



# CALIFORNIA'S WORKING LANDSCAPE:

A Key Contributor to the State's Economic Vitality

**NOVEMBER 2019**



**UNIVERSITY OF CALIFORNIA**  
Agriculture and Natural Resources



# PARTNERS

The Centers of Excellence (COE) collaborated with the University of California, Division of Agriculture and Natural Resources to study California's working landscape and the impact that industries associated with agriculture and natural resources have on the state's economy. This report represents an effort to quantify the role of the many people throughout the state whose livelihoods depend upon the state's fertile valleys, forested mountains, and rich oceans.



**California Community Colleges Centers of Excellence.** The Centers of Excellence (COE) for Labor Market Research deliver regional workforce research and technical expertise to California Community Colleges for program decision making and resource development. This information has proven valuable to colleges in beginning, revising, or updating economic development and Career Education (CE) programs, strengthening grant applications, assisting in the accreditation process, and in supporting strategic planning efforts.

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**University of California Agriculture and Natural Resources.** UC Agriculture and Natural Resources (UC ANR) connects campus-based researchers with

offices, programs, and academics in every county to provide science-based information to the people of California through Cooperative Extension and the Agricultural Experiment Stations. Ten Research and Extension Centers host over 1,300 research projects annually. Eleven statewide programs, collaborating with a wide array of external partners, support work on complex issues that need multidisciplinary approaches. UC ANR's mission is to: "Engage UC with the people of California to achieve innovation in fundamental and applied research and education that supports

- sustainable, safe, and nutritious food production and delivery
- economic success in a global economy
- a sustainable, healthy, and productive environment
- science literacy and youth development programs.



**California Economic Summit.** California Economic Summit Action Teams play a key role in developing a roadmap for promoting triple-bottom-line prosperity in California. Working Landscapes is one of seven Action Teams chartered in 2013 to address key priorities that regions across California have identified as critical to creating jobs and promoting competitiveness in through:

- Triple-bottom-line prosperity: simultaneously advancing economic, social and environmental progress.
- Global connectivity: California's competitiveness depends on greater connectivity to global markets.
- Regional alignment: develop a consensus around priorities that are widely shared among regions.

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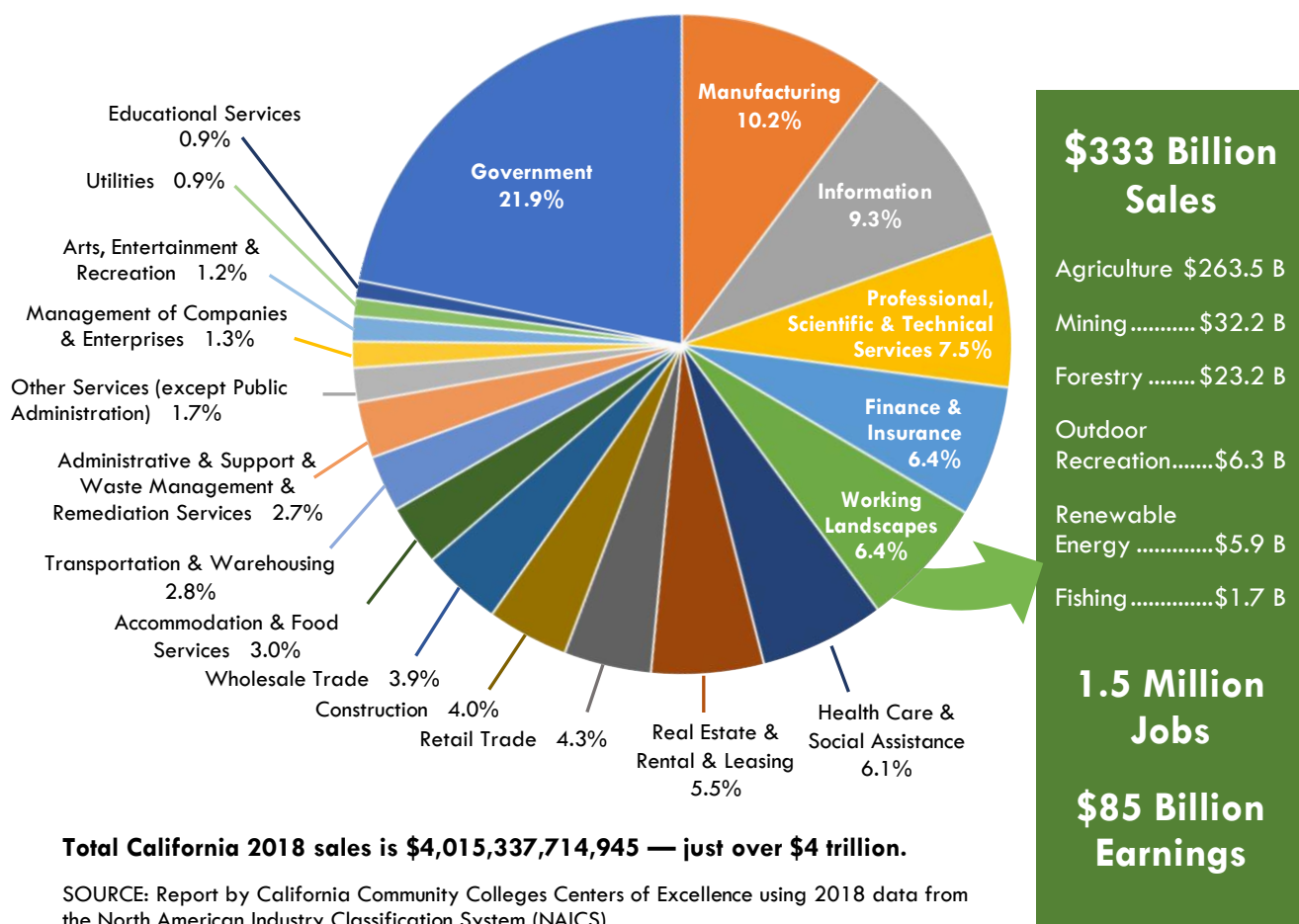
# EXECUTIVE SUMMARY

California is the nation's largest agricultural producer and is the nation's sole exporter of many agricultural commodities, supplying 99% or more of almonds, artichokes, and garlic. However, California's working landscape is not limited simply to agriculture. This study identifies and analyzes nine segments, including support activities such as agricultural distribution and processing, that are associated with the working landscape. The nine segments of focus are: agricultural distribution, agricultural processing, agricultural production, agricultural support, fishing, forestry, mining, outdoor recreation, and renewable energy.

Collectively, these segments contribute significantly to the state's economic vitality and account for many jobs in the labor market. A key finding of this study is that California's working landscape supports more than 1.5 million jobs and nearly 70,000 business establishments. In 2018, the nine working landscape segments paid workers \$85 billion in earnings and generated \$333 billion in sales.

The study employs three measures to gauge the contribution of each working landscape segment to the state economy: number of jobs, total earnings paid to workers, and total sales income. These numbers provide an indication of the breadth of each segment's workforce and its financial contribution to regional economies.

## Total California sales for all 20 industry sectors, with new "working landscapes" segment.



Total California 2018 sales is \$4,015,337,714,945 — just over \$4 trillion.

SOURCE: Report by California Community Colleges Centers of Excellence using 2018 data from the North American Industry Classification System (NAICS)

Four working landscape segments are economic powerhouses within the working landscape: agricultural distribution, agricultural production, agricultural processing, and agricultural support. These are the largest employers of the nine segments, pay the most earnings, have the most business establishments, and generate the most sales income. Agricultural production leads in the area of employment, with 325,200 jobs statewide, followed by agricultural support, nearly 320,000 jobs.

Agricultural distribution and agricultural support lead with the number of business establishments, a combined total of 39,000. The earnings these segments pay to workers is also substantial. For example, agricultural support paid \$17.9 billion in earnings in 2018, while agricultural distribution paid \$17.8 billion.

Agricultural processing is the top segment for sales income, producing \$113.3 billion in 2018. Agricultural production sales income, meanwhile, totaled \$60.9 billion, followed by agricultural distribution, \$57.4 billion. At the other end of the spectrum, the fishing and renewable energy

*California's working landscape makes up 6.4% of the total economy and contributes \$333B in sales, 1.5M jobs and \$87B in earnings.*

segments are the smallest working landscape segments for all measures: establishments, jobs, earnings, and sales. However, while some working landscape segments might seem small in comparison to the agricultural segments, they are still sizeable when compared to the nation. For example, California has the largest outdoor recreation economy in the United States and the value of mineral production through the mining industry ranks fourth in the nation.

The study also examined the geographic concentration of jobs for each of the nine segments. The Los Angeles/Orange County region, the San Francisco Bay Area, and San Joaquin Valley have the greatest concentration of jobs for agricultural distribution, agricultural processing, agricultural support, mining, and renewable energy. The San Joaquin Valley, followed by the Central Coast, dominates in the agricultural production segment. Forestry jobs are greatest in the Los Angeles/Orange County and Inland Empire regions, while fishing and outdoor recreation jobs are greatest in the San Francisco Bay Area, which follows the Los Angeles/Orange County region.



# INTRODUCTION

From the arrival of Spanish missionaries in the 1700's to the frenzied Western migration spurred by the Gold Rush in the 1840's, California's abundance has driven economic growth for at least three hundred years.

In light of the important role that the landscape has played in California's development as the fifth largest economy in the world and the nation's largest agricultural producer, the Centers of Excellence collaborated with the University of California Office of the President, Division of Agriculture and Natural Resources to measure the economic impact of the many facets of the state's working landscape, from fishing to agriculture and ranching, from mining to renewable energy. This report represents an effort to quantify the contributions of Californians whose livelihoods are tied to the land.

The term "working lands" has typically been used to describe conservation efforts focused on protecting rural lands, namely agricultural land, forests used for timber, and range lands. This report has adopted the broader term "working landscape" which goes beyond the "working lands" definition to encompass the economic benefits derived from ocean fishing, renewable energy generation, mining, and public lands used for outdoor recreation.

In addition to the economic value of their products, working lands are complex systems encompassing many other dimensions that are more difficult to measure, and which some might deem priceless—dimensions of social, cultural, aesthetic, and ecological importance.<sup>1</sup>

Recognizing this, various states have launched initiatives to protect their working lands. These efforts have typically been undertaken by rural states, such as North Carolina and Oregon, in conjunction with landowners, with an eye toward conservation measures to limit wildland fragmentation, protect biodiversity, and safeguard the dwindling parcels owned by small farmers.<sup>2</sup>

In most cases, the long-term economic benefits derived from working lands have been an impetus for these initiatives. For example, according to the Willamette Partnership in Oregon, "More investment in green infrastructure and in mitigation of gray infrastructure creates new, higher-paying jobs that are closer to home. And, nature-based solutions are long-lasting and resilient, which means less cost to ratepayers over time."<sup>3</sup>

Vermont has emerged as a leader in the working lands arena. In 2010, the state released a report on strategies implemented elsewhere in the world that have proven effective in promoting working landscapes.<sup>4</sup> Then in 2012, the state passed legislation in support of a plan to measure and increase

***"Working landscapes are a related concept. The 'landscape' part of working landscapes has the same meaning—a cohesive, ecologically and socially connected area of land. The 'working' part tells us something about the land use and economic importance of a landscape."***

**—GLOBAL RANGELANDS,  
A COLLECTIVE EFFORT OF  
19 LAND-GRANT  
UNIVERSITIES, INCLUDING  
THE UNIVERSITY OF  
CALIFORNIA**

<sup>1</sup> "Landscapes and Working Landscapes: What Are They?" Global Rangelands, 2019, <https://globalrangelands.org/topics/large-landscape-conservation/landscapes-and-working-landscapes-what-are-they>.

<sup>2</sup> "Working Lands Conservation," College of Natural Resources, North Carolina State University, June 2015, <https://sentinelandscapes.wordpress.ncsu.edu/files/2015/06/TrainTheTrainerManual-1.pdf>.

<sup>3</sup> "What We Do," Willamette Partnership, 2019, <http://willamettepartnership.org/about/strategies/>.

<sup>4</sup> Morse, Cheryl E. and Richard Kujawa, "Strategies for Promoting Working Landscapes in North America and Europe," Vermont Council on Rural Development, August 2010, [https://www.vtrural.org/sites/default/files/content/working%20landscape/UVM\\_StrategiesforPromotingWorkingLandscapes.pdf](https://www.vtrural.org/sites/default/files/content/working%20landscape/UVM_StrategiesforPromotingWorkingLandscapes.pdf)

the economic impact of its working lands. Three main goals were adopted in 2015: growth in number of jobs, number of acres in use, and business establishments.<sup>5</sup> A key component of Vermont's plan is encouraging entrepreneurship, and additional performance measures were selected to help track progress on supporting businesses that rely on working lands.

The work by Vermont offers a framework upon which other states, particularly California, could expand and build upon. Future reports seeking to further illuminate the value of California's working landscape may choose to incorporate the performance measures used to track Vermont's nine working lands objectives.

While Vermont's working landscape employs approximately 13,000 workers and contributes about \$1.5 billion in revenue to the state every year, California's working landscape is substantially larger and more complex.<sup>6</sup> As a result, this study analyzes nine key industry segments to derive a picture of the working landscape's overall contribution to California's economy.

### **Working landscape segments**

The bounty produced by California's working landscape has a ripple effect throughout the larger economy and fuels the growth of many associated sectors, such as food and beverage processing, and food and agricultural product distribution. It even could be argued that California's \$126 billion tourism industry is partially derived from the state's working landscape as well.

For the purpose of this report, the following segments were identified as most closely linked to California's working landscape:

- Agricultural Distribution
- Agricultural Processing
- Agricultural Production
- Agricultural Support
- Fishing
- Forestry
- Mining
- Outdoor Recreation
- Renewable Energy

The nine working landscape segments identified for this study and their sub-segments contribute significantly to the state's business and economic development and account for many jobs in the labor market.

<sup>5</sup> "Organizational Plan," Vermont Working Lands Enterprise Initiative, approved September 17, 2015, [https://workinglands.vermont.gov/sites/ag\\_wlei/files/WLEB%20Org%20Plan%20approved%2091515.pdf](https://workinglands.vermont.gov/sites/ag_wlei/files/WLEB%20Org%20Plan%20approved%2091515.pdf).

<sup>6</sup> "Healthy Forests and Wildlife," Vermont Conservation Voters, 2019, <http://vermontconservationvoters.com/issues/healthy-forests-wildlife/>.

