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Fresno Council of Governments

Extreme Heat and Shade Adaptation Plan



**EXTREME HEAT AND
SHADE ADAPTATION PLAN**

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Introduction and Background

Introduction and Background

BACKGROUND

In 2024, FCOG applied for the Sustainable Transportation Planning Grant with the California Department of Transportation (Caltrans) and was awarded \$221,325 in funds to develop the Extreme Heat and Shade Adaptation Plan (Plan). FCOG contributed \$28,675 for a total project cost of \$250,000. Following this award, a project team including experts on transportation, urban canopy, heat resilience, public outreach and land use planning was assembled, along with a working group consisting of local interested parties and decision makers. Over the course of 18 months, the Plan was developed integrating local feedback, data analysis, local expertise, and best practices. The following section outlines the Plan and how it should be used by local governments.

PURPOSE AND NEED

Extreme heat is a threat that Fresno Council of Governments (FCOG) has identified as a key element of long-range planning in the Fresno region to encourage safe and car-free transportation. Fresno County has identified extreme heat as one of the region's most significant public health threats. Fresno County Office of Emergency Services notes that "Extreme Heat often results in the highest number of annual deaths among all weather-related hazards." In 2021 alone, Fresno County recorded 349 heat-related emergency calls to 911, and heat was listed as a cause of death for six residents.^{1,2} It also increases car use among households with access to a vehicle, when walking or biking is too unpleasant or unsafe. Heat is a hazard requiring a regional approach to develop consistent guidance on increasing **heat resilience** such that communities can employ consistent building blocks of urban forestry and design. Paired with countywide analysis and a toolkit for repeatable projects, this guidance can be deployed by local

governments wanting to mitigate urban heat in active transportation sites where local commuters are experiencing high levels of exposure.

Extreme heat is challenging to measure, as it is not simply how high the temperature is, but how much shade and greenery there is in the community, existing health conditions that make heat more dangerous, access to affordable air conditioning, and if people must be outside for work or important errands. A detailed assessment of the county at the Census Tract level is presented in Appendix C. Generally, the county's most rural tracts across eastern and northern Fresno County have lower extreme heat impacts, while higher impacts appear primarily in and around the Fresno–Clovis urban area. These patterns reflect the interaction of dense urban spaces with limited green space and high rates of people that face health or economic challenges that make extreme heat more dangerous. Firebaugh, Mendota, Selma, Reedley, Laton, and Huron all also have elevated extreme heat impacts as a result of environmental and socio-economic conditions. All people in Fresno County that live in areas with limited green space and shade, work or run errands outside, and lack access to affordable air conditioning face challenges to respond to extreme heat days as they become more frequent in the region.

Heat-resilience

Heat resilient communities include streets and public spaces so people can walk, bike, and use transit safely during hot weather, using practical tools like shade, trees, and cooler materials to lower heat exposure.

PAST PLANNING EFFORTS

The Fresno County Regional Transportation Network Vulnerability Assessment helped establish a broader understanding of how rising temperatures may affect transportation infrastructure, transit operations, and public access across the region, defining the problems that this Plan needed to solve. The plan also drew from the assessment's findings related to the user experience during extreme heat events, including the importance of shade, cooling access, and reliable transit service. Public outreach conducted as part of the assessment reinforced the value of transportation-focused heat adaptation strategies such as expanded tree canopy, shaded waiting areas, and improved access to cooling resources.

The Fresno Climate Resiliency Plan informed the development of this Plan by providing initial shade design recommendations including: expanded tree canopy, shaded transit stops, shaded corridors, and cooling-focused improvements within the public right-of-way. This plan builds on these recommendations by providing context specific shading recommendations, consistent with the initial recommendations.

The Active Transportation Plan identifies future projects to enhance human-powered transportation, such as walking, using a wheelchair, in-line skating, skateboarding, etc. Active transportation projects can include, but as not limited to, bike lanes, sidewalks, trails, and crosswalks. The Plan evaluated ATP projects for their heat vulnerability, transit connectivity, connection to activity centers, and their current deficiency. This analysis will help local jurisdictions add shade improvements to enhance new community investment in active transportation. Scoring also helped identify high need projects to use as typologies.

Additionally, the California Extreme Heat Action Plan, FCOG Priority Climate Action Plan, Regional Transportation Plan, Fresno County Multi-Jurisdictional Hazard Mitigation Plan, Emergency

Service Master Plan, Fresno County General Plan, City of Fresno General Plan, and City Urban Forestry Master Plan were reviewed for their strategies along eight elements of extreme heat planning. Model policies, local implementation, and recommendations are summarized in Chapter 2.

PLAN ORGANIZATION

CHAPTER 1. COMMUNITY ENGAGEMENT SUMMARY

This chapter summarizes the planning team's community engagement efforts conducted throughout the development of the Plan, as well as the feedback received during the process. Input was gathered through a combination of in-person events, virtual workshops, and meetings with stakeholders and interested parties. The feedback collected helped guide the selection of template projects, identify recommended improvements, and determine the locations of priority projects described in Chapter 5.



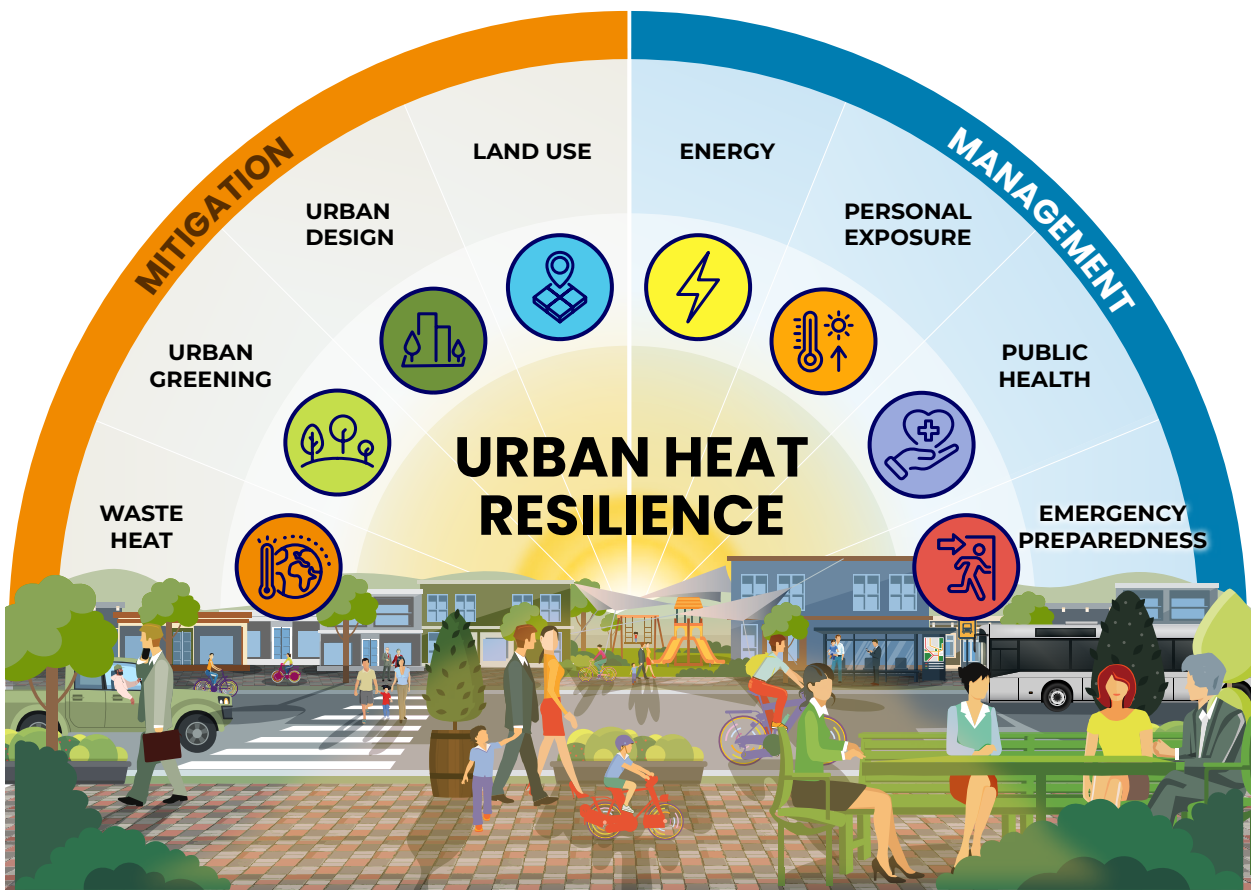
CHAPTER 2. PLAN REVIEW AND RECOMMENDATIONS

This chapter examines existing plans and policies related to extreme heat in Fresno County. The project team reviewed plans from local governments around the county to inventory existing government progress in urban cooling. Policies and programs across jurisdictions were grouped by type of resilience strategy, as illustrated in **Figure 1**. This process highlighted gaps and opportunities for future planning related to extreme heat. In order to address the barriers and needs to implementation, a survey was sent to staff in all 15 local jurisdictions in the County of Fresno. The results of plan review informed the final section, **Recommendations**, which lays out the opportunity to improve extreme heat management and mitigation in the county with local government policy changes.

Template projects

Template projects are illustrative, repeatable project concepts provided in this Plan to help local agencies plan and deliver heat-mitigation improvements more efficiently. They are not site-specific designs; instead, each template is intended to be adapted to local context (e.g., right-of-way constraints, existing infrastructure, community needs, and maintenance capacity) while maintaining the core design elements that reduce heat exposure for people walking, biking, and using transit. Template projects can be used as “starting point” packages to support scoping, cost estimating, community engagement, and implementation, and may be combined or scaled to fit individual locations.

Figure 1: Urban Heat Mitigation and Management Strategies



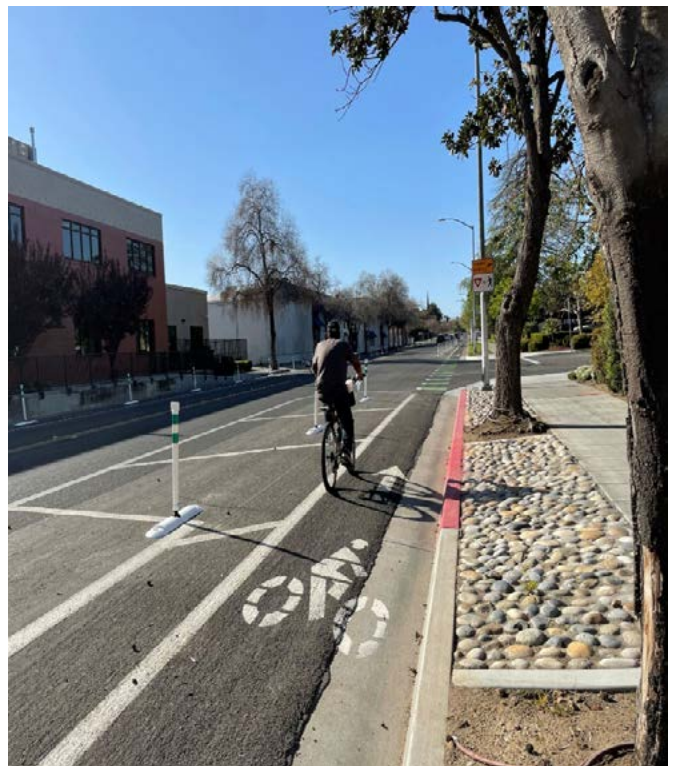
CHAPTER 3. PROJECT SELECTION METHODOLOGY

The project team created a dataset resulting in priority areas for urban heat mitigation interventions, including exposure to extreme heat and planned active transportation improvements in the Active Transportation Plan that could benefit from shade. To find out where extreme heat was most impactful, Fresno County's Heat Vulnerability Index (HVI) was developed to identify neighborhoods most at risk. The HVI looks at four factors: how hot an area gets; how many people and heat-absorbing surfaces are present; community health and demographic sensitivities; and access to resources like trees, parks, transportation, and income. Results showed the highest vulnerability in many urban, southern, and western parts of the county, where dense development, lower incomes, and fewer cooling resources overlap.

To understand how extreme heat vulnerability intersected with active transportation routes, a walking and biking analysis was performed to identify locations in Fresno County where adding shade would best protect people from extreme heat. Active transportation projects and transit stops were evaluated by heat vulnerability, transit access, nearby destinations, and existing gaps or lack of shade. This study resulted in a ranked list of active transportation projects and transit stops across Fresno County where adding shade would most effectively reduce heat exposure for people walking, biking, and riding transit. Once this list was produced, it was cross-referenced with community engagement feedback and verified on the ground. The five template projects selected are illustrated in Chapter 5.

CHAPTER 4. IMPROVEMENTS

This chapter details 10 heat mitigation improvements that can be used in active transportation facilities in Fresno County. These improvements include median expansion, tree-shaded walking and biking routes, green alleyways, vegetated swales, expanded planting areas, bus stop retrofits, separated bike lanes, and shade sails. Details provided for the improvements include model projects, resources and standards, case studies, and costs to consider. Many of the improvements are included in the five template projects illustrated in Chapter 5.



CHAPTER 5. PRIORITY PROJECTS

This chapter covers the five template projects selected for this Plan following data analysis and community engagement. Each project includes visual renderings and implementation issues considered, as well as a planting pallet for vegetative shade.



1

Community Engagement Summary

Community Engagement Plan

Shortly after the project kickoff, in April 2025, the project team finalized a comprehensive Public Engagement Plan (PEP) to guide community participation in the Plan. The outreach plan provided a roadmap of the community input needed to inform the plan, methods to reach a wide range of community members, and how to collect and integrate the data gathered. The purpose of conducting community outreach and engagement was to involve people throughout the planning process, share information about extreme heat impacts, create meaningful opportunities for residents to offer their feedback, and incorporate community input into decisions related to the analysis. The engagement program ultimately included 11 distinct activities: ongoing social media and email outreach, five pop-up tabling events, two virtual public workshops, and two Working Group meetings. An important component of the outreach process was identifying a broad range of interested parties and creating a comprehensive database for Constant Contact distributions, ensuring opportunities for a wide variety of people, organizations, interested parties, and agencies to participate in the planning effort.

Social Media and Email Outreach

Following the finalization of the plan, social media and email newsletter content was developed to introduce the project to the community and invite participation in the process. Social media posts were made on Facebook and Instagram via a scheduling platform to appear several times throughout the weeks prior to each engagement activity, offering details on how to participate (**Figure 2**). For the email communications, the project team created and continually updated an interested party database containing names, organizations, agencies, and email addresses for incorporation into Constant Contact distributions. This database was used to share information, materials, and updates related to the project and was expanded as new interested parties were identified. All messages were distributed in both English and Spanish to ensure accessibility for the region's diverse population (**Figure 3**). These digital outreach efforts helped build awareness of the project and drove engagement with the in-person and virtual engagement activities.

Figure 2: Social Media Posts



Figure 3: Email Outreach Messages



Tabling Events

Five pop-up tabling events were held during May and June 2025 at high-traffic community locations throughout Fresno County. Events took place at the River Park Farmers Market in Fresno, Save Mart on Manning Avenue in Reedley, the Old Town Clovis Farmers Market, the Selma Flea Market, and the Kerman Farmers Market. These events were intentionally scheduled during a period when Fresno County was experiencing high temperatures, making the topic of extreme heat especially relevant to participants. The pop-up booths were staffed by project team members, including bilingual staff, and featured visual preference survey display boards, comment cards, project overview materials, and flyers about how to stay involved. All materials were available in both English and Spanish, with QR codes providing electronic access to online versions.

Participants engaged in dot exercises to indicate their priorities for shade infrastructure and their favorite benefits of trees and provided written feedback on comment cards about their

experiences with extreme heat and specific locations needing more shade (**Figure 4**). To encourage participation, staff distributed stickers depicting various transportation modes and trees, which proved effective at attracting families with children, teenagers, and older adults. Feedback from the tabling events revealed that participants consistently described Fresno County as "very hot, overwhelming, and sometimes even dangerous." Commonly mentioned locations needing more shade included schools and playgrounds; bus stops and transit corridors (especially along Shaw Avenue); high-traffic streets, such as Clinton Avenue, Shields Avenue, McKinley Avenue, and Dakota Avenue; and neighborhoods in Reedley, Orange Cove, and Southeast and Southwest Fresno. The dot exercise results showed strong support for biking and walking trails, school crosswalks, and bus stops in both rural and urban areas as priority infrastructure (**Figure 5**). Participants recognized cleaner air, shade, and healthier communities as the most valued benefits of expanded tree canopy.

Figure 4: Pop Up Comment Card

Fresno County Heat Vulnerability Analysis and Shade Adaptation Plan

FRESNO
Council of Governments

We want to hear your thoughts about heat and shade.

1) What is your experience with extreme heat in Fresno County?
No shade when getting exercise

2) What are some specific locations you would like to have more shade?
Schools

3) What walking and biking routes need more trees?
neighborhoods in Reedley

4) What types of shade solutions would you prefer (e.g., trees, shade structures, bus shelters)?
(e.g., trees, shade structures, bus shelters)

Análisis de vulnerabilidad al calor y plan de adaptación a la sombra del Condado de Fresno

FRESNO
Council of Governments

Queremos conocer su opinión sobre el calor y la sombra.

1) ¿Cuál es su experiencia con el calor extremo en el condado de Fresno?
Mucho calor

2) ¿En qué lugares específicos le gustaría tener más sombra?
Orange Ave (walking trail)

3) ¿Qué rutas para caminar y andar en bicicleta necesitan más árboles?
Orange Ave

4) ¿Qué tipos de soluciones de sombra preferiría (por ejemplo, árboles, estructuras de sombra, casetas de autobuses)?
Arboles

Fresno County Heat Vulnerability Analysis and Shade Adaptation Plan

FRESNO
Council of Governments

We want to hear your thoughts about heat and shade.

1) What is your experience with extreme heat in Fresno County?
Gets verry hot here

2) What are some specific locations you would like to have more shade?
etc Riverview School Play grounds

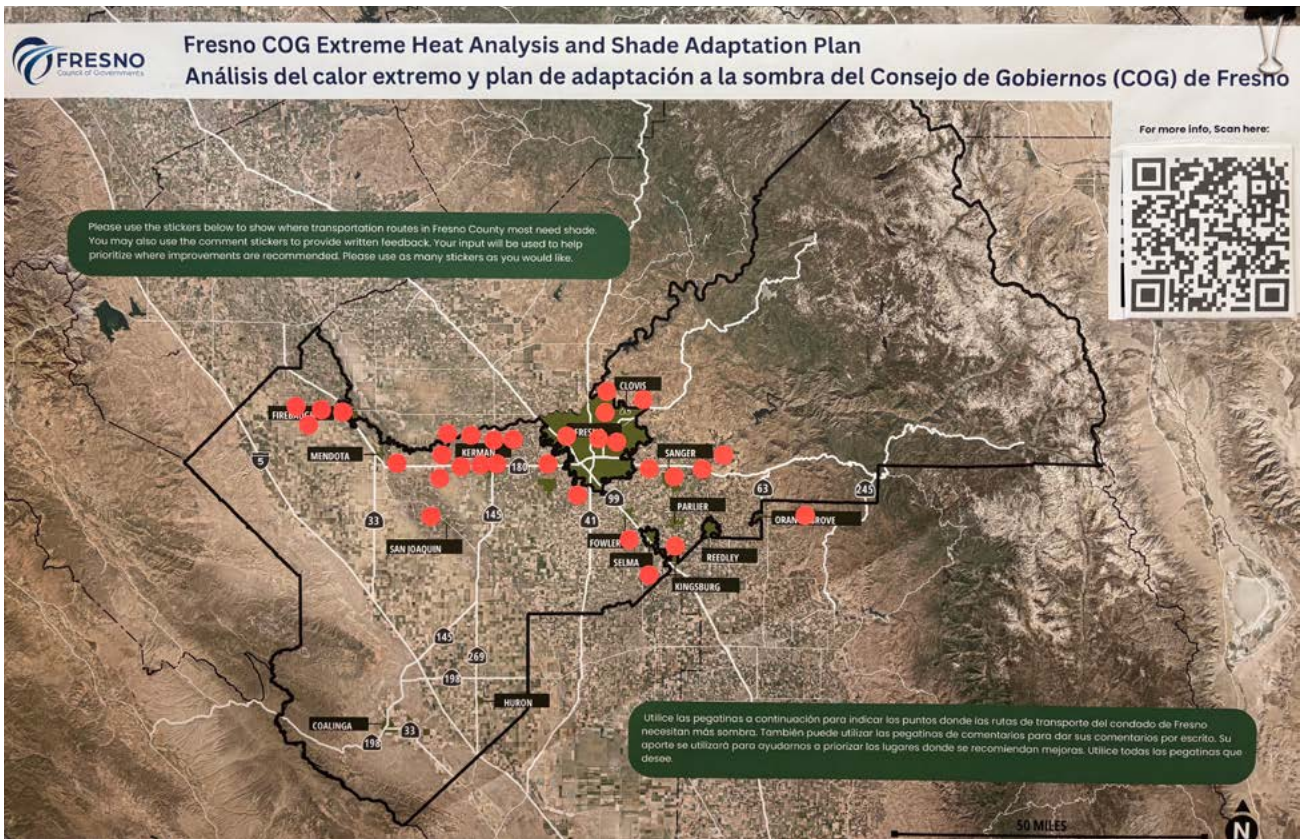
3) What walking and biking routes need more trees?
Parks mostly

4) What types of shade solutions would you prefer (e.g., trees, shade structures, bus shelters)?
trees maybe more structures trailwalks

Figure 5: Tabling Exercise Results

# OF DOTS: Favorite Things About Trees	# OF DOTS: Routes that Would Benefit from Shade
Cleaner Air: 112	Bike Lanes and Sidewalks in Residential Areas: 41
Shade: 110	Sidewalks in Commercial Areas: 55
Energy Savings: 16	Bus Stops in Urban Areas: 62
Wildlife Habitat: 56	School Crosswalks: 76
Healthier Communities: 61	Bike Lanes in Thoroughfares: 26
Rainwater Capture: 14	Bike Lanes in Commercial Areas: 22
	Bus Stops in Rural Areas: 65
	Biking and Walking Trails: 123





Public Workshops

Two virtual public workshops provided opportunities for deeper community dialogue about extreme heat impacts and potential solutions. The first workshop, held in June 2025, introduced the project and engaged participants in visioning exercises, virtual feedback boards, and voting exercises on priority locations for shade infrastructure. Facilitated discussions explored who is most impacted by extreme heat, where impacts are felt most acutely, and how different types of transportation infrastructure—sidewalks, bike lanes, bus stops, and trails—could be improved. Participants identified vulnerable populations, including older residents, children, individuals with disabilities, unhoused community members, transit-dependent riders, and students, as those most affected by heat exposure.

The second workshop in November 2025 presented a summary of input gathered from all public outreach activities, shared findings from the review of existing plans and policies, discussed the heat vulnerability analysis, and reviewed the data analysis and project screening methodology. Participants provided feedback on challenges and solutions for five project template types: urban commercial corridors, suburban neighborhood connectors, transit stops, rural town main streets, and community trails (**Figure 6**). Feedback highlighted concerns about extensive pavement and heat buildup, lack of trees and green space, infrastructure designed without shade considerations, and the need for both natural shade (trees) and structural solutions (shade sails, awnings, artistic structures). Both workshops were promoted through flyers, Constant Contact messages in English and Spanish, social media posts, and the project website.

Figure 6: Participant Responses During Workshop #1



WHO	WHERE
families/local commuters/college students	I think streets that span east and west are the most affected trails, transit routes, commercial corridors
families, students, workers	bike routes which are not explicitly marked but experience high rates of travel McKinley Ave, from airport to Fresno City College, Clovis Ave from City of Clovis to Airport. eastside cities, SW Fresno Downtown Fresno, Reedley College, Fresno College
WHEN	HOW
We would need to have bike routes first :(	If feasible, shift pedestrian/bicycle access into "green belts" as much as possible to avoid planting trees in difficult areas. Retrofit and develop existing areas that can accept new shading easier than fighting the southern exposure areas.
asap and with development	transportation funding to include the addition of micro transit utilizing grants Coordinate with the local irrigation districts to improve canal banks to open access.

Working Group Meetings

A dedicated Working Group convened twice during the planning process to provide technical guidance and ensure diverse regional perspectives shaped the analysis. The Working Group included representatives from the City of Fresno, an eastside city, a westside city, the County of Fresno, the County of Fresno Department of Public Health, an active transportation organization, and community-based and nonprofit organizations.

The first Working Group meeting in May 2025 introduced the project, reviewed the PEP, gathered input on vulnerability indicators and criteria for location analysis of vulnerable corridors, and discussed the needs of local governments and interested parties. Members recommended using walk studies to prioritize shade along school routes, emphasized collaboration between local governments and the private sector to address tree-planting and maintenance challenges, and requested that unincorporated county communities with lower-income residents be included in outreach efforts.

The second Working Group meeting in October 2025 reviewed input from public outreach activities and discussed challenges for each of the five project template types. Members identified specific barriers, including sparse tree canopy due to utilities and limited space, incomplete or unsafe sidewalks, lack of shade structures at transit stops, insufficient hydration points along trails, and permitting barriers in rural areas (**Figure 7**). Discussion highlights included the importance of including unincorporated communities like Tranquility and Raisin City, the need for greater emphasis on urban design improvements such as storefront canopies, and using Orange Cove as a model for green space pathways. Members also referenced shade planning resources from Arizona, Las Vegas, and cool pavement efforts in Los Angeles as potential models for Fresno County. This feedback directly informed the development of the five replicable project templates and was incorporated into the final plan.

Figure 7: Participant Responses During Workshop #2

What limitations make it hard to add shade or trees suburban neighborhood connectors? 10 / 16 16

Lack of right of way	Lack of control of the private property for tree placement
Irrigation needs	Funding
Removal without replacement	Funding opportunities
For private residents, trees are expensive to maintain AND insurance wants them kept cut back	Time, trees won't mature within a few years to yield any shade
Outside of City jurisdiction	Maintenance
Determination of who is responsible for maintenance	A inability to reflect on qualitative aspects of trees and as a calming technique.
Lack of right of way, cooperation of homeowners can be difficult, lack of space	Tree theft? Happened to a park in the city of Madera.
Kids, cyclists	Majority of our transit stops are just a sign stuck in a dirt pile on the side of the road

Public Review of Draft Plan

This section will reflect public comment and adoption.



2

Plan Review and Recommendations

This Plan provides an analysis of **extreme heat vulnerability** in Chapter 4 and sets forth an implementation plan that builds upon existing plans and initiatives. Because FCOG leads regional transportation planning, this analysis emphasizes strategies for adapting **active transportation infrastructure** to better serve riders, walkers, and cyclists during extreme heat events. Effective heat resilience requires both mitigation strategies that reduce extreme heat and management approaches that improve how people and systems respond to heat exposure. The following review looks at existing extreme heat adaptation policies across the region and compares them to best practices and models from successful adaptations elsewhere.

HOW THIS SECTION IS ORGANIZED

The analysis is structured in three parts. The Planning Context section reviews existing plans throughout the region, describing their relationship to extreme heat and potential applications for local governments. The Heat Resilience Strategies section organizes policies from these plans into eight mitigation and management categories, introducing the theory behind the strategies and then providing a high-level review of how the region currently approaches extreme heat resilience. The Conclusion identifies specific gaps and opportunities in current planning efforts, which will directly inform the recommendations developed in this Plan.

INFORMED BY OUTREACH

To better understand how local governments are planning for heat resilience, a survey was sent to staff in every local government asking for input on local challenges and opportunities. The results of this survey is available in Appendix B. Responses to this survey are referenced throughout this document in order to add local nuance to the regional findings. Additionally, community engagement was performed for this plan, summarized in Chapter 1, Community Engagement Summary.

Extreme Heat Vulnerability

The susceptibility of individuals or communities to adverse impacts from high temperatures. Determined by exposure levels, sensitivity factors (age, health, income), and adaptive capacity (cooling access, resources). Vulnerable groups include older adults, children, outdoor workers, those with chronic conditions, low-income households, and communities lacking air conditioning and/or urban green spaces.

Active Transportation Infrastructure

Physical facilities and systems that support human-powered mobility, including sidewalks, bike lanes, trails, pedestrian crossings, transit stops, and bike parking. Infrastructure designed to safely accommodate walking, cycling, and connections to public transit, often incorporating accessibility features, lighting, shade structures, and traffic-calming measures to encourage non-motorized transportation.

Planning Context

STATE PLANS

CALIFORNIA EXTREME HEAT ACTION PLAN

The California Natural Resources Agency and the Governor’s Office of Land Use and Climate Innovation has developed the nation’s most comprehensive state-level extreme heat planning framework, centered on a formal statewide action plan released in April 2022. The Protecting Californians From Extreme Heat: A State Action Plan to Build Community Resilience plan represents a coordinated effort across more than 20 state agencies to address what officials identify as California’s most deadly climate hazard. The approach organizes response efforts through interconnected action tracks that span prevention, response, and long-term resilience. The effort created the California Communities Extreme Heat Scoring System (CalHeatScore), and the Heat Ready California website, which provides comprehensive information and resources for heat adaptation and heat illness prevention to the public. These programs are designed to assist state and local governments in taking action to reduce risks posed by extreme heat, including support for local government planning and response.

REGIONAL PLANS

FCOG: TRANSPORTATION NETWORK VULNERABILITY ASSESSMENT

This report, conducted in response to California Senate Bill 379 requirements to address climate adaptation. The report evaluates how climate hazards—including extreme heat, flooding, wildfire, and landslides—affect transportation infrastructure and system reliability. It incorporates community engagement, stakeholder input, and technical analysis to identify vulnerable assets and populations. Results highlight risks to critical roadways, bridges, and transit services, particularly for disadvantaged communities. The report also outlines adaptation strategies and resilience principles to guide future planning,

investment, and policy decisions that improve transportation system performance under changing climate conditions.

LOCAL PLANS

FCOG: FRESNO COUNTY CLIMATE RESILIENCY PLAN

This Plan provides a strategic framework for building climate resilience across the County’s transportation infrastructure. This plan assesses the vulnerability of assets to climate impacts, including flooding, wildfire, landslides, and extreme heat, and recommends adaptation projects that address both climate risks and local community needs. These recommended projects will be considered for inclusion in FCOG’s 2026 Regional Transportation Plan/ Sustainable Communities Strategy. While much of the analysis was focused on impacts to infrastructure, the assessment of extreme heat risks additionally looked at impacts to ridership. As such, included in these recommendations are urban and rural bus stops most in need of shade, and these findings will be used to inform the recommendations in this Plan.

FCOG: PRIORITY CLIMATE ACTION PLAN

The FCOG Priority Climate Action Plan (PCAP) was adopted in 2024. The PCAP is the first component of the Regional Climate Action Plan and includes priority greenhouse gas (GHG) emissions reduction measures, one of which would result in extreme heat mitigation as a co-benefit. The PCAP also includes a GHG inventory, a public outreach process, identification and quantification of priority GHG emissions reduction measures, a benefit analysis for low-income and disadvantaged communities, and identification of implementation authorities. The Regional Climate Action Plan will cover the 15 incorporated cities in Fresno County and the unincorporated County areas and will provide a roadmap to reducing GHGs in these locations.

FCOG: REGIONAL TRANSPORTATION PLAN

FCOG's Regional Transportation Plan (RTP) provides essential infrastructure analysis and climate vulnerability assessments that will inform the development of this Plan. As noted above, the Fresno County Climate Resiliency Plan makes recommendations on how to mitigate climate hazard impacts, including heat, on the transportation system, which will feed into the 2026 RTP update. This transportation planning foundation will assist the planning team in understanding infrastructure vulnerabilities, help identify cooling corridors along transit routes, and integrate heat mitigation strategies with regional mobility needs, ensuring transportation systems remain functional during extreme heat events while supporting equitable access to cooling resources.

FRESNO COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

The Multi-Jurisdictional Hazard Mitigation Plan (MJHMP) is a countywide plan and includes annexes (appendices) for the 17 communities and special districts in Fresno County. The MJHMP was developed in 2024 and is a strategic policy document intended to reduce or eliminate the impact of natural or human-caused hazards, including wildland fire, earthquake, drought, flooding or dam failure, and extreme heat. The MJHMP is updated every 5 years and contains a series of goals and policies related to these potential hazards, including three related to extreme heat, which guides the preparation of this Plan.

FRESNO COUNTY EMERGENCY SERVICE MASTER PLAN

The County's Office of Emergency Services created the Emergency Service Master Plan to guide response procedures during large-scale emergencies and disasters throughout unincorporated areas and other jurisdictions within Fresno County. The plan addresses multiple climate hazards, including floods, wildfires, extreme weather events (severe storms, extreme temperatures, drought, tule fog, and high

winds), epidemics and pandemics, agricultural emergencies, and dam failures. Recognizing the need for inclusive emergency planning, the plan specifically considers vulnerable populations, including individuals with disabilities, chronic health conditions, and limited English proficiency; older adults; children; low-income residents; people experiencing homelessness; transit-dependent individuals; pregnant women; and those in institutional settings.

CITY OF FRESNO GENERAL PLAN

The City's General Plan is a statement of long-range public policy to guide the use of private and public lands in Fresno. This plan establishes the overall vision for Fresno, reflecting the aspirations and values of Fresno's residents. It serves as the foundation for decisions by elected and appointed officials for long-term planning. The Safety Element addresses risks to health and safety, such as flooding, erosion, and wildfire, but does not yet explicitly address extreme heat. However, the City is currently updating the General Plan with environmental justice and housing policies, which will directly address extreme heat. The General Plan also contains policies related to urban greening, emergency sheltering, and energy conservation, which are extreme heat mitigation strategies.

FRESNO COUNTY GENERAL PLAN

The Fresno County General Plan, updated in 2024, establishes critical planning frameworks that will inform the Plan. The Fresno County General Plan serves as the guiding document for development in the unincorporated areas of Fresno County. The update includes a new Environmental Justice Element designed to protect disadvantaged communities from harmful pollution, addressing many of the same vulnerable populations most at risk from extreme heat events. Additionally, the Health and Safety Element includes eight heat-related resilience policies providing essential groundwork for regional heat planning.

CITY OF FRESNO URBAN FOREST MANAGEMENT PLAN

The City's Urban Forestry Management Plan (UFMP) represents an ambitious 40-year strategy to increase Fresno's tree canopy from 14.6% to 20% coverage. Approved by the Fresno City Council in May 2024, the plan sets a goal of planting approximately 4,600 new trees annually over the next four decades, totaling around 80,000 new trees. The initiative prioritizes equity by targeting neighborhoods south of Shaw Avenue with limited canopy cover. These areas are designated as high- or mid-level priority for new tree plantings. The UFMP addresses climate resilience by promoting

drought-tolerant species adapted to Fresno's future climate conditions. Implementation faces funding challenges, as the City currently already struggles to fund its existing goal of 1,000 trees annually, often requiring state grants for fulfillment. The UFMP addresses the urban heat island effect, which disproportionately impacts lower-income neighborhoods. The UFMP provides a critical foundation to the Plan by establishing tree canopy expansion as a key heat mitigation strategy for the most populous area of the region.



Heat Resilience Strategies

Increasing heat resilience in a region requires effective coordination between different disciplines and sectors, and various levels of government. Resilience results from the practical implementation of both mitigation and management strategies, which are outlined below and illustrated in **Figure 8. The co-benefits of each strategy will appear as icons which are shown in the legend at the bottom of the page.**

MITIGATION

Heat mitigation strategies aim to reduce the built environment's contribution to extreme heat through design and planning interventions, such as the following:

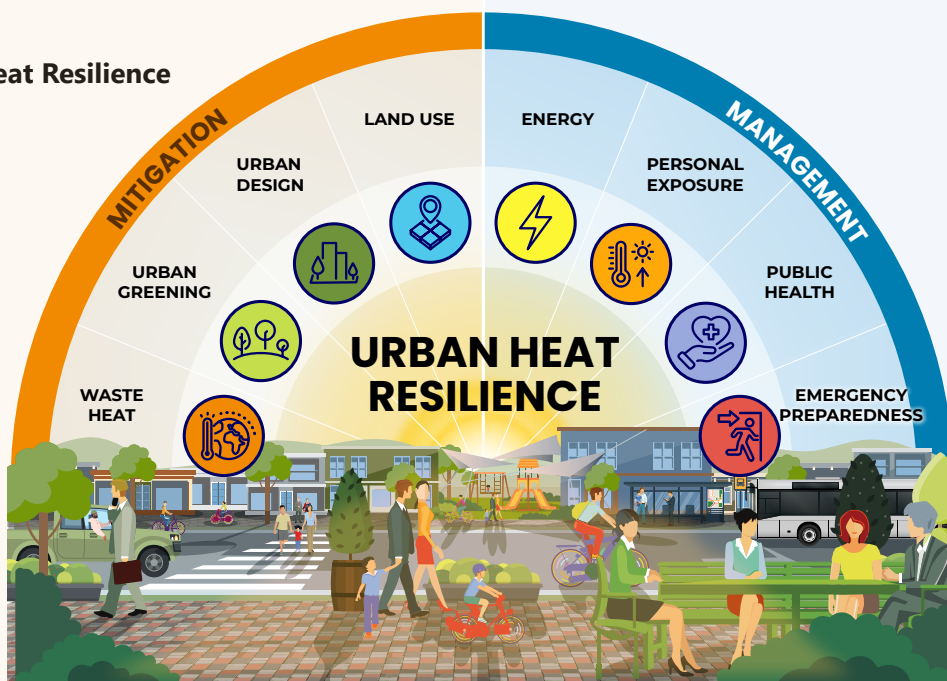
- **Waste Heat:** Weatherization programs, cool roofs, waste heat reduction
- **Urban Greening:** Parks, urban forests, water features, green roofs, green stormwater infrastructure
- **Urban Design:** Built shade, cool pavements, building and street orientation
- **Land Use:** Ventilation corridors, greenspace conservation, urban geometry, building massing

MANAGEMENT

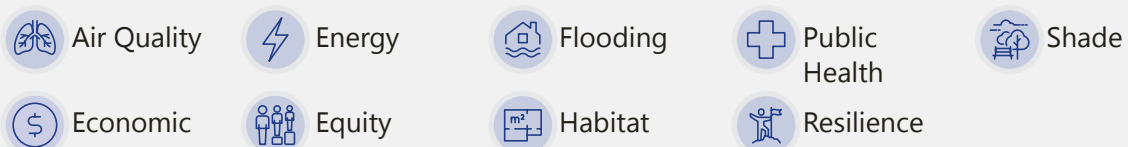
Heat management strategies aim to prepare for and respond to extreme heat and address the following:

- **Energy:** Air conditioning, grid resilience, accessible and affordable energy
- **Personal Exposure:** Transit system operations, parks and trails operations, worker safety
- **Public Health:** Education and awareness
- **Emergency Preparedness:** Early warning systems, heat response plans, cooling centers

Figure 8.
Urban Heat Resilience



CO-BENEFITS





WASTE HEAT



WHAT IT IS

Waste heat is an excess of heat released into cities from the mechanical processes of human activities. Major sources include power plants, factories, data centers, air conditioning systems, and automobiles. Cars, trucks, and other vehicles generate significant heat from engines and exhaust. This added heat worsens urban heat islands, making cities hotter than surrounding areas and intensifying dangerous heat conditions.

WHY IT MATTERS

Urban areas generate substantial waste heat, creating a significant yet frequently overlooked factor in the urban heat island effect. Building energy efficiency improvements, including weatherization and cool surface materials, can substantially reduce waste heat from air conditioning and other mechanical systems. Similarly, reducing vehicle dependence through strategic transit planning and active transportation infrastructure decreases heat generation while providing the added benefit of lowering local GHG emissions.³

CO-BENEFITS:



Energy



Air Quality



Public Health

HOW ARE OTHER COMMUNITIES ADDRESSING WASTE HEAT?

New York State's heat waste recovery program provides funding for heat waste recovery projects that recover wasted heat generated by buildings and recycle it directly at point of use or store it for later.

Cooling Portland: A PCEF-funded climate resilience program | Portland.gov delivers and installs heat pump cooling units to Portlanders most at risk for heat-related illness. In December 2024, the Portland City Council approved expanding this groundbreaking program to reduce risk of heatwave deaths over the next 2 years. The Portland Clean Energy Community Benefits Fund (PCEF) will add \$10.3 million to the Cooling Portland program, allowing it to help 10,000 additional households through 2026.

CONSIDERATIONS FOR FRESNO REGION

California researchers recently developed technology that recovers 80% of wasted industrial heat below 300°F at 80% lower cost than alternatives. Successfully tested at a brewery and winery, the technology⁴ could save natural gas costs annually while reducing GHG emissions.



WASTE HEAT PLANNING IN FRESNO COUNTY

Among FCOG jurisdictions, waste heat mitigation is generally addressed through building code and weatherization assistance programs, with waste heat reduction as a co-benefit.

Policies from the Fresno County General Plan include the following:

- Support programs to provide financial assistance for the retrofitting of homes whose property owners are income qualified (such as water and energy efficiency upgrades, improved insulation, renewable energy upgrades, use of electric appliances, consideration of air quality, access to indoor cooling, structure hardening if the homes are in wildfire zones, and elevating if homes are in flood zones).
- The FCOG PCAP includes a measure calling for incentive programs for the purchase of certified energy-efficient appliances, heating and cooling equipment, lighting, and building products to replace inefficient products.

As the agency responsible for comprehensive regional transportation planning, FCOG has adopted many policies related to increasing access to active transportation and reducing vehicle miles traveled (VMT).

Polices from the RTP 2022 include the following:

- Encourage alternatives to single-occupancy vehicles that reduce VMT and GHG emissions.
- Support investment in and promotion of active transportation and transit to improve public health and mobility, especially in historically underinvested areas.

California's Green Building Code (CALGreen) addresses urban heat through a tiered voluntary framework rather than mandatory requirements. Local governments need to adopt these more stringent standards, which aim to minimize the creation of heat islands in new construction to reduce the energy load for building cooling and to moderate atmospheric temperature.

CALGreen's urban heat island measures exist primarily as voluntary Tier 1 and Tier 2 provisions rather than mandatory requirements. No Fresno County local government has adopted these enhanced standards; however, existing building standards include minimum appliance and heating, ventilation, and air conditioning (HVAC) efficiency standards, insulation R-Value minimums, and smart thermostats for new buildings or remodels.

LOCAL IMPLEMENTATION EXAMPLES:

Income-eligible Fresno County residents can receive weatherization and heat pump installation assistance. Additionally, multiple federal and state rebate and incentive programs are available, which can be combined with Pacific Gas and Electric Company offerings. Investments from Caltrans include those in infrastructure improvements that make public transportation, walking, and biking easier, safer, and more efficient, which reduces VMT and waste heat.

RECOMMENDATIONS:

Weatherization and cooling assistance programs should include renters, who currently face barriers to eligibility. There is additional opportunity to strengthen connections between VMT reduction goals in the RTP and heat mitigation benefits, framing active transportation investments as dual-purpose climate strategies. Vehicle waste heat is an underestimated contributor to urban heat islands; enhancing walking, bicycling, micromobility, and transit options can reduce this impact while improving thermal comfort and air quality. Mixed-use land development patterns further decrease vehicle usage and associated waste heat. State support for electric vehicle (EV) adoption is a heat mitigation strategy, as EVs emit significantly less waste heat than traditional combustion engines.



URBAN GREENING



WHAT IT IS

Urban greening, including urban forestry, green stormwater infrastructure, green roofs, parks, and greenways, effectively mitigates heat islands and cools microclimates. This integrated network of planned and unplanned green spaces across public and private areas provides essential heat mitigation through evapotranspiration and strategic shade. Urban greening strategies include urban forestry, parks and open space, green stormwater infrastructure, green roofs and walls, and water features.

WHY IT MATTERS

Urban greening projects can reduce air temperatures in the area by up to 5 degrees while also providing shade, which reduces heat exposure even further. Vegetation also delivers co-benefits including flood risk reduction, ecological habitat creation, and psychological wellness for community members, making holistic green systems a critical component of urban heat resilience. The many benefits of urban greening make it the most popular strategy for combatting urban heat.

CO-BENEFITS:



Air Quality



Shade



Equity

HOW ARE OTHER COMMUNITIES ADDRESSING HEAT WITH URBAN GREENING

Streets for People Tree Opportunity

Analysis demonstrates an effective model for integrating heat vulnerability with infrastructure opportunity at the street level. A similar analysis for transportation corridors across Fresno County would result in a database identifying where vegetative shade investments could provide maximum heat protection for active transportation users by integrating this Plan's HVI data with tree canopy coverage mapping and planting feasibility assessments.

Green Alleys - Trust for Public Land transform service corridors with permeable pavements, shade structures, and drought-tolerant vegetation to reduce urban heat and manage stormwater. These retrofits address flooding in residential areas while creating cooler microclimates in heat-vulnerable neighborhoods. Los Angeles's approach prioritizes equity by targeting alleys in communities with limited green space and high heat exposure.

CONSIDERATIONS FOR FRESNO REGION

For Fresno's urban greening initiatives, addressing green gentrification requires proactive planning to prevent displacement of existing residents. When parks are developed in historically marginalized neighborhoods, they can trigger increases in housing prices and attract wealthier residents, potentially displacing longtime community members—the very populations these equity efforts aim to serve. Anti-displacement strategies can help to prevent this, but only if implemented early. Key considerations include preserving affordable housing near new green spaces through zoning protections and community land trusts, ensuring meaningful community engagement with existing residents in planning processes, coordinating parks development with affordable housing initiatives, and establishing anti-displacement monitoring systems. Given Fresno's socioeconomic diversity and history of environmental inequities, pairing greening investments with robust tenant protections and affordable housing preservation will improve equity of outcomes.⁵

URBAN GREENING PLANNING IN FRESNO COUNTY

The planning for urban greening in Fresno County region is perhaps the most robust of the region's mitigation strategies; however, implementation and enforcement lag due to a lack of funding and capacity.

The City of Fresno has recently updated the Parks Master Plan and adopted a new UFMP, both of which contain many policies to expand the urban forest and increase vegetated shade. **The UFMP includes policies to increase tree canopy, including the following:**

- Pursue funding for the Green Street Tree Planting Program, including landscaping of median islands.
- Plant 3,447 new trees per year over 20 years to achieve 20% canopy cover goals.
- Achieve a 20% citywide canopy cover over the next 40 years.
- Focus tree planting initiatives on schools, mixed-use areas, and commercial areas and on census tracts with high-priority planting scores.
- Increase tree planting near bus stops, paths, and trails with 0%–10% canopy cover.

Tree Fresno is a nonprofit environmental stewardship organization founded in 1985 that has planted over 42,000 trees throughout the San Joaquin Valley. The program transforms communities through tree planting, greenway development, and beautiful landscapes while promoting health, air quality improvement, and water conservation. Tree Fresno offers volunteer opportunities including tree care and planting, tribute trees honoring veterans and community members, community landscape plans, and educational events. Members receive tree seedlings, educational resources, and event tickets while supporting the organization's mission to raise Fresno's park quality, develop the Valley Arboretum greenway system, and teach environmental stewardship to every citizen.

LOCAL IMPLEMENTATION EXAMPLES:

Fresno's \$66.5 million Transformative Climate Communities grant has funded significant urban greening initiatives in southwest Fresno, Chinatown, and downtown since 2018. The Inside Out Community Garden at Sunset Community Center provides neighborhood food access and education. Currently underway, the Chinatown Urban Greening Project will install trees, lighting, and green infrastructure along F, Kern, and Mariposa Streets by 2025. These community-selected projects emerged from an unprecedented participatory process involving 160+ residents, demonstrating grassroots climate action in California's most disadvantaged communities.

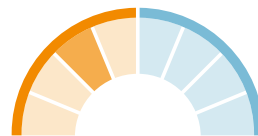
RECOMMENDATIONS:

A comprehensive green infrastructure toolkit could support local jurisdictions in implementing stormwater management practices that integrate vegetative shade. The toolkit should offer standardized design guidelines, technical specifications, and implementation resources adaptable to local contexts, with guidance on practices suited to Fresno County's climate that capture stormwater while providing shade. California's Climate Bond, a \$10 billion measure passed in November 2024, may offer new funding sources for this work.

A regional street tree gap analysis would help identify areas in need of shade. Combined with HVI data from this Plan, statewide resources including California Heat Assessment Tool projections, canopy data, and lidar land cover⁶ classifications can provide the necessary spatial analysis foundation without new data collection. Analysis would quantify jurisdictional disparities in tree infrastructure across urban and rural communities, enabling coordinated investments addressing documented vulnerabilities.



URBAN DESIGN



WHAT IT IS

Urban design directly impacts the urban heat island effect. Regulated through zoning, land-use codes, and development guidelines, effective urban design mitigation strategies include strategic building and street orientation for maximum shade, installation of shade structures, and implementation of cool materials for pavements, walls, and roofs.

WHY IT MATTERS

Site-level urban design decisions influence both citywide heat island effects and local microclimates, impacting human health and outdoor usability. For example, cool pavement technologies can reduce surface temperatures by 10°F–20°F.⁷

CO-BENEFITS:



Public Health

HOW ARE OTHER COMMUNITIES ADDRESSING HEAT WITH URBAN DESIGN?

[The City of Phoenix Shade Action Plan](#) calls for the installation of 550 shade structures. These structures are intended to expand access to shaded areas along pedestrian routes, at transit stops, and in other public spaces where residents may be exposed to extreme heat.

The City of Los Angeles Cool Roof Ordinance⁸, passed in December 2013, requires all new residences, or existing residences undergoing roof renovations, to install cool roof products. This includes single-family and multifamily buildings. To aid this transition, the Los Angeles Department of Water and Power offers cool roof rebates.

[Depave](#) is a nonprofit organization based in Portland, Oregon, that promotes the removal of unnecessary pavement from urban areas to create community green spaces and mitigate stormwater runoff. Through community partnerships and volunteer engagement, Depave strives to overcome the social and environmental impacts of pavement with the use of action-oriented educational events, community stewardship, and advocacy to reconnect people with nature and inspire others.

CONSIDERATIONS FOR FRESNO REGION

During community engagement for this plan, community members expressed a clear desire for additional shade trees, especially along pedestrian, bicycle, and transit corridors. Strategically implemented urban greening policies can provide this essential protection for vulnerable populations.



URBAN DESIGN PLANNING IN FRESNO COUNTY

Urban design regulations in Fresno County addressing extreme heat operate primarily through state-mandated building energy efficiency standards rather than comprehensive heat island reduction requirements.

There are several newer policies related to shade in the Fresno County General Plan, as detailed below.

- The Health and Safety Element includes Policy HS-G.7: “The County shall utilize drought-tolerant plantings and shade structures for applicable County projects as part of cooling strategies in areas with impermeable surfaces to help reduce heat islands and energy demand during extreme heat events. Project implementation shall be prioritized in disadvantaged unincorporated communities.”
- The Environmental Justice Element includes Policy EJ-A.13: “Automobile parking areas for new industrial development shall be planted with trees in a manner to provide adequate shade cover of at least 35% of the parking area utilizing trees or a combination of trees and photovoltaic solar shade structures. Landscaping for new industrial development shall use drought tolerant species with low biogenic emissions.”

One of Fresno’s Specific Plans, the Fulton Corridor Specific Plan, offers several urban design policies aimed at addressing urban heat.

- Introduce new buildings that employ passive cooling and heating strategies, including frontage types (porches and arcades), architectural elements (overhangs, awnings, shutters, louvers, canopies, and trellises), and strategically placed shade trees to minimize or increase solar heat gain according to the season.
- Enhance pedestrian comfort by shading the sidewalk with continuous street trees, arcades, and awnings and by introducing pedestrian-scaled lighting, street furniture, and enhanced paving.

Additionally, the development code in both the City of Clovis and the City of Fresno, requires 50% of parking lots be shaded.

LOCAL IMPLEMENTATION EXAMPLES: Fresno State interior design and architecture students collaborated with the City of Fresno to design innovative bus shelters for extreme summer heat. About 40,300 people ride Fresno Area Express (FAX) buses daily, often waiting up to 20 minutes with little to no shade during triple-digit temperatures. Students created modular, easily maintainable designs using solar analysis software to maximize shade coverage. The shelters can be installed with pickup trucks rather than cranes, allowing for easy expansion and component replacement. Five winning designs were selected at Fresno City Hall and are moving toward implementation citywide.

RECOMMENDATIONS:

While urban design regulations fall outside FCOG’s direct authority, a supportive role can be played in advancing heat-responsive design across the region. For example, this Plan provides templates for repeatable projects focused on providing shade. Staying abreast of best practices from communities like Phoenix and Los Angeles can help support knowledge of shade structure innovations, cool pavement specifications, and design guidelines that can be implemented by local governments. Shade and cool surface requirements could also be incorporated into funding criteria for regional transportation projects, incentivizing heat-conscious design into local infrastructure.



LAND USE



WHAT IT IS

Strategic land-use planning is essential for heat mitigation because development patterns directly influence local climate and heat exposure. Key approaches include preserving natural areas, creating **ventilation corridors**, and reducing heat-trapping surfaces like roads and parking lots. Urban expansion intensifies heat islands, but planners can build resilience by integrating heat mitigation strategies into development decisions at city and regional scales.

WHY IT MATTERS

Any expansion or growth of an urban area will likely increase the urban heat island effect if heat mitigation strategies are not applied.

Ventilation Corridor

A ventilation corridor is a designated pathway that allows air to flow through urban areas, connecting cooler zones to dense city centers to reduce heat buildup and improve air quality.

CO-BENEFITS:



Flooding



Air Quality



Habitat

HOW ARE OTHER COMMUNITIES ADDRESSING HEAT WITH LAND USE PLANNING?

Green Area Ratio Overview | [doee](#) An environmental sustainability zoning regulation that sets standards for landscape and site design to help reduce stormwater runoff, improve air quality, and keep the city cooler.

RiverSmart Permeable Surface Rebates | [doee](#) District homeowners who remove impervious surfaces and replace them with permeable pavement or revegetate them to reduce and/or treat stormwater runoff from impervious surfaces on their property are eligible for a rebate.

CONSIDERATIONS FOR FRESNO REGION

Measure P is Fresno's voter-approved 3/8-cent sales tax running through 2049, generating \$38 million annually to fund parks, trails, and green spaces throughout the city. The measure directly addresses urban heat island effects by creating new parks and increasing tree canopy coverage, particularly in underserved neighborhoods south of Shaw Avenue. Measure P prioritizes highest-need areas where residents lack adequate green space access. By expanding urban forests and cooling infrastructure, the initiative provides essential heat relief for vulnerable populations while improving air quality and promoting environmental justice in California's hot Central Valley.



LAND USE PLANNING IN FRESNO COUNTY

Land use and zoning regulations in Fresno County provide minimal specific protections against extreme heat exposure, despite recent comprehensive planning updates.

The County's updated General Plan and Comprehensive Zoning Ordinance focus on traditional land use separation rather than heat-sensitive development standards. General Plan updates in process in both Fresno and Clovis may include new mitigation and strategies related to land use. Conservation efforts reflect the most robust heat mitigation policy in the land use category.

The Fresno County General Plan Open Space and Conservation Element includes policies to conserve the function and values of wetland communities and related riparian areas throughout Fresno County while allowing compatible uses where appropriate.

It also includes policies in the land use element that call for continued support of local conservancies, including the following:

San Joaquin River Natural Reserves

- The County shall administer its land use regulations in the San Joaquin River Corridor Overlay to protect natural reserve areas in the San Joaquin River Parkway, principally in those areas adjoining the wildlife corridor along the river where the largest acreages of highest quality habitat exist. The County shall administer these regulations in consultation with the San Joaquin River Conservancy. Additionally, the RTP indicates support for conservation: Support local governments' efforts to minimize the loss of farmland, environmentally sensitive areas, and natural resources.

California has enacted sweeping parking reforms to address housing costs and climate goals. Assembly Bill 2097 (2022) eliminated minimum parking requirements near transit, and Senate Bill 9 (2021) reduced parking mandates for accessory dwelling units. These policies reduce VMT, which has the additional benefit of reducing waste heat.

LOCAL IMPLEMENTATION EXAMPLES:

The San Joaquin River Conservancy is a state agency created by the legislature to develop the San Joaquin River Parkway by acquiring 5,900 acres from willing sellers; enhancing and restoring riparian, floodplain, and other habitats; and developing lands for public recreational and educational uses compatible with resource protection.

RECOMMENDATIONS:

Assembly Bill 2684 requires cities and counties to review and update their safety elements to address extreme heat hazards by January 1, 2028, presenting an administrative challenge for smaller local governments with limited capacity. FCOG could assist with a regional approach to these updates, providing technical assistance and shared resources that streamline compliance while ensuring consistency across Fresno County.

The legislation allows local governments to reference existing extreme heat action plans or state documents to meet requirements, creating an opportunity for FCOG to leverage this Plan and others as foundational resources. By developing model language, heat hazard mapping, and vulnerability assessment frameworks that local governments can adapt, FCOG can help reduce local planning costs and expedite the update process.

This approach addresses resource constraints identified in community surveys while building on this planning effort.

WHAT IT IS

This strategy supports community resilience to extreme heat by promoting efficient and equitable access to indoor cooling. Effective cooling relies on dependable energy infrastructure and operational cooling systems across residential, educational, employment, and community facilities. Because extreme heat can increase electricity demand and stress the power grid while also elevating wildfire risk, power disruptions may occur during heat events. Public safety power shutoff policies are addressed in the Emergency Preparedness section.

WHY IT MATTERS

Indoor cooling can be a matter of life or death in Fresno, where extreme heat poses a serious public health threat and access to air-conditioned spaces is an important protective measure. During California's September 2022 heat wave, the California Department of Public Health estimated 395 excess deaths statewide, underscoring the importance of maintaining safe indoor temperatures and expanding access to cooling resources.⁹

CO-BENEFITS:



Economic



Public Health



Equity

HOW ARE OTHER COMMUNITIES ADDRESSING ENERGY POLICY?

