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Labor Market Analysis

Environmental Science



Prepared by Central Valley/Mother Lode Center of Excellence



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Summary

The Central Valley/Mother Lode Center of Excellence developed this report for Clovis College to determine whether there is demand in the local labor market that is not being met by the supply from postsecondary programs. This report summarizes labor market demand, wages, skills, and postsecondary supply for *environmental science* occupations, which include:

- First-Line Supervisors of Farming, Fishing, and Forestry Workers (SOC 45-1011)
- Forest and Conservation Technicians (SOC 19-4071)
- Forest and Conservation Workers (SOC 45-4011)
- Foresters (SOC 19-1032)

Key Findings

- **Occupational Demand** — Occupations related to *environmental science* have a labor market demand of 918 annual job openings in the South Central Valley/Southern Mother Lode (SCV/SML) subregion. Between 2022 and 2027, *First-line Supervisors of Farming, Fishing, and Forestry Workers* are projected to have the most demand with 713 annual job openings.
- **Wages** — Average entry-level earnings of \$17.51/hour for *environmental science* occupations are higher than the living wage in the SCV/SML subregion. *Foresters* earn the highest entry-level wage, \$22.53/hour.
- **Employers and Job Titles** — Employers in the SCV/SML subregion include United States Forest Service, State of California, and United States Department of the Interior. The most common job title is forestry technician.
- **Skills** — The top baseline skill is management; the top specialized skill is forestry; and the top software skill is Microsoft Office.
- **Education** — A high school diploma or equivalent is typically required for *First-Line Supervisors of Farming, Fishing, and Forestry Workers* and *Forest and Conservation Workers*, while an associate degree is typically required for *Forest and Conservation Technicians*, and a bachelor's degree is required for *Foresters*.
- **Supply and Demand Analysis** — Based on 918 annual openings (i.e., demand) and 100 postsecondary awards conferred (i.e., supply), an analysis of supply and demand suggests there is an undersupply of 818 workers in the SCV/SML subregion. In the CVML region, 127 awards were conferred suggesting an undersupply of 1,128 workers (based on 1,255 annual openings in the CVML region).

Recommendation

Based on a comparison of demand and supply, there is an undersupply of trained workers in the SCV/SML subregion and the CVML region. The Center of Excellence recommends that Clovis College work with the regional directors, the college's advisory board, and local industry in the creation or expansion of programs to address the shortage of workers.

Introduction

The Central Valley/Mother Lode Center of Excellence developed this report to provide Clovis College with labor market information for *environmental science* occupations. The geographical focus for this report is the South Central Valley/Southern Mother Lode (SCV/SML) subregion, but regional demand and supply data has been included for broader applicability and use. Analysis of the program and occupational data related to *environmental science* occupations is included in the report. The Standard Occupational Classification (SOC) System codes and occupational titles used in this report from the Bureau of Labor Statistics and O*NET OnLine are shown below.

First-Line Supervisors of Farming, Fishing, and Forestry Workers (SOC 45-1011)

- **Job description:** Directly supervise and coordinate the activities of agricultural, forestry, aquacultural, and related workers.
- **Knowledge:** Administration and Management, Production and Processing, Customer and Personal Service, English Language, Mechanical
- **Skills:** Coordination, Critical Thinking, Monitoring, Speaking, Management of Personnel Resources

Forest and Conservation Technicians (SOC 19-4071)

- **Job description:** Provide technical assistance regarding the conservation of soil, water, forests, or related natural resources. May compile data pertaining to size, content, condition, and other characteristics of forest tracts under the direction of foresters, or train and lead forest workers in forest propagation and fire prevention and suppression. May assist conservation scientists in managing, improving, and protecting rangelands and wildlife habitats.
- **Knowledge:** Public Safety and Security, English Language, Customer and Personal Service, Law and Government, Administration and Management
- **Skills:** Active Listening, Critical Thinking, Reading Comprehension, Judgement and Decision Making, Speaking

Forest and Conservation Workers (SOC 45-4011)

- **Job description:** Under supervision, perform manual labor necessary to develop, maintain, or protect areas such as forests, forested areas, woodlands, wetlands, and rangelands through such activities as raising and transporting seedlings; combating insects, pests, and diseases harmful to plant life; and building structures to control water, erosion, and leaching of soil. Includes forester aides, seedling pullers, tree planters, and gatherers of nontimber forestry products such as pine straw.
- **Knowledge:** English Language, Public Safety and Security, Administration and Management, Customer and Personal Service, Biology
- **Skills:** Critical Thinking, Monitoring, Active Learning, Active Listening, Coordination

