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Volume and Taper Tables For Red Alder

by Robert O. Curtis, David Bruce, and Caryanne VanCoevering

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INTRODUCTION

Red alder is a species of increasing importance in the Pacific Northwest. Interest in improved volume tables for the species resulted in publication of the 1949 volume tables (Johnson et al, 1949; Skinner 1959). More recently, Browne (1962) published cubic-foot-volume tables for red alder in British Columbia, and Hoyer (1966) presented tarif access tables, based on the 1949 tables, for use with the general tarif tables of Turnbull et al. (1963).

This paper presents new volume and taper tables for red alder. These form a unified system, permitting computation of cubic- and board-foot volumes for alternative assumed scaling practices and limits of merchantability.

DATA

Basic data used in construction of these tables consisted of (1) tree measurement data from Oregon, Washington, and British Columbia used in construction of the 1949 tables; (2) additional tree measurement data from Washington and Oregon contributed by Weyerhaeuser Co.; and (3) tree measurement data originally used for the volume tables published by Johnson et al. in 1926. After elimination of trees lacking measurements of upper stem diameters to less than 10 inches, having low forks or other gross abnormalities or apparent errors in recording of data, a total of 473 trees were available for the analysis (table 1).

METHODS

A report on the method of data analysis is planned for separate publication. Therefore, only an outline of the approach used is given in this paper.

Basically, the method consisted in deriving from the pooled tree measurement data an equation expressing squared diameter inside bark — $(\text{d.i.b.})^2$ — as a function of the relative height at point of measurement, diameter outside bark at breast height (d.b.h.) and total height (H) of the tree.[1]

Cubic volumes (CV) were then estimated by integration of the resulting equation. Estimates of upper stem diameter were obtained as the square root of the estimated $(\text{d.i.b.})^2$. Board-foot volumes were estimated by applying assumed merchantability and scaling standards to the estimates of upper stem diameters. Equations were then developed for conversion of total cubic volume to merchantable cubic- and board-foot volumes.

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[1] Since the principal intended use of the equation was in estimation of volume, using the relationship cubic volume $= k \int (\text{d.i.b.})^2 dH$, $(\text{d.i.b.})^2$ rather than d.i.b. was considered the variable of primary interest.

RESULTS

CUBIC-VOLUME TABLE

Table 2 gives estimates of average cubic volume of red alder trees of specified d.b.h. and total height. Volumes are inside bark, from a stump of height in feet equal to $[\frac{1}{2} + (\frac{1}{2})(\text{d.b.h.}/12)]$,[2] to the indicated inside bark (i.b.) top diameter limits of 12.0, 10.0, 8.0, 6.0, 4.0, and 0.0 inches. No trim allowance is made.

These estimates were obtained by integration of the estimating equation for $(\text{d.i.b})^2$ from assumed stump height to heights corresponding to the indicated diameter limits.

TAPER TABLE

Table 3 gives estimated diameters inside bark of red alder trees of specified d.b.h. and total height, at intervals of 4.125 feet above stump height. Values given are square roots of the values of $(\text{d.i.b.})^2$ predicted by the estimating equation. The height interval used provides trim allowance of 0.50 foot per 16 feet of bole.

VOLUME TABLES IN BOARD FEET

Tables 4, 5, and 6 give estimated average tree volume in board feet Scribner (SV) for stated assumed scaling lengths (8 and 16 feet), top diameter limits (12.0, 10.0, 8.0, and 6.0 inches i.b.), and diameter measurement practice ("nearest inch" versus rounding of fractional diameters to next lower exact inch). Volumes were obtained by applying the formula Scribner log rule (Bruce 1925) to estimated upper stem diameters (table 3), with trim allowance of 0.50 foot per 16 feet of merchantable stem and using, for top logs, estimated length (unrounded) to the stated top d.i.b. limit.

Use of formula rule rather than scale stick values eliminates the arbitrary and illogical jumps which result from rounding and the diagraming process. Volumes for measurement to "nearest inch" were obtained by using estimated top d.i.b. in the formula; volumes for measurement "rounding down" were obtained by using $(\text{d.i.b.}—\frac{1}{2})$ as the diameter in the formula. Since volume tables represent the means of many trees, smoothed values are appropriate.

Table 7, which gives estimated Scribner volumes by d.b.h. class and number of 16-foot logs, was prepared by graphical interpolation from values shown in tables 3 and 5.

Table 8 gives estimated tree volumes in board feet by International ¼-inch rule, with the same assumed measurement practices used in table 4.

CHOICE OF TOP DIAMETER LIMIT

In application of either board-foot or merchantable cubic-volume tables, the choice of minimum top d.i.b. limit should be based on the user's estimate of the top d.i.b. to which average trees of the size under consideration can actually be utilized. This limit will vary with tree size, because of excessive branching in the tops of large trees. Thus, board-foot volume to a 6-inch top in a tree 24 inches d.b.h. is not a realistic estimate of the volume of material actually utilizable as sawtimber, even though smaller trees may be utilized to this limit.

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[2] An arbitrary rule, which approximates average height of stumps as cut.

COMPARISON OF "ACTUAL" AND ESTIMATED VOLUMES

"Actual" cubic volume of sample trees was calculated by Smalian's formula (except with butt section treated as a neiloid) and the differences [$CV_{estimate} - CV_{actual}$], where estimated volume was CVT as shown in table 2, were expressed as percentages of estimated volume. The mean percentage difference, excluding 131 trees for which stump diameter had not been recorded, was −1 percent with standard deviation of 9 percent.

For a portion (139) of the sample trees, differences between estimated Scribner volume (SV8 in table 6) and "actual" Scribner volume were calculated. These, when expressed as percentages of estimated volume, had a mean of −0.8 percent and standard deviation of 15 percent.

TARIF ACCESS CURVES

Those wishing to use the tarif system for volume computation (Turnbull et al. 1963) can readily use table 2 as the basis for a tarif access table by means of the relationship

$$\text{tarif number} = \frac{0.913(CV4)}{(\text{basal area} - 0.087)}$$

given by Turnbull and Hoyer (1965).

Figure 1 is such an access table in graphical form.

COMPUTING EQUATIONS

The equations given below may be used for calculations on automatic data processing equipment.

1. Diameters inside bark may be estimated by the following equation, which is the basis of table 3.

$$\text{d.i.b.}_{\text{est}} = (\text{d.b.h.})\sqrt{\left[\frac{(\text{d.i.b.})^2}{(\text{d.b.h.})^2}\right]_{\text{est}}}$$

where

$$\left[\frac{(\text{d.i.b.})^2}{(\text{d.b.h.})^2}\right]_{\text{est}} = 0.91274(x)^{1.5} - 1.9758(x^{1.5}-x^3)(\text{d.b.h.})(10^{-2}) + 8.2375(x^{1.5}-x^3)(H)(10^{-3}) - 4.964(x^{1.5}-x^{32})(H)(\text{d.b.h.})(10^{-5}) + 3.773(x^{1.5}-x^{32})(H)^{0.5}(10^{-3}) - 7.417(x^{1.5}-x^{40})(H)^2(10^{-6})$$

in which

H = total height of tree,

d.b.h. = diameter outside bark at breast height,

and

$$x = \frac{(\text{distance from tip to estimated d.i.b.})}{(H-4.5)}$$

The ratio $(\text{d.i.b.})^2/(\text{d.b.h.})^2$ has a standard error of estimate of approximately 0.07.

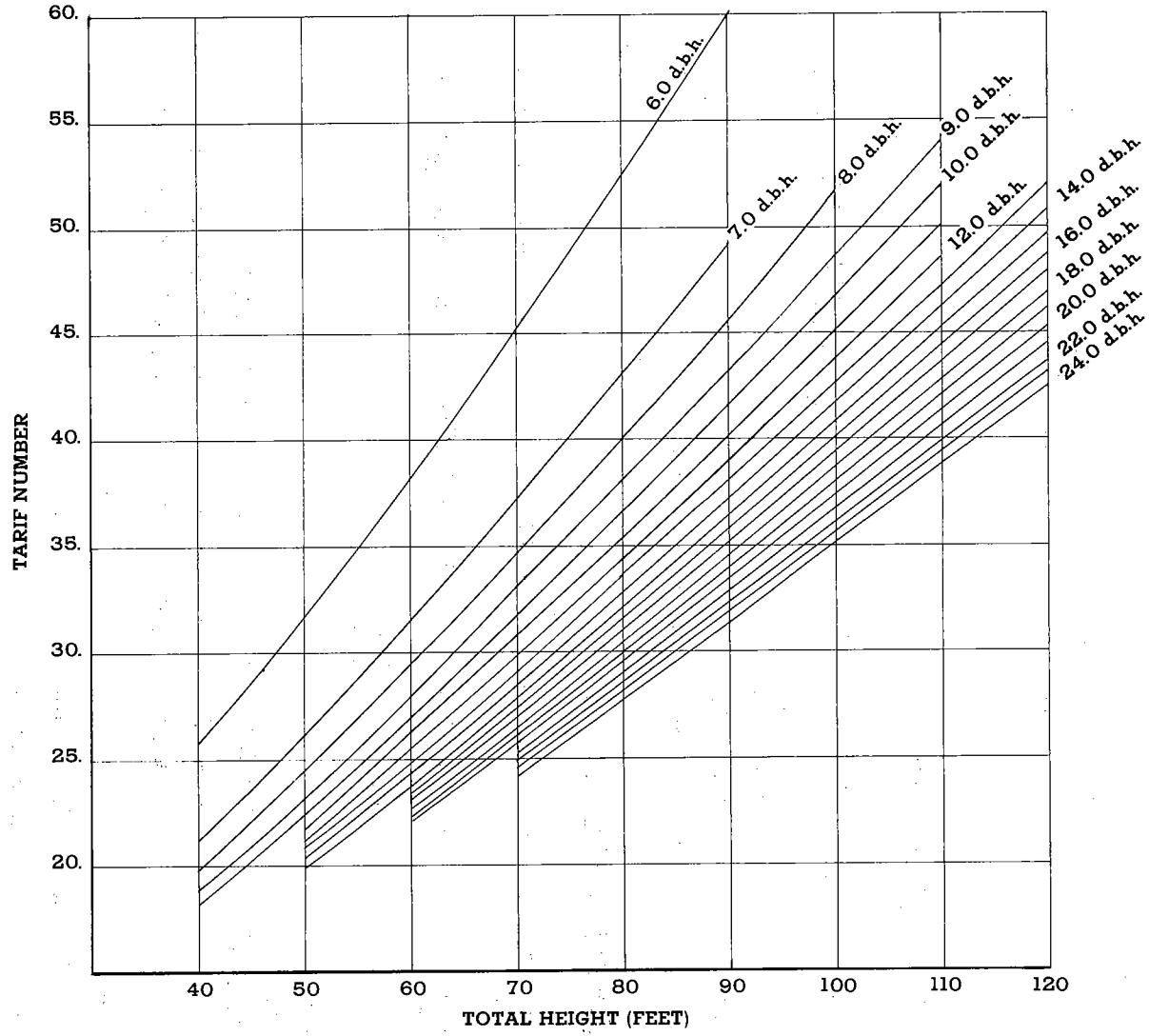

Figure 1. —Graph for estimating tarif number of red alder from d.b.h. and total height.

Figure 1. —Graph for estimating tarif number of red alder from d.b.h. and total height.

