Strathcona Timber Supply Area
Vegetation Resources Inventory
Project Implementation Plan

Prepared for:

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On Behalf of the

Strathcona TSA Licensees

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1. INTRODUCTION

1.1 BACKGROUND

The Vegetation Resources Inventory (VRI) is the Ministry of Forests and Range (MoFR) forest inventory standard on public lands in BC. Where possible, forest licensees must use the VRI standard in their data package when preparing the submission for Timber Supply Review (TSR).

The VRI is a four-step process (Figure 1):

1. **Phase I (unadjusted inventory data)** – Polygon attributes are estimated, generally using photo-interpretation for the target population.
2. **Phase II (ground sample data)** – Measurements are taken from randomly located ground samples for the target population.
3. **Net Volume Adjustment Factor (NVAF) sampling** – Random trees are selected for stem-analysis studies to develop adjustment ratios that correct taper and decay estimation bias.
4. **Statistical Adjustment Phase** – The Phase I estimates are adjusted using the NVAF-corrected Phase II ground samples to provide an adjusted unbiased estimate of forest inventory attributes. The final product is an adjusted VRI database.

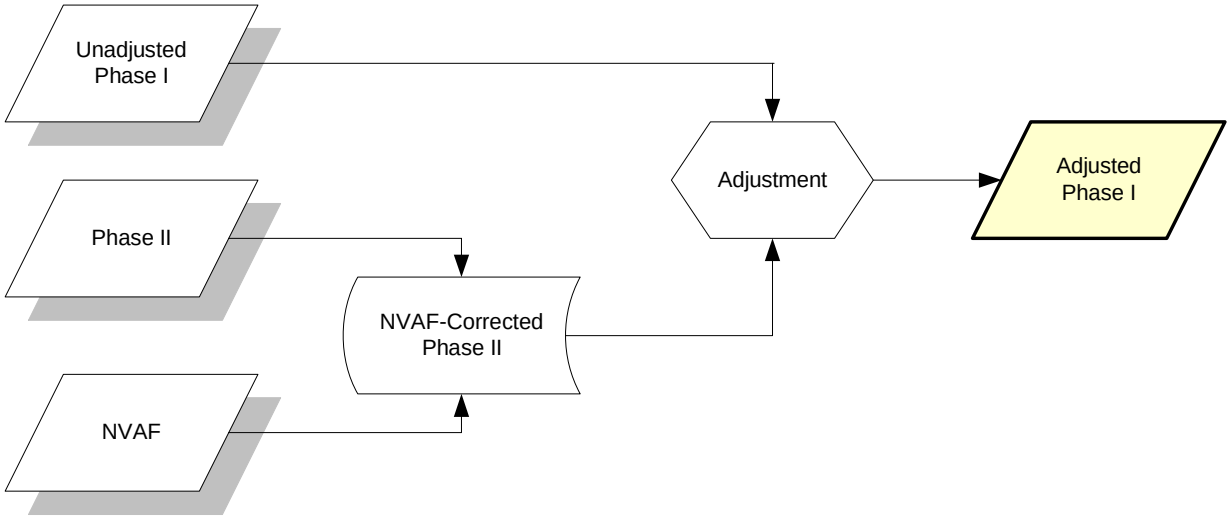

Figure 1. VRI flow-chart.

Timberline Forest Inventory Consultants Ltd. (TFIC) completed the Phase I in February 2006. The Strathcona TSA licensees' goal is to complete Phase II ground sampling and the NVAF program in the 2006 field season, and the statistical adjustment phase before March 31, 2007.

1.2 VPIP OBJECTIVES

The objective of this VPIP is to:

1. *Develop the sampling methods required to implement the Strathcona TSA Phase II program.*
2. *Present the proposed NVAF program.*
3. *Outline the strategy for Phase II implementation and the proposed timelines.*

The intent is that MoFR will review and approve the proposed Phase II sampling program. The Strathcona licensees will update this VPIP once the Phase II sampling is complete, and before the NVAF program commences.

1.3 TERMS OF REFERENCE

This VPIP was prepared for Pat Bryant, *RPF* of Western Forest Products Ltd. on behalf of the Strathcona TSA licensees by Guillaume Thérien, *PhD* (biometrician) and Hamish Robertson, *RPF* (project manager) of J.S. Thrower & Associates Ltd. This VPIP will be approved by the MoFR prior to beginning the Phase II program.

