

# Alaska Biomass Equations

(Equations Ver.: 11/5/02)

FIA currently stores calculated biomass based on regionally specific equations as two different variables, REGIONAL\_DRYBIOT and REGIONAL\_DRYBIOM. The below equations produce results in KILOGRAMS, these values are converted to pounds prior to storage in the NIMS database.

## SPECIFICATIONS

Dry\_kg – dry weight of above-ground whole tree (bole wood, bark, branches, twigs and foliage) in kilograms, given dbh in centimeters, squared (dsqr\_cm) or meters, squared (dsqr\_m) and total height in meters (height\_m)

Green\_kg = green weight of above-ground whole tree in kilograms, given dbh in centimeters, squared (dsqr\_cm) or meters, squared (dsqr\_m) and total height in meters (height\_m)

Dry\_kg\_bole = dry weight of tree bole from a .3 m stump to a 2.5 cm top, without bark, in kilograms, given dbh in centimeters, squared (dsqr\_cm) or meters, squared (dsqr\_m) and total height in meters (height\_m)

Green\_kg\_bole = green weight of tree bole from a .3 m stump to a 2.5 cm top, without bark, in kilograms, given dbh in centimeters, squared (dsqr\_cm) or meters, squared (dsqr\_m) and total height in meters (height\_m)

Dry\_kg\_bark = dry weight of stem bark in kilograms, given dbh in centimeters, squared (dsqr\_cm), or dbh in meters, squared (dsqr\_m), and height in meters (height\_m)

Green\_kg\_bark = green weight of stem bark in kilograms, given dbh in centimeters, squared (dsqr\_cm), or dbh in meters, squared (dsqr\_m), and height in meters (height\_m)

Dry\_kg\_branches = dry weight of tree branches, in kilograms, given dbh in centimeters, squared (dsqr\_cm) or meters, squared (dsqr\_m) and total height in meters (height\_m)

Green\_kg\_branches = green weight of tree branches, in kilograms, given dbh in centimeters, squared (dsqr\_cm) or meters, squared (dsqr\_m) and total height in meters (height\_m)

Dry\_kg\_twigs\_foliage = dry weight of tree twigs and leaves, in kilograms, given dbh in centimeters, squared (dsqr\_cm) or meters, squared (dsqr\_m) and total height in meters (height\_m)

Green\_kg\_twigs\_foliage = green weight of tree twigs and foliage, in kilograms, given dbh in centimeters, squared (dsqr\_cm) or meters, squared (dsqr\_m) and total height in meters (height\_m)

Green\_kg\_dead\_branches = air-dry weight of tree dead branches, in kilograms, given dbh in centimeters, squared (dsqr\_cm) or meters, squared (dsqr\_m) and total height in meters (height\_m)

Dsqr\_m – dbh in meters, squared  
Dsqr\_cm – dbh in centimeters, squared

Subdivision 1 – currently used by PNW-FIA (5/4/12) = Coastal Alaska

Subdivision 2 – not currently used by FIA = Interior Alaska

Unit 3 – not currently used by FIA = Interior Alaska south and east of the Alaska Range

Unit 4 – not currently used by FIA = Interior Alaska north and west of the Alaska Range

## SOFTWOOD DRY WEIGHT WHOLE-TREE BIOMASS EQUATION ASSIGNMENTS

Species		Subdivision 1	Subdivision 2	Subdivision 2
Code	Common name		Unit 3	Unit 4
11	Pacific silver fir	86	--	--
19	Subalpine fir	97	--	--
42	Alaska-cedar	54	--	--
71	Tamarack	--	--	76
94	White spruce	1	1	1
95	Black spruce	12	12	12
98	Sitka spruce	23	--	--
108	Lodgepole pine	65	--	--
242	Western redcedar	44	--	--
263	Western hemlock	34	--	--
264	Mountain hemlock	34	--	--

## SOFTWOOD GREEN WEIGHT WHOLE-TREE BIOMASS EQUATION ASSIGNMENTS

Species		Subdivision 1	Subdivision 2	Subdivision 2
Code	Common name		Unit 3	Unit 4
11	Pacific silver fir	87	--	--
19	Subalpine fir	98	--	--
42	Alaska-cedar	55	--	--
71	Tamarack	--	--	77
94	White spruce	2	2	2
95	Black spruce	13	13	13
98	Sitka spruce	24	--	--
108	Lodgepole pine	66	--	--
242	Western redcedar	45	--	--
263	Western hemlock	35	--	--
264	Mountain hemlock	35	--	--

## SOFTWOOD DRY WEIGHT BOLE BIOMASS EQUATION ASSIGNMENTS

Species Code	Common name	Subdivision 1	Subdivision 2 Unit 3	Subdivision 2 Unit 4
11	Pacific silver fir	88	--	--
19	Subalpine fir	99	--	--
42	Alaska-cedar	56	--	--
71	Tamarack	--	--	78
94	White spruce	3	3	3
95	Black spruce	14	14	14
98	Sitka spruce	25	--	--
108	Lodgepole pine	67	--	--
242	Western redcedar	46	--	--
263	Western hemlock	36	--	--
264	Mountain hemlock	36	--	--

## SOFTWOOD GREEN WEIGHT BOLE BIOMASS EQUATION ASSIGNMENTS

Species Code	Common name	Subdivision 1	Subdivision 2 Unit 3	Subdivision 2 Unit 4
11	Pacific silver fir	89	--	--
19	Subalpine fir	100	--	--
42	Alaska-cedar	57	--	--
71	Tamarack	--	--	79
94	White spruce	4	4	4
95	Black spruce	15	15	15
98	Sitka spruce	26	--	--
108	Lodgepole pine	68	--	--
242	Western redcedar	47	--	--
263	Western hemlock	37	--	--
264	Mountain hemlock	37	--	--

## SOFTWOOD DRY WEIGHT BARK BIOMASS EQUATION ASSIGNMENTS

Species Code	Common name	Subdivision 1	Subdivision 2 Unit 3	Subdivision 2 Unit 4
11	Pacific silver fir	90	--	--
19	Subalpine fir	101	--	--
42	Alaska-cedar	58	--	--
71	Tamarack	--	--	80
94	White spruce	5	5	5
95	Black spruce	16	16	16
98	Sitka spruce	27	--	--
108	Lodgepole pine	69	--	--
242	Western redcedar	48	--	--
263	Western hemlock	38	--	--
264	Mountain hemlock	38	--	--

## SOFTWOOD GREEN WEIGHT BARK BIOMASS EQUATION ASSIGNMENTS

Species Code	Common name	Subdivision 1	Subdivision 2 Unit 3	Subdivision 2 Unit 4
11	Pacific silver fir	91	--	--
19	Subalpine fir	102	--	--
42	Alaska-cedar	59	--	--
71	Tamarack	--	--	81
94	White spruce	6	6	6
95	Black spruce	17	17	17
98	Sitka spruce	28	--	--
108	Lodgepole pine	70	--	--
242	Western redcedar	49	--	--
263	Western hemlock	39	--	--
264	Mountain hemlock	39	--	--

## SOFTWOOD DRY WEIGHT BRANCHES BIOMASS EQUATION ASSIGNMENTS

Species Code	Common name	Subdivision 1	Subdivision 2 Unit 3	Subdivision 2 Unit 4
11	Pacific silver fir	92	--	--
19	Subalpine fir	103	--	--
42	Alaska-cedar	60	--	--
71	Tamarack	--	--	82
94	White spruce	7	7	7
95	Black spruce	18	18	18
98	Sitka spruce	29	--	--
108	Lodgepole pine	71	--	--
242	Western redcedar	50	--	--
263	Western hemlock	40	--	--
264	Mountain hemlock	40	--	--

## SOFTWOOD GREEN WEIGHT BRANCHES BIOMASS EQUATION ASSIGNMENTS

Species Code	Common name	Subdivision 1	Subdivision 2 Unit 3	Subdivision 2 Unit 4
11	Pacific silver fir	93	--	--
19	Subalpine fir	104	--	--
42	Alaska-cedar	61	--	--
71	Tamarack	--	--	83
94	White spruce	8	8	8
95	Black spruce	19	19	19
98	Sitka spruce	30	--	--
108	Lodgepole pine	72	--	--
242	Western redcedar	51	--	--
263	Western hemlock	41	--	--
264	Mountain hemlock	41	--	--

