Northern Forest Management: Ends and Means

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Abstract

Forest management is a means to an end, not an end in itself. In the past, there has been much confusion among foresters over the objectives of forest management; our conventional wisdom has been based, variously, on the goals of full utilization, maximum wood growth, and equal annual harvests. These are technological goals, and our profession is beginning to recognize that they are not adequate guides to the design of forest management policies in the public interest.

Forests are part of the total capital stock of our society. In the context of our economy as a whole, forests, along with all our other resources, contribute to our standard and quality of life. Good management involves using forests, and investing in them, in such a way and to such a degree that they will contribute the most social benefit.

Maximization of the values generated by forest resources provides the only consistent and workable criterion for judging the appropriateness of management policies and practices. In the light of this objective, problems relating to the best standards of utilization, silviculture, and rates of harvest can be analysed using well established economic techniques. Optimum management will thus vary widely in different circumstances, and will require flexibility of standards.

In Canada's northern forests there is still time to avoid the mistakes we have made in management policies elsewhere. The framework of public policy within which private harvesters must operate is important; not only because forests are so important to our economy but also because the government is the landlord over most of our forests. Tenure policies must take account of the need for assured supplies of timber to justify heavy investment in utilization plant on the one hand, and the economic value of private competition for public timber on the other. Stumpage charges should be designed to encourage efficient utilization standards. Once the objective of maximizing forest values is accepted, the economic incentives of private harvesters can be harnessed to serve the public interest.

L'aménagement de la forêt du nord: fins et moyens

Résumé

L'aménagement forestier est un moyen pour atteindre une fin et non une fin en soi. Dans le passé, il y a eu beaucoup de confusion parmi les forestiers concernant les objectifs de l'aménagement forestier: notre sagesse conventionnelle fut basée sur les buts de l'utilisation complète, sur l'accroissement ligneux maximum et sur des récoltes annuelles égales. Ce sont là des buts technologiques et notre profession commence à reconnaître qu'ils ne sont pas des guides adéquats pour élaborer des politiques d'aménagement forestier dans l'intérêt public.

Les forêts font partie du capital total de notre société. Dans le contexte de notre économie tout entière, les forêts ainsi que toutes nos autres ressources contribuent à notre standard et à notre qualité de vie. Un bon aménagement implique utilisation et investissements dans les forêts de façon, et à un degré tel, qu'elles contribuent au bénéfice social le plus possible.

La maximisation des valeurs générées par les ressources forestières fournit le seul critère consistant et utilisable pour juger de la justesse des politiques et pratiques d'aménagement. À la lumière de cet objectif, les problèmes reliés aux meilleurs standards d'utilisation, à la sylviculture et aux taux de récolte peuvent être analysés par l'usage de techniques économiques bien connues. L'aménagement optimum variera donc grandement suivant les circonstances et requerra des standards flexibles.

Dans les forêts nordiques Canadiennes, il est encore temps d'éviter les erreurs commises ailleurs concernant les politiques d'aménagement. Le cadre de politique publique à l'intérieur duquel les exploitants doivent opérer est important non seulement parce que les forêts sont tellement importantes pour notre économie, mais aussi parce que le Gouvernement est propriétaire de la plupart de nos forêts. Les politiques de tenure doivent tenir compte, d'une part du besoin d'approvisionnement assuré en matière ligneuse pour justifier les investissements massifs dans les usines d'utilisation et, d'autre part, de la valeur économique de la concurrence entre les individus pour les forêts publiques. Les valeurs sur pied devraient être calculées de façon à favoriser des standards d'utilisation efficaces. Une fois l'objectif de maximisation des valeurs forestières accepté, les intérêts économiques des exploitants peuvent être harnachés pour servir l'intérêt public.

Introduction

We are all already aware of the dominant position of forest industries in the Canadian economy. It is well known, too, that the forest industries have shown vigorous development during the last three decades and that the outlook for the future is generally bright (Drysdale, 1969).

