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A GUIDE FOR ESTIMATING MERCHANTABLE VOLUME AND GROWTH RATE OF SOFTWOOD STANDS IN CENTRAL NEWFOUNDLAND

by
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FOREST RESEARCH LABORATORY
ST. JOHN'S, NEWFOUNDLAND
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A Guide for Estimating Merchantable Volume and Growth Rate of Softwood Stands in Central Newfoundland

The information contained in this report provides a means for estimating present merchantable volume and growth potential of softwoods in even-aged stands in central Newfoundland (Forest Section B28a; Rowe, 1959). The table and two graphs were derived from data obtained from three measurements, taken at 10 year intervals between 1947 and 1968, of approximately 350 1/5 acre permanent sample plots.

The graphs are freehand smoothed curves drawn through 20-year growth trend lines. The table is taken from a single free-hand curve drawn through plotted points on a graph of volume/basal area ratios over stand height. The methods used are essentially those described and illustrated by van Hostrand (1964). In this earlier report growth curves were prepared by height index classes. However, for this guide curves have been prepared by species only, all sites combined. This was done because it became evident during analysis that plots having different height indexes, but with the same predominant species, merchantable volume, and age, displayed approximately equal volume increments during the next 10 or 20 years. On the other hand, there were obvious differences in the rates of growth between plots predominantly spruce (Picea mariana (Mill.) B.S.P. and Picea glauca (Moench) Voss) and those predominantly balsam fir (Abies balsamea (L.) Mill.). An additional modification was the combining of the volume/basal area ratios for spruce and fir. This was done on the basis of data from the latest remeasurement which indicated no appreciable differences between species.

Table 1 gives mean ratios of merchantable cubic feet per square foot of basal area, and cords per square foot of basal area, according to the mean height of dominant and co-dominant trees. Figures 1 and 2 are graphical representations of mean growth rate trends in merchantable volume per acre according to mean age of the stand at breast height, and present volume. Figure 1 represents stands with the softwood component comprised of more than 50 percent spruce, while Figure 2 represents stands with the softwood component comprised of more than 50 percent balsam fir. All merchantable volumes used in this report were derived from volume tables prepared by Honer (1967). Utilization is to a 6 inch stump and a 3 inch d.i.b. top.

It is intended that these data be used to obtain estimates for large forested areas such as a watershed, by means of a weighted average of individual estimates obtained from random samples in the various stands making up the watershed. Ideally, this would require stratification of the area by forest type and age. Where this is not psssible or practical, an overall random sample using standard, or relescope plots should produce acceptable results.

Recommended Procedure for Plot Estimates

(1) Obtain basal area in square feet per acre of softwoods 4" + d.b.h. by species.

(2) Determine predominant softwood species by proportion of basal area.

(3) Obtain mean height and breast height age from approximately 10 dominant and co-dominant trees of the predominant softwood species.

(4) From Table 1 obtain the volume/basal area ratio corresponding to the mean height, and multiply this by the basal area per acre to obtain present merchantable softwood volume.

(5) Enter the appropriate growth trend graph at the determined age and present volume, and follow the trend of the curves to the desired future age. Read off the corresponding predicted volume.

Cautionary Notes:

(1) No allowance has been made in the table or graphs for cull or abnormal stand disturbance.

(2) Volume projections of more than 20 years are not recommended.

(3) Results have been prepared by graphical means and therefore no statistical confidence limits are given for estimates obtained using these data.

References

Honer, T.G., 1967. Newfoundland Forest Inventory Volume Tables. Canada Department of Forestry Computer Program MS 2D/13.

Rowe, J.S., 1959. Forest Regions of Canada, Dept. of North. Aff. and Nat. Res. For. Branch Bull. 123.

van Nostrand, R.S., 1964. Growth Trends in Spruce and Fir Stands in Central Newfoundland, Dept. of For. Publication 1063.

TABLE 1

VOLUME/BASAL AREA RATIOS

Merchantable Volume Per Square Foot of Basal Area

1 Cord = 85 Cubic Feet

Mean Height	Cubic Feet	Cords	Mean Height	Cubic Feet	Cords
20	9.2	.11	43	15.6	.18
21	9.5	.11	44	16.0	.19
22	9.7	.11	45	16.4	.19
23	9.8	.12	46	16.7	.20
24	10.2	.12	47	17.1	.20
25	10.4	.12	48	17.4	.20
26	10.5	.12	49	17.7	.21
27	10.7	.13	50	18.1	.21
28	11.0	.13	51	18.4	.22
29	11.3	.13	52	18.6	.22
30	11.5	.14	53	18.9	.22
31	11.7	.14	54	19.2	.23
32	12.0	.14	55	19.5	.23
33	12.2	.14	56	19.7	.23
34	12.5	.15	57	19.9	.23
35	12.7	.15	58	20.2	.24
36	13.1	.15	59	20.4	.24
37	13.5	.16	60	20.6	.24
38	13.8	.16	61	20.8	.24
39	14.2	.17	62	21.0	.25
40	14.5	.17	63	21.2	.25
41	14.8	.17	64	21.3	.25
42	15.2	.18	65	21.5	.25

