Vegetation Resources Inventory

Prince George Natural Resource District - Project Implementation Plan for Photo Interpretation

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July 12, 2016

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Section 1 – Introduction and Background Information

Document Objectives

This inventory planning document is a working document that states the critical reasons and objectives for carrying out a phase 1 VRI (photo-interpretation forest inventory) in the Prince George Natural Resource District together with details on the area to be inventoried and key steps during the implementation of this phase 1 inventory project.

This plan identifies the target project area for new photo interpretation within the boundaries of the Prince George Natural Resource District and includes all of TFL 30 and a relatively small portion of TFL 48 and where the adjoining areas overlap with square edge map blocks in adjacent units, primarily the Ft St. James, Vanderhoof and Dawson Creek TSAs. The areas bounded by provincial parks that are within the inventory project area are also included.

Background Information

In addition to provincial stakeholders such as the Chief Forester's Office, local stakeholders for this unit include:

- Prince George Natural Resource District and Omineca Region staff
- Ministry of Environment and other government agencies
- B.C. Timber Sales
- Local licensees including woodlot owners and community forests groups.

Major licensees include CanFor (TFL 30 and TFL 48). Additionally and crucially, there are several First Nations, including the Carrier and Sekani First Nations for engagement within the project area described in this plan. There are up to 15 other First Nations whose communities are outside the Prince George Natural Resource District but whose territories extend into the inventory project area (see Appendix B). Consultation is paramount during the development of this inventory plan and during subsequent phase 1 fieldwork planning and ongoing project activities. Consultation follows the protocol as described in http://www.for.gov.bc.ca/haa/Docs/MOF_Consultation_guidelines_final.pdf

The present inventory consists of a complex mix of varying currencies, standards and formats and is obviously now in need of a re-inventory (for details please see State of the Current Inventory below). A re-inventory of the Prince George Natural Resource District would provide up-to-date information on land cover types, and stand age, height, species composition, volume, and stocking together with a seamless spatial coverage of the entire project area. The re-inventory process starts by acquiring new imagery. The new digital air photos acquired during the 2015 and 2016 field season will provide full coverage of the Prince George Natural Resource District and adjoining area. This new imagery will be used for photo interpretation of the inventory in concert with air and ground calls for calibration purposes. Where available and if budgets permit, pre-existing or additional new LiDAR imagery may be acquired to augment the phase I inventory.

Overview of the VRI Process

The Vegetation Resources Inventory (VRI) provides a 'strategic' level inventory for planning at the management unit level (TSA or TFL) designed to answer two basic questions: where is the resource and how much is there. The VRI inventory standard consists of two phases that may be undertaken in combination or, in certain situations, individually. In phase I of the inventory, air photos are acquired, and polygons are delineated within an inventory unit in order to provide full 'wall-to-wall' coverage at the management unit level. Vegetation attributes of these polygons are estimated by photo interpreters. In phase II of the inventory, a subset of the polygons is randomly selected for ground sampling and Net Volume Adjustment Factor (NVAF) sampling. The purpose of phase II ground sampling is to verify our level of confidence in the phase 1 inventory and to provide supplementary

information on stand characteristics (such as tree size distribution) that are not captured in phase 1. Phase II sampling is carried out using documented statistical procedures and standards. More details regarding the VRI process and the VRI standards and procedures are available at the MFLNRO Forest Analysis and Inventory Branch (FAIB) website: http://www.for.gov.bc.ca/hts/vri/index.html

State of the Current Inventory

The inventory in the Prince George Natural Resource District consists of old 1990-99 vintage data primarily in the eastern portion of the unit and mostly 2000-2004 vintage inventory in the western portion, with an information gap in the central part of the unit (TFL 30). Significant disturbance has occurred in the western to central area, where substantial MPB kill and harvesting have occurred since 2004, and a large portion of the remaining live unharvested timber is situated in predominantly non-pine leading stands in the central to eastern portion where the inventory information is the oldest (see Figures 1 and 2). The MPB epidemic peaked between 2005 and 2008 and has since leveled off, with salvage harvesting following the profile of dead pine. A significant area of approximately 876,000 ha has been disturbed and updated information on the younger stands across this area needs to be brought into the re-inventory (refer to section on Integrating RESULTS Information and Figure 10).

