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# Labor Market Analysis

## Watershed Management



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Prepared by the Central Valley/Mother Lode Center of Excellence

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**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](mailto: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 Watershed Management. 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. Two occupations related to Watershed Management were identified for Columbia College:

- 17-3025, Environmental Engineering Technologists and Technicians
- 51-8031, Water and Wastewater Treatment Plant and System Operators

## Key findings:

- **Occupational demand** — There were 694 workers employed in jobs related to Watershed Management in 2021 in the North Central Valley/Northern Mother Lode (NCV/NML) subregion. The largest occupation is water and wastewater treatment plant and system operators with 665 workers, a projected growth rate of 1% over the next five years, and 63 annual openings.
- **Wages** — Water and wastewater treatment plant and system operators earn the highest entry-level wage, \$24.79/hour in the subregion.
- **Employers** — Employers with the most job postings in the subregion are Clean Harbors, Synagro, and the city of Lodi.
- **Occupational titles** — The most common occupational title in job postings in the subregion is Water and Wastewater Treatment Plant and System Operators. The most common job title is Potable Water Systems Operator.
- **Skills and certifications** — The top baseline skill is physical abilities, the top specialized skill is water treatment, and the top software skill is SCADA. The most in-demand certification is Wastewater Treatment Plant Operator.
- **Education** — A high school diploma or equivalent is typically required for water and wastewater treatment plant and system operators. An associate degree is typically required for environmental engineering technologists and technicians.
- **Supply** — Analysis of postsecondary completions shows that on average 11 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 61 trained workers in the subregion and 157 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 Watershed Management workers in the region.

# Introduction

The Central Valley/Mother Lode Center of Excellence was asked by Columbia College to provide labor market information for Watershed Management. 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.<sup>1</sup> Analysis of the program and occupational data related to Watershed Management resulted in the identification of applicable occupations. The Standard Occupational Classification (SOC) System codes and titles used in this report are:

- 17-3025, Environmental Engineering Technologists and Technicians
- 51-8031, Water and Wastewater Treatment Plant and System Operators

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.

## **Environmental Engineering Technologists and Technicians**

**Job Description:** Apply theory and principles of environmental engineering to modify, test, and operate equipment and devices used in the prevention, control, and remediation of environmental problems, including waste treatment and site remediation, under the direction of engineering staff or scientists. May assist in the development of environmental remediation devices.

**Knowledge:** Engineering and Technology, Customer and Personal Service, Mathematics, English Language, Chemistry

**Skills:** Active Listening, Critical Thinking, Reading Comprehension, Active Listening, Monitoring

## **Water and Wastewater Treatment Plant and System Operators**

**Job Description:** Operate or control an entire process or system of machines, often through the use of control boards, to transfer or treat water or wastewater.

**Knowledge:** Chemistry, Biology, Mechanical, Mathematics, Production and Processing

**Skills:** Operations Monitoring, Operation and Control, Monitoring, Active Listening, Quality Control Analysis

# Occupational Demand

The NCV/NML subregion employed 694 workers in Watershed Management occupations in 2021 (Exhibit 1). The largest occupation is water and wastewater treatment plant and system operators with 665 workers in 2021. This occupation is projected to grow by 1% over the next five years and has the greatest number of projected annual openings, 63.

**Exhibit 1. Watershed Management employment and occupational projections in the NCV/NML subregion**

Occupation	2021 Jobs	2026 Jobs	5-Year Change	5-Year % Change	Annual Openings
Water and Wastewater Treatment Plant and System Operators	665	669	4	1%	63
Environmental Engineering Technologists and Technicians	29	31	2	7%	3
<b>TOTAL</b>	<b>694</b>	<b>700</b>	<b>6</b>	<b>1%</b>	<b>66</b>

<sup>1</sup> 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/>.

