
Vegetation Resources Inventory

Fraser TSA - VRI Photo Interpretation Project Implementation Plan

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Section 1 Introduction and Background Information

Introduction

The Ministry of Forests, Lands, Natural Resource Operations and Rural Development (“Ministry”) has developed a planning process to ensure the successful implementation of Vegetation Resources Inventory (“VRI”) photo interpretation projects. The VRI Project Implementation Plan (“VPIP”) is a working document detailing the specific operational activities associated with implementing and documenting an inventory project. It identifies the target areas for new photo interpretation, data sources, format of base files, project scheduling, deliverable expectations, etc. VRI photo interpreted inventories are produced by Ministry certified photo interpreters and approved by the Ministry to ensure that projects are completed to current standards, are congruent with the Forest Analysis and Inventory Branch (“FAIB”) business plans, and to ensure the project meets the needs of all the consulted parties.

Background

The Ministry has identified a need to complete a new VRI in the Fraser Timber Supply Area (“TSA”). A new VRI provides a strategic level planning inventory at the management unit level designed to answer two basic questions: where the resource is and how much is there.

The VRI is a formalized summary of knowledge about the overall condition of the forest land base and is typically depicted as a continuous series of British Columbia Geographic System (BCGS) 1:20,000 scale map sheets that indicate forest cover using a number of descriptors. The VRI information is used for a wide spectrum of forest management purposes including assessment of forest biodiversity and old growth, wildlife habitat modelling, watershed modelling, timber supply reviews and many other applications to ensure that forest resource are managed in a sustainable manner.

The Fraser TSA is located in the southern portion of British Columbia’s South Coast Natural Resource Region and is administrated from the Chilliwack Natural Resource District Office. It is the most densely populated TSA in the province, encompassing major population centres in the Lower Mainland and Fraser Valley. The Fraser TSA is bordered by the Soo TSA and Lillooet TSA to the north and the Merritt TSA to the east. The southern edge of the TSA follows the Canada-USA border, while the western edge meets the Strait of Georgia. Figure 1 below illustrates the Fraser TSA