Cuyahoga County in Ohio recently launched America's first microgrid electrical utility, Cuyahoga Green Energy, with Compass Energy Platform as operator. The 10-year contract, approved unanimously in December 2025, includes \$1.8 million of Department of Energy funding secured by Senator Brown. Three initial projects are planned for the Euclid, Brooklyn, and Cleveland Hopkins Airport areas.¹⁰

In August 2025, Los Angeles County mandated that all rental housing maintain indoor temperatures of 82°F or cooler in habitable rooms. Smaller property owners with 10 or fewer units received a partial exemption until 2032. Landlords must also permit tenants to install air conditioning units at their own expense.¹¹

CONSIDERATIONS FOR FRESNO REGION

Energy and grid resilience regulations in California were recently updated in response to extreme heat challenges. The California Public Utilities Commission (CPUC) Emergency Reliability Rulemaking (R.20-11-003) established extensive heat emergency protocols following August 2020 rotating blackouts during a record-setting "heat storm." The Strategic Reliability Reserve was developed in 2022 as part of Assembly Bill 205 to expand the resources capable of managing or reducing net-peak demand during extreme events.

Pacific Gas and Electric, serving as Fresno County's primary utility, implements heat event response through Emergency Operating Centers, pre-positioned equipment, and dedicated crews for Fresno-specific allocation during heat events. The utility operates several programs related to backup power systems and battery storage installation programs for qualifying customers.

ENERGY PLANNING IN FRESNO COUNTY

Indoor cooling is essential for preventing heat-related illnesses and deaths in Fresno County, but access depends on reliable and affordable energy and equipment.

As noted in the Waste Heat section, many of the energy-related policies in the reviewed General Plans addressed energy conservation. It is likely that the updates to these plans will include new policies aimed at increasing grid resilience.

The Fresno County General Plan includes a policy related to energy resilience in critical facilities (HS-A.11):

- The County shall invest in sustainable backup power sources as funding becomes available to provide redundancy and continued services for critical facilities in the event of a power outage triggered by a climate event.

There are no laws requiring cooling systems in housing in California, although the Department of Housing and Community Development (HDD) has issued recommendations to the legislature regarding cooling standards for rental housing, including setting an indoor temperature limit. These recommendations aim to protect tenants from extreme heat and encompass both existing rental properties and new construction. Low-income families in Fresno can access financial assistance and other support for air conditioning through programs like the Low Income Home Energy Assistance Program (LIHEAP) and the California Cool Air Rebate (CAR) Program. LIHEAP can help with energy bills and potentially assist with repairs or replacement of air conditioning units, whereas CAR provides rebates for automotive air-conditioning repairs.

LOCAL IMPLEMENTATION EXAMPLES:

The Fresno County Rural Transit Agency (FCRTA) recently completed a microgrid feasibility study as a first step in addressing energy challenges and providing a reliable energy source for its fleet transition to electric vehicles. FCRTA plans to deploy microgrids/distributed energy resources throughout Fresno County. The microgrids will include solar-powered EV charging and backup power, resulting in energy cost savings and a reliable power supply during emergencies.¹²

RECOMMENDATIONS:

FCOG should work with partner agencies to identify funding for solar and battery backup micro-grids to increase energy resilience and cooling during black outs and control energy prices. Maintaining affordable and reliably cooling must be cultivated and maintained continuously.



PERSONAL EXPOSURE



WHAT IT IS

Protecting individuals from dangerous heat exposure may require modifications to public infrastructure, such as transit stops, hiking trails, and playgrounds, as well as updated ordinances and enhanced safety regulations for both indoor and outdoor workers.

WHY IT MATTERS

Public shade and water features provide critical relief during extreme heat events, reducing ambient temperatures through evapotranspiration and blocking solar radiation. These amenities offer accessible cooling spaces for vulnerable populations who lack air conditioning, preventing heat-related illness and death.

CO-BENEFITS:



Public Health



Equity

HOW ARE OTHER COMMUNITIES ADDRESSING PERSONAL EXPOSURE POLICY?

Los Angeles County expanded the pool season from 10 weeks to 5 months in 2024, in an effort to adapt to higher temperatures and reduce heat exposure. The County also invested in new lighting at pools to ensure swimmers can enjoy the pools even as the sun rises later and sets earlier in the fall.

A City of Phoenix March 2024 ordinance mandates heat protections for city contractors' outdoor workers, including those in greenhouses, sheds, and jet bridges. Requirements include regular shade/air conditioning breaks, free cool water, vehicle air conditioning by May 2025, and worker acclimatization programs. This covers all work on city-owned, leased, or licensed outdoor properties.

CONSIDERATIONS FOR FRESNO REGION

In the local planning survey, respondents noted the presence of vulnerable populations and agricultural workers as key concerns for vulnerability to extreme heat in their communities.

Recent legislation has resulted in new protections related to personal heat exposure. Regulations covering workers and students in Fresno County exist at the state level: Per California Division of Occupational Safety and Health (Cal/OSHA) regulations, coverage for workers is fairly comprehensive. Outdoor heat illness prevention applies to all outdoor workplaces, with progressive protection levels and specialized industry requirements. The City implements this program for its employees through Administrative Order 2-31.¹³ Effective in July 2024, the Cal/OSHA Heat Illness Prevention in Indoor Places of Employment regulation (8 CCR 3396) establishes indoor heat illness prevention requirements at 82°F thresholds, requiring written prevention plans, cooldown areas, and temperature monitoring.¹⁴

As of Fall 2026, Cal/OSHA is currently updating Sections 3395 and 3396 and jurisdictions should monitor regulatory changes.



PERSONAL EXPOSURE PLANNING IN FRESNO COUNTY

Student protection regulations expanded significantly in 2024 with Assembly Bill 1653 requiring **Wet Bulb Globe Temperature (WBGT)** monitoring for school athletics. Fresno County falls in Zone 3 (highest heat thresholds), with activity restrictions beginning at 82.2°F WBGT and complete outdoor practice prohibition at 92.1°F WBGT. Requirements include mandatory 5-day acclimatization periods, unlimited water access, and training for coaches on heat illness recognition.

Wet Bulb Globe Temperature (WBGT)

WBGT is a heat stress index that measures the combined effects of temperature, humidity, wind speed, and solar radiation on the human body. It is considered one of the most accurate indicators of heat stress risk. WBGT provides a more comprehensive assessment of thermal stress by incorporating all the factors that affect how conditions actually feel to the human body and how effectively we can cool ourselves through sweating.

Access to water features such as swimming pools and splash pads are a way to reduce exposure to extreme heat. The City of Fresno's water-based cooling infrastructure includes a network of nine splash pads and three municipal pools offering free admission, plus a partnership arrangement for the use of five additional school district pools during summer months.¹³ Outside the City of Fresno, however, there are no publicly accessible pools or splash pads.

Except for the FCOG Climate Resilience Plan, regional plans do not directly address personal exposure to extreme heat.

The Resilience Plan identifies two priority projects aimed at addressing transit users' personal heat exposure in both urban and rural areas.

Priority Projects 3 and 4 address extreme heat exposure at transit stops across Fresno, Clovis, and FCRTA routes by adding bus shelters, shade structures, and tree canopies. With over 1,500

bus stops region-wide, locations are scored and ranked by ridership and other factors to prioritize improvements that deliver critical health benefits to transit-dependent riders during warmer months.

Both projects included a list of stops, prioritized by assessed vulnerability, usage, and estimated costs.

LOCAL IMPLEMENTATION EXAMPLES:

Within the FAX system, a large investment in infrastructure is underway as part of the System Efficiency and Accessibility Improvement Project, which includes funding for enhancing bus stop infrastructure with solar lighting and shade structures, particularly for the new Route 19 expansion along Church Avenue.¹⁴

RECOMMENDATIONS:

Options to fund rapidly deployable shade structures can provide immediate heat protection for active transportation users while long-term tree canopy strategies mature. Vegetative shade can take 10-20 years to reach full cooling effectiveness, leaving vulnerable populations exposed during the critical interim period when extreme heat events are intensifying. Faster-growing tree species may be considered for shade-specific planting in locations where quicker canopy establishment is prioritized. Quick shade solutions—including prefabricated shade sails, pergolas, and modular bus shelter designs—could be installed along high-priority pedestrian and cycling corridors identified through the vulnerability analysis. Access to water is also essential for reducing personal heat exposure; misters and hydration stations should be integrated into shade infrastructure where feasible, as discussed in Chapter 4 of this plan.



PUBLIC HEALTH



WHAT IT IS

When heat becomes dangerous, the public needs to be informed and educated about the risks, how to avoid them, and what resources are available to do so. Public information and awareness campaigns, as well as early warning systems, can help keep people safe. Campaigns should communicate how to spot early signs of heat stress and illness and how to identify who is most at risk. Early warning systems should be broadcast to a wide audience, with attention to populations most at risk.

CO-BENEFITS:



Equity

HOW ARE OTHER COMMUNITIES ADDRESSING PUBLIC HEALTH POLICY?

At the state level, recent measures have emphasized public awareness. Track A of the California Extreme Heat Action Plan is “Build Public Awareness and Notification” and includes three goals:

1. Build public awareness about extreme heat through targeted communications campaigns.
2. Support actionable climate science and research to inform risk assessments and decision-making.
3. Improve accuracy and accessibility of heat modeling and data to inform decision-makers.



WHY IT MATTERS

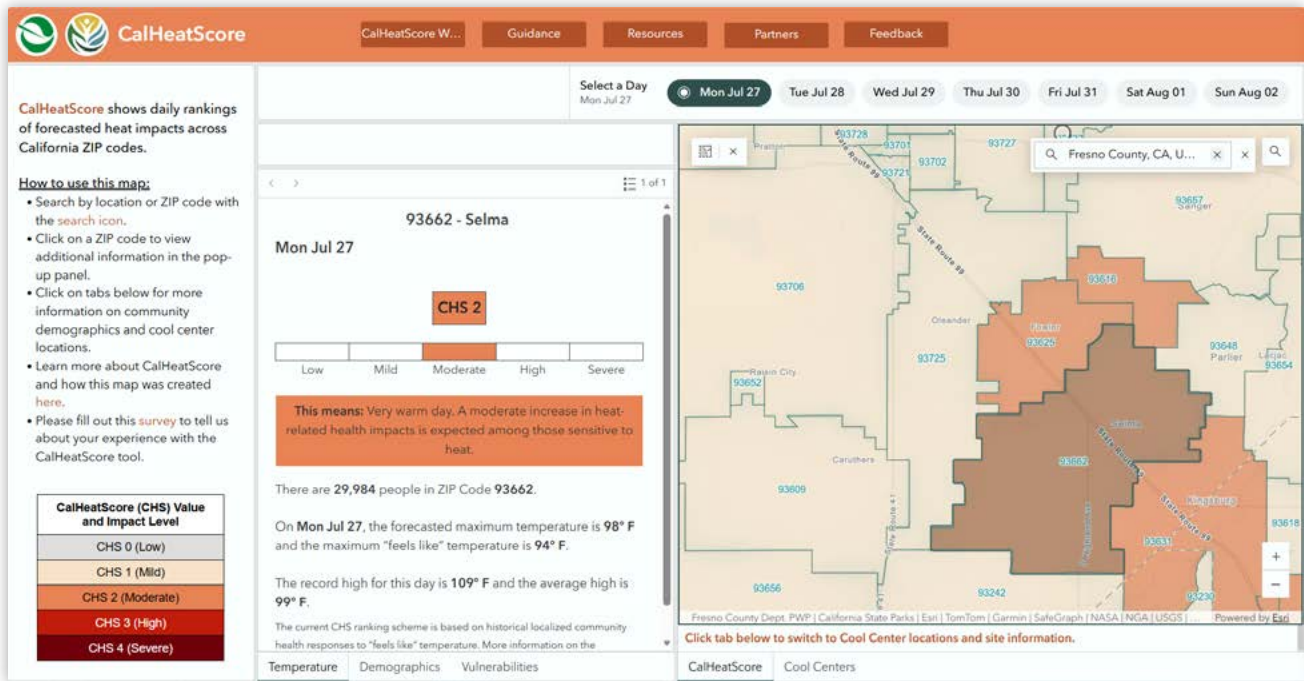
Heat-related illnesses associated with extreme heat are preventable, and human health is the priority when considering the impacts of extreme heat and planning for it. Advance warning of extreme heat can trigger protective measures at schools, event venues, and places of work. When people are equipped with information for how to respond they are more likely to suffer less harm.

Building on this plan, in May 2025, California Governor Newsom announced the launch of [OEHHA - California Communities Extreme Heat Scoring System](#), described as a “cutting edge tool to forecast and rank severity risks and connect Californians with available resources to stay safe during extreme heat events.” This public health tool for individuals, communities, decision-makers, and policy-makers scores forecasted extreme heat risk conditions from 0 to 4. The web mapping tool is informed by public health data and local weather conditions and is updated daily. CalHeatScore includes a community profile, forecasted rankings, and cooling center locations (**Figure 9**).

Another public health measure to result from the Extreme Heat Action Plan is the HeatReadyCA.com website, which provides comprehensive information for the public on extreme heat, including how to assess risk, how to make a personal safety plan, and links to resources. The site also offers a communication toolkit to be used by both individuals and organizations to communicate risk and raise awareness.

PUBLIC HEALTH PLANNING IN FRESNO COUNTY

Figure 9: CalHeatScore



The Fresno County General Plan does not contain policies explicitly addressing public health education or awareness of extreme heat.

The General Plan lists Fresno County Public Health Emergency Preparedness as the program responsible for providing response and recovery resources for individuals with high levels of outdoor exposure. The program website offers information in English and Spanish for the prevention and identification of heat illnesses, the locations of cooling centers, and an explanation of state-mandated safety standards for schools and student athletic programs.

The City is currently updating its Health and Safety Element, and this update may include relevant policies. A search of the City website did not turn up pages dedicated to extreme heat, although cooling center hours and locations are announced when activated.

- **The MJHMP includes a policy** to “develop and conduct a multi-hazard Seasonal Public Awareness Program,” though the status of implementation is unclear.

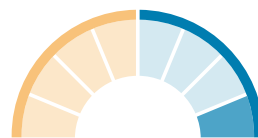
RECOMMENDATIONS:

Formalizing roles in extreme heat response across Fresno County local governments by developing regional processes, metrics, and collaborative frameworks can help address the fragmented nature of heat governance.

Drawing from successful models, including Miami-Dade County's Chief Heat Officer and Phoenix's Office of Heat Response and Mitigation, FCOG could develop a regional coordination structure that integrates local community plans, ensures consistent heat metrics across local governments, and facilitates resource sharing for cooling centers, early warning systems, and public outreach campaigns. Critically, this coordination would position FCOG and its member governments to track and pursue joint funding applications—identified by survey respondents as the most valuable form of regional collaboration—for federal and state heat resilience grants that individual jurisdictions cannot access independently. This coordinated approach would support smaller jurisdictions like Selma and Kerman that lack independent capacity for comprehensive heat response.¹⁵



EMERGENCY PREPAREDNESS



WHAT IT IS

Communities must prepare their emergency management systems for extreme heat response by developing emergency response plans and early warning systems and by establishing cooling centers and resilience hubs. Heat response planning involves coordinated government and partner actions during extreme heat events to prevent heat-related illness and death.

WHY IT MATTERS

Not everyone can mitigate extreme heat on their own, and coexisting social or physical conditions can increase risks for people. Response systems reduce illness and death among vulnerable populations.

CO-BENEFITS:



Resilience



Equity



Public Health

HOW ARE OTHER COMMUNITIES ADDRESSING EMERGENCY PREPAREDNESS POLICY?

Other communities are addressing extreme heat emergency preparedness through coordinated heat response programs that include cooling centers, resilience hubs, early warning systems, public education campaigns, and targeted outreach to vulnerable populations. Several jurisdictions have formalized heat response roles and partnerships including the City of Phoenix's Office of Heat Response and Mitigation and Miami-Dade County's Chief Heat Officer, which coordinate heat communications, resource deployment, and interagency response efforts.

CONSIDERATIONS FOR FRESNO REGION

Public Safety Shut Offs: Electric investor-owned utilities (IOUs) that elect to rely on power shutoffs as a measure of last resort to mitigate catastrophic wildfire risks must do so in a manner consistent with their fundamental statutory obligation to protect the public safety, as set forth in Public Utilities Code Section 451. PSPS occur when IOUs, such as San Diego Gas & Electric, elect to de-energize their electrical grid to mitigate the risk of catastrophic wildfire caused by utility infrastructure.

There are currently no regulations that determine thresholds to trigger (PSPS), but CPUC requires the IOUs to report their PSPS protocols and the frequency with which they used a PSPS in the previous year. Further, the CPUC has guidelines determining how IOUs must notify and communicate with the community, support community resource centers, and report PSPS incidents. IOUs set their own trigger points for PSPS; the triggers may include a combination of metrics related to fire weather, including a wind-speed threshold, and one or more fire behavior thresholds, such as an energy release component or burning index.



EMERGENCY PREPAREDNESS PLANNING IN FRESNO COUNTY

While the City has established comprehensive cooling and infrastructure programs, and most of the small cities offer some form of a cooling center, the County government provides no cooling centers for unincorporated communities.

The Fresno County General Plan policies include the following:

- **Cooling Centers:** Work with cities and unincorporated community service districts to open cooling centers during extreme heat events, advertise the availability of these centers to unincorporated communities, and confirm that there is convenient access to these centers for unincorporated communities.
- **Immediate Assistance and Emergency Shelters:** Work with community-based organizations to provide immediate assistance locations and emergency shelters in unincorporated areas of the County during extreme heat events, poor air quality, severe weather events, drought, and other highly hazardous conditions. Focus outreach and education of resources to vulnerable communities.

Cooling centers and shelters are critical infrastructure, especially during a power outage, when people who have air conditioning are no longer able to run them.

Cooling Centers

Cooling centers are designated indoor locations—such as libraries, schools, community centers, places of worship, malls, or convention centers—where people can seek relief from extreme heat. Another model, resilience hubs, are trusted community facilities that offer resources, communication, and support before, during, and after disruptions. These hubs may include emergency supplies, backup power, and additional services.

Fresno County's General Plan states:

- The County shall invest in sustainable backup power sources as funding becomes available to provide redundancy and continued services for critical facilities in the event of a power outage triggered by a climate event. The MJHMP includes goals calling for the identification of climate hazard vulnerabilities in critical infrastructure and investing in resilience efforts, which include backup power.

The [Self-Generation Incentive Program](#) in California provides rebates for installing energy storage and other distributed energy resources at residential and nonresidential facilities. This program aims to encourage the adoption of technologies, like battery storage systems, that can provide backup power during outages and benefit the grid.

LOCAL IMPLEMENTATION EXAMPLES:

The City leads regional efforts to provide cooling centers with four designated sites operating once temperatures reach 105°F: the Ted C. Wills, Mosqueda, Maxie L. Parks, and Pinedale Community Centers are open from 12:00 p.m. to 8:00 p.m. during activation, with free FAX bus transportation. In the survey, a County staffer stated that funding for staffing of cooling centers was a significant challenge. Clovis operates the second-most comprehensive program, activating cooling centers at Sierra Vista Mall when temperatures reach 105°F, with free transit service via Stageline Route 50.

The County website now has a [list of all communities and their cooling centers](#): The County's Extreme Heat Program focuses on educating residents about heat-related illnesses, identifying vulnerable populations, promoting access to cooling resources, and coordinating preparedness activities during periods of extreme heat. Guidance extends beyond individual safety to include recommendations for outdoor workers, schools, youth athletics, and community organizations, demonstrating a comprehensive, countywide approach to reducing heat-related health risks.

Conclusions

The review of existing extreme heat adaptation policies across the Fresno County region reveals a complex landscape of emerging strategies, significant implementation gaps, and substantial opportunities for regional coordination. While foundational policies exist across multiple local governments, the analysis demonstrates that current planning efforts are insufficient to address the scale and urgency of extreme heat challenges facing the region's diverse communities.

KEY FINDINGS

The regional assessment reveals notable disparities in heat resilience capacity between urban and rural areas. The City of Fresno's comprehensive UFMP and active cooling center program contrast sharply with limited infrastructure and resources available in smaller local governments. Survey responses highlighted that local governments face common challenges regardless of size, with funding limitations and maintenance capacity constraints ranking as the top barriers to implementation.

Infrastructure gaps are particularly pronounced in active transportation networks. Survey findings indicate that while residential sidewalks have "some shade but need improvement," commercial areas have "limited shade infrastructure," and bike lanes have very little or none. This disparity directly impacts the region's most vulnerable populations, as identified by respondents: communities south of Ashlan Avenue and west of Highway 99 in Fresno, areas near schools, vulnerable populations throughout the region, and rural communities lacking basic cooling infrastructure.

CHALLENGES

Funding and Capacity Constraints: Limited funding and maintenance challenges emerged as the most significant barriers facing local governments across the region. Small rural communities like Selma face particular difficulties

accessing financial opportunities, while even larger local governments struggle to meet basic infrastructure needs. For example, the City of Fresno currently struggles to fund its existing goal of 1,000 trees annually, falling well short of the 4,600 trees needed annually to achieve canopy goals.

Geographic and Social Equity: The analysis reveals stark disparities in heat resilience infrastructure between urban and rural areas, and between different neighborhoods within cities. Kerman's older neighborhoods lack adequate HVAC systems and off-street parking, while commercial shopping centers throughout the region lack shade-providing landscape planters. These infrastructure gaps disproportionately impact the region's most vulnerable populations, including agricultural workers, older residents, and low-income families.

Transportation Barriers: Access to cooling resources is severely limited by transportation constraints. Only Clovis and Fresno provide free transit specifically for cooling center access, leaving rural residents and those in smaller cities without viable transportation options during extreme heat emergencies. Additionally, extreme heat creates operational challenges for transit systems themselves, with mechanical failures and system breakdowns further straining emergency response capacity.

Implementation and Enforcement Gaps: While urban greening represents the most robust category of mitigation strategies in regional planning documents, implementation and enforcement lag significantly due to capacity and funding limitations. Survey responses indicate that even local governments with cooling center policies face insufficient capacity or access challenges in actual emergency responses.

Regulatory Limitations: Current land use and zoning regulations provide minimal specific protections against extreme heat exposure, despite recent comprehensive planning updates. Building codes focus primarily on energy efficiency rather than comprehensive heat island reduction, and few local governments have adopted enhanced voluntary standards.

OPPORTUNITIES

Regional Collaboration: Survey respondents identified joint funding applications and implementation of heat mitigation projects as the most helpful form of regional collaboration. This presents a clear pathway for FCOG to leverage its regional coordination role in pursuing federal and state funding opportunities that individual local governments cannot access independently.

Strategic Infrastructure Investment: The prioritization of public shade structures and increased tree canopy by survey respondents aligns with proven heat mitigation strategies. FCOG's transportation planning authority positions the agency to integrate shade infrastructure into regional mobility investments, particularly along transit corridors and active transportation networks.

Transit-Oriented Heat Resilience: FCOG's Climate Resilience Plan has already identified priority projects for bus stop improvements in both urban and rural areas. The FAX system's ongoing System Efficiency and Accessibility Improvement Project provides a model for incorporating shade structures and solar lighting that can be scaled regionally.

Leveraging Existing Programs: Federal and state programs, including weatherization assistance, heat pump installation programs, and various rebate programs, are available but underutilized. FCOG can play a coordinating role in connecting local governments and residents with these resources while advocating for program improvements that address renter eligibility gaps.

Innovation and Pilot Programs: FCRTA's microgrid feasibility study and the collaborative bus shelter design project between Fresno State students and the City of Fresno demonstrates local capacity for innovative heat resilience solutions. These pilot approaches can inform regional strategies and attract additional funding and partnership opportunities.

Policy Integration: Ongoing General Plan updates in Fresno and Clovis present opportunities to incorporate heat-specific land use policies and transportation planning strategies. FCOG can support these efforts by providing regional data, best practices, and coordinated policy recommendations.

MOVING FORWARD

The implementation of effective regional heat resilience requires FCOG to leverage its unique position as a regional transportation planning agency while building partnerships across sectors and local governments. Priority actions should focus on addressing the identified infrastructure gaps in active transportation networks, developing regional funding strategies that support both urban and rural communities, and creating coordinated emergency response systems that overcome current transportation barriers to cooling resources.

Success will depend on FCOG's ability to translate this analysis into concrete implementation strategies that address both immediate emergency response needs and long-term infrastructure development. The strong interest in regional collaboration expressed by survey respondents, combined with existing policy foundations and available funding opportunities, creates a promising foundation for advancing comprehensive heat resilience across Fresno County.



3

Project Selection Methodology

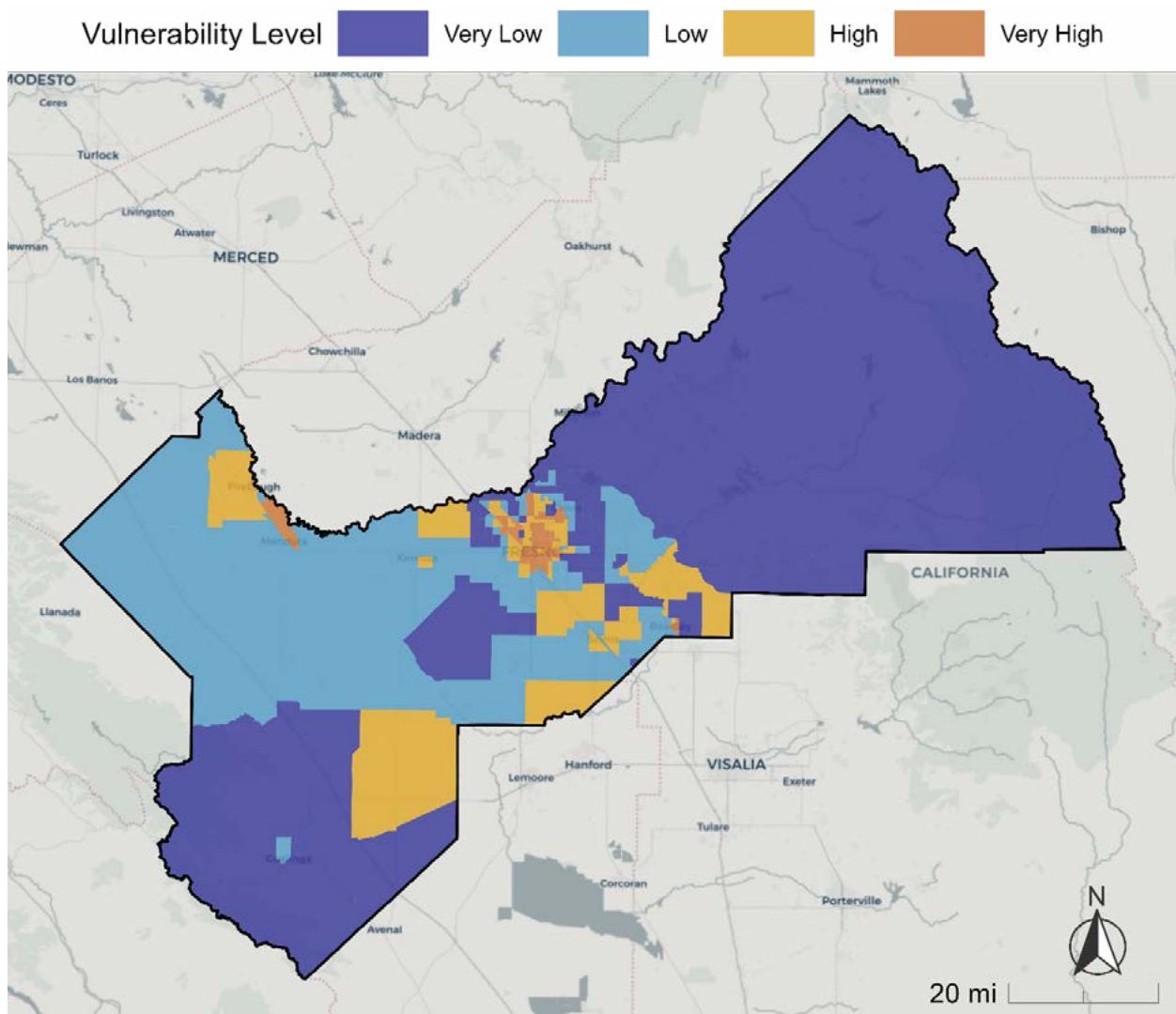
Extreme Heat Vulnerability

The project team created a data set resulting in priority areas for urban heat mitigation interventions from publicly available environmental and social data at the census tract level. The HVI looks at four factors: how hot an area gets; how many people and heat-absorbing surfaces are present; community health and demographic sensitivities; and access to resources like trees, parks, transportation, and income. Results showed the highest vulnerability

in many urban, southern, and western parts of the county, where dense development, lower incomes, and fewer cooling resources overlap as illustrated in **Figure 10** for a map of vulnerability in Fresno county.

Large rural census tracts with less paved area, can obfuscate the profound risk farm workers in these areas face and should not be discounted. Detailed methodology is presented in Appendix C.

Figure 10: Vulnerability Levels in Fresno County



Walking and Biking Analysis

Transportation routes for sample improvements were gathered from the Active Transportation Plan. Routes were ranked ordinally (low [1], medium [2], high [3]) on their heat vulnerability, distance to transit, distance to activity centers (libraries, schools, medical facilities), and existing deficiency (would it add to the overall connectivity of the system). Once this ranking was prepared, the top-ranking projects were compared to community feedback and community typologies.

Typologies

The five template projects were stratified into five sample typologies to provide a range of example routes in Fresno County. These typologies included the following:

- Urban commercial corridors—large streets with multiple lanes of traffic and commercial uses with no setback. Typically high speed with very little greenspace. Often include transit corridors and high-use bus stops.
- Suburban neighborhood connectors—residential streets typically abutted by private property with large setbacks, including private yards and schools. Routes connecting homes to schools or urban commercial corridors.
- Rural mainstreets—large streets with multiple lanes, typically State Routes, serving as the main corridor in unincorporated communities.
- Trails—off street walking and biking trails, typically narrow.
- Bus stops

Each of the routes identified above was assigned one of the four route types. The project team then reviewed the top scoring projects by route and selected routes that were most representative of Fresno County and the community feedback. A bus stop without a shelter on a high-ranking route was also selected. See **Figure 11** For an example of the urban commercial corridor typology.

Figure 11: Example of an Urban Commercial Corridor in the City of Fresno





4

Urban Heat Projects

Improvements

This chapter details eight heat mitigation improvements that can be used in active transportation facilities in Fresno County. These improvements include median expansion, tree-shaded walking and biking routes, green alleyways, vegetated swales, expanded planting areas, bus stop retrofits, separated bike lanes, and shade sails. Details provided for the improvements include model projects, resources and standards, case studies, and costs to consider. Many of these improvements are included in the five template projects illustrated in the next chapter.

MEDIAN EXPANSION



Photo Source: Cal Trans, posted on X.com.

Purpose

Median expansion lowers urban heat by converting heat-absorbing pavement into vegetated corridors that provide shade and evaporative cooling. Wide medians accommodate mature tree canopies that shade adjacent travel lanes and sidewalks, reducing surface temperatures and creating more comfortable conditions for pedestrians and cyclists. When designed with bioretention features, medians capture stormwater to passively irrigate vegetation while filtering pollutants. This approach slows traffic, improves stormwater management, and decreases urban heat islands.

Case Studies

Vegetated medians have been successfully implemented in multiple California cities with varied objectives and community benefits. In San Francisco, the [Median Greening program](#) transforms hard, paved medians into planted landscapes managed through neighborhood and City partnerships. On a busy [commercial corridor in San Diego](#), medians were added as part of a comprehensive road diet that reduced travel lanes, shortened pedestrian crossing distances from 68 feet to roughly 14 feet, and paired roundabouts with landscaped center islands. This redesign improved safety (a 90% reduction in crashes) and boosted retail activity by about 30%.



[The City of Los Angeles Median Greening Project](#) scaled up greening of existing traffic medians to combat urban heat, expand habitat and greenery, and repurpose water resources as part of a broader City effort to increase canopy cover and integrate tree planting into transportation corridors, supporting ecological function and streetscape quality.

Resources and Standards

When exploring implementing median expansions, communities should consider the following safety standards and considerations:^{16, 17, 18}

- Minimum 6-foot pedestrian refuges
- Curbs and bollards to protect pedestrians
- Pedestrian cut-throughs added where there is a significant desire line, in front of transit, and in areas where the nearest pedestrian crossing is more than 250 feet away
- Pedestrian refuges with a tip or nose that extends past the pedestrian crossing

- Landscaping that maximizes sight triangles at crossing locations and allows pedestrians to see to the other side
- Maintenance and irrigation access that does not expose crews to live traffic
- Reducing on-street parking to make installing medians possible
- Medians on concave streets to maximize stormwater collection

Cost

Median expansion project costs depend on level of construction and engineered soils. Basic median construction or restriping projects typically range from approximately \$400,000 to \$1.5 million per mile when installing curbs, landscaping, and irrigation.^{19, 20}

Applicable Model Projects

Median vegetation should be explored on large streets, especially with a middle turning lane that spans the corridor. This project can include urban commercial corridors, suburban neighborhood corridors, and rural mainstreets.

SHADED WALK AND BIKEWAYS



Purpose

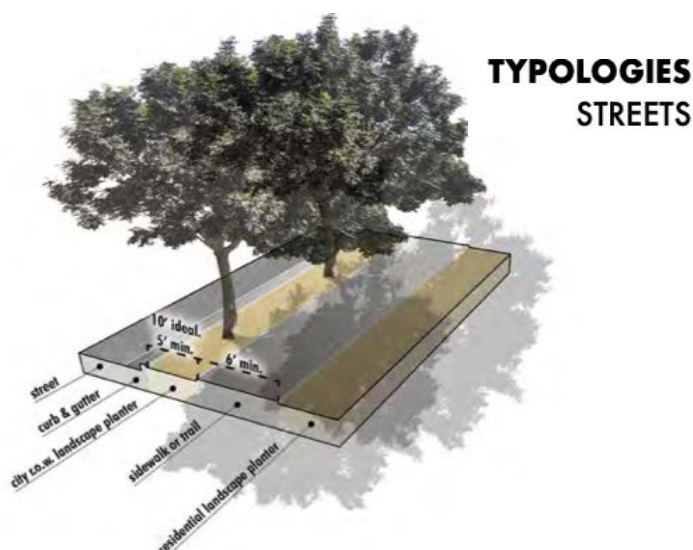
Shaded active transportation corridors provide critical protection for pedestrians, cyclists, and transit users navigating extreme heat conditions, making walking and biking viable during hot months when unshaded routes become dangerous or uncomfortable. Strategic tree placement along sidewalks, bike lanes, and trails creates continuous canopy coverage that reduces surface temperatures while improving air quality and stormwater management. Priority corridors connecting high-use community destinations, such as schools, transit stops, and community centers, in heat-vulnerable neighborhoods offer the greatest impact. When combined with engineered shade structures, bioretention infrastructure, and amenities like drinking fountains, these corridors

serve multiple functions: supporting tree health through passive irrigation, filtering pollutants, and creating attractive green networks that encourage active transportation while addressing urban heat island effects in underserved communities.

Case Studies

Shaded walking and biking paths are being implemented across the county. In Los Angeles, [TreePeople's Community Forestry](#) program has supported thousands of street tree plantings across Los Angeles neighborhoods with historically low canopy cover, helping expand shade along residential streets and pedestrian routes. In Fresno, Tree Fresno's planting programs focus on neighborhoods experiencing the highest heat-related illness rates, prioritizing walking routes to schools and transit stops, such as those near [Malaga Community Park and Recreation Center](#). [Phoenix's Cool Corridor Program](#) is working to create a network of shaded routes to encourage safe movement throughout the city by combining trees, engineered shade, and other temperature-lowering design features. These projects demonstrate how strategic corridor greening addresses heat equity by concentrating shade infrastructure where vulnerable populations often face the greatest exposure: while trying to get to work and school.

Figure 12. Residential Planting Strategies for Shade



RESIDENTIAL: NORTH + EAST SIDES

To best shade the pedestrian and bicycle facilities on the North and East Sides of a typical street corridor trees should:

- Be placed between the back of curb and the walkway
- For best coverage plant the backside of the walkway and encourage residents and property owners to plant the spaces as well
- 15' recommended for optimal tree health

MINIMUM RIGHT OF WAY

11' - back of curb to back of sidewalk

ELEMENTS:



Figure 12 was originally published in the Gilbert Arizona Shade and Streetscape Master Plan.



ARTERIAL/MAJOR COLLECTORS: SOUTH + WEST SIDES

To best shade the pedestrian and bicycle facilities on the North and East Sides of a typical street corridor trees should:

- Be placed behind the back of the walkway
- For best shade coverage, ensure trees are planted on both sides of the walkway
- 15' recommended for optimal tree health

MINIMUM RIGHT OF WAY

17' - edge of vehicular lane to back of path

ELEMENTS:



Resources and Standards²¹

- To best shade the pedestrian and bike facilities on the **north** and **east** sides of a street, a typical street tree should be placed between *the back of the curb and walkway*.
- To best shade the pedestrian and bike facilities on the **south** and **west** side of a street, a typical street tree should be placed on the *back side of the walkway* (this is often private property).
- Recommended shade trees for bike and walkways are included in **Appendix F**, Plant Palette.

Cost

Street tree installation typically ranges from \$500 to \$3,500 per tree, depending on species, soil preparation, irrigation, and site conditions. Assuming typical street tree spacing of 25–40 feet, corridor-scale canopy expansion can cost \$150,000–\$500,000 per mile of planting.^{22, 23}

Many communities reduce these costs through community forestry programs and targeted corridor strategies. Volunteer-supported planting programs such as [Friends of Trees](#) in Portland and [TreePeople](#) in Los Angeles partner with local governments to organize community planting events, significantly lowering labor costs and enabling large-scale canopy expansion along neighborhood streets and

active transportation routes. Partnerships such as [Tree Fresno's](#) community forestry program coordinate tree planting with schools and community organizations to expand canopy coverage along walking routes while reducing implementation costs.

Design strategies can also reduce costs while improving tree performance. Green infrastructure guidance from the U.S. Environmental Protection Agency recommends integrating tree planting with stormwater capture systems such as curb cuts and bioretention planters, allowing street runoff to passively irrigate trees and reduce the need for irrigation infrastructure.²⁴ Prioritizing corridors with existing planting strips or opportunities for expanded tree wells can further reduce construction costs while supporting mature canopy development.

Applicable Model Projects

Cool corridor implementation should prioritize routes to school and routes to transit in vulnerable neighborhoods to benefit students, commuters, and families who are most likely to be exposed to extreme heat while traveling on foot or by bike. Ensuring these routes are comfortable and safe encourages active transportation and helps mitigate health risks.

GREEN ALLEYWAYS



Photo Source: Motor City Inc., CC BY-SA 4.0.

Purpose

Green alleyways transform neglected service corridors into multifunctional climate infrastructure that manages heat and stormwater simultaneously. Using permeable pavements, high-albedo surfaces that reflect rather than absorb heat, and strategic vegetation placement, green alleyways reduce flooding while lowering surface temperatures. These corridors offer underutilized opportunities for urban greening in dense neighborhoods where utilities, narrow sidewalks, or building setbacks limit traditional street tree planting. By incorporating bioretention features, rain gardens, and tree canopy alongside permeable surfaces, green alleyways provide shade, improved drainage, and cooler microclimates in residential areas most vulnerable to extreme heat while creating inviting pedestrian spaces from previously degraded infrastructure.

Case Studies

Green alleyway initiatives across the country demonstrate how underutilized service corridors can be transformed into multifunctional climate-resilience assets. Alleys can be reimaged with permeable pavements, vegetation, and stormwater-capture features to reduce localized flooding while cooling adjacent neighborhoods. Chicago's [Green Alley Handbook](#) outlines strategies to retrofit dense residential blocks, highlighting both environmental performance and long-term maintenance considerations. The [Avalon Green Alley Network Demonstration Project](#) in Los Angeles expands on these principles at a district scale, showing how multiple connected alleys can create a neighborhood-wide network of cooler pedestrian passages, improved habitat, and enhanced stormwater management while revitalizing previously neglected infrastructure. When appropriate, green alleyways are a unique tool for heat mitigation, stormwater control, and community-oriented public realm improvements.

Resources and Standards

- Motivation can be multi-foci: economic, safety, stormwater, habitat.
- Both commercial and residential land uses can support green alleyways.
- Residents and tenants should be engaged throughout the process to encourage stewardship.

Cost

Green alleyway retrofits that replace asphalt with permeable pavement typically cost \$10–\$30 per square foot installed, depending on pavement type, drainage infrastructure, and base preparation.²⁵ When combined with stormwater infrastructure, vegetation, and lighting improvements, full alley corridor retrofits commonly range from \$500,000 to \$2 million per corridor, depending on alley length and drainage conditions. Costs remain lower when retrofits involve simple pavement replacement and increase when installations incorporate infiltration galleries, rain gardens, or utility adjustments.²⁶

Applicable Model Projects

Green alleyway retrofits are most applicable in dense neighborhoods where service alleys exist but traditional street tree planting opportunities are limited.

Photo Source: Los Angeles Department of Water & Power.



VEGETATED SWALES



Photo Source: City of Kirkland, WA (left) City of Portland, OR Bureau of Environmental Services (right).

Purpose

Vegetated swales along transportation corridors provide integrated stormwater management and heat mitigation through shallow, vegetated channels that collect and slowly convey runoff. These open drainage features trap particulate pollutants, promote infiltration, and reduce flow velocity while filtering sediment and metals through dense vegetation. When strategically placed alongside streets and active transportation routes, swales replace traditional concrete drainage infrastructure with living systems that can provide shade through established vegetation, cool surface temperatures through evapotranspiration, and create attractive green corridors. Enhanced with check dams (small barriers placed perpendicular to flow to slow stormwater velocity) to maximize retention time and native drought-tolerant plants suited to local conditions, vegetated swales offer cost-effective solutions that serve dual functions as both conveyance systems and climate adaptation infrastructure.

Case Studies

Cities facing stormwater issues have typically invested in vegetated (or “bio”) swale implementation, driven by regulatory mandates to reduce combined sewer overflows and manage heavy rainfall. [Portland](#) has installed more than 3,000 green stormwater infrastructure facilities, including bioswales and rain gardens, to manage runoff and improve water quality²⁷ in recent decades, while [Seattle's Street Edge Alternatives Project](#) achieved a 99% reduction in stormwater compared to conventional street drainage systems. The [El Cerrito Green Streets Pilot Project](#) retrofitted 750 feet of San Pablo Avenue with rain gardens, while the [San Pablo Avenue Green Stormwater Spine](#) retrofitted a 12.5-mile stretch. However, these green infrastructure facilities offer equally critical benefits in Fresno County's semi-arid environment. [Les Kimber Park](#) in Fresno integrates tree-lined pathways with linear bioswales to form a shaded circulation framework that supports stormwater conveyance, treatment, and detention along a multipurpose park loop.

Resources and Standards²⁸

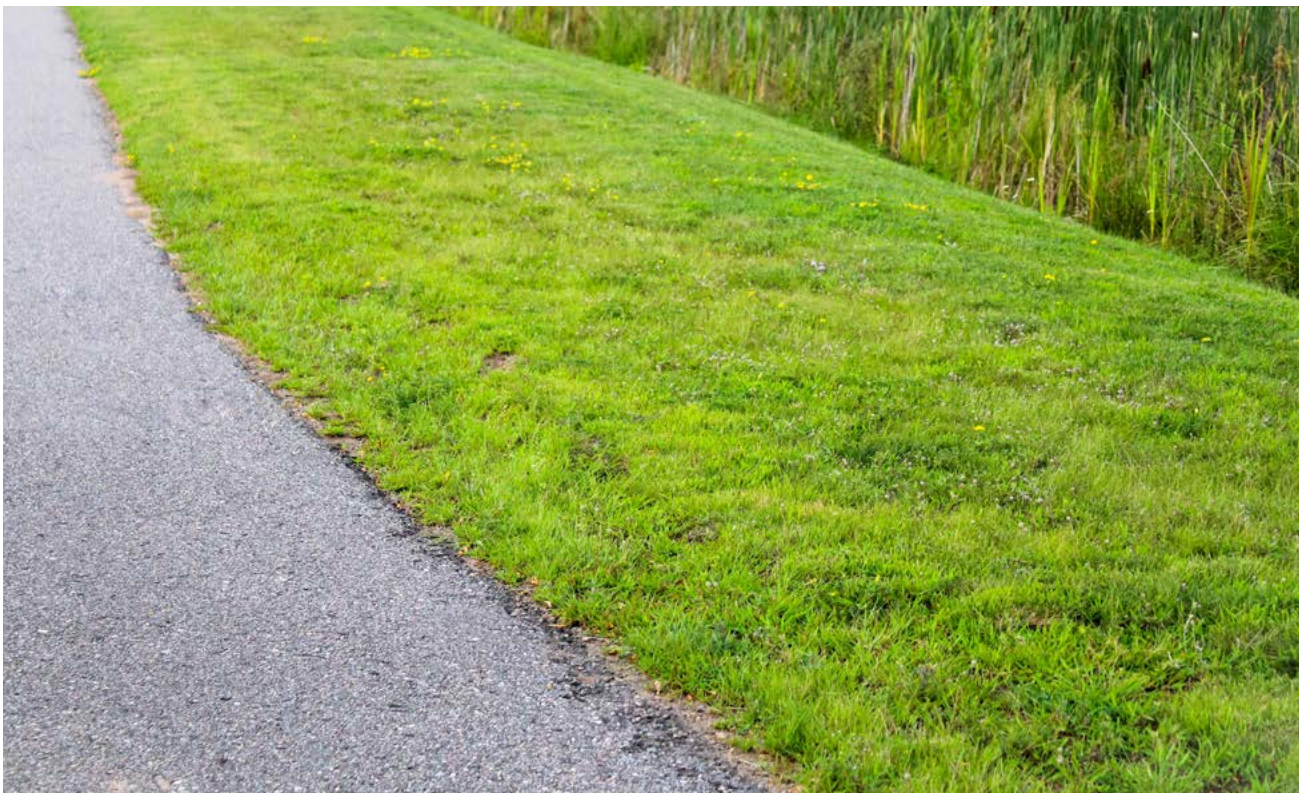
- Bioswales require a mild slope no greater than 5% and are not appropriate in areas with steep or unstable slopes due to erosion risk.
- Thick vegetated cover is needed for vegetated swales to function properly.
- Swales can become a nuisance due to mosquito breeding if obstructions develop or if proper slopes are not implemented and maintained.
- Native plant species naturally reduce the need for maintenance.
- The “low zone” of the swale (or bottom of ditch) should be planted with water-tolerant plants with dense root structure, such as native grasses or ground covers; though in some cases tree planting may be appropriate.
- The “mid zone” of the swale (or sloped side of ditch) should be planted with drought-tolerant plants that prevent erosion.
- The “high zone” of the swale (or top of bank) can be planted with trees or woody plants with deep roots to provide shade and bank stability.

Cost

Vegetated swales typically cost \$50–\$200 per square foot depending on excavation depth, engineered soil media, and stormwater infrastructure requirements. When installed along roadways this generally corresponds to \$250–\$1,000 per linear foot of corridor treatment.^{29, 30} Costs are lower when swales are constructed in open right-of-way with natural slopes and minimal utilities and increase when installations require curb reconstruction, underdrains, or connections to existing storm sewer systems.

Applicable Model Projects

Vegetated swales are suitable alongside any roadway, including arterials and collectors, and are effective in parking lot islands, medians, and large commercial developments, such as an office campus.



EXPANDED PLANTING AREAS



Photo Source: City of Portland, Bureau of Transportation.

Purpose

Expanding planting areas through curb extensions and street narrowing transforms underutilized pavement into vegetated infrastructure that provides shade and stormwater management. Road diets—reducing traffic lanes or lane width—reclaim asphalt for bioretention basins and street trees while calming traffic and improving pedestrian safety. Curb extensions, or bulb-outs, extend sidewalks into parking lanes at intersections or mid-block, creating expanded tree wells and planted areas that intercept runoff while shortening pedestrian crossing distances. These strategies reduce impervious surfaces, lower heat absorption, support mature tree canopy development, and integrate climate resilience into existing street corridors without requiring additional right-of-way acquisition in space-constrained urban environments.

Case Studies

Portland, Oregon, recently piloted a program that placed [40 trees into the curb zone](#), repurposing underutilized parking lane space for single, double, and triple curb planters with adequate soil volume to reach full canopy potential. Sites were selected by overlaying heat dome temperature maps with street suitable for curb extensions.³¹ Gresham, Oregon, added

“stormwater tree wells” to their [Stormwater Management Manual](#) after piloting a program that planted trees along a major arterial in wells fed stormwater from the street through inlets cut into the curb. Some cities use the opportunity to plant trees into traffic-calming and pedestrian-friendly [curb extensions](#), sometimes called “bulb-outs” or “bump-outs,” where the sidewalk and curb are extended into the roadway, typically at an intersection to shorten the distance from curb to curb.³² Trees in curbs typically require less pruning around overhead lines.

Resources and Standards

- See [B.5.3 of the Portland Bureau of Transportation Pedestrian Design Guide](#) for more information on the curb extension program.
- Install on streets where at least 6 feet of on-street parking is present.
- Expanded planting areas should not interfere with stormwater runoff or should address runoff through trench drains or by managing flow around.
- Consider underground utilities when choosing location.

Cost

Curb extensions and stormwater tree planters typically cost \$20,000–\$80,000 per installation, depending on concrete work, stormwater infrastructure, and tree planting requirements. Bioretention and rain garden installations commonly cost \$10–\$40 per square foot depending on excavation depth, planting design, and drainage infrastructure.^{33, 34} These installations are often incorporated into curb extensions where they provide traffic calming, tree canopy expansion, and stormwater management within existing street rights-of-way.

Applicable Model Projects

Expanded planting areas are appropriate in commercial corridors where small or zero setbacks do not provide planting area. They are most effective in designated “cool corridors” where people are walking and biking to work, school, daily errands, and transit.



BUS STOP RETROFIT



Photo Source: FAX

Case Studies

Clovis Transit and FAX are both pursuing upgraded shaded structures on many of their stops. FAX and Fresno State's VisLab are collaborating together on a Shade Structure project that is student led. The students came up with multiple different designs which were made into nine design sets, and of all the great designs, they were refined down to four design options. The goal in mind was to mitigate Fresno's heat island effects by designing new bus stops in various facing directions that are more sustainable, create more shade, and instill placemaking behind each design.

Resources and Standards

Each transit will typically develop its own standards. [The FCOG Transportation Network Vulnerability Assessment](#) include strategies and recommendations for addressing health and transit accessibility implications high heat days.

Cost

Clovis Transit's current stops cost approximately \$16,000 per stop, including engineering and design.

Applicable Model Projects

Improved shade structures should be deployed to all transit stops, starting with the most highly utilized. Local transit agencies have already made progress on this goal.

SEPARATED BIKE LANES



Photo Credit: City of Philadelphia

Purpose

Separated bike lanes, or protected bikeways, use physical barriers—planters, curbs, or bioswales—to create dedicated cycling corridors distinct from vehicle traffic and pedestrian zones. When designed with vegetated buffers, these lanes integrate shade trees and low plantings that cool surface temperatures, filter stormwater runoff, and improve air quality while enhancing cyclist comfort and safety. The separation buffer provides ideal space for linear bioretention features and street trees without conflicting with sight lines or door zones. Protected bike lanes with integrated green infrastructure transform transportation corridors into multifunctional climate-resilient spaces that encourage active transportation while addressing urban heat and stormwater challenges simultaneously.

Case Studies

The City of Fresno implemented a separated bike lane on R Street between Ventura and Tulare Streets in downtown, reconfiguring the corridor to create a parking-protected bikeway. The street was restriped so that the bicycle lane is between the curb and parked cars. Flexible posts and painted buffers were added at key

locations to discourage driving or parking in the bicycle lane.^{35, 36} The City removed a center turn lane to accommodate the bicycle lane; this could also be achieved by narrowing lanes with restriping, depending on the specific street being retrofitted.

Resources and Standards^{37, 38, 39}

- Physical separation between bicycles and vehicles improves rider comfort and safety and can be created using curbs, planters, parked vehicles, or flexible posts.
- Intersection design should minimize conflicts between turning vehicles and cyclists through clear sight lines and appropriate crossing treatments.
- Landscaping within separation buffers should maintain visibility near intersections while allowing shade and vegetation mid-block.
- Drainage should ensure that bicycle lanes do not collect standing water when curbs or planters are used for separation.
- Quick-build approaches using striping and flexible posts can be used to test separated bike lanes before permanent construction.

Cost

Separated bike lanes vary widely in cost depending on the level of infrastructure separation. National planning guidance indicates \$50,000–\$200,000 per mile for paint-and-bollard installations, \$500,000–\$2 million per mile for curb-protected lanes, and \$1–\$5 million per mile when landscaped buffers or stormwater infrastructure are incorporated.^{40, 41} Costs increase when projects require roadway reconstruction, drainage redesign, or landscaped buffers designed to support tree planting and green infrastructure.

Applicable Model Projects

Separated bicycle lanes are most useful on corridors where traffic speeds or volumes make standard bike lanes uncomfortable or unsafe. Separated bike lanes are often developed on busy corridors connecting people to work, transit, and shopping. They can also be implemented on suburban corridors with high car and bike conflict, such as safe routes to school where less-confident riders are sharing the roads with cars.



Photo Source: City of Fresno

MISTERS AND BUILT SHADE



Photo Credit: City of Portland Water Bureau

Purpose

Misting systems provide immediate evaporative cooling in high-heat pedestrian environments by dispersing fine water droplets that lower ambient temperatures by 10-20 degrees within their zone of influence. Strategic placement at transit stops and outdoor gathering spaces and along active transportation corridors offers relief during extreme heat events when shade infrastructure is insufficient or not yet mature. While effective for short-term thermal comfort, misters require reliable water supply and regular maintenance. Combined with shade structures and vegetation, misting systems create layered cooling strategies that address immediate heat exposure while permanent green infrastructure develops.

Case Studies

The City of Phoenix tested artist-designed shade structures through the [¡Sombra! Experiments in Shade](#) program, installing nine temporary installations in public spaces to provide heat relief. These projects used modular materials such as UV-resistant fabric, reflective coatings, and simple anchoring systems that can be installed and adjusted without permanent construction. Some installations incorporated additional cooling elements, including misting, to improve

comfort during peak heat.⁴² In parallel, the City of Cambridge launched “Shade is Social Justice” in 2023, commissioning artists to design shade structures in identified hot spots, particularly in under-resourced neighborhoods. These installations are sited in parks, plazas, and community spaces and are used for events and public programming while the City evaluates locations and designs for future investment.⁴³

Resources and Standards

Quick build shade should be deployed to maintain Americans with Disabilities Act (ADA) access while maximizing shade where people walk or congregate.

Cost

Shade cloth and misters are generally low cost. Quick-deploy shade cloth and misters can be incredibly low cost, while more permanent solutions can cost between \$10,000 and \$30,000. These are the quickest and most cost-effective solutions.

Applicable Model Projects

Quick-build shade can be added to any project, especially as a temporary response to an extreme heat event and as canopy grows in.



5

Priority Projects

Templates

The following projects are illustrative, repeatable project concepts based on five separate transportation typologies. They are not site-specific designs, though they are real examples from Fresno County; instead, each project is intended to be adapted across the County. Each template includes an example and a set of relevant shade improvements. A jurisdiction can evaluate the relevant template based on right-of-way and adjacent land uses. Specific site designs will need to take into consideration traffic volumes, existing and planned infrastructure, community needs, and maintenance capacity, while maintaining the core design elements that reduce heat exposure for people walking, biking, and using transit. The following project designs should be used as a starting point to support scoping, cost estimating, community engagement, and implementation and may be combined or scaled to fit individual locations. Each project includes planning considerations. For each type of project, research planned infrastructure, such as active transportation projects, and the orientation of the sun during peak travel times, especially the afternoon when it is hottest, to appropriately place shade where and when it is needed. Each sample project was selected from its identification as a high urgency project in Appendix E.

Partners

Implementation can be strengthened through partnerships with organizations such as Tree Fresno, Fresno Irrigation District, local school districts, and community-based organizations. These partners may assist with project design, installation, stewardship, and long-term maintenance, including watering, monitoring, and tree care, helping to maximize the benefits and longevity of shade investments.



SUBURBAN NEIGHBORHOOD CONNECTOR

Definition:

A suburban neighborhood connector is a multi-lane community street used to get to neighborhood serving uses such as school or a grocery store. They are typically heavily used by people walking or biking. The land uses adjacent to suburban neighborhood connectors are typically residential or civic uses with lawns and unpaved areas next to the sidewalk.

Planning Considerations:

When designing a shade project on a suburban neighborhood connector the following should be evaluated:

- Who owns the land adjacent to the route and how could tree planting be encouraged?
- Is the route a designated Safe Route to School?
- Are there existing safety concerns and or traffic calming opportunities?
- Can parking be reduced?

Before:

This location offers little shade as families and workers commute from home to school and work on the sidewalk or in the bike lane. There is no right-of-way in which to plant street trees; however, there is an opportunity to plant shade trees on the school property behind the fence.



After:

Planting trees along the fence line provides a **shaded walkway and bikeway** along this priority corridor. As the trees mature, the shade will eventually extend to the relocated double bike lane running along the sidewalk. This is especially effective on the south and west sides of a street.



URBAN COMMERCIAL CORRIDOR

Definition:

An urban commercial connector is a large, typically multi-laned street in an urban center. They tend to feature parking spots and are lined primarily by commercial businesses and high-density residential uses, which often directly abut the sidewalk. They often include medians and large turning lanes.

Planning Considerations:

When designing a shade project on an urban neighborhood connector the following should be evaluated:

- Is there a business district or association to partner with?
- Can parking be reduced?
- Can the turn lane be reduced/shortened/removed?
- Can lanes be removed or narrowed?
- Are there existing safety concerns and or traffic calming opportunities?

Before:

This busy urban street offers little shade to pedestrians, and the lack of pervious surfaces with trees and vegetation contributes to the urban heat island effect and flooding.



After:

By **expanding planting areas** through curb extensions, road diet, and a new median, underutilized pavement is transformed into opportunities for shade and cooling. These strategies add planting space where none existed.



RURAL MAIN STREET

Definition:

A rural main street is typically a state highway that serves as the commercial corridor for a rural community. These roads are generally multiple lanes with a center turn lane. Land uses are often commercial with driveways and parking lots abutting the sidewalk.

Planning Considerations:

When designing a shade project on a rural main street the following should be evaluated:

- Is there a community group or business district to partner with?
- Can the turn lane be reduced/shortened/removed?
- Can lanes be removed or narrowed?
- Are there existing safety concerns and or traffic calming opportunities?
- Are there transit stops that would benefit from shade?

