

Growth Intercept Models and Tables for British Columbia — Coastal Species

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GROWTH INTERCEPT MODELS AND TABLES FOR BRITISH COLUMBIA — COASTAL SPECIES

Gordon D. Nigh

Forest Productivity Section

B.C. Ministry of Forests, Research Branch

P.O. Box 9519, Stn. Prov. Govt., Victoria, B.C. V8W 9C2

This field guide insert presents the growth intercept models and tables available for use in coastal regions of British Columbia. Included are growth intercept models and tables for:

Species	Code	Reference	Revised
Western Hemlock	Hw	Nigh (1999)	Oct. 1999
Sitka Spruce	Ss	Nigh (1999)	Oct. 1999
Douglas-fir	Fd	Nigh (1997)	Oct. 1999

The Options section notes any options and alternative models or model formulations, and provides references that are available from the above address.

The tables are designed for rough estimation of site index in the field. The formulation or the appropriate publication should be consulted for accurate site index determination.

The arbitrary range of site index in the tables is 10–50 m. The tables are in a common format for consistency among species and do not necessarily represent the range of site indices found in the model development data. Site index is based on top height and a reference age of 50 years (breast height) for all species. Estimates of growth intercept and site index that are beyond the range of the data used in the analyses (given in the Notes section for each species) should be interpreted with caution.

The tables presented in this handbook do not have sufficient resolution, particularly at young ages, to be used in silviculture surveys. Silviculture surveyors, and others who need to estimate site index during a silviculture survey or a reconnaissance, should consult the appropriate field guide for silviculture surveys (B.C. Min. For. 1995. Growth intercept method for silviculture surveys. Forest Practices Br., Victoria, B.C.). As well, information about the application of the models can be obtained from the source reports.

Growth intercept models and tables will be refined and updated as new information becomes available. A revised reference list will be issued with each addition or revision. Write to the above address for updates.

Coastal Western Hemlock

Source:

Nigh, G.D. 1999. Revised growth intercept models for coastal western hemlock, Sitka spruce, and interior spruce. B.C. Min. For., Res. Br., Victoria, B.C. Exten. Note 37.

Formulation:

Age	Model	Age	Model
1	$SI = 1.3 + 4.36 GI_1^{0.464}$	26	$SI = 1.3 + 0.944 GI_{26}^{0.820}$
2	$SI = 1.3 + 3.68 GI_2^{0.505}$	27	$SI = 1.3 + 0.885 GI_{27}^{0.836}$
3	$SI = 1.3 + 3.36 GI_3^{0.530}$	28	$SI = 1.3 + 0.841 GI_{28}^{0.849}$
4	$SI = 1.3 + 3.22 GI_4^{0.543}$	29	$SI = 1.3 + 0.796 GI_{29}^{0.862}$
5	$SI = 1.3 + 2.86 GI_5^{0.575}$	30	$SI = 1.3 + 0.748 GI_{30}^{0.878}$
6	$SI = 1.3 + 2.46 GI_6^{0.613}$	31	$SI = 1.3 + 0.703 GI_{31}^{0.894}$
7	$SI = 1.3 + 2.23 GI_7^{0.637}$	32	$SI = 1.3 + 0.661 GI_{32}^{0.910}$
8	$SI = 1.3 + 2.15 GI_8^{0.644}$	33	$SI = 1.3 + 0.622 GI_{33}^{0.925}$
9	$SI = 1.3 + 2.03 GI_9^{0.655}$	34	$SI = 1.3 + 0.591 GI_{34}^{0.939}$
10	$SI = 1.3 + 1.84 GI_{10}^{0.676}$	35	$SI = 1.3 + 0.570 GI_{35}^{0.949}$
11	$SI = 1.3 + 1.69 GI_{11}^{0.694}$	36	$SI = 1.3 + 0.554 GI_{36}^{0.957}$
12	$SI = 1.3 + 1.55 GI_{12}^{0.712}$	37	$SI = 1.3 + 0.542 GI_{37}^{0.964}$
13	$SI = 1.3 + 1.44 GI_{13}^{0.727}$	38	$SI = 1.3 + 0.532 GI_{38}^{0.970}$
14	$SI = 1.3 + 1.39 GI_{14}^{0.734}$	39	$SI = 1.3 + 0.523 GI_{39}^{0.975}$
15	$SI = 1.3 + 1.36 GI_{15}^{0.738}$	40	$SI = 1.3 + 0.514 GI_{40}^{0.981}$
16	$SI = 1.3 + 1.33 GI_{16}^{0.742}$	41	$SI = 1.3 + 0.507 GI_{41}^{0.985}$
17	$SI = 1.3 + 1.29 GI_{17}^{0.749}$	42	$SI = 1.3 + 0.504 GI_{42}^{0.988}$
18	$SI = 1.3 + 1.25 GI_{18}^{0.755}$	43	$SI = 1.3 + 0.502 GI_{43}^{0.990}$
19	$SI = 1.3 + 1.21 GI_{19}^{0.763}$	44	$SI = 1.3 + 0.500 GI_{44}^{0.991}$
20	$SI = 1.3 + 1.16 GI_{20}^{0.772}$	45	$SI = 1.3 + 0.499 GI_{45}^{0.993}$
21	$SI = 1.3 + 1.13 GI_{21}^{0.779}$	46	$SI = 1.3 + 0.499 GI_{46}^{0.994}$
22	$SI = 1.3 + 1.09 GI_{22}^{0.786}$	47	$SI = 1.3 + 0.499 GI_{47}^{0.995}$
23	$SI = 1.3 + 1.05 GI_{23}^{0.794}$	48	$SI = 1.3 + 0.496 GI_{48}^{0.997}$
24	$SI = 1.3 + 1.03 GI_{24}^{0.799}$	49	$SI = 1.3 + 0.494 GI_{49}^{1.00}$
25	$SI = 1.3 + 0.995 GI_{25}^{0.806}$	50	$SI = 1.3 + 0.491 GI_{50}^{1.00}$

