** Conservation and Resource Management Occupations Labor Market Information Report**

**Merritt College**

Prepared by the San Francisco Bay Center of Excellence

for Labor Market Research

May 2019

# Recommendation

Based on all available data, there appears to be an undersupply of Conservation and Resource Management workers compared to the demand for this cluster of occupations in the Bay region and in the East Bay sub-region (Alameda and Contra Costa Counties.) There is a projected annual gap of about 805 students in the Bay region and 269 students in the East Bay Sub-Region.

This report also provides student outcomes data on employment and earnings for programs on TOP 0115.00 - Natural Resources in the state and region. It is recommended that these data be reviewed to better understand how outcomes for students taking courses on this TOP code compare to potentially similar programs at colleges in the state and region, as well as to outcomes across all CTE programs at Merritt College and in the region.

# Introduction

This report profiles Conservation and Resource Management Occupations in the 12 county Bay region and in the East Bay sub-region for a proposed new program at Merritt College. Although five occupations were listed by Merritt College for this proposed new certificate program, two of the occupations require a Bachelor’s degree. Students completing the certificate will be prepared for entry-level employment, but not for positions that require a Bachelor’s degree. Therefore, for the supply and demand “gap analysis” only the three occupations that require less than a Bachelor’s degree or that require a Bachelor’s degree but a third or more of those employed in the occupation have an Associate degree or some college coursework, were included in the Conservation and Resource Management occupational cluster, when estimating the labor market demand. However, for informational purposes all five occupations are used when presenting data in Tables 1,2,3,4,6,9,10, and 11 of this report.

|  |
| --- |
| * **Conservation Scientists (SOC 19-1031):** Manage, improve, and protectnatural resources to maximize their use without damaging the environment. May conduct soil surveys and develop plans to eliminate soil erosion or to protect rangelands. May instruct farmers, agricultural production managers, or ranchers in best ways to use crop rotation, contour plowing, or terracing to conserve soil and water; in the number and kind of livestock and forage plants best suited to particular ranges; and in range and farm improvements, such as fencing and reservoirs for stock watering. Excludes “Zoologists and Wildlife Biologists" (19-1023) and "Foresters" (19-1032).
 |
| Entry-Level Educational Requirement: Bachelor's degree |
| Training Requirement: None |
| Percentage of Community College Award Holders or Some Postsecondary Coursework: 0% |
| * **Environmental Science and Protection Technicians**, **Including Health (SOC 19-4091):** 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 specialist. May collect samples of gases, soil, water, and other materials for testing.
 |
| Entry-Level Educational Requirement: Associate's *degree* |
| Training Requirement: None |
| Percentage of Community College Award Holders or Some Postsecondary Coursework: 34*%* |
| * **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 rangelands and wildlife habitats. Excludes “Conservation Scientists” (19-1031) and “Foresters” (19-1032).
 |
| Entry-Level Educational Requirement: Associate's *degree* |
| Training Requirement: None |
| Percentage of Community College Award Holders or Some Postsecondary Coursework: 34*%* |
| * **Biological Technicians (SOC 19-4021)**: Assist biological and medical scientists in laboratories. Set up, operate, and maintain laboratory instruments and equipment, monitor experiments, make observations, and calculate and record results. May analyze organic substances, such as blood, food, and drugs.
 |
| Entry-Level Educational Requirement: Bachelor's *degree* |
| Training Requirement: None |
| Percentage of Community College Award Holders or Some Postsecondary Coursework: 35*%* |
| * **Environmental Scientists and Specialists, Including Health (SOC 19-2041):** Conduct research or perform investigation for the purpose of identifying, abating, 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. Excludes “Zoologists and Wildlife Biologists" (19-1023), "Conservation Scientists" (19-1031), "Forest and Conservation Technicians" (19-4093), "Fish and Game Wardens" (33-3031), and "Forest and Conservation Workers" (45-4011).
 |
| Entry-Level Educational Requirement: Bachelor's *degree* |
| Training Requirement: None |
| Percentage of Community College Award Holders or Some Postsecondary Coursework: 0*%* |

