Vegetation Resources Inventory

Sampling Plan

Canadian Forest Products Ltd.

Tree Farm License 48

Submitted to:

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1 INTRODUCTION

1.1 BACKGROUND

Canadian Forest Products Ltd. (Canfor) Tree Farm Licence (TFL) 48 is comprised of five timber supply blocks and the Rice Property and is located in the Dawson Creek Forest District. Canfor is conducting a new Vegetation Resources Inventory (VRI) for the TFL to support the timber supply analysis. This inventory is based on the Ministry of Forests (MOF) VRI standards, including new photo interpretation (Phase I), ground sampling (Phase II), net volume adjustment factor (NVAF) sampling, and within polygon variation (WPV) sampling.

The Phase II data may also be used to check the accuracy of future Terrestrial Ecosystem Mapping (TEM) and Site Index-Biogeoclimatic Ecological Classification or Site Index Adjustment (SIA). Definitions of these and other terms are provided in Appendix I.

The new Phase I has been completed, and ground sampling – needed to adjust the new Phase I estimates – has begun. VRI ground sampling completed to date includes plots established by:

- The Dawson Creek Forest District (10 plots completed in 1998 and 7 in 1999) inside the TFL.
- Canfor (1998) to audit the existing mature inventory in the TFL (65 timber emphasis plots).

Canfor is planning to continue with the ground sampling in the 2000 and 2001 field seasons.

1.2 DOCUMENT OBJECTIVES

This sample plan describes the VRI ground sampling activities occurring in TFL 48 in 1998/99 and those planned for the 2000/2001 field seasons. This report has been prepared for Canfor by A.Y. Omule, *PhD, RPF,* and Guillaume Therien, *PhD* of J.S.Thrower & Associates (JST) and has been reviewed and supported by the Prince George Forest Region (PGFR).

2 TREE FARM LICENCE 48

2.1 LANDBASE

The TFL covers approximately 651,382 ha, of which about 340,714 ha (52%) form the High and Moderate Priority areas (Table 1). The main commercial tree species on the TFL are white spruce and aspen in the northeast, and white spruce, lodgepole pine, subalpine fir, aspen and cottonwood in the mountainous areas to the west and south.

Table 1. TFL 48 area distribution by BC Landcover Classification.

Land Type/Leading Species	Stand age (years)	Minimum Site index (m)	Total Area* (ha)
Vegetated Treed (VT) areas			*567,027*
High Priority			*274,778*
Spruce	80+	8	115,093
Balsam	80+	11	4,665
Pine	80+	11	101,039
Aspen	60+	14	35,895
Cottonwood	60+	7	18,086
Moderate Priority			*65,936*
Spruce	<80	8	14,951
Balsam	<80	11	4,393
Pine	<80	11	29,448
Aspen	<60	14	13,479
Cottonwood	<60	7	3,665
Low Priority (Remainder of VT areas – mainly low site)			*226,313*
Vegetated Non-Treed (VnT) & Non-Vegetated (NV) areas			*84,355*
Total			*651,382*

* Based on the new Phase I database.

The High Priority areas will likely be incorporated in the next timber supply analysis, and the Moderate Priority areas may be included as well. These areas are mainly spruce (39%), lodgepole pine (38%), aspen (14%), cottonwood (6%), and balsam (3%) leading polygons.

2.2 GROUND SAMPLING REQUIREMENTS

Conducting VRI ground sampling over the entire TFL landbase will provide data to:

1. Adjust the Phase I estimates to provide statistically valid timber volume estimates to support the timber supply analysis.
2. Validate TEM, develop SIA, and address other forest management questions such as monitoring and certification for sustainable forest management.

3 SAMPLING PLAN

3.1 INVENTORY OBJECTIVES

The main objectives of completing the inventory in the TFL are to (Section 2.2):

1. *Install an adequate number of Phase II plots to adjust the timber inventory in the TFL (emphasis on High and Moderate Priority areas) to achieve a sampling error of ±10% (95% probability) for net timber volume in the High and Moderate Priority areas.*
2. *Provide baseline ecology and coarse-woody debris data to support other projects in the TFL including TEM, SIA, monitoring, and certification.*

Net timber volume is gross volume less stumps, tops, decay, waste, and breakage. Decay and waste will be estimated through the VRI call grading/net factoring and NVAF sampling; breakage will be estimated using existing loss factors.

3.2 TARGET POPULATION

The target population is the entire TFL landbase, both Vegetated Treed (BC Land Cover Classification Scheme), Vegetated Non-Treed (VnT), and Non-Vegetated (NV) areas (Table 1). This population includes the High and Moderate Priority VT areas, the non-productive forest, and any parks and Protected Areas within the TFL.

