Apple Hill Arboriculture

Tree Canopy Assessment

Placerville, California 95667

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First developed by the U.S. Forest Service in 2006, the Urban Tree Canopy (UTC) Assessment was created to understand the amount and distribution of tree canopy in Baltimore, Maryland. Since then, UTC assessments have been performed in hundreds of cities throughout the United States as well as internationally.

By creating a map of tree canopy and other land cover types, communities can use this information to understand how much tree canopy there is, where it is located, and where new trees can be planted.

Additionally, cities can also use this information to inform other planning activities such as setting canopy cover goals, prioritizing where to plant new trees to address environmental and social issues, and developing urban forest management plans (UFMP).

Point Sampling

The most simple method is to use a point sampling technique developed by the i-Tree Canopy tool. Random points, like those shown in the map, are generated within an area and manually assigned a value of “tree” or “non-tree” until a 1-2% standard error is reached. By dividing the number of "tree" points by the total number of points, you can quickly get an estimate of the percent canopy cover or any other land cover type.

The downside to this method is that there is no way to understand the location and distribution of tree canopy, plantable space, or other land cover types within various planning scales.

i-Tree Landscape

Another way to measure tree canopy is through the i-Tree Landscape tool. This tool uses land cover data from the National Land Cover Database. Once a location is selected, an estimate of the amount of tree canopy is provided. You can also explore location data (census data, forest risk, future climate, etc.), see tree benefits, prioritize tree plantings, and generate reports.

This is a great, free tool from i-Tree with lots of information to explore. However, the land cover data is typically lower resolution (30-meter) than what the third method provides (60-centimeter).

High resolution land cover data are critical for understanding canopy cover in urban landscapes where much of the urban forest is comprised of street and park trees that are not visible with 30-meter pixels.

High Resolution Land Cover Mapping

The third method uses remote sensing technology and high resolution imagery (aerial or satellite) and elevation (LiDAR) datasets to create detailed land cover data. These data inform all other aspects of the project by categorizing a given landscape into specific classes such as tree canopy, other non-canopy vegetation, impervious or hardscape, bare soil, or water.
With this information in hand, you can then look at the quantity and geographic distribution of each type of land cover and ask many questions like:

- Where is there existing tree canopy? How much?
- How much gray infrastructure (roads, buildings, parking lots, etc.) is there compared to green infrastructure (trees, grass, other vegetation)?
- Where are there potential planting opportunities to increase canopy coverage and address specific issues?

Geographic Assessment Scales

UTC assessments provide decision makers with a top-down view of canopy cover throughout a city and across various spatial scales. These scales can benefit many city departments by providing detail on the current level of canopy cover, where plantable spaces exist, and where trees can be planted to address specific issues and to achieve goal.

Stormwater staff may be interested in expanding canopy cover to help reduce runoff. Streets staff may be interested in increasing canopy cover within the public right-of-way to help offset urban heat islands. Council members may interested in expanding canopy, green space, or recreation opportunities for their citizens.

Plantable Space and Planting Prioritization

Another key element of a UTC assessment is locating plantable or open space and identifying the most suitable areas for tree planting to address specific issues. Using a variety of tools and datasets, cities can determine the areas that would benefit the most for environmental, social, and economic reasons.

Air Quality

Energy Conservation

Underserved Populations

Public Health - Asthma Rates

Priority areas can then be combined with different weights or levels of importance to provide targeted planting areas that align with community goals.

Setting canopy cover goals

Establishing a canopy cover goal requires knowing what you already have. It also requires knowledge of local issues: is Downtown hotter than other areas? Do the streets flood during heavy rain events? Are there certain segments of the population that don't have equal access to green space?

With a UTC assessment, you'll get the information you need to set realistic goals based on the existing canopy cover, available planting space, and specific locations affected by these local issues.

You'll also gain understanding of the effort needed to reach this goal. Will it take planting 1,000 trees or 100,000 trees? Will you need to focus on public outreach and engagement in order to expand the urban forest in private residential areas?

Our reports aim to summarize our methods, findings, and general recommendations on how best to put your new data to use. The data are analyzed to find the most meaningful and practical outcomes such as advocating for public education and outreach programs, locations of the areas that need more trees, the number of trees that need to be planted to achieve goals, and other data-driven advice that can be applied in an urban forest management plan (UFMP).

Since 2012, we have helped over 80 communities in the United States, Canada, and Australia gain a better understanding of their tree canopy and identified strategic ways for them to improve conditions for residents, visitors, and their local environment. In addition, many other communities have had similar projects done by internal staff or other groups. As the importance of trees has become more widely understood, the number of cities that have recognized the importance of these assessments has increased.

Use this tool to classify land and tree cover across a given area using random sampling of aerial imagery. See tree canopy benefits in terms of **carbon dioxide**, **air pollution**, and **stormwater** impacts.