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CLUSTER BRIEF

AGRICULTURE

Occupational Opportunity Analysis FOR YUBA COLLEGE



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North/Far North Center of Excellence

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INTRODUCTION AND METHODOLOGY

Yuba College is exploring program opportunities related to agriculture. The college offers related programs in the areas of veterinary technician, agriculture (plant science, pest management), agricultural business, welding, and manufacturing technology.

Given the broad range of programs, this report employs cluster analysis, using models from the U.S. Cluster Mapping Project.¹ Cluster research enables a broader analysis of traditional industry sector research. Cluster analysis investigates industries in the supply chain (e.g., manufacturing, distribution), and focuses on traded (export-oriented) products and services. (Appendix A lists the data sources used for this report, and a full list of the cluster industries for each study region can be found in Appendix B.)

For the purpose of this report, the study area includes the college's service territory, Yuba and Sutter counties, and the 22 counties in the North/Far North region. The clusters analyzed in the study include:

- Agricultural Inputs and Services,
- Food Processing and Manufacturing,
- Livestock Processing,
- Forestry, and
- Wood Products.

To identify workforce opportunities in the clusters, the research incorporated occupational analysis and uses staffing patterns from the industry clusters to identify priority occupations. Since Yuba College is interested in potential transfer pathways to four-year universities from career education (CE) programs, the research includes middle-skill and above-middle-skill occupational data. Drilling down into the specific work requirements from employers, the study also explored job posting data.

Finally, the report offers student completion data from related programs in the North/Far North region. Comparing the community college awards data indicates areas where modified or new programs could support industry and occupational needs.

Data was sourced from the Bureau of Labor Statistics (BLS) and the U.S. Census Bureau (aggregated in Emsi). Job posting data (real-time labor market information) was derived from Burning Glass. Student award data comes from the California Community Colleges Chancellor's Office MIS Data Mart and the U.S. Department of Education's Integrated Postsecondary Education System (IPEDS).

The report is organized into the following sections:

- Industry cluster analysis;
- Occupational overview;
- Occupational demand and wages: maintenance, repair, and mechanics;
- Occupational demand and wages: other middle-skill occupations;
- Occupational demand and wages: above-middle-skill occupations;
- Educational supply; and
- Conclusion & recommendations.

¹ U.S. Cluster Mapping Project, Institute for Strategy and Competitiveness, U.S. Economic Development Administration, <http://www.clustermapping.us>.

INDUSTRY CLUSTER ANALYSIS

Four clusters have most of the employment in Yuba and Sutter counties: agricultural inputs and services, food processing and manufacturing, wood products, and forestry (Exhibit 1).

The data analysis also revealed:

- The agricultural inputs and services cluster represents the largest cluster in the two-county region, with 77 establishments, and about 2,200 employees in 2017. The top two industries in the cluster are farm labor contractors and crew leaders, and postharvest crop activities.
- Food processing and manufacturing is the second largest cluster, with dried and dehydrated food manufacturing representing the largest industry within the cluster, with more than 550 employees. The industry has more than 130 times the employment concentration of the U.S. overall. There are nine establishments in the two-county region in the industry, and growth projections are strong.
- Logging and forest nurseries, and gathering of forest products, represent the top industries in the forestry cluster. These are small, but highly concentrated, industries that have shown some employment growth.
- A variety of industries that produce wood products for shipping, construction, and other miscellaneous products comprise the main wood products industries. These are also small industries that have shown a decline of 15 percent over the last decade. Employment concentrations are high.
- There is not much fishing or related activity in the two-county region.
- The livestock processing cluster registers no employment.

Exhibit 1: Cluster employment trends, location quotient, earnings, and establishments, Yuba and Sutter counties, 2007–2022²

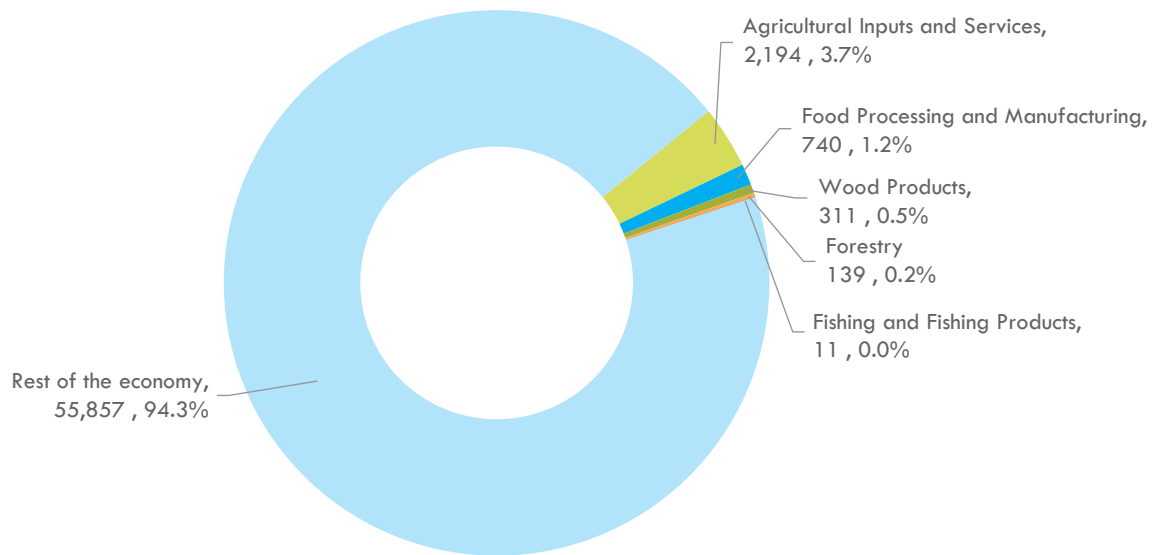
Cluster	2007 Jobs	2012 Jobs	2017 Jobs	2020 Projected Jobs	07–17% Change	2017 LQ (Approx.)	Avg. Earnings Per Job (Approx.)	2017 Establishments
Agricultural Inputs and Services	1,694	1,627	2,194	2,544	29.5%	7.4	\$43,279	77
Food Processing and Manufacturing	614	886	740	716	20.6%	29.1	\$61,045	15
Wood Products	368	230	311	275	-15.3%	5.2	\$51,825	10
Forestry	89	145	139	155	56.2%	13.3	\$63,001	10
Fishing and Fishing Products	-	-	11	14	Insf. Data	Insf. Data	Insf. Data	1
Livestock Processing	-	-	-	-	-	-	-	-



² EMSI 2018.3; QCEW Employees, Non-QCEW Employees and Self-Employed. Sutter and Yuba counties.

