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# VARIABLE-DENSITY YIELD TABLES FOR NATURAL STANDS OF LODGEPOLE PINE IN ALBERTA

**W.D.Johnstone**



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### **Abstract**

By using regression analysis and techniques developed herein, least-square equations were derived to predict the yield of natural lodgepole pine (*Pinus contorta* Dougl. var. *latifolia* Engelm.) stands from age, stand density, and site productivity. The equations were derived to ensure additivity between partial- and whole-stand per-acre yield estimates. The equations give reliable yield estimates over a wide range of age, site, and stand-density conditions. Several yield characteristics for various diameter limits are tabulated for stands ranging in age from 20 to 100 years, high- to low-productivity sites, stand densities of 500 to 2,000 stems per acre at age 70 years, and quadratic-mean diameters from 3.0 to 8.5 inches at the same age.

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### **Résumé**

L'auteur, utilisant l'analyse de régression et des techniques personnelles, dérive des équations des moindres carrés pour prévoir le rendement de peuplements naturels de Pin tordu latifolié (*Pinus contorta* Dougl. var. *latifolia* Engelm.) d'après l'âge, la densité du peuplement et la productivité de la station. Elles ont été dérivées dans le but d'assurer l'additivité des estimations partielles et totales du rendement à l'acre des peuplements. Ces équations fiables couvrent un large éventail d'âges, de stations et de densités. Des tables réunissent plusieurs caractéristiques de rendement jusqu'à diverses limites de diamètres, pour des peuplements dont l'âge varie de 20 à 100 ans, en stations faiblement à fortement productives, à densités de 500 à 2000 tiges à l'acre (âge: 70 ans) et dont les diamètres quadratiques moyens varient de 3.0 à 8.5 po au même âge.



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**Figure 1a.** Stereogram of a high density (7,000 stems/acre at 70 years) in a 95-year-old stand of lodgepole pine on an average site ( $PI = 1.0$ ).



**Figure 1b.** Stereogram of a medium density (1,000 stems/acre at 70 years) in a 95-year-old stand of lodgepole pine on an average site ( $PI = 1.0$ ).

## Introduction

Reliable estimates of stand yield are essential for judicious and successful forest management planning. Optimum resource allocation and stand manipulation require a knowledge of growth rates and total production by site and stand age. Past European and North American attempts to predict yield have been reviewed by Assmann (1970), Curtis (1972), and Smith (1973).

The majority of past attempts resulted in the construction of either "normal" or empirical yield tables based upon the independent variables site and age. Despite their obvious shortcomings, normal yield tables are still widely used (Plonski 1956; McArdle et al. 1961; Farr 1967; Bella 1968a; Payandeh 1973; Page and Van Nostrand 1973). Efforts to account for stand density in natural stands (Mulloy 1944, 1947; MacLean and Bedell 1955; Clutter 1963; Dahms 1966; Evert 1970; Smith 1973; Johnstone 1975) or spacing in plantations and managed stands (Duff 1966; Bradley et al. 1966; Myers 1967; Bennett et al. 1970; Stiell and Berry 1973a, 1973b) were few and varied greatly in technique.

Most recently, several mathematical and computer models have been investigated to simulate the development of stands or trees within stands (Newnham 1964; Lee 1967; Myers 1968; Mitchell 1969; Lin 1970; Bella 1970; Arney 1972; Goulding 1972; Stage 1973; Pienarr and Turnbull 1973; Clutter and Allison 1974). Although it appears to be very promising, stand modeling is generally in the developmental stage, and there is still a need for conventional yield prediction methods.

The ideal basis for constructing stand development and yield functions is long-term remeasurement data of permanent sample plots. When single-examination data are used, information on the past development of a given stand is usually unavailable, and therefore the stand cannot be placed in a sequence of stand development in relation to other stands. In this study a technique has been developed that allows the assessment of past stand development from single-examination-plot data. This technique, involving what is herein called development index, is based upon Ackerman's (1962) work, which demonstrated that it is possible, by using growth analysis and the basal area of a small number of the largest trees per acre, to predict the development patterns of lodgepole pine stands. Development index was used to construct the yield tables for essentially pure, natural and unmanaged, even-aged lodgepole pine stands of Alberta as presented in this report. These yield tables differ from conventional ones in that (1) they are variable-density tables, and (2) the base equations were derived to ensure that, for each per-acre characteristic, the sum of the predicted partial-stand values equals the predicted whole-stand value.

### Growth and Development of Lodgepole Pine Stands

Lodgepole pine often regenerates overabundantly after wildfire. Stocking levels as high as 500,000 stems per acre<sup>†</sup> have been reported in young stands by Smithers (1957) and even as many as 100,000 living stems per acre have been reported in a 70-year-old stand (Mason 1915). Under these conditions competition is severe. Horton (1956) reported a dominant height of only 4 feet in one dense 50-year-old lodgepole pine stand. Indeed, it is unlikely that stands of more than 2,000 stems per acre at 90 years of age will yield a merchantable volume (Smithers 1961).

The ability of lodgepole pine to establish itself and exist in extremely dense stands appears to depend upon many factors. As a result, there is an extreme variation in the number of stems on similar sites at any age (Figs. 1a and 1b). As pointed out by Horton (1953), seedling establishment is not directly related to site quality. Once established, lodgepole pine is well adapted to a wide range of soil moisture regimes and soil parent materials. Mortality appears to depend upon initial density and, although heavy mortality may occur even at advanced ages, initially dense stands tend to remain dense regardless of site quality (Smithers 1961).

One of the most reliable indicators of the productive capacity of forest sites is the relationship between age and the average height of dominant and codominant trees. For most coniferous species this relationship is independent of density over a wide range of stand densities. Unlike those of most conifers, many of the growth expressions of lodgepole pine (including volume, average stand height, average diameter, and dominant height) are strongly influenced by stand density regardless of physiographic site (Smithers 1956; Holmes and Tackle 1962) and, consequently, the simple relationship between age and dominant height is not a reliable index of productivity for dense lodgepole pine stands (Alexander et al. 1967). Basal area per acre seems to be the one stand characteristic that is independent of stand density expressed as numbers of stems (Smithers 1956). It is apparent, therefore, that in dealing with lodgepole pine some adjustment for stand density is warranted both for the assessment of site productivity and for the prediction of stand development.

### The Lodgepole Pine Forests of Alberta

The importance of lodgepole pine, which occurs throughout most of western Alberta (Fig. 2), has been discussed

<sup>†</sup> Metric conversion factors are presented in Appendix I.

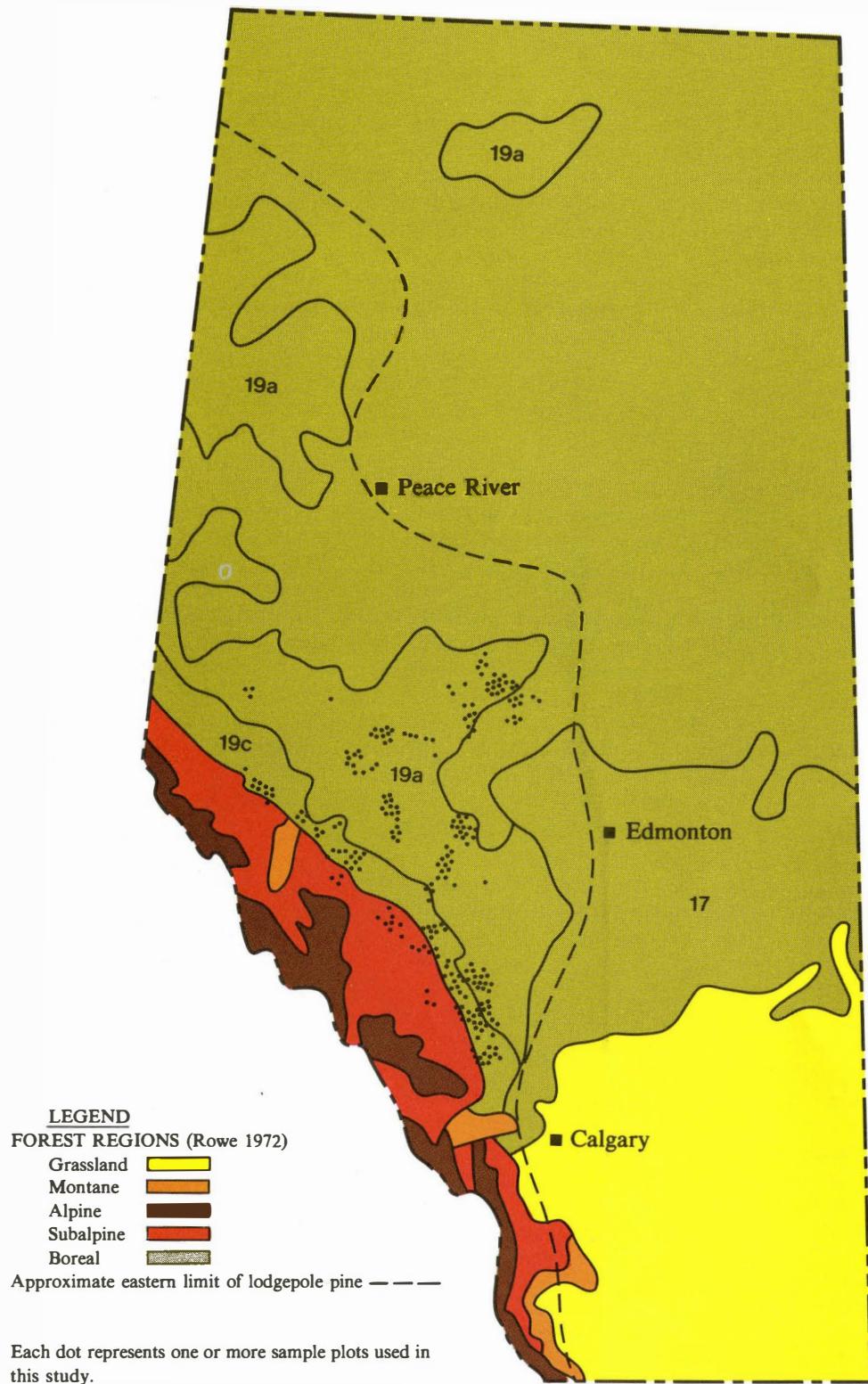


Figure 2. Distribution of lodgepole pine by forest regions in Alberta.

in detail by Smithers (1961) and McDougall (1975). Because lodgepole pine is well adapted to adverse alpine conditions, it forms the main cover-type for most of Alberta's mountain watersheds. Lodgepole pine is also the predominant tree species within most of Alberta's provincial and national parks and most other high-use recreational areas in the province. Natural lodgepole pine stands are generally considered to be poor for wildlife production, but the large area of the province occupied by these stands represents one of the most important wildlife habitat types in Alberta. In terms of timber production, lodgepole pine is second only to white spruce in merchantable coniferous wood inventories and total wood harvested. Because of its ecological adaptability, rapid early growth, relatively good regenerative ability, and excellent wood characteristics, lodgepole pine will probably become Alberta's main commercial species.

### Data Base

The sample-plot data used in this study were obtained from two sources: the Canadian Forestry Service (CFS) and the Alberta Forest Service (AFS). The CFS data included 161 single-examination plots, 14 permanent sample plots remeasured once, and 85 permanent sample plots remeasured twice. These data were supplemented with 421 single-examination-plot observations made available by the AFS. The remeasurement data were treated as independent plot data, making a total of 865 plot observations. The plots, which varied in size from 0.50 to 0.05 acre, were located in essentially pure pine stands of Foothills sections B.19a and B.19c of the Boreal Forest Region (Rowe 1972) of Alberta (Fig. 2). Only those plots were used in which the pine basal area constituted at least 75% of the total stand basal area. Each plot was carefully scrutinized to ensure a one-aged condition. The plots used in the analyses represented a wide range of site, age, and stand-density conditions (Table 1). Crown closure data were available for the AFS plots only and averaged 60% within a range of 10-95%.

Data taken on each plot included:

1. Diameter at breast height of all living trees larger than 0.5 inch, by 1-inch classes;
2. Sufficient total height measurements to permit the construction of a reliable height-diameter curve;
3. Enough borings at stump height (1.0 foot) to accurately determine the stand age of the pine.

Where species other than pine occurred, trees with diameters as large as or larger than the smallest pine were considered as pine and the remaining trees in the understory were eliminated from the analysis. In addition, increment cores were obtained at breast height from the equivalent of the 200 largest pine trees per acre on 117 of the CFS plots.

### Analyses

#### *Terminology and Measures*

**Age.** Unless otherwise noted, "age" refers to stump-height age measured at 1.0 foot above ground level. All analyses are based upon stump-height age (A). An analysis of all available information suggests that the following adjustments are appropriate for converting stump age to total age:

high sites-add 4 years;  
medium-high sites-add 5 years;  
average sites-add 6 years;  
medium-low sites-add 7 years;  
low sites-add 8 years.

**Density.** "Density" refers to the total number of living trees equal to or greater than ( $>$ ) 0.6 inch dbhob. The tabular results presented are for a specified total number of stems  $>$  0.6 inch dbhob at 70 years total age.

**Development index (DI).** Basal area of the 100 largest (dbhob) trees per acre at index stump age 70 years. It is used here to stratify plots of different ages into similar development patterns.

**Stand diameter.** Two types of diameter are presented:

- a. Average diameter is the arithmetic-average dbhob of all trees that exceed a specified diameter limit.
- b. Quadratic-mean diameter is the diameter of the tree of mean basal area for all trees equal to or greater than 0.6 inch dbhob.

TABLE 1. SUMMARY OF CHARACTERISTICS OF 865 PLOT OBSERVATIONS\* OF NATURAL LODGEPOLE PINE STANDS IN ALBERTA

Stand characteristic	Symbol	Mean	Standard deviation	Minimum value	Maximum value
Stump age (yr)	A	70.3	23.9	15.0	133.0
Development index	DI	38.2	16.2	8.0	119.5
Site productivity index	PI	1.0	0.1	0.6	1.4
Number of stems > 0.6" per acre (spa)	Y <sub>1</sub>	1154.5	979.6	126.0	7820.0
Number of stems > 4.6" per acre (spa)	Y <sub>2</sub>	461.4	197.8	0.0	892.0
Number of Stems > 8.6" per acre (spa)	Y <sub>3</sub>	62.3	80.2	0.0	330.0
Average dbhob (in.) > 0.6"	Y <sub>4</sub>	5.6	1.9	1.3	12.4
Average dbhob (in.) > 4.6"	Y <sub>5</sub>	6.4	1.8	0.0	12.4
Average dbhob (in.) > 8.6"	Y <sub>6</sub>	6.1	4.7	0.0	14.1
Quadratic-mean dbhob (in.) > 0.6"	Y <sub>7</sub>	5.8	2.0	1.4	13.0
Average height (ft) > 0.6"	Y <sub>8</sub>	48.1	14.9	11.3	86.3
Average height (ft) > 4.6"	Y <sub>9</sub>	51.9	15.2	0.0	86.3
Average height (ft) > 8.6"	Y <sub>10</sub>	42.5	32.8	0.0	88.0
Dominant height (ft)	Y <sub>11</sub>	58.5	16.0	17.0	96.0
Basal area (ft <sup>2</sup> ) per acre > 0.6"	Y <sub>12</sub>	148.9	39.3	34.3	260.5
Basal area (ft <sup>2</sup> ) per acre > 4.6"	Y <sub>13</sub>	117.1	58.4	0.0	259.3
Basal area (ft <sup>2</sup> ) per acre > 8.6"	Y <sub>14</sub>	34.7	47.6	0.0	213.1
Total cubic foot volume (ft <sup>3</sup> ) per acre > 0.6"	Y <sub>15</sub>	3923.6	1790.6	296.2	9422.1
Total cubic foot volume (ft <sup>3</sup> ) per acre > 4.6"	Y <sub>16</sub>	3421.5	2104.0	0.0	9400.4
Total cubic foot volume (ft <sup>3</sup> ) per acre > 8.6"	Y <sub>17</sub>	1203.3	1721.0	0.0	8358.2
Merchantable cubic foot volume (ft <sup>3</sup> ) per acre > 4.6"	Y <sub>18</sub>	2793.6	1927.9	0.0	8581.9
Merchantable cubic foot volume (ft <sup>3</sup> ) per acre > 8.6"	Y <sub>19</sub>	1112.0	1598.2	0.0	7789.9
Sawlog cubic foot volume (ft <sup>3</sup> ) per acre > 8.6"	Y <sub>20</sub>	976.4	1430.0	0.0	7055.1
Sawlog board foot volume (fbm) per acre > 8.6"	Y <sub>21</sub>	5164.7	7899.3	0.0	41002.2

\* 831 plot observations contained stems > 4.6 inches dbhob.  
550 plot observations contained stems > 8.6 inches dbhob.

**Height.** Several measures of height are used and are defined as follows:

- Average height is the arithmetic-average height of all trees larger than a specified diameter limit.
- Dominant-codominant height is the arithmetic-average height of measured dominant and codominant trees.
- Top height is the arithmetic-average height of the 100 largest (dbhob) trees per acre.

**Site.** Conventional site indices are not used. Instead, an index of site productivity (PI) based on top height adjusted by stand density is employed. PI is discussed and defined mathematically on page 7.

**Volume.** Per-acre volumes greater than specified diameter limits were calculated from stand tables, height-diameter curves, and the appropriate volume equations (Appendix II). The following size standards were used in this report:

- Total volume—all trees  $\geq 0.6$  inch dbhob and including stump and top volumes;
  - Merchantable volume—all trees  $\geq 4.6$  inches dbhob from a 1.0-foot stump to a 4.0-inch dib top;
  - Sawlog volume—all trees  $\geq 8.6$  inches dbhob from a 1.0-foot stump to a 6.0-inch dib top.
- All volumes presented are gross volumes, with no allowance for cull or breakage. Studies conducted in the Boreal Forest in Alberta by Loman and Paul (1963) indicated that no allowance need be made for heart rot in lodgepole pine trees up to 100 years of age.

#### *Yield Equation Derivation*

An exploratory analysis was conducted with a thorough examination of the simple correlation coefficients between the various stand characteristics (Table 2) and numerous transformations and interactions thereof. Yield characteristics were then divided into yield groups (i.e. diameter group, height group, etc.), and numerous group models were tested. Final least-square equations were derived for the various partial-stand (i.e. trees  $\geq 4.6$  inches dbhob and trees  $\geq 8.6$  inches dbhob) and whole-stand (trees  $\geq 0.6$  inch dbhob) yield characteristics by using the following basic group models. ††

**Number of stems:**

$$Y_{(1-3)} = b_0 + b_1 A + b_2 A^{-1} + b_3 A^{-0.75} + b_4 PI + b_5 \text{Log}_{10} PI + b_6 DI^{-2} + b_7 DI^{-1} + b_8 (A \cdot DI)^{-1} + b_9 (PI \cdot DI)^{-1} + b_{10} (A \cdot PI)^{-1}$$

**Stand diameter:**

$$Y_{(4-7)} = b_0 + b_1 A + b_2 A^{-1} + b_3 A^{-0.25} + b_4 PI^{-0.5} + b_5 DI^{0.5} + b_6 (A \cdot DI) + b_7 (PI \cdot DI) + b_8 (A \cdot PI)$$

**Height:**

$$Y_{(8-11)} = b_0 + b_1 A + b_2 A^{-1} + b_3 A^{-0.25} + b_4 PI + b_5 DI + b_6 DI^{0.25} + b_7 (A \cdot DI) + b_8 (A / PI)$$

**Basal area:**

$$Y_{(12-14)} = b_0 + b_1 A + b_2 A^{-1} + b_3 A^{-0.25} + b_4 PI + b_5 PI^{0.25} + b_6 DI + b_7 DI^{0.75} + b_8 (A \cdot DI) + b_9 (PI \cdot DI)^{-1} + b_{10} (PI^2 \cdot DI) + b_{11} (A / PI^2)$$

**Volume:**

$$Y_{(15-21)} = b_0 + b_1 A + b_2 A^2 + b_3 PI + b_4 PI^{0.25} + b_5 DI + b_6 DI^{0.25} + b_7 (A \cdot DI) + b_8 (PI^2 \cdot DI) + b_9 (A \cdot PI^2)$$

Although slight improvements (higher  $R^2$  and lower  $s_{y,x}$  values) could be obtained by independently deriving equations for each stand characteristic, priority was given to achieving additivity within per-acre yield groups. As demonstrated by Bella (1968b) and Kozak (1970), additivity between partial- and whole-stand estimates results if the same regression model is used for each component within the yield group. Consequently, in all cases the basic group equation was selected to agree with the best whole-stand equation (obtained by elimination procedures) for that group.

Because the standard error of estimate determined from the residual mean square of a logarithmic equation cannot be transformed back to an arithmetic scale without bias, the standard errors of estimate ( $s_{y,x}$ ) of all logarithmic equations were calculated directly from observed and estimated values of the dependent variable:

$$\hat{s}_{y,x} = \pm \sqrt{\frac{\sum(Y - \hat{Y})^2}{n-m-1}}$$

---

††Dependent and independent variables are defined in Table 1.

TABLE 2. SIMPLE CORRELATION COEFFICIENTS ( $r$ ) BETWEEN STAND CHARACTERISTICS AND INDEPENDENT VARIABLES OF 865 PLOT OBSERVATIONS OF NATURAL LODGEPOLE PINE STANDS IN ALBERTA

Stand characteristics*	Independent variable		
	A	DI	PI
$Y_1$	-0.506	-0.511	0.012
$Y_2$	0.470	0.012	0.270
$Y_3$	0.497	0.682	0.406
$Y_4$	0.604	0.714	0.239
$Y_5$	0.591	0.637	0.166
$Y_6$	0.497	0.574	0.220
$Y_7$	0.601	0.726	0.242
$Y_8$	0.640	0.598	0.406
$Y_9$	0.648	0.524	0.369
$Y_{10}$	0.527	0.573	0.304
$Y_{11}$	0.657	0.590	0.449
$Y_{12}$	0.540	0.239	0.571
$Y_{13}$	0.655	0.518	0.458
$Y_{14}$	0.471	0.715	0.401
$Y_{15}$	0.628	0.513	0.603
$Y_{16}$	0.633	0.585	0.528
$Y_{17}$	0.458	0.710	0.424
$Y_{18}$	0.616	0.628	0.517
$Y_{19}$	0.456	0.711	0.423
$Y_{20}$	0.449	0.714	0.420
$Y_{21}$	0.434	0.713	0.426
A	1.000	-	-
DI	-0.031	1.000	-
PI	-0.009	0.394	1.000

\* Symbols defined in Table 1.

where  $Y$  and  $\hat{Y}$  = observed and estimated values of the dependent variable

$n$  = number of observations

$m$  = number of independent variables

Similarly, an estimated coefficient of determination ( $\hat{R}^2$ ) was obtained directly from:

$$\hat{R}^2 = \frac{SS_{\text{total}} - SS_{\text{residual}}}{SS_{\text{total}}}$$

where  $SS_{\text{total}}$  = sums of square of untransformed  $Y$ ;  $\hat{SS}_{\text{residual}} = \Sigma(Y - \hat{Y})^2$

Logarithmic equations, derived by least-squared methods, result in a systematic underestimate of the dependent variable because the squared deviations of logarithmic values rather than arithmetic values are minimized. A method of overcoming this problem was suggested by Meyer (1944), who derived the formula:

$$C.F. = 10^{1.1513\sigma^2}$$

where  $C.F.$  = correction factor for multiplying the estimate from a logarithmic equation

$\sigma$  = standard error of estimate of a logarithmic equation in terms of logarithms, as determined from the residual mean square

Fig. 3 shows this correction factor (C.F.). As can be seen, the application of the correction factor becomes critical when  $\sigma$  exceeds 0.10. Caution must be exercised, however, in applying this correction factor when the normality assumptions used by Meyer to derive the factor are not met, in which case an overcorrection may result. The correction factor is only applied here where it results in an improved estimate (i.e. the estimation of top height).

### *Development Index*

In the present study the problem of assessing past stand development of single-examination-plot data was overcome by assigning a DI value to each plot observation. It was assumed that, on a given site, stands of the same DI grew and would continue to grow in the same pattern and would have the same yield.

The DI curves were based upon increment-core data at breast height collected from 117 CFS plots. For each of these plots the diameters equivalent to the 200 largest trees per acre were determined for each previous 10-year period. A cofrequency listing of the 200 largest trees per acre by decade was made (Smithers 1949). From this listing the cumulative basal area of the 100 largest trees per acre was determined by decade. In total, 719 decadal measurements were obtained. By procedures similar to those outlined by Johnson and Worthington (1963) for the preparation of anamorphic site-index curves, a sheath of curves (DI curves) relating the basal area of the 100 largest trees per acre to age, with an index age of 70 years, was prepared (Fig. 4). These curves were found to be applicable over the range of site and density conditions encountered in this study. The assumption underlying the use of the DI is that, for short periods (50 years or less), a small group of the largest trees in a stand is free from "regular" mortality. Any mortality among the largest trees would result in an underestimate of the DI. Examination of the 8- to 10-year remeasurement data from the 99 permanent sample plots used in this study showed, by means of a paired t-test, that despite a slight negative bias in the DI, which suggested slight mortality, the successive estimates were, 19 times out of 20, not significantly different.

### *Site Productivity*

For the reasons already discussed, an adjustment for stand density is warranted when the evaluation of site productivity is based upon the growth of lodgepole pine trees or stands. In the present study, a PI value based upon the following analysis was assigned to each plot observation. Data from the 865 plot observations were used to derive a least-square regression to estimate top height:

$$\log_{10} \text{top height (feet)} = 1.0688 - 0.371084 (\text{no. stems}/10,000) - 0.132622 (\log_{10} \text{no. stems})$$

$$+ 0.717922 (\log_{10} A) - 0.00276672 (A)$$

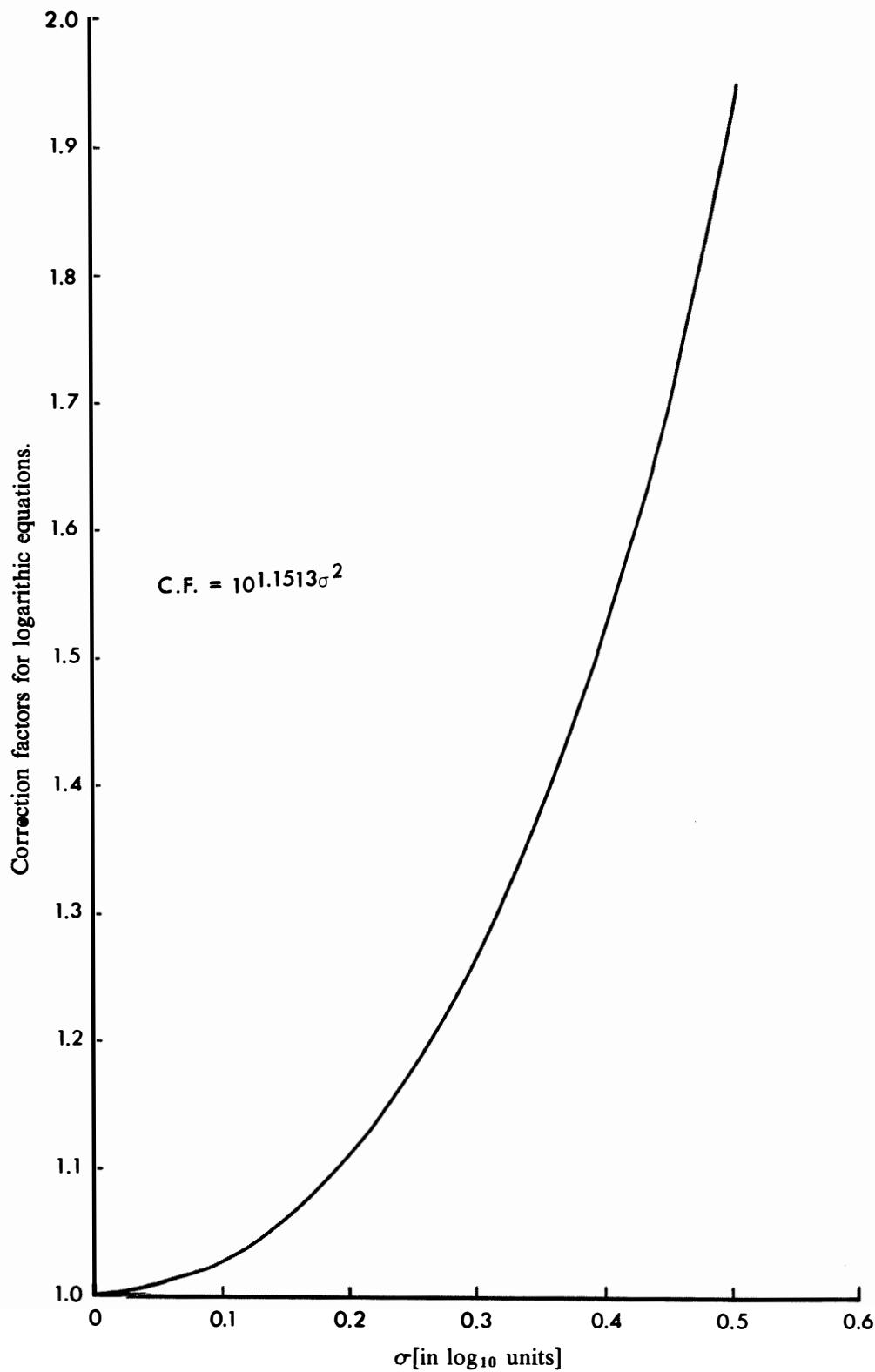
$$C.F. = 1.008771$$

$$n = 865$$

$$\hat{R}^2 = 0.771$$

$$\hat{s}_{y,x} = 7.36 \text{ feet}$$

This relationship is shown in Fig. 5. Because the data were collected from a wide range of age, density, and site types, this equation was deemed to represent the average for lodgepole pine in Alberta. Consequently, if the observed



**Figure 3.** The relationship between bias correction factors and standard errors of estimate ( $\sigma$ ) of logarithmic equations.

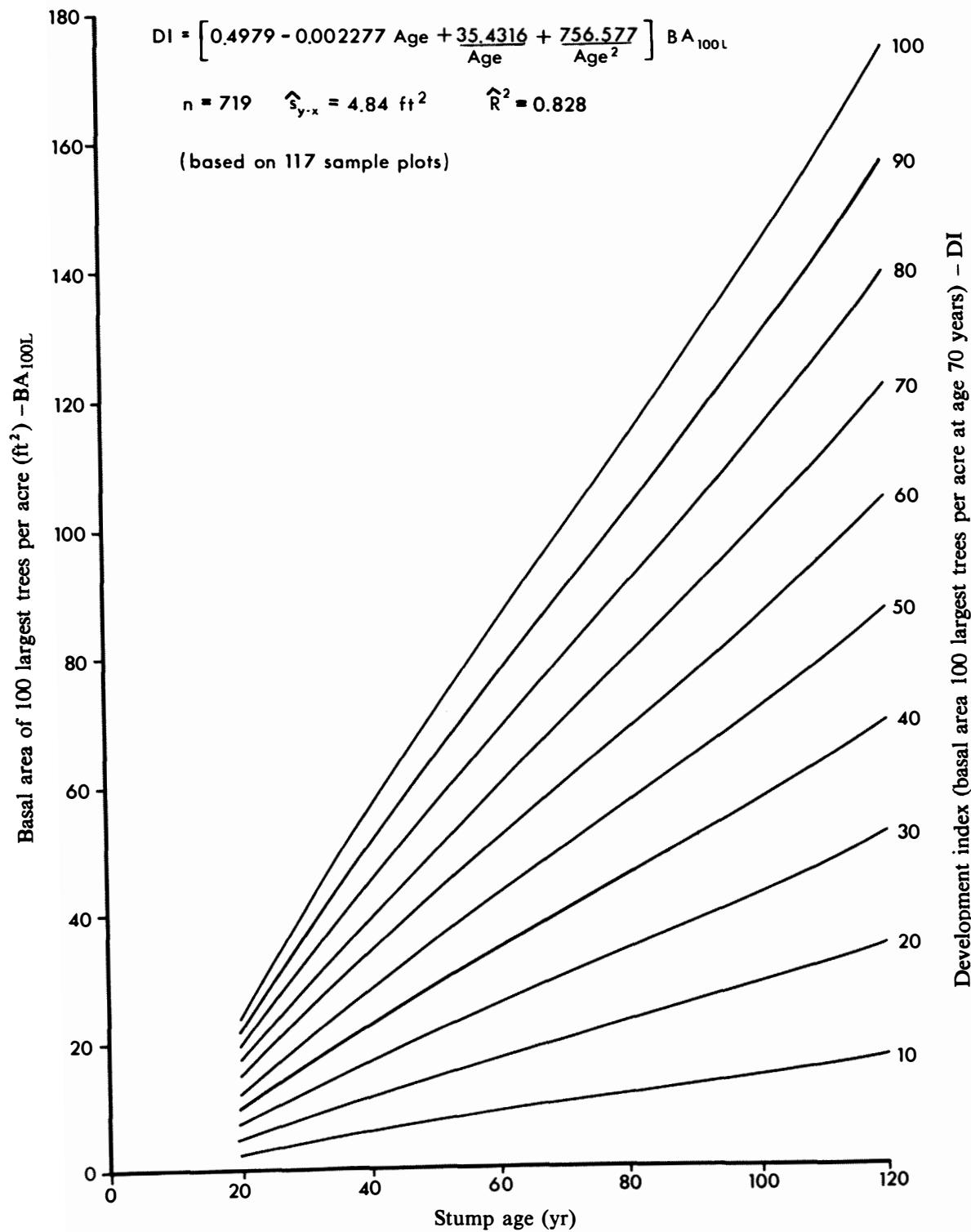


Figure 4. Development index curves for lodgepole pine in Alberta.

