Engineered Wood Products Ltd.

TFL 55 – VEGETATION RESOURCES INVENTORY
GROUND SAMPLING REPORT

Prepared by:

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Acknowledgements

Atticus Resource Consulting Ltd. would like to thank the following individuals for their assistance during this project. Carole Dascher for her contract management, ongoing project support and trust in Atticus to complete the field portion of the project in a timely manner; Chris Mulvihill for his assistance with project planning, sampling design and prompt quality assurance checking; Gary Johansen and Keith Tudor for their assistance in the sampling plan design and overall project planning; and Bob Krahn for his continued guidance and assistance with the data entry program and data submission.

R.P.F. Signature

This project has been done to the required standards and completed accurately for LP Engineered Wood Products Ltd.

Terry Conville, R.P.F.

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1.0 Introduction

This report describes the Vegetation Resources Inventory (VRI) timber emphasis ground sampling activities completed for LP Engineered Wood Products Ltd. (LP) by Atticus Resource Consulting Ltd. (Atticus) on Tree Farm License (TFL) 55. It outlines the sampling design and methods as well as the implementation of the field sampling.

1.1 Rationale/Background

In 1996, during the review and determination of the Allowable Annual Cut (AAC) for Tree Farm License 55 (TFL 55), the Chief Forester at that time stated that "a comprehensive inventory specific to the TFL land base be completed for use in the preparation of Management Plan No. 3". However, since the current inventory's estimate of volume for the mature component from the inventory audit (of the inventory) was statistically acceptable, LP requested that the need for an inventory be waived. In January 2000, the Chief Forester granted this request, but also requested that a thorough inventory be completed – and the Company agreed to participate in a VRI during the term of Management Plan No. 3. As well, the inventory audit report found that the site index assignment for immature stands was suspect, and also that the delineation and description of non-forest types was not completed to current standards (1999).

In 2002, Atticus (as part of IRC, in association with Trillium Pacific and HCK Forestry) completed the VRI photo interpretation (herein referred to as Phase I) work. The final attribution and draft linework were completed by late August 2002. The Phase II ground sampling work follows this and is required to complete an adjustment of the tree ages, heights, and gross and net volume for the entire inventory of the TFL.

1.2 Landbase

The TFL is situated in the Selkirk Mountains north of Revelstoke and is located between the Revelstoke reservoir (alongside Highway 23) to the west and the townsite of Mica (to the north), Goldstream River (to the south), and the height of land to the east. The TFL is characterized by the steep and rugged topography, wet interior climate with very heavy snowfalls, and large productive timber stands on the middle and lower slopes. The three biogeoclimatic zones located within the TFL include the Interior Cedar Hemlock (ICH) zone, the Engelmann Spruce Subalpine Fir (ESSF) zone, and the Alpine Tundra (AT)

zone. The area is also used extensively by Canadian Mountain Holidays helicopter skiing – with three lodges within the TFL boundary (including the new lodge near Mica).

TFL 55 is approximately 92,700 hectares in total area. Based on the latest Timber Supply Review (TSR) information (June 2000), 45,400 hectares is productive forest, and less than one-half of this (19,782 hectares), is considered suitable as the Timber Harvesting Land Base (THLB). Table (A) below shows an abbreviated landbase summary as per the Management Plan No. 3 Revised Information Package (Sterling Wood Group, June 2000).

Table (A) : TFL 55 Abbreviated Landbase Summary (as per the TSR Information Package, 2000)

Description	**Total Area (ha)**
Total Landbase	**92,700**
Non-forest	34,373
Non-Productive Forest	13,927
Total Productive Forest	**45,400**
Less:	
Inoperable/Inaccessible	*22,551*
Other reductions	*3,067*
Current Timber Harvesting Landbase	**19,782**

For the preparation for the VRI Ground Sampling work, the species information from the Phase I photo inventory was compiled and summarized for all polygons which were considered treed and had at least 10 percent tree cover. From this information a leading species frequency table was generated. Table (B) below shows that currently the TFL is dominated by Engelmann spruce (33%) and subalpine fir (balsam) stands (32 %), with a significant component of western hemlock (17%) and western red cedar (12%). Douglas-fir occurs as the leading species on only about five percent of the productive forest area, and other species cover less than one percent of the TFL.

