

CANADA
Department of Northern Affairs and National Resources
FORESTRY BRANCH

**STANDARD VOLUME TABLES FOR
LODGEPOLE PINE IN ALBERTA**

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Standard Volume Tables for Lodgepole Pine in Alberta

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During the winter of 1953-54 all the existing tree measurement data for lodgepole pine (*Pinus contorta* Dougl. var. *latifolia* Engelm.) were assembled for the purpose of constructing standard volume tables based on diameter and total height. Altogether, complete taper measurements were available on 676 trees distributed throughout the range of lodgepole pine in Alberta.

Four volume tables were prepared:

1. Total volume in cubic feet (stump and top included, bark excluded).
2. Merchantable volume in cubic feet (stump height 1.0 feet; top diameter 4 inches I.B.).
3. Board foot volume, Scribner Log Rule (stump height 1.0 feet; top diameter 6 inches I.B.).
4. Board foot volume, International $\frac{1}{4}$ " Log Rule (stump height 1.0 feet; top diameter 6 inches I.B.).

The total cubic foot volume table was prepared by the method of harmonized curves as described by Dwight (1).

The merchantable cubic foot volume table was prepared by subtracting the curved amount of non-merchantable volume for each diameter and height class from the volumes shown in the total cubic table.

The board foot volume tables for both the Scribner and International Log Rules were prepared by the volume-diameter ratio method as devised by Meyer (2).

While it is felt that the tables presented here are applicable throughout the range of lodgepole pine in Alberta, they should be checked whenever possible by measurements taken in the area where they are being applied.

REFERENCES

1. DWIGHT, T. W. 1937. Refinements in plotting and harmonizing freehand curves. For. Chron. 13 (2): 357-370.
2. MEYER, W. H. 1944. A method of volume-diameter ratios for board foot volume tables. J. For. 42 (3): 185-189.

Lodgepole Pine
(*Pinus contorta* Dougl. var. *latifolia* Engelm.)

| Diameter Breast Height | Total Height of Tree in Feet | | | | | | | | | | Cubic Feet | |
|------------------------------|--|------|------|------|------|------|------|------|------|------|---|-----------------------|
| | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | Double Bark Thick- ness at Breast Height | Number of Trees |
| | TOTAL VOLUME (Stump and top included) | | | | | | | | | | | |
| 1 | .03 | .05 | .08 | .11 | | | | | | | .08 | 5 |
| 2 | .13 | .23 | .33 | .44 | | | | | | | .16 | 48 |
| 3 | .25 | .48 | .72 | .97 | 1.21 | | | | | | .23 | 83 |
| 4 | .49 | .89 | 1.28 | 1.68 | 2.08 | 2.47 | | | | | .28 | 93 |
| 5 | | 1.45 | 2.04 | 2.63 | 3.23 | 3.83 | | | | | .32 | 74 |
| 6 | | 2.13 | 2.98 | 3.88 | 4.70 | 5.55 | 6.41 | | | | .36 | 57 |
| 7 | | 2.92 | 4.12 | 5.31 | 6.50 | 7.71 | 8.92 | | | | .39 | 34 |
| 8 | | | 5.43 | 7.02 | 8.63 | 10.3 | 11.9 | 13.5 | | | .42 | 51 |
| 9 | | | 6.87 | 8.89 | 10.9 | 13.0 | 15.1 | 17.1 | | | .44 | 42 |
| 10 | | | | 10.9 | 13.4 | 15.9 | 18.5 | 21.0 | 23.6 | | .47 | 42 |
| 11 | | | | 13.0 | 16.0 | 19.0 | 22.0 | 25.0 | 28.0 | | .50 | 44 |
| 12 | | | | 15.2 | 18.7 | 22.2 | 25.6 | 29.1 | 32.6 | 36.1 | .53 | 28 |
| 13 | | | | | 21.7 | 25.6 | 29.5 | 33.4 | 37.3 | 41.2 | .56 | 35 |
| 14 | | | | | 25.0 | 29.3 | 33.6 | 37.9 | 42.2 | 46.5 | .60 | 27 |
| 15 | | | | | 28.8 | 33.5 | 38.2 | 42.9 | 47.6 | 52.3 | .63 | 8 |
| 16 | | | | | | 38.4 | 43.5 | 48.6 | 53.6 | 58.7 | .66 | 1 |
| 17 | | | | | | 44.1 | 49.5 | 54.8 | 60.1 | 65.5 | .69 | 1 |
| 18 | | | | | | 50.6 | 56.2 | 61.7 | 67.3 | 72.8 | .72 | 1 |
| 19 | | | | | | | 63.5 | 69.3 | 75.0 | 80.8 | .75 | 2 |
| 20 | | | | | | | 71.5 | 77.4 | 83.3 | 89.3 | .79 | - |

