CSU The California State University

THE IMPACT OF THE CALIFORNIA STATE UNIVERSITY

PREPARED FOR
Office of the Chancellor
The California State University

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A MESSAGE FROM THE CHANCELLOR

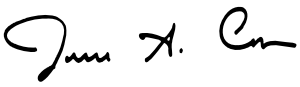
From its inception, the California State University has focused on helping students achieve their academic and career aspirations. That unwavering focus has transformed the lives of millions of Californians as it has elevated families and communities, while driving California to its brightest future.

Indeed, the impact of the CSU on Californians—and on our great Golden State – cannot be overstated. And it is powerfully illustrated throughout this economic report, both in the statistics and data that reflect how CSU expenditures generate economic prosperity in campus communities and identified regions of the state, as well as in the remarkable return-on-investment that California receives from the CSU: For every dollar invested by the state in the California State University, nearly seven dollars is generated in positive economic activity.

Even more compelling is the profound impact of CSU alumni on California's economy. More than 2.4 million alumni with bachelor's or master's degrees are active participants in California's workforce. Because of their CSU degrees, they enjoy significantly higher earnings than what a high school diploma or associate degree might have provided. In 2019, those incrementally higher earnings totaled a remarkable $70.7 billion for CSU alumni in California. That increased spending power supported $88.3 billion in industry activity and nearly $6 billion in state and local tax revenue.

These numbers, remarkable as they are, are really just the story behind the story. The real story of the California State University is found in the ways we enrich the lives of our students and alumni, and in the ways the CSU contributes to the knowledge and innovations that make California one of the world's most successful economies. In the final section of this report are stories about the research being conducted at CSU campuses from Humboldt State in the north to San Diego State in the south. They illustrate the powerful ways we are engaging students, developing faculty, benefiting key industries and serving our communities as we develop solutions to some of the most critical issues facing our state, nation and world.

I invite you to spend time with this report, discovering for yourself the remarkable ways the California State University is serving our state and its citizens. I think you'll find, as I did, that this is a story worth sharing.



Chancellor Joseph I. Castro

EXECUTIVE SUMMARY

California is known for its diverse, robust economy and as a hub for innovation. As the nation's largest and most affordable public four-year university system, the California State University (CSU) has a wide-ranging and significant impact on the state, its residents and its economy. This analysis serves as an update to CSU economic impact assessments conducted in 2004 and 2010 by ICF. This current assessment provides a refreshed understanding of the CSU's economic contributions to the state's economy and in campus-affiliated regions, as well as the impact of the CSU's research activities on students, communities and some of the state's vital industries. These assessments demonstrate the value of the CSU on the state and its residents.

HOW THE CSU IMPACTS CALIFORNIA'S ECONOMY

The CSU provides excellent higher education to academically qualified Californians, offering them the opportunity to enhance the trajectory of their lives. Having a four-year college degree opens doors to career opportunities, enhances earning potential, and increases social mobility.[1] In fact, the CSU campuses rank among the best in the nation for value, return on investment and social mobility, and the CSU is one of the most affordable public universities in the U.S. The university's 23 campuses annually graduate more than 100,000 job-ready alumni who contribute significantly to California and its economy. In academic year 2015-16 (the most recent year for which comparative data is available), the CSU conferred more than 90,024 bachelor's degrees—nearly half of all the bachelor's degrees awarded by all of the universities (public and private) in the entire state. In that same year, the CSU conferred roughly 20,300 master's degrees, or

almost one-fourth of all the master's degrees awarded that year in California.[2] In particular, the CSU provides opportunities for improved success among underserved and underrepresented communities in higher education within the state.

However, the impact of the CSU goes beyond the high-quality education that it provides to its student body. Investment in the CSU by the state and the spending of the CSU and its students creates a ripple effect that boosts California's overall economy, supporting jobs, industry activity, and tax revenue.

While preparing university graduates has been the most visible way that the CSU supports the state's knowledge-based economy, it is not the only way. The CSU's applied research activities help California's industries remain innovative and competitive, and the university provides an array of services and facilities to assist entrepreneurial start-ups. The value of the CSU's applied research efforts can be categorized into three types of impact: student impact, community impact, and industry or workforce impact. First and foremost, CSU research efforts have a positive effect on student learning, engagement and career choice. Additionally, CSU research leads to the development of new approaches and technologies that directly address the needs of the community and improve the quality of life of its residents. Finally, research and innovation spurs entrepreneurial activity in regional industry and develops a quality workforce pipeline in industries that drive the California economy.

The purpose of this report is to provide an economic analysis to estimate the total impacts of spending in a region. This modeling technique accounts for the "multiplier effect" of economic activity, calculating the total impact created by multiple rounds of spending triggered by new income, spending, or jobs in a region. Direct spending by the CSU and its students has a multiplier effect in each campus region, as well as in the state. The overall economic impact of the CSU on the various regions and on the state of California is the summation of the direct impacts as well as the secondary impacts spurred by the direct impacts.

THE MAGNITUDE OF THE CSU'S ECONOMIC IMPACT

The impacts associated with the CSU begin with the university itself—its faculty, staff, students, and alumni—and then percolates throughout the state, generating successive rounds of economic activity because of the interlinkages between different economic sectors and regions.

Direct spending by the CSU and its students are the university's most obvious and direct sources of economic impact. Each CSU campus and the Chancellor's Office annually invests in capital, operation, and auxiliary expenditures, while the student body purchases goods and services from the surrounding regional economy.

However, direct spending represents only a portion of the CSU's total economic impact. The full economic impact of the CSU on the state's economy, including its impact on other seemingly unrelated sectors beyond those in which it directly participates (education, retail, construction, etc.), can be assessed through regional economic impact analysis. Regional economic modeling is founded on the principle that industry sectors are interdependent: One industry purchases inputs from other industries and households (e.g., labor) and then sells outputs to other industries, households, and government. Therefore, economic activity in one sector causes an increased flow of money throughout the economy. For this analysis, the widely used modeling software IMPLAN[3] was employed to calculate these impacts.

In this assessment of the California State University's core economic impact, two types of economic impacts are modeled: the impacts generated by CSU-related expenditures and the impact of earnings of CSU alumni that are attributable to their degree.[4] The impact associated with CSU alumni earnings constitutes the total

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[1] CSU. Why the CSU Matters. Available at https://www2.calstate.edu/csu-system/why-the-csu-matters/Pages/default.aspx
[2] CSU. Measuring the Value of the CSU. Available at https://www2.calstate.edu/csu-system/why-the-csu-matters/value-of-the-csu
[3] IMPLAN is a static input-output model created and maintained by the Minnesota IMPLAN Group (MIG) and is widely used throughout the United States and internationally.
[4] The qualitative impact of CSU research activity is also examined in Section II.

economic impact of CSU alumni who are currently living in California and thus contributing to and spending their income in the California economy. The value of their CSU degrees is evaluated as the differential between their current salaries and what they would have earned without their CSU degrees. This assessment is based on data from 2018-19, the most recent year available.

In the 2018-19 academic year, the CSU and its student body spent $17.54 billion on capital, auxiliary, operations, and student spending. CSU-related expenditures supported a total of nearly **209,400 jobs and $26.9 billion in industry activity, as well as $1.6 billion in state and local tax revenue in 2019.**

The CSU also plays the important role of preparing its students to become active participants in the California economy. The CSU has an estimated 2.4 million alumni with bachelor's or master's degrees who are active participants in California's workforce. Those alumni have a significantly higher earning potential compared to what they might have had with only a high school or associate degree. For instance, on average a bachelor's degree holder in California earns nearly double the earnings of a high school graduate.[5] In total, the CSU alumni that are still active in California's labor force in 2019 earned incrementally higher earnings of $70.7 billion due to their CSU degree. That increased spending power supported roughly **474,900 additional jobs, $88.3 billion in industry activity, and $5.9 billion in state and local tax revenue.**

FOR EVERY DOLLAR THAT CALIFORNIA INVESTS IN THE CSU, $6.98 OF POSITIVE ECONOMIC ACTIVITY IS GENERATED.

CALIFORNIA'S RETURN ON INVESTMENT IN THE CSU

The magnitude of the CSU's economic impact can be put into context by California's annual investment in the university. In 2018-19, the state invested $3.85 billion in CSU operation and capital appropriations. For every dollar the state invested in the California State University, $6.98 of industry activity was stimulated in the state. When the impact of the enhanced earnings of CSU alumni are considered, the ratio rises to $29.90 in total economic activity for every dollar the state invests in the CSU.

This return on investment demonstrates the CSU's massive economic impact on California. State and local governments annually receive more in CSU-supported tax revenue than the state's investment in the university, making the CSU increasingly valuable each year.

JOB CREATION

209,400
ANNUAL JOBS
SUPPORTED BY CSU

ECONOMIC BENEFIT

$26.9 BILLION
IN INDUSTRY ACTIVITY

TAXES

$1.6 BILLION
IN TAX REVENUE

[5] USCB. 2018 American Community Survey 5-Year Estimates. Table S2001.
[6] CSU. 2019 Strategic Plan for Research. Available at https://www2.calstate.edu/impact-of-the-csu/research/Pages/2018-19-Strategic-Plan.aspx

THE IMPACT OF CSU RESEARCH ACTIVITY

The primary mission of CSU research is to engage students, develop faculty, grow the economy, and advance the discovery and dissemination of knowledge. CSU research positively impacts student success and faculty excellence by providing opportunities to investigate and solve issues of statewide, nationwide, and global importance. Research at the CSU improves student outcomes through enhanced engagement and retention, while preparing students for the demands of the future. Research drives academic excellence by empowering faculty to advance knowledge in their fields and integrate their scholarship into the curriculum. These student and faculty outcomes have additional benefits for local and regional communities and California industry. CSU research activities foster innovation and contribute to technology development, industry competitiveness, and community engagement.

The CSU conducts a significant amount of externally funded research, receiving some $648 million in funding from federal, state, local and non-government sources in the 2017-18 academic year.[6] These external funds are used for innovative projects that benefit local communities and prepare students for graduate studies or for future careers. As a public university with a student-focused educational mission, research at the CSU is primarily aimed at investigating complex environmental, social, and economic issues affecting the statewide population. To this end, the CSU faculty and students pursue innovative and collaborative research projects in the areas of agriculture and water; biotechnology and healthcare; energy and the environment; coasts and oceans; hospitality, tourism and entertainment; and information technology, engineering and advanced sciences.

This report includes examples of projects or initiatives in each of these areas, demonstrating the innovative and broadly applicable nature of CSU research. Examples include faculty-led and student-involved programs and projects, research partnerships and entrepreneurial initiatives sponsored by CSU-affiliated campus centers and institutes, and multi-campus collaborations associated with CSU existing affinity groups. Each vignette demonstrates the ways in which CSU research and innovation has material impacts on students, regional communities, and vital industries. These research activities are indicative of the CSU's growing economic impact across California.

INTRODUCTION

California, with the largest state economy in the U.S., is known for its robust and diverse economy, an economy that increasingly demands a highly skilled and educated workforce. California leads the country and the world in computer manufacturing, the aerospace industry, film and television, and agriculture and viticulture.[7] California's labor force is highly educated, with 31 percent[8] of its population over the age of 18 and 37 percent[9] of the population ages 25 to 34 having a bachelor's degree or higher.[10] Many businesses locate in California specifically for access to the state's highly educated workforce.

The CSU's primary mission is to provide access to academically excellent baccalaureate, post-baccalaureate, master's level and some doctoral level education. The CSU has long played a vital role in providing California's advanced industries with the skilled workforce they need. To that end, the CSU is working to alleviate California's predicted "degree drought" by educating and training more career-ready graduates than any other college or university in the state.[11] Moreover, as California's population grows in diversity, the CSU is deeply committed to providing access to a quality affordable education and focuses on reaching those populations for whom higher education has traditionally been less accessible. The CSU is among the most diverse university systems in the nation in terms of students' social, economic, and educational backgrounds. More than half of CSU students are students of color, and one in three CSU undergraduates is the first in his or her family to attend college.[12]

In addition to those benefits, there are other quantifiable ways that the CSU impacts the state's economy—especially via the direct spending of the university, its students, and alumni. Economic impact analysis is used to estimate the total impacts of this spending in campus regions across the state. Economic impact modeling quantifies the "multiplier effect" of economic activity, calculating the total impact created by the multiple

rounds of spending triggered by spending, new income, or jobs in a region. The overall economic impact of the CSU's operational, capital and auxiliary spending on specific regions and on the state is the summation of the direct spending as well as the secondary impacts spurred across the supply chain.

CSU students also have a tremendous impact on California in their role as students and as degree- or certificate-earning graduates. As students make education-related purchases, that spending provides an economic stimulus to the surrounding campus communities. Moreover, as alumni, many CSU graduates continue to live and work in California, and their earnings and subsequent spending continues to contribute significantly to the state's economy.

Further, the economic impact of the CSU's applied research efforts can be categorized into three types of impact. These include 1) student, 2) community benefit and 3) industry advancement. CSU research efforts have a positive effect on student learning, engagement, and career choice. Additionally, CSU research leads to the development of new approaches and technologies that directly address the needs of the community and improve the quality of life of its residents. Finally, research and innovation spurs entrepreneurial activity in regional industry and helps develop a high-quality workforce in industries that drive the California economy.

This report provides an update to the CSU's economic impact assessments conducted by ICF in 2004 and 2010. It focuses on the CSU's current economic contributions related to workforce, industry activity and applied research. All three reports underscore that the CSU was and continues to be central to California's economy and directly or indirectly impacts everyone in the state.

I. THE MAGNITUDE OF THE CSU'S ECONOMIC IMPACT

The CSU is the largest public four-year university in the United States, and as such has a significant economic and social impact on the regions and communities in which CSU campuses and centers reside and on California as a whole. It's worth noting that the CSU educated more than 480,500 students in the 2018-19 academic year, which is a 10 percent increase from a decade prior.[13]

This chapter provides an overview of the quantitative estimates of the total economic impact of the CSU. Two types of economic impacts are presented: the impacts of CSU-related expenditures, from the university itself as well as current students; and the impact of CSU alumni earnings that are attributable to their CSU degrees. Impacts are presented at the state and regional levels.

1. METHODOLOGY

Traditionally, the impact of a university is framed as the incalculable worth of knowledge and learning that its students receive. While education is valuable in its own right, the impact of a university can also be accounted for in economic terms, through its spending, student activity, and the incremental lifetime income of its alumni. The direct economic activity associated with the university has a multiplier effect on industry activity, employment, labor income and tax revenue across the region.

Economic impact analysis is based on the understanding that economic sectors are

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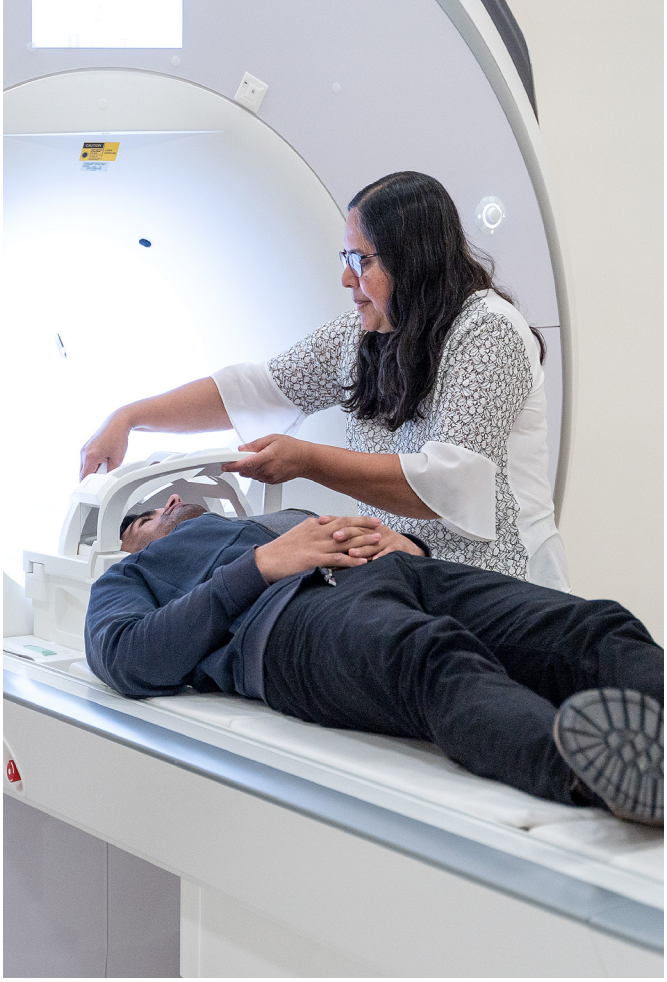
[7] Encyclopedia Britannica. California: Economy. Available at https://www.britannica.com/place/California-state/Economy
[8] 30 percent nationally
[9] 36 percent nationally
[10] USCB. 2019. Table S1501: Educational Attainment. 2018 ACS 5-Year Estimates Subject Tables. Available at https://data.census.gov/cedsci/
[11] CSU. Why the CSU Matters. Available at https://www2.calstate.edu/csu-system/why-the-csu-matters#:~:text=The%20Impact%20of%20the%20%E2%80%8BCSU&text=We%20educate%20the%20majority%20of,percent%20of%20the%20nation's%20teachers.&text=We%20work%20to%20end%20California's,every%20field%20across%20the%20world
[12] CSU. Closing the Equity and Achievement Gap. Available at https://www2.calstate.edu/csu-system/why-the-csu-matters/Pages/closing-the-achievement-gap.aspx
[13] CSU. Fall 2019 Enrollment of Students Resident in Campus County (based on Resident Code). Campus Total



interdependent: One industry purchases inputs from other industries and households (e.g., labor), and then produces and sells outputs to other industries, households and government entities. This analysis uses the economic impact modeling software IMPLAN (IMPLAN Online) to calculate the total industry impacts. IMPLAN was created and is maintained by the Minnesota IMPLAN Group (MIG) and is widely used throughout the United States and internationally. The IMPLAN model is a static input-output framework used to analyze the effects of an economic stimulus on pre-specified economic regions—in this case, eight multi-county regions across California, as well as the state as a whole. The IMPLAN model is based on the input-output data from the U.S. National Income and Product Accounts (NIPA) from the Bureau of Economic Analysis within the U.S. Department of Commerce. The model includes 546 sectors based on the North American Industry Classification System (NAICS).

The model uses state-specific multipliers to trace and calculate the flow of dollars from the industries that originate the impact to supplier industries. Multipliers convert the input values (such as increased spending or employment) into a net economic impact retained in the region, allowing for leakages outside of the local economy. Direct impacts occur in the industries where primary activities occur, indirect impacts are in industries that supply or interact with the primary industries, and induced impacts are due to spending from increased wages for workers in directly and indirectly impacted industries. Indirect and induced impacts are often referred to as secondary impacts. By assessing the economic impact of the CSU at the state and regional level, the total impact of each campus can be fully understood. The IMPLAN model allows for the estimation of the total impacts of CSU-related activity on the regional economy in terms of the following types of impacts:

- **Employment** – Jobs supported by the CSU. IMPLAN estimates employment by aggregated sector.
- **Labor Income** – Wages and salaries (including benefits) paid to workers, plus proprietor income, supported by the CSU activity.
- **Industry Activity** – The contribution of the investments to total regional economic activity.
- **Tax Impact** – Tax revenues from businesses, sales, excise, and property from all policy-related activity. State and local tax revenue is calculated.

The economic impact of the CSU is contextualized by calculating the **multiplier effect** that the CSU and each of its campuses has on its region and the state. The multiplier demonstrates the ripple effect of total impact that each dollar of spending by the CSU and its students has on the region. The multiplier is calculated by dividing the total industry activity impact by the total spending by the CSU or the campus. Throughout this report, ICF also reports **California's return on investment** for every dollar the state invests in the CSU. Return on investment is calculated by dividing the total industry activity impact by the total dollar amount the state invests in the CSU or the relevant campus.

Details about the methodology used in assessing the CSU's statewide and regional economic impact can be found in **Appendix A: Impact Analysis Methodology.**

2. ANNUAL IMPACTS OF THE CSU ON THE STATE OF CALIFORNIA

The spending of the CSU, its students and the lifelong incrementally higher income of its alumni helps to stimulate and grow the California economy with an impact much larger than the initial spending amount might suggest. Impacts are assessed at the state level, as well as in the regions throughout the state where CSU campuses and centers are found.