## **Examples of Vermont's Working Lands Measures**

### **Job creation and retention**

- Number of employees (FTE)
- Number of jobs created

### **Income**

- Gross sales
- Percentage change in gross sales
- Net income
- Percentage change in net income

### **Production output**

- Percentage change in output
- Acres in active forestry or agricultural use
- Acres in production

### **Compensation**

- Total payroll
- Average wage per FTE



With more than 71,000 farms producing 400 different commodities, California is an agricultural behemoth.<sup>7</sup> It is the nation's the most agriculturally productive state, followed by Iowa and Texas.<sup>8</sup> Known as the avocado capital of the world, the strawberry capital of the world, and the almond capital of the world, it is no wonder that California farmers and ranchers received \$50 billion in 2017 for their products.<sup>9</sup> According to Feeding the Economy, the nearly 23 million workers in the food and agriculture industries represent 15% of United States employment.<sup>10</sup> California exported nearly a third of its agricultural production in 2017, worth more than \$20 billion, illustrating California's role as a key player in the global agricultural economy.<sup>11</sup>

Beyond the food and agriculture industries, the value of California's working landscape is magnified through each subsequent layer of the economy. For example, the state's food and beverage processing sector, accounts for \$82 billion of value added and 760,000 jobs.<sup>12</sup> Other industries associated with the working landscape also help drive the California economy. It is

estimated the outdoor recreation industry generates \$92 billion in consumer spending annually.<sup>13</sup> Meanwhile, in the area of renewable energy, California is the nation's largest producer of electricity from solar, geothermal, and biomass resources,<sup>14</sup> with solar energy jobs totaling nearly 77,000.<sup>15</sup> Regarding mining, California is the only U.S. producer of boron compounds and rare earth elements, and leads the nation in the production of construction sand and gravel and diatomite.<sup>16</sup>

Structurally, this report provides an overview of California's working landscape and its economic contribution by taking a detailed look at nine industry segments. Multiple methods are utilized to describe and quantify labor and employment, including an analysis of the size of each segment's workforce, earnings, and total sales income.

<sup>7</sup> "California Agricultural Statistics Review 2017-2018," California Department of Food and Agriculture, 2018, <https://www.cdffa.ca.gov/statistics/PDFs/2017-18AgReport.pdf>.

<sup>8</sup> Ibid.

<sup>9</sup> Ibid.

<sup>10</sup> "U.S. Food and Ag Industries," Feeding the Economy, accessed June 12, 2019,

<https://goodstone.guerrillaeconomics.net/reports/f19d0821-102b-4391-914d-e65927f77927>

<sup>11</sup> "California Agricultural Statistics Review 2017-2018," California Department of Food and Agriculture, 2018, <https://www.cdffa.ca.gov/statistics/PDFs/2017-18AgReport.pdf>.

<sup>12</sup> Sexton, Richard J., Josue Medellin-Azuara, and Tina L. Saitone, "The Economic Impact of Food and Beverage Processing in California and Its Cities and Counties," California League of Food Processors, January 2015, [http://clfp.com/wp-content/uploads/CLFP\\_FINAL\\_Report\\_1\\_29\\_15.pdf](http://clfp.com/wp-content/uploads/CLFP_FINAL_Report_1_29_15.pdf).

<sup>13</sup> "California," Outdoor Industry Association, July 2017, [https://outdoorindustry.org/wp-content/uploads/2017/07/OIA\\_RecEcoState\\_CA.pdf](https://outdoorindustry.org/wp-content/uploads/2017/07/OIA_RecEcoState_CA.pdf).

<sup>14</sup> "California State Profile and Energy Estimate," U.S. Energy Information Administration, November 15, 2018, <https://www.eia.gov/state/?sid=CA>.

<sup>15</sup> "Solar Jobs Census 2018," The Solar Foundation, 2018, <https://www.solarstates.org/#states/solar-jobs/2018>.

<sup>16</sup> Clinkenbeard, John, "California Geological Survey New Report on 2015 Non-Fuel Mineral Production Finds Gold Production at 160,767 Ounce," Sierra Sun Times, August 6, 2017, <https://goldrushcam.com/sierrasuntimes/index.php/news/local-news/10694-california-geological-survey-new-report-on-2015-non-fuel-mineral-production-finds-gold-production-at-160-767-ounces>.



# METHODOLOGY

The working landscape is complex and quickly evolving, spanning dozens of industries and industry sub-sectors. In conducting this study, the challenge facing the research team was to identify relevant industries based on each working landscape segment's diverse mix of technologies, products, and companies. To accomplish this analysis, the research team defined the working landscape using codes created by the North American Industry Classification System (NAICS).<sup>17</sup>

Since an overarching industry code does not exist for California's working landscape, nearly 200 industries were grouped into segments to accurately organize and track labor market data, primary activities, and economic impact by each working landscape segment. The resulting nine segment groupings include businesses engaged in agricultural distribution, agricultural processing, agricultural production, agricultural support, fishing, forestry, mining, outdoor recreation, and renewable energy. (Refer to Appendix A for a complete list of NAICS codes used to define each of the nine segments related to the working landscape.)

Several segments related to the harvesting and use of natural resources were identified. As a result, mining is included as an important segment of the California working landscape. This is because mining is an industry based on the extraction of metals and minerals that can be a particularly important economic driver in rural areas of the state. Mining, like agriculture, requires significant water resources, land, and labor.

An objective of this study was to measure the importance and impact of the nine working landscape segments in the state and by region. For example, some segments, although relatively small in terms of employment or sales income, are cornerstones of local economies and play a critical role in the livelihoods of communities. For the purpose of this study, geographic areas clustered by county were selected and organized by the University of California Office of the President, Division of Agriculture and Natural Resources. These regions and their associated counties are defined in Appendix B.

For each of the nine working landscape segments, the study uses three metrics to gauge their contribution to regional economies and the state's overall economy:

- Employment (number of jobs)
- Total earnings paid to workers
- Sales income generated by business establishments in each segment

## Definitions of Working Landscape Measures

### Employment

Employment measures the number of jobs in a specific industry, county, or for a type of worker, such as full time or part time.

### Total Earnings

The total industry earnings for a region. Includes wages, salaries, supplements (additional employee benefits), and proprietor income. Total earnings is one of the four components of Gross Regional Product (GRP). The other elements are profits/property income, taxes on production and imports, and subsidies.

### Sales Income

In input-output modeling, sales income is an industry's total annual sales (gross receipts), both to other industries and to consumers.

### Source:

Emsi model incorporating data from the Bureau of Economic Analysis (BEA).

<sup>17</sup> NAICS is the standard used by federal statistical agencies to classify business establishments for the purpose of collecting, analyzing, and publishing statistical data related to the U.S. business economy. The U.S. NAICS Manual includes definitions for each industry, background information, tables showing changes between 2012 and 2017, and a comprehensive index. [https://www.census.gov/eos/www/naics/2017NAICS/2017\\_NAICS\\_Manual.pdf](https://www.census.gov/eos/www/naics/2017NAICS/2017_NAICS_Manual.pdf)

The study uses these three data points to quantify the contribution of the working landscape segments to the state's economy. These three metrics are common variables that are indicators of the strength, weakness, or health of an economy. They affect the livelihoods of people and contribute value to the state's economy as a source of financial wellbeing that creates spending ripple effects through local and state economies.

Employment was used as a metric to help measure the workforce component of the working landscape. Employment captures how important each working landscape segment is for the populations of each region in the state. Historically, employment has been used as an indicator of the health of an economy.

Earnings can be used in conjunction with employment to broaden our understanding of an industry segment's importance in a regional economy. Earnings, i.e., the annual wages and benefits paid to workers, are related to how consumers spend money and tend to have a broad effect in the economy, influencing the demand for goods and services.

## Sales versus Gross Domestic Product (GDP)

Although GDP is commonly used to gauge the health of the economy, it is not the most useful measure to compare the value of industry segments to each other with consistent proportions. This is largely due to the inconsistent handling of inventories — goods a company has on hand but hasn't yet sold to customers — coupled with variabilities in how investments are valued. In some sectors, inventories can regularly swing up, then down, and the size change can be big. On the other end of the spectrum, natural resource-based economies can often hold inventories for years, even decades, in the case of trees or livestock. Given that business spending on inventories is one of the key components of GDP measures, it can be misleading. Data on sales, while having some drawbacks, is one way to obtain a more accurate comparison of the relative value of various industry segments.

Sales income contributes to Gross Regional Product, a measure of a society's wealth, reflecting an increase or decrease in profits. Sales income helps strengthen the state's position as the fifth largest economy in the world. The sales income of each of the working landscape segments indicates the fiscal importance of each segment regionally and in the state's economy.

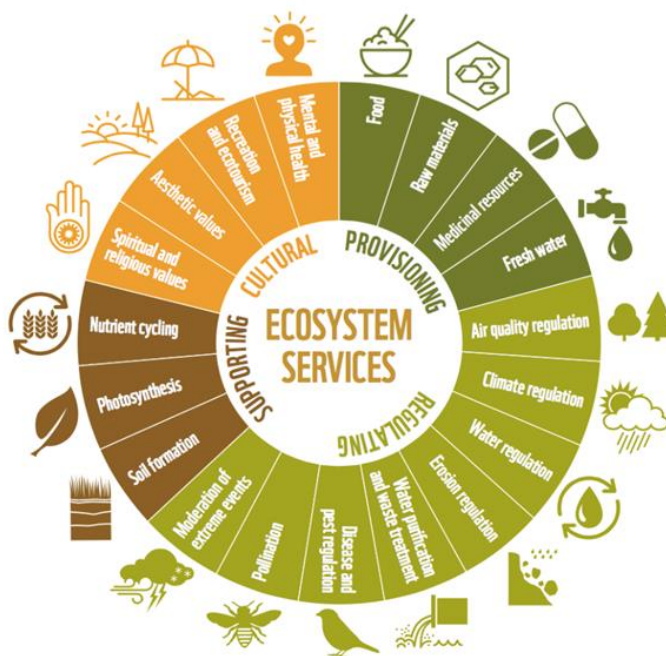
All data is from 2018 and sourced from Emsi, a national provider of labor market information. Appendix C contains a list of references used in the literature review which informed this study.



# ECOSYSTEM SERVICES

## The Value of Ecosystem Services is Not Included in this Report

California's working landscapes include farmland, ranches, forests, wetlands, mines, water bodies and other natural resource lands, both private and public. Ecosystem services are ways that the natural world provides biological necessities, such as clean water, nutritious food and a livable climate, as well as indirect economic benefits, such as jobs and revenue created along food value chains. More broadly, they encompass intangible goods that contribute to human well-being, such as recreation, aesthetic inspiration and cultural connection. What they have in common is that they depend on "natural capital," or in other words, the generative capabilities of natural systems.



A widely accepted framework for understanding these relationships and identifying "bundles" of ecosystem services was developed by the United Nations in the Millennium Ecosystem Assessment (MA). At the heart of this framework are four categories of ecosystem services: provisioning, regulating, cultural and supporting.

Compared to financial and built capital, natural capital is often taken for granted, leading to underinvestment in the natural systems that sustain them—a market failure that hits particularly hard in rural areas. The result has been a continuing depletion of natural capital, with examples ranging from falling groundwater levels and loss of productive farmland to poor air quality and declining biodiversity.

In California, however, there is a growing recognition of the importance of natural capital, especially in relation to conserving

working landscapes and stabilizing rural economies. The state has become a global leader in linking environmental stewardship and economic development through ecosystem services markets. Its climate policies, for example, integrate resource conservation, infrastructure planning and social equity—and they include programs that protect natural capital by directly paying farmers and ranchers for ecosystem services.

While market-based approaches can raise both ethical concerns and practical challenges, they are showing promising results in California, and have helped to address environmental challenges elsewhere. The most effective means of representing these relationships are through mapping and modeling tools capable of integrating vast amounts of scientific data across broad landscapes in ways that are accessible to local policy makers, stakeholders and the general public. A stronger framework for mapping, valuing and investing in ecosystem services can ensure that those who manage California's working landscapes benefit from stewarding this "natural capital."



# The Value of California’s Ecosystem Services Could Surpass Direct Sales

New techniques for quantifying the value of open space, natural areas and working lands, and their ecosystem services clearly demonstrate that nature has significant value and provides exceptional return on investment. While this report does not attempt to derive a monetary value for the ecosystem services provided by California’s working landscape, it is a study that should be pursued.

Supporting that goal, some California counties have recently pursued valuation of their ecosystem services. The Healthy Lands & Healthy Economies initiative “monetizes,” for the first time, the value of ecosystem services provided by working and natural lands within Santa Clara, Santa Cruz and Sonoma counties — estimated to be up to \$11.2 billion annually. More studies throughout California will enable decision-makers to better target investments in working landscapes where they will serve the greatest public good.

For example, Santa Clara County’s natural capital provides ecosystem services to people and the local economy that range in value from \$1.6 billion to \$3.9 billion. If the County’s natural capital were valued similarly to infrastructure such as roads, buildings and bridges (built capital) that depreciate over time, its minimum asset value would be between \$45 billion and \$107 billion.

Data from Sonoma County showed a range of 2.2 billion to 6.6 billion in natural capital in 2015:

## A Three-County Initiative

A collaboration led by Sonoma County Ag + Open Space, the Resource Conservation District of Santa Cruz County, and the Santa Clara Valley Open Space Authority, the Healthy Lands and Healthy Economies Initiative was formed to answer:

- What benefits and economic values are provided to the community, region, and state by working and natural lands?
- What is the return on investment from conservation investments to date?
- What are innovative, economically sound financing mechanisms for conservation of working and natural landscapes?

[sonomaopenspace.org/projects/healthy-lands-healthy-economies/](http://sonomaopenspace.org/projects/healthy-lands-healthy-economies/)

## ANNUAL VALUE OF SONOMA COUNTY NATURAL CAPITAL

Annual value provided by natural capital in Sonoma County, in millions of 2015 dollars. The range for each service indicates the low and high values estimated using the benefit transfer method.

Ecosystem Service	\$ Millions Per Year Countywide (low estimate)	\$ Millions Per Year Countywide (high estimate)
Water Supply	\$9M	\$180M
Wastewater Treatment	\$35M	\$117M
Moderation of Extreme Events	\$82M	\$220M
Urban Stormwater Management	\$0.2M	\$8M
Soil Retention and Formation	\$4M	\$620M
Carbon Sequestration	\$58M	\$197M
Air Quality	\$19M	\$22M
Pollination	\$218M	\$367M
Habitat and Nursery	\$4M	\$43M
Biological Control	\$8M	\$23M
Natural Beauty	\$1,214M	\$4,182M
Recreation and Tourism	\$500M	\$596M
<b>GRAND TOTAL</b>	<b>\$2,151M (or \$2.2 billion)*</b>	<b>\$6,575M (or \$6.6 billion)*</b>

\* The totals reported are based upon rounded values from individual services. For precise values, please see the original study. <https://www.sonomaopenspace.org/wp-content/uploads/HLHE-Sonoma-Report-Ag-Open-Space-lores-1.pdf>

# STATE OVERVIEW

## Working landscape employment

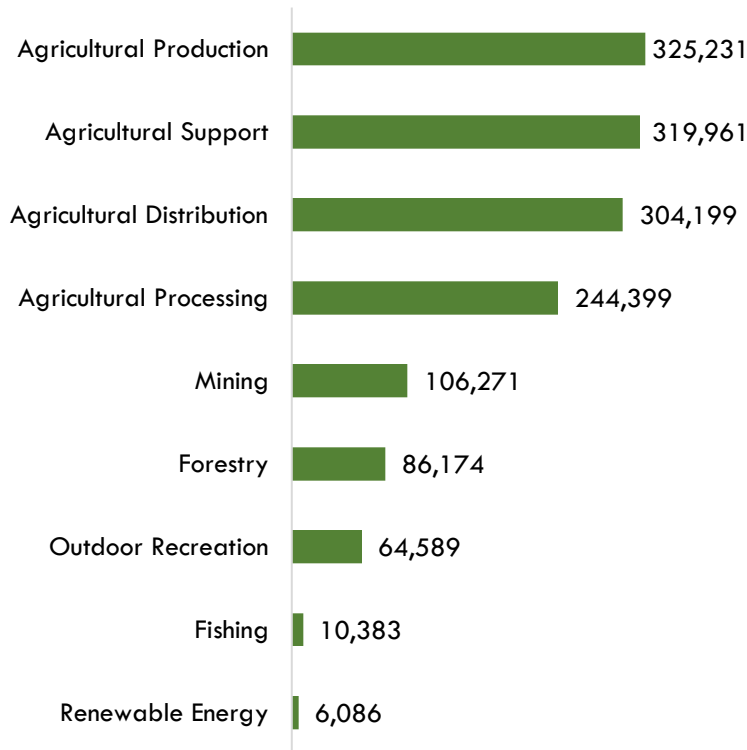
In total, the nine working landscape segments provide nearly 1.5 million jobs in the state. When looking at employment, the segments in California's working landscape that have the most jobs are agricultural production, agricultural support, agricultural distribution, and agricultural processing (Exhibit 1).

