

THE SIGNIFICANCE OF URBAN TREES AND FORESTS: TOWARD A DEEPER UNDERSTANDING OF VALUES

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Abstract. Many city dwellers hold very strong personal ties to urban trees and forests, with some attachments approaching a spiritual involvement. Ties between people and trees are associated with traditions, symbolism, and the need to “get involved” at the local level to sustain or enhance the environment for present and future generations. Urban forestry programs that aim to improve quality of life in urban areas will be most effective if urbanites learn about the basic biological needs of trees. At the same time managers and planners must learn about the many psychological, social, and cultural needs that trees and forests fulfill for urbanites.

Trees and forests play a significant role in the urban environment and have many important meanings to urban residents. However, we find that the effort of many municipal urban forestry programs to expand or sustain trees and forests is justified in terms of a few fairly simple dimensions of their significance to urbanites, such as beauty, shade, cooling, or contribution to global gas balances. Programs based on this narrow spectrum of tree benefits may not fully meet the needs or urbanites or gain their support. We suggest a broader perspective is needed, one that takes into consideration the deep psychological ties between people and urban trees and forests. In this paper we outline some of the major ties we have found, and we suggest their implications for management of arboricultural programs.

For the past decade we and a number of colleagues have been studying the role that trees and forests play in people’s perceptions, preferences, and use of urban environments. These efforts have shown the importance of trees and forests in many kinds of urban settings, including streets, housing developments, parks, forest preserves, arboreta, botanic gardens, conservatories, and trail corridors (16). We have found consistent patterns in people’s responses, and have built statistical models to help managers predict how urbanites will respond to urban forest

resource management options.

Much of our initial work focused on predicting people’s preferences for urban forest management changes, for example, planting new trees along a street, increasing density of tree cover in a park, or designing changes in a landscape along a bicycle trail. As we conducted this work, however, it became increasingly clear to us that the values of trees and forests in urban areas involved more than simple pleasure in the attractive environments they provide. There are deep emotional ties between people and trees that are not conveyed by a high correlation between “tree size” and “preference” in the equations we have developed to predict perceptions of urban forest environments. Likewise, the strong ties between people and trees cannot be explained by increased property values, reductions in air pollutants, and moderations in temperature. The psychological ties between people and trees defy easy quantification, yet few would deny their existence or their profound implications for urban forest management. We come across these ties in many aspects of our everyday experience with trees and in our daily contact with individuals. Together these ties help us understand the deeper meaning of people-tree relationships. The following examples illustrate some of our observations:

Discussions with urbanites about tree problems. Calls to our office for help make it clear that many people feel strongly about trees, particularly when these trees appear to be threatened by insects or disease.

Heroic efforts by urbanites to save urban trees and forests from destruction. These actions reinforce our beliefs that some very strong values are involved here. It has become increasingly common in the rapidly growing parts of the Chicago area for people to tie yellow ribbons around trees

to protest their removal for roadways or other construction projects.

Strong personal attachments of urbanites to trees in general, and to certain ones in particular. How many remember a big tree in front of their parents' or grandparents' home, and the deep sense of loss when it was removed? How many individuals have planted a tree as a child and watched it mature as they did? At the same time there is often much interest in planting trees as "living memorials" to remember loved ones.

Strong involvement of urbanites in tree planting efforts. This involvement is exemplified by renewed interest in "Tree City USA," Arbor Day, and Earth Day activities. Such activities also convey a strong people-tree bond, particularly when children, parents, and grandparents participate together in tree planting efforts.

Efforts by adults to provide urban children with forest experiences in urban nature centers, parks, arboreta, botanical gardens, or zoos. Outdoor outings are a common component of many organized youth programs, including scouting, park district, and similar programs.

