November 2022

Labor Market Analysis

Forestry and Natural Resources

C·O·E
CENTERS OF EXCELLENCE
Inform Connect Advance

POWERED BY
California Community Colleges

Prepared by the Central Valley/Mother Lode Center of Excellence

Table of Contents

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 Forestry and 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 Forestry and 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 Forestry and 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 Stevens Protection, the State of California, and Adventist Health.

- **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.

- **Skills and certifications —** The top baseline skill is physical abilities, the top specialized skill is fire control, and the top software skill is ArcGIS. The most in-demand certification is a Wildland Firefighter I.

- **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's degree is typically required for forest and conservation technicians.

- **Supply —** Analysis of postsecondary completions shows that on average 61 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 300 trained workers in the subregion and 1,067 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 Forestry and 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 Forestry and 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 Forestry and 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, 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 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 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://insightcced.org/tools-metrics/self-sufficiency-standard-tool-for-california/.

Occupational Demand

The NCV/NML subregion employed 2,151 workers in Forestry and 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. Forestry and 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 Forestry and 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 by gained long-term employment, received extra training, etc.

Exhibit 2a. Forestry and 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

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

---

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

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

10th Percentile	25th Percentile	Median	75th Percentile	90th Percentile
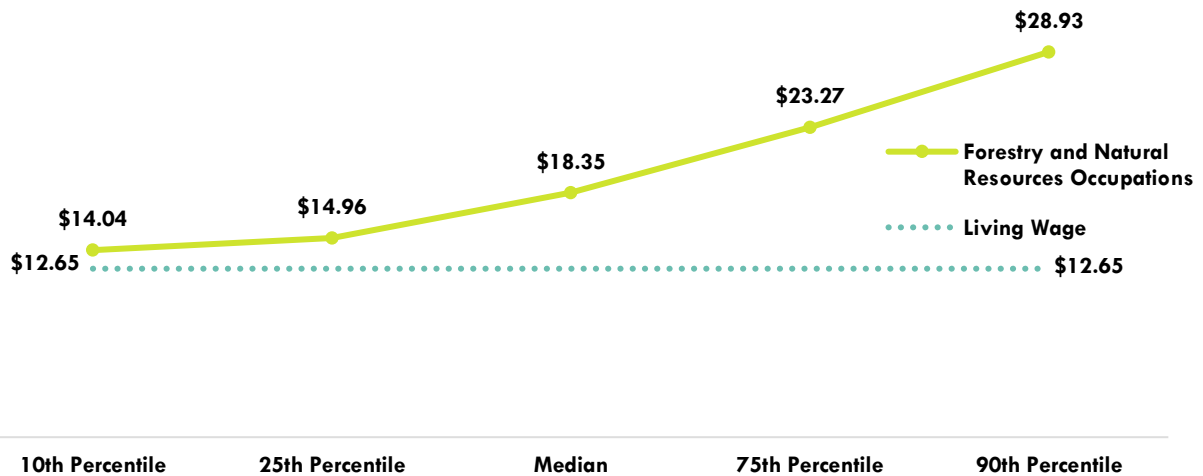
Job Postings

There were 24 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 Forestry and Natural Resources by number of job postings

Employer	Job Postings	% Job Postings
Stevens Protection	2	13%
state of california	2	13%
Adventist Health	1	6%
Ea Family Services	1	6%
East Stanislaus Rcd	1	6%
Ej Gallo Winery	1	6%
Great Basin Institute	1	6%
Greater Valley Conservation Corps	1	6%
National Park Service	1	6%
Ratto Bros Incorporated	1	6%

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 15 job postings. Note how this occupational title dominates the job posting results. Common job titles in postings include Forestry Technician in three job postings, Standing Post Guard in two job postings, and Wildland Firefighter Forestry Aid/Technician in two job postings.

