

**Mid Coast Timber Supply Area,  
Tree Farm License 25 Block 5 &  
Tree Farm License 39 Block 7**

**Vegetation Resources Inventory  
Photo Interpretation  
Project Implementation Plan  
(Phase I VPIP)**

**PREPARED FOR  
THE MID COAST TIMBER SUPPLY AREA (TSA) VRI COMMITTEE**

**APRIL 2008**

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## **EXECUTIVE SUMMARY**

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This VRI Photo Interpretation Project Implementation Plan was prepared for the Mid Coast Timber Supply Area (TSA) VRI Committee and is consistent with the Central Coast LRMP Area VRI Strategic Inventory Plan of February 2008 (Central Coast VSIP) that was previously approved by the Ministry of Forests and Range (MFR). The project covers Phase I VRI activities that will be completed in the Mid Coast TSA, TFL 39 Block 7, and TFL 25 Block 5 (including Block 5 areas outside the Mid Coast TSA region). Tweedsmuir Park is specifically excluded. Forest Investment Account (FIA) budget eligibility relating to funding work in the provincial parks and newly protected areas that occupy full or near full landscape units will be reviewed prior to starting work.

The specific objectives of this proposed inventory program include:

- Addressing the issues outlined in the Forest Management Considerations section of the Central Coast VSIP;
- Improving the Mid Coast TSA vegetation polygon delineation and vegetation polygon descriptions;
- Bringing the inventory in the three Management Units up to current VRI standards; and
- Updating the silviculture and free growing information with the use of RESULTS data and any other relevant data recognized in gap analysis.

This project will be implemented in the 2008/2009, 2009/2010, 2010/2011, and 2011/2012 fiscal years and is expected to cost approximately \$3.87 million.

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## **ACKNOWLEDGEMENTS**

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This plan was developed by International Forest Products Ltd. (Interfor) and Timberline Natural Resource Group Ltd. (Timberline), on behalf of the Mid Coast TSA VRI Committee. Direct support and plan development was carried out by various parties including the following: Gerry Sommers RPF (Interfor), Hugh Carter MSc, RFT (Timberline), Hamish Robertson RPF (Timberline), Warren Nimchuk, RPF (Timberline), Derek Challenger RPF (Ministry of Forests and Range), Laurence Bowdige RPF (Ministry of Forests and Range), Gary Johansen RFP (Ministry of Forests and Range), and Ian Robertson RPF (Forsite Ltd.). Pat Bryant RPF (Western Forest Products Ltd.), Deidre Haight RPF (BC Timber Sales) and Rina Gemeinhardt RPF, MF, CEPIT (Heiltsuk Coastal Forest Products Ltd.) also provided input.

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## 1.0 INTRODUCTION

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This Vegetation Resources Inventory (VRI) Photo Interpretation Project Implementation Plan (Phase I VPIP) was prepared for the Mid Coast VRI committee and covers all Phase I VRI activities that will be conducted in the Mid Coast Timber Supply Area (TSA), including TFL 39 Block 7 and a portion of TFL 25 Block 5. TFL 39 Block 7 is managed by British Columbia Timber Sales (BCTS) and TFL 25 Block 5 is managed by Western Forest Products Ltd (WFP). The project excludes large tracts of private land. This document was prepared and submitted in accordance with current Ministry of Forests and Range (MFR) Phase I VPIP standards and guidelines and will be approved by the MFR prior to implementation.

### 1.1 OBJECTIVES

The specific objectives of this proposed inventory program include:

- Addressing the issues outlined in the Forest Management Considerations section of the Mid Coast VRI Strategic Inventory Plan (VSIP);
- Improving the Mid Coast TSA vegetation polygon delineation and vegetation polygon descriptions;
- Bringing the inventory up to current VRI standards; and
- Updating the silviculture and free growing information with the use of RESULTS data and any other relevant data recognized in gap analysis.

### 1.2 STATE OF CURRENT INVENTORY

The Mid Coast TSA was inventoried between 1988 and 1990 from 1977-1979 photography (with reference years for some portions of the current inventory from as early as the 1950's). The inventory file has been continually updated to December 1996 for disturbances. The inventory has been projected for forest stand characteristics and growth and age-class to January 1998<sup>1</sup>. In 1994, an inventory audit was completed and the results indicated that the inventory was suitable for strategic planning purposes. Areas of concern for the existing inventory were species composition estimates, deciduous stand delineation, and second growth stand delineation.

In 2006, a project to update the inventory to VRI standards was initiated. The first step was to capture new photography. 2006 marks the first year of capturing 1:20,000 scale color aerial photographs. Aerial photography was completed for the rest of the TSA in 2007.

In 2005 a reconnaissance level Terrestrial Ecosystem Mapping (TEM) project was initiated and approximately 15% of the TSA is completed to date. A full TEM project was completed in the Johnston Landscape Unit in 2003.

Inventories for TFL 25 Block 5 and TFL 39 Block 7 date back to 1964 and inventory audits were not completed for either of the TFLs. Refer to Section 2.2 for more details on the existing inventories.

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<sup>1</sup> BC Ministry of Forests. 2000. Mid Coast Timber Supply Area Rationale for Allowable Annual Cut (AAC) Determination. June 1, 2000. 88p.

## 1.3 VRI BACKGROUND INFORMATION

### 1.3.1 The VRI Planning Process

The MFR has developed a business plan to ensure the successful implementation of VRI ground sampling and photo interpretation projects. The process includes the preparation of VSIP and VPIPs (Figure 1).

