

No. 49

ADMINISTRATION OF CROWN FORESTS IN CANADA

(Based on a lecture prepared by the Dominion Forest Service for use by the Canadian Legion Educational Services, December, 1943, and revised, August, 1949).

More than nine-tenths of all the forests in Canada belong to the public, and are known as Crown forests. They are managed by governments on behalf of the people. Forests in the Northwest and Yukon Territories, and those in National Parks and Forest Experiment Stations, are controlled by the federal government, but all other Crown forests are administered by the governments of the provinces in which they stand.

PROVINCIAL FOREST ADMINISTRATIONS

The size of the organization necessary to look after the forests in a province is more or less governed by the extent of the forested lands, and the way in which ownership is distributed between Crown and private holdings. In Prince Edward Island there are no provincial Crown forests and consequently there is no forest administration.\* In Nova Scotia 87 per cent of the forest land is privately owned, and 13 per cent is Crown land. In New Brunswick the forests are almost equally divided between private and public ownership. In all the remaining provinces from 86 per cent to 96 per cent of the forests are publicly owned.

The departments of government dealing with forestry matters are differently named in different provinces, and the chief forest officers have different titles. In each case, however, the department is headed by a Minister, who is an elected member of the legislature and member of the provincial cabinet. The Minister is assisted by a deputy minister who is a civil servant and permanent head of the department. In each province the department responsible for forest administration also has other duties to perform in connection with lands or mines or other natural resources. In most cases a branch form of organization is used, with the senior forestry officer directly responsible to the deputy minister. In Quebec there are separate services concerned with forestry and forest protection, each having its own chief, and in Ontario and British Columbia a divisional form of organization is used in which the deputy

\* In Newfoundland only 23.5 per cent of the forest land has not been alienated from the Crown by long term leases or in fee simple. This chiefly consists of a belt of land three miles wide extending around the coast.



minister is, in effect, in direct charge of forestry work. Names of the departments responsible for forest administration and titles of chief forest officers, are as follows:-

<u>Province</u>	<u>Department</u>	<u>Chief Forest Officer</u>
Newfoundland	Natural Resources	Director of Forestry
Nova Scotia	Lands & Forests	Chief Forester
New Brunswick	Lands & Mines	Chief Forester
Quebec	Lands & Forests	Chief of Forest Service, Chief of Forest Protection Service
Ontario	Lands & Forests	Deputy Minister
Manitoba	Mines & Natural Resources	Provincial Forester
Saskatchewan	Natural Resources	Director of Forests
Alberta	Lands & Mines	Director of Forestry
British Columbia	Lands & Forests	Deputy Minister

Authority to administer the forests is provided to the department concerned by Acts adopted by the legislature and signed by the Lieutenant-Governor as representative of the King. These Acts, or statutes, are provincial laws, and penalties are provided for any persons who may fail to comply with their provisions.

Statutes respecting forest administration may contain general statements of principles to be followed without going into details. In such cases they usually grant power to the Lieutenant-Governor in Council to issue Regulations under the Acts which, when published, have the effect of laws. Such regulations may be amended from time to time by Orders in Council, and in this way adjustments to meet changing conditions can easily be made without referring each minor point to the legislature.

Headquarters of departments, including those of the forest services, are located in the capital cities of the provinces. In the Maritimes distances are not great and the details of administration can be handled conveniently from the main offices. The other provinces, however, are much larger in area and the forest services find it necessary to establish administrative districts, with a district officer in charge of each. Large districts may be further divided into sub-districts, each under the charge of a field officer or forest ranger. The district chiefs and their field staffs carry on the administration according to instructions issued from head office, and important questions outside the ordinary routine are referred to head office for consideration. Ordinary business, however, can be conducted more efficiently by district officials who are thoroughly familiar with conditions in their own districts.

Since there are nine provincial forest administrations, entirely independent of each other, it might be expected that there would be great differences in



administrative methods. There are, of course many differences in detail; but the similarities are more remarkable than the differences. The most important policy, now common to all provinces, is that of retaining ownership of forest lands while disposing of standing timber under license, lease, or timber sale. The only exception to this rule occurs when forested lands are considered to be of agricultural quality and are sold or otherwise transferred to the private ownership of settlers.