# Occupational Demand

**Table 1. Employment Outlook for Conservation and Resource Management Occupations in Bay Region**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Occupation  | 2017 Jobs | 2022 Jobs | 5-Yr Change | 5-Yr % Change | 5-Yr Open-ings | Average Annual Open-ings | 10% Hourly Wage | Median Hourly Wage |
| Conservation Scientists | 765 | 806 | 41  | 5% | 363 | 73 | $20.04  | $38.64  |
| Environmental Science and Protection Technicians, Including Health | 1,397 | 1,482 | 85  | 6% | 917 | 183 | $16.89  | $31.16  |
| Forest and Conservation Technicians | 835 | 853 | 19  | 2% | 507 | 101 | $11.64  | $21.37  |
| Biological Technicians | 4,496 | 4,959 | 463  | 10% | 2,716 | 543 | $16.69  | $25.60  |
| Environmental Scientists and Specialists, Including Health | 3,675 | 3,894 | 220  | 6% | 1,939 | 388 | $25.69  | $44.71  |
| **Total** | **11,167** | **11,994** | **827**  | **7%** | **6,443** | **1,288** | **$19.53**  | **$33.16**  |

*Source: EMSI 2019.2*

**Bay Region** includes Alameda, Contra Costa, Marin, Monterey, Napa, San Benito, San Francisco, San Mateo, Santa Clara, Santa Cruz, Solano and Sonoma Counties

**Table 2. Employment Outlook for Conservation and Resource Management Occupations in East Bay Sub-Region**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Occupation  | 2017 Jobs | 2022 Jobs | 5-Yr Change | 5-Yr % Change | 5-Yr Open-ings | Average Annual Open-ings | 10% Hourly Wage | Median Hourly Wage |
| Conservation Scientists | 107 | 115 | 7  | 7% | 53 | 11 | $30.56  | $43.11  |
| Environmental Science and Protection Technicians, Including Health | 439 | 451 | 12  | 3% | 275 | 55 | $18.14  | $31.40  |
| Forest and Conservation Technicians | 46 | 50 | 4  | 9% | 31 | 7 | $13.35  | $18.41  |
| Biological Technicians | 1,777 | 1,917 | 141  | 8% | 1,025 | 208 | $16.20  | $23.99  |
| Environmental Scientists and Specialists, Including Health | 1,498 | 1,529 | 32  | 2% | 741 | 149 | $20.71  | $45.89  |
| **TOTAL** | **3,866** | **4,062** | **196**  | **5%** | **2,125** | **429** | **$18.53**  | **$33.78**  |

*Source: EMSI 2019.2*

**East Bay Sub-Region** includes Alameda and Contra Costa Counties

### Job Postings in Bay Region and East Bay Sub-Region

**Table 3. Number of Job Postings by Occupation for latest 12 months (May 2018 - April 2019)**

| Occupation | Bay Region | East Bay |
| --- | --- | --- |
|  Biological Technicians | 1,399 | 369 |
|  Environmental Science and Protection Technicians, Including Health | 405 | 159 |
|  Environmental Scientists and Specialists, Including Health | 301 | 102 |
|  Environmental Restoration Planners | 125 | 45 |
|  Park Naturalists | 93 | 25  |
|  Forest and Conservation Technicians | 79 | 20 |
|  **Total** | **2,402** | **720** |

*Source: Burning Glass*

**Table 4a. Top Job Titles for Conservation and Resource Management Occupations for latest 12 months (May 2018 - April 2019) Bay Region**

|  |  |  |  |
| --- | --- | --- | --- |
| Common Title | Bay | Common Title | Bay |
| Research Associate | 554 | Field Environmental Technician | 26 |
| Environmental Specialist | 118 | Smog Technician | 24 |
| Environmental Scientist | 110 | Staff Research Associate, C++ | 21 |
| Environmental Planner | 110 | Research Associate, Engineering | 18 |
| Development Associate | 103 | Specialist | 17 |
| Environmental Technician | 76 | Ranger | 17 |
| Staff Research Associate | 64 | EH & S Specialist | 16 |
| Research Technician | 57 | Media Prep Technician | 13 |
| Technician | 42 | Hazardous Waste Technician | 13 |
| Senior Associate Research Associate, Research | 35 | Research Associate, Information And Technology Industry | 12 |
| Research Associate, Laboratory | 33 | Utility Forestry Technician | 11 |
| Biological Science Technician | 30 | Park Ranger | 11 |
| Senior Research Associate | 27 | Senior Research Associate, Oncology | 10 |
| Environmental Protection Specialist | 27 | Research Associate, Cell Culturing | 10 |

