SUSTAINED YIELD FOREST MANAGEMENT PLANNING IN BRITISH COLUMBIA¹

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Your Program Committee has asked us again this year to report to the Annual Meeting on the progress being made in British Columbia on our sustained-yield management program, inaugurated with the basic legislation passed in 1947.

Certain basic background is essential to a clear understanding of our problems and our approach to their solution. As this background material was recited at some length in our report to the Joint Meeting at Montreal a year ago, in a paper which has been published and is readily available in the *Forestry Chronicle*,⁴ we shall content ourselves for the present by repeating only the brief summary:

"British Columbia, in common with widely distributed forest regions in North America, was endowed with an unusually valuable heritage of old-growth timber. In line with the usual course of development of forest exploitation, the Province has heretofore been liquidating the resource without regard to future requirements, and the process has been largely accelerated by the use of modern power machinery.

"The earliest forest administration was an extremely sketchy organization, designed for the collection of revenue. The Forest Service was organized in 1912, and rapid progress has been made since that date in the collection of essential data, development of protection, and introduction of organized administration throughout the Province.

"In 1947, new legislation was introduced, providing for the institution of rational, sustained-yield management. The principal features of this sustained-yield program are embodied in Forest Management Licenses, Public Working Circles, Farm Woodlots, and Tree Farms, coupled with a number of related administrative activities such as largely improved forest protection, inventory, and revised taxation. The sustained-yield program in its present form is only five years old, but important progress has been made in its application in the field."

Our latest inventory data credits the Province with 116,294 million cubic feet of mature timber and 89,231,619 acres of productive forest land. From the total resources, we cut in 1952 a total of 847 million cubic feet, representing an average of about 9.49 cubic feet per acre and 0.728% of our mature stock, both figures well within the limits of a sound sustained-yield program.

Unfortunately, however, much of our land and timber is well beyond the limits of economic reach, industry tended to concentrate around the market places, and regionally we are badly overcut. It is in these regions that we have encountered our worst problems. Here, too, we have learned our lessons, the

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⁴Serial No. 112 of March, 1953, *Forestry Chronicle*.

most important of which has been that, no matter how impatient you may be, before you can plan and inaugurate a sound and equitable sustained-yield program for any region you must have, first, a reliable inventory with all the detail that that implies; and, second, a detailed survey of such factors as access roads, primary transportation facilities such as railways and highways, population and population distribution, markets, established manufacturing capacity, and extent of dependence of payrolls on the forest resource.

Our two principal vehicles for the management of the sustained-yield program are the Management Licence and the Public Working Circle.

A Management Licence is an area reserved to the exclusive use of the Licensee, and the responsibility for management rests on the Licensee.

The Public Working Circle, as the name implies, is managed by the Forest Service for the benefit of the public, the sustained-yield annual product being sold to any interested party at competitive sales, usually public auctions.

To strike a fair balance between Management Licences and Public Working Circles involves a lot more than textbook cruising and yield tables, and it is the primary object of this paper to enlarge on last year's report by describing the processes that have been evolving in British Columbia in this regard.

AN EXAMPLE OF REGIONAL FOREST MANAGEMENT PLANNING

The region selected as an example is centered about Merritt and Princeton, two small towns in our Southern Interior dry belt just east of the Cascade Mountains and embraces an area of approximately 5,000 square miles.

Within this area the Forest Service has had, over the past few years, a considerable number of Forest Management Licence applications by various companies resulting in the situation mentioned above, where over-lapping applications make it difficult to resolve the resulting conflict of interests. Added to this was the fact that we did not have a satisfactory forest inventory for management planning.

It was evident that no constructive study of the area could be made without such an inventory and it was therefore decided that all applications in the Merritt-Princeton region would be held in abeyance until the forest survey program which had already been instituted, was complete for the whole region. Management Licence applicants were notified accordingly.

Early this year our Forest Surveys Division supplied a complete area classification and summary of timber volumes by compartments for the region, thus enabling us to proceed with our analysis. The study was broken down into a number of steps and proceeded in the following manner.

