January 2020

Labor Market Analysis

Natural Resources

California
Community
Colleges

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Summary

This study conducted by the Central Valley/Mother Lode Center of Excellence examines labor market demand, wages, skills, and postsecondary supply for natural resources. Three occupations related to natural resources for Reedley College were identified:

- Recreation Workers (SOC 39-9032)
- Forest and Conservation Technicians (SOC 19-4093)
- Forest and Conservation Workers (SOC 45-4011)

Key findings:

- **Occupational demand —** Nearly 3,400 workers were employed in jobs related to natural resources in 2018 in the South Central Valley/Southern Mother Lode subregion. The largest occupation is recreation workers with 2,379 workers in 2018, a projected growth rate of 7% over the next five years, and 438 annual openings.

- **Wages —** The entry-level wages of recreation workers, and the entry-level and median wages of forest and conservation workers fall below the region's average living wage. The occupation earning the highest median wages is forest and conservation technicians, $15.29/hour in the subregion and $15.47/hour in the region.

- **Employers —** Top employers in the subregion are Visalia Unified School District, Concordia College, and Bakersfield City School District.

- **Job titles —** The most common occupational title in job postings in the subregion is recreation worker. The most common job title is activities assistant.

- **Skills and certifications —** The top baseline skill is planning, the top specialized skill is scheduling, and the top software skill is Microsoft Office. The most in-demand certification is a driver's license.

- **Education —** Recreation workers and forest and conservation workers typically require a high school diploma or the equivalent. An associate degree is typically required for forest and conservation technicians.

- **Supply —** Analysis of postsecondary completions in the region shows that on average 71 awards were conferred in the Central Valley/Mother Lode region each year.

Based on a comparison of occupational demand and supply, there is an undersupply of 533 trained workers in the subregion and 992 workers in the region. The Center of Excellence recommends that Reedley College work with the Agriculture, Water and Environmental Technologies regional director, 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 Reedley College to provide labor market information for Natural resources. Review of the Taxonomy of Programs (TOP) found the following programs are appropriate for this analysis:

- Forestry-011400
- Natural Resources-011500
- Parks and Outdoor Recreation-011510

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 natural resources resulted in the identification of three applicable occupations. The Standard Occupational Classification (SOC) System titles and codes used in this report are:

- Recreation Workers (SOC 39-9032)
- Forest and Conservation Technicians (SOC 19-4093)
- Forest and Conservation Workers (SOC 45-4011)

The SOC codes, occupational titles, job descriptions, sample job titles, and knowledge and skills from the Bureau of Labor Statistics and O*NET OnLine are shown in Exhibit 1.
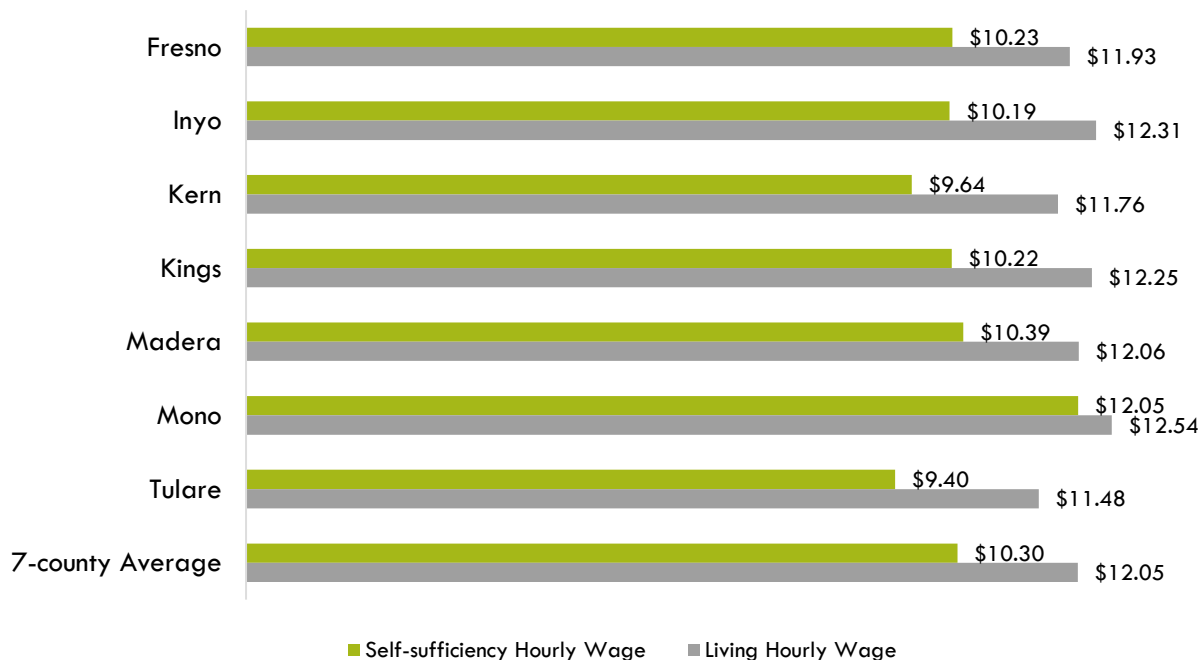
Exhibit 1. SOC titles, job descriptions, sample job titles, and knowledge and skills for natural resources

