

# MITIGATING EXTREME HEAT IN A CHANGING CLIMATE



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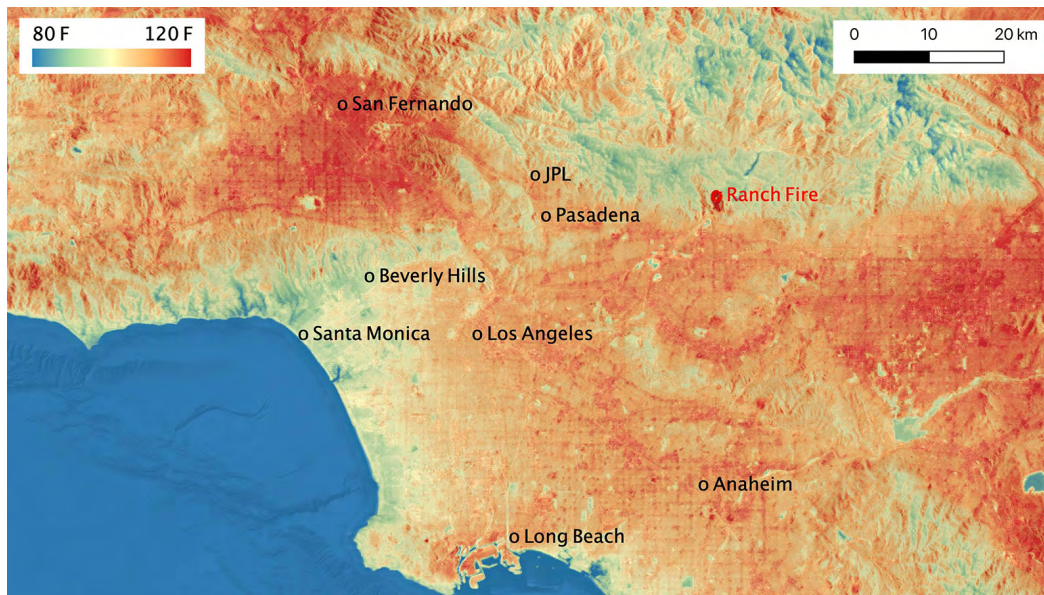


Image: ECOSTRESS map of land surface temperatures in Los Angeles County on Aug. 14, 2020 during a heat wave. | NASA/JPL-Caltech



## SELECT EXPERTS

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## BACKGROUND

- Human activities such as fossil fuel use and land use changes have dramatically increased the amount of greenhouse gases in the atmosphere over the past century.
- The resulting impacts to the global climate pose a grave threat to society and the environment due to more frequent and severe disasters such as destructive storms, droughts, wildfires, and extreme heat.
- Extreme heat is defined as temperatures that are much hotter and/or humid than average.
- Average temperatures in California have been increasing over the last century and heatwaves are becoming more common.
- Inland urban areas are more impacted by rising temperatures and heat waves than coastal and rural areas.

## CALIFORNIA IS GETTING HOTTER

Despite California's ambitious climate change policies, our state is already warming as a consequence of climate change. Structures such as roads, pavement, and buildings absorb and re-emit more of the sun's heat than natural landscapes such as forests, parks, or bodies of water. Due to this "urban heat island" effect, dense urban cores are hotter than coastal and rural areas.

Even small increases in average temperature can have dramatic impacts on fertility, learning outcomes, job performance, accident rates, quality of sleep, and overall health. Higher nighttime temperatures are particularly concerning because they inhibit people's ability to recover from daytime exposure to heat.

