Tree Farm License 46

Vegetation Resources Inventory

Strategic Inventory Plan

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EXECUTIVE SUMMARY

This Vegetation Resources Inventory (VRI) Preliminary Strategic Inventory Plan (VSIP) outlines the VRI activities and products that address forest management and inventory issues in Tree Farm License (TFL) 46 held by the Teal-Jones Forest Ltd (Teal-Jones).

Teal-Jones is planning to undertake a Vegetation Resources Inventory (VRI) for TFL 46.

The following VRI activities and products are planned:

- Conduct a Phase I photo-interpretation for the entire TFL. The Phase I database will support timber-emphasis inventories, habitat mapping, ecosystem mapping, riparian mapping, and other applications over the TFL.

- Conduct Phase II timber emphasis ground sampling in the Vegetated Treed area of the TFL to provide statistically valid timber volumes and polygon-specific tree attributes for the subsequent timber supply reviews.

- In concert with the Phase II ground sampling, conduct Net Volume Adjustment Factor (NVAF) sampling for trees randomly selected from the Phase II plots. The NVAF will be used to statistically adjust the estimate of net merchantable volume of VRI ground samples.

These VRI activities and products will support timber supply objectives and other resource specific interpretations. They may be implemented in smaller units (e.g., Management Zones) across the TFL. They may also be jointly implemented to address common management issues within the Coast Region.

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1. INTRODUCTION

1.1 Background

The BC Ministry of Forest issued a Rationale for Annual Allowable Cut Determination (AAC) for Tree Farm License 46 (BC MoF, September 1, 2003). In their report of the AAC, the Ministry "encourage(ed) the licensee to pursue completion of a VRI for the TFL, so that more up-to-date information can be used in the next determination for TFL 46" [1]. Specific shortcomings of the current inventory have been identified by the Ministry as the age of the inventory, tree composition accuracy, and the lack of tree/stand heights. Site index is also believed to be underestimated in young stands.

The original forest inventory of old growth timber was prepared during the period 1967 to 1970. During the period 1972 to 1980, numerous intensive inventories were completed for the purpose of operational planning and these were combined with the original inventory to produce the maps and values for Management and Working Plan No. 1. Approximately 10,300 volume sample plots were established. For the TSR 2 analysis, the inventory was updated to account for harvesting and silvicultural activities to December 31, 1999.

A Vegetation Resources Inventory (VRI) is planned for Tree Farm License (TFL) 46 to provide both the Ministry and the licensee with updated inventory information for long-term planning and timber supply analysis.

This VRI Preliminary Strategic Inventory Plan (VSIP) outlines the VRI activities and products that address forest management and inventory issues in TFL 46 held by Teal Jones Forest Ltd. This VSIP has been prepared in consultation with staff from the Ministry of Forests and Range (MoFR) Forest Analysis and Inventory Branch.

The TFL has a high proportion of operable and productive land. It is primarily a Douglas fir, hemlock, cedar, and true fir forest. In comparison to the coastal region in general, it is a relatively young forest. Table 1.1 provides a land base summary of TFL 46[1].

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[1] Rationale for Allowable Annual Cut (AAC) Determination, September 1, 2003

Table 1.1 TFL 46 area summary

Management Unit	Total Land Base (ha)	Timber Harvesting Land Base (ha)
TFL 46	83,545	63,777
Total Area	**83,545**	**63,777**

Table 1.2 provides a summary of the allowable annual cut (AAC) for TFL 46 by management unit as determined in 2003.

Table 1.2 TFL 46 allowable annual cut

Management Unit	AAC Determination (m³/year)	Effective AAC* (m³/year)
TFL 46	510,000	488,400
Total	**510,000**	**488,400**

* Reflecting a Part 13 Adjustment July 2004, and a further administrative adjustment July 2004.

1.2 VRI Overview

The VRI is a vegetation (forest) inventory process that has been approved by the Resources Inventory Committee (RIC) to assess the quantity and quality of BC's timber and vegetation resources. The VRI estimates overall population totals and averages, as well as individual polygon attributes, for timber and non-timber resources. Its design is simple, reasonably efficient, statistically defensible, and addresses issues raised by the Forest Resources Commission in its 1991 report, *The Future of Our Forests*.

