

FRONTISPIECE.



PLATE I. Waukegan River. (Township 45, Range 23).

Photo J. A. Durrell, 1912.

DEPARTMENT OF THE INTERIOR, CANADA

Hon. W. J. ROCHE, Minister; W. W. CORY, Deputy Minister.

FORESTRY BRANCH—BULLETIN No. 41.

R. H. CAMPBELL, Director of Forestry.

TIMBER CONDITIONS

IN

LITTLE SMOKY RIVER VALLEY, ALTA.

AND

ADJACENT TERRITORY

Being a continuation of "Timber Conditions in the Lesser Slave
Lake Region" (Bulletin No. 29).

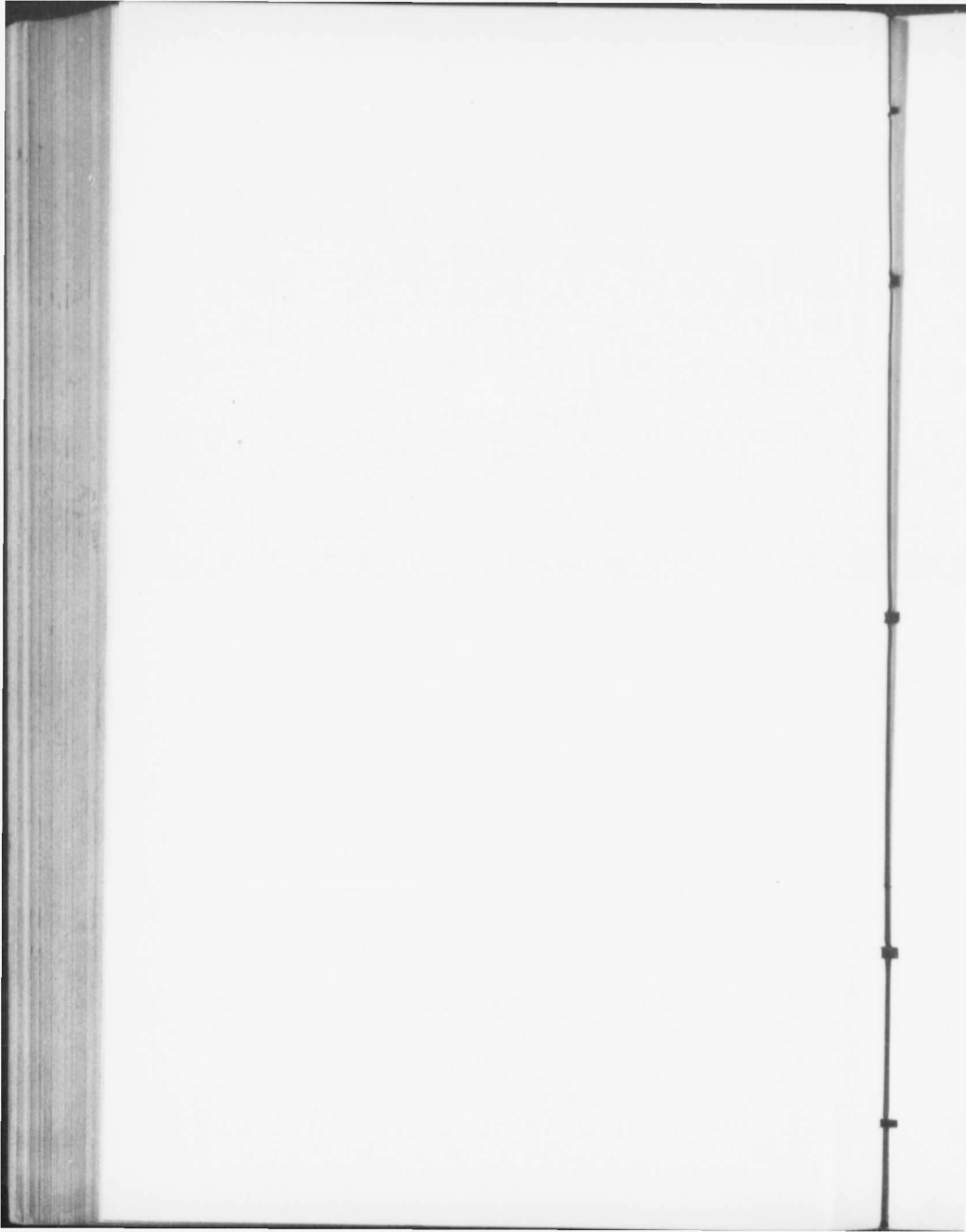
BY

J. ANDRÉ DOUCET

OTTAWA
GOVERNMENT PRINTING BUREAU

1914

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LETTER OF TRANSMITTAL.

FORESTRY BRANCH,
DEPARTMENT OF THE INTERIOR,
OTTAWA, May 10, 1913.

SIR,—I have the honour to submit herewith a report on the forest conditions of a tract of country south and southwest of Lesser Slave lake, in Alberta, and comprising the valley of the Little Smoky river and adjacent territory and to recommend its publication as Bulletin No. 41 of this Branch.

The country reported on comprises an area of over seven thousand square miles, lying between the Athabaska river, on the south, and Sturgeon lake, on the north, and immediately west of, and contiguous with, the country described in Bulletin No. 29 of this Branch. The survey was made during the summer of 1912 by a party under the direction of Mr. J. André Doucet, by whom the report is written.

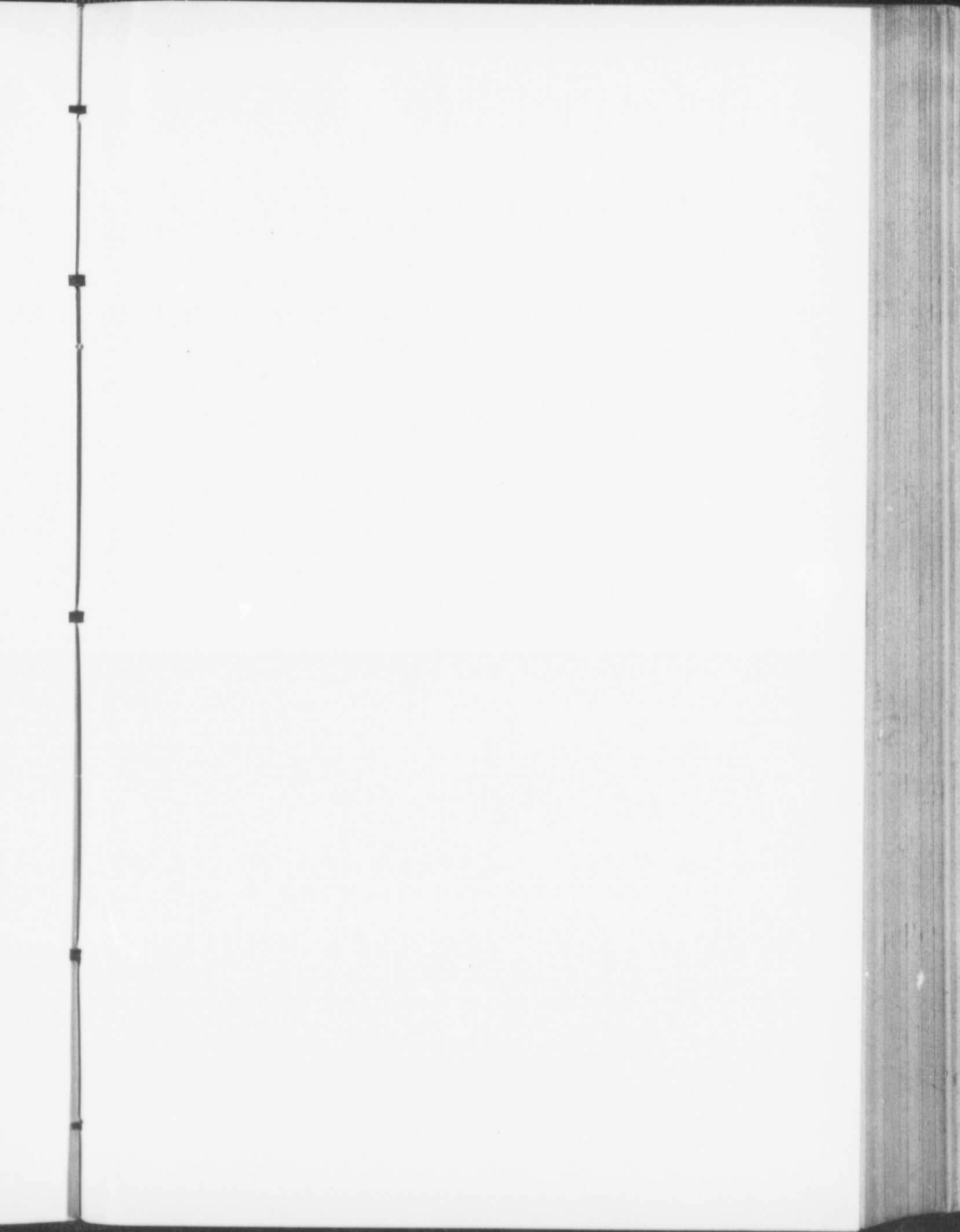
The greater proportion of the country examined was found to be forest land. Some tracts of very good timber were found, and, with adequate protection against fire for the next twenty-five years, the region should become a valuable forest area. The actual stand of merchantable timber at present standing on the area is given as approximately 4,590,000,000 feet, board measure, of spruce and pine, and 20,000,000 cords of poplar and birch.

Suggestions for the protection of the forests of the area against fire are given.

I have the honour to be, sir,

Your obedient servant,

R. H. CAMPBELL,
Director of Forestry.



FORESTRY BRANCH,
DEPARTMENT OF THE INTERIOR,
OTTAWA, May 1, 1913.

W. W. CORY, Esq., C.M.G.,
Deputy Minister of the Interior,
Ottawa.

SIR,—I beg to submit, with map accompanying, a report on the work done during the summer of 1912, completing the reconnaissance and delimitation survey of the proposed Lesser Slave Lake Forest Reserve in the Athabaska River and Lesser Slave Lake region.

