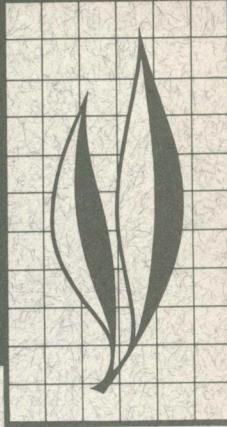


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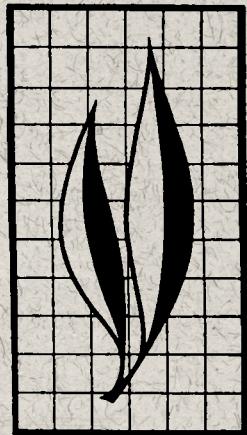
Tree Volume Equations and Tables from Dendrometer Measurements

I. Tree Volume Equations from Measurements Taken with a Barr and Stroud Optical Dendrometer

Lee C. Wensel

II. Young Growth Gross Volume Tables for Sierra Redwood *{Sequoia gigantea (Lindl.) Decne}*

Lee C. Wensel and Richard L. Schoenheide



In the first paper, the procedures are developed to compute tree volume equations from field measurements taken with a Barr and Stroud optical dendrometer. The computer programs used to perform all of the calculations are briefly described. The volume equations developed for young growth Sierra redwood are also reported, together with a discussion of the validity of these equations.

In the second paper, tree volume tables are given for young growth Sierra redwood based upon measurements taken at Mountain Home State Forest. Standard and local volume tables are given for cubic feet and Scribner board feet, together with the 95 per cent confidence intervals for the volumes in these tables. The standard table for cubic feet is based upon total height while for Scribner board feet tables are given for both merchantable height (6-inch top) and total height.

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II. Young Growth Gross Volume Tables for Sierra Redwood [*Sequoia gigantea* (Lindl.) Decne]^{1,2}

INTRODUCTION

THE SIERRA REDWOODS at one time may have covered much of the Western world. Today, their natural range is limited to an area extending some 325 miles from the most northerly grove, on the Middle Fork of the American River in Placer County, to the southern-most grove along Deer Creek in Tulare County, just north of the Kern County boundary. These groves are all located along the western slope of the Sierra Nevada at elevations ranging from approximately 3,000 to 8,500 feet, their optimum range being between 5,500 and 7,000 feet (California State Park Commission, 1952).

Of the estimated 35,607 acres of Sierra redwood stands, approximately 63 per cent are still in a virgin condition. Some 21 per cent were logged prior to 1910, and an additional 7 per cent between 1910 and 1965. The remaining 9 per cent of the stands have had pine and fir removed but not the Sierra redwood. Generally speaking, the 28 per cent of the stands in which the Sierra redwoods have been logged now have most of the young-growth trees.³

Although much of the second-growth Sierra redwood is on land where the species is protected from cutting, its rapid growth and physical properties make it a prime choice as reforestation

stock on areas that are not so protected.

Beechel (1960) reported an average annual volume increase on a single Sierra redwood one-acre plot on an area logged about 70 years previously of 2,297 board feet per acre. Beechel's figures were based upon a volume table for coast redwood which he thought yielded volumes about 30 per cent too high for Sierra redwood. Recomputing this growth based upon the new Sierra redwood tables yields an average volume increase of 1,240 board feet per acre per year for the five-year period, or about 54 per cent of what Beechel reported.

While one should not be too hasty in drawing conclusions from this single one-acre plot (which Beechel claims is not fully stocked) it does indicate a promising growth potential for this species.

A recent study by Cockrell, *et al.* (1971) indicates that second-growth Sierra redwood can be used for light construction, being "slightly heavier and stronger than second-growth coast redwood and decidedly heavier and stronger than most of the wood of old growth (Sierra redwood) tested." In the same study it was found that the fiber lengths of second-growth Sierra redwood average from "4 to 4.5 mm which

¹ Submitted for publication January 8, 1971.

² *Sequoia gigantea* is also known as bigtree or giant sequoia. The term Sierra redwood is used here because it is the name used by the California Legislature in making Sierra redwood and coast redwood California's state trees.

³ Personal communication from Dean F. Schlobohm, California Division of Forestry.

TABLE 1A
GROSS CUBIC-FOOT VOLUME TABLE
NUMBER OF SAMPLE TREES
FOR SIERRA REDWOOD, MTN. HOME STATE FOREST

| DBH (INCHES) | TOTAL HEIGHT (FEET) (NUMBER OF TREES) | | | | | | | | | | TOTAL | | | | |
|-----------------|--|----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|----------|----------|----------|----------|------------|-----|
| | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | | 140 | 150 | 160 | 170 |
| 12 | 1 | 3 | 2 | 2 | 2 | 1 | 3 | 1 | 1 | 1 | 5 | 7 | | | |
| 14 | | 1 | 2 | 4 | 1 | 5 | 1 | 1 | 1 | 1 | 11 | 10 | | | |
| 16 | | 1 | 1 | 2 | 2 | 3 | 2 | 2 | 3 | 1 | 13 | | | | |
| 18 | | | | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | | | |
| 22 | | | | | | | | | | | | | | | |
| 24 | | | | | | | | | | | | | | | |
| 26 | | | | | | | | | | | | | | | |
| 28 | | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | |
| 32 | | | | | | | | | | | | | | | |
| 34 | | | | | | | | | | | | | | | |
| 36 | | | | | | | | | | | | | | | |
| 38 | | | | | | | | | | | | | | | |
| 40 | | | | | | | | | | | | | | | |
| 42 | | | | | | | | | | | | | | | |
| 44 | | | | | | | | | | | | | | | |
| 46 | | | | | | | | | | | | | | | |
| 48 | | | | | | | | | | | | | | | |
| 50 | | | | | | | | | | | | | | | |
| 52 | | | | | | | | | | | | | | | |
| 54 | | | | | | | | | | | | | | | |
| 56 | | | | | | | | | | | | | | | |
| 58 | | | | | | | | | | | | | | | |
| 60 | | | | | | | | | | | | | | | |
| TOTAL | 1 | 5 | 11 | 19 | 26 | 32 | 28 | 23 | 14 | 5 | 2 | 1 | 1 | 195 | |

TABLE 1B
GROSS BOARD-FOOT VOLUME TABLE FOR SIERRA REDWOOD, MTN. HOME STATE FOREST

| DBH (INCHES) | MERCH. HEIGHT (FEET) (NUMBER OF TREES) | | | | | | | | | | TOTAL |
|-----------------|---|----|----|----|----|----|----|----|----|-----|-------|
| | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | |
| 12 | 1 | 3 | 1 | 2 | 2 | 4 | 1 | 2 | 1 | 1 | 5 |
| 14 | | 2 | | | | | | | | | 7 |
| 16 | | | 2 | 1 | 3 | 2 | | | | | 11 |
| 18 | | | 1 | | 4 | 2 | 3 | 3 | | | 10 |
| 20 | | | | | | | | | | | 13 |
| 22 | | | | | 3 | 10 | 2 | 3 | 1 | 1 | 20 |
| 24 | | | | | 2 | 2 | 4 | 2 | 2 | | 12 |
| 26 | | | | | | 4 | 4 | 5 | 2 | 2 | 17 |
| 28 | | | | | | | | 6 | 2 | 3 | 12 |
| 30 | | | | | | | 5 | 5 | 2 | 4 | 17 |
| 32 | | | | | | | 2 | 1 | 1 | 3 | 8 |
| 34 | | | | | | | 1 | 3 | 3 | 3 | 11 |
| 36 | | | | | | | | 1 | 3 | 5 | 10 |
| 38 | | | | | | | | 1 | 2 | 3 | 7 |
| 40 | | | | | | | | 1 | 3 | 1 | 9 |
| 42 | | | | | | | | 1 | 1 | 1 | 4 |
| 44 | | | | | | | | | 2 | | 3 |
| 46 | | | | | | | | | | 1 | 2 |
| 48 | | | | | | | | | | | 4 |
| 50 | | | | | | | | | | | 3 |
| 52 | | | | | | | | | | 1 | 5 |
| 54 | | | | | | | | | | | 1 |
| 56 | | | | | | | | | | | 1 |
| 58 | | | | | | | | | | | 1 |
| 60 | | | | | | | | | | | 1 |
| TOTAL | 1 | 5 | 5 | 5 | 16 | 24 | 24 | 28 | 16 | 20 | 195 |

is slightly higher than the average fiber length for conifers." Thus Sierra redwood promises to make acceptable pulp.

The objective of this paper is to present the cubic foot and board foot vol-

ume tables and confidence intervals for Sierra redwood computed using the procedures outlined in the preceding paper.

DATA BASE AND VOLUME TABLES

The tree measurement information for this study was obtained during the summer of 1969 from standing trees using the University's Model FP-12 Barr and Stroud optical dendrometer. Most of the field measurements were made by Malcolm Gibson, a U.C. forestry student working as a summer employee of the California Division of Forestry (CDF) at Mountain Home State Forest.

Mountain Home State Forest is located toward the southern end of the Sierra redwood belt at elevations between 4,800 and 7,800 feet. Climatic conditions are typical of the southern Sierras and the precipitation ranges from 40 to 60 inches with a large portion in the form of snow. The summers are dry and hot.

A total of 195 trees were randomly selected within the range of tree diameters from 12 to 60 inches. Table 1 gives the range of tree heights sampled for each diameter class. Even though the same basic data were used for both the cubic foot and board foot tables, the difference between the total and merchantable heights gives a somewhat different breakdown for table 1A and 1B. Young growth trees larger than 60 inches in DBH were not considered and, for this reason, extrapolation of the present tables is not advised.

