Labor Market Information Report
Geographic Information Systems (GIS) Occupations
Napa Valley College

Prepared by the San Francisco Bay Center of Excellence for Labor Market Research

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Recommendation

Based on all available data, there appears to be an "undersupply" of Geographic Information Systems (GIS) workers compared to the demand for this cluster of occupations in the Bay region and in the North Bay sub-region (Marin, Napa, Solano, Sonoma counties). There is a projected annual gap of about 4,727 students in the Bay region and 206 students in the North Bay Sub-Region.

Introduction

This report provides student outcomes data on employment and earnings for TOP 2206.10 Geographic Information Systems programs 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 Napa Valley College and in the region.

This report profiles Geographic Information Systems (GIS) Occupations in the 12 county Bay region and in the North Bay sub-region for exploratory purposes at Napa Valley College.

Labor market information (LMI) is not available at the eight-digit SOC Code level for Geographic Information Systems Technologists and Technicians (15-1299.02), therefore, the data shown in Tables 1 and 2 is for Computer Occupations, All Other (at the six-digit SOC level) and likely overstates demand for Geographic Information Systems Technologists and Technicians. Also, labor market information (LMI) is not available at the eight-digit SOC Code level for Environmental Restoration Planners (19-2041.02), therefore, the data shown in Tables 1 and 2 is for Environmental Scientists and Specialists, Including Health (at the six-digit SOC level) and likely overstates demand for Environmental Restoration Planners. Finally, labor market information (LMI) is not available at the eight-digit SOC Code level for Remote Sensing Technicians (19-4099.03), therefore, the data shown in Tables 1 and 2 is for Life, Physical, and Social Science Technicians, All Other (at the six-digit SOC level) and likely overstates demand for Remote Sensing Technicians.

- **Natural Sciences Managers (11-9121):** Plan, direct, or coordinate activities in such fields as life sciences, physical sciences, mathematics, statistics, and research and development in these fields. Excludes "Architecture and Engineering Managers" (11-9041) and "Computer and Information Systems Managers" (11-3021).
    Entry-Level Educational Requirement: Bachelor's degree
    Training Requirement: None
    Percentage of Community College Award Holders or Some Postsecondary Coursework: 8%

- **Emergency Management Directors (11-9161):** Plan and direct disaster response or crisis management activities, provide disaster preparedness training, and prepare emergency plans and procedures for natural (e.g., hurricanes, floods, earthquakes), wartime, or technological (e.g., nuclear power plant emergencies or hazardous materials spills) disasters or hostage situations.

Entry-Level Educational Requirement: Bachelor's degree

Training Requirement: None

Percentage of Community College Award Holders or Some Postsecondary Coursework: 28%

- **Computer Occupations, All Other (15-1299):** All computer occupations not listed separately. Excludes "Computer and Information Systems Managers" (11-3021), "Computer Hardware Engineers" (17-2061), "Electrical and Electronics Engineers" (17-2070), "Computer Science Teachers, Postsecondary" (25-1021), "Multimedia Artists and Animators" (27-1014), "Graphic Designers" (27-1024), "Computer Operators" (43-9011), and "Computer, Automated Teller, and Office Machine Repairs" (49-2011).

   Entry-Level Educational Requirement: Bachelor's degree

   Training Requirement: None

   Percentage of Community College Award Holders or Some Postsecondary Coursework: 26%

- **Environmental Scientists and Specialists, Including Health (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%

- **Life, Physical, and Social Science Technicians, All Other (19-4099):** All life, physical, and social science technicians not listed separately.

   Entry-Level Educational Requirement: Associate's degree

   Training Requirement: None

   Percentage of Community College Award Holders or Some Postsecondary Coursework: 37%

Occupational Demand

Table 1. Employment Outlook for GIS Occupations in Bay Region

Occupation	2021 Jobs	2026 Jobs	5-yr Change	5-yr % Change	5-yr Total Openings	Annual Openings	25% Hourly Earning	Median Hourly Wage
Natural Sciences Managers	5,452	5,904	451	8%	2,428	486	$75	$99
Emergency Management Directors	284	292	8	3%	129	26	$47	$58
Computer Occupations, All Other	41,505	43,279	1,774	4%	17,273	3,455	$43	$61
Environmental Scientists and Specialists, Including Health	2,851	2,965	114	4%	1,512	302	$36	$46
Life, Physical, and Social Science Technicians, All Other	3,920	4,088	168	4%	2,612	522	$22	$29
Total	**54,012**	**56,527**	**2,515**	**5%**	**23,955**	**4,791**		

Source: Lightcast 2022.3

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 GIS Occupations in North Bay Sub-region