I have the honour to be, Sir,
Your obedient servant,

J. ANDRE DOUCET,
Forest Assistant.

R. H. CAMPBELL, Esq.,
Director of Forestry,
Department of the Interior,
Ottawa.

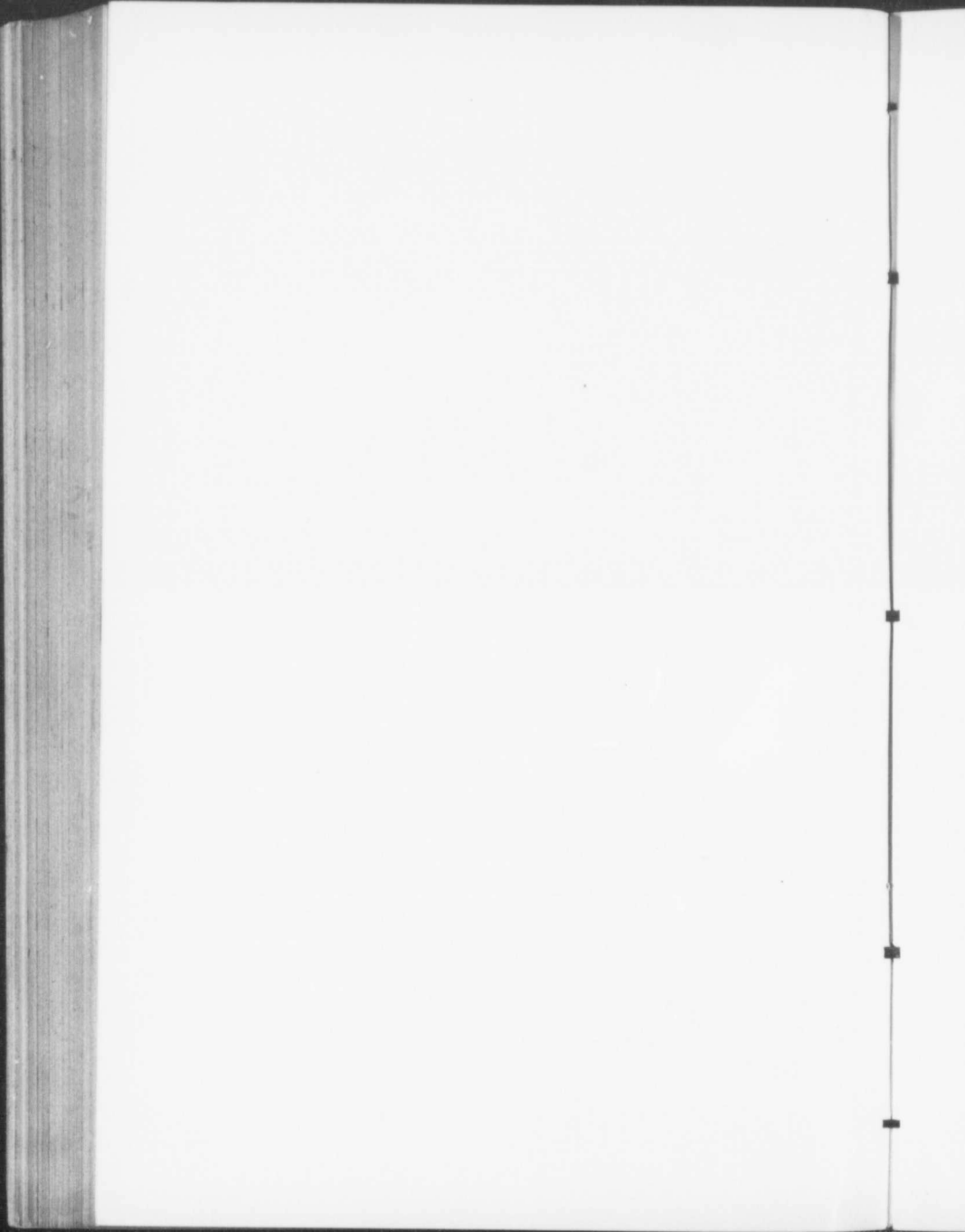


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TIMBER OF LITTLE SMOKY RIVER VALLEY

The boundary of the territory examined may be outlined as follows: On the south, a stretch of the Athabaska river from the northwest corner of Township 52, Range 22, west of the 5th meridian, to a few miles below the entrance of the Sakawatamau river; on the north, the summer road leading from Sturgeon lake to Lesser Slave lake, and the southwestern corner of the latter; on the east, the Driftpile river, the summit-plateau country forming the watersheds of West and East Prairie rivers, Driftpile, Sakwatamau and Freeman rivers, and the valley of Christmas creek. In accordance with instructions, inspection of the timber and soils was directed along, west of the Grand Prairie road, from the Athabaska river to the Waskabigan river, defining the western boundary, approximately between Ranges 12 and 13, west of the 5th meridian. Further instructions received at Whitecourt, October 30, added to the territory outlined above, the district (called Athabaska and McLeod River district) bounded on the west and north by the Athabaska river, east by the McLeod river from its entrance to the mouth of Wolfe creek, south by the Grand Trunk Pacific Railway from Wolfe creek to Medicine Lodge.

DISTRIBUTION AND METHODS OF WORK.

The survey to be made was of a purely reconnaissance and delimitation nature and as such required much moving and travelling, while it must be noted that the territory was very extensive.

On the route the main camp was always left in charge of the cook. The packing of the supplies through muddy trails, hampered by the bad condition of the weather, which was remarkably wet from July to mid-August, and by the discomfort caused to the horses by the flies, kept a man and six horses busy during June, July and August. Moreover, on account of the bad condition of the trails, it was necessary on many occasions, in order to safely lead the pack-ponies, to put two men at that work.

As a matter of fact, the packing of the supplies through such a country means a good deal of labour. Experience shows that under such conditions, especially when the number of horses is insufficient, the general progress and the accomplishment of the real object of the work is delayed considerably and this fact seems to add to the loneliness and distance of the journey.

From the beginning of June until August 5 the party moved along the Grande Prairie road. Side-trips were made at intervals of six to eight miles on both sides of the road. Among the most important of these were the trip east along the 16th Base Line. Here the sub-party ventured as far as the junction of that survey line with the Athabaska river. It might be of interest to say that these sub-parties are generally composed of three men, and two or three horses carrying provisions and bedding. One man walks ahead with an axe, another one leads the horses, while the forester in charge studies the conditions of the forest and the soil, climbing trees occasionally to form an idea of the surrounding country.

Another important trip was made west on the same base line, up the Little Smoky river to Range 23; a third, east of the Little Smoky to Buck lake, and a fourth, west, along the 17th base line, over the divide to the valley of the Simonette river.

Whenever it was possible and convenient, the base lines were used to penetrate back into the country. There, one can always locate his position, and by following these lines over ridges, and across valleys, a more correct idea of the character of the land and the nature of the soil can be obtained, than by following the water-

courses or the hunting trails only, as the courses of these latter lead through only the best part of the land and consequently give an unsatisfactory knowledge of the territory under inspection.

The poplar land was reached at Waskahigan river. From there, I made a flying trip to Sturgeon lake to obtain a general idea of the country.

On August 5, the work was directed to the east of the Little Smoky river, or, more properly, towards the eastern slope of the Swan Hills. The party proceeded across country, opening its own trail to the junction of the 18th Base Line with the east Snipe Lake trail. Then many important sub-trips were made. Those most worthy of mention are: (1) south, along the north branch of the Goose river to the fork; (2) east over the height of land, along the 17th Base Line, to East Prairie river.

On September 4, the party reached the winter road at the northeast corner of Snipe lake. A few days later a stationary camp was put up on the summer road, at West Prairie river, this being thirty miles farther. There a sub-party was organized



Photo J. A. Dowset, 1912.

PLATE 2.—Sub-party reaching Feeding Ground at Goose River.

and proceeded up East Prairie river, returning by way of Sucker Creek trail to Grouard, Alta., on September 14, after having covered a distance of over 100 miles. One of the objects of this trip was to connect work at Driftpile river, with Mr. D. R. Cameron's boundary of the previous year.

Mr. D. E. Clark returned to college from Grouard, by way of Athabaska Landing, on September 15. The departure of the assistant and the sudden leaving of the cook which occurred at that date greatly modified the party, which was thereafter composed of only three men. The progress of the work was, however, kept up, as the entire supplies and baggage could be carried along with the same number of horses, this resulting in easier moving. Following the summer road, the party reached Sturgeon lake on September 21. The Grande Prairie road was again used advantageously. We worked back on it, and camped at the Little Smoky river, at the junction of Hash Lake and Josephin River trails, on September 28. It was decided, in order not to leave unexamined any accessible part of the territory, to use an old trail

leading from this point, passing by Hash lake to the head of Sakwatamanu river (Eagle river), thence to Whitecourt, at the entrance of the McLeod river, thus working back our way on entirely new ground. In the course of the journey, this trail was found to have many ramifications or secondary blind hunting-trails which gave the opportunity to cover well, in a relatively short time, the large tract of land extending from the Little Smoky river to Christmas creek.

The main one is the Iosegun River and Pass Creek trail, located in the vicinity of the Canadian Northern Railway's location line direct to Grand Prairie. Information gathered from Indian hunters helped us to find these trails. Here, as elsewhere during the journey, many sub-trips of some interest were made. One led from the Little Smoky river, up along the Iosegun to the Atikkamek river; another one from the northeast corner of Hash lake to Bear lake. A third one was made from Shooting Prairie, on the Shooting river, down the Iosegun river to the Atikkamek and fifteen miles up this river, and a fourth—and very important one—from Shooting Prairie.



PLATE 3.—Young Mixed Forest of Pine and Spruce in Athabaska River Valley, Viewed from River-bank at Crossing. *Photo J. A. Doucet, 1911.*

over the summit to the Athabaska river, at the Canadian Northern Railway crossing. A fifth started from the head of Two Creek, on the south trail, reaching again the upper valley of the Athabaska river.

Many other trips were made, but it is unnecessary to enumerate them all. It was October 31, when the small party reached the Athabaska river, at a point opposite Whitecourt. The snow was then eight inches deep, creeks and small rivers were frozen over and on the Athabaska were drifting quantities of ice-cakes. Having been favoured with a couple of days of milder weather, we were enabled to swim the horses across on November 3. A sub-trip to McLeod lake and Christmas creek completed the examination work on the north side of the Athabaska river on November 11.

In accordance with further instructions received at Whitecourt in regard to the examination of the land lying between the McLeod and Athabaska rivers, the work

on that new section of territory was started immediately. The weather continued to be remarkably fine.

Here the main route followed is a pack-trail leading to Shiningbank lake. From Shiningbank lake to Edson, we could work from the wagon road. Along with the daily short trips, more especially directed to the boundary determination, many lengthy ones were made into the centre of the district; one, for example, led up the Athabaska river, to the Canadian Northern Railway crossing, along the right of way, advancing up the Windfall river; another, on the 15th Base Line, west of Shiningbank lake. From Edson, a last trip was made which covered the territory west of the Grand Prairie road. The party proceeded from Edson to Medicine Lodge. From this point, following the trail to Athabaska Crossing, it came back to Edson again on the Grand Prairie road. The work was completed and the party broke up December 23.

The main object of this above resumé of the distribution of the work is to show the route followed in making the examination of the territory under consideration. I deem this important. Besides, the party had to spend some time in putting out ground-fires spreading from camp-fires left by travellers or hunters along the routes, and, in order to complete the description of the every-day travels, examination-work and mapping, a detail diary has been written, giving particulars on the progress of the work, the topography, the nature of the soil and conditions of the timber.

During the season the party had fifty-eight main camps and thirty-nine sub-camps. The members of the party worked with the greatest harmony and ability, and I am grateful to them for the success of the work.

GENERAL CONDITIONS.

TOPOGRAPHY, SOIL AND TIMBER.

The Athabaska River and its Tributaries.—Amongst the many streams draining the territory examined, the Athabaska river, with its deep, wide and broken valley, is already known to be the most important. Its banks are from 100 feet to 300 feet high; its flat is narrow and cut by the riverbed.

There is no agricultural soil in any portion of this section of the Athabaska River valley. The surface of the land is mostly rough and broken, cut by deep ravines and gullies. This is particularly remarkable on the south side of the river. The soil is sandy and stony, and the few small pockets of deposited sandy loam or clay that could be found at the entrance of the creeks are not worthy of special consideration.

The country, however, improves gradually. Following the course of the river, the slope becomes more and more even, so that below the Sakwatamau river, especially in the vicinity of the valley of Christmas creek, the Athabaska river enters fair agricultural land.