## SOFTWOOD DRY WEIGHT TWIGS AND FOLIAGE BIOMASS EQUATION ASSIGNMENTS

Species Code	Common name	Subdivision 1	Subdivision 2 Unit 3	Subdivision 2 Unit 4
11	Pacific silver fir	94	--	--
19	Subalpine fir	105	--	--
42	Alaska-cedar	62	--	--
71	Tamarack	--	--	84
94	White spruce	9	9	9
95	Black spruce	20	20	20
98	Sitka spruce	31	--	--
108	Lodgepole pine	73	--	--
242	Western redcedar	52	--	--
263	Western hemlock	42	--	--
264	Mountain hemlock	42	--	--

## SOFTWOOD GREEN WEIGHT TWIGS AND FOLIAGE BIOMASS EQUATION ASSIGNMENTS

Species Code	Common name	Subdivision 1	Subdivision 2 Unit 3	Subdivision 2 Unit 4
11	Pacific silver fir	95	--	--
19	Subalpine fir	106	--	--
42	Alaska-cedar	63	--	--
71	Tamarack	--	--	85
94	White spruce	10	10	10
95	Black spruce	21	21	21
98	Sitka spruce	32	--	--
108	Lodgepole pine	74	--	--
242	Western redcedar	53	--	--
263	Western hemlock	43	--	--
264	Mountain hemlock	43	--	--

## SOFTWOOD GREEN WEIGHT DEAD BRANCHES BIOMASS EQUATION ASSIGNMENTS

Species Code	Common name	Subdivision 1	Subdivision 2 Unit 3	Subdivision 2 Unit 4
11	Pacific silver fir	96	--	--
19	Subalpine fir	107	--	--
42	Alaska-cedar	64	--	--
71	Tamarack	--	--	n.a.
94	White spruce	11	11	11
95	Black spruce	22	22	22
98	Sitka spruce	33	--	--
108	Lodgepole pine	75	--	--
242	Western redcedar	n.a.	--	--
263	Western hemlock	n.a.	--	--
264	Mountain hemlock	n.a.	--	--

n.a. = not available



## HARDWOOD DRY WEIGHT WHOLE-TREE BIOMASS EQUATION ASSIGNMENTS

Species		Subdivision 1	Subdivision 2	Subdivision 2
Code	Common name		Unit 3	Unit 4
310	Maple sp.	119	--	--
351	Red alder	141	--	--
375	Paper birch	119	119	119
660	Apple	119	--	--
746	Quaking aspen	108	108	108
747	Cottonwood	130	130	130
920	Willow sp.	141	141	141

## HARDWOOD GREEN WEIGHT WHOLE-TREE BIOMASS EQUATION ASSIGNMENTS

Species		Subdivision 1	Subdivision 2	Subdivision 2
Code	Common name		Unit 3	Unit 4
310	Maple sp.	120	--	--
351	Red alder	142	--	--
375	Paper birch	120	120	120
660	Apple	120	--	--
746	Quaking aspen	109	109	109
747	Cottonwood	131	131	131
920	Willow sp.	142	142	142

## HARDWOOD DRY WEIGHT BOLE BIOMASS EQUATION ASSIGNMENTS

Species		Subdivision 1	Subdivision 2	Subdivision 2
Code	Common name		Unit 3	Unit 4
310	Maple sp.	121	--	--
351	Red alder	143	--	--
375	Paper birch	121	121	121
660	Apple	121	--	--
746	Quaking aspen	110	110	110
747	Cottonwood	132	132	132
920	Willow sp.	143	143	143

## HARDWOOD GREEN WEIGHT BOLE BIOMASS EQUATION ASSIGNMENTS

Species		Subdivision 1	Subdivision 2	Subdivision 2
Code	Common name		Unit 3	Unit 4
310	Maple sp.	122	--	--
351	Red alder	144	--	--
375	Paper birch	122	122	122
660	Apple	122	--	--
746	Quaking aspen	111	111	111
747	Cottonwood	133	133	133
920	Willow sp.	144	144	144

## HARDWOOD DRY WEIGHT BARK BIOMASS EQUATION ASSIGNMENTS

Species		Subdivision 1	Subdivision 2	Subdivision 2
Code	Common name		Unit 3	Unit 4
310	Maple sp.	123	--	--
351	Red alder	145	--	--
375	Paper birch	123	123	123
660	Apple	123	--	--
746	Quaking aspen	112	112	112
747	Cottonwood	134	134	134
920	Willow sp.	145	145	145

## HARDWOOD GREEN WEIGHT BARK BIOMASS EQUATION ASSIGNMENTS

Species		Subdivision 1	Subdivision 2	Subdivision 2
Code	Common name		Unit 3	Unit 4
310	Maple sp.	124	--	--
351	Red alder	146	--	--
375	Paper birch	124	124	124
660	Apple	124	--	--
746	Quaking aspen	113	113	113
747	Cottonwood	135	135	135
920	Willow sp.	146	146	146

## HARDWOOD DRY WEIGHT BRANCH BIOMASS EQUATION ASSIGNMENTS

Species		Subdivision 1	Subdivision 2	Subdivision 2
Code	Common name		Unit 3	Unit 4
310	Maple sp.	125	--	--
351	Red alder	147	--	--
375	Paper birch	125	125	125
660	Apple	125	--	--
746	Quaking aspen	114	114	114
747	Cottonwood	136	136	136
920	Willow sp.	147	147	147

\*Aspen branches included with twig and foliage equation

## HARDWOOD GREEN WEIGHT BRANCH BIOMASS EQUATION ASSIGNMENTS

Species		Subdivision 1	Subdivision 2	Subdivision 2
Code	Common name		Unit 3	Unit 4
310	Maple sp.	126	--	--
351	Red alder	148	--	--
375	Paper birch	126	126	126
660	Apple	126	--	--
746	Quaking aspen	115	115	115
747	Cottonwood	137	137	137
920	Willow sp.	148	148	148

\*Aspen branches included with twig and foliage equation

## HARDWOOD DRY WEIGHT, TWIG, AND FOLIAGE BIOMASS EQUATION ASSIGNMENTS

Species		Subdivision 1	Subdivision 2	Subdivision 2
Code	Common name		Unit 3	Unit 4
310	Maple sp.	127	--	--
351	Red alder	149	--	--
375	Paper birch	127	127	127
660	Apple	127	--	--
746	Quaking aspen	*	*	*
747	Cottonwood	138	138	138
920	Willow sp.	149	149	149

\*Aspen twig and foliage included with branch equation

## HARDWOOD GREEN WEIGHT TWIG, AND FOLIAGE BIOMASS EQUATION ASSIGNMENTS

Species		Subdivision 1	Subdivision 2	Subdivision 2
Code	Common name		Unit 3	Unit 4
310	Maple sp.	128	--	--
351	Red alder	150	--	--
375	Paper birch	128	128	128
660	Apple	128	--	--
746	Quaking aspen	*	*	*
747	Cottonwood	139	139	139
920	Willow sp.	150	150	150

\*Aspen twig and foliage included with branch equation

## HARDWOOD AIR-DRY WEIGHT DEAD BRANCHES BIOMASS EQUATION ASSIGNMENTS

Species		Subdivision 1	Subdivision 2	Subdivision 2
Code	Common name		Unit 3	Unit 4
310	Maple sp.	129	--	--
351	Red alder	151	--	--
375	Paper birch	129	129	129
660	Apple	129	--	--
746	Quaking aspen	118	118	118
747	Cottonwood	140	140	140
920	Willow sp.	151	151	151

## BIOMASS EQUATIONS

### Equation 1

Manning INF-REP-BC-X-250, Pg 30

\* includes green weight of dead branches

$$\text{dry\_kg} = 1.6914 + 0.01891 * \text{dsqr\_cm} * \text{height\_m}$$

### Equation 2

Manning INF-REP-BC-X-250, Pg 25

$$\text{green\_kg} = 3.735 + 0.03632 * \text{dsqr\_cm} * \text{height\_m}$$

### Equation 3

Manning INF-REP-BC-X-250, Pg 26

$$\text{dry\_kg\_bole} = 0.277 + 0.0124 * \text{dsqr\_cm} * \text{height\_m}$$

### Equation 4

Manning INF-REP-BC-X-250, Pg 20

$$\text{green\_kg\_bole} = 0.6956 + 0.02402 * \text{dsqr\_cm} * \text{height\_m}$$

