Plant with a Purpose

Every year, 200-300 street trees are planted in Arlington: mostly by resident request, but a portion are planted at the discretion of the town. By selecting planting sites based on areas that have the highest summer temperatures, the town can help cool the hottest parts of town. An adult tree can reduce daytime summer temperatures by almost 2°C in the area around it. Arlington should prioritize areas with the least amount of trees over the coming years. By doing so, trees will not only make Arlington a cooler place to be, but can actually save lives!

Plant Trees to Reduce the Urban Heat Island

Arlington's Street Trees

Trees are already a valued presence in Arlington, MA largely because of their aesthetic appeal and the natural feel they give the community. In 2017, Arlington created an inventory where they recorded the location, size, and species of all municipal trees and identified open areas where there used to be street trees. The town then committed to plant over 2000 trees by the year 2037 to restore the municipal tree population to its historic maximum of almost 11,000 street trees. Historically, the town planted trees without fully considering the many benefits the trees can provide. But, trees live for many years and long-term planning can help maximize the health of the trees and the services they provide.

It's Hot & Getting Hotter

As the climate warms, not only will summers get hotter on average, but heat waves will become more common and more extreme. In urban areas, vulnerable people already experience heat stress, which can lead to hospitalizations and even death. In the coming years, urban temperatures will continue to increase, and cities and suburbs in the northeastern U.S. may become unpleasant or even unbearable in the summer months. In cities, temperature mitigation is one of the most important pieces of climate change preparation.

Hardworking Trees

Street trees provide many benefits in addition to cooling the area around them. Trees store carbon, can reduce stormwater flooding, and reduce air pollutants. Trees are not only aesthetically pleasing but residents have reported having trees in a city has great benefits for mental health and quality of life!

Urban Heat Island

The phenomenon where urban areas are much hotter than their surrounding rural areas is called the "urban heat island". This is primarily caused by turning vegetation and open soil into roads, buildings, and other manmade surfaces. Because manmade materials absorb more heat, do not provide the evaporative cooling of vegetation, and are usually associated with more waste heat from vehicles and building energy usage, urban areas with fewer trees are hotter.
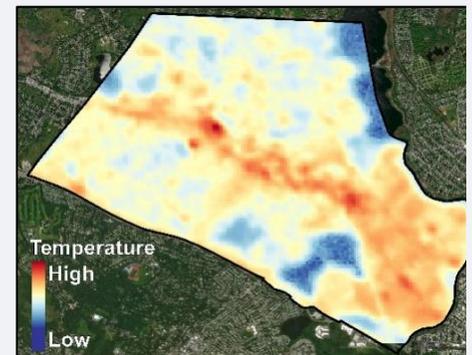

Figure 1. The hottest parts of Arlington are also the areas with the fewest street trees.

Nature's Air Conditioners

Trees are both air conditioners and a sun-brella rolled into one. Trees "sweat" water through their leaves, cooling themselves and the air

around them. Trees also provide shade, which can prevent sun from heating up the sidewalk and provides a respite for people to get out of the heat. These two features of trees can change a neighborhood from an oven into a nice walk-in-the-park. In Arlington, there is a clear difference in summer temperatures between places with lots of trees and areas like Massachusetts Avenue that have little vegetation (Figure 1).

The Dollars and Cents of Greening

Arlington budget close to $600,000 for tree planting, maintenance and salaries in 2018, and plans to increase funding for tree planting in the future. The town estimates that the cost of planting and watering a tree for the first 2-3 years is between $1,000 and $2,000. The cost to remove a dead adult tree is even higher. Careful selection of planting sites will not only maximize the benefits of these expenditures, but can even reduce costs by selecting sites that give trees the best chance at survival. Long-term planning also can ensure that the tree population is sufficiently diverse to ensure that invasive pests do not pose a risk to the entire tree population.

Where do we plant?

Arlington's Tree Warden and the Department of Public works already put lots of thought into planting trees so they don't interfere with power lines, water pipes, and other municipal infrastructure. By combining information from the town's GIS database with recent research from Boston University

Fig 2. Arlington DPW hard at work planting a new street tree. (arlingtontrees.org)

on heat islands and urban forestry, we created a site-ranking index for all possible planting sites in Arlington. This will help prioritize areas that can get the most cooling benefits from planting trees, while accounting for how suitable the site is to plant trees in (Figure 3). By using the best available research, Arlington can make plan(t) for the future, and ensure that its trees are healthy and benefitting the town for years to come.

Fig 3. Results for an Arlington neighborhood from a planting-priority index that ranks possible tree locations based on their temperature, availability of open tree pits, and other suitability factors.

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