Feasibility of Afforestation as an Equitable Nature-Based Solution in Urban Areas – Supplementary Material

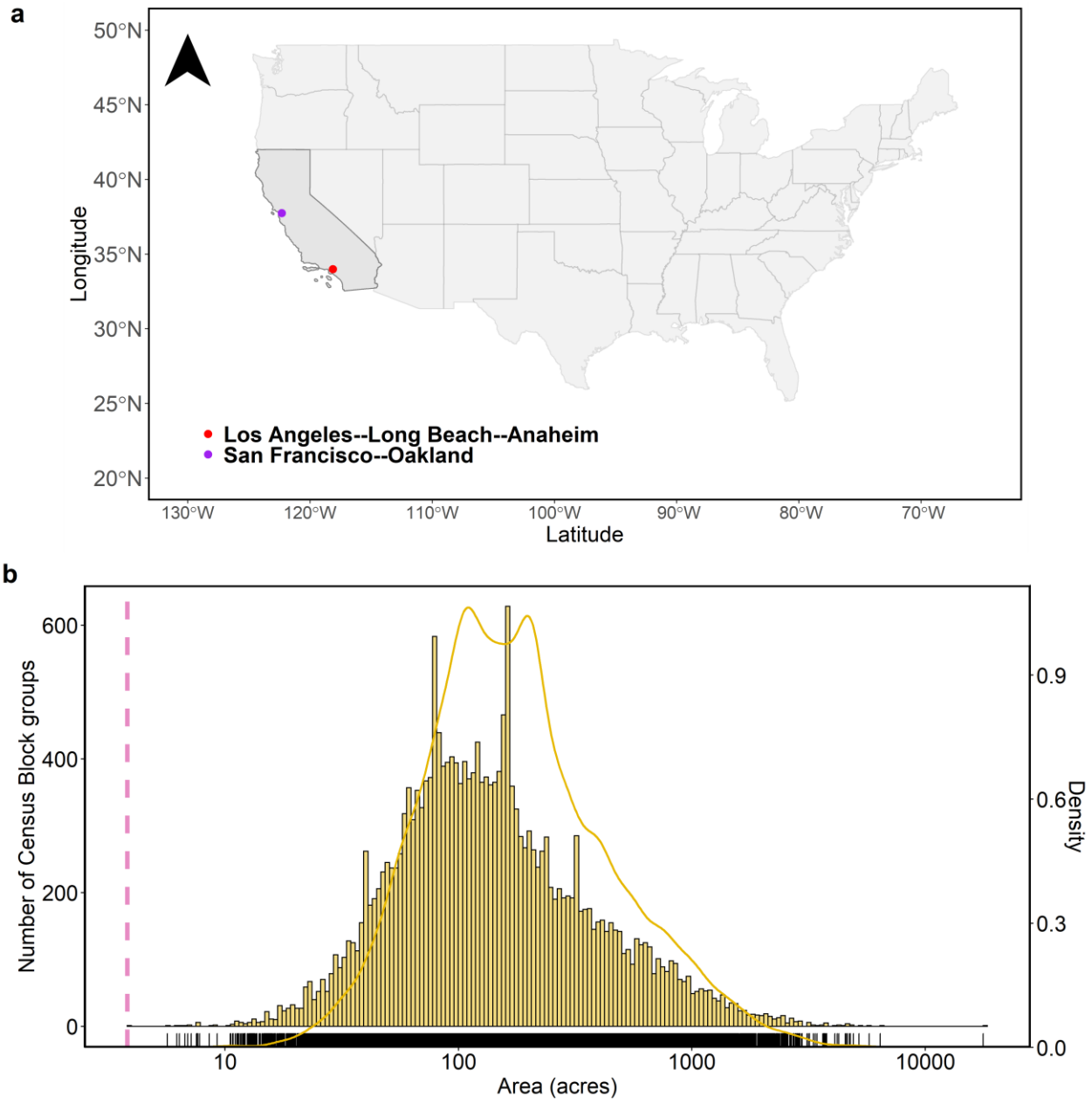

Fig. S1. Region of interest and distribution of census block groups. Sub-figure (a) shows the location of California (black borders) within the United States and the locations of the centroids of Greater Los Angeles and the San Francisco Bay area. Sub-figure (b) shows the area distribution of the census block groups considered in this study. The area of a ~100 m Landsat pixel is shown for comparison using the vertical dashed line.

