RECONNAISSANCE

HAZELTON DISTRICT

P. Z. Caverhill, 1912

II
RECONNAISSANCE

from

HAZELTON to BURNS LAKE

1912

P.Z. Caverhill.

Reconnaissance File No. 300.

Map Scale 1" = 1 mile
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VICTORIA, Dec. 26th 1913.

The Chief Forester,
Victoria, B.C.

Dear Sir,-

I beg to submit the following report on the reconnaissance work carried on by me in the Hazelton District, under your instructions of July 20th 1913.

Object of Survey

The survey was conducted with an idea of securing data for a rough type map; showing the different types of timber by percentage, the approximate average stand; also for ascertaining what land should be kept under permanent timber reserve, and what thrown open for agricultural purposes.

Methods used.

The methods used in the survey were necessarily very rough. The greater portion of the valley was surveyed by a more or less consecutive system of land surveys. This was taken as a base and checked in occasionally by points on the railway line. Prominent hills were located and a rough system of triangles extended up the valley. Sketching with the plain table was done from triangulation stations, and other points, showing roughly the types burned over land, agricultural land, the boundaries of these divisions being checked in by lot stakes where possible. Unmapped roads and important pack trails were traversed with a traverse board and pacing and the while compiled in rough field maps. Scale 1 mile - 1 inch.

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Area covered.

The area covered embraced the valleys of the Bulkley and Endako Rivers along the line of the G.T.P. Railway from the town of Hazelton to the east end of Burns Lake, and extending from 3 to 5 miles from the railway. The total area covered was approximately 583,040 acres.

Cost

The cost of the survey was as follows,-

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equipment and supplies</td>
<td>$650.10</td>
</tr>
<tr>
<td>Travelling expenses</td>
<td>99.90</td>
</tr>
<tr>
<td>(Self)</td>
<td>435.00</td>
</tr>
<tr>
<td>Salary (Assistant)</td>
<td>264.55</td>
</tr>
<tr>
<td></td>
<td>1649.55</td>
</tr>
<tr>
<td>Less present value of equipment</td>
<td>535.00</td>
</tr>
<tr>
<td></td>
<td>$1114.55</td>
</tr>
</tbody>
</table>

From this we should deduct 22 1/3% for time spent on timber permits and collections, leaving a total cost of $743.04 or $0.0013 per acre.

Topography.

The tract may be divided into three topographic divisions.

1st. The lower Bulkley valley from Hazelton to Moricetown.
2nd. The Bulkley valley from Moricetown to North Bulkley.
3rd. The summit from north Bulkley to Burns Lake.

The lower Bulkley valley may be characterized as a deep mountain trough. On the south-west, Rochers de Boule and Kitsequel mountains rise 8000 feet, while on the north east the Babine rise 6000 feet above sea level. The valley is terraced and the river has a fall of 1000 feet in twenty eight miles and has cut a canyon-like
channel 200 feet below the general level of the valley. Many swift, glacial fed streams enter the Bulkley in this division, the principal being the Suskwa or Bear River. This river forms a pass 4300 feet high through the Babine range, and through its valley has been constructed a pack trail which leads from Hazelton to Babine Lake and the Omineca. This trail has been recently improved, and is now in good condition. At Morice town, the main range of the Babine breaks down into low wooded hills which recede from the river, culminating again into a high peak at the head of Driftwood Creek. On the south west side, the mountains also recede. A low pass 2000 feet at the head of Trout Creek separates Kitseguecla from Hudson Bay Mountain. Through this pass, trails run from Morice town to the headwaters of the Copper and Kitseguecla River. Hudson Bay Mountain is about half way between Morice town and Telkwa, rising in steep precipitous slopes bare of tree growth to a height of 8000 feet.

The Telkwa, a large tributary of the Bulkley on south west side. A few miles from its mouth it breaks into a number of branches. The Goat, Mud, Pine and Telkwa Creeks. This valley is wide at its mouth and contains some excellent land, but as we ascend the streams the valleys soon become narrow and rocky. Trails extend up this valley from the town of Telkwa through passes varying from 3000 to 5000 feet high to the upper waters of the Copper or Cyomets Rivers; to Summit Creek and the lower waters of the Copper, thence down the Copper to Copper City, and across to the head waters of the Morice, as well as branch trails up almost every Creek. It is thus exceptionally interesting from a picturesque standpoint. About twenty-five miles above Telkwa, the Morice river enters from the west, this is
here a much larger river than the Upper Bulkley. It rises in a high mountain range near the head of the Telkwa.