Combined, agricultural production, agricultural support, agricultural distribution, and agricultural processing account for 80% of all working landscape jobs, demonstrating the importance of agriculture and its associated jobs to the state's working landscape and overall economy. In total, these four segments employ 1.2 million people.

Mining jobs are also a significant contributor to working landscape employment. This segment counted more than 106,000 jobs in 2018. This segment is followed by forestry with more than 86,000 jobs. The smallest segments in terms of employment are outdoor recreation, fishing, and renewable energy.



**Exhibit 1. Jobs by working landscape segment, 2018**

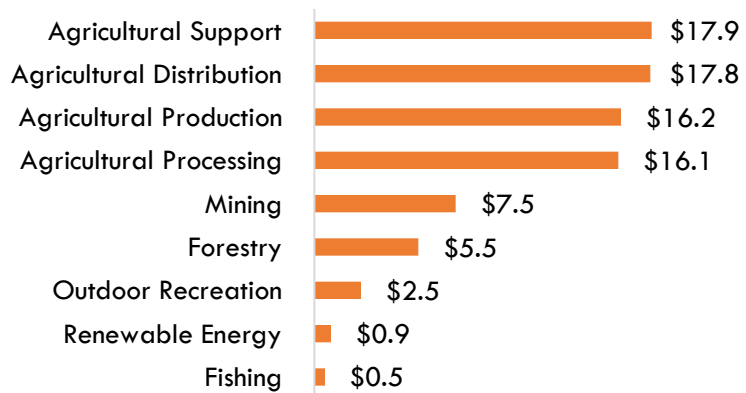




## Working landscape earnings

The study analyzed the total amount of earnings paid to workers in each of the nine working landscape segments. Overall, the working landscape generates \$85 billion in earnings statewide (Exhibit 2). Agricultural support, \$17.9 billion in earnings, and agricultural distribution, \$17.8 billion in earnings, are nearly tied for the segment with the greatest amount of earnings. Agricultural production paid the third greatest amount, \$16.2 billion, followed by agricultural processing, \$16.1 billion. Together, these four agriculture-related segments accounted for 80% of total earnings paid to workers by the working landscape segments in the state.

**Exhibit 2. Earnings by working landscape segment, 2018, in billions (\$)**



## Working landscape sales income

California's working landscape plays an important role in the state's economy, generating \$333 billion in sales income in 2018. Exhibit 3 shows the total sales for each of the nine segments comprising the state's working landscape.

The agricultural processing segment generated the largest amount of sales income, \$113 billion, accounting for over a third of all working landscape segments' sales. Agricultural production is another leader in sales income. The segment reported \$61 billion in sales in 2018. Agricultural distribution sales totaled \$57 billion.

Data related to sales and employment jobs shows that crop production, wineries, other scientific and technical consulting services, animal production, and crude petroleum extraction accounted for the most sales in 2018, as well as the highest number of jobs. California remained the leading state in cash receipts for agricultural products in 2017, with combined commodities representing 13% of the U.S. total.<sup>18</sup> Over 27% of California farms generated commodity sales greater than \$100,000, which exceeds the national average for this category of 20%.<sup>19</sup>

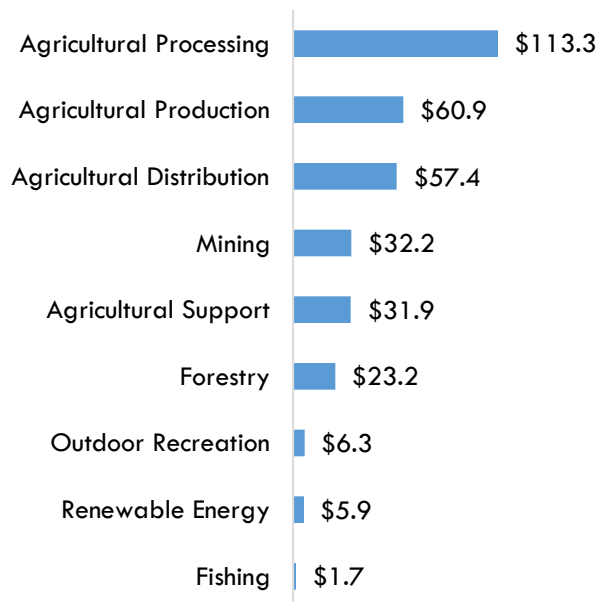
<sup>18</sup> "California Agricultural Statistics Review 2016-2017," California Department of Food and Agriculture, 2017, <https://www.cdfa.ca.gov/Statistics/PDFs/2016-17AgReport.pdf>.

<sup>19</sup> "California Agricultural Statistics Review 2017-2018," California Department of Food and Agriculture, 2018, <https://www.cdfa.ca.gov/statistics/PDFs/2017-18AgReport.pdf>.

A noteworthy finding of this study is that although mining employment is smaller than the agricultural segments of the working landscape, it generates slightly more sales income than the agricultural support segment. In fact, California is one of the nation's leaders in terms of mining revenue. California's mineral production value is the fourth largest in the United States, after Nevada, Arizona, and Texas.<sup>20</sup>

Although the outdoor recreation segment generated a smaller amount of sales income, a total of \$6.3 billion in 2018, when compared to the other working landscape segments, its impact is considerable. According to the Outdoor Industry Association, outdoor recreations generated \$92 billion in consumer spending in 2017.<sup>21</sup> The Outdoor Industry Association also reports that 56% of California residents participate in outdoor recreation activities each year.<sup>22</sup> In addition, according to AB 1111 to establish an Office of Outdoor Recreation in the Office of the Governor, California's outdoor recreation economy is the largest in the nation.<sup>23</sup>

**Exhibit 3. Sales by working landscape segment, 2018, in billions (\$)**



## California's Agricultural Exports

Over the last 10 years, California's agricultural exports have nearly doubled in value, from \$11.1 billion in 2007 to \$20.56 in 2017. In 2017, California exported approximately 28% of its agricultural production by volume.

California is the nation's sole exporter of many agricultural commodities, supplying 99% or more of the following: almonds, artichokes, dates, dried plums, figs, garlic, kiwifruit, olives and olive oil, pistachios, raisins, table grapes, and walnuts. California's top 10 export destinations accounted for 70 percent of the 2017 export value: the European Union, Canada, China/Hong Kong, Japan, Mexico, Korea, India, United Arab Emirates, Turkey, and Vietnam.

The largest growth in total export value was spurred by India, a 32.5% increase compared to the previous year. California's top five agricultural exports are almonds, dairy and products, pistachios, wine, walnuts, and walnuts.

### Sources:

"California Agricultural Exports, 2017-2018," California Department of Food and Agriculture, 2018, <https://www.cdffa.ca.gov/statistics/PDFs/2017-18AgExports.pdf>.

"California Agricultural Statistics Review 2017-2018," California Department of Food and Agriculture, 2018, <https://www.cdffa.ca.gov/statistics/PDFs/2017-18AgReport.pdf>.

<sup>20</sup> "The Top 5 Mineral Producing States," Department of the Interior, U.S. Geological Survey, April 14, 2017, <https://www.usgs.gov/news/top-5-mineral-producing-states>.

<sup>21</sup> "California," Outdoor Industry Association, July 2017, [https://outdoorindustry.org/wp-content/uploads/2017/07/OIA\\_RecEcoState\\_CA.pdf](https://outdoorindustry.org/wp-content/uploads/2017/07/OIA_RecEcoState_CA.pdf).

<sup>22</sup> "California, 4th Congressional District," Outdoor Industry Association, accessed June 27, 2019, [https://outdoorindustry.org/wp-content/uploads/congressionaldata/CALIFORNIA/OIA-ConDist-California\\_4.pdf](https://outdoorindustry.org/wp-content/uploads/congressionaldata/CALIFORNIA/OIA-ConDist-California_4.pdf).

<sup>23</sup> "AB-1111 Outdoor recreation: Office of Outdoor Recreation: California Outdoor Recreation Account," August 12, 2019, [https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill\\_id=201920200AB1111](https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201920200AB1111).



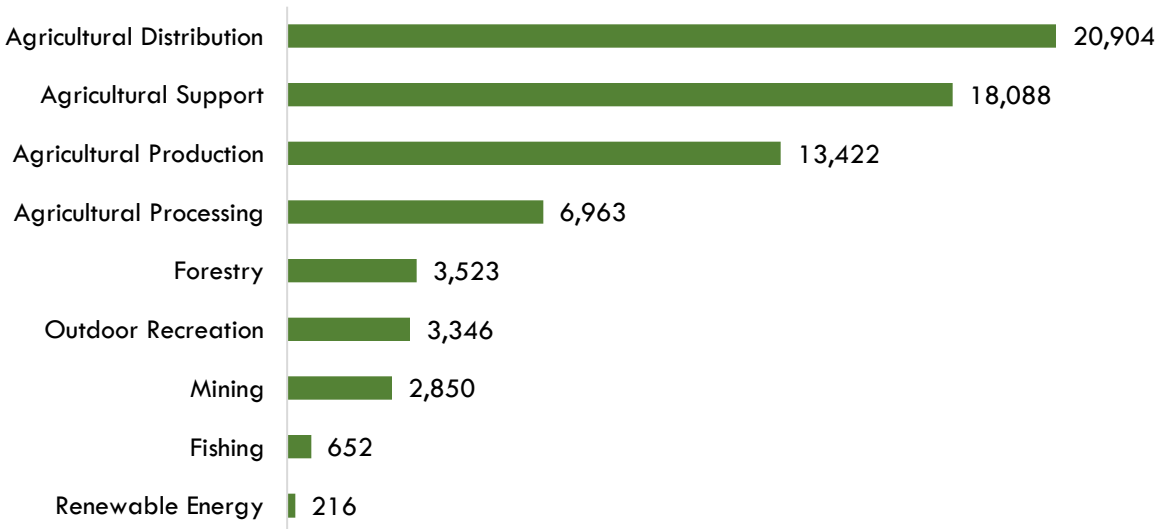
## Working landscape establishments

In California, there are an estimated 69,964 businesses represented by industry codes associated with the working landscape (Exhibit 4). Among these identified establishments, the agricultural distribution segment has the most establishments, 20,904, followed by agricultural support, 18,088, and agricultural production, 13,422. Agricultural processing has the fourth highest number of establishments, 6,963.

Industries within the working landscape segments that have the most establishments include other scientific and technical consulting services, crop production, stores (beer, wine, and liquor), animal production, wineries, and amusement and recreation industries.

When considering the breadth of establishments in the working landscape, it is important to keep in mind that California is a hub for many industries. One large component is California's wineries which lead the state and the nation in production. Findings from Wines Vines Analytics indicate there are 8,391 wineries in North America, with 93% of those located in the United States and nearly half, 45%, in California.<sup>24</sup> California's net production of wine accounts for 86% of total wine production in the United States.<sup>25</sup>

**Exhibit 4. Establishments by working landscape segment**



<sup>24</sup> "U.S. Wineries - By State," Wines Vines Analytics, January 2019, <https://winesvinesanalytics.com/statistics/winery/>.

<sup>25</sup> "U.S. Wineries - Annual Production (Cases)," Wines Vines Analytics, 2018, <https://winesvinesanalytics.com/statistics/winery/>.





# AGRICULTURAL PRODUCTION



Top in working landscape jobs

**\$16B**

2018 Total Earnings

**325,200**

Number of Jobs

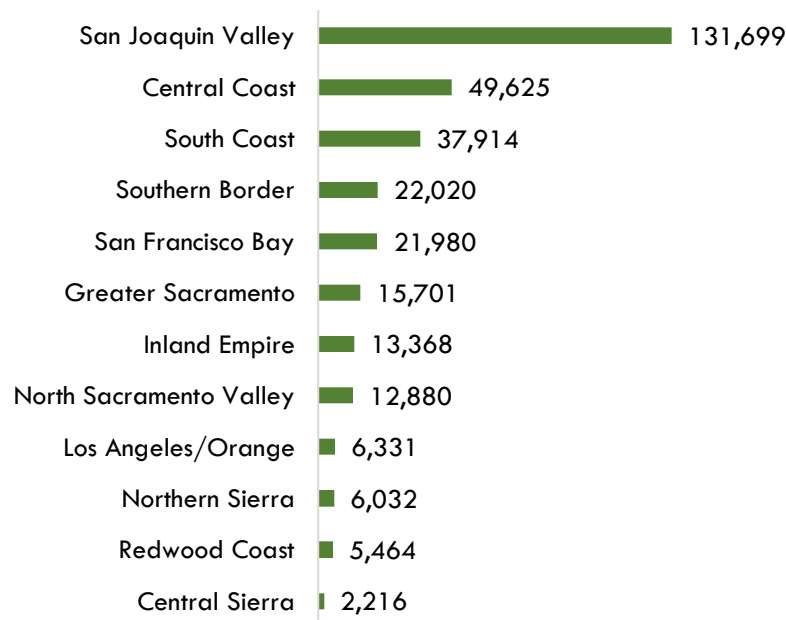
**\$61B**

2018 Sales

## Agricultural production jobs

The agricultural production segment of the working landscape provides the most jobs of all nine working landscape segments. In 2018, this segment accounted for over 325,200 total jobs in the state with 40% of them in the San Joaquin Valley. The San Joaquin Valley is the top region for agricultural production jobs in California, and with nearly 132,000 jobs, it has more than twice as many jobs than the next largest region, the Central Coast, which has nearly 50,000 jobs (Exhibit 11). The South Coast has nearly 38,000 jobs and the Southern Border has 22,000.

**Exhibit 11. Agricultural production jobs, 2018**



## Significant savings via UC research

UC ANR scientists diagnosed infectious pathogens and addressed potential production issues faced by large scale vegetable crop growers in the Central Valley. In one example, improved prediction of Beet Curly Top Virus (BCTV) avoided losses approaching \$100 million in processing tomatoes. In another example, a major garlic processor is now treating fields at planting with fungicide, which is reducing risk of white rot and saving a substantial percentage of the crop. Damage in replicated studies has been reduced by as much as 68% with the use of a fungicide, making the savings to the garlic industry in Fresno County as high as \$5 million per year.

## Agricultural production earnings

Total earnings paid by the agricultural production segment is substantial, \$16.2 billion in the state in 2018. As with jobs, the San Joaquin Valley and Central Coast have the greatest total earnings, \$6.5 billion and \$2.6 billion respectively (Exhibit 12). Combined, these two regions account for 50% of all earnings paid to workers in the agricultural production segment. This is an important observation for this part of the state, which typically falls behind the Los Angeles/Orange County region, and San Francisco Bay Area for number of jobs and earnings. Another notable finding is that earnings in the South Coast total \$1.7 billion, and \$1.1 billion in the Southern Border, indicating the importance this segment plays in two comparatively small geographic regions.

