



REGIONAL WORKFORCE AND INDUSTRY ANALYTIC SERVICES
North Bay Employment Connection (NBEC)

May 2022

Copyright ©2022 by
Economic Forensics and Analytics, Inc.
Petaluma, CA
eyler@econforensics.com

Contents

Executive Summary2

1. Introduction5

2. Labor Force and Employment Profile6

2a. Pre-Pandemic Employment and Occupational Trends.....6

2b. Changes since March 2020: Pandemic Effects and Shocks8

2c. Community-Level Impacts of the Pandemic14

2d. Business Openings and Closures, 2019 to 2021.....15

Mobility: Where Workers Go to Work in the NBEC Region 16

3. Worker Demographics, 2019 to 202118

3a. Vulnerable Populations18

3b. Population Change, NBEC Region, 2011 to 2021.....23

4. Forecasts for the NBEC Region and for Occupations25

4a. Context Forecasts.....25

National Overview 25

State Overview..... 26

4b. Analysis of Skills Needed for the Jobs of the Future.....28

What National-Level Studies Say about Skills 30

4c. What We Learned from Industry Interviews: Overview of Results31

 Challenges 31

 Opportunities 32

4d. Analysis of Middle-Skill Job Availability in the Future.....33

5. Conclusions and Recommendations34

Recommendations35

References.....38

Appendix39

Details from Interviews with Industry Leaders, January to March 202239

Detailed Data.....45

Middle-Skill Occupational Profiles in Brief57

Executive Summary

The COVID-19 pandemic created changes in regional labor markets throughout the United States; some changes will continue to have effects until 2025 and perhaps beyond. The North Bay Employment Connection (NBEC) commissioned this study of six counties and their pre-pandemic trends and potential forecasts for regional employers’ demand for workers, occupational demand for specific types of jobs, and the skills most needed as a result of demand in those occupations. These six counties in California are: Lake, Marin, Mendocino, Napa, Solano, and Sonoma.

We use December 2019 as a pre-pandemic benchmark to be restored (or not), as we examine a mix of monthly, quarterly, and annual data. Our focus is occupations and skills linked to employer demand for workers. Trends before 2020 suggested labor-market recovery from the Great Recession (2008-10), except in Mendocino County, among these six counties. Industries such as health care, retail, food services and drinking places, manufacturing, and construction led job growth in 2011-2019. Some occupational categories led the job gains, such as healthcare support, community and social services, construction and extraction, transportation and material moving, management, and agriculture.

The pandemic (since March 2020) has affected some occupations more than others. Certain industries—such as leisure and hospitality (restaurants, hotels, event centers), personal services (hair and nail salons, fitness centers, non-healthcare not-for-profits), and government—continued to be under social restrictions or lacked the revenue for rehiring workers. Communities in Lake, Mendocino, and Solano recovered jobs more quickly than Sonoma, Napa and Marin, primarily because they imposed fewer social restrictions in general. However, our analysis suggests that Lake, Mendocino, and Solano counties may have vulnerabilities (larger proportions of lower-income households with dependents, for example), that create challenges in terms of attracting and retaining workers for the jobs available.

Post-Pandemic Occupational Categories Forecasted to Have the Most Demand by NBEC County, 2022-2025

Lake	Marin	Mendocino	Napa	Solano	Sonoma
Healthcare Support	Healthcare Support	Healthcare Support	Community and Social Service	Healthcare Support	Healthcare Support
Healthcare Practitioners and Technical	Life, Physical, and Social Science	Transportation and Material Moving	Arts, Design, Entertainment, Sports, and Media	Community and Social Service	Construction and Extraction
Transportation and Material Moving	Farming, Fishing, and Forestry	Business and Financial Operations	Computer and Mathematical	Management	Healthcare Practitioners and Technical
Sales and Related	Building and Grounds Cleaning and Maintenance	Architecture and Engineering	Healthcare Support	Business and Financial Operations	Protective Service
Business and Financial Operations	Production	Legal	Business and Financial Operations	Transportation and Material Moving	Community and Social Service

From 2011 to 2019, commuting patterns in the NBEC counties show that more working residents commute to work elsewhere than came to the NBEC counties to work from other counties, which

NBEC Workforce and Economic Development 2022

suggests that regional employers depend on workers who live outside the NBEC counties to fill open jobs. Population forecasts suggest that the total number of residents and the number of high-school graduates will fall through 2030. Both of these forecasted changes will make it more difficult for regional employers to find workers within the NBEC counties as their need for workers grows. Middle-skill occupations are those that require more than a high-school diploma but not a bachelor's degree. They are of major importance as a focus of regional workforce development. These efforts would not only provide employers with badly needed skilled workers but also give workers and residents social mobility.

The literature on skills, occupations, and employment in the wake of the pandemic suggest that, through the 2020s, more workers will be needed with STEM (science, technology, engineering, and mathematics) and soft skills. Problem solving and critical thinking, as well as time and project management, are skills specifically mentioned in forecasts up to 2025. With respect to STEM skills, workers in construction, health care, government, and computer systems all require fluency in software and technology. Although some previous jobs have been made obsolete by technology, workers are needed to interact with machines, as well as to be primary coders or programmers for those computer systems and software. In the NBEC counties, employment in these occupations is predicted to exceed pre-pandemic levels by 2025. The data, surveys, and interviews in this report offer recommendations for NBEC's workforce development organizations, which can help shape worker preparation for jobs that enable more social mobility and a more skilled workforce for employers for the foreseeable future.

Recommended Focus in Middle-Skill Jobs and in STEM and Soft Skills in Regional Programs

Middle-Skill Occupations across NBEC Counties	Median Wage NBEC 2021	Median Wage CA 2021	STEM Skills	Soft Skills
Heavy and tractor-trailer truck drivers	\$28.40	\$24.80	Spreadsheet software	Critical thinking
Medical assistants	\$26.00	\$19.80	E-mail software	Monitoring
Licensed practical/licensed vocational nurses	\$37.20	\$31.20	Word processing software	Reading comprehension
Phlebotomists	\$25.30	\$23.00	Database user interface and query software	Speaking
Veterinary technologists and techs	\$23.20	\$23.20	Operating system software	Time management
Physical therapist assistants	\$38.60	\$36.40	Medical software	Active listening
Aircraft mechanics and service technicians	\$42.70	\$37.30	MS Office suite software	Social perceptiveness
Firefighters	\$51.50	\$39.90	Internet browser software	Complex problem solving
Hairdressers, hairstylists, cosmetologists	\$15.60	\$15.10	Presentation software	Decision making
Occupational therapy assistants	\$43.00	\$37.20	Calendar/scheduling software	Coordination
Radiologic technologists and technicians	\$53.50	\$46.80	Accounting software	Operations monitoring
Respiratory therapists	\$44.30	\$42.80	Medical software	Writing
Paralegals and legal assistants	\$36.70	\$30.60	Database software	Service orientation
Psychiatric technicians	\$30.20	\$30.20	Medical software	Instructing

The county-specific occupations below fine-tune the above data into additional recommendations for focused programs and training, given the mix of the quantitative and interview/survey data on the future of jobs in the NBEC region.

**Key County-Specific Occupations for Which a Need for Training Is Forecasted,
With an Emphasis on Middle Skills:**

- Lake
 - Software developers and software quality assurance analysts;
 - Nurse practitioners;
 - Food preparation and serving related workers;
 - Animal caretakers;
 - Weighers, measurers, checkers and samplers, recordkeeping
- Marin
 - Home health and personal care aides;
 - Childcare workers;
 - Chemical equipment operators and tenders;
 - Animal caretakers;
 - Medical assistants;
- Mendocino
 - Septic tank servicers and sewer pipe cleaners;
 - Structural metal fabricators and fitters;
 - Machinists;
 - Teaching assistants, postsecondary;
 - Nurse practitioners;
- Napa
 - Ambulance drivers and attendants, except emergency medical technicians (EMTs);
 - Coating, painting, and spraying machine setters, operators, and tenders;
 - Computer network support specialists;
 - Radiation therapists;
 - Interpreters and translators;
- Solano
 - Chemical plant and system operators;
 - Pressing and compacting machine setters;
 - Pourers and casters, metal;
 - Security and fire alarm systems installers;
 - Woodworking machine setters, operators, and tenders, except sawing;
- Sonoma
 - Ophthalmic medical technicians;
 - Chemical equipment operators and tenders;
 - Tool and die makers;
 - Chemical plant and system operators;
 - Ambulance drivers and attendants, except EMTs.

1. Introduction

This study provides data, forecasts, and analyses for workforce development in the North Bay, California, and Lake, Marin, Mendocino, Napa, Solano, and Sonoma counties. The workforce development boards (WDBs) in these counties are collectively known as the North Bay Employment Connection (NBEC), which commissioned this work. The COVID-19 pandemic significantly affected the mix of industries and jobs in demand throughout the region. Employment impacts vary widely across cities and counties throughout California. Understanding the local changes due to the pandemic is essential for planning the future in the NBEC region. It is also necessary for workforce development to proceed in parallel with economic development and to keep up with the changes forecasted through 2025.

This study used surveys and interviews with employers, regional workers, and local, non-for-profit advocacy organizations to provide more detail and breadth to the quantitative data we collected. Summary points are presented throughout the report. The COVID-19 pandemic and subsequent recession did not affect all communities equally. In particular, workers who are black, indigenous, and people of color (BIPOC) comprised 43% of the workers employed in the NBEC counties in 2019 and held 48% of the jobs lost in Marin, Napa, Solano, and Sonoma counties in the initial stages of recession in 2020. In some communities, “vulnerability” might affect the workforce supply in the NBEC counties through 2025, including BIPOC communities and those with a disproportionate number of households with dependents or relatively low income. Forecasts of employment demand in specific occupations and skills round out our data collection. These forecasts are then matched with interviews conducted by our team as well as survey results from workers and workforce development professionals to form our conclusions and recommendations. One concern of the NBEC is the job “quality” in the North Bay. This study provides insight into the steps that NBEC organizations can take to address these disparate impacts. The data and recommendations provided below can inform policies for fostering healthier communities and providing better pathways to social and economic mobility.

This study is structured as follows. Section 2 describes the pre-pandemic (2011-2019) and pandemic-era data (2020-2021), as available. Section 3 looks at the demography of workers and shifting populations within and outside the NBEC counties. These data include the effects on BIPOC communities and vulnerable neighborhoods in the NBEC region. Section 4 provides a mix of macroeconomic and occupational forecasts in the six NBEC counties. These forecasts indicate that growth in statewide and regional jobs will continue until 2025. Section 4 ties together what we know about disparate impacts regionally and the forecasts, including the changes forecasted with respect to hiring for “quality” jobs throughout the six-county region, which offers insights into which skills, jobs, and communities will need workforce development services the most going forward. Section 5 outlines our conclusions and recommendations.

2. Labor Force and Employment Profile

From 2011 through 2019, the US, California, and NBEC-county economies were recovering from the global financial crisis.¹ Then came the pandemic starting in March 2020, which created an economic and employment recession. This section considers changes in employment and occupations between 2011 and 2019 and changes due to the pandemic through 2021. The data in Section 2 give a benchmark for recent growth (“recovery”) and the pandemic’s effects on employment and occupational trends in the NBEC’s six counties.²

2a. Pre-Pandemic Employment and Occupational Trends

Table 1 shows an overview of employment in the top 10 industries in the region and changes in the number of workers in them between 2011 and 2019. These data help us understand where demand for labor in NBEC was concentrated and growing (declining) during the recovery from the Great Recession (2008-2010).

Table 1: Industry Sector Employment Demand, NBEC Counties (Total Jobs and % Change) and California, % Change, 2011 to 2019, Fourth Quarter, Payroll Employment

Industry Sector	NBEC				California
	Employment		Change	Percent Change	
	2011	2019	2011-2019	2011-2019	2011-2019
Healthcare	65,104	95,718	30,614	47.0%	61.0%
Retail	66,478	71,606	5,128	7.7%	7.6%
Food services and drinking places	52,753	66,078	13,325	25.3%	32.5%
Manufacturing	44,491	57,843	13,352	30.0%	6.7%
Construction	26,785	43,937	17,152	64.0%	57.9%
Admin and waste services	22,719	30,017	7,298	32.1%	27.1%
Prof serv	28,091	25,628	(2,463)	-8.8%	24.8%
Other personal services	24,187	20,466	(3,721)	-15.4%	-28.0%
Wholesale	15,519	16,965	1,446	9.3%	5.2%
Finance	15,423	13,332	(2,091)	-13.6%	3.5%
All other industries	68,109	66,223	-1,886	-2.8%	22.1%
Total	429,659	507,813	78,154	18.2%	22.3%

Sources: Bureau of Labor Statistics (BLS), Quarterly Census of Employment and Wages (QCEW)), Economic Modeling/Burning Glass (EMSI), Economic Forensics and Analytics (EFA), and National Economic Education Delegation (NEED).

It is critical to recognize the subtle difference between employment demand by industry and occupational demand, which is the work that workers do regardless of their employer. Table 2 shows the evolution in occupational demand in the NBEC region and California as a whole, as well as the growth and concentration of the types of jobs in demand regionally. The occupations are listed in

¹ Also known as the Great Recession, which lasted in California from 2008 to 2010, before economic recovery began. We choose 2011 as the starting point for this history because the Great Recession (2008-2010) ended in these six counties, and the labor market generally began to recover in 2011.

² As of December 2021, Mendocino County had not yet recovered the 2007 volume of workers since 2007.

NBEC Workforce and Economic Development 2022

descending order of growth between 2011 and 2019. Table 2 also gives an overview of occupational categories and changes in employment before the pandemic, similar to the industry sectors shown in Table 1. However, recommendations for workforce development must come from a more granular look at occupations.

Table 2: Employment by Occupation, Payroll and Self-Employed
2011 to 2019, First Quarter of Each Year

Broad Occupation Category	NBEC			California	
	Employment		Change	Percent Change	
	2011	2019	2011-2019	2011-2019	2011-2019
Total	523,877	624,349	100,472	19.2%	23.8%
Office and administrative support	78,300	67,862	(10,438)	-13.3%	-10.8%
Sales and related	58,811	66,089	7,278	12.4%	14.2%
Food preparation and serving related	51,131	63,248	12,117	23.7%	30.5%
Transportation and material moving	30,156	41,791	11,635	38.6%	63.1%
Management	28,850	38,447	9,597	33.3%	35.4%
Healthcare support	18,113	37,934	19,821	109.4%	155.1%
Construction and extraction	24,152	37,482	13,330	55.2%	50.3%
Educational instruction and library	34,348	36,730	2,382	6.9%	17.9%
Healthcare practitioners and technical	30,817	34,326	3,509	11.4%	20.2%
Business and financial operations	26,943	29,574	2,631	9.8%	39.6%
Production	25,458	29,155	3,697	14.5%	7.3%
Building and grounds cleaning and maintenance	22,625	25,965	3,340	14.8%	11.1%
Installation, maintenance, and repair	17,931	20,800	2,869	16.0%	18.2%
Personal care and service	16,468	20,620	4,152	25.2%	19.0%
Protective service	10,007	13,024	3,017	30.1%	11.1%
Community and social service	8,104	12,655	4,551	56.2%	46.8%
Farming, fishing, and forestry	8,045	10,503	2,458	30.6%	28.6%
Computer and mathematical	9,464	10,423	959	10.1%	43.9%
Arts, design, entertainment, sports, and media	8,806	9,106	300	3.4%	19.4%
Architecture and Engineering	6,741	8,200	1,459	21.7%	12.8%
Life, physical, and social science	5,116	6,661	1,545	30.2%	9.4%
Legal	3,490	3,754	264	7.6%	21.6%

Sources: BLS Occupational Employment and Wages Statistics (OES), EMSI, EFA, NEED.

Note: Estimates are sorted by the % change in 2011-2019.

Table 3 drills down and provides evidence on the importance of occupations at a more granular level within the broad occupation categories in Table 2. For instance, rather than reporting on “Healthcare practitioners and technical,” Table 3 breaks out “Registered nurses,” “Medical assistants,” and more specific occupations included as a part of the broader “Healthcare practitioners and technical” category. These data are compared to the statewide growth for the same 20 occupations. One concern is in vulnerable and BIPOC communities throughout the NBEC region. We revisit shifting jobs, challenges, and opportunities in these communities more completely in Section 3.

NBEC Workforce and Economic Development 2022

Table 3: Top 20 Occupations, Job Growth, 2011-2019, NBEC Counties and California
(% change, sorted by rate of growth locally relative to growth in California overall)

Occupation	NBEC				California
	Employment		Change	Percent Change	
	2011	2019	2011-2019	2011-2019	2011-2019
Total	523,877	624,349	100,472	19.2%	20.1%
Nursing assistants	2,666	3,989	1,323	49.6%	-0.2%
Demonstrators and product promoters	1,981	3,263	1,282	64.7%	11.5%
Office clerks, general	7,515	10,671	3,156	42.0%	9.6%
Fast food and counter workers	7,254	15,245	7,991	110.2%	28.4%
Registered nurses	5,900	12,110	6,210	105.3%	30.4%
Stockers and order fillers	4,722	8,993	4,271	90.5%	26.9%
Teaching assistants, except postsecondary	3,288	6,137	2,850	86.7%	26.1%
Medical assistants	2,482	4,024	1,542	62.1%	25.1%
Project management and business operations specialists	2,440	5,551	3,111	127.5%	55.5%
Sales, except advertising, insurance, finance, and travel	1,801	3,377	1,576	87.5%	55.5%
Elementary school teachers, except special education	6,022	7,460	1,438	23.9%	15.4%
Human resources specialists	941	2,049	1,108	117.8%	77.0%
Cashiers	14,761	17,903	3,142	21.3%	15.3%
Waiters and waitresses	10,880	13,235	2,355	21.6%	15.7%
Passenger vehicle drivers, except bus, transit and intercity	1,191	2,454	1,263	106.1%	88.4%
Construction laborers	4,765	6,263	1,498	31.4%	26.6%
Cooks, restaurant	4,729	7,535	2,806	59.3%	54.8%
Electricians	2,014	3,343	1,330	66.0%	67.9%
Carpenters	5,443	7,146	1,704	31.3%	37.4%
Laborers and freight, stock, and material movers, hand	6,409	8,262	1,853	28.9%	67.0%
All Others	426,676	475,341	48,665	11.4%	17.6%

Sources: OES, EMSI, EFA, NEED.

Tables 1-3 offer evidence on where the economy was headed before the pandemic. We now consider the effects of the pandemic on regional labor markets through 2021.

2b. Changes since March 2020: Pandemic Effects and Shocks

The pandemic affected labor markets nationwide. For the NBEC counties, it has four particular implications or themes for labor markets, each of which is important for our conclusions and recommendations:

- Lower-wage workers experienced more acute and sustained job losses than other workers;
 - Personal services jobs lost more available positions than goods-producing (construction and manufacturing) and professional services jobs;
- The cost of doing business, including wages, increased;
- In many cases, the utilization of commercial space shifted to homes;
 - In other cases, the number of people working per square foot changed;
 - These changes have implications for hiring in support industries (e.g., retail and restaurants) based on the number of workers who commute to commercial office spaces in large suburban or urban areas in the future; and

- Migration and retirements changed labor-force participation and worker availability regionally.

Rising housing costs create challenges for employers and workers throughout California, specifically in the NBEC region. Broadly speaking, the median home value in California is more than double that nationwide: \$745,000 in California versus \$326,000 countrywide.

This cost of housing is an impediment to workforce growth and puts a strain on workers throughout the NBEC region. One measure of the housing burden is whether the share of household income spent on housing exceeds 30%; if so, the cost is considered “burdensome” on household budgets. Household income is not the same thing as wages earned by individuals. In Table 4, we provide some evidence on the housing burden in each of the NBEC region’s counties and California.³ Table 4 also sheds light on the relative burdens of white, non-Hispanic households and households in BIPOC communities. White households are more likely to own their homes, so the values in the final two columns indicate the relative burden of housing on homeowners versus renters.