### Equation 5

Manning INF-REP-BC-X-250, Pg 27

$$\text{Dry\_kg\_bark} = 0.1506 + 0.00193 * \text{dsqr\_cm} * \text{height\_m}$$

### Equation 6

Manning INF-REP-BC-X-250, Pg 21

$$\text{Green\_kg\_bark} = 0.3509 + 0.003890 * \text{dsqr\_cm} * \text{height\_m}$$

### Equation 7

Manning INF-REP-BC-X-250, Pg 28

$$\text{Dry\_kg\_branches} = 0.2519 + 0.001191 * \text{dsqr\_cm} * \text{height\_m}$$

## Equation 8

Manning INF-REP-BC-X-250, Pg 22

$$\text{green\_kg\_branches} = 0.4995 + 0.00214 * \text{dsqr\_cm} * \text{height\_m}$$

## Equation 9

Manning INF-REP-BC-X-250, Pg 29

$$\text{Dry\_kg\_twigs\_foliage} = 0.9265 + 0.00241 * \text{dsqr\_cm} * \text{height\_m}$$

## Equation 10

Manning INF-REP-BC-X-250, Pg 23

$$\text{green\_kg\_twigs\_foliage} = 2.1036 + 0.00535 * \text{dsqr\_cm} * \text{height\_m}$$

## Equation 11

Manning INF-REP-BC-X-250, Pg 24

$$\text{green\_kg\_dead\_branches} = 0.0854 + 0.00093 * \text{dsqr\_cm} * \text{height\_m}$$

## Equation 12

Manning INF-REP-BC-X-250, Pg 52

$$\text{dry\_kg} = 1.6426 + 0.02509 * \text{dsqr\_cm} * \text{height\_m}$$

\*includes green weight dead branches

## Equation 13

Manning INF-REP-BC-X-250, Pg 47

$$\text{green\_kg} = 3.4601 + 0.04308 * \text{dsqr\_cm} * \text{height\_m}$$

## Equation 14

Manning INF-REP-BC-X-250, Pg 48

$$\text{dry\_kg\_bole} = 0.3170 + 0.01550 * \text{dsqr\_cm} * \text{height\_m}$$



## Equation 15

Manning INF-REP-BC-X-250, Pg 42

$$\text{green\_kg\_bole} = 0.7238 + 0.02646 * \text{dsqr\_cm} * \text{height\_m}$$

## Equation 16

Manning INF-REP-BC-X-250, Pg 49

$$\text{Dry\_kg\_bark} = 0.1696 + 0.00284 * \text{dsqr\_cm} * \text{height\_m}$$

## Equation 17

Manning INF-REP-BC-X-250, Pg 43

$$\text{green\_kg\_bark} = 0.3603 + 0.00516 * \text{dsqr\_cm} * \text{height\_m}$$

## Equation 18

Manning INF-REP-BC-X-250, Pg 50

$$\text{dry\_kg\_branches} = 0.2376 + 0.00143 * \text{dsqr\_cm} * \text{height\_m}$$

## Equation 19

Manning INF-REP-BC-X-250, Pg 44

$$\text{green\_kg\_branches} = 0.4796 + 0.00248 * \text{dsqr\_cm} * \text{height\_m}$$

## Equation 20

Manning INF-REP-BC-X-250, Pg 51

$$\text{Dry\_kg\_twigs\_foliage} = 0.8662 + 0.00322 * \text{dsqr\_cm} * \text{height\_m}$$

## Equation 21

Manning INF-REP-BC-X-250, Pg 45

$$\text{green\_kg\_twigs\_foliage} = 1.8442 + 0.00693 * \text{dsqr\_cm} * \text{height\_m}$$

## Equation 22

Manning INF-REP-BC-X-250, Pg 46

$$\text{green\_kg\_dead\_branches} = 0.0522 + 0.00206 * \text{dsqr\_cm} * \text{height\_m}$$

### Equation 23

J.T. STANDISH 1983 PROJ 7952 TALISMAN LAND RESOURCE'  
CONSULTANTS 100-842 THURLOW ST, VANCOUVER, BC APPENDIX A - PG 2

$$\text{dry\_kg} = 17.6 + 172.1 * \text{dsqr\_m} * \text{height\_m}$$

### Equation 24

J.T. STANDISH 1983 PROJ 7952 TALISMAN LAND RESOURCE'  
CONSULTANTS 100-842 THURLOW ST, VANCOUVER, BC APPENDIX A - PG 2

$$\text{green\_kg} = 39.3 + 362.4 * \text{dsqr\_m} * \text{height\_m}$$

### Equation 25

J.T. STANDISH 1983 PROJ 7952 TALISMAN LAND RESOURCE'  
CONSULTANTS 100-842 THURLOW ST, VANCOUVER, BC APPENDIX A - PG 2

$$\text{dry\_kg\_bole} = -1.0 + 117.4 * \text{dsqr\_m} * \text{height\_m}$$

### Equation 26

J.T. STANDISH 1983 PROJ 7952 TALISMAN LAND RESOURCE'  
CONSULTANTS 100-842 THURLOW ST, VANCOUVER, BC APPENDIX A - PG 2

$$\text{green\_kg\_bole} = 2.0 + 252.1 * \text{dsqr\_m} * \text{height\_m}$$

### Equation 27

J.T. STANDISH 1983 PROJ 7952 TALISMAN LAND RESOURCE'  
CONSULTANTS 100-842 THURLOW ST, VANCOUVER, BC APPENDIX A - PG 2

$$\text{dry\_kg\_bark} = -1.3 + 12.6 * \text{dsqr\_m} * \text{height\_m}$$

### Equation 28

J.T. STANDISH 1983 PROJ 7952 TALISMAN LAND RESOURCE'  
CONSULTANTS 100-842 THURLOW ST, VANCOUVER, BC APPENDIX A - PG 2

$$\text{green\_kg\_bark} = 3.1 + 28.8 * \text{dsqr\_m} * \text{height\_m}$$

## Equation 29

J.T. STANDISH 1983 PROJ 7952 TALISMAN LAND RESOURCE'  
CONSULTANTS 100-842 THURLOW ST, VANCOUVER, BC APPENDIX A - PG 2  
\* DBRANH1 + DBRAN2

$$\text{dry\_kg\_branches} = 7.0 + 17.2 * \text{dsqr\_m} * \text{height\_m}$$

## Equation 30

J.T. STANDISH 1983 PROJ 7952 TALISMAN LAND RESOURCE'  
CONSULTANTS 100-842 THURLOW ST, VANCOUVER, BC APPENDIX A - PG 2  
\*FBRAN1 + FBRAN2

$$\text{green\_kg\_branches} = 12.8 + 31.2 * \text{dsqr\_m} * \text{height\_m}$$

## Equation 31

J.T. STANDISH 1983 PROJ 7952 TALISMAN LAND RESOURCE'  
CONSULTANTS 100-842 THURLOW ST, VANCOUVER, BC APPENDIX A - PG 2  
\* DBRANH3 + DFOLI

$$\text{dry\_kg\_twigs\_foliage} = 10.3 + 24.9 * \text{dsqr\_m} * \text{height\_m}$$

## Equation 32

J.T. STANDISH 1983 PROJ 7952 TALISMAN LAND RESOURCE'  
CONSULTANTS 100-842 THURLOW ST, VANCOUVER, BC APPENDIX A - PG 2  
\*FBRAN3 + FFOLI

$$\text{green\_kg\_twigs\_foliage} = 21.4 + 50.4 * \text{dsqr\_m} * \text{height\_m}$$

## Equation 33

J.T. STANDISH 1983 PROJ 7952 TALISMAN LAND RESOURCE'  
CONSULTANTS 100-842 THURLOW ST, VANCOUVER, BC APPENDIX A - PG 2

$$\text{green\_kg\_dead\_branches} = 1.0 + 1.8 * \text{dsqr\_m} * \text{height\_m}$$

