Public Higher Education in Today’s Climate Crisis
University–Community Engagement and Planning Strategies for Climate Resilience

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ABOUT THE SOCIETY FOR COLLEGE AND UNIVERSITY PLANNING (SCUP)
SCUP is a community of practice that undertakes research and creates learning opportunities to share perspectives, resources, best practices, and forward-thinking ideas to advance institutional resilience through the integrated planning approach.

WHAT IS INTEGRATED PLANNING?
Integrated planning is a sustainable approach to planning that builds relationships, aligns the organization, and emphasizes preparedness for change.
# Table of Contents

**MEET TAMARA WALLACE** ........................................................................................................................................ 1

**THE PROJECT** .................................................................................................................................................. 2

- SCUP FELLOWS PROJECT BACKGROUND AND GOALS .......................................................... 2
- DEFINING SUSTAINABILITY, CLIMATE ACTION, AND CLIMATE RESILIENCE ................. 6
- RESEARCH APPROACH: FINDING A FRAMEWORK FOR STAKEHOLDER ENGAGEMENT AND THE ROLE OF HIGHER EDUCATION IN CLIMATE RESILIENCE PLANNING........................................................................................................................................................................ 16
- ANALYSIS OF KEY FINDINGS OF THEMES, IMPLICATIONS, OPPORTUNITIES, AND NEEDS: FOUR KEY AREAS FOR STRATEGIC ACTION-ORIENTED PLANNING IN HIGHER EDUCATION................................................................. 24
- FUTURE WORK AND CONSIDERATIONS ...................................................................................... 28

**ACKNOWLEDGMENTS** ................................................................................................................................. 30

- PROJECT ADVISORS ......................................................................................................................... 30
- CONTRIBUTORS ............................................................................................................................... 31
Society for College and University Planning SCUP Fellow Research Project Final Report

Public Higher Education in Today’s Climate Crisis
A Primer for University-Community Engagement and Planning Strategies for Climate Resilience

Tamara Wallace, MA, SCUP Fellow 2022–2023

MEET TAMARA WALLACE

TAMARA WALLACE is the systemwide assistant director of energy, sustainability, and transportation, Department of Capital Planning, Design, and Construction, in the California State University (CSU), Office of the Chancellor. During her 15-year career in sustainability, she has passionately championed the strategic vision of sustainability in higher education, with its unique opportunities for driving organizational change through innovative solutions to tackle today's challenges of a changing climate. Wallace sits on the project team that developed the first-of-its-kind CSU's Climate Resilient Infrastructure Guidelines and Framework, represents CSU as an affiliate member of the Alliance of Regional Collaboratives for Climate Adaptation (ARCCA), and represents CSU on the executive committee for the Environmental and Climate Change Literacy Projects (ECCLPS), which is a CSU-UC partnership. Wallace is an elected member and past chair of the Association for the Advancement of Sustainability in Higher Education (AASHE) STARS Steering Committee and successfully advocated for systemwide participation in comprehensive university sustainability benchmarking using the STARS reporting platform. Additionally, she is the co-founder, past managing editor, and advising editor for the CSU Journal of Sustainability and Climate Change. Wallace is a double alumna from CSU Fullerton's Geography Department, a certified change management professional, and a LEED Green Associate.
THE PROJECT

SCUP FELLOWS PROJECT BACKGROUND AND GOALS

The scale of impact of academia as an industry, sector, and community pillar must be considered in climate planning and readiness. As was memorably highlighted by Bryan Alexander in *Universities on Fire: Higher Education in the Climate Crisis*, he writes: “Globally, there are roughly thirty thousand postsecondary institutions at present. Their population includes around 220 million students and perhaps more than 6 million faculty members. [...] Economically, estimates of how much money colleges and universities have range from $2 to $3 trillion.”¹ Structurally, Alexander notes, these institutions of higher education are not only physical spaces occupying and influencing the built environment and infrastructure of the surrounding geographic areas but also provide a place for opportunities in research, teaching and learning, and economic development and vitality.

From this macro-level, it is argued in this fellowship research that higher education as a community must embrace and adopt the principles and philosophies around climate change impact as the guide for planning and investment in this critical decade. Relevancy of higher education will only survive if the institutions are able to adequately prepare for and withstand the impacts of extreme weather events.

For this fellowship project with the Society for College and University Planning (SCUP), the background included lived experiences of direct impact of extreme weather events of increasing frequency and intensity at numerous campuses across the California State University (CSU) system. Additionally, the direct impacts have caused observable disruptions to life and property, including catastrophic risk and/or actual damage, prompting vulnerability assessments systemwide and coordinated climate resilience planning and investment activities.

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The CSU Board of Trustees Sustainability Policy\(^2\) aligns with and supports state mandates for carbon reduction and climate resilience goals. Within each of the 23 CSU campuses are dozens of individual climate change and sustainability researchers from a wide range of disciplines examining practical and innovative solutions to today’s problems. Further, there are dozens of CSU research institutes examining the impact of climate change on energy, agriculture, water, transportation, fire, etc. Due to the recent increase in the frequency of extreme weather events, the CSU is working to increase resilience in response to catastrophic wildfires, extended drought, floods, extreme heat, public safety power shutoffs, and sea level rise through systemwide technical guidance resources on building and infrastructure design and retrofit.