Fig. 1 – Prince George Natural Resource District Inventory File Standard

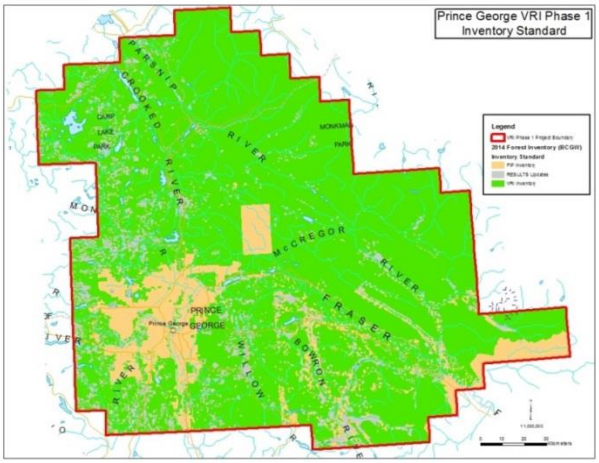
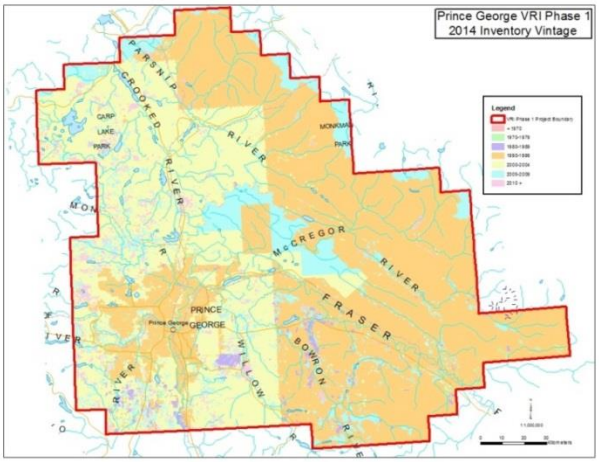


Fig. 2 – Prince George Natural Resource District Inventory Dates/Currency



In 2014, the largest inventory ground sampling project of recent years was completed in the Prince George TSA. Long-term monitoring plots were established on a 20-km grid over the full extent of the TSA. Sampling of the young stand population was intensified by establishing long-term monitoring plots on a 10 x 10-km grid over the TSA. Also, to increase sample size in a specific portion of the TSA, additional inventory ground samples were established.

An audit of the inventory has been completed for the mature (>50 years of age) timber component in 2015 based on the 2014 ground samples (*Prince George TSA Documentation of Vegetation Resources Inventory Analysis _ Volume Audit (Mature)*, September 17, 2015 at: https://www.for.gov.bc.ca/hts/vri/planning_reports/tsa_analysis/pgtsa_vri_analysis_volume_audit.PDF). The inventory audit analysis indicates the following with respect to confidence in the present inventory:

- The ages are significantly older in the inventory compared to the ground sample data;
- Heights are slightly overestimated in the inventory compared to the ground samples;
- Basal area is overestimated in the inventory primarily due to overestimation of BA in pine leading stands;
- Stand density (trees per hectare) is underestimated in the inventory;
- Volumes in balsam leading stands are underestimated while volumes in pine and spruce leading stands are overestimated in the inventory compared to the ground samples; and
- Leading species agreement as recorded in the inventory was relatively low compared to the ground samples, largely due to changes in species composition in MPB impacted pine stands.

The inventory audit results indicate the need for a re-inventory of the Prince George Natural Resource District particularly in the non-pine leading stands that form the bulk of the mid-term timber supply once MPB salvage harvesting has been completed. Spruce beetle has been recently attacking spruce stands in the northeast area of the unit so priority and scheduling of the inventory of spruce leading stands, or stands where spruce is a major component, will need to be factored in with the time and future spread of attack (see Figure 3).