3.3 SAMPLE SIZE

In 1998/99, 82 Phase II plots were installed in the TFL. A minimum of 72 additional Phase II plots should be installed in 2000/01 (Table 2) to achieve the targeted sample error.

Table 2. Planned distribution of Phase II plots in TFL 48.

Land Type*	1998 (Canfor)	1998/99 (MOF)	2000	2001	Total Sample	% Distribution
VT						
High Priority	49	7	38		94	*61.0*
Moderate Priority	2	4		22	28	*18.2*
Low Priority	13	5		4	22	*14.3*
VnT & NV	1	1		8	10	6.5
Total	*65*	*17*	*38*	*34*	*154*	*100.0*

* Based on the new Phase I database.

The sample size in the combined High and Moderate Priority areas will create a sampling error of approximately ±8% (95% probability) for net timber volume in the combined areas, and approximately ±10% (95% probability) in the High Priority area. These sampling errors are based

on the estimated coefficient of variation of approximately 47%[1] obtained from an initial sample of 65 plots installed by Canfor in 1998.

Approximately 80% of the sampling effort is allocated to High and Moderate Priority areas, and 20% to the remainder of the TFL landbase (Table 2). For efficiency, sampling the Moderate Priority areas may be done in conjunction with the planned SIA sampling, which is scheduled for 2001.

3.4 SAMPLE SELECTION

J.S. Thrower & Associates selected the new sample polygons for sampling in 2000 and 2001 using the current MOF Resources Inventory Branch procedures (Appendix II) and the new Phase I file (Appendix III). Graphical comparisons of the new sample with the target population are included in Appendix IV.

The sample locations established in 1998/99 have been transferred to the new Phase I database. Sample clusters split by the new polygon boundaries may be re-visited to confirm the "in" trees.

3.5 SAMPLE WEIGHTS

The data should be weighted appropriately since the total sample will consist of a combination of the 1998/99 sample and the 2000/2001. One method for weighting the samples is to weight each plot by the number of hectares each plot represents. For example, in the High Priority areas each plot has a weight of 274,778 ha ÷ 94 plots = 2,923.1702 ha per plot.

3.6 SAMPLING APPROACH

The ground samples will be the full VRI plots (excluding Range resources). Measurements will be based on the MOF *Vegetation Resources Inventory Ground Sampling Manual version 4.1* (March 2000). Measurements will include tree attributes, plant lists and percent cover, ecological site description, soil description, old-growth designation, and coarse woody debris. Timber emphasis plots established in 1998/99 will be re-visited to collect additional information.

An 11.28-m radius fixed-area plot will be used for collecting tree attribute data (trees 4.0 cm+ dbh). This plot will be the Integrated Plot Centre (IPC) in a subset of 55 sample locations in the VT landbase.

The monitoring locations were randomly selected (simple random) from the Phase II locations within the VT landbase land types (Table 1); the probability of selection was approximately proportional to land type area.[2] Twenty-seven monitoring plots will be installed in the High Priority

[1] The ratio of ground volume to the new Phase I estimated volume was 1.193, and the (one) standard error of this ratio was 0.069 (n=65). The ground volume was 264.7 m^3/ha and the new Phase I volume was 219.8 m^3/ha. The correlation between the ground volume and the Phase I volume was 0.546.

areas, six in the Moderate Priority areas, and 22 in the Low Priority areas. Tree attribute measurements may be based on the procedures being developed by the MOF.[2]

3.7 NVAF SAMPLING

The NVAF sampling will be conducted to adjust net volume for possible hidden decay and taper equation bias. A minimum of 60 trees (approximately 50 live and 10 dead) will be selected from at least 40 locations for destructive sampling in 2001. Additional trees may be selected depending on available budget.

Table 3. Minimum number of NVAF sample locations and trees.

Landbase/leading Species	Locations	Trees*
VT – High Priority		
Spruce	15	15(2)
Pine	11	10(2)
Aspen	2	3(1)
Cottonwood	2	2(1)
VT – Moderate Priority		
Spruce	2	5(1)
Balsam	2	8(2)
Pine	1	3(1)
Aspen	1	1(0)
Cottonwood	1	1(0)
Low Priority VT, VnT & Non-Treed & NV	3	2(0)
Total	*40*	*50(10)*

*Values in brackets are dead trees.

Emphasis will be on the spruce-balsam and balsam-spruce high elevation stands (Table 3). Sample locations were selected systematically (following MOF procedures) by each land type/leading species group from the Phase II plots. A separate NVAF will be calculated for the High and Moderate Priority areas as well as a combined NVAF for the entire TFL.[3]

3.8 WITHIN POLYGON VARIATION SAMPLING

The WPV sampling is used to estimate the actual error of the adjusted polygon database to directly check the accuracy of individual polygons once the Phase I estimates have been statistically adjusted. The WPV sampling also demonstrates to inventory users what should be present when a field check of the inventory is done.