Table (B) : Summary of Leading Species by Area (hectares)

Leading Species	Vegetated – treed Total Area
Spruce	16,516.9
Balsam	15,711.9
Hemlock	8,521.9
Cedar	5,746.6
Fir	2,647.2
Pine	62.0
Cottonwood	111.0
Aspen	72.1
Birch	54.4
TOTAL	**49,443.9**

1.3 Inventory Objectives

The main objective of the timber emphasis inventory was to install an adequate number of VRI sample clusters in order to statistically adjust the photo interpreted timber inventory attributes (such as height, age, and volume), within the TFL vegetated-treed areas to achieve a sampling error or +- 10% with a 95% confidence level.

1.4 Sample Size

The sample size is based on the inventory objectives provided above and given the expected coefficient of variation in the population (which is between 42 and 45 percent for the productive forest and operable area respectively, based on the latest inventory audit results from January 1999). Based on this criteria, the Nelson Regional Vegetation Resources Inventory Forester, Chris Mulvihill, estimated that 85 samples would be required. The calculations for this are shown below:

Sample Size Estimate

NOTE: CV is from VRI Ratio-of-Means (ground volume/unadjusted inventory volume)

Where n = t^2 * CV^2 / PE^2 (t at alpha/2, n-1)

if t=2 is assumed (for alpha=0.05), n = 4 * CV^2 / PE^2

Sample size for the operable area based on CV from the inventory audit:

CV=	45.0%	
alpha=	0.05	t=2
	Error %	Sample size
	PE	n
	10%	81
	15%	36

Sample size for a given CV and n:

CV=	45.0%	
alpha=	0.05	
	Sample size	Error %
	N	PE
	50	12.8%
	80	10.0%
	86	9.6%
	100	8.9%
	120	8.1%
	130	7.8%
	150	7.3%
	175	6.7%

2.0 Sampling Plan

The method used for selecting polygons was that of probability of selection proportional to size with replacement (PPSWR). The selection process for TFL 55 followed the procedures outlined in the document, "Sample Selection Procedures for Ground Sampling", which was produced by the Ministry of Forests, Resources Inventory Branch, in July 2002.

In the August 2002, the draft TFL 55 VRI Phase I inventory database was used for preparing the sampling plan for the VRI ground field verification sampling. This section describes the methods followed for completing this work. The sampling design and plan included the following phases:

- Data Assembly Phase
- Features of Selection Process
- Stratification Criteria
- Sample Allocation
- Quality Assurance Process
- Sampling Issues/Errors
- Roles and Responsibilities
- Use of Sample Lists

Information is provided below for each specific part of the process.

2.1 Data Assembly Process

The Phase I VRI inventory photo interpretation work was completed and was submitted to the Ministry of Sustainable Resource Management (MSRM), Terrestrial Information Branch in August, 2002. Prior to submission, the Phase I polygon attribute information was checked and approved through MSRM quality assurance process. Only some final few map edge tie issues remained at this time. But none of this remaining work effected the integrity of the selection process or work completed for Phase II ground sampling.

A seamless inventory database was created for the entire TFL. From this database specific attributes were used for sample plan, including:

1) MAP_ID
2) POLY_ID
3) SPECIES_ID
4) SPECIES_CD
5) CROWN_CLOSURE
6) FOR_COVER_RANK_CD
7) SPECIES_PERCENT
8) BASAL_AREA, and
9) AGE

LP also provided an external coverage from management Plan No. 3 called 'OPERABILITY', for use in this process.

2.2 Features of the Selection Process

In order to meet the requirements set by LP, the operable area of TFL 55 was first identified (as defined previously for Management Plan No. 3). Then after sensitivity analysis of various approaches, it was decided that those VRI polygons touching the operability line were to be considered for selection – and thus available for ground sampling.

In the sensitivity analysis we attempted the following different ways for determining the potential ground sampling population:

1. VT 100% w/in operable = Vegetated-treed polygons (entire polygons only), which are 100% contained within the operable line;

2. VT 35% w/in operable = Vegetated-treed polygons which are at least 35% contained within the operable line;

3. VT Touching operable = Vegetated-treed polygons which, are at least touching the operability line;

4. VT 50% w/in ESSF = Vegetated-treed polygons which are at least 50% within the upper ESSF (but non-parkland) line; and

5. VT Total = the total vegetated treed area within the entire TFL.

After discussions with Gary Johansen (MSRM) and Chris Mulvihill (MSRM) it was our recommendation to use " VT Touching Operable" as the population from which to draw samples. This decision was based on a the following key points:

1. Conversations with LP's Bernie Heuvelman about the operable line (1999) accuracy, and their desire to try and meet the Chief Forester's requirements for cut justification. As well the information contained in the AAC Rationale for TFL 55 document. It is assumed that harvesting in the non-operable areas in the future would most likely be periodic and intermittent at best.

