



Understanding Skills Shortages and Regional Economies

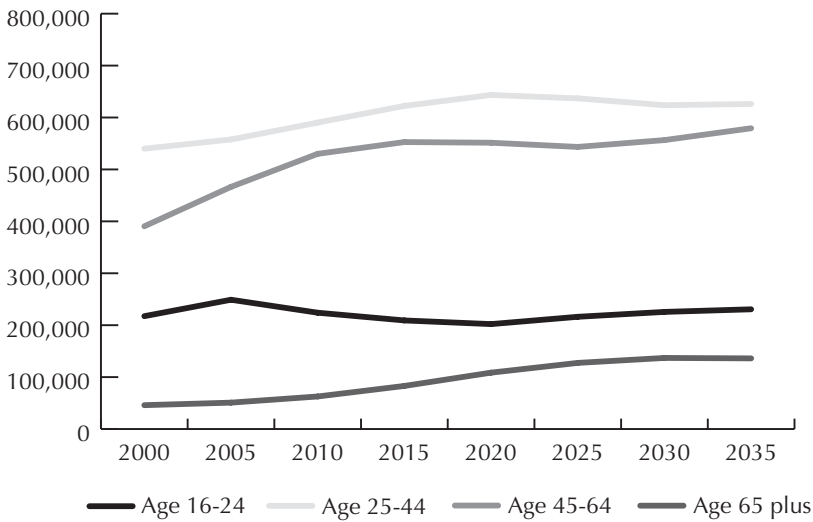
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Much has been written on the prevalence of skills shortages nationally and within Minnesota. The tilt toward a “knowledge-based” economy, increased use of technology, and expected retirements within the Baby Boom generation are some of the many factors cited for an increased need for skilled workers at all education levels beyond high school. In the meantime, various media reports suggest a post-recessionary economy of employers needing high-skill workers, while a pool of structurally unemployed persons exists who lack the skills necessary for reemployment. While the notion of true skills shortages is still somewhat controversial, such messages resonate in parts of Greater Minnesota, where a decades-long flight of young workers has diminished the viability of some small communities and regional specializing creates a demand for skills that is hard to meet locally.

Demographics

The Greater Minnesota workforce is projected to grow by 165,000 between 2010 and 2035 (see Figure 1). Unfortunately, as the workforce grows, it is also aging. The workforce under 25 years of age is expected to decrease in coming years before partially recovering between 2020 and 2035. Workers between age 25 and

Figure 1: Workforce projections by age for Greater Minnesota (non-Twin Cities,) 2000-2035.



Source: Minnesota Office of the State Demographer, Workforce Projections.

44 will grow before reaching a plateau in 2020. Workers between the ages of 45 and 64 have already reached that plateau. Indeed, the only group that seems to be growing is the age 65+ cohort. The message of this chart is that most of our future labor (about three quarters) is already working or is at least of working age. If employers require a more skilled workforce, the old model of training young workers may not be sufficient to meet demand.

To put these projections into perspective, the Minnesota Department of Employment and Economic Development projects job growth of about 159,000 jobs in Greater Minnesota between 2010 and 2020. In that ten-year span, however, the workforce is expected to grow by only 98,500. That leaves more than 60,000 jobs potentially unfilled.

There are a number of ways this job gap could be managed. Obviously, the area outside of the Twin Cities is highly diverse in terms of industry makeup and demographic trends. Table 1 shows projected regional job growth and the top three industries expected to grow jobs. Potential workforce challenges could be met by an influx of new workers looking for employment or higher wages, as is happening in western North Dakota. Workers may stay in the labor force longer, as is portrayed in Figure 1, or perhaps hold multiple jobs. The

Table 1: Projected employment growth by region and top three industries: Greater Minnesota, 2010-2020.

Region	Total Regional Projected Job Growth	Top Three Regional Growth Industries	Projected Job Growth
Central	51,622	Health Care & Social Assistance	16,314
		Construction	6,043
		Retail Trade	4,461
Northeast	20,350	Health Care & Social Assistance	9,875
		Construction	1,772
		Retail Trade	1,445
Northwest	36,235	Health Care & Social Assistance	10,627
		Manufacturing	4,238
		Construction	3,573
Southeast	36,384	Health Care & Social Assistance	17,564
		Retail Trade	3,468
		Construction	2,954
Southwest	21,377	Health Care & Social Assistance	8,052
		Manufacturing	2,157
		Construction	2,131

Source: Minnesota Dept. of Employment and Economic Development, 2010-2020 Regional Projections.