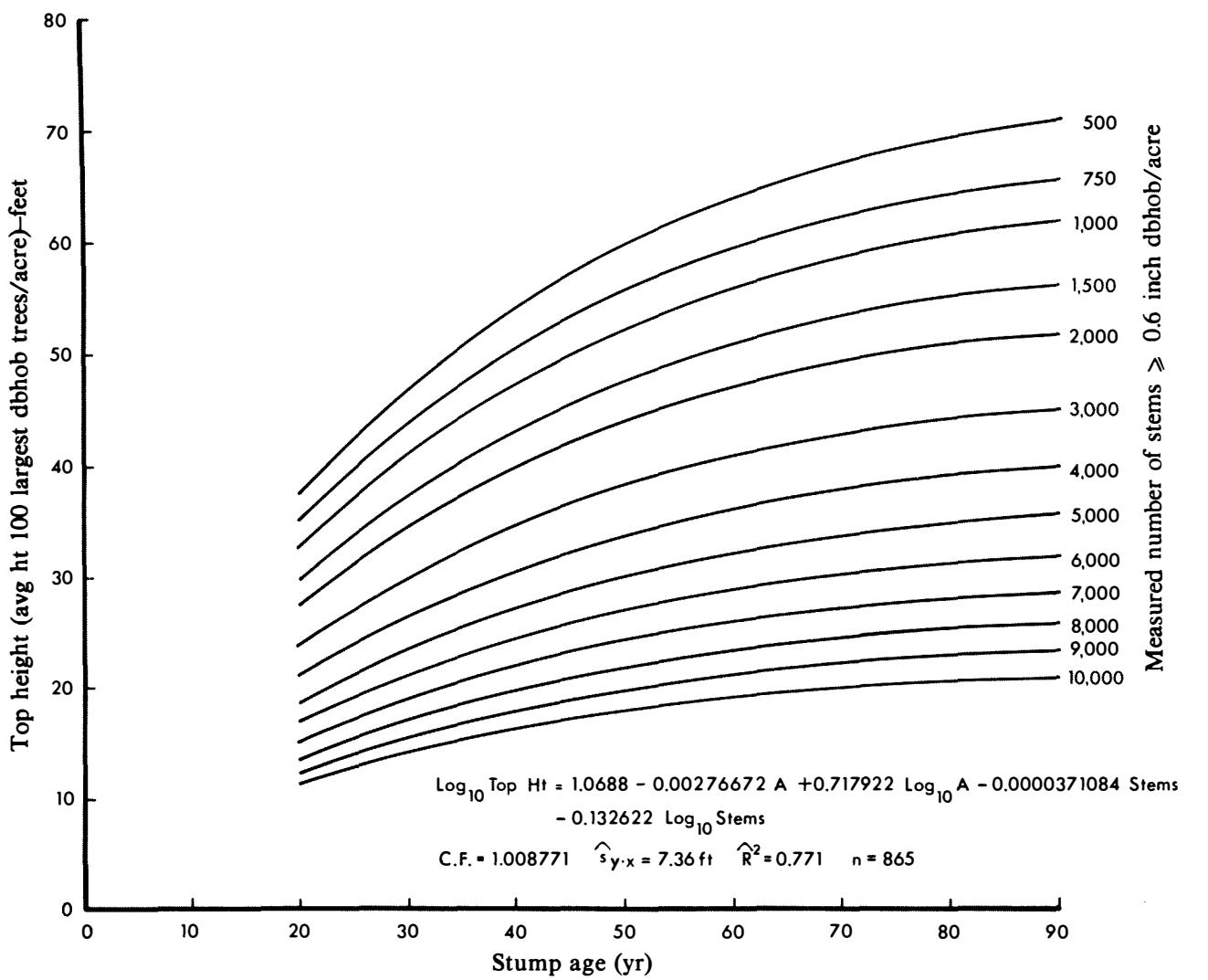


Figure 5. The effect of stand density on the top height-age relationship of lodgepole pine.

top height of a given stand exceeded the expected (predicted) top height, that site was of better-than-average productivity and, conversely, if the observed top height was less than the expected top height, the site was of less-than-average productivity. A PI value, expressed as a decimal fraction, was assigned to each plot on the following basis:

$$PI = \frac{\text{Observed top height}}{\text{Expected top height}}$$

The PI for an average site is equal to 1.00. This method is not unlike the method suggested by Parker (1942). The expected top heights (PI = 1.00) are given in Table 3 for several age and number-of-stems combinations.

### **Yield Formulae**

Least-square regression equations and their associated statistics for whole- and partial-stand yield characteristics are presented in Table 4. It is apparent from the F-ratios that independent variables that did not significantly improve some equations were retained in those equations because they contributed significantly to other equations within the same yield group. For example, even though PI did not contribute significantly to the estimation of  $Y_{(2)}$  or  $Y_{(3)}$ , it was retained because of its significant contribution to the estimation of  $Y_{(1)}$ . As noted previously, this retention was necessary to ensure additivity within yield groups.

### **Yield Table Construction**

#### *Table Density Classes*

The basic measures of density used in the yield tables are numbers of stems per acre  $\geq 0.6$  inch dbhob at 70 years total age and quadratic-mean diameter at 70 years total age. The appropriate DI can be calculated for a specified number of stems (or quadratic-mean diameter) at total age 70 years on a specified site by substituting the correct stump age for total age 70, number of stems (or quadratic-mean diameter), and site (PI) into equation  $Y_{(1)}$  (or  $Y_{(7)}$ ) and solving the resulting quadratic-type equation for DI. Then by substituting this calculated DI, the selected PI, and various ages (A) into the yield equations an estimate of yield for that density class and site can be obtained for any desired age. This procedure is repeated for each site and density class desired. For example, the DI of a 70-year-old (64 years stump age) stand containing 1,000 stems per acre and growing on an average-quality site (PI = 1.00) is 32.94. The yield per acre, past or future, can be estimated for that stand by using DI = 32.94, PI = 1.00, and any desired age in the appropriate equation (Table 4). Table 5 presents development indices for the various site productivity-density combinations used in the yield tables.

#### *Yield Tables*

Appendices III-1 to III-13 present selected whole- and partial-stand yield characteristics for low- to high-site productivities, total ages 20 to 100 years, and stand densities from 500 to 2,000 stems per acre at total age 70 years. Equivalent estimates for the same yield characteristics, sites, and ages by quadratic-mean diameters from 3.0 to 8.5 inches at total age 70 years are tabulated in Appendices IV-1 to IV-13.

### **Using the Yield Formulae and Tables**

To use the formulae and tables it is necessary to determine (1) the stump age of the lodgepole pine, (2) the number of trees per acre ( $\geq 0.6$  inch dbhob), and (3) the average height of the 100 largest dbhob trees per acre. This information is used to estimate site productivity (PI) and any of the yield characteristics in the formulae or tables. The procedure is illustrated in the following example. Suppose a stand of lodgepole pine contains 1,500 stems per acre and has an average stump age of 45 years and the average height of the 100 largest trees per acre (top height) is 50.0 feet.

1. Table 3 shows that the expected top height for a 45-year-old (stump age) stand containing 1,500 stems per acre is 45.5 feet.

Therefore the PI of the site is:

$$PI = \frac{50.0}{45.5} = 1.1$$

TABLE 3. TOP HEIGHT (FEET) OF LODGEPOLE PINE ON AVERAGE-PRODUCTIVITY SITES (PI = 1.00) BY AGE AND NUMBER-OF-STEMS COMBINATIONS

Stump age (yr)	Measured number of stems (> 0.6 inch dbhob) per acre											
	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000
20	37.6	32.8	29.8	27.5	25.6	23.9	22.5	21.1	19.9	18.8	17.8	16.9
25	42.7	37.3	33.9	31.3	29.1	27.2	25.5	24.0	22.7	21.4	20.3	19.2
30	47.2	41.2	37.4	34.5	32.1	30.0	28.2	26.5	25.0	23.7	22.4	21.2
35	51.0	44.6	40.5	37.3	34.7	32.5	30.5	28.7	27.1	25.6	24.2	22.9
40	54.4	47.5	43.2	39.8	37.0	34.6	32.5	30.6	28.9	27.3	25.8	24.5
45	57.3	50.1	45.5	42.0	39.0	36.5	34.3	32.3	30.4	28.8	27.2	25.8
50	59.9	52.4	47.5	43.9	40.8	38.2	35.8	33.7	31.8	30.1	28.4	26.9
55	62.1	54.3	49.3	45.5	42.3	39.2	37.2	35.0	33.0	31.2	29.5	27.9
60	64.1	56.0	50.8	46.9	43.6	40.8	38.3	36.1	34.0	32.1	30.4	28.8
65	65.7	57.5	52.2	48.1	44.8	41.9	39.3	37.0	34.9	33.0	31.2	29.6
70	67.2	58.7	58.3	49.2	45.7	42.8	40.1	37.8	35.7	33.7	31.9	30.2
75	68.3	59.7	54.2	50.0	46.5	43.5	40.9	38.5	36.3	34.3	32.4	30.7
80	69.3	60.6	55.0	50.8	47.2	44.2	41.5	39.0	36.8	34.8	32.9	31.2
85	70.2	61.3	55.7	51.4	47.8	44.7	41.9	39.5	37.2	35.2	33.3	31.5
90	70.8	61.9	56.2	51.8	48.2	45.1	42.3	39.9	37.6	35.5	33.6	31.8
95	71.3	62.3	56.6	52.2	48.6	45.4	42.6	40.1	37.9	35.8	33.8	32.1
100	71.4	62.6	56.9	52.5	48.8	45.6	42.8	40.3	38.0	35.9	34.0	32.2

TABLE 4. PARTIAL-AND WHOLE-STAND LODGEPOLE PINE YIELD EQUATIONS, AND REGRESSION COEFFICIENT SIGNIFICANCE TEST

## Yield characteristic

	Dependent variable	$b_0$	$b_1$
<i>Number of trees per acre (spa)<sup>b</sup></i>			
1. Trees $\geq 0.6$ in. dbhob	$Y_{(1)}$	$-0.898820 \times 10^4$	$0.114563 \times 10^2$
2. Trees $\geq 4.6$ in. dbhob	$Y_{(2)}$	$0.131507 \times 10^4$	$-0.489955 \times 10^1$
3. Trees $\geq 8.6$ in. dbhob	$Y_{(3)}$	$-0.258838 \times 10^2$	$0.263925 \times 10^1$
<i>Stand diameter (in.)<sup>c</sup></i>			
1. Avg diameter trees $\geq 0.6$ in. dbhob	$Y_{(4)}$	$0.801063 \times 10^1$	$0.199663 \times 10^{-1}$
2. Avg diameter trees $\geq 4.6$ in. dbhob	$Y_{(5)}$	$-0.228629 \times 10^2$	$0.543916 \times 10^0$
3. Avg diameter trees $\geq 8.6$ in. dbhob	$Y_{(6)}$	$0.916504 \times 10^2$	$-0.191319 \times 10^0$
4. Quadratic-mean diameter trees $\geq 0.6$ in. dbhob	$Y_{(7)}$	$0.732337 \times 10^1$	$0.211138 \times 10^0$
<i>Height (ft)<sup>d</sup></i>			
1. Avg height trees $\geq 0.6$ in. dbhob	$Y_{(8)}$	$0.155604 \times 10^3$	$-0.121389 \times 10^0$
2. Avg height trees $\geq 4.6$ in. dbhob	$Y_{(9)}$	$0.484096 \times 10^2$	$-0.554927 \times 10^{-2}$
3. Avg height trees $\geq 8.6$ in. dbhob	$Y_{(10)}$	$0.454001 \times 10^3$	$-0.635436 \times 10^0$
4. Dominant-codominant height	$Y_{(11)}$	$0.216959 \times 10^3$	$-0.267232 \times 10^0$
<i>Basal area (ft<sup>2</sup>) per acre<sup>e</sup></i>			
1. Trees $\geq 0.6$ in. dbhob	$Y_{(12)}$	$0.556645 \times 10^3$	$0.223571 \times 10^1$
2. Trees $\geq 4.6$ in. dbhob	$Y_{(13)}$	$0.302471 \times 10^4$	$0.129482 \times 10^1$
3. Trees $\geq 8.6$ in. dbhob	$Y_{(14)}$	$-0.579611 \times 10^2$	$0.110728 \times 10^1$
<i>Volume per acre<sup>f</sup></i>			
1. Total volume (ft <sup>3</sup> ) trees $\geq 0.6$ in. dbhob	$Y_{(15)}$	$-0.196829 \times 10^4$	$0.269380 \times 10^2$
2. Total volume (ft <sup>3</sup> ) trees $\geq 4.6$ in. dbhob	$Y_{(16)}$	$-0.275315 \times 10^4$	$0.286300 \times 10^2$
3. Total volume (ft <sup>3</sup> ) trees $\geq 8.6$ in. dbhob	$Y_{(17)}$	$0.151385 \times 10^5$	$-0.114668 \times 10^3$
4. Merchantable volume (ft <sup>3</sup> ) trees $\geq 4.6$ in. dbhob	$Y_{(18)}$	$0.164993 \times 10^4$	$-0.409972 \times 10^1$
5. Merchantable volume (ft <sup>3</sup> ) trees $\geq 8.6$ in. dbhob	$Y_{(19)}$	$0.138717 \times 10^5$	$-0.106964 \times 10^3$
6. Sawlog cubic foot volume (ft <sup>3</sup> )	$Y_{(20)}$	$0.118386 \times 10^5$	$-0.971216 \times 10^2$
7. Sawlog board foot volume (fbm)	$Y_{(21)}$	$0.588213 \times 10^5$	$-0.557924 \times 10^3$

<sup>a</sup> p.05 significance level  $F_{1,400} = 3.86$   $F_{1,1000} = 3.85$  p.01 significance level  $F_{1,400} = 6.70$   $F_{1,1000} = 6.66$ <sup>b</sup>  $Y_{(1-3)} = b_0 + b_1A + b_2A^{-1} + b_3A^{0.75} + b_4PI + b_5\text{Log}_{10}PI + b_6DI^{-2} + b_7DI^{-4} + b_8(A \cdot DI)^{-1} + b_9(PI \cdot DI)^{-1} + b_{10}(A \cdot PI)^{-1}$ <sup>c</sup>  $Y_{(4-7)} = b_0 + b_1A + b_2A^{-1} + b_3A^{-0.25} + b_4PI^{-0.5} + b_5DI^{0.5} + b_6(A \cdot DI) + b_7(PI \cdot DI) + b_8(A \cdot PI)$ <sup>d</sup>  $Y_{(8-11)} = b_0 + b_1A + b_2A^{-1} + b_3A^{-0.25} + b_4PI + b_5DI + b_6DI^{0.25} + b_7(A \cdot DI) + b_8(A \cdot PI)$ <sup>e</sup>  $Y_{(12-14)} = b_0 + b_1A + b_2A^{-1} + b_3A^{0.25} + b_4PI + b_5PI^{0.25} + b_6DI + b_7DI^{0.75} + b_8(A \cdot DI) + b_9(PI \cdot DI)^{-1} + b_{10}(PI^2 \cdot DI) + b_{11}(A \cdot PI^2)$ <sup>f</sup>  $Y_{(15-21)} = b_0 + b_1A + b_2A^2 + b_3PI + b_4PI^{0.25} + b_5DI + b_6DI^{0.25} + b_7(A \cdot DI) + b_8(PI^2 \cdot DI) + b_9(A \cdot PI^2)$

Regression coefficients and F-ratios<sup>a</sup>

Fx <sub>1</sub>	b <sub>2</sub>	Fx <sub>2</sub>	b <sub>3</sub>	Fx <sub>3</sub>	b <sub>4</sub>	Fx <sub>4</sub>	b <sub>5</sub>
26.7	-0.253876 × 10 <sup>6</sup>	55.6	0.165374 × 10 <sup>6</sup>	61.4	0.519086 × 10 <sup>4</sup>	34.8	-0.123380 × 10 <sup>5</sup>
23.7	0.689820 × 10 <sup>5</sup>	20.0	-0.447889 × 10 <sup>5</sup>	21.9	0.175924 × 10 <sup>1</sup>	0.0	0.172512 × 10 <sup>4</sup>
107.1	-0.110948 × 10 <sup>5</sup>	8.0	0.154266 × 10 <sup>4</sup>	0.4	0.143707 × 10 <sup>3</sup>	2.0	0.349069 × 10 <sup>3</sup>
9.6	0.376725 × 10 <sup>1</sup>	0.0	-0.145246 × 10 <sup>2</sup>	4.4	-0.342415 × 10 <sup>1</sup>	31.0	0.899977 × 10 <sup>0</sup>
41.9	-0.278879 × 10 <sup>3</sup>	149.9	0.725501 × 10 <sup>2</sup>	65.4	0.272025 × 10 <sup>-1</sup>	0.0	0.732946 × 10 <sup>0</sup>
23.1	0.731332 × 10 <sup>3</sup>	45.9	-0.306672 × 10 <sup>3</sup>	52.0	-0.179690 × 10 <sup>1</sup>	0.2	0.469631 × 10 <sup>1</sup>
13.7	0.181837 × 10 <sup>1</sup>	0.0	-0.137156 × 10 <sup>2</sup>	5.1	-0.303469 × 10 <sup>1</sup>	31.2	0.907704 × 10 <sup>0</sup>
3.2	0.102153 × 10 <sup>4</sup>	30.8	-0.602898 × 10 <sup>3</sup>	68.9	0.102178 × 10 <sup>2</sup>	13.1	-0.396680 × 10 <sup>0</sup>
0.0	-0.315165 × 10 <sup>3</sup>	3.3	-0.274564 × 10 <sup>3</sup>	16.2	0.179206 × 10 <sup>2</sup>	45.5	-0.284968 × 10 <sup>0</sup>
5.9	0.504228 × 10 <sup>4</sup>	50.6	-0.208940 × 10 <sup>4</sup>	55.7	-0.104995 × 10 <sup>2</sup>	0.9	-0.147406 × 10 <sup>1</sup>
23.1	0.136034 × 10 <sup>4</sup>	81.2	-0.773971 × 10 <sup>3</sup>	68.5	0.218410 × 10 <sup>2</sup>	88.7	-0.392720 × 10 <sup>0</sup>
77.6	-0.454152 × 10 <sup>4</sup>	30.1	0.122944 × 10 <sup>4</sup>	14.0	0.397859 × 10 <sup>3</sup>	20.4	-0.138362 × 10 <sup>4</sup>
27.7	0.422204 × 10 <sup>4</sup>	27.7	-0.220302 × 10 <sup>4</sup>	48.0	0.644855 × 10 <sup>3</sup>	56.9	-0.303026 × 10 <sup>4</sup>
54.6	-0.308834 × 10 <sup>4</sup>	39.9	0.177361 × 10 <sup>4</sup>	83.9	0.202936 × 10 <sup>3</sup>	15.2	-0.915642 × 10 <sup>3</sup>
37.8	-0.212322 × 10 <sup>0</sup>	107.3	-0.150493 × 10 <sup>4</sup>	0.6	-0.418033 × 10 <sup>4</sup>	0.4	-0.706440 × 10 <sup>2</sup>
32.3	-0.167858 × 10 <sup>0</sup>	50.7	-0.729707 × 10 <sup>3</sup>	0.1	-0.134567 × 10 <sup>5</sup>	3.0	-0.114665 × 10 <sup>3</sup>
818.4	0.419720 × 10 <sup>0</sup>	501.3	-0.294273 × 10 <sup>4</sup>	2.9	-0.463131 × 10 <sup>4</sup>	0.6	-0.585303 × 10 <sup>2</sup>
0.9	-0.260978 × 10 <sup>-1</sup>	1.7	-0.679875 × 10 <sup>3</sup>	0.1	-0.132411 × 10 <sup>5</sup>	4.0	-0.102665 × 10 <sup>3</sup>
849.0	0.390816 × 10 <sup>0</sup>	518.2	-0.288226 × 10 <sup>4</sup>	3.3	-0.369432 × 10 <sup>4</sup>	0.4	-0.534490 × 10 <sup>2</sup>
955.9	0.352656 × 10 <sup>0</sup>	576.3	-0.303834 × 10 <sup>4</sup>	4.9	-0.143216 × 10 <sup>4</sup>	0.1	-0.450040 × 10 <sup>2</sup>
1120.4	0.197105 × 10 <sup>1</sup>	639.4	-0.241732 × 10 <sup>5</sup>	11.1	0.125122 × 10 <sup>5</sup>	0.2	-0.251615 × 10 <sup>3</sup>

$Fx_5$	$b_6$	$Fx_6$	$b_7$	$Fx_7$	$b_8$	$Fx_8$	$b_9$	$Fx_9$
31.0	$0.367311 \times 10^6$	228.6	$0.516807 \times 10^5$	92.3	$0.167327 \times 10^7$	299.6	$-0.538635 \times 10^5$	133.2
2.9	$-0.160430 \times 10^6$	211.9	$0.222178 \times 10^5$	82.9	$-0.578002 \times 10^6$	173.8	$0.513928 \times 10^3$	0.1
1.9	$0.653739 \times 10^5$	547.1	$-0.165479 \times 10^5$	715.3	$0.206793 \times 10^6$	345.8	$0.418504 \times 10^4$	60.8
289.4	$0.103492 \times 10^{-2}$	393.4	$-0.469320 \times 10^{-1}$	153.8	$-0.246491 \times 10^{-1}$	30.2		
113.2	$0.546530 \times 10^{-3}$	64.7	$-0.189530 \times 10^{-1}$	14.8	$-0.103098 \times 10^{-1}$	3.1		
206.8	$0.332331 \times 10^{-3}$	1.1	$-0.208370 \times 10^0$	79.6	$0.654093 \times 10^{-1}$	5.6		
376.6	$0.104351 \times 10^{-2}$	511.8	$-0.441466 \times 10^{-1}$	174.1	$-0.244080 \times 10^{-1}$	37.9		
47.8	$0.421739 \times 10^2$	199.6	$0.317459 \times 10^{-2}$	34.0	$-0.137709 \times 10^0$	15.0		
27.9	$0.430537 \times 10^2$	235.2	$0.126478 \times 10^{-3}$	0.0	$-0.895895 \times 10^{-1}$	7.2		
44.4	$0.146070 \times 10^3$	161.1	$0.511057 \times 10^{-2}$	5.9	$-0.248543 \times 10^0$	3.3		
69.6	$0.419390 \times 10^2$	292.9	$0.318694 \times 10^{-2}$	50.8	$-0.979724 \times 10^{-1}$	11.3		
16.2	$-0.493452 \times 10^1$	21.2	$0.172728 \times 10^2$	18.3	$-0.766153 \times 10^{-2}$	9.5	$0.791656 \times 10^3$	23.9
82.6	$-0.898322 \times 10^1$	74.7	$0.334974 \times 10^2$	73.1	$-0.206390 \times 10^{-1}$	73.5	$-0.543586 \times 10^3$	12.0
20.3	$-0.448375 \times 10^1$	50.1	$0.101795 \times 10^2$	18.2	$0.538417 \times 10^{-1}$	1348.0	$0.823141 \times 10^3$	74.2
72.1	$0.334776 \times 10^4$	95.1	$0.978931 \times 10^4$	3.1	$0.404804 \times 10^2$	111.3	$0.492204 \times 10^2$	348.9
143.7	$0.735427 \times 10^4$	347.2	$0.110305 \times 10^0$	2.9	$0.455805 \times 10^2$	106.7	$0.496852 \times 10^2$	268.8
59.2	$-0.273031 \times 10^4$	75.6	$0.195660 \times 10^1$	1460.7	$0.359765 \times 10^2$	105.1	$0.229631 \times 10^2$	90.8
159.2	$0.548630 \times 10^4$	267.0	$0.489728 \times 10^0$	80.0	$0.403514 \times 10^2$	115.6	$0.430252 \times 10^2$	278.6
58.8	$-0.266079 \times 10^4$	85.7	$0.183144 \times 10^1$	1525.8	$0.336009 \times 10^2$	109.3	$0.210312 \times 10^2$	90.8
57.0	$-0.277030 \times 10^4$	126.8	$0.168263 \times 10^1$	1758.9	$0.306598 \times 10^2$	124.3	$0.178712 \times 10^2$	89.5
63.3	$-0.182676 \times 10^5$	195.8	$0.950487 \times 10^1$	1993.4	$0.197132 \times 10^3$	182.5	$0.105030 \times 10^3$	109.8

$b_{10}$	$Fx_{10}$	$b_{11}$	$Fx_{11}$	$R^2$	Sy.x
$-0.219848 \times 10^5$	12.0			0.922	275.8 spa
$0.993768 \times 10^4$	11.9			0.605	125.1 spa
$0.409906 \times 10^4$	31.5			0.845	31.7 spa
				0.952	0.43 in.
				0.906	0.56 in.
				0.686	2.63 in.
				0.966	0.38 in.
				0.908	4.5 ft
				0.923	4.3 ft
				0.718	17.5 ft
				0.946	3.7 ft
$0.867041 \times 10^0$	22.5	$-0.716475 \times 10^0$	96.5	0.742	20.1 ft <sup>2</sup> /acre
$0.146896 \times 10^1$	68.7	$-0.853422 \times 10^0$	145.7	0.890	19.5 ft <sup>2</sup> /acre
$0.500987 \times 10^0$	21.5	$-0.312477 \times 10^0$	52.6	0.939	11.9 ft <sup>2</sup> /acre
				0.936	457 ft <sup>3</sup> /acre
				0.938	525 ft <sup>3</sup> /acre
				9.942	418 ft <sup>3</sup> /acre
				0.947	447 ft <sup>3</sup> /acre
				0.943	383 ft <sup>3</sup> /acre
				0.948	328 ft <sup>3</sup> /acre
				0.952	1,738 fbm/acre

TABLE 5. DEVELOPMENT INDICES FOR DIFFERENT SITE-PRODUCTIVITY, DENSITY, AND QUADRATIC-MEAN-DIAMETER CLASSES

Site productivity	Density classes (stems > 0.6 inch dbhb/acre at total age 70 years)						
	500	750	1000	1250	1500	1750	2000
(PI)							
0.80	41.72	31.42	25.94	22.46	20.02	18.19	16.77
0.90	47.35	35.74	29.37	25.28	22.41	20.26	18.59
1.00	54.30	40.49	32.94	28.13	24.77	22.28	20.34
1.10	64.08	46.42	37.11	31.31	27.32	24.40	22.15
1.20	79.52	54.58	42.41	35.14	30.28	26.78	24.14

Site productivity	Quadratic-mean diameter (inches) total age at 70 years											
	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5
(PI)												
0.80	14.15	17.63	21.41	25.47	29.79	34.35	39.15	44.16	-	-	-	-
0.90	14.06	17.62	21.51	25.69	30.15	34.89	39.87	45.10	-	-	-	-
1.00	-	17.88	21.89	26.23	30.88	35.81	41.03	46.51	52.24	-	-	-
1.10	-	-	22.55	27.08	31.94	37.12	42.60	48.38	54.43	60.75	-	-
1.20	-	-	23.47	28.22	33.34	38.80	44.60	50.72	57.16	63.89	70.91	78.22

2. If Appendix III-1 is used for PI 1.1, a stand containing 1,500 stems per acre at stump age 45 years (total age 50 years) falls into the 1,000-stems-per-acre-at-total-age-70-years density class (the actual tabular value is 1,501).
3. The yield characteristics of the stand can be estimated for any age by using the appropriate tables for PI 1.1 and density class 1,000. In our example, at 100 years total age the stand will have an average diameter of 6.7 inches (Appendix III-2), an average height of 62 feet (Appendix III-4), and a total cubic foot volume per acre of 6,200 ft<sup>3</sup>/acre (Appendix III-7).

In the preceding example it was possible to work exclusively within the tables, although identical estimates would have been obtained by using the formulae. When either the stump age or the measured number of stems, or both, fall between tabular classes, it is necessary to rely on the formulae, and the following procedure is recommended:

1. Estimate the expected top height, using stump age and measured number of stems.
2. Determine the PI by expressing the observed top height as a decimal fraction of the expected top height.
3. Determine the DI of the stand by substituting measured number of stems, stump age, and PI (from step 2) into equation Y<sub>(1)</sub> (from Table 4) and solving for DI.
4. Estimate the yield characteristic of interest with the appropriate yield equation (Table 4) for that characteristic, using the PI determined in step 2, the DI determined in step 3, and the desired stump age.

#### **Application of Yield Formulae and Tables**

The yield tables and formulae in this report are for use in essentially pure, even-aged stands of lodgepole pine. Because of the nature of the transformations used and the limitations of the original data (Appendix V), application of the formulae should be restricted to the general range of age, site, and stand-density conditions used in the tables. For example, large overestimates of volume and basal area may be obtained at high ages and low stand densities, and large underestimates for total number of stems at young ages and high stand densities.

Tabular estimates have been presented only for yield parameters of general use and interest. Compatible estimates can be generated for any of the partial-stand components by using the formulae provided. Although number of stems and quadratic-mean diameter at total age 70 years were chosen to define density within the tables, other stand characteristics or index ages can be used (i.e. average stand diameter at 70 years). It is recommended, however, that only stand characteristics that can be predicted with a high degree of certainty (i.e. average stand diameter) be used to define density and that an index age close to 70 years be chosen.

As already noted, within per-acre-yield groups (i.e. stems/acre, basal area/acre, and volume/acre), the formulae presented are additive, thus increasing the flexibility of the yield-prediction system. If, for example, the parameter of interest is the total volume per acre (ft<sup>3</sup>/acre) of logging residues (i.e. top and stumps plus the total volume of trees < 4.6 inches dbhob) resulting from a pulpwood harvest (i.e. the removal of all trees ≥ 4.6 inches dbhob above a 1.0-foot stump to a 4.0-inch dib top), an equation can be derived to estimate this parameter merely by subtracting the intercept and regression coefficients of formula Y<sub>(18)</sub> from the corresponding intercept and regression coefficients of formula Y<sub>(15)</sub>. Similarly, an equation to estimate the basal area per acre (ft<sup>2</sup>/acre) of trees from 4.6 to 8.5 inches dbhob can be derived by subtracting the intercept and regression coefficients of Y<sub>(14)</sub> from the corresponding intercept and regression coefficients of Y<sub>(13)</sub>, and so on. Estimates from these short-cut methods are exactly equal to estimates obtained by the somewhat more laborious methods of subtracting the estimates calculated from the two appropriate formulae; in addition, measures of precision (i.e. standard error of estimates etc.) can be calculated for the derived equation (Kozak 1970). Also, because the formulae are additive, the sum of all partial-stand estimates will always be exactly equal to the estimate obtained by the whole-stand formula.

Users of the formulae will find that for some site-age-density combinations (particularly high ages on high sites at low densities), some partial-stand estimates are higher than the whole-stand estimate. This occurs because the estimated value of one of the partial-stand components is less than zero. Although statistically correct, these negative values are disconcerting because they clearly cannot occur in nature. Although it is possible to transform the data in such a way as to prevent this, such transformations would result in a loss of additivity. The ages at which the merging of the various equations occurs for various site-density combinations for the range of site productivities and density conditions used in the tables are presented in Appendix VI. It is recommended that the whole-stand estimate be used for the partial-stand estimates after merging. Finally, some discretion is required of the user of the formulae because some of the transformations used (i.e. parabolic) will result in unrealistically high estimates at young ages.

Of the whole-stand characteristics examined, stand basal area ( $Y_{(12)}$ ) is the most difficult characteristic to predict (Table 4). Attempts to overcome this problem by determining basal area from estimates of number of trees per acre ( $Y_{(1)}$ ) and quadratic-mean diameter ( $Y_{(7)}$ ) were even less successful ( $R^2 = 0.557$ ). Consequently, it is recommended that estimates of stand basal area be based upon equation  $Y_{(12)}$ .

#### Increment and Rotation

Two types of rotations are considered: physical rotation, in which the rotation age coincides with the culmination of mean annual increment (TMAI) in total cubic feet of the whole stand, and technical rotation, which coincides with the culmination of mean annual increment (MMAI) in merchantable cubic feet of pulpwood ( $\geq 4.6$  inches dbhb). TMAI and MMAI were determined for each site, age, and density by dividing the values presented in Appendices III-7 and III-10, respectively, by total age.

Physical rotation yields the largest quantity of stem volume per unit area over several rotations. For the range of site, age, and density conditions covered in the tables maximum TMAI varies from 125.0 ft<sup>3</sup>/acre for PI 1.2, density 500 at total age 20 years, to 26.7 ft<sup>3</sup>/acre for PI 0.8, density 2,000 at total age 86 years. Fig. 6 shows the combined effect of site and stand density on TMAI rotation age, and it is obvious that density has a much more pronounced effect on high sites than on low sites.