Annually, the CSU spends money on operational expenditures such as wages, salaries, supplies and other ongoing operational costs, construction and capital investment; and on auxiliary expenditures such as bookstores, campus dining, foundation, research institutes and other entities. Additionally, CSU students spend money on books and supplies, housing, food, transportation, and other miscellaneous costs. Direct CSU-related expenditures in the 2018-19 academic year (AY) totaled **$17.54 billion**, divided into four spending categories, as shown below.

$8.3 BILLION
ON OPERATIONAL EXPENDITURES

$838.3 MILLION
4-YEAR AVERAGE CAPITAL EXPENDITURES

$1.65 BILLION
ON AUXILIARY EXPENDITURES

$6.7 BILLION
IN STUDENT SPENDING

CSU-related expenditures supported a total of nearly **209,400 annual jobs and $10.3 billion in labor income, $26.9 billion in industry activity, as well as $1.6 billion in state and local tax revenue in 2019.** Table 1 (below) shows the contribution of each spending category—operational expenditures, capital expenditures, auxiliary, and student spending—to the total economic impact of the CSU on California. Impacts related to operational expenditures account for more than half the total output impact. More than 55 percent of the total industry activity supported is attributable to direct impacts.

CSU STATEWIDE IMPACT

- **Nearly 209,400 annual jobs**
- **$10.3 billion in labor income**
- **$26.9 billion in regional industry activity**
- **$1.6 billion in state and local tax revenue**

TABLE 1. ANNUAL CSU-WIDE STATE IMPACT ($BILLIONS, 2020 USD)

INPUT	EMPLOYMENT	LABOR INCOME	INDUSTRY ACTIVITY	TAX IMPACT
Operational Expenditures	123,818	$6.6B	$15.6B	$0.8B
Capital Expenditures	9,032	$0.6B	$1.5B	$0.1B
Auxiliary	18,871	$0.9B	$2.6B	$0.2B
Student Spend	57,657	$2.2B	$7.2B	$0.6B
Total	**209,378**	**$10.3B**	**$26.9B**	**$1.6B**

Source: ICF IMPLAN Analysis

Direct spending by the CSU stimulates a total economic impact that is more significant than what it actually directly expends. The ripple effect of the CSU's impact is explained by the multiplier effect. **For every dollar spent by the CSU and its students, $1.54 of positive economic activity[14] is generated** within the state.

MEDIAN ANNUAL EARNINGS BY DEGREE LEVEL

MEDIAN HIGH SCHOOL GRADUATE EARNINGS

$32,533

MEDIAN ASSOCIATE'S EARNINGS

$40,332

MEDIAN BACHELOR'S EARNINGS

$63,447

MEDIAN ADVANCED DEGREE EARNINGS

$91,838

CSU ALUMNI STATEWIDE IMPACT

- **nearly 474,900 additional jobs**
- **$88.3 billion in industry activity**
- **$5.9 billion in state and local tax**

University and student spending accounts for only a portion of the CSU's total impact on the state. The CSU also plays the important role of educating and preparing its students to become active participants in the California state economy. Each year, the CSU awards more than 125,000 degrees, and one in every 20 Americans holding a college degree is a graduate of the CSU.[15] The university has an estimated 2.4 million alumni with bachelor's and master's degrees who are active participants in California's workforce. Those alumni have a higher earning potential compared to Californians who have high school diplomas or an associate degree. For instance, on average in California, a bachelor's degree holder earns nearly double the earnings of a high school graduate.[16] In total, the CSU alumni who are still active in California's labor force in 2019 earned incrementally higher earnings of $70.7 billion due to their CSU degree. That increased spending power supported roughly 474,900 additional jobs, $88.3 billion in industry activity and $5.9 billion in state and local tax revenue.

TABLE 2. ANNUAL CSU ALUMNI IMPACT ON CALIFORNIA ($BILLIONS, 2020 USD)

INPUT	EMPLOYMENT	LABOR INCOME	INDUSTRY ACTIVITY	TAX IMPACT
Alumni	474,845	$29.4B	$88.3B	$5.9B

Source: ICF IMPLAN Analysis

[14] The $1.54 multiplier effect of spending by the CSU and its students is not to be confused with California's return on investment, discussed in Section 2.1.

[15] CSU. 2019. Graduation Rate for First-Time and Transfer Students Reach All-Time Highs. https://www2.calstate.edu/csu-system/news/Pages/Graduation-Rates-for-First-Time-and-Transfer-Students-Reach-All-Time-Highs.aspx

[16] USCB. 2018 American Community Survey 5-Year Estimates. Table S2001

[17] California's return on investment should not be confused with the multiplier effect of direct spending by the CSU, discussed above.

[18] CSU. Building California's Workforce

2.1 CALIFORNIA'S RETURN ON INVESTMENT IN THE CSU

The magnitude of the CSU's economic impact can be put into context by the state's annual investment in the university. In 2018-19, California invested $3.85 billion in CSU operation and capital appropriations. For every dollar the state invested in the California State University, $6.98 dollars of industry activity was stimulated in the state.[17] When the impact of the **enhanced earnings of CSU alumni is considered, the ratio rises to $29.90** in total economic activity for every dollar the state invests in the CSU.

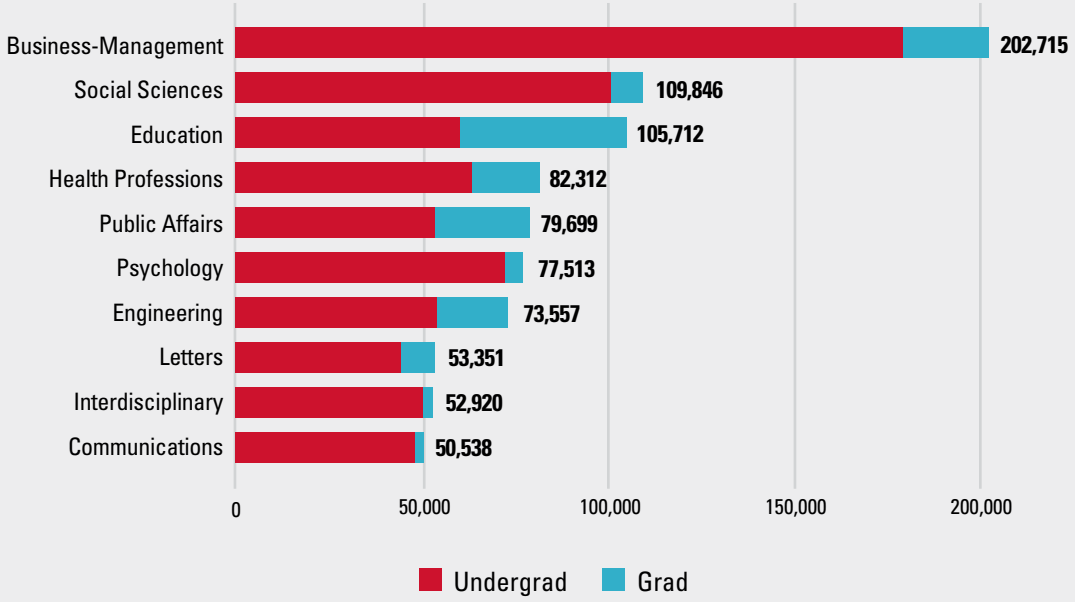
FOR EVERY DOLLAR THAT CALIFORNIA INVESTS IN THE CSU, $6.98 OF POSITIVE ECONOMIC ACTIVITY IS GENERATED.

This return on investment demonstrates the CSU's massive economic impact on California. State and local governments annually receive more in CSU-supported tax revenue than the state's investment in the university, making the CSU increasingly valuable each year.

2.2 INDUSTRIES IMPACTED

While spending by the CSU and its students stimulates large economic impacts throughout the state, another key way the CSU impacts the California economy is by awarding more bachelor's degrees than any other higher education institute in the state.[18] Highly qualified graduates use the skills developed and honed at the CSU to create positive impacts in the industries that drive California's economy. Figure 1 shows the total number of undergraduate and graduate students that received degrees in various disciplines during the 10-year period from 2009-10 AY to the 2018-19 AY. The top three most popular areas of study were business management, social sciences and education. While CSU students gain expertise in their areas of study, the

FIGURE 1. TOP 10 AREAS OF STUDY FOR CSU UNDERGRADUATES AND GRADUATES, 2009-10 - 2018-19 AY



CSU. 2018-2019 CSU Undergraduate and Graduate Degrees Granted. Available at: https://www2.calstate.edu/data-center/institutional-research-analyses/Pages/reports-and-analytics.aspx

CSU also gives them skills to be productive and successful workers in whatever field they end up enjoying a career in, regardless of their majors and degrees.

According to the California Employment Development Department 2016 Long-Term Occupational Employment Projects,[19] business management-related positions have been a consistently significant source of jobs in California, and employment in business positions was expected to grow more than 10 percent between 2016 and 2026.[20] CSU's 202,715 business management students from the past 10 years are ready to step into the newly demanded jobs across a range of industries. In academic year 2015-16, the CSU awarded approximately half of all the business and professional service degrees earned in California, demonstrating the importance of the CSU in the state's economy.[21] Many of these business-management graduates also completed hands-on learning experiences through regional and local Small Business Development Centers or Centers for Entrepreneurship housed at many of the CSU campuses.[22] Realistically, not all business management students are bound to go into business-industry positions only, but CSU graduates with a degree in business management are well prepared to work in a variety of sectors.

Social sciences is the second most popular area of study among CSU graduates. Social science occupations include economists, survey researchers, clinical and school psychologists, sociologists, urban and regional planners, anthropologists, archeologists, and others. Within California, employment in the social sciences field was expected to grow by 12 percent between 2016 and 2026.[12] Clinical, counseling, and school psychologists were the most popular occupations for social scientists, accounting for more than 50 percent of all jobs in the industry in California.[12]

Education is the most popular area of study for CSU graduate students, with more than 45,000 students earning graduate degrees in education over the 10-year period studied. Employment in the education/teaching sector was also anticipated to grow by 10 percent over the same time period, creating more than 250,000 jobs into which CSU students are prepared to enter.[12] The CSU estimates that the university educates the majority of California's teachers and nearly 8 percent of the nation's teachers, playing a key role in the education of every generation.[23]

Employment in the health professionals' field was expected to experience the highest growth of all the industries discussed, with employment increasing by 22 percent between 2016 and 2026.[12] On average, more than 8,200 CSU students graduate with a bachelor's or master's in health professions each year, a number that has grown by 5 percent annually over the 10-year period. The CSU educates more than half of all California health- or medical-related bachelor's degrees.[24]

Engineering and psychology are also important and growing fields that CSU graduates can support in the state. In the 2018-19 AY, nearly 53,300 students graduated with undergraduate or graduate degrees in engineering, and almost 33,000 graduated with degrees in psychology. Employment in both fields was expected to grow 15 percent and 10 percent between 2016 and 2026, respectively.[12] In fact, the CSU currently enrolls approximately one out of every 15 engineering students and nearly one out of every seven Hispanic engineering students nationwide.[25]

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[19] All employment projections were made per COVID-19 pandemic.
[20] State of California Employment Development Department. Long-Term Occupational Employment Projections – California. Available at https://data.edd.ca.gov/Employment-Projections/Long-Term-Occupational-Employment-Projections-Cali/5qrz-qipy/data
[21] CSU. Measuring the Value of the CSU. Available at https://www2.calstate.edu/csu-system/why-the-csu-matters/value-of-the-csu
[22] CSU. Providing California's Skills-ready Graduates
[23] CSU. Why the CSU Matters. Available at https://www2.calstate.edu/csu-system/why-the-csu-matters/Pages/default.aspx
[24] CSU. Providing California's Skills-ready Graduates
[25] CSU. Providing California's Skills-Ready Graduates

3. ANNUAL IMPACT OF THE CSU ON CALIFORNIA'S REGIONS

In addition to the statewide benefits discussed above, CSU campuses and centers have a strong regional economic impact because of the goods and services they purchase from their communities. By assessing the regional and statewide impacts, the impact of each campus can be better understood.

In this section of the report, the direct and total economic impacts of the CSU campuses on each of eight regions within California is quantified. Consistent with the 2004 and 2010 studies, the regions were defined by grouping counties that shared a common economic base or commuter shed. Naturally, CSU impacts for each region vary, depending on factors such as total magnitude of direct spending by the campuses, the proportional spending by type by the campuses, the percent of spending that is local, and the proportion of alumni that remain in the region.

Details of the economic impact calculations for each campus and region, and for the state as a whole, are provided in **Appendix B: Model Inputs by Campus and Region.**

3.1 BAY AREA REGION

The Bay Area region consists of 11 counties: San Francisco, Alameda, Santa Clara, San Mateo, Contra Costa, Marin, Sonoma, Napa, Solano, Santa Cruz and Lake. Five CSU campuses are associated with that region: Cal State East Bay, Cal Maritime, San Francisco State, San José State, and Sonoma State. Collectively, these campuses had a direct annual spend of $3.3 billion[26] in 2019:

$1.6 BILLION
ON OPERATIONAL EXPENDITURES

$134.9 MILLION
4-YEAR AVERAGE CAPITAL EXPENDITURES

$162 MILLION
ON AUXILIARY EXPENDITURES

$1.4 BILLION
IN STUDENT SPENDING

Regionally, Bay Area CSU campuses in 2019 supported:

- **nearly 28,400 local jobs**
- **$1.9 billion in labor income**
- **more than $4.4 billion in regional industry activity**

And generated:

- **$236 million in state and local tax revenue.**

Additionally, many alumni of Bay Area CSU campuses remain in the region after graduation and continue to contribute to the regional economy. Those alumni earned incrementally higher earnings of $6.05 billion[27] in 2019. These incremental earnings nearly double the impact of the Bay Area campuses, supporting an additional nearly 28,000 jobs, $2.1 billion in labor income, $5.9 billion on regional output, and $542 million in state and local tax impact in 2019.

Approximately 60 percent of the total industry activity supported by these campuses is related to operational expenditures.

TABLE 3. TOTAL IMPACT OF BAY AREA CAMPUSES ON THE REGION ($MILLIONS, 2020 USD)

INPUT	EMPLOYMENT	LABOR INCOME	INDUSTRY ACTIVITY	TAX IMPACT
Operational Expenditures	17,387	$1,271M	$2,635M	$117M
Capital Expenditures	1,065	$99M	$209M	$7M
Auxiliary	1,350	$86M	$223M	$13M
Student Spend	8,561	$404M	$1,374M	$99M
Total	**28,363**	**$1,861M**	**$4,439M**	**$236M**
Alumni	27,983	$2,103M	$5,855M	$542M

Source: ICF IMPLAN Analysis

At the state level, the Bay Area CSU campuses in 2019 supported:

- **approximately 30,000 jobs**
- **$1.9 billion in labor income**
- **$4.7 billion in state-wide industry activity**

And generated:

- **$255 million in state and local tax revenue.**

Statewide, alumni from Bay Area CSU campuses experienced increased earnings totaling $13.4 billion in 2019. These earnings supported an additional 90,240 jobs across the state, $16.8 billion in statewide industry activity, and $1.1 billion in state and local tax revenue.

TABLE 4. TOTAL IMPACT OF BAY AREA CAMPUSES ON THE STATE ($MILLIONS, 2020 USD)

INPUT	EMPLOYMENT	LABOR INCOME	INDUSTRY ACTIVITY	TAX IMPACT
Operational Expenditures	18,480	$1,322M	$2,821M	$129M
Capital Expenditures	1,184	$106M	$231M	$9M
Auxiliary	1,423	$89M	$234M	$14M
Student Spend	8,952	$422M	$1,437M	$103M
Total	**30,039**	**$1,939M**	**$4,723M**	**$255M**
Alumni	90,240	$5,596M	$16,776M	$1,123

Source: ICF IMPLAN Analysis

Bay Area Summary:

- For every dollar spent by Bay Area campuses, **$1.44 of positive economic activity is generated** in the state.
- For every dollar the state invested in Bay Area CSU campuses in 2018-19, **$7.24 in statewide spending is generated.** (In 2018-19, state appropriations to these campuses totaled nearly $652 million.)
- When the impact of enhanced earnings of CSU alumni from Bay Area campuses is included, for every dollar the state invested in these campuses, the **total spending impact increases to $32.97.**

[26] Numbers may not sum due to rounding.

[27] San José State was conducting its own economic and social impact study and did not provide an estimate for the number of SJSU alumni in the Bay Area region after graduation. Therefore, this number is a sum of the incrementally higher earnings of alumni from the other four Bay Area CSU campuses

3.2 CENTRAL COAST REGION

The Central Coast region consists of five counties: Ventura, Santa Barbara, San Luis Obispo, Monterey and San Benito. Three CSU campuses are associated with that region: CSU Channel Islands, CSU Monterey Bay and Cal Poly San Luis Obispo. Collectively, these campuses had a direct annual spend of $1.6 billion in 2019:

$836.4 MILLION
ON OPERATIONAL EXPENDITURES

$115.9 MILLION
4-YEAR AVERAGE CAPITAL EXPENDITURES

$193.2 MILLION
ON AUXILIARY EXPENDITURES

$429.2 MILLION
IN STUDENT SPENDING

Regionally, Central Coast CSU campuses in 2019 supported:

- **nearly 25,800 local jobs**
- **$800 million in labor income**
- **$2.45 billion in regional industry activity**

And generated:

- **$158 million in state and local tax revenue**

Activity related to operational expenditures is the key driver of economic impact, accounting for more than 63 percent of total industry activity. More than 60 percent of the industry activity supported by Central Coast campuses is generated by direct impacts, rather than indirect and induced impacts.

Additionally, alumni who remain in the area after graduation earned incrementally higher earnings of $1.55 billion in 2019. These incremental earnings increase the regional economic impact of the Central Coast campuses, supporting nearly 8,800 additional jobs, $466 million in labor income, $1.4 billion in regional output, and $106 million in state and local tax impact in 2019.

TABLE 5. TOTAL IMPACT OF CENTRAL COAST CAMPUSES ON THE REGION ($MILLIONS, 2020 USD)

INPUT	EMPLOYMENT	LABOR INCOME	INDUSTRY ACTIVITY	TAX IMPACT
Operational Expenditures	18,536	$517M	$1,554M	$88M
Capital Expenditures	1,155	$80M	$180M	$8M
Auxiliary	2,517	$87M	$280M	$20M
Student Spend	3,576	$117M	$439M	$42M
Total	**25,784**	**$800M**	**$2,452M**	**$158M**
Alumni	8,778	$466M	$1,405M	$106M

Source: ICF IMPLAN Analysis

At the state level, the Central Coast CSU campuses in 2019 supported:

- **more than 27,250 annual jobs**
- **$913 million in labor income**
- **$2.8 billion in statewide industry activity**

And generated:

- **$174 million in state and local tax revenue**

Statewide, alumni from Central Coast CSU campuses experienced increased earnings in 2019 totaling $4.75 billion, supporting an additional 32,000 jobs, $5.9 billion in statewide industry activity, and $397 million in state and local tax revenue.

TABLE 6. TOTAL IMPACT OF CENTRAL COAST CAMPUSES ON THE STATE ($MILLIONS)

INPUT	EMPLOYMENT	LABOR INCOME	INDUSTRY ACTIVITY	TAX IMPACT
Operational Expenditures	19,519	$593M	$1,790M	$100M
Capital Expenditures	1,279	$89M	$209M	$9M
Auxiliary	2,675	$99M	$315M	$21M
Student Spend	3,781	$132M	$484M	$44M
Total	**27,254**	**$913M**	**$2,799M**	**$174M**
Alumni	31,914	$1,979M	$5,933M	$397M

Source: ICF IMPLAN Analysis

Central Coast Summary:

- For every dollar spent by Central Coast CSU campuses, **$1.75 of positive economic activity is generated** in the state.
- For every dollar the state invested in Central Coast CSU campuses, **$7.94 in statewide spending is generated.** (In 2018-19, state appropriations to these campuses totaled nearly $352.3 million.)
- When the impact of enhanced earnings of CSU alumni from Central Coast CSU campuses is included, for every dollar the stat invested in these campuses, the **total spending impact increases to $24.78.**

3.3 LOS ANGELES REGION

The Los Angeles region consists of Los Angeles and Orange counties. The Los Angeles region includes the CSU Chancellor's Office, CSU Dominguez Hills, Cal State Fullerton, Cal State Long Beach, Cal State LA and CSUN. Collectively, these campuses had a direct annual spend of $5.4 billion in 2019:

$2.6 BILLION
ON OPERATIONAL EXPENDITURES

$191.4 MILLION
4-YEAR AVERAGE CAPITAL EXPENDITURES

$452.1 MILLION
ON AUXILIARY EXPENDITURES

$2.2 BILLION
IN STUDENT SPENDING

Regionally, Los Angeles-area CSU campuses in 2019 supported:

- **more than 58,000 local jobs**
- **$3.2 billion in labor income**
- **$7.8 billion in regional industry activity**

And generated:

- **$509 million in state and local tax revenue**

Additionally, alumni who remained in the Los Angeles region earned incrementally higher earnings of $20.1 billion in 2019. These incremental earnings supported an additional 132,900 jobs, $8.0 billion in labor income, $23.7 billion on regional output, and generated $1.6 billion in state and local tax impact in 2019.

