

Table of Contents

Highlights

2007 Change Descriptions	ii
--------------------------------	----

1 Introduction

2 Data Input and Edits

2.1 Input Data - Standard Compilation	2-2
2.2 Card type A	2-7
2.2.1 Table of Data Types	2-7
2.2.2 Fatal Errors	2-8
2.2.3 Warning	2-8
2.2.4 Messages	2-8
2.3 Card Type B - Compilation Standard	2-9
2.3.1 Table of Data Types	2-9
2.3.2 Fatal Errors	2-10
2.3.3 Warnings	2-10
2.3.4 Messages	2-11
2.4 Card type C - Type Identity	2-12
2.4.1 Table of Data Types	2-12
2.4.2 Fatal Errors	2-12
2.4.3 Warnings	2-13
2.4.4 Messages	2-13
2.5 Card Type D - Block Description	2-14
2.5.1 Table of Data Types	2-14
2.5.2 Fatal Errors	2-14
2.5.3 Messages	2-15
2.6 Card Type E - Height/Diameter Description	2-16
2.6.1 Table of Data Types	2-16
2.6.2 Messages	2-16
2.7 Card Type F - Harvesting Method Description	2-17
2.7.1 Table of Data Types	2-17
2.7.2 Fatal Errors	2-17
2.7.3 Warnings	2-18
2.8 Card Type G - Treatment Unit Description	2-19
2.8.1 Table of Data Types	2-19

2.8.2 Fatal Errors.....	2-19
2.9 Card Type H – Non Productive Areas	2-20
2.9.1 Table of Data Types.....	2-20
2.10 Cruise Tally Sheet Image.....	2-21
2.11 Card Type 9 - Plot Identity Information	2-23
2.11.1 Table of Data Types.....	2-23
2.11.2 Fatal Errors.....	2-24
2.11.3 Warnings	2-25
2.11.4 Messages	2-25
2.12 Card Type 2 - Tree Details.....	2-26
2.12.1 Table of Data Types.....	2-26
2.12.2 Fatal Errors.....	2-27
2.12.3 Warnings	2-27
2.12.4 Messages	2-28
2.13 Card Type 3 - Sample Tree Details.....	2-29
2.13.1 Table of Data Types.....	2-29
2.13.2 Messages	2-29
2.14 Report 001A - Sample Listing (Partial)	2-30

3 Compilation Sequence

3.1 Compilation Sequence	3-2
3.1.1 Step-by-Step Compilation Instructions.....	3-2
3.1.2 Compilation Dataflow Diagram.....	3-3
3.2 Log Volume Calculation - Overview.....	3-4
3.2.1 Step-by-Step Log Volume Calculation Instructions	3-4
3.2.2 Calculate Volumes and Grades	3-8
3.3 Sample Data Model.....	3-9
3.4 Plot Types	3-11
3.4.1 Prism Plots	3-11
3.4.1.1 Number of Trees per Hectare.....	3-12
3.4.1.2 Basal Area per Hectare	3-13
3.4.1.3 Volume per Hectare	3-13
3.4.2 Fixed Area Plots.....	3-14
3.4.2.1 Number of Trees per Hectare.....	3-15
3.4.2.2 Basal Area per Hectare	3-16
3.4.2.3 Volume per Hectare	3-16
3.5 Double Sampling Ratio - Sample Listing	3-18

4 Damage Reports

4.1 List of Damage Reports	4-3
4.2 Damage Report Calculation.....	4-5
4.3 Sample Damage Report Listings	4-6

4.3.1 Extended Forest Type Stand and Stock Damage Report - Sample Listing.....	4-6
4.3.2 Block Stand Damage Table - Sample Listing.....	4-7
4.3.3 Block Volume Summary Damage Report - Sample Listing.....	4-8

5 Reduction Compilations

5.1 Reduction Compilations - Overview	5-2
5.2 Percent Reduction Worksheet Image.....	5-4
5.3 Reduction Examples	5-5
5.3.1 Timber Type and Cutting Permit Reductions - Average Line Method.....	5-6
5.3.2 Block and Timber Type Reductions - Block Method.....	5-8
5.3.3 Single Tree Reduction.....	5-11
5.4 Percent Reduction Card Edits	5-13
5.4.1 Table of Data Types.....	5-13
5.4.2 Fatal Errors.....	5-13
5.5 Percent Reduction Input Values - Sample Listing.....	5-14