The technical rotation is that in which the management objective is to produce the maximum amount of products of a given size for a special use, in this case pulpwood. Once again stand density had a marked effect on MMAI (Table 6); however, unlike under a physical rotation, technical rotation age was reached much later on all sites and was much more stable on a given site. Although MMAI does not culminate within the 100-year age limit of the tables, Table 6 clearly shows that MMAI is almost constant from 80 to 100 years. Thus there is a fairly broad time frame within which harvesting could be carried out without incurring any serious loss in merchantable growth.

#### Diameter Frequencies

A technique similar to the method of stand table construction described by Meyer (1937) was used. Stand tables from the 865 plot observations were sorted into 1-inch average-stand-diameter groups. The total number of trees in each 1-inch diameter class was obtained for all plots within each average-stand-diameter group. One-inch diameter class totals were accumulated progressively from the smallest diameter class to the largest and then converted to percentages by dividing the cumulative frequency for each class by the total number of trees in the average-stand-diameter group. However, unlike in the case of Meyer, who used graphical methods, relative (%) cumulative frequencies were transformed to probits and used as dependent variables in the following least-square regression:

$$\text{Probit} = 4.98029 - 0.934073 \bar{D} + 1.02616 \text{UCL} + 0.0518781 \bar{D}^2 - 0.00915781 \text{UCL}^2 - 0.0579873 (\bar{D} \cdot \text{UCL}) \\ + 0.0000599792 (\bar{D}^2 \cdot \text{UCL}^2)$$

$n = 103 \quad R^2 = 0.971$

where  $\bar{D}$  = arithmetic-average stand diameter (inches)

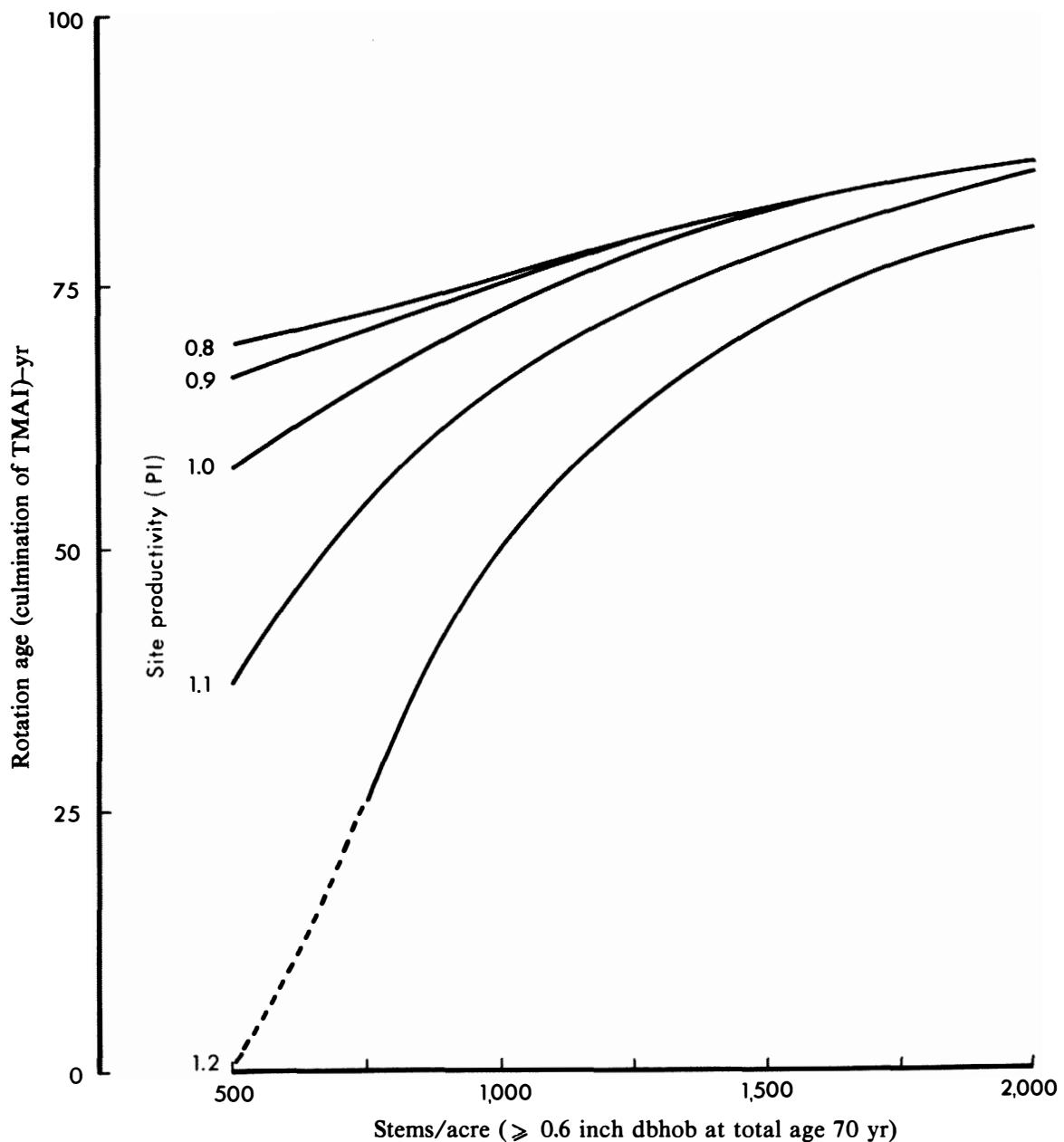
UCL = upper diameter class limit (inches)

The preceding equation can be used to estimate the relative cumulative frequency (after converting from probits) of any diameter class for any average stand diameter (up to 12.0 inches).

The relative frequency distributions presented in Table 7 are used independently of site, age, and stand density. Access to the table is by arithmetic-average stand diameter ( $\geq 0.6$  inch dbhb), and an estimate of the number of stems per acre by 1.0-inch dbhb classes can be obtained for any age-site combination by multiplying the total number of stems by the appropriate percent frequency. These frequency distributions represent an alternative to the partial-stand equations and can be used to estimate the number of stems, average diameter, and basal area to any size limit. It is noted, however, that large differences may exist between the estimates obtained by the two methods.

#### Discussion

The equations generally provide reliable estimates of the various characteristics of essentially pure lodgepole pine stands from age 20 to age 100 years for a range of stand densities. However, for the reasons already noted, application of the equations should be limited to the general range of age (20-100 years), site (PI 0.8-1.2), and stand-density (500-2,000 stems per acre) conditions of the yield tables. The merging of the partial- and whole-stand estimates rarely occurs, and care on the part of the user will minimize the problem. Because of the data base and the analytical methods used, the formulae and tables are intended for general management planning over large areas and not for short-term projections in small blocks of forest.



**Figure 6.** The effect of stand density and site productivity on physical rotation age of lodgepole pine stands.

TABLE 6. THE EFFECT OF STAND DENSITY AND SITE PRODUCTIVITY ON TECHNICAL MEAN ANNUAL INCREMENT (MMAI)<sup>a</sup> OF LODGEPOLE PINE STANDS AT TOTAL AGES 80, 90, AND 100 YEARS

Site productivity (PI)	Total age (yr)	Stand density (Stems $\geq 0.6$ inch at total age 70 years)						
		500	750	1000	1250	1500	1750	2000
0.80	80	29	23	18	14	11	9	7
	90	30	24	20	16	13	11	9
	100	31	25	21	17	15	13	11
0.90	80	38	30	25	21	18	15	13
	90	39	32	27	23	20	17	15
	100	40	33	28	25	22	19	17
1.00	80	49	41	34	30	26	23	20
	90	51	42	36	32	28	25	23
	100	52	43	38	33	30	27	25
1.10	80	65	54	46	40	36	32	29
	90	66	55	48	43	38	35	32
	100	67	56	49	44	40	37	34
1.20	80	88	72	61	54	48	44	40
	90	88	73	63	56	51	46	43
	100	89	73	64	57	52	48	45

<sup>a</sup> Nearest ft<sup>3</sup>/acre per year (all trees  $\geq 4.6$  inches dbhob, 1.0-foot stump, 4.0 inches dib top).

TABLE 7. RELATIVE FREQUENCY DISTRIBUTION IN NATURAL LODGEPOLE PINE STAND OF ALBERTA BY 1-INCH DIAMETER CLASSES AND AVERAGE DBHOB

Avg dbhob (inches) <sup>a</sup>	Diameter class (inches) <sup>b</sup>																			
	1	2	3	4	5	6	6	8	9	10	11	12	13	14	15	16	17	18	19	20
Percent of trees in stand																				
1	70	23	6	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	37	33	22	7	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3	14	25	31	20	8	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4	4	12	24	31	17	9	2	1	-	-	-	-	-	-	-	-	-	-	-	-
5	1	4	13	23	25	20	10	3	1	-	-	-	-	-	-	-	-	-	-	-
6	-	2	5	13	21	23	19	10	5	2	-	-	-	-	-	-	-	-	-	-
7	-	1	2	6	12	19	21	18	12	5	3	1	-	-	-	-	-	-	-	-
8	-	-	1	3	7	12	17	19	16	12	7	4	1	1	-	-	-	-	-	-
9	-	-	1	1	4	7	12	15	17	15	12	8	4	2	1	1	-	-	-	-
10	-	-	-	1	2	5	8	11	14	16	14	11	8	5	3	1	1	-	-	-
11	-	-	-	1	2	3	5	9	9	15	14	13	10	8	5	3	2	1	-	-
12	-	-	-	1	2	2	5	6	9	11	13	12	12	9	7	5	3	1	1	1

<sup>a</sup> Arithmetic average of trees > 0.6 inch dbhob.<sup>b</sup> Class limits  $x - .4$  to  $x + .5$  (i.e. 1 = 0.6 through 1.5 etc.).

The results suggest that the application of DI is a useful technique for stratifying single-examination-plot data into sequences of stand development. Although this technique undoubtedly introduces a bias of unknown dimensions into the analysis, the limited tests conducted to date indicate that this bias is very small.

PI provides a reliable estimate of site productivity. Although somewhat more awkward to use, PI represents an improvement over conventional site index because stand density has a marked effect on the dominant-codominant height of lodgepole pine (Appendices III-5 and IV-5). Because PI is based upon a specified number of trees of a specified size, the problems associated with the subjective selection of "dominant" trees are overcome.

The results presented here can be used to allocate thinning resources because the relationships will indicate what various natural lodgepole pine stands will yield if left unthinned. For example, Appendix III-10 shows that the pulpwood yield of dense stands on low and medium-low sites left untended will be negligible, whereas stands of an equal density growing on average to high sites will yield substantial pulpwood volumes. Appendices III-12 and III-13 clearly demonstrate that high sawlog yields should be expected only from low-density stands growing on medium-high and better sites. Although the results indicate that early control of stocking and density will greatly increase yield, the relationships developed in this study cannot be used to define thinning regimes, and one should not expect thinning to a particular density to result in the yield predicted for a natural stand of that density.

The results clearly show that stand density has a pronounced inverse effect on MAI and directly affects rotation age and that this effect varies greatly with site productivity. As would be expected, greater utilization of individual trees will markedly reduce rotation age on all sites at all stand densities, and this effect will be most dramatic at the lower stand densities on the more productive sites. The potential of increasing stand yields for pulp production through complete utilization of lodgepole pine trees has been discussed by Johnstone and Keays (1973) and Keays and Szabo (1974).

Although mortality was not measured or estimated directly, trends in Appendices III-1 and IV-1 indicate that over the 80-year range of the tables percentage mortality decreases with increasing site quality for a given density class; in other words, good sites can support more trees than poor sites. Over the same 80-year period percentage mortality also decreases with higher initial stand density for a given site. However, mortality trends are inconsistent for different density classes on a given site. At young ages the highest percentage mortality occurs in denser stands, and this rate declines with increasing age. This would seem reasonable because of the intense competition at early ages in dense stands. In low density stands the rate of mortality, which is initially low, increases until the stands are 50-60 years old and then declines. This too seems reasonable because at low densities little crowding occurs at young ages. Competition and thus mortality then increase during a period of rapid growth, after which mortality declines. It is important to note, however, that initially dense stands tend to remain dense and that problems associated with density may be greatest on the high sites.

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## **APPENDIX I. Metric Conversion Factors**

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Inches (in.) $\times 2.54$	= centimetre (cm)
Feet (ft) $\times 0.3048$	= metre (m)
No./acre $\times 2.471054$	= no./hectare (ha)
Ft <sup>2</sup> /acre $\times 0.22957$	= m <sup>2</sup> /ha
Ft <sup>3</sup> /acre $\times 0.06998$	= m <sup>3</sup> /ha
Fbm/acre $\times 2.471054$	= fbm/ha

## **APPENDIX II. Lodgepole Pine Volume Equations**

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### **A. Total cubic foot volume for each tree<sup>1</sup>**

1. trees < 3.5 inches dbhob — Vtcf = 0.0232 + 0.00253D<sup>2</sup>H
2. trees 3.6-8.5 inches dbhob — Vtcf = -0.0949 + 0.00272D<sup>2</sup>H
3. trees ≥ 8.6 inches dbhob — Vtcf = 2.4328 + 0.00227D<sup>2</sup>H

### **B. Merchantable volume for each tree**

1. Merchantable cubic foot volume (> 4.6 inches dbhob, 1.0-foot stump, 4.0 inches dib top) (Honer 1967):

$$Vmcf = Vtcf (0.9658 - 0.1278X - 0.8108X^2)$$

where X =  $\left[ \left( \frac{4.0}{D} \right)^2 \bullet \left( 1.0 + \frac{1.0}{H} \right) \right]$

2. sawlog cubic foot volume (>8.6 inches dbhob, 1.0 foot-stump, 6.0 inches dib top) (Honer 1967):

$$Vscf = Vtcf (0.9658 - 0.1278X - 0.8108X^2)$$

where X =  $\left[ \left( \frac{6.0}{D} \right)^2 \bullet \left( 1.0 + \frac{1.0}{H} \right) \right]$

3. sawlog board foot volume (International 5/16) (>8.6 inches dbhob, 1.0-foot stump, 6.0 inches dib top)<sup>1</sup>:

$$Vfbm = -29.43 + 0.0151D^2H$$

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<sup>1</sup> Kirby, C.L. 1973. Tree volume equations and volume basal-area ratios for white spruce and lodgepole pine in Alberta. Can. Dep. Environ., For. Serv., North. For. Res. Cent. (unpublished manuscript). 22 pp.

**APPENDIX III. Yield Tables Based upon Site, Age, and Number of Stems at Age 70 Years**

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**APPENDIX III-1. NUMBER OF STEMS PER ACRE - ALL TREES > 0.6 INCH DBHOB**

**LOW SITE (PI = 0.8)**

TOTAL AGE (YR)	STUMP AGE (YR)	STEMS > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS						
		500	750	1000	1250	1500	1750	2000
20	12	1879	3012	4018	4940	5801	6614	7391
25	17	1953	2764	3494	4171	4809	5417	6001
30	22	1762	2398	2977	3521	4037	4533	5013
35	27	1532	2057	2542	3001	3441	3866	4280
40	32	1315	1764	2184	2585	2973	3349	3718
45	37	1123	1516	1889	2248	2597	2938	3274
50	42	957	1308	1644	1971	2291	2605	2915
55	47	814	1132	1440	1741	2038	2331	2622
60	52	693	983	1268	1549	1827	2103	2378
65	57	589	857	1123	1387	1650	1912	2173
70	62	500	750	1000	1250	1500	1750	2000
75	67	425	659	895	1133	1372	1612	1853
80	72	361	582	806	1034	1264	1495	1727
85	77	307	516	731	949	1171	1394	1620
90	82	262	461	666	877	1091	1308	1528
95	87	225	414	612	816	1024	1235	1449
100	92	195	376	567	764	966	1172	1381

**MEDIUM-LOW SITE (PI = 0.9)**

TOTAL AGE (YR)	STUMP AGE (YR)	STEMS > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS						
		500	750	1000	1250	1500	1750	2000
20	13	1854	2805	3675	4487	5255	5988	6692
25	18	1872	2577	3230	3846	4432	4996	5541
30	23	1685	2252	2783	3287	3771	4239	4694
35	28	1469	1947	2399	2831	3250	3656	4054
40	33	1266	1682	2078	2461	2834	3198	3555
45	38	1086	1456	1812	2158	2497	2829	3157
50	43	930	1265	1590	1908	2220	2529	2834
55	48	796	1103	1403	1699	1991	2280	2567
60	53	681	966	1246	1524	1799	2073	2345
65	58	583	849	1113	1376	1637	1898	2158
70	63	500	750	1000	1250	1500	1750	2000
75	68	429	666	904	1143	1383	1624	1865
80	73	369	594	822	1052	1284	1517	1750
85	78	319	534	753	975	1199	1425	1652
90	83	277	483	694	909	1127	1346	1568
95	88	242	441	645	853	1065	1279	1496
100	93	214	406	604	807	1013	1223	1435

**APPENDIX III. Yield Tables Based upon Site, Age, and Number of Stems at Age 70 Years**

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**AVERAGE SITE (PI = 1.0)**

TOTAL AGE (YR)	STUMP AGE (YR)	STEMS > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS						
		500	750	1000	1250	1500	1750	2000
20	14	1793	2630	3408	4143	4843	5515	6164
25	19	1780	2419	3019	3590	4139	4669	5184
30	24	1603	2127	2623	3100	3560	4007	4443
35	29	1403	1851	2280	2693	3095	3488	3873
40	34	1215	1609	1990	2360	2721	3075	3424
45	39	1047	1403	1747	2084	2415	2741	3063
50	44	902	1227	1544	1856	2163	2467	2767
55	49	777	1077	1372	1664	1953	2239	2523
60	54	670	950	1227	1503	1776	2048	2318
65	59	578	842	1104	1366	1627	1887	2146
70	64	500	750	1000	1250	1500	1750	2000
75	69	434	672	911	1151	1392	1634	1876
80	74	378	606	836	1067	1300	1534	1769
85	79	331	550	772	996	1222	1450	1679
90	84	292	503	718	936	1156	1378	1601
95	89	261	464	673	885	1099	1316	1535
100	94	235	433	635	842	1052	1264	1479

**MEDIUM-HIGH SITE (PI = 1.1)**

TOTAL AGE (YR)	STUMP AGE (YR)	STEMS > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS						
		500	750	1000	1250	1500	1750	2000
20	15	1695	2454	3168	3846	4496	5123	5730
25	20	1671	2264	2827	3367	3887	4391	4882
30	25	1511	2005	2478	2933	3375	3806	4228
35	30	1329	1758	2170	2570	2960	3342	3717
40	35	1158	1539	1908	2268	2621	2968	3310
45	40	1005	1350	1687	2017	2342	2663	2980
50	45	871	1189	1501	1808	2111	2411	2709
55	50	756	1052	1343	1632	1918	2202	2484
60	55	657	934	1210	1483	1755	2025	2295
65	60	572	835	1096	1357	1617	1876	2135
70	65	500	750	1000	1250	1500	1750	2000
75	70	439	678	918	1159	1400	1642	1885
80	75	388	617	849	1082	1316	1550	1786
85	80	345	566	790	1016	1243	1472	1702
90	85	309	523	741	960	1182	1406	1630
95	90	281	488	700	914	1131	1349	1569
100	95	258	460	666	875	1087	1302	1518

**APPENDIX III. Yield Tables Based upon Site, Age, and Number of Stems at Age 70 Years**

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**HIGH SITE (PI = 1.2)**

TOTAL AGE (YR)	STUMP AGE (YR)	STEMS > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS						
		500	750	1000	1250	1500	1750	2000
20	16	1565	2271	2937	3574	4186	4777	5351
25	21	1546	2108	2644	3159	3657	4141	4614
30	26	1408	1882	2338	2778	3206	3624	4034
35	31	1249	1663	2064	2453	2834	3207	3574
40	36	1096	1467	1828	2181	2528	2869	3205
45	41	958	1297	1628	1954	2274	2591	2904
50	46	837	1151	1459	1762	2063	2360	2655
55	51	733	1025	1315	1601	1885	2167	2448
60	56	642	919	1192	1464	1735	2005	2273
65	61	565	827	1088	1349	1608	1867	2125
70	66	500	750	1000	1250	1500	1750	2000
75	71	445	684	925	1166	1408	1650	1893
80	76	398	629	861	1095	1330	1566	1802
85	81	360	583	808	1035	1264	1493	1724
90	86	328	544	763	985	1208	1432	1658
95	91	303	513	726	942	1160	1380	1602
100	96	283	488	696	907	1121	1337	1555

**APPENDIX III. Yield Tables Based upon Site, Age, and Number of Stems at Age 70 Years**

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**APPENDIX III-2. AVERAGE DBHOB (INCHES) - ALL TREES > 0.6 INCH DBHOB**

**LOW SITE (PI = 0.8)**

TOTAL AGE (YR)	STUMP AGE (YR)	STEMS > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS						
		500	750	1000	1250	1500	1750	2000
20	12	1.5	1.0	0.6	0.0	0.0	0.0	0.0
25	17	2.2	1.7	1.3	1.1	0.9	0.7	0.6
30	22	2.8	2.2	1.9	1.6	1.4	1.2	1.1
35	27	3.4	2.7	2.3	2.0	1.8	1.6	1.5
40	32	3.8	3.1	2.7	2.4	2.1	2.0	1.8
45	37	4.2	3.5	3.0	2.7	2.4	2.3	2.1
50	42	4.6	3.8	3.3	3.0	2.7	2.5	2.4
55	47	5.0	4.1	3.6	3.2	3.0	2.8	2.6
60	52	5.4	4.4	3.9	3.5	3.2	3.0	2.8
65	57	5.7	4.7	4.1	3.7	3.4	3.2	3.0
70	62	6.0	5.0	4.4	3.9	3.6	3.4	3.2
75	67	6.3	5.2	4.6	4.2	3.8	3.6	3.4
80	72	6.6	5.5	4.8	4.4	4.0	3.8	3.6
85	77	6.9	5.7	5.0	4.6	4.2	4.0	3.7
90	82	7.2	6.0	5.2	4.7	4.4	4.1	3.9
95	87	7.5	6.2	5.4	4.9	4.6	4.3	4.1
100	92	7.8	6.4	5.6	5.1	4.7	4.4	4.2

**MEDIUM-LOW SITE (PI = 0.9)**

TOTAL AGE (YR)	STUMP AGE (YR)	STEMS > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS						
		500	750	1000	1250	1500	1750	2000
20	13	1.8	1.4	1.0	0.8	0.6	0.0	0.0
25	18	2.6	2.1	1.7	1.4	1.3	1.1	1.0
30	23	3.2	2.6	2.2	1.9	1.7	1.6	1.4
35	28	3.7	3.1	2.6	2.3	2.1	1.9	1.8
40	33	4.2	3.5	3.0	2.7	2.5	2.3	2.1
45	38	4.6	3.8	3.4	3.0	2.8	2.6	2.4
50	43	5.0	4.2	3.7	3.3	3.0	2.8	2.6
55	48	5.4	4.5	4.0	3.6	3.3	3.1	2.9
60	53	5.8	4.8	4.2	3.8	3.5	3.3	3.1
65	58	6.1	5.1	4.5	4.0	3.7	3.5	3.3
70	63	6.4	5.4	4.7	4.3	3.9	3.7	3.5
75	68	6.8	5.6	5.0	4.5	4.1	3.9	3.7
80	73	7.1	5.9	5.2	4.7	4.3	4.0	3.8
85	78	7.4	6.1	5.4	4.9	4.5	4.2	4.0
90	83	7.7	6.4	5.6	5.1	4.7	4.4	4.1
95	88	8.0	6.6	5.8	5.3	4.9	4.5	4.3
100	93	8.3	6.9	6.0	5.4	5.0	4.7	4.4

**APPENDIX III. Yield Tables Based upon Site, Age, and Number of Stems at Age 70 Years**

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**AVERAGE SITE (PI = 1.0)**

<b>TOTAL AGE (YR)</b>	<b>STUMP AGE (YR)</b>	<b>STEMS &gt; 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS</b>					
		<b>500</b>	<b>750</b>	<b>1000</b>	<b>1250</b>	<b>1500</b>	<b>1750</b>
20	14	2.2	1.7	1.4	1.1	1.0	0.8
25	19	2.9	2.4	2.0	1.7	1.5	1.4
30	24	3.5	2.9	2.5	2.2	2.0	1.8
35	29	4.0	3.4	2.9	2.6	2.4	2.2
40	34	4.5	3.8	3.3	3.0	2.7	2.5
45	39	5.0	4.1	3.6	3.3	3.0	2.8
50	44	5.4	4.5	3.9	3.6	3.3	3.0
55	49	5.8	4.8	4.2	3.8	3.5	3.3
60	54	6.2	5.1	4.5	4.1	3.7	3.5
65	59	6.5	5.4	4.8	4.3	4.0	3.7
70	64	6.9	5.7	5.0	4.5	4.2	3.9
75	69	7.2	6.0	5.3	4.7	4.4	4.1
80	74	7.6	6.3	5.5	4.9	4.6	4.2
85	79	7.9	6.5	5.7	5.1	4.7	4.4
90	84	8.2	6.8	5.9	5.3	4.9	4.6
95	89	8.6	7.0	6.1	5.5	5.1	4.7
100	94	8.9	7.3	6.3	5.7	5.2	4.9

**MEDIUM-HIGH SITE (PI = 1.1)**

<b>TOTAL AGE (YR)</b>	<b>STUMP AGE (YR)</b>	<b>STEMS &gt; 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS</b>					
		<b>500</b>	<b>750</b>	<b>1000</b>	<b>1250</b>	<b>1500</b>	<b>1750</b>
20	15	2.4	2.0	1.7	1.4	1.2	1.1
25	20	3.1	2.6	2.3	2.0	1.8	1.6
30	25	3.8	3.2	2.7	2.5	2.2	2.0
35	30	4.3	3.6	3.2	2.8	2.6	2.4
40	35	4.8	4.0	3.5	3.2	2.9	2.7
45	40	5.3	4.4	3.9	3.5	3.2	3.0
50	45	5.8	4.8	4.2	3.8	3.5	3.2
55	50	6.2	5.1	4.5	4.0	3.7	3.4
60	55	6.6	5.5	4.8	4.3	3.9	3.7
65	60	7.0	5.8	5.0	4.5	4.2	3.9
70	65	7.4	6.1	5.3	4.7	4.4	4.1
75	70	7.8	6.4	5.5	5.0	4.6	4.2
80	75	8.2	6.7	5.8	5.2	4.7	4.4
85	80	8.6	6.9	6.0	5.4	4.9	4.6
90	85	8.9	7.2	6.2	5.6	5.1	4.7
95	90	9.3	7.5	6.5	5.8	5.3	4.9
100	95	9.7	7.8	6.7	6.0	5.4	5.0

**APPENDIX III. Yield Tables Based upon Site, Age, and Number of Stems at Age 70 Years**

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**HIGH SITE (PI = 1.2)**

TOTAL AGE (YR)	STUMP AGE (YR)	STEMS > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS						
		500	750	1000	1250	1500	1750	2000
20	16	2.6	2.2	1.9	1.6	1.5	1.3	1.2
25	21	3.4	2.8	2.5	2.2	2.0	1.8	1.7
30	26	4.0	3.4	3.0	2.6	2.4	2.2	2.1
35	31	4.7	3.9	3.4	3.0	2.8	2.6	2.4
40	36	5.2	4.3	3.8	3.4	3.1	2.9	2.7
45	41	5.8	4.7	4.1	3.7	3.4	3.1	2.9
50	46	6.3	5.1	4.4	4.0	3.6	3.4	3.2
55	51	6.8	5.5	4.7	4.2	3.9	3.6	3.4
60	56	7.3	5.8	5.0	4.5	4.1	3.8	3.6
65	61	7.7	6.2	5.3	4.7	4.3	4.0	3.7
70	66	8.2	6.5	5.6	5.0	4.5	4.2	3.9
75	71	8.6	6.8	5.8	5.2	4.7	4.4	4.1
80	76	9.1	7.2	6.1	5.4	4.9	4.5	4.2
85	81	9.5	7.5	6.3	5.6	5.1	4.7	4.4
90	86	10.0	7.8	6.6	5.8	5.3	4.9	4.5
95	91	10.4	8.1	6.8	6.0	5.4	5.0	4.7
100	96	10.8	8.4	7.0	6.2	5.6	5.2	4.8

**APPENDIX III. Yield Tables Based upon Site, Age, and Number of Stems at Age 70 Years**

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**APPENDIX III-3. QUADRATIC-MEAN DBHOB (INCHES) - ALL TREES > 0.6 INCH DBHOB**

**LOW SITE (PI = 0.8)**

TOTAL AGE (YR)	STUMP AGE (YR)	STEMS > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS					
		500	750	1000	1250	1500	1750
20	12	1.6	1.1	0.8	0.0	0.0	0.0
25	17	2.4	1.8	1.5	1.2	1.0	0.9
30	22	3.1	2.4	2.0	1.7	1.5	1.4
35	27	3.6	2.9	2.5	2.2	1.9	1.8
40	32	4.1	3.3	2.8	2.5	2.3	2.1
45	37	4.5	3.7	3.2	2.9	2.6	2.4
50	42	4.9	4.0	3.5	3.1	2.9	2.7
55	47	5.2	4.3	3.8	3.4	3.1	2.9
60	52	5.6	4.6	4.1	3.7	3.4	3.2
65	57	5.9	4.9	4.3	3.9	3.6	3.4
70	62	6.3	5.2	4.6	4.1	3.8	3.6
75	67	6.6	5.4	4.8	4.3	4.0	3.8
80	72	6.9	5.7	5.0	4.6	4.2	4.0
85	77	7.2	5.9	5.2	4.8	4.4	4.1
90	82	7.5	6.2	5.5	5.0	4.6	4.3
95	87	7.8	6.4	5.7	5.1	4.8	4.5
100	92	8.1	6.7	5.9	5.3	4.9	4.6

**MEDIUM-LOW SITE (PI = 0.9)**

TOTAL AGE (YR)	STUMP AGE (YR)	STEMS > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS					
		500	750	1000	1250	1500	1750
20	13	2.0	1.5	1.2	0.9	0.7	0.6
25	18	2.8	2.2	1.9	1.6	1.4	1.2
30	23	3.4	2.8	2.4	2.1	1.9	1.7
35	28	4.0	3.3	2.8	2.5	2.3	2.1
40	33	4.4	3.7	3.2	2.9	2.6	2.4
45	38	4.9	4.0	3.5	3.2	2.9	2.7
50	43	5.3	4.4	3.8	3.5	3.2	3.0
55	48	5.6	4.7	4.1	3.7	3.4	3.2
60	53	6.0	5.0	4.4	4.0	3.7	3.4
65	58	6.4	5.3	4.7	4.2	3.9	3.6
70	63	6.7	5.6	4.9	4.5	4.1	3.8
75	68	7.0	5.9	5.2	4.7	4.3	4.0
80	73	7.4	6.1	5.4	4.9	4.5	4.2
85	78	7.7	6.4	5.6	5.1	4.7	4.4
90	83	8.0	6.6	5.8	5.3	4.9	4.6
95	88	8.3	6.9	6.0	5.5	5.1	4.7
100	93	8.6	7.1	6.3	5.7	5.2	4.9

**APPENDIX III. Yield Tables Based upon Site, Age, and Number of Stems at Age 70 Years**

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**AVERAGE SITE (PI = 1.0)**

TOTAL AGE (YR)	STUMP AGE (YR)	STEMS > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS					
		500	750	1000	1250	1500	1750
20	14	2.4	1.9	1.5	1.3	1.1	0.9
25	19	3.1	2.5	2.2	1.9	1.7	1.5
30	24	3.7	3.1	2.7	2.4	2.1	1.9
35	29	4.3	3.6	3.1	2.8	2.5	2.3
40	34	4.8	4.0	3.5	3.1	2.9	2.6
45	39	5.2	4.4	3.8	3.4	3.2	2.9
50	44	5.6	4.7	4.1	3.7	3.4	3.2
55	49	6.0	5.0	4.4	4.0	3.7	3.4
60	54	6.4	5.4	4.7	4.2	3.9	3.6
65	59	6.8	5.7	5.0	4.5	4.1	3.8
70	64	7.2	5.9	5.2	4.7	4.3	4.0
75	69	7.5	6.2	5.5	4.9	4.5	4.2
80	74	7.9	6.5	5.7	5.1	4.7	4.4
85	79	8.2	6.8	5.9	5.3	4.9	4.6
90	84	8.6	7.0	6.1	5.5	5.1	4.8
95	89	8.9	7.3	6.4	5.7	5.3	4.9
100	94	9.2	7.6	6.6	5.9	5.4	5.1

**MEDIUM-HIGH SITE (PI = 1.1)**

TOTAL AGE (YR)	STUMP AGE (YR)	STEMS > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS					
		500	750	1000	1250	1500	1750
20	15	2.7	2.2	1.8	1.5	1.3	1.2
25	20	3.4	2.8	2.4	2.1	1.9	1.7
30	25	4.1	3.4	2.9	2.6	2.4	2.2
35	30	4.6	3.8	3.3	3.0	2.7	2.5
40	35	5.1	4.3	3.7	3.3	3.1	2.8
45	40	5.6	4.7	4.1	3.7	3.4	3.1
50	45	6.1	5.0	4.4	3.9	3.6	3.4
55	50	6.5	5.4	4.7	4.2	3.9	3.6
60	55	6.9	5.7	5.0	4.5	4.1	3.8
65	60	7.4	6.0	5.2	4.7	4.3	4.0
70	65	7.8	6.3	5.5	4.9	4.5	4.2
75	70	8.1	6.6	5.8	5.2	4.7	4.4
80	75	8.5	6.9	6.0	5.4	4.9	4.6
85	80	8.9	7.2	6.2	5.6	5.1	4.7
90	85	9.3	7.5	6.5	5.8	5.3	4.9
95	90	9.7	7.8	6.7	6.0	5.5	5.1
100	95	10.0	8.0	6.9	6.2	5.6	5.2