2. The basic equation for total cubic volume above stump (CVT), derived from (1), is:

$$CVT = 0.00545415\ (d.b.h.)^2(H—4.5)\ (F)$$

where[3]

$$\begin{aligned} F = {} & 0.36510(Z)^{2.5} — 7.9032(Z)^{2.5}(d.b.h.)(10^{-3}) + 3.2950(Z)^{2.5}(H)(10^{-3}) \\ & — 1.9856(Z)^{2.5}(H)(d.b.h.)(10^{-5}) — 2.9668\ (Z)^{2.5}(H)^2(10^{-6}) \\ & + 1.5092(Z)^{2.5}(H)^{0.5}(10^{-3}) + 4.9395(Z)^4(d.b.h.)(10^{-3}) \\ & — 2.05937(Z)^4(H)(10^{-3}) + 1.5042(Z)^{33}(H)(d.b.h.)(10^{-6}) \\ & — 1.1433(Z)^{33}(H)^{0.5}(10^{-4}) + 1.8090(Z)^{41}(H)^2(10^{-7}) \end{aligned}$$

in which

$$Z = \frac{(H—½—(d.b.h.)/24)}{(H—4.5)} = \frac{\text{(total height above stump in feet)}}{\text{(total height above b.h. in feet)}}$$

3. The estimates of total cubic volume (CVT) for trees of specified d.b.h. and height (H) given by equation 2 above may be converted to merchantable cubic volumes to top diameters of 4, 6, 8, 10, and 12 inches i.b. (CV4, CV6, CV8, CV10, CV12) by multiplying estimated total cubic volume by the following conversion factors:

$$\frac{CV4}{CVT} = 0.99875 - \frac{43.336}{(d.b.h.)^3} - \frac{124.717}{(d.b.h.)^4} + \frac{0.193437(H)}{(d.b.h.)^3} + \frac{479.83}{(d.b.h.)^3(H)}$$

$$\frac{CV6}{CVT} = 1.00081 - \frac{1614.44}{(d.b.h.)^4} + \frac{2.86121(H)}{(d.b.h.)^4} + \frac{1686.7}{(H)^3} - \frac{21.7181}{(d.b.h.)(H)} + \frac{1.1028(10^5)}{(d.b.h.)^5(H)}$$

$$\frac{CV8}{CVT} = 1.03361 - \frac{1.59234}{(d.b.h.)} - \frac{4667.04}{(d.b.h.)^4} + \frac{0.104498(H)}{(d.b.h.)^2} + \frac{5322.16}{(d.b.h.)^3(H)}$$

$$\frac{CV10}{CVT} = 1.02328 - \frac{43.4570}{(d.b.h.)^2} - \frac{7626.29}{(d.b.h.)^4} + \frac{76.7229(H)}{(d.b.h.)^4} - \frac{9954.576(H)}{(d.b.h.)^6} + \frac{116766.}{(d.b.h.)^4(H)}$$

$$\frac{CV12}{CVT} = 1.21396 - \frac{10.24325}{(d.b.h.)} + \frac{6.54920}{(H)} + \frac{12.2606(H)}{(d.b.h.)^3} - \frac{46116.8(H)}{(d.b.h.)^6} - \frac{1145.61}{(d.b.h.)^2(H)}$$

A similar set of conversion factors, some what less accurate but based on d.b.h. only, is given by the curves shown in figure 2.

These cubic-volume conversion factors, and the board-foot volume conversion factors of following sections, should of course *not* be applied to trees of dimensions too small to contain merchantable volume to the specified top diameter limit.

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[3] "F" is $\int_0^Z \left[\frac{(d.i.b.)}{(d.b.h.)}\right]^2 dx$, which is a form factor based on a cylinder of diameter equal to d.b.h. and height equal to (H—4.5).

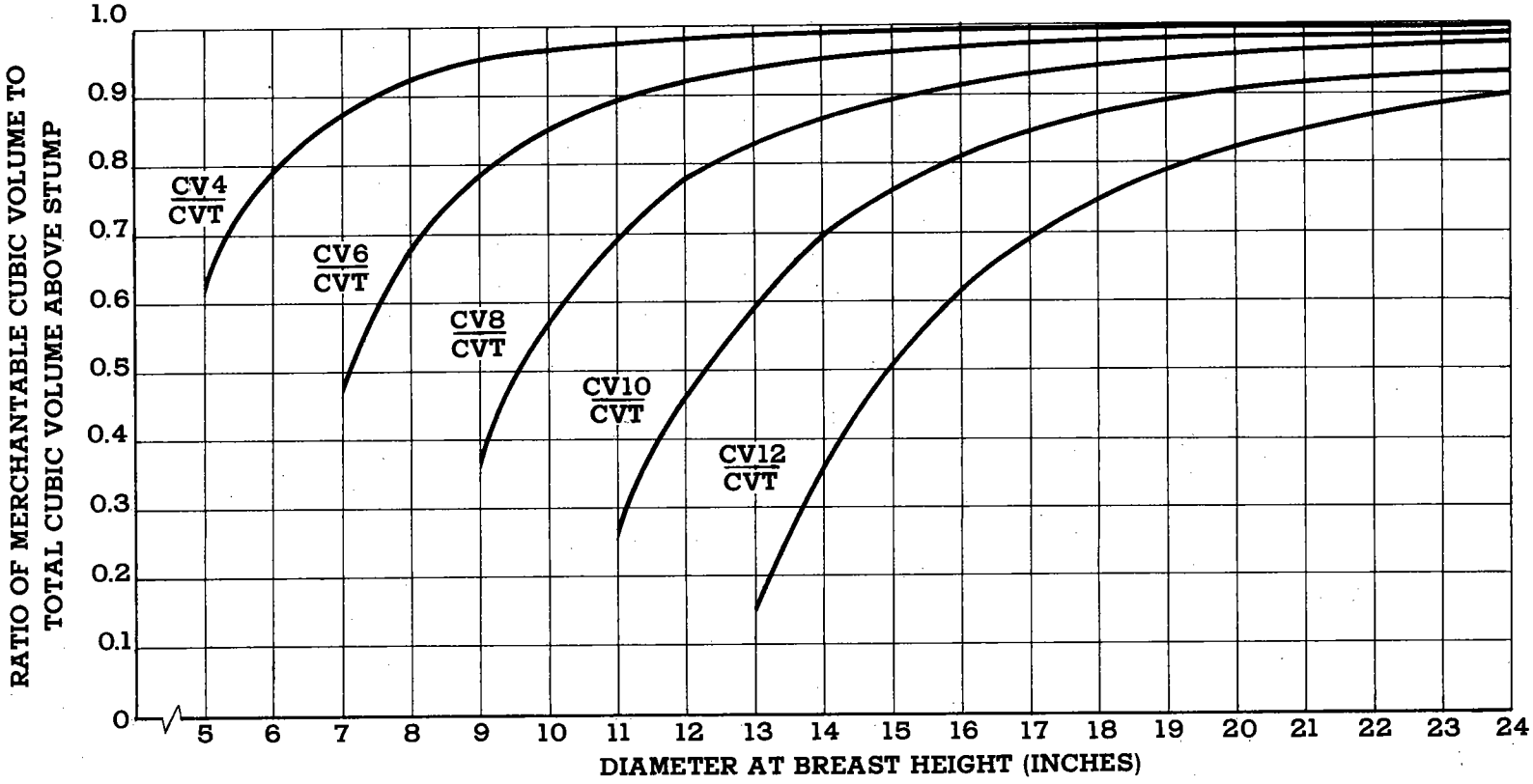

Figure 2.—Relationship of ratios of (merchantable cubic volume)/CVT to tree d.b.h.

4. Total cubic-volume estimates (CVT) for saw-log-size trees of specified d.b.h. and H may be converted to board feet, Scribner, by multiplying by the conversion factors given below. Ratios are for board-foot volumes to tops of 6, 8, 10, and 12 inches i.b. (SV6, SV8, SV10, and SV12). Scaling is assumed to be in 16-foot logs, with fractional diameters rounded down to next lower exact inch, since this most nearly approximates current commercial practice.

$$\frac{SV6}{CVT} = 8.36001 - \frac{30.3982}{D} - \frac{205.532}{H} - \frac{152.004}{D^2} + \frac{1674.00}{D^4} + \frac{1227.84}{DH}$$

$$\frac{CV8}{CVT} = 8.11342 - \frac{398.033}{D^2} - \frac{218.418}{H} + \frac{76702.1}{H^3} - \frac{0.05208(H)}{D} + \frac{11337.8}{D^2H} - \frac{2.46759(10^7)}{D^6H}$$

$$\frac{SV10}{CVT} = 7.76152 - \frac{16.6331}{(d.b.h.)} - \frac{156.070}{(H)} - \frac{5845.33}{(d.b.h.)^3} + \frac{2.29172(10^5)}{(d.b.h.)^3(H)} - \frac{2.43897(10^8)}{(d.b.h.)^8}$$

$$\frac{SV12}{CVT} = 7.34627 - \frac{129.986}{(H)} - \frac{2.20502(H)(10^5)}{(d.b.h.)^6} + \frac{7465.72}{(H)^2} - \frac{4082.55}{(d.b.h.)(H)} + \frac{2.97332(10^6)}{(d.b.h.)^4(H)}$$

Total cubic-volume estimates (CVT) for saw-log-size trees of specified d.b.h. and H may be converted to board feet, International ¼-inch rule, by multiplying by the conversion factors given below. Ratios are for board-foot volumes to tops of 6, 8, 10, and 12 inches i.b. (IV6, IV8, IV10, and IV12). Scaling is assumed to be in 16-foot logs, with fractional diameters rounded to the nearest inch.

$$\frac{IV6}{CVT} = 8.22987 - \frac{189.164}{D^2} - \frac{5631.3}{D^4} - \frac{179.256}{H} + \frac{7977.6}{D^2H} + \frac{143.04(H)}{D^5}$$

$$\frac{IV8}{CVT} = 8.30882 - \frac{190.146}{D^2} - \frac{21960.}{D^4} - \frac{191.413}{H} - \frac{1.211(10^6)}{H^4} + \frac{11281.}{D^2H}$$

$$\frac{IV10}{CVT} = 8.24035 - \frac{7034.29}{D^3} - \frac{4.22367(10^8)}{D^8} - \frac{178.007}{H} + \frac{2.49955(10^5)}{D^3H}$$

$$\frac{IV12}{CVT} = 7.84957 - \frac{51936.7}{D^2H} + \frac{398559.}{D^3H} - \frac{2.45274(10^5)(H)}{D^6} - \frac{130.245}{H} + \frac{7.299(10^6)}{H^4}$$

Erratum: In the above equations D=d.b.h.

TABLE 1.--DISTRIBUTION OF SAMPLE TREES BY DIAMETER AND HEIGHT CLASSES.

DBH	TOTAL HEIGHT IN FEET											TOTAL FOR DBH CLASS
	20	30	40	50	60	70	80	90	100	110	120	
2	1	4	2	-	-	-	-	-	-	-	-	7
3	-	1	6	3	-	-	-	-	-	-	-	10
4	-	1	3	1	1	-	-	-	-	-	-	6
5	-	-	1	-	2	2	-	-	-	-	-	5
6	-	-	-	1	-	2	5	2	-	-	-	10
7	-	-	-	-	1	4	12	5	-	-	-	22
8	-	-	-	-	-	1	14	9	-	-	-	24
9	-	-	-	-	4	3	14	11	1	-	-	33
10	-	-	-	-	-	2	18	12	4	-	-	36
11	-	-	-	-	2	5	9	13	3	-	-	32
12	-	-	-	-	2	7	15	23	4	1	-	52
13	-	-	-	-	-	2	7	14	4	-	-	27
14	-	-	-	-	-	2	15	18	16	1	-	52
15	-	-	-	-	-	2	12	14	10	1	-	39
16	-	-	-	-	-	1	13	14	13	4	-	45
17	-	-	-	-	-	-	4	5	6	4	-	19
18	-	-	-	-	-	-	8	4	2	2	-	16
19	-	-	-	-	-	1	2	4	7	-	1	15
20	-	-	-	-	-	-	2	2	4	-	-	8
21	-	-	-	-	-	-	-	2	1	1	-	4
22	-	-	-	-	-	-	-	-	2	-	-	2
23	-	-	-	-	-	1	1	-	1	-	1	4
24	-	-	-	-	-	-	1	2	-	2	-	5
TOTAL FOR HT CLASS	1	6	12	5	12	35	152	154	78	16	2	TOTAL NO. 473

TABLE 2.--VOLUME OF RED ALDER TREES IN CUBIC FEET INSIDE BARK (CV), FROM STUMP TO SPECIFIED MINIMUM TOP DIAMETER INSIDE BARK (DIB). STUMP HEIGHT = 0.5 FOOT + 0.5 x DBH. MERCHANTABLE VOLUMES OMITTED FOR TREES LESS THAN 6 INCHES DBH OR HAVING LESS THAN 8 LINEAL FEET OF MERCHANTABLE BOLE.

