

## Urban Heat Island Effect

Researchers, city planners, elected officials, and others are spending more and more time studying the urban heat island (UHI) effect. This term refers to the phenomenon of significantly higher temperatures in built-up areas as compared to surrounding rural or natural areas. In cities with one million or more residents, daytime temperatures can differ from surrounding areas by 1.8 – 5.4 degrees Fahrenheit, while nighttime temperatures differences can be up to 22 degrees Fahrenheit. These temperature differences decrease with city size, but can still have a significant impact on the livability of an urban area.

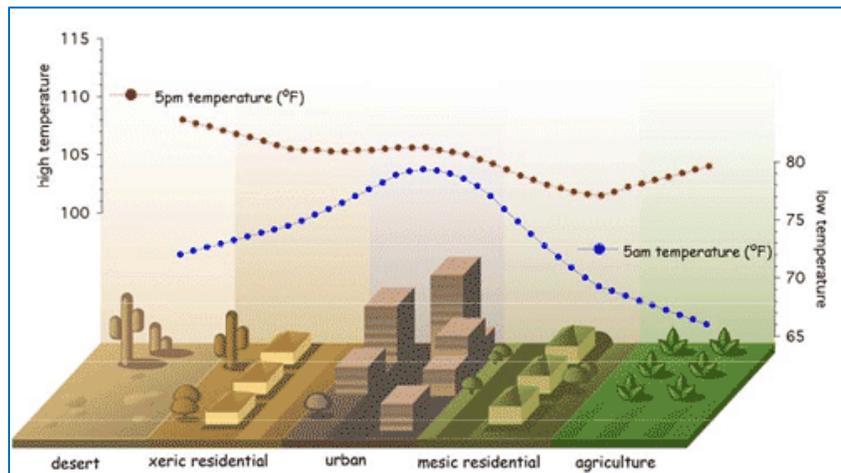


Figure 1: Urban heat island effect in a Southwest city

Urban heat islands form as natural areas are paved over and built up to form cities. These built up areas are composed of materials that absorb and store much more solar heat than do natural land covers. Buildings, roads, and parking lots release this stored heat more slowly than natural materials, accounting for the high nighttime temperature differentials noted above. As an area urbanizes and removes vegetation, it also removes the cooling effect offered by evapotranspiration and shading. Work by Sharon Harlan, a geographer at Arizona State University, has shown that in Phoenix, urban heat island effects disproportionately impact low-income areas, primarily because these areas contain much less landscaping and vegetation than their higher-income counterparts.

Several strategies exist to help mitigate the UHI effect, including increasing the albedo of surface materials, installation of green roofs, and planting vegetation—especially trees. A study in New York City found that increasing the urban forest is one of the most cost-effective ways to combat high urban temperatures. In the Southwest U.S., where water supplies are often limited, water harvesting represents a method of increasing urban vegetation without stressing potable water supplies.

### Further reading and resources:

<http://www.epa.gov/heatisld/resources/compendium.htm>

<https://webapp4.asu.edu/directory/person/191863>