2. The CV for the "operable area" is about 45 percent (pers. comm. C. Mulvihill), therefore the 80 plots might be needed to get a sampling error of 10% of this population.

3. Based on the information package from Management Plan No. 3...the total area of the TFL is 92,700 hectares, the productive forest is about 45,000 hectares, but the THLB is only about 19,000 hectares (roughly about 20% of the TFL). Sampling the proposed "VT Touching operable" total area is 23,230 hectares (excluding cutblocks and stands less than 20 years old). This allows for an increase in potentially non-operable sampling areas of about 20-22% compared to the current THLB.

Once the population was determined, the actual selection process consisted of first identifying "Vegetated and Treed" polygons from the database touching the operability line, and then only those polygons over twenty years of age were selected for ground sampling. The specific query was as follows:

1. First the attribute CROWN_CLOSURE from the LAYER table in the database was used. Furthermore, only "LAYER" with a value of "1" was accepted – except for those cases when crown closure for Layer 1 was less than 10%, but where Layer 2 is greater than 10% crown closure (in this case Layer 2 is used); then

2. Only those polygons with a CROWN_CLOSURE value greater than or equal to "10" were selected into the resultant (TREED) table; then

3. The attribute LEADING SPECIES was used to set a minimum age for ground sampling. Keith Tudor of the Terrestrial Information Branch (pers. Comm.. August 2002), suggested using a minimum age of 20 years. The qualifying polygons were then selected into the resultant table to be used for further analysis.

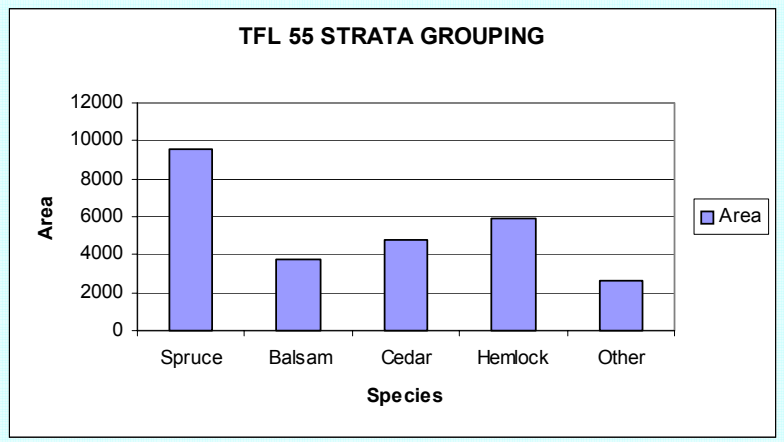
2.3 Stratification Criteria

This section describes the criteria used for stratifying the resultant polygons. The 1864 qualifying polygons were divided in five strata based on the leading species. Table (C) shows a summary of the number of polygons within each strata class, and Figure (1) below graphically displays the area of each strata.

Table (C) : TFL 55 Sampling Stata

Species	Area	% Area	# Polygons
Spruce	9,593.4	36.0%	694
Balsam	3,724.6	14.0%	219
Cedar	4,744.5	17.8%	361
Hemlock	5,937.2	22.3%	428
Other	2,646.1	9.9%	162
TOTAL	**26,645.7**	**100.0%**	**1,864**

Figure (1): Strata Area Summary



Once the strata were defined, the standards required that each of the strata be further separated in sub-strata, based on volume. However, in our case volume has not yet been assigned to the inventory file (assigned separately by the MSRM). Therefore, in discussions with the Ministry it was decided that the photo interpreted attribute basal area would be used for sub-stratification. The target was less than 15 substrata overall with a maximum of three substrata (low to high basal area), per main species strata. Table (D) shows the results of this substrata breakdown.

