CENTER OF EXCELLENCE
FOR LABOR MARKET RESEARCH
ORANGE COUNTY

ORANGE COUNTY SECTOR PROFILE SUPPLEMENTAL APPENDICES:

AGRICULTURE, WATER, AND ENVIRONMENTAL TECHNOLOGIES

2024

ORANGE COUNTY REGIONAL CONSORTIUM | WORKFORCE DEVELOPMENT ALLIANCE

California Community Colleges

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INTRODUCTION

The Orange County Center of Excellence for Labor Market Research (OC COE) is releasing a series of 12 sector profiles to provide a comprehensive analysis of Orange County's occupational landscape. This series dives into each of the 12 community college sectors, offering historical and projected occupational insights while building upon foundational research established through the Orange County Labor Market Overview.

In addition to the profiles themselves, supplemental appendices for each sector are being issued to provide detailed demand and supply data. The data in these appendices are presented to the region with the intent of being utilized for grant applications, project proposals, and the like. The full Agriculture, Water, and Environmental Technologies Sector Profile is available on the COE Website.

Occupations are denoted throughout this report in italics, with their corresponding SOC code in parentheses. Middle-skill occupations have no special notation however, below middle-skill occupations are denoted with an * and above middle-skill occupations denoted with a ^. Occupations that are on U.S. News & World Report's 2024 100 Best Jobs list are denoted by a #, such as, *Environmental Engineers (17-2081)^#*.

By examining this labor market data, in conjunction with the individual sector profiles, the OC COE seeks to highlight underlying dynamics and intricacies shaping each sector in Orange County. Community colleges and regional stakeholders can use this information for strategic planning and data-informed decision making to address workforce needs in this sector.

APPENDIX E: AGRICULTURE, WATER, AND ENVIRONMENTAL TECHNOLOGIES DEMAND – LABOR MARKET DATA

Exhibit 23 shows the traditional labor market data points for all 42 occupations analyzed in the Agriculture, Water, and Environmental Technologies Sector Profile. Below middle-skill occupations are indicated with light shading, middle-skill occupations are denoted with medium shading, and above middle-skill occupations are indicated with dark shading.

Exhibit 23: Occupational Demand for the 42 Agriculture, Water, and Environmental Technologies Occupations

Skill Level	SOC	Occupation	2022 Jobs	2027 Jobs	5-Yr Change	5-Yr % Change	Annual Openings	Pct. 25 Hourly Earnings	Median Hourly Earnings	Pct. 75 Hourly Earnings	Typical Entry Level Education	Work Experience Required	Typical On-The-Job Training
Below Middle-Skill	37-3011	Landscaping and Groundskeeping Workers	14,892	15,143	251	2%	2,014	$16.04	$17.60	$21.79	No formal educational credential	None	Short-term on-the-job training
	39-2021	Animal Caretakers	3,096	3,866	770	25%	793	$14.00	$15.17	$18.09	High school diploma or equivalent	None	Short-term on-the-job training
	45-2092	Farmworkers and Laborers, Crop, Nursery, and Greenhouse	1,210	1,054	(157)	(13%)	183	$14.03	$14.61	$16.85	No formal educational credential	None	Short-term on-the-job training
	37-2021	Pest Control Workers	1,287	1,307	20	2%	181	$17.93	$20.99	$26.63	High school diploma or equivalent	None	Moderate-term on-the-job training
	37-3013	Tree Trimmers and Pruners	1,083	1,075	(8)	(1%)	148	$22.62	$26.98	$36.34	High school diploma or equivalent	None	Short-term on-the-job training
	45-2093	Farmworkers, Farm, Ranch, and Aquacultural Animals	570	537	(33)	(6%)	89	$14.06	$15.31	$23.16	No formal educational credential	None	Short-term on-the-job training
	45-3031	Fishing and Hunting Workers	108	114	6	5%	18	$13.48	$15.08	$29.35	No formal educational credential	None	Moderate-term on-the-job training
	45-2091	Agricultural Equipment Operators	106	93	(13)	(12%)	16	$14.02	$14.34	$19.40	No formal educational credential	None	Moderate-term on-the-job training
	45-2099	Agricultural Workers, All Other	114	88	(26)	(23%)	16	$14.39	$16.25	$18.90	No formal educational credential	None	Short-term on-the-job training

