LOS ANGELES

The largest El Niño event ever recorded was supposed to dominate the news in Los Angeles in early 2016. So large it was dubbed Godzilla El Niño, the enormous swath of unusually warm Pacific Ocean water, some 6 million square miles in area, was anticipated to bring drenching rains to the city, and many feet of snow to the mountains.

Nearly everyone in Southern California was waiting to welcome El Niño with open arms. A record-setting deluge was just what was needed to break, or at least put a dent in, a crippling, four-year year drought.

El Niño brought some relief, especially to northern and central California, and some reservoirs, such as Shasta, the state's largest, are at or near capacity. Los Angeles was not so fortunate. After the last severe drought, from 1987 to 1991, Southern California increased its water storage capacity 14-fold. All that storage eased the pain of the current drought, but now, despite El Niño, reservoirs near Los Angeles are still less than half full.

The link between climate change and drought are intriguing but still speculative. The daunting prospect for Angelenos, however, is the possibility that climate has tipped to a new and lasting condition, marked by little rain and rising temperatures. That future became reality in the winter of 2016.

Typical February temperatures in Los Angeles is about 70 degrees. On February 7, 2016, the temperature reached 89 degrees at Los Angeles International Airport, a new record for the day. Another bout of record-breaking heat hit the city a few weeks later.

All this would usually be of little concern to anyone except the record-keepers and weather junkies. In this case, however, it is part of a worrisome trend. The late winter heat waves followed on fall weather that was even hotter. In early October 2015, downtown Los Angeles hit 100 degrees on back-to-back days. The sweltering 100-degree stretch was the longest in 25 years and matched the longest ever recorded in October. The heat stressed electricity generation, and at least 9,000 people were without power.

The combination of heat and extreme drought spell trouble for air quality in Los Angeles through a complex chain of events. Prolonged dry spells bring more temperature inversions, with a layer of warmer air trapping cooler air below, concentrating pollution near the ground. Higher temperatures accelerate the chemical reactions that form ozone, a key ingredient in smog, while also boosting demand for electricity, which further increases the smog-forming emissions from power plants. Hot, dry weather also creates ideal conditions for wildfires, which release still more smoke and soot. Meanwhile, in the Central Valley north of the city, dry farmland has been kicking huge dust clouds into the air.

If the warm, dry trends continue, as most experts predict, California's decades-long progress in improving its air quality may be in danger. Since the 1980s, peak ozone concentrations in Southern California have fallen by about two-thirds, and fine-particle pollution has been cut in half since 1999. Emissions from cars, trucks, ships, power plants, and industrial facilities are also falling. About 63 percent of Californians now live in areas that meet federal health standards for ozone, compared with 24 percent in 1990, according to estimates by the state Air Resources Board.

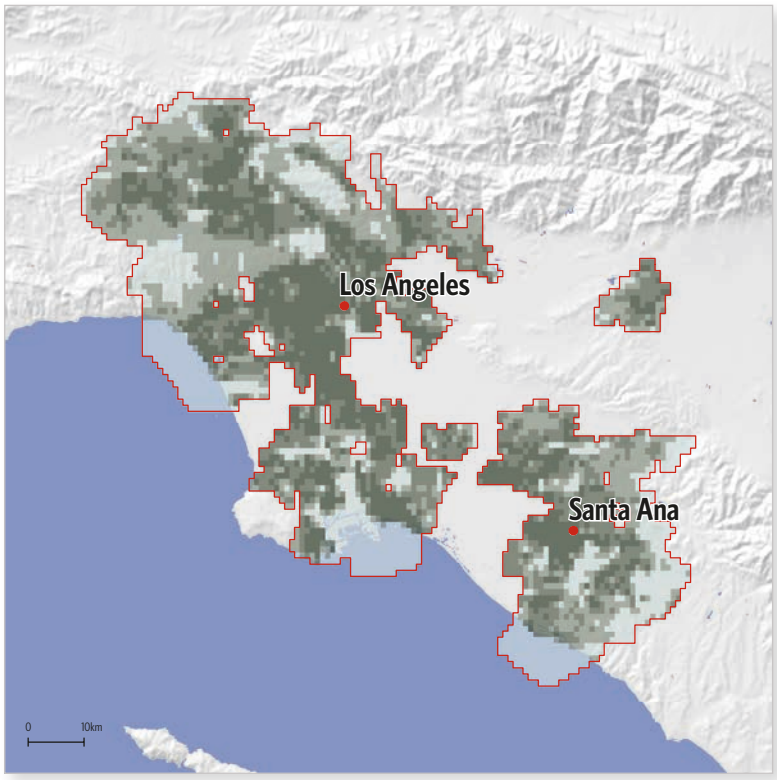
Yet California still has a long way to go before it meets federal air-quality standards and its own ambitious climate goals. Reducing ozone to federally mandated levels by 2032 will require deploying low- or zero-emissions

technology across the economy, and particularly in the South Coast Air Quality Management District, which includes 16.7 million people in Los Angeles, Orange, Riverside, and San Bernardino counties.

Given the long-term threat that increasing temperatures due to climate change poses to air quality, state regulators are looking into new rules as well as new strategies to reduce emissions of greenhouse gases at the local level. Those strategies could target short-lived pollutants like methane; encourage dense development near transit stations; or fund solar water heaters, electric vehicle charging stations, and other carbon-cutting projects.

The results of this study also indicate the role the trees can play in the larger strategy for Los Angeles. While at a city-level, the median ROI of tree planting is only moderate by global standards, there are specific neighborhoods that would have high ROI, including dense neighborhoods in central Los Angeles, Santa Monica, and Long Beach. For an additional annual investment of $6.4 million in street tree planting, we estimate that more than 400,000 people could have a reduction of 1.5° C (2.7° F) in summertime temperatures.

Results from the Los Angeles study



Map 21. Neighborhood-level ROI for Los Angeles (temperature reduction).

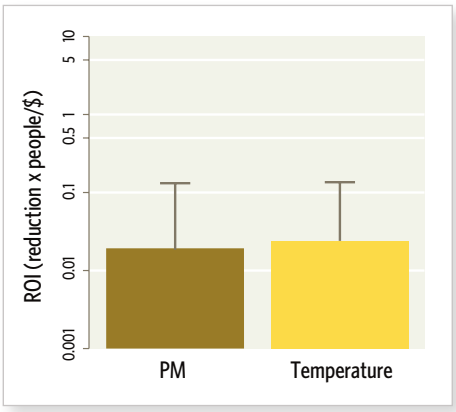


Figure 26. ROI for tree planting for Los Angeles.

Investment	Annual Cost ($)	> 1 ug/m² $PM_{2.5}$	1.5 deg C
10% of sites	6,360,000	432,000	437,000
20% of sites	12,700,000	695,000	702,000
Full Investment	51,600,000	1,300,000	1,320,000

Table 14. Temperature and PM reduction benefits under three investment scenarios for Los Angeles.

The Nature Conservancy

Science contact: Rob McDonald, Lead Scientist, Global Cities
1 (703) 841-2093 | Email: rob_mcdonald@tnc.org

Media contact: Misty Edgecomb, Communications Director, Global Cities
1 (617) 532-8317 | Email: medgecomb@tnc.org