No attempt will be made here to go into details of administration which differ from province to province and from time to time. Instead, we will review briefly the different kinds of work that all the forest services have to do, and discuss in general terms how they are done.

### Forest Protection

The most urgent duty of any provincial forest administration is that of providing protection against forest fires. Canada's forests are, for the most part, easy to set on fire, especially in dry seasons, and the destruction caused by fires in the past has been enormous.

Carelessness with camp fires and smoking materials, and improper burning of slash for land-clearing purposes, are still far too common in Canada; and lightning also is responsible for many outbreaks. About 6,000 forest fires are reported each year, and about 5,000 of these are known to be caused by human agencies. This situation means that the forest services must make large expenditures and employ many men to prevent fires from starting and to put out fires that do occur.

In a provincial administration fire protection activities may be supervised directly by the chief forester or by a senior officer specially appointed for the purpose. In Quebec the Forest Protection Service is independent of the Forest Service, and has its own chief.\* Field work is controlled from District Offices in provinces where they exist, or by district fire rangers. Sub-divisions of districts are looked after by fire rangers, who may be assisted by look-out men and patrolmen. The former act as observers on look-out towers and report the appearance of smoke to a central office by telephone or radio. The latter carry out regular patrols along roads or waterways and warn travellers against carelessness with fire, as well as suppressing or reporting fires that break out. Special crews are organized to construct improvements needed for protection purposes, such as roads, trails, telephone lines, look-out towers, and ranger cabins. Usually these crews are kept on duty throughout the fire season, and are used as stand-by fire-fighting crews.

When fires occur that cannot be promptly suppressed by the local staff, temporary fire-fighting crews are organized from employees of lumber camps, farmers, and any other available source. In many districts all fit men (excepting clergymen and doctors) are required by law to help put out forest fires if called upon by the ranger.

\* Newfoundland appoints a Chief Fire Warden who maintains a fire patrol under his direction in co-operation with the Pulp and Paper companies. He is responsible only for fires on Crown lands and along the railway rights of way.



These crews must be outfitted with tools, food, blankets, and so forth, and they must be transported to the scene of the fire as quickly as possible. All this requires forethought and planning, and a very considerable degree of executive ability. In extreme cases, local supplies of labour may not be sufficient to deal with a bad fire, and arrangements must be made through the district or head offices to bring in extra crews recruited in towns or cities.

Fires that start must be put out as quickly as possible, but the ideal of all protection services is to prevent them from starting. Means taken to reduce the number of outbreaks include the posting of warning notices along roads and portages and in camps; restriction or prohibition of travel in forest areas during periods of exceptional danger; radio addresses, and plays, and articles in the press advocating care with fire in the woods; talks in schools; and settlers who wish to burn slash are required by law to obtain permits and to conduct their burning under supervision at times when the fire hazard is not great.

For protection of forests against injurious insects and tree diseases the provincial forest services co-operate with the Forests Insects Division and Forest Pathology Division of the federal Department of Agriculture, although one province also maintains its own entomological and pathological services.

### Disposal of Timber

Governments sell timber standing on Crown lands, but do not go into the logging business themselves. The felling of timber and its manufacture into useful products - lumber, paper, etc. - is left entirely to private enterprise. In order to carry on logging operations a company or individual must have the right to enter on land where the timber stands and, when a large body of timber is concerned, that right must be extended over a number of years. Furthermore the operator must have some legal protection against the cutting of his timber by unauthorized persons. Since Crown timber lands are not sold outright, it is necessary for governments to grant leases to would-be operators, giving them the right to cut timber from described blocks of land. Leases may be drawn for a specified number of years, or they may be good as long as merchantable timber remains on the area provided that the lessee abides by conditions laid down in the lease. Rights to cut timber are usually disposed of by competition, either by public auction or by calling for sealed tenders, but there are certain exceptions to this general rule.

Holders of timber leases are required to pay annual ground rents for the use of the land, usually running from \$5 to \$10 per square mile in eastern Canada, but amounting to \$140 per square mile on the west coast of British Columbia. Lease holders must also pay fire protection taxes or other protection charges, the basis for which differs in different provinces.