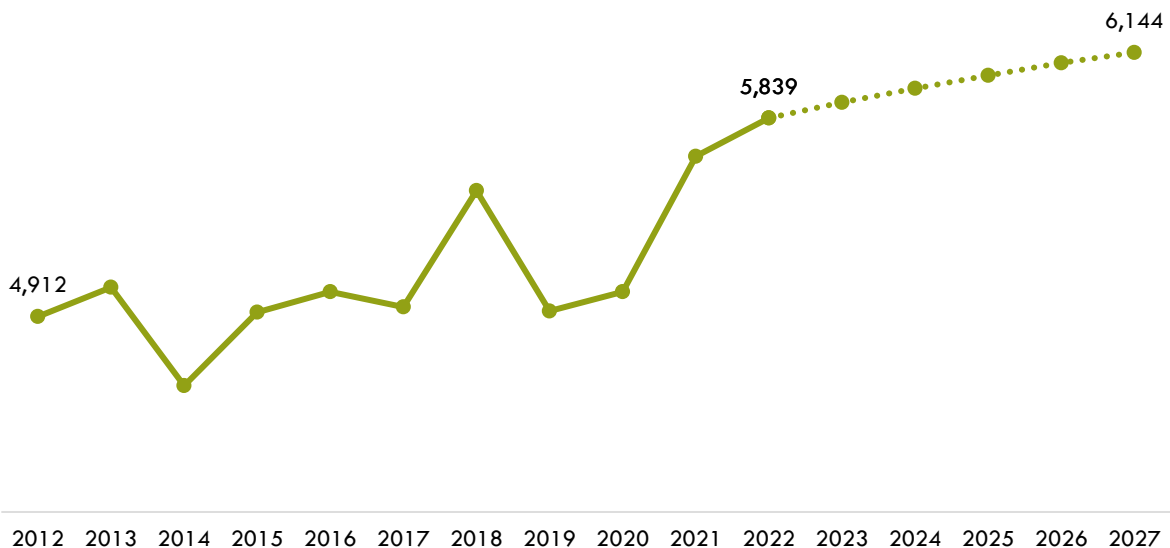
Foresters (SOC 19-1032)

- **Job description:** Manage public and private forested lands for economic, recreational, and conservation purposes. May inventory the type, amount, and location of standing timber, appraise the timber's worth, negotiate the purchase, and draw up contracts for procurement. May determine how to conserve wildlife habitats, creek beds, water quality, and soil stability, and how best to comply with environmental regulations. May devise plans for planting and growing new trees, monitor trees for healthy growth, and determine optimal harvesting schedules.
- **Knowledge:** Customer and Personal Service, Administration and Management, English Language, Biology, Law and Government
- **Skills:** Active Listening, Complex Problem Solving, Critical Thinking, Reading Comprehension, Speaking

Employment

Exhibit 1a shows trends for *environmental science* occupations in the SCV/SML subregion. Between 2022 to 2027, the number of jobs for occupations related to *environmental science* is projected to increase by 305, growing by 5%.

Exhibit 1a. Historical employment and projected occupational demand for occupations related to *environmental science* in the SCV/SML subregion, 2012-2027



Occupations related to *environmental science* in the SCV/SML subregion employed 5,839 workers in 2022 (Exhibit 1b). *First-Line Supervisors of Farming, Fishing, and Forestry Workers* are projected to have the largest annual openings, 713.

Exhibit 1b. Current employment and projected occupational demand for occupations related to *environmental science* in the SCV/SML subregion, 2022-2027

Occupation	2022 Jobs	2027 Jobs	5-Year Change	5-Year % Change	Annual Openings
First-Line Supervisors of Farming, Fishing, and Forestry Workers	4,425	4,724	300	7%	713
Forest and Conservation Technicians	767	746	(20)	(3%)	94
Forest and Conservation Workers	501	515	14	3%	95
Foresters	146	159	12	9%	16
TOTAL	5,839	6,144	305	5%	918

Exhibit 1c. Current employment and projected occupational demand for *zoologists and wildlife biologists* and *conservation scientists* in the SCV/SML subregion, 2022-2027

Occupation	2022 Jobs	2027 Jobs	5-Year Change	5-Year % Change	Annual Openings
Zoologists and Wildlife Biologists	126	135	9	7%	10
Conservation Scientists	158	165	7	4%	10
TOTAL	284	300	16	6%	20