Skill Level	SOC	Occupation	2022 Jobs	2027 Jobs	5-Yr Change	5-Yr % Change	Annual Openings	Pct. 25 Hourly Earnings	Median Hourly Earnings	Pct. 75 Hourly Earnings	Typical Entry Level Education	Work Experience Required	Typical On-The-Job Training
Below Middle-Skill	45-2041	Graders and Sorters, Agricultural Products	79	70	(8)	(11%)	11	$14.42	$16.03	$17.76	No formal educational credential	None	Short-term on-the-job training
	45-4021	Fallers	31	29	(2)	(6%)	5	$25.27	$27.13	$44.19	High school diploma or equivalent	None	Moderate-term on-the-job training
	45-4022	Logging Equipment Operators	28	27	(1)	(2%)	4	$19.49	$22.73	$33.55	High school diploma or equivalent	None	Moderate-term on-the-job training
	45-2021	Animal Breeders	15	16	1	9%	3	$15.81	$17.81	$24.61	High school diploma or equivalent	None	Short-term on-the-job training
	45-4023	Log Graders and Scalers	<10	<10	Insf. Data	Insf. Data	1	Insf. Data	Insf. Data	Insf. Data	High school diploma or equivalent	None	Moderate-term on-the-job training
	45-4029	Logging Workers, All Other	<10	<10	Insf. Data	Insf. Data	1	Insf. Data	Insf. Data	Insf. Data	High school diploma or equivalent	None	Moderate-term on-the-job training
	13-1074	Farm Labor Contractors	0	0	0	0%	0	$0.00	$0.00	$0.00	No formal educational credential	Less than 5 years	Short-term on-the-job training
Middle-Skill	31-9096	Veterinary Assistants and Laboratory Animal Caretakers	1,490	1,648	159	11%	333	$16.91	$17.23	$20.38	High school diploma or equivalent	None	Short-term on-the-job training
	37-1012	First-Line Supervisors of Landscaping, Lawn Service, and Groundskeeping Workers	2,223	2,236	13	1%	237	$18.33	$23.74	$34.86	High school diploma or equivalent	Less than 5 years	None
	29-2056	Veterinary Technologists and Technicians#	985	1,140	155	16%	134	$17.79	$22.08	$25.53	Associate degree	None	None
	47-4041	Hazardous Materials Removal Workers	861	848	(13)	(2%)	110	$22.30	$25.60	$32.06	High school diploma or equivalent	None	Moderate-term on-the-job training
	39-2011	Animal Trainers	344	397	53	15%	67	$14.00	$15.25	$22.84	High school diploma or equivalent	None	Moderate-term on-the-job training
	27-1023	Floral Designers	507	510	2	0%	62	$14.06	$15.80	$20.70	High school diploma or equivalent	None	Moderate-term on-the-job training

Skill Level	SOC	Occupation	2022 Jobs	2027 Jobs	5-Yr Change	5-Yr % Change	Annual Openings	Pct. 25 Hourly Earnings	Median Hourly Earnings	Pct. 75 Hourly Earnings	Typical Entry Level Education	Work Experience Required	Typical On-The-Job Training
Middle-Skill	11-9013	Farmers, Ranchers, and Other Agricultural Managers	405	297	(108)	(27%)	37	$14.00	$16.53	$28.99	High school diploma or equivalent	5 years or more	None
	37-3012	Pesticide Handlers, Sprayers, and Applicators, Vegetation	245	245	1	0%	32	$18.55	$20.94	$23.95	High school diploma or equivalent	None	Moderate-term on-the-job training
	45-2011	Agricultural Inspectors	161	166	5	3%	30	$18.10	$23.57	$36.18	Bachelor's degree	None	Moderate-term on-the-job training
	19-4013	Food Science Technicians	176	185	9	5%	27	$20.53	$22.93	$28.94	Associate degree	None	Moderate-term on-the-job training
	45-4011	Forest and Conservation Workers	150	152	2	1%	27	$14.16	$14.67	$15.10	High school diploma or equivalent	None	Moderate-term on-the-job training
	45-1011	First-Line Supervisors of Farming, Fishing, and Forestry Workers	183	179	(4)	(2%)	26	$16.45	$22.26	$31.71	High school diploma or equivalent	Less than 5 years	None
	49-3041	Farm Equipment Mechanics and Service Technicians	227	238	11	5%	24	$18.35	$25.31	$32.62	High school diploma or equivalent	None	Long-term on-the-job training
	19-4012	Agricultural Technicians	113	120	7	6%	18	$16.69	$20.21	$27.46	Associate degree	None	Moderate-term on-the-job training
	19-4071	Forest and Conservation Technicians	135	137	2	1%	17	$17.03	$20.31	$26.83	Associate degree	None	None
Above Middle-Skill	17-2081	Environmental Engineers#	973	1,022	48	5%	81	$37.52	$40.12	$56.48	Bachelor's degree	None	None
	29-1131	Veterinarians#	923	1,033	109	12%	54	$35.67	$56.70	$76.30	Doctoral or professional degree	None	None
	19-1012	Food Scientists and Technologists	179	186	7	4%	20	$29.16	$39.26	$50.43	Bachelor's degree	None	None
	17-2111	Health and Safety Engineers, Except Mining Safety Engineers and Inspectors	201	209	8	4%	14	$47.96	$61.55	$69.04	Bachelor's degree	None	None
	19-1013	Soil and Plant Scientists	75	84	10	13%	10	$25.55	$35.34	$47.18	Bachelor's degree	None	None
	19-1023	Zoologists and Wildlife Biologists	73	80	6	9%	8	$27.49	$35.45	$44.58	Bachelor's degree	None	None

