



Program Endorsement Brief:

Environmental Science and Technology in the North region

North/Far North Center of Excellence, February 2020

INTRODUCTION

This report provides an overview of the labor market demand, wages, skills, and postsecondary supply for occupations related to environmental science and technology in the 7-county North region and the broader 22-county North/Far North region.

SUMMARY OF KEY FINDINGS

- There were 4,923 jobs in environmental science and technology occupations in 2019. Jobs in environmental science and technology occupations are projected to increase by less than 1% over the next five years and will have an estimated 443 annual openings through 2023.
- Median hourly wages are above the North region's living wage of \$11.48 per hour for a single adult.
- Education: While the typical entry-level education for middle-skill environmental science and technology occupations is an associate's degree, incumbent workers are more likely to have attended some college and, perhaps, hold a certificate than to have earned an associate's degree.
- Analysis of postsecondary completions in the North region shows that community colleges have awarded, on average, 36 certificates and degrees each year between 2016/17 and 2018/19. CSU Sacramento and UC Davis have awarded an average of 159 bachelor degrees each year between 2015/16 and 2017/18.

The report contains the following sections:

- Occupational demand,
- Wages
- Job postings,
- Education and training,
- Program supply, and
- Findings and recommendations.

Context of the Study

The following Standard Occupational Classification (SOC) codes related to the proposed program were included in the analysis:¹

17-2081.00 - Environmental Engineers	
Description:	Research, design, plan, or perform engineering duties in the prevention, control, and remediation of environmental hazards using various engineering disciplines. Work may include waste treatment, site remediation, or pollution control technology.
Sample job titles:	Air Pollution Control Engineer; Chief, Pesticides and Toxic Substances Branch; Environmental Analyst; Environmental Engineer; Environmental Remediation Specialist; Global Director Air and Climate Change; Hazardous Substances Engineer; Marine Engineer CPVEC (Marine Engineer Commercial Passenger Vessel Environmental Compliance); Regulatory Environmental Compliance Manager; Sanitary Engineer.
17-3025.00 - Environmental Engineering Technicians	
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.
Sample job titles:	Air Quality Instrument Specialist, Engineer Technician, Environmental Engineering Assistant, Environmental Engineering Technician, Environmental Field Technician, Environmental Specialist, Environmental Technician, Haz Tech (Hazardous Technician), Industrial Waste Inspector, Senior Environmental Technician
19-2041.00 - Environmental Scientists and Specialists, Including Health	
Description:	Conduct research or perform an investigation to identify, abate, or eliminating sources of pollutants or hazards that affect either the environment or the health of the population. Using knowledge of various scientific disciplines, may collect, synthesize, study, report, and recommend action based on data derived from measurements or observations of air, food, soil, water, and other sources.
Sample job titles:	Environmental Analyst, Environmental Health and Safety Specialist, Environmental Programs Specialist, Environmental Protection Specialist, Environmental Scientist, Environmental Specialist, Hazardous Substances Scientist, Registered Environmental Health Specialist (REHS), Research Environmental Scientist, Senior Environmental Scientist
19-4091.00 - Environmental Science and Protection Technicians, Including Health	
Description:	Perform laboratory and field tests to monitor the environment and investigate sources of pollution, including those that affect health, under the direction of an environmental scientist, engineer, or other specialists. May collect samples of gases, soil, water, and other materials for testing.
Sample job titles:	Environmental Health Specialist, Environmental Specialist, Environmental Technician, Laboratory Specialist, Laboratory Technician, Process Laboratory Specialist, Public Health Sanitarian, Sanitarian, Water Quality Analyst, Water Quality Specialist

Please note that environmental restoration planners (SOC 19-2041.02) are included as a subset of environmental scientists and specialists, including health (SOC 19-2041). Also, note that water/wastewater engineers (SOC 17-2081.01) were excluded from this study.

¹O*NET OnLine. U.S. Department of Labor Education & Training Administration. Accessed November 22, 2019. <https://www.onetonline.org/>.

Review of Taxonomy of Programs (TOP) codes revealed that the following programs are appropriate for inclusion in this study:

TOP codes	Corresponding CIP codes
0301.00 - Environmental science	03.0104 - Environmental science
0302.00 - Environmental studies	03.0103 - Environmental studies
0303.00 - Environmental technology*	15.0507 - Environmental engineering technology/environmental technology

An asterisk (*) denotes a career education TOP code. Non-career education TOP codes were included in this study due to the inclusion of occupations that typically require a bachelor's degree for entry-level work.