1.4 STRATHCONA TSA LANDBASE

The Strathcona Timber Supply Area (TSA) is situated in the Coast Forest Region and is administered from the Campbell River Forest District Office in Campbell River. The District covers central Vancouver Island from the south end of Strathcona Park to the Brooks Peninsula in the north, several islands in the Strait of Georgia and portions of the mainland to the east. In total, the boundaries of the District encompass approximately 1.4 million hectares, but a significant portion of this is marine area. The Vegetated Treed component of the Strathcona TSA is 327,955 ha (24% of the total District).

Figure 2. Map of the Campbell River Forest District (green denotes the land component of the Strathcona TSA).

Table 1. Campbell River Forest District net down.

Land Class	Area (ha)	% District
Total District	1,383,793	
Outside TSA	712,648	51%
TSA (including water)	671,145	49%
Non-Vegetated	322,758	23%
Vegetated	348,387	25%
Non-Treed	20,432	1%
Treed	327,955	24%

2. STRATEGIC PLAN

2.1 PROJECT OVERVIEW

The overall goal of the project is to complete the VRI Phase II and NVAF in the 2006/07 fiscal year. A first batch of Phase II plots will be established in early summer followed by preliminary compilations. Additional plots, if needed, will be established in the fall of 2006 if possible, but may be extended into the following fiscal year. The NVAF destructive sampling program will be implemented at the completion of the Phase II sampling program (funding permitted). The goal is to have the Phase II data compilation, analysis, and reporting will be completed before March 2007, pending the timely completion of the Phase II program.

2.2 GOAL & OBJECTIVES

The goal of this project is to provide the Provincial Chief Forester with the necessary confidence in the Strathcona TSA forest inventory to support Timber Supply Review. The Strathcona TSA licensees objective is to:

> *Develop statistically unbiased volume estimates for stands at least 30 years old in the VT landbase in the Strathcona TSA.*

2.3 TARGET POPULATION

The target population was defined as the VT landbase, 30 years and older in 2006 (that is, stands established before 1977). The target population represents approximately 275,237 ha (20% of the total District) (Table 2).

Table 2. Strathcona VRI Phase II target population.

Land Class	Area (ha)	% District
Total District	1,383,793	
Vegetated Treed	327,955	24%
Stands < 30 years	52,718	4%
Target Population	275,237	20%

2.4 STRATIFICATION

Pre-stratification of the target population was used to increase sampling efficiency. The stratification was based on the leading species in a stand and age class. The strata were defined as follows:

1. Western redcedar and yellow cedar (C-Y) leading stands, greater than 30 years.
2. Douglas-fir (Fd) leading stands, greater than 30 years.
3. Other species leading, established after 1885 (H-Immature).
4. Other species leading, established before 1886 (H-Mature).

Most Fd-leading stands (93%) were established after 1885 while most C-Y stands (90%) were established before 1886; thus, these species groups did not need to be split by age class. Most of the other stands were hemlock-leading (84% and 85% in the H-Immature and H-Mature, respectively). Inventory adjustment ratios will be computed at the stratum level.

Table 3. Target population stratification.

Stratum	Sub-stratum	Area (ha)	% Stratum	% Target
C-Y	0-300 m^3/ha	22,372	37%	
	300.1-450 m^3/ha	20,512	34%	
	450.1+ m^3/ha	17,164	29%	
	Total	*60,048*		*22%*
Fd	≤27 m	19,632	35%	
	27.1-32 m	18,444	33%	
	32.1+ m	17,654	32%	
	Total	*55,730*		*20%*
H-Immature	≤22 m	22,652	35%	
	22.1-27 m	18,949	30%	
	27.1+ m	22,599	35%	
	Total	*64,200*		*23%*
H-Mature	0-450 m^3/ha	31,206	33%	
	450.1-650 m^3/ha	36,039	38%	
	650.1+ m^3/ha	28,014	29%	
	Total	*95,259*		*35%*

Each stratum was subdivided into sub-strata to ensure a representative distribution of the samples within each stratum. The sub-strata in the Fd and H-Immature strata were based on site index class; those in the C-Y and H-Mature strata were based on stand volume. Sub-stratification was for spatial distribution of plots only. No adjustment ratios will be applied at the sub-strata level.

2.5 TIMBER EMPHASIS SAMPLING

2.5.1 Overview

Timber Emphasis Plot (TEP) installation will be done in the 2006 field season by VRI-certified timber emphasis cruisers. The choice of field samplers will be determined early in the fiscal year following a competitive bid process. The goal is to complete the Phase II field work during the 2006 field season.