Skill Level	SOC	Occupation	2022 Jobs	2027 Jobs	5-Yr Change	5-Yr % Change	Annual Openings	Pct. 25 Hourly Earnings	Median Hourly Earnings	Pct. 75 Hourly Earnings	Typical Entry Level Education	Work Experience Required	Typical On-The-Job Training
Above Middle-Skill	19-1031	Conservation Scientists	62	70	8	13%	7	$21.33	$28.37	$42.49	Bachelor's degree	None	None
	19-1032	Foresters	65	70	5	8%	7	$23.28	$34.79	$47.77	Bachelor's degree	None	None
	25-9021	Farm and Home Management Educators	50	57	7	14%	6	$24.57	$40.63	$44.84	Master's degree	None	None
	19-1011	Animal Scientists	23	25	2	10%	3	$31.66	$46.86	$73.45	Bachelor's degree	None	None
	17-2021	Agricultural Engineers	<10	<10	Insf. Data	Insf. Data	1	Insf. Data	Insf. Data	Insf. Data	Bachelor's degree	None	None

APPENDIX F: AGRICULTURE, WATER, AND ENVIRONMENTAL TECHNOLOGIES SUPPLY – COMMUNITY COLLEGE AND NON-COMMUNITY COLLEGE AWARDS

This appendix provides labor market supply information, which equates to educational awards, for the Agriculture, Water, and Environmental Technologies sector.

Exhibit 24 shows the distribution of community college awards in Orange County by program in the Agriculture, Water, and Environmental Technologies sector.

Exhibit 24: Agriculture, Water, and Environmental Technologies Community College Awards by Program, 2020-2023

TOP	Program	2020-2021 Awards	2021-2022 Awards	2022-2023 Awards	3-Year Award Average
0101.00	Agriculture Technology and Sciences, General	-	-	-	-
0102.00	Animal Science	-	-	-	-
0102.10	Veterinary Technician (Licensed)	-	-	-	-
0102.20	Artificial Inseminator (Licensed)	-	-	-	-
0102.30	Dairy Science	-	-	-	-
0102.40	Equine Science	-	-	-	-
0103.00	Plant Science	-	-	-	-
0103.10	Agricultural Pest Control Adviser and Operator (Licensed)	-	-	-	-
0104.00	Viticulture, Enology and Wine Business	-	-	-	-
0109.00	Horticulture	58	56	39	51
0109.10	Landscape Design and Maintenance	26	45	18	30
0109.20	Floriculture /Floristry	12	5	-	6
0109.30	Nursery Technology	1	2	3	2
0109.40	Turfgrass Technology	-	-	-	-
0112.00	Agriculture Business, Sales and Service	-	-	-	-
0113.00	Food Processing and Related Technologies	-	-	-	-
0114.00	Forestry	-	-	-	-
0115.00	Natural Resources	6	7	6	6
0115.10	Parks and Outdoor Recreation	-	-	-	-
0115.20	Wildlife and Fisheries	-	-	-	-
0116.00	Agricultural Power Equipment Technology	-	-	-	-

