RECONNAISSANCE

in

LILLOOET & CARIBOO DISTRICTS

1914

E.G. McDougall.

Reconnaissance File 600B.
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Forest Branch  
April 19/1915.

REPORT ON RECONNAISSANCE IN LILLOOET  
AND CARIBOO DISTRICTS.  
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Chief Forester,

Sir,

I have the honour to report as follows on a reconnaissance  
survey for the Forest Branch of those portions of the Cariboo and  
Lillooet Districts lying east of the Fraser River and south of the  
53rd. parallel, together with a portion of the Kamloops District  
comprising the Clearwater Lakes and vicinity, and the upper part of  
Clearwater River. A portion of this territory, namely, that part of  
Lillooet District lying east of the Cariboo Road, with a fringe  
along the boundaries, was covered in the season of 1913, but will  
be briefly referred to in this report. The territory covered last  
year included (1) the east side of the Fraser Valley and adjacent  
plateau, from Pavilion to Quesnel; (2) the greater part of the country  
drained by Quesnel River and its tributaries; (3) portions of the  
country drained by the upper waters of Cottonwood River and Antler Creek  
; (4) the country drained by Clearwater Lake and the west side of the  
Upper valley of Clearwater River.

Area Covered

The Area covered in the seasons of 1913 and 1914 amounts to  
about 7½ million acres, of which only 2½ million acres were completed  
in the first year. The expense, up to the time of placing the map in  

&c; &c;
the draughtsman's hands, was almost exactly 1 mill. per acre. This figure includes the purchase of supplies and equipment which were still valuable at the end of the operation, but does not include depreciation on supplies issued from headquarters; the two items, however, would about balance. While accuracy was to some extent sacrificed to economy and speed in the operation, yet it will probably be conceded that a larger expenditure for the sake of more exact information would not, under present conditions, be justified.

**Topography**

The North-eastern boundary of the region examined is formed by the Cariboo Range, a high, snowy mountain-chain dividing the Quesnel and Clearwater Drainages on the one side from the upper waters of the Fraser and North Thompson Rivers on the other. There are several spurs and outlying ranges, between the arms of Quesnel Lake and west of Clearwater Lakes. Coming further west, there is a broad belt of foot-hill or low mountain country, the summits ranging from 5000 to 7000 feet in elevation, and forming no considerable ranges, since they are deeply dissected by river-valleys. This hill country in turn passes over into a great plateau or plain, with a fairly level surface, in general sloping downwards to the north-west. The San Jose and Quesnel River, besides many of the smaller streams follow the general direction of the slope; the Fraser River, on the other hand, cuts across it, and its valley deepens southward into an immense canyon. At Big Bar, the Fraser enters the mountains, passing between two outlying ranges of the Cascade system. The Limestone Range, east of the river, rises abruptly from the plain referred to, and forms its boundary in this section. This
great interior plateau crosses the Fraser and extends north-westward for a long distance, flanked on the one side by the Cascade Range and on the other by the Cariboo Mountains and their outliers.

**Climate**

The climate of the country is a continental one, with fairly hot summers and severe winters. The heat is never intense, save in the Fraser Canyon, and the nights are always cool. The winters are probably about as cold as on the prairie, and the Chinooks that regularly visit the Nicola Country seem to be absent. The forest cover, however, gives a good deal of protection from cold winds, and is thus of some service to the stockman.

The aridity is greatest in the Fraser Canyon and in the lee of the Limestone Range; in the latter region are a number of Alkaline lakes. The precipitation gradually increases as the Cariboo Mountains are approached, until at their feet the humidity is very marked. The Forest Cover map will give a fairly good clue to the distribution of humidity.

I am informed that peaches have been grown at Lillooet and apples at Soda Creek. Oats are produced at moderate elevations throughout the country. Summer frosts seem to be quite rare, except in the neighbourhood of the mountains, where, however, there is very little agricultural land. Hail storms of great violence sometimes occur, but are usually limited in extent.

