CAN TREES COOL US AND OUR CITIES?

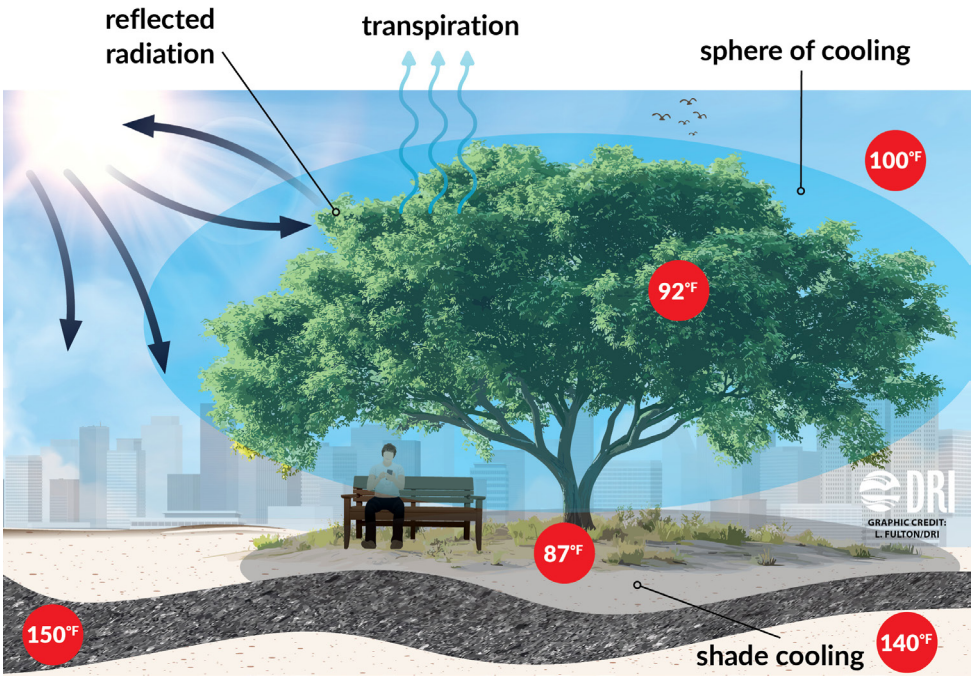
We all know what it feels like to seek relief from the heat in the shade of a tree. Pavement and rock can be up to 50°F cooler in the shade than in the sun. Air temperatures inside the canopy are up to 8°F cooler than out in the open. Our instinct to look to trees as a respite from heat is a wise choice.

Feeling hot is a function of air temperature and sun exposure (along with humidity and wind) — making shade continuity and accessibility crucial to keep us cool.

Studies estimate that 30–40% tree canopy is necessary to reduce air temperatures in a community. In the Las Vegas Valley, most communities currently have 5–10% tree canopy, making the path to sufficient citywide canopy cover to cool the city challenging.

How do trees cool people?

IT'S NOT JUST HOT AIR: It's important to identify the different ways in which we feel the heat. Even when the air temperature is only 78°F in the middle of the day, we feel much warmer when we are out in the full sun. Our bodies absorb the solar radiation from the sun's rays as a direct heat source on our skin, elevating our temperature perception by 10–20 degrees.



Trees cool the environment around them through two processes: shade and transpiration.

SHADE: Shade keeps surfaces from heating up during the day by reflecting solar radiation. This also keeps the area cooler throughout the day and at night by preventing surfaces from absorbing and releasing that heat for hours after the sun sets.

TRANSPIRATION: Trees lose water to the air through tiny holes in their leaves (stomata). When the water evaporates, it cools the air. This is the same process that allows sweat to cool our skin.

Cooling superpowers of desert trees

Because the air in the desert is so dry, water released from the leaves is absorbed into the air rapidly, producing a stronger cooling effect than in humid environments. Trees in the desert have a greater impact on air temperatures in and around their canopy than those in muggy communities — but the cooling power is only in full effect when they have sufficient access to water to overcome drought stress.

How far can we feel the cool?

Trees and built shade help keep surfaces cool, with transpiration giving an extra air-cooling boost. Cooling from transpiration is relatively localized — generally extending 5–30 feet from the tree. Clusters of trees magnify the cooling effect of individual trees, extending the range of the cooling benefits up to 100 feet beyond the edge of the patch.