Before:

This location offers little protection to pedestrians and cyclists as they travel along a rural commercial street. There are vast swaths of pavement contributing to the urban heat island effect.



After:

Planting trees in a new, **expanded median** converts heat-absorbing pavement into green space, providing shade and evaporative cooling to the area. The median slows traffic and offers a safe haven for a pedestrian crossing multiple lanes of traffic.



TRAILS

Definition:

A trail is on off-street route.

Planning Considerations:

When designing a shade project on a trail the following should be evaluated:

- On which side of the trail will trees provide the most shade when the trail is most utilized?
- Is there access to water to maintain the trees?
- Can a shade structure be installed as a temporary stop gap while trees mature?

Before:

This trail offers pedestrians and cyclists a direct route connecting destinations without the danger of cars. There is green space but no shade.



After:

Following the installation of **built shade** and shade trees, this **shaded walkway and bikeway** provides critical protection from heat exposure away from traffic and encourages walking and biking.



BUS STOP

Definition:

A bus stop is a formal, fixed, and well utilized transit stop operated by FAX, FCRTA, or Clovis Transit.

Planning Considerations:

When designing a shade project at a bus stop the following should be evaluated:

- Is there room for a shelter?
- Is there access to water for a fountain or mister (temporary or permanent)?
- Is there area for planting or other awnings near the bus stop, and can transit arrival/approach be seen from those locations?

Before:

This transit stops offers seating and a trash bin, but no shade.



After:

A **bus stop retrofit** complete with temporary or permanent misters provides immediate shade relief and evaporative cooling for active commuters.





6

Next Steps

This Plan is a guidance document for the County, Cities, and transit providers in Fresno County. This document should be used to plan, fund and implement. This section outlines these three steps and how each of these partner agencies could use this Plan.

Plan

LONG RANGE PLANS:

This Plan should be used to write general plans, active transportation plans, transit plans, and downtown revitalization, and specific plans. The Plan's data can be used to inform background and existing conditions report on environmental, socio-economic, and planning conditions. The Plan's menu of shade strategies and sample shade projects can be used as potential policy recommendations or design treatments. Chapter 2 Plan Review and Recommendations, includes model policy from the region and nation that can be used to update these plans.

AREAS FOR FURTHER STUDY:

COOLING CENTERS

Partner agencies interested in pursuing a holistic shade and cooling strategy may want to invest in specific tailored studies beyond the scope of this plan. Cooling centers are public buildings, such as libraries and community centers open for extended hours on extreme heat days. These places should provide comfortable seating, air conditioning, and access to free water. Partner agencies should evaluate how their cooling center network addresses the specific needs of vulnerable populations including children, older adults, and the unhoused community. Cooling centers are only one tool in an urban heat strategy addressing hazard days, and should be included along side strategies that provide cool and shaded places throughout the community

allowing for transportation, education, play, and commerce on hot days. The California Department of Public Health has established cooling center guidelines [here](#).

WATER FEATURES AND HYDRATION

Water features such as playgrounds, water fountains / bottle filling stations, misters, and pools provide important cooling opportunities. The City of Miami Extreme Heat Plan "Water" section provides recommendations including inventorying water features to establish priority implementation areas, providing water at outdoor community events, and expanding hours of splash pads and pools during hot days. Retrofitting existing parks can be expensive, but jurisdictions, including the Portland Water Bureau, deploy temporary misters and water stations on hot days. Additionally, all public facilities and CIPs should be evaluated for their potential to provide public water.

THE UNHOUSED COMMUNITY

The unhoused community faces specific vulnerabilities to extreme heat, including limitations on being able to access cooling centers with their pets or belongings. Their specific needs and experience should be included and coordinated with partner agencies.

Fund

Many funding sources are available for extreme heat planning. As of fall 2026, the Governor's Office of [Land Use and Climate Innovation](#) has dedicated extreme heat funding. [Prop 4](#), a 10 million dollar climate bond, provides a range of funding opportunities as well. Jurisdictions should explore these opportunities, as well as, active transportation funding such as Safe Routes to School and other extreme heat adjacent funding opportunities to find create strategies to fund this important work.



Source: Portland Water Bureau Facebook

Chapter 4 Urban Heat Projects and Chapter 5 Priority Projects provide example vegetation projects that could be funded.

The [California Grants Portal](#) is a user friendly site to explore relevant opportunities for member agencies to explore.

Implement

There are many quick wins partner agencies can undertake to combat extreme heat immediately. Local governments can partner with nonprofit organizations to provide tree planting and education events. This should include considerations for how tree planting recipients water, prune, and care for their trees to help ensure long term maintenance and sustainability. Additionally, built shade such as awnings and parklets can be pursued with storefront improvement, economic development, and downtown revitalization efforts. Lastly, communities can update their municipal codes regarding tree planting, replacement, and maintenance. They can also adopt Urban Forestry Master Plans to adjust municipal policy and position for grants.



7

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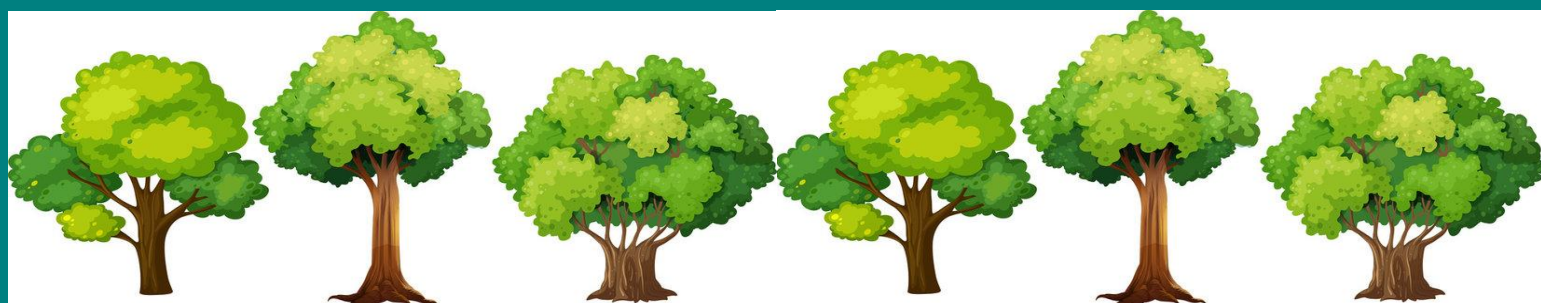
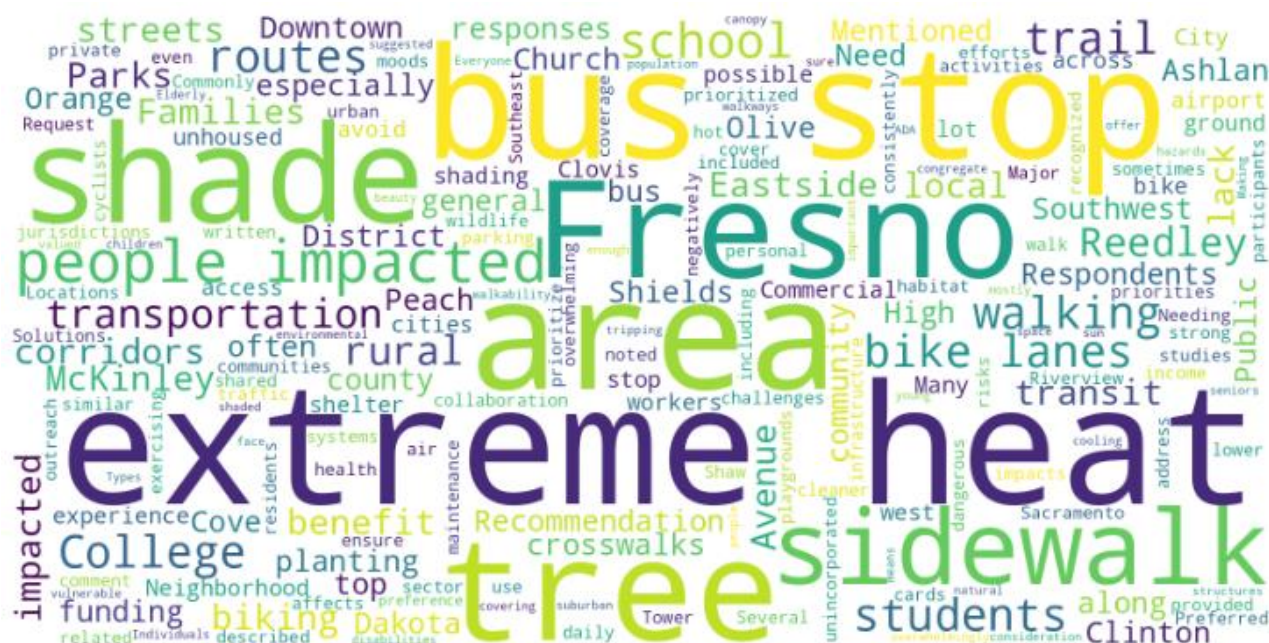
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APPENDIX

Fresno Council of Governments

Extreme Heat Analysis

Public Engagement Summary



Fresno County Extreme Heat Analysis

Public Engagement Summary

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EXECUTIVE SUMMARY

When reaching out to residents in Fresno County to solicit their thoughts on the impacts of extreme heat on people who travel by walking, biking, or taking the bus in our region, there is unanimous consensus that extreme heat is already here, our days of extreme heat are getting more severe, and we must take proactive and effective actions to mitigate the effects. Through a series of pop-up events, workshops, and working group meetings, the following key themes and proposed solutions emerged from the outreach.

Key Themes

Extreme Heat Impacts

- Fresno County described as “very hot, overwhelming, and dangerous.”
- Health risks and emotional toll of heat were frequently mentioned.
- Lack of shade affects daily activities, especially walking, biking, and waiting for transit.

Transportation & Mobility

- Walking and biking routes are top priorities for shade improvements.
- Bike lanes and sidewalks lack shade, especially in rural and suburban areas.
- Extreme heat impacts mobility, especially for vulnerable populations (elderly, children, unhoused, disabled).
- Green belts and canal banks suggested as alternative routes for shaded travel.

Tree Planting & Shade Infrastructure

- Strong preference for trees as the primary shade solution due to their environmental and aesthetic benefits.
- Shade structures (e.g., bus shelters, shaded walkways) are also valued, especially in areas where trees may not be feasible.
- Maintenance concerns: Tree types, placement, and sidewalk interference were frequently mentioned.
- Collaboration is needed between jurisdictions and private sector for funding, planting, and upkeep.

Priority Locations for Shade

- Schools & Playgrounds
- Bus Stops & Transit Corridors
- High-Traffic Streets
- Neighborhoods & Community Areas
- Parks, Trails, Parking Lots, Sidewalks

Transit Access & Equity

- Bus stops in rural and underserved areas lack shade and shelter.
- Need expanded transit access to parks, schools, and healthcare.
- Potential partnerships with rideshare companies (Uber/Lyft) for data and service integration.

Equity & Inclusion

- Unincorporated communities with lower-income residents must be included in outreach and planning.
- ADA accessibility and walkability are critical considerations.

- Community partnerships (e.g., with nonprofits, businesses, irrigation districts) are essential for implementation.

Proposed Solutions

Expand Shade Everywhere Via All Available Means

- Strong preference for both natural (trees) and structural shade options
- More trees with appropriate species, spacing, irrigation, and maintenance; more shade at bus stops, including foliage-covered bus stops.
- More shade structures (awnings, shade sails, artistic structures, movable shade solutions).
- Cooling surfaces such as cool pavement, cool roofs, and reflective materials.

Improve Heat-Safe Mobility

- Build or repair sidewalks, bike lanes, and trail networks designed with shade in mind.
- Add shaded connections to schools, parks, bus stops, and everyday destinations.
- Improve bus stop design with shelters, seating, and hydration.

Address Maintenance, Irrigation, and Cost Barriers in the Planning Process

- Fund long-term tree care, irrigation access, and upkeep responsibilities.
- Use partnerships (businesses, nonprofits, irrigation districts) to address shade.

Plan for Equity & Vulnerable Populations and Increase Shade for Everyone

- Prioritize shade for children, elderly, disabled residents, unhoused individuals, transit-dependent riders, and low-income communities.
- Increase shade for everyone.
- Improve shade access in rural, older, and historically underinvested areas.

Urban Design & Street Geometry

- Narrower streets to reduce heat retention and increase shading potential.
- Building placement that creates shade over sidewalks and streets.
- More connected networks of shade across corridors, stops, and trails.

Policy & Planning Tools

- Incorporate planning and design standards that treat shade as essential infrastructure.
- Update zoning and design standards to require tree canopy shade in urban design from the start of the planning process.
- Use planning models from Arizona, Las Vegas, Orange Cove, Visalia, and Sacramento.
- Strengthen urban design standards and update municipal codes to prioritize shade.
- Ensure Fresno COG advisory plans are adopted more proactively by member cities.

INTRODUCTION

Background

The purpose of the Fresno County Extreme Heat Analysis and Shade Adaptation Plan (analysis) is to analyze adaptations to extreme heat along major active transportation corridors, including the impact on disadvantaged communities, impacts on present and future infrastructure, and an understanding of the different needs in varying geographic areas throughout Fresno County. The parties involved in this project included Fresno COG, each of the 16 local incorporated cities; Clovis, Coalinga, Firebaugh, Fowler, Fresno, Huron, Kerman, Kingsburg, Mendota, Orange Cove, Parlier, Reedley, San Joaquin, Sanger, and Selma; along with Fresno County, community organizations, and the general public.

PUBLIC ENGAGEMENT ACTIVITIES

In April 2025, the project team (Fresno COG staff, Dudek, and VRPA Technologies) finalized the Public Engagement Plan (PEP), outlining the approach for public participation in the planning process. The purpose of conducting community outreach and engagement was to involve people, share information, create opportunities for people to offer their feedback, and incorporate their input into decisions related to the analysis.

Activities and Summary of Feedback

Table 1 lists the engagement activities proposed in the PEP. Following the table, engagement activities are listed in chronological order, with a summary of feedback resulting from each activity. Additional information is included in the Appendices. Appendix 1 provides a summary of organizations included in the Extreme Heat database to which e-blasts were sent.

Table 1
Summary of Engagement Activities

Activity	Number	How Feedback will be Used
Extreme Heat Working Group Meetings	2	<i>Incorporate into Extreme Heat Analysis</i>
Pop-up Events	5	<i>Report to Working Group & Incorporate into Extreme Heat Analysis</i>
Virtual Public Workshops	2	<i>Report to Working Group & Incorporate into Extreme Heat Analysis</i>
Social Media, Flyers, Constant Contact email distributions	Ongoing	<i>Inform stakeholders, the public, and elected officials</i>
Presentations to Standing Fresno COG Committees	2	<i>Incorporate into Extreme Heat Analysis</i>
Total	11	

SUMMARY OF FEEDBACK FROM EACH ENGAGEMENT ACTIVITY IN CHRONOLOGICAL ORDER

Working Group Meeting #1 – May 14, 2025 (Virtual)

Activity and Purpose of Activity
Working Group Mtg #1: Project Introduction; Review of Public Engagement Plan; Input on Vulnerability Indicators; Criteria for Location Analysis of Vulnerable Corridors; and Needs of Local Governments and Interested Parties
Working Group Composition: Representatives from the City of Fresno, an eastside city, a westside city, Fresno County, the Fresno County Department of Public Health, an active transportation organization, a community-based organization (CBO) or non-profit organization, and other organizations. See Appendix 2 for Working Group membership.
How Working Group Meeting #1 was Promoted: • Project team identified members and contact information of Working Group. • Fresno COG Project Manager emailed Working Group members an introduction to the project. • Fresno COG Project Manager sent the Working Group members a calendar meeting invitation.
Summary of Feedback Received: • Recommendation to use walk studies to prioritize shade along school routes, similar to in Sacramento. • Recommendation for collaboration between jurisdictions and the private sector to address challenges related to tree-planting, shade cover maintenance, and funding. • Request to ensure that unincorporated county communities, often with lower income residents, are included in outreach efforts.
How Feedback Was Used: • Recommendations for collaboration between the public sector, the private sector, the public, and non-profit organizations. • Project team provided materials to Fresno COG staff for distribution at concurrent Measure C activities.

Pop-Up Events – May and June 2025

Activity and Purpose of Activity
Pop-Up Events #1-5: Share Information and Solicit Feedback (Project overview board, feedback boards, mapping boards, illustrations of active transportation project settings, comment cards, and other materials)
Dates and Locations: • #1 - Tuesday, May 27, 2025, 5-7 pm - River Park Famers Market, Fresno • #2 - Monday, June 2, 2025, 4:30-6:30 pm - Save Mart on Manning Avenue, Reedley • #3 - Friday, June 6, 2025, 5-7 pm - Old Town Clovis Farmers Market, Clovis • #4 - Sunday, June 15, 2025, 7:30-10 am - Selma Flea Market, Selma • #5 - Wednesday, June 18, 2025, 5-8 pm - Kerman Farmers Market, Kerman
Details: The purpose of pop-up events was to provide a forum to educate the general public and interested stakeholders about extreme heat, and to provide meaningful opportunities for the public to provide input regarding their experiences with extreme heat (comment card), ideas for specific locations that should have more shade (comment card), their priorities for which types of active transportation routes should receive shade (dot

Activity and Purpose of Activity

exercise), and their favorite benefits about trees (dot exercise). To further ensure broad participation, materials were available in both English and Spanish and included QR codes providing electronic availability to the same materials on-line.

The pop-up booths were run by members of the project team, including bilingual staff (Spanish and Punjabi). The booths contained visual preference survey display boards for dot exercises (where participants were provided with two dots per board), comment cards, flyers about how to stay involved, and other materials. To entice people to participate in the visual preference survey dot exercises, staff distributed stickers showing various transportation modes and a tree. These were well-received, and helped attract families with children, as well as teenagers and seniors.



The pop-up events were held during May and June 2025, during a time when Fresno County was experiencing high temperatures.

How Pop-Up Events Were Promoted:

- Pop-Up information was posted onto the Fresno COG Extreme Heat website.
- Two Constant Contact messages were sent in both English and Spanish to individuals and agencies in the project database (Appendix 3).
- Social media posts were posted a day in advance of each pop-up event (Appendix 4).
- The pop-up events were held in areas with high foot traffic (farmers markets, in front of grocery stores, at flea markets). See Appendix 5 for individual pop-up summaries and photos from each event.

Summary of Feedback Received:

Overview of Written Feedback from the Comment Cards Collected at All Pop-Up Events (Appendix 6)

Experiences with Extreme Heat:

- Of those that provided written responses on comment cards, participants consistently described Fresno County as very hot, overwhelming, and sometimes even dangerous. Several noted the lack of shade when walking, biking, or exercising. A few shared more personal impacts, including health risks and how extreme heat negatively affects daily activities and moods.

Commonly Mentioned Locations in Need of More Shade:

- Schools and playgrounds (Riverview School, general school grounds)
- Public areas and sidewalks
- Bus stops and transit corridors (especially along Shaw Avenue)
- Neighborhoods and community areas (Reedley, Orange Cove, Southeast and Southwest Fresno, Eastside)
- High-traffic streets (Clinton, Shields, McKinley, Ashlan, Olive, Church, Peach, Dakota)
- Crosswalks and areas for cyclists

Activity and Purpose of Activity

- Parks, walking trails, and parking lots

Walking and Biking Routes Needing More Trees:

- Major corridors (Clinton, Shields, McKinley, Ashlan, Olive, Dakota, Church, Peach)
- Downtown / Tower District
- Neighborhood streets in Reedley and Orange Cove
- Parks and trail systems
- General coverage across Southwest Fresno

Preferred Shade Solutions:

- There was a strong preference for trees—mentioned overwhelmingly across responses. Many valued trees for their beauty, natural cooling, and environmental benefits. Some also suggested shade structures, bus shelters, and shaded walkways for trails and public areas.

Compilation of Dot Exercises from Visual Preference Surveys from All Pop-Up Events + Electronic Surveys¹:

- Respondents recognized *cleaner air, shade, and healthier communities* as top benefits of trees.
- Respondents prioritized *biking and walking trails, school crosswalks, and bus stops in rural and urban areas* as their top priorities for transportation infrastructure that could benefit from shade.

# of Dots: Favorite Things About Trees	# of Dots: Routes that Would Benefit from Shade
Cleaner Air: 112	Bike Lanes and Sidewalks in Residential Areas: 41
Shade: 110	Bus Stops in Urban Areas: 62
Energy Savings: 16	Bus Stops in Rural Areas: 65
Wildlife Habitat: 56	Biking and Walking Trails: 123
Healthier Communities: 61	Sidewalks in Commercial Areas: 55
Rainwater Capture: 14	School Crosswalks: 76
	Bike Lanes in Thoroughfares: 26
	Bike Lanes in Commercial Areas: 22

How the Feedback Was Used:

The feedback resulting from the written comment cards and the dot exercises from the Extreme Heat and Shade Planning Visual Preference Surveys was provided to the project team undertaking the analytical inventory for incorporation into the technical analysis. The feedback was also reported to the Working Group at its second meeting and to participants of the second Public Workshop for additional feedback.

¹ See Appendix 7 for Electronic Responses to Visual Preference Survey

Workshop #1 – June 2025

Activity and Purpose of Activity	Timeframe and Location
Workshop #1: Project Introduction; Visioning Exercises; Virtual Feedback Boards; Voting Exercises on Priority Locations for Shade Infrastructure	June 17, 2025 (Virtual)
The virtual workshop allowed for group discussions and interactive activities, with the goal of exchanging and gathering information. Materials included a PowerPoint presentation, virtual feedback boards, and virtual voting exercises on priority locations for shade infrastructure. The goal was to dive deeper into questions related to extreme heat to help shape strategies for mitigation and management and prioritize projects in the future. Participants were encouraged to post comments into the virtual chat, and to take the visual preference surveys available via a QR code. See Appendix 8 for Workshop Materials.	
How Workshop #1 Was Promoted: The first workshop was promoted through a series of Constant Contact messages distributed to the stakeholder list, social media posts, and information posted to the project website on the Fresno COG website.	
Summary of Feedback Received: The following comments were received during the Virtual Workshop on Sidewalks, Bike Lanes, and Bus Stops. <u>Sidewalks:</u> Who is impacted by extreme heat on sidewalks: • <i>Elderly and young children</i> • <i>Individuals with disabilities</i> • <i>Everyone!</i> • <i>The unhoused population</i> • <i>People walking to the bus stop</i> • <i>Students</i> Where are people impacted by extreme heat on sidewalks? • <i>Commercial areas where the unhoused congregate</i> • <i>Rural areas</i> • <i>Areas of sidewalks that face the sun</i> When are people impacted by extreme heat on sidewalks? • <i>Our suburban area Fresno is mostly rural so lack of sidewalks to bus stops and no covering for bus stops means lack of shade for our most vulnerable – ADA, seniors, students</i> How are people impacted by extreme heat on sidewalks? • <i>Types of trees are important; those that offer canopy, consideration of tripping hazards</i> • <i>Making sure there is enough space for walkability</i> • <i>The trees are often planted too close and interfere with the levelness of the sidewalk, bushes tend to be overgrown, too</i> • <i>Partnerships with businesses and nonprofits</i>	

Activity and Purpose of Activity	Timeframe and Location
- Valley Oaks <u>Bike Lanes:</u> Who is impacted by extreme heat on bike lanes: - Families, local commuters, college students - Families, students, workers Where are people impacted by extreme heat on bike lanes? - I think that streets that span east and west are the most affected - Trails, transit routes, commercial corridors - Bike routes which are not explicitly marked but experience high rates of travel - Eastside cities, SW Fresno - Downtown Fresno, Reedley College, Fresno College - McKinley Avenue, from airport to Fresno City College, Clovis Avenue from City of Clovis to Airport When are people impacted by extreme heat on bike lanes? - We would need to have bike routes first 😬 - ASAP and with development How are people impacted by extreme heat on bike lanes? - If feasible, shift pedestrian/bicycle access into “green belts” as much as possible to avoid planting trees in difficult areas that can accept new shading easier than fighting the southern exposure areas - Transportation funding to include the addition of microtransit - Utilizing grants - Coordinate with the local irrigation districts to improve canal banks to open access <u>Bus Stops:</u> Who is impacted by extreme heat at bus stops: - Families, workers, students, riders, visitors Where are people impacted by extreme heat at bus stops? - A lot of bus stops in rural areas have limited to zero shading - There should be more bus stops to the north part of town, especially to parks and schools, and healthcare facilities - West-Central Fresno bus stops have no tree canopies or shelter benches - Stops throughout eastside cities to Reedley College When are people impacted by extreme heat at bus stops? - It could also be beneficial to partner/consult Uber/Lyft and local rideshare companies (if possible). Many community members lean into these transit options to supplement bus/alternative transportation to cars, and it could be worth seeing if they would be willing to share aggregate transportation data (could be a long shot, but just wanted to put it out there)!	

Activity and Purpose of Activity	Timeframe and Location
How are people impacted by extreme heat at bus stops? <i>Avoid trees that produce fruit/materials that leads to waste on the ground</i>	
How Feedback Was Used: The feedback resulting from the virtual comment cards and the virtual dot exercises was provided to the project team for incorporation into the technical pieces of the analysis, which was then presented and discussed at the second Working Group meeting and second Public Workshop	

Working Group Meeting #2 – October 2025 (Appendices 9 and 10)

Activity and Purpose of Activity	Timeframe and Location
Working Group Mtg #2: Receive a Summary of Input from the Public Outreach Activities; Discuss the Findings from the Review of Existing Plans and Policies; Discuss the Heat Vulnerability Analysis; Review the Data Analysis and Project Screening Resulting from the Pedestrian and Bicyclist Traffic Analysis and Location Analysis; and Discuss the Project Template Selection	October 28, 2025 (Virtual)
How Working Group Meeting #2 Was Promoted: The second Working Group meeting was promoted through a series of Constant Contact messages distributed to the Working Group, social media posts, and information posted to the project website on the Fresno COG website. In addition, Fresno COG staff sent Working Group members a calendar appointment for this meeting.	
Summary of Feedback Received: The plan will identify five replicable template types, including: - Urban Commercial Corridors - Suburban Neighborhood Connectors - Transit Stops - Rural Town Main Streets - Community Trails and Pathway Corridors Working Group members identified the following challenges that should be addressed in each template. Urban Commercial Corridors - Sparse shade and tree canopy due to utilities, small tree wells, and limited space. - Extensive pavement and heat buildup creating unwalkable, unattractive streetscapes. - Maintenance and cost barriers preventing sustained tree care and equitable canopy distribution. Suburban Neighborhood Connectors - Incomplete or unsafe sidewalks that leave pedestrians and families exposed to heat. - Private property boundaries and irrigation needs limiting new planting opportunities. - Funding and maintenance gaps reducing the city's ability to expand or sustain trees. Transit Stops - Lack of shade structures or trees leading to extreme discomfort and heat exposure.	

- Design and infrastructure conflicts (right-of-way, visibility, and utilities) hindering shade additions.
- Perception and maintenance challenges — fears of loitering, vandalism, or upkeep costs.

Community Trails

- Insufficient shade and hydration points along exposed trail networks.
- Environmental and maintenance constraints like weeds, dust, and irrigation limits.
- Accessibility and safety issues for families, elderly users, and people with disabilities.

Rural Main Streets

- Funding and water access constraints making retrofits expensive and complex.
- Permitting barriers (e.g., Caltrans) delaying or preventing planting projects.
- Low pedestrian activity reducing motivation for shade investments despite community benefits.

Discussion Highlights

Working Group members raised comments regarding:

- Inclusion of unincorporated communities like Tranquility and Raisin City
- Lack of shade infrastructure in older developments, such as Main streets
- Need to place a greater value in the planning process on urban design improvements (e.g., storefront canopies or awnings that provide shade during summer and protect from rain in the winter) and traffic-calming techniques
- Importance of safe routes to schools considering heat exposure for children
- Shade in parks and on city property
- Suggestion to use Orange Cove as a model for green space pathways, and Visalia and Sacramento as shade-friendly cities
- Access to shade planning resources, such as planning examples in Arizona and Las Vegas, and cool pavement efforts in Los Angeles
- Understanding that plans published by the Fresno COG are advisory for member agencies

Next Steps

Next steps include finalizing the selection of five representative projects across geographies and templates; hosting a public workshop in November 2025; developing a plant palette, shade infrastructure guide, and implementation strategies; and releasing the final plan in early to mid-2026, including a public comment period.

How Feedback Was Used:

The feedback received was reported at Public Workshop #2 and was used to help inform the creation of the templates.

Workshop #2 – November 2025(Appendices 11, 12, and 13)

Activity and Purpose of Activity	Timeframe and Location
Workshop #2: Hear a Summary of Input from the Public Outreach Activities; Discuss the Findings from the Review of Existing Plans and Policies; Discuss the Heat Vulnerability Analysis; Review the Data Analysis and Project Screening Resulting from the Pedestrian and Bicyclist Traffic Analysis and Location Analysis; and Discuss the Project Template Selection	November 18, 2025 (virtual)
How Workshop #2 Was Promoted: The second workshop was promoted through a workshop flyer, a series of Constant Contact messages in English and Spanish distributed to the stakeholder list, social media posts, and information posted to the project website on the Fresno COG website.	
Summary of Feedback Received: Members of the public identified the following challenges that should be addressed in each template. Urban Commercial Corridors - Extremely hot conditions; extensive pavement and asphalt. - Significant lack of trees, green space, and shade (including at transit stops). - Narrow sidewalks limiting space for shade infrastructure. - Heat island effects noted and worrying. - Hot environments discourage walking, biking, and transit use. - People shift trips to early/late hours or stay home. - Heat exposure negatively affects ridership, business activity, and overall comfort. - Prioritized users: walkers, bikers, shoppers, heat-exposed workers, elderly, disabled, children, and communities with limited car access. Suburban Neighborhood Connectors - Too little shade; wide roads create large heat-absorbing surfaces. - Unsafe/ shadeless routes to schools; parked cars become extremely hot. - Residents and kids avoid being outdoors; fewer children playing outside. - Heat drives short trips to be made by car instead of walking/biking. - Can lead to social isolation; limits physical activity. - Prioritized users: children, families, seniors, people without cars, disabled, low-income residents. Transit Stops - Major theme: almost no shade or inadequate shade structures. - Hot metal benches, no water, no comfortable waiting environment. - Heat discourages transit ridership and leads people back to cars. - Health risks for those who rely on transit (students, elderly, disabled, workers). - Heat exposure combines with fumes—unhealthy for waiting riders.	

Activity and Purpose of Activity	Timeframe and Location
Prioritized users: disabled individuals, elderly, students, workers, transit-dependent riders, families with young kids.	
Rural Main Streets - Extremely low pedestrian activity during heat; people stay in cars. - Lack of shade, awnings, and tree canopy; streets feel unattractive and inhospitable. - Heat reduces shopping and economic activity. - Limited transit/walking/biking infrastructure. - Far distances between cooling centers. - Prioritized users: elderly, families, farmers, residents without transportation, shoppers, students.	
Community Trails - Dusty, hot, sun-exposed; insufficient trees and understory. - Reduced use—only early morning or late evening outings. - Dehydration risks; inadequate water fountains. - Poor nighttime usability due to lack of lighting. - Prioritized users: students, families, bikers/scooter commuters, workers, farmers; essentially everyone.	
Final Question – Barriers & Suggested Solutions Barriers to Adding Shade/Trees - Upkeep and maintenance responsibilities. - Limited access to water and irrigation. - Insufficient root areas or tree wells. - Funding constraints and reliance on decisions by city leadership. - Need for updated urban design standards and planning practices. Proposed Solutions - Shade sails, awnings, and movable shade structures. - Use of vines, foliage-covered bus stops, or public art that provides shade. - Solar cooling strategies. - Cool pavements, reflective surfaces, cool roofs. - Narrower streets and buildings positioned to create shade. - Stronger requirements for tree canopy in urban design.	
<u>Common Concerns Across All Categories</u> Heat & Comfort - Overwhelming lack of shade, greenery, and places to cool down. - Hot pavement/asphalt intensifying heat across all environments. Mobility & Safety - Heat discourages walking, biking, transit use, and outdoor activities. - Vulnerable populations (elderly, disabled, low-income, children, transit-dependent riders) are disproportionately affected. Health Impacts	

Activity and Purpose of Activity	Timeframe and Location
• Risk of dehydration, heat exhaustion, and overall physical discomfort. • People shift schedules or stay indoors due to heat. Infrastructure Limitations • Streets, sidewalks, and transit stops often designed without shade in mind. • Maintenance, water access, and space limitations hinder adding trees. Social & Economic Effects • Reduced outdoor activity, social isolation, decreased shopping or economic engagement. • In rural and commercial areas, heat reduces pedestrian traffic and local business vitality. Desire for Integrated Shade Solutions • Strong preference for both natural (trees) and structural shade options (shade sails, awnings, art, umbrellas). • Need for long-term planning and design standards that treat shade as essential infrastructure.	
How Feedback Was Used: The feedback received was used to help inform the creation of the five project templates.	

Presentations to Fresno COG Standing Committees –2026

Activity and Purpose of Activity	Timeframe and Location
Presentations to Fresno COG Standing Committees: • Technical Transportation Committee (TTC)/Policy Advisory Committee (PAC) • Fresno COG Board	Date TBD, Fresno COG Offices Date TBD, Fresno COG Offices

Social Media, Flyers, Constant Contact Email Distributions

Interested Party List

An important part of the outreach process was to identify a broad range of interested parties, create an interested party list (Appendix 1), and continually update and expand the list. The list was meant to be as inclusive as possible, providing opportunities for a wide variety of people, organizations, stakeholders, and agencies to participate in the planning effort. The project team created a database, including the names of people, organizations/agencies, and their email addresses, for incorporation into a Constant Contact distribution list. The database was updated and expanded as the project proceeded. The project team used the database as a way to share information, materials, and updates related to project.

Relevant Past Outreach Efforts

Significant work has been conducted in the past decade in Fresno County in the climate change space. To recognize and build upon this work, Table 2 summarizes the major climate-related efforts completed or underway, and lists the groups involved in those efforts. The project team incorporated these groups into the interested party list database created for this project.

Table 2
Recent Climate Efforts and
Major Groups Included in the Extreme Heat Analysis Database

Recent Climate Efforts in Fresno County	Major Groups Involved and Proposed for Inclusion in the Extreme Heat Analysis Database
2020 Fresno County Regional Transportation Network Vulnerability Assessment	▪ California Rural Legal Assistance ▪ Central California Asthma Collaborative ▪ City of San Joaquin - Public Works ▪ Fresno County Office of Emergency Services ▪ Fresno Metropolitan Flood Control District ▪ Fresno County Rural Transit Agency ▪ City of Fresno – Traffic Engineer ▪ City of Fresno – Fresno Area Express (FAX) ▪ Fresno County Transportation Planning
2024 Priority Climate Action Plan and related Climate Pollution Reduction Grant program efforts Fresno County Comprehensive Climate Action Plan	▪ San Joaquin Air Pollution Control District ▪ Tranquility Resources Conservation District ▪ Central California Asthma Collaborative ▪ California Office of Land Use & Climate Innovation (LUCI, formerly Governor’s Office of Planning and Research [OPR])
City of Fresno Climate Adaptation Plan and Environmental Justice Element	▪ Building Healthy Communities ▪ Central Valley Community Foundation ▪ West Fresno Family Resource Center ▪ Every Neighborhood Partnership ▪ Poverello House

Recent Climate Efforts in Fresno County	Major Groups Involved and Proposed for Inclusion in the Extreme Heat Analysis Database
	▪ Fresno Economic Opportunities Commission (FEOC) ▪ Black Wellness & Prosperity Center ▪ LGBTQ+ Resource Center ▪ Lowell Community Development Corporation ▪ Chinatown Fresno Foundation ▪ Downtown Fresno Partnership ▪ The Development Southeast Fresno Community Economic Association ▪ St. Rest EDC ▪ South Tower Community Land Trust ▪ Tower Neighborhood Association ▪ Habitat for Humanity Greater Fresno Area ▪ Big Brothers Big Sisters of Central California ▪ Fresno Interdenominational Refugee Ministry ▪ Better Blackstone CDC ▪ HandsOn Central California ▪ Jakara Movement ▪ El Dorado Park CDC ▪ Highway City Community Development ▪ Jane Addams CDC ▪ SW Fresno CDC ▪ Hidalgo CDC ▪ Jackson CDC ▪ Dolores Huerta Foundation
City of Fresno Urban Forestry Master Plan	▪ Public Works Department, City of Fresno ▪ PARCs Department, City of Fresno ▪ Planning Department, City of Fresno ▪ General Services Department, City of Fresno ▪ Personnel Department, City of Fresno ▪ San Joaquin River Parkway and Conservation Trust ▪ San Joaquin Valley Air Pollution Control District ▪ Water Conservation, Public Utilities, City of Fresno ▪ ISA Certified Arborist, PG&E Kern – Fresno ▪ Fresno Unified School District ▪ Tree Fresno
Fresno Understands Environmental Resilience Through Equity (FUERTE)	▪ Fresno County Department of Public Health ▪ Public Health Institute ▪ UCSF, Fresno ▪ Fresno-Madera Medical Society ▪ Central California Environmental Justice Network (CCEJN) ▪ UCLA

APPENDIX 1 - ORGANIZATIONS INCLUDED IN STAKEHOLDER DATABASE

Organization/Agency
FCOG Staff and Consultants
FCOG
Dudek
VRPA
Member Agencies
City of Clovis
City of Coalinga
City of Firebaugh
City of Fowler
City of Fresno
City of Huron
City of Kerman
City of Kingsburg
City of Mendota
City of Orange Cove
City of Parlier
City of Reedley
City of San Joaquin
City of Sanger
City of Selma
County of Fresno
Additional Agency Contacts
California Air Resources Board
California Department of Parks and Recreation
California Department of Water Resources
California Highway Patrol
CalFire
Central Valley Regional Water Quality Control District, Region 5
Clovis Transit
FEMA Region 9
Fresno Area Express
Fresno City Planning and Development
Fresno County Agricultural Dept.
Fresno County Board of Supervisors
Fresno County Department of Public Health

Fresno County Economic Development Corporation
Fresno County Fire Protection District
Fresno County Office of Emergency Services
Fresno County Office of Health Policy and Wellness
Fresno County Public Works & Planning
Fresno County Rural Transit Agency
Fresno Irrigation District
Fresno Madera Kings County Regional Health Authority Commission
Fresno Metropolitan Flood Control District
Land Use and Climate Initiative (LCI) (Former OPR)
PG&E
San Joaquin Valley Air Pollution Control District
U.S. EPA
U.S. Forest Service
U.S. National Weather Service
USFS Sierra National Forest Tribal Relations
Airports
City of Firebaugh
City of Fresno Airports
City of Mendota
City of Selma Airport
Naval Air Station Lemoore
Reedley Municipal Airport
Community-Based Organizations
County-wide
A Hopeful Encounter, Inc.
Better Blackstone CDC
Big Brothers Big Sisters of Central California
Building Better Communities
California Rural Legal Assistance
Central California Asthma Collaborative
Central California Environmental Justice Network
Central Valley Air Quality Coalition
Central Valley Partnership
Dolores Huerta Foundation
Fresno County Bicycle Coalition
Fresno County League of Women Voters

Fresno Cycling Club
Fresno Economic Opportunities Commission (FEOC)
Fresno Interdenominational Refugee Ministries
Fresno State University
Fresno State Outreach and Special Programs
Fresno State Transportation Institute
Fresno State University - Student Food Pantry
Habitat for Humanity Greater Fresno Area
HandsOn Central California
Leadership Counsel for Justice and Accountability
Resources for Independence, Central Valley
San Joaquin River Parkway and Conservation Trust
Self Help Enterprises
Tree Fresno
US Green Building Council
East Fresno County (mountains)
Basilwood Farms
Church of Jesus Christ of Latter-day Saints
Earth Day / Ponderosa Lions Club (Aubery)
highway 168 cleanup resource
IAF - St Anthony Mary Claret Catholic Church
Muahoo Market
Public Library
Search and Rescue (SAR)
Sequoia Riverlands Trust
Shaver Lake Lions Cub
Sierra RCD
Sierra Foothill Conservancy
Sierra High School
Sierra Resource Conservation District
Sierra School District
Trauma Intervention Program (TIP)
West Fresno County
Central Valley Leadership Roundtable
Coalinga Rec
Community Development, Inc
Concerned Citizens of West Fresno
Kerman Senior Center

SEEN Team
The LEAP Institute
Westside Youth Center / Mendota Open Market
City of Fresno
A Hopeful Encounter
American Red Cross Central California Region
Binational of Central California
Black Wellness & Prosperity Center
Bullard High School
Calwa Park and Recreation District
Central California Environmental Justice Network
Central Valley Community Foundation
Central Valley Young Environmental Advocates
Centro Binacional Para El Desarrollo Indigena Oxa
Centro La Familia
Chinatown Fresno Foundation
Community United in Lanare
Cultiva La Salud
Downtown Fresno Partnership
El Dorado Park CDC
Every Neighborhood Partnership
FACE (Fresno Area Community Enterprise - Robinson Neighborhood))
Faith In The Valley
Familias En Accion
Fresno Black Chamber of Commerce
Fresno Building Healthy Communities
Fresno City College
Fresno Community Housing Council
Fresno Cycling Club
Fresno Interdenominational Refuge Ministries
Fresno Metro Ministry
Fresno Street Saints
Fresno Unified School District
Fresno Unified Parent University/Hoover High School
Friends of Calwa
Hidalgo CDC
Highway City Community Development

Holistic Wellness Program (The Fresno Center)
Jackson CDC
Jakara Movement
Jane Addams Community Development Corp.
Jefferson + ENP
LGBTQ+ Resource Center
Lowell Neighborhood CDC
Office of Community Affairs City of Fresno
Poverello House
Regenerate California Innovation, Inc. (RCI)
St. Rest EDC
Southeast Fresno Community Econ. Dev. Assoc. (SEFCEDA)
South Tower Community Land Trust
Stone Soup
SW Fresno CDC
The Children's Movement Fresno
The Fresno Center
Tower Neighborhood Association
West Fresno Development Corporation
West Fresno Family Resource Center
Southeast (Reedley, Orange Cove, etc.)
Community Youth Ministries
Kings River Conservancy
Lions Club
Marjaree Mason Center (Reedley)
Reedley Area Veterans Inc
Reedley College
Reedley Parks and Recreation Foundation
Self Help Enterprise
Sequoia Safety Council
The Arc of Fresno/Madera Counties
Tribal Representative
Big Sandy Rancheria
Caltrans
Cold Springs Rancheria of Mono Indians
Department of Transportation
Table Mountain Rancheria Tribe

Tribal Transportation Planner (TMR)
FUERTE Participants
UCSF
UCLA
Central California Environmental Justice Network (CCEJN)
Fresno-Madera Medical Society
UCSF and Public Health Institute
Fresno County Department of Public Health
Others
American Lung Association
Building Industry Association
Care Fresno
California Office of Land Use and Climate Innovation (LUCI)
CRH San Joaquin Valley Housing Collaborative
Fresno Area Hispanic Foundation
Fresno BHC Community Engagement Coordinator
Fresno Chamber of Commerce
Fresno Pacific University Community Transformation
Fresno Regional Workforce Development Board
HandsOn Central California
Helping One Woman
Housing Authority of the City of Fresno
Kings Canyon National Park
Kings River Conservancy District
Reedley College Media Relations
Reedley Community Resource Network
San Joaquin River Conservancy District
Say Yes Foundation
Sequoia National Forest
Sequoia Riverlands Trust
Sharing and Caring
Sierra National Forest
Sierra Resource Conservation District
Tranquility Resource Conservation District/CA Assoc. of RCDs - SJV Area 9
Valley Dream Center

APPENDIX 2 - WORKING GROUP MEMBERSHIP

Organizations /Agencies	
- City of Fresno: - Preston Her, Planner II	
- County of Fresno: - Mohammad Khorsand, Senior Planner	
- Transit Operators: - Drew Wilson, Planning Manager, FAX	
- Westside City: - Theresa Johnson, Community Services Director, City of Kerman	
- Eastside City: - Rodney Horton, Reedley Community Development Director, City of Reedley - Michael Honn, Public Works Director, City of Selma - Javier Andrade, Principal Civil Engineer, City of Parlier	
- Community-based organization (CBO) or non-profit organization: - Mona Cummings, Tree Fresno - Dr. Venise Curry, Concerned Citizens of West Fresno - Jeannie Sa, Earth Day/Ponderosa Lions Club (Aubery) - Bikere Ikoba, Black Wellness & Prosperity Center - Carol Davies, HandsOn Central California - April Henry, Highway City Community Development, Inc - Laura Gromis, US Green Building Council - Environmental Protection Agency: - Eric Byous, Project Manager for Climate Action Plan	
- Caltrans: - Lorena Mendibles, Senior Transportation Planner, District 6 - Jason Adair, Climate Change Adaptation Program Manager, District 6	
- Fresno State University - Hongwei Dong, Professor, Dept. of Geography and City Regional Planning	

APPENDIX 3 - CONSTANT CONTACT MESSAGES PROMOTING POP-UP EVENTS

EXTREME HEAT PLAN



Hello! Welcome to the Fresno COG Extreme Heat Analysis and Shade Adaptation Planning Effort!

As we all know, extreme heat is causing an immediate and pressing hazard in the Fresno region. The Fresno Council of Governments (Fresno COG) is leading a regional approach to develop guidance on increasing vegetation and shade projects for key transportation corridors in Fresno County, particularly for active transportation facilities, where pedestrians, bicyclists, and transit riders are directly affected.

You have been added to this email distribution list because of your likely interest and/or expertise in this topic.

WE WANT YOUR INVOLVEMENT!

Within the next weeks, we will begin engaging in public outreach efforts. Various pop-up events are planned throughout the region from late May through mid-June, and a virtual workshop will be held on **Tuesday, June 17th from 10-11 a.m.**, which will include interactive activities to gain valuable input. Register for the June 17th virtual workshop here:

https://us06web.zoom.us/webinar/register/WN_Pb8xD2Q3QbaixThX179TvQ

How can I get involved or provide input on the plan?

Public involvement is critical to the success of this plan. The following opportunities will be available during the planning process:

- Pop-up booths at community gatherings to hear your ideas and experiences
- Virtual workshops at key stages of the effort to gain local knowledge
- A survey to help identify the visual preferences for tree canopy in the community

For more specific information on the dates, times, and locations of the pop-up booths and other outreach efforts, please contact Matthew Shimizu at mshimizu@fresnocog.org or 559-223-4148 Ext. 240, or visit our website at [Fresno County Extreme Heat Analysis and Shade Adaptation Plan](#).

Please forward this email to your friends, coworkers, or other stakeholders so that we can receive input from across the region.

Public Engagement Summary | Page 23

¡Hola! ¡Bienvenido al Análisis de Calor Extremo y al Esfuerzo de Planificación de Adaptación de Sombra en la Región de Fresno!

Como todos sabemos, el calor extremo está causando un peligro inmediato y urgente en Fresno. El Consejo de Gobiernos de Fresno (Fresno COG) está liderando un enfoque regional para desarrollar orientación sobre el aumento de la vegetación y proyectos de sombra para corredores de transporte clave en el Condado de Fresno, particularmente para instalaciones de transporte activo, donde los peatones, ciclistas y usuarios del transporte público se ven directamente afectados.

Usted ha sido agregado a esta lista de distribución de correos electrónicos debido a su probable interés y/o experiencia en este tema.

¡QUEREMOS SU PARTICIPACIÓN!

En las próximas semanas, comenzaremos a llevar a cabo esfuerzos de divulgación pública. Se planifican varios eventos en toda la región desde finales de mayo hasta mediados de junio, y se llevará a cabo un **taller virtual el martes 17 de junio de 10 a.m. a 11 a.m.** que incluirá actividades interactivas para obtener aportes valiosos. Regístrese para el taller virtual del 17 de junio aquí:

https://us06web.zoom.us/webinar/register/WN_Pb8xD2Q3QbaixThX179TvQ

¿Cómo puedo involucrarme o aportar ideas sobre el plan?

La participación pública es fundamental para el éxito de este plan. Las siguientes oportunidades estarán disponibles durante el proceso de planificación:

- Stands temporales en reuniones comunitarias para escuchar sus ideas y experiencias
- Talleres virtuales en etapas clave del esfuerzo para adquirir conocimiento local
- Una encuesta para ayudar a identificar las preferencias visuales para el dosel de árboles en la comunidad

Para información más específica sobre las fechas, horarios y ubicaciones de los stands temporales y otros esfuerzos de divulgación, comuníquese con Matthew Shimizu al mshimizu@fresnocog.org o 559-223-4148 Ext. 240, o visite nuestro sitio web en [Fresno County Extreme Heat Analysis and Shade Adaptation Plan](#).

Por favor, reenvíe este correo electrónico a sus amigos, compañeros de trabajo u otros interesados para que podamos recibir aportes de toda la región.



Public outreach efforts are underway for the Fresno COG Extreme Heat Analysis and Shade Adaptation Planning Effort, and we welcome you to join us!

Supported by community input, Fresno COG is developing guidance on a regional approach to increase vegetation and shade projects for key transportation corridors in Fresno County, particularly where pedestrians, bicyclists, and transit riders are directly affected.

POP-UP EVENTS AND A VIRTUAL PUBLIC WORKSHOP!

Our pop-up events have begun and will run through mid-June (we started at River Park in the City of Fresno, and remaining events will be held in Reedley, Clovis, Selma, and Kerman). A virtual workshop is scheduled for **Tuesday, June 17th from 10–11 a.m.**, which will include interactive activities to gain valuable input.

Register for the June 17th virtual workshop here:

https://us06web.zoom.us/webinar/register/WN_Pb8xD2Q3QbaixThX179TvQ

How can I get involved or provide input on the plan?

Public involvement is critical to the success of this plan. The following opportunities will be available during the planning process:

- Pop-up booths at community gatherings to hear your ideas and experiences
- Virtual workshops at key stages of the effort to gain local knowledge
- A [visual preference survey](#) to help prioritize the kinds of corridors that need shade

For more specific information on the dates, times, and locations of the pop-up booths, please contact Matthew Shimizu at mshimizu@fresnocog.org or 559-223-4148 Ext. 240, or visit our website at [Fresno County Extreme Heat Analysis and Shade Adaptation Plan](#).

Please forward this email to your friends, coworkers, or other stakeholders so that we can receive input from across the region. Extreme heat affects us all!



Se están realizando esfuerzos de divulgación pública para el Análisis de Calor Extremo y el Esfuerzo de Planificación de Adaptación de Sombra en la Región de Fresno, ¡y lo invitamos a unirse a nosotros!

Con el apoyo de los aportes de la comunidad, Fresno COG está desarrollando una guía sobre un enfoque regional para aumentar la vegetación y los proyectos de sombra para corredores de transporte clave en el condado de Fresno, particularmente donde los peatones, ciclistas y usuarios del transporte público se ven directamente afectados.

¡EVENTOS POP-UP Y UN TALLER PÚBLICO VIRTUAL!

Nuestros eventos comunitarios ya comenzaron y se extenderán hasta mediados de junio (empezamos en River Park, en la ciudad de Fresno, y los eventos restantes se realizarán en Reedley, Clovis, Selma y Kerman). Hay un taller virtual programado para el **martes 17 de junio, de 10 a 11 h**, que incluirá actividades interactivas para obtener valiosas aportaciones.

Regístrese aquí para el taller virtual del 17 de junio:

https://us06web.zoom.us/webinar/register/WN_Pb8xD2Q3QbaixThX179TvQ

¿Cómo puedo participar o aportar ideas sobre el plan?

La participación pública es fundamental para el éxito de este plan. Durante el proceso de planificación se ofrecerán las siguientes oportunidades:

- Eventos pop-up en reuniones comunitarias para escuchar sus ideas y experiencias
- Talleres virtuales en etapas clave del esfuerzo por adquirir conocimiento local
- Una [encuesta de preferencias visuales](#) para ayudar a priorizar los tipos de corredores que necesitan sombra

Para información más específica sobre las fechas, horarios y ubicaciones de los eventos comunitarios y otros esfuerzos de divulgación, comuníquese con Matthew Shimizu al mshimizu@fresnocog.org o 559-223-4148 Ext. 240, o visite nuestro sitio web en [Fresno County Extreme Heat Analysis and Shade Adaptation Plan](#).

Por favor, reenvíe este correo electrónico a sus amigos, compañeros u otros interesados para que podamos recibir aportes de toda la región. ¡El calor extremo nos afecta a todos!