Aggregate difference= Table 0.185% high.
Average deviation= \pm 5.71%.
Basis of Table 676 trees.
Trees measured at $\frac{1}{10}$ sections above d.b.h.
Volumes calculated by Smalian formula.
Heavy line indicates range of basic data.

Table prepared from harmonized curves, with
refinements as suggested by T. W. Dwight,
For. Chronicle, Vol. XIII, No. 2, June, 1937.
Data collected in Alberta.

Lodgepole Pine
(*Pinus contorta* Dougl. var. *latifolia* Engelm.)

Cubic Feet

| Diameter Breast Height | Total Height of Tree in Feet | | | | | | | | | Double Bark Thick- ness at Breast Height | Number of Trees |
|------------------------------|--|-----|------|------|------|------|------|------|------|---|-----------------------|
| | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | | |
| | MERCHANTABLE VOLUME (Stump height 1.0 feet: Top diameter 4 inches I.B.) | | | | | | | | | | |
| 5 | 0.9 | 1.2 | 1.4 | 1.7 | 2.0 | | | | | .32 | 74 |
| 6 | 1.6 | 2.2 | 2.9 | 3.5 | 4.2 | 4.9 | | | | .36 | 57 |
| 7 | 2.3 | 3.4 | 4.5 | 5.6 | 6.7 | 7.8 | | | | .39 | 34 |
| 8 | | 4.7 | 6.3 | 7.8 | 9.4 | 10.9 | 12.4 | | | .42 | 51 |
| 9 | | 6.1 | 8.1 | 10.1 | 12.1 | 14.1 | 16.1 | | | .44 | 42 |
| 10 | | | 10.0 | 12.5 | 14.9 | 17.5 | 20.0 | 22.6 | | .47 | 42 |
| 11 | | | 12.0 | 15.0 | 17.9 | 20.9 | 23.9 | 26.9 | | .50 | 44 |
| 12 | | | 14.1 | 17.6 | 21.0 | 24.4 | 27.9 | 31.4 | 34.9 | .53 | 28 |
| 13 | | | | 20.3 | 24.2 | 28.1 | 32.0 | 35.9 | 39.8 | .56 | 35 |
| 14 | | | | 23.4 | 27.7 | 32.0 | 36.3 | 40.6 | 44.9 | .60 | 27 |
| 15 | | | | 27.0 | 31.7 | 36.4 | 41.1 | 45.8 | 50.5 | .63 | 8 |
| 16 | | | | | 36.4 | 41.5 | 46.6 | 51.6 | 56.6 | .66 | 1 |
| 17 | | | | | 41.8 | 47.2 | 52.5 | 57.8 | 63.2 | .69 | 1 |
| 18 | | | | | 48.1 | 53.7 | 59.2 | 64.8 | 70.3 | .72 | 1 |
| 19 | | | | | | 60.8 | 66.5 | 72.2 | 78.0 | .75 | 2 |
| 20 | | | | | | 68.5 | 74.4 | 80.3 | 86.3 | .79 | - |

5

Aggregate difference= Table 0.251% high.
Average deviation= ± 7.55%.
Basis of Table 447 trees.
Trees measured at $\frac{1}{10}$ sections above d.b.h.
Volumes calculated by Smalian formula.
Heavy line indicates range of basic data.

Table prepared from total cubic foot volume table by
subtracting a variable non-merchantable volume.
Data collected in Alberta.