Based on employment, five of the six clusters represent less than 6 percent of the economy in Yuba and Sutter counties, accounting for 3,400 of 59,000 total jobs (Exhibit 2).

Exhibit 2: Share of the overall economy by cluster employment, Yuba and Sutter counties, 2017³



Key Finding: Agricultural inputs and services, and food processing and manufacturing are the largest agricultural clusters included in the study, and their industrial activity accounts for about 6 percent of the total economy in Yuba and Sutter counties, around 3,400 jobs.

Analysis of the 22-county North/Far North region shows a richer economic picture—higher employment levels, more industry diversity (employment in all clusters), and generally higher earnings. The clusters’ employment represents a much smaller share of the total economy, however, just over 2 percent.

Exhibit 3 illustrates the following:

- The agricultural inputs and services cluster represents the largest cluster in the 22-county region by employment, but food processing is not far behind. Agricultural inputs had nearly 460 establishments and 13,000 employees in 2017. The top two industries in the cluster are the same as the two-county region, farm labor contractors and crew leaders, and postharvest crop activities. However, several other industries register hundreds of employees including:
 - Soil Preparation, planting, and cultivating;
 - Farm management services;
 - Support activities for animal production;
 - Crop harvesting, primarily by machine; and
 - Fertilizer (mixing only) manufacturing.

³ Ibid. The 22-county North/Far North region includes Butte, Colusa, Del Norte, Glenn, Humboldt, Lake, Lassen, Mendocino, Modoc, Plumas, Shasta, Sierra, Siskiyou, Tehama and Trinity, El Dorado, Placer, Nevada, Sacramento, Sutter, Yolo and Yuba.

- Food Processing and manufacturing is again the second largest cluster. In the wider region, the cluster includes a range of industries with hundreds of employees. The exhibit below includes top industries, but the breadth of food manufacturing in the region is impressive. The top industries by 2017 employment are:
 - Wineries,
 - Fruit and vegetable canning,
 - Breweries,
 - Soft drink manufacturing,
 - Rice milling,
 - Roasted nuts and peanut butter manufacturing,
 - Dried and dehydrated food manufacturing, and
 - Coffee and tea manufacturing.
- Sawmills and other millwork industries comprise a majority of the wood products cluster. Employment by sawmills dropped precipitously during the recession but has somewhat stabilized. Other millwork and wood window and door manufacturing employment has been somewhat stable for the last decade. These top industries have location quotients two and three times the concentration of the nation. Earnings are strong.
- Logging employment has fallen dramatically in the region since the onset of the recession, declining from 2,300 to 1,850 jobs in the last 10 years. These two industries make up most of the employment in the forestry cluster.
- The fishing and fishing products cluster is small. Perhaps not surprisingly, one sizeable industry in the cluster is related to food processing—seafood processing and packaging, with over 250 employees. The industry is related to food manufacturing but is included in the fishing cluster.
- Livestock processing is a small cluster that has lost more than half its employment in the last decade.

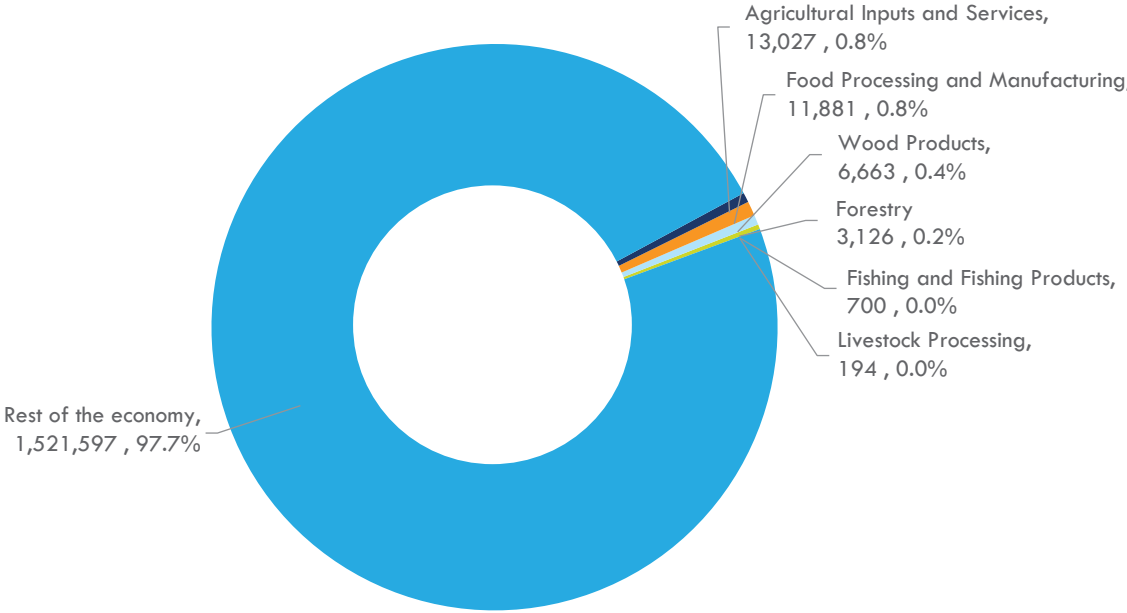
Exhibit 3: Cluster employment trends, location quotient, earnings, and establishments, North/Far North region, 2007–2022⁴

Cluster	2007 Jobs	2012 Jobs	2017 Jobs	2020 Projected Jobs	07–17% Change	2017 LQ (Approx.)	Avg. Earnings Per Job (Approx.)	2017 Establishments
Agricultural Inputs and Services	9,661	9,965	13,027	14,984	34.8%	2.2	\$50,118	459
Food Processing and Manufacturing	9,727	10,125	11,881	12,530	22.2%	1.8	\$62,936	400
Wood Products	9,202	5,815	6,663	6,433	-27.6%	1.6	\$61,185	144
Forestry	3,479	2,854	3,126	3,067	-10.1%	3.8	\$59,118	255
Fishing and Fishing Products	742	827	700	647	-5.6%	1.3	\$56,160	115
Livestock Processing	440	426	194	131	-55.8%	0.2	\$65,869	22

Even though agricultural cluster employment and the number of establishments are much higher in the 22-county region, the share of the economy is four percentage points lower than the two-county region. The six clusters represent just over 2 percent of the economy in the 22-county North/Far North region, accounting for 33,000 jobs out of 1.5 million total jobs (Exhibit 4).

⁴ Ibid.

Exhibit 4: Share of the overall economy by cluster employment, North/Far North region, 2017⁵



Key Finding: Cluster activity is 10 times greater across the 22-county North/Far North region, but agricultural activity in the clusters represents just 2 percent of the total economy in the region, about 33,000 jobs.



⁵ Ibid.

