills and experience are developed. These typically offer between $42,000 up to the regional average wage ($51,100 in the Northeast). Below are a few Gateway Occupations in Agriculture, Food, and Natural Resources locally. 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.

Likely Gateways	Aligned Gateways
Logging Equipment Operators	Financial Managers
Tree Trimmers and Pruners	Office Clerks
Forest and Conservation Technicians	General Managers
Biological technicians	Computer User Support Specialists
Logging Workers, All Other	Machinists
Farm Equipment Mechanics and Service Technicians	Engineering Managers

Target Occupations refer to high-wage occupations that pay at or above the region's average wage ($51,100 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.

## Top Target Occupations in Agriculture, Food, and Natural Resources, Northeast Minnesota 2021Q1

SOC	Occupation	2021Q1 Empl	Mean Ann Wages[2]	High-Wage	High-Skill	High-Demand	OG	AG
29-1131	Veterinarians	117	$89,000	HW	HS	HD	OG	AG
19-2041	Environmental Scientists and Specialists, Including Health	97	$72,000	HW	HS	HD	OG	
25-1042	Biological Science Teachers, Postsecondary	57	$80,600	HW	HS	HD	OG	
49-9081	Wind Turbine Service Technicians	56	$60,900	HW	HS	HD	OG	
53-5021	Captains, Mates, and Pilots of Water Vessels	43	$92,600	HW	HS	HD		AG
19-2042	Geoscientists, Except Hydrologists and Geographers	35	$105,300	HW	HS	HD		
19-4042	Environmental Science and Protection Technicians, Including Health	29	$53,500	HW	HS	HD		
17-1012	Landscape Architects	27	$68,000	HW	HS	HD		AG
53-5031	Ship Engineers	20	$87,900	HW	HS	HD		
45-2011	Agricultural Inspectors	16	$57,900	HW	HS	HD		

Northeast Minnesota will need a stronger pipeline of Veterinarians in the years ahead, and there are not sufficient graduates coming out of local educational programs to meet that demand. Large animal veterinarians are in shortest supply, in particular. Below, this occupation is analyzed in more detail for better understanding of occupation "gain and drain." The chart below illustrates the national profiles of current and past people in this occupation. The left column shows job transitions from other occupations to Veterinarians. The right column shows job transitions from Veterinarians to other occupations–including both likely transitions and aligned transitions. Likely transitions include Veterinary Assistants, Animal Caretakers, and Veterinary Technologists and Technicians. Other aligned career transitions include Medical Managers, Registered Nurses, and Life Scientists.

There are no local Veterinary programs in the Northeast–all graduate talent must be attracted from the MSP Metro or from out of state.