2.5.2 Sampling Objectives

The TEP sampling objective is to:

> Install sufficient number of plots to achieve a target sampling error of approximately ±15% (at a 95% confidence level) on net merchantable volume in the target population.

We estimate that approximately 50 samples will be required to achieve the target sampling error. If the interim results show that the target sampling error has not been achieved, the licensees will install more plots.[1]

2.5.3 Sample Size

A first batch of 50 plots from the target population has been selected and will be installed in the four strata (Table 4). Sample size was allocated proportionally to the area of each sub-stratum. Each plot, therefore, represented approximately 5,500 ha. The licensees will complete an interim analysis of the 50 Phase II plots once the data is entered to determine whether further Phase II sampling is required. The sample list is given in Appendix II. The sample and target population were compared by height class, age class, and volume class (Appendix III).

Table 4. Phase II sample size by stratum.

Stratum	Sub-stratum	Area (ha)	No. Plots	Sampling Weight
C-Y	0-300 m^3/ha	22,372	4	5,593
	300.1-450 m^3/ha	20,512	4	5,128
	450.1+ m^3/ha	17,164	3	5,721
	Total	60,048	11	5,459
Fd	≤27 m	19,632	4	4,908
	27.1-32 m	18,444	3	6,148
	32.1+ m	17,654	3	5,885
	Total	55,730	10	5,573
H-Immature	≤22 m	22,652	4	5,663
	22.1-27 m	18,949	3	6,316
	27.1+ m	22,599	4	5,650
	Total	64,200	11	5,836
H-Mature	0-450 m^3/ha	31,206	6	5,201
	450.1-650 m^3/ha	36,039	7	5,148
	650.1+ m^3/ha	28,014	5	5,603
	Total	95,259	18	5,292

2.6 NET VOLUME ADJUSTMENT FACTOR SAMPLING

2.6.1 Overview

The Strathcona TSA licensees intend to pursue an NVAF program whereby the Phase II field data will be used to develop a NVAF tree matrix from which to select trees for NVAF destructive sampling. A sub-sample of the VRI Phase II plots must be selected for NVAF-enhancement to build the NVAF tree matrix.

[1] Assuming future FIA funding is available to fund the initiative.

Fifteen (15) VRI Phase II plots (7 immature and 8 mature) were selected to be NVAF-enhanced. This represents approximately one-third of the total number of first batch Phase II plots within each maturity class. The VRI Phase II plots were sorted by stratum and sub-stratum within each maturity class and plots were selected using a systematic sampling design with a random start. Net factoring and call grading will be completed on all auxiliary plots for the NVAF-enhanced plots. If more Phase II plots are needed after the first batch is complete, one third of these additional plots will be selected for NVAF-enhancement.

2.6.2 NVAF Sample Description

The NVAF sample size and species distribution of the NVAF field program will be determined following review of the Phase II field volumes. However, the proposed NVAF sample size contains approximately 55 live and 5 dead trees. The sample will be stratified by maturity class and species. The sample size for each species will be proportional to the importance of the species in the TSA. The final sample distribution will be updated at the completion of the Phase II program and will include discussion and input from MoFR and updated in the final version of the VPIP.

Table 5. Proposed NVAF strata and sample size.

Strata	Ground Samples (N)	Sample Trees (N)
Immature	7	20
Mature	8	35
Dead		5
Total	*15*	*60*

3. IMPLEMENTATION PLAN

3.1 SAMPLE SELECTION

Sample polygons were selected using probability proportional to size with replacement (PPSWR). Each polygon in the sampling frame was listed only once and size was the total area of the polygon. The sample points within the sample polygons were selected from the provincial 100 m grid in a Geographic Information System (GIS) using the simple random sampling (SRS) method.

3.2 SAMPLE PACKAGES

Field sample packages will be prepared once the sample plan is approved. The field sample packages will include:

1. An ortho-photo (1:5,000) showing plot location and GPS points or pin-pricked 1:15,000 aerial photos.
2. 1:20,000 forest cover access maps showing polygon and plot location.
3. Overview map (approx 1:100,000) showing polygon location.

3.3 TIMBER EMPHASIS SAMPLING

3.3.1 Field Crews

Fieldwork is scheduled to begin early in the 2006 field season. A project pre-work meeting will be held on the first day and sampling should begin immediately thereafter. All plots will be installed at the random locations selected by GIS. If a plot location is unsafe the Strathcona TSA licensees and MoFR representative will try to locate an alternate location. If an alternate location cannot be found, the plot will be dropped.

