

LABOR MARKET ANALYSIS

FOR PROGRAM RECOMMENDATION



C·O·E

CENTERS OF EXCELLENCE
FOR LABOR MARKET RESEARCH

SOIL CONSERVATION IN THE GREATER SACRAMENTO REGION

North (Greater Sacramento)
Center of Excellence

OCTOBER 2022

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SUMMARY

The North (Greater Sacramento) of Excellence for Labor Market Research prepared this report to provide a labor market analysis of educational supply and occupational demand for middle-skilled career pathways in the North (Greater Sacramento) subregion. This report aims to determine if demand in the local labor market is unmet by the supply from existing community college programs and other postsecondary training providers.

This report primarily focuses on training that leads to jobs in middle-skilled occupations - jobs that typically require education beyond a high school diploma but less than a bachelor's degree - but may include higher-skilled occupations for training pathways that lead to a bachelor's degree. Lowered skilled occupations are rarely considered in this analysis due to the lessened barriers for entry-level work, such as no formal education and on-the-job training requirements.

Key findings include:

- Most of Greater Sacramento's soil conservation jobs are in middle-skill occupations. Nearly three-quarters of soil conservation jobs in 2021 were found among the agricultural and forest conservation technician occupations.
- Most annual job openings are concentrated at the middle-skill level, with 117 yearly openings for the agricultural, forest, and conservation technicians over the next five years.
- Wage data shows that soil conservation occupations earn \$2 to \$14 above the single adult living wage of \$14.53 per hour.
- American River College (ARC) in the Greater Sacramento area offers a degree and multiple certificate programs under the Natural Resources (0115.00) TOP code.
- Between 2018-19 and 2020-21, UC Davis conferred an average of 92 bachelor's degrees in these programs over the last three years.

Recommendations include:

- The North (Greater Sacramento) Center of Excellence recommends moving forward with developing new certificate and associate degree programs in soil conservation at the community level.

INTRODUCTION

The North (Greater Sacramento) Center of Excellence (COE) was asked to provide labor market information for a proposed program at a regional community college. This report focuses on the following Standard Occupational Classification (SOC) occupations and codes:

- These middle-skill occupations require more education and training beyond a high school diploma but less than a four-year degree:
 - Agricultural Technicians (19-4012)
 - Forest and Conservation Technicians (19-4071)
- Students who transfer and earn a four-year degree could pursue the following high-skill occupations:
 - Soil and Plant Scientists (19-1013)
 - Conservation Scientists (19-1031)

A review of related programs revealed the following Taxonomy of Programs (TOP) title(s) and code(s) are appropriate for inclusion in this report:

- Natural Resources (0115.00)

The corresponding Classification of Instructional Program (CIP) title(s) and code(s) are:

- Natural Resources/Conservations, General (03.0101)
- Agroecology and Sustainable Agriculture (01.0308)

OCCUPATIONAL DEMAND

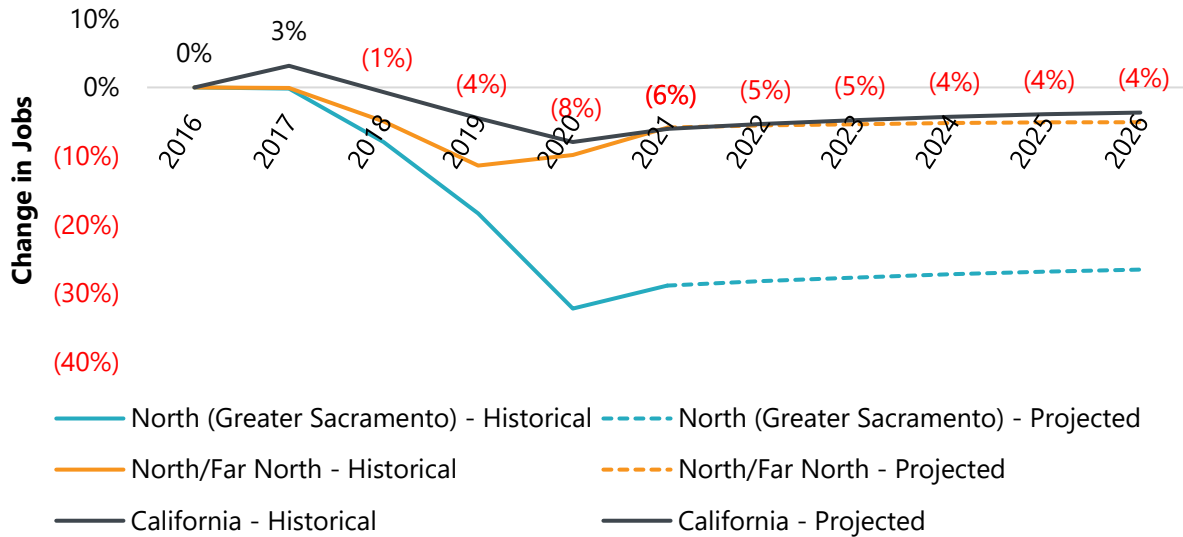
Exhibit 1 summarizes the five-year projected job growth for middle-skill and high-skill occupations in the North, North/Far North, and California.