The timber itself is usually paid for shortly after it has been felled and scaled. Payments are made at rates of so much per thousand board feet, or per cord, or



at prices per lineal foot or per piece. In the province of Quebec prices are based on 100 cubic feet.\*

Prices paid for Crown timber are frequently made up of two different kinds of charges, which we may classify as Crown Dues and Stumpage, although different names are used in different provinces.

Crown Dues are rates of payment for timber, established by statute or by order in council, and apply uniformly throughout whole provinces or in large regions. Different rates are set for different species and, in British Columbia, for different grades of logs of the same species. They are, in effect, minimum prices below which the administration may not sell Crown timber. The rates of dues are not affected by such factors as extra good quality of timber or very easy accessibility, which might justify higher prices for particular stands.

Note - Payments of the kind described as "Crown Dues" in this chapter are officially called "royalties" in B.C. and "stumpage" in N.B. Charges described as stumpage are known in Ontario as "bonus dues".

Stumpage, (as we are using the word here) when paid for Crown timber consists of charges additional to Crown dues. Such charges reflect the difference between the real value of a particular stand of timber and the Crown dues rates. This additional value may arise from exceptionally high quality, easy accessibility, and a number of other factors. Stumpage charges may not be finally determined until a sale is completed. For example, the government of a province where Crown dues for white pine are set at \$2.50 per M ft. b.m. may consider that a certain lot of better-than-average timber located near a good road is really worth at least \$5.00. The block may then be offered for auction at an "upset price" of \$5.00, made up of \$2.50 for Crown dues and \$2.50 for stumpage. If the timber is put up for auction and no bid as high as the upset price is received, there will be no sale. On the other hand, competition amongst bidders may force the final price up to \$8.00. We could then say the selling price represents Crown dues of \$2.50 and stumpage of \$5.50.

There are a number of different ways of disposing of Crown timber which we can review briefly under the names of timber berths, pulpwood berths, timber sales, and permits.

Timber berths are areas of Crown timber lands held by operators under lease. Nowadays it is customary to make berths renewable for a specified number of years, although many of the older berths carry no time limit. Annual renewals are granted if the holder takes out an annual license to operate, pays his ground rent and timber charges, and observes the conditions re methods of operation, filing of returns, etc., under which the berth was granted. In several provinces the maximum size of a single berth is limited by law. Timber berths are disposed of by public competition, the successful bidder usually paying a lump sum for the berth. Crown dues are payable as the timber is cut. Boundaries of timber berths are described in the leases.

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\* Timber dues in Newfoundland are paid only on timber sawn into lumber for sale. The pulp and paper companies pay a stipulated sum annually on their holdings.



Pulpwood berths are large areas leased to pulp and paper companies. Since erection of a pulp and paper mill requires a great deal of money, no company can commence to build one unless it is first assured of sufficient timber supplies to permit of the mill's operation for a considerable number of years. Thus pulpwood berths are usually established by agreement between government and company, an important condition of such agreements being that the company must erect and operate a mill of specified size by a certain date or lose possession of the berth. Berths of this kind may be good for anywhere from 21 to 99 years, with renewal privileges at the end of the original agreement. Crown dues and ground rent are paid at stipulated rates.

Timber Sales are made by public competition at upset prices per M ft. b.m., or per cord, etc. Bidding above the upset price is also on a unit volume basis, rather than in lump sums for the whole sale. They are usually good only for short periods of from one to five years. Ground rent may or may not be required on timber sales. Payment is made as timber is cut but the successful bidder may be required to make a guarantee deposit, or furnish a bond, or do both at the time he is awarded the sale. The area of a timber sale is defined in the same way as that of a berth.

British Columbia has established a special type of license a Forest-Management license - which allowed the holder to retain the land in perpetuity provided he carries out sound forestry practices in its management. The aim is to have such forests managed on a sustained yield basis.

Timber Permits give the holders the right to cut specified small quantities of wood from Crown lands, for their own use or for sale. Payment of dues for all the wood to be cut may be required when the permit is issued. Free permits are sometimes granted to certain classes of people, such as settlers, to enable them to get building logs and fuel which they would be unable to pay for.\*

The relative importance of these different methods of disposing of Crown timber differs as between provinces, and different names for the same sort of arrangement may be found in different parts of the Dominion.