Occupational Demand

Exhibit 1 summarizes the job trends by SOC codes in the 7-county North region, 22-county North/Far North region, and California.²

Exhibit 1. Employment and projected occupational demand³

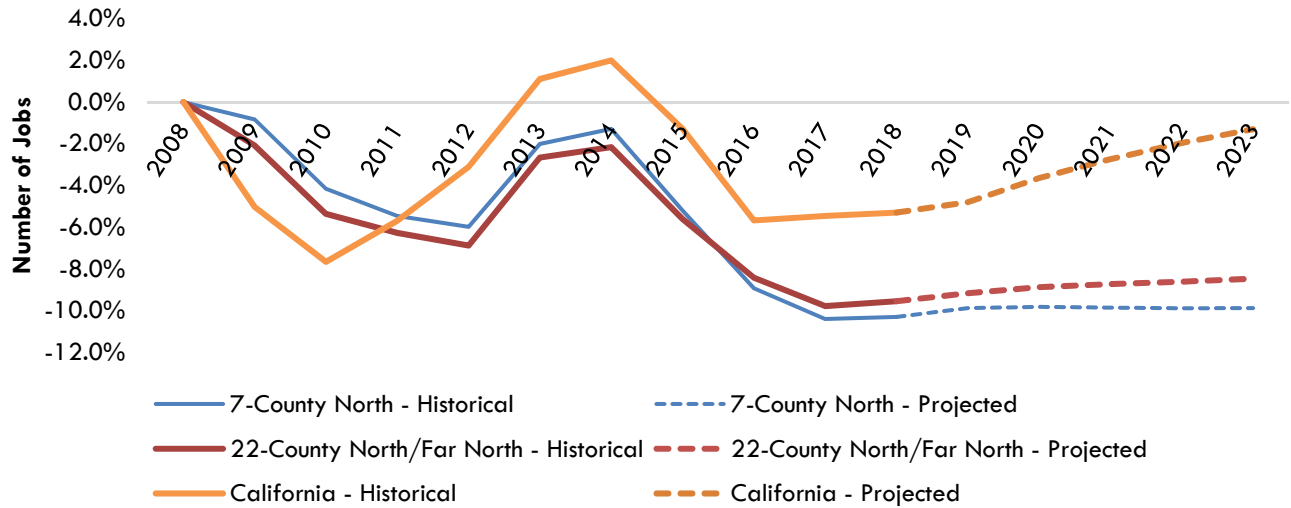
Occupation	SOC	2008 Jobs	2018 Jobs	2023 Jobs	2018-23 % Change	Annual Openings
Environmental Engineers	17-2081	1,532	1,472	1,480	0.6%	101
Environmental Engineering Technicians	17-3025	290	244	255	4.4%	23
Environmental Scientists and Specialists, Including Health	19-2041	2,949	2,668	2,661	-0.2%	254
Environmental Science and Protection Technicians, Including Health	19-4091	723	540	554	2.6%	65
NORTH	TOTALS	5,493	4,923	4,951	0.6%	443
Environmental Engineers	17-2081	1,667	1,600	1,610	0.7%	111
Environmental Engineering Technicians	17-3025	381	335	350	4.6%	33
Environmental Scientists and Specialists, Including Health	19-2041	3,378	3,084	3,104	0.6%	297
Environmental Science and Protection Technicians, Including Health	19-4091	915	717	739	3.2%	88
NORTH/FAR NORTH	TOTALS	6,341	5,735	5,804	1.2%	529
Environmental Engineers	17-2081	8,795	8,523	8,796	3.2%	616
Environmental Engineering Technicians	17-3025	3,702	3,150	3,313	5.2%	307
Environmental Scientists and Specialists, Including Health	19-2041	13,313	12,792	13,362	4.5%	1,303
Environmental Science and Protection Technicians, Including Health	19-4091	5,464	5,153	5,397	4.7%	654
CALIFORNIA	TOTALS	31,274	29,617	30,867	4.2%	2,881

² The 7-county North region includes El Dorado, Placer, Nevada, Sacramento, Sutter, Yolo and Yuba. The 15-county Far North region includes the Butte, Colusa, Del Norte, Glenn, Humboldt, Lake, Lassen, Mendocino, Modoc, Plumas, Shasta, Sierra, Siskiyou, Tehama and Trinity counties. The 22-county North/Far North region is the combination of the 7-county North and 15-county Far North regions.