The VRI consists of several components:

1. BC Land Cover Classification Scheme (BCLCS)
2. Photo Interpreted Estimates (Phase I)
3. Ground Sampling (Phase II) – timber emphasis, ecology, coarse woody debris
4. Net Volume Adjustment Factor (NVAF) sampling
5. Within Polygon Variation (WPV) sampling
6. Statistical Adjustment.

One or more of these components can address specific forest management or inventory issues. For more information, VRI manuals are available through the internet at http://srmwww.gov.bc.ca/risc/pubs/teveg/index.htm.

1.3 VRI Planning

The VRI planning process requires that a Strategic Inventory Plan (VSIP) and one or more Project Implementation Plans (VPIPs) are developed for defined units (e.g. TFL or TSA). A VSIP outlines VRI products to address forest management issues and provides strategic direction for implementing the inventory activities. A VPIP details the operational activities identified in the VSIP (e.g., ground sampling or photo interpretation projects) and identifies project areas, priorities, plot location, yearly inventory costs, and roles and responsibilities. Guidelines for preparing VSIPs and VPIPs are available on the Internet at http://srmwww.gov.bc.ca/tib/fia/vri.htm.

The VRI planning process is an important component of the overall VRI process and related activities (Figure 1). The intent of the VRI planning process is to ensure that baseline products meet a range of applications and they are efficiently implemented, and to ensure issues are identified and that stakeholders needs are addressed. These processes and activities include:

1. Forest management decision processes (land integration planning)
2. Identifying forest management issues
3. VRI Strategic planning (prepare a VSIP)
4. VRI operational planning (prepare VPIPs)
5. Implementation, including development and maintenance of procedures and standards;
    a). Management inventories
    b). Database management
    c). Data interpretation
6. Teal-Jones prepares a VSIP, which is signed off by indicated individuals.
7. VPIP process begins

The steps for preparing a VPIP include:

1. Review and update VSIP recommendations
2. Secure funding
3. Identify project activities and geographic areas
4. Specify roles and responsibilities for project implementation
5. Prepare VPIP

VRI is a Ministry of Forests and Range approved process consisting of the following 4 components.

1.4 Phase I - Photo Interpretation:

Prior to commencing the Phase I of a VRI project, a *Vegetation Resource Inventory Project Implementation Plan (VPIP) for Photo Interpretation* must be completed and subsequently approved by the Ministry of Forests and Range. This plan will outline the overall VRI Phase I process, and will provide details on the target area (the landbase), current inventory status/issues, standards for work, photo acquisition requirements, photo interpretation objectives, calibration data sources, scheduling, project responsibilities, quality control, and project deliverables.

Phase I is the photo interpretation phase of a VRI and entails polygon delineation and attribute estimation by certified photo interpreters through the use of aerial photographs or softcopy images. The delineation identifies the location of the forest resources and the attribute estimation component provides estimates of numerous attributes including land cover type, crown closure, tree species, height, age, stand structure, volume, basal area, density, slope position, moisture and nutrient regime, snags, shrubs, herbs, and bryoids.

Estimation of attributes from field reference points is based upon field procedures using a combination of air and ground calibration points.

The Phase I portion for the TFL 46 VRI will be conducted by IRC Spatial using softcopy technology. Existing preset models, produced from 20 micron scans of 1:15,000 color photography (2003), will be interpreted. The lead photo interpreter for this project will be Bruce Townsend. Bruce is a certified VRI interpreter, and has over 30 years of local experience. IRC internal quality control of VRI delineation, field work and estimation will be conducted by Chon Kim, R.P.F.

Teal intends to engage a 3rd party VRI-certified interpreter to provide quality assurance services for all phases of work undertaken by IRC.

The Phase I work will include all areas that are currently part of the TFL, plus a parcel in the Camper Creek area committed to the TFL (T0057). The Phase I portion of the VRI is expected to be completed by March 31, 2006.

