REPORT ON THINNING EXPERIMENTS IN YOUNG HEMLOCK STANDS, QUATSINO, B.C.

Schenstrom

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of

DESCRIPTIVE PART

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DESCRIPTION OF EXPERIMENTAL PLOTS

General organization of the field work and computations.

In order to obtain information regarding density, and other factors having a bearing upon the thinning experiments, the work was first centered upon small plots. These were laid out on Dahlstrom point and were subjected to the same measurements as were later made in reference to the larger plots. In addition these small plots were thinned and will, in the future be a very useful complement to the larger plots.

The larger plots were arranged in strips, running through typical sections of the second growth. The outside boundaries were surveyed and the different types of density were mapped.

Experimental plots have been established in reproduction of the following ages:-

7 years old - Plots XI.A - D, and XII.A-C

15 years old - Plots I - IX, and X.A-C

35 years old - Temporary plots 1 and 2.

On each plot all of the trees have been tallied. The breast height diameters were measured, on the 'meeting' side of the trees, in half centimeters (/); and the weighted average diameter and basal areas computed.

/ The desire to simplify the compilation work was the reason for using the metric system on the tally sheets. In most other cases English system of feet and inches has been used.

Height curves were drawn and the average heights read opposite the average diameters.

On each sample tree the width of the last five annual growth rings (1929-33) was measured and the weighted average increment compiled with help of curves and Johnson's formula (//). From the increment records curves have been prepared which show the number of years required to increase the diameter of a hemlock tree by one inch.

The compiled field records are presented in the following maps, tables and graphs:-

General maps of plots

Maps of each experimental plot

Tally sheets

Height curves

Graphs showing the distribution of basal area and increment, in each diameter class

Graph showing the number of years required to increase diameter one inch.

// Johnson's Formula

$$P = \frac{100}{r}\left(1 - \frac{\sum d^2}{\sum D^2}\right)$$

P = Average increment in %
d = Diameter r years ago
D = Present diameter

Date of Establishment of the Plots.

The following are the dates when the plots were tallied:

Plot No.	Date. 1934.
I	June 11
II	June 12
III	June 12, 13
IV	June 13
V	June 14
VI	June 15
VII	June 15
VIII & IX	June 26 - 28
X.A	July 21
X.B	July 9
X.C	July 12
XI.A	
XI.B	July 26
XI.C	July 30
XI.D	July 31
XII.A	August 8
XII.B	August 10
XII.C	August 13

Location of plots.

All plots can be conveniently reached from skid-roads on which reference posts near each plot indicate the shortest route to same. The plots are marked with red paint and by cedar corner posts.

Plots I - X are situated on Dahlstrom Point, which forms the Eastern part of L.194, West Arm of Quatsino Sound.

Plots XI - XII are situated on L.324 and L.325, West Arm of Quatsino Sound.

The temporary plots 1 and 2 were laid out on Dahlstrom Point. They can be reached by ten minutes walk westward along the shore from the fishery boundary mark indicated on the map, and thence about ten chains south along a skid-road to a 35 year old 'blow-down.' Being only temporary these plots were not permanently marked.

History of the plots.

The section of Dahlstrom Point where plots I - X are situated was logged in 1920-21. Plots XI and XII are on an area which was logged in 1926. No fires have occurred in these areas subsequent to the logging.