## Equation 34

SHAW, D.L., JR., BIOMASS EQUATIONS FOR DOUGLAS-FIR, WESTERN  
HEMLOCK AND RED CEDAR IN WASHINGTON AND OREGON. IN: FOREST  
RESOURCE INVENTORIES WORKSHOP PROCEEDINGS, COLO. STATE UNIV., FT.  
COLLINS, CO: 1979 JULY 23-26. VOL II, PG 772

$$\text{dry\_kg} = 0.497 + 0.02113 * \text{dsqr\_cm} * \text{height\_m}$$

## Equation 35

SHAW, D.L., JR., BIOMASS EQUATIONS FOR DOUGLAS-FIR, WESTERN HEMLOCK AND RED CEDAR IN WASHINGTON AND OREGON. IN: FOREST RESOURCE INVENTORIES WORKSHOP PROCEEDINGS, COLO. STATE UNIV., FT. COLLINS, CO: 1979 JULY 23-26. VOL II, PG 772

$$\text{green\_kg} = -0.007 + 0.03742 * \text{dsqr\_cm} * \text{height\_m}$$

## Equation 36

SHAW, D.L., JR., BIOMASS EQUATIONS FOR DOUGLAS-FIR, WESTERN HEMLOCK AND RED CEDAR IN WASHINGTON AND OREGON. IN: FOREST RESOURCE INVENTORIES WORKSHOP PROCEEDINGS, COLO. STATE UNIV., FT. COLLINS, CO: 1979 JULY 23-26. VOL II, PG 772

$$\text{dry\_kg\_bole} = 0.362 + 0.01145 * \text{dsqr\_cm} * \text{height\_m}$$

## Equation 37

SHAW, D.L., JR., BIOMASS EQUATIONS FOR DOUGLAS-FIR, WESTERN HEMLOCK AND RED CEDAR IN WASHINGTON AND OREGON. IN: FOREST RESOURCE INVENTORIES WORKSHOP PROCEEDINGS, COLO. STATE UNIV., FT. COLLINS, CO: 1979 JULY 23-26. VOL II, PG 772

$$\text{green\_kg\_bole} = 0.083 + 0.02020 * \text{dsqr\_cm} * \text{height\_m}$$

## Equation 38

SHAW, D.L., JR., BIOMASS EQUATIONS FOR DOUGLAS-FIR, WESTERN HEMLOCK AND RED CEDAR IN WASHINGTON AND OREGON. IN: FOREST RESOURCE INVENTORIES WORKSHOP PROCEEDINGS, COLO. STATE UNIV., FT. COLLINS, CO: 1979 JULY 23-26. VOL II, PG 772

$$\text{Dry\_kg\_bark} = -0.025 + 0.00134 * \text{dsqr\_cm} * \text{height\_m}$$

## Equation 39

SHAW, D.L., JR., BIOMASS EQUATIONS FOR DOUGLAS-FIR, WESTERN HEMLOCK AND RED CEDAR IN WASHINGTON AND OREGON. IN: FOREST RESOURCE INVENTORIES WORKSHOP PROCEEDINGS, COLO. STATE UNIV., FT. COLLINS, CO: 1979 JULY 23-26. VOL II, PG 772

$$\text{Green\_kg\_bark} = -0.616 + 0.00177 * \text{dsqr\_cm} * \text{height\_m}$$

## Equation 40

SHAW, D.L., JR., BIOMASS EQUATIONS FOR DOUGLAS-FIR, WESTERN HEMLOCK AND RED CEDAR IN WASHINGTON AND OREGON. IN: FOREST RESOURCE INVENTORIES WORKSHOP PROCEEDINGS, COLO. STATE UNIV., FT. COLLINS, CO: 1979 JULY 23-26. VOL II, PG 772

$$\text{Dry\_kg\_branches} = 0.047 + 0.00413 * \text{dsqr\_cm} * \text{height\_m}$$

### Equation 41

SHAW, D.L., JR., BIOMASS EQUATIONS FOR DOUGLAS-FIR, WESTERN HEMLOCK AND RED CEDAR IN WASHINGTON AND OREGON. IN: FOREST RESOURCE INVENTORIES WORKSHOP PROCEEDINGS, COLO. STATE UNIV., FT. COLLINS, CO: 1979 JULY 23-26. VOL II, PG 772

$$\text{green\_kg\_branches} = 0.213 + 0.00637 * \text{dsqr\_cm} * \text{height\_m}$$

### Equation 42

SHAW, D.L., JR., BIOMASS EQUATIONS FOR DOUGLAS-FIR, WESTERN HEMLOCK AND RED CEDAR IN WASHINGTON AND OREGON. IN: FOREST RESOURCE INVENTORIES WORKSHOP PROCEEDINGS, COLO. STATE UNIV., FT. COLLINS, CO: 1979 JULY 23-26. VOL II, PG 772

$$\text{Dry\_kg\_twigs\_foliage} = 0.113 + 0.00421 * \text{dsqr\_cm} * \text{height\_m}$$

### Equation 43

SHAW, D.L., JR., BIOMASS EQUATIONS FOR DOUGLAS-FIR, WESTERN HEMLOCK AND RED CEDAR IN WASHINGTON AND OREGON. IN: FOREST RESOURCE INVENTORIES WORKSHOP PROCEEDINGS, COLO. STATE UNIV., FT. COLLINS, CO: 1979 JULY 23-26. VOL II, PG 772

$$\text{green\_kg\_twigs\_foliage} = 0.313 + 0.00908 * \text{dsqr\_cm} * \text{height\_m}$$

### Equation 44

SHAW, D.L., JR., BIOMASS EQUATIONS FOR DOUGLAS-FIR, WESTERN HEMLOCK AND RED CEDAR IN WASHINGTON AND OREGON. IN: FOREST RESOURCE INVENTORIES WORKSHOP PROCEEDINGS, COLO. STATE UNIV., FT. COLLINS, CO: 1979 JULY 23-26. VOL II, PG 772

$$\text{dry\_kg} = 1.270 + 0.01501 * \text{dsqr\_cm} * \text{height\_m}$$

### Equation 45

SHAW, D.L., JR., BIOMASS EQUATIONS FOR DOUGLAS-FIR, WESTERN HEMLOCK AND RED CEDAR IN WASHINGTON AND OREGON. IN: FOREST RESOURCE INVENTORIES WORKSHOP PROCEEDINGS, COLO. STATE UNIV., FT. COLLINS, CO: 1979 JULY 23-26. VOL II, PG 772

$$\text{green\_kg} = 2.362 + 0.02583 * \text{dsqr\_cm} * \text{height\_m}$$

## Equation 46

SHAW, D.L., JR., BIOMASS EQUATIONS FOR DOUGLAS-FIR, WESTERN HEMLOCK AND RED CEDAR IN WASHINGTON AND OREGON. IN: FOREST RESOURCE INVENTORIES WORKSHOP PROCEEDINGS, COLO. STATE UNIV., FT. COLLINS, CO: 1979 JULY 23-26. VOL II, PG 772

$$\text{dry\_kg\_bole} = 0.452 + 0.00697 * \text{dsqr\_cm} * \text{height\_m}$$

## Equation 47

SHAW, D.L., JR., BIOMASS EQUATIONS FOR DOUGLAS-FIR, WESTERN HEMLOCK AND RED CEDAR IN WASHINGTON AND OREGON. IN: FOREST RESOURCE INVENTORIES WORKSHOP PROCEEDINGS, COLO. STATE UNIV., FT. COLLINS, CO: 1979 JULY 23-26. VOL II, PG 772

$$\text{green\_kg\_bole} = 0.818 + 0.01117 * \text{dsqr\_cm} * \text{height\_m}$$

## Equation 48

SHAW, D.L., JR., BIOMASS EQUATIONS FOR DOUGLAS-FIR, WESTERN HEMLOCK AND RED CEDAR IN WASHINGTON AND OREGON. IN: FOREST RESOURCE INVENTORIES WORKSHOP PROCEEDINGS, COLO. STATE UNIV., FT. COLLINS, CO: 1979 JULY 23-26. VOL II, PG 772

$$\text{Dry\_kg\_bark} = 0.336 + 0.00058 * \text{dsqr\_cm} * \text{height\_m}$$

## Equation 49

SHAW, D.L., JR., BIOMASS EQUATIONS FOR DOUGLAS-FIR, WESTERN HEMLOCK AND RED CEDAR IN WASHINGTON AND OREGON. IN: FOREST RESOURCE INVENTORIES WORKSHOP PROCEEDINGS, COLO. STATE UNIV., FT. COLLINS, CO: 1979 JULY 23-26. VOL II, PG 772

$$\text{Green\_kg\_bark} = 0.595 + 0.00083 * \text{dsqr\_cm} * \text{height\_m}$$

