Standard of Care

URBAN FOREST HEALTH MONITORING IN THE UNITED STATES – *Part 4*

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Statewide Urban Street Tree Monitoring

Statewide Urban Street Tree Monitoring assesses street trees using plots established randomly in the public right-of-way in urban areas. Although they account for a small portion of the urban forest (approximately 5 to 10 percent), street trees are the resource that municipal foresters are responsible for and often are the most visible component of the urban forest. A monitoring system provides data on the nature and condition of the street tree population and can be used to detect new or exotic insects or pathogens. Like urban forest inventory plots, street tree plots are updated continually to provide data on changes in tree populations.

The statewide sample consists of 300 street tree plots. In the first year, all 300 plots are installed; this becomes the baseline sample. In subsequent years, a subsample of plots is revisited to allow for assessments of change. A state may choose to intensify the baseline sample. This intensification was done in Wisconsin in 2002 when 900 plots were installed by the Wisconsin Department of Natural Resources. The Massachusetts Division of Forests and Parks (2002) and Maryland Department of Agriculture (2001) each installed 300 baseline plots. In 2002, in Maryland, plots were revisited using a rotating panel design to obtain an estimate of year-to-year change in condition. A panel consists of one-fifth of the 300 baseline plots along with a remeasurement of one-third of the previous year's plots (20 overlap plots) for a total of 80 plots per year.

Each plot consists of four subplots, two on each side of the roadway. Plots were installed within the public right-of-way, so property owner contacts were not an issue. Each subplot is 181.5 feet long and 10 feet wide (area equals the area of an urban forest inventory subplot). Instructions were provided for cul-de-sacs, dead-end roadways, and roads with median strips. Although not set permanently with monument markers, plot locations are identified by distance and azimuth to landmarks. Divided highways, private communities, interstate access ramps, and military installations were excluded as sample locations. Plot locations were provided to state personnel along with replacement locations if the original plots could not be accessed (e.g., plots with dangerous access or located in private or gated communities).

A street tree manual includes information on plot establishment procedures and data collection. All trees one inch and larger in diameter are tallied. Data are collected on tree diameter and height, crown condition, and damage. Ground-cover types on the plot are estimated, and information on sidewalk and utility conflicts is recorded. Training, conducted for all field crews, included a review of the field manual and procedures for in-field plot establishment.

Street Tree Monitoring in Maryland and Massachusetts

An estimated 643,958 trees exist along Maryland's 14,139 miles of urban roadway (about 46 trees/mile). The 20,384 miles of urban roads in Massachusetts are lined with an estimated 1,184,776 trees (58 trees/mile). In Maryland, the street tree population comprises 67 different species, none making up more than 13 percent of the total population (Table 1). Species diversity at the genus level shows 32 different genera, with more than 70 percent of the trees among only five genera *(Acer, Pyrus, Quercus, Prunus,* and *Platanus).* In Massachusetts, Norway maple clearly dominates, accounting for nearly 35 percent of the 66 species encountered (Table 2). Massachusetts street trees are represented by 29 different genera, with more than half of all trees either *Acer* or *Quercus.*

The street population in both states is dominated by maples; nearly half of the trees in Massachusetts and 40 percent of the trees in Maryland are Norway, sugar, red, silver, or other maples.This distribution has implications for insect or disease infestations that could cause significant losses in street trees. An example is the recently introduced ALB, which attacks and kills at least six species of maple. Other potentially significant pests or diseases are the gypsy moth, which could have a significant impact on oaks, the emerald ash borer, and sudden oak death.

Available planting space was determined by factoring an accepted planting space (50 feet) between trees, knowing the proportion of roadways that lack street trees, and considering trees whose crowns overlap the public right-of-way and essentially function as street trees. In Maryland, an estimated 23 plantable spaces exist per mile of urban roadway, and 20 such spaces exist per mile in Massachusetts. Planting potential spaces would nearly double the number of street trees in Maryland but increase street trees only about 30 percent in Massachusetts. However, this estimate of potential planting space includes hardscape such as driveways, sidewalks, and other impervious surfaces that could limit tree planting.

Distribution of tree size as reflected by diameter class indicates that street tree populations in Maryland are relatively well distributed; the largest proportion of trees is in the 5- to 15-inch diameter classes. In Massachusetts, larger trees (15 inches and larger in diameter) account for about half of the total, indicating a somewhat older or maturing street tree population. Large street trees are often aesthetically pleasing, but frequently require additional management (e.g., pruning due to interference with sidewalks or overhead wires, or for public safety). Compared to street trees in Maryland, those in Massachusetts had a higher incidence of conflicts involving sidewalks (28 versus 18 percent) and overhead wires (25 versus 18 percent). In Maryland, 64 percent of the trees did not meet the minimum threshold for recording damage compared to 71 percent in Massachusetts. In Maryland, the most common damage recorded was open wounds (16 percent of damage recorded); conks and signs of advanced decay were the most common in Massachusetts (17 percent). Street tree monitoring, particularly in the long term, can provide useful information for sustaining populations, maximizing benefits, and minimizing liability.

Conclusion

National monitoring of urban forests can provide critical information for improving urban forest health, management, and benefits derived from this valuable resource. Although the information obtained from UFHM plots can be used immediately in management and planning, increased value will be derived after the plots have been remeasured. Long-term tree and forest monitoring in urban areas provides essential information on rates of change as well as a means for detecting and monitoring the spread and range of numerous tree health-related factors (e.g., spread and damage associated with the introduction of exotic pests). Knowing how the urban forest is changing can aid in developing more effective policies for protecting, sustaining, and otherwise enhancing our urban forests for future generations.

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