OCCUPATIONAL OVERVIEW

Comparing the share and total employment by skill level of the cluster industries in the two study regions reveals some important areas of strategic focus for Yuba College moving forward.

Staffing patterns across all industries in all study clusters in the two-county region show a disappointing picture. Of the 3,000 employees in cluster industries in the two-county region, occupational estimates indicate few middle-skill and above-middle-skill jobs. Only 5 percent are middle-skill jobs.

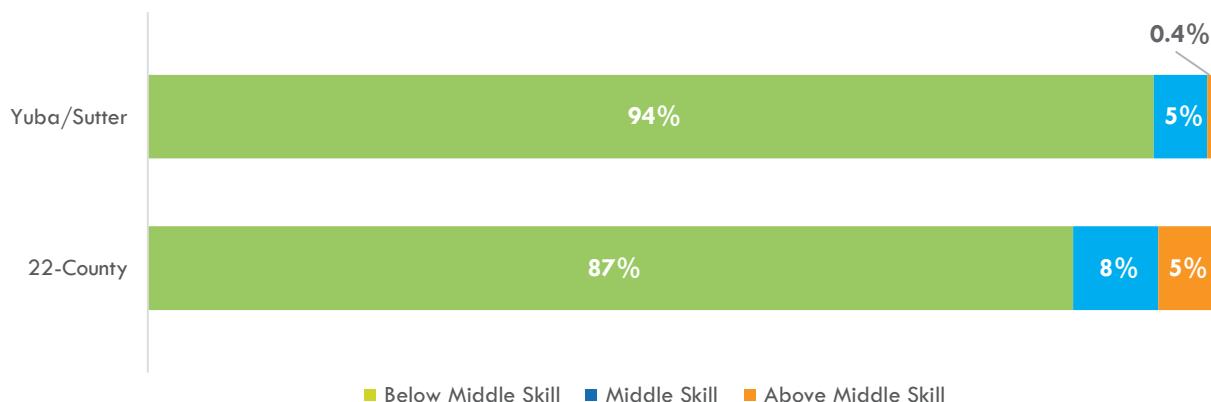
In addition, only five middle-skill occupations have 20 or more employees in the two counties. These occupations include: industrial maintenance mechanics; maintenance workers, machinery; farmers, ranchers, and other agricultural managers; and bookkeeping, accounting, and auditing clerks.

The only above-middle-skill job with employment of 10 or more workers in the staffing patterns is industrial production managers, providing a bleak workforce development picture for the local clusters. Farmworkers and laborers (below-middle-skill) make up the largest occupation overall, with 1,500 workers. Other below-middle-skill occupations span production, logistics, equipment operations, and laborers. None is dominant, and all have low entry-level educational requirements and wages.

Key Finding: There are few middle-skill jobs in the agricultural clusters in the Yuba College service area.

The picture improves, but is still concerning, in the 22-county North/Far North region (Exhibit 5). There is a larger percentage and greater total number of workers with middle-skill jobs (8 percent of total cluster employment) and above-middle-skill jobs (5 percent of total cluster employment).

Exhibit 5: Comparison of occupational employment in all clusters by skill level for Yuba and Sutter counties, and the North/Far North region (n= 3,000; n=35,000)⁶



Recommendation: Yuba College should focus on the broader regional labor market since there are so few middle-skill jobs in the agricultural clusters in the two-county service area. The share is larger, although still narrow, in the 22-county North/Far North region.

⁶ Ibid.

OCCUPATIONAL DEMAND AND WAGES: MAINTENANCE, REPAIR, AND MECHANICS

Industrial machinery mechanics, which employed 365 workers in 2017, tops the list of middle-skill occupations for the 22-county North/Far North region. Other maintenance, repair, and mechanics occupations have modest employment levels. These could represent an opportunity for the community colleges if the needed skills also could be applied to other industries that have a positive employment outlook. Related occupations include maintenance, mechanics, and production technician occupations (Exhibit 6).

Exhibit 6: Maintenance-and-repair middle-skill occupations, cluster staffing patterns, North/Far North region⁷

Top Middle-skill Maintenance/Repair Occupations	# Employed in Clusters, 2017
Industrial Machinery Mechanics	365
Maintenance Workers, Machinery	130
Mobile Heavy Equipment Mechanics	66
Electricians	60
Millwrights	60
Bus and Truck Mechanics and Diesel Engine Specialists	50
Farm Equipment Mechanics and Service Technicians	50

Occupational data shows demand across all industries in the economy, including annual openings (new jobs and replacement jobs due to retirements and separations). Data includes all occupational activity in the 22-county North/Far North region.

The data analysis for occupations in maintenance, repair, and mechanics indicates that a large share of related activity is not taking place in the agriculture-related clusters. Nearly 2,000 industrial machinery mechanics are counted across all industries, but only 365 workers are employed in one of the industry clusters studied. Maintenance workers (machinery), however, comprise a large share of employment in the clusters.



⁷ Ibid.

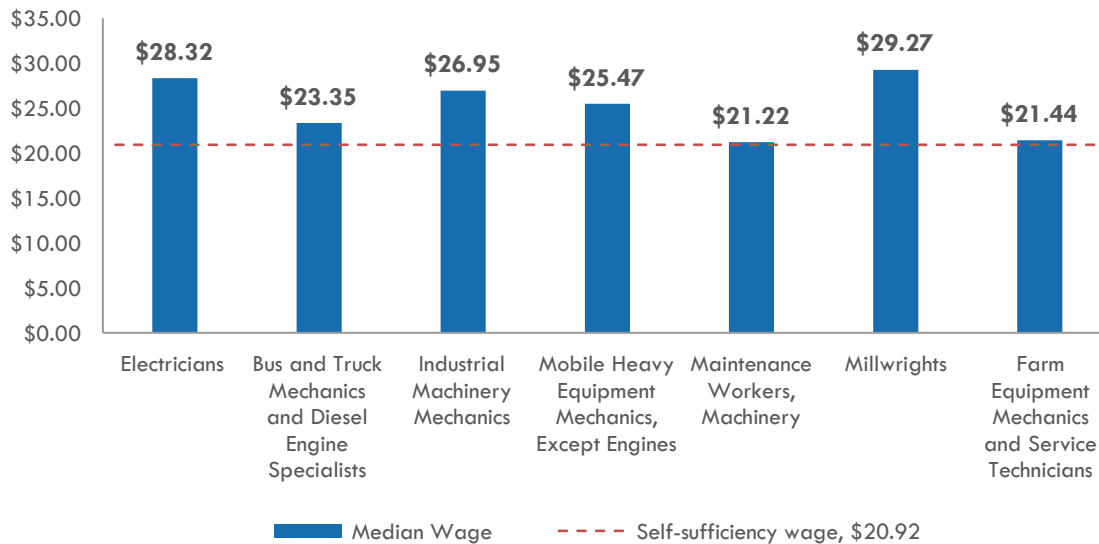
Projected demand is strong for these occupations, with hundreds of annual openings projected over the next five years in the North/Far North region (Exhibit 7).