Figure 1

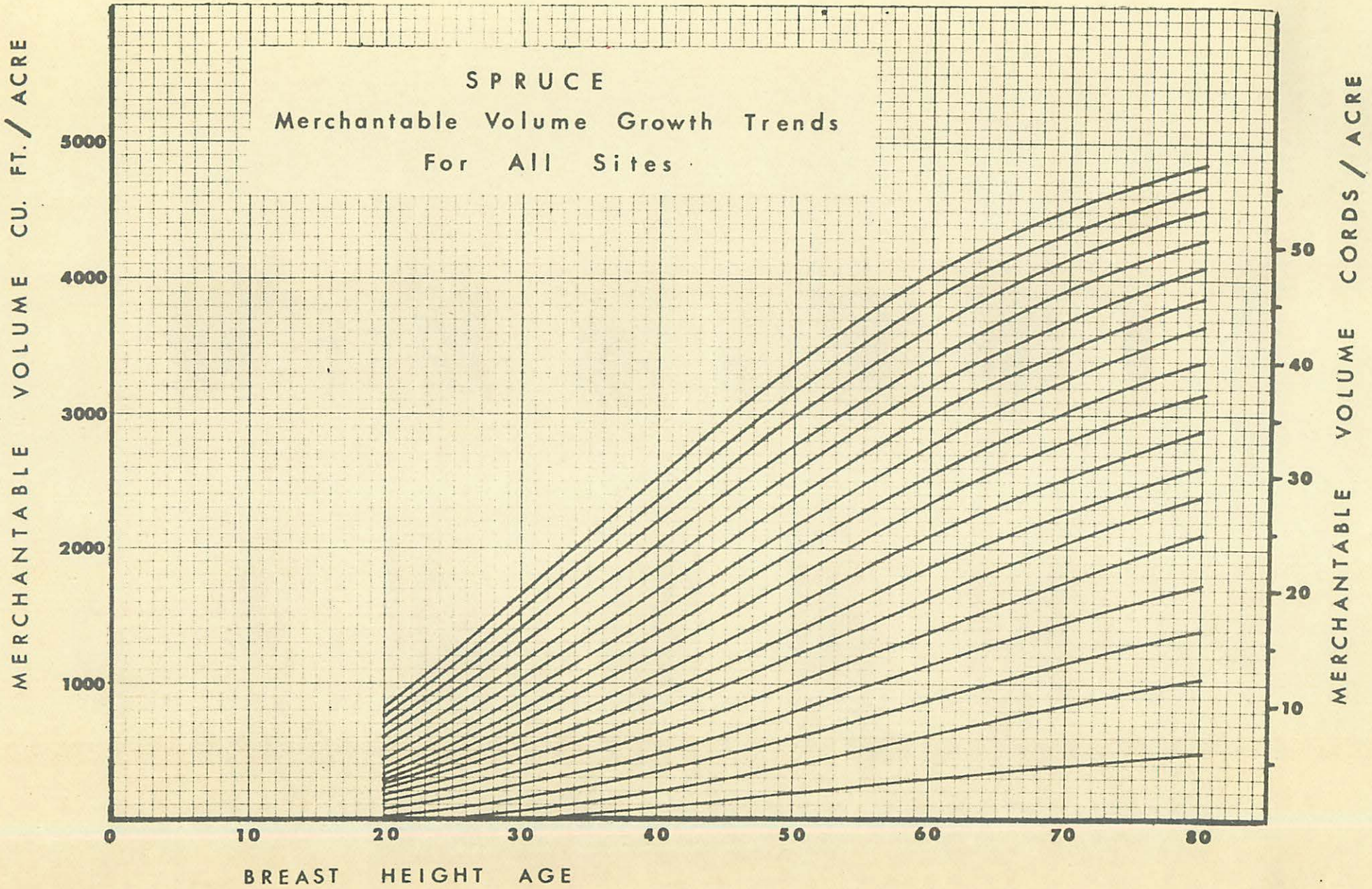
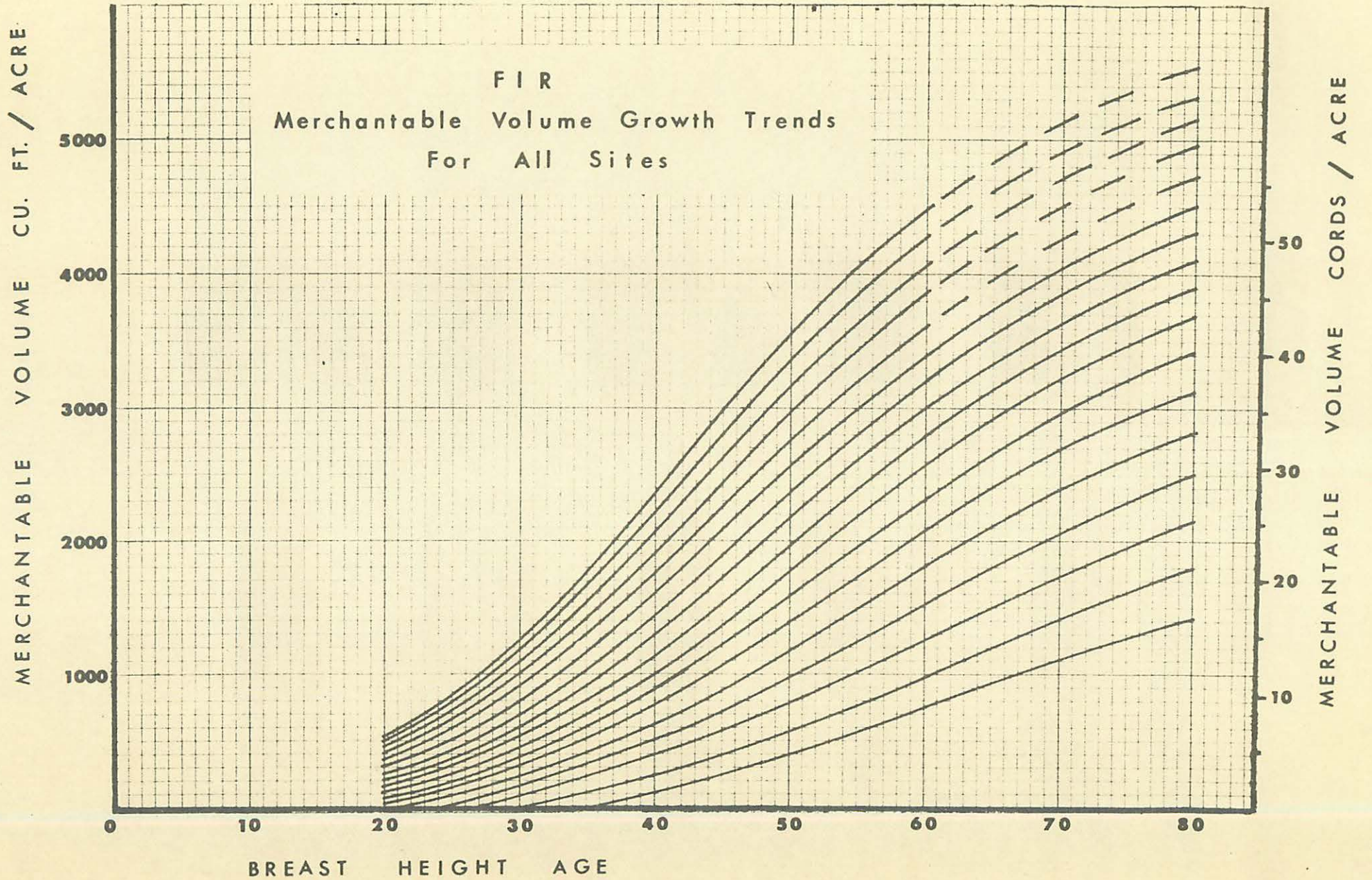

SPRUCE
Merchantable Volume Growth Trends
For All Sites
MERCHANTABLE VOLUME CU. FT. / ACRE
5000
4000
3000
2000
1000
MERCHANTABLE VOLUME CORDS / ACRE
50
40
30
20
10
0
10
20
30
40
50
60
70
80
BREAST HEIGHT AGE

Figure 2


FIR
Merchantable Volume Growth Trends
For All Sites
MERCHANTABLE VOLUME CU. FT. / ACRE
5000
4000
3000
2000
1000
MERCHANTABLE VOLUME CORDS / ACRE
50
40
30
20
10
0
10
20
30
40
50
60
70
80
BREAST HEIGHT AGE