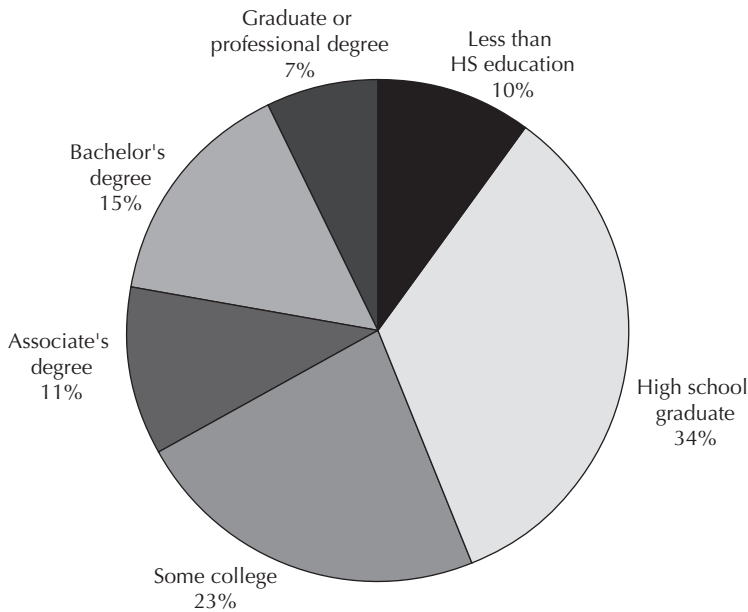
region might also see an increase in persons commuting daily across borders.

On the other hand, worker shortages could result in *lower* job growth if employers choose to rely on new-labor saving technologies or, in the worst case, simply leave the region. And more might be expected of the population that already works in Greater Minnesota.

Educational Attainment

Access to a skilled workforce is critical to maintaining the economic vitality of any region. Greater Minnesota has a relatively high level of educational attainment and might be well placed to take on additional training needs. Over half the population over the age of 25 has some

Figure 2: Educational attainment of persons age 25 and over in Greater Minnesota (non-Twin Cities).

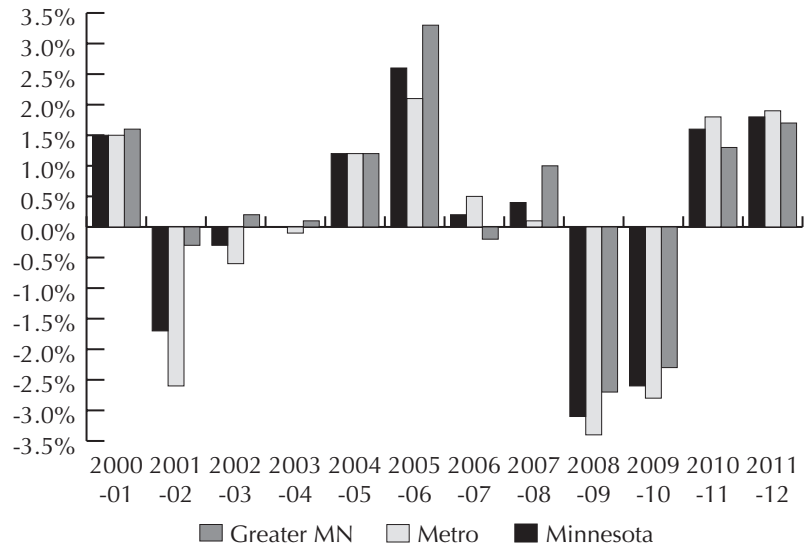


Source: U.S. Census, American Community Survey.

education beyond high school (56%, see Figure 2). Even when counties encompassed by metropolitan areas (e.g. Fargo-Moorhead, St. Cloud, Rochester, etc.) are taken out of the analysis, 52.5% of the population has some amount of training beyond high school. In the seven counties of the Twin Cities Metropolitan Region, 69.8% of persons over age 25 have higher amounts of education.

