

ESTHETIC PERCEPTIONS OF THE URBAN FOREST: A UTILITY PERSPECTIVE¹

by Herbert W. Schroeder

Abstract. This paper reviews research about the esthetic and psychological values of trees and suggests implications of this research for utility arboriculture. Research on human perception of urban environments has shown repeatedly that trees have a powerful positive influence on esthetics and visual quality. They also promote relaxation and recovery from stress. Street trees are primarily valued for visual esthetics and shade. Large trees are the most preferred, especially when their foliage forms a continuous canopy above the street.

City dwellers take many things for granted, including trees on their streets and electricity in their homes. People become most aware of the importance of these things when they are (temporarily or permanently) deprived of them. The utility arborist's job is to minimize losses of benefits received from both electricity and trees. The job is challenging because trees and utility lines just don't get along together very well. Power lines do unfriendly things when they come into contact with objects such as tree limbs, ladders, and people. Trees seek space for their foliage and, unfortunately, many of them choose space that has already been occupied by power lines. The utility arborist has the difficult job of mediating this conflict so that city dwellers can enjoy the benefits of reliable electric power and attractive outdoor environments.

In this paper I will present the results of research about the esthetic and psychological values of trees and suggest some implications of this research for managing trees near utility lines.

Basic benefits of urban trees. Research on human response to landscapes has consistently shown that environments with natural elements such as trees are highly preferred to urban scenes lacking vegetation (12, 13). The presence of natural features in urban environments can increase residents' overall satisfaction with their living conditions (3, 5).

When people are asked to describe in their own words what kinds of experiences they have in en-

vironments with natural vegetation, the most frequent responses are beauty and tranquility (7). The calming quality of vegetation can also be measured physiologically. Pulse rate, blood pressure, and brain wave recordings show that a person viewing a vegetated landscape is more relaxed than a person viewing an urban scene without vegetation (12), and that vegetation promotes recovery from stress (14). Thus trees can provide a partial remedy for the stress and ugliness that are too often associated with urban living. It is not surprising that people often become upset when their trees are removed or severely pruned.

Attitudes towards street trees and their management. Survey research has helped us find out how people attach priority to trees and their management, and some specific sources of satisfaction and annoyance with particular trees. A survey in a Chicago suburb found that 99 percent of the respondents thought parkway trees were an asset to the community (8). Detroit residents ranked park and street trees second only to education programs in priority for receiving additional funding, and they rated trees on streets as more important than trees in yards, parks, and wooded areas (2).

People also attach importance to the maintenance of trees. Schroeder and Appelt (8) found that removing hazardous trees and controlling insect and disease problems rated higher in importance than planting new trees. In this survey, 84 percent of the people said they thought maintenance of parkway trees was adequate, but in a survey of California communities that had suffered budget cuts from a tax reduction initiative, only 14 percent said that tree maintenance was good or excellent (11).

The most important benefits that urbanites receive from street trees are visual esthetics and

1. Presented at the annual conference of the International Society of Arboriculture in St. Charles, Illinois in August 1989.

shade (2, 11). With respect to preference for types of trees, in Detroit 63 percent of survey respondents said they preferred a combination of large shade trees and small flowering trees, 24 percent preferred just large shade trees, and 11 percent preferred just small flowering trees (2). In California, small immature trees received lower evaluations from residents than larger trees, apparently because they were less esthetic and provided less shade. Flower parts dropping from trees annoyed residents and detracted from their preference for flowering species. Most of the people in this survey said that they would not want to have their current tree removed and replaced with another tree, but that they would have preferred the city to have planted a different tree originally (11).

Visual preferences for street trees. We have conducted a series of studies on how trees influence the visual quality of residential streets, as seen in the view along the street (e.g. from a motorist's perspective). Our general technique was to take photographs representing a variety of street scenes in one or more communities, show them to groups of people, and ask the people to evaluate the visual quality of the scenes by rating them or rank-ordering them. Preference scores calculated from the viewers' evaluations were then statistically related to measurements of the amount and kind of vegetation on the streets.

In one study (9) we photographed randomly chosen streets in 10 towns in northern and central Ohio and took an inventory of the trees located on those streets. The inventory included the species and size of each tree. We also recorded the visual prominence of a variety of vegetative and manmade features visible in the photographs.

We showed the photographs of the streets to university students in Chicago and Urbana-Champaign, Illinois, who rated each scene on a 10-point scale of attractiveness. From the ratings we calculated scale values for the visual quality of each scene. We also showed slides to several local groups in one of the Ohio towns we photographed and found a very high correlation between the local groups' ratings and the university students' ratings.

Our analyses indicated that street trees were the strongest positive influence on visual quality

and that vegetation in yards was the next strongest. Large street trees had a much greater influence than small ones. Overhead wires, cars, and buildings had substantial negative impacts on visual quality.

