



**2023**

**NAPA COUNTY WAGES & BENEFITS  
SURVEY RESULTS**

Sponsored by: **Napa Valley Grapegrowers**

Prepared by: **Dr. Ashley Spalding**

# **2023 Napa County Wage and Benefits Survey Results**

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## **I. Introduction**

This study presents the results of a survey conducted in February 2024. It gathered information on vineyard labor practices, employment, compensation, and benefits in Napa County during 2023. This is the 12<sup>th</sup> year of the survey and the 4<sup>th</sup> year it is conducted by Dr. Ashley Spalding.

The survey was conducted by the Napa Valley Grapegrowers (NVG), and all responses were directed to Dr. Ashley Spalding of the USDA's Economic Research Service. Dr. Spalding prepared the analysis and maintains control of the survey data. The findings and conclusions in this publication are those of the author and should not be construed to represent any official USDA or U.S. Government determination or policy. The raw data itself will remain confidential. This report is available to NVG members who participated in the survey.

A very special thank you is due to the survey respondents, without whom we would not be able to gather the data in this report. The Napa Valley Grapegrowers, and indeed the collective of grape growers in the Napa Valley area, owe you a debt of gratitude.

The goal of the survey is to provide the latest information about the levels and changes in employment, wages, and benefits offered to those who work in the vineyards of Napa County, as well as to survey some important recent trends relative to labor in that industry and location. This information is valuable to grape growers of all sizes who face competition from each other and from other agricultural industries for skilled workers.

Questions about the survey should be directed to Caleb Mosely, Executive Director of the Napa Valley Grapegrowers ([cmosley@napagrowers.org](mailto:cmosley@napagrowers.org)), or Dr. Ashley Spalding, Research Assistant for this project ([acspalding@gmail.com](mailto:acspalding@gmail.com)).

## **II. Executive Summary and Highlights**

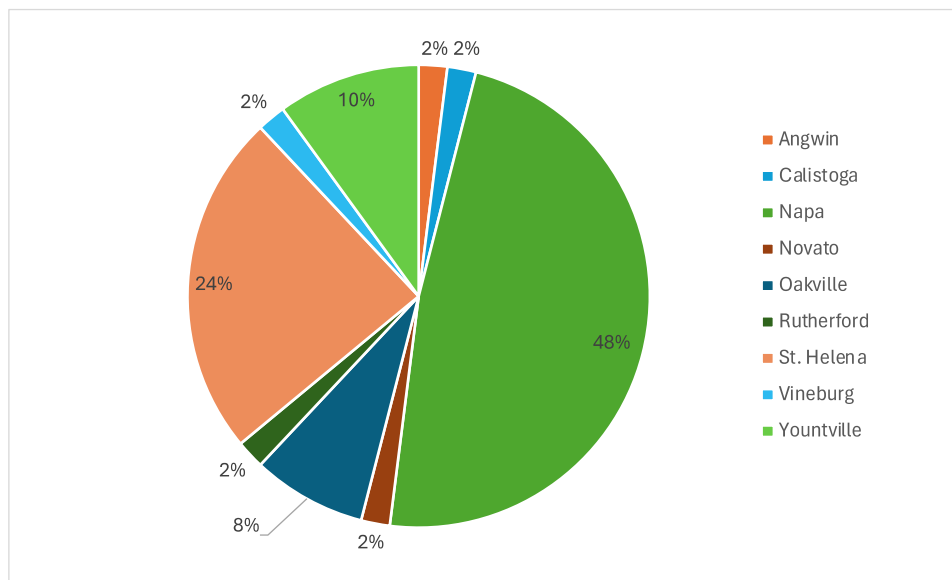
Many factors affect the quality of Napa County grapes. On one hand, we have those factors beyond the control of the grower such as weather and unexpected events. The winter 2013/2014 drought, the earthquake that occurred in August 2014, the wildfires of 2017 and 2020, and the COVID-19 pandemic of 2020 and 2021 are good examples. On the other hand, clone choice, planting method and location, cultivation and harvesting techniques, irrigation choices, and labor are factors over which the grower has some level of control. Among these, labor represents a unique input into the production process. The vineyard owner certainly has more control over the quantity and quality of the labor than they do over weather and unexpected events. However, the quality of labor is under less control

than clone choice and irrigation. Thus, it is very important for the grower to create the right incentives to attract and maintain a high-quality labor force.

The essential problem is the vineyard owner can only observe workers for short periods of time during the workday. Market economies have developed a solution to the owner-worker information asymmetry problem: wages and benefits. Remuneration in the form of wages and benefits plays the role of matching vineyard owner demand for quality work to the skilled labor supplied by vineyard workers. Vineyard owners who offer relatively higher total remuneration can expect relatively higher worker quality. This survey serves the purpose of informing vineyard owners about the state of existing vineyard labor practices and worker remuneration. The details about average wage, wage increases, and benefits by occupation provide valuable information to vineyard owners who seek to stay up to date.

The survey respondents represent vineyard owners, owners of vineyards with a winery, and vineyard management companies. Nine cities in Napa County are represented, although organizations in the cities of Napa and St. Helena account for 71.2% of the sample, as shown in figure 1.