where: SI = estimated site index (m at breast height age 50), and
GI = growth intercept (cm/year).

Site Index Table for Coastal Western Hemlock

bh ring count	Tree Height (m)														
	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
	Site Index (m)														
2	27	41	-	-	-	-	-	-	-	-	-	-	-	-	
4	18	28	35	42	47	-	-	-	-	-	-	-	-	-	
6	13	21	28	34	39	44	48	-	-	-	-	-	-	-	
8	10	17	23	28	32	36	40	44	47	50	-	-	-	-	
10	-	14	19	23	27	31	34	37	40	43	46	49	-	-	
12	-	12	16	20	23	26	29	32	35	38	40	43	45	48	
14	-	10	14	17	20	23	26	28	31	33	36	38	40	43	
16	-	-	12	15	18	21	23	25	28	30	32	34	36	38	
18	-	-	11	14	16	19	21	23	25	27	29	31	33	35	
20	-	-	10	13	15	17	19	21	23	25	27	29	30	32	
22	-	-	-	11	14	16	18	19	21	23	25	26	28	30	
24	-	-	-	11	13	14	16	18	20	21	23	25	26	28	
26	-	-	-	10	12	13	15	17	18	20	21	23	25	26	
28	-	-	-	-	11	12	14	16	17	19	20	22	23	24	
30	-	-	-	-	10	11	13	14	16	17	19	20	22	23	
32	-	-	-	-	-	10	12	13	15	16	18	19	20	22	
34	-	-	-	-	-	10	11	13	14	15	17	18	19	21	
36	-	-	-	-	-	-	11	12	13	14	16	17	18	20	
38	-	-	-	-	-	-	10	11	13	14	15	16	17	19	
40	-	-	-	-	-	-	10	11	12	13	14	16	17	18	
42	-	-	-	-	-	-	-	10	11	13	14	15	16	17	
44	-	-	-	-	-	-	-	10	11	12	13	14	15	17	
46	-	-	-	-	-	-	-	10	11	12	13	14	15	16	
48	-	-	-	-	-	-	-	-	10	11	12	13	14	15	
50	-	-	-	-	-	-	-	-	10	11	12	13	14	15	

bh - breast height = 1.3 m

(continued)

