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Urban Forestry Issues

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Introduction

The U.S. population has grown increasingly urban each decade, from 28 percent in 1910 to 80 percent in 2000 (U.S. Census Bureau, 2002). In the Chesapeake watershed alone, residential development is predicted to consume 800,000 acres between 2003 and 2030, nearly 90 percent of it replacing farmland (Boesch and Greer, 2003). As urban communities grow larger and faster than ever before, natural resource management in these areas becomes crucial for achieving sustainable development and maintaining and enhancing the quality of life and the environment.

Tree-Care Issues in the Urban/Community Forest

Many tree-care issues affect the use, management, and protection of the urban and community forest. These include loss of tree cover, proper care of trees to increase longevity and decrease hazards, alleviation and prevention of soil compaction, providing for better wildlife habitat, the effect of air pollution on tree health, and public mandates for storm-water retention and flood prevention.

The loss of tree cover is becoming a critical issue in many areas. In a natural or commercial forest situation, the canopy will approach 100 percent cover as trees attempt to capture all available sunlight. In a residential area, the canopy cover will typically range from 30 percent to 60 percent. Highly developed areas often have less than 10 percent canopy cover. One way to calculate the loss of forest cover in a community is to compare aerial photographs taken over time. Soil surveys are one source of these photographs. If you have two photographs at the same scale, lay a dot grid over each photo and count the percentage of dots that fall on forest cover.

Planting the right tree in the right place is essential to the proper care of trees. Trees can only provide benefits if they are healthy and live for a long time. Trees should not be planted where they cannot live or will interfere with power lines or buildings. They should not be planted where they cannot survive cold winters or hot summers because they will die and have to be removed. These are examples of trees costing money, not saving money. Table 1 provides a list of common urban and community trees suitable for hardiness zones 6 and 7 (all of Virginia). The table is meant as a starting point for ideas. Consult websites for additional information, such as pictures of tree form (Peterson and Seiler, 2003) and government nurseries for hard-to-find native tree seedlings (Department of Forestry, 2004).

Pruning is *sometimes* required for the proper care of trees. In young trees, you prune primarily to promote good tree structure. Older trees may require periodic pruning to clean out dead and dying branches or for other clearly defined reasons. However, a good rule of thumb is never to remove a branch from a tree unless you have a clearly defined reason for doing so. When you prune, properly placed, clean cuts will help the tree recover quickly. A common mistake is to remove a tree limb by cutting it flush with the tree trunk. Take care to cut the branch at its natural removal point, the branch collar. Remove any size tree limb with three cuts to avoid bark stripping from the tree after the final cut (Bedker et al., 1995). Perhaps the worst mistake you can make is to top a tree. This is the practice of severely cutting back branches and the main stem so

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that only stubs remain. Topping destroys a tree's natural beauty and makes it dangerous by allowing decay fungi to invade the branches and make them hollow. Although strong limb growth may occur after topping, these branches are only weakly attached to the outer layers of wood and are likely to fail in storms.

Many people forget to protect the roots of trees in an urban area. In a natural forest situation, the forest floor is usually left undisturbed in the area beneath a tree. This often is not the case in the urban/community setting, where tree roots are restricted by pavement and building foundations. In 2003, Hurricane Isabel uprooted many trees because their root systems had been compromised by sidewalks, curbs, and streets. A good management practice is to mulch the area beneath and extending about three feet beyond the canopy (see the pictures below).

Soil compaction is a problem in every community. It occurs when vehicles, particularly those involved with construction and maintenance, drive across moist soil, but it can even occur where there is heavy foot traffic. Natural, undisturbed soils have many pore spaces that are important reservoirs of gasses, such as oxygen, and moisture that roots need to live. Pore spaces also serve as passageways for water to percolate through the soil profile. When compaction occurs, these pore spaces collapse. Existing roots find it difficult to obtain oxygen, nutrients, and moisture, and the resultant dense soil is difficult for new roots to penetrate. Consequently the tree makes very slow growth and can die back from the branch tips. These trees can die during drought because of their limited root systems. On older trees, severe soil compaction can precipitate decline and eventually lead to tree death.

Urban and community forests have great potential for providing wildlife habitat. An important decision is whether to retain or remove dead and hollow trees, which are used by cavity-nesting birds, squirrels, and other animals. Unlike natural forests, the retention of dead and hollow trees in urban/community areas must be balanced against the safety hazards posed to humans from falling branches or trees that blow over in storms. There are many urban and community areas where this hazard is low, and dead and hollow trees may be retained. Another wildlife habitat issue is the need to provide food and cover. Evergreens provide valuable winter cover. Nut- and berry-producing trees are particularly valuable food trees. (Martin et al. 1951).

