

# URBAN FORESTRY: ITS SCOPE AND COMPLEXITY

by Elwood L. Shafer and George H. Moeller

**Abstract.** Every State in the Nation, particularly throughout densely populated urban environments, is currently involved in an environment-energy crisis. Yet, man's misuse of forest, water, soil, and wildlife resources in and around our cities has caused detrimental environmental impacts that reflect a lack of concern for the basic underlying needs of society for ecological support systems. Urban forestry offers a means to help meet this challenge and to help improve the quality of life for a large proportion of the American public. Urban foresters need to know: the benefits of urban forests, factors that influence those benefits, means to manage vegetation to provide the benefits, and how to integrate urban forestry with the total urban planning and development process.

---

What is the best use of natural forest and water resources that intertwine and separate the great metropolitan complexes of the Nation? What is the optimum mix of manmade communities and natural environments? What should go where? Are certain areas already so overloaded with commercial and transport activity as to constitute ecological disaster zones? Should some urban forest areas be retained in an undeveloped state? Have we considered the importance of visual order and excellence of design in creating ecologically and aesthetically stable conditions in communities that people can be proud of?

Just to raise these types of questions is to realize that forest and water resources are not being properly managed throughout many of our urban areas. We are in danger of creating a regional kaleidoscope of conditions that are so lacking in concern for basic ecological support systems as to make land use planning an exercise in futility.

The idea that unlimited, uncontrolled growth is good, is no longer an unquestioned dogma. Indeed, quite the contrary, communities across the land are alarmed by pollution, congestion, ugliness, sprawl, decaying neighborhoods. The problems are tied inexorably to the destruction of open space, forest conditions, and water resources that are required for community enhancement and basic necessities of life.

The forestry profession recognizes that,

although a significant part of America's forest wealth is found in rural or wildland areas, urban forests are vital assets in soil and water conservation and in upgrading the quality of life in urban environments. Open spaces, greenbelts, buffer strips, roadsides, community parks, wooded residential and industrial zones, expanding urban areas and new communities: these are new target areas of forestry concern. The potential benefits are many: energy conservation, pleasant and serene environments, increased natural beauty, cooling shade, recreational environments, better air to breathe, less street noise, protection from winds, and more birds and wildlife.

Many different disciplines are concerned with the benefits urban forests can provide; and historically, each discipline has looked at its problem of "urban forestry" from its own professional perspective. Private urban-tree companies are in business to increase the amenities of urban environments while making a profit (Chevron Chemical Company nd.). Utility companies strive to provide energy but at the same time improve the quality of the urban environment (Georgia Power Company nd.). The landscape architect is concerned with enhancing the natural beauty of urban landscapes (American Society of Planning Officials 1968). The regional planner is involved with integrating urban forest values within the total urban-development process (Zube, et al. 1975). The horticulturist is concerned with the ecological and physiological aspects of individual trees and shrubs (Forest Service 1976). The municipal watershed manager is faced with providing quality water on a watershed that is valued for many other uses ranging from parking lots to riding trails (Forest Service 1976). The urban forester looks at the long term management and valuation of the urban vegetative system (University of Massachusetts 1971). The wildlife managers seeks to integrate wildlife in an urbanizing environment (University of Massachusetts 1971), and in-

vite wildlife to your backyard (Thomas et al. 1973). The recreation professional attempts, among other things, to use natural environments to improve the quality of life for urban children (Forest Service 1977). And so it goes.

Each of these and other professions has something to contribute to the use or management of ecological systems in or near urban areas, so as to increase the benefits that these systems produce. In the past, each of these professions, in effect, has been working somewhat independently of the other resulting in different approaches to the use or management of trees, soil, water, wildlife, and open space in urban areas.

Urban forestry has emerged as a concept from a wide range of disciplines that may sometimes disagree on the exact meaning of the term "urban forestry," but that have found a great deal of common interest in related problems.