Exhibit 1. Employment and projected demand, 2021-2026

Occupation	2021 Jobs	2026 Jobs	2021-2026 Change	2021-2026 % Change	2021-2026 Annual Openings
Agricultural Technicians	201	209	8	4%	27
Forest and Conservation Technicians	715	726	11	1%	90
Soil and Plant Scientists	164	172	8	5%	19
Conservation Scientists	183	198	14	8%	20
North (Greater Sacramento)	1,263	1,304	41	3%	157
Agricultural Technicians	311	323	11	4%	43
Forest and Conservation Technicians	2,652	2,627	(25)	(1%)	327
Soil and Plant Scientists	204	217	13	6%	25
Conservation Scientists	356	386	30	8%	40
North/Far North	3,524	3,553	29	1%	434
Agricultural Technicians	2,141	2,204	63	3%	291
Forest and Conservation Technicians	6,472	6,451	(21)	(0%)	805
Soil and Plant Scientists	2,045	2,155	110	5%	242
Conservation Scientists	1,653	1,812	159	10%	190
California	12,311	12,622	311	3%	1,527

Exhibit 2 compares the percent change in jobs between 2016 through 2021 and the projected changes through 2026. The rate of change is indexed to the total number of jobs in 2016.

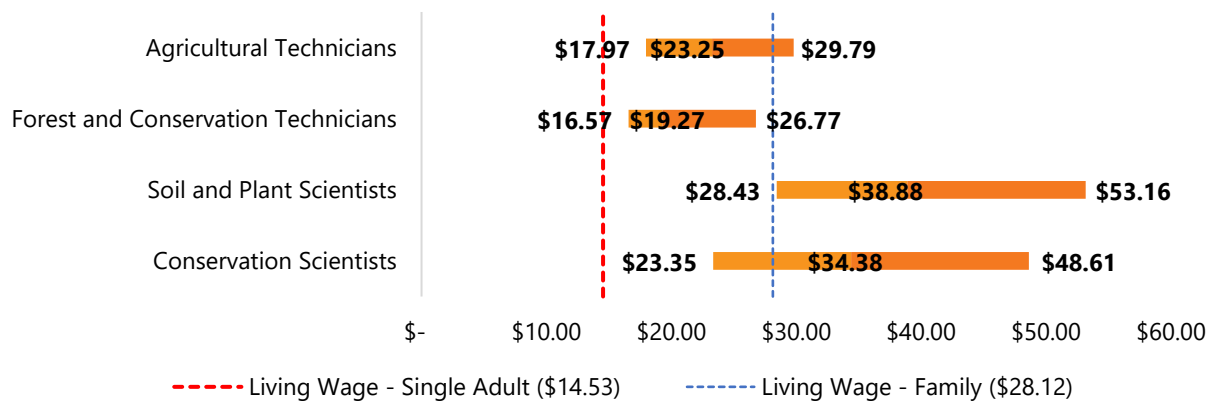
Exhibit 2. Changes in employment, 2016-2026



WAGES

Exhibit 3 compares the entry-level, median, and experienced wages for the selected occupations to the North (Greater Sacramento) living wage¹ for a single adult (\$14.53 per hour) and a small family² (\$28.12 per hour).

Exhibit 3. Comparison of wages by occupation, 2021



¹ Living wage is defined as the level of income a single adult with no children must earn to meet basic needs, including food, housing, transportation, healthcare, taxes, and other miscellaneous basic needs. Please note that the 25th-percentile and 75th-percentile hourly wages are used as proxy for entry-level and experienced-level wages.