APPENDIX 4 - SOCIAL MEDIA POSTS PROMOTING POP-UP EVENTS



Extreme Heat Plan
**POP-UP
EVENT!**

Sunday
June 15th
7-9:00 am
Selma Flea Market



Plan de Calor Extremo
**¡Las actividades
de divulgación!**

Domingo
15 de junio
7-9:00 am
Mercado de pulgas
de Selma



Extreme Heat Plan
**POP-UP
EVENT!**

Wednesday
June 18th
5-7:00 pm
Kerman Farmers Market



Plan de Calor Extremo
**¡Las actividades
de divulgación!**

Miércoles
18 de junio
5-7:00 pm
Mercado Agrícola
de Kerman



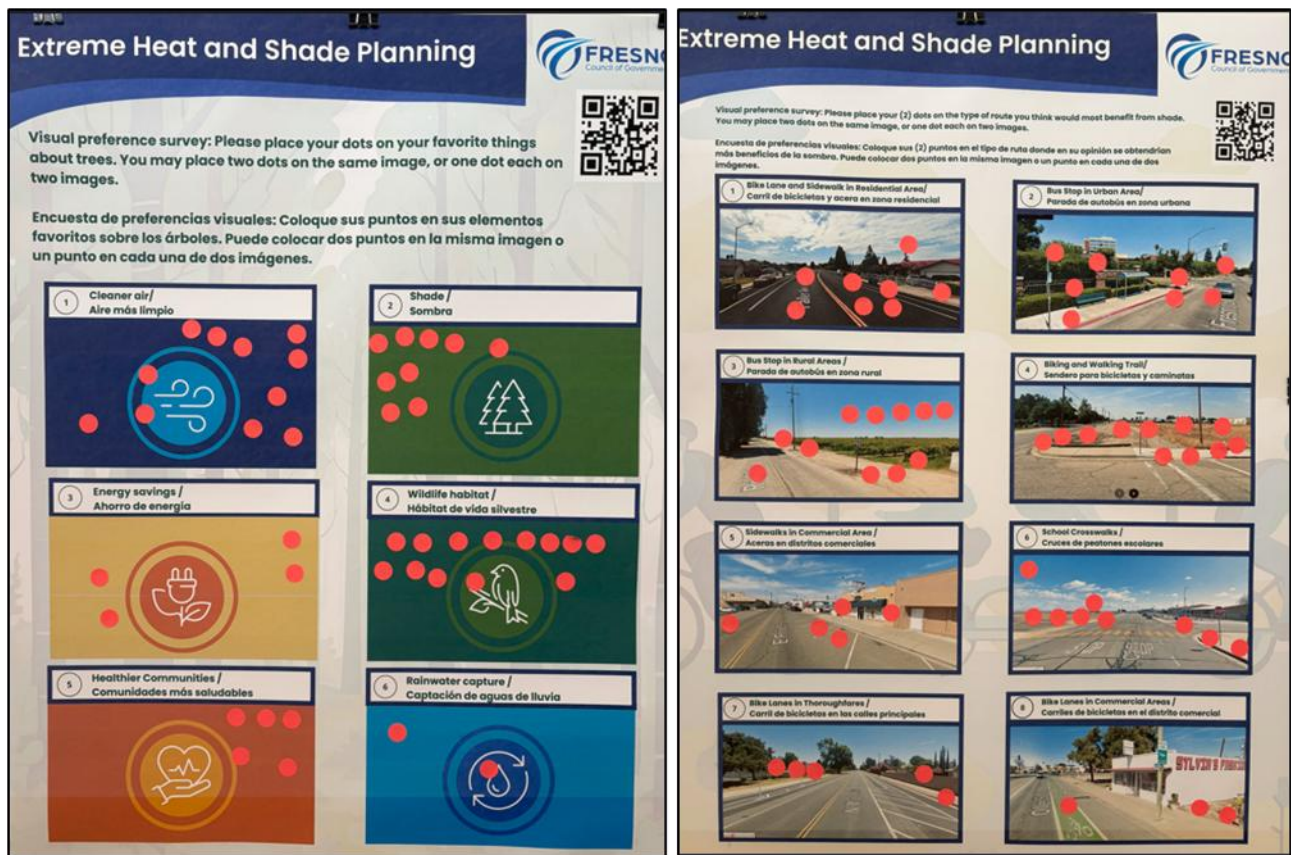
APPENDIX 5 - INDIVIDUAL POP-UP SUMMARIES

River Park Famers Market, Fresno

Written Feedback from Comment Cards:

1. **What is your experience with extreme heat in Fresno County?**
 - *I almost died*
 - *We don't have enough trees, fruit, flowers, etc.*
 - *Need shade*
 - *Hot*
 - *It sucks when you don't have shade*
 - *West of 99 Highway*
2. **What are some specific locations you would like to have more shade?**
 - *I think around schools and public areas*
 - *Eastside*
 - *Cross-walk*
 - *Southeast Fresno*
 - *Where cyclists commute*
 - *Clinton Shields McKinley Ashlan Olive*
3. **What walking and biking routes need more trees?**
 - *Don't know any*
 - *Dakota*
 - *Church and Peach*
 - *Downtown / Tower District*
 - *Clinton Shields McKinley Ashlan Olive*
4. **What types of shade solutions would you prefer (e.g., trees, shade structures, bus shelters)?**
 - *Trees*
 - *All of the above*
 - *Trees*
 - *Trees*
 - *Trees*

Photos of Visual Preference Survey Dot Exercises at the River Park Farmers Market:



# of Dots: Favorite Things About Trees	# of Dots: Routes that Would Benefit from Shade
Cleaner Air: 11	Bike Lanes and Sidewalks in Residential Areas: 8
Shade: 9	Bus Stops in Urban Areas: 8
Energy Savings: 4	Bus Stops in Rural Areas: 11
Wildlife Habitat: 13	Biking and Walking Trails: 11
Healthier Communities: 5	Sidewalks in Commercial Areas: 5
Rainwater Capture: 2	School Crosswalks: 9
	Bike Lanes in Thoroughfares: 5
	Bike Lanes in Commercial Areas: 3

Photos from the Pop-Up Event at the River Park Farmers Market:



Save Mart on Manning Avenue in Reedley

Written Feedback from Comment Cards:

1. What is your experience with extreme heat in Fresno County?
 - No shade when getting exercise
 - Gets very hot here
 - “Mucho calor” (Very hot)
2. What are some specific locations you would like to have more shade?
 - Schools
 - Riverview School playgrounds
 - Orange Avenue walking trail
3. What walking and biking routes need more trees?
 - Neighborhoods in Reedley
 - Parks mostly
 - Orange Cove
4. What types of shade solutions would you prefer (e.g., trees, shade structures, bus shelters)?
 - Trees
 - Trees, maybe more structures, trail walks
 - “Arboles” (Trees)

Photos of Visual Preference Survey Dot Exercises from the Save Mart on Manning Avenue in Reedley:



# of Dots: Favorite Things About Trees	# of Dots: Routes that Would Benefit from Shade
Cleaner Air: 8	Bike Lanes and Sidewalks in Residential Areas: 3
Shade: 9	Bus Stops in Urban Areas: 14
Energy Savings: 1	Bus Stops in Rural Areas: 9
Wildlife Habitat: 4	Biking and Walking Trails: 10
Healthier Communities: 1	Sidewalks in Commercial Areas: 6
Rainwater Capture: 1	School Crosswalks: 11
	Bike Lanes in Thoroughfares: 5
	Bike Lanes in Commercial Areas: 3

Photos from the Pop-Up Event from the Save Mart on Manning Avenue in Reedley:

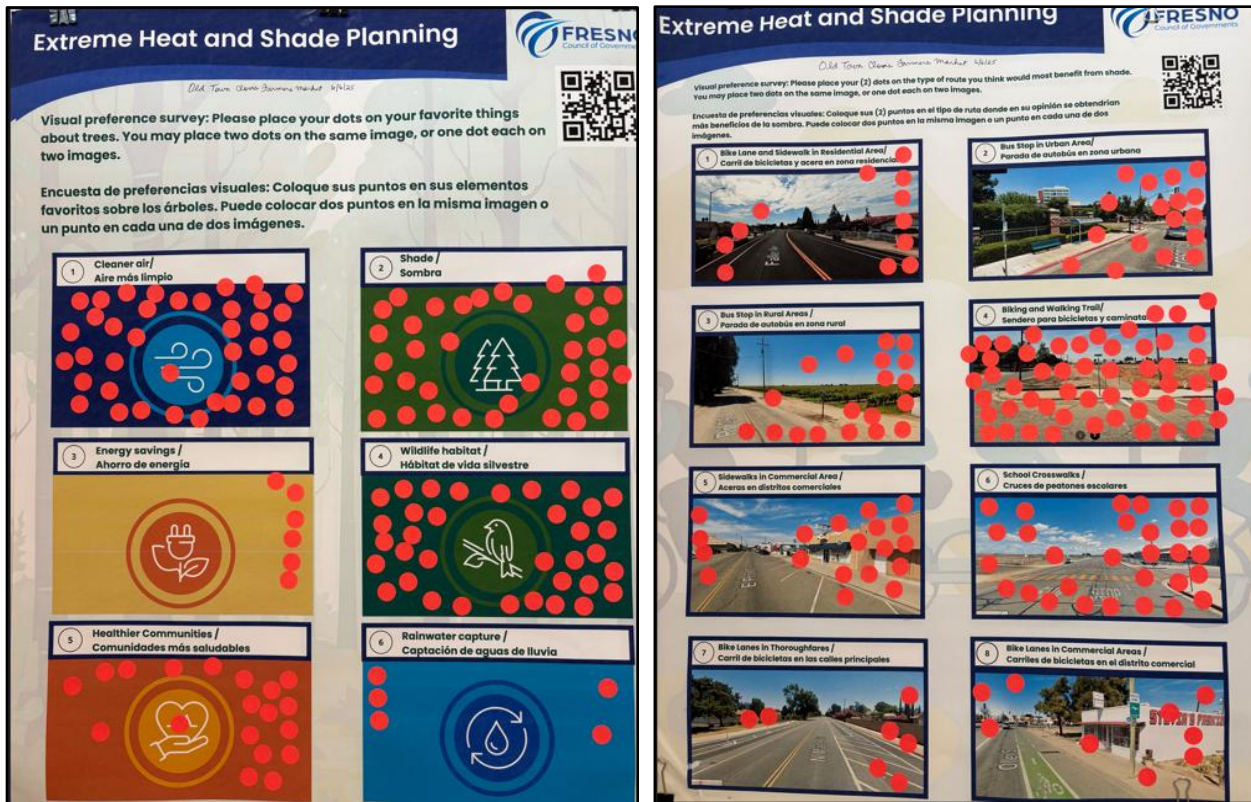


Old Town Clovis Farmers Market, Clovis

Written Feedback from Comment Cards:

1. What is your experience with extreme heat in Fresno County?
 - Good/Bad pending
 - HOT!
 - It is overwhelming and can affect moods
2. What are some specific locations you would like to have more shade?
 - Southwest Fresno
 - Public areas, i.e., sidewalks
 - All of Shaw bus stops
 - Shaw Avenue / main roads
3. What walking and biking routes need more trees?
 - Southwest
 - All
4. What types of shade solutions would you prefer (e.g., trees, shade structures, bus shelters)?
 - Trees
 - Trees are good! And beautiful
 - Bus shelters
 - Trees

Photos of Visual Preference Survey Dot Exercises from the Old Town Clovis Farmers Market:



# of Dots: Favorite Things About Trees	# of Dots: Routes that Would Benefit from Shade
Cleaner Air: 41	Bike Lanes and Sidewalks in Residential Areas: 12
Shade: 39	Bus Stops in Urban Areas: 17
Energy Savings: 6	Bus Stops in Rural Areas: 19
Wildlife Habitat: 19	Biking and Walking Trails: 54
Healthier Communities: 35	Sidewalks in Commercial Areas: 19
Rainwater Capture: 5	School Crosswalks: 29
	Bike Lanes in Thoroughfares: 7
	Bike Lanes in Commercial Areas: 8

Photos from the Pop-Up Event at the Old Town Clovis Farmers Market:

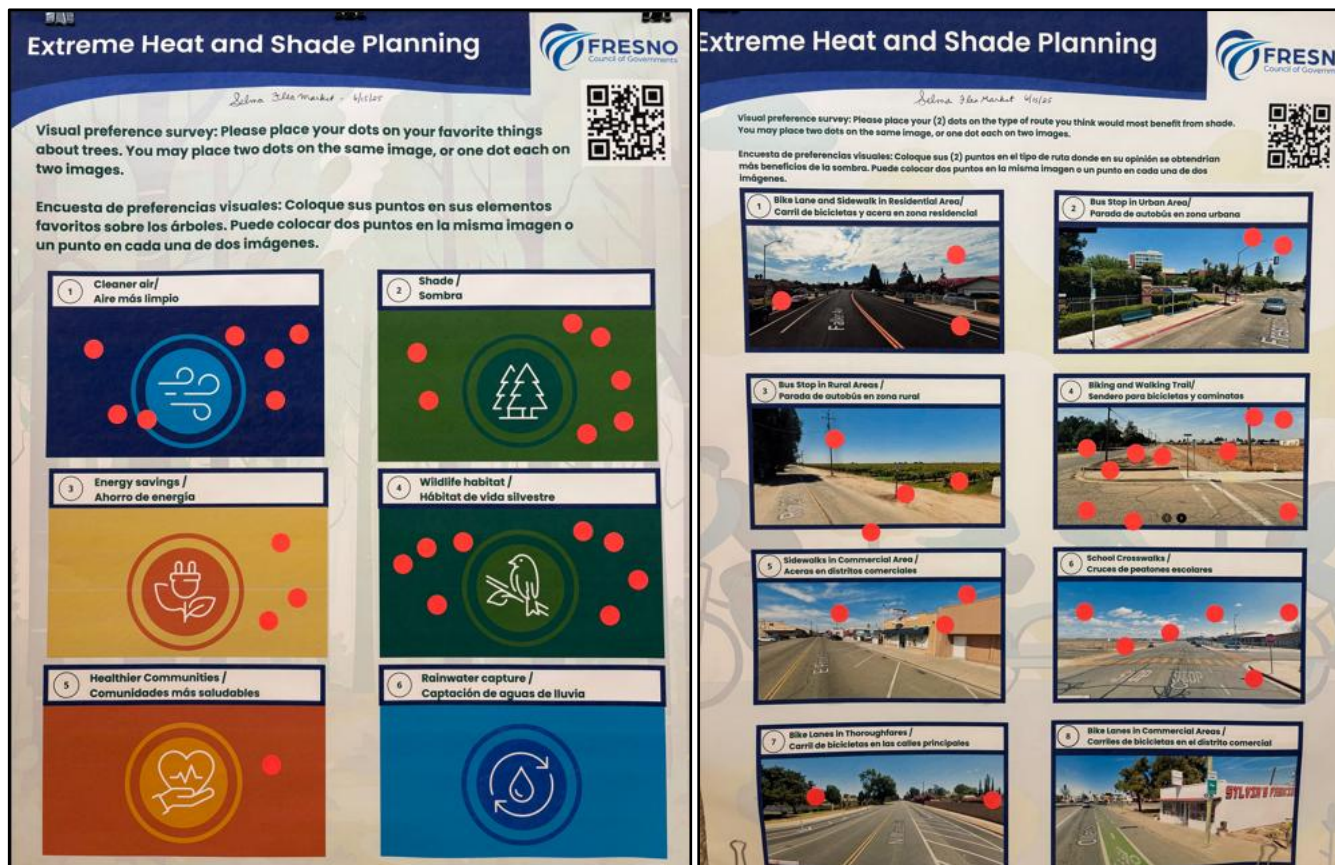


Selma Flea Market, Selma

Written Feedback from Comment Cards:

1. What is your experience with extreme heat in Fresno County?
2. What are some specific locations you would like to have more shade?
 - *Parking Lots*
3. What walking and biking routes need more trees?
4. What types of shade solutions would you prefer (e.g., trees, shade structures, bus shelters)?

Photos of Visual Preference Survey Dot Exercises at the Selma Flea Market:



# of Dots: Favorite Things About Trees	# of Dots: Routes that Would Benefit from Shade
Cleaner Air: 7	Bike Lanes and Sidewalks in Residential Areas: 3
Shade: 7	Bus Stops in Urban Areas: 2
Energy Savings: 3	Bus Stops in Rural Areas: 4
Wildlife Habitat: 8	Biking and Walking Trails: 10
Healthier Communities: 1	Sidewalks in Commercial Areas: 3
Rainwater Capture: 0	School Crosswalks: 6
	Bike Lanes in Thoroughfares: 2
	Bike Lanes in Commercial Areas: 0

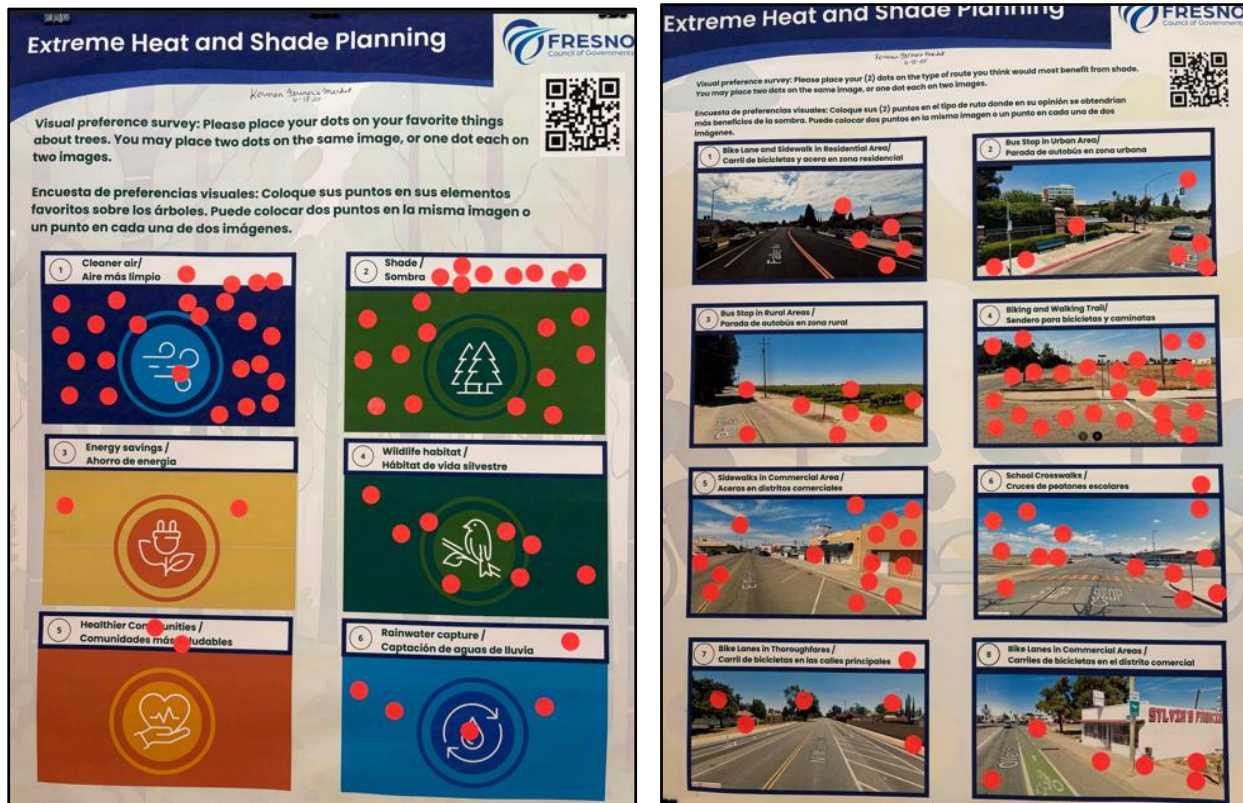
Photos from the Pop-Up Event at the Selma Flea Market:



Kerman Farmers Market, Kerman

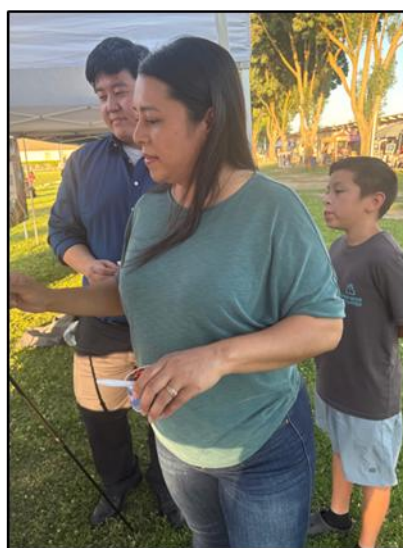
Written Feedback from Comment Cards: *None Received*

Photos of Visual Preference Survey Dot Exercises at the Kerman Farmers Market:



# of Dots: Favorite Things About Trees	# of Dots: Routes that Would Benefit from Shade
Cleaner Air: 25	Bike Lanes and Sidewalks in Residential Areas: 5
Shade: 21	Bus Stops in Urban Areas: 7
Energy Savings: 2	Bus Stops in Rural Areas: 8
Wildlife Habitat: 8	Biking and Walking Trails: 25
Healthier Communities: 2	Sidewalks in Commercial Areas: 15
Rainwater Capture: 5	School Crosswalks: 14
	Bike Lanes in Thoroughfares: 6
	Bike Lanes in Commercial Areas: 6

Photos from the Pop-Up Event at the Kerman Farmers Market:



APPENDIX 6 - COMMENT CARDS COLLECTED AT POP-UP EVENTS

Fresno County
**Heat Vulnerability Analysis
and Shade Adaptation Plan**



We want to hear your thoughts about heat and shade.

1) What is your experience with extreme heat in Fresno County?

I almost died

2) What are some specific locations you would like to have more shade?

I think around schools and public areas

3) What walking and biking routes need more trees?

Don't know any

4) What types of shade solutions would you prefer (e.g., trees, shade structures, bus shelters)?

trees -

Fresno County
**Heat Vulnerability Analysis
and Shade Adaptation Plan**



We want to hear your thoughts about heat and shade.

1) What is your experience with extreme heat in Fresno County?

We don't have enough trees fruit, flowers, etc.

2) What are some specific locations you would like to have more shade?

Eastside

3) What walking and biking routes need more trees?

Dahota

4) What types of shade solutions would you prefer (e.g., trees, shade structures, bus shelters)?

all of the above.

Fresno County
Heat Vulnerability Analysis
and Shade Adaptation Plan



We want to hear your thoughts about heat and shade.

1) What is your experience with extreme heat in Fresno County?

need shade.

2) What are some specific locations you would like to have more shade?

Cross walk -

3) What walking and biking routes need more trees?

4) What types of shade solutions would you prefer (e.g., trees, shade structures, bus shelters)?

Fresno County
Heat Vulnerability Analysis
and Shade Adaptation Plan



We want to hear your thoughts about heat and shade.

1) What is your experience with extreme heat in Fresno County?

Hot?

2) What are some specific locations you would like to have more shade?

Southeast Fresno

3) What walking and biking routes need more trees?

Church & Peach

4) What types of shade solutions would you prefer (e.g., trees, shade structures, bus shelters)?

Trees

Fresno County
Heat Vulnerability Analysis
and Shade Adaptation Plan



We want to hear your thoughts about heat and shade.

1) What is your experience with extreme heat in Fresno County?

It sucks when you don't have shade

2) What are some specific locations you would like to have more shade?

where cyclists commute.

3) What walking and biking routes need more trees?

Downtown / tower district

4) What types of shade solutions would you prefer (e.g., trees, shade structures, bus shelters)?

Trees

Fresno County
Heat Vulnerability Analysis
and Shade Adaptation Plan



We want to hear your thoughts about heat and shade.

1) What is your experience with extreme heat in Fresno County?

West of 99 Highway

2) What are some specific locations you would like to have more shade?

Clinton Shields McKinley Ashlan olive

3) What walking and biking routes need more trees?

4) What types of shade solutions would you prefer (e.g., trees, shade structures, bus shelters)?

Trees

Fresno County
Heat Vulnerability Analysis
and Shade Adaptation Plan



We want to hear your thoughts about heat and shade.

1) What is your experience with extreme heat in Fresno County?

No shade when getting exercise

2) What are some specific locations you would like to have more shade?

Schools

3) What walking and biking routes need more trees?

neighborhoods in Reedley

4) What types of shade solutions would you prefer (e.g., trees, shade structures, bus shelters)?

Fresno County
Heat Vulnerability Analysis
and Shade Adaptation Plan



We want to hear your thoughts about heat and shade.

1) What is your experience with extreme heat in Fresno County?

Gets very hot here

2) What are some specific locations you would like to have more shade?

~~the~~ Riverview School Play grounds

3) What walking and biking routes need more trees?

Parks mostly

4) What types of shade solutions would you prefer (e.g., trees, shade structures, bus shelters)?

trees maybe more structures trail walks

**Análisis de vulnerabilidad al
calor y plan de adaptación a la
sombra del Condado de Fresno**



Queremos conocer su opinión sobre el calor y la sombra.

1) ¿Cuál es su experiencia con el calor extremo en el condado de Fresno?

Mucho Calor

2) ¿En qué lugares específicos le gustaría tener más sombra?

Orange Cove (walking trail)

3) ¿Qué rutas para caminar y andar en bicicleta necesitan más árboles?

Orange Cove

4) ¿Qué tipos de soluciones de sombra preferiría (por ejemplo, árboles, estructuras de sombra, casetas de autobús)?

Arboles

Fresno County
Heat Vulnerability Analysis
and Shade Adaptation Plan



We want to hear your thoughts about heat and shade.

1) What is your experience with extreme heat in Fresno County?

Good/Bad pending

2) What are some specific locations you would like to have more shade?

South west Fresno

3) What walking and biking routes need more trees?

South west

4) What types of shade solutions would you prefer (e.g., trees, shade structures, bus shelters)?

trees

Fresno County
Heat Vulnerability Analysis
and Shade Adaptation Plan



We want to hear your thoughts about heat and shade.

1) What is your experience with extreme heat in Fresno County?

Hot!

2) What are some specific locations you would like to have more shade?

PUBLIC AREAS IE. SIDEWALKS

3) What walking and biking routes need more trees?

ALL

4) What types of shade solutions would you prefer (e.g., trees, shade structures, bus shelters)?

TREES ARE GOOD! AND BEAUTIFUL

Fresno County
Heat Vulnerability Analysis
and Shade Adaptation Plan



We want to hear your thoughts about heat and shade.

1) What is your experience with extreme heat in Fresno County?

It is overwhelming and can effect roads

2) What are some specific locations you would like to have more shade?

All of Shaw bus stops

3) What walking and biking routes need more trees?

OK

4) What types of shade solutions would you prefer (e.g., trees, shade structures, bus shelters)?

Fresno County
Heat Vulnerability Analysis
and Shade Adaptation Plan



We want to hear your thoughts about heat and shade.

1) What is your experience with extreme heat in Fresno County?

2) What are some specific locations you would like to have more shade?

Shaw Ave / Main Roads

3) What walking and biking routes need more trees?

4) What types of shade solutions would you prefer (e.g., trees, shade structures, bus shelters)?

Trees

Fresno County
**Heat Vulnerability Analysis
and Shade Adaptation Plan**



We want to hear your thoughts about heat and shade.

1)What is your experience with extreme heat in Fresno County?

2)What are some specific locations you would like to have more shade?

PARKING lots

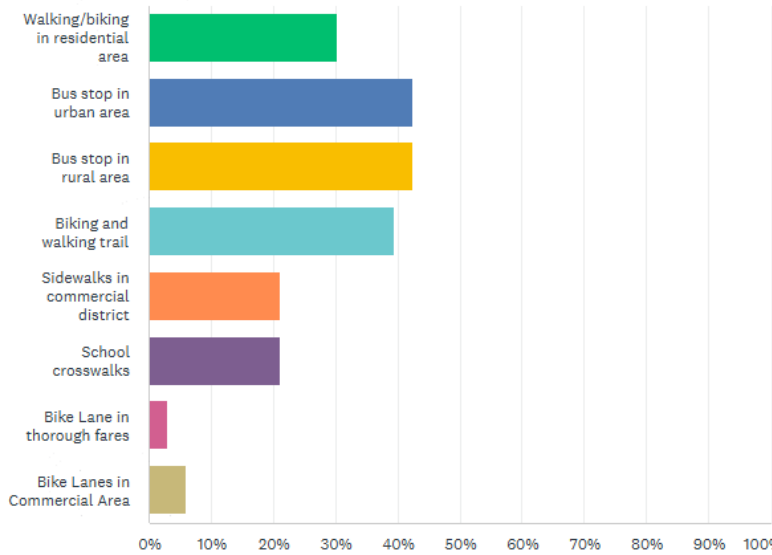
3)What walking and biking routes need more trees?

4)What types of shade solutions would you prefer (e.g., trees, shade structures, bus shelters)?

APPENDIX 7 - ELECTRONIC RESPONSES TO VISUAL PREFERENCE SURVEY

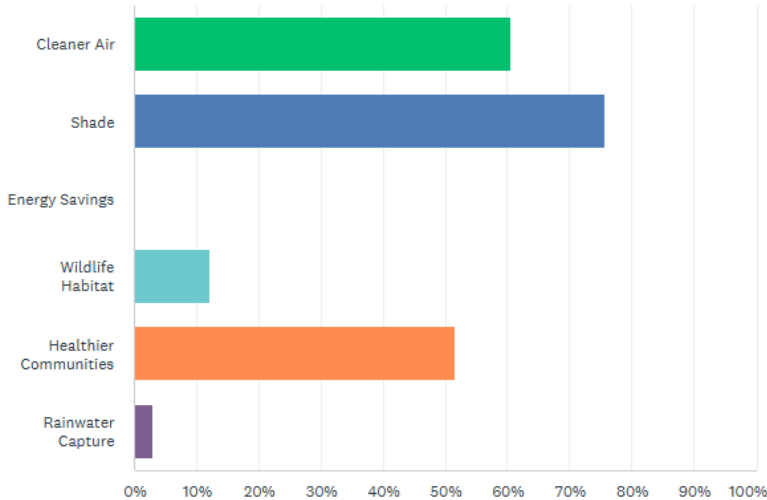
Vote for two of the types of routes you think would most benefit from shade.

Answered: 33 Skipped: 0



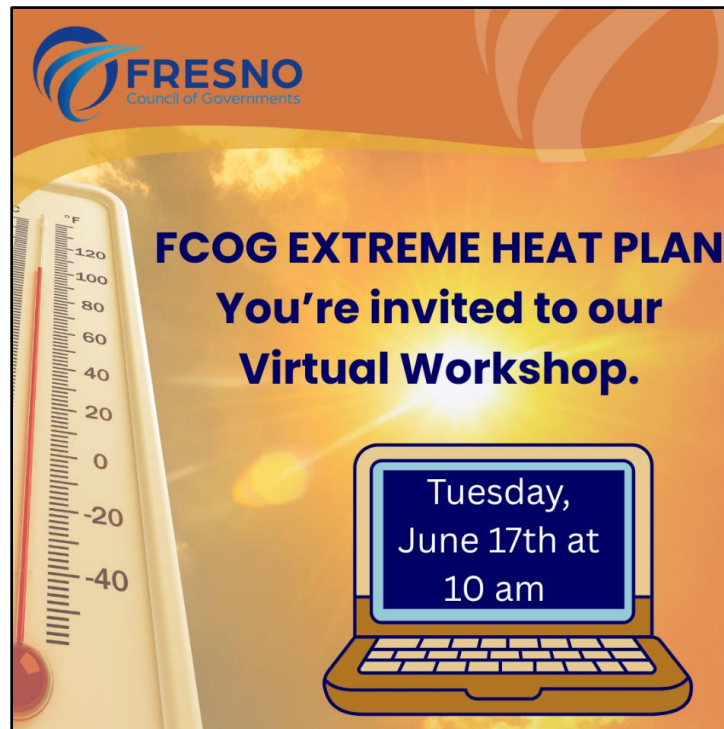
Please Vote for your top two favorite benefits from trees

Answered: 33 Skipped: 0

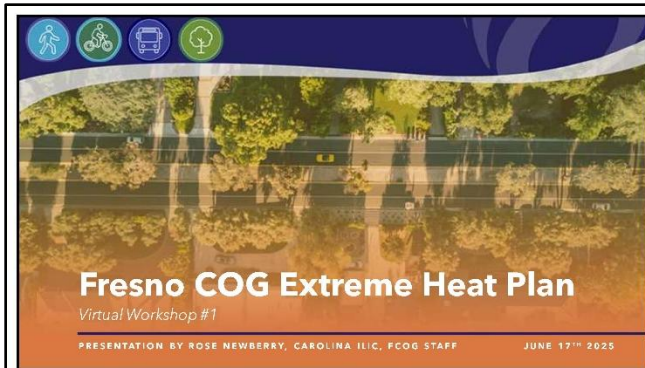


APPENDIX 8 - MATERIALS FOR PUBLIC WORKSHOP #1

Social Media



PowerPoint Presentation



Project Description

- The Fresno Council of Governments will develop an **Extreme Heat Analysis and Shade Adaptation Plan** for Fresno County. The plan will include an **extreme heat vulnerability analysis**, which will provide valuable data for future adaptation and mitigation responses to extreme heat induced by climate change. The plan will also **identify native and drought tolerant tree canopy and vegetative cover improvement projects** in communities most vulnerable to extreme heat based on the extreme heat vulnerability analysis and bike and pedestrian traffic analysis.
- This plan will inform general plans, other long-range plans, and the design and retrofit of future and present infrastructure.

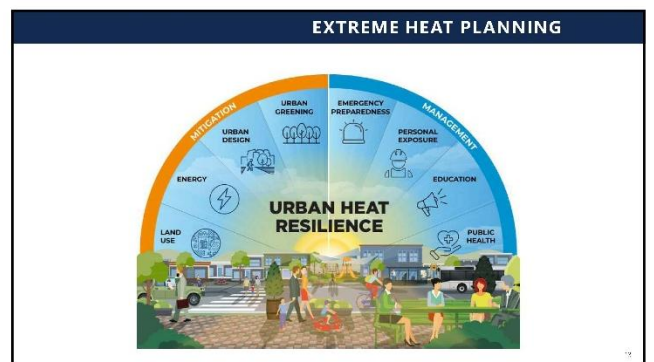
WHY EXTREME HEAT MATTERS

Health Impacts

- Exacerbates respiratory illnesses like asthma
- Increases risk for people with diabetes and cardiovascular disease
- Can lead to heat-related hospitalizations and deaths
- Fresno County has disproportionately high rates of underlying health conditions

Vulnerable Populations at Greatest Risk

- Transit-dependent residents and zero-vehicle households
- Pedestrians and cyclists exposed to direct heat
- Communities with limited tree canopy coverage
- Low-income residents in poor housing conditions
- Disadvantaged communities with existing health burdens



Major Plan Inputs



14

Purpose of Public Engagement

In addition to this workshop, the team has been visiting sites all over the county to gather feedback on extreme heat impact to active transportation uses.



15

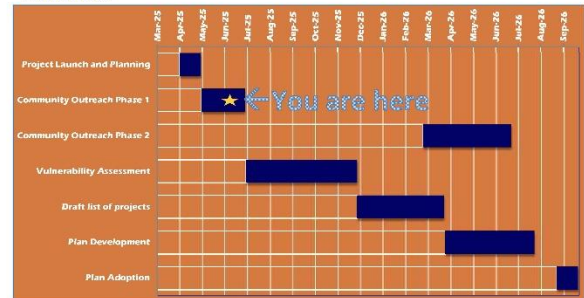
Purpose of Public Engagement

From this workshop, we hope to dive deeper into questions about related to extreme heat - this will help to shape strategies for mitigation and management and help prioritize projects in the future.



16

Timeline



17

03

DUDEK

Instructions for how to participate!



WHO, WHEN, WHERE AND HOW DOES EXTREME HEAT IMPACT YOU?

We will do three of these exercises:



Bus Stops



But First, a quick survey using your phone to point at the QR code (on next slide).

WHO
Use the **chat** to type your thoughts about **WHO** is impacted by extreme heat on sidewalks

WHERE
Use the **chat** to type your thoughts about **WHERE** people are impacted by extreme heat on sidewalks

WHEN
Use the **chat** to type your thoughts about **WHEN** people are impacted by extreme heat on sidewalks

HOW
Use the **chat** to type your thoughts about **HOW** people are impacted by extreme heat on sidewalks

20

Who, when, where and how does extreme heat impact you?

 USE THE CHAT For each slide we'd like you to consider who, when, where and how extreme heat impacts people as they move about the county in different ways. Type your response in the chat. For example: "who: moms pushing strollers"	 BE SPECIFIC It's ok to generalize, but specific responses, such as "where: the bus stop at the intersection of X and Y" will be very helpful to the project team!	 COMMENTS Feel free to add additional context to your answers. This plan addresses extreme heat in transportation corridors but we understand it impacts you in other ways too.
--	---	---

21



In English

Take our 2 minute survey!



En Español



22



Sidewalks



WHO	WHERE
WHEN	HOW



Bike Lanes



WHO	WHERE
WHEN	HOW



Bus Stops



WHO	WHERE
WHEN	HOW

05

DUDEK

Questions?



Lines of Communication and Logistics

- Rose Newberry - Dudek
mewberry@dudek.com
- Matthew Shimizu - FCOG
mshimizu@fresnocog.org
- Carolina Ilic - VRPA
cilic@vrpatechnologies.com
- Link to project site:
<https://publicinput.com/k06367>

Sign up to receive emails at the Project website:





Thank you!

Please join us for the next two workshops starting in March of 2026!






Results of Who, When, Where, and How Exercise:



Sidewalks



WHO

Elderly and young children
Everyone!
People walking to bus stop

Individuals with disability
The unhoused population
Students

WHERE

Commercial areas where the unhoused congregate
Rural areas
Areas of sidewalk that face the sun

WHEN

Our suburban Fresno area, is mostly "rural" feel so lack of sidewalks to bus stops and no covering for bus stops means lack of shade for our most vulnerable- ADA, seniors, students

HOW

types of trees are important
- those that offer canopy
- consideration of tripping hazards

making sure there is enough space for walkability
the trees are often planted to close and interfere with the levelness of the sidewalk, bushes tend to be overgrown too.

Partnerships with businesses and nonprofits
Valley oaks



Bike Lanes



WHO

families/local commuters/college students

families, students, workers

WHERE

I think streets that span east and west are the most affected
trails, transit routes, commercial corridors

bike routes which are not explicitly
marked but experience high rates
of travel

McKinley Ave, from airport to
Fresno City College. Clovis Ave
from City of Clovis to Airport.

eastside cities, SW Fresno

Downtown Fresno, Reedley College, Fresno College

WHEN

We would need to have bike routes first :(

asap and with development

HOW

If feasible, shift pedestrian/bicycle access into "green
belts" as much as possible to avoid planting trees in
difficult areas. Retrofit and develop existing areas that
can accept new shading easier than fighting the
southern exposure areas.

transportation
funding to include the
addition of micro
transit

utilizing grants

Coordinate with the local irrigation districts to improve canal banks to open
access.



Bus Stops



WHO

families, students, workers, riders, visitors

WHERE

transit stops near grocery stores to provide more shade

A lot of bus stops in the rural cities
have limited to zero shading

there should be more bus stops to
the north part of town, especially
to parks and schools, and
healthcare facilities

West-Central Fresno bus stops have no tree canopies or shelter benches
stops throughout eastside cities to Reedley College

WHEN

It could also be beneficial to partner/consult Uber/Lyft and local
rideshare companies (if possible). Many community members
lean into these transit options to supplement bus/alternative
transportation to cars, and it could be worth seeing if they
would be willing to share aggregate transportation data (could
be a long shot, but just wanted to put out there)!

HOW

Avoid trees that produce fruit/materials that leads
to waste on the ground

APPENDIX 9 - MEETING SUMMARY FROM WORKING GROUP MEETING #2

Fresno County Extreme Heat Vulnerability Analysis and Shade Adaptation Plan

Extreme Heat Working Group Meeting #2
10-28-25

Welcome and Introductions

Matthew Shimizu (Fresno COG) opened the meeting, emphasizing the importance of addressing extreme heat impacts on vulnerable populations and transportation infrastructure. The project, in collaboration with Dudek and VRPA Technologies, aims to gather data and community input to develop effective adaptation strategies for pedestrians, bicyclists, and transit riders that use local transportation facilities in the Fresno region. Team members from Dudek and VRPA Technologies introduced themselves and their roles in the project.

Matthew reported that as part of the vulnerability analysis, the team is identifying high-risk areas by examining transit dependency, temperature projections, health conditions, tree canopy coverage, socioeconomic factors, and pedestrian and bicyclist travel patterns. The Extreme Heat program aims to address rising temperatures by identifying vulnerable populations, assessing risk to the transportation users and infrastructure, and developing strategies that enhance community resilience, safety, and livability. The plan will deliver a countywide heat vulnerability assessment, strengthen regional coordination, and produce project designs for five priority locations, each with detailed fact sheets to support implementation. The plan will also identify the tree canopy and vegetation projects that Public Works Departments may use for implementation and inclusion in future capital improvement programs. Using local data on temperature, land use, and population vulnerability, the program will produce maps and strategies to help jurisdictions advance shade, cooling, and resiliency initiatives.

Project Overview and Progress

Rose Newberry (Dudek) provided a recap of the project's goals and progress since the first working group meeting. Key accomplishments include:

- Completion of the plan review
- Heat vulnerability assessment
- Active transportation analysis
- Ongoing community engagement
- Initial project template development

Plan Review Findings

The group discussed outcomes from reviewing local and regional plans focusing on heat mitigation (e.g., urban greening and trees, urban design and shade, physical shade structures, or buildings and land use choices) and heat management (e.g., cooling centers, public health strategies).

The Plan review process revealed that there's a lot going on locally. The City of Fresno has very aggressive tree planting goals, Measure P funds for parks and green spaces, free bus rides to cooling centers on days above 105 degrees, and some new state tools for forecasting heat risks and getting public information out.

Challenges: It can be challenging to find the places and funding for planting the trees. There is some geographic

inequity, as many rural areas are lacking the infrastructure needed to provide shade. There are also transportation barriers, such as getting to the cooling centers, especially when residents need to walk to a bus stop in the heat. And renters are being left behind, as they often don't have choices on how to cool their homes. They may be left with a very expensive and inefficient air conditioning unit that they have no control over, and are stuck with electricity bills, taking on an unfair burden.

Summary of challenges:

- Geographic inequities in shade infrastructure
- Transportation barriers to cooling centers
- Limited renter control over cooling options

Public Engagement Summary

Carolina Ilic (VRPA) shared a summary of outreach efforts across five regional locations, including pop-ups at the River Park Farmers Market, the Save Mart on Manning Avenue in Reedley, the Old Town Clovis Farmers Market in Clovis, the Selma Flea Market, and the Kerman Farmers Market, a survey, comment cards, and stickers/comments on maps. Key findings included: high public support for shade at sidewalks, bike routes, trails, and bus stops in urban and rural areas; strong preference for trees for their shade, aesthetic, and environmental benefits, and shade structures; emphasis on collaboration across agencies and organizations; the emotional toll of extreme heat; and priority areas for tree planting in areas such as Shaw Avenue, West Central Fresno, Clinton, Shields, McKinley, Ashlan, Olive, Church, Peach, and Dakota and in neighborhoods such as Reedley, Orange Cove, Southeast and Southwest Fresno, and the Eastside communities, and others.

There was a question by Preston Herr, City of Fresno, in relation to whether there were any questions from the public about trees being cut down without permission or replacement? Carolina reported that this particular topic did not come up during the outreach efforts.

Heat Vulnerability Analysis

Alexandria Reed (Dudek) stated that the purpose of the Heat Vulnerability analysis was to identify where populations with greater vulnerability to extreme heat are concentrated across the county to help guide equitable shade and greening investments, especially in communities most exposed and least able to adapt. This work builds on the Fresno COG's climate resiliency plan, which focused on infrastructure risk. This analysis complements that by focusing on people and neighborhoods, looking at social, health, and environmental-based vulnerability using a four-part framework based on Hazard, Exposure, Sensitivity, and Adaptive Capacity.

Vulnerability is highest in urban and disadvantaged communities, especially in Fresno and Reedley. Data sources included CDC, American Communities Survey (ACS), and land surface temperature and tree canopy datasets. All datasets were standardized and combined at the census tract level, providing a useful scale for integrating demographic, health, and environmental data. The output is a health vulnerability index that allows the comparison of conditions across the county. A clear pattern emerges, showing that the highest vulnerability appears in the central and western urbanized areas, such as the City of Fresno and Reedley. These tracts tend to experience greater heat intensity, where in contrast, the eastern foothill and far western agriculture tracts generally have lower vulnerability, reflecting more open land cover, lower population density, and reduced exposure to extreme heat.

The main takeaway is that vulnerability is concentrated in urban and disadvantaged communities. Knowing this can help the region determine where to prioritize greening and shade infrastructure projects.

Steve Haze asked about the Westside communities, such as the City of San Joaquin, or the unincorporated communities, such as Tranquility and Raisin City.

Rose Newberry responded that, in recognizing the differences in the county, the plan will segment out improvements broken down by west/east of Hwy 99, incorporated/ unincorporated areas, and the Fresno-Clovis Metropolitan Area, so that 5 templates are selected to reflect representative areas of the County. This recognizes that agricultural communities have extreme vulnerability because of the people that work outside, but the nature of the environment is less built up, often not appearing in key indices, meaning that we need multiple ways of looking at the project areas.

Data Analysis and Project Screening

Erik Ruehr (VRPA Technologies) explained the project selection screening process. This included screening transportation projects and transit stops included in the 2024 Regional Active Transportation Plan and transit resiliency analysis; evaluating them based on heat vulnerability, transit connectivity, activity centers, and existing deficiencies; and categorizing them into 5 geographic areas, including west/east of Hwy 99, incorporated/ unincorporated areas, and Fresno-Clovis metro.

Projects were placed into a large spreadsheet and then rated as high, medium, or low, by category, adding up the scores to get a total score. Comments received through the outreach process were added to the spreadsheet not as a numerical score, but as an additional indicator of interest to move forward.

Steve Haze asked about unincorporated communities such as Tranquility, Raisin City, and Biola not hitting the threshold the way incorporated communities are.

Erik Ruehr responded that the active transportation projects came from the Active Transportation Plan and were categorized by incorporated areas and unincorporated areas. In the active transportation planning process, Fresno County advanced a number of projects from the unincorporated areas. So, a place like Tranquility or Raisin City would have been advanced into the active transportation plan and then entered into this planning process. The projects are listed on the project website, and the team is happy to follow up individually.

Project Template Selection and Feedback

Rose Newberry (Dudek) stated that the goal of the plan is to identify five types of representative projects that could be repeated across the county in similar kinds of areas for implementation to be useful. She described the five proposed template types:

1. Urban Commercial Corridors
2. Suburban Neighborhood Connectors
3. Transit Stops
4. Rural Town Main Streets
5. Community Trails and Pathway Corridors

Participants provided feedback for each template type via the “Mentimeter” polling app on heat-related challenges, barriers to adding shade, and priority users for each corridor type.

The following section summarizes outcomes of the Mentimeter exercises for each proposed template:

Urban Commercial Corridors

- Sparse shade and tree canopy due to utilities, small tree wells, and limited space.
- Extensive pavement and heat buildup creating unwalkable, unattractive streetscapes.
- Maintenance and cost barriers preventing sustained tree care and equitable canopy distribution.

Suburban Neighborhood Connectors

- Incomplete or unsafe sidewalks that leave pedestrians and families exposed to heat.
- Private property boundaries and irrigation needs limiting new planting opportunities.
- Funding and maintenance gaps reducing the city's ability to expand or sustain trees.

Transit Stops

- Lack of shade structures or trees leading to extreme discomfort and heat exposure.
- Design and infrastructure conflicts (right-of-way, visibility, and utilities) hindering shade additions.
- Perception and maintenance challenges — fears of loitering, vandalism, or upkeep costs.

Community Trails

- Insufficient shade and hydration points along exposed trail networks.
- Environmental and maintenance constraints like weeds, dust, and irrigation limits.
- Accessibility and safety issues for families, elderly users, and people with disabilities.

Rural Main Streets

- Funding and water access constraints making retrofits expensive and complex.
- Permitting barriers (e.g., Caltrans) delaying or preventing planting projects.
- Low pedestrian activity reducing motivation for shade investments despite community benefits.

Discussion Highlights

As part of the general discussion as well as the group chat, comments were raised about:

- Inclusion of unincorporated communities like Tranquility and Raisin City
- Lack of shade infrastructure in older developments, such as Main streets
- Need to place a greater value in the planning process on urban design improvements (e.g., storefront canopies or awnings that provide shade during summer and protect from rain in the winter) and traffic-calming techniques
- Importance of safe routes to schools considering heat exposure for children
- Shade in parks and on city property
- Suggestion to use Orange Cove as a model for green space pathways, and Visalia and Sacramento as shade-friendly cities
- Access to shade planning resources, such as planning examples in Arizona and Las Vegas, and cool pavement efforts in Los Angeles
- Understanding that plans published by the Fresno COG are advisory for member agencies

Next Steps

Next steps include finalizing the selection of five representative projects across geographies and templates; hosting a public workshop in November focused on design solutions; developing a plant palette, shade infrastructure guide, and implementation strategies; and releasing the final plan in early to mid-2026, including a public comment period.

APPENDIX 10 - MENTIMETER RESULTS FROM WORKING GROUP MEETING #2

What problems do you notice on urban commercial corridors during hot weather? 14 / 16 28

Unrelenting sun, low tree coverage	Not enough shaded benches.
Lack of trees/shade, typically due to utilities or limited tree wells, concentrated impervious surfaces	Lack of shade trees make these areas hotter and not as beautiful.
Lots of pavement. Not always room to plant trees.	Homeless, or actually, any person outside trying to find shade ... for waiting, parking
Urban heat island effect is more pronounced	Lots of asphalt no shade, no store front canopies
Lack of trees	Not enough canopy covering from buildings
Need more space for trees. Plan for space for trees	Generally wider streets tend to make it difficult to plant trees, considering also the tree heights for different cars that travel. Parts of downtown is also hard because of setbacks of buildings.
Concrete jungle.	bad smells
No green	Poor tree care, like topping
Unbroken pavement without open spaces	less people active
Awning can be helpful	Lack of shade for benches
Concentrate jungles.	Long stretches without shade
Topping trees eliminates canopy for shade and tree health	Sacramento is a Tree City which also can be used as a calming technique
People prefer to be inside the air conditioned areas, thus reducing walking between shops.	Irrigation facilities
There shouldn't be any. That is what engineers and Urban planners thrive.	Business Owners

What limitations make it hard to add shade or trees on urban commercial corridors?

11 / 16 20

Lack of water infrastructure	All the existing paving
Lack of infrastructure	Access to irrigation /water to maintain
lack of space due to existing paving	limited city resources/funding
Street diets would help.	Who maintains - caretakers
Responsibility for maintenance	Space, water, city investment in tree care
Depaving is expensive	Very expensive to add in trees, especially along long corridors.
wider sider walks for trees in some places	Right of way requirements
Space and maintenance	Older development that was not required to plant trees
Current maintenance does not support canopy froth - over pruning	Overhead utility poles, limited area to expand on, tree haters?
People might complain about all the leaves in the streets.	Everyone. It is most critical for vulnerable populations (aged, children, sick, pregnant).

Whose needs should be prioritized on urban commercial corridors?

12 / 16

17

Shoppers	Pedestrians
Walkers	commuters, unhoused
Pedestrian traffic	Older people
Transit riders	K-12 students, elderly, and pets.
Elderly,	Those who ambulate the walkways, sensitive to those with mobility issues
children	Moms with babies in strollers
Business owners	Pedestrians, especially younger/older and those with disabilities
Disabled	folks with accessibility concerns, its harder and longer to navigate an urban space
Students Ada Seniors Mothers with children	

What problems do you notice on suburban neighborhood connectors during hot weather?

13 / 16

27

Families walking to school without shade.	Lack of tree canopy
Long stretches without shade	Lack of sidewalks with trees
Narrow or missing sidewalks	Lack of safe and connected sidewalks and lack of shade
Inconsistent infrastructure (sidewalks)	Waiting in the heat, to cross streets
Poor tree canopy, inconsistent coverage	Temperatures are much higher in non-shaded areas
Fast traffic ... speed	Traffic calming
Many area without complete streets, unsafe	Trees often not along the street but rather far from the street or sidewalk where the shade is actually needed
Fewer trees near stops or walking routes	Trees are small and don't provide shade
Shaded benches	Proper trees that have deep roots versus roots that cause sidewalk problems
Slow down and smell the roses, with good tree canopy	Palm trees not good for shade
Poorly maintained, "topped" trees, no canopy	Asphalt softening
Types of trees also provide varying coverage	private homeowners have barriers to plant trees
Property owner needs to want trees, pay for water.	property owners are not required to plant trees or don't have funds for water and maintenance
Trees may not exist on the front setback.	

What limitations make it hard to add shade or trees suburban neighborhood connectors?

10 / 16 16

Lack of right of way	Lack of control of the private property for tree placement
Irrigation needs	Funding
Removal without replacement	Funding opportunities
For private residents, trees are expensive to maintain AND insurance wants them kept cut back	Time, trees won't mature within a few years to yield any shade
Outside of City jurisdiction	Maintenance
Determination of who is responsible for maintenance	A inability to reflect on qualitative aspects of trees and as a calming technique.
Lack of right of way, cooperation of homeowners can be difficult, lack of space	Tree theft? Happened to a park in the city of Madera.
Kids, cyclists	Majority of our transit stops are just a sign stuck in a dirt pile on the side of the road

Whose needs should be prioritized on suburban neighborhood connectors?

9 / 16

11

students	Children
Residents	Children and pedestrians
Local residents	Families
K-12 students and elderly	Children, elderly and disabled
Those who don't venture far from home. Disabled, elderly, children/families	Those with disabilities
Neighborhood residents, children especially on school routes	

What problems do you notice at transit stops during hot weather?

11 / 16 13

Lack of shade for benches and overheating	Lack of shade
Riders are miserable waiting for transit, when zero shade	people utilizing buildings for shade if its not adequately there
Uncomfortable for people to wait in the harsh sun	Hydration facilities
Hot metal	Unbearable heat.
Lack of structures and benches, let alone trees.	Hot enough to just keep walking instead of waiting (lower transportation usage)
need to depave, add tree wells, transit stop may be out of commission for some time, funding	Shade can limit visibility, leading to safety concerns especially at night
There shouldn't be any limitations, flex design and placement. Not everything has to be linear, throughput being too high of a priority.	

What limitations make it hard to add shade or trees at transit stops?

7 / 16 15

Lack of right of way	Lack of required space (easements)
Unwilling property owners	Orientation of the stop and the public right of way.
Safety issues can arise such as line of sight.	Underground utilities
Direction of travel. South and east facing stops	Drainage issues
Space available for trees. Authorities don't want it to be "too" comfortable... people might linger.	Perceptions by property owners that transit riders will litter
Maintenance burdens	Permit hurdles
Logistically, there's also the frequency of the stop	Tree limbs scratching the tops or sides of the buses, causing damage

Whose needs should be prioritized at transit stops?

7 / 16 9

Travelers	People going to work
People with young children	Mothers with children Students Seniors Ada But all
People who rely on public transportation as their sole method	Elderly, children and those with disabilities
People with disabilities	Tourists? Students.
Giant setbacks	

What problems do you notice on rural main streets during hot weather?

9 / 16 13

Lack of presence	Big setbacks
Excessive heat due to extra paving and urban heat island effect	Lack of pedestrian infrastructure
Businesses see the road as someone else's responsibility. Not likely to want to care for trees distant from their front door.	Parking takes a majority of the front setback
No building shade	So much pavement
No street ambiance	Lack of building canopies extending out, lack of protected benches. Lack of tree canopies.
Noisy , you can hear every car's ac system	The quintessential "concrete jungle." No planning was performed emphasizing user comfort.
Capital cost vs. users	

What limitations make it hard to add shade or trees on rural main streets?

7 / 16 10

No one walking

Too much cement and asphalt

Funding

Funding

Expensive to retrofit

Water

Caltrans' permitting process (to some degree).

Who pays for water and maintenance?

People without cars

Honestly, making livable and walkable communities as a priority

Whose needs should be prioritized on rural main streets?

7 / 16 9

Students

People without cars

Transit users

Local residents.

Bike riders

Patrons of business, also business owners and employees.
Parking, walking... public transit

Working with businesses establish an understanding of the value of walkable streetscapes

Families and kids

Connectivity to places we need to go: school, work, shopping/medical centers. We need comfortable, tree-lined trails that are connecting as many regions of the area possible. Rest stop for water

What problems do you notice on community trails during hot weather?

6 / 16 8

Lack of water supply	Dusty
It's like im trekking a desert	dust, snakes, little water, no shade
Hot!	On west side of the county -- what trails or pathways?
Red ant issues, noxious weeds	Potential for dehydration

What limitations make it hard to add shade or trees on community trails?

7 / 16 13

Water and maintenance	Capital and maintenance costs
Who's responsible for maintenance?	Accountability
Property ownership	Access for water tie ins and who pays for it?
Lack of Control	Vandalism
Irrigation	Use native trees from this area, not redwood or palm trees
It really takes time as well	Palm trees don't provide shade
Suitable trees, not just native	

Whose needs should be prioritized on community trails?

6 / 16 9

Children	Families
K-12 students	Everyone, different ages and non-able body individuals
Bicycling enthusiasts	Enthusiasts
People walking their dogs	People with no vehicles, families out for a stroll, disabled/elderly getting away from home nearly, students going and coming... alternative to driving!
Children first, and the leisurely	

APPENDIX 11 - PROMOTIONAL MATERIALS FOR PUBLIC WORKSHOP #2

Flyers and Constant Contact E-Blasts

EXTREME HEAT PLAN



Fresno County Extreme Heat Analysis and Shade Adaptation Plan

Supported by community input, Fresno COG is developing guidance on a regional approach to increase vegetation and shade projects for key transportation corridors in Fresno County, particularly where pedestrians, bicyclists, and transit riders are directly affected.

JOIN US FOR A PUBLIC WORKSHOP!

A virtual workshop is scheduled for Tuesday, November 18, 2025, from 12 noon to 1:30 p.m., which will include interactive activities to gain valuable input.

Scan the QR Code or visit <http://bit.ly/435DgVM> to register for the virtual workshop.

After registering, a Zoom link will be sent for participation.



What will be covered at the Extreme Heat virtual workshop?

- Project summary to date
- Input received from previous public outreach activities
- A Vulnerability Analysis
- Pedestrian and bicyclist traffic analysis and location analysis
- Input on tree canopy and vegetative cover projects
- Discussion on Vulnerability Analysis and categories for site selection

A draft plan will be posted for review in early 2026 on the project website at [Fresno County Extreme Heat Analysis and Shade Adaptation Plan](#).

WE WANT TO HEAR FROM YOU AT THE NOVEMBER 18TH WORKSHOP AND RECEIVE YOUR INPUT ON THE DRAFT PLAN, ONCE AVAILABLE!

Questions?

Please contact Matthew Shimizu at mshimizu@fresnocog.org or 559-223-4148 Ext. 240.

Extreme heat affects us all!

Please forward this email to your friends, coworkers, or other stakeholders so that we can receive feedback from across the region.

ANÁLISIS DE CALOR EXTREMO



Análisis del Calor Extremo y Plan de Adaptación a la Sombra en el Condado de Fresno

Apoyado por la participación comunitaria, Fresno COG está desarrollando una guía con un enfoque regional para aumentar la vegetación y los proyectos de sombra para corredores de transporte clave en el condado de Fresno, particularmente donde los peatones, ciclistas y usuarios del transporte público se ven directamente afectados.

¡PARTICIPE EN NUESTRO TALLER PÚBLICO!

Se ha programado un taller virtual para el martes 18 de noviembre de 2025, de 12:00 p.m. a 1:30 p.m., que incluirá actividades interactivas para obtener aportes valiosos.

Escanee el código QR o visite <http://bit.ly/435DgVM> para registrarse en el taller virtual.

Después de que se registre, recibirá un enlace de Zoom para participar.



¿Qué se cubrirá en el taller virtual sobre el calor extremo?

- Resumen del proyecto hasta la fecha
- Aportes recibidos de actividades previas de divulgación pública
- Análisis de vulnerabilidad
- Análisis de tráfico peatonal y ciclista y análisis de ubicación
- Aportes sobre proyectos de cobertura vegetal y dosel de árboles
- Discusión sobre el análisis de vulnerabilidad y categorías para la selección de sitios

Un borrador del plan se publicará para revisión a principios de 2026 en el sitio web del Proyecto: [Fresno County Extreme Heat Analysis and Shade Adaptation Plan](#).

¡QUEREMOS ESCUCHAR SU OPINIÓN EN EL TALLER DEL 18 DE NOVIEMBRE Y RECIBIR SUS COMENTARIOS SOBRE EL BORRADOR DEL PLAN, UNA VEZ DISPONIBLE!

¿Preguntas?

Comuníquese con Matthew Shimizu en mshimizu@fresnocog.org o al 559-223-4148 Ext. 240.

¡El calor extremo nos afecta a todos!

Por favor, reenvíe este correo electrónico a sus amigos, compañeros u otros interesados para que podamos recibir aportes de toda la región.

Website Updates

<https://publicinput.com/fresnocountyextremeheat#tab-64402>

Fresno COG > Fresno County Extreme Heat Analysis and Shade Adaptation Plan

Join Us at Virtual Workshop #2

A second virtual workshop is scheduled for **Tuesday, November 18, 2025, from 12 noon to 1:30 p.m.**, which will include interactive activities to gain valuable input.

Register for the November 18th virtual workshop here: https://us06web.zoom.us/webinar/register/WN_Rg3BDWVCQEYeQamJ_koudQ

What will be covered at the Extreme Heat virtual workshop?

- Project summary to date
- Input received from previous public outreach activities
- A Vulnerability Analysis
- Pedestrian and bicyclist traffic analysis and location analysis
- Input on tree canopy and vegetative cover projects
- Discussion on Vulnerability Analysis and categories for site selection

APPENDIX 12 - MEETING SUMMARY FOR PUBLIC WORKSHOP #2

Fresno County Extreme Heat Vulnerability Analysis and Shade Adaptation Plan

Public Workshop #2: 11/18/2025

Webinar Summary

Quick recap

The Fresno COG Extreme Heat Analysis Public Workshop #2 focused on reviewing progress and discussing the plan review task, community engagement efforts, and heat vulnerability analysis, with emphasis on identifying vulnerable populations and transportation risks. The team reviewed completed work including plan review, county-wide heat vulnerability analysis, and active transportation analysis, while discussing challenges such as geographic inequity and transportation barriers in meeting tree planting goals. The conversation ended with discussions on heat impacts across different types of roadways and public spaces, focusing on solutions like adding trees and shade structures to prioritize areas serving high-need populations, with next steps involving project selection and creating a guidebook for local governments.

Summary

Fresno Heat Vulnerability Analysis Review

The Fresno COG Extreme Heat Analysis Public Workshop #2 focused on reviewing progress and discussing the plan review task, community engagement efforts, and a heat vulnerability analysis. Rose Newberry, the project manager, and Matthew Shimizu, Fresno COG, presented updates on the project, emphasizing the identification of vulnerable populations, risks to transportation users, and strategies to enhance community resilience. They highlighted the importance of community input to ensure the plan reflects local priorities and discussed the analysis of factors such as transit dependency, temperature projections, and tree canopy coverage. The team also addressed the need to inform general plans and transportation improvements, with the goal of guiding design standards and cooling strategies across Fresno County.

Fresno County Heat Planning Update

Rose provided a progress report on extreme heat planning efforts in Fresno County, highlighting completed work including plan review, county-wide heat vulnerability analysis, and active transportation analysis. She explained that the team is currently conducting community engagement and will discuss template selection for future plans. Rose detailed the two main buckets of heat mitigation strategies: physical measures to reduce heat exposure and management strategies for coping with heat, noting that Fresno is struggling to meet its tree planting goals and facing challenges such as geographic inequity and transportation barriers.