TOP	Program	2020-2021 Awards	2021-2022 Awards	2022-2023 Awards	3-Year Award Average
0199.00	Other Agriculture and Natural Resources	-	-	-	-
0303.00	Environmental Technology	9	11	3	8
0947.00	Diesel Technology	10	-	14	8
0947.20	Heavy Equipment Maintenance	17	16	17	17
0947.30	Heavy Equipment Operation	49	-	-	16
1301.00	Family and Consumer Sciences, General	-	-	-	-
1301.10	Consumer Services	6	-	-	2
1303.00	Fashion	24	16	13	18
1305.00	Child Development/Early Care and Education	379	432	607	473
1305.10	Child and Adolescent Development	208	233	196	212
1305.60	Parenting and Family Education	-	-	-	-
1305.70	Foster and Kinship Care	-	-	-	-
1305.90	Infants and Toddlers	167	174	127	156
1308.00	Family Studies	-	-	-	-
1309.00	Gerontology	13	21	23	19
1920.00	Ocean Technology	-	-	-	-
	Total/Average	**985**	**1,018**	**1,066**	**1,023**

Exhibit 25 details Agriculture, Water, and Environmental Technologies sector supply award counts by Orange County community college.

Exhibit 25: Agriculture, Water, and Environmental Technologies Community College Awards by College, 2020-2023

College	2020-2021 Awards	2021-2022 Awards	2022-2023 Awards	3-Year Award Average
Coastline	4	5	6	5
Cypress	2	4	5	4
Fullerton	169	163	161	164
Golden West	59	48	39	49
Irvine Valley	73	142	75	97
North Orange Adult	63	32	129	75
Orange Coast	48	40	62	50
Saddleback	269	319	233	274
Santa Ana	234	235	233	234
Santiago Canyon	64	30	123	72
Total/Average	**985**	**1,018**	**1,066**	**1,023**

Exhibit 26 provides the number of Agriculture, Water, and Environmental Technologies sector awards conferred by non-community college programs.

Exhibit 26: Agriculture, Water, and Environmental Technologies Non-Community College Awards by Program, 2019-2022

CIP	Program	2019-2020 Awards	2020-2021 Awards	2021-2022 Awards	3-Year Award Average
01.1001	Food Science	17	18	15	17
01.8101	Veterinary Sciences/Veterinary Clinical Sciences, General	-	-	18	6
01.8301	Veterinary/Animal Health Technology/Technician and Veterinary Assistant	87	95	56	79
03.0101	Natural Resources/Conservation, General	12	14	21	16
03.0104	Environmental Science	62	35	34	44
14.1401	Environmental/Environmental Health Engineering	50	56	71	59
26.0101	Biology/Biological Sciences, General	1,080	1,022	1,007	1,036
26.0202	Biochemistry	86	95	95	92
26.1310	Ecology and Evolutionary Biology	14	12	19	15
26.1399	Ecology, Evolution, Systematics and Population Biology, Other	13	10	8	10
30.1901	Nutrition Sciences	-	-	1	0
40.0501	Chemistry, General	268	211	208	229
	Total/Average	**1,689**	**1,568**	**1,553**	**1,603**

Exhibit 27 includes the number of Agriculture, Water, and Environmental Technologies sector awards conferred by non-community college institutions.

Exhibit 27: Agriculture, Water, and Environmental Technologies Non-Community College Awards by Institution, 2019-2022

Institution	2019-2020 Awards	2020-2021 Awards	2021-2022 Awards	3-Year Award Average
American College of Healthcare and Technology-Santa Ana	-	-	18	6
California State University-Fullerton	388	317	423	376
Chapman University	97	113	89	100
Concordia University-Irvine	27	24	34	28

Institution	2019-2020 Awards	2020-2021 Awards	2021-2022 Awards	3-Year Award Average
Platt College-Anaheim	43	51	29	41
Stanbridge University	44	44	27	38
University of California-Irvine	1,068	996	910	991
Vanguard University of Southern California	22	23	23	23
Total/Average	**1,689**	**1,568**	**1,553**	**1,603**

APPENDIX G: AGRICULTURE, WATER, AND ENVIRONMENTAL TECHNOLOGIES CIP CODES

This appendix provides the list of CIP codes that crosswalk to the occupations in the Agriculture, Water, and Environmental Technologies sector but did not have any supply (Exhibit 28).

