

A
FOREST MANAGEMENT PLAN
FOR
THE MURCHIE SEIGNIORY MANAGEMENT AREA

Prepared by:

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Approved by

Chief Forest Engineer

Edmundston, N.B.
April 17, 1950

Mr. E.L. Howie,
Chief Forest Engineer,
Fraser Companies Limited,
Edmundston, N.B.

Dear Sir:

I submit herewith a Forest Management Plan for
the Murchie Seigniory Management Area.

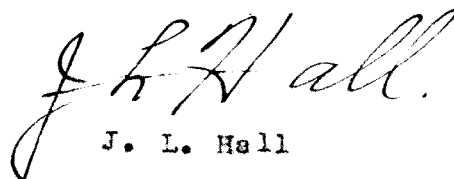
A summary of the main features of this plan
follows:-

Total Area	30,472 acres of which 99% is forested.
Total estimated Stand of Spruce and Fir	- 258,323 Cords
Estimated Annual Cut	- 9,000 Cords
Proposed Cutting Cycle	- 10 years
Proposed Rotation	- 60 years

The Iroquois River watershed will be operated by
farmers as at present. Other areas near the settlements along
the New Brunswick Quebec Boundary Line will be cut by farmers
working on a modified form of this plan as described here
after. The remainder of the area will be operated from a
central depot at Basley Lake.

It should be pointed out that the information
contained in this plan is rather general in nature and will
need to be revised as more information is available.

Yours very truly,



J. L. Hall

J.L.Hall/SR
Att.

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FOREST MANAGEMENT PLAN

MURCHIE SEIGNIORY MANAGEMENT AREA

PART 1 - GENERAL

Object:

The object of this forest management plan is to present a plan of operating the Murchie Seignior Management Area on a sound basis that will comply with good forestry and business practices.

A large part of this forest is now over mature. The mature stands occupy 85 percent of the area. On account of the large percentage of mature wood the growth rate is slow. This plan calls for the gradual removal of these mature stands in a manner calculated to result in an all-aged forest with a higher growth rate. At the same time this area will be preserved as a permanent forest reserve and serve the best interests of the company and the welfare of the community as a whole.

Basis of Management Plan:

The following reports have been used extensively in preparing this management plan.

1. "A Cruise Report on the Murchie Seignior" written in 1937 by O.E. Nickerson. This covers the entire Murchie Seignior but only the part which deals with this area is included in this forest management plan. This report is very complete and rich in information, but it is realized that nearly fourteen years have passed since this cruising was done and there has been considerable change since that period.

2. "A report on Cruise and aerial Survey on a portion of Murchie Seignior and Headwaters of Richard Brook, Temiscouata County, Province of Quebec". This report covers the entire management area, but the field work was confined to the Iroquois River watershed.

3. "A report on the Hardwood stands on the Iroquois Watershed Murchie Seignior Management Area". Prepared by J.L. Hall in 1950. This report contains an estimate of the hardwood on the entire Management area, but the field work was limited to the Iroquois River Watershed.

4. A report by Mr. W.T. Nash with the name "Abstract of Title of the Murchie Seignior, Quebec".

5. A new set of 20 chain photographs made in May 1949 by the Spartan Airways Company.

6. A new cruise report is being prepared by Mr. Grenier on the Murchie Seignior Management Area. When this new report is available this plan should be examined to see how the newest information affects the results and if necessary, this plan should be brought up to date.

Location and Area:

The Murchie Seignior Management Area consists of 47.6 square miles of Freehold and Crown Land.

The Freehold Land is a part of the "Murchie Seignior" and is 44.2 square miles in area. This is a piece of land six miles wide on the east side of the Madawaska River between the New Brunswick-Quebec Boundary and the southern height of land of the Birch River Watershed.

The Crown Land included in this area consists of 3.4 square miles within the drainage of the Iroquois River. This is a small area between the Freehold Land described above and the Inter-Provincial Boundary Line. (See enclosed key map).

The area is divided into three natural divisions. These are drained by 1. The Iroquois River, 2. the Madawaska River and 3. Basley Brook. These three areas have been further divided into several smaller parts for operating purposes.

Ownership:

The part of the Murchie Seignior, included in the Murchie Seignior Management Area, is all Freehold land reported to be the property of Fraser Companies, Limited. In addition to this, 3.4 miles of Quebec Crown Land, a part of the fifty year Forest Reserve Agreement, under licence to the Fraser Companies Limited, are included in the Murchie Seignior Management Area.

History of Ownership:

The land now known as the Murchie Seignior Management Area has a long and interesting history. Originally this was a part of a grant of land given Antoine Aubert and his sister, Marguerite Angelique de la Chenage, by the Governor of New France. This grant consisted of a strip of land extending two leagues on both sides of the Madawaska River and Lake Temiscouata. The original owners were given the sole right to hunt and fish in this whole area. At the end of the war with France in 1763 it came to the hands of General James Murray, Governor of Canada. These lands changed hands many times, being divided at times until about 1884 or 1885 the part of these lands on the east side of the Madawaska River was acquired by James Murchie's sons Company, who built a sawmill and dam across the Madawaska River at Edmundston. These lands were conveyed to Donald Fraser and Sons, Limited, on April 6, 1911. In 1947 the southern part of this area was set aside as a location for intensive forest management and is now known as the Murchie Seignior Management Area.

History of Operations:

This wood land was valued by the first owners only for the hunting and fishing it provided. Later the pine stands became valuable for timber and early woodmen came here to cut pine logs only. Only the best trees were taken as these men could afford

to be very discriminating with the vast areas of virgin timber before them. The cull logs they rejected at this time may still be found with the cuts made by their axes still visible. Pine trees notched by these men and found to be defective, are still standing, in some cases, and many of them are over 400 years old. When pine became scarce, and as the market demands increased, spruce and fir logs were cut to a minimum stump diameter of 12". The remains of many of the camps and roads made at this time can still be found. Cedar was cut from time to time for various uses on several parts of the Seigniory.

One chapter in early logging history that needs mention is the introduction and use of the steam log haulers. This was about 1918. These machines were a new approach to the transportation problem and many difficulties were often met with but a great many logs were transported by means of them. They may be considered as one step in the evolution of the modern logging industry. One road built for these machines can still be followed from Caribou Lake, past the head of Basley Lake and nearly to the Madawaska River.

Since that time a few small cutting operations have been carried out for pulpwood along the Madawaska River. The biggest of these operations was made about 1936 when the area between the Rich River and Big Brook was clear cut. However, large parts of this area have not been cut over for many years.

It has only been in recent years that hardwood in this area has found a market as anything but fuel wood. This condition is gradually changing and there is a growing market for hardwood lumber and other products. It is hoped that this trend will continue until at some time in the future there will be a market for large amounts of low grade wood now considered worthless. The white birch which has been frequently called a weed tree that

should be eliminated if possible now finds a market as spool wood. At the present time several places on the Iroquois Watershed that were cut over during the recent war for veneer, are being cut over again for hardwood logs. This is due to the fact that it is now possible to market smaller logs. The loss of large amounts of birch due to birch die-back has resulted in a scarcity of this variety of wood, and at present, all the sound yellow birch logs above 9" in top diameter are in good demand. The demand for maple logs is not as brisk but considerable amounts have been sold during the last few years.

Hardwood operations have been carried on in the northern part of the Management Area for some years. In 1948-49 the hardwood ridges on the Iroquois River Watershed were partly cut over and more cutting is being done here at the present time, as well as in the northern part of the Management Area. In 1948-49 nearly 1,000 cords of white birch were cut along the Madawaska River near the Provincial Boundary Line.

