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**Nebraska Forest Service**  
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## Cooling Urban “Heat Islands”

*SIMPLY TREES for May 2015 by Kendall Weyers, Nebraska Forest Service*

Though many of us in urban areas don't realize it, we are residing on an island, a “heat island.” This is the condition where urban areas are significantly warmer than the surrounding countryside during the heat of summer due to human activity and the large amount of heat-absorbing surfaces, plus the lack of vegetation and the cooling it provides.

Our personal comfort is affected by this phenomenon, but it goes much further than that. According to the Environmental Protection Agency, “heat islands can affect communities by increasing summertime peak energy demand, air conditioning costs, air pollution and greenhouse gas emissions, heat-related illness and mortality, and water quality.” All of these issues are amplified by changes in climate and additional urban development.

Fortunately, plants in the urban landscape contribute far more than beauty, and can be a tool in addressing all of the challenges listed above. The more strategic the landscape design, and the lower the inputs (maintenance, water, fertilizer and pesticides) required by the landscape, the more positive the contribution.

The main contribution of plants is a cooling effect, which they accomplish in two ways. The obvious one is shade. Shaded surfaces in the urban environment can be up to 45 degrees cooler than surrounding exposed areas. It's no wonder that shady parking space on a blazing day is in such high demand. The other plant contribution to cooling is through evapotranspiration, a process which can knock up to 9 degrees off the air temperature during peak summer heat.

To maximize the impact on moderating temperature extremes, it's important to consider a number of factors. Maybe the most important is the angle of the sun. In Southeast Nebraska the summer sun is almost directly overhead at midday, with sunrise in the northeast sky and sunset in the northwest. The winter sun is at a much lower angle tracking across the southern sky.

So a tree planted on the west side of house will provide shade during the hottest part of the day and will have more impact than one on the south. Trees planted on the south should have a mature canopy large and close enough to shade the structure, while also allowing the low angle winter sun's rays to reach the home and provide solar heating.

Any trees close to buildings should be resilient in storms, with good structure and strong wood characteristics. And for shade, denser foliage has more impact. A tree such as sugar maple or linden provides deep shade, while a honeylocust offers only light, partial shade.

Plants are most effective at cooling (actually limiting heat gain) when they shade windows and hard surfaces—walls, roofs and pavement—that would otherwise absorb, hold and slowly release heat from the sun. Shading the air conditioning unit itself is also beneficial, increasing its efficiency. If space is limited, vines, shrubs, tall grasses and small trees can all contribute to shading. Vines should be avoided on wooden siding, but serve quite well on masonry walls, arbors and trellises.

As for cooling through evapotranspiration, the more plants the better. Plus more space for plants usually means less for pavement, another reason for smaller patios, narrower drives and minimal parking lots.

These steps definitely benefit homeowners, but they also reach far beyond property lines. Planting a tree or tending a landscape is rewarding in itself, but realizing the positive impact we have on the community around us adds another level of value and satisfaction.