Exhibit 28: List of CIP with No Supply in Orange County

CIP	Program
01.0000	Agriculture, General
01.0101	Agricultural Business and Management, General
01.0102	Agribusiness/Agricultural Business Operations
01.0104	Farm/Farm and Ranch Management
01.0199	Agricultural Business and Management, Other
01.0201	Agricultural Mechanization, General
01.0204	Agricultural Power Machinery Operation
01.0205	Agricultural Mechanics and Equipment/Machine Technology/Technician
01.0207	Irrigation Management Technology/Technician
01.0299	Agricultural Mechanization, Other
01.0301	Agricultural Production Operations, General
01.0302	Animal/Livestock Husbandry and Production
01.0303	Aquaculture
01.0304	Crop Production
01.0306	Dairy Husbandry and Production
01.0307	Horse Husbandry/Equine Science and Management
01.0308	Agroecology and Sustainable Agriculture
01.0310	Apiculture
01.0399	Agricultural Production Operations, Other
01.0401	Agricultural and Food Products Processing
01.0504	Dog/Pet/Animal Grooming
01.0505	Animal Training
01.0507	Equestrian/Equine Studies
01.0509	Farrier Science

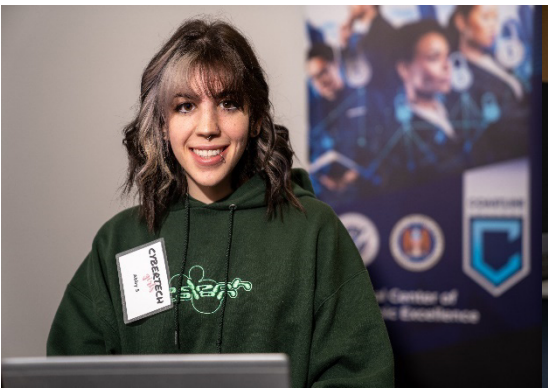
CIP	Program
01.0601	Applied Horticulture/Horticulture Operations, General
01.0603	Ornamental Horticulture
01.0604	Greenhouse Operations and Management
01.0605	Landscaping and Groundskeeping
01.0606	Plant Nursery Operations and Management
01.0607	Turf and Turfgrass Management
01.0609	Public Horticulture
01.0610	Urban and Community Horticulture
01.0701	International Agriculture
01.0801	Agricultural and Extension Education Services
01.0901	Animal Sciences, General
01.0902	Agricultural Animal Breeding
01.0903	Animal Health
01.0904	Animal Nutrition
01.0905	Dairy Science
01.0906	Livestock Management
01.0907	Poultry Science
01.0999	Animal Sciences, Other
01.1002	Food Technology and Processing
01.1003	Brewing Science
01.1004	Viticulture and Enology
01.1005	Zymology/Fermentation Science
01.1099	Food Science and Technology, Other
01.1101	Plant Sciences, General

CIP	Program
01.1102	Agronomy and Crop Science
01.1103	Horticultural Science
01.1104	Agricultural and Horticultural Plant Breeding
01.1105	Plant Protection and Integrated Pest Management
01.1106	Range Science and Management
01.1199	Plant Sciences, Other
01.1201	Soil Science and Agronomy, General
01.1202	Soil Chemistry and Physics
01.1203	Soil Microbiology
01.1299	Soil Sciences, Other
01.1399	Agriculture/Veterinary Preparatory Programs, Other
01.8001	Veterinary Medicine
01.8102	Comparative and Laboratory Animal Medicine
01.8103	Large Animal/Food Animal and Equine Surgery and Medicine
01.8104	Small/Companion Animal Surgery and Medicine
01.8105	Veterinary Anatomy
01.8106	Veterinary Infectious Diseases
01.8107	Veterinary Microbiology and Immunobiology
01.8108	Veterinary Pathology and Pathobiology
01.8109	Veterinary Physiology
01.8110	Veterinary Preventive Medicine, Epidemiology, and Public Health
01.8111	Veterinary Toxicology and Pharmacology
01.8199	Veterinary Biomedical and Clinical Sciences, Other
01.8399	Veterinary/Animal Health Technologies/Technicians, Other
03.0201	Environmental/Natural Resources Management and Policy, General
03.0205	Water, Wetlands, and Marine Resources Management
03.0206	Land Use Planning and Management/Development
03.0301	Fishing and Fisheries Sciences and Management