Exhibit 7: Employment, projected occupational demand, education, and training levels for maintenance/repair workers and mechanics, North/Far North region⁸

SOC	Description	2017 Jobs	5-Year change	5-Year % change	Annual Openings	Typical Entry-level Education	Work Experience/OJT
47-2111	Electricians	5,883	646	11.0%	819	H.S. diploma	None/Apprenticeship
49-3031	Bus and Truck Mechanics and Diesel Engine Specialists	2,162	170	7.9%	232	H.S. diploma	None/Long-term OJT
49-9041	Industrial Machinery Mechanics	1,933	238	12.3%	222	H.S. diploma	None/Long-term OJT
49-3042	Mobile Heavy Equipment Mechanics, Except Engines	1,265	61	4.8%	134	H.S. diploma	None/Long-term OJT
49-9043	Maintenance Workers, Machinery	483	44	9.1%	59	H.S. diploma	None/Long-term OJT
49-9044	Millwrights	273	18	6.5%	29	H.S. diploma	None/Apprenticeship
49-3041	Farm Equipment Mechanics and Service Technicians	262	36	13.7%	34	H.S. diploma	None/Long-term OJT

Occupations in maintenance, repair, and mechanics offer wage levels at and above the self-sufficiency wage for a one-adult, one-child household (Exhibit 8). Four of the seven occupations have median wages above \$25 per hour. All have hourly wages above \$20 per hour.

Exhibit 8: Median hourly wages for occupations in the maintenance, repair, and mechanics cluster⁹



⁸ Ibid.

⁹ Insight Center for Community Economic Development, Self-sufficiency Standard Tool for California, <https://insightccd.org/tools-metrics/self-sufficiency-standard-tool-for-california>.



Data from Burning Glass was used to analyze job postings related to maintenance, repair, and mechanics for the 22-county North/Far North region. The search did not reveal an abundance of jobs but does indicate some demand for technicians. Exhibit 9 displays the top employers, job titles, and skills requested in job postings related to maintenance, repair, and mechanics in the 22-county North/Far North region.

Exhibit 9: Top employers, job titles, and skills in job postings related to maintenance, repair, and mechanics, North/Far North region, August 2017–July 2018¹⁰

Employers		Job Titles		Skills	
Masco Corporation	6	Maintenance Technician	13	Repair	26
Forest Service	4	Maintenance Mechanic	6	Welding	17
LP Building Products	4	Maintenance Electrician	3	Predictive / Preventative Maintenance	10
Elk Grove Milling	3	Maintenance Worker	3	Plumbing	9
Bunge	2	Service Technician	3	Schematic Diagrams	9
ADM	1	Facility Maintenance Technician	2	Machinery	8
E. I. Du Pont De Nemours	1	Facilities Maintenance Technician	1	Facility Maintenance	7
Food People Talent	1	Maintenance Coordinator	1	Hydraulics	7
Industrial Resource Group	1	Maintenance I	1	Customer Service	6
Land O' Lakes, Inc	1	Maintenance Journeyman	1	Electrical Work	6
Leggett & Platt	1	Maintenance Manager	1	Hand Tools	6

Recommendation: Yuba College should investigate training for maintenance, repair, and mechanics occupations in the agricultural clusters and other industries that employ workers with similar skills.

¹⁰ Burning Glass Technologies, "Labor Insight Real-Time Labor Market Information Tool," 2018.

OCCUPATIONAL DEMAND AND WAGES: OTHER MIDDLE-SKILL OCCUPATIONS

A few additional middle-skill occupations appear in modest numbers in the North/Far North cluster staffing patterns (Exhibit 10). These include bookkeeping, agricultural managers, and agricultural and food science technicians.

Exhibit 10: Other middle-skill occupations, cluster staffing patterns, North/Far North region¹¹

Top Middle-skill Occupations, Other	# Employed in Clusters, 2017
Bookkeeping, Accounting, and Auditing Clerks	360
Farmers, Ranchers, and Other Agricultural Managers	340
Agricultural and Food Science Technicians	130

Comparing the demand data for bookkeeping, accounting, and auditing clerks to staffing patterns shows that most bookkeeping activity is not in the cluster. The labor market for agricultural and food science technicians is small, with 450 jobs in the North/Far North region, and 50 projected annual openings (Exhibit 11). Farmers, ranchers, and other agricultural managers has 3,700 jobs, with 300 projected annual openings and no projected growth. In addition, there is limited demand for agricultural and food science technicians, with only 49 annual openings and a 3 percent projected growth rate.

Exhibit 11: Employment, projected occupational demand, education, and training levels for other middle-skill occupations, North/Far North region¹²

SOC	Description	2017 Jobs	5-Year Change	5-Year % Change	Annual Openings	Typical Entry-level Education	Work Experience/OJT
43-3031	Bookkeeping, Accounting, and Auditing Clerks	17,030	351	2.1%	1,983	Some college	None/Moderate-term OJT
11-9013	Farmers, Ranchers, and Other Agricultural Managers	3,712	(1)	0.0%	298	H.S. diploma	>/= 5 years /None
19-4011	Agricultural and Food Science Technicians	458	15	3.2%	49	Associate	None/Moderate-term OJT

¹¹ Ibid.

¹² Ibid.



These occupations have median wages below the self-sufficiency standard for a one-adult, one-child household (Exhibit 12). All occupations in this group have median hourly wages below \$20 per hour. The occupation that is composed of farmers, ranchers, and other agricultural managers has especially low wages, only \$13.50 per hour. (Job posting data for these occupations is included in the following section of the report.)

Exhibit 12: Median hourly wages, other middle-skill occupations¹³



Key Finding: The other middle-skill occupations represent a narrow slice of overall cluster employment, and wages are below the self-sufficiency standard.

¹³ Ibid.

OCCUPATIONAL DEMAND AND WAGES: ABOVE-MIDDLE-SKILL OCCUPATIONS

In the North/Far North region, above-middle-skill jobs represent transfer pathways in business-related occupations: accounting, purchasing, sales, and management occupations. Exhibit 13 displays the top above-middle-skill occupations in the clusters. Overall, the cluster staffing pattern numbers are low. More research would be needed to determine the connections between bookkeeping and accounting positions at the middle-skill level and the occupations requiring a bachelor's degree described below.

Food science and technology is a possible transfer pathway opportunity for agricultural and food science technician jobs. Again, more research is needed to determine the relationship between these occupations.