Here the Athabaska valley was, at one time, very well timbered with the best of lodgepole pine, spruce, birch and poplar. Repeated fires have swept over it in such a way that there are, at the present time, only a few remaining patches of the old stand. These are found scattered along its flats, and mostly at the entrance of streams.

The young growth, however, is generally abundant over the old brûlé, to which large and healthy patches of forest, 35 to 50 years old, give a certain value. But no one will ever know how many millions of dollars worth of the national wealth, represented by the virgin forest, were turned into ashes by recurring fires and washed away with the best of the soil by the rapid current of the Athabaska river.

The Baptiste and Sakwatamau rivers, Christmas creek, Two creek, Pass creek and Marshhead creek are the main tributaries on the north side of the Athabaska river.

The Sakwatamau river, Two creek, Christmas creek and Pass creek, with their many feeders, drain a part of the south slope of the Swan Hills, which flatten down gradually and slowly to the high bank of the Athabaska river. A high spur-ridge stretching between this latter and the Little Smoky connects the Swan Hills to the eastern slope of the Rockies.

Quite large areas of spruce and tamarack muskegs stretch between ridges in the region covered by these streams. On ridges the soil is generally of a very sandy and stony nature and, as a whole, of practically no value for farming purposes.

On the south side, running down from the high divide which bends out the Athabaska and McLeod river are Windfall river, Oldman creek, Stony creek, Jack-pine creek, Beaver creek, Nose Hill creek and many others. They all drain a rough sandy, stony and broken country. It is the roughest part of the territory examined last season. The McLeod river is the main tributary for that section of the Athabaska river. From Wolf creek, the McLeod river cuts a very deep valley, mostly rough and strongly rolling; its entrance into the Athabaska forms a rich flat. Along its course are a few pockets of good soil, but on the slope, and particularly on the west slope, the soil is found to be mostly sandy, with gravel and stones. Repeated fires have swept over the valley of the McLeod river.

Little Smoky River and its Tributaries.—The Little Smoky river comes next. This river flows parallel with the Baptiste river in an easterly direction to Township 60, Range 20, west of the 5th meridian. Then, deviating from that direction by reason of the long spur-ridge connecting the Swan Hills to the Rockies, it turns suddenly north, to empty, a long distance below, into the Big Smoky river.

In following up the Little Smoky river from the Grande Prairie road, it looks at first as if it were running level, or nearly so, with the summit-plateau country. Its banks are relatively low, and behind are large areas of muskegs spreading along the river with a width of one to three miles, to lodgepole pine ridges. The flat is very narrow and fringed generally with merchantable spruce timber.

But below the elbow, the river has a well marked valley. Long slopes rise up from the bank gradually, by benches overspread with muskegs, this being a particular characteristic of the east slope. Lodgepole pine, which is at first the predominant species, gradually leaves the ground to the poplar. This section of the Little Smoky river was formerly notable for its splendid forest of lodgepole pine, spruce and poplar. Scattered on the slopes and mainly on the west slope are yet many valuable patches of forest of the old type. The east slope is remarkably well wooded with a thirty-five to seventy-five year old stand, which is very promising. The soil passes from sand, gravel and boulders to sandy loam with stone and gravel on ridges.

At the entrance of the Iosegun and Waskahigan rivers the conditions so far prevailing along the Little Smoky change again. The valley of the river widens, the slope flattens down and the river slowly flows through a gently undulating country, magnificently covered with a stand of poplar and birch seventy-five to one hundred years old. It is good arable land.

The main tributaries of the Little Smoky are, on the west side, Moose creek, coming from a high and broken range spreading along the east side of the Simonette river; the Waskahigan river, which marks a boundary between the forest land south, and the arable land north; and Tony Creek, draining a large area of high and broken land smoothing down when it approaches the Little Smoky river.

Flowing down the east slope are the Iosegun river, the Goose river and Carrot creek.

The Iosegun receives the waters of the Atikkamek, the Shooting and the Heavy Sound rivers coming from the height of land and the summit-plateau country. The Iosegun presents the most conspicuous break in the western slope of the Swan Hills. A long and narrow valley spreads from the entrance of the Heavy Sound river to the

Atikkamek river. This valley is enclosed on the east by a high spur-ridge circling in a southwesterly direction; on the west by another ridge gradually falling off and running in a northwesterly direction from Hash lake, between the Little Smoky and Iosegun rivers.

There is much merchantable timber in the valley of the Iosegun river, around Hash lake and Bear lake.

The Goose river rises some distance back in the centre summit-plateau of the Swan Hills, and leaving the pine and sandy land a little below the fork, enters a wide undulating arable land, richly wooded with poplar and scattered small patches of spruce. Carrot creek drains a large tract of good agricultural land extending from Snipe lake to the Goose river. With the exception of a few patches of spruce, this tract is mostly wooded with poplar and birch. The land is undulating, rising up gently to a high elevation between the Goose river and its north branch. The muskges here represent about fifteen per cent. The grass is plentiful under the heavy cover of birch and poplar.



Photo J. A. Doucet, 1912.

PLATE 4. —View Looking Southwest, Upper End of Snipe Lake.

Snipe lake is situated at the foot of the northwest corner of the Swan Hills. Dry, level or gently undulating land extends from its west side; around the north end spread quite large areas of muskeg and swamp.

West Prairie, East Prairie and Driftpile Rivers.—These are three important rivers emptying into Lesser Slave lake. The watersheds between these consist of low ridges, gradually declining as they approach the lake. The most remarkable of these is a high sandy ridge between the Driftpile and the East Prairie rivers, forcing the latter to make a big curve west. The Driftpile river flows down between high banks. East Prairie river comes out from the hill six miles below the fork. Somewhere at the top of Township 70 the East Prairie river opens up a wide valley, as does the West Prairie river, both emptying their waters into Lesser Slave lake after winding through the large basin extending at the west end of the lake.

Over the districts occupied by the last three rivers spreads, from the west end of Lesser Slave lake, a valuable poplar and birch forest of 50 to 100 years of age occupy-

ing their entire lower valleys. Back on the hill slope, the type changes to spruce, pine, poplar and birch, while behind, on the height of land and the summit-plateau country, the lodgepole pine is the omnipresent species with large areas of muskegs.

THE FOREST GROWTH.

It is not believed necessary to report at length on the forest growth. Mr. D. R. Cameron, in his report on Timber Conditions around Lesser Slave Lake (Forestry Branch Bulletin No. 29) has fully developed that aspect. Practically the same region is here dealt with, so it is quite natural that the same species are found.

The different types given in Bulletin No. 29 have been found here presenting about the same character. However, owing probably, to a better drainage of the soil, and less frequent fires in remote period, resulting in less difference in the quality of the soil, the different types occupying the western section of the Swan Hills were found in better conditions as regards health, density and yield. This is particularly remarkable for the lodgepole pine and poplar. The white spruce does not present any difference. The muskeg type is always the same wherever it is met. The jackpine was found in very small quantity.

The balsam fir loses here the importance that it was given in the height of land type. As a fact, it is a very inferior species considered from a commercial point of view.

The different species with which we have to deal are:—

1. Lodgepole pine.
2. White spruce.
3. Poplar.
4. Tamarack.
5. Black spruce.
6. Birch.
7. Balsam fir.
8. Jack Pine.

1. The lodgepole pine (*Pinus Murrayana*) is an omnipresent species in the western section of the Swan Hills. It is frequent on the lower north slope of the Athabaska river; it occupies, in pure stand or in admixture with the black spruce, the upper north slope of this river and the summit-plateau country across the Swan Hills, and extends from the Swan Hills to the Rockies. The growth in the Athabaska and McLeod River district, south of the Athabaska river, includes over 60 per cent of lodgepole pine. Under ordinary conditions, on slopes or well drained lands, this species reaches a merchantable size at about 100 years old, with a diameter of eight to twenty inches at breast-height. Its average height varies from 70 to 100 feet. It matures early, at the approximate age of 125 years.

The lodgepole pine is found in pure stand on the height of land, on slopes in admixture with spruce and poplar, and with the black spruce forming the summit-plateau type.

2. The white spruce (*Picea canadensis*) occurs in pure stand (or practically so) on river flats, characterized usually by the presence of large cottonwood, and on well drained upland as remnant patches of the virgin forest. In these conditions, white spruce of 150 years old may run from 10,000 to 35,000 feet, board measure, per acre. The white spruce is also found mixed with lodgepole pine and poplar on high slopes and scattered amongst poplar in the poplar type. Wherever white spruce is found in admixture with other species it rapidly outgrows them, and, as it is the longest-lived species, it is bound to replace the others. This has been observed on many occasions.

3. Poplar (*Populus tremuloides*).

A forest of poplar, as a rule, is a forest of second growth, which has replaced white spruce after fires. In many cases these new forests can be regarded as permanent, especially where the soil is good. A forest of aspen poplar is ordinarily characterized by the presence of a good percentage (10 to 25 per cent) of balsam poplar, which grows generally in the moist spots, or where the soil is the richest and deepest.

In ordinary conditions a forest of poplar of 75 to 100 years of age will give, at a conservative estimate, twenty cords of pulpwood per acre. Poplar of that age measures from five to twenty inches in diameter at breast-height, and averages from forty to seventy feet high. This species is also found in admixture with white spruce and balsam poplar on uplands, with lodgepole pine and white spruce on slopes and even on the height of land. In this last situation it is a poor tree, living but a very short time.

4. Tamarack (*Larix laricina*).

Good-sized tamaracks are seen in deep wet soil. It is there in pure stand or mixed with white and black spruce. It takes about 150 years to grow a tamarack tree of 10 to 24 inches at breast-height. At that age the height will be from 60 to 90 feet. A good deal of tamarack was found in the vicinity of Iosegun and Atikamek rivers and Hash lake, and in the swampy basin formed by the junction of the many branches of Muskeg river and Trout creek in the McLeod and Athabaska district. On really swampy land tamarack, alone or mixed with the black spruce, makes a poor figure; it grows very slowly; on the driest spot of the swamp it reaches pole size.

5. Black Spruce (*Picea mariana*).

The black spruce is the predominant species of the muskegs. In pure stand or in admixture with the lodgepole pine it occupies the summit-plateau country. This species on account of its location is a tree of the slowest growth, and it is only under the best conditions that black spruce will reach log size, and even then in a small quantity. In its natural state it measures from three to seven inches in diameter at breast-height at 150 to 200 years of age.

6. Birch (*Betula resinifera*).

Birch is especially seen on the north slope of the Swan Hills, at the transition zone between the pine and the poplar. It occurs occasionally in pure stand, but ordinarily in admixture with pine, spruce and poplar or with poplar alone. The largest birch area exists between the Driftpile and East Prairie rivers. Birch matures at about 75 years of age, measuring from five to fourteen inches at breast-height. Its height is from thirty to fifty feet. The Athabaska valley has borne in the past a rich crop of birch, while to-day it can be seen only as pole-stuff.

7. Balsam Fir (*Abies balsamea*).

As has been already stated, the balsam fir should not be considered of much merchantable value. This species is found with heavy spruce as undergrowth, also in small quantities with lodgepole pine and spruce, which form the height-of-land type. It grows to eighteen inches at breast-height; trees of this size, however, are always defective from heart-rot.