Community Heat Assessment Findings

Carolina Ilic, VRPA Technologies, presented findings from community engagement activities, including pop-up events and feedback collection, which highlighted the importance of shade and trees along transportation corridors, with a preference for collaboration between various entities for planting and maintenance. Rose explained the heat limit assessment methodology, which considered physical heat, population exposure, sensitivity, and adaptive capacity at the census tract level, noting that rural areas scored lower due to tract size. Samantha inquired about data sources and classification methods, and Rose promised to provide a detailed report with further information via email.

Fresno County Heat Vulnerability Plan

Erik Ruehr, VRPA Technologies, presented the screening process for selecting transportation projects in Fresno County, focusing on pedestrian, bicycle, and transit stops. He explained the use of performance measures

including heat vulnerability, transit connectivity, activity centers, and existing deficiencies to rate projects and narrow down a large list to a smaller set for further study. Rose discussed the purpose of the plan, which is to identify common vulnerable routes that need shade across the county and provide general recommendations for all local governments. She introduced the five types of routes being considered and asked participants to identify problems during hot weather, assess the impact of heat on mobility, and prioritize needs on these routes.

Transportation Corridor Design Challenges

Rose and Matthew discussed the availability of Excel spreadsheets on the FCOG website for scoring various projects. They focused on a variety of transportation corridors, identifying issues such as lack of shade, limited green space, and insufficient room for trees due to large parking lots and fast cars. The group explored how these conditions affect people's ability to walk, bike, or use transit, noting that heat often leads to reduced outdoor activity and impacts businesses. They concluded by discussing who should be prioritized when designing these corridors, including walkers, bikers, shoppers, heat-exposed workers, and vulnerable groups like the elderly, disabled, and children.

Heat Impact Solutions for Roadways

The meeting focused on discussing heat impacts on different types of roadways and public spaces, including urban corridors, suburban connectors, transit stops, rural main streets, and community trails. Participants identified key challenges such as lack of shade, increased car usage due to heat, and reduced pedestrian activity, particularly affecting vulnerable groups like children, the elderly, and transit-dependent individuals. The group discussed solutions including adding trees, shade structures, and other cooling measures, with a particular emphasis on prioritizing areas that serve high-need populations. The next steps involve selecting five projects that represent all five templates and ensuring representation across different geographies in Fresno County, with the ultimate goal of creating a guidebook for local governments as a resource to implement shade solutions.

APPENDIX 13 - POWERPOINT PRESENTATION FROM PUBLIC WORKSHOP #2

Fresno COG Extreme Heat Analysis
Public Workshop #2
PRESENTATION BY FCOG, DUDEK, AND VRPA
NOVEMBER 2023

FRESNO / EXTREME HEAT AND SHADE PLAN

- 01 Introduction + Refresh
- 02 Progress Report
- 03 Plan Review
- 04 Community Engagement
- 05 Heat Vulnerability Analysis
- 06 Walking, Biking, and Transit Stop Data Analysis
- 07 Project Template
- 08 Next Steps

Project Team

- FCOG**
Project Managers
- CONSULTING TEAM**
Dudek and VRPA
- WORKING GROUP MEMBERS**

To refresh:

- The Fresno Council of Governments will develop an **Extreme Heat Analysis and Shade Adaptation Plan** for Fresno County. The plan will include an **extreme heat vulnerability analysis**, which will provide valuable data for future adaptation and mitigation responses to extreme heat induced by climate change. The plan will also **identify native and drought tolerant tree canopy and vegetative cover improvement projects** in communities most vulnerable to extreme heat based on the extreme heat vulnerability analysis and bike and pedestrian traffic analysis.
- This plan will **inform general plans, other long-range plans, and the design and retrofit of future and present infrastructure.**

Logistics

- Please put questions in the chat, they will be answered by the presenters at the end of each technical overview, with FCOG staff follow ups as needed.
- We will use Menti for the interactive portions of today's meeting. You may use your smartphone or a web browser.

Progress Report

02

Completed

- Plan Review
- Heat Vulnerability Analysis
- Active Transportation Analysis

In Progress

- Community Engagement
- Template Selection

Next Steps

- Template Design and Implementation
- Final Plan

03

Plan Review

Plan Review

MITIGATION - Reducing heat buildup:

- Planting trees and creating shade
- Cool roofs and pavements
- Preserving green spaces
- Reducing vehicle emissions

MANAGEMENT - Helping people cope:

- Cooling centers during heat emergencies
- Worker safety protections
- Public education and early warnings
- Ensuring reliable electricity

Plan Review

Heat Planning Locally:

- City of Fresno:** Goal to plant 4,600 trees annually, expanding tree canopy to 20% (Mitigation)
- Measure P:** \$35 million annually for parks and green spaces (Mitigation)
- Bus Stop Improvements:** Identifying bus stops needing shade (Management)
- Cooling Centers:** 4 locations in Fresno, scheduled at 100°F (Management)
- State Support:** New CalHeatScore tool forecasts heat risk daily (Management)

Challenges we heard from local planners and implementers:

- Funding:** Even Fresno struggles to meet tree planting goals (only 1,000/year vs 4,600 needed)
- Geographic Inequality:** Fresno's lack of infrastructure
- Transportation Barriers + Stress:** Transportation to cooling centers, exposure is higher among those using the system
- Barriers Left Behind:** Can't make cooling decisions; ineligible for many weatherization programs

Questions from Chat

04

Community Engagement

Community Engagement Summary

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Key Findings

Mobility Priorities

- Sidewalk, bike routes, and walking/bike trails
- Bus stops in rural and urban areas
- School crosswalks
- Sidewalks in commercial areas
- Green belts and canal banks

Shade Infrastructure

- Preference for trees
- Shade structures also valued
- Collaboration for funding, planning, and upkeep; partnerships with irrigation districts, non-profits, and businesses
- Health risks and emotional toll of extreme heat frequently mentioned

Priority Locations

- Bus stop and transit corridors, especially Shaw Avenue and West Central Fresno
- High traffic points (Clifton, Shields, McKinley, Johnson, Olsen, Church, Beach, Dakota)
- Neighborhoods (Reedley, Orange Grove, Southeast and Southwest Fresno, Eastside communities)

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Questions from Chat

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Heat Vulnerability Assessment

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Vulnerability Assessment

Hazard → Exposure → Sensitivity → Adaptive Capacity → **Vulnerability**

Component	Indicators
Hazard	Urban heat severity, extreme heat days
Exposure	Population density, impervious surfaces
Sensitivity	Older adults, young children, disability, asthma, obesity, coronary heart disease, outdoor workers, low-income households
Adaptive Capacity	Tree canopy, transportation, income, park and cooling centers proximity

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Heat Vulnerability Index (HVI) Map

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Questions from Chat

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Active Transportation Analysis

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Goals of Transportation Analysis

Screening Process

- Fresno COG Active Transportation Plan Projects
- Transit Stops

Priority Analysis

- Heat Vulnerability
- Transit Connectivity
- Activity Center
- Existing Deficiency

Prioritized Geographies

- West of 99 (Incorporated/Unincorporated)
- East of 99 (Incorporated/Unincorporated)
- Fresno/Clovis Metro

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Evaluation Spreadsheet (Active Transportation Projects)

22

Evaluation Spreadsheet (Transit Stops)

23

Evaluation Spreadsheet (Individual Geography)

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Questions from Chat

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Template Selection

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Why Templates

Purpose - Identify common vulnerable routes that need shade across the County and provide general recommendations, and implementation notes all local governments can use.

Templates -

- Urban Commercial Corridors
- Suburban Neighborhood Connectors
- Transit Stop / Mobility Hub Corridors
- Rural Town Main Streets
- Community Trail / Pathway Corridors

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We want to hear from you

Three Questions -

- What problems do you notice on these streets during hot weather?
- How does heat in this type of area affect people's ability to walk, bike, wait for transit, or perform daily tasks?
- Whose needs should be prioritized on these routes?

Mentimeter Exercises for Your Input

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Urban Commercial Corridor

What it is: Main streets or business corridors with shops, bus stops, and lots of people walking.

29

Suburban Neighborhood Connector

What it is: Residential streets that connect homes, schools, and parks.

30

Transit Stop / Mobility Hub Corridor

- **What it is:** Routes people walk or bike to take the bus.



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Rural Town Main Street

- **What it is:** Smaller downtown streets or highways running through town centers that mix vehicles, people, and storefronts.



32

Community Trail / Pathway Corridors

- **What it is:** Off-street paths and routes



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Last Mentimeter Question

- What makes it challenging to add more trees or shade in your community, and what kinds of solutions do you think could work instead?

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DUDEK

Questions from Chat

35

08

Next Steps

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Next Steps

- Project Selection
 - Represent all five geographies
 - Represent all five templates
- Project Design
 - Plant pallet (canopy, planting recommendations)
 - Site improvements
- Final Plan

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DUDEK

Questions from Chat

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DUDEK

Thank you!

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APPENDIX 14 - MENTIMETER RESULTS FROM PUBLIC WORKSHOP
#2

What problems do you notice on **urban commercial corridors** during hot weather?

Melting asphalt	Narrow sidewalks. Lack of trees. Lack of canopies on the buildings. Buildings far away from the edge of the streets.	Urban heat island	Narrow sidewalks, not enough room for trees, either to survive or to be planted
Lots of cars	No trees, shade, bus stops have minimal shade	Transit stops with inadequate shade	
Very hot!	So much pavement	Heat waves	No shade Fast cars Sea of asphalt
Lack of green space	I'm worried about the urban heat island effect taking place, since we have so much black surface exposed in the form of parking lots and unshaded roads	J walking	Vast urban desert - scary hot

How does heat in **urban commercial corridors** affect people's ability to walk, bike, wait for transit, or perform daily tasks?

Lack of ridership

Heat related illness risk

They avoid walking

Hard to carry packages.

Stay home

People typically complete trips early or later in day

Bad for business

Near impossible when the sun is up to use transport outside of a car

uncomfortable ridership experience

Less places people travel due to heat exhaustion

Greatly impact people's decision to walk, bike or use transit.

People resort to shopping where they use big parking lots

Risk of heat related health impacts, poorer air quality,

Increase poor health quality

All modes of transportation, find a balance

Whose needs should be prioritized in **urban commercial corridors**?

Walkers and bikers

Shoppers

Heat exposed workers

Elderly and disabled

Children and seniors

Shoppers

Youth, students, seniors
with limited access to
car.

The community most likely
to need access, depends on
neighborhood and services.
If groceries than all in the
neighborhood.

These connectors still get
used because of what
they're connected to, but it
gets uncomfortable to use.

What problems do you notice on **suburban neighborhood connectors** during hot weather?

Less kids playing outside

Too little shade and too
much exposed road
surface to the sun

Lack of shade on
sidewalk or bikelane

Shadeless and unsafe
routes to schools

Cars parked are magma
hot

People trying to get
under trees wherever
they can

Right of way geared to
the vehicle

Not all have continuous
sidewalks. Not many people
outside unless shaded.

Roads are way too wide
- need road diets!

Heated asphalt, lots of it.

Residents block
sidewalk

Kids and residents.
Notably students

How does heat in **suburban neighborhood connectors** affect people's ability to walk, bike, wait for transit, or perform daily tasks?

Try to schedule activities earlier or later

Avoidance of all the above

Can cause social isolation

People are more likely to stay inside and less walking that impacts daily tasks

Drive more, if they have a car

Exhausting

People will use their cars for short distances in their neighborhood that otherwise they would walk or bike to

Not able to engage in physical activity

Limits it greatly or puts people at risk. Older or disabled population need assistance.

Strain on cars (paint damage, interior damage, ac system)

Children

Whose needs should be prioritized on **suburban neighborhood** connectors?

Residents and kids

Families

Children and the elderly

Children

Those who don't drive or
own cars.

Families, seniors,
disabled

Balance the needs of all
modes and users

Dogs

Elderly who live alone

Low income

Not enough shade

What problems do you notice at **transit stops** during hot weather?

No shade

Lower ridership

inconsistent shading

No water

Discomfort of transit riders

The shade structure does not provide continuous shade

No space to sit.

Distance between stops / to home. No shade.

Higher risks of dehydration

No shade. Not attractive. Discouraging to use transit.

No shade or covering- makes it difficult to wait for buses in the heat and in the rain

Scorched seats and people mostly stand

Those metal benches look hot

Not as attractive as stops with trees

Over reliance on the vehicle will continue

Less hawk sign

How does heat at **transit stops** affect people's ability to walk, bike, wait for transit, or perform daily tasks?

Reduce their trips unless critical

Avoidance and resorting to cars again

Dangerous for students who rely on public transport to get from school to home

Its hard on people going to doctors appointments or getting around town for errands

Resort to carpooling

Bad for their health, lots of exposure to fumes combined w heat,

Will negatively impact people with no car to find and maintain reliable jobs.

Disabled make less trips

Sometimes transit stops are used just to rest from the heat.

All users!

Students and the elderly

Whose needs should be prioritized at **transit stops**?

Disabled

Elderly

Workers, students, elderly and disabled

Commuters

Transit reliant riders

Teenagers without cars

Travelers

Students, seniors, families w small kids, everyone using the transit

What problems do you notice on **rural main streets** during hot weather?

Less pedestrian traffic

No one out unless in cars

Drivers are more hot tempered

People timing their trips for cooler weather

Less hawk sign

Not enough proper transit, walking and biking facilities.

Expansion of parking lots because cars are the option

Less rest stops

Less attractive. Trees bring beauty and economic development

Building's don't always have awnings for shade.

Need better planning!

How does heat on **rural main streets** affect people's ability to walk, bike, wait for transit, or perform daily tasks?

Sidewalks should be wide with lots of tree canopy

People stay home, instead of shopping they might have something delivered.

Less shopping

An attractive shady street would make options to cars more likely

Farther spaced cooling centers

Need more trees!

Less contact with people

Less bike lanes

Whose needs should be prioritized on **rural main streets**?

Elderly

Farmers

Families

Residents who don't
have transportation.

Shoppers, elderly,
children, college
students, EVERYBODY

What problems do you notice on **community trails** during hot weather?

Dusty and hot!

Less usage

Sunburns

Not enough shade

Need more trees and
understory

Less trees for city's to
manage

Dehydration

How does heat on **community trails** affect people's ability to walk, bike, wait for transit, or perform daily tasks?

Less reliable for long distances

Only use early am or late pm

Harder to travel those longer trail distances

Can't use until night time

Less water fountains

If using in the evenings, no lighting

Whose needs should be prioritized on **community trails**?

Students, teenagers

Families

EVERYONE

Workers, students, bikers, and farmers

Bicycle and Scooter Commuters

What makes it challenging to add more trees or shade in your community, and what kinds of solutions do you think could work instead ?

Upkeep	The city planning process needs to include shade trees from the start!	Access to water	Irrigation
Shade sails	Water	urban design standards that help incentivize planting street trees	Irrigation, funding, support of decision makers, stakeholder agreements
Cool pavements	Cool Roofs	Shade sails	Reflective surfaces
Narrower streets with taller buildings	Insufficient root area,	Tree wells	
Shade structures that can be malleable to the position of the sun	Awnings should shade sidewalk	Umbrella sharing programs	Coverage using vines to create a canopy
Solar cooling strategies	Bus stops covered with foliage	Public art installations that double as shade	Restrict bushes. Require tree canopy

Cool pavements

Cool Roofs

Shade sails

Reflective surfaces

Narrower streets with
taller buildings

Insufficient root area,

Tree wells

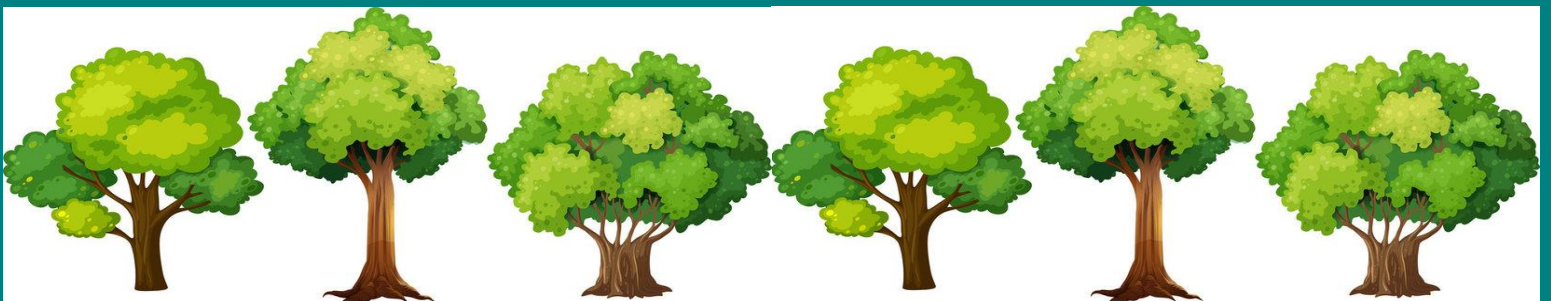
APPENDIX 15 - DRAFT PUBLIC ENGAGEMENT PLAN

Fresno Council of Governments

Extreme Heat Analysis

DRAFT

Public Engagement Plan



Fresno County Extreme Heat Analysis

Draft

Public Engagement Plan
April 2025

Prepared for:



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INTRODUCTION

About Fresno Council of Governments

As a Metropolitan Planning Organization (MPO), the Fresno Council of Governments (Fresno COG) addresses issues of mutual concern to the county and the cities in the Fresno County region and satisfies Federal and State transportation planning and programming mandates. Fresno COG provides a forum for planning, discussion, and study of area-wide issues, prepares and adopts regional plans and programs, serves as the regional agency for Federal and State transportation programs and funding opportunities, and addresses other area-wide issues based on the desires of the member jurisdictions. Fresno COG and its member agencies are responsible for determining policy, adopting plans and programs, and awarding funds to implement these plans. Fresno COG represents its member agencies as planner, programmer, and broker in developing an efficient and effective inter-modal transportation system that provides for the mobility needs of people, goods, and services.

Fresno County Extreme Heat Analysis

Extreme heat is causing an immediate and pressing hazard in the Fresno region. A regional approach is needed to develop consistent guidance on increasing vegetation and shade projects for key transportation corridors in Fresno County, particularly for active transportation facilities, where pedestrians, bicyclists, and transit riders are directly affected. As the primary weather-related killer in the county, extreme heat is a threat that the Fresno COG has identified as a key element of long-range planning in Fresno County.

The Fresno County Extreme Heat Analysis will analyze adaptations to extreme heat along major active transportation corridors, including the impact on disadvantaged communities, impacts on present and future infrastructure, and an understanding of the different needs in varying geographic areas throughout Fresno County. This regional approach will allow communities to employ consistent building blocks of urban forestry and design, with consistent measurable improvements. Successful completion of the Extreme Heat and Shade Adaptation Plan (plan) will result in regional coordination, a consistent countywide heat vulnerability assessment, and project designs for five replicable projects across Fresno County in the most vulnerable corridors to begin implementing solutions.

Overall Project Objectives

- ✓ Provide valuable data for climate adaptation and mitigation responses to extreme heat induced by climate change.
- ✓ Identify native and drought tolerant tree canopy and vegetative cover improvement projects in communities most vulnerable to extreme heat based on the extreme heat vulnerability analysis and bike and pedestrian traffic analysis.
- ✓ Inform general plans, long-range plans, and the design and retrofit of future and present infrastructure.
- ✓ Identify project designs for five repeatable projects across Fresno County, with specific fact sheets in the most vulnerable corridors to jump start mitigation implementation.

The parties involved in this project will be Fresno COG, each of the 16 local incorporated cities; Clovis, Coalinga, Firebaugh, Fowler, Fresno, Huron, Kerman, Kingsburg, Mendota, Orange Cove, Parlier, Reedley, San Joaquin, Sanger, and Selma; along with Fresno County, community organizations, and the general public.

PUBLIC ENGAGEMENT PLAN

This Public Engagement Plan (PEP) outlines the approach for public participation in the Fresno County Extreme Heat Analysis (analysis) and details the responsibilities of the project team (Fresno COG staff, Dudek, VRPA Technologies, and the translation services provided by a firm named Excel). All engagement efforts will be documented, and feedback will be considered throughout the duration of the analysis. The PEP is considered a living document and will be revised to reflect necessary changes to the engagement and outreach process, as needed.

Description

Public engagement is a problem-solving approach which brings together community members and planners to discuss complex issues facing the communities and their residents, in this case, the impacts of increasingly frequent and severe extreme heat events on users of the transportation system and on transportation facilities in Fresno County. Public engagement is most successful when the process is transparent with access to decisions, services, and information for all interested stakeholders and community members. The active participation of the community ensures that the outcomes are better tuned to meeting the community's needs today and into the future. State and Federal transportation laws, regulations, policies, and guidance require and encourage public involvement throughout the planning process, particularly regarding underserved communities, including low-income and minority populations. This PEP establishes consistent guidelines to ensure people have meaningful opportunities to be involved in the Extreme Heat Analysis planning process.

Purpose

The purpose of conducting community outreach and engagement is to involve people and to incorporate their input into decisions related to the analysis. This PEP is designed to outline a clear approach for involving the community, sharing information, and creating opportunities for everyone to offer their feedback.

Public Outreach Goals

Community members understand their local transportation needs and feel the impacts of extreme weather events on their methods of travel, particularly if they are walking, biking, or taking transit. Users of these transportation modes have many ideas that can help improve the system. To effectively evaluate and comment on the Extreme Heat Analysis development process, community members and other interested stakeholder groups should be adequately informed about the analysis and understand the details associated with the analysis.

Sharing timely, clear, and helpful information with the communities within the Fresno region will help achieve the following goals:

- ✓ Create a cooperative community outreach process.
- ✓ Identify and seek to engage underserved communities in English and Spanish.
- ✓ Provide information on ways to get and stay involved.
- ✓ Provide clear, concise information about the analysis.
- ✓ Allow public comments through a variety of methods.
- ✓ Provide policy makers with information about the public's opinions and values regarding the analysis.
- ✓ Establish a formal process to consider and respond to stakeholder input.

PUBLIC ENGAGEMENT ACTIVITIES

The project team, together with Fresno COG and its partners, will carry out various activities to engage the public. This includes scheduling and coordination, preparation of materials, and implementation tasks. It is critical to make sure that the public, interested individuals, and various community groups have plenty of opportunities to share their thoughts and feedback during the outreach efforts. To achieve this, different engagement activities will be designed to reach different audiences. The project team will consider factors like the size and type of the audience, their awareness of transportation and climate adaptation and mitigation issues, where they are located, and their preferred ways to engage. The best engagement efforts combine various methods and technologies to share information, raise awareness, provide resources, and build connections.

Proposed Activities and Timeline

Table 1 provides a summary of the proposed engagement activities for this planning process and Table 2 outlines a timeline for these activities. The activities and techniques are described in more depth further below.

Table 1
Summary of Proposed Engagement Activities

Activity	Number
Extreme Heat Working Group Meetings	2
Social Media, Flyers, Constant Contact email distributions	Ongoing
Pop-up Events	5
Virtual Workshops	2
Draft for Public Review	1
Presentations to Standing Fresno COG Committees	3
Total	13

Table 2
Overview and Timeline of Proposed Public Engagement Activities

Activity and Purpose of Activity	Timeframe and Location
Working Group Mtg #1: Project Introduction; Review of Public Engagement Plan; Input on Vulnerability Indicators; Criteria for Location Analysis of Vulnerable Corridors; and Needs of Local Governments and Interested Parties	May 14, 2025 (Virtual)
Working Group Mtg #2: Hear Input from Public Outreach Activities; Review of Existing Plans and Policies; Discussion on Vulnerability Analysis and Site Selection; Pedestrian and Bicyclist Traffic Analysis and Location Analysis; Discussion on Templates for Site Selection	October 28, 2025 (Virtual)
<i>How Outcomes will be Used:</i>	<i>Incorporate into Extreme Heat Analysis</i>
<i>Advertising to Vulnerable Groups:</i>	<i>Email Blasts, Personal Phone Calls</i>

Activity and Purpose of Activity	Timeframe and Location
Pop-Up Event #1: Share Information and Solicit Feedback (Project overview board, feedback boards, mapping boards, illustrations of model shade projects, comment cards, and other materials)	Tuesday, May 27, 2025 River Park Famers Market, Fresno 5-7 p.m.
Pop-Up Event #2: Share Information and Solicit Feedback	Monday, June 2, 2025 Grocery Outlet on Jensen Avenue, Sanger 4:30-6:30 p.m.
Pop-Up Event #3: Share Information and Solicit Feedback	Friday, June 6, 2025 Old Town Clovis Farmers Market, Clovis 5-7 p.m.
Pop-Up Event #4: Share Information and Solicit Feedback	Sunday, June 15, 2025 Selma Flea Market, Selma 7:30-10 a.m.
Pop-Up Event #5: Share Information and Solicit Feedback	Wednesday, May 28, 2025 Kerman Farmers Market, Kerman 5-8 p.m.
<i>How Outcomes will be Used:</i>	<i>Report to Working Group Incorporate into Extreme Heat Analysis</i>
<i>Advertising to Vulnerable Groups:</i>	<i>Email Blasts, Social Media, Requests for CBOs to contact vulnerable groups, Request for Working Group members to disseminate information widely</i>
Workshop #1: Project Introduction; Visioning Exercises; Virtual Feedback Boards; Voting Exercises on Priority Locations for Shade Infrastructure	June 17, 2025 (Virtual)
Workshop #2: Project Summary to Date; Hear Input from Public Outreach Activities; Vulnerability Analysis; Pedestrian and Bicyclist Traffic Analysis and Location Analysis; Discussion on Templates for Site Selection	November 18, 2025 (Virtual)
<i>How Outcomes will be Used:</i>	<i>Report to Working Group Incorporate into Extreme Heat Analysis</i>
<i>Advertising to Vulnerable Groups:</i>	<i>Email Blasts, Social Media, Requests for CBOs to contact vulnerable groups, Request for Working Group members to disseminate information widely</i>
Draft for Public Review	Spring 2026
<i>How Outcomes will be Used:</i>	<i>Incorporate into Extreme Heat Analysis Report feedback to Standing Committees</i>
<i>Advertising to Vulnerable Groups:</i>	<i>Email Blasts, Social Media, Requests for CBOs to contact vulnerable groups, Request for Working Group members to</i>

Activity and Purpose of Activity	Timeframe and Location
	<i>disseminate information widely</i>
Presentations to Fresno COG Standing Committees: - Technical Transportation Committee (TTC)/Policy Advisory Committee (PAC) - Fresno COG Board	Spring/Summer, 2026 Spring/Summer, 2026
<i>How Outcomes will be Used:</i>	<i>For information/approval</i>
<i>Advertising to Vulnerable Groups:</i>	<i>Email Blasts</i> <i>Items on Standing Committee Agendas</i>

Techniques

The following techniques are proposed for this project, with action items assigned to responsible parties.

Extreme Heat Working Group

Fresno COG and the project team will establish an Extreme Heat Working Group, consisting of representatives from the City of Fresno, an eastside city, a westside city, Fresno County, the Fresno County Department of Public Health, an active transportation organization, a community-based organization (CBO) or non-profit organization, and other organizations. An initial list of suggested Working Group agencies/organizations is provided in Table 3. A final list of member agencies/organizations will be incorporated into future versions of the PEP.

Roles and responsibilities of the working group members include the following:

- ✓ Provide input and feedback for deliverables throughout the entire project development process.
- ✓ Attend Working Group meetings to understand and participate in the Extreme Heat analysis process.
- ✓ Review and provide input on Public Engagement Plan and community outreach materials.
- ✓ Promote and distribute information on the community outreach and engagement events.
- ✓ Receive and discuss input resulting from the engagement activities.
- ✓ Provide input on priority locations for shade infrastructure.
- ✓ Contribute to implementation strategies to address extreme heat.

Table 3
Suggested Working Group Membership

Organizations /Agencies
- City of Fresno: - Preston Her, Planner II
- County of Fresno: - Mohammad Khorsand, Senior Planner
- Transit Operators: - Drew Wilson, Planning Manager, FAX

- Westside City: - Theresa Johnson, Community Services Director, City of Kerman
- Eastside City: - Rodney Horton, Reedley Community Development Director, City of Reedley - Michael Honn, Public Works Director, City of Selma - Javier Andrade, Principal Civil Engineer, City of Parlier
- Community-based organization (CBO) or non-profit organization: - Mona Cummings, Tree Fresno - Dr. Venise Curry, Concerned Citizens of West Fresno - Jeannie Sa, Earth Day/Ponderosa Lions Club (Aubrey) - Bikere Ikoba, Black Wellness & Prosperity Center - Carol Davies, HandsOn Central California - April Henry, Highway City Community Development, Inc - Laura Gromis, US Green Building Council - Environmental Protection Agency: - Eric Byous, Project Manager for Climate Action Plan
- Caltrans: - Lorena Mendibles, Senior Transportation Planner, District 6 - Jason Adair, Climate Change Adaptation Program Manager, District 6
- Fresno State University - Hongwei Dong, Professor, Dept. of Geography and City Regional Planning

The project team will organize three (3) virtual Working Group meetings. Meetings will be led by the Fresno COG Project Manager with active participation by the project team. Following each meeting, the project team will provide meeting summary notes, action items, and next steps for the planning process.

Responsible Party	Action Items
Fresno COG	Schedule Working Group meetings and provide virtual link
Dudek	Prepare agendas, materials, PowerPoint presentations, and interactive activities
VRPA	Prepare meeting summaries

Interested Party List

An important part of the outreach process is to identify a broad range of interested parties, create an interested party list, and continually update and expand the list. The list is meant to be as inclusive as possible, providing opportunities for a wide variety of people, organizations, stakeholders, and agencies to participate in the planning effort. The project team will create a database, including the names of people, organizations/agencies, and their email addresses, for incorporation into a Constant Contact distribution list. As work on the analysis continues, the database will be updated and expanded. The project team will use the database as a way to share information, materials, and updates related to project.

Responsible Party	Action Items
Fresno COG	Review and contribute to interested party list
Dudek	Review and contribute to interested party list

VRPA	• Prepare initial interested party list • Add contacts from relevant past outreach efforts • Maintain interested party list up-to-date • Create Constant Contact list
-------------	--

Relevant Past Outreach Efforts

Significant work has been conducted in the past decade in Fresno County in the climate change space. To recognize and build upon this work, Table 4 summarizes the major climate-related efforts completed or underway, and lists the groups involved in those efforts. The project team recommends adding these groups to the interested party list database that will be created for this project.

Table 4
Recent Climate Efforts and
Major Groups Proposed for Inclusion in the Extreme Heat Analysis Database

Recent Climate Efforts in Fresno County	Major Groups Involved and Proposed for Inclusion in the Extreme Heat Analysis Database
2020 Fresno County Regional Transportation Network Vulnerability Assessment	▪ California Rural Legal Assistance ▪ Central California Asthma Collaborative ▪ City of San Joaquin - Public Works ▪ Fresno County Office of Emergency Services ▪ Fresno Metropolitan Flood Control District ▪ Fresno County Rural Transit Agency ▪ City of Fresno – Traffic Engineer ▪ City of Fresno – Fresno Area Express (FAX) ▪ Fresno County Transportation Planning
2024 Priority Climate Action Plan and related Climate Pollution Reduction Grant program efforts	▪ San Joaquin Air Pollution Control District ▪ Tranquility Resources Conservation District ▪ Central California Asthma Collaborative ▪ California Office of Land Use & Climate Innovation (LUCI, formerly Governor’s Office of Planning and Research [OPR])
Fresno County Comprehensive Climate Action Plan	
City of Fresno Climate Adaptation Plan and Environmental Justice Element	▪ Building Healthy Communities ▪ Central Valley Community Foundation ▪ West Fresno Family Resource Center ▪ Every Neighborhood Partnership ▪ Poverello House ▪ Fresno Economic Opportunities Commission (FEOC) ▪ Black Wellness & Prosperity Center ▪ LGBTQ+ Resource Center

Recent Climate Efforts in Fresno County	Major Groups Involved and Proposed for Inclusion in the Extreme Heat Analysis Database
	▪ Lowell Community Development Corporation ▪ Chinatown Fresno Foundation ▪ Downtown Fresno Partnership ▪ The Development Southeast Fresno Community Economic Association ▪ St. Rest EDC ▪ South Tower Community Land Trust ▪ Tower Neighborhood Association ▪ Habitat for Humanity Greater Fresno Area ▪ Big Brothers Big Sisters of Central California ▪ Fresno Interdenominational Refugee Ministry ▪ Better Blackstone CDC ▪ HandsOn Central California ▪ Jakara Movement ▪ El Dorado Park CDC ▪ Highway City Community Development ▪ Jane Addams CDC ▪ SW Fresno CDC ▪ Hidalgo CDC ▪ Jackson CDC ▪ Dolores Huerta Foundation
City of Fresno Urban Forestry Master Plan	▪ Public Works Department, City of Fresno ▪ PARCs Department, City of Fresno ▪ Planning Department, City of Fresno ▪ General Services Department, City of Fresno ▪ Personnel Department, City of Fresno ▪ San Joaquin River Parkway and Conservation Trust ▪ San Joaquin Valley Air Pollution Control District ▪ Water Conservation, Public Utilities, City of Fresno ▪ ISA Certified Arborist, PG&E Kern – Fresno ▪ Fresno Unified School District ▪ Tree Fresno
Fresno Understands Environmental Resilience Through Equity (FUERTE)	▪ Fresno County Department of Public Health ▪ Public Health Institute ▪ UCSF, Fresno ▪ Fresno-Madera Medical Society ▪ Central California Environmental Justice Network (CCEJN) ▪ UCLA

Leverage Participation of Existing Fresno COG Participants

The project team will also request email contact information from individuals on various Fresno COG standing committees and advisory groups, including the Active Transportation Program Multidisciplinary Advisory Group, the Environmental Justice Subcommittee, the Safe Routes to School Subcommittee, and the Social Services Transportation Advisory Council, to leverage their participation in the planning process. The project team will add their contact information to the interested party list database to ensure that existing Fresno COG participants receive the same information as all other interested parties.

Responsible Party	Action Items
Fresno COG	• Provide relevant email addresses from Fresno COG lists • Add Fresno County Extreme Heat Analysis items to Fresno COG Advisory Committee meeting agendas
Dudek	• Review and contribute to interested party list • Prepare materials for presentations to Fresno COG advisory groups
VRPA	• Incorporate Fresno COG contacts into interested party list • Make presentations to Fresno COG Advisory Groups • Summarize comments provided by Fresno COG Advisory Groups

Social Media Content

Using social media is a great way to reach more people, keep them updated about the project, and engage with the community. When done right, social media can quickly share important information and let the public ask questions or share their thoughts on key decisions. The project team will create up to five (5) sets of important social media posts related to the Extreme Heat Analysis and will work with the Fresno COG to share these posts on their and partner agencies' social media pages, especially to highlight participation in the community pop-up events and the virtual workshops. Fresno COG will be responsible for posting all related notices and outreach event materials, monitoring comments on their social media sites, and responding to comments as needed.

Responsible Party	Action Items
Fresno COG	• Post social media posts, monitor comments, and respond as needed
Dudek	• Create social media posts • Provide posts to Fresno COG and Working Group partners for posting
Excel	• Translate posts into Spanish

Outreach Materials and QR Codes

Multilingual (English and Spanish) flyers will be developed to share information about the community engagement activities. These flyers will serve as a tool to make sure everyone receives the same accurate information. The project team will develop text and design, including photos and graphics, to make the flyers visually appealing. The flyers will also include QR codes linking back to the Fresno COG website for additional information and comment opportunities. Once completed, the flyers will be widely distributed via email to the interested party list and Fresno COG's social media sites, and will be posted on the Fresno COG web site. The project team will also encourage stakeholders to share the flyer on their own websites and social media.

Responsible Party	Action Items
Fresno COG	• Review outreach materials • Post outreach materials on Fresno COG web site
Dudek	• Create outreach materials and QR codes

	• Provide outreach materials and QR codes to Fresno COG and Working Group partners for posting
Excel	• Translate outreach materials into Spanish
VRPA	• Print outreach materials for use at pop-up events

Virtual Workshops and Community Pop-up Events

The purpose of public workshops and pop-up events will be to provide a forum to educate the general public and interested stakeholders about extreme heat, and to provide meaningful opportunities for public input regarding the consulting team's analysis on extreme heat vulnerability analysis, pedestrian and bicyclist traffic and location analysis, native and drought-tolerant tree canopy and vegetative cover projects, and short-, mid-, and long-term implementation strategies.

Workshops and pop-up events will be designed to allow for organized group or one-on-one discussion with the goal of exchanging and gathering information and collecting attendee/participant feedback related to the analysis. The project team will receive comments and input from stakeholders and the public, and document and respond to comments. All comments received will be incorporated into the study. To further ensure broad participation, Spanish translation services and materials will be available to workshop and pop-up event attendees. Translation services for other languages will be provided upon request.

The project team will organize five (5) pop-up events and two (2) virtual workshops in Fresno County. The pop-up events will be at local fairs, festivals, farmers' markets, or other similar gatherings where people are already coming together. When making the final determination on pop-up events, Fresno COG and the project team will consider the following:

- ✓ Geographic distribution, with a focus on reaching residents of disadvantaged communities.
- ✓ Events that capture large numbers of residents/visitors.
- ✓ Timing of the event to coincide with study deliverables.

The pop-up event booths will be run by members of the project team, including bilingual staff from VRPA. The booths will contain informational display boards, comment cards, flyers about how to stay involved, and other materials providing an opportunity for engagement and comments. After each pop-up event, the project team will create a brief summary that includes the date, time, location, approximate number of attendees that dropped by the booth, key comments, completed surveys, and photos. These summaries will be gathered into a final report that provides an overview of all the community outreach and engagement activities completed during the analysis.

The virtual workshops will allow for group discussions and interactive activities, with the goal of exchanging and gathering information. Materials will include a PowerPoint presentation, visioning exercises, virtual feedback boards, voting exercises on priority locations for shade infrastructure, a visual preference survey of model shade projects, and other materials.

Responsible Party	Action Items
Fresno COG	• Provide final approval of pop-up event locations and dates • Schedule and provide link for virtual workshops • Review workshop and pop-up materials
Dudek	• Prepare workshop materials (including invitation) and pop-up materials

Excel	• Translate workshop and pop-up materials into Spanish; provide translations for other languages upon request • Translate Spanish and other feedback from comment cards at pop-ups • Provide Spanish and other language translations upon request at virtual workshops
VRPA	• Schedule pop-up events • Print boards and materials for pop-ups • Purchase refreshments for pop-ups • Set-up, attend, and break-down tables and materials at pop-ups • Take photos at pop-ups • Gather comment cards; transcribe comments in English • Summarize feedback from pop-ups • Take screenshots of virtual workshops • Summarize feedback from virtual workshops

EXPECTED OUTCOMES

The following outcomes are expected once the Engagement Plan is implemented:

- ✓ Educational materials will be developed to increase awareness and understanding of extreme heat.
 - Underrepresented communities and individuals will have an increased opportunity to participate in the study development process.
- ✓ Partnerships will be developed with key community members to disseminate educational materials and information.
- ✓ Concerns will be tracked to ensure that everyone's voice is heard.
- ✓ Support will be built from community members, stakeholders, and partner agencies for the project.
- ✓ Information about how the public outreach process helped inform the plan's development will be incorporated into the final plan.

SUMMARY REPORT

Following the completion of the community outreach and engagement activities, the project team will prepare a Summary Report, including the following:

- ✓ Results from the Working Group meetings.
- ✓ Results from each of the virtual workshops.
- ✓ Results from each of the pop-up events.
- ✓ Pictures from the outreach events.
- ✓ How the input received was incorporated into the planning process.
- ✓ Appendices containing copies of all materials prepared and used during the public engagement process.

Upon completion, the Summary Report will be incorporated into the final Extreme Heat Analysis as an appendix.

Comment #	Commenter / Agency	Date Received	Consolidated Comment	Recommendation	Action Taken
1	David Cremins	9/2/2026	The plan should recognize that current Cal/OSHA occupational heat standards establish minimum requirements and that local jurisdictions may consider stronger protections for outdoor workers. Potential approaches include lower temperature thresholds, additional rest breaks, and extending protections to municipal contractors and licensees. The plan should also acknowledge that Cal/OSHA is currently updating Sections 3395 and 3396 and encourage jurisdictions to monitor regulatory changes.	Consider adding language clarifying that local jurisdictions may establish heat protections that exceed current Cal/OSHA requirements, where appropriate.	Language added to page 28.
2	Tania L. Werner	9/8/2026	I would like to see more use of fallowed land that won't be going back into production to be for re-greening using low-cost methods like the following: Zai or tassa pits, demi-lunes, contour earth bunds, infiltration ditches, and woody-debris barriers. There are a lot of lots in county islands that could also benefit from this. As well as a requirement that land can't just sit plain without some sort of mitigation for dust and heat. You can see about getting Prop 4 money to do some of that.	Consider re-greening fallow and vacant land, including county islands, using low-cost heat and dust mitigation strategies and exploring available funding opportunities.	Outside the scope of this plan.
3	Bob McCloskey	9/8/2026	Increase shade in schools, playgrounds, public areas, sidewalks, transit corridors, neighborhoods, parks, trails, parking lots, crosswalks, and bicycle/pedestrian routes. Priority areas identified include Reedley, Orange Cove, Southeast and Southwest Fresno, Eastside, and other areas lacking shade trees. Specific high-traffic streets were also identified.	Consider identifying priority locations for additional trees and shade structures, including transit stops/corridors, pedestrian and bicycle routes, parks, parking lots, and communities with limited existing shade.	Vulnerable active transit locations were identified in the Plan. See Appendix C-E
4	Bob McCloskey	9/9/2026	The commenter recommends measures to reduce heat associated with asphalt and other hard surfaces, including reflective coatings, cool pavement, shade trees, and removal of unnecessary pavement.	Consider adding cool pavement, reflective surfaces, tree canopy, and pavement removal/de-paving as potential heat-reduction strategies.	These strategies are addressed in Chapter 2 and 4.
5	Bob McCloskey	9/9/2026	The commenter recommends using native, drought-tolerant trees around streets and parking lots and incorporating green infrastructure such as green roofs, landscaping, and conversion of unused paved areas into permeable or landscaped areas.	Consider expanding the plan's green infrastructure and urban forestry strategies to include drought-tolerant trees, green roofs, landscaping, and de-paving/reuse of unnecessary paved areas.	These strategies are addressed in Chapter 2 and 4.
6	Bob McCloskey	9/9/2026	The commenter recommends that the County use local health advisories and emergency measures to communicate heat dangers and complement existing workplace heat-safety requirements.	Consider adding local heat advisories and other emergency communication measures as potential strategies for communicating extreme heat risks and coordinating community response.	These strategies are addressed in Chapter 2 and 4.
7	Bob McCloskey	9/9/2026	The commenter recommends opening cooling centers at community centers and other public buildings when temperatures exceed 100°F and notifying residents and unhoused community members when cooling centers are activated.	Consider establishing or expanding criteria for cooling-center activation and outreach, including targeted notification to vulnerable and unhoused populations.	These strategies are addressed in Chapter 2 and 4.
8	Brandi Nuse-Villegas	9/9/2026	Unhoused and unsheltered individuals face increased vulnerability to extreme heat and other extreme weather events and may have limited access to information, transportation, cooling centers, and other emergency resources.	Strengthen the plan's discussion of unhoused/unsheltered populations and identify strategies to improve access to emergency information, services, and resources.	Public health response is beyond the scope of this plan, however, many of these strategies are discussed in Chapter 2.
9	Brandi Nuse-Villegas	9/9/2026	Traditional public notifications may not effectively reach unhoused residents who lack reliable access to phones, electricity, internet, or community information networks. Consistent and predictable communication is needed.	Consider establishing consistent, recurring, and multi-channel outreach strategies to notify unhoused residents of extreme heat conditions, cooling center availability, transportation, and other resources.	Public health response is beyond the scope of this plan, however, many of these strategies are discussed in Chapter 2.

10	Brandi Nuse-Villegas	9/9/2026	Cooling centers may be difficult for unhoused individuals to access because of distance, transportation limitations, belongings, or restrictions involving pets.	Consider strategies to improve physical access to cooling centers, including transportation assistance and accommodations for belongings and pets where feasible.	Public health response is beyond the scope of this plan, however, many of these strategies are discussed in Chapter 2.
11	Brandi Nuse-Villegas	9/9/2026	The commenter notes that cooling centers may only open at high temperature thresholds, while significant heat-related health impacts can occur at lower temperatures, particularly among medically vulnerable individuals.	Consider whether heat-response services should account for factors beyond a single temperature threshold, including duration of heat, overnight temperatures, humidity, and vulnerability of affected populations.	Public health response is beyond the scope of this plan, however, many of these strategies are discussed in Chapter 2.
12	Brandi Nuse-Villegas	9/9/2026	The commenter recommends ensuring that unhoused individuals can access shade, parks, water features, cooling amenities, and other public resources identified in the plan without unnecessary barriers.	Consider identifying equitable access to public shade, cooling, hydration, and respite resources as a strategy for protecting unhoused and unsheltered populations.	Public health response is beyond the scope of this plan, however, many of these strategies are discussed in Chapter 2.
13	Brandi Nuse-Villegas	9/9/2026	Additional hydration stations are recommended throughout Fresno County, particularly in parks, community centers, and strategically located areas accessible to unhoused residents and others vulnerable to heat.	Consider identifying strategically located hydration stations as a heat adaptation strategy, with priority given to areas with high heat exposure and limited access to water.	Personal exposure strategies are addressed in Chapter 2.
14	Brandi Nuse-Villegas	9/9/2026	The commenter recommends continued community engagement with unhoused residents to better understand their experiences, needs, barriers, and potential solutions.	Continue incorporating lived experience and direct feedback from unhoused and unsheltered community members into implementation and future updates to the plan.	Addressed in Chapter 6 Next steps.
15	Nataly Escobedo Garcia / Leadership Council for Justice and Accountability	9/10/2026	The plan should more fully recognize the vulnerability of rural communities to extreme heat. Rural residents may experience limited access to air conditioning, adequate ventilation, clean water, green space, and cooling centers, despite potentially experiencing less urban heat-island effect.	Consider expanding the discussion of rural heat vulnerability and ensuring that heat adaptation projects and investments are considered throughout Fresno County, with an emphasis on rural communities.	Language added to page 37
16	Nataly Escobedo Garcia / Leadership Council for Justice and Accountability	9/10/2026	The plan provides descriptions of potential heat adaptation projects, including shaded walking and bicycling routes, shaded transit stops, and expanded medians for tree canopy, but could provide more specificity regarding where projects could be implemented.	Consider identifying potential priority locations or geographic areas for each project type and, where feasible, providing estimated costs or cost ranges to support project implementation and prioritization.	This plan scope was focused on active transit. Vulnerable active transit locations were identified in the Plan. See Appendix C-E.
17	Nataly Escobedo Garcia / Leadership Council for Justice and Accountability	9/10/2026	The plan should provide additional information regarding funding opportunities for the recommended heat mitigation projects.	Consider identifying potential funding sources, including local budget allocations, state and federal grants, and other applicable programs, for each major heat mitigation strategy in Chapter 4.	Implementation guide added as Chapter 6 to this plan.
18	Transportation Technical Committee (TTC)	9/11/2026	How do trees affect pavement condition and ensuring that the report includes long term new tree/shade maintenance costs.	Consider including discussion of potential tree-related pavement impacts and long-term maintenance costs for trees and shade improvements.	Tree Care guide added to end of plan
19	Political Advisory Committee (PAC)	9/11/2026	The plan should address containment of tree roots and information that includes root barrier (tree selection, root barriers, and tree wells to prevent surface root impacts).	Consider including guidance on appropriate tree selection, root barriers, tree wells, and other root-management strategies.	Tree Care guide added to end of plan



B

APPENDIX

FCOG Local Planning Survey - Extreme Heat and Shade

1. Tell us about yourself:

Name	
Jurisdiction	
Department	
Title	
Email	

2. How would you describe your jurisdiction's vulnerability to extreme heat? (Select all that apply)

- ☐ Agricultural communities with outdoor workers
- ☐ Limited tree canopy coverage
- ☐ Lack of built shade infrastructure
- ☐ Inadequate air conditioning in homes
- ☐ Presence of vulnerable populations (e.g., elderly, low-income, unhoused)
- ☐ Industrial areas contributing to localized heat
- ☐ Rural areas with few cooling resources (e.g., centers, water features)
- ☐ Other (please specify)

3. What are the top extreme heat and shade-related challenges your jurisdiction faces? (Use the up and down arrows to rank the list from most to least challenging)

-   Limited funding for tree planting and maintenance
-   Inadequate infrastructure to handle power outages during high-demand heat events and planned shut-offs.
-   Insufficient capacity or access to cooling centers
-   Economic impact on agriculture
-   Increased wildfire risk due to heat

4. Any other challenges you want to mention?

5. What existing resources or programs does your jurisdiction currently offer to address extreme heat? (Select all that apply)

- ☐ Designated cooling centers
- ☐ Emergency heat response protocols
- ☐ Public outreach and education initiatives
- ☐ Outreach programs for vulnerable populations
- ☐ Outdoor worker safety protocols
- ☐ Tree planting/urban forestry programs
- ☐ Building energy efficiency programs
- ☐ Cool roof or pavement strategies
- ☐ Water features or splash pads
- ☐ Heat emergency communication systems
- ☐ None of the above
- ☐ Other (please specify)

FCOG Local Planning Survey - Extreme Heat and Shade

6. For your jurisdiction, please assess the adequacy of shade coverage of **Residential Area Sidewalks? (select one)**

- ☐ Adequate
- ☐ Some Shade but needs improvement
- ☐ Limited shade infrastructure
- ☐ Very little to no public shade
- ☐ Example or specific need:

7. For your jurisdiction, please assess the adequacy of shade coverage of **Commercial Area Sidewalks? (select one)**

- ☐ Adequate
- ☐ Some Shade but needs improvement
- ☐ Limited shade infrastructure
- ☐ Very little to no public shade
- ☐ Example or specific need:

8. For your jurisdiction, please assess the adequacy of shade coverage of **Residential Area Bike Lanes? (select one)**

- ☐ Adequate
- ☐ Some Shade but needs improvement
- ☐ Limited shade infrastructure
- ☐ Very little to no public shade
- ☐ Example or specific need:

9. For your jurisdiction, please assess the adequacy of shade coverage of **Commercial Area Bike Lanes? (select one)**

- ☐ Adequate
- ☐ Some Shade but needs improvement
- ☐ Limited shade infrastructure
- ☐ Very little to no public shade
- ☐ Example or specific need:

10. Please list specific neighborhoods, districts, or zones within your jurisdiction most impacted by extreme heat.

FCOG Local Planning Survey - Extreme Heat and Shade

11. What types of regional collaboration would be most helpful for your jurisdiction? Please use the up and down arrows to rank in order of most helpful to least helpful.

-   Joint funding applications for heat mitigation projects
-   Coordinated tree canopy/shade implementation projects
-   Regional sharing of best practices and technical support
-   Unified emergency response planning
-   Regional green infrastructure planning
-   Shared heat vulnerability mapping and data

12. What else would be helpful?

13. What are the most significant barriers your jurisdiction faces when implementing heat adaptation measures? (Select the top 2-3)

- ☐ Budget limitations
- ☐ Staffing constraints
- ☐ Need for technical expertise or guidance
- ☐ Regulatory or permitting challenges
- ☐ Low public awareness/engagement
- ☐ Conflicting priorities
- ☐ Ongoing maintenance or operations concerns
- ☐ Limited coordination with regional agencies
- ☐ Community or political resistance
- ☐ Other (please specify)

14. How is your jurisdiction integrating heat adaptation into local planning efforts? (Select all that apply)

- ☐ Safety Element Update
- ☐ Climate Action Plan
- ☐ Emergency Operations Plan
- ☐ Parks & Recreation Master Plan
- ☐ Urban Forestry Plan
- ☐ Housing Element
- ☐ Sustainability or Resilience Strategy
- ☐ Economic Development Strategy
- ☐ No current planning efforts for heat adaptation
- ☐ Other (please specify)

15. If funding were available, what would be your top three investment priorities for heat adaptation? (Select your top 2-3 priorities)

- ☐ New or upgraded cooling centers
- ☐ Urban tree canopy and forestry efforts
- ☐ Cool roof/pavement programs
- ☐ Retrofitting buildings for vulnerable populations
- ☐ Emergency communication systems
- ☐ Mobile cooling or outreach units
- ☐ Installation of public shade structures
- ☐ Water amenities (splash pads, hydration stations)
- ☐ Backup power/emergency generators
- ☐ Equipment and training for outdoor workers
- ☐ Community heat-health education campaigns
- ☐ Other (please specify)

FCOG Local Planning Survey - Extreme Heat and Shade

16. Thank you for taking the time to complete this survey. Your input is essential to shaping a comprehensive Heat and Shade Adaptation Plan that reflects the priorities and needs of Fresno County jurisdictions. Feel free to leave any additional comments here. For questions, contact Matthew Shimizu: mshimizu@fresnocog.org

A large, empty rectangular box with a thin black border, intended for users to provide additional comments. A small cursor icon is visible in the bottom right corner of the box.

Q1 Tell us about yourself:

Answered: 14 Skipped: 0

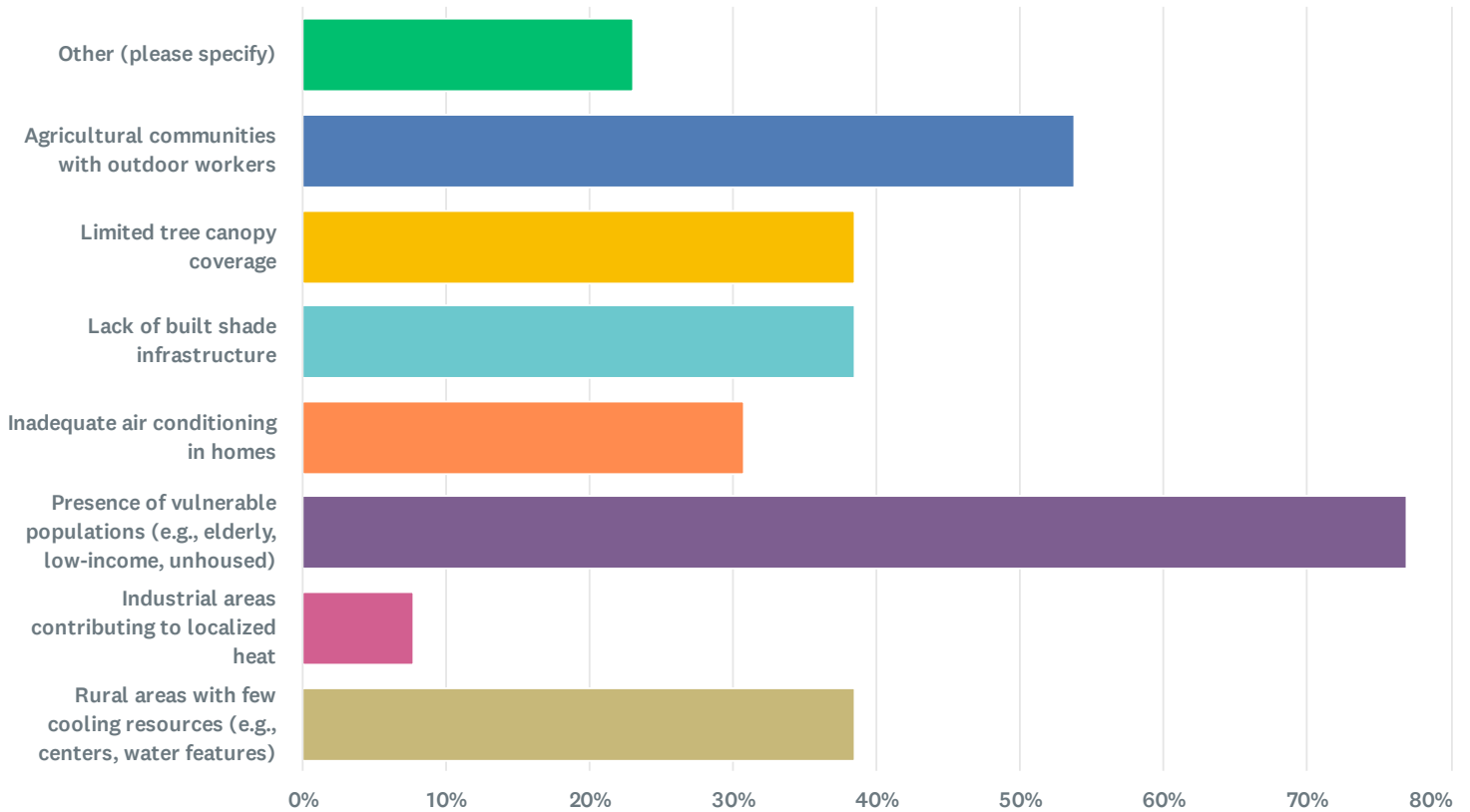
ANSWER CHOICES	RESPONSES	
Name	92.86%	13
Jurisdiction	92.86%	13
Department	92.86%	13
Title	85.71%	12
Email	92.86%	13

FCOG Local Planning Survey - Extreme Heat and Shade

Q2

13 responses

How would you describe your jurisdiction's vulnerability to extreme heat? (Select all that apply)



RESPONSES (0)

WORD CLOUD

TAGS (0)

Search Responses

? Filter: by tag ▼

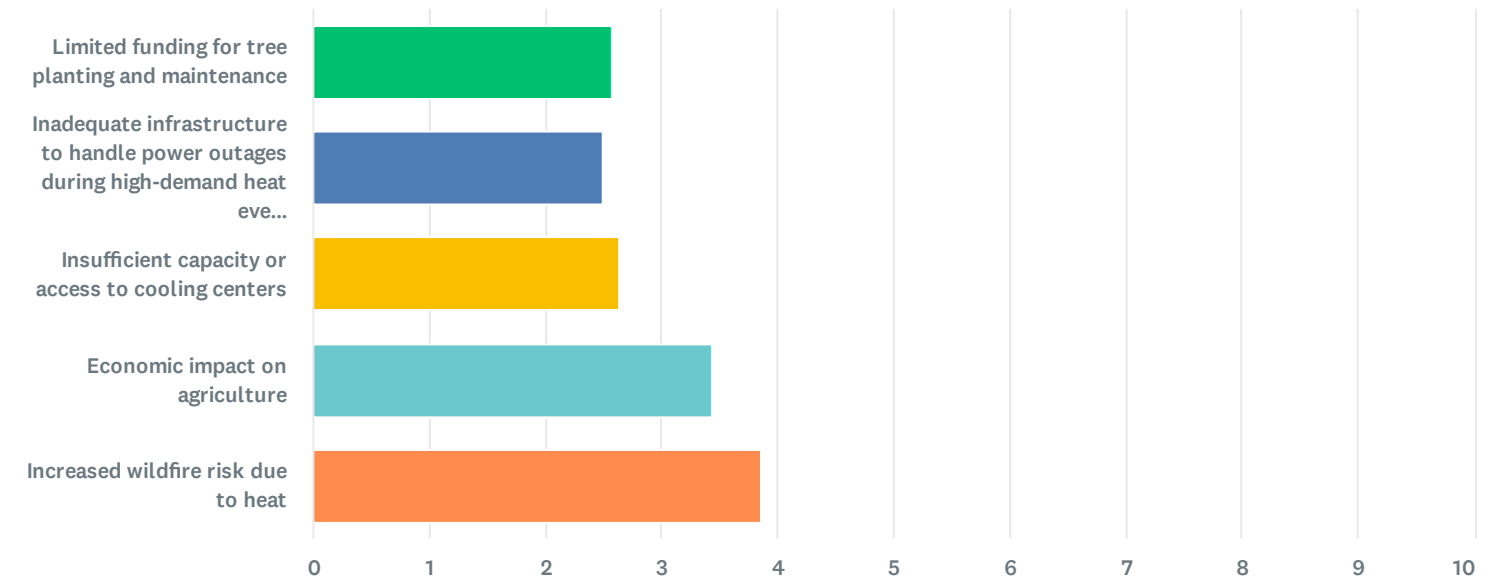
☐ No responses yet

FCOG Local Planning Survey - Extreme Heat and Shade

Q3

14 responses

What are the top extreme heat and shade-related challenges your jurisdiction faces? (Use the up and down arrows to rank the list from most to least challenging)



● evaluationLabel.average

Q4 Any other challenges you want to mention?