SOC Title & Code	Description	Sample Job Titles	Knowledge & Skills
Recreation Workers (SOC 39-9032)	Conduct recreation activities with groups in public, private, or volunteer agencies or recreation facilities. Organize and promote activities, such as arts and crafts, sports, games, music, dramatics, social recreation, camping, and hobbies, taking into account the needs and interests of individual members.	Activities Assistant, Activities Director, Activity Aide, Activity Assistant, Activity Coordinator, Activity Director, Program Assistant, Recreation Assistant, Recreation Coordinator, Recreation Supervisor	**Knowledge** English Language Public Safety and Security Customer and Personal Service Education and Training Law and Government **Skills** Active Listening Coordination Service Orientation Social Perceptiveness Speaking
Forest and Conservation Technicians (SOC 19-4093)	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, fire prevention and suppression. May assist conservation scientists in managing, improving, and protecting	Biological Science Aide, Conservationist, County Ranger, Forest Technician, Forestry Aide, Forestry Technician, Resource Manager, Resource Specialist, Resource Technician, Timber Appraiser	**Knowledge** Public Safety and Security English Language Customer and Personal Service Law and Government Administration and Management **Skills** Active Listening Critical Thinking

SOC Title & Code	Description	Sample Job Titles	Knowledge & Skills
	rangelands and wildlife habitats.		Reading Comprehension
			Judgment and Decision Making
			Speaking
Forest and Conservation Workers (SOC 45-4011)	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, and tree planters.	Conservation Officer, Crew Leader, Field Laborer, Foreman, Forest Resource Specialist, Forestry Support Specialist, Geographic Information Systems Coordinator (GIS Coordinator), Park Maintainer, Reforestation Worker, Tree Planter	**Knowledge**
			Geography
			English Language
			Public Safety and Security
			Clerical
			Biology
			Skills
			Coordination
			Speaking
			Active Listening
			Critical Thinking
			Judgment and Decision Making

The average self-sufficiency wage for a single adult in the South Central Valley/Southern Mother Lode (SCV/SML) subregion is $10.30/hour, and the current average living wage for a single adult is $12.05/hour. Self-sufficiency and living wage data by county and the overall seven-county average are shown in Exhibit 2. In the wages sections of this report, the 25th percentile denotes entry-level wages, and median represents experienced wages.

Exhibit 2. Self-sufficiency and living wages in the SCV/SML subregion

County	Self-sufficiency Hourly Wage	Living Hourly Wage
Fresno	$10.23	$11.93
Inyo	$10.19	$12.31
Kern	$9.64	$11.76
Kings	$10.22	$12.25
Madera	$10.39	$12.06
Mono	$12.05	$12.54
Tulare	$9.40	$11.48
7-county Average	$10.30	$12.05