Typically, 10-20 polygons selected from a target population are intensively cruised using a combination of 20-50 full measure and count plots per sample polygon. The WPV sampling may be conducted following the statistical adjustment of the inventory.

[2] Contact: Laurence Bowdige (MOF Resources Inventory Branch, Victoria, BC).

[3] The NVAF trees from the Dawson Creek Forest District VRI that are outside the TFL will not be used to compile the TFL NVAF. Depending on available budget, more NVAF trees may be sampled within the TFL.

3.9 PROJECT IMPLEMENTATION

3.9.1 Overview

The Canfor staff in the Chetwynd Division office will manage the project in 2000/2001. Project scheduling will be developed during each year of inventory activity since funding and priorities may change over time.

3.9.2 Schedule for 2000

The project activities will be implemented as follows:

1. Generate a VRI sample list of 38 sample polygons (July 30) (JST).
2. Prepare and submit a Sampling Plan (this Plan) for approval by the MOF (July) (Canfor).
3. Transfer Integrated Plot Centre (IPC) locations established in 1998 to the new Phase I database, and identify those falling in the target population (Canfor) (July).
4. Select IPC locations within all the sample polygons using a Geographic information System (GIS). Overlay the provincial 100-m grid over a sample polygon and select one of the grid intersections at random with replacement as the IPC location (July) (Canfor).
5. Prepare approved sample packages; each package to include stereo-pair access photos, a photocopy of the document photo, a plot location map (1:10,000), and access maps (1:20,000) (July)(Canfor).
6. Tender and select contract crews and an independent Check-Cruiser (July) (Canfor).
7. Select the sub-sample of 40 polygons for NVAF sampling from all Phase II plots (Section 3.7) (July) (JST).
8. Locate and measure the new VRI sample clusters, re-visit the old samples, enhance NVAF samples, and enter and edit the data (July- September) (Field contract crew).[4]
9. Conduct quality assurance (10% check) (July - September) (independent Check-Cruiser).
10. Prepare a tree-sampling matrix, select the sample trees, and conduct stem analysis (September - October) (Canfor).
11. Validate and compile the data from the completed plots and prepare inventory summary reports (October - November) (MOF).

3.9.3 Sample Packages

Field sample packages will be prepared and approved by the MOF prior to beginning fieldwork. The packages will include current stereo pair photos, a copy of the document photo, plot location maps (1:10,000), access maps (1:20,000) indicating cluster location and polygon boundaries, and overview maps (1:250,000). Maps will be plotted showing the VRI grid overlays and selected sample locations. Sample locations within a polygon will be selected using a (GIS).

3.9.4 Project Support

Field supplies such as aluminum stakes, field maps, photos, field cards, and equipment (including global positioning system [GPS]) will be the responsibility of field contract crews. Canfor's Project Coordinator will arrange helicopter use.

3.9.5 Fieldwork

Fieldwork will be completed using VRI measurement protocols and certified crews. All VRI Card Types (excluding the Range Sampling cards) will be completed according to the *VRI Ground Sampling Manual version 4.0* (March 2000). The Project Coordinator will manage the fieldwork contracts and quality assurance.

3.9.6 Quality Assurance

An independent, approved subcontractor will conduct Quality Assurance (QA) checking. The VRI QA standards require inspection of at least 10% of the samples. The field contract crews will be responsible for quality control of their own work.

3.9.7 Data Compilation, Analysis, and Adjustment

The field contract crew will complete data entry. The MOF Resources Inventory Branch (RIB) will complete data compilation and verification. Canfor may contract JST to complete all statistical analysis and database adjustment after the 2001 sampling. The RIB and the PGFR may check the results of these analyses.

3.9.8 Roles and Responsibilities

The *Ministry of Forests* will be asked to:

- Prepare the Standards Agreement and Schedule A (agreement between Canfor and the MOF PGFR Office).
- Approve field sample packages (PGFR).
- Mentor field crews at the start of the fieldwork (PGFR).
- Validate and compile data (RIB).
- Check data after initial compilation (PGFR).
- Provide minimum standards for statistical analysis (RIB).

Canfor's Project Coordinator will:

- Coordinate the project.
- Liaise with the MOF.
- Conduct sample selection (JST).
- Ensure sample selection is valid.
- Monitor and communicate project progress.

[4] A mentorship session between the MOF and the field contract crew is required under VRI ground sampling standards prior to VRI timber emphasis fieldwork commencing.

