FORESTRY CONSIDERATIONS IN CANADIAN LAND-USE PLANNING ¹

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Forests occupy two-thirds of the total land area of Canada's 10 provinces, but less than half of this huge area of 1.4 million square miles of forested land produces timber that can be economically utilized at the present time. Within the accessible and productive forest area of 690 thousand square miles, there are extremely wide variations in the capability of the land to grow timber. For example, on a regional basis, the best growth rate in the coastal forests of British Columbia may be up to ten times that of the poorest areas being operated commercially in the northern and northeastern parts of Canada. Even within a given climatic region, production on different sites may vary by a factor of five.

When considering the possible land-use of forest areas in Canada on a national basis, it is convenient to visualize three broad zones that differ greatly in forest characteristics and land-use problems. They are:

(i) The northern zone lying between the commercial forests and the barren lands to the north. It is characterized by relatively small pockets of productive forest land, mostly along rivers, and extensive areas of scrub forest or other non-productive land.

(ii) The central forest zone extending in an irregular east-west belt of continuous and largely productive forest. The land-use in this area lying mostly to the north of the agricultural fringe is predominantly for forestry.

(iii) The southern zone between the agricultural land and commercial forest. Here, the land-use is a variable pattern of agriculture and forestry.

This discussion deals briefly with the northern zone, in more detail with the central zone which is of prime importance to forestry, and will pay particular attention to the southern zone where the problems of alternative land-uses are most acute.

The northern zone is largely undeveloped for any purpose at present, and the primary problem is to find some use for it. Its future potential for forestry and other forms of land management is low because of its inaccessibility and the limited areas of productive land. Unless the demand for forest products increases enormously a sustained forest industry in this northern zone is unlikely. While it is technically possible to bring some of the forested land to a more productive state, it would be better, from an

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economic aspect, to increase production as required by more intensive management practices on the good forest lands to the south. The use of the land for agriculture is even less promising. Protection of the better forested areas from fire and maintenance of timber supplies in the vicinity of settlements, together with wildlife management and limited recreational use will hold this area essentially in its present state for possible future requirements.

The central zone of commercial forests supports most of Canada's forest industries but contributes little to the agricultural economy. Forestry in this zone is "big business" with heavy capital investments for mills and the permanent development of large forest properties. Most of the area is provincial Crown land under long- or short-term leases to forest industries. The size of the individual management units is large, with limits of 100 to 2,000 square miles each, being common. The forests are operated under varying levels of forest management, with the age of forest exploitation or "cut and get out" rapidly drawing to an end in Canada.

Canadian forest industries were able to develop as they did because of the large accumulation of forest capital that nature bestowed upon us, but their future operating level is governed by the amount of usable wood that can be grown in perpetuity. This principle of sustained yield whereby the annual cut from a property is brought into balance with the productive capacity of the soil is now accepted as a policy by provincial governments and the larger forest industries. The implementation of a policy of sustained yield management does, however, pose many technical and economic problems.

Two of these problems are directly related to land-use planning. The first is: What is the productive capacity of the various sites within the management units for forestry or other uses? The second is: What classes of land now in forest production are likely to be withdrawn in the future for non-compatible uses? Forest management in the central zone of commercial forests is now reaching a stage where answers to these questions are necessary for rational planning. Information on land capability will provide the basis for wise policy decisions on future land use. For forestry purposes these policy decisions are essential, since land cannot be withdrawn indiscriminately from sustained yield forest management units for other purposes without seriously disrupting the flow of raw materials to our forest industries.

Information on the capabilities of forest land is rather sketchy at present because forest surveys have been concerned primarily with the inventory of the forest crop rather than with its land base. However, most forestry organizations are working on ways and means of assessing the land itself and several provincial inventories now include some information on this feature. The Federal Department of Forestry is keenly interested in the problem and feels that a co-ordinated effort by foresters, forest soil specialists, agricultural soil surveyors, geologists and geographers will be required for its solution on a national basis.