DBH	TOTAL HT	MINIMUM TOP DIB - INCHES					
		12.0 CV12	10.0 CV10	8.0 CV8	6.0 CV6	4.0 CV4	0.0 CVT
2	20	-	-	-	-	-	.216
2	30	-	-	-	-	-	.307
2	40	-	-	-	-	-	.404
3	20	-	-	-	-	-	.510
3	30	-	-	-	-	-	.690
3	40	-	-	-	-	-	.902
3	50	-	-	-	-	-	1.12
4	30	-	-	-	-	-	1.22
4	40	-	-	-	-	-	1.59
4	50	-	-	-	-	-	1.98
4	60	-	-	-	-	-	2.39
5	30	-	-	-	-	-	1.91
5	40	-	-	-	-	-	2.47
5	50	-	-	-	-	-	3.07
5	60	-	-	-	-	-	3.70
5	70	-	-	-	-	-	4.35
6	40	-	-	-	-	2.81	3.54
6	50	-	-	-	-	3.47	4.39
6	60	-	-	-	-	4.18	5.28
6	70	-	-	-	-	4.94	6.20
6	80	-	-	-	-	5.72	7.15
6	90	-	-	-	-	6.54	8.12
7	40	-	-	-	2.30	4.20	4.78
7	50	-	-	-	2.72	5.20	5.92
7	60	-	-	-	3.17	6.26	7.12
7	70	-	-	-	3.66	7.37	8.36
7	80	-	-	-	4.19	8.52	9.64
7	90	-	-	-	4.74	9.71	10.9

TABLE 2 (continued)

DBH	TOTAL HT	MINIMUM TOP DIB - INCHES 12.0 CV12	10.0 CV10	8.0 CV8	6.0 CV6	4.0 CV4	0.0 CVT
8	40	-	-	-	4.20	5.71	6.20
8	50	-	-	-	5.13	7.06	7.67
8	60	-	-	-	6.15	8.50	9.21
8	70	-	-	-	7.23	9.99	10.8
8	80	-	-	-	8.38	11.5	12
8	90	-	-	-	9.59	13.1	14.1
8	100	-	-	-	10.8	14.8	15.8
9	40	-	-	-	6.11	7.37	7.78
9	50	-	-	3.49	7.51	9.10	9.62
9	60	-	-	3.91	9.02	10.9	11.6
9	70	-	-	4.33	10.6	12.9	13.6
9	80	-	-	4.72	12.3	14.8	15.6
9	90	-	-	5.05	14.0	16.8	17.7
9	100	-	-	5.26	15.8	18.9	19.8
9	110	-	-	5.27	17.6	21.0	22.0
10	40	-	-	5.58	8.08	9.17	9.53
10	50	-	-	6.69	9.96	11.3	11.8
10	60	-	-	7.91	12.0	13.6	14.1
10	70	-	-	9.23	14.1	16.0	16.6
10	80	-	-	10.6	16.3	18.4	19.1
10	90	-	-	12.1	18.5	20.9	21.6
10	100	-	-	13.6	20.8	23.4	24.2
10	110	-	-	15.2	23.2	26.0	26.9
11	50	-	-	9.74	12.5	13.7	14.1
11	60	-	-	11.6	15.0	16.5	16.9
11	70	-	-	13.7	17.7	19.3	19.8
11	80	-	-	15.8	20.4	22.2	22.8
11	90	-	-	18.0	23.2	25.2	25.9
11	100	-	-	20.3	26.1	28.3	29.0
11	110	-	-	22.7	29.0	31.4	32.2
12	50	-	8.08	12.8	15.2	16.3	16.6
12	60	-	9.37	15.3	18.3	19.5	19.9
12	70	-	10.8	18.0	21.4	22.9	23.4
12	80	-	12.2	20.8	24.7	26.4	26.9
12	90	-	13.7	23.7	28.1	29.9	30.5
12	100	-	15.2	26.7	31.5	33.5	34.1
12	110	-	16.7	29.8	35.0	37.1	37.8

TABLE 2 (continued)

DBH	TOTAL HT	MINIMUM TOP DIB - INCHES					
		12.0 CV12	10.0 CV10	8.0 CV8	6.0 CV6	4.0 CV4	0.0 CVT
13	50	-	11.8	15.9	18.1	19.0	19.3
13	60	-	14.0	19.1	21.7	22.8	23.2
13	70	-	16.3	22.4	25.4	26.7	27.1
13	80	-	18.7	25.8	29.3	30.7	31.2
13	90	-	21.3	29.4	33.2	34.8	35.4
13	100	-	23.9	33.1	37.3	39.0	39.6
13	110	-	26.7	36.8	41.4	43.2	43.9
13	120	-	29.4	40.6	45.5	47.5	48.2
14	50	9.28	15.4	19.1	21.0	21.9	22.2
14	60	10.5	18.4	22.9	25.2	26.2	26.6
14	70	11.7	21.6	26.9	29.6	30.8	31.1
14	80	12.9	24.9	31.0	34.0	35.4	35.8
14	90	14.0	28.3	35.2	38.6	40.1	40.6
14	100	14.8	31.8	39.6	43.3	44.9	45.4
14	110	15.4	35.5	44.0	48.0	49.7	50.3
14	120	15.4	39.2	48.4	52.8	54.6	55.2
15	50	13.6	19.1	22.4	24.2	25.0	25.2
15	60	15.9	22.8	26.8	29.0	29.9	30.2
15	70	18.3	26.7	31.5	33.9	35.0	35.4
15	80	20.9	30.8	36.3	39.0	40.2	40.7
15	90	23.5	35.1	41.2	44.3	45.6	46.0
15	100	26.1	39.5	46.2	49.6	51.0	51.5
15	110	28.8	43.9	51.3	55.0	56.5	57.0
15	120	31.5	48.5	56.5	60.4	62.0	62.6
16	60	21.1	27.3	30.9	32.8	33.7	34.0
16	70	24.5	32.0	36.2	38.5	39.5	39.8
16	80	28.2	36.8	41.7	44.3	45.4	45.8
16	90	31.9	41.9	47.3	50.2	51.4	51.8
16	100	35.8	47.1	53.1	56.1	57.5	57.9
16	110	39.8	52.3	58.9	62.2	63.6	64.1
16	120	43.8	57.6	64.7	68.3	69.8	70.3
17	60	26.2	31.8	35.1	36.9	37.7	38.0
17	70	30.6	37.2	41.1	43.2	44.1	44.4
17	80	35.2	42.9	47.3	49.7	50.7	51.1
17	90	39.9	48.7	53.7	56.3	57.4	57.8
17	100	44.8	54.7	60.1	63.0	64.2	64.6
17	110	49.8	60.7	66.7	69.7	71.0	71.5
17	120	54.9	66.8	73.2	76.5	77.9	78.4

TABLE 2 (continued)

DBH	TOTAL HT	MINIMUM TOP DIB - INCHES					
		12.0 CV12	10.0 CV10	8.0 CV8	6.0 CV6	4.0 CV4	0.0 CVT
18	60	31.2	36.3	39.6	41.1	41.9	42.1
18	70	36.5	42.6	46.2	48.1	49.0	49.3
18	80	42.0	49.0	53.1	55.3	56.3	56.6
18	90	47.7	55.6	60.2	62.6	63.7	64.0
18	100	53.6	62.4	67.4	70.0	71.2	71.6
18	110	59.5	69.2	74.7	77.5	78.7	79.1
18	120	65.5	76.1	82.0	85.0	86.3	86.8
19	60	36.3	41.0	43.9	45.5	46.2	46.4
19	70	42.4	48.0	51.4	53.2	54.0	54.3
19	80	48.9	55.3	59.1	61.1	62.0	62.3
19	90	55.5	62.7	66.9	69.2	70.2	70.5
19	100	62.2	70.2	74.9	77.3	78.4	78.8
19	110	69.1	77.9	82.9	85.5	86.7	87.1
19	120	76.0	85.5	90.9	93.8	95.0	95.4
20	60	41.4	45.8	48.5	50.0	50.7	50.9
20	70	48.4	53.6	56.7	58.4	59.2	59.5
20	80	55.7	61.6	65.2	67.1	68.0	68.2
20	90	63.2	69.9	73.8	75.9	76.8	77.2
20	100	70.8	78.2	82.5	84.8	85.8	86.2
20	110	78.6	86.6	91.3	93.8	94.9	95.2
20	120	86.4	95.1	100.	103.	104.	104.
21	70	54.4	59.3	62.2	63.8	64.6	64.8
21	80	62.6	68.1	71.4	73.3	74.1	74.4
21	90	70.9	77.2	80.8	82.8	83.7	84.0
21	100	79.5	86.3	90.4	92.5	93.5	93.8
21	110	88.1	95.6	99.9	102.	103.	104.
21	120	96.8	105.	110.	112.	113.	113.
22	70	60.5	65.0	67.8	69.4	70.0	70.3
22	80	69.5	74.7	77.9	79.6	80.3	80.6
22	90	78.8	84.6	88.1	89.9	90.8	91.1
22	100	88.2	94.6	98.4	100.	101.	102.
22	110	97.6	105.	109.	111.	112.	112.
22	120	107.	115.	119.	121.	122.	123.
23	70	66.6	70.9	73.6	75.0	75.7	75.9
23	80	76.5	81.4	84.4	86.0	86.8	87.0
23	90	86.6	92.1	95.4	97.2	98.0	98.3
23	100	96.9	103.	107.	108.	109.	110.
23	110	107.	114.	118.	120.	121.	121.
23	120	118.	125.	129.	131.	132.	132.

TABLE 2 (continued)

DBH	TOTAL HT	MINIMUM TOP DIB - INCHES					
		12.0 CV12	10.0 CV10	8.0 CV8	6.0 CV6	4.0 CV4	0.0 CVT
24	70	72.8	76.9	79.4	80.8	81.4	81.7
24	80	83.6	88.2	91.1	92.6	93.3	93.6
24	90	94.6	99.8	103.	105.	105.	106.
24	100	106.	111.	115.	117.	118.	119.
24	110	117.	123.	127.	129.	130.	130.
24	120	128.	135.	139.	141.	142.	142.

TABLE 3.--TAPER TABLE FOR RED ALDER, BASED ON DIAMETER OUTSIDE BARK AT BREAST HEIGHT (DBH) AND TOTAL HEIGHT. VALUES ARE DIAMETERS INSIDE BARK IN INCHES, AT INDICATED HEIGHT ABOVE STUMP. STUMP HEIGHT = 0.5 foot + 0.5 x DBH. VALUES LESS THAN 4.0 OMITTED.