Figure 1: Share of Firms by City



Both employee and compensation indicators suggest the industry has contracted or stagnated since 2021 after years of growth. The average number of employees decreased from 2021 to 2023 for both vineyards and vineyard management companies, though the latter firm type experienced the largest change. Vineyard management companies averaged 132 workers in 2010 and 227 employees in 2021 but only 122 employees in 2023. We have reason to believe that vineyard management companies based in Napa County are also extending beyond Napa and have workers covering other areas too, so the actual decrease may differ. On average, 2023 nominal wages for vineyard workers in napa were roughly equivalent to 2021 wages at wineries with vineyards (\$20.93 to \$20.96), decreased at

vineyards (\$19.70 to \$19.35), and increased at vineyard management companies (\$18.80 to \$22.64). Despite decreasing wages for some firm types, firms in Napa continued to pay, in dollars, well above the California and U.S. average for comparable occupations; however, steep increase in prices and rents in recent years have eroded most, if not all, wage growth experienced in Napa.

### **III. The Survey and its Respondents**

#### **Organization: Numbers and Types**

The survey was sent to approximately 450 owners of vineyards, wineries, and vineyard management companies operating in Napa County. Respondents were asked to use figures that applied to the year 2023 and limited to operations within Napa County. We used 50 completed surveys for this analysis. This is a decrease from the 73 surveys used in 2021. These respondents farm or manage a total of 15,941 acres of land, representing approximately 35.1% of the 45,402 planted acres of winegrapes in Napa County (2017). The surveys used for this year's report cover a smaller share of total acreage than in 2021 (39.3%), so it is important to note that these results may not be representative of all Napa firms.

Of the 50 respondents in our sample, 30 (60%) were wineries with vineyards that use their own employees, 6 (12%) were vineyards that use their own employees, 12 (24%) were vineyard management companies, and the remaining 2 did not specify the firm type. The small number of vineyards included in the survey, and especially their small coverage of the total employment, should make us cautious about interpreting some of the averages for this group. Statistical variance and measurement errors are larger when relying on this small sample. Of the 15,941 acres in the sample, approximately 4,771 are owned by wineries with vineyards, which conduct (most of) their own vineyard operations, 383 are owned and operated by vineyards, which conduct (most of) their own vineyard operations, and 440 are owned by firms of unspecified type. The remaining 10,083 are owned by either vineyards or wineries with vineyards who contract their vineyard operations out to vineyard management companies.

### **IV. Detailed Survey Results**

The average of any statistic can be misleading if one does not know the distribution of the numbers. For example, if there are five vineyards and one pays its workers \$20.00 per hour while the other four pay their workers \$10.00 per hour, the average will be \$12.00 per hour. Although this is the mathematical average, no vineyard actually pays that amount. Furthermore, most pay less than the average. The best way around this problem is to provide more information to the reader. Particularly helpful would be the minimum, middle (or median), and maximum values for any statistic, and so those figures are presented along with the average. In general, the average and median values provide the most practical figures for benchmarking purposes. The average value expresses what wage would be paid if each firm were to pay the same hourly wage and the total amount of wage paid was equal to the total actually paid. The median wage, instead, is the wage paid by the firm which has 50% of other firms paying less and 50% paying more.

## Workforce Size

Before providing information on the wages, let us give some summary statistics on the average size of firms in terms of number of employees hired in the year 2023.

*Number of Year-round Employees:*

	Average	Minimum	Median	Maximum
Winery w/vineyards	16	0	10	150
Vineyard	14	1	3	73
Mgmt. Company	98	12	65	275

*Number of Seasonal Employees:*

	Average	Minimum	Median	Maximum
Winery w/vineyards	5	0	1	30
Vineyard	3	0	0	11
Mgmt. Company	25	0	13	77

A winery with vineyards or a stand-alone vineyard can employ its own workers or use the service of an outside vineyard management company (or both). The survey asked questions about employees only, regardless of who their employer was. The data above suggests that all firm types use far more year-round employees than seasonal employees.<sup>1</sup> Specifically, vineyards use almost five times as many year-round employees as seasonal employees, whereas vineyard management companies and wineries with vineyards employ nearly four times more year-round workers than seasonal workers. Unsurprisingly, vineyard management companies have a larger number of employees on average.

In untabulated results, we find the structure of the average firm is as follows: for one manager, wine firms hire 1.03 supervisors, 1.88 foremen, 3 tractor drivers, 1.2 specialized equipment operators, about 20.29 workers (10.03 when excluding vineyard management companies), 0.77 mechanics, and 0.32 interns. On average, vineyard management companies were 6-7 times larger than other types of firms.

*Average Female Share of Employment, 2015 to 2023:*

	2015	2016	2017	2018	2019	2020	2021	2023
Winery w/vineyards	9%	10%	13%	12%	16%	15%	18%	21%
Vineyards	9%	10%	10%	15%	20%	9%	4%	17%
Mgmt. Company	10%	12%	16%	24%	17%	17%	19%	16%

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<sup>1</sup> A seasonal worker is a worker who worked less than six months during 2023.

We asked firms how many female workers they employ as a share of their total workforce to understand how the employment of women is evolving in the viticulture labor force. The share of female employment is growing relative to 2015 for all firm types but decreased between 2021 and 2023 for vineyard management companies. Notice the percentage is rather noisy (jumps up and down) for vineyards, which is a clear sign of a small sample and measurement error. For instance, the share of female employment grew from 4% in 2021 to 17% in 2023 for vineyards. In contrast, wineries with vineyards employed 21% of women in their workforce compared to 18% in 2021, a much more modest increase.

Additionally, starting in 2019 we have asked firms to report whether they hired workers using the H-2A visa for temporary agricultural work. In 2023, approximately 10% of wineries with vineyards and 42% of vineyard management companies reported hiring workers using the H-2A program compared to no vineyards.

### **Use of Seasonal Employees**

*Average Share of Seasonal Workers in Total Workers:*

	Wineries w/Vineyards	Vineyards	Mgmt. Company
Share of seasonal workers	24%	17%	20%

Vineyards and vineyard management companies are more reliant on seasonal workers than wineries with vineyards.