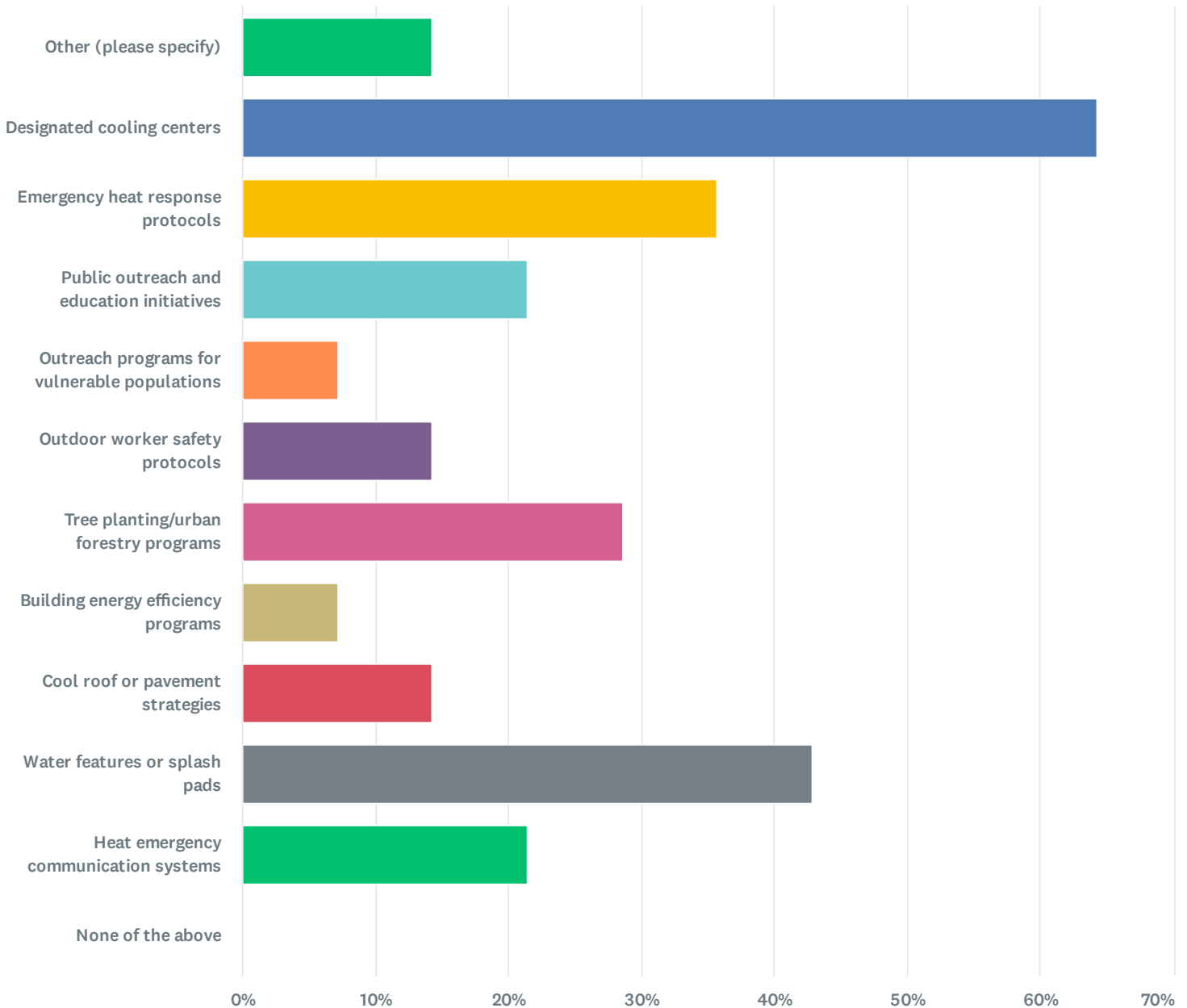
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FCOG Local Planning Survey - Extreme Heat and Shade

Q5

14 responses

What existing resources or programs does your jurisdiction currently offer to address extreme heat? (Select all that apply)



RESPONSES (0)

WORD CLOUD

TAGS (0)

Search Responses

Filter: by tag ▼

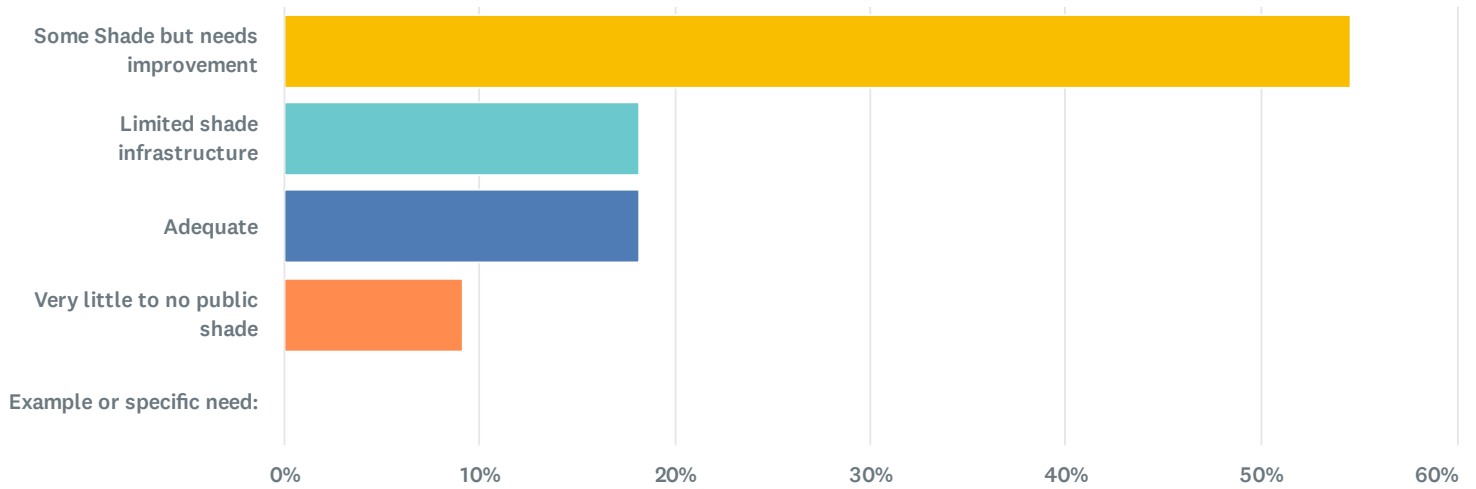
☐ No responses yet

FCOG Local Planning Survey - Extreme Heat and Shade

Q6

11 responses

For your jurisdiction, please assess the adequacy of shade coverage of Residential Area Sidewalks? (select one)



RESPONSES (0)

WORD CLOUD

TAGS (0)

Q Search Responses

? Filter: by tag ▼

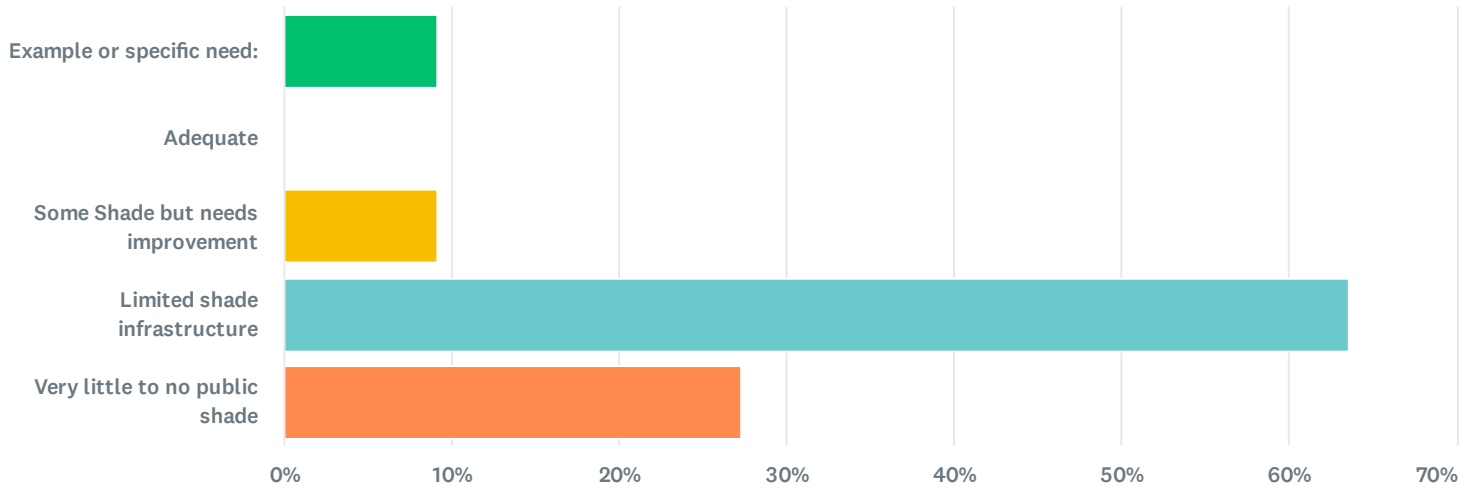
☐ No responses yet

FCOG Local Planning Survey - Extreme Heat and Shade

Q7

11 responses

For your jurisdiction, please assess the adequacy of shade coverage of Commercial Area Sidewalks? (select one)



RESPONSES (0)

WORD CLOUD

TAGS (0)

? Filter: by tag ▼

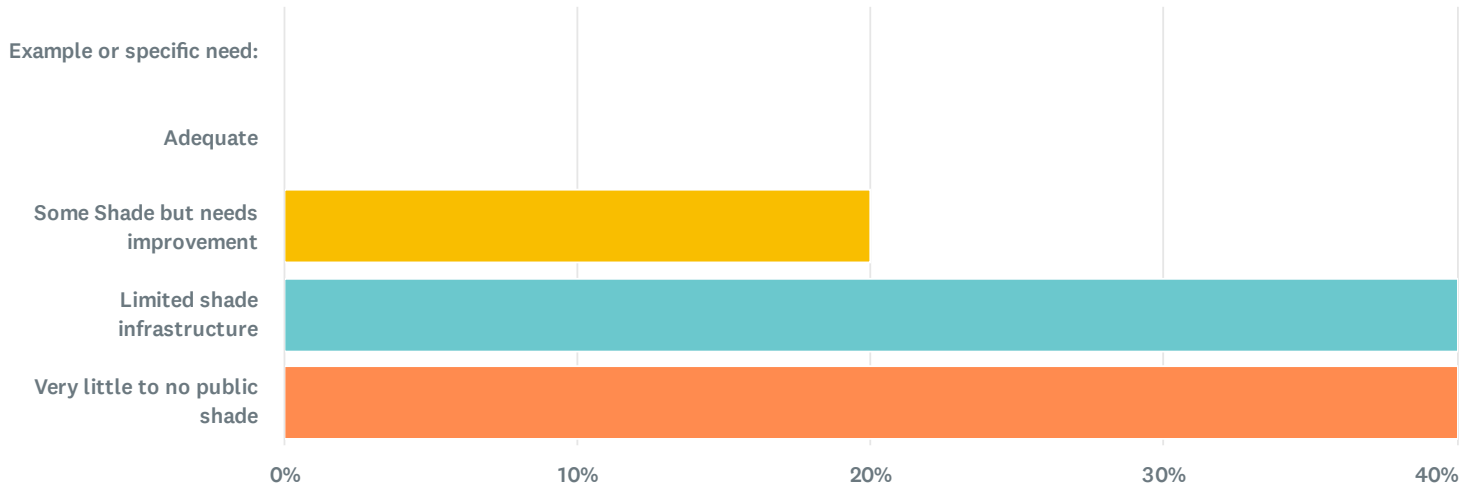
☐ No responses yet

FCOG Local Planning Survey - Extreme Heat and Shade

Q8

10 responses

For your jurisdiction, please assess the adequacy of shade coverage of Residential Area Bike Lanes? (select one)



RESPONSES (0)

WORD CLOUD

TAGS (0)

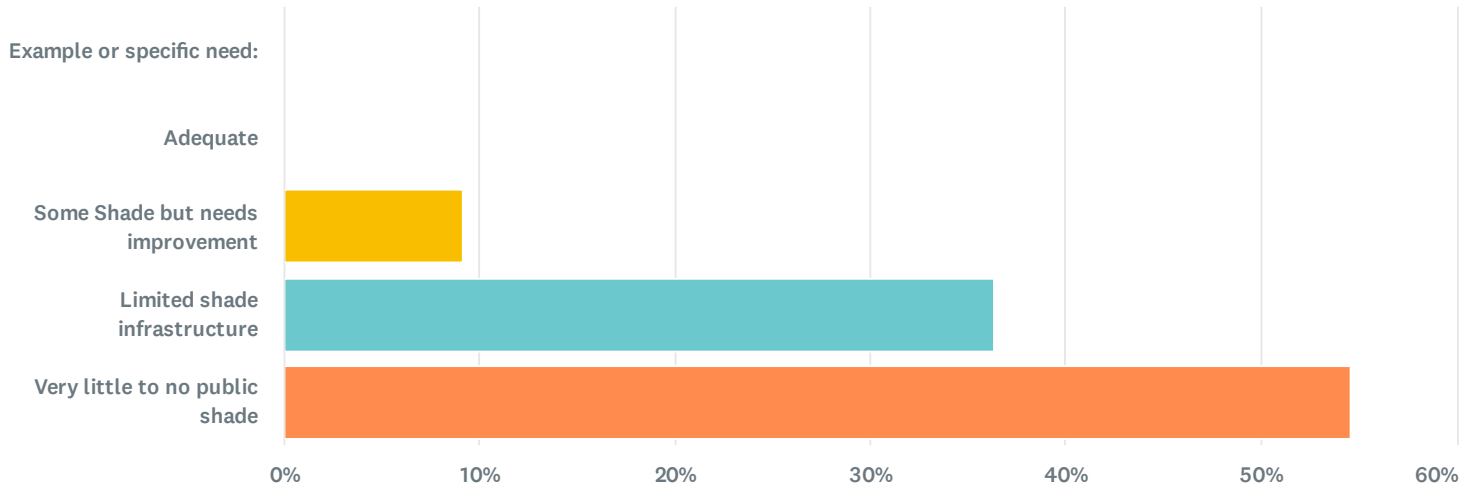
☐ No responses yet

FCOG Local Planning Survey - Extreme Heat and Shade

Q9

11 responses

For your jurisdiction, please assess the adequacy of shade coverage of Commercial Area Bike Lanes? (select one)



RESPONSES (0)

WORD CLOUD

TAGS (0)

☐ No responses yet

Q10 Please list specific neighborhoods, districts, or zones within your jurisdiction most impacted by extreme heat.

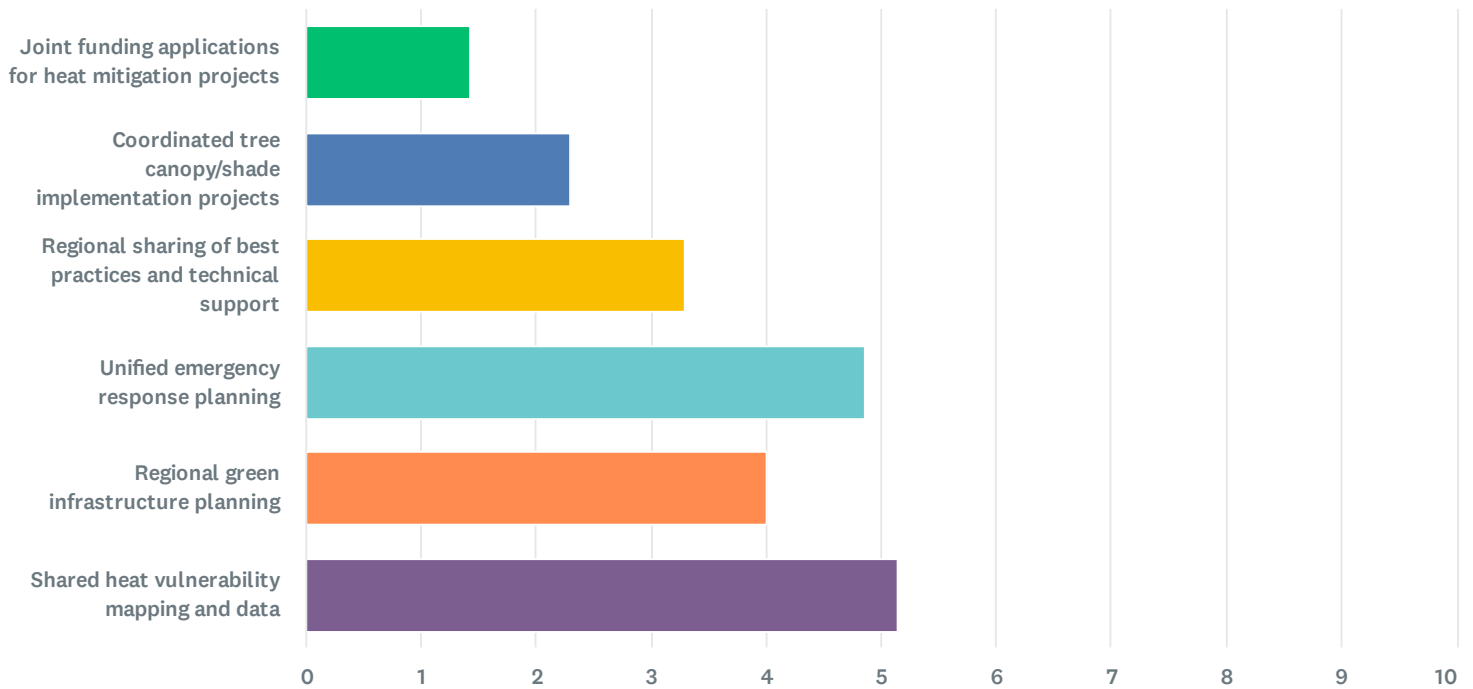
Answered: 6 Skipped: 8

FCOG Local Planning Survey - Extreme Heat and Shade

Q11

7 responses

What types of regional collaboration would be most helpful for your jurisdiction? Please use the up and down arrows to rank in order of most helpful to least helpful.



● evaluationLabel.average

Q12 What else would be helpful?

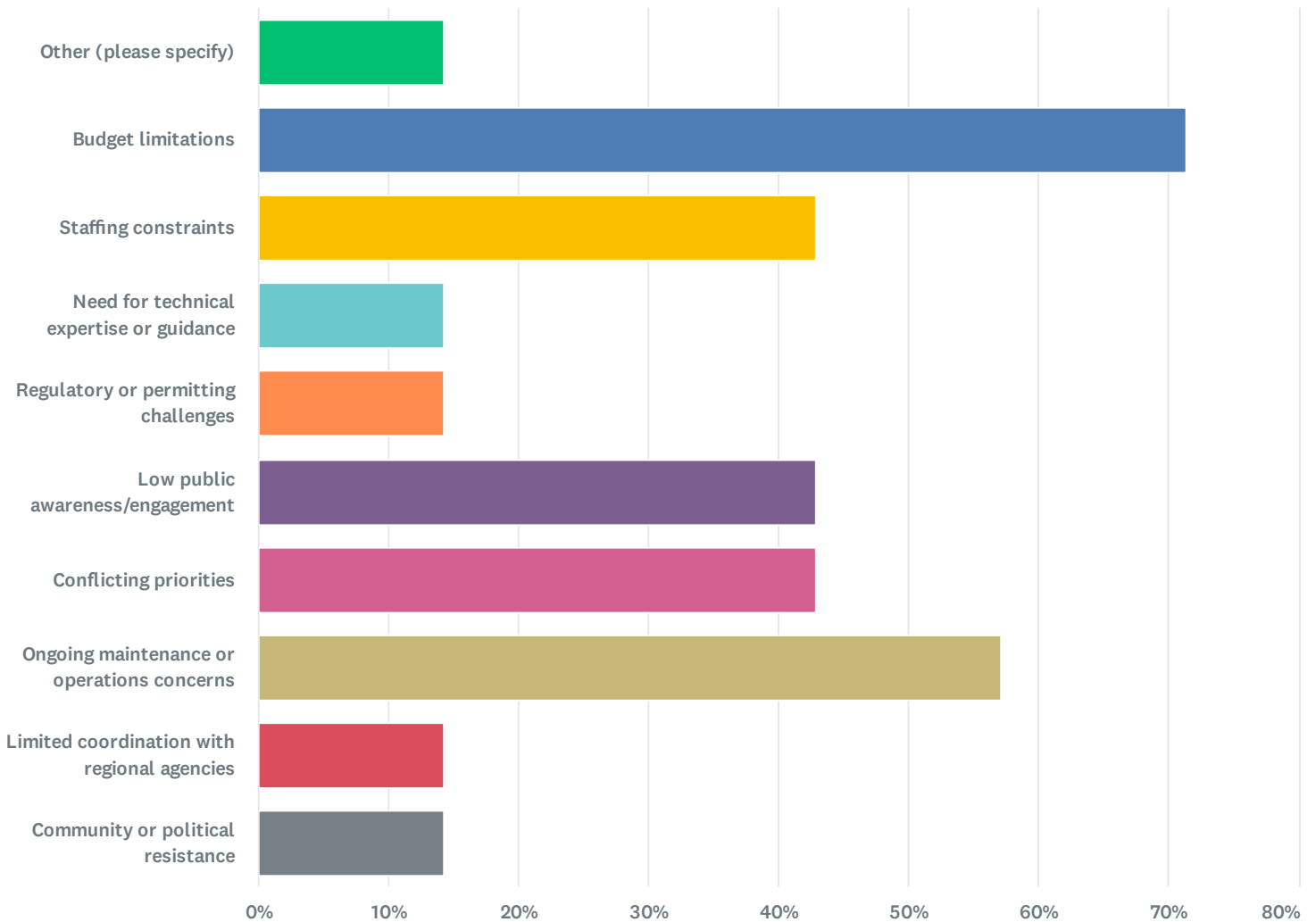
Answered: 2 Skipped: 12

FCOG Local Planning Survey - Extreme Heat and Shade

Q13

7 responses

What are the most significant barriers your jurisdiction faces when implementing heat adaptation measures? (Select the top 2-3)



RESPONSES (0)

WORD CLOUD

TAGS (0)

Search Responses



Filter: by tag ▼



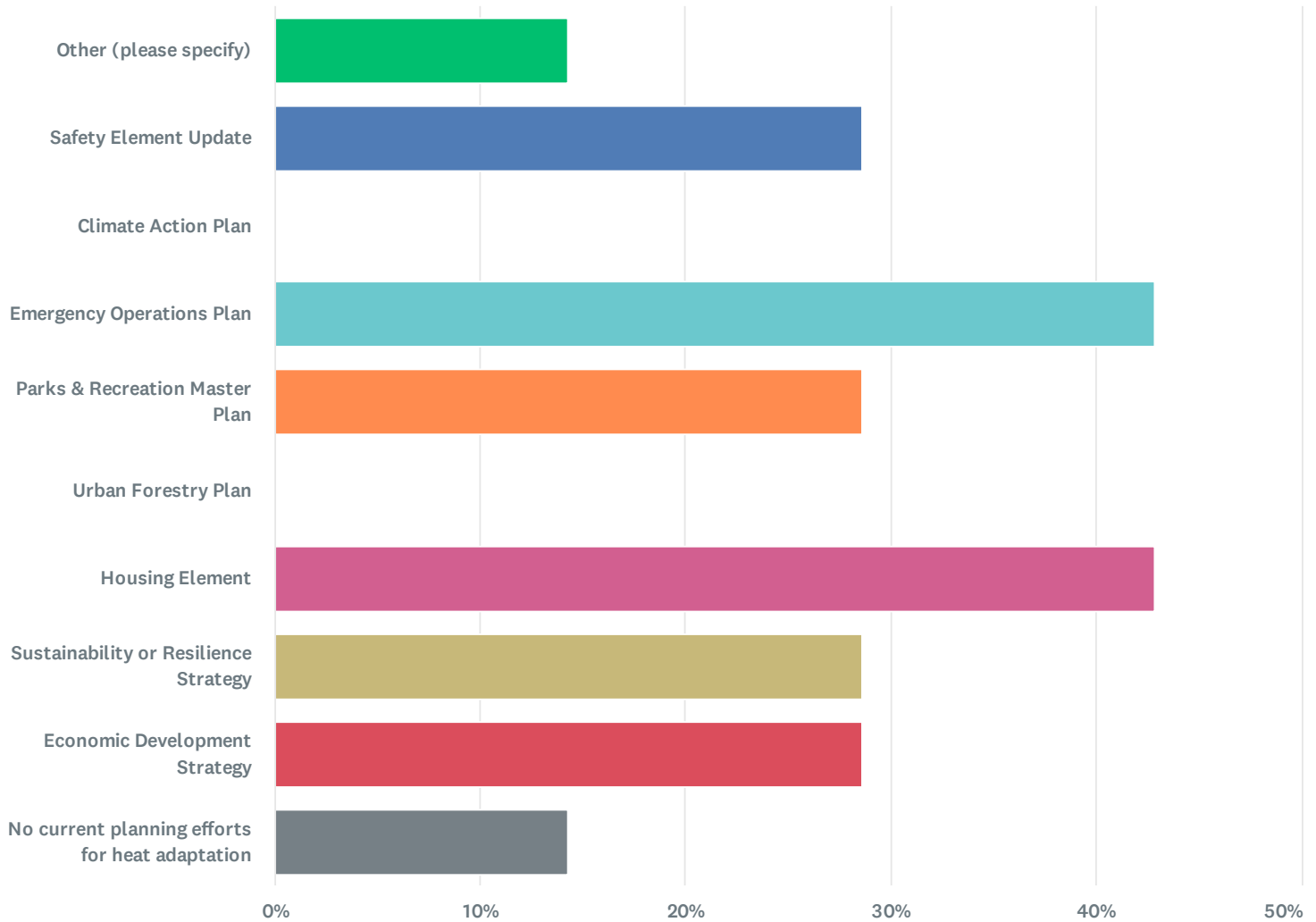
No responses yet

FCOG Local Planning Survey - Extreme Heat and Shade

Q14

7 responses

How is your jurisdiction integrating heat adaptation into local planning efforts? (Select all that apply)



RESPONSES (0)

WORD CLOUD

TAGS (0)

Q Search Responses

? Filter: by tag ▼

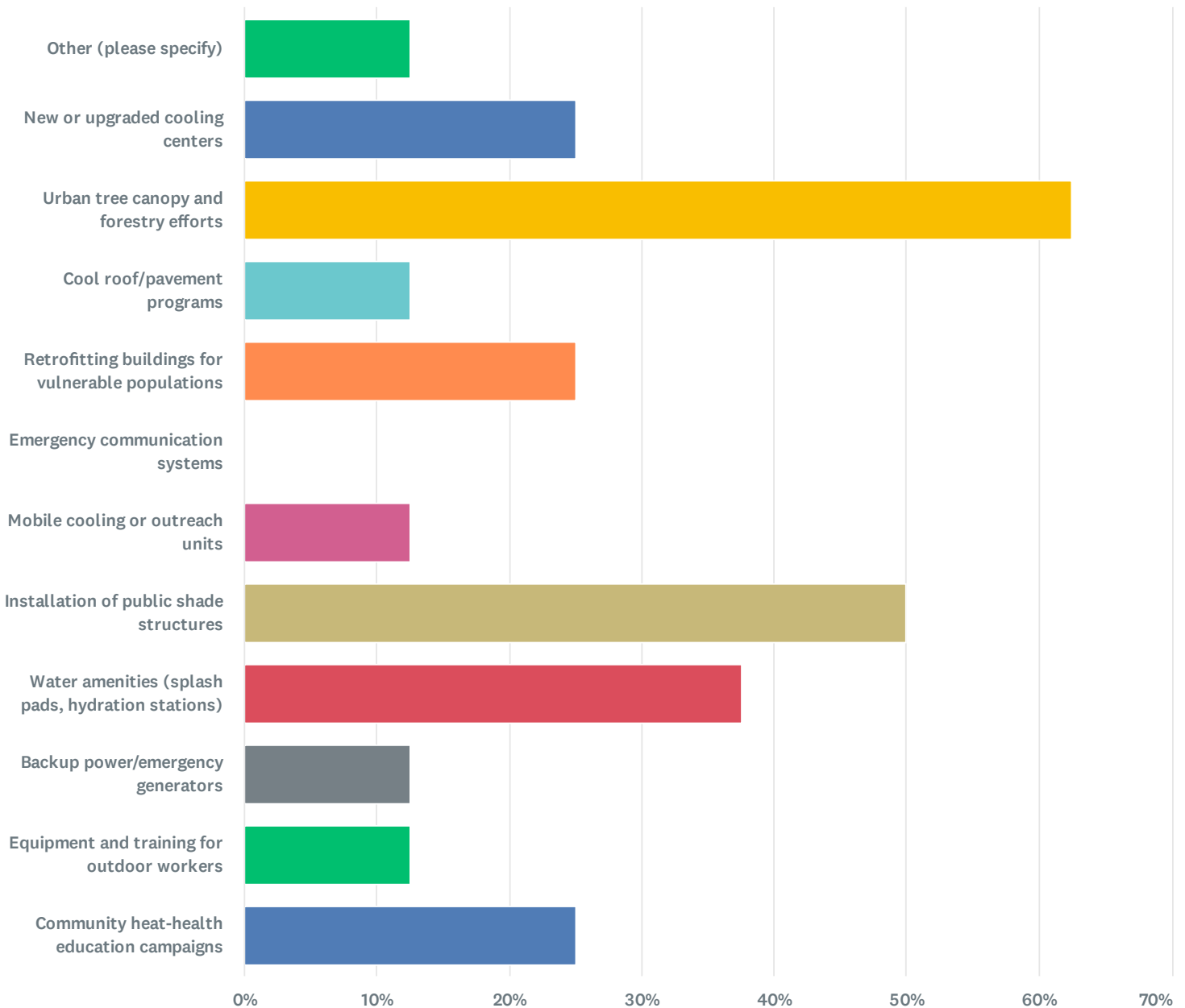
☐ No responses yet

FCOG Local Planning Survey - Extreme Heat and Shade

Q15

8 responses

If funding were available, what would be your top three investment priorities for heat adaptation? (Select your top 2-3 priorities)



RESPONSES (0)

WORD CLOUD

TAGS (0)

Q Search Responses

? Filter: by tag ▼

☐ No responses yet

Q16 Thank you for taking the time to complete this survey. Your input is essential to shaping a comprehensive Heat and Shade Adaptation Plan that reflects the priorities and needs of Fresno County jurisdictions. Feel free to leave any additional comments here. For questions, contact Matthew Shimizu: mshimizu@fresnocog.org

Answered: 0 Skipped: 14



C

APPENDIX

1 Purpose and Intended Use

This appendix documents the methodology used to develop the Heat Vulnerability Index (HVI or index) for the Fresno County Extreme Heat Analysis and Shade Adaptation Plan (Plan). The HVI is a planning-scale tool designed to compare relative heat vulnerability across Fresno County census tracts based on the combined influence of environmental conditions, population characteristics, and access to adaptive resources. The index supports consistent countywide comparison and uses publicly available demographic, health, and environmental datasets.

HVI results are used throughout the Plan to inform prioritization of shade and cooling investments, support corridor screening, and guide future project development. The index also informs later analyses related to people who walk, bike, or rely on public transit by providing neighborhood-level vulnerability context that is used when evaluating active transportation routes and shade needs across the county.

The HVI is intended for planning and prioritization purposes. It does not predict individual health outcomes or estimate heat-related illness. Instead, it provides a relative comparison across census tracts that helps focus follow-up analysis, engagement, and site-level assessment during project scoping and design.

2 Heat Vulnerability Framework

Heat vulnerability reflects the degree to which individuals or communities are likely to experience adverse effects from extreme heat. It results from the interaction between heat conditions and the social, health, and environmental factors that influence exposure, sensitivity, and the ability to cope. Understanding these factors helps identify where extreme heat is most likely to pose risks and where targeted planning, investment, and mitigation strategies may be most effective.

The HVI uses a widely applied climate vulnerability framework that defines vulnerability as a function of four components: hazard, exposure, sensitivity, and adaptive capacity. This structure is common in climate and transportation adaptation work and supports consistent integration of physical heat conditions with population and built environment characteristics.

In this framework, hazard represents the severity and frequency of extreme heat conditions. Exposure reflects built environment and population characteristics that influence how much heat people experience. Sensitivity represents demographic, occupational, and health factors that increase the likelihood of adverse outcomes. Adaptive capacity reflects access to resources that help reduce heat impacts, including income, transportation, tree canopy, parks, and cooling locations.

In this assessment, extreme heat serves as the underlying climatic stressor. Hazard indicators represent the intensity and frequency of heat conditions, providing spatial context for where extreme heat is most pronounced. Exposure, sensitivity, and adaptive capacity indicators describe how population characteristics, health conditions, and access to resources shape the potential for adverse outcomes once heat occurs.

Organizing the analysis around these four components allows the HVI to reflect both physical heat conditions and the social factors that shape how heat affects communities. This framework supports comparison across census tracts and linking vulnerability results to planning actions.

3 Data and Indicator Selection

Indicators were selected to represent each component of the heat vulnerability framework and to reflect heat conditions, population characteristics, and resources relevant to extreme heat risk in Fresno County. Selection prioritized datasets commonly used in planning-scale heat vulnerability analyses and screened indicators for spatial coverage, temporal relevance, and interpretability for decision making. Indicator selection and refinement were informed by internal technical review and input from the project’s Technical Working Group.

Indicators vary in spatial extent and applicability. Some represent countywide conditions and apply across both urban and rural census tracts, while others capture urban-specific characteristics associated with localized heat exposure. These differences were considered during indicator selection and are addressed in subsequent steps of index construction.

Table 1 summarizes all indicators used in the HVI, organized by component, along with description and data sources.

Table 1. Heat Vulnerability Indicators and Data Sources

Component	Indicator	Description	Data Sources
Hazard	Urban heat severity	Relative spatial variation in urban surface heat conditions	Trust for Public Land, Urban Heat Severity for Urban Areas, derived from Landsat 8 thermal imagery (2024)
	Extreme heat days (max temp > 95 °F)	Annual number of days where daily maximum temperature exceeds 95 °F.	CDC Environmental Public Health Tracking Network, Extreme Heat Days (2023)
Exposure	Population density	Residents per square mile.	U.S. Census Bureau, American Community Survey (ACS) 2023 5-year estimates
	Impervious Surface Coverage	Percent of land covered by roads, roofs, etc. that absorb heat.	Urban Land Cover; Trees at Work / Arbor Day Foundation; USDA Forest Service & PlanIT Geo (2022)
Sensitivity	Older adults (65+)	Percent of population age 65 and older.	U.S. Census Bureau, ACS 2023 5-year estimates
	Young children (5 and below)	Percent of population under age 5.	U.S. Census Bureau, ACS 2023 5-year estimates
	Disability	Percent of population with a disability.	U.S. Census Bureau, ACS 2023 5-year estimates
	Asthma	Percent of population with asthma.	CDC PLACES (2024)
	Obesity	Prevalence of obesity within the population.	CDC PLACES (2024)
	Coronary heart disease	Coronary heart disease prevalence.	CDC PLACES (2024)

Table 1. Heat Vulnerability Indicators and Data Sources

Component	Indicator	Description	Data Sources
	Low birth weight	Percent of live births classified as low birth weight.	OEHHA CalEnviroScreen 4.0 (2021).
	Outdoor workers	Percent of population in high-exposure outdoor jobs (e.g., agriculture).	U.S. Census Bureau, ACS 5-year estimates
	Low-income households	Percent of household below the federal poverty line.	U.S. Census Bureau, ACS 5-year estimates
Adaptive Capacity	Tree Canopy Cover	Percent canopy cover by tract.	Urban Tree Canopy Dataset based on 2022 NAIP imagery; EarthDefine and Dewberry for USDA Forest Service, CAL FIRE, and NOAA
	Access to Parks and Cooling Centers	Number of parks and cooling centers per capita by census tract.	OpenStreetMap parks; Cal OES cooling centers
	Transportation Access	Percent of population without access to personal transportation.	U.S. Census Bureau, ACS 5-year estimates
	Income	Median household income.	U.S. Census Bureau, ACS 5-year estimates

3.1 Hazard

Heat hazard indicators represent two complementary dimensions of extreme heat. Extreme heat days reflect regional exposure to high ambient temperatures and apply consistently across both urban and rural census tracts. Urban heat severity captures relative spatial variation in surface heat conditions within urbanized areas and reflects localized differences associated with the built environment.

Urban census tracts use both indicators, while rural and less-developed tracts use extreme heat days alone because the urban heat severity dataset only covers mapped urban areas. This reflects data availability rather than any assumption about localized heat conditions in rural tracts.

3.2 Exposure

Exposure indicators describe population concentration and built environment characteristics associated with increased heat exposure. Population density reflects the number of residents potentially affected during extreme heat events. Impervious surface coverage represents the extent of heat-absorbing built surfaces that contribute to elevated local temperatures.

Land use intensity was evaluated as a potential indicator but was excluded due to strong overlap with impervious surface coverage and more limited spatial availability across census tracts. Where impervious surface values are unavailable, the exposure score is based on population density alone.

3.3 Sensitivity

Sensitivity indicators represent population characteristics associated with increased likelihood of adverse health outcomes during extreme heat events. Indicators capture age-related vulnerability, disability status, underlying health conditions, occupational exposure, and economic constraints commonly linked to heat-related illness and mortality.

These indicators apply across both urban and rural contexts and were available consistently at the census tract level across Fresno County.

3.4 Adaptive Capacity

Adaptive capacity indicators represent resources and conditions that support coping and response during extreme heat events. Tree canopy cover reflects the presence of trees that reduce heat exposure through shading and evapotranspiration and was evaluated within urbanized portions of census tracts using high-resolution urban canopy data. Parks and cooling centers were summarized by tract and expressed per capita to represent relative access to cooling resources. Transportation access and income represent residents' ability to reach cooling resources and afford heat-protective measures and services.

4 Data Preparation

The HVI was calculated for 225 census tracts across Fresno County. All datasets were prepared for comparison at the census tract level, which served as the base geography for indicator summarization and index scoring. Census tract boundaries were used for all spatial joins and aggregations, and tract-level tabular datasets were joined using GEOID. Spatial datasets were aligned to a consistent coordinate reference system prior to analysis.

4.1 Spatial Processing

Raster datasets were summarized to census tract boundaries using zonal statistics. Vector datasets were intersected with tract boundaries and summarized as area-based percentages where applicable. Point datasets were spatially joined to tracts and summarized as counts, then converted to per-capita or rate-based measures where appropriate. Indicators already reported at the census tract level were joined directly by GEOID.

4.2 Indicator Availability and Component Scoring

Several indicators, including urban heat severity, impervious surfaces, and urban tree canopy, are available only within urbanized areas. Urbanized areas were defined using a merged 2010 and 2020 Census Urban Area boundary, which was used to identify developed portions of each tract and determine where urban-only indicators could be summarized. Tracts outside this extent retain NA values for these indicators, while other indicators, such as population and health variables, are available countywide.

Differences in indicator availability require a consistent approach to calculating component scores. Component scores were therefore computed using the mean of the indicators available for each tract, which avoids lowering scores in locations where certain datasets do not apply. This approach prevents tracts from appearing to have lower vulnerability solely due to limited data coverage. Tracts with fewer available indicators rely on a smaller evidence base, so each remaining indicator plays a proportionally larger role in the resulting component score. These scores remain comparable across the county but should be interpreted with additional caution because they reflect a narrower set of underlying heat-related conditions.

5 Index Construction

Index construction involved normalizing all indicators to a common scale, aligning their directionality, combining them into component scores, and producing a composite HVI for each census tract.

All indicators were normalized to a 0–1 scale using min–max scaling across Fresno County so that variables with different units and ranges could be combined. Normalized values were oriented so that higher values represent higher heat vulnerability.

Indicators representing protective conditions were directionally aligned so that higher values reflect higher heat vulnerability. Adaptive capacity indicators were first constructed such that higher values represent greater capacity, then inverted during calculation of the composite HVI to maintain consistent directionality across all components.

5.1 Component Scores

Each of the four components of the HVI was constructed from normalized indicators as described below.

- **Hazard** scores reflect the intensity and frequency of extreme heat. In urban tracts where both indicators were available, hazard was calculated as a weighted combination of normalized extreme heat days (40%) and normalized urban heat severity (60%). Urban heat severity received a higher weight because it captures fine-scale variation in surface heat intensity driven by land cover and impervious surfaces, whereas heat-day frequency varies more gradually across the county and shows little neighborhood-level variation. In tracts without urban heat severity values, hazard was defined by normalized extreme heat days alone.
- **Exposure** scores combine normalized population density and impervious surface coverage using the mean of available inputs. For tracts without impervious surface values, exposure reflects normalized population density alone.
- **Sensitivity** scores combine demographic, occupational, and health indicators using the mean of available inputs. These indicators were available consistently across both urban and rural tracts and capture age-related vulnerability, disability status, underlying health conditions, outdoor work, and economic constraints.
- **Adaptive capacity** scores combine normalized urban tree canopy cover, parks and cooling centers per capita, transportation access, and median household income using the mean of available inputs. Tracts without an urban canopy value were scored using the remaining adaptive capacity indicators.

5.2 Composite HVI

A composite HVI was calculated by combining the four component scores into a single metric for each census tract using an equal-weight additive approach. Adaptive capacity was inverted prior to combination so that all components contribute in the same direction of interpretation, with higher values indicating higher overall heat vulnerability. The composite HVI was calculated as:

$$HVI = (Hazard\ Index + Exposure\ Index + Sensitivity\ Index + (1 - Adaptive\ Capacity))/4$$

Final HVI values were classified into quartiles to produce four relative heat vulnerability categories, ranging from lowest to highest vulnerability. These categories are used throughout the Plan as a screening tool to identify areas with comparatively lower or higher heat vulnerability. Component maps and component scores were also produced to support interpretation of which dimensions of vulnerability contribute most to tract-level heat vulnerability.

5.3 Method Validation

Method validation focused on the internal structure of the sensitivity component and evaluating whether equal weighting was appropriate. To evaluate potential multicollinearity among related indicators and to check whether a data-driven weighting scheme would substantially alter results, a principal component analysis (PCA) was conducted as a diagnostic step. The PCA indicated that variables related to poverty and chronic health conditions accounted for the largest share of variance within the sensitivity indicator set.

A PCA-weighted sensitivity index and the equal-weighted sensitivity index produced nearly identical spatial patterns and tract rankings. This similarity indicates that the equal-weighted approach adequately captures the dominant drivers of sensitivity while maintaining methodological clarity and transparency. Based on this diagnostic, the equal-weighted approach was retained for the final HVI.

In addition, component and composite HVI maps were visually reviewed to confirm that spatial patterns aligned with known heat exposure, urbanization, and socioeconomic conditions in Fresno County. This review helped verify that areas classified as having higher heat vulnerability corresponded to neighborhoods with higher urban heat severity, denser development, and greater concentrations of sensitive or lower-capacity populations, consistent with the intent of the HVI.

Draft results were also presented to the FCOG Working Group, where members of the public had the opportunity to provide feedback. These comments were addressed through discussion of how the HVI incorporates both regional and localized heat conditions, and through clarification that the broader Plan includes strategies intended to support both urban and rural areas even when data availability differs.

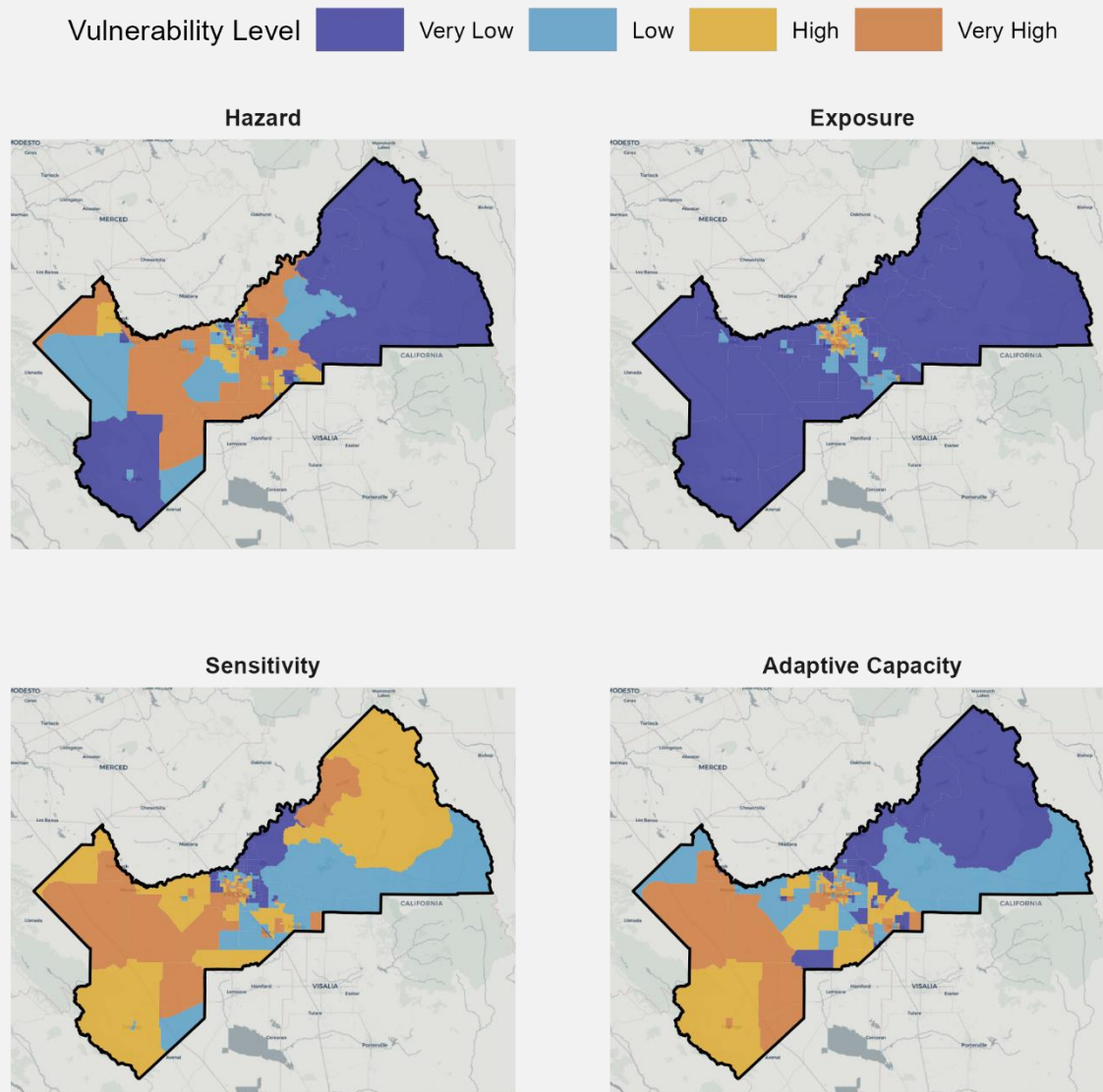
6 Results and Interpretation

The results show relative differences in heat vulnerability across Fresno County based on the combined influence of hazard, exposure, sensitivity, and adaptive capacity. Component maps illustrate how each dimension varies across the county, and the composite HVI summarizes these normalized component scores into a single relative measure. All maps classify census tracts into quartiles of countywide values. “Very Low” and “Low” represent the

lower half of the distribution, while “High” and “Very High” represent the upper half. These are relative categories intended to support comparison across the county.

Reviewing the component maps first helps clarify which underlying conditions contribute to each tract’s overall heat vulnerability. **Exhibit 1** shows quartile-based vulnerability categories for each of the four HVI components

Exhibit 1: Component Heat Vulnerability Scores by Census Tract



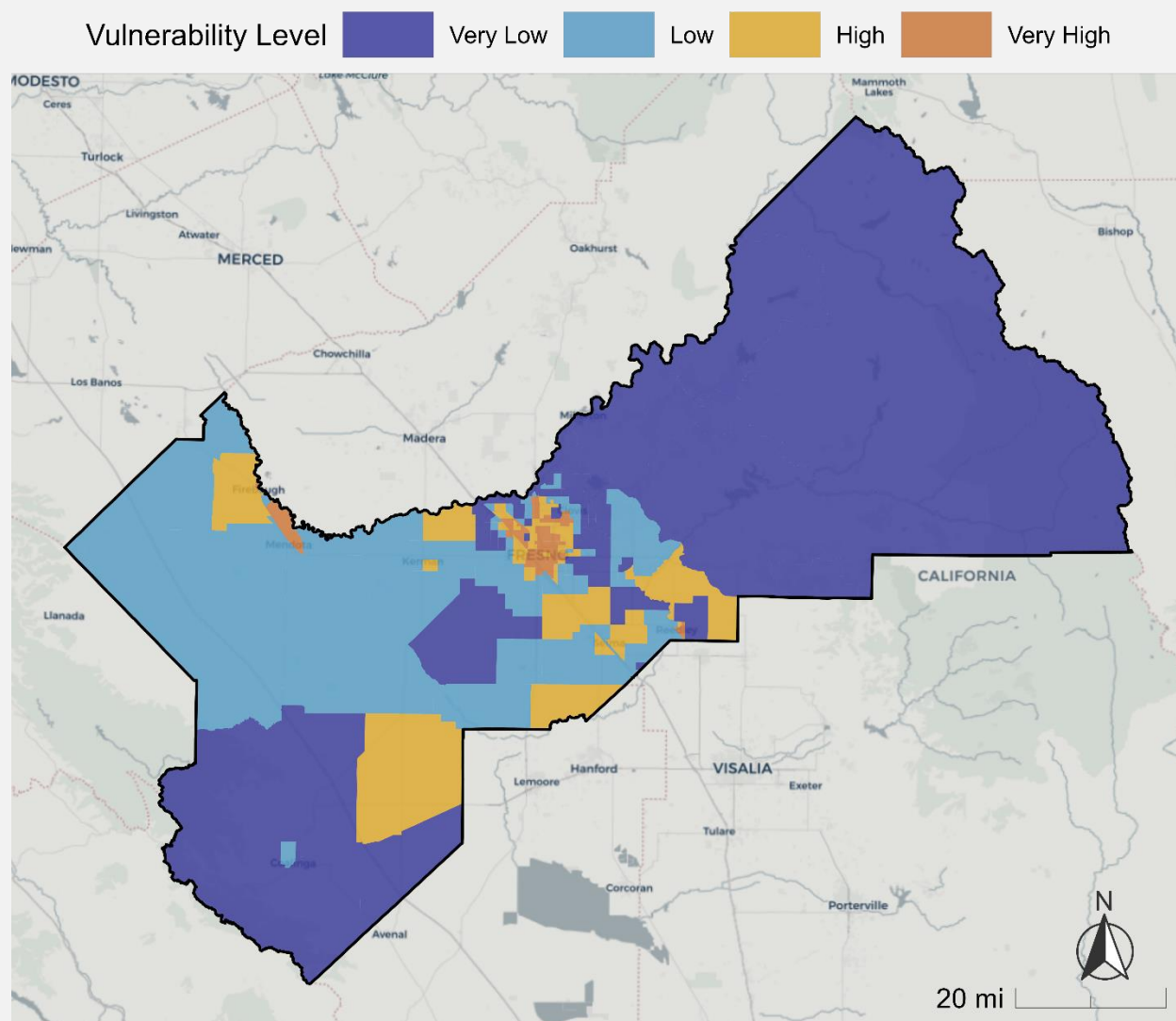
Source: Dudek 2025.

- **Hazard** scores reflect the intensity and frequency of extreme heat. Higher hazard categories appear in several parts of the county where regional extreme heat days and localized surface heat conditions overlap.

Some western agricultural tracts and portions of the Fresno urban area fall into the High or Very High hazard categories. Many eastern and northern tracts fall into the Very Low or Low hazard categories, reflecting lower relative exposure to localized surface heat conditions and less concentrated development compared to more urbanized areas.

- **Exposure** combines population density and impervious surface coverage. High and Very High exposure scores occur primarily in the Fresno–Clovis urban area, where more residents live in densely developed neighborhoods with large areas of heat-absorbing pavement and rooftops. Most rural tracts fall into the Very Low or Low exposure categories, reflecting lower population density and land use patterns characterized by agricultural and vegetated cover rather than heat-absorbing built surfaces.
- **Sensitivity** scores capture demographic, occupational, and health characteristics associated with greater susceptibility to heat. Higher sensitivity categories occur in both urban and non-urban areas, including several eastern and western tracts and parts of the southern urban area. These patterns reflect the distribution of indicators such as poverty, disability, chronic disease burden, and outdoor work.
- **Adaptive capacity** represents conditions that help people cope with extreme heat, including tree canopy, access to parks and cooling centers, household income, and vehicle access. For mapping purposes, adaptive capacity is shown in inverted form so that High and Very High categories indicate lower capacity and therefore higher vulnerability. Tracts in these categories tend to have comparatively low canopy cover, fewer cooling resources per capita, lower household income, or a higher percentage of households without a vehicle. Areas with Low or Very Low values have greater adaptive resources and therefore lower vulnerability.

Exhibit 2 presents the composite HVI, which combines the four components into a single relative score for each census tract. The map highlights where multiple dimensions of vulnerability overlap.

Exhibit 2: Composite Heat Vulnerability Index for Fresno County

Source: Dudek 2025.

The composite HVI scores combine the four component values after normalization, directional alignment, and averaging. This provides a single relative measure that reflects the aggregate influence of multiple heat-related conditions. Most rural tracts across eastern and northern Fresno County fall into the Very Low or Low composite categories, while higher composite scores appear primarily in and around the Fresno–Clovis urban area. These patterns reflect the interaction of higher population exposure, localized heat conditions, underlying sensitivity, and more limited adaptive capacity in urbanized areas. Smaller clusters of High and Very High composite scores also occur in portions of western and southern areas where elevated heat conditions or limited adaptive capacity coincide with vulnerable populations.

Composite scores ranged from 0.21 to 0.70 , reflecting relative differences in heat vulnerability across Fresno County. Tracts in the highest quartile represent census tracts with comparatively higher combined component scores once normalized and averaged. These tracts do not necessarily have the highest value in every individual component; instead, they reflect consistently higher values across multiple components relative to other tracts in the county.

The component and composite results provide a consistent, countywide view of relative heat vulnerability. These results establish a clear baseline for identifying locations where additional investigation, engagement, or site-level evaluation may be most valuable when planning shade, cooling, and heat adaptation investments.

7 Limitations and Future Improvements

The index is a relative, planning-scale tool and should be interpreted within the context of its data sources and scale of analysis. All tract-level results inherit the spatial granularity and sampling uncertainty of ACS and CDC PLACES datasets. Raster inputs used for urban heat and canopy vary in resolution and year. Although all layers were aligned to a consistent coordinate reference system, localized uncertainty remains, especially along tract boundaries or in areas with heterogeneous land cover.

Some conditions relevant to heat exposure and response are not consistently measured at the census-tract scale. These include air-conditioning availability, detailed housing thermal performance, and building conditions. These factors were represented using related variables such as income, vehicle access, tree canopy, and access to parks or cooling centers. These proxies are common in county-scale assessments but introduce limitations that should be considered when interpreting results.

Several indicators, such as impervious surfaces, tree canopy, and urban heat severity, are available only within mapped urbanized areas. Tracts without these indicators rely on the remaining inputs in each component. Their scores remain comparable across the county because all values were normalized, but interpretation should account for the smaller underlying set of indicators.

A PCA was conducted as part of method validation to examine correlations within the sensitivity indicators. Results showed that the equal-weighted approach captures the dominant structure of the sensitivity component without introducing additional complexity.

Future improvements could include incorporating locally collected survey data, field verification of localized cooling resources, integration of building cooling characteristics where available, and deeper coordination with transportation and emergency management datasets. The framework is designed to evolve alongside new data sources and planning needs.

