THE ESTABLISHMENT OF SUSTAINED PRODUCTION FROM CANADIAN FORESTS FOR THE SUPPORT OF PERMANENT FOREST INDUSTRIES.

DOMINION RESPONSIBILITY AND PROGRAM

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THE PROVINCES themselves, as the owners of the forest lands, must necessarily assume primary responsibility for the introduction of sustained yield management. The Dominion Forest Service is essentially a fact-finding and advisory organization. The development of detailed management plans requires an appreciation of local conditions that only the provincial authorities can have. There is need also, however, of a thorough knowledge of the natural laws governing forest growth, a scientific approach to utilization of forest products, and an understanding of the broad economic aspects of the situation. It is in these fields that the Dominion Forest Service hopes to give leadership and be of practical assistance in furthering the introduction of sustained yield management into Canadian forests.

A general description of Dominion functions is given in the foreword of the Dominion Forest Service section of the Annual Report for the fiscal year ending March 31, 1939, which reads as follows:

"The Dominion Forest Service is maintained to further the protection, maximum production, and wise use of Canadian forest resources. It operates forest experiment stations to obtain basic knowledge of the best methods of managing woodlands and afforestation of waste lands, and forest products laboratories to aid in securing more efficient utilization. Research in forest-fire hazards facilitates protection, and special studies in interpretation of aerial photographs give valuable data for the stock-taking of our forest estate. Statistics of forest production and trade are analyzed, market trends are noted, and the information derived is made available through publications issued. These activities are a Dominion contribution to forest conservation. They supplement the activities of the provinces, which, as the owners of the forests within their boundaries, are mainly responsible for forest administration in Canada."

For purposes of this discussion the responsibilities of the Dominion Forest Service will be reviewed under six headings as follows:

1. Dominion Properties

To apply forest management to its own properties to the extent that economic or other conditions may justify such action.

It is the intention to operate the five Dominion forest experiment stations under sustained yield. In the working plans for these stations the ordinary objective of maximum volume and value of production must be modified by the necessity of using cutting operations as practical experiments for working out a series of treatments to discover the one most suitable.

Dominion policy for the operation of national parks does not ordin-

arily include provision for sustained timber disposal. Two special cases have, however, arisen. Riding Mountain National Park in Manitoba is entirely surrounded by settlement, and the area has from early days provided adjoining communities with domestic timber needs. A working plan is under preparation for timber disposal, special provision being, of course, included to safeguard park values. Similarly, in Cape Breton Highlands National Park, Nova Scotia, special cutting areas have been laid out in a few localities, to make provision for the needs of a small surrounding population which has always been dependent on the area for fuelwood supplies.

Discussions are under way between the branches of the Department of Mines and Resources concerned, respecting the possibility of better organization of timber disposal on Indian reserves. Much of the Indian reserve timber is in small and scattered holdings, but there may be instances where conditions may make it possible for operation of selected areas under working plan. In the interim proposed timber sales on Indian reserves are referred to the Dominion Forest Service for review.

2. Economic Studies

To make economic analyses of forestry statistics secured from the Bureau of Statistics, provincial authorities, and other sources.

These include studies of the forest resources, of the trends of development of forest industries, and of domestic and foreign markets for forest products. Data compiled are publicized through articles, papers, and addresses. In addition information useful in extending markets is provided to other departments of government.

In connection with a national forest inventory, special investigations have been made of the situations in some of the provinces and reports have been issued on the forests of Manitoba and of New Brunswick. Since the development of a technique for obtaining volumetric data through the interpretation of aerial photographs, Dominion participation in inventory work is largely concentrated on this phase. Industry itself has been able to secure inventory data by using these methods. Foresters employed in industry have been sent to Ottawa and given instructions in the new technique.

Economic studies are, of course, essential to determine the feasibility of sustained yield operations.

3. Protection Research

To increase the efficiency of fire-protective effort by the development of scientific aids, such as the measurement and forecasting of fire-hazard, fire danger rating, fire control planning, and improved equipment and technique for fire-protection.

This work is included here because management must wait on protection and can only be economically feasible when protection reaches the stage that the forest can be considered an insurable asset. The "Wright" method for measuring and forecasting forest-fire hazard has passed the experimental stage and is in active use in two provinces. It is standard

practice on Dominion forest experiment stations and its use is being extended to the national parks.

Note—The Dominion Department of Agriculture also conducts protection research in the insect and disease fields.