As noted above, young stand monitoring (YSM) has been initiated with samples established in 2014 to monitor the performance of younger (15-50 years old) regenerated stands across the entire TSA (*Young Stand Monitoring in the Prince George TSA: Plot Establishment Report*, January 6, 2016 at: https://www.for.gov.bc.ca/hts/vri/monitoring/dowloads/young_stand_monitoring_in_PG_TSA_plot_Establishment_Jan2016.pdf). An initial YSM analysis indicates the following with respect to confidence in the present inventory:

- Volumes are significantly underestimated in the inventory compared to the ground sample data;
- Basal area is underestimated in the inventory compared to the YSM data;
- Heights are underestimated in the inventory;
- Density (trees per ha) is overestimated in the inventory compared to the ground; and
- A relatively large number of trees exhibited some incidence of damage, especially in pine, however the overall impact on growth and yield is not yet quantified pending ongoing monitoring.

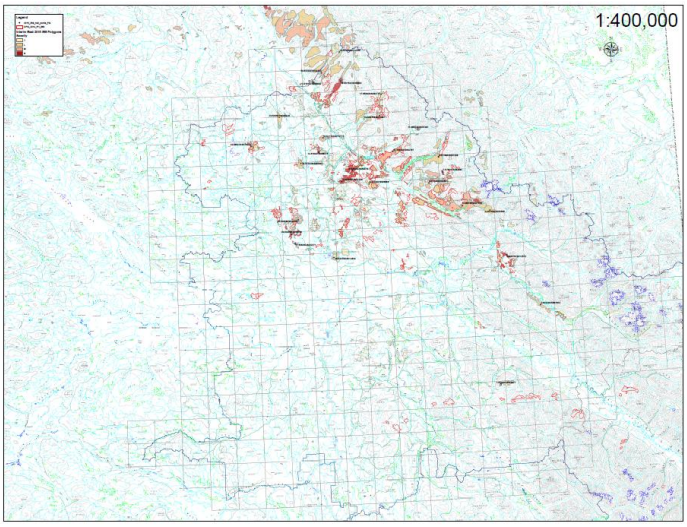
The YSM results indicate the need to complete a re-inventory of these younger stands for key inventory attributes such as leading species, stand density, ages and heights. The results from both the inventory audit and YSM analyses pertain to the entire Prince George TSA and not just the district, i.e. the inventory project area, so district specific trends should be treated with some caution.

A number of forest inventory data related concerns were raised in the Prince George TSA Rationale and reflected in the Chief Forester's Implementation Instructions January 11, 2011, summarized as follows:

- Ministry staff should monitor performance in non-pine leading stands and development of secondary stands
- Ministry staff should monitor the development of young, MPB affected stands to determine the stand development trajectory
- Ministry staff should monitor stand development of balsam leading stands to include volume estimates for these stands in the next TSR

Updated inventory information will assist the Ministry in carrying out these instructions. In addition, there is a recent and expanding spruce beetle outbreak across an estimated 156,000 ha in the northern and eastern areas of the District, and updated inventory information is required to reflect spruce beetle outbreak s in these areas (see Figure 3 below).

Fig. 3 Spruce Beetle outbreak in the Prince George Natural Resource District (2015)



Project Area Overview

The total area within Prince George Natural Resource District is 3.40 million hectares, which is 43 percent of the Prince George Timber Supply Area. Of this area, 2.19 million hectares are considered provincial Crown forest land and, assuming a continuation of recent practices; 1.38 million hectares may eventually be harvested. The City of Prince George is the largest community within the district and is situated at the junction of highways 16 and 97. Smaller communities include Hixon, Bear Lake, McLeod Lake, Willow River and Dome Creek. First Nations communities include the Lheidli T'enneh and McLeod Lake. Landscapes within the district are diverse and include rugged alpine terrain and sub-alpine forests in the Cariboo and Rocky Mountains, ancient cedar-hemlock rainforests in the Rocky Mountain Trench, spruce forests in wetter ecosystems east of Prince George and dry pine-dominated forests on the interior plateau. The predominant tree species in the district include interior spruce, lodgepole pine, sub-alpine fir and Douglas-fir. Deciduous species include aspen, cottonwood and birch. The recent mountain pine beetle epidemic has caused significant mortality in pine forests and timber harvesting has been directed to these stands.