Strong bonds between people and the natural environment have probably been discussed most widely with respect to wilderness and rare and endangered plants and animals. The support for the preservation of wild places and the species of plants and animals who live there is often very strong—and sometimes especially strong among urban people who have never seen them and never expect to. Some of this support has been attributed to the attraction that many urbanites feel for a natural environment that is distinctly different from the highly developed environment in which they live. Urban trees and forests provide contrast and relief from the highly built-up and developed city environment, but often lack the aura of "pureness" associated with the remote areas of this and other continents. However, the close bonds between people and their urban trees and forests may be enhanced by almost daily contact during all seasons of the year and by the distinct contrast between trees and the built-up environment. The role of urban nature as a contrast to the built-up environment is illustrated in this quote from an individual's account of an experience in

Lincoln Park on the Chicago lakefront:

While bicycling in Lincoln Park, Chicago in the fall, I came upon a scene of colored trees next to a lagoon (pond). The view was totally natural—water, trees, and bushes—no buildings. It was very beautiful—at least to a city person who sees brick, asphalt, and concrete most of the time.

Efforts at preservation also appear to be motivated by the feeling that trees and forests are "threatened" or "vulnerable" in the urban environment. In other instances trees are valued for their enduring nature, as in the following quote from a University of Wisconsin student:

I focused on a huge tree that was situated about fifty yards ahead of me... As I approached the tree, I noticed it was a Bur Oak of an unbelievable size... I became an insignificant figure... I wondered how many years the tree must have been there... As I walked away, I took one last glance of a 'King' that has never given in to man and other vegetation.

Research on the Significance of Trees and Forests

To explore in depth the strong attractions between people and trees, we have conducted studies in which individuals are asked to describe significant environments and experiences, and to explain the meanings they associate with those environments (3, 6, 7, 14). Much of this research has been conducted at the Morton Arboretum, which lies at an intermediate position along an urban - wilderness continuum. Its 1,500 acres on the outskirts of the Chicago area range from open mowed grassy areas and formal planting to prairie and some very "natural" woodlands — all readily accessible by road. Our research suggests that this area is capable of providing many of the experiences people often associate with wilderness. (Thoreau's "Walden" was reasonable close to an urban area.)

The results of our research revealed some very profound emotional ties between people and forests. An example is the following description of an experience at the Morton Arboretum (6):

A good friend had recently lost a loved one and was feeling extremely depressed. It was about 4:00 p.m. on

a warm and sunny Autumn day. Being familiar with the Morton arboretum and with its beauty at this time of the year, I felt that a drive through the Arboretum could be both pleasant and therapeutic. She agreed to go. As we drove into the Arboretum she remarked about the changing colors of several individual trees. It was almost peak fall color. While riding, we talked freely of our feelings and her present situation. As we approached the Forest area, I chose a road with no other cars or people in sight. We were able to drive slowly and soon came to the densest part of the forest where the sugar maples had turned brilliant colors of yellow and orange. Mingled in with the maples were tall green spruces; the Virginia creeper with its fall red coloring dappled the other colors. It was as if, suddenly we were inside a large cathedral with stained-glass windows. The feeling was magnificent and awe-inspiring. Almost automatically my car came to a stop. All conversation came to a stop. The 'peak' aesthetic experience occurred as the presence of a Supreme Being seemed to engulf us. The beauty of the environment and the solitude of the forest made us become 'one.' We were quiet and motionless for several minutes. A few tears rolled down the cheek of my friend. Quietly, she said, 'Thank you, I feel better - I can face anything now.' It was a profound experience for both of us.

In the rest of the paper we present a number of "themes" concerning the ties between people and trees and forests that we have discovered in our research, from our observations, and in the findings of others. These themes help us explain and interpret the results of our research on people-environment interactions and may provide useful insights for arborists and other urban forest managers.

Sensory Dimensions of Trees

The contribution of trees and forests to the beauty of the urban environment is well documented (16), but their influence on urbanites goes deeper than visual esthetics. Trees and vegetation can have a strong, relaxing effect on people. Four-fifths of the respondents in a study of Morton Arboretum users described their favorite settings as "serene," "peaceful," and "restful" (14). Morton Arboretum visitors have described the relaxing effect of the Arboretum in terms such as the following:

A pleasant tranquil place to be - rather like a living

piece of artwork in its impact. It appears orderly, in balance, and inviting.