² A small family is defined as a single adult and one school aged child (between the ages of 5 and 12 years).

JOB POSTINGS

This section analyzes recent data from online job postings (real-time LMI). Online job postings may provide additional insight into recent changes in the labor market that are not captured by historical trends.

The North COE identified 333 online job postings for the selected occupations in the Greater Sacramento subregion. Job posting data comes from Lightcast (formerly EMSI Burning Glass) and represents new listings posted online within the last year, from October 1, 2021, to September 30, 2021.

Occupations and Job Titles

Exhibit 4 details the number of online job postings for the selected occupations.

Exhibit 4. Number of job postings by occupation

Occupation	Job Postings	Share of Job Postings
Forest and Conservation Technicians	120	36%
Conservation Scientists	87	26%
Agricultural Technicians	81	24%
Soil and Plant Scientists	45	14%
Total Job Postings	333	100%

Exhibit 5 shows the top 10 job titles with the most job postings and the share. All job postings included a job title.

Exhibit 5. Top jobs titles

Job Title	Job Postings	Share of Job Postings
Agricultural Technicians	48	14%
Forestry Technicians	41	12%
Botanists	18	5%
Park Rangers	17	5%
Forestry Aides	15	5%

Job Title	Job Postings	Share of Job Postings
Conservationists	11	3%
Natural Resources Specialists	7	2%
Soil Scientists	6	2%
Timber Sale Preparation Forestry Technicians	6	2%
Interpretive Specialists	5	2%

Employers

Exhibit 6 shows the top 10 employers with the most job postings for the selected occupations.

Exhibit 6. Employers with the most job postings

Employer	Job Postings	Share of Job Postings
Forest Service	39	12%
State of California	25	8%
Bureau of Land Management	16	5%
California Public Utilities Commission	11	3%
University of California, Agriculture and Natural Resources	10	3%
University of California	9	3%
California Department of Food & Agriculture (Cdfa)	7	2%
Bureau of Reclamation	6	2%
American Conservation Experience	5	2%
ICF International	5	2%

Certifications, Skills, and Experience

Exhibit 7 shows the most relevant certifications requested by employers for the selected occupations.

Exhibit 7. Most in-demand certifications

Certification	Job Postings	Share of Job Postings
Pesticide Applicator License	7	2%
Certified Crop Advisor	6	2%
Certified Professional Agronomist	4	1%
Certified Professional Soil Scientist	4	1%
Certified Professional In Erosion And Sediment Control (CPESC)	2	1%
GIS Certificate	1	0%

Exhibit 8 shows the top 10 skills across three categories for the studied occupations: specialized, human-centered, and technical skills.

Exhibit 8. Most in-demand specialized skills

Top 10 Specialized Skills	Top 10 Human-Centered Skills	Top 10 Technical Skills
Forestry	Management	Microsoft Excel
Agriculture	Valid Driver's License	Global Positioning Systems
Biology	Communications	Microsoft Office
Soil Science	Planning	Geographic Information Systems
Resource Management	Operations	ArcGIS (GIS Software)
Irrigation (Landscaping and Agriculture)	Research	Microsoft Word
Natural Resource Management	Coordinating	Microsoft Access
Rangeland Management	Customer Service	Microsoft Outlook

Top 10 Specialized Skills	Top 10 Human-Centered Skills	Top 10 Technical Skills
Data Collection	Leadership	ArcMap
Ecology	Detail Oriented	Microsoft PowerPoint

Exhibit 9 shows employers' minimum level of education for job postings for the selected occupations.