**Conditions of Settlement**

The settlement of the country exhibits varying phases of development. The first settlement dates from the Cariboo gold rush, and
devoted itself largely to growing feed for the freight teams on the Cariboo Road. Stock raising and gardening, chiefly for the local market, were added as side lines. This old settlement is now well established, and will readily readjust itself to the altered conditions introduced by the construction of the Pacific Great Eastern Railway. The same may be said of the settlement in the lower Fraser Valley, though that is more strictly a ranching community.

In the past few years there has been a considerable inrush of new preemptors. The latter are mostly men of small means and as they are confronted by serious obstacles, they have not yet succeeded in establishing themselves, but depend for a living on such wages as they can earn in railroad construction, government road-work, etc. Most of them do a certain amount of hunting, fishing and trapping, and some were trappers or prospectors by occupation before they took to farming. The necessity for some such side line is evident, since it usually takes some years to make a place productive. There is the usual conflict of interest between the old and new settlers, especially regarding the use of the range; but as yet it has not reached an acute stage, perhaps because the new settlers have very few cattle. However, there is no reason to doubt that the laws will be equitably enforced and serious friction among the settlers avoided.

At present the most promising line of agricultural development lies in dry-farming. The movement was launched in the Chimney Creek District, and the Government has established an experimental farm near 105 mile House, which will be of considerable value for extension of the movement. Irrigation is also being developed.
Undoubtedly there is a good deal of room for agricultural expansion, but stock-raising, or at least mixed farming, will continue to be the most profitable line of endeavour.

There is a strong demand for a relaxation of the fire law so that the extensive and practically worthless lodgepole pine second growth may be removed to make way for grass. For a discussion of this point, I would refer you to my last year's report, with the remark that I have seen no reason to modify the opinion therein expressed, that some such relaxation is in the best interest of the country.

The well-timbered regions of the north-east have practically no agricultural land, and are inhabited only by a few miners, prospectors, and trappers; the last named at least having a direct and active interest in the prevention of forest fires.

\[\text{FOREST SPECIES}\]

\text{Pinus monticola, D. Don., White Pine, is represented by a few scattered specimens on the upper Quesnel and Clearwater lakes. It is not a factor in the composition of the forest, but since it attains a good development and its wood is valuable, it may ultimately be found desirable to encourage it.}

\text{Pinus albicaulis, Engelm, Scrub Pine, is found near timber-line both in the Limestone Range and the Cariboo Mountains. It is not found in the lower hills west of Swamp River. It has no commercial value, but may have some influence in retarding slides which would damage useful timber on the lower slopes.}

\text{Pinus ponderosa, Haws, Yellow Pine, occurs in the southern part of the district; the mouth of Canoe Creek, the 61 Mile chasm on}
the Cariboo Road, and the forks of the Bonaparte are points on the
northern limit of its range. It occurs in open stands of poor devel-
opment, and is probably of very little commercial importance.

*Pinus contorta*, var-*murrayana*, Engelm, Lodgepole Pine, is
found practically throughout the district, where it is by far the
most abundant tree. It occurs to some extent in admixture with
other species, notably fir, but takes the leading place on the three
million acres or more of burned over land, where it forms the first
reproduction. It is very liable to be wind-thrown shortly before
it would attain saw size: and though it occasionally becomes mer-
chantable, its stands never approach statutory requirements. It is
used locally for fencing, building logs, fuel etc: its possibilities
for pulp will be referred to later. Considering the small value of
this species, and the absence of available markets for its products,
I have no doubt that any land capable of producing a good growth of
grass would be better applied to that use than to the productions of
lodgepole pine or other timber.

*Picea Engelmanni*, Engelm, Engelmann Spruce, occurs in abun-
dance in the moister parts of the territory, and scattered throughout
the dry parts, in moist situations. In the *Dry Belt*, however, it is
of poor development, rare occurrence, and very slow growth. Where
there is a fair amount of precipitation, the spruce attains excellent
development. Along the edge of the *Wet Belt*, it is the leading timber
tree: within the Wet Belt, however, it is replaced on the lower slopes
by the cedar and hemlock. As yet it is not utilized to any large ex-
tent; and since the local demand for lumber will always be limited,
it is probable that this species can best be utilized in the form of
pulp, which will more readily bear transportation to distant markets. The species is somewhat troubled by budworm, and is otherwise subject to defect, but much less so than its associates; it should, therefore, be favoured in management.