The inventory project area for the Prince George Natural Resource District is approximately 2.92 million hectares (2,920,067), based on an average of about 14,528 ha per BCGS 1:20,000 mapsheet.

This area occupies all or part of 201 map sheets. In 2015 digital aerial imagery was acquired for about 185 full and partial mapsheets and the remaining 16 mapsheets in the north easternmost portion of the unit are being flown in 2016 for a total of 201full map sheet equivalents (FMEs) (see Figure 4 below). Note that the inventory project area is not the same as the Prince George Natural Resource District area because inventory projects are done to square edge mapsheet neatlines and the inventory projects being done in the adjacent units of Ft St James and Vanderhoof overlap with some of the western side of Prince George, providing full seamless inventory coverage (see Target Area under Section 2 for further details). Thus for planning purposes the following summaries are based on the total Prince George Natural Resource District inventory project area consisting of 201 square edge mapsheets, including inland lakes and rivers, and not the actual area defined by administrative boundaries (see Tables 1 and 2 below).

Fig. 4: Air Photo Acquisition in Prince George Natural Resource District

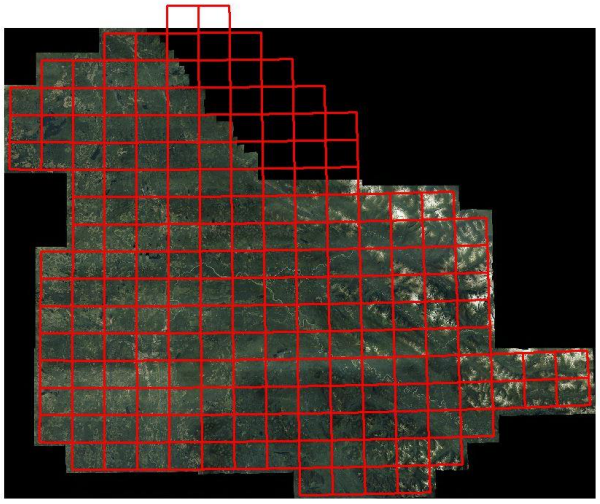


Table 1 Prince George Natural Resource District Project Area Land Base Summary

Land Classification*	**Area**
Total Project Area	2,920,067.23
Total Provincial Park Area	133,085.34
Total Protected Areas and Reserves	5,413.64
Total TFL Area (TFL30/TFL48)	184,003.01
Total Woodlot and Community Forest Area	91,242.09
Total Indian Reserves Area	19,115.34
TSA Summary	**Area**
Dawson Creek TSA (41)	52,752.65
Mackenzie TSA (16)	36,614.17
Prince George TSA (24)	2,780,556.29
Robson Valley TSA (17)	50,048.38
	2,919,971.49
TFL Summary	**Area**
TFL 30	180,346.72
TFL 48	3,656.29
	184,003.01

***Note: More detailed area breakdowns of TFLs, TSAs, Parks, Woodlots and Community Forests can be found in Appendix A.**

Table 2: Prince George Natural Resource District Project Area Ownership Class

Cadastre (Ownership Class)	Area
Total Crown Federal	17,897.97
Crown Municipal	2,320.40
Crown Provincial	415,958.64
Private	165,912.90
Unknown	10,375.36
Total Ownership	612,465.27

Of the total project area of approximately 2,920,000 ha some 666,242 ha is categorized as non-productive and/or non-forested (see Table 3 below).

Table 3 Prince George Natural Resource District Non-productive/Non-forest Summary

Non Productive/ Non Forest Summary	Area
Non Productive	115,128.86
Non Forested	19,999.69
BCLCS "VN"	531,113.45
Total Non-Productive/Non–Forested	**666,242.00**

The summary of area by leading species is provided in Table 4 below and is limited based on the fragmented nature of the Ministry's FIP and VRI format inventory coverage across the current project area.