4. Silvicultural Research

To determine through research and experiments the rates and conditions of growth of the more important component species of Canadian Forests and to devise harvesting methods by which potential productive capacity can be best realized.

The main effort is concentrated on Dominion forest experiment stations, but other studies have been made in co-operation with provincial authorities or with industry. With regard to the latter the rule laid down is that investigations entered into must, in each case, be subject to the approval of the forest service of the province in which the work is to be done. On the forest experiment stations timber extraction is handled largely through permits or sales, timber for removal being designated by Forest Service personnel.

It may be noted here that as the British Columbia Forest Service has its own silvicultural research division, no work is being done by the Dominion in this field in British Columbia.

5. Forest Products Laboratories

To promote better utilization by more efficient manufacture, by waste elimination, by discovering more valuable uses for wood, and by ascertaining the extent to which Canadian woods may be substituted for imported materials.

Work in this field is probably better known to industry than to the forestry profession. However, many important advances have been made. A recent striking instance has been the survey of waste from spruce saw-mills, found to exceed 400,000 cords per annum, and the efforts now being made for its utilization for chemical pulp. Findings of the Forest Products Laboratories can and will have an important bearing on the feasibility of placing designated areas under sustained yield management.

6. Advisory

To prepare plans and, where required, to supervise organization of national projects in forestry; to give technical assistance and advice to other departments and bureaux of the Dominion Government, provincial services, industrial concerns and private individuals to the extent that funds and staff will permit.

Examples of the first responsibility are the National Forestry Program and submissions made in connection with Dominion assistance to the provinces and post-war reconstruction. In the second category co-operative studies are carried on in the protection, silvicultural and utilization fields. Results sought must be such as to make a contribution to knowledge of general value. In protection, much time is being presently devoted to re-organization in the national parks. In silvicultural experiments, agreements

must provide for the preservation of experimental areas for the time required.

DOMINION PROGRAM

In common with all other civil activities of the Dominion Government the regular work of the Dominion Forest Service is being reduced to the absolute minimum for the duration of the war. No new projects are being undertaken and the general rule is care and maintenance only. The Forest service objective is, first, to make the maximum possible contribution to the war effort, and, second, to keep in mind the necessity for retaining key personnel so that trained staff will be available for the expansion of forestry activities that will undoubtedly come in the post-war reconstruction period. Much of the time of the staff is occupied on work having to do directly or indirectly with the war. Some of the personnel are absent on military leave, others are on loan to war departments or to other administrative branches of the Department of Mines and Resources. As a consequence the present program of work of the Dominion Forest Service is not an indication of normal activities. Following is a brief description of present status in the six lines of endeavour described above.

1. Dominion Properties

Work is proceeding on a revision of the 1928 working plan of the Peta-wawa Forest Experiment Station. The basic volumetric data will be obtained from aerial photographs specially taken at a moderate altitude. Stand tables will be prepared by subdivisions down to a ten-acre base. Ground surveys will check results and secure data respecting increment and age classes. Further work on working plans on the other forest experiment stations must, to a large extent, be deferred until after the war.

The working plan for Riding Mountain National Park will be completed. This area will be divided into six working circles, the budget determinations being obtained through aerial photographs. It is of interest to note here that when the ground survey was placed on Riding Mountain in 1936 one of its principal duties was to check the estimates made from aerial photographs. These were found to be up to the standard of accuracy that it was possible to obtain through ordinary ground methods and were consequently adopted.

2. Economic Studies

Aside from the routine gathering of statistics available, further effort in this field will cease for the war period. The officer in charge has been loaned to the Timber Controller for Canada.

3. Protection Research

Work in this field will likewise be seriously curtailed, although it may be possible to undertake a small-scale co-operative investigation in the Province of British Columbia. A special study for re-organization of fire protection in the National Parks will be continued.

4. Silvicultural Research

Ordinary work on the forest experiment stations falls into three main categories, namely — plant maintenance, silvicultural research, and timber disposal. The last item is unusually active due to increased demand. The other two phases are restricted to the minimum. Plant maintenance, of

course, has to do with upkeep of buildings and equipment, forest improvements, and protection from fire. Current silvicultural work at the forest experiment stations is described in Research Note No. 64, a mimeographed publication of the Dominion Forest Service. It is mainly directed to investigations dealing with cultural treatment of second growth stands. There are some 350 permanent sample plots in the five forest experiment stations, a number of which come due for remeasurement each year. An endeavour will be made to take care of this work, but no new projects are contemplated.