Table 4: Household Income, the Cost of Housing, and Housing Burden
NBEC Counties and California, 2019

Area	Median	Median	Median Owners	Home Ownership	Housing Burden
	HH Income (\$)	Rent (\$)	Housing Costs (\$)	Rates (% of total households)	White (%)
California	\$78,672	\$1,442	\$1,688	55.3%	63.4%
Lake	\$49,254	\$834	\$998	67.7%	72.1%
Marin	\$121,671	\$2,047	\$2,522	63.6%	68.8%
Mendocino	\$52,915	\$960	\$1,097	60.3%	65.0%
Napa	\$92,219	\$1,648	\$1,844	64.8%	70.5%
Solano	\$84,638	\$1,508	\$1,765	62.1%	69.0%
Sonoma	\$86,173	\$1,593	\$1,828	61.3%	67.2%

Sources: U.S. Census Bureau, American Community Survey (ACS) 5-year Summary Files, NEED and EFA.

Notes: HH = household. Comparisons of household income with rent and mortgage burdens is not available by race/ethnicity, so ownership shares are used as a proxy for the share of BIPOC who are burdened by rent and by ownership. Homes without a mortgage or rent are omitted. The housing burden is the share of the relevant population with housing costs that exceed income.

Table 5 shows the annual worker wages in the NBEC region by race/ethnicity. Some observations help to summarize. First, on average, the wages of BIPOC workers are within 75% of wages by white workers. Second, wages grew more for white workers than for BIPOC workers in the first year of the pandemic. Third, it is reasonably well established that more low-wage jobs were lost nationally and across California than other jobs. Compared with a sample before the pandemic, BIPOC workers who lost their jobs are more likely to have lost lower-wage jobs than white non-Hispanic workers, who are disproportionately represented in high-wage jobs.

³ Similar information for places, cities, and CDPs in the region can be found in Appendix Table 15-A.

NBEC Workforce and Economic Development 2022

Table 5: Annual Real Wages Earned by Workers Residing in the NBEC Region

Race/Ethnicity	2011	2019	2020	% Change	
				2011-2019	2019-2020
White Non-Hispanic	\$49,471	\$62,636	\$69,639	26.6	11.2
BIPOC	\$37,070	\$46,090	\$49,596	24.3	7.6
% Difference	-25.1	-26.4	-28.8		

Source: ACS 1-year Public Use Microdata Sample (PUMS), EFA, NEED.

Note: Data are adjusted for inflation. Appendix Tables 3-A and 4-A provide the same data for individual industries and occupations. Additional data in the Appendix provide details on NBEC-region wages, average and median, as well as information on weekly and hourly wages compared with California and national data (Appendix Tables 3-A to 7-A).

Table 6 provides a breakdown of the job changes in the region both overall and by major industry categories. Industries that hire disproportionately high levels of low-skilled, lower-wage workers had most of the job losses regionally—particularly in education and health services, leisure and hospitality, and other services. Collectively, these industries accounted for nearly 16,000, or 64%, of just over 24,000 jobs lost between December 2019 and December 2021.

Table 6: Change (%) in Industry Employment
NBEC Counties and California, Dec. 2019 to Dec. 2021

Industry	Napa	Sonoma	Marin	Lake	Mendocino	Solano	California
Total farm	-	(900)	(700)	-	(220)	(130)	(1,950)
Total nonfarm	(4,500)	(8,800)	(4,200)	(4,800)	(60)	(1,970)	(24,270)
Construction	(300)	1,500	(800)	400	30	150	980
Manufacturing	(100)	(500)	(500)	500	(30)	(120)	(750)
Wholesale trade	(200)	(300)	(100)	(100)	-	-	(700)
Retail trade	500	(300)	300	(900)	150	(100)	(350)
Transportation, warehousing, & utilities	700	300	(200)	100	230	210	1,340
Information	(300)	(300)	(100)	-	(20)	(40)	(760)
Financial activities	(100)	(900)	(300)	(100)	(20)	(50)	(1,470)
Professional & business services	(300)	(900)	500	700	30	(60)	(30)
Educational & health services	1,200	(2,400)	(300)	(800)	(120)	(300)	(2,720)
Leisure & hospitality	(3,300)	(2,700)	(1,500)	(2,100)	(20)	(1,070)	(10,690)
Other services	(400)	(900)	(300)	(800)	(20)	(100)	(2,520)
Government	(1,900)	(1,400)	(900)	(1,700)	(270)	(490)	(6,660)
Total Changes	(4,500)	(9,700)	(4,900)	(4,800)	(280)	(2,100)	(26,280)

Sources: California Employment Development Division (EDD), EFA, NEED.

Section 4 adds more data to show which occupations are forecasted to grow and decline the most rapidly because of the pandemic, as of May 2021 (the latest data available as of March 2022).

NBEC Workforce and Economic Development 2022

Table 7: Employment by Occupation, 2019 to 2021

Occupational Category	NBEC				California	
	2019	2020	2021	Change 2019-2021	Percent Change 2019-2021	
Total	624,349	576,886	639,677	15,328	2.5%	-0.50%
Healthcare practitioners and technical	38,447	37,324	44,679	6,232	16.2%	0.9%
Business and financial operations	9,106	8,297	13,249	4,143	45.5%	-6.9%
Healthcare support	29,574	29,772	33,120	3,546	12.0%	-1.6%
Management	10,503	10,009	13,936	3,433	32.7%	-1.6%
Community and social service	25,965	24,265	29,256	3,291	12.7%	-3.3%
Life, physical, and social science	34,326	35,044	37,038	2,712	7.9%	1.1%
Computer and mathematical	37,482	34,753	40,072	2,590	6.9%	-6.7%
Farming, fishing, and forestry	41,791	39,799	44,342	2,551	6.1%	-4.5%
Transportation and material moving	20,620	17,089	22,439	1,819	8.8%	-21.2%
Installation, maintenance, and repair	20,800	19,706	22,506	1,706	8.2%	-5.6%
Protective service	37,934	36,980	39,514	1,580	4.2%	-0.8%
Building and grounds cleaning and maintenance	3,754	3,243	4,937	1,183	31.5%	-16.1%
Construction and extraction	12,655	12,213	13,574	919	7.3%	2.3%
Educational instruction and library	6,661	6,415	7,323	662	9.9%	-0.6%
Arts, design, entertainment, sports, and media	10,423	10,018	11,075	652	6.3%	-4.3%
Office and administrative support	8,200	7,215	8,376	176	2.1%	2.5%
Production	13,024	12,281	12,748	-276	-2.1%	-9.6%
Sales and related	29,155	26,378	28,062	-1,093	-3.7%	-7.8%
Architecture and engineering	66,089	59,379	64,278	-1,811	-2.7%	-4.5%
Legal	36,730	33,855	34,316	-2,414	-6.6%	-4.3%
Personal care and service	67,862	61,729	63,889	-3,973	-5.9%	-6.9%
Food preparation and serving related	63,248	51,121	50,948	-12,300	-19.4%	-0.5%

Sources: OES, EFA, NEED, EMSI.

Note: Occupational employment and wage data for 2021 are expected to come from official sources by June 2022.

Tables 8 and 9 show that some occupations experienced little change and perhaps gains in overall employment as the pandemic began. Three implications of the data in Tables 8 and 9 are:

- Fewer workers might be available, such that achieving the pre-pandemic number of workers regionally may prove difficult;
- Employers might face higher costs in finding employees, which can lead fewer overall workers to be hired, as rising search costs imply a longer time to hire and rising wages; and
- Worker or student demand may have fallen for third-party training in occupations with less employer demand.

Note that, in Table 9, many of the occupations with significant job losses were in industries in which employment declined quickly in 2020; the reduction in regional employment compared with pre-pandemic levels might persist in 2023 and beyond. It is critical to remember that employment forecasts for industries reflect hiring by employers and occupational forecasts, and data describe what people do for work, regardless of their industry employer. Forecasts, as we see in Section 4, begin with changes in industrial employment and then connect to occupations and skills.

NBEC Workforce and Economic Development 2022

Table 8: Top 20 Occupations Based on Additional Jobs in NBEC Counties
NBEC Counties and California, 2019 to 2021

Occupation	NBEC				California	
	2019	2020	2021	Change 2019-2021	Percent Change 2019-2021	
Total	624,349	578,868	639,677	15,328	2.5%	3.4%
Heating, air cond (HVAC) mechanics and installers	787	1,748	1,962	1,175	149.3%	149.3%
Project management and business operations specialists	5,551	6,368	6,487	936	16.9%	16.9%
Secondary school teachers, except special and CTE	2,486	3,012	3,325	839	33.7%	33.7%
Emergency medical technicians and paramedics	1,080	1,340	1,753	673	62.3%	62.3%
Marriage and family therapists	573	1,013	1,071	498	86.9%	86.9%
Switchboard operators, including answering service	275	786	717	442	160.7%	160.7%
Cooks, fast food	3,104	3,505	3,519	415	13.4%	13.4%
Medical and health services managers	1,590	1,860	1,985	395	24.8%	24.8%
Food preparation and serving related workers, all other	575	851	949	374	65.0%	65.0%
First-line supervisors of non-retail sales workers	987	1,148	1,360	373	37.8%	37.8%
Electrical engineers	268	588	626	358	133.6%	133.6%
Registered nurses	12,110	12,437	12,427	317	2.6%	2.6%
Medical assistants	4,024	4,246	4,303	279	6.9%	6.9%
Opticians, dispensing	191	376	414	223	116.8%	116.8%
Educational instruction and library workers, all other	1,177	1,549	1,398	221	18.8%	18.8%
Machine setters, operators, and tenders, metal and plastic	75	269	288	213	284.0%	284.0%
Biological technicians	68	250	257	189	277.9%	277.9%
Middle school teachers, except special and career technical education	1,234	1,405	1,399	165	13.4%	13.4%
Sales representatives, wholesale and manufacturing	832	993	958	126	15.1%	15.1%
Demonstrators and product promoters	3,263	3,470	3,373	110	3.4%	3.4%
All others	584,102	531,655	591,106	7,004	1.2%	2.2%

Sources: OES, EMSI, EFA, NEED.

Hidden in all these changes, especially where there have been major job losses, is the direct and indirect effect on jobs that depend on concentrated office space. Inbound commuters to large office spaces and central business districts in cities provide a work environment that offers demand for services (e.g., restaurants, retail, personal services). As employers make decisions about returning workers to the office in 2022 and beyond, industries such as restaurants and retail sales may have more opportunities; however, workforce development should focus more on extending career transition services for workers who lost jobs in those industries and occupations than on training for full recovery or expansion until 2025.

NBEC Workforce and Economic Development 2022

Table 9: Top 20 Occupations That Suffered Job Losses
NBEC Counties and California, 2019 to 2021

Occupation	NBEC					California	
	2019	2020	2021	Change 2019-2021	Percent Change 2019-2021		
Total	624,349	578,868	645,301	20,952	3.4%	-5.7%	
Waiters and waitresses	13,235	10,007	9,663	(3,853)	-29.1%	-31.0%	
Retail salespersons	17,641	14,893	13,391	(2,341)	-13.3%	-12.8%	
Cashiers	17,903	15,825	16,013	(2,149)	-12.0%	-8.3%	
Cooks, restaurant	7,535	5,500	5,575	(1,989)	-26.4%	-25.7%	
Fast food and counter workers	15,245	13,389	9,206	(1,943)	-12.7%	-14.4%	
Administrative assistants, except legal, medical, and executive	7,887	6,759	16,017	(1,733)	-22.0%	-11.8%	
Bartenders	2,960	2,042	25,418	(1,545)	-52.2%	-34.5%	
Amusement and recreation attendants	2,115	1,225	7,077	(1,311)	-62.0%	-33.7%	
Dishwashers	3,273	2,430	7,077	(1,246)	-38.1%	-31.5%	
Office clerks, general	10,671	9,842	10,068	(995)	-9.3%	-7.5%	
Elementary school teachers, except special education	7,460	6,691	2,320	(976)	-13.1%	-8.1%	
Laborers and freight, stock, and material movers, hand	8,262	7,511	6,286	(970)	-11.7%	-1.3%	
First-line supervisors of food preparation and serving workers	3,866	3,123	2,001	(930)	-24.1%	-15.2%	
Substitute teachers, short-term	2,270	1,548	9,110	(882)	-38.8%	-19.4%	
Preschool teachers, except special education	2,337	1,617	8,960	(868)	-37.2%	-13.6%	
Filtering machine setters, operators, and tenders	3,217	2,533	1,833	(856)	-26.6%	-8.9%	
Wholesale and manufacturing sales, except scientific products	5,732	5,051	5,441	(787)	-13.7%	-7.0%	
Hosts and hostesses, restaurant, lounge, and coffee shop	2,109	1,431	1,872	(783)	-37.1%	-29.6%	
Dining room and cafeteria attendants and bartender helpers	2,605	1,950	2,470	(705)	-27.1%	-29.2%	
Sales, except advertising, insurance, financial, and travel	3,377	2,722	1,404	(679)	-20.1%	-9.1%	
All Others	484,652	462,778	484,100	(549)	-0.1%	-3.7%	

Sources: OES, EMSI, EFA, NEED.

Summary

The data in Section 2b show that, as the pandemic effects on labor markets began to recover from original, low levels after social restrictions in 2020, more jobs were retained in health care and professional services than in leisure and hospitality and retail. So-called essential workers continued to work throughout (typified by HVAC mechanics as in Table 8), but not all these workers were employed consistently across the region beginning in March 2020. As of the end of 2021, the following types of workers and industries were still affected by the pandemic:

- Sales and related;
- Personal care and service;
- Food preparation and serving related.

We now look at the community-level impacts in terms of which communities in the NBEC region have recovered or have moved toward labor-market recovery more quickly.

2c. Community-Level Impacts of the Pandemic

We now consider data (Table 10) that show pandemic-induced shocks across the NBEC region at the community (census-designated place, or CDP) level, where social restrictions concerning both workplace conditions and the ability of consumers to access specific places of business (retail, events, restaurants as examples) varied and influenced subsequent labor-market impacts. We continue to use 2019 as a benchmark. We look at cities throughout the NBEC region, for which we have monthly estimates of the labor force and employment. These data can be connected to a neighborhood analysis, especially in the unincorporated areas of the NBEC region (e.g., Marin City, coastal Sonoma, and Marin Counties).

Table 10: Percent Change in Employment and Labor Force and Unemployment Rates
Places in NBEC Counties, 2011-2020

Place	County	Change: 2011-2019			Change: 2019-2020			Change: 2019-2021		
		Empl	Labor Force	Unem Rate 2019	Empl	Labor Force	Unem Rate 2020	Empl	Labor Force	Unem Rate 2021
Clearlake	Lake	-1.1	-11.8	11.4	-7.1	2.9	19.8	-11.3	-16.2	15.2
Lakeport	Lake	16.0	7.4	3.2	-7.1	-4.3	6.0	-12.1	-13.5	4.6
Lower Lake	Lake	2.9	-18.4	6.0	-6.7	-1.9	11.0	-8.6	-11.4	8.1
Middletown	Lake	-55.2	-60.2	5.4	-6.6	-1.7	9.9	-10.3	-12.7	7.5
Upper Lake	Lake	62.2	39.0	7.8	-6.9	-0.2	14.0	-11.1	-15.2	10.2
Corte Madera	Marin	15.5	14.0	3.5	-10.5	-4.5	9.7	-13.2	-16.4	6.3
Larkspur	Marin	16.2	7.6	1.7	-10.2	-7.3	4.8	-13.8	-15.3	3.3
Mill Valley	Marin	4.6	0.5	1.4	-10.2	-7.7	4.2	-13.6	-14.7	2.7
Novato	Marin	13.1	7.5	2.4	-10.2	-5.7	7.2	-13.5	-15.8	4.6
San Anselmo	Marin	17.6	13.1	2.9	-10.2	-5.3	8.2	-13.9	-16.5	5.4
San Rafael	Marin	7.7	1.7	2.3	-10.1	-5.9	6.8	-13.5	-15.6	4.4
Sausalito	Marin	-8.6	-15.1	1.8	-10.5	-6.9	5.3	-12.6	-14.1	3.6
Fort Bragg	Mendocino	-7.6	-12.8	3.7	-9.1	-4.8	8.1	-14.7	-16.9	5.6
Point Arena	Mendocino	-13.0	-16.6	6.3	-8.8	-1.2	13.5	-13.0	-17.2	9.1
Ukiah	Mendocino	16.6	2.5	5.4	-9.1	-2.6	11.8	-15.7	-18.7	8.5
Willits	Mendocino	-11.7	-16.8	3.7	-9.1	-4.7	8.2	-15.3	-17.6	5.6
American Canyon	Napa	12.5	2.8	3.4	-11.7	-5.0	10.1	-13.0	-15.9	7.2
Calistoga	Napa	9.1	9.2	3.4	-12.4	-5.1	10.2	-13.1	-16.5	6.8
Napa	Napa	12.5	3.9	3.1	-11.5	-5.5	9.4	-13.1	-15.9	6.4
St. Helena	Napa	18.2	13.3	2.2	-11.0	-7.5	6.7	-14.5	-15.3	4.8
Yountville	Napa	0.8	-9.0	3.6	-13.8	-3.0	10.7	-10.7	-14.8	7.0
Benicia	Solano	9.2	3.6	2.8	-8.2	-3.8	7.3	-15.1	-17.0	5.3
Dixon	Solano	13.9	5.8	3.7	-8.1	-2.9	9.1	-15.4	-17.0	7.3
Fairfield	Solano	16.1	7.0	3.7	-8.2	-2.6	9.3	-15.1	-17.0	7.2
Rio Vista	Solano	6.4	-15.4	4.8	-8.7	0.0	11.7	-13.9	-16.3	8.8
Suisun City	Solano	10.2	1.9	3.8	-8.1	-2.1	9.8	-15.3	-16.9	7.8
Vacaville	Solano	13.5	5.6	3.2	-8.2	-3.3	8.2	-15.1	-16.8	6.3
Vallejo	Solano	9.6	-4.2	4.3	-8.2	-1.0	11.3	-15.1	-17.4	8.7
Cloverdale	Sonoma	11.2	3.1	1.4	-9.3	-7.5	4.1	-15.3	-15.6	3.0
Cotati	Sonoma	9.9	-2.2	2.8	-10.1	-4.7	8.1	-14.0	-16.7	5.6
Healdsburg	Sonoma	30.9	21.2	1.8	-9.9	-6.4	5.4	-15.4	-16.9	3.9
Petaluma	Sonoma	16.4	9.6	2.4	-9.6	-5.0	7.3	-15.0	-17.2	4.9
Rohnert Park	Sonoma	18.2	8.6	2.7	-9.6	-3.9	8.6	-15.1	-17.6	5.8
Santa Rosa	Sonoma	17.0	6.6	2.8	-9.7	-4.3	8.3	-14.9	-17.1	5.9
Sebastopol	Sonoma	3.4	-1.2	4.6	-9.5	-1.0	12.7	-15.8	-19.2	9.0
Sonoma	Sonoma	12.6	6.8	4.3	-9.4	-1.9	12.0	-15.1	-17.8	8.5
Windsor	Sonoma	13.0	5.5	2.7	-9.8	-4.9	7.6	-15.1	-16.8	5.6

Sources: EDD, NEED, EFA, EMSI.

2d. Business Openings and Closures, 2019 to 2021

The initial data on business closures are more encouraging than the pessimistic estimates in March–June 2020 would have led us to expect. Table 11 provides an overview of net changes in the number of employers by industry as of the second quarter of 2021 compared with the second quarter of 2019 and 2020 (in which Q2 2019 is the benchmark data, Q2 2020 shows the depth of jobs losses generally in the NBEC counties, and in Q3 2020, employment recovery began). The cells in gray in Table 11 show the reduction versus gains in employers and signal the industries with a potential reduction in the overall volume of hiring, rather than growth.