# Wages

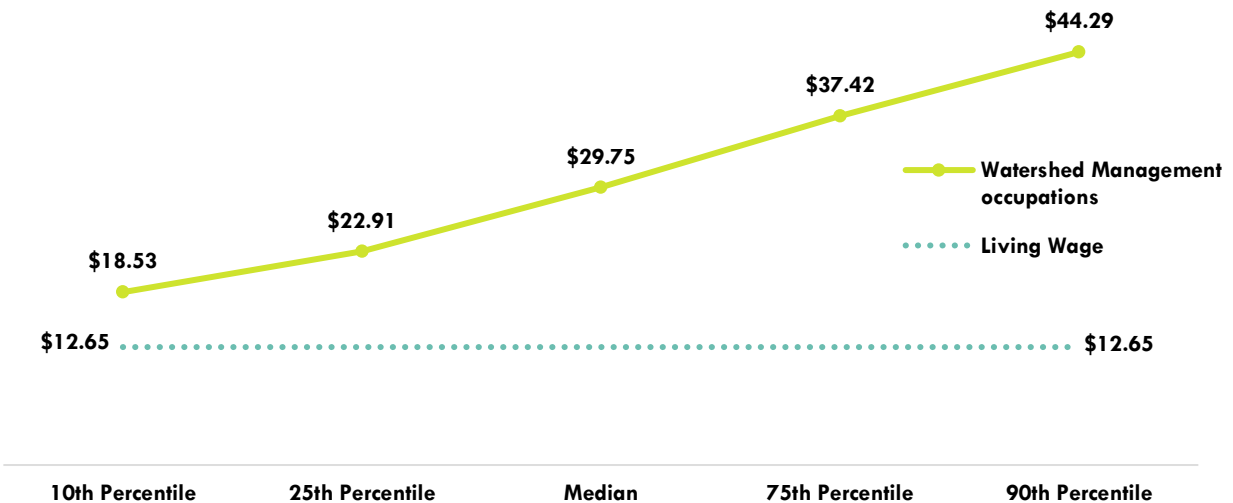
Exhibit 2a shows the hourly wages of the Watershed Management occupations. Water and wastewater treatment plant and system operators earn the highest entry-level wage, \$24.79/hour in the subregion<sup>2</sup>. Please note 10<sup>th</sup> and 25<sup>th</sup> percentiles are considered entry-level wages while 75<sup>th</sup> and 90<sup>th</sup> are considered experienced wages, either by gained by long term employment, received extra training, etc.

**Exhibit 2a. Watershed Management hourly wages in the NCV/NML subregion**

Occupation	Pct. 25 Hourly Earnings	Median Hourly Earnings	Pct. 75 Hourly Earnings
Water and Wastewater Treatment Plant and System Operators	\$24.79	\$31.13	\$37.21
Environmental Engineering Technologists and Technicians	\$21.04	\$28.36	\$37.62

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

**Exhibit 2b. Watershed Management average hourly wages in the NCV/NML subregion**



<sup>2</sup> Entry-level wages are derived from the 25<sup>th</sup> percentile.

# Job Postings

There were 51 job postings for the two occupations in the NCV/NML subregion from May 2022 to October 2022.<sup>3</sup> The employers with the most job postings are listed in Exhibit 3.

## Exhibit 3. Top employers of Watershed Management by number of job postings

Employer	Job Postings	% Job Postings
Clean Harbors	4	9%
Synagro	3	7%
The city of Lodi	2	4%
The city of Modesto	2	4%
Crystal Creamery	2	4%
Ej Gallo	2	4%
Ej Gallo Winery	2	4%
Foster Farms	2	4%
Gallo Glass Company	2	4%
Global Healthcare It	2	4%

Exhibit 4 shows how job postings for the targeted occupations in the NCV/NML subregion are distributed across two O\*NET OnLine occupations. The occupational title Water and Wastewater Treatment Plant and System Operators is listed in 50 job postings. Note how this occupational title dominates the job posting results. Common job titles in postings include Potable Water Systems Operator in four job postings, Waste Water Operator in four job postings, and Wastewater Press Equipment Operator in four job postings.

## Exhibit 4. Top occupational titles in job postings for Watershed Management

Occupational Title	Job Postings	% of Job Postings
Water and Wastewater Treatment Plant and System Operators	50	98%
Environmental Engineering Technicians	1	2%

## Salaries

Exhibit 5 shows the “Market Salaries” for Watershed Management 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 Watershed Management occupations

Market Salary Percentile	Salary Amount
10th Percentile	\$33,122
25th Percentile	\$36,534
50th Percentile	\$43,980
75th Percentile	\$48,035
90th Percentile	\$58,252

<sup>3</sup> 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.