8 Use in the Plan

The results of the HVI establish a consistent, countywide view of relative heat vulnerability that supports multiple elements of the Extreme Heat and Shade Adaptation Plan. By summarizing hazard conditions, population characteristics, and adaptive resources into a single, comparable metric, the index provides a clear basis for identifying where additional analysis, outreach, or site-level evaluation may be most useful.

Component results help clarify whether elevated vulnerability in a tract is driven more by exposure, sensitivity, limited adaptive capacity, or a combination of these factors. This supports more precise planning by helping align interventions with the specific conditions present in different parts of the county.

Within the Plan, the HVI results are used to identify priority corridors, focus community engagement, and guide shade and cooling strategies for people walking, biking, or using transit. The tract-level values are incorporated into the walking and biking analysis to understand where shade would most effectively reduce heat exposure along active transportation routes and transit stops. These values are combined with information on destination access, existing shade conditions, and community feedback to help identify locations where added cooling infrastructure could provide the greatest benefit.

Overall, the index provides a transparent and reproducible foundation for applying heat vulnerability information in transportation planning, climate adaptation work, funding applications, and coordination with local partners. It is intended to serve as a first-stage screening tool that directs attention to areas where additional planning detail and community-informed design can further refine local heat resilience actions.

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D

APPENDIX

Fresno COG Extreme Heat Project Location Analysis

8/25/25



Active Transportation Projects	Heat Vulnerability			Transit Connectivity			Activity Center			Existing Deficiency			Total Score
	H	M	L	H	M	L	H	M	L	H	M	L	
COALINGA													
Ped Crossing - Cambridge Ave @ Coalinga Middle School						1		2		3			6
Bike Facility - Cambridge Ave btwn N Monterey Ave and Sunset Ave Trail Segment 13						1			1		2		4
Bike Facility - Elm Ave						1			1			1	3
Bike Facility - School Rd						1			1			1	3
FIREBAUGH													
Bike Facility - Canal Crossing East of T St						1			1			1	3
Bike Fac. - Behmer Ave to Clyde Fannon Rd, west side of Clyde Fannon Rd to Borboa Ln						1			1		2		4
FOWLER													
Ped Crossing - Golden State Blvd/8th St at Vine St						1		2			2		5
Bike Facility - Golden State between Adams Ave and Merced St						1		2				1	4
HURON													
Ped Crossing - Across Lassen Ave (SR 269) at 11th St						1			1		2		4
Bike Facility - Huron Middle School to Porvenir Estates						1			1	3			5
KERMAN													
Ped Crossing - Across Madera Ave (SR 145) at A St (California Ave)						1		2			2		5
Bike Facility - California Ave from Madera Ave (SR 145) to east of Goldenrod Ave						1		2				1	4
Bike Facility - Whitesbridge Ave (SR 180) from city limit to N Howard Ave						1			1		2		4
KINGSBURG													
Sidewalk - South side of Sierra St (SR 201) west of Simpson St and north side of Sierra east of Simpson St						1		2			2		5
Bike Facility - Draper St from 10th Ave to Sierra St						1		2			2		5
Bike Facility - West side of Golden State Blvd from 1100 ft south of Stroud Ave to Sierra St						1		2			2		5
Bike Facility - West side of Golden State from Mountain View to 1040 ft south of Bethel						1			1		2		4
MENDOTA													
Ped Crossing - Across Derrick Ave (SR 33) at 4th St						1		2			2		5
Ped Crossing - Across Derrick Ave (SR 33) at 9th St						1		2			2		5
Ped Crossing - Across Derrick Ave (SR 33) at Lozano St						1		2			2		5
Bike Facility - West side of Derrick Ave between Bass Ave and Naples St						1			1			1	3
ORANGE COVE													
Sidewalk - Gap between 10th St and Center St						1			1		2		4
Bike Facility -Behind Citrus MS and Orange Cove HS from South Ave to Parlier Ave						1		2				1	4
Bike Facility - From Orange St to Anchor Ave, across field						1			1			1	3
PARLIER													
Sidewalk - South side of Manning Ave from Academy Ave to Madsen Ave						1			1		2		4
Bike Facility -Eastern trail from Whitner Ave to North of Madsen Ave						1			1			1	3
Bike Facility - Trail between Tuolumne St and E Manning Ave						1			1			1	3
SAN JOAQUIN													
Ped Crossing - Across Manning Ave at Sutter Ave						1			1		2		4
Ped Crossing - Across railroad tracks at 9th St						1			1	3			5
Ped Crossing - Across railroad tracks at Main St						1			1	3			5
Bike Facility - 9th St from Pine St to Nevada Ave						1			1		2		4
SANGER													
Ped Crossing - Railroad crossing at 7th St						1		2		3			6
Bike Facility - K St between 5th St and Annadale St						1		2				1	4
Bike Facility - Kings Canyon Rd (SR 180) between Indianola Ave and Quality Ave						1			1		2		4
FRESNO COUNTY													

Ped Crossing - Friant Rd at Bugg Ave						1		2				1	4
Sidewalk- Both sides of Church Ave east of East Ave and East Ave north of Church Ave						1			1			1	3
Sidewalk- Clemenceau Ave between Sandy Ave and West Ave						1			1			1	3
Sidewalk- Elm Ave from Fantz Ave to Morton Ave						1			1			1	3
Sidewalk- Mt Whitney Ave between Latonia St and Fowler Ave						1			1		2		4
Sidewalk- Bullard Ave from Briarwood Ave to Sequoia Ave, from Channing Way to Fruit Ave, and from west of Harrison Ave to Harrison Ave						1			1			1	3
Sidewalk- Belmont Ave from Winery Ave to east of Bush Ave						1			1		2		4
Sidewalk- Mt Whitney Ave between Chateau Fresno Ave and Garfield Ave						1			1		2		4
Sidewalk- Valentine Ave from Mt Whitney Ave to Kruger Ave						1			1			1	3
Sidewalk- Clovis Ave from Park Circle Dr to railroad tracks to south						1			1	3			5
Bike Facility -Path along Jensen Bypass from Cedar Ave to Orange Ave					2			2			2		6
Bike Facility - Behind Del Rey Elementary School from Melrona Ave to Jefferson Ave					1			2				1	4
Bike Facility - Palm Ave from Shaw Ave to Dakota Ave					2			2		3			7
Bike Facility - E Copper Ave between N Minnewawa Ave and N Sunnyside Ave					2			2			2		6
Bike Facility - Marjan Ave near Pico Ave					1			1				1	3
CLOVIS													
Bike Facility -Ashlan Ave from Fordham to DeWolf					2			2			2		6
Bike Facility - Minnewawa from Shepherd to Herndon					2			2			2		6
Bike Facility - Herndon Ave from Willow to Fowler					2			2		3			7
Bike Facility - DeWolf from Shepherd to Owens Mt Pkwy					2				1		2		5
FRESNO													
Bike Facility -E Copper Ave from Willow to Friant					2			2			2		6
Bike Facility - Willow Ave from Barstow to Copper					2			2			2		6
Bike Facility - Sheherd Ave from Willow to Friant					2			2			2		6
Bike Facility - N Maroa Ave from Herndon Trail to Dakota					2			2				1	5
Bike Facility - N Clovis Ave to Fancher #6 Canal to Central # 23 Canal from McKinley Ave and Church Ave to Clovis Ave					2			2		3			7
Bike Facility - G St to Tuolumne St to B St to Merced St to Martin Ave to Fresno St from Tulare St to California Ave					2		3			3			8
Transit Stops	Heat Vulnerability			Transit Connectivity			Activity Center			Existing Deficiency			Total Score
	H	M	L	H	M	L	H	M	L	H	M	L	
Manning Ave and Buttonwillow Ave						1			1		2		4
Davita Sanger Dialysis Center						1			1			1	3
Auto Dealership						1			1			1	3
Me N Ed's						1			1			1	3
Round Table Pizza						1			1			1	3
Sanger Hospital						1		2			2		5
Sanger City Hall						1		2			2		5
Sanger City Hall						1		2			2		5
McDonald's						1			1			1	3
Reedley College						1		2			2		5
Beauty Supply						1			1			1	3
Dr. Verma's						1			1			1	3
Selma Plaza shopping center/Papa Murphy's Pizza						1		2				1	4
Selma Plaza shopping center/WIC Bench						1		2				1	4
Brooks Ranch						1			1		2		4
BRAWLEY - SHIELDS					2			2			2		6
SHAW - WEST					2			2		3			7
SE SHAW - BLACKSTONE					2		3			3			8

SHAW - FIRST				2			2			2		6
SHAW - CEDAR				2			2			2		6
WILLOW - SHAW				2			2			2		6
SHAW - CEDAR				2			2			2		6
FRESNO YOSEMITE INTL - EB				2			2			2		6
FIRST/SHAW S/B				2			2			2		6
FIRST - SHIELDS				2			2			2		6
FIRST - SHIELDS				2			2			2		6
CEDAR - VENTURA				2			2			2		6
CEDAR - VENTURA				2			2			2		6
MARKS - SHAW				2			2			2		6
SW SHAW - HUGHES				2			2			2		6
SE SHAW - PALM				2			2			2		6
SE SHAW - GLENN				2			2			2		6
SE SHAW - FRESNO				2			2		3			7
NW SHAW - FRESNO				2			2			2		6
NW SHAW - PALM				2			2			2		6
SE SHAW - VALENTINE				2			2			2		6
SHAW - CEDAR				2			2			2		6
NW SHAW - MARKS				2			2			2		6
NE BRAWLEY - SHAW				2			2			2		6
A SHELTER				2			2			2		6
NW SHAW - BARTON				2			2			2		6
SE SHAW - FISHER				2			2			2		6
MAPLE STATION			3				2			2		7
FIRST ST STATION			3				2			2		7
1ST ST STATION			3				2			2		7
MAPLE STATION			3				2			2		7
SW SHAW - CHESTNUT			3				2			2		7
GETTYSBURG STATION			3				2			2		7
SE FRESNO - FULTON MALL			3			3				2		8
NE FRESNO - BROADWAY			3			3			3			9
M ST STATION			3			3			3			9
B SHELTER			3			3				2		8
NE CEDAR - OLIVE			3				2			2		7
SE BLACKSTONE - NEES			3				2			2		7
SE NEES - FRESNO			3				2			2		7
SW CEDAR - HERNDON			3				2			2		7
SW CEDAR - GETTYSBURG			3				2			2		7
NW CEDAR - ASHLAN			3				2			2		7
NW CEDAR - CLINTON			3				2			2		7
SW CEDAR - OLIVE			3				2			2		7
SW CEDAR - BELMONT			3				2			2		7
SW CEDAR - TULARE			3				2			2		7
SE NEES - FIRST			3				2			2		7
SW RIVERSIDE - EL PASEO			3				2			2		7
GETTYSBURG STATION			3				2			2		7
6TH ST STATION			3				2			2		7
SIXTH STREET STATION			3				2			2		7
NE PEACH - DAKOTA			3				2			2		7
SHAW - FIRST			3				2			2		7
NW SHAW - BLACKSTONE			3				2		3			8

BRAWLEY - WALMART				3				2			2		7
MANCHESTER TRANSIT CENTER				3			3			3			9
CEDAR STATION				3				2			2		7
MANCHESTER TRANSIT CENTER				3				2		3			8
FIRST - SHAW NB				3				2			2		7
HERNDON STATION				3				2			2		7
SHAW STATION				3				2			2		7
CEDAR - SHAW				3				2			2		7
DIVISADERO STATION				3				2			2		7
BELMONT STATION				3				2			2		7
OLIVE STATION				3				2			2		7
L SHELTER				3				2			2		7
CHESTNUT STATION				3				2			2		7
GRIFFITH STATION				3				2			2		7
ASHLAN STATION				3				2			2		7
SHAW STATION				3				2		3			8
BARSTOW STATION				3				2			2		7
SIERRA STATION				3				2			2		7
EL PASO STATION				3				2			2		7
SIERRA STATION				3				2			2		7
BARSTOW STATION				3				2			2		7
ASHLAN STATION				3				2			2		7
GRIFFITH STATION				3				2			2		7
WELDON STATION				3				2			2		7
BELMONT STATION				3				2			2		7
WILLOW STATION				3				2			2		7
NE BLACKSTONE - EL PASO				3				2			2		7
WOODWARD STATION				3				2			2		7
HERNDON STATION				3				2			2		7
BULLARD STATION				3				2			2		7
CLINTON STATION				3				2			2		7
OLIVE STATION				3				2			2		7
DIVISADERO STATION				3				2			2		7
FRESNO ST STATION				3				2			2		7
VAN NESS STATION				3				2		3			8
CHESTNUT STATION				3				2			2		7
PEACH STATION				3				2			2		7
CLOVIS STATION				3				2			2		7
PEACH STATION				3				2			2		7
FRESNO ST STATION				3				2			2		7
VAN NESS STATION				3				2		3			8
WILLOW STATION				3				2			2		7



E

APPENDIX

MEMORANDUM

TO: Rose Newberry, Dudek

FROM: Erik Ruehr, VRPA Technologies

DATE: February 5, 2026

RE: Fresno COG Extreme Heat Analysis
Project Location Methodology

This memorandum provides documentation of the methodology used to identify, locate, and rank projects for inclusion in the Fresno COG Extreme Heat Analysis conducted in 2025 and 2026.

The remainder of the memorandum includes information on the background, selection of candidate projects, analysis of active transportation projects, and analysis of transit.

BACKGROUND INFORMATION

The location analysis methodology described in this memorandum was part of an Extreme Heat Analysis and Shade Adaptation Plan conducted by Fresno COG. Dudek was the prime consultant for this analysis and VRPA Technologies (VRPA) was a subconsultant.

The purpose of the location analysis was to identify and rank active transportation projects (pedestrian and bicycle improvements) and transit stops as candidate locations for providing increased shade in order to reduce heat exposure for pedestrians, bicyclists, and transit riders.

SELECTION OF CANDIDATE PROJECTS

Candidate projects for implementation of shade features were selected from this plan in five regional subareas of Fresno County:

- ✓ Fresno – Clovis Metropolitan Area
- ✓ Incorporated Areas East of SR 99
- ✓ Unincorporated Areas East of SR 99
- ✓ Incorporated Areas West of SR 99
- ✓ Unincorporated Areas West of SR 99

Active transportation projects were selected from the Fresno COG Regional Active Transportation Plan (Fresno COG, 2018). Transit stops were selected from the Fresno Climate Resiliency Plan (Fresno COG, 2025).

The attachments include a summary exhibit that include all of the selected active transportation projects and transit projects along with rankings for each project. In addition, an exhibit was prepared that was specific to each of the geographic subareas described above.

ANALYSIS OF ACTIVE TRANSPORTATION PROJECTS

Active transportation projects were evaluated based on the following criteria. Each project was ranked either high, medium, or low with respect to each criterion. If a project was ranked high, it was assigned a point score of 3. Medium-ranked projects were assigned a score of 2, and low-ranked projects were assigned a score of 1. The scores for all criteria were summed to determine a total point score for each project.

- ✓ Heat Vulnerability: Each project was assigned a heat vulnerability score based on its location within Fresno County.
- ✓ Transit Connectivity: Active transportation projects were ranked based on their accessibility to transit. Projects near existing bus routes were scored higher than projects more distant from existing bus routes. In addition, projects were scored higher based on a higher frequency of buses along the routes that were nearby.
- ✓ Activity Centers: Projects were assigned a higher score if they were near activity centers such as schools, libraries, hospital and medical facilities and retail centers.
- ✓ Existing Deficiency: Active transportation projects that would resolve a clearly-identified existing deficiency scored higher. For example, a bicycle path or sidewalk that closed a gap between two existing facilities would score high in this category.

ANALYSIS OF TRANSIT STOPS

Transit stops were evaluated based on the same criteria and using the same methodology described above for active transportation process. However, the considerations for each criterion were slightly different, as described below.

- ✓ Heat Vulnerability: Each project was assigned a heat vulnerability score based on its location within Fresno County, the same as was described above for active transportation projects.
- ✓ Transit Connectivity: Transit stops were based on the number of bus routes and frequency of buses.



- ✓ Activity Centers: Projects were assigned a higher score if they were near activity centers such as schools, libraries, hospital and medical facilities and retail centers, the same as was described above for active transportation projects.
- ✓ Existing Deficiency: Transit stops were ranked higher in this category if there is currently few or no shaded areas for transit riders to wait for a bus.

Please contact me if you have any questions. I can be reached by email at eruehr@vrpatech.com or by phone at (858) 361-7151.



ATTACHMENTS

Location Analysis Summary
Fresno – Clovis Metropolitan Area
Incorporated Areas East of SR 99
Unincorporated Areas East of SR 99
Incorporated Areas West of SR 99
Unincorporated Areas West of SR 99



Fresno COG Extreme Heat Project Location Analysis

10/23/25

Active Transportation Projects	Location	Heat Vulnerability			Transit Connectivity			Activity Center			Existing Deficiency			Total Score	Public Comments
		H	M	L	H	M	L	H	M	L	H	M	L		
COALINGA															
Ped Crossing - Cambridge Ave @ Coalinga Middle School	West of SR 99 - Incorporated		2				1		2		3			8	
Bike Facility - Cambridge Ave btwn N Monterey Ave and Sunset Ave Trail Segment 13	West of SR 99 - Incorporated		2							1		2		6	
Bike Facility - Elm Ave	West of SR 99 - Incorporated			1			1			1			1	4	
Bike Facility - School Rd	West of SR 99 - Incorporated			1			1			1			1	4	
FIREBAUGH															
Bike Facility - Canal Crossing East of T St	West of SR 99 - Incorporated	3					1			1			1	6	
Bike Fac. - Behmer Ave to Clyde Fannon Rd, west side of Clyde Fannon Rd to Borboa Ln	West of SR 99 - Incorporated			1			1			1		2		5	
FOWLER															
Ped Crossing - Golden State Blvd/8th St at Vine St	East of SR 99 - Incorporated		2				1		2			2		7	Public support expressed for locations in Eastside cities
Bike Facility - Golden State between Adams Ave and Merced St	East of SR 99 - Incorporated		2				1		2				1	6	Public support expressed for locations in Eastside cities
HURON															
Ped Crossing - Across Lassen Ave (SR 269) at 11th St	West of SR 99 - Incorporated			1			1			1		2		5	
Bike Facility - Huron Middle School to Ponvenir Estates	West of SR 99 - Incorporated			1			1			1	3			6	
KERMAN															
Ped Crossing - Across Madera Ave (SR 145) at A St (California Ave)	West of SR 99 - Incorporated			1			1		2			2		6	
Bike Facility - California Ave from Madera Ave (SR 145) to east of Goldenrod Ave	West of SR 99 - Incorporated		2				1		2				1	6	
Bike Facility - Whitesbridge Ave (SR 180) from city limit to N Howard Ave	West of SR 99 - Unincorporated		2				1			1		2		6	
KINGSBURG															
Sidewalk - South side of Sierra St (SR 201) west of Simpson St and north side of Sierra east of Simpson St	East of SR 99 - Incorporated		2				1		2			2		7	Public support expressed for locations in Eastside cities
Bike Facility - Draper St from 10th Ave to Sierra St	East of SR 99 - Incorporated		2				1		2			2		7	Public support expressed for locations in Eastside cities
Bike Facility - West side of Golden State Blvd from 1100 ft south of Stroud Ave to Sierra St	East of SR 99 - Unincorporated		2				1		2			2		7	Public support expressed for locations in Eastside cities
Bike Facility - West side of Golden State from Mountain View to 1040 ft south of Bethel	East of SR 99 - Incorporated		2				1			1		2		6	Public support expressed for locations in Eastside cities
MENDOTA															
Ped Crossing - Across Derrick Ave (SR 33) at 4th St	West of SR 99 - Incorporated			1			1		2			2		6	
Ped Crossing - Across Derrick Ave (SR 33) at 9th St	West of SR 99 - Incorporated			1			1		2			2		6	
Ped Crossing - Across Derrick Ave (SR 33) at Lozano St	West of SR 99 - Incorporated			1			1		2			2		6	
Bike Facility - West side of Derrick Ave between Bass Ave and Naples St	West of SR 99 - Incorporated			1			1			1			1	4	
ORANGE COVE															
Sidewalk - Gap between 10th St and Center St	East of SR 99 - Incorporated		2				1			1		2		6	Public support expressed for locations in Orange Cove
Bike Facility -Behind Citrus MS and Orange Cove HS from South Ave to Parlier Ave	East of SR 99 - Incorporated		2				1		2				1	6	Public support expressed for locations in Orange Cove
Bike Facility - From Orange St to Anchor Ave, across field	East of SR 99 - Unincorporated		2				1			1			1	5	Public support expressed for locations in Orange Cove
PARLIER															
Sidewalk - South side of Manning Ave from Academy Ave to Madsen Ave	East of SR 99 - Incorporated		2				1			1		2		6	
Bike Facility -Eastern trail from Whitner Ave to North of Madsen Ave	East of SR 99 - Incorporated		2				1			1			1	5	
Bike Facility - Trail between Tuolumne St and E Manning Ave	East of SR 99 - Incorporated			1			1			1			1	4	
SAN JOAQUIN															
Ped Crossing - Across Manning Ave at Sutter Ave	West of SR 99 - Incorporated		2				1			1		2		6	
Ped Crossing - Across railroad tracks at 9th St	West of SR 99 - Incorporated		2				1			1	3			7	
Ped Crossing - Across railroad tracks at Main St	West of SR 99 - Incorporated		2				1			1	3			7	
Bike Facility - 9th St from Pine St to Nevada Ave	West of SR 99 - Incorporated		2				1			1		2		6	
SANGER															
Ped Crossing - Railroad crossing at 7th St	East of SR 99 - Incorporated			1			1		2		3			7	Public support expressed for locations in Eastside cities
Bike Facility - K St between 5th St and Annadale St	East of SR 99 - Incorporated			1			1		2				1	5	Public support expressed for locations in Eastside cities
Bike Facility - Kings Canyon Rd (SR 180) between Indianola Ave and Quality Ave	East of SR 99 - Unincorporated			1			1			1		2		5	Public support expressed for locations in Eastside cities
FRESNO COUNTY															
Ped Crossing - Friant Rd at Buggy Ave	East of SR 99 - Unincorporated			1			1		2				1	5	
Sidewalk- Both sides of Church Ave east of East Ave and East Ave north of Church Ave	East of SR 99 - Incorporated/Unincorporated	3					1			1			1	6	Public support expressed for locations in Southwest Fresno and along major corridors, including Church Ave
Sidewalk- Clemenceau Ave between Sandy Ave and West Ave	West of SR 99 - Unincorporated		2				1			1			1	5	
Sidewalk- Elm Ave from Fantz Ave to Morton Ave	West of SR 99 - Unincorporated		2				1			1			1	5	
Sidewalk- Mt Whitney Ave between Latonia St and Fowler Ave	West of SR 99 - Unincorporated		2				1			1		2		6	
Sidewalk- Bullard Ave from Briarwood Ave to Sequoia Ave, from Channing Way to Fruit Ave, and from west of Harrison Ave to Harrison Ave	East of SR 99 - Incorporated			1			1			1			1	4	
Sidewalk- Belmont Ave from Winery Ave to east of Bush Ave	East of SR 99 - Incorporated		2				1			1		2		6	
Sidewalk- Mt Whitney Ave between Chateau Fresno Ave and Garfield Ave	West of SR 99 - Unincorporated			1			1			1		2		5	
Sidewalk- Valentine Ave from Mt Whitney Ave to Kruger Ave	West of SR 99 - Unincorporated			1			1			1			1	4	
Sidewalk- Clovis Ave from Park Circle Dr to railroad tracks to south	East of SR 99 - Incorporated			1			1			1	3			6	Public support expressed for locations along Clovis Avenue and in Eastside cities
Bike Facility -Path along Jensen Bypass from Cedar Ave to Orange Ave	East of SR 99 - Incorporated/Unincorporated	3					2		2			2		9	
Bike Facility - Behind Del Rey Elementary School from Melrona Ave to Jefferson Ave	East of SR 99 - Unincorporated			1			1		2				1	5	
Bike Facility - Palm Ave from Shaw Ave to Dakota Ave	East of SR 99 - Incorporated		2				2			2		3		9	
Bike Facility - E Copper Ave between N Minnewawa Ave and N Sunnyside Ave	East of SR 99 - Unincorporated			1			2			2		2		7	
Bike Facility - Marjan Ave near Pico Ave	East of SR 99 - Unincorporated			1			1			1			1	4	
CLOVIS															
Bike Facility -Ashlan Ave from Fordham to DeWolf	Fresno/Clovis Urban Area			1			2			2		2		7	Public support expressed for major corridors, including Ashlan
Bike Facility - Minnewawa from Shepherd to Herndon	Fresno/Clovis Urban Area			1			2			2		2		7	Public support expressed for locations in Eastside cities
Bike Facility - Herndon Ave from Willow to Fowler	Fresno/Clovis Urban Area			1			2			2		3		8	Public support expressed for locations in Eastside cities
Bike Facility - DeWolf from Shepherd to Owens Mt Pkwy	Fresno/Clovis Urban Area			1			2			1		2		6	Public support expressed for locations in Eastside cities

FRESNO																	
Bike Facility -E Copper Ave from Willow to Friant	Fresno/Clovis Urban Area			1		2			2			2			7		
Bike Facility - Willow Ave from Barstow to Copper	Fresno/Clovis Urban Area	2				2			2			2			8		
Bike Facility - Shepherd Ave from Willow to Friant	Fresno/Clovis Urban Area	2				2			2			2			8		
Bike Facility - N Maroa Ave from Herndon Trail to Dakota	Fresno/Clovis Urban Area	2				2			2				1		7		
Bike Facility - N Clovis Ave to Fancher #6 Canal to Central # 23 Canal from McKinley Ave and Church Ave to Clovis Ave	Fresno/Clovis Urban Area	2				2			2			3			9		Public support expressed for locations in Southeast Fresno and along McKinley Ave and Church Ave
Bike Facility - G St to Tuolumne St to B St to Merced St to Martin Ave to Fresno St from Tulare St to California Ave	Fresno/Clovis Urban Area	3				2			3			3			11		Public support expressed for improving access to canal banks Public support expressed for locations in Eastside cities Public support expressed for locations in Downtown
Transit Stops	Location	Heat Vulnerability			Transit Connectivity			Activity Center			Existing Deficiency			Total Score	Public Comments		
		M	L	H	M	L	H	M	L	H	M	L					
Manning Ave and Buttonwillow Ave	East of SR 99 - Incorporated	2				1			1		2			6			Public support expressed for locations in Eastside cities
Davita Sanger Dialysis Center	East of SR 99 - Incorporated	2				1			1			1		5			Public support expressed for locations in Eastside cities
Auto Dealership	East of SR 99 - Incorporated		1			1			1			1		4			Public support expressed for locations in Eastside cities
Me N Ed's	East of SR 99 - Incorporated	2							1			1		5			Public support expressed for locations in Eastside cities
Round Table Pizza	East of SR 99 - Incorporated		1			1			1			1		4			Public support expressed for locations in Eastside cities
Sanger Hospital	East of SR 99 - Incorporated	2				1		2			2			7			Public support expressed for locations in Eastside cities
Sanger City Hall	East of SR 99 - Incorporated	2				1		2			2			7			Public support expressed for locations in Eastside cities
Sanger City Hall	East of SR 99 - Incorporated	2				1		2			2			7			Public support expressed for locations in Eastside cities
McDonald's	East of SR 99 - Incorporated	2				1			1			1		5			Public support expressed for locations in Eastside cities
Reedley College	East of SR 99 - Incorporated	2				1		2			2			7			Public support expressed for locations in Reedley
Beauty Supply	East of SR 99 - Incorporated	2				1			1			1		5			Public support expressed for locations in Eastside cities
Dr. Verma's	East of SR 99 - Incorporated	2				1						1		5			Public support expressed for locations in Eastside cities
Selma Plaza shopping center/Papa Murphy's Pizza	East of SR 99 - Incorporated	2				1		2				1		6			Public support expressed for locations in Eastside cities
Selma Plaza shopping center/WIC Bench	East of SR 99 - Incorporated	2				1		2				1		6			Public support expressed for locations in Eastside cities
Brooks Ranch	East of SR 99 - Incorporated	2				1			1		2			6			Public support expressed for locations in Eastside cities
BRAWLEY - SHIELDS	Fresno/Clovis Urban Area	2			2			2			2			8			Public support expressed for major corridors, including Shields
SHAW - WEST	Fresno/Clovis Urban Area		1		2			2		3				8			Public support for shade at bus stops along Shaw Avenue
SE SHAW - BLACKSTONE	Fresno/Clovis Urban Area		1		2		3			3				9			Public support for shade at bus stops along Shaw Avenue
SHAW - FIRST	Fresno/Clovis Urban Area	3			2			2			2			9			Public support for shade at bus stops along Shaw Avenue
SHAW - CEDAR	Fresno/Clovis Urban Area	3			2			2			2			9			Public support for shade at bus stops along Shaw Avenue
WILLOW - SHAW	Fresno/Clovis Urban Area	3			2			2			2			9			Public support for shade at bus stops along Shaw Avenue
SHAW - CEDAR	Fresno/Clovis Urban Area	3			2			2			2			9			Public support for shade at bus stops along Shaw Avenue
FRESNO YOSEMITE INTL - EB	Fresno/Clovis Urban Area		2		2			2			2			8			
FIRST/SHAW S/B	Fresno/Clovis Urban Area	3			2			2			2			9			Public support for shade at bus stops along Shaw Avenue
FIRST - SHIELDS	Fresno/Clovis Urban Area	3			2			2			2			9			Public support expressed for major corridors, including Shields
FIRST - SHIELDS	Fresno/Clovis Urban Area	3			2			2			2			9			Public support expressed for major corridors, including Shields
CEDAR - VENTURA	Fresno/Clovis Urban Area	3			2			2			2			9			
CEDAR - VENTURA	Fresno/Clovis Urban Area	3			2			2			2			9			
MARKS - SHAW	Fresno/Clovis Urban Area		1		2						2			7			Public support for shade at bus stops along Shaw Avenue
SW SHAW - HUGHES	Fresno/Clovis Urban Area	2			2			2			2			8			Public support for shade at bus stops along Shaw Avenue
SE SHAW - PALM	Fresno/Clovis Urban Area		1		2			2			2			7			Public support for shade at bus stops along Shaw Avenue
SE SHAW - GLENN	Fresno/Clovis Urban Area		2		2			2			2			8			Public support for shade at bus stops along Shaw Avenue
SE SHAW - FRESNO	Fresno/Clovis Urban Area	3			2			2		3				10			Public support for shade at bus stops along Shaw Avenue
NW SHAW - FRESNO	Fresno/Clovis Urban Area	3			2			2			2			9			Public support for shade at bus stops along Shaw Avenue
NW SHAW - PALM	Fresno/Clovis Urban Area		2		2			2			2			8			Public support for shade at bus stops along Shaw Avenue
SE SHAW - VALENTINE	Fresno/Clovis Urban Area	3			2			2			2			9			Public support for shade at bus stops along Shaw Avenue
SHAW - CEDAR	Fresno/Clovis Urban Area		2		2			2			2			8			Public support for shade at bus stops along Shaw Avenue
NW SHAW - MARKS	Fresno/Clovis Urban Area		2		2			2			2			8			Public support for shade at bus stops along Shaw Avenue
NE BRAWLEY - SHAW	Fresno/Clovis Urban Area		2		2			2			2			8			Public support for shade at bus stops along Shaw Avenue
A SHELTER	Fresno/Clovis Urban Area	3			2			2			2			9			
NW SHAW - BARTON	Fresno/Clovis Urban Area		2		2			2			2			8			Public support for shade at bus stops along Shaw Avenue
SE SHAW - FISHER	Fresno/Clovis Urban Area	3			2			2			2			9			Public support for shade at bus stops along Shaw Avenue
MAPLE BRT STATION NB	Fresno/Clovis Urban Area	3			3			2			2			10			
FIRST ST BRT STATION NB	Fresno/Clovis Urban Area	3			3			2			2			10			
FIRST ST BRT STATION SB	Fresno/Clovis Urban Area	3			3			2			2			10			
MAPLE BRT STATION SB	Fresno/Clovis Urban Area	3			3			2			2			10			
SW SHAW - CHESTNUT	Fresno/Clovis Urban Area	3			3			2			2			10			Public support for shade at bus stops along Shaw Avenue
GETTYSBURG BRT STATION SB	Fresno/Clovis Urban Area		2		3			2			2			9			
SE FRESNO - FULTON MALL	Fresno/Clovis Urban Area	3			3		3				2			11			
NE FRESNO - BROADWAY	Fresno/Clovis Urban Area	3			3			3			3			12			
M ST BRT STATION	Fresno/Clovis Urban Area	3			3			3			3			12			
B SHELTER	Fresno/Clovis Urban Area	3			3			3				2		11			
NE CEDAR - OLIVE	Fresno/Clovis Urban Area	3			3			2			2			10			Public support expressed for major corridors, including Olive
SE BLACKSTONE - NEES	Fresno/Clovis Urban Area	3			3			2			2			10			
SE NEES - FRESNO	Fresno/Clovis Urban Area		2		3			2			2			9			
SW CEDAR - HERNDON	Fresno/Clovis Urban Area		2		3			2			2			9			
SW CEDAR - GETTYSBURG	Fresno/Clovis Urban Area		2		3			2			2			9			
NW CEDAR - ASHLAN	Fresno/Clovis Urban Area		2		3			2			2			9			Public support expressed for major corridors, including Ashlan
NW CEDAR - CLINTON	Fresno/Clovis Urban Area	3			3			2			2			10			Public support expressed for major corridors, including Clinton
SW CEDAR - OLIVE	Fresno/Clovis Urban Area	3			3			2			2			10			Public support expressed for major corridors, including Olive
SW CEDAR - BELMONT	Fresno/Clovis Urban Area	3			3			2			2			10			
SW CEDAR - TULARE	Fresno/Clovis Urban Area		2		3			2			2			9			
SE NEES - FIRST	Fresno/Clovis Urban Area		2		3			2			2			9			

SW RIVERSIDE - EL PASEO	Fresno/Clovis Urban Area		2		3				2			2		9	
GETTYSBURG BRT STATION NB	Fresno/Clovis Urban Area		2		3				2			2		9	
SIXTH STREET BRT STATION EB	Fresno/Clovis Urban Area			1	3				2			2		8	
SIXTH STREET BRT STATION WB	Fresno/Clovis Urban Area		2		3				2			2		9	
NE PEACH - DAKOTA	Fresno/Clovis Urban Area		2		3				2			2		9	Public support expressed for major corridors, including Dakota Ave and Peach Ave
SHAW - FIRST	Fresno/Clovis Urban Area	3			3				2			2		10	Public support for shade at bus stops along Shaw Avenue
NW SHAW - BLACKSTONE	Fresno/Clovis Urban Area	3			3				2		3			11	Public support for shade at bus stops along Shaw Avenue
BRAWLEY - WALMART	Fresno/Clovis Urban Area		2		3				2			2		9	
MANCHESTER TRANSIT CENTER NB	Fresno/Clovis Urban Area	3			3		3				3			15	
CEDAR BRT STATION EB	Fresno/Clovis Urban Area	3			3				2			2		10	
MANCHESTER TRANSIT CENTER SB	Fresno/Clovis Urban Area	3			3				2		3			11	
FIRST - SHAW NB	Fresno/Clovis Urban Area	3			3				2			2		10	Public support for shade at bus stops along Shaw Avenue
HERNDON BRT STATION SB	Fresno/Clovis Urban Area	3			3				2			2		10	
SHAW BRT STATION SB	Fresno/Clovis Urban Area	3			3				2			2		10	Public support for shade at bus stops along Shaw Avenue
CEDAR - SHAW	Fresno/Clovis Urban Area		2		3				2			2		9	Public support for shade at bus stops along Shaw Avenue
DIVISADERO BRT STATION NB	Fresno/Clovis Urban Area	3			3				2			2		10	
BELMONT BRT STATION NB	Fresno/Clovis Urban Area	3			3				2			2		10	
OLIVE BRT STATION NB	Fresno/Clovis Urban Area	3			3				2			2		10	Public support expressed for major corridors, including Olive
L SHELTER	Fresno/Clovis Urban Area	3			3				2			2		10	
CHESTNUT BRT STATION EB	Fresno/Clovis Urban Area	3			3				2			2		10	
GRIFFITH BRT STATION NB	Fresno/Clovis Urban Area		2		3				2			2		9	
ASHLAN BRT STATION NB	Fresno/Clovis Urban Area		2		3				2			2		9	Public support expressed for major corridors, including Ashlan
SHAW BRT STATION NB	Fresno/Clovis Urban Area	3			3				2		3			11	Public support for shade at bus stops along Shaw Avenue
BARSTOW BRT STATION NB	Fresno/Clovis Urban Area	3			3				2			2		10	
SIERRA BRT STATION NB	Fresno/Clovis Urban Area	3			3				2			2		10	
EL PASO BRT STATION NB	Fresno/Clovis Urban Area	3			3				2			2		10	
SIERRA BRT STATION NB	Fresno/Clovis Urban Area	3			3				2			2		10	
BARSTOW BRT STATION SB	Fresno/Clovis Urban Area	3			3				2			2		10	
ASHLAN BRT STATION SB	Fresno/Clovis Urban Area		2		3				2			2		9	Public support expressed for major corridors, including Ashlan
GRIFFITH BRT STATION SB	Fresno/Clovis Urban Area		2		3				2			2		9	
WELDON BRT STATION SB	Fresno/Clovis Urban Area	3			3				2			2		10	Public expressed support for shade near Fresno City College
BELMONT BRT STATION SB	Fresno/Clovis Urban Area	3			3				2			2		10	
WILLOW BRT STATION EB	Fresno/Clovis Urban Area	3			3				2			2		10	
NE BLACKSTONE - EL PASO	Fresno/Clovis Urban Area	3			3				2			2		10	
WOODWARD BRT STATION	Fresno/Clovis Urban Area			1	3				2			2		8	
HERNDON BRT STATION NB	Fresno/Clovis Urban Area	3			3				2			2		10	
BULLARD BRT STATION NB	Fresno/Clovis Urban Area	3			3				2			2		10	
CLINTON BRT STATION NB	Fresno/Clovis Urban Area	3			3				2			2		10	Public support expressed for major corridors, including Clinton
OLIVE BRT STATION SB	Fresno/Clovis Urban Area	3			3				2			2		10	Public support expressed for major corridors, including Olive
DIVISADERO BRT STATION SB	Fresno/Clovis Urban Area	3			3				2			2		10	
FRESNO ST BRT STATION NB	Fresno/Clovis Urban Area	3			3				2			2		10	
VAN NESS BRT STATION EB	Fresno/Clovis Urban Area	3			3				2		3			11	
CHESTNUT BRT STATION EB	Fresno/Clovis Urban Area	3			3				2			2		10	
PEACH BRT STATION EB	Fresno/Clovis Urban Area	3			3				2			2		10	Public support expressed for major corridors, including Peach Ave
CLOVIS BRT STATION EB	Fresno/Clovis Urban Area		2		3				2			2		9	
PEACH BRT STATION WB	Fresno/Clovis Urban Area		2		3				2			2		9	
FRESNO ST BRT STATION SB	Fresno/Clovis Urban Area	3			3				2			2		10	
VAN NESS BRT STATION WB	Fresno/Clovis Urban Area	3			3				2		3			11	
WILLOW BRT STATION WB	Fresno/Clovis Urban Area	3			3				2			2		10	

Fresno COG Extreme Heat Project Location Analysis - Fresno Clovis Urban Area

10/23/25

Active Transportation Projects		Location	Heat Vulnerability			Transit Connectivity			Activity Center			Existing Deficiency			Total Score	Public Comments
			H	M	L	H	M	L	H	M	L	H	M	L		
CLOVIS																
Bike Facility - Herndon Ave from Willow to Fowler	Fresno/Clovis Urban Area				1		2			2		3			8	Public support expressed for locations in Eastside cities
Bike Facility - Ashlan Ave from Fordham to DeWolf	Fresno/Clovis Urban Area				1		2			2			2		7	Public support expressed for major corridors, including Ashlan
Bike Facility - Minnewawa from Shepherd to Herndon	Fresno/Clovis Urban Area				1		2			2			2		7	Public support expressed for locations in Eastside cities
Bike Facility - DeWolf from Shepherd to Owens Mt Pkwy	Fresno/Clovis Urban Area				1		2				1		2		6	Public support expressed for locations in Eastside cities
FRESNO																
Bike Facility - G St to Tuolumne St to B St to Merced St to Martin Ave to Fresno St from Tulare St to California Ave	Fresno/Clovis Urban Area		3				2		3			3			11	Public support expressed for locations in Downtown
Bike Facility - N Clovis Ave to Fancher #6 Canal to Central # 23 Canal from McKinley Ave and Church Ave to Clovis Ave	Fresno/Clovis Urban Area			2			2			2		3			9	Public support expressed for locations in Southeast Fresno and along McKinley Ave and Church Ave Public support expressed for improving access to canal banks Public support expressed for locations in Eastside cities
Bike Facility - Willow Ave from Barstow to Copper	Fresno/Clovis Urban Area			2			2			2			2		8	
Bike Facility - Shepherd Ave from Willow to Friant	Fresno/Clovis Urban Area			2			2			2			2		8	
Bike Facility -E Copper Ave from Willow to Friant	Fresno/Clovis Urban Area				1		2			2			2		7	
Bike Facility - N Maroa Ave from Herndon Trail to Dakota	Fresno/Clovis Urban Area			2			2			2				1	7	
Transit Stops		Location	Heat Vulnerability			Transit Connectivity			Activity Center			Existing Deficiency			Total Score	Public Comments
				M	L	H	M	L	H	M	L	H	M	L		
MANCHESTER TRANSIT CENTER NB		Fresno/Clovis Urban Area	3			3			3			3			15	
NE FRESNO - BROADWAY		Fresno/Clovis Urban Area	3			3			3			3			12	
M ST BRT STATION		Fresno/Clovis Urban Area	3			3			3			3			12	
SE FRESNO - FULTON MALL		Fresno/Clovis Urban Area	3			3			3				2		11	
B SHELTER		Fresno/Clovis Urban Area	3			3			3				2		11	
NW SHAW - BLACKSTONE		Fresno/Clovis Urban Area	3			3				2		3			11	Public support for shade at bus stops along Shaw Avenue
MANCHESTER TRANSIT CENTER SB		Fresno/Clovis Urban Area	3			3				2		3			11	
SHAW BRT STATION NB		Fresno/Clovis Urban Area	3			3				2		3			11	Public support for shade at bus stops along Shaw Avenue
VAN NESS BRT STATION EB		Fresno/Clovis Urban Area	3			3				2		3			11	
VAN NESS BRT STATION WB		Fresno/Clovis Urban Area	3			3				2		3			11	
SE SHAW - FRESNO		Fresno/Clovis Urban Area	3				2			2		3			10	Public support for shade at bus stops along Shaw Avenue
MAPLE BRT STATION NB		Fresno/Clovis Urban Area	3			3				2			2		10	
FIRST ST BRT STATION NB		Fresno/Clovis Urban Area	3			3				2			2		10	
FIRST ST BRT STATION SB		Fresno/Clovis Urban Area	3			3				2			2		10	
MAPLE BRT STATION SB		Fresno/Clovis Urban Area	3			3				2			2		10	
SW SHAW - CHESTNUT		Fresno/Clovis Urban Area	3			3				2			2		10	Public support for shade at bus stops along Shaw Avenue
NE CEDAR - OLIVE		Fresno/Clovis Urban Area	3			3				2			2		10	Public support expressed for major corridors, including Olive
SE BLACKSTONE - NEES		Fresno/Clovis Urban Area	3			3				2			2		10	
NW CEDAR - CLINTON		Fresno/Clovis Urban Area	3			3				2			2		10	Public support expressed for major corridors, including Clinton
SW CEDAR - OLIVE		Fresno/Clovis Urban Area	3			3				2			2		10	Public support expressed for major corridors, including Olive
SW CEDAR - BELMONT		Fresno/Clovis Urban Area	3			3				2			2		10	
SHAW - FIRST		Fresno/Clovis Urban Area	3			3				2			2		10	Public support for shade at bus stops along Shaw Avenue
CEDAR BRT STATION EB		Fresno/Clovis Urban Area	3			3				2			2		10	
FIRST - SHAW NB		Fresno/Clovis Urban Area	3			3				2			2		10	Public support for shade at bus stops along Shaw Avenue
HERNDON BRT STATION SB		Fresno/Clovis Urban Area	3			3				2			2		10	
SHAW BRT STATION SB		Fresno/Clovis Urban Area	3			3				2			2		10	Public support for shade at bus stops along Shaw Avenue
DIVISADERO BRT STATION NB		Fresno/Clovis Urban Area	3			3				2			2		10	
BELMONT BRT STATION NB		Fresno/Clovis Urban Area	3			3				2			2		10	
OLIVE BRT STATION NB		Fresno/Clovis Urban Area	3			3				2			2		10	Public support expressed for major corridors, including Olive
L SHELTER		Fresno/Clovis Urban Area	3			3				2			2		10	
CHESTNUT BRT STATION EB		Fresno/Clovis Urban Area	3			3				2			2		10	
BARSTOW BRT STATION NB		Fresno/Clovis Urban Area	3			3				2			2		10	

SIERRA BRT STATION NB	Fresno/Clovis Urban Area	3			3				2			2		10	
EL PASO BRT STATION NB	Fresno/Clovis Urban Area	3			3				2			2		10	
SIERRA BRT STATION NB	Fresno/Clovis Urban Area	3			3				2			2		10	
BARSTOW BRT STATION SB	Fresno/Clovis Urban Area	3			3				2			2		10	
WELDON BRT STATION SB	Fresno/Clovis Urban Area	3			3				2			2		10	Public expressed support for shade near Fresno City College
BELMONT BRT STATION SB	Fresno/Clovis Urban Area	3			3				2			2		10	
WILLOW BRT STATION EB	Fresno/Clovis Urban Area	3			3				2			2		10	
NE BLACKSTONE - EL PASO	Fresno/Clovis Urban Area	3			3				2			2		10	
HERNDON BRT STATION NB	Fresno/Clovis Urban Area	3			3				2			2		10	
BULLARD BRT STATION NB	Fresno/Clovis Urban Area	3			3				2			2		10	
CLINTON BRT STATION NB	Fresno/Clovis Urban Area	3			3				2			2		10	Public support expressed for major corridors, including Clinton
OLIVE BRT STATION SB	Fresno/Clovis Urban Area	3			3				2			2		10	Public support expressed for major corridors, including Olive
DIVISADERO BRT STATION SB	Fresno/Clovis Urban Area	3			3				2			2		10	
FRESNO ST BRT STATION NB	Fresno/Clovis Urban Area	3			3				2			2		10	
CHESTNUT BRT STATION EB	Fresno/Clovis Urban Area	3			3				2			2		10	
PEACH BRT STATION EB	Fresno/Clovis Urban Area	3			3				2			2		10	Public support expressed for major corridors, including Peach Ave
FRESNO ST BRT STATION SB	Fresno/Clovis Urban Area	3			3				2			2		10	
WILLOW BRT STATION WB	Fresno/Clovis Urban Area	3			3				2			2		10	
SE SHAW - BLACKSTONE	Fresno/Clovis Urban Area			1		2		3			3			9	Public support for shade at bus stops along Shaw Avenue
SHAW - FIRST	Fresno/Clovis Urban Area	3			2				2			2		9	Public support for shade at bus stops along Shaw Avenue
SHAW - CEDAR	Fresno/Clovis Urban Area	3			2				2			2		9	Public support for shade at bus stops along Shaw Avenue
WILLOW - SHAW	Fresno/Clovis Urban Area	3			2				2			2		9	Public support for shade at bus stops along Shaw Avenue
SHAW - CEDAR	Fresno/Clovis Urban Area	3			2				2			2		9	Public support for shade at bus stops along Shaw Avenue
FIRST/SHAW S/B	Fresno/Clovis Urban Area	3			2				2			2		9	Public support for shade at bus stops along Shaw Avenue
FIRST - SHIELDS	Fresno/Clovis Urban Area	3			2				2			2		9	Public support expressed for major corridors, including Shields
FIRST - SHIELDS	Fresno/Clovis Urban Area	3			2				2			2		9	Public support expressed for major corridors, including Shields
CEDAR - VENTURA	Fresno/Clovis Urban Area	3			2				2			2		9	
CEDAR - VENTURA	Fresno/Clovis Urban Area	3			2				2			2		9	
NW SHAW - FRESNO	Fresno/Clovis Urban Area	3			2				2			2		9	Public support for shade at bus stops along Shaw Avenue
SE SHAW - VALENTINE	Fresno/Clovis Urban Area	3			2				2			2		9	Public support for shade at bus stops along Shaw Avenue
A SHELTER	Fresno/Clovis Urban Area	3			2				2			2		9	
SE SHAW - FISHER	Fresno/Clovis Urban Area	3			2				2			2		9	Public support for shade at bus stops along Shaw Avenue
GETTYSBURG BRT STATION SB	Fresno/Clovis Urban Area		2		3				2			2		9	
SE NEES - FRESNO	Fresno/Clovis Urban Area		2		3				2			2		9	
SW CEDAR - HERNDON	Fresno/Clovis Urban Area		2		3				2			2		9	
SW CEDAR - GETTYSBURG	Fresno/Clovis Urban Area		2		3				2			2		9	
NW CEDAR - ASHLAN	Fresno/Clovis Urban Area		2		3				2			2		9	Public support expressed for major corridors, including Ashlan
SW CEDAR - TULARE	Fresno/Clovis Urban Area		2		3				2			2		9	
SE NEES - FIRST	Fresno/Clovis Urban Area		2		3				2			2		9	
SW RIVERSIDE - EL PASEO	Fresno/Clovis Urban Area		2		3				2			2		9	
GETTYSBURG BRT STATION NB	Fresno/Clovis Urban Area		2		3				2			2		9	
SIXTH STREET BRT STATION WB	Fresno/Clovis Urban Area		2		3				2			2		9	
NE PEACH - DAKOTA	Fresno/Clovis Urban Area		2		3				2			2		9	Public support expressed for major corridors, including Dakota Ave and Peach Ave
BRAWLEY - WALMART	Fresno/Clovis Urban Area		2		3				2			2		9	
CEDAR - SHAW	Fresno/Clovis Urban Area		2		3				2			2		9	Public support for shade at bus stops along Shaw Avenue
GRIFFITH BRT STATION NB	Fresno/Clovis Urban Area		2		3				2			2		9	
ASHLAN BRT STATION NB	Fresno/Clovis Urban Area		2		3				2			2		9	Public support expressed for major corridors, including Ashlan
ASHLAN BRT STATION SB	Fresno/Clovis Urban Area		2		3				2			2		9	Public support expressed for major corridors, including Ashlan
GRIFFITH BRT STATION SB	Fresno/Clovis Urban Area		2		3				2			2		9	
CLOVIS BRT STATION EB	Fresno/Clovis Urban Area		2		3				2			2		9	
PEACH BRT STATION WB	Fresno/Clovis Urban Area		2		3				2			2		9	
BRAWLEY - SHIELDS	Fresno/Clovis Urban Area		2			2			2			2		8	Public support expressed for major corridors, including Shields
SHAW - WEST	Fresno/Clovis Urban Area			1		2			2		3			8	Public support for shade at bus stops along Shaw Avenue
FRESNO YOSEMITE INTL - EB	Fresno/Clovis Urban Area		2			2			2			2		8	
SW SHAW - HUGHES	Fresno/Clovis Urban Area		2			2			2			2		8	Public support for shade at bus stops along Shaw Avenue
SE SHAW - GLENN	Fresno/Clovis Urban Area		2			2			2			2		8	Public support for shade at bus stops along Shaw Avenue
NW SHAW - PALM	Fresno/Clovis Urban Area		2			2			2			2		8	Public support for shade at bus stops along Shaw Avenue
SHAW - CEDAR	Fresno/Clovis Urban Area		2			2			2			2		8	Public support for shade at bus stops along Shaw Avenue
NW SHAW - MARKS	Fresno/Clovis Urban Area		2			2			2			2		8	Public support for shade at bus stops along Shaw Avenue
NE BRAWLEY - SHAW	Fresno/Clovis Urban Area		2			2			2			2		8	Public support for shade at bus stops along Shaw Avenue
NW SHAW - BARTON	Fresno/Clovis Urban Area		2			2			2			2		8	Public support for shade at bus stops along Shaw Avenue
SIXTH STREET BRT STATION EB	Fresno/Clovis Urban Area			1	3				2			2		8	
WOODWARD BRT STATION	Fresno/Clovis Urban Area			1	3				2			2		8	
MARKS - SHAW	Fresno/Clovis Urban Area				1	2			2			2		7	Public support for shade at bus stops along Shaw Avenue
SE SHAW - PALM	Fresno/Clovis Urban Area				1	2			2			2		7	Public support for shade at bus stops along Shaw Avenue

**Fresno COG Extreme Heat
Project Location Analysis - East of SR 99 Incorporated**

10/23/25

Active Transportation Projects	Location	Heat Vulnerability			Transit Connectivity			Activity Center			Existing Deficiency			Total Score	Public Comments
		H	M	L	H	M	L	H	M	L	H	M	L		
FOWLER															
Ped Crossing - Golden State Blvd/8th St at Vine St	East of SR 99 - Incorporated	2					1		2			2		7	Public support expressed for locations in Eastside cities
Bike Facility - Golden State between Adams Ave and Merced St	East of SR 99 - Incorporated	2					1		2				1	6	Public support expressed for locations in Eastside cities
KINGSBURG															
Sidewalk - South side of Sierra St (SR 201) west of Simpson St and north side of Sierra east of Simpson St	East of SR 99 - Incorporated	2					1		2			2		7	Public support expressed for locations in Eastside cities
Bike Facility - Draper St from 10th Ave to Sierra St	East of SR 99 - Incorporated	2					1		2			2		7	Public support expressed for locations in Eastside cities
Bike Facility - West side of Golden State from Mountain View to 1040 ft south of Bethel	East of SR 99 - Incorporated	2					1			1		2		6	Public support expressed for locations in Eastside cities
ORANGE COVE															
Sidewalk - Gap between 10th St and Center St	East of SR 99 - Incorporated	2					1			1		2		6	Public support expressed for locations in Orange Cove
Bike Facility -Behind Citrus MS and Orange Cove HS from South Ave to Parlier Ave	East of SR 99 - Incorporated	2					1		2				1	6	Public support expressed for locations in Orange Cove
PARLIER															
Sidewalk - South side of Manning Ave from Academy Ave to Madsen Ave	East of SR 99 - Incorporated	2					1			1		2		6	
Bike Facility -Eastern trail from Whitner Ave to North of Madsen Ave	East of SR 99 - Incorporated	2					1			1			1	5	
Bike Facility - Trail between Tuolumne St and E Manning Ave	East of SR 99 - Incorporated			1			1			1			1	4	
SANGER															
Ped Crossing - Railroad crossing at 7th St	East of SR 99 - Incorporated			1			1		2		3			7	Public support expressed for locations in Eastside cities
Bike Facility - K St between 5th St and Annadale St	East of SR 99 - Incorporated			1			1		2				1	5	Public support expressed for locations in Eastside cities
FRESNO COUNTY															
Bike Facility -Path along Jensen Bypass from Cedar Ave to Orange Ave	East of SR 99 - Incorporated/Unincorporated	3					2		2			2		9	
Bike Facility - Palm Ave from Shaw Ave to Dakota Ave	East of SR 99 - Incorporated		2				2			2		3		9	
Sidewalk- Both sides of Church Ave east of East Ave and East Ave north of Church Ave	East of SR 99 - Incorporated/Unincorporated	3					1			1			1	6	Public support expressed for locations in Eastside cities
Sidewalk- Belmont Ave from Winery Ave to east of Bush Ave	East of SR 99 - Incorporated		2				1			1		2		6	
Sidewalk- Clovis Ave from Park Circle Dr to railroad tracks to south	East of SR 99 - Incorporated			1			1			1	3			6	Public support expressed for locations in Eastside cities
Sidewalk- Bullard Ave from Briarwood Ave to Sequoia Ave, from Channing Way to Fruit Ave, and from west of Harrison Ave to Harrison Ave	East of SR 99 - Incorporated			1			1			1			1	4	
Transit Stops	Location	Heat Vulnerability			Transit Connectivity			Activity Center			Existing Deficiency			Total Score	Public Comments
			M	L	H	M	L	H	M	L	H	M	L		
Sanger Hospital	East of SR 99 - Incorporated		2				1		2			2		7	Public support expressed for locations in Eastside cities
Sanger City Hall	East of SR 99 - Incorporated		2				1		2			2		7	Public support expressed for locations in Eastside cities
Sanger City Hall	East of SR 99 - Incorporated					1			2			2		7	Public support expressed for locations in Eastside cities
Reedley College	East of SR 99 - Incorporated					1			2			2		7	Public support expressed for locations in Reedley
Manning Ave and Buttonwillow Ave	East of SR 99 - Incorporated		2			1				1		2		6	Public support expressed for locations in Eastside cities
Selma Plaza shopping center/Papa Murphy's Pizza	East of SR 99 - Incorporated		2				1		2				1	6	Public support expressed for locations in Eastside cities
Selma Plaza shopping center/WIC Bench	East of SR 99 - Incorporated		2				1		2				1	6	Public support expressed for locations in Eastside cities
Brooks Ranch	East of SR 99 - Incorporated		2				1			1		2		6	Public support expressed for locations in Eastside cities
Davita Sanger Dialysis Center	East of SR 99 - Incorporated		2				1			1			1	5	Public support expressed for locations in Eastside cities
Me N Ed's	East of SR 99 - Incorporated		2				1			1			1	5	Public support expressed for locations in Eastside cities
McDonald's	East of SR 99 - Incorporated		2				1			1			1	5	Public support expressed for locations in Eastside cities
Beauty Supply	East of SR 99 - Incorporated		2				1			1			1	5	Public support expressed for locations in Eastside cities
Dr. Verma's	East of SR 99 - Incorporated		2				1			1			1	5	Public support expressed for locations in Eastside cities
Auto Dealership	East of SR 99 - Incorporated			1			1			1			1	4	Public support expressed for locations in Eastside cities
Round Table Pizza	East of SR 99 - Incorporated			1			1			1			1	4	Public support expressed for locations in Eastside cities