Internment camps for enemy aliens are established at three of the forest experiment stations, namely, Acadia, Petawawa, and Kananaskis. The time of the staff at these stations is largely taken up in planning and supervising work to be undertaken by the internees. At the Acadia Station fuelwood cutting is the main activity, although some pit props may be made. Cutting is organized to provide useful experiments in stand improvements. At Petawawa similar conditions prevail. Woods operations are restricted to provision of a fuelwood supply, but in addition a number of prisoners will be occupied with road construction and other improvement work. At the Kananaskis Forest Experiment Station, besides fuelwood for the camp some mine props are being manufactured. The principal occupation at this point, however, is the logging of a mature stand of spruce and the manufacture of rough lumber with a portable sawmill. The product is to be turned over to the Timber Controller for use on war projects. Development of the new forest experiment station at Riding Mountain is in abeyance, and the technical personnel is employed on working plan compilations and on timber disposal operations on the national park as a whole. The Valcartier Station in Quebec will be closed down for the duration of the war.

5. Forest Products Laboratories

Activities at the Laboratories are largely concentrated on war work. Many projects are, of course, necessarily secret but a brief review of some of the more general studies may be of interest. These are as follows:

The design, specification and testing of containers of wood, plywood, fibreboard and corrugated board for the shipment of munitions.

The fire-retardant treatment of timbers or plywood for use in aerodromes, ships, machine-gun carriers, and for other special war purposes.

The proof-testing for the Department of National Defence of glues and plywoods to assure that they comply with R.C.A.F. specifications for use in aeroplanes and other war supplies.

The establishment of design factors for wood and plywood construction in aeroplanes.

The testing of other Canadian timbers as alternatives for Sitka spruce for aeroplane construction.

The modification of British specifications by the substitution of suitable Canadian woods for specific purposes where European or other woods were specified.

In addition to war work, the following are a few of the more important current problems receiving attention.

The setting-up of standard grades of eastern spruce by arrangement with the Trade Promotion Committee of the Canadian Lumbermen's

Association—funds provided by the Committee through the Provinces of Quebec, New Brunswick, and Nova Scotia.

The utilization of spruce sawmill waste for the manufacture of chemical pulp. Co-operation with a joint committee of the C.L.A. and C.P.P.A.

The strength of ring-connector joints in the principal Canadian structural species.

Co-operation with the Canadian Engineering Standards Association in the setting up of standard specifications for piling and for wooden poles of eastern cedar, western cedar, lodgepole pine, jack pine, and red pine.

In connection with the Dominion Housing Commission the investigation of prefabricated sections, insulation and new types of construction.

Toxicity and resistance to leaching of mixtures of preservative salts.

Ground-line and butt treatments of telephone poles.

The chemical seasoning of timbers to reduce checking and other defects.

The effects of immersion in water on the resin and soluble carbohydrate content of pine lumber.

The significance of red stain in pine from the utilization and marketing standpoint.

Producer gas as a motor fuel.

Wood plastics.

The significance of compression wood in spruce and other species used for pulp.

The study of air-borne fungi in seasoning yards and the prevention of blue-stain.

The significance of red colorations in Douglas fir and western red cedar.

Relative durability of Canadian woods under service conditions.

CONCLUSION

In conclusion it may be pointed out that while the period of the depression undoubtedly retarded progress in the Dominion Forest Service as in other agencies, steady advances have been made. Opportunity was taken to extend scientific work through such means as use of relief labour and the National Forestry Program. Many foresters obtained additional training after graduation through employment on these special projects; training that will be of use to them in connection with future management problems.

The last decade has seen the rise of the tourist industry to a position of real importance in the Canadian economy. That industry is also dependent on the forest for its livelihood, and therefore must have an interest in forest management. It is only right to expect that the tourist industry, or governments in furthering that industry, should subscribe in some measure to the extra costs that management will entail. The ways and means whereby such assistance can be obtained and applied bring up new and complex problems.

Adequate forest fire protection, the prerequisite of forest management, requires proper transportation facilities into forest areas. Tourists need good roads. For the public, personal experience in the forest brings personal interest in its proper care and use. Timber values are conditioned on accessibility. Have we here a lead? Certain it is that our post-war situation is going to demand a new integration of effort in many directions. Playing a proper part in planning for the readjustments that must come is the great opportunity and the great challenge to the intelligence of the forestry profession in Canada.