Most of the sample trees were located on granite-derived soils (Shaver series) of depths of 4 feet or more. The heights of sample trees indicated a site quality of II or better (Dunning, 1942).

Cubic foot and Scribner board foot standard and local volume tables are presented in the tables following, along with the width of the confidence intervals (in percentage) for each table.

Tables 2A and 2C are standard

volume tables giving the gross cubic foot and gross Scribner board-foot volumes, respectively, for trees ranging in diameter from 12 to 60 inches and in total height from 40 to 170 feet. Over the same diameter range, table 2B gives the gross Scribner board-foot volumes for trees ranging in merchantable height (to a 6-inch top inside bark) from 10 to 160 feet.

Tables 3A, 3B, and 3C give the widths of the 95 per cent confidence intervals for the volumes in tables 2A, 2B, and 2C, respectively, expressed as a percentage of the volumes. As explained in the previous paper, these confidence intervals are not symmetric about the volume estimates but they do indicate the relative reliability of the volume estimates. For the range of the data used (see table 1A), the width of the cubic foot confidence intervals (tables 3A) ranged from 5 to 21 per cent, with most of the intervals below 10 per cent. The width of the board foot confidence intervals based upon merchantable height (table 3B) ranged from 5 to 32 per cent, with only one interval more than 20 per cent and most of the intervals under 10 per cent for the range of the data used (table 1B). As expected, the confidence intervals for the board-foot volumes based upon total height (table 3C) are much wider than those obtained using merchantable height, which was used in scaling the logs originally.

Tables 4A and 4B contain the local volume tables (using DBH as the only index variable) for cubic-foot and board-foot volumes, respectively. Since these volumes are averaged over the heights present in the sample data, the widths of the 95 per cent confidence intervals for these volumes (table 5) are somewhat wider than those shown in table 3.

TABLE 2A
GROSS CUBIC-FOOT VOLUME FOR SIERRA REDWOOD, MOUNTAIN HOME
STATE FOREST

| DBH (INCHES) | TOTAL HEIGHT (FEET) | | | | | | | | | | | | | | |
|-----------------|---------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|
| | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 140 | 150 | 160 | 170 | |
| 12 | 7 | 9 | 12 | 15 | 17 | 20 | 23 | 26 | 29 | 33 | 36 | 39 | 43 | 46 | |
| 14 | 9 | 12 | 15 | 19 | 22 | 26 | 30 | 33 | 37 | 42 | 46 | 50 | 54 | 59 | |
| 16 | 11 | 15 | 19 | 23 | 27 | 32 | 36 | 41 | 46 | 51 | 56 | 61 | 67 | 72 | |
| 18 | 13 | 18 | 22 | 27 | 33 | 38 | 44 | 49 | 55 | 61 | 67 | 74 | 80 | 87 | |
| 20 | 16 | 21 | 26 | 32 | 38 | 45 | 51 | 58 | 65 | 72 | 79 | 87 | 94 | 102 | |
| 22 | 18 | 24 | 31 | 37 | 44 | 52 | 59 | 67 | 75 | 83 | 92 | 100 | 109 | 118 | |
| 24 | 21 | 28 | 35 | 43 | 51 | 59 | 68 | 77 | 86 | 95 | 105 | 115 | 125 | 135 | |
| 26 | 23 | 31 | 40 | 48 | 57 | 67 | 77 | 87 | 97 | 108 | 119 | 130 | 141 | 153 | |
| 28 | 26 | 35 | 44 | 54 | 64 | 75 | 86 | 97 | 109 | 121 | 133 | 146 | 159 | 171 | |
| 30 | 29 | 39 | 49 | 60 | 72 | 84 | 96 | 108 | 121 | 135 | 148 | 162 | 176 | 191 | |
| 32 | 32 | 43 | 55 | 67 | 79 | 92 | 106 | 120 | 134 | 149 | 164 | 179 | 195 | 211 | |
| 34 | 35 | 47 | 60 | 73 | 87 | 101 | 116 | 132 | 147 | 163 | 180 | 197 | 214 | 231 | |
| 36 | 39 | 52 | 65 | 80 | 95 | 111 | 127 | 144 | 161 | 178 | 196 | 215 | 234 | 253 | |
| 38 | 42 | 56 | 71 | 87 | 103 | 120 | 138 | 156 | 175 | 194 | 214 | 234 | 254 | 275 | |
| 40 | 45 | 61 | 77 | 94 | 112 | 130 | 149 | 169 | 189 | 210 | 231 | 253 | 275 | 297 | |
| 42 | 49 | 65 | 83 | 101 | 121 | 140 | 161 | 182 | 204 | 226 | 249 | 273 | 296 | 321 | |
| 44 | 53 | 70 | 89 | 109 | 130 | 151 | 173 | 196 | 219 | 243 | 268 | 293 | 319 | 345 | |
| 46 | 56 | 75 | 96 | 117 | 139 | 162 | 185 | 210 | 235 | 261 | 287 | 314 | 341 | 369 | |
| 48 | 60 | 80 | 102 | 125 | 148 | 173 | 198 | 224 | 251 | 278 | 306 | 335 | 364 | 394 | |
| 50 | 64 | 86 | 109 | 133 | 158 | 184 | 211 | 239 | 267 | 296 | 326 | 357 | 388 | 420 | |
| 52 | 68 | 91 | 115 | 141 | 168 | 195 | 224 | 253 | 284 | 315 | 347 | 379 | 412 | 446 | |
| 54 | 72 | 97 | 122 | 149 | 178 | 207 | 237 | 269 | 301 | 334 | 367 | 402 | 437 | 473 | |
| 56 | 76 | 102 | 129 | 158 | 188 | 219 | 251 | 284 | 318 | 353 | 389 | 425 | 462 | 500 | |
| 58 | 81 | 108 | 137 | 167 | 198 | 231 | 265 | 300 | 336 | 373 | 410 | 449 | 488 | 528 | |
| 60 | 85 | 114 | 144 | 176 | 209 | 244 | 279 | 316 | 354 | 393 | 432 | 473 | 514 | 556 | |

$$V = \text{ANTILOG}(-6.66790 + 1.54423 \log(D) + 1.29808 \log(H))$$

TABLE 2B
GROSS BOARD-FOOT VOLUME FOR SIERRA REDWOOD, MOUNTAIN HOME
STATE FOREST (6-INCH TOP)

| DBH (INCH) | MERCH. HEIGHT (FEET) | | | | | | | | | | | | | | | |
|-----------------------|----------------------|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|------|------|------|
| | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 140 | 150 | 160 |
| (SCRIBNER BOARD FEET) | | | | | | | | | | | | | | | | |
| 12 | 5 | 15 | 30 | 47 | 68 | 92 | 118 | 147 | 178 | 211 | 246 | 284 | 323 | 365 | 408 | 453 |
| 14 | 6 | 18 | 36 | 57 | 82 | 111 | 142 | 177 | 215 | 255 | 298 | 343 | 391 | 441 | 493 | 548 |
| 16 | 7 | 22 | 42 | 67 | 97 | 131 | 168 | 209 | 253 | 300 | 351 | 404 | 460 | 519 | 581 | 646 |
| 18 | 8 | 25 | 49 | 78 | 112 | 151 | 194 | 241 | 292 | 347 | 405 | 467 | 532 | 600 | 672 | 746 |
| 20 | 9 | 29 | 55 | 89 | 128 | 172 | 221 | 274 | 332 | 395 | 461 | 531 | 605 | 683 | 764 | 849 |
| 22 | 10 | 32 | 62 | 100 | 143 | 193 | 248 | 308 | 374 | 444 | 518 | 597 | 681 | 768 | 859 | 955 |
| 24 | 12 | 36 | 69 | 111 | 160 | 215 | 276 | 343 | 416 | 494 | 577 | 665 | 757 | 854 | 956 | 1062 |
| 26 | 13 | 40 | 77 | 122 | 176 | 237 | 305 | 379 | 459 | 545 | 636 | 733 | 835 | 943 | 1055 | 1172 |
| 28 | 14 | 43 | 84 | 134 | 193 | 260 | 334 | 415 | 503 | 597 | 697 | 803 | 915 | 1033 | 1155 | 1284 |
| 30 | 15 | 47 | 91 | 146 | 210 | 282 | 363 | 451 | 547 | 649 | 759 | 874 | 996 | 1124 | 1258 | 1397 |
| 32 | 16 | 51 | 99 | 158 | 227 | 306 | 393 | 489 | 592 | 703 | 821 | 946 | 1078 | 1217 | 1361 | 1512 |
| 34 | 18 | 55 | 106 | 170 | 245 | 329 | 424 | 526 | 638 | 757 | 885 | 1019 | 1162 | 1311 | 1467 | 1629 |
| 36 | 19 | 59 | 114 | 182 | 263 | 353 | 454 | 565 | 684 | 812 | 949 | 1094 | 1246 | 1406 | 1573 | 1748 |
| 38 | 20 | 63 | 122 | 195 | 281 | 378 | 486 | 604 | 731 | 868 | 1014 | 1169 | 1332 | 1502 | 1681 | 1868 |
| 40 | 22 | 67 | 130 | 208 | 299 | 402 | 517 | 643 | 779 | 925 | 1080 | 1245 | 1418 | 1600 | 1791 | 1989 |
| 42 | 23 | 71 | 138 | 221 | 317 | 427 | 549 | 682 | 827 | 982 | 1147 | 1322 | 1506 | 1699 | 1901 | 2112 |
| 44 | 24 | 75 | 146 | 234 | 336 | 452 | 581 | 723 | 876 | 1040 | 1214 | 1399 | 1594 | 1799 | 2050 | 2236 |
| 46 | 26 | 80 | 154 | 247 | 355 | 478 | 614 | 763 | 925 | 1098 | 1282 | 1478 | 1684 | 1900 | 2126 | 2362 |
| 48 | 27 | 84 | 163 | 260 | 374 | 503 | 647 | 804 | 974 | 1157 | 1351 | 1557 | 1774 | 2002 | 2240 | 2488 |
| 50 | 29 | 88 | 171 | 273 | 393 | 529 | 680 | 845 | 1024 | 1216 | 1421 | 1637 | 1865 | 2105 | 2355 | 2616 |
| 52 | 30 | 93 | 179 | 287 | 412 | 555 | 714 | 887 | 1075 | 1276 | 1491 | 1718 | 1957 | 2209 | 2471 | 2745 |
| 54 | 31 | 97 | 188 | 300 | 432 | 581 | 748 | 929 | 1126 | 1337 | 1562 | 1799 | 2050 | 2313 | 2589 | 2876 |
| 56 | 33 | 101 | 196 | 314 | 452 | 608 | 782 | 972 | 1177 | 1398 | 1633 | 1882 | 2144 | 2419 | 2707 | 3007 |
| 58 | 34 | 106 | 205 | 328 | 472 | 635 | 816 | 1015 | 1229 | 1459 | 1705 | 1964 | 2238 | 2526 | 2826 | 3140 |
| 60 | 36 | 110 | 214 | 342 | 492 | 662 | 851 | 1058 | 1281 | 1522 | 1777 | 2048 | 2333 | 2633 | 2946 | 3273 |