A VSIP provides general strategic direction for implementing the provincial VRI. The Mid Coast TSA VSIP was prepared in February 2008 and should be referred to for background information on VRI activities and also for products needed to address the TSA's forest management issues identified by the VRI Committee.

A Phase I VPIP is a working document that details the specific operational activities associated with the implementation and documentation of a VRI project. It is a working document that:

- Details the specific operational activities associated with the implementation and documentation of a VRI project;
- Identifies the target areas for new photo interpretation;
- Documents availability of existing aerial photographs or acquisition plan for new aerial photographs, data sources, fieldwork, format of base files, project scheduling, and deliverables; and
- Describes the quality control and quality assurance requirements that will ensure all work is done to provincial VRI mapping standards.

### 1.3.2 The VRI Process

The VRI is a vegetation (forest) inventory process that has been approved by the former Resources Inventory Committee (RIC) to assess the quantity and quality of BC's timber and vegetation resources (Figure 1). The VRI estimates overall tree species 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:

- BC Land Cover Classification Scheme (BCLCS)
- Photo interpreted estimates (Phase I)
- Ground sampling (Phase II) – timber emphasis, ecology, coarse woody debris
- Net Volume Adjustment Factor (NVAF) sampling
- Statistical adjustment.

New Phase I photo interpretation will address the following key issues as outlined in the VSIP<sup>2</sup>:

- provide more detailed delineation and improved species composition, age and height estimates for productive forest areas and allow more accurate volume estimates to be calculated, especially for outer coast stands of redcedar and inner coast hemlock-balsam stands
- provide more detailed delineation of non-productive forested and non-forested areas, including wetlands, to support land management decision-making. Wildlife habitat

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<sup>2</sup> Mid Coast TSA VRI Committee. Mid Coast Timber Supply Area VRI Strategic Inventory Plan. February, 2008.

modelling, landscape biodiversity, ecosystem representation and riparian management are some examples

- provide up-to-date information for dynamic second-growth stands, partially harvested stands, areas affected by damage agents such as fire, mountain pine and balsam bark beetles, and yellow cedar die-back

Overall, the above data improvements will give greater confidence to users in undertaking timber supply analysis, allocation of volume and tenure to licencees, operability mapping, etc. It will provide a more accurate baseline for the implementation and monitoring of Ecosystem Based Management and support government commitments to First Nations and international agreements and protocols dealing with climate change and carbon storage.