3.3.2 VRI Measurements

The project priority is to measure timber attributes at each plot. Data will be collected to provincial VRI ground sampling standards.[2] Additional attributes beyond VRI requirements will be measured (Section 3.3.3). Certified crews will gather the data using VRI Card Types 1, 2, 3, 8, 9, 10, and 11.

3.3.3 Non-Standard VRI Data

The Strathcona licensees will collect additional, non-standard, VRI data. The purpose of collecting these additional measurements is to supplement the information normally provided by the VRI Phase II sampling. Additional measurements will include (Appendix IV):

1. Measuring the distance from the sample point to the tree in the auxiliary plots.
2. Recording borderline trees that are outside the normal prism plot.

3.3.4 Core Counting

Tree ages from sample cores will be counted by the field contractor completing the plot. Ages will be counted in the lab using a microscope and entered into the MoFR data entry program (TIMVEG).

3.3.5 Data Entry

Standard VRI field data will be entered into TIMVEG. Validation reports will be generated for each plot to ensure data integrity. All standard VRI data will be provided to the MoFR to be included in the provincial

[2] VRI ground sampling procedures are available: http://srmwww.gov.bc.ca/risc/pubs/teveg/vri_gs_2k4/vri_gs_2k4.pdf

VRI database. Non-standard data will also be provided to the MoFR in a Microsoft Access™ database.

Global Positioning System (GPS) data will be post-processed by the field contractors, entered into TIMVEG, and delivered with the data at the end of the project.

3.3.6 Pre-work and Quality Assurance

All field crews should attend a pre-work session with the client and the auditor to review the plot methods and ensure that all questions are resolved at the beginning of the project. Western will hire a third party auditor to audit approximately 10% of all plots[3] following the *VRI Ground Sampling Quality Assurance Standards.*[4] Auditing will be done by batch, and failed plots may result in a failed batch.[5]

3.3.7 Plot Supplies

Supplies such as aluminum stakes, field maps, photos, plot cards, handheld data recorders, GPS units, and other required equipment are supplied by the field contract crews.

3.4 NET VOLUME ADJUSTMENT FACTOR SAMPLING

The trees from all enhanced-TEPs will be used to develop the NVAF tree matrix. Stratification of the tree matrix and sample size within each stratum will be reviewed and confirmed with MoFR representatives prior to the NVAF destructive sampling and updated in the VPIP. A NVAF-certified crew will be hired to complete destructive sampling, with the intent being to have the sampling completed by the end of the 2006 field season.

The NVAF program will follow MoFR standards and involves five steps:[6]

1. Create a tree matrix using data from the enhanced TEPs.
2. Select sample trees from the tree matrix.
3. Complete stem analysis of the sample trees.
4. Complete a third-party audit of the sample trees.
5. Analyze the data to develop net volume adjustment factors.

Western will hire a third party auditor to audit approximately 10% of all plots[7] following the NVAF quality assurance standards.[8]

3.5 STATISTICAL ADJUSTMENT

3.5.1 Data Compilation, Analysis and Adjustment

The Strathcona TSA licensees will use the MoFR SAS compiler to compile all TEPs and NVAF trees. An interim analysis will be completed in the summer of 2006, and if needed, the results will be used to determine the remaining sample size for the fall of 2006.

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[3] The number of TEPs audited should be left to the discretion of the auditor. This has been done on many landbases.

[4] Minimum standards for VRI sampling are located at: http://srmwww.gov.bc.ca/risc/PUBS/TEVEG/VRI QA/VRI_Ground_Sampling_2K2/QA Standards for VRI-02.pdf

[5] Crews may be required to revisit failed plots at their own expense.

[6] NVAF sampling standards can be found at: http://srmwww.gov.bc.ca/risc/pubs/teveg/nvaf2k2/nvaf 02.pdf

[7] The number of TEPs audited should be left to the discretion of the auditor. This has been done on many landbases.

[8] The NVAF quality assurance standards are described in the NVAF sampling standards, chapter 10.

At the conclusion of the field program, the licensees will complete the analysis and statistical adjustment of the Phase I data to MoFR standards. The analysis will:

- Use the approved MoFR adjustment procedures.
- Calculate ground sample average volumes and inventory volumes for the Strathcona TSA.
- Adjust inventory height and age.
- Generate new *VDYP* volumes using the adjusted heights and ages.
- Adjust new volume estimates using the ratio of means method.
- Compute sampling errors for the Strathcona TSA area.

4. SCHEDULE

4.1 2006/07 TIMELINES

The Strathcona TSA licensees will complete the preliminary VPIP before March 31, 2006. Early in the 2006/07 fiscal year, the licensees will seek approval of the VPIP by the MoFR, prepare sample packages and solicit bids from consultants with VRI-certified field personnel to install the TEPs.