Table (D): Strata Summary

Strata (by Species)	# Polygons	Strata Area	Plots per strata	# of Substrata
Spruce	694	9,593.4	31	3
Balsam	219	3,724.6	12	2
Cedar	361	4,744.5	15	3
Hemlock	428	5,937.2	19	3
Other	162	2,646.1	8	1
TOTAL	**1,864**	**26,645.7**	**85**	**12**

2.4 Sample Allocation

The number of samples allocated to each sub-strata was proportional to their area, resulting in a minimum of eight (8) VRI ground samples for the less represented species and a maximum of thirty-one (31) samples for the most well represented species. For example, as shown in Table (D) above, the "Spruce" strata would be further broken into three equal substrata with approximately 10 plots (31 in total) per basal area class (low to high basal area). Whereas the "Other" strata (which includes Douglas-fir, lodgepole pine, and deciduous leading tree species), would just have one class and would not be further subdivided by basal area. The overall goal, as per the standards, is to ensure that the ground sampling represents and is well distributed throughout the selected population.

Once the substrata was determined, the substrata polygon areas were totaled and then individual polygons were selected "with replacement", based on total accumulated polygon area for each grouping. A random number generator was used to select the sample polygons.

2.5 Quality Assurance Process

Staff from the MSRM Terrestrial Information Branch and from the Nelson Forest Regional Office were involved in the process from the beginning and assisted or reviewed the process undertaken for this sampling plan. At the recommendation of the Ministry, Atticus completed some internal quality assurance testing of the "sample" polygons (selected for fieldwork), by comparing them to the entire "population". To do this both height class and age class were queried from both the sample and the population datasets and the distribution of each compared and graphed for assessment. The results are shown in the tables and charts provided below for both height class and age class:

Table (E): Height Class Comparison

Height Class	Sample	Population
1	11.4%	6.5%
2	2.2%	4.5%
3	30.4%	25.6%
4	44.7%	51.2%
5	11.3%	12.3%
TOTAL	100.0%	100.0%

Table (F): Age Class Comparison

Age Class	Sample	Population
1	0%	0%
2	10.8%	5.7%
3	0.1%	2.4%
4	0.2%	2.5%
5	9.5%	9.6%
6	1.0%	2.8%
7	6.8%	3.2%
8	44.6%	42.6%
9	27.0%	31.2%
TOTAL	100.0%	100.0%

Figure (2): Height Class Comparison (Sample V.S. Population)

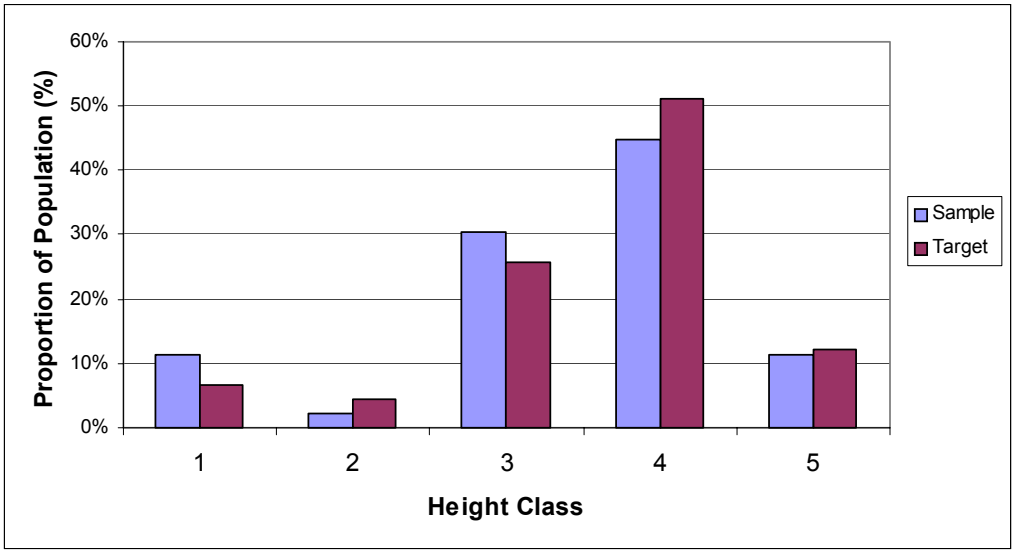
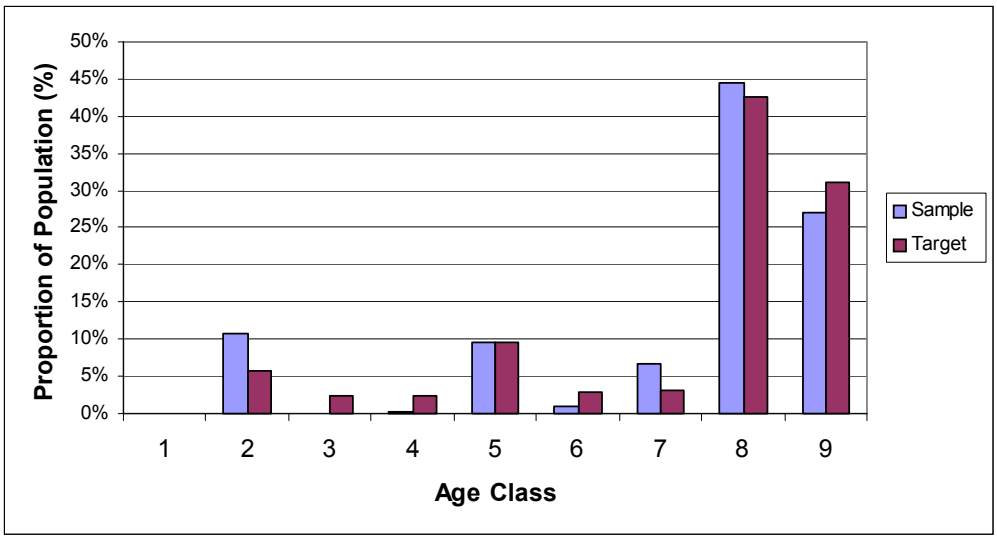