**APPENDIX III. Yield Tables Based upon Site, Age, and Number of Stems at Age 70 Years**

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**HIGH SITE (PI = 1.2)**

TOTAL AGE (YR)	STUMP AGE (YR)	STEMS > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS						
		500	750	1000	1250	1500	1750	2000
20	16	2.9	2.4	2.1	1.8	1.6	1.4	1.3
25	21	3.7	3.1	2.7	2.4	2.1	1.9	1.8
30	26	4.4	3.6	3.2	2.8	2.5	2.3	2.2
35	31	5.0	4.1	3.6	3.2	2.9	2.7	2.5
40	36	5.6	4.6	4.0	3.5	3.2	3.0	2.8
45	41	6.1	5.0	4.3	3.9	3.5	3.3	3.1
50	46	6.6	5.4	4.6	4.2	3.8	3.5	3.3
55	51	7.2	5.8	5.0	4.4	4.0	3.7	3.5
60	56	7.6	6.1	5.3	4.7	4.3	4.0	3.7
65	61	8.1	6.5	5.5	4.9	4.5	4.2	3.9
70	66	8.6	6.8	5.8	5.2	4.7	4.4	4.1
75	71	9.0	7.1	6.1	5.4	4.9	4.5	4.2
80	76	9.5	7.5	6.3	5.6	5.1	4.7	4.4
85	81	9.9	7.8	6.6	5.8	5.3	4.9	4.6
90	86	10.4	8.1	6.8	6.0	5.5	5.0	4.7
95	91	10.8	8.4	7.1	6.2	5.7	5.2	4.9
100	96	11.3	8.7	7.3	6.4	5.8	5.4	5.0

**APPENDIX III. Yield Tables Based upon Site, Age, and Number of Stems at Age 70 Years**

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**APPENDIX III-4. AVERAGE HEIGHT (FEET) - ALL TREES > 0.6 INCH DBHOB**

**LOW SITE (PI = 0.8)**

TOTAL AGE (YR)	STUMP AGE (YR)	STEMS > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS						
		500	750	1000	1250	1500	1750	2000
20	12	14	10	7	5	0	0	0
25	17	15	11	8	6	0	0	0
30	22	19	15	12	10	8	7	5
35	27	23	19	16	14	12	11	9
40	32	28	23	20	18	16	15	13
45	37	32	27	24	22	20	18	17
50	42	35	31	27	25	23	21	20
55	47	38	34	30	28	26	24	23
60	52	41	36	33	30	28	27	25
65	57	44	39	35	33	30	29	27
70	62	46	41	37	35	32	31	29
75	67	48	43	39	36	34	32	31
80	72	50	44	41	38	36	34	32
85	77	52	46	42	39	37	35	34
90	82	53	47	43	41	38	36	35
95	87	55	49	45	42	39	37	36
100	92	56	50	46	43	40	38	37

**MEDIUM-LOW SITE (PI = 0.9)**

TOTAL AGE (YR)	STUMP AGE (YR)	STEMS > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS						
		500	750	1000	1250	1500	1750	2000
20	13	16	13	10	8	6	5	0
25	18	18	15	12	10	8	7	5
30	23	23	19	16	14	12	11	9
35	28	28	24	21	18	16	15	13
40	33	32	28	25	22	20	19	17
45	38	36	32	28	26	24	22	21
50	43	40	35	32	29	27	26	24
55	48	43	38	35	32	30	28	27
60	53	46	41	38	35	33	31	29
65	58	49	44	40	37	35	33	32
70	63	51	46	42	39	37	35	34
75	68	53	48	44	41	39	37	35
80	73	55	50	46	43	41	39	37
85	78	57	51	47	44	42	40	38
90	83	59	53	49	46	43	41	40
95	88	60	54	50	47	45	43	41
100	93	62	56	51	48	46	44	42

**APPENDIX III. Yield Tables Based upon Site, Age, and Number of Stems at Age 70 Years**

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**AVERAGE SITE (PI = 1.0)**

TOTAL AGE (YR)	STUMP AGE (YR)	STEMS > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS						
		500	750	1000	1250	1500	1750	2000
20	14	19	16	13	11	9	7	6
25	19	22	19	16	14	12	10	9
30	24	27	23	20	18	16	14	13
35	29	32	28	25	22	20	19	17
40	34	36	32	29	26	24	23	21
45	39	40	36	33	30	28	26	25
50	44	44	40	36	33	31	29	28
55	49	47	43	39	36	34	32	31
60	54	51	46	42	39	37	35	33
65	59	53	48	44	42	39	37	36
70	64	56	51	47	44	41	39	38
75	69	58	53	49	46	43	41	40
80	74	61	55	51	47	45	43	41
85	79	63	57	52	49	47	44	43
90	84	64	58	54	51	48	46	44
95	89	66	60	55	52	49	47	45
100	94	68	61	57	53	50	48	46

**MEDIUM-HIGH SITE (PI = 1.1)**

TOTAL AGE (YR)	STUMP AGE (YR)	STEMS > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS						
		500	750	1000	1250	1500	1750	2000
20	15	22	19	16	14	12	10	9
25	20	26	23	20	17	15	13	12
30	25	31	27	24	22	20	18	16
35	30	36	32	29	26	24	22	21
40	35	41	36	33	30	28	26	25
45	40	45	40	37	34	32	30	28
50	45	49	44	40	37	35	33	32
55	50	52	47	43	41	38	36	34
60	55	56	50	46	43	41	39	37
65	60	59	53	49	46	43	41	39
70	65	61	55	51	48	45	43	41
75	70	64	58	53	50	47	45	43
80	75	66	60	55	52	49	47	45
85	80	68	62	57	54	51	49	47
90	85	71	64	59	55	52	50	48
95	90	72	65	60	57	54	51	49
100	95	74	67	62	58	55	52	50

**APPENDIX III. Yield Tables Based upon Site, Age, and Number of Stems at Age 70 Years**

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**HIGH SITE (PI = 1.2)**

TOTAL AGE (YR)	STUMP AGE (YR)	STEMS > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS						
		500	750	1000	1250	1500	1750	2000
20	16	25	22	19	17	15	13	12
25	21	30	27	24	21	19	17	15
30	26	35	32	28	26	23	22	20
35	31	40	36	33	30	28	26	24
40	36	45	41	37	34	32	30	28
45	41	50	45	41	38	36	34	32
50	46	54	49	45	42	39	37	35
55	51	58	52	48	45	42	40	38
60	56	61	55	51	47	45	43	41
65	61	64	58	53	50	47	45	43
70	66	67	61	56	52	49	47	45
75	71	70	63	58	54	52	49	47
80	76	73	65	60	56	53	51	49
85	81	75	67	62	58	55	53	50
90	86	78	69	64	60	57	54	52
95	91	80	71	65	61	58	55	53
100	96	82	73	67	63	59	57	54

**APPENDIX III. Yield Tables Based upon Site, Age, and Number of Stems at Age 70 Years**

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**APPENDIX III-5. DOMINANT-CODOMINANT HEIGHT (FEET)**

**LOW SITE (PI = 0.8)**

TOTAL AGE (YR)	STUMP AGE (YR)	STEMS > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS						
		500	750	1000	1250	1500	1750	2000
20	12	19	0	0	0	0	0	0
25	17	19	15	13	10	9	7	6
30	22	23	19	17	14	13	11	10
35	27	29	24	21	19	17	16	14
40	32	34	29	26	24	22	20	19
45	37	38	34	30	28	26	25	23
50	42	42	38	34	32	30	28	27
55	47	46	41	38	35	33	32	30
60	52	49	44	41	38	36	35	33
65	57	52	47	44	41	39	37	36
70	62	55	50	46	43	41	39	38
75	67	57	52	48	45	43	41	40
80	72	59	54	50	47	45	43	42
85	77	61	55	52	49	47	45	43
90	82	63	57	53	50	48	46	45
95	87	65	58	54	51	49	47	46
100	92	66	60	56	53	50	48	47

**MEDIUM-LOW SITE (PI = 0.9)**

TOTAL AGE (YR)	STUMP AGE (YR)	STEMS > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS						
		500	750	1000	1250	1500	1750	2000
20	13	22	19	16	14	12	11	9
25	18	24	20	17	15	13	12	11
30	23	29	25	22	20	18	16	15
35	28	34	30	27	25	23	21	20
40	33	39	35	32	29	27	26	24
45	38	44	39	36	34	32	30	28
50	43	48	43	40	37	35	34	32
55	48	52	47	43	41	39	37	35
60	53	55	50	47	44	42	40	38
65	58	58	53	49	47	44	43	41
70	63	61	55	52	49	47	45	43
75	68	63	58	54	51	49	47	45
80	73	65	60	56	53	51	49	47
85	78	67	62	58	55	52	50	49
90	83	69	63	59	56	54	52	50
95	88	71	65	61	57	55	53	51
100	93	72	66	62	59	56	54	52

**APPENDIX III. Yield Tables Based upon Site, Age, and Number of Stems at Age 70 Years**

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**AVERAGE SITE (PI = 1.0)**

TOTAL AGE (YR)	STUMP AGE (YR)	STEMS > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS						
		500	750	1000	1250	1500	1750	2000
20	14	26	22	20	18	16	14	13
25	19	29	25	22	20	18	16	15
30	24	34	30	27	25	23	21	20
35	29	39	35	32	30	28	26	25
40	34	44	40	37	34	32	31	29
45	39	49	45	41	39	37	35	33
50	44	53	49	45	43	40	39	37
55	49	57	52	49	46	44	42	40
60	54	61	56	52	49	47	45	43
65	59	64	59	55	52	50	48	46
70	64	67	61	57	54	52	50	48
75	69	69	64	60	56	54	52	50
80	74	72	66	62	58	56	54	52
85	79	74	68	63	60	58	56	54
90	84	76	69	65	62	59	57	55
95	89	78	71	66	63	60	58	56
100	94	79	72	68	64	62	59	58

**MEDIUM-HIGH SITE (PI = 1.1)**

TOTAL AGE (YR)	STUMP AGE (YR)	STEMS > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS						
		500	750	1000	1250	1500	1750	2000
20	15	30	27	24	21	20	18	16
25	20	33	30	27	25	23	21	20
30	25	39	35	32	30	28	26	24
35	30	45	41	37	35	33	31	29
40	35	50	46	42	40	37	36	34
45	40	55	50	47	44	42	40	38
50	45	59	54	51	48	45	43	42
55	50	63	58	54	51	49	47	45
60	55	67	61	57	54	52	50	48
65	60	70	64	60	57	55	52	51
70	65	73	67	63	60	57	55	53
75	70	76	69	65	62	59	57	55
80	75	78	72	67	64	61	59	57
85	80	81	74	69	66	63	61	59
90	85	83	76	71	67	64	62	60
95	90	85	77	72	69	66	63	61
100	95	86	79	74	70	67	65	63

**APPENDIX III. Yield Tables Based upon Site, Age, and Number of Stems at Age 70 Years**

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**HIGH SITE (PI = 1.2)**

TOTAL AGE (YR)	STUMP AGE (YR)	STEMS > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS						
		500	750	1000	1250	1500	1750	2000
20	16	34	31	28	26	24	22	20
25	21	38	35	32	30	28	26	24
30	26	44	41	38	35	33	31	29
35	31	50	46	43	40	38	36	34
40	36	56	51	48	45	42	40	39
45	41	61	56	52	49	47	45	43
50	46	65	60	56	53	50	48	47
55	51	69	64	60	56	54	52	50
60	56	73	67	63	60	57	55	53
65	61	77	70	66	62	60	57	55
70	66	80	73	68	65	62	60	58
75	71	83	76	71	67	64	62	60
80	76	86	78	73	69	66	64	62
85	81	88	80	75	71	68	66	63
90	86	91	82	77	73	70	67	65
95	91	93	84	78	74	71	68	66
100	96	95	86	80	76	72	70	67

**APPENDIX III. Yield Tables Based upon Site, Age, and Number of Stems at Age 70 Years**

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**APPENDIX III-6. BASAL AREA (SQUARE FEET) PER ACRE - ALL TREES > 0.6 INCH DBHOB**

**LOW SITE (PI = 0.8)**

TOTAL AGE (YR)	STUMP AGE (YR)	STEMS > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS						
		500	750	1000	1250	1500	1750	2000
20	12	0	0	0	0	0	0	0
25	17	43	43	43	45	46	48	50
30	22	70	70	71	72	74	76	78
35	27	84	84	85	87	89	91	93
40	32	91	93	94	95	97	100	102
45	37	96	98	99	101	103	105	107
50	42	99	101	103	105	107	109	111
55	47	101	104	106	108	110	112	114
60	52	103	106	108	110	112	115	117
65	57	104	107	110	112	114	117	119
70	62	105	109	111	114	116	119	121
75	67	106	110	113	115	118	121	123
80	72	107	112	115	117	120	123	125
85	77	108	113	116	119	122	125	127
90	82	109	114	118	121	124	127	129
95	87	111	116	120	123	126	129	131
100	92	112	118	121	125	128	131	134

**MEDIUM-LOW SITE (PI = 0.9)**

TOTAL AGE (YR)	STUMP AGE (YR)	STEMS > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS						
		500	750	1000	1250	1500	1750	2000
20	13	8	5	3	3	3	3	4
25	18	59	57	55	55	55	56	57
30	23	84	82	80	80	80	81	82
35	28	97	95	94	94	95	95	96
40	33	105	104	103	103	104	104	106
45	38	110	110	109	109	110	111	112
50	43	114	114	114	114	115	116	117
55	48	117	117	117	118	118	120	121
60	53	119	120	120	121	122	123	124
65	58	122	123	123	124	125	126	128
70	63	124	125	126	127	128	129	131
75	68	126	128	129	130	131	132	134
80	73	128	130	131	132	134	135	137
85	78	130	132	134	135	137	138	140
90	83	132	135	137	138	140	142	143
95	88	134	138	140	141	143	145	147
100	93	136	140	142	144	146	148	150

**APPENDIX III. Yield Tables Based upon Site, Age, and Number of Stems at Age 70 Years**

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**AVERAGE SITE (PI = 1.0)**

TOTAL AGE (YR)	STUMP AGE (YR)	STEMS > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS					
		500	750	1000	1250	1500	1750
20	14	37	31	27	25	24	23
25	19	81	76	72	70	69	68
30	24	103	98	95	93	92	91
35	29	115	111	108	107	106	105
40	34	123	120	117	115	115	114
45	39	129	126	123	122	121	121
50	44	133	130	128	127	127	127
55	49	136	134	133	131	131	131
60	54	139	138	136	135	135	136
65	59	142	141	140	139	139	140
70	64	144	144	143	143	143	143
75	69	147	147	147	146	146	147
80	74	150	150	150	150	150	151
85	79	152	153	153	153	154	155
90	84	155	157	157	157	158	159
95	89	158	160	160	161	161	162
100	94	160	163	164	165	165	167

**MEDIUM-HIGH SITE (PI = 1.1)**

TOTAL AGE (YR)	STUMP AGE (YR)	STEMS > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS					
		500	750	1000	1250	1500	1750
20	15	70	61	55	50	47	45
25	20	108	100	94	90	87	85
30	25	128	120	114	111	108	106
35	30	139	132	127	123	121	119
40	35	147	140	135	132	130	128
45	40	152	146	142	139	137	135
50	45	156	151	147	144	142	141
55	50	160	156	152	149	147	146
60	55	163	159	156	153	152	151
65	60	166	163	160	158	156	155
70	65	169	166	164	162	160	159
75	70	172	170	168	166	164	164
80	75	174	173	171	170	169	168
85	80	177	177	175	174	173	172
90	85	180	181	179	178	177	177
95	90	183	184	183	182	182	181
100	95	186	188	187	187	186	186

**APPENDIX III. Yield Tables Based upon Site, Age, and Number of Stems at Age 70 Years**

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**HIGH SITE (PI = 1.2)**

TOTAL AGE (YR)	STUMP AGE (YR)	STEMS > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS						
		500	750	1000	1250	1500	1750	2000
20	16	110	96	86	79	74	71	68
25	21	143	129	120	113	109	105	103
30	26	160	148	139	132	128	125	123
35	31	171	159	151	145	140	137	135
40	36	177	167	159	153	149	146	144
45	41	182	173	165	160	156	153	151
50	46	186	178	171	165	162	159	157
55	51	190	182	175	170	167	164	163
60	56	193	186	180	175	172	169	168
65	61	195	190	184	180	176	174	173
70	66	198	193	188	184	181	179	177
75	71	201	197	192	188	186	184	182
80	76	204	201	196	193	190	188	187
85	81	206	204	200	197	195	193	192
90	86	209	208	205	202	200	198	197
95	91	212	212	209	206	204	203	202
100	96	215	216	213	211	209	208	207

**APPENDIX III. Yield Tables Based upon Site, Age, and Number of Stems at Age 70 Years**

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**APPENDIX III-7. TOTAL CUBIC FOOT VOLUME PER ACRE - ALL TREES > 0.6 INCH DBHOB**

**LOW SITE (PI = 0.8)**

TOTAL AGE (YR)	STUMP AGE (YR)	STEMS > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS					
		500	750	1000	1250	1500	1750
20	12	236	102	0	0	0	0
25	17	518	379	244	127	25	0
30	22	789	645	508	389	286	197
35	27	1049	901	761	640	536	446
40	32	1299	1146	1003	881	775	684
45	37	1539	1380	1235	1110	1004	912
50	42	1768	1604	1456	1330	1222	1129
55	47	1986	1817	1666	1538	1430	1336
60	52	2193	2019	1866	1737	1627	1532
65	57	2390	2211	2055	1924	1813	1717
70	62	2576	2392	2234	2101	1989	1892
75	67	2752	2563	2402	2267	2154	2056
80	72	2917	2723	2559	2423	2308	2210
85	77	3071	2873	2706	2568	2452	2353
90	82	3215	3011	2842	2702	2585	2485
95	87	3349	3139	2967	2826	2708	2607
100	92	3471	3257	3082	2939	2820	2718
							2629

**MEDIUM-LOW SITE (PI = 0.9)**

TOTAL AGE (YR)	STUMP AGE (YR)	STEMS > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS					
		500	750	1000	1250	1500	1750
20	13	488	316	157	20	0	0
25	18	812	635	473	334	214	111
30	23	1126	943	778	637	516	411
35	28	1429	1240	1072	929	807	701
40	33	1721	1527	1355	1210	1087	980
45	38	2003	1803	1628	1481	1357	1249
50	43	2274	2069	1891	1742	1616	1507
55	48	2535	2324	2143	1992	1864	1754
60	53	2785	2568	2384	2231	2102	1991
65	58	3024	2802	2614	2459	2329	2217
70	63	3253	3025	2834	2677	2545	2432
75	68	3471	3237	3044	2885	2751	2637
80	73	3679	3439	3242	3081	2947	2832
85	78	3876	3630	3431	3268	3131	3015
90	83	4062	3811	3608	3443	3305	3188
95	88	4238	3981	3775	3608	3469	3351
100	93	4403	4140	3931	3762	3622	3502
							3399

**APPENDIX III. Yield Tables Based upon Site, Age, and Number of Stems at Age 70 Years**

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**AVERAGE SITE (PI = 1.0)**

TOTAL AGE (YR)	STUMP AGE (YR)	STEMS > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS					
		500	750	1000	1250	1500	1750
20	14	895	650	443	271	126	3
25	19	1268	1016	805	631	484	359
30	24	1629	1371	1156	979	832	705
35	29	1980	1715	1497	1318	1168	1041
40	34	2321	2049	1827	1645	1494	1366
45	39	2651	2372	2146	1963	1810	1680
50	44	2970	2684	2455	2269	2115	1983
55	49	3279	2986	2753	2565	2409	2276
60	54	3577	3277	3041	2850	2692	2559
65	59	3864	3558	3318	3125	2965	2830
70	64	4141	3828	3584	3389	3228	3092
75	69	4407	4087	3840	3642	3479	3342
80	74	4663	4336	4085	3885	3720	3582
85	79	4908	4574	4319	4117	3951	3811
90	84	5142	4802	4543	4338	4171	4030
95	89	5366	5019	4756	4549	4380	4238
100	94	5579	5225	4959	4750	4579	4435

**MEDIUM-HIGH SITE (PI = 1.1)**

TOTAL AGE (YR)	STUMP AGE (YR)	STEMS > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS					
		500	750	1000	1250	1500	1750
20	15	1523	1146	858	632	447	292
25	20	1949	1564	1272	1042	856	700
30	25	2365	1971	1675	1442	1254	1096
35	30	2771	2368	2067	1832	1641	1482
40	35	3166	2754	2448	2211	2018	1858
45	40	3550	3130	2819	2579	2384	2223
50	45	3924	3495	3180	2936	2740	2577
55	50	4287	3849	3530	3283	3085	2920
60	55	4639	4193	3869	3620	3419	3253
65	60	4981	4526	4197	3945	3743	3576
70	65	5312	4848	4515	4260	4056	3887
75	70	5632	5160	4823	4565	4359	4188
80	75	5942	5462	5119	4859	4651	4479
85	80	6242	5752	5405	5142	4932	4759
90	85	6530	6032	5681	5415	5203	5028
95	90	6808	6302	5946	5677	5463	5287
100	95	7076	6560	6200	5928	5712	5535

**APPENDIX III. Yield Tables Based upon Site, Age, and Number of Stems at Age 70 Years**

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**HIGH SITE (PI = 1.2)**

TOTAL AGE (YR)	STUMP AGE (YR)	STEMS > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS						
		500	750	1000	1250	1500	1750	2000
20	16	2501	1872	1447	1133	888	688	521
25	21	2989	2348	1917	1600	1352	1151	983
30	26	3467	2814	2377	2056	1806	1603	1434
35	31	3935	3269	2827	2502	2250	2045	1874
40	36	4392	3714	3265	2937	2682	2476	2304
45	41	4838	4148	3693	3362	3105	2897	2723
50	46	5274	4572	4111	3776	3516	3306	3132
55	51	5699	4984	4518	4179	3917	3706	3530
60	56	6113	5387	4914	4572	4307	4094	3917
65	61	6517	5778	5300	4954	4687	4472	4294
70	66	6910	6159	5675	5325	5056	4840	4660
75	71	7293	6529	6039	5686	5415	5196	5015
80	76	7665	6889	6393	6036	5762	5542	5360
85	81	8026	7238	6736	6376	6100	5878	5694
90	86	8377	7577	7068	6705	6426	6203	6018
95	91	8717	7905	7390	7023	6742	6517	6331
100	96	9046	8222	7702	7331	7048	6821	6633

**APPENDIX III. Yield Tables Based upon Site, Age, and Number of Stems at Age 70 Years**

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**APPENDIX III-8. TOTAL CUBIC FOOT VOLUME PER ACRE - ALL TREES > 4.6 INCHES DBHOB**

**LOW SITE (PI = 0.8)**

TOTAL AGE (YR)	STUMP AGE (YR)	STEMS > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS						
		500	750	1000	1250	1500	1750	2000
20	12	0	0	0	0	0	0	0
25	17	117	0	0	0	0	0	0
30	22	410	0	0	0	0	0	0
35	27	694	265	0	0	0	0	0
40	32	969	535	170	0	0	0	0
45	37	1237	796	428	124	0	0	0
50	42	1496	1050	678	372	116	0	0
55	47	1746	1294	920	612	354	133	0
60	52	1988	1531	1153	844	584	363	169
65	57	2222	1759	1378	1067	806	583	389
70	62	2447	1978	1595	1281	1019	796	601
75	67	2664	2190	1803	1488	1224	999	804
80	72	2872	2392	2003	1686	1421	1195	999
85	77	3072	2587	2194	1875	1609	1382	1185
90	82	3264	2773	2377	2056	1789	1561	1363
95	87	3447	2950	2552	2229	1960	1731	1532
100	92	3622	3120	2718	2393	2123	1893	1694

**MEDIUM-LOW SITE (PI = 0.9)**

TOTAL AGE (YR)	STUMP AGE (YR)	STEMS > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS						
		500	750	1000	1250	1500	1750	2000
20	13	29	0	0	0	0	0	0
25	18	373	0	0	0	0	0	0
30	23	709	272	0	0	0	0	0
35	28	1037	593	208	0	0	0	0
40	33	1356	906	517	191	0	0	0
45	38	1667	1211	818	489	211	0	0
50	43	1970	1507	1111	780	499	259	48
55	48	2264	1795	1395	1062	780	538	326
60	53	2549	2074	1671	1335	1052	809	596
65	58	2827	2345	1938	1600	1315	1071	858
70	63	3096	2607	2197	1857	1571	1325	1111
75	68	3356	2862	2448	2105	1817	1571	1355
80	73	3608	3107	2690	2345	2056	1808	1592
85	78	3852	3345	2924	2577	2286	2037	1820
90	83	4087	3574	3149	2800	2507	2257	2039
95	88	4314	3794	3366	3015	2721	2469	2250
100	93	4533	4006	3575	3221	2925	2673	2453

**APPENDIX III. Yield Tables Based upon Site, Age, and Number of Stems at Age 70 Years**

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**AVERAGE SITE (PI = 1.0)**

TOTAL AGE (YR)	STUMP AGE (YR)	STEMS > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS					
		500	750	1000	1250	1500	1750
20	14	420	0	0	0	0	0
25	19	814	327	0	0	0	0
30	24	1199	705	274	0	0	0
35	29	1576	1074	639	274	0	0
40	34	1945	1435	996	628	318	51
45	39	2305	1788	1344	974	662	393
50	44	2657	2132	1684	1312	997	728
55	49	3001	2468	2016	1641	1324	1053
60	54	3336	2795	2339	1961	1643	1371
65	59	3662	3114	2654	2273	1954	1680
70	64	3981	3425	2961	2577	2256	1981
75	69	4291	3727	3259	2873	2549	2273
80	74	4592	4021	3548	3160	2834	2557
85	79	4885	4307	3830	3439	3111	2832
90	84	5170	4584	4103	3709	3380	3099
95	89	5446	4852	4367	3971	3640	3358
100	94	5714	5113	4623	4224	3891	3608
							3363

**MEDIUM-HIGH SITE (PI = 1.1)**

TOTAL AGE (YR)	STUMP AGE (YR)	STEMS > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS					
		500	750	1000	1250	1500	1750
20	15	1057	467	0	0	0	0
25	20	1506	907	396	0	0	0
30	25	1948	1338	822	396	40	0
35	30	2381	1762	1240	811	453	148
40	35	2805	2176	1650	1218	857	550
45	40	3221	2583	2051	1616	1253	945
50	45	3629	2981	2444	2005	1640	1331
55	50	4028	3370	2829	2387	2019	1708
60	55	4419	3752	3205	2760	2390	2077
65	60	4802	4125	3572	3124	2752	2438
70	65	5176	4489	3932	3480	3106	2790
75	70	5542	4845	4283	3828	3452	3134
80	75	5899	5193	4625	4167	3789	3469
85	80	6248	5532	4959	4498	4118	3797
90	85	6589	5863	5285	4821	4438	4115
95	90	6921	6185	5602	5135	4750	4426
100	95	7245	6499	5911	5441	5054	4728
							4447

**APPENDIX III. Yield Tables Based upon Site, Age, and Number of Stems at Age 70 Years**

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**HIGH SITE (PI = 1.2)**

TOTAL AGE (YR)	STUMP AGE (YR)	STEMS > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS						
		500	750	1000	1250	1500	1750	2000
20	16	2050	1256	610	91	0	0	0
25	21	2563	1756	1103	581	154	0	0
30	26	3069	2248	1588	1061	632	272	0
35	31	3566	2731	2064	1534	1101	740	431
40	36	4054	3206	2532	1998	1563	1199	889
45	41	4534	3672	2992	2454	2016	1650	1339
50	46	5006	4130	3443	2901	2460	2093	1780
55	51	5469	4579	3886	3340	2897	2527	2213
60	56	5924	5021	4320	3770	3324	2953	2637
65	61	6371	5453	4746	4192	3744	3370	3053
70	66	6809	5878	5164	4606	4155	3780	3461
75	71	7239	6294	5573	5011	4557	4180	3860
80	76	7660	6701	5974	5408	4951	4572	4251
85	81	8073	7101	6367	5797	5337	4956	4633
90	86	8478	7491	6751	6177	5715	5332	5007
95	91	8874	7874	7127	6548	6084	5699	5373
100	96	9261	8248	7494	6912	6444	6058	5730

**APPENDIX III. Yield Tables Based upon Site, Age, and Number of Stems at Age 70 Years**

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**APPENDIX III-9. TOTAL CUBIC FOOT VOLUME PER ACRE -ALL TREES > 8.6 INCHES DBHOB**

**LOW SITE (PI = 0.8)**

TOTAL AGE (YR)	STUMP AGE (YR)	STEMS > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS						
		500	750	1000	1250	1500	1750	2000
20	12	0	0	0	0	0	0	0
25	17	0	0	0	0	0	0	0
30	22	0	0	0	0	0	0	0
35	27	0	0	0	0	0	0	0
40	32	0	0	0	0	0	0	0
45	37	0	0	0	0	0	0	0
50	42	0	0	0	0	0	0	0
55	47	49	0	0	0	0	0	0
60	52	165	0	0	0	0	0	0
65	57	302	0	0	0	0	0	0
70	62	460	51	0	0	0	0	0
75	67	639	130	0	0	0	0	0
80	72	839	229	0	0	0	0	0
85	77	1060	349	20	0	0	0	0
90	82	1302	490	108	0	0	0	0
95	87	1565	653	217	0	0	0	0
100	92	1849	836	346	61	0	0	0

**MEDIUM-LOW SITE (PI = 0.9)**

TOTAL AGE (YR)	STUMP AGE (YR)	STEMS > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS						
		500	750	1000	1250	1500	1750	2000
20	13	0	0	0	0	0	0	0
25	18	0	0	0	0	0	0	0
30	23	0	0	0	0	0	0	0
35	28	0	0	0	0	0	0	0
40	33	0	0	0	0	0	0	0
45	38	0	0	0	0	0	0	0
50	43	54	0	0	0	0	0	0
55	48	228	0	0	0	0	0	0
60	53	423	47	0	0	0	0	0
65	58	639	149	0	0	0	0	0
70	63	876	272	0	0	0	0	0
75	68	1134	416	76	0	0	0	0
80	73	1412	581	178	0	0	0	0
85	78	1712	768	302	32	0	0	0
90	83	2033	975	447	137	0	0	0
95	88	2375	1203	613	263	35	0	0
100	93	2737	1452	800	410	154	0	0

**APPENDIX III. Yield Tables Based upon Site, Age, and Number of Stems at Age 70 Years**

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**AVERAGE SITE (PI = 1.0)**

TOTAL AGE (YR)	STUMP AGE (YR)	STEMS > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS						2000
		500	750	1000	1250	1500	1750	
20	14	0	0	0	0	0	0	0
25	19	0	0	0	0	0	0	0
30	24	0	0	0	0	0	0	0
35	29	0	0	0	0	0	0	0
40	34	0	0	0	0	0	0	0
45	39	134	0	0	0	0	0	0
50	44	380	27	0	0	0	0	0
55	49	648	160	0	0	0	0	0
60	54	937	314	33	0	0	0	0
65	59	1247	488	134	0	0	0	0
70	64	1578	684	256	15	0	0	0
75	69	1929	901	398	111	0	0	0
80	74	2302	1139	562	227	13	0	0
85	79	2696	1397	747	365	118	0	0
90	84	3111	1677	953	524	244	50	0
95	89	3546	1977	1180	704	391	172	12
100	94	4003	2299	1427	904	559	316	137

**MEDIUM-HIGH SITE (PI = 1.1)**

TOTAL AGE (YR)	STUMP AGE (YR)	STEMS > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS						2000
		500	750	1000	1250	1500	1750	
20	15	0	0	0	0	0	0	0
25	20	0	0	0	0	0	0	0
30	25	0	0	0	0	0	0	0
35	30	5	0	0	0	0	0	0
40	35	334	0	0	0	0	0	0
45	40	684	165	0	0	0	0	0
50	45	1055	363	71	0	0	0	0
55	50	1447	582	199	0	0	0	0
60	55	1860	822	348	91	0	0	0
65	60	2294	1083	518	204	12	0	0
70	65	2748	1365	709	338	107	0	0
75	70	3224	1668	921	494	223	41	0
80	75	3721	1992	1154	670	361	149	0
85	80	4239	2337	1408	867	519	279	106
90	85	4778	2703	1682	1085	698	430	234
95	90	5338	3090	1978	1324	898	601	384
100	95	5918	3498	2295	1584	1119	794	554