Sampling will start early in the field season immediately after the pre-work meeting. Crews will be audited at the start of the project and as the auditor deems necessary throughout the project. Data will be entered into TIMVEG and non-standard data into Microsoft Access™.

The licensees will complete a preliminary analysis at the end of the first batch of Phase II plots, and through discussions with the MoFR, will determine whether additional sampling is required. If required, additional Phase II plots will be selected and the VPIP will be updated. The goal is to have the Phase II field work and data entry completed before September 15, 2006. Once the Phase II program is complete, the NVAF tree matrix, sample size and VPIP update will be completed (by the end of September 2006). If there is time to complete the NVAF program within this fiscal, the destructive sampling program will be completed before snowfall in 2006, with data entry completed by November 30, 2006. Once the Phase II sampling program is complete, data compilation, inventory adjustment, and reporting will be completed by March 31, 2007.[9]

Activities	2006										2007		
	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
1. Complete VPIP													
2. Select sample locations													
3. Submit VPIP to MoFR													
4. Hire field staff													
5. Mentor TEP crews													
6. TEP sampling													
7. TEP QA													
8. Preliminary Analysis													
9. Select new sample locations (if necessary)													
10. Update VPIP (if necessary)													
11. TEP sampling (if necessary)													
12. NVAF sample plan													
13. Submit NVAF plan to MoFR													
14. NVAF destructive sampling													
15. NVAF audit													
16. Compilation, analysis, & report													

Figure 3. Proposed 2006/07 implementation schedule. Licensees; TEP Crew; VRI Mentor Auditor; NVAF Crew; NVAF Auditor

[9] If the Phase II program is not complete during this fiscal year, this program will be completed in future, as funding levels permit.

4.2 ROLES & RESPONSIBILITIES

Strathcona TSA Licensees

- Develop and update VPIP (as necessary).
- Coordinate project activities.
- Select sample polygons and locations within polygons.
- Prepare sample packages.
- Check data after initial compilation.
- Validate and compile data.
- Provide data to the MoFR.
- Complete interim analyses.
- Complete statistical adjustment.
- Complete final report.

TEP Field Contractors

- Complete field sampling.
- Enter the standard and non-standard sample data (incl. full cores and GPS of plot locations).
- Complete internal quality control and submit data to the Strathcona TSA licensees at the conclusion of field sampling.

NVAF Field Contractor

- Complete destructive sampling.
- Enter the sample data and provide to the Strathcona TSA licensees.

VRI Phase II Auditor

- Third party check-cruiser will audit approximately 10% of the Phase II samples.

NVAF Auditor

- NVAF-certified auditor will audit approximately 10% of the NVAF sample trees.

MoFR

- Review and approve the current version of the VPIP and the updated version in 2006.
- Review and approve the final analysis & the statistical attribute adjustment.
- Be the custodian of the VRI standard and non-standard sample & population data.
- Audit the VRI process to ensure that VPIP commitments and MoFR standards were met.

4.3 PROPOSED BUDGET

The proposed Phase II program should cost approximately $145,000, including audit, helicopter costs and the statistical adjustment. The proposed NVAF costs and the final program will be updated once this program is defined at the conclusion of the Phase II program.

Table 6. Proposed Phase II and NVAF program cost.

Phase	Cost	%
Field Sampling[a]	$75,000	TBD
Helicopter estimate	$45,000	TBD
Field Audit estimate	$5,000	TBD
Statistical Adjustment & Report	$20,000	TBD
Sub-total	*$145,000*	TBD
NVAF Sampling	TBD	TBD
Helicopter	TBD	TBD
Field Audit	TBD	TBD
NVAF Analysis	$15,000	TBD
Total		TBD

[a] These costs are based on a field crew rate of $1,500/day.

4.4 DELIVERABLES

The project deliverables include:

- Phase II sample plot data entered into TIMVEG and Microsoft Access database containing non-standard data.
- Quality assurance reports completed by the VRI Phase II Field Auditor
- Final report including a discussion of the analysis, adjustment and results.

APPENDIX I – GLOSSARY OF TERMS

Ground Sampling

VRI ground sampling (Phase II) is the field measurement of timber, ecology, range, and/or coarse woody debris values at one or more locations within each sample polygon. To accommodate the wide variety of resources, various types and sizes of sampling units (e.g., fixed and variable plots, transects) are used to make the measurements.