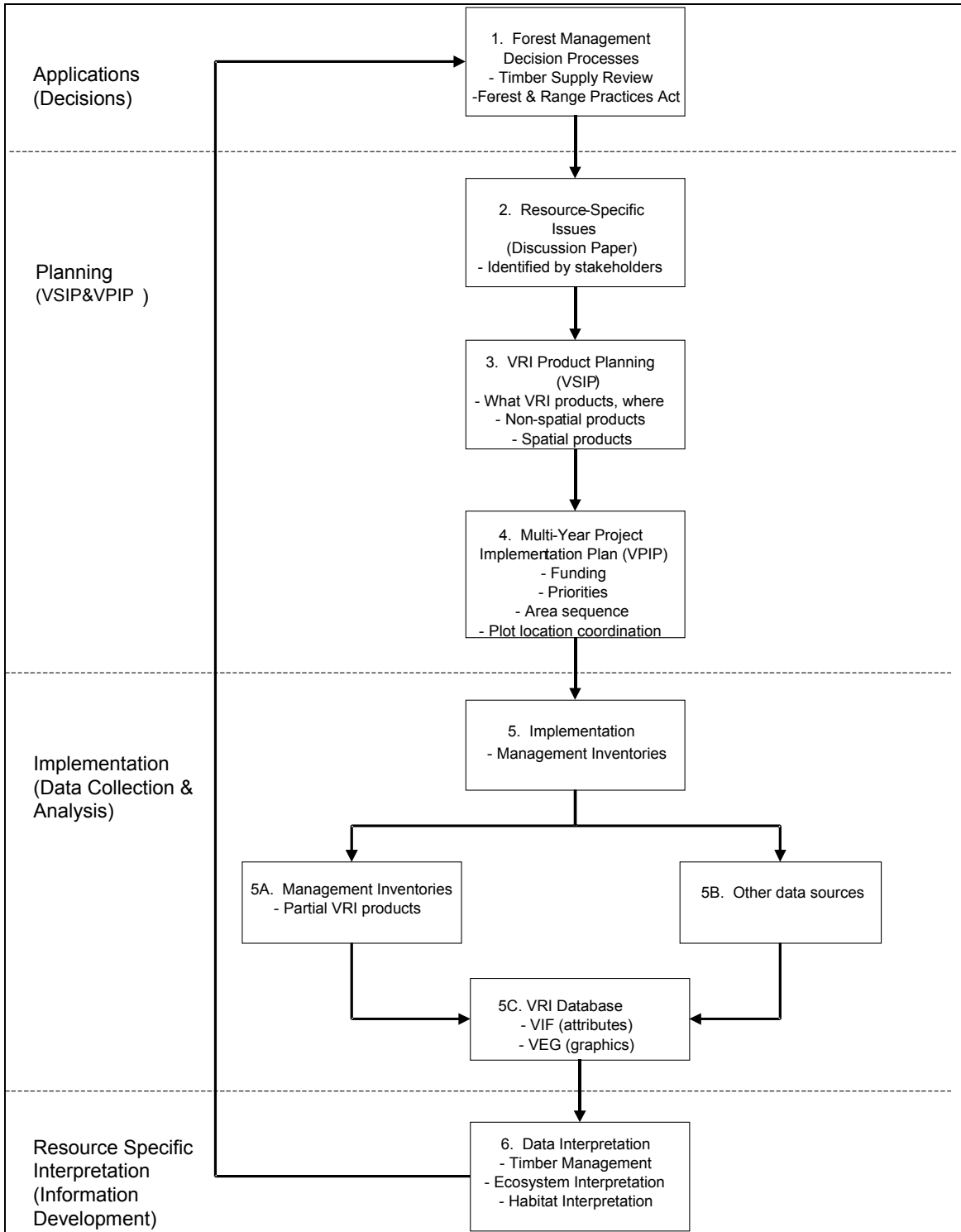


Figure 1. The VRI management inventory process.<sup>3</sup>

<sup>3</sup> Preparing a VRI Project Implementation Plan for Photo Interpretation, MFR (Ver. 2.0, April 2006)



### 1.4 PROJECT AREA LAND BASE

The project area for the VRI Phase 1 project covers the Mid Coast TSA, TFL 25 Block 5 and TFL 39 Block 7 (Figure 2).

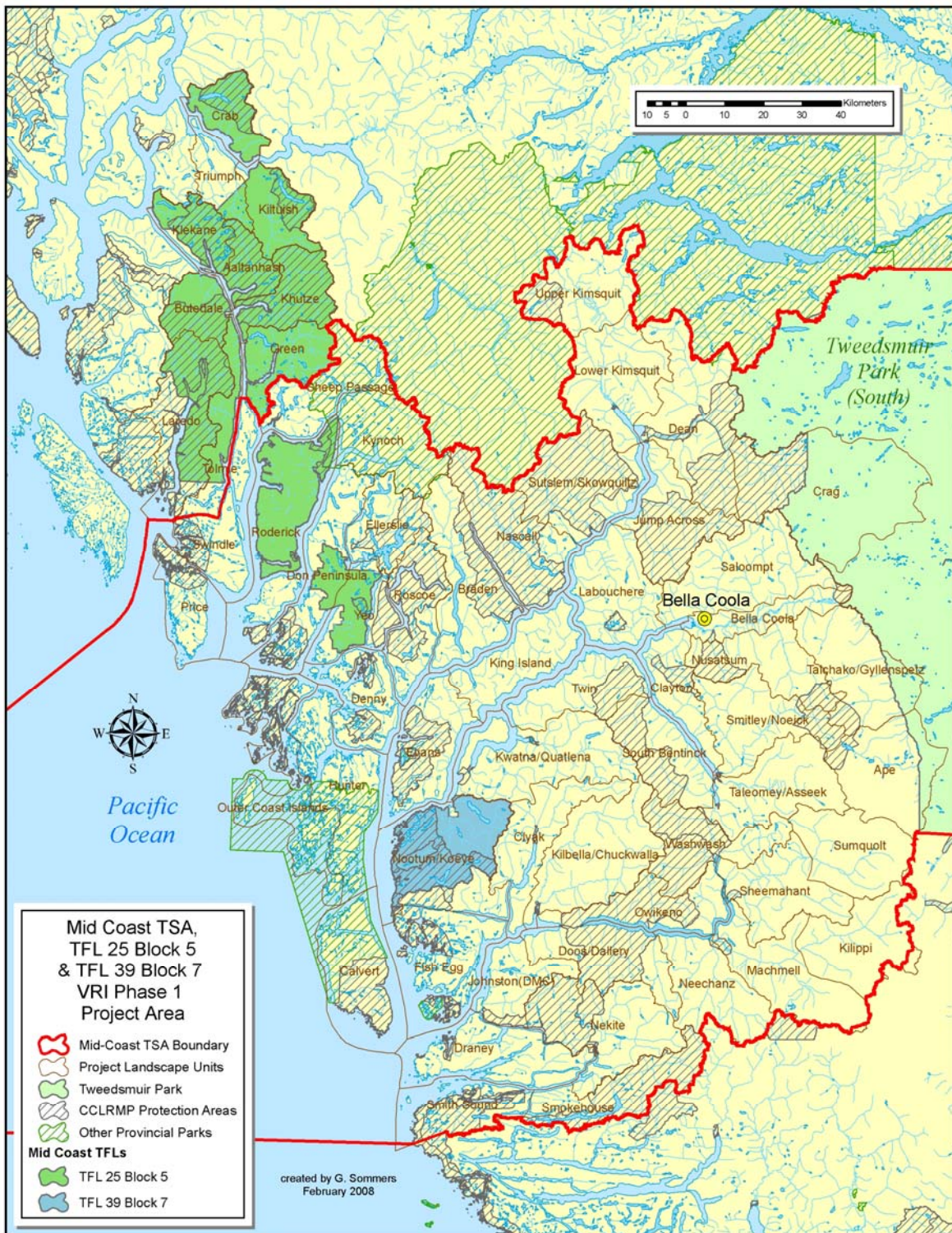


Figure 2. Overview of Mid Coast TSA Area.

The Mid Coast TSA covers approximately 2.2 million hectares located on the central coast of BC. The TSA is within the Coast Forest Region and North Island – Central Coast Forest District and is administered from Port McNeill.