■ Self-sufficiency Hourly Wage   ■ Living Hourly Wage

Occupational Demand

The South Central Valley/Southern Mother Lode subregion employed nearly 3,399 workers in natural resources occupations in 2018 (Exhibit 3). The largest occupation is recreation workers with 2,379 workers in 2018. This occupation is projected to grow by 7% over the next five years and has the greatest number of projected annual openings, 438.
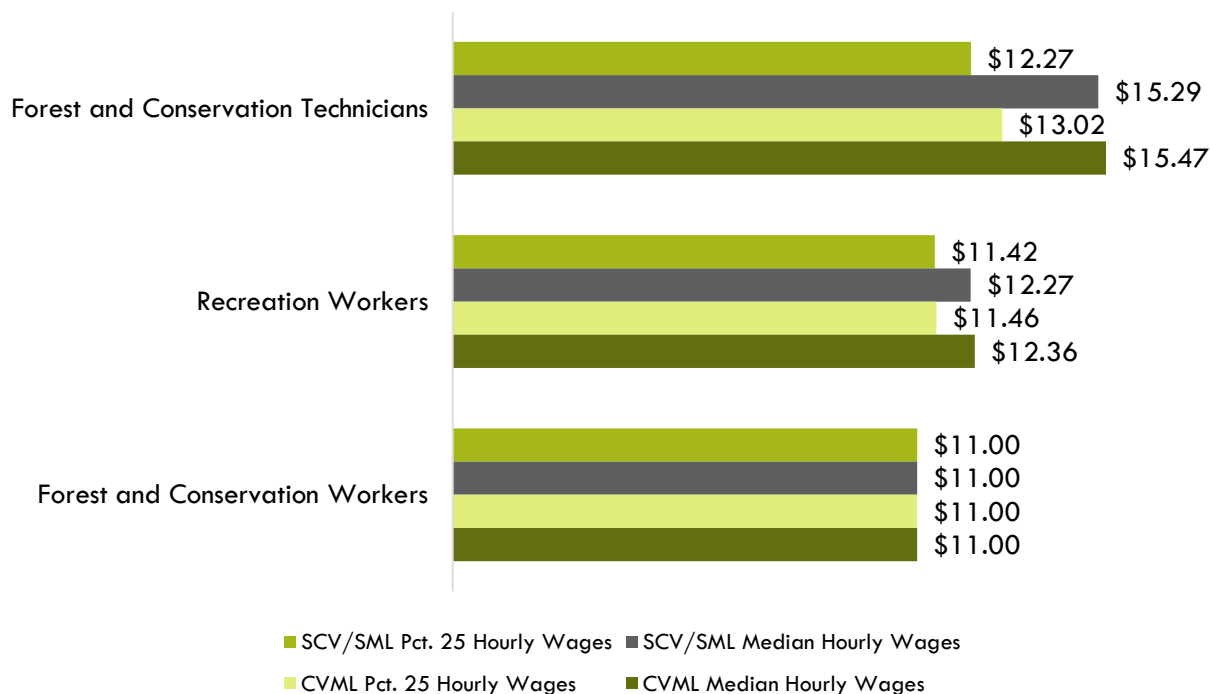
Exhibit 3. Natural resources employment and occupational projections in the SCV/SML subregion

Occupation	2018 Jobs	2023 Jobs	5-year Change	5-year % Change	Annual Openings
Recreation Workers	2,379	2,549	170	7%	438
Forest and Conservation Technicians	621	629	8	1%	75
Forest and Conservation Workers	399	394	(5)	(1%)	63
Total	**3,399**	**3,572**	**173**	**5%**	**576**

Wages

Exhibit 4 compares the entry-level and experienced wages of the natural resources occupations. The entry-level wages of recreation workers fall below the region's average living wage. The entry-level and median wages of forest and conservation workers also fall below the region's average living wage. The occupation earning the highest median wages is forest and conservation technicians, $15.29/hour in the subregion and $15.47/hour in the region.

Exhibit 4. Entry-level and experienced wage comparison for natural resources in the SCV/SML subregion and region

Forest and Conservation Technicians
- $12.27
- $15.29
- $13.02
- $15.47

Recreation Workers
- $11.42
- $12.27
- $11.46
- $12.36

Forest and Conservation Workers
- $11.00
- $11.00
- $11.00
- $11.00

■ SCV/SML Pct. 25 Hourly Wages ■ SCV/SML Median Hourly Wages
■ CVML Pct. 25 Hourly Wages ■ CVML Median Hourly Wages

Job Postings

There were 551 job postings for the three occupations in the SCV/SML subregion from January 2019 through December 2019. The top employers advertising these job postings are listed in Exhibit 5.