$$V = \text{ANTILOG}(-5.20645+1.22817 \log(D)+1.62977 \log(H))$$

TABLE 2C
GROSS BOARD-FOOT VOLUME FOR SIERRA REDWOOD, MOUNTAIN HOME
STATE FOREST (TOTAL HEIGHT)

| DBH (INCHES) | TOTAL HEIGHT (FEET) | | | | | | | | | | | | | |
|-----------------------|---------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 140 | 150 | 160 | 170 |
| (SCRIBNER BOARD FEET) | | | | | | | | | | | | | | |
| 12 | 25 | 31 | 36 | 42 | 47 | 52 | 58 | 63 | 68 | 74 | 79 | 84 | 89 | 94 |
| 14 | 35 | 43 | 51 | 59 | 66 | 74 | 81 | 89 | 96 | 103 | 111 | 118 | 125 | 132 |
| 16 | 47 | 58 | 68 | 79 | 89 | 99 | 109 | 119 | 129 | 139 | 149 | 159 | 168 | 178 |
| 18 | 61 | 75 | 89 | 102 | 115 | 129 | 142 | 155 | 168 | 180 | 193 | 206 | 218 | 231 |
| 20 | 77 | 95 | 112 | 129 | 146 | 162 | 179 | 195 | 211 | 228 | 244 | 260 | 275 | 291 |
| 22 | 95 | 117 | 138 | 159 | 180 | 200 | 221 | 241 | 261 | 281 | 301 | 320 | 340 | 360 |
| 24 | 115 | 141 | 167 | 193 | 218 | 243 | 268 | 292 | 316 | 341 | 365 | 388 | 412 | 436 |
| 26 | 138 | 169 | 200 | 230 | 260 | 290 | 319 | 349 | 378 | 406 | 435 | 464 | 492 | 520 |
| 28 | 162 | 199 | 235 | 271 | 306 | 341 | 376 | 411 | 445 | 479 | 513 | 546 | 580 | 613 |
| 30 | 189 | 232 | 274 | 316 | 357 | 398 | 438 | 478 | 518 | 558 | 597 | 636 | 675 | 714 |
| 32 | 218 | 267 | 316 | 364 | 412 | 459 | 505 | 552 | 598 | 643 | 689 | 734 | 778 | 823 |
| 34 | 249 | 306 | 361 | 416 | 471 | 525 | 578 | 631 | 683 | 735 | 787 | 839 | 890 | 941 |
| 36 | 282 | 347 | 410 | 472 | 534 | 595 | 656 | 716 | 775 | 834 | 893 | 952 | 1010 | 1068 |
| 38 | 318 | 391 | 462 | 532 | 602 | 671 | 739 | 807 | 874 | 940 | 1007 | 1073 | 1138 | 1203 |
| 40 | 356 | 438 | 517 | 596 | 674 | 751 | 828 | 903 | 979 | 1053 | 1128 | 1201 | 1275 | 1348 |
| 42 | 397 | 487 | 576 | 664 | 751 | 837 | 922 | 1006 | 1090 | 1173 | 1256 | 1338 | 1420 | 1501 |
| 44 | 440 | 540 | 639 | 736 | 832 | 927 | 1022 | 1115 | 1208 | 1300 | 1392 | 1483 | 1574 | 1664 |
| 46 | 486 | 596 | 705 | 812 | 918 | 1023 | 1127 | 1230 | 1333 | 1435 | 1536 | 1636 | 1736 | 1836 |
| 48 | 533 | 655 | 774 | 892 | 1009 | 1124 | 1238 | 1352 | 1464 | 1576 | 1687 | 1798 | 1908 | 2017 |
| 50 | 584 | 717 | 847 | 976 | 1104 | 1230 | 1355 | 1479 | 1603 | 1725 | 1846 | 1967 | 2088 | 2207 |
| 52 | 637 | 782 | 924 | 1065 | 1204 | 1342 | 1478 | 1613 | 1748 | 1881 | 2014 | 2146 | 2277 | 2407 |
| 54 | 692 | 850 | 1005 | 1157 | 1309 | 1458 | 1607 | 1754 | 1900 | 2045 | 2189 | 2332 | 2475 | 2617 |
| 56 | 750 | 921 | 1089 | 1254 | 1418 | 1580 | 1741 | 1900 | 2059 | 2216 | 2372 | 2527 | 2682 | 2836 |
| 58 | 810 | 995 | 1176 | 1356 | 1533 | 1708 | 1881 | 2054 | 2225 | 2395 | 2563 | 2731 | 2898 | 3064 |
| 60 | 873 | 1072 | 1268 | 1461 | 1652 | 1841 | 2028 | 2214 | 2398 | 2581 | 2763 | 2944 | 3124 | 3303 |

$$V = \text{ANTILOG}(-5.66831 + 2.21035 \log(D) + 0.91921 \log(H))$$

TABLE 3A
THE 95 PER CENT CONFIDENCE INTERVALS. GROSS CUBIC-FOOT VOLUME
FOR SIERRA REDWOOD, MOUNTAIN HOME STATE FOREST

| DBH (INCHES) | TOTAL HEIGHT (FEET) | | | | | | | | | | | | | |
|-----------------|---------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 140 | 150 | 160 | 170 |
| (PERCENT) | | | | | | | | | | | | | | |
| 12 | 13.0 | 15.4 | 18.3 | 21.3 | 24.0 | 26.6 | 28.9 | 31.0 | 33.0 | 34.9 | 36.6 | 38.2 | 39.8 | 41.2 |
| 14 | 10.7 | 11.9 | 14.4 | 17.2 | 19.9 | 22.5 | 24.8 | 27.0 | 28.9 | 30.8 | 32.5 | 34.2 | 35.7 | 37.2 |
| 16 | 9.7 | 9.3 | 11.3 | 13.8 | 16.5 | 19.0 | 21.3 | 23.5 | 25.5 | 27.3 | 29.1 | 30.7 | 32.2 | 33.7 |
| 18 | 9.9 | 7.8 | 8.7 | 11.0 | 13.5 | 16.0 | 18.3 | 20.4 | 22.4 | 24.3 | 26.1 | 27.7 | 29.2 | 30.7 |
| 20 | 10.9 | 7.4 | 6.9 | 8.6 | 10.9 | 13.3 | 15.6 | 17.8 | 19.8 | 21.6 | 23.4 | 25.0 | 26.6 | 28.0 |
| 22 | 12.3 | 7.9 | 6.0 | 6.7 | 8.7 | 11.0 | 13.3 | 15.4 | 17.4 | 19.3 | 21.1 | 22.7 | 24.2 | 25.7 |
| 24 | 13.9 | 9.1 | 6.1 | 5.6 | 7.0 | 9.1 | 11.3 | 13.4 | 15.4 | 17.2 | 19.0 | 20.6 | 22.1 | 23.6 |
| 26 | 15.5 | 10.5 | 7.0 | 5.3 | 5.8 | 7.5 | 9.5 | 11.6 | 13.5 | 15.4 | 17.1 | 18.7 | 20.3 | 21.7 |
| 28 | 17.1 | 12.0 | 8.2 | 5.8 | 5.3 | 6.4 | 8.1 | 10.1 | 12.0 | 13.8 | 15.5 | 17.1 | 18.6 | 20.1 |
| 30 | 18.7 | 13.5 | 9.5 | 6.7 | 5.4 | 5.7 | 7.1 | 8.8 | 10.6 | 12.4 | 14.0 | 15.6 | 17.1 | 18.6 |
| 32 | 20.2 | 15.0 | 11.0 | 7.9 | 6.1 | 5.7 | 6.5 | 7.9 | 9.5 | 11.2 | 12.8 | 14.3 | 15.8 | 17.2 |
| 34 | 21.7 | 16.4 | 12.4 | 9.2 | 7.1 | 6.1 | 6.3 | 7.3 | 8.7 | 10.2 | 11.7 | 13.2 | 14.7 | 16.0 |
| 36 | 23.1 | 17.8 | 13.7 | 10.5 | 8.2 | 6.8 | 6.5 | 7.0 | 8.1 | 9.5 | 10.9 | 12.3 | 13.7 | 15.0 |
| 38 | 24.4 | 19.2 | 15.1 | 11.8 | 9.4 | 7.7 | 7.0 | 7.1 | 7.9 | 9.0 | 10.2 | 11.5 | 12.8 | 14.1 |
| 40 | 25.7 | 20.5 | 16.4 | 13.1 | 10.5 | 8.7 | 7.7 | 7.4 | 7.8 | 8.7 | 9.7 | 10.9 | 12.1 | 13.3 |
| 42 | 27.0 | 21.7 | 17.6 | 14.3 | 11.7 | 9.8 | 8.5 | 8.0 | 8.6 | 8.6 | 9.5 | 10.5 | 11.6 | 12.7 |
| 44 | 28.1 | 22.9 | 18.8 | 15.5 | 12.9 | 10.8 | 9.4 | 8.6 | 8.4 | 8.7 | 9.4 | 10.2 | 11.2 | 12.2 |
| 46 | 29.3 | 24.1 | 19.9 | 16.6 | 14.0 | 11.9 | 10.3 | 9.4 | 9.0 | 9.0 | 9.4 | 10.1 | 11.0 | 11.9 |
| 48 | 30.4 | 25.2 | 21.1 | 17.7 | 15.0 | 12.9 | 11.3 | 10.2 | 9.6 | 9.4 | 9.6 | 10.1 | 10.8 | 11.7 |
| 50 | 31.4 | 26.2 | 22.1 | 18.8 | 16.1 | 13.9 | 12.2 | 11.0 | 10.3 | 9.9 | 10.0 | 10.3 | 10.8 | 11.5 |
| 52 | 32.5 | 27.3 | 23.1 | 19.8 | 17.1 | 14.9 | 13.1 | 11.8 | 11.0 | 10.5 | 10.4 | 10.5 | 11.0 | 11.5 |
| 54 | 33.5 | 28.3 | 24.1 | 20.8 | 18.1 | 15.8 | 14.0 | 12.7 | 11.7 | 11.1 | 10.9 | 10.9 | 11.1 | 11.6 |
| 56 | 34.4 | 29.2 | 25.1 | 21.8 | 19.0 | 16.8 | 14.9 | 13.5 | 12.5 | 11.8 | 11.4 | 11.3 | 11.4 | 11.7 |
| 58 | 35.3 | 30.1 | 26.0 | 22.7 | 19.9 | 17.7 | 15.8 | 14.3 | 13.2 | 12.4 | 11.9 | 11.7 | 11.8 | 12.0 |
| 60 | 36.2 | 31.0 | 26.9 | 23.6 | 20.8 | 18.5 | 16.7 | 15.1 | 14.0 | 13.1 | 12.5 | 12.2 | 12.1 | 12.3 |

