THE CENTRAL PARK TREE INVENTORY: A MANAGEMENT MODEL

by Geraldine Weinstein

In the mid-nineteenth century, Central Park was designed and built by Frederick Law Olmsted and Calvert Vaux. Its naturalistic landscape is now a historic and scenic landmark and an urban greenspace visited by 13,000,000 people each year. There are approximately 30,000 trees in Central Park. They are the dominant feature of this urban forest, and a highly regarded treasure. During the summer of 1982, a condition survey and classification system of all trees over 6" in diameter was implemented. The process that lead us to do this tree inventory, the actual tree inventory process, and in particular, the role it has in the management of Central Park's urban forest are the subject of this discussion.

In the 1970s dwindling resources cut deeply into the health, vigor, and beauty of Central Park's trees, most dramatically after the fiscal crisis of 1975. In January 1980 the Central Park Conservatory, a not-for-profit corporation, was formed to foster a partnership between the private sector and the New York City Department of Parks for the purpose of restoring and maintaining Central Park. In an urban park, landscape restoration and tree preservation are inseparable. In Central Park specifically the design, life and character of the Park are conveyed by well known specimen trees such as the magnificent burr and red oaks, the red maples, the sweet gums and sour gums, and the irreplaceable stands of American elms, European beeches and Turkey oaks. Placed above aesthetic considerations are those pertaining to public safety; therefore, a great deal of attention must be given to trees on playgrounds, athletic fields and along entrances and pathways.

Because of its concern to preserve Central Park's urban forest, the Conservancy assumed responsibility for maintaining it, and in doing so, initiated a new direction and level of tree care.

During the fall and winter of 1981, nearly a thousand trees were pruned, hazardous dead trees were removed and declining trees fertilized. But as we worked on the trees, it became apparent that their problems were complex. Doubts arose. Are the trees being pruned those in most need of this care? Are funds being spent in areas of greatest need? Should fertilizing precede pruning? That winter both the Conservancy and the Park users learned a great deal about trees. The Park users learned because we informed them about tree care practices that promote vigor and preserve the health and lifespan of a tree. The Conservancy learned that to have an organized and truly effective tree management system, rather than a series of reactive and potentially inefficient tree care practices, an objective analysis which would provide the identity, location, and condition of the tree resource of Central Park was needed.

The first step to an objective analysis of our tree resource was taken during the summer of 1982 when the initial survey and classification system of trees 6" and over in diameter was completed. Our objectives in taking this inventory were to:

1. Formulate a systematic preventative maintenance program with established priorities.
2. Locate and record those structural and biological characteristics which identify a tree as potentially hazardous.
3. Determine replanting needs and requirements.
4. Prepare a cost effective and defensible annual budget.

To obtain these objectives, information directly relating to tree care operations we knew we could accomplish would be required. The listing that follows points out the kind of information summaries retrieved.

1. A listing of the tree species in Central Park by number and percentage of total population.
2. A profile of trees based on diameter, height and crown spread.
3. A parkwide profile of tree maintenance needs.

4. A profile of maintenance needs by tree lawn.
5. A condition profile of trees in playgrounds, on ballfields and at entrances.
6. A condition profile of each of the ten dominant species.
7. A profile of the maintenance needs of the ten most dominant species.
8. A profile of percentage of deadwood parkwide by species.
9. A profile of diameter vs. height for all species by location.
10. Listings of trees showing specific insect and/or disease problems.

Data Collection and Training

The data collected fell into three broad classes: 1) Tree characteristics, such as size, species and condition. 2) Environmental characteristics, such as soil conditions. 3) Location characteristics needed in order to perform future maintenance operations.

Measurements were taken of diameter, height, crown spread, percentage of dead wood in the crown, diameter of largest dead limb, lowest limb height. These were all coded by numerical classes. Other variables referring to root, trunk and crown conditions were assigned letter codes (Fig. 1).

The variables were observed and measured by students and graduates from programs in arboriculture, resource management and/or urban forestry. The Park benefited from their expertise and the students were given career training unmatched in their experience. Specifically, they saw how different species tolerate the urban environment. As future urban tree managers and arborists, they would be able to use the knowledge gained from the Central Park Tree Inventory to choose trees they have actually seen able to cope with intensively-used urban landscapes and to understand the level of tree care they must have.

The Inventory In Use

Management and maintenance. The inventory, now completed and computerized, is a powerful management tool for present maintenance and future planning. Rather than randomly search and sort through the various problems

CS — CROWN SPREAD
1 - less than 10′
2 - 11-20′
3 - 21-30′
4 - 31-40′
HT — HEIGHT
1 - 0-15′
2 - 16-30′
3 - 31-45′
4 - 46-60′
5 - over 60′
LU — LAND USE
S - street tree
P - playground tree
E - entrance tree
N - bench tree
B - ballfield tree
W - walkway tree
O - other
RC — ROOT CONDITION
ER - exposed roots
SL - soil grade lowered
SR - soil grade raised
RZ - compacted soil
GR - girdling root
TW - tree well
SD - structural damage
TC — TRUNK CONDITION
SC - split crotch
WC - weak crotch
CV - cavity base/trunk
CF - cavity filled
LC - longitudinal crack
SF - slime flux
SD - structural damage
BW - bark wound
CC — CROWN CONDITION
DB - dieback
HS - hanger/size
UP - utility pole
UW - utility wires
SD - structural damage
DW — DEADWOOD
1 - less than 10%
2 - 11-25%
3 - 26-50%
4 - 51-75%
5 - 76-100%
DL — DIAM. LARGEST DEAD LIMB
1 - less than 3″
2 - 3-6″
3 - 7-10″
4 - over 10″
HL — HEIGHT LOWEST LIMB
1 - less than 8′
2 - 8-16′
3 - over 16′
PD — PEST/DISEASE PROBLEM
1 - roots
2 - trunk
3 - crown

Fig. 1. Tree Condition Classes

affecting the Park's trees, computerization enables us to have this information organized and directly before us. We now know the location of the trees needing attention and the degree and kind of corrective maintenance required. We can assign priorities for each operation by area and/or by species. Moreover, rather than request funds for pruning or fertilization in general, we can establish a 3-5 year funding plan with funds first sought for a specified number of trees needing immediate attention.