The TSA extends from Cape Caution in the south to Sheep Passage in the north. It is bordered by the Kingcome TSA to the south, Tweedsmuir Park to the east, and Fiordland Recreation Area, Kitlope Heritage Conservancy Protected Area and TFL 25 to the north. The terrain is variable and rugged. The outer coast consists primarily of numerous low-lying islands with relatively low forest productivity. Further inland, the terrain is very mountainous with very productive forests in the valley bottoms and along the many steep sided inlets. Also evident are a large proportion of non-forest areas (alpine and subalpine) and ice fields at higher elevations.

The TSA area is dominated by hemlock/balsam (~47%) and western redcedar (~44%), with lesser proportions of Sitka spruce (~1%) and Douglas-fir (~3%) (Figure 3).

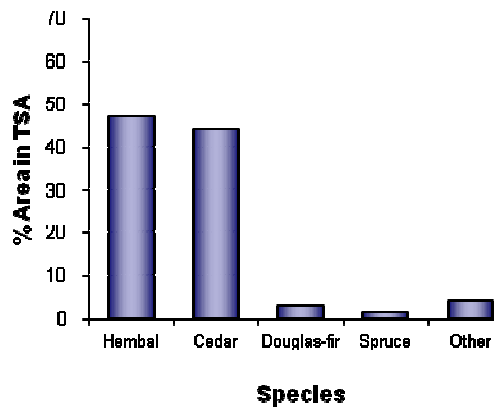


Figure 3. Species distribution for the entire Mid Coast TSA.

The majority of the forested TSA area (~90%) is occupied by mature species (age 141+) (Figure 4).

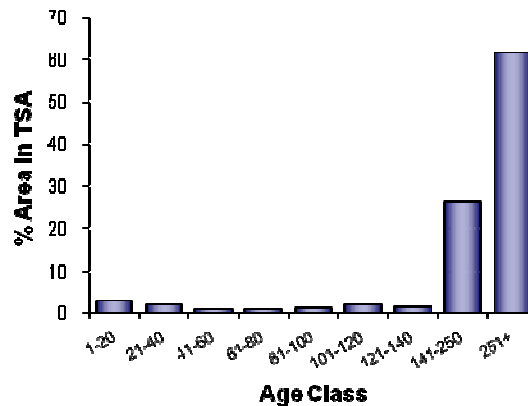


Figure 4. Age distribution for the entire Mid Coast TSA.

The AAC for the Mid Coast TSA is 768,000 m<sup>3</sup>/year (January 2006), which includes approximately 80% conventional and 20% low site.<sup>4</sup> Approximately 37% of the TSA is considered productive forest area (~817,000 hectares) and approximately 9% (~190,000 ha) is available for harvesting.<sup>5</sup> A summary of the TSA land base is provided in Table 1.<sup>6</sup>

Table 1. Land base net down by forest cover.

Area description	TSA area (ha)	% TSA Area
<b>No Typing Available</b>	141	0
<b>Non-Forest Land</b>	1,095,597	50
<b>Non-Productive</b>	301,997	14
<b>Productive</b>		
Immature	100,336	5
Mature	704,613	32
Not Stocked	12,417	1
<b>Productive Sub-total</b>	<b>817,366</b>	<b>37</b>
<b>Total TSA area</b>	<b>2,211,930</b>	<b>100</b>

TFL 39 block 7 lands entirely within the boundary of the TSA and occupies approximately 56,300 ha (Table 2).

Table 2. TFL 39 Block 7 area.<sup>7</sup>

Area description	Total TFL area	Non-Forest Land	Non-Productive	Productive
<b>Block 7</b>	<b>56,336</b>	6,162	20,280	29,723

TFL 25 Block 5 occupies approximately 312,000 ha and straddles both the Mid Coast TSA (~54,000 ha) and the North Coast TSA (~258,000 ha) (Table 3).

Table 3. TFL 25 Block 5 area.<sup>8</sup>

Area description	TSA area (ha)	% Total Land base
<b>Total TFL area</b>	<b>311,707</b>	<b>100</b>

The total area of the TSA including the two portions of the TFLs is approximately 2.32 million hectares.

<sup>4</sup> MFR – Apportionment System TSA AAC, Apportionment and Commitments, July 2007. <http://www.for.gov.bc.ca/HTH/apportionment/Documents/APTR011%2019.PDF>

<sup>5</sup> Mid Coast Timber Supply Area Analysis Report, BC Ministry of Forests, June 1999.

<sup>6</sup> Forest Inventory Reporting Provincial Summary 1998. <http://www.for.gov.bc.ca/hts/inventory/reports.html>

<sup>7</sup> Areas obtained from TFL 39 MP8 <http://www.for.gov.bc.ca/dmswww/tfl/TFL-39/Management-Plans/Mp8/>

<sup>8</sup> Area provided by Pat Bryant, Western Forest Products.



## 2.0 PHOTO INTERPRETATION PLAN

### 2.1 TARGET AREA

Using the Central Coast VSIP for guidance the following management units lack an inventory to VRI standards and will form the target area of this plan:

- Mid Coast TSA
- TFL 25 Block 5
- TFL 39 Blocks 7

#### Exceptions

- The inventory will exclude large tracts of private land.
- For regions of TFL 25 Block 5 within the North Coast TSA boundary only the TFL area will be inventoried. TSA and park areas sharing landscape unit area with TFL 25 Block 5 in the North Coast TSA will not be inventoried. It is expected that they will be handled under a separate North Coast VSIP/Phase I VPIP process. Also proposed newly protected areas within the TFL 25 Block 5 boundary in the North Coast TSA region will need to be evaluated against FIA funding rules for project inclusion.