TABLE 3B
THE 95 PER CENT CONFIDENCE INTERVALS. GROSS BOARD-FOOT VOLUME
FOR SIERRA REDWOOD MOUNTAIN HOME STATE FOREST (6-INCH TOP)

| DBH (INCH) | MERC. HEIGHT (FEET) | | | | | | | | | | | | | | | |
|---------------|---------------------|----|----|----|----|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|
| | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 140 | 150 | 160 |
| (PERCENT) | | | | | | | | | | | | | | | | |
| 12 | 32 | 18 | 12 | 12 | 15 | 18 | 20 | 23 | 26 | 28 | 30 | 32 | 34 | 36 | 37 | 39 |
| 14 | 35 | 20 | 12 | 10 | 11 | 14 | 16 | 19 | 22 | 24 | 26 | 28 | 30 | 32 | 33 | 35 |
| 16 | 38 | 21 | 13 | 9 | 9 | 11 | 13 | 16 | 18 | 20 | 23 | 25 | 26 | 28 | 30 | 31 |
| 18 | 40 | 24 | 15 | 9 | 7 | 8 | 10 | 13 | 15 | 17 | 20 | 22 | 23 | 25 | 27 | 28 |
| 20 | 42 | 26 | 16 | 10 | 7 | 6 | 8 | 10 | 13 | 15 | 17 | 19 | 21 | 23 | 24 | 26 |
| 22 | 44 | 28 | 18 | 12 | 7 | 5 | 6 | 8 | 10 | 13 | 15 | 17 | 18 | 20 | 22 | 23 |
| 24 | 46 | 29 | 20 | 13 | 8 | 6 | 5 | 6 | 8 | 11 | 13 | 15 | 16 | 18 | 20 | 21 |
| 26 | 48 | 31 | 21 | 15 | 10 | 6 | 5 | 5 | 7 | 9 | 11 | 13 | 15 | 16 | 18 | 19 |
| 28 | 50 | 33 | 23 | 16 | 11 | 8 | 5 | 5 | 6 | 8 | 9 | 11 | 13 | 15 | 16 | 18 |
| 30 | 51 | 34 | 25 | 18 | 13 | 9 | 6 | 5 | 5 | 6 | 8 | 10 | 12 | 13 | 15 | 16 |
| 32 | 53 | 36 | 26 | 19 | 14 | 10 | 7 | 5 | 5 | 6 | 7 | 9 | 10 | 12 | 14 | 15 |
| 34 | 54 | 37 | 28 | 21 | 16 | 12 | 9 | 6 | 5 | 6 | 7 | 8 | 10 | 11 | 12 | 14 |
| 36 | 56 | 39 | 29 | 22 | 17 | 13 | 10 | 8 | 6 | 6 | 6 | 7 | 9 | 10 | 12 | 13 |
| 38 | 57 | 40 | 30 | 24 | 18 | 14 | 11 | 9 | 7 | 6 | 6 | 7 | 8 | 10 | 11 | 12 |
| 40 | 58 | 41 | 32 | 25 | 20 | 16 | 12 | 10 | 8 | 7 | 7 | 7 | 8 | 9 | 10 | 11 |
| 42 | 60 | 43 | 33 | 26 | 21 | 17 | 14 | 11 | 9 | 8 | 7 | 7 | 8 | 9 | 10 | 11 |
| 44 | 61 | 44 | 34 | 27 | 22 | 18 | 15 | 12 | 10 | 9 | 8 | 8 | 8 | 9 | 10 | 11 |
| 46 | 62 | 45 | 35 | 28 | 23 | 19 | 16 | 13 | 11 | 10 | 9 | 8 | 8 | 9 | 9 | 10 |
| 48 | 63 | 46 | 36 | 29 | 24 | 20 | 17 | 14 | 12 | 11 | 10 | 9 | 9 | 9 | 9 | 10 |
| 50 | 64 | 47 | 37 | 30 | 25 | 21 | 18 | 15 | 13 | 12 | 10 | 10 | 9 | 9 | 10 | 10 |
| 52 | 65 | 48 | 38 | 31 | 26 | 22 | 19 | 16 | 14 | 12 | 11 | 10 | 10 | 10 | 10 | 10 |
| 54 | 66 | 49 | 39 | 32 | 27 | 23 | 20 | 17 | 15 | 13 | 12 | 11 | 10 | 10 | 10 | 10 |
| 56 | 67 | 50 | 40 | 33 | 28 | 24 | 21 | 18 | 16 | 14 | 13 | 12 | 11 | 11 | 11 | 11 |
| 58 | 68 | 51 | 41 | 34 | 29 | 25 | 22 | 19 | 17 | 15 | 14 | 12 | 12 | 11 | 11 | 11 |
| 60 | 69 | 52 | 42 | 35 | 30 | 26 | 23 | 20 | 18 | 16 | 14 | 13 | 12 | 12 | 12 | 11 |

TABLE 3C
THE 95 PER CENT CONFIDENCE INTERVALS. GROSS BOARD-FOOT VOLUME
FOR SIERRA REDWOOD, MOUNTAIN HOME STATE FOREST (TOTAL HEIGHT)

