California School Tree Study

Annual Report 2025

Contents

I. Study Overview

The year 2025 was full of exciting data collection for the California School Tree Study. Teams of students, fellows, postdoctoral researchers, and faculty collected data on elementary school campuses about trees, microclimate, and stewardship. As a refresher, our study objectives are to:

1. Investigate policies that have created and reinforce extensive impervious cover on school grounds, and describe land cover patterns on school campuses;
2. Assess tree microclimate benefits, and develop future scenarios for such benefits based on varying tree configurations;
3. Assess the vulnerability of campus tree species to climate change; and
4. Characterize landscape management perspectives and needs from school principals, teachers, and parents, as well as facilities staff at school and district levels, and nonprofit greening partners.

Objective 1 was the focus in 2024, and objectives 2-4 were investigated in 2025. Data collection is complete and analyses are underway.

The study is a collaboration between researchers at the United States Department of Agriculture (USDA) Forest Service, Pacific Southwest Research Station (PSW); University of California, Berkeley (UC Berkeley); University of California, Davis (UC Davis); and University of California, Los Angeles (UCLA), in partnership with the USDA Forest Service Region 5; California Department of Forestry & Fire Protection (CAL FIRE); and Green Schoolyards America.

To learn more about this study, check out the project website from UCLA, which includes a list of collaborators at our core partner organizations as well as the project Advisory Committee. The study is also affiliated with the Los Angeles Center for Urban Natural Resources Sustainability.

UCLA crew prepares to collect data on a steep slope. Source: Amelia Najar.

II. Expanding the Team

Our team expanded in 2025 to accomplish an ambitious data collection effort. The team is composed of scholars with extensive experience in various disciplines, including urban forestry, forest ecology, urban ecology, entomology, tree management, nursery crops, ecosystem services, climate change, remote sensing, public health, urban geography, and schoolyard greening. Through a transdisciplinary collaborative effort, the team is dedicated to producing useful findings for state agencies, school districts, non-profit organizations, and others involved in school tree planting and management.

Please see a brief bio for each of the research team members below:

Research leads

USDA Forest Service

Lara Roman, PhD, Research Ecologist, USDA Forest Service

Lara Roman is a Research Ecologist with the USDA Forest Service, Pacific Southwest Research Station. Her research centers on the temporal dynamics of urban forests, including tree mortality and growth, canopy cover change, historical legacies, species composition change, and the factors constraining or enabling tree planting in varied neighborhoods. These studies involve collaborations with municipal agencies, school districts, and nonprofit organizations, and her contributions to urban forestry practice were recognized with an Early-Career Scientist Award from the International Society of Arboriculture. She received a PhD from UC Berkeley, and Bachelor's in Biology and Master of Environmental Studies from the University of Pennsylvania.

Natalie van Doorn, PhD, Research Urban Ecologist, USDA Forest Service

Natalie van Doorn is a Research Urban Ecologist with the USDA Forest Service, Pacific Southwest Research Station. She is interested in what drives change in urban and wildland forests, how forests are vulnerable to disturbances and stressors, and what can be done to improve their resilience. Her research utilizes and builds on long-term datasets tracking populations and individual trees; measuring forest structure and dynamics. She is a co-PI on the Climate-ready Trees study – a data-driven approach to evaluate the ability of promising underused species to tolerate stressors of future climates. She earned her bachelor's, master's, and doctorate degrees from UC Berkeley.

Universities

Iryna Dronova, PhD, Associate Professor, UC Berkeley

Iryna Dronova is an associate professor jointly appointed in the Departments of Environmental Science, Policy & Management (Rausser College of Natural Resources) and Landscape Architecture & Environmental Planning (College of Environmental Design). She is interested in diverse aspects of landscape ecology and its potential to inform sustainable, multi-functional landscape-designs and decision-making in environmental planning. Her research combines field ecological methods with remote sensing, geographic information systems (GIS) and spatial analysis to perform analyses of multi-scale structure of ecosystems, to facilitate scaling of ecological processes from local to regional levels and to develop remote sensing-based monitoring approaches for vulnerable areas and sites with limited field access. Since May 2017 she is also an affiliate Professor of Geography at UC Berkeley Department of Geography. She holds a PhD in Environmental Science, Policy and Management from UC Berkeley, a MS degree in Natural Resources/Terrestrial Ecology and Management and a Certificate in Spatial Analysis from the School of Natural Resource and Environment at the University of Michigan, Ann Arbor and a BS degree in Ecology from the National University of Kyiv-Mohyla Academy, Ukraine.