With these activities of CSU climate action and adaptation planning, this SCUP fellowship project sought to achieve three (3) primary objectives:

1. Review planning documents and policies that consider climate resiliency governance versus climate resiliency implementation at an institution of higher education;

2. Identify key stakeholders to develop a primer for addressing and incorporating university-community implementation approaches; and

3. Raise awareness with the broader higher education planning community to collect feedback and share model practices.

California State University is the largest system of four-year higher education in the country, with 23 campuses, nearly 500,000 students, and more than 50,000 faculty and staff. Nearly 40 percent of CSU’s undergraduate students transfer from California community colleges. Established as a university system in 1960, the mission of CSU is to provide high-quality, affordable education to meet the ever-changing needs of California students, with hands-on research opportunities to gain skills that generate a highly qualified workforce. With its commitment to quality, opportunity, and student success, CSU is renowned for superb teaching, innovative research, and producing job-ready graduates. Much of the ethnically and socioeconomically diverse student population originates from communities within 150 miles of their enrolled campus and

\(^2\) CSU Board of Trustees’ Sustainability Policy: [https://calstate.policystat.com/policy/11699668/latest](https://calstate.policystat.com/policy/11699668/latest)
returns to those communities after graduation. Minority-serving institutions (MSIs)\(^3\) are leaders in social upward mobility and serve as economic drivers for disadvantaged or vulnerable communities in which the campuses are located. Each year, CSU awards more than 132,000 degrees. One in every 20 Americans holding a college degree is a graduate of CSU, and our alums are 4 million strong. This speaks to the impact of CSU, including the critical focus on sustainability and climate change.

Figure 1 California State University System Map

![California State University System Map](source: California State University)

The diversity of campuses is in the range of geography, student population, and urban development density. The northernmost campus is Cal Poly Humboldt, and the southernmost is at San Diego State University. The smallest student populated campus

is Cal Maritime Academy, with approximately 1,200, to the largest student-populated campus at CSU Fullerton, with just over 42,000. The system of campuses is geographically located across the state, serving urban, suburban, exurb, and rural communities, each with a diverse set of priorities, circumstances, and opportunities. However, CSU is unified under the same core mission: inclusive and high-quality higher education for California students, with nearly all campuses ranked nationally in the Social Mobility Index. Diversity, equity, and inclusivity are a core part of CSU’s mission.

The suite of systemwide implementation tools supporting campus-level goals of carbon reduction include the CSU Decarbonization Framework, the Solar and Battery Storage Systemwide Master Agreement and Energy Contracts Oversight Board (Scope 1 emissions), the Systemwide Energy Information System and Mechanical Review Board (Scope 2 emissions), Streetlight Data Systemwide Master Agreement for transportation (Scope 3 emissions), and publicly-accessible campus sustainability university-wide tracking using AASHE’s STARS.

The above-listed suite of systemwide implementation tools to support campus goals of climate resilience now include CSU Resilient Infrastructure Guidelines for climate-informed design day guidance and the Climate Action Grants and Loans Program, with a systemwide master agreement bench of consultants providing external funding search/identification and grant-writing professional services.

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4 Social Mobility Index, 2023: [https://www.socialmobilityindex.org/](https://www.socialmobilityindex.org/)


6 CSU Master Enabling Agreements, Solar and Battery Storage: [https://www.calstate.edu/csu-system/doing-business-with-the-csu/capital-planning-design-construction/operations-center/Pages/agreements-systemwide.aspx](https://www.calstate.edu/csu-system/doing-business-with-the-csu/capital-planning-design-construction/operations-center/Pages/agreements-systemwide.aspx)


8 CSU Impact of the CSU, Climate Action Grants and Loans Program: [https://www.calstate.edu/impact-of-the-csu/sustainability/climate-action-grants-program/Pages/default.aspx](https://www.calstate.edu/impact-of-the-csu/sustainability/climate-action-grants-program/Pages/default.aspx)
DEFINING SUSTAINABILITY, CLIMATE ACTION, AND CLIMATE RESILIENCE

Sustainability and Climate Action

The United Nations International Panel on Climate Change (IPCC), consistent with the Bruntland Commission (WCED, 1987), the Third Assessment Report (TAR) (IPCC, 2001b), defines sustainable development as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs.” The phrase commonly applied in discourse among agencies, organizations, industries, and individuals in the spheres of “climate action” is essentially the call to collective action that emphasizes and drives the opportunities that reduce carbon-emitting activities to mitigate the negative impacts of carbon emissions heating the overall temperature of the planet. The increased heating of the planet from greenhouse gas (GHG) emissions from human activity, especially within the past several decades, has been widely observed and acknowledged as the primary cause of the adverse and catastrophic sequence of events in changing the historical climate and weather patterns regionally and globally. Consequently, guidance has been developed to define emissions by “scopes” or categories. This has established an inventory and accelerated investment approaches at scale to draw down emissions.

According to the US Environmental Protection Agency (EPA): “Scope 1 emissions are direct greenhouse (GHG) emissions that occur from sources that are controlled or owned by an organization (e.g., emissions associated with fuel combustion in boilers, furnaces, vehicles). Scope 2 emissions are indirect GHG emissions associated with the purchase of electricity, steam, heat, or cooling. Although Scope 2 emissions physically occur at the facility where they are generated, they are accounted for in an organization’s GHG inventory because they are a result of the organization’s energy use.” Scope 3 emissions include all emissions not addressed in Scopes 1 or 2, which

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10 US Environmental Protection Agency, Scope 1 and 2 Inventory Guidance: https://www.epa.gov/climateleadership/scope-1-and-scope-2-inventory-guidance
result in emissions from activities through the supply chain (i.e., transportation and business travel, solid waste in landfills, etc.).

The large-scale strategies for carbon reduction include, namely, investments in renewable energy and battery storage technologies, deep decarbonization of fossil fuel-based assets for heating and cooling buildings, modernization of building technologies for energy efficiency, electrification of vehicles with investments in large-scale and regional charging infrastructure networks, and strategic sourcing of environmentally-responsible durable goods with circular economies to reduce waste and GHG-emitting materials. For additional guidance, context, and considerations to support industry-specific criteria within the higher education community for sustainability planning and implementation, visit the Society for College and University Planning’s (SCUP) guide for higher education and traditional roles in campus-community engagement.

Figure 2 California State University, Cal-Adapt’s Identified Climate Hazards

Source: California State University, 2017

Beyond carbon reduction, carbon mitigation investments, and efficient management of the planet’s finite resources, sustainability principles further include the protection of the most vulnerable communities of people, who are oftentimes at the frontlines of industrial activities. They are the most directly affected with the longest-lasting negative health impacts and the longest-lasting recovery. Economic marginalization and inadequate access to basic services and resources increase the likelihood of extreme vulnerability in times of natural disaster events and severe weather. The vulnerabilities in infrastructure (utilities, transportation, telecommunications, emergency response services) cause breakdowns in response and recovery, which have catastrophic and longer-lasting effects on and damage to the surrounding region.