Since 1947 the cutting of pulpwood has been going on at the rate of between two and three thousand cords per year. Most of this wood was cut on the Iroquois Watershed and a part of it was cut selectively. It is expected that this cutting of pulpwood will increase as more of the area is opened up and put under management.

History of Fires, Insects, Disease, and Wind:

Fires:

There is very little evidence of any recent fires in this area. It would appear that much of the western part of the Management Area was burned over nearly 100 years ago, as a great deal of this area is now covered with a mixedwood stand that contains considerable amounts of white birch. This white birch is usually found in burned over areas. Apparently there was a second fire about 30 years ago that burned over a small area near Sasley Lake. All

burned over areas are now reproducing very satisfactorily.

Insects and Disease:

Insect damage appears to have been light in this locality. There are few patches which apparently suffered from Spruce Budworm in the years 1916-20. These are limited in extent and the damage on the area as a whole appears to have been light. The spruce sawfly has done some damage in this area in the past but it is not present in epidemic proportions at this time.

Disease has had a more noticeable effect on the present stands than have insect attacks. Birch Die-back has been most severe and has killed off possibly as much as 90 percent of the yellow and white birch. This has resulted in opening up the mixedwood stands and we find inferior species, such as mountain maple, striped maple and hobble bush are very common at present but that in many cases softwood reproduction has started under the hardwood species. Many of the Balsam Fir stands are now over mature and are becoming badly infected with heart rot and butt rot. Many suppressed trees are likewise subject to these last two diseases.

Wind:

There are no large areas of total blow, however we find that many areas have some trees blown down and the amount of windfall is increasing every year. In the mature mixedwood stands the effect of the wind is quite noticeable. See photographs. There are many windfalls on the ground in various stages of decay. A great many leaning trees, that are still living but which are in poor condition may be found. Some of this wood can be salvaged if the areas are opened up very soon, but much of it will be lost. Shallow soil is not often the cause of windfalls but rather we find that windfalls are usually defective trees that have broken off above the ground. The softwood stands are fairly wind firm as a whole. In the hardwood stand the trees are more exposed and more wind firm.

Local Conditions:

Labor

There is available at the present time a pool of about sixty men living in New Brunswick near the New Brunswick-Quebec Boundary Line from the Madawaska River to Sweeney Settlement who have come to look to the Murchie Seignior Management Area for a large part of their work. They can be called upon to do nearly any type of labor from camp construction to cutting all types of forest products. As these men have their own horses and equipment very few supplies of any nature need to be provided for them. Unless the employment situation changes considerably, there will be plenty of men available to increase the size of operations at any time, as additional men can be drawn from nearby settlements both in New Brunswick and in Quebec when required.

Markets:

This area is very favourably located in relation to the pulpmill at Edmundston. The rough pulpwood cut here need only be trucked to the Madawaska River which carries it to the mill. It is proposed to build a truck road to the mouth of Big Brook where this wood can be dumped into the river. Trucks hauling such wood could operate entirely on company-owned roads with a saving in gasoline tax and vehicle licenses. Average trucking distance would be about seven miles, a stream drive 15 miles down the Madawaska River will then bring it to the mill. Sap peeled wood will have to be trucked an average of 19 miles, to deliver it to the mill.

Much of the hardwood cut so far in this area has been sold to Royce and Murphy who have a mill at St. Jacques but other small operators are anxious to buy hardwood logs. It is possible to sell

white birch to several small mills in Quebec and Maine. Special orders of large size hardwood timbers have been filled for the Edmundston Mill.

Pine which is found in limited quantities in this area is readily sold to any local wood working establishment. Cedar which is found in scattered areas along the streams might be disposed of as bridge timbers, telephone poles or shingle wood.

It has been estimated that there are 50,000 cords of fuel wood on this area. It is desirable that much of this wood should be cut but the local market can handle only limited amounts. Until such time as fuel wood can be produced in a manner that will enable it to compete successfully with coal as a source of heat, it may not be economically feasible to cut much of this poorer wood.

Boundaries:

The Murchie Seignior Management Area is bounded on the west by the Madawaska River, on the south by the New Brunswick-Quebec Provincial Boundary Line from an iron monument numbered 21, near the Madawaska River then $N45^{\circ}00'E$ for a distance of 491.50 chains to another iron monument numbered 24.

The boundaries of the south and east sides were described in the report of Mr. D.E. Nickerson of 1937, as follows:

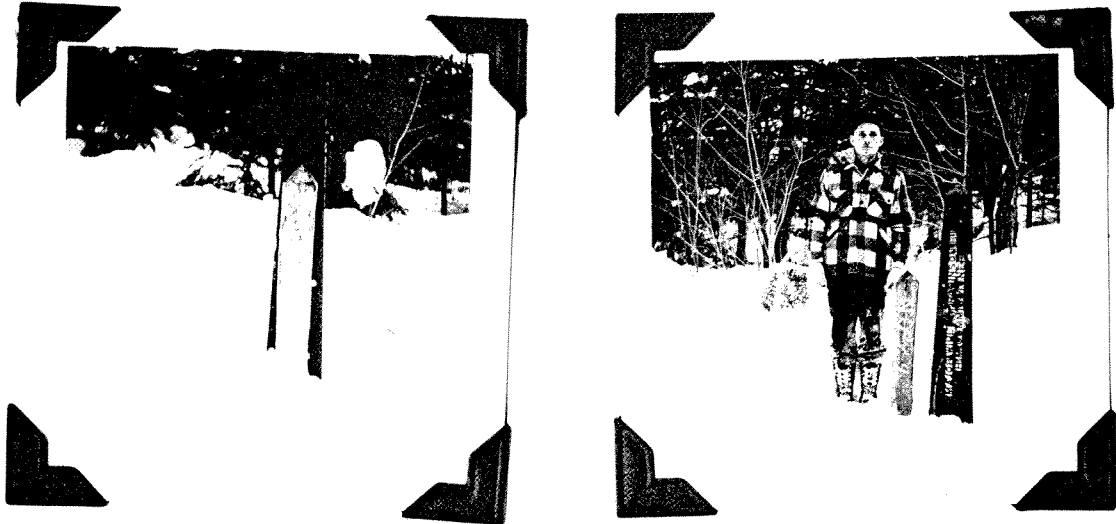
Course No. 1 $N45^{\circ}00'E$, 491.50 chains along the interprovincial boundary line from large iron monument No. 21 on the Madawaska River to Monument No. 24.

Course No. 2 $N53^{\circ}25'W$, 457.99 chains to large wooden post.

Course No. 3, $N50^{\circ}30'W$, 107.53 chains.

Course No. 4 $N53^{\circ}30'W$, to the height of land between the Basley Brook and Squateck Lake Watersheds.

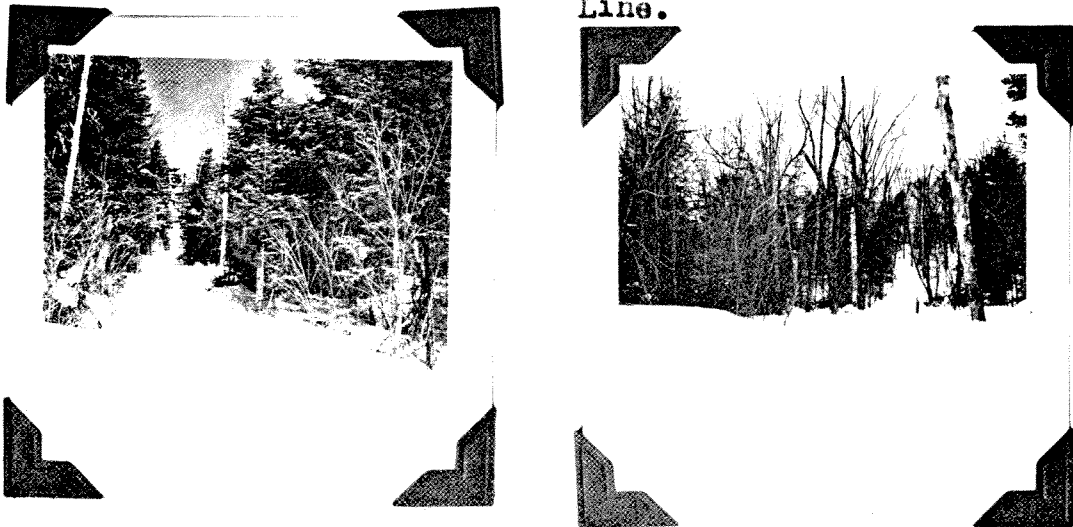
The northern limit at the present time is the southern height of land of the Birch River Watershed.