DBH	HEIGHT ABOVE STUMP	TOTAL HEIGHT OF TREE IN FEET								
		40	50	60	70	80	90	100	110	120
6	0.00	7.1	6.8	6.6	6.6	6.5	6.5	-	-	-
6	4.13	5.7	5.7	5.7	5.7	5.7	5.7	-	-	-
6	8.25	5.3	5.4	5.5	5.5	5.5	5.5	-	-	-
6	12.38	4.8	5.1	5.2	5.3	5.4	5.4	-	-	-
6	16.50	4.3	4.7	5.0	5.1	5.2	5.3	-	-	-
6	20.63	-	4.3	4.7	4.9	5.1	5.2	-	-	-
6	24.75	-	-	4.4	4.7	4.9	5.0	-	-	-
6	28.88	-	-	4.0	4.4	4.7	4.9	-	-	-
6	33.00	-	-	-	4.1	4.5	4.7	-	-	-
6	37.13	-	-	-	-	4.2	4.5	-	-	-
6	41.25	-	-	-	-	4.0	4.3	-	-	-
6	45.38	-	-	-	-	-	4.1	-	-	-
7	0.00	8.3	7.9	7.8	7.7	7.6	7.6	-	-	-
7	4.13	6.6	6.6	6.6	6.6	6.6	6.6	-	-	-
7	8.25	6.1	6.3	6.4	6.4	6.4	6.4	-	-	-
7	12.38	5.6	5.9	6.1	6.2	6.2	6.2	-	-	-
7	16.50	5.0	5.5	5.8	6.0	6.1	6.2	-	-	-
7	20.63	4.4	5.1	5.4	5.7	5.9	6.0	-	-	-
7	24.75	-	4.5	5.1	5.4	5.7	5.8	-	-	-
7	28.88	-	4.0	4.7	5.1	5.4	5.7	-	-	-
7	33.00	-	-	4.2	4.8	5.2	5.4	-	-	-
7	37.13	-	-	-	4.4	4.9	5.2	-	-	-
7	41.25	-	-	-	4.0	4.6	5.0	-	-	-
7	45.38	-	-	-	-	4.3	4.7	-	-	-
7	49.50	-	-	-	-	4.4	4.4	-	-	-
7	53.63	-	-	-	-	4.1	4.1	-	-	-
8	0.00	9.6	9.1	8.9	8.8	8.8	8.7	8.7	-	-
8	4.13	7.6	7.6	7.6	7.6	7.6	7.6	7.6	-	-
8	8.25	7.0	7.2	7.2	7.3	7.3	7.3	7.3	-	-
8	12.38	6.4	6.7	6.9	7.0	7.1	7.2	7.2	-	-
8	16.50	5.7	6.2	6.6	6.8	6.9	7.0	7.1	-	-
8	20.63	5.0	5.7	6.2	6.5	6.7	6.8	6.9	-	-
8	24.75	4.1	5.2	5.8	6.2	6.4	6.6	6.8	-	-
8	28.88	-	4.5	5.3	5.8	6.2	6.4	6.6	-	-
8	33.00	-	-	4.8	5.4	5.9	6.2	6.4	-	-
8	37.13	-	-	4.3	5.0	5.6	5.9	6.2	-	-
8	41.25	-	-	-	4.6	5.2	5.6	6.0	-	-
8	45.38	-	-	-	4.1	4.8	5.4	5.7	-	-

TABLE 3 (continued)

DBH	HEIGHT ABOVE STUMP	TOTAL HEIGHT OF TREE IN FEET								
		40	50	60	70	80	90	100	110	120
8	49.50	-	-	-	-	4.4	5.0	5.5	-	-
8	53.63	-	-	-	-	4.0	4.7	5.2	-	-
8	57.75	-	-	-	-	-	4.3	4.9	-	-
8	61.88	-	-	-	-	-	-	4.6	-	-
8	66.00	-	-	-	-	-	-	4.2	-	-
9	0.00	10.9	10.4	10.1	10.0	9.9	9.8	9.8	9.8	-
9	4.13	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	-
9	8.25	7.8	8.0	8.1	8.2	8.2	8.2	8.2	8.2	-
9	12.38	7.1	7.5	7.8	7.9	8.0	8.0	8.0	8.0	-
9	16.50	6.4	7.0	7.4	7.6	7.7	7.8	7.9	.79	-
9	20.63	5.5	6.4	6.9	7.3	7.5	7.6	7.8	7.8	-
9	24.75	4.6	5.7	6.4	6.9	7.2	7.4	7.6	7.7	-
9	28.88	-	5.1	5.9	6.5	6.9	7.2	7.4	7.5	-
9	33.00	-	4.3	5.4	6.1	6.6	6.9	7.2	7.4	-
9	37.13	-	-	4.8	5.6	6.2	6.6	6.9	7.2	-
9	41.25	-	-	4.1	5.1	5.8	6.3	6.7	7.0	-
9	45.38	-	-	-	4.6	5.4	6.0	6.4	6.8	-
9	49.50	-	-	-	4.0	4.9	5.6	6.1	6.5	-
9	53.63	-	-	-	-	4.5	5.2	5.8	6.2	-
9	57.75	-	-	-	-	-	4.8	5.5	6.0	-
9	61.88	-	-	-	-	-	4.4	5.1	5.7	-
9	66.00	-	-	-	-	-	-	4.7	5.3	-
9	70.13	-	-	-	-	-	-	4.3	5.0	-
9	74.25	-	-	-	-	-	-	-	4.6	-
9	78.38	-	-	-	-	-	-	-	4.3	-
10	0.00	12.2	11.6	11.3	11.1	11.0	11.0	10.9	10.9	-
10	4.13	9.4	9.5	9.5	9.5	9.5	9.5	9.5	9.4	-
10	8.25	8.7	8.9	9.0	9.0	9.1	9.1	9.1	9.0	-
10	12.38	7.9	8.3	8.6	8.7	8.8	8.9	8.9	8.9	-
10	16.50	7.0	7.7	8.1	8.4	8.6	8.7	8.7	8.8	-
10	20.63	6.1	7.0	7.6	8.0	8.3	8.5	8.6	8.6	-
10	24.75	5.1	6.3	7.1	7.6	8.0	8.2	8.4	8.5	-
10	28.88	4.0	5.6	6.5	7.2	7.6	7.9	8.2	8.3	-
10	33.00	-	4.7	5.9	6.7	7.2	7.6	7.9	8.1	-
10	37.13	-	-	5.2	6.2	6.8	7.3	7.7	7.9	-
10	41.25	-	-	4.5	5.6	6.4	7.0	7.4	7.7	-
10	45.38	-	-	-	5.0	5.9	6.6	7.1	7.4	-
10	49.50	-	-	-	4.4	5.4	6.2	6.8	7.2	-
10	53.63	-	-	-	-	4.9	5.8	6.4	6.9	-
10	57.75	-	-	-	-	4.3	5.3	6.0	6.6	-

TABLE 3 (continued)

DBH	HEIGHT ABOVE STUMP	TOTAL HEIGHT OF TREE IN FEET								
		40	50	60	70	80	90	100	110	120
10	61.88	-	-	-	-	-	4.8	5.6	6.2	-
10	66.00	-	-	-	-	-	4.3	5.2	5.9	-
10	70.13	-	-	-	-	-	-	4.7	5.5	-
10	74.25	-	-	-	-	-	-	4.3	5.1	-
10	78.38	-	-	-	-	-	-	-	4.7	-
10	82.50	-	-	-	-	-	-	-	4.2	-
11	0.00	-	12.8	12.4	12.3	12.2	12.1	12.1	12.1	-
11	4.13	-	10.4	10.4	10.4	10.4	10.4	10.4	10.4	-
11	8.25	-	9.7	9.9	9.9	10.0	10.0	9.9	9.9	-
11	12.38	-	9.1	9.4	9.6	9.7	9.7	9.7	9.7	-
11	16.50	-	8.4	8.9	9.2	9.4	9.5	9.6	9.6	-
11	20.63	-	7.7	8.3	8.8	9.1	9.2	9.4	9.5	-
11	24.75	-	6.9	7.8	8.3	8.7	9.0	9.2	9.3	-
11	28.88	-	6.1	7.1	7.8	8.3	8.7	8.9	9.1	-
11	33.00	-	5.2	6.4	7.3	7.9	8.3	8.7	8.9	-
11	37.13	-	4.2	5.7	6.7	7.5	8.0	8.4	8.7	-
11	41.25	-	-	4.9	6.1	7.0	7.6	8.1	8.4	-
11	45.38	-	-	4.1	5.5	6.5	7.2	7.7	8.1	-
11	49.50	-	-	-	4.8	5.9	6.8	7.4	7.8	-
11	53.63	-	-	-	4.0	5.3	6.3	7.0	7.5	-
11	57.75	-	-	-	-	4.7	5.8	6.6	7.2	-
11	61.88	-	-	-	-	4.0	5.2	6.1	6.8	-
11	66.00	-	-	-	-	-	4.7	5.7	6.4	-
11	70.13	-	-	-	-	-	4.1	5.2	6.0	-
11	74.25	-	-	-	-	-	-	4.6	5.6	-
11	78.38	-	-	-	-	-	-	4.1	5.1	-
11	82.50	-	-	-	-	-	-	-	4.6	-
11	86.63	-	-	-	-	-	-	-	4.1	-
12	0.00	-	14.0	13.6	13.4	13.3	13.2	13.2	13.2	-
12	4.13	-	11.3	11.3	11.3	11.3	11.3	11.3	11.3	-
12	8.25	-	10.6	10.7	10.8	10.8	10.8	10.8	10.8	-
12	12.38	-	9.9	10.2	10.4	10.5	10.6	10.6	10.6	-
12	16.50	-	9.1	9.6	10.0	10.2	10.3	10.4	10.4	-
12	20.63	-	8.3	9.0	9.5	9.8	10.0	10.2	10.3	-
12	24.75	-	7.4	8.4	9.0	9.4	9.7	9.9	10.1	-
12	28.88	-	6.6	7.7	8.5	9.0	9.4	9.7	9.9	-
12	33.00	-	5.6	7.0	7.9	8.6	9.0	9.4	9.6	-
12	37.13	-	4.5	6.2	7.3	8.1	8.7	9.1	9.4	-
12	41.25	-	-	5.3	6.6	7.6	8.2	8.7	9.1	-
12	45.38	-	-	4.4	5.9	7.0	7.8	8.4	8.8	-
12	49.50	-	-	-	5.2	6.4	7.3	8.0	8.5	-

TABLE 3 (continued)

DBH	HEIGHT ABOVE STUMP	TOTAL HEIGHT OF TREE IN FEET								
		40	50	60	70	80	90	100	110	120
12	53.63	-	-	-	4.4	5.8	6.8	7.6	8.1	-
12	57.75	-	-	-	-	5.1	6.2	7.1	7.8	-
12	61.88	-	-	-	-	4.4	5.7	6.6	7.4	-
12	66.00	-	-	-	-	-	5.0	6.1	7.0	-
12	70.13	-	-	-	-	-	4.4	5.6	6.5	-
12	74.25	-	-	-	-	-	-	5.0	6.0	-
12	78.38	-	-	-	-	-	-	4.4	5.5	-
12	82.50	-	-	-	-	-	-	-	5.0	-
12	86.63	-	-	-	-	-	-	-	4.4	-
13	0.00	-	15.3	14.8	14.6	14.4	14.4	14.3	14.3	14.3
13	4.13	-	12.2	12.2	12.2	12.2	12.2	12.2	12.2	12.2
13	8.25	-	11.4	11.6	11.6	11.7	11.7	11.7	11.6	11.6
13	12.38	-	10.7	11.0	11.2	11.3	11.4	11.4	11.4	11.4
13	16.50	-	9.8	10.4	10.7	11.0	11.1	11.2	11.2	11.2
13	20.63	-	9.0	9.7	10.2	10.6	10.8	11.0	11.0	11.1
13	24.75	-	8.0	9.0	9.7	10.2	10.5	10.7	10.9	10.9
13	28.88	-	7.0	8.3	9.1	9.7	10.1	10.4	10.6	10.8
13	33.00	-	6.0	7.5	8.5	9.2	9.7	10.1	10.4	10.6
13	37.13	-	4.8	6.6	7.8	8.7	9.3	9.8	10.1	10.4
13	41.25	-	-	5.7	7.1	8.1	8.8	9.4	9.8	10.1
13	45.38	-	-	4.7	6.4	7.5	8.4	9.0	9.5	9.8
13	49.50	-	-	-	5.6	6.9	7.8	8.6	9.1	9.6
13	53.63	-	-	-	4.7	6.2	7.3	8.1	8.8	9.2
13	57.75	-	-	-	-	5.5	6.7	7.6	8.3	8.9
13	61.88	-	-	-	-	4.7	6.1	7.1	7.9	8.6
13	66.00	-	-	-	-	-	5.4	6.6	7.5	8.2
13	70.13	-	-	-	-	-	4.7	6.0	7.0	7.8
13	74.25	-	-	-	-	-	-	5.4	6.5	7.3
13	78.38	-	-	-	-	-	-	4.7	5.9	6.9
13	82.50	-	-	-	-	-	-	4.0	5.4	6.4
13	82.50	-	-	-	-	-	-	-	4.8	5.9
13	90.75	-	-	-	-	-	-	-	4.1	5.4
13	94.88	-	-	-	-	-	-	-	-	4.8
13	99.00	-	-	-	-	-	-	-	-	4.2
14	0.00	-	16.5	16.0	15.8	15.6	15.5	15.5	15.4	15.4
14	4.13	-	13.2	13.2	13.2	13.2	13.2	13.2	13.2	13.1
14	8.25	-	12.3	12.4	12.5	12.5	12.5	12.5	12.5	12.4
14	12.38	-	11.4	11.8	12.0	12.2	12.2	12.2	12.2	12.2
14	16.50	-	10.5	11.1	11.5	11.8	11.9	12.0	12.0	12.0
14	20.63	-	9.6	10.4	11.0	11.3	11.6	11.7	11.8	11.9
14	24.75	-	8.6	9.7	10.4	10.9	11.2	11.5	11.6	11.7