Table 4 Prince George Natural Resource District Area by Leading Species Summary

Species	Area
Aspen/Cottonwood (AC, ACT,AT)	165,150.83
Balsam (B, BA, BG, BL)	678,589.94
Cedar (CW)	45,555.85
Alder (D, DR)	1.70
Birch (EP)	41,496.35
Fir (FD)	28,928.13
Hemlock (H, HM, HW)	29,469.63
Larch (LT)	224.95
Pine (PL, PLC, PW, PY)	360,262.71
Oak (Q)	20.99
Spruce (S, SB, SW, SE, SX)	1,005,934.90
Willow (W)	73.13
Total Area by Leading Species*	**2,355,709.10**

*Note – Total area by leading species is based on current available inventory data MFLNRO has and does not reflect actual area by leading species across the entire project area land base (refer to Figures 5, 6 and 7 below).

Fig. 5 Pine leading stands in the Prince George Natural Resource District

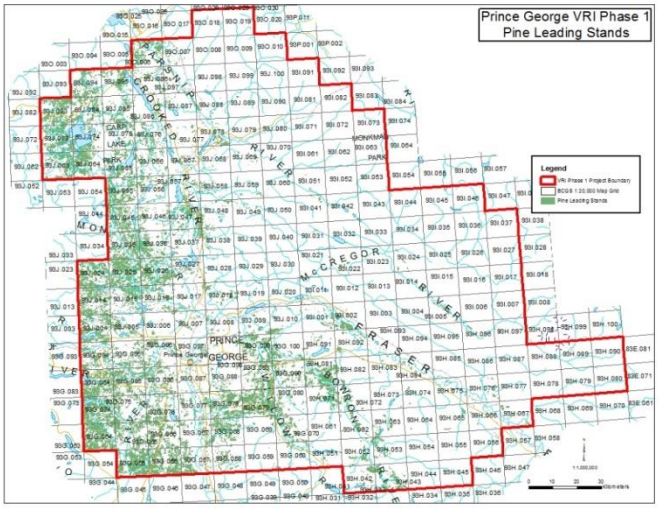


Fig. 6 Spruce leading stands in the Prince George Natural Resource District

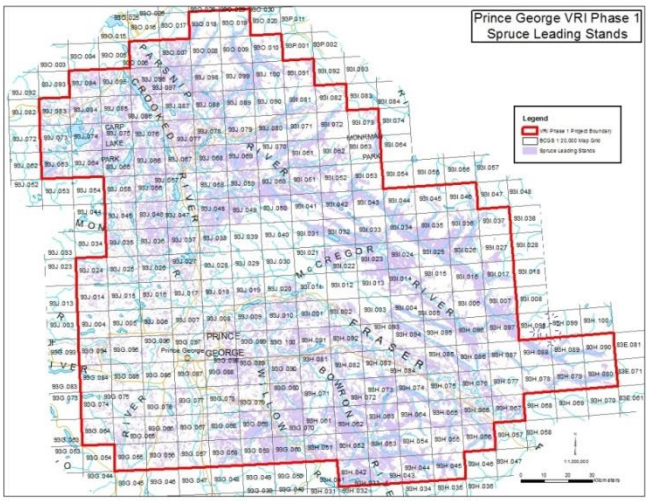
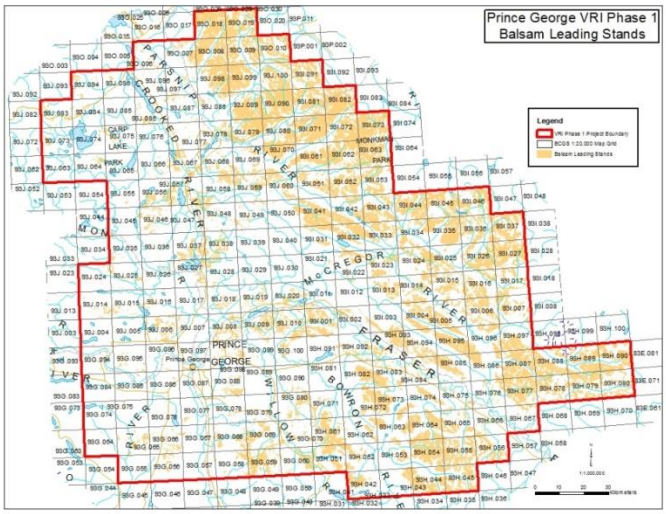