Alessandro Ossola, PhD, Associate Professor, UC Davis

Alessandro Ossola is a professor at UC Davis. He is an honorary research fellow at the University of Melbourne, Australia, where he obtained a PhD in urban ecology. He is a former US National Academy of Sciences, Engineering and Medicine NRC Associate and a recipient of a 2022 New Innovator Award from the Foundation for Food and Agriculture Research. His research encompasses several topics including urban forestry, ecology, climate change, water management, urban planning and design. Alessandro currently serves the Chair of the Saratoga Horticultural Research Endowment (SHRE) and he is a member of the Executive Oversight Team of the Los Angeles Center for Urban Natural Resources Sustainability.

Kirsten Schwarz, PhD, Associate Professor, UCLA

Kirsten Schwarz is an urban ecologist and holds a joint appointment in the Departments of Urban Planning and Environmental Health Sciences at UCLA. Her research aims to understand how the ways in which we build and shape cities affect environment, health, and justice. Using transdisciplinary, community-engaged, and mixed method approaches, her research explores the spatial distribution of environmental hazards and amenities in cities and the resulting inequities. She embraces community-engaged practices as a mechanism to move beyond mapping such inequities and support research processes that can facilitate dismantling them. Her expertise in science communication and engaging communities in the co-production of science was recognized by the American Association for the Advancement of Science (AAAS) naming her a Fellow in the Leshner Leadership Institute in the Center for Public Engagement with Science and Technology. Prior to joining UCLA, she was an Associate Professor of Environmental Science at Northern Kentucky University where she directed their Ecological Stewardship Institute. Kirsten has a BA in Human Ecology from College of the Atlantic and a PhD in Ecology from Rutgers University.

Fellows, Interns and Post-doctoral Researchers

Levon Bigelow, MS, ORISE Urban Forestry Fellow

Levon Bigelow is a research fellow with the Oak Ridge Institute for Science and Education (ORISE), in collaboration with the USDA Forest Service. His current role involves working with data to support research decisions on a variety of projects focused on trees in California schoolyards. Levon started his career at Rutgers University, where he earned a BS in Ecology, Evolution and Natural Resources and interned with the New Jersey Urban & Community Forestry program. From there, he worked as a street tree planting forester at New York City Parks & Recreation before earning his MS in Natural Resources and the Environment and a certificate in GIS from the University of Connecticut. His master's thesis focused on street tree dynamics in a large city (Philadelphia).

Jacob Cecala, PhD, ORISE Climate Hub Fellow

Jacob Cecala is a postdoctoral research fellow with the ORISE program, mentored by USDA Forest Service scientists Natalie van Doorn and Lara Roman. Jake's primary project for his postdoctoral appointment is conducting a comprehensive literature review on how climate change is affecting trees growing in urban areas worldwide. He received his PhD in Entomology from UC Riverside, where he studied the ecology of California wild bee species in agricultural environments, and his MS and BS in biology from Cal Poly Pomona.

Jared Coffelt, Graduate Fellow, UCLA

Jared Coffelt is a PhD student at UCLA's Institute of the Environment and Sustainability. His research interests revolve around community engagement during the design, implementation, and maintenance of sustainable infrastructure and how such infrastructure can be used to develop more peaceful and democratic relations. His current projects include analysis of factors contributing to the implementation and endurance of impermeable surfaces on school grounds and how they prevent greening efforts, as well as the development of the hydrogen energy economy in the US and beyond. He has a bachelor's in chemical engineering from the University of Pittsburgh.

Michaela Dethlefsen-Rivera, Undergraduate Intern, UC Berkeley

Michaela Dethlefsen-Rivera is a fourth-year undergraduate student at UC Berkeley with a double major in Forestry and Conservation Resource Studies, and a focus on freshwater and wetland ecology. She is under the mentorship of Albert Ruhi in the Ruhi Lab and enjoys working on projects related to wildland and rural forestry, aquatic ecology, and the ways in which they intersect.

Phoebe Elliott, Undergraduate Intern, UC Davis

Phoebe Elliott is a recent graduate from UC Davis where she earned a BS in Plant Sciences with a focus in Environmental Management and Restoration. She is currently serving an 11-month GrizzlyCorps fellowship at Shasta Valley Resource Conservation District for forestry and fire.

Alden Hughes, Undergraduate Intern, UC Davis

Alden Hughes is a recent graduate from UC Davis where he earned a BS in Environmental Science and Management while focusing on plants, water, and working landscapes. At Davis he has worked for labs on projects relating to viticulture, soil science, and mammal genetics. In 2025 he worked at Alessandro Ossola's Urban Science Lab on the UC Landscape Plant Irrigation Trials and schoolyard tree inventory.