³ Emsi 2019.4; QCEW Employees, Non-QCEW Employees and Self-Employed.

Exhibit 2 compares the rates of change of the total number of jobs between 2008 and 2018 in the North region, the North/Far North region, and California. It also compares occupational demand projections from 2018 through 2023 across the same areas. The rate of change is indexed to the base year 2008 total number of jobs.

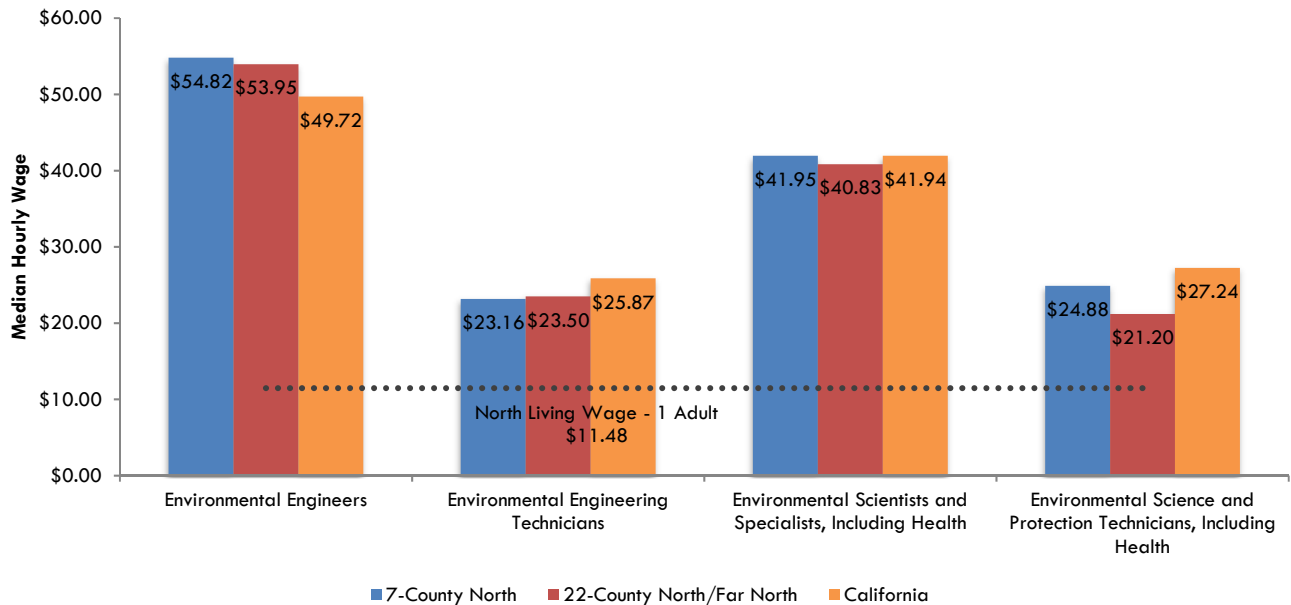
Exhibit 2. Rate of Change for Selected Occupations⁴



Wages

Exhibit 3 compares the median hourly wages of the selected occupations in the study regions to the North region's 7-county average living wage for a one-adult household.⁵

Exhibit 3. Wages for selected occupations⁶



⁴ Ibid.

⁵ "Family Needs Calculator (Formerly the Self-Sufficiency Standard)." Insight Center for Community Economic Development, February 2018. <https://insightccd.org/2018-family-needs-calculator/>.

⁶ Emsi 2019.4; QCEW Employees, Non-QCEW Employees and Self-Employed.

Job Postings

Burning Glass identified a pool of 767 job postings in the North region for the studied occupations. This data represents job listings posted online within the last year, from February 1, 2019, through January 31, 2020.

Exhibit 4 shows the number of job postings per occupations. All 767 job postings mapped to an O*Net occupation.