- Ensure all contractors are qualified and certified, and manage fieldwork contracts.
- Assess the need and coordinate the use of helicopters.
- Monitor the budget.
- Ensure the sample packages are assembled and complete.
- Obtain approval of sample packages by the MOF.
- Obtain approval of ground sampling plan (this Plan).
- Oversee ground sampling activities.
- Ensure QA is complete.
- Assist in coordinating technical expertise where required.

The *Fieldwork contractors* will:

- Complete the field sampling.
- Conduct internal quality control.
- Enter the sampled data.

The *Check-cruiser* will:

- Complete QA work for 10% of the VRI samples.
- Complete call grading/net-factoring of the NVAF samples.
- Enter the sample data.
- Prepare the QA report.

3.10 ESTIMATED COSTS

Estimated costs for the 2000 and 2001 field seasons are listed in Table 4. These costs are based on the sample sizes given in Table 2 and 3.

Table 4. Estimated VRI costs in 2000 and 2001 for TFL 48.

VRI Activity	Sample size (clusters)	Unit Cost ($)	Total Cost ($)
2000			
Upgrade 1998 Phase II	65	1,500	97,500
New Phase II plots	22	3,000	66,000
NVAF cruising	40	400	16,000
Quality assurance			17,950
Report writing			5,000
Sub-total 2000			*202,450*
2001			
New Phase II plots	49	1,500	73,500
NVAF destructive sampling	60 trees	400	24,000
Stat. Adjustment			20,000
Quality assurance			9,750
Sub-total 2001			*127,250*
Project Total			*329,700*

APPENDIX I – GLOSSARY OF TERMS

District-wide VRI

This is synonymous with provincial VRI; see Provincial VRI.

Ground Sampling

Ground sampling is the field measurement of timber, ecology, range, and/or coarse woody debris values at one or more locations within each sample polygon. Sample polygons are selected proportional to their area from a sorted list. To accommodate a wide variety of resources, various types and sizes of sampling units (e.g., fixed and variable plots, transects) are used to make the measurements.

Inventory Unit

An inventory unit is the target population from which the samples are chosen. For the provincial VRI, the inventory unit is the Forest District, which includes the timber harvesting landbase, parks, recreational areas, private, and federal lands. For management inventories, the inventory unit is a subset of the provincial VRI inventory unit that focuses on a geographic area or specific attribute set, depending upon sampling objectives.

Landcover Classification

The BC Land Cover Classification Scheme (BCLCS) was designed specifically to meet VRI requirements, in addition to providing general information useful for "global vegetation accounting" and "integrated resource management." The BCLCS is hierarchical and reflects the current state of the landcover (e.g., presence or absence of vegetation, type and density of vegetation) and such fixed characteristics as landscape position (i.e., wetland, upland, alpine). There are two main classes of polygons: Vegetated and Non-Vegetated.

Management VRI

Management VRI are specialized inventories that provide detailed information required for specific resource management, i.e., day-to-day forest management. One or more VRI sampling procedures may be used for management inventories. Management inventories may focus on specific resource types (e.g., timber, range, ecology), geographic areas (e.g., landscape unit, TFL), attribute sets (e.g., Douglas-fir leading stands, age class 4+). They may use one or more of the following tools (e.g., photo-interpretation, ground sampling, NVAF sampling).

National Forest Inventory (NFI)

The NFI provides information on Canada's resources across all provinces and allows the Federal Government a consistent framework for reporting on Canada's inventory. The inventory unit for the NFI is the entire country, although it is implemented province-by-province.

Net Volume Adjustment Factor (NVAF) Sampling

NVAF sampling provides factors to adjust net tree volume estimated from net factoring and taper equations. The adjustment accounts for hidden decay and possible taper equation bias. NVAF sampling involves detailed stem analysis of sample trees, calculation of actual net volume, and calculation of the ratio between actual net volume and estimated net volume (where estimated net volume is obtained from net factoring and taper equations).

Photo-Interpretation

Photo-interpretation involves subjective delineation of polygons and photo estimation of attributes for all polygons in an inventory unit. Medium scale aerial photographs (1:15,000) are most often used in photo-interpretation. However, if existing photo-based inventory is acceptable, the database can be translated into VRI format and upgraded to include the additional VRI attributes.

Post-Stratification

Post-stratification involves dividing inventory unit into mutually exclusive sub-populations (strata) *after* ground sampling has been completed. Samples that fall in each post-stratum are analyzed separately and the results are applied to the corresponding population post-strata to improve the precision of the inventory's overall averages and totals.