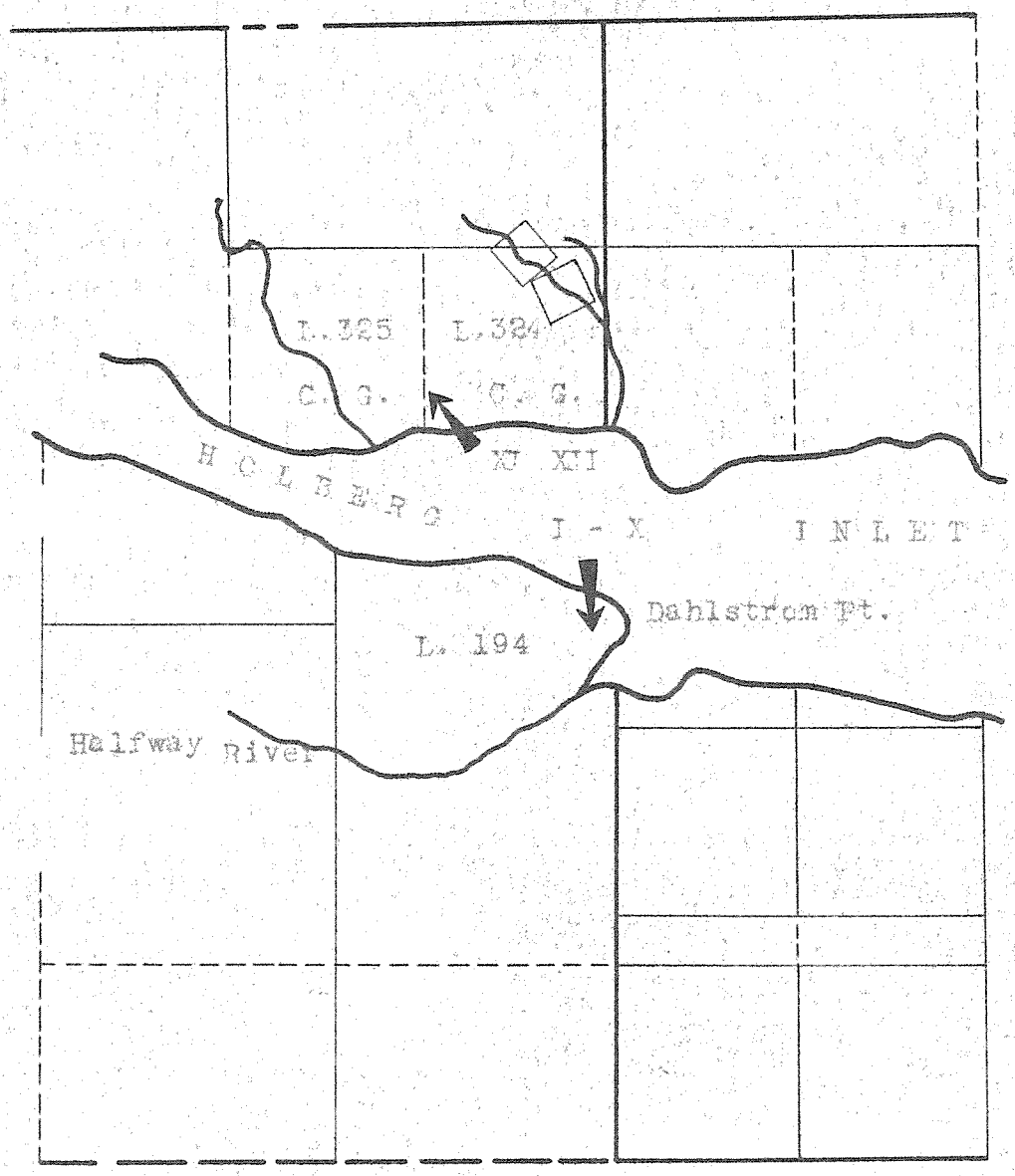
MAP

SHOWING

LOCATION OF THINNING PLOTS

at

QUATSINO SOUND



Areas of Plots

Plot No.	Area Sq.Chains	Acreage Conversion Factor
I	0.120	83.2
II	0.088	125.8
III	0.477	21.0
IV	0.759	13.2
V	0.313	31.95
VI	0.564	17.75
VII	0.355	28.13
VIII	0.454	22.0
IX	0.618	16.2
X.A	3.69	2.7
X.B	2.90	3.45
X.C	5.25	1.91
XI.A	0.965	10.36
XI.B	0.778	12.87
XI.C	0.72	13.9
XI.D	0.777	12.87
XII.A	1.38	7.2
XII.B	0.585	17.1
XII.C	0.652	15.35

Ecological Conditions.

The rainfall in this district is in the neighbourhood of 120 inches a year. This is more than sufficient to keep an adequate water supply in the ground throughout the growing season. As a result of the rainy climate the number of hours of sunshine is comparatively low, but to what extent this affects the assimilation of carbonic acid by the trees one cannot say at present.

The mineral soil consists of moraine with a large amount of clay. The underlying bedrock is limestone, which considerably increases the fertility of the soil. The soil-type has not been studied intensively. Its outstanding brown color points to the presence of a large amount of colloidal matter. If this soil is enriched by litter from broadleaf trees it will very likely approach, in many places, the mull type.

Methods of Treatment.

All thinnings were carried out according to the 'crown thinning' System. This method is not only better than 'low thinning' from a botanical aspect, but it was found to be necessary on account of the large number of faulty dominant trees in the second growth.

All of the small plots have been thinned according to this system with the purpose of obtaining an even

spacing of the dominant trees. As indicated in the enclosed tables and graphs a wide range of densities is represented.

Plot X comprises three sections typical of different rates of stocking. No. X.A is very open and the number of trees per acre is very unsatisfactory. The plot may serve as an indication of the result of deficient reproduction.