_Picea Mariana, B. & P. Black Spruce_, seems to occur, but its identification is uncertain. Except for a wetter habitat and slower growth, it closely resembles the former species.

_Tsuga heterophylla, Sarg.,_ the Western Hemlock, occurs in the wetter parts of the territory, principally in the vicinity of Quesnel, Horsefly, and Clearwater Lakes, at elevations below 4000 feet. It is very abundant and of fair size, but unfortunately infested with fungus, so that it is of very little value. Scarcely a tree can be found free from fungus rot. In this region the species is regarded as altogether worthless; but it may be of some value for tan-bark, in connection with the stock industry in adjoining territory.

_Pseudotsuga mucronata, Seward.,_ Douglas Fir, occurs throughout the region, though sometimes absent from the upper slopes. It seems to have two distinct forms, characterizing the West and Dry Belts. The Dry Belt form is rather short, usually very pitchy, and subject to wind-shake. It is quite abundant, and notwithstanding its defects, is a valuable timber tree. The Wet Belt form, on the other hand, is much taller and better-formed, but suffers greatly from insect and fungus attacks. It is much less abundant than the former, being unable to hold its own against the more tolerant species of the Wet Belt; and it may therefore be considered of little commercial importance. The fir is extensively utilized for lumber, being cut at small portable mills
throughout the country. It might also play a subsidiary part in
the pulp industry.

Abies lasiocarpa, Nutt., Balsam fir, occurs in the mountain
ranges, usually at elevations from 4000 feet to timber line, but
occasionally descending lower. It attains moderate dimensions,
usually sufficient for saw timber; but its principal use will probably
be for pulp.

Thuja plicata, D. Don., Red cedar, has a slightly more exten-
sive range than the hemlock, with which it is usually associated.
Within its range it is one of the leading species, and attains large
dimensions; but it is attacked by a dry-rot which reduces it to a
mere shell. Sometimes, however, enough can be saved to be put to
some use. Probably most of it will eventually be worked up to
shingles.

Juniperus scopulorum, Sarg., the juniper, is a shrubby tree
occurring in rocky canyons in the Dry Belt. It is not common enough
to be of any commercial importance.

Taxus brevifolia, Nutt., the Yew, is a fairly abundant
shrub in the Wet Belt, but does not reach tree size.

Populus tremuloides, Michx., the Quaking Asp., is generally
distributed, appearing on burned lands where the soil is deep and
heavy, the light or stony soils being monopolized by the lodgepole.
It is of small size and of little value.

Populus trichocarpa, Hook., the Black Cottonwood, occurs
on sand-bars along lake shores in this region. Like the cedar, it
is used for making canoes; otherwise it is of little importance.
There is also a Birch (Betula alba var.) which was not identified, as it was not in fruit at the time it was observed. It occurs on the Lower Clearwater Lake, and attains fairly large dimensions.

**Forest Types.**

The Yellow Pine type occurs in the southern part of the district, at altitudes ranging from 1500 to 3500 feet. The composition is Yellow Pine 70%, Fir 30%, the latter coming in on northern exposures and at higher altitudes. The stand is open, the density rarely exceeding 3000 feet B.M. per acre. In dry situations it passes over into a park-like formation, which in turn gives place to open bunch-grass and sage-brush country. Reproduction is rather scanty, probably because of the extreme intolerance of the seedlings. Owing to the poverty of the stand, the type is of little commercial importance.

The Douglas Fir type formerly covered a large part of the interior, mostly above 3000 feet elevation; but it is now limited to certain strips and patches along the edge of the valley of the Fraser, San Jose, Bridge and Bonaparte Rivers, and to a few isolated patches elsewhere. It ascends to an elevation of 4000 to 5000 feet. The stand varies in density from 2000 to 6000 feet B.M. per acre. Reproduction is usually good, taking place chiefly in openings, which are numerous. This forest is of some importance for local lumber supplies, but the poverty of the stand and the poor quality of the product would make it unavailable for outside markets.