Iron Monuments Marking Inter Provincial Boundary Line.



Murchie Seigniory Boundary Line.



Part of Inter Provincial Boundary Line kept bushed out by Company guardians.

Course No. 1 is based on a plan of the interprovincial boundary line prepared in 1955.

Course No. 2 to 4 inclusive, are based on a plan by D.W. Mill, prepared in 1914.

The Murchie Seignior Management Area includes in addition to the Freehold Land described above, about 5.4 square miles of Quebec Crown Land. This is bounded on the east by the interprovincial boundary line, on the north by the northern heights of land of Richard Brook and Victory Brook, Watersheds, and on the west by the Seignior Line described above as Course No. 2.

Topography:

Most of this area is rolling and hilly with moderate slopes. The hills are low for the most part and no point on the area is over 1,000 feet above sea level. Conventional logging methods can be followed anywhere in the district and the majority of the area is well drained.

Part of the area is drained directly into the Madawaska River. A second section is drained by Basley Brook and its branches. After a round about journey of nearly fifty miles through Squateck Lake this also drains into the Madawaska River. A third part of the Management Area is drained by small branches of the Iroquois River.

The height of land between the Basley Brook and Madawaska River Watersheds is quite low in some places. In the past this fact has been taken advantage of for building a portage road across the Seignior. This old road followed the courses of Big and Basley Brooks

Most of the streams in the district are large enough for stream driving pulpwood while Basley Brook has been successfully driven for logs and the remains of three old driving dams may still be found at the foot of Basley Lake.

PART 11 - THE FOREST

Description of the Forest:

Age Classification

The stands in this area fall into three age classes.

<u>Classification</u>	<u>Description</u>
1	Mature
2	Second Growth
3	Reproduction

The mature stands occupy 84.5% of the entire area or 25,753 acres. These stands were largely cut over for logs about 30 to 40 years ago but have not been operated since that time. The age of most of the softwood trees is about 90 years and it appears that the growth rate is not as high as it is in younger stands.

These stands are the result of the cutting practices being followed in this area from 30 to 60 years ago. Trees that would not yield good sized logs were left and they make up the mature stands of today. There are many old defective fir trees but spruce trees as a whole seem to be quite thrifty. The hardwood stands are older than the softwood and also contain a great many defective trees.

In many places a two story stand may be found where the forests have been opened up by budworm damage, by loss of birch or by other causes. These stands would be considered as mature if the older trees covered a larger percentage of the area.

Second growth stands are found growing on various scattered areas. Some of these second growth stands are the result of fires which burned over parts of the Murchie Seigniory nearly 100 years ago. The age of these stands varies from 50 to 70 years. Other patches of second growth are the result of clear cutting. The majority of this class is found on the slope of the Madawaska River. A total of 1,091 acres or 3.6% of the area falls into this class.

A total of 3,314 acres or 10.9% of the area is covered with reproduction. This is found in the places that were clear cut for pulpwood over ten years ago. There may be found some larger trees in this area remaining from the residual stands but not enough to change the age class.

The balance of the area, 279 acres, is considered as waste.

DATE May 4 1950 FIRM NAME Trorer Companies Limited

ANALYSIS OF Area Classification Percentages of Total Area by Age Classes

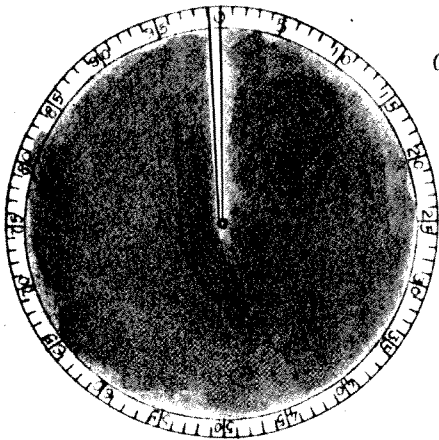


Chart of Total Area

Primary

Management Area

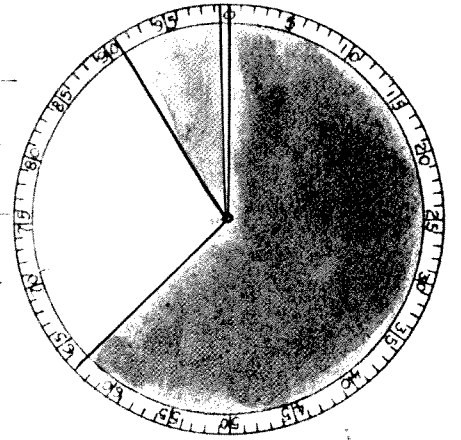


Chart of Iroquois River
Drainage Area

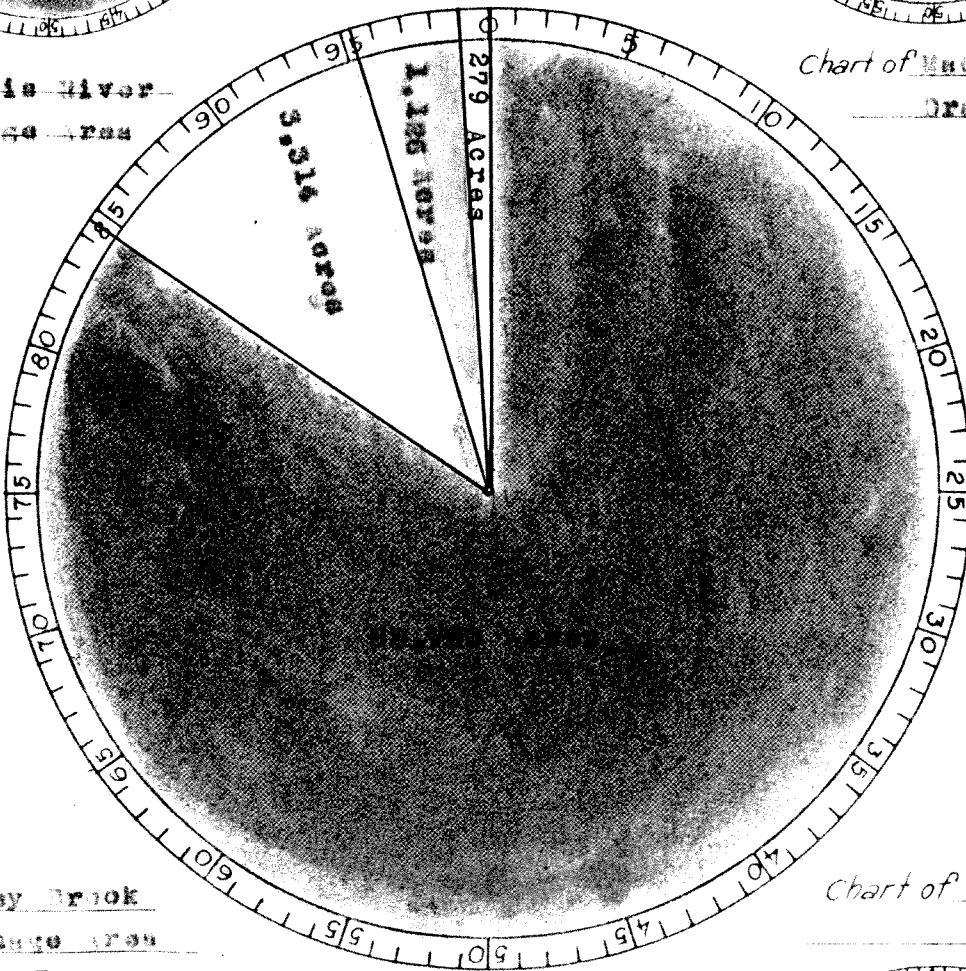
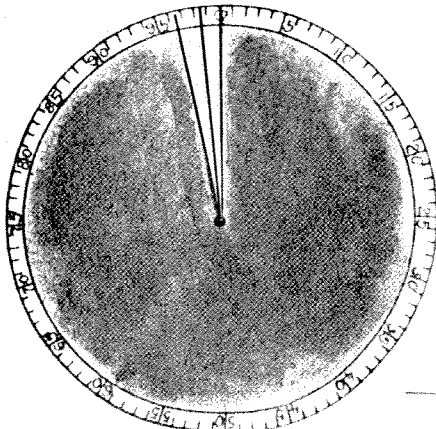