FOR MORE INFORMATION:

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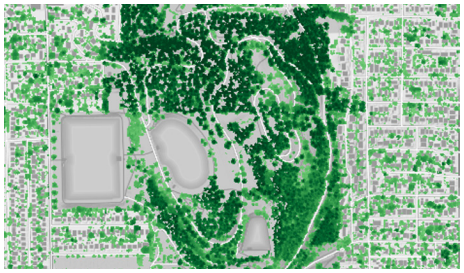
SCALE MATTERS FOR COOLING BENEFITS OF TREES

EASY/EFFECTIVE → **DIFFICULT/DISTANT**

one tree

A single mature tree can give measurable benefits and be established with relatively low investment.

a neighborhood



We need coordination and investment to establish a dense enough tree canopy to cool a larger area like a park or neighborhood.

a whole city

For trees to cool an entire city, it would take a dense, continuous tree canopy, which would require enormous effort and time.

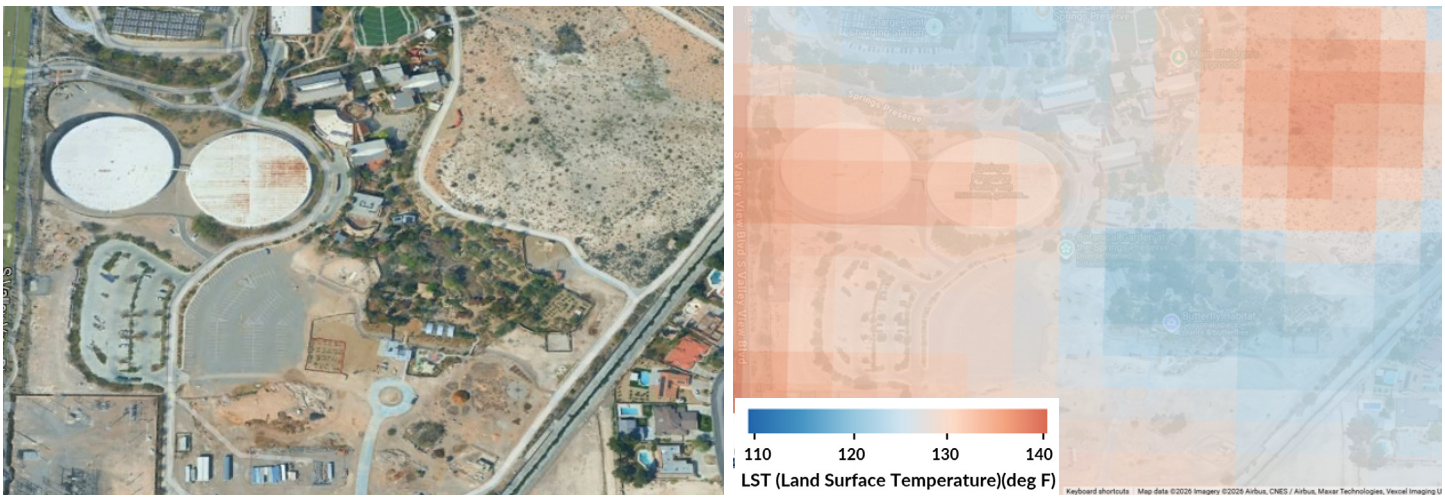
We can maximize the benefits of trees by focusing on connectivity and accessibility — coordinating planting efforts within and among neighborhoods, and connecting communities through green corridors.

Investments needed

Expanding canopy expansion across a large area is a daunting task. Barriers include planting space, irrigation requirements, and maintenance costs. Trees require care and planning to keep them performing at their peak.

- **Maturity matters:** Planting trees is a long-range adaptation. Tree benefits increase with size. We can expect to wait 5–10 years to realize the shading and cooling benefits of young trees. Protecting the current mature canopy is essential for community benefits.
- **Water availability:** This is a consideration in our arid environment. Appropriate and efficient irrigation at planting and beyond is necessary for tree canopy expansion. Watering may not need to be exorbitant, from as little as 20 gallons per month for a young arid adapted tree.
- **Maintenance required:** Trees are assets and require management. In our urban environment where soils and infrastructure are drastically altered trees often need assistance to maximize their vitality. In addition to irrigation, this may include soil management, mulching, proper pruning, and regular monitoring for pests and diseases.

Surface Temperature at Springs Preserve—Summer 2025



Tree clusters contribute to cooler temperatures than those found in the surrounding desert.