Pre-Stratification

Pre-stratification divides an inventory unit into mutually exclusive sub-populations (strata) *before* ground sampling to provide estimates for specific areas, or to increase the confidence in the overall estimates by considering special characteristics of each stratum.

PPSWR (Probability Proportional to Size With Replacement)

This is a sample selection method in which samples (polygons) are selected with probability proportional to their size. That is, the larger polygons have a higher chance of being included in the sample.

Provincial VRI

The provincial VRI provides baseline data for provincial inventory reporting, monitoring, and research. All sampling procedures from the VRI toolbox are used for this inventory at the Forest District level. The databases generated from each District inventory will be compiled to create the provincial VRI database. The provincial VRI has also been referred to in the past as the District VRI.

Resource-Specific Interpretations

Resource-Specific Interpretations (RSI) use the Resource Inventory Committee (RIC) standard VRI baseline data products (provincial VRI or management inventory), in combination with other data sets and analysis (outside of that required to produce VRI), to produce information to address specific-resource management issues (e.g., TSR review, important ecosystems, important habitats). These interpretations include ecosystem interpretations and habitat interpretations.

Retrofit

Retrofitting is the process of translating and upgrading an existing photo-based inventory to VRI standards. If the polygon linework and attributes are of acceptable quality, the existing FIP (Forest Inventory Planning) databases are translated to VIF (Vegetation Inventory Files) databases and the additional attributes required by the VRI are re-estimated from aerial photographs.

Sample Size

The sample size for an inventory is the minimum number of ground samples to be established in an inventory unit to meet the target precision.

Statistical Analysis

Statistical analysis is the process of adjusting the values of the photo-interpretation variables using ground sampling observations. For each sampled polygon, ground observations are compared to photo-estimated values to develop an adjustment factor. This factor is then applied to all polygons in the photo interpretation database to produce the final adjusted database.

Sub-unit

Sub-unit describes the inventory unit of a management inventory (i.e., the management inventory target population is a subset of the provincial VRI inventory unit). A sub-unit may be defined by a specific geographic area (e.g., operable landbase) or stand type (e.g., problem forest types) within the Forest District.

Target Precision

Target precision expresses the amount of variation in key attributes (e.g., timber volume) desired in the final results. Target precision, usually expressed as the coefficient of variation (CV) is used to calculate the minimum sample size for subsequent ground sampling.

Vegetation Resources Inventory (VRI)

VRI is an improved vegetation inventory process for assessing quantity and quality of BC's vegetation resources. The VRI process is designed to include a flexible set of sampling procedures for collecting vegetation resource information. The VRI is essentially a toolbox of procedures, which include:

- *Photo-interpretation*: the delineation of polygons from aerial photography and the estimation of resource attributes.
- *Ground sampling*: the establishment of plot clusters in selected polygons to measure timber, ecological, and/or range attributes.
- *NVAF Sampling*: stem analysis sampling of individual trees for net volume adjustment.
- *WPV Sampling*: intensive sampling of selected polygons to determine the error between the estimated attribute values and the "true" attribute values.
- *Statistical Adjustment*: the adjustment of the photo-interpreted estimates for all polygons in an inventory unit or management unit using the values measured during ground sampling.

The VRI can be deployed over the entire province (provincial VRI) measuring timber and non-timber resources, or over a large management unit (management VRI) measuring selected resources in specific portions of the landbase. The VRI sampling process produces spatial and non-spatial databases that can be used in multiple resource management applications including timber, ecosystem, and wildlife habitat management.

Within Polygon Variation Sampling

WPV sampling provides information for expressing the true individual polygon error, assessed as the difference between the adjusted polygon value and the "true" value for that polygon. The "true" value for the polygon is an estimate derived from a small sample of polygons that are intensively sampled on the ground.

APPENDIX II – SAMPLE SELECTION ALGORITHM

Sample polygon selection was done using the MOF stratified PPSWR method (with proportional allocation) for each land type (Table 1) using the following 11 steps:

