

Building a Sustainable Community Forest

Contributed by Terry Mock
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There are now local, regional, national, and global opportunities for individuals in a wide variety of land development professions to participate in long-range environmental sustainability for our society. A common element of all of these efforts is the importance of a healthy community forest. In the United States it is estimated that 90 percent of the entire population now lives within the boundaries of what is defined as community forest. Additionally, the total yearly economic value of community forest services is more than \$400 billion.

Many of these services are now required due to various government initiatives. They include energy conservation, reduction of atmospheric contaminants, enhanced property values, and NPDES (National Pollutant Discharge Elimination System) Phase II requirements such as erosion control and storm water runoff. In some instances, the desire for improved social and professional aesthetics is a motivating factor as well.

To achieve sustainability of our rapidly expanding community ecosystems and deliver the maximum level of benefits to the inhabitants, the community forest must have three components:

1. Healthy Tree Resource
2. Comprehensive Management
3. Community-wide Support

As the engine that drives the urban forest, the healthy tree resource is the most important component in the system. As a designer or implementer of the sustainable community environment, land development professionals should be aware of the quality of tree that will be placed into their plans. Two articles that may be of interest because they emphasize tree health by focusing on improving quality through better nursery production methods and genetic cloning have appeared in *Arbor Age*.

The remaining tree resource criteria necessary for community forest sustainability are canopy cover, age distribution, species mix, and soil volume and composition. These are directly related to the land development designer.

Though the ideal amount of canopy cover will vary by climate and region, there is an optimal degree of cover for every urban area. Geographic information system technology can be used to map and analyze the workings of the community forest. It can be demonstrated that a 65 percent loss of canopy cover in Atlanta since 1972 has led to a 9 degree rise in average urban temperature.

The city of Milwaukee, with only a 16 percent canopy cover, can point to 22 percent reduction in storm water flow and a saving in city taxes of \$15.4 million by not having to build additional storm water retention capacity. At the household level, it is now possible to determine how much canopy cover is needed to cover a family's oxygen need and offset its carbon dioxide emissions.

A mix of young and mature trees is essential if canopy cover is to remain relatively constant over time. To ensure sustainability, an ongoing planting program should go hand in hand with the removal of senescent trees. Some level of tree inventory is necessary to monitor this indicator. Small, privately owned properties pose the biggest challenge because only 20 percent of the urban forest is on public land, and historically private property owners have not reinvested in trees after removal.

Experience with species-specific pests has shown the folly of depending too heavily upon one species. For maximum protection against unusual weather or pests, the community forest should contain (1) no more than 10 percent of any species, (2) no more than 20 percent of any genus, and (3) no more than 30 percent of any family.

For diversity, use the best clones, cultivars, and seedlings of many species and genera either as scattered strips or blocks of uniformity distributed throughout the city or as mixtures of individual trees along parkways and in parks. When selecting tree species, it is important to emphasize native trees, which are well adapted to the local climate and support native wildlife.

Because of the way in which sidewalks and roads are constructed, their base materials are severely compacted, causing street tree root growth often to be restricted within the typical 4-foot by 4-foot planting pit in which they are planted. Insufficient rooting volume in urban situations often leads to unhealthy trees and/or property damage where roots outgrow the planting pit and spread immediately below the pavement surface, eventually destroying the pavement. Urban trees planted in large open volumes of soil have growth and health dramatically superior to trees in contained root zones.

Where space is at a premium, new structured soil technology can be utilized under pavement to increase rooting volume without pavement damage. An article entitled about structured soil appeared in the March 2003 issue of *Land Development Today*.

Other emerging community soil technologies are focusing on replacing metabolically active minerals and trace elements together with microorganism rich compost, once plentiful in the soil, that have been leached away in the past due to erosion, acid rain, and chemical agriculture.

A sustainable urban forest is fundamentally dependent on the health of the tree resource. The optimal structure of community forests — both above and below ground - remains the subject of ongoing research.

Comprehensive Management

The health of the community forest is one of three factors in determining whether an urban forest can achieve sustainability and deliver the maximum level of benefits to the community ecosystem. The other two necessary components for urban forest sustainability are comprehensive management and community wide support.