TABLE 7. TOTAL IMPACT OF LOS ANGELES CAMPUSES ON THE REGION ($MILLIONS, 2020 USD)

INPUT	EMPLOYMENT	LABOR INCOME	INDUSTRY ACTIVITY	TAX IMPACT
Operational Expenditures	30,568	$2,099M	$4,511M	$264M
Capital Expenditures	1,978	$141M	$327M	$18M
Auxiliary	4,587	$249M	$683M	$43M
Student Spend	20,922	$759M	$2,276M	$185M
Total	**58,055**	**$3,248M**	**$7,797M**	**$509M**
Alumni	132,933	$7,996M	$23,657M	$1,591M

Source: ICF IMPLAN Analysis

Because of the robust nature of the LA basin economy, a significant 97 percent of the total statewide employment and 95 percent of industry activity supported by Los Angeles-area campuses is felt in the region, rather than leaking out into the rest of the state.

At the state level, the Los Angeles-area CSU campuses in 2019 supported:

- **more than 60,000 annual jobs**
- **$3.4 billion in labor income**
- **$8.2 billion in state-wide industry activity**

And generated:

- **$487 million in state and local tax revenue**

Statewide, alumni from CSU campuses in the Los Angeles region experienced increased earnings totaling $26 billion in 2019, supporting an additional 174,500 jobs, $32.4 billion in statewide industry activity, and generating $2.2 billion in state and local tax revenue.

TABLE 8. TOTAL IMPACT OF LOS ANGELES REGION CAMPUSES ON THE STATE ($MILLIONS, 2020 USD)

INPUT	EMPLOYMENT	LABOR INCOME	INDUSTRY ACTIVITY	TAX IMPACT
Operational Expenditures	31,774	$2,183M	$4,774M	$236M
Capital Expenditures	2,122	$151M	$360M	$15M
Auxiliary	4,735	$259M	$713M	$44M
Student Spend	21,408	$793M	$2,375M	$191M
Total	**60,039**	**$3,385M**	**$8,223M**	**$487M**
Alumni	174,484	$10,821M	$32,438M	$2,171M

Source: ICF IMPLAN Analysis

Los Angeles Region Summary:

- For every dollar spent by CSU campuses in the Los Angeles region, **$1.52 of positive economic activity is generated** in the state.
- For every dollar the state invested in Los Angeles area CSU campuses, **$5.97 in statewide spending is generated.** (In 2018-19, state appropriations for Los Angeles region campuses totaled nearly $1.4 billion.)
- When the impact of enhanced earnings of CSU alumni from Los Angeles area campuses is included, for every dollar the state invested in those campuses, the **total spending impact increases to $29.54.**

3.4 INLAND EMPIRE REGION

The Inland Empire region focuses on Riverside and San Bernardino counties. CSU campuses serving the Inland Empire region include Cal Poly Pomona (located in Los Angeles County) and Cal State San Bernardino. Collectively, these campuses had a direct annual spend of $1.6 billion in 2019:

$674.6 MILLION
ON OPERATIONAL EXPENDITURES

$126.7 MILLION
4-YEAR AVERAGE CAPITAL EXPENDITURES

$143.5 MILLION
ON AUXILIARY EXPENDITURES

$642.4 MILLION
IN STUDENT SPENDING

Regionally, Inland Empire CSU campuses in 2019 supported:

- **nearly 16,400 local annual jobs**
- **$758 million in labor income**
- **$2.0 billion in regional industry activity**

And generated:

- **$119 million in state and local tax revenue.**

Additionally, alumni who remain in the region earned incrementally higher earnings of $2.4 billion in 2019. These incremental earnings greatly increase the regional economic impact of the campuses serving the Inland Empire, supporting an additional nearly 13,000 jobs, $580 million in labor income, $1.9 billion on regional output, and generating $146 million in state and local tax impact in 2019.

TABLE 9. TOTAL IMPACT OF INLAND EMPIRE CAMPUSES ON THE REGION ($MILLIONS, 2020 USD)

INPUT	EMPLOYMENT	LABOR INCOME	INDUSTRY ACTIVITY	TAX IMPACT
Operational Expenditures	8,689	$462M	$1,028M	$51M
Capital Expenditures	1,231	$78M	$182M	$7M
Auxiliary	1,517	$58M	$185M	$12M
Student Spend	4,926	$159M	$571M	$49M
Total	**16,362**	**$758M**	**$1,966M**	**$119M**
Alumni	12,982	$580M	$1,876M	$146M

Source: ICF IMPLAN Analysis

At the state level, Inland Empire CSU campuses supported:

- **more than 17,400 annual jobs**
- **$848 million in labor income**
- **$2.2 billion in state-wide industry activity**

And generated:

- **$133 million in state and local tax revenue.**

While many alumni of the campuses serving the Inland Empire choose to stay in the region, many more alumni from these campuses are found throughout California. Those alumni experienced increased earnings totaling $4.7 billion in 2019. This supported an additional 32,000 jobs, $5.96 billion in statewide industry activity, and generated $399 million in state and local tax revenue.

TABLE 10. TOTAL IMPACT OF INLAND EMPIRE CAMPUSES ON THE STATE ($MILLIONS, 2020 USD)

INPUT	EMPLOYMENT	LABOR INCOME	INDUSTRY ACTIVITY	TAX IMPACT
Operational Expenditures	9,325	$515M	$1,190M	$59M
Capital Expenditures	1,341	$87M	$211M	$8M
Auxiliary	1,617	$67M	$210M	$13M
Student Spend	5,157	$179M	$631M	$52M
Total	**17,440**	**$848M**	**$2,241M**	**$133M**
Alumni	32,035	$1,987M	$5,955M	$399M

Source: ICF IMPLAN Analysis

Inland Empire Summary:

- For every dollar spent by CSU campuses in the Inland Empire region, **$1.41 of positive economic activity is generated** in the state.
- For every dollar the state invested in Inland Empire CSU campuses, **$6.72 in statewide spending is generated.** (In 2018-19, state appropriations totaled nearly $333.7 million to Inland Empire campuses.)
- When the impact of the enhanced earnings of CSU alumni from Inland Empire campuses is included, for every dollar the state invested in those campuses, the **total spending impact increases to $24.56.**

3.5 NORTH COAST REGION

Five counties comprise the North Coast region: Mendocino, Trinity, Humboldt, Del Norte and Siskiyou. Humboldt State University is the only CSU campus in that region. In 2019, Humboldt State had a direct annual spend of $317 million:

$174.7 MILLION
ON OPERATIONAL EXPENDITURES

$7.7 MILLION
4-YEAR AVERAGE CAPITAL EXPENDITURES

$46.5 MILLION
ON AUXILIARY EXPENDITURES

$88.1 MILLION
IN STUDENT SPENDING

Activity associated with Humboldt State has a significant impact on the North Coast regional economy. In 2019, the campus supported:

- **nearly 4,900 local annual jobs**
- **$150 million in labor income**
- **$459 million in regional industry activity**

And generated:

- **$32 million in state and local tax revenue**

Additionally, many Humboldt State alumni remain in the region and continue to contribute to the regional economy. Those alumni earned incrementally higher earnings of $487.6 million in 2019, and supported an additional 2,350 jobs, $109 million in labor income, $351 million on regional output, while generating $27 million in state and local tax impact.

TABLE 11. TOTAL IMPACT OF HUMBOLDT STATE UNIVERSITY ON THE REGION ($MILLIONS, 2020 USD)

INPUT	EMPLOYMENT	LABOR INCOME	INDUSTRY ACTIVITY	TAX IMPACT
Operational Expenditures	3,576	$101M	$293M	$17M
Capital Expenditures	158	$4M	$13M	$1M
Auxiliary	592	$19M	$64M	$5M
Student Spend	548	$25M	$88M	$9M
Total	**4,873**	**$150M**	**$459M**	**$32M**
Alumni	2,343	$109M	$351M	$27M

Source: ICF IMPLAN Analysis

At the state level, Humboldt State University in 2019 supported:

- **more than 5,200 jobs**
- **$174 million in labor income**
- **$533 million in state-wide industry activity**

And generated:

- **$35 million in state and local tax revenue.**

While many Humboldt State alumni continue to live in the North Coast area after graduation, a large number return to other locations in California. Those alumni experienced increased earnings totaling $1.3 billion in 2019, supporting an additional 8,700 jobs, $1.6 billion in statewide industry activity, and $108 million in state and local tax revenue.

TABLE 12. TOTAL IMPACT OF HUMBOLDT STATE UNIVERSITY ON THE STATE ($MILLIONS)

INPUT	EMPLOYMENT	LABOR INCOME	INDUSTRY ACTIVITY	TAX IMPACT
Operational Expenditures	3,821	$119M	$348M	$19M
Capital Expenditures	169	$5M	$15M	$1M
Auxiliary	636	$23M	$73M	$5M
Student Spend	588	$28M	$97M	$10M
Total	**5,214**	**$174M**	**$533M**	**$35M**
Alumni	8,680	$538M	$1,614M	$108M

Source: ICF IMPLAN Analysis

North Coast Summary:

- For every dollar spent by Humboldt State, **$1.68 of positive economic activity is generated** in the state.
- For every dollar the state invested in Humboldt State, **$6.08 in statewide spending is generated.** (In 2018-19, state appropriations totaled nearly $87.7 million to Humboldt State.)
- When the impact of the enhanced earnings of Humboldt State alumni is included, for every dollar the state invested in Humboldt State, **the total spending impact increases to $24.50.**

3.6 SACRAMENTO VALLEY REGION

The Sacramento Valley region consists of 18 counties: Alpine, Amador, Butte, Colusa, El Dorado, Glenn, Lassen, Modoc, Nevada, Placer, Plumas, Sacramento, Shasta, Sierra, Sutter, Tehama, Yolo and Yuba. There are two CSU campuses in the region: Chico State and Sacramento State. Together, these campuses had a direct annual spend of $1.8 billion in 2019:

$784.8 MILLION
ON OPERATIONAL EXPENDITURES

$89.3 MILLION
4-YEAR AVERAGE CAPITAL EXPENDITURES

$202.7 MILLION
ON AUXILIARY EXPENDITURES

$727.3 MILLION
IN STUDENT SPENDING

At the state level, the Sacramento Valley CSU campuses supported:

- **nearly 22,900 local annual jobs**
- **$893 million in labor income**
- **$2.6 billion in regional industry activity**

And generated:

- **$169 million in state and local tax revenue**

Many CSU alumni remain in the Sacramento Valley area and continue to contribute to the regional economy. Those alumni received incrementally higher earnings of $6.2 billion in 2019, and supported an additional 36,800 jobs, $1.95 billion in labor income, $6.0 billion in regional output, and $446 million in state and local tax impact in 2019.

TABLE 13. TOTAL IMPACT OF SACRAMENTO VALLEY CAMPUSES ON THE REGION ($MILLIONS, 2020 USD)

INPUT	EMPLOYMENT	LABOR INCOME	INDUSTRY ACTIVITY	TAX IMPACT
Operational Expenditures	13,759	$542M	$1,410M	$75M
Capital Expenditures	940	$64M	$150M	$6M
Auxiliary	2,465	$97M	$305M	$20M
Student Spend	5,728	$191M	$745M	$68M
Total	**22,891**	**$893M**	**$2,608M**	**$169M**
Alumni	36,837	$1,958M	$6,005M	$446M

Source: ICF IMPLAN Analysis

At the state level, Sacramento Valley CSU campuses supported:

- **nearly 24,000 annual jobs**
- **$983 million in labor income**
- **$2.9 billion in state-wide industry activity**

And generated:

- **$182 million in state and local tax revenue.**

While many alumni of the Sacramento Valley campuses remain in the region, a significant number are dispersed throughout the state. Those alumni experienced increased earnings totaling $9.4 billion in 2019, and supported an additional 63,100 jobs, $11.7 billion in statewide industry activity, and generated $786 million in state and local tax revenue.

TABLE 14. TOTAL IMPACT OF SACRAMENTO VALLEY CAMPUSES ON THE STATE ($MILLIONS, 2020 USD)

INPUT	EMPLOYMENT	LABOR INCOME	INDUSTRY ACTIVITY	TAX IMPACT
Operational Expenditures	14,367	$595M	$1,574M	$83M
Capital Expenditures	1,011	$70M	$169M	$7M
Auxiliary	2,578	$107M	$334M	$22M
Student Spend	5,957	$211M	$804M	$71M
Total	**23,913**	**$983M**	**$2,881M**	**$182M**
Alumni	63,140	$3,916M	$11,738M	$786M

Source: ICF IMPLAN Analysis

Sacramento Valley Summary:

- For every dollar spent by CSU campuses in the Sacramento Valley region, **$1.60 of positive economic activity is generated** in the state.
- For every dollar the state invested in CSU campuses in the Sacramento Valley region, **$8.07 in statewide spending is generated.** (In 2018-19, state appropriations totaled nearly $356.9 million to Sacramento Valley campuses.)
- When the impact of the enhanced earnings of Sacramento State and Chico State alumni is included, for every dollar the state invested in those campuses, the **total spending impact increases to $40.96.**

3.7 SAN DIEGO REGION

The San Diego region comprises San Diego and Imperial counties and includes two CSU campuses: San Diego State University and CSU San Marcos. Together, those campuses had a direct annual spend of $1.9 billion in 2019:

$847.6 MILLION
ON OPERATIONAL EXPENDITURES

$128 MILLION
4-YEAR AVERAGE CAPITAL EXPENDITURES

$302.9 MILLION
ON AUXILIARY EXPENDITURES

$635.2 MILLION
IN STUDENT SPENDING

Regionally, in 2019, San Diego-area campuses supported:

- **nearly 22,600 local annual jobs**
- **$1.1 billion in labor income**
- **$2.8 billion in regional industry activity**

And generated:

- **$164 million in state and local tax revenue.**

Additionally, many alumni of San Diego-area CSU campuses remain in the region after graduation and continue to contribute to the regional economy. In 2019, those alumni earned incrementally higher earnings of $3.4 billion, and supported an additional 20,770 jobs, $1.1 billion in labor income, $3.4 billion on regional output, and generated $245 million in state and local tax impact.

TABLE 15. TOTAL IMPACT OF SAN DIEGO CAMPUSES ON THE REGION ($MILLIONS, 2020 USD)

INPUT	EMPLOYMENT	LABOR INCOME	INDUSTRY ACTIVITY	TAX IMPACT
Operational Expenditures	11,901	$639M	$1,483M	$77M
Capital Expenditures	1,318	$87M	$207M	$9M
Auxiliary	3,238	$149M	$441M	$27M
Student Spend	6,097	$191M	$638M	$51M
Total	**22,553**	**$1,066M**	**$2,770M**	**$164M**
Alumni	20,770	$1,096M	$3,429M	$245M

Source: ICF IMPLAN Analysis

At the state level, CSU campuses in the San Diego region supported:

- **nearly 23,600 jobs**
- **$1.1 billion in labor income**
- **$3.0 billion in state-wide industry activity**

And generated:

- **$175 million in state and local tax revenue.**

While many alumni of the San Diego campuses remain in the region, a significant number are found throughout California. Those alumni experienced increased earnings totaling $4.8 billion in 2019, and supported an additional 32,500 jobs, $6.0 billion in statewide industry activity, and generated $404 million in state and local tax revenue.

TABLE 16. TOTAL IMPACT OF SAN DIEGO CAMPUSES ON THE STATE ($MILLIONS, 2020 USD)

INPUT	EMPLOYMENT	LABOR INCOME	INDUSTRY ACTIVITY	TAX IMPACT
Operational Expenditures	12,437	$678M	$1,606M	$83M
Capital Expenditures	1,424	$95M	$233M	$10M
Auxiliary	3,379	$159M	$472M	$29M
Student Spend	6,329	$208M	$690M	$54M
Total	**23,569**	**$1,139M**	**$3,000M**	**$175M**
Alumni	32,482	$2,014M	$6,039M	$404M

Source: ICF IMPLAN Analysis

San Diego Region Summary:

- For every dollar spent by San Diego region CSU campuses, **$1.57 of positive economic activity is generated** in the state.
- For every dollar the state invested in CSU campuses in the San Diego region, **$8.64 in statewide spending is generated.** (In 2018-19, state appropriations totaled nearly $347.2 million to San Diego region campuses.)
- When the impact of the enhanced earnings of CSU alumni from San Diego-area campuses is included, for every dollar the state invested in those campuses, the **total spending impact rises to $26.04.**

3.8 SAN JOAQUIN VALLEY REGION

The San Joaquin Valley region is composed of 13 counties: San Joaquin, Stanislaus, Merced, Madera, Fresno, Kings, Tulare, Kern, Calaveras, Tuolumne, Mono, Mariposa and Inyo. There are three CSU campuses in the region: Fresno State, CSU Bakersfield and Stanislaus State. Together, the three campuses had a direct spend of $1.6 billion in 2019:

$765 MILLION
ON OPERATIONAL EXPENDITURES

$44.4 MILLION
4-YEAR AVERAGE CAPITAL EXPENDITURES

$146 MILLION
ON AUXILIARY EXPENDITURES

$635.6 MILLION
IN STUDENT SPENDING

Regionally, in 2019, CSU campuses in the San Joaquin Valley region supported:

- **more than 20,500 local jobs**
- **$762 million in labor income**
- **$2.2 billion in regional industry activity**

And generated:

- **$141 million in state and local tax revenue.**

Additionally, many alumni of CSU campuses in the San Joaquin Valley remain in the San Joaquin Valley region and continue to contribute to the regional economy. In 2019, those alumni earned incrementally higher earnings of $4.6 billion, supporting an additional 30,700 jobs, $1.9 billion in labor income, $5.7 billion in regional output, and generating $382 million in state and local tax impact.

TABLE 17. TOTAL IMPACT OF SAN JOAQUIN VALLEY CAMPUSES ON THE REGION ($MILLIONS, 2020 USD)

INPUT	EMPLOYMENT	LABOR INCOME	INDUSTRY ACTIVITY	TAX IMPACT
Operational Expenditures	13,164	$496M	$1,304M	$72M
Capital Expenditures	457	$29M	$71M	$3M
Auxiliary	1,716	$64M	$209M	$14M
Student Spend	5,198	$173M	$596M	$53M
Total	**20,536**	**$762M**	**$2,179M**	**$141M**
Alumni	30,709	$1,904M	$5,709M	$382M

Source: ICF IMPLAN Analysis

At the state level in 2019, the San Joaquin Valley campuses supported:

- **more than 21,900 jobs**
- **$870 million in labor income**
- **$2.5 billion in state-wide industry activity**

And generated:

- **$156 million in state and local tax revenue.**

Many alumni of the San Joaquin Valley campuses remain in the region, but a significant number are found throughout California. Those alumni experienced increased earnings totaling $6.2 billion in 2019, supporting an additional 41,870 jobs, $7.8 billion in statewide industry activity, and $521 million in state and local tax revenue.

