



research notes

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The Role of Immature Stands in a Programme of Continuous Forest Production

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THE ROLE OF IMMATURE STANDS IN A PROGRAMME
OF CONTINUOUS FOREST PRODUCTION

Under the conditions that existed in pioneer days there was no need for forestry. Forest resources were available far in excess of the needs of the settlers; in fact, in many places, the forests were a hindrance to development. However, in spite of these abundant resources some rules and regulations were considered necessary to ensure the best use of the forests. These early efforts toward controlled utilization prepared the ground for the appointment by the Government of British Columbia of the Royal Commission of 1909 and its subsequent report. A direct outgrowth of that report was the enactment of the "Forest Act" in 1912 and the establishment of the Forest Service. In general, these enactments were remarkably farsighted and they have continued without a break as the basis of our forest law. From time to time amendments have been made to eliminate weaknesses and provide for new advances but the fundamental principles laid down in 1912 are still the basis of the "Forest Act" of today.

With each forward step that forestry takes in British Columbia its scope becomes wider and the management of the forests becomes more intensive. The current trend is toward good cutting practice which aims to keep the forest land continuously productive. It follows principles developed through years of research and experience in scientific forestry and it leaves the forest in condition to keep on yielding other, and often better, crops of timber. By contrast, poor cutting practice strips the land of all present values without thought of the future. Or it mows down young stands prematurely, before they have reached the period of most productive growth. Or it high-grades the stand, taking out the best specimens and species and leaving a residual stand of poor, low-value trees. Basically, it is a conflict between present and future profit, between private gain and public interest. As might be expected, the operators, both large and small, are concerned first with recovering a profit from their operations and some are not interested in the perpetuation of the forest after their investment has been liquidated. However, in the public interest the forests must be maintained in a productive condition and this is the responsibility of the Forest Service as the agent of the Government and on behalf of the public.

In order to obtain continuous crops of timber, it is essential to keep all the accessible forest areas productive, with stands maturing in regular succession. It is not essential that we grow trees three hundred years old or more, like the majority of the stands now being harvested, but the product must be merchantable as sawlog, pulpwood, or other commodity. The present proportion of high-grade lumber will not be maintained in future crops; at the same time we cannot ignore the fact that it will take from eighty to one hundred or more years to grow trees which will yield products of sufficient quality and quantity to enable the forest industries of British Columbia to maintain their present eminent position.

With this publication the Forest Service re-establishes its series of Research notes, discontinued since the publication of Research Note 11, in 1944.

Forest Service surveys and research studies indicate that the forests of this Province, which have been developing for centuries in the absence of utilization by man, are not well suited to produce the maximum of yield. The ideal forest has no decadent stands, only a small part is composed of fully mature timber, and the age-classes range from mature trees to seedlings. In the Coastal region fires have been infrequent in virgin stands and extensive areas of mature and over-mature forest have accumulated, but in the Interior lightning fires and the fires set by early settlers have had the effect of producing a somewhat better balanced series of age-classes on those areas that have not been entirely denuded.

In general, the forests of British Columbia are disproportionately mature and over-mature, thereby placing a special premium on thrifty stands of immature forest. This situation is particularly evident when an attempt is made to delineate the boundaries of a working circle sufficient to supply the raw-material requirements of a given industry. All too frequently it is found that the allowable cut from a given region in the first rotation is only sixty per cent of the yield which may be anticipated in the second and subsequent rotations. The reason for this is that large areas of mature timber, which are producing no net increment, must be held in reserve to provide a continuous supply of wood until such time as the young stands reach rotation age. Up to a point, therefore, each acre of thrifty immature forest is equal in value to an acre of mature forest. For example, in a recent case it was found that an area of 250,000 acres of productive forest land was required to constitute the working circle for an industry which consumes 75,000,000 board feet of logs a year. At the same time this area can be expected to yield 125,000,000 board feet when a proper range of age-classes has been established and all productive sites are stocked with commercial species. Or, expressed in another way, with an adequate range of age-classes this industry could be maintained on a continuous production basis by the yield from 150,000 acres. This is a very important consideration in regions of high industrial development such as the Lower Coast or the Okanagan Drainage.

