C·O·E CENTERS OF EXCELLENCE FOR LABOR MARKET RESEARCH

Program Endorsement Brief: 2206.10/Geographic Information Systems

Geographic Information Systems

Los Angeles/Orange County Center of Excellence, March 2021

Summary Analysis

Program Endorsement:	Endorsed: All Criteria Met ☐	Endorsed: Some Criteria Met ☒	Not Endorsed ☐

Program Endorsement Criteria		
Supply Gap:	Yes ☑	No ☐
Living Wage: (Entry-Level, 25th)	Yes ☑	No ☐
Education:	Yes ☐	No ☑
Emerging Occupation(s)		
Yes ☑		*No* ☐

The Los Angeles/Orange County Center of Excellence for Labor Market Research (COE) prepared this report to provide Los Angeles/Orange County regional labor market supply and demand data related to two middle-skill occupations: *computer occupations, all other* (15-1299), and *survey and mapping technicians* (17-3031), and one above middle-skill occupation: *physical scientists, all other* (19-2099). Middle-skill occupations typically require some postsecondary education, but less than a bachelor's degree.[1] Although *computer occupations, all other* typically requires a bachelor's degree, it is considered middle-skill because approximately one-third of workers in the field have completed some college or an associate degree. The occupation, *physical scientists, all other* (19-2099), is classified as an above middle-skill occupation. This occupation was included in this report due to the emerging occupation, *remote sensing scientists and technologists* (19-2099.01), embedded within it. 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.

Based on the available data, there appears to be a supply gap for these occupations in the region. However, two of the three occupations typically require a bachelor's degree as the entry-level education. **Due to some of the criteria being met, the COE endorses this proposed program.** Detailed reasons include:

Demand:

- ***Supply Gap Criteria –*** Over the next five years, there is projected to be **1,976 jobs available annually** in the region due to new job growth and replacements, **which is**

[1] The COE classifies middle-skill jobs as the following:

- All occupations that require an educational requirement of some college, associate degree or apprenticeship;
- All occupations that require a bachelor's degree, but also have more than one-third of their existing labor force with an educational attainment of some college or associate degree; or
- All occupations that require a high school diploma or equivalent or no formal education, but also require short- to long-term on-the-job training where multiple community colleges have existing programs.

more than the 101 awards conferred annually by educational institutions in the region.

- However, the two occupations: *computer occupations, all other* (15-1299), and *physical scientists, all other* (19-2099) include a variety of emerging occupations, including *geographic information systems technologists and technicians* and *remote sensing scientists and technologists*. Since these SOC codes do not solely represent these emerging occupations, **the number of annual job openings is likely overstated.**

- ***Living Wage Criteria –*** Within Los Angeles County, all of the annual job openings for these three occupations have entry-level wages above the county's living wage ($15.04/hour).[2]
- ***Educational Criteria –***Within the LA/OC region, ***92% of the annual job openings*** for occupations related to geographic information systems ***typically require a bachelor's degree.***
  - National-level educational attainment data indicates that there are no *physical scientists, all other* who have completed some college or an associate degree as their highest level of education. Approximately half have a doctoral or professional degree, one-fourth have a master's degree, and the remaining forth have obtained a bachelor's degree.
  - However, between 27.2% and 57.7% of *computer occupations, all other*, and *surveying and mapping technicians* in the field have completed some community college training.

Supply:

- There are **five community colleges** in the LA/OC region that issue awards related to geographic information systems and surveying, conferring an average of **78 awards annually** between 2016 and 2019.
- Between 2014 and 2017, there was an average of **23 awards conferred annually** in related training programs by non-community college institutions.

[2] Living wage data was pulled from California Family Needs Calculator on 2/23/21. For more information, visit the California Family Needs Calculator website: https://insightcced.org/2018-family-needs-calculator/.

Occupational Demand

Exhibit 1 shows the five-year occupational demand projections for geographic information systems-related occupations. In Los Angeles/Orange County, the number of jobs related to these occupations is projected to increase by 1% through 2024. There will be nearly 2,000 job openings per year through 2024 due to job growth and replacements. It is important to note that *computer occupations, all other* (15-1299) and *physical scientists, all other* (19-2099) include a variety of emerging occupations and not solely *geographic information systems technologists and technicians* (15-1299.02) and *remote sensing scientists and technologists* (19-2099.01). Therefore, the data in Exhibit 1 is likely overstated for the geographic information systems occupational group.