**Fresno COG Extreme Heat
Project Location Analysis - East of SR 99 Unincorporated**

10/23/25

Active Transportation Projects	Location		Heat Vulnerability			Transit Connectivity			Activity Center			Existing Deficiency			Total Score	Public Comments
			H	M	L	H	M	L	H	M	L	H	M	L		
KINGSBURG																
Bike Facility - West side of Golden State Blvd from 1100 ft south of Stroud Ave to Sierra St	East of SR 99 - Unincorporated		2				1		2			2		7	Public support expressed for locations in Eastside cities	
ORANGE COVE																
Bike Facility - From Orange St to Anchor Ave, across field	East of SR 99 - Unincorporated		2				1			1			1	5	Public support expressed for locations in Orange Cove	
SANGER																
Bike Facility - Kings Canyon Rd (SR 180) between Indianola Ave and Quality Ave	East of SR 99 - Unincorporated			1			1			1		2		5	Public support expressed for locations in Eastside cities	
FRESNO COUNTY																
Bike Facility -Path along Jensen Bypass from Cedar Ave to Orange Ave	East of SR 99 - Incorporated/Unincorporated		3				2		2			2		9		
Bike Facility - E Copper Ave between N Minnewawa Ave and N Sunnyside Ave	East of SR 99 - Unincorporated				1		2			2		2		7		
Sidewalk- Both sides of Church Ave east of East Ave and East Ave north of Church Ave	East of SR 99 - Incorporated/Unincorporated		3				1			1			1	6	Public support expressed for locations in Southwest Fresno and along major corridors, including Church Ave	
Bike Facility - Behind Del Rey Elementary School from Melrona Ave to Jefferson Ave	East of SR 99 - Unincorporated			1			1		2				1	5		
Ped Crossing - Friant Rd at Bugg Ave	East of SR 99 - Unincorporated			1			1		2				1	5		
Bike Facility - Marjan Ave near Pico Ave	East of SR 99 - Unincorporated				1			1			1			4		
Transit Stops	Location		Heat Vulnerability			Transit Connectivity			Activity Center			Existing Deficiency			Total Score	Public Comments
			H	M	L	H	M	L	H	M	L	H	M	L		
N/A																

Fresno COG Extreme Heat Project Location Analysis - West of SR 99 Incorporated

10/23/25

Active Transportation Projects		Location		Heat Vulnerability			Transit Connectivity			Activity Center			Existing Deficiency			Total Score
				H	M	L	H	M	L	H	M	L	H	M	L	
COALINGA																
Ped Crossing - Cambridge Ave @ Coalinga Middle School		West of SR 99 - Incorporated			2				1		2		3			8
Bike Facility - Cambridge Ave btwn N Monterey Ave and Sunset Ave Trail Segment 13		West of SR 99 - Incorporated			2				1			1		2		6
Bike Facility - Elm Ave		West of SR 99 - Incorporated				1			1			1			1	4
Bike Facility - School Rd		West of SR 99 - Incorporated				1			1			1			1	4
FIREBAUGH																
Bike Facility - Canal Crossing East of T St		West of SR 99 - Incorporated		3					1			1			1	6
Bike Fac. - Behmer Ave to Clyde Fannon Rd, west side of Clyde Fannon Rd to Borboa Ln		West of SR 99 - Incorporated				1			1			1		2		5
HURON																
Bike Facility - Huron Middle School to Porvenir Estates		West of SR 99 - Incorporated				1			1			1	3			6
Ped Crossing - Across Lassen Ave (SR 269) at 11th St		West of SR 99 - Incorporated				1			1			1		2		5
KERMAN																
Ped Crossing - Across Madera Ave (SR 145) at A St (California Ave)		West of SR 99 - Incorporated				1			1		2			2		6
Bike Facility - California Ave from Madera Ave (SR 145) to east of Goldenrod Ave		West of SR 99 - Incorporated			2				1		2				1	6
MENDOTA																
Ped Crossing - Across Derrick Ave (SR 33) at 4th St		West of SR 99 - Incorporated				1			1		2			2		6
Ped Crossing - Across Derrick Ave (SR 33) at 9th St		West of SR 99 - Incorporated				1			1		2			2		6
Ped Crossing - Across Derrick Ave (SR 33) at Lozano St		West of SR 99 - Incorporated				1			1		2			2		6
Bike Facility - West side of Derrick Ave between Bass Ave and Naples St		West of SR 99 - Incorporated				1			1			1			1	4
SAN JOAQUIN																
Ped Crossing - Across railroad tracks at 9th St		West of SR 99 - Incorporated			2				1			1	3			7
Ped Crossing - Across railroad tracks at Main St		West of SR 99 - Incorporated			2				1			1	3			7
Bike Facility - 9th St from Pine St to Nevada Ave		West of SR 99 - Incorporated			2				1			1		2		6
Ped Crossing - Across Manning Ave at Sutter Ave		West of SR 99 - Incorporated			2				1			1		2		6
Transit Stops		Location		Heat Vulnerability			Transit Connectivity			Activity Center			Existing Deficiency			Total Score
N/A					M	L		H	M	L		H	M	L		

**Fresno COG Extreme Heat
Project Location Analysis - West of SR 99 Unincorporated**

10/23/25

Active Transportation Projects	Location		Heat Vulnerability			Transit Connectivity			Activity Center			Existing Deficiency			Total Score	Public Comments
			H	M	L	H	M	L	H	M	L	H	M	L		
KERMAN																
Bike Facility - Whitesbridge Ave (SR 180) from city limit to N Howard Ave	West of SR 99 - Unincorporated			2				1			1		2		6	
FRESNO COUNTY																
Sidewalk- Mt Whitney Ave between Latonia St and Fowler Ave	West of SR 99 - Unincorporated			2				1			1		2		6	
Sidewalk- Clemenceau Ave between Sandy Ave and West Ave	West of SR 99 - Unincorporated			2				1			1			1	5	
Sidewalk- Mt Whitney Ave between Chateau Fresno Ave and Garfield Ave	West of SR 99 - Unincorporated				1			1			1		2		5	
Sidewalk- Elm Ave from Fantz Ave to Morton Ave	West of SR 99 - Unincorporated			2				1			1			1	5	
Sidewalk- Valentine Ave from Mt Whitney Ave to Kruger Ave	West of SR 99 - Unincorporated				1			1			1			1	4	
Transit Stops	Location		Heat Vulnerability			Transit Connectivity			Activity Center			Existing Deficiency			Total Score	Public Comments
			M	L		H	M	L	H	M	L	H	M	L		
N/A				M	L		H	M	L		H	M	L			



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APPENDIX

Genus	Species	Common Name	Evergreen, Deciduous, Conifer	Size Classificaiton	Height (Feet)	Crown Spread (Feet)	Spacing between trees (Feet)
<i>Casuarina</i>	<i>cunninghamiana</i>	river she-oak	E.	Large	70	30	20-30
<i>Pinus</i>	<i>canariensis</i>	Canary-Island pine	E.	Large	80	20-35	20-25
<i>Pinus</i>	<i>halepensis</i>	Aleppo pine	E.	Large	60+	20-40	30-35
<i>Quercus</i>	<i>agrifolia</i>	coast live oak	E.	Large	40+	40+	30-35
<i>Quercus</i>	<i>canbyi</i>	chisos oak	D./E.	Large	50+	30-50	30-35
<i>Quercus</i>	<i>chrysolepis</i>	canyon live oak	E.	Large	70+	30+	30-35
<i>Quercus</i>	<i>engelmannii</i>	Engelmann oak	D.	Large	65	80-120	15-65
<i>Quercus</i>	<i>lobata</i>	valley oak	D.	Large	50-70	50	30-35
<i>Quercus</i>	<i>douglasii</i>	blue oak	D.	Large	70+	40-50	30-35
<i>Quercus</i>	<i>wislizeni</i>	interior live oak	E.	Large	70+	40-80	30-35
<i>Tipuana</i>	<i>tipu</i>	tipu tree	D.	Large	50	25-50	20-30
<i>Ulmus</i>	<i>wilsoniana</i>	prospector elm	D.	Large	40-50	25-30	20-25
<i>Arbutus</i>	<i>marina'</i>	marina madrone	E.	Medium	40-50	40	30-35
<i>Cedrus</i>	<i>deodora</i>	Deodor Cedar	C.	Medium	40+	40+	35-40
<i>Laurus</i>	<i>nobilis 'Saratoga'</i>	Sweetbay	E.	Medium	15-40	15-30	20-25
<i>Melaleuca</i>	<i>linariifolia</i>	flaxleaf paperbark	E.	Medium	30	20-25	15-20
<i>Melaleuca</i>	<i>styphelioides</i>	prickly melaleuca	E.	Medium	40	10-20	15-20
<i>Olea</i>	<i>europaea 'Swan Hill'</i>	Fruitless olive	E.	Medium	20-40	-20	30-35
<i>Pinus</i>	<i>sabiniana</i>	Gray Pine	C.	Medium	70+	15-20	15-20
<i>Pinus</i>	<i>eldarica</i>	Afghan Pine	C.	Medium	40+	20-40	30-35
<i>Pistacia</i>	<i>chinensis</i>	Chinese pistache	D.	Medium	40+	40+	30-35
<i>Pistacia</i>	<i>chinensis 'Keith Davey'</i>	Keith Davey	D.	Medium	40+	40+	30-35
<i>Prosopis</i>	<i>glandulosa 'Maverick'</i>	thornless honey mesquite	D.	Medium	35	25-35	15-25
<i>Prunus</i>	<i>ilicifolia ssp. Lyonii</i>	Catalina cherry	E.	Medium	35	20-30	15-20
<i>Quercus</i>	<i>ilex</i>	holly oak	E.	Medium	30-60	30-60	30-35
<i>Quercus</i>	<i>suber</i>	cork oak	E.	Medium	20-40	20-40	20-25
<i>Searsia</i>	<i>lancea</i>	African sumac	E.	Medium	30	20-35	20-25
<i>Sophora</i>	<i>japonica 'Regent'</i>	Japanese pagoda tree	D.	Medium	50	30-40	25-30
<i>Vachellia</i>	<i>farnesiana</i>	sweet acacia	D.	Medium	25	15-25	15-25
<i>Acacia</i>	<i>stenophylla</i>	shoestring acacia	E.	Small	30	10-20	15-20
<i>Arbutus</i>	<i>unedo</i>	strawberry madrone	E.	Small	35	20-35	20-25
<i>Callistemon</i>	<i>viminalis</i>	weeping bottlebrush	E.	Small	20	15-20	15-20

Genus	Species	Common Name	Evergreen, Deciduous, Conifer	Size Classificaiton	Height (Feet)	Crown Spread (Feet)	Spacing between trees (Feet)
<i>Cassia</i>	<i>leptophylla</i>	gold medallion tree	D.	Small	25	30	20-25
<i>Celtis</i>	<i>reticulata</i>	netleaf hackberry	D.	Small	35	25-30	20-25
<i>Cercidium</i>	<i>x 'Desert Museum'</i>	desert museum palo verde	D.	Small	20	20-25	15-20
<i>Cercidium</i>	<i>floridum</i>	blue palo verde	D.	Small	25	15-20	15-20
<i>Cercis</i>	<i>occidentalis</i>	Western Redbud	D.	Small	-20	-20	20-25
<i>Cordia</i>	<i>boissieri</i>	Texas olive	E.	Small	20	10-15	10-15
<i>Prosopis</i>	<i>chilensis</i>	Chilean mesquite	D.	Small	30+	30+	20-25

Genus	Species	Common Name	Minimum Parkway Width (Feet)	Utility Friendly	Water Use Classification of Landscape Species (WUCOLS) rating	Regionally Native	California Native
<i>Casuarina</i>	<i>cunninghamiana</i>	river she-oak	>10	No	Low		
<i>Pinus</i>	<i>canariensis</i>	Canary-Island pine	8	No	Low		
<i>Pinus</i>	<i>halepensis</i>	Aleppo pine	8-Jan	No	Low		
<i>Quercus</i>	<i>agrifolia</i>	coast live oak	6 to 8	No	Very Low	Yes	
<i>Quercus</i>	<i>canbyi</i>	chisos oak	8+	No	low		
<i>Quercus</i>	<i>chrysolepis</i>	canyon live oak	>10	No	Low		Yes
<i>Quercus</i>	<i>engelmannii</i>	Engelmann oak	>10	No	Low		
<i>Quercus</i>	<i>lobata</i>	valley oak	6 to 8	No	Low	Yes	
<i>Quercus</i>	<i>douglasii</i>	blue oak	>10	No	Very Low		Yes
<i>Quercus</i>	<i>wislizeni</i>	interior live oak	>10	No	Very Low	Yes	
<i>Tipuana</i>	<i>tipu</i>	tipu tree	>10	No	Low		
<i>Ulmus</i>	<i>wilsoniana</i>	prospector elm	6	No	Low		
<i>Arbutus</i>	<i>marina'</i>	marina madrone	6 to 8	No	Low		
<i>Cedrus</i>	<i>deodora</i>	Deodor Cedar	8+	No	Low		
<i>Laurus</i>	<i>nobilis 'Saratoga'</i>	Sweetbay	3 to 4	No	Low		
<i>Melaleuca</i>	<i>linariifolia</i>	flaxleaf paperbark	5 to 10	No	Low		
<i>Melaleuca</i>	<i>styphelioides</i>	prickly melaleuca	5 to 10	No	Low		
<i>Olea</i>	<i>europaea 'Swan Hill'</i>	Fruitless olive	6 to 8	No	Very Low		
<i>Pinus</i>	<i>sabiniana</i>	Gray Pine	>7	No	Low		Yes
<i>Pinus</i>	<i>eldarica</i>	Afghan Pine	6 to 8	No	Very low		
<i>Pistacia</i>	<i>chinensis</i>	Chinese pistache	6 to 8	No	Low		
<i>Pistacia</i>	<i>chinensis 'Keith Davey'</i>	Keith Davey	6 to 8	No	Low		
<i>Prosopis</i>	<i>glandulosa 'Maverick'</i>	thornless honey mesquite	5 to 10	No	Low		
<i>Prunus</i>	<i>ilicifolia ssp. Lyonii</i>	Catalina cherry	5 to 10	No	Low		
<i>Quercus</i>	<i>ilex</i>	holly oak	6 to 8	No	Low		
<i>Quercus</i>	<i>suber</i>	cork oak	3 to 4	No	Low		
<i>Searsia</i>	<i>lancea</i>	African sumac	5 to 10	No	Low		
<i>Sophora</i>	<i>japonica 'Regent'</i>	Japanese pagoda tree	8+	No	Low		
<i>Vachellia</i>	<i>farnesiana</i>	sweet acacia	5 to 10	Yes	Very Low		
<i>Acacia</i>	<i>stenophylla</i>	shoestring acacia	4	Yes	Low		
<i>Arbutus</i>	<i>unedo</i>	strawberry madrone	4 to 6	Yes	Low		
<i>Callistemon</i>	<i>viminialis</i>	weeping bottlebrush	2 to 5	Yes	Low		

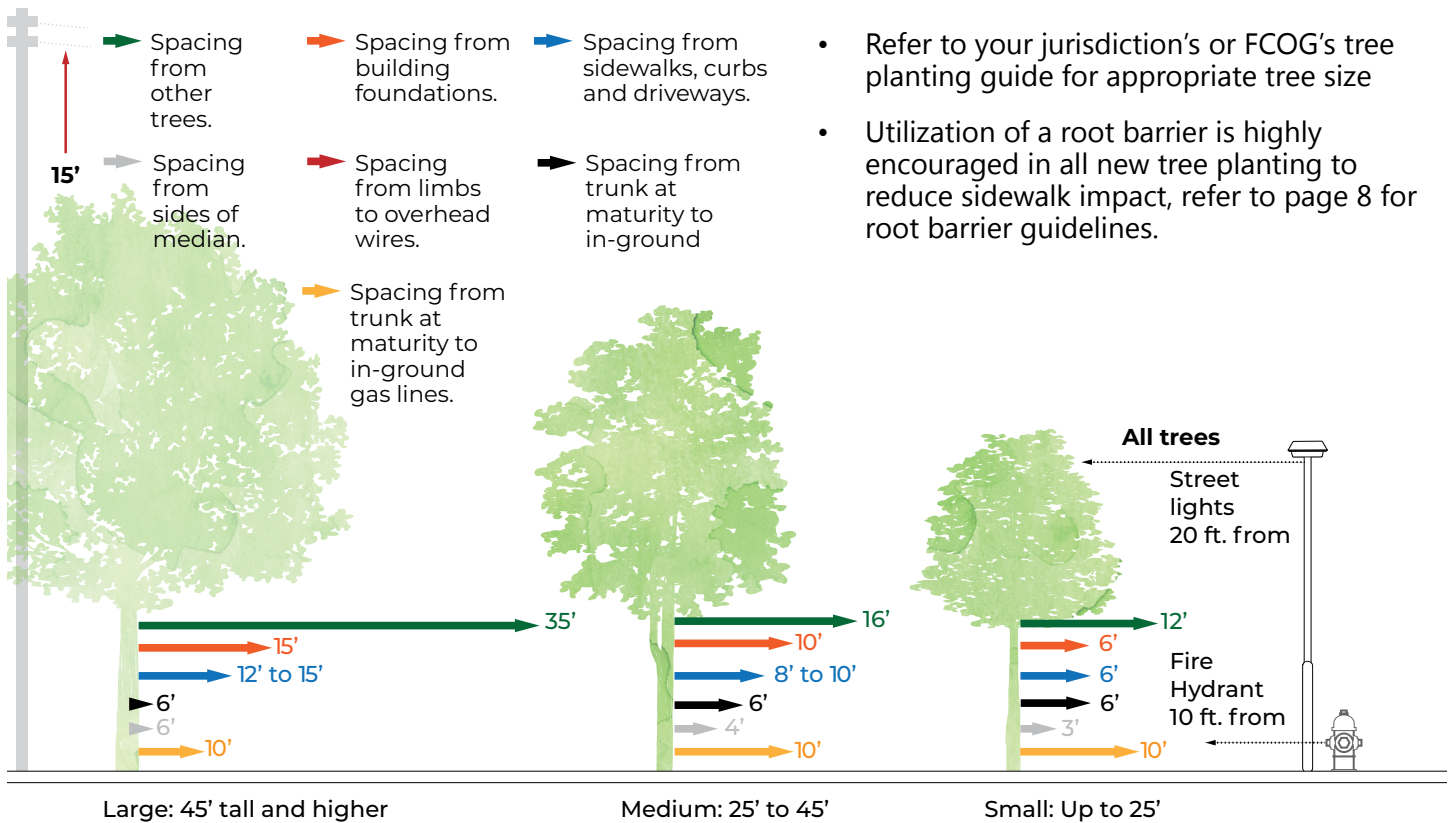
Genus	Species	Common Name	Minimum Parkway Width (Feet)	Utility Friendly	Water Use Classification of Landscape Species (WUCOLS) rating	Regionally Native	California Native
<i>Cassia</i>	<i>leptophylla</i>	gold medallion tree	5 to 10	No	Low		
<i>Celtis</i>	<i>reticulata</i>	netleaf hackberry	4 to 6	No	Low		Yes
<i>Cercidium</i>	<i>x 'Desert Museum'</i>	desert museum palo verde	2 to 5	Yes	Very Low		
<i>Cercidium</i>	<i>floridum</i>	blue palo verde	4	Yes	Very Low		Yes
<i>Cercis</i>	<i>occidentalis</i>	Western Redbud	3 to 4	Yes	Very Low		
<i>Cordia</i>	<i>boissieri</i>	Texas olive	2 to 5	Yes	Low		
<i>Prosopis</i>	<i>chilensis</i>	Chilean mesquite	6	No	Low		



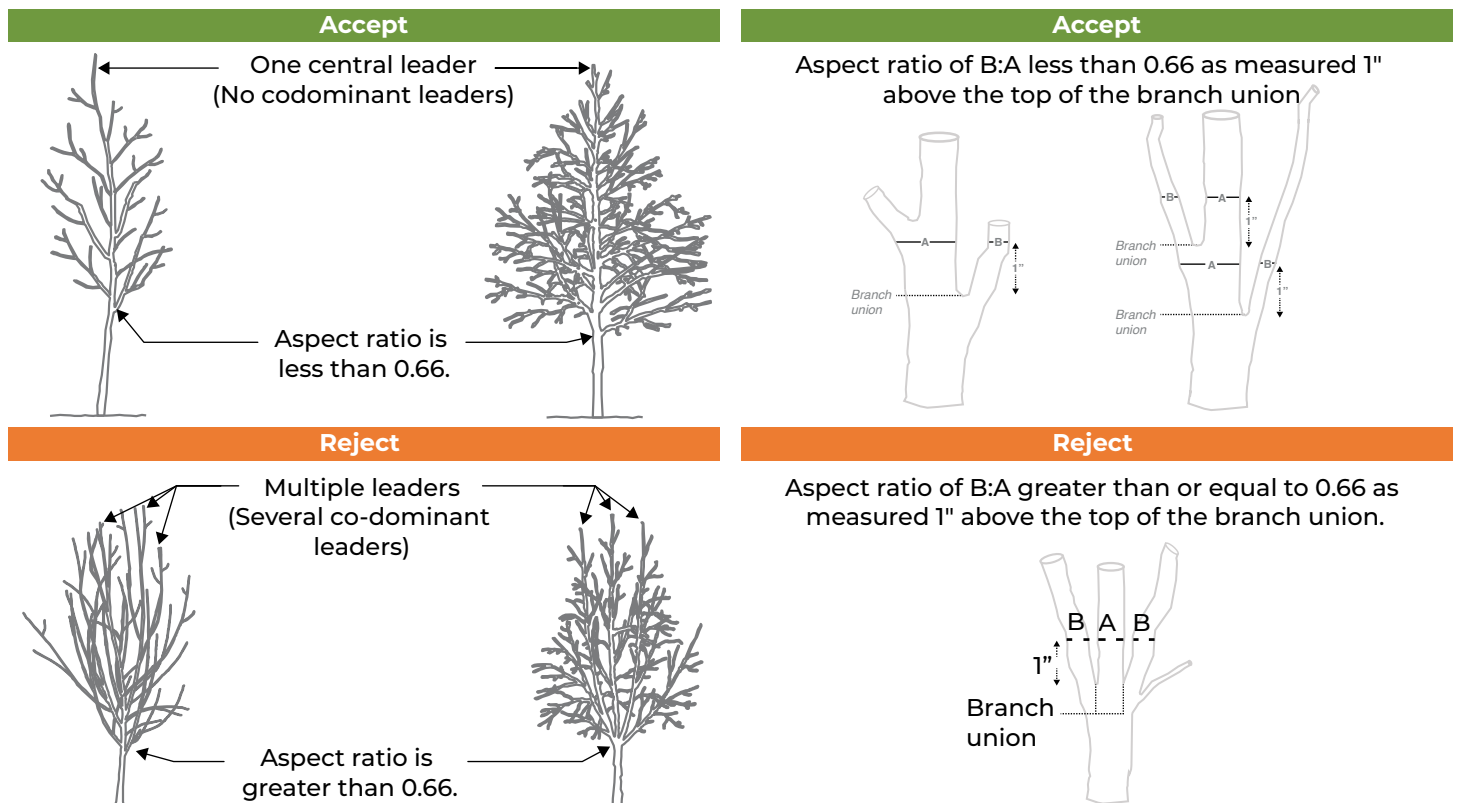
Tree Care Guide

SPACING GUIDELINES FOR STREET TREES

CALL 8-1-1 BEFORE YOU DIG!

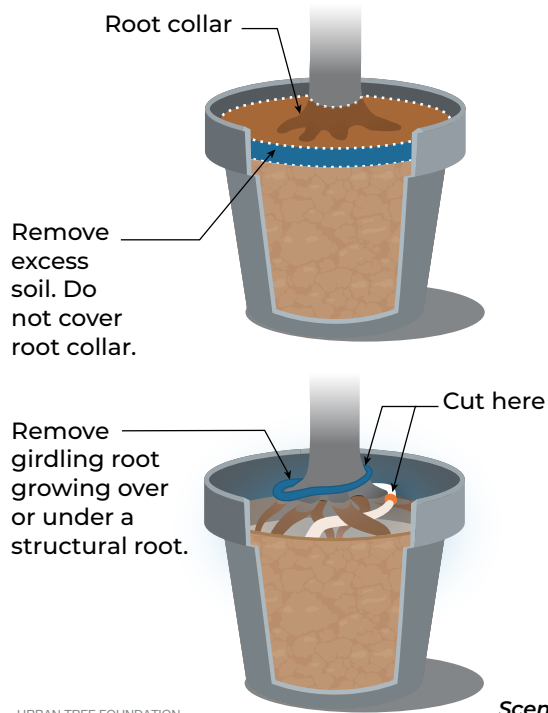


NURSERY STOCK SELECTION



NOTE: 1. Nursery stock with significant mechanical injury, serious root defects, and trees that show signs of dehydration are to be rejected. 2. Aspect Ratio shall be less than 0.66 on all branch unions. Aspect ratio is the diameter of branch (B) divided by the diameter of the trunk (A) as measured 1" above the top of the branch union. 3. Any tree not meeting the crown observations detail may be rejected.

ROOT CORRECTION FOR CONTAINER GROWN TREES



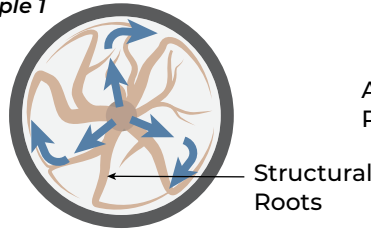
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Accept

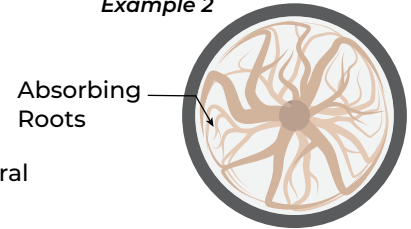
Bottom-Up View

Roots radiate from trunk and reach each side of root ball without deflecting down or around.

Example 1



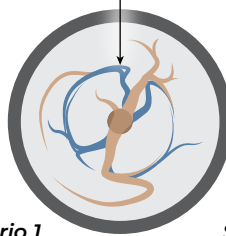
Example 2



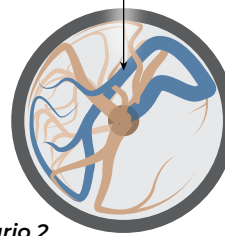
Reject

Bottom-Up View

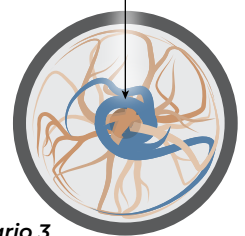
Structural roots do not reach periphery.



Structural roots primarily grow to one side or tangent to trunk.

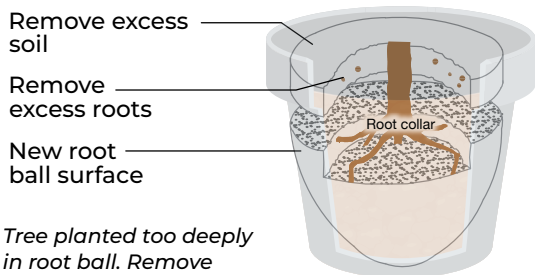


Structural roots circle and do not radiate from the trunk.



ROOT CORRECTION PROCESS

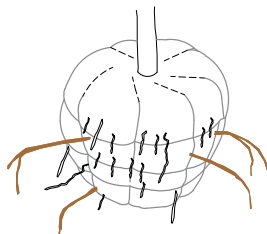
Step 1: Remove soil and roots over the root collar.



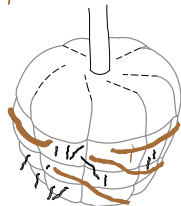
Tree planted too deeply in root ball. Remove excess soil and roots to meet root inspection detail.

Root Ball

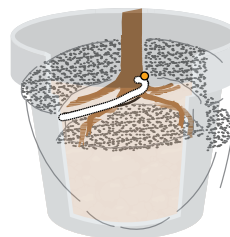
Remove structural roots (4 shown in black) extending from root ball.



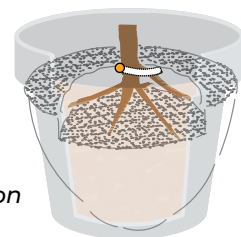
Remove structural roots (4 shown in black) deflected on root ball periphery. Small roots (1/4" or less) at the periphery of the root ball are not defined as defects and do not need to be removed.



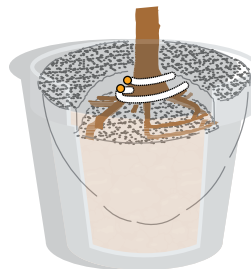
Step 2: Remove defects.



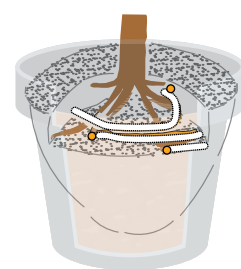
Four structural roots shown in black. Remove root (white) growing over structural roots.



Five structural (large) roots shown in black. Remove structural (white) root wrapping root collar



Six structural roots shown in black. Remove structural roots (white) growing over root collar by cutting them just before they make an abrupt turn.

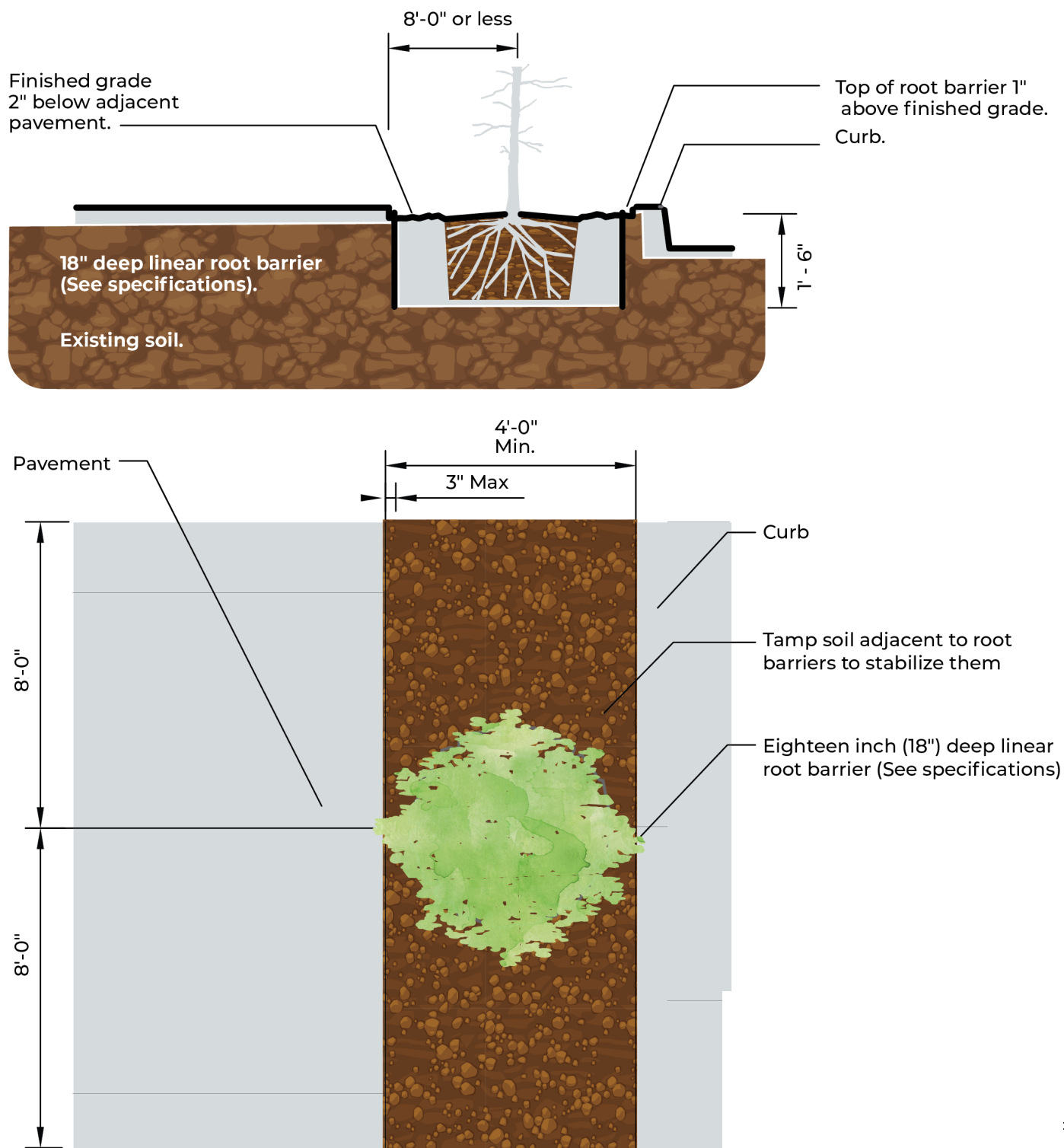


Seven structural roots shown in black. Remove structural roots (white) growing around or over root collar by cutting them just before they make an abrupt turn.

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ROOT BARRIERS

Root barriers are strongly encouraged during the planting of new street trees, to prevent damage to the pavement. Root barriers can be purchased locally at landscape supply stores and at many big-box hardware stores.

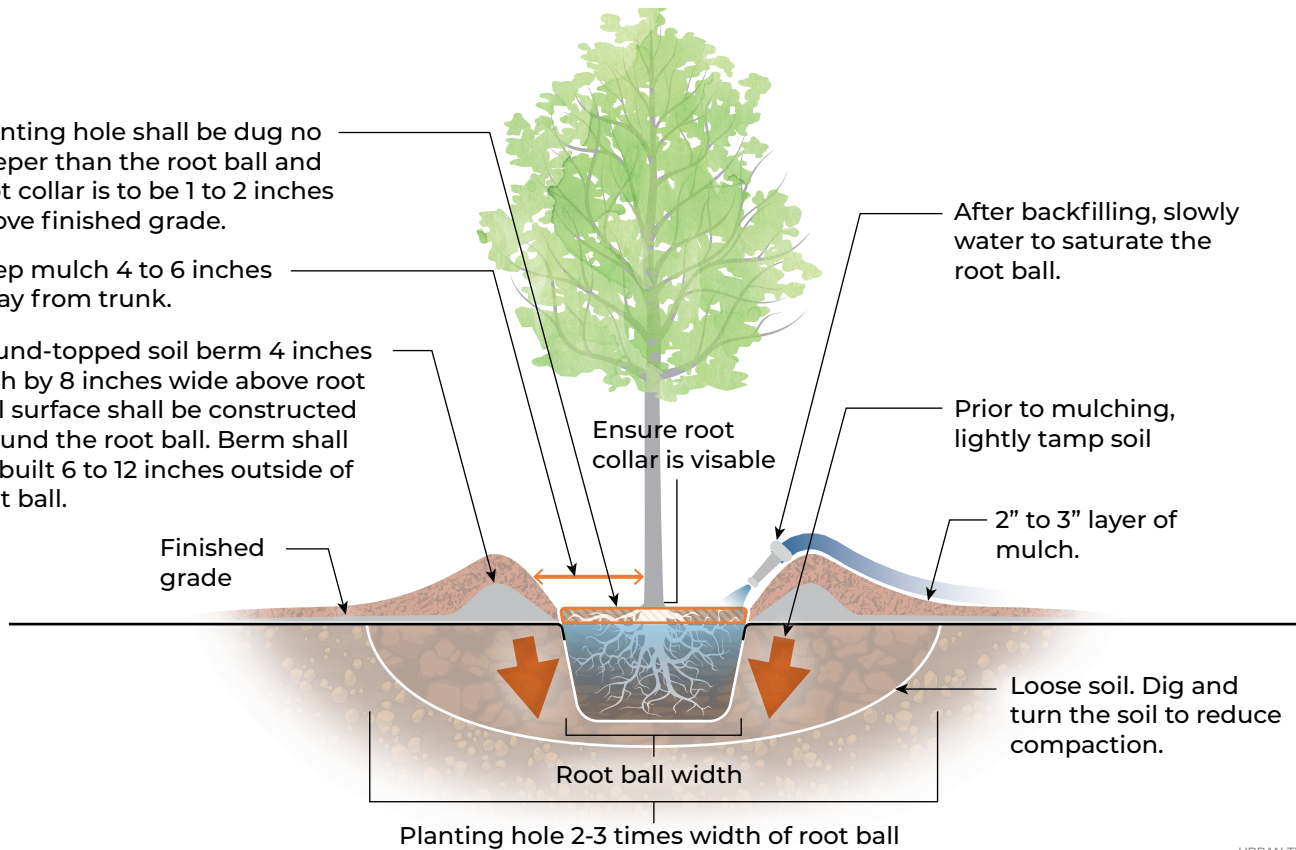


TREE PLANTING AND MULCHING

Planting hole shall be dug no deeper than the root ball and root collar is to be 1 to 2 inches above finished grade.

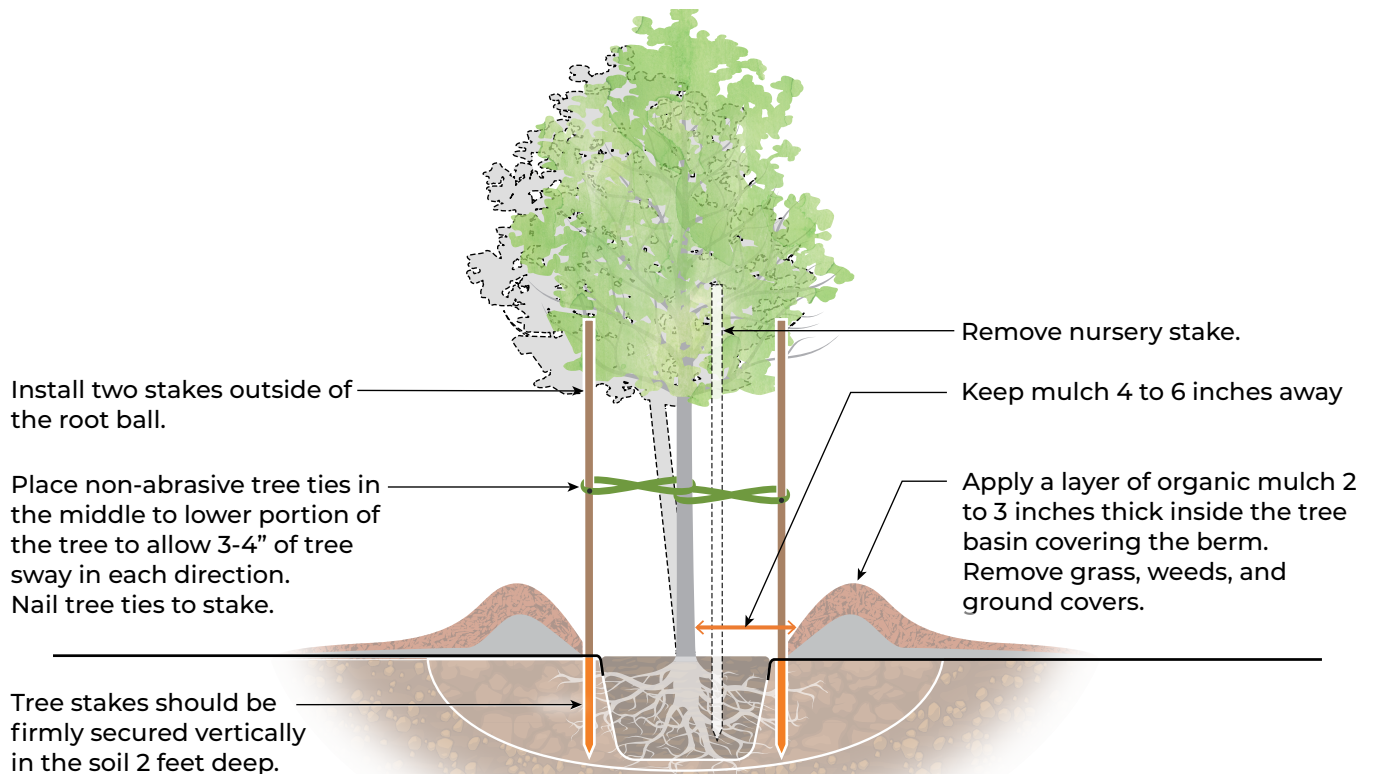
Keep mulch 4 to 6 inches away from trunk.

Round-topped soil berm 4 inches high by 8 inches wide above root ball surface shall be constructed around the root ball. Berm shall be built 6 to 12 inches outside of root ball.



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ESTABLISHMENT CARE GUIDELINES



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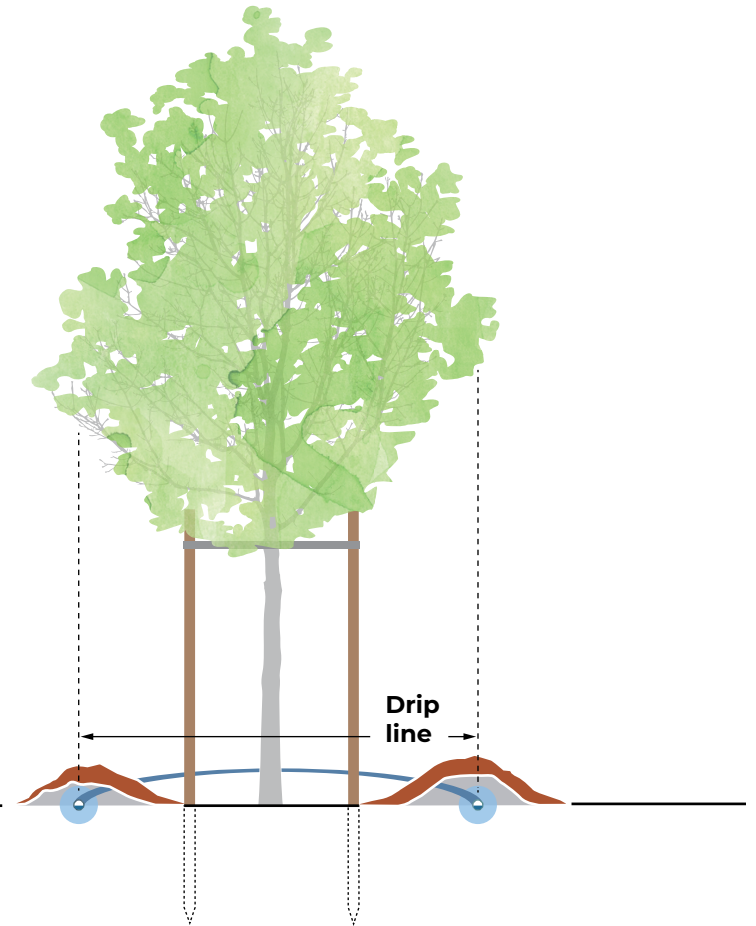
WATERING GUIDELINES

Watering for Wet Seasons

- Prolonged saturated soil can lead to tree mortality.
- Turn off irrigation during rain events.
- To avoid over watering a newly planted tree, monitor soil moisture after rain events.
- If soil is saturated, stop watering. Resume watering when soil is dry.

Watering Guidelines for Hot and Dry Seasons

- Prolonged and unexpected extreme heat waves can threaten a newly planted trees survivability by depleting the available water inside the tree and in the soil.
- During these periods trees may need additional watering once or twice a week to be sustained.
- It is critical to provide additional water as soon as possible during extreme heat events to maintain tree health and vigor.



Tree Age	Frequency	Quantity
First 3 months after planting	Deep water by filling basin once a week	10-15 gallons per watering
4 -12 months following planting	Fill the water basin every 2-3 week June-September Tip: Check soil moisture 2-3" deep; water only if dry.	10-15 gallons
Year 2 - 3	Once a month June-September	15-20 gallons
Year 4 - 7	Only during extended dry periods (6+ weeks without rain) Tip: Move watering source outward toward the dripline each year.	Deep watering (simulate a rainstorm)

TREE PRUNING

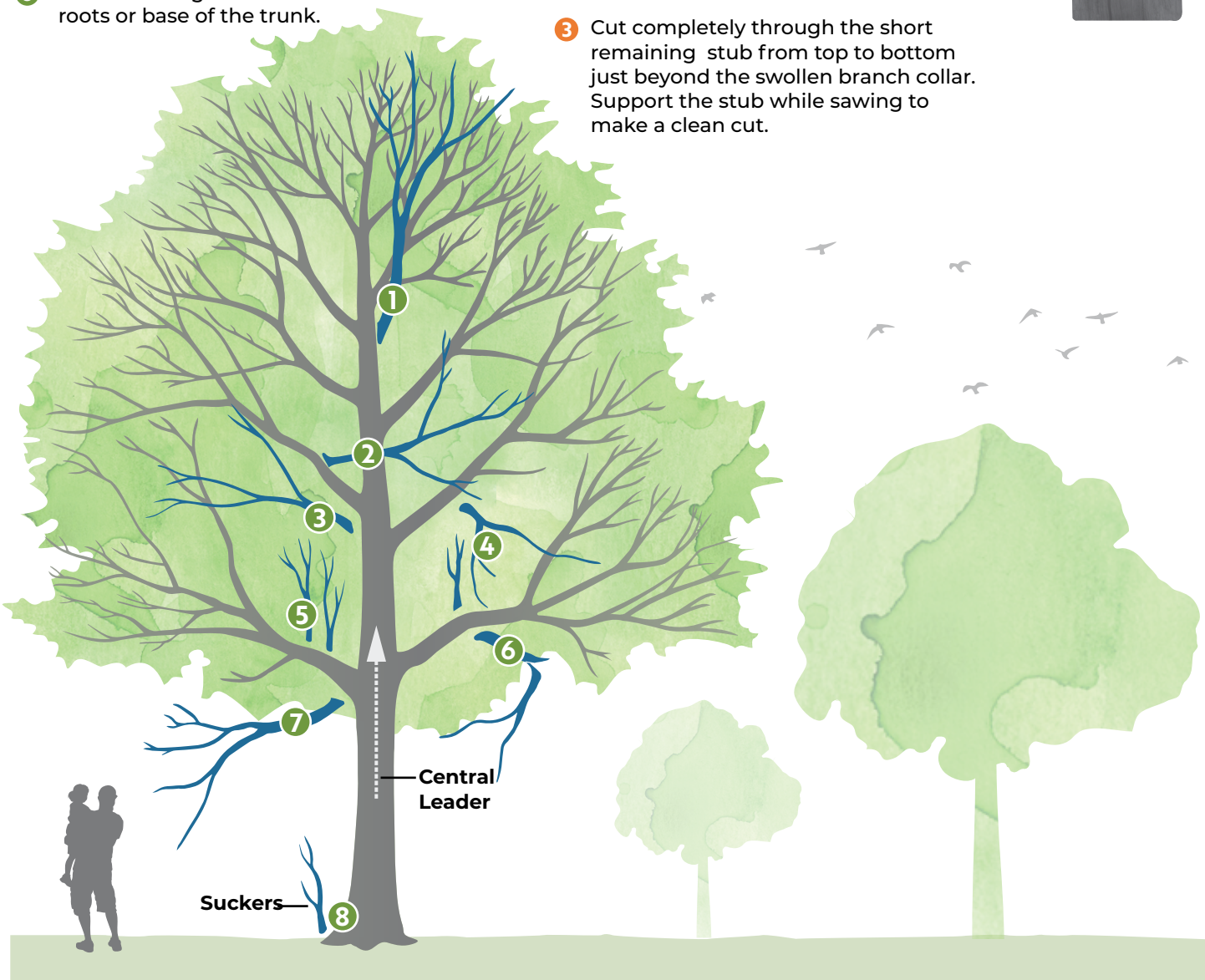
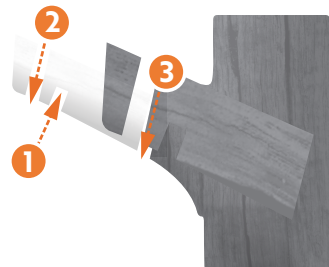
Healthy Pruning Cuts

- 1 Limbs that compete with the tree's central leader.
- 2 Rubbing, crossing branches.
- 3 Inadequate spacing between branches.
- 4 Awkward unattractive branches.
- 5 Watersprouts that shoot up from main "scaffold" branches.
- 6 Dead, diseased, or broken limbs.
- 7 Limbs that sag or grow close to the ground.
- 8 Suckers that grow from the roots or base of the trunk.

How to Make a Pruning Cut

To prune a tree limb larger than 2 inches in diameter cleanly and safely, as shown in the image above, use a pruning saw and make these three sequential cuts:

- 1 On the bottom of the limb between 6 and 12 inches from the trunk; cut about one-quarter of the way through.
- 2 Through the limb from the top, starting about 1 inch beyond the first cut. The weight of the branch may cause it to snap off before the cut is complete.
- 3 Cut completely through the short remaining stub from top to bottom just beyond the swollen branch collar. Support the stub while sawing to make a clean cut.



PRUNING TO IMPROVE YOUNG TREE STRUCTURE

1. Remove broken branches.

2. Select central leader and remove competing leaders.

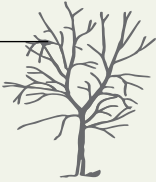
3. Select lowest permanent branch.

4. Select scaffold branches.

5. Select low temporary branches. Cut back and leave as temporary.

BEFORE PRUNING

1. Broken branch



2. Central leader



WHAT TO PRUNE

Competing leader



AFTER PRUNING



4. Scaffold branch

5. Temporary branch



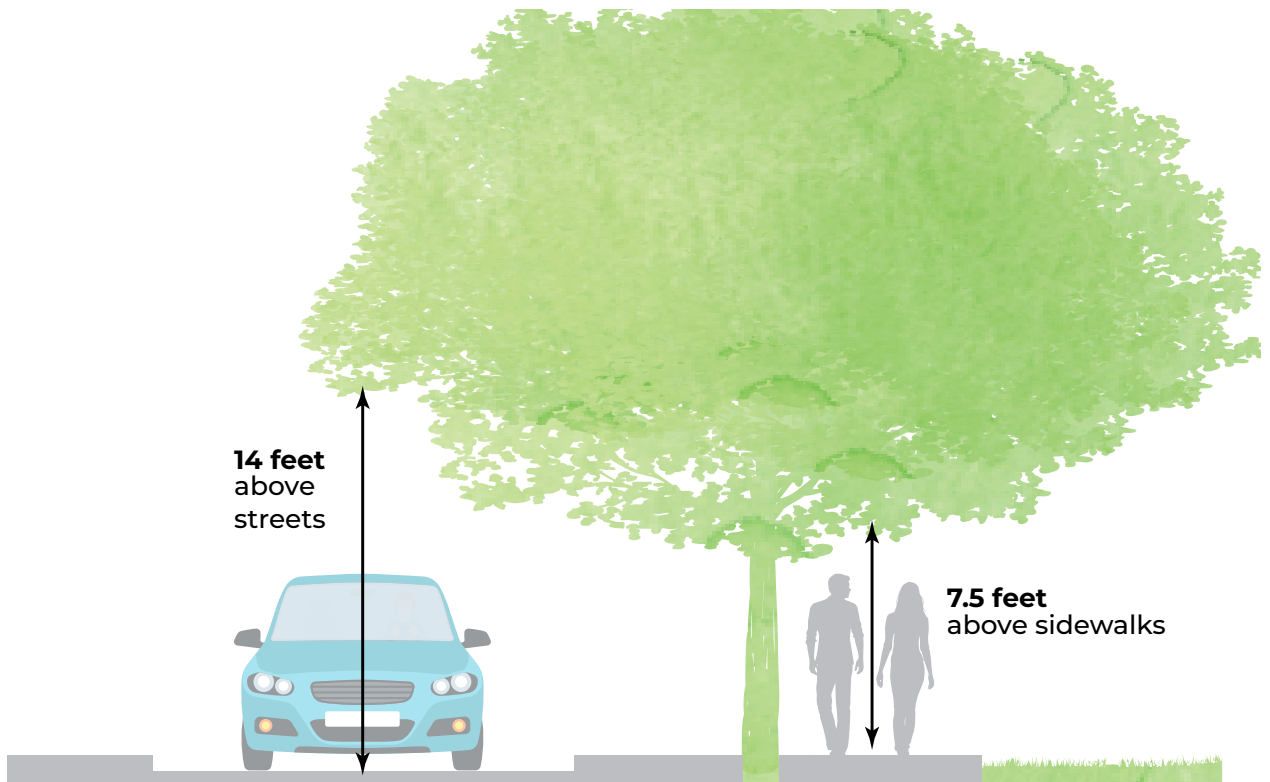
3. Lowest permanent branch



NOTE: 1. At the time of planting, limit pruning to removal of broken, dead, or diseased branches only. 2. Young Tree Structural Pruning is to occur only after trees establish and resume normal growth rates following planting.

Structural Pruning: A Guide for the Green Industry
URBAN TREE FOUNDATION | ADAPTED BY DUC

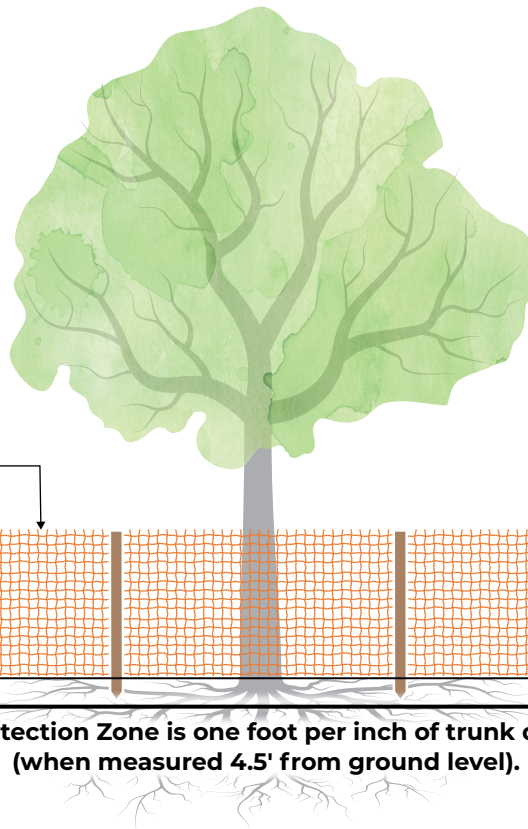
RECOMMENDED MINIMUM BRANCH HEIGHT REQUIREMENTS ABOVE STREETS AND SIDEWALKS



MATURE TREE PROTECTION GUIDELINES

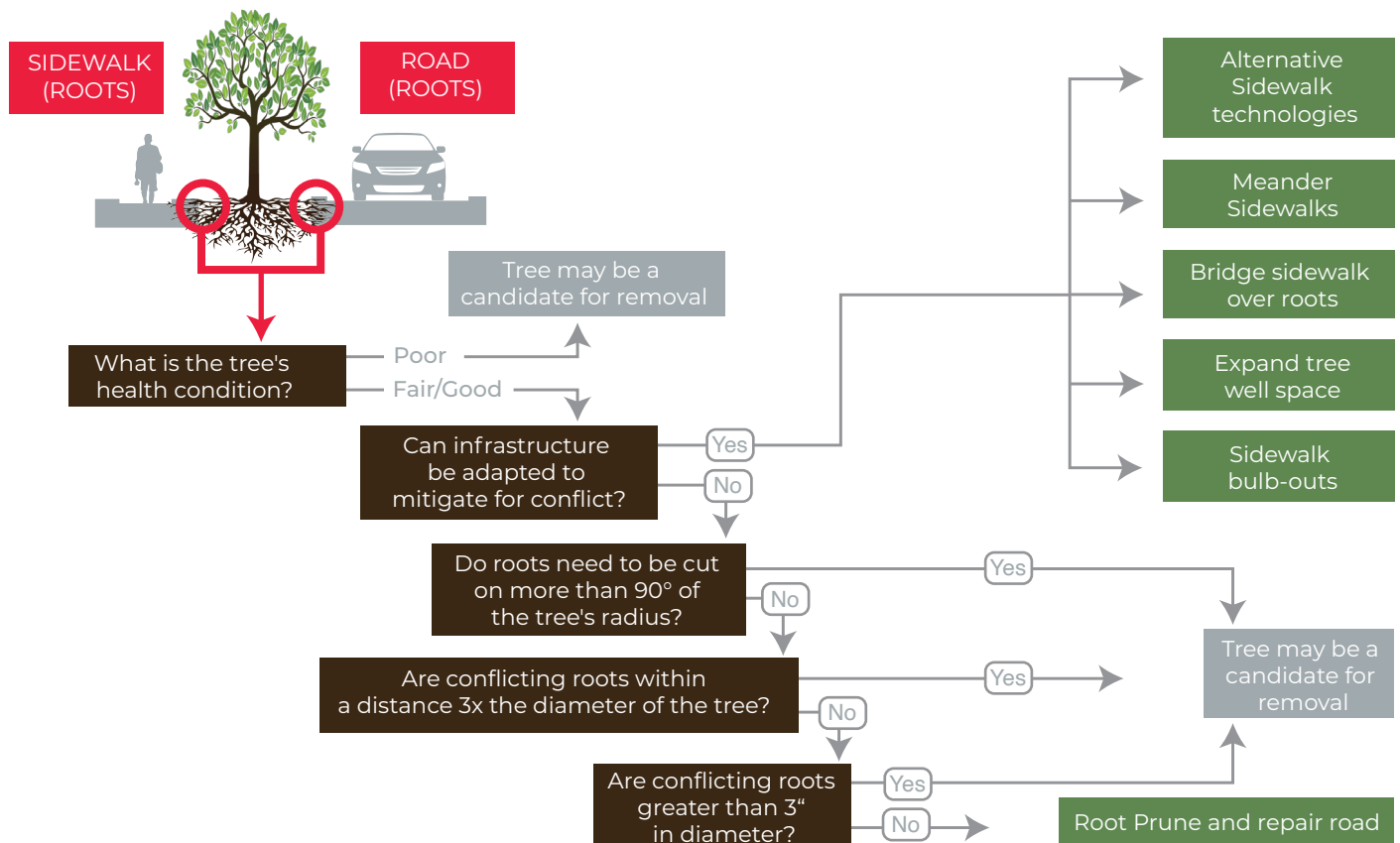
These guidelines apply to Protected Trees on properties where a Building Permit has been granted.

The passage or storage of vehicles, machinery, or materials is prohibited. No herbicides, solvents, or other harmful chemicals may come into contact with soil within the TPZ.



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WHAT TO DO FOR TREE CROWN AND BUILDING CONFLICTS



WHAT TO DO FOR TREE ROOT AND BUILDING CONFLICTS