Wages

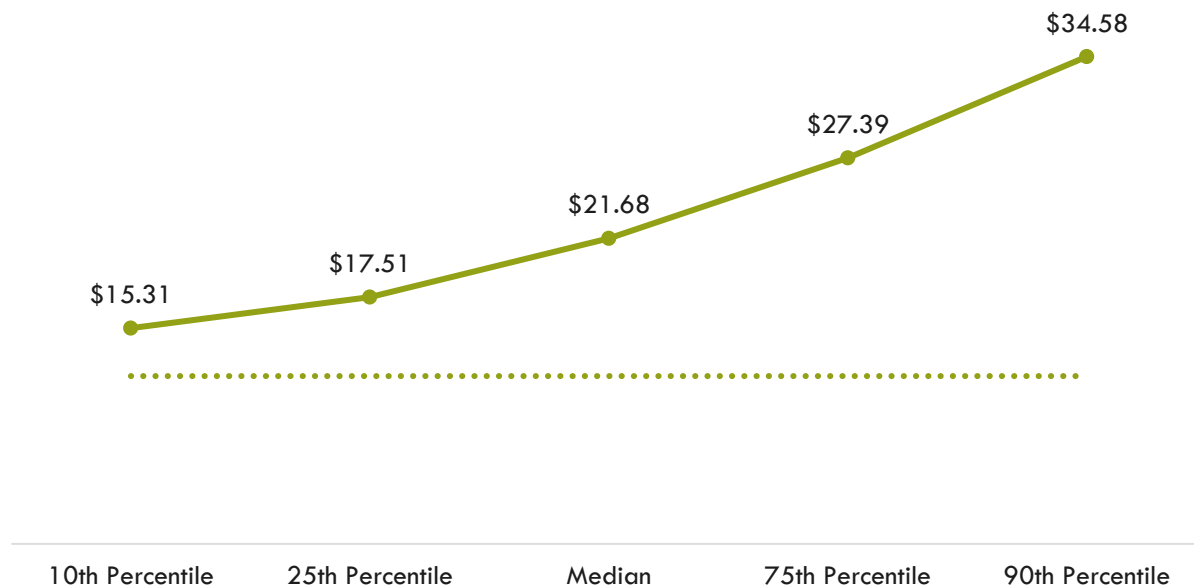
Exhibit 2a shows the hourly wages for the four occupations studied in this report. Foresters have the highest entry-level wage, \$22.53/hour.¹

Exhibit 2a. Hourly wages for occupations related to *environmental science* in the SCV/SML subregion.

Occupation	25 th Percentile Hourly Earnings	Median Hourly Earnings	75 th Percentile Hourly Earnings
First-Line Supervisors of Farming, Fishing, and Forestry Workers	\$16.45	\$20.61	\$27.05
Forest and Conservation Technicians	\$16.91	\$19.27	\$25.95
Forest and Conservation Workers	\$14.16	\$17.00	\$20.44
Foresters	\$22.53	\$29.82	\$36.12

Exhibit 2b shows the average hourly wages for *environmental science* occupations; all four average wages are well above the living wage for the SCV/SML subregion.

Exhibit 2b. Average hourly wages for occupations related to *environmental science* in the SCV/SML subregion.



¹ Note: 10th and 25th percentiles are considered entry-level wages while 75th and 90th are considered experienced wages, which may be obtained through long-term employment or extra training, etc.

Job Postings

There were 260 unique job postings for occupations related to *environmental science* in the SCV/SML subregion from May 2023 to April 2024.²

Top Employers

The top employers with the most job postings are listed in Exhibit 3. The top employers in online job postings were United States Forest Service, State of California, and United States Department of the Interior.

Exhibit 3. Top employers

Employer
United States Forest Service
State of California
United States Department of the Interior
The Salvation Army
The Salvation Army Golden State Division
Farm Service Agency
Revol Greens CA
The Salvation Army Western Division

Top Job Titles

Exhibit 4 shows the most common job titles for *environmental science* in the SCV/SML subregion.

Exhibit 4. Top job titles

Job Title
Forestry Technicians
Forestry Aides
Natural Resources Technicians
Forestry Technicians (Dispatch)
Wildlife Technicians
Conservation Technicians

² Other than occupational titles and job titles, the categories below can be counted one or multiple times per job posting, and across several areas in a single posting. For example, a skill can be counted in two different skill types, and an employer can indicate more than one education level.

Education

Of the 260 unique job postings, 165 listed a preferred or minimum educational requirement for the position being filled. Among those, 55% requested a high school diploma or GED, 8% requested an associate degree, and 24% requested a bachelor's degree (Exhibit 5).