From available information on the capability of forest land in the central zone, it seems unlikely that large segments will be withdrawn for non-compatible uses in the foreseeable future. There are some exceptions to this. For example, for parts of the Clay Belt in Ontario and Quebec and of the Slave Lake — Peace River country in Alberta, it may be economically desirable at a

future date to withdraw lands from forest production for agriculture. The limited areas of potential agricultural land in the commercial forest zone, should be delineated and agreed upon as soon as possible so that forest managers can plan their long-term operations on a sound base. While most of the area is likely to remain in forest cover because of the nature of the terrain, climate and soil, this does not mean that forest industries will be the sole users of the land.

Forest managers are recognizing, whether they like it or not, that they must manage forest-land for purposes other than wood production. The concept of the multiple use of forest land involves management for wildlife, recreational use, watershed values, and the maintenance of aesthetic values. The integration of these various uses on a particular tract of forest land poses problems, but almost all of them are capable of solution through realistic planning to attain clearly formulated and compatible management objectives. For example, it is very unrealistic to consider two such incompatible objectives for a forest area as a game sanctuary for deer and the regeneration of the forest to yellow birch; but it would be feasible to maintain a deer population at a level that would permit only light or moderate damage to yellow birch reproduction stands. Similarly, a logging company can legitimately object to the public use of those of its logging roads that it uses for hauling, but it may well be that suitable arrangements can be made for public use of some of the company's other roads and so create another source of revenue. Throughout the commercial forest zone the chief problem will be to develop suitable working arrangements for the multiple use of forest land. Sometimes there can be only one use and sometimes several, but it is certain that foresters will fight a losing battle if they insist that the only real use of forest land is to grow trees for the mills.

I would now like to discuss forestry land-use problems in the southern forest zone where either forestry or agriculture can predominate. In this zone, recreational use together with wildlife management are very important considerations; and sometimes watershed values and erosion control may be primary management objectives. This region supports the so-called rural slums that developed after settlement on marginal agricultural land. In eastern Canada much land that was formerly cultivated or pastured is now reverting to forest, either by natural means or through reforestation schemes. In some areas of western Canada the forested area in the fringe zone is still being reduced through an extension of cultivation or range land. From available soil capability information, it is evident that some of the soils can be used either for agriculture or for forestry and allied purposes, with the final choice rationally being governed by economic and social factors.

Land-use capability surveys for such problem areas are essential, and these surveys must also rate the land for purposes other than agriculture. For forestry purposes, there is not too much difficulty in rating forested land from a production standpoint, but considerable research and investigation is needed to assess the forestry capabilities of some lands previously cleared for agricultural use. Rating for land capability is only the preliminary step toward the solution of a very complex problem. Economic studies to evaluate alternative land uses in terms of input required and output expected, current

and future markets, etc., are the logical follow-up. Technical and economic factors must then be integrated with social and political considerations to arrive at policy decisions that can be practically implemented.

In any land rehabilitation schemes for this area, forestry and associated recreational uses will play important roles. In Quebec, Ontario, and the Maritimes, the region with which I am most familiar, much of the land is forested and considerable areas of cleared land—some estimates say 20,000,000 acres—are suitable for reforestation. Forestry has a great potential but the potential may not be realized unless certain limitations are understood.

Consider first the problems on the areas now forested.

The forests are usually in poor condition, especially where there is a high hardwood content, and are producing far below the potential of the relatively good sites on which they occur. Most of the high-quality products have been removed so that the present stands contain a high proportion of low-grade material for which the price is low and the market limited. Such forests cannot be brought back to a high level of quality production by giving the owners courses in woodlot management or by providing extension foresters to give advice. The problem is largely an economic one. If markets and a demand for low-grade forest products can be developed, relatively simple management practices can bring these forests to a highly productive state. Markets, chiefly for hard-wood pulpwood, are developing in some areas, but a major expansion in demand will be required before the condition of the forests can be materially improved through the conduct of current operations at a profit or break-even level for wages.