Table 11: Percent Change in the Number of Employers in Major Industries
NBEC Counties with Bay Area and Statewide Comparisons, Q2 2019 to Q2 2021

Industry	CA	Solano	Sonoma	Lake	Marin	Mendocino	Napa	Contra Costa	Alameda	San Francisco	San Mateo	Sacramento
Transport/Logistics	24.7%	21.2%	12.5%	4.8%	7.8%	2.9%	13.6%	25.3%	27.4%	4.8%	4.4%	42.3%
Utilities	14.4%	9.1%	31.3%	0.0%	100.0%	16.7%	0.0%	36.4%	40.0%	4.8%	25.0%	38.9%
Events and Hotels	12.7%	-6.8%	6.1%	0.0%	3.5%	-6.4%	9.9%	9.5%	10.8%	5.4%	8.3%	7.2%
Education	9.8%	-8.3%	7.2%	-7.7%	11.0%	0.0%	-3.6%	11.5%	6.6%	6.0%	12.3%	11.8%
Real Estate	9.3%	10.5%	-2.2%	2.0%	9.7%	7.9%	15.4%	11.4%	9.1%	2.7%	10.4%	10.4%
Prof Services	8.4%	5.7%	3.8%	3.2%	3.9%	10.0%	3.2%	9.5%	6.9%	5.1%	5.2%	7.0%
Information	7.0%	9.7%	9.0%	-8.3%	5.9%	-5.7%	4.9%	5.1%	3.2%	0.3%	3.7%	2.8%
Construction	6.9%	6.7%	4.0%	0.5%	2.4%	0.7%	3.7%	6.8%	4.9%	2.8%	3.4%	7.5%
Admin and Waste	6.5%	2.6%	2.8%	-3.6%	2.7%	4.6%	-1.1%	5.9%	4.3%	-0.1%	1.9%	9.1%
Totals	5.1%	3.1%	0.3%	-5.7%	2.5%	-1.0%	1.3%	6.2%	3.1%	1.1%	3.0%	6.7%
Healthcare	4.9%	2.4%	-2.9%	-8.1%	6.3%	-5.7%	0.8%	9.4%	1.7%	4.7%	8.7%	6.3%
Finance	3.0%	0.3%	-1.0%	0.0%	1.5%	-3.6%	-6.2%	-3.4%	1.7%	1.2%	3.2%	2.9%
Other Services	2.3%	-0.1%	1.5%	15.1%	-4.3%	-1.5%	-3.6%	2.0%	3.2%	-13.3%	-9.5%	4.9%
Ag	1.8%	-3.5%	3.8%	1.6%	-3.8%	16.7%	4.0%	-4.0%	15.2%	3.8%	1.7%	10.3%
Retail	1.6%	3.5%	-2.0%	-5.2%	-1.8%	-2.0%	-1.6%	-1.4%	0.9%	-4.3%	-1.1%	3.9%
Food Services	1.6%	1.3%	0.0%	-4.9%	-5.1%	-2.5%	-1.2%	0.0%	-0.1%	-3.4%	1.3%	3.7%
Manufacturing	0.9%	3.7%	2.5%	-4.7%	-3.8%	12.4%	6.2%	-0.8%	-0.2%	-1.4%	-3.5%	4.3%
Wholesale	-1.2%	-1.4%	-2.2%	15.0%	2.2%	-4.0%	-11.3%	-0.3%	-2.5%	-8.7%	-2.3%	0.2%

Sources: QCEW, NEED and EFA.

Note: Shaded cells are industries that had fewer businesses reporting payroll taxes in Q2 2021 compared to Q2 2019.

Business closure is a deceptive statistic and, despite the best efforts of data collection agencies, is not measured well or consistently.⁴ The COVID-19 pandemic generated enormous concern about potential business closures due to social restrictions. These concerns led to various relief mechanisms from the federal government: Paycheck Protection Plan (PPP) loans; Economic Injury and Disaster Loans (EIDL); reduced interest rates; and enhanced liquidity through banks and credit unions, all of which attempted to maintain business at the same level as before the pandemic in terms of employment. Temporary business closures are difficult to distinguish from permanent closures in the short run; further, it is possible that the generosity of government policies created temporary closures that otherwise would have been permanent.⁵

⁴ Data on business closures do not come from business closure announcements. Rather, they come from the absence of reports that are regularly submitted for a sufficiently long period. The level of payroll employment is indirect or inferred, rather than reported directly.

⁵ Appendix Tables 8-A and 9-A look at industries in detail and indicate how specific employers reduced their demand for workers.

The industries that gained employment during the pandemic’s largest effects on labor markets may have achieved those gains due to the pandemic, suggesting stability in job growth to 2025. For NBEC-region residents, jobs were lost outside these counties, and NBEC-region residents were displaced from their jobs. Where workers go to work and where NBEC workers come from show that workforce development of regional residents might not necessarily fill regional jobs. Data on workers who remain at home will continue to emerge until 2025; data on commuters and commuting patterns lag by 18-24 months.⁶

Mobility: Where Workers Go to Work in the NBEC Region

The Census Bureau and the Internal Revenue Service (IRS) maintain a joint project called the Longitudinal Employment and Household Dynamics (LEHD) database. These data provide a pre-pandemic baseline on where commuters went to work, including both those that live in the NBEC region and those who live outside it. Table 12 gives evidence of the extent of worker mobility into and out of the NBEC region. Appendix Tables 10-A and 11-A show where NBEC residents went to work outside the region before the pandemic, and Appendix Tables 12-A and 13-A show where workers who live outside the NBEC region but work there come from.⁷ The latest data go through the end of 2019 (data were released in December 2021).

Table 12: Flows of Workers into and out of NBEC Counties

Area	2011		2019	
	Work Outside NBEC	Live Outside NBEC	Work Outside NBEC	Live Outside NBEC
Lake	5,486	1,636	4,097	2,307
Marin	51,686	41,041	57,644	46,778
Mendocino	4,039	3,609	5,511	4,317
Napa	17,054	12,661	19,360	17,241
Solano	88,321	51,019	107,382	59,252
Sonoma	46,531	33,623	51,711	41,005
NBEC	213,117	143,589	245,705	170,900

Sources: U.S. Census Bureau, Longitudinal Employer-Household Dynamics (LEHD), NEED and EFA.
 Note: “Work Outside NBEC” only includes those who live in the NBEC region. “Live Outside NBEC” includes only those who work inside the NBEC region, but live outside it.

These mobility data overall tell three stories:

- The industries hiring in the NBEC region before the pandemic and the number of inbound workers coming to the region for those jobs from outside it;
- The number of residents of the NBEC counties who worked outside the region; and
- The number of NBEC residents who work in the NBEC counties.

⁶ It is possible to detect indications of workers going back to the office in commercial real estate forecasts. Forecasts for 2022 suggest that there will be some flow back to urban centers for daily work and a reduction in the volume of workers working from home. Daily traffic counts and data showing flows of traffic (e.g., the use of rail and bus transport) can also be used as indicators.

⁷ A caveat to the data in Table 12 and Appendix Tables 10-A to 13-A is that the “place of work” is based on where payroll is processed in the United States, which can lead to ambiguous results.

Commuting patterns since 2011 show an increase toward specific counties in the NBEC area: Contra Costa and Sacramento experienced an increase in activity. San Mateo and San Francisco Counties remain important for Marin County residents, and Yolo County is accessed primarily by Solano County residents. These data are reminders to NBEC workforce development professionals of the competition outside these six counties, and watching economic development (new employers, broader economic development initiatives in the NBEC counties and beyond) is critical for understanding how regional labor markets might react to growth outside NBEC versus growth within this region. Shifts in workforce demand and in how workers supply their time might depend on whether workers prefer to be independent contractors or traditional employees of a business or employer.

The “Gig” Economy and the Pandemic’s Effects

The pandemic might create a shift from traditional employment to more independent contract work in California, sometimes called “gig” employment.⁸ Just before the pandemic and the subsequent recession, Assembly Bill 5 (AB 5) in California changed the way in which businesses could employ independent contractors based on how they worked. Because some occupations have more work-from-home or no specific place of work, gig work seems likely to increase in some industries (logistics, specifically last-mile delivery) and decrease in others (leisure and hospitality). In other kinds of personal services (hair salons, nail salons, fitness centers), more workers might shift to being independent contractors to alternate among multiple workplaces. We should not assume that the debate over independent contractors and their work status per AB 5 will disappear, and this type of employment is likely to change to enable workers to have more flexibility. Workforce development organizations and professionals might want to consider training workers about running their own personal finance business as a “soft” skill as part of a training curriculum after 2022.

Preparing workers for regional job opportunities and helping employers finding workers will depend on worker availability. Section 3 provides an overview of worker demographics, vulnerable communities, and how the black, indigenous, and BIPOC communities in the NBEC region fared before and after the pandemic up to the end of 2021.

⁸ See [Independent Contracting in California: An Analysis of Trends and Characteristics Using Tax Data](#) from UC Berkeley’s Labor Center (2022) for more on pre-pandemic trends in the gig economy and [Worker Ownership, COVID-19 and the Future of the Gig Economy](#), from the UCLA Labor Center in October 2020.

3. Worker Demographics, 2019 to 2021

In this section, we consider the demography and geography of workers in the NBEC region, with comparisons to other counties throughout California. The effects on BIPOC communities and vulnerable populations in specific cities and towns in the NBEC region signal where workforce development resources may be most needed to lift up the NBEC region's most adversely affected by both the initial and lingering effects of the pandemic-induced recession. We start by defining and then measuring "vulnerable" places (using census-designated places or CDPs), followed by looking at how local BIPOC communities were affected by the pandemic and subsequent labor-market shocks.⁹

3a. Vulnerable Populations

To explore the pandemic's economic impacts on vulnerable populations, we summarize three items:

- What makes a population "vulnerable"?
- What national data are available on these populations, given that they are more up-to-date than regional data on NBEC counties; and
- What do the regional data on economic impacts indicate about which populations might have longer-term job losses and job search?

Regional workforce development agencies have areas of opportunity for deploying resources to help.

We define a household as "vulnerable" if it has the following characteristics:

- Female head of household; or
- Household has at least one dependent (child under 18 or adult over 65) who is under the age of 65 with no other adults below 65; or
- BIPOC person as the head of household;
- Household income of less than 200% of the federal poverty level in 2012 in adjusted dollars in 2019; or
- At least one person in the household has no health insurance.

By this measure of vulnerability, Solano, Lake, and Mendocino Counties have relatively large vulnerable populations compared to the rest of the NBEC region (Table 13). However, many counties throughout California have larger vulnerable populations. These other counties are in the San Francisco Bay Area, the Central Valley, and Southern California. In the NBEC region, the table

⁹ At the time of this writing, the authors of this report were still waiting for the 2020 Census and the American Community Survey 2020 from the Census Bureau. Those data might provide more background and signals as to which communities and which demographic groups had large effects.

NBEC Workforce and Economic Development 2022

suggests that regional assistance may be more needed in Solano, Lake, and Mendocino Counties (perhaps Napa County as well), rather than Sonoma and Marin Counties (not shown because they are less vulnerable than the NBEC average).

Table 13: Vulnerability, NBEC Counties and Region, Selected Counties in California
Vulnerability Index as Weighted Average of Criteria, 2019

County or Region	BIPOC HH	Female HH	At least 1 Dependent	In Poverty	Uninsured HH	Vulnerable Population
NBEC	21.8%	9.3%	64.3%	3.1%	17.2%	10.9%
Tulare	47.5%	14.8%	74.4%	4.8%	33.3%	28.3%
Los Angeles	55.7%	14.0%	69.5%	4.2%	28.8%	28.1%
Merced	46.9%	12.5%	69.5%	4.2%	31.2%	26.4%
Fresno	47.1%	14.6%	71.7%	4.8%	30.4%	26.2%
Yuba	26.9%	12.4%	67.1%	3.5%	27.1%	17.1%
Alameda	49.0%	11.0%	67.6%	3.4%	17.1%	16.9%
Santa Clara	47.0%	9.4%	71.4%	3.3%	15.8%	15.6%
Madera	27.9%	8.0%	80.1%	2.6%	25.4%	15.3%
Sacramento	34.3%	11.8%	63.8%	3.7%	22.1%	14.9%
Solano	37.8%	11.2%	71.4%	2.7%	15.2%	14.6%
Contra Costa	36.2%	9.7%	65.5%	2.6%	15.2%	13.5%
Lake	19.1%	10.8%	59.9%	2.5%	24.4%	13.2%
Mendocino	19.1%	10.8%	59.9%	2.5%	24.4%	13.2%
San Francisco	43.3%	7.9%	59.6%	3.7%	15.3%	13.1%
Yolo	30.4%	9.1%	72.2%	4.8%	14.2%	13.0%
Kings	24.3%	7.6%	85.6%	2.6%	56.7%	12.7%
Butte	17.8%	11.3%	61.4%	4.7%	23.5%	12.7%
San Mateo	41.0%	8.4%	66.3%	2.6%	13.1%	12.5%
Colusa	19.3%	8.5%	61.6%	3.1%	24.2%	12.2%
Santa Cruz	20.1%	8.4%	69.1%	3.3%	17.4%	12.0%
Napa	18.3%	7.9%	64.1%	5.3%	19.2%	11.1%

Sources: ACS 5-year PUMS, NEED, EFA.

Table 14 shows which jobs were lost or shifted between BIPOC workers and non-BIPOC workers (basically white non-Hispanic) workers between 2011 and 2019. The white non-Hispanic workforce grew by 5.5% whereas the BIPOC workforce grew by 35.9%. To some extent, this change is mirrored in the California economy as a whole, in which the growth rates were 7.5% and 31.7%, respectively.

Table 15 provides estimates of wages for white non-Hispanic workers and BIPOC workers in 2019. Before the pandemic, the averages wage for BIPOC workers was 36% less than that of white workers. As seen in the second row, on average both white and BIPOC workers lost jobs in low-wage occupation categories.

NBEC Workforce and Economic Development 2022

Table 14: Industry Employment by Race, Changes from 2011 Q4 to 2019 Q4,
NBEC Region and California, BIPOC and White

Industry	Absolute Change				Percent Change			
	White Non-Hispanic		BIPOC		White Non-Hispanic		BIPOC	
	NBEC	California	NBEC	California	NBEC	California	NBEC	California
Total	16,221	480,923	73,048	2,545,698	5.5%	7.5%	35.9%	31.7%
Ag and natural resource	288	11,567	-234	12,253	4.5%	9.4%	-2.2%	4.0%
Mining/logging	-22	-5,636	66	-1,254	-6.0%	-36.7%	45.8%	-12.1%
Utilities	-105	-3,690	211	8,444	-4.1%	-6.4%	22.1%	17.4%
Construction	7,440	103,913	10,069	224,513	41.9%	33.9%	92.6%	75.4%
Light manufacturing	3,853	7,750	4,524	400	30.5%	9.4%	41.2%	0.2%
Heavy manufacturing	543	-9,774	1,548	15,655	13.7%	-10.0%	42.4%	10.7%
Advanced manufacturing	235	-13,286	1,520	77,801	3.2%	-4.6%	32.5%	18.5%
Wholesale	-475	-24,434	1,538	54,798	-4.4%	-8.4%	28.3%	15.2%
Retail-stores	-99	-20,292	5,477	104,235	-0.4%	-4.8%	31.6%	17.6%
Retail-no stores	-795	-15,564	737	28,526	-8.7%	-8.2%	9.6%	10.6%
People transport	-230	12,192	659	84,075	-4.6%	9.6%	15.4%	41.8%
Goods transport	166	25,466	692	112,411	15.9%	58.9%	75.9%	132.5%
Information	-493	82,227	76	128,264	-9.6%	24.4%	2.9%	57.9%
Financial activities	-2,085	-12,163	-45	39,547	-22.1%	-4.7%	-0.9%	15.7%
Real estate	340	15,899	1,050	42,526	6.9%	12.5%	39.0%	34.9%
Professional services	-1,546	76,371	871	193,608	-8.0%	12.8%	11.0%	41.3%
Management consulting	253	12,482	721	43,069	7.3%	12.8%	33.1%	35.1%
Admin and waste	2,493	48,554	5,491	181,526	22.3%	15.1%	44.1%	30.5%
Education	293	4,708	4,823	181,576	0.9%	0.7%	48.0%	32.7%
Healthcare	7,593	186,909	22,463	724,176	19.7%	28.7%	69.4%	72.9%
Accommodation and events	963	23,042	2,078	51,894	12.2%	14.3%	44.8%	35.3%
Food services	3,346	91,875	9,418	323,255	12.9%	18.8%	39.1%	41.3%
Other services	-4,879	-94,843	-2,677	-155,844	-29.6%	-30.4%	-22.4%	-31.7%
Govt	-573	-22,357	1,802	70,218	-3.3%	-7.1%	19.4%	20.8%

Sources: U.S. Census Bureau, Quarterly Workforce Indicators (QWI), BLS, NEED, EFA.

A complete list of occupational categories and job loss is given in Appendix Table 14-A. Although this appears slightly less true for BIPOC workers than white workers, wages from lost jobs are only 32.8% lower for BIPOC workers than for white workers; we find that the percentage of jobs lost was significantly greater for BIPOC workers than for white workers, 9.3% rather than 2.6%. Table 16 shows that the shock generally affected BIPOC and non-BIPOC communities working in all industries.

Table 15: NBEC Wages by Race/Ethnicity Change in Average Wages
Between 2019 and 2020

	White NH	BIPOC	% Difference
Avg. Wages in 2019	68,773	43,969	-36.1
Avg. Wages in Lost Jobs in 2020	58,449	39,300	-32.8
% Difference	-15.0	-10.6	

Sources: ACS 1-year PUMS, EFA, NEED.

NBEC Workforce and Economic Development 2022

Table 16: Industry Employment by Race, Changes from 2019 Q4 to 2021 Q1,
NBEC Region and California, BIPOC and White

Industry	Absolute Change				Percent Change			
	White Non-Hispanic		BIPOC		White Non-Hispanic		BIPOC	
	NBEC	California	NBEC	California	NBEC	California	NBEC	California
Total	-39,802	-561,930	-28,031	-765,420	-12.8%	-8.1%	-10.1%	-7.2%
Ag and natural resource	-1,065	-12,115	-2,656	-92,414	-15.8%	-9.0%	-25.0%	-28.9%
Mining/logging	-105	-1,473	-66	-1,257	-30.7%	-15.2%	-31.4%	-13.8%
Utilities	-291	-3,435	-97	-1,679	-11.7%	-6.4%	-8.3%	-3.0%
Construction	-1,746	-18,435	-2,138	-23,675	-6.9%	-4.5%	-10.2%	-4.5%
Light manu	-3,022	-10,028	-2,483	-24,130	-18.4%	-11.1%	-16.0%	-12.4%
Heavy manu	1	-3,844	256	-4,086	0.0%	-4.4%	4.9%	-2.5%
Advanced manu	-133	-12,928	-76	-17,992	-1.8%	-4.7%	-1.2%	-3.6%
Wholesale	-876	-21,366	-574	-33,112	-8.4%	-8.1%	-8.2%	-8.0%
Retail-stores	-482	-7,033	699	-10,009	-2.1%	-1.7%	3.1%	-1.4%
Retail-no storefront	50	1,438	1,060	25,394	0.6%	0.8%	12.6%	8.5%
People transport	-892	-19,870	-656	-29,272	-18.8%	-14.3%	-13.3%	-10.3%
Goods transport	347	31,730	948	95,135	28.7%	46.2%	59.1%	48.2%
Information	-616	-23,455	-441	-17,444	-13.2%	-5.6%	-16.4%	-5.0%
Financial activities	-140	-2,611	168	1,374	-1.9%	-1.1%	3.5%	0.5%
Real estate	-674	-12,410	-623	-14,931	-12.8%	-8.7%	-16.7%	-9.1%
Professional services	-1,092	-31,495	-132	-15,944	-6.2%	-4.7%	-1.5%	-2.4%
Management consulting	-86	-5,514	79	-5,183	-2.3%	-5.0%	2.7%	-3.1%
Admin and waste	-1,920	-25,630	-2,065	-59,349	-14.0%	-6.9%	-11.5%	-7.6%
Education	-4,801	-68,589	-2,003	-40,123	-15.1%	-9.6%	-13.5%	-5.4%
Healthcare	-4,262	-24,389	-2,384	-6,911	-9.2%	-2.9%	-4.3%	-0.4%
Accommodation and events	-3,590	-70,176	-2,825	-92,352	-40.5%	-38.1%	-42.1%	-46.5%
Food services	-9,869	-167,825	-9,540	-325,208	-33.6%	-28.9%	-28.5%	-29.4%
Other services	-2,227	-39,015	-1,843	-67,615	-19.2%	-18.0%	-19.8%	-20.2%
Govt	-2,289	-13,462	-591	-4,623	-13.7%	-4.6%	-5.3%	-1.1%

Sources: QWI, NEED, EFA, data are not seasonally adjusted.