**Table 4b. Top Job Titles for Conservation and Resource Management Occupations for latest 12 months (May 2018 - April 2019) East Bay Sub-Region**

|  |  |  |  |
| --- | --- | --- | --- |
| Common Title | East Bay | Common Title | East Bay |
| Research Associate | 140 | Hazardous Waste Technician | 7 |
| Environmental Specialist | 46 | Biological Science Technician | 7 |
| Environmental Planner | 42 | Water Resources Technician | 6 |
| Environmental Technician | 38 | Specialist | 6 |
| Environmental Scientist | 34 | Smog Technician | 5 |
| Development Associate | 23 | Paint Prep | 5 |
| Staff Research Associate | 22 | Engineering Research Associate | 5 |
| Staff Research Associate, C++ | 21 | EH & S Specialist | 5 |
| Research Technician | 20 | Various Management Positions | 4 |
| Technician | 15 | Stem Cell Research Associate | 4 |
| Environmental Protection Specialist | 12 | Safety Specialist | 4 |
| Senior Associate Research Associate, Research | 11 | Research Associate, Genome, Engineering | 4 |
| Field Environmental Technician | 10 | Research Associate, Flow Cytometry | 4 |
| J + + Fire Control Specialist | 8 | Research Associate, Cell Culturing | 4 |

*Source: Burning Glass*

# Industry Concentration

**Table 5. Industries hiring Conservation and Resource Management Workers in Bay Region**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Industry – 6 Digit NAICS (No. American Industry Classification) Codes | Jobs in Industry (2018) | Jobs in Industry (2022) | % Change (2018-22) | % in Industry (2018) |
| Research and Development in the Physical, Engineering, and Life Sciences (except Nanotechnology and Biotechnology) (541715) | 1,913 | 1,847 |  (3.5%) | 16.8% |
| Local Government, Excluding Education and Hospitals (903999) | 1,151 | 1,198 | 4.1% | 10.1% |
| Research and Development in Biotechnology (except Nanobiotechnology) (541714) | 1,022 | 1,380 | 35.0% | 9.0% |
| Federal Government, Civilian, Excluding Postal Service (901199) | 932 | 923 |  (1.0%) | 8.2% |
| State Government, Excluding Education and Hospitals (902999) | 560 | 585 | 4.5% | 4.9% |
| Administrative Management and General Management Consulting Services (541611) | 538 | 630 | 17.1% | 4.7% |
| Colleges, Universities, and Professional Schools (State Government) (902612) | 533 | 516 |  (3.2%) | 4.7% |
| Engineering Services (541330) | 483 | 519 | 7.5% | 4.2% |
| Testing Laboratories (541380) | 465 | 459 |  (1.3%) | 4.1% |
| Other Scientific and Technical Consulting Services (541690) | 451 | 406 |  (10.0%) | 4.0% |
| Colleges, Universities, and Professional Schools (611310) | 413 | 435 | 5.3% | 3.6% |
| Pharmaceutical Preparation Manufacturing (325412) | 327 | 339 | 3.7% | 2.9% |
| Marketing Consulting Services (541613) | 252 | 300 | 19.0% | 2.2% |
| General Medical and Surgical Hospitals (622110) | 174 | 166 |  (4.6%) | 1.5% |
| Environmental Consulting Services (541620) | 142 | 146 | 2.8% | 1.2% |