Exhibit 5. Top employers of natural resources by number of job postings

Employer	Job Postings
Visalia Unified School District	62
Concordia College	45
Bakersfield City School District	37
Forest Service	32
Boys & Girls Clubs Of America	17
US Department of Agriculture	16
In House Vacancy Internal Candidates Only	10
In Shape	8
Cutler Orosi Joint Unified	7
In Shape Health Clubs	7

Job posting analysis also included the top industries hiring positions related to natural resources (Exhibit 6).

Exhibit 6. Top industries for natural resources by number of job postings

Industry	Job Postings
Elementary and Secondary Schools	121
Administration of Economic Program	53
Colleges, Universities, and Professional Schools	50
Support Activities for Forestry	32
National Security and International Affairs	23
Continuing Care Retirement Communities and Assisted Living Facilities for the Elderly	21
Civic and Social Organizations	17
General Medical and Surgical Hospitals	13
Nursing Care Facilities (Skilled Nursing Facilities)	10
Executive, Legislative, and Other General Government Support	9

Job Titles

Exhibit 7 shows how job postings for the three targeted occupations in the SCV/SML subregion are distributed across three O*NET OnLine occupations. The occupational title recreation workers is listed in the most job postings, 404, followed by forest and conservation technicians, 141 job postings.

Exhibit 7. Top occupational titles in job postings for natural resources

Occupational Title	Job Postings
Recreation Workers	404
Forest and Conservation Technicians	141
Forest and Conservation Workers	6

Analysis of the 551 advertised job titles for the targeted occupations reveals the top title is activities assistant, occurring in 59 job postings, followed by forestry technician, 53 job postings (Exhibit 8).

Exhibit 8. Top job titles by number of job postings for natural resources

Job Title	Job Postings
Activities Assistant	59
Forestry Technician	53
District General Activities Aide, Elementary School	43
Camp Counselor	28
Forestry Technician, Recreation	24
Fitness Advisor	22
J + + Fire Control Specialist	19
Recreation Assistant	17
Activities Coordinator	11
Summer Camp Counselor	11

Salaries

Exhibit 9 shows the "Market Salaries" for natural resources occupations that are calculated by Burning Glass which uses a machine learning model built off of millions of job postings every year, and accounts for adjustments based on locations, industry, skills, experience, education requirements, among other variables.

Exhibit 9. Salaries for natural resources

Market Salary Percentile	Salary Amount
10th Percentile	23,651
25th Percentile	27,448
50th Percentile	32,542
75th Percentile	39,404
90th Percentile	50,110

Education

Of the 551 job postings, 407 listed an education level preferred for the positions being advertised. Of those, 63% requested high school or vocational training, 26% requested a bachelor's degree, and 8% requested an associate degree (Exhibit 10).
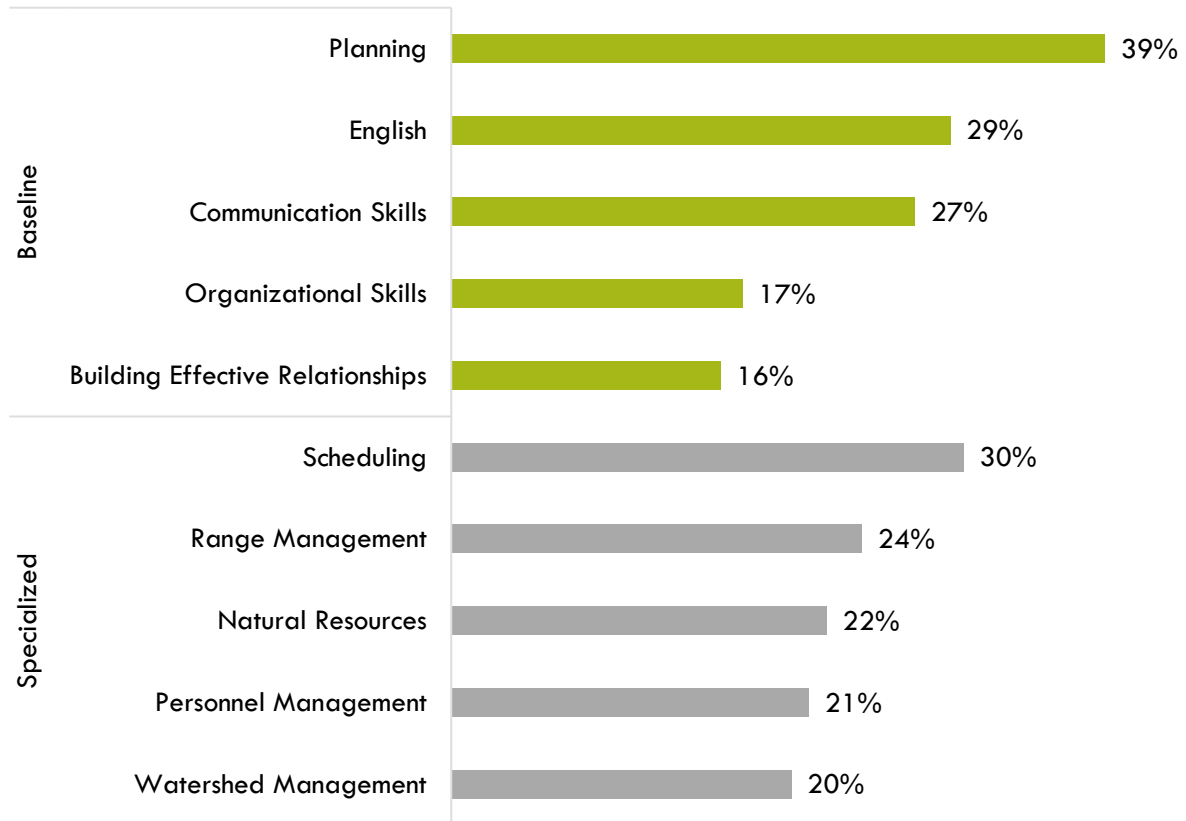
Exhibit 10. Education levels requested in job postings for natural resources