## Equation 50

SHAW, D.L., JR., BIOMASS EQUATIONS FOR DOUGLAS-FIR, WESTERN HEMLOCK AND RED CEDAR IN WASHINGTON AND OREGON. IN: FOREST RESOURCE INVENTORIES WORKSHOP PROCEEDINGS, COLO. STATE UNIV., FT. COLLINS, CO: 1979 JULY 23-26. VOL II, PG 772

$$\text{Dry\_kg\_branches} = 0.199 + 0.00381 * \text{dsqr\_cm} * \text{height\_m}$$

## Equation 51

SHAW, D.L., JR., BIOMASS EQUATIONS FOR DOUGLAS-FIR, WESTERN HEMLOCK AND RED CEDAR IN WASHINGTON AND OREGON. IN: FOREST RESOURCE INVENTORIES WORKSHOP PROCEEDINGS, COLO. STATE UNIV., FT. COLLINS, CO: 1979 JULY 23-26. VOL II, PG 772

$$\text{green\_kg\_branches} = 0.198 + 0.00621 * \text{dsqr\_cm} * \text{height\_m}$$

## Equation 52

SHAW, D.L., JR., BIOMASS EQUATIONS FOR DOUGLAS-FIR, WESTERN HEMLOCK AND RED CEDAR IN WASHINGTON AND OREGON. IN: FOREST RESOURCE INVENTORIES WORKSHOP PROCEEDINGS, COLO. STATE UNIV., FT. COLLINS, CO: 1979 JULY 23-26. VOL II, PG 772

$$\text{dry\_kg\_twigs\_foliage} = 0.298 + 0.00365 * \text{dsqr\_cm} * \text{height\_m}$$

## Equation 53

SHAW, D.L., JR., BIOMASS EQUATIONS FOR DOUGLAS-FIR, WESTERN HEMLOCK AND RED CEDAR IN WASHINGTON AND OREGON. IN: FOREST RESOURCE INVENTORIES WORKSHOP PROCEEDINGS, COLO. STATE UNIV., FT. COLLINS, CO: 1979 JULY 23-26. VOL II, PG 772

$$\text{green\_kg\_twigs\_foliage} = 0.751 + 0.00762 * \text{dsqr\_cm} * \text{height\_m}$$

## Equation 54

J.T. STANDISH 1983 PROJ 7952 TALISMAN LAND RESOURCE' CONSULTANTS 100-842 THURLOW ST, VANCOUVER, BC APPENDIX A - PG 17

$$\text{dry\_kg} = 9.2 + 191.6 * \text{dsqr\_m} * \text{height\_m}$$

## Equation 55

J.T. STANDISH 1983 PROJ 7952 TALISMAN LAND RESOURCE' CONSULTANTS 100-842 THURLOW ST, VANCOUVER, BC APPENDIX A - PG 17

$$\text{green\_kg} = 29.6 + 296.5 * \text{dsqr\_m} * \text{height\_m}$$

## Equation 56

J.T. STANDISH 1983 PROJ 7952 TALISMAN LAND RESOURCE' CONSULTANTS 100-842 THURLOW ST, VANCOUVER, BC APPENDIX A - PG 17

$$\text{dry\_kg\_bole} = -4.0 + 166.2 * \text{dsqr\_m} * \text{height\_m}$$

## Equation 57

J.T. STANDISH 1983 PROJ 7952 TALISMAN LAND RESOURCE'  
CONSULTANTS 100-842 THURLOW ST, VANCOUVER, BC APPENDIX A - PG 17

$$\text{green\_kg\_bole} = 2.1 + 251.6 * \text{dsqr\_m} * \text{height\_m}$$

## Equation 58

J.T. STANDISH 1983 PROJ 7952 TALISMAN LAND RESOURCE'  
CONSULTANTS 100-842 THURLOW ST, VANCOUVER, BC APPENDIX A - PG 17

$$\text{dry\_kg\_bark} = 1.8 + 9.6 * \text{dsqr\_m} * \text{height\_m}$$

## Equation 59

J.T. STANDISH 1983 PROJ 7952 TALISMAN LAND RESOURCE'  
CONSULTANTS 100-842 THURLOW ST, VANCOUVER, BC APPENDIX A - PG 17

$$\text{green\_kg\_bark} = 5.1 + 18.1 * \text{dsqr\_m} * \text{height\_m}$$

## Equation 60

J.T. STANDISH 1983 PROJ 7952 TALISMAN LAND RESOURCE'  
CONSULTANTS 100-842 THURLOW ST, VANCOUVER, BC APPENDIX A - PG 17  
\* DBRANH1 + DBRANH2

$$\text{dry\_kg\_branches} = 4.1 + 8.7 * \text{dsqr\_m} * \text{height\_m}$$

## Equation 61

J.T. STANDISH 1983 PROJ 7952 TALISMAN LAND RESOURCE'  
CONSULTANTS 100-842 THURLOW ST, VANCOUVER, BC APPENDIX A - PG 17  
\*FBRANH1 + FBRANH2

$$\text{green\_kg\_branches} = 7.6 + 14.7 * \text{dsqr\_m} * \text{height\_m}$$

## Equation 62

J.T. STANDISH 1983 PROJ 7952 TALISMAN LAND RESOURCE'  
CONSULTANTS 100-842 THURLOW ST, VANCOUVER, BC APPENDIX A - PG 17  
\* DBRANH3 + DFOLI

$$\text{dry\_kg\_twigs\_foliage} = 7.4 + 7.1 * \text{dsqr\_m} * \text{height\_m}$$

## Equation 63



J.T. STANDISH 1983 PROJ 7952 TALISMAN LAND RESOURCE'  
CONSULTANTS 100-842 THURLOW ST, VANCOUVER, BC APPENDIX A - PG 17  
\*FBRAN3 + FFOLI

$$\text{green\_kg\_twigs\_foliage} = 14.8 + 12.2 * \text{dsqr\_m} * \text{height\_m}$$

### Equation 64

J.T. STANDISH 1983 PROJ 7952 TALISMAN LAND RESOURCE'  
CONSULTANTS 100-842 THURLOW ST, VANCOUVER, BC APPENDIX A - PG 17

$$\text{green\_kg\_dead\_branches} = 0.3 + 1.3 * \text{dsqr\_m} * \text{height\_m}$$

### Equation 65

Manning INF-REP-BC-X-250, Pg 41  
\* includes green weight of dead branches

$$\text{dry\_kg} = 1.8962 + 0.02183 * \text{dsqr\_cm} * \text{height\_m}$$

### Equation 66

Manning INF-REP-BC-X-250, Pg 36

$$\text{green\_kg} = 6.1298 + 0.04031 * \text{dsqr\_cm} * \text{height\_m}$$

### Equation 67

Manning INF-REP-BC-X-250, Pg 37

$$\text{dry\_kg\_bole} = 0.6301 + 0.01568 * \text{dsqr\_cm} * \text{height\_m}$$

### Equation 68

Manning INF-REP-BC-X-250, Pg 31

$$\text{green\_kg\_bole} = 2.4865 + 0.02894 * \text{dsqr\_cm} * \text{height\_m}$$

### Equation 69

Manning INF-REP-BC-X-250, Pg 38

$$\text{Dry\_kg\_bark} = 0.3064 + 0.00153 * \text{dsqr\_cm} * \text{height\_m}$$

## Equation 70

Manning INF-REP-BC-X-250, Pg 32

$$\text{Green\_kg\_bark} = 0.9234 + 0.00302 * \text{dsqr\_cm} * \text{height\_m}$$

## Equation 71

Manning INF-REP-BC-X-250, Pg 39

$$\text{Dry\_kg\_branches} = 0.2614 + 0.00171 * \text{dsqr\_cm} * \text{height\_m}$$

## Equation 72

Manning INF-REP-BC-X-250, Pg 33

$$\text{green\_kg\_branches} = 0.4259 + 0.00353 * \text{dsqr\_cm} * \text{height\_m}$$

## Equation 73

Manning INF-REP-BC-X-250, Pg 40

$$\text{Dry\_kg\_twigs\_foliage} = 1.1011 + 0.00142 * \text{dsqr\_cm} * \text{height\_m}$$

## Equation 74

Manning INF-REP-BC-X-250, Pg 34

$$\text{green\_kg\_twigs\_foliage} = 2.6805 + 0.003319 * \text{dsqr\_cm} * \text{height\_m}$$

## Equation 75

Manning INF-REP-BC-X-250, Pg 35

$$\text{green\_kg\_dead\_branches} = -0.3864 + 0.00149 * \text{dsqr\_cm} * \text{height\_m}$$