The Buck river enters the Bulkley five miles further, making a low pass to the south, through which runs a wagon road to Francois lies and Qatas Lake. Pleasant valley there between the Horice and the Buck. It is a wide sandy bottom and extending about 2 miles back from the Bulkley, it is open and prairie like, except for a few clumps of cottonwood.

The summit division is a wide hilly upland, the mountains have here entirely disappeared, and we have range after range of timbered hills between which are found numerous lakes. The general elevation is 3000 feet with the hills rising 1500 feet higher. From the East end of Becker Lake, a pack trail runs over to Babine Lake, a distance of 23 miles, while from the west end of Burns Lake, a wagon road has been built to the north side of Francois Lake 14 miles.

Soil.

This valley has been glaciated and the soil is largely deposits of glacial drift over rocks of the Hazelton Porphyrite group. In valleys these glacial deposits have been overlaid by thick deposits of waste, forming a rich loam soil. The higher slopes, however, soon become a stony clay.

Along the upper Bulkley, a sluggish stream, are found deep deposits of sand with a thin coat of loam on top. At Chicken Lake, a heavy clay soil is found underlaid by gumbo. This gumbo formation seems to underly a great deal of the country.
Climate.

The tract lies between the semi-dry belt of the Northern interior and the wet belt of the Northern coast district. The winter weather is often severe, the thermometer sometimes reaching 40° - 50° below zero. This, however, does not last many days, and the dry, calm atmosphere tends to modify its effect. The snow fall is from 2 - 3 feet, which comes early and remains late in the spring. February and March, especially are clear and bright. During the summer, the days are long and clear. The rainfall is light, but in most cases sufficient for good crops. Summer frosts are liable to occur at any period seldom doing any harm on western exposures. The long warm days of summer make vegetable growth very rapid.

Conditions of Settlement.

People have been going into this country for a long period. Perhaps the first were brought in during the Chinese Gold rush, and later by the construction of the Western Union Telegraph line, and the Klondyke gold rush, but it was not until 1904 that attempts at farming were made.

Some of the earlier settlers have fine ranches, such as the Bulkley Ranch, Government Ranch, Home Ranch and Holman's Ranch. With the construction of the Grand Trunk Pacific, settlers rushed in and land staking was general over the whole area. All the good land, with the exception of a few scattered portions, is now alienated, but may be purchased from private parties at $6. - $15. per acre. Good roads have been built up the valley with many branch roads leading to neighboring valleys, and the whole country is now easy of access. It will be further opened up with the extension of
the Grand Trunk Pacific Railway eastward from Hazelton, its present terminus.

**Agricultural Possibility.**

Approximately 185,000 acres of the area examined is suitable for agricultural development. This is not a general farming district, being too much broken to ever permit the growing of grain on a large scale. The summer frosts also make the ripening of grain uncertain.

Vegetables grow well when not struck by the frost, and are of excellent quality. Good natural grass, such as Peavine, Vetch and Wild Rye, are found on the slopes, especially on burned-over lands, and light Cottonwood stands. Timothy does well on the valley lands and I believe the country is well suited for dairy farming. Stock can winter out, but require some feeding for two or three months and would do much better if the period was extended and stable accommodation provided. Small fruits do well at Hazelton, the larger ones have not been tried yet. I believe the only danger would be in spring frosts blighting the bloom.

Markets are excellent at present and everything a person can raise can be sold at more than remunerative prices. The value of farm stuffs will naturally fall when the railway is completed, but with the future development of the mineral wealth of the area, good local markets should always be had.

**Forest Species.**

_Fir/cone Englemannii (spruce)_

This tree is common over the whole area and is found in all the types. It has suffered greatly from fire, and large tracts once
almost pure spruce are now covered with pine.

Thuja Plicata (cedar)

This tree extends up the Bulkley valley 17 miles to Porphyry Creek, which appears to be its eastern limit. It is found on steep rocky hillsides where it grows in mixture with spruce. It is very defective above 18 inches DBH.

Pinus contorta (lodgepole)

The range of this species has been greatly increased by forest fires. It is found throughout the region on burned over lands. Most common on the summit division when it forms 80% of the tree growth. This species grows very slowly after reaching an age of 75 years, and rarely attains a diameter larger than 12 inches.

Tsuga Heterophylla (hemlock)

It is found on high mountain slopes above 3000 feet in elevation. Apparently does not go east of the Telkwa; owing to its high exposed elevation it is inferior to the coast hemlock.

Juniperus scopulorum

Only a few isolated trees of this species were found near Telkwa. It grows on high rocky hillsides, but will seed in on the lower slopes with aspen. Grows slowly and is very crooked.

Abies lasiocarpa

Found on high mountain slopes and on wash plains at the foot of glaciers, reaches large size but often contains heart rot.