Master's degree 2%
Doctoral degree 1%
Associate degree 8%
Bachelor's degree 26%
High school or vocational training 63%
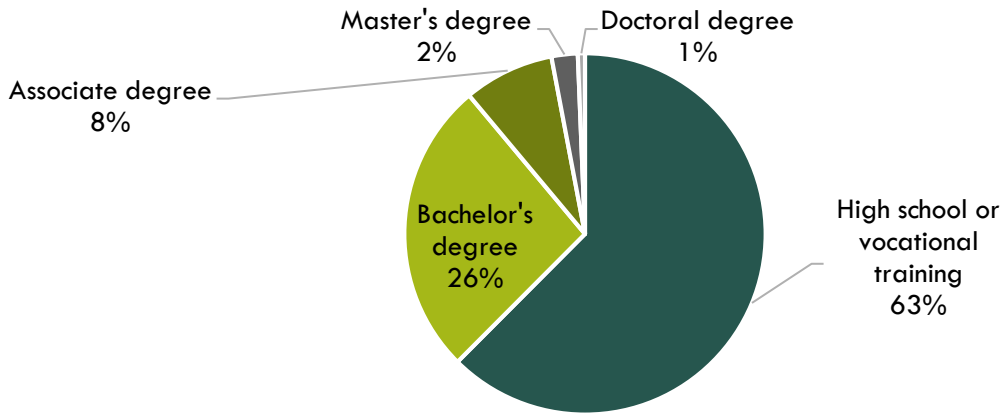
Baseline and Specialized Skills

Exhibit 11 depicts the top baseline and specialized skills for the three targeted occupations. The three most important baseline skills are planning, 39% of job postings, English, 29%, and communication skills, 27%. The top three specialized skills are scheduling, 30% of job postings, range management, 24%, and natural resources, 22%.

Exhibit 11. In-demand natural resources baseline and specialized skills

Baseline
Planning 39%
English 29%
Communication Skills 27%
Organizational Skills 17%
Building Effective Relationships 16%

Specialized
Scheduling 30%
Range Management 24%
Natural Resources 22%
Personnel Management 21%
Watershed Management 20%