Exhibit 9. Employer-preferred minimum education levels

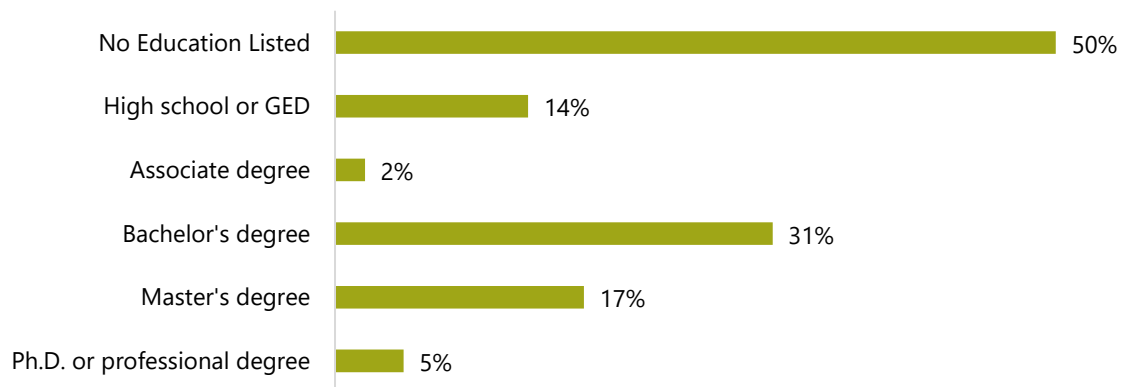
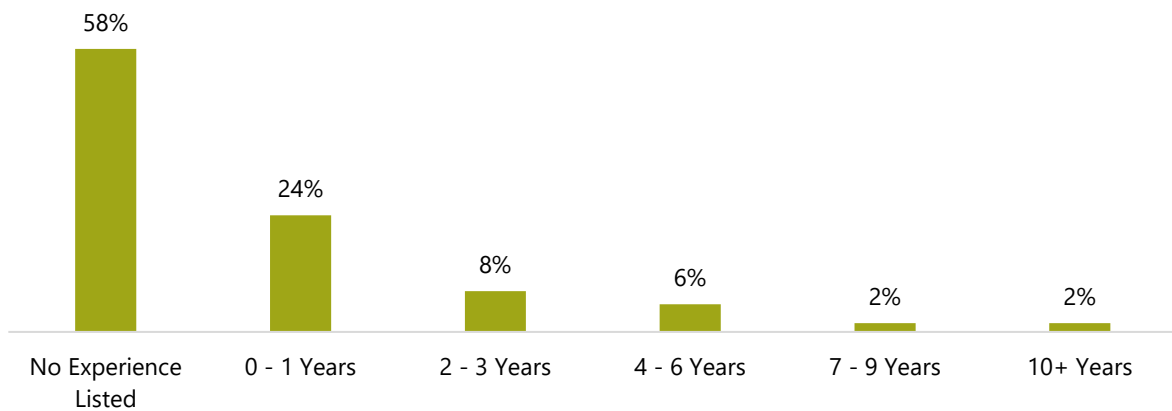


Exhibit 10 shows the experience levels required by employers for job postings for the selected occupations.

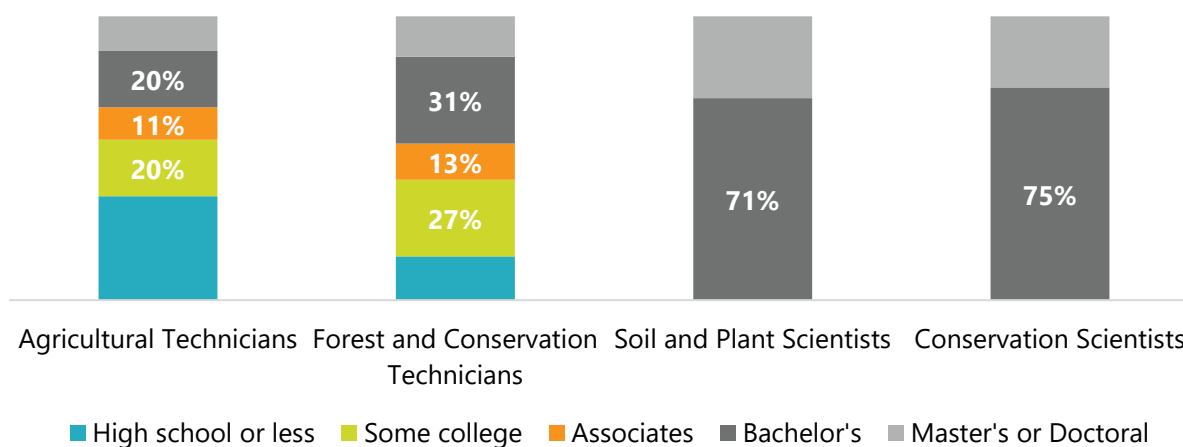
Exhibit 10. Employer-preferred experience levels



EDUCATION AND TRAINING

The U.S. Census Bureau collects education data from workers employed in occupations. Exhibit 11 shows the state-level educational attainment of the current workforce in the selected occupations.