**APPENDIX III. Yield Tables Based upon Site, Age, and Number of Stems at Age 70 Years**

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**HIGH SITE (PI = 1.2)**

TOTAL AGE (YR)	STUMP AGE (YR)	STEMS > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS						
		500	750	1000	1250	1500	1750	2000
20	16	0	0	0	0	0	0	0
25	21	0	0	0	0	0	0	0
30	26	279	0	0	0	0	0	0
35	31	769	156	0	0	0	0	0
40	36	1279	422	101	0	0	0	0
45	41	1811	710	269	55	0	0	0
50	46	2363	1018	459	173	11	0	0
55	51	2937	1348	669	313	103	0	0
60	56	3531	1698	900	473	216	50	0
65	61	4147	2070	1153	654	350	149	11
70	66	4783	2462	1426	856	504	270	105
75	71	5441	2876	1720	1080	680	411	221
80	76	6119	3310	2036	1324	877	574	358
85	81	6819	3765	2372	1589	1094	757	515
90	86	7539	4242	2729	1875	1333	962	694
95	91	8280	4739	3108	2183	1593	1187	893
100	96	9043	5258	3507	2511	1873	1434	1114

**APPENDIX III. Yield Tables Based upon Site, Age, and Number of Stems at Age 70 Years**

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**APPENDIX III-10. MERCHANTABLE CUBIC FOOT VOLUME PER ACRE - ALL TREES > 4.6 INCHES DBHOB**

**LOW SITE (PI = 0.8)**

TOTAL AGE (YR)	STUMP AGE (YR)	STEMS > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS						
		500	750	1000	1250	1500	1750	2000
20	12	0	0	0	0	0	0	0
25	17	59	0	0	0	0	0	0
30	22	273	0	0	0	0	0	0
35	27	486	188	0	0	0	0	0
40	32	698	374	102	0	0	0	0
45	37	908	559	273	40	0	0	0
50	42	1117	743	444	201	0	0	0
55	47	1325	925	613	362	155	0	0
60	52	1531	1107	780	521	308	128	0
65	57	1737	1287	947	679	460	275	116
70	62	1940	1465	1112	836	611	421	259
75	67	2143	1642	1276	991	760	566	400
80	72	2344	1818	1439	1145	908	710	540
85	77	2544	1993	1600	1298	1055	852	679
90	82	2742	2166	1760	1449	1200	993	816
95	87	2940	2339	1918	1600	1344	1133	953
100	92	3136	2509	2076	1748	1487	1271	1087

**MEDIUM-LOW SITE (PI = 0.9)**

TOTAL AGE (YR)	STUMP AGE (YR)	STEMS > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS						
		500	750	1000	1250	1500	1750	2000
20	13	0	0	0	0	0	0	0
25	18	182	0	0	0	0	0	0
30	23	446	150	0	0	0	0	0
35	28	709	385	101	0	0	0	0
40	33	971	618	319	69	0	0	0
45	38	1231	850	535	275	58	0	0
50	43	1490	1081	750	480	256	64	0
55	48	1748	1310	964	684	452	255	85
60	53	2005	1538	1176	887	648	446	271
65	58	2260	1765	1387	1088	842	635	456
70	63	2514	1991	1597	1288	1035	822	639
75	68	2766	2215	1806	1486	1226	1008	822
80	73	3018	2438	2013	1684	1417	1193	1003
85	78	3268	2659	2219	1880	1605	1377	1182
90	83	3516	2879	2424	2074	1793	1559	1360
95	88	3764	3098	2627	2268	1979	1740	1537
100	93	4010	3316	2829	2460	2164	1920	1713

**APPENDIX III. Yield Tables Based upon Site, Age, and Number of Stems at Age 70 Years**

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**AVERAGE SITE (PI = 1.0)**

TOTAL AGE (YR)	STUMP AGE (YR)	STEMS > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS					
		500	750	1000	1250	1500	1750
20	14	150	0	0	0	0	0
25	19	474	152	0	0	0	0
30	24	796	440	126	0	0	0
35	29	1116	727	395	118	0	0
40	34	1436	1013	662	373	131	0
45	39	1754	1297	927	627	377	164
50	44	2070	1580	1192	879	621	402
55	49	2386	1861	1455	1131	864	639
60	54	2700	2142	1717	1381	1106	875
65	59	3013	2421	1977	1630	1346	1109
70	64	3324	2699	2237	1877	1586	1342
75	69	3635	2975	2495	2123	1824	1574
80	74	3944	3250	2751	2368	2060	1805
85	79	4251	3524	3007	2612	2296	2034
90	84	4557	3796	3261	2854	2530	2262
95	89	4862	4068	3513	3095	2762	2488
100	94	5166	4337	3765	3335	2994	2714
							2477

**MEDIUM-HIGH SITE (PI = 1.1)**

TOTAL AGE (YR)	STUMP AGE (YR)	STEMS > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS					
		500	750	1000	1250	1500	1750
20	15	598	217	0	0	0	0
25	20	991	566	197	0	0	0
30	25	1381	914	522	200	0	0
35	30	1771	1260	845	509	231	0
40	35	2159	1605	1168	817	529	286
45	40	2546	1949	1488	1124	826	576
50	45	2932	2291	1808	1429	1121	864
55	50	3316	2632	2126	1733	1416	1151
60	55	3699	2972	2443	2036	1709	1437
65	60	4081	3311	2759	2338	2000	1722
70	65	4461	3648	3073	2638	2291	2005
75	70	4840	3984	3386	2937	2580	2287
80	75	5218	4318	3698	3234	2868	2568
85	80	5595	4651	4009	3530	3154	2847
90	85	5970	4983	4318	3825	3439	3125
95	90	6344	5314	4626	4119	3723	3402
100	95	6716	5643	4932	4411	4006	3677
							3402

**APPENDIX III. Yield Tables Based upon Site, Age, and Number of Stems at Age 70 Years**

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**HIGH SITE (PI = 1.2)**

TOTAL AGE (YR)	STUMP AGE (YR)	STEMS > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS						
		500	750	1000	1250	1500	1750	2000
20	16	1357	802	337	0	0	0	0
25	21	1837	1220	726	332	11	0	0
30	26	2314	1637	1113	701	368	91	0
35	31	2791	2052	1498	1069	724	438	195
40	36	3266	2467	1883	1436	1079	784	535
45	41	3740	2879	2266	1801	1432	1129	873
50	46	4213	3291	2648	2165	1784	1472	1210
55	51	4684	3701	3028	2528	2135	1815	1546
60	56	5154	4110	3407	2889	2484	2156	1880
65	61	5623	4518	3785	3249	2833	2495	2214
70	66	6090	4924	4162	3608	3179	2833	2545
75	71	6557	5329	4537	3965	3525	3170	2876
80	76	7021	5733	4911	4321	3869	3506	3205
85	81	7485	6135	5283	4676	4212	3840	3533
90	86	7947	6537	5655	5030	4554	4174	3860
95	91	8408	6936	6025	5382	4894	4505	4185
100	96	8868	7335	6393	5733	5233	4836	4509

**APPENDIX III. Yield Tables Based upon Site, Age, and Number of Stems at Age 70 Years**

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**APPENDIX III-11. MERCHANTABLE CUBIC FOOT VOLUME PER ACRE - ALL TREES > 8.6 INCHES DBHOB**

**LOW SITE (PI = 0.8)**

TOTAL AGE (YR)	STUMP AGE (YR)	STEMS > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS					
		500	750	1000	1250	1500	1750
20	12	0	0	0	0	0	0
25	17	0	0	0	0	0	0
30	22	0	0	0	0	0	0
35	27	0	0	0	0	0	0
40	32	0	0	0	0	0	0
45	37	0	0	0	0	0	0
50	42	0	0	0	0	0	0
55	47	37	0	0	0	0	0
60	52	145	0	0	0	0	0
65	57	272	0	0	0	0	0
70	62	419	42	0	0	0	0
75	67	586	114	0	0	0	0
80	72	772	206	0	0	0	0
85	77	978	317	14	0	0	0
90	82	1203	448	95	0	0	0
95	87	1447	599	195	0	0	0
100	92	1712	769	315	52	0	0

**MEDIUM-LOW SITE (PI = 0.9)**

TOTAL AGE (YR)	STUMP AGE (YR)	STEMS > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS					
		500	750	1000	1250	1500	1750
20	13	0	0	0	0	0	0
25	18	0	0	0	0	0	0
30	23	0	0	0	0	0	0
35	28	0	0	0	0	0	0
40	33	0	0	0	0	0	0
45	38	0	0	0	0	0	0
50	43	42	0	0	0	0	0
55	48	204	0	0	0	0	0
60	53	385	37	0	0	0	0
65	58	586	131	0	0	0	0
70	63	807	245	0	0	0	0
75	68	1046	379	64	0	0	0
80	73	1306	532	159	0	0	0
85	78	1585	705	273	25	0	0
90	83	1884	897	407	121	0	0
95	88	2202	1109	561	237	27	0
100	93	2539	1340	734	373	136	0

**APPENDIX III. Yield Tables Based upon Site, Age, and Number of Stems at Age 70 Years**

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**AVERAGE SITE (PI = 1.0)**

TOTAL AGE (YR)	STUMP AGE (YR)	STEMS > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS						
		500	750	1000	1250	1500	1750	2000
20	14	0	0	0	0	0	0	0
25	19	0	0	0	0	0	0	0
30	24	0	0	0	0	0	0	0
35	29	0	0	0	0	0	0	0
40	34	0	0	0	0	0	0	0
45	39	116	0	0	0	0	0	0
50	44	346	18	0	0	0	0	0
55	49	595	141	0	0	0	0	0
60	54	864	283	24	0	0	0	0
65	59	1152	445	117	0	0	0	0
70	64	1460	626	229	7	0	0	0
75	69	1787	827	361	95	0	0	0
80	74	2134	1048	512	203	6	0	0
85	79	2501	1288	683	329	102	0	0
90	84	2887	1548	874	476	218	39	0
95	89	3293	1827	1084	642	353	151	4
100	94	3718	2125	1313	828	508	283	118

**MEDIUM-HIGH SITE (PI = 1.1)**

TOTAL AGE (YR)	STUMP AGE (YR)	STEMS > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS						
		500	750	1000	1250	1500	1750	2000
20	15	0	0	0	0	0	0	0
25	20	0	0	0	0	0	0	0
30	25	0	0	0	0	0	0	0
35	30	0	0	0	0	0	0	0
40	35	303	0	0	0	0	0	0
45	40	629	144	0	0	0	0	0
50	45	974	328	57	0	0	0	0
55	50	1339	531	175	0	0	0	0
60	55	1724	753	313	76	0	0	0
65	60	2128	996	470	180	3	0	0
70	65	2551	1257	646	303	90	0	0
75	70	2994	1539	842	446	197	29	0
80	75	3457	1840	1058	609	323	128	0
85	80	3939	2160	1293	791	468	247	87
90	85	4441	2500	1548	992	633	385	205
95	90	4962	2859	1822	1213	818	543	342
100	95	5503	3238	2116	1454	1022	720	499

**APPENDIX III. Yield Tables Based upon Site, Age, and Number of Stems at Age 70 Years**

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**HIGH SITE (PI = 1.2)**

TOTAL AGE (YR)	STUMP AGE (YR)	STEMS > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS						
		500	750	1000	1250	1500	1750	2000
20	16	0	0	0	0	0	0	0
25	21	0	0	0	0	0	0	0
30	26	255	0	0	0	0	0	0
35	31	711	135	0	0	0	0	0
40	36	1187	382	84	0	0	0	0
45	41	1682	649	239	42	0	0	0
50	46	2197	936	414	150	2	0	0
55	51	2731	1241	608	278	85	0	0
60	56	3285	1567	822	426	188	36	0
65	61	3859	1912	1056	593	311	127	0
70	66	4452	2276	1309	779	453	237	86
75	71	5064	2660	1582	985	615	366	191
80	76	5696	3064	1874	1211	796	515	316
85	81	6348	3487	2186	1456	996	684	460
90	86	7019	3930	2517	1721	1217	872	624
95	91	7709	4392	2868	2005	1456	1080	808
100	96	8420	4874	3238	2309	1716	1307	1011

**APPENDIX III. Yield Tables Based upon Site, Age, and Number of Stems at Age 70 Years**

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**APPENDIX III-12. SAWLOG CUBIC FOOT VOLUME PER ACRE - ALL TREES > 8.6 INCHES DBHOB**

**LOW SITE (PI = 0.8)**

TOTAL AGE (YR)	STUMP AGE (YR)	STEMS > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS						
		500	750	1000	1250	1500	1750	2000
20	12	0	0	0	0	0	0	0
25	17	0	0	0	0	0	0	0
30	22	0	0	0	0	0	0	0
35	27	0	0	0	0	0	0	0
40	32	0	0	0	0	0	0	0
45	37	0	0	0	0	0	0	0
50	42	0	0	0	0	0	0	0
55	47	5	0	0	0	0	0	0
60	52	102	0	0	0	0	0	0
65	57	217	0	0	0	0	0	0
70	62	349	18	0	0	0	0	0
75	67	499	82	0	0	0	0	0
80	72	667	163	0	0	0	0	0
85	77	852	261	0	0	0	0	0
90	82	1055	378	67	0	0	0	0
95	87	1276	512	155	0	0	0	0
100	92	1514	663	261	31	0	0	0

**MEDIUM-LOW SITE (PI = 0.9)**

TOTAL AGE (YR)	STUMP AGE (YR)	STEMS > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS						
		500	750	1000	1250	1500	1750	2000
20	13	0	0	0	0	0	0	0
25	18	0	0	0	0	0	0	0
30	23	0	0	0	0	0	0	0
35	28	0	0	0	0	0	0	0
40	33	0	0	0	0	0	0	0
45	38	0	0	0	0	0	0	0
50	43	11	0	0	0	0	0	0
55	48	157	0	0	0	0	0	0
60	53	320	12	0	0	0	0	0
65	58	501	96	0	0	0	0	0
70	63	700	196	0	0	0	0	0
75	68	916	315	39	0	0	0	0
80	73	1149	451	121	0	0	0	0
85	78	1401	604	221	5	0	0	0
90	83	1670	776	339	88	0	0	0
95	88	1957	965	474	189	6	0	0
100	93	2261	1171	627	307	100	0	0

**APPENDIX III. Yield Tables Based upon Site, Age, and Number of Stems at Age 70 Years**

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**AVERAGE SITE (PI = 1.0)**

TOTAL AGE (YR)	STUMP AGE (YR)	STEMS > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS						
		500	750	1000	1250	1500	1750	2000
20	14	0	0	0	0	0	0	0
25	19	0	0	0	0	0	0	0
30	24	0	0	0	0	0	0	0
35	29	0	0	0	0	0	0	0
40	34	0	0	0	0	0	0	0
45	39	78	0	0	0	0	0	0
50	44	285	0	0	0	0	0	0
55	49	509	101	0	0	0	0	0
60	54	752	227	1	0	0	0	0
65	59	1011	371	81	0	0	0	0
70	64	1289	532	179	0	0	0	0
75	69	1584	711	294	61	0	0	0
80	74	1897	907	427	154	0	0	0
85	79	2227	1121	578	264	65	0	0
90	84	2575	1353	746	392	165	10	0
95	89	2941	1603	932	537	282	106	0
100	94	3324	1870	1136	701	417	220	77

**MEDIUM-HIGH SITE (PI = 1.1)**

TOTAL AGE (YR)	STUMP AGE (YR)	STEMS > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS						
		500	750	1000	1250	1500	1750	2000
20	15	0	0	0	0	0	0	0
25	20	0	0	0	0	0	0	0
30	25	0	0	0	0	0	0	0
35	30	0	0	0	0	0	0	0
40	35	249	0	0	0	0	0	0
45	40	542	100	0	0	0	0	0
50	45	854	263	26	0	0	0	0
55	50	1183	444	128	0	0	0	0
60	55	1530	642	248	41	0	0	0
65	60	1894	858	385	130	0	0	0
70	65	2277	1091	540	236	51	0	0
75	70	2676	1342	713	360	141	0	0
80	75	3094	1611	903	502	249	80	0
85	80	3529	1897	1112	661	375	181	43
90	85	3981	2201	1337	838	519	300	143
95	90	4451	2523	1581	1032	679	436	261
100	95	4939	2862	1841	1245	858	590	396

**APPENDIX III. Yield Tables Based upon Site, Age, and Number of Stems at Age 70 Years**

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**HIGH SITE (PI = 1.2)**

TOTAL AGE (YR)	STUMP AGE (YR)	STEMS > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS						
		500	750	1000	1250	1500	1750	2000
20	16	0	0	0	0	0	0	0
25	21	0	0	0	0	0	0	0
30	26	214	0	0	0	0	0	0
35	31	627	90	0	0	0	0	0
40	36	1057	310	44	0	0	0	0
45	41	1505	548	179	9	0	0	0
50	46	1970	804	333	101	0	0	0
55	51	2453	1077	504	211	44	0	0
60	56	2954	1368	692	338	131	1	0
65	61	3473	1677	898	483	235	75	0
70	66	4009	2003	1122	646	356	168	38
75	71	4562	2347	1363	826	496	277	125
80	76	5134	2708	1622	1024	653	405	231
85	81	5722	3087	1899	1239	828	550	354
90	86	6329	3484	2193	1472	1020	713	494
95	91	6953	3898	2505	1723	1230	894	653
100	96	7595	4330	2835	1992	1457	1092	828

**APPENDIX III. Yield Tables Based upon Site, Age, and Number of Stems at Age 70 Years**

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**APPENDIX III-13. SAWLOG BOARD FOOT VOLUME PER ACRE - ALL TREES > 8.6 INCHES DBHOB**

**LOW SITE (PI = 0.8)**

TOTAL AGE (YR)	STUMP AGE (YR)	STEMS > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS						
		500	750	1000	1250	1500	1750	2000
20	12	0	0	0	0	0	0	0
25	17	0	0	0	0	0	0	0
30	22	0	0	0	0	0	0	0
35	27	0	0	0	0	0	0	0
40	32	0	0	0	0	0	0	0
45	37	0	0	0	0	0	0	0
50	42	0	0	0	0	0	0	0
55	47	0	0	0	0	0	0	0
60	52	89	0	0	0	0	0	0
65	57	692	0	0	0	0	0	0
70	62	1394	0	0	0	0	0	0
75	67	2194	105	0	0	0	0	0
80	72	3093	515	0	0	0	0	0
85	77	4091	1023	0	0	0	0	0
90	82	5187	1630	69	0	0	0	0
95	87	6381	2335	514	0	0	0	0
100	92	7675	3139	1058	0	0	0	0

**MEDIUM-LOW SITE (PI = 0.9)**

TOTAL AGE (YR)	STUMP AGE (YR)	STEMS > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS						
		500	750	1000	1250	1500	1750	2000
20	13	0	0	0	0	0	0	0
25	18	0	0	0	0	0	0	0
30	23	0	0	0	0	0	0	0
35	28	0	0	0	0	0	0	0
40	33	0	0	0	0	0	0	0
45	38	0	0	0	0	0	0	0
50	43	0	0	0	0	0	0	0
55	48	427	0	0	0	0	0	0
60	53	1308	0	0	0	0	0	0
65	58	2289	209	0	0	0	0	0
70	63	3367	736	0	0	0	0	0
75	68	4544	1361	0	0	0	0	0
80	73	5820	2085	389	0	0	0	0
85	78	7194	2907	909	0	0	0	0
90	83	8667	3828	1527	242	0	0	0
95	88	10238	4847	2243	765	0	0	0
100	93	11908	5965	3058	1386	328	0	0

**APPENDIX III. Yield Tables Based upon Site, Age, and Number of Stems at Age 70 Years**

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**AVERAGE SITE (PI = 1.0)**

TOTAL AGE (YR)	STUMP AGE (YR)	STEMS > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS					
		500	750	1000	1250	1500	1750
20	14	0	0	0	0	0	0
25	19	0	0	0	0	0	0
30	24	0	0	0	0	0	0
35	29	0	0	0	0	0	0
40	34	0	0	0	0	0	0
45	39	77	0	0	0	0	0
50	44	1211	0	0	0	0	0
55	49	2443	272	0	0	0	0
60	54	3774	947	0	0	0	0
65	59	5204	1720	215	0	0	0
70	64	6732	2592	728	0	0	0
75	69	8359	3562	1340	141	0	0
80	74	10084	4631	2051	623	0	0
85	79	11908	5799	2860	1203	180	0
90	84	13830	7065	3767	1882	699	0
95	89	15851	8430	4773	2660	1317	409
100	94	17971	9893	5878	3536	2033	1007
							275

**MEDIUM-HIGH SITE (PI = 1.1)**

TOTAL AGE (YR)	STUMP AGE (YR)	STEMS > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS					
		500	750	1000	1250	1500	1750
20	15	0	0	0	0	0	0
25	20	0	0	0	0	0	0
30	25	0	0	0	0	0	0
35	30	0	0	0	0	0	0
40	35	1175	0	0	0	0	0
45	40	2805	324	0	0	0	0
50	45	4534	1213	0	0	0	0
55	50	6362	2201	494	0	0	0
60	55	8288	3288	1138	58	0	0
65	60	10313	4473	1881	525	0	0
70	65	12436	5757	2723	1091	126	0
75	70	14658	7140	3663	1755	601	0
80	75	16979	8620	4701	2518	1174	293
85	80	19398	10200	5838	3379	1846	825
90	85	21915	11878	7074	4339	2616	1457
95	90	24531	13654	8408	5398	3485	2187
100	95	27246	15530	9841	6555	4453	3015
							1984

**APPENDIX III. Yield Tables Based upon Site, Age, and Number of Stems at Age 70 Years**

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**HIGH SITE (PI = 1.2)**

TOTAL AGE (YR)	STUMP AGE (YR)	STEMS > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS					
		500	750	1000	1250	1500	1750
20	16	0	0	0	0	0	0
25	21	0	0	0	0	0	0
30	26	1333	0	0	0	0	0
35	31	3641	386	0	0	0	0
40	36	6047	1607	85	0	0	0
45	41	8551	2926	825	0	0	0
50	46	11155	4343	1665	393	0	0
55	51	13856	5860	2603	986	98	0
60	56	16656	7474	3639	1677	558	0
65	61	19555	9188	4774	2466	1117	271
70	66	22553	11000	6007	3354	1774	762
75	71	25648	12910	7339	4341	2529	1352
80	76	28843	14919	8770	5426	3384	2040
85	81	32136	17027	10299	6610	4337	2827
90	86	35527	19233	11927	7893	5388	3712
95	91	39017	21537	13653	9273	6538	4696
100	96	42606	23940	15478	10753	7786	5778



## APPENDIX IV-1. NUMBER OF STEMS PER ACRE - ALL TREES &gt; 0.6 INCH DBHOB

## LOW SITE (PI = 0.8)

TOTAL AGE (YR)	STUMP AGE (YR)	QUADRATIC-MEAN DBHOB (INCHES) - ALL TREES > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS											
		3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5
20	12	9287	6903	5283	4127	3270	2615	2103	1692	-	-	-	-
25	17	7445	5633	4424	3573	2950	2478	2112	1820	-	-	-	-
30	22	6209	4711	3725	3041	2545	2173	1886	1659	-	-	-	-
35	27	5321	4019	3175	2595	2180	1870	1634	1448	-	-	-	-
40	32	4652	3485	2738	2230	1870	1604	1401	1244	-	-	-	-
45	37	4129	3062	2385	1930	1610	1375	1198	1061	-	-	-	-
50	42	3712	2719	2097	1682	1392	1182	1024	902	-	-	-	-
55	47	3371	2438	1858	1475	1209	1017	874	765	-	-	-	-
60	52	3089	2204	1658	1300	1054	878	747	648	-	-	-	-
65	57	2853	2008	1490	1153	923	759	639	548	-	-	-	-
70	62	2654	1842	1348	1028	812	658	546	462	-	-	-	-
75	67	2485	1700	1227	922	717	573	468	390	-	-	-	-
80	72	2340	1580	1123	832	637	500	401	328	-	-	-	-
85	77	2216	1477	1035	755	568	439	345	276	-	-	-	-
90	82	2109	1388	960	690	511	387	298	233	-	-	-	-
95	87	2017	1313	897	635	462	344	259	198	-	-	-	-
100	92	1938	1248	843	589	422	308	228	169	-	-	-	-

## MEDIUM-LOW SITE (PI = 0.9)

TOTAL AGE (YR)	STUMP AGE (YR)	QUADRATIC-MEAN DBHOB (INCHES) - ALL TREES > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS											
		3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5
20	13	9579	7168	5544	4394	3546	2901	2399	1998	-	-	-	-
25	18	7809	5912	4654	3774	3133	2649	2275	1978	-	-	-	-
30	23	6611	5005	3955	3228	2703	2311	2008	1770	-	-	-	-
35	28	5745	4326	3409	2781	2331	1996	1741	1540	-	-	-	-
40	33	5089	3801	2976	2416	2018	1725	1502	1328	-	-	-	-
45	38	4576	3383	2627	2118	1758	1495	1295	1141	-	-	-	-
50	43	4163	3045	2341	1870	1541	1300	1119	979	-	-	-	-
55	48	3827	2766	2104	1664	1358	1135	969	841	-	-	-	-
60	53	3547	2534	1906	1491	1203	996	841	723	-	-	-	-
65	58	3313	2339	1739	1345	1073	877	733	622	-	-	-	-
70	63	3115	2174	1597	1220	962	777	640	536	-	-	-	-
75	68	2947	2034	1477	1115	867	691	562	463	-	-	-	-
80	73	2803	1914	1374	1025	787	619	495	402	-	-	-	-
85	78	2679	1811	1287	948	719	557	439	350	-	-	-	-
90	83	2572	1723	1212	883	662	505	392	306	-	-	-	-
95	88	2480	1648	1148	828	613	462	353	271	-	-	-	-
100	93	2401	1584	1094	782	573	427	321	242	-	-	-	-

## AVERAGE SITE (PI = 1.0)

TOTAL AGE (YR)	STUMP AGE (YR)	QUADRATIC-MEAN DBHOB (INCHES) - ALL TREES > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS										
		3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	
20	14	-	7219	5633	4515	3693	3071	2586	2201	1889	-	-
25	19	-	6026	4762	3881	3240	2758	2385	2090	1852	-	-
30	24	-	5161	4086	3343	2807	2407	2099	1857	1662	-	-
35	29	-	4510	3558	2906	2439	2092	1827	1619	1453	-	-
40	34	-	4003	3138	2550	2132	1823	1588	1405	1259	-	-
45	39	-	3599	2799	2259	1877	1596	1383	1218	1087	-	-
50	44	-	3271	2521	2017	1663	1404	1209	1058	938	-	-
55	49	-	3000	2290	1816	1484	1242	1061	921	810	-	-
60	54	-	2775	2096	1646	1333	1105	935	804	701	-	-
65	59	-	2584	1933	1503	1204	989	828	704	607	-	-
70	64	-	2423	1795	1381	1095	890	736	619	527	-	-
75	69	-	2286	1677	1278	1003	805	659	547	460	-	-
80	74	-	2169	1576	1190	924	734	593	486	403	-	-
85	79	-	2068	1491	1115	857	674	538	435	355	-	-
90	84	-	1982	1417	1051	801	623	492	392	315	-	-
95	89	-	1908	1355	997	753	580	453	357	283	-	-
100	94	-	1845	1302	952	714	545	422	329	256	-	-

## MEDIUM-HIGH SITE (PI = 1.1)

TOTAL AGE (YR)	STUMP AGE (YR)	QUADRATIC-MEAN DBHOB (INCHES) - ALL TREES > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS									
		3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5
20	15	-	-	5611	4543	3760	3167	2707	2341	2046	1803
25	20	-	-	4785	3924	3298	2827	2463	2176	1944	1755
30	25	-	-	4144	3407	2875	2477	2172	1931	1738	1580
35	30	-	-	3642	2988	2518	2169	1902	1693	1526	1389
40	35	-	-	3242	2646	2222	1908	1668	1481	1332	1211
45	40	-	-	2917	2366	1975	1687	1468	1298	1162	1053
50	45	-	-	2650	2133	1768	1500	1298	1141	1016	915
55	50	-	-	2428	1939	1594	1343	1153	1007	890	797
60	55	-	-	2241	1775	1448	1209	1030	892	783	695
65	60	-	-	2084	1636	1323	1096	926	795	691	608
70	65	-	-	1950	1518	1218	1000	837	712	613	534
75	70	-	-	1836	1418	1128	918	761	641	547	472
80	75	-	-	1739	1333	1051	848	697	582	491	419
85	80	-	-	1656	1260	986	790	644	532	445	375
90	85	-	-	1586	1198	932	740	599	490	406	339
95	90	-	-	1526	1146	886	699	561	456	374	309
100	95	-	-	1475	1103	848	666	531	428	349	285

## HIGH SITE (PI = 1.2)

TOTAL AGE (YR)	STUMP AGE (YR)	QUADRATIC-MEAN DBHOB (INCHES) - ALL TREES > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS											
		3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5
20	16	-	-	5518	4514	3778	3221	2788	2445	2168	1940	1750	1591
25	21	-	-	4751	3925	3325	2873	2524	2248	2026	1844	1693	1566
30	26	-	-	4153	3437	2920	2533	2235	2001	1813	1659	1532	1425
35	31	-	-	3682	3040	2580	2236	1973	1767	1602	1467	1356	1263
40	36	-	-	3304	2716	2296	1985	1747	1561	1412	1291	1192	1109
45	41	-	-	2996	2449	2060	1772	1553	1383	1247	1136	1046	970
50	46	-	-	2742	2227	1862	1593	1389	1230	1104	1002	918	848
55	51	-	-	2530	2041	1695	1441	1249	1100	982	886	808	743
60	56	-	-	2352	1884	1554	1312	1130	989	877	787	713	652
65	61	-	-	2202	1751	1434	1203	1029	895	788	703	633	575
70	66	-	-	2074	1638	1332	1110	943	814	713	631	564	509
75	71	-	-	1965	1542	1246	1031	870	746	648	570	506	453
80	76	-	-	1872	1460	1172	964	808	689	594	519	457	406
85	81	-	-	1792	1390	1110	908	757	640	549	476	417	367
90	86	-	-	1725	1331	1058	860	713	600	512	441	383	336
95	91	-	-	1667	1281	1014	821	677	567	481	412	356	310
100	96	-	-	1619	1240	978	789	648	541	457	390	335	290

## APPENDIX IV-2. AVERAGE DBHOB (INCHES) - ALL TREES &gt; 0.6 INCH DBHOB

## LOW SITE (PI = 0.8)

TOTAL AGE (YR)	STUMP AGE (YR)	QUADRATIC-MEAN DBHOB (INCHES) - ALL TREES > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS											
		3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5
20	12	0.0	0.0	0.0	0.6	0.9	1.1	1.3	1.6	-	-	-	-
25	17	0.0	0.7	1.0	1.3	1.6	1.8	2.1	2.4	-	-	-	-
30	22	0.8	1.2	1.5	1.8	2.1	2.4	2.7	3.0	-	-	-	-
35	27	1.2	1.6	1.9	2.3	2.6	2.9	3.2	3.5	-	-	-	-
40	32	1.5	1.9	2.3	2.6	3.0	3.3	3.7	4.0	-	-	-	-
45	37	1.8	2.2	2.6	3.0	3.3	3.7	4.1	4.4	-	-	-	-
50	42	2.0	2.5	2.9	3.3	3.7	4.1	4.4	4.8	-	-	-	-
55	47	2.3	2.7	3.1	3.6	4.0	4.4	4.8	5.2	-	-	-	-
60	52	2.5	2.9	3.4	3.8	4.3	4.7	5.1	5.6	-	-	-	-
65	57	2.7	3.1	3.6	4.1	4.5	5.0	5.4	5.9	-	-	-	-
70	62	2.8	3.3	3.8	4.3	4.8	5.3	5.8	6.2	-	-	-	-
75	67	3.0	3.5	4.0	4.5	5.0	5.5	6.1	6.6	-	-	-	-
80	72	3.2	3.7	4.2	4.8	5.3	5.8	6.3	6.9	-	-	-	-
85	77	3.3	3.9	4.4	5.0	5.5	6.1	6.6	7.2	-	-	-	-
90	82	3.5	4.0	4.6	5.2	5.7	6.3	6.9	7.5	-	-	-	-
95	87	3.6	4.2	4.8	5.4	6.0	6.6	7.2	7.8	-	-	-	-
100	92	3.8	4.4	5.0	5.6	6.2	6.8	7.4	8.1	-	-	-	-