Steve Jang, Undergraduate Intern, UCLA

Steve Jang is a fourth-year undergraduate student at UCLA with a major in Environmental Science and a minor in Environmental Engineering. Under the mentorship of UCLA's Kirsten Schwarz, he worked on various projects involving schoolyard greening and soil analysis. His research interests include urban planning and water treatment.

Kaylianne Jordan, Undergraduate Intern, UC Davis

Kaylianne Jordan is a fourth-year transfer student and McNair Scholar studying Viticulture and Enology at UC Davis. She has a background in culinary arts and a passion for sustainable farming and enjoys exploring the connections between agriculture, winemaking, and community. Outside of college, she loves trying out new recipes, discovering local food spots, and spending time with friends outdoors.

Corinne Marangi, Master's Student, UCLA

Corinne Marangi is a second-year Master of Urban and Regional Planning student at UCLA. She has a background in social services and landscape architecture and her interests include community-driven planning, urban forestry, and sustainable architecture. She is currently working on a capstone project focused on teaching in green schoolyards, barriers and motivations to engagement, and aligned curriculum.

Amelia Najar, Undergraduate Intern, UCLA

Amelia Najar is a third-year undergraduate student at UCLA with a major in Environmental Science and a minor in Environmental Systems and Society. She is currently under the mentorship of Kirsten Schwartz and has worked on projects involving schoolyard greening and soil analysis. Her research interests include environmental justice and community-led solutions.

Kristen Patino, Master's Student, UC Berkeley

Kristen is a Master of Landscape Architecture student at UC Berkeley who is interested in community-led urban greening and climate adaptation. After earning her bachelor's in Architecture from Washington University in St. Louis, she began her career designing public spaces as an urban designer in Oakland, then moved into landscape design at Greenprint Partners in Chicago, where she helped design green stormwater infrastructure for schoolyards. She later worked at City Plants tree nursery in Los Angeles and then as a Planning Assistant at the Los Angeles Department of City Planning before starting graduate school.

Elizabeth Riedman, PhD, Post-doctoral Researcher, UCLA

Elizabeth Riedman is a feminist, urban geographer who specializes in qualitative research, with a focus on urban greening initiatives and volunteer labor. Currently, her research investigates issues of equity within urban forestry, green infrastructure, community well-being and health. She utilizes a range of methods, including ethnography, interviews and surveys to collaborate across community partners and disciplines. As part of the schoolyard greening project, she seeks to understand tree management and maintenance strategies across various California schools. She received a PhD in Geography and Urban Studies at Temple University and an MA in Anthropology from Wayne State University.

Cailyn Schmidt, Graduate Fellow, UCLA

Cailyn is a master's student in the Urban and Regional Planning program at UCLA with a concentration in climate, environment and society. As a Science Fellow with the LA Center for Urban Natural Resources Sustainability, she is researching tree plantings at schools across Los Angeles County. Before beginning her master's, Cailyn spent three years working in urban forestry in Honolulu, Hawai'i, managing a nonprofit and coordinating culturally relevant fruit tree plantings at under-resourced schools. Cailyn has a BS in Conservation and Resource Studies and a BA in Music from the University of California, Berkeley.

Jared Sisneroz, PhD student, UC Davis

Jared is a second year PhD student in the Geography Graduate Group. He has a bachelor's degree in Landscape Architecture from UC Davis. After graduating in 2010, Jared worked as researcher on projects related to greenhouse and nursery crops, residential urban runoff, and outreach to structural pest controllers. His key focus was managing the UC Landscape Plant Irrigation Trials, a long-term project endeavoring to identify low water-use landscape plants for California's Central Valley. Jared is interested in how landscape plants fit into larger conversations around water-use, and human wellbeing in urban environments.

Collin Vail, Undergraduate Intern, UC Berkeley

Collin is a fourth-year undergraduate majoring in Ecosystem Management & Forestry at UC Berkeley. He is under the apprenticeship of Phil Nemir and is interested in projects related to wildland fire, prescribed fire, urban forestry, silviculture, and human-ecosystem interactions.

Luisa Velásquez Camacho, PhD, Post-doctoral Researcher, UC Davis

Luisa Velásquez is a postdoc currently focused on assessing tree cooling benefits across California's K-12 schoolyards. Luisa holds a BS in Forestry Engineering at the District University in Bogotá, Colombia, a MS in Data Science applied to Forestry from the University of Valladolid, Spain and a PhD in Forest Management from the University of Lleida, Spain. Her PhD research focused on the automation of urban tree mapping, analyzing their distribution patterns in cities, and the assessment of ecosystem services using deep learning techniques and multiple remote sensing data sources. Luisa has extensive experience in urban forestry, remote sensing, modeling, spatiotemporal analysis, and artificial intelligence.