### 2.2 INVENTORY DOCUMENTATION AND ARCHIVE

The current status of forest inventory, either VRI or otherwise, for each management unit is summarized in Table 4 below.

Table 4. Inventory status of management units within CCLRMP area

Management Unit	Inventory type	Comments
Mid Coast TSA	FIP	
TFL 25 Block 5–NICC portion (WFP)	WFP standard	Completed 1985
TFL 39 Block 7 (WFP)	MB standard	Dates from 1964 and 1981

Note: FIP refers to the MOF standard in place prior to introduction of VRI

#### *Mid Coast TSA*

The Mid Coast TSA was last re-inventoried between 1988 and 1990 using 1977-79 photography. The reference year for some data, particularly from the outer coast areas, is from an earlier era, in some cases as far back as the 1950s unit surveys. It is likely that this inventory is partially comprised of data carried over from the previous inventory completed in the mid-1970s. The inventory file has been continually updated to December 1998 for most disturbances and silviculture history with further depletion updates to 2004.

An inventory audit conducted in 1994 found that timber volumes in mature (older than 60 years) stands were overestimated by 6% overall and 11% in the operable land base. More relevant was the finding that attribute (classification) bias resulted in volume overestimates for the overall and operable land base of 20% and 21%, respectively. This attribute overestimate was partially offset by an opposite bias in the yield prediction model.

Other audit findings were that: i) on average, leading species was correct 63% of the time in mature stands and 50% in immature stands; ii) site index for immature stands was generally inaccurate., i.e. within +/- 5 metres less than 40% of the time. These results reflect overall averages for the



TSA land base, but the experience of those using the inventory has been that on a sub-unit or polygon level the attributes are quite unreliable. For those map sheets that still carry very old data typing is very broad and does not reflect the variability that exists on the ground.

#### ***TFL 25 Block 5 (WFP)***

Existing inventory completed in 1985 using a combination of 1960 and 1978-1980 photos. The work was done generally following MOF standards of the day. No MOF inventory audit was conducted on this unit.

#### ***TFL 39 Block 7 (BCTS)***

Inventories for these blocks date back to 1964 with areas considered inoperable or inaccessible at that time subsequently photo-classified in 1981 by the original licensee, MacMillan Bloedel MB). No inventory audits were done by MOF on any of these three blocks, however, MB did undertake “self-audits” during the late 1990s using a non-standard approach which compared volumes on a part of the inventory (no sampling of immature stands) but did not provide any statistical measures of attribute accuracy.

#### ***Status of New Photography***

Colour 1:20,000 aerial photographs were flown in 2006 and 2007 providing complete photo coverage of the target area. Next in the process these photos were digitally scanned and aerially triangulated (AT). Softcopy digital models were subsequently created to facilitate the digital capture of vegetation information. Photo-interpretation and polygon delineation will be completed utilizing Softcopy technology. Orthophotos are also produced from the scanned photos and will be available for planning purposes prior to inventory field work. Appendix I includes a map and a complete list of BCGS mapsheets flown for the Mid Coast TSA.

## **2.3 POLYGON DELINEATION**

### ***2.3.1 VRI Polygon Delineation***

Provincially Certified Photo Interpreters will complete new VRI Phase I polygon delineation (which will be based on the BC Land Cover Classification Scheme) according to the most current MFR VRI standards. Licensees (most likely accessing the RESULTS databases) will provide a list of free growing polygons and these areas will be re-delineated with the free growing information utilized as reference material for polygon descriptions.

All new roads and landings will be digitized and kept on a separate layer and provided to BMGS for updating the TRIM base.

The MFR Update Section will be contacted to ensure compliance with existing protocols related to silviculture openings. As a general guideline, photo interpreters will:

- Retain existing opening numbers and provide VRI attributes for the largest polygon of the silviculture opening (based on VRI source files). If opening numbers are not in the VRI source files, obtain the opening numbers from the RESULTS spatial file. The MFR VRI Update Section will provide access to the RESULTS data as required.
- Add new openings that are not in the VRI source files. Obtain the opening number from RESULTS and provide full VRI attributes. Additional internal polygon delineation and attribute estimation is not required.

- Require internal stratification of openings where an opening has been declared to be Free-to-Grow in RESULTS. Each polygon requires complete attributes plus the designation “FTG” in the VegCap polygon record project field.
- Re-interpret any polygon from the VRI source files that has “FTG” in the project field to VRI standards and retain the “FTG” designation.
- Interpret VRI stands slightly beyond the outside project boundary (200 – 400 meters) in outer areas that do not have current VRI standard inventories in the adjacent area. This allows for possible fluctuations in boundary positioning. If a VRI standard inventory does exist adjacent to the project boundary then the area should be interpreted up to, but not beyond, the adjacent VRI project boundary.

All delineation will be quality control checked and audited to ensure adherence to project objectives and MFR Standards.

## **2.4 CALIBRATION PROGRAM**

### **2.4.1 Calibration Data Sources**

Calibration data sources are field data reference points established across the land base, such as ground calls, air calls, ground observations, ground samples, cruise plots, and any other historical information that might be useful for determining polygon attributes. Field data measurements or estimates at these points are used to assist in the delineation and interpretation of forest vegetation and terrain types. The previous or historical data sources will also be reviewed and those air and ground calls/observations that are still valid will be transferred to the new photos and utilized in new stand delineation.