| DBH (INCHES) | TOTAL HEIGHT (FEET) | | | | | | | | | | | | | | |
|-----------------|---------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|--|
| | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 140 | 150 | 160 | 170 | |
| (PERCENT) | | | | | | | | | | | | | | | |
| 12 | 23.7 | 28.0 | 33.4 | 38.8 | 43.9 | 48.6 | 52.9 | 56.9 | 60.6 | 64.1 | 67.4 | 70.4 | 73.3 | 76.1 | |
| 14 | 19.4 | 21.6 | 26.3 | 31.4 | 36.4 | 41.0 | 45.3 | 49.3 | 53.0 | 56.5 | 59.7 | 62.8 | 65.7 | 68.4 | |
| 16 | 17.6 | 17.0 | 20.5 | 25.2 | 30.0 | 34.6 | 38.9 | 42.8 | 46.5 | 50.0 | 53.2 | 56.3 | 59.2 | 61.9 | |
| 18 | 17.9 | 14.2 | 15.8 | 19.9 | 24.6 | 29.1 | 33.3 | 37.3 | 41.0 | 44.4 | 47.6 | 50.7 | 53.5 | 56.3 | |
| 20 | 19.8 | 13.4 | 12.6 | 15.6 | 19.9 | 24.2 | 28.4 | 32.4 | 36.1 | 39.5 | 42.7 | 45.8 | 48.6 | 51.3 | |
| 22 | 22.3 | 14.4 | 11.0 | 12.2 | 15.9 | 20.1 | 24.2 | 28.1 | 31.8 | 35.2 | 38.4 | 41.4 | 44.3 | 47.0 | |
| 24 | 25.2 | 16.5 | 11.1 | 10.1 | 12.7 | 16.5 | 20.5 | 24.3 | 28.0 | 31.4 | 34.6 | 37.6 | 40.4 | 43.1 | |
| 26 | 28.2 | 19.1 | 12.6 | 9.6 | 10.5 | 13.7 | 17.4 | 21.1 | 24.6 | 28.0 | 31.2 | 34.2 | 37.0 | 39.7 | |
| 28 | 31.2 | 21.8 | 14.9 | 10.5 | 9.5 | 11.6 | 14.8 | 18.3 | 21.7 | 25.0 | 28.2 | 31.1 | 33.9 | 36.6 | |
| 30 | 34.1 | 24.6 | 17.4 | 12.3 | 9.8 | 10.4 | 12.9 | 16.0 | 19.3 | 22.5 | 25.5 | 28.4 | 31.2 | 33.8 | |
| 32 | 36.9 | 27.3 | 19.9 | 14.4 | 11.1 | 10.3 | 11.8 | 14.3 | 17.3 | 20.3 | 23.3 | 26.1 | 28.8 | 31.4 | |
| 34 | 39.6 | 30.0 | 22.5 | 16.8 | 12.9 | 11.0 | 11.4 | 13.3 | 15.8 | 18.6 | 21.3 | 24.1 | 26.7 | 29.2 | |
| 36 | 42.1 | 32.5 | 25.0 | 19.2 | 14.9 | 12.4 | 11.8 | 12.8 | 14.8 | 17.2 | 19.8 | 22.3 | 24.9 | 27.3 | |
| 38 | 44.6 | 35.0 | 27.5 | 21.5 | 17.0 | 14.0 | 12.7 | 12.9 | 14.3 | 16.3 | 18.6 | 20.9 | 23.3 | 25.7 | |
| 40 | 47.0 | 37.4 | 29.8 | 23.8 | 19.2 | 15.9 | 14.0 | 13.5 | 14.3 | 15.8 | 17.7 | 19.9 | 22.1 | 24.3 | |
| 42 | 49.3 | 39.6 | 32.1 | 26.0 | 21.3 | 17.8 | 15.5 | 14.5 | 14.6 | 15.6 | 17.2 | 19.1 | 21.1 | 23.2 | |
| 44 | 51.5 | 41.8 | 34.3 | 28.2 | 23.4 | 19.7 | 17.1 | 15.7 | 15.3 | 15.9 | 17.0 | 18.6 | 20.4 | 22.3 | |
| 46 | 53.6 | 44.0 | 36.4 | 30.3 | 25.4 | 21.6 | 18.8 | 17.1 | 16.3 | 16.4 | 17.2 | 18.4 | 19.9 | 21.6 | |
| 48 | 55.7 | 46.0 | 38.4 | 32.3 | 27.4 | 23.5 | 20.5 | 18.5 | 17.4 | 17.1 | 17.5 | 18.5 | 19.7 | 21.2 | |
| 50 | 57.7 | 48.0 | 40.4 | 34.2 | 29.3 | 25.3 | 22.2 | 20.0 | 18.6 | 18.0 | 18.1 | 18.7 | 19.7 | 21.0 | |
| 52 | 59.6 | 49.9 | 42.3 | 36.1 | 31.1 | 27.1 | 23.9 | 21.5 | 20.0 | 19.1 | 18.9 | 19.2 | 19.9 | 20.9 | |
| 54 | 61.4 | 51.7 | 44.1 | 37.9 | 32.9 | 28.8 | 25.6 | 23.1 | 21.3 | 20.2 | 19.7 | 19.8 | 20.3 | 21.1 | |
| 56 | 63.2 | 53.5 | 45.9 | 39.7 | 34.7 | 30.5 | 27.2 | 24.6 | 22.7 | 21.4 | 20.7 | 20.5 | 20.8 | 21.4 | |
| 58 | 65.0 | 55.2 | 47.6 | 41.4 | 36.3 | 32.2 | 28.8 | 26.1 | 24.0 | 22.6 | 21.7 | 21.3 | 21.4 | 21.8 | |
| 60 | 66.6 | 56.9 | 49.3 | 43.1 | 38.0 | 33.8 | 30.3 | 27.6 | 25.4 | 23.8 | 22.8 | 22.2 | 22.1 | 22.3 | |

TABLE 4A
LOCAL BOARD-FOOT VOLUME. GROSS VOLUME FOR GIANT SEQUOIA,
MOUNTAIN HOME STATE FOREST

| DRH (INCHES) | ONE TENTH INCH | | | | | | | | | |
|-----------------|----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| (CUBIC FEET) | | | | | | | | | | |
| 12 | 11.3 | 11.5 | 11.8 | 12.1 | 12.3 | 12.6 | 12.8 | 13.1 | 13.4 | 13.6 |
| 13 | 13.9 | 14.2 | 14.5 | 14.8 | 15.1 | 15.4 | 15.7 | 16.0 | 16.3 | 16.6 |
| 14 | 16.9 | 17.2 | 17.5 | 17.8 | 18.1 | 18.5 | 18.8 | 19.1 | 19.5 | 19.8 |
| 15 | 20.2 | 20.5 | 20.9 | 21.2 | 21.6 | 21.9 | 22.3 | 22.7 | 23.0 | 23.4 |
| 16 | 23.8 | 24.2 | 24.5 | 24.9 | 25.3 | 25.7 | 26.1 | 26.5 | 26.9 | 27.3 |
| 17 | 27.7 | 28.1 | 28.6 | 29.0 | 29.4 | 29.8 | 30.3 | 30.7 | 31.1 | 31.6 |
| 18 | 32.0 | 32.5 | 32.9 | 33.4 | 33.8 | 34.3 | 34.8 | 35.2 | 35.7 | 36.2 |
| 19 | 36.6 | 37.1 | 37.6 | 38.1 | 38.6 | 39.1 | 39.6 | 40.1 | 40.6 | 41.1 |
| 20 | 41.6 | 42.1 | 42.6 | 43.2 | 43.7 | 44.2 | 44.8 | 45.3 | 45.8 | 46.4 |
| 21 | 46.9 | 47.5 | 48.0 | 48.6 | 49.1 | 49.7 | 50.3 | 50.8 | 51.4 | 52.0 |
| 22 | 52.6 | 53.1 | 53.7 | 54.3 | 54.9 | 55.5 | 56.1 | 56.7 | 57.3 | 57.9 |
| 23 | 58.5 | 59.2 | 59.8 | 60.4 | 61.0 | 61.6 | 62.3 | 62.9 | 63.6 | 64.2 |
| 24 | 64.8 | 65.5 | 66.1 | 66.8 | 67.5 | 68.1 | 68.8 | 69.4 | 70.1 | 70.8 |
| 25 | 71.5 | 72.1 | 72.8 | 73.5 | 74.2 | 74.9 | 75.6 | 76.3 | 77.0 | 77.7 |
| 26 | 78.4 | 79.1 | 79.8 | 80.6 | 81.3 | 82.0 | 82.7 | 83.5 | 84.2 | 84.9 |
| 27 | 85.7 | 86.4 | 87.2 | 87.9 | 88.7 | 89.4 | 90.2 | 90.9 | 91.7 | 92.5 |
| 28 | 93.2 | 94.0 | 94.8 | 95.6 | 96.3 | 97.1 | 97.9 | 98.7 | 99.5 | 100.3 |
| 29 | 101.1 | 101.9 | 102.7 | 103.5 | 104.3 | 105.1 | 106.0 | 106.8 | 107.6 | 108.4 |
| 30 | 109.3 | 110.1 | 110.9 | 111.8 | 112.6 | 113.4 | 114.3 | 115.1 | 116.0 | 116.8 |
| 31 | 117.7 | 118.6 | 119.4 | 120.3 | 121.1 | 122.0 | 122.9 | 123.8 | 124.6 | 125.5 |
| 32 | 126.4 | 127.3 | 128.2 | 129.1 | 130.0 | 130.9 | 131.8 | 132.7 | 133.6 | 134.5 |
| 33 | 135.4 | 136.3 | 137.2 | 138.1 | 139.1 | 140.0 | 140.9 | 141.8 | 142.8 | 143.7 |
| 34 | 144.6 | 145.6 | 146.5 | 147.5 | 148.4 | 149.3 | 150.3 | 151.2 | 152.2 | 153.2 |
| 35 | 154.1 | 155.1 | 156.0 | 157.0 | 158.0 | 159.0 | 159.9 | 160.9 | 161.9 | 162.9 |
| 36 | 163.9 | 164.8 | 165.8 | 166.8 | 167.8 | 168.8 | 169.8 | 170.8 | 171.8 | 172.8 |
| 37 | 173.8 | 174.8 | 175.8 | 176.8 | 177.9 | 178.9 | 179.9 | 180.9 | 181.9 | 183.0 |
| 38 | 184.0 | 185.0 | 186.1 | 187.1 | 188.1 | 189.2 | 190.2 | 191.3 | 192.3 | 193.3 |
| 39 | 194.4 | 195.4 | 196.5 | 197.6 | 198.6 | 199.7 | 200.7 | 201.8 | 202.9 | 203.9 |
| 40 | 205.0 | 206.1 | 207.1 | 208.2 | 209.3 | 210.4 | 211.4 | 212.5 | 213.6 | 214.7 |
| 41 | 215.8 | 216.9 | 218.0 | 219.1 | 220.2 | 221.3 | 222.4 | 223.5 | 224.6 | 225.7 |
| 42 | 226.8 | 227.9 | 229.0 | 230.1 | 231.2 | 232.3 | 233.4 | 234.6 | 235.7 | 236.8 |
| 43 | 237.9 | 239.0 | 240.2 | 241.3 | 242.4 | 243.5 | 244.7 | 245.8 | 247.0 | 248.1 |
| 44 | 249.2 | 250.4 | 251.5 | 252.6 | 253.8 | 254.9 | 256.1 | 257.2 | 258.4 | 259.5 |
| 45 | 260.7 | 261.8 | 263.0 | 264.2 | 265.3 | 266.5 | 267.6 | 268.8 | 270.0 | 271.1 |
| 46 | 272.3 | 273.5 | 274.6 | 275.8 | 277.0 | 278.2 | 279.3 | 280.5 | 281.7 | 282.9 |
| 47 | 284.0 | 285.2 | 286.4 | 287.6 | 288.8 | 290.0 | 291.2 | 292.3 | 293.5 | 294.7 |
| 48 | 295.9 | 297.1 | 298.3 | 299.5 | 300.7 | 301.9 | 303.1 | 304.3 | 305.5 | 306.7 |
| 49 | 307.9 | 309.1 | 310.3 | 311.5 | 312.7 | 313.9 | 315.1 | 316.3 | 317.6 | 318.8 |
| 50 | 320.0 | 321.2 | 322.4 | 323.6 | 324.8 | 326.1 | 327.3 | 328.5 | 329.7 | 330.9 |
| 51 | 332.2 | 333.4 | 334.6 | 335.8 | 337.1 | 338.3 | 339.5 | 340.7 | 342.0 | 343.2 |
| 52 | 344.4 | 345.7 | 346.9 | 348.1 | 349.4 | 350.6 | 351.8 | 353.1 | 354.3 | 355.5 |
| 53 | 356.8 | 358.0 | 359.3 | 360.5 | 361.7 | 363.0 | 364.2 | 365.5 | 366.7 | 367.9 |
| 54 | 369.2 | 370.4 | 371.7 | 372.9 | 374.2 | 375.4 | 376.7 | 377.9 | 379.2 | 380.4 |
| 55 | 381.7 | 382.9 | 384.2 | 385.4 | 386.7 | 387.9 | 389.2 | 390.4 | 391.7 | 392.9 |
| 56 | 394.2 | 395.4 | 396.7 | 397.9 | 399.2 | 400.4 | 401.7 | 403.0 | 404.2 | 405.5 |
| 57 | 406.7 | 408.0 | 409.2 | 410.5 | 411.8 | 413.0 | 414.3 | 415.5 | 416.8 | 418.1 |
| 58 | 419.3 | 420.6 | 421.8 | 423.1 | 424.4 | 425.6 | 426.9 | 428.2 | 429.4 | 430.7 |
| 59 | 431.9 | 433.2 | 434.5 | 435.7 | 437.0 | 438.3 | 439.5 | 440.8 | 442.0 | 443.3 |
| 60 | 444.6 | 445.8 | 447.1 | 448.4 | 449.6 | 450.9 | 452.2 | 453.4 | 454.7 | 455.9 |