The 'scape' across the valley and up the distant rise in autumn brings such a feeling of serenity. It makes me feel that 'God's in His heaven' and 'all's right with the world.' Each shade of leaf coloring is Art in itself. I could sit here forever and let the world go by.

A feeling of quiet, peace, and order arises within me.

Ulrich (18) and his associates have actually measured the relaxation effects associated with views of trees and other vegetation. They found that individuals who viewed urban scenes with vegetation had slower heartbeats, lower blood pressure, and more relaxed brain wave patterns than individuals who viewed scenes without vegetation. Similarly, Ulrich (19) reported that hospital patients recovering from surgery who had a view of a grove of trees through their windows required fewer strong pain relievers, experienced fewer complications, and left the hospital sooner than similar patients who had a view of a brick wall.

Individuals in Ulrich's studies responded to views of vegetation in pictures or through a window. What about responses to the many other sensory dimensions the forest environment, such as sounds, odors, shelter, and lighting? What about the sound of wind rustling through leaves or branches? This sound is similar to "white noise", which has been used in hospital wards to mask disturbing sounds and help heart attack victims to relax. Recordings of wind and rain in the trees have been marketed as aids for meditation and relaxation (17). What about the sounds of birds and insects in the trees? What about the odors associated with trees and forests, including the fragrance of flowers and understory plants, the distinct essence of the humus layer in a pine forest after a rain, or the aroma of wet leaves in the fall? Research has shown that unlike visual sensation, smells tend to trigger responses that are more emotional and cognitive, and they tend to be remembered much more vividly than the visual characteristics of places (10). What about the feeling of being sheltered or protected from the sun, wind, and rain by a natural "roof over your head" — feelings that go well beyond simple

physical sensations to reach our innermost feelings? What about the ever-changing patterns of color, light, and texture revealed as light flickers through leaves and branches, — alternately revealing and hiding other components of the urban environment (1)?

Trees and forests reach out to the urbanite and convey serenity and beauty along a number of sensory dimensions, often surrounding the individual with nature in an environment where natural things are at a premium. This is reflected in a line from a popular John Denver song of a few years ago: "You fill up my senses like a night in the forest." Trees and forests, and especially large trees or groups of trees, touch our lives in so many ways that it is difficult to describe them. There is often synergism among these attributes that complicates our attempts to understand the ties between people and trees and forests. The task is similar to describing what attracts us to a loved one, a home, or a profession. We can come up with endless lists of reasons, but are seldom satisfied that we have included all the dimensions, or that they collectively come anywhere near capturing the totality of what we are evaluating!

Perhaps the all-embracing influence of trees and forests is why many urbanites choose to name their subdivisions and communities after trees and forests (i.e., "Tall Oaks Condominiums" or the "Village of Elmhurst"). The following quote from a Morton Arboretum visitor illustrates the profound influence that trees can have in a residential environment:

Elm trees were part of my life. We all loved the elms for their beauty, shade, and protection from rain, but never fully appreciated them until they started to die. As each one died in my neighborhood, it left an irreparable scar and the place began to look old, worn, and crowded. When the enormous elm in our front yard showed signs of disease, we moved - after 20 years of residence. That old neighborhood became somewhat of a slum. But in recent years people have been renovating the homes and it is again considered a "nice" place to live. ... incidently the replacement trees for the elms are now mature ... When my husband and I bought our first and present home (he is from Wisconsin) we insisted on a older home with mature trees. We settled on the older area of Glen Ellyn. We have planted 12 additional trees.

Each sensory aspect of the urban forest changes over time, in the short run with the seasons, and in the long run with tree growth, maturation, and death. This evolution is a key element in the psychological ties between people and trees. Comments of Morton Arboretum visitors about their favorite settings convey the importance of the dynamic qualities of the urban forest:

It is always changing naturally as well as by man.