6 Stump Cruise Compilations

6.1 Stump Compilation - Overview	6-2
6.2 Stump Cruise Tally Sheet Image	6-4
6.3 Stump Cruise Tally Sheet Edits	6-6
6.3.1 Card Type 9 - Plot Identity Information	6-6
6.3.2 Card Type 2 - Stump Details	6-6
6.3.3 Card Type 3 - Sample Tree Details.....	6-6
6.3.3.1 Messages.....	6-7

7 Height-Diameter Equations

7.1 Regression Coefficients	7-3
7.1.1 Parabola.....	7-3
7.1.2 Conditioned Parabola.....	7-4
7.1.3 Hyperbola.....	7-5
7.1.4 Conditioned Hyperbola.....	7-6
7.1.5 Weibull and Conditioned Weibull	7-6
7.2 Minimum and Maximum DBH.....	7-7
7.2.1 Parabola and Conditioned Parabola	7-7
7.2.1.1 Minimum DBH	7-7
7.2.1.2 Maximum DBH	7-8
7.2.2 Hyperbola and Conditioned Hyperbola	7-8
7.2.2.1 Minimum DBH	7-8
7.2.2.2 Maximum DBH	7-10

7.2.3 Weibull and Conditioned Weibull	7-10
7.2.3.1 Minimum DBH	7-10
7.2.3.2 Maximum DBH	7-10
7.3 Standard Error of Estimate (S.E.E.) and Bias	7-11
7.3.1 Standard Error of Estimate - Height	7-11
7.3.1.1 Parabola.....	7-11
7.3.1.2 Conditioned Parabola.....	7-11
7.3.1.3 Hyperbola.....	7-12
7.3.1.4 Conditioned Hyperbola.....	7-12
7.3.1.5 Weibull and Conditioned Weibull	7-13
7.3.2 Bias - Height	7-13
7.3.3 Bias - Volume	7-13
7.3.4 Standard Error Estimate - Volume*	7-14
7.4 Sample Report Listings.....	7-15
7.4.1 Report 001b - Sample Listing	7-15
7.4.2 Report 004a - Sample Listing	7-16
7.4.3 Report 003 - Sample Listing	7-17

8 Summary and Cruise Statistics

8.1 Plot Summary Report Overview	8-2
8.1.1 Header Information.....	8-2
8.1.2 Plot Information	8-3
8.1.3 Species Information	8-4
8.1.3.1 Number of Stems and Snags	8-4
8.1.3.2 Number of Stems and Snags Per Hectare	8-4
8.1.3.3 Average Diameter of Stems and Snags.....	8-4
8.1.3.4 Less Decay	8-5
8.1.3.5 Less Decay and Waste	8-5
8.1.3.6 Less Decay, Waste and Breakage - Net Merchantable Volume per Hectare	8-6
8.1.3.7 Loss Factor Table.....	8-6
8.1.4 Plot Frequency Report	8-7
8.2 Plot Summary Listing	8-8
8.3 Plot Summary by Maturity Overview and Listing.....	8-10
8.3.1 Header Information.....	8-10
8.3.2 Sample Listing	8-11
8.4 Cruise Statistics Overview	8-12
8.4.1 Header information	8-12
8.4.2 Timber Type Information	8-13
8.4.2.1 Type Information	8-13
8.4.2.2 Type of Plots	8-13
8.4.2.3 Number of Potential Trees	8-13
8.4.2.4 Number of Measured and Count Plots.....	8-13
8.4.2.5 Mean Net Volume per Hectare	8-13
8.4.2.6 Mean Net Basal Area/hectare	8-14

8.4.2.7 Standard Deviation for Volume - Measure Plots Only	8-14
8.4.2.8 Standard Deviation for Basal Area - All Plots	8-15
8.4.2.9 Coefficient of Variation for Volume - Measure Plots Only	8-16
8.4.2.10 Coefficient of Variation for Basal Area	8-16
8.4.2.11 Standard Error of the Mean Percent for Volume	8-17
8.4.2.12 Standard Error of the Mean Percent for Basal Area	8-19
8.4.2.13 % Confidence Interval for Volume	8-19
8.4.2.14 % Confidence Interval for Basal Area	8-20
8.4.3 Cutting Permit Information	8-20
8.4.3.1 Cutting Permit 95% Confidence Interval for Volume - All Plots	8-20
8.4.3.2 Cutting Permit 95% Confidence Interval for Basal Area - All Plots	8-21
8.4.3.3 Cutting Permit 95% Confidence Interval for Volume - Measure Plots Only	8-22
8.4.3.4 Cutting Permit 95% Confidence Interval for Basal Area - Measure Plots Only	8-23
8.5 Cruise Statistics Listing	8-24