Samantha Venegas, Undergraduate Intern, UCLA

Samantha Venegas is a third-year physiological science major at UCLA. She is an undergraduate student researcher under the mentorship of UCLA's Kirsten Schwarz where she has worked on projects involving schoolyard greening and soil analysis.

Tyler Wakabayashi, Undergraduate Intern, UC Davis

Tyler Wakabayashi is a fourth-year undergraduate student at UC Davis with a major in Evolution, Ecology, and Biodiversity and a minor in Japanese. He is currently under the mentorship of Alessandro Ossola in the Urban Science Lab and has worked on projects involving schoolyard greening and the UC Landscape Plant Irrigation Trials.

III. Data Collection by the Numbers

Our summer 2025 data collection effort was a logistical accomplishment involving extensive coordination with school districts and other partners. We are deeply grateful to all of the school and district staff who allowed us access to elementary school campuses, to our partners and Advisory Committee members for supporting our data collection process, and to our many students, fellows, and postdoctoral researchers whose labor resulted in mounds of data that our team is now analyzing.

Tree Inventory

- 4 school districts
- 50 schools with tree inventories: 16 each in 3 districts, plus 2 schools in an additional district
    - 4,756 trees inventoried
    - 3 key measurements for each tree: trunk diameter, tree height, crown width

UCLA crew members Samantha Venegas, Steve Jang, Jared Coffelt, Jacob Cecala, and Amelia Najar. Source: Kirsten Schwarz.

UCLA crew members Steve Jang and Samantha Venegas collect trunk diameter on a tree. Source: Kirsten Schwarz.

UC Davis crew members Jared Sisneroz, Alden Hughes, and Tyler Wakabayashi collect crown width. Source: Alessandro Ossola.

UCLA crew lead Jared Coffelt being trained by Levon Bigelow to use a hypsometer to collect tree height. Source: Kirsten Schwarz.

Lara Roman trains UCLA crew members Amelia Najar, Samantha Venegas, and Steve Jang how to collect trunk diameter. Source: Kirsten Schwarz.

UC Berkeley crew members Collin Vail, Michaela Dethlefsen-Rivera, and Kristen Patino. Source: Natalie van Doorn.

Microclimate

- 15 schools for microclimate: 2 each in 3 districts, plus 9 in an additional district
    - ~300 km (200 miles) walked by the team with MaRTyna (a roving cart with sensors designed to measure thermal comfort), across all 15 schools
    - From 16 to 20 HOBO loggers measuring relative humidity and temperature and 17 to 23 Kestrel sensors measuring Wet Bulb Globe Temperature, humidity, and heat index were deployed per school
    - Six common school surface materials were evaluated for surface temperature at each site: asphalt, concrete, grass, rubber mat, mulch, and bare soil.
    - 2TB of data to analyze with ENVI-met, a software model for simulating urban microclimates

UC Davis crew stands with the fully assembled MaRTyna. Source: Simoni Triantafyllidou.

Alessandro Ossola and Jared Sisneroz prepare to collect microclimate data with the assistance of UC Berkeley crew members Collin Vail and Michaela Dethlefsen-Rivera. Source: Natalie van Doorn.
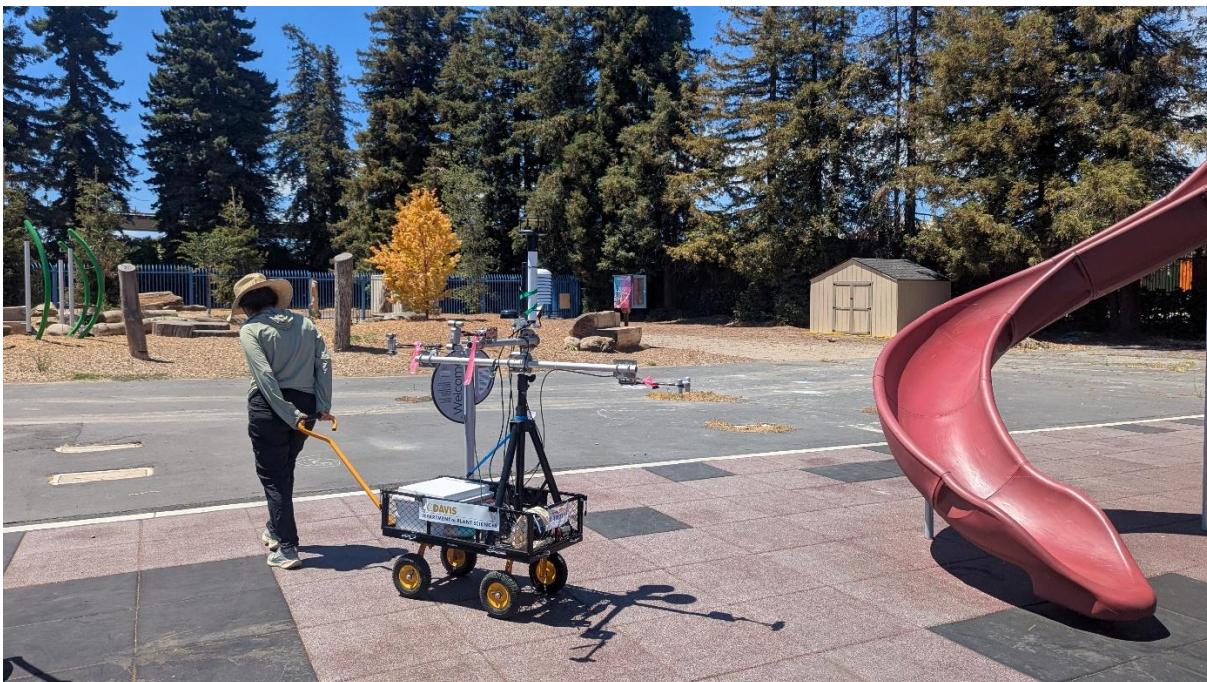
UC Davis postdoc crew lead Luisa Velasquez Camacho walks MaRTyNa through a schoolyard play area. Source: Natalie van Doorn.