$$V = \text{ANTILOG}(-4.43275 + 2.85186 \log(D) + -.01911 D)$$

TABLE 4B
LOCAL BOARD-FOOT VOLUME. GROSS VOLUME FOR GIANT SEQUOIA,
MOUNTAIN HOME STATE FOREST

| DBH (INCHES) | ONE TENTH INCH | | | | | | | | | |
|-----------------|-----------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| | (SCRIBNER BOARD FEET) | | | | | | | | | |
| 12 | 27.6 | 28.4 | 29.2 | 30.1 | 31.0 | 31.9 | 32.8 | 33.8 | 34.7 | 35.7 |
| 13 | 36.7 | 37.7 | 38.7 | 39.8 | 40.9 | 41.9 | 43.1 | 44.2 | 45.3 | 46.5 |
| 14 | 47.7 | 48.9 | 50.1 | 51.3 | 52.6 | 53.9 | 55.2 | 56.5 | 57.9 | 59.2 |
| 15 | 60.6 | 62.0 | 63.4 | 64.9 | 66.4 | 67.8 | 69.4 | 70.9 | 72.4 | 74.0 |
| 16 | 75.6 | 77.2 | 78.9 | 80.5 | 82.2 | 83.9 | 85.7 | 87.4 | 89.2 | 91.0 |
| 17 | 92.8 | 94.6 | 96.5 | 98.4 | 100.3 | 102.2 | 104.2 | 106.2 | 108.2 | 110.2 |
| 18 | 112.2 | 114.3 | 116.4 | 118.5 | 120.7 | 122.8 | 125.0 | 127.2 | 129.5 | 131.7 |
| 19 | 134.0 | 136.3 | 138.6 | 141.0 | 143.3 | 145.7 | 148.2 | 150.6 | 153.1 | 155.6 |
| 20 | 158.1 | 160.6 | 163.2 | 165.8 | 168.4 | 171.0 | 173.7 | 176.4 | 179.1 | 181.8 |
| 21 | 184.6 | 187.4 | 190.2 | 193.0 | 195.8 | 198.7 | 201.6 | 204.5 | 207.5 | 210.5 |
| 22 | 213.5 | 216.5 | 219.5 | 222.6 | 225.7 | 228.8 | 231.9 | 235.1 | 238.3 | 241.5 |
| 23 | 244.7 | 248.0 | 251.2 | 254.5 | 257.9 | 261.2 | 264.6 | 268.0 | 271.4 | 274.8 |
| 24 | 278.3 | 281.8 | 285.3 | 288.8 | 292.4 | 296.0 | 299.6 | 303.2 | 306.8 | 310.5 |
| 25 | 314.2 | 317.9 | 321.6 | 325.4 | 329.2 | 333.0 | 336.8 | 340.7 | 344.5 | 348.4 |
| 26 | 352.3 | 356.3 | 360.2 | 364.2 | 368.2 | 372.2 | 376.3 | 380.3 | 384.4 | 388.5 |
| 27 | 392.6 | 396.8 | 400.9 | 405.1 | 409.3 | 413.6 | 417.8 | 422.1 | 426.4 | 430.7 |
| 28 | 435.0 | 439.4 | 443.8 | 448.1 | 452.6 | 457.0 | 461.4 | 465.9 | 470.4 | 474.9 |
| 29 | 479.4 | 484.0 | 488.5 | 493.1 | 497.7 | 502.3 | 507.0 | 511.6 | 516.3 | 521.0 |
| 30 | 525.7 | 530.4 | 535.2 | 539.9 | 544.7 | 549.5 | 554.3 | 559.2 | 564.0 | 568.9 |
| 31 | 573.7 | 578.6 | 583.6 | 588.5 | 593.4 | 598.4 | 603.4 | 608.4 | 613.4 | 618.4 |
| 32 | 623.4 | 628.5 | 633.6 | 638.7 | 643.8 | 648.9 | 654.0 | 659.2 | 664.3 | 669.5 |
| 33 | 674.7 | 679.9 | 685.1 | 690.3 | 695.6 | 700.8 | 706.1 | 711.4 | 716.7 | 722.0 |
| 34 | 727.3 | 732.6 | 738.0 | 743.3 | 748.7 | 754.1 | 759.4 | 764.9 | 770.3 | 775.7 |
| 35 | 781.1 | 786.6 | 792.0 | 797.5 | 803.0 | 808.5 | 814.0 | 819.5 | 825.0 | 830.6 |
| 36 | 836.1 | 841.6 | 847.2 | 852.8 | 858.4 | 863.9 | 869.5 | 875.1 | 880.8 | 886.4 |
| 37 | 892.0 | 897.7 | 903.3 | 909.0 | 914.6 | 920.3 | 926.0 | 931.7 | 937.3 | 943.0 |
| 38 | 948.7 | 954.5 | 960.2 | 965.9 | 971.6 | 977.4 | 983.1 | 988.9 | 994.6 | 1000.4 |
| 39 | 1006.2 | 1011.9 | 1017.7 | 1023.5 | 1029.3 | 1035.1 | 1040.9 | 1046.6 | 1052.5 | 1058.3 |
| 40 | 1064.1 | 1069.9 | 1075.7 | 1081.5 | 1087.4 | 1093.2 | 1099.0 | 1104.8 | 1110.7 | 1116.5 |
| 41 | 1122.4 | 1128.2 | 1134.1 | 1139.9 | 1145.8 | 1151.6 | 1157.5 | 1163.3 | 1169.2 | 1175.0 |
| 42 | 1180.9 | 1186.7 | 1192.6 | 1198.5 | 1204.3 | 1210.2 | 1216.1 | 1221.9 | 1227.8 | 1233.6 |
| 43 | 1239.5 | 1245.4 | 1251.2 | 1257.1 | 1262.9 | 1268.8 | 1274.6 | 1280.5 | 1286.4 | 1292.2 |
| 44 | 1298.1 | 1303.9 | 1309.7 | 1315.6 | 1321.4 | 1327.3 | 1333.1 | 1338.9 | 1344.8 | 1350.6 |
| 45 | 1356.4 | 1362.2 | 1368.1 | 1373.9 | 1379.7 | 1385.5 | 1391.3 | 1397.1 | 1402.9 | 1408.7 |
| 46 | 1414.5 | 1420.2 | 1426.0 | 1431.8 | 1437.6 | 1443.3 | 1449.1 | 1454.8 | 1460.6 | 1466.3 |
| 47 | 1472.0 | 1477.8 | 1483.5 | 1489.2 | 1494.9 | 1500.6 | 1506.3 | 1512.0 | 1517.7 | 1523.4 |
| 48 | 1529.1 | 1534.7 | 1540.4 | 1546.0 | 1551.7 | 1557.3 | 1562.9 | 1568.6 | 1574.2 | 1579.8 |
| 49 | 1585.4 | 1591.0 | 1596.5 | 1602.1 | 1607.7 | 1613.2 | 1618.8 | 1624.3 | 1629.9 | 1635.4 |
| 50 | 1640.9 | 1646.4 | 1651.9 | 1657.4 | 1662.8 | 1668.3 | 1673.8 | 1679.2 | 1684.6 | 1690.1 |
| 51 | 1695.5 | 1700.9 | 1706.3 | 1711.7 | 1717.0 | 1722.4 | 1727.7 | 1733.1 | 1738.4 | 1743.7 |
| 52 | 1749.0 | 1754.3 | 1759.6 | 1764.9 | 1770.2 | 1775.4 | 1780.7 | 1785.9 | 1791.1 | 1796.3 |
| 53 | 1801.5 | 1806.7 | 1811.8 | 1817.0 | 1822.1 | 1827.3 | 1832.4 | 1837.5 | 1842.6 | 1847.7 |
| 54 | 1852.7 | 1857.8 | 1862.8 | 1867.9 | 1872.9 | 1877.9 | 1882.9 | 1887.8 | 1892.8 | 1897.8 |
| 55 | 1902.7 | 1907.6 | 1912.5 | 1917.4 | 1922.3 | 1927.2 | 1932.0 | 1936.8 | 1941.7 | 1946.5 |
| 56 | 1951.3 | 1956.0 | 1960.8 | 1965.6 | 1970.3 | 1975.0 | 1979.7 | 1984.4 | 1989.1 | 1993.7 |
| 57 | 1998.4 | 2003.0 | 2007.6 | 2012.2 | 2016.8 | 2021.4 | 2025.9 | 2030.5 | 2035.0 | 2039.5 |
| 58 | 2044.0 | 2048.5 | 2052.9 | 2057.4 | 2061.8 | 2066.2 | 2070.6 | 2075.0 | 2079.4 | 2083.7 |
| 59 | 2088.0 | 2092.3 | 2096.6 | 2100.9 | 2105.2 | 2109.4 | 2113.7 | 2117.9 | 2122.1 | 2126.3 |
| 60 | 2130.4 | 2134.6 | 2138.7 | 2142.8 | 2146.9 | 2151.0 | 2155.1 | 2159.1 | 2163.1 | 2167.2 |