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As the industrial demands on Canada's forest resources have increased, previously submarginal forests have been utilized. The frontier of usable forests has been, and is continuing to be pushed back. And now that the thrust westward has been completed, the dominant direction is northward.

The subject of this conference is the forests that lie to the north of our firmly established forest industrial activity. If present trends continue, these northern forests will provide the raw material for much of an expanded forest industry in Canada. Exploitation of these forests presents special problems: the timber itself differs from that to which we have adapted our industry in southern forests; different techniques of harvesting and transport are required; and the political and social environment of the north is different and less rigid.

The forests of northern Canada vary tremendously in their physical and technical characteristics, their ease of exploitation and their value. Moreover the political jurisdiction over them is fragmented among several provincial governments, the federal government and federal territories. But it is possible to identify a few common characteristics of these forests to provide some basis for general discussion. First, they are all in a natural or virgin state, except for the few pockets where harvesting has already taken place. Being at or beyond the frontier, the infrastructure for exploitation — the roads, railroads, communication systems and communities — does not yet exist. Secondly, they are, generally, less productive than southern forests: the yield per acre and the potential rates of growth are relatively low. Thirdly, the associated industry is in an early stage of development. Added to the rapid rate of technological change in the forest industry everywhere, the new problems of coping with problems in the north leave northern industry characterized by rapid change. Fourthly, since marginal resources are the first to be abandoned when markets fall, the northern forest industry is susceptible to greater instability. Finally, northern forests are more uniformly held under public title than are the forests

It is not my purpose in this paper to discuss the natural characteristics of northern forests nor the technical problems in utilizing them. My knowledge of these issues is scanty, and there are others far more capable than I to deal with them. I intend, rather, to discuss some of the fundamental questions relating to forest resource development in the north — our economic and social objectives and means of achieving them. My point of view will be that of public policy, or that of the government charged with management of the resources in the interests of the people they represent and who hold title to the resource base.

Objectives in resource development

Forests, like our other natural resources, constitute part of our society's stock of capital. Like man-made capital — factories, roads, machines, and so on — natural capital enhances our standard of life

by providing our labour force with complimentary inputs to produce goods and services for consumption or trade. The basic economic problem I wish to discuss is that of how to use this stock of capital in the form of northern forests in a way which will contribute most to our standard of living.

It appears obvious that these forests can make their best contribution through industrial exploitation for wood supplies. There are, of course, other ways that forests contribute to our standard and quality of life: by providing recreational opportunities; by protecting watersheds and so on; but these other uses are undoubtedly less important in northern forests than those closer to large centres of population.

We can reasonably assume that while these forests are mostly public property and will remain so, timber exploitation will be left to private enterprise. It will therefore be the function of forest services to play the role of the public landlord. This means providing an administrative framework within which private companies can use our forest capital in a way that will best serve the interests of society at large.

I shall assume at the outset that our ultimate objective is to use our forests in a way which will generate the maximum long-run value to society. The "society" refers to the people in the political jurisdiction which holds title to the forests — individual provinces or (in the case of federal lands) the nation. Insofar as the value of forest lies in wood production, the problem is one of ensuring that they contribute the maximum net economic value under industrial timber exploitation.

The goal of maximizing the value generated by forest resources may seem obvious enough, but it is worth noting that it conflicts with some of the basic precepts of traditional forestry. Many of us older foresters, for example, were taught in forestry schools that good forest management meant maximizing the growth of wood. Such an objective is economically and logically unfeasible, for it is always possible to increase growth by more intense culture; far beyond the point where such efforts yield a net return. It conflicts also with the goal of "full use", for there are standards of utilization below which losses are generated, even after silvicultural considerations are allowed for. Harvesting of sub-marginal wood in an attempt to prevent waste really amounts to wasting labour and capital which would yield greater returns in other uses. Finally, the objective of generating maximum benefit conflicts with the frequently expounded goal of equal annual harvests, which is the extreme technocratic interpretation of the principle of sustained yield (Haley, 1966; Smith, 1969). In an economy with fluctuating costs and prices, maximum value can be generated only by varying the rate of output over time. This is particularly so where (as everywhere) we do not have an even gradation of age classes in the forest to begin with.