This report includes employment projection data by Emsi which uses EDD information. Emsi'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. To the extent that a recession or labor shock, such as the economic effects of COVID-19, can cause long-term structural change, it 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. Therefore, the projections included in this report do not take the impacts of COVID-19 into account.

Exhibit 1: Occupational demand in Los Angeles and Orange Counties[3]

Geography	2019 Jobs	2024 Jobs	2019-2024 Change	2019-2024 % Change	Annual Openings
Los Angeles	18,675	18,864	189	1%	1,375
Orange	7,984	8,1222	139	2%	601
Total	**26,659**	**26,986**	**328**	**1%**	**1,976**

Wages

The labor market endorsement in this report considers the entry-level hourly wages for geographic information systems-related occupations in Los Angeles County, as they relate to the county's living wage. Orange County wages are included below in order to provide a complete analysis of the LA/OC region. Detailed wage information, by county, is included in Appendix A.

Los Angeles County: All of the annual job openings for geographic information systems-related occupations have entry-level wages above the living wage for one adult ($15.04 in Los Angeles County).[4] Typical entry-level hourly wages are in a range between $27.21 and $40.61. Experienced workers can expect to earn wages between $47.20 and $81.00, which are higher than the living wage estimate.

[3] Five-year change represents new job additions to the workforce. Annual openings include new jobs and replacement jobs that result from retirements and separations.

[4] Living wage data was pulled from California Family Needs Calculator on 2/23/21. For more information, visit the California Family Needs Calculator website: https://insightcced.org/2018-family-needs-calculator/.

Orange County: All of the annual openings for geographic information systems occupations have entry-level wages above the living wage for one adult ($17.36 in Orange County).[5] Typical entry-level hourly wages are in a range between $26.40 and $39.35. Experienced workers can expect to earn wages between $47.55 and $79.50, which are higher than the living wage estimate.

Job Postings
There were 329 online job postings related to geographic information systems listed in the past 12 months. The highest number of job postings were for party crew chief, survey technician, and GIS technician. The top skills were surveys, project management, and AutoCAD. The top employers, by number of job postings, in the region were Aerospace Corporation, Tait Associates, Inc., and Los Angeles County.

There are typically several GIS-related job postings from ESRI in Redlands (San Bernardino County), but those postings are outside the parameters used for this search (LA and OC only).

It is important to note that the job postings data included in this section reflects online job postings listed in the past 12 months and does not yet demonstrate the impact of COVID-19. While employers have generally posted fewer online job postings since the beginning of the pandemic, the long-term effects are currently unknown.

Educational Attainment
The Bureau of Labor Statistics (BLS) lists the following typical entry-level education requirements for the geographic information systems-related occupations studied in this report:

- **Bachelor's degree:** *computer occupations, all other* (15-1299), *physical scientists, all other* (19-2099)
- **High school diploma or equivalent:** *surveying and mapping technicians* (17-3031)

In the LA/OC region, 92% of the annual job openings for geographic information systems occupations typically require a bachelor's degree. National-level educational attainment data indicates that there are no *physical scientists, all other* who have completed some college or an associate degree as their highest level of education. However, between 27.2% and 57.7% of *computer occupations, all other*, and *surveying and mapping technicians* in the field have completed some community college training. Of the 48% of geographic information systems job postings listing a minimum education requirement in Los Angeles/Orange County, 17% (27) requested a high school diploma, 23% (36) requested an associate degree, and 60% (96) requested a bachelor's degree.

Educational Supply

Community College Supply—Exhibit 2 shows the annual and three-year average number of awards conferred by community colleges in the related TOP codes: Geographic Information Systems (2206.10) and Surveying (0957.30). The college with the most completions in the region

[5] Living wage data was pulled from California Family Needs Calculator on 2/23/21. For more information, visit the California Family Needs Calculator website: https://insightcced.org/2018-family-needs-calculator/.

is Santiago Canyon. Over the past 12 months, there were no other related program recommendation requests from regional community colleges.