$$V = \text{ANTILOG}(-6.54770 + 4.21450 \log(D) + -.05073 D)$$

TABLE 5A
THE 95 PER CENT CONFIDENCE INTERVALS, GROSS CUBIC-FOOT VOLUME
FOR GIANT SEQUOIA, MOUNTAIN HOME STATE FOREST

| DBH (INCHES) | ONE TENTH INCH | | | | | | | | | |
|-----------------|----------------|------|------|------|------|------|------|------|------|------|
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| (PERCENT) | | | | | | | | | | |
| 12 | 37.6 | 37.0 | 36.4 | 35.8 | 35.3 | 34.7 | 34.2 | 33.6 | 33.1 | 32.6 |
| 13 | 32.1 | 31.6 | 31.1 | 30.6 | 30.1 | 29.6 | 29.2 | 28.7 | 28.3 | 27.9 |
| 14 | 27.4 | 27.0 | 26.6 | 26.2 | 25.8 | 25.4 | 25.0 | 24.6 | 24.3 | 23.9 |
| 15 | 23.6 | 23.2 | 22.9 | 22.5 | 22.2 | 21.9 | 21.6 | 21.3 | 21.0 | 20.7 |
| 16 | 20.4 | 20.1 | 19.8 | 19.6 | 19.3 | 19.1 | 18.8 | 18.6 | 18.3 | 18.1 |
| 17 | 17.9 | 17.7 | 17.4 | 17.2 | 17.0 | 16.8 | 16.7 | 16.5 | 16.3 | 16.1 |
| 18 | 16.0 | 15.8 | 15.6 | 15.5 | 15.3 | 15.2 | 15.1 | 14.9 | 14.8 | 14.7 |
| 19 | 14.6 | 14.5 | 14.4 | 14.3 | 14.2 | 14.1 | 14.0 | 13.9 | 13.8 | 13.7 |
| 20 | 13.7 | 13.6 | 13.5 | 13.5 | 13.4 | 13.3 | 13.3 | 13.2 | 13.2 | 13.2 |
| 21 | 13.1 | 13.1 | 13.1 | 13.0 | 13.0 | 13.0 | 12.9 | 12.9 | 12.9 | 12.9 |
| 22 | 12.9 | 12.9 | 12.9 | 12.8 | 12.8 | 12.8 | 12.8 | 12.8 | 12.8 | 12.8 |
| 23 | 12.8 | 12.8 | 12.8 | 12.8 | 12.8 | 12.9 | 12.9 | 12.9 | 12.9 | 12.9 |
| 24 | 12.9 | 12.9 | 12.9 | 12.9 | 12.9 | 13.0 | 13.0 | 13.0 | 13.0 | 13.0 |
| 25 | 13.0 | 13.0 | 13.1 | 13.1 | 13.1 | 13.1 | 13.1 | 13.1 | 13.2 | 13.2 |
| 26 | 13.2 | 13.2 | 13.2 | 13.2 | 13.3 | 13.3 | 13.3 | 13.3 | 13.3 | 13.3 |
| 27 | 13.3 | 13.4 | 13.4 | 13.4 | 13.4 | 13.4 | 13.4 | 13.4 | 13.4 | 13.5 |
| 28 | 13.5 | 13.5 | 13.5 | 13.5 | 13.5 | 13.5 | 13.5 | 13.5 | 13.6 | 13.6 |
| 29 | 13.6 | 13.6 | 13.6 | 13.6 | 13.6 | 13.6 | 13.6 | 13.6 | 13.6 | 13.6 |
| 30 | 13.7 | 13.7 | 13.7 | 13.7 | 13.7 | 13.7 | 13.7 | 13.7 | 13.7 | 13.7 |
| 31 | 13.7 | 13.7 | 13.7 | 13.7 | 13.7 | 13.7 | 13.7 | 13.7 | 13.7 | 13.7 |
| 32 | 13.7 | 13.7 | 13.7 | 13.7 | 13.7 | 13.7 | 13.7 | 13.8 | 13.8 | 13.8 |
| 33 | 13.8 | 13.8 | 13.8 | 13.8 | 13.8 | 13.8 | 13.8 | 13.8 | 13.8 | 13.8 |
| 34 | 13.8 | 13.8 | 13.8 | 13.8 | 13.8 | 13.8 | 13.8 | 13.8 | 13.8 | 13.8 |
| 35 | 13.8 | 13.9 | 13.9 | 13.9 | 13.9 | 13.9 | 13.9 | 13.9 | 13.9 | 13.9 |
| 36 | 13.9 | 13.9 | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | 14.1 |
| 37 | 14.1 | 14.1 | 14.1 | 14.1 | 14.1 | 14.2 | 14.2 | 14.2 | 14.2 | 14.3 |
| 38 | 14.3 | 14.3 | 14.3 | 14.4 | 14.4 | 14.4 | 14.4 | 14.5 | 14.5 | 14.5 |
| 39 | 14.6 | 14.6 | 14.6 | 14.7 | 14.7 | 14.8 | 14.8 | 14.8 | 14.9 | 14.9 |
| 40 | 15.0 | 15.0 | 15.1 | 15.1 | 15.1 | 15.2 | 15.2 | 15.3 | 15.3 | 15.4 |
| 41 | 15.5 | 15.5 | 15.6 | 15.6 | 15.7 | 15.7 | 15.8 | 15.9 | 15.9 | 16.0 |
| 42 | 16.1 | 16.1 | 16.2 | 16.3 | 16.3 | 16.4 | 16.5 | 16.6 | 16.6 | 16.7 |
| 43 | 16.8 | 16.9 | 16.9 | 17.0 | 17.1 | 17.2 | 17.3 | 17.4 | 17.4 | 17.5 |
| 44 | 17.6 | 17.7 | 17.8 | 17.9 | 18.0 | 18.1 | 18.2 | 18.3 | 18.4 | 18.5 |
| 45 | 18.6 | 18.7 | 18.8 | 18.9 | 19.0 | 19.1 | 19.2 | 19.3 | 19.4 | 19.5 |
| 46 | 19.6 | 19.7 | 19.9 | 20.0 | 20.1 | 20.2 | 20.3 | 20.4 | 20.6 | 20.7 |
| 47 | 20.8 | 20.9 | 21.1 | 21.2 | 21.3 | 21.4 | 21.6 | 21.7 | 21.8 | 21.9 |
| 48 | 22.1 | 22.2 | 22.3 | 22.5 | 22.6 | 22.8 | 22.9 | 23.0 | 23.2 | 23.3 |
| 49 | 23.4 | 23.6 | 23.7 | 23.9 | 24.0 | 24.2 | 24.3 | 24.5 | 24.6 | 24.8 |
| 50 | 24.9 | 25.1 | 25.2 | 25.4 | 25.5 | 25.7 | 25.8 | 26.0 | 26.1 | 26.3 |
| 51 | 26.5 | 26.6 | 26.8 | 26.9 | 27.1 | 27.3 | 27.4 | 27.6 | 27.8 | 27.9 |
| 52 | 28.1 | 28.3 | 28.4 | 28.6 | 28.8 | 28.9 | 29.1 | 29.3 | 29.4 | 29.6 |
| 53 | 29.8 | 30.0 | 30.1 | 30.3 | 30.5 | 30.7 | 30.8 | 31.0 | 31.2 | 31.4 |
| 54 | 31.6 | 31.7 | 31.9 | 32.1 | 32.3 | 32.5 | 32.7 | 32.9 | 33.0 | 33.2 |
| 55 | 33.4 | 33.6 | 33.8 | 34.0 | 34.2 | 34.4 | 34.5 | 34.7 | 34.9 | 35.1 |
| 56 | 35.3 | 35.5 | 35.7 | 35.9 | 36.1 | 36.3 | 36.5 | 36.7 | 36.9 | 37.1 |
| 57 | 37.3 | 37.5 | 37.7 | 37.9 | 38.1 | 38.3 | 38.5 | 38.7 | 38.9 | 39.1 |
| 58 | 39.3 | 39.5 | 39.7 | 39.9 | 40.1 | 40.3 | 40.6 | 40.8 | 41.0 | 41.2 |
| 59 | 41.4 | 41.6 | 41.8 | 42.0 | 42.2 | 42.5 | 42.7 | 42.9 | 43.1 | 43.3 |
| 60 | 43.5 | 43.7 | 44.0 | 44.2 | 44.4 | 44.6 | 44.8 | 45.1 | 45.3 | 45.5 |