Populus tremuloides (aspen)

Common over this region, coming in on the better class of soils and on bottom lands after a fire; growth rapid; seldom reaches a diameter greater than 10 inches.
Populus balsamifera (cottonwood)

Is found on bottomlands and extending upstream to timber line. It reaches a large size (6 feet) in diameter and has a clear straight hole 80 feet in length. Often rotten at the heart.

Betula alaskana (white birch)

Is common in the lower Bulkley valley and on steep rocky slopes throughout the region. Usually 5 inches D.B.H. It is often crooked and only fit for wood.

The timber may be divided into form types. Bottomland, slope, subalpine and temporary.

The bottomland type occurs only in small areas along the river. The chief species are spruce and cottonwood, usually of larger size. A dense growth of underbrush of dogwood (Cornus stolonifera) and willow is common.

The humus is thick, composed of decayed leaves. The soil is commonly sandy loam, but may be gravel with only an inch or two of loam covering it. A modification of this type is the open cottonwood stands as at Pleasant Valley, which results from destruction of the spruce by repeated burnings.

The slope type is found along the lower slopes of mountains and extends up to 3000 feet above sea level. The species are spruce in mixture with aspen and pine; spruce predominating. Dogwood, alder and willow here form an underbrush, but less dense than in the bottomland. The ground cover is moss, and a rich humus is created by its decay. The soil is generally a clay loam, but it may be rock and boulders.
This type has suffered greatly from fire and at present is represented by stands at Chicken Lake, along the Buskwa River and Babine mountains.

The subalpine type extends from the upper extremity of the slope type to timber line. It is composed of Spruce, Cottonwood, Hemlock and White Fir in varying proportions. Many individual trees reach a large size, but are generally of poor quality. The underbrush is light. Dogwood, willow, alder and devil club (equisetum horridum). The ground cover is mostly moss and the decayed moss makes a deep humus. The soil is rocky often boulders or ledges. The timber gradually thins out and becomes scattered as the upper limit of the growth is reached.

Temporary Type.

This type has been formed by fire. The forest is in various stages of transition from burned land to its original forest cover. A better idea of this type will be obtained if considered from the standpoint of its history from the time when a forest fire has swept over a tract of country leaving everything destroyed, until it is again restocked with the original crop.

This fire, while killing all the timber, has opened up the cones of the lodgepole pine. The seeds germinate and take root in the soil and a dense growth of lodgepole results. On the better slopes, on southern exposures, aspen comes in either from root shoots or from seed carried by wind. Spruce cannot exist under the soil and light conditions and therefore disappears entirely for the time. After 20,
30 or 40 years have elapsed, however, and the new crop has made sufficient shade and a layer of moist duff again covers the ground, spruce gradually seeds in, soon overtaking the slower growing pine, which eventually dies out on account of the shade and the type again returns to the original slope type. All stages of this transition are found in the 800 sq. miles of burned land over this summer Lodgepole pine, the predominating species, often reaching a diameter of 6" - 8" at 75 years of age grows very slowly and seldom reaches a size suitable for timber.

There is very little undergrowth in this type, but willows may come in in almost pure stand on rocky hillsides. The humus is composed of a thin coat of dry needles, beneath which is usually found a clay soil burned to a white or reddish.

The area of green timber is 41,154 acres, containing approximately 3000,000,000 feet; in addition to this 209,640 acres contain small timber and poles which would, at the present, yield about 3000 feet b.m. per acre or a total of 662,000,000 feet.

Location of merchantable timber.

The greatest portion of the merchantable timber is found along the foot of the Babine mountains and valley of the Skekwa River; also along the foot of Hudson Bay Mountain at Chicken Lake with small areas at North Bulkley and Barret Lake. Good stands of 2nd growth pine are found at North Bulkley and Burns Lake. The greater portion of the timbered land is still held by the Crown. The timber, not being of a sufficiently high quality to attract the lumbermen at the present time.
Burned over lands.

Approximately 523,990 acres have been burned over within the last seventy-five years. 203,640 acres of this has been replaced by a crop of lodgepole pine, which is upwards of 30 feet high. The balance 314,340 acres has suffered more recently and the reproduction varies from 0 - 20 feet high.

Damage by fire:

1st. Timber destroyed
2nd. Loss of annual growth
3rd. Decreased fertility of soil.

Only a rough estimate can be made of the complete damage. The average stand is about 5000 feet per acre, worth $1.00 on the stump. If the 314,340 acres burned bore its original stand, there would be over 1,500,000,000 feet worth in revenue, $1,500,000 and the utilization of this would be worth to the community $22,500,000. This representing the cost of labor, transportation and marketing the product.