Urban forestry has come of age and is recognized by the Society of American Foresters as a distinct branch of the forestry profession. In addition, the need for urban forestry programs has been recognized in Congress, and several State foresters have initiated aggressive urban forestry management programs. The Forest Service commitment and concern for urban forestry issues is evident in the Human and Community Development Element of the Resources Planning Act, and in their urban forestry research efforts at Syracuse, New York; Amherst, Massachusetts; Pennington, New Jersey; Chicago, Illinois; Athens, Georgia; and Berkeley, California (Forest Service 1973; Riddle, et al. 1976). Because of the many and diverse professional interests involved, a precise definition of urban forestry, and the associated resources, has been difficult to develop. As a result, various terms have evolved: urban forestry, metro forestry, environmental forestry, community forestry; and others. Basically, however, as "urban forestry" has evolved, its underlying premise involved *delivering benefits to people through management of forest resources in and near the city.*

An *urban forest*, therefore, is that portion of the urban ecosystem that consists of forest vegetation, water, soil, and wildlife in densely populated areas and adjacent lands. Urban forest *manage-*

*ment* is the process through which these urban forests are manipulated to provide multiple, long term benefits to urban society. And, finally, urban forestry *research* tries to find a balance between people's needs and nature's capabilities.

How big, or small, can an urban forest be; how far does its influence extend? The answers depend on what kind of urban forest management situation is involved. For example, if the situation deals with maintenance of natural forest stands in a 10-acre city park, then obviously the urban forest is defined by the boundary of the park. On the other hand, if a city is spraying urban wastewater over large areas of nearby public forest lands, then the urban forest could comprise hundreds or thousands of acres.

Basically, urban forest management and research involves at least four major areas of interest: human benefits from urban forests; the basic biological processes where urban forests influences the urban environment; methods to breed, select, establish, maintain, and protect urban forest resources; and strategies to integrate sound urban forestry planning and management into the urban planning and development process.

#### *Human Benefits from Urban Forests*

Urban foresters manage components of the urban forest (such as vegetation, water, soil, and wildlife) to produce human benefits.

Ideally, the urban forester would like to know how, and to what degree, components of the urban forests related to human benefits such as:

- Physical health
- Mental health
- Property values
- Employment stability and growth
- Conservation of energy
- Knowledge, through environmental education, about ecological processes

At the same time, the urban forester realizes that the benefits derived from urban forests may not always be positive ones. In some urban forests, the most immediate and pressing question may be the effect of the vegetation on the population of rats or stray dogs, rather than on enjoyable birds and wildlife. Likewise, rather than being pleasant and serene, some wooded urban

areas may be foreboding and threatening to many city dwellers who see them as hangouts for muggers and derelicts, places of terror. Nonetheless, whenever possible, it is important to establish qualitative or quantitative values (either positive or negative) for the benefits that trees provide to urban residents.

For instance, consider the urban forester who is trying to convince a developer to save trees around a proposed apartment complex. The developer says it is cheaper to remove the trees. The forester must be able to compare two apartment complexes. They are equal, except that one has no trees, and the other has mature, desirable, healthy trees in proper locations. He needs to show how preserving the vegetation will mean more dollars in the developer's pocket. He must be able to show the builder that the trees may save dollars by supporting a higher rental rate per unit, reducing the vacancy time between rentals, reducing the tenant turnover rate, and reducing vandalism.

#### *Management of Urban Forests to Enhance the Urban Environment*

To manage the components of the urban forests so as to produce or increase human benefits, urban forest managers and planners must understand the biological and physical interrelationships among various components of the urban forests.

That is, the urban forester must be able to understand the basic process through which urban forests can be managed to help achieve desired qualities of the urban environment. Human benefits from urban forests are produced or increased by managing urban forests resources to affect:

- Visual quality
- Climatic conditions
- Home energy conservation
- Noise reduction
- Air quality
- Water quantity and quality
- Wastewater disposal systems
- Opportunities to view urban wildlife
- Recreation opportunities
- Utilization of urban wood

For example, a city may be interested in using

urban forest land for recycling municipal wastewater and sludge. The urban forester must know the effects of such a disposal system on ground water quality, vegetation, soils, soil moisture, litter composition, nutrient recycling, micro- and macro-organisms, insects and disease, and timber production.

#### *Growth, Maintenance, Reproduction, and Management of Urban Forest Systems*

The process of managing vegetation in urban forests underlies the whole concept of urban forestry. These activities concentrate on the management processes required to:

- Select and develop trees that tolerate the rigors of urban elements.
- Produce quality nursery stock.
- Plant, grow, improve, protect, maintain, and replace urban forests.
- Develop rotation criteria and management strategies.

For instance, when a new shopping center is being developed and large groups of natural vegetation are being preserved to enhance the landscape quality, the urban forester is faced with the task of suggesting ways to protect the vegetation from undue compaction during the construction phase, and methods to maintain the vegetation after the area is developed.