Native tree species are often preferred over nonnatives where you are planting trees to achieve greater canopy cover. It is important to remember, however, that the tree must be an appropriate choice for the location. For example, if air pollution is common in the area, it is better to plant a nonnative tree that tolerates pollution than a native tree that does not. Never plant an exotic species that is known to be invasive. An invasive plant list for Virginia is available from the Department of Conservation and Recreation. (DCR, 2003).

Photo by Brian Kane, Assistant Professor, University of Massachusettts, Amherst

Photo by Edward F. Gilman, Professor, Environmental Horticulture Department, IFAS, University of Florida

Mulch rings should be three to four inches deep, and as wide as possible around the tree. Remember not to put mulch right up against the trunk.

Flooding and storm-water retention are growing issues in urban areas. Tree canopies intercept rainfall, reducing and postponing the amount and time that water is received into a stream or river. Tree roots help to create pore spaces that provide reservoirs for still more water, and provide pathways for rainwater to be absorbed into the soil profile. Loss of tree-canopy cover and soil compaction are two conditions that contribute to flooding in urban and community areas.

The effect of air pollution on tree health is very difficult to quantify. Like many environmental conditions, it is almost impossible to directly link tree death to air pollution. Usually environmental conditions contribute to overall poor health, and may contribute to tree death in the face of other disturbances, such as insect or disease attack or drought.

Table 1. Common trees suitable for planting in Virginia (hardiness zones 6 and 7) by size class (Peterson and Seiler, 2003). For hard-to-get species consult on-line sources for local tree nurseries.

Less than 30 feet tall

Acer buergeranum - trident maple*

Acer griseum - paperbark maple*

Acer palmatum - Japanese maple*

Amelanchier arborea - downy serviceberry

Asimina triloba - pawpaw

Carpinus caroliniana - hornbeam

Cercis canadensis - eastern redbud

Chionanthus virginicus - fringetree

Cornus florida - flowering dogwood

Cornus kousa - kousa dogwood*

Hamamelis virginiana - witch-hazel

Ilex x attenuata - Foster's holly*

Koelreuteria paniculata - goldenraintree*

Magnolia stellata - star magnolia*

Magnolia x soulangiana - saucer magnolia*

Magnolia virginiana - sweetbay magnolia

Malus spp. - crabapple*
(disease resistant varieties only)

Pinus thunbergiana - Japanese black pine*

Prunus americana - American plum

Prunus cerasifera - purple leaf plum*

Prunus serrulata - Kwanzan cherry*

Prunus subhirtella "pendula" -
Weeping higan cherry*

Prunus x yedoensis - Yoshino cherry*

Salix discolor - pussy willow

Between 30 and 50 feet tall

Acer negundo - boxelder

Betula nigra - river birch

Castanea mollissima - Chinese chestnut*

Diospyros virginiana - persimmon

Ilex opaca - American holly

Juniperus virginiana - eastern red cedar

Maclura pomifera - osage-orange*

Morus rubra - red mulberry

Nyssa sylvatica - blackgum

Ostrya virginiana - hophornbeam

Oxydendrum arboreum - sourwood

Picea pungens - blue spruce*

Pinus virginiana - Virginia pine

Pyrus calleryana - callery pear*

Quercus acutissima - sawtooth oak*

Salix babylonica - weeping willow*

Salix nigra - black willow

Sassafras albidum - sassafras

Thuja occidentalis - northern white-cedar

Tilia cordata - littleleaf linden*

Ulmus parvifolia - Chinese elm*

x Cupressocyparis leylandii - Leyland cypress*

Zelkova serrata - Japanese zelkova*

Over 50 feet tall

Acer rubrum - red maple

Acer saccharinum - silver maple

Acer saccharum - sugar maple

Carya glabra - pignut hickory

Carya illinoinensis - pecan

Catalpa speciosa - northern catalpa

Celtis occidentalis - hackberry

Fagus grandifolia - American beech

Fraxinus americana - white ash

Fraxinus pennsylvanica - green ash

Ginkgo biloba - ginkgo*

Gleditsia triacanthos - honeylocust

Juglans nigra - walnut

Liquidambar styraciflua - sweetgum

Liriodendron tulipifera - yellow-poplar

Magnolia grandiflora - southern magnolia

Picea abies - Norway spruce*

Pinus echinata - shortleaf pine

Pinus strobus - eastern white pine

Pinus taeda - loblolly pine

Platanus occidentalis - American sycamore

Platanus Xacerifolia - London plane tree*

Populus deltoides - cottonwood

Prunus serotina - black cherry

Quercus alba - white oak

Quercus bicolor - swamp white oak

Quercus coccinea - scarlet oak

Quercus nigra - water oak

Quercus palustris - pin oak

Quercus phellos - willow oak

Quercus prinus - chestnut oak

Quercus rubra - northern red oak

Quercus velutina - black oak

Robinia pseudoacacia - black locust

Taxodium distichum - baldcypress

Tilia americana - American basswood

Ulmus americana - American elm
(disease resistant varieties only)

* not native to Virginia

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