### **Employee Compensation**

We asked survey respondents to provide the hourly wage paid to seven classes of workers: Manager, Supervisor, Foreman, Tractor Driver, Specialized Equipment Operator, Mechanic, and Vineyard Worker. To compare across vineyards, the survey requested the respondents to convert their answers into hourly rates and to distinguish between year-round and seasonal workers. Their roles are defined as:

- **Manager:** responsible for all vineyard operations from pruning to harvest. The manager interfaces with grower relations, winemakers, owners, etc. and he/she oversees the vineyard supervisors.
- **Supervisor:** directs and supervises the activities of foreman.
- **Foreman:** supervises and directs the activities of vineyard workers.
- **Tractor Driver:** drives tractors and operates other machinery associated with farming and vineyard operations. Also performs various other vineyard labor activities.
- **Specialized Equipment Operator:** drives tractors, skip loaders, backhoes, loaders, excavators, graders, compactors, off-road water and dump trucks, and other heavy equipment.
- **Mechanic:** under supervision, performs a wide variety of skilled mechanic duties to install, troubleshoot, repair, and modify mechanical equipment and facilities.

- Vineyard Worker: performs various assigned tasks in the vineyard. These tasks may involve pruning, harvesting, spraying, suckering, planting, irrigation, some heavy equipment operation, and frost protection.

The following tables present worker compensation for both year-round and seasonal workers in each class of workers:

*Hourly Compensation of Manager:*

<b>Year-Round</b>	Average	Minimum	Median	Maximum	Observations
Mgmt. Company	\$46.53	\$22.75	\$41.00	\$74.00	11
Vineyard	\$55.00	\$50.00	\$55.00	\$60.00	2
Winery w/vineyards	\$54.59	\$29.00	\$49.91	\$101.92	24

*Hourly Compensation of Supervisor:*

<b>Year-Round</b>	Average	Minimum	Median	Maximum	Observations
Mgmt. Company	\$35.25	\$28.00	\$32.75	\$50.00	11
Vineyard	\$51.88	\$33.75	\$51.88	\$70.00	2
Winery w/vineyards	\$36.06	\$22.50	\$35.00	\$52.00	13

<b>Seasonal</b>	Average	Minimum	Median	Maximum	Observations
Mgmt. Company	\$30.50	\$29.00	\$30.50	\$32.00	2
Vineyard	n/a	n/a	n/a	n/a	0
Winery w/vineyards	\$50.00	\$50.00	\$50.00	\$50.00	1

*Hourly Compensation of Foreman:*

<b>Year-Round</b>	Average	Minimum	Median	Maximum	Observations
Mgmt. Company	\$26.78	\$20.25	\$25.50	\$36.00	11
Vineyard	\$26.50	\$26.50	\$26.50	\$26.50	1
Winery w/vineyards	\$30.51	\$25.00	\$28.50	\$41.83	12

<b>Seasonal</b>	Average	Minimum	Median	Maximum	Observations
Mgmt. Company	\$25.00	\$25.00	\$25.00	\$25.00	2

Vineyard	n/a	n/a	n/a	n/a	0
Winery w/vineyards	n/a	n/a	n/a	n/a	0

*Hourly Compensation of Tractor Driver:*

<b>Year-Round</b>	Average	Minimum	Median	Maximum	Observations
Mgmt. Company	\$27.12	\$22.00	\$25.50	\$50.00	12
Vineyard	\$24.75	\$23.50	\$24.75	\$26.00	2
Winery w/vineyards	\$26.37	\$20.00	\$26.00	\$35.43	23

<b>Seasonal</b>	Average	Minimum	Median	Maximum	Observations
Mgmt. Company	\$23.45	\$22.00	\$24.00	\$25.00	5
Vineyard	n/a	n/a	n/a	n/a	0
Winery w/vineyards	\$25.81	\$23.62	\$25.81	\$28.00	2

*Hourly Compensation of Specialized Equipment Operator:*

<b>Year-Round</b>	Average	Minimum	Median	Maximum	Observations
Mgmt. Company	\$32.04	\$23.00	\$29.26	\$50.00	8
Vineyard	n/a	n/a	n/a	n/a	0
Winery w/vineyards	\$29.54	\$23.00	\$27.00	\$48.55	9

<b>Seasonal</b>	Average	Minimum	Median	Maximum	Observations
Mgmt. Company	\$23.00	\$23.00	\$23.00	\$23.00	2
Vineyard	n/a	n/a	n/a	n/a	0
Winery w/vineyards	n/a	n/a	n/a	n/a	0



*Hourly Compensation of Vineyard Worker:*

<b>Year-Round</b>	Average	Minimum	Median	Maximum	Observations
Mgmt. Company	\$22.64	\$18.00	\$20.75	\$45.00	12
Vineyard	\$24.19	\$19.00	\$22.00	\$33.75	4
Winery w/vineyards	\$22.57	\$18.50	\$21.70	\$31.25	26

<b>Seasonal</b>	Average	Minimum	Median	Maximum	Observations
Mgmt. Company	\$20.46	\$19.75	\$20.01	\$22.36	10
Vineyard	\$19.50	\$19.00	\$19.50	\$20.00	2
Winery w/vineyards	\$22.53	\$18.50	\$20.83	\$30.00	14

*Hourly Compensation of Mechanic:*

<b>Year-Round</b>	Average	Minimum	Median	Maximum	Observations
Mgmt. Company	\$35.84	\$30.00	\$33.21	\$45.00	10
Vineyard	n/a	n/a	n/a	n/a	0
Winery w/vineyards	\$29.13	\$22.50	\$30.00	\$33.00	9