These other goals of forest management — maximum growth; full use; equal annual harvests — are

well documented in forestry literature. They are technological goals, in the sense that they imply that forest resources can properly be managed in isolation, without reference to economic variables in the economy as a whole. A few years ago they were part of the conventional wisdom of our profession, and perhaps the most profound changes in our concepts of forest management during the last decade result from our recognition that forests constitute social capital, and basically the same economic rules apply in efficiently utilizing forests as with other capital.

A perusal of recent issues of the *Forestry Chronicle* reveals that the debate between purely technical and economic objectives in forest management is still lively, but the trend and outcome of this healthy debate seems clear (Thompson, 1966; Winsten, 1966; 'For Sake Argument', 1968). We do not want forest management for its own sake, but rather as a means of making us better off. And while it is not the role of foresters to decide what our social goals are, they do have the specialized knowledge to show how forests can be managed in a way to best serve these goals. We must rely on foresters to provide the data, to demonstrate the alternatives in forest management and to ensure that the often subtle long-run considerations relating to silviculture and protection are not forgotten.

Before leaving this discussion of goals, it is worth referring to the popular support for government measures to "open up the north". This usually refers to the desirability of using public funds to initiate exploitation of unused resources through transportation subsidies, communications development and other policies. Yet it is insufficient to argue that we ought to develop the north simply because it is there and it is ours, or because we have some obligation to do so, or because we would like the area to be self-supporting at any initial cost. Any industry or region can be made profitable if it is subsidized enough.

"The degree to which it is in our interest to develop the North depends upon what it has to offer, our evaluation of these things, and the benefits we might expect from directing our efforts and resources elsewhere. Similarly, the fact that resources lie unexploited in an area is insufficient reason to advocating costly programmes to stimulate their development. (Scott and Pearse, 1968)

Means to ends

Once we recognise that northern forests are part of our social capital, to be used to maximize our standard of life, well-established economic criteria are available to help determine the best rate of exploitation, intensity of use and capital investment. They also provide guides to the extent to which the economic incentives inherent in private resource-using enterprises can be harnessed and relied upon to achieve our objectives. Thus we can begin to define the kind of administrative framework and public

policies that will ensure efficient use of forest resources in the public interest. It is to this question — how to set up a framework of public administration of forest resources to ensure efficient private use in the public interest — that the remainder of this paper is addressed.

Perhaps the most important problem is how to design a system of tenure for private harvesting companies operating on Crown timber. This is a most complex issue, which has vexed forest services across the continent. To it is related the problem of how to capture, for the public, the value of the timber net of the costs of harvesting, including a normal profit to the operator. Also related to tenure arrangements are the questions of contractual standards of performance, rates of harvesting, and protection and reforestation.

Forest companies everywhere press for security of tenure, to assure themselves of a resource base for their logging operations and, where they are integrated with utilization plants, to justify often huge initial expenditures of capital. In the face of established policy which precludes outright private ownership, they want long-term leases with guaranteed allowable cuts for as long a period as possible. Provinces and the federal government have devised a wide variety of leasing and quota arrangements to guarantee a supply of timber to companies for long periods of time.

The primary objection to these long-term guaranteed cutting rights is that they, by definition, preclude effective market competition for the timber during the guaranteed period. This is serious, because when we depend upon private enterprise to fulfill an economic function, we must depend upon competition to see that it is done efficiently. Short of cumbersome government controls, there is no easy alternative to competitive bidding to guarantee that the timber will go to the most efficient user, that he will acquire only the amount that he can utilize more profitably than others, and that the Crown will capture the full stumpage value. Hence we have repeated controversy over long-term non-competitive leasing arrangements — over the adequacy of stumpage charges and over leases which leave some companies "timber-rich" and others "timber-poor".

