seed – a conservation imperative

Since the late 1980s, there has been a powerful grassroots movement focused on restoring nature's place, greening the land and putting some wilderness back into our cities. Across North America and around the world, community groups have been sharing in the joy of the simple act of planting a tree.

Thousand of seedlings have been planted in one-day volunteer events that enable the average armchair environmentalist to shed some "green guilt" and give back to their local environment. It was and continues to be a great social and environmental activity. But deep ecologists are not content with such a visceral one-off to society's profound environmental disregard. They knew the idea was good but also, they knew the projects could be improved.

A common concern among conservationists was that seedlings, adapted to local soils and climates, were in short supply or not used at all in these green-up projects. Also, there was the issue of genetic diversity. After all, planted seedlings are expected to succeed meadows by forming new woodlands over the next 50 years. Does planting stock have the right stuff to survive in these soils, to endure the demanding combinations of drought, cold, heat, smog and pestilence that inevitably will ensue?

Threatened Trees

Many species of trees, once common and widespread in eastern North America have suffered dramatic reductions in their distribution and population. Magnificent trees such as the American chestnut, butternut, cucumber tree and the red mulberry are already listed as endangered species. Chestnut blight, butternut canker, Dutch elm disease and white pine blister rust are examples of chronic exotic disease syndromes which have plagued the forests of eastern North America for many decades. Now, there is also the significant challenge of managing the emerald ash borer and the Asian long-horned beetle.

A large white/bur oak in severe decline since the construction of this housing development in York Region. A neighbouring farmer told me that after the grade of the land was raised to the west of the tree, the tree was flooded for a long period during the spring. The severe drought experienced in southern Ontario has added to the stress on this veteran tree. Unfortunately, it will probably die before its seed or genetic heritage can be salvaged.

Extreme weather events and unusual weather patterns appear to be occurring more frequently. Decades of forest health monitoring show correlations between the occurrence of acid rain and ground level ozone with the severity of insect and disease attacks on trees.

Drought, prolonged heat waves, ice storms, heavy wet snow and windstorms can inflict stress on large areas of forest land. Stress is a trigger for decline in trees because it increases vulnerability to insects and pathogens to which they would normally be resistant.

Bark beetles, sawyer beetles, wood borers and fungi are typical opportunistic pests which invade weakened and wounded trees. Even if weather conditions mitigate, these secondary attackers can precipitate long term health problems for trees. Obviously, urban forests are of particular concern because the stresses conducive to forest decline plague metropolitan environments. A reduction in the average life expectancy of trees is another symptom of forest decline. In the eastern United States, it is anticipated that air pollution will reduce the lifespan of some trees by 25%.

The recent boom in the housing market poses a serious threat to the longevity of many veteran trees growing in an around these massive construction projects. Unfortunately, potentially unique seed sources are being lost to a zoning amendment and the resultant urban sprawl (pictured adjacent). Shouldn't new developments be planned with some regard for rare specimen trees they displace?

Finally, remember when you played outside and you spent the day in a tree fort with your friends? That giant grandfather tree worked its magic on your psyche. It was a lookout post, a refuge, a place of solitude and it never talked back. Surely heritage trees like those deserve to have their legacy renewed in the lives of tomorrow's children.

A Management Alternative

Recognizing that an organized system of collecting seed from urban forests was desperately needed, I undertook the challenge (with financial assistance through the Canadian TREE Fund) to try and develop a manual for identifying seed trees. Given that the biodiversity crisis is greatest in and around urban areas, the guide focuses on this habitat. It will not solve all the conservation problems, but it could be a powerful management tool that will reduce the loss of local genetic diversity. The system was designed to be able to identify candidate seed collection sites and groves yet not be so complicated that it alienated the professional's biggest ally – caring citizens and naturalists, both young and old.

Perhaps the most powerful reason to establish local seed collection programs is because the very act of seed collecting ensures that we are doing something to manage existing heritage trees and groves while simultaneously, we are gathering the quintessential building blocks for future landscape restoration projects. We all know that trees won't live forever and often

trees in urban settings have to be cut down for safety reasons or because new urban developments are being constructed. If we can mandate that seed should be collected from important but condemned trees before a permit to cut them is awarded, then we will have instituted a powerful tool for urban forest conservation.

An Evaluation System for Seed Trees

There are many different seed collection opportunities in urban forests but the mosaic of tree ownership combined with the biological variation in seed production necessitates that a formal inventory system be used to register potential seed trees. Managers would then access the database to efficiently coordinate and focus collection efforts according to their local conservation objectives. Collection sites also have to be catalogued in way that helps collectors, many of whom will be volunteers, find sites quickly and easily.

Perhaps the most powerful reason for seed collecting, in addition to managing existing heritage trees, is to gather the quintessential building blocks for future landscape restoration projects.

Candidate seed collection sites should be characterized in terms of ownership, forest type, stand origin, size, configuration and topographic position. The issue of ownership has many obvious implications with respect to cooperation, access and liability. Forest type, size and origin tells collectors the physical information they need to identify the grove in which the target trees may be found. Topographic position identifies the tree as one that would be adapted to upland or lowland microsites.

In order to compare the relative merit of one seed grove to another, the inventory should include a system for scoring seed trees according to a standard set of criteria. The scores serve to measure the suitability of collection sites against the conservation objectives set by local authorities.

After much research, consultation and field testing, seven criteria have been estab-

lished to form the basis of the seed tree evaluation system. Trunk diameter, crown size, dominance, tree age, health and vigour, number of trees (in cohort) and social value/context were chosen as the measures which could be used by both professionals and amateurs to judge the relative merits of trees. For simplicity, each criteria is scored on a 4-point scale and then summed to generate the total score for the candidate collection site.

We want to empower local citizens to become partners in tree conservation and heritage.

It is hoped that trained volunteers, keen to hike through their neighbourhood woods in search of majestic seed trees would become partners in the conservation and management of the natural heritage right where they live. Completed tally sheets would be sent to the managing authority or perhaps entered into an on-line database.

Once the survey results were registered, potential seed trees should be ranked from best to worst, by species, using the final mark awarded through the evaluation procedure. The resulting list will establish priorities by directing seed collectors to the best sources of seed for each species. The list of trees could also be sorted in other useful ways as well. One could search for all the big trees which appeared to be declining or in poor health, if the focus was to salvage their genetic heritage before they died. Alternatively, if seed was needed to return forest cover to a floodplain or other bottomland habitat, the tree inventory could be sorted to display all seed sources classified as lowland sites to meet that restoration priority.

The purpose of the seed tree evaluation manual is to bridge the gap between existing seed collection programs and the overlooked but rapidly disappearing reservoir of native forest diversity, right where most people live, around our towns and cities. Look for the guidebook, expected to be in print, next year. ♦

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