1.4.1 Phase II - Ground Sampling

Prior to commencing Phase II, a *Vegetation Resource Inventory Project Implementation Plan (VPIP) for Ground Sampling* must be completed and subsequently approved by the Ministry of Forests and Range. This plan will outline the overall VRI Phase II process and standards for adherence, and will provide details on sampling objectives, target and sample populations, and sample selection and sample size details. The VPIP will include discussion of the field program and will include the proposed implementation schedule. The VPIP will include details on a proposed NVAF program including sample size and sample selection. Finally, the VPIP will discuss the proposed data compilation, analysis, and statistical adjustment.

1.4.2 Net Volume Adjustment Factor (NVAF) Sampling

As per the Ministry of Forests and Range Vegetation Resource Inventory standards, all new Ground Sampling Vegetation Resource Inventories must complete Net Volume Adjustment Factor Sampling.

This sampling involves detailed stem analysis of sample trees that have been randomly selected from the Phase II plots. The NVAF is used to correct the VRI estimates of net close tree utilization for all species and the NVAF adjusted VRI ground sample volumes are used to correct the VDYP yield table model.

1.4.3 Final Compilation, Analysis and Statistical Adjustment

Adjustment to the Phase I using the results of Phase II sampling data for the entire VRI project area is the final VRI phase. The NVAF information is utilized to adjust the Phase II sample estimates for hidden decay and taper equation bias and the Phase II plot measurements are used to adjust the Phase I photo interpretation attribute estimates. The final product is a statistically valid new inventory supported by re-adjustment of photo-estimated attributes based on ground samples.

1.5 Funding

Teal-Jones develops criteria for setting VRI activity priorities and products identified during the planning process. Inventory funding, or follow-up resource-specific management interpretations, is excluded from the planning process since funding mechanisms may vary. Currently, funding for VRI activities are FIA eligible. Teal has allocated approximately $75,000 of their 2005-2006 FIA allocation for the Phase I photo interpretation.