Exhibit 11. California worker educational attainment for selected occupations, 2019



The Bureau of Labor Statistics (BLS) uses a system to assign categories for entry-level education, work experience in a related occupation, and typical on-the-job training to each occupation for which the BLS publishes projections data. Exhibit 12 shows the selected occupations' entry-level job requirements.

Exhibit 12. Typical education, work experience, and on-the-job training requirements

Occupation	Typical Entry-level Education	Work Experience Required	On-the-job Training Required
Agricultural Technicians	Associate degree	None	Moderate-term on-the-job training
Forest and Conservation Technicians	Associate degree	None	None
Soil and Plant Scientists	Bachelor's degree	None	None
Conservation Scientists	Bachelor's degree	None	None

EDUCATIONAL SUPPLY

Educational supply for an occupation can be estimated by analyzing the number of awards issued in related Taxonomy of Programs (TOP) or Classification of Instructional Programs (CIP) codes. Exhibit 13 shows the TOP and CIP codes for educational programs related to the selected occupations.

Exhibit 13. TOP and CIP codes for training programs related to the selected occupations

TOP Programs and Codes	Aligned CIP Programs and Codes
Natural Resources (0115.00)	Natural Resources/Conservations, General (03.0101) Agroecology and Sustainable Agriculture (01.0308)

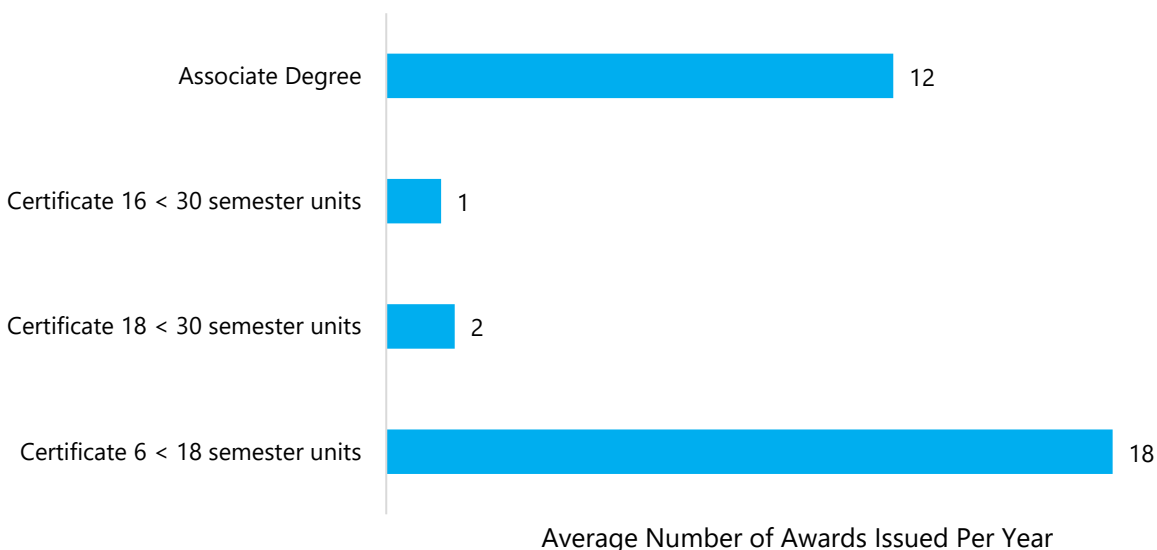
Community College Supply

Exhibits 14 and 15 compare the average number of certificates and degrees from selected community college programs over the last three academic years.

Exhibit 14. Annual average community college awards by program, 2018-19 through 2020-21

Program - TOP Code	College	Annual Awards 2018-19	Annual Awards 2019-20	Annual Awards 2020-21	3-Yr Annual Awards Average
Natural Resources (0115.00)	American River	33	28	38	33
	Grand Total	33	28	38	33

Exhibit 15. Annual average community college awards by type, 2018-19 through 2020-21



Other Postsecondary Supply

Exhibit 16 compares the average number of degrees that non-community college training providers conferred in the North (Greater Sacramento) subregion over the last three academic years. Please note that non-community college data lags by one year.