Exhibit 4. Job postings by occupation⁷

Occupation	SOC Code	Job Postings	% Job Posting
Environmental Scientists and Specialists, Including Health	19-2041.00	308	40%
Environmental Engineers	17-2081.00	209	27%
Environmental Science and Protection Technicians, Including Health	19-4091.00	124	16%
Environmental Restoration Planners	19-2041.02	111	14%
Environmental Engineering Technicians	17-3025.00	15	2%

Exhibit 5 shows the top 10 job titles across the 767 job postings. Ninety-nine percent of the 767 job postings included a job title. For a more comprehensive list of job titles, please contact the North/Far North COE.

Exhibit 5. Top 10 job titles⁸

Occupation	Job Postings	% Job Posting
Environmental Scientist	215	28%
Environmental Planner	116	15%
Environmental Specialist	92	12%
Environmental Engineer	57	7%
Environmental Technician	37	5%
Environmental Project Manager	24	3%
Engineer	23	3%
Quality Engineer	15	2%
Technician	10	1%
Field Environmental Technician	9	1%

⁷ Ibid.

⁸ Ibid.

Exhibit 6 shows the top 10 skills most in-demand for the studied occupations in the North region. 722 of the 767 job postings included skills information.

Exhibit 6. Top skills by number of job postings ⁹

Specialized skills	Job Postings	% Job Posting
Environmental Science	336	47%
Project Management	203	28%
California Environmental Quality Act (CEQA)	188	26%
Budgeting	184	25%
Environmental Engineering	147	20%
Environmental Laws and Regulations	139	19%
National Environmental Policy Act (NEPA)	114	16%
Environmental Planning	113	16%
Scheduling	113	16%
Water Quality	106	15%
Soft skills	Job Postings	% Job Posting
Communication Skills	360	50%
Planning	284	39%
Writing	245	34%
Research	194	27%
Microsoft Office	137	19%
Organizational Skills	131	18%
Teamwork / Collaboration	125	17%
Detail-Oriented	124	17%
Microsoft Excel	120	17%
Verbal / Oral Communication	86	12%
Software skills	Job Postings	% Job Posting
Microsoft Office	137	19%
Microsoft Excel	120	17%
Microsoft PowerPoint	52	7%
Microsoft Word	42	6%
ArcGIS	40	6%
AutoCAD	32	4%
Geographic Information System (GIS)	28	4%
SAP	27	4%
Word Processing	25	3%
Microsoft Project	18	2%

⁹ Ibid.

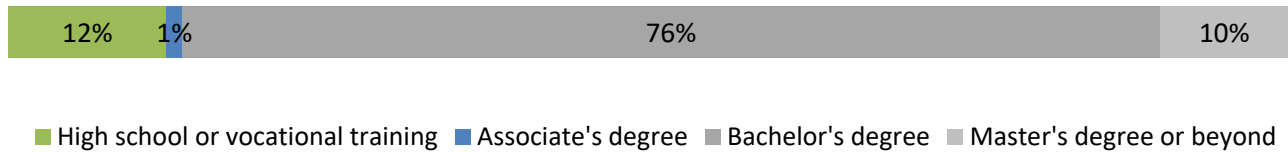
Exhibit 7 lists North region employers with the most job openings for the selected occupations. Sixty-seven percent (or 511) of the 767 job postings included the employer’s name.

Exhibit 7. Top employers by number of job postings¹⁰

Employer	Number of Postings	Percent of Postings
TJG Civil Engineers And Land Planners	32	6%
State of California	28	5%
Stantec, Inc.	26	5%
County of Sacramento	17	3%
AECOM Technology Corporation	17	3%
Jacobs Engineering Group Incorporated	13	3%
Johnson Environmental Services	11	2%
Stericycle Incorporated	9	2%
HDR Incorporated	9	2%
CDM Smith	9	2%

Exhibit 8 shows the minimum level of education advertised in job postings for the selected occupations. 258 of the 767 job postings did not include a minimum level of education.

Exhibit 8. Minimum education advertised¹¹



¹⁰ Ibid.

¹¹ Ibid.

Exhibit 9 shows the number of job postings in the North region, by city, for the selected occupations.