Comprehensive management of the community forest requires a broad set of activities, including management of single trees as well as large stands, education of the community at large, and coordination between bureaucracies that are accustomed to acting independently.

Principles of ecosystem management argue for a natural scale based on ecological boundaries such as entire watersheds. However, political borders do not respect biology.

In the rush to make our cities modern marvels we've fine-tuned nature out of the design process — ignoring the ecosystem cycles of energy, nutrients, air and water. To build a new awareness of urban communities as ecosystems, we need to reexamine the natural and manmade infrastructure that make up our communities, the ways they interact, and how the community forest fits in. Only then can we manage our resources so they can sustain our community communities for future generations.

The U.S. Department of Agriculture initiated a noble but ill-fated national project called the Urban Resources Partnership to provide a basis for recognizing the value of the natural resources in urban areas and create the local actions to care for them. The South Florida Community - Urban Resources Partnership was formed to assist with the restoration of the entire south Florida ecosystem. Before its demise, this four-county Urban Resources Partnership successfully crossed traditional political boundaries and embraced the need for a sustainable community forest to help the \$8.7 billion Everglades Restoration project achieve regional sustainability.

New policies need to be developed that promote positive environmental actions. Community leaders need better information about the costs and benefits of their urban ecosystem. You can't manage what you can't see. Using geographic information system (GIS) technology we can map and analyze the workings of the urban ecosystem to see more clearly the benefits provided to the community.

A project called Transagency Resources for Economic and Environmental Sustainability (T.R.E.E.S.), developed by in Los Angeles, proves that there are enormous economic, environmental and social benefits to be gained through a cooperative approach to designing our community ecosystems as functioning watersheds.

Using a sophisticated GIS-based cost-benefit computer-modeling program, T.R.E.E.S. successfully demonstrated that having public agencies, private landowners, the green industry and neighborhood groups share the same vision of the community forest is a crucial element of sustainability.

Community-wide Support

Given the proven ability of trees to mitigate carbon dioxide emissions, air pollution and storm water runoff; reduce energy costs, crime rates and medical bills; and enhance biodiversity by improving livable conditions for most life forms, it is no wonder that experts promote healthy urban forests as a key environmental component of regional, national and global sustainability.

And yet, USDA Forest Service experts estimate that less than 10 percent of the U.S. population understands or cares about natural resource management. If great numbers of people do not take seriously the worst wave of extinction since the dinosaurs died, how are we going to teach people to be concerned about the health of their community forests?

Recent advancements in scientifically-based tree care and best resource management practices have clearly demonstrated that we now have sufficient knowledge and technology to physically build and maintain sustainable community forests. But how do we generate the collective will to do the job without community-wide support? The simple answer is that we don't.

People take themselves seriously, but concern for self does not seem to expand sufficiently to embrace concern for the species — and definitely not for all species and ecosystems. This is why the community ecosystem holds the key to global sustainability. The urban ecosystem is where the vast majority of people live. If we can't sell the idea of sustainable community forests to the people who inhabit them, then we have little likelihood of convincing others.

Many natural resource specialists and land development professionals think that we should not be involved in public relations, marketing, or media relations. They say we should stick with science. This attitude is largely responsible for the fact that the vast majority of the public does not know, understand, or care about natural resource management.

As a critical element of sustainability, what we really need from the public is greater awareness, understanding, and support for community forests and comprehensive ecosystem management. We need a proactive approach that employs full-time media, marketing, and public relations specialists to package and present our product so that people will accept it.

Interactive promotional events can increase public support for sustainable community forestry by building cross-market stakeholder partnerships focused on ecosystem restoration.

In addition to creativity, studies show that frequency is critical to the public's perception of a message's importance. And let's not forget that we must also utilize innovative educational methods to reach our youth if we hope to increase the public's understanding of natural resources to the extent necessary for true sustainability.

Sustainable urban forestry holds the key to saving our cities. What began as simple tree planting has grown into managing community infrastructure. We have begun to discover new principles and practices that will enable us to reinvent cities in the new century. By following these principles and implementing urban-forest-based best management practices, our cities can become economically and environmentally sustainable as well as aesthetically uplifting and enlivening for all who dwell there.

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