Chart of Madawaska River
Drainage Area

Chart of Osley Brook
Drainage Area

Chart of _____



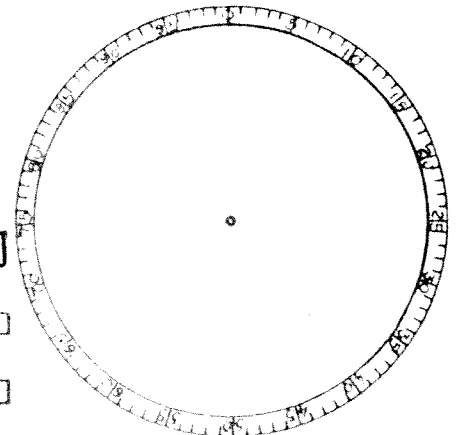
Remarks _____

Mature

Out-ter

Second Growth

Open



Classification by Types

Only three types have been considered, softwood, mixedwood and hardwood.

The softwood types contain mostly spruce and fir with some cedar along the streams. This type is found in the bottoms of the valleys where soil and moisture conditions are better. The percentage of spruce in these stands average 27% of the total volume.

In the mixedwood stands we usually find spruce and fir mixed with white birch, yellow birch and red maple. Due to the loss of large quantities of birch, we find that there are now considerable amount of such minor species as striped maple and mountain maple.

On the tops of the hills we find stands that are often made up entirely of maple, but more often contains some beech and some yellow birch. Hardwood types when found on the lower slopes contain a larger percentage of birch and some spruce and fir.

DATE May 4 1930 FIRM NAME Prayer Companies Limited

ANALYSIS OF Area Classification Percentages of total area by forest types

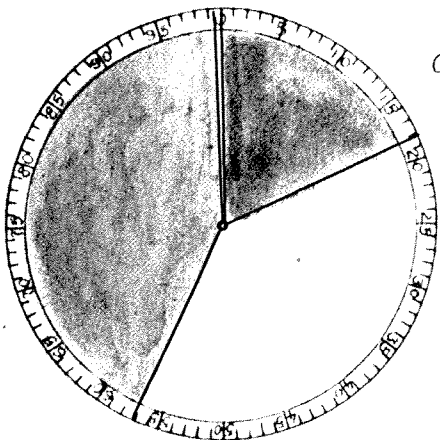


Chart of Total Murchie

Emergency Management

area

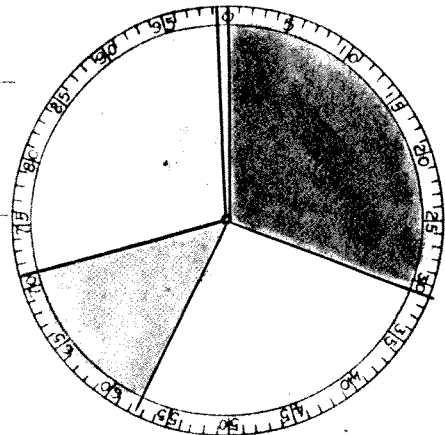


Chart of Murchie River

Drainage area

Chart of Iroquois River

Drainage area

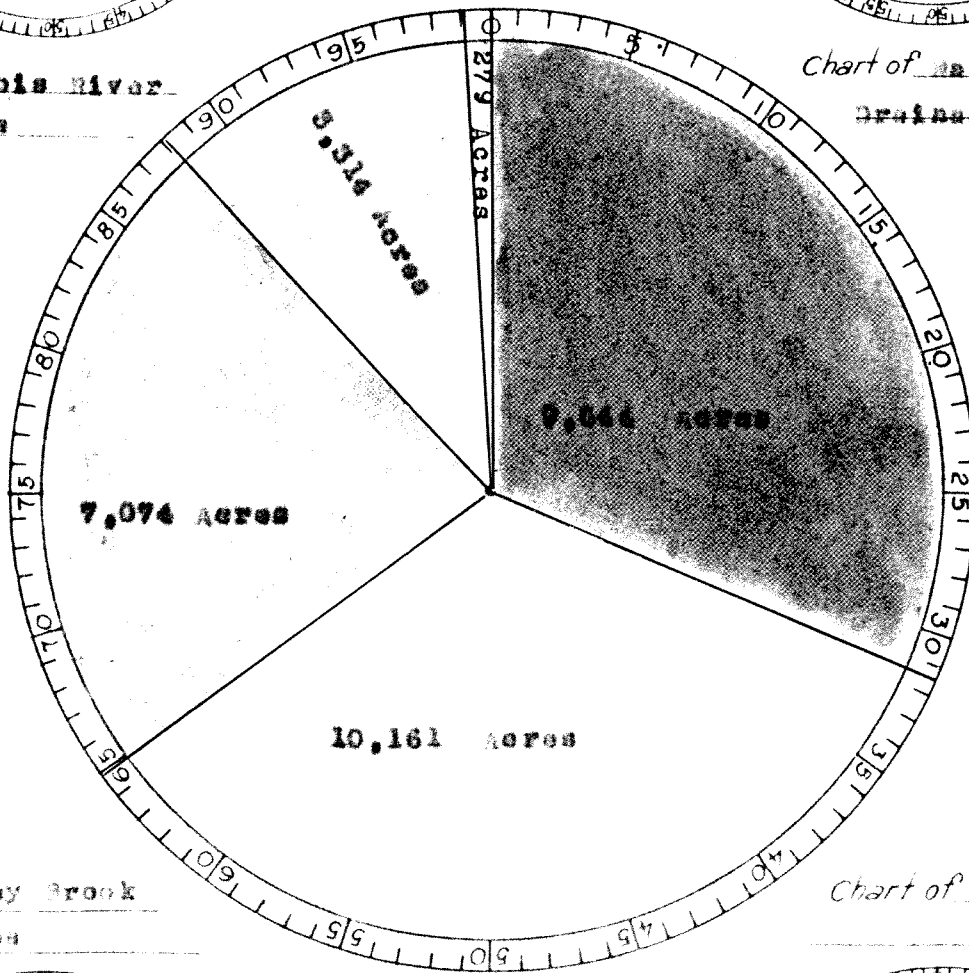
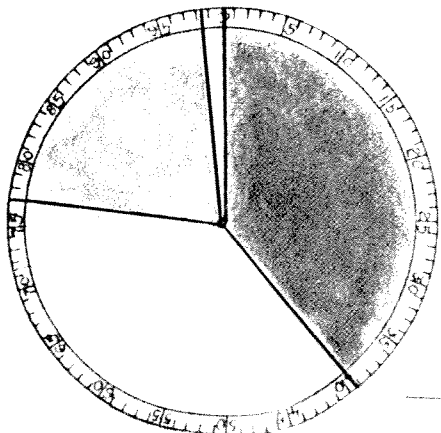