A Kestrel Wet Bulb Globe Temperature measurement tool collecting microclimate data in a schoolyard play area. Source: Natalie van Doorn.

A shaded schoolyard space encountered by the UC Davis field crew. Source: Alessandro Ossola.

Interviews

- 24 schools for interviews: 8 each in 3 districts
    - 74 interviews conducted with 68 people interviewed total, including principals, teachers, parents, facilities staff, district staff and nonprofit partners
    - Site visits to all 24 schools
   - Over 100 files of transcripts and notes to code with NVivo, software for thematic analysis of qualitative data

Tree leaf debris observed during a school site tour. Source: Cailyn Schmidt.

IV. Campus Tree Resources

The campus tree inventories were completed thanks to the efforts of undergraduate students, graduate students, postdoctoral researchers, and faculty at UC Berkeley, UC Davis, and UCLA. All trees on 50 elementary school campuses were mapped, plus adjacent street trees. Campuses were mapped into four main zone categories: within the fence boundary (where children spend most of their school days), outside the fence (such as entryway trees), parking lots, and sidewalk area. For the inside fence area, kindergarten and garden areas were also delineated. For each tree identified, field crews measured trunk size, canopy width, and total height, and assigned a crown vigor rating. Additionally, the team documented the individual locations of all trees, supported by at least one photo of every specimen. Teams included Collin Vail, Michaela Dethlefsen-Rivera, and Kristen Patino at UC Berkeley; Phoebe Elliott, Alden Hughes, Kaylianne Jordan, Tyler Wakabayashi, Jared Sisneroz, Luisa Velasquez Camacho, Simoni Triantafyllidou, and Alessandro Ossola at UC Davis; and Amelia Najar, Steve Jang, Samantha Venegas, Jared Coffelt, Jacob Cecala, and Kirsten Schwarz at UCLA. Tree inventory methods and training were supported by Lara Roman, Natalie van Doorn, and Levon Bigelow.