Photo-interpreters will meet with the Mid Coast stakeholders and MFR before the project begins to get access to supporting data sets, incorporate local knowledge, and help familiarize photo-interpreters with issues specific to the Mid Coast TSA.

### **2.4.2 VRI Field Calibration Sampling Plan**

Following a VRI Gap Analysis (or data source analysis) to identify stand types to be targeted, the VRI field calibration program will be completed. A VRI Field Calibration Sampling Plan with maps of potential distribution of the calibration points will be submitted to the MFR for comment and approval. This will document the types of stands, based on forest management issues and available data sources, which are to be visited during the field program. This plan will take into consideration areas of high variability and the appropriate number of calibration points needed in these areas. It is expected that outer coast redcedar and inner coast marginal hemlock/balsam stands, as identified in the *Mid Coast TSA Rationale for Allowable Annual Cut (June 1, 2000)* as a management concern, will be noted in the VRI Gap Analysis and factored into this sampling plan. The likely allocation of ground calibration points, air calibration points, ground observations and air observations is presented in Table 5. VRI ground calibration locations in parks and protected areas will be established at a lower intensity than in other parts of the project area.

Table 5. Likely distribution of ground and air calibration points and observations.

Type of VRI Calibration Point	Number Required per Mapsheet Equivalent (MSE)
One-plot Ground Calibration Points	10
Air Calibration Point	20
Ground Observation (without measurements)	10
Air Observations	20

### 2.4.3 Field Calibration Procedures

According to the MFR, the suggested minimum field calibration intensity is 10 ground calls, 10 air calls and 10 observations per full BCGS mapsheet equivalent.<sup>9</sup> Field calibration (air calls and ground calls) data collection is to be completed as per the Vegetation Resources Inventory Air Calibration (Air Call) Data Collection Procedures and the Vegetation Resources Inventory Ground Calibration (Ground Call) Data Collection Procedures. Field calibration data collection is to be documented and recorded in a format acceptable to the MFR. The actual number of calibration points could vary on a map by map basis and more points may be completed.

Document photos and supporting information are needed for the historical calibration points. The MFR will supply a digital file with locations, and air and ground call books, as well as the document photos.

VRI field calibration should occur in polygons lacking source information or where the source information is questionable and should include a variety of cover types including non-vegetated and non-treed.

The spatial coordinates (UTM) for all field plots will be recorded on the field cards. The plot locations will subsequently be loaded as a separate spatial coverage. A digital listing of field work data in a suitable format will be supplied to the MFR for all VRI field work.

## 2.5 POLYGON DESCRIPTIONS (ATTRIBUTE ESTIMATION)

### 2.5.1 VRI Descriptions

All VRI polygon descriptions will be completed to MFR VRI standards. VRI certified photo interpreters (or interpreters under the direct supervision of a certified interpreter) who complete the field calibration phase will complete the polygon description phases. Initial polygon delineation will be re-assessed during the final polygon description phase to ensure consistency and that VRI standards are achieved.

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<sup>9</sup> In a June 1, 2005 email from MFR, 'The number of calibration points, both ground calls and air calls, required to support VRI Photo Interpretation depends on the management unit in question. The current VRI Standards do not attempt to give precise estimates and neither did the earlier forest cover inventory manual, because any estimate comes from working through several considerations'.

The photos will assist in identification of mortality from forest insects, deciduous stands, and improve the description of Non Forested Polygons. There are five general categories of data that are produced during the attribute estimation of polygons:

1. **Ecology:** includes surface expression, modifying process, slope position, alpine designations, and soil nutrient regime;
2. **Land Classification – Land cover component:** includes treed (broadleaf, coniferous, mixed) and terrain identification if trees are absent including snow, water, rock, and soil moisture regime;
3. **Site Index:** includes species, source, and site index;
4. **Tree Attributes:** includes crown closure, tree layer, vertical complexity, species and age of leading and second species, basal area, density, and snag frequency; and
5. **Non-treed attributes:** includes shrub height and crown closure, herb type and percent cover, and bryoid percent cover.

The MFR VPIP guidelines state that if a softcopy project is to be undertaken, an indication of the absolute number or percentage of heights that will be digitally measured per map sheet should be presented. The number or percentage of digital heights taken on an individual map sheet will vary based on image quality, thus an indication of this number is difficult to predict with any certainty.

All VRI attribute files will be validated and delivered in a format consistent with MFR standards.

## 2.6 MAPPING DELIVERABLES

The following is a summary of deliverables that will be required for Phase I VRI.

### 2.6.1 VRI Mapping Digital Deliverables

All VRI mapping will be completed to MFR mapping standards. The graphics file will be checked for file structure integrity to ensure it is free of errors and missing pointers. Parameters entered in each layer or theme will be checked to confirm that the data meets MFR standards. A log report will indicate the type of errors found on each level. The deliverables for this project include:

1. Completed VRI digital graphic files in digital standard format and digitized to TRIM digitizing standards.
2. In order to produce the Vegetation Information File (VIF), the overlay themes must have closed shapes and unique nodes before information is combined to produce a resultant file.
3. The MFR is revising the format for submission and storage of spatial and attribute data for the VRI program. All final products relevant to the work completed in a fiscal work will be delivered to the MFR at the end of that year.