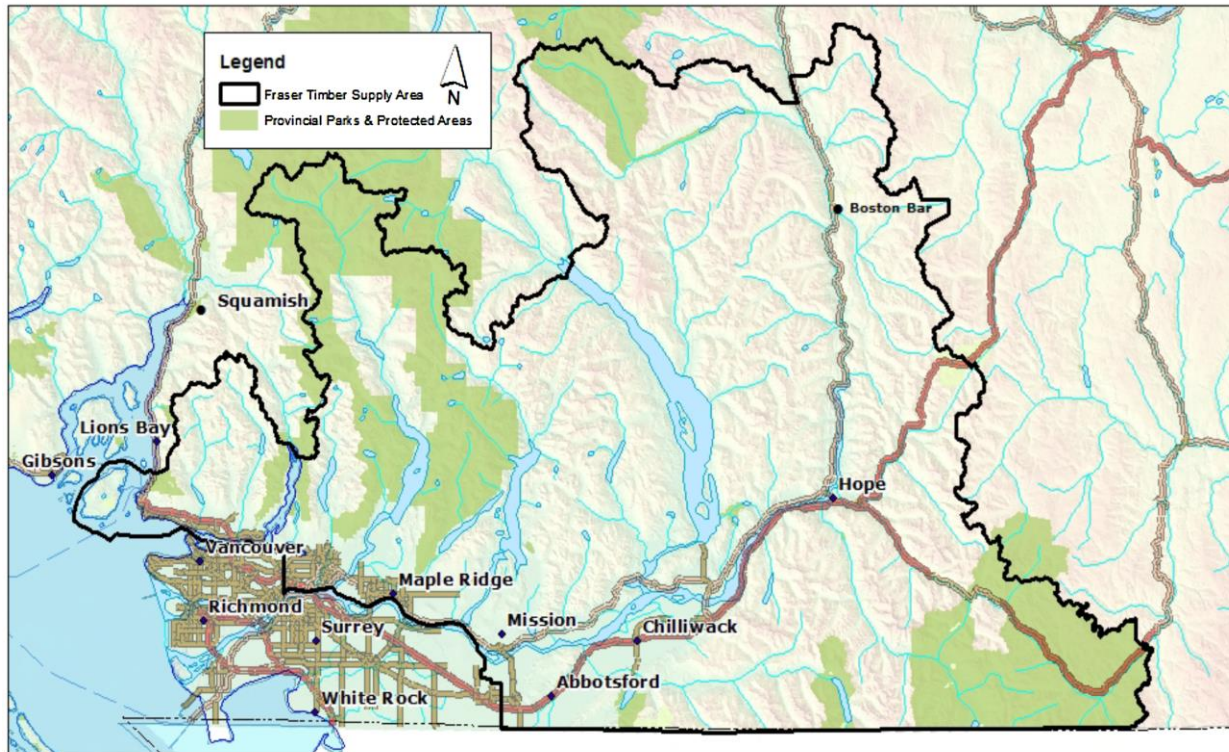


Figure 1. Fraser Timber Supply Area Boundary

Section 2- Photo Interpretation Plan

Project Objectives

The FAIB has developed a 10-year provincial inventory action plan to update older inventories to the current VRI standards, provide a full coverage of inventory across the province to eliminate any data gaps, and update the currency of the inventory.

The overriding objective of this re-inventory project is to produce a new photo interpreted inventory to account for the accumulated change in the Fraser TSA since it's last re-inventory. The changes are attributable to annual harvesting and planting, insect and disease mortality, salvage harvesting, wildfires, and realized differences between modelled growth since the last re-inventory and actual growth on the land base.

The new inventory will provide much needed current information on the spatial distribution of live and dead stands, update species compositions to reflect insect and disease mortality and harvesting, and provide an estimate of dead standing volume in the project area

The Fraser TSA inventory was originally part of the Vegetation Resource Inventory pilot project. The inventory was completed in four sections during 1995/1996 by multiple certified inventory contracting companies. Vancouver, Surrey and Langley were not included in the 1996 inventory; they were last inventoried in 1970. The Tree Farm Licence ("TFL") 26 and parcels in the northern section of Garibaldi

Provincial Park were not included in the 1996 inventory. The majority of Garibaldi Provincial Park was included in the 1996 inventory and is incomplete due to lack of aerial imagery coverage.

The 2015 Fraser Timber Supply Review (“TSR”) indicated that the current inventory has overestimated the volume of Hemlock and Balsam leading stands and had concerns with the volumes of second growth silviculture blocks. The current inventory also lacks stand disturbance updates for beetle infestations and wildfire losses.

The Chilliwack Natural Resource District has identified the following:

- Accuracy of vegetation cover descriptions for habitat modelling (i.e. avalanche chutes for grizzly bears and tree species for avian nesting)
- Sensitivity of harvest levels in the TSA in relation to harvest performance in old growth hemlock and balsam stands
- Concern with the volumes of second growth silviculture blocks
- Updated species composition to reflect beetle infestations and wildfire losses
- Estimations of dead standing volumes within the project area
- Classification of previously uninventoried areas within the TSA

Inventory Project or Target Area

The new Fraser VRI project Boundary will not match the Fraser TSA boundary as recent VRI data from the surrounding TSA’s have been excluded, and the project will not include the extensive lower mainland urban and agricultural areas. The Fraser TSA covers 1,423, 038 ha, while the Fraser VRI project will cover approximately 1,346,156 ha or 83.5 Full British Columbia Geographic System (“BCGS”) Map sheet Equivalents (“FME”) based on 16,112 ha per FME.

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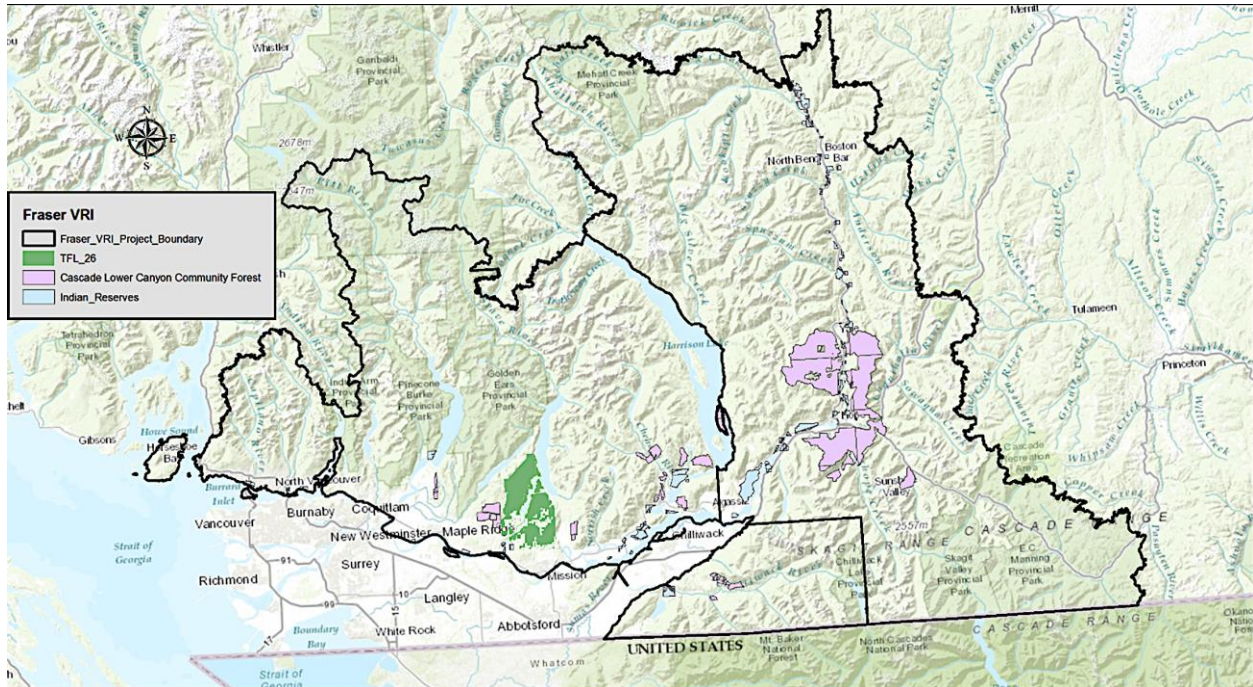