Fig. 7 Balsam leading stands in the Prince George Natural Resource District



The biogeoclimatic (BEC) summary is based on current information across the project area and is a complete coverage (see Figure 8 and Table 5 below). The Prince George Natural Resource District is predominated by the sub-boreal spruce (SBS), Englemann Spruce -- Subalpine Fir (ESSF), and Interior Cedar -- Hemlock (ICH) BEC Zones.

Fig. 8 Prince George Natural Resource District Project Area BEC

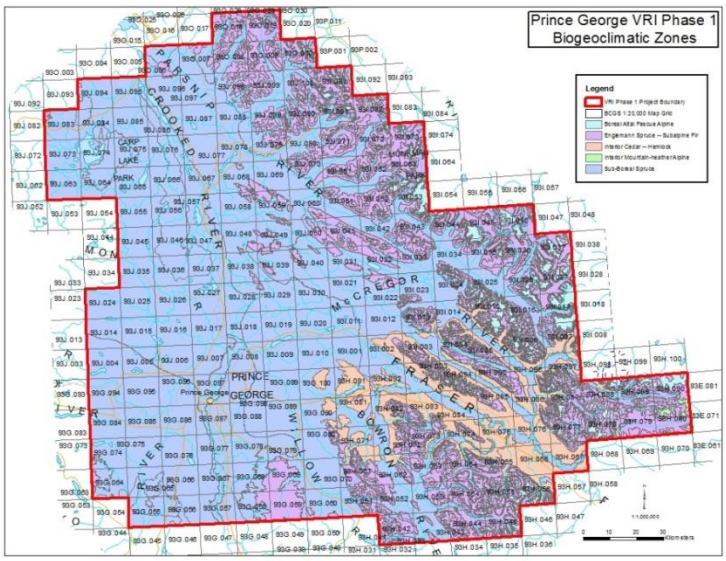


Table 5 Summary of Project Area by BEC Zone in the Prince George Natural Resource District

Biogeoclimatic Zones	Area
Boreal Altai Fescue Alpine (BAFA)	71,152.68
Englemann Spruce -- Subalpine Fir (ESSF)	815,180.60
Interior Cedar -- Hemlock (ICH)	206,473.33
Interior Mountain-heather Alpine (IMA)	3,691.41
Sub-Boreal Spruce (SBS)	1,823,472.16
Total Biogeoclimatic Zones	2,919,970.18

TFLs, Private Land, Woodlots, and Community Forests

As long as the associated air photos are available, the new inventory will include any woodlots and community forests lying within the project area along with all of TFL 30 and a relatively small portion of TFL 48 in the northeast, and all parks. Any previous photo interpretation calibration points established in the project area would be made available as part of any historical data source for use in the new inventory project. Municipal lands and woodlots are included in this project however ground calls will not be established on any private lands. A full listing of woodlots and community forests can be found in Appendix A. Forest Analysis and Inventory Branch recognizes the special sensitivity of inventory information on some tenure and ownership types and will work with stakeholders to resolve any concerns during all stages of this project.

Section 2 - Photo Interpretation Plan

Project Objectives

The overriding objective of this photo interpretation project is to update the inventory for the Prince George Natural Resource District to one standard, format and currency across the entire inventory project area to account for what is presently an older inventory consisting of various currencies and with known gaps in forest cover information. Producing one consistent and seamless inventory across this entire project area will provide all local stakeholders with accurate and up-to-date forest resource information (delineation and attribution) that will be available in a single dataset using published standards and format. The information from this re-inventory will be used to inform future resource management decisions by industry, BCTS, local woodlot owners and community forest managers, First Nations, MFLNRO and other government agencies.