**Governance through Policy**

For purposes of this SCUP Fellows project, the scope has remained limited to California and state public higher education campuses. However, further research and investigation are of significant opportunity and must be explored and applied further. This is maintained as a primer and catalyst to other peer institutions as a means of direction and model practice.

Federal authorities (i.e., the President) have recently outlined and directed interagency action, strategic investment, and expedited coordination. This is not an exhaustive list and is intended instead to demonstrate the overarching direction of governmental authorities, identify key themes, and spur action where gaps exist.

**Executive Order 14008: Tackling the Climate Crisis at Home and Abroad** (2021): Directs the President’s Cabinet of Secretaries to engage in complete and coordinated interagency collaboration through various critical channels of the government, including but not limited to federal financial pillars, military and national security branches, real property management authorities, energy and infrastructure authorities, public health and housing officials, tribal governments, and environmental agencies and regulators.

The California State Legislature has authority to carry out the implementation and regulatory activities through select state agencies. As previously mentioned, this is not an exhaustive list and is intended instead to demonstrate the overarching direction of governmental authorities, identify key themes, and spur action where gaps exist.
California SB 379 (2015): Requires cities and counties within California to integrate climate adaptation into their general plans by January 1, 2017, or January 1, 2022, depending on whether that city or county has adopted a local hazard mitigation plan.

California SB 1000 (2016): Requires local governments to identify environmental justice communities (called “disadvantaged communities”) in their jurisdictions and address environmental justice in their general plans. This law has several purposes, including facilitating transparency and public engagement in local governments’ planning and decision-making processes, reducing harmful pollutants and the associated health risks in environmental justice communities, and promoting equitable access to health-inducing benefits, such as healthy food options, housing, public facilities, and recreation.

California SB 852 (2022): Authorizes a city, county, special district, or a combination of any of these entities to form a climate resilience district, as defined, to raise and allocate funding for eligible projects and the operating expenses of eligible projects. The bill would deem each district to be an enhanced infrastructure financing district and require each district to comply with existing law concerning enhanced infrastructure financing districts, except as specified. The bill would require a district to finance only specified projects that meet the definition of an eligible project. The bill would define “eligible project” to mean projects that address sea level rise; extreme heat; extreme cold; and the risk of wildfire, drought, and flooding, as specified. The bill would establish project priorities and authorize districts to establish additional priorities.

Assessing Climate Vulnerability: Federal and Regional Implementation Tools

Mirroring the governance through policy, implementation tools, and guidance provides instruction and direction to local and regional authorities in carrying out policy. Conducting a climate vulnerability assessment is the initial step to establish a gap analysis for addressing those weaknesses at scale through coordination of policies, budget reprioritization, and critical community stakeholder groups in national, state, and regional existing networks. Historical climate and weather patterns have traditionally guided planning authorities to protect against and respond to emergency events. However, modern science-based climate modeling at the global, international, state, regional, and local levels all indicate ranges of significant temperature change and anticipated impacts for which communities at all scales are being directed to prepare through key planning and investment activities.
At the international level, the guiding scientific body, known as the Intergovernmental Panel on Climate Change (IPCC), released the 6th Assessment in 2022 to continue the work of “[assessing] the impacts of climate change, looking at ecosystems, biodiversity, and human communities at global and regional levels. It also reviews vulnerabilities and the capacities and limits of the natural world and human societies to adapt to climate change.”

Included in this most recent report is the Complex, Compound, and Cascading Risks (18) summary for policymakers and decision-makers to consider in climate adaptation and resilience planning, strategy, investment, and coordination.

At the federal level, the Biden Administration recently issued an Executive Order on Tackling the Climate Crisis at Home and Abroad, directing all federal agencies to coordinate and collaborate on the issues around climate change and resilience and established the Community Resilience Portal that now includes the framework and step-by-step guide for communities to begin planning activities. This “US Climate Resilience Toolkit offers a framework to help communities systematically consider and address their climate hazards. Communities can use this portal to document their past, present, and future exposure to climate-related hazards.”

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17 Climate Mapping for Resilience and Adaptation: [https://resilience.climate.gov/](https://resilience.climate.gov/)
The State of California has conducted four (4) statewide climate assessments to date\textsuperscript{18} and is currently undergoing the publication of the fifth assessment.\textsuperscript{19} These assessments have formed a longevity study that has informed, maintained, and expanded the scope of guiding documents and tools for communities and agencies throughout the state. The Cal-Adapt statewide tool utilizes the statewide climate change assessment to “[provide] the public, researchers, government agencies, and industry stakeholders with essential data & tools for climate adaptation planning, building resiliency, and fostering community engagement.”\textsuperscript{20}

Stemming from the Cal-Adapt tool, the statewide \textit{Adaptation Planning Guide} informs communities, “[providing] guidance to local governments on local adaptation and resiliency planning.” Additionally, California’s Climate Resilience Partnership \textit{Climate Crossroads} report includes six (6) key recommendations as guidance for state-level grant funding development for climate resilience and adaptation. For an example of the state agency guidebook, visit CA Department of Public Health \textit{Wildfire Smoke Considerations for California’s Public Health Officials} guidebook. To view an example of a regional-level vulnerability assessment, visit \textit{Los Angeles County Climate Vulnerability Assessment with Cascading Impacts}. For a local/neighborhood-level guidebook, visit the \textit{Boyle Heights Resilience Hub Implementation Toolkit}.