Figure 2- Fraser VRI Project Boundary

The Fraser VRI project surrounds the largest municipalities in the province of British Columbia. Such a large population influences the surrounding landscape with large areas identified as private lands, protected watersheds, community forests, agricultural lands, federal military reserves, Indian reservations, provincial parks/recreation zones and protected wildlife and ecosystem areas. The Fraser VRI project will include these identified areas in the attribution portion of the project and may exclude them from any field calibration sampling.

Primary Land Use	Area (ha)
Private Land	80,016
TFL 26	10,935
Provincial and Municipal Parks	447,425
Community Forest	20,060
Indian Reserves/FN Woodlands/Mt. Woodside Spiritual Area	22,955
Community Watersheds	74,322
Watershed Reserve	28,665
Woodlots	7,465
Wildlife Management Area	3,970
Timber Licence	1,774
Other Land Use Area	649,066

Table 1- Land Classes and Ha within the Fraser VRI Project

Inventory Information Sources

New and other data sources provide critical reference information, such as base mapping information, or other data that needs to be integrated with the new VRI. New and other existing data sources may include the following:

- Reporting Silviculture Updates and Land Status Tracking System (“RESULTS”) data
- Base map information such as Fresh Water Atlas (“FWA”) water features, and Digital Roads Atlas road features
- Biogeoclimatic Zones (BEC) mapping
- Forest Health mapping
- Historical field measurement data collected during previous inventory projects and corresponding aerial photography (if available)
- The existing forest inventory for the project area
- Digital orthorectified photography
- Digital Aerial photography

Standards, Procedures and Final deliverable formats that will be followed for the photo interpretation projects are as described in FAIB’s Photo Interpretation Standards page:

<https://www2.gov.bc.ca/gov/content/industry/forestry/managing-our-forest-resources/forest-inventory/forest-cover-inventories/photo-interpretation/standards>

Section 3- Project Specifications:

Project Photography

Digital frame camera imagery of the project area was acquired to GeoBC photo standards and specifications in the summer of 2020. The following is the list of products supplied:

- 4-band 8bit RGBI digital frame imagery at 25cm ground sample distance (“GSD”);
- ISSD Z\I stereo project file in UTM NAD 83 projection;
- 50 cm colour orthophotos;
- Photo index shapefile with image names and locations; and
- Flight orientation is east-west and west-east.

Stages of Photo Interpretation

A typical VRI project is divided into three stages which occur in succession: polygon delineation, field calibration and attribute estimation. Quality assurance is a component of each stage that occurs concurrently.

A project pre-work meeting is mandatory. The purpose of this meeting is to bring together the Ministry Project Manager, VRI Phase 1 Contractor and Quality Assurance personnel prior to project start-up. This

meeting will ensure that an efficient communication network is established, identify individuals responsible for all aspects of the project, allow discussion of any issues before project work commences, and establish timelines for deliverables and data flow. Minor changes to the contract to complete the Phase 1 activities may be identified at this meeting. A project pre-work checklist, signed off by all parties attending, will be used to organize and guide the meeting.