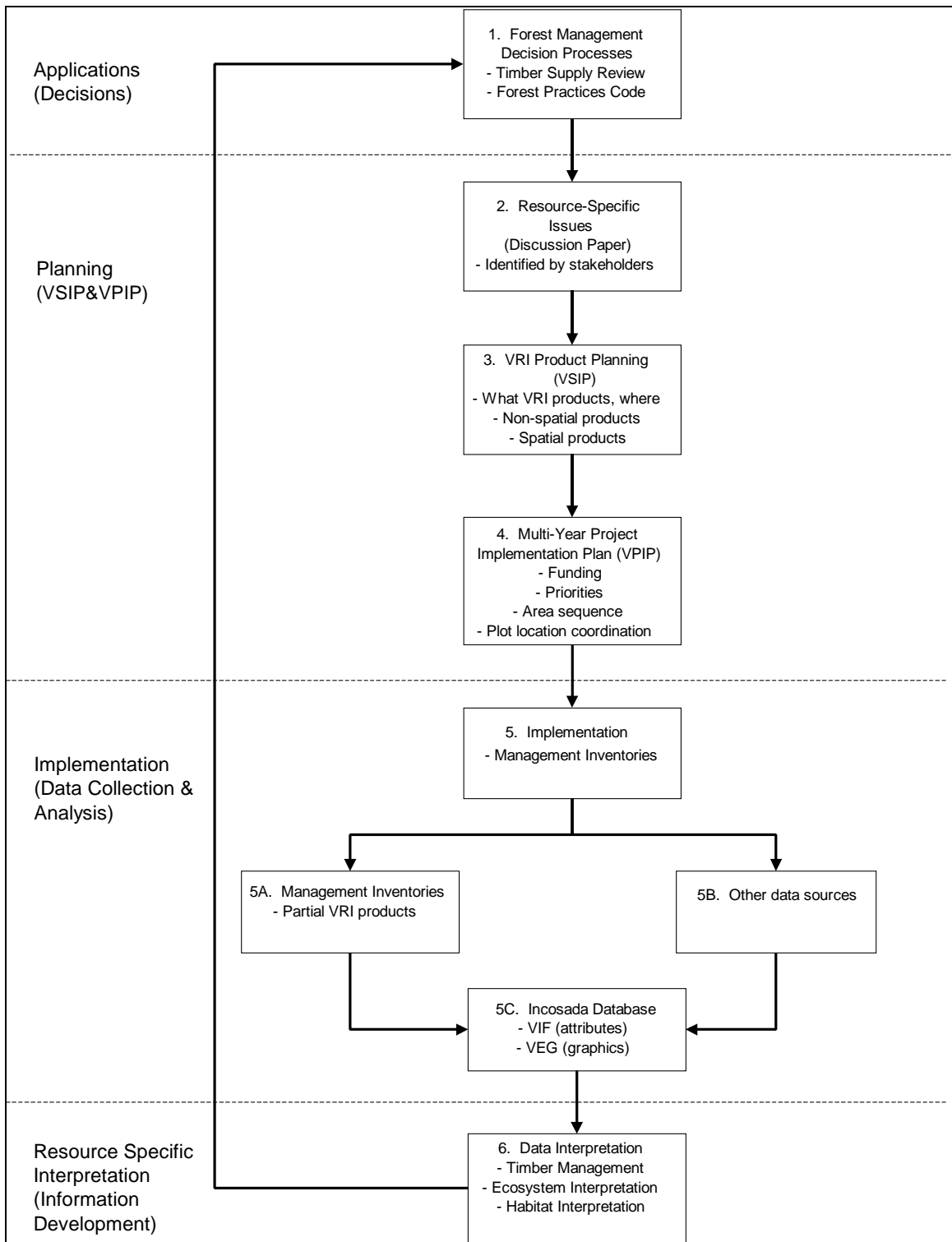| Applications (Decisions)	**1. Forest Management Decision Processes** - Timber Supply Review - Forest Practices Code
Planning (VSIP&VPIP)	**2. Resource-Specific Issues (Discussion Paper)** - Identified by stakeholders **3. VRI Product Planning (VSIP)** - What VRI products, where - Non-spatial products - Spatial products **4. Multi-Year Project Implementation Plan (VPIP)** - Funding - Priorities - Area sequence - Plot location coordination
Implementation (Data Collection & Analysis)	**5. Implementation** - Management Inventories **5A. Management Inventories** - Partial VRI products **5B. Other data sources** **5C. Incosada Database** - VIF (attributes) - VEG (graphics)
Resource Specific Interpretation (Information Development)	**6. Data Interpretation** - Timber Management - Ecosystem Interpretation - Habitat Interpretation

Figure 1. The VRI management inventory process.

2. BUSINESS CONSIDERATIONS

2.1 Current Forest Cover Inventory and Forest Management Considerations

The status of forest cover inventory on the TFL, the most basic and important input to timber supply analysis is summarized below. The original forest cover inventory for TFL 46 was collected between 1967 and 1970, with inventories of older immature stands updated in 1976 and 1977.

2.1.1 Inventory Audit

The Ministry of Forests undertook an inventory audit of TFL 46 in 1997. The results suggested that volume prediction is acceptable for mature stands, but that assessment was of overall volume prediction and may disguise volume prediction at any sub-strata (such as by species or site grouping) level. The audit also suggested that site indices for stands between free growing and 60 years of age are underestimated using the inventory data.

In preparation for the new inventory on TFL 46, 1:15 000 color photos were flown in 2003, scanned and viewer sets prepared for softcopy compatibility. The inventory will be completed using digital softcopy photogrammetric technology

2.2 Forest Management Considerations

Forest management issues in TFL 46 are summarized in Table 2.