Tree Height (m)															bh ring count
16	17	18	19	20	21	22	23	24	25	26	27	28	29		
Site Index (m)															
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10
50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12
45	47	49	-	-	-	-	-	-	-	-	-	-	-	-	14
40	42	44	46	48	50	-	-	-	-	-	-	-	-	-	16
37	39	41	42	44	46	47	49	-	-	-	-	-	-	-	18
34	36	37	39	41	42	44	45	47	48	50	-	-	-	-	20
31	33	35	36	38	39	41	42	44	45	47	48	49	-	-	22
29	31	32	34	35	37	38	39	41	42	44	45	46	48	-	24
27	29	30	32	33	35	36	37	39	40	41	43	44	45	-	26
26	27	29	30	31	33	34	36	37	38	39	41	42	43	-	28
24	26	27	29	30	31	33	34	35	36	38	39	40	42	-	30
23	24	26	27	28	30	31	32	34	35	36	37	39	40	-	32
22	23	24	26	27	28	30	31	32	33	35	36	37	39	-	34
21	22	23	25	26	27	28	30	31	32	33	35	36	37	-	36
20	21	22	24	25	26	27	29	30	31	32	33	35	36	-	38
19	20	21	23	24	25	26	27	29	30	31	32	33	34	-	40
18	20	21	22	23	24	25	26	28	29	30	31	32	33	-	42
18	19	20	21	22	23	24	25	27	28	29	30	31	32	-	44
17	18	19	20	21	22	23	25	26	27	28	29	30	31	-	46
17	18	19	20	21	22	23	24	25	26	27	28	29	30	-	48
16	17	18	19	20	21	22	23	24	25	26	27	28	29	-	50

Options:

1. The growth intercept can also be determined by calculating the average annual height growth from the sub-nodal branches (see source report). This method is useful when the stem is not suitable for growth intercept measurements (e.g., when the trees have top damage) and for research applications.

Notes:

These models were updated to incorporate the latest growth intercept modelling techniques.

The growth intercept table (preceding) eliminates the need to calculate the growth intercept. To use the table, first measure the total height of a top height tree and count the number of annual growth rings at its breast height. Find the row corresponding to the ring count and the column most closely corresponding to the tree height. The number at the intersection of this row and column is the approximate site index.

The model formulation provides better resolution than the table. For those wanting this resolution, the growth intercept is calculated by subtracting 1.3 from the tree height (in m), dividing by the number of years of growth above breast height (ring count - 0.5), and then multiplying by 100 to convert metres into centimetres. The site index is first calculated for each tree in the plot from its growth intercept and the model corresponding to age = ring count. The site indices are then averaged to get a site index for the plot.

The growth intercept models were developed from 46 stem analysis plots located in the Coastal Western Hemlock biogeoclimatic zone. Plots ranged in site index from about 7 to 40 m, and the growth intercepts ranged from about 10 to 100 cm. The models can be used throughout coastal British Columbia.

Coastal Sitka Spruce

Source:

Nigh, G.D. 1999. Revised growth intercept models for coastal western hemlock, Sitka spruce, and interior spruce. B.C. Min. For., Res. Br., Victoria, B.C. Exten. Note 37.

Formulation:

Age	Model	Age	Model
1	$SI = 1.3 + 4.37 GI_1^{0.503}$	26	$SI = 1.3 + 0.974 GI_{26}^{0.819}$
2	$SI = 1.3 + 3.16 GI_2^{0.573}$	27	$SI = 1.3 + 0.948 GI_{27}^{0.825}$
3	$SI = 1.3 + 3.01 GI_3^{0.583}$	28	$SI = 1.3 + 0.923 GI_{28}^{0.832}$
4	$SI = 1.3 + 2.90 GI_4^{0.590}$	29	$SI = 1.3 + 0.891 GI_{29}^{0.840}$
5	$SI = 1.3 + 2.81 GI_5^{0.598}$	30	$SI = 1.3 + 0.878 GI_{30}^{0.844}$
6	$SI = 1.3 + 2.77 GI_6^{0.601}$	31	$SI = 1.3 + 0.857 GI_{31}^{0.849}$
7	$SI = 1.3 + 2.89 GI_7^{0.589}$	32	$SI = 1.3 + 0.820 GI_{32}^{0.860}$
8	$SI = 1.3 + 3.04 GI_8^{0.574}$	33	$SI = 1.3 + 0.799 GI_{33}^{0.867}$
9	$SI = 1.3 + 3.10 GI_9^{0.567}$	34	$SI = 1.3 + 0.780 GI_{34}^{0.873}$
10	$SI = 1.3 + 3.05 GI_{10}^{0.567}$	35	$SI = 1.3 + 0.764 GI_{35}^{0.879}$
11	$SI = 1.3 + 2.93 GI_{11}^{0.575}$	36	$SI = 1.3 + 0.749 GI_{36}^{0.884}$
12	$SI = 1.3 + 2.78 GI_{12}^{0.585}$	37	$SI = 1.3 + 0.735 GI_{37}^{0.889}$
13	$SI = 1.3 + 2.56 GI_{13}^{0.603}$	38	$SI = 1.3 + 0.723 GI_{38}^{0.894}$
14	$SI = 1.3 + 2.31 GI_{14}^{0.625}$	39	$SI = 1.3 + 0.711 GI_{39}^{0.899}$
15	$SI = 1.3 + 2.10 GI_{15}^{0.646}$	40	$SI = 1.3 + 0.697 GI_{40}^{0.905}$
16	$SI = 1.3 + 1.90 GI_{16}^{0.669}$	41	$SI = 1.3 + 0.677 GI_{41}^{0.913}$
17	$SI = 1.3 + 1.73 GI_{17}^{0.690}$	42	$SI = 1.3 + 0.655 GI_{42}^{0.922}$
18	$SI = 1.3 + 1.60 GI_{18}^{0.707}$	43	$SI = 1.3 + 0.635 GI_{43}^{0.931}$
19	$SI = 1.3 + 1.50 GI_{19}^{0.722}$	44	$SI = 1.3 + 0.615 GI_{44}^{0.940}$
20	$SI = 1.3 + 1.40 GI_{20}^{0.737}$	45	$SI = 1.3 + 0.592 GI_{45}^{0.950}$
21	$SI = 1.3 + 1.30 GI_{21}^{0.753}$	46	$SI = 1.3 + 0.570 GI_{46}^{0.961}$
22	$SI = 1.3 + 1.21 GI_{22}^{0.771}$	47	$SI = 1.3 + 0.549 GI_{47}^{0.971}$
23	$SI = 1.3 + 1.12 GI_{23}^{0.788}$	48	$SI = 1.3 + 0.530 GI_{48}^{0.981}$
24	$SI = 1.3 + 1.05 GI_{24}^{0.802}$	49	$SI = 1.3 + 0.514 GI_{49}^{0.990}$
25	$SI = 1.3 + 1.00 GI_{25}^{0.812}$	50	$SI = 1.3 + 0.499 GI_{50}^{0.999}$

where: SI = estimated site index (m at breast height age 50), and
GI = growth intercept (cm/year).

Site Index Table for Coastal Sitka Spruce

bh ring count	Tree Height (m)														
	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
	Site Index (m)														
2	30	49	-	-	-	-	-	-	-	-	-	-	-	-	
4	18	30	39	47	-	-	-	-	-	-	-	-	-	-	
6	14	23	30	36	41	46	-	-	-	-	-	-	-	-	
8	12	20	25	30	34	38	41	45	48	-	-	-	-	-	
10	11	17	22	26	29	32	35	38	41	43	46	48	50	-	
12	-	15	19	22	26	29	31	34	36	39	41	43	45	47	
14	-	13	16	20	23	25	28	30	33	35	37	39	41	43	
16	-	11	14	17	20	22	25	27	29	31	34	36	37	39	
18	-	-	12	15	18	20	22	25	27	29	31	33	34	36	
20	-	-	11	14	16	18	20	22	24	26	28	30	32	33	
22	-	-	10	12	14	16	18	20	22	24	26	28	29	31	
24	-	-	-	11	13	15	17	19	20	22	24	25	27	29	
26	-	-	-	10	12	14	15	17	19	20	22	24	25	27	
28	-	-	-	-	11	13	14	16	18	19	21	22	24	25	
30	-	-	-	-	10	12	14	15	17	18	19	21	22	24	
32	-	-	-	-	10	11	13	14	16	17	18	20	21	22	
34	-	-	-	-	-	11	12	13	15	16	17	19	20	21	
36	-	-	-	-	-	10	11	13	14	15	17	18	19	20	
38	-	-	-	-	-	10	11	12	13	15	16	17	18	19	
40	-	-	-	-	-	-	10	12	13	14	15	16	17	19	
42	-	-	-	-	-	-	10	11	12	13	14	16	17	18	
44	-	-	-	-	-	-	-	10	12	13	14	15	16	17	
46	-	-	-	-	-	-	-	10	11	12	13	14	15	16	
48	-	-	-	-	-	-	-	-	10	12	13	14	15	16	
50	-	-	-	-	-	-	-	-	10	11	12	13	14	15	

bh - breast height = 1.3 m

(continued)

