LOCAL VOLUME TABLES, TOTAL VOLUME, MERCHANTABLE VOLUME AND TREE BIOMASS, FOR THE COMMERCIAL TREE SPECIES OF PRINCE EDWARD ISLAND

PRINCE EDWARD ISLAND

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Height and diameter measurements were procured from detailed stem analysis data on 11 major tree species on Prince Edward Island. Using this data, coefficients for height-diameter curves were calculated using a Weibull Model by species (Table 1A). The remaining species utilized height-diameter coefficients from the 1980/81 P.E.I. Forest Biomass Inventory (Table 1B).

From the detailed stem analysis, total height, diameter at breast height, and total volume estimates were inserted into Schumacker's total volume relationship (May 1982). The total volume coefficients are illustrated in Table 2A. The remaining species coefficients were converted to metric from T.G. Honer's publication (Table 2B). The same procedure was followed for the merchantable volume relationships (Tables 3A and 3B).

The coefficients utilized for calculating total above ground biomass are on Table 4 (Ker, 1980).

Table 1A. P.E.I. coefficients for a Weibull height/diameter model by species (Hutchinson, 1986).

Species	A	BO	B1
Red Maple	26.110	20.425	0.873
Sugar Maple	26.290	22.830	0.822
Yellow Birch	22.906	19.550	0.893
White Birch	24.627	19.218	0.968
Trembling Aspen	28.066	28.544	0.822
White Spruce	26.646	31.168	0.983
Red Spruce	29.642	36.498	0.913
Black Spruce	25.260	26.716	1.019
Balsam Fir	17.157	15.897	1.036
Eastern Larch	26.411	24.512	0.975
Red Pine	22.124	22.908	1.171

Equation: $CO = [-(DBH/BO)^{B1}]$

Total Height = A[1-EXP(CO)]

DBH = Diameter at Breast Height (1.3 m)

Table 1B. P.E.I. coefficients for a Weibull height/diameter model (Dendron Resources Surveys Ltd., 1982).

Species	A	B
Other Softwoods	14.7579	15.0
Other Hardwoods	17.9606	20.0

Equation: Total Height = 1.3+A[1-EXP(-DBH/B)]

Table 2A. P.E.I. coefficients for the Schumacker total volume model by species (Hutchinson, 1986).

Species	A	B	C
Red Maple	-9.893	1.963	0.911
Sugar Maple	-9.621	2.089	0.686
Yellow Birch	-9.096	1.904	0.674
White Birch	-9.914	1.989	0.919
Trembling Aspen	-9.071	1.808	0.798
White Spruce	-10.280	1.836	1.219
Red Spruce	-9.905	1.792	1.136
Black Spruce	-10.640	2.249	0.873
Balsam Fir	-10.660	2.017	1.143
Eastern Larch	-10.630	1.899	1.229
Red Pine	-10.310	2.115	0.909

Equation: $TV = LOG(A)*(DBH)^{B}\ H^{C}$

TV = Total Volume

H = Total Height

Table 2B. Eastern Canada coefficients for Honer's total tree Volume by species (Honer, 1967).

Species	A	B
Eastern Hemlock	253.322	24311.1
Jack Pine	204.335	24202.7
Eastern White Cedar	949.377	17006.7
Beech	218.488	23250.9
Other Hardwoods	344.485	23367.5

Equation: $TV = DBH^2/(A+B/H)$

Table 3A. P.E.I. coefficients for the Honer merchantible volume model by species (Hutchinson, 1986).

Species	A	B	C
Red Maple	0.9389	-0.0023	-0.000037
Sugar Maple	0.9635	-0.4373	-0.000758
Yellow Birch	0.9174	-0.2563	-0.3514
White Birch	0.9205	-0.0731	-1.1238
Trembling Aspen	0.9578	-0.1115	0.0011
White Spruce	0.9456	-0.2186	-0.3414
Black Spruce	0.9319	-0.0524	-0.5065
Black Spruce	0.9401	-0.0939	-0.6768

Balsam Fir	0.8956	0.3499	-1.6076
Eastern Larch	0.9156	0.0940	-1.1743
Red Pine	0.9131	0.3071	-1.9363

Equation: $X = [(1+hs/ht)(Dtop^2/DBH^2)]$

$MV = \text{Total Volume } [A+B(X)+C(X^2)]$

HS = Stump Height

HT = Total Height

Dtop = Minimum Top Diameter

MV = Merchantable Volume

Table 3B. Eastern Canada coefficients for Honer's merchantable volume equations by species (Honer, 1967).