The disparity in educational attainment between rural and metropolitan areas or across different regions within the state reflects the industrial makeup and occupational needs of the different regions. Industries such as finance or software development require a highly trained workforce and often cluster in urban areas. Manufacturing might require people with a range of educational preparation, from high school diplomas to associate's degrees and four-year degrees, while tourism-related jobs may require little education outside of on-the-job training. However, many rural areas are at a disadvantage in that they lack dense labor markets—geographically compact markets with high numbers of employers, workers, and training institutions. Demand for workers with a particular skill may not reach a critical mass necessary for training institutions to create (or maintain) a program. For instance, Anoka County has 243 firms (7,951 jobs) involved in the production of fabricated metal as of First Quarter 2012. In the seven counties of Northwestern Minnesota that comprise Economic Development Region 1 (Kittson, Marshall, Norman, Pennington, Polk, Red Lake and Roseau), there are nine such firms employing 199 workers spread out over an area that is about 19 times the area of Anoka County. The industry is important in both regions, and both regions maintain quality training programs. However, an institution in Anoka County may find it easier to develop a new program across employers given the high density of firms and larger potential pool of workers.

Figure 3: Annual Employment Growth: Minnesota, Metro and Greater Minnesota, Q1 2000-2012



Source: Minnesota Dept. of Employment and Economic Development, Quarterly Census of Employment and Wages.

One percent of workers requiring new training in Anoka County would yield 80 students compared to only 2 in EDR 1.

In the face of shortage, employers may find themselves drawing upon labor well beyond their region or training existing staff. Prior to shutting down due to the recent recession, Suzlon, a maker of wind turbines, engaged in a program of busing workers to their plant in Pipestone from Worthington, a city one hour away. With potential employers spread out over large distances, skilled workers may not find immediate employment opportunities that draw upon their skills and interests. In such a case, anecdotal evidence of skills shortages coexisting with underemployment is sure to exist. In any case, labor mobility is necessary to fulfill the supply and demand sides of the labor market.

Supply and Demand

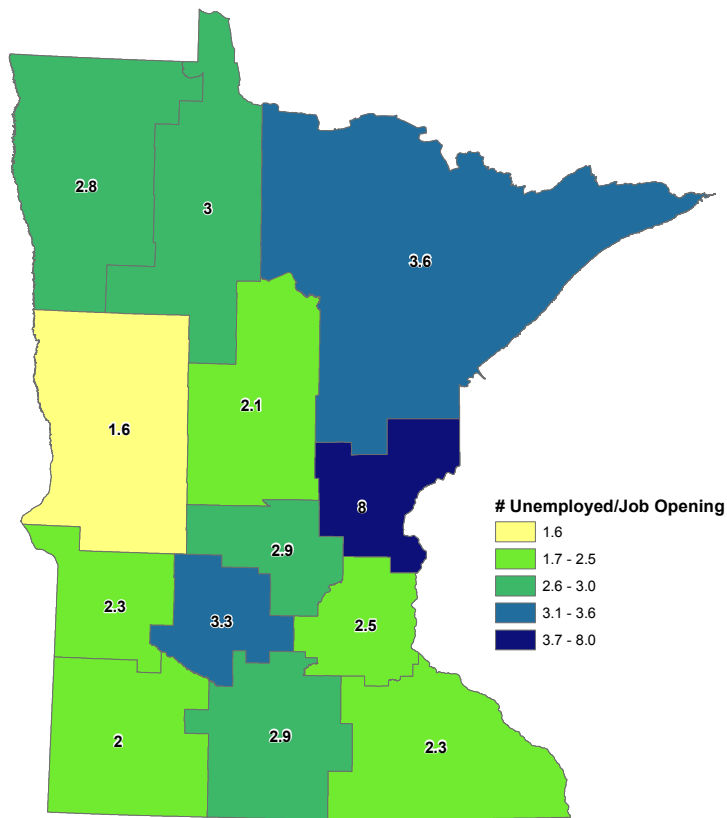
Labor conditions in Greater Minnesota are often different from those of the state as a whole or the Twin Cities Metro Region. The 2007-08 recession impacted Greater Minnesota less than the state as a whole or the Twin Cities Metro, though the recovery has also brought less job growth (see Figure 3). At 5.6%, the August 2012 unemployment rate in the balance of Minnesota without the Twin Cities was equal to the state seasonally unadjusted rate and compared well with 5.7% in the Twin Cities. However, counties in Greater Minnesota have the highest unemployment rates, with the top ten rates being in northern and east central Minnesota.

One rough measure of the mismatch between labor supply and demand is a comparison of the number of job openings with the actual number of unemployed workers. Figure 4 shows the ratio of unemployed workers to job vacancies for Second Quarter 2012. Ratios vary from relatively tight labor markets in the west central region (EDR 4) where the ratio stands at 1.6 to a much looser labor market in east central Minnesota (EDR 7e) where the ratio stands at 8 job seekers for every job opening. Incidentally, this represents an improvement from a 32-to-1 ratio in 2009. Potential skills shortages are more likely to occur in parts of western Minnesota, whereas long-term unemployment may be occurring in the northern and east central parts of the state.