Chart of Iroquois River

Drainage area

Chart of Busley Brook

Drainage area



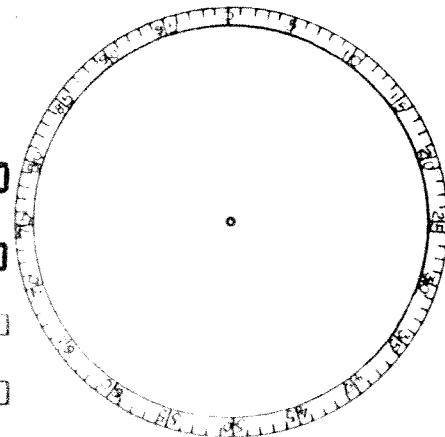
Remarks: soft wood

Mixed wood

Cut over

Hardwood

Waste





Softwood stands at edge of road. Note excellent height growth.



Two storey stand.



Same type of stand after
over story has been cut.



Mixedwood stand
containing White Birch and Poplar trees.



Areas cut selectively.

AREA CLASSIFICATION

This Area is divided into three major watersheds, drained by the Iroquois River, The Madawaska River and Basley Brook.

For descriptive purposes and as an aid in compiling the estimate these watersheds have been broken down into 25 compartments as shown in plan on next page.

This information is taken from the report by R.S. Jones of the 1948 cruise of this area. It has been revised slightly by adding to the Iroquois River watershed a small area that was formerly thought to be in the Madawaska River watershed.

MURCHIE SEIGNIORY MANAGEMENT AREAAREA CLASSIFICATIONALL WATERSHEDSNUMBER OF ACRES PER TYPE

<u>WATERSHED</u>	<u>SW</u>	<u>MW</u>	<u>HW</u>	<u>SW</u> <u>2nd</u>	<u>MW</u> <u>2nd</u>	<u>Co</u>	<u>ROAD</u>	<u>BARREN</u>	<u>WATER</u>	<u>TOTAL</u>
Iroquois	1,244	2,617	2,826				44	9		6,740
Basley	4,613	4,513	2,699	223		27		126	55	12,256
Madawaska	2,696	2,996	1,549	868	35	3,287		45		11,476
	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
<u>TOTAL</u>	<u>8,553</u>	<u>10,126</u>	<u>7,074</u>	<u>1,091</u>	<u>35</u>	<u>3,314</u>	<u>44</u>	<u>180</u>	<u>55</u>	<u>30,472</u>

MURCHIE SEIGNIORY MANAGEMENT AREAAREA CLASSIFICATIONIROQUOIS WATERSHEDNUMBER OF ACRES PER TYPE

<u>COMPARTMENT</u>	<u>SW</u>	<u>MW</u>	<u>HW</u>	<u>SW 2nd</u>	<u>MW 2nd</u>	<u>Co</u>	<u>ROAD</u>	<u>BARREN</u>	<u>WATER</u>	<u>TOTAL</u>
Richard Brook	667	1,076	1,159				18			2,920
Iroquois		332	269							601
Dufour	462	651	1,057				14	9		2,193
Belanger	115	558	341				12			1,026
<u>TOTAL</u>	<u>1,244</u>	<u>2,617</u>	<u>2,826</u>				<u>44</u>	<u>9</u>		<u>6,740</u>

MURCHIE SEIGNIORY MANAGEMENT AREA

AREA CLASSIFICATION

BASLEY BROOK WATERSHED

NUMBER OR ACRES PER TYPE

<u>COMPARTMENT</u>	<u>SW</u>	<u>MW</u>	<u>HW</u>	<u>SW 2nd</u>	<u>MW 2nd</u>	<u>Co</u>	<u>BARREN</u>	<u>WATER</u>	<u>TOTAL</u>
Basley 1	64	184	26	14			19		307
Basley 2	576	439	261	29			3		1,308
Basley 3	624	413	324	39			17		1,417
Basley 4	217	325	229	64			7	5	847
Basley 5	787	610	317	41				1	1,756
Basley 6	480	164	10	12			9	46	721
Basley 7	446	425	247			25		34	1,177
Basley 8	123	311	231						665
Basley 9	123	415	139			1			678
Basley 10	245	184	196						625
Basley 11	871	822	372	13		1	17		2,296
Squateck	57	221	147	11			20	3	459
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<u>TOTAL</u>	<u>4,613</u>	<u>4,513</u>	<u>2,699</u>	<u>225</u>		<u>27</u>	<u>92</u>	<u>89</u>	<u>12,256</u>
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The Iroquois River watershed has been further broken down into small operating units. Each small unit has been allotted to a cutter who is cutting his area selectively. As an aid in finding the permissible annual cut for each small unit the areas of these units are given in the following table.

IROQUOIS RIVER WATERSHED

AREA IN EACH TYPE

<u>Comp. No.</u>	<u>Softwood</u>		<u>Mixedwood</u>		<u>Hardwood</u>		<u>Total Forested</u>		<u>Waste</u>		<u>Total</u>	
	<u>Acres</u>	<u>%</u>	<u>Acres</u>	<u>%</u>	<u>Acres</u>	<u>%</u>	<u>Acres</u>	<u>%</u>	<u>Acres</u>	<u>%</u>	<u>Acres</u>	<u>%</u>
<u>Richard Brook</u>												
1	101	34	96	33	93	32	290	99	4	1	294	100
2	121	31	108	28	154	40	383	99	6	1	389	100
3	135	22	235	38	246	40	616	99	6	1	622	100
4	221	30	206	28	317	42	744	100	-	-	744	100
5	89	10	431	50	349	40	869	100	2	-	871	100
<u>TOTAL</u>	667	25	1,076	37	1,159	39	2,902		18	1	2,920	
<u>Main Branch Iroquois</u>												
6			332	55	269	45	601	100			601	100
<u>Dufour Brook</u>												
7	102	28	179	48	79	21	360	97	10	3	370	100
8	116	41	52	19	110	39	278	99	3	1	281	100
9	62	11	150	37	345	61	557	99	7	-	564	100
10	81	15	142	27	300	47	525	99	3	-	526	100
11	101	22	128	28	223	50	452	100	-	-	452	100
<u>TOTAL</u>	462	21	651	30	1,057	48	2,170	99	23	1	2,193	100
<u>Belanger Brook</u>												
12	2	-	239	61	148	38	389	99	5	1	394	100
13	113	18	319	50	193	31	625	99	7	1	632	100
<u>TOTAL</u>	115	11	558	55	341	33	1,014	99	12	1	1,026	100
<u>GRAND TOTAL</u>	<u>1,244</u>		<u>2,617</u>		<u>2,826</u>		<u>6,687</u>		<u>53</u>		<u>6,740</u>	