Species	A	B	C
Eastern Hemlock	0.96447	-0.16151	-0.81488
Eastern White Pine	0.97345	-0.23469	-0.75913
Jack Pine	0.96344	-0.14909	-0.83075
Eastern White Cedar	0.96444	-0.16079	-0.81689
Beech	0.90563	-0.06892	-0.86114
Other Hardwood	0.90563	-0.06892	-0.86113

Table 4. Biomass coefficients used in total biomass equation (Ker, 1980).

Species	A	B	C
Balsam Fir	-1.8337	2.1283	1.03
Black/Red Spruce	-2.0243	2.2343	1.02
White Spruce	-2.2662	2.2907	1.01

Eastern Larch	-1.7823	2.1777	1.02
Eastern Hemlock	-1.8223	2.1536	1.02
Eastern White Pine	-1.8821	2.1420	1.03
Red Pine	-2.4684	2.3503	1.01
Jack Pine	-2.2136	2.3291	1.01
Eastern White Cedar	-2.1643	2.1439	1.01
Red/Sugar Maple	-1.8329	2.3376	1.01
Yellow Birch	-1.8701	2.3666	1.01
White Birch	-2.2308	2.4313	1.01
Beech	-1.6309	2.2538	1.01
Trembling Aspen	-2.6224	2.4827	1.01
Other Hardwoods	-1.8740	2.3213	1.01

Equation: $W = ce^{a+b\ln(DBH)}$

W = Dry Weight

C = Correction Factor

LITERATURE CITED

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APPENDIX

APPENDIX I

LIST OF TREE SPECIES

BY COMMON NAME

AND SCIENTIFIC NAME

COMMON NAME	**SCIENTIFIC NAME**
White Spruce	Picea glauca (Moench) Voss
Black Spruce	Picea mariana (Mill.) B.S.P.
Red Spruce	Picea rubens Sarg.
Balsam Fir	Abies balsamea (L.) Mill.
Eastern White Cedar	Thuja occidentalis L.
Eastern Hemlock	Tsuga canadensis (L.) Carr.
Eastern Larch	Larix laricina (Du Roi) K. Koch
Eastern White Pine	Pinus strobus L.
Jack Pine	Pinus banksiana Lamb.
Red Pine	Pinus resinosa Ait.
Trembling Aspen	Populus tremuloides Michx.
Sugar Maple	Acer saccharum Marsh.
Red Maple	Acer rubrum L.
White Birch	Betula papyrifera Marsh.
Yellow Birch	Betula alleghaniensis Britton
Beech	Fagus grandifolia Ehrh.

APPENDIX II

CONVERSION FACTORS

SI UNITS		ENGLISH UNITS
LENGTH		
1 cm (centimetre)	=	0.393701 inch
1 km (kilometre)	=	0.621371 mile
1 m (metre)	=	0.0497097 chain
1 m	=	3.28084 feet
1 m	=	1.09361 yards
AREA		
1 ha (hectare)	=	2.47105 acres
1 km^2 (square kilometre)	=	0.386102 square mile
1 m^2 (square metre)	=	0.247105 mil-acre
VOLUME OR CAPACITY		
1 m^3 (cubic metre)	=	35.3147 cubic feet
1 m^3 (cubic metre)	=	0.353147 cunit (of 100 ft^3 of solid wood)
1 m^3 (stacked cubic metre)	=	0.275896 cord (of 128 stacked ft^3)
RATIOS		
1 kg/m^3 (kilogram per cubic metre)	=	0.0624280 pound/ cubic foot
1 m^2/ha (square metre per hectare)	=	4.35600 square feet per acre
1 m^3/ha (cubic metre per hectare)	=	14.2913 cubic feet per acre
1 m^3 (stacked)/ha, (stacked cubic metre per hectare)	=	0.111651 cord per acre
1 t/ha (tonne per hectare)	=	0.446090 ton (of 2,000 lb per

acre)

APPENDIX III

CONVERSION FACTORS

ENGLISH UNITS		SI UNITS
LENGTH		
1 inch	=	2.54 cm
1 mile	=	1.60934 km
1 chain	=	20.1168 m
1 foot	=	0.3048 m
1 yard	=	0.9144 m
AREA		
1 acre	=	0.404686 ha
1 square mile	=	2.5899 km^2
1 mil-acre	=	4.04686 m^2
VOLUME OR CAPACITY		
1 cubic foot	=	0.0283168 m^3
1 cunit (100 ft^3 of solid wood)	=	2.83168 m^3
1 cord (128 stacked ft^3)	=	3.62456 m^3
RATIOS		
1 pound/cubic foot	=	16.0185 kg/m^3
1 square foot/acre	=	0.229568 m^2/ha
1 cubic foot/acre	=	0.0699725 m^3/ha
1 cord/acre	=	8.95647 m^3 (stacked)/ha
1 ton (2,000 lb)/acre	=	2.24170 t/ha