Table 2.0 Forest Management Issues

Issue[2]	VRI Implication		Remarks
	Photo-Interpretation (Phase 1)	Ground Sampling (Phase II)	
1 Inventory audit	Required	Required	Volume estimates from VRI ground sampling will provide additional data to adjust inventory estimates. The Ministry of Forests undertook an inventory audit of the TFL in 1997 and suggested that volume prediction is acceptable.
2 Uncertainty to timber Supply analysis	Required	Required	The state of the forest cover inventory the TFL introduces considerable uncertainty to timber supply analysis; especially spatial analysis that would otherwise have added capability for modeling complicated integrated resource management.
3 Productivity	Required	Required	Old growth site index bias is an acknowledged problem in the forest inventories of British Columbia. The Ministry of Forests undertook an inventory audit of the TFL in 1997. The results suggested that site indices for stands between free growing and 60 years of age are underestimated using the inventory data.
4 Operability criteria: re examine the distribution	Required	Required	VRI may provide additional information to use in confirming the distribution of merchantable timber in the TFL.
5 Management for Wildlife and Biodiversity:	Required	Required	Spatial data derived from the photo interpretation and ground sampling may provide additional information useful in delineating wildlife tree patches, ungulate winter ranges, seral stage and stand attributes.
6 Low Sites:	Required	Required	Better age and height information will result in low sites being more accurately identified.
7 Riparian management:	Required	Required	Spatial data from photo interpretation will provide additional information for riparian area designation and quantification
8 Land use planning:	Required	Required	Updated forest cover data provided by the VRI could be used to in the process of identifying areas of interest specific to the land use objective
9 Visual Quality Objectives:	Required	Optional	VRI will provide updated spatial information useful in effectively assessing visual impact of timber harvesting activities.
10 Deciduous Stands	Required	Optional	VRI will provide updated deciduous spatial information to answer the outstanding issue of harvesting performance in deciduous leading stands.

2.3 VRI Activities and Products

The following VRI activities and products are recommended to address the forest management issues identified for TFL 46. These recommendations are based on the issues identified in Table 2.1 and Section 2.1.

1. Conduct a Phase I photo-interpretation for the entire TFL. The Phase I database will support timber-emphasis inventories, habitat mapping, ecosystem mapping, riparian mapping, and other applications over the TFL.

2. Conduct Phase II timber emphasis ground sampling in the vegetated-treed areas of the TFL, to provide statistically valid timber volumes and polygon-specific tree attributes. These data will support the next timber supply review (TSR) in TFL 46.

3. In concert with the ground sampling, conduct Net Volume Adjustment Factor (NVAF) sampling to check loss factors and taper equations for several tree species.

4. Adjust the Phase I photo-interpreted attribute data.

A preliminary strategic inventory plan to address the identified products so far is outlined in section 3.

3. STRATEGIC INVENTORY PLAN

3.1 Overview

This section outlines a preliminary strategic inventory plan to develop specific VRI products discussed in Section 2.3. The VRI products include a new spatial vegetation inventory (Phase I) over TFL 46 and a timber emphasis inventory in the vegetated treed landbase. These products can be obtained through completion of VRI photo interpretation, ground sampling and statistical adjustment.

3.2 Photo-Interpretation (Phase 1)

3.2.1 Objective
The objective is to improve TFL polygon information – especially in areas where specific management issues occur – using photo interpretation. The VRI product is a spatial database consisting of unadjusted photo-interpreted estimates. Ground sampling, used to check and adjust the photo-interpreted estimates, is discussed as a separate process (Section 3.3).

3.2.2 Target Area

All the lands, shown below in Figure 2, will be updated to VRI standards through new photo interpretation. Some portions of TFL 46 are the subject of takeback negotiations, but nonetheless will be included in the photo interpretation. A block not currently in the TFL, but committed as a future addition, will also be included in the interpretation.

