DEVELOPMENT OF URBAN FORESTRY PROGRAMS IN ONTARIO

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RESUMO

O program florestal urbano da provincia de Ontario, Canadá, é apresentado e discutido; existe ainda muito espaço para a melhoria das fases de estabelecimento, manutenção e re-vitalização da vegetação urbana em Ontario.

Palavras chave: floresta urbana, Ontario, Candá .

ABSTRACT

The urban forestry program in the province of Ontario, Canada, is presented and detailed; there still a lot of improvement to be done concerning not only the establishment but also maintenance and reciclying of urban forests in Ontario.

Key words: Urban forestry, Ontario, Canada.

INTRODUCTION

Ontario communities were frequently developed with little regard to the natural environment. In urban centers, forests and other natural systems such as wetlands, rivers, and streams were seen as an obstacle to development and were altered or removed entirely. Land occupied by these natural systems, as well as agricultural land, was developed into a network of houses, roads, various types of industry and services necessary to support an urban infrastructure. Fragmentation or complete loss of environmental values and systems has resulted in a loss of functioning forest ecosystems throughout many of our established urban centers. Provincial forest management programs are rarely directed at forest remnants in urbanizing areas. Land values escalate on the urban fringe as properties are purchased by development interests. In many cases, when development proceeds the land is deemed to be too valuable

for it to be left in forest. There are few legislative means to protect forest cover on private land. However, most communities contain some natural, or remnant forest ecosystems. These are usually situated on land that was deemed unsuitable for development, such as ravine lands, and lands that were deemed to be prone to flooding. In only a few cases, woodlots of significance have been protected and set aside.

URBAN TREE ESTABLISHMENT

Planting of trees and shrubs in urban centers began in the eighteenth and nineteenth centuries in Europe (Zube, 1971). In settled areas of Ontario, then known as Upper Canada, the planting of amenity trees began in the late nineteenth century (Lambert, 1967). Ontario has had a long history of programs to promote the planting of trees on private lands. Most of these programs have been directed towards roadside and large blocks of land in rural areas.,

Reforestation programs were initiated to reduce the negative effects of environmental degradation on human inhabitants in a rural setting. These
provincial programs have not been promoted in an urban setting.

EVOLUTION OF URBAN FORESTRY PROGRAMS

Municipalities have typically recognized the need for an urban forestry program as a result of a drastic change in the state or health of the urban forest such as: a tree epidemic like Dutch elm disease; storm or flooding damage; or demands from increasing urbanization (Morsink, 1985). Out of such crises, urban forestry programs have been established, and over time some have developed a broader scope. Most municipal urban forestry programs have developed in relative isolation, with little or no external support.

Urbanization in Ontario continues with pressure focused mainly on a number of urban growth nodes. Communities within these areas tend to have the most developed programs to manage the urban forest. In recent years, there has been increasing community support for urban forest management. Community residents have formed associations and even hired consultants to study neighborhood forests to learn more about them and how they can best be managed (Buchanan, 1992). Until now, urban forestry has remained largely unrecognized at the provincial level.

URBAN FOREST VALUES

Urban forests bring a natural richness and diversity to our communities, and
provide us with a wide range of values. Communities that have properly managed and maintained urban forests are much more desirable and healthy places to live. The following are just some of the values and benefits that urban forests provide:

ENVIRONMENTAL ISSUES

Air Quality - Trees trap dust particles and can

absorb small amounts of gaseous pollutants from the air. Through photosynthesis, trees absorb carbon dioxide and produce oxygen. Trees and forests are often referred to as the "lungs of the Earth".

Water Quality - Establishing vegetation on stream banks will lower water temperature by providing shade. Soil erosion and siltation of urban watercourses is lessened by retaining or establishing vegetation on the banks of watercourses. This vegetation will also intercept fertilizers and other pollutants moving into riparian areas through ground and surface runoff.

Water Quantity - Tree canopies intercept precipitation and facilitate groundwater recharge while reducing flooding and the load on storm sewage systems. This effect is especially important in areas where a high proportion of the surface is impervious due to pavement or buildings. When forest cover is insufficient, runoff is quickly discharged to aquatic systems through storm sewers (Wilm, 1971). This rapid runoff is reflected in diminished base flows to local streams. In communities that rely on groundwater for their water supply, aquifers are more efficiently recharged when there is sufficient forest cover.