The economic arguments in favour of active competition for public timber are powerful, and the economic distortions that result when it is absent are real. But in many circumstances competition is difficult to arrange. Where a viable market for logs, accessible to a large number of suppliers and demanders exists, or could exist (as on the Pacific Coast), the argument for guaranteeing a timber supply to capital-intensive utilization plants loses its strength. In the northern forests which we are discussing here, however, this is probably seldom the case. These forests have relatively low yields per acre, and will probably be used mainly for pulping. Given the large economies of scale in modern pulping, very extensive geographical areas of forests are required to serve each mill. Thus mills are likely to be widely separated, and the possibilities of interchange of timber between them are minimal.

Where geography thus separates users, so that interchange of logs is uneconomic, each user becomes a local monopsonist and competition is precluded.

Some compromise between the need for competition on the one hand, and guaranteed cutting rights on the other, is necessary. The required period of guaranteed wood supply must be related to the real depreciation period for utilization plants — probably in the order of thirty years. Careful planning on the part of forest agencies will permit estimates of the optimum annual harvest for a utilization plant in any given circumstance, and hence the geographical area required for the lease. The best proposal that this author is aware of is to stimulate competition for such leases at the outset. The average annual stumpage value might be calculated by the public agency at current prices and costs, and firms might then bid in terms of the percentage of the stumpage value payable to the Crown. Annual, or more frequent, recalculations of the dollar value of stumpage would permit adjustments in Crown revenues as market conditions change, without change in the percentage payable by the harvester (Moore, 1957). At the end of each expiration period, the percentage would be renegotiated by a process of bilateral bargaining between the public agency and the user. This is likely to be difficult, because once the utilization plant is established, it and the appurtenant timber are effectively locked in and competition therefore precluded.

A related problem is the procedure for administering stumpage charges. The customary method of charging a fixed price per unit of timber discourages harvesters from removing timber below average quality; for if the stumpage price reflects the true net value of average timber, he will make a profit only on timber of more than average value. Unless cogent silvicultural considerations dictate otherwise, it is in both the public and private interest to extract wood only of the lowest quality and size that will yield a net return. But the private operator will not extend himself to harvest this marginal wood if he is required to pay the average stumpage in addition to harvesting costs. This presumably explains the need for publicly enforced utilization standards under our common stumpage system.

This is an important problem, because administered utilization standards tend to be too general and inflexible, failing to take account of varying costs and values among sites. We can reasonably depend on harvesters to know the margin of quality which will yield a net return, and their knowl-

edge and incentives can be used to advantage (Crossley, 1969). The solution would appear to be to make stumpage payments fixed in total amount for each acre harvested or per period, rather than relating them to the wood actually removed. Harvesters would then have every incentive voluntarily to remove all wood which has any positive value. And their standards of utilization would thus be the same as those that would best serve the public interest without cumbersome regulations.

Concluding note

A longer paper would permit discussion of some of the other important aspects of public arrangements for efficient private use of northern forests — arrangements for ensuring the optimum level of capital investment; the best rate of use over time; flexibility in harvesting programmes; provisions for competing uses, and so on. We have much experience on these problems, and the undeveloped north offers an opportunity to avoid the mistakes that have been made elsewhere.

The question before this panel is "should northern forests be managed?" While a negative answer to this question would be heresy, an affirmative one would not really mean anything significant. Management is a matter of degree. The best level of management varies under different circumstances. The optimum intensity of forest management in England or in southern Ontario is very different from the optimum intensity of management in the Mackenzie basin. To adopt European standards of forest management in Canada would be as misguided as applying Japanese methods of agriculture on the prairies. Certainly the best intensity of management of northern forests is much less intense than the optimum intensity in most of our southern forests.

Public policies governing forest use are important not only because forests are extremely important to our economy, but also because governments in Canada own most of our forest resources. If we accept the goal of maximizing the value of public forests, and the fact that they are exploited by the private sector, the best government policies are those that will let the economic incentives of private operators induce them to work voluntarily in the public interest. But the first problem is to get the objectives clear — a problem we are still muddling with in developed forest areas. Once we concede the objective of maximizing value we can see more clearly the means to optimize management in the north.

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