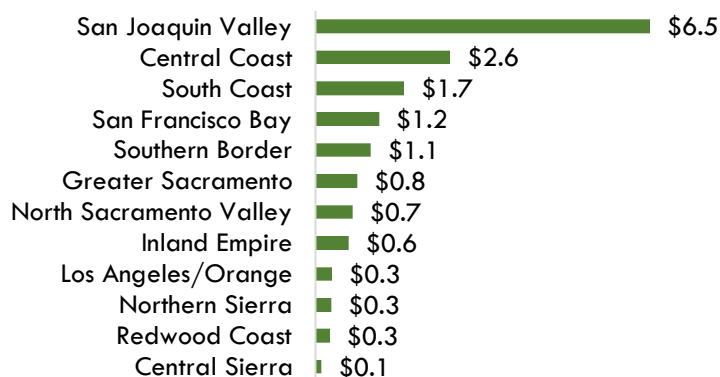


### California Agriculture: Bounty, Quality, Innovation

From tangerines to walnuts, broccoli to berries, California's farmers and ranchers are global leaders in productivity and quality.

According to California Agricultural Statistics Review, 2017-2018, California is the nation's leading producer of 75 different crops. California quality has an international reputation — and a big market — with exports exceeding \$20 billion annually. The state's farms have pioneered many innovative production techniques, reducing resource use through efficiency, and transforming the ways that fresh greens, berries and many other crops are produced. "California's farmers and ranchers provide very well for us," notes Karen Ross, Secretary, California Department of Food and Agriculture. "They produce an astonishing array of products and achieve the highest standards in quality, food safety and environmental stewardship."

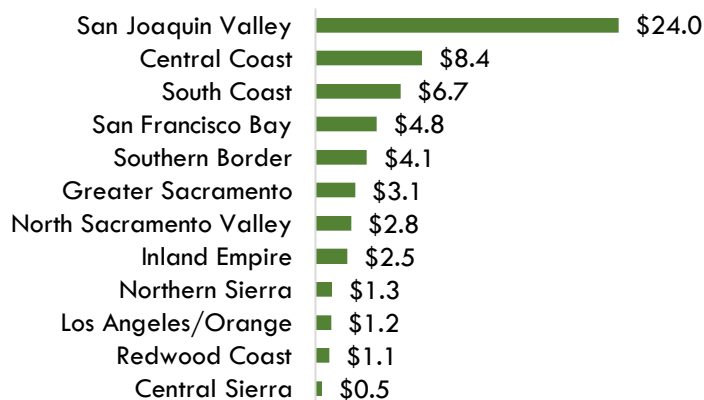
**Exhibit 12. Agricultural production earnings, 2018, in billions (\$)**



## Agricultural production sales

Agricultural production establishments provide services that support the production of crops and animal husbandry. These activities range from soil preparation and crop harvesting, to raising animals and post-crop services. Sales income generated by agricultural production statewide totaled \$61 billion in 2018. Again, the San Joaquin Valley and Central Coast are prominent regions for agricultural production reported sales income (Exhibit 13). Sales from these two regions alone total \$32 billion, accounting for half of all agricultural production sales in the state. The South Coast region is another powerhouse, with \$6.7 billion in sales.

**Exhibit 13. Agricultural production sales, 2018, in billions (\$)**





# AGRICULTURAL SUPPORT



Top in working landscape earnings, along with ag distribution

**\$18B**

2018 Total Earnings

**320,000**

Number of Jobs

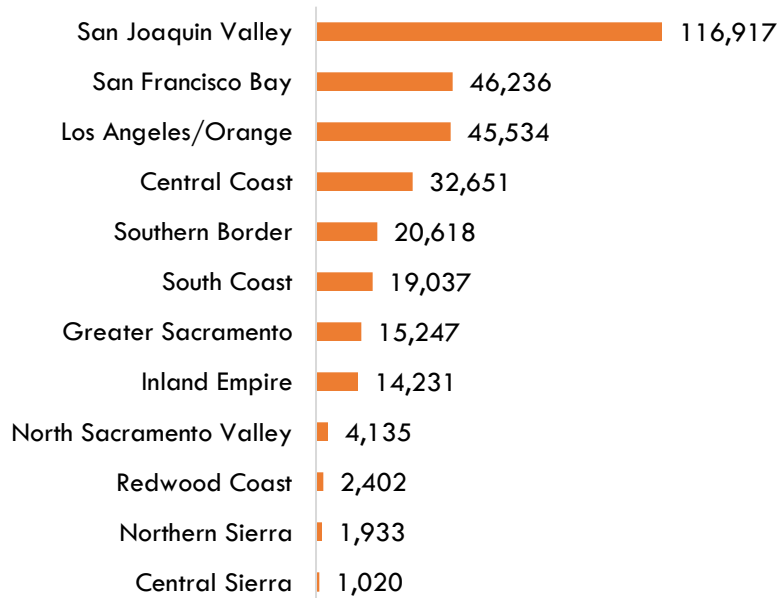
**\$32B**

2018 Sales

## Agricultural support jobs

Agricultural support employment ranks fourth among the nine working landscape segments. Statewide, agricultural support provided 320,000 jobs through business establishments specializing in farm management services, water irrigation systems, the manufacturing of farm machinery, and more. The San Joaquin Valley benefits the most from jobs in this segment with nearly 117,000 workers in 2018 (Exhibit 14). There were approximately 46,200 jobs in the San Francisco Bay Area and 45,500 jobs in the Los Angeles/Orange County region.

**Exhibit 14. Agricultural support jobs, 2018**



## Agricultural support earnings

Agricultural support disburses the most earnings of the nine segments, even as it ranks second for employment. In 2018, this segment accounted for nearly \$18 billion in earnings to workers. Nearly the same amount is generated by the agricultural distribution segment. In aggregate, the San Francisco Bay Area, San Joaquin Valley, and the Los Angeles/Orange County region reported paid earnings of approximately \$12 billion (Exhibit 15). Earnings in the Central Coast and Southern Border regions top \$1 billion.

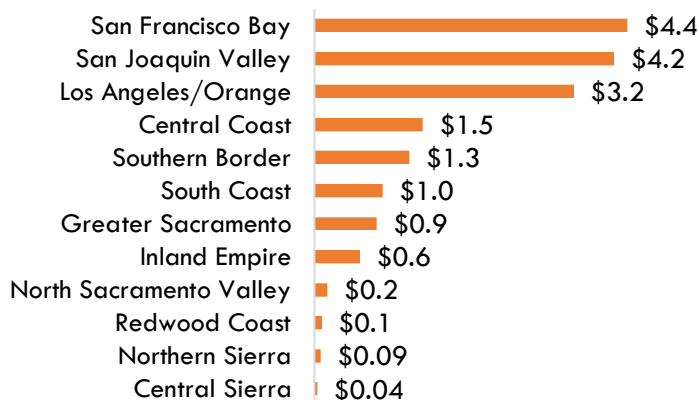


### Savings and improved yields with CropManage

Farmers can quickly calculate precise fertilizer and water needs of their crops using a free online program. CropManage provides real-time recommendations based on a crop's water and nutrient needs, weather data, soil type and irrigation system; the program collects the data and calculates the amount of water and nitrogen to apply. Using CropManage, growers report higher yields while reducing water and fertilizer use by 20% to 40%. Currently, the online tool supports decision-making for production of raspberries, broccoli, cauliflower, cabbage, bell peppers, processing tomatoes, spinach, baby lettuce, cilantro, mizuna and iceberg, romaine and leaf lettuce. In Ventura County, it can also be used for strawberries and celery. Also available in Spanish, CropManage was developed by UC Cooperative Extension with a grant from the California Department of Food and Agriculture's Fertilizer Research and Education Program.

<https://cropmanage.ucanr.edu>

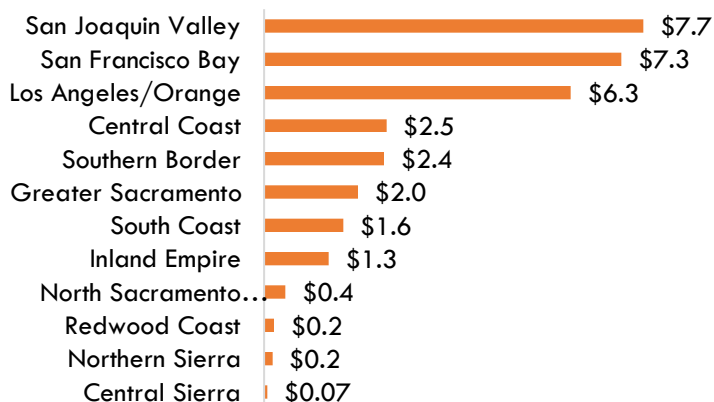
**Exhibit 15. Agricultural support earnings, 2018, in billions (\$)**



## Agricultural support sales

While agricultural support jobs and earnings rank highest among the working landscape segments, sales income is relatively low in the state. In 2018, statewide agricultural support sales totaled \$32 billion, the fifth largest amount of all the working landscape segments. Again, the San Joaquin Valley, San Francisco Bay Area, and the Los Angeles/Orange County region are the largest in terms of sales by agricultural support establishments (Exhibit 16). Together, the three regions comprise 67% of all agricultural support sales in the state.

**Exhibit 16. Agricultural support sales, 2018, in billions (\$)**





# AGRICULTURAL PROCESSING



Top in working landscape sales

**\$16B**  
2018 Total Earnings

**245,000**  
Number of Jobs

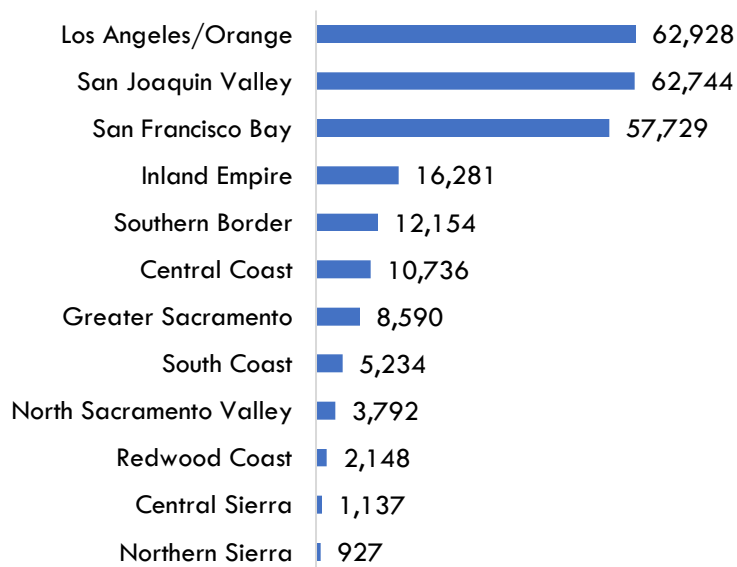
**\$113B**  
2018 Sales

## Agricultural processing jobs

As with all the agricultural segments, agricultural processing is a major employer in the state's working landscape. Across all regions, agricultural processing provided nearly 245,000 jobs in 2018. Half of these jobs are concentrated in the Los Angeles/Orange County region and San Joaquin Valley (Exhibit 8). An important finding of this study is that the San Joaquin Valley, a much less densely populated region than the Los Angeles/Orange County region, is competitive in terms of jobs in this segment. The San Francisco Bay Area has the third highest number of agricultural processing jobs, nearly 58,000.



**Exhibit 8. Agricultural processing jobs, 2018**



*“The U.S. packaging market size is estimated to grow by 48% to \$315.3 billion between 2015–2025. The demand for packaging graduates in the industry has stayed robust even through the economic downturns. A recent salary survey for the U.S.-based packaging industry reported that the overall average salary/bonus/cash/incentives/commission of packaging professionals reached \$117,050 in 2018.”*

CA LEAGUE OF  
FOOD PRODUCERS

## Agricultural processing earnings

Total earnings paid to workers in the agricultural processing segment in California in 2018 was \$16.1 billion. Workers in the San Francisco Bay Area and Los Angeles/Orange County region received the highest earnings of all other regions (Exhibit 9). The San Francisco Bay Area leads the rest of the state with \$4.3 billion in earnings, followed by \$4.1 billion in the Los Angeles/Orange County region, and \$4 billion in the San Joaquin Valley. Earnings elsewhere in the state are substantially smaller compared to the top three earnings regions.



### Food processors cut costs through energy efficiency

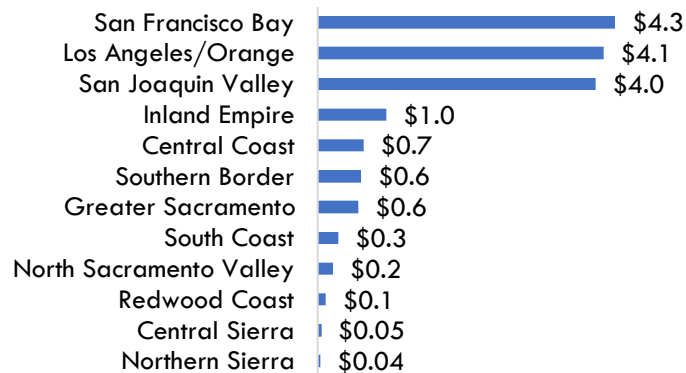
Food processing is the third largest manufacturing sector in California. The industry provides 198,000 jobs and, when multiplier effects are taken into consideration, indirectly supports 562,000 jobs, according to the California League of Food Processors. Examples of food processing include tomato processing, dehydrating raisins, canning fruits and vegetables, poultry processing, drying walnuts and making cheese.

The California Energy Commission is drawing on the state Greenhouse Gas Reduction Fund to provide matching grants to food processors for investments in technologies that reduce the use of natural gas and electricity, which cost the industry over \$1.6 billion annually. Greenhouse gas reductions from the first round of funded projects are projected to be equivalent to taking 11,677 average passenger vehicles off the road.

**Source:**

California Energy Commission  
Research & Development, May 2019

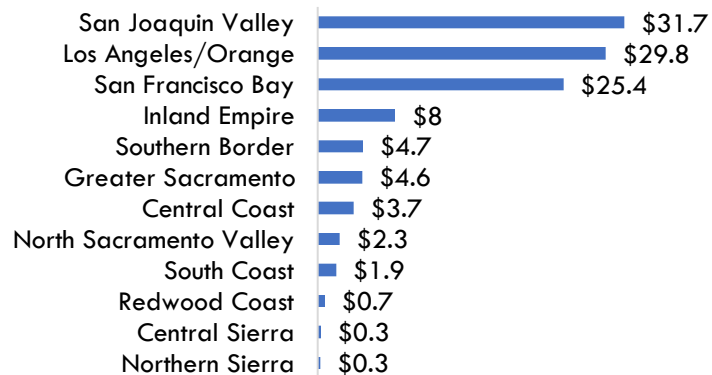
**Exhibit 9. Agricultural processing earnings, 2018, in billions (\$)**



## Agricultural processing sales

Establishments in this segment are responsible for turning raw farm products into items for distribution and sale. This includes all forms of food products, beverage products, materials and machinery required to maintain crops and packaging. This segment generates the most sales of the nine working landscape segments. Agricultural processing sales in the state totaled \$113 billion in 2018. The three regions generating the greatest amount of agricultural processing sales are the San Joaquin Valley, \$31.7 billion, Los Angeles/Orange County, \$29.8 billion, and the San Francisco Bay Area, \$25.4 billion (Exhibit 10).