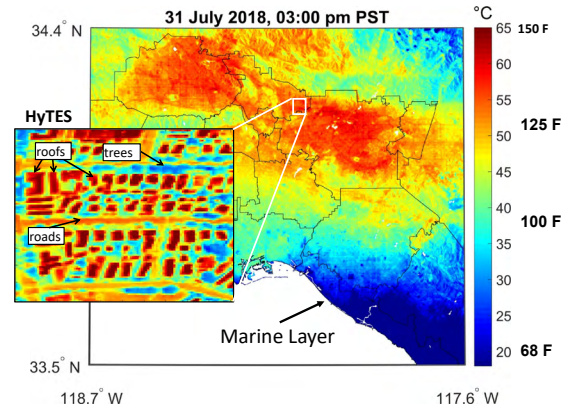
## WAYS TO MITIGATE EXTREME HEAT

1. **Increase** access to air-conditioned indoor spaces both during the day and night.
2. **Adjust** schedules to reduce time spent outdoors when temperatures are highest.
3. **Increase** use of cool roofs and other building materials to lower indoor temperatures.
4. **Increase** vegetation coverage and green spaces in urban areas to lower local ambient temperatures.

Disadvantaged communities in California are not only hotter because they have less access to green spaces but are at greater risk of negative outcomes from extreme heat because they have less access to technologies such as air conditioning that can provide relief when temperatures are high.



**Figure:** Researchers analyzed observations from 331 weather stations between 1950 and 2000 and found that average temperatures rose in 6 out of 7 of the state's major climatic sub-regions.  
Source: NASA

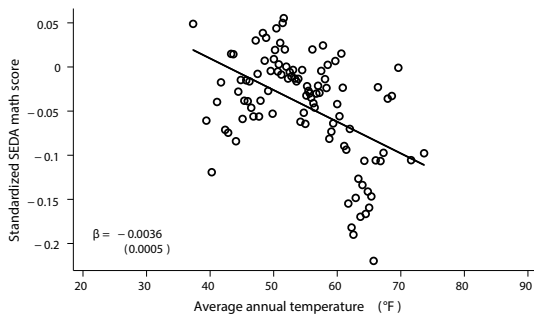


**Figure:** ECOSTRESS land surface temperature during a heatwave on July 31st, 2018. Inset of temperature data from the HyTES airborne instrument showing roofs and roads become much hotter than trees in Pasadena, CA.  
Source: NASA JPL

## WHERE CALIFORNIA IS HOTTEST

Research into the effects of climate change has found that California is getting hotter, with the biggest increases observed in southern California (left) and in dense urban areas with limited vegetation cover (above).

### 2

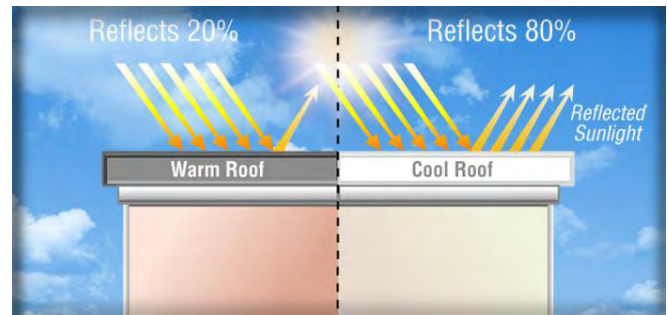


**Example: Research finds that** students in hotter U.S. counties score lower on standardized tests in part due to the effect of heat on learning.  
Figure: Park et al. (2020) American Economic Journal: Economic Policy, 12(2): 306-339

## IMPACTS OF EXTREME HEAT

Extreme heat can not only have profound impacts on human health - including increased injury, illness, and death - but can also have many other negative outcomes for society, such as decreased worker productivity or decreased student learning (above).

### 3



**Example:** Cool roofs made of materials that reflect more of the light from the sun can help reduce the indoor temperatures of buildings.  
Figure: LBNL

## REDUCING HEAT EXPOSURE

Strategies to reduce the local ambient temperatures of communities include the increased use of cool building materials (above) and cool ground cover such as cool pavement and green spaces. Other strategies to reduce exposure to high temperatures include decreasing time spent outdoors and increasing access to air-conditioned indoor spaces.



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