Colleges and universities are encouraged to apply the previously mentioned approaches relevant to the geographic region to conduct vulnerability assessments and engage in planning activities at the campus level. The Second Nature organization has developed a toolkit for colleges and universities to approach climate adaptation planning measures through the Climate and Resilience Commitments, which give signatory institutions tools for assessing and guiding the development of campus-community resilience plans.\textsuperscript{21}

\textsuperscript{18} California’s Climate Change Assessment Program, \url{https://www.climateassessment.ca.gov/about/}

\textsuperscript{19} California’s Climate Assessment, Science, and Research, 5th Climate Assessment: \url{https://opr.ca.gov/climate/icarp/climate-assessment/}

\textsuperscript{20} Cal-Adapt: \url{https://cal-adapt.org/}

\textsuperscript{21} Second Nature, College and University Presidents’ Climate Commitment, Climate and Resilience Commitment Toolkit: \url{https://secondnature.org/}
The CSU Resilient Framework focuses on campus horizontal infrastructure. It is the first of its kind and the first phase of resilience guidelines for CSU campuses.\textsuperscript{22} This newly-published framework was the base inspiration for this SCUP project, catalyzing interest in exploring potential partnerships in the immediate surrounding communities to the campuses as the basis of a roundtable discussion. Planning efforts can find alignment through infrastructure prioritization and investment strategies and foster collaboration through shared services and mutual aid agreements.\textsuperscript{23}

\textbf{Emergency Management Meets Climate Resilience}

Emergency management, disaster mitigation and preparedness, and disaster relief and recovery are well-established networks of agencies, organizations, and local authorities serving communities across the globe. In the emergency management sector of services, disaster can include a broad range of events, which can span disease outbreaks (i.e., measles), active shooter incidents, hazardous material releases and spills, natural forces such as tsunamis (tidal waves), and meteorological (weather-related) and geological (earthquakes) events. The Federal Emergency Management Agency (FEMA)\textsuperscript{24} defines an emergency management cycle as organized into four (4) key phases: mitigation, preparedness, response, and recovery (Figure 3).

The following summarizes the key phases of the emergency management cycle, as defined by FEMA.\textsuperscript{25} Mitigation involves actions taken to prevent or reduce the impact of a disaster. Preparedness activities aim to adequately plan, train, and educate first responders, community leaders, and members of the public for unavoidable disaster events. The recovery phase is a restoration period that oftentimes triggers continuity efforts to aid in recovering and maintaining basic operational infrastructure for response (i.e., electrical power and telecommunications restoration, roadway clearance, first aid triage response, food, and water distribution centers).

\begin{itemize}
\item \textsuperscript{22} California State University, CSU Resilience Framework: \url{www.calstate.edu/csu-system/doing-business-with-the-csu/capital-planning-design-construction/Documents/CSU%20Resilience%20Framework.pdf}
\item \textsuperscript{23} \url{www.calstate.edu/csu-system/doing-business-with-the-csu/capital-planning-design-construction/Documents/CSU%20Resilience%20Framework.pdf}
\item \textsuperscript{24} Federal Emergency Management Agency (FEMA): \url{https://www.fema.gov/}
\item \textsuperscript{25} EMA training, Emergency Management in the United States: \url{https://training.fema.gov/emiweb/downloads/is111_unit%204.pdf}
\end{itemize}
With the increasing frequency of extreme weather events, there is growing focus on and coordination by federal and state agencies in developing new approaches to this emergency management cycle based on the exponentially intense impacts to communities causing longer-lasting recovery periods. Figure 4 depicts the two (2) operational areas that have historically been approached separately and without direct connection: emergency management services as short-lived and acute hazard events in relation to climate change planning involving longer-term and slower-moving impacts that exacerbate the acute hazard events.

**Figure 3 FEMA’s Emergency Management Cycle**

**Figure 4 Emergency Services Meets Climate Planning**

*Source: California State University, 2019*
Based on the recognized interlinkages of emergency management and climate action planning, it is encouraged at the federal level that climate change and sustainability professionals and emergency management professionals partner. This partnership will elevate the criticality of these planning approaches and leverage each of the networks to build capacity, mitigate risk, and increase resilience within the local and regional community scales.\textsuperscript{26}

The State of California Governor’s Office of Emergency Services (CalOES) echoes and aligns with FEMA, continuing to focus on the intricate relationship between climate change and disasters statewide. It spurs action at the local and regional levels and calls for mitigation and climate adaptation to be folded into emergency response and preparedness strategies.\textsuperscript{27}

Climate Resilience and Adaptation in Higher Education: Climate Change Projections, Stressors, and Events

For campus-type facilities, particularly those institutions of higher education, learning, and research, meeting today’s challenges is becoming increasingly difficult and imperative. Across the sector of colleges and universities, many of the challenges stem from aging infrastructure causing increasing backlogs of deferred maintenance for critical physical infrastructure to buildings. It is observed in this research that the compounding challenges include decreasing direct state allocations (specific to public institutions) and increasing mandates from federal and state authorities to reduce GHG emissions across Scopes 1–3. These changes are coupled with an increasing frequency of extreme weather events with resulting cascading impacts such as extended electrical power outages and catastrophic risk and/or damage to the campus’ aging infrastructure. The unfolding scenario exposes critical areas in need of infrastructure renewal investment for campus resilience against the changing climate.


\textsuperscript{27} California Governor’s Office of Emergency Services (CalOES) Building a More Resilient California through our Changing Climate: https://news.caloes.ca.gov/building-a-more-resilient-california-through-our-changing-climate/#:~:text=To/mitigate%20the%20impacts%20of%20all%20Californians%20for%20future%20disasters.
Campus life is a core aspect of the higher educational experience, which is embodied by the university’s built environment. The facilities, infrastructure, aesthetics, and access of a university supports the cultural and community sense of place. Figure 5 is an abridged interpretation of Alexander’s observations,\(^{28}\) which paint a picture of many of the aspects of a university that we, as university professionals, must consider in planning for climate adaptation. This will be discussed further as it relates to the campus community of people later in this report’s Spheres of Influence in Higher Education and Community Engagement section.