Exhibit 16. Other postsecondary awards by program, 2017-18 through 2019-20

Program - CIP Code	College	Annual Awards 2017-18	Annual Awards 2018-19	Annual Awards 2019-20	3-Yr Annual Awards Average
Natural Resources/Conservations, General (03.0101)	UC Davis (Bachelor's degree)	60	58	63	60
	Subtotal	60	58	63	60
Agroecology and Sustainable Agriculture (01.0308)	UC Davis (Bachelor's degree)	26	37	33	32
	Subtotal	26	37	33	32
	Grand Total	86	95	96	92

FINDINGS

- This report focuses on four occupations in the soil conservation career pathway: agricultural technicians, forest and conservation technicians, soil and plant scientists, and conservation scientists.
- The North (Greater Sacramento) subregion held 1,263 soil conservation jobs in 2021. These jobs are projected to increase by 3% over the next five years, adding 41 new jobs to the subregion by 2026.
 - Most of Greater Sacramento's soil conservation jobs are in middle-skill occupations. Nearly three-quarters of soil conservation jobs in 2021 (n = 916 jobs) were found among the agricultural and forest conservation technician occupations.
 - Though only one-quarter of soil conservation jobs are found in the soil, plant, and conservation scientist occupations, employment in these high-skill occupations is projected to grow faster than middle-skill jobs over the next five years.
- Soil conservation jobs are projected to grow at the same rate in the North (Greater Sacramento) subregion as in California.
- Over the next five years, soil conservation jobs are projected to have 157 annual openings in the North (Greater Sacramento) subregion. More than 10% of the state's yearly soil conservation job openings are in the Greater Sacramento area.
 - Most annual job openings are concentrated at the middle-skill level, with 117 yearly openings for the agricultural, forest, and conservation technicians over the next five years.
- Wage data shows that soil conservation occupations earn \$2 to \$14 above the single adult living wage of \$14.53 per hour. Middle-skill occupations have entry-level wages ranging between \$16 and \$18 per hour, while wages for high-skill occupations start between \$23 and \$29 per hour.
- According to real-time labor market information, there were 333 online job postings for soil conservation occupations between October 1, 2021, and September 30, 2021. Job postings were highest for forest and conservation technicians (n = 120), followed by conservation scientists (n = 87).
- Between 31% and 40% of agricultural, forest, and conservation technicians have educational attainment levels consistent with community college offerings (some college or associate degrees). Another 20% to 31% of workers in these occupations hold a bachelor's degree.

- More than 70% of soil, plant, and conservation scientists have a bachelor's degree, and the remaining 30% have advanced graduate degrees.
- American River College (ARC) in the Greater Sacramento area offers a degree and multiple certificate programs under the Natural Resources (0115.00) TOP code. ARC conferred an average of 33 awards through its natural resources programs over the last three academic years (2018-19 through 2020-21).
- The University of California, Davis offers bachelor's degrees in programs related to soil conservation. Between 2018-19 and 2020-21, UC Davis conferred an average of 92 bachelor's degrees in these programs over the last three years. Please note that non-community college awards data often lags by one year.

RECOMMENDATIONS

- Based on a three-year average of annual awards in North (Greater Sacramento) subregion soil conservation programs and projected yearly openings, the supply gap analysis shows that the region seems to have room for additional training at the middle-skill level.
 - Community colleges issued an average of 33 awards over the last three years.
 - There are 117 projected annual openings for middle-skilled soil conservation jobs over the next five years.
- The North (Greater Sacramento) Center of Excellence recommends moving forward with the soil conservation certificate and terminal degree programs at the community college level.
- The supply-gap analysis for high-skill soil conservation occupations suggests an oversupply of awards in this area. Further study will be needed to substantiate local demand for transfer programs in this area.

New Program Recommendation		
Move forward with the new program	Proceed with caution	A new program is not recommended
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

APPENDIX A. METHODOLOGY AND SOURCES

This report identified Occupations using the Center of Excellence TOP-to-CIP-to-SOC crosswalk and O*Net OnLine. This report's findings were determined using labor market data from the Bureau of Labor Statistics (BLS), U.S. Census Bureau data from Emsi, and jobs posting data from Burning Glass.

Lightcast (Formerly EMSI Burning Glass) 2022.3; QCEW Employees, Non-QCEW Employees, and Self-Employed. <https://www.economicmodeling.com/>. *Note: EMSI occupational employment data are based on final EMSI industry data and final EMSI staffing patterns. Wage estimates are based on Occupational Employment Statistics (QCEW and Non-QCEW Employees classes of worker) and the American Community Survey (Self-Employed and Extended Proprietors).*

Integrated Postsecondary Education Data System (IPEDS). National Center for Education Statistics. U.S. Department of Education. <https://nces.ed.gov/ipeds/>.