What links labor demand to labor supply levels is the regional labor force. As shown below, the pandemic changed short-term and perhaps some medium-term outcomes in specific industries and occupations. However, the number of workers available for work, how these six counties share residents and workers who commute, and how many residents of NBEC counties work outside the region versus those coming from elsewhere to work define the regional labor supply. Appendix Table 15-A shows the changes in the number of people who live in each county from 2011 to 2019; Appendix Table 16-A shows the number of people seeking work (labor-force participation) and the number of non-farm payroll jobs, enabling comparisons with population levels.

Tables 14 and 16 detailed the incidence of job losses across race/ethnicity by industry. Table 17 gives similar information by occupation. The data in Table 17 are most comparable to those in Table 16, as they estimate job losses in the NBEC region (except Lake and Mendocino Counties) as the pandemic-induced recession began. We emphasize the difference between what people do (occupations) and the types of employers for which workers work (industries). As seen in Table 14, the job losses in Table 17 suggest that white non-Hispanic workers lost more of the

NBEC Workforce and Economic Development 2022

jobs in the region (51.8%). We do not know the extent to which the workers who accounted for the job losses were from within the region or from outside of the region. Although the BIPOC communities make up 43% of the workforce in Marin, Napa, Sonoma, and Solano Counties, that figure indicates that this community accounted for more than 48% of the jobs lost (data on occupational employment by race or ethnicity in Table 17 for Lake and Mendocino Counties are not available at the time of this writing).

Table 17: Share of Job Losses Experienced by BIPOC Workers by Occupation
Marin, Napa, Sonoma, and Solano Counties Only

	Total Employment		Jobs Lost	Share (%) BIPOC	BIPOC Jobs Lost
	2019	2020			
Management	24,000	23,850	-150	25.7%	-72
Business and financial operations	18,900	19,690	790	29.9%	132
Computer and mathematical	5,660	5,590	-70	35.0%	77
Architecture and engineering	6,120	5,310	-810	31.2%	-265
Life, physical, and social science	4,550	4,340	-210	26.2%	-102
Community and social service	7,670	7,780	110	38.4%	515
Legal	1,700	1,270	-430	21.3%	-53
Educational instruction and library	24,640	22,900	-1,740	27.6%	-701
Arts, design, entertainment, sports, and media	3,710	3,380	-330	24.4%	-154
Healthcare practitioners and technical	24,820	26,000	1,180	38.8%	334
Healthcare support	25,370	24,770	-600	54.8%	-553
Protective service	9,600	9,060	-540	42.0%	-399
Food preparation and serving related	45,460	36,510	-8,950	55.1%	-5,268
Building and grounds cleaning and maintenance	14,410	13,280	-1,130	73.6%	-773
Personal care and service	11,330	8,790	-2,540	47.6%	-1,880
Sales and related	46,460	41,650	-4,810	40.6%	-1,945
Office and administrative support	48,450	44,100	-4,350	40.5%	-2,155
Farming, fishing, and forestry	7,760	7,410	-350	86.3%	-276
Construction and extraction	26,810	24,790	-2,020	52.9%	-1,460
Installation, maintenance, and repair	14,890	14,110	-780	41.2%	-190
Production	24,210	21,780	-2,430	55.4%	-1,379
Transportation and material moving	30,590	29,070	-1,520	55.9%	-1,191
Total	427,110	395,430	-31,680	48.2%	-17,758

Sources: ACS 5-year PUMS, OES, EFA and NEED.

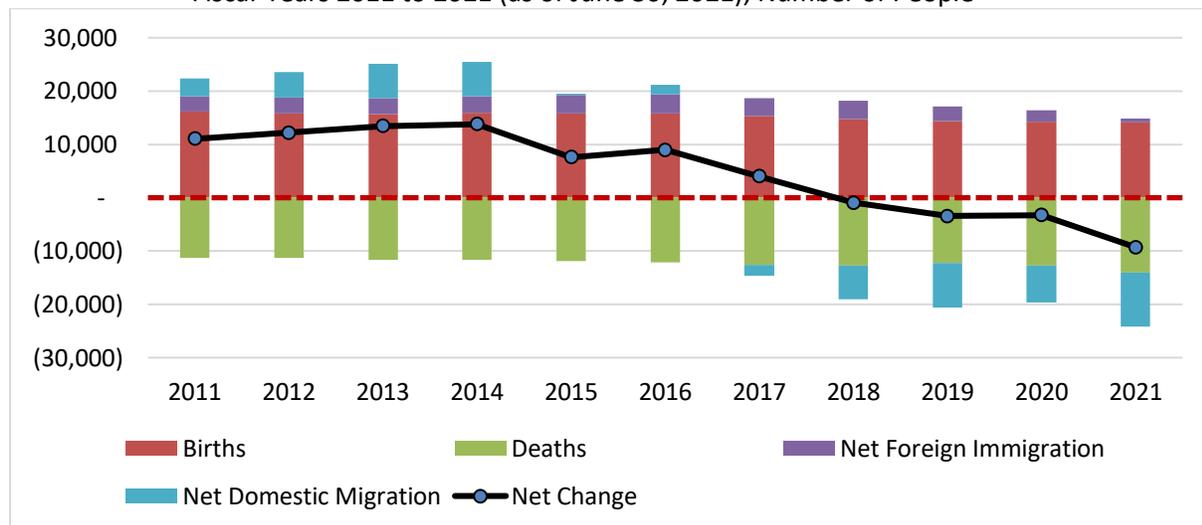
Summary

In the NBEC region, Lake, Mendocino, and Solano Counties are “vulnerable” in terms of having households with females as the prime income earners, more BIPOC households, households with more dependents (and thus less work-time flexibility), and lower-income households. Napa County is slightly more vulnerable than Sonoma and Marin Counties, and its vulnerability is due to having lower-income households; Sonoma and Marin have relatively large numbers of BIPOC households. The employment data show how BIPOC households were affected by the pandemic and the subsequent recession in terms of losing gains made from 2011 to 2019 in the wake of the Great Recession. The data in Table 15 highlight the fact that job losses were generalized; for the NBEC region’s BIPOC communities, job losses might also be structural, in that the industries that shed jobs might not recover the volume they had before the pandemic for years to come.

3b. Population Change, NBEC Region, 2011 to 2021

Mapping population changes to labor-force changes is critical for understanding how forecasts might suggest a changing composition of available workers. Population in the NBEC region grew until 2014. Beginning in 2015, growth slowed, and the population of the NBEC region has declined since 2018 (see Figure 1). The trend toward slower growth was exacerbated by the 2017 fires in Sonoma, Napa, and Mendocino Counties; the fires in Lake County from 2015 to 2020 caused a shift in population, though, as seen below, the NBEC counties gained population until fiscal year 2017-18. Marin County has an aging population and has lost population since 2017; Solano County has consistently experienced population increases, albeit at a slower pace than during the period 2011 to 2016, with a small, estimated loss in 2020-21. Lake County was the only of the six counties estimated to have gained population between July 1, 2020, and June 30, 2021. Appendix Tables 17-A to 19-A show what happened to the BIPOC population from 2011 to the end of 2020 in more detail.

Figure 1: Population Change and Components of Change, NBEC Counties Overall, Fiscal-Years 2011 to 2021 (as of June 30, 2021), Number of People

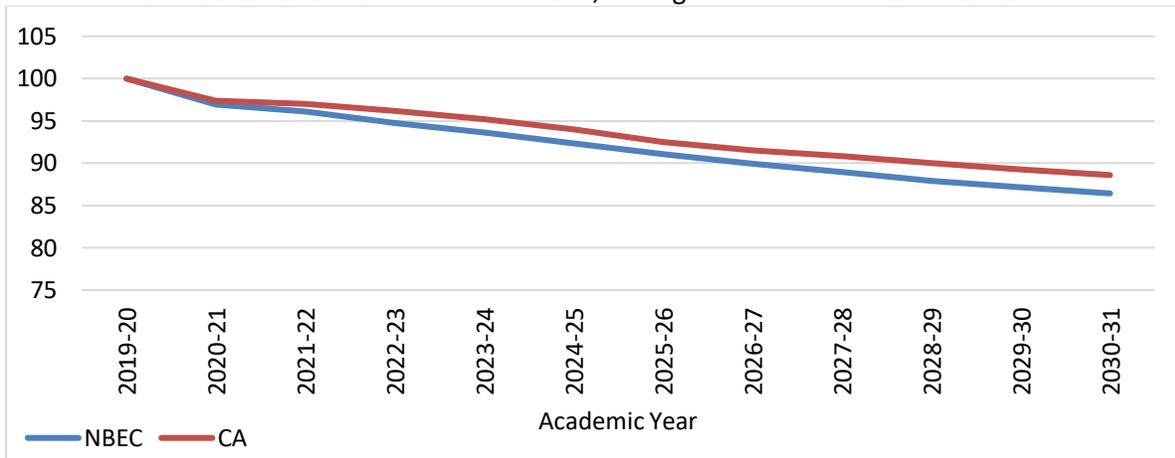


Sources: California Department of Finance and EFA.

These changes affect projected K-12 enrollments. Figure 2 shows a projected decline in school enrollments from 2020-21 in academic year 2030-31 in the NBEC counties and California. Figure 3 shows a decline in the number of high-school graduates.

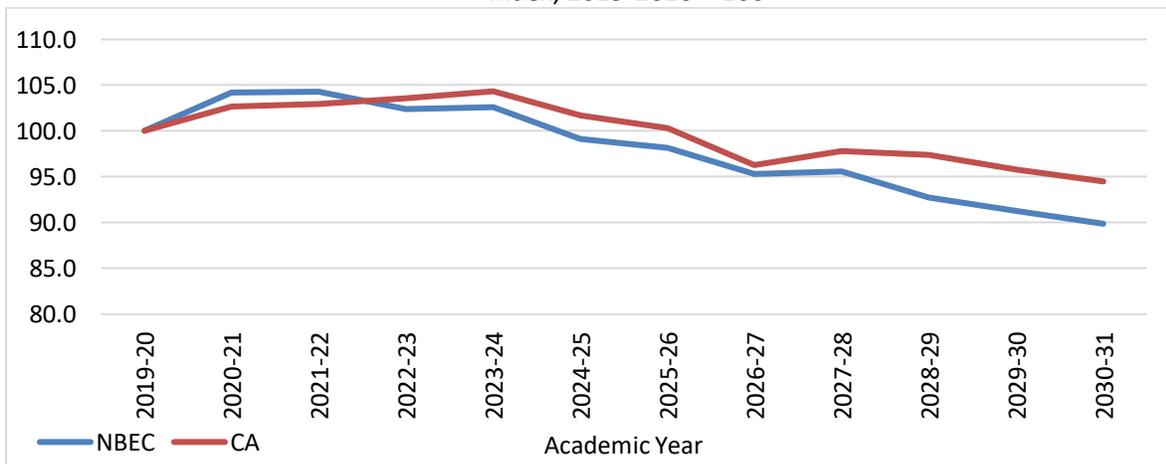
One of the more concerning outcomes in recent demographic studies from the California Department of Finance is the decline in the number of high-school graduates. In general, this decline is due to lower birthrates, an increase in the regional median age throughout California, and migration patterns. The assumptions do not include an increase in the frequency of high-school dropouts.

Figure 2: K-12 Enrollments, Workforce Pipeline Indicator, Index 2019-2020 Academic Year = 100, through Academic Year 2030-2031



Sources: California Department of Education and EFA.

Figure 3: High-School Graduates, NBEC and CA, 2019-2020 Academic Year to 2030-2031 Index, 2019-2020 = 100



Sources: California Department of Education and EFA.

Two themes emerge in Figures 2 and 3:

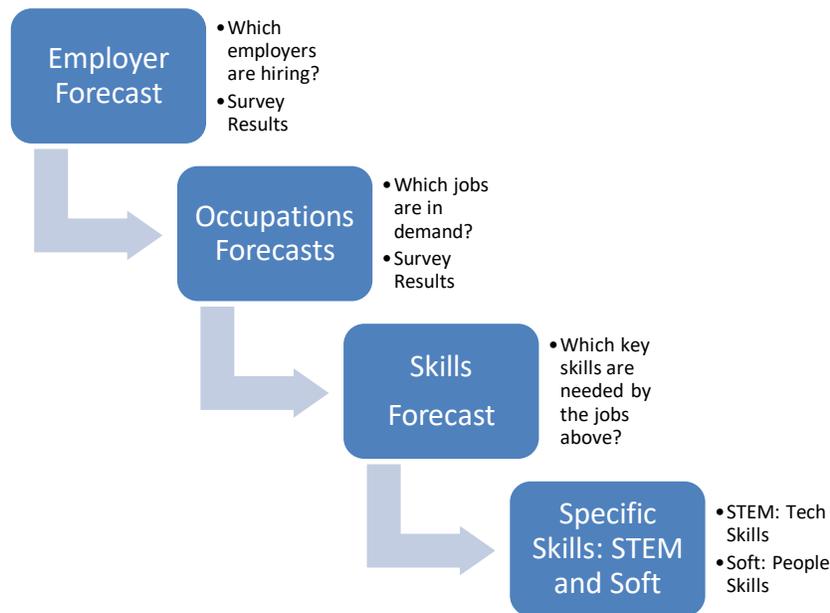
- The NBEC region will have fewer working families through 2030:
 - This implies greater challenges in terms of K–12, and perhaps K–14, enrollment throughout these counties;
- If these forecasts come to pass and employer demand rises in the NBEC counties, these counties’ employers will need to attract workers from outside the region, attempt to persuade local residents who work for an employer outside the NBEC region to work locally, draw workers who are not currently working back into the workforce, or a combination.

Much depends on the forecasts and their accuracy as we approach 2030.

4. Forecasts for the NBEC Region and for Occupations

The forecasts for jobs in these six counties begin with the national and state forecasts. As the data in this section show, the region has generally moved with California’s labor market in terms of total employment and the composition of the labor force. Figure 4 summarizes our methodology for going from industry hiring forecasts to occupational demand forecasts, including science, technology, engineering, and mathematics (STEM) skills and soft skills in demand by employers.

Figure 4: Forecast Flow to Recommendations



Tables 18-20 show the latest forecasts by the California Department of Finance (DOF) for the national and California labor markets (as of March 2022). We also use the DOF’s forecast of industry demand to guide our considerations about where the North Bay economy might be going. From a labor-market perspective, the following data show that these six counties and the state on average have moved in the same direction.

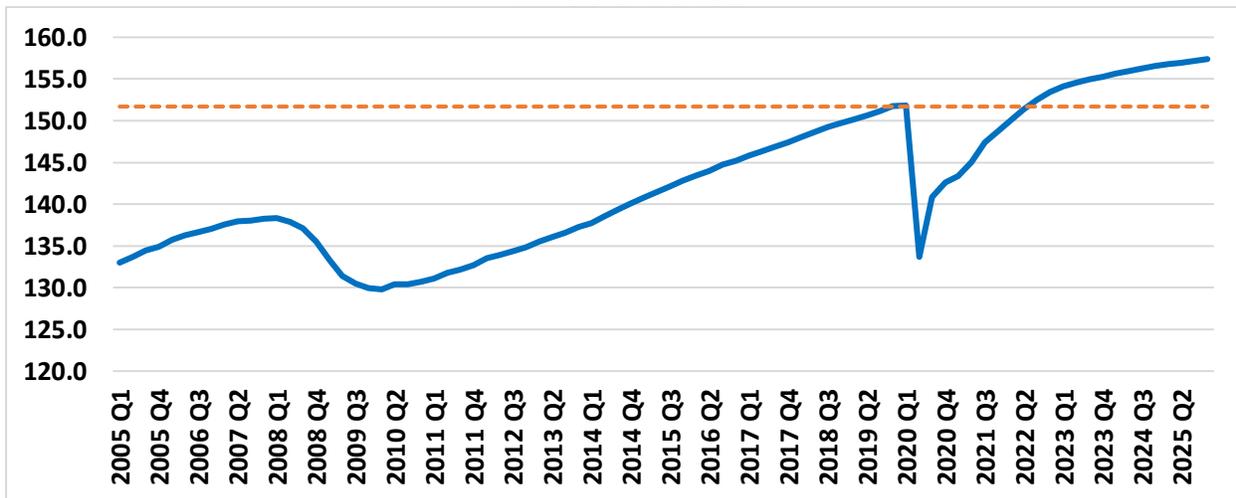
4a. Context Forecasts

National Overview

Forecasts on the US economy generally have the total volume of workers, with jobs recovering the pre-pandemic level by the end of the second quarter of 2022. Figure 5 shows the quarterly changes and forecast for national-level employment from 2005 to 2025.

National forecasts (Table 18) tell us that employment growth is expected to continue up to 2025, but at a slower pace after 2022; labor-force growth (and thus the availability of workers) also slows down up to 2025. The national and state forecasts should both consider that the aggregate number of workers might return, but some industry sectors and specific types of employers might struggle or refrain from rehiring at pre-pandemic levels; such changes create workforce development opportunities.

Figure 5: Quarterly Employment, United States, 2005 Q1 to 2025 Q4 (forecast from 2021 Q4), Millions of Workers



Source: California Department of Finance and EFA.

Note: Dotted line is the pre-pandemic benchmark level.

Table 18: Recent Changes and Forecast
National Labor Force, % Change 2011 to 2025

Timeframe	Labor Force	Employment	Non-Farm Employment
2011-2019	6.5%	12.6%	14.4%
2019-2020	-1.7%	-6.2%	-5.7%
2019-2025	4.1%	4.0%	4.1%

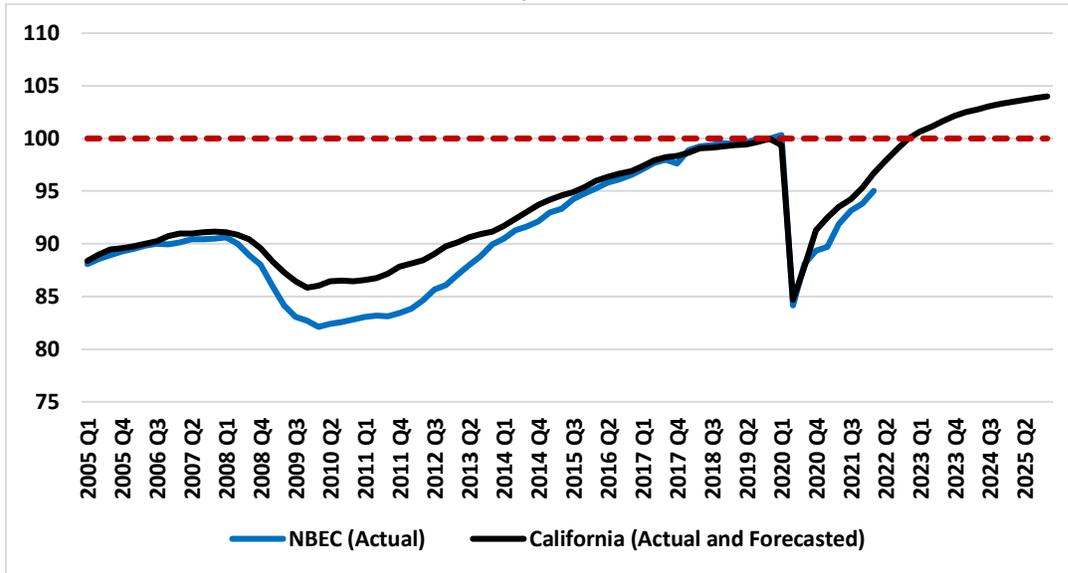
Source: California Department of Finance and EFA.