8. Jack Pine (*Pinus Banksiana*).

A small quantity of jack pine occurs in the lower valley of the Athabaska river in the vicinity of Sakwatamau river and Christmas creek, and across the Swan Hills, scattered along high banks of rivers, or in small patches, on sandy ridges in the neighbourhood of the Iroquois and Little Smoky rivers. Over the area that we have to deal with, this species can be regarded as a negligible quantity.

FIRES.

Of the total area of land examined last season (approximately 7,330 square miles) it is considered that 740 square miles, or nearly eleven per cent, has been fire-swept during the last twenty years. This area should not be looked upon as yet re-stocking.

Many brûlés occurred together to form this area of 740 square miles. They present different sizes varying from approximately 8 to 250 square miles. The specific conditions of these brûlés, their localities and respective areas will be given later on in reporting the country by blocks.

If one considers the immense area of land only re-stocking or covered with a reproduction not exceeding thirty years of age (an area which will be found to cover about 1,400 square miles), added to the 740 square miles of burnt land, one is brought to the conclusion that about 2,100 square miles, or over twenty per cent of the whole country, was swept by fires during the last fifty years.

It has been also estimated that only about 1,760 square miles, or 23 per cent of the 7,330 square miles examined, have been free from fires during the last 100 years, and of these 1,760 square miles, only 250 could be considered as bearing a mature cover.



Photo J. A. Doucet, 1912.

PLATE 5.—Isogun River, Showing Strip of Spruce and Tamarack Timber. (Township 63, Range 9)

Fires do not seem to be less imminent to-day than they were twenty-five or fifty years ago. The only difference is that there is less to be burnt. The past, in connection with these facts and considerations, teaches its lessons, it is true, but the lessons to be derived are useful only insofar as they are applied to provide for the future.

REPRODUCTION.

Details of the reproduction will be given in the presentation of the country by blocks. But for general information, it can be kept in mind that the reproduction is coming in plentifully over the burnt areas, with the exception of the muskeg brûlés, which are very slow to recover, and over areas where repeated fires have destroyed the seed and the fertile soil itself.

REPORT ON THE COUNTRY BY BLOCKS.

The figures given in the course of this part of the report on the country divided by blocks should be regarded as merely approximate. It is not supposed that in a reconnaissance survey absolutely correct data could be obtained. The lines of the blocks were laid down with the greatest care, and the general conditions of the different blocks are well known. Consequently the information resulting will be sufficiently correct to give a good idea of the actual conditions of the country. This particular way of presenting the conditions of the timber and the soil seems to offer advantages well worthy of the attempt.

TABLE No. 1—

No. of Block.	Approx. Area.	Soil.	Species and Percentage.	Density.	Age.
	Ac.			%	Yrs.
1	450,000	Sand, sandy loam and clay loam.	Poplar 60% Birch 40%	100	75 to 100
5	52,000	Sandy loam and clay.	Poplar 80% Birch 10% Spruce 10%	80	75
13	370,000	Sandy and clay loam.	Poplar 80% Birch 10% Spruce 10%	80	75
Totals,....	872,000	.....	.....	.....	.....

The number of blocks on the map corresponds with those given in the tables. Each table contains many blocks which have been classified as being of a similar nature.

This table gives an area of 1,362 square miles of poplar land. The percentage of coniferous trees is negligible. The total production of poplar and birch would amount to 17,336,000 cords of wood. This is a second-growth forest of 75 to 100 years old; it covers generally good arable land. The boundaries of the proposed reserve include a considerable portion of Block 1; here the sandy nature of the soil was the reason for the inclusion. Over the area comprised in these blocks the poplar and birch were found remarkably sound.

POPLAR.

No. of Block.	Percentage of Muskeg.	Diameter at Breast-height.	Average Cut per Acre M Ft. B. M. and Cords.	Total Cut.	
				M Ft. B.M.	Cords.
1	5	In. 5 to 18	20 cords.	.....	9,000,000
5	0	5 to 14 (Poplar & Birch) 3 to 5 (Spruce)	18 cords.	.....	936,000
13	10	5 to 20 (Poplar & Birch) 5 to 14 (Spruce)	20 cords.	.....	7,400,000
Totals.....				.....	17,336,000

In this table, blocks 2, 3, 11, 20 and 21 are held under timber licenses. They are patches of the virgin forest, containing scattered large poplar. The average run given is conservative. Blocks 9, 10, 14, 15 and 16 are small patches of the original spruce, but, owing, probably, to their small size affording less protection from the

TABLE No. 2—

No. of Block.	Approx. Area.	Soil.	Species.	Density.	Age.
	Ac.			%	Yrs.
2	34,000	Sand and clay loam....	Spruce Poplar	80	150-200
3	7,680	Sand and clay loam....	Spruce Poplar	80	150-200
11	6,400	Sand and clay loam....	Spruce Poplar	80	125-200
12	5,120	Sand and clay loam....	Spruce Poplar	80	125-200
9	1,000	Sandy loam	Spruce Poplar	70	125-200
10	2,000	Sandy loam	Spruce Poplar	70	125-200
14	1,000	Sandy loam	Spruce Poplar	80	100-200
15	300	Sandy loam	Spruce Poplar	90	125-200
16	1,280	Clay loam	Spruce Poplar	70	150-200
20	12,800	Sandy loam.....	Spruce Poplar	80	150-200
21	13,000	Sandy loam	Spruce Poplar Pine	80	150-200
Totals..	84,580	.....	.....	.....	.....

winds, they present more openings and wind-falls than in the first mentioned. This timber is found close to drivable water-courses.

The table shows 132 square miles giving about 954,000,000 feet, board measure.

OLD SPRUCE FOREST.

No. of Block.	Percentage of Muskeg.	Diameter at Breast-height.	Average Cut per Acre.		Total Cut.	
			M Ft. B.M.	Cords.	M Ft. B.M.	Cords.
2	5	8 to 38	12	.....	408,000	.....
3	0	8 to 38	12	.....	92,000	.....
11	5	6 to 24	10	.....	64,000	.....
12	5	6 to 24	10	.....	51,000	.....
9	0	6 to 28	10	.....	10,000	.....
10	0	6 to 24	10	.....	20,000	.....
14	0	5 to 24	10	.....	10,000	.....
15	0	8 to 24	12	.....	3,600	.....
16	2	8 to 24	10	.....	12,800	.....
20	0	8 to 24	12	.....	153,000	.....
21	5	5 to 24	10	.....	133,000	.....
Totals..	.....	.....	.....	.....	954,400	.....

The timber here dealt with is a young forest of 75 to 100 years old, where about 60 per cent of the stand of pine and spruce is below the merchantable size (8 in.). With the exception of blocks 22, 17 and 32, the poplar in admixture with the pine and spruce has not been taken into account, as being in very small quantity, and will in a very short time be replaced by the other species. In block 17, on the north slope of the Iosegun river, and on the slopes of the Goose river are many patches of old mature spruce, which were considered in the general average.

TABLE No. 3—

NOTE—Of the timber included in this table about

No. of Block.	Approx. Area.	Soil.	Species and Percentage.	Density.	Age.
	Ac.			%	Yrs.
22	26,600	Sandy loam and sand.	Pine 5% Spruce 20% Poplar 75%	100	75 to 100
17	124,600	Sandy loam and sand with gravel.	Pine 40% Spruce 10% Poplar 20% Black Spruce 30%	90	75
48	5,120	Sandy loam or sand with gravel.	Spruce 60% Pine 35% Poplar 5%	100	75 to 100
49	5,120	Sandy loam or sand with gravel.	Pine 50% Spruce 45% Poplar 5%	100	75 to 100
50	13,000	Sandy loam or sand with stones	Pine 40% Spruce 40% Poplar 5% Tamarack 5% Black Spruce.	100	75 to 100
32	19,000	Sandy loam	Poplar 40% Spruce 50% Birch 10%	100	75
Totals..	133,440	.....	.....	.....	.....

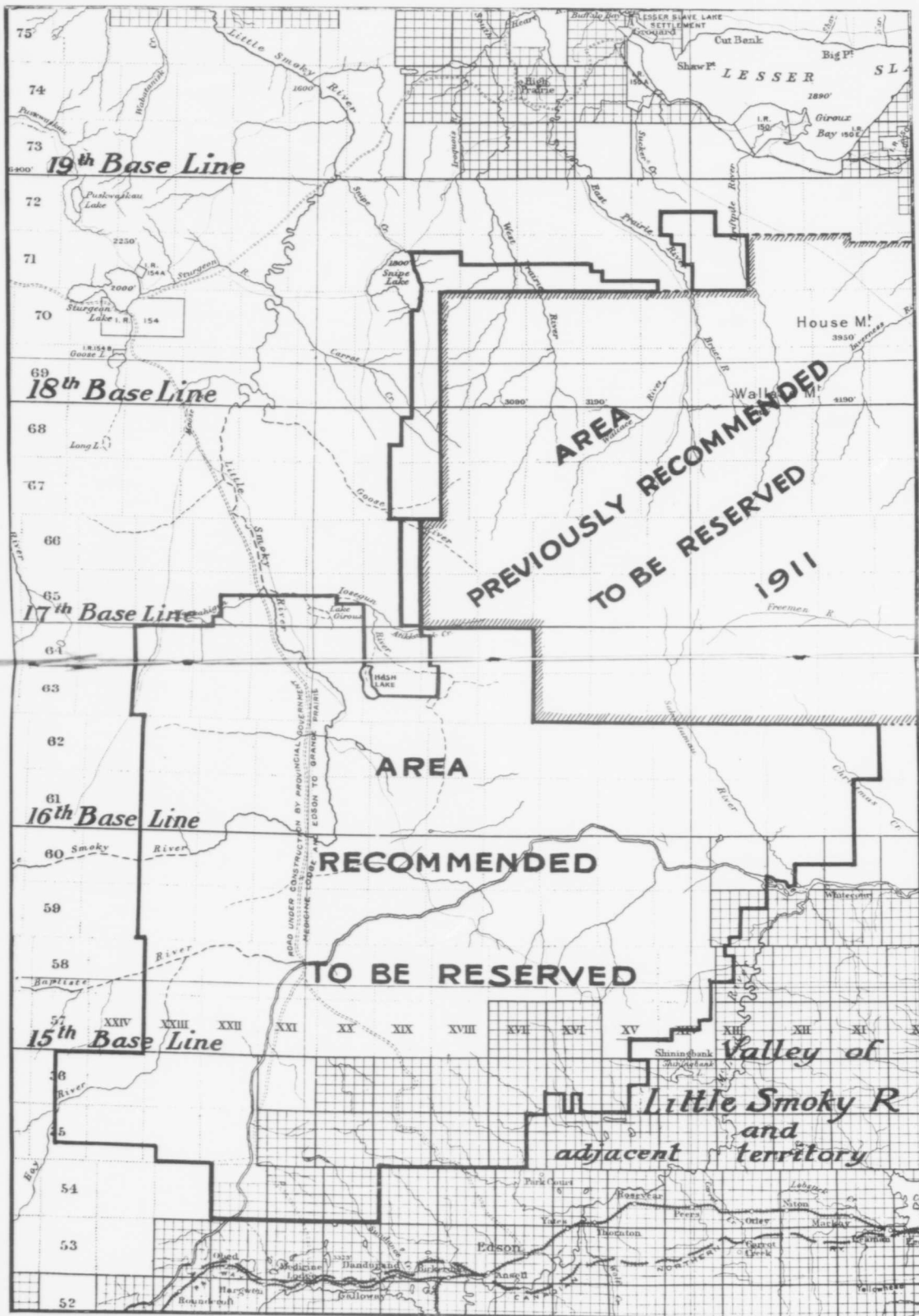
Blocks 17 and 50 contain many muskegs covering about 25 to 30 per cent of their area. As a rule, the soil is a poor sandy loam or sand with gravel and boulders; the land is markedly undulating.