TABLE 18. TOTAL IMPACT OF SAN JOAQUIN VALLEY CAMPUSES ON THE STATE ($MILLIONS, 2020 USD)

INPUT	EMPLOYMENT	LABOR INCOME	INDUSTRY ACTIVITY	TAX IMPACT
Operational Expenditures	14,096	$567M	$1,519M	$82M
Capital Expenditures	503	$33M	$82M	$4M
Auxiliary	1,826	$73M	$234M	$15M
Student Spend	5,486	$197M	$662M	$56M
Total	**21,911**	**$870M**	**$2,497M**	**$156M**
Alumni	41,870	$2,597M	$7,784M	$521M

Source: ICF IMPLAN Analysis

San Joaquin Valley Region Summary:

- For every dollar spent by San Joaquin Valley, **$1.57 of positive economic activity is generated** in the state.
- For every dollar the state invested in CSU campuses in the San Joaquin Valley region, **$7.23 in statewide spending is generated.** (In 2018-19, state appropriations totaled nearly $345.5 million to San Joaquin Valley campuses.)
- When the impact of the enhanced earnings of CSU alumni from San Joaquin Valley campuses is included, for every dollar the state invested in those campuses, the **total spending impact increases to $29.76.**

II. THE IMPACTS OF CSU RESEARCH ACTIVITY

Universities are critical centers of knowledge generation, innovation and technology development. In addition to educating highly skilled graduates who contribute to their communities, universities play a key role in driving discovery and the dissemination of new knowledge. Public universities conduct a significant amount of research annually, accounting for approximately 66 percent of university-based research and development expenditures annually.[28]

The CSU's research activities are almost entirely supported by external funding. These research activities generate new innovations, new technologies and economic benefits to the state. In FY 2017-18 sponsored awards from federal, state, local and private sources amounted to more than $648 million dollars. This funding has an economic multiplier effect on industry activity, employment, labor income and tax revenue across the region.

CSU RESEARCH & SPONSORED PROGRAMS

$648 MILLION

Current External Revenue

The scale of the CSU, the bottom-up nature of CSU research and the sheer breadth of research activities occurring at its many campuses make it difficult to summarize succinctly its mulative impact; analysis can illuminate the important benefits that CSU research and innovation activities have on students, communities and California's vital industries.

STUDENT FOCUS

Research at the California State University is deliberately student-focused in keeping with the CSU's core mission to advance and extend knowledge, learning and culture, and to provide opportunities for students to develop intellectually, personally and professionally. Students involved in research develop a variety of interdisciplinary skills, such as research design, information or data collection and analysis, information literacy, and communication. Moreover, hands-on research experiences enable students to develop independent critical-thinking skills along with valuable oral and written communication skills. Students carry these skills into the classroom and use them to open doors in their professional careers and graduate programs. Undergraduate research has been shown to have the highest positive impact on promoting student engagement and retention, while preparing students for the demands of the future.[29] Students involved in research are far more likely to graduate, have higher grade point averages, enroll in graduate school, be employed in a major-related career, and are more likely to obtain an advanced degree.[30] At the same time, research drives academic excellence by empowering faculty to advance knowledge in their fields and integrate their scholarship into the curriculum.

COMMUNITY BENEFIT

Beyond the benefits gained by students and faculty, research conducted at CSU campuses has important benefits for communities across the state. CSU campuses undertake significant community engagement efforts and strive to align their work with the strengths and needs of their communities and regions, as well as the state.

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[28] NSF. Higher Education Research and Development Survey Fiscal Year 2018, Tables 36 and 37. Available at https://ncsesdata.nsf.gov/herd/2018/

[29] Lanning, S. and Brown, M. Journal of Education Sciences. Undergraduate Research as a High Impact Practice in Higher Education. Available at https://www.mdpi.com/2227-7102/9/3/160/pdf

[30] CSU ARI. 2019-2020 Annual Report

[31] The Press Democrat. Latino Service Providers-Sonoma County has $1 million grant to improve Latino mental health. Available at https://legacy.pressdemocrat.com/news/5974530-181/sonoma-state-has-1-million?sba=AAS

[32] Cal Poly. Hothouse. Available at https://cie.calpoly.edu/hothouse

[33] Cal Poly Center for Innovation & Entrepreneurship. News: Cal Poly Center for Innovation & Entrepreneurship Adds New Faculty Fellows to Inspire Startups and Innovation. Available at https://cie.calpoly.edu/news/

"WE ARE TRYING TO CREATE A PIPELINE FOR STUDENTS TO BECOME MENTAL HEALTH WORKERS, BECAUSE THERE'S A TREMENDOUS LACK OF BILINGUAL LATINOS IN THAT FIELD."

Francisco H. Vázquez, Ph.D.
Sonoma State professor

To this end, the CSU faculty and students pursue innovative and community-focused research projects that often have a meaningful social and health impact on the communities. These efforts span across all segments of society from education, health centers and agricultural cooperatives, to neighborhood organizations and environmental sustainability advocacy groups.

For example, Sonoma State University faculty and students have partnered with a community group called Latino Service Providers to examine how Latino cultural practices—such as mariachi music, mural painting, theater, and even conversation and tamale-making—can be implemented into therapeutic practices to promote mental and behavioral health. This research addresses a key community need given that Latinos tend to use mental-health services at about half the rate of whites.[31]

Cal Poly San Luis Obispo is also helping members of the Central Coast business community through the SLO HotHouse, a community space created in partnership with the city and county of San Luis Obispo. Located in downtown San Luis Obispo, the HotHouse is a place where students, employees, alumni and community members can develop or run their businesses, participate in workshops and speaker's series, and network with one another. The HotHouse is home to Cal Poly's Center for Innovation and Entrepreneurship Programming (CIE), the Cal Poly Small Business Development Center, coworking space open to the community, and a business incubator.[32] Since the CIE was formed in 2010, more than 100 startups have been created, along with more than 1,000 jobs. Several of these businesses could have a substantial community impact. Those include a business called Flume, which created a device to help customers measure water usage; and a De Oro Devices' product called NexStride that helps patients with Parkinson's disease overcome a condition, known as "freezing of gait," that impacts their ability to walk.[33]

INDUSTRY ADVANCEMENT

Finally, CSU research contributes to innovations and technology development that support many of California's key industries. CSU researchers have often worked with state businesses to ensure that research is aligned with industry needs and developed collaborative partnerships around key industry priorities.

For example, for the past seven years, Cal State LA students have participated in two EcoCAR project competitions co-sponsored by the U.S. Department of Energy and General Motors. Most recently, the four-year EcoCAR3 competition, which ended in 2018, required teams to redesign a Chevrolet Camaro to improve its efficiency while maintaining its performance. As part of classes, students also take tours, meet industry leaders, and complete internships at local green technology manufacturers, such as electric bus manufacturer Proterra or EV batteries producer Romeo Power.[34] This type of hands-on research experience and industry engagement makes CSU graduates valuable assets to industry upon graduation.

UNIVERSITY-WIDE COLLABORATION

The CSU puts significant emphasis on collaborative research opportunities; consequently, one of the best ways to explain CSU-driven research is via multi-campus collaboratives. Ten existing collaborations, or affinity groups, harness the power of shared expertise, initiatives, facilities and resources across campuses to conduct research on a breadth of topics, from agriculture and biotechnology to desert and ocean life. These affinity groups are:

- Agricultural Research Institute (ARI)
- Council on Ocean Affairs, Science & Technology (COAST)
- CSU Program for Education Research in Biotechnology (CSUPERB)
- California Desert Studies Consortium (CDSC)
- CSU Shiley Institute for Palliative Care
- Moss Landing Marine Laboratories (MLML)
- Ocean Studies Institute (OSI)
- Social Science Research & Instructional Council (SSRIC)
- STEM-NET
- Water Resources and Policy Initiatives (WRPI).

The structure of these affinity groups varies widely, and they do not cover the breadth of all CSU research activities; however, they do exemplify the way that CSU is using collaborative research to address some of California's most pressing challenges.

The following sections discuss the economic and societal contributions that CSU research provides for seven of California's key industries. Each section provides an overview of CSU's research activities (including campus-specific research centers and institutes as well as multi-campus collaboratives and affinity groups), and highlights a specific research project that illustrates the ways in which CSU research impacts student learning and community well-being, as well as the ways in which research drives economic activity across industries.

As a public university with a student-focused educational mission, research at CSU is primarily aimed at investigating complex environmental, social, and economic issues affecting the statewide population. The profiled projects include faculty-led and student-supported programs, research partnerships and entrepreneurial initiatives sponsored by CSU-affiliated campus centers and institutes, and multi-campus collaborations associated with the existing affinity groups. CSU's expanding research efforts are complementing and stimulating its educational mission, while providing new solutions for – and new partnerships with – California-based industry.

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[34] CSU. New: Leading the Way – Alternative Energy Industry. Available at https://www2.calstate.edu/csu-system/news/Pages/where-the-jobs-are-energy.aspx

[35] CDFA. California Agricultural Statistics Review, 2018-19. Available at https://www.cdfa.ca.gov/statistics/PDFs/2018-2019AgReport-nass.pdf

1. AGRICULTURE

In 2018, California's agricultural industry generated approximately $49.9 billion in sales and employed nearly 420,000 workers. This accounted for approximately 2.8 percent of the state's total GDP, but the total impact is more significant when the economic multiplier of additional dollars re-spent within the local economy is also considered. This is even more significant when coupled with the implication of the industry on the state's food supply. California's agricultural production was the largest of any state and made up more than 13 percent of the U.S. total.[35]

California agricultural and natural resource industries often cite four challenges to their future: water, environment, labor and regulations. Clearly, population growth and climate change pose significant threats to California's agricultural industry. CSU faculty and students are investigating innovative ways to address these challenges and ensure the sustainability of California agriculture.

THE CSU'S CONTRIBUTIONS TO AGRICULTURAL RESEARCH

The CSU has always been a strong contributor to the agriculture, food and beverage industries, and agricultural research remains an important focus of CSU faculty and students. With colleges of agriculture on four CSU campuses, and allied disciplines across the CSU, the breadth of agricultural expertise is extensive.

Campus Centers and Institutes

There are several existing campus centers and institutes (CCIs) devoted to agricultural research at the CSU. These research organizations are affiliated with CSU campuses but offer non-credit instruction, information, or other services to groups beyond the campus community, serving individuals, public organizations, and other private companies or agencies. CCIs are extremely diverse, ranging from general agricultural business expertise offered by the Agribusiness Institute (Chico State), to specific training and technical assistance for industry members, farmers, and state and local government agencies like the assistance offered by the Irrigation Training and Resource Center (Cal Poly San Luis Obispo), to research into technologies and farming practices for specific industries and crops like the novel dairy processes investigated by the Dairy Innovation Institute (Cal Poly San Luis Obispo).

The four CSU campuses with colleges of agriculture operate working farms and ranches to support classes and research in agriculture. For example, the University Farm at Chico State is an 800-acre facility that supports the Agricultural Teaching and Research Center. The farm includes an aquaponics lab; beef, sheep, and swine units; greenhouses; orchards; an irrigation training facility; organic dairy unit; and houses the Center for Regenerative Agriculture (see the following case study).

AGRIscapes is an outreach branch of the Don B. Huntley College of Agriculture at Cal Poly Pomona that occupies 20 acres of farmland and facilities. It includes a visitor center with space available for meetings, workshops and conferences, a farm store, and a large greenhouse that is used for production and research. The center hosts thousands of school children on field trips each year.

Fresno State's California Agricultural Technology Institute oversees operations of four centers that serve as bases for applied research and development activities. Facilities include a 1,100-

acre university farm; an assortment of modern indoor laboratories; a truly one-of-a-kind dried foods technology laboratory; experimental and commercial wineries; a raisin-processing plant; and a large hydraulics unit for testing irrigation equipment.

Other CCIs include the Strawberry Center at Cal Poly San Luis Obispo, which has secured more than $1.3 million in external funding to conduct 114 research projects with the goal of increasing sustainability of California's strawberry industry; the Institute for Food and Agriculture at Fresno State that conducts research in food and fiber systems as well as market and policy analysis; and the Center for Turf, Landscape, and Irrigation Technology at Cal Poly Pomona. That center provides a focal point for technical research, learning and community outreach in the areas of turfgrass; ornamental plant materials; landscape irrigation technology; as well as landscape operations; sport turf and golf course management; and the preservation of natural resources that includes new water-conserving technologies.

A more comprehensive list of CSU campus centers and institutes involved in agriculture research can be found in **Appendix C: List of Campus Centers and Institutes by Research Sector.**

Multi-campus Collaboration

CSU's Agricultural Research Institute (ARI) is a multi-campus affinity group that links the diverse research activities taking place at various campuses in the CSU through collaboration and knowledge sharing. ARI works with four member campuses, two affiliated campuses and allied disciplines across the CSU to conduct applied research to make California's agriculture, natural resources, and food systems more resilient and sustainable. Since its launch in 1999, ARI has transformed agricultural research at the CSU with more than $160 million in grant funding and close to 950 projects.[36]

In FY 2018-19, there were 132 active projects being conducted by ARI faculty and students. Environmental and water issues are being addressed in 32 percent and 23 percent of projects respectively while 17 percent of projects address regulations and labor issues. Research projects cover a variety of topics ranging from advanced technologies, animals, business and economics, environment, farming and ranching, food science, health, human sciences, natural resources, and plants. ARI expenditures across the six ARI campuses, including system projects, totaled $3.782 million. These funds were matched with another $3.829 million from industry, state and federal sources to support these ARI projects.[37]

This research has a profound impact on student experience and development. Approximately 95 percent of all ARI projects employed students to assist with research projects. These opportunities increase student engagement and allows students to get deeply involved with their discipline and gain knowledge that will help them in their careers. The skills learned through research are a value-added component to their education, but also have a significant downstream economic impact.

Across all campuses and projects, a total of 501 students received science training by working on agricultural research projects. Of these, 250 students were supported with wages. On average, the six ARI campuses allocated 23.5 percent of their budget to support students through wages.

Research projects are also closely tied with the California agricultural industry. ARI has approximately 42 existing industry partnerships.[38] Not only does industry provide matching funding for many ARI research projects, the research culture is further instilled in students when they participate in professional or grower conferences. Some 55 percent of the projects had students who attended or presented their ARI-sponsored research results at a conference or symposium.

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[36] CSU. Agricultural Research Institute (ARI). Available at https://www2.calstate.edu/impact-of-the-csu/research/ari
[37] CSU ARI. 2019-2020 Annual Report
[38] CSU ARI. Industry Partners. Available at https://csuari.inforeadyscale.com/hub

SPOTLIGHT:
CENTER FOR REGENERATIVE AGRICULTURE AND RESILIENT SYSTEMS

Facing the effects of climate change, the need to sustainably feed its growing population and deal with degraded soils and increasing water scarcity, California's agricultural and environmental sectors are in search of new, transdisciplinary ideas. Students and faculty at Chico State have assembled a diverse team of researchers investigating innovative methods. The Center for Regenerative Agriculture and Resilient Systems (CRARS) seeks to promote regenerative farming practices to improve carbon capture, restore soil resiliency, increase the sustainability of farms and ranches, and address food and water insecurity. Since its inception in 2019, CRARS has received nearly $1.2 million dollars in research funding. The center hopes to demonstrate that agriculture, when done correctly, can be the solution to soil degradation and climate change.

Student Focus: Chico State now allows students to study regenerative agriculture (RA) as an emphasis within the interdisciplinary master's degree program. CRARS students are conducting on-farm research on 100 acres devoted to eight RA demonstrations.

Community Benefit: CRARS focuses on the economic stability of rural communities in California and believes RA can help to revitalize struggling agriculture operations. Chico State is developing an online certificate program that will help educate farmers, ranchers, and community members, providing the flexibility to study on their own schedule while continuing to work fulltime. CRARS is enlisting farmers practicing RA as mentors to help educate and train others.

Industry Advancement: In addition to hosting soil-intensive workshops for industry and a Sustainability Conference with approximately 1,200 registrations, the Regenerative Agriculture Demonstration Lab (RAD-Lab) functions as a service lab for the assessment of soil quality and health along with food quality and nutrient density to support farmers, CRARS projects, stakeholders and private partners. The lab hopes to make nutrient density assessment much more affordable and accessible. The data from the RAD-Lab will also help farms more easily enter carbon markets and gain value for their efforts by selling soil credits in the cap and trade markets and improving farm profitability. The Soil Processing Area (SPA) also provides workforce development and training for students, managers, and stakeholders through hands-on educational workshops and experiences.

"ADOPTION OF [REGENERATIVE AGRICULTURE APPROACHES] WILL ALLOW FARMERS AND RANCHERS TO INCREASE THEIR PRODUCTIVITY, SUBSTANTIALLY REDUCE THEIR INPUT COSTS AND WATER USE AND BECOME MORE PROFITABLE, ALL WHILE BENEFITTING OUR ENVIRONMENT AND PRODUCING HEALTHIER FOOD."

David Johnson, Ph.D.
Adjunct professor in Chico State's CRARS

2. WATER

Water is essential for all types of economic activity and is used by every business and household to support daily human needs, as well as in the production of agricultural and industrial products and other goods and services. Additionally, watersheds and waterways provide Californians with services like hydroelectric power, recreation, transportation, fisheries, and aesthetic pleasure.

Yet California faces growing water management challenges from factors like climate change, aging water infrastructure and population growth. The planning and management of this critical resource is vital to the health of the state's economy and environment. Climate change and weather variability pose significant threats to the future availability and quality of water supply. This is primarily due to greater uncertainty over the Sierra Nevada snowpack, rising sea levels, periodic droughts and catastrophic floods. Due to population growth, many of the state's aquifers are declining at an alarming rate. Additionally, large-scale water infrastructure, which has traditionally been relied upon to meet the state's water needs, is aging and will soon need to be replaced.

THE CSU'S CONTRIBUTIONS TO WATER RESEARCH

The CSU is helping to change the way California manages water. With more than 250 water experts and water-related degrees and courses at all 23 campuses, the CSU is educating students and preparing them to address the wide range of California water challenges.

Campus Centers and Institutes

Campus research centers and institutes across 10 campuses contribute to research and innovation that improves water use efficiency in all sectors and at all stages of the water use cycle, improves water quality, reduces energy needs, improves economic resiliency and enhances environmental sustainability.

For example, Fresno State's Center for Irrigation and Technology (CIT) is the leading independent testing laboratory and applied research facility for the California irrigation industry. With state-of-the-art indoor and outdoor testing facilities, CIT works with the public and private sector to advance irrigation technology, water/energy management practices, and equipment standards. CIT also administers the Advanced Pumping Efficiency Program, which is an educational and incentive program that utilizes funding from Pacific Gas and Electric to improve overall pumping efficiency for water pumps primarily used for production agriculture, landscape or turf irrigation, or municipal purposes, and to encourage energy conservation in California.

The Office of Water program at Sacramento State is a nonprofit auxiliary of the university focused on providing cost-effective solutions for protecting and enhancing water resources, public health and the environment through training, scientific research and public education. Research group engineers and scientists manage efforts to develop and test methods to improve water quality. Researchers provide technical advice on water policy issues and assist in watershed planning, and perform modeling, data analysis, and cost assessments to assist the public and private sectors.

Much of the water research at the CSU is related to watershed management and other environmental issues. For example, the Water Institute at CSU Monterey Bay and the Watershed Institute at San Diego State bring together diverse coalitions of researchers, educators, planners, students and volunteers to foster watershed science and management. First and foremost, these centers provide research opportunities for faculty, staff and students, but they also contribute to policy development and provide community outreach, education, and service-learning opportunities to involve local communities in environmental decision making.

A more comprehensive list of CSU campus centers and institutes involved in water resources research can be found in **Appendix C: List of Campus Centers and Institutes by Research Sector.**

[39] California Water Boards. Fact Sheet. Available at https://www.waterboards.ca.gov/publications_forms/publications/factsheets/docs/SADWF%20Fact%20Sheet%20updated%20dft%20fnl%207.24.19.pdf

Multi-campus Collaboration

Realizing that smarter water management and investments can make California's economy more resilient and robust in the face of various threats, the CSU's Water Resources & Policy Initiatives (WRPI) is a multi-campus affinity group dedicated to developing water management solutions through research, partnerships, education and training that provides students with hands-on learning. In 2018-19, WRPI generated approximately $1.9 million in external funding. Approximately half of this funding was directed toward CSU student and faculty researchers.