Exhibit 5. Education levels requested in job postings for *environmental science* occupations

Education Level	Job Postings	% of Job Postings
High school or GED	90	55%
Associate degree	13	8%
Bachelor's degree	40	24%
Master's degree or above	22	13%

Baseline, Specialized, and Software Skills

Exhibit 6 depicts the top baseline, specialized, and software skills in job postings. The most requested baseline skill is management. The most requested specialized skill is forestry. The most requested software skill is Microsoft Office.

Exhibit 6. In-demand baseline, specialized, and software skills for *environmental science* in job postings

Baseline Skills	Specialized Skills	Software Skills
Management	Forestry	Microsoft Office
Operations	Agriculture	Geographic Information Systems
Communications	Rangeland Management	ArcGIS (GIS Software)
Planning	Fire Suppression Systems	Spreadsheets
Mathematics	Wildfire Suppression	Database Systems

Education, Work Experience, & Training

A high school diploma or equivalent is typically required for *First-Line Supervisors of Farming, Fishing, and Forestry Workers* and *Forest and Conservation Workers*, while an associate degree is typically required for *Forest and Conservation Technicians*, and a bachelor's degree is required for *Foresters* (Exhibit 7).

Exhibit 7. Education, work experience, and training for occupations related to *environmental science*³

Occupation	Typical Entry-level Education	Work Experience Required	Typical On-The-Job Training
First-Line Supervisors of Farming, Fishing, and Forestry Workers	High school diploma or equivalent	Less than 5 years	None
Forest and Conservation Technicians	Associate degree	None	None
Forest and Conservation Workers	High school diploma or equivalent	None	Moderate-term on-the-job training
Foresters	Bachelor's Degree	None	None

Supply

An analysis of program data from the Integrated Postsecondary Education Data System (IPEDS) for the last three program years shows that, on average, 100 awards were conferred in the SCV/SML subregion (Exhibits 8 and 9).

Exhibit 8. TOP and CIP codes

TOP Titles	CIP Titles
	03.0501 – Forestry, General
0114.00 – Forestry	
0115.00 – Natural Resources	03.0511 – Forest Technology/Technician
	03.0599 – Forestry, Other

³ "Labor Force Statistics from the Current Population Survey," Bureau of Labor Statistics, <https://www.bls.gov/cps/>.

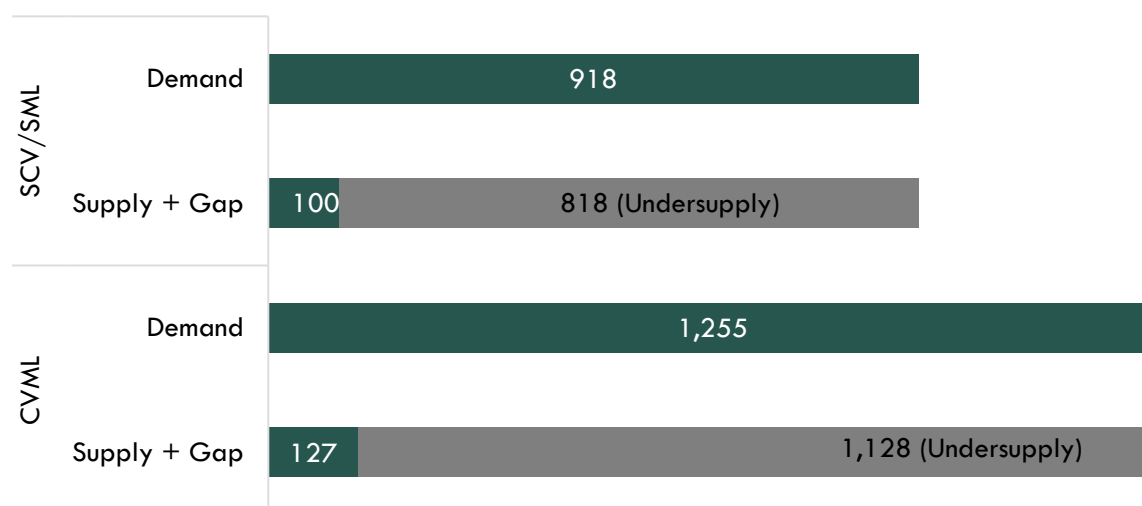
Exhibit 9. Postsecondary supply, Program Years 2019-20 through 2021-22

TOP/CIP Code- Title	College	Associate Degree	Certificate 30 < 60 Semester Units	Certificate 16 < 30 Semester Units	TOTAL
0114.00 - Forestry	Bakersfield	12	1		13*
	Columbia	9	2	1	12
	Reedley	12		39	51*
0115.00 – Natural Resources	Columbia	14	1		15
	Fresno City			3	3*
	Reedley	12		21	33*
SCV/SML TOTAL		36	1	63	100
CVML TOTAL		59	4	64	127

*SCV/SML awards

There is an undersupply of 818 *environmental science* workers in the SCV/SML subregion and an undersupply of 1,128 workers in the CVML region (Exhibit 10).