... an always changing and growing place.

Every two weeks different flowers are blooming and the plants are a lot taller. It is a source of endless fascination to me.

Reminds me of the first breath of spring after a long winter and the reawakening of nature.

The changing colors in the fall foliage warns our hearts that wintry winds will soon be upon us and we must enjoy the present as long as it lasts.

Seeing the rich growth from the decay of other vegetation reminds me of the cycles of life and death. Death is a form or part of the life cycle.

Symbolic Values of Trees

Apart from the sensory experiences they provide, trees are often valued as carriers of symbolic meaning. There are many examples of trees used as symbols of people as well as in religions.

Trees as symbols of people. Appleyard (1) observes several parallels between our images of people and trees. The sheltering nature of trees suggests a parental nature. He also notes that old trees look wise, and young saplings are fresh and growing. We feel sad when a tree looks sick. We speak of a tree's branches as "limbs" — just as we do of our own arms and legs. Some leaves are characterized as "reaching out like fingers" or having a "palmate" shape (after the Latin word for hand), while in the fall others "curl up like a fist." Cartoons involving trees often depict the branches as arms and also have faces drawn on the trunks. When a tree has been damaged, we speak of "wounds" and "healing" and may enlist the help of a tree "doctor" or "surgeon". We speak of our own

“roots” and our “family tree.”

Appleyard (1) further observes that trees are seen as being innocent, fragile, and endangered, and as demanding of our concern and pity. They are one of the most loved elements of the urban environment. It is no accident that advocates and supporters of urban trees are often referred to as “tree huggers.”

Several writers have made the analogy between the individual, cultural, and social characteristics of trees and people. Single trees planted in parks and yards grow quite differently from trees growing together in a forest setting. Like people, individual trees have their own unique appearance, personality, and idiosyncracies. The great diversity of tree species and varieties mirrors our own ethnic and cultural diversity in its differences in appearance, customs, and traditions. And when trees grow together in forests, we tend to focus on the qualities of assets of the whole group much as we look at the qualities or assets of a community, business, or other social groups of people. In his book *The Tree*, author John Fowles (5) parallels the “sociology of trees” with the human condition and the value it places on independence while recognizing the necessity to belong and cooperate: “We think we feel nearest to a tree’s ‘essence’ (or that of its species) when it chances to stand like us, in isolation, but evolution did not intend trees to grow singly. Far more than ourselves, they are social creatures, and no more natural as isolated specimens than man is as a marooned sailor or hermit.”

Perhaps our love of trees and their similarities with people are responsible for our efforts to plant trees as “living memorials” for loved ones. Trees are common in cemeteries, and many trees and forests have been planted as memorials to fallen soldiers and others. Our office has received several calls from people requesting information about planting commemorative trees. One woman wanted to know how to propagate a buckeye tree that stood near her grandfather’s home. The grandfather had passed away and now the tree appeared to be dying. Each family member wanted two seedlings from “Grandpa’s tree” to remember him by. Others have called to find out more about a certain casket company that provides a certifi-

cate to the family of the deceased indicating that a tree has been planted on a National Forest in their name.

Trees as religious symbols. Schroeder (15) observes that trees have been used by many cultures to symbolize health, wisdom, and enlightenment. Rolston (11) describes a gnarled wind-blown tree as representing endurance and strength and as a symbol of life pushing on before the winds that blast it. Schroeder (15) provides illustrations of a number of religious and cultural traditions where trees stand as a symbolic link between the human and divine, and are the means by which humans come into contact with their deepest spiritual values. This spirituality is exemplified by the two trees in the mythical Garden of Eden (the Tree of Life and Tree of Knowledge) in the Hebrew creation story. The cross, central to Christianity, is sometimes identified with the Tree of Life; and in the Book of Revelation, the Tree of Life is found growing in The New Jerusalem. Hindu symbolism represents the awakening of divine consciousness as a serpent ascending a tree, and Buddha is reported to have achieved enlightenment while sitting under the “wisdom tree.”