<b>Seasonal</b>	Average	Minimum	Median	Maximum	Observations
Mgmt. Company	\$27.58	\$19.75	\$31.00	\$32.00	3
Vineyard	n/a	n/a	n/a	n/a	0
Winery w/vineyards	\$50.00	\$50.00	\$50.00	\$50.00	1

*Hourly Compensation of Intern:*

<b>Year-Round</b>	Average	Minimum	Median	Maximum	Observations
Mgmt. Company	\$12.83	\$0.00	\$18.63	\$21.00	6
Vineyard	n/a	n/a	n/a	n/a	0
Winery w/vineyards	\$22.65	\$20.25	\$22.00	\$27.00	5

<b>Seasonal</b>	Average	Minimum	Median	Maximum	Observations
Mgmt. Company	\$14.31	\$0.00	\$18.63	\$20.00	4
Vineyard	n/a	n/a	n/a	n/a	0
Winery w/vineyards	\$22.00	\$18.00	\$22.00	\$25.00	6

This data shows a reasonable level of wage uniformity across worker and firm types. Year-round vineyard workers earn, on average, between \$22.57 and \$24.19 per hour. Interestingly, the range of wages paid to vineyard workers is much tighter among wineries than among other types of firms.

California’s minimum wage is \$15.50 per hour as of January 1, 2023, for employers of all sizes. The Napa wine industry pays, on average, significantly more than minimum wage. Even vineyard management companies pay well above the California minimum wage. All firms pay at least \$18.00 per hour to year-round, non-intern workers (see the minimum pay for year-round vineyard workers).

We asked firms to estimate the 2024 starting wage for year-round and seasonal vineyard workers. The median estimates of next year’s starting wage for year-round employees were all quite similar at about \$22/hr. Interestingly, the median starting wage estimated by vineyard management companies was lowest among the three types of firms, but these types of firms reported paying these workers a slightly higher average wage than wineries with vineyards. It is worth noting the mean estimated starting wages for year-round workers in 2024 were more varied, ranging between \$21.03 and \$23.25 per hour, and were highest among vineyards.

*Median Estimated 2023 Starting Wage for Year-round and Seasonal Vineyard Workers:*

	Winery w/vineyards	Vineyard	Mgmt. Company
Year-round	\$22.00	\$22.00	\$20.75
Seasonal	\$20.75	\$20.50	\$20.50

**Employee Benefits**

In addition to information about employees and their wages, respondents were also asked about the various types of benefits provided to their year-round and seasonal employees. We listed all the possible benefits that an employer could offer, and respondents checked whether they were or were not providing them. The following table shows the proportion of firms checking the box for the corresponding benefit, separating year-round and seasonal workers.

*Percentage of Companies that Provide a Benefit:*

Benefit:	Year-Round	Seasonal
Dental	60%	6%
Vision	50%	6%
Dependent Healthcare	58%	10%
Life Insurance	34%	2%
Education – Vocational	30%	2%
Education - School or College	12%	0%
Disability Insurance	32%	0%
Paid Vacation	90%	6%
Paid Holidays	88%	12%
Banking Assistance	16%	4%
401(k) plan	72%	8%
Legal Assistance	14%	0%
Carpooling	6%	4%
Wine	48%	10%
Fresh Produce	20%	4%
Housing	14%	0%
Child-Care Assistance	2%	0%

Over half of companies offer dental, vision, dependent healthcare, paid holidays, paid vacations, and 401(k) plans to year-round workers. For seasonal workers, few firms pay benefits, with no seasonal workers getting disability insurance and only 12% getting paid holidays. We also asked about the participation and salary matching in 401(k) plans. Over half of employees of wineries with vineyard managers participate in employer-sponsored 401(k)s, compared to a quarter of vineyard management company workers.

*Averages of Worker Participation, Salary Matching, and Cash Outs in Firm 401(k) Plans:*

	Percent Participating	Percent of Salary Matched	Share cashing out in 2023
Mgmt. Company	25.6%	12.7%	3.0%
Vineyard	0%	0%	0%
Winery w/vineyards	56.8%	7.8%	2.1%

## Labor

We collected data about labor shortages, the use of farm labor contractors, and how firms dealt with shortages and excesses of workers throughout the year. The tables below report our findings.

Nearly all firms had excess labor during the slower parts of the year (summer/winter). Most firms handled excess labor by saving activities that are not time-sensitive for these months (72%).

*Percentage of Companies Using Each Solution Below to Address their Excess Labor:*

Excess Labor Solution	
Lay off employees	26%
Cut hours during the work week	20%
Saved activities that are not time-sensitive for these months	72%

In contrast, few firms (12%) reported experiencing a labor shortage during 2023. Across company types, the share ranged from 0% for vineyards and 25% for vineyard management companies. The labor shortages reported by firms were the largest during the canopy management season, with a total labor shortage of 349 workers during canopy management. During the harvest season, firms reported a total shortage of 124 workers, with the greatest shortage among vineyard management companies.

*Percentage of Companies Reporting a Labor Shortage and the Total Shortage:*

Firm Type	Share of firms reporting a labor shortage	Total labor shortage (# of workers)	
		Canopy Management	Harvest
Winery w/vineyards	10%	15	13
Vineyard	0%	0	0
Mgmt. Company	25.0%	334	124
All firms	12.0%	349	137

The primary method firms used to alleviate labor shortages was to pay overtime – 100% of firms experiencing a labor shortage said they hired paid overtime. The majority of firms hired a farm labor contractor (67%), shifted the timing of some activities (67%), or utilized mechanization to solve their labor shortages (67%). Only one firm skipped some activities.