Operators in Crown timber are always required to observe certain regulations, but details of these regulations vary from province to province and from time to time. The following are merely examples of the kind of requirements which might appear in a typical lease. The operator may be forbidden to cut trees of less than specified stump diameter; maximum stump heights may be prescribed; use of inferior kinds of timber in the construction of camps, culverts and bridges may be required; and burning of logging slash may be necessary. In addition, operators are required to keep book records which may be readily inspected, and to maintain their camps in a sanitary condition.

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\* In Newfoundland every citizen has the right to cut free of charge, timber for fuel or for use in his industry, but not for sale.



- 7 -

In order to ensure that government regulations and any special conditions contained in a lease are complied with by operators, logging operations on Crown lands may be inspected from time to time by officials of the department. If there is evidence of failing to observe regulations on a serious scale, operations may be closed down until the situation is corrected or, in extreme cases, the berth or sale may be cancelled.

### Scaling

Since payment of government dues is based on the scale, both the government and the operator are very much interested in the accuracy of measurements made. The former wants to be sure the scale is not too low - the latter, that it is not too high.

Scalers may be employed by the government or by the operator depending on custom in the province concerned. In either case the scaler is required to make solemn declarations that his measurements are honest and fair to both parties.

Men who wish to become log scalers are required to serve a term of apprenticeship during which they work with qualified scalers and gain experience and judgment. In several provinces scalers must pass stiff examinations set by government boards or departments before they can obtain licenses, or call themselves scalers. Needless to say, licenses are not issued to persons whose reputation for honesty is open to question.

Since there is a large element of judgment in scaling, governments usually employ a few check scalers. These are men of great experience and ability who travel from operation to operation and remeasure a sample number of log skidways or cordwood piles, and then compare their results with the records of the local scaler. If the latter is found to be running consistently high or low, his attention is drawn to the fact and he is expected to show an improvement when the next check scale is made.

While the pulpwood cord of 128 stacked cubic feet is pretty well established as a unit of measurement throughout the Dominion, the board foot contents of sawlogs is calculated according to different Log Rules in different provinces. New Brunswick and British Columbia use rules called by the names of the provinces; Ontario uses the Doyle Rule, Alberta the Scribner Rule, and Manitoba and Saskatchewan the International  $\frac{1}{4}$ " Kerf Rule.\*

### Forest Reserves and Parks

Most of the provinces have established areas which are known as provincial forest reserves, and five provinces also maintain provincial parks.

Forest reserves are forest areas of exceptional value which are set aside for one of two main purposes, namely, the supply of forest products to industry or the

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\* As dues are paid only on timber sold in Newfoundland they are based on mill tally rather than scaling results.



protection of watersheds. The latter are called protection forests. In neither case is the timber withdrawn from use. On the contrary logging operations are carried on, but particular care is taken to see that the forest resources on the area are not seriously depleted at any time. In the case of protection forests, the decision as to whether any particular area can be logged at a given time depends on the effect which such action will have on the run-off of water. If logging a certain hillside in a protection forest is likely to lead to erosion or otherwise interfere with the control of stream-flow, no logging will be allowed even though it may appear highly desirable from a commercial point of view.

Parks are primarily recreational areas and in some of them all logging operations are forbidden. In others logging is permitted under close control and particular care is taken to see that scenic values are not damaged.

### Game and Fish

In most provinces the administration of laws respecting hunting and fishing is carried out by staffs specially appointed for that purpose but in others forest officers are required to act as game and fish wardens in addition to their other duties. Whether he is responsible for game and fish laws or not, the forest ranger must always take an interest in the movements of hunters and fishermen in his district because of the danger of forest fires which their presence entails. The majority of men who go into the woods to hunt or fish are careful with their camp fires and tobacco but there is always likely to be a small number who may start conflagrations either through ignorance or carelessness.