Software Skills

Analysis also included the software skills most in demand by employers. Microsoft Office and Salesforce rank first and second (Exhibit 12).
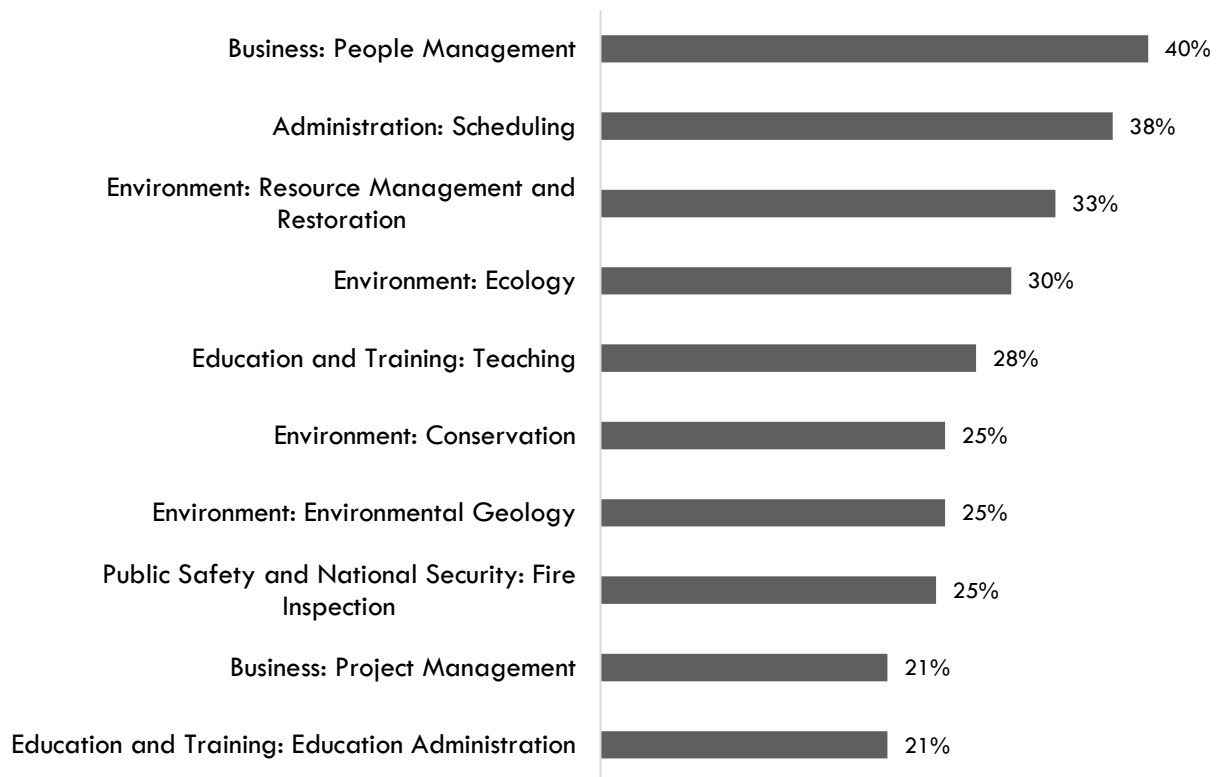
Exhibit 12. In-demand natural resources software skills

Skill	Percentage
Microsoft Office	6%
Salesforce	6%
Microsoft Excel	4%
Word Processing	4%
Microsoft Word	2%
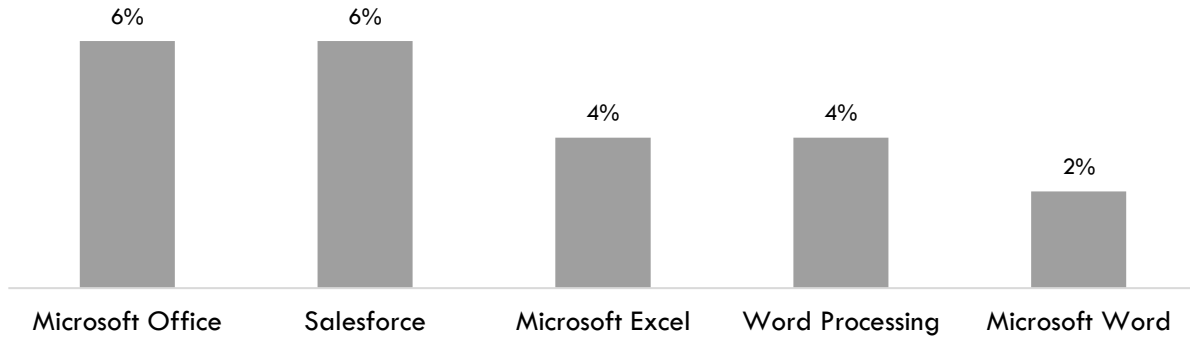
Skill Cluster Projections

Of the 551 job postings, 308 postings contained skill projections. An evaluation of the skill clusters that will have the greatest gains in level of importance shows that the top areas are business: people management (40%); administration: scheduling (38%); and environment: resource management and restoration (33%) (Exhibit 13).