Noise - Vegetation reduces noise through absorption and diffusion of sound waves (Cook, 1978). Barriers of trees and shrubs can be utilized to reduce noise levels when properly located.

Microclimate - Wind speed at ground level is lowered by the strategic placement of trees. Trees also provide shade and reduce glare in the urban environment (Herrington, 1978). Temperature - Urban areas are sometimes termed "heat islands" as the temperature is higher than surrounding rural areas. Cities are warmer in both summer and winter. The warmer winter temperatures are due to heat generated in the urban environment. In summer, trees and other urban vegetation cools the environment through shading effects and evapotranspiration. (Federer, 1971)

Ecological Values - Urban forest provides ecological diversity and important habitat in an urban setting for a variety of flora and fauna. In parts of southern Ontario, urban development covers such large portion of the landscape that

urban forests may provide the only habitat for flora and fauna in a given locality. These urban forests can also serve as important stopover points for migratory bird species. Woodlots that were part of the historical forest cover are termed "arboreal or forest remnants." These remnants are increasingly being recognized for their natural heritage values. The longer a site has remained forested, the more likely it is to contain important ecological attributes, and the more difficult it becomes to replace or restore these features .

SOCIAL VALUES

Ameliorative Effects - Urban forests have an ameliorative effect on an otherwise barren, manmade environment. Society has a need to maintain links to the natural environment. The aesthetic value of urban shade trees and forests provide an unconscious outlet to moderate the stress of everyday urban life. The amenities provided by an urban forest can provide a sense of space and privacy for individuals, and can contribute to overall mental and physical health. From an architectural standpoint, urban trees and vegetation soften hard lines and provides contrast to flat surfaces.
Recreation - An important trend with respect to our aging population is the increased demand for passive recreation. Tree parks and other types of urban greenspace will become increasingly important to the Ontario public over the coming decades (OMNR,
1992a). Urban inhabitants frequently subject themselves to great expense and aggravation in order travel to more natural surroundings on weekends and vacations. Healthy urban forests can help offset this need.
Education - Today's urban populace is becoming increasingly detached from the natural world. Having natural areas within or in close proximity to urban centers allows for greater opportunities to understand the functions of these ecosystems. It is extremely important that our educational systems, and the residents they serve have access to forests to facilitate awareness and understanding of the natural world.
Community Identity - Urban forests can be a great source of community identity and pride.

Shade trees on private property may be valued by the local neighborhood as much or more than by the individual owner. Remnant woodlots become an important focal point for the community.

ECONOMIC VALUES

Community Asset - The value of publicly owned shade trees in communities can be considerable. The Town of Oakville's seventy-six thousand publicly owned shade trees are estimated to be worth seventy million dollars . The City of North York estimates the replacement cost of its two-hundred thousand shade trees to be five hundred million dollars. Properly maintained shade trees are an investment that appreciates in value. Maintenance programs are necessary to sustain shade tree health, and avoid public safety and liability problems.
Growth and Prosperity - A healthy urban forest is necessary to maintain community prosperity and is a major factor in attracting tourism and investment. People tend to linger and shop longer along streets lined with shade trees. Apartments and office space are rented more quickly and for longer periods in "green" areas. Businesses may be more apt to locate in a community with a healthy urban forest (USDA, 1988). Such businesses are more likely to be clean and modern.
Real Estate Value - It is well known that neighborhood shade trees and trees on private property can substantially increase property values, in some cases over twenty percent (USDA, 1988). In new housing developments, owners usually landscape and plant trees, even before finishing some interior aspects of the house. Trees and other vegetation is frequently established to mark boundary lines and increase personal privacy.
Energy Savings - In winter, an effective windbreak can reduce heating costs by ten to twenty-five percent when properly located. In summer, properly located trees may reduce air conditioning costs by over fifty percent (Moll, 1989).
Employment - Tree maintenance programs provide employment and contribute to the local economy.