CSU water research has had a profound impact on California communities. According to recent estimates, at least one-million California residents lack access to safe drinking water.[39] WRPI is focused on providing safe drinking water to these communities, while training the next generation of water leaders. WRPI is currently administering a grant to help underserved communities in Orange, Los Angeles, Ventura, San Bernardino and Riverside counties apply for technical assistance funding to repair or improve their water infrastructure. The four-phase project is headed by a team at CSUN's Center for Geospatial Science and Technology. In the first phase of the project, the team is using geographic information system mapping software to better identify the communities that qualify for California Department of Water Resources (DWR) funding, based on water agency service boundaries along with socioeconomic and demographic indicators. The second phase involves engaging with local community outreach and nonprofit partners to help communities advocate for state resources. Moving forward, the team is also hoping to use grant funding to develop a tool to help DWR staff prioritize applications based on factors like location, cost, support needed and the community's ability to maintain the project. Once the projects are awarded, CSU students will get hands-on experience in working on these technical assistance projects. In this way, WRPI is simultaneously supporting communities, enhancing student engagement and building professional capacity.

These community benefits are just one component of the economic impact of CSU's water research efforts. CSU researchers and individual campus centers and institutes are consistently commercializing new ideas and technologies and fostering entrepreneurial activities in water industries and services.

SPOTLIGHT:

FRESNO STATE'S WATER, ENERGY AND TECHNOLOGY CENTER (WET)

Situated on the Fresno State campus, the Water, Energy and Technology (WET) Center typifies the way that CSU research fosters innovation and drives economic impact through close collaboration with private industry partners.

The mission of the WET Center is to empower entrepreneurs to build successful businesses focused on bringing innovative water, energy, and agriculture technologies to market. The center received more than $1.5 million in external funding in FY 2018-19 and serves as a particularly strong demonstration of the way CSU research drives industry activity.

The center provides business development resources through two key programs: the BlueTech Valley Initiative and the Valley Ventures Accelerator. The BlueTech Valley Initiative provides a variety of commercialization services that help entrepreneurs test, develop and commercialize new technology and solutions for managing finite water and energy resources. The program services include consultation on technology viability, commercialization, securing funding, business model mapping, third-party testing, physical office space, networking opportunities and more. Valley Ventures is the accelerator component of BlueTech Valley. The four-month program prepares companies to access investment opportunities, generate revenue and establish a solid understanding of the industry.

Student Focus: The BlueTech Valley Innovation Cluster provides internship opportunities to CSU students at one of the six CSU campuses. Students contribute to outreach, data management, reporting, innovation screening, social media, newsletter design and editing, and much more.

Community Benefit: Recent drought conditions in the Central Valley have reduced available surface water supplies and increased electricity demand due to increased groundwater pumping. Key services, infrastructure and resources provided by the WET Center contribute to the development of new technologies that improve farming economics.

Industry Advancement: The WET building has facilities for incubation, acceleration and water technology testing that support business growth, increased investment and local job creation. In FY 2018-19, the WET Center's incubator program housed nine early-stage companies and serviced 96 members, and 14 companies were accelerated through the Valley Ventures program. As of 2019, BlueTech Valley has accepted and supported a total of 179 companies (66 in 2019), which received $8.2 million in follow-on private capital and $4.85 million in follow on public funding to date. The initiative also hosted or supported more than 50 events in 2019 to assist and encourage entrepreneurs.

3. BIOTECHNOLOGY AND HEALTHCARE

As of 2019, the biotechnology industry directly employed more than 480,000 Californians, and generated more than $372 billion in economic activity.[40] Through biotechnology research, CSU students, faculty and staff are developing solutions to current and future health and environmental challenges.

The biotechnology industry faces myriad challenges ranging from immediate public health crises, such as the COVID-19 pandemic[41]; enduring problems, such as chronic illness; and growing environmental challenges related to agriculture and climate change.

THE CSU'S CONTRIBUTIONS TO WATER RESEARCH

With biotechnology research institutes at three campuses, degree programs at nine campuses, and research projects occurring at all 23 campuses, biotechnology and health research is leading to discoveries across the university.

Campus Centers and Institutes

The Center for Applied Biotechnology Studies includes a subset of laboratories from departments and colleges at Cal State Fullerton that aim to catalyze the transfer of basic research into applied technologies for the benefit of human health and society. Research ranges from novel technologies to combat antibiotic resistance, research into adaptation mechanisms for parasite survival and infectivity and the development of new therapeutic tools against tropical diseases, the physics of living systems at a microscopic scale, plant immune receptor function in disease resistance, and much more.

Marcelo Tolmasky, professor of biological science and director for the Center for Applied Biotechnology Studies, was recently awarded nearly $1.3 million in grant funding from the National Institutes of Health to continue funding the Los Anegeles Basin CSU Minority Health and Health Disparities Research Training Program. The program, which has been operational since 2006, is a consortium of seven CSU campuses in Southern California: Cal State Fullerton (lead campus of the consortium), CSU Dominguez Hills, CSUN, Cal State Long Beach, Cal State LA, Cal Poly Pomona, and CSU San Marcos. The program offers training opportunities to students in diverse aspects of health disparities with the goal of increasing minority representation in biomedical, behavioral, clinical and social science fields. The program seeks to make trainees aware of health problems that disproportionally affect the most disadvantaged and underserved sectors of the society and prepare students to seek novel approaches to address them.

Similar to the research center at Cal State Fullerton, the mission of the Center for Applications in Biotechnology (CAB) at Cal Poly San Luis Obispo is to develop and apply biological tools to address human concerns through collaborative interdisciplinary research, and to educate the next generation of biotechnologists. However, while the research center at Cal State Fullerton has historically been more focused on human health applications, the Center for Applications in Biotechnology (formerly the Environmental Biotechnology Institute) was first known for applying biological tools to address environmental concerns. The Center has a state-of-the-art lab on campus which houses 200,000 square feet of classrooms, laboratories, offices, and study spaces. CAB scientists are currently conducting sponsored research in the fields of bioremediation, functional genomics, ancient microbiology, and microbial diversity.

A more comprehensive list of CSU campus centers and institutes involved in biotechnology and healthcare research can be found in **Appendix C: List of Campus Centers and Institutes by Research Sector.**

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[40] Biocom. 2020 California Economic Impact Report. Available at https://cabiotech.org/wp-content/uploads/2020/07/Biocom_EIR_Data-book_2020.pdf

[41] The impact of the COVID-19 pandemic is outside the scope of the current study.

MULTI-CAMPUS COLLABORATION SPOTLIGHT:
CSUPERB HIGH-IMPACT FUNDING FOR BIOTECHNOLOGY RESEARCH

CSU's Program for Education and Research in Biotechnology (CSUPERB) is a multi-campus affinity group working to develop a professional biotechnology workforce by supporting CSU student and faculty research and partnering with the life science industry. Since its launch in 1999, CSUPERB has granted approximately $14.4 million in grant funding to 1,174 faculty members and 964 students. As of July 2019, 33 percent of seed grant-funded faculty won follow-on funding within one year of completing a CSUPERB-supported project that represents an expansion of student research and experiential learning opportunities across the CSU.[42] The role of CSUPERB in fueling biotechnology research at CSU is a particularly strong case study of the ways research benefits student learning. In addition to educating the biotechnology workforce of the future, CSU's biotechnology research also plays a critical role in innovating technologies that could have a lasting community benefit.

Student Focus: CSUPERB supports CSU students in three ways: 1) funding faculty-led research groups, 2) awarding grants and scholarships to students, and 3) providing travel reimbursements, lodging, and meals to attend the annual CSU Biotechnology Symposium. Over the years, these funding opportunities have had a profound impact on CSU students. Unique research opportunities have increased student engagement in biotechnology and STEM and contributed to professional career clarity. Approximately 85 percent of funded undergraduates graduated or continued in CSU degree programs. Sixty-one percent of supported students are either employed at a biotechnology-relevant company (30 percent), enrolled in a biotechnology-relevant doctoral program (15 percent), enrolled in a biotechnology-relevant master's program (9 percent) or are employed at a biotechnology-relevant job at a university (7 percent). Seventy-eight percent of all supported students stay in California after they graduate, which means California reaps the economic benefits of their workforce contributions and spending.[43]

Community Benefit: California benefits from scientific discoveries in the areas of health, energy and agriculture. Advancements in medical biotechnology have impacted millions of lives in the past few decades. Medical biotechnology is the use of living cells and cell materials to research and produce pharmaceutical and diagnostic products that help treat and prevent human diseases. CSU research is pushing the field of medical biotechnology forward. For example, undergraduate researcher Hector Galvez worked on a project at CSU San Marcos under the supervision of Dr. James Jancovich, assistant professor of biological sciences, that aims to better understand how freshwater viruses work at the molecular level. The research aims to identify and characterize viral genes that influence the virulence of a ranavirus, a class of viruses that infect cold-blooded vertebrates, including fish, amphibians, and reptiles.

"THE CONVERSATIONS ABOUT INDUSTRY AND RESEARCH WERE SUPER BENEFICIAL FOR ME TO FIGURE OUT WHAT SKILLS ARE IN DEMAND AND WHAT THE 'ECOSYSTEM' IS LIKE. ADDITIONALLY, THE NETWORKING SESSION PROVIDES A GREAT OPPORTUNITY TO DIRECTLY ASK QUESTIONS AND FIND DIFFERENT PATHS."

CSU student feedback on the symposium

[42] CSUPERB. 2018-19 Annual Report. Available at https://www2.calstate.edu/impact-of-the-csu/research/csuperb/news-announcements/Documents/AY%2018-19%20CSUPERB%20Annual%20Report%20web.pdf
[43] CSUPERB Grants. CSUPERB Data Dashboard. Available at https://csuperb.org/grants/csuperb-data-dashboard/

The research could provide a better understanding of the molecular mechanisms of immune evasion and pathogenicity.[44] This is just one example of the way biotechnology has the potential to impact communities.

Discoveries have the potential to reduce rates of infectious disease, tailor treatments to individuals to minimize health risks, and create more precise tools for disease detection. In energy applications, biotechnology has the potential to improve energy efficiency, cut greenhouse gas emissions, and decrease water use and waste generation. For example, CSUPERB funded research by Dr. Chantel Stieber at Cal Poly Pomona aimed at understanding how biological systems might work to reduce greenhouse gas emissions.

The long-term goal of this research is to remove pollutants from the environment and use them as feedstocks in chemical synthesis for pharmaceuticals or making plastics. The group is studying transition metals used by biological systems in soil bacteria, such as nitric oxide reductases, and nitrous oxide reductases. These metals are known to facilitate the reactions, but researchers do not yet know how.[45] In agricultural applications, biotechnology can improve crop yields, lower the necessary volumes of agricultural pesticides, develop foods to address vitamin and nutrient deficiencies and more.

Industry Advancement: The 31st Annual Biotechnology Symposium brought together 645 CSU students, as well as faculty members and administrators, to design workshops, review research projects and network with regional biotechnology trade organizations and industry members. The symposium featured a discussion with a panel of biotechnology industry experts, sessions on immunotherapies and cancer research, CSU student award finalists' talks, and CSUPERB-funded faculty short talks. Students attended NSF graduate research fellowship grant writing, career networking, and graduate school information sessions. The two poster sessions featured 292 posters from 180 groups working at all 23 CSU campuses and with 87 external partners.

[44] CSU. Understanding How Viruses Work at the Molecular Level. Available at https://www2.calstate.edu/impact-of-the-csu/research/highlights/san-marcos/Pages/pharma.aspx?PageVersion=512

[45] Cal Poly Pomona. NSF Career Grant Fuels Green Chemistry Research. Available at https://www.cpp.edu/sci/Newsletter/nsf-career-grant-fuels-green-chemistry-research.shtml

4. ENERGY AND ENVIRONMENT

Second only to Texas in total energy consumption, California's energy sector is significant both in terms of use and production. According to the 2020 U.S. Energy & Employment Report, there were close to 412,000 traditional energy workers in energy jobs statewide.[46] California has worked hard to increase energy efficiency and implement alternative technologies, and as a result, the state has one of the lowest per capita energy consumption levels in the U.S., leading the nation in non-hydroelectric renewable-sourced electricity generation.[47]

Energy is a key input to the production of all goods and services and therefore energy prices have an influence on the overall economy. Furthermore, the true cost of energy is more than just financial, since energy use and generation has a profound impact on the environment. Impacts range from air and water pollution, damage to public health, wildlife and habitat loss, water use, land use, and carbon emissions. Energy and the environment touch nearly every research field at the CSU through climate change.

THE CSU'S CONTRIBUTIONS TO ENERGY RESEARCH

Four CSU campuses have specialized campus centers and institutes dedicated to the technical, economic, and environmental aspects of energy use to go along with eight energy related degree programs.

Campus Centers and Institutes

In addition to Humboldt State's Schatz Energy Research Center profiled below, CSUN's Energy Research Center manages a wind tunnel laboratory, rocket engine test cell, environmental chamber, a "wet" laboratory space used to support special projects in the thermal-fluids area, and other equipment used to study fluids and heat. The center promotes research and development projects in new or alternative energy sources as well as conservation and sustainability practices at the CSUN campus. The Energy Research Center is part of CSUN's College of Engineering and Computer Science. From 2015 to 2018, the college hosted the California Renewable Energy and Storage Technology Conference, designed to bring together universities, industries, R&D labs and government agencies to propel renewable energy and advanced storage technology forward.

The Sustainable Energy Center at San Diego State fosters cutting-edge renewable energy research through an emphasis on public- and private-sector partnerships. The center provides a variety of research opportunities for both academic and industry researchers. For example, the center's Solar Energy Laboratory permits science and engineering students and faculty to engage in laboratory testing of new types of solar technologies. The Energy Engineering Institute allows engineering students and faculty to solve problems presented by industrial sponsors; and industry partnerships with firms such as Cal Energy and Ormat Technologies help to increase local educational opportunities in STEM-related fields.

The Electric Power Institute at Cal Poly San Luis Obispo serves as an interface between the university and the electric power industry and as a center for electric power-oriented study and research activity within the university. The institute oversees several laboratories dedicated to electric machines, power electronics, sustainable energy, power system protection, industrial power controls and automation, batteries, and microgrids.

A more comprehensive list of CSU campus centers and institutes involved in energy research can be found in **Appendix C: List of Campus Centers and Institutes by Research Sector.**

[46] NASEO & Energy Future Initiative. 2020 U.S. Energy and Employment Report. Available at https://www.usenergyjobs.org/
[47] U.S. Energy Information Administration. California State Energy Profile. Available at https://www.eia.gov/state/print.php?sid=CA

SPOTLIGHT:

HUMBOLDT STATE'S SCHATZ ENERGY RESEARCH CENTER INVOLVED REGIONAL LEADERSHIP IN CLEAN ENERGY

For 30 years, the Schatz Center has been working to promote the use of clean and renewable energy technologies, both within the Humboldt State region and across the state. The Schatz Center began its research with a focus on hydrogen as a storage medium for intermittent renewable energy. This evolved into R&D on fuel cells, electric vehicles and hydrogen fueling infrastructure, and today the center's research activities encompass the full range of clean and renewable energy technologies, including smart grids, bioenergy, offshore wind and clean transportation. Among the Schatz Center's most significant and visible regional impacts have been its design, development and deployment of several innovative, community-scale, low-carbon microgrids.

Student Focus: The Schatz Center's educational mission is to "increase energy and environmental awareness, and to engage students and community members firsthand with clean and renewable energy technologies." Schatz Center engineers and educators work together to design curriculum for elementary through university students. The center also provides graduate fellowships and work opportunities for student engineers and scientists.

Community Benefit: At the regional level, the Schatz Center has worked with Redwood Coast Energy Authority (RCEA) for over a decade to analyze and plan for the Humboldt State region's energy needs. In 2009, the two organizations received a $200,000 grant from the California Energy Commission to develop the RePower Humboldt Strategic Plan. This plan found that the county could meet all of its energy needs using local renewable energy sources, and that the local community had a strong desire to influence energy planning decisions. This early work planning helped lay the groundwork for the region to pursue community-based energy supply options, such as community choice aggregation. By supporting generation of local renewable power, including from Humboldt Redwood Company's biomass power plant in Scotia, the Schatz Center and RCEA are helping to keep millions of energy dollars in Humboldt County that would otherwise go elsewhere and working to build a locally controlled energy economy.

Industry Advancement: The center provides training to solar product testing labs worldwide under the Lighting Global program. The center is also educating K-12 classes and the general public on clean energy technologies through interactive lectures and hands-on activities tailored to the audience.

The Schatz Center's cutting-edge research, thought leadership, and project development have helped establish Humboldt County as a statewide leader in the planning and deployment of community-scale renewable energy.

5. COASTAL AND OCEAN

The ocean is essential to California's economy and way of life. Not only do residents rely on its fundamental ecological functions, but it also supports vital ocean-based industries such as fishing and aquaculture, marine construction and transportation, offshore mineral resources, ship and boat building, and tourism and recreation. Approximately 68 percent of the statewide population resides in counties bordering the Pacific Ocean. Although these coastal counties account for just 22 percent of the state's land area, they generate more than 80 percent of the state's GDP.[48] The intrinsic value of this coastal and marine ecology is immediately apparent, and the economic impact of the ocean economy is significant. In California, the ocean economy provides more than 1 million total jobs (direct, indirect and induced), and more than $143 billion in total economic output statewide.[49]

That said, the ocean and its related economy are facing unprecedented challenges, from pollution and overfishing to climate change. Sea level rise, ocean warming, ocean acidification, temperature change and extreme heat are the forces most likely to impact the ocean-related activity.

THE CSU'S CONTRIBUTIONS TO COASTAL AND OCEAN RESEARCH

The CSU's 23 campuses offer a variety of marine and coastal resources. Assets include eight marine facilities, seven operational SCUBA diving programs and seven marine research vessels at various locations along the Pacific coast.[50] Additionally, there are six campus research centers and institutes dedicated to coastal and ocean research.

Campus Centers and Institutes

The CSU centers and institutes provide vital marine research capabilities for the local regions they serve. For example, the Estuary and Ocean Science Center at San Francisco State supports scientific study of the marine and coastal ecosystems nearby, enhances public engagement with marine science and develops solutions to the environmental problems confronting coastal communities. Current research projects at the center are related to climate change, stress and behavior, coastal oceanography, marine spatial ecology and endangered species, oysters and water quality, and crashing waves and baby sea urchins. In addition, Cal Maritime is one of the few federally approved ballast test water sites. The result of this work has a huge impact on the global maritime industry that is seeking ways to comply with international standards for handling ship ballast water. Further, the Coastal and Marine Institute Laboratory at San Diego State is the only stand-alone CSU marine laboratory in Southern California and is part of a "Coastal Zone Campus" on San Diego Bay, which allows mutual access to and sharing of new and innovative research ideas and activities that bring together federal, regional and local entities, and nationally known scientists and experts, in order to exchange information related to the coastal zone environment. The Center for Coastal Marine Sciences at Cal Poly San Luis Obispo operates as a marine research facility at the end of the 3,000 ft. Cal Poly Pier and provides unrivaled access to the marine environment of the Central Coast.

The Institute for Applied Marine Ecology at CSU Monterey Bay attempts to provide further insight into the interaction of marine ecological systems and human activities. The institute operates a small boats program, scientific diving program, and has a variety of resources ranging from lab and field equipment to geospatial resources and legacy data. There are research labs dedicated to ecosystem electronics, coastal ecology, environmental physiology, image analysis, marine landscape ecology, and biological oceanography.

A more comprehensive list of CSU campus centers and institutes involved in coastal and ocean researchcan be found in **Appendix C: List of Campus Centers and Institutes by Research Sector.**

Multi-campus Collaboration

Realizing that collaboration will be key to protecting California's coast, the CSU has several ongoing collaborative research efforts in the areas of coastal and ocean research. These are headed by CSU's three coastal and ocean multi-campus affinity groups but also include individual campus centers and institutes.

The CSU has three existing affinity groups working in the area of coastal and ocean research, including Moss Landing Marine Laboratories (MLML), Ocean Studies Institute (OSI), and CSU's Council on Ocean Affairs, Science and Technology (COAST). This coastal research triad promotes research and education that advance the knowledge of marine and coastal resources and the processes that affect them.

SPOTLIGHT:

MOSS LANDING MARINE LABORATORIES AQUACULTURE FACILITY— SUSTAINABLE AQUACULTURE FOR CALIFORNIA

The Moss Landing Marine Laboratories' (MLML's) Aquaculture Facility is driving growth and innovation in California's aquaculture industry. Despite being the leading global importer of fish and fishery products, the U.S. is a minor aquaculture producer globally. By weight, 90 percent of the U.S. seafood comes from abroad and more than half of those imports are from aquaculture.[51] The U.S. has yet to truly embrace aquaculture as a potential source for sustainable food, biofuel, fertilizer or overtaxed fisheries remediation. MLML's Shorelab facility houses a 1,200-square-foot building and 1,800-square-foot concrete slab for seawater tanks to foster marine algae production for potential uses, including renewable biofuels, animal feed (to reduce reliance on irrigated land sources), and innovative food products and supplements. Additionally, the facility researches and promotes the use of aquaculture in clean technology applications for a variety of wastewater treatment and resource recovery settings that is especially significant given the alarming rate of ocean acidification due to climate change.