Landcover Classification

The BC Landcover Classification Scheme (BCLCS) was designed specifically to meet the requirements of the VRI, 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.

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 estimate net volume is obtained from net factoring and taper equations).

Photo-Interpretation (Phase I)

Photo-interpretation (Phase I) involves the subjective delineation of polygons and the photo estimation of attributes for all polygons in an inventory unit. Medium scale aerial photographs (1:15,000) are most often used in the photo-interpreted estimates inventory. However, if the 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 the division of an 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.

Pre-Stratification

Pre-stratification involves the division of 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 the special characteristics of each stratum.

Sample Size

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

Statistical Adjustment

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

Sub-unit

The term 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 Population

The target population is the unit from which the samples are chosen. For management inventories, the inventory unit is a TSA, TFL or other geographic area or specific attribute set, depending upon the sampling objectives.

Target Precision

Target precision expresses the amount of variation in key attributes (e.g., timber volume) desired in the final results. The 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)

The VRI is an improved vegetation inventory process for assessing the 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:

- BC Landcover classification scheme (BCLCS).
- *Photo-interpreted estimates (Phase I)*: the delineation of polygons from aerial photography and the estimation of resource attributes.
- *Ground sampling (Phase II)*: the establishment of plot clusters in selected polygons to measure timber, ecological, and/or range attributes. The data are used for the adjustment of the photo-interpreted estimates for all polygons in an inventory unit or management unit.
- *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.
- *Change Monitoring Inventory (CMI)*

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.

APPENDIX II – PHASE II & NVAF PLOT LIST

Table 7. Strathcona TSA 50 Phase II plots.

Plot No	NVAF	Maturity	Stratum	Sub Stratum	Map ID	Polygon ID	Area (ha)	Height (m)	Age (yrs)	Volume (m^3/ha)	UTM Zone	UTM Easting	UTM Northing
1	No	Mature	C-Y	450.1+	092K055	109	9.1	40.0	253	701.4	10	349881	5598692
2	Yes	Mature	FD	<=27	092E090	87	13.1	18.0	123	166.3	9	713195	5522764
3	No	Immature	H-Immature	27.1+	092K002	182	4.3	22.0	43	290.6	10	308523	5550680
4	No	Immature	H-Immature	22.1-27	092E094	26	37.1	15.0	34	114.5	9	622242	5539955
5	Yes	Immature	H-Immature	<=22	092E096	180	27.9	16.9	45	151.4	9	655804	5538034
6	No	Mature	H-Mature	450.1-650	092E094	40	13.5	36.0	278	571.6	9	628893	5538630
7	Yes	Immature	H-Immature	22.1-27	092L060	369	5.9	23.0	43	192.8	9	708698	5604584
8	Yes	Mature	H-Mature	650.1+	092K055	108	21.1	45.0	303	718.2	10	349186	5598821
9	No	Immature	FD	<=27	092K004	308	116.9	23.7	75	264.7	10	331606	5543045
10	Yes	Mature	C-Y	300.1-450	092K054	131	58.9	27.0	193	347.4	10	342693	5596587
11	Yes	Mature	C-Y	300.1-450	092E067	421	18.3	25.0	303	376.3	9	668554	5504675
12	Yes	Mature	H-Mature	450.1-650	092L070	51	18.0	29.0	303	469.9	9	709428	5613718
13	No	Mature	C-Y	450.1+	092K044	345	8.9	34.0	303	556.8	10	342424	5594898
14	Yes	Mature	H-Mature	450.1-650	092L005	574	13.4	38.0	278	615.3	9	633097	5540902
15	No	Immature	FD	27.1-32	092F093	92	11.4	28.0	53	358.3	10	323012	5538196
16	No	Mature	H-Mature	450.1-650	092L005	1156	16.4	32.4	192	512.3	9	641860	5551457
17	No	Mature	H-Mature	650.1+	092L015	256	9.9	40.0	304	721.9	9	638962	5558736
18	No	Mature	H-Mature	650.1+	092E095	364	23.8	45.0	303	740.5	9	634809	5538173
19	No	Mature	C-Y	300.1-450	092E087	342	95.7	23.0	303	307	9	666134	5519965
20	Yes	Immature	FD	32.1+	092K013	553	32.9	34.0	63	521.3	10	324730	5558321
21	No	Mature	C-Y	0-300	092E067	976	116.3	22.0	303	269.5	9	659732	5498023
22	Yes	Immature	FD	<=27	092K033	502	9.2	22.0	53	225.5	10	320258	5576201
23	No	Mature	H-Mature	450.1-650	092L013	61	38.4	32.0	233	506.3	9	610985	5558381
24	No	Mature	C-Y	450.1+	092E067	331	18.8	38.0	503	511.1	9	670532	5505155
25	No	Immature	H-Immature	<=22	092K061	248	68.8	12.2	34	37.3	10	298203	5611908
26	No	Immature	H-Immature	<=22	092E080	64	44.2	13.1	36	50	9	714935	5516736
27	Yes	Immature	H-Immature	27.1+	092K023	162	5.7	40.0	93	793.9	10	315223	5572906
28	Yes	Immature	FD	27.1-32	092K003	428	28.8	30.0	63	378.8	10	320356	5549100
29	No	Immature	C-Y	0-300	092L003	41	20.3	12.0	35	48.9	9	609607	5550627
30	No	Mature	H-Mature	0-450	092K044	7	20.5	15.0	203	136.8	10	341491	5596536
31	No	Mature	C-Y	300.1-450	092E067	654	9.0	24.0	303	358.8	9	661884	5501607
32	No	Mature	H-Mature	0-450	092K055	140	18.4	26.0	253	353.9	10	350967	5598348
33	No	Immature	H-Immature	22.1-27	092L013	486	11.4	26.7	62	385.4	9	608577	5553783
34	No	Mature	H-Mature	650.1+	092E067	775	22.9	42.0	403	663.9	9	664606	5501018
35	No	Mature	H-Mature	450.1-650	092E095	102	25.2	35.0	278	549.3	9	640048	5539588
36	No	Mature	H-Mature	0-450	092K061	176	35.9	10.0	203	16.1	10	295846	5613004
37	Yes	Immature	C-Y	0-300	092K033	470	2.4	12.0	43	40.5	10	316767	5576443
38	No	Immature	FD	32.1+	092F094	44	8.8	35.0	63	550.7	10	332255	5534422