TABLE 3 (continued)

DBH	HEIGHT ABOVE STUMP	TOTAL HEIGHT OF TREE IN FEET								
		40	50	60	70	80	90	100	110	120
14	28.88	-	7.5	8.9	9.8	10.4	10.8	11.2	11.4	11.5
14	33.00	-	6.3	8.0	9.1	9.8	10.4	10.8	11.1	11.3
14	37.13	-	5.1	7.1	8.4	9.3	10.0	10.4	10.8	11.1
14	41.25	-	-	6.1	7.6	8.7	9.5	10.0	10.5	10.8
14	45.38	-	-	5.0	6.8	8.0	8.9	9.6	10.1	10.5
14	49.50	-	-	-	5.9	7.3	8.4	9.2	9.8	10.2
14	53.63	-	-	-	5.0	6.6	7.8	8.7	9.4	9.9
14	57.75	-	-	-	4.0	5.8	7.2	8.2	8.9	9.5
14	61.88	-	-	-	-	5.0	6.5	7.6	8.5	9.1
14	66.00	-	-	-	-	4.1	5.8	7.0	8.0	8.7
14	70.13	-	-	-	-	-	5.0	6.4	7.5	8.3
14	74.25	-	-	-	-	-	4.2	5.7	6.9	7.8
14	78.38	-	-	-	-	-	-	5.0	6.3	7.4
14	82.50	-	-	-	-	-	-	4.3	5.7	6.8
14	86.63	-	-	-	-	-	-	-	5.1	6.3
14	90.75	-	-	-	-	-	-	-	4.4	5.7
14	94.88	-	-	-	-	-	-	-	-	5.1
14	99.00	-	-	-	-	-	-	-	-	4.5
15	0.00	-	17.7	17.2	16.9	16.8	16.7	16.6	16.6	16.6
15	4.13	-	14.1	14.1	14.1	14.1	14.1	14.1	14.1	14.1
15	8.25	-	13.1	13.3	13.4	13.4	13.4	13.4	13.3	13.3
15	12.38	-	12.2	12.6	12.8	13.0	13.0	13.0	13.0	13.0
15	16.50	-	11.2	11.9	12.3	12.5	12.7	12.8	12.8	12.8
15	20.63	-	10.2	11.1	11.7	12.1	12.3	12.5	12.6	12.7
15	24.75	-	9.1	10.3	11.0	11.6	12.0	12.2	12.4	12.5
15	28.88	-	8.0	9.4	10.4	11.0	11.5	11.9	12.1	12.3
15	33.00	-	6.7	8.5	9.7	10.5	11.1	11.5	11.8	12.0
15	37.13	-	5.4	7.5	8.9	9.9	10.6	11.1	11.5	11.8
15	41.25	-	-	6.4	8.1	9.2	10.1	10.7	11.2	11.5
15	45.38	-	-	5.3	7.2	8.5	9.5	10.2	10.8	11.2
15	49.50	-	-	4.1	6.3	7.8	8.9	9.7	10.4	10.9
15	53.63	-	-	-	5.3	7.0	8.3	9.2	9.9	10.5
15	57.75	-	-	-	4.2	6.2	7.6	8.7	9.5	10.1
15	61.88	-	-	-	-	5.3	6.9	8.1	9.0	9.7
15	66.00	-	-	-	-	4.3	6.1	7.4	8.5	9.3
15	70.13	-	-	-	-	-	5.3	6.8	7.9	8.8
15	74.25	-	-	-	-	-	4.4	6.1	7.3	8.3
15	78.38	-	-	-	-	-	-	5.3	6.7	7.8
15	82.50	-	-	-	-	-	-	4.5	6.1	7.3
15	86.63	-	-	-	-	-	-	-	5.4	6.7
15	90.75	-	-	-	-	-	-	-	4.6	6.1

TABLE 3 (continued)

DBH	HEIGHT ABOVE STUMP	TOTAL HEIGHT OF TREE IN FEET								
		40	50	60	70	80	90	100	110	120
15	94.88	-	-	-	-	-	-	-	-	5.4
15	99.00	-	-	-	-	-	-	-	-	4.7
15	103.13	-	-	-	-	-	-	-	-	4.0
16	0.00	-	-	18.4	18.1	17.9	17.8	17.7	17.7	17.7
16	4.13	-	-	15.0	15.0	15.0	15.0	15.0	15.0	15.0
16	8.25	-	-	14.1	14.2	14.2	14.2	14.2	14.2	14.1
16	12.38	-	-	13.4	13.6	13.8	13.8	13.9	13.8	13.8
16	16.50	-	-	12.6	13.0	13.3	13.5	13.6	13.6	13.6
16	20.63	-	-	11.7	12.4	12.8	13.1	13.3	13.4	13.4
16	24.75	-	-	10.9	11.7	12.3	12.7	12.9	13.1	13.2
16	28.88	-	-	10.0	11.0	11.7	12.2	12.6	12.8	13.0
16	33.00	-	-	9.0	10.2	11.1	11.7	12.2	12.5	12.8
16	37.13	-	-	7.9	9.4	10.4	11.2	11.8	12.2	12.5
16	41.25	-	-	6.8	8.5	9.8	10.6	11.3	11.8	12.2
16	45.38	-	-	5.6	7.6	9.0	10.0	10.8	11.4	11.9
16	49.50	-	-	4.3	6.6	8.2	9.4	10.3	11.0	11.5
16	53.63	-	-	-	5.6	7.4	8.7	9.7	10.5	11.1
16	57.75	-	-	-	4.4	6.5	8.0	9.2	10.0	10.7
16	61.88	-	-	-	-	5.6	7.3	8.5	9.5	10.3
16	66.00	-	-	-	-	4.6	6.5	7.9	9.0	9.8
16	70.13	-	-	-	-	-	5.6	7.2	8.4	9.3
16	74.25	-	-	-	-	-	4.7	6.4	7.8	8.8
16	78.38	-	-	-	-	-	-	5.6	7.1	8.3
16	82.50	-	-	-	-	-	-	4.8	6.4	7.7
16	86.63	-	-	-	-	-	-	-	5.7	7.1
16	90.75	-	-	-	-	-	-	-	4.9	6.4
16	94.88	-	-	-	-	-	-	-	4.1	5.7
16	99.00	-	-	-	-	-	-	-	-	5.0
16	103.13	-	-	-	-	-	-	-	-	4.2
17	0.00	-	-	19.6	19.3	19.1	18.9	18.9	18.8	18.8
17	4.13	-	-	15.9	15.9	15.9	15.9	15.9	15.9	15.9
17	8.25	-	-	14.9	15.0	15.1	15.1	15.0	15.0	14.9
17	12.38	-	-	14.1	14.4	14.6	14.6	14.7	14.6	14.6
17	16.50	-	-	13.3	13.8	14.1	14.2	14.3	14.4	14.4
17	20.63	-	-	12.4	13.1	13.5	13.8	14.0	14.1	14.2
17	24.75	-	-	11.5	12.3	13.0	13.4	13.7	13.9	14.0
17	28.88	-	-	10.5	11.6	12.3	12.9	13.3	13.6	13.7
17	33.00	-	-	9.4	10.8	11.7	12.4	12.9	13.2	13.5
17	37.13	-	-	8.3	9.9	11.0	11.8	12.4	12.8	13.2
17	41.25	-	-	7.1	9.0	10.3	11.2	11.9	12.5	12.9
17	45.38	-	-	5.9	8.0	9.5	10.6	11.4	12.0	12.5

TABLE 3 (continued)

DBH	HEIGHT ABOVE STUMP	TOTAL HEIGHT OF TREE IN FEET								
		40	50	60	70	80	90	100	110	120
17	49.50	-	-	4.5	7.0	8.7	9.9	10.8	11.6	12.1
17	53.63	-	-	-	5.8	7.8	9.2	10.3	11.1	11.7
17	57.75	-	-	-	4.6	6.9	8.4	9.6	10.6	11.3
17	61.88	-	-	-	-	5.9	7.6	9.0	10.0	10.8
17	66.00	-	-	-	-	4.8	6.8	8.3	9.4	10.3
17	70.13	-	-	-	-	-	5.9	7.6	8.8	9.8
17	74.25	-	-	-	-	-	4.9	6.8	8.2	9.3
17	78.38	-	-	-	-	-	-	5.9	7.5	8.7
17	82.50	-	-	-	-	-	-	5.0	6.8	8.1
17	86.63	-	-	-	-	-	-	4.1	6.0	7.4
17	90.75	-	-	-	-	-	-	-	5.2	6.8
17	94.88	-	-	-	-	-	-	-	4.3	6.0
17	99.00	-	-	-	-	-	-	-	-	5.3
17	103.13	-	-	-	-	-	-	-	-	4.4
18	0.00	-	-	20.8	20.4	20.2	20.1	20.0	20.0	19.9
18	4.13	-	-	16.8	16.8	16.8	16.8	16.8	16.8	16.8
18	8.25	-	-	15.7	15.9	15.9	15.9	15.9	15.8	15.7
18	12.38	-	-	14.9	15.2	15.3	15.4	15.5	15.4	15.4
18	16.50	-	-	14.0	14.5	14.8	15.0	15.1	15.1	15.1
18	20.63	-	-	13.0	13.8	14.2	14.6	14.8	14.9	14.9
18	24.75	-	-	12.0	13.0	13.6	14.1	14.4	14.6	14.7
18	28.88	-	-	11.0	12.2	13.0	13.6	14.0	14.3	14.4
18	33.00	-	-	9.9	11.3	12.3	13.0	13.5	13.9	14.2
18	37.13	-	-	8.7	10.4	11.6	12.4	13.0	13.5	13.8
18	41.25	-	-	7.5	9.4	10.8	11.8	12.5	13.1	13.5
18	45.38	-	-	6.1	8.4	10.0	11.1	12.0	12.6	13.1
18	49.50	-	-	4.7	7.3	9.1	10.4	11.4	12.2	12.7
18	53.63	-	-	-	6.1	8.2	9.6	10.8	11.6	12.3
18	57.75	-	-	-	4.8	7.2	8.9	10.1	11.1	11.8
18	61.88	-	-	-	-	6.1	8.0	9.4	10.5	11.4
18	66.00	-	-	-	-	5.0	7.1	8.7	9.9	10.8
18	70.13	-	-	-	-	-	6.2	7.9	9.2	10.3
18	74.25	-	-	-	-	-	5.1	7.1	8.6	9.7
18	78.38	-	-	-	-	-	4.0	6.2	7.8	9.1
18	82.50	-	-	-	-	-	-	5.3	7.1	8.5
18	86.63	-	-	-	-	-	-	4.2	6.3	7.8
18	90.75	-	-	-	-	-	-	-	5.4	7.1
18	94.88	-	-	-	-	-	-	-	-	6.3
18	99.00	-	-	-	-	-	-	-	-	5.5
18	103.13	-	-	-	-	-	-	-	-	4.6

TABLE 3 (continued)