Exhibit 13. Skill cluster projections for natural resources

Skill Cluster	Percentage
Business: People Management	40%
Administration: Scheduling	38%
Environment: Resource Management and Restoration	33%
Environment: Ecology	30%
Education and Training: Teaching	28%
Environment: Conservation	25%
Environment: Environmental Geology	25%
Public Safety and National Security: Fire Inspection	25%
Business: Project Management	21%
Education and Training: Education Administration	21%

Certifications

Of the 551 job postings, 128 contained certification data. Of those, 62% indicated a need for a driver's license. The next top certifications are First Aid/CPR/AED and Wildland Firefighter (Exhibit 14). (Due to the low number of job postings with certifications listed, the chart below may not be representative of the full sample.)

Exhibit 14. Top natural resources certifications requested in job postings

| Driver's License | First Aid Cpr Aed | Wildland Firefighter | Cdl Class B | Basic Life Saving (BLS) |
| 62% | 20% | 14% | 6% | 5% |
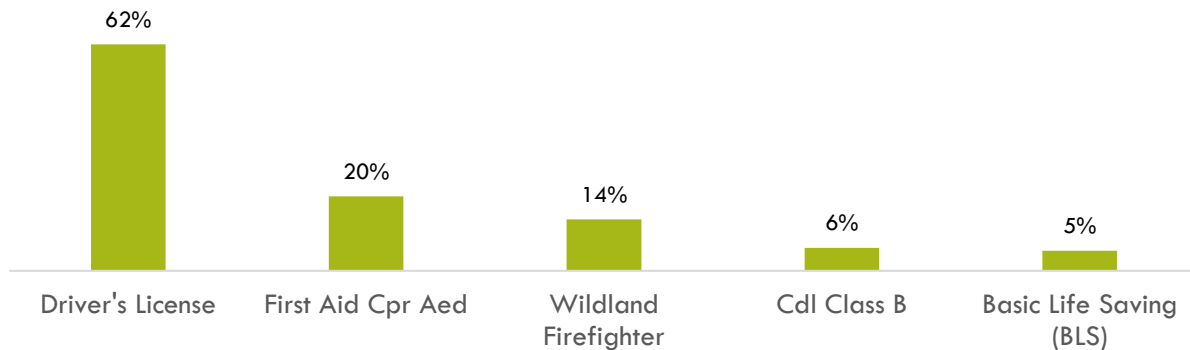
Education, Work Experience & Training

Two occupations typically require a high school diploma or the equivalent (Exhibit 15). An associate degree is typically required for forest and conservation technicians.

Exhibit 15. Education, work experience, training and Current Population Survey results for natural resources occupations[1]

Occupation	Typical Entry-level Education	Work Experience Required	Typical On-The-Job Training	CPS
Forest and Conservation Technicians	Associate degree	None	None	34.5%
Recreation Workers	High school diploma or equivalent	None	Short-term	34.1%
Forest and Conservation Workers	High school diploma or equivalent	None	Moderate-term	35.1%

Supply

Analysis of program data from the California Community Colleges Chancellor's Office Data Mart included the TOP codes: Forestry-011400, Natural Resources-011500, and Parks and Outdoor Recreation-011510. Analysis of the last three years of TOP code data shows that, on average, 71 awards were conferred in the Central Valley/Mother Lode region each year (Exhibit 16).