JLH/SR
April 26th, 1950

IROQUOIS RIVER WATERSHEDRECAPITULATION OF AREA AND VOLUMES OF SPRUCE AND FIR

<u>Comp. No.</u>	<u>Area</u>	<u>Spruce & Fir 5" +</u> <u>Cords</u>	<u>% Spruce</u>	<u>Cds/Ac.</u>
<u>Richards Brook</u>				
1	294	3,029	27	10.4
2	389	3,566	26	8.9
3	622	4,865	25	7.9
4	744	6,785	27	8.4
5	<u>871</u>	<u>7,376</u>	<u>24</u>	<u>7.2</u>
<u>TOTAL</u>	2,920	25,621	26	8.2
<u>Main Branch Iroquois</u>				
6	601	4,327	27	7.2
<u>Dufour Brook</u>				
7	370	3,605	33	9.8
8	281	2,628	39	9.3
9	564	3,047	30	5.4
10	526	3,210	32	6.1
11	<u>452</u>	<u>3,296</u>	<u>34</u>	<u>7.1</u>
<u>TOTAL</u>	2,193	15,786	34	7.0
<u>Belanger Brook</u>				
12	394	2,191	18	5.6
13	<u>632</u>	<u>4,155</u>	<u>20</u>	<u>6.6</u>
<u>TOTAL</u>	1,026	6,346	19	6.2
<u>GRAND TOTAL</u>	<u>6,740</u>	<u>52,080</u>	<u>26</u>	<u>7.5</u>

MURCHIE SEIGNIORY MANAGEMENT AREA

VOLUME CLASSIFICATION

ALL WATERSHEDS

<u>TYPE</u>	<u>AREA</u>	<u>SPRUCE & FIR 5**/</u>		
	<u>AREA</u>	<u>%</u>	<u>CDS/AC.</u>	<u>TOTAL CDS.</u>
Mature SW	8,553	28.1	16.9	144,480
Mature MW	10,126	33.2	9.8	98,862
Mature HW	7,074	23.2	2.1	14,981
<u>TOTAL MATURE</u>	<u>25,753</u>	<u>84.5</u>	<u>10.0</u>	<u>258,323</u>
SW 2nd	1,091	3.6		
MW 2nd	35			
Co	3,314	10.9		
<u>TOTAL 2nd</u>	<u>4,440</u>	<u>14.5</u>		
<u>TOTAL FORESTED</u>	<u>30,193</u>		<u>8.6</u>	<u>258,323</u>
Barren	180	.6		
Water	55	.2		
Road	44	.2		
<u>TOTAL WASTE</u>	<u>279</u>	<u>1.0</u>		
<u>TOTAL</u>	<u>30,472</u>	<u>100%</u>	<u>8.5</u>	<u>258,323</u>

MURCHIE SEIGNIORY MANAGEMENT AREAVOLUME CLASSIFICATIONIROQUOIS WATERSHED(CROWN & FREEHOLD LANDS)

<u>TYPE</u>	<u>AREA</u> <u>ACRES</u>	<u>%</u>	<u>SPRUCE & FIR 5*/</u>	
			<u>CDS/AC.</u>	<u>TOTAL</u> <u>CDS.</u>
Mature SW	1,244	19.5	16.8	20,899
Mature MW	2,617	37.2	9.4	25,505
Mature HW	<u>2,826</u>	<u>42.5</u>	<u>2.0</u>	<u>5,652</u>
<u>TOTAL FORESTED</u>	<u>6,687</u>	<u>99.2</u>	<u>7.9</u>	<u>52,056</u>
Barren	9	.1		
Water				
Road	<u>44</u>	<u>.7</u>		
<u>TOTAL WASTE</u>	<u>53</u>	<u>.8</u>		
<u>TOTAL WATERSHED</u>	<u>6,740</u>	<u>100%</u>	<u>7.8</u>	<u>52,056</u>

NOTE: Crown Lands 2,174 Acres
Freehold Lands 4,199 Acres

MURCHIE SEIGNIORY MANAGEMENT AREAVOLUME CLASSIFICATIONBASLEY BROOK WATERSHED

<u>TYPE</u>	<u>AREA</u>		<u>SPRUCE & FIR 5^m</u>	
	<u>ACRES</u>	<u>%</u>	<u>CDS/AC.</u>	<u>TOTAL CDS.</u>
Mature SW	4,613	37.7	16.9	77,960
Mature MW	4,513	36.8	9.7	43,776
Mature HW	2,699	22.0	2.2	5,938
<u>TOTAL MATURE</u>	<u>11,825</u>	<u>96.5</u>	<u>10.8</u>	<u>127,674</u>
SW 2nd	223	1.8		
MW 2nd				
Co	27	.2		
<u>TOTAL 2nd</u>	<u>250</u>	<u>2.0</u>		
<u>TOTAL FORESTED</u>	<u>12,075</u>		<u>10.6</u>	<u>127,674</u>
Barren	92	1.0		
Water	89	.5		
<u>TOTAL WASTE</u>	<u>181</u>	<u>1.5</u>		
<u>TOTAL WATERSHED</u>	<u>12,256</u>	<u>100%</u>	<u>10.4</u>	<u>127,674</u>

MURCHIE SEIGNIORY MANAGEMENT AREAVOLUME CLASSIFICATIONMADAWASKA RIVER WATERSHED

<u>TYPE</u>	<u>AREA</u>		<u>SPRUCE & FIR 5"/</u>	
	<u>ACRES</u>	<u>%</u>	<u>CDS/AC.</u>	<u>TOTAL CDS.</u>
Mature SW	2,696	22.8	16.9	45,611
Mature MW	2,996	27.4	9.7	29,568
Mature HW	1,549	14.0	2.2	3,390
<u>TOTAL MATURE</u>	<u>7,241</u>	<u>64.2</u>	<u>10.6</u>	<u>78,569</u>
SW 2nd	868	7.3		
MW 2nd	35	.3		
Co	3,287	27.8		
<u>TOTAL 2nd</u>	<u>4,190</u>	<u>35.4</u>		
<u>TOTAL FORESTED</u>	<u>11,431</u>		<u>6.8</u>	<u>78,569</u>
Barren	45	.4		
Water	-	-		
<u>TOTAL WASTE</u>	<u>45</u>	<u>.4</u>		
<u>TOTAL WATERSHED</u>	<u>11,476</u>	<u>100%</u>	<u>6.8</u>	<u>78,569</u>

PART III - MANAGEMENT
OF THE FOREST

Object of Management

In any management plan of this area it is necessary to utilize the mature trees at present on the land, and to provide for an adequate growing stock of valuable species. In this case it is desirable to cover the area fairly rapidly so as to remove much of the overmature wood from the area as quickly as possible.

CUTTING METHODS

Much of this area is so located that wood can be delivered to the market quickly and cheaply. Thus it will be possible to follow silvicultural practices that will ensure the maximum yield of wood over a long period of time. This indicates that a large amount of young fast growing wood should be kept on the ground at all times. A growing stock of this sort serves as a reserve of readily accessible wood if needed in an emergency and should increase the growth rate.

Part of this management area lies adjacent to settlers lots in New Brunswick and it has been possible to utilize the labor from these farms to cut considerable amounts of wood without the expense of running large company camps or of providing large stores of equipment. This practice seems to be very sound and can be extended to other areas along the inter-provincial boundary line. Selective cutting practices have been tried out on the Iroquois Watershed and proved very successful. Wherever possible this practice should be continued and trees should be marked for cutting until such time as the cutters are sufficiently well trained to work without this assistance.

"Selective cutting" has been suggested as the system to be followed in this area. No clear concise definition of this system has been found but in theory this system is very simple. It calls for an all aged stand with the right proportion of trees in each age class. As each age class matures it is harvested. In actual practice these conditions are not found. No forest is perfectly all aged. It is not economically possible to cut over the entire area each year but the growth is allowed to accumulate for a period of years, called the cutting cycle, and then harvested. There are also many species in most stands for which no markets may be found and these "weed trees" tend to reduce the yield of merchantable wood from a stand.