MUNICIPAL URBAN FORESTRY PROGRAMS

Urban forestry programs in Ontario vary by municipal size, budget support, and needs. Small communities rarely have in-house knowledge of urban forestry, and may rely on consultants and private tree care services. Larger communities in many cases have the resources for an urban forestry department or program, although some work may be contracted to private firms. All municipalities share a need to effectively manage their urban forest. Greater needs for protecting the ecological and ameliorative functions of the forest may exist in larger centers due to greater changes to the landscape. The following program components were observed in Ontario or are needed to effectively manage the urban forest:

OBJECTIVES

A community must have a clear set of goals and objectives for an urban forestry program. The goals and objectives of a program must be attainable and will depend on the individual municipality. It may be necessary for the urban forest manager to educate municipal government and other staff of the values and benefits that can be obtained by an effective management program. Once this is understood, the municipality will be better able to develop objectives for urban forest management. The municipality may wish to manage the urban forest to preserve community character, cultural identity, and heritage values. For many communities, the aesthetic values of the urban forest are essential to
attracting tourists or investment and growth. A desired objective may be a certain percentage of greenspace, along with the maintenance of a healthy population of street trees. If forest cover is already low, it may also be necessary to have an objective of no net loss or even an increase in forest cover within the municipality.

INVENTORY

An urban forest inventory can provide information regarding the trees and forested areas existing within the municipality. Inventory information provides the basis for planning and decision making, and is extremely important to the urban forest manager. The inventory information must be kept current, as it is only a snapshot of the forest at the time the information is collected. Most Ontario municipalities would benefit from having greater inventory capabilities. The information is essential to give mangers, municipal government, and the community a clear picture of the values and requirements of the urban forest. There are two basic components of an urban forest inventory: 1) Shade Tree or Single Tree Inventory: A basic shade tree inventory may simply contain species and location information. More detailed inventories contain information such as age, condition, and maintenance history. This information is used to manage the single tree component of the urban forest, and can be organized in a database. Commercial computer software for urban forestry inventories is now available for a wide variety of computer systems. Most Ontario communities do not have computerized inventories. A shade tree inventory can be used to planning of arboricultural management. Ideal intervals for shade tree inspection can be calculated. Species composition and age-class structure of the forest can be analyzed, and can be modeled to predict and plan future program requirements. i1) Forest Ecosystem Inventory This aspect of the inventory gives information on the woodlot and remnant forest components of the urban forest. A basic inventory may simply contain forest type, location and boundary information. More detailed information can be collected such as species composition, age and height of dominant trees, site class, understory composition, and habitat potential. Location of significant species of flora and fauna and ecological communities may also be identified. Most communities have maps which outline the location and boundaries of these components and supplement this information with provincial Forest Resource Inventory (FRI) information. Few municipalities have the

resources to gather more detailed information. Another useful component of an urban forest inventory is a forest canopy or tree cover analysis. Percentage crown cover can be derived from analysis of aerial photography and mapped . This can be used to give a clear overview of the extent of the urban forest within the municipality.

PLANNING

1) The Urban Forest Management Plan: it is important that the urban forest be managed in accordance with a carefully prepared management plan. Consideration of goals and objectives, community needs, and analysis of inventory information will dictate long term management requirements to achieve sustainability of the urban forest. Such a plan may be adopted as part of an Official Plan. An important aspect of the planning process is constant monitoring of plan implementation and its effectiveness in reaching program objectives. If the approach does not appear effective then the plan must be modified. To help with the planning process, change over time can be modeled to evaluate different management scenarios for the urban forest.
2) Planning and Development Ecological features which are critical to developing sustainable ecosystems must be identified in developing communities. These features can then be protected during development along with existing or potential linkages between these components. This should be specified in the Official Plan, as part of a Woodlands Strategy or Urban Forest Management Plan. Communities which are well established and have little room to expand cannot realistically expect to increase their area of remnant forest included in the urban network. They can however plan to establish greater numbers of shade trees to increase the area of urban forest. Existing tree cover must be protected, and adequate space to retain or establish shade trees, must be a requirement during redevelopment. Tree removal and replacement is costly and these costs increase if trees are not able to live out their expected lifespan. Some communities are planning or undertaking naturalization projects in areas that were

traditionally manicured greenspace. Establishment of trees and shrubs as well as native grasses and plants can help restore greater ecological function to these areas. Planning is important to direct ecological restoration projects to areas where they would be most beneficial. Naturalized areas within municipal parks systems provide the public with the opportunity to view flora
and fauna that they might not normally come into contact with in a manicured park.