State Overview

Figure 6 shows that the state of California is following a pattern of job recovery and forecasted growth similar to that of the country, on average (Figure 5) but is likely to recover the total volume of lost jobs in the COVID-19 recession by the end of 2022 (approximately six months later than the country, on average). In Figure 7, wages in California are expected to rise along with the growth of jobs. These data suggest that two items related to regional workforce development should be watched:

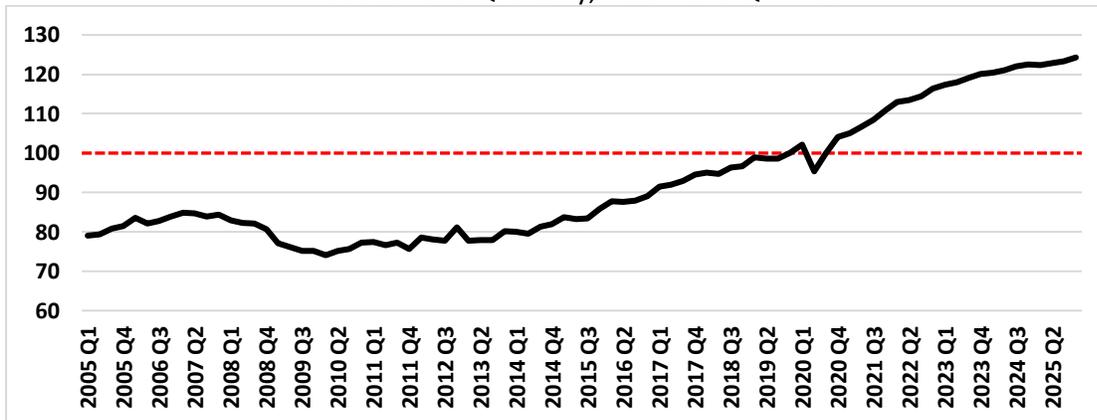
- As wages rise, more workers might be reallocated from industries that remain at lower revenue and hiring levels than before the pandemic, placing more cost pressure on those industries and thus reducing hiring incentives and opportunities; and
- If the cost of labor rises too quickly for regional employers, overall growth in hiring might be lower.

Figure 6: Quarterly Employment, NBEC Region and California, 2005 Q1 to 2025 Q4 (Forecast from 2021 Q4), Index 2019 Q4 = 100, Actual Data to 2022 Q1



Source: California Department of Finance
 Note: Dotted line is the pre-pandemic benchmark level.

Figure 7: Inflation-Adjusted Wages (Real Wages), California Median, 2005 to 2025 Quarterly, Index 2019 Q4 = 100



Source: California Department of Finance.
 Note: Dotted line is the pre-pandemic benchmark level.

The jobs forecast in California suggests that growth in employment in the state is likely to come from industries such as the following, as shown in Table 19:

- Transport and warehousing;
- Professional, scientific, tech services & mgt.;
- Health services;
- Construction;
- Information;
- Leisure and hospitality.

Table 19: Sector-Level Changes, 2011-2019, 2019-2020, 2019-2025
Forecasted for California from 2021 to 2025, % Change

Sector or Variable	2011-19	2019-20	2019-25
Civilian labor force	5.2%	-2.8%	4.2%
Civilian employment	14.4%	-8.9%	4.1%
Civilian unemployment	-63.3%	138.6%	4.9%
Civilian unemployment rate	-65.1%	146.2%	0.6%
Farm employment	8.2%	-3.4%	1.2%
Non-farm payroll employment	20.7%	-6.8%	5.6%
Transport and warehousing	55.5%	4.8%	19.6%
Professional, scientific, tech services & mgt.	26.0%	-2.3%	14.2%
Health services	30.7%	-2.1%	11.7%
Construction	57.7%	-3.1%	10.1%
Information	30.4%	-2.6%	9.4%
Leisure and hospitality	32.6%	-26.5%	5.6%
Other services	17.0%	-15.5%	3.9%
Administrative, waste mgt and remediation	28.6%	-6.7%	3.8%
Educational services	24.4%	-8.1%	3.0%
Government	8.0%	-4.3%	2.2%
Financial activities	10.3%	-2.9%	1.6%
Machinery, computers and transportation	6.9%	-2.8%	0.4%
Wholesale trade and utilities	6.8%	-5.7%	-0.3%
Manufacturing	5.8%	-4.2%	-1.4%
Retail trade	7.3%	-7.5%	-2.4%
Food, textiles and other manufacturing	4.1%	-6.2%	-4.1%
Mining and logging	-15.9%	-11.8%	-12.2%

Sources: California EDD, EFA and NEED.

Note: 2019-2025 covers the pandemic and forecasted recovery period.

4b. Analysis of Skills Needed for the Jobs of the Future

In the prior sections, our report provides an outlook on industry hiring and occupations.¹⁰ Job forecasts are related to hiring demand by industry. Table 20 shows the top 20 occupations forecasted in the NBEC counties up to 2025, based on our analyses above. By aggregating occupational demand, we can obtain an aggregate forecast of the skills in demand. In Section 2d, we showed which industries and occupations have been most heavily affected by the pandemic. We can now identify which skills are most likely to be in demand through 2025 and in which NBEC counties some skills might be sought more than in the others. It is important for our analysis of future skills demand in the region to identify both those whose demand is expected to increase and those for which demand is expected to decline.

¹⁰ A study in 2021 from the Future Skills Centre and the Government of Canada provides a guide to using labor market forecasts to determine skills forecasts. Their study recommended using [O*NET data](https://o*net.org/) on which skills are used most in specific occupations, using what we know about industry and occupational demand. For more, see <https://fsc-ccf.ca/research/how-to-forecast-skills-in-demand-a-primer/>.

NBEC Workforce and Economic Development 2022

Table 20: Top 20 Occupations Growth in NBEC Region and California, 2021-2025,
Growth of Jobs, Skill Level for NBEC Top-20 Occupations

Top 20	NBEC Growth of Jobs	Skills Level	CA Growth of Jobs
Home health and personal care aides	5,625	Middle	177,673
Fast food and counter workers	796	Low	43,976
Maids and housekeeping cleaners	612	Low	27,617
Security guards	603	Low	23,035
Registered nurses	595	High	22,501
Passenger vehicle drivers, except bus drivers, transit and intercity	585	Low	21,941
Construction laborers	563	Low	13,618
Heavy and tractor-trailer truck drivers	557	Middle	13,383
Nursing assistants	449	Middle	12,567
Medical and health services managers	420	High	11,400
General and operations managers	404	High	10,849
Substance abuse, behavioral disorder, and mental health counselors	389	High	10,607
Industrial machinery mechanics	376	Low	10,340
Medical assistants	368	Middle	9,201
Laborers and freight, stock, and material movers, hand	341	Low	8,891
Electricians	323	Low	8,596
Licensed practical and licensed vocational nurses	295	Middle	8,533
Social and human service assistants	286	Low	8,186
Animal caretakers	285	Low	8,076
Software developers and software quality assurance analysts and testers	274	High	7,379

Sources: California EDD, EMSI, EFA and NEED.

In this study, we consider skills in three ways, as shown in Table 21:

- **Low-skill** jobs are defined as those for which just a high-school diploma or equivalency degree (GED, e.g.) is needed and, in some cases, not even a high-school diploma;
- **Middle-skill** jobs are defined as those that require certification or an associate degree beyond a high-school diploma or equivalency to qualify for such a job;
- **High-skill** jobs are those for which a bachelor's or higher degree is needed to qualify;
 - Low, middle, and high skills depend on educational or training levels based on the Standard Occupational Classification (SOC) code information for education/training level;
 - Technical skills are specific to a software package, machine, or other technology that is used to perform a job; and
 - Soft skills are interpersonal or behavioral skills that workers need.

Table 21: Growth of Jobs by Skill Level (Low, Medium, and High),
2021-2025, NBEC Region and CA

Skill Level	New NBEC Jobs 2019 - 2025	New CA Jobs 2019-2025	NBEC % Change 2019-25	CA % Change 2019-25
Low	-34,142	-653,401	-7.6%	-5.3%
Middle	-3,391	-39,168	-4.8%	-1.9%
High	-3,081	181,006	-1.9%	3.3%
Totals	-40,614	-511,563	-5.9%	-2.6%

Sources: California EDD, EMSI, EFA, and NEED.

What National-Level Studies Say about Skills

Before the pandemic, concerns existed over the lack of available skills matching the jobs offered by employers. This was especially true in STEM occupations. Debates over the value of bachelor’s degrees as degree-holding workers try to find work or worker mobility and the use of automation as persistent threats to workforce availability in California were exacerbated by the pandemic. Some key skills mentioned in recent studies are as follows:¹¹

STEM-Related	Soft Skills
Analytical thinking and innovation oriented	Critical thinking
Complex problem solving	Problem solving
Technology design and programming	Self-management
Technology use, monitoring and control	Working in teams

The use and monitoring of technology have been characterized as a precursor to replacement of workers due to greater use of artificial intelligence (AI). In the short term, workers are still needed to act as problem solvers and customer service touch points. This need, then, is connected to STEM skills: a skills gap might give way to a “mastery” gap, in which previous training has been provided, but the worker has not mastered the skills to the point that employers will hire the person. These gaps could be filled through certification or recertification; this is among many *opportunities* for training and educational institutions throughout the NBEC region to become places for regional workers to find STEM-trained workers.

Automation is a consistent and age-old threat to workers, because the replacement of a worker by a machine is a part of technical progress. In particular, the pandemic has:

- Accelerated the automation of tasks (e.g., chatbots);
- Generated more remote work;
- Increased the use and reliance on digital tools for work (e.g., videoconferencing versus in-person meetings);
- Increased the need for upskilling and reskilling to technology use by workers who may not have mastered such tools before.

Further, in some specific industries, these trends in a post-pandemic labor market might result in less job growth or perhaps a reduction in demand based on automation. Larger risks exist in the following industries (in descending order of likelihood):

- Accommodation and food services (hotels, motels, bars, restaurants, event centers)
- Wholesale and retail markets;
- Transportation;
- Education;
- Construction;
- Manufacturing;
- Health care.

¹¹ The Government of Canada released a study (April 2021) that provides an overview on forecasting skills demand from occupational demand (see [How to Forecast Skills in Demand](#) for more). The World Economic Forum released a study in 2020 on the [Future of Work](#), attempting to see past the pandemic.

One workforce development riddle between 2022 and 2025 is what happens to workers who are displaced permanently due to the pandemic and what the most productive way is to transition workers from one industry or occupation to another. We can identify career paths that workers have taken in 2022 after losing jobs in retail or leisure and hospitality:

- Education;
- Financial services;
- Health care;
- Not-for-profits;
- Transportation and logistics.

In both surveys and group interviews, our team asked the respondents on the front lines of workforce development (including workers trying to find jobs at the regional “one-stop” centers) about some of the challenges and opportunities in industry sectors that they foresee from 2022 to 2025.

4c. What We Learned from Industry Interviews: Overview of Results

The data in previous sections of this study suggest that the pandemic and subsequent economic and social decisions may have caused lingering damage in specific industries and occupations.

The EFA held group sessions with regional experts and industry leaders in:

- Health care;
- Leisure and hospitality;
- Construction;
- Agriculture, wine, and cannabis;
- Manufacturing; and
- “Other services.”

Our interviews were open conversations among professionals in these industries and some not-for-profit organizations’ advocates for workers or employees in economic development or K–14 education. The following are thoughts they expressed on industries and workforce development:¹²

Challenges

- Health care:
 - Workers decline to accept positions because they fear for their safety, wages are too low, jobs are too far away from home, and child care remains uncertain;
- Construction:
 - Lack of high-school students interested in construction careers means higher search costs, more time, and an older workforce;
- Leisure and Hospitality:
 - Regionally: the lower number of workers available might slow recovery, as larger events and a higher number of guests are not easily accommodated;

¹² Please see the Appendix for more detailed notes on our group sessions.

- Ag/wine/cannabis:
 - Immigration problems arose due to the pandemic, federal immigration rules, and general workforce migration and movements, which increase search costs for workers and “outsourcing” by local farms to obtain workers;
- Manufacturing:
 - Lack of industrial technologists can lead to lower efficiency in complex manufacturing (including biotech and food and beverage processing), but this training takes 5-7 years;
- Other services and retail:
 - Safety perceptions and low wages have reduced the number of workers available, and shifts to online retail may reduce the workforce in the medium term;
- Education
 - Inability to find instructors, especially in career technical education, para education, and healthcare subfields, and the loss of students overall at the K–12 and community college levels;
- Worker survey results
 - Wages are too low to draw them back to work; North Bay wages need to be in sync with or equal to Bay Area wages elsewhere.

Opportunities

- Health care:
 - Add an associate degree in management as an option for training as a medical assistant (MA), certified nursing assistant (CNA), or home health assistant (HHA) at community college to prep for career advancement to management;
- Construction:
 - STEM training for building information modeling (BIM) and computer-assisted design (CAD) software;
- Leisure and hospitality:
 - Better narrative about career potential and more management training to support that narrative;
- Ag/wine/cannabis:
 - Farmer training on business and land management and perhaps other revenue generators, including carbon capture;
- Manufacturing:
 - Specific types of jobs are needed regionally: computer numerical control (CNC) machinist, welder, quality control, and tap and dye tool setting;
- Other services and retail:
 - Training on conversion of current business to “hybrid” storefront (owner revenue flexibility);
- Education
 - Building education pathways early, especially dual enrollment in high school/community college and work-ready training programs;
- Worker survey results
 - Incentives are needed to encourage going to school for training or a degree; hybrid or flex schedule can help with child care and other personal needs.

Summary

Our group sessions and employer and worker surveys provide more details about the state of the NBEC counties' labor markets in 2022 and perhaps through 2025. Four themes stand out as helping to shape conclusions and recommendations; middle-skill worker needs are discussed in the next subsection in more detail:

- Wages might still be too low to motivate workers to take the jobs currently offered, based on a mixture of the rising cost of living, increasing concerns about child/dependent care, and uncertainty about worker safety;
- Across all occupations and industries, technology-trained workers are needed;
- Finding skilled educators is a general problem in K–14 education across all six counties, with some differences in career technical education (CTE);
- Many of the NBEC region's workforce development partners can partner with one another (especially at the county level) to create student/employee tracks that will fit region needs.

4d. Analysis of Middle-Skill Job Availability in the Future

By definition, middle-skill jobs are those in which workers have a high-school education and some college, covering many kinds of certifications and associate degrees, but have not completed a bachelor's degree. Table 22 shows the pre-pandemic changes in demand for middle-skill jobs from 2011 to 2019, the shock to these jobs (which ones had the most and the fewest losses) in 2020, and the predicted growth or reduction in demand for workers until 2025.¹³ For workforce development, especially at community colleges, demand for middle-skill jobs is critical in planning for future instructor hiring and programs.

National and state forecasts provide context and show that no recessions are currently predicted until 2025. In the NBEC region, forecasted occupations show rising demand for jobs in health care and logistics, as well as some support positions in personal and professional services. STEM and soft skills are also identified, based on how the expansion in overall occupations leads to regional employers to demand specific skills.

¹³ Our team used a mixture of EMSI/Burning Glass data as well as official occupational forecasts that currently exist from California's EDD for California and its counties and workforce development areas (see [EDD OES](#) for more).

Table 22: Top Middle-Skill Positions in the NBEC Area, Forecasted Job Demand, 2021-2025
Wage Range in NBEC Counties Compared to Median Wage in California in 2021

Occupation	New Jobs 2021-25 NBEC	Estimated Jobs 2025 CA	Wage Range 2021 NBEC		Wages 2021 CA
			Min	Max	
Heavy and tractor-trailer truck drivers	557	13,618	\$20.67	\$29.05	\$24.53
Medical assistants	368	8,076	\$30.89	\$38.20	\$19.68
Licensed practical and licensed vocational nurses	295	7,142	\$20.49	\$25.16	\$30.62
Phlebotomists	82	1,782	\$17.88	\$22.74	\$22.89
Veterinary technologists and technicians	67	1,060	\$32.28	\$38.42	\$22.74
Physical therapist assistants	64	1,757	\$34.53	\$42.06	\$36.30
Aircraft mechanics and service technicians	52	899	\$31.41	\$51.31	\$36.79
Firefighters	51	1,847	\$14.66	\$15.83	\$39.75
Hairdressers, hairstylists, and cosmetologists	49	810	\$40.17	\$42.80	\$14.99
Occupational therapy assistants	45	823	\$42.78	\$62.58	\$37.03
Radiologic technologists and technicians	39	1,486	\$40.86	\$52.28	\$45.94
Respiratory therapists	38	1,715	\$29.47	\$42.68	\$42.01
Paralegals and legal assistants	36	2,803	\$26.85	\$33.23	\$30.18
Psychiatric technicians	36	793	\$32.94	\$45.89	\$29.63
Surgical technologists	34	887	\$24.37	\$29.65	\$31.35
Actors	27	1,247	\$31.80	\$37.62	\$23.95
Medical equipment repairers	26	116	\$21.20	\$25.49	\$29.79
Radio, cellular, and tower equip installers and repairers	23	(33)	\$46.80	\$65.38	\$35.49
Diagnostic medical sonographers	20	874	\$20.24	\$39.80	\$51.21
Audio and video technicians	14	1,180	\$28.22	\$38.57	\$29.68
Telecom equip installers and repairers, except line install	12	(1,008)	\$28.49	\$43.63	\$32.89
Electrical repairers, commercial/industrial equipment	10	22	-	-	\$33.42
Radiation therapists	10	111	\$20.67	\$29.05	\$60.73

Sources: California EDD, EMSI, EFA and NEED.

Note: Data in parentheses indicate a loss of jobs.

5. Conclusions and Recommendations

The COVID-19 pandemic has affected labor markets in the NBEC counties and communities. The medium-term effects on workers seeking jobs and employers seeking workers create workforce development challenges in the six NBEC counties across most industries and occupations. Workforce development (including for regional educators) and employers must work together to reduce job search time and costs for employers and workers to place workers more quickly and enable greater social mobility, especially for middle-skill workers.

The trends before the pandemic created opportunities for our BIPOC communities and general economic recovery and expansion after the Great Recession (2008-10). As the BIPOC population the NBEC counties increased, the proportion of workers in that population grew. This growth occurred not only in lower-wage, personal services industries and jobs but in almost all industries and all NBEC counties, following statewide trends from 2011 to 2019. However, since 2020 these BIPOC communities experienced more job loss than white non-Hispanic workers.

The data and findings in this study suggest that lower-wage, low-skill jobs, for which entry is easy, are still adversely affected by the pandemic’s impact on labor markets, creating challenges for the communities in the NBEC. Wages have increased in most industry sectors since 2019.

The price of housing has also increased, including for rent. Jobs shifted away from leisure and hospitality to transportation and warehousing. Vulnerable communities in the NBEC counties remain susceptible to ongoing and relatively high poverty rates, households in which a female is the main income earner, and households with relatively low-income levels. The return to pre-pandemic levels of employment among vulnerable communities was more rapid in Lake and Solano Counties than in Marin, Sonoma and Napa Counties. Data on Mendocino County's rural and coastal communities suggest they remain vulnerable to lingering job losses and a lack of economic opportunities.

Commuting patterns and the movement of workers both to and from NBEC communities from outside remain to be seen. From 2011 to 2019, the NBEC counties exported more workers than imported, suggesting that regional employers may have some dependence on workers outside these six counties who are willing to commute to the NBEC region for slightly higher wages. The population forecasts for the NBEC counties suggest that the total number of residents and high-school graduates will fall until 2030. These forecasted changes create pressure on regional employers in attracting regional workers.

The literature on skills, occupations, and employment in the wake of the pandemic suggest that more training in STEM and soft skills for new and continuing workers is needed through the 2020s. Soft skills, such as problem solving and critical thinking as well as time and project management, are highlighted in forecasts until 2025. With respect to STEM skills, workers in industries from construction to health care, government, and computer systems design all need greater fluency in software and technology. Although some jobs will be replaced by technology, the need for workers to interact with machines or computer systems design is ongoing; continuing training is also needed in classic STEM jobs (e.g., primary coders or programmers). Employment growth in the NBEC counties is predicted until 2025, such that the number of residents working and the amount of overall employment are greater than before the pandemic; our recommendations below suggest how the NBEC's workforce development organizations can help shape worker preparation for jobs that provide both more social mobility and more skilled workers through the remainder of the 2020s for employers in the NBEC region.