#### *Integrating Urban Forestry with Urban Planning and Development*

Urban forestry issues and management solutions ultimately must mesh successfully with other regional-planning, development, and management processes. Of major importance here are such items as:

- Strategies for incorporating urban forest management and protection procedures into a more comprehensive urban planning process.
- Information exchange systems and methods to insure public involvement in urban forestry management decisions.
- Monitoring technology and social change to evaluate their impacts on future urban forestry programs.
- Large scale applications to test ways of in-

tegrating urban forest management technology into community planning systems that emphasize natural ecological processes.

### Summary

In all its guises, urban forestry tries to strike a balance between people's needs and the ability of natural resource systems to fulfill these needs. With careful planning and increased research efforts, urban forestry can improve natural resource capacity to fulfill our needs for centuries to come.

### Literature Cited

- American Society of Planning Officials. 1968. Trees in the city. Rpt. No. 236, Chicago, IL. 44 p.
- Chevron Chemical Company nd. Trees for a livable environment. San Francisco, CA. 20 p.
- Forest Service. 1973. The Pinchot Institute system for environmental forestry studies. General Tech. Rpt. NE-2, Northeastern Forest Experiment Station, Upper Darby, PA. 60 p.
- Forest Service. 1975. Municipal watershed management symposium proceedings. General Tech. Rpt. NE-13, Northeastern Forest Experiment Station, Upper Darby, PA. 196 p.
- Forest Service. 1976. Better trees for metropolitan landscapes symposium proceedings of a symposium-fair. General Tech. Rpt. NE-30, Northeastern Forest Experiment Station, Upper Darby, PA. 256 p.
- Forest Service. 1977. Children, nature, and the urban environment: proceedings of a symposium-fair. General Tech. Rpt. NE-30, Northeastern Forest Experiment Station, Upper Darby, PA. 261 p.
- Georgia Power Company. nd. Planting the right tree in the right place. 15 p.
- Riddle, J.R., G.H. Moeller, and W.H. Smith. 1976. Breaking new ground in urban America. American Forests, Nov. Issue, 8 p.
- Thomas, J.W., R.O. Brush, and R.M. DeGraaf. 1973. Invite wildlife to your backyard. National Wildlife, April-May 11(3):5-16.
- University of Massachusetts. 1971. Trees and forests in an urbanizing environment. Planning and Resource Development Series No. 28, Amherst, MA. 168 p.
- University of Massachusetts. 1974. Wildlife in an urbanizing environment. Planning and Resource Development Series No. 28, Amherst, MA. 182 p.
- Zube, E.H., R.O. Brush, and J.G. Fabos. 1975. Landscape assessment. Dowden, Hutchinson, and Ross, Inc., Stroudsburg, PA. 367 p.

*Forest Service, U.S.D.A.  
Washington, D.C. and  
St. Paul, Minnesota, respectively*

---

### ABSTRACT

White-Stevens, Robert. 1979. **The year of the pest.** *Agrichemical Age* 23(1): 6, 8, 30.

After a quarter of a century of virtually total freedom from locust and grasshopper plagues in North America, prodigious flights of hoppers this year have ravaged the Southwest from Colorado across the Plains States into Nebraska and south into Texas, devouring millions of acres of rangeland, forage crops, vegetables and orchard fruits. What will the Environmental Defense Fund, the Sierra Club and the Redwoods Association say when the gypsy moth inexorably penetrates the great Sequoia forests of northern California? The gypsy moth, an omnivorous pest that feeds on at least 350 different species of plants, may well emerge as the most formidable, destructive and costly forest and ornamental insect pest on the continent. Aldrin, dieldrin and chlordane have all now been banned. More recently mirex has become entangled in the morass of frivolous litigation promoted with arrogant mendacity by the EDF. Unquestionably, however, the most disgraceful and inhuman result of the current unconscionable "war on chemical pesticides" has been the recrudescence of arbor or insect-vectored human diseases not only in the United States but around the world, particularly among developing people who are largely incapable of protecting themselves. The worst and by far the most threatening of these is malaria, which is steadily mounting in 63 different countries embracing over 1.5 billion people. The enormity of the inexcusable campaign to ban DDT and its related organo-chloride pesticides is now beginning to become clearly apparent. Regulatory constraints and restraints are being laid upon industry, the farmer, food processor, the distributor and, of course, the consumer. Constraints placed on industry in America in the name of the environment merely drive the process, the business and the profits overseas to other countries.