Exhibit 2: Regional community college awards (certificates and degrees), 2016-2019

TOP Code	Program	College	2016-2017 Awards	2017-2018 Awards	2018-2019 Awards	3-Year Award Average
2206.10	Geographic Information Systems	LA Pierce	-	-	7	2
		Rio Hondo	28	36	19	28
		LA Subtotal	**28**	**36**	**26**	**30**
		Cypress	1	12	8	7
		OC Subtotal	**1**	**12**	**8**	**7**
Supply Subtotal/Average			**29**	**48**	**34**	**37**
0957.30	Surveying	East LA	-	4	-	1
		LA Subtotal	**-**	**4**	**-**	**1**
		Santiago Canyon	11	46	64	40
		OC Subtotal	**11**	**46**	**64**	**40**
Supply Subtotal/Average			**11**	**50**	**64**	**41**
Supply Total/Average			**40**	**98**	**98**	**78**

Non-Community College Supply—Since two of the three occupations in this report typically require a bachelor's degree, it is important to consider the supply from non-community college institutions in the region that provide training programs for these occupations. Exhibit 3 shows the annual and three-year average number of awards conferred by these institutions in the related Classification of Instructional Programs (CIP) Code, Geographic Information Science and Cartography (45.0702). Due to different data collection periods, the most recent three-year period of available data is from 2014 to 2017. Between 2014 and 2017, one private institution in the region conferred an average of 23 awards annually in a related training program.

Exhibit 3: Regional non-community college awards, 2014-2017

CIP Code	Program	College	2014-2015 Awards	2015-2016 Awards	2016-2017 Awards	3-Year Award Average
45.0702	Geographic Information Science and Cartography	University of Southern California	46	24	0	23
Supply Total/Average			**46**	**24**	**0**	**23**

Appendix A: Occupational demand and wage data by county

Exhibit 4. Los Angeles County

Occupation (SOC)	2019 Jobs	2024 Jobs	5-Yr Change	5-Yr % Change	Annual Openings	Entry-Level Hourly Earnings (25th Percentile)	Median Hourly Earnings	Experienced Hourly Earnings (75th Percentile)
Computer Occupations, All Other (15-1299)	17,255	17,376	121	1%	1,225	$27.21	$38.34	$53.77
Surveying and Mapping Technicians (17-3031)	844	881	37	4%	102	$27.99	$38.46	$47.20
Physical Scientists, All Other (19-2099)	576	607	31	5%	48	$40.61	$59.67	$81.00
Total	**18,675**	**18,864**	**189**	**1%**	**1,375**			

Exhibit 5. Orange County

Occupation (SOC)	2019 Jobs	2024 Jobs	5-Yr Change	5-Yr % Change	Annual Openings	Entry-Level Hourly Earnings (25th Percentile)	Median Hourly Earnings	Experienced Hourly Earnings (75th Percentile)
Computer Occupations, All Other (15-1299)	7,359	7,468	109	1%	534	$26.40	$37.17	$52.12
Surveying and Mapping Technicians (17-3031)	411	429	18	4%	50	$28.38	$38.90	$47.55
Physical Scientists, All Other (19-2099)	213	225	12	6%	18	$39.35	$58.18	$79.50
Total	**7,984**	**8,1222**	**139**	**2%**	**601**			

Exhibit 6. Los Angeles and Orange Counties

Occupation (SOC)	2019 Jobs	2024 Jobs	5-Yr Change	5-Yr % Change	Annual Openings	Typical Entry-level Education Requirement
Computer Occupations, All Other (15-1299)	24,614	24,844	230	1%	1,758	Bachelor's degree
Surveying and Mapping Technicians (17-3031)	1,255	1,310	55	4%	152	High School diploma or equivalent
Physical Scientists, All Other (19-2099)	789	832	42	5%	65	Bachelor's degree
Total	**26,659**	**26,986**	**328**	**1%**	**1,976**	

Appendix B: Sources

- O*NET Online
- Labor Insight/Jobs (Burning Glass)
- Economic Modeling Specialists, International (Emsi)
- Bureau of Labor Statistics (BLS)
- Employment Development Department, Labor Market Information Division, OES
- California Community Colleges Chancellor's Office Management Information Systems (MIS)
- California Family Needs Calculator, Insight Center for Community Economic Development
- Chancellor's Office Curriculum Inventory (COCI 2.0)

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