All Skills are Local

As the labor market recovers, the potential for workforce shortages are likely to increase. The data in Figure 4 point to a simple disconnect between jobs and “warm bodies,” the simplistic assumption that one person can fill any one job. Obviously, employer needs are more complex and vary with each industry. Table 2 lists a set of skilled occupations that have high location

Figure 4: Ratio of unemployed per job vacancy by Economic Development Region, Q2 2012.



Source: Minnesota Dept. of Employment and Economic Development, Minnesota Job Vacancy Survey.

quotients (LQ) in Greater Minnesota. Occupations with high location quotients are those that have a high concentration in a particular area compared to the nation as a whole. For example, one might expect automotive assembly jobs to have a high location quotient in Detroit. The magnitude of the location quotient indicates the degree to which that occupation is concentrated in the region. For instance, there are 5.4 times more farm

Table 2: Distinguishing high-skill occupations in Greater Minnesota.

Occupation	Location Quotient	Projected Employment Change 2010-2020	Median Hourly Wage (MN, Q2 2012)
Farm Equipment Mechanics	5.44	510	\$17.86
Soil & Plant Scientists	3.98	340	\$30.01
Conservation Scientists	3.30	60	\$28.83
Zoologists & Wildlife Biologists	3.12	80	\$26.24
Stationary Engineers & Boiler Operators	2.91	260	\$26.91
Ag./Food Science Technicians	2.83	170	\$17.69
Locomotive Engineers	2.56	350	\$24.82
Industrial Engineering Technicians	2.39	290	\$24.95
Electrical Power Line Installers & Repairers	2.34	880	\$24.80
Numerical Tool & Process Control Programmers	2.00	120	\$24.80
Forest/Conservation Technicians	2.00	300	\$18.97
Welders & Related	1.79	2,290	\$18.50
Licensed Practical and Vocational Nurses	1.78	5,360	\$19.35
Occupational Therapist Assistants	1.75	210	\$19.78
Surgeons	1.72	280	>\$80.00
Medical & Clinical Lab Technologists	1.71	840	\$28.86
Mechanical Engineering Technicians	1.71	160	\$25.75
Chiropractors	1.67	350	\$32.88
Bus/Truck Mechanics & Diesel Engine Specialists	1.62	1,120	\$20.92
Mechanical Drafters	1.61	330	\$24.95
Tool and Die Makers	1.61	50	\$22.91
Civil Engineering Technicians	1.60	180	\$27.65
Industrial Machinery Mechanics	1.59	1,660	\$23.02

Source: Minnesota Dept. of Employment and Economic Development, *Occupational Employment Statistics and 2010-2020 Regional Projections*; U.S. Bureau of Labor Statistics, *Occupational Employment Statistics*.

equipment mechanics per worker in Greater Minnesota than in the U.S. as a whole.

Table 2 represents a small part of the special workforce needs of Greater Minnesota. Obviously, these needs are going to vary by region, with Northeast Minnesota needing skilled mining workers and the Rochester area requiring more healthcare workers. The list above is instructive, though, in that it shows a heavy reliance on workers employed in natural resources, agriculture, transportation, utilities, manufacturing, and healthcare. Indeed, manufacturing represents 13.6% of total jobs in Greater Minnesota compared to 11.6% in Minnesota and 10.4% in the Twin Cities. Healthcare is another big employer, accounting for 20.2% of employment compared to 16.7% of state and 14.5% of Metro employment. Rural Minnesota's aging populations and wider spaces (more healthcare facilities spread over a large area) create a relatively high need for healthcare workers.

Table 2 is more than a snapshot of skilled occupations representative of Greater Minnesota. These examples represent a slice of the occupations that are particularly critical to industries in the region and are thus critical to the economic health of the region. Life scientists are needed not only to maintain the health of natural resource-driven industries such as forestry and agriculture but also the tourism industry in some cases. Engineering, food science, and production workers support the manufacturing sectors that are particularly strong in Greater Minnesota, such as machinery, food, and fabricated metals. Healthcare workers obviously serve the needs of local populations but also support the healthcare industry as a regional economic driver, as in the Rochester area. Concerns about economic vitality in rural Minnesota are driven in part by the prospect of workforce shortages. As the demographic trends laid out

earlier in this article are borne out, prospects of regional “brain drains” become more likely.