## Equation 76

T.SINGH NOTE #257 NO FOREST RESEARCH CENTER EDMONTON,  
CANADA PG 17

$$\text{dry\_kg} = 6.32169 + 0.01728 * \text{dsqr\_cm} * \text{height\_m}$$

## Equation 77

T.SINGH NOTE #257 NO FOREST RESEARCH CENTER EDMONTON,  
CANADA PG 17 Conversion to green weight based on 110% moisture content

$$\text{dry\_kg} = (6.32169 + 0.01728 * \text{dsqr\_cm} * \text{height\_m}) * 2.11$$

## Equation 78

T.SINGH NOTE #257 NO FOREST RESEARCH CENTER EDMONTON,  
CANADA PG 17

$$\text{dry\_kg\_bole} = (-3.11604 + 0.01165 * \text{dsqr\_cm} * \text{height\_m}) \\ + (5.98493 + 0.00008 * \text{dsqr\_cm} * \text{height\_m})$$

## Equation 79

T.SINGH NOTE #257 NO FOREST RESEARCH CENTER EDMONTON,  
CANADA PG 17 Conversion to green weight based on 110% moisture content

$$\text{green\_kg\_bole} = [(-3.11604 + 0.01165 * \text{dsqr\_cm} * \text{height\_m}) \\ + (5.98493 + 0.00008 * \text{dsqr\_cm} * \text{height\_m})] * 2.11$$

## Equation 80

T.SINGH NOTE #257 NO FOREST RESEARCH CENTER EDMONTON,  
CANADA PG 17

$$\text{dry\_kg\_bark} = (0.65323 + 0.00123 * \text{dsqr\_cm} * \text{height\_m}) \\ + (1.15548 + 0.00002 * \text{dsqr\_cm} * \text{height\_m})$$

## Equation 81

T.SINGH NOTE #257 NO FOREST RESEARCH CENTER EDMONTON,  
CANADA PG 17 Conversion to green weight based on 110% moisture content

$$\text{green\_kg\_bark} = [(0.65323 + 0.00123 * \text{dsqr\_cm} * \text{height\_m}) \\ + (1.15548 + 0.00002 * \text{dsqr\_cm} * \text{height\_m})] * 2.11$$

## Equation 82

T.SINGH NOTE #257 NO FOREST RESEARCH CENTER EDMONTON,  
CANADA PG 17 Conversion to green weight based on 110% moisture content

$$\text{dry\_kg\_branches} = (-1.25157 + 0.00111 * \text{dsqr\_cm} * \text{height\_m}) \\ + (-0.34731 + 0.00030 * \text{dsqr\_cm} * \text{height\_m})$$

## Equation 83

T.SINGH NOTE #257 NO FOREST RESEARCH CENTER EDMONTON,  
CANADA PG 17 Conversion to green weight based on 110% moisture content

$$\text{green\_kg\_branches} = [(-1.25157 + 0.00111 * \text{dsqr\_cm} * \text{height\_m}) \\ + (-0.34731 + 0.00030 * \text{dsqr\_cm} * \text{height\_m})] * 2.11$$

## Equation 84

T.SINGH NOTE #257 NO FOREST RESEARCH CENTER EDMONTON,  
CANADA PG 17

$$\text{dry\_kg\_twigs\_foliage} = (2.01016 + 0.00137 * \text{dsqr\_cm} * \text{height\_m}) \\ + (0.97374 + 0.00070 * \text{dsqr\_cm} * \text{height\_m})$$

## Equation 85

T.SINGH NOTE #257 NO FOREST RESEARCH CENTER EDMONTON,  
CANADA PG 17 Conversion to green weight based on 110% moisture content

$$\text{dry\_kg\_twigs\_foliage} = [(2.01016 + 0.00137 * \text{dsqr\_cm} * \text{height\_m}) \\ + (0.97374 + 0.00070 * \text{dsqr\_cm} * \text{height\_m})] * 2.11$$

## Equation 86

J.T. STANDISH 1983 PROJ 7952 TALISMAN LAND RESOURCE'  
CONSULTANTS 100-842 THURLOW ST, VANCOUVER, BC APPENDIX A - PG 9

$$\text{dry\_kg} = 12.8 + 183.6 * \text{dsqr\_m} * \text{height\_m}$$

## Equation 87

J.T. STANDISH 1983 PROJ 7952 TALISMAN LAND RESOURCE'  
CONSULTANTS 100-842 THURLOW ST, VANCOUVER, BC APPENDIX A - PG 9

$$\text{green\_kg} = 37.5 + 397.9 * \text{dsqr\_m} * \text{height\_m}$$

## Equation 88

J.T. STANDISH 1983 PROJ 7952 TALISMAN LAND RESOURCE'  
CONSULTANTS 100-842 THURLOW ST, VANCOUVER, BC APPENDIX A - PG 9

$$\text{dry\_kg\_bole} = 1.4 + 122.9 * \text{dsqr\_m} * \text{height\_m}$$

## Equation 89

J.T. STANDISH 1983 PROJ 7952 TALISMAN LAND RESOURCE'  
CONSULTANTS 100-842 THURLOW ST, VANCOUVER, BC APPENDIX A - PG 9

$$\text{green\_kg\_bole} = 13.1.0 + 274.4 * \text{dsqr\_m} * \text{height\_m}$$

### Equation 90

J.T. STANDISH 1983 PROJ 7952 TALISMAN LAND RESOURCE'  
CONSULTANTS 100-842 THURLOW ST, VANCOUVER, BC APPENDIX A - PG 9

$$\text{dry\_kg\_bark} = 1.0 + 15.6 * \text{dsqr\_m} * \text{height\_m}$$

### Equation 91

J.T. STANDISH 1983 PROJ 7952 TALISMAN LAND RESOURCE'  
CONSULTANTS 100-842 THURLOW ST, VANCOUVER, BC APPENDIX A - PG 9

$$\text{green\_kg\_bark} = 2.6 + 32.8 * \text{dsqr\_m} * \text{height\_m}$$

### Equation 92

J.T. STANDISH 1983 PROJ 7952 TALISMAN LAND RESOURCE'  
CONSULTANTS 100-842 THURLOW ST, VANCOUVER, BC APPENDIX A - PG 9  
\* DBRANH1 + DBRANH2

$$\text{dry\_kg\_branches} = 3.3 + 17.8 * \text{dsqr\_m} * \text{height\_m}$$

### Equation 93

J.T. STANDISH 1983 PROJ 7952 TALISMAN LAND RESOURCE'  
CONSULTANTS 100-842 THURLOW ST, VANCOUVER, BC APPENDIX A - PG 9  
\* FBRAN1 + FBRAN2

$$\text{green\_kg\_branches} = 6.1 + 35.7 * \text{dsqr\_m} * \text{height\_m}$$

### Equation 94

J.T. STANDISH 1983 PROJ 7952 TALISMAN LAND RESOURCE'  
CONSULTANTS 100-842 THURLOW ST, VANCOUVER, BC APPENDIX A - PG 9  
\* DBRANH3 + DFOLI

$$\text{dry\_kg\_twigs\_foliage} = 7.1 + 27.4 * \text{dsqr\_m} * \text{height\_m}$$

### Equation 95

J.T. STANDISH 1983 PROJ 7952 TALISMAN LAND RESOURCE'  
CONSULTANTS 100-842 THURLOW ST, VANCOUVER, BC APPENDIX A - PG 9  
\* FBRAN3 + FFOLI

$$\text{green\_kg\_twigs\_foliage} = 15.6 + 55.0 * \text{dsqr\_m} * \text{height\_m}$$

### Equation 96

J.T. STANDISH 1983 PROJ 7952 TALISMAN LAND RESOURCE'  
CONSULTANTS 100-842 THURLOW ST, VANCOUVER, BC APPENDIX A - PG 9

$$\text{green\_kg\_dead\_branches} = 0.8 + 0.9 * \text{dsqr\_m} * \text{height\_m}$$