Recommendations

Our forecasts, surveys, and interviews concerning employment and occupational demand imply employer demand for skills and specific workers to support a workforce that is "occupation ready." Our recommendations are divided into two parts: (1) general recommendations on how to approach workforce development until 2025; and (2) specific recommendations on the middle-skill occupations, STEM skills, and soft skills most likely to be in demand until 2025, including the top occupations in demand by the NBEC county.

General Recommendations

1. Workforce development needs to do better marketing about careers and training at regional high schools;
 - a. Having fewer high-school graduates means more regional competition for those workers;
2. Yolo, Sacramento, Contra Costa, Alameda, San Francisco, and San Mateo Counties need to be monitored closely in terms of new employers, wages, and occupational demand;
 - a. These counties act as competitors to both NBEC residents and their own residents who might help fill gaps for NBEC employers across lower- and middle-skill jobs;
3. Workforce development efforts among Lake, Napa, Mendocino, and Sonoma Counties need to be combined more;
 - a. These counties all employ Lake and Mendocino residents, which can create shortages in those counties if wages and opportunities in Napa and Sonoma Counties rise more quickly, if commuting workers travel from the north to the south;
4. Greater focus is needed on partnerships with employers that offer more middle-skill positions than others;
 - a. Healthcare subfields (HHA, MA, PA, CNA, etc.);
 - b. Para education (to assist at high schools and training programs);
 - c. Construction;
 - d. Manufacturing;
 - e. Agriculture and climate-change science through land management;
5. Apprenticeships for students **and** faculty need to be expanded and funded;
 - a. Funding is needed for students to be trained as apprentices and for externships for potential faculty as a way to build bench strength in training programs;
6. Training programs should add management training, rather than customer service training;
 - a. This helps to build careers in customer-facing fields and provides national brands with local talent;
 - b. It also recognizes that, given shifts due to the COVID-19 pandemic, management workers are more likely to be in demand than front-line workers to 2025 and beyond;
7. Resources should be used to provide increases in instructor compensation over a ten-year period;
 - a. One-time funding should be considered a quasi-endowment where possible to help finance more instructors;
8. Technology (STEM) training is needed across all jobs;
 - a. STEM needs should be matched to all training programs, as feasible using online instruction;
 - b. Regional employers should be asked about their software and other needs;
9. As an incentive to attract and retain trained workers, child care needs to be funded for those in training programs;
 - a. The lack of childcare has been identified as a major cost factor in decisions;
 - b. Anticipated legislation might not treat all counties in NBEC region equally.

Table 23: Specific Recommended Middle-Skill Jobs Focus
STEM Skills, and Soft Skills, Regional Programs as Opportunities

Middle-Skill Occupations across NBEC Counties	Median Wage NBEC 2021	Median Wage CA 2021	STEM Skills	Soft Skills
Heavy and tractor-trailer truck drivers	\$28.40	\$24.80	Spreadsheet software	Critical thinking
Medical assistants	\$26.00	\$19.80	Electronic mail software	Monitoring
Licensed practical and licensed vocational nurses	\$37.20	\$31.20	Word processing software	Reading comprehension
Phlebotomists	\$25.30	\$23.00	Database user interface and query software	Speaking
Veterinary technologists and techs	\$23.20	\$23.20	Operating system software	Time management
Physical therapist assistants	\$38.60	\$36.40	Medical software	Active listening
Aircraft mechanics and service technicians	\$42.70	\$37.30	MS Office suite software	Social perceptiveness
Firefighters	\$51.50	\$39.90	Internet browser software	Complex problem solving
Hairdressers, hairstylists, and cosmetologists	\$15.60	\$15.10	Presentation software	Judgment and decision making
Occupational therapy assistants	\$43.00	\$37.20	Calendar and scheduling software	Coordination
Radiologic technologists and technicians	\$53.50	\$46.80	Accounting software	Operations monitoring
Respiratory therapists	\$44.30	\$42.80	Medical software	Writing
Paralegals and legal assistants	\$36.70	\$30.60	Database software	Service orientation
Psychiatric technicians	\$30.20	\$30.20	Medical software	Instructing
Surgical technologists	\$35.30	\$31.60	Medical software	Service orientation

Source: OES, EFA, NEED.

Occupations for Which Training Is Needed, Forecast (Emphasis on Middle-Skills):

- Lake
 - Software developers and software quality assurance analysts; nurse practitioners; food preparation and serving related workers; animal caretakers; weighers, measurers, checkers, and samplers, recordkeeping
- Marin
 - Home health and personal care aides; childcare workers; chemical equipment operators and tenders; animal caretakers; medical assistants;
- Mendocino
 - Septic tank servicers and sewer pipe cleaners; structural metal fabricators and fitters; machinists; teaching assistants, postsecondary; nurse practitioners;
- Napa
 - Ambulance drivers and attendants, except emergency medical technicians (EMTs); coating, painting, and spraying machine setters, operators, and tenders; computer network support specialists; radiation therapists; interpreters and translators;
- Solano
 - Chemical plant and system operators; pressing and compacting machine setters; pourers and casters, metal; security and fire alarm systems installers; woodworking machine setters, operators, and tenders, except sawing;
- Sonoma
 - Ophthalmic medical technicians; chemical equipment operators and tenders; tool and die makers; chemical plant and system operators; ambulance drivers and attendants, except emergency medical technicians.

References

- Bureau of Labor Statistics (BLS) (2022) "Occupational and Wage Survey (OEWS)," accessed at <http://www.bls.gov/oes>
- Bureau of the Census, American Community Survey (ACS), various years, both the Summary File and Public Use Microdata (PUMS) datafiles, accessed at <https://www.census.gov/programs-surveys/acs/>
- Bureau of the Census, Longitudinal Employer-Household Dynamics, accessed at <https://lehd.ces.census.gov>
- Bureau of the Census, Quarterly Workforce Indicators (QWI), accessed at <https://www.census.gov/data/developers/data-sets/qwi.html>
- California Department of Finance (2022) "Demographics" accessed at <https://dof.ca.gov/Forecasting/Demographics/>
- California Department of Finance (2022) "Inflation Forecasts," accessed at https://www.dof.ca.gov/Forecasting/Economics/Eco_Forecasts_Us_Ca/
- EMSI/Burning Glass (2022) "Industry and Occupational Data and Forecasts," accessed at <http://www.economicmodeling.com> courtesy of Workforce Alliance of the North Bay.
- Government of Canada (2021) "How to Forecast Skills in Demand: A Primer," Accessed at <https://fsc-ccf.ca/research/how-to-forecast-skills-in-demand-a-primer/> (April 2021)
- UC Berkeley Labor Center (2022) "Independent Contracting in California: An Analysis of Trends and Characteristics Using Tax Data," released March 1, 2022 - Annette Bernhardt Sarah Thomason Chris Campos Allen Prohofsky Aparna Ramesh and Jesse Rothstein, accessed at <https://laborcenter.berkeley.edu/wp-content/uploads/2022/03/Independent-Contracting-in-CA.pdf>
- UCLA Labor Center (2020) "Worker Ownership, COVID-19, and the Future of the Gig Economy," released October 2020, accessed at https://www.labor.ucla.edu/wp-content/uploads/2020/10/UCLA_coop_report_Final-1.pdf
- World Economic Forum (2020) "The Future of Work," accessed at <https://www.weforum.org/reports/the-future-of-jobs-report-2020> (October 2020)
- Zillow™ Research "Housing Data," accessed at <https://www.zillow.com/research/data/>

Appendix

Details from Interviews with Industry Leaders, January to March 2022

Healthcare

There are reasons workers do not accept or pursue jobs in healthcare, including:

- Workers continue to have a lot of fear surrounding pandemic;
- Lack of support services available at work, including mental health;
- Work-life balance not stable: some workers are quitting to reduce commute;
- Such choices included looking for jobs that are 100% remote or close to where worker lives;
- There are union environments: pay raise to retain and attract may not be enough;

There is a need to communicate about career paths and communications early, as longer-term challenges exist for retention:

- Medical Assistant (MA, Certified Nursing Assistant (CNA), Home Health Aide (HHA) path to data analytics jobs;
- Management and supervision as a next step from MA, CNA, HHA positions
 - Soft-skills training needed for management (how to deal with employees versus patients and transfer of skills);
 - Possibility of combining an associate's degree in management with MA, CNA, HHA training.

Construction

Our group and survey results suggest the following takeaways:

- Residential work in Marin County continued through the major pandemic period;
- Heavy (infrastructure) construction doing well in 2022, more coming through 2025;
- Large amount of wage competition and worker "cherry-picking" regionally;
- Workers are coming from lost hospitality and retail jobs;
- Child care is a big issue for workers regionally (Mendocino and Lake counties' residents);
- Lack of high-school students coming out a larger concern to 2025 and beyond;
- Commercial real estate work may not come back as before pandemic;
- Cost of construction rising based on wages rising to attract workers.

Construction: Challenges and **Opportunities**

- Challenge: Manager/foreman shortages, but workers need experience in trades (3-5 years);
 - **Opportunity:** soft skills and project management/foreman training;
- STEM **Opportunity:** training in computer-assisted design (CAD) and building information modeling (BIM)
- **Opportunity:** better communications about programs and need to change narrative:
 - Compare and contrasting career tracks: college is not the path for all students.

Leisure and Hospitality

Perhaps one of the industries to experience long-term effects on workforce demand and development is leisure and hospitality.

Effects of the Pandemic on Workforce and Tourism:

- Independently-owned hotel properties have seen larger impact than global brands;
- Some markets are more outdoor-visitor and camping,
- Leisure travel back as of 2022, intra-week corporate travel (biotech and military) back, but other corporate travel is still lower;
 - Vacaville can have a niche in biotech and may be an **opportunity** (including the scientists and medical professionals)
- Events in smaller meeting and celebration spaces have demand, not large gatherings;
- Lack of staffing leads to inability to aggressively market events.

Challenges and Opportunities

- Challenge: career training generally available and utilized, as it is low cost and flexible;
 - **Opportunity:** marketing careers as fun and being outside (lifestyle VERY GOOD), need to advertise better to potential workers;
- **Opportunity:** entry-level (housekeeping, as an example) needed;
 - Challenges: worker perception of worker safety, no training needed, wage levels
- **Opportunity** (perhaps for BIPOC): middle- to upper-level management training;
 - Challenge: do larger, corporate properties hire managers without bachelor's degrees?
- Challenge: Difficult to provide an incentive to take training when so many jobs available;
- **Opportunity:** ESL for restaurant workers and training from "back of house" to "front of house";
 - Bump in pay and availability of tips also by moving to front of house;
- **Opportunity:** Chefs and Sous Chefs, concern is where to live (especially in Mendocino and Lake counties), and if demand will be there by 2025 for further training beyond safety training?

Structural Concerns and Changes:

- VRBO and Airbnb may be a strategic threat to classic hospitality;
- Broadband and water are constraints to remote work and industry growth;
- Cost of living a major issue for attracting and retaining talent;
- Hotels are getting more creative about retention: staggered shifts, e.g.;
- Owners see profit, managers are struggling to provide service.

Agriculture/Wine/Cannabis

Lake, Mendocino, Sonoma, Napa have defined wine industries that are a large and rising part of labor demand throughout the NBEC region, where Solano and Marin have agricultural diversity without as much land use in vineyards. The future of cannabis and labor-market effects were an important part of our discussion with this group.

Costs of doing business for farmers and the pandemic:

- Challenge: Regulatory change and costs;
 - New wage and hour rules: change in overtime rules (not providing overtime);
- Housing requirement for farmers: imported labor need housing;
 - Marin workforce is year-round: housing a big issue;
- Cannot easily do remote work in agriculture;
- Most young farmers and ranchers (perhaps tied to family properties) have two jobs;
- Three tiers of farms (small farms, multi-generational family farms that are medium size, and then the corporate farms), three sets of challenges and opportunities;
 - Labor may be 70% of overhead in pears;
 - Basically 100% contract workers due to worker shortage;
 - Labor is leaving for cannabis: all cash;
- Wage competition very difficult: supply is so short and cannabis adds to competition.

Structural Concerns to 2025

- Drought, climate change and housing: all headwinds for farming;
 - Dairy and meat processing challenged: (organic milk over supply, e.g.);
- There are now three, mobile-meat processors above Golden Gate Bridge;
 - Mobile coop coming soon to Mendocino (maybe northern Sonoma) County;
- Marketing shift coming away from food to carbon capture;
 - Assembly Bill (AB) 125: shifting toward more “climate-friendly” agriculture;
- **Opportunity:** BIPOC shift to ownership (training need here on managing change or a farm) = farmer training center needed?
 - Farm worker training is available statewide, but little of it in NBEC region;
 - Training is primarily for compliance;
- Plant-based movement: need more education about how “good” this really is.

Other Issues:

- Immigration rules and pandemic = reduced workforce;
- Shifts in crops and mix (Pears in Mendocino as an example);
 - Lack of infrastructure to process and transport for fruit generally;
 - Geography lends to only specific crops without major shift in infrastructure;
- These specialize in farmer trainings in growing vegetables, fruit, and nursery stock;
- **Opportunity** for training: viticulture, dairy, ranching, and vegetables;
- Community college farms for training: local farmers and service learning there is good;
- Also need to recognize global source and a need to be competitive.

Manufacturing

What are difficult jobs or classifications to hire and retain?

- “Touch” labor: machinists, welders, quality assessment and control (Quality Assessment);
 - **Opportunity:** start low, get to a really good wage (\$30/hr. or more);
 - **Opportunity:** struggle to find workers, wage acceleration (supply chain long and wide, 25-30 employees is the typical firm);
- Instructors at colleges are in shortage also, alongside of students;
 - Heavy lift for instruction, especially with capital to train, more students in pipeline;
 - Computer numerical control (CNC) machine: basically, running a small manufacturing factory when community colleges have these machines;
- Struggle to attract workers: re-launch Manufacturing, tech alliance (50 manufacturers in this group), this may be where the info flow will come.

What are difficult jobs or classifications to hire and retain in manufacturing?

- Process manufacturing: high tech and safety, cleaning;
 - **Training opportunity here;**
- Industrial technician: average age rising in the North Bay;
 - **Training opportunity here;**
 - Long time involved to get these industrial technician positions, perhaps 5-7 years;
- **Opportunity:** provide students more information about breadth and depth of manufacturing jobs and careers.

Jobs in Need of more Training and in Shortage in North Bay:

- Industrial technologists: over \$100,000 possible after seven (7) years
 - Training programs on the job = earn and learn is available
 - Need to get info out to younger people to get into this work
- Key job shortages: computer numeric control (CNC) machinist, welder, Quality Control (QC) inspectors, tap and dye tool setting;
- Demographic change coming, and there is dependence on one or two people in each business;
- Aerospace: anti-ballistic missile components and optics for those weapons still thriving in NBEC counties, specifically Sonoma County;
 - Supply chain for defense doing very well;
 - Original equipment manufacturer (examples are General Dynamics and Lockheed-Martin both of which are in Sonoma County and around Travis AFB in Solano): more volatile in pandemic’s wake;
- Mendocino County: employers struggling to attract due to housing and schools (family not a fit for the location) = Metal FX (supply chain for ventilators);
 - “WobTech” in Willits = Lockheed company, leaders in railway tech.

Other Services, Including Retail

General Issues with Retail:

- Retailers: catering to group of customers that want brick and mortar (downtown specific);
 - Shop local campaigns may be working;
- Training to convert/pivot to digital (storefront and e-commerce) for store owners;
- Pop-up marketplaces: platform to display e-commerce (lack of traffic);
 - Destination retail versus malls: more experience for the consumer than just simply consumption only;
- Restoration Hardware (large property and experience as example of where retail may be going): very specific to Marin County and maybe downtown Napa or St. Helena.

Skills Issues

- Worker perspectives: shift to new industry means better salaries, benefits and getting away from retail, personal services;
 - Construction is where workers go: corroborates what we heard in previous groups;
 - Help-wanted signs are everywhere;
- Skills needed: customer services, social media and design (training **opportunity**)
 - Additional skill sets: personal interaction, situation and people management (training **opportunity**)
- Education does not promote customer service as a “career” path: is this possible?
 - Retail skills linked from starting jobs to potential career (few retailers do this training);
- Social mobility and paths as part of workforce development;
- Repair skills: in the trades/repair (manufacturing and technology);
 - Training **opportunity**, but some structural issues with shop availability and teachers;
- Point of Sale (POS) systems and inventory:
 - BIPOC **opportunity** here (including management training);
- Other services: “at home” services happening, likely a legal violation in many ways;
 - Women in the workforce a key issue (training **opportunity**);
 - Not all immigrants are undocumented (need to connect more here);
- Lack of transportation, child care, language access (need training to be in Spanish and other languages, but also need ESL in workplace training);
- “Rightsizing” in these industries: not going back to pre-pandemic levels.

Education/Workforce Development

- Considering how to mount programs, and coming issues in terms of instructor availability;
 - Tenure rules make it hard to be flexible on hiring or scheduling;
 - Career Technical Education (CTE) structure: needs to change;
 - Dual enrollment could help;
 - May not be as fragmented as believed: varies across counties in terms of coordination;
 - Solano County may be easier to coordinated;
 - No pushback in Solano County on CTE and coordination;
 - Flexibility needed: Napa has a logistics program, welding that are time-intensive;
 - Night and weekends also available: where to find instructors?
- **Does state-level funding or structure or systems need to be in place to help?**
 - Difficult in HS, better at Community Colleges;
 - Most CTE jobs are about CC work after HS;
- Considering how to mount programs, and coming issues in terms of instructor availability;
 - Challenge: Nursing (across all nursing assistants also) instructor shortages;
- Napa County: wages rising in hospitality, internships and career ladders there (soft skills as a catalyst); lack of labor available;
 - Coming retirements wave, especially in local and state government, coming;
- Mendocino County: smaller high-school settings, collaboration more difficult;
- Disabled students also a challenge to fit middle-skills occupations;
 - **Opportunity:** reduce quals for HS and CC instructors to expand the set;
- Partnership with Community Colleges and K-12;
 - Lake County: both CC have been proactive to make the connection of HS and CC (dual enrollment): K-12 workforce (Strong Workforce);
 - Mentoring piece within industry important = Lake County Chamber (leadership role in job shadowing and mentorship);
- Challenges to address:
 - Para-educators (special educators) shortage;
 - Substitute teachers (rising demand due to COVID), pathway from sub to para-educator to full-blown career: **opportunity** here;
 - Transportation/bus drivers to connect remote places;
 - CTE instructor and student shortages: general issue;
 - Dropout rates rising;
 - Education pathways: 9-12 grade to credential (Marin County);
 - Woodland Community College has Sacramento State University partnership;
 - Lake County Ag as CTE pathways for teachers
 - May need a different model: hybrid model may help?
 - Digital divide and rural areas: may be federal and state partners here.

Detailed Data

This section of the Appendix expands the details and provides more background information in terms of past growth, population change, and commute patterns.

Table 1-A: Industry Employment Demand
NBEC Counties (Total Jobs and % Change) and California
% Change, 2011 to 2019, Quarter 4

Occupation	NBEC			California
	Employment		Change	Change
	2011	2019	2011-2019	2011-2019
Healthcare	65,104	95,718	47.0%	61.0%
Retail	66,478	71,606	7.7%	7.6%
Food Services and Drinking Places	52,753	66,078	25.3%	32.5%
Manufacturing	44,491	57,843	30.0%	6.7%
Construction	26,785	43,937	64.0%	57.9%
Prof Serv	28,091	25,628	-8.8%	24.8%
Admin and Waste Services	22,719	30,017	32.1%	27.1%
Other Personal Services	24,187	20,466	-15.4%	-28.0%
Wholesale	15,519	16,965	9.3%	5.2%
Finance	15,423	13,332	-13.6%	3.5%
Transport/Logistics	10,729	9,644	-10.1%	63.1%
Events and Accommodations	9,332	10,991	17.8%	36.1%
Education (Private)	8,371	10,078	20.4%	15.0%
Real Estate	7,886	9,591	21.6%	24.6%
Information	7,401	6,865	-7.2%	29.5%
Management Consulting	5,164	6,819	32.0%	27.0%
Utilities	1,854	1,852	-0.1%	0.1%
Mining/natural Resources	450	738	64.2%	-24.9%
Total	429,659	507,813	18.20%	22.3%

Sources: BLS, QCEW, EMSI, EFA, NEED.

