FOREST MANAGEMENT OF THE "COAST ISLANDS WORKING CIRCLE"¹

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THE "Coast Islands Working Circle" should be described both as an initial step in a phase of Forest Management not heretofore followed in the Province of British Columbia and as an experiment in Forest Administration. This working circle (a group of smaller Provincial Forests) has been instituted by the British Columbia Forest Service in order that experience might be gained for application in the management and regulation of our coast forests and particularly with a view to discovering and providing a solution for some of the problems to be expected from their close regulation.

There can be little difference of opinion as to the necessity for the careful management and regulation of the Provincial Forests but perhaps a brief review of figures for the coast of British Columbia as a whole will be of interest. The production estimates used are from the Forest Service publication *Forest Resources of British Columbia*—to date our most complete analysis of this problem.

Based on our present standards of utilization and on the assumption that we will require material such as provided by a one hundred year rotation, the Coast will produce annually 1,800 million board feet from all productive areas, or 937 million board feet from those now considered accessible. Against this there was an actual annual cut of 2,900 million board feet for the decade ending 1938—perhaps about an average figure. In the year 1941 the cut was 3,266 million board feet. We may, of course, expect that in future a changing market will permit closer utilization and the utilization of some material grown on a shorter rotation—say 60 years for pulp, for other cellulose derivatives or for fabricated products. But even our most optimistic assumptions along this line will give a gross total of only 2,900 million board feet from all productive areas on the Coast regardless of accessibility.

For the future of the Province, the picture is far from satisfactory and unfortunately the demands of our present wartime economy are such that we must place them before all other considerations. Today, last year's drop in log production of 15 per cent is a tragedy. Five years ago it would have been marked by relief by all interested in the future of our forests. It is cold comfort to note that our enemies are in as bad a fix and that practically a decade ago German foresters were ordered to drastically overcut their holdings. We cannot help the situation now, but we can and must be ready to mend our fences when the crisis is over.

As an initial administrative unit, four of the smaller Provincial Forests have been grouped for management as a working circle. Those included are islands lying north of Seymour Narrows and bear the same names as the islands they occupy—Sonora, East Thurlow, West Thurlow, and Hardwicke. A revised survey of the area was made in 1938 with the aid of aerial photo-

1. Address delivered to the Vancouver Section, C.S.F.E., on January 12, 1943.

graphs and the inventory and cover maps brought up to date. The area involved is fairly small and was selected to provide certain favorable conditions for this initial attempt at detailed management of Coastal Forests. The total area is 103,070 acres, of which 64,570 acres is productive forest land. An area of 21,640 acres is in mature timber, 30,320 acres in immature timber, and 12,610 acres not satisfactorily stocked for one reason or another. The total volume of mature timber available is 460,960 thousand feet board measure, of which 71 per cent is controlled outright by the Crown. This means that it is not encumbered in any way by timber lease, by license to cut, or by outright Crown grant of the land on which it grows. Most of the privately controlled timber is alienated under timber lease or license to cut which means that control of the land will return to the Crown when the present stand is cut and some areas may even be allowed to revert with at least a part of the timber still standing.

Due to its location so close to salt water, the whole of the mature timber volume is considered accessible. The Circle is within the Douglas fir belt and 24 per cent of the mature stand is of this species, with 45 per cent hemlock, 19 per cent cedar and minor amounts of other species. Large volumes of fir and cedar have been removed in the past, with the earliest logging dating back to the 1890's. The timber has always had a good reputation for quality.

There are several factors which make the unit more favorable for management than the rest of the Coast. The large proportion of the area in immature stands (practically half the productive area in comparison with a figure of 7 per cent for the whole Coast) is perhaps the biggest advantage from a technical viewpoint. The large percentage of timber in outright Crown control (71 per cent, as against 28 per cent of the accessible volume or 49 per cent of the total volume on the whole Coast) is a big factor from a business viewpoint. The well isolated position of the islands and the scarcity of settlements in the area materially reduces the fire risk and the water surrounding them ensures against our work being wiped out by fire spreading from other areas, another considerable advantage. Of course, the limitation of the Working Circle to the islands mentioned does not provide an ideal unit. Adjacent portions of the Loughborough Forest (the mainland to the north), and even of Vancouver Island, fall naturally in the same administrative unit. But the peculiar advantages with respect to ownership and low fire risk, in particular, have made it a desirable unit for experimental purposes.

The immediate objectives of Management in the Working Circle are:

1. To regulate the cutting of Crown timber so that the total depletion from fires and logging is within the sustained yield capacity;
2. To study and develop cutting plans, in co-operation with timber operators, which will provide for natural regeneration following logging;
3. To conduct a progressive reforestation program on the more valuable unstocked Crown areas; and,
4. To provide adequate fire protection and control measures.