The Lodgepole Pine type is the most extensively distributed
in the Interior, but is probably of a transitory character. It comes in on burned areas formerly occupied by other types, especially the Douglas Fir type; it may also occupy areas that were formerly prairie. As a rule it is not wind-thrown before reaching maturity, but sometimes attains saw size, and in favorable locations might yield 2000 feet B.M. per acre. The stand is very dense, and the trees well-formed, though small; they often show frost-cracks and other defects. This forest is used locally for fencing, building logs, etc., and might be utilized for pulp. A discussion of its suitability for that purpose will be given under the heading "Burned over land."

The Spruce-Balsam type is characteristic of upper slopes above 4000 feet, and in the main of the Wet Belt, though it is represented in the Limestone Range. Its composition is about 60% Spruce, and 40% Balsam, though occasionally there is some Lodgepole Pine present. Along its lower border the stand frequently attains or passes statutory density. This forest, being comparatively inaccessible, is very little utilized. It may be developed in some future period as a source of pulpwood, for which it is probably more suitable than the Lodgepole Pine forest. Moreover, the land occupied by the latter is largely suitable for grazing, while that held by the former is available only for timber-growing.

The Alpine type is substantially the same in the Wet Belt and Dry Belt, and consists of an open stand of Balsam with some Whitebark Pine along the ridges. It may be regarded as having some value for soil-protection, but otherwise it is of little importance.
The Transition type is distributed along the borders of the Wet and Dry Belts, being represented in the Lower Valley of Swift River, about the foot of Quesnel Lake, in the valley of Horsefly River, and in the hills north of Canim and Mahood Lakes. Its composition is most varied; Spruce, Fir, Cottonwood, Cedar and Balsam all being represented approximately in the order named. Its distinguishing feature is the predominance of Spruce at low altitudes; and, since this species is fairly free from defect, the forest is probably of considerable commercial value.

The Cedar-Hemlock type is characteristic of the Wet Belt below 4000 feet elevation; above this level it is replaced by the Spruce-Balsam type. It is composed of the two species mentioned, in varying but roughly equal proportions, with some admixture of Fir, usually dying, and occasionally a little spruce. The amount of defect is enormous, the Hemlock being fungus infested and the Cedar hollow. In consequence, it is very difficult to cruise the stand satisfactorily. On the Clearwater Lakes, indeed, the defect seems less prominent than on Quesnel and Horsefly Lakes; but on the latter it is very doubtful if any of the timber is merchantable.
### Quantity of Timber

Hereewith is a table giving an estimate of the quantity of timber on the area covered by drainages.

<table>
<thead>
<tr>
<th>Drainage</th>
<th>Area (acres)</th>
<th>Volume (M. feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0-5 M. per acre</td>
<td>5-10 M. per acre</td>
</tr>
<tr>
<td>Cottonwood</td>
<td>145,730</td>
<td>145,730</td>
</tr>
<tr>
<td>Antler</td>
<td>13,820</td>
<td>13,820</td>
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<tr>
<td>Swamp River</td>
<td>117,500</td>
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<tr>
<td>Quesnel Lake</td>
<td>156,670</td>
<td>27,070</td>
</tr>
<tr>
<td>Clearwater</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lakes &amp; Rivers</td>
<td>107,710</td>
<td>110,020</td>
</tr>
<tr>
<td>Horsefly</td>
<td>93,310</td>
<td>146,880</td>
</tr>
<tr>
<td>Quesnel River</td>
<td>7,490</td>
<td>11,520</td>
</tr>
<tr>
<td>Fraser R. North</td>
<td>47,810</td>
<td>47,810</td>
</tr>
<tr>
<td>San Jose River</td>
<td>173,950</td>
<td>6,910</td>
</tr>
<tr>
<td>Fraser R. South</td>
<td>196,140</td>
<td>2,880</td>
</tr>
<tr>
<td>Bonaparte River</td>
<td>229,600</td>
<td>2,880</td>
</tr>
<tr>
<td>Bridge River</td>
<td>70,270</td>
<td>75,560</td>
</tr>
</tbody>
</table>

**Totals** 1,261,000 588,000 82,370 1,331,570 3,785,000 4,430,000 988,440 9,181,440
It will be noted that nearly two million acres carry timber, to a total amount of over nine billion feet B.M. These round figures are probably as near the truth as the others, which are made up by pleimeter measurements and arbitrary calculations.