---

[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. Top occupational titles in job postings for Forestry and Natural Resources

Occupational Title	Job Postings	% of Job Postings
Forest and Conservation Technicians	15	63%
Forest and Conservation Workers	4	17%
First-Line Supervisors of Agricultural Crop and Horticultural Workers	2	8%
First-Line Supervisors of Animal Husbandry and Animal Care Workers	2	8%
First-Line Supervisors of Aquacultural Workers	1	4%

Salaries

Exhibit 5 shows the "Market Salaries" for Forestry and 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 Forestry and Natural Resources occupations

Market Salary Percentile	Salary Amount
10th Percentile	$26,132
25th Percentile	$32,883
50th Percentile	$37,489
75th Percentile	$43,296
90th Percentile	$49,854

Education

Of the 24 job postings, 10 listed an education level preferred for the positions being filled. Among those, 70% requested a bachelor's degree, 50% requested a high school or vocational training, and 20% requested an associate degree (Exhibit 6). A job posting can indicate more than one education level. Hence, the percentages shown in the chart below may total more than 100%.
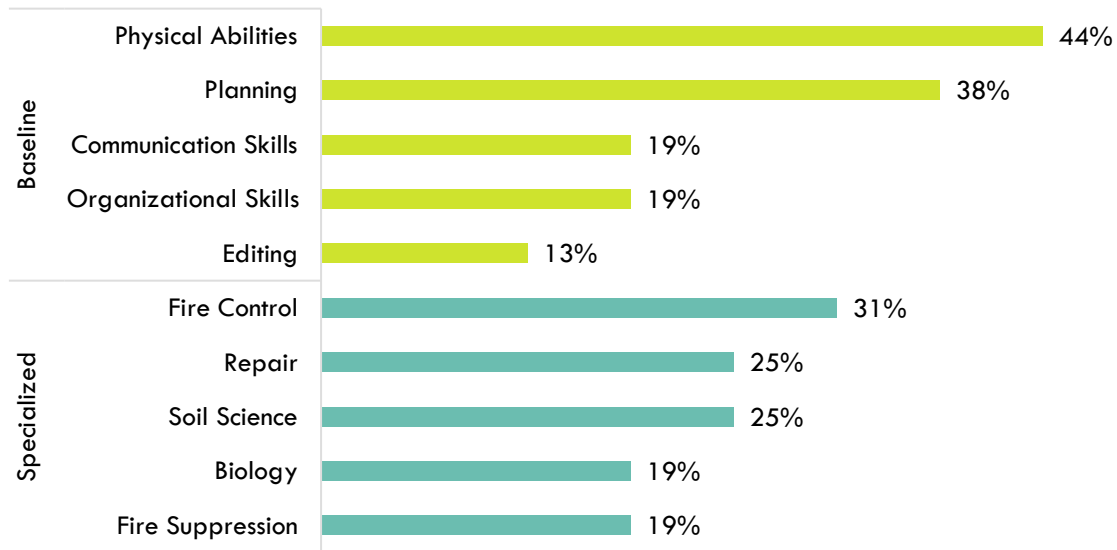
Exhibit 6. Education levels requested in job postings for Forestry and Natural Resources

Education Level	Job Postings	% of Job Postings
Bachelor's degree	7	70%
High school or vocational training	5	50%
Associate degree	2	20%
Doctoral degree	1	10%

Baseline and Specialized Skills

Exhibit 7 depicts the top baseline and specialized skills for the targeted occupations. The three most important baseline skills are physical abilities, 44% of job postings, planning, 38%, and communication skills, 19%. The top three specialized skills are fire control, 31% of job postings, repair, 25%, and soil science, 25%.

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

Baseline	
Physical Abilities	44%
Planning	38%
Communication Skills	19%
Organizational Skills	19%
Editing	13%
Specialized	
Fire Control	31%
Repair	25%
Soil Science	25%
Biology	19%
Fire Suppression	19%

Software Skills

Analysis also included the software skills most in demand by employers. ArcGIS and Microsoft Excel were the top two software skills identified in job postings (Exhibit 8).

Exhibit 8. In-demand Forestry and Natural Resources software skills

ArcGIS	Microsoft Excel	Microsoft Word
6%	6%	6%
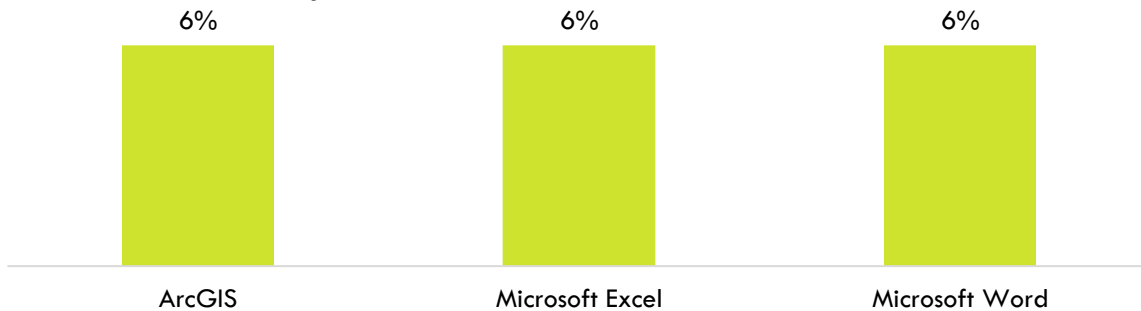
Certifications