The total area represented by these six blocks is 304 square miles. The quantity of the merchantable timber is 442,980,000 feet, board measure, and 658,800 cords.

YOUNG MIXED FOREST (A).

forty per cent is merchantable. Compare Table 7.

No. of Block.	Percentage of Muskeg.	Diameter at Breast-height.	Average Cut per Acre.		Total Cut.	
			M Ft. B.M.	Cords.	M Ft. B.M.	Cords.
22	5	In. 5 to 16 (Pine and Spruce). 8 to 16 (Poplar.)	2½	5	66,000	133,000
17	30	3 to 15	2½	3	311,500	373,800
48	15	3 to 14	3		15,360	
49	10	3 to 14	1		5,120	
50	25	3 to 14	2		26,000	
32	5	5 to 15	1	8	19,000	132,000
Totals					442,980	658,800



19th Base Line

18th Base Line

17th Base Line

16th Base Line

15th Base Line

AREA
PREVIOUSLY RECOMMENDED
TO BE RESERVED
1911

AREA
RECOMMENDED
TO BE RESERVED

Valley of
Little Smoky R
and
adjacent
territory

ROAD UNDER CONSTRUCTION BY PROVISIONAL GOVERNMENT OF MICHIGAN FROM EDSON TO GRAND PRAIRIE

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XXIV XXIII XXII XXI XX XXIX XVIII XVII XVI XV XIII XII XI X

Edson
Shiningbank
Houghton
Peers
Orver
Ston
Markey
Graham
Yellow Lake
Edson
Houghton
Peers
Orver
Ston
Markey
Graham
Yellow Lake

TABLE No. 4—

No. of Block.	Approx. Area.	Soil.	Species and Percentage.	Density.	Age.
	Ac.			%	Yrs.
18	29,440	Sand or boulder-clay...	Pine 75% Spruce 20% Balsam Fir 5%	90	125
52	19,200	Sand or boulder-clay...	Pine 60% Spruce 30% Balsam Fir 5% Poplar 5%	100	125
73	19,200	Sand or boulder-clay...	Pine 75% Spruce 25%	90	150
82	1,600	Sand and boulder-clay..	Pine 100%	100	150
Totals....	69,440	.....		

Table 4 refers to the height-of-land type of the lodgepole pine. It is the best of the kind met with last season.

Block 18 occupies the high range lying between Carrot creek and the north branch of the Goose river on the west, and West Prairie river on the east. It is a very high rolling divide.

Block 50 is situated on the crest of a high ridge coming from the north, and running between the head-waters of Two creek, Sweathouse creek and Heavy Sound river.

Block 73 is located on the west slope of the Athabaska river, in the rough upper valley of the Windfall river and Oldman creek.

PINE.

No. of Block.	Percentage of Muskeg.	Diameter at Breast-height.	Average Cut per Acre.		Total Cut.	
			M Ft. B.M.	Cords.	M Ft. B. M.	Cords.
18	10	5 to 22	10	.....	290,000	.....
52	10	5 to 22	10	.....	192,000	.....
73	15	5 to 22	10	.....	192,000	.....
82	0	8 to 24	30	.....	48,000	.....
Totals....	.....	.....	.....	.....	722,000	.....

Block 82, located at the head of Muskeg river, is the oldest of all, being 150 years old. It is the best lodgepole pine yet seen.

Blocks 73 and 82 should be regarded as carrying a mature forest. Blocks 18 and 52 carry a forest of great value, but it has not yet reached the maximum of production.

The total area given in the table is 108 square miles, the total production 722,000,000 feet, board measure.

TABLE No. 5—

No. of Block.	Approx. Area.	Soil.	Species and Percentage.	Density.	Age.
	Ac.			%	Yrs.
26	280,360	Sand or boulder clay...	Pine 40% Spruce 30% Birch 15% Poplar 15%	90	75 to 100
31	64,000	Sandy loam, clay loam, gravel.	Spruce 70% Tamarack 5% Poplar 20% Black Spruce.	95	75 to 100
55	23,080	Sand and boulders or gravel.	Spruce 50% Pine 40% Poplar 5% Black Spruce.	90	75 to 100
63	15,300	Sand and gravel.....	Pine 70% Spruce 30%	90	75 to 100
66	2,560	Sand and gravel.....	Pine 75% Spruce 25%	90	125
70	1,280	Sand.....	Pine 40% Spruce 60%	100	125
80	36,600	Sand and stones,	Pine 75% Spruce 25%	40	125
88	100	Sand.....	Pine 20% Spruce 75% Poplar 5%	80	125
89	50	Sand.....	Pine 75% Spruce 25%	80	125
Totals....	423,270	.....	.....	.....	.....

The above table gives us approximately 660 square miles of young mixed forest of lodgepole pine, spruce, poplar and birch, amounting to 1,232,500,000 feet, board measure, of coniferous timber and 1,249,200 cords of poplar and birch.

Block 26 is by far the most important, both regarding size and future possibilities. It occupies the north slope of Wallace mountain and approximately all the high sloping and rolling land crowning the northwestern summit-plateau of the Swan Hills. The pine and spruce trees are healthy and will soon overcome the crop of poplar and birch, which is about mature. Needless to say, the soil is very sandy.

Block 31 is another very important one. It occupies a spruce ridge running from Hash lake in a northwesterly direction between the Iosegun and the Little Smoky rivers. The forest here is very dense. A large percentage of the spruce is under eight inches at breast-height, but it is growing up rapidly. The forest is about 100 years old.

MIXED FOREST MOSTLY ABOUT 100 YEARS OLD.

No. of Block.	Percentage of Muskeg.	Diameter at Breast-height.	Average Cut per Acre.		Total Cut.	
			M Ft. B. M.	Cords.	M Ft. B. M.	Cords.
26	15	3 to 14 (Pine & Spruce)	2	.....	560,000	.....
			.....	4	.....	1,121,200
31	10	5 to 14 (Spruce & Tamarack)	6	.....	384,000	.....
			.....	2	.....	128,000
56	10	5 to 14	5	.....	118,400	.....
63	15	5 to 14	5	.....	76,500	.....
66	0	5 to 16	5	.....	12,800	.....
70	5	5 to 18	5	.....	6,400	.....
80	15	5 to 18	2	.....	73,200	.....
88	0	5 to 20	8	.....	800	.....
89	0	5 to 20	8	.....	400	.....
Totals	.....	.....	.....	.....	1,232,500	1,240,200

In all the other blocks given in the same table the small quantity of poplar found has not been taken into account. Block 56, situated at the east slope of the Sakawatamau river, gives a larger percentage of spruce than lodgepole pine, while block 63, which is on the west slope of the same river, gives 70 per cent of pine to 30 of spruce. The first is better drained and will grow up a very heavy forest.

Block 80 is located on the south slope of Shining Range. Fires which swept that range some twenty years ago have caused much damage here, burning, in spots, about 40 per cent of the area of the 56 square miles contained in this block. This explains the low average of 2,000 feet, board measure, per acre given in the table. Spruce occurs mostly in valleys. The soil is very sandy and stony and the land rough and broken. Blocks 66, 70, 88 and 89 are only small patches of pine, with a small percentage of spruce and scattered poplar in admixture.

TABLE No. 6—

No. of Block.	Approx. Area.	Soil.	Species and Percentage.	Density.	Age.
	Ac.			%	Yrs.
4	1,900	Sandy and clay loam...	Spruce	70	150 to 200
28	7,680	Sand and sandy loam...	Spruce Pine (scat.)	80	150 to 200
30	2,560	Sandy and clay loam ..	Spruce Tamarack	80	150 to 200
33	400	Sandy loam.....	Spruce	80	150 to 200
34	400	Sandy loam.....	Spruce	80	150 to 200
35	80	Sandy loam with stones	Spruce	80	150 to 200
36	720	Sandy with boulders...	Spruce	80	150 to 200
37	1,000	Sandy with boulders...	Spruce 95% Poplar	70	150 to 200
38	300	Sandy loam	Spruce 95% Poplar	80	125 to 150
39	300	Sandy loam with gravel	Spruce	90	150 to 200
40	1,280	Sandy loam with gravel	Spruce 95% Poplar	90	150 to 200
41	1,900	Sandy with gravel.	Spruce 90% Tamarack 5% Poplar Balsam Fir.	80	150 to 200
42	500	Sandy with gravel.....	Spruce 95% Tamarack 5%	80	150 to 200
44	500	Sandy loam	Spruce	80	150 to 200
77	1,000	Sandy loam with gravel and stones.	Spruce	80	150 to 200
78	2,000	Sandy with stones.....	Spruce 85% Pine 15%	70	150 to 200
47	11,600	Sandy loam with stones or gravel.	Spruce 75% Pine 10% Tamarack 15%	80	150 to 200
61	11,500	Sandy loam with stones	Spruce 85% Pine 10% Poplar 5%	80	150 to 200
62	7,680	Sandy loam with stones	Spruce 90% Poplar 10%	80	150 to 200
66	22,400	Sandy loam or sand with stones.	Spruce 85% Pine 20%	80	150 to 200
70	1,280	Sandy loam	Spruce	70	150 to 200
74	1,600	Sandy loam.....	Spruce 95% Pine 5%	70	150 to 200
75	800	Sandy with gravel.....	Balsam Fir 50% Spruce 50%	70	150 to 200
Totals....	79,980	.....		

MATURE SPRUCE.

No. of Block.	Percentage of Muskeg.	Diameter at Breast-height.	Average Cut per Acre.		Total Cut.	
			M Ft. B.M.	Cords.	M Ft. B. M.	Cords.
4	4	8 to 30	12	.....	22,800	.....
28	15	8 to 24	12	.....	92,160	.....
30	20	8 to 30	15	.....	38,400	.....
33	8 to 24	12	.....	4,800	.....
34	8 to 30	15	.....	6,000	.....
35	8 to 30	15	.....	1,200	.....
36	8 to 30	15	.....	10,800	.....
37	8 to 35	15	.....	15,000	.....
38	5 to 20	10	.....	9,000	.....
39	8 to 24	15	.....	4,500	.....
40	8 to 30	15	.....	19,000	.....
41	8 to 30	15	.....	28,000	.....
42	8 to 24	12	.....	6,000	.....
44	8 to 30	21	.....	10,000	.....
77	8 to 30	20	.....	20,000	.....
78	8 to 30	12	.....	24,000	.....
47	15	8 to 24	12	.....	139,000	.....
61	8 to 24	12	.....	138,000	.....
62	8 to 35	15	.....	115,200	.....
66	8 to 30 10 to 26	10	.....	224,000	.....
70	8 to 30	10	.....	12,800	.....
74	8 to 30	10	.....	16,000	.....
75	8 to 20	8	.....	6,400	.....
Totals	963,060	.....