1. Polygon Delineation:

Polygon delineation is based on the BC Land Cover Classification Scheme ("BCLCCS"). This classification scheme includes both vegetated and non-vegetated cover classes. Polygons identified by the land classification scheme are further divided into similar vegetated or non-vegetated polygons based on mensuration attributes (i.e. species, age, height and crown closure), and ecological attributes where appropriate.

Vegetated polygons meet a minimum 2ha or 5ha polygon size based on distinct or indistinct boundaries, respectively. Alpine designated polygons will have a minimum size of 5 ha. FAIB will supply RESULTS openings and FWA polygon features for incorporation into the VRI.

2. Field Calibration:

Field calibration points are established by the project's photo interpreters. Calibration points are a combination of low elevation helicopter passes over stands of interest (air calls), and field ground visitations (ground calls), requiring either a helicopter or truck access where forest mensuration attributes such as species, age, height and basal area are collected. The field calibration program allows the interpreters to gain some familiarity with the project area, and the data acts as reference points during the subsequent attribute estimation stage.

The field calibration program will establish a minimum of 10 ground calls and 20 air calls per 16,000 ha (approximately 1 FME). The ground calls will be a combination of 1-point and 3-point ground calls. The type of ground call established in each polygon is based on the species complexity as described in the *VRI Photo Interpretation Field Calibration Procedures*.

The Ministry and VRI Contractor will coordinate with both the Vancouver Regional District and BC Parks to establish standards around accessing their designated areas. A VRI Contractor is not permitted to establish field calibration plots in any areas where access has not been approved.

Prior to the initiation of a field calibration program, the VRI Contractor submits a field calibration plan to the Ministry for review and approval to ensure all identified issues are accommodated where possible. As part of the final project deliverables, the Ministry requires the delivery of a complete set of all new field calibration data sources in a digital format determined by the Ministry, including their geographical locations (e.g. UTM coordinates) and the complete set of field attribute data collected.

3. Attribution Estimation:

Delineated polygons are assigned descriptions that are either estimates of polygon characteristics or contain other information relating to the polygon. The attribute suite consists of general attributes that include information about the polygon and descriptions of ecological characteristics.

Attributes are polygon-based estimates. Each polygon is uniquely identified, and subsequent qualitative and quantitative measurements are made for all Vegetated and Non-Vegetated covers

observed in the polygon. Cover types within the polygon that are too small to delineate may be described as land cover components.

4. Quality Assurance:

Quality Assurance (“QA”) of all project stages is conducted by a party that is independent of the VRI Contractor performing the VRI photo interpretation and field calibration work. The QA auditor is present at the initial pre-work meeting held by the Ministry and VRI Contractor. QA must meet or exceed the *Vegetation Resource Inventory Photo Interpretation Quality Assurance Standards* on each stage of a VRI project.

Section 4- Project Scheduling:

The Fraser VRI project will likely be split into two separate contracts to complete the project. The **Fraser East** work will proceed from north to south and east to west with approximately 43.5 FMEs being completed in fiscal year 2022/2023. The new inventory will be available in 2024. This schedule may change to meet the Ministry’s needs.

Table 2. The proposed project schedule for the Fraser EAST Inventory project.

FISCAL YEAR	PRIME ACTIVITY
2021/2022	VPIP planning Contract Planning and Development Contract Award
2021/2022	Delineation
2022/2023	Field Calibration Attribution
2023/2024	Attribution Contract Evaluation

A detailed delivery schedule outlining progressive delivery of products will be set by the Ministry, in consultation with the VRI contractor, for each fiscal.

Roles and Responsibilities

Ministry Project Manager

The Ministry project manager’s responsibilities involve: project coordination; monitoring project progress; ensuring all contractors are qualified and certified; overseeing photo-interpretation activities;

ensuring quality assurance is complete and delivered at each stage, authorizing payment and assisting in coordinating technical support where required.

VRI Contractor

The VRI Contractor works with the Ministry Project Manager to ensure the planning, coordination and execution of project activities are consistent with the VPIP and contract requirements. The VRI Contractor will ensure that there are a minimum of 4 interpreters on the project to keep data consistency. There will be one VRI certified photo interpreter to every non-certified photo interpreter if the latter are required for the project.

VRI QA

Quality Assurance may be performed either through a 3rd party Quality Assurance contractor or Ministry personnel. Where a VRI QA contractor is utilized, the VRI QA Contractor coordinates with the VRI Contractor and the Ministry to ensure that QA reporting meets the VRI prescribed standards. The QA Contractor or Ministry Quality Assurance personnel is a VRI certified photo interpreter with a minimum of 10 years VRI experience and independent of the VRI contractor.