Stage 1—Compilation of Basic Data and Preliminary Recommendations

First a basic composite map, scale 2 miles equal 1 inch, was prepared, complete with compartment boundaries and basic forest inventory information for each compartment. Using Kodapak, a transparent plastic film, the following overlays were prepared to be used in conjunction with the base map.

1. An ownership overlay—on which were shown such alienations as Crown granted lands, mineral claims and timber licences, which would have to be taken into consideration.
2. Transportation overlay—on this transparency were plotted the railroads

and all roads suitable for hauling logs and timber, thus providing a picture of present accessibility throughout the region.

3. Forest Management Licence applications were plotted on a third overlay and with the considerable over-lapping already mentioned presented quite a confused picture with the resulting entanglement of application boundaries.
4. Two Public Working Circles, which had been tentatively proposed prior to the decision to undertake a regional analysis, were plotted on a fourth overlay.
5. An overlay showing the recommended division of the region into Public Working Circle and Forest Management Licence areas on the basis of information compiled during this initial stage of the analysis. This overlay is referred to later in this paper.

The base map, with overlays 1-4, was intended to give as complete a picture as possible of the region. (A photomosaic would be very desirable in this type of planning to serve as the base map).

By using the overlays singly, or in various combinations with the base map, we are provided with a completely flexible method of studying the information plotted thereon. By using wax crayons of different colors for the different applications, individual boundaries could be easily recognized. Using a piece of cloth as an effective eraser, boundary adjustments could be made at will. Information of a more permanent nature, such as transportation routes, was plotted on the Kodapak with India ink quite satisfactorily.

To supplement the data shown on the map and accompanying overlays, the following information was tabulated for the Region.

1. Population distribution and payroll figures for the different communities were obtained from the Regional Index of British Columbia.
2. A list of all operations active during the period 1950-1952 was compiled giving individual annual cuts during this period.
3. Shipments of logs from the area for re-manufacture elsewhere were recorded.

With the foregoing information at hand we were in a position to tentatively consider the first major question. Was the estimated sustained annual yield available from the region sufficient to satisfy the requirements of the area at the current rate of cutting?

It might be well at this point to briefly mention the method we most commonly use in estimating annual allowable cut, since the size of each management unit, particularly in the case of a Forest Management Licence, is largely based on this figure.

We have found that for preliminary studies at least, Hanzlik's formula⁵

$$AC = \frac{Vm}{R} + I$$

is a useful aid in estimating annual allowable cuts for specific areas, providing it is used with caution and qualified with an area-volume check. Since the forests

⁵AC—indicated annual cut; Vm—mature timber volume; R—rotation age; I—mean annual increment of immature stands at rotation age.

in the Merritt-Princeton area are a combination of mature and immature stands, they are suited to the use of this formula.

Limited growth and yield information in the area under review indicated that we could expect an average mean annual increment of at least twenty cubic feet per productive acre using a rotation of 130 years. At this stage of our planning it was felt that by using this figure we would be in a sound position to determine the balance between supply and demand, since the resulting estimate would almost certainly be conservative. Therefore, if the figure obtained was just sufficient to satisfy the demand, there would in fact be timber to spare.

When dealing with the individual management units at a later stage of the analysis we would, of course, aim for the best possible estimate of allowable cut within the limits of our forest inventory and in consideration of utilization standards in each area and for each species.

The region was next divided in blocks, with the object of first selecting the most suitable Public Working Circle areas. Our basic information indicated a need for three Public Working Circles. Two of these were to serve the communities of Merritt and Princeton and the third to supply the South Okanagan communities of Osoyoos, Oliver and Penticton. It was felt that this latter "circle" was essential for, although the communities to be served were outside the region under study, they obtained their log supply from within the region, having only limited supplies available elsewhere.

In selecting the three Public Working Circle areas, major consideration was given to the maximum distance from the communities which they are meant to serve. Ease of access also warrants serious consideration in selecting such units since too large a proportion of difficult access area will require large expenditure of time and money to develop and will not be as suitable for smaller operators who will be depending on "working circles" for their log supplies. Forest Management Licence applications were ignored at this stage with the understanding that in the final analysis minor adjustments would probably have to be made to Public Working Circle boundaries, when rounding out suitable Management Licence units.