**Exhibit 10. Agricultural processing sales, 2018, in billions (\$)**





# AGRICULTURAL DISTRIBUTION



Top in working landscape earnings, along with agricultural supplies

**\$18B**

2018 Total Earnings

**304,000**

Number of Jobs

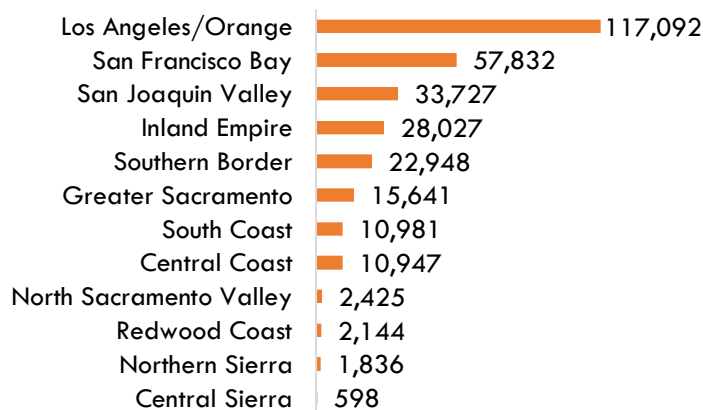
**\$57B**

2018 Sales

## Agricultural distribution jobs

With its total number of jobs nearly rivalling the agricultural production segment which has more than 325,000 jobs, the agricultural distribution segment is an important working landscape employer in the state. Across all regions, this segment employed more than 304,000 workers in 2018. The regions where agricultural distribution provides the most jobs are Los Angeles/Orange County and the San Francisco Bay Area (Exhibit 5). This may be largely due to the role these regions play in international trade since Oakland, Los Angeles, and Long Beach are home the state's three "megaports," the three largest ports in the state. Together, these two regions represent more than 50% of all agricultural distribution employment in the state. Agricultural distribution employment in the Los Angeles/Orange County region is more than double the San Francisco Bay Area. Employment is also substantial in the San Joaquin Valley, 33,700 jobs, and the Inland Empire, 28,000 jobs.

**Exhibit 5. Agricultural distribution jobs, 2018**

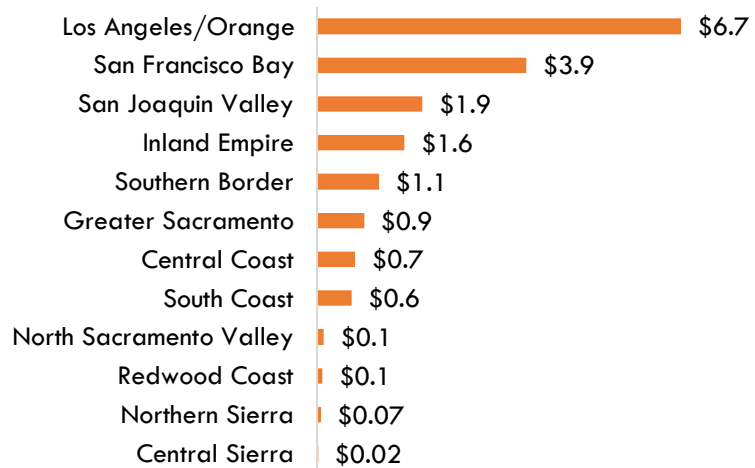




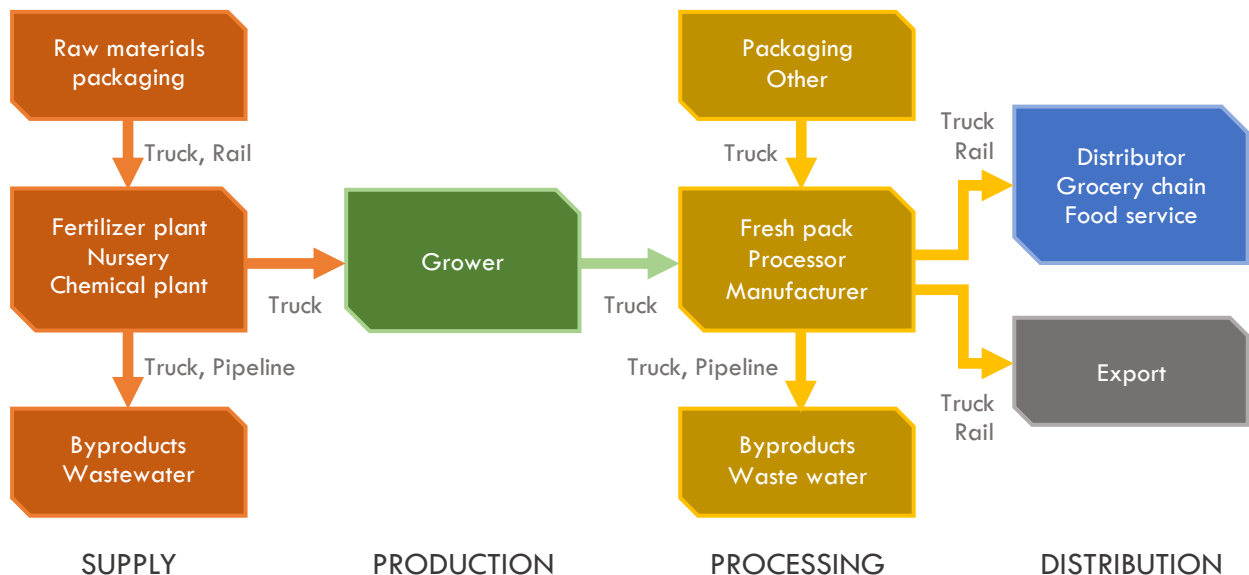
## Agricultural distribution earnings

One measure that demonstrates the importance of an industry or cluster of industries is the earnings paid to its workers. Among the working landscape segments, agricultural distribution sub-industries paid the second highest aggregate wages, a total of \$17.8 billion, following agricultural support, \$17.9 billion (Exhibit 6). The Los Angeles/Orange County region, which has the highest concentration of agricultural distribution jobs, also leads the state in earnings, totaling \$6.7 billion in 2018.

**Exhibit 6. Agricultural distribution earnings, 2018, in billions (\$)**



## Processing Tomato Supply Chain



**Complex supply chains connect the agricultural production, processing and distribution sectors. This diagram shows the major links and modes of transportation for California's processing tomato industry.**

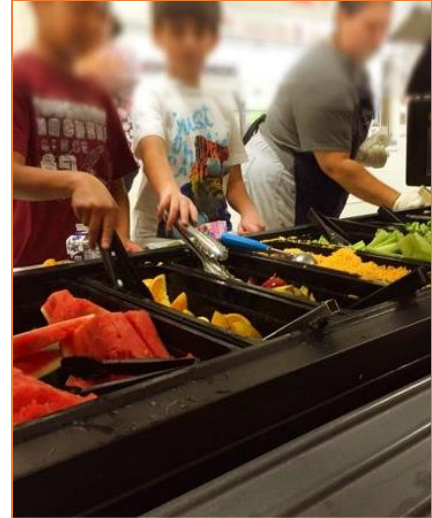
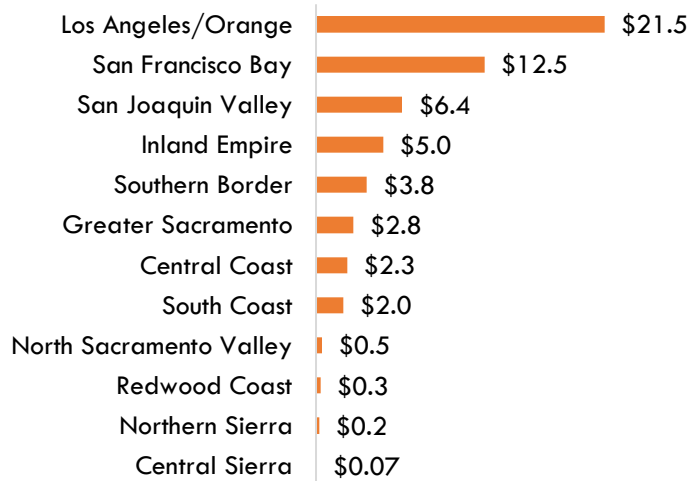
Source: The San Joaquin Valley Interregional Goods Movement Plan ([https://www.fresnocog.org/wp-content/uploads/2017/04/DR1\\_SJV\\_GoodsMovement\\_ExecSumv21.pdf](https://www.fresnocog.org/wp-content/uploads/2017/04/DR1_SJV_GoodsMovement_ExecSumv21.pdf)) (Figure redrawn)



## Agricultural distribution sales

Sales by agricultural distribution establishments represent annual gross sales to consumers and other industries. Sales for the agricultural distribution segment total \$57.4 billion, third behind agricultural processing and agricultural production. The Los Angeles/Orange County region had the largest sales income in 2018, totaling \$21.5 billion (Exhibit 7). Other geographic areas with large agricultural distribution sales are the San Francisco Bay Area, \$12.5 billion, San Joaquin Valley, \$6.4 billion, and the Inland Empire, \$5 billion.

**Exhibit 7. Agricultural distribution sales, 2018, in billions (\$)**



## Hub Innovation

Building on a successful farm-to-school program, Riverside Unified School District created a distribution hub to increase access to fresh, local produce for smaller schools, childcare and other institutions while providing local growers with an alternative produce market. UC Agriculture and Natural Resources Nutrition Policy Institute found that the hub distributed \$2.9 million in California-grown specialty crops in 2017-2019. Of that, \$308,000 was purchased from 12 local growers, with \$2.6 million purchased from produce distribution companies. The hub also purchased over \$200,000 of cosmetically imperfect produce and introduced children at schools and childcare centers to numerous new varieties of California-grown fruits and vegetables. The hub has also trained new farmers and helped current farmers obtain Good Agricultural Practices (GAP) food safety certification to expand their markets.





# FISHING



**\$0.5B**

2018 Total Earnings

**10,300**

Number of Jobs

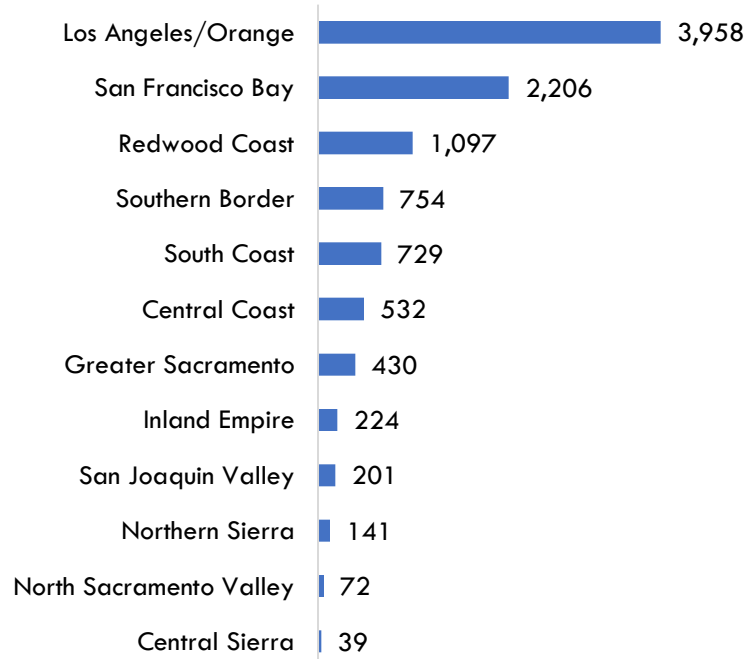
**\$1.7B**

2018 Sales

## Fishing jobs

The fishing segment of the state’s working landscape has the second smallest number of jobs of all segments, total of 10,383, but is an important contributor to the agricultural supply chain and a lynchpin for the economies of some coastal communities. The coastal areas of the Los Angeles/Orange County region, San Francisco Bay Area, and Redwood Coast support the greatest number of fishing jobs (Exhibit 17). In 2018, there were nearly 4,000 jobs in the Los Angeles/Orange County region, and 2,200 in the San Francisco Bay Area. The fishing segment accounts for more than 1,000 jobs in the Redwood Coast region.

**Exhibit 17. Fishing jobs, 2018**



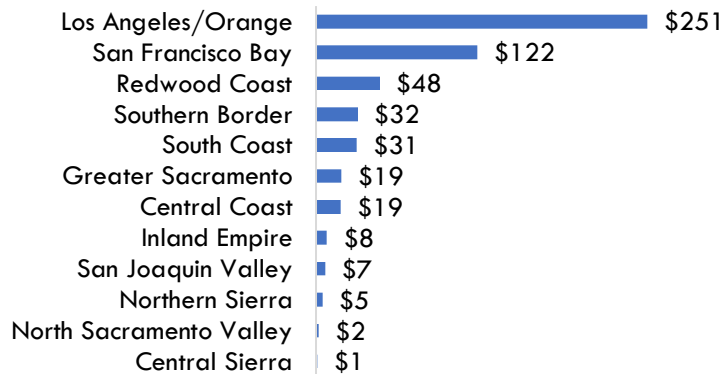
*“Over 200 commercial vessels still list Eureka as homeport and over 500 vessels from other west coast ports use the Bay’s facilities annually, delivering catch to the seafood buyers located in Humboldt County. Despite diminishing fisheries, Humboldt Bay is still one of the largest oyster suppliers, providing 90% of the oysters in California. The Bay’s commercial fleet contains a large number of crabbing boats, which harvest Dungeness crab along the coast. The Bay plays an important part in the Dungeness crab life cycle, as it provides ideal spawning and nursery grounds in the Bay’s eelgrass beds.”*

HUMBOLDT BAYKEEPER

## Fishing earnings

The fishing segment's total earnings is \$547 million, the lowest total earnings of the nine working landscape segments. Fishing earnings are greatest in the Los Angeles/Orange County region, \$251 million, and the San Francisco Bay Area, \$122 million (Exhibit 18). Fishing earnings total \$48 million in the Redwood Coast region and \$32 million in the Southern Border region.

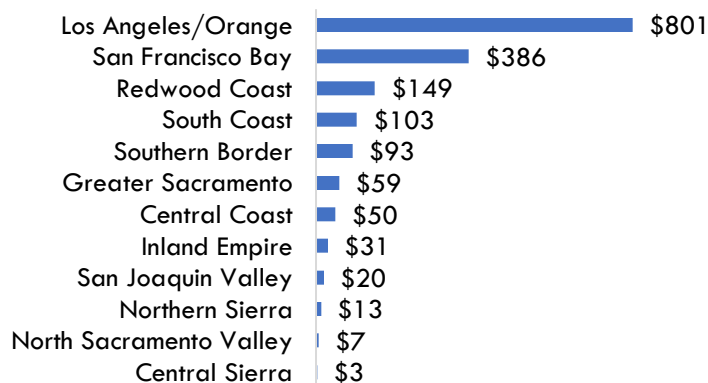
**Exhibit 18. Fishing earnings, 2018, in millions (\$)**



## Fishing sales

Total jobs for the fishing segment are relatively small compared to the other eight working landscape segments. However, sales from fishing activities are strong, generating a total of \$1.7 billion in sales income in 2018. In terms of dollar amounts, the Los Angeles/Orange County region dominates the rest of the state in total sales income from fishing-related industries (Exhibit 19). In 2018, the Los Angeles/Orange County region reported \$801 million in sales. The San Francisco Bay Area, the second most important region for fishing jobs, was the second largest for fishing-related sales, reporting \$386 million in sales in the same year. Sales income in the Redwood Coast region totaled \$149 million in 2018.