OPERATIONS

The size of the municipality and the urban forest, as well as available budget dictates the size of the operational program. Operational components may include tree establishment and maintenance, pruning, and removal. Few Ontario municipalities actively manage woodlots within the urban forest. In Ontario, urban forestry responsibilities are frequently split between two departments. Parks and Recreation departments frequently have responsibility for trees in parks and other public greenspace, while Public Works departments are often responsible for street trees. Very few municipalities have one department responsible for managing all aspects of the urban forest. Operational planning can be used to identify what work is needed over the short term to meet the objectives of the urban forest management plan. Size and number of work crews and equipment available will vary by municipality. Some or all work may be contracted out to private tree care firms.

RESEARCH

Municipal urban staff remain current by participating in professional associations, participating in workshops, and receiving scientific journals. At present, most research information originates outside of Ontario, and even Canada. As such, it may not be entirely applicable. It is extremely important that urban forest managers have access to current and reliable research information. Informed decisions and effective programs will result in greater benefit from the urban forest and better use of available funding.

PUBLIC AWARENESS, EDU-CATION, AND INVOLVEMENT

An involved and aware community is likely to understand and support effective management of the urban forest. Awareness and educational programs should be considered as investments in the long-term vitality of the community. Urban forestry programs should encourage public participation. Special events on Arbor Day or Earth Day, can be organized by the urban forestry department. Volunteer groups may offer support or take on projects themselves. Public participation can help focus attention on the urban forest, especially through media coverage of these special events.

EFFECTIVELY MANAGING ONTARIO'S URBAN FORESTS

A lead role promoting and supporting urban forest management in Ontario
needs to be established and clearly defined. At the moment, there is virtually no presence in urban forestry at the federal or provincial level. As a result, municipal programs develop in relative isolation. There are presently few outside agencies in Canada assisting municipalities in acquiring the information and tools necessary to develop a comprehensive urban forest management program.

DETERMINING THE STATE OF ONTARIO URBAN FORESTS

Information is needed on the current state of urban forests in Ontario. Many urban centers have experienced considerable growth during the past few decades. For instance, between 1981 and 1986, in the Greater Toronto Area, 20,600 hectares of agricultural land were converted to urban use (Berridge Lewinberg Greenberg Ltd., 1993). However, we have no information as to how much forest land is being lost to urban development in recent time. Due to this lack of information, cumulative losses of forest cover or declines in urban forest health frequently go unrecognized until there is a serious problem. Municipalities need comprehensive information to determine the state of their urban forests and

manage them on a sustainable basis. There is a need for assistance in developing comprehensive inventory methodology for shade trees and remnant forest cover. A range of inventory methodologies and analysis techniques are needed from which a municipality can select based on its specific objectives. A methodology is needed for a balanced evaluation of remnant forest cover which takes into account all values, as well as a way to determine which forest components are integral to a sustainable system. Woodlots which have little diversity or heritage value may play an extremely important function in linking ecosystem components. Even undeveloped lands that have no existing forest may have a potential function if the site can be rehabilitated and will link existing natural areas. A simple ranking system for forest types does not take into account ecological function or other values. Ranking systems cannot be used to protect urban forest components during development, as they are unlikely to result in retention of a functioning ecosystem.

