

November 2022

Labor Market Analysis

Natural Resources



POWERED BY



Prepared by the Central Valley/Mother Lode Center of Excellence

Table of Contents

- Summary..... 2
 - Key findings2
- Introduction 3
- Occupational Demand 4
- Wages 4
- Job Postings 5
 - Salaries6
 - Education.....6
 - Baseline and Specialized Skills.....7
 - Software Skills.....7
 - Certifications8
- Education, Work Experience & Training 8
- Supply 9
- Student Outcomes 9
- Conclusion..... 10
- Recommendation 10
- Appendix A: Methodology & Data Sources 11

COVID-19 Statement: This report includes employment projection data by Lightcast. Lightcast’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.

If for any reason this document is not accessible or if you have specific needs for readability, please contact us and we will do our utmost to accommodate you with a modified version. To make a request, contact Nora Seronello by phone at (209) 575-6894 or by email seronellon@mjc.edu.

Summary

Please note the COVID-19 statement on page 1 when considering this report's findings.

This study conducted by the Central Valley/Mother Lode Center of Excellence examines labor market demand, wages, skills, and postsecondary supply for Natural Resources. This report is intended to help determine whether there is demand in the local labor market that is not being met by the supply from community college programs that align with the relevant occupations. Three occupations related to Natural Resources were identified for Columbia College:

- 19-4071, Forest and Conservation Technicians
- 45-1011, First-Line Supervisors of Farming, Fishing, and Forestry Workers
- 45-4011, Forest and Conservation Workers

Key findings:

- **Occupational demand** — There were 2,151 workers employed in jobs related to Natural Resources in 2021 in the North Central Valley/Northern Mother Lode (NCV/NML) subregion. The largest occupation is first-line supervisors of farming, fishing, and forestry workers with 1,449 workers, a projected growth rate of 3% over the next five years, and 219 annual openings.
- **Wages** — Forest and conservation technicians earn the highest entry-level wage, \$15.49/hour in the subregion.
- **Employers** — Employers with the most job postings in the subregion are Forest Service, National Park Service, and Bureau of Land Management.
- **Occupational titles** — The most common occupational title in job postings in the subregion is Forest and Conservation Technicians. The most common job title is Forestry Technician Recreation.
- **Skills and certifications** — The top baseline skill is English and the top specialized skill is fire suppression.
- **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. An associate degree is typically required for forest and conservation technicians.
- **Supply** — Analysis of postsecondary completions shows that, on average, 124 awards were conferred in the Central Valley/Mother Lode region each year.

Recommendation:

Based on a comparison of occupational demand and supply, there is an undersupply of 282 trained workers in the subregion and an undersupply of 1,025 workers in the region. The Center of Excellence recommends that Columbia College work with the regional directors, the college's advisory board, and local industry in the expansion of programs to address the shortage of Natural Resources workers in the region.

Introduction

The Central Valley/Mother Lode Center of Excellence was asked by Columbia College to provide labor market information for Natural Resources. The geographical focus for this report is the North Central Valley/Northern Mother Lode (NCV/NML) subregion, but regional demand and supply data has been included for broader applicability and use. The average living wage for a single adult in the NCV/NML subregion is \$12.65/hour.¹ Analysis of the program and occupational data related to Natural Resources resulted in the identification of applicable occupations. The Standard Occupational Classification (SOC) System codes and titles used in this report are:

- 19-4071, Forest and Conservation Technicians
- 45-1011, First-Line Supervisors of Farming, Fishing, and Forestry Workers
- 45-4011, Forest and Conservation Workers

The occupational titles, job descriptions, sample job titles, and knowledge and skills from the Bureau of Labor Statistics and O*NET OnLine are shown below.

Forest and Conservation Technicians

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, Judgment and Decision Making, Speaking

First-Line Supervisors of Farming, Fishing, and Forestry Workers

Job Description: Directly supervise and coordinate the activities of agricultural, forestry, aquaculture, 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 Workers

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: Geography, English Language, Public and Safety and Security, Administrative, Biology

Skills: Coordination, Speaking, Active Listening, Critical Thinking, Judgment and Decision Making

¹ The term "living wage" in Center of Excellence reports is calculated by averaging the self-sufficiency wages from the Insight Center's California Family Needs Calculator for each county in the subregion: <https://insightccd.org/tools-metrics/self-sufficiency-standard-tool-for-california/>.