2nd. The annual growth per year per acre is approximately 40 feet b.m., or about 15,000,000 on the burned area, worth $180,000 to the community and $12,000 in royalty. This item is for two to five or ten years, in which the land lies idle before it is again reproduced.

3rd. Decreased fertility of soil resulting in a decrease in the annual growth of the stand. This is caused by the fire destroying the humus and nitrogenous substances in the soil, and while no actual data can be had at present, I believe it will exceed 10 - 15%.
Utilization of Dead Timber.

The Grand Trunk Pacific are this winter taking out about 500,000 ties, the greater part of which will come off partially damaged tracts. The Bulkley Valley Lumber Company will also be cutting in burned territories on their limit. The remainder, owing to its small size, the lack of transportation facilities and market, and the high cost of labor, would be impossible to utilize.

Fire Protection.

Fire protection is the greatest problem which must be faced in the northern country. The conditions are especially favourable for the spread of forest fires. Here is an extensive territory with a widely scattered population of prospectors, trappers and ranchers. The sentiment is largely against the forest, especially as it is not merchantable at the present time.

The rancher must clear his land and in fire he sees his greatest aid, he also sees in the forest the cause of the summer frosts, of the flies which trouble his stock and many of this other ills. This sentiment is expressed in an article by Dr. H. L. Gordon in the Canada Magazine, Aug. 31st 1912. In speaking of the summer frosts around the Bulkley valley, he says, "As the timber around the farm is cleared and the air drainage through the valley, thereby improved, this trouble grows less and should disappear". And again in an article in Field Magazine the same author says (in substance) "In clearing land all that is necessary is to drop a burning match to complete the destruction." This also refers to the Bulkley Valley.

This Policy has found a too ready response, and is too
often carried out to the detriment of the whole country. The prospectors also is not averse to a fire, which clears away much of the underbrush and may even expose a load of ore. These are conditions. In addition, at the present time, is the building of the Grand Trunk Pacific Railway going on through this district, bringing in hundreds of foreigners who leave camp fires unguarded, who are burning stumps on the right of way and in many ways endanger the forest.

The danger points, therefore, are,-
1st - Farming communities.
2nd - Regions where prospecting is actively going on.
3rd - The railway.

In organizing a protective service, I would recommend that the tract be placed in charge of a District Gardener, one who understands the aims of Forestry.

He should, to meet the present emergency, place guards along that portion of the railway under construction, not more than 20 miles apart. These guards should have the power to prohibit the setting of fire, except for domestic purposes at dangerous periods, and all men on railway construction should be available for fighting any fire in their neighbourhood, receiving the current rate of wage if it is shown that they are not responsible for the fire.

The general patrol of the country should be organized by placing a guard in each of the centres of activity, - Kitssilas, Hazelton, Telkwa, North Bulkley and Burns Lake. These men would patrol their respective districts, issue permits for burning slash to the settlers when this can be done with safety, and work with the settlers, aiming to create a sentiment for forest protection, and to get, if possible, their co-operation. Later volunteer fire
fighting forces might be attempted, and per diem guards appointed in remote districts.

The District Warden should inspect the region and submit a report to the District Forester once each month. In case of an extensive fire, he could take personal charge of the operations. He should be given wide powers to engage or discharge any guard or warden whose services are not satisfactory. The person whose services are thus disposed of, having the right to appeal to the District Forester or to the head office in case of dissatisfaction.

Forest Reserves.

The reconnaissance of the Bulkely valley region shows that practically all of the lands of any value for agricultural purposes have been alienated, and that the only remaining Crown lands lie on the slopes of mountains, and their only value, except for minerals, is for the production of timber. It is shown also that on the completion of the C. T. P. Railway, the timber will attain a value, and to prevent alienation of these timber lands, they should be included in a forest reserve.

Other Resources.

The region is mineralized, and a number of very promising mining prospects have been discovered, and are being developed. Large areas also are underlaid by coal. The completion of the C. T. P. Railway will result in the immediate development of these resources. Good water power possibilities are also to be found and their development is only a matter of time.

Need of continuing the work.

There is a good deal of timber reported in the side valleys beyond the region I was able to cover, and which should be covered
as soon as possible, as each year sees prospectors and land hunters pushing their way further into it. All land unsuitable for farming should be reserved for its timber. The principal tracts reported are: - The Upper Valley of the Sunkwya - Some on Babine Lake - a large area on Driftwood River - Tacla Lake - also on the Copper and the head waters of the Telkwa Rivers. All this region is easily accessible with horses, and this is the best means of travelling, except on the larger lake trips where boats would be necessary. Good work could be done in February and March when the snow is crusty and travelling with dogs good.

Yours truly,

"F. Z. Caverhill."