**Figure 5** Colleges and Universities Typical Built Environment of Facilities and Physical Infrastructure

<table>
<thead>
<tr>
<th>Academic Buildings</th>
<th>Seminar classrooms, lecture halls, laboratories, staff and faculty offices, administrative staff spaces, etc.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academic Mission</td>
<td>Libraries, clinics and hospitals, performing arts centers, archives, museums, dining halls, observatories, etc.</td>
</tr>
<tr>
<td>University Life and Care</td>
<td>Student residence halls, staff and faculty housing and residence, wellness centers, stadiums, student unions, recreation and aerobics centers, etc.</td>
</tr>
<tr>
<td>Auxiliaries</td>
<td>Campus bookstore, campus shopping and dining, transportation and parking, university police, donor and alum facilities, etc</td>
</tr>
<tr>
<td>Infrastructure</td>
<td>Electrical and Gas power grid, water and sewage pipes, steam pipes, telecommunications, fire/life safety, etc</td>
</tr>
<tr>
<td>Grounds</td>
<td>Landscaped areas (trees/ lawns/ shrubs), parking and transportation, walkways, public art, pedestrian bridges, arboretums, creeks and ponds, beaches, trails, etc.</td>
</tr>
</tbody>
</table>

*Source: Wallace, 2024*

Figure 6 can be applied to any number of types of physical or social infrastructure on a given campus facility for strategic planning and investment. Using this image and applying it to a real-world example, consider the event of a regional electrical power outage. The center of the image is the goal of a climate-resilient electrical grid. It has two (2) key strategies achieved through grid reliability that maintain power through a

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strong grid capacity (i.e., on-site solar photovoltaic system and battery storage) and grid flexibility (i.e., campus microgrid to support campus electrical demand through power interruptions from off-campus utility sources). These two (2) strategies are aimed at having critical areas of investment needs: mechanical redundancies, electrical cable hardening against extreme weather events such as wildfire or flooding, aged equipment modernized with more energy efficiency and newer technologies, and adaptive technologies to flex with unforeseen circumstances.

Figure 6 Climate Resilience and Adaption through Infrastructure Readiness

RESEARCH APPROACH: FINDING A FRAMEWORK FOR STAKEHOLDER ENGAGEMENT AND THE ROLE OF HIGHER EDUCATION IN CLIMATE RESILIENCE PLANNING

With the previously mentioned list of key resources at the federal, state, and regional scales, it is argued that much of the guidance to date is centered around cities, counties, and regional jurisdictions. For higher education and particularly public higher education, the implementation tools have fallen short in supporting and guiding state-funded institutions. There’s little to no guidance on the reprioritization of projects, investments, and infrastructural adaptive design. Further, it is observed and noted here that public higher education continues to not be an apparent priority for funding by granting
agencies, programs, and authorities, compared to the counterpart state entities receiving direct state allocations. This apparent gap in addressing the unique challenges and circumstances public higher education faces prompted this SCUP Fellowship project.

Within the context of CSU and California, over the past decade, more than half of all CSU campuses have been directly impacted by catastrophic risk and/or damage to campus communities and physical infrastructure. In 2014, CSU San Marcos was directly threatened by the Cocos wildfire, with two (2) roads accessible for campus emergency evacuation and catastrophic damage to electrical utility power lines.\(^29\) Sonoma State University’s community has the lived experience and trauma of the 2017 Sonoma Complex Fire, which included three (3) wildfires (Nuns, Tubbs, and Pocket) occurring on the same night, October 7, effectively surrounding the Sonoma and Napa County valleys. This event was followed by the catastrophic Kincade wildfire at 9:24 pm on October 23, 2019.\(^30\) CSU Channel Islands was impacted by the Thomas Fire in October 2017, followed by two (2) wildfires in three (3) weeks in October 2018, resulting in extended campus closures for each event and prompting new emergency planning and management activities.\(^31\) Chico State University’s infamous Camp Fire on November 8, 2018, was marked at the time as the deadliest wildfire in California’s history.\(^32\) It burned the entire town of Paradise, California, which was home to hundreds of the campus’ students and employees, displacing thousands.\(^33\) Cal Maritime Academy was impacted by a sudden wildfire breakout on a nearby hillside with dry brush conditions and high winds, causing the fire to breach the adjacent highway road and onto the campus.

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29 [https://news.csusm.edu/wildfires-force-campus-closure/#:\text=The%20Cocos%20Fire%2C%20which%20burned%2C%20buildings%2C%20no%20structures%20were%20burned](https://news.csusm.edu/wildfires-force-campus-closure/#:\text=The%20Cocos%20Fire%2C%20which%20burned%2C%20buildings%2C%20no%20structures%20were%20burned)


32 [https://www.fire.ca.gov/our-impact/remembering-the-camp-fire#:\text=The%20Camp%20Fire%20started%20on%20downhill%20through%20developed%20areas](https://www.fire.ca.gov/our-impact/remembering-the-camp-fire#:\text=The%20Camp%20Fire%20started%20on%20downhill%20through%20developed%20areas)

burning campus assets.  

CSU San Bernardino has experienced wildfires, hurricane-force winds, two (2) hurricanes resulting in flash floods, sudden electrical utility power hard-shutoffs, and extreme heat events occurring within the same three to four weeks of each other, numerous years in a row.

California’s Public Utility Commission’s (CPUC) Public Safety Power Shutoffs (PSPS) events are also considered to be cascading events due to extreme weather conditions. They can place further vulnerability on impacted communities, triggering the emergency management cycle of mitigation, preparedness, response, and recovery. A PSPS event, defined by the CPUC, is a statewide response measure. CPUC states with the “continuing threat of wildfire, the electric investor-owned utilities (IOUs) may proactively cut power to electrical lines as a measure of last resort if the utility reasonably believes that there is an imminent and significant risk that strong winds may topple power lines or cause major vegetation-related issues leading to increased risk of wildfires.”

The state’s electrical grid operator managed to maintain grid stability and avoid catastrophe during the Demand Response events of September 2022, in an extreme heat event statewide.