Occupational Demand

The NCV/NML subregion employed 2,151 workers in Natural Resources occupations in 2021 (Exhibit 1). The largest occupation is first-line supervisors of farming, fishing, and forestry workers with 1,449 workers in 2021. This occupation is projected to grow by 3% over the next five years and has the greatest number of projected annual openings, 219.

Exhibit 1. Natural Resources employment and occupational projections in the NCV/NML subregion

Occupation	2021 Jobs	2026 Jobs	5-Year Change	5-Year % Change	Annual Openings
First-Line Supervisors of Farming, Fishing, and Forestry Workers	1,449	1,489	40	3%	219
Forest and Conservation Technicians	491	470	(21)	(4%)	60
Forest and Conservation Workers	211	220	9	4%	37
TOTAL	2,151	2,179	28	1%	316

Wages

Exhibit 2a shows the hourly wages of the Natural Resources occupations. Forest and conservation technicians earn the highest entry-level wage, \$15.49/hour in the subregion.² Please note 10th and 25th percentiles are considered entry-level wages while 75th and 90th are considered experienced wages, either gained by long-term employment, received extra training, etc.

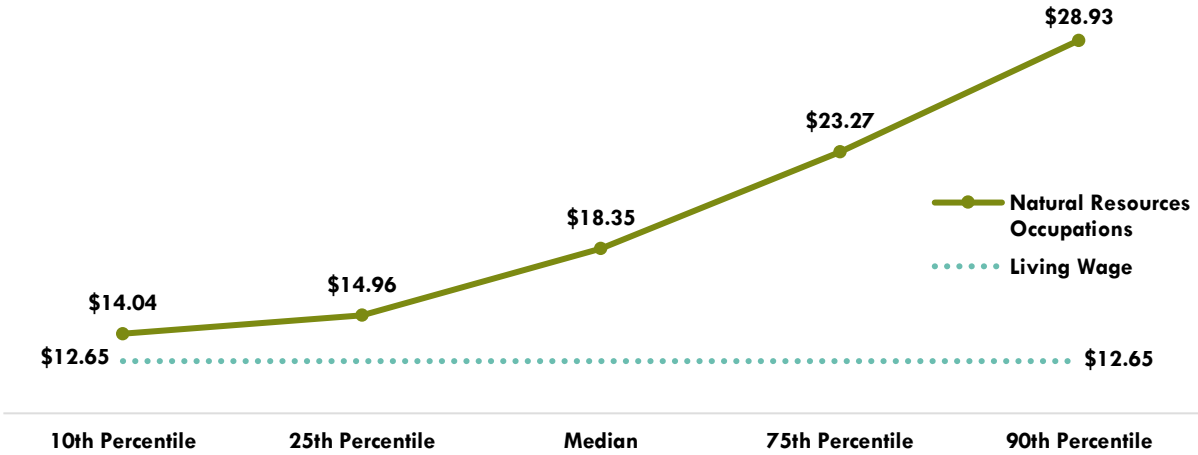
Exhibit 2a. Natural Resources hourly wages in the NCV/NML subregion

Occupation	Pct. 25 Hourly Earnings	Median Hourly Earnings	Pct. 75 Hourly Earnings
Forest and Conservation Technicians	\$15.49	\$17.04	\$23.25
First-Line Supervisors of Farming, Fishing, and Forestry Workers	\$14.90	\$19.82	\$27.07
Forest and Conservation Workers	\$14.50	\$18.18	\$19.50

² Entry-level wages are derived from the 25th percentile.

Exhibit 2b shows the average hourly wages for Natural Resources occupations; the average entry-level wage exceeds the average living wage for the North Central Valley/Northern Mother Lode NCV/NML subregion.