In this area the cutting system should be such that, the residual stands tend to become all aged, the more valuable species should be favoured and all diseased and defective trees should be removed, and every effort should be made to keep as much of the area as possible covered with young thrifty trees of a desirable species.

In some areas selective cutting may not be economically possible because of the nature of the stands. Such cases might be slow growing black spruce swamps, mixedwood stands that are already too thin and suffering wind damage, etc. The system of cutting must be flexible enough to permit clear cutting in limited areas where necessary but care should be taken to guard against depleting the growing stock below the amount needed for a maximum yield. On the other hand a few places contain stands that are too young to be cut at once and these will have to be left for another cutting cycle.

Areas too far north to be cut by the settlers living at home should be cut by crews working from company camps.

In the light of present experience and because of the light cut per acre in any one cutting cycle, it seems desirable to cut as much as possible of the northern part of this area from a permanent camp at Basley Lake. This camp will be in the centre of the district and the distances to any part of the Management Area will not be great. Men can walk to work for distances up to $1\frac{1}{2}$ miles and beyond that they can be transported with trucks or horses. This will save the expense of building and running several small camps.

As this area is opened up it will be found that there are small amounts of cedar, pine and hardwoods that could be cut to the best advantage while the district is opened up for pulpwood operation. Every effort should be made to market these products as they become mature and to cut these species in a manner calculated to take full advantage of roads and improvements made for pulpwood operations.

ROTATION:

It has been found by plotting curves for the growth of a stand during its life cycle that the volume of wood added in any one year increases from zero to its highest peak when the trees are 50 years old. After this the growth rate decreases rapidly and is again zero at 90 years (See graph Page 34.)

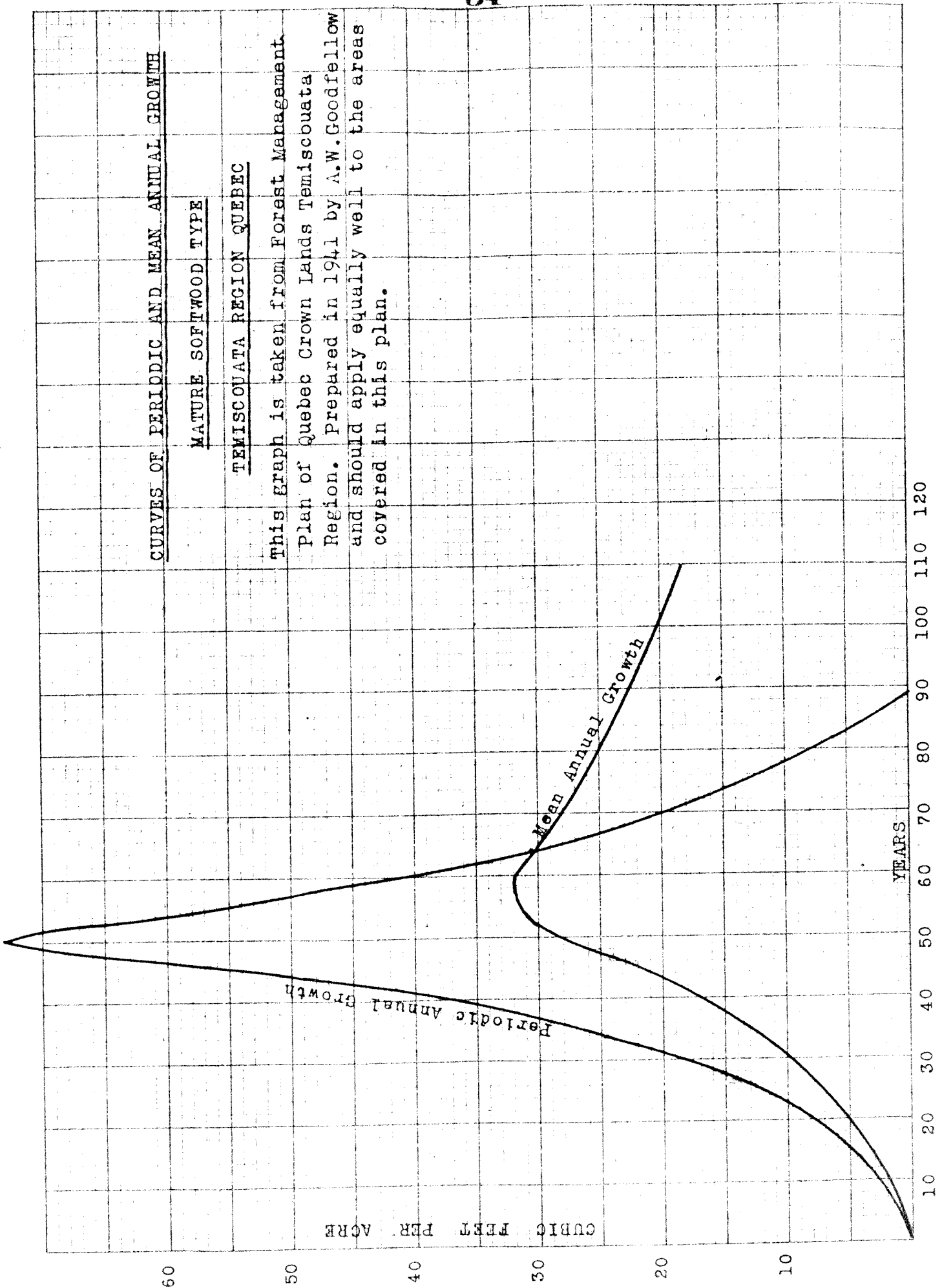
A second curve is shown for the average or mean annual growth of stands over the entire life of a stand. This is found by dividing total yield of a stand by its age at that time. The point where these two curves intersect is the culmination point and stands are then mature.

CURVES OF PERIODIC AND MEAN ANNUAL GROWTH

MATURE SOFTWOOD TYPE

TEMISCOUATA REGION QUEBEC

This graph is taken from Forest Management Plan of Quebec Crown Lands Temiscouata Region. Prepared in 1941 by A.W. Goodfellow and should apply equally well to the areas covered in this plan.



The maximum volume of wood will be gained from a piece of land by cutting the trees at this time and clearing the way for new stands. We have kept stands beyond this age in the past where logs were desired because bigger trees, although growth was slower, yielded a bigger return. When pulpwood is cut we are more interested in total volume than in size of trees therefore the logical point seems to be to cut the stands at the age indicated by the point of culmination. In this case 60 years has been taken as the length of the rotation.

In support of this rotation age we point out that the large percentage of fir in these stands calls for a short rotation due to the excessive amounts of cull in older stands. Furthermore growth rate is greatest in stands of from 40-60 years and older stands show a greatly decreased growth rate.

Cutting Cycle

A ten year cutting cycle is suggested as the best compromise between extreme silvicultural practices and economics. This short cutting cycle will go a long way towards putting the forest in good condition and at the same time spread the costs of permanent improvements over a ten year period. The ground will be covered very rapidly so as to remove the over mature wood and stimulate the growth of the remaining trees. Reproduction can get started in the openings left by the removal of old trees and after a few cycles we should have an all aged forest with crops of trees maturing at regular intervals.

Estimation of Possible Annual Cut

From cutting operations on the Iroquois River Watershed it has been found that an average of three cords per acre should be removed from the parts of the area covered in any one year. This is a fair sized cut per acre in most cases since much of the wood is concentrated in heavy stands while other areas contain no wood and need not be opened up. If one tenth of the entire area is covered each year this means 9,000 cords per year could be cut annually.