## 3.0 PROJECT IMPLEMENTATION PLAN

### 3.1 SCHEDULING

This project is scheduled for implementation in the 2007/08, 2008/09, and 2009/2010 fiscal years. The timing and completion of this project is dependent upon the Mid Coast TSA stakeholders available FIA funding. Activities will include:

- Analysis of existing data sources;
- Polygon delineation (using Softcopy)
- Sample plan design;
- Field data collection;
- Polygon descriptions (using Softcopy);
- Final digital mapping; and
- Final deliverables.

Table 6. Mid Coast TSA summary of estimated delivery schedule by phase.

Fiscal Year	Photos flown	Viewer Set Preps.	Polygon Delineation	Sample Design	Field Data Collection	Polygon Descriptions	Final Digital Mapping and Deliverables	Quality Control
06/07	Fall 2006							
07/08	Spring 2007	Fall 2007	Spring 2008					Ongoing
08/09			Spring – Summer – Fall 2008/ 2009	Spring 2008	Summer – Fall 2008	Fall – Winter 2008/2009	Spring 2009	Ongoing
09/10			Spring – Summer – Fall 2009/ 2010	Spring 2009	Summer – Fall 2009	Fall – Winter 2009/2010	Spring 2010	Ongoing
10/11			Spring – Summer – Fall 2010/ 2011	Spring 2010	Summer – Fall 2010	Fall – Winter 2010/2011	Spring 2011	Ongoing
11/12			Spring – Summer – Fall 2011/ 2012	Spring 2011	Summer – Fall 2011	Fall – Winter 2011/2012	Spring 2012	Ongoing

### 3.2 PROJECT COORDINATOR

The project coordinator will:

- Coordinate the project;
- Monitor and communicate project progress; and
- Liaise with the project manager to ensure all expectations are met.

### 3.3 PERSONNEL

All VRI photo interpretation work will be completed or directly supervised by a VRI Certified Photo Interpreter. At least half of the photo interpreters working on the project will be certified for

VRI photo interpretation and those photo interpreters not certified will be directly supervised by a Certified Photo Interpreter working on this project.

### 3.4 QUALITY ASSURANCE

Quality assurance for the Mid Coast Phase I program will follow (at a minimum) the MFR standards stated in the VRI Photo Interpretation and Quality Assurance Standards – April 2006. The Mid Coast TSA VRI committee will hold a pre-project meeting with the photo interpretation contractor, quality assurance contractor, and MFR representatives (both North Island - Central Coast Forest District and Forest Analysis and Inventory Branch staff) to discuss the project goals, objectives, methods, timing of activities and deliverables, and roles and responsibilities. An independent third-party auditor, MFR staff, or both will provide quality assurance services concurrently throughout the program for polygon delineation, polygon attribute estimation and field data collection. If a third part auditor is chosen to provide QA the selecting process will be by a tendered Request for Proposal. QA results will be forwarded to the MFR Regional representative during or after completion of each phase of the project. The program will be completed to VRI Phase I standards and will be audited to the VRI quality assurance standards and procedures for photo interpretation as outlined at:

[http://ilmbwww.gov.bc.ca/risc/pubs/teveg/vri\\_qa\\_photointerp\\_2k6/qa\\_photointerp\\_2k6.pdf](http://ilmbwww.gov.bc.ca/risc/pubs/teveg/vri_qa_photointerp_2k6/qa_photointerp_2k6.pdf)

### 3.5 DELIVERABLES

#### 3.5.1 VRI Deliverables

The following products will be delivered to MFR upon completion of the VRI for all areas including the TFLs:

- Complete and validated Microsoft Access™ format digital attribute descriptions linked to the vegetation inventory base maps;
- VegCap validation reports;
- Complete VRI data files to the most current MFR format;
- MFR validation reports for each mapsheet;
- Hardcopy tally sheets or digital equivalent for each ground and air calibration point;
- Field Calibration Sampling Plan;
- Digital field summary for all calibration points;
- All Softcopy system files including digital SIS (or SJS) image files, MOD files and SDT surface files on removable IDE hard drives;
- Quality assurance documentation for each phase of the VRI project; and
- A final project report.

All project deliverables will be signed off by a qualified Registered Professional Forester. Note that deliverables will be delivered at the end of each fiscal year reflecting the activities of the fiscal year. The proposed approach will be to complete the delineation, calibration, and attribute estimation in phases for complete 1:20,000 BCGS mapsheets per fiscal year in as many mapsheets as yearly budgets will allow. Year-end deliverables will be consistent with this approach.

### 3.6 REFERENCE MATERIAL

The following material is readily available for the project<sup>10</sup>:

- VRI BC Land Cover Classification Scheme (current version);
- VRI Photo Interpretation Procedures (current version);
- VRI Quality Assurance Procedures for Photo Interpretation (current version);
- VRI Photo Interpretation Standards (current version);
- VRI Air Calibration Data Collection Procedures and Standards (current version);
- VRI Ground Calibration Data Collection Procedures and Standards (current version);
- MFR Vector Cleaning Specifications (current version);
- BC MFR Inventory Manual;
- BC MFR Biodiversity Guidebook;
- BC MFR Color Stereogram Handbook;
- BC MFR Black and White Stereogram Handbook;
- Several tree and plant identification field guides; and
- Forest District Silviculture Opening History records.
- RESULTS data.<sup>11</sup>

### 3.7 COST

The VRI will be completed on the total Mid Coast TSA land base including TFL 39 Block 7 and TFL 25 Block 5 that falls both inside and outside the TSA boundary (Table 7).

Table 7. Estimated costs for the Mid Coast VRI program.