### Forest Surveys

Since the provincial forest services are responsible for the administration of large forest areas, it is most important for them to know as accurately as possible what those forests contain and how much wood can be cut or burned each year without causing permanent damage to the forests as a whole. Extensive forest surveys are, therefore, carried out by the provincial services and results are compiled in the form of forest inventories. Much has been accomplished in this direction but a very great deal remains to be done before satisfactory information for the whole of the Dominion will be available. Field survey parties are usually headed by qualified forest engineers who may or may not be members of the permanent staff of the provincial service, while the remainder of the crew are temporary employees engaged on a seasonal basis. Most timber cruising is carried out during the summer months but some winter work has also been done. The use of aerial photographs has been greatly developed during the past ten years and the Dominion Forest Service, many of the provinces and several private timber holding companies maintain their own forest air survey organizations.

In several of the provinces the Dominion Forest Service has undertaken preparation of forest inventories, and all provinces supply information to the Dominion which permits revision of the national forest inventory from time to time.



## Forest Research

The larger proportion of the forest research work done in Canada is conducted by the Dominion Forest Service, which works in close collaboration with provincial authorities. However, certain provinces also maintain research staffs of their own. The principal objects of this research work are the discovery of the best means for managing the forest resources so that future supplies of wood products will be assured both to industry and to individual users. Work of this kind is very complex, and most parts of it require a lapse of considerable periods of time before worthwhile results can be obtained. It includes experimental treatment of selected areas of forest by different methods, investigations of better methods of protection, and many other allied lines of work.

## Artificial Reforestation

Most of the forests of Canada reproduce themselves after logging or fires by natural means, and the securing of new growth of the most desirable species is mainly a matter of proper management of logging operations. There are areas, however, from which all possible sources of seed supply have been removed and on which forests can only be re-established by planting. Planting may also be necessary to check the progress of drifting sand dunes or to provide shelter for farm buildings and fields. Several provinces, notably Quebec, Ontario and British Columbia, maintain large forest nurseries where planting stock is grown both for forest plantings and for the supply of farmers. Permanent nursery stations are maintained. Permanent staffs are small but considerable local employment is provided during the transplanting seasons. The output of these stations runs into millions of small trees annually.

## Publicity and Extension Work

Since improvements in management of the forests depend ultimately on public support, the forest services do everything in their power to draw the attention of the people to the importance of the forest resources, the benefits we reap from them, and the need for protecting and improving them. Main reliance is placed on the press and the radio but these sources of public information are supplemented by the issue of special literature and by public lectures. Increasing emphasis is being placed on introduction of courses on the value of natural resources into public schools because it is believed that the child who is taught to appreciate our resources will take an active interest in their conservation when he grows up.

## Farm Forestry

It has been realized in recent years that farm woodlots together make up one of the most important sections of our forest resources. In the decade before the outbreak of war they contributed almost one-third of all the wood cut in Canada for all purposes although a large proportion of this was firewood. They are the most accessible of all our forests. Although these woodlots are all privately owned, their importance to the community justifies the provincial forest services in providing special advice and assistance to their owners. Good management of farm woodlots



increases the prosperity of the agricultural community, partly because of the use or sale of wood products and partly because of their protective influence. Several provinces now employ qualified foresters whose chief duty is to encourage farmers to manage their woods along proper lines. This work is developing rapidly and promises to become even more important in future.

### DOMINION FOREST SERVICE

Prior to 1930 the forests of the three Prairie Provinces and those in the "Railway Belt" and the "Peace River Block" in British Columbia, were administered by the Department of the Interior of the federal government. In that year the management of these forests was transferred to the provinces and since then federal activities in the forestry field have been principally concerned with research and investigation. The Dominion Forest Service is now a bureau of the Mines, Forests and Scientific Services Branch of the Department of Mines and Resources. Activities of the old Department of the Interior were taken over by the present department in 1936.

The Dominion Forest Service is particularly concerned with forestry problems which are of interest to more than one province or to all provinces and to forest industries. For example, certain forest types may be found in a number of different provinces, and experiments intended to show how they could best be managed are of particular interest to the provinces in which they occur. It is, of course, much more economical for the Dominion to study such questions than it would be for each individual province to investigate them separately. Information obtained by the Dominion is made available both to the provinces and to forest industries. On the other hand, the provinces supply the Dominion with information respecting their own forests in order that summaries for the whole of Canada may be built up.