Figure (3): Age Class Comparison (Sample V.S. Population)



This quality assurance process ensured that a reasonably well distributed and representative sample was selected for VRI ground sampling.

2.6 Selection Issues/ Errors

In the selection process, the designers of the sampling plan were confronted with a few issues, non-of which significantly affected the integrity or accuracy of the ground sampling work. One important issue was the long length of time required to complete the Phase I photo interpretation work, thus resulting in a relatively short period of time in which to complete the Phase II sampling design and plan. Because of this, Atticus was required to use the draft Phase I inventory database, rather than a completely 'final' Phase I database for this process, in order to complete Phase II work in the 2002 field season. However, all the polygon attribute information from the Phase I work was completed and reviewed by the MSRM. The only remaining inventory issue involved some minor edge tie corrections, which have been corrected and had a negligible impact on the ground sampling design and process. As well, it was discovered during the final Phase I work that some portions of the TFL 55 boundary were most likely in error, which requires additional ground-truthing and possible GPS work before the issue is finalized.

On a minor note, the missing attribute "volume" in the inventory database prompted the use of a surrogate attribute, "basal area", in the sub-stratification process.

2.7 Roles and Responsibilities

Atticus staff was responsible for developing all the phases of the sampling plan, from data assembly and design to sample packages preparation. Chris Mulvihill the Nelson Region Vegetation Resources Inventory Forester (MSRM), determined the sample size, and assisted in discussions throughout the process. Gary Johansen and Kieth Tudor of the Terrestrial Information Branch (MSRM), assisted in the project planning and development by providing documentation, advice and timely reviews of the sampling plan.

2.8 Use of Sample Lists

Based on the sample size, 85 polygons were selected for ground sampling and another 85 back-up samples (selected by strata) were also selected (and archived), and are available if required for further VRI ground sampling. Table (G) shows the samples selected in this process and Table (H) displays the backup samples:

Table (G): Selected VRI Ground Samples

SAMPLE	Mapsheet	Poly #	UTM_X	UTM_Y	Latitude	Longitude
1	082M077	2445	389081.7	5731913.6	51 43 38	-118 36 22
2	082M077	2424	387821.5	5733890.1	51 44 41	-118 37 30
3	082M088	1176	392336.3	5746324.2	51 51 26	-118 33 48
4	082M077	2116	387842.4	5732475.4	51 43 55	-118 37 27
5	082M069	1406	412661.3	5724661.8	51 39 58	-118 15 46
6	082M069	1218	406241.8	5727298.6	51 41 20	-118 21 23
7	082M077	2114	388560.2	5731778.5	51 43 33	-118 36 49
8	082M078	1463	390253.9	5733982.6	51 44 46	-118 35 23
9	082M079	1207	408303.9	5732379.9	51 44 5	-118 19 40
10	083D008	2047	394788.9	5766286.3	52 2 14	-118 32 2
11	082M068	1510	392757.0	5728317.2	51 41 44	-118 33 6
12	082M068	1727	394540.9	5727282.4	51 41 12	-118 31 32
13	082M078	1341	396276.1	5735330.6	51 45 33	-118 30 10
14	082M078	1345	396588.8	5736198.4	51 46 2	-118 29 55
15	082M078	1609	397500.4	5733862.9	51 44 47	-118 29 5
16	082M078	1638	397937.7	5734916.4	51 45 21	-118 28 43
17	082M078	1913	390532.2	5731425.6	51 43 23	-118 35 5
18	082M070	2592	417350.1	5724263.3	51 39 48	-118 11 42
19	082M077	2023	389481.7	5737409.7	51 46 36	-118 36 7
20	082M078	1886	392516.9	5731171.9	51 43 16	-118 33 22
21	082M080	1105	418376.8	5731493.9	51 43 42	-118 10 55
22	082M098	1417	394790.9	5758417.5	51 57 59	-118 31 53
23	083D008	2007	391688.9	5767288.2	52 2 44	-118 34 46
24	082M068	1715	394635.6	5725656.6	51 40 19	-118 31 25
25	082M068	1928	399818.6	5724388.8	51 39 42	-118 26 54
26	082M068	1928	399930.5	5724475.3	51 39 44	-118 26 49
27	082M078	1433	389948.0	5735534.6	51 45 36	-118 35 41
28	082M080	1191	417710.6	5728654.5	51 42 10	-118 11 27
29	082M068	1929	400179.7	5724846.8	51 39 57	-118 26 36
30	082M070	2571	418981.3	5722037.6	51 38 37	-118 10 15
31	082M068	1960	402930.3	5723486.5	51 39 14	-118 24 12
32	082M078	1123	398483.5	5739183.6	51 47 39	-118 28 19
33	082M077	2412	388128.2	5737078.4	51 46 24	-118 37 17
34	082M069	1549	411728.7	5719738.9	51 37 18	-118 16 30
35	082M078	1154	399038.5	5738003.1	51 47 2	-118 27 49