Lodgepole Pine
(*Pinus contorta* Dougl. var. *latifolia* Engelm.)

| Diameter Breast Height | Total Height of Tree in Feet | | | | | | | | Scribner Log Rule | |
|---|------------------------------|----|-----|-----|-----|-----|-----|-----|---|-----------------------|
| | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | Double Bark Thick- ness at Breast Height | Number of Trees |
| MERCHANTABLE VOLUME IN BOARD FEET (Stump height 1.0 feet: Top diameter 6 inches I.B. Log Length 16.3 feet) | | | | | | | | | | |
| 7 | 10 | 11 | 14 | 19 | 26 | | | | .39 | 30 |
| 8 | 19 | 21 | 24 | 30 | 38 | 48 | | | .42 | 51 |
| 9 | 29 | 32 | 36 | 42 | 51 | 63 | | | .44 | 42 |
| 10 | | 46 | 50 | 57 | 67 | 80 | 96 | | .47 | 42 |
| 11 | | 61 | 66 | 74 | 85 | 99 | 117 | | .50 | 44 |
| 12 | | 79 | 84 | 93 | 105 | 121 | 140 | 162 | .53 | 28 |
| 13 | | | 104 | 113 | 127 | 144 | 164 | 188 | .56 | 35 |
| 14 | | | 127 | 136 | 150 | 169 | 191 | 217 | .60 | 27 |
| 15 | | | 151 | 161 | 176 | 196 | 220 | 248 | .63 | 8 |
| 16 | | | | 188 | 204 | 225 | 250 | 280 | .66 | 1 |
| 17 | | | | 217 | 234 | 256 | 283 | 315 | .69 | 1 |
| 18 | | | | 248 | 266 | 290 | 318 | 352 | .72 | 1 |
| 19 | | | | | 300 | 325 | 355 | 390 | .75 | 2 |
| 20 | | | | | 335 | 362 | 394 | 431 | .79 | - |

Aggregate difference= Table 0.621% high.
Average deviation= $\pm 13.19\%$.
Basis of Table 312 trees.
Top log scaled to a minimum length of 8 feet.
Heavy line indicates range of basic data.

Table prepared by volume-diameter ratio method.

W. H. Meyer, Journal of Forestry, Vol. 42, No. 3, March, 1944.

Data collected in Alberta.

Lodgepole Pine

(*Pinus contorta* Dougl. var. *latifolia* Engelm.)

| Diameter Breast Height | Total Height of Tree in Feet | | | | | | | | International Log Rule | |
|------------------------------|--|----|-----|-----|-----|-----|-----|-----|---|-----------------------|
| | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | Double Bark Thick- ness at Breast Height | Number of Trees |
| | MERCHANTABLE VOLUME IN BOARD FEET (Stump height 1.0 feet. Top diameter 6 inches I.B.: Log Length 16.3 feet) | | | | | | | | | |
| 7 | 8 | 11 | 15 | 22 | 31 | | | | .39 | 30 |
| 8 | 20 | 23 | 27 | 35 | 45 | 59 | | | .42 | 51 |
| 9 | 35 | 38 | 42 | 50 | 62 | 77 | | | .44 | 42 |
| 10 | | 55 | 59 | 68 | 81 | 97 | 116 | | .47 | 42 |
| 11 | | 75 | 79 | 89 | 102 | 120 | 141 | | .50 | 44 |
| 12 | | 97 | 102 | 112 | 126 | 145 | 168 | 189 | .53 | 28 |
| 13 | | | 127 | 137 | 152 | 173 | 197 | 220 | .56 | 35 |
| 14 | | | 155 | 165 | 181 | 203 | 228 | 252 | .60 | 27 |
| 15 | | | 185 | 196 | 213 | 235 | 262 | 287 | .63 | 8 |
| 16 | | | | 229 | 246 | 270 | 298 | 325 | .66 | 1 |
| 17 | | | | 264 | 282 | 307 | 336 | 364 | .69 | 1 |
| 18 | | | | 302 | 321 | 346 | 377 | 406 | .72 | 1 |
| 19 | | | | | 362 | 388 | 420 | 450 | .75 | 2 |
| 20 | | | | | 405 | 432 | 465 | 496 | .79 | - |

Aggregate difference = Table 0.401% high.
 Average deviation = $\pm 14.02\%$.
 Basis of Table 312 trees.
 Top log scaled to a minimum length of 8 feet.
 Heavy line indicates range of basic data.

Table prepared by volume-diameter ratio method.

W. H. Meyer, Journal of Forestry, Vol. 42, No. 3, March, 1944.

Data collected in Alberta.

EDMOND CLOUTIER, C.M.G., O.A., D.S.P.
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