**Exhibit 19. Fishing sales, 2018, in millions (\$)**



## The world is their oyster

As the oyster capital of California, Humboldt Bay's bivalve business is big for the region. According to a report from Humboldt State University and California Sea Grant researchers, the local oyster business was a \$9.8 million industry in 2016, which translates to an estimated total local economic impact of \$19.3 million when indirect impacts are included. The report noted that businesses anticipate higher production of oysters, larvae, and seed, and more acreage, jobs, and revenue by 2022.



# FORESTRY



**\$5.5B**

2018 Total Earnings

**86,200**

Number of Jobs

**\$23.1B**

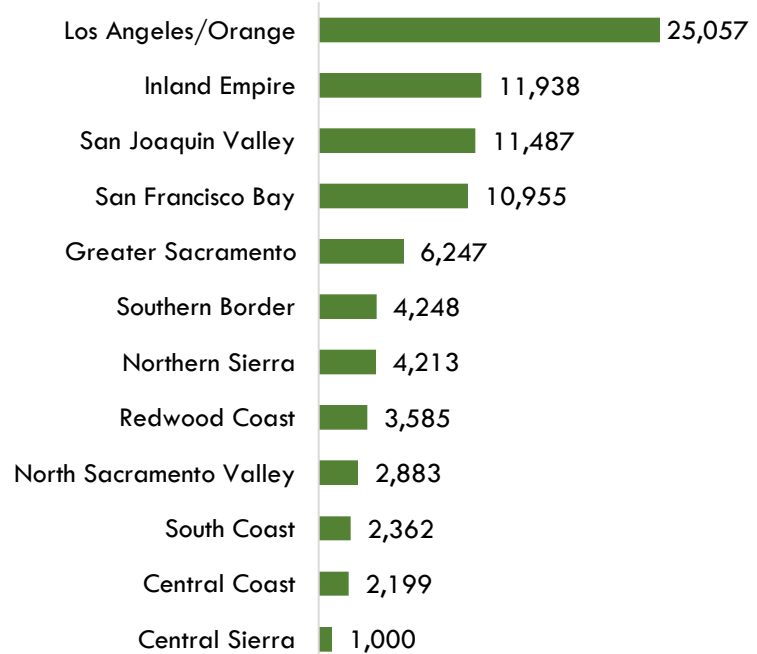
2018 Sales



## Forestry jobs

Forestry activities in the state provide more than 86,000 jobs, a number that falls slightly behind mining for size of employment, but that is larger than outdoor recreation. As with nearly all other working landscape segments, the Los Angeles/Orange County region leads the state with the highest number of forestry jobs, 25,000 (Exhibit 20). In the forestry segment, the Inland Empire (Riverside and San Bernardino counties) ranks second in forestry employment, accounting for nearly 12,000 jobs.

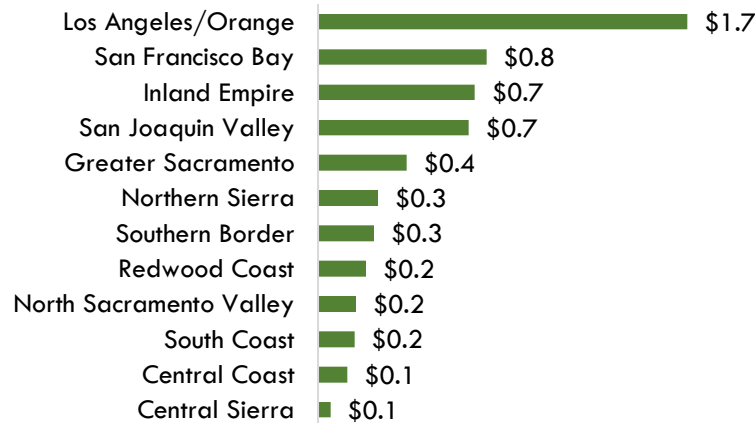
**Exhibit 20. Forestry jobs, 2018**



## Forestry earnings

Statewide forestry earnings totaled \$5.5 billion in 2018. The Los Angeles/Orange County region and San Francisco Bay region are among the largest providers of forestry related activities and pay the largest total earnings to workers in the segment's component industries. The Los Angeles/Orange County region's total earnings in 2018 totaled \$1.7 billion, while earnings in the San Francisco Bay Area totaled \$0.8 billion (Exhibit 21).

**Exhibit 21. Forestry earnings, 2018, in billions (\$)**



California's forested areas are home to parks, recreational assets, lakes, rivers, valuable stands of trees, vital wildlife habitat and fisheries. Most water used by urban California and the state's agricultural lands comes from rural forested watersheds. Forests also play an important role in regulating levels of atmospheric carbon on a wide-scale basis.

However, forest overgrowth and wildfires threaten this balancing act, both on a short-term and long-term basis.

Forest restoration – mechanical thinning, removal of woody materials and the strategic use of fire – is critical to forest health and maintaining water supply reliability and quality. As the Elevate Rural CA initiative recognizes, new strategies must be pursued to develop viable commercial uses for low-value woody materials and biomass. One promising market area involves mass timber, including an engineered wood product known as cross-laminated timber, which can be used in building construction.

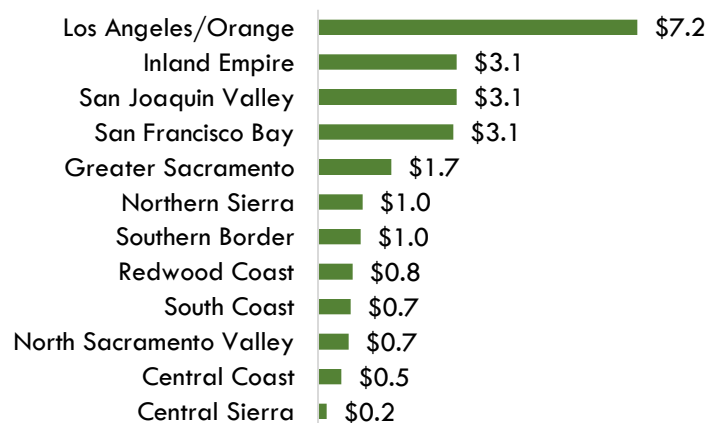
**Source:**

<https://caeconomy.org/landing-page/elevate-rural-ca>

## Forestry sales

Sales activity from the forestry segment is derived from establishments that provide support to forestry activities, manufacturers of wood products, paper mills, and forest product wholesalers. In the state, forestry activity sales totaled \$23 billion in 2018. The Los Angeles/Orange County region generated more than \$7 billion in sales in 2018, while the next largest sales volume was half that – in the Inland Empire, \$3.1 billion. The San Joaquin Valley and San Francisco Bay Area each reported \$3.1 billion in sales (Exhibit 22).

**Exhibit 22. Forestry sales, 2018, in billions (\$)**





# MINING



**\$7.5B**

2018 Total Earnings

**106,300**

Number of Jobs

**\$32.2B**

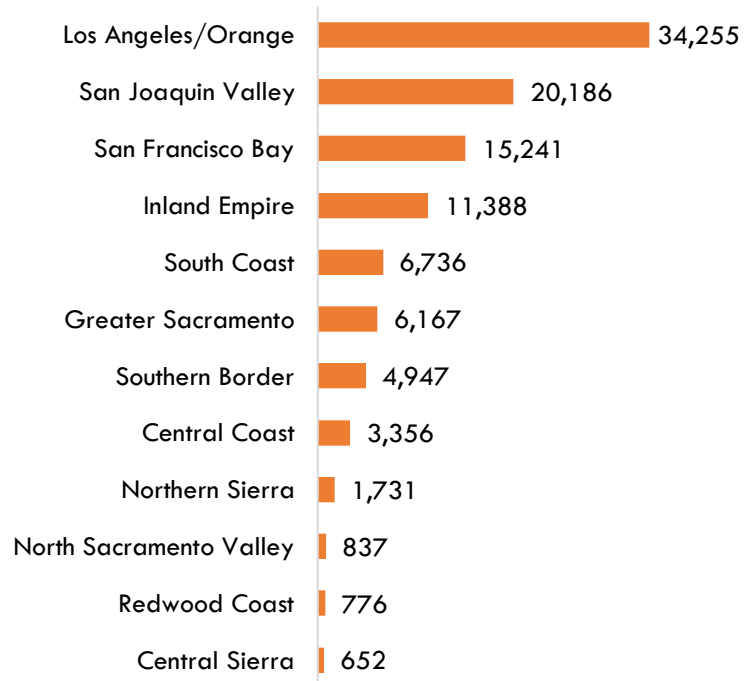
2018 Sales

## Mining jobs

The mining industries that comprise this working landscape segment include not only the mining of raw materials but support activities, and manufacturing of the materials. The mining segment accounted for nearly 106,300 jobs in 2018. After the Los Angeles/Orange County region, which has more than 34,200 jobs, the San Joaquin Valley represents a sizable portion of employment in this segment, with nearly 20,200 jobs (Exhibit 23). Other regions with considerable mining employment include the San Francisco Bay Area, Inland Empire, South Coast region, and Greater Sacramento region.



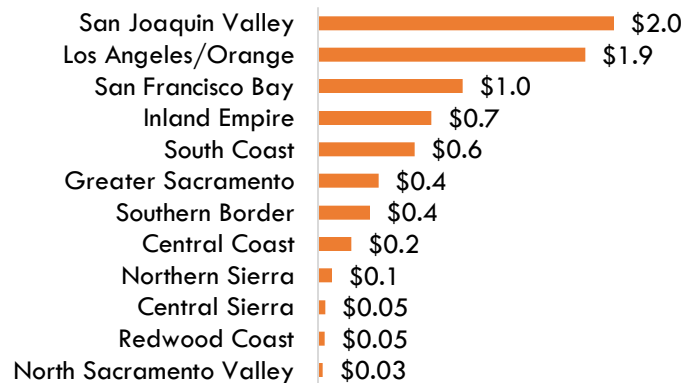
**Exhibit 23. Mining jobs, 2018**



## Mining earnings

Another measure of the importance of the mining segment in the state's economy is earnings paid to workers. In 2018, \$7.5 billion in total earnings was paid by the mining segment. Aggregate wages paid by mining establishments, mining support activities, and the manufacturing of equipment required for mining, range from \$33 million in the North Sacramento Valley to nearly \$2 billion in the San Joaquin Valley (Exhibit 24). These earnings represent wages paid to all workers in the industries that comprise mining. One noteworthy finding is that while employment in the mining and forestry industries is similar in size, mining earnings is \$2 billion greater than forestry earnings. San Joaquin Valley mining earnings was the largest in the state, totaling \$2 billion, while the Los Angeles/Orange County region paid nearly identical earnings, \$1.9 billion.

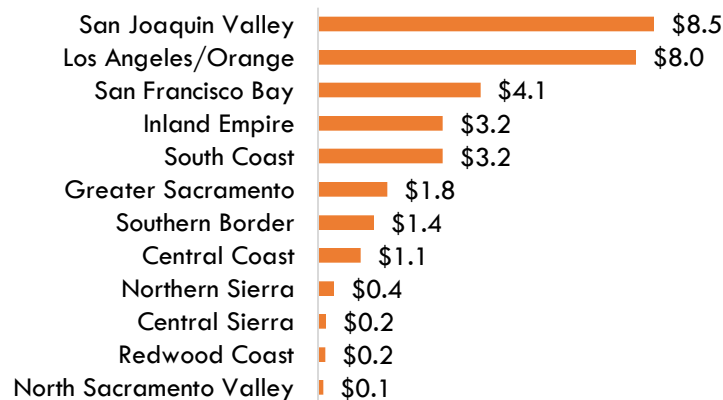
**Exhibit 24. Mining earnings, 2018, in billions (\$)**



## Mining sales

Similar to the importance of the mining segment's jobs in the San Joaquin Valley, mining sales in this region also contribute significantly to total sales income generated by the statewide working landscape. Mining sales income totaled \$32 billion in 2018. The San Joaquin Valley was a leader in the state, with \$8.5 billion in sales income (Exhibit 25). The second highest sales amount was generated by the Los Angeles/Orange County region, \$8 billion.

**Exhibit 25. Mining sales, 2018, in billions (\$)**



The California gold rush of the 1800s continues today with small miners extracting gold and silver in more than 5,000 mining claims and thousands of amateur rockhounds search for rocks, minerals, and gemstones on public lands. Although oil is the number one product by value in this segment, California is among the country's leading mining states, producing a greater variety of mineral products than any other state — minerals critical to production and manufacturing in many other industries. Commercially, California mines all the boron produced in the United States and is the leading producer of diatomite, sand and gravel, sodium compounds, tungsten and among the top producers of gold, gypsum, magnesium compounds, molybdenum, perlite, potash, and pumice. California's mineral production value is the fourth largest in the United States, after Nevada, Arizona, and Texas.

**Source:**

<https://www.usgs.gov/news/top-5-mineral-producing-states>.



# OUTDOOR RECREATION



**\$2.5B**

2018 Total Earnings

**64,600**

Number of Jobs

**\$6.3B**

2018 Sales



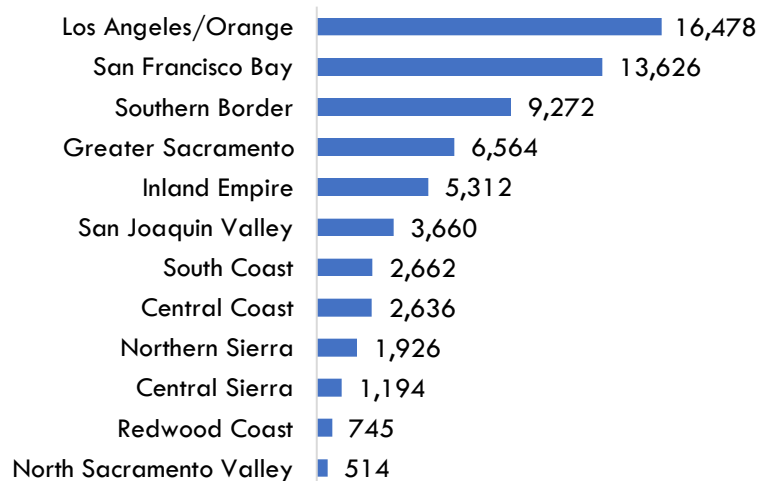
## CA fishing reels in economic benefits

California's 2,795,253 anglers, who spent \$2.4 billion while fishing in California, supported more than 35,000 jobs and had a \$4.6 billion impact on the state's economic output in 2017 according to a news release from the American Sportfishing Association and Southwick Associates. The information is from the 2017 update of Economic Contributions of Recreational Fishing: U.S. Congressional Districts, along with a series of one-page infographics which depict recreational fishing's economic impact on all 435 Congressional districts and the 50 states.

## Outdoor recreation jobs

In terms of employment, earnings, and sales income, the outdoor recreation segment is the third smallest segment of the nine studied in this report. However, this is in comparison to segments that are extremely powerful in their economic impact, particularly the agricultural segments. California has the largest outdoor recreation economy in the nation. Employers in this segment include zoos, skiing facilities, parks, and recreational and vacation camps. In 2018, there were nearly 64,600 outdoor recreation jobs in the state. Nearly half of all outdoor recreation jobs are in the Los Angeles/Orange County region and the San Francisco Bay Area (Exhibit 26). The Southern Border and Greater Sacramento regions also lead the state in having the greatest concentration of outdoor recreation employment.