Studies of visual quality of streets in Dearborn and Ann Arbor, Michigan, have produced similar results (1, 4). The strongest contributors to visual quality in these studies were the amount of deciduous crown visible in the scene, and the average size of the trees. Lien and Buhyoff (4) found that preference increases rapidly with increasing tree size up to about 10 inches in diameter, after which the rate of increase begins to slow.

A later study that compared the roles of street and yard trees in visual quality showed that a street tree contributed about 8 times as much to the visual quality of the view along a street as did a yard tree. The positive influence of street trees decreases, however, as the number and size of yard trees increase (10).

Orland (6) analyzed people's responses to the spatial characteristics of street tree plantings and found that the highest preference was for plantings of tall trees that created an enclosed space, with the tree crowns meeting above the street. The more open the space between and beneath the trees, and the wider the gap between the crowns of trees on the two sides of the street, the lower was the rated preference.

Implications for Utility Arboriculture

These research studies suggest that there are no easy solutions to the utility arborist's task. The trees that people like the most—large trees with wide spreading crowns—are the ones most likely to interfere with electrical transmission lines. Severe pruning of these trees may alter their natural appearance enough to significantly diminish the esthetic benefits they provide, although they could still be highly valued for shade. Replacing large trees with smaller species would remove the necessity for unattractive pruning, but the smaller trees are generally perceived as less esthetic and they provide less shade. Flowering species would add esthetic value during part of the year, but fallen flower parts can also be an annoyance.

Given all these factors, it is difficult to predict if people would prefer that large trees near power lines be pruned or replaced with smaller trees. I would recommend using trees that provide as much shade as possible, consistent with the requirements of power line clearance. I also think it is important to involve local residents in decisions affecting their trees and utilities.

Future Research

We need more information on how different kinds and degrees of pruning affect visual quality of trees near power lines, and on relative preference for large, severely pruned trees versus small trees that do not grow high enough to require pruning around power lines. We are currently developing a cooperative research project with a Chicago-area utility company to obtain some of this information.

Computerized video imaging may be a powerful tool for carrying out research on these topics, and for presenting alternatives to homeowners whose trees must be either severely pruned or removed. Using this technique, we can store a photograph in the computer's memory and electronically edit it to remove or add trees, and to alter the shape of trees. This will help residents visualize the outcomes of different approaches to managing trees near power lines.

Literature Cited

1. Buhyoff, G.J., L.J. Gauthier and J.D. Wellman. 1984. *Predicting scenic quality for urban forests using vegetation measurements*. *Forest Science* 30(1):71-82.
2. Getz, D.A., A. Karow, and J.J. Kielbaso. 1982. *Inner city preferences for trees and urban forestry programs*. *J. Ar-*

- boric. 8(10):258-263.
3. Kaplan, R. 1982. Managing greenspace in multiple-family neighborhoods. In *Proceedings of the 1982 Convention of the Society of American Foresters* (Cincinnati, OH).
4. Lien, J.N. and G.J. Buhyoff. 1986. *Extension of visual quality models for urban forests*. *Environ. Management* 22(3):245-254.
5. Marans, R.W. and J.M. Fly. 1981. Recreation and the quality of urban life. Research Report Series, The University of Michigan, Institute for Social Research (Ann Arbor, MI).
6. Orland, B. 1987. Spatial characteristics of urban street tree plantings. Progress report, USDA Forest Service research agreement 23-85-21 (Chicago, IL).
7. Schroeder, H.W. 1987. The experience of significant landscapes at the Morton Arboretum. In *Proceedings of the 1987 Convention of the Society of American Foresters* (Minneapolis, MN).
8. Schroeder, H.W. and P. Appelt. 1985. *Public attitudes toward a municipal forestry program*. *J. Arboric.* 11(1):18-21.
9. Schroeder, H.W. and W.N. Cannon, Jr. 1983. *The esthetic contribution of trees to residential streets in Ohio towns*. *Arboric.* 9(9):237-243.
10. Schroeder, H.W. and W.N. Cannon, Jr. 1987. *Visual quality of residential streets: Both street and yard trees make a difference*. *J. Arboric.* 13(10):236-239.
11. Sommer, R. 1989. Householder response to street trees. Final report, USDA Forest Service research agreement 23-87-8 (Chicago, IL).
12. Ulrich, R.S. 1981. *Natural versus urban scenes: some psychophysiological effects*. *Environment and Behavior* 13(5):523-556.
13. Ulrich, R.S. 1986. *Human responses to vegetation and landscapes*. *Landscape and Urban Planning* 13:29-44.
14. Ulrich, R.S. and R.F. Simons. 1986. Recovery from stress during exposure to everyday outdoor environments. In *Proceedings of EDRA 17* (Washington, DC).

Research Social Scientist

USDA Forest Service

North Central Forest Experiment Station

5801-C N. Pulaski Road

Chicago, IL 60646