Of the 24 job postings, 15 contained certification data. Among those, 20% indicated a need for a Wildland Firefighter I. The next top certification fire officer 1 (Exhibit 9). Please note 87% indicated a need for a driver's license, but it is not a certification.

Exhibit 9. Top Forestry and Natural Resources certifications requested in job postings

Wildland Firefighter I	Fire Officer I
20%	7%
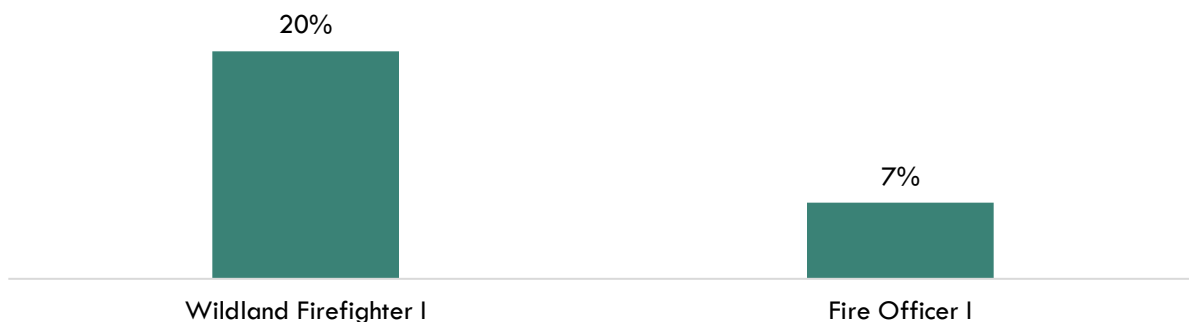
Education, Work Experience & Training

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 10).

Exhibit 10. Education, work experience, training, and Current Population Survey results for Forestry and Natural Resources occupations[4]

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

Supply

Analysis of program data from the Integrated Postsecondary Education Data System (IPEDS) included the TOP and CIP codes and titles: 095650 - Welding Technology and 48.0508 - Welding Technology/Welder. Analysis of the last three years of data shows that, on average, 61 awards were conferred in the Central Valley/Mother Lode region each year (Exhibit 11).

Exhibit 11. Postsecondary supply for Forestry and 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
TOTAL		**39**	**5**	**9**	**6**	**2**	**61**

---

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

There is an undersupply of 300 Forestry and Natural Resources workers in the NCV/NML subregion and 1,067 workers in the region (Exhibit 12).

Exhibit 12. Forestry and 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
NCV/NML	316	16	300
CVML	1,128	61	1,067

Student Outcomes

Exhibit 13 summarizes employment and wage outcomes from the California Community College Chancellor's Cal-PASS Plus LaunchBoard for the TOP code related to Forestry and Natural Resources. Of note, 13 forestry students received a degree or certificate or attained apprenticeship journey status.

Exhibit 13. Regional metrics for the TOP code related to Forestry and Natural Resources

Metric	Forestry 011400
Students Who Got a Degree or Certificate or Attained Apprenticeship Journey Status	13
Number of Students Who Transferred	*
Job Closely Related to Field of Study	*
Median Change in Earnings	*
Attained a Living Wage	*
* denotes data not available.	

Conclusion

The entry-level wages of the three occupations exceed the NCV/NML subregion's average living wage. There were 24 job postings in the past six months for occupations related to Forestry and Natural Resources in the subregion. Analysis of skills and certification requirements in job postings indicates:

- The top baseline skill is physical abilities, and the top specialized skill is fire control.
- The top software skill is ArcGIS.
- The top certification is a Wildland Firefighter I.

There is an undersupply of trained workers, a shortage of 300 in the NCV/NML subregion and 1,067 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 Forestry and 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.