The distribution of the various species has already been referred to. The percentage of species, on the whole, is approximately as follows: Spruce 30%; Fir 25%; Cedar 20%; Balsam 10%; the balance being comprised of about equal parts of Lodgepole Pine, Yellow Pine, Hemlock and Cottonwood.

**Location of Merchantable Timber.**

It will be seen from the above table that about two-thirds of the total quantity of timber is situated in the north-eastern part of the country, where the precipitation increases as the Cariboo Mountains make their influence felt. The remaining timber is distributed in patches over a great area of burned country.

The greater part of the timber is still in the hands of the Crown, but numbers of timber limits have recently been surveyed along the Clearwater Lakes, the north arm of Quesnel Lake, and the north shore of Horsefly Lake, covering the most valuable parts of the stand. As yet there have been no important logging operations, with one exception presently to be noted. In the settled parts of the country small quantities of lumber are cut under permit at portable mills for local use.

Some years ago a donkey engine was brought into the Clearwater valley, by way of Canim and Mahood Lakes; a number of logs
were cut, and an attempt was made to drive them down the Clearwater River, but with no success. Access to the Clearwater Lakes is a matter of some difficulty; owing to the rugged character of the country it would be very costly either to make the river drivable or to construct a railway from Clearwater Crossing on the C. N.R. to the foot of the Lake. Quesnel River, on the other hand, has been navigated with canoes from the Forks to Quesnel, and presents no insuperable obstacles above the Forks. A shingle mill should, however, be erected at the foot of the lake, as the hollow cedar logs would be seriously damaged in driving. The product could probably be handled with less loss in barges. As Mr. Green, B.C.I.S. suggests, the Upper Clearwater Lake could without much difficulty be diverted into Quesnel Lake; and its logs could be removed in that direction, if the route to the North Thompson proved too costly.

There are three suitable sites for pulp-mills, each being within reach of a large quantity of spruce and other timber, and having water-power available. These sites are, Bridge River Falls below Canim Lake, the lower falls on the Horsefly River near Kimberley Creek, and the falls on the north fork of Quesnel River below Cariboo Lake. These sites are difficult of access at present, but they can all be reached from a projected line of railway from Clearwater Crossing to near Fort George, traversing the valleys of the Clearwater, Bridge, Description, McKinley, Horsefly, Quesnel, Swamp and Bear Rivers. It is certain that this railway will not be built for many years, and equally certain that for that period the timbered country near
the mountains (with the possible exception of the shores of Quesnel and Horsefly Lakes, will remain in its present undeveloped condition.

Burned-over Land.

Nearly half of the total area surveyed, or about three million acres, have been burned over in the past sixty years. Portions of the burned area (perhaps one-tenth of the total) are not restocking satisfactorily; and more extensive areas have a fair percentage of fir and other species in the reproduction; but over by far the greater part of the burn there is a dense reproduction of Lodgepole Pine, from five to sixty years of age.

The loss of timber on the burned-over land, at the moderate figure of 3000 feet B.M. per acre, would amount to nine billion feet, or about as much timber as remains in the country. Whether this loss is altogether to be deplored is an open question. Much of the timber was removed from land that will be found useful for agriculture or grazing. The local supply of timber is still ample for local needs, and of too poor quality to pay for transportation to distant markets. The areas which are fit only for timber-growing, if protected from fire, will probably have a flourishing forest growth by the time the country's development has reached a stage when timber will be at a premium.