9 Stand and Stock Reports

9.1 Header Information - All Reports	9-3
9.2 Stand Table	9-4
9.2.1 Stand Table - Detail Information	9-4
9.2.1.1 Live Stems per Hectare	9-4
9.2.1.2 Example 9.3	9-8
9.2.1.3 Useless Stems (snags) per Hectare	9-10
9.2.1.4 Dead Potential Stems per Hectare	9-11
9.2.1.5 Average DBH at Five Levels	9-12
9.2.1.6 Example 9.4	9-13
9.2.2 Block Stand Table - Sample Listing - Block Method	9-14
9.3 Stock Table	9-15
9.3.1 Stock Table - Detail Information	9-15
9.3.1.1 Net Merchantable Volume per Hectare	9-15
9.3.1.2 Example 9.7	9-18
9.3.1.3 Useless Volume per Hectare	9-20
9.3.1.4 Dead Potential Volume per Hectare	9-21
9.3.1.5 Total Volume per Hectare at Seven Levels	9-22
9.3.2 Stock Table - Sample Listing - Cutting Permit Level	9-24
9.4 Basal Area Table	9-25
9.4.1 Basal Area Table - Detail Information	9-25
9.4.1.1 Basal Area per Hectare	9-25
9.4.1.2 Example 9.8	9-25
9.4.1.3 Useless Basal Area per Hectare	9-30
9.4.1.4 Dead Potential Stems per Hectare	9-31
9.4.1.5 Total Basal Area per Hectare at Five Levels	9-32

9.4.2 Basal Area Table - Sample Listing - Timber Type Level.....	9-35
--	------

10 Extended Forest Type Stand and Stock Reports

10.1 Header Information.....	10-2
10.2 Detail Information.....	10-4
10.2.1 Average Height	10-4
10.2.2 Gross Merchantable Volume per Tree.....	10-4
10.2.3 Net Merchantable Volume per Tree	10-5
10.2.4 Stems per Hectare by Risk Group.....	10-5
10.2.5 Total Stems per Hectare.....	10-5
10.2.6 Live Veterans per Hectare	10-6
10.2.7 Dead Useless Snags per Hectare.....	10-6
10.2.8 Live Useless Snags per Hectare.....	10-6
10.2.9 Total of Averages.....	10-6
10.2.10 Percent by Risk Group.....	10-6
10.2.11 Average DBH at Five Levels.....	10-7
10.3 Extended Forest Type Stand and Stock - Sample Listing.....	10-9

11 Volume and Lumber Recovery Reports

11.1 Volume and Lumber Recovery Reports - Overview	11-2
11.2 Header Information.....	11-3
11.3 Detail Information.....	11-4
11.3.1 Base Lumber Recovery Factor.....	11-6
11.3.2 Gross Merchantable Volume by Top Diameter Class	11-6
11.3.3 Percent Decay by Top Diameter Class	11-6
11.3.4 Net Merchantable volume by Top Diameter Class.....	11-7
11.3.5 Foot Board Measure by Top Diameter Class.....	11-8
11.4 Totals and Averages.....	11-9
11.4.1 Total Gross Merchantable Volume by Risk Group	11-9
11.4.2 Percent Decay by Risk Group.....	11-9
11.4.3 Total net merchantable Volume by Risk Group	11-9
11.4.4 Total Foot Board Measure by Risk Group.....	11-10
11.4.5 LRF by Risk Group.....	11-10
11.5 Risk Group Combinations.....	11-11
11.5.1 PI Adjustment	11-12
11.5.2 Percent Decay by Risk Group Combination	11-13
11.5.3 Percent Stud Log by Risk Group Combination	11-13
11.5.4 Percent Small Log by Risk Group Combination	11-14
11.5.5 Percent Large Log by Risk Group Combination	11-14
11.6 Volume and Lumber Recovery report - Sample Listing.....	11-15