In some instances it may be worthwhile to make improvement cutting operations at a net current loss, in order to secure higher future returns. Investments of this nature can be more profitable than establishing plantations on cleared land. The cost of the land is about the same regardless of whether or not it has trees on it, and the trees can be considered either as a liability or a bonus depending upon their condition.

The ownership pattern of this mixture of forested and cleared land is a limiting factor in what can be done to increase its productivity for forestry. Individual holdings are commonly from 200 to 500 acres. Many of the resident owners obtain a high proportion of their cash income from cutting in their bushlot, but the size of the holding is not sufficiently large in view of timber quality to provide them with full-time employment. The size of the holdings needs to be increased, but individual owners rarely have the capital to acquire the land or to maintain it on a long-term planned basis.

Lack of capital and the long-term nature of the investment are also limiting factors in the establishment of plantations by private owners on cleared land. Most people with capital find alternative investments with higher yields and earlier returns more attractive. As a result, the consolidation of forested areas and the reforestation of suitable cleared land has been chiefly by provincial or local governments. Many of such forests have been established in Ontario and the scheme appears relatively successful. However, I do not believe that public ownership of forests is the only answer. There could be a considerable flow of private capital into these depressed areas for reforestation and land consolidation, by improving the economic climate for investments in

forestry. This might be accomplished through a combination of: Minimizing long-term risks, providing long-term low interest loans, and by a re-examination of the income and land tax policies applicable to forest holdings. For example, provincial forest services which have the equipment and know-how could do contract planting on private lands on a cost-sharing basis, with the owner paying perhaps \$10 or \$15 per acre; this could bring many thousands of acres back into production, particularly if the annual cost of plantation establishment was considered as a normal operating charge rather than as a capital investment for tax purposes. An extension of the loans under the Farm Credit Corporation for both resident and non-resident owners of tree farms might also be helpful. I have used these examples merely to point out that government bodies, local, provincial or federal, need not bear the whole burden of land rehabilitation if they can make it a moderately attractive field for individual investment and development.

I have dwelt on economic and social considerations more than the technical ones because I think they are very important. Nevertheless, major technical problems will arise with large-scale reforestation schemes.

At present the total area planted annually to trees in Canada is well under 100,000 acres, with total nursery production under 80,000,000 trees. To step this production up to 1,000,000 acres per year, to cover, in 20 years, the area said by some sources to be in need of reforestation in the agricultural fringe, would require a fantastic expansion in seed collection and nursery facilities. This expansion cannot be done overnight and needs careful consideration. The heavy capital investments required and the long-term nature of the tree crop make it imperative that both planting stock and planting sites be carefully selected. The most feasible way of doing this is through pilot trials of selected species and provenances on typical planting sites throughout the vast area available for reforestation, and by concurrent programs of more basic research. Because land at one time grew trees of a particular species is no guarantee that it will grow them again. Even though trees have relatively low nutrient requirements compared to most agricultural crops, nutrient deficiencies have been the cause of very large-scale and expensive failures in both Canada and the United States. Much research is required if future failures are to be avoided, and the Department of Forestry is expanding its research activities in this direction to provide information for greatly expanded future planting programs. While trees can be grown anywhere if one is prepared to spend sufficient money growing them, costs must be balanced against future returns. For reforestation work, the cost of plantation establishment is usually greatest on the sites with the highest production and least on those with the lowest potential. We need reliable information on this balance before heavy investments are made.

When large capital investments are made for reforestation and the development of efficient forest management units in the rural areas, adequate provision must be made to safeguard the initial investment. This will involve additional costs for thinning, weeding, and other silvicultural practices, but most important is protection from fire, insect, disease, and animal damage. Major improvements will have to be made in the protection facilities, especially for fire, now available in rural municipalities, and someone must bear the cost.

In summary, on a national basis, I would say that forestry is Canada's foremost land-use. Future production from forests can be increased greatly but economic and technical limitations must be appreciated. The use of forested areas for recreation, wildlife and watershed values is increasing rapidly, and such use is technically compatible with forest production provided that realistic management policies are accepted for each use.