Exhibit 2b. Natural Resources average hourly wages in the NCV/NML subregion



Job Postings

There were 79 job postings for the three occupations in the NCV/NML subregion from May 2022 to October 2022.³ The employers with the most job postings are listed in Exhibit 3.

Exhibit 3. Top employers of Natural Resources by number of job postings

Employer	Job Postings	% Job Postings
Forest Service	31	47%
National Park Service	8	12%
Bureau of Land Management	4	6%
City Bakersfield	2	3%
Edison International	2	3%
Revol Greens Mn	2	3%
The Corps Network	2	3%
California Conservation Corps	1	2%
Chloeta	1	2%
Cilker Orchards Management	1	2%

³ Other than occupation 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.

Exhibit 4 shows how job postings for the targeted occupations in the NCV/NML subregion are distributed across five O*NET OnLine occupations. The occupational title Forest and Conservation Technicians is listed in 61 job postings. Common job titles in postings include Forestry Technician Recreation in six job posting, Forestry Technician in three job posting, and Conservation Corps in two job postings.

Exhibit 4. Top occupational titles in job postings for Natural Resources

Occupational Title	Job Postings	% of Job Postings
Forest and Conservation Technicians	61	77%
Forest and Conservation Workers	11	14%
First-Line Supervisors of Agricultural Crop and Horticultural Workers	5	6%
First-Line Supervisors of Animal Husbandry and Animal Care Workers	1	1%
First-Line Supervisors of Aquacultural Workers	1	1%

Salaries

Exhibit 5 shows the “Market Salaries” for Natural Resources occupations. These are calculated by Burning Glass using a machine learning model built off of millions of job postings every year. This accounts for adjustments based on locations, industry, skills, experience, education requirements, among other variables.

Exhibit 5. Salaries for Natural Resources occupations

Market Salary Percentile	Salary Amount
10th Percentile	\$27,520
25th Percentile	\$31,582
50th Percentile	\$37,336
75th Percentile	\$43,992
90th Percentile	\$49,755

Education

Of the 79 job postings, 40 listed an education level preferred for the positions being filled. Among those, 43% requested a bachelor’s degree (Exhibit 6).

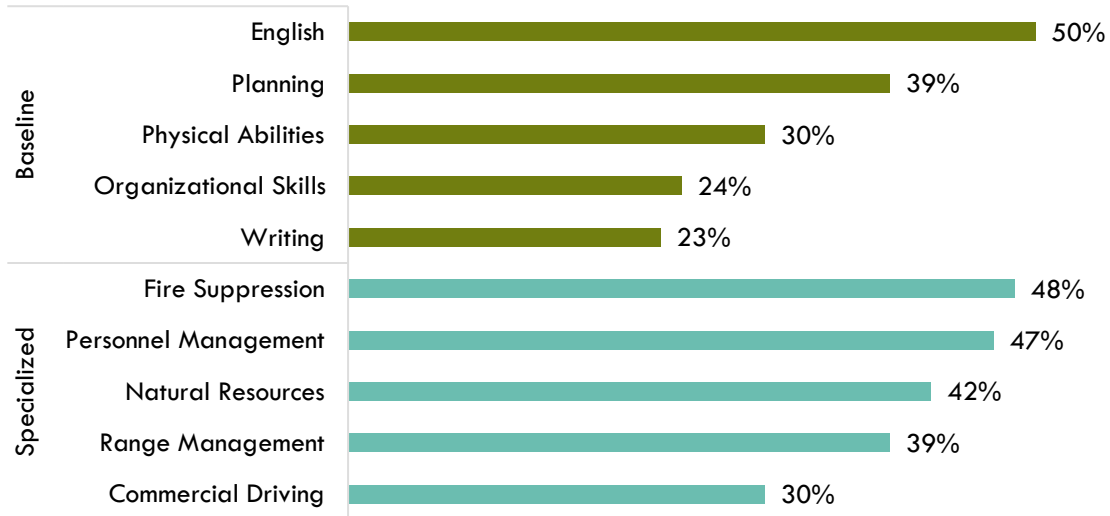
Exhibit 6. Education levels requested in job postings for Natural Resources

Education Level	Job Postings	% of Job Postings
High school or vocational training	23	58%
Bachelor's degree	17	43%
Master's degree	13	33%
Associate degree	2	5%
Doctoral degree	1	3%

Baseline and Specialized Skills

Exhibit 7 depicts the top baseline and specialized skills for the targeted occupations. The three most important baseline skills are English, 50% of job postings, planning, 39%, and physical abilities, 30%. The top three specialized skills are fire suppression, 48% of job postings, personnel management, 47%, and natural resources, 42%.