Rolston (11) and Schroeder (17) refer to the forest as a religious resource and compare forests and places of worship (i.e., Cathedrals). The spiritual-religious values of wilderness have long been noted. The question remains concerning the extent to which urban trees and forests are associated with religious experiences. The work of Chenoweth and Gobster (3), Gobster and Chenoweth (6,7), and Schroeder (14,15) suggests that urban trees and forests can contribute to experiences that are religious in nature. The following quotes from Morton Arboretum visitors support such a view:

Being deep in the woods is a place where your spirit can fly free, without interruption, bringing you closer to God.

Each time I look up to one of those tall trees at the Arboretum, I am reminded of Joyce Kilmer’s poem, ‘Trees’. I too look to God and pray.

...trees towering over the road like a cathedral...

There is at once strength, and form in these native trees that create a potent force and magic in the area.

Human Roots in the Forest/Savanna

People's responses to trees and forests are so strong and consistent that some researchers have even suggested that we have evolved instinctive preferences for certain types of environments with trees. Most humans appear to prefer groves of widely scattered trees, open at eye level, with overhead canopy and a uniformly textured ground cover (8). It has been suggested that this environment is attractive because it resembles African savannas on which the human species evolved (2). In that sense it may represent our most primal image of "home" (17). Rolston (11) also considers it significant that humans evolved in forests and savannas and "love the forest for what is aboriginally is." Some say that people go to the forest "to get away from it all"; Rolston (11) instead suggests that they "go there to get back to it all."

Appleyard (1) sees trees as one of the last representatives of nature in the city, providing a constant reminder of the natural world beyond as well as of our distant past. Some people tell us that when they are in an urban natural area they fantasize about traveling back in time to earlier experiences in their lives or to a time when there were no cities on our continent. For them the urban forest provides an opportunity to escape from daily routine and urban stress, as is expressed by Morton Arboretum visitors:

...a place of beauty, peace, quiet excitement, and refuge from the noise, turmoil, pollution, and unpleasantness of traffic and crowded work and living conditions.

A forest represents to me cool, calm, a place to regain composure.

I think of this as a place to contemplate, to stop and use my senses, to remove myself from today's schedule of events.

I felt I was somewhere quite far away from the bustle and noise of people and cars.

The Arboretum has been a resource and refuge for me through what were often some difficult times.

...all problems and cares disappear for the time being.

Students from the University of Wisconsin have also implied an element of escape as a dimension of their experiences with urban trees and forests:

While walking through Tenny park on my way to the library I became more and more absorbed in the fresh snow and beautiful landscape until I felt part of the whole scene. I stopped, stared at a grove of trees and felt a wonderful calming sensation. It was as though time had momentarily stopped and there I was — part of the whole park scene.

I looked up into the miraculously blue sky through the still unleaved branches of the oak tree. The twigs and branches in front of blue background formed a very delicate pattern. I never looked at a tree like that before. There was beauty in it just for the sake of it. I looked at it, I could not get enough of it, and for a short time I forgot the surroundings - the activities that were going on around me.

Fear of the Forest

It is important to recognize that the images of trees and forests in our past have not always been positive. There are images of the "howling wilderness" full of savage beasts and other dangers. In the early years of European settlement in this country, the forest was often a barrier to cultivation and a hiding place of enemies. Fears of the forest persist to this day. Some have their roots in the past, but others are a function of more recent concerns.

We have encountered examples of deep-seated fears of trees and forests. Although these fears are not necessarily widespread, many urbanites are afraid of going into a forest area. Urbanites may fear being attacked by criminals who spring from urban vegetation, becoming lost, or contracting Lyme disease while in the forest. These fears may cause people to limit the density of tree planting around homes and to avoid heavily forested portions of the city. We suspect that fear of getting lost in the forest may cause many urbanites to walk through the forest on paved bicycle trails and to prefer forest scenes with major open areas or buildings in them. For some time we have observed a wider variety of users on

urban bicycle trails than in the surrounding forests. Other fears associated with trees include concern that animals and insects will invade the home or that trees or parts of them will fall on a home or car.