36	082M078	1865	394529.2	5731923.2	51 43 42	-118 31 38
37	082M078	1491	392126.7	5733642.3	51 44 36	-118 33 45
38	082M098	1060	395218.0	5760178.6	51 58 57	-118 31 33
39	082M069	1538	410916.6	5722061.4	51 38 33	-118 17 15
40	082M078	1060	394621.3	5738164.6	51 47 4	-118 31 40
41	082M070	2629	417241.3	5721050.2	51 38 4	-118 11 45
42	083D008	2055	399337.2	5763989.3	52 1 3	-118 28 1
43	083D008	2055	396260.4	5764383.1	52 1 13	-118 30 43
44	082M070	2689	417585.0	5719796.0	51 37 23	-118 11 26
45	082M068	1958	401790.4	5724035.7	51 39 31	-118 25 11
46	082M098	1686	394487.3	5752101.3	51 54 35	-118 32 2
47	082M088	1140	392317.7	5748545.7	51 52 38	-118 33 52
48	082M088	1318	399509.5	5746415.4	51 51 34	-118 27 33
49	082M088	1354	401349.0	5747390.4	51 52 7	-118 25 58
50	082M088	1489	395931.0	5740518.7	51 48 21	-118 30 34
51	082M068	1979	402984.6	5720756.7	51 37 46	-118 24 6
52	082M069	1250	406252.2	5726591.3	51 40 57	-118 21 22
53	082M088	1464	393329.9	5742263.4	51 49 16	-118 32 52
54	082M098	1608	395054.0	5754954.1	51 56 7	-118 31 36
55	082M069	1724	411413.7	5718064.8	51 36 24	-118 16 45
56	083D008	2105	396133.4	5763390.5	52 0 41	-118 30 48
57	082M098	1599	394627.0	5753193.0	51 55 10	-118 31 56
58	082M098	1598	393957.6	5753480.4	51 55 19	-118 32 31
59	082M069	1730	412382.8	5718545.9	51 36 40	-118 15 55
60	082M070	2654	419396.3	5719765.8	51 37 23	-118 9 52
61	082M069	1152	411559.5	5725508.8	51 40 25	-118 16 44
62	082M069	1449	415597.5	5723176.7	51 39 12	-118 13 12
63	082M088	1487	395551.3	5742281.9	51 49 18	-118 30 56
64	082M068	1722	393620.2	5726391.5	51 40 42	-118 32 19
65	082M068	1956	402185.0	5723178.5	51 39 4	-118 24 50
66	082M069	1091	415889.6	5725458.8	51 40 26	-118 12 59
67	082M069	1521	413692.5	5720899.4	51 37 57	-118 14 49
68	082M070	2287	417355.6	5721943.1	51 38 33	-118 11 40
69	082M070	2653	420625.0	5719911.0	51 37 29	-118 8 48
70	082M088	1412	393759.2	5744831.0	51 50 39	-118 32 32
71	082M088	1416	394215.0	5743663.2	51 50 2	-118 32 7
72	082M088	1146	391483.4	5747542.9	51 52 5	-118 34 34
73	082M088	1361	401598.2	5747762.0	51 52 19	-118 25 46
74	082M088	1481	394533.5	5742210.3	51 49 15	-118 31 49
75	082M098	1440	393037.9	5757330.4	51 57 23	-118 33 24
76	082M079	1235	409255.8	5731148.7	51 43 26	-118 18 50
77	082M070	2086	429195.0	5726981.9	51 41 22	-118 1 28
78	082M098	1003	393503.0	5759389.3	51 58 30	-118 33 2
79	082M088	1358	400313.8	5745606.4	51 51 8	-118 26 51
80	082M068	1796	395091.5	5724489.0	51 39 42	-118 31 0
81	082M068	1832	396913.3	5723751.8	51 39 19	-118 29 25
82	082M070	2740	417836.6	5720974.0	51 38 2	-118 11 14

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83	082M068	1794	395404.1	5725356.7	51 40 10	-118 30 45
84	082M070	2633	417635.8	5720192.9	51 37 36	-118 11 24
85	082M068	1729	393109.1	5725549.2	51 40 15	-118 32 45

Table (H): Backup Samples

Sample #	Mapsheet/Polygon
1	082M077.2065
2	082M077.2424
3	082M077.2114
4	082M088.1159
5	082M087.2003
6	082M078.1876
7	082M070.2130
8	082M068.1739
9	082M079.1207
10	082M068.1727
11	082M088.1122
12	082M068.1629
13	082M078.1600
14	082M078.1112
15	082M068.1898
16	082M068.1748
17	082M078.1484
18	082M098.1491
19	082M078.1026
20	082M098.1593
21	082M077.2126
22	082M088.1436
23	082M088.1171
24	082M078.1433
25	082M078.1161
26	082M068.1946
27	082M068.1993
28	082M080.1191
29	082M088.1298
30	082M070.2571
31	083D008.2041
32	082M088.1454
33	082M078.1013
34	082M078.1041
35	082M088.1590
36	082M088.1501
37	082M078.1369
38	082M088.1257
39	083D008.2055

40	082M088.1186
41	083D008.2055
42	083D008.2206
43	082M070.2171
44	082M088.1160
45	082M098.2114
46	082M088.1134
47	082M088.1489
48	082M069.1759
49	082M077.2091
50	083D008.2104
51	082M088.1318
52	082M088.1489
53	082M078.1933
54	082M070.2380
55	082M070.2172
56	082M070.2271
57	082M069.1247
58	082M079.1189
59	082M069.1252
60	082M078.1483
61	082M069.1252
62	082M070.2341
63	082M069.1465
64	082M069.1469
65	082M070.2287
66	082M069.1374
67	082M070.2511
68	082M069.1531
69	082M070.2653
70	082M088.1360
71	083D008.2196
72	082M070.2253
73	082M098.1015
74	082M079.1235
75	082M070.2089
76	082M070.2086
77	083D008.2027
78	083D008.2029
79	082M088.1359
80	082M069.1478
81	082M068.1905
82	082M068.1865
83	082M068.1837
84	082M069.1732
85	083D008.2187

Comment: Same as previous comment

2.9 Sample Point Selection

Once the polygons (and back-up polygons) were selected then the sample point within each target polygon was selected. First the Provincial 100 by 100 meter grid was obtained from Gary Johansen (MSRM). Then the "official" grid was digitally overlaid in ArcInfo and every grid point within each selected polygon was retained. At this time, a random point generator (in ArcInfo) was used to select a single sample point location for each of the selected polygons.