Exhibit 9. Top job postings locations for selected occupations¹²

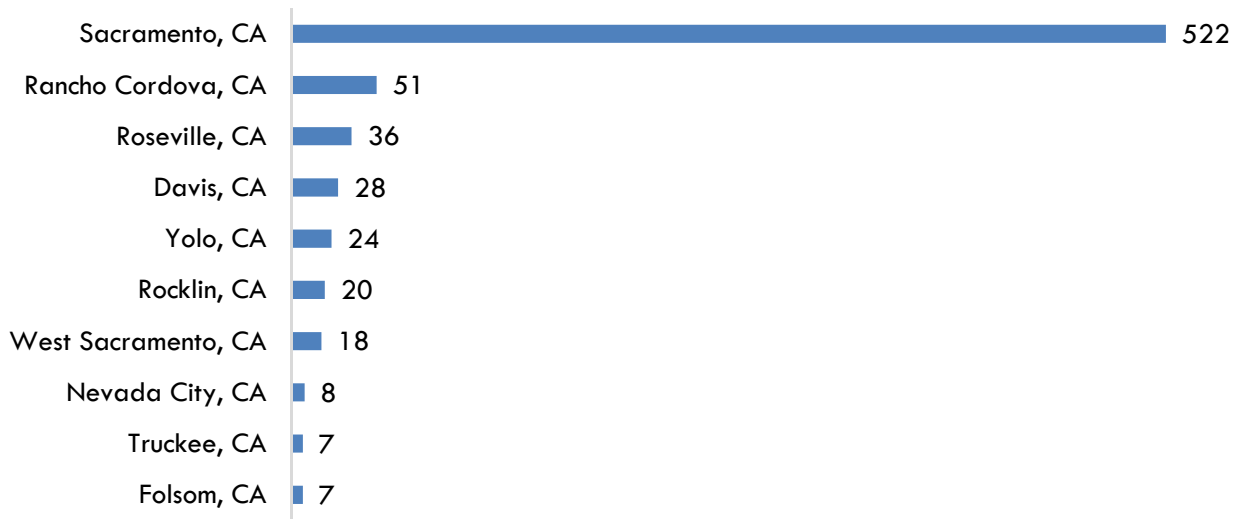
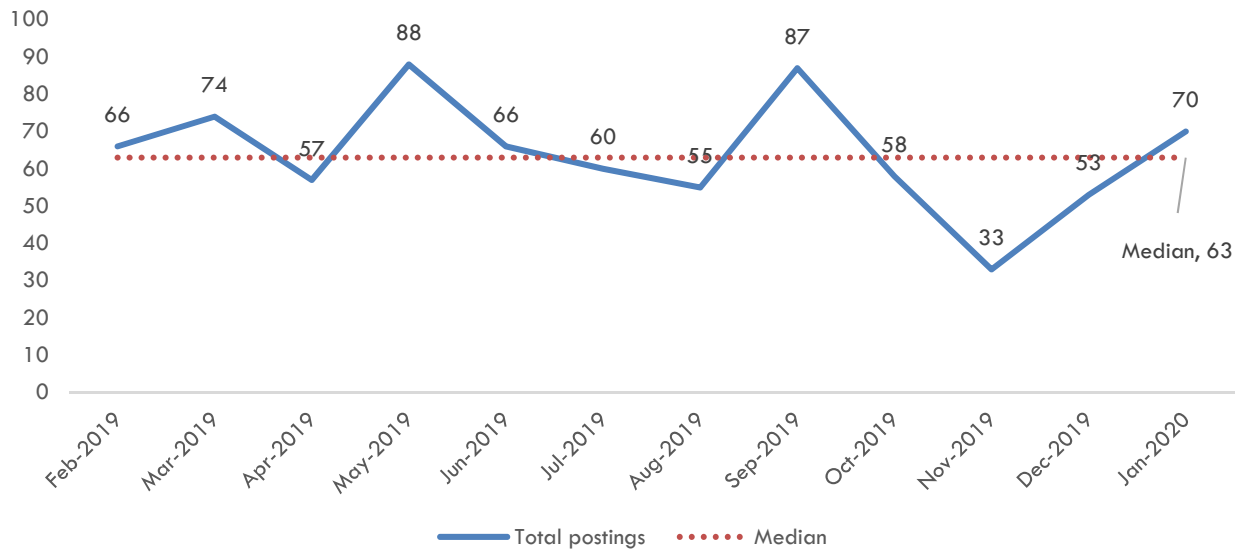


Exhibit 10 compares the 12-month job posting trends of the selected occupations to the median number of job postings in the North region.

Exhibit 10. Job postings trend for selected occupations¹³



¹² Ibid.