To substantiate this figure Von Mantel's formula has been applied to the estimated volume of 258,323 cords of spruce and balsam fir.

$$\begin{aligned} \text{Annual cut} &= \frac{\text{Present Stand}}{1/2 \text{ Rotation}} \\ &= \frac{258,323}{1/2 \times 60} \\ &= 8,611 \text{ cords per year} \end{aligned}$$

Presler's formula also agrees with these figures fairly well.

$$\text{(Growth \%} = \frac{V-v}{V} \times \frac{200}{n})$$

where V = volume of wood in 1948

v = volume of wood in 1937

n = 11 years between two cruises

<u>Watershed</u>	<u>Area</u>	<u>Vol. 1937</u>	<u>Vol. 1948</u>	<u>Growth %</u>	<u>Annual Yield</u>
Basley Bk.	12,256	83,585	127,674	3.79%	4,839
Madawaska R.	11,476	51,161	80,769	4.10%	3,311
Iroquois R.	<u>6,740</u>	<u>35,561</u>	<u>52,080</u>	<u>3.42%</u>	<u>1,781</u>
Total	30,472	170,307	258,323	3.73%	9,981

The figure 9,981 cords is considerably higher than

the one found by Von Mantel's Formula. A cut of about 9,000 cords seems to be indicated as it is between the two figures given above. Using this figure as a guide, the growing stock will not be depleted and the annual cut can be revised at a later date to comply with a further knowledge of the area that is gained.

A further indication of what might be expected from this area when the overmature stands are cut over is gained from a study of the research records for Green River Research Block 2 on Pemou Brook. Net growth here was 44.4 cubic feet per year for softwood and mixedwood types. A comparative growth rate for same types on the Murchie Seigniory Management Area would indicate a possible annual cut of 12,076 cords from softwood and mixedwood types only. No figures were available for hardwood types.

Regulation of Cut

Iroquois River Watershed

It is proposed that this area be cut along the lines that are being followed at present in this area.

A table showing permissible annual cut rounded off to the nearest 10 for compartments 1 to 13 inclusive, by Von Mantel's Formula follows.

<u>Compartment No.</u>	<u>Annual Cut</u>
1	100
2	120
3	160
4	230
5	250
6	140
7	120
8	90
9	100
10	110
11	110
12	70
13	140

1,740

Madawaska River Compartments 1,2,3,4,5.

Madawaska River compartments 1, 2 and 3 can be cut very easily by settlers living in this area. Thus the need for large company camps is done away with in this district.

The greatest difficulty with the system of cutting on the Iroquois River has been the distances to be covered in supervising the men. To get around this a modification of this system is suggested which will overcome this objection. Rather than spread the men over the entire area an improved method might be to concentrate a group of ten or twelve men in one large compartment which will be selectively cut in two or three years, then the same group will move to the next compartment. In this way there will be few, if any

improvements needed here for the first two or three years; supervision can be better carried out and trucking of pulpwood made easier. Also the whole area can be covered in a comparatively short time.

The annual cut (Von Mantel's Formula) for these three Madawaska River compartments near the inter-provincial boundary is as follows:

<u>Compartment</u>	<u>Annual Cut</u>
1	210
2	680
3	<u>210</u>
	1,100

Remainder of Management Area

On the parts of this district that are too far from the settlements to be cut by farmers it will be necessary to operate Company camps. A central depot at Basley Lake is suggested and where possible men might be transported to work from the central depot. This will reduce the costs of camp building charged to each cord of wood which would otherwise be high where the amount removed per acre is small. From this part of the Management Area approximately 6,160 cords per year would be needed to complete 9000 cords per year for the whole area.

Progress of Operations:

On the compartments near the interprovincial boundary line each cutter can cover a large part of his sub-compartment in any given year. This will make it possible to concentrate the cutting in those areas that are in greatest need of immediate attention, such areas are often mixedwood stands that contain many windfalls, of areas with large amounts of defective fir trees. The wood to be cut should be marked before cutting starts. On the remaining part of the Murchie Seigniory Management Area the oldest stands

are found on the south side of Basley Brook. Much of the Madawaska River Watershed has been cut over recently. A portion of the stand to the north of Basley Brook has also been cut over not too long ago. The logical order of cutting seems to be to start with the stands around Basley Lake and cut the compartments in the following order. Basley Compartments 6, 5, 4, 3, 2, and 1 on the south side of Basley Brook to be cut first which will probably take nearly three years. Compartment 7 to 11 inclusive, on the north side of this stream should be cut next. This will probably take another three years. This leaves four years of the first cutting cycle to cover the Madawaska River Watershed. Compartment 9 in this drainage should be the last one cut because the stands are youngest there.

About 2,000 acres should be opened up each year. This allows for a gradual extension of the road system by building a first class truck road from the Madawaska River to Basley Lake and along Basley Brook to the Seignior Boundary Line. Branch roads can be built from this highway into each compartment.

Forest Protection:

Forest Fires:

Protection from fires on this area is under the supervision of Southern St. Lawrence Forest Protective Association. They keep a fire warden on duty in this area during the fire season. The company also maintains at Dennis Sirois's a Wajax Pump Unit complete with 3, 250 feet of hose and tools for forty men. A trained operator is in charge of this equipment. Furthermore, the area is overlooked by the Green River, St. Rose and Pemouet fire towers. The area is fairly well served with roads that could be used in fire fighting. The norther section is partly opened up with truck roads made for hardwood operations and the southern part by fourteen miles of permanent roads opened up for pulpwood operations.

Insects and Disease:

In recent years the company has liberated parasites of the European Spruce Sawfly over these limits, but this policy has been discontinued as there does not seem to be any further need for it. It is felt that the introduction of selective cutting will be a means of decreasing the number of diseased trees and that more healthy, all aged stands should result from this system.

Wind:

This area is somewhat susceptible to blowdown particularly mixedwood stands that have been opened up very rapidly due to the loss of the birch. These stands now contain considerable amounts blowdown. By cutting over the area as rapidly as possible, much of this wood will be salvaged before it becomes a total loss. It is felt that blowdown will not be a serious factor after the area has been covered and younger stands occupy the area.

Summary:

This Forest Management Plan calls for intensive management of this area. Full advantage should be taken of the ideal location of the area to have part of the annual yield cut by settlers who live along the boundaries. This applies to the Iroquois River Watershed and to the southern part of the Madawaska River watershed. The cutting system now in force on the Iroquois watershed should be continued but areas further from the settlements will have to be cut from company camps. Insofar as possible the practice of marking trees for cutting should be continued at least until men have become trained for this kind of work.

Briefly the highlights of this management plan may be stated as follows:-

1. Selective cutting wherever the stands permit.
2. Areas of blowdown, very thin stands and slow growing

black spruce swamps to be clear cut.

3. A 60 year Rotation which removes the trees as soon as they become mature should be followed.
4. A ten year cutting cycle should be followed. This means that the entire area will be divided into 10 parts of about 2,000 acres and a light cut, equal to the calculated annual yield, taken from one of them each year. In a complete rotation of 60 years, these 10 small areas will be cut over six times.
5. A total cut of about 9,000 cords should be removed from the entire area annually. This is made up of 1740 cords from the Iroquois River drainage, 1100 cords from the Southern Part of The Madawaska River Watershed and 6,160 cords from the rest of the Management area.
6. The Iroquois River watershed will be cut by the settlers who are at present working there. The areas of blowdown and places with many defective fir trees will be cut first, with the better softwood stands left till the last, when it is reasonable to do so.

On the compartments near the inter-provincial boundary in the Madawaska River Drainage, the same system of having the farmers cut the wood will be followed, but the cutters will be concentrated in one compartment in any one year.

The remainder of the area will be operated from a central depot at Basley Lake. The Compartments south of Basley Brook should be cut first followed by those on the North side of this stream, and the Madawaska River Area should be left till the last.

J. L. Hall
J. L. Hall