In estimating the amount of pulpwood that the second growth would afford, it may be assumed that permanent operations are contemplated, that all age-classes are represented, and that the stands are to be cut on reaching the age of sixty years, at which period
they would yield eight cords per acre. The total area then would yield a continuous revenue of 400,000 cords of wood worth, say, $2,000,000. Assuming that the whole area could be made suitable for grazing, and that each 100 acres would then support five head of cattle, one of which, worth $100.00, would come on the market each year, then the revenue from the land would be $3,000,000. Remembering that the market for beef is much less likely to be congested than that for pulp, I have little doubt that cattle-raising, for which a large part of the Interior Plateau is well adapted, will be found more profitable there than the growing of pulpwood. Whether the existing stock of pulpwood can be utilized depends on the present and prospective state of the market.

For a further discussion of this subject I would respectfully refer you to my report of last year.

Agricultural Land.

In the Dry Belt, especially the Fraser Valley, the agricultural land is limited to such areas as can be irrigated from the streams, and to a few hay meadows about the alkaline lakes. In the slightly less arid regions, such as the Chimney Creek prairie, dry-farming is practicable and is making good headway. In this zone nearly all of the land that is not too steep or stony will eventually be found fit for agriculture. A good deal of it can be irrigated in the valleys of the Bridge and San Jose Rivers. In the next zone, to the north-east again, the rainfall is generally sufficient for ordinary farming operations, but the country here becomes more hilly, and
the agricultural is limited to some patches about Canim Lake, a fairly extensive, flat near Horsefly Camp, a strip down Beaver Valley, and a few smaller patches. In the Wet Belt proper, the agricultural land is limited in amount to a few swampy river-flats. Possibly one-tenth of the whole area, or 750,000 acres, will eventually be found suitable for cultivation of some sort, nearly half being dry-farmland. Of the remainder, probably 2½ million acres are suitable for grazing, 3 million acres for timber, and the balance 1¼ million acres is waste and water.

Other Resources.

In connection with grazing mention should be made of the Caribou Meadows in the hills about Swamp River. On a muskeg foundation, they bear an abundant crop of grasses and succulent herbs during at least three months of the year. These meadows are probably too boggy for sheep or goats, but, since they are frequented by caribou, it is likely that reindeer would do well there. These formations are probably more extensive farther north. Deer and grouse are quite abundant in the lower country, forming a large part of the settler's meat supply. In the wooded mountains to the north-east caribou are the principal game. A few moose are found, and goat in the alpine regions. Mountain sheep are found in the Limestone Range. Bear, both black and grizzly, are found in the rougher parts of the country. Coyotes are the commonest pests, but wolves and cougars are found in the wilder parts. Waterfowl are quite abundant, especially in spring and fall. Good trout are fairly abundant, especially in Quesnel Lake. Salmon run in the Fraser River and its
tributaries.

Of mineral resources gold is the chief, and hitherto the only one of importance. The placer deposits about Barkerville seem to be nearly exhausted, but gold-washing operations are still in progress at various points throughout the country. A few copper mines have also been located, but as yet are undeveloped. Coal has been found along the Fraser, between Quesnel and Soda Creek. Other mineral resources are as yet unknown.

A summer hotel on Quesnel Lake has been projected. The district has unsurpassed scenic attractions, with boating, mountain-climbing, fishing and shooting all available, but in these respects it is probably not superior to many more accessible regions.

Inaccessibility is, in fact, the chief handicap of the whole district, especially with regard to the development of its timber resources. The relative poverty of these resources should also be borne in mind. Since this report is confidential, I may perhaps be permitted to offer a criticism of a section of the recent admirable Forest Act, the section, namely, by which the Government's stumpage charges on timber in the interior of the Province are fixed at 50 cents per thousand feet south of the Railway Belt, and 65 cents per thousand north of the Railway Belt. I have a fairly extensive acquaintance with the Southern Interior of the Province, and will give my opinion for what it is worth, that it would be a more equitable arrangement to charge the higher rate east of the Gold and Cariboo Ranges. The timber of the Upper Fraser and Columbia valleys is both in denser stand and more accessible to the Prairie market than that of the central interior; while as between
the north and south sides of the Railway Belt, the advantage seems to lie chiefly with the latter, when similar zones are compared.