DBH	HEIGHT ABOVE STUMP	TOTAL HEIGHT OF TREE IN FEET								
		40	50	60	70	80	90	100	110	120
19	0.00	-	-	22.0	21.6	21.4	21.2	21.1	21.1	21.1
19	4.13	-	-	17.7	17.7	17.7	17.7	17.7	17.7	17.7
19	8.25	-	-	16.6	16.7	16.7	16.7	16.7	16.6	16.6
19	12.38	-	-	15.6	15.9	16.1	16.2	16.2	16.2	16.1
19	16.50	-	-	14.7	15.2	15.5	15.8	15.9	15.9	15.9
19	20.63	-	-	13.7	14.4	14.9	15.3	15.5	15.6	15.7
19	24.75	-	-	12.6	13.6	14.3	14.8	15.1	15.3	15.4
19	28.88	-	-	11.5	12.7	13.6	14.2	14.6	14.9	15.1
19	33.00	-	-	10.3	11.8	12.9	13.6	14.2	14.6	14.8
19	37.13	-	-	9.1	10.9	12.1	13.0	13.7	14.2	14.5
19	41.25	-	-	7.8	9.8	11.3	12.3	13.1	13.7	14.2
19	45.38	-	-	6.4	8.8	10.4	11.6	12.5	13.2	13.8
19	49.50	-	-	4.9	7.6	9.5	10.9	11.9	12.7	13.3
19	53.63	-	-	-	6.4	8.5	10.1	11.3	12.2	12.9
19	57.75	-	-	-	5.0	7.5	9.3	10.6	11.6	12.4
19	61.88	-	-	-	-	6.4	8.4	9.8	11.0	11.9
19	66.00	-	-	-	-	5.2	7.4	9.1	10.4	11.4
19	70.13	-	-	-	-	-	6.4	8.3	9.7	10.8
19	74.25	-	-	-	-	-	5.4	7.4	9.0	10.2
19	78.38	-	-	-	-	-	4.2	6.5	8.2	9.5
19	82.50	-	-	-	-	-	-	5.5	7.4	8.9
19	86.63	-	-	-	-	-	-	4.4	6.5	8.2
19	90.75	-	-	-	-	-	-	-	5.6	7.4
19	94.88	-	-	-	-	-	-	-	4.7	6.6
19	99.00	-	-	-	-	-	-	-	-	5.8
19	103.10	-	-	-	-	-	-	-	-	4.8
20	0.00	-	-	23.2	22.8	22.5	22.4	22.2	22.2	22.2
20	4.13	-	-	18.6	18.6	18.6	18.6	18.6	18.6	18.6
20	8.25	-	-	17.4	17.5	17.5	17.5	17.5	17.4	17.4
20	12.38	-	-	16.4	16.7	16.9	17.0	17.0	17.0	16.9
20	16.50	-	-	15.3	15.9	16.3	16.5	16.6	16.6	16.6
20	20.63	-	-	14.3	15.1	15.6	16.0	16.2	16.3	16.4
20	24.75	-	-	13.2	14.2	14.9	15.4	15.8	16.0	16.1
20	28.88	-	-	12.0	13.3	14.2	14.8	15.3	15.6	15.8
20	33.00	-	-	10.8	12.3	13.4	14.2	14.8	15.2	15.5
20	37.13	-	-	9.5	11.3	12.6	13.6	14.3	14.8	15.2
20	41.25	-	-	8.1	10.3	11.8	12.9	13.7	14.3	14.8
20	45.38	-	-	6.6	9.1	10.9	12.1	13.1	13.8	14.4
20	49.50	-	-	5.0	7.9	9.9	11.3	12.4	13.3	13.9

TABLE 3 (continued)

DBH	HEIGHT ABOVE STUMP	TOTAL HEIGHT OF TREE IN FEET								
		40	50	60	70	80	90	100	110	120
20	53.63	-	-	-	6.6	8.9	10.5	11.8	12.7	13.4
20	57.75	-	-	-	5.2	7.8	9.6	11.0	12.1	12.9
20	61.88	-	-	-	-	6.6	8.7	10.3	11.5	12.4
20	66.00	-	-	-	-	5.4	7.7	9.5	10.8	11.8
20	70.13	-	-	-	-	4.0	6.7	8.6	10.1	11.2
20	74.25	-	-	-	-	-	5.6	7.7	9.3	10.6
20	78.38	-	-	-	-	-	4.3	6.8	8.5	9.9
20	82.50	-	-	-	-	-	-	5.7	7.7	9.2
20	86.63	-	-	-	-	-	-	4.6	6.8	8.5
20	90.75	-	-	-	-	-	-	-	5.9	7.7
20	94.88	-	-	-	-	-	-	-	4.8	6.9
20	99.00	-	-	-	-	-	-	-	-	6.0
20	103.13	-	-	-	-	-	-	-	-	5.0
20	107.25	-	-	-	-	-	-	-	-	4.0
21	0.00	-	-	-	24.0	23.7	23.5	23.4	23.4	23.3
21	4.13	-	-	-	19.5	19.5	19.5	19.5	19.5	19.5
21	8.25	-	-	-	18.3	18.4	18.4	18.3	18.2	18.1
21	12.38	-	-	-	17.5	17.7	17.8	17.8	17.7	17.6
21	16.50	-	-	-	16.6	17.0	17.2	17.3	17.4	17.4
21	20.63	-	-	-	15.7	16.3	16.7	16.9	17.0	17.1
21	24.75	-	-	-	14.8	15.6	16.1	16.5	16.7	16.8
21	28.88	-	-	-	13.8	14.8	15.5	16.0	16.3	16.5
21	33.00	-	-	-	12.8	14.0	14.8	15.4	15.9	16.2
21	37.13	-	-	-	11.8	13.1	14.1	14.9	15.4	15.8
21	41.25	-	-	-	10.7	12.2	13.4	14.3	14.9	15.4
21	45.38	-	-	-	9.5	11.3	12.6	13.6	14.4	15.0
21	49.50	-	-	-	8.2	10.3	11.8	12.9	13.8	14.5
21	53.63	-	-	-	6.9	9.2	10.9	12.2	13.2	14.0
21	57.75	-	-	-	5.4	8.1	10.0	11.5	12.6	13.5
21	61.88	-	-	-	-	6.9	9.1	10.7	11.9	12.9
21	66.00	-	-	-	-	5.6	8.0	9.8	11.2	12.3
21	70.13	-	-	-	-	4.2	7.0	9.0	10.5	11.7
21	74.25	-	-	-	-	-	5.8	8.0	9.7	11.0
21	78.38	-	-	-	-	-	4.5	7.0	8.9	10.3
21	82.50	-	-	-	-	-	-	5.9	8.0	9.6
21	86.63	-	-	-	-	-	-	4.8	7.1	8.8
21	90.75	-	-	-	-	-	-	-	6.1	8.0
21	94.88	-	-	-	-	-	-	-	5.0	7.1
21	99.00	-	-	-	-	-	-	-	-	6.2
21	103.13	-	-	-	-	-	-	-	-	5.2
21	107.25	-	-	-	-	-	-	-	-	4.2

TABLE 3 (continued)

DBH	HEIGHT ABOVE STUMP	TOTAL HEIGHT OF TREE IN FEET								
		40	50	60	70	80	90	100	110	120
22	0.00	-	-	-	25.1	24.8	24.7	24.6	24.5	24.5
22	4.13	-	-	-	20.4	20.4	20.4	20.4	20.4	20.3
22	8.25	-	-	-	19.1	19.2	19.2	19.1	19.0	18.9
22	12.38	-	-	-	18.2	18.4	18.5	18.5	18.5	18.4
22	16.50	-	-	-	17.3	17.7	17.9	18.1	18.1	18.1
22	20.63	-	-	-	16.4	17.0	17.4	17.6	17.8	17.8
22	24.75	-	-	-	15.4	16.2	16.8	17.1	17.4	17.5
22	28.88	-	-	-	14.4	15.4	16.1	16.6	17.0	17.2
22	33.00	-	-	-	13.3	14.5	15.4	16.0	16.5	16.8
22	37.13	-	-	-	12.2	13.6	14.7	15.4	16.0	16.4
22	41.25	-	-	-	11.0	12.7	13.9	14.8	15.5	16.0
22	45.38	-	-	-	9.8	11.7	13.1	14.1	14.9	15.6
22	49.50	-	-	-	8.5	10.7	12.2	13.4	14.4	15.1
22	53.63	-	-	-	7.1	9.6	11.3	12.7	13.7	14.5
22	57.75	-	-	-	5.6	8.4	10.4	11.9	13.1	14.0
22	61.88	-	-	-	-	7.1	9.4	11.1	12.4	13.4
22	66.00	-	-	-	-	5.8	8.3	10.2	11.6	12.8
22	70.13	-	-	-	-	4.3	7.2	9.3	10.9	12.1
22	74.25	-	-	-	-	-	6.0	8.3	10.1	11.4
22	78.38	-	-	-	-	-	4.6	7.3	9.2	10.7
22	82.50	-	-	-	-	-	-	6.1	8.3	10.0
22	86.63	-	-	-	-	-	-	4.9	7.3	9.2
22	90.75	-	-	-	-	-	-	-	6.3	8.3
22	94.88	-	-	-	-	-	-	-	5.2	7.4
22	99.00	-	-	-	-	-	-	-	4.0	6.4
22	103.13	-	-	-	-	-	-	-	-	5.4
22	107.25	-	-	-	-	-	-	-	-	4.3
23	0.00	-	-	-	26.3	26.0	25.8	25.7	25.6	25.6
23	4.13	-	-	-	21.3	21.3	21.3	21.3	21.2	21.2
23	8.25	-	-	-	19.9	20.0	20.0	19.9	19.8	19.7
23	12.38	-	-	-	18.9	19.2	19.3	19.3	19.2	19.1
23	16.50	-	-	-	18.0	18.4	18.7	18.8	18.8	18.8
23	20.63	-	-	-	17.0	17.6	18.0	18.3	18.4	18.5
23	24.75	-	-	-	16.0	16.8	17.4	17.8	18.0	18.2
23	28.88	-	-	-	14.9	16.0	16.7	17.2	17.6	17.8
23	33.00	-	-	-	13.8	15.1	16.0	16.6	17.1	17.5
23	37.13	-	-	-	12.6	14.1	15.2	16.0	16.6	17.0
23	41.25	-	-	-	11.4	13.1	14.4	15.4	16.1	16.6
23	45.38	-	-	-	10.1	12.1	13.6	14.7	15.5	16.1
23	49.50	-	-	-	8.8	11.0	12.7	13.9	14.9	15.6
23	53.63	-	-	-	7.3	9.9	11.7	13.1	14.2	15.1
23	57.75	-	-	-	5.8	8.7	10.7	12.3	13.5	14.5

TABLE 3 (continued)

DBH	HEIGHT ABOVE STUMP	TOTAL HEIGHT OF TREE IN FEET								
		40	50	60	70	80	90	100	110	120
23	61.88	-	-	-	4.0	7.4	9.7	11.5	12.8	13.9
23	66.00	-	-	-	-	6.0	8.6	10.6	12.1	13.2
23	70.13	-	-	-	-	4.4	7.4	9.6	11.2	12.6
23	74.25	-	-	-	-	-	6.2	8.6	10.4	11.8
23	78.38	-	-	-	-	-	4.8	7.5	9.5	11.1
23	82.50	-	-	-	-	-	-	6.3	8.6	10.3
23	86.63	-	-	-	-	-	-	5.1	7.6	9.5
23	90.75	-	-	-	-	-	-	-	6.5	8.6
23	94.88	-	-	-	-	-	-	-	5.4	7.7
23	99.00	-	-	-	-	-	-	-	4.1	6.7
23	103.13	-	-	-	-	-	-	-	-	5.6
23	107.25	-	-	-	-	-	-	-	-	4.5
24	0.00	-	-	-	27.5	27.2	27.0	26.8	26.8	26.7
24	4.13	-	-	-	22.2	22.2	22.2	22.2	22.1	22.1
24	8.25	-	-	-	20.7	20.7	20.7	20.7	20.6	20.5
24	12.38	-	-	-	19.7	19.9	20.0	20.0	20.0	19.9
24	16.50	-	-	-	18.7	19.1	19.4	19.5	19.5	19.5
24	20.63	-	-	-	17.6	18.3	18.7	19.0	19.1	19.2
24	24.75	-	-	-	16.6	17.4	18.0	18.4	18.7	18.8
24	28.88	-	-	-	15.4	16.5	17.3	17.9	18.2	18.5
24	33.00	-	-	-	14.3	15.6	26.5	17.2	17.7	18.1
24	37.13	-	-	-	13.1	14.6	15.7	16.6	17.2	17.6
24	41.25	-	-	-	11.8	13.6	14.9	15.9	16.6	17.2
24	45.38	-	-	-	10.5	12.5	14.0	15.2	16.0	16.7
24	49.50	-	-	-	9.0	11.4	13.1	14.4	15.4	16.2
24	53.63	-	-	-	7.6	10.2	12.1	13.6	14.7	15.6
24	57.75	-	-	-	5.9	8.9	11.1	12.7	14.0	15.0
24	61.88	-	-	-	4.1	7.6	10.0	11.8	13.2	14.4
24	66.00	-	-	-	-	6.2	8.9	10.9	12.4	13.7
24	70.13	-	-	-	-	4.6	7.7	9.9	11.6	13.0
24	74.25	-	-	-	-	-	6.4	8.8	10.7	12.2
24	78.38	-	-	-	-	-	4.9	7.7	9.8	11.5
24	82.50	-	-	-	-	-	-	6.5	8.8	10.6
24	86.63	-	-	-	-	-	-	5.2	7.8	9.8
24	90.75	-	-	-	-	-	-	-	6.7	8.9
24	94.88	-	-	-	-	-	-	-	5.5	7.9
24	99.00	-	-	-	-	-	-	-	4.2	6.9
24	103.13	-	-	-	-	-	-	-	-	5.8
24	107.25	-	-	-	-	-	-	-	-	4.6

TABLE 4.--ESTIMATED TREE VOLUMES IN BOARD FEET SCRIBNER (SV), BY FORMULA RULE. BASED ON 16-FOOT SCALING LENGTH (EXCEPT TOP LOGS) AND ESTIMATED LOG TOP DIAMETERS INSIDE BARK (CORRESPONDING TO MEASUREMENT OF SCALING DIAMETERS TO "NEAREST INCH"). 6-INCH TRIM ALLOWANCE PER 16-FOOT LOG. VALUES OMITTED FOR TREES HAVING LESS THAN 8 FEET OF MERCHANTABLE BOLE.