Exhibit 13: Top above-middle-skill occupations, cluster staffing patterns, North/Far North region¹⁴

Top Above-middle-skill Occupations	# Employed in Clusters, 2017
Industrial Production Managers	169
Managers, All Other	164
Accountants and Auditors	151
Sales Managers	127
Buyers and Purchasing Agents	108
Food Scientists and Technologists	104

Analysis of demand data for the top above-middle-skill occupations reveals substantial workforce demand. Comparing staffing patterns to the occupational demand data shows that the vast majority of the labor market is outside the study clusters (Exhibit 14).

Exhibit 14: Employment, projected occupational demand, education, and training levels for above-middle-skill occupations, North/Far North region¹⁵

SOC	Description	2017 Jobs	5-Year change	5-Year % change	Annual Openings	Typical Entry-level Education	Work Experience/OJT
13-2011	Accountants and Auditors	14,897	698	4.7%	1,468	Bachelor's	None/None
11-9199	Managers, All Other	9,703	657	6.8%	823	Bachelor's	< 5 years/None
11-2022	Sales Managers	4,502	248	5.5%	433	Bachelor's	< 5 years/None
13-1028	Buyers and Purchasing Agents	3,075	48	1.6%	304	Bachelor's	None/Moderate-term OJT
11-3051	Industrial Production Managers	918	76	8.3%	81	Bachelor's	>= 5 years /None
19-1012	Food Scientists and Technologists	272	9	3.3%	30	Bachelor's	None/None

Key Finding: Most management, sales, purchasing, and food science occupational activity is not in agriculture-related cluster industries. Cluster activity represents a narrow opportunity for these occupations. Developing transfer pathways for science and business occupations, contextualized to agriculture, requires further research.

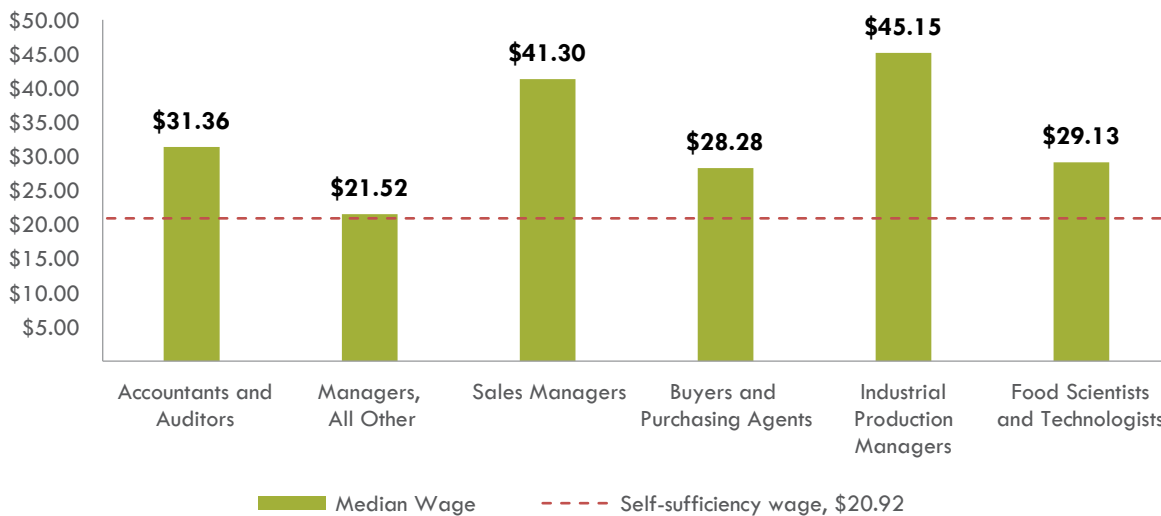
¹⁴ Ibid.

¹⁵ Ibid.



Above-middle-skill occupations have median wages well-above the self-sufficiency standard for a one-adult, one-child household (Exhibit 15). All except one occupation have a median wage of \$28 per hour or above. The exception is managers (all other). Two occupations have median wages of more than \$40 per hour, sales managers and industrial production managers.

Exhibit 15: Median hourly wages, above-middle-skill occupations¹⁶



¹⁶ Ibid.

Exhibit 16 displays job posting data for three categories of employment—management, sales, and food science-related positions—from cluster-related employers in the 22-county North/Far North region. The table shows the top employers, job titles, and skills for each of the three categories.

Job postings for management positions include production manager, account manager, human resources manager, and operations supervisor. Top employers include Land O’ Lakes, Nestle, Monsanto, and the J.M. Smucker Company. However, there were few job postings for managers in the cluster industries over the last 12 months.

As part of the analysis, sales-related positions were separately grouped. Top job titles were sales representative, route sales representative, and route sales driver. Specialist and associate positions also were among the top job postings. Top employers include food producers, such as Schwan Food and Mondelez International, and furniture companies.

There were fewer than 10 postings in the clusters studied in the last 12 months for food science and technician jobs in the 22-county region. Nearly all employers advertising for food scientists and technicians are in university, government, and professional, scientific, and technical services. Variations of agricultural technician and food scientist were the most common job titles. These positions are involved in regulatory compliance, involving safety and quality assurance.

Exhibit 16: Top employers, job titles, and skills for management, sales, and food science positions in job postings, North/Far North region, August 2017–July 2018¹⁷

Employers	Job Titles	Skills
Management-related Positions		
Land O’ Lakes, Inc	5 Production Manager	17 Production Management 20
Masco Corporation	5 Account Manager	9 Sales 15
Monsanto	5 Production Supervisor	6 Budgeting 14
Nestle USA Incorporated	4 Human Resources Manager	5 Quality Assurance and Control 12
The J.M. Smucker Company	4 Manager	5 Quality Management 11
Campbell Soup Company	3 Operations Supervisor	4 Cost Control 10
Syngenta	3 Procurement Manager	3 Lean Six Sigma 10
Forest Service	2 Assistant, Project Management	2 Operations Management 10
Gale Building Products	2 Distribution Manager	2 Scheduling 10
Noble Vineyard Management	2 Division Manager	2 Six Sigma 10

(continued)

¹⁷ Ibid.

