

12345 El Monte Road

Los Altos Hills, California 94022

650.949.7777

**Geographic Information Systems Program Report**

**For Greater South Bay and Peninsula Region**

**(Santa Clara and San Mateo Counties)**

**November 2014**

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| **Geographic Information Science and Cartography** |

CIP 2010: A program that focuses on the systematic study of map-making and the application of mathematical, computer, and other techniques to the analysis of large amounts of geographic data and the science of mapping geographic information. Includes instruction in cartographic theory and map projections, computer-assisted cartography, geographic information systems, map design and layout, photogrammetry, air photo interpretation, remote sensing, spatial analysis, geodesy, cartographic editing, and applications to specific industrial, commercial, research, and governmental mapping problems.

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| **Target Occupations**‡ |
| Cartographers and Photogrammetrists (17-1021) |
| Surveying and Mapping Technicians (17-3031) |

‡Based on EMSI crosswalk of the Classification of Instructional Programs (CIP) codes with Standard Occupational Classification (SOC) codes as published by the U.S. Department of Education.

In 2014, the number of geographic information system (geographic information science and cartography) jobs in the target occupations in Santa Clara and San Mateo Counties totaled 476. The Bureau of Labor Statistics (BLS) expects the total number of positions to increase by 6.9% over the next three years. Regional openings in 2014, which included created jobs and turnover, totaled 23. There were no completions in regional geographic information system programs, but there were three completions from other related programs. These other programs are linked to multiple occupations and not all those who complete will enter the target occupations indicated in this report.

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| **Target Occupation Performance** | | |
| **476\*** | **6.9%\*** | **$27.52/hr** |
| **Jobs (2014)** | **Growth (2014-2017)** | **Median Earnings** |
| National Location Quotient: 0.74† | National: 3.5% | National: $21.19/hr |

\*Based on total number of jobs for target occupations Santa Clara and San Mateo Counties.

†Represents occupation density as compared to national average (national average=1).

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| Regional Openings (2014)\*\* | 23 |  |
| Regional Program Completions (2013) | 0 |  |
| All Regional Completions for Target Occupations†† (2013) | 3 |  |

\*\*Openings include created jobs and turnover.

††Includes all regional programs applicable to target occupations.

**Geographic Information Systems Occupations Performance**

| **Target Occupations** | **Regional Openings (2014)** | **Median Hourly Earnings** | **Growth (2014-2017)** |
| --- | --- | --- | --- |
| Cartographers and Photogrammetrists (17-1021) | 5 | $34.07 | 11.8% |
| Surveying and Mapping Technicians (17-3031) | 18 | $26.37 | 6.1% |

**Regional Breakdown for Geographic Information Systems Occupations**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **County Name** | **2014 Jobs** | **2017 Jobs** | **2014 Annual Openings** | **Median Hourly Earnings** | **2014 National Location Quotient** |
| Santa Clara | 410 | 437 | 19 | $26.66 | 0.87 |
| San Mateo | 66 | 71 | 4 | $32.96 | 0.38 |
| Total | 476 | 509 | 23 | $27.52 |  |

Other regional programs may train individuals eligible for the targeted geographic information system occupations, which are based on an occupation-program crosswalk developed by the Department of Education. These additional programs are offered at Evergreen Valley College. As noted earlier, many postsecondary programs are linked to multiple occupations and not all those who complete the program will enter the target occupation.

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| **Regional Geographic Information Systems Training Programs** | |
| **2** | **3** |
| **Programs (2013)** | **Completions (2013)** |

| **Program** | **2009** | **2010** | **2011** | **2012** | **2013** |
| --- | --- | --- | --- | --- | --- |
| Surveying Technology/Surveying (15.1102) | 0 | 2 | 4 | 2 | 3 |
| Engineering Technology, General (15.0000) | 3 | 1 | 0 | 49 | 0 |

**Target Occupations Demographics**

The demographics among those employed in geographic information system technology occupations in Santa Clara and San Mateo Counties for 2014 show the majority men (84%) and almost half are between the ages of 25-44 (49%).