These data are the official, final data versus the monthly estimates.

NBEC Workforce and Economic Development 2022

Table 2-A: Household incomes, Housing Costs, and Housing Burden, NBEC Places, 2019

Place	County	Median	Median	Median Owners	Home Ownership Rates			Housing Burden	
		HH Income	Rent	Housing Costs	All	White	BIPOC	Renters	Owners
Clearlake	Lake	36,339	703	861	55.2	57.9	48.8	46.8	51.7
Lakeport	Lake	49,908	688	876	67.0	72.6	41.3	18.5	22.5
Lower Lake	Lake	33,545	1,099	895	69.7	89.8	0.0	59.1	93.7
Middletown	Lake	144,696	1,650	N/A	38.2	35.5	100.0	0.0	25.4
Upper Lake	Lake	89,083	N/A	1,618	84.5	86.1	77.5	10.8	54.9
Belvedere	Marin	247,768	3,177	4,001	79.9	79.0	89.3	30.8	33.5
Corte Madera	Marin	153,101	2,642	3,113	67.7	70.2	50.4	37.5	44.0
Fairfax town	Marin	106,474	1,792	2,146	59.7	62.5	43.2	39.3	48.2
Larkspur	Marin	115,543	2,191	2,445	48.5	51.4	34.1	33.8	46.7
Marin City	Marin	54,150	1,796	2,098	31.4	55.0	15.9	51.7	60.8
Mill Valley	Marin	170,946	2,570	3,167	65.9	66.7	58.8	37.1	40.4
Novato	Marin	101,629	1,877	2,234	69.9	76.1	51.7	42.1	53.7
Ross	Marin	138,641	2,721	2,880	86.3	89.1	76.3	41.6	48.4
San Anselmo	Marin	146,179	1,911	2,901	66.0	68.3	51.6	31.2	51.5
San Rafael	Marin	97,009	1,955	2,261	49.4	59.2	25.7	37.7	52.7
Sausalito	Marin	120,920	2,651	2,701	56.2	56.8	52.9	53.6	31.1
Tiburon	Marin	178,125	2,434	3,258	70.0	72.2	60.5	41.8	38.2
Fort Bragg	Mendocino	41,917	897	1,122	37.1	38.5	33.5	43.3	62.7
Point Arena	Mendocino	48,750	619	956	48.2	47.8	49.1	71.1	41.9
Ukiah	Mendocino	55,177	1,060	1,220	49.2	53.6	39.6	41.8	60.1
Willits	Mendocino	33,007	815	915	33.3	41.2	11.9	51.9	59.4
American Canyon	Napa	108,884	1,813	1,987	77.7	81.9	76.1	32.4	44.0
Calistoga	Napa	70,954	1,319	1,317	66.0	80.3	31.7	33.6	33.0
Napa	Napa	85,953	1,665	1,829	58.6	64.6	46.9	34.8	53.4
St. Helena	Napa	103,452	1,568	2,087	67.6	71.5	51.5	39.0	40.3
Yountville	Napa	65,519	1,428	1,316	62.2	70.0	38.1	47.1	53.9
Benicia	Solano	106,989	1,786	2,084	71.2	74.4	63.3	31.0	55.8
Dixon	Solano	79,465	1,260	1,606	60.2	57.8	63.7	35.8	25.2
Fairfield	Solano	86,204	1,549	1,845	59.0	66.6	54.0	33.6	52.0
Rio Vista	Solano	69,883	1,222	1,269	81.4	78.9	86.3	29.8	47.0
Suisun City	Solano	82,325	1,615	1,820	60.6	69.2	56.1	38.8	49.1
Vacaville	Solano	93,291	1,588	1,882	65.2	68.6	60.1	28.8	52.9
Vallejo	Solano	73,869	1,448	1,663	57.1	65.5	53.2	34.5	54.6
Cloverdale	Sonoma	80,896	1,194	1,716	67.8	76.4	43.0	34.6	56.6
Cotati	Sonoma	86,982	1,552	1,731	55.8	60.3	40.4	25.4	45.0
Healdsburg	Sonoma	89,239	1,446	1,704	55.5	58.5	41.8	37.2	39.3
Petaluma	Sonoma	92,762	1,819	2,060	64.1	67.8	51.2	34.2	52.0
Rohnert Park	Sonoma	77,831	1,704	1,800	50.7	57.0	36.3	34.4	58.1
Santa Rosa	Sonoma	80,472	1,582	1,777	55.2	61.9	41.2	38.0	51.6
Sebastopol	Sonoma	83,856	1,467	1,663	55.5	60.6	29.9	37.4	40.1
Sonoma	Sonoma	85,509	1,792	1,915	60.3	63.8	41.2	42.3	60.1
Windsor	Sonoma	117,533	1,826	2,276	78.0	81.0	71.3	36.0	56.0

Sources: ACS 5-year Summary Files.

Note: "Place" is an incorporated city or defined area by the Census Bureau.

NBEC Workforce and Economic Development 2022

Table 3-A: Mean Wages by Race in the NBEC Region, (Inflation Adjusted), 2011, 2019, 2020

Industry	2011		2019		2020	
	White, NH	BIPOC	White, NH	BIPOC	White, NH	BIPOC
Ag, For, Fish, & Hunting	39,287	25,621	44,732	32,936	51,037	29,480
Mining	52,311	85,930	128,356		64,394	25,154
Utilities	108,420	39,037	95,857	71,808	98,769	106,994
Construction	37,314	31,423	56,989	52,214	61,989	52,949
Manufacturing	76,439	43,767	90,694	67,532	91,307	55,115
Wholesale Trade	60,139	46,529	90,242	53,535	81,485	52,338
Retail Trade	37,071	30,079	42,371	36,412	43,508	31,000
Trans. & Ware.	43,833	43,025	60,944	39,473	47,975	38,680
Information	58,735	92,377	89,172	71,845	106,938	99,790
Fin & Ins.	79,446	59,943	113,577	60,391	138,812	89,324
RE, Rental, Leasing	58,373	32,055	61,051	46,924	68,601	36,981
Prof., Sci, & Tech.	49,436	51,814	88,093	79,969	92,991	80,588
Mgmt. of Companies			84,377	46,024	302,515	60,369
Admin, Support, & Waste	34,017	26,662	37,919	31,256	59,067	30,140
Educ. Services	44,465	33,052	52,128	34,891	56,686	46,664
Health Care & Soc. Asst.	56,885	47,751	64,591	54,819	73,392	57,692
Arts, Ent., & Rec	25,847	29,166	31,919	32,737	38,981	34,056
Accom & Food Svcs	28,348	16,671	30,529	24,021	28,780	26,391
Other Svcs	27,214	18,452	30,791	28,515	37,722	29,727
Public Admin	70,926	54,258	82,407	55,875	82,218	72,599
All Industries	49,471	37,070	62,636	46,090	69,639	49,596

Source: ACS 1-year PUMS, EFA, NEED

Table 4-A: Median Wages by Race in the NBEC Region, (Inflation Adjusted), 2011, 2019, 2020

Industry	2011		2019		2020	
	White, NH	BIPOC	White, NH	BIPOC	White, NH	BIPOC
Ag, For, Fish, & Hunting	30,466	23,435	24,802	30,683	44,271	22,638
Mining	44,527	82,024	89,491	N/A	64,394	25,154
Utilities	105,460	2,109	81,821	73,638	75,461	80,492
Construction	29,294	20,154	51,138	39,274	46,786	45,277
Manufacturing	58,589	35,153	66,479	46,024	70,430	40,246
Wholesale Trade	41,012	35,153	67,502	51,138	64,394	46,786
Retail Trade	23,435	23,435	30,683	25,569	27,166	25,154
Trans. & Ware.	46,871	37,497	51,138	36,819	43,164	31,191
Information	42,184	26,951	45,308	66,479	73,449	66,406
Fin & Ins.	52,730	46,871	83,866	51,138	84,517	57,350
RE, Rental, Leasing	43,707	24,607	36,819	35,796	32,197	35,215
Prof., Sci, & Tech.	29,294	35,153	61,365	61,365	55,338	50,307
Mgmt. of Companies	N/A	N/A	84,377	47,047	251,537	60,369
Admin, Support, & Waste	27,537	16,405	25,569	18,410	50,307	24,651
Educ. Services	37,497	23,435	45,513	26,080	50,307	43,264
Health Care & Soc. Asst.	38,669	39,372	43,979	39,274	45,277	40,246
Arts, Ent., & Rec	22,264	21,092	24,546	24,546	19,016	30,184
Accom. & Food Svcs	10,956	14,061	21,478	18,410	18,614	20,123
Other Svcs	12,421	16,405	15,341	17,489	26,160	18,111
Public Admin	64,448	39,254	72,104	46,024	70,430	60,369
All Industries	35,153	26,951	42,956	32,728	47,088	35,215

Source: ACS 1-year PUMS, EFA, NEED; "n/A" = not available

NBEC Workforce and Economic Development 2022

Table 5-A: Average Annual Wages for the NBEC Region, 2019

Occupation	Median Annual Wages	Industry Sector	Median Annual Wages
Management	66,108	Ag, For, Fish, & Hunting	23,770
Business and Financial Operations	56,615	Mining	41,174
Computer and Mathematical	71,388	Utilities	75,633
Architecture and Engineering	75,552	Construction	37,057
Life, Physical, and Social Science	59,079	Manufacturing	51,468
Community and Social Service	42,659	Wholesale Trade	46,460
Legal	59,723	Retail Trade	23,610
Educational Instruction and Library	37,327	Trans. & Ware.	39,525
Arts, Design, Entertainment, Sports, and Media	15,440	Information	50,439
Healthcare Practitioners and Technical	74,834	Fin & Ins.	56,664
Healthcare Support	19,448	RE, Rental, Leasing	28,752
Protective Service	61,762	Prof., Sci, & Tech.	41,369
Food Preparation and Serving Related	15,299	Mgmt. of Companies	56,664
Building and Grounds Cleaning and Maintenance	14,166	Admin, Support, & Waste	22,666
Personal Care and Service	6,483	Educ. Services	40,609
Sales and Related	25,595	Health Care & Soc. Asst.	39,653
Office and Administrative Support	32,414	Arts, Ent., & Rec	17,499
Farming, Fishing, and Forestry	22,716	Accom. & Food Svcs	16,470
Construction and Extraction	32,414	Other Svcs	15,677
Installation, Maintenance, and Repair	42,669	Public Admin	57,644
Production	35,204		
Transportation and Material Moving	26,763		

Source: ACS 5-year PUMS.

Note: 2019 data provide the pre-pandemic benchmark.

Table 6-A: Average Weekly Wages, (Inflation Adjusted)

Industry	NBEC			California			United States		
	2011	2019	2021	2011	2019	2021	2011	2019	2021
Ag, For, Fish, & Hunting	679	879	931	622	758	830	643	755	815
Mining	1,589	1,665	1,618	2,941	2,234	2,027	2,128	2,058	1,937
Utilities	2,683	2,704	2,611	2,353	2,585	2,491	2,027	2,136	2,130
Construction	1,387	1,609	1,577	1,331	1,485	1,507	1,196	1,304	1,321
Manufacturing	1,471	1,621	1,716	1,755	1,836	2,047	1,361	1,353	1,408
Wholesale Trade	1,419	1,484	1,588	1,528	1,594	1,723	1,510	1,568	1,665
Retail Trade	725	776	877	752	779	890	647	682	768
Trans. & Ware.	871	1,113	1,236	1,124	1,245	1,330	1,071	1,098	1,131
Information	1,455	1,743	2,002	2,372	3,654	4,599	1,836	2,367	2,832
Fin & Ins.	1,784	1,983	2,302	2,051	2,418	3,031	1,792	1,929	2,103
RE, Rental, Leasing	980	1,143	1,255	1,155	1,374	1,475	1,046	1,170	1,262
Prof., Sci, & Tech.	1,611	1,751	1,808	2,050	2,434	2,788	1,806	1,954	2,089
Mgmt. of Companies	2,072	2,457	2,900	2,149	2,486	2,862	2,146	2,288	2,424
Admin, Support, & Waste	838	956	1,065	876	966	1,061	795	862	944
Educ. Services	964	1,002	1,104	1,114	1,189	1,252	1,083	1,125	1,172
Health Care & Soc. Asst.	1,318	1,212	1,316	1,265	1,081	1,181	1,063	1,052	1,121
Arts, Ent., & Rec	546	565	618	1,028	1,040	1,155	742	760	801
Accom. & Food Svcs	465	569	650	466	551	645	419	465	510
Other Svcs	667	878	967	629	871	952	709	809	880
Other	1,209	1,326	1,313	1,353	987	1,995	1,121	1,108	1,319

Source: QCEW, EFA, NEED.

NBEC Workforce and Economic Development 2022

Table 7-A: Mean Hourly Wages, (Inflation Adjusted), 2015, 2019, 2020

	NBEC-Lite			California			National		
	2015	2019	2020	2015	2019	2020	2015	2019	2020
All	27.92	27.82	29.92	29.02	29.84	31.61	25.37	26.04	27.07
Architecture and Engineering	45.77	46.53	48.24	51.19	50.07	50.63	43.57	43.22	43.41
Arts, Design, Entertainment, Sports, and Media	32.31	34.06	36.09	37.44	37.17	38.75	29.91	30.16	30.96
Building and Grounds Cleaning and Maintenance	16.55	18.59	19.39	15.79	17.68	18.74	14.22	15.22	15.75
Business and Financial Operations	43.62	40.75	42.48	43.03	40.81	42.09	38.75	38.03	38.79
Community and Social Service	27.64	28.78	30.32	27.90	28.90	29.70	24.23	24.57	25.09
Computer and Mathematical	51.40	47.83	49.66	54.04	54.62	56.16	45.25	45.64	46.53
Construction and Extraction	31.20	31.78	32.95	29.01	29.89	30.78	24.99	25.60	25.93
Education, Training, and Library	29.18	31.18	33.13	31.21	32.82	33.74	27.83	28.10	28.75
Farming, Fishing, and Forestry	14.62	17.56	18.53	12.00	14.08	15.22	13.84	15.26	16.02
Food Preparation and Serving Related	14.18	15.70	16.71	13.36	14.95	15.93	11.99	12.98	13.30
Healthcare Practitioners and Technical	50.92	51.69	54.72	50.00	50.21	52.08	40.85	40.71	41.30
Healthcare Support	20.21	18.01	19.88	18.47	16.14	17.07	15.50	15.10	15.50
Installation, Maintenance, and Repair	28.32	28.55	30.26	26.57	27.10	28.39	24.15	24.40	25.17
Legal	51.35	65.66	67.90	65.39	64.35	66.23	54.32	53.37	54.00
Life, Physical, and Social Science	42.39	41.60	43.98	42.37	42.95	43.66	37.39	37.75	38.15
Management	61.79	61.18	64.77	66.64	67.05	69.78	60.40	59.62	60.81
Office and Administrative Support	21.89	23.48	24.56	21.09	22.36	23.03	19.08	19.98	20.38
Personal Care and Service	16.13	19.53	20.34	14.72	16.96	18.37	13.47	15.22	15.68
Production	20.91	23.26	23.43	18.77	20.24	21.03	19.01	19.54	20.08
Protective Service	32.58	36.10	36.46	28.34	30.27	31.24	23.43	24.28	25.11
Sales and Related	20.93	22.96	24.43	22.01	22.71	24.49	20.64	20.96	22.00
Transportation and Material Moving	18.87	19.64	20.64	18.73	19.27	20.28	18.46	18.46	19.08

Sources: OES, EFA, NEED; Latest Data from 2020 as of March 2022

NBEC Workforce and Economic Development 2022

Table 8-A: Top 20 Growth Industries, Centers of Continued Job Loss, NBEC Counties and CA
2011, 2019 to 2020, Quarter 4 of each year

Industry	CA 2011 Q4	CA 2019 Q4	CA 2020 Q4	NBEC 2011 Q4	NBEC 2019 Q4	NBEC 2020 Q4	Change NBEC 2019-20	% Change NBEC 2019-20	% Change CA 2019-20
Total	14,447,557	17,474,178	16,024,161	494,363	586,411	522,732	-63,679	-10.9%	-8.3%
Pipeline Transportation	3,055	1,478	1,307	-	7	17	10	142.9%	-11.6%
Couriers and Messengers	53,258	94,640	135,507	907	1,407	2,021	614	43.6%	43.2%
Leather and Allied Product Manufacturing	3,526	2,758	2,857	47	70	98	28	40.0%	3.6%
Transportation Equipment Manufacturing	99,882	130,059	127,915	620	768	949	181	23.6%	-1.6%
Plastics & Rubber Products Manufacturing	42,826	42,138	40,905	918	802	934	132	16.5%	-2.9%
Funds, Trusts & Other Financial Vehicles	10,419	3,100	3,057	229	25	29	4	16.0%	-1.4%
Food and Beverage Stores	326,178	344,621	364,350	15,551	17,097	19,050	1,953	11.4%	5.7%
Warehousing and Storage	73,970	170,607	207,067	1,047	1,405	1,555	150	10.7%	21.4%
Chemical Manufacturing	71,865	78,558	80,173	3,180	4,717	5,008	291	6.2%	2.1%
Mining (except Oil and Gas)	5,439	6,062	5,865	246	181	192	11	6.1%	-3.2%
Petroleum & Coal Products Manufacturing	17,234	13,347	12,941	-	33	35	2	6.1%	-3.0%
Electrical Equipment and Appliances	28,220	31,765	27,271	299	356	375	19	5.3%	-14.1%
Machinery Manufacturing	70,176	76,584	74,304	2,336	2,571	2,657	86	3.3%	-3.0%
Non-store (internet) Retailers	35,096	59,374	56,860	1,663	1,326	1,362	36	2.7%	-4.2%
Truck Transportation	108,089	136,564	137,620	3,525	3,847	3,951	104	2.7%	0.8%
Credit Intermediation & Related Jobs	242,609	236,276	235,578	6,756	5,332	5,470	138	2.6%	-0.3%
Building Material & Garden Supply Stores	103,550	114,660	126,735	5,543	6,389	6,542	153	2.4%	10.5%
Animal Production and Aquaculture	28,074	26,738	27,153	1,325	1,143	1,154	11	1.0%	1.6%
Miscellaneous Manufacturing	79,651	84,366	79,761	2,488	2,171	2,165	(6)	-0.3%	-5.5%
Justice, Public Order, and Safety	249,805	251,407	249,532	11,888	10,514	10,357	(157)	-1.5%	-0.7%

Sources: QCEW, NEED, EFA.

NBEC Workforce and Economic Development 2022

Table 9-A: Lowest 20 Growth Industries, NBEC Counties and CA
2011, 2019 to 2020, Quarter 4 of each year

Industry	CA 2011 Q4	CA 2019 Q4	CA 2020 Q4	NBEC 2011 Q4	NBEC 2019 Q4	NBEC 2020 Q4	Change NBEC 2019-20	% Change NBEC 2019-20	% Change CA 2019-20
Total	14,447,557	17,474,178	16,024,161	494,363	586,411	522,732	-63,679	-10.9%	-8.3%
Motion Picture & Sound Recording Ind	268,506	341,041	276,794	1,468	1,266	487	(779)	-61.5%	-18.8%
Scenic and Sightseeing Transportation	4,571	5,537	3,324	394	622	278	(344)	-55.3%	-40.0%
Lessors, Nonfinancial Intangible Assets	2,802	2,360	1,949	22	8	4	(4)	-50.0%	-17.4%
Performing Arts and Spectator Sports	70,614	95,064	56,556	2,083	1,839	929	(910)	-49.5%	-40.5%
Amusement, Gambling & Recreation	219,548	265,269	145,539	10,040	13,067	8,016	(5,051)	-38.7%	-45.1%
Rental and Leasing Services	56,763	66,540	48,484	1,751	2,616	1,613	(1,003)	-38.3%	-27.1%
Accommodation (Hotel)	209,271	259,065	153,174	10,415	12,529	8,015	(4,514)	-36.0%	-40.9%
Primary Metal Manufacturing	19,911	17,343	15,511	24	98	66	(32)	-32.7%	-10.6%
Personal and Laundry Services	142,240	188,364	126,683	5,138	5,998	4,249	(1,749)	-29.2%	-32.7%
Transit and Ground Passenger Transport	71,077	95,481	70,090	3,931	3,146	2,282	(864)	-27.5%	-26.6%
Apparel Manufacturing	52,207	31,624	25,405	229	317	231	(86)	-27.1%	-19.7%
Food Services and Drinking Places	1,062,631	1,427,967	1,059,972	39,674	50,324	37,434	(12,890)	-25.6%	-25.8%
Textile Product Mills	8,511	8,666	7,782	105	180	140	(40)	-22.2%	-10.2%
Support Activities for Mining	12,335	9,383	7,087	262	371	289	(82)	-22.1%	-24.5%
Clothing and Clothing Accessories Stores	165,063	172,175	141,712	5,084	5,409	4,223	(1,186)	-21.9%	-17.7%
Printing and Related Support Jobs	42,232	36,679	30,926	869	846	661	(185)	-21.9%	-15.7%
Membership Organizations & Associations	158,160	166,666	139,447	4,911	6,061	4,874	(1,187)	-19.6%	-16.3%
Paper Manufacturing	22,335	21,237	19,525	29	50	41	(9)	-18.0%	-8.1%
Educational Services	1,267,271	1,453,555	1,315,626	41,472	46,588	38,715	(7,873)	-16.9%	-9.5%
Museums, Parks and Historical Sites	17,921	22,686	16,595	410	668	556	(112)	-16.8%	-26.8%

Sources: QCEW, NEED, EFA.