The mature patches of spruce presented in this table cover approximately 124 square miles and give a total production of 963,060,000 feet, board measure. The lodgepole pine represented a very small percentage on this table, since it is, practically, only found in blocks 47, 66 and 61, representing 10 per cent in the first two and 20 per cent in the latter. It is interesting to note that this species was formerly in larger quantity here and even prevalent in Block 61, but arriving at maturity at an early age compared with the longevity of the spruce, it has partly decayed, leaving the ground to the spruce. The poplar is usually found scattered through these remnant patches of the old forest; it always represents less than 10 per cent and, therefore, has not been taken into account.

This timber may be considered as mature, and, consequently, is beginning to be wind-thrown; the main cause of this is due to a root-rot of the oldest trees. This timber is also very accessible. The Little Smoky, Iosegun, Atikkamek and Sakwatamau rivers in an ordinary freshet would enable it to be floated down to suitable points. Block 30 is remarkable for its large quantity of tamarack; it occupies the flat of the Iosegun river. Its larger body is on the point of land formed by the entrance of the Atikkamek into the Iosegun. Spruce comes first in narrow strips along the river banks, while large tamarack trees border the tamarack swamp spreading back to the slope.

Blocks 61, 62 and 70 are held under timber licenses.

Scattered along the flat of the Little Smoky, from its elbow up, are many valuable patches of spruce; all these have been taken account of in Block 44. These patches are mostly found in the neighbourhood of the elbow and farther up across Range 22.

The flat of the Athabaska river also contains many patches of spruce. It is rather difficult to estimate that timber, but I deem it safe to say, that, if it spreads regularly along the river flats, we would have strips on both sides of the river of half an acre wide and running easily 10,000 feet, board measure, per acre.



PLATE 6.—Forest of Large-sized Poplar, north of Waskahigan River. (Township 65, Range 22.)

Photo J. A. Doucet, 1912.



PLATE 7.—Lodgepole Pine on Height of Land between the Goose and West Prairie Rivers. (Townships 68 and 69, range 18, west of the 5th meridian.)

Photo J. A. Doucet, 1912.

TABLE No. 7—

NOTE:—Very little (only about ten per cent) of the timber included in this table is merchantable.

No. or Block.	Approx. Area.	Soil.	Species and Percentage.	Density.	Age.
	Ac.			$\frac{100}{\%}$	Yrs.
13A	57,600	Sandy loam with stones and gravel.	Spruce 50% Pine 20% Poplar 30%	70	75
57	64,000	Sandy and clay loam...	Spruce 50% Poplar 50% Pine (scat.)	80	75 to 100
65	57,600	Sandy soil and stones...	Spruce 40% Pine 20% Poplar 30% Birch 10%	70	50 to 100
79	96,000	Sandy with gravel or stones.	Pine 60% Spruce 25% Poplar 10% Tamarack Birch 5%	100	50 to 75
Totals ...	275,200	.....	.....	.....	.....

Table 7 presents a young mixed forest of spruce, pine, poplar and birch. In the present case 90 per cent of the coniferous trees are under 8 inches in diameter at breast-height. However, the 430 square miles covered by the four blocks given in the table would give 275,200,000 feet, board measure, of merchantable spruce and pine, and 765,600 cords of poplar and birch.

Block 13A occupies a high and rolling range stretching along the Simonette river.

Block 57, which is located in the valley of Christmas creek, is apparently covered with poplar, but spruce which came up later and, consequently, is mostly pole-stuff is now rapidly outgrowing the poplar.

YOUNG MIXED FOREST (B).

chantable, whereas in Table 3, 'Young Mixed Forest (A)' about forty per cent is

No. of Block.	Percentage of Muskeg.	Diameter at Breast-height.	Average Cut per Acre.		Total Cut.	
			M Ft. B.M.	Cords.	M Ft. B.M.	Cords.
13A	20	In. 3 to 12 (Spruce & Pine) 4 to 14 (Poplar)	1	2	57,600	113,200
57	10	3 to 14 (Spruce) 5 to 16 (Poplar)	1	5	64,000	320,000
65	15	3 to 14 (Spruce & Pine) 5 to 16 (Poplar & Birch)	1	4	57,600	330,400
79	15	3 to 12	1		96,000	
Totals					275,200	765,600

Block 65 covers the north slope of the Athabaska from Pass creek to the valley of the Sakwatamau river exclusively. It has been drawn to include approximately all the mixed forest. Farther back north the type changes to mostly pure pine. There are many burned spots all through this block.

Block 79 is covered with a very promising forest of pine and spruce containing a small percentage of poplar and birch. It occupies a large tract of the valley of the Athabaska river west of the Grande Prairie road. The young forest is very dense and very healthy.

TABLE No. 8—

No. of Block.	Approx. Area.	Soil.	Species, and Percentage.	Density.	Age.
	Sq. Miles.			%	Yrs.
23	40	Sand and clay with boulders.	Pine 60% Spruce 30% Poplar 10%	60	50 to 75
43	825	Sandy and stony.	Pine 40% Spruce 30% Poplar 20% Birch 5% Tamarack 5%	80	35 to 50
54	824	Sandy and stony.	Pine 60% Spruce 30% Poplar 5% Tamarack 5%	90	35 to 75
67	125	Sandy and stony.	Pine 60% Spruce 30% Poplar 10%	90	35 to 60
83	18	Sandy and stony.	Pine 70% Spruce 30%	100	45
84	10	Sandy and stony.	Pine 70% Spruce 30%	100	45
85	40	Sandy and stony.	Pine 70% Spruce 30%	100	55
86	100	Sandy and stony.	Pine 40% Spruce 30% Tamarack 10% Poplar 20%	90	35 to 75
87	80	Sand and boulder-clay.	Pine 50% Spruce 20% Tamarack 10% Poplar 20%	70	35 to 75
Totals	2,062				

The area covered by the pole-wood forest, which is not considered to be, at present, of practical commercial value is approximately 2,060 square miles, or about 30 per cent of the whole area. The lodgepole pine is the omnipresent species; the black spruce comes next. The other species are tamarack, poplar and birch.

Block 23 is situated in the upper valley of West Prairie river on its west side. The muskeg represents 20 per cent. This section has suffered much from fires in a remote period, the growth is rather open and has been pretty slow. Blocks 43 and 54 each cover an area of approximately 825 square miles.

Block 54 occupies the summit-plateau country, (water-shed of the numerous rivers draining the west half of the Swan Hills) and the upper slope on the north side of the Athabaska river. The pole-stuff is healthy and dense in ridges. On the summit-plateau the muskegs and semi-muskegs represent about 60 per cent, on slope about 25 per cent.

Block 43 occupies a large tract of land in the neighbourhood of the Little Smoky, or, more properly, extending from the Athabaska river to the 17th Base Line. The

TIMBER OF POLE SIZE.

No. of Block.	Percentage of Muskeg.	Diameter at Breast-height.	Average Cut per Acre.		Total Cut.	
			M Ft. B. M.	Cords.	M Ft. B. M.	Cords.
23	20	3 to 6				
43	30	3 to 8				
54	40	3 to 7				
67	20	3 to 8				
83	10	3 to 6				
84	10	3 to 6				
85	15	3 to 8				
86	25	3 to 8				
87	25	3 to 8				

forest on the slopes is very healthy and rapidly growing up. The poorest section of this block is found on the upper land, from the Baptiste river to Tony creek. The muskegs here represent 30 per cent.

Block 67, on the north slope of the Athabaska river in the northeast corner of Shiningbank Hill district, carries a healthy pole-wood of pine, spruce, poplar and birch of 35 to 65 years old. The area is 125 square miles. The muskeg and semi-muskegs represent about 20 per cent.

Blocks 85, 86 and 87 are the other most important patches of pole timber. Block 85, in the valley of Little Sundance creek, is nearly entirely outside the limits of the proposed reserve. The polewood is dense and healthy.

Blocks 86 and 87 are situated in the upper valley of Muskeg river and Trout creek. They are remarkable for their large areas of tamarack swamps, which occasionally carry good-sized trees.

On the whole, the soil is of the most sandy nature, or clay with boulders.

TABLE No. 9—REPRODUCTION.

No. of Block.	Approx. Area.	Soil.	Species and Percentage.	Density.	Age.	Percentage of Muskeg.	Diameter at Breast-height.
	Sq. Mls.			$\frac{100}{\text{sq}}$	Yrs.		In.
7	180	Sandy and clay loam	Poplar 50 Willow 25 Alders 25	50	10 to 35	5	1 to 3
51	78	Sand or clay with boulders.	Pine 50 Spruce 10 Tamarack 10 Poplar.	50	10 to 35	30	1 to 4
76	70	Sand and boulder clay.	Pine 40 Spruce 30 Poplar 20 Birch 5 Tamarack 5	60	10 to 35	20	1 to 3
72	530	Sand and stones....	Pine 70 Spruce 15 Birch 10 Poplar 5	80	10 to 35	15	1 to 4
81	300	Sand and stones.....	Pine 60 Spruce 30 Tamarack 5 Poplar 5	50	10 to 35	20	1 to 4
90	250	Sandy with gravel...	Pine 50 Spruce 30 Tamarack 15 Poplar 5	60	10 to 35	25	1 to 4
Total ...	1,408						

Table No. 9 shows that the area covered with a reproduction of 10 to 35 years old is nearly 1,408 square miles. The reproduction is dense and healthy wherever fires have not been often repeated. The muskegs are very slow to recover from a fire.

Block 7 has many openings or grassy willow-lands.

Block 51 has a very large percentage of muskeg. The soil is mostly boulder clay.

Block 76 and the section of 72 north of the Athabaska river present about the same conditions. Fires have been remarkably frequent over these areas. The growth has been better during the last five years.

On the section of Block 72 south of the Athabaska river the reproduction is scarcely over 25 years old, but is generally dense. Wind-falls are piled all over that section greatly endangering, in case of fire, the young growth and the remainder of the thin layer of soil.

Blocks 81 and 90 are recovering rather poorly. This is due to fierce and repeated fires.



Photo J. A. Dowset, 1912.
PLATE 8. — Scattered Lodgepole Pine (18 inches in diameter at breast-height) amongst Poplar and Birch, East Prairie River, at Fork.



Photo J. A. Dowset, 1912.
PLATE 9. — View looking South from Hillside Stopping Place at Mile 35, Grande Prairie Road.

TABLE No. 10—BRULÉ.

No. of Block.	Approx. Area.	Soil.	Species.	Age of Brulé.	Percentage of Muskeg.
	Sq. Mls.			Yrs.	
19	30	Sandy loam, clay loam and sand.	Spruce Pine Poplar	15	15
27	130	Sand, clay, gravel, stones.	Tamarack Pine Spruce	2, 5, 10	20
35A	10	Sandy loam	Poplar Spruce	1	5
46	160	Sand and boulder-clay.	Poplar Pine Spruce	8, 15	30
53	25	Sand and boulders	Tamarack Poplar Pine	3	25
55	40	Sand, gravel.	Spruce Pine Spruce	2, 10	15
60	150	Sand, gravel and stones	Pine Spruce	2, 8, 15, 20	10
64	20	Sand and gravel	Poplar Pine	15	15
64A	60	Sand and gravel.	Spruce Pine Spruce	1, 10	10
68	15	Sandy loam and sand.	Poplar Pine Spruce	1	0
71	100	Sandy loam, sand and gravel.	Poplar Birch Poplar Spruce	20	5
Total	740	. . . . .	. . . . .	. . . . .	. . . . .