12 Volume Summaries

12.1 Volume Summary - Overview	12-2
12.1.1 List of Reports.....	12-2
12.2 Header Information - All Reports	12-3
12.3 Detail Information.....	12-6
12.3.1 Gross Merchantable Volume	12-11
12.3.2 Net Merchantable Volume.....	12-15
12.3.3 Net Merchantable Volume per Hectare	12-15
12.3.4 Percent Distribution per Hectare.....	12-15
12.3.5 Percent Decay – Gross	12-15
12.3.6 Percent Waste - Gross	12-16
12.3.7 Percent Waste (Billing) - Net.....	12-16
12.3.8 Percent Total Cull - Gross.....	12-16
12.3.9 Stems per Hectare	12-17
12.3.10 Snags per Hectare	12-17
12.3.11 Average DBH - Stems	12-18
12.3.12 Average DBH – Snags	12-18
12.3.13 Merchantable Volume per Tree - Gross.....	12-18
12.3.14 Merchantable Volume per Tree - Net	12-19
12.3.15 Average Weighted Total Height	12-19
12.3.16 Average Weighted Merchantable Height.....	12-21
12.3.17 Net Merchantable Volume per Log	12-22
12.3.18 Average Number of Logs per Tree	12-24
12.3.19 Percent Immature - Coast Only.....	12-24
12.3.20 Percent Net Merch - Small Logs.....	12-28
12.3.21 Block Slope.....	12-28
12.4 Lumber Information – Interior Only.....	12-31
12.4.1 Percent Net Merch - Stud Logs.....	12-31
12.4.2 Percent Net Merch - Small Logs.....	12-31
12.4.3 Percent Net Merch - Large Logs.....	12-31
12.4.4 Average LRF - All Logs (bd ft/m ³).....	12-32
12.5 Statistical Summary	12-34
12.5.1 Number of Measured Plots Used	12-34
12.5.2 Type of Plots	12-34
12.5.3 Number of Measured Potential Trees	12-34
12.5.4 Number of Plots per Hectare - Cutting Permit Only.....	12-35
12.5.5 Number of Trees per Plot - Cutting Permit and Timber Type Only	12-35
12.5.6 % Confidence Interval for Volume	12-35
12.6 Volume Summary - Sample Listings.....	12-37

13 Harvesting Method Summary - Overview

13.1 Header Information.....	13-3
13.2 Detail Information Variable Definitions.....	13-4

13.2.1	Gross Merchantable Volume	13-7
13.2.2	Net Merchantable Volume.....	13-9
13.2.3	Net Merchantable Volume per Hectare	13-9
13.2.4	Net Merchantable Volume per Hectare - Live.....	13-9
13.2.5	Net Merchantable Volume per Hectare - Dead Potential	13-10
13.2.6	Net Merchantable Volume per Tree	13-10
13.2.7	Net Merchantable Volume per Log	13-10
13.2.8	Percent Decay - Gross.....	13-12
13.2.9	Percent Waste (Billing) - Net.....	13-13
13.2.10	Percent Total Cull - Gross.....	13-13
13.2.11	Percent Useless Trees	13-13
13.2.12	Percent Blowdown Volume - Net	13-14
13.2.13	Percent Fire Damage Volume - Net.....	13-17
13.2.14	Percent Heavy Fire Damage Volume – Net.....	13-18
13.2.15	Percent Insect Damage Volume – Net.....	13-19
13.2.16	Percent Second Growth Volume – Net.....	13-19
13.2.17	Average Slope Percent.....	13-20
13.2.18	Algorithm Grade Percent	13-22
13.3	Lumber Information - Interior Only	13-23
13.3.1	Percent Stud Log Volume - Net.....	13-23
13.3.2	Percent Net Merch – Small Logs	13-23
13.3.3	Percent Net Merch – Large Logs	13-23
13.3.4	Average LRF – All Logs.....	13-24

14 Appraisal Summaries

14.1	Appraisal Summary - Coast.....	14-2
14.1.1	Header information	14-2
14.1.2	Detail Information.....	14-2
14.1.2.1	Species Grade Percent Table	14-2
14.1.2.2	Harvesting Method Parameter Table	14-3
14.1.2.3	Cutting Permit Parameters	14-4
14.1.2.4	All Method Parameters	14-5
14.2	Coast Appraisal Summary - Sample Listing.....	14-7
14.3	Appraisal Summary - Interior	14-8
14.3.1	Header Information.....	14-8
14.3.2	Detail Information.....	14-8
14.3.2.1	Species Parameter Table	14-8
14.3.2.2	Harvesting Method Parameter Table	14-9
14.3.2.4	Appraisal Summary Page – Insect Damage Table.....	14-11
14.4	Interior Appraisal Summary - Sample Listing.....	14-12

Appendices

Appendix 1	Species Groupings.....	A-2
------------	------------------------	-----