NBEC Workforce and Economic Development 2022

Table 10-A: Top Destinations for NBEC Working Residents That Work Outside NBEC Counties, 2011

Destination	Lake	Marin	Mendocino	Napa	Solano	Sonoma	NBEC	% Outbound
San Francisco	396	25,043	499	2,332	10,693	9,435	48,398	26.5
Contra Costa	305	4,297	454	3,336	21,778	5,004	35,174	19.2
Alameda	414	7,127	527	2,451	13,802	7,144	31,465	17.2
Sacramento	559	1,944	662	1,502	11,435	4,196	20,298	11.1
Santa Clara	515	3,045	NA	1,485	5,679	4,755	15,479	8.5
San Mateo	212	3,711	164	943	4,664	3,501	13,195	7.2
Yolo	123	246	150	383	4,519	803	6,224	3.4
San Joaquin	97	574	157	535	2,637	1,044	5,044	2.8
Orange	200	694	NA	417	1,221	1,222	3,755	2.1
Placer	112	453	151	343	1,733	912	3,704	2.0

Source: LEHD, NEED and EFA, Data for 2019 are the latest data available at the time of this writing.

Table 11-A: Top Destinations for NBEC Working Residents That Work Outside NBEC Counties, 2019

Destination	Lake	Marin	Mendocino	Napa	Solano	Sonoma	NBEC	% Outbound
San Francisco	378	27,993	510	2,730	12,788	9,926	54,325	25.7
Contra Costa	296	4,449	380	3,622	26,003	5,517	40,267	19.0
Alameda	404	7,459	589	2,753	17,854	8,292	37,351	17.6
Sacramento	437	1,921	568	1,503	13,068	4,072	21,569	10.2
Santa Clara	230	3,936	359	1,731	7,235	5,414	18,905	8.9
San Mateo	180	4,357	219	1,108	5,812	3,891	15,567	7.4
Yolo	121	285	144	458	5,032	929	6,969	3.3
San Joaquin	139	626	185	630	3,915	1,235	6,730	3.2
Orange	78	890	141	566	1,819	1,593	5,087	2.4
Placer	176	575	251	476	2,394	1,105	4,977	2.4

Source: LEHD, NEED and EFA, Data for 2019 are the latest data available at the time of this writing.

Table 12-A: Top Origin Counties for NBEC Workers That Live Outside NBEC Counties, 2011

Origin	Lake	Marin	Mendocino	Napa	Solano	Sonoma	NBEC	% Inbound
Contra Costa	134	9,145	184	2,214	10,505	4,071	26,253	23.7
Alameda	123	6,389	223	1,266	4,752	4,148	16,901	15.2
Sacramento	197	2,270	278	1,257	8,190	3,443	15,635	14.1
San Francisco	65	9,497	119	799	2,206	2,603	15,289	13.8
Santa Clara	63	2,630	191	857	3,079	3,575	10,395	9.4
San Mateo	27	3,352	103	478	1,973	1,932	7,865	7.1
Yolo	51	385	77	758	4,627	680	6,578	5.9
San Joaquin	51	917	114	518	2,832	1,304	5,736	5.2
Placer	54	488	74	301	1,488	912	3,317	3.0
Stanislaus	31	437	84	336	1,220	858	2,966	2.7

Source: LEHD, NEED and EFA, Data for 2019 are the latest data available at the time of this writing.

Table 13-A: Top Origin Counties for NBEC Workers That Live Outside NBEC Counties, 2019

Origin	Lake	Marin	Mendocino	Napa	Solano	Sonoma	NBEC	% Inbound
Contra Costa	211	11,316	232	2,690	11,823	5,230	31,502	24.8
Sacramento	252	2,260	425	2,027	10,111	4,487	19,562	15.4
Alameda	123	7,361	287	1,736	5,388	4,604	19,499	15.3
San Francisco	68	8,989	129	917	1,792	2,683	14,578	11.5
Santa Clara	114	3,013	189	1,099	3,112	3,212	10,739	8.5
San Mateo	49	3,646	94	663	1,588	2,039	8,079	6.4
Yolo	53	412	105	1,042	5,360	837	7,809	6.1
San Joaquin	100	1,102	124	941	3,694	1,725	7,686	6.0
Placer	72	580	112	370	1,828	1,097	4,059	3.2
Stanislaus	58	581	104	395	1,510	907	3,555	2.8

Source: LEHD, NEED and EFA, Data for 2019 are the latest data available at the time of this writing.

NBEC Workforce and Economic Development 2022

Table 14-A: Jobs, Job Losses and Wages in the NBEC Region, by Race/Ethnicity, 2019 and 2020

Occupation Category	White Non-Hispanic		BIPOC		Change in Employment		Percent Change		Average Wages (2019)	
	2019	2020	2019	2020	White NH	BIPOC	White NH	BIPOC	White NH	BIPOC
Management	45,410	49,053	13,929	22,723	-3,643	8,794	-7.4	63.1	128,362	87,139
Business and Financial Operations	19,570	18,455	8,595	6,537	1,115	-2,058	6.0	-23.9	123,918	97,346
Computer and mathematical occupations	10,001	8,513	5,430	5,165	1,488	-265	17.5	-4.9	99,054	100,437
Architecture and Engineering	8,144	6,186	4,827	4,262	1,958	-565	31.7	-11.7	105,410	84,256
Life, Physical, and Social Science	3,389	3,494	2,223	1,492	-105	-731	-3.0	-32.9	124,453	88,261
Community and Social Service	1,621	2,836	1,979	1,013	-1,215	-966	-42.8	-48.8	41,940	50,391
Legal	4,235	3,464	1,231	813	771	-418	22.3	-34.0	181,123	87,929
Education, Training, and Library	4,761	5,667	3,384	3,609	-906	225	-16.0	6.6	45,452	22,434
Arts, Design, Entertainment, Sports, and Media	7,107	7,895	2,950	3,250	-788	300	-10.0	10.2	73,966	65,548
Healthcare Practitioners and Technical	12,781	15,197	9,482	8,521	-2,416	-961	-15.9	-10.1	90,053	108,773
Healthcare Support	8,454	9,162	10,195	7,551	-708	-2,644	-7.7	-25.9	21,316	26,158
Protective Service	2,352	2,260	3,585	4,388	92	803	4.1	22.4	25,869	33,784
Food Preparation and Serving Related	18,697	24,284	30,429	20,793	-5,587	-9,636	-23.0	-31.7	17,102	22,095
Building and Grounds Cleaning and Maintenance	2,650	4,422	13,407	12,927	-1,772	-480	-40.1	-3.6	30,198	28,335
Personal Care and Service	7,286	8,548	7,611	6,507	-1,262	-1,104	-14.8	-14.5	22,430	16,776
Sales and Related	45,666	43,987	32,890	29,953	1,679	-2,937	3.8	-8.9	54,354	38,158
Office and Administrative Support	35,525	33,625	23,764	25,711	1,900	1,947	5.7	8.2	36,467	31,478
Farming, Fishing, and Forestry	1,221	1,264	11,753	7,694	-43	-4,059	-3.4	-34.5	28,229	23,486
Construction and Extraction	19,715	17,990	23,002	16,309	1,725	-6,693	9.6	-29.1	57,425	45,135
Installation, Maintenance, and Repair	9,861	8,505	7,234	7,998	1,356	764	15.9	10.6	71,403	60,912
Production	9,907	12,490	18,542	19,972	-2,583	1,430	-20.7	7.7	53,799	36,192
Transportation and Material Moving	20,383	19,470	26,417	21,336	913	-5,081	4.7	-19.2	34,298	32,311
Total	298,736	306,767	262,859	238,524	-8,031	-24,335	-2.6	-9.3	70,087	46,194

Source: QWI, EFA, and NEED.

Note: These are the latest available data as of March 2022.

NBEC Workforce and Economic Development 2022

Table 15-A: Population Levels and Changes in the NBEC Region and Counties, 2011 to 2021

Total Population in Each Year							
Year	NBEC	Lake	Marin	Mendocino	Napa	Solano	Sonoma
2011	1,447,677	64,921	254,925	87,319	137,560	415,230	487,722
2012	1,463,644	67,017	257,455	88,936	138,859	420,979	490,398
2013	1,477,108	67,300	260,645	89,346	139,378	425,587	494,852
2014	1,490,885	67,677	263,335	90,108	140,461	431,153	498,151
2015	1,498,503	66,931	263,964	90,198	140,955	435,902	500,553
2016	1,507,449	66,945	265,181	91,021	141,089	441,224	501,989
2017	1,511,456	67,963	264,753	91,609	140,299	445,721	501,111
2018	1,510,546	68,358	264,944	91,726	139,558	449,091	496,869
2019	1,507,092	68,114	263,917	91,727	138,965	451,701	492,668
2020	1,503,829	68,099	262,410	91,602	138,433	453,405	489,880
2021	1,494,546	68,082	260,416	90,806	137,600	452,532	485,110

Year over Year Percent Change in Population							
Year	NBEC	Lake	Marin	Mendocino	Napa	Solano	Sonoma
2011	0.58	0.71	0.85	-0.71	0.64	0.49	0.72
2012	1.10	3.23	0.99	1.85	0.94	1.38	0.55
2013	0.92	0.42	1.24	0.46	0.37	1.09	0.91
2014	0.93	0.56	1.03	0.85	0.78	1.31	0.67
2015	0.51	-1.10	0.24	0.10	0.35	1.10	0.48
2016	0.60	0.02	0.46	0.91	0.10	1.22	0.29
2017	0.27	1.52	-0.16	0.65	-0.56	1.02	-0.17
2018	-0.06	0.58	0.07	0.13	-0.53	0.76	-0.85
2019	-0.23	-0.36	-0.39	0.00	-0.42	0.58	-0.85
2020	-0.22	-0.02	-0.57	-0.14	-0.38	0.38	-0.57
2021	-0.62	-0.02	-0.76	-0.87	-0.60	-0.19	-0.97

Source: California Department of Finance (DOF), E-2 Population Tables.

NBEC Workforce and Economic Development 2022

Table 16-A: Population, Labor Force, and Employment
NBEC Region and Counties, 2011 to 2021

Population							
Year	NBEC	Lake	Marin	Mendocino	Napa	Solano	Sonoma
2011	1,447,677	64,921	254,925	87,319	137,560	415,230	487,722
2012	1,463,644	67,017	257,455	88,936	138,859	420,979	490,398
2013	1,477,108	67,300	260,645	89,346	139,378	425,587	494,852
2014	1,490,885	67,677	263,335	90,108	140,461	431,153	498,151
2015	1,498,503	66,931	263,964	90,198	140,955	435,902	500,553
2016	1,507,449	66,945	265,181	91,021	141,089	441,224	501,989
2017	1,511,456	67,963	264,753	91,609	140,299	445,721	501,111
2018	1,510,546	68,358	264,944	91,726	139,558	449,091	496,869
2019	1,507,092	68,114	263,917	91,727	138,965	451,701	492,668
2020	1,503,829	68,099	262,410	91,602	138,433	453,405	489,880
2021	1,494,546	68,082	260,416	90,806	137,600	452,532	485,110

Labor-Force Participation							
Year	NBEC	Lake	Marin	Mendocino	Napa	Solano	Sonoma
2011	726,349	30,121	134,913	41,607	71,838	201,942	245,928
2012	732,396	30,375	137,771	41,769	73,132	202,362	246,987
2013	739,703	29,348	139,741	41,851	74,460	204,022	250,281
2014	743,672	29,451	138,820	40,982	74,529	202,838	257,052
2015	746,678	29,244	139,015	40,436	74,877	205,153	257,953
2016	749,993	29,141	139,837	40,257	73,820	207,713	259,225
2017	753,341	29,342	140,343	40,045	74,633	208,539	260,439
2018	754,275	29,275	139,788	39,287	75,216	209,958	260,751
2019	748,841	29,417	139,248	39,064	75,059	209,064	256,989
2020	711,311	28,184	128,392	37,100	70,002	202,356	245,277
2021	714,980	29,672	131,671	36,666	70,588	201,915	244,468

Nonfarm Payroll Employment							
Year	NBEC	Lake	Marin	Mendocino	Napa	Solano	Sonoma
2011	649,028	25,762	124,781	36,969	64,931	176,647	219,938
2012	664,164	26,626	128,692	37,661	67,045	179,893	224,247
2013	682,708	26,128	132,105	38,477	69,401	184,898	231,699
2014	698,761	26,944	132,874	38,283	70,563	187,537	242,560
2015	709,544	27,108	133,986	38,220	71,657	192,384	246,189
2016	715,935	27,267	135,010	38,302	70,773	195,968	248,615
2017	724,095	27,714	136,083	38,339	72,039	198,516	251,404
2018	728,876	27,752	136,065	37,731	73,001	201,352	252,975
2019	725,253	27,993	135,896	37,597	72,992	201,001	249,774
2020	627,680	24,722	115,539	32,662	61,331	176,230	217,196
2021	669,804	27,451	125,400	34,307	66,272	186,144	230,230

Source: DOF, EDD, BLS, EFA, NEED

NBEC Workforce and Economic Development 2022

Table 17-A: Population Demographics, BIPOC and Non-BIPOC Residents
NBEC Counties and California, 2011 to 2020

2011 Q4	California	Lake	Marin	Mendocino	Napa	Solano	Sonoma	NBEC
ALL	37,721,468	64,921	254,925	87,319	137,560	415,230	487,722	1,447,677
BIPOC	15,095,538	47,972	185,838	59,631	77,079	169,232	322,023	861,775
WNH	22,625,930	16,949	69,087	27,688	60,481	245,998	165,699	585,902
2019 Q4	California	Lake	Marin	Mendocino	Napa	Solano	Sonoma	NBEC
ALL	39,761,195	64,080	260,969	88,125	139,874	439,990	495,058	1,488,096
BIPOC	15,230,028	45,558	185,485	57,880	74,404	172,446	317,732	853,505
WNH	24,531,167	18,522	75,484	30,245	65,470	267,544	177,326	634,591
2020 Q4	California	Lake	Marin	Mendocino	Napa	Solano	Sonoma	NBEC
ALL	39,953,269	64,174	258,165	88,297	139,369	445,326	500,879	1,496,210
BIPOC	15,205,370	45,387	182,502	57,628	73,450	173,369	320,323	852,659
WNH	24,747,899	18,787	75,663	30,669	65,919	271,957	180,556	643,551

Sources: QWI, NEED and EFA, Latest Data as of March 2022

Table 18-A: Worker Demographics, BIPOC and Non-BIPOC Workers
NBEC Counties and California, 2011 to 2020

2011 Q4	California	Lake	Marin	Mendo	Napa	Solano	Sonoma	NBEC
ALL	14,447,557	13,293	101,320	27,716	65,441	118,906	170,466	497,142
BIPOC	8,025,285	3,839	39,091	8,708	29,019	61,219	61,731	203,607
WNH	6,422,272	9,454	62,229	19,008	36,422	57,687	108,735	293,535
2019 Q4	California	Lake	Marin	Mendo	Napa	Solano	Sonoma	NBEC
ALL	17,474,178	15,346	112,462	30,641	79,817	140,497	207,648	586,411
BIPOC	10,570,983	5,132	50,145	10,999	40,536	81,826	88,017	276,655
WNH	6,903,195	10,214	62,317	19,642	39,281	58,671	119,631	309,756
2020 Q4	California	Lake	Marin	Mendo	Napa	Solano	Sonoma	NBEC
ALL	16,024,161	14,586	99,073	27,178	69,671	127,145	185,079	522,732
BIPOC	9,717,896	4,975	44,835	10,097	35,885	74,127	80,045	249,964
WNH	6,306,265	9,611	54,238	17,081	33,786	53,018	105,034	272,768

Sources: QWI, NEED and EFA, Latest Data as of March 2022

Table 19-A: BIPOC Share of the Population and Workforce
NBEC Counties and California, 2011 to 2020

2011 Q4	California	Lake	Marin	Mendo	Napa	Solano	Sonoma	NBEC
Population	44.5	71.1	61.4	68.6	55.7	48.5	63.8	59.0
Workforce	60.0	26.1	27.1	31.7	44.0	59.2	34.0	40.5
2019 Q4	CA	Lake	Marin	Mendo	Napa	Solano	Sonoma	NBEC
Population	39.5	66.6	55.4	64.1	49.2	41.8	57.6	52.8
Workforce	61.7	28.9	28.9	34.3	46.8	60.8	35.8	42.6
2020 Q4	CA	Lake	Marin	Mendo	Napa	Solano	Sonoma	NBEC
Population	39.4	65.9	54.7	62.8	48.5	41.7	56.8	52.2
Workforce	61.9	29.3	29.3	34.7	47.3	61.1	36.0	43.0

Sources: Census Bureau (Quarterly Workforce Indicators), NEED and EFA, Latest Data as of March 2022

Middle-Skill Occupational Profiles in Brief

These samples of occupations and identified scientific, technology, engineering and mathematics (STEM) and soft skills and wage differentials between the NBEC and California on average. These data come from the [O*Net database](#) by the SOC code.

Heavy and Tractor-Trailer Truck Drivers	Medical Assistants
SOC Code = 53-3032	SOC Code = 31-9092
STEM Skills	STEM Skills
<ul style="list-style-type: none"> • Database user interface and query software • Inventory management software • Route navigation software • Spreadsheet software • Word processing software 	<ul style="list-style-type: none"> • Accounting software • Database user interface and query software • Electronic mail software • Medical software — Epic Systems • Office suite software
Soft Skills	Soft Skills
<ul style="list-style-type: none"> • Operation and Control • Operations Monitoring • Time Management • Critical Thinking • Monitoring 	<ul style="list-style-type: none"> • Social Perceptiveness • Active Listening • Speaking • Reading Comprehension • Critical Thinking
Median Wages, 2021	Median Wages, 2021
NBEC = \$28.42	NBEC = \$26.04
California = \$24.78	California = \$19.76
Licensed Practical/Vocational Nurses	Firefighters
SOC Code = 29-2061	SOC Code = 33-2011
STEM Skills	STEM Skills
<ul style="list-style-type: none"> • Categorization or classification software • Electronic mail software • Medical software — Epic Systems • Spreadsheet software • Video conferencing software 	<ul style="list-style-type: none"> • Database user interface and query software • Electronic mail software • Geographic information system • Office suite software • Spreadsheet software
Soft Skills	Soft Skills
<ul style="list-style-type: none"> • Service Orientation • Coordination • Social Perceptiveness • Active Listening • Monitoring 	<ul style="list-style-type: none"> • Active Listening • Monitoring • Coordination • Operations Monitoring • Critical Thinking
Median Wages, 2021	Median Wages, 2021
NBEC = \$37.15	NBEC = \$32.20
California = \$24.21	California = \$25.24