Exhibit 16: Top employers, job titles, and skills for management, sales, and food science positions in job postings, North/Far North region, August 2017–July 2018
(continued)

Sales-related Positions					
Schwan Food	36	Sales Representative	27	Sales	80
La-Z-Boy	8	Route Sales Representative	22	Customer Service	69
Mondelez International	8	Route Sales Driver	9	Route Sales	51
Smithfield Foods	6	Sales Associate	8	Direct Sales	32
Masco Corporation	4	Field Sales, Information and Technology Industry	5	Sales Goals	26
Bassett Furniture Industries	3	Product Demonstrator	5	Product Sales	24
Franz Bakery	3	Area Sales Manager	4	Sales Management	21
Schwans Shared Services, LLC	3	Sales Specialist	4	Merchandising	18
Tuff Shed Incorporated	3	Territory Sales Manager	4	Retail Industry Knowledge	17
Club Demonstration Services	2	Brand Ambassador	3	Description and Demonstration of Products	14
Food-science-and-technician-related Positions					
State of California	4	Agricultural Technician	19	Food Safety	11
Safe Food Alliance	3	Agricultural Specialist	3	Repair	9
University California	3	Food Safety Auditor	3	Chemistry	7
Blue Diamond Growers	2	Food Scientist	3	Food Science	7
Chubb	2	Senior Agricultural Technician	3	Quality Assurance and Control	7
Cooperative Agricultural Support Services Authority	2	Technician	3	Quality Management	7
Hupp Draft Services Inc	2	Agriculture Underwriting Technician	2	Cleaning	6
Quest Management	2	Enologist	2	Environmental Science	6
Aspiranet, Inc	1	General Application Inquiries	2	Forklift Operation	6
Bayer Corporation	1	Research Scientist, Food	2	Biology	5

Recommendation: Further research and employer engagement should be conducted to verify if the identified skills require contextualization for agricultural programs, or if general manufacturing, business, management, biology, or chemistry coursework could provide the training needed by employers.

EDUCATIONAL SUPPLY

Exhibit 17 displays the average annual community college completions for agriculture-related TOP codes between 2014 and 2017. (Please refer to other Center of Excellence reports for findings regarding manufacturing, maintenance and repair, business, and management.)

Overall, community college programs conferred, on average, 173 degrees and 124 certificates each year in the North/Far North region. (Appendix C details the awards conferred by college.)

Exhibit 17: Annual average community college awards, North/Far North region, 2014–2017¹

TOP Code and Title	Certificates	Degrees
010100 Agriculture Technology and Sciences, General	6	61
010200 Animal Science	2	0
010210 Veterinary Technician	14	28
010240 Equine Science	0	13
010300 Plant Science	0	1
010310 Agricultural Pest Control Adviser and Operator	3	0
010900 Horticulture	17	13
010910 Landscape Design and Maintenance	7	7
010920 Floriculture / Floristry	3	0
010930 Nursery Technology	6	1
011200 Agriculture Business, Sales and Service	7	18
011400 Forestry	2	3
011500 Natural Resources	24	23
011510 Parks and Outdoor Recreation	4	1
011520 Wildlife and Fisheries	4	0
011600 Agricultural Power Equipment Technology	24	4
TOTAL	124	173

Key Finding: Agricultural program completions account for a modest number of awards for the North/Far North region—about 300 certificates and degrees each year.

¹⁸ COE Supply Tables, California Community Colleges Chancellor's Office MIS Data Mart.

CONCLUSION & RECOMMENDATIONS

The overall finding of this report is that the employment outlook is somewhat limited for many clusters related to agriculture. The clusters studied in this report account for a small percentage, about 6 percent, of the overall economy in Yuba College's service area, Yuba and Sutter counties. Cluster employment is more diverse and 10 times larger in the 22-county North/Far North region, but the cluster accounts for just over 2 percent of the regional economy. The two largest clusters in the North/Far North region and the two-county area are agricultural inputs and services, and food processing and manufacturing.

Middle-skill and above-middle-skill occupational employment accounts for a miniscule share of cluster employment in Yuba and Sutter counties; staffing patterns yielded numbers too small to analyze. In the North/Far North region, 8 percent of the clusters' occupational employment is middle skill, and 5 percent is above middle skill. These numbers are low for CE program developers at the community colleges who might target these occupations for training.

The clearest and best opportunity for the community colleges is to target middle-skill occupations serving related cluster industries, such as occupations in maintenance, repair, and mechanics. These occupations align with community college education and training levels. Wages are at or above self-sufficiency levels for occupations in maintenance, repair, and mechanics.

It should be noted that job postings are not a reliable source for measuring workforce demand. Instead, the job posting analysis provided in this report offers insights into the top employers, job titles and skills associated with certain types of occupations. Still, the research revealed only low numbers of job postings in cluster industries. Most related job activity is outside the clusters.

Regarding community college completions, nonagricultural program areas, including manufacturing technology, industrial electronics, general management, business, and accounting, could supply workers to meet occupational demand in the agricultural clusters researched for this report. Similarly, many of the agriculture-related programs do not appear to align with industry and occupational demand, or the skills from job postings.

This study was not able to uncover workforce development opportunities directly related to the clusters identified for analysis. Workforce training and education should serve cluster needs and provide students with transferable knowledge and skills beyond the agricultural cluster. Any new or expanded coursework should not focus solely on the industry clusters studied in this report.

Additional key findings:

- The staffing patterns and occupational demand data reveal a common theme: The majority of occupational employment is not in the agriculture-related industry clusters studied.
- Workforce development opportunities were not apparent among the other middle-skill occupations analyzed in this report. Food science technicians have limited overall employment, limited cluster employment, and median wages below \$20 per hour. Agricultural managers show modest demand but have dismal median wages. The only other middle-skill occupation is accounting and bookkeeping. The degree to which contextualized training related to agriculture might be needed could not be determined.
- Regarding above-middle-skill occupations analyzed for this report, a range of occupations were identified: industrial production managers, accountants, sales managers, buyers and purchasing agents, and food scientists. Projected demand for these occupations is substantial. However, the degree to which business, management, accounting, or sales occupations require contextualized agricultural coursework could not be determined.
- The job posting analysis indicates that many of the skills, knowledge, and abilities needed by cluster industry employers are strongly related to skills required by other industries.



- Analysis of community college award data for agriculture and natural resources programs shows that a significant share of occupational demand could be fulfilled by other program areas, such as business, management, accounting, manufacturing, and industrial technology. Similarly, the cluster analysis and staffing pattern analysis did not show occupational demand aligned with many of the programs listed.

Recommendations:

- Employer engagement should take place regionally and statewide beyond Yuba College's two-county service area since the research shows that opportunities for middle-skill occupations are limited in agriculture-related clusters.
- Employer engagement and additional research should explore similarities between in-demand agricultural skills, knowledge, and abilities and related industries.
- Additional research and employer engagement should be conducted to explore four-year university awards and enrollment data for agricultural sciences, business, and management programs. Transfer pathways that supply students for business and management occupations may not need additional feeder programs if enrollments are robust. Similarly, comparing the awards data to the labor market information may indicate whether supply is adequate for university programs.
- Occupations in maintenance, repair, and mechanics present an opportunity for program development. Wages and demand are strong in this area. The COE conducted a survey of manufacturing, logistics, and warehousing employers in Northern California presented in the report "Industrial Maintenance Mechanics Workforce Needs Assessment: Survey Results from Northern California Employers," published in June 2018 in conjunction with Valley Vision.¹⁹ Many of the employers surveyed belong to the cluster industries investigated for this report. Others extend beyond, such as manufacturing suppliers and utilities. The report revealed the high potential for community college education and training related to industrial maintenance mechanics in the North/Far North region. Specific, related curriculum is not offered by one program or department, and in some cases, the community colleges in the North/Far North region do not offer coursework for skills, knowledge, and abilities in demand by employers.
- The COE has participated in ongoing labor market research efforts by the Sector Navigator of Agriculture, Water, and Environmental Technology through the Working Landscapes action team, and other projects. Yuba College should review this research for additional findings that may yield program development opportunities.