Plot X.B is well stocked, although a narrow gap runs lengthwise through the middle of it. This plot will give a good yield and the main study will be the influence of density upon total yield and upon the rate of growth of individual trees.

Plot X.C, the last of this series, is fairly well stocked, but the occurrence of gaps, particularly in the south end, is disturbing.

Plots XI.A and XI.B are very similar in regard to the number of trees per acre, but each has been dealt with in a different manner. On XI.A. most of the codominant and many of the ruled trees have been removed, so as to give selected predominant trees the best possible opportunity for fast growth without hazarding the self-pruning of the stand. The following figure gives an idealized picture of this plot. (Page 10)

Some of the dominant trees on XI.A are older than the rest of the stand. They were present at the time of the logging and many of them were damaged.

On this plot, as well as on others located on north side of the West Arm, many trees showed peculiar wounds in the bark. Most of these wounds or scars seem to have originated three years ago in the early spring of 1932 growing season. Climatic conditions are the most probable cause. Whenever possible such trees have been removed but in a few cases they have been left in order to maintain the balance of the stand.

Plot XI.B also had many trees damaged in the same way and was treated similarly to plot XI.A. Otherwise the thinning on this plot was a regular 'heavy crown thinning.'

Plots XI.C and XI.D represent stands in which gaps occur. In thinning, the first aim was to remove all defective trees. In other respects 'crown thinning' was applied, consideration being given to an even spacing of the predominant trees.

Plots XII.A - C have different densities, as shown on the general summary table on page 11. On these plots all of the trees have grown up since the time of logging, and the average heights and diameters are consequently lower than those of plots XI.A-D.

The density of the stand on plot XI.A is very low and uneven; as a result the tree trunks are generally crooked. In thinning the stand, the crooked trees were removed where it was possible to eliminate them without causing gaps in the crown closure. The remaining trees were given more space in which to grow. On this plot, as well as on XII.B and XII.C, scars were evident although they were not as numerous as on plots XI.A - D.

Before the thinning, plot XII.B was very dense, and plot XII.C was denser still. For this reason the thinning was severe in the upper crown classes. It was endeavoured to get an even spacing between dominant and codominant trees, and where such trees were lacking, a ruled tree was selected and liberated. There are not as many crooked trees on these two plots as on XII.A, nor were the scars as common as on XII.A and XI.

Idealized picture of plot
XI.A

GENERAL SUMMARY

(All figures on acreage basis)

Plot No.	Before Thinning					After Thinning				
	No.of trees	Avg. DBH ins	Basal area sq.ft	Annual incrmt b.area sq.ft.	Avg. ht. ft.	No.of trees	Avg. DBH in.	Basal area sq.ft	Avg. ht. ft.	Age in yrs.
1	11160	1.9	210	27.7 13.2%	23	4165	2.1	98	24.5	15.5
2	13800	1.6	192	26.1 13.6%	22	4780	1.9	91	23.5	15
3	1850	1.9	42	7.3 17.3%	18.5	1340	1.8	36	18	15
4	3330	1.8	61	10.2 16.5%	19.5	2370	1.9	47	20	14
5	1940	2.5	61	9.9 16.2%	20	1180	2.5	40	20	15
6	1440	1.9	28	4.9 17.4%	16	710	2.2	18	17	14
7	2080	2.1	51	8.4 16.4%	18.5	1290	2.2	34	19	15
8	11120	1.5	127	17.2 12.5%	21	6060	1.5	77	21	15
9	7610	1.9	146	17.2 11.8%	23.5	5120	1.7	83	22	15
10.A	476	2.9	22	3.7 16.8%	-	426	2.9	19	-	15
10.B	4460	2.3	124	14.2 11.5%	26.4	2670	2.1	61	26	15
10.C	1420	2.0	44	7.9 17.9%	19	970	2.5	30	21	15
11.A	9500	1.4	101	18.9 18.7%	17	6660	1.2	51	16.5	7
11.B	8060	1.5	102	19.1 18.7%	18	5510	1.3	50	17	7
11.C	9330	1.2	75	14.2 19.0%	15.5	6000	1.2	39.9	15.5	7
11.D	5330	1.2	45	8.6 19.0%	14	3540	1.1	24	13	7
12.A	4750	1.4	50	9.7 19.4%	15	2790	1.2	22	13	7
12.B	16700	0.7	49	9.7 19.7%	12	11920	0.7	29	12	7
12.C	31400	0.7	74	14.3 19.3%	12	25035	0.6	43	11	7
Tp.1	604	9.1	276	10.0 3.6%	77	-	-	-	-	35
Tp.2	680	8.4	260	9.1 3.5%	75	-	-	-	-	35