All attributes listed on the VRI photo interpretation attribute form will be targeted. These attributes will be interpreted to current VRI photo interpretation standards.
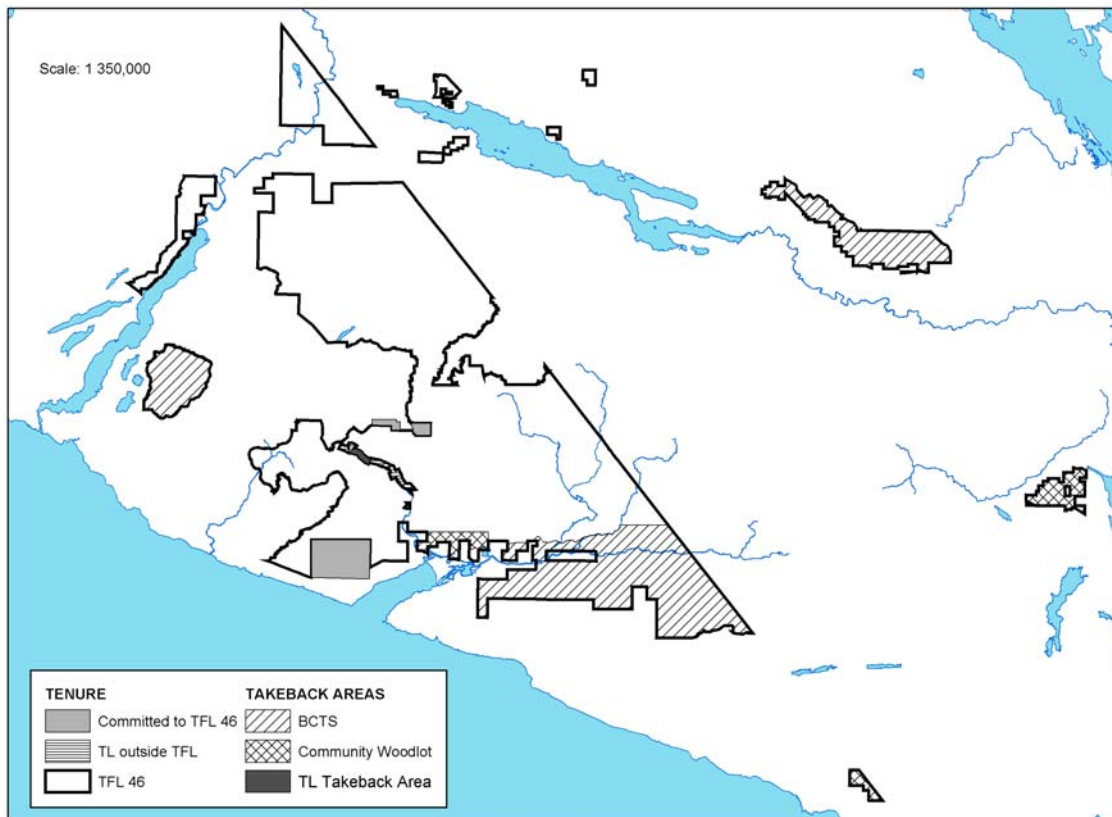

Figure 2. TFL 46

3.2.3 Methods

The Phase 1 inventory will be completed using digital softcopy photogrammetric technology. Air and ground field calibration will be established by the photo interpreters to gain local knowledge and improve VRI attribute estimation.

3.3   Timber Emphasis Inventory – Phase II (Vegetated Treed Areas)

3.3.1 Ground Sampling (Phase II) Objectives

The main objective of the ground sampling timber emphasis inventory is to:

> *Install an adequate number of Phase II VRI sample clusters to statistically adjust the photo interpreted timber inventory attributes in the Vegetated Treed (VT) areas of the TFL, to achieve a sampling error between 10 and 15% (95% probability) for overall net timber volume in the VT area, and reasonably accurate individual polygon adjusted estimates.*

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

3.3.2 Target Population

The target population will be the vegetated treed (VT) portion of the TFL. The treed area within the TFL will be priorized for ground sampling as it provides cost effective VRI ground sampling and focuses sampling activities in the portion of the landbase that is particularly important to the stakeholders.

3.3.3 Sample Size

An estimate of the sample size will be determined once the results of the Phase 1 are analyzed and discussions are completed with the Ministry of Forests and Range.