Urban African Americans are not generally found to be heavy users of forest areas, and studies suggest they are more likely than urban whites to prefer developed recreation areas over more natural ones (4). Although the reasons for this behavior are many and complex, one explanation that has emerged in our research with African Americans in the Chicago area concerns negative images of forests in rural areas in the South where many have their "roots." The concerns range from insects, snakes, etc. to threats to life and limb. We have found particularly strong fears of forest environments among urban African American female children (9).

These fears may in part reflect a lack of familiarity with forests; and their origins probably relate to the environments in which people have grown up. For example, in one study individuals who grew up in suburban areas tended to feel most comfortable in natural settings, while those who grew up in cities tended to feel most comfortable in developed settings (13).

Tree Planting as an Activity

The emotional ties that people have to trees express themselves in many ways. One form of expression that has particular importance to urban foresters is the activity of planting trees. Tree planting is a popular activity among urbanites; the level of interest has apparently been increasing in recent years and was particularly strong during the recent Earth Day/Arbor Day celebrations. The popularity of and commitment to tree planting suggest that it has benefits in and of itself that go beyond the expected benefits of the resulting trees (i.e., tree planting is a good thing to do even if the trees don't survive!). Some possible explanations for the strong interest in tree planting include:

Tree planting as a demonstration of commitment to the future. It has often been said that one plants a tree not for oneself, but for future generations. Perhaps this explains why we en-

countered so many multi-generational groups at tree plantings this past year. In our highly mobile society, tree planting is often taken as a symbol of permanence or "putting down roots." Appleyard (1) characterizes trees as "anchors of stability in the urban scene."

Tree planting as possibly a major impact on the landscape over time. Few activities that individuals can undertake on their own land have the potential for as large an impact — in time — as tree planting. A small seedling can grow to a huge oak that dominates the local landscape for a very long period of time. People may not see that impact in their lifetimes; but may get some hint of that impact as the tree grows, taking great pleasure in the belief that their action will have influence long after they have departed from the scene. In the shorter run, the types of trees and other plants are often the major distinguishing factor among homes in a new subdivision.

Tree planting as a means of improving the environment. With increasing recognition of numerous global environmental problems, individuals can often feel helpless in the fight for a better environment. Tree planting is one thing they can accomplish on their own and feel that they have helped solve some of the problems. Discussion of the possible role of trees in reducing urban heat islands, global warming, noise pollution, air pollution, erosion, fuel consumption, and other problems most likely reinforces this motive for tree planting. Tree planting often fits well into the motto to "think globally, act locally," which has become increasingly popular with citizen groups.

Unfortunately, the deeply held values that motivate people to plant trees often do not find expression in a desire to care for the tree on a regular basis. Consequently we often see much attention paid to urban tree planting efforts, only to have some of the trees deteriorate or perish due to lack of watering and basic maintenance. Perhaps more attention should be given to providing information on how tree care practices are tied to tree preservation. This might include involving urbanites in care of public trees.

We also see urban tree planting efforts that do not capitalize on many of the benefits that could be generated by urban trees — for example, shading

and reduced heating and cooling costs (12). At times, there seems to be quite a bit of tree planting too far from the house to shade the roof, windows, or air conditioners. Perhaps there is a need for better dissemination of information on how species selection, placement, and care can provide particular benefits. Perhaps the increased involvement of urbanites in neighborhood and community tree planting efforts will provide additional opportunities for disseminating such information.

Summary

Trees have many different values to people; some of these values are very important but are not often considered in planning, planting, and caring for trees. Managers and planners need to understand the "big picture" about values to effectively manage urban trees and forests to meet the needs of the people who own and care about these resources.