## Education

Of the 51 job postings, 35 listed an education level preferred for the positions being filled. Among those, 100% requested high school or vocational training, 17% requested a bachelor's degree, and 6% 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%.

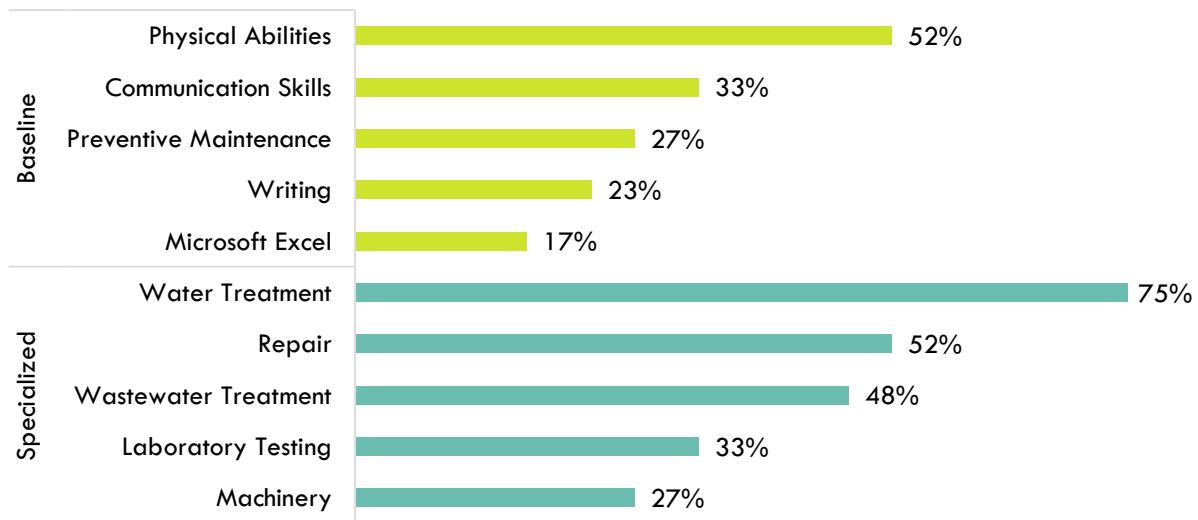
**Exhibit 6. Education levels requested in job postings for Watershed Management**

Education Level	Job Postings	% of Job Postings
High school or vocational training	35	100%
Bachelor's degree	6	17%
Associate's degree	2	6%

## 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, 52% of job postings, communication skills, 33%, and preventive maintenance, 27%. The top three specialized skills are water treatment, 75% of job postings, repair, 52%, and wastewater treatment, 48%.

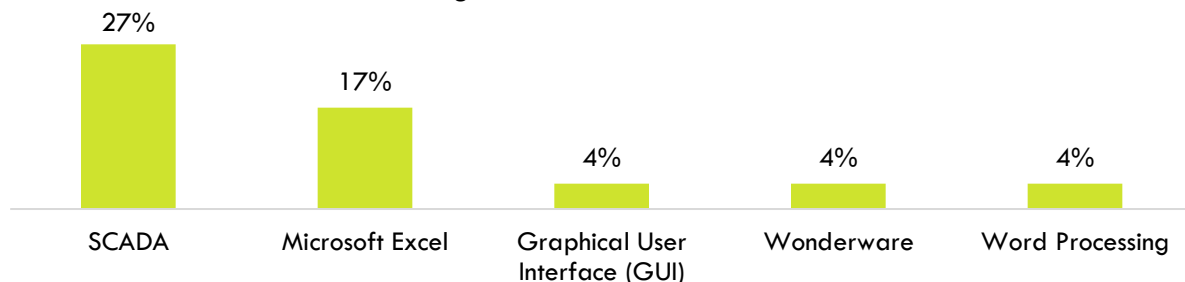
**Exhibit 7. In-demand Watershed Management baseline and specialized skills**