These occupations are not always expected to grow in large numbers over the next ten years. An increase of 50 tool and die makers or 100 food scientists may not seem particularly difficult to fill. However, small numbers of openings can still result in tight labor conditions. In Second Quarter 2012, there were 84 job openings for computer-controlled machine tool operators in Greater Minnesota, according to the Minnesota Job Vacancy Survey. This is certainly far less than the 563 openings for registered nurses or 1,511 openings for fast food workers. However, these 84 openings represent 8.0% of the total employment in that occupation in the region, a number indicative of tight though not necessarily shortage conditions.

A Question of Degrees

According to the Minnesota Office of Higher Education (OHE), in the 2009-10 academic year there were about 36,600 degrees and certificates conferred in Greater Minnesota (see Table 3). Two rounds of the Minnesota Job Vacancy Survey in 2010 found about 11,800 job openings in Greater Minnesota that required some education beyond high school. If one can extrapolate that number to an annual figure, one might find about 24,000 such openings in Greater Minnesota in 2010. This is obviously an over-simplification in many ways, but it shows some degree of surplus of educated workers against available openings. Of course, many of these students have no intention of staying in Greater Minnesota after graduation and will migrate to the Twin Cities or outside the state for employment or additional education. Indeed, producing more educated workers may be less important in some regions than retaining trained workers after graduation.

Table 3: Certificates and Degrees Awarded in Greater Minnesota, 2009-10 Academic Year.

Degree/Certificate Awarded	Number of Certificates & Degrees Awarded
Award of Less than one Year	2,858
Award of at Least one but Less than Two Years	3,078
Associate's Degree	8,245
Award of at Least Two but Less than Four Years	1,331
Bachelor's Degree	17,123
Post-baccalaureate Certificate	633
Master's Degree	3,131
Post Master's Degree	49
Doctor's Degree (Research)	79
Doctor's Degree (Professional Practice)	96

Source: Minnesota Office of Higher Education.

Table 4: Employment Projections for Greater Minnesota by Educational Preparation: 2010-2020.

Educational Preparation	Growth Openings	Replacement Openings	Total Openings	Percent Growth
Less than high school	52,735	91,127	145,101	16.3%
High school diploma or equivalent	64,380	119,421	191,425	12.1%
Some college, no degree	364	862	1,233	11.2%
Postsecondary non-degree award	9,911	11,969	22,248	15.7%
Associate's degree	9,380	11,441	21,169	15.7%
Bachelor's degree	14,468	28,520	43,332	11.4%
Master's degree	2,172	3,206	5,398	14.8%
Doctoral or professional degree	4,685	4,622	9,311	19.8%

Source: Minnesota Dept. of Employment and Economic Development, Occupational Employment Statistics and 2010-2020 Regional Projections.

Table 4 summarizes projected job growth for Greater Minnesota by educational preparation. The future economy will continue to produce jobs across the skill spectrum. Of all the jobs made available through growth and replacement, 23% will require some education beyond high school. The creation of higher-skill (and presumably higher-wage) jobs supports the creation of many more lower-paid jobs typical of much of the service sector. This is generally true in both the metropolitan and rural parts of the country. The issue of workforce shortage is less salient to these low-skill jobs since automation, multiple job-holding, or wage increases may solve potential labor shortages. The high-skill jobs deserve attention as these represent the occupations found in Table 2 and are critical to regional economic development.

Obviously, labor conditions are not the same for all training levels: a bachelor's degree in psychology might provide preparation for a variety of jobs but not necessarily for a higher demand job in welding or machining. Combining the results of Tables 3 and 4 provides some insights into where some areas of scarcity might occur. If one annualizes the 10-year projections above by simply dividing by 10, we would expect there to be about 4,300 openings in jobs requiring a bachelor's degree. In most years, Greater Minnesota produces over 10,000 graduates (17,000 in 2009-10). A similar story plays out with jobs requiring associate's degrees, growing at about 2,100 per year, while in comparison, 2009-10 produced 8,000 graduates. In other words, there are likely to be surpluses of workers with bachelor's and associates degrees. Specific shortages could exist, however, in particular areas such as IT, engineering, or nursing, where graduate numbers are comparatively small, demand is projected to be very large, or students migrate to metropolitan areas in larger

Table 5: Projected employment change by occupational category: Greater Minnesota, 2010-2020.