Tree problems such as soil deficiencies, insects and diseases, split crotch and bark wounds, which previously were considered in general terms, can now be linked specifically to species and location, quantified, and can be included in a comprehensive management plan.

The inventory enables us to decrease cost and increase the impact of our efforts. We can isolate lawn areas in which trees are most in need of care and concentrate the efforts of a contractor or in-house crew in these areas, instead of scattering their energies from one tree to another throughout the Park. The inventory enables us to formulate sensible limit lines for the private contractor and helps us determine a fair cost for the work prior to the bidding. Moreover, in determining levels and need, the inventory is helping us define those areas where it would be cost effective to use a commercial arborist versus areas or trees requiring the kind of attention provided by our specialized tree care crew.

The inventory will be used to increase productivity in all aspects of tree care. The information we have on each tree enables us to determine the crew size and time needed to get the work done. Moreover, certain work operations such as cabling, integrated pest management, and Dutch elm disease control are done on selected trees. With locations lists of all trees requiring these maintenance operations available, work crews can be routed efficiently, thereby increasing the impact of the work accomplished.

The tree inventory is a springboard for tracking and monitoring current programs which directly influence on-going maintenance plans. These tracking and monitoring programs include:

An Update File. To record maintenance practices performed and damage incurred to trees since the initial data collection. How much maintenance is given to, or required by, specific trees and/or areas can be quantified and evaluated.

Tracking of Newly Planted Trees. Information relevant to the establishment and development of newly planted material is recorded and computerized. Data includes date of planting, location, source and size of material, soil characteristics and maintenance practices.

A Data Base on Soil. The soil data will provide us with additional information regarding maintenance practices, tree growth, and longevity as they relate to rooting environment.

Tracking of Dutch Elm Disease. This program will enable us to monitor the extent of progress of the disease in the Park and the effectiveness of our control efforts. We will have a computerized record of the extent of infection in each tree and in a specific area, the exact date and nature of the treatment, and the result it produced.

Replanting. A replanting strategy is another aspect of our management system. Replanting trees in Central Park is a design as well as a horticultural decision. The information from the tree survey provides guidelines. We know species distribution and frequency throughout the Park; therefore, we can decide to plant a species already found in the Park, data collected on that particular tree species gives us information concerning its susceptibility to branch breakage, splitting, leaf scorch, insect, and disease problems, and its ability to just cope or even thrive in different sites throughout the Park.

Equally important, the inventory allows us to identify and locate those specimens and stands, which because of their growth habit and their unique relationship to the landscape and to each other, convey the design of Central Park. Tree losses that actually weaken the design life or fabric of the Park can be identified and a replanting strategy can be devised.

Replanting decisions can become more enlightened if we use the inventory information to compare maintenance costs of different lawn areas and then define the factors—density, species selection; use plant placement among others—which make one area a maintenance burden and another nearly self-sustaining and aesthetically pleasing landscape.

Through the inventory survey and classification system an urban tree management system, in this case Central Park's, has been set on a positive and far-reaching course.

ABSTRACTS

MACLURE, M.S. 1983. **Chinese ladybugs hold promise for controlling Japanese scales in the U.S.** Am. Nurseryman 158(3): 30-33.

Insects introduced into different areas of the world from where they evolved often become very serious pests. Gypsy moth, Japanese beetle, and Mediterranean fruit fly are familiar examples. In a new habitat with a hospitable climate, a suitable host plant and no natural enemies from the homeland, a population of introduced insects can increase in number very rapidly. Examples of successful biological control are few compared to those of chemical control. The most effective predator and the one with the best chance for establishment in the northeastern United States is a ladybug, *Harmonia axyridis.* I observed large numbers of those ladybugs feeding voraciously in scale-infested pine stands throughout eastern China. Scale mortality from this ladybug of 70 percent is common, but mortality as high as 90 percent has been observed. I have obtained a colony of *H. axyridis.* I am now conducting experiments in Connecticut to determine if this ladybug can control red pine scale populations and successfully over winter.

WILSON, P.J. 1983. **The shigometer technique in practice.** Arboric. J. 7: 81-85.

The shigometer technique was developed to detect decay in living trees and telegraph poles. The technique is almost non-destructive and if proved to be quick, easy, and reliable to use in practice it would have applications in arboriculture, forest management, research, and the maintenance of some wood in service. In any practical application of the technique, the internal condition of a tree or pole would be predicted from one or more radial patterns of resistance readings. This test was designed with this in mind. The test material consisted of discs of New Zealand red beech (*Nothofagus fusca*) selected randomly from part of Maruia State Forest, Westland, New Zealand. The shigometer technique proved to be neither quick, nor easy, nor reliable to use in practice. It did not work in red beech and the evidence that it works in other species is inconclusive. The high variability encountered in red beech remains unexplained because the technique lacks any firm theoretical foundation.