The attaining of a sustained annual yield from the Working Circle is the objective of greatest interest. The others are, despite their importance, subordinated to the production of marketable wood volume, which is the real objective of management of this area. The problem presented is a little different from the popular conception of sustained yield, which is the removal each year of the volume equalling the actual net growth or increment in the Working Circle for that year. In this, as in all our Coast forests, we have far from a normal forest and an important consideration is our approach to that ideal. A normal forest requires a certain volume of growing stock, the capital of a forest property, which is the sum of volumes of the various age classes which should be present in that forest. While this volume cannot be measured, it can be computed approximately and for this computed value is used the term "Regulated Empirical Growing Stock." For this group of forests this figure, based on available yield information and assigning values to all stands 50 years of age and over, is 640 million board feet. By so much as the actual growing stock of 464,985 thousand board feet is short of this figure, is it short of the capital needed for this property. This figure for actual growing stock is composed of 460,960 thousand board feet of over-mature timber and 4,025 thousand board feet is in the 51 to 60 year class. You will judge that the distribution of this volume in the various age classes is far from satisfactory and reference to the graphs will show how poorly it compares with the ideal requirements.

The objects of the regulation which must be imposed to attain a sustained yield are really threefold:

1. To provide for continuous production with a minimum disturbance at that critical stage marked by the exhaustion of the present stock of overmature timber;
2. To build up the growing stock to its required level; and,
3. To attain a more normal arrangement of age classes.

Again the principal objective is that of maintaining continuous production and the other two are really means to that end.

The yield table used as a basis of the calculations is the result of actual growth measurements carried out in the young stands of the Working Circle since 1926. It shows that the maximum mean annual increment occurs between 90 and 100 years, indicating a rotation age of 100 years and a mean annual increment of 270 board feet per acre. Edward Hanzlik's formula is most adaptable to forests in this stage of development and its application to the figures of 461 million feet of mature timber and 30 thousand acres of immature timber indicates an annual yield of 12,800 thousand board feet. However, with the deficiency of intermediate age classes, it will be necessary to restrict cutting to 11 million board feet per year in order to maintain yield without any hiatus. Even so the overmature material will be exhausted about 1980 and shortly thereafter it will be necessary to borrow from younger age classes to maintain production. The two graphs illustrate this; also the way that the material now 11-20 years old will fill the gap, and how eventually this cut, if maintained, will result in the retention of some stands to an

age of at least 120 years. Eventually a capacity of 17,400 thousand board feet per year may be expected.

Similar calculations covering merely the area owned by the Crown would indicate a yield of 10,700 thousand board feet, but here again the deficiency in certain age classes would make it necessary to confine the annual cut to 8,500 thousand board feet.

Privately controlled timber is being rapidly liquidated in the unit, the average annual cut from 1935 to 1938 for this class of timber being 8,200 thousand board feet and from 1939 to 1941, 15,800 thousand board feet. As a result regulation of the whole unit requires drastic curtailment of Crown timber sales—something that sounds good on paper but is a little harder to work out in practice. While it is possible and correct to withhold timber which can be operated as a separate unit, it is rarely wise to reserve any that is merely a fringe to an existing operation unless it is needed for seed. Allowing such sales has resulted in a remarkably high total figure for timber sales, which has at times reached 6 million board feet per year. As a result the cut over the whole unit has very substantially exceeded that proposed and such excess must be covered by further restrictions until the books balance once again. This is only a transitory phase. Private timber will be liquidated shortly and, as has been explained before, control of the land it grows on will then largely return to the Crown.

Actually it would appear that there are two options in the management of such a working circle. One is to forget about the alienated timber and regulate that controlled by the Crown—a policy which would seem to give more freedom for experimental management. The other is to attempt regulation of the whole unit by balancing the cut on the Crown areas against that on others. From our experience to date it does not seem to make much difference which is followed. In practice the actual cut just about splits the difference. There is a certain amount of alienated, readily accessible timber available, which will undoubtedly be removed in a comparatively short time—say during the first decade. Incident to the logging of this, it will be good business in many instances to sell adjacent small areas of Crown timber. To date the volume of such sales has approached the amount we would cut were we regulating Crown areas alone. The result will be for the first decade a cut greater than was anticipated, with a slight reduction thereafter. While the situation is not ideal, it is unavoidable under the existing system of stumpage tenure. Since, of course, that system is precisely what must be dealt with in the rest of the Province, the system of regulation must be flexible enough to meet such conditions.

As a sidelight, there is one interesting point which has come to notice in connection with the production from this group of forests. You will understand that in making the inventory it was not practical to take into account scattered timber volumes in scrub or non-merchantable timber, nor certain very scattered trees left on productive sites after earlier logging—seed trees which have now filled their purpose. An amazing volume is being produced from such material by hand-loggers and small power operators—groups of two or three men for the most part, although some are individu-

als. The production of such material from 1938 to 1941 has totalled 6,641 thousand board feet, an annual average of 1,660 thousand board feet. Part of it is from bluffy areas, bearing scattered timber, and part from scattered seed trees which have fulfilled their function and may now safely be removed. This forms a source of additional revenue to the Crown and a means of livelihood to a small group of men who take pride in "working on their own". Over the total area actually covered by such material, the per acre volume is so small as to be practically negligible but this "buckshee" production totals to a figure which is a not unpleasant surprise.