The above account of regional catastrophes due to wildfires is not an exhaustive list across CSU history, nor does it include many other extreme weather event types or increasing damage due to climate-induced environmental change (i.e., Sea Level Rise, subsidence due to drought, etc.). This list is not intended to compare or prioritize tragedy or trauma or place guilt on any community over another. These very brief accounts are intended to demonstrate the high-level urgency and apparent shift in decision-

34 Captain, California Wild Fires Strike Maritime College: [https://gcaptain.com/california-wild-fires-strike-maritime-college/](https://gcaptain.com/california-wild-fires-strike-maritime-college/)


36 California Public Utilities Commission (CPUC), Public Safety Power Shutoffs: [https://www.cpuc.ca.gov/pspss/](https://www.cpuc.ca.gov/pspss/)


making observed across CSU. Most of these events occurred within three years of each other and caused millions of dollars in damage claims to campus facilities and direct impacts of trauma on campus communities (students, faculty, staff, administrators, and immediate surrounding communities). Additionally, this account is intended to memorialize these impacts to higher education as a warning to the larger community and prompt swift action.

Figure 7 Climate Hazards in CSU Example: Extreme Heat

Increasing temperatures pose a threat to human health. Extreme temperatures put people at higher risk for heat-related illnesses, such as dehydration, heat exhaustion, heat stroke, and in severe cases, death. Hazards from extreme heat are made worse when high temperatures are accompanied by high levels of humidity. Vulnerable populations including youth, adults older than 65, athletes, outdoor workers, low-income households, and individuals with certain chronic medical conditions are more prone to the effects of extreme heat.

The risk of power shut-offs due to extreme heat is also of concern to the CSU system. Utility alerts are a constant threat to campuses particularly during the summer when there is increased risk of brownouts, rotating outages, and full outages that strain the grid. In the event of a power outage, many campuses rely on inefficient backup diesel generators.

Fema Heat Wave Risk Map (Map 1 National Risk Index (fema.gov))
Risk: Likelihood of extreme heat change causing harm. Heat waves and extreme heat events are becoming increasingly more common in California. Preparing the CSU infrastructure to withstand the impacts of these extreme temperatures will be vital as they continue to intensify. Southern and urban-area campuses are already experiencing these impacts, while Northern and coastal campuses will be affected in the near future. Across all CSU campuses, extreme heat events have occurred annually for the past several years. Given that more than 26 extreme heat events have occurred over the past 15 years (1.7 events per year), it is Highly likely that the hazard will occur annually.

Trend in Annual Extreme Heat Days Across California Counties
(2021 Hazard Vulnerability Risk Assessment. The California State University System)

Source: Glumac, 2024

Due to the recent events occurring with increasing frequency, intensity, and impact, CSU has invested in the development of the California State University Climate Resiliency Framework, which is climate-informed design day guidelines. This document “is intended to be part of the planning process for any California State University campus

undertaking a significant infrastructure project [and] identify specific climate hazards, vulnerabilities, and risks relevant to their campus and then choose mitigation strategies in response. If a CSU campus or the CSU system at large is undergoing a capital expense planning process, the design team is encouraged to apply this framework to identify climate-related vulnerabilities and prioritize the actions needed to increase their resilience.\footnote{US Energy Information System (EIA), California consumers respond to appeals for electricity conservation during heat wave: https://www.eia.gov/todayinenergy/detail.php?id=54039.} Figure 7 is a screenshot example of one of the identified climate hazards, Extreme Heat. The document’s organization is designed with campus staff, decision-makers, and external consultants for design considerations. In addition to being a guidance document, the Resilience Framework also demonstrates CSU’s commitment to the surrounding communities of each campus as an indicator of the future-proofing infrastructure.

**Review of Spheres of Influence in Higher Education and Community Engagement**

Leading up to the development of the partner and stakeholder interviews requested to participate in this project was a mind-mapping exercise using the online tool Miro Board\footnote{https://miro.com/} to explore some (but not all) of the critical bridge point opportunities for coordination and collaboration across the social infrastructure and physical campus infrastructure. This brief examination is intended to be a starting point for discussion in higher education and an exercise in collaboration between competing priorities. As a gap analysis, it effectively identifies the unique characteristics and potential vulnerabilities.

For the context of this SCUP project, the terminology of spheres of influence is being applied as a mutual and multi-level dynamic of interrelated stakeholders and physical infrastructure. All areas are inherently connected and interdependent. In an extreme weather event, emergency management and continuity planning should be considered and properly resourced to maintain critical operations. Figure 8 depicts a simplistic exercise observing some of the key aspects of a generic campus’ social and physical infrastructure. The physical infrastructure is grouped by externally-dependent resources such as utilities, potential vulnerabilities such as deferred maintenance, new physical infrastructure investments such as electrical grid resilience (i.e., microgrids...
and on-site self-generated power), and areas of reprioritized renewal projects and potential projects for managed retreat\(^42\) in vulnerable areas to climate impacts as identified under state and federally mapped zones.

**Figure 8 Mindmapping Tool for Higher Education Climate Resilience**

Figure 8 identifies internal campus stakeholders, such as students and employees; external stakeholders, such as immediate surrounding neighbors; and external partners, such as local and regional non-governmental organizations and community-based organizations. Oftentimes, an additional reality is the longstanding campus-community relationship can sometimes be fraught with historical difficulties, challenges, and economic dependencies. The town-and-gown connections are intrinsically tied with certain undeniable dependencies.

In times of emergency, both on- and off-campus resources become shared services but are not always coordinated in advance of event response and can result in competition for emergency aid. This structural competition over resources can further strain town-and-gown relations, erode trusted partnerships, and drive against community resilience in adapting and recovering from extreme weather events.

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\(^{42}\) Georgetown Law, Climate Center’s Managed Retreat Toolkit: [https://www.georgetownclimate.org/adaptation/toolkits/managed-retreat-toolkit/introduction.html](https://www.georgetownclimate.org/adaptation/toolkits/managed-retreat-toolkit/introduction.html)
The following section will discuss the approach and methodologies to record observations across the higher education community (primarily within CSU for this project), including interview questions and participants.