*Percentage of Companies Using Each Solution Below to Address their Labor Shortage:*

Labor Shortage Solution	
Hired an outside contractor	66.7%
Paid overtime	100%
Skipped some activities	16.7%
Mechanization	66.7%
Shifted the timing of some activities	66.7%
Other	16.7%

Nearly half of firms hired farm labor contractors local to Napa County (48%), but many relied on farm labor contractors from outside and inside Napa County; 16% of firms used contractors from outside and 4% used both.

*Percentage of Companies Hiring a Farm Labor Contractor by Type of Contractor:*

	Farm labor contractor type		
	Napa	Outside Napa	Both
Winery w/vineyards	53.3%	6.7%	3.3%
Vineyard	66.7%	16.7%	0.0%
Mgmt. Company	33.3%	41.7%	8.3%
All firms	48.0%	16.0%	4.0%

Additionally, survey respondents were asked to report the percentage of year-round employees living in Napa County. These percentages are relatively stable relative to 2021 for wineries with vineyards, but percentages decreased for vineyards and vineyard management companies.

*Share of Year-round Workers Living in Napa:*

	Percent living in Napa County (year-round)
Winery w/vineyards	78.8%
Vineyard	75.5%
Mgmt. company	49.3%

To estimate the total size of the labor force in Napa County, we took total employment as measured by the survey and scaled it up by the ratio of total winegrape acres planted in Napa County (45,402 acres in 2017) to total acreage covered by the survey (15,941 acres); this ratio is about 2.85. This method assumes every acre farmed by our respondents approximately represents 2.85 acres of winegrapes planted in Napa County. Similarly, the total labor shortage measured by our survey is scaled by the same ratio to estimate the “Estimated Total Labor Shortage” in Napa County. These two weighted sums are then added together to compute the “Estimated Total Need for Labor” in Napa County in 2023.

*Estimated Employment, Labor Shortage, and Need for Labor During the 2023 Harvest:*

	Estimated Total Employment	Estimated Total Shortage (Harvest)	Estimated Total Need for Labor in Napa Co.
Winery w/vineyards	1,729	37	1,766
Vineyard	288	0	288
Mgmt. Companies	3,694	353	4,047
Total	5,950	390	6,340

\* Total includes employees from 2 firms that did not specify firm type. These firms had no labor shortage, so it did not impact the total in column 2.

We focus on employment and labor shortages during the harvest months as demand for labor is greatest during that time of year. Total employment in Napa County during harvest is estimated at 5,950 workers. These firms were short an estimated 390 workers at the time, meaning that Napa County wine firms had a need for 6,340 workers during the 2023 harvest. As reported on page 11, Napa County wine firms utilized a range of solutions to solve this shortfall, from hiring additional workers from farm labor contractors to mechanizing some activities.

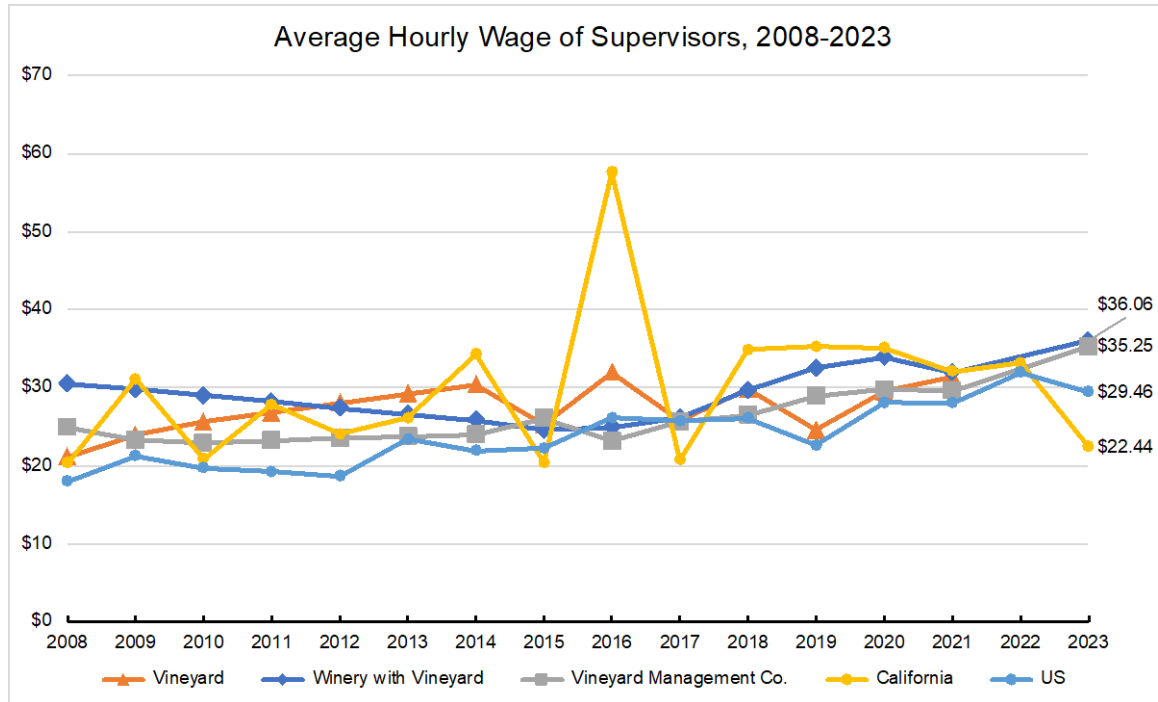
**VI. Benchmarking Analysis**

**Wages**

A useful way to benchmark the level of Napa County vineyard wages is to compare them to the hourly wages for similarly defined agricultural workers in the U.S. and in California. We collected data from the American Community Survey (ACS), which is a census of employees that collects wages and salary data on all workers in every U.S. state. We use the hourly wage data for agricultural supervisors and agricultural workers from the ACS and compare it to the historical average wage we have collected for vineyard supervisors

and workers in each year of the survey<sup>2</sup>. The data from the ACS were collected annually between 2008 and 2023 (see appendix for a detailed description) and lags by a year.

