

## Creating "Forests" Criss-crossing our Cities

by Rick Ryan

Public land managers are often responsible for managing large acreages of land in our cities. These sites often consist of narrow corridors that criss-cross, connect, and run throughout populated areas. Transportation right-of-ways, flood control channels, and utility right-of-ways are a few examples. Intersections of these corridors sometimes create odd-shaped parcels of land of considerable size. Presently, in most drylands cities, these areas are unattractive, unproductive, and a net drain on public resources because they carry hidden public costs. We could turn unproductive resource-draining space into productive beneficial areas.

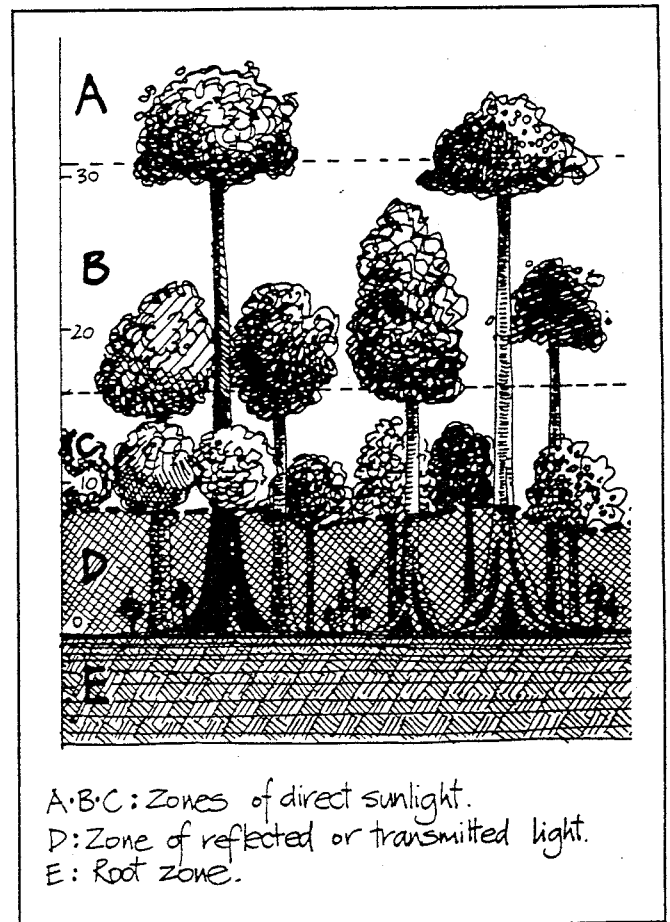
Many problems face treeless urban areas. The city gridwork of streets and buildings may create wind tunnel effects which increase the energy required by the city populace to heat and cool our human habitat. The soils in these areas may be skeletal, badly eroded, or compacted. During rain events, their relative impenetrability contributes to flooding in city streets. Their denuded surfaces, especially combined with increased winds velocity contribute to dust pollution problems. The control of tenacious pioneer weeds which appear in such areas contributes to city maintenance costs, and impact on public health if herbicides are used to accomplish control.

These problems disappear when we look at urban public lands as an opportunity for creating or extending a forest. The network of interconnecting corridors can function as a web of climate-modifying shelter belts with multiple uses and benefits. Through design and subsequent management, the urban forest can give maximum return for what we put in.

Even so, establishing plants on these sites often requires coping with very extreme microclimates. The accelerated winds desiccate and stress plants. The sites may be subject to intense reflected sunlight and radiated heat from surrounding pavement and buildings. The poor quality of the soil, or lack of soil, must be dealt with. Strategies and techniques exist to cope with these extreme microclimates. (See page 1.)

As a model, we can look to one of the most productive ecosystems on earth - the tropical forest. Multiple canopy levels increase its productivity by increasing the vertical edge, and maximizing diversity. The result is very efficient uptake and storage of solar energy and nutrients. Another very productive environment is the edge of deserts where divergent ecosystems interface. This edge effect results in rich species diversity and increased productivity.

Taking our model from these extremely rich natural systems, we can design and manage the urban forest as an all-age, multi-species polyculture which contains multiple canopy levels. This will involve building plant associations and guilds into the pattern of the urban forest, rather than viewing elements singly. (See issue #6 for discussion of guilds.)



*This cross-section illustration shows how a natural tropical forest with many "stories" provides more growing space and growing conditions.*

Emergent trees (over 50 feet) will provide the primary long-term structural component, protecting and providing shelter to the lower levels. The upper and middle canopy will consist of intensively managed trees for lumber production and maintenance of habitat.

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Lower levels would primarily consist of young trees and plants for habitat enhancement and food production. Small trees which require some protection will be able to thrive in the sheltered forest environment.

In many arid climates, getting trees established in extreme exposed sites is a difficult task. It may take 30 to 50 years to develop an emergent canopy in these extreme environments. Initially, fast growing, climate adapted species should be used. These pioneers can eventually be succeeded by more desirable species after they have served to nursemaid more tender growth, break up subsoil with their aggressive roots, and modify soil with their decomposing litter. Species chosen and actual heights would be determined by the climate or developed microclimate (for instance, the amount of water that can be harvested at that site.)

Around one-fifth of the total inventory of trees should be managed as structural components of the forest and allowed to stand as long as they are healthy. These trees should be selected as the best individuals to provide seed for future generations, and to maintain the structure of the whole forest system. As much as half of the total can be reserved for intensive production of forest resources on short term rotation (5 to 50 years).

A fair percentage of the total should be composed of native species to help maintain a base of support for the native ecosystem. Many species of plants and animals and their co-evolved interdependencies can be maintained by supplying the foundation for their habitats by planting native trees and shrubs.

Management of the urban forest should be wholistic in approach, with structural maintenance, economic return, soil maintenance, and urban wildlife habitat combined so that no one type of management covers large contiguous areas and the overall network remains intact throughout its web.

Cash products harvestable in an integrated urban forest include fuelwood, lumber, nursery stock, and fruits and nuts. These commodities are currently imported from outside dryland cities, often with large transportation and environmental costs.

Other functions which the urban forest can serve (potentially saving us money in the long run) are creation of local jobs, climate modification, air filtration, shade provision, humidification, nutrient cycling, provision of habitat for wildlife, and local beauty. In addition, the urban forest could make use of outputs of the city which would otherwise present waste problems. It can recycle "waste" water into the saleable products listed above, and can make use of organic waste which would otherwise be stressing landfills. The urban forest can be viewed as a sophisticated, massive recycling system.

This approach to urban forestry offers exciting frontiers for developing our understanding of guild interactions in different bioregions and for interdisciplinary collaboration. Most important, it offers a vision of how we may learn to care for ourselves, in place, and the hope of a future for desert cities.

*Rick Ryan is an Urban Forester, working with "Tree People" in Los Angeles.*