¹³ Burning Glass Technologies, "Labor Insight Real-Time Labor Market Information Tool," <http://www.burning-glass.com>, 2019.

Education and Training

Exhibit 11 shows the average level of educational attainment for workers 25 years and older by occupation across the U.S.

Exhibit 9. Typical educational attainment for selected occupations, nationally¹⁴

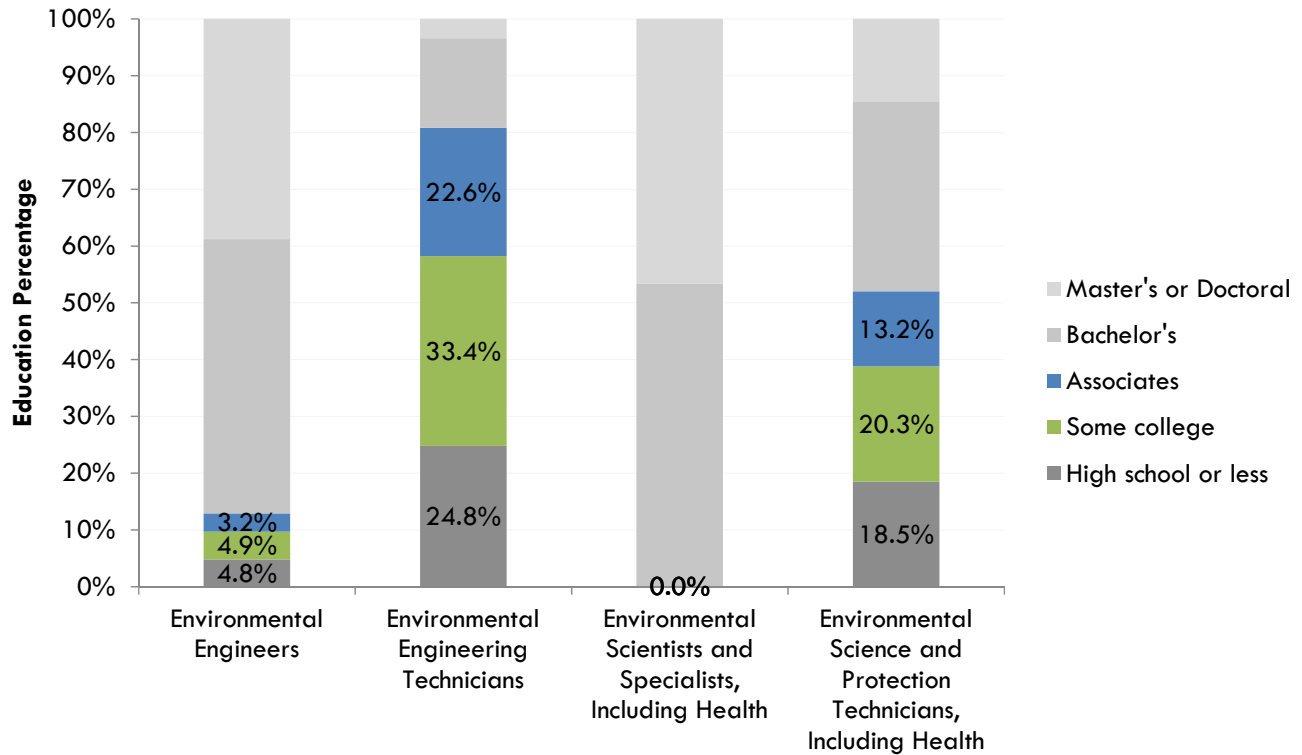


Exhibit 10 shows the typical education requirements, on-the-job training, and work experience requirements for entry-level positions in the selected occupations in the North region.

Exhibit 10. Typical education, training, and work experience for selected occupations¹⁵

Occupations	SOC	Typical Entry-Level Education	Typical On-The-Job Training	Work Experience Required
Environmental Engineers	17-2081	Bachelor's degree	None	None
Environmental Engineering Technicians	17-3025	Associate's degree	None	None
Environmental Scientists and Specialists, Including Health	19-2041	Bachelor's degree	None	None
Environmental Science and Protection Technicians, Including Health	19-4091	Associate's degree	None	None

¹⁴ "Educational Attainment for Workers 25 Years and Older by Detailed Occupation." U.S. Bureau of Labor Statistics. U.S. Department of Labor, September 4, 2019. <https://www.bls.gov/emp/tables/educational-attainment.htm>.