Figure 2: Time-trend Comparison of Supervisor Wages in Napa County by Type of Firm<sup>3</sup>

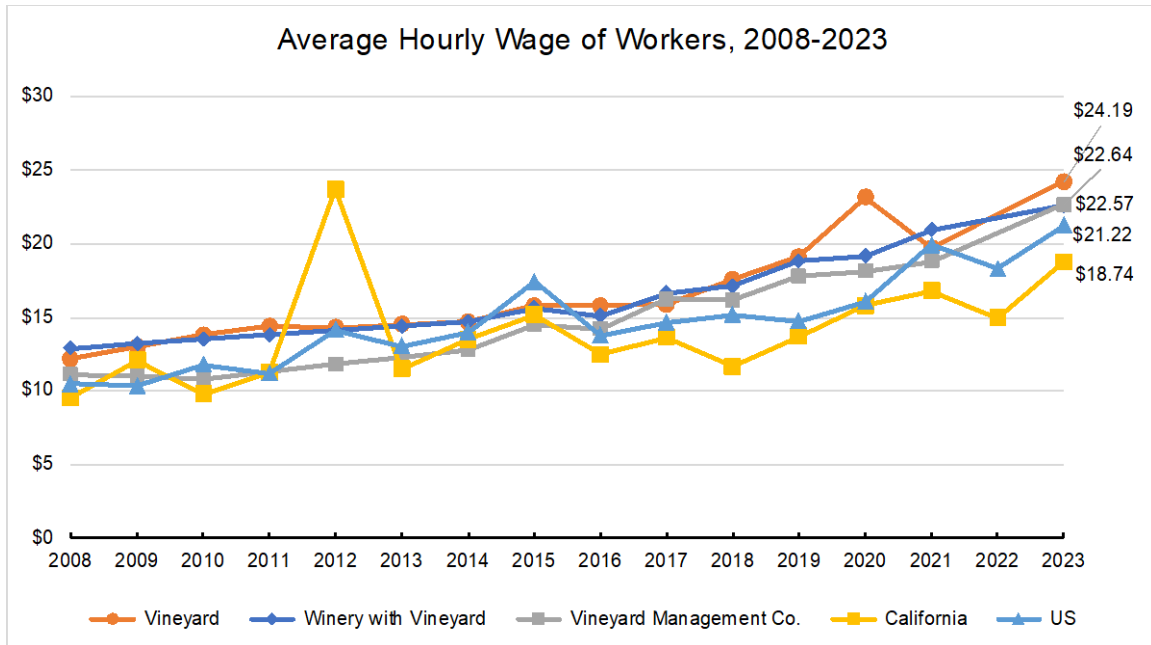


The two figures show very clearly some interesting trends. First, most firms in Napa paid well above the US and CA averages for comparable occupations in 2023 after many years of paying above the US average. This is largely due to decreases in US and CA wages between 2022 and 2023. Second, wages for supervisors by firms in Napa experienced large increases for wineries with vineyards and vineyard management companies between 2021 and 2023.

<sup>2</sup> The Napa Valley Wages & Benefits Survey collected data in 2006, 2007, 2008, 2010, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021 and 2023.

<sup>3</sup> Napa wage data for the years 2009, 2011, and 2012 were constructed by linear interpolation using data in the closest years. Vineyard wages for 2023 excluded because of small sample size (n=2).

Figure 3: Time-trend Comparison of Vineyard Worker Wages in Napa County by Type of Firm



Through 2023, vineyard workers in Napa received higher wages per hour than similar agricultural workers in CA and the rest of the U.S. While vineyard management companies now pay comparable wages to vineyard workers at vineyards and wineries, vineyards see the highest average wages in 2023, at about \$24.19 per hour.

### Cost of Housing

Regional variation in wages can occur for several reasons: local demand for labor, the local supply of workers with specific skills, local occupational hazards, local collective bargaining, and many others. One particularly important factor is the local cost of living: firms located in expensive areas must offer higher wages to attract workers. After examining the wages paid to vineyard supervisors and workers compared to other similar workers in the rest of California and the United States, in the previous section, we want to extend this comparison to cost of living, particularly, the cost of housing.