1. Define land type population by selecting all records (polygons) that have a SPP1 (leading species label) with a crown closure greater or equal to 10% in the land type.
2. Count the number of records for each SPP1 and divide that number by 3; this defines the number of records per stratum.
3. Sort the database (polygons) by SPP1 and volume per hectare (descending).
4. For each SPP1, the first third of all records are assigned the stratum "High", the second third are assigned the stratum "Medium", and the remaining records are assigned the stratum "Low". For example, for SPP1 Sx (spruce), the strata would be defined as Sx-High, Sx-Medium, and Sx-Low.
5. When the total number of records for a SPP1 is not exactly divisible by 3, randomly select the stratum to contain one more or one less record. For instance, if the total number of records was 10, one of the strata, randomly selected, would get 4 records and the two others would get 3. If the total number of records were 11, one stratum, randomly selected, would get 3 records; the two other strata would get 4 records.
6. Calculate the area, and proportion of total area, of each stratum.
7. Define the theoretical number of samples per stratum by multiplying the total sample size by the proportion of area in each stratum.
8. Round the theoretical sample size at both the stratum (volume) and species (SPP1) level.
9. After rounding, if the number of samples does not match what was expected for the species, randomly select one stratum within the species and modify the sample size. For instance, suppose the theoretical sample size for Sx-High, Sx-Med, and Sx-Low was 0.4 samples. Rounded at the stratum level, they all get 0 (0.4 becomes 0 for all three strata), however, at the species level, it should get 1, (3 times 0.4 is 1.2, rounded to 1). In this situation, randomly choose one of the three strata and assign one sample to that stratum.
10. Generate as many random numbers as samples within a stratum.
11. Select each stratum sample using PPSWR.

APPENDIX III – LIST OF NEW SAMPLE POLYGONS

The new sample polygons for 2000/01 sampling are listed in Table 5 by land type: High Priority (High P), Moderate Priority (Moderate P), Low Priority (Low P), and Vegetated non-Treed and Non-Vegetated (VnT & NV). These land types are defined in Table 1. Polygons marked with an asterisk in the Low P land type are a random subset to be sampled in 2001; the remaining samples may be sampled if budget permits.

Table 5. List of sample polygons.

Land Type	Map ID	Polygon ID	Leading Species	Area (ha)	Site Index (m)
High P	093I094	1021	S	22.23	11.32
High P	093O060	895	S	38.17	11.99
High P	093O060	915	P	4.18	15.42
High P	093O070	372	P	33.20	13.15
High P	093O076	383	S	49.16	8.03
High P	093O077	428	P	31.64	15.68
High P	093O098	1062	S	18.14	10.93
High P	093P011	428	S	10.64	21.41
High P	093P014	635	P	10.34	12.7
High P	093P033	140	S	1.90	9.59
High P	093P034	115	P	9.80	14.61
High P	093P041	604	P	9.28	14.99
High P	093P041	1461	S	11.88	8.89
High P	093P042	1862	P	8.33	12.3
High P	093P051	127	A	2.24	22.31
High P	093P051	344	P	11.13	15.24
High P	093P051	1530	S	22.78	12.16
High P	093P051	2019	P	9.16	14.51
High P	093P052	1953	P	11.58	12.62
High P	093P074	157	S	14.15	13.96
High P	093P081	68	A	6.11	17.45
High P	093P081	115	S	8.43	15.19
High P	093P084	349	AC	12.13	14.54
High P	093P092	478	S	2.54	17.02
High P	094A012	151	A	52.09	19.72
High P	093O077	26	SX	19.05	18.06
High P	093O098	82	PL	19.86	15.72
High P	093O098	352	AC	3.05	12.7
High P	093P015	65	PL	13.02	14.61
High P	093P021	698	PL	7.77	13.76
High P	093P031	367	SX	6.66	13.61
High P	093P033	176	PL	17.60	17.08

Land Type	Map ID	Polygon ID	Leading Species	Area (ha)	Site Index (m)
High P	093P051	393	PL	4.24	12.62
High P	093P052	2117	SX	26.32	17.11
High P	093P073	99	SX	26.70	14.17
High P	093P083	87	AT	10.60	14.92
High P	094B009	385	SX	14.59	14.88
High P	094B029	216	AT	15.40	18.32
Moderate P	093I094	240	S	3.61	8.28
Moderate P	093O030	820	B	2.27	11.62
Moderate P	093O086	67	S	11.09	12
Moderate P	093O087	1176	B	17.71	15.48
Moderate P	093P005	25	P	19.81	15.01
Moderate P	093P005	405	P	6.81	19.57
Moderate P	093P014	418	P	14.33	12.4
Moderate P	093P014	709	S	4.71	16.9
Moderate P	093P041	1954	S	2.92	11.64
Moderate P	093P043	466	A	26.80	15.2
Moderate P	093P043	1550	S	8.83	14.18
Moderate P	093P053	987	P	11.22	17.29
Moderate P	093P085	308	A	3.12	19.99
Moderate P	094A002	519	P	11.84	17.79
Moderate P	094A002	964	S	1.78	11.02
Moderate P	094A002	987	P	37.08	16.79
Moderate P	094A002	1114	A	81.27	18.39
Moderate P	094B018	174	A	47.23	14.77
Moderate P	094B018	244	A	7.15	16.93
Moderate P	094B018	649	AC	4.34	13.78
Moderate P	094B028	220	P	29.65	13.96
Moderate P	094B028	770	P	32.05	17.95
Low P	093O086	441	S	29.53	6.85
Low P	094B039	36	A	40.72	13.18
Low P	093I093	671	S	31.69	5.59
Low P	093O076	555	B	9.52	5.18
Low P	093O029	19	B	110.08	9.3
Low P	094B008	691	P	55.55	9.02
Low P	093O097	1097	P	14.36	7.56
Low P	093I094	645	B	5.88	7.93
Low P	093P031	702	B	3.22	9.7
Low P	093O030	761	B	27.60	2.8
Low P	093O020	250*	B	13.92	4.47
Low P	093O049	1839	B	3.91	6.68
Low P	093O030	552	P	6.44	5.63