3.0 Implementation Plan

The implementation plan involved the installation of up to 85 VRI ground samples in the field, during the 2002 field season. The plots were timber emphasis VRI ground sample clusters, however ecological site series data was also collected at each sample location. Additional Net Volume Adjustment Factor (NVAF) sampling will be investigated in 2003 and determined if necessary by LP. If NVAF sampling were to occur, the installation of these plots would potentially be in the summer of 2003.

The implementation included sample package preparation and field logistical planning, ground sampling, and post-field data entry and validation. The schedule of activities was as follows:

- Sample polygons selection: August 2002
- Approval of the sampling plan: early September 2002
- Sample packages Preparation: mid September 2002
- Location and measurement of the sample clusters in the field: mid September to late October 2002
- Quality Assurance: October – November 2002
- Data entry and reporting: November – January 2003

3.1 Roles and Responsibilities

Atticus was responsible for all phases of the ground sampling work and ensures that every aspect of the ground sampling phase was completed to the latest VRI standards. Horatiu Muresan, F.I.T., with the assistance of Terry Conville, R.P.F., was responsible for the overall logistics and delivery of the project. As well, these two people and Peter Hatch (Hatch Woodlands Ltd.) and Jeff Labelle, R.P.F. (Jeff Labelle Enterprises), were involved in the project as certified VRI ground samplers – and were individually responsible for the samples they completed during the life of the project.

Atticus and Hatch Woodlands Ltd. supplied the crew assistants for this project, including hiring a local assistant from Revelstoke (Azimuth), as recommended by Mike Coppersthwaite of LP.

3.2 Sample packages

Atticus prepared the packages, with each package containing:

- copies of Phase I document photos
- 1:10,000 scale orthophoto sample location maps
- 1:20,000 scale forest cover maps with the most recent Forest Development Plan information included (and additional access information provided by LP).

In addition, each field crew was provided with overview maps 1:60,000 scale for the entire TFL 55 area.

3.3 Field work

The fieldwork was completed with four VRI certified crews following the VRI measurement protocols as detailed by Vegetation Resources Inventory Ground Sampling Procedures Version 4.3 – March 2002. Besides the two certified crews provided by Atticus, Jeff Labelle Enterprises and Hatch Woodlands also provided a crew for the completion of the fieldwork. The fieldwork included locating and completing a VRI timber emphasis cluster sample with site series (following the protocols for ground inspection plot data collection as outlined by "Describing Terrestrial Ecosystems in the Field" Ministry of Environment, 1998). At each plot the crew recorded the field data either on a TIMVEG handheld computer program or on standard VRI data cards provided by the MSRSM. In addition, each crew collected GPS information (where possible), took 35mm photographs of the plots, and collected tree ages for microscopic office age counting. Of the 85 proposed samples, only 80 were actually established on the ground. The remaining five samples were determined to be either too dangerous for the crews (i.e. samples 24, 78, and 80 were extremely steep, and sample 60 could not be accessed due to a dangerous river crossing), or found to be logged at the time of sampling (i.e. sample 48).

The sample plots were completed in batches suitable for quality assurance checking by the MSRM.

3.4 Quality assurance

Chris Mulvihill the Nelson Regional Vegetation Resources Inventory Forester conducted the Quality Assurance of 8 random samples – representing 10% of the project total. During his field audit no major issues were encountered, and all samples were passed without issue.

3.5 Compilation

Data entry, GPS corrections, and office age counts were completed for all samples in November and December 2002. The data entry was completed in MSRM's VIDE (Vegetation Inventory Data Entry program), and submitted to Bob Krahn, R.P.F. (MSRM VRI Ground Sampling Coordinator) for final validation. He completed his assessment an approved the work completed in January 2003. Final compilation of the Phase II data still needs to be completed – including statistical analysis and data adjustment. This work, potentially along with NVAF sampling, may be completed in 2003 in order to finalize all the tasks associated with the inventory for TFL 55.