After the field season concluded, postdoctoral fellow Jacob Cecala and postmasters fellow Levon Bigelow carried out extensive quality checks and postprocessing, including numerous small fixes to the zone maps, ensuring that species deemed to be shrubs were excluded, and reconciling species names. Buildings were overlayed (using Open Street Map) and reconciled with field data. An example map is shown below, depicting campus zones and tree locations. In total, 4,756 trees were recorded that will be included in our analyses and reports to school districts. Results from this part of our research will be shared with partners in the months ahead.
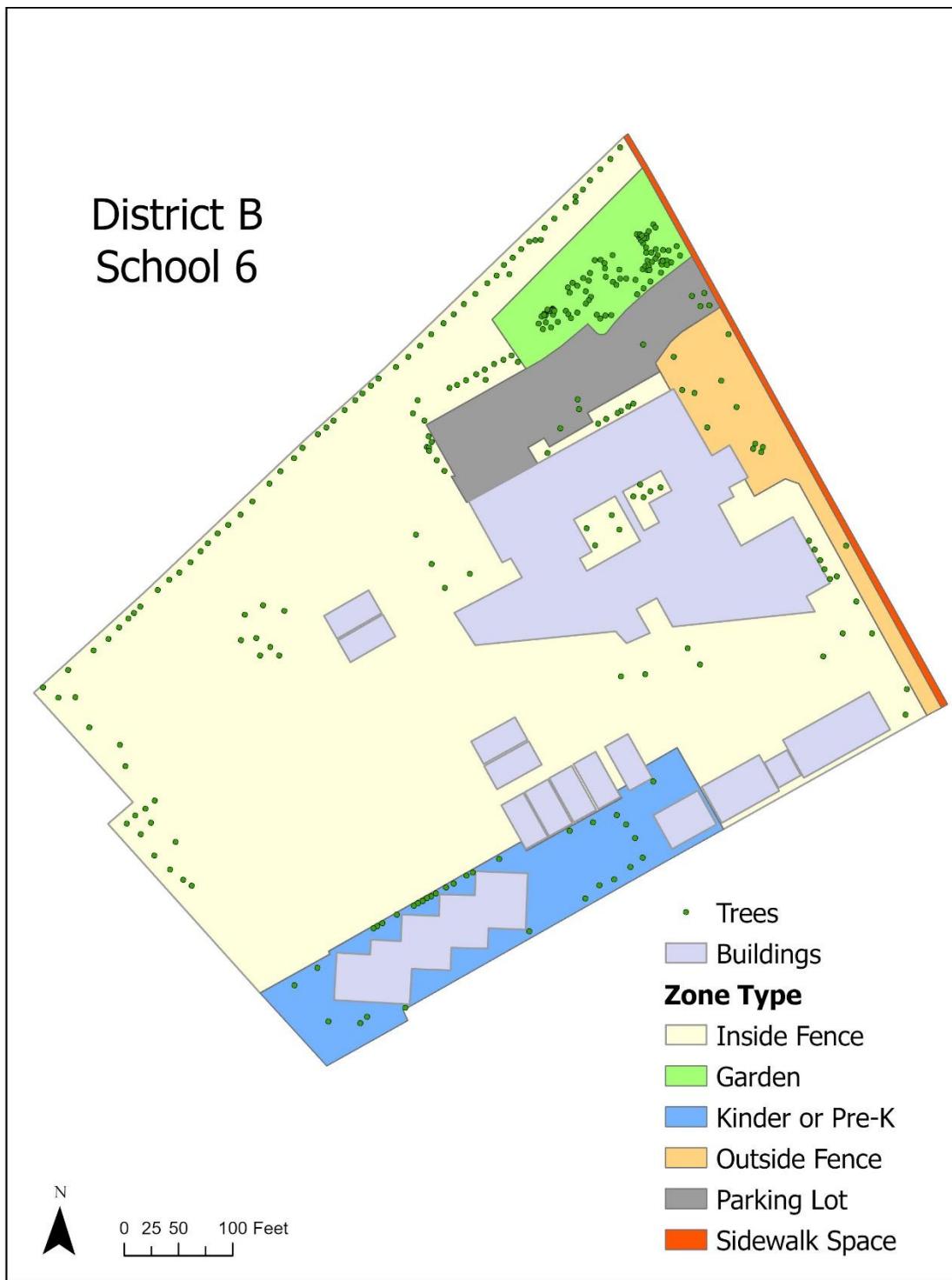
Campus tree inventory and zone map of a school in the study. Source: Levon Bigelow.

V. Sharing our Science

Presentations

American Association of Geographers

Postdoctoral fellow Liz Riedman gave a presentation at the Annual Association of American Geographers meeting in Detroit, Michigan on April 25th, 2025. Her presentation was entitled "Examining the role of urban forestry management within schools" and was included as part of "Trees in the City" organized session. Her talk presented the project's developing framework of 'schools as socio-ecological systems' and contributed to ongoing conversations with the urban forestry scholarly community. Kirsten Schwarz, Lara Roman and Natalie van Doorn were co-authors on this presentation.

Green Schoolyards America (GSA) Webinar

Melody Ng and Jared Coffelt, both graduate students at UCLA, gave a presentation to the GSA Green Schoolyard Lecture Series entitled, "Depaving California schools for a greener future" on October 2, 2025. This presentation provided an overview of their report on the topic, which was released last year. The report can be found here and the webinar is archived here.