*Source: EMSI 2019.2*

**Table 6. Top Employers Posting Conservation and Resource Management Occupations in Bay Region and East Bay Sub-Region (May 2018 - April 2019)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Employer | Bay | Employer | Bay | Employer | East Bay |
| Gladstone Institutes | 35 | Golden Gate Audubon Society | 14 | UC San Diego | 34 |
| University Of California Berkeley | 34 | American Technologies Incorporated | 14 | University Of California Berkeley | 33 |
| UC San Diego | 34 | Stericycle Incorporated | 13 | Zymergen | 18 |
| Bristol-Myers Squibb | 34 | Clean Harbors | 13 | University California | 16 |
| University California | 33 | Buck Institute | 13 | Work For Progress | 11 |
| Department Interior | 30 | Work For Progress | 12 | University Of California | 8 |
| Ngm Biopharmaceuticals | 29 | Tetra Tech | 12 | 10X Genomics | 8 |
| Prime Therapeutics | 27 | Sfmta | 12 | Waste Management | 7 |
| Zymergen | 22 | Arcadis | 12 | Gilead Sciences | 7 |
| Biomarin Pharmaceutical Incorporated | 21 | Stantec, Inc. | 11 | American Technologies Incorporated | 7 |
| Biophase Solutions Incorporated | 19 | County San Mateo | 11 | AECOM Technology Corporation | 7 |
| Bepc | 19 | City San Jose | 11 | Tetra Tech | 6 |
| University Of California San Francisco | 17 | Audentes Therapeutics | 11 | Pivot Bio | 6 |
| State of California | 16 | Ascent | 11 | East Bay Regional Park District | 6 |
| US Government | 16 | Rd Partners | 10 | Ch2M & Jacobs | 6 |
| Gilead Sciences | 16 | Orchard Therapeutics | 10 | Caribou Biosciences, Inc | 6 |
| Davey Resource Group | 15 | Fluidigm Corporation | 10 | Veolia Water North America | 5 |

*Source: Burning Glass*

# Educational Supply

There are three colleges in the Bay Region issuing 22 awards on average annually (last 3 years) on TOP 0115.00 - Natural Resources. There are no colleges in the East Bay sub-region issuing awards on this TOP code.

**Table 7. Awards on TOP 0115.00 - Natural Resources in the Bay Region**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| College | Sub-Region | Associates | Certificates | Total |
| **De Anza** | Silicon Valley | 1 | 3 | 4 |
| **Santa Rosa** | North Bay | 5 | 5 | 10 |
| **West Valley** | Silicon Valley | 4 | 4 | 8 |
| **Total Bay Region** | **10** | **12** | **22** |
| **Total East Bay Sub-Region** | **0** | **0** | **0** |

# *Source: IPEDS, Data Mart and Launchboard*

NOTE: Headcount of students who took one or more courses is for 2016-17. The annual average for awards is 2014-17 unless there are only awards in 2016-17. The annual average for other postsecondary is for 2013-16.

# Gap Analysis

Although five occupations were listed by Merritt College for this proposed new certificate program, two of the occupations require a Bachelor’s degree. Students completing the certificate will be prepared for entry-level employment, but not for positions that require a Bachelor’s degree. Therefore, for the supply and demand “gap analysis” only the three occupations that require less than a Bachelor’s degree or that require a Bachelor’s degree but a third or more of those employed in the occupation have an Associate degree or some college coursework, were included in the Conservation and Resource Management occupational cluster, when estimating the labor market demand.

Based on the data included in this report, there is a labor market gap in the Bay region with 827 annual openings for the Conservation and Resource Management occupational cluster and 22 annual (3-year average) awards for an annual undersupply of 805 students. In the East Bay Sub-Region, there is also a gap with 269 annual openings and no annual (3-year average) awards for an annual undersupply of 269 students.

# Student Outcomes

**Table 8. Four Employment Outcomes Metrics for Students Who Took Courses on TOP 0115.00 - Natural Resources**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 2015-16 | Bay (All CTE Programs) | Merritt College (All CTE Programs) | State (0115.00) | Bay (0115.00) | East Bay (0115.00) | Merritt College (0115.00) |
| % Employed Four Quarters After Exit | 74% | 71% | 65% | 72% | 71% | 71% |
| Median Quarterly Earnings Two Quarters After Exit | $10,550 | $9,306 | $8,399 | $10,242 | $9,500 | $9,263 |
| Median % Change in Earnings | 46% | 43% | 48% | 47% | 50% | 44% |
| % of Students Earning a Living Wage | 63% | 60% | 53% | 59% | 57% | 59% |