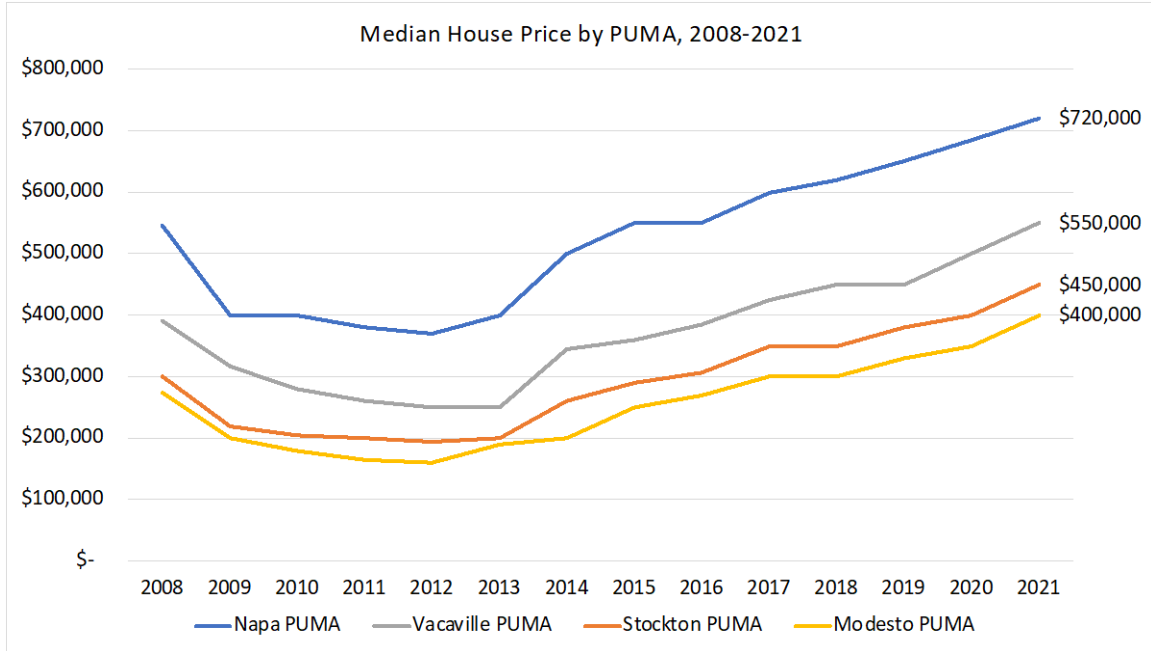
To compare the cost of housing in Napa to other similar areas we obtained home value and monthly rent data from the American Community Survey (ACS) for four Public Use Microdata Areas<sup>4</sup> (PUMAs) in California: Napa, Vacaville, Stockton, and Modesto. The Napa PUMA consists of all of Napa County, having the same border as the county. We selected a sample of employed workers with positive wages between the ages of 18 and 65 living in households. Using our sample of workers, we computed the median home value

<sup>4</sup> Public Use Microdata Areas, or PUMAs, are the smallest geographic unit for which the US Census Bureau reports detailed economic and demographic data from the ACS. Each PUMA must contain at least 100,000 people, of which there are 265 in California.



reported by homeowners and the median monthly rent reported by renters in each of the four PUMAs of interest.

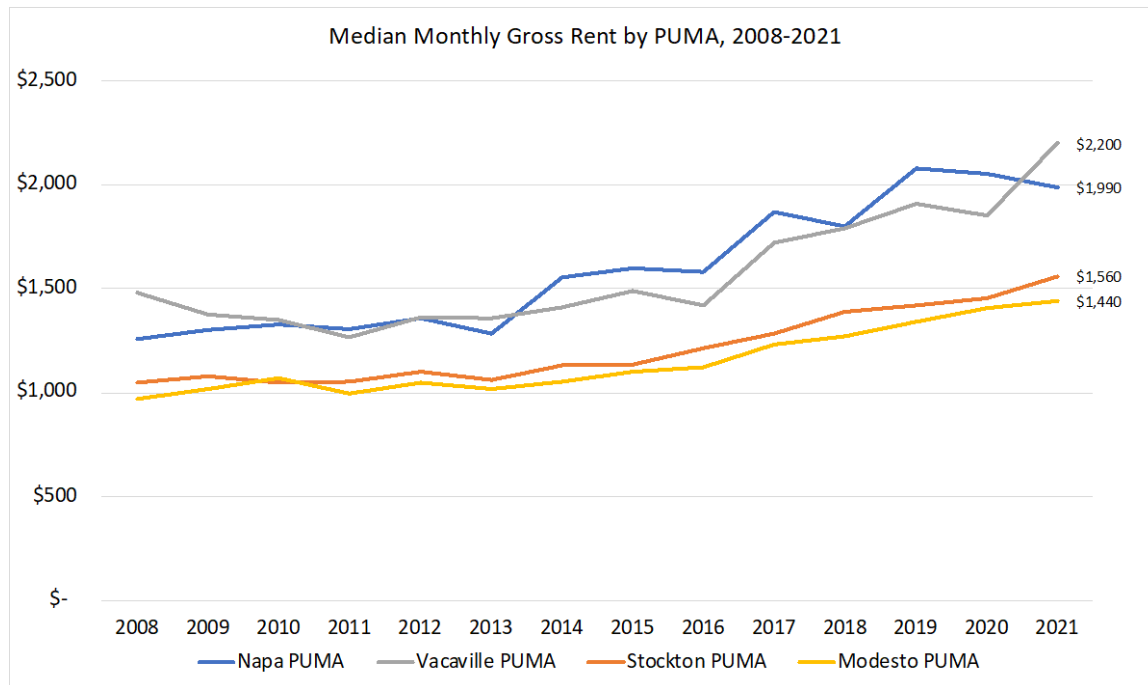
Figure 4: Median House Price by PUMA, 2008-2020



House prices in Napa are significantly higher than in the three other PUMAs we analyzed throughout the entire period. On average, the median house price in the Napa PUMA was about 31% higher than in the Vacaville PUMA and 80% higher on average than in the Modesto PUMA in the year 2021, which is the latest available in ACS. This chart demonstrates that at least part of the explanation for the high wages in Napa relative to the rest of California and the US – particularly for managers and supervisors in this case – is due to higher home prices.

