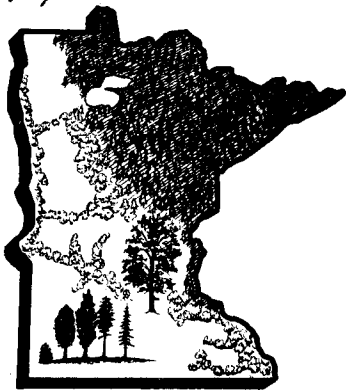
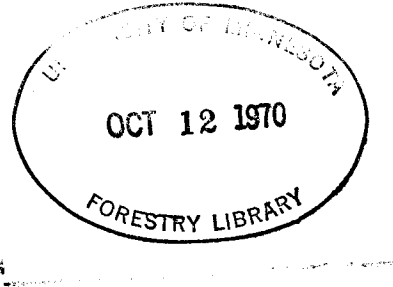


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A COMPOSITE LOCAL AERIAL STAND VOLUME TABLE FOR THE CLOQUET, MINNESOTA VICINITY

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Previous experimental aerial stand volume tables for Minnesota (1,2,3) were compiled by conventional hand calculator methods. In view of the compilation and analysis capacities now available through electronic computer methods, the value of these previous prediction equations becomes questionable.

For this revised table, a total of 134 ground-measured plots were located on 1:15,840 scale fall panchromatic photography. Each plot was measured for photo stand height and estimated for crown density by a number of trained photo interpreters and all ground and photo data for the plot entered in an IBM machine card. The Umstat 50: Correlation and Multiple Linear Regression Program for use with the CDC 1604 Computer was then employed to provide the possible volume prediction tables.

The results of this multiple linear regression analysis consisted of 255 regression equations from which the final equation was selected on the basis of a balanced combination of the following desirable attributes: (a) fewest possible variables, (b) highest possible correlation coefficient, and (c) lowest possible standard error of the estimate.

With the selection of the best photo volume prediction equation, a program was developed for use with the IBM 1401 Computer for the actual construction of the volume table from the equation.

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Composite Aerial Stand Volume Table for the
Cloquet, Minnesota Vicinity

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 -									
20	640	570	530	510	520	560	620	710	820	970
25	620	530	480	460	480	530	620	750	910	1110
30	610	510	450	430	460	530	650	810	1020	1270
35	610	500	440	440	480	570	720	910	1150	1450
40	610	520	470	480	550	660	820	1040	1310	1630
45	630	570	550	590	670	800	990	1220	1500	1830
50	660	650	680	750	870	1020	1210	1440	1710	2020
55	710	780	880	1000	1140	1310	1500	1720	1950	2210
60	780	960	1150	1340	1520	1700	1880	2050	2230	2400
65	860	1200	1510	1770	2000	2190	2340	2460	2530	2570
70	980	1510	1960	2320	2600	2790	2900	2930	2870	2730
75	1120	1890	2510	2990	3330	3520	3570	3480	3240	2860

Volumes may be converted to rough cords by dividing by 80

Volume table prepared from 134 ground and photo measured plots; heavy lines indicate limits of basic data.

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.

Multiple correlation coefficient (R): .694

Standard error of estimate: $\pm 45\%$

Equation:

$$\text{Photo volume} = 67.993 + .0000495H^2D^2 - .00000083H^2D^2 \\ - .003823H^2D + .00007257H^3D$$

where: H is photo height, and
D is estimate photo crown density

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