With the three Public Working Circle areas delineated, the remainder of the region was divided into seven blocks which, it was hoped, would supply the requirements of all Management Licence applicants. This division was made on the basis of topographic features and access to the major transportation routes. The boundaries of the ten blocks were next plotted on an overlay as mentioned earlier.

It should be explained that the Public Working Circle areas referred to are areas to be reserved from inclusion in Forest Management Licences and within which the final Public Working Circles are to be defined, after taking into consideration alienated lands, probable agricultural development, mineral development, or other factors which might conflict with the aims and objectives of this type of management unit.

The same principle applies to the Forest Management Licence blocks. No one of these blocks is intended to be a unit in itself, but may ultimately consist of two or more Management Licences or conversely, a Management Licence may consist of one or more such blocks.

With the region divided into these ten major components, the resources of each component were summarized and an estimated annual allowable cut calculated as explained earlier. These calculations indicated that the three Public Working Circle areas could sustain a combined annual cut of at least 22 million cubic feet and in each "circle" the estimated allowable cut was two to three times the current rate of consumption, thus providing a reasonable margin for future expansion. Coincidentally, the estimated annual cut for the seven Management Licence blocks was approximately 22 million cubic feet and therefore sufficient to satisfy the requirements of all Management Licence applicants whose applications were on hand. Since it was felt that this 50-50 division between the two forms of management would probably be satisfactory, in that requirements of the forest industries in the area appeared to be amply provided for, no changes were considered necessary in the block sub-division at this stage.

Following a preliminary discussion of the results of the analysis up to this point with senior officers, approval was given to carry on with the next step.

Stage 2—Discussion of Proposals with Forest District Staff

This involved the presentation of the proposals under Stage 1 by a member of our headquarter's staff to the District Forester responsible for the administration of the Kamloops Forest District within which the Region lies, and his assistants. Following a preliminary discussion at District headquarters, contact was made with District Rangers at Merritt, Princeton and Penticton, since most of the region fell within their respective Districts. In this way first hand information was gathered, based on their intimate knowledge of the area and the operations therein. This phase required about ten days and resulted in several adjustments to the boundaries of two of the Public Working Circle areas proposed and strong support for the general proposals submitted and the procedure followed. We were now ready for stage three.

Stage 3—Delineation of Individual Forest Management Units

With the broad division of the Region accomplished, the next step is to review the individual Forest Management Licence applications and to see how they fit into our planning. This part of the analysis is now in progress and it may be some time before the final disposition of the entire area is decided.

Among the many factors to be considered in reviewing each Management Licence application are:

1. Location of applicant's present operation.
2. Comparison of yield potential of area under application with applicant's current consumption.
3. Conflict with other applicants.

4. Suitability of the unit from an administration standpoint.
5. Accessibility.
6. Timber types.
7. Established ownership within each application area.
8. Probable conflicts with interests other than forestry.
9. Conflict with proposed Public Working Circles.

Considerable reshuffling is necessary at this stage for a number of reasons.

Applications which fall within the areas now proposed as Public Working Circles must be relocated. Overlapping applications must be sorted out so that there is no conflict. Fortunately the fact that, almost without exception, applicants request an area in excess of their requirements is helpful in eliminating such overlaps. In some cases priority of the applicant, based on the location of his present operation, or his private timber holdings, may help in making a decision.

It so happens that one of the Management Licence applications in this particular region is for a proposed pulpmill. In contemplation of such a development, attention can be focused on extensive lodgepole pine stands which are considered sub-marginal on the basis of sawlog utilization. Consideration must also be given to other sources of pulping material, such as the residue from sawmills in the area and logging waste, since the availability of this material will reduce the volume required from a Forest Management Licence.

Final approval of individual Forest Management Licence applications, of course, rests with the Government and there is no way of knowing at this stage what the final pattern of management for the region will be. However, having assembled and carefully reviewed all the pertinent information we feel that whatever may be the decision on individual applications, the overall plan of management will be in the best interests of the public, based as it is on all the regional factors pertaining thereto and providing as it will an ample supply of timber to meet present and reasonable future demands.