

detoxifying the soil. It was also found that once a sparse grass cover was established, seeds of the few remaining stunted poplars, willows and birches in the neighbourhood would blow in, germinate and become established.

In 1974, after three years of small-scale experimentation, the technique was tried out on a six-acre barren plot of land in the valley of Coniston Creek. In mid-August, after the dry part of the summer was over, the soil surface was roughened using an agricultural harrow; then, limestone, fertilizer and Canada Blue Grass seed were applied using agricultural spreaders. The ground was harrowed once more to incorporate the seeds and additives. The result in the first year was a sparse green sward of grass. But as the years progressed, more and more wildflower, shrub and tree species appeared spontaneously and thrived.

Because such flat, sandy, accessible areas formed only a fraction of the barren land, attention was turned in 1974 to the inaccessible stony barren hillsides that lined the highways and railways entering Sudbury. In these new experiments, ground limestone, fertilizer and grass seeds were thrown onto the soil surface by hand, and no attempt was made to till the soil or work in the materials. Nevertheless, the stony mantle trapped the lime, fertilizer and seeds, while at the same time conserving moisture. A grassy covering developed, soon followed, spontaneously, by poplar, birch and willow seedlings.

In order to try the technique on a slightly larger scale, I found an elementary school surrounded by barren land, and obtained the Principal's permission to explain my project to the Grade 7 and 8 students. I invited them to spend a half-day in mid-August working on an acre of barren land beside their school. This approach was successful - first at St. Hubert's School in the West End in 1975, then at St. Paul the Apostle School in Coniston in 1977. The seed mixture of five grass species, with nitrogen-fixing Alsike Clover and Birdsfoot Trefoil in-

cluded, was applied at a low enough rate that the open cover allowed birch, poplar and willows to colonize spontaneously.

In 1978, the mining companies announced layoffs and a summer shutdown, depriving numerous post-secondary students of summer employment. Bill Lautenbach, a planner with the Regional Municipality of Sudbury, was aware of my research, and he proposed that the Region apply for job-creation funds through the federal Young Canada Works program. That summer, 174 students worked on several different land reclamation projects, including the grassing of 285 acres of barren land, at a total cost of \$140,000. The Regional Municipality and the Ontario Ministry of Northern Affairs paid for the supplies and equipment, with material support from Inco and Falconbridge.



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Since 1978, similar programs have been run annually. The manpower component reached its peak in 1983 when 1,277 unemployed persons were hired for land reclamation. Funding for this peak year came from federal, provincial and regional government agencies and Inco, with material support from Falconbridge.

To date, 11.6 square miles of barren and semi-barren land have been revegetated by the Regional Land Reclamation Program. In addition, the predominantly broad-leaved nature of the trees that colonize spontaneously was offset by the planting of more than one million tree-seedlings, mostly pines. The "plantation" effect was avoided by placing the trees in informal groups with the goal of creating an aesthetically appeal-

ing and ecologically balanced landscape. The Program has received widespread acclaim, including:

- the 1990 Arboricultural Award of Merit;
- the 1990 Lieutenant Governor's Conservation Award;
- the Government of Canada Environmental Achievement Award;
- the United States 1992 Chevron Conservation Award; and,
- the 1992 United Nations Local Government Honours Award presented at the Earth Summit in Rio de Janeiro.

The revegetated lands constitute a living laboratory. Research continues on such diverse topics as metal uptake by reclamation species and nitrogen fixation from the atmosphere by clovers. A major research emphasis over the next few years will centre on the re-establishment of some of the less obvious plants and animals. If we wish to return to a "normal" forested landscape, we must assist recolonization by woodland wildflowers, as well as by small beneficial, litter-eating animals like mites and springtails (primitive wingless insects). A current strategy involves the transfer of small blocks of forest floor soil to revegetated sites, and the measurement of rate of spread, if any, of these plants and animals.

A century from now, the Sudbury landscape may not look all that different from any other part of northern Ontario. And it would be unfortunate if residents and visitors forgot an important part of their heritage. For this reason, we plan to preserve an area of untreated barren land and an area of treated land as an outdoor museum, where future generations can not only learn history, but also some applied ecology. Although the preserved barrens will probably not be barren forever, they will retain unique characteristics of great interest and value to scientists, as well as to the casual observer.

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