## MEDIUM-LOW SITE (PI = 0.9)

TOTAL AGE (YR)	STUMP AGE (YR)	QUADRATIC-MEAN DBHOB (INCHES) - ALL TREES > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS											
		3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5
20	13	0.0	0.0	0.6	0.8	1.1	1.3	1.5	1.8	-	-	-	-
25	18	0.6	0.9	1.2	1.5	1.7	2.0	2.3	2.5	-	-	-	-
30	23	1.0	1.3	1.7	2.0	2.3	2.6	2.8	3.1	-	-	-	-
35	28	1.3	1.7	2.0	2.4	2.7	3.0	3.3	3.6	-	-	-	-
40	33	1.6	2.0	2.4	2.7	3.1	3.4	3.7	4.1	-	-	-	-
45	38	1.9	2.3	2.7	3.1	3.4	3.8	4.1	4.5	-	-	-	-
50	43	2.1	2.5	2.9	3.3	3.7	4.1	4.5	4.9	-	-	-	-
55	48	2.3	2.8	3.2	3.6	4.0	4.4	4.8	5.2	-	-	-	-
60	53	2.5	3.0	3.4	3.9	4.3	4.7	5.2	5.6	-	-	-	-
65	58	2.7	3.2	3.6	4.1	4.6	5.0	5.5	5.9	-	-	-	-
70	63	2.9	3.3	3.8	4.3	4.8	5.3	5.8	6.2	-	-	-	-
75	68	3.0	3.5	4.0	4.5	5.0	5.5	6.1	6.6	-	-	-	-
80	73	3.2	3.7	4.2	4.7	5.3	5.8	6.3	6.9	-	-	-	-
85	78	3.3	3.8	4.4	4.9	5.5	6.0	6.6	7.2	-	-	-	-
90	83	3.4	4.0	4.6	5.1	5.7	6.3	6.9	7.5	-	-	-	-
95	88	3.6	4.1	4.7	5.3	5.9	6.5	7.1	7.8	-	-	-	-
100	93	3.7	4.3	4.9	5.5	6.1	6.8	7.4	8.0	-	-	-	-

## AVERAGE SITE (PI = 1.0)

TOTAL AGE (YR)	STUMP AGE (YR)	QUADRATIC-MEAN DBHOB (INCHES) - ALL TREES > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS											
		3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5
20	14	-	0.0	0.8	1.0	1.3	1.5	1.7	1.9	2.1	-	-	-
25	19	-	1.1	1.4	1.6	1.9	2.1	2.4	2.6	2.8	-	-	-
30	24	-	1.5	1.8	2.1	2.4	2.7	2.9	3.2	3.4	-	-	-
35	29	-	1.8	2.2	2.5	2.8	3.1	3.4	3.7	3.9	-	-	-
40	34	-	2.1	2.5	2.8	3.2	3.5	3.8	4.1	4.4	-	-	-
45	39	-	2.4	2.8	3.1	3.5	3.8	4.2	4.5	4.8	-	-	-
50	44	-	2.6	3.0	3.4	3.8	4.2	4.5	4.9	5.3	-	-	-
55	49	-	2.8	3.2	3.7	4.1	4.5	4.9	5.3	5.6	-	-	-
60	54	-	3.0	3.5	3.9	4.3	4.8	5.2	5.6	6.0	-	-	-
65	59	-	3.2	3.7	4.1	4.6	5.0	5.5	5.9	6.4	-	-	-
70	64	-	3.4	3.8	4.3	4.8	5.3	5.8	6.2	6.7	-	-	-
75	69	-	3.5	4.0	4.5	5.0	5.5	6.0	6.6	7.1	-	-	-
80	74	-	3.7	4.2	4.7	5.3	5.8	6.3	6.9	7.4	-	-	-
85	79	-	3.8	4.4	4.9	5.5	6.0	6.6	7.1	7.7	-	-	-
90	84	-	4.0	4.5	5.1	5.7	6.3	6.8	7.4	8.0	-	-	-
95	89	-	4.1	4.7	5.3	5.9	6.5	7.1	7.7	8.3	-	-	-
100	94	-	4.2	4.8	5.5	6.1	6.7	7.4	8.0	8.7	-	-	-

## MEDIUM-HIGH SITE (PI = 1.1)

TOTAL AGE (YR)	STUMP AGE (YR)	QUADRATIC-MEAN DBHOB (INCHES) - ALL TREES > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS											
		3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5
20	15	-	-	1.0	1.2	1.4	1.7	1.8	2.0	2.2	2.3	-	-
25	20	-	-	1.5	1.8	2.0	2.3	2.5	2.7	2.9	3.1	-	-
30	25	-	-	1.9	2.2	2.5	2.7	3.0	3.2	3.5	3.7	-	-
35	30	-	-	2.3	2.6	2.9	3.2	3.4	3.7	4.0	4.2	-	-
40	35	-	-	2.6	2.9	3.2	3.5	3.8	4.1	4.4	4.7	-	-
45	40	-	-	2.8	3.2	3.5	3.9	4.2	4.5	4.9	5.2	-	-
50	45	-	-	3.1	3.4	3.8	4.2	4.6	4.9	5.3	5.6	-	-
55	50	-	-	3.3	3.7	4.1	4.5	4.9	5.3	5.6	6.0	-	-
60	55	-	-	3.5	3.9	4.3	4.8	5.2	5.6	6.0	6.4	-	-
65	60	-	-	3.7	4.1	4.6	5.0	5.5	5.9	6.4	6.8	-	-
70	65	-	-	3.9	4.3	4.8	5.3	5.8	6.2	6.7	7.2	-	-
75	70	-	-	4.0	4.5	5.0	5.5	6.0	6.5	7.1	7.6	-	-
80	75	-	-	4.2	4.7	5.2	5.8	6.3	6.8	7.4	7.9	-	-
85	80	-	-	4.3	4.9	5.4	6.0	6.6	7.1	7.7	8.3	-	-
90	85	-	-	4.5	5.1	5.6	6.2	6.8	7.4	8.0	8.6	-	-
95	90	-	-	4.6	5.2	5.8	6.5	7.1	7.7	8.3	9.0	-	-
100	95	-	-	4.8	5.4	6.0	6.7	7.3	8.0	8.6	9.3	-	-

		HIGH SITE (PI = 1.2)											
TOTAL AGE (YR)	STUMP AGE (YR)	QUADRATIC-MEAN DBHOB (INCHES) - ALL TREES > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS											
		3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5
20	16	-	-	1.1	1.4	1.6	1.8	1.9	2.1	2.2	2.4	2.5	2.6
25	21	-	-	1.6	1.9	2.1	2.3	2.5	2.7	2.9	3.1	3.2	3.3
30	26	-	-	2.0	2.3	2.6	2.8	3.0	3.3	3.5	3.7	3.8	4.0
35	31	-	-	2.3	2.7	2.9	3.2	3.5	3.7	4.0	4.2	4.4	4.6
40	36	-	-	2.6	3.0	3.3	3.6	3.9	4.2	4.4	4.7	4.9	5.2
45	41	-	-	2.9	3.2	3.6	3.9	4.2	4.5	4.9	5.1	5.4	5.7
50	46	-	-	3.1	3.5	3.9	4.2	4.6	4.9	5.3	5.6	5.9	6.2
55	51	-	-	3.3	3.7	4.1	4.5	4.9	5.3	5.6	6.0	6.4	6.7
60	56	-	-	3.5	3.9	4.4	4.8	5.2	5.6	6.0	6.4	6.8	7.2
65	61	-	-	3.7	4.1	4.6	5.0	5.5	5.9	6.4	6.8	7.2	7.7
70	66	-	-	3.9	4.3	4.8	5.3	5.8	6.2	6.7	7.2	7.6	8.1
75	71	-	-	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.6
80	76	-	-	4.2	4.7	5.2	5.8	6.3	6.8	7.4	7.9	8.4	9.0
85	81	-	-	4.3	4.9	5.4	6.0	6.5	7.1	7.7	8.3	8.8	9.4
90	86	-	-	4.5	5.0	5.6	6.2	6.8	7.4	8.0	8.6	9.2	9.8
95	91	-	-	4.6	5.2	5.8	6.4	7.0	7.7	8.3	9.0	9.6	10.3
100	96	-	-	4.7	5.4	6.0	6.6	7.3	8.0	8.6	9.3	10.0	10.7

## APPENDIX IV-3. QUADRATIC-MEAN DBHOB (INCHES) - ALL TREES &gt; 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS

		LOW SITE (PI = 0.8)											
TOTAL AGE (YR)	STUMP AGE (YR)	QUADRATIC-MEAN DBHOB (INCHES) - ALL TREES > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS											
		3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5
20	12	0.0	0.0	0.0	0.7	1.0	1.3	1.5	1.8	-	-	-	-
25	17	0.0	0.8	1.1	1.4	1.7	2.0	2.3	2.6	-	-	-	-
30	22	1.0	1.3	1.7	2.0	2.3	2.6	2.9	3.2	-	-	-	-
35	27	1.3	1.7	2.1	2.4	2.8	3.1	3.4	3.7	-	-	-	-
40	32	1.7	2.0	2.4	2.8	3.2	3.5	3.9	4.2	-	-	-	-
45	37	1.9	2.3	2.7	3.1	3.5	3.9	4.3	4.7	-	-	-	-
50	42	2.2	2.6	3.0	3.5	3.9	4.3	4.7	5.1	-	-	-	-
55	47	2.4	2.9	3.3	3.7	4.2	4.6	5.0	5.4	-	-	-	-
60	52	2.6	3.1	3.5	4.0	4.5	4.9	5.4	5.8	-	-	-	-
65	57	2.8	3.3	3.8	4.3	4.7	5.2	5.7	6.2	-	-	-	-
70	62	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	-	-	-	-
75	67	3.2	3.7	4.2	4.7	5.3	5.8	6.3	6.8	-	-	-	-
80	72	3.3	3.9	4.4	5.0	5.5	6.0	6.6	7.2	-	-	-	-
85	77	3.5	4.1	4.6	5.2	5.7	6.3	6.9	7.5	-	-	-	-
90	82	3.6	4.2	4.8	5.4	6.0	6.6	7.2	7.8	-	-	-	-
95	87	3.8	4.4	5.0	5.6	6.2	6.8	7.4	8.1	-	-	-	-
100	92	3.9	4.5	5.2	5.8	6.4	7.1	7.7	8.4	-	-	-	-
		MEDIUM-LOW SITE (PI = 0.9)											
TOTAL AGE (YR)	STUMP AGE (YR)	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5
20	13	0.0	0.0	0.7	1.0	1.2	1.5	1.7	1.9	-	-	-	-
25	18	0.7	1.0	1.3	1.6	1.9	2.2	2.4	2.7	-	-	-	-
30	23	1.1	1.5	1.8	2.1	2.4	2.7	3.0	3.3	-	-	-	-
35	28	1.5	1.8	2.2	2.5	2.9	3.2	3.5	3.8	-	-	-	-
40	33	1.8	2.1	2.5	2.9	3.3	3.6	3.9	4.3	-	-	-	-
45	38	2.0	2.4	2.8	3.2	3.6	4.0	4.3	4.7	-	-	-	-
50	43	2.2	2.7	3.1	3.5	3.9	4.3	4.7	5.1	-	-	-	-
55	48	2.5	2.9	3.3	3.8	4.2	4.6	5.1	5.5	-	-	-	-
60	53	2.7	3.1	3.6	4.0	4.5	4.9	5.4	5.8	-	-	-	-
65	58	2.8	3.3	3.8	4.3	4.7	5.2	5.7	6.2	-	-	-	-
70	63	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	-	-	-	-
75	68	3.2	3.7	4.2	4.7	5.2	5.8	6.3	6.8	-	-	-	-
80	73	3.3	3.8	4.4	4.9	5.5	6.0	6.6	7.1	-	-	-	-
85	78	3.5	4.0	4.6	5.1	5.7	6.3	6.9	7.4	-	-	-	-
90	83	3.6	4.2	4.7	5.3	5.9	6.5	7.1	7.7	-	-	-	-
95	88	3.7	4.3	4.9	5.5	6.1	6.8	7.4	8.0	-	-	-	-
100	93	3.9	4.5	5.1	5.7	6.4	7.0	7.7	8.3	-	-	-	-

## AVERAGE SITE (PI = 1.0)

TOTAL AGE (YR)	STUMP AGE (YR)	QUADRATIC-MEAN DBHOB (INCHES) - ALL TREES > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS											
		3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5
20	14	-	0.6	0.9	1.2	1.4	1.7	1.9	2.1	2.3	-	-	-
25	19	-	1.2	1.5	1.8	2.0	2.3	2.6	2.8	3.0	-	-	-
30	24	-	1.6	1.9	2.2	2.5	2.8	3.1	3.4	3.7	-	-	-
35	29	-	1.9	2.3	2.6	3.0	3.3	3.6	3.9	4.2	-	-	-
40	34	-	2.2	2.6	3.0	3.3	3.7	4.0	4.3	4.7	-	-	-
45	39	-	2.5	2.9	3.3	3.7	4.0	4.4	4.7	5.1	-	-	-
50	44	-	2.7	3.1	3.6	4.0	4.4	4.7	5.1	5.5	-	-	-
55	49	-	2.9	3.4	3.8	4.2	4.7	5.1	5.5	5.9	-	-	-
60	54	-	3.1	3.6	4.1	4.5	5.0	5.4	5.8	6.3	-	-	-
65	59	-	3.3	3.8	4.3	4.8	5.2	5.7	6.2	6.6	-	-	-
70	64	-	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	-	-	-
75	69	-	3.7	4.2	4.7	5.2	5.8	6.3	6.8	7.3	-	-	-
80	74	-	3.8	4.4	4.9	5.5	6.0	6.6	7.1	7.7	-	-	-
85	79	-	4.0	4.5	5.1	5.7	6.3	6.8	7.4	8.0	-	-	-
90	84	-	4.1	4.7	5.3	5.9	6.5	7.1	7.7	8.3	-	-	-
95	89	-	4.3	4.9	5.5	6.1	6.7	7.4	8.0	8.7	-	-	-
100	94	-	4.4	5.0	5.7	6.3	7.0	7.6	8.3	9.0	-	-	-

## MEDIUM-HIGH SITE (PI = 1.1)

TOTAL AGE (YR)	STUMP AGE (YR)	QUADRATIC-MEAN DBHOB (INCHES) - ALL TREES > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS											
		3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5
20	15	-	-	1.1	1.3	1.6	1.8	2.0	2.2	2.4	2.6	-	-
25	20	-	-	1.6	1.9	2.2	2.4	2.7	2.9	3.1	3.3	-	-
30	25	-	-	2.0	2.3	2.6	2.9	3.2	3.5	3.7	3.9	-	-
35	30	-	-	2.4	2.7	3.0	3.3	3.6	3.9	4.2	4.5	-	-
40	35	-	-	2.7	3.0	3.4	3.7	4.1	4.4	4.7	5.0	-	-
45	40	-	-	2.9	3.3	3.7	4.1	4.4	4.8	5.1	5.5	-	-
50	45	-	-	3.2	3.6	4.0	4.4	4.8	5.2	5.5	5.9	-	-
55	50	-	-	3.4	3.8	4.3	4.7	5.1	5.5	5.9	6.3	-	-
60	55	-	-	3.6	4.1	4.5	5.0	5.4	5.9	6.3	6.7	-	-
65	60	-	-	3.8	4.3	4.8	5.2	5.7	6.2	6.6	7.1	-	-
70	65	-	-	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	-	-
75	70	-	-	4.2	4.7	5.2	5.8	6.3	6.8	7.3	7.9	-	-
80	75	-	-	4.3	4.9	5.4	6.0	6.6	7.1	7.7	8.2	-	-
85	80	-	-	4.5	5.1	5.7	6.2	6.8	7.4	8.0	8.6	-	-
90	85	-	-	4.7	5.3	5.9	6.5	7.1	7.7	8.3	9.0	-	-
95	90	-	-	4.8	5.4	6.1	6.7	7.3	8.0	8.6	9.3	-	-
100	95	-	-	5.0	5.6	6.3	6.9	7.6	8.3	9.0	9.7	-	-

		HIGH SITE (PI = 1.2)											
TOTAL AGE (YR)	STUMP AGE (YR)	QUADRATIC-MEAN DBHOB (INCHES) - ALL TREES > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS											
		3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5
20	16	-	-	1.2	1.5	1.7	1.9	2.1	2.3	2.5	2.6	2.7	2.9
25	21	-	-	1.7	2.0	2.3	2.5	2.7	3.0	3.1	3.3	3.5	3.7
30	26	-	-	2.1	2.4	2.7	3.0	3.2	3.5	3.7	3.9	4.1	4.3
35	31	-	-	2.5	2.8	3.1	3.4	3.7	4.0	4.2	4.5	4.7	5.0
40	36	-	-	2.7	3.1	3.4	3.8	4.1	4.4	4.7	5.0	5.3	5.5
45	41	-	-	3.0	3.4	3.7	4.1	4.4	4.8	5.1	5.4	5.8	6.1
50	46	-	-	3.2	3.6	4.0	4.4	4.8	5.2	5.5	5.9	6.2	6.6
55	51	-	-	3.4	3.9	4.3	4.7	5.1	5.5	5.9	6.3	6.7	7.1
60	56	-	-	3.6	4.1	4.5	5.0	5.4	5.9	6.3	6.7	7.1	7.6
65	61	-	-	3.8	4.3	4.8	5.2	5.7	6.2	6.6	7.1	7.6	8.0
70	66	-	-	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5
75	71	-	-	4.2	4.7	5.2	5.7	6.3	6.8	7.3	7.9	8.4	9.0
80	76	-	-	4.3	4.9	5.4	6.0	6.5	7.1	7.7	8.2	8.8	9.4
85	81	-	-	4.5	5.1	5.6	6.2	6.8	7.4	8.0	8.6	9.2	9.8
90	86	-	-	4.6	5.2	5.8	6.4	7.1	7.7	8.3	9.0	9.6	10.3
95	91	-	-	4.8	5.4	6.0	6.7	7.3	8.0	8.7	9.3	10.0	10.7
100	96	-	-	4.9	5.6	6.2	6.9	7.6	8.3	9.0	9.7	10.4	11.1

## APPENDIX IV-4. AVERAGE HEIGHT (FEET) - ALL TREES &gt; 0.6 INCH DBHOB

## LOW SITE (PI = 0.8)

TOTAL AGE (YR)	STUMP AGE (YR)	QUADRATIC-MEAN DBHOB (INCHES) - ALL TREES > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS											
		3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5
20	12	0	0	5	7	9	11	13	14	-	-	-	-
25	17	0	0	5	8	10	12	14	16	-	-	-	-
30	22	0	6	9	12	14	16	18	20	-	-	-	-
35	27	7	10	13	16	18	21	23	24	-	-	-	-
40	32	10	14	17	20	23	25	27	29	-	-	-	-
45	37	14	18	21	24	26	29	31	32	-	-	-	-
50	42	17	21	24	27	30	32	34	36	-	-	-	-
55	47	20	24	27	30	33	35	37	39	-	-	-	-
60	52	22	26	29	32	35	38	40	42	-	-	-	-
65	57	24	28	32	35	38	40	43	45	-	-	-	-
70	62	26	30	34	37	40	42	45	47	-	-	-	-
75	67	28	32	35	39	42	44	47	49	-	-	-	-
80	72	29	33	37	40	43	46	49	51	-	-	-	-
85	77	31	35	38	42	45	48	50	53	-	-	-	-
90	82	32	36	40	43	46	49	52	55	-	-	-	-
95	87	33	37	41	44	48	51	53	56	-	-	-	-
100	92	34	38	42	45	49	52	55	57	-	-	-	-

## MEDIUM-LOW SITE (PI = 0.9)

TOTAL AGE (YR)	STUMP AGE (YR)	QUADRATIC-MEAN DBHOB (INCHES) - ALL TREES > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS											
		3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5
20	13	0	0	5	8	10	12	14	16	-	-	-	-
25	18	0	0	7	10	13	15	16	18	-	-	-	-
30	23	5	8	11	14	17	19	21	22	-	-	-	-
35	28	9	12	16	19	21	23	25	27	-	-	-	-
40	33	13	16	20	23	25	27	29	31	-	-	-	-
45	38	16	20	23	26	29	31	33	35	-	-	-	-
50	43	19	23	27	30	32	35	37	39	-	-	-	-
55	48	22	26	29	33	35	38	40	42	-	-	-	-
60	53	25	28	32	35	38	41	43	45	-	-	-	-
65	58	27	31	34	38	40	43	46	48	-	-	-	-
70	63	29	33	36	40	43	45	48	50	-	-	-	-
75	68	30	34	38	42	45	47	50	52	-	-	-	-
80	73	32	36	40	43	46	49	52	54	-	-	-	-
85	78	33	37	41	45	48	51	54	56	-	-	-	-
90	83	34	39	43	46	49	52	55	58	-	-	-	-
95	88	35	40	44	47	51	54	57	59	-	-	-	-
100	93	36	41	45	48	52	55	58	61	-	-	-	-

**AVERAGE SITE (PI = 1.0)**

TOTAL AGE (YR)	STUMP AGE (YR)	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5
20	14	-	0	7	10	12	14	16	17	18	-	-	-
25	19	-	7	10	13	15	17	19	20	22	-	-	-
30	24	-	11	14	17	19	21	23	25	26	-	-	-
35	29	-	15	18	21	24	26	28	30	31	-	-	-
40	34	-	19	22	25	28	30	32	34	36	-	-	-
45	39	-	22	26	29	32	34	36	38	40	-	-	-
50	44	-	26	29	32	35	38	40	42	44	-	-	-
55	49	-	29	32	35	38	41	43	45	47	-	-	-
60	54	-	31	35	38	41	43	46	48	50	-	-	-
65	59	-	33	37	40	43	46	48	51	53	-	-	-
70	64	-	35	39	42	45	48	51	53	55	-	-	-
75	69	-	37	41	44	47	50	53	55	58	-	-	-
80	74	-	39	43	46	49	52	55	58	60	-	-	-
85	79	-	40	44	48	51	54	57	59	62	-	-	-
90	84	-	41	45	49	52	56	58	61	64	-	-	-
95	89	-	43	47	50	54	57	60	63	65	-	-	-
100	94	-	44	48	52	55	58	61	64	67	-	-	-

**MEDIUM-HIGH SITE (PI = 1.1)**

TOTAL AGE (YR)	STUMP AGE (YR)	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5
20	15	-	-	9	12	14	16	18	19	20	21	-	-
25	20	-	-	12	15	18	20	21	23	24	25	-	-
30	25	-	-	17	20	22	24	26	28	29	30	-	-
35	30	-	-	21	24	27	29	31	33	34	35	-	-
40	35	-	-	25	28	31	33	35	37	39	40	-	-
45	40	-	-	29	32	34	37	39	41	43	44	-	-
50	45	-	-	32	35	38	40	43	45	46	48	-	-
55	50	-	-	35	38	41	43	46	48	50	52	-	-
60	55	-	-	37	41	44	46	49	51	53	55	-	-
65	60	-	-	40	43	46	49	51	54	56	58	-	-
70	65	-	-	42	45	48	51	54	56	58	60	-	-
75	70	-	-	44	47	50	53	56	59	61	63	-	-
80	75	-	-	45	49	52	55	58	61	63	65	-	-
85	80	-	-	47	51	54	57	60	63	65	67	-	-
90	85	-	-	48	52	56	59	62	64	67	69	-	-
95	90	-	-	50	53	57	60	63	66	69	71	-	-
100	95	-	-	51	55	58	62	65	68	70	73	-	-

		HIGH SITE (PI = 1.2)											
TOTAL AGE (YR)	STUMP AGE (YR)	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5
20	16	-	-	11	14	16	18	20	21	23	24	24	25
25	21	-	-	15	18	20	22	24	26	27	28	29	30
30	26	-	-	19	22	25	27	29	31	32	33	34	35
35	31	-	-	24	27	29	32	34	35	37	38	39	40
40	36	-	-	28	31	34	36	38	40	41	43	44	45
45	41	-	-	31	35	37	40	42	44	46	47	48	49
50	46	-	-	35	38	41	43	46	48	49	51	52	54
55	51	-	-	38	41	44	46	49	51	53	54	56	57
60	56	-	-	40	44	47	49	52	54	56	58	59	61
65	61	-	-	43	46	49	52	54	57	59	61	62	64
70	66	-	-	45	48	51	54	57	59	61	64	65	67
75	71	-	-	47	50	53	56	59	62	64	66	68	70
80	76	-	-	48	52	55	58	61	64	66	68	71	72
85	81	-	-	50	54	57	60	63	66	68	71	73	75
90	86	-	-	51	55	59	62	65	68	70	73	75	77
95	91	-	-	53	57	60	63	67	69	72	75	77	79
100	96	-	-	54	58	62	65	68	71	74	77	79	81

## APPENDIX IV-5. DOMINANT-CODOMINANT HEIGHT (FEET)

## LOW SITE (PI = 0.8)

TOTAL AGE (YR)	STUMP AGE (YR)	QUADRATIC-MEAN DBHOB (INCHES) - ALL TREES > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS											
		3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5
20	12	0	0	0	0	0	0	18	20	-	-	-	-
25	17	0	7	10	12	15	17	18	20	-	-	-	-
30	22	7	11	14	16	19	21	23	24	-	-	-	-
35	27	12	15	18	21	24	26	28	29	-	-	-	-
40	32	16	20	23	26	28	31	33	34	-	-	-	-
45	37	20	24	27	30	33	35	37	39	-	-	-	-
50	42	24	28	31	34	37	39	41	43	-	-	-	-
55	47	27	31	34	37	40	43	45	47	-	-	-	-
60	52	30	34	37	41	43	46	48	50	-	-	-	-
65	57	33	37	40	43	46	49	51	53	-	-	-	-
70	62	35	39	42	46	49	51	54	56	-	-	-	-
75	67	37	41	44	48	51	53	56	58	-	-	-	-
80	72	39	43	46	50	53	55	58	60	-	-	-	-
85	77	40	44	48	51	54	57	60	62	-	-	-	-
90	82	41	45	49	53	56	59	62	64	-	-	-	-
95	87	42	47	50	54	57	60	63	66	-	-	-	-
100	92	43	48	52	55	58	62	64	67	-	-	-	-

## MEDIUM-LOW SITE (PI = 0.9)

TOTAL AGE (YR)	STUMP AGE (YR)	QUADRATIC-MEAN DBHOB (INCHES) - ALL TREES > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS											
		3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5
20	13	5	9	12	14	16	18	20	22	-	-	-	-
25	18	6	10	13	15	18	20	22	23	-	-	-	-
30	23	10	14	17	20	22	24	26	28	-	-	-	-
35	28	15	19	22	25	27	30	31	33	-	-	-	-
40	33	20	23	27	30	32	34	36	38	-	-	-	-
45	38	24	28	31	34	36	39	41	43	-	-	-	-
50	43	27	31	35	38	40	43	45	47	-	-	-	-
55	48	31	35	38	41	44	46	49	51	-	-	-	-
60	53	34	37	41	44	47	50	52	54	-	-	-	-
65	58	36	40	44	47	50	52	55	57	-	-	-	-
70	63	38	42	46	49	52	55	58	60	-	-	-	-
75	68	40	44	48	51	54	57	60	62	-	-	-	-
80	73	42	46	50	53	56	59	62	64	-	-	-	-
85	78	43	48	51	55	58	61	64	66	-	-	-	-
90	83	45	49	53	56	60	63	66	68	-	-	-	-
95	88	46	50	54	58	61	64	67	70	-	-	-	-
100	93	47	51	55	59	62	66	69	71	-	-	-	-

## AVERAGE SITE (PI = 1.0)

TOTAL AGE (YR)	STUMP AGE (YR)	QUADRATIC-MEAN DBHOB (INCHES) - ALL TREES > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS											
		3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5
20	14	-	11	14	17	19	21	23	24	25	-	-	-
25	19	-	13	16	19	21	23	25	27	28	-	-	-
30	24	-	18	21	24	26	28	30	32	33	-	-	-
35	29	-	22	26	29	31	33	35	37	39	-	-	-
40	34	-	27	30	33	36	38	40	42	44	-	-	-
45	39	-	31	35	38	40	43	45	47	48	-	-	-
50	44	-	35	38	41	44	47	49	51	53	-	-	-
55	49	-	38	42	45	48	50	53	55	57	-	-	-
60	54	-	41	45	48	51	53	56	58	60	-	-	-
65	59	-	44	47	51	54	56	59	61	63	-	-	-
70	64	-	46	50	53	56	59	61	64	66	-	-	-
75	69	-	48	52	55	58	61	64	66	68	-	-	-
80	74	-	50	54	57	60	63	66	68	71	-	-	-
85	79	-	51	55	59	62	65	68	71	73	-	-	-
90	84	-	53	57	60	64	67	70	72	75	-	-	-
95	89	-	54	58	62	65	68	71	74	77	-	-	-
100	94	-	55	59	63	66	70	73	76	78	-	-	-

## MEDIUM-HIGH SITE (PI = 1.1)

TOTAL AGE (YR)	STUMP AGE (YR)	QUADRATIC-MEAN DBHOB (INCHES) - ALL TREES > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS											
		3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5
20	15	-	-	17	19	22	24	26	27	28	29	-	-
25	20	-	-	20	23	25	27	29	31	32	33	-	-
30	25	-	-	25	28	30	32	34	36	37	38	-	-
35	30	-	-	30	33	35	37	39	41	43	44	-	-
40	35	-	-	34	37	40	42	44	46	48	49	-	-
45	40	-	-	38	41	44	47	49	51	52	54	-	-
50	45	-	-	42	45	48	51	53	55	57	58	-	-
55	50	-	-	45	49	52	54	57	59	61	62	-	-
60	55	-	-	48	52	55	57	60	62	64	66	-	-
65	60	-	-	51	54	57	60	63	65	67	69	-	-
70	65	-	-	53	57	60	63	65	68	70	72	-	-
75	70	-	-	55	59	62	65	68	70	73	75	-	-
80	75	-	-	57	61	64	67	70	73	75	77	-	-
85	80	-	-	59	63	66	69	72	75	77	79	-	-
90	85	-	-	60	64	68	71	74	77	79	81	-	-
95	90	-	-	62	66	69	72	75	78	81	83	-	-
100	95	-	-	63	67	70	74	77	80	83	85	-	-

		HIGH SITE (PI = 1.2)											
TOTAL AGE (YR)	STUMP AGE (YR)	QUADRATIC-MEAN DBHOB (INCHES) - ALL TREES > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS											
		3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5
20	16	-	-	20	23	25	27	29	30	31	32	33	34
25	21	-	-	24	27	29	31	33	34	36	37	38	38
30	26	-	-	29	32	34	36	38	40	41	42	43	44
35	31	-	-	34	37	39	41	43	45	47	48	49	50
40	36	-	-	38	41	44	46	48	50	52	53	54	55
45	41	-	-	42	45	48	51	53	55	57	58	59	60
50	46	-	-	46	49	52	55	57	59	61	62	64	65
55	51	-	-	49	53	56	58	61	63	65	66	68	69
60	56	-	-	52	56	59	61	64	66	68	70	72	73
65	61	-	-	55	58	61	64	67	69	71	73	75	76
70	66	-	-	57	61	64	67	69	72	74	76	78	80
75	71	-	-	59	63	66	69	72	74	77	79	81	83
80	76	-	-	61	65	68	71	74	77	79	81	83	85
85	81	-	-	63	67	70	73	76	79	81	84	86	88
90	86	-	-	64	68	72	75	78	81	83	86	88	90
95	91	-	-	66	70	73	76	80	82	85	88	90	92
100	96	-	-	67	71	74	78	81	84	87	90	92	95

## APPENDIX IV-6. BASAL AREA (SQUARE FEET) PER ACRE - ALL TREES &gt; 0.6 INCH DBHOB

## LOW SITE (PI = 0.8)

TOTAL AGE (YR)	STUMP AGE (YR)	QUADRATIC-MEAN DBHOB (INCHES) - ALL TREES > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS											
		3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5
20	12	0	0	0	0	0	0	0	0	-	-	-	-
25	17	56	49	45	44	43	43	43	43	-	-	-	-
30	22	84	77	73	71	70	70	70	70	-	-	-	-
35	27	99	92	88	86	84	84	84	83	-	-	-	-
40	32	108	100	96	94	93	92	92	91	-	-	-	-
45	37	113	106	102	99	98	97	96	96	-	-	-	-
50	42	118	110	106	103	101	100	100	99	-	-	-	-
55	47	121	113	108	106	104	103	102	101	-	-	-	-
60	52	123	115	111	108	106	105	103	102	-	-	-	-
65	57	126	118	113	110	108	106	105	103	-	-	-	-
70	62	128	120	115	112	109	108	106	104	-	-	-	-
75	67	130	122	116	113	111	109	107	105	-	-	-	-
80	72	132	124	118	115	112	110	108	106	-	-	-	-
85	77	134	126	120	116	114	112	109	107	-	-	-	-
90	82	136	128	122	118	115	113	111	108	-	-	-	-
95	87	138	130	124	120	117	114	112	109	-	-	-	-
100	92	141	132	126	122	119	116	113	110	-	-	-	-

## MEDIUM-LOW SITE (PI = 0.9)

TOTAL AGE (YR)	STUMP AGE (YR)	QUADRATIC-MEAN DBHOB (INCHES) - ALL TREES > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS											
		3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5
20	13	10	5	3	3	4	5	6	7	-	-	-	-
25	18	63	57	55	55	56	57	58	59	-	-	-	-
30	23	88	83	81	80	81	81	82	83	-	-	-	-
35	28	103	97	95	94	95	95	96	97	-	-	-	-
40	33	112	106	104	103	103	104	104	105	-	-	-	-
45	38	118	113	110	109	109	109	110	110	-	-	-	-
50	43	124	118	115	114	114	114	114	114	-	-	-	-
55	48	128	122	119	118	117	117	117	117	-	-	-	-
60	53	131	125	122	121	120	120	120	120	-	-	-	-
65	58	135	129	125	124	123	123	122	122	-	-	-	-
70	63	138	132	128	127	126	125	125	124	-	-	-	-
75	68	141	135	131	130	128	128	127	126	-	-	-	-
80	73	145	138	134	132	131	130	129	128	-	-	-	-
85	78	148	141	137	135	134	133	131	130	-	-	-	-
90	83	151	145	141	138	136	135	134	132	-	-	-	-
95	88	155	148	144	141	139	138	136	135	-	-	-	-
100	93	158	151	147	144	142	140	139	137	-	-	-	-