Cities and the Environment Symposium, Loyola Marymount University

Steve Jang and Samantha Venegas, both undergraduate students at UCLA, presented a poster at the Cities and the Environment Symposium on November 20, 2025. The Symposium was hosted by Loyola Marymount University's Center for Urban Resilience. The poster, entitled "Supporting Cool Schools: Tree Inventories for Climate Resilient Futures", provided an overview of field data collection and shared preliminary results on school tree composition. Amelia Najar, Levon Bigelow, Jacob Cecala, Jared Coffelt, Natalie van Doorn, Lara Roman, and Kirsten Schwarz were co-authors on the poster.
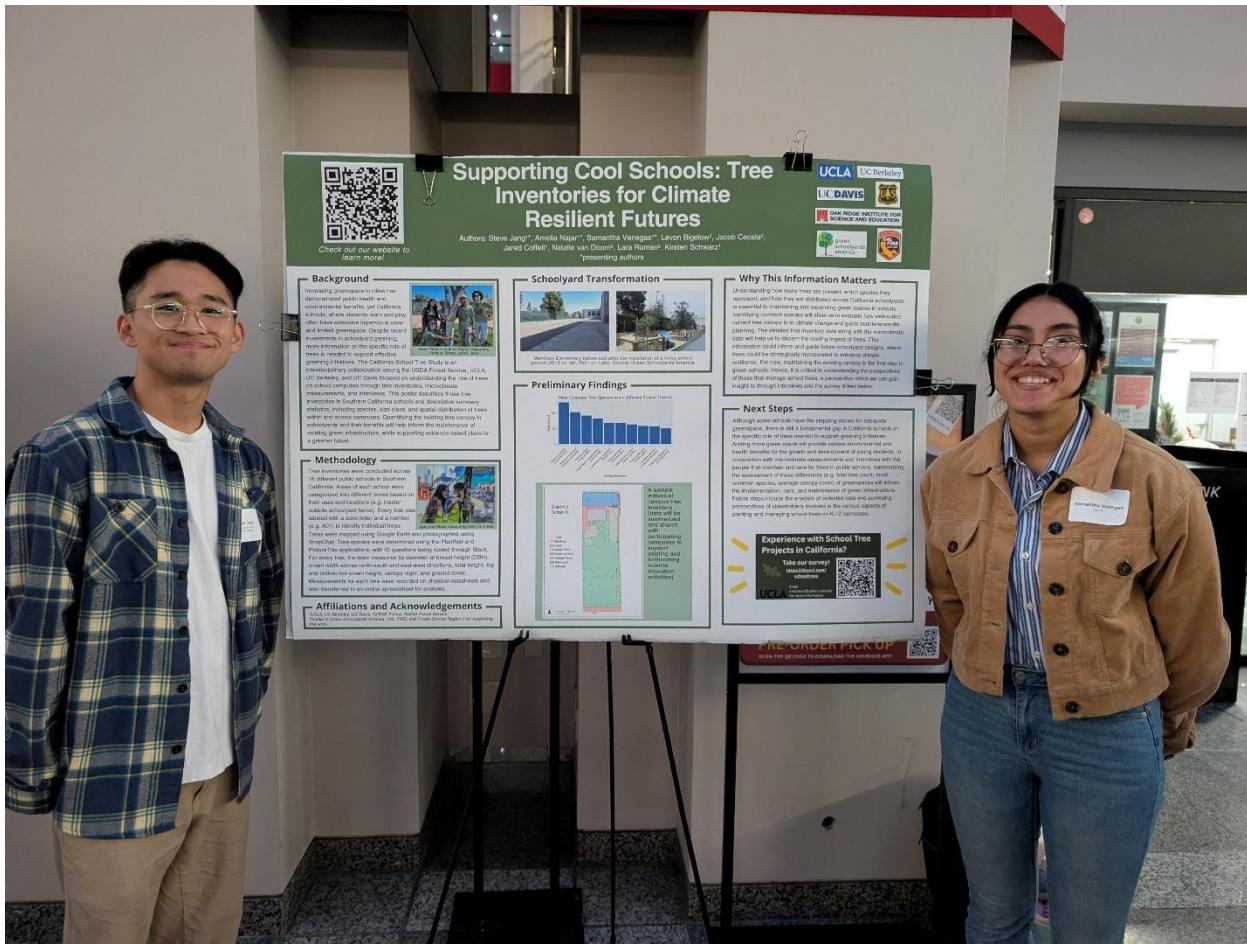
UCLA students Steve Jang and Samantha Venegas stand with their poster at the Cities and the Environment Symposium. Source: Kirsten Schwarz.

Los Angeles Center for Urban Natural Resources Sustainability

Forest Service scientist Lara Roman, UC Davis faculty Alessandro Ossola, and UCLA masters student Cailyn Schmidt presented at the Executive Oversight Team meeting of the Forest Service's Los Angeles Center for Urban Natural Resources Sustainability on March 10, 2025. They each provided overviews of the research and data collection efforts for the school tree study, with Cailyn focusing on the TREE Fund survey results and interview findings for southern California.