*Source: Launchboard Pipeline (version available on 5/21/19)*

# Skills, Certifications and Education

**Table 9. Top Skills for Conservation and Resource Management Occupations in Bay Region (May 2018 - April 2019)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Skill | Postings | Skill | Postings | Skill | Postings |
| Molecular Biology | 840 | Western Blot | 256 | Transfection | 139 |
| Biology | 733 | qPCR | 241 | Cancer knowledge | 138 |
| Experiments | 647 | Environmental Science | 232 | Proteins | 137 |
| Cell Culturing | 570 | Tissue Culture | 191 | Oncology | 136 |
| Biochemistry | 527 | Scheduling | 180 | Genome | 133 |
| Cell Biology | 505 | Assay Development | 178 | Electrophoresis | 131 |
| Biochemical and Cell-Based Assays | 401 | Hazardous Waste | 177 | CRISPR | 120 |
| Biotechnology | 389 | Microscope | 175 | California Environmental Quality Act (CEQA) | 119 |
| Flow Cytometry | 387 | Fluorescence-activated cell sorting (FACS) | 173 | Budgeting | 117 |
| DNA | 369 | Quality Assurance and Control | 168 | Environmental Health and Safety | 116 |
| Immunology | 326 | Record Keeping | 155 | Drug Discovery | 116 |
| Data Analysis | 319 | Microbiology | 152 | Occupational Health and Safety | 115 |
| Enzyme-Linked Immunosorbent Assay  | 311 | Next Generation Sequencing (NGS) | 151 | Protein Expression | 111 |
| Chemistry | 286 | Project Management | 146 | Prepare Compounds and Reagents | 111 |
| Mammalian Cell Culture | 280 | Customer Service | 142 | Repair | 106 |

*Source: Burning Glass*

**Table 10. Certifications for Conservation and Resource Management Occupations in the Bay Region (May 2018 - April 2019)**

Note: 80% of records have been excluded because they do not include a certification. As a result, the chart below may not be representative of the full sample.

|  |  |  |  |
| --- | --- | --- | --- |
| Certification | Postings | Certification | Postings |
| Driver's License | 345 | Hazardous Materials Certification | 8 |
| Security Clearance | 67 | CDL Class C | 8 |
| Hazwoper | 59 | Project Management Certification | 7 |
| First Aid CPR AED | 25 | Licensed Professional Engineer | 6 |
| Certified Industrial Hygienist | 23 | Biotechnology Certificate | 6 |
| Phlebotomy Certification | 15 | American Board for Engineering and Technology (ABET) Accredited | 6 |
| CDL Class B | 14 | Law Enforcement Certification | 5 |
| American Institute of Certified Planners | 13 | Occupational Safety and Health Administration Certification | 4 |
| Certified Hazardous Materials Manager | 11 | HIV Counseling | 4 |
| Certified Associate in Software Quality | 11 | Emergency Medical Technician (EMT) | 4 |
| CDL Class A | 11 | Certified in Integrated Resource Management (CIRM) | 4 |
| Forklift Operator Certification | 9 | Wildland Firefighter | 3 |

*Source: Burning Glass*

**Table 11. Education Requirements for Conservation and Resource Management Occupations in Bay Region**

Note: 21% of records have been excluded because they do not include a degree level. As a result, the chart below may not be representative of the full sample.

|  |  |  |
| --- | --- | --- |
| Education (minimum advertised) | Latest 12 Mos. Postings | Percent 12 Mos. Postings |
| High school or vocational training | 205 | 11% |
| Associate Degree | 178 | 9% |
| Bachelor’s Degree or Higher | 1,471 | 80% |

*Source: Burning Glass*

# Methodology

Occupations for this report were identified by use of skills listed in O\*Net descriptions and job descriptions in Burning Glass. Labor demand data is sourced from Economic Modeling Specialists International (EMSI) occupation data and Burning Glass job postings data. Educational supply and student outcomes data is retrieved from multiple sources, including CTE Launchboard and CCCCO Data Mart.

# Sources

O\*Net Online

Labor Insight/Jobs (Burning Glass)

Economic Modeling Specialists International (EMSI)

CTE LaunchBoard [www.calpassplus.org/Launchboard/](http://www.calpassplus.org/Launchboard/)

Statewide CTE Outcomes Survey

Employment Development Department Unemployment Insurance Dataset

Living Insight Center for Community Economic Development

Chancellor’s Office MIS system

# Contacts

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