### Equation 97

J.T. STANDISH 1983 PROJ 7952 TALISMAN LAND RESOURCE'  
CONSULTANTS 100-842 THURLOW ST, VANCOUVER, BC APPENDIX A - PG 16

$$\text{dry\_kg} = 14.3 + 186.2 * \text{dsqr\_m} * \text{height\_m}$$

### Equation 98

J.T. STANDISH 1983 PROJ 7952 TALISMAN LAND RESOURCE'  
CONSULTANTS 100-842 THURLOW ST, VANCOUVER, BC APPENDIX A - PG 16

$$\text{green\_kg} = 33.6 + 367.2 * \text{dsqr\_m} * \text{height\_m}$$

### Equation 99

J.T. STANDISH 1983 PROJ 7952 TALISMAN LAND RESOURCE'  
CONSULTANTS 100-842 THURLOW ST, VANCOUVER, BC APPENDIX A - PG 16

$$\text{dry\_kg\_bole} = 4.0 + 107.4 * \text{dsqr\_m} * \text{height\_m}$$

### Equation 100

J.T. STANDISH 1983 PROJ 7952 TALISMAN LAND RESOURCE'  
CONSULTANTS 100-842 THURLOW ST, VANCOUVER, BC APPENDIX A - PG 16

$$\text{green\_kg\_bole} = 11.4 + 217.0 * \text{dsqr\_m} * \text{height\_m}$$

### Equation 101

J.T. STANDISH 1983 PROJ 7952 TALISMAN LAND RESOURCE'  
CONSULTANTS 100-842 THURLOW ST, VANCOUVER, BC APPENDIX A - PG 16

$$\text{dry\_kg\_bark} = 1.0 + 17.2 * \text{dsqr\_m} * \text{height\_m}$$

### Equation 102

J.T. STANDISH 1983 PROJ 7952 TALISMAN LAND RESOURCE'  
CONSULTANTS 100-842 THURLOW ST, VANCOUVER, BC APPENDIX A - PG 16

$$\text{green\_kg\_bark} = 4.2 + 32.0 * \text{dsqr\_m} * \text{height\_m}$$

### Equation 103

J.T. STANDISH 1983 PROJ 7952 TALISMAN LAND RESOURCE'  
CONSULTANTS 100-842 THURLOW ST, VANCOUVER, BC APPENDIX A - PG 16  
\* DBRANH1 + DBRANH2

$$\text{dry\_kg\_branches} = 1.3 + 33.3 * \text{dsqr\_m} * \text{height\_m}$$

### Equation 104

J.T. STANDISH 1983 PROJ 7952 TALISMAN LAND RESOURCE'  
CONSULTANTS 100-842 THURLOW ST, VANCOUVER, BC APPENDIX A - PG 16  
\*FBRANH1 + FBRANH2

$$\text{green\_kg\_branches} = 2.2 + 61.9 * \text{dsqr\_m} * \text{height\_m}$$

### Equation 105

J.T. STANDISH 1983 PROJ 7952 TALISMAN LAND RESOURCE'  
CONSULTANTS 100-842 THURLOW ST, VANCOUVER, BC APPENDIX A - PG 16  
\* DBRANH3 + DFOLI

$$\text{dry\_kg\_twigs\_foliage} = 8.0 + 28.4 * \text{dsqr\_m} * \text{height\_m}$$

### Equation 106

J.T. STANDISH 1983 PROJ 7952 TALISMAN LAND RESOURCE'  
CONSULTANTS 100-842 THURLOW ST, VANCOUVER, BC APPENDIX A - PG 16  
\*FBRANH3 + FFOLI

$$\text{green\_kg\_twigs\_foliage} = 15.9 + 56.3 * \text{dsqr\_m} * \text{height\_m}$$

### Equation 107

J.T. STANDISH 1983 PROJ 7952 TALISMAN LAND RESOURCE'  
CONSULTANTS 100-842 THURLOW ST, VANCOUVER, BC APPENDIX A - PG 16

$$\text{green\_kg\_dead\_branches} = 0.6 + 7.9 * \text{dsqr\_m} * \text{height\_m}$$

### Equation 108

Manning INF-REP-BC-X-250, Pg 60

$$\text{dry\_kg} = 0.4407 + 0.0187 * \text{dsqr\_cm} * \text{height\_m}$$

### Equation 109

Manning INF-REP-BC-X-250, Pg 56

$$\text{green\_kg} = 1.3872 + 0.0357 * \text{dsqr\_cm} * \text{height\_m}$$

### Equation 110

Manning INF-REP-BC-X-250, Pg 57

$$\text{dry\_kg\_bole} = 0.0983 + 0.0128 * \text{dsqr\_cm} * \text{height\_m}$$

### Equation 111

Manning INF-REP-BC-X-250, Pg 53

$$\text{green\_kg\_bole} = 0.3076 + 0.0234 * \text{dsqr\_cm} * \text{height\_m}$$

### Equation 112

Manning INF-REP-BC-X-250, Pg 58

$$\text{Dry\_kg\_bark} = 0.1281 + 0.0029 * \text{dsqr\_cm} * \text{height\_m}$$

### Equation 113

Manning INF-REP-BC-X-250, Pg 54

$$\text{Green\_kg\_bark} = 0.3711 + 0.0059 * \text{dsqr\_cm} * \text{height\_m}$$

### Equation 114

Manning INF-REP-BC-X-250, Pg 59

$$\text{Dry\_kg\_branches\_twigs\_foliage} = 0.2143 + 0.0031 * \text{dsqr\_cm} * \text{height\_m}$$

### Equation 115

Manning INF-REP-BC-X-250, Pg 55

$$\text{green\_kg\_branches\_twigs\_foliage} = 0.7069 + 0.0064 * \text{dsqr\_cm} * \text{height\_m}$$



Equation 116 – 117 – not used, components included in equation 115

### Equation 118

J.T. STANDISH 1983 PROJ 7952 TALISMAN LAND RESOURCE'  
CONSULTANTS 100-842 THURLOW ST, VANCOUVER, BC APPENDIX A - PG 20

$$\text{green\_kg\_dead\_branches} = 0.6 + 2.4 * \text{dsqr\_m} * \text{height\_m}$$

### Equation 119

ALEMDAG INF REP PI-X-46,1984, ONTARIO PG 28  
OM/GM RATIO, PG 34, 40

$$\text{dry\_kg} = 0.023468 * \text{dsqr\_cm} * \text{height\_m}$$

### Equation 120

ALEMDAG INF REP PI-X-46,1984, ONTARIO PG 28  
OM/GM RATIO, PG 34, 40

$$\text{green\_kg} = (0.023468 * \text{dsqr\_cm} * \text{height\_m}) * 1.7422$$

### Equation 121

ALEMDAG INF REP PI-X-46,1984, ONTARIO PG 28  
OM/GM RATIO, PG 34, 40

$$\text{dry\_kg\_bole} = 0.016211 * \text{dsqr\_cm} * \text{height\_m}$$

### Equation 122

ALEMDAG INF REP PI-X-46,1984, ONTARIO PG 28  
OM/GM RATIO, PG 34, 40

$$\text{green\_kg\_bole} = (0.016211 * \text{dsqr\_cm} * \text{height\_m}) * 1.7452$$

### Equation 123

ALEMDAG INF REP PI-X-46,1984, ONTARIO PG 28  
OM/GM RATIO, PG 34, 40

$$\text{Dry\_kg\_bark} = 0.002873 * \text{dsqr\_cm} * \text{height\_m}$$

## Equation 124

ALEMDAG INF REP PI-X-46,1984, ONTARIO PG 28  
OM/GM RATIO, PG 34, 40

$$\text{green\_kg\_bark} = (0.002873 * \text{dsqr\_cm} * \text{height\_m}) * 1.5083$$

## Equation 125

ALEMDAG INF REP PI-X-46,1984, ONTARIO PG 28  
OM/GM RATIO, PG 34, 40

$$\text{Dry\_kg\_branches} = 0.003525 * \text{dsqr\_cm} * \text{height\_m}$$

## Equation 126

ALEMDAG INF REP PI-X-46,1984, ONTARIO PG 28  
OM/GM RATIO, PG 34, 40

$$\text{green\_kg\_branches} = (0.003525 * \text{dsqr\_cm} * \text{height\_m}) * 1.7391$$

## Equation 127

ALEMDAG INF REP PI-X-46,1984, ONTARIO PG 28  
OM/GM RATIO, PG 34, 40

$$\text{Dry\_kg\_twigs\_foliage} = 0.000859 * \text{dsqr\_cm} * \text{height\_m}$$

## Equation 128

ALEMDAG INF REP PI-X-46,1984, ONTARIO PG 28  
OM/GM RATIO, PG 34, 40

$$\text{green\_kg\_twigs\_foliage} = (0.000859 * \text{dsqr\_cm} * \text{height\_m}) * 2.500$$