**Gender Demographics (Regional)**

|  |  |  |
| --- | --- | --- |
| Gender |  |  |
| Male | 84% |  |
| Female | 16% |  |

**Age Demographics (Regional)**

|  |  |  |
| --- | --- | --- |
| Age |  |  |
| 14-18 | 1% |  |
| 19-24 | 9% |  |
| 25-44 | 49% |  |
| 45-64 | 38% |  |
| 65+ | 4% |  |

**Industries Employing Geographic Information Systems Occupations**

A number of industries in Santa Clara and San Mateo Counties employ those trained in geographic information systems and its related occupations. The following table represents a regional industry breakdown of the number of geographic information system positions employed, the percentage of geographic information system jobs employed by industry and the percentage geographic information system jobs represent within all jobs by each industry. While engineering services employed 31.8% of all regional geographic information system positions in 2014, geographic information systems and its related occupations represent only 1.3% of the total jobs in that industry.

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| --- | --- | --- | --- |
| **Inverse Staffing Patterns (Regional)** | | | |
| **Industry** | **Occupation Group Jobs in Industry (2014)** | **% of Occupation Group in Industry (2014)** | **% of Total Jobs in Industry (2014)** |
| Engineering Services (541330) | 151 | 31.8% | 1.3% |
| Architectural Services (541310) | 90 | 18.9% | 5.0% |
| Local Government, Excluding Education and Hospitals (903999) | 52 | 10.9% | 0.1% |
| Surveying and Mapping (except Geophysical) Services (541370) | 38 | 8.0% | 5.7% |
| Landscape Architectural Services (541320) | 30 | 6.3% | 3.9% |

**Compatible Occupations for Geographic Information Systems**

Individuals completing a geographic information systems program share many skills and abilities with other occupations. The Occupational Information Network (O\*Net) identifies compatible occupations based on an analysis of overlapping knowledge, skills and ability. Additional education required for transition can range from short on-site training to advanced post-secondary degrees. The following tables show how much education might be needed to be employed in these compatible occupations

**Top Ten Compatible Occupations for Geographic Info. Systems: Associate’s or Less**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Rank | Occupation | Median Hourly Earnings | 2014 Jobs | 2014-2017 Change | 2014-2017 Estimated Annual Openings |
| 1 | Mapping Technicians | $26.37 | 404 | 24 | 13 |
| 2 | Remote Sensing Technicians | $23.73 | 710 | 43 | 34 |
| 3 | Civil Drafters | $28.53 | 1,011 | 11 | 16 |
| 4 | Forest and Conservation Technicians | $18.94 | 186 | (1) | 6 |
| 5 | Mechanical Drafters | $30.36 | 631 | (24) | 7 |
| 6 | Biomass Plant Technicians | $34.75 | 40 | 0 | 1 |
| 7 | Electronic Drafters | $33.20 | 541 | 0 | 6 |
| 8 | Environmental Science and Protection Technicians, Including Health | $25.17 | 200 | 24 | 12 |
| 9 | First-Line Supervisors of Landscaping, Lawn Service, and Groundskeeping Workers | $21.17 | 1,169 | 25 | 17 |
| 10 | Forest and Conservation Workers | $12.42 | 106 | 6 | 3 |

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| **Data Sources and Calculations** |

**State Data Sources**

This report uses state data from the following agencies: California Labor Market Information Department

**Institution Data**

The institution data in this report is taken directly from the national IPEDS database published by the U.S. Department of Education's National Center for Education Statistics.

**Completers Data**

The completers data in this report is taken directly from the national IPEDS database published by the U.S. Department of Education's National Center for Education Statistics.

**Occupation Data**

EMSI occupation 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 affected by county-level EMSI earnings by industry.

**Staffing Patterns Data**

The staffing pattern data in this report are compiled from several sources using a specialized process. For QCEW and Non-QCEW Employees classes of worker, sources include Occupational Employment Statistics, the National Industry-Occupation Employment Matrix, and the American Community Survey. For the Self-Employed and Extended Proprietors classes of worker, the primary source is the American Community Survey, with a small amount of information from Occupational Employment Statistics.

**Industry Data**

EMSI industry data have various sources depending on the class of worker. (1) For QCEW Employees, EMSI primarily uses the QCEW (Quarterly Census of Employment and Wages), with supplemental estimates from County Business Patterns and Current Employment Statistics. (2) Non-QCEW employees data are based on a number of sources including QCEW, Current Employment Statistics, County Business Patterns, BEA State and Local Personal Income reports, the National Industry-Occupation Employment Matrix (NIOEM), the American Community Survey, and Railroad Retirement Board statistics. (3) Self-Employed and Extended Proprietor classes of worker data are primarily based on the American Community Survey, Nonemployer Statistics, and BEA State and Local Personal Income Reports. Projections for QCEW and Non-QCEW Employees are informed by NIOEM and long-term industry projections published by individual states.