¹⁹ Centers of Excellence, "Industrial Maintenance Mechanics Workforce Needs Assessment: Survey Results from Northern California Employers," June 2018, https://valleyvision.org/wp-content/uploads/2018/07/COE-Industrial-Maintenance-Mechanics-Workforce-Needs-V.Final_.pdf.

APPENDIX A: SOURCES

- U.S. Department of Labor/Employment and Training Administration (DOLETA) O*NET OnLine
- Burning Glass, Labor Insight/Jobs
- Economic Modeling Specialists, International (Emsi)
- Employment Development Department, Labor Market Information Division (EDD, LMID)
- Bureau of Labor Statistics, Occupational Employment Statistics (OES)
- California Community Colleges Chancellor's Office, Cal-PASS Plus LaunchBoard
- Santa Rosa Junior College, CTE Outcomes Survey (CTEOS)
- Living Insight Center for Community Economic Development, Self-Sufficiency Standard Tool for California
- California Community Colleges Chancellor's Office Management Information Systems (MIS) Data Mart
- U.S. Cluster Mapping Project, U.S. Economic Development Administration; Institute for Strategy and Competitiveness, Harvard University



APPENDIX B: CLUSTER INDUSTRIES

High location quotients and low employment numbers characterize the cluster industries in Yuba and Sutter counties (Exhibit B1). Only 20 industries qualified for inclusion in the analysis; other industries did not have enough employment and were not included in the staffing patterns analysis.

Exhibit B1: Cluster industries included in the Yuba-and-Sutter-counties analysis, employment and location quotient, 2017

NAICS	Description	Cluster	2017 Jobs	2017 Location Quotient
115115	Farm Labor Contractors and Crew Leaders	Agricultural Inputs and Services	1,670	13.91
115114	Postharvest Crop Activities (except Cotton Ginning)	Agricultural Inputs and Services	340	9.99
115112	Soil Preparation, Planting, and Cultivating	Agricultural Inputs and Services	95	6.96
115113	Crop Harvesting, Primarily by Machine	Agricultural Inputs and Services	52	10.01
115210	Support Activities for Animal Production	Agricultural Inputs and Services	19	1.26
115116	Farm Management Services	Agricultural Inputs and Services	16	2.17
311710	Seafood Product Preparation and Packaging	Fishing and Fishing Products	11	0.84
311423	Dried and Dehydrated Food Manufacturing	Food Processing and Manufacturing	577	132.66
312111	Soft Drink Manufacturing	Food Processing and Manufacturing	85	2.84
311821	Cookie and Cracker Manufacturing	Food Processing and Manufacturing	47	3.62
424510	Grain and Field Bean Merchant Wholesalers	Food Processing and Manufacturing	16	0.90
312113	Ice Manufacturing	Food Processing and Manufacturing	16	5.66
113310	Logging	Forestry	83	3.13
113210	Forest Nurseries and Gathering of Forest Products	Forestry	29	33.07
115310	Support Activities for Forestry	Forestry	27	3.67
321918	Other Millwork (including Flooring)	Wood Products	134	8.74
321214	Truss Manufacturing	Wood Products	90	8.33
321999	All Other Miscellaneous Wood Product Manufacturing	Wood Products	39	3.30
321920	Wood Container and Pallet Manufacturing	Wood Products	28	1.17
321912	Cut Stock, Resawing Lumber, and Planing	Wood Products	21	4.29
TOTAL			3,395	

High location quotients and employment levels higher than the two-county study region characterize the cluster industries in the 22-county study region (Exhibit B2).

Exhibit B2: Cluster industries included in the 22-county North/Far North analysis, employment and location quotient, 2017

NAICS	Description	Cluster	2017 Jobs	2017 Location Quotient
115115	Farm Labor Contractors and Crew Leaders	Agricultural Inputs and Services	7,607	2.41
115114	Postharvest Crop Activities (except Cotton Ginning)	Agricultural Inputs and Services	2,340	2.62
115112	Soil Preparation, Planting, and Cultivating	Agricultural Inputs and Services	1,637	4.55
115116	Farm Management Services	Agricultural Inputs and Services	513	2.59
115210	Support Activities for Animal Production	Agricultural Inputs and Services	508	1.26
115113	Crop Harvesting, Primarily by Machine	Agricultural Inputs and Services	256	1.86
325314	Fertilizer (Mixing Only) Manufacturing	Agricultural Inputs and Services	154	1.90
325311	Nitrogenous Fertilizer Manufacturing	Agricultural Inputs and Services	11	0.14
114111	Finfish Fishing	Fishing and Fishing Products	306	2.12
311710	Seafood Product Preparation and Packaging	Fishing and Fishing Products	255	0.74
114112	Shellfish Fishing	Fishing and Fishing Products	139	1.00
312130	Wineries	Food Processing and Manufacturing	1,791	2.82
311421	Fruit and Vegetable Canning	Food Processing and Manufacturing	1,483	2.56
312120	Breweries	Food Processing and Manufacturing	1,348	2.02
312111	Soft Drink Manufacturing	Food Processing and Manufacturing	1,222	1.55
311212	Rice Milling	Food Processing and Manufacturing	1,179	24.58
311911	Roasted Nuts and Peanut Butter Manufacturing	Food Processing and Manufacturing	1,058	6.96
311423	Dried and Dehydrated Food Manufacturing	Food Processing and Manufacturing	743	6.50
311920	Coffee and Tea Manufacturing	Food Processing and Manufacturing	481	2.19
424510	Grain and Field Bean Merchant Wholesalers	Food Processing and Manufacturing	389	0.85
311821	Cookie and Cracker Manufacturing	Food Processing and Manufacturing	332	0.98
311511	Fluid Milk Manufacturing	Food Processing and Manufacturing	298	0.56
311119	Other Animal Food Manufacturing	Food Processing and Manufacturing	181	0.54
311520	Ice Cream and Frozen Dessert Manufacturing	Food Processing and Manufacturing	157	0.76
311513	Cheese Manufacturing	Food Processing and Manufacturing	155	0.33