Environmental Scientist Talent Gain and Drain, Northeast Minnesota 2021Q3 Candidate Profile Analysis
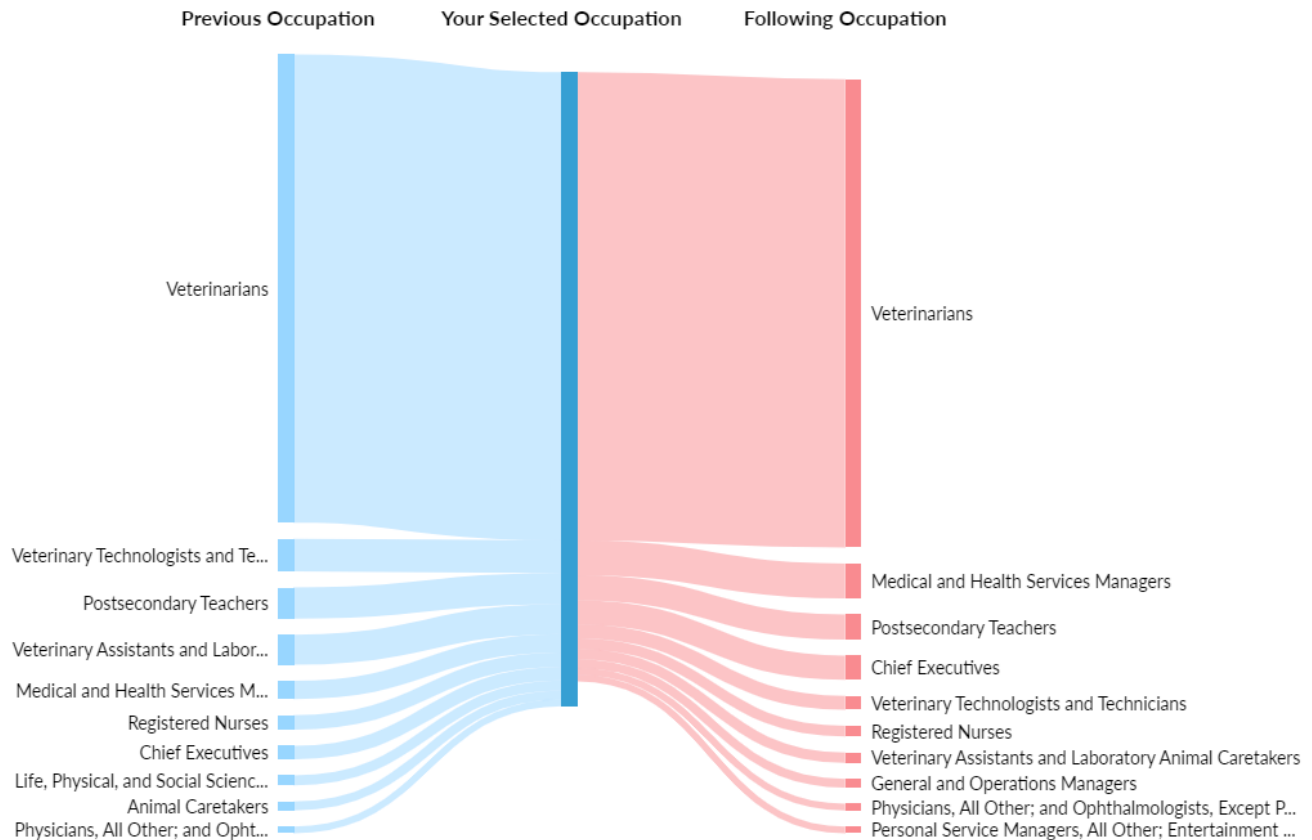
Candidate profile analysis from Emsi 2021Q3 national dataset.

Graduate Pipeline for Veterinarians, Northeast Minnesota 2021

0 Programs

36 programs can train for this job, while 0 programs have produced completers in this region.

0 Completions (2020)

The completions from all regional institutions for all degree types.

9 Openings (2020)

The average number of openings for an occupation in the region is 29.

2020 IPEDS Completions Data; Visualizations from Emsi 2021Q3 dataset.

Conclusion

The region's most in-demand occupations of the future require a 2-year degree or higher, offer high 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. All six career and technical education Career Fields are likely to experience talent shortages and oversupply in certain occupations and skill areas in the current anticipated trajectory of workforce demand and overall economic recovery, though much remains uncertain. Overall, digital skills, human skills, and business enablers will be the foundational skills of the future in Northeast Minnesota. Remote work and digital skills have grown in importance during the first year and a half of the COVID-19 pandemic and all signs indicate that these features of the workplace are here to stay.

The region's most in-demand occupations of the future require a 2-year degree or higher, offer high average wages, and will likely experience talent shortages by 2025 due to low qualified talent pool located within the region. All six career and technical education Career Field areas will experience talent shortages and oversupply in certain occupations and skill areas. It is likely that Northeast Minnesota careers that require a Bachelor's degree or higher have some of the largest anticipated shortages and highest wages.

The region is poised to see changes in demand for talent over the next five years and beyond as the region responds to the impacts of COVID-19 on the local population, economy, and business infrastructure. The disruptions of COVID-19, social unrest, and heightened inequalities have exacerbated concerns over the economy, business viability, and workforce opportunities. The region faces an immediate and short-term challenge of high unemployment among high contact-intensity roles and rapidly changing job requirements. However, many of the occupation shortages initially identified prior to the pandemic and early on in the first months of the pandemic's impact continue to be relevant to the current and future needs of Northeast Minnesota businesses. There is greater urgency to address these talent shortages now the pandemic accelerates some businesses to automate, modernize, and reskill the workforce in a changing market.