Heating Things Up: Extreme Heat Events Rise With Sprawl

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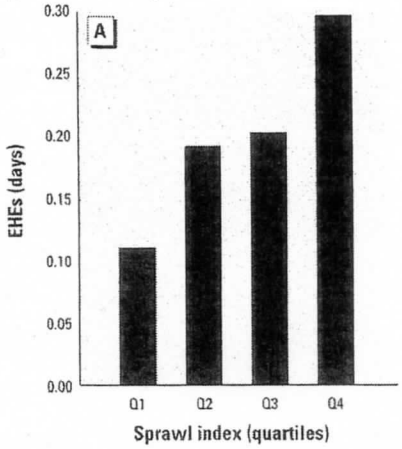
New research in the journal Environmental Health Perspectives reveals the association between spread out urban form and Extreme Heat Events (EHEs). In a phrase, sprawl heats things up.

In "Urban Form and Extreme Heat Events: Are Sprawling Cities More Vulnerable to Climate Change Than Compact Cities?," Brian Stone, Jeremy Hess and Howard Frumkin analyze 53 urban regions in America for their degree of sprawl and compare that with each region's annual growth of the number of days per year that have Extreme Heat Events (EHEs), as defined by the National Climatic Data Center. They then break down the regions into four equal groups (quartiles), from least sprawling (Q1) to most sprawling (Q4) and line up the number of EHEs along side (see right). The relationship is pretty striking.



So what causes these ESEs? The culprit is the urban heat island effect, where urban areas can be up to 10 degrees hotter because of the removal of vegetation, the prevalence of dark paving and dark roofs that absorb heat, buidings and structures that trap heat, and concentrated heat from machines, appliances, generators and vehicles.

Clearly, then, more urbanized area would mean more heat. Indeed, the study points out, for one, that the rate of deforestation in sprawling regions is more than double the rate for more compact regions. And of course we'd expect more paving for roads and parking, too.

Now it's important to note that an increase in ESEs does not translate into an increased risk of mortality. The rate of heat-related illness has, in fact, been flat, or has even declined slightly, since 1980 in the US, mostly due to the availability of air conditioning. Yet an increase in urban heat has led to higher mortality in other cities--Shanghai is an example offered in the report--so the implications of this research are important for cities outside the United States.

Perhaps most importantly, however, is the cumulative impact this increase in warming can have when coupled with expected increases in temperatures due to the impacts of global warming, which may increase temperatures higher than we've been forced to manage up to now.

The authors wisely counsel cities to reduce heat-related risk through

> preservation of regional green space; the installation of street trees, more reflective surfaces on roads and buildings, and green roofs; and replacement of vehicular travel by transit, walking and bicycling.

Slowing extreme heat events: yet another good reason to promote sustainable communities.

Name/Period/Date

Heating Things Up

1. What are EHE's?
2. What organization defines EHE's?
3. Describe the urban heat island effect.
4. Explain the effect that EHE's have on mortality rates in the U.S.
5. Explain the effect that EHE's have on mortality rates elsewhere in the world.
6. How does this relate to global climate change?
7. What can be done to reduce heat related risk?