														Tree Height (m)	bh ring count
16	17	18	19	20	21	22	23	24	25	26	27	28	29		
														Site Index (m)	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	6	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	8	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	10	
49	-	-	-	-	-	-	-	-	-	-	-	-	-	12	
45	46	48	50	-	-	-	-	-	-	-	-	-	-	14	
41	43	45	46	48	50	-	-	-	-	-	-	-	-	16	
38	40	41	43	45	46	48	50	-	-	-	-	-	-	18	
35	37	38	40	42	43	45	46	48	49	-	-	-	-	20	
33	34	36	37	39	40	42	44	45	46	48	49	-	-	22	
30	32	33	35	36	38	39	41	42	44	45	47	48	49	24	
28	30	31	33	34	36	37	38	40	41	43	44	45	47	26	
27	28	29	31	32	34	35	36	38	39	40	41	43	44	28	
25	26	28	29	30	32	33	34	36	37	38	39	41	42	30	
24	25	26	28	29	30	31	33	34	35	36	37	39	40	32	
22	24	25	26	27	29	30	31	32	33	35	36	37	38	34	
21	23	24	25	26	27	29	30	31	32	33	34	35	37	36	
20	22	23	24	25	26	27	28	30	31	32	33	34	35	38	
20	21	22	23	24	25	26	27	28	30	31	32	33	34	40	
19	20	21	22	23	24	25	26	27	29	30	31	32	33	42	
18	19	20	21	22	23	24	26	27	28	29	30	31	32	44	
17	18	19	20	22	23	24	25	26	27	28	29	30	31	46	
17	18	19	20	21	22	23	24	25	26	27	28	29	30	48	
16	17	18	19	20	21	22	23	24	25	26	27	28	29	50	

Options:

1. The growth intercept can also be determined by calculating the average annual height growth from the annual whorls. This method is useful when the stem is not suitable for growth intercept measurements (e.g., when the trees have top damage) and for research applications.

Notes:

These models were updated to incorporate the latest growth intercept modelling techniques.

The growth intercept table (preceding) eliminates the need to calculate the growth intercept. To use the table, first measure the total height of a top height tree and count the number of annual growth rings at its breast height. Find the row corresponding to the ring count and the column most closely corresponding to the tree height. The number at the intersection of this row and column is the approximate site index.

The model formulation provides better resolution than the table. For those wanting this resolution, the growth intercept is calculated by subtracting 1.3 from the tree height (in m), dividing by the number of years of growth above breast height (ring count - 0.5), and then multiplying by 100 to convert metres into centimetres. The site index is first calculated for each tree in the plot from its growth intercept and the model corresponding to age = ring count. The site indices are then averaged to get a site index for the plot.

The growth intercept models were developed from 38 stem analysis plots located in the Coastal Western Hemlock biogeoclimatic zone. Plots ranged in site index from about 16 to 40 m, and the growth intercepts ranged from about 20 to 90 cm. The models can be used throughout coastal British Columbia.

Coastal Douglas-fir

Source:

Nigh, G.D. 1997. A growth intercept model for coastal Douglas-fir.
B.C. Min. For., Res. Br., Victoria, B.C. Res. Rep. 10.