VRI Activity	VRI Unit		Total Cost (\$)
	Units	Cost (\$/ha)	
MFR VRI Phase I Program	2,579,973 ha <sup>12</sup>	@ \$1.50/ha	\$3,869,0959.50

Cost estimates are based on the following:

Phase I	Air calibration	\$100-\$150/air call
	Ground calibration	\$250-\$300/ground call

Neither the VRI nor the previous re-inventory standards (manuals) specify how many calibration points are required in a Management Unit to support photo interpretation. Each case is unique and depends on:

- the amount and composition of productive forest;

<sup>10</sup> The material listed is readily available; however gap and/or data source analysis will determine the availability and relevance of other reference material.

<sup>11</sup> Special considerations will be made for polygons with existing silviculture records as outlined in the VRI Guidelines for preparing a Project Implementation Plan for Photo Interpretation – June 2007.

<sup>12</sup> The total area may be adjusted downward depending on Forest Investment Account funding eligibility for parks and protected areas.

- amount of existing, usable calibration data;
- distribution of existing calibration data;
- knowledge and skill of the interpreter(s) and their familiarity with the area; and
- other considerations, including available budget.

The MFR has set "benchmarks" for the number of air calls and ground observations with measurements (these replaced the earlier ground calls) that would be established. These were not a standard, but more a "best practice" to ensure that the interpreters had adequate data to be confident in their attribute estimates. Note, also, that this "benchmark" specified that the air and ground calls were done by the individual interpreters in the areas they were assigned, to calibrate themselves.



**Approval/Sign-off of Phase I VPIP**

I have read and concur that the Mid Coast TSA VRI Strategic Inventory Plan dated April 2008 meets current VRI standards. It is understood that this is an agreement-in-principle and does not commit the signatories to completing the inventory activities outlined within the plan.

\_\_\_\_\_  
*International Forest Products Ltd.*  
*(lead proponent Mid Coast TSA)*

\_\_\_\_\_  
*Date*

\_\_\_\_\_  
*Western Forest Products Ltd.*  
*(lead proponent TFL 25 Block 5)*

\_\_\_\_\_  
*Date*

\_\_\_\_\_  
*British Columbia Timber Sales*  
*(lead proponent TFL 39 Block 7)*

\_\_\_\_\_  
*Date*

\_\_\_\_\_  
*Jon Vivian, RPF*  
*Manager Vegetation Resources Inventory*  
*Forest Analysis and Inventory Branch*  
*Ministry of Forests and Range*

\_\_\_\_\_  
*Date*

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## APPENDIX I – PROJECT AREA MAPSHEET NUMBERS



List of Potential BCGS Maps in Mid Coast VRI Phase 1 Project									
92M		92N	93C	93D		93E	102P	103A	103H
92M012	92M070	92N051	93C001	93D001	93D047	93E001	102P050	103A008	103H006
92M013	92M071	92N061	93C011	93D002	93D048	93E003	102P060	103A009	103H007
92M014	92M072	92N071	93C021	93D003	93D049	93E004	102P070	103A010	103H008
92M021	92M073	92N081		93D004	93D050	93E005	102P079	103A018	103H009
92M022	92M074	92N091		93D005	93D051	93E006	102P080	103A019	103H010
92M023	92M075			93D006	93D052	93E007	102P088	103A020	103H016
92M024	92M076			93D007	93D053	93E013	102P089	103A027	103H017
92M025	92M077			93D008	93D054	93E014	102P090	103A028	103H018
92M026	92M078			93D009	93D055	93E015	102P098	103A029	103H019
92M027	92M079			93D010	93D056	93E016	102P099	103A030	103H020
92M031	92M080			93D011	93D057	93E024	102P100	103A037	103H026
92M032	92M081			93D012	93D058	93E025		103A038	103H027
92M033	92M082			93D013	93D059	93E026		103A039	103H028
92M034	92M083			93D014	93D061	93E035		103A040	103H029
92M035	92M084			93D015	93D062			103A046	103H036
92M036	92M085			93D016	93D063			103A047	103H037
92M037	92M086			93D017	93D064			103A048	103H038
92M041	92M087			93D018	93D065			103A049	103H039
92M042	92M088			93D019	93D066			103A050	103H047
92M043	92M089			93D020	93D067			103A056	103H048
92M044	92M090			93D021	93D068			103A057	103H049
92M045	92M091			93D022	93D069			103A058	103H057
92M046	92M092			93D023	93D071			103A059	103H058
92M047	92M093			93D024	93D072			103A060	103H067
92M048	92M094			93D025	93D073			103A067	103H068
92M049	92M095			93D026	93D074			103A068	
92M050	92M096			93D027	93D075			103A069	
92M051	92M097			93D028	93D076			103A070	
92M052	92M098			93D029	93D077			103A077	
92M053	92M099			93D030	93D078			103A078	
92M054	92M100			93D031	93D079			103A079	
92M055				93D032	93D081			103A080	
92M056				93D033	93D082			103A087	
92M057				93D034	93D084			103A088	
92M058				93D035	93D085			103A089	
92M059				93D036	93D086			103A090	
92M060				93D037	93D087			103A096	
92M061				93D038	93D088			103A097	
92M062				93D039	93D089			103A098	
92M063				93D040	93D091			103A099	
92M064				93D041	93D094			103A100	
92M065				93D042	93D095				
92M066				93D043	93D096				
92M067				93D044	93D097				
92M068				93D045	93D098				
92M069				93D046					

Total Number of BCGS Maps: 267
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