Plot No	NVAF	Maturity	Stratum	Sub Stratum	Map ID	Polygon ID	Area (ha)	Height (m)	Age (yrs)	Volume (m^3/ha)	UTM Zone	UTM Easting	UTM Northing
39	No	Mature	H-Mature	450.1-650	092E095	934	23.6	36.0	278	637	9	634020	5533044
40	No	Mature	C-Y	0-300	092K062	212	98.4	19.0	203	214.1	10	309188	5608960
41	No	Immature	H-Immature	27.1+	092K034	81	123.1	22.0	43	276.7	10	332277	5579111
42	Yes	Mature	H-Mature	0-450	092K023	1001	5.2	17.0	278	154.7	10	324674	5564322
43	No	Mature	H-Mature	650.1+	092E100	20	65.5	40.0	303	753.7	9	709603	5542513
44	No	Immature	FD	27.1-32	092K003	250	5.1	31.0	63	518.3	10	314068	5549355
45	No	Immature	H-Immature	<=22	092K034	95	9.2	7.0	43	0	10	330259	5578694
46	Yes	Mature	H-Mature	0-450	092L005	538	11.1	14.0	203	142.4	9	638673	5541430
47	No	Immature	FD	32.1+	092K002	710	22.2	28.0	50	327.6	10	313071	5551895
48	No	Mature	H-Mature	0-450	092E095	1221	5.4	29.0	253	431.9	9	636688	5531354
49	No	Immature	H-Immature	27.1+	092K013	536	29.3	33.0	63	491.4	10	322650	5558805
50	No	Mature	FD	<=27	092K044	85	48.2	26.0	193	360.7	10	330798	5591873

APPENDIX III – TARGET AND SAMPLE COMPARISONS

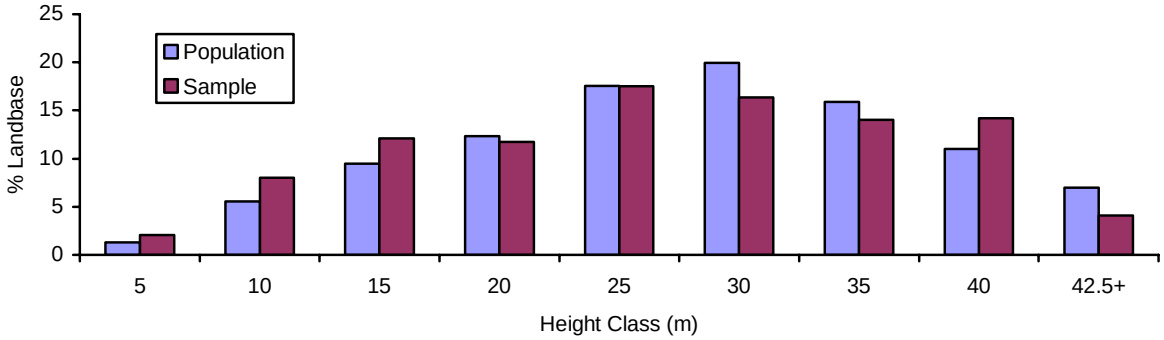

Figure 4. Target and sample population comparison by height class.