DBH	TREE TOTAL HEIGHT	TOP DIAMETER LIMIT-INCHES IB 12.0 SV12	10.0 SV10	8.0 SV8	6.0 SV6
8	40	-	-	-	11
8	50	-	-	-	16
8	60	-	-	-	21
8	70	-	-	-	26
8	80	-	-	-	31
8	90	-	-	-	37
8	100	-	-	-	43
9	40	-	-	-	17
9	50	-	-	16	26
9	60	-	-	18	33
9	70	-	-	20	40
9	80	-	-	22	50
9	90	-	-	24	58
9	100	-	-	25	66
9	110	-	-	25	76
10	40	-	-	22	24
10	50	-	-	27	35
10	60	-	-	34	44
10	70	-	-	43	57
10	80	-	-	51	69
10	90	-	-	59	80
10	100	-	-	67	94
10	110	-	-	76	105
11	50	-	-	40	45
11	60	-	-	53	59
11	70	-	-	65	75
11	80	-	-	76	88
11	90	-	-	90	106
11	100	-	-	104	122
11	110	-	-	117	138
12	50	-	39	54	55
12	60	-	46	70	74
12	70	-	54	84	93
12	80	-	65	103	112
12	90	-	75	121	133
12	100	-	85	137	152
12	110	-	94	158	174
13	50	-	52	68	65
13	60	-	69	86	91
13	70	-	86	108	113
13	80	-	102	131	138
13	90	-	119	151	161
13	100	-	134	176	186
13	110	-	152	199	211
13	120	-	170	221	236
14	50	50	70	82	78
14	60	57	93	102	109
14	70	65	114	132	133
14	80	73	133	158	164
14	90	80	157	185	191
14	100	85	181	214	222
14	110	90	204	240	250
14	120	90	228	270	282
15	50	68	89	95	93
15	60	82	115	123	127
15	70	100	139	157	156
15	80	120	168	185	192
15	90	138	198	220	223
15	100	156	225	252	260
15	110	173	256	286	292
15	120	191	286	320	330
16	60	111	136	144	146
16	70	137	166	181	181
16	80	162	203	216	221
16	90	186	236	256	259
16	100	213	270	292	300

TABLE 4 (continued)

DBH	TREE TOTAL HEIGHT	TOP DIAMETER LIMIT-INCHES IB 12.0 SV12	10.0 SV10	8.0 SV8	6.0 SV6
16	110	242	308	333	338
16	120	269	341	370	379
17	60	140	156	166	165
17	70	171	196	207	207
17	80	200	237	249	252
17	90	234	273	293	295
17	100	270	318	335	341
17	110	304	358	382	386
17	120	338	400	423	431
18	60	166	176	188	186
18	70	201	226	233	234
18	80	239	271	282	283
18	90	283	316	331	334
18	100	323	365	380	384
18	110	363	409	431	435
18	120	408	460	480	485
19	60	192	200	211	207
19	70	230	256	259	262
19	80	281	304	317	316
19	90	329	359	370	373
19	100	372	412	427	428
19	110	425	464	482	486
19	120	474	520	539	541
20	60	216	226	234	228
20	70	263	286	286	290
20	80	322	338	352	349
20	90	373	402	409	413
20	100	428	460	474	473
20	110	486	521	533	539
20	120	538	581	598	598
21	70	298	317	316	319
21	80	361	376	388	383
21	90	417	446	450	455
21	100	483	507	523	520
21	110	545	578	586	593
21	120	605	642	659	659
22	70	333	347	347	349
22	80	400	415	424	419
22	90	463	490	494	498
22	100	537	558	572	569
22	110	603	636	643	648
22	120	675	703	721	721
23	70	368	377	378	380
23	80	439	454	461	455
23	90	513	535	538	541
23	100	591	611	622	619
23	110	661	694	701	704
23	120	743	769	784	784
24	70	402	408	410	411
24	80	477	494	499	492
24	90	562	579	584	585
24	100	645	665	673	670
24	110	725	752	760	762
24	120	811	836	848	848

TABLE 5.--ESTIMATED TREE VOLUMES IN BOARD FEET SCRIBNER (SV), BY FORMULA RULE. BASED ON 16-FOOT SCALING LENGTH (EXCEPT TOP LOGS), AND ESTIMATED LOG TOP DIAMETER INSIDE BARK MINUS 1/2 INCH (CORRESPONDING TO "ROUNDING DOWN" FRACTIONAL SCALING DIAMETERS TO NEXT LOWER EXACT INCH). 6-INCH TRIM ALLOWANCE PER 16-FOOT LOG. VALUES OMITTED FOR TREES HAVING LESS THAN 8 FEET OF MERCHANTABLE BOLE.

DBH	TREE TOTAL HEIGHT	TOP DIAMETER LIMIT-INCHES IB 12.0 SV12	10.0 SV10	8.0 SV8	6.0 SV6
8	40	-	-	-	8
8	50	-	-	-	12
8	60	-	-	-	16
8	70	-	-	-	20
8	80	-	-	-	24
8	90	-	-	-	28
8	100	-	-	-	33
9	40	-	-	-	12
9	50	-	-	13	20
9	60	-	-	15	26
9	70	-	-	17	31
9	80	-	-	18	39
9	90	-	-	20	46
9	100	-	-	21	53
9	110	-	-	21	61
10	40	-	-	18	19
10	50	-	-	22	28
10	60	-	-	28	35
10	70	-	-	36	46
10	80	-	-	43	56
10	90	-	-	50	66
10	100	-	-	57	77
10	110	-	-	65	86
11	50	-	-	34	37
11	60	-	-	45	48
11	70	-	-	55	62
11	80	-	-	65	74
11	90	-	-	77	89
11	100	-	-	89	102
11	110	-	-	100	116
12	50	-	34	47	46
12	60	-	41	60	63
12	70	-	47	72	79
12	80	-	57	89	95
12	90	-	66	105	113
12	100	-	75	119	130
12	110	-	83	137	149
13	50	-	46	59	55
13	60	-	61	75	78
13	70	-	76	94	97
13	80	-	90	114	119
13	90	-	104	132	140
13	100	-	119	154	161
13	110	-	135	174	183
13	120	-	151	194	205
14	50	45	62	72	67
14	60	52	83	89	94
14	70	59	101	116	116
14	80	66	119	139	143
14	90	72	141	163	167
14	100	77	162	189	195
14	110	81	182	212	220
14	120	81	204	240	248
15	50	62	79	84	80
15	60	74	103	109	111
15	70	91	124	139	137
15	80	109	151	165	169
15	90	126	178	196	197
15	100	142	202	225	230
15	110	157	230	255	259
15	120	173	258	286	292
16	60	101	123	129	129
16	70	125	149	162	161
16	80	148	183	193	197

TABLE 5 (continued)

DBH	TREE TOTAL HEIGHT	TOP DIAMETER LIMIT-INCHES IB 12.0 SV12	10.0 SV10	8.0 SV8	6.0 SV6
16	90	170	213	230	230
16	100	194	244	262	268
16	110	221	278	299	302
16	120	246	309	333	339
17	60	127	141	149	147
17	70	156	178	186	185
17	80	183	215	224	226
17	90	214	248	265	265
17	100	247	289	303	306
17	110	278	326	345	347
17	120	309	364	383	389
18	60	152	160	170	166
18	70	184	206	210	210
18	80	219	247	256	255
18	90	260	288	300	301
18	100	297	334	346	347
18	110	333	374	392	394
18	120	375	420	437	440
19	60	176	183	191	186
19	70	211	234	235	237
19	80	258	279	288	286
19	90	303	329	337	339
19	100	343	378	390	389
19	110	392	426	440	443
19	120	437	478	492	493
20	60	199	207	213	207
20	70	242	263	261	264
20	80	297	310	322	318
20	90	345	370	375	377
20	100	395	423	435	433
20	110	449	480	489	493
20	120	497	535	549	548
21	70	276	291	289	292
21	80	334	346	356	351
21	90	386	412	413	417
21	100	448	468	481	477
21	110	505	534	539	544
21	120	561	593	607	606
22	70	309	320	319	320
22	80	372	384	391	385
22	90	430	454	456	458
22	100	500	517	529	524
22	110	560	589	594	597
22	120	627	652	667	665
23	70	342	349	349	350
23	80	408	421	427	419
23	90	477	496	498	500
23	100	551	568	577	572
23	110	616	644	650	652
23	120	693	715	727	726
24	70	374	379	380	380
24	80	445	460	463	456
24	90	524	539	542	542
24	100	602	619	626	622
24	110	677	701	706	707
24	120	758	779	789	787

TABLE 6.--ESTIMATED TREE VOLUMES IN BOARD FEET SCRIBNER (SV), BY FORMULA RULE. BASED ON 8-FOOT SCALING LENGTH AND ESTIMATED LOG TOP DIAMETERS INSIDE BARK (CORRESPONDING TO MEASUREMENT OF SCALING DIAMETERS TO "NEAREST INCH"). 3-INCH TRIM PER 8-FOOT LOG. VALUES OMITTED FOR TREES HAVING LESS THAN 8 LINEAL FEET OF MERCHANTABLE BOLE.