## AVERAGE SITE (PI = 1.0)

TOTAL AGE (YR)	STUMP AGE (YR)	QUADRATIC-MEAN DBHOB (INCHES) - ALL TREES > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS											
		3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5
20	14	-	23	23	24	26	29	31	34	36	-	-	-
25	19	-	69	68	69	71	74	76	78	80	-	-	-
30	24	-	92	91	92	94	96	98	100	102	-	-	-
35	29	-	106	105	106	108	109	111	113	115	-	-	-
40	34	-	115	114	115	116	118	120	121	123	-	-	-
45	39	-	122	121	122	123	124	126	127	128	-	-	-
50	44	-	128	126	127	128	129	130	132	133	-	-	-
55	49	-	132	131	131	132	133	134	135	136	-	-	-
60	54	-	137	135	135	136	137	138	139	139	-	-	-
65	59	-	141	139	139	139	140	141	142	142	-	-	-
70	64	-	145	143	143	143	144	144	144	145	-	-	-
75	69	-	149	147	146	146	147	147	147	147	-	-	-
80	74	-	153	151	150	150	150	150	150	150	-	-	-
85	79	-	157	154	154	153	153	153	153	153	-	-	-
90	84	-	161	158	157	157	157	157	156	155	-	-	-
95	89	-	165	162	161	161	160	160	159	158	-	-	-
100	94	-	169	166	165	164	164	163	162	161	-	-	-

## MEDIUM-HIGH SITE (PI = 1.1)

TOTAL AGE (YR)	STUMP AGE (YR)	QUADRATIC-MEAN DBHOB (INCHES) - ALL TREES > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS											
		3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5
20	15	-	-	44	47	51	55	58	62	66	69	-	-
25	20	-	-	84	87	90	94	97	101	104	107	-	-
30	25	-	-	105	108	111	114	118	121	124	127	-	-
35	30	-	-	118	121	124	127	130	133	136	138	-	-
40	35	-	-	128	130	132	136	139	141	144	146	-	-
45	40	-	-	135	136	139	142	145	147	150	151	-	-
50	45	-	-	140	142	145	147	150	152	154	156	-	-
55	50	-	-	145	147	149	152	154	156	158	159	-	-
60	55	-	-	150	152	154	156	158	160	162	163	-	-
65	60	-	-	155	156	158	160	162	163	165	166	-	-
70	65	-	-	159	160	162	164	165	167	168	169	-	-
75	70	-	-	163	164	166	168	169	170	171	172	-	-
80	75	-	-	168	169	170	171	173	174	174	175	-	-
85	80	-	-	172	173	174	175	176	177	178	178	-	-
90	85	-	-	177	177	178	179	180	181	181	181	-	-
95	90	-	-	181	182	182	183	184	184	184	184	-	-
100	95	-	-	186	186	187	187	188	188	188	187	-	-

		HIGH SITE (PI = 1.2)											
TOTAL AGE (YR)	STUMP AGE (YR)	QUADRATIC-MEAN DBHOB (INCHES) - ALL TREES > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS											
		3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5
20	16	-	-	68	72	77	82	88	93	98	102	106	109
25	21	-	-	102	107	112	117	122	127	131	135	139	142
30	26	-	-	122	126	131	136	141	145	149	153	157	160
35	31	-	-	135	138	143	148	152	157	161	164	168	170
40	36	-	-	144	147	152	156	160	165	168	172	175	177
45	41	-	-	151	154	158	163	167	171	174	177	180	182
50	46	-	-	157	160	164	168	172	176	179	182	184	186
55	51	-	-	162	165	169	173	177	180	183	186	188	189
60	56	-	-	167	170	174	177	181	184	187	189	191	192
65	61	-	-	172	175	178	182	185	188	191	193	194	195
70	66	-	-	177	180	183	186	189	192	194	196	197	198
75	71	-	-	182	184	187	190	193	196	198	199	200	201
80	76	-	-	187	189	192	195	197	199	201	203	203	204
85	81	-	-	192	194	196	199	201	203	205	206	206	206
90	86	-	-	197	199	201	203	205	207	209	209	210	209
95	91	-	-	202	203	206	208	210	211	212	213	213	212
100	96	-	-	207	208	210	212	214	215	216	216	216	215

## APPENDIX IV-7. TOTAL CUBIC FOOT VOLUME PER ACRE - ALL TREES &gt; 0.6 INCH DBHOB

## LOW SITE (PI = 0.8)

TOTAL AGE (YR)	STUMP AGE (YR)	QUADRATIC-MEAN DBHOB (INCHES) - ALL TREES > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS											
		3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5
20	12	0	0	0	68	153	214	251	-	-	-	-	-
25	17	0	0	86	230	344	432	494	534	-	-	-	-
30	22	0	166	347	493	610	699	764	807	-	-	-	-
35	27	194	415	598	746	865	956	1023	1069	-	-	-	-
40	32	431	653	838	988	1109	1203	1272	1320	-	-	-	-
45	37	657	881	1067	1219	1342	1438	1510	1560	-	-	-	-
50	42	872	1098	1286	1440	1565	1663	1738	1790	-	-	-	-
55	47	1077	1304	1494	1650	1777	1878	1955	2010	-	-	-	-
60	52	1271	1500	1692	1850	1979	2082	2161	2218	-	-	-	-
65	57	1454	1685	1879	2039	2170	2275	2357	2416	-	-	-	-
70	62	1627	1860	2055	2217	2351	2458	2542	2604	-	-	-	-
75	67	1789	2024	2221	2385	2520	2630	2716	2781	-	-	-	-
80	72	1941	2177	2376	2542	2680	2791	2880	2947	-	-	-	-
85	77	2082	2319	2520	2689	2828	2942	3033	3103	-	-	-	-
90	82	2212	2451	2654	2824	2966	3082	3175	3248	-	-	-	-
95	87	2332	2573	2777	2950	3094	3212	3307	3382	-	-	-	-
100	92	2441	2684	2890	3064	3210	3331	3429	3506	-	-	-	-

## MEDIUM-LOW SITE (PI = 0.9)

TOTAL AGE (YR)	STUMP AGE (YR)	QUADRATIC-MEAN DBHOB (INCHES) - ALL TREES > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS											
		3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5
20	13	0	0	0	35	180	298	392	464	-	-	-	-
25	18	0	0	172	349	496	616	713	787	-	-	-	-
30	23	12	262	473	652	801	924	1023	1100	-	-	-	-
35	28	298	550	764	945	1096	1221	1322	1402	-	-	-	-
40	33	574	828	1044	1226	1380	1507	1611	1693	-	-	-	-
45	38	840	1095	1313	1498	1653	1783	1889	1974	-	-	-	-
50	43	1095	1352	1571	1758	1916	2048	2157	2244	-	-	-	-
55	48	1339	1598	1819	2008	2168	2303	2414	2503	-	-	-	-
60	53	1573	1833	2057	2248	2410	2546	2660	2752	-	-	-	-
65	58	1796	2058	2283	2476	2641	2780	2896	2991	-	-	-	-
70	63	2008	2272	2500	2695	2861	3002	3121	3218	-	-	-	-
75	68	2210	2476	2705	2902	3071	3214	3335	3435	-	-	-	-
80	73	2402	2669	2900	3099	3270	3416	3539	3642	-	-	-	-
85	78	2582	2851	3084	3285	3458	3607	3732	3837	-	-	-	-
90	83	2752	3023	3258	3461	3636	3787	3915	4023	-	-	-	-
95	88	2912	3184	3421	3626	3804	3956	4087	4197	-	-	-	-
100	93	3060	3335	3573	3781	3960	4115	4248	4361	-	-	-	-

## AVERAGE SITE (PI = 1.0)

TOTAL AGE (YR)	STUMP AGE (YR)	QUADRATIC-MEAN DBHOB (INCHES) - ALL TREES > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS											
		3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5
20	14	-	0	0	192	374	530	662	774	867	-	-	-
25	19	-	95	339	551	734	893	1028	1143	1238	-	-	-
30	24	-	439	685	899	1085	1246	1384	1501	1599	-	-	-
35	29	-	772	1020	1236	1424	1588	1728	1848	1949	-	-	-
40	34	-	1095	1345	1563	1753	1919	2062	2185	2289	-	-	-
45	39	-	1407	1659	1879	2072	2240	2386	2511	2618	-	-	-
50	44	-	1708	1962	2185	2380	2550	2698	2826	2936	-	-	-
55	49	-	1999	2255	2479	2677	2850	3000	3131	3243	-	-	-
60	54	-	2279	2537	2764	2963	3139	3292	3425	3540	-	-	-
65	59	-	2549	2808	3037	3239	3417	3573	3709	3827	-	-	-
70	64	-	2808	3069	3300	3505	3685	3843	3982	4103	-	-	-
75	69	-	3056	3320	3553	3759	3942	4103	4244	4368	-	-	-
80	74	-	3294	3559	3795	4003	4188	4352	4496	4622	-	-	-
85	79	-	3521	3788	4026	4237	4424	4590	4737	4866	-	-	-
90	84	-	3737	4007	4246	4460	4650	4818	4968	5100	-	-	-
95	89	-	3943	4215	4456	4672	4864	5035	5188	5322	-	-	-
100	94	-	4139	4412	4656	4874	5068	5242	5397	5534	-	-	-

## MEDIUM-HIGH SITE (PI = 1.1)

TOTAL AGE (YR)	STUMP AGE (YR)	QUADRATIC-MEAN DBHOB (INCHES) - ALL TREES > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS											
		3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5
20	15	-	-	185	435	658	858	1037	1197	1339	1464	-	-
25	20	-	-	591	843	1069	1272	1453	1616	1761	1889	-	-
30	25	-	-	987	1241	1470	1675	1859	2024	2172	2304	-	-
35	30	-	-	1372	1629	1859	2067	2254	2422	2573	2708	-	-
40	35	-	-	1747	2005	2239	2449	2638	2809	2963	3101	-	-
45	40	-	-	2111	2372	2607	2820	3012	3186	3342	3483	-	-
50	45	-	-	2464	2727	2965	3180	3375	3552	3711	3855	-	-
55	50	-	-	2806	3072	3312	3530	3728	3907	4070	4217	-	-
60	55	-	-	3139	3406	3649	3869	4069	4252	4417	4567	-	-
65	60	-	-	3460	3730	3975	4198	4401	4586	4754	4908	-	-
70	65	-	-	3771	4043	4290	4516	4721	4909	5081	5237	-	-
75	70	-	-	4071	4345	4595	4823	5031	5222	5396	5556	-	-
80	75	-	-	4361	4637	4889	5120	5331	5524	5702	5864	-	-
85	80	-	-	4640	4918	5173	5406	5619	5816	5996	6162	-	-
90	85	-	-	4908	5189	5446	5681	5898	6097	6280	6449	-	-
95	90	-	-	5166	5449	5708	5946	6165	6367	6553	6725	-	-
100	95	-	-	5413	5698	5960	6200	6422	6627	6816	6991	-	-

## HIGH SITE (PI = 1.2)

TOTAL AGE (YR)	STUMP AGE (YR)	QUADRATIC-MEAN DBHOB (INCHES) - ALL TREES > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS											
		3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5
20	16	-	-	477	773	1046	1298	1532	1748	1950	2137	2311	2473
25	21	-	-	938	1237	1512	1767	2003	2223	2427	2618	2796	2961
30	26	-	-	1389	1690	1968	2225	2464	2687	2895	3088	3270	3439
35	31	-	-	1829	2132	2412	2673	2915	3140	3351	3548	3733	3906
40	36	-	-	2258	2564	2847	3110	3354	3583	3797	3997	4186	4362
45	41	-	-	2677	2985	3270	3536	3784	4015	4232	4436	4628	4808
50	46	-	-	3085	3396	3683	3952	4202	4437	4657	4864	5059	5243
55	51	-	-	3483	3795	4086	4357	4610	4848	5071	5281	5480	5667
60	56	-	-	3870	4185	4478	4751	5007	5248	5475	5688	5890	6081
65	61	-	-	4246	4563	4859	5135	5394	5638	5867	6084	6290	6484
70	66	-	-	4612	4932	5229	5508	5770	6017	6250	6470	6679	6876
75	71	-	-	4967	5289	5589	5871	6136	6385	6621	6845	7057	7258
80	76	-	-	5312	5636	5939	6223	6490	6743	6982	7209	7425	7630
85	81	-	-	5646	5972	6277	6564	6835	7090	7333	7563	7782	7990
90	86	-	-	5969	6298	6606	6895	7168	7427	7672	7906	8128	8340
95	91	-	-	6282	6613	6923	7215	7491	7753	8002	8238	8464	8680
100	96	-	-	6584	6917	7230	7525	7804	8068	8320	8560	8789	9009

**APPENDIX IV. Yield Tables Based upon Site, Age, and Quadratic-mean Diameter at Age 70 Years**

**APPENDIX IV-8. TOTAL CUBIC FOOT VOLUME PER ACRE - ALL TREES > 4.6 INCHES DBHOB**

**LOW SITE (PI = 0.8)**

<b>TOTAL AGE (YR)</b>	<b>STUMP AGE (YR)</b>	<b>QUADRATIC-MEAN DBHOB (INCHES) - ALL TREES &gt; 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS</b>											
		3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5
20	12	0	0	0	0	0	0	0	0	-	-	-	-
25	17	0	0	0	0	0	0	38	181	-	-	-	-
30	22	0	0	0	0	0	136	329	475	-	-	-	-
35	27	0	0	0	0	169	416	611	760	-	-	-	-
40	32	0	0	0	132	438	687	885	1037	-	-	-	-
45	37	0	0	20	391	699	950	1151	1306	-	-	-	-
50	42	0	0	267	641	951	1205	1409	1566	-	-	-	-
55	47	0	60	506	882	1195	1452	1658	1818	-	-	-	-
60	52	0	289	737	1115	1430	1690	1898	2061	-	-	-	-
65	57	0	509	960	1340	1657	1919	2131	2296	-	-	-	-
70	62	188	721	1174	1556	1876	2140	2354	2523	-	-	-	-
75	67	389	925	1380	1764	2086	2353	2570	2741	-	-	-	-
80	72	583	1120	1577	1964	2288	2558	2777	2951	-	-	-	-
85	77	768	1307	1766	2155	2482	2754	2976	3152	-	-	-	-
90	82	944	1485	1946	2337	2667	2941	3166	3345	-	-	-	-
95	87	1112	1655	2118	2512	2844	3121	3348	3530	-	-	-	-
100	92	1272	1817	2282	2678	3012	3291	3521	3706	-	-	-	-

**MEDIUM-LOW SITE (PI = 0.9)**

<b>TOTAL AGE (YR)</b>	<b>STUMP AGE (YR)</b>	<b>QUADRATIC-MEAN DBHOB (INCHES) - ALL TREES &gt; 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS</b>											
		3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5
20	13	0	0	0	0	0	0	0	0	-	-	-	-
25	18	0	0	0	0	0	0	128	310	-	-	-	-
30	23	0	0	0	0	0	228	460	645	-	-	-	-
35	28	0	0	0	0	263	549	784	971	-	-	-	-
40	33	0	0	0	226	572	861	1099	1289	-	-	-	-
45	38	0	0	113	525	874	1165	1406	1599	-	-	-	-
50	43	0	0	402	816	1167	1461	1704	1900	-	-	-	-
55	48	0	194	682	1098	1451	1748	1994	2193	-	-	-	-
60	53	0	463	953	1372	1728	2027	2276	2478	-	-	-	-
65	58	150	724	1216	1637	1995	2298	2549	2754	-	-	-	-
70	63	401	976	1471	1894	2255	2560	2814	3021	-	-	-	-
75	68	643	1221	1717	2143	2506	2813	3070	3281	-	-	-	-
80	73	877	1456	1955	2383	2749	3059	3318	3532	-	-	-	-
85	78	1102	1684	2184	2615	2983	3295	3558	3774	-	-	-	-
90	83	1319	1903	2406	2838	3209	3524	3789	4008	-	-	-	-
95	88	1528	2113	2618	3053	3426	3744	4012	4234	-	-	-	-
100	93	1728	2315	2823	3260	3635	3956	4226	4451	-	-	-	-

## AVERAGE SITE (PI = 1.0)

TOTAL AGE (YR)	STUMP AGE (YR)	QUADRATIC-MEAN DBHOB (INCHES) - ALL TREES > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS											
		3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5
20	14	-	0	0	0	0	0	0	188	367	-	-	-
25	19	-	0	0	0	0	80	352	578	760	-	-	-
30	24	-	0	0	0	128	455	730	959	1144	-	-	-
35	29	-	0	0	106	492	822	1100	1331	1520	-	-	-
40	34	-	0	7	459	848	1180	1461	1696	1887	-	-	-
45	39	-	0	349	804	1195	1530	1814	2052	2247	-	-	-
50	44	-	156	683	1140	1534	1872	2159	2399	2597	-	-	-
55	49	-	479	1009	1468	1865	2205	2495	2738	2940	-	-	-
60	54	-	794	1326	1788	2187	2530	2823	3069	3274	-	-	-
65	59	-	1101	1635	2099	2501	2847	3142	3392	3599	-	-	-
70	64	-	1399	1935	2402	2806	3155	3453	3706	3916	-	-	-
75	69	-	1689	2227	2696	3103	3454	3756	4011	4225	-	-	-
80	74	-	1970	2511	2982	3392	3746	4050	4308	4525	-	-	-
85	79	-	2243	2786	3260	3672	4029	4336	4597	4817	-	-	-
90	84	-	2508	3053	3529	3944	4303	4613	4878	5101	-	-	-
95	89	-	2764	3312	3790	4207	4569	4882	5150	5376	-	-	-
100	94	-	3012	3562	4042	4462	4827	5143	5413	5643	-	-	-

## MEDIUM-HIGH SITE (PI = 1.1)

TOTAL AGE (YR)	STUMP AGE (YR)	QUADRATIC-MEAN DBHOB (INCHES) - ALL TREES > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS											
		3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5
20	15	-	-	0	0	0	280	553	783	973	-	-	-
25	20	-	-	0	0	24	396	718	994	1227	1421	-	-
30	25	-	-	0	16	447	823	1148	1426	1663	1861	-	-
35	30	-	-	0	429	863	1241	1569	1851	2091	2292	-	-
40	35	-	-	335	833	1269	1650	1981	2267	2510	2714	-	-
45	40	-	-	728	1229	1668	2052	2386	2674	2921	3129	-	-
50	45	-	-	1113	1616	2058	2445	2782	3073	3323	3535	-	-
55	50	-	-	1490	1995	2439	2829	3169	3464	3717	3932	-	-
60	55	-	-	1858	2366	2813	3205	3548	3846	4103	4321	-	-
65	60	-	-	2217	2728	3177	3573	3919	4220	4480	4702	-	-
70	65	-	-	2569	3082	3534	3932	4281	4586	4849	5074	-	-
75	70	-	-	2912	3427	3882	4283	4635	4943	5209	5438	-	-
80	75	-	-	3246	3764	4222	4626	4981	5291	5561	5794	-	-
85	80	-	-	3572	4093	4553	4960	5318	5632	5905	6141	-	-
90	85	-	-	3890	4413	4876	5285	5647	5964	6240	6480	-	-
95	90	-	-	4199	4725	5190	5603	5967	6287	6567	6810	-	-
100	95	-	-	4500	5028	5496	5912	6279	6602	6886	7132	-	-

		HIGH SITE (PI = 1.2)											
TOTAL AGE (YR)	STUMP AGE (YR)	QUADRATIC-MEAN DBHOB (INCHES) - ALL TREES > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS											
		3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5
20	16	-	-	0	0	0	368	744	1076	1367	1619	1836	2021
25	21	-	-	0	0	431	859	1239	1574	1868	2124	2345	2534
30	26	-	-	0	426	911	1342	1725	2063	2361	2621	2846	3038
35	31	-	-	348	895	1382	1816	2202	2544	2845	3109	3338	3534
40	36	-	-	806	1355	1845	2282	2671	3017	3322	3589	3822	4022
45	41	-	-	1255	1807	2300	2740	3132	3481	3789	4061	4297	4502
50	46	-	-	1696	2250	2746	3189	3585	3937	4249	4524	4764	4973
55	51	-	-	2128	2685	3184	3630	4029	4384	4700	4978	5223	5435
60	56	-	-	2552	3112	3613	4063	4465	4823	5142	5425	5673	5889
65	61	-	-	2968	3530	4034	4487	4892	5254	5577	5863	6115	6335
70	66	-	-	3375	3940	4447	4902	5311	5676	6002	6292	6548	6773
75	71	-	-	3774	4342	4851	5310	5721	6090	6420	6713	6973	7202
80	76	-	-	4164	4735	5247	5709	6123	6496	6829	7126	7390	7622
85	81	-	-	4547	5119	5635	6099	6517	6893	7229	7530	7798	8035
90	86	-	-	4920	5496	6014	6481	6902	7281	7622	7926	8198	8438
95	91	-	-	5285	5864	6385	6855	7279	7662	8006	8314	8589	8834
100	96	-	-	5642	6223	6747	7220	7648	8034	8381	8693	8972	9221

## APPENDIX IV-9. TOTAL CUBIC FOOT VOLUME PER ACRE - ALL TREES &gt; 8.6 INCHES DBHOB

## LOW SITE (PI = 0.8)

TOTAL AGE (YR)	STUMP AGE (YR)	QUADRATIC-MEAN DBHOB (INCHES) - ALL TREES > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS											
		3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5
20	12	0	0	0	0	0	0	0	0	-	-	-	-
25	17	0	0	0	0	0	0	0	0	-	-	-	-
30	22	0	0	0	0	0	0	0	0	-	-	-	-
35	27	0	0	0	0	0	0	0	0	-	-	-	-
40	32	0	0	0	0	0	0	0	0	-	-	-	-
45	37	0	0	0	0	0	0	0	0	-	-	-	-
50	42	0	0	0	0	0	0	0	0	-	-	-	-
55	47	0	0	0	0	0	0	0	13	88	-	-	-
60	52	0	0	0	0	0	0	6	104	227	-	-	-
65	57	0	0	0	0	0	0	71	216	388	-	-	-
70	62	0	0	0	0	0	0	157	349	570	-	-	-
75	67	0	0	0	0	0	59	264	503	773	-	-	-
80	72	0	0	0	0	0	143	392	678	997	-	-	-
85	77	0	0	0	0	0	247	541	874	1242	-	-	-
90	82	0	0	0	0	77	372	711	1090	1508	-	-	-
95	87	0	0	0	0	181	518	902	1328	1795	-	-	-
100	92	0	0	0	0	306	686	1114	1587	2103	-	-	-

## MEDIUM-LOW SITE (PI = 0.9)

TOTAL AGE (YR)	STUMP AGE (YR)	QUADRATIC-MEAN DBHOB (INCHES) - ALL TREES > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS											
		3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5
20	13	0	0	0	0	0	0	0	0	-	-	-	-
25	18	0	0	0	0	0	0	0	0	-	-	-	-
30	23	0	0	0	0	0	0	0	0	-	-	-	-
35	28	0	0	0	0	0	0	0	0	-	-	-	-
40	33	0	0	0	0	0	0	0	0	-	-	-	-
45	38	0	0	0	0	0	0	0	0	-	-	-	-
50	43	0	0	0	0	0	0	0	0	18	-	-	-
55	48	0	0	0	0	0	0	0	47	170	-	-	-
60	53	0	0	0	0	0	0	23	169	342	-	-	-
65	58	0	0	0	0	0	0	117	311	536	-	-	-
70	63	0	0	0	0	0	25	232	475	751	-	-	-
75	68	0	0	0	0	0	115	368	660	987	-	-	-
80	73	0	0	0	0	0	226	525	865	1244	-	-	-
85	78	0	0	0	0	58	357	703	1092	1521	-	-	-
90	83	0	0	0	0	167	510	902	1339	1820	-	-	-
95	88	0	0	0	0	297	683	1121	1608	2140	-	-	-
100	93	0	0	77	448	878	1362	1898	2480	-	-	-	-

**AVERAGE SITE (PI = 1.0)**

TOTAL AGE (YR)	STUMP AGE (YR)	QUADRATIC-MEAN DBHOB (INCHES) - ALL TREES > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS											
		3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5
20	14	-	0	0	0	0	0	0	0	0	-	-	-
25	19	-	0	0	0	0	0	0	0	0	-	-	-
30	24	-	0	0	0	0	0	0	0	0	-	-	-
35	29	-	0	0	0	0	0	0	0	0	-	-	-
40	34	-	0	0	0	0	0	0	0	0	-	-	-
45	39	-	0	0	0	0	0	0	0	94	-	-	-
50	44	-	0	0	0	0	0	39	167	321	-	-	-
55	49	-	0	0	0	0	25	177	358	568	-	-	-
60	54	-	0	0	0	0	133	336	571	837	-	-	-
65	59	-	0	0	0	47	262	516	805	1127	-	-	-
70	64	-	0	0	0	149	412	717	1059	1437	-	-	-
75	69	-	0	0	6	271	583	939	1335	1769	-	-	-
80	74	-	0	0	104	415	775	1182	1631	2122	-	-	-
85	79	-	0	0	223	580	988	1446	1949	2495	-	-	-
90	84	-	0	21	364	765	1222	1731	2287	2890	-	-	-
95	89	-	0	140	525	972	1477	2036	2647	3305	-	-	-
100	94	-	0	280	707	1199	1753	2363	3027	3742	-	-	-

**MEDIUM-HIGH SITE (PI = 1.1)**

TOTAL AGE (YR)	STUMP AGE (YR)	QUADRATIC-MEAN DBHOB (INCHES) - ALL TREES > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS											
		3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5
20	15	-	-	0	0	0	0	0	0	0	0	-	-
25	20	-	-	0	0	0	0	0	0	0	0	-	-
30	25	-	-	0	0	0	0	0	0	0	0	-	-
35	30	-	-	0	0	0	0	0	0	0	0	-	-
40	35	-	-	0	0	0	0	0	18	127	258	-	-
45	40	-	-	0	0	0	0	75	215	382	576	-	-
50	45	-	-	0	0	0	71	235	432	659	914	-	-
55	50	-	-	0	0	19	199	417	670	956	1273	-	-
60	55	-	-	0	0	117	348	620	929	1275	1653	-	-
65	60	-	-	0	1	236	518	843	1209	1614	2055	-	-
70	65	-	-	0	94	377	709	1088	1511	1974	2477	-	-
75	70	-	-	0	208	538	921	1354	1833	2356	2920	-	-
80	75	-	-	25	343	720	1154	1640	2176	2758	3384	-	-
85	80	-	-	136	498	924	1408	1948	2540	3181	3869	-	-
90	85	-	-	269	675	1148	1683	2277	2925	3626	4376	-	-
95	90	-	-	422	873	1393	1979	2626	3331	4091	4903	-	-
100	95	-	-	597	1092	1660	2296	2997	3758	4577	5451	-	-

		HIGH SITE (PI = 1.2)											
TOTAL AGE (YR)	STUMP AGE (YR)	QUADRATIC-MEAN DBHOB (INCHES) - ALL TREES > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS											
		3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5
20	16	-	-	0	0	0	0	0	0	0	0	0	0
25	21	-	-	0	0	0	0	0	0	0	0	0	0
30	26	-	-	0	0	0	0	0	0	23	130	255	
35	31	-	-	0	0	0	0	0	83	209	360	535	732
40	36	-	-	0	0	0	24	152	312	501	718	961	1230
45	41	-	-	0	0	9	157	342	561	813	1096	1409	1749
50	46	-	-	0	0	110	311	553	832	1147	1496	1877	2289
55	51	-	-	0	23	232	487	785	1124	1502	1917	2366	2849
60	56	-	-	0	116	375	683	1038	1437	1878	2358	2877	3431
65	61	-	-	0	230	538	900	1312	1771	2274	2821	3408	4034
70	66	-	-	66	364	723	1138	1606	2125	2692	3304	3960	4657
75	71	-	-	175	520	929	1397	1922	2501	3131	3809	4533	5302
80	76	-	-	306	697	1155	1677	2259	2898	3590	4334	5128	5968
85	81	-	-	457	894	1403	1978	2617	3315	4071	4881	5743	6654
90	86	-	-	629	1113	1671	2300	2996	3754	4573	5448	6379	7362
95	91	-	-	822	1352	1961	2643	3395	4214	5095	6037	7036	8091
100	96	-	-	1036	1613	2272	3007	3816	4694	5639	6646	7714	8840

**APPENDIX IV. Yield Tables Based upon Site, Age, and Quadratic-mean Diameter at Age 70 Years**

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**APPENDIX IV-10. MERCHANTABLE CUBIC FOOT VOLUME PER ACRE - ALL TREES > 4.6 INCHES DBHOB**

**LOW SITE (PI = 0.8)**

TOTAL AGE (YR)	STUMP AGE (YR)	QUADRATIC-MEAN DBHOB (INCHES) - ALL TREES > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS											
		3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5
20	12	0	0	0	0	0	0	0	0	-	-	-	-
25	17	0	0	0	0	0	0	15	92	-	-	-	-
30	22	0	0	0	0	0	99	223	312	-	-	-	-
35	27	0	0	0	0	119	294	430	531	-	-	-	-
40	32	0	0	0	0	74	302	488	635	748	-	-	-
45	37	0	0	0	0	244	483	680	839	965	-	-	-
50	42	0	0	0	119	414	663	871	1042	1180	-	-	-
55	47	0	0	0	277	582	841	1061	1243	1393	-	-	-
60	52	0	68	433	748	1018	1249	1444	1606	-	-	-	-
65	57	0	214	589	913	1194	1436	1642	1817	-	-	-	-
70	62	0	359	743	1078	1369	1622	1840	2027	-	-	-	-
75	67	54	503	896	1240	1542	1806	2036	2235	-	-	-	-
80	72	187	645	1047	1402	1714	1989	2231	2442	-	-	-	-
85	77	320	786	1197	1562	1885	2171	2425	2648	-	-	-	-
90	82	451	925	1346	1721	2054	2352	2617	2853	-	-	-	-
95	87	580	1064	1494	1878	2222	2531	2808	3056	-	-	-	-
100	92	709	1201	1640	2034	2389	2709	2998	3258	-	-	-	-

**MEDIUM-LOW SITE (PI = 0.9)**

TOTAL AGE (YR)	STUMP AGE (YR)	QUADRATIC-MEAN DBHOB (INCHES) - ALL TREES > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS											
		3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5
20	13	0	0	0	0	0	0	0	0	-	-	-	-
25	18	0	0	0	0	0	0	34	145	-	-	-	-
30	23	0	0	0	0	0	120	280	404	-	-	-	-
35	28	0	0	0	0	141	352	524	662	-	-	-	-
40	33	0	0	0	0	96	361	583	768	918	-	-	-
45	38	0	0	0	0	304	579	813	1010	1173	-	-	-
50	43	0	0	178	510	796	1042	1251	1426	-	-	-	-
55	48	0	0	372	715	1012	1269	1490	1679	-	-	-	-
60	53	0	162	565	918	1226	1495	1729	1930	-	-	-	-
65	58	0	345	757	1120	1440	1720	1965	2179	-	-	-	-
70	63	48	526	948	1321	1651	1943	2201	2428	-	-	-	-
75	68	219	706	1137	1521	1862	2165	2435	2675	-	-	-	-
80	73	389	884	1325	1719	2071	2386	2668	2921	-	-	-	-
85	78	557	1062	1512	1916	2279	2606	2900	3165	-	-	-	-
90	83	724	1237	1697	2111	2485	2824	3130	3408	-	-	-	-
95	88	890	1412	1881	2306	2691	3041	3359	3650	-	-	-	-
100	93	1055	1585	2064	2499	2895	3256	3587	3891	-	-	-	-

**AVERAGE SITE (PI = 1.0)**

TOTAL AGE (YR)	STUMP AGE (YR)	QUADRATIC-MEAN DBHOB (INCHES) - ALL TREES > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS											
		3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5
20	14	-	0	0	0	0	0	0	17	121	-	-	-
25	19	-	0	0	0	0	0	169	321	439	-	-	-
30	24	-	0	0	0	20	259	459	624	756	-	-	-
35	29	-	0	0	0	283	534	747	925	1072	-	-	-
40	34	-	0	0	241	545	808	1034	1226	1386	-	-	-
45	39	-	0	129	490	806	1081	1319	1525	1699	-	-	-
50	44	-	0	366	738	1065	1352	1604	1822	2011	-	-	-
55	49	-	170	602	985	1323	1623	1887	2119	2321	-	-	-
60	54	-	395	837	1230	1580	1892	2168	2414	2631	-	-	-
65	59	-	619	1071	1474	1836	2159	2449	2708	2938	-	-	-
70	64	-	841	1303	1717	2090	2425	2728	3000	3245	-	-	-
75	69	-	1062	1534	1959	2343	2690	3005	3291	3550	-	-	-
80	74	-	1282	1763	2199	2594	2954	3282	3581	3854	-	-	-
85	79	-	1500	1992	2438	2844	3216	3557	3870	4156	-	-	-
90	84	-	1717	2219	2675	3093	3477	3831	4157	4458	-	-	-
95	89	-	1933	2444	2912	3341	3737	4103	4443	4758	-	-	-
100	94	-	2148	2669	3147	3587	3996	4375	4727	5056	-	-	-