Occupation	2021 Jobs	2026 Jobs	5-yr Change	5-yr % Change	5-yr Total Openings	Annual Openings	25% Hourly Earning	Median Hourly Wage
Natural Sciences Managers	270	281	10	4%	116	23	$58	$76
Emergency Management Directors	40	42	2	5%	19	4	$39	$49
Computer Occupations, All Other	1,517	1,454	-63	-4%	542	108	$31	$45
Environmental Scientists and Specialists, Including Health	471	484	14	3%	245	49	$31	$40
Life, Physical, and Social Science Technicians, All Other	245	239	-6	-2%	152	30	$19	$24
Total	**2,542**	**2,500**	**-43**	**-2%**	**1,073**	**214**		

Source: Lightcast 2022.3

North Bay Sub-Region includes: Marin, Napa, Solano, Sonoma Counties

Job Postings in Bay Region and North Bay Sub-Region

Table 3. Number of Job Postings by Occupation for latest 12 months (Jan. 2022 - Dec. 2022)

Occupation	Bay Region	North Bay
Computer Occupations, All Other	39,078	908
Natural Sciences Managers	5,970	252
Life, Physical, and Social Science Technicians, All Other	4,042	433
Environmental Scientists and Specialists, Including Health	742	70
Emergency Management Directors	475	42

Source: Lightcast

Table 4a. Top Job Titles for GIS Occupations for latest 12 months (Jan. 2022 - Dec. 2022) - Bay Region

Title	Bay	Title	Bay
Systems Engineers	1,529	IT Project Managers	556
Solutions Architects	1,326	Clinical Trial Managers	437
Technical Project Managers	977	Quality Control Analysts	419
Scrum Masters	974	Infrastructure Engineers	399
Clinical Research Coordinators	789	IT Managers	386
Project Managers	650	Clinical Research Associates	371
Principal Architects	632	Software Systems Engineers	362
Firmware Engineers	611	Technical Leads	362
Automation Engineers	591	Postdoctoral Researchers	351

Source: Lightcast

Table 4b. Top Job Titles for GIS Occupations for latest 12 months (Jan. 2022 - Dec. 2022) - North Bay Sub-Region

Title	North Bay	Title	North Bay
Quality Assurance Technicians	80	Clinical Research Coordinators	24
Quality Control Analysts	74	Environmental Scientists	20
IT Quality Control Analysts	59	Clinical Trial Managers	19
Quality Control Technicians	43	IT Project Managers	19
IT Managers	31	Automation Engineers	18
Postdoctoral Fellows	31	Postdoctoral Researchers	18
Systems Engineers	27	Environmental Specialists	17
Document Control Specialists	26	Product Testers	17
Principal Architects	26	Usage Testers/Product Testers	17

Source: Lightcast

Industry Concentration

Table 5. Industries hiring GIS Workers in Bay Region

Industry - 6 Digit NAICS (No. American Industry Classification) Codes	Jobs in Industry (2021)	Jobs in Industry (2026)	% Change (2021-26)	% Occupation Group in Industry (2021)
Custom Computer Programming Services	8,097	8,688	7%	15%
Computer Systems Design Services	4,468	4,536	2%	8%
Internet Publishing and Broadcasting and Web Search Portals	3,635	4,178	15%	7%
Research and Development in the Physical, Engineering, and Life Sciences (except Nanotechnology and Biotechnology)	3,700	3,909	6%	7%
Federal Government, Civilian, Excluding Postal Service	3,127	3,320	6%	6%
Research and Development in Biotechnology (except Nanobiotechnology)	2,493	2,944	18%	5%
Data Processing, Hosting, and Related Services	2,430	2,685	11%	4%
Software Publishers	2,220	2,365	7%	4%
Electronic Computer Manufacturing	1,901	2,070	9%	4%
Local Government, Excluding Education and Hospitals	1,218	1,246	2%	2%

Source: Lightcast 2022.3

Table 6. Top Employers Posting GIS Occupations in Bay Region and North Bay Sub-Region (Jan. 2022 - Dec. 2022)

Employer	Bay	Employer	North Bay
Stanford University	1,250	Biomarin Pharmaceutical	75
Nvidia	662	Ultragenyx Pharmaceutical	60
Lucid Motors	641	PG&E	58
Cynet Systems	538	PSG Global Solutions	27
Google	486	Select Medical	24
Amazon	462	American Consumer Panels	23
Cisco	462	L3Harris Technologies	22
Apple	458	Randstad	21
Jobot	447	The Home Depot	19
Randstad	431	Keysight	18

Source: Lightcast

Educational Supply

There are six (6) community colleges in the Bay Region issuing 61 awards on average annually (last 3 years ending 2019-20) on TOP 2206.10 - Geographic Information Systems. In the North Bay Sub-Region, there is one (1) community college that issued eight (8) awards on average annually (last 3 years) on this TOP code.