We also analyzed monthly gross rent data from the ACS to better represent the cost of housing faced by lower-wage workers, such as vineyard workers, as they are more likely to be renters than homeowners. Gross rent is the preferred measure of renting costs because it is generally a better representation of overall housing cost than contract rent alone. Gross rent is defined as contract rent plus the additional cost of utilities (electricity, gas, water) and fuels (oil, coal, etc.).

Figure 5: Median Monthly Gross Rent by PUMA, 2008-2020



We find that the median monthly gross rent in the Napa and Vacaville PUMAs diverged after 2020. Between 2020 and 2021, median rent increased by 19% in Vacaville and decreased by 3% in Napa. As a result, rents in Napa were \$210 less per month than in Vacaville in the year 2021, the first time since 2013 that rent in Vacaville exceeded rent in Napa. Monthly gross rent in Napa and Vacaville is significantly higher than in either the Stockton or Modesto PUMAs, with gross rent in Napa about 30% higher than in Modesto in 2008 and increasing to 38% higher by 2021. The median monthly gross rent in Napa was \$1,990 in 2021, compared to \$2,200 in Vacaville, \$1,560 in Stockton, and \$1,440 in the Modesto PUMA. Again, this figure suggests that at least part of the reason we find Napa firms paying workers a premium compared to the rest of California may be due to housing costs.

### Calculation of Salary Net of Housing Costs

A useful metric for comparison is to compute gross rent as a share of income. We can estimate this for the average year-round vineyard worker by estimating annual earnings and annual rent using our data. The average year-round vineyard worker making the 2023 average wage of \$22.68 (across all firm types) and working an average of 2,220 annual hours has annual earnings of \$50,352.70 and would pay \$24,636 in annual housing rental costs (using the median value) to live in Napa, or about 47% of annual earnings. The same worker living in the Vacaville PUMA would spend over 50% of annual earnings as rent, not accounting for commuting costs.

We can also explore whether the difference in wages between Napa and other areas of California compensates workers for the difference in housing costs. For this comparison, we compute the annual wage and rent of working in Napa and living in either Napa or

Vacaville, and the annual wage and rent of living and working in Stockton or Modesto. We use the California average wage for non-supervisor agricultural workers for the hourly wage earned in Stockton and Modesto. We then compare income net of housing cost in each PUMA relative to living and working in Napa. The table below presents this comparison.

A vineyard worker living and working in the Napa PUMA earned \$50,352.70 (full time-full-year equal to 2220 annual hours) in 2023 and paid an annual rent of \$23,880 in 2023, earning \$26,473 after paying rent. The same worker could take home less annually by living in the Vacaville PUMA and working in Napa and by living and working in Stockton or Modesto PUMAs. Specifically, vineyard workers living in the Vacaville PUMA and working in Napa take home \$2,520 less annually than a vineyard worker living and working in Napa because the median Vacaville rent exceeds the median rent in Napa. If the same worker lived and worked in the Modesto PUMA they would take home \$2,160 less annually than if they lived and worked in Napa, based on the average pay in agriculture in California of \$18.74 per hour, and would take home \$3,600 less annually by living and working in the agricultural sector of the Stockton PUMA. This comparison does not include commuting costs, so vineyard workers living in Vacaville and working in Napa likely take home even less than what is reported here relative to vineyard workers working and living in Napa.

*Housing Costs and Wages by PUMA*

PUMA	Hourly wage	Monthly wage	Annual wage	Monthly rent*	Annual Rent*	Monthly Difference with Napa	Annual Difference with Napa
Napa	\$22.68	\$4,196.06	\$50,352.70	\$1,990.00	\$23,880.00	\$0.00	\$0.00
Vacaville	\$22.68	\$4,196.06	\$50,352.70	\$2,200.00	\$26,400.00	-\$210.00	-\$2,520.00
Stockton	\$18.74	\$3,466.04	\$41,592.54	\$1,560.00	\$18,720.00	-\$300.01	-\$3,600.16
Modesto	\$18.74	\$3,466.04	\$41,592.54	\$1,440.00	\$17,280.00	-\$180.01	-\$2,160.16

\* housing costs are from 2021, the last reported year for the four PUMAs reported in the American Community Survey.

**VII. Conclusions**

This survey provides information on the amounts of wages and benefits offered to vineyard employees in Napa County. Because the survey relates to Napa County vineyard employees, inferences for other agricultural workers or vineyard workers in other counties should not be made. With this in mind, our study finds that 2023 saw both increases and decreases in wages across the Napa County vineyard industry depending on the position.

## Appendix

### *Obtaining US and California wages from the American Community Survey*

To benchmark Napa County wages, we obtain wages from the American Community Survey (ACS) as presented in the Integrated Public Use Microdata Series (IPUMS) project.

First, we extracted data from the 1-year ACS samples from between 2009 and 2022 from IPUMS-USA. Then we keep only individuals - male and female - who are currently working, earn a positive wage, and are between ages 18 and 65. Using occupations from a modified version of the 1990 Census Bureau occupational classification scheme, we define supervisors and workers as follows:

The ‘agricultural supervisor’ occupation included:

- Farmers (owners and tenants)
- Horticultural specialty farmers
- Farm managers, except for horticultural farms
- Managers of horticultural specialty farms
- Supervisors of agricultural occupations

The ‘agricultural worker’ occupation included:

- Farm workers
- Graders and sorters of agricultural products
- Inspectors of agricultural products

Then we define (hourly wage) = (incwage/weeks)/uhrswork, where ‘incwage’ is annual income last year, ‘weeks’ is number of weeks worked last year, and ‘uhrswork’ is usual weekly hours worked last year. The variable ‘hourly wage’ is then directly compared to the average hourly wages for supervisors and vineyard workers in Napa County computed using our survey data.