Table 10 gives 740 square miles of brulé up to 20 years old. Eleven blocks form this area. The most desolate and ruinous are blocks 27, 46 and 60.

Block 27 extends along the north branch of the Goose river, over to Attikamek lake and Attikamek river. Three different fires occurred, opening the 130 square miles given in this block. Block 46 covers 160 square miles. It extends from the Athabaska river in a northerly direction, along Pass creek, and follows down the Shooting river and up Sweathouse creek. Three fires swept that area. The reproduction is starting up on ridges. Two years ago fire again swept over about 60 per cent of block 55, where the reproduction was starting up well. The newly burnt portion will take a long time to restock on account of the lack of soil.

The portion of block 60 east of the Sakwatamanu river was mainly burnt some eight years ago. Many million feet of spruce and pine were destroyed here. The

reproduction is starting up on ridges. The northern half of block 60, west of the Sakwatamau river, was swept by fire three years ago, while the southern half is a twenty year old bruk. Here the reproduction is very poor. The soil was burned to the stones, and no tree has been left to seed in the ground. The blocks 35A, 68 and 46A are the result of fires in the spring of 1912.

The table also shows that in these blocks, the soil is sandy, gravelly and stony. The only exceptions to this are in block 35A, along the Waskahigan river, blocks 68 and 71, which have sandy loam but are not without sand and gravel on ridges.

RESUME OF TABULAR STATEMENT.

The above tabular statement gives us an area of 7,333 square miles and an actual production of 4,590,100,000 feet, board measure, of merchantable spruce and pine, and 20,009,600 cords of poplar and birch. The mature spruce and pine timber covers an area of approximately 364 square miles, with a production estimated at 2,839,460,000 feet, board measure. The young forest carrying merchantable timber covers an area of a little over 1,500 square miles with 2,672,680,000 feet, board measure, of merchantable timber of pine and spruce, and 2,675,600 cords of poplar and birch.

The nearly mature poplar covers an area of approximately 1,362 square miles and gives 17,336,000 cords of wood.

The pole-wood of 35 to 75 years old covers an area of approximately 2,060 square miles. This pole-wood, together with the 1,500 square miles of mixed young forest already carrying merchantable timber, are rich prospects for the future.

The area belonging to young reproduction is given as 1,408 square miles, while the area lately burned represents 740 square miles, approximately 20 and 10 per cent respectively of the whole area.

THE PROPOSED FOREST RESERVE.

From the foregoing report it is shown that much of the land examined is unfit for agricultural purposes, as it is mostly high, hilly, sandy and stony. Moreover a large tract of it belongs to summit-plateaus, forming the water-sheds of numerous streams emptying into the Athabaska river or Lesser Slave lake. The merchantable timber found presents actual value and the prospects for the future are worth special attention and protection.

It is well agreed upon to-day, that the only practical and efficient way of protecting the forest areas, or the forest land, from repeated and calamitous fires is the establishment of forest reserves over such tracts of land.

In view of this consideration a preliminary report was submitted with a sketch-plan showing the boundaries of the forest land, for recommending its establishment in forest reserves. In accordance with that, on the map accompanying this report, are also outlined the same boundaries including the non-agricultural land, which should be put in forest reserves for special protection.

The boundaries given on the map were laid down carefully with the main object of including only the forest land. On the north side where the surveys are very infrequent, the boundaries could only be accurately located on the base lines, or in their proximity. On the south the work of the delimitation offered better facilities and more accuracy, as the land was sub-divided.

The only patches of agricultural land of any importance which were included inside the boundaries of the proposed reserve are two in number. One contains about 1,000 acres situated north of Tony creek in the corner of the triangle formed by this



Photos J. A. Dewart, 1912.

PLATES 10 AND 11.—Typical Reproduction between the Baptiste River and Marshhead Creek, on Grande Prairie Road, showing remnants of Lodgepole Pine.

creek and the Little Smoky river. The other consists of a low ridge starting from the northwest corner of Hash lake in a northwesterly direction to the Little Smoky and Iosegun rivers. This ridge is covered mainly with a very healthy stand of spruce 100 years old, and has been included for special protection. The soil in this last case is a sandy loam, not entirely free, however, from gravel or stones on the higher points of the ridge.

No doubt a few acres of agricultural soil occur here and there inside the boundaries of the proposed reserve, but these are so infrequent and isolated that they do not count when considered in the whole. It would not be wise at present to neglect or to leave out thousands of acres of forest land which demand protection for the sake of a few rather inaccessible acres of fairly good land, which are, moreover, exposed to frequent frost even during the mid-summer months, on account of the high elevation of the country.

The boundary was connected to the proposed Lesser Slave Lake forest reserve, on the north side at the top of Township 71, Range 13, west of the 5th meridian, on the south at the northwest corner of Township 62, Range 10. They cross the Athabaska river four miles above the entrance of the McLeod river on the line of Township 60, between Ranges 12 and 13, west of the 5th meridian, including the Shining-bank range and connecting with the Rocky Mountains Forest Reserve at the north-east corner of Township 53, Range 23, west of the 5th meridian.

The boundaries were not determined on the west side, between Township 57 and 68 inclusive, as there are evident possibilities for enlargement in that direction.

Of the total area of the land examined, an approximate area of 5,500 square miles was taken inside the boundaries, including approximately 1,517,000,000 feet, board measure, of mature spruce, from the 1,595,000,000 feet that has been found existing on the whole territory, or a little over 99 per cent.

The poplar land, on the north, was left out, with the exception of a considerable portion of Block 1, where the soil is essentially sandy, and the stand of birch and poplar the most beautiful.

The area outlined contains also 722,000,000 feet, board measure, or nearly mature pine, and 1,120 square miles of young mixed forest already carrying merchantable timber estimated at 1,739,000,000 feet, board measure, and about 2,000,000 cords of poplar and birch. This area will, in 25 years, more than treble its actual given production. Moreover, this area contains nearly 2,000 square miles of pine and spruce pole-wood of a diameter at breast-height of three to seven inches mostly healthy and rapidly growing. At present it is a forest of great economic value, and it will soon become real wealth over a land that repeated forest fires can only turn into an encumbrance, or, at least, a desolation and a shame, if it is not properly looked after.

It is the duty of the Forestry Branch to seize immediately this opportunity of preserving and assuring the timber resources of the Dominion.

FIRE PROTECTION.

A reserved tract of land destined to supply timber for the needs of future generations must have very adequate and effective fire-protection, in order that expenses incurred, in the survey of the land and in the organization of the administration, are not wasted, together with the crop of timber which is the main object sought in the establishment of reserves. It is necessary for all that the forests, old or young, and every particle of them, be well preserved, especially in districts where the soil is poor and unfit for farming purposes. If the carelessness of the present generation should be the cause of the disappearance of the forest over such areas, unless after the destruction of their natural cover, future generations could not help but hold us

responsible, in presence of the need of timber supply, for the damage caused to their welfare and the loss befalling the national wealth.

It is generally considered that fire-protection, in order to be really efficient and effective, must be extended to every part of the territory divided into ranger districts, so that the rangers would be, to a certain extent, responsible for its fire protection. This is true when dealing with a territory well organized and provided with the necessary trails. But in the present case, or in territory of a similar nature, it is rather difficult, at the beginning, to extend the protection to the entire territory, or to determine or draw up any scheme of districts permanently, for the reason that good existing trails are scarce and present conditions are liable to great changes which would affect the building up of new ones.

First of all, the relatively small amount of money appropriated to fire protection must be used for the protection of the most exposed localities, without neglecting the remote spots which are generally frequented only by hunters or trappers. These places ought to be visited in due time for posting warnings for educational purposes.

When these most exposed localities are found, the next thing to be looked after is well qualified men to serve as rangers. These men should have a certain knowledge of the importance and the value of the forest, real conscientiousness in their duties, together with the training of experience in forest life. They have to live and even struggle alone in the wilderness for a great part of the time. A certain number of the rangers should be permanent. It would be a very practical way to get men interested in their work, as they would feel more responsible and become thoroughly acquainted with the district under their care. During the slack season, more particularly in winter, they could spend their time in improving and opening trails, whether for the sake of protection or for giving access to the different parts of the reserve. Nothing very effective could be accomplished without taking serious account of these considerations.

A plan has been specially prepared to show the trails located during the course of the examination work, which could, at present, be used for the locating of the patrols of the proposed reserve and of the adjacent territory. It further shows the approximate temporary territory assigned to each of the rangers. Trail extensions will be dealt with later on.

Some of these trails are much frequented by tourists, home-seekers, labourers and trappers. To-day the Grande Prairie road is the main route for homeseekers and tourists entering Grande Prairie. It is expected to be greatly frequented, even after the Canadian Northern Railway line to Grande Prairie is completed. This road should be well patrolled.

Another route much frequented on account of the Canadian Northern Railway construction line is the Iosegun and Pass Creek trail. It will become for a length of time a real highway. It is in the vicinity of the largest and most valuable patches of timber met with in the proposed reserve.

The trail leading from Whitecourt to Shiningbank lake and Long lake needs also to be specially patrolled. The settlement of these localities and the scattered homesteads close to the border of the proposed reserve are a constant source of danger to it, as can be proved by the present poor condition of the forest in the neighbourhood. Connecting with the latter is the trail along the Canadian Northern Railway right of way, from Whitecourt to the crossing, which jeopardizes the forty-year old stand spreading back from the Athabaska river.

It would be very important also to keep under patrol the road from Sturgeon lake to Grouard and around the southwest corner of Lesser Slave lake to Driftpile river. This highway is tributary to many settlements and gives access to numerous trails leading back to the hills, through well wooded land.

Many other trails are shown, some of them going into the heart of the proposed reserve. They are practically only used by trappers or hunters. It is not thought necessary to keep men patrolling these trails all the time, but some kind of patrol or

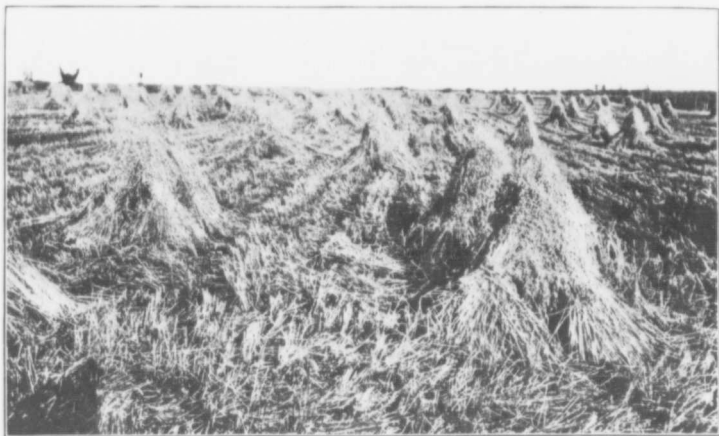


PLATE 12.—Magnificent Field of Oats, High Prairie Settlement, Alta. (West of Lesser Slave Lake, and some distance north of the reserve).

Photo J. A. Doucet, 1912.



PLATE 13.—Main Street of Gronard, Alta., Looking West.