The Methodology: Observations and a Qualitative Account of the Spheres of Influence

For this SCUP Fellow project, semi-structured interviews were conducted with individuals holding positions focused solely on climate action and resilience planning and those holding positions directly impacted by extreme weather events, with decision-making responsibilities and opportunities to influence the campus community. Interviews spanned multiple campuses in CSU, off-campus partnerships, and peer institutions:

1. CSU San Jose, Campus Energy and Utilities
2. CSU Systemwide Office, Systemwide Emergency Management and Business Continuity
3. CSU Los Angeles, Academic Programming and Budget Planning
4. CSU Fullerton, Campus Emergency Management
5. SUNY Empire State University, President; Sonoma State University, Academic Affairs (formerly)
6. Mt San Antonio Community College, Campus Planning
7. CSU Chico, Campfire Collaborative

Semi-structured interview questions were prepared, and participants were selected primarily based on years of experience working in higher education and lived experience during campus emergency response events. The interviews with the identified participants were conducted individually via video conference calls or in person. This interviewer captured comments as notes and later identified high-level themes as broad observations. This was done to reduce the risk of biased responses and avoid misperceptions of the individuals in their respective roles or on behalf of their institutions. The questions were developed to better understand, inform, and acknowledge the role of higher education institutions within a community and that
which supports partnership in climate resilience planning. The following list was the pre-planned questions that were administered to all participants:

1. *In your opinion, what is the role of higher education in the immediate surrounding community?*

2. *Based on this description you’ve provided, and in your opinion, what is the role of higher education with the immediate surrounding community resilience?*

3. *In your role in your organization, what are the biggest obstacles and key opportunities as they relate to climate adaptation?*

4. *To your knowledge, what, if any, steps is your organization taking to coordinate with the surrounding community?*

5. *What are the key indicators of progress for leadership in climate action and adaptation implementation (i.e., recognition, cultivating partnerships, grant/state funding, benchmarking data)?*

ANALYSIS OF KEY FINDINGS OF THEMES, IMPLICATIONS, OPPORTUNITIES, AND NEEDS: FOUR KEY AREAS FOR STRATEGIC ACTION-ORIENTED PLANNING IN HIGHER EDUCATION

Assess Regional Vulnerabilities

Using federal and state tools guiding assessment and planning decision-makers, such as Cal-Adapt, higher education institutions must consider the regional-level vulnerabilities instead of those only within the borderlines of the campus property. In a sudden and extreme weather event, most impacts to regional infrastructure will most likely also impact campus property and infrastructure. A recommended approach is one that aligns the inventory of vulnerable infrastructure (i.e., deferred maintenance, aging infrastructure, student services, and housing facilities) with that of the identified climate hazards for the given geographic region. This can become the basis for a gap analysis of campus vulnerabilities that may pose risks to campus operations.
Beyond the campus, vulnerabilities affecting campus will inherently impact the immediate surrounding community and create imminent needs for mutual aid and support during emergencies and extreme weather events. Regional vulnerability assessments can coincide with those of institutions of higher education to inform planning and investment.

Resilience Hubs: The University as an Essential Community Pillar

One of the findings and key themes of this project was that the concept of Community Resilience Centers, Resilience Hubs, and Roundtable Facilitators is a posited opportunity for institutions of higher education. California’s Strategic Growth Council defines Community Resilience Centers as “neighborhood-level resilience centers to provide shelter and resources during climate and other emergencies” and as places of safe refuge. Currently, the eligible participant entities in this program (and many others that are similar) include a variety of facility types, including “schools,” but do not include higher education (i.e., universities, community colleges). Institutions of higher education can collaborate with and support their local eligible partners and align planning and investment strategies in a coordinated effort. Therefore, advocacy at multiple levels across the state and federal dialogue that higher education facilities be elevated in this opportunity for more intentional investment and partnership.

The Urban Sustainability Directors Network categorizes Resilience Hubs into three (3) modes: Everyday, Disruption, and Recovery. Everyday mode is for planning, partnership building, disseminating information between disasters, and facilitating strong connections across the community for resilience. Disruption mode is ideal for researchers and facility operations experts and is a place for collecting information to assess impact, assembling information and inventory resources, and leading local response measures. Recovery mode facilitates operational continuity during disaster response and recovery, working with experts, aid organizations, volunteers, and community-based organizations to transmit communications and resources.

43 California Governor’s Strategic Growth Council, Community Resilience Centers program: https://sgc.ca.gov/programs/community-resilience-centers/

44 Urban Sustainability Directors Network, What are Resilience Hubs?: http://resilience-hub.org/what-are-hubs/
Facilities designated as FEMA Disaster Recovery Centers (DRCs)\textsuperscript{45} are another option for higher education facilities to explore, advocating for expedited resources (electricity, medical supplies, food and water, shelters) to be deployed on-site for community-level response and support during a disaster. As facilities equipped with large open spaces, multi-story buildings, and typically on-campus housing with existing beds, colleges and universities often are called on to respond but are not typically designated proactively as FEMA response and recovery locations. Proactive planning, coordination, training, and investment could support the overall success and viability of a community if these activities were to be engaged prior to emergency events—as opposed to reactionary.

For many reasons, higher education institutions are arguably a local asset and neighborhood-level partner as a Community Resilience Center/Resilience Hub/Disaster Recover Center. Per the findings of the interview participants of this SCUP fellowship project, observations were made of colleges and universities as cultural centers, community pillars, and centers for academics and research. Research centers and institutes often study local issues and provide solution-finding approaches to vexing challenges within the community to support and progress vitality and resilience.

**The Recommendation to Formalize Campus-Community Shared Services**

Lessons learned from impacted communities that have filed FEMA and insurance claims have notably shown increased volume in recent years, triggering activities such as the development of systemwide tracking dashboards, model practices for emergency aid communications, and training on filing damage claims. In the aftermath of disasters and during disaster recovery alongside the process of filing various claims with state and federal agencies, a recurring theme from this project’s interviews found the community pillars within the surrounding area compete over the same disaster-relief dollars.

It is recommended, based on the above description, that there is a critical opportunity for increased and formalized collaboration between a university campus and the immediate surrounding community to partner on improvement projects, place immediate focus on the most vulnerable communities needing assistance in the event of an extreme weather event or disaster, and align funding strategies programmatically.