Student Focus: The Aquaculture facility provides engaging research opportunities and training for CSU students and prepares them for jobs in the burgeoning aquaculture industry. Three current research projects help students acquire a variety of skills, including construction, and engineering, water quality sampling and sensor use, husbandry, animal care and maintenance, food preparation, reporting and data collection, data analysis and report writing.

Community Benefit: The facility aims to find ways to utilize aquaculture to address issues that impact the community. For example, Luke Gardner, Scott Hamilton, and Mike Graham received $206,000 in grant funding to identify and culture California marine macroalgae capable of reducing greenhouse gas production from ruminant livestock. Infusing seaweed into livestock diet has been found to greatly reduce methane production. The project will collect and test nearly 30 species of seaweed measuring digestion and gas production. Approximately 29 percent of California methane comes from ruminant livestock, and because methane is an especially potent greenhouse gas, this research could have a major impact in easing emissions from land-based food production.[52]

Industry Advancement: MLML's facility partners with industry and outreach partners to solve real problems in aquaculture science and production, and addressing broader societal issues (e.g., biofuels/ energy independence, food security and restoration of natural populations). For example, the facility has a partnership with Hog Island Oysters and Monterey Abalone Company to assess the effectiveness of various species of seaweed in mitigating ocean acidification and the impacts to the health of shellfish. The project could demonstrate the utility of land-based integrated seaweed-abalone farms for expansion of the shellfish industry in California, creating new pathways for aquaculture industry across the state.[53]

[48] NOAA. The National Significant of the Ocean Economy. Available at https://coast.noaa.gov/data/digitalcoast/pdf/california-ocean-economy.pdf

[49] LAEDC. The Ocean Economy in Los Angeles County: Economic Impact Analysis. Available at https://laedc.org/research-analysis/recent-reports/

[50] CSU. Marine Resources. Available at https://www2.calstate.edu/impact-of-the-csu/research/coast/coastal-resources/Pages/csu-marine-resources.aspx

[51] NOAA Fisheries. U.S. Aquaculture. Available at https://www.fisheries.noaa.gov/national/aquaculture/us-aquaculture#:~:text=The%20United%20States%20is%20a,half%20of%20it%20from%20aquaculture.

[52] MLML Aquaculture Facility. Current Research: Sea Feeds: Identification and Culture of Californian Marine Macroalgae Capable of Reducing Greenhouse Gas Production from Ruminant Livestock. Available at https://www.mlml.calstate.edu/aquaculture/research/

[53] MLML Aquaculture Facility. Current Research: Solving Impediments to the Co-Culture of Seaweeds and Shellfish. Available at https://www.mlml.calstate.edu/aquaculture/research/

6. HOSPITALITY, TOURISM AND ENTERTAINMENT

With dozens of national and state parks, picturesque beaches, and world-class attractions like the Golden Gate Bridge and Disneyland, California is known around the globe as a travel destination. California is routinely the most visited state in the U.S., making its tourism industry an economic powerhouse. In 2019, direct travel-related spending in California was almost $145 billion. This spending generated nearly 1.2 million jobs, and $12.2 billion in state and local tax revenue.[54] The GDP of the California travel industry was $84.6 billion in 2019, which represents about 2.5 percent of the total GDP of the state.

THE CSU'S CONTRIBUTIONS TO HOSPITALITY, TOURISM AND ENTERTAINMENT RESEARCH

There are eight centers and institutes within the CSU that engage in myriad hospitality- and tourism-related research.

Campus Centers and Institutes

Four of these centers and institutes are affiliated with the San Diego State campus. The research missions of these centers are expansive, such as the Center for Hospitality and Tourism Research that has programs focus on identifying "best practices" in all aspects of hospitality and tourism, including hotel operations, restaurant operations, global tourism, and events, conventions and attractions management. Other centers and institutes have a more specific focus, such as the Center for Surf Research, which is an international hub for research on sustainable surf tourism and issues of sustainability affecting the industry and broader community.

CSUN's Center for Recreation and Tourism explores the nature of play and its effect on lifestyle, health and interpersonal dynamics, while the Center for Entertainment and Hospitality Management at Cal State Fullerton links students to the entertainment media and hospitality industries. Center resources and events help prepare students for career opportunities in both industries.

A more comprehensive list of CSU campus centers and institutes involved in hospitality, tourism and entertainment research can be found in **Appendix C: List of Campus Centers and Institutes by Research Sector.**

Multi-campus Collaboration

The Hospitality & Tourism Alliance and the Entertainment Alliance are working with students, faculty, alumni and industry partners to prepare students for careers in the areas of hospitality, tourism and entertainment. Both alliances enjoy strong long-lasting relationships with industry partners, all of whom have hired CSU graduates or mentored them during their coursework.

[54] Visit California. Economic Impact of Travel in California. Available at https://industry.visitcalifornia.com/research/economic-impact

SPOTLIGHT:

CAL STATE SAN BERNARDINO'S HOSPITALITY MANAGEMENT PROGRAM EDUCATES THE NEXT GENERATION OF TOURISM AND HOSPITALITY LEADERS IN THE COACHELLA VALLEY

The hospitality industry is especially vital to the Coachella Valley, where four out of 10 jobs are hospitality or tourism related. The region boasts a $7.5 billion hospitality and tourism industry that employs 22 percent of local workers thanks to its extensive collection of golf courses, rental properties, resorts and events like the Coachella Valley Music and Arts Festival (which alone draws 99,000 people per festival day).[55] To meet this demand and keep California students local, CSU San Bernardino recently launched a new hospitality management program.

Student Focus: The program provides a hands-on student learning experience with close proximity to locations like Disneyland, the museums of Los Angeles, the hotels of Las Vegas and outdoor recreation sites like Joshua Tree National Park. In the future, the program hopes to introduce trips to the Hotel Show in New York City, the Chicago Restaurant Show and various international destinations, including an annual short-term study abroad trip to Italy during spring break. These experiences enhance student's engagement, provide global awareness and improve career clarity.

Community Benefit: The program provides educational opportunities to students who remain local after graduation and ensures that the region continues to capitalize on the economic benefits of the local hospitality, tourism and entertainment industries.

Industry Advancement: Local industries benefit from a pipeline of qualified CSU graduates who have the experience to interact with the different types of guests and tourists hailing from diverse international locations and the skill set to fast-track into supervisory and management careers.

[55] The CSU System. At Your Service: The Hospitality Industry. Available at https://www2.calstate.edu/csu-system/news/Pages/where-the-jobs-are-hospitality.aspx

7. INFORMATION TECHNOLOGY, ENGINEERING AND ADVANCED SCIENCES

Information Technology, Engineering and Advanced Sciences, or "high-tech," is a vital part of California's economy. The high-tech sector can be defined as industries having a concentration of workers in science, technology, engineering, and mathematics (STEM) occupations. Industries range from software engineering and cybersecurity to aerospace and tech manufacturing. California's high-tech workforce is approximately 1.8 million people, which is nearly twice as many as the next ranked state. The state also had the highest number of tech business establishments of any state and accounts for over a quarter of the national tech productivity.[56] CSU's high-tech research contributes to the state's innovation ecosystem.

SPOTLIGHT:

ENGINEERING BREAKTHROUGHS—MEASURING THE WIND FROM MILES AWAY

A group of researchers at Chico State, composed of students, alumni, and working professionals, are studying fluid dynamics in laboratories, measuring the wind from miles away using atmospheric lidars, the optical counterparts to radars.

Student Focus: This research has provided opportunities for more than 30 Chico State students to be part of a dynamic cutting-edge research team. The current team consists of 19 former students, alumni, and working professionals.

Community Benefit: This research has the strong potential to influence local agricultural spraying operations, emissions from industrial stacks or mining operations, wildfire suppression, and airport safety operations. For example, lidar can be used to provide direct, precise, real-time location and heading of aerosol plumes. This information can be used to test dispersion models and even warn the populations downstream of industrial or mining release sites, as well as take low-regret protection actions, such as shutting ventilation intakes.

Industry Advancement: The team has also developed algorithms and licenses software to partners in the commercial sector, as well as the Department of Defense, to deduce the motion of potentially hazardous plumes. The capability has strong potential with broad commercial value.

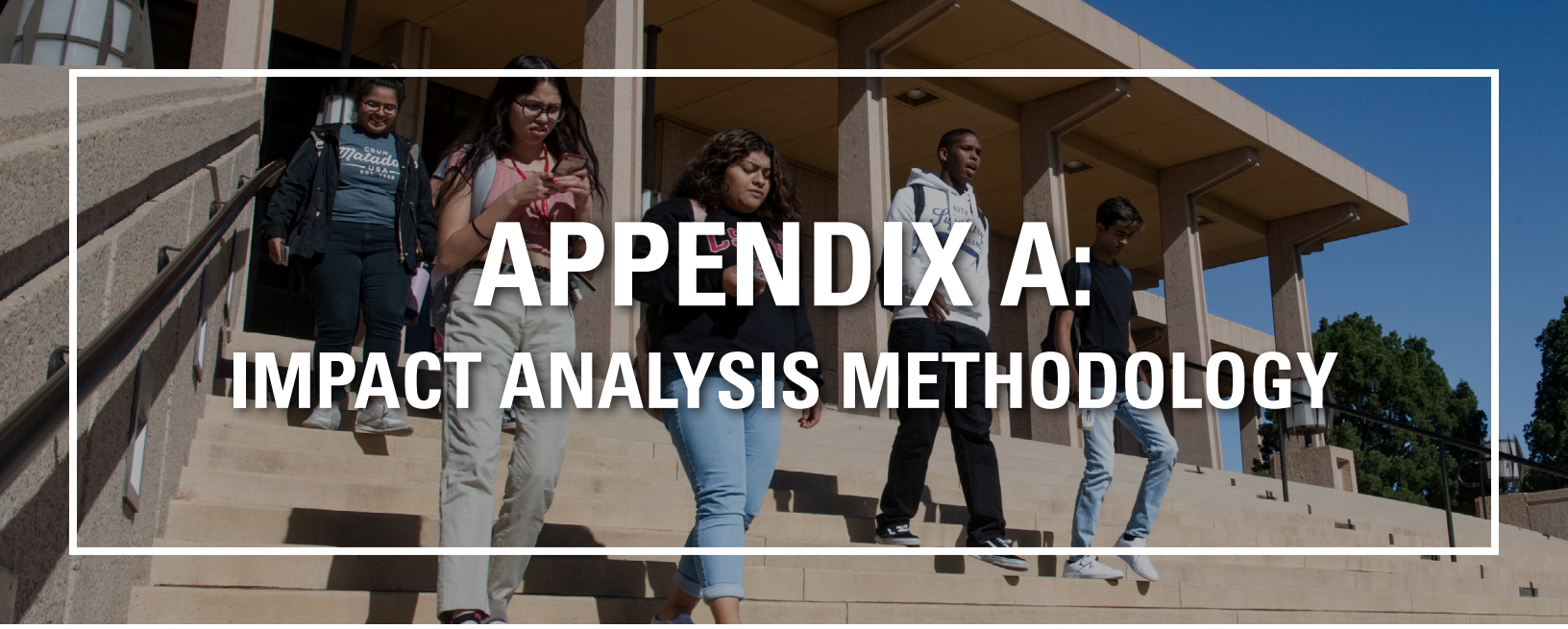
[56] State of California, Governor's Office of Business and Economic Development. High Tech. Available at https://business.ca.gov/industries/high-tech/

CONCLUSION

The impact of the CSU and its alumni are significant to California. Annually, CSU-related expenditures support nearly $26.9 billion in industry activity and more than 209,000 jobs across the state. The CSU returns $6.98 to the California economy for every dollar that the state invests. Moreover, when the impact of the increased spending power of CSU graduates is included, the CSU supports an additional 474,900 annual jobs and $88.3 billion in statewide industry activity. The state return on investment including the impact of CSU alumni increases to $29.90.

California continues to celebrate its strong and diverse industries—from entertainment, aerospace, and tourism in the Southern California region, to agriculture in the Central Valley, and high-tech manufacturing, software development and financial services in the Bay Area. The California State University prepares students for success in careers spanning this diverse set of industries. The well-rounded and multi-disciplinary research approach provides distinctive educational opportunities for an extremely diverse body of students, one-third of whom are the first in their families to attend college.[57] Additionally, CSU research allows students and faculty to investigate and contribute to solutions to key issues facing California's communities and vital industries.

[57] CSU, Impact of CSU, Diversity. Available at https://www2.calstate.edu/impact-of-the-csu/diversity/Pages/default.aspx



APPENDIX A: IMPACT ANALYSIS METHODOLOGY

This section describes the methodology and data sources used to conduct the economic impact analysis.

ECONOMIC IMPACT MODELING METHODOLOGY

ICF used the IMPLAN model to estimate the state and regional economic impacts of the CSU. IMPLAN is an economic input-output model that combines a set of extensive databases related to economic factors, economic multipliers, and demographic statistics with a refined and detailed system of modeling software. There are three primary types of impacts in IMPLAN:

- **Direct** – refers to the impacts on the industries that the CSU and its students directly interact with, such as construction, food and beverage establishments, retail stores, etc.
- **Indirect** – refers to the impacts in inter-industry purchases resulting from direct spending on materials, equipment and labor. These results represent the upstream supply chain impacts that are created due to the industry linkages caused by project-related industries purchasing from other industries, such as raw materials sectors supplying the directly impacted industry.
- **Induced** – refers to the downstream impacts created in all local industries due to consumers' consumption expenditures arising from changes in personal income caused by the direct and indirect effects.

The use of the IMPLAN model allows for the estimation of the total impacts of CSU-related activity on the regional economy in terms of the following types of impacts:

- **Employment** –jobs supported by the CSU. IMPLAN estimates employment by aggregated sector.
- **Labor Income** – wages and salaries (including benefits) paid to workers, plus proprietor income, supported by CSU activity.
- **Industry Activity** – the contribution of the investments to total regional economic activity.
- **Tax Impact** – tax revenues from businesses, sales, excise, and property from all policy-related activity. State and local as well as federal tax revenue is calculated.

DATA SOURCES

The direct economic impacts presented in the report are based on public financial data for the CSU and/or from calculations based on assumptions discussed in the following sections. All direct economic impacts were vetted and updated by each CSU campus and the Chancellor's Office.[58] The direct economic impacts included annual CSU operational expenditures, average (four-year) capital expenditures, auxiliary expenditures, and student expenditures.

Operational Expenditures

CSU operational expenditures were based on Financial Information Record Management System (FIRMS) data provided by the Chancellor's Office.[59] In order to avoid double-counting with student spending, ICF excluded depreciation and fellowship and scholarship spending.

Capital Expenditures

Because campus capital expenditures vary year-to-year, a four-year average, from 2016 to 2019, of financial statements[60] was used to calculate an

average annual capital expenditure for each campus.

Auxiliary Expenditures

Information regarding the impact of auxiliary organizations also came from internal CSU financial reports.[61] Again, to avoid double-counting, ICF excluded depreciation and fellowship and scholarship spending because the data were not broken down by the type of auxiliary enterprise, i.e., retail store, food service area, research institute, etc. The following assumptions were made regarding expenditures in each IMPLAN sector:

- 40 percent dorms/campus housing (rental housing)
- 20 percent campus stores (retail bookstores)
- 20 percent campus dining and cafes (food and beverage establishments)
- 20 percent research activity (higher education)

Student Expenditures

A significant portion of CSU student expenditures occur at auxiliary organizations (e.g., campus housing, bookstores, campus food services and parking), which are incorporated in the auxiliary organization spending as noted above.

To analyze the spending of the different types of CSU students based on residency (meaning students that live on campus, off campus, and with family), ICF first determined the residency of students for each CSU campus using enrollment data provided by the Chancellor's Office.[62] ICF used the number of students that are from the campus county as a proxy for the number of students that live at home. The number of students that live on campus was assumed to be the same as the total student occupancy of campus-operated and auxiliary-operated facilities in fall 2019.[63] All remaining students were assumed to live off campus.

Student spending patterns were based on the CSU 2019-20 Estimated Undergraduate Cost of Attendance.[64] Several budget items were excluded to avoid double-counting with operational costs or campus auxiliary expenditures. For all housing types, ICF excluded spending on tuition and campus fees, which are included in operational costs. For students living on campus, food and housing expenditures were also excluded (already included in auxiliary revenues), and only half of spending on books and supplies was included, based on the assumption that students buy a portion of their books and supplies at campus stores, which are included in auxiliary revenues.

Alumni Impacts

Alumni impacts are treated differently than the other spending impacts in IMPLAN because they are not expenditures by the CSU but by CSU graduates. Analysis of alumni impacts is focused on the impact of the incremental increase in income that CSU graduates earn due to their CSU degree. Several assumptions and data sources were used to complete this portion of the analysis, detailed below.

1. On average, CSU students are 25 years old when they graduate. This accounts for students who are completing their graduate degrees, students who do not start their college education directly out of high school, and students who take more than four years to graduate.
2. The retirement age is 67 years old. Therefore, alumni from the class of 1977-78 up to 2018-19 are assumed to still be part of the workforce and were included in the analysis.
3. U.S. workers earn incrementally more as their educational attainment level increases. Annual earnings based on educational attainment (high school diploma, associate degree, bachelor's degree and advanced degrees) in California is based on U.S. Census Bureau (USCB) data.[65]

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[58] San José State University did not provide data verification because it was performing its own campus-specific economic and social impact study.

[59] Financial Information Record Management System (FIRMS) - Operating Expenses for the year ended June 30, 2019 (before systemwide elimination)

[60] Financial Information Record Management System (FIRMS) - Capital Expenditures (University) by State Fund for the Years-Ended June 30, 2019, 2018, 2017, and 2016 (Legal-Basis Only, Unaudited)

[61] Financial Information Record Management System (FIRMS) - Operating Expenses for the Year Ended June 30, 2019 from audited auxiliary financial statement

[62] CSU. Fall 2019 Enrollment of Students Resident in Campus County (based on Resident Code). Campus Total.

[63] CSU. Housing Occupancy Report. Student and Faculty/Staff. Fall 2019.

[64] CSU. CSU 2019-20 Estimated Undergraduate Cost of Attendance. Available at: https://www2.calstate.edu/attend/paying-for-college/pages/campus-costs-of-attendance.aspx

[65] USCB. 2019. 2018 American Community Survey 5-Year Estimates. Table S2001: Earnings in the Past 12 Months.

4. Campuses (with the exception of San José State) provided data to estimate the number of alumni that live in the campus region and in California. For San José State, ICF used the average annual "out-migration rate" for California, based on USCB data. No regional estimates were possible for San José State.
5. For each graduation year, the total earnings of CSU alumni were calculated by multiplying the number of bachelor's degree recipients remaining in California and the region by the weighted average bachelor's degree salary for that year. The calculation was repeated for master's degree holders, and the two totals were summed. This total, summed for every year back to 1977-78, provides an estimate of the total annual earnings of CSU alumni still living in California or the campus region.
6. The amount of total earnings that is attributable to the CSU degrees of alumni is the difference between the weighted average salary associated with their final educational level minus the weighted average salary associated with their previous educational level. For individuals with master's degree, for example, the amount of earnings that is attributable to the CSU master's degrees of alumni is the weighted average master's salary minus the weighted average bachelor's salary. For bachelor's degree holders, the amount of earnings attributable to the CSU degrees of alumni is the average bachelor's salary minus the average salary for either a high school graduate or transfer student who already had some college credit.
7. Some students come to the CSU with a high school diploma only; others transfer after completing some college. The salary differences between bachelor's degree recipients and high school graduates were calculated as well as the salary difference between bachelor's degree recipients and transfer students with some college credits. These two differences were weighted based on historical data for the split between the two sources of students to the CSU (first-time freshmen with a high school diploma and transfer students). Lastly, a total earnings differential attributable to the CSU degrees was calculated.