What is an immature forest? This is a common question and the questioner is generally ready to point out that the trees, or at least many of them, in a stand of so-called second-growth "are large enough to log." The criterion of what classifies a stand as immature is a combination of age in years and age in capacity to add increment. In a managed forest any stand with an average age less than the rotation age is immature. The rotation age is the age at which the forest will yield the greatest harvest per year of age. Diameter is no criterion because the average diameter of stands of similar ages varies with the quality of the site on which they are growing. On sites of low productivity it is common to find stands of 150 years and an average diameter of fourteen to sixteen inches. This compares with good sites where similar diameters are found at sixty years and where, by allowing the same trees to grow for another forty years, they will reach an average diameter of twenty-nine to thirty inches.

The potential value of immature stands can be easily under-estimated. In the course of a recent field trip it was found that the increase in net merchantable volume of a 72-year-old stand for the next twenty years could be

reasonably estimated to be sixty per cent of the entire net merchantable growth in the first seventy-two years. The trees in the stand were about sixteen inches d.b.h., on the average and growing rapidly and the periodic growth for the next twenty to twenty-five years would be much greater than the current mean annual growth. The conclusion was that clear cutting should not be recommended under any circumstances but, under proper supervision, an operation could be permitted that would thin out the trees marked for removal on a silvicultural basis. In this connection it should be pointed out that, in any such operation, experienced supervision will be most essential. No average operator could be expected to do this thinning unless the trees to be cut are marked.

In another instance a visit was made to an operation in a spruce stand about one hundred years old. The operator-owner was cutting all trees eighteen inches d.b.h. and over, leaving only poor quality trees. The stand was growing rapidly at the rate of about four per cent per annum or six rings per inch for the last ten years. Under good management practice the stand should have been opened up to obtain maximum increment on the better trees through removal of marked trees. Certainly the present operation was not satisfactory forestry.

The above are not, by any means, isolated cases but can be duplicated in all parts of the Province both on private and Crown lands. On private lands the Forest Service has no control but on Crown lands such practices should not be permitted. Research Note No. 3, dated January 28, 1938, presented a report on the immature values being sacrificed in the process of logging mature trees from certain areas on Vancouver Island. This report is descriptive of conditions that may be found on a number of timber sales today. Values may be adjusted for the current price level and when that is done it is of interest to note that, in one of the cases analyzed, about \$75.00 per acre of immature values (65-year-old stand) were being sacrificed to realize about \$30.00 of mature values. In view of these potential values we are very remiss in our duties as forest officers when we condone any operation in Crown timber that involves the harvesting of thrifty, young stands or low volumes of merchantable timber at the expense of valuable immature stands.

Even though a stand is 120 or 150 years old, providing it is growing thriftily, no harvesting should be permitted. Even in the absence of mature timber, young growth must be preserved if there is to be a forest industry of any value in British Columbia fifty or sixty years hence. Good management practice calls for harvesting of the oldest and most decadent stands as soon as possible so as to replace them with thrifty young growth which is adding increment rapidly.

The thinning experiments under way at the Cowichan Lake Experiment Station indicate that, in the future, the immature stands can be expected to yield considerable volumes of wood over and above the volume of the final harvest of crop trees. In crown-thinning a 40-year-old stand of Douglas fir 1,000 cubic feet per acre were removed which include about 2,000 board feet per acre in the form of number three sawlogs saleable on the log market at the present time. Further, the research foresters state that a second, similar yield may be expected seven years hence. Thus, by careful treatment, stands of similar density may yield 4,000 board feet of merchantable sawlogs or 2,000 cubic feet (or twenty cords) of pulpwood per acre by age fifty. These values

cannot be overlooked. At the same time it should be appreciated that the market for thinnings will develop slowly and, for best results, careful supervision is demanded at all times. In the matter of supervision our efforts are handicapped at present by a lack of suitable personnel; therefore, it is suggested that, for the present, intensive operations should not be undertaken on any large scale. Rather we should continue our experimental cuttings on a restricted scale and carefully conserve the main bodies of immature timber for future treatment.

In a managed forest the acre that is one year old is just as indispensable as the acre of mature timber; and we must manage our forests if we are to maintain a forest industry.

Take three looks at a stand of young growth before you consider recommending a sale; and then recommend that we keep it.