INTEGRATION OF URBAN FOREST VALUES DURING LAND USE PLANNING AND DEVELOPMENT

Although recent attention has been focused on protection of environmental
values in general, forest values have received little specific recognition in the land use planning process. Distinction should be made between the various types of greenspace, and a specific emphasis placed on urban forest values. Forest cover plays a key role in linking and supporting natural systems such as wetlands and other riparian areas. Increasing land values may be one reason that forest values do not receive appropriate recognition during land use planning and development. When forested land is converted to other uses the value exceeds that of the unaltered forest. An urban redevelopment project has more direct economic value than a small group of mature shade trees. Planning and development decisions that do not take into

account the full value of forested land have resulted in significant loss of forest cover during urban development. The real value of urban forests is not always taken into sufficient consideration by planners and decision makers. There is a need to consider all values and develop effective incentives if forest ecosystems are to be integrated in an urbanizing environment. However, even when this understanding exists there are few mechanisms to allow for protection and retention during development.

CURRENT OPTIONS FOR URBAN FOREST PROTECTION

There is a need for legislative means to protect forested land in urbanizing areas. Forest areas which have been identified as Environmentally Sensitive Areas (ESA's) or Areas of Natural and Scientific Interest (ANSI's) represent only regionally and provincially significant values. At the local level very few forest remnants are included in these designations. Protection of ESA and ANSI designated forest alone is not enough to have functioning ecosystems. We risk losing remaining significant forest ecosystems in developing areas of Ontario. Remnant forest can be acquired through the five percent dedication of land for park or highway purposes required under the Planning Act. However, the intention of this section of the Act is to acquire open space for community and neighborhood parks, and it is difficult to secure adequate areas of both park and forest. There is a need for dedication of forested land in addition to the five percent for parks and highways. There are few incentives for developers, or municipalities to leave forest intact at present, other than a recognition of the values and benefits of trees and woodlands. Components that are integral to a sustainable ecosystem may be identified and protected in Official Plans. The recent Resource Material for Input To Municipal Planning (OMNR, 1992b) is a good source of information for municipalities interested in
protecting resources during the planning process. However, adoption of the recommendations is voluntary and is not required. Other options which are available

include: Trusts Conservation Easements Stewardships Purchase Land Swaps Density Bonuses Donation and Dedication Trade offs in Regulated Areas Zoning Site Planning Tree Preservation Plans Tree Bylaws under the Trees Act. These currently available options are not sufficient. We continue to lose forest cover and established shade trees in urbanizing areas on a site-by-site basis.

DEVELOPMENT AND COORDINATION OF MUNICIPAL URBAN FORESTRY PROGRAMS

The level of municipal program development is generally low, and limited by low funding levels. Many municipalities have not sufficiently recognized ecosystem-based management. Most programs are focused on shade trees at the individual tree level and parks are viewed mainly from a recreational perspective. There is a need for many municipal programs to incorporate sustainable development and ecological principles into urban forest management. Municipal urban forest management programs are frequently divided between more than one department. There is a need for a more coordinated approach to facilitate ecosystem-based approaches within many communities. Model programs that integrate urban forestry responsibilities and ecosystem-based approaches
are required. Communities which lack the resources to establish comprehensive
programs need assistance in the form of technical support and management
planning assistance.

PROVINCIAL LEGISLATION AND POLICY

STRATEGY: Develop provincial legislation and policy to support urban forestry programs in Ontario. RECOMMENDED STRATEGIC ACTIONS: Create a
Provincial Policy Statement to protect forests under Section 3 of the Planning Act (R.S.O. 90). This would require that municipalities protect and retain forest ecosystems. Change Section 51 of the Planning Act (R.S.O. 90) to

allow for dedication of forested land. This would be other than the five percent dedication of land for park or highway purposes. Cash payment in lieu of conveyance for forested land would be disallowed, except in cases where the money is used to acquire other forested lands. Change the property tax system.

Ensure that forested land is taxed at a lower rate so there is less of a burden on the owner to retain forest. High taxes act as an incentive to develop. Revise the Trees Act to enable municipalities to enact more effective tree cutting bylaws.