The main divisions of the Dominion Forest Service deal with forest economics, silvicultural research, forest fire protection investigations air surveys and forest products research.

Forest Economics. This work includes the analysis of statistics secured from the Dominion Bureau of Statistics, provincial authorities, and other sources, and general studies of the supply and demand situation in Canada. Trends of development of forest industries and of domestic and foreign markets for forest products are followed and information on forestry conditions in other countries is gathered. The national forest inventory is maintained and revised from time to time as new information becomes available, and comparisons are made between the rates at which forests are being depleted by logging, fires, etc., and the rates at which new growth is replacing that depletion.

Forest Air Surveys. This Division is engaged in the study of new methods for using aerial photographs in connection with forest surveys and a great deal of progress in this highly technical field has been accomplished. New instruments have been devised and ways have been found for measuring tree heights, volumes of merchantable stands, and other factors direct from the photographs.



Silvicultural Research includes investigations necessary to determine the best methods of treating growing stands and of harvesting forest crops. Most of these experiments have to be carried on continuously for many years before final answers can be obtained. This is so because it takes a long time for a tree to grow from a seedling to saw-timber size. To provide the necessary control of areas where such experiments are carried out, five forest experiment stations are maintained in different forest regions of the Dominion. The locations and areas of these stations are as follows:-

<u>Name of Station</u>	<u>Location</u>	<u>Area</u> Sq. Miles
Acadia F.E.S.	near Fredericton, N.B.	35
Valcartier F.E.S.	Valcartier, P.Q.	7
Petawawa F.E.S.	Chalk River, Ontario	97
Riding Mountain F.E.S.	Riding Mountain Nat. Park	25
Kananaskis F.E.S.	Seebe, Alberta	62

These stations are well equipped with buildings, roads, lookout towers and so forth, essential for administrative purposes. Their value for research purposes makes it necessary to provide very intensive protection against damage by fire or other causes. In addition to silvicultural experiments the forests on the larger stations are used to demonstrate methods of forest management and the stations also serve for purposes of research in connection with protection against forest fires, injurious insects, and tree diseases.

Forest Protection. The Dominion Forest Service annually compiles classified statements respecting forest fire losses throughout the Dominion from information supplied by the provinces. From these it is possible to trace the trends of fire damage in Canada as a whole and in different regions of the country. Extensive investigations have been made into methods for measuring the degree of fire danger or fire hazard that exists at any given time and for forecasting probable hazard for short periods in the future. This work is of great importance to organizations actually engaged in forest protection work, and the Wright system of measuring hazard, as developed by the Dominion Forest Service, is now in use in several provinces.

Forest Products Research. Forest Products Laboratories are maintained by the Forest Service at Ottawa and Vancouver, and in addition the Dominion participates with the Canadian Pulp and Paper Association and McGill University in the operation of the Pulp and Paper Research Institute whose laboratories are in Montreal.

The Forest Products Laboratories study the characteristics of all Canadian woods and are constantly engaged in a search for more effective methods of manufacturing and using wood products. Some of the principal lines of investigation are timber testing, wood preservation, lumber seasoning, timber physics, timber pathology, and wood utilization. Particular attention is paid to investigations likely to lead to the reduction of waste in manufacturing processes. Many of the projects undertaken are carried on in close co-operation with the wood-using industries.



Other activities of the Dominion Forest Service include the preparation and distribution of educational material designed to bring home to the public the great importance of the forest resources to all Canadians; provision of technical advice respecting forestry problems to other Divisions of the Dominion Government, such as the National Parks Bureau and the Indian Affairs Branch, and general co-operation with provincial forest authorities in matters of common interest.

DEPARTMENT OF AGRICULTURE

Investigation of outbreaks of injurious forest insects and of tree diseases are carried on by the Science Service of the federal Department of Agriculture because these lines of work are closely allied with the larger fields of general entomology and plant pathology. This work is done in close co-operation with the Dominion and provincial forest services. This Department also maintains two tree planting stations located at Indian Head, Saskatchewan, and Sutherland, Saskatchewan. These stations provide planting stock, for the establishment of windbreaks and shelter-belts, to farmers in the three Prairie Provinces.

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RP/A