The importance of urban trees and forests is grounded in some very deep feelings and ties that sometimes even have a spiritual quality. These feelings manifest themselves in strong support for tree planting and for the preservation of existing trees and forests. They may also emerge in preferences for or fears of particular urban forest environments. These powerful forces must be taken into account in any effort to expand and enhance urban forest resources.

Perhaps the strong interest in tree planting by urbanites can provide the motivation to reforest many of our cities where the urban forest has been depleted. At the same time we hope urbanites can be provided with information about the systematic professional tree care and maintenance that must accompany tree planting.

The values mentioned in this paper tend to evoke emotional rather than rational arguments for tree preservation. Managers, who are trained to think in terms of rational justifications to obtain money for tree planting and maintenance programs, need to see the other side of the coin. Managers and administrators often report that trees and tree care cannot compete well with other functions provided at the municipal level. Businesses that employ tree care professionals face similar challenges concerning the allocation of

scarce resources. Perhaps the solution to this problem is, in part, to focus attention on new information and perspectives concerning the deeply held values of trees into the argument.

To discover what urbanites value, we need to listen more and preach less. Education programs for urbanites are valuable; but we managers, planners, and researchers also need more education to understand the basis for people's behaviors, preferences, and fears. Research on people's perceptions, values, and behaviors concerning urban trees and forests can play a key role in the educational process.

Our studies of the psychological values of trees in urban areas confirm the value of "everyday nature" as a significant contributor to the health and well-being of the urban population. People should not have to leave the city to find opportunities to refresh themselves in nature. Rather, this work shows the unique value of providing experiences of nature "at the doorstep;" trees and nature in our everyday lives.

Our work does not tell managers how many trees to plant, where to plant them, etc. It does, however, provide support for overall program emphases as well as ideas for "marketing" their programs to the general public and to policy makers. In many cases it points out that what people "value" in trees is not so much the tangible benefits such as energy savings or property values, but rather the experiences that trees provide.

At present we lack information on the best design and management of urban forests for providing important benefits such as stress reduction and opportunities for recreation and leisure activities, or for creating particular sights, sounds, or smells. We also need to understand people's fears and concerns about problems associated with trees. With this information we might change the way that urban trees and forests are managed, as well as provide additional information to urbanites to help them make appropriate choices concerning urban forest management and use.

In sum, urban trees are living, breathing organisms with which people feel a strong relationship, and in our planning and management we should not think of them just as air conditioners, providers of shade, and ornaments in the urban

system. Failure to recognize the deep significance of trees to urbanites will most likely result in less effort being given to tree planting, care, and protection than the public desires.