## Equation 129

J.T. STANDISH 1983 PROJ 7952 TALISMAN LAND RESOURCE'  
CONSULTANTS 100-842 THURLOW ST, VANCOUVER, BC APPENDIX A - PG 21

$$\text{dry\_kg} = 0.5 + 0.4 * \text{dsqr\_m} * \text{height\_m}$$

## Equation 130

J.T. STANDISH 1983 PROJ 7952 TALISMAN LAND RESOURCE'  
CONSULTANTS 100-842 THURLOW ST, VANCOUVER, BC APPENDIX A - PG 18

$$\text{dry\_kg} = 7.4 + 156.4 * \text{dsqr\_m} * \text{height\_m}$$

### Equation 131

J.T. STANDISH 1983 PROJ 7952 TALISMAN LAND RESOURCE'  
CONSULTANTS 100-842 THURLOW ST, VANCOUVER, BC APPENDIX A - PG 18

$$\text{green\_kg} = 16.2 + 312.7 * \text{dsqr\_m} * \text{height\_m}$$

### Equation 132

J.T. STANDISH 1983 PROJ 7952 TALISMAN LAND RESOURCE'  
CONSULTANTS 100-842 THURLOW ST, VANCOUVER, BC APPENDIX A - PG 2

$$\text{dry\_kg\_bole} = 2.3 + 97.5 * \text{dsqr\_m} * \text{height\_m}$$

### Equation 133

J.T. STANDISH 1983 PROJ 7952 TALISMAN LAND RESOURCE'  
CONSULTANTS 100-842 THURLOW ST, VANCOUVER, BC APPENDIX A - PG 18

$$\text{green\_kg\_bole} = 5.9 + 199.2 * \text{dsqr\_m} * \text{height\_m}$$

### Equation 134

J.T. STANDISH 1983 PROJ 7952 TALISMAN LAND RESOURCE'  
CONSULTANTS 100-842 THURLOW ST, VANCOUVER, BC APPENDIX A - PG 18

$$\text{dry\_kg\_bark} = 1.2 + 15.5 * \text{dsqr\_m} * \text{height\_m}$$

### Equation 135

J.T. STANDISH 1983 PROJ 7952 TALISMAN LAND RESOURCE'  
CONSULTANTS 100-842 THURLOW ST, VANCOUVER, BC APPENDIX A - PG 18

$$\text{green\_kg\_bark} = 4.1 + 32.4 * \text{dsqr\_m} * \text{height\_m}$$

### Equation 136

J.T. STANDISH 1983 PROJ 7952 TALISMAN LAND RESOURCE'  
CONSULTANTS 100-842 THURLOW ST, VANCOUVER, BC APPENDIX A - PG 18  
\* DBRANH1 + DBRANH2

$$\text{dry\_kg\_branches} = 1.9 + 35.5 * \text{dsqr\_m} * \text{height\_m}$$

## Equation 137

J.T. STANDISH 1983 PROJ 7952 TALISMAN LAND RESOURCE'  
CONSULTANTS 100-842 THURLOW ST, VANCOUVER, BC APPENDIX A - PG 18  
\*FBRAN1 + FBRAN2

$$\text{green\_kg\_branches} = 2.8 + 65.4 * \text{dsqr\_m} * \text{height\_m}$$

## Equation 138

J.T. STANDISH 1983 PROJ 7952 TALISMAN LAND RESOURCE'  
CONSULTANTS 100-842 THURLOW ST, VANCOUVER, BC APPENDIX A - PG 18  
\* DBRANH3 + DFOLI

$$\text{dry\_kg\_twigs\_foliage} = 2.1 + 7.8 * \text{dsqr\_m} * \text{height\_m}$$

## Equation 139

J.T. STANDISH 1983 PROJ 7952 TALISMAN LAND RESOURCE'  
CONSULTANTS 100-842 THURLOW ST, VANCOUVER, BC APPENDIX A - PG 18  
\*FBRAN3 + FFOLI

$$\text{green\_kg\_twigs\_foliage} = 3.3 + 15.6 * \text{dsqr\_m} * \text{height\_m}$$

## Equation 140

J.T. STANDISH 1983 PROJ 7952 TALISMAN LAND RESOURCE'  
CONSULTANTS 100-842 THURLOW ST, VANCOUVER, BC APPENDIX A - PG 18

$$\text{green\_kg\_dead\_branches} = 0.6 + 2.2 * \text{dsqr\_m} * \text{height\_m}$$

## Equation 141

J.T. STANDISH 1983 PROJ 7952 TALISMAN LAND RESOURCE'  
CONSULTANTS 100-842 THURLOW ST, VANCOUVER, BC APPENDIX A - PG 19

$$\text{dry\_kg} = 4.8 + 206.5 * \text{dsqr\_m} * \text{height\_m}$$

## Equation 142

J.T. STANDISH 1983 PROJ 7952 TALISMAN LAND RESOURCE'  
CONSULTANTS 100-842 THURLOW ST, VANCOUVER, BC APPENDIX A - PG 19

$$\text{green\_kg} = 15.9 + 378.9 * \text{dsqr\_m} * \text{height\_m}$$

## Equation 143

J.T. STANDISH 1983 PROJ 7952 TALISMAN LAND RESOURCE'  
CONSULTANTS 100-842 THURLOW ST, VANCOUVER, BC APPENDIX A - PG 19

$$\text{dry\_kg\_bole} = -4.6 + 159.7 * \text{dsqr\_m} * \text{height\_m}$$

### Equation 144

J.T. STANDISH 1983 PROJ 7952 TALISMAN LAND RESOURCE'  
CONSULTANTS 100-842 THURLOW ST, VANCOUVER, BC APPENDIX A - PG 19

$$\text{green\_kg\_bole} = -5.9 + 294.6 * \text{dsqr\_m} * \text{height\_m}$$

### Equation 145

J.T. STANDISH 1983 PROJ 7952 TALISMAN LAND RESOURCE'  
CONSULTANTS 100-842 THURLOW ST, VANCOUVER, BC APPENDIX A - PG 19

$$\text{dry\_kg\_bark} = -1.2 + 24.0 * \text{dsqr\_m} * \text{height\_m}$$

### Equation 146

J.T. STANDISH 1983 PROJ 7952 TALISMAN LAND RESOURCE'  
CONSULTANTS 100-842 THURLOW ST, VANCOUVER, BC APPENDIX A - PG 19

$$\text{green\_kg\_bark} = -0.5 + 41.2 * \text{dsqr\_m} * \text{height\_m}$$

### Equation 147

J.T. STANDISH 1983 PROJ 7952 TALISMAN LAND RESOURCE'  
CONSULTANTS 100-842 THURLOW ST, VANCOUVER, BC APPENDIX A - PG 19  
\* DBRANH1 + DBRAN2

$$\text{dry\_kg\_branches} = 7.1 + 19.4 * \text{dsqr\_m} * \text{height\_m}$$

### Equation 148

J.T. STANDISH 1983 PROJ 7952 TALISMAN LAND RESOURCE'  
CONSULTANTS 100-842 THURLOW ST, VANCOUVER, BC APPENDIX A - PG 19  
\*FBRAN1 + FBRAN2

$$\text{green\_kg\_branches} = 13.2 + 36.1 * \text{dsqr\_m} * \text{height\_m}$$

### Equation 149

J.T. STANDISH 1983 PROJ 7952 TALISMAN LAND RESOURCE'  
CONSULTANTS 100-842 THURLOW ST, VANCOUVER, BC APPENDIX A - PG 19  
\* DBRANH3 + DFOLI

$$\text{dry\_kg\_twigs\_foliage} = 3.5 + 3.4 * \text{dsqr\_m} * \text{height\_m}$$

### Equation 150

J.T. STANDISH 1983 PROJ 7952 TALISMAN LAND RESOURCE'  
CONSULTANTS 100-842 THURLOW ST, VANCOUVER, BC APPENDIX A - PG 19  
\*FBRAN3 + FFOLI

$$\text{green\_kg\_twigs\_foliage} = 9.1 + 6.9 * \text{dsqr\_m} * \text{height\_m}$$

### Equation 151

J.T. STANDISH 1983 PROJ 7952 TALISMAN LAND RESOURCE'  
CONSULTANTS 100-842 THURLOW ST, VANCOUVER, BC APPENDIX A - PG 19

$$\text{green\_kg\_dead\_branches} = -0.6 + 8.5 * \text{dsqr\_m} * \text{height\_m}$$

## BIOMASS EQUATION SOURCES

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