MNR POLICY AND PROGRAMS

STRATEGY: Provide an appropriate level of provincial direction, coordination, and support for urban forestry programs.
RECOMMENDED STRATEGIC ACTIONS: An urban forestry policy is needed to provide provincial direction and a lead role in the coordination of urban forestry programs. Recognize urban forestry as an aspect of the provincial forest policy framework and address it in Regional forest strategies. The Forest Health partnership program would be an important vehicle for promotion of urban forestry and urban forest health issues. Include production of an urban forestry strategy as part of the program. A provincial urban forestry position within MNR, dedicated solely to urban forestry, would ensure this area is given appropriate consideration within the Ministry's mandate. Specify urban forestry responsibilities for MNR area teams to include in their mandate. This could include providing technical advice when requested such as input into municipal urban forestry program development, strategies, plans, and other projects. A detailed plan input package on urban forestry would be beneficial for MNR staff to use in compiling their input to municipal official plans. Encourage availability of nursery stock suitable for urban forestry purposes, with emphasis placed on indigenous species and proper seed source. Seed could be made available to private nurseries. Consideration could be given to forming a seed cooperative linking the Ontario Tree Seed Plant with Landscape Ontario.

LAND USE PLANNING

STRATEGY: Promote the use of a broad landscape approach in municipal planning. RECOMMENDED STRATEGIC ACTIONS: Recommend the use of a broad landscape approach in the Ministry's review of Official Plans and amendments, as ecosystem components cross municipal boundaries. Encourage the inclusion of urban forest inventories and management plans in Official Plans.

INCENTIVES

STRATEGY: Develop and review incentive programs which promote the comprehensive management of urban forest ecosystems.
RECOMMENDED STRATEGIC ACTIONS: Provide incentives and support for municipalities that are developing effective urban forestry programs. This would encourage a greater number of municipalities to develop effective programs. The goal should be to foster self-sustaining programs. Direct employment and student programs towards municipalities where urban forest inventories and other projects are required.
Support the involvement of public interest groups in urban forestry. Community-based groups can undertake significant projects and can be effective in promoting awareness within the community. Develop a process to allow for private sector support and funding of urban forestry programs and projects. The private sector has a stake in community prosperity and has a direct interest in projects that improve the local environment.

RESEARCH/SCIENCE/ TECHNOLOGICAL TRANSFER

STRATEGY: Support and promote research. Ensure scientific advice and technical information is easily accessible to those involved in all aspects of urban forest management.
RECOMMENDED STRATEGIC ACTIONS: Identify research priorities. Support and promote research projects that are needed to

provide a state-of-the-art information base for urban forest managers in Ontario. Develop an urban forest ecological evaluation system that balances environmental, social, and economic values. Support the development of model urban forestry programs. This would foster and promote effective and self-sustaining municipal urban forestry programs. Facilitate preparation of a manual for urban forest management. Municipalities and urban forest managers would have ready access to necessary technical information. Facilitate development of technical guidelines for protection of urban forest values during construction and development. Make computer software for urban forest inventories available to municipalities. Use of computer databases to manage inventory information will assist municipalities in developing urban forest programs. Promote utilization of bio-products from the urban forest. There is an unrealized potential for economic utilization of many bio-products from the urban forest. Urban forests could potentially supply communities with foods, medicines, and wood products, and also divert material from public landfills. Sponsor an urban forestry symposium in Ontario. Such an event would generate widespread interest and enthusiasm for urban forest management in Ontario. Promote inclusion of urban forestry topics in other forestry symposiums.

INFORMATION, AWARENESS, AND EDUCATION

STRATEGY: Promote awareness and education of urban forest values.
RECOMMENDED STRATEGIC ACTIONS: Prepare an effective communications program to promote and facilitate an under-standing of urban forest values and urban forest management. This could be delivered through various partners to a wide Ontario
audience. Prepare a series of fact sheets dealing with urban forestry, and promote preparation and dissemination of such information by all partners. Actively promote publication of urban forestry articles by the Canadian media in magazines, newspapers and other formats. Promote adopt-a-tree programs within Ontario municipalities. Such programs could involve tree establishment

projects or adoption of existing trees and would generate greater public and municipal interest in the state of community urban forests. Programs such as the Ontario Forestry Association's Project Tree Cover could be utilized to fund projects. Promote the establishment of educational and training programs for
urban forestry professionals within the Ontario educational system. Ontario residents would not have to travel outside the country to obtain an education specifically in urban forestry. Create an educational program for engineers, planners, public works employees to raise awareness and understanding of urban forestry within these professions.

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