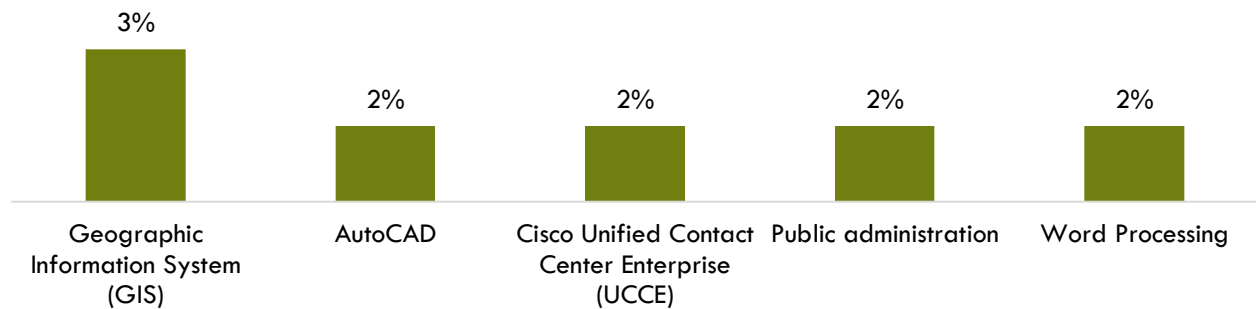
Exhibit 7. In-demand Natural Resources baseline and specialized skills



Software Skills

Analysis also included the software skills most in demand by employers. Geographic Information System (GIS) and AutoCAD were the top two software skills identified in job postings (Exhibit 8).

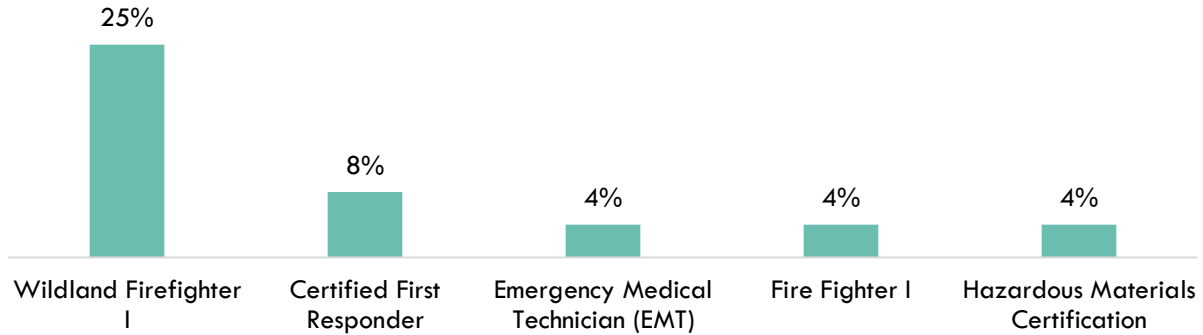
Exhibit 8. In-demand Natural Resources software skills



Certifications

Of the 79 job postings, 66 contained certification data. Among those, 25% indicated a need for a Wildland Firefighter I. The next top certification is Certified First Responder (Exhibit 9).

Exhibit 9. Top Natural Resources certifications requested in job postings



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. An associate degree is typically required for forest and conservation technicians (Exhibit 8). However, these occupations require an EMT certification along with completion of a fire academy program before being eligible to work in the field.