Land Type	Map ID	Polygon ID	Leading Species	Area (ha)	Site Index (m)
Low P	093I094	1540*	P	92.02	8.13
Low P	093O096	423*	B	8.29	2.93
Low P	093O088	1443*	S	18.21	6.06
VnT & NV	093O029	141	ZZ	7.82	0
VnT & NV	093O029	429	BL	170.78	3.68
VnT & NV	093O029	921	ZZ	3.06	0
VnT & NV	093O030	1146	BL	12.80	2.71
VnT & NV	093O086	307	ZZ	43.80	0
VnT & NV	093O096	481	BL	17.58	5.18
VnT & NV	093P031	2450	AC	4.62	5.99
VnT & NV	093P075	257	AT	415.80	19.99

APPENDIX IV – NEW SAMPLE AND POPULATION COMPARISONS

Figures 1 and 2 show the age class and site index class (2-m) profiles of the target population and the new sample (Appendix III) in the TFL 48 land types. The land-type definitions are provided in Table 1.

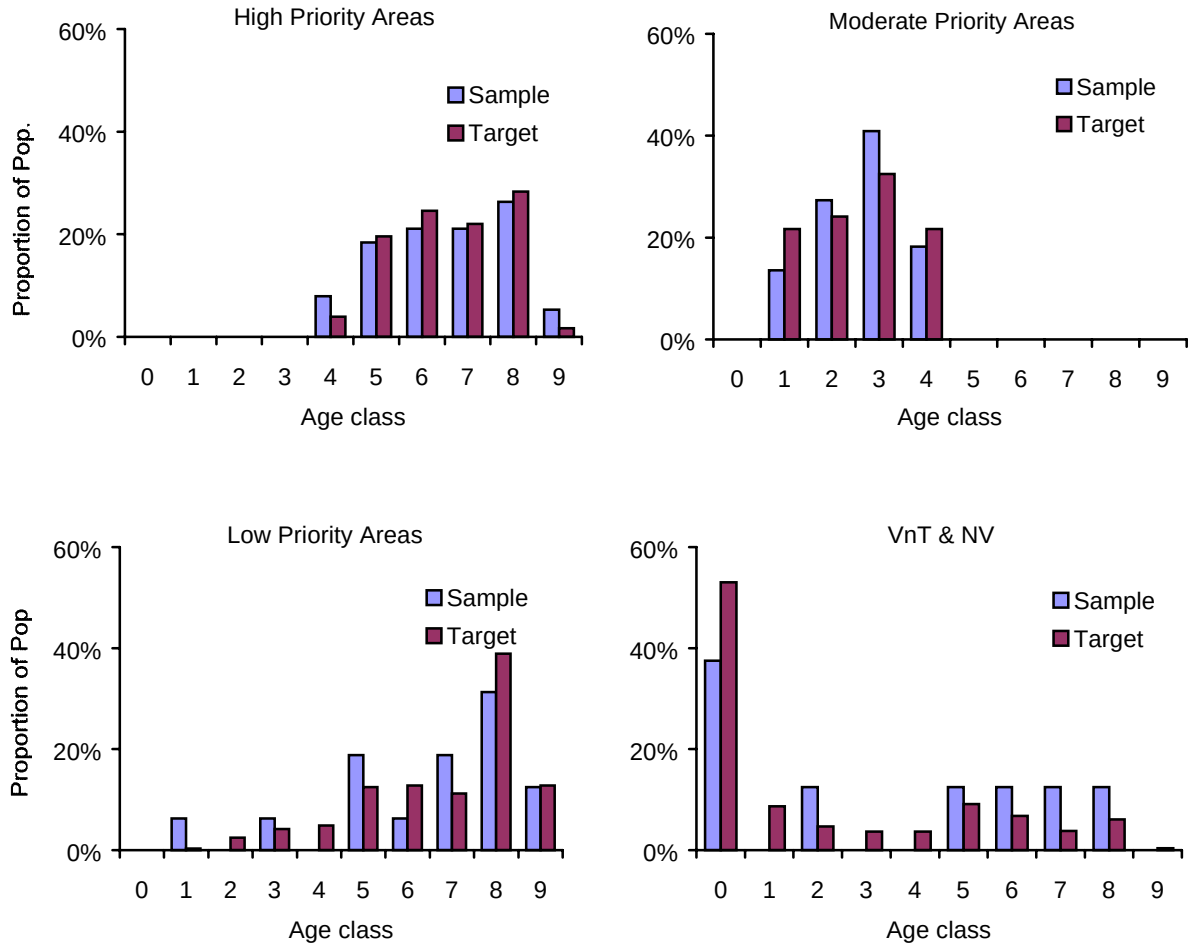

Figure 1. Age class profiles of target and sample populations for the TFL 48 land types.

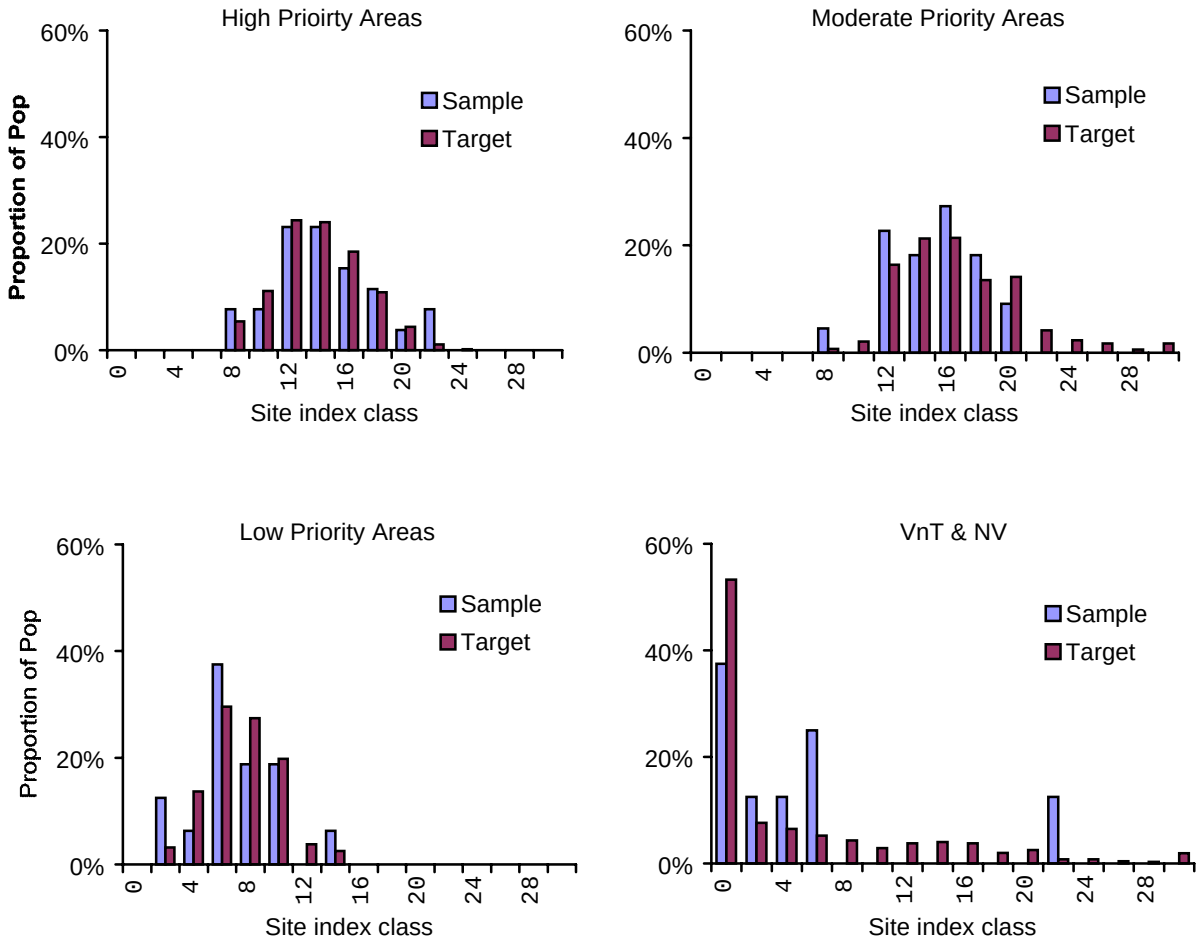

Figure 2. Site index class (2-m) profiles of target and sample population for the TFL 48 land types.