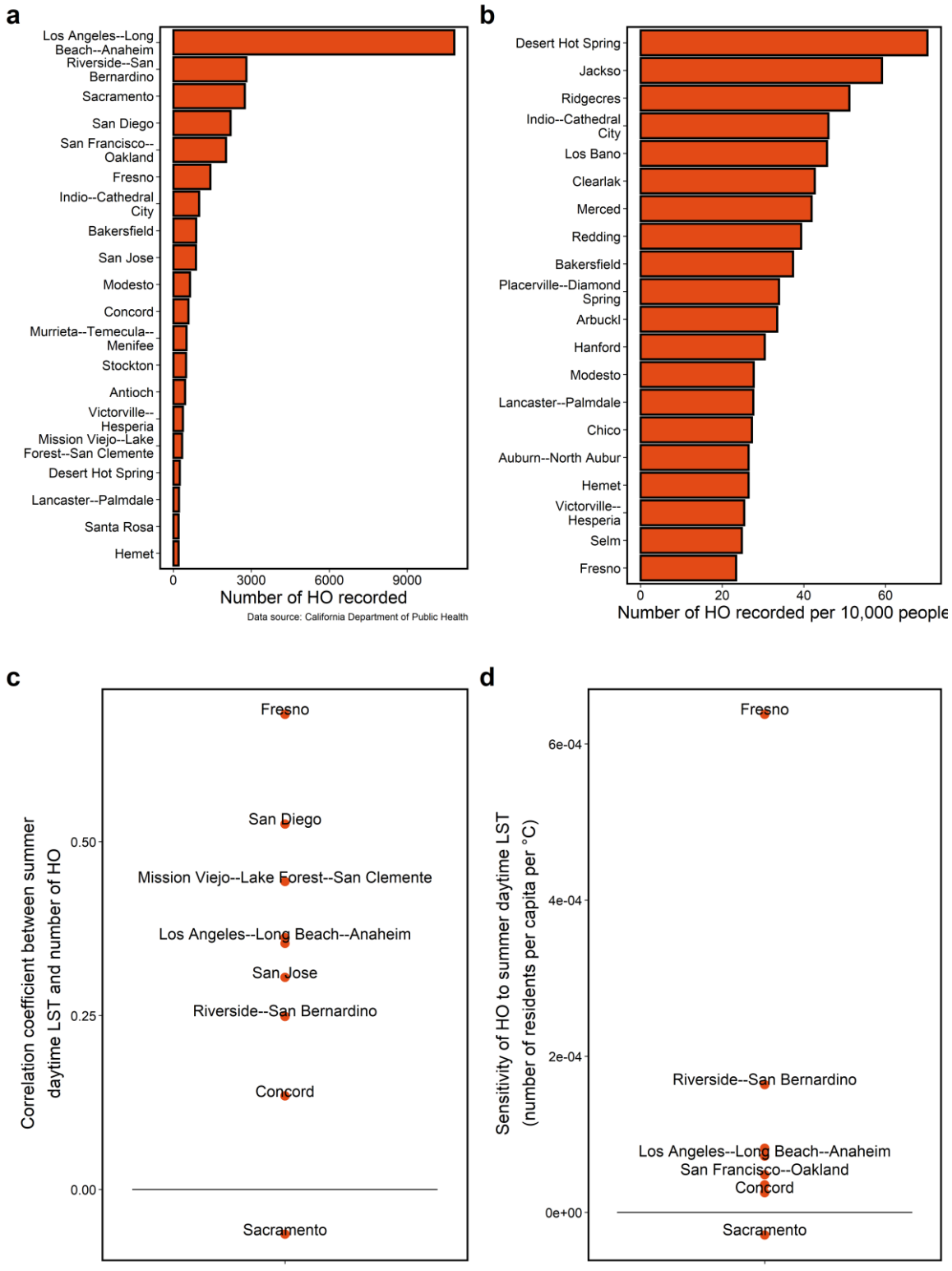

Fig. S2. Summary of heat stress health outcomes and its avoidance. Sub-figures (a) and (b) show the twenty urban areas in California with the highest total heat stress related emergency department visits, hospitalizations, and deaths (HO) and HO per 10,000 residents between 2009 and 2018, respectively. Sub-figures (c) and (d) show the distribution of correlation coefficients between total

zip code level HO and summer daytime LST between 2015 and 2020 and the slope of the relationship between per capita HO and summer daytime LST, respectively, for the cities in California with over 10 zip codes with heat stress related HO.