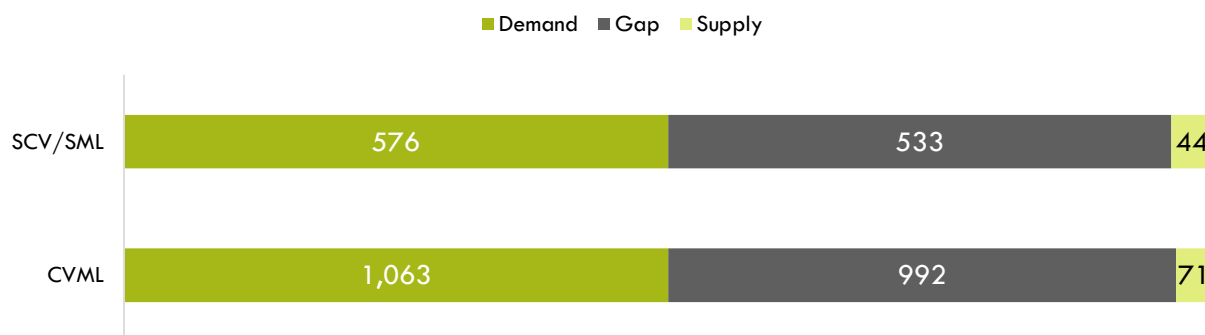[1] "Labor Force Statistics from the Current Population Survey," Bureau of Labor Statistics, https://www.bls.gov/cps/.

Exhibit 16. Postsecondary supply for natural resources occupations in the region

TOP Title and Code	Colleges	Certificates	Degrees	Subtotal
Forestry-011400	Bakersfield	4	11	15
	Columbia	1	7	8
	Modesto Junior	0	0	1
	Reedley College	10	11	21
Natural Resources-011500	Columbia	8	11	19
	Reedley College	5	1	7
Parks and Outdoor Recreation-011510	Modesto Junior	0	0	1
	Reedley College	1		1
Total		**30**	**42**	**71**

Gap Analysis

There is an undersupply of 533 natural resources workers in the SCV/SML subregion and 992 workers in the region (Exhibit 17).

Exhibit 17. Natural resources workforce annual demand and supply in the SCV/SML subregion and region

Legend: ■ Demand ■ Gap ■ Supply

SCV/SML: Demand 576, Gap 533, Supply 44
CVML: Demand 1,063, Gap 992, Supply 71

Student Outcomes

Exhibit 18 summarizes employment and wage outcomes from the California Community College Chancellor's Cal-PASS Plus LaunchBoard for the TOP codes related to natural resources. Across the region, 45 forestry students received a degree or certificate, and 52 transferred; by comparison, 31 natural resources received a degree or certificate, and 44 transferred. A higher percentage of forestry students reported obtaining a job closely related to their field of study and a median change in earnings.

Exhibit 18: Regional metrics for the TOP codes related to natural resources

Metric	Forestry-011400	Natural Resources-011500
Students Who Got a Degree or Certificate or Attained Apprenticeship Journey Status	45	31
Number of Students Who Transferred	52	44
Job Closely Related to Field of Study	71%	57%
Median Change in Earnings	61%	48%
Attained a Living Wage	48%	52%
* denotes data not available.		

Conclusion

The entry-level wages of the three occupations exceed the SCV/SML subregion's self-sufficiency. The entry-level wages of recreation workers fall below the region's average living wage. The entry-level and median wages of forest and conservation workers also fall below the region's average living wage. The occupation earning the highest median wages is forest and conservation technicians, $15.29/hour in the subregion and $15.47/hour in the region.

Analysis of skills and certification requirements in job postings indicates:

- The top baseline skill is planning, and the top specialized skill is scheduling.
- The top software skill is Microsoft Office.
- The top certification is a driver's license.

There is an undersupply of trained workers, a shortage of 533 in the SCV/SML subregion and 992 in the region.

Recommendation

Based on these findings, it is recommended that Reedley College work with the Agriculture, Water and Environmental Technologies regional director, the college's advisory board and local industry in the expansion of programs to address the shortage of Natural resources 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. (EMSI). 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). Occupational wage estimates also affecte d by county-level EMSI earnings by industry: economicmodeling.com.
Living Wage	A living wage calculator that estimates the cost of living in a specific community or region: livingwage.mit.edu.
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. (EMSI) 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.

Wages Family Compositions: The living wage calculator estimates the living wage needed to support families. For single adult families, the adult is assumed to be employed full time. For two adult families where both adults are in the labor force, both adults are assumed to be employed full time. For two adult families where one adult is not in the labor force, one of the adults is assumed to be employed full time while the other non-wage-earning adult provides full-time child care for the family's children. Full-time work is assumed to be year-round, 40 hours per week for 52 weeks, per adult. Families with one child are assumed to have a 'young child' (4 years old). Families with two children are assumed to have a 'young child' and a 'child' (9 years old). Families with three children are assumed to have a 'young child,' a 'child,' and a 'teenager' (15 years old).