The remainder of the four objectives of management will be treated but briefly.

The development of cutting plans has not progressed far in the Working Circle. There are as yet no independent Crown blocks of timber in operation. The objective of satisfactory reseeded, however, is always in mind and the necessity for retaining adequate seed sources is always the first factor to be considered in every sale. As many are aware, the Forest Service has been working along these lines with one of the larger operators on Vancouver Island and by the time cutting of the larger blocks of Crown timber in this working circle is permissible there should be some definite ideas to work out.

There has been no recent reforestation of areas within the Islands although one of the first plantations in the province was set out in West Thurlow Forest in 1932. There are a few areas to be replanted, notably a total of some 5,500 acres in the Hardwicke Forest and one fairly large burn (about 675 acres) north of Mellon Lake in the East Thurlow Forest. It was hoped to care for work of this nature with local men, if possible, as one of the ideals of management should be to maintain local employment. Under present conditions there is no local labor to be had and the available labor elsewhere is definitely tied up on large scale protection work and reforestation work closely tied in with it. It will be possible to proceed with reforestation in the working circle after the wartime pressure is relieved.

From a protection viewpoint the Working Circle is not considered particularly hazardous. As stated before, it is reasonably secure from outside risk. The chief hazard, as elsewhere on the coast, is on logged and burned areas, particularly where they are exposed to human risk such as campers and fishermen. Fortunately there are few such visitors to the district and with reasonable care by local logging operators fire losses should be held to a satisfactory level. The area is handled by a Ranger at Thurston Bay, with an Assistant Ranger during the fire season at least. Patrol, in conjunction with other work, is maintained by launch—one for each man. The Ranger's launch is equipped for radio communication with our Vancouver Stations and other Forest Service Stations. Adequate control and prevention of fires is prerequisite to maintaining a sustained yield, but from the figures shown by records (57 thousand board feet per annum or one-half of 1 per cent of the sustained yield capacity of 11 million board feet) it would appear that the present facilities are adequate.

To summarize the picture briefly, the "Coast Islands Working Circle" has been established as a first step in more intensive Management of our Coastal

FIG. 1.
Effect on Age Class Distribution
of Annual Cut of 11,000 M.B.M.

Non Producing Areas.
Not satisfactorily
restocked
Non-Commercial Cover - Deciduous
Coniferous

Stands to be cut
Ending Decade
Stands planted
or areas released
by removal of Non-Commercial Cover
Main growing stock

Forests and in part as an experiment to guide our future efforts in this direction. Studies indicate that a rotation of one hundred years will give the greatest return of marketable material. With a growing stock of 461 million feet of mature timber and 30 thousand acres of immature stands, it can be expected to provide an annual cut of 11 million board feet for the first rotation of one hundred years and at the same time allow for rearranging the age classes and building up the growing stock so that eventually the area

Note:—

Some explanation of the accompanying graphs is required.

Figure 1 is a series of graphs showing the approach to a normal arrangement of age classes which will be obtained by the regulation proposed for the Working Circle. The following assumption has been made in its preparation:

- (1) Uniform annual cut of 11 million board feet;
- (2) Restocking of present unsatisfactorily stocked areas by 1958;
- (3) Release of areas under deciduous non-commercial cover during decade 1958-68.

Figure 2 was obtained by applying volumes for the various age classes obtained from the empirical yield table for the Working Circle to areas obtained from Figure 1. No volumes are assigned stands under 50 years of age. Comparative volumes of regulated stock for a normal forest are shown.

will produce 17,400 thousand board feet per year. In its simplest terms the scheme of regulation proposed calls for spreading the cutting of the over-mature timber now present over about 40 years, and the maintenance of an annual cut of the same proportion throughout the first rotation will go a long way toward the creation of a properly regulated forest. There will be some difficulties experienced because the right to cut some 29 per cent of the timber was granted at an early stage in the development of our forest policy and control of this timber cannot be resumed without initiating a policy of regulating the cutting of alienated timber. At the worst, however, this can mean only an accelerated cutting for a period of about ten years and a somewhat reduced production for the remaining portion of the initial adjustment period of 40 years. There is the option of ignoring this alienated timber and dealing with the remainder of the stand but in any case practically all of the land will return to Crown control within a reasonable period. With the opening of operations on the larger blocks of Crown timber, it is hoped to be able to try out some improved schemes of cutting designed to ensure adequate restocking and in the meantime the possibility of reseedling is a first consideration in connection with all timber sales. Some reforestation has already been carried out within the Working Circle and it is planned to replant the more valuable portions of the non-stocked areas when circumstances permit. Hazard is low on the area and the present protection organization appears to be functioning satisfactorily.

The results of work of this sort will be apparent not in years, of course, but in tens of years and the institution of regulation in the Working Circle is too recent to permit any observations as to results or of predictions for the future, either for this group of Forests or for the rest of the Coast Forests. However, it has already provided and will certainly continue to provide experience for use in the larger job of intensive management for the balance of the Coast.