Photo J. A. Doucet, 1912.

inspection is needed there, particularly in the early spring and fall when trappers are entering or leaving the forest, in order to warn them against the danger resulting from fire, and for posting up fire-notices as constant advocates in the cause. Efficient results could be obtained if interested and wise rangers would give the proper attention to this part of their work. Trappers or hunters having to live in the forest and to depend on it for the protection of the game are not deaf to wise admonition and advice.

FIRE PATROL.

For the present it is believed that ten good men are required to patrol efficiently the west half of the proposed Lesser Slave Lake forest reserve and the neighbouring territory. They could have their respective headquarters at such places as are suitable in each case and could range the territory as follows:—

Ranger 1. Headquarters, Grouard.—Could range the lake shore from Grouard to Driftpile river, the summer road from Grouard to East Prairie river, and at opportune times, the trails leading up to the hills, so protecting the large area of valuable poplar and birch extending south to the foothills. A ranger here could also extend his protection to the forest north and northeast from the west end of the lake, a forest of real importance for the growing town of Grouard.

Ranger 2. Headquarters, High Prairie Settlement.—Could range from Little Smoky to East Prairie river and the trail leading to Snipe lake. This is important to assure protection to the valuable timber limits east and north of that lake. He could also range the hunting trails leading to the hills from Snipe lake and East Prairie river. This is a very important district.

Ranger 3. Headquarters, Sturgeon Lake.—This ranger is entirely outside the proposed reserve, but is needed during the dangerous season for general fire-protection.

Could range the Grand Prairie road to Moose creek and the roads leading to Little Smoky river and Snipe lake, with the hunting trails opening on them, particularly the one leading to Goose river, and also the one leading to the interior, passing by Goose and Long lakes. This ranger could also give particular attention to the well wooded tract of land north of Sturgeon lake.

Ranger 4. Headquarters, Waskahigan River.—Could range the Grand Prairie road from Moose creek to mile 110. He could carry on special patrol on the Iosegun trail to the Atikamek river and the Hash Lake trail, watching also the hunting trail leading to Goose river.

Ranger 5. Headquarters, Tony Creek.—Could range from Mile 110 to Little Smoky crossing, also the hunting trails leading to Buck lake as far as connection with Hash Lake trail, and up the Little Smoky to Range 23.

Ranger 6. Headquarters, Athabaska Crossing.—Could range from Little Smoky river to Mile 35, (Side-hill stopping place), and, when opportune, a few miles up the Baptiste river and the Athabaska valley on the Medicine Lodge road and the hunting trail on the west side of the Athabaska river.

Ranger 7. Headquarters, Edson.—Could range along Grande Prairie road from Mile 35 (Side-hill stopping place), to Edson and give necessary instructions to travellers who may enter the reserve; along the road from Edson to Long lake and guard the settlements on that corner of the reserve.

Ranger 8. Headquarters, Whitecourt.—Could range along trails from Whitecourt to Shiningbank and Long lakes and up the Athabaska river to Bessie creek; up the Sakwatamau (Eagle) to Two Creek and the McLeod Lake trails.

Ranger 9. Headquarters, Athabaska Crossing at Canadian Northern Railway.—Will range down the Athabaska river to Bessie creek in connection with Ranger 8, up Pass creek to the Heavy Sound river, assuring good patrol along the Canadian Northern Railway construction line, and a few miles up the Athabaska river.

Ranger 10. Headquarters, Shooting Prairie.—Could range the Hash and Bear Lake trails, down the Shooting river to the Atikkamek, and up to the Heavy Sound river, connecting with Rangers 4 and 9; and along the Sakwatamau trail to Two creek.

These ten rangers, together with those ranging the districts as laid down by Mr. D. R. Cameron for the east half of the proposed Lesser Slave Lake forest reserve, should be under the immediate control of a Chief Ranger or Supervisor who is fairly well acquainted with the territory, and who would consequently be in a better position to correlate their work.



PLATE 14.—Timbered Island on the Athabaska River at Mouth of Pass Creek, half a mile above Canadian Northern Railway Crossing.

Photo J. A. Doucet, 1912.

TRAIL IMPROVEMENTS AND EXTENSIONS.

In relation to fire-protection, trails are of the first importance for a good fire-patrol.

Of the many existing hunting-trails and pack-trails shown on the plan, very few will allow a ranger to travel with all the speed required by his work. Most of them are blind, narrow and full of wind-falls and often require an experienced man to follow them. Nevertheless, they present a great advantage, as the route is traced, a little clearing, with blazing and corduroy-work, would make good trails of them.

Such improvements and further extensions, leading to a better investigation, or examination, facilitating communications amongst rangers, and extending protection over the entire territory are believed necessary when the forest reserve is established.

Existing Trails Needing Improvements.—The following are the most urgently needed:—

1. East Prairie River trails from Sucker creek to the 18th Base Line. Both give about sixty miles of trail. Need mostly cutting and clearing.

2. West Prairie River trail, from East Prairie river in a southwesterly direction to the north branch of the Goose river, forty miles. A very little work will put that trail in good condition.

3. The 18th Base Line trail, from East Prairie river to the Goose river, forty-five miles. This trail was roughly reopened by the party last summer, but requires a little more cutting out and corduroy to make it convenient.

4. Snipe Lake trail, from the north end of Snipe lake over to the fork of the Goose river, thirty miles. Needs corduroy and cutting out.

5. Hash Lake trail, from Dogeaten Prairie to Hash lake, thirty-five miles. Needs cutting out and corduroy.

6. Pass Creek and Iosegun trail, from the mouth of Pass creek to the mouth of Iosegun river, seventy miles. Needs mostly corduroy. This trail, however, is supposed to be put in good shape for the construction line of the Canadian Northern Railway.

7. The Sakwatamau trail, from the mouth of Sakwatamau river to Hash lake, one hundred miles, including the south Sakwatamau trail, from Two creek. Needs corduroy and cutting out from Sakwatamau crossing to Two creek, and clearing through Timber Limit No. 1229.

8. Goose River trail, from Dogeaten Prairie to Goose river and Little Smoky, fifteen miles. Needs cutting out only.

9. Lake McLeod trails from the Athabaska river to Lake McLeod, sixteen miles, and from the same lake to the Sakwatamau river. Needs corduroy and clearing.

10. Shiningbank Lake trail, from Whitecourt to Shiningbank lake, thirty-five miles. Needs mostly clearing.

11. The 15th base-line trail, from Shiningbank lake to the Grande Prairie road, thirty miles. Needs cutting out and clearing.

12. Buck Lake trail, from Tony Creek bridge to Buck lake, seven miles. Needs mostly cutting out.

All these trails and others not mentioned could be cleared, widened and put in fairly good shape with comparatively little work; it is my belief that during the wet season which prevails there in July and part of August, or in the fall, when fire cannot possibly be started or run, the fire-rangers could do that repair work without much extra expense to the Forestry Branch.

Proposed Trail Extensions.—Supplementing the now existing trails, extensions have been provided for, which, when completed, will form, with the others, a system of trails allowing the division of the west half of the proposed Lesser Slave Lake forest reserve, or addition, into regular districts, with the object of opening the territory to examination, and giving access to any part of it.

These extensions are the following:—

1. Athabaska River Trails.—One on the north side of the Athabaska river, from the Grande Prairie road to Freeman river, one hundred miles. The other on the south side of the Athabaska river from the Grande Prairie road to the Canadian Northern Railway crossing, forty miles.

2. Windfall River Trail.—Along the Windfall river, the Shiningbank hills to the 15th Base Line. The already existing parts of the trail running in that same direction will much simplify the work to be done here, fifteen miles of extension.

3. Goose River Trail.—A prolongation of the now existing Goose River trail to the head of this river, about thirty-five miles.

4. East Prairie River Trail.—A prolongation of the East Prairie River trail in a southwesterly direction from the 18th Base Line to the head of the Goose river, twenty miles.



Photo J. A. Doucet, 1912.

PLATE 15.—Indian Party at North End of Hash Lake.



Photo J. A. Doucet, 1912.

PLATE 16.—Last Day on the Trail, Dec. 19th, 1913. Grande Prairie Road, Township 61, Range 17, west of the 5th meridian.

5. Sakwatamau Trail.—A prolongation of the Sakwatamau trail in a north-westerly direction, to the head of the Goose river, twenty-five miles.

6. Freeman Trail.—A prolongation of Freeman trail from Freeman lake in a westerly direction until connection with Sakwatamau trail, twenty-five miles.

7. Atikkamek Lake Trail.—From the fork of the Goose river in a southerly direction, passing by Atikkamek lake to connection with Sakwatamau trail, somewhere in Township 64, Range 17, Section 20; twenty-two miles.

8. Atikkamek River Trail.—A prolongation of the Atikkamek River trail to Atikkamek lake, ten miles.

The work of opening these trail extensions would be, mainly, the winter task of the ranger who would be supposed to live on the reserve.

LOOKOUT STATIONS.

There are many places where lookouts could be advantageously established. Among these the most important are:—

1. Central Hill.—Situating in Township 56, Range 18, Section 19. It is a rounded elevation, the highest point of the high range lying between the Athabaska and the McLeod rivers. It overlooks an immense area, east, southeast, south, southwest and west. Many far-reaching views can be obtained from many other spots on that range, particularly from the 'Side-hill,' at a few steps only from the road and the stopping place. It would take only twenty minutes for the ranger, passing by, to climb that hill and have a good look on all the country lying south, from the east to the southwest. But there is no doubt that the Central Hill, if not quite so handy, offers the most strategic view.

2. Nose Hill. Three miles from the Athabaska Crossing in the upper end of Township 57, Range 21.—This point overlooks miles of country up and down the valley of the Athabaska river, up the Baptiste river, north and northwest to the height of land separating the waters of the Little Smoky river from those of the Baptiste river. Plenty of feed for horses can be found at the foot of the hill. This would require the building of a couple of miles of trail, which is not to be considered.

3. Muddy Ridge. On the Grande Prairie road, about two and a half miles north-west of Round lake.—A lookout here will give an excellent view over the valley of the Little Smoky river from Tony creek to the 18th Base Line, over the land drained by the Iosegun river and the upper part of the Goose, also west, south and south-west over the south branch of the Waskabigan river and the head of Tony creek.

4. Thunder Hill. One mile west-southwest of the junction of the West Prairie river trail with the 18th Base Line trail, at the southwest corner of Township 69, Range 17, west of the 5th meridian.—This point overlooks the valley of West Prairie river, and the upper valley and the north branch of the Goose river.

5. Another strategic view can be obtained from the northeast corner of the Shiningbank range, one mile only from the trail leading from Whitecourt to Shiningbank lake, in the northeast corner of Section 35, Township 57, Range 14. From this point a good view can be obtained of the entire valley of the McLeod river, the valley of the Athabaska river from the Canadian Northern Railway crossing, at the mouth of Pass creek, to the entrance of the Freeman river; the valley of Two creek, Sakwatamau river and Christmas creek, to the summit of the Swan Hills.

There is no timber available here to put up any kind of building, but, as is also the case at the 'Side-hill,' one can obtain a view of the country from the ground. Feed for horses is abundant on the east slope of the hill.

On the Central Hill, Nose Hill, Muddy Ridge and Thunder Hill, small towers of twenty-five to forty feet high should be built.

Many other points could be given, but these five are believed to be of the first importance for the beginning. They command the largest and the most important part of the proposed reserve.

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