Media Coverage

Beason, Tyrone. "Most of California's public K-12 students go to school on campuses with virtually no shade." LA Times. October 29, 2025. https://www.latimes.com/environment/story/2025-10-29/half-of-california-k-12-students-to-school-on-campuses-with-virtually-no-shade

Dooley, Emily C. "California schools are losing tree canopy." UC Davis News. October 27, 2025. https://www.ucdavis.edu/climate/news/california-schools-are-losing-tree-canopy

UCLA Fields School of Public Health. "California's K-12 schools often lack sufficient shade and natural resources." UCLA Newsroom. September 4, 2025. https://newsroom.ucla.edu/releases/california-k-12-schools-often-lack-shade-natural-surfaces

Pimentel, Cinthia. "Tree canopy in Californian schools" Television interview with L. Velásquez-Camacho. Telemundo 48 Bay Area (NBC Bay Area). June 11, 2025.

Graduate Fellows Supporting Green Schoolyards America

In partnership with Green Schoolyards America and with funding through UC Davis, master's student Emily Haideman examined maintenance costs for schoolyard forests in California, producing a report for Green Schoolyards America. Emily reported the associated costs with maintaining a schoolyard forest throughout the different phases of tree growth. Research was completed through discussions with colleagues and reviewing publications to establish what the costs are to maintain asphalt and grass in schoolyards, which allowed a comparison of these costs to a schoolyard forest. Maintaining a 15,000 square foot schoolyard forest is much more cost effective than maintaining 15,000 square feet of grass and slightly more cost effective than maintaining asphalt, which are the two most common types of schoolyard surfaces. The information is intended to be used to assist school district leaders, particularly facilities staff, in the long-term stewardship of their schoolyards. All schoolyard design paradigms require some maintenance, which is why it is important to provide school district leaders with accurate cost information to make informed decisions. Separately, Emily also supported the California Nursery

Map, which provides a geographic distribution of where nurseries are located in the state of California. It is intended to assist school district leaders, particularly facilities staff, in locating inventory for establishing their schoolyard forests. The map also highlights nurseries that indicated interest in being a part of a formal California Schoolyard Forest System® Nursery Network. The nursery research was separately supported through CAL FIRE funding to Green Schoolyards America and a partnership with researchers Deborah Hilbert from the State University of New York and Andrew Koeser from the University of Florida.

Publications

Velásquez-Camacho L, Willaredt M, Singh P, Ossola A. 2025. Bleeding green: California's schools are rapidly losing tree canopy cover. *Urban Forestry & Urban Greening* 113: 129117. https://doi.org/10.1016/j.ufug.2025.129117

VI. California School Tree Stewardship Survey

Kirsten Schwarz at UCLA received a grant from the Tree Research and Education Endowment (TREE) Fund to conduct a complementary study about bridging the stakeholders who design, plant, and maintain schoolyard trees. The project has been led by postdoctoral researcher Liz Riedman, who distributed a statewide online survey in Fall 2025. The goals of this study were to:

1) Characterize the labor and resources contributing to school campus trees from organizations external to school districts,
2) Investigate the networks and processes currently supporting tree planting and management,
3) Identify management challenges and strategies related to the practice of school tree planting, maintenance, and planning, particularly in relation to coordination and collaboration across professional sectors,

We received a total of 169 responses, out of which 114 were fully completed. Stakeholders included people from nonprofit organizations, environmental advocacy groups, landscape architecture firms, schools, parent teacher associations, colleges and universities, botanic gardens, tree care companies, and more. Thanks to many members of our Advisory Committee for taking the survey or forwarding it to professional networks.

VII. The Road Ahead

The year 2026 will be busy with data analysis and writing up findings. Results from our work will be shared later in 2026.

For the tree inventory data, we will summarize trends across districts, including common species, size class distribution, and differences across zones. We will also investigate the urban forest tree species composition similarities across schools.

The microclimate data analysis involves cleaning and harmonizing datasets from stationary sensors and mobile datasets. Following this, we will perform temporal alignment and define spatial specifications for each unique schoolyard surface. Statistical models will be applied to analyze diurnal temperature patterns and surface-shade interactions, to quantify their impact on children's thermal comfort. We will use ENVI-met to simulate microclimatic scenarios within schoolyards based on the observed field conditions. Using the collected data for model calibrations, alternative tree-planting configurations will be tested to evaluate how increasing the canopy cover could improve and reduce thermal stress.

The stakeholder interview data analysis involves transcribing and anonymizing the transcripts and coding each and every sentence of the interviews using NVivo software. Thematic analysis involves both predetermined and emerging themes.

Findings from the above studies will be shared with school districts, and with our wider network of partners and the Advisory Committee, and also published in peer-reviewed journals.

VIII. Funding