¹⁵ Emsi 2019.4; QCEW Employees, Non-QCEW Employees and Self-Employed.

Program Supply

Exhibit 11 compares the total number of awards (certificates and degrees) conferred by related training providers in the selected TOP and CIP codes in the North region over the last three academic years.

Exhibit 11. Total awards conferred by North training providers, 2016-2019¹⁶

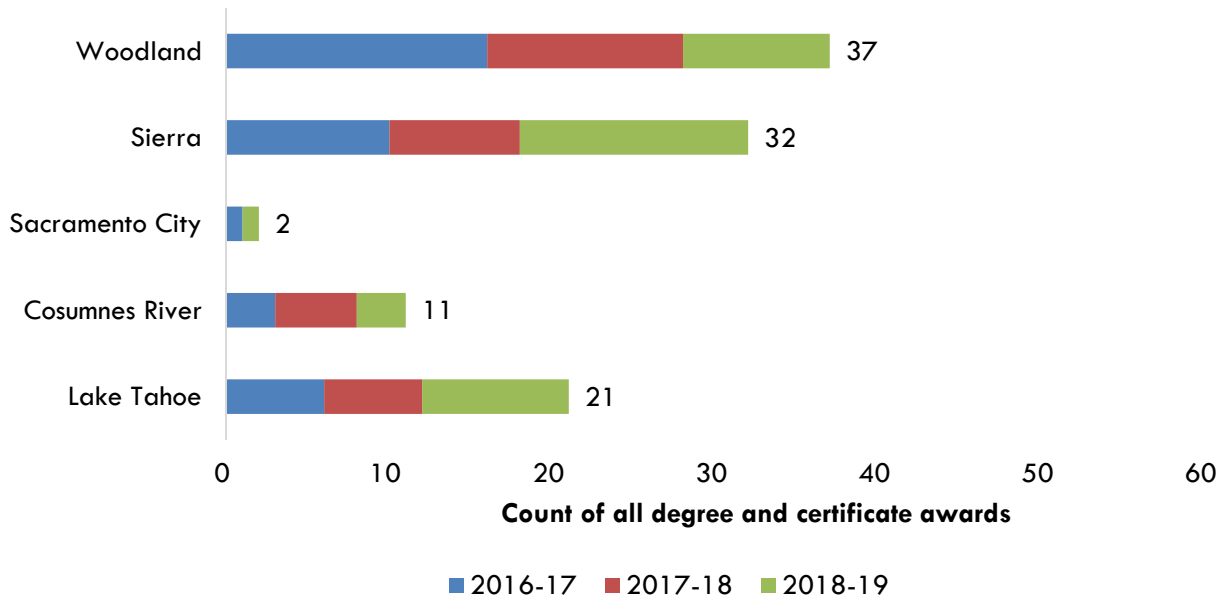


Exhibit 12 displays program awards by level and year for community college programs averaged over the last three academic years.

Exhibit 12. Program awards conferred by North region training providers, 2016-2019¹⁷

TOP tile - TOP code	College	3-yr Average Certificates	3-Yr Average Associate	Total
Environmental science - 0301.00	None	--	--	--
Environmental studies - 0302.00	Cosumnes River	1	--	1
	Sierra	--	6	6
Environmental technology - 0303.00*	Lake Tahoe	1	4	5
	Sacramento City	9	--	9
	Sierra	1	2	3
	Woodland	12	--	12
	Totals	24	12	36

¹⁶ COE Supply Tables, California Community Colleges Chancellor's Office DataMart, and Integrated Postsecondary Education Data System (IPEDS).

¹⁷ Ibid.

Exhibit 13 displays program awards by level and year for other postsecondary programs averaged over the latest three academic years for which data is available.

Exhibit 12. Program awards conferred by North region training providers, 2015-2018¹⁸

CIP title - CIP code	College	2015-16	2016-17	2017-18	3-Yr Average Bachelor
Environmental science - 03.0104	CSU Sacramento	44	53	57	51
	University of California, Davis	83	96	89	89
Environmental studies - 03.0103	CSU Sacramento	--	--	--	--
	University of California, Davis	0	0	54	18
Environmental engineering technology/environmental technology - 15.0507	N/A	--	--	--	--
Totals		200	149	127	159

¹⁸ Ibid.