## Software Skills

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

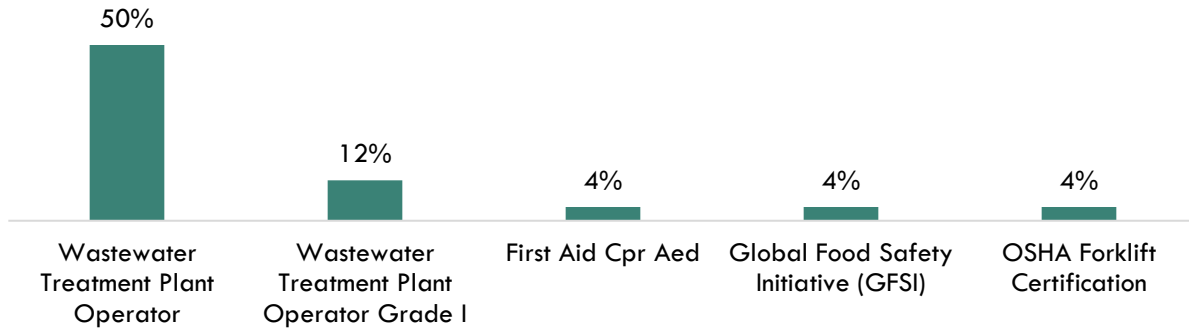
**Exhibit 8. In-demand Watershed Management software skills**



## Certifications

Of the 51 job postings, 26 contained certification data. Among those, 50% indicated a need for a Wastewater Treatment Plant Operator. The next top certification is First Aid Cpr Aed (Exhibit 9).

**Exhibit 9. Top Watershed Management certifications requested in job postings**



## Education, Work Experience & Training

A high school diploma or equivalent is typically required for water and wastewater treatment plant and system operators. An associate degree is typically required for environmental engineering technologists and technicians (Exhibit 10).

**Exhibit 10. Education, work experience, training, and Current Population Survey results for Watershed Management occupations<sup>4</sup>**

Occupation	Typical Entry-level Education	Work Experience Required	Typical On-The-Job Training	CPS
Environmental Engineering Technologists and Technicians	Associate's degree	None	None	50.7%
Water and Wastewater Treatment Plant and System Operators	High school diploma or equivalent	None	Long-term	47.0%

<sup>4</sup> "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 code and title: 095800 - Water and Wastewater Technology. Analysis of the last three years of data shows that, on average, 11 awards were conferred in the Central Valley/Mother Lode region each year (Exhibit 11).

**Exhibit 11. Postsecondary supply for Watershed Management 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
095800 - Water and Wastewater Technology	Clovis		1	3			4
	Columbia	4			0	1	5
	Sequoias					2	2
<b>TOTAL</b>		<b>4</b>	<b>1</b>	<b>3</b>	<b>0</b>	<b>3</b>	<b>11</b>

There is an undersupply of 61 Watershed Management workers in the NCV/NML subregion and 157 workers in the region (Exhibit 12).

**Exhibit 12. Watershed Management 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	66	5	61
CVML	168	11	157

# 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 Watershed Management. Of note, 72% of water and wastewater technology students attained a living wage.

**Exhibit 13. Regional metrics for the TOP code related to Watershed Management**

Metric	Water and Wastewater Technology 095800
Students Who Got a Degree or Certificate or Attained Apprenticeship Journey Status	*
Number of Students Who Transferred	*
Job Closely Related to Field of Study	*
Median Change in Earnings	*
Attained a Living Wage	72%
* denotes data not available.	

# Conclusion

The entry-level wages of the two occupations exceed the NCV/NML subregion's average living wage. There were 51 job postings in the past six months for occupations related to Watershed Management 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 water treatment.
- The top software skill is SCADA.
- The top certification is a Wastewater Treatment Plant Operator.

There is an undersupply of trained workers, a shortage of 61 in the NCV/NML subregion and 157 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 Watershed Management 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: <a href="https://www.bls.gov/emp/tables/educational-attainment.htm">https://www.bls.gov/emp/tables/educational-attainment.htm</a> .
Labor Force, Employment and Unemployment Estimates	California Employment Development Department, Labor Market Information Division: <a href="http://labormarketinfo.edd.ca.gov">labormarketinfo.edd.ca.gov</a> .
Job Posting and Skills Data	Burning Glass: <a href="http://burning-glass.com/">burning-glass.com/</a> .
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: <a href="http://onetonline.org">onetonline.org</a> .

## 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.