Formulation:

Age	Model	Age	Model
1	$SI = 1.3 + 3.89 GI_1^{0.538}$	26	$SI = 1.3 + 0.658 GI_{26}^{0.906}$
2	$SI = 1.3 + 2.55 GI_2^{0.633}$	27	$SI = 1.3 + 0.659 GI_{27}^{0.906}$
3	$SI = 1.3 + 2.45 GI_3^{0.633}$	28	$SI = 1.3 + 0.641 GI_{28}^{0.913}$
4	$SI = 1.3 + 2.35 GI_4^{0.636}$	29	$SI = 1.3 + 0.624 GI_{29}^{0.920}$
5	$SI = 1.3 + 2.19 GI_5^{0.647}$	30	$SI = 1.3 + 0.618 GI_{30}^{0.924}$
6	$SI = 1.3 + 2.03 GI_6^{0.659}$	31	$SI = 1.3 + 0.616 GI_{31}^{0.925}$
7	$SI = 1.3 + 1.77 GI_7^{0.688}$	32	$SI = 1.3 + 0.603 GI_{32}^{0.931}$
8	$SI = 1.3 + 1.60 GI_8^{0.708}$	33	$SI = 1.3 + 0.591 GI_{33}^{0.937}$
9	$SI = 1.3 + 1.44 GI_9^{0.730}$	34	$SI = 1.3 + 0.580 GI_{34}^{0.943}$
10	$SI = 1.3 + 1.27 GI_{10}^{0.757}$	35	$SI = 1.3 + 0.564 GI_{35}^{0.951}$
11	$SI = 1.3 + 1.16 GI_{11}^{0.776}$	36	$SI = 1.3 + 0.564 GI_{36}^{0.952}$
12	$SI = 1.3 + 1.04 GI_{12}^{0.798}$	37	$SI = 1.3 + 0.550 GI_{37}^{0.958}$
13	$SI = 1.3 + 0.972 GI_{13}^{0.814}$	38	$SI = 1.3 + 0.546 GI_{38}^{0.962}$
14	$SI = 1.3 + 0.897 GI_{14}^{0.831}$	39	$SI = 1.3 + 0.536 GI_{39}^{0.967}$
15	$SI = 1.3 + 0.881 GI_{15}^{0.834}$	40	$SI = 1.3 + 0.529 GI_{40}^{0.971}$
16	$SI = 1.3 + 0.837 GI_{16}^{0.846}$	41	$SI = 1.3 + 0.518 GI_{41}^{0.977}$
17	$SI = 1.3 + 0.787 GI_{17}^{0.860}$	42	$SI = 1.3 + 0.514 GI_{42}^{0.980}$
18	$SI = 1.3 + 0.755 GI_{18}^{0.869}$	43	$SI = 1.3 + 0.511 GI_{43}^{0.983}$
19	$SI = 1.3 + 0.737 GI_{19}^{0.875}$	44	$SI = 1.3 + 0.504 GI_{44}^{0.988}$
20	$SI = 1.3 + 0.717 GI_{20}^{0.882}$	45	$SI = 1.3 + 0.499 GI_{45}^{0.991}$
21	$SI = 1.3 + 0.701 GI_{21}^{0.887}$	46	$SI = 1.3 + 0.490 GI_{46}^{0.997}$
22	$SI = 1.3 + 0.681 GI_{22}^{0.894}$	47	$SI = 1.3 + 0.484 GI_{47}^{1.00}$
23	$SI = 1.3 + 0.681 GI_{23}^{0.895}$	48	$SI = 1.3 + 0.486 GI_{48}^{1.00}$
24	$SI = 1.3 + 0.674 GI_{24}^{0.898}$	49	$SI = 1.3 + 0.484 GI_{49}^{1.00}$
25	$SI = 1.3 + 0.670 GI_{25}^{0.900}$	50	$SI = 1.3 + 0.489 GI_{50}^{1.00}$

where: SI = estimated site index (m at breast height age 50), and
GI = growth intercept (cm/year).