Exhibit 10. *Environmental Science* workforce demand (annual job openings), postsecondary awards (supply), and additional students needed to fill gap in the SCV/SML subregion and region



Recommendation

This report suggests there is a shortage of 818 workers in the SCV/SML subregion and a shortage of 1,128 workers in the CVML region for *environmental science*. Based on these findings, it is recommended that Clovis College work with the regional directors, the college's advisory board, and local industry in the creation or expansion of programs to address the shortage of workers in the region.

Appendix: Methodology & Data Sources

Data Sources

Labor market and educational supply data compiled in this report derive from a variety of sources. Data were drawn from external sources, including the Economic Modeling Specialists, Inc., the California Community Colleges Chancellor's Office Management Information Systems Data Mart and the National Center for Educational Statistics (NCES) Integrated Postsecondary Education Data System (IPEDS). Below is the summary of the data sources found in this study.

Data Type	Source
Labor Market Information/Population Estimates and Projections/Educational Attainment	Economic Modeling Specialists, Intl. (Lightcast). Lightcast occupational employment data are based on final Lightcast industry data and final Lightcast 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). Occupational wage estimates also affected by county-level Lightcast earnings by industry: economicmodeling.com.
Typical Education Level and On-the-job Training	Bureau of Labor Statistics (BLS) uses a system to assign categories for entry-level education and typical on-the-job training to each occupation for which BLS publishes projections data: https://www.bls.gov/emp/tables/educational-attainment.htm .
LaunchBoard	Chancellor's LaunchBoard. https://www.calpassplus.org/LaunchBoard/SWP.aspx
Labor Force, Employment and Unemployment Estimates	California Employment Development Department, Labor Market Information Division: labormarketinfo.edd.ca.gov .
Job Posting and Skills Data	Lightcast: https://lightcast.io/ .
Additional Education Requirements/Employer Preferences	The O*NET Job Zone database includes over 900 as well as information on skills, abilities, knowledge, work activities and interests associated with specific occupations: onetonline.org .

Key Terms and Concepts

Annual Job Openings: Annual openings are calculated by dividing the number of years in the projection period by total job openings.

Education Attainment Level: The highest education attainment level of workers age 25 years or older.

Employment Estimate: The total number of workers currently employed.

Employment Projections: Projections of employment are calculated by a proprietary Economic Modeling Specialists, Intl. (LIGHTCAST) formula that includes historical employment and economic indicators along with national, state and local trends.

LaunchBoard (Attained the Living Wage): Among SWP students who exited college and did not transfer to any postsecondary institution, the proportion who attained the district county living wage for a single adult measured immediately following academic year of exit.

LaunchBoard (Median Annual Earnings): Among SWP students who exited the community college system and who did not transfer to any postsecondary institution, median earnings following the academic year of exit.

LaunchBoard (Median Change in Earnings): Among SWP students who exited and who did not transfer to any postsecondary institution, median change in earnings between the second quarter prior to the beginning of the academic year of entry and the second quarter after the end of the academic year of exit from the last college attended.

LaunchBoard (Job Closely Related to Field of Study): Among SWP students who responded to the CTE Outcomes Survey and did not transfer to any postsecondary institution, the proportion who reported that they are working in a job very closely or closely related to their field of study.

Living Wage: The cost of living in a specific community or region for one adult and no children. The cost increases with the addition of children.

Occupation: An occupation is a grouping of job titles that have a similar set of activities or tasks that employees perform.

Percent Change: Rate of growth or decline in the occupation for the projected period; this does not factor in replacement openings.

Replacements: Estimate of job openings resulting from workers retiring or otherwise permanently leaving an occupation. Workers entering an occupation often need training. These replacement needs, added to job openings due to growth, may be used to assess the minimum number of workers who will need to be trained for an occupation.

Total Job Openings (New + Replacements): Sum of projected growth (new jobs) and replacement needs. When an occupation is expected to lose jobs, or retain the current employment level, number of openings will equal replacements.

Typical Education Requirement: represents the typical education level most workers need to enter an occupation.

Typical On-The-Job Training: indicates the typical on-the-job training needed to attain competency in the skills needed in the occupation.