FINDINGS

- Between 2008 and 2018, environmental science and technology occupations declined by 570 jobs in the North region alone. While job losses were spread across the four studied occupations, environmental scientists and specialists made up the bulk of this loss, losing nearly 300 jobs over ten years.
- Jobs in environmental science and technology occupations are projected to increase by less than 1% over the next five years, adding 28 new jobs by 2023. Environmental scientists and specialists are expected to lose another seven jobs, while the middle-skill environmental engineering technicians and environmental science and protection technicians will add another 25 new jobs by 2023.
- Environmental science and technology occupations are projected to have nearly 443 job openings per year over the next five years. Annual job openings are highest for environmental engineers and scientists at 355 openings per year over the next five years. Annual job openings for the middle-skill environmental engineering and science technicians are estimated at 88 openings per year over the next five years.
- Median hourly wages for environmental science and technology occupations are above the regional living wage for a single adult (\$11.48). The middle-skill occupations, environmental engineering and science technicians, earn between \$23 and \$28 per hour.
- Burning Glass Labor Insights identified a pool of 767 jobs for environmental science and technology occupations posted online in the last 12 months. Eighty-one percent of job postings, or 628 job postings, were for the above-middle-skill occupations: environmental scientists and specialists, environmental engineers, and environmental restoration planners.
- There were 139 job postings for middle-skill occupations: environmental science and protection technicians (124 job postings) and environmental engineering technicians (15 job postings).
- While only 66% of job postings included a minimum education level in the job postings, nearly 76% of employers were looking for workers with at least a bachelor's degree. 13% of job postings included a minimum level of education at the high school/vocational training or associate's degree level.
- Typical educational attainment varies according to the occupation. For the middle-skill occupations, environmental science and protection technicians and environmental engineering technicians, between 33.5% and 56% of incumbent workers, have attended some college or hold an associate's degree. The incumbent workers in the above-middle-skill occupations, environmental scientists and specialists and environmental engineers typically hold a bachelor's degree or beyond.
- While the typical entry-level education for the middle-skill occupations of environmental science and protection technicians and environmental engineering technicians is an associate's degree, incumbent workers are more likely to have attended some college (and perhaps hold a postsecondary certificate) than to have earned an associate's degree.
- Analysis of California Community College Chancellor's Office Management Information Systems Data Mart shows that there are five community colleges in the region offering awards in two of the three identified TOP codes. Colleges include Cosumnes River, Lake Tahoe, Sacramento City, Sierra, and Woodland.
- Together, these colleges conferred an average of 24 certificates and 12 associate degrees per year over the last three academic years (2016/17 - 2018/19).

- According to the National Center for Education Statistics, CSU Sacramento and University of California, Davis, offer programs in environmental science and environmental studies. Together, these universities conferred an average of 159 bachelor degrees in the studied programs over the last three academic years (2015/16 - 2017/18).

RECOMMENDATIONS

- Based on a three-year average of annual awards in environmental science and technology (195 certificates and degrees), and projected yearly openings for environmental science and technology occupations (443 openings), the region appears to have some demand for programs related to the occupations.
- Since most occupational demand is concentrated at the above-middle-skill occupations (environmental scientists and specialists and environmental engineers), college considering new programs or modifications to existing programs should establish a transfer pathway in addition to postsecondary certificate and associate degree-granting pathways.

COE Recommendation		
Move forward with program	Program is not recommended	Additional information needed
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

METHODOLOGY

Occupations in this report were identified using O*Net. Findings in this report were determined using labor market data from the Bureau of Labor Statistics (BLS), U.S. Census Bureau data from Emsi, and jobs posting data from Burning Glass.

APPENDIX A: DATA SOURCES

Sources used for data analysis purposes in this report include:

- U.S. Department of Labor/Employment and Training Administration (DOLETA) O*NET Online
- Burning Glass, Labor Insight/Jobs
- Economic Modeling Specialists, International (EMSI)
- California Employment Development Department, Labor Market Information Division (EDD, LMID)
- Bureau of Labor Statistics, Occupational Employment Statistics (OES)
- California Community Colleges Chancellor's Office, Cal-PASS Plus LaunchBoard
- Living Insight Center for Community Economic Development, Self-Sufficiency Standard Tool for California
- California Community Colleges Chancellor's Office Management Information Systems (MIS Data Mart)
- U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS)

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