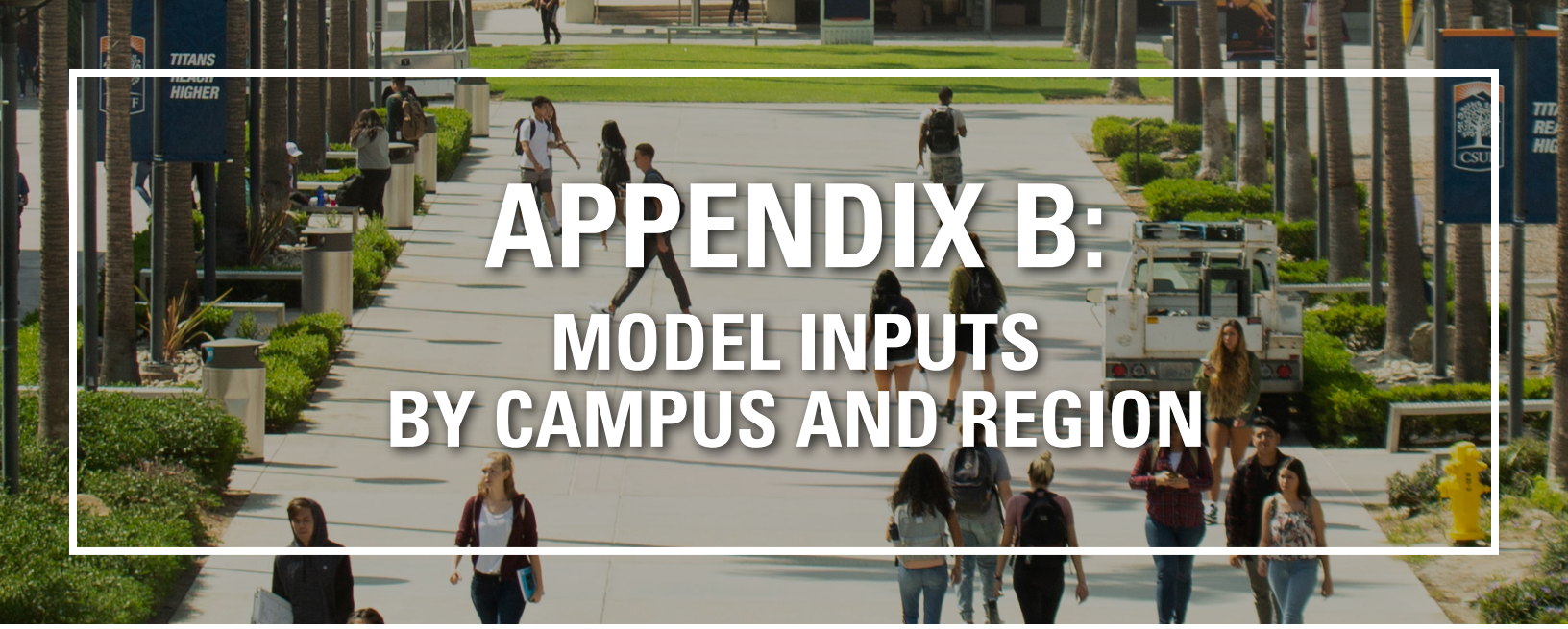
COMPARISON WITH PREVIOUS ANALYSES

Since the 2010 analysis, there has been an increase in direct CSU activity, which has led to a corresponding increase in the level of economic activity supported by the CSU in California. Compared to the 2010 analysis results, the number of jobs supported by the CSU increased by more than 40 percent, industry activity supported by the CSU increased by nearly 35 percent, and the state and local tax revenue generated increased by 35 percent. In terms of state investment, California's investment increased by about 20 percent between 2008-09 and 2018-19. The state return on investment was $5.43 in 2009 and increased to $6.79 in 2019. When the impact of the enhanced earnings of CSU alumni is considered, in 2009 the return on investment was $22.51 and increased to $29.90 in 2019.

That said, the results from the 2010 analysis are not directly comparable to the results presented in this report due to numerous methodological differences. For student spending, the 2010 analysis only included the impact of spending by students from outside of the region. In this updated analysis, ICF included the spending from all CSU students, utilizing different spending patterns depending on the student residency type. This is consistent with current best practices and accounts for the fact that without the CSU's many campuses and affordable education, many California students may have gone elsewhere for their college education.

Additionally, ICF also updated the methodology used to determine the percentage of alumni that remain in the state and campus region for each CSU campus. The 2010 study utilized U.S. Census Bureau state-to-state migration data to determine the percentage of alumni from each campus that would remain in California post-graduation. For this analysis, ICF used values provided by each campus to determine the number of alumni that remain and work in the relevant campus region and in the state.[66] The inclusion of the number of alumni that still wok in the campus regions allows for a more granular analysis of how each CSU campus impacts the California region it resides in.

[66] Because it was conducting its own research, San José State chose not to provide data on the number or percentage of alumni that remain in the state or campus region. Therefore, ICF used USCB state-to-state migration data to estimate the number of alumni that remain in California. No regional estimate is available.



APPENDIX B: MODEL INPUTS BY CAMPUS AND REGION

This appendix provides details of the economic input calculations for each campus, region and the state as a whole.

CSU ECONOMIC MODEL INPUTS: ALL REGIONS ($MILLIONS)

IMPACT CATEGORY	DATA INPUTS	ENTIRE CSU
1. Operational Expenditures[67]	Total OpEx	$8,271,207,949
2. Capital Expenditures[68]	4 year average	$838,301,778
3. Auxiliary Expenditures[69]	Total AuxEx	$1,648,850,710
	Rental Housing (dorms)	$659,540,284
	Retail (bookstores)	$329,770,142
	Food & drink (cafes)	$329,770,142
	Colleges & Universities (research activity)	$329,770,142
4. Student Spending[70]	Total Enrollment	480,541
	Number of students that live at home	235,746
	Average Live-at-home student budget	$11,298
	Total Live-at-home Student Spend	$2,691,662,673
	Number of students that live on campus	57,252
	Average on campus student budget	$3,886
	Total On Campus Student Spend	$223,634,108
	Number of students that live off campus	187,543
	Average off campus student budget	$20,050
	Total Off Campus Student Spend	$3,805,082,779
	Total Student Spend	$6,720,379,560
5. Alumni[71]	Total alumni earnings attributable to CSU education in CA	$70,734,175,608

[67] Financial Financial Information Record Management System (FIRMS)—Operating Expenses for the year ended June 30, 2019 (before systemwide elimination). Figure represents total excluding depreciation and fellowship and scholarship

[68] Financial Information Record Management System (FIRMS)—Capital Expenditures (University) by State Fund for the Years-Ended June 30, 2019, 2018, 2017 and 2016 (Legal-Basis Only, Unaudited). Figure represents 4-year average (2016-19)

[69] Financial Information Record Management System (FIRMS)—Operating Expenses for the Year Ended June 30, 2019, from audited auxiliary financial statement. Figure represents total excluding depreciation and fellowship and scholarship

[70] CSU 2019-20 Estimated Undergraduate Cost of Attendance. Available at https://www2.calstate.edu/attend/paying-for-college/pages/campus-costs-of-attendance.aspx. ICF applied systemwide spending patterns for each student residency type (on-campus, living at home, off-campus) to total student body by campus

[71] Figure represents alumni from 1977-78 to 2018-19 academic year. Potential earning is based on USCB data, and the percentage of alumni that remain in the state is based off data provided by each campus, or USCB data. For more information see Appendix A: Impact Analysis Methodology.

CSU ECONOMIC MODEL INPUTS: BAY AREA ($MILLIONS)

IMPACT CATEGORY	DATA INPUTS	EAST BAY	MARITIME ACADEMY	SAN FRANCISCO	SAN JOSÉ	SONOMA	BAY AREA TOTAL
1. Operational Expenditures[72]	Total OpEx	$258	$73	$506	$551	$214	$1,601
2. Capital Expenditures[73]	4 year average	$13	$2	$29	$78	$13	$135
3. Auxiliary Expenditures[74]	Total AuxEx	$17	$2	$25	$105	$14	$162
	Rental Housing (dorms)	$7	$1	$10	$42	$5	$65
	Retail (bookstores)	$3	$0	$5	$21	$3	$32
	Food & drink (cafes)	$3	$0	$5	$21	$3	$32
	Colleges & Universities (research activity)	$3	$0	$5	$21	$3	$32
4. Student Spending[75]	*Total Enrollment*	14,705	911	28,880	33,282	8,649	86,427
	Number of students that live at home	6,225	44	5,331	13,802	2,011	27,413
	Total Live-at-home student budget	$0	$0	$0	$0	$0	$0
	Total Live-at-home Student Spend	$84	$1	$62	$158	$23	$328
	Number of students that live on campus	1,534	724	3,933	4,075	2,897	13,163
	Total on campus student budget	$0	$0	$0	$0	$0	$0
	Total On Campus Student Spend	$7	$3	$14	$17	$12	$53
	Number of students that live off campus	6,946	143	19,616	15,405	3,741	45,851
	Total off campus student budget	$0	$0	$0	$0	$0	$0
	Total Off Campus Student Spend	$155	$2	$421	$332	$80	$991
	Total Student Spend	$246	$6	$497	$507	$115	$1,372
5. Alumni[76]	Total alumni earnings attributable to CSU education in CA	$3,168	$65	$2,934	$5,594	$1,682	$13,442
	Total alumni earnings attributable to CSU education in campus region	$2,614	$29	$2,298		$1,109	$6,050

[72] Financial Information Record Management System (FIRMS)—Operating Expenses for the year ended June 30, 2019 (before systemwide elimination). Figure represents total excluding depreciation and fellowship and scholarship

[73] Financial Information Record Management System (FIRMS)—Capital Expenditures (University) by State Fund for the Years-Ended June 30, 2019, 2018, 2017 and 2016 (Legal-Basis Only, Unaudited). Figure represents 4-year average (2016-19)

[74] Financial Information Record Management System (FIRMS)—Operating Expenses for the Year Ended June 30, 2019, from audited auxiliary financial statement. Figure represents total excluding depreciation and fellowship and scholarship

[75] CSU 2019-20 Estimated Undergraduate Cost of Attendance. Available at https://www2.calstate.edu/attend/paying-for-college/pages/campus-costs-of-attendance.aspx. ICF applied systemwide spending patterns for each student residency type (on-campus, living at home, off-campus) to total student body by campus

[76] Figure represents alumni from 1977-78 to 2018-19 academic year. Potential earning is based on USCB data, and the percentage of alumni that remain in the state is based off data provided by each campus, or USCB data. For more information see Appendix A: Impact Analysis Methodology.

CSU ECONOMIC MODEL INPUTS: CENTRAL COAST ($MILLIONS)

IMPACT CATEGORY	DATA INPUTS	CHANNEL ISLANDS	MONTEREY BAY	SAN LUIS OBISPO	CENTRAL COAST TOTAL
1. Operational Expenditures[77]	Total OpEx	$161	$167	$535	$863
2. Capital Expenditures[78]	4 year average	$18	$28	$70	$116
3. Auxiliary Expenditures[79]	Total AuxEx	$16	$45	$132	$193
	Rental Housing (dorms)	$6	$18	$53	$77
	Retail (bookstores)	$3	$9	$26	$39
	Food & drink (cafes)	$3	$9	$26	$39
	Colleges & Universities (research activity)	$3	$9	$26	$39
4. Student Spending[80]	*Total Enrollment*	7,093	7,123	21,242	35,458
	Number of students that live at home	3,489	2,315	1,300	7,104
	Total Live-at-home student budget	$0	$0	$0	$0
	Total Live-at-home Student Spend	$40	$23	$13	$77
	Number of students that live on campus	1,563	3,389	7,952	12,904
	Total on campus student budget	$0	$0	$0	$0
	Total On Campus Student Spend	$7	$10	$30	$47
	Number of students that live off campus	2,041	1,419	11,990	15,450
	Total off campus student budget	$0	$0	$0	$0
	Total Off Campus Student Spend	$44	$28	$234	$306
	Total Student Spend	$90	$62	$277	$429
5. Alumni[81]	Total alumni earnings attributable to CSU education in CA	$460	$518	$3,776	$4,754
	Total alumni earnings attributable to CSU education in campus region	$323	$230	$996	$1,550

[77] Financial Information Record Management System (FIRMS)—Operating Expenses for the year ended June 30, 2019 (before systemwide elimination). Figure represents total excluding depreciation and fellowship and scholarship

[78] Financial Information Record Management System (FIRMS)—Capital Expenditures (University) by State Fund for the Years-Ended June 30, 2019, 2018, 2017, and 2016 (Legal-Basis Only, Unaudited). Figure represents 4-year average (2016-19)

[79] Financial Information Record Management System (FIRMS)—Operating Expenses for the Year Ended June 30, 2019, from audited auxiliary financial statement. Figure represents total excluding depreciation and fellowship and scholarship

[80] CSU 2019-20 Estimated Undergraduate Cost of Attendance. Available at https://www2.calstate.edu/attend/paying-for-college/pages/campus-costs-of-attendance.aspx. ICF applied systemwide spending patterns for each student residency type (on-campus, living at home, off-campus) to total student body by campus

[81] Figure represents alumni from 1977-78 to 2018-19 academic year. Potential earning is based on USCB data, and the percentage of alumni that remain in the state is based off data provided by each campus, or USCB data. For more information see Appendix A: Impact Analysis Methodology.

CSU ECONOMIC MODEL INPUTS: LOS ANGELES ($MILLIONS)

IMPACT CATEGORY	DATA INPUTS	CHANCELLOR'S OFFICE	DOMINGUEZ HILLS	FULLERTON	LONG BEACH	LOS ANGELES	NORTHRIDGE	LOS ANGELES REGION
1. Operational Expenditures[82]	Total OpEx	$235	$238	$553	$567	$387	$580	$2,561
2. Capital Expenditures[83]	4 year average	$33	$31	$14	$41	$34	$38	$191
3. Auxiliary Expenditures[84]	Total AuxEx	$104	$31	$89	$99	$39	$90	$452
	Rental Housing (dorms)	$42	$12	$36	$40	$16	$36	$181
	Retail (bookstores)	$21	$6	$18	$20	$8	$18	$90
	Food & drink (cafes)	$21	$6	$18	$20	$8	$18	$90
	Colleges & Universities (research activity)	$21	$6	$18	$20	$8	$18	$90
4. Student Spending[85]	*Total Enrollment*		17,027	39,868	38,074	26,361	38,391	159,721
	Number of students that live at home		9,363	19,628	21,299	22,888	31,838	105,049
	Total Live-at-home student budget		$0	$0	$0	$0	$0	$0
	Total Live-at-home Student Spend		$107	$224	$244	$263	$365	$1,204
	Number of students that live on campus		636	2,043	2,701	966	3,252	9,598
	Total on campus student budget		$0	$0	$0	$0	$0	$0
	Total On Campus Student Spend		$2	$9	$11	$4	$14	$401
	Number of students that live off campus		6,995	18,197	14,074	2,507	3,301	45,074
	Total off campus student budget		$0	$0	$0	$0	$0	$0
	Total Off Campus Student Spend		$142	$392	$287	$54	$71	$946
	Total Student Spend		$251	$625	$543	$321	$451	$2,191
5. Alumni[86]	Total alumni earnings attributable to CSU education in CA		$2,280	$7,083	$6,598	$4,118	$5,913	$25,922
	Total alumni earnings attributable to CSU education in campus region		$1,756	$5,626		$3,340	$4,295	$20,133

[82] Financial Information Record Management System (FIRMS)—Operating Expenses for the year ended June 30, 2019 (before systemwide elimination). Figure represents total excluding depreciation and fellowship and scholarship.
[83] Financial Information Record Management System (FIRMS)—Capital Expenditures (University) by State Fund for the Years-Ended June 30, 2019, 2018, 2017, and 2016 (Legal-Basis Only, Unaudited). Figure represents 4-year average (2016-19)
[84] Financial Information Record Management System (FIRMS)—Operating Expenses for the Year Ended June 30, 2019, from audited auxiliary financial statement. Figure represents total excluding depreciation and fellowship and scholarship
[85] CSU 2019-20 Estimated Undergraduate Cost of Attendance. Available at https://www2.calstate.edu/attend/paying-for-college/pages/campus-costs-of-attendance.aspx. ICF applied systemwide spending patterns for each student residency type (on-campus, living at home, off-campus) to total student body by campus
[86] Figure represents alumni from 1977-78 to 2018-19 academic year. Potential earning is based on USCB data, and the percentage of alumni that remain in the state is based off data provided by each campus, or USCB data. For more information see Appendix A: Impact Analysis Methodology.

CSU ECONOMIC MODEL INPUTS: INLAND EMPIRE ($MILLIONS)

IMPACT CATEGORY	DATA INPUTS	POMONA	SAN BERNARDINO	INLAND EMPIRE
1. Operational Expenditures[87]	Total OpEx	$380	$295	$675
2. Capital Expenditures[88]	4 year average	$77	$50	$127
3. Auxiliary Expenditures[89]	Total AuxEx	$96	$47	$144
	Rental Housing (dorms)	$38	$19	$57
	Retail (bookstores)	$19	$9	$29
	Food & drink (cafes)	$19	$9	$29
	Colleges & Universities (research activity)	$19	$9	$29
4. Student Spending[90]	*Total Enrollment*	27,914	20,311	48,225
	Number of students that live at home	13,772	11,484	25,256
	Total Live-at-home student budget	$0	$0	$0
	Total Live-at-home Student Spend	$150	$125	$275
	Number of students that live on campus	3,688	1,184	4,872
	Total on campus student budget	$0	$0	$0
	Total On Campus Student Spend	$13	$4	$17
	Number of students that live off campus	10,454	7,643	18,097
	Total off campus student budget	$0	$0	$0
	Total Off Campus Student Spend	$188	$162	$350
	Total Student Spend	$351	$291	$642
5. Alumni[91]	Total alumni earnings attributable to CSU education in CA	$1,871	$2,901	$4,772
	Total alumni earnings attributable to CSU education in campus region	$467	$1,955	$2,423

[87] Financial Information Record Management System (FIRMS)—Operating Expenses for the year ended June 30, 2019 (before systemwide elimination). Figure represents total excluding depreciation and fellowship and scholarship

[88] Financial Information Record Management System (FIRMS)—Capital Expenditures (University) by State Fund for the Years-Ended June 30, 2019, 2018, 2017 and 2016 (Legal-Basis Only, Unaudited). Figure represents 4-year average (2016-19)

[89] Financial Information Record Management System (FIRMS)—Operating Expenses for the Year Ended June 30, 2019, from audited auxiliary financial statement. Figure represents total excluding depreciation and fellowship and scholarship

[90] CSU 2019-20 Estimated Undergraduate Cost of Attendance. Available at https://www2.calstate.edu/attend/paying-for-college/pages/campus-costs-of-attendance.aspx. ICF applied systemwide spending patterns for each student residency type (on-campus, living at home, off-campus) to total student body by campus

[91] Figure represents alumni from 1977-78 to 2018-19 academic year. Potential earning is based on USCB data, and the percentage of alumni that remain in the state is based off data provided by each campus, or USCB data. For more information see Appendix A: Impact Analysis Methodology.

CSU ECONOMIC MODEL INPUTS: NORTH COAST ($MILLIONS)

IMPACT CATEGORY	DATA INPUTS	HUMBOLDT
1. Operational Expenditures[92]	Total OpEx	$175
2. Capital Expenditures[93]	4 year average	$8
3. Auxiliary Expenditures[94]	Total AuxEx	$47
	Rental Housing (dorms)	$19
	Retail (bookstores)	$9
	Food & drink (cafes)	$9
	Colleges & Universities (research activity)	$9
4. Student Spending[95]	*Total Enrollment*	6,983
	Number of students that live at home	1,091
	Total Live-at-home student budget	$0
	Total Live-at-home Student Spend	$11
	Number of students that live on campus	1,821
	Total on campus student budget	$0
	Total On Campus Student Spend	$6
	Number of students that live off campus	4,071
	Total off campus student budget	$0
	Total Off Campus Student Spend	$71
	Total Student Spend	$88
5. Alumni[96]	Total alumni earnings attributable to CSU education in CA	$1,293
	Total alumni earnings attributable to CSU education in campus region	$488

[92] Financial Information Record Management System (FIRMS)—Operating Expenses for the year ended June 30, 2019 (before systemwide elimination). Figure represents total excluding depreciation and fellowship and scholarship

[93] Financial Information Record Management System (FIRMS)—Capital Expenditures (University) by State Fund for the Years-Ended June 30, 2019, 2018, 2017 and 2016 (Legal-Basis Only, Unaudited). Figure represents 4-year average (2016-19)

[94] Financial Information Record Management System (FIRMS)—Operating Expenses for the Year Ended June 30, 2019, from audited auxiliary financial statement. Figure represents total excluding depreciation and fellowship and scholarship

[95] CSU 2019-20 Estimated Undergraduate Cost of Attendance. Available at https://www2.calstate.edu/attend/paying-for-college/pages/campus-costs-of-attendance.aspx. ICF applied systemwide spending patterns for each student residency type (on-campus, living at home, off-campus) to total student body by campus

[96] Figure represents alumni from 1977-78 to 2018-19 academic year. Potential earning is based on USCB data, and the percentage of alumni that remain in the state is based off data provided by each campus, or USCB data. For more information see Appendix A: Impact Analysis Methodology.