CIP	Program
03.0501	Forestry, General
03.0502	Forest Sciences and Biology
03.0506	Forest Management/Forest Resources Management
03.0508	Urban Forestry
03.0509	Wood Science and Wood Products/Pulp and Paper Technology/Technician
03.0510	Forest Resources Production and Management
03.0511	Forest Technology/Technician
03.0599	Forestry, Other
03.0601	Wildlife, Fish and Wildlands Science and Management
12.0509	Culinary Science/Culinology
14.0301	Agricultural Engineering
14.0802	Geotechnical and Geoenvironmental Engineering
14.0805	Water Resources Engineering
14.9999	Engineering, Other
15.0508	Hazardous Materials Management and Waste Technology/Technician
19.0101	Family and Consumer Sciences/Human Sciences, General
19.0201	Business Family and Consumer Sciences/Human Sciences
19.0203	Consumer Merchandising/Retailing Management
19.0401	Family Resource Management Studies, General
19.0402	Consumer Economics
19.0403	Consumer Services and Advocacy
19.0499	Family and Consumer Economics and Related Services, Other
19.0601	Housing and Human Environments, General
19.0605	Home Furnishings and Equipment Installers
19.0704	Family Systems
19.0706	Child Development
19.0707	Family and Community Services
19.0711	Early Childhood and Family Studies

CIP	Program
19.0712	Parent Education Services
19.0901	Apparel and Textiles, General
26.0301	Botany/Plant Biology
26.0305	Plant Pathology/Phytopathology
26.0307	Plant Physiology
26.0308	Plant Molecular Biology
26.0399	Botany/Plant Biology, Other
26.0502	Microbiology, General
26.0701	Zoology/Animal Biology
26.0702	Entomology
26.0707	Animal Physiology
26.0708	Animal Behavior and Ethology
26.0709	Wildlife Biology
26.0799	Zoology/Animal Biology, Other
26.1301	Ecology
26.1302	Marine Biology and Biological Oceanography
26.1303	Evolutionary Biology
26.1305	Environmental Biology
26.1307	Conservation Biology
30.3201	Marine Sciences
30.3301	Sustainability Studies
30.3401	Anthrozoology
30.4401	Geography and Environmental Studies

CIP	Program
31.0302	Golf Course Operation and Grounds Management
49.0202	Construction/Heavy Equipment/Earthmoving Equipment Operation
60.0301	Veterinary Anesthesiology Residency Program
60.0302	Veterinary Dentistry Residency Program
60.0303	Veterinary Dermatology Residency Program
60.0304	Veterinary Emergency and Critical Care Medicine Residency Program
60.0305	Veterinary Internal Medicine Residency Program
60.0306	Laboratory Animal Medicine Residency Program
60.0307	Veterinary Microbiology Residency Program
60.0308	Veterinary Nutrition Residency Program
60.0309	Veterinary Ophthalmology Residency Program
60.0310	Veterinary Pathology Residency Program
60.0311	Veterinary Practice Residency Program
60.0312	Veterinary Preventive Medicine Residency Program
60.0313	Veterinary Radiology Residency Program
60.0314	Veterinary Surgery Residency Program
60.0315	Theriogenology Residency Program
60.0316	Veterinary Toxicology Residency Program
60.0317	Zoological Medicine Residency Program
60.0318	Poultry Veterinarian Residency Program
60.0319	Veterinary Behaviorist Residency Program
60.0320	Veterinary Clinical Pharmacology Residency Program
60.0399	Veterinary Residency/Fellowship Program, Other



Important Disclaimers

All representations included in this report have been produced from primary research and/or secondary review of publicly and/or privately available data and/or research reports. This study examines the most recent data available at the time of the analysis; however, data sets are updated regularly and may not be consistent with previous reports. Efforts have been made to qualify and validate the accuracy of the data and the report findings; however, neither the Centers of Excellence for Labor Market Research (COE), COE host district, nor California Community Colleges Chancellor's Office are responsible for the applications or decisions made by individuals and/or organizations based on this study or its recommendations.

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COE FOR LABOR MARKET RESEARCH ORANGE COUNTY

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