Site Index Table for Coastal Douglas-fir

bh ring count	Tree Height (m)														
	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
	Site Index (m)														
2	30	-	-	-	-	-	-	-	-	-	-	-	-	-	
4	17	29	38	47	-	-	-	-	-	-	-	-	-	-	
6	12	21	28	34	39	45	50	-	-	-	-	-	-	-	
8	-	16	21	27	31	36	40	44	48	-	-	-	-	-	
10	-	13	17	22	26	29	33	37	40	43	47	50	-	-	
12	-	10	14	18	21	25	28	31	34	37	40	43	46	49	
14	-	-	12	15	18	21	24	27	30	33	35	38	40	43	
16	-	-	11	14	16	19	22	24	27	29	31	34	36	38	
18	-	-	-	12	14	17	19	22	24	26	28	30	33	35	
20	-	-	-	11	13	15	18	20	22	24	26	28	30	32	
22	-	-	-	10	12	14	16	18	20	22	24	26	27	29	
24	-	-	-	-	11	13	15	17	19	20	22	24	26	27	
26	-	-	-	-	11	12	14	16	17	19	21	22	24	26	
28	-	-	-	-	10	12	13	15	16	18	19	21	23	24	
30	-	-	-	-	-	11	12	14	15	17	18	20	21	23	
32	-	-	-	-	-	10	12	13	15	16	17	19	20	22	
34	-	-	-	-	-	10	11	12	14	15	16	18	19	20	
36	-	-	-	-	-	-	11	12	13	14	16	17	18	20	
38	-	-	-	-	-	-	10	11	13	14	15	16	17	19	
40	-	-	-	-	-	-	10	11	12	13	14	16	17	18	
42	-	-	-	-	-	-	-	10	11	13	14	15	16	17	
44	-	-	-	-	-	-	-	10	11	12	13	14	15	16	
46	-	-	-	-	-	-	-	10	11	12	13	14	15	16	
48	-	-	-	-	-	-	-	-	10	11	12	13	14	15	
50	-	-	-	-	-	-	-	-	10	11	12	13	14	15	

bh - breast height = 1.3 m

(continued)

															bh ring count
Tree Height (m)															
16	17	18	19	20	21	22	23	24	25	26	27	28	29		
Site Index (m)															
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12
46	48	50	-	-	-	-	-	-	-	-	-	-	-	-	14
41	43	45	47	49	-	-	-	-	-	-	-	-	-	-	16
37	39	41	43	45	47	49	-	-	-	-	-	-	-	-	18
34	36	38	39	41	43	45	47	49	-	-	-	-	-	-	20
31	33	35	37	38	40	42	44	45	47	49	50	-	-	-	22
29	31	32	34	36	37	39	41	42	44	45	47	49	50	-	24
27	29	30	32	33	35	37	38	40	41	43	44	46	47	-	26
26	27	29	30	32	33	34	36	37	39	40	42	43	45	-	28
24	26	27	28	30	31	33	34	35	37	38	40	41	42	-	30
23	24	26	27	28	30	31	32	34	35	36	38	39	40	-	32
22	23	24	26	27	28	30	31	32	33	35	36	37	39	-	34
21	22	23	25	26	27	28	30	31	32	33	34	36	37	-	36
20	21	22	23	25	26	27	28	29	31	32	33	34	35	-	38
19	20	21	23	24	25	26	27	28	29	31	32	33	34	-	40
18	19	21	22	23	24	25	26	27	28	30	31	32	33	-	42
18	19	20	21	22	23	24	25	26	27	29	30	31	32	-	44
17	18	19	20	21	22	23	24	25	27	28	29	30	31	-	46
16	17	19	20	21	22	23	24	25	26	27	28	29	30	-	48
16	17	18	19	20	21	22	23	24	25	26	27	28	29	-	50

Options:

1. The growth intercept can also be determined by calculating the average annual height growth from the annual whorls. This method is useful when the stem is not suitable for growth intercept measurements (e.g., when the trees have top damage) and for research applications.

Notes:

This is the first species to have growth intercept models up to breast height age 50.

The growth intercept table (preceding) eliminates the need to calculate the growth intercept. To use the table, first measure the total height of a top height tree and count the number of annual growth rings at its breast height. Find the row corresponding to the ring count and the column most closely corresponding to the tree height. The number at the intersection of this row and column is the approximate site index.

The model formulation provides better resolution than the table. For those wanting this resolution, the growth intercept is calculated by subtracting 1.3 from the tree height (in m), dividing by the number of years of growth above breast height (ring count - 0.5), and then multiplying by 100 to convert metres into centimetres. The site index is first calculated for each tree in the plot from its growth intercept and the model corresponding to age = ring count. The site indices are then averaged to get a site index for the plot.

The growth intercept models were developed from 47 stem analysis plots located in the Coastal Western Hemlock and Coastal Douglas-fir biogeoclimatic zones. Plots ranged in site index from about 15 to 46 m, and the growth intercepts ranged from about 22 to 108 cm. The models can be used throughout coastal British Columbia.