**Exhibit 26. Outdoor recreation jobs, 2018**

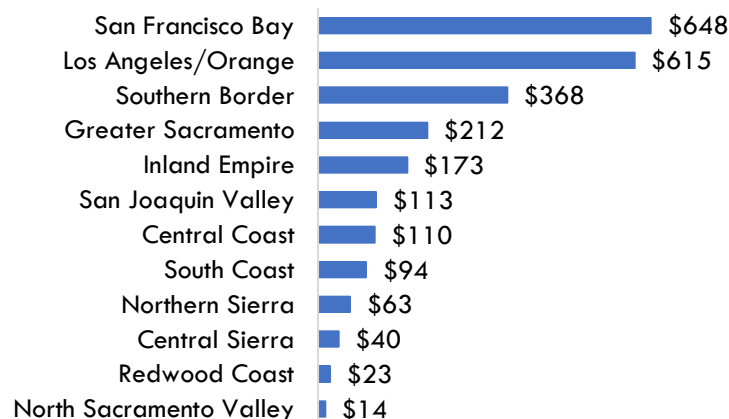




## Outdoor recreation earnings

In California, total earnings paid by outdoor recreation establishments in 2018 was \$2.5 billion. By region, the earnings paid by outdoor recreation business establishments range from \$14 million in the North Sacramento Valley to \$648 million in the San Francisco Bay (Exhibit 27). Business establishments in the San Francisco Bay Area and the Los Angeles/Orange County region paid the highest amounts of earnings. Together these two regions comprise 51% of all earnings paid to workers in the outdoor recreation segment.

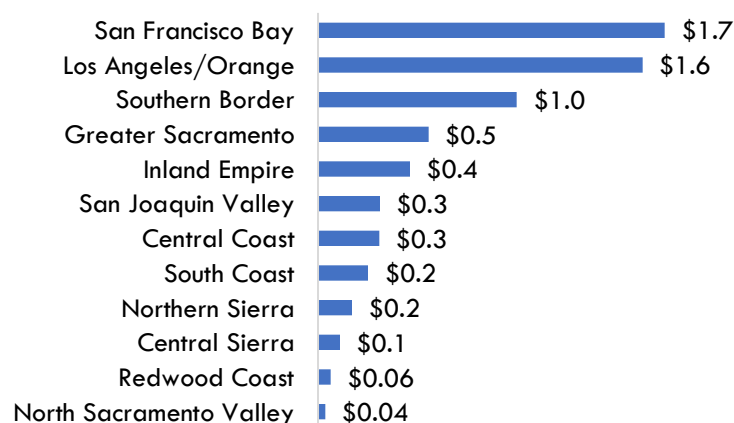
**Exhibit 27. Outdoor recreation earnings, 2018, in millions (\$)**



## Outdoor recreation sales

Statewide sales income from outdoor recreation totaled \$6.3 billion in 2018. The financial value of outdoor recreation activities, in terms of sales to other industries and consumers, is most prominent in the San Francisco Bay Area, which accounted for \$1.7 billion (Exhibit 28). In the Los Angeles/Orange County region, sales income was \$1.6 billion. The Southern Border, another region which leads the state for outdoor recreation employment and earnings, had the third greatest amount of sales income, \$1 billion.

**Exhibit 28. Outdoor recreation sales, 2018, in billions (\$)**



## Community health benefits and more

California's protected open-space lands cover over 49.2 million acres, representing 47% of the total landmass in California. According to a 2017 report by the Outdoor Industry Association, outdoor recreation in California contributes \$92 billion to the state's economy and directly supports 691,000 jobs when taking into consideration multiplier effects such as travel and equipment purchases. In addition to economic prosperity, outdoor recreation creates healthy communities and has shown to reduce crime rates, improve educational outcomes for youth, and lower public health care costs by increasing physical fitness. Several states throughout the nation have noted the importance of outdoor recreation and have created state offices, task forces, or identified policy advisors charged with supporting outdoor recreation.



# RENEWABLE ENERGY



**\$0.9B**

2018 Total Earnings

**6,100**

Number of Jobs

**\$5.9B**

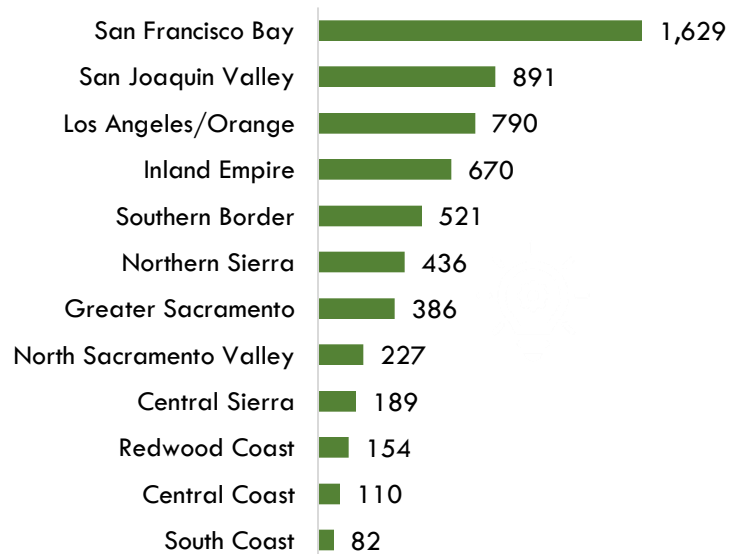
2018 Sales



## Renewable energy jobs

Activities related to renewable energy provide nearly 6,100 jobs across the state. The San Francisco Bay Area employs the most workers for the generation of alternative energy, a total of 1,629 jobs (Exhibit 29). The San Joaquin Valley has nearly 900 jobs, followed by the Los Angeles/Orange County region, nearly 800 jobs. Overall, the renewable energy segment has relatively few jobs compared to other segments in the working landscape and ranks last for size of employment. However, its impact is magnified through higher earnings and sales income, and while these numbers are small, they still rank above the fishing segment.

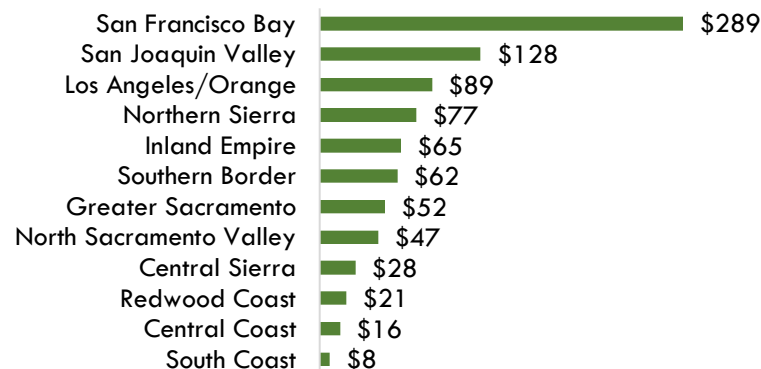
**Exhibit 29. Renewable Energy Jobs, 2018**



## Renewable energy earnings

Earnings paid to workers in the renewable energy segment totaled \$0.9 billion in the state in 2018. Earnings paid in the San Francisco Bay Area totaled \$289 million (Exhibit 30). The San Francisco Bay Area accounts for one-third of statewide renewable energy earnings. Workers in the San Joaquin Valley received \$128 million and workers in the Los Angeles/Orange County region received \$89 million.

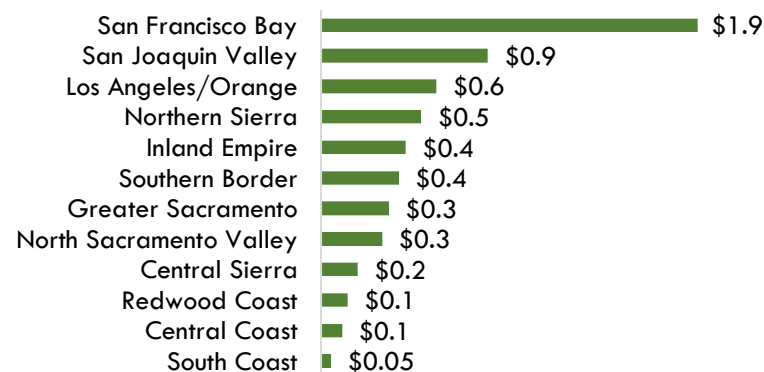
**Exhibit 30. Renewable energy earnings, 2018, in millions (\$)**



## Renewable energy sales

Business establishments comprising the renewable energy segment are responsible for the generation of alternative energy, such as hydroelectric, solar, and wind. Statewide, total sales income generated by renewable energy is \$5.9 billion. The San Francisco Bay Area, the region with the most renewable energy jobs in California, also had the most sales in the state in 2018 (Exhibit 31). Totaling nearly \$2 billion, sales in the San Francisco Bay Area were double that of the next largest region, the San Joaquin Valley, \$0.9 billion. While the Inland Empire and Southern Border regions are home to some of the largest renewable energy projects in the state, these regions do not top the list, indicating that smaller renewable energy projects, such as residential solar installations, may be more financially lucrative for business establishments.

**Exhibit 31. Renewable energy sales, 2018, in billions (\$)**



### Wind energy: clean power and ag support

California's working landscapes support more than 100 wind energy installations that together account for 6.5% of in-state power generation. Many wind projects also allow the land to continue to support farming and ranching. In Solano County, for instance, the Shiloh III project provides enough power for roughly 50,000 Pacific Gas and Electric customers. The project extends across 4,600 acres — 98% of which are still used for agriculture. The wind industry in California accounts for about 4,500 direct jobs and \$87.5 million in annual state and local tax revenue -- while delivering enough clean power to supply 1.3 million California homes.

# CONCLUSION

California's early economy was founded upon the working landscape which continues to contribute to the economic prosperity of just about every corner of the state. The working landscape supports communities whose livelihoods are dependent upon the state's many natural resources—its fertile valleys, forested mountains, and rich oceans. This study set out to measure the economic impact of the working landscape by analyzing data associated with employment, earnings, and sales income. Nine segments that are essential to the working landscape were identified: agricultural distribution, agricultural production, agricultural processing, agricultural support, fishing, forestry, mining, outdoor recreation, and renewable energy.

The nearly 70,000 business establishments associated with the working landscape paid \$85 billion in earnings to their workforce in 2018 and generated \$333 billion in sales income. Four segments dominate the others in terms of job numbers, earnings, sales income, and number of establishments: agricultural distribution, agricultural production, agricultural processing, and agricultural support. These segments are major players in the state with billions of dollars in sales and earnings paid to workers. Together they work together to form a powerful supply chain benefitting the national and global economy. In conjunction, these four agricultural segments:

Account for 85% of all working landscape business establishments

- Employ 1.2 million people, the equivalent of 81% of all working landscape jobs
- Pay 80% of total working landscape earnings to workers
- Generate 79% of working landscape sales income

*The nearly 70,000 business establishments associated with the working landscape paid \$85 billion in earnings to their workforce in 2018 and generated \$333 billion in sales income.*

Agricultural production provides the greatest number of jobs, more than 325,000, and generates the second highest amount of sales income, \$61 billion in 2018. Agricultural support leads all segments for earnings, \$17.8 billion in 2018, and ranks second for most jobs and number of business establishments. When it comes to sales income, agricultural processing surpasses all other working landscape segments. This segment generated more than \$113 billion in 2018, nearly twice the amount of the next largest segment, agricultural production, nearly \$61 billion.

Measuring employment was another method used in this study to gauge the working landscape's economic impact statewide. Collectively, these nine working landscape segments provide nearly 1.5 million jobs in California. The Los Angeles/Orange County region, the San Francisco Bay Area, and San Joaquin Valley have the greatest concentration of jobs for agricultural distribution, agricultural processing, agricultural support, mining, and renewable energy. Agricultural production is dominated by the San Joaquin Valley, followed by the Central Coast. Forestry jobs are greatest in the Los Angeles/Orange County and Inland Empire regions, while fishing and outdoor recreation jobs are greatest in San Francisco Bay Area, which follows the Los Angeles/Orange County region.

At the other end of the spectrum, the fishing and renewable energy segments are the smallest segments for all measures: establishments, jobs, earnings, and sales. Other relatively small segments

are mining, forestry, and outdoor recreation. However, while some of the other working landscape segments might seem diminutive in comparison to the agricultural segments, they are still sizeable when compared to the rest of the nation. The agricultural segments in California are so large that they tend to dwarf other segments in direct comparison, but this is only because California's agriculture is a massive economic juggernaut.

For example, California has the largest outdoor recreation economy in the United States and the value of its mineral production through the mining industry ranks fourth in the nation. While forestry ranks fourth to last for number of jobs, earnings, and sales income of the nine working landscape segments, it is important to keep in mind that compared to other states, the forestry segment is quite large. After Alaska and Oregon, California has the greatest amount of forested land in the United States.<sup>26</sup>

While Southern California, the San Francisco Bay Area, and San Joaquin Valley are the major regions in the state dominating employment for many working landscape segments, simply focusing on these behemoths does not paint a full picture of the contribution of working landscape jobs to local economies. For example, although dominant in other parts of the state, agricultural production accounts for a healthy number of jobs in the Northern Sierra and Redwood Coast regions, and agricultural support plays a substantial role in employment in the Greater Sacramento, North Sacramento, and Inland Empire regions. A considerable number of workers are employed by the forestry segment in the Greater Sacramento, Southern Border, and Northern Sierra regions. Furthermore, in terms of size of employment, mining has a presence in the Inland Empire, South Coast, and Greater Sacramento regions.



**California's working landscape is diverse, encompassing the state's agricultural activities, as well as activities that rely on the harvesting of natural resources and the pursuit of outdoor recreation. The impact of the working landscape is far-reaching, affecting every corner of the state. In exploring the economic contribution of each of the nine industry segments identified for this report, it is apparent that the working landscape is a major employer and income generator statewide.**

<sup>26</sup> "U.S. Forest Products Industry - Statistics & Facts," Statista Research, September 19, 2017, <https://www.statista.com/topics/1316/forest-products-industry/>.