Labor Market Information Division. California Employment Development Department. <https://labormarketinfo.edd.ca.gov/>.

Management Information Systems (MIS) Data Mart. California Community Colleges Chancellor's Office. <https://datamart.cccco.edu/>.

O*NET OnLine. U.S. Department of Labor/Employment and Training Administration (DOL ETA). <https://www.onetonline.org/>.

Public Use Microdata Sample (PUMS). U.S. Census Bureau American Community Survey (ACS). <https://www.census.gov/programs-surveys/acs/microdata.html>

Self-Sufficiency Standard Tool for California. The University of Washington. <http://www.selfsufficiencystandard.org/>

"Taxonomy of Programs." California Community Colleges Chancellor's Office. June 2012, 6th Edition. <https://www.cccco.edu/-/media/CCCCO-Website/About-Us/Divisions/Educational-Services-and-Support/Academic-Affairs/What-we-do/Curriculum-and-Instruction-Unit/Files/TOPmanual6200909corrected12513pdf.ashx>

"TOP-CIP-SOC Crosswalk." Centers of Excellence for Labor Market Research. June 2021 Edition. <http://coecc.net/>

APPENDIX B. GLOSSARY OF KEY TERMS

Key Terms	Definition
Occupation	Occupation refers to professions, or careers, in the workforce. Occupations differ from jobs in that jobs show the number of positions held in a given occupation.
Jobs	<p>A job is any position where a worker provides labor for monetary compensation.</p> <p>Job numbers include employees (those who work for businesses) and proprietors (those who work for themselves). Full- and part-time jobs are included and counted equally (i.e., not adjusted to full-time equivalents). Data for jobs, or employment, are annual averages.</p>
Job Change	Job change is the net increase or decrease of jobs over a given timeframe.
Job Openings	<p>Job openings are the projected number of positions available for workers entering an occupation.</p> <p>Openings include growth and replacement jobs. Growth jobs are the positive change in the total number of workers employed. Replacement jobs are the estimates of new workers needed to replace workers permanently leaving the occupation.</p>
Wages	Wages, or compensation, show workers' percentile and average earnings in a given occupation. The 25th-percentile and 75th-percentile hourly wages are used as a proxy for entry-level and experienced-level wages.
Living Wage	The living wage is the level of income a single adult with no children must earn to meet basic needs. The living wage is calculated using basic levels of allowances for food, housing, transportation, healthcare, taxes, and other miscellaneous basic needs.
Educational Attainment	Educational attainment is the level of education achieved by workers in a given occupation. The data includes workers aged 25 years and older.
Typical Entry-level Education	The education level generally required for employment in an occupation. It may differ from the actual educational levels attained by workers in any given occupation.
Work Experience Required	The level of prior experience a worker needs to enter a job in a given occupation.
On-the-job Training Required	The level of on-the-job training a worker needs to obtain competency in a given occupation.
Awards	Awards are the number of certificates and degrees conferred for a specific course of study in a given year. Awards counts "papers" and, as a result, may be greater than the actual number of students who complete a program.

COVID-19 Statement: This report includes employment projection data by EMSI. EMSI's projections are modeled on recorded (historical) employment figures and incorporate several underlying assumptions, including the assumption that the economy during the projection period will be at approximately full employment or potential output. To the extent that a recession or labor shock, such as the economic effects of COVID-19, can cause long-term structural change, they may impact the projections. At this time, it is not possible to quantify the impact of COVID-19 on projections of industry and occupational employment. Other measures such as unemployment rates and monthly industry employment estimates will reflect the most recent information on employment and jobs in the state and, in combination with input from local employers, may help validate current and future employment needs as depicted here.

Important Disclaimer: All representations included in this report have been produced from primary research and/or secondary review of publicly and/or privately available data and/or research reports. Efforts have been made to qualify and validate the accuracy of the data and the reported findings; however, neither the Centers of Excellence, COE host District, nor California Community Colleges Chancellor's Office are responsible for applications or decisions made by recipient community colleges or their representatives based upon components or recommendations contained in this study.

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Centers of Excellence for Labor Market Research, Economic and
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