\textsuperscript{45} FEMA, California Region 9, Disaster Recovery Centers: https://www.fema.gov/locations/california#block-views-block-disaster-recovery-centers-block-2.
A Partnership-Driven Implementation

An observed and increasing trend in external funding opportunities from the state and federal governments for physical infrastructure improvements is requiring proposers to develop concepts that partner community-based organizations (CBOs) to drive efficient use of dollars through community resilience. Examples can be found in the US Department of Energy and FEMA, California Governor’s Office of Planning and Research, Office of Emergency Services, and others. Additionally, these external dollars seek project proposals that include significant elements of workforce development, positioning colleges and universities as ideal collaborators. It is also worth noting that many of these competitive dollars are not seeking research and development proposals, but instead focus on large-scale deployment, implementation, and broad community impact. Further, it is highly encouraged to aim for proposals that prioritize specific climate adaptation and resilience projects to address specific identified regional climate hazards.

Another key theme from this project’s interviews found that in campus emergency management and continuity, many shared services agreements are typically triggered in disaster responses, especially with the risk of competition over critical resources (water, power, roadways, etc.) and during extreme weather events. It is recommended that an increased focus on these types of agreements is expanded to identify budget efficiency, reinforce interdependency across networks, and prevent unforeseen gaps and vulnerabilities. Examples might include critical infrastructure such as increased electrical capacity, EV charging infrastructure, stormwater management for flooding, and open space for disaster recovery. Acknowledging the realities of town-and-gown relationships, the mindset of “protecting its own” assets, people, and infrastructure is a tortured history. However, it must be emphasized that the campus benefits from its inherent dependence on the surrounding community and is complimented by the community’s benefits to local economic prosperity and vitality.
FUTURE WORK AND CONSIDERATIONS

This project’s purposes were to memorialize recent events of extreme weather, discuss broadly the impacts on university campuses in terms of risk, and establish a primer for peer institutions to use as the basis for exploring adoptable model practices. The project focuses mainly on state-funded institutions in California, namely California State University, as a limited scope and case study.

Future work is critical in the space of higher education. There is an increasingly dire need to quantify the cost of carbon and the value of resilience in higher education investment strategies, particularly as a cost-avoidance measure. Investment in infrastructure improvements and renewal, energy efficiency and on-site self-generated power, resource conservation, and equitable and inclusive considerations to the most vulnerable populations reduces vulnerability for the university. Deferred Maintenance and Infrastructure Renewal should be reframed as a cost avoidance measure with trackable Return on Investments (ROI), Cost of Carbon, and Value of Resilience as an opportunity cost to the university.

Because of the diverse and broad spectrum of climate hazards occurring in a small geographic area, future research opportunities should include peer institutional systems in California. Beyond California’s institutions, documentation of those institutions in areas with lived experience with extreme weather events such as extreme cold, tornadoes, and hurricanes (of which have only occurred at a low-intensity level in California to date). If a gap analysis has yet to be completed for a given area, the initial and critical step is to conduct a city-regional climate vulnerability assessment to identify opportunities for coordination in climate resilience planning and investment.

At the state agency level, workforce development, training, and education agencies are critical stakeholders and coordinating partners. Unbounded Associates, a firm focusing on innovation in the educational space, published A New Green Learning Agenda for Postsecondary Institutions (2023) outlining pathways for postsecondary education to support and build capacity in climate-ready jobs. This publication uses case studies to demonstrate opportunities for diversifying the workforce of “green” jobs by addressing community economic inequities, environmental justice, and student success in higher education. Using this publication as a roadmap for colleges’ and universities’ strategic curricular and co-curricular planning, a partnership with economic development...
agencies can also foster employment opportunities. Beyond higher education, but connected to the campuses, exploration of surrounding communities seeking to implement place- and nature-based solutions that can be scaled up. Research institutes and technology incubators adjacent to higher education institutions are ideal partners that foster innovation and workforce development.

Higher education should be explored as a designated place of safe refuge/Resilience Hub/Disaster Recovery Center to ensure continuity in response actions such as expediency of return of electrical power in a grid outage. This designation may be achieved through advocacy efforts with trusted partners and adjacent communities with a cascading value chain, in which each impacts the other with mutual benefits across the region. Higher education could be an excellent host site as Resilience Hubs and with inherent support to the community in times of need.

This is a call to action for those in higher education planning to engage in climate resilience. Climate impacts are on our doorsteps, if not already in our living rooms. Through a network such as SCUP, higher education institutions should develop and establish a higher education consortium. Build a support network for climate resilience to share model practices and policies, investment strategies, research and development of innovative technologies, and potential partnerships to attract external funding to maintain the institutions as reliable, valuable, and relevant community pillars.
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MICHAEL MCCORMICK is the founder and president of Farallon Strategies, a certified B Corp. created to support transformative solutions to climate change and community resilience. Michael has worked at the local, regional, state, and federal levels and in non-profit, business, and government organizations. Michael co-founded the first Climate AmeriCorps program in the United States in 2012 and helped found the Alliance of Regional Collaboratives for Climate Adaptation (ARCCA) in 2013, and he continues active engagement in the organization. He also co-founded the California Adaptation Forum (CAF) in 2013, co-chaired the National Adaptation Forum in 2018, and continues to help connect emerging leaders to roles that shape the future of the practice of resilience. Michael is passionate about supporting a middle way for the ongoing evolution of consulting to help prioritize an anti-racist and equity-centered community benefit mindset. He is currently serving as a mentor at Third Derivative, a Regional Advisory Committee member at the UC Davis Center for Regional Change, an advisor to Bright Action, a board member for Community Climate Solutions, an advisor in the Cool Davis Foundation Council of Advisors, a Senior Fellow of the American Leadership Forum: Mountain Valley Chapter, and a member of the American Planning Association (AICP certified in 2004).
SCUP fellow coaches are volunteers who are experienced in an area of higher education or thought leadership that is aligned with the ultimate goals of the SCUP Fellow Research Project. They bring fresh perspectives and insights over the course of the fellowship year. We thank Royce Robertson’s three SCUP coaches for their generosity of time and perspective.

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