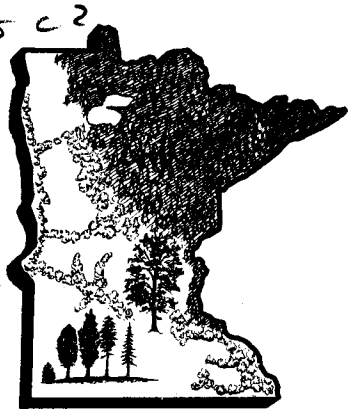

MINNESOTA FORESTRY NOTES

No. 105
July 15, 1961

AERIAL STAND VOLUME TABLES FOR NORTHERN MINNESOTA

M. P. Meyer[1]

These tables represent the preliminary stage in a study of the applicability of systems of aerial stand classification and measurement to the formulation of forest management plans[2]. The tables are based on ground and air photo measurements of 52 one-acre conifer plots and 53 one-acre hardwood plots in Carlton County. Gross volumes are i.b. and include all trees 5.0 inches d.b.h. and larger from stump to variable top diameter not less than 4.0 inches i.b. Solid lines indicate limits of basic data; dotted lines indicate boundaries between the two linear regression equations employed in each table.

Conifer Aerial Stand Volume Table for Northern Minnesota

Average total photo height (feet)	Photo crown closure per cent 5	15	25	35	45	55	65	75	85	95
	- gross cubic feet per acre -									
30		80	190	310	420	540	660	770	890	1,000
35	140	250	370	480	600	720	830	950	1,060	1,180
40	310	430	540	660	780	890	1,010	1,120	1,240	1,360 [3]
45	790	850	910	970	1,040	1,100	1,190	1,300	1,420	1,530
50	1,180	1,240	1,310	1,370	1,430	1,490	1,560	1,620	1,680	1,740
55	1,580	1,640	1,700	1,760	1,820	1,890	1,950	2,010	2,070	2,140
60	1,970	2,030	2,100	2,160	2,220	2,280	2,340	2,410	2,470	2,530
65	2,370	2,430	2,490	2,550	2,610	2,680	2,740	2,800	2,860	2,930
70	2,760	2,820	2,890	2,950	3,010	3,070	3,130	3,200	3,260	3,320
75	3,160	3,220	3,280	3,340	3,400	3,470	3,530	3,590	3,650	3,720 [4]
80	3,550	3,610	3,680	3,740	3,800	3,860	3,920	3,990	4,050	4,110
85	3,950	4,010	4,070	4,130	4,190	4,260	4,320	4,380	4,440	4,510
90	4,340	4,400	4,470	4,530	4,590	4,650	4,720	4,780	4,840	4,900
95	4,740	4,800	4,860	4,920	4,980	5,050	5,110	5,170	5,230	5,300
100	5,130	5,190	5,260	5,320	5,380	5,440	5,500	5,570	5,630	5,690

Volumes may be converted to rough cords per acre by dividing by 80

1/ Associate Professor, School of Forestry, University of Minnesota.

2/ The author wishes to acknowledge his appreciation to the Minnesota and Ontario Paper Co. for the interest and assistance afforded through the Mando Fellowship program.

3/ Standard error of estimate of this portion of table: ± 44% of average plot volume.

4/ Standard error of estimate of this portion of table: ± 35% of average plot volume.

Published by the School of Forestry, University of Minnesota, St. Paul 1, Minnesota, cooperating with the Division of Forestry, Minnesota Conservation Department, and Forest Industries of Minnesota

Hardwood Aerial Stand Volume Table for Northern Minnesota

Average total photo height (feet)	Photo crown closure percent: 5	15	25	35	45	55	65	75	85	95
	- gross cubic feet per acre -									
30				90	180	280	370	460	550	640
35		60	160	250	340	430	520	610	700	790
40	130	220	310	400	490	580	670	760	860	950 5/
45	280	370	460	550	640	740	830	920	1,010	1,100
50	570	650	730	810	890	970	1,050	1,130	1,210	1,290
55	850	930	1,010	1,090	1,170	1,250	1,330	1,410	1,490	1,570
60	1,130	1,210	1,290	1,370	1,450	1,530	1,610	1,690	1,770	1,850
65	1,420	1,490	1,570	1,650	1,730	1,810	1,890	1,970	2,050	2,130
70	1,700	1,780	1,850	1,930	2,010	2,090	2,170	2,250	2,330	2,410 6/
75	1,980	2,060	2,140	2,220	2,290	2,370	2,450	2,530	2,610	2,690
80	2,260	2,340	2,420	2,500	2,580	2,660	2,730	2,810	2,890	2,970
85	2,540	2,620	2,700	2,780	2,860	2,940	3,020	3,100	3,170	3,250

Volumes may be converted to rough cords per acre by dividing by 80.

5/ Standard error of estimate of this portion of table: ± 32% of average plot volume.

6/ Standard error of estimate of this portion of table: ± 29% of average plot volume.

Data were obtained for the conifer table in two stages: (a) photo measurements of 23 plots by 18 interpreters, and (b) photo measurements of an additional 29 plots by four interpreters. Mean photo plot data were similarly obtained for the hardwood table by: (a) measurements of 25 plots by 18 interpreters, and (b) measurements of an additional 28 plots by four interpreters. A total of four parallax height measurements of dominant tree heights and an estimate of crown closure using Moessner's Density Scale were made on each plot by each interpreter. The mean height measurement, mean crown closure estimate, and the ground volume estimate on each plot provided the basis for the construction of the regression equations.

Although no suitable ground measurement exists for comparison, the crown closure estimates tended, on an individual plot basis, to be quite uniform for all interpreters involved. As was expected, the photo tree height measurements were lower on the average than the ground measurements. For the conifers, the average interpreter was 9.9' low in his estimate of mean height of all trees, whereas in the hardwoods the average interpreter was only 2.3' low in his estimate of mean height of all trees.

Published as Sci. Jour. Ser. Paper No. 4661 of the Minn. Agr. Expt. Station.