**MEDIUM-HIGH SITE (PI = 1.1)**

TOTAL AGE (YR)	STUMP AGE (YR)	QUADRATIC-MEAN DBHOB (INCHES) - ALL TREES > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS											
		3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5
20	15	-	-	0	0	0	0	91	275	426	547	-	-
25	20	-	-	0	0	0	197	430	629	795	931	-	-
30	25	-	-	0	0	238	522	769	981	1162	1314	-	-
35	30	-	-	0	212	549	846	1106	1332	1528	1696	-	-
40	35	-	-	117	510	859	1168	1441	1682	1893	2076	-	-
45	40	-	-	402	806	1167	1489	1776	2030	2256	2454	-	-
50	45	-	-	686	1101	1474	1808	2109	2378	2618	2832	-	-
55	50	-	-	968	1395	1779	2127	2440	2723	2979	3208	-	-
60	55	-	-	1250	1687	2084	2444	2771	3068	3338	3583	-	-
65	60	-	-	1530	1978	2387	2759	3100	3411	3696	3956	-	-
70	65	-	-	1808	2268	2689	3074	3428	3753	4053	4329	-	-
75	70	-	-	2086	2557	2989	3387	3754	4094	4408	4700	-	-
80	75	-	-	2362	2844	3288	3699	4079	4433	4762	5069	-	-
85	80	-	-	2637	3130	3586	4009	4403	4771	5115	5438	-	-
90	85	-	-	2910	3414	3882	4318	4726	5108	5467	5805	-	-
95	90	-	-	3183	3698	4177	4626	5047	5443	5817	6170	-	-
100	95	-	-	3453	3980	4471	4933	5367	5777	6166	6535	-	-

## HIGH SITE (PI = 1.2)

TOTAL AGE (YR)	STUMP AGE (YR)	QUADRATIC-MEAN DBHOB (INCHES) - ALL TREES > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS										
		3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0
20	16	-	-	0	0	162	435	673	881	1059	1211	1338
25	21	-	-	0	0	219	542	828	1082	1305	1500	1669
30	26	-	-	0	209	584	920	1221	1489	1728	1940	2126
35	31	-	-	130	560	948	1297	1612	1895	2150	2378	2581
40	36	-	-	468	910	1310	1672	2001	2300	2570	2815	3036
45	41	-	-	805	1258	1671	2047	2390	2703	2990	3251	3488
50	46	-	-	1141	1605	2030	2420	2777	3106	3407	3685	3940
55	51	-	-	1475	1951	2388	2791	3163	3506	3824	4118	4390
60	56	-	-	1808	2296	2745	3162	3547	3906	4239	4550	4839
65	61	-	-	2139	2639	3101	3531	3931	4304	4653	4980	5287
70	66	-	-	2469	2980	3455	3898	4313	4701	5066	5409	5733
75	71	-	-	2798	3321	3808	4265	4693	5097	5477	5837	6178
80	76	-	-	3126	3660	4160	4630	5073	5491	5887	6264	6622
85	81	-	-	3452	3998	4511	4994	5451	5884	6296	6689	7064
90	86	-	-	3777	4335	4860	5356	5827	6276	6704	7113	7506
95	91	-	-	4101	4670	5208	5717	6203	6666	7110	7536	7945
100	96	-	-	4423	5004	5554	6077	6577	7055	7515	7957	8384

**APPENDIX IV. Yield Tables Based upon Site, Age, and Quadratic-mean Diameter at Age 70 Years**

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**APPENDIX IV-11. MERCHANTABLE CUBIC FOOT VOLUME PER ACRE - ALL TREES > 8.6 INCHES DBHOB**

		LOW SITE (PI = 0.8)											
TOTAL AGE (YR)	STUMP AGE (YR)	QUADRATIC-MEAN DBHOB (INCHES) - ALL TREES > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS											
		3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5
20	12	0	0	0	0	0	0	0	0	-	-	-	-
25	17	0	0	0	0	0	0	0	0	-	-	-	-
30	22	0	0	0	0	0	0	0	0	-	-	-	-
35	27	0	0	0	0	0	0	0	0	-	-	-	-
40	32	0	0	0	0	0	0	0	0	-	-	-	-
45	37	0	0	0	0	0	0	0	0	-	-	-	-
50	42	0	0	0	0	0	0	0	0	-	-	-	-
55	47	0	0	0	0	0	0	4	72	-	-	-	-
60	52	0	0	0	0	0	0	89	202	-	-	-	-
65	57	0	0	0	0	0	59	193	352	-	-	-	-
70	62	0	0	0	0	0	139	316	522	-	-	-	-
75	67	0	0	0	0	49	238	459	711	-	-	-	-
80	72	0	0	0	0	126	357	622	919	-	-	-	-
85	77	0	0	0	0	223	495	804	1147	-	-	-	-
90	82	0	0	0	67	339	653	1006	1395	-	-	-	-
95	87	0	0	0	163	474	830	1227	1662	-	-	-	-
100	92	0	0	0	278	629	1027	1468	1949	-	-	-	-
		MEDIUM-LOW SITE (PI = 0.9)											
TOTAL AGE (YR)	STUMP AGE (YR)	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5
20	13	0	0	0	0	0	0	0	0	-	-	-	-
25	18	0	0	0	0	0	0	0	0	-	-	-	-
30	23	0	0	0	0	0	0	0	0	-	-	-	-
35	28	0	0	0	0	0	0	0	0	-	-	-	-
40	33	0	0	0	0	0	0	0	0	-	-	-	-
45	38	0	0	0	0	0	0	0	0	-	-	-	-
50	43	0	0	0	0	0	0	0	8	-	-	-	-
55	48	0	0	0	0	0	0	36	150	-	-	-	-
60	53	0	0	0	0	0	16	149	310	-	-	-	-
65	58	0	0	0	0	0	102	281	490	-	-	-	-
70	63	0	0	0	0	18	209	433	690	-	-	-	-
75	68	0	0	0	0	101	334	605	910	-	-	-	-
80	73	0	0	0	0	203	480	796	1148	-	-	-	-
85	78	0	0	0	48	324	645	1006	1407	-	-	-	-
90	83	0	0	0	148	465	829	1236	1685	-	-	-	-
95	88	0	0	0	268	626	1033	1486	1982	-	-	-	-
100	93	0	0	65	407	806	1256	1755	2299	-	-	-	-

## AVERAGE SITE (PI = 1.0)

TOTAL AGE (YR)	STUMP AGE (YR)	QUADRATIC-MEAN DBHOB (INCHES) - ALL TREES > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS											
		3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5
20	14	-	0	0	0	0	0	0	0	0	-	-	-
25	19	-	0	0	0	0	0	0	0	0	-	-	-
30	24	-	0	0	0	0	0	0	0	0	-	-	-
35	29	-	0	0	0	0	0	0	0	0	-	-	-
40	34	-	0	0	0	0	0	0	0	0	-	-	-
45	39	-	0	0	0	0	0	0	0	79	-	-	-
50	44	-	0	0	0	0	0	28	147	290	-	-	-
55	49	-	0	0	0	0	17	156	325	520	-	-	-
60	54	-	0	0	0	0	116	303	522	770	-	-	-
65	59	-	0	0	0	37	235	470	739	1040	-	-	-
70	64	-	0	0	0	130	374	657	976	1329	-	-	-
75	69	-	0	0	0	243	532	863	1232	1637	-	-	-
80	74	-	0	0	89	376	710	1088	1508	1966	-	-	-
85	79	-	0	0	199	528	907	1333	1803	2313	-	-	-
90	84	-	0	12	328	700	1124	1598	2117	2680	-	-	-
95	89	-	0	121	476	891	1360	1882	2452	3067	-	-	-
100	94	-	0	250	644	1101	1616	2185	2805	3473	-	-	-

## MEDIUM-HIGH SITE (PI = 1.1)

TOTAL AGE (YR)	STUMP AGE (YR)	QUADRATIC-MEAN DBHOB (INCHES) - ALL TREES > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS											
		3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5
20	15	-	-	0	0	0	0	0	0	0	0	-	-
25	20	-	-	0	0	0	0	0	0	0	0	-	-
30	25	-	-	0	0	0	0	0	0	0	0	-	-
35	30	-	-	0	0	0	0	0	0	0	0	-	-
40	35	-	-	0	0	0	0	0	8	109	232	-	-
45	40	-	-	0	0	0	0	61	190	346	527	-	-
50	45	-	-	0	0	0	58	209	392	603	842	-	-
55	50	-	-	0	0	10	176	377	613	880	1176	-	-
60	55	-	-	0	0	100	313	565	853	1176	1530	-	-
65	60	-	-	0	0	209	470	772	1113	1491	1904	-	-
70	65	-	-	0	78	339	647	999	1393	1826	2297	-	-
75	70	-	-	0	182	487	843	1245	1692	2181	2709	-	-
80	75	-	-	13	306	656	1059	1511	2011	2555	3141	-	-
85	80	-	-	115	449	843	1294	1797	2349	2949	3593	-	-
90	85	-	-	237	612	1051	1548	2102	2707	3362	4064	-	-
95	90	-	-	378	794	1278	1823	2426	3085	3795	4555	-	-
100	95	-	-	538	996	1524	2117	2770	3481	4247	5065	-	-

		HIGH SITE (PI = 1.2)											
TOTAL AGE (YR)	STUMP AGE (YR)	QUADRATIC-MEAN DBHOB (INCHES) - ALL TREES > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS											
		3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5
20	16	-	-	0	0	0	0	0	0	0	0	0	0
25	21	-	-	0	0	0	0	0	0	0	0	0	0
30	26	-	-	0	0	0	0	0	0	13	113	232	
35	31	-	-	0	0	0	0	0	67	184	326	491	677
40	36	-	-	0	0	0	13	131	279	455	659	887	1140
45	41	-	-	0	0	0	136	307	511	746	1011	1304	1624
50	46	-	-	0	0	92	278	502	762	1056	1382	1740	2127
55	51	-	-	0	13	204	439	716	1032	1385	1774	2195	2649
60	56	-	-	0	97	335	620	950	1322	1735	2184	2670	3191
65	61	-	-	0	201	485	821	1204	1632	2103	2615	3165	3752
70	66	-	-	50	324	655	1041	1477	1961	2491	3065	3679	4333
75	71	-	-	149	467	845	1280	1770	2310	2899	3534	4213	4934
80	76	-	-	268	629	1054	1540	2082	2679	3326	4023	4766	5554
85	81	-	-	406	811	1283	1818	2414	3066	3773	4531	5339	6194
90	86	-	-	564	1012	1531	2117	2765	3474	4239	5059	5931	6853
95	91	-	-	742	1233	1799	2434	3136	3901	4725	5607	6543	7531
100	96	-	-	938	1473	2086	2772	3527	4347	5231	6174	7174	8230

## APPENDIX IV-12. SAWLOG CUBIC FOOT VOLUME PER ACRE - ALL TREES &gt; 8.6 INCHES DBHOB

100

		LOW SITE (PI = 0.8)											
TOTAL AGE (YR)	STUMP AGE (YR)	QUADRATIC-MEAN DBHOB (INCHES) - ALL TREES > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS											
		3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5
20	12	0	0	0	0	0	0	0	0	-	-	-	-
25	17	0	0	0	0	0	0	0	0	-	-	-	-
30	22	0	0	0	0	0	0	0	0	-	-	-	-
35	27	0	0	0	0	0	0	0	0	-	-	-	-
40	32	0	0	0	0	0	0	0	0	-	-	-	-
45	37	0	0	0	0	0	0	0	0	-	-	-	-
50	42	0	0	0	0	0	0	0	0	-	-	-	-
55	47	0	0	0	0	0	0	0	35	-	-	-	-
60	52	0	0	0	0	0	0	54	153	-	-	-	-
65	57	0	0	0	0	0	31	147	288	-	-	-	-
70	62	0	0	0	0	0	102	258	441	-	-	-	-
75	67	0	0	0	0	26	190	386	612	-	-	-	-
80	72	0	0	0	0	93	296	532	800	-	-	-	-
85	77	0	0	0	0	178	419	696	1006	-	-	-	-
90	82	0	0	0	43	281	560	877	1230	-	-	-	-
95	87	0	0	0	127	401	718	1076	1471	-	-	-	-
100	92	0	0	228	539	895	1293	1729	-	-	-	-	-

		MEDIUM-LOW SITE (PI = 0.9)											
TOTAL AGE (YR)	STUMP AGE (YR)	QUADRATIC-MEAN DBHOB (INCHES) - ALL TREES > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS											
		3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5
20	13	0	0	0	0	0	0	0	0	-	-	-	-
25	18	0	0	0	0	0	0	0	0	-	-	-	-
30	23	0	0	0	0	0	0	0	0	-	-	-	-
35	28	0	0	0	0	0	0	0	0	-	-	-	-
40	33	0	0	0	0	0	0	0	0	-	-	-	-
45	38	0	0	0	0	0	0	0	0	-	-	-	-
50	43	0	0	0	0	0	0	0	0	-	-	-	-
55	48	0	0	0	0	0	0	9	108	-	-	-	-
60	53	0	0	0	0	0	0	110	253	-	-	-	-
65	58	0	0	0	0	0	70	228	415	-	-	-	-
70	63	0	0	0	0	0	164	363	594	-	-	-	-
75	68	0	0	0	0	70	275	516	791	-	-	-	-
80	73	0	0	0	0	159	404	687	1006	-	-	-	-
85	78	0	0	0	25	266	551	876	1239	-	-	-	-
90	83	0	0	0	112	390	715	1082	1489	-	-	-	-
95	88	0	0	0	216	532	897	1306	1756	-	-	-	-
100	93	0	39	338	692	1096	1547	2042	-	-	-	-	-

**AVERAGE SITE (PI = 1.0)**

<b>TOTAL AGE (YR)</b>	<b>STUMP AGE (YR)</b>	<b>QUADRATIC-MEAN DBHOB (INCHES) - ALL TREES &gt; 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS</b>											
		3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5
20	14	-	0	0	0	0	0	0	0	0	-	-	-
25	19	-	0	0	0	0	0	0	0	0	-	-	-
30	24	-	0	0	0	0	0	0	0	-	-	-	-
35	29	-	0	0	0	0	0	0	0	-	-	-	-
40	34	-	0	0	0	0	0	0	0	-	-	-	-
45	39	-	0	0	0	0	0	0	0	45	-	-	-
50	44	-	0	0	0	0	0	2	105	234	-	-	-
55	49	-	0	0	0	0	0	114	264	441	-	-	-
60	54	-	0	0	0	0	80	245	441	666	-	-	-
65	59	-	0	0	0	12	185	393	635	909	-	-	-
70	64	-	0	0	0	92	307	559	847	1169	-	-	-
75	69	-	0	0	0	190	446	742	1077	1447	-	-	-
80	74	-	0	0	55	306	603	944	1324	1742	-	-	-
85	79	-	0	0	149	439	778	1162	1589	2055	-	-	-
90	84	-	0	0	261	590	971	1399	1871	2386	-	-	-
95	89	-	0	80	391	759	1181	1653	2171	2734	-	-	-
100	94	-	0	191	538	945	1408	1924	2489	3100	-	-	-

**MEDIUM-HIGH SITE (PI = 1.1)**

<b>TOTAL AGE (YR)</b>	<b>STUMP AGE (YR)</b>	<b>QUADRATIC-MEAN DBHOB (INCHES) - ALL TREES &gt; 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS</b>											
		3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5
20	15	-	-	0	0	0	0	0	0	0	0	-	-
25	20	-	-	0	0	0	0	0	0	0	0	-	-
30	25	-	-	0	0	0	0	0	0	0	0	-	-
35	30	-	-	0	0	0	0	0	0	0	0	-	-
40	35	-	-	0	0	0	0	0	0	70	183	-	-
45	40	-	-	0	0	0	0	27	141	283	448	-	-
50	45	-	-	0	0	0	26	158	321	513	732	-	-
55	50	-	-	0	0	0	128	306	518	761	1033	-	-
60	55	-	-	0	0	62	248	472	733	1026	1352	-	-
65	60	-	-	0	0	156	385	656	965	1310	1688	-	-
70	65	-	-	0	40	267	541	857	1215	1610	2042	-	-
75	70	-	0	129	397	714	1076	1482	1929	2414	-	-	-
80	75	-	0	235	544	904	1313	1767	2265	2803	-	-	-
85	80	-	67	359	708	1112	1567	2070	2619	3210	-	-	-
90	85	-	171	500	890	1338	1839	2391	2990	3635	-	-	-
95	90	-	292	659	1090	1581	2129	2729	3379	4077	-	-	-
100	95	-	430	835	1307	1842	2436	3084	3786	4537	-	-	-

		HIGH SITE (PI = 1.2)											
TOTAL AGE (YR)	STUMP AGE (YR)	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5
20	16	-	-	0	0	0	0	0	0	0	0	0	0
25	21	-	-	0	0	0	0	0	0	0	0	0	0
30	26	-	-	0	0	0	0	0	0	0	79	192	
35	31	-	-	0	0	0	0	0	29	135	265	419	594
40	36	-	-	0	0	0	0	85	217	377	564	777	1013
45	41	-	-	0	0	0	89	239	422	637	880	1152	1450
50	46	-	-	0	0	51	212	411	646	914	1214	1545	1905
55	51	-	-	0	0	146	353	600	886	1209	1566	1956	2377
60	56	-	-	0	52	258	511	807	1145	1522	1935	2384	2867
65	61	-	-	0	139	388	687	1032	1421	1852	2322	2830	3374
70	66	-	-	7	243	535	880	1274	1715	2200	2727	3294	3899
75	71	-	-	89	365	701	1091	1534	2026	2565	3149	3775	4442
80	76	-	-	189	505	883	1320	1811	2355	2948	3589	4274	5002
85	81	-	-	307	662	1084	1566	2107	2702	3349	4046	4790	5580
90	86	-	-	442	837	1302	1830	2419	3066	3768	4521	5324	6176
95	91	-	-	594	1030	1537	2112	2750	3448	4204	5014	5876	6789
100	96	-	-	765	1240	1791	2411	3098	3848	4657	5524	6446	7420

## APPENDIX IV-13. SAWLOG BOARD FOOT VOLUME PER ACRE - ALL TREES &gt; 8.6 INCHES DBHOB

		LOW SITE (PI = 0.8)											
TOTAL AGE (YR)	STUMP AGE (YR)	QUADRATIC-MEAN DBHOB (INCHES) - ALL TREES > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS											
		3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5
20	12	0	0	0	0	0	0	0	0	-	-	-	-
25	17	0	0	0	0	0	0	0	0	-	-	-	-
30	22	0	0	0	0	0	0	0	0	-	-	-	-
35	27	0	0	0	0	0	0	0	0	-	-	-	-
40	32	0	0	0	0	0	0	0	0	-	-	-	-
45	37	0	0	0	0	0	0	0	0	-	-	-	-
50	42	0	0	0	0	0	0	0	0	-	-	-	-
55	47	0	0	0	0	0	0	0	0	-	-	-	-
60	52	0	0	0	0	0	0	0	325	-	-	-	-
65	57	0	0	0	0	0	0	354	1044	-	-	-	-
70	62	0	0	0	0	0	178	934	1862	-	-	-	-
75	67	0	0	0	0	0	0	629	1612	2779	-	-	-
80	72	0	0	0	0	0	175	1178	2389	3794	-	-	-
85	77	0	0	0	0	0	606	1825	3265	4907	-	-	-
90	82	0	0	0	0	0	1135	2572	4239	6120	-	-	-
95	87	0	0	0	0	373	1763	3416	5311	7430	-	-	-
100	92	0	0	0	0	894	2490	4360	6482	8840	-	-	-
		MEDIUM-LOW SITE (PI = 0.9)											
TOTAL AGE (YR)	STUMP AGE (YR)	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5
20	13	0	0	0	0	0	0	0	0	-	-	-	-
25	18	0	0	0	0	0	0	0	0	-	-	-	-
30	23	0	0	0	0	0	0	0	0	-	-	-	-
35	28	0	0	0	0	0	0	0	0	-	-	-	-
40	33	0	0	0	0	0	0	0	0	-	-	-	-
45	38	0	0	0	0	0	0	0	0	-	-	-	-
50	43	0	0	0	0	0	0	0	0	-	-	-	-
55	48	0	0	0	0	0	0	0	187	-	-	-	-
60	53	0	0	0	0	0	0	244	961	-	-	-	-
65	58	0	0	0	0	0	86	869	1834	-	-	-	-
70	63	0	0	0	0	0	573	1592	2806	-	-	-	-
75	68	0	0	0	0	123	1157	2414	3876	-	-	-	-
80	73	0	0	0	0	581	1841	3334	5044	-	-	-	-
85	78	0	0	0	0	1138	2622	4353	6311	-	-	-	-
90	83	0	0	0	362	1793	3503	5470	7677	-	-	-	-
95	88	0	0	0	904	2547	4482	6686	9141	-	-	-	-
100	93	0	0	19	1545	3400	5559	8000	10704	-	-	-	-

AVERAGE SITE (PI = 1.0)													
TOTAL AGE (YR)	STUMP AGE (YR)	QUADRATIC-MEAN DBHOB (INCHES) - ALL TREES > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS											
		3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5
20	14	-	0	0	0	0	0	0	0	0	-	-	-
25	19	-	0	0	0	0	0	0	0	0	-	-	-
30	24	-	0	0	0	0	0	0	0	0	-	-	-
35	29	-	0	0	0	0	0	0	0	0	-	-	-
40	34	-	0	0	0	0	0	0	0	0	-	-	-
45	39	-	0	0	0	0	0	0	0	0	-	-	-
50	44	-	0	0	0	0	0	0	260	938	-	-	-
55	49	-	0	0	0	0	0	341	1122	2073	-	-	-
60	54	-	0	0	0	0	194	1041	2083	3306	-	-	-
65	59	-	0	0	0	0	745	1840	3143	4638	-	-	-
70	64	-	0	0	0	288	1395	2738	4300	6068	-	-	-
75	69	-	0	0	0	801	2143	3734	5557	7597	-	-	-
80	74	-	0	0	119	1414	2990	4829	6912	9224	-	-	-
85	79	-	0	0	609	2124	3936	6022	8365	10950	-	-	-
90	84	-	0	0	1198	2934	4980	7314	9918	12774	-	-	-
95	89	-	0	279	1885	3842	6122	8704	11568	14697	-	-	-
100	94	-	0	858	2671	4848	7363	10193	13317	16719	-	-	-

MEDIUM-HIGH SITE (PI = 1.1)													
TOTAL AGE (YR)	STUMP AGE (YR)	QUADRATIC-MEAN DBHOB (INCHES) - ALL TREES > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS											
		3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5
20	15	-	-	0	0	0	0	0	0	0	0	-	-
25	20	-	-	0	0	0	0	0	0	0	0	-	-
30	25	-	-	0	0	0	0	0	0	0	0	-	-
35	30	-	-	0	0	0	0	0	0	0	0	-	-
40	35	-	-	0	0	0	0	0	0	157	795	-	-
45	40	-	-	0	0	0	0	0	547	1328	2267	-	-
50	45	-	-	0	0	0	0	642	1530	2598	3838	-	-
55	50	-	-	0	0	0	495	1449	2611	3967	5507	-	-
60	55	-	-	0	0	163	1140	2354	3790	5434	7274	-	-
65	60	-	-	0	0	660	1883	3358	5068	7000	9141	-	-
70	65	-	-	0	72	1256	2725	4460	6445	8665	11106	-	-
75	70	-	-	0	535	1950	3665	5661	7920	10428	13169	-	-
80	75	-	-	0	1097	2742	4704	6961	9494	12289	15331	-	-
85	80	-	-	238	1758	3634	5841	8358	11167	14249	17591	-	-
90	85	-	-	781	2516	4624	7077	9855	12937	16308	19950	-	-
95	90	-	-	1424	3374	5712	8412	11450	14807	18465	22408	-	-
100	95	-	-	2165	4330	6899	9845	13144	16775	20721	24964	-	-

## HIGH SITE (PI = 1.2)

TOTAL AGE (YR)	STUMP AGE (YR)	QUADRATIC-MEAN DBHOB (INCHES) - ALL TREES > 0.6 INCH DBHOB AT TOTAL AGE 70 YEARS											
		3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5
20	16	-	-	0	0	0	0	0	0	0	0	0	0
25	21	-	-	0	0	0	0	0	0	0	0	0	0
30	26	-	-	0	0	0	0	0	0	0	0	469	1194
35	31	-	-	0	0	0	0	0	27	653	1436	2367	3440
40	36	-	-	0	0	0	0	315	1064	1996	3099	4364	5784
45	41	-	-	0	0	0	0	329	1160	2200	3438	4861	6460
50	46	-	-	0	0	129	997	2104	3435	4978	6721	8654	10767
55	51	-	-	0	0	636	1763	3146	4768	6617	8680	10947	13407
60	56	-	-	0	144	1241	2628	4287	6200	8355	10738	13338	16145
65	61	-	-	0	605	1945	3592	5526	7730	10191	12894	15828	18982
70	66	-	-	0	1165	2748	4654	6864	9359	12125	15148	18416	21918
75	71	-	-	360	1823	3649	5815	8300	11086	14158	17501	21103	24952
80	76	-	-	891	2580	4649	7074	9835	12912	16290	19953	23888	28084
85	81	-	-	1520	3435	5747	8432	11469	14837	18520	22503	26772	31315
90	86	-	-	2248	4389	6944	9889	13201	16860	20849	25152	29755	34645
95	91	-	-	3075	5441	8239	11444	15031	18981	23276	27899	32836	38073
100	96	-	-	4000	6592	9633	13097	16960	21201	25802	30745	36015	41599



**APPENDIX V. Distribution of Plot Observations by Productivity and Age Classes**

PI class <sup>a</sup>	Age class (yr) <sup>b</sup>	No. obs	Observed range		
			Stems/acre > 0.6 inch dbhob	Quadratic-mean dbhob (inches)	DI
0.6	20	2	2290-2720	2.1-2.3	16.3-27.2
	120	2	126	8.3-8.4	28.0-28.2
	Subtotal	4			
0.7	20	3	2127-4300	1.8-2.5	16.3-34.9
	40	13	750-2640	2.6-4.8	18.1-53.3
	60	7	160-1900	3.6-9.6	16.9-75.1
	80	2	202-1485	3.9-7.7	14.9-43.5
	100	1	1960	3.7	11.6
	120	7	168-1680	3.9-8.8	11.1-32.6
	Subtotal	33			
0.8	20	5	680-4970	1.6-3.7	15.2-65.5
	40	4	610-1930	3.3-5.2	24.0-38.4
	60	45	174-5140	2.6-9.9	10.7-82.2
	80	5	507-1570	3.8-6.2	17.5-32.4
	100	5	520-827	5.8-6.7	23.6-35.5
	120	7	410-1600	4.7-7.6	14.1-31.4
	Subtotal	71			
0.9	20	6	1120-3200	1.7-3.9	25.8-54.6
	40	17	456-2750	2.7-6.5	18.7-90.1
	60	89	186-5260	2.3-9.3	9.1-74.3
	80	31	150-2150	3.4-10.7	16.8-72.5
	100	26	300-1341	4.4-9.3	17.1-54.2
	120	6	430-905	6.3-8.9	21.4-38.5
	Subtotal	175			
1.0	20	12	1810-4770	1.4-3.5	20.8-44.2
	40	23	640-4570	2.0-6.7	16.7-53.9
	60	117	264-7420	2.1-9.0	8.0-71.4
	80	87	160-2703	3.2-11.8	17.0-87.8
	100	30	298-1308	4.5-10.0	19.1-58.2
	120	16	350-1620	4.7-9.4	18.4-47.1
	Subtotal	285			
1.1	20	13	1720-4890	1.5-3.6	27.6-44.6
	40	26	689-3140	3.0-5.9	26.0-62.1
	60	84	274-2840	3.2-9.8	17.8-79.0
	80	48	160-2042	4.0-13.0	20.3-119.5
	100	22	334-764	6.9-10.1	32.7-60.6
	120	21	330-1016	6.5-10.0	27.0-48.8
	Subtotal	214			

(cont.)

**APPENDIX V. Distribution of Plot Observations by Productivity and Age Classes**

PI class <sup>a</sup>	Age class (yr) <sup>b</sup>	No. obs	Observed range		
			Stems/acre >0.6 inch dbhob	Quadratic-mean dbhob (inches)	DI
1.2	20	5	4020-6280	1.4-1.9	16.3-32.1
	40	9	1140-3650	2.7-5.0	24.2-52.9
	60	18	350-2721	3.2-9.6	20.1-91.8
	80	28	260-1120	5.7-11.0	29.5-86.0
	100	5	380-1165	6.1-10.2	34.5-60.3
	120	1	485	8.4	47.6
	Subtotal	66			
1.3	20	2	4225-4660	1.5-1.6	27.6-30.3
	60	4	550-1730	4.6-8.6	37.3-94.2
	80	9	340-1608	5.0-10.0	26.1-81.4
Subtotal		15			
1.4	20	2	3510-7820	1.5-2.9	16.3-34.1
Subtotal		2			
<b>Grand total</b>		<b>865</b>			

<sup>a</sup> PI class intervals: 0.6 = 0.56-0.65, 0.7 = 0.66-0.75, etc.

<sup>b</sup> Age class intervals: 20 = 11-30, 40 = 31-50, etc.

**APPENDIX VI. Merging Age (Years) of Partial- and Whole-stand Yield Estimates\***

Partial- and whole-stand equations	PI <sup>b</sup>	Density classes (stems/acre > 0.6 inch dbhob at total age 70 years)						1750	2000
		500	750	1000	1250	1500			
$Y_{(1)} - Y_{(2)}$	0.8	79	93	—	—	—	—	—	—
	0.9	76	90	—	—	—	—	—	—
	1.0	73	88	—	—	—	—	—	—
	1.1	71	87	—	—	—	—	—	—
	1.2	69	86	—	—	—	—	—	—
$Y_{(4)} - Y_{(5)}$	1.2	88	—	—	—	—	—	—	—
$Y_{(8)} - Y_{(9)}$	1.2	83	—	—	—	—	—	—	—
$Y_{(12)} - Y_{(13)}$	0.8	76	—	—	—	—	—	—	—
	0.9	82	—	—	—	—	—	—	—
	1.0	85	—	—	—	—	—	—	—
	1.1	85	—	—	—	—	—	—	—
	1.2	75	—	—	—	—	—	—	—
$Y_{(12)} - Y_{(14)}$	1.2	94	—	—	—	—	—	—	—
$Y_{(15)} - Y_{(16)}$	0.8	85	—	—	—	—	—	—	—
	0.9	89	—	—	—	—	—	—	—
	1.0	88	—	—	—	—	—	—	—
	1.1	85	—	—	—	—	—	—	—
	1.2	81	—	—	—	—	—	—	—

(cont.)

**APPENDIX VI. Merging Age (Years) of Partial- and Whole-stand Yield Estimates<sup>a</sup>**

Partial- and whole-stand equations	PI <sup>b</sup>	Quadratic-mean diameter (inches) at 70 years total age									
		3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5
$Y_{(1)} - Y_{(2)}$	0.8	-	-	-	-	97	87	81	77	-	-
	0.9	-	-	-	-	-	92	84	78	-	-
	1.0	-	-	-	-	-	-	87	80	75	-
	1.1	-	-	-	-	-	-	93	84	78	73
	1.2	-	-	-	-	-	-	-	91	83	77
										72	70
$Y_{(4)} - Y_{(5)}$	1.0	-	-	-	-	-	-	-	-	99	-
	1.1	-	-	-	-	-	-	-	-	-	95
	1.2	-	-	-	-	-	-	-	-	98	92
											88
$Y_{(8)} - Y_{(9)}$	1.1	-	-	-	-	-	-	-	-	-	99
	1.2	-	-	-	-	-	-	-	-	-	9.2
											87
$Y_{(12)} - Y_{(13)}$	0.8	-	-	-	-	-	-	82	74	-	-
	0.9	-	-	-	-	-	-	95	85	-	-
	1.0	-	-	-	-	-	-	97	90	-	-
	1.1	-	-	-	-	-	-	-	98	89	-
	1.2	-	-	-	-	-	-	-	99	87	80
											76
$Y_{(12)} - Y_{(14)}$	1.2	-	-	-	-	-	-	-	-	-	-
											95
$Y_{(15)} - Y_{(16)}$	0.8	-	-	-	-	-	-	92	80	-	-
	0.9	-	-	-	-	-	-	92	-	-	-
	1.0	-	-	-	-	-	-	99	90	-	-
	1.1	-	-	-	-	-	-	-	94	87	-
	1.2	-	-	-	-	-	-	-	95	89	84
											81

<sup>a</sup> Total age after which partial-stand per-acre estimate (i.e. number of trees, basal area, or volume) is greater than the whole-stand per-acre estimate or after which the whole-stand average estimate (i.e. diameter or height) is greater than the partial-stand average estimate.

<sup>b</sup> PI class intervals: 0.6 = 0.56-0.65, 0.7 = 0.66-0.75, etc.