Exhibit 8. Education, work experience, training, and Current Population Survey results for Natural Resources occupations⁴

Occupation	Typical Entry-level Education	Work Experience Required	Typical On-The-Job Training	CPS
Forest and Conservation Technicians	Associate degree	None	None	37.1%
First-Line Supervisors of Farming, Fishing, and Forestry Workers	High school diploma or equivalent	Less than 5 years	None	21.9%
Forest and Conservation Workers	High school diploma or equivalent	None	Moderate-term	24.4%

⁴ "Labor Force Statistics from the Current Population Survey," Bureau of Labor Statistics, <https://www.bls.gov/cps/>.

Supply

Analysis of program data from the Integrated Postsecondary Education Data System (IPEDS) included the TOP codes and titles: 011400 – Forestry and 011500 - Natural Resources.

TOP code – title 213310 - Wildland Fire Technology is included in the supply table below for information purposes only. The ongoing drought in California and the subsequent devastation sustained by wildfires has become of critical importance to the State. Therefore, the COE has determined that it's imperative the community college are cognizant of the growing need for forestry workers to have wildland fire training.

Analysis of the last three years of data shows that, on average, 124 awards were conferred in the Central Valley/Mother Lode region each year (Exhibit 9).

Exhibit 9. Postsecondary supply for Natural Resources occupations in the region

TOP/CIP Code- Title	College	Associate Degree	Certificate 16 < 30 Semester Units	Certificate 18 < 30 Semester Units	Certificate 30 < 60 Semester Units	Certificate 6 < 18 Semester Units	Subtotal
011400 - Forestry	Bakersfield	19			2		21
	Columbia	11			4	2	16
	Reedley College	10	5	9			23
011500 - Natural Resources	Columbia	12			6	1	18
	Fresno City		0	0			1
	Reedley College	5	5	13			23
213310 - Wildland Fire Technology	Bakersfield	3				0	3
	Porterville					18	18
TOTAL		59	10	22	12	21	124

There is an undersupply of 282 Natural Resources workers in the NCV/NML subregion and 1,025 workers in the region (Exhibit 10).

Exhibit 10. Natural Resources workforce demand (annual job openings), postsecondary supply of students (awards), and additional students needed to fill gap in the NCV/NML subregion and region

Region	Demand (Annual Openings)	Supply (Total Annual Average Supply)	Supply Gap or Oversupply
NCV/NML	316	34	282
CVML	1,128	103	1,025

Student Outcomes

Exhibit 11 summarizes employment and wage outcomes from the California Community College Chancellor's Cal-PASS Plus LaunchBoard for the TOP code related to Natural Resources. Of note, 25 students received a degree or certificate or attained apprenticeship journey status; 37 students transferred; 73% of students obtained a job closely related to their field of study; 52% had a median change in earnings; and 58% of students attained a living wage.

Exhibit 11. Subregional metrics for the TOP code related to Natural Resources

Metric	Forestry 011400	Natural Resources 011500
Students Who Got a Degree or Certificate or Attained Apprenticeship Journey Status	13	25
Number of Students Who Transferred	*	37
Job Closely Related to Field of Study	*	73%
Median Change in Earnings	*	52%
Attained a Living Wage	*	58%

* denotes data not available.

Conclusion

The entry-level wage of the three occupations exceed the NCV/NML subregion's average living wage. There were 79 job postings in the past six months for occupations related to Natural Resources in the subregion. Analysis of skills and certification requirements in job postings indicates:

- The top baseline skill is English, and the top specialized skill is fire suppression.
- The top software skill is Geographic Information System (GIS).
- The top certification is a Wildland Firefighter I.

There is an undersupply of trained workers, a shortage of 282 in the NCV/NML subregion and 1,025 in the region.

Recommendation

Based on these findings, it is recommended that Columbia College work with the regional directors, the college's advisory board, and local industry in the expansion of programs to address the shortage of Natural Resources workers in the region.

Appendix A: 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 .
Labor Force, Employment and Unemployment Estimates	California Employment Development Department, Labor Market Information Division: labormarketinfo.edd.ca.gov .
Job Posting and Skills Data	Burning Glass: burning-glass.com/ .
Additional Education Requirements/ Employer Preferences	The O*NET Job Zone database includes over 900 occupations 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.

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.