TABLE 5B
THE 95 PER CENT CONFIDENCE INTERVALS. GROSS BOARD-FOOT VOLUME
FOR GIANT SEQUOIA, MOUNTAIN HOME STATE FOREST

| DBH (INCHES) | ONE TENTH INCH (PERCENT) | | | | | | | | | |
|-----------------|-----------------------------|------|------|------|------|------|------|------|------|------|
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 12 | 25.7 | 25.3 | 24.9 | 24.5 | 24.1 | 23.7 | 23.3 | 23.0 | 22.6 | 22.3 |
| 13 | 21.9 | 21.6 | 21.2 | 20.9 | 20.6 | 20.3 | 20.0 | 19.6 | 19.3 | 19.0 |
| 14 | 18.8 | 18.5 | 18.2 | 17.9 | 17.6 | 17.4 | 17.1 | 16.9 | 16.6 | 16.4 |
| 15 | 16.1 | 15.9 | 15.6 | 15.4 | 15.2 | 15.0 | 14.8 | 14.6 | 14.4 | 14.2 |
| 16 | 14.0 | 13.8 | 13.6 | 13.4 | 13.2 | 13.0 | 12.9 | 12.7 | 12.5 | 12.4 |
| 17 | 12.2 | 12.1 | 11.9 | 11.8 | 11.7 | 11.5 | 11.4 | 11.3 | 11.2 | 11.0 |
| 18 | 10.9 | 10.8 | 10.7 | 10.6 | 10.5 | 10.4 | 10.3 | 10.2 | 10.1 | 10.0 |
| 19 | 10.0 | 9.9 | 9.8 | 9.8 | 9.7 | 9.6 | 9.6 | 9.5 | 9.5 | 9.4 |
| 20 | 9.3 | 9.3 | 9.3 | 9.2 | 9.2 | 9.1 | 9.1 | 9.1 | 9.0 | 9.0 |
| 21 | 9.0 | 9.0 | 8.9 | 8.9 | 8.9 | 8.9 | 8.9 | 8.8 | 8.8 | 8.8 |
| 22 | 8.8 | 8.8 | 8.8 | 8.8 | 8.8 | 8.8 | 8.8 | 8.8 | 8.8 | 8.8 |
| 23 | 8.8 | 8.8 | 8.8 | 8.8 | 8.8 | 8.8 | 8.8 | 8.8 | 8.8 | 8.8 |
| 24 | 8.8 | 8.8 | 8.8 | 8.9 | 8.9 | 8.9 | 8.9 | 8.9 | 8.9 | 8.9 |
| 25 | 8.9 | 8.9 | 8.9 | 9.0 | 9.0 | 9.0 | 9.0 | 9.0 | 9.0 | 9.0 |
| 26 | 9.0 | 9.0 | 9.1 | 9.1 | 9.1 | 9.1 | 9.1 | 9.1 | 9.1 | 9.1 |
| 27 | 9.1 | 9.1 | 9.2 | 9.2 | 9.2 | 9.2 | 9.2 | 9.2 | 9.2 | 9.2 |
| 28 | 9.2 | 9.2 | 9.2 | 9.2 | 9.3 | 9.3 | 9.3 | 9.3 | 9.3 | 9.3 |
| 29 | 9.3 | 9.3 | 9.3 | 9.3 | 9.3 | 9.3 | 9.3 | 9.3 | 9.3 | 9.3 |
| 30 | 9.3 | 9.4 | 9.4 | 9.4 | 9.4 | 9.4 | 9.4 | 9.4 | 9.4 | 9.4 |
| 31 | 9.4 | 9.4 | 9.4 | 9.4 | 9.4 | 9.4 | 9.4 | 9.4 | 9.4 | 9.4 |
| 32 | 9.4 | 9.4 | 9.4 | 9.4 | 9.4 | 9.4 | 9.4 | 9.4 | 9.4 | 9.4 |
| 33 | 9.4 | 9.4 | 9.4 | 9.4 | 9.4 | 9.4 | 9.4 | 9.4 | 9.4 | 9.4 |
| 34 | 9.4 | 9.4 | 9.4 | 9.5 | 9.5 | 9.5 | 9.5 | 9.5 | 9.5 | 9.5 |
| 35 | 9.5 | 9.5 | 9.5 | 9.5 | 9.5 | 9.5 | 9.5 | 9.5 | 9.5 | 9.5 |
| 36 | 9.5 | 9.5 | 9.6 | 9.6 | 9.6 | 9.6 | 9.6 | 9.6 | 9.6 | 9.6 |
| 37 | 9.6 | 9.6 | 9.7 | 9.7 | 9.7 | 9.7 | 9.7 | 9.7 | 9.7 | 9.8 |
| 38 | 9.8 | 9.8 | 9.8 | 9.8 | 9.9 | 9.9 | 9.9 | 9.9 | 9.9 | 10.0 |
| 39 | 10.0 | 10.0 | 10.0 | 10.1 | 10.1 | 10.1 | 10.1 | 10.2 | 10.2 | 10.2 |
| 40 | 10.2 | 10.3 | 10.3 | 10.3 | 10.4 | 10.4 | 10.4 | 10.5 | 10.5 | 10.5 |
| 41 | 10.6 | 10.6 | 10.7 | 10.7 | 10.7 | 10.8 | 10.8 | 10.9 | 10.9 | 10.9 |
| 42 | 11.0 | 11.0 | 11.1 | 11.1 | 11.2 | 11.2 | 11.3 | 11.3 | 11.4 | 11.4 |
| 43 | 11.5 | 11.5 | 11.6 | 11.6 | 11.7 | 11.8 | 11.8 | 11.9 | 11.9 | 12.0 |
| 44 | 12.1 | 12.1 | 12.2 | 12.2 | 12.3 | 12.4 | 12.4 | 12.5 | 12.6 | 12.6 |
| 45 | 12.7 | 12.8 | 12.8 | 12.9 | 13.0 | 13.1 | 13.1 | 13.2 | 13.3 | 13.4 |
| 46 | 13.4 | 13.5 | 13.6 | 13.7 | 13.7 | 13.8 | 13.9 | 14.0 | 14.1 | 14.2 |
| 47 | 14.2 | 14.3 | 14.4 | 14.5 | 14.6 | 14.7 | 14.7 | 14.8 | 14.9 | 15.0 |
| 48 | 15.1 | 15.2 | 15.3 | 15.4 | 15.5 | 15.6 | 15.7 | 15.8 | 15.8 | 15.9 |
| 49 | 16.0 | 16.1 | 16.2 | 16.3 | 16.4 | 16.5 | 16.6 | 16.7 | 16.8 | 16.9 |
| 50 | 17.0 | 17.1 | 17.2 | 17.3 | 17.5 | 17.6 | 17.7 | 17.8 | 17.9 | 18.0 |
| 51 | 18.1 | 18.2 | 18.3 | 18.4 | 18.5 | 18.6 | 18.8 | 18.9 | 19.0 | 19.1 |
| 52 | 19.2 | 19.3 | 19.4 | 19.5 | 19.7 | 19.8 | 19.9 | 20.0 | 20.1 | 20.2 |
| 53 | 20.4 | 20.5 | 20.6 | 20.7 | 20.8 | 21.0 | 21.1 | 21.2 | 21.3 | 21.5 |
| 54 | 21.6 | 21.7 | 21.8 | 21.9 | 22.1 | 22.2 | 22.3 | 22.4 | 22.6 | 22.7 |
| 55 | 22.8 | 23.0 | 23.1 | 23.2 | 23.3 | 23.5 | 23.6 | 23.7 | 23.9 | 24.0 |
| 56 | 24.1 | 24.3 | 24.4 | 24.5 | 24.7 | 24.8 | 24.9 | 25.1 | 25.2 | 25.3 |
| 57 | 25.5 | 25.6 | 25.7 | 25.9 | 26.0 | 26.1 | 26.3 | 26.4 | 26.6 | 26.7 |
| 58 | 26.8 | 27.0 | 27.1 | 27.3 | 27.4 | 27.5 | 27.7 | 27.8 | 28.0 | 28.1 |
| 59 | 28.2 | 28.4 | 28.5 | 28.7 | 28.8 | 29.0 | 29.1 | 29.3 | 29.4 | 29.5 |
| 60 | 29.7 | 29.8 | 30.0 | 30.1 | 30.3 | 30.4 | 30.6 | 30.7 | 30.9 | 31.0 |

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