# APPENDIX A: WORKING LANDSCAPE INDUSTRIES

NAICS	Industry
Agricultural Production	
111000	Crop Production
112000	Animal Production and Aquaculture
115112	Soil Preparation, Planting, and Cultivating
115113	Crop Harvesting, Primarily by Machine
115114	Postharvest Crop Activities (except Cotton Ginning)
Agricultural Support	
115115	Farm Labor Contractors and Crew Leaders
115116	Farm Management Services
115210	Support Activities for Animal Production
221310	Water Supply and Irrigation Systems
325311	Nitrogenous Fertilizer Manufacturing
325312	Phosphatic Fertilizer Manufacturing
325314	Fertilizer (Mixing Only) Manufacturing
325320	Pesticide and Other Agricultural Chemical Manufacturing
333111	Farm Machinery and Equipment Manufacturing
423820	Farm and Garden Machinery and Equipment Merchant Wholesalers
444220	Nursery, Garden Center, and Farm Supply Stores
541620	Environmental Consulting Services
541690	Other Scientific and Technical Consulting Services
Agricultural Processing	
115111	Cotton Ginning
311111	Dog and Cat Food Manufacturing
311119	Other Animal Food Manufacturing
311211	Flour Milling
311212	Rice Milling
311213	Malt Manufacturing
311221	Wet Corn Milling
311224	Soybean and Other Oilseed Processing
311225	Fats and Oils Refining and Blending
311230	Breakfast Cereal Manufacturing
311313	Beet Sugar Manufacturing
311314	Cane Sugar Manufacturing
311340	Nonchocolate Confectionery Manufacturing
311411	Frozen Fruit, Juice, and Vegetable Manufacturing
311412	Frozen Specialty Food Manufacturing
311421	Fruit and Vegetable Canning
311422	Specialty Canning
311423	Dried and Dehydrated Food Manufacturing
311511	Fluid Milk Manufacturing
311512	Creamery Butter Manufacturing
311513	Cheese Manufacturing

NAICS	Industry
<b>Agricultural Processing</b>	
311514	Dry, Condensed, and Evaporated Dairy Product Manufacturing
311520	Ice Cream and Frozen Dessert Manufacturing
311611	Animal (except Poultry) Slaughtering
311612	Meat Processed from Carcasses
311613	Rendering and Meat Byproduct Processing
311615	Poultry Processing
311811	Retail Bakeries
311812	Commercial Bakeries
311813	Frozen Cakes, Pies, and Other Pastries Manufacturing
311821	Cookie and Cracker Manufacturing
311824	Dry Pasta, Dough, and Flour Mixes Manufacturing from Purchased Flour
311830	Tortilla Manufacturing
311911	Roasted Nuts and Peanut Butter Manufacturing
311919	Other Snack Food Manufacturing
311920	Coffee and Tea Manufacturing
311930	Flavoring Syrup and Concentrate Manufacturing
311941	Mayonnaise, Dressing, and Other Prepared Sauce Manufacturing
311942	Spice and Extract Manufacturing
311991	Perishable Prepared Food Manufacturing
311999	All Other Miscellaneous Food Manufacturing
312111	Soft Drink Manufacturing
312112	Bottled Water Manufacturing
312113	Ice Manufacturing
312120	Breweries
312130	Wineries
312140	Distilleries
313110	Fiber, Yarn, and Thread Mills
316110	Leather and Hide Tanning and Finishing
316998	All Other Leather Good and Allied Product Manufacturing
333241	Food Product Machinery Manufacturing
333993	Packaging Machinery Manufacturing
<b>Agricultural Distribution</b>	
424410	General Line Grocery Merchant Wholesalers
424420	Packaged Frozen Food Merchant Wholesalers
424430	Dairy Product (except Dried or Canned) Merchant Wholesalers
424440	Poultry and Poultry Product Merchant Wholesalers
424450	Confectionery Merchant Wholesalers
424470	Meat and Meat Product Merchant Wholesalers
424480	Fresh Fruit and Vegetable Merchant Wholesalers
424490	Other Grocery and Related Products Merchant Wholesalers
424510	Grain and Field Bean Merchant Wholesalers
424520	Livestock Merchant Wholesalers
424590	Other Farm Product Raw Material Merchant Wholesalers
424810	Beer and Ale Merchant Wholesalers
424820	Wine and Distilled Alcoholic Beverage Merchant Wholesalers
424910	Farm Supplies Merchant Wholesalers
424930	Flower, Nursery Stock, and Florists' Supplies Merchant Wholesalers

NAICS	Industry
<b>Agricultural Distribution</b>	
424990	Other Miscellaneous Nondurable Goods Merchant Wholesalers
445210	Meat Markets
445230	Fruit and Vegetable Markets
445291	Baked Goods Stores
445292	Confectionery and Nut Stores
445299	All Other Specialty Food Stores
445310	Beer, Wine, and Liquor Stores
446191	Food (Health) Supplement Stores
453110	Florists
484230	Specialized Freight (except Used Goods) Trucking, Long-Distance
493120	Refrigerated Warehousing and Storage
493130	Farm Product Warehousing and Storage
624210	Community Food Services
<b>Fishing</b>	
114111	Finfish Fishing
114112	Shellfish Fishing
114119	Other Marine Fishing
311710	Seafood Product Preparation and Packaging
424460	Fish and Seafood Merchant Wholesalers
<b>Forestry</b>	
113110	Timber Tract Operations
113210	Forest Nurseries and Gathering of Forest Products
113310	Logging
115310	Support Activities for Forestry
321113	Sawmills
321114	Wood Preservation
321211	Hardwood Veneer and Plywood Manufacturing
321212	Softwood Veneer and Plywood Manufacturing
321213	Engineered Wood Member (except Truss) Manufacturing
321214	Truss Manufacturing
321219	Reconstituted Wood Product Manufacturing
321911	Wood Window and Door Manufacturing
321912	Cut Stock, Resawing Lumber, and Planing
321918	Other Millwork (including Flooring)
321920	Wood Container and Pallet Manufacturing
321992	Prefabricated Wood Building Manufacturing
321999	All Other Miscellaneous Wood Product Manufacturing
322110	Pulp Mills
322121	Paper (except Newsprint) Mills
322122	Newsprint Mills
322130	Paperboard Mills
322211	Corrugated and Solid Fiber Box Manufacturing
322212	Folding Paperboard Box Manufacturing
322219	Other Paperboard Container Manufacturing
322220	Paper Bag and Coated and Treated Paper Manufacturing
322230	Stationery Product Manufacturing



NAICS	Industry
Forestry	
322291	Sanitary Paper Product Manufacturing
322299	All Other Converted Paper Product Manufacturing
333243	Sawmill, Woodworking, and Paper Machinery Manufacturing
337110	Wood Kitchen Cabinet and Countertop Manufacturing
337211	Wood Office Furniture Manufacturing
423310	Lumber, Plywood, Millwork, and Wood Panel Merchant Wholesalers
Mining	
211120	Crude Petroleum Extraction
211130	Natural Gas Extraction
212111	Bituminous Coal and Lignite Surface Mining
212112	Bituminous Coal Underground Mining
212113	Anthracite Mining
212210	Iron Ore Mining
212221	Gold Ore Mining
212222	Silver Ore Mining
212230	Copper, Nickel, Lead, and Zinc Mining
212291	Uranium-Radium-Vanadium Ore Mining
212299	All Other Metal Ore Mining
212311	Dimension Stone Mining and Quarrying
212312	Crushed and Broken Limestone Mining and Quarrying
212313	Crushed and Broken Granite Mining and Quarrying
212319	Other Crushed and Broken Stone Mining and Quarrying
212321	Construction Sand and Gravel Mining
212322	Industrial Sand Mining
212324	Kaolin and Ball Clay Mining
212325	Clay and Ceramic and Refractory Minerals Mining
212391	Potash, Soda, and Borate Mineral Mining
212392	Phosphate Rock Mining
212393	Other Chemical and Fertilizer Mineral Mining
212399	All Other Nonmetallic Mineral Mining
213111	Drilling Oil and Gas Wells
213112	Support Activities for Oil and Gas Operations
213113	Support Activities for Coal Mining
213114	Support Activities for Metal Mining
213115	Support Activities for Nonmetallic Minerals (except Fuels) Mining
327120	Clay Building Material and Refractories Manufacturing
327310	Cement Manufacturing
327320	Ready-Mix Concrete Manufacturing
327331	Concrete Block and Brick Manufacturing
327390	Other Concrete Product Manufacturing
327410	Lime Manufacturing
327991	Cut Stone and Stone Product Manufacturing
327992	Ground or Treated Mineral and Earth Manufacturing
331410	Nonferrous Metal (except Aluminum) Smelting and Refining
333131	Mining Machinery and Equipment Manufacturing
333132	Oil and Gas Field Machinery and Equipment Manufacturing
423320	Brick, Stone, and Related Construction Material Merchant Wholesalers

NAICS	Industry
Mining	
423520	Coal and Other Mineral and Ore Merchant Wholesalers
532412	Construction, Mining, and Forestry Machinery and Equipment Rental and Leasing
541360	Geophysical Surveying and Mapping Services
Outdoor Recreation	
114210	Hunting and Trapping
441222	Boat Dealers
487110	Scenic and Sightseeing Transportation, Land
487210	Scenic and Sightseeing Transportation, Water
487990	Scenic and Sightseeing Transportation, Other
532284	Recreational Goods Rental
712130	Zoos and Botanical Gardens
712190	Nature Parks and Other Similar Institutions
713920	Skiing Facilities
713930	Marinas
713990	All Other Amusement and Recreation Industries
721214	Recreational and Vacation Camps (except Campgrounds)
Renewable Energy	
221111	Hydroelectric Power Generation
221114	Solar Electric Power Generation
221115	Wind Electric Power Generation
221116	Geothermal Electric Power Generation
221117	Biomass Electric Power Generation
221118	Other Electric Power Generation



# APPENDIX B: REGIONS

<p><b>Redwood Coast</b>  Del Norte County  Humboldt County  Mendocino County  Lake County  Trinity County</p>	<p><b>San Joaquin Valley</b>  Fresno County  Kern County  Kings County  Madera County  Merced County  San Joaquin County  Stanislaus County  Tulare County</p>
<p><b>Northern Sierra</b>  Lassen County  Modoc County  Shasta County  Siskiyou County  Nevada County  Plumas County  Sierra County</p>	<p><b>Central Sierra</b>  Alpine County  Amador County  Calaveras County  Inyo County  Mariposa County  Mono County  Tuolumne County</p>
<p><b>Greater Sacramento Region</b>  El Dorado County  Placer County  Sacramento County  Sutter County  Yolo County  Yuba County</p>	<p><b>LA/Orange</b>  Los Angeles County  Orange County</p>
<p><b>North Sacramento Valley</b>  Butte County  Colusa County  Glenn County  Tehama County</p>	<p><b>Inland Empire</b>  Riverside County  San Bernardino County</p>
<p><b>San Francisco Bay Area</b>  Alameda County  Contra Costa County  Marin County  Napa County  San Francisco County  San Mateo County  Santa Clara County  Solano County  Sonoma County</p>	<p><b>Southern Border</b>  San Diego County  Imperial County</p>
<p><b>Central Coast</b>  Monterey County  San Benito County  Santa Cruz County  San Luis Obispo County</p>	<p><b>South Coast</b>  Santa Barbara County  Ventura County</p>

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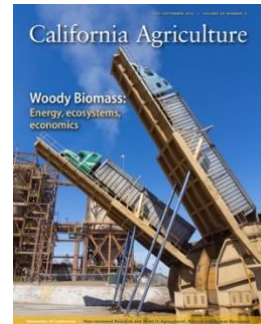
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# MORE INFORMATION ON CALIFORNIA'S WORKING LANDSCAPE

**University of California Agriculture and Natural Resources ([ucanr.edu](http://ucanr.edu)):** A statewide network of UC researchers and educators who create, develop, and extend knowledge on agricultural and natural resource management, youth development, family and consumer sciences, STEM, community economic development, and more. UC ANR collaborates with a wide array of partners in all 58 counties and delivers over 3,000 local partnership programs. For over 100 years, our advisors, specialists, faculty and staff have been committed to ensure that UC ANR research and education programs advance the wellbeing of all Californians.

**California Agriculture journal ([calag.ucanr.edu](http://calag.ucanr.edu)):** The quarterly open-access research journal of UC Agriculture and Natural Resources publishes research and news on many topics related to California's working landscape. Recent special issues cover [forestry](#), [woody biomass](#), [groundwater management](#) and [cannabis production](#).



**California State University Agricultural Research Institute ([calstate.edu/impact-of-the-csu/research/ari](http://calstate.edu/impact-of-the-csu/research/ari)):** Works through partnerships across the agricultural industry and beyond to conduct applied research to ensure the sustainability of California agriculture.

**California Community Colleges' Agriculture, Water, and Environmental Technology Initiative ([calagcc.org/](http://calagcc.org/)):** Invests funding and resources in industry sectors that are key to California's economic growth; the Agriculture, Water, and Environmental Technology initiative works to ensure the economic viability of California's agriculture and natural resources industry, while maintaining our environmental integrity, especially in the area of water – our most precious resource.

**California Department of Food and Agriculture ([cdfa.ca.gov](http://cdfa.ca.gov)):** Administers a wide array of programs that support the state's agricultural sector. Cdfa publishes annual reports on the state's agricultural production and posts the local-level annual reports from each county's agricultural commissioner.

**California Department of Conservation ([conservation.ca.gov](http://conservation.ca.gov)):** Administers a variety of programs vital to California's public safety, environment and economy. The services DOC provides are designed to balance today's needs with tomorrow's obligations by fostering the wise use and conservation of energy, land and mineral resources.

**California Department of Forestry and Fire Protection ([fire.ca.gov](http://fire.ca.gov)):** Delivers programs that serve the public interest in environmentally, economically, and socially sustainable management of forest and rangelands, and a fire protection system that protects and serves the people of the state. CalFire provides extensive technical and public information for statewide fire threat, fire hazard, watersheds, socio-economic conditions, environmental indicators, and forest-related climate change.

**California Energy Commission ([www.energy.ca.gov](http://www.energy.ca.gov)):** the state's primary energy policy and planning agency.

**California Natural Resources Agency ([resources.ca.gov](https://resources.ca.gov)):** Restore, protect and manage the state's natural, historical and cultural resources for current and future generations using creative approaches and solutions based on science, collaboration and respect for all the communities and interests involved.

**The Healthy Lands and Healthy Economics Initiative**

([www.sonomaopenspace.org/projects/healthy-lands-healthy-economies/](http://www.sonomaopenspace.org/projects/healthy-lands-healthy-economies/)): A regional collaboration led by Sonoma County Ag + Open Space, the Resource Conservation District of Santa Cruz County, and the Santa Clara Valley Open Space Authority to quantify the benefits and economic values provided by working lands and natural areas.

**Lawrence Berkeley National Laboratory Electricity Markets and Policy Group, Renewable Energy program ([emp.lbl.gov/research/renewable-energy](https://emp.lbl.gov/research/renewable-energy)):** Research to inform decision-makers about the complexities and opportunities of renewable energy deployment.

**USDA Economic Research Service ([ers.usda.gov](https://ers.usda.gov)):** Provides data and analysis on topics including the agricultural economy, food and nutrition, food safety, global markets, natural resources and the rural economy.

**USDA National Agricultural Statistics Service ([www.nass.usda.gov](http://www.nass.usda.gov)):** Collects and publishes comprehensive data on U.S. agriculture, including production, prices, farm labor and wages, farm finances, chemical use, farm demographics and many more topics.

**AgFunder ([agfunder.com/research/](https://agfunder.com/research/)):** A global venture capital platform that publishes news and research on innovation and investment in food and agriculture.



# MORE ABOUT THE CENTERS OF EXCELLENCE

The Centers of Excellence (COE) for Labor Market Research deliver regional workforce research and technical expertise to California Community Colleges for program decision making and resource development. This information has proven valuable to colleges in beginning, revising, or updating economic development and Career Education (CE) programs, strengthening grant applications, assisting in the accreditation process, and in supporting strategic planning efforts.

The Centers of Excellence Initiative is funded in part by the Chancellor's Office, California Community Colleges, Economic and Workforce Development Program. The Centers aspire to be the leading source of regional workforce information and insight for California Community Colleges. More information about the Centers of Excellence is available at [www.coecc.net](http://www.coecc.net).

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## **Important Disclaimer**

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