Literature Cited

1. Appleyard, D. 1980. Urban trees, urban forests: what do they mean? pp. 138-155. In Proceedings of the National Urban Forestry Conference. November 13-16, 1978. State University of New York College of Environmental Science and Forestry, Syracuse, NY.
2. Balling, J.D. and J.H. Falk 1982. *Development of visual preference for natural environments*. Environment and Behavior 14: 5-38.
3. Chenoweth, R.E. and P.H. Gobster. 1990. *The nature and ecology of aesthetic experiences in the landscape*. Landscape Journal 9: 1-8.
4. Dwyer, J.F. and R. Hutchison. 1990. Outdoor recreation participation and preferences by black and white Chicago households. pp. 49-67. In Social Science and Natural Resources Recreation Management Ed. Joanne Vining. Westview Press, Boulder, CO.
5. Fowles, J. 1989. excerpt from The Tree. p. 11 In Fairchild, J. (ed.) Trees: A Celebration. Weidenfeld and Nicolson, New York.
6. Gobster, P.H. and R.E. Chenoweth. 1989. *The dimensions of aesthetic preference: a quantitative analysis*. Journal of Environmental Management 29: 47-72.
7. Gobster, P.H. and R.E. Chenoweth. 1990. Peak aesthetic experiences and the natural environment. pp. 185-191. In Proceedings of the Twenty-First Annual Conference of the Environmental Design Research Association. Eds. Robert I. Selby, Kathryn H. Anthony, Jaepil Choi, and Brian Orland. April 6-9, 1990, Champaign, IL.
8. Kaplan, R. 1984. Dominant and variant values in environmental preference. pp. 8-11. In A.S. Devlin and S.L. Taylor (eds.), Environmental Preference and Landscape Preference. Connecticut College, New York.
9. Metro, L.J., J.F. Dwyer, and E.S. Dreschler. 1981. Forest experiences of fifth-grade Chicago public school students. Res. Pap. NC-216. U.S. Department of Agriculture, Forest Service, North Central Forest Experiment Station, St. Paul, MN. 6 pp.
10. Porteous, J.D. 1985. *Smellscape*. Progress in Human Geography 9: 356-378.
11. Rolston, H. 1988. Values deep in the woods: the hard-to-measure benefits of forest preservation. pp. 315-319. In Proceedings of the 1987 Society of American Foresters National Convention. October 18-21, 1987. Minneapolis, MN.
12. Schmid, J.A. 1975. Urban vegetation: A review and Chicago case study. Research paper No. 161. Chicago: The University of Chicago Department of Geography. 266 pp.
13. Schroeder, H.W. 1983. *Variations in the perception of urban forest recreation sites*. Leisure Sciences 5: 221-230.
14. Schroeder, H.W. 1988. The experience of significant landscapes at Morton Arboretum. pp. 378-381. In Proceedings of the 1987 Society of American Foresters National Convention, October 18-21, 1987. Minneapolis, MN.
15. Schroeder, H.W. 1988. Psychological and cultural effects of forests on people. pp. 10-14. In Proceedings of the 1988 Society of American Foresters National Convention. October 16-19, 1988. Rochester, NY.
16. Schroeder, H.W. 1989. Environment, behavior, and design research on urban forests. pp. 87-117. In Advances in Environment, Behavior, and Design. Vol. 2, Ed. E.V. Zube and Gary T. Moore. Plenum Publishing Company. New York.
17. Schroeder, H.W. 1991. *The psychological value of trees*. The Public Garden 6: 17-19.
18. Ulrich, R.S. 1981. *Natural versus urban scenes: some psychophysiological effects*. Environment and Behavior 13: 523-556.
19. Ulrich, R.S. 1984. *View through a window may influence recovery from surgery*. Science 224: 420-421.

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Résumé. De nombreux habitants de la ville maintiennent des liens personnels très solides envers les arbres urbains et les forêts, les attachements approchant l'engagement spirituel. Les liens entre les gens et les arbres sont associés aux traditions, au symbolisme et à un besoin de "s'impliquer" à l'échelle locale à entretenir et rehausser l'environnement pour les générations présentes et futures. Les programmes de foresterie urbaine qui visent à améliorer la qualité de vie en milieux urbanisés seront plus efficaces si les habitants des villes apprennent à connaître les besoins biologiques des arbres. Dans un même temps, les gestionnaires et les planificateurs doivent apprendre à connaître les nombreux besoins psychologiques, sociaux et culturels que les arbres et les forêts remplissent pour la population urbaine.

Zusammenfassung: Viele Stadtbewohner halten sehr starke, persönliche Verbindungen mit städtischen Bäumen und Wäldern, die manchmal als religiöse Anbetung erscheinen. Verbindungen zwischen Bäumen und Menschen sind mit Traditionen, Symbolen und das Bedürfnis nach einem ortsbezogenen Engagement, um für die gegenwärtigen und zukünftigen Generationen die Umwelt zu verschonen, assoziiert. Städtische Forstwirtschaft, die das Lebensqualität in städtischen Orten zu verbessern bezwecken, wird am wirksamsten wenn die Stadtbewohner über die fundamentalsten biologischen Baumbedingungen lernen. Zur gleichen Zeit muss auch die Stadtverwaltung über die psychologischen, gesellschaftlichen und kulturellen auf den Baum und Wald bezogenen Bedürfnisse der Stadtbewohner lernen.