Occupational Group	Growth Rate	Total Openings	Representative Occupations (Projected Openings)
Management	3.5%	23,040	General & Operations Managers (2,470)
			Health & Medical Managers (1,080)
			Industrial Production Managers (710)
Business & Financial Operations	16.3%	14,960	Accountants & Auditors (2,400)
			Management Analysts (960)
			Market Research Analysts (660)
Computer & Math	15.5%	4,480	Software Developers (1,010)
			Computer Support Specialists (970)
			Network & Computer Systems Administrators (760)
Architecture & Engineering	9.2%	4,170	Mechanical Engineers (640)
			Industrial Engineers (490)
			Mechanical Drafters (330)
Sciences	12.2%	3,540	Clinical, Counseling, and School Psychologists (830)
			Biological Technicians (400)
			Forest & Conservation Technicians (300)
Community & Social Services	19.3%	11,110	Child, Family & School Social Workers (850)
			Education, Guidance, School & Vocational Counselors (510)
			Substance Abuse & Behavior Counselors (490)
Legal	12.6%	1,340	Lawyers (860)
			Paralegals and Legal Assistants (270)
			Court Reporters (60)
Education, Training & Library	5.1%	18,820	Elementary School Teachers (2,840)
			Secondary School Teachers (2,180)
			Special Education Teachers (1,360)
Healthcare Practitioners & Technical	23.6%	31,610	Registered Nurses (9,640)
			Licensed Practical & Vocational Nurses (5,360)
			Emergency Medical Technicians & Paramedics (1,720)

Source: Minnesota Dept. of Employment and Economic Development, 2010-2020 Regional Projections.

numbers. Although educational categories in Tables 3 and 4 do not match up precisely, the general trend is that Greater Minnesota does not have a problem producing graduates. The greater problem might be producing graduates in programs where there is demand and then keeping workers within the region.

Table 5 lists projected employment conditions in various occupational categories in Greater Minnesota that typically require some amount of education beyond high school. Future labor shortages could potentially develop in some of these areas, particularly as the Baby Boom generation retires. When comparing the number of graduates in various programs with occupations, Greater Minnesota typically over-produces graduates when broadly compared to occupational needs. This is particularly true in an area of study such as psychology (1,081 graduates in 2010), where one year of graduates could satisfy 10 years of employment growth. Engineering (399 graduates) and information technology (663 graduates) programs might theoretically produce enough graduates, but the number of workers leaving for metropolitan areas might still leave the region short of workers.

Conclusion

While much of the data above does not support the notion of actual widespread workforce shortages across the entire state, there are bound to be local differences with regional employers having highly specific needs and demographic changes that have direct impacts on those needs. Minnesota State Colleges and Universities recently carried out a series of listening sessions across the state to determine the nature of shortages in various industries, including manufacturing, transportation, information technology, agriculture, and healthcare. The results are found at www.mnworkforceneeds.org

and indicate that employers have a wide range of needs around workforce ranging from very simple “soft skills” to highly specific technical knowledge. Those employers reported a range of difficulties in hiring as well, from a plentitude of applicants without ideal training or experience to a complete absence of applicants. Regional differences abound. For example, employers in northwest Minnesota have been particularly impacted by workers being lured to western North Dakota.

A number of initiatives will help inform our workforce situation in coming months. The Workforce Data Quality Initiative, which links education data to employment data, will allow DEED to answer questions about where graduates work after school in terms of industry, wage, and geography. This will provide more information on the potential for “brain drain” in regions of the state, as well as the employment outcomes concerning programs without a clear-cut path between school and occupational employment (e.g. various liberal arts degrees). DEED is also carrying out a survey on skill needs around key areas in healthcare, manufacturing, and engineering. Preliminary results indicate that issues of shortages are highly complex and involve many factors, including working conditions (location and hours), relatively low wages, lack of experienced applicants, inadequate education, and poor work ethic.

While the magnitude and nature of workforce shortages are being studied and debated, regional entities with a stake in workforce development will need to work together to solve present or future shortages. Educational providers need to work closely with employers to ensure that workers are graduating with the right skills. It is also important to help students make informed decisions about careers and what is available and critical. According to the 2010 American Community Survey, 13% of Minnesota bartenders have a bachelor of arts degree or

higher. Twenty-two percent of retail sales workers have the same background. Presumably, these workers had different expectations when they received those degrees. It is essential that regional education institutions provide materials to students and parents that help them make informed decisions on high-demand occupations in their own backyards.