There is one (1) four-year institution in the Bay Region issuing three (3) Bachelor's degrees on average annually (last 3 years ending 2019-20) on CIP 45.0702 - Geographic Information Science and Cartography. There are no four-year institutions in the North Bay Sub-Region issuing Bachelor's degrees on this CIP code.

Table 7a. Community College Awards on TOP 2206.10 - Geographic Information Systems in Bay Region

College	Subregion	Associate Degree	High unit Certificate	Low unit Certificate	Total
Diablo Valley	East Bay	3	3	11	17
Foothill	Silicon Valley	4	0	17	21
Ohlone	East Bay	0	0	2	2
San Francisco	Mid-Peninsula	0	0	12	12
Santa Rosa	North Bay	3	0	5	8
West Valley	Silicon Valley	0	0	1	1
Total		**10**	**3**	**48**	**61**

Source: Data Mart

Note: The annual average for awards is 2017-18 to 2019-20.

Table 7b. Bachelor's Degree Awards on CIP 45.0702 - Geographic Information Science and Cartography in Bay Region

College	Subregion	Bachelor's Degree	Total
California State University-East Bay	East Bay	3	3
Total		**3**	**3**

Source: Data Mart

Note: The annual average for awards is 2017-18 to 2019-20.

Gap Analysis

Based on the data included in this report, there is a large labor market gap in the Bay region with 4,791 annual openings for the Geographic Information Systems (GIS) occupational cluster and 64 annual (3-year average) awards for an annual undersupply of 4,727 students. In the North Bay Sub-Region, there is also a gap with 214 annual openings and 8 annual (3-year average) awards for an annual undersupply of 206 students.

Student Outcomes

Table 8. Four Employment Outcomes Metrics for Students Who Took Courses on TOP 2206.10 - Geographic Information Systems

Metric Outcomes	Bay All CTE Programs	Napa Valley All CTE Programs	State 2206.10	Bay 2206.10	North Bay 2206.10	Napa Valley 2206.10
Students with a Job Closely Related to Their Field of Study	74%	82%	73%	77%	88%	N/A
Median Annual Earnings for SWP Exiting Students	$48,926	$44,815	$48,885	$52,808	$55,517	N/A
Median Change in Earnings for SWP Exiting Students	23%	37%	23%	28%	3%	N/A
Exiting Students Who Attained the Living Wage	50%	57%	63%	53%	70%	N/A

Source: Launchboard Strong Workforce Program Median of 2018 to 2021.

Skills, Certifications and Education

Table 9. Top Skills for GIS Occupations in Bay Region (Jan. 2022 - Dec. 2022)

Skill	Posting	Skill	Posting
Computer Science	10,969	Auditing	4,609
Python (Programming Language)	8,385	Software Engineering	4,431
Agile Methodology	8,179	Java (Programming Language)	4,410
Automation	6,748	Scalability	4,335
Project Management	5,914	Solution Architecture	4,278
Systems Engineering	5,793	Marketing	4,173
Software Development	5,252	Scripting	4,111

Skill	Posting	Skill	Posting
Amazon Web Services	5,012	C++ (Programming Language)	3,991
Scrum (Software Development)	4,786	Debugging	3,937
Linux	4,651	New Product Development	3,916

Source: Lightcast

Table 10. Certifications for GIS Occupations in the Bay Region (Jan. 2022 - Dec. 2022)

Certification	Posting	Certification	Posting
Project Management Professional Certification	2,101	Top Secret-Sensitive Compartmented Information (TS/SCI Clearance)	236
Master Of Business Administration (MBA)	1,229	Cisco Certified Network Professional	224
Certified Scrum Master	803	Certified Information System Auditor (CISA)	213
Security Clearance	760	Microsoft Certified Systems Engineer	178
Certified Information Systems Security Professional	590	ITIL Certifications	164
Cisco Certified Network Associate	305	Secret Clearance	159
Certified Power Quality Professional	284	CompTIA Security+	158
Cisco Certified Internetwork Expert	265	Microsoft Certified Professional	156
GIAC Certifications	246	Enterprise Desktop Administrator (Microsoft Certified IT Professional)	153
Agile Certification	241	PMI Agile Certified Practitioner	150

Source: Lightcast

Table 11. Education Requirements for GIS Occupations in Bay Region

Education Level	Job Postings	% of Total
High school or GED	2,567	6%
Associate degree	2,165	4%
Bachelor's degree & higher	43,718	90%

Source: Lightcast

Note: 33% of records have been excluded because they do not include a degree level. As a result, the chart above may not be representative of the full sample.

Methodology

Occupations for this report were identified by use of job descriptions and skills listed in O*Net. Labor demand data is sourced from Lightcast occupation and job postings data. Educational supply and student outcomes data is retrieved from multiple sources, including CCCCO Data Mart and CTE Launchboard.

Sources

O*Net Online
Lightcast
CTE LaunchBoard 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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