3.3.4 Sampling Approach

VRI Timber Emphasis Plots (TEP) should be used to gather data following the current VRI Ground Sampling Manual. These TEPs could provide a sampling framework for additional sampling, such as monitoring (where a subset of the TEPs would be re-measured over time).

3.3.5 Sample Selection

Sample polygons would be selected using the MOF probability of selection proportional to size with replacement (PPSWR). The selection process would follow the procedures outlined in the document, "Sample Selection Procedures for Ground Sampling v3.3", which was produced by the Ministry of Sustainable Resource Management, Terrestrial Information Branch, in December 2002.

3.3.6 Net Volume Adjustment Factor Sampling

As per the Ministry of Forests and Range standards, the net volume adjustment factor (NVAF) sampling is mandatory for the inventory. 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; it will be used to statistically adjust the estimate of net merchantable volume of VRI ground samples.

The objective of the NVAF portion of the inventory is to complete destructive tree sampling and obtain local information for hidden decay, waste, and stem taper in order to statistically adjust the cruiser calls for net volume.

In the ground sampling phase of the NVAF process, ground sampling crews will provide detailed enhanced cruising (net factoring and call grading) of all the trees (live, dead, standing or fallen) within the selected auxiliaries at the same time as they are conducting regular timber emphasis sampling within the TFL. Once the enhanced data is collected then the NVAF enhanced tree data will be compiled in a tree matrix and a sample design for selected trees will be developed.

A minimum of 60 trees (50 live, 10 dead) will be selected from at least 17 VT polygons. The finalized ground-sampling plan will provide additional details on stratification of destructive sampling plots.

All NVAF planning and implementation will follow the Net Volume Adjustment Factor Sampling Standards and Procedures, MOF, Version v4.0, March 2004

3.3.7 Implementation

A VPIP for ground sampling should be developed following the Ministry of Forests and Range guidelines in *Vegetation Resources Inventory Guidelines for Preparing a Project Implementation Plan for Ground Sampling*.

3.4 Monitoring

The Ministry of Forests and Range is responsible for monitoring this VRI planning process and ensuring that the final VSIP is approved.

3.5 Approval/Sign-off of VPIP

Suggested sign-off contacts are:

Agencies	Contact
Ministry of Forests and Range	Jon Vivian

Licensee Contacts:

Licensees	Contact
TFL Forest Ltd. (Teal-Jones)	John Pichugin

I have read and agree that the activities and products outlined in this proposal will meet the Ministry of Forests and Range business needs.

_____

Manager

Development and Policy Forest Analysis Branch, Ministry of Forests
or other suitable MOF representative

APPENDIX II – GLOSSARY OF TERMS

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 using the probability proportional to size with replacement (PPSWR) method. 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. The inventory unit could be a specific a geographic area (e.g. TFL or TFL) where a specific set of attributes is needed. The size of the inventory unit depends upon the 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,

including reporting on the Criteria and Indicators and the Kyoto protocols. The inventory unit for the NFI is the entire country, although it is implemented province-by-province. BC's provincial CMI system will provide the data needed for the NFI as well as provincial reporting.

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). The NVAF (and VRI net factoring) replaces the existing loss factors for inventory applications. It does not, however, replace the loss factors for revenue applications.

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.

Resource-Specific Interpretations

Resource-Specific Interpretations (RSI) use the Resource Inventory Committee (RIC) standard VRI baseline data products (provincial CMI 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 and habitats). These interpretations include ecosystem interpretations and habitat interpretations.

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 or adjustment is the process of adjusting the values of the photo-interpretation variables using ground sampling observations. Ground observations are compared to photo-estimated values to develop adjustment factors by species groups. These factors are then applied to the polygons in the photo interpretation database to produce the final adjusted database.

Sub-unit

Sub-unit describes the inventory unit within an Inventory Unit. For example, if the inventory unit is defined as the Vegetated Treed area in a TFL, then 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 Vegetated Treed area in the TFL.

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. The current target precision for timber volume is $\pm$10% (90% or 95% probability); stakeholders define the probability (uncertainty) level.

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 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.