CSU ECONOMIC MODEL INPUTS: SACRAMENTO VALLEY ($MILLIONS)

IMPACT CATEGORY	DATA INPUTS	CHICO	SACRAMENTO	SAC. VALLEY TOTAL
1. Operational Expenditures[97]	Total OpEx	$292	$493	$785
2. Capital Expenditures[98]	4 year average	$22	$67	$89
3. Auxiliary Expenditures[99]	Total AuxEx	$63	$140	$203
	Rental Housing (dorms)	$25	$56	$81
	Retail (bookstores)	$13	$28	$41
	Food & drink (cafes)	$13	$28	$41
	Colleges & Universities (research activity)	$13	$28	$41
4. Student Spending[100]	*Total Enrollment*	17,019	31,156	48,175
	Number of students that live at home	2,593	13,785	16,378
	Total Live-at-home student budget	$0	$0	$0
	Total Live-at-home Student Spend	$28	$160	$188
	Number of students that live on campus	2,286	2,164	4,450
	Total on campus student budget	$0	$0	$0
	Total On Campus Student Spend	$9	$8	$16
	Number of students that live off campus	12,140	15,207	27,347
	Total off campus student budget	$0	$0	$0
	Total Off Campus Student Spend	$218	$305	$523
	Total Student Spend	$255	$472	$727
5. Alumni[101]	Total alumni earnings attributable to CSU education in CA	$3,289	$6,117	$9,406
	Total alumni earnings attributable to CSU education in campus region	$1,703	$4,466	$6,169

[97] Financial Information Record Management System (FIRMS)—Operating Expenses for the year ended June 30, 2019 (before systemwide elimination). Figure represents total excluding depreciation and fellowship and scholarship

[98] Financial Information Record Management System (FIRMS)—Capital Expenditures (University) by State Fund for the Years-Ended June 30, 2019, 2018, 2017 and 2016 (Legal-Basis Only, Unaudited). Figure represents 4-year average (2016-19)

[99] Financial Information Record Management System (FIRMS)—Operating Expenses for the Year Ended June 30, 2019, from audited auxiliary financial statement. Figure represents total excluding depreciation and fellowship and scholarship

[100] CSU 2019-20 Estimated Undergraduate Cost of Attendance. Available at https://www2.calstate.edu/attend/paying-for-college/pages/campus-costs-of-attendance.aspx. ICF applied systemwide spending patterns for each student residency type (on-campus, living at home, off-campus) to total student body by campus

[101] Figure represents alumni from 1977-78 to 2018-19 academic year. Potential earning is based on USCB data, and the percentage of alumni that remain in the state is based off data provided by each campus, or USCB data. For more information see Appendix A: Impact Analysis Methodology.

CSU ECONOMIC MODEL INPUTS: SAN DIEGO ($MILLIONS)

IMPACT CATEGORY	DATA INPUTS	SAN DIEGO	SAN MARCOS	SAN DIEGO TOTAL
1. Operational Expenditures[102]	Total OpEx	$589	$259	$848
2. Capital Expenditures[103]	4 year average	$110	$18	$128
3. Auxiliary Expenditures[104]	Total AuxEx	$274	$28	$303
	Rental Housing (dorms)	$110	$11	$121
	Retail (bookstores)	$55	$6	$61
	Food & drink (cafes)	$55	$6	$61
	Colleges & Universities (research activity)	$55	$6	$61
4. Student Spending[105]	*Total Enrollment*	35,081	14,519	49,600
	Number of students that live at home	17,852	8,305	26,157
	Total Live-at-home student budget	$0	$0	$0
	Total Live-at-home Student Spend	$204	$95	$298
	Number of students that live on campus	6,806	1,528	8,334
	Total on campus student budget	$0	$0	$0
	Total On Campus Student Spend	$29	$6	$36
	Number of students that live off campus	10,423	4,686	15,109
	Total off campus student budget	$0	$0	$0
	Total Off Campus Student Spend	$201	$101	$301
	Total Student Spend	$433	$202	$635
5. Alumni[106]	Total alumni earnings attributable to CSU education in CA	$3,630	$1,209	$4,839
	Total alumni earnings attributable to CSU education in campus region	$2,371	$995	$3,366

[102] Financial Information Record Management System (FIRMS)—Operating Expenses for the year ended June 30, 2019 (before systemwide elimination). Figure represents total excluding depreciation and fellowship and scholarship

[103] Financial Information Record Management System (FIRMS)—Capital Expenditures (University) by State Fund for the Years-Ended June 30, 2019, 2018, 2017 and 2016 (Legal-Basis Only, Unaudited). Figure represents 4-year average (2016-19)

[104] Financial Information Record Management System (FIRMS)—Operating Expenses for the Year Ended June 30, 2019, from audited auxiliary financial statement. Figure represents total excluding depreciation and fellowship and scholarship

[105] CSU 2019-20 Estimated Undergraduate Cost of Attendance. Available at https://www2.calstate.edu/attend/paying-for-college/pages/campus-costs-of-attendance.aspx. ICF applied systemwide spending patterns for each student residency type (on-campus, living at home, off-campus) to total student body by campus

[106] Figure represents alumni from 1977-78 to 2018-19 academic year. Potential earning is based on USCB data, and the percentage of alumni that remain in the state is based off data provided by each campus, or USCB data. For more information see Appendix A: Impact Analysis Methodology.

CSU ECONOMIC MODEL INPUTS: SAN JOAQUIN VALLEY ($MILLIONS)

IMPACT CATEGORY	DATA INPUTS	BAKERSFIELD	STANISLAUS	FRESNO	SAN JOAQUIN VALLEY TOTAL
1. Operational Expenditures[107]	Total OpEx	$176	$186	$403	$765
2. Capital Expenditures[108]	4 year average	$10	$13	$22	$44
3. Auxiliary Expenditures[109]	Total AuxEx	$19	$4	$123	$146
	Rental Housing (dorms)	$8	$2	$49	$58
	Retail (bookstores)	$4	$1	$25	$29
	Food & drink (cafes)	$4	$1	$25	$29
	Colleges & Universities (research activity)	$4	$1	$25	$29
4. Student Spending[110]	*Total Enrollment*	11,199	10,614	24,139	45,952
	Number of students that live at home	8,367	5,081	13,850	27,298
	Total Live-at-home student budget	$0	$0	$0	$0
	Total Live-at-home Student Spend	$96	$54	$161	$311
	Number of students that live on campus	430	691	989	2,110
	Total on campus student budget	$0	$0	$0	$0
	Total On Campus Student Spend	$2	$2	$4	$7
	Number of students that live off campus	2,402	4,842	9,300	16,544
	Total off campus student budget	$0	$0	$0	$0
	Total Off Campus Student Spend	$45	$86	$186	$317
	Total Student Spend	$142	$143	$350	$636
5. Alumni[111]	Total alumni earnings attributable to CSU education in CA	$993	$1,446	$3,799	$2,438
	Total alumni earnings attributable to CSU education in campus region	$761	$1,170	$2,643	$1,931

[107] Financial Information Record Management System (FIRMS)—Operating Expenses for the year ended June 30, 2019 (before systemwide elimination). Figure represents total excluding depreciation and fellowship and scholarship

[108] Financial Information Record Management System (FIRMS)—Capital Expenditures (University) by State Fund for the Years-Ended June 30, 2019, 2018, 2017 and 2016 (Legal-Basis Only, Unaudited). Figure represents 4-year average (2016-19)

[109] Financial Information Record Management System (FIRMS)—Operating Expenses for the Year Ended June 30, 2019, from audited auxiliary financial statement. Figure represents total excluding depreciation and fellowship and scholarship

[110] CSU 2019-20 Estimated Undergraduate Cost of Attendance. Available at https://www2.calstate.edu/attend/paying-for-college/pages/campus-costs-of-attendance.aspx. ICF applied systemwide spending patterns for each student residency type (on-campus, living at home, off-campus) to total student body by campus

[111] Figure represents alumni from 1977-78 to 2018-19 academic year. Potential earning is based on USCB data, and the percentage of alumni that remain in the state is based off data provided by each campus, or USCB data. For more information see Appendix A: Impact Analysis Methodology

APPENDIX C:
ECONOMIC IMPACT OF CSU RESEARCH ACTIVITY

INTERVIEWS CONDUCTED

- **Dr. David Still**, Executive Director
  Agricultural Research Institute (ARI)
  Interview Date: 6/15/2020
- **Boykin Witherspoon III**, Executive Director
  Water Resources and Policy Initiatives
  Interview Date: 6/15/2020
- **Dr. Krista Kramer,** Director
  Council on Ocean Affairs,
  Science & Technology (COAST)
  Interview Date: 6/17/2020
- **Laura Ramos**, Programs Manager
  California Water Institute
  Interview Date: 6/22/2020
- **Thomas Esqueda**, Associate Vice President for Water and Sustainability
  Jordan Agricultural Research Center
  Interview Date: 6/22/2020
- **Dr. Bianca Mothé**, Interim Executive Director
  CSU Program for Education and Research in Biotechnology (CSUPERB)
  Interview Date: 6/24/2020
- **Danielle Bram**, Director
  CSUN, Center for Geospatial Science & Technology
  Interview Date: 6/24/2020
- **Cynthia Daly**, Director and Co-Founder
  CSU Chico, Center for Regenerative Agriculture & Resilient Systems
  Interview Date: 7/8/2020

LIST OF CAMPUS CENTERS AND INSTITUTES BY RESEARCH SECTOR

AGRICULTURAL RESEARCH

- Agribusiness Institute (Chico State): Provides agricultural business expertise in the areas of education, marketing, human resource development, management, and finance, serving the needs of agribusiness in California and other Western States.
- Agricultural Teaching and Research Center/ The University Farm (Chico State): 800-acre working farm facility supporting classes and research in agriculture. Includes an aquaponics lab; beef, sheep, and swine units; greenhouses; irrigation training facility; meats lab; orchards; organic dairy unit; regenerative agriculture; and row crops.
- AGRIscapes (Cal Poly Pomona): Visitor center, farm store, and a large greenhouse complex used for production and research.
- California Agricultural Technology Institute (Fresno State): Oversees operations of four centers that serve as bases for applied research and development activities. Facilities include a 1,100-acre university farm, an assortment of modern indoor laboratories, a unique-in-the-world dried foods technology

laboratory, experimental and commercial wineries, a raisin processing plant, and a large hydraulics unit for testing irrigation equipment.

- Center for Turf, Landscape and Irrigation Technology (Cal Poly Pomona): Provides a focal point for technical research, learning and community outreach in the areas of turfgrass, ornamental plant materials, landscape irrigation technology, landscape operations, sport turf and golf course management, and the preservation of natural resources which includes new water-conserving technologies.
- Dairy Innovation Institute (Cal Poly San Luis Obispo): The institute is home to faculty, research associates, technicians, educational program managers and administrative support staff who are passionate about dairy science and technology. The research program currently emphasizes cheese science and technology, dairy foods quality, dairy ingredients technology, and novel process technologies.
- Institute for Food and Agriculture (Fresno State): The independent facility conducts research and training in food and fiber systems as well as market and policy analysis.
- Irrigation Training and Resource Center (Cal Poly San Luis Obispo): Provides pragmatic irrigation training and technical expertise to industry, farmers, irrigation districts and state/federal agencies. The center is self-supported through contracts and is approximately 65 percent direct technical assistance, 15 percent training, and 20 percent research (both applied government-funded and industry).
- Strawberry Center (Cal Poly San Luis Obispo): The center has secured more than $1.3 million in extramural funding and more than $400,000 in gifts to conduct 114 research projects with the goal of increasing sustainability of the California strawberry industry. Its research includes three main programs: plant pathology, entomology and automation.

WATER RESEARCH

- Center for Water and the Environment (Chico State): The center is a hub for research and education activities related to water, energy and the environment. Center faculty and students collaborate with local, state, and federal agencies, non-profit organizations, businesses and educational institutions, focusing within Chico State's 12-county service region in Northern California.
- California Water Institute, Center for Irrigation Technology, and Water, Energy and Technology (WET) Center (Fresno State): Profiled within the report.
- River Institute (Humboldt State): The institute's mission is to conserve and restore river ecosystems locally, nationally and internationally, through multi-disciplinary research, education, policy reform, improved management practices and creative restoration strategies.
- The Watershed Institute (CSU Monterey Bay): Institute consists of a direct action, community-based coalition of researchers, restoration ecologists, educators, planners, students and volunteers. These participants all work to promote and employ a systems approach to the management of watersheds around the world.
- Center for Geographical Studies, Institute for Sustainability, and Center for Urban Water Resilience (CSUN): Profiled within the report.
- California Center for Land and Water Stewardship (Cal Poly Pomona): A collaborative interdisciplinary research and community service center dedicated to the development and creation of partnerships both between faculty and academic units at Cal Poly Pomona and with outside agencies to solve the issues relating to land and water facing California today.
- Office of Water Programs (Sacramento State): OWP is a nonprofit auxiliary providing cost-effective solutions for protecting and enhancing water resources, public health and the environment through training, scientific research and public education.
- Water Resources Institute and Water Resources Institute at Palm Desert (Cal State San Bernardino): The institute serves as a regional water hub for a variety of stakeholders and functions as a repository for water resources related materials. It has an extensive collection of books, historical research, legal papers, technical database and other water resources-related materials.

- Watershed Science Institute (San Diego State): The institute promotes collaboration among SDSU researchers and communities involved in the management and regulation of land and water resources particularly in the areas of hydrologic and watershed. modeling, remote sensing, management and policy, and water quality and ecosystems.
- WATERS Collaborative (Sonoma State University): The WATERS Collaborative boosts funding, logistics support, and awareness of water-related studies on the SSU campus to create a trained local workforce with water expertise and to enhance public understanding of water issues. In 2018-19, 617 students participated in 56 projects with 30 faculty and 21 organizations.

BIOTECHNOLOGY RESEARCH

- Center for Applied Biotechnology Studies (CSU Fullerton) – Includes a subset of laboratories from Departments and Colleges at Cal State Fullerton that aim to catalyze the transfer of basic research into applied technologies for the benefit of human health and society. The mission of CABS is to provide research, educational and consulting opportunities, and services to the local and state biotechnology/biomedical communities through its applied research programs and workforce-oriented curriculum.
- Biotechnology Education and Research Institute (SJSU) – Directs the development of biotechnology through inter-departmental cooperation and serves as a clearinghouse; promotes cooperation between industry, government, and the university in biotechnology research and development.
- Center for Applications in Biotechnology (Cal Poly) - 200,000 square feet of classrooms, research space, laboratories, offices and study spaces. The mission of the Center is to develop and apply biological tools to address human concerns through collaborative interdisciplinary research, and to educate the next generation of biotechnologists.

ENERGY AND ENVIRONMENT

- Schatz Energy Research Center (Humboldt State): The Schatz Center has an interdisciplinary team of 48 people, including directors, faculty, professional staff and student employees. Research and project expertise includes: solar power, microgrids, and demand response; clean transportation, electric vehicle deployment, hydrogen, and fuel cells; biomass technology assessment; off-grid energy access, planning and policy, energy efficiency, and environmental and human health impacts of energy use; and training, education, and outreach.
- Energy Research Center (CSUN): Promotes research and development projects in new or alternative energy sources as well as conservation and sustainability practices at CSUN.
- Center for Energy Studies (San Diego State): The center provides a forum for faculty, students and researchers from different disciplines to cooperate in matters relating to the technical, economic and environmental aspects of energy use.
- Electric Power Institute (Cal Poly San Luis Obispo): The institute serves as an interface between the university and the electric power industry and also serves as a center for electric power-oriented activity within the university.
- Sustainable Energy Center (San Diego State): Through its emphasis on synergistic public and private sector partnerships, the center fosters cutting-edge renewable energy research, provides academic and professional education relevant to California's energy future, and contributes to the social and economic development of Imperial County.

COASTAL AND OCEAN

- Center for Coastal Marine Sciences (Cal Poly San Luis Obispo): The Cal Poly Pier now operates as a marine research facility. At 3,000 feet long, it provides students, faculty and researchers with unrivaled access to the marine environment of the Central Coast. Research areas include sustainable regional fisheries, water quality, local climate change adaptability, protecting coastal habitats, invasive species, sustainable marine economics/working waterfronts.
- Coastal and Marine Institute Laboratory (San Diego State): Only stand-alone CSU marine laboratory in Southern California, the institute is

part of a "Coastal Zone Campus" on San Diego Bay that allows mutual access to and sharing of new and innovative research ideas and activities. The institute brings together federal, regional, and local entities, and nationally known scientists and experts, in order to exchange information related to the coastal zone environment.

- Estuary and Ocean Science Center (San Francisco State): Located on the shore of San Francisco Bay, the center supports scientific study of the marine and coastal ecosystems nearby, enhances public engagement with marine science and develops solutions to the environmental problems confronting coastal communities. Research areas include climate change, stress and behavior, coastal oceanography, marine spatial ecology and endangered species, oysters and water quality, and crashing waves and baby sea urchins.
- Humboldt Marine & Coastal Sciences Institute (Humboldt State): Serves as a forum for coordinated development, funding, and execution of marine science research, education and outreach efforts on campus.
- Institute for Applied Marine Ecology (CSU Monterey Bay): Using cutting-edge technology, the goal of the Marine Science Research program is to provide insight, to reorganize thinking, and to improve paradigms for understanding the interaction of marine ecological systems and human activities. The institute operates a small boats program and scientific diving and has a variety of resources ranging from lab and field equipment to geospatial resources and legacy data.

HOSPITALITY, TOURISM AND ENTERTAINMENT

- Center for Recreation and Tourism (CSUN): The center collaborates with local schools, parks and recreation centers to organize educational events that bring together children, families and CSUN faculty and student specialists for fun, recreation and play. Groups explore the nature of play and its effect on lifestyle, health and interpersonal dynamics.
- Center for Entertainment and Hospitality Management (Cal State Fullerton): The center links students to the entertainment media and hospitality industries. Center resources and events help prepare students for career opportunities in both industries.
- Professional Development Institute (Cal Poly Pomona): The college serves as a strategic partner for hospitality associations, such as the National Restaurant Association Educational Foundation (NRAEF),California Restaurant Association (CRA), and Club Managers Association of America (CMAA) by providing educational support. This support includes curriculum development, course development, seminars and workshops.
- Center for Hospitality and Tourism Research (San Diego State): An education and research center dedicated to the study and application of professional principles in the broad field of hospitality and tourism. Programs associated with the center focus on identifying "best practices" in all aspects of hospitality and tourism such as hotel operations, restaurant operations, global tourism, and events, conventions and attractions management.
- Conrad N. Hilton Foundation Volunteer and Mentorship Center (San Diego State): The center engages with area high schools to provide learning opportunities for underserved youth. The schools the center targets have a focus on hospitality, tourism, culinary arts and/or event planning curricula.
- Institute for Meetings and Events (San Diego State): The institute is focused on education and research dedicated to the application of professional principals in meetings and events.
- The J. Willard and Alice S. Marriott Foundation Student Center for Professional Development (San Diego State): The center provides support for internship programs related to the hospitality industry. It assists hospitality and tourism students in finding internships and job placement through workshops, focus groups, and continuing conversations with industry leaders.
- Center for Surf Research (San Diego State): International hub for research on sustainable surf tourism and issues of sustainability affecting the industry and broader community.

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