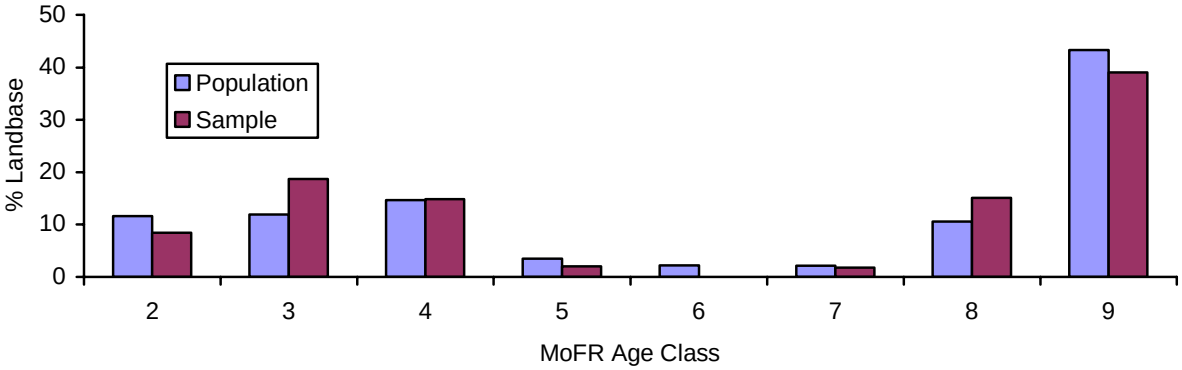

Figure 5. Target and sample population comparison by age class.

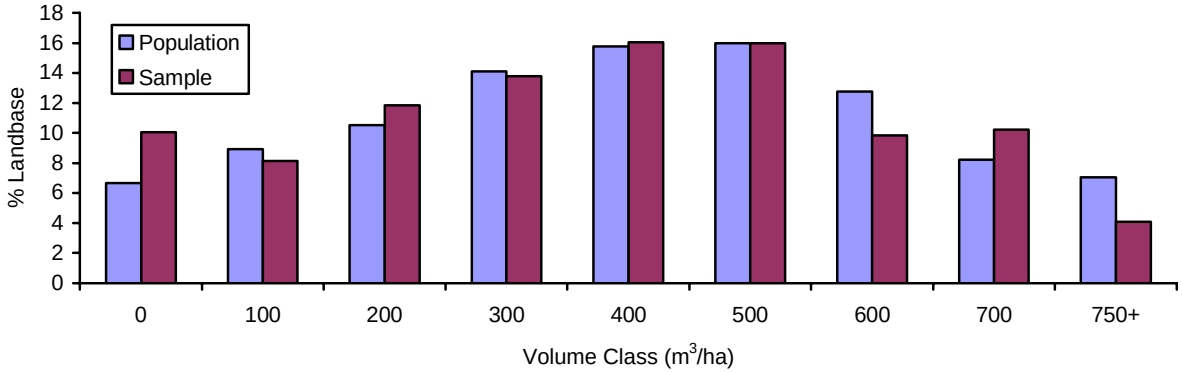

Figure 6. Target and sample population comparison by volume class.

APPENDIX IV – ADDITIONS TO STANDARD VRI METHODS

In order to provide data that better meets the Strathcona licencees' inventory needs, additional field data is being collected beyond provincial VRI standards. The intent is that this data may aid future plot remeasurements. The additions to current VRI methods include:

- Recording the distance plot centre-tree on auxiliary plots.
- Recording borderline trees that are outside the prism plot.
- Establishing the regeneration plot on all points.

Recording the distance plot centre-tree on auxiliary plots

Tree distances are only recorded on the Integrated Plot Centre (IPC). We propose recording this attribute on all auxiliary plots to increase the information on tree distances.

Recording borderline trees outside the prism plot

Recording borderline trees will decrease the likelihood of missing a tree. In the current system, trees are dropped from compilation if the tree was mistakenly recorded as in tree, but it is impossible to know if missed trees should have been included.