(continued)

Exhibit B2: Cluster industries included in the 22-county North/Far North analysis, employment and location quotient, 2017 (continued)

NAICS	Description	Cluster	2017 Jobs	2017 Location Quotient
312112	Bottled Water Manufacturing	Food Processing and Manufacturing	153	0.99
311211	Flour Milling	Food Processing and Manufacturing	136	1.00
311991	Perishable Prepared Food Manufacturing	Food Processing and Manufacturing	123	0.24
311412	Frozen Specialty Food Manufacturing	Food Processing and Manufacturing	111	0.20
311352	Confectionery Manufacturing from Purchased Chocolate	Food Processing and Manufacturing	77	0.25
311225	Fats and Oils Refining and Blending	Food Processing and Manufacturing	72	1.11
311942	Spice and Extract Manufacturing	Food Processing and Manufacturing	63	0.27
312140	Distilleries	Food Processing and Manufacturing	61	0.45
311941	Mayonnaise, Dressing, and Other Prepared Sauce Manufacturing	Food Processing and Manufacturing	55	0.34
311111	Dog and Cat Food Manufacturing	Food Processing and Manufacturing	47	0.19
311224	Soybean and Other Oilseed Processing	Food Processing and Manufacturing	30	0.36
311830	Tortilla Manufacturing	Food Processing and Manufacturing	21	0.11
311351	Chocolate and Confectionery Manufacturing from Cacao Beans	Food Processing and Manufacturing	19	0.22
311824	Dry Pasta, Dough, and Flour Mixes Manufacturing from Purchased Flour	Food Processing and Manufacturing	18	0.08
311514	Dry, Condensed, and Evaporated Dairy Product Manufacturing	Food Processing and Manufacturing	18	0.11
312113	Ice Manufacturing	Food Processing and Manufacturing	17	0.24
311314	Cane Sugar Manufacturing	Food Processing and Manufacturing	17	0.30
311813	Frozen Cakes, Pies, and Other Pastries Manufacturing	Food Processing and Manufacturing	16	0.12
311919	Other Snack Food Manufacturing	Food Processing and Manufacturing	10	0.03
113310	Logging	Forestry	1,851	2.66
115310	Support Activities for Forestry	Forestry	1,114	5.71
113210	Forest Nurseries and Gathering of Forest Products	Forestry	137	5.96
113110	Timber Tract Operations	Forestry	24	0.75
424520	Livestock Merchant Wholesalers	Livestock Processing	100	0.57
311612	Meat Processed from Carcasses	Livestock Processing	53	0.04

(continued)

Exhibit B2: Cluster industries included in the 22-county North/Far North analysis, employment and location quotient, 2017 (continued)

NAICS	Description	Cluster	2017 Jobs	2017 Location Quotient
311613	Rendering and Meat Byproduct Processing	Livestock Processing	23	0.27
311611	Animal (except Poultry) Slaughtering	Livestock Processing	19	0.01
321113	Sawmills	Wood Products	2,631	3.16
321918	Other Millwork (including Flooring)	Wood Products	1,244	3.10
321911	Wood Window and Door Manufacturing	Wood Products	1,121	2.28
321920	Wood Container and Pallet Manufacturing	Wood Products	300	0.48
321212	Softwood Veneer and Plywood Manufacturing	Wood Products	293	2.13
321999	All Other Miscellaneous Wood Product Manufacturing	Wood Products	288	0.94
321912	Cut Stock, Resawing Lumber, and Planing	Wood Products	206	1.58
321214	Truss Manufacturing	Wood Products	193	0.68
321114	Wood Preservation	Wood Products	159	1.62
321213	Engineered Wood Member (except Truss) Manufacturing	Wood Products	118	1.98
321992	Prefabricated Wood Building Manufacturing	Wood Products	59	0.39
321219	Reconstituted Wood Product Manufacturing	Wood Products	50	0.37
TOTAL			35,592	



APPENDIX C: COMMUNITY COLLEGE SUPPLY

Exhibit C1 shows a breakdown of community college completions by program area in the 22-county North/Far North region.

Exhibit C1: Annual average community college completions by program area in the North/Far North region, 2014–2017²⁰

TOP Code and Title / Award Type / College	3-year Avg
010100 - Agriculture Technology and Sciences, General	
Certificate	
Sierra	6
Associate Degree	
Butte	6
Feather River	16
Lassen	6
Redwoods	4
Shasta	14
Sierra	8
Woodland	5
Yuba	1
010200 - Animal Science	
Certificate	
Shasta	2
010210 - Veterinary Technician (Licensed)	
Certificate	
Cosumnes River	9
Yuba	5
Associate Degree	
Cosumnes River	17
Yuba	12
010240 - Equine Science	
Associate Degree	
Cosumnes River	2
Feather River	12
010300 - Plant Science	
Associate Degree	
Butte	1

TOP Code and Title / Award Type / College	3-year Avg
010310 - Agricultural Pest Control Adviser and Operator (Licensed)	
Certificate	
Butte	2
Shasta	1
010900 - Horticulture	
Certificate	
American River	13
Butte	2
Cosumnes River	1
Shasta	1
Associate Degree	
Butte	4
Mendocino	5
Shasta	2
Woodland	2
010910 - Landscape Design and Maintenance	
Certificate	
American River	3
Butte	2
Cosumnes River	1
Mendocino	1
Associate Degree	
American River	6
Cosumnes River	1
010920 - Floriculture / Floristry	
Certificate	
Butte	3

(continued)

²⁰ COE Supply Tables, California Community Colleges Chancellor's Office DataMart.

Exhibit C1: Annual average community college completions by program area in the North/Far North region, 2014–2017 (continued)

TOP Code and Title / Award Type / College	3-year Avg
010930 - Nursery Technology	
Certificate	
American River	5
Mendocino	1
Associate Degree	
American River	1
011200 - Agriculture Business, Sales and Service	
Certificate	
Butte	4
Cosumnes River	1
Woodland	1
Associate Degree	
Butte	12
Cosumnes River	3
Shasta	3
011400 - Forestry	
Certificate	
Redwoods	2
Associate Degree	
Redwoods	3
011500 - Natural Resources	
Certificate	
American River	20
Butte	1
Shasta	3
Associate Degree	
American River	7
Butte	10
Shasta	4
Siskiyou	1
011510 - Parks and Outdoor Recreation	
Certificate	
Butte	4
Associate Degree	
Butte	1

TOP Code and Title / Award Type / College	3-year Avg
011520 - Wildlife and Fisheries	
Certificate	
Butte	4
011600 - Agricultural Power Equipment Technology	
Certificate	
Butte	5
Shasta	18
Associate Degree	
Butte	4

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