Appendix 2 Allowable Species By Forest Inventory Zone	A-4
Appendix 3 Allowable Pathological Remarks By Forest Inventory Zone	A-5
A3.1 Coast Immature	A-5
A3.2 Coast Mature	A-6
A3.3 Interior Immature	A-7
A3.4 Interior Mature	A-8
Appendix 4 Maximum Height by Forest Inventory Zone	A-9
Appendix 5 Maximum Age by Forest Inventory Zone.....	A-10
Appendix 6 Regions and District Numbers	A-11
Appendix 7 Lumber Recovery Factors	A-13
Appendix 8 Removed	A-15
Appendix 9 Coast Log Grade Algorithms	A-16
A9.1 Douglas Fir, Pine and Larch	A-17
A9.2 Douglas Fir, Pine and Larch	A-18
A9.3 Western Red Cedar	A-19
A9.4 Western Red Cedar	A-20
A9.5 Hemlock and Balsam	A-21
A9.6 Hemlock and Balsam	A-22
A9.7 Spruce.....	A-23
A9.8 Spruce.....	A-24
A9.9 Cypress.....	A-25
A9.10 Cypress.....	A-26
A9.11 Percentages within Spruce Grades.....	A-27
A9.11.1 Percentages within Cedar Grades	A-28
A9.12 Deciduous.....	A-29
Appendix 10 Interior LRF Algorithms	A-30
A10.1 Interior Hemlock	A-30
A10.2 Dead Potential White Pine	A-31
A10.4 Allocation of Path in Thirds.....	A-32
Appendix 11 Student's "T" Table	A-33
Appendix 12 Wet and Dry Belt Douglas Fir BEC Zones.....	A-34
Appendix 13 Volume Calculation	A-35
Appendix 14 Diameter Classes.....	A-52
Appendix 15 Volume Constants	A-53
Appendix 16 Rounding.....	A-54
Appendix 17 Mathematical Notation.....	A-56
Appendix 18 Interior Fir Quality Class Algorithm.....	A-57
Appendix 19 Valid Compilation Versions.....	A-58
Appendix 20 CGNF Compilation for the Coast Forest Region.....	A-59

Index

Glossary

List of Figures

Figure 2.1a Input File (Page 1).	2-3
Figure 2.1b Input File (Page 2).	2-4
Figure 2.2a Sample Map Area Statement - Front Side.	2-5
Figure 2.2b Sample Map Area Statement - Reverse Side.	2-6
Figure 2.3a Interior Cruise Tally Sheet - Front Side.	2-21
Figure 2.3b Cruise Tally Sheet - Reverse Side.	2-22
Figure 2.4 Report 001A.	2-30
Figure 3.1 Cruise Compilation Sequence.	3-3
Figure 3.2 Log Volume Calculation.	3-8
Figure 3.3 Input Data Relationships.	3-9
Figure 3.4 Report 004b.	3-18
Figure 4.1 Extended Forest Type Stand and Stock Damage Report - Sample Listing (Partial).	4-6
Figure 4.2 Block Stand Damage Table - Sample Listing (Partial).	4-7
Figure 4.3 Block Volume Summary Damage Report - Sample Listing.	4-8
Figure 5.1 Sample Percent Reduction Worksheet.	5-4
Figure 5.2 Percent Reduction Input Values.	5-14
Figure 6.1 Stump Cruise Tally Sheet - Front Side.	6-4
Figure 6.2 Stump Cruise Tally Sheet - Reverse Side.	6-5
Figure 7.1 Scattergram of Card Type 2 trees (Partial).	7-15
Figure 7.2 Height Curve Edits - Sample Listing (Partial).	7-16
Figure 7.3 Regression Coefficients and Calculated Heights – Sample Listing (Partial).	7-17
Figure 7.4 Regression Coefficients and Calculated Heights - Sample Listing - Continued (Partial).	7-18
Figure 8.1 Plot Summary - Sample Listing.	8-8
Figure 8.2 Plot Frequency - Sample Listing.	8-9
Figure 8.3 Plot Distribution by Maturity - Sample Listing.	8-11
Figure 8.4 Cruise Statistics - Sample Listing.	8-24
Figure 9.1 Block Stand Table - Sample Listing (Partial).	9-14
Figure 9.2 Cutting Permit Stock Table - Sample Listing (Partial).	9-24
Figure 9.3 Timber Type Basal Area.	9-35
Figure 10.1 Extended Forest Type Stand and Stock Table - Sample Listing (Partial).	10-9
Figure 12.1 Type Volume Summary - Sample Listing (Partial).	12-37
Figure 12.2 Treatment Unit within Block Volume Summary - Sample Listing (Partial).	12-38
Figure 12.3 Block Volume Summary - Sample Listing (Partial).	12-39
Figure 12.4 Cutting Permit Volume Summary - Sample Listing (Partial).	12-40
Figure 14.1 Coast Appraisal Summary - Sample Listing.	14-7
Figure 14.2 Interior Appraisal Summary - Sample Listing.	14-12
Figure A.7a Lumber Recovery Factors.	A-13
Figure A.7b Lumber Recovery Factors.	A-14