DBH	TREE TOTAL HEIGHT	TOP DIAMETER LIMIT-INCHES IB 12.0 SV12	10.0 SV10	8.0 SV8	6.0 SV6
8	40	-	-	-	15
8	50	-	-	-	20
8	60	-	-	-	24
8	70	-	-	-	29
8	80	-	-	-	35
8	90	-	-	-	40
8	100	-	-	-	46
9	40	-	-	-	23
9	50	-	-	16	31
9	60	-	-	18	39
9	70	-	-	21	46
9	80	-	-	23	55
9	90	-	-	25	64
9	100	-	-	26	72
9	110	-	-	26	81
10	40	-	-	26	33
10	50	-	-	32	43
10	60	-	-	39	54
10	70	-	-	47	65
10	80	-	-	54	77
10	90	-	-	63	89
10	100	-	-	71	101
10	110	-	-	80	114
11	50	-	-	48	57
11	60	-	-	59	71
11	70	-	-	71	85
11	80	-	-	83	101
11	90	-	-	97	117
11	100	-	-	110	133
11	110	-	-	124	149
12	50	-	43	64	71
12	60	-	52	80	89
12	70	-	60	96	108
12	80	-	69	113	127
12	90	-	79	131	147
12	100	-	88	148	167
12	110	-	97	167	187
13	50	-	63	80	86
13	60	-	78	101	109
13	70	-	93	122	132
13	80	-	109	143	156
13	90	-	125	166	180
13	100	-	142	189	204
13	110	-	159	212	229
13	120	-	176	235	254
14	50	52	84	99	103
14	60	61	104	123	130
14	70	70	125	149	157
14	80	77	146	176	185
14	90	84	169	203	214
14	100	90	191	230	243
14	110	94	215	258	273
14	120	93	239	286	302
15	50	78	105	118	121
15	60	93	130	147	153
15	70	110	156	177	185
15	80	128	184	209	217
15	90	145	212	241	251
15	100	163	241	274	285
15	110	181	271	307	319
15	120	199	300	340	354
16	60	125	157	172	176
16	70	149	188	208	214
16	80	174	222	244	252
16	90	200	256	281	290
16	100	226	291	319	329

TABLE 6 (continued)

DBH	TREE TOTAL HEIGHT	TOP DIAMETER LIMIT-INCHES IB 12.0 SV12	10.0 SV10	8.0 SV8	6.0 SV6
16	110	253	325	358	369
16	120	280	361	396	409
17	60	156	184	198	202
17	70	187	222	239	244
17	80	219	261	281	287
17	90	252	300	323	331
17	100	285	341	367	376
17	110	320	383	410	421
17	120	355	424	454	466
18	60	186	211	224	228
18	70	225	256	271	275
18	80	263	301	318	324
18	90	303	347	367	374
18	100	345	393	416	424
18	110	385	440	466	474
18	120	427	488	515	525
19	60	218	240	250	254
19	70	262	290	303	308
19	80	309	342	357	363
19	90	355	394	412	418
19	100	402	447	467	474
19	110	451	500	523	530
19	120	500	553	578	586
20	60	250	270	278	282
20	70	300	325	337	342
20	80	352	382	397	402
20	90	407	441	458	464
20	100	461	501	519	525
20	110	515	560	581	588
20	120	571	620	642	650
21	70	340	363	373	376
21	80	398	426	438	443
21	90	458	490	505	510
21	100	520	556	572	578
21	110	582	622	640	647
21	120	644	688	708	716
22	70	379	400	409	412
22	80	445	470	482	485
22	90	511	541	555	559
22	100	579	612	628	633
22	110	648	684	702	708
22	120	717	756	776	783
23	70	418	438	447	448
23	80	491	515	526	528
23	90	565	592	605	608
23	100	640	671	685	690
23	110	714	749	766	771
23	120	790	828	846	852
24	70	456	476	485	486
24	80	538	560	570	572
24	90	619	645	656	659
24	100	701	730	743	747
24	110	783	815	830	835
24	120	864	900	917	922

TABLE 7.--ESTIMATED TREE VOLUMES IN BOARD FEET SCRIBNER (SV) BY FORMULA RULE, BY TREE DBH AND MERCHANTABLE HEIGHT IN 16-FOOT LOGS. BASED ON 16-FOOT SCALING LENGTH AND ESTIMATED LOG TOP DIAMETER INSIDE BARK MINUS 1/2 INCH (CORRESPONDING TO "ROUNDING DOWN" FRACTIONAL SCALING DIAMETERS TO NEXT LOWER EXACT INCH). 6-INCH TRIM PER 16-FOOT LOG. TABLE DERIVED BY GRAPHICAL METHODS FROM TABLES 3 AND 5.

DBH	NO. 16.5-FOOT LOGS	TOP DIAMETER LIMIT - INCHES IB			
		12.0 SV12	10.0 SV10	8.0 SV8	6.0 SV6
8	1.	-	-	-	10
8	1.5	-	-	-	18
8	2.	-	-	-	25
9	0.5	-	-	12	-
9	1.	-	-	-	-
9	1.5	-	-	-	22
9	2.	-	-	-	30
9	2.5	-	-	-	42
9	3.	-	-	-	52
10	1.	-	-	26	-
10	1.5	-	-	44	25
10	2.	-	-	59	36
10	2.5	-	-	-	51
10	3.	-	-	-	64
10	3.5	-	-	-	77
11	1.5	-	-	49	-
11	2.	-	-	67	44
11	2.5	-	-	87	59
11	3.	-	-	-	76
11	3.5	-	-	-	93
11	4.	-	-	-	108
12	1.	-	48	-	-
12	1.5	-	-	53	-
12	2.	-	-	74	50
12	2.5	-	-	99	71
12	3.	-	-	120	90
12	3.5	-	-	-	109
12	4.	-	-	-	128
12	4.5	-	-	-	148
13	1.	-	50	-	-
13	1.5	-	84	59	-
13	2.	-	114	83	56
13	2.5	-	144	111	82
13	3.	-	-	137	104
13	3.5	-	-	164	127
13	4.	-	-	189	151
13	4.5	-	-	-	173
13	5.	-	-	-	195
14	1.	78	-	-	-
14	1.5	-	91	-	-
14	2.	-	124	89	-
14	2.5	-	160	123	93
14	3.	-	194	154	118
14	3.5	-	-	185	147
14	4.	-	-	214	173
14	4.5	-	-	-	201
14	5.	-	-	-	227
15	1.	79	-	-	-
15	1.5	128	96	-	-
15	2.	170	134	101	-
15	2.5	-	176	137	105
15	3.	-	214	171	134
15	3.5	-	254	207	166
15	4.	-	-	241	196
15	4.5	-	-	277	229
15	5.	-	-	-	258
15	5.5	-	-	-	291
16	1.5	135	-	-	-
16	2.	183	144	-	-
16	2.5	233	190	150	-
16	3.	-	234	189	152
16	3.5	-	278	231	187
16	4.	-	-	267	222
16	4.5	-	-	308	259
16	5.	-	-	-	293
16	5.5	-	-	-	329

TABLE 7 (continued)

DBH	NO. 16.5-FOOT LOGS	TOP DIAMETER LIMIT - INCHES IB			
		12.0 SV12	10.0 SV10	8.0 SV8	6.0 SV6
17	1.5	143	-	-	-
17	2.	195	155	-	-
17	2.5	253	207	164	-
17	3.	303	253	208	169
17	3.5	-	303	253	209
17	4.	-	350	295	249
17	4.5	-	-	341	289
17	5.	-	-	382	329
17	5.5	-	-	-	369
18	1.5	151	-	-	-
18	2.	208	162	-	-
18	2.5	271	221	179	-
18	3.	326	276	227	187
18	3.5	-	331	277	232
18	4.	-	380	325	276
18	4.5	-	-	375	322
18	5.	-	-	423	366
18	5.5	-	-	-	410
19	2.	218	-	-	-
19	2.5	290	238	195	-
19	3.	349	297	247	206
19	3.5	415	356	301	255
19	4.	-	413	353	304
19	4.5	-	472	410	354
19	5.	-	-	461	404
19	5.5	-	-	-	454
20	2.	232	-	-	-
20	2.5	308	255	210	-
20	3.	376	316	267	225
20	3.5	444	384	328	280
20	4.	506	446	385	334
20	4.5	-	508	447	389
20	5.	-	-	501	442
20	5.5	-	-	-	498
21	2.5	325	-	-	-
21	3.	399	340	287	-
21	3.5	475	413	356	304
21	4.	545	479	413	362
21	4.5	-	551	484	424
21	5.	-	-	540	480
21	5.5	-	-	609	543
21	6.	-	-	-	607
22	2.5	346	-	-	-
22	3.	423	364	313	-
22	3.5	506	442	383	330
22	4.	581	512	449	392
22	4.5	-	588	522	460
22	5.	-	656	585	521
22	5.5	-	-	650	590
22	6.	-	-	-	652
23	2.5	365	-	-	-
23	3.	450	388	-	-
23	3.5	536	469	410	355
23	4.	616	549	482	421
23	4.5	708	628	561	497
23	5.	-	711	633	564
23	5.5	-	-	707	637
23	6.	-	-	-	707
24	2.5	383	-	-	-
24	3.	474	411	-	-
24	3.5	565	499	437	383
24	4.	656	584	517	454
24	4.5	746	668	600	534
24	5.	-	751	677	609
24	5.5	-	-	756	686
24	6.	-	-	-	759

TABLE 8.--ESTIMATED TREE VOLUMES IN BOARD FEET INTERNATIONAL 1/4-INCH RULE (IV), BASED ON 16-FOOT SCALING LENGTH (EXCEPT TOP LOGS) AND ESTIMATED LOG TOP DIAMETERS INSIDE BARK (CORRESPONDING TO MEASUREMENT OF SCALING DIAMETERS TO "NEAREST INCH"). 6-INCH TRIM ALLOWANCE PER 16-FOOT LOG. VALUES OMITTED FOR TREES HAVING LESS THAN 8 LINEAL FEET OF MERCHANTABLE BOLE.

DBH	TREE TOTAL HEIGHT	TOP DIAMETER LIMIT -INCHES IB 12.0 IV12	10.0 IV10	8.0 IV8	6.0 IV6
8	40	-	-	-	17
8	50	-	-	-	23
8	60	-	-	-	30
8	70	-	-	-	37
8	80	-	-	-	45
8	90	-	-	-	52
8	100	-	-	-	59
9	40	-	-	-	24
9	50	-	-	18	34
9	60	-	-	21	44
9	70	-	-	24	55
9	80	-	-	26	66
9	90	-	-	30	77
9	100	-	-	32	89
9	110	-	-	32	101
10	40	-	-	26	32
10	50	-	-	34	46
10	60	-	-	42	59
10	70	-	-	52	74
10	80	-	-	61	88
10	90	-	-	72	104
10	100	-	-	83	120
10	110	-	-	94	136
11	50	-	-	48	58
11	60	-	-	63	75
11	70	-	-	77	94
11	80	-	-	93	112
11	90	-	-	108	132
11	100	-	-	125	153
11	110	-	-	142	172
12	50	-	43	64	70
12	60	-	54	83	92
12	70	-	64	102	114
12	80	-	74	122	138
12	90	-	85	143	162
12	100	-	96	165	186
12	110	-	107	186	212
13	50	-	61	80	81
13	60	-	79	103	110
13	70	-	97	126	137
13	80	-	116	153	165
13	90	-	136	179	195
13	100	-	154	205	223
13	110	-	174	232	252
13	120	-	194	260	282
14	50	53	80	95	96
14	60	62	104	121	130
14	70	74	128	153	159
14	80	82	153	185	194
14	90	90	178	214	227
14	100	97	206	247	261
14	110	101	234	279	296
14	120	101	259	312	330
15	50	77	100	110	111
15	60	92	130	143	149
15	70	111	159	180	184
15	80	132	189	214	224
15	90	151	223	252	261
15	100	172	256	291	302
15	110	194	288	327	341
15	120	214	323	366	382
16	60	122	152	165	169
16	70	150	187	207	210
16	80	179	226	246	255
16	90	208	267	292	298
16	100	236	303	333	344
16	110	267	345	377	389
16	120	298	385	422	435

TABLE 8 (continued)

DBH	TREE TOTAL HEIGHT	TOP DIAMETER LIMIT -INCHES IB 12.0 IV12	10.0 IV10	8.0 IV8	6.0 IV6
17	60	152	177	188	190
17	70	187	219	236	237
17	80	222	264	281	287
17	90	258	307	331	336
17	100	296	354	378	388
17	110	338	402	430	438
17	120	374	446	478	491
18	60	182	198	211	213
18	70	223	251	263	266
18	80	263	300	317	322
18	90	309	351	373	377
18	100	354	405	426	434
18	110	400	456	482	491
18	120	447	509	537	548
19	60	209	223	235	235
19	70	254	282	291	295
19	80	307	339	353	358
19	90	360	396	413	418
19	100	410	456	475	481
19	110	465	513	537	544
19	120	518	574	599	606
20	60	238	250	260	258
20	70	289	315	320	325
20	80	349	374	390	391
20	90	410	442	455	461
20	100	467	507	524	528
20	110	530	572	592	599
20	120	589	638	661	666
21	70	325	347	351	355
21	80	393	413	428	427
21	90	456	489	498	504
21	100	525	558	576	577
21	110	592	632	647	656
21	120	659	705	726	729
22	70	361	379	383	387
22	80	434	454	466	464
22	90	504	535	543	548
22	100	581	610	628	628
22	110	656	693	706	714
22	120	732	769	790	794
23	70	397	413	415	418
23	80	477	495	505	502
23	90	555	581	590	595
23	100	639	665	680	680
23	110	718	754	766	772
23	120	802	837	856	859
24	70	432	445	449	451
24	80	518	537	544	541
24	90	606	630	637	641
24	100	695	720	733	734
24	110	783	814	827	832
24	120	875	906	922	926

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