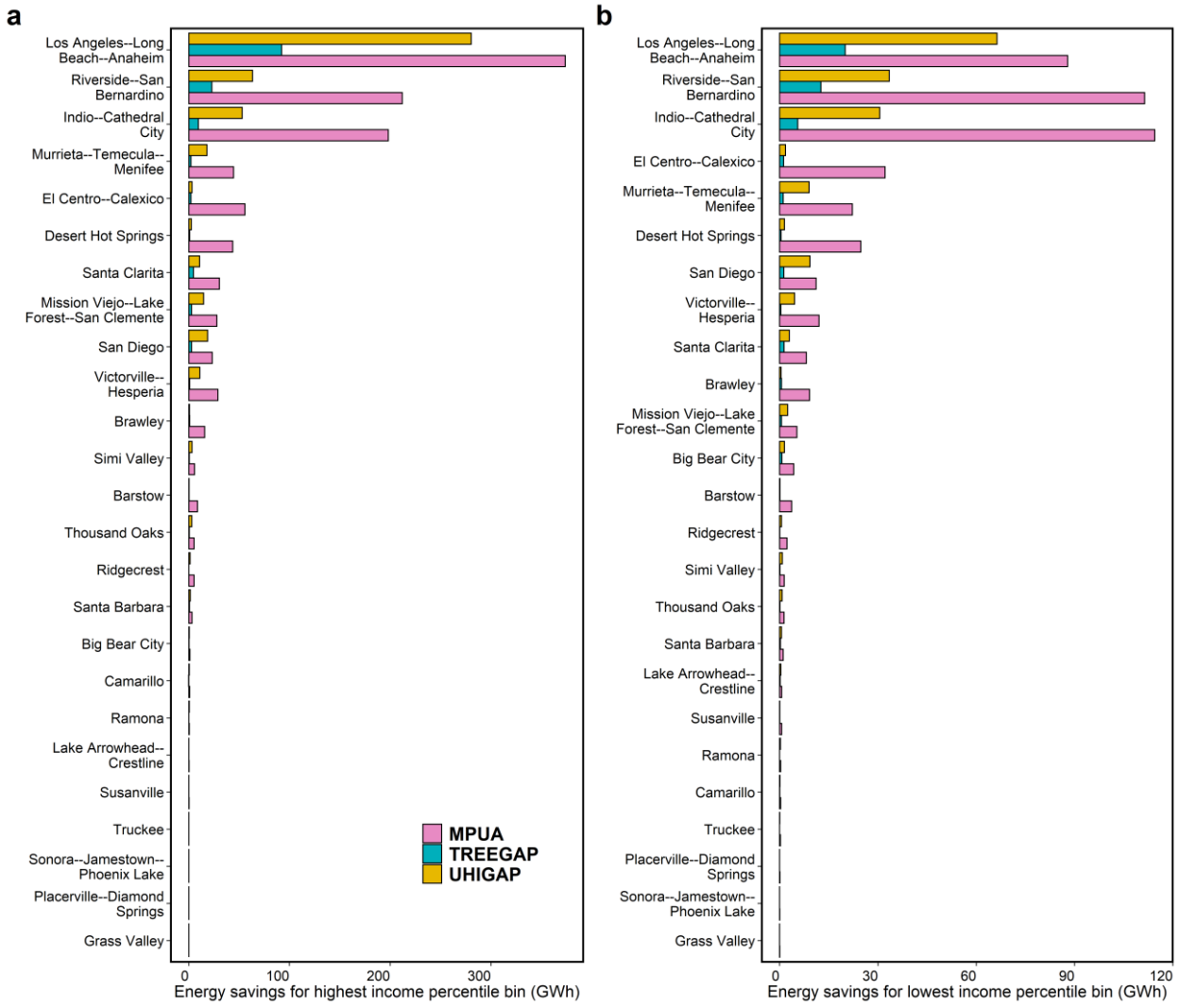

Fig. S3. Summertime energy savings by urban area. Residential energy savings during summer for (a) highest income percentile bin and (b) lowest income percentile bin for the cities studied by Chen et al.[30] for each afforestation scenario.

Table S1. Calculated reduction in residential electricity use for cities in southern California for the three afforestation scenarios (namely MPUA, TREEGAP, and UHIGAP) and the associated economic benefit, reduced GHG emissions, and the social cost of carbon (SCC).

	Residential Electric Use		GHG Emissions	
Metric	**GWH**	**Savings ($M)**	**MT**	**SCC ($M)**
UHIGAP	327	62.1	77,643	4.3
TREEGAP	95	18.1	22,591	1.2
MPUA	770	146.2	182,935	10.1

Table S2. Calculated net present value of urban afforestation for the three scenarios (namely MPUA, TREEGAP, and UHIGAP) and associated benefits. Assumes 3% discount rate, 35 years for trees to reach maturity, and linear canopy growth.

	Net Present Value ($M)		
Metric	**Residential Savings**	**Social Cost of Carbon**	**Total**
UHIGAP	694.2	47.9	742.1
TREEGAP	202.0	13.9	215.9
MPUA	1635.7	112.8	1748.4