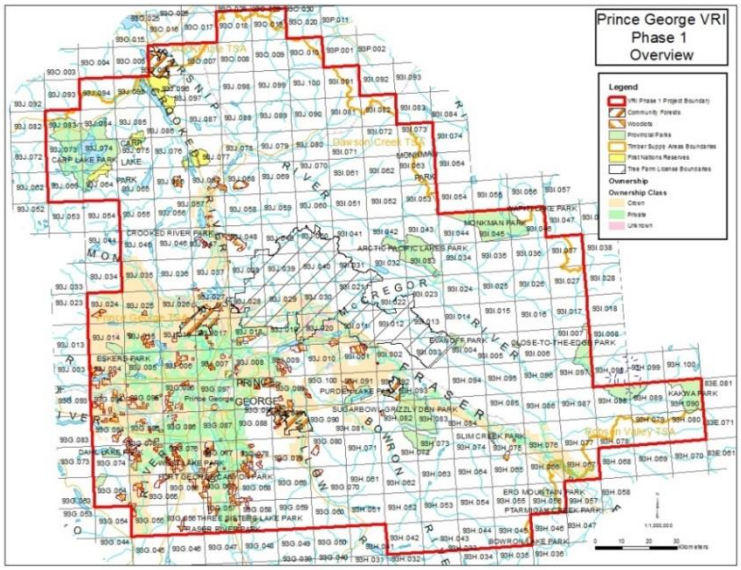
Target Area

The entire Prince George Natural Resource District will be photo interpreted inclusive of TFL 30 and a small overlapping portion of TFL 48, parks, all woodlots, private land, and community forests with the exception of approximately 168,000 ha of private and municipal land primarily centered around the city of Prince George (see Figure 9 below). VRI inventory for all parks will be to the same standard as the TSA and TFL lands in order to determine seral stage distribution, potential wildlife habitat, etc.

Information on First Nations traditional use studies are not generally made available to government agencies and any information such as location of cultural heritage resources or archeological sites is held in confidence. A new phase 1 VRI will not record location or any other associated details regarding this sensitive information as it is completely outside the scope of inventory data collecting activities.

A detailed map sheet and area summary is provided in the attached Appendix A.

Fig. 9: Prince George Natural Resource District VRI Project Area Overview



Historical Data Sources

An estimated 18,299 FIP (historic) air and ground calls were established in the Prince George Natural Resource District since the first forest inventory project in the early 1970's. In addition to an estimated 3,589 VRI air and ground calls established more recently (see Table 6 Inventory Calibration Points below). An unknown number of the established data sources were destroyed over the years through harvesting and other disturbances. FAIB is still assembling historic data and the actual number of data sources ultimately available will be determined at the data source transfer stage which may or may not be completed prior to the award of the VRI photo interpretation contracts.

All data sources that were available in the last re-inventory project are documented on the earlier document photos. A digital spatial location of these points will be made available in ESRI shape file. **Where the document photos are available**, data sources available on the document photos will be reviewed by photo interpreters and data sources that are still relevant to a new inventory on the 2015-16 imagery will be transferred to a digital format provided by the Ministry. A full list of currently known FIP historic and VRI can be found in Appendix D.

Table 6: Inventory Calibration Points Established in the Prince George Natural Resource District Project Area

Data Source Origin	Type	Number
VRI	Ground Call (cd 17)	1,546
VRI	Air Call (cd 18)	2,043
FIP	XG (cd 04)	9,709
FIP	X (cd 01)	8,590
Total		21,888

Situations that would justify removal of existing data sources include a major disturbance (such as a large fire, harvesting or insect/disease damage), large stand structure changes, or as defined in the contract documents (Schedule A and associated annual field work plans).

New Data Sources

The contractor will establish a minimum of 15 ground calls and 20 air calls per full mapsheet equivalent (FME) with the exact ratio of ground to air calls per FME still to be determined pending confirmation of the number of historic data sources available.

The type of ground call established in each polygon is based on the stand structure complexity as described in the VRI Photo Interpretation Field Calibration Procedures. The ratio of 3-pt versus 1-pt ground call will be confirmed after a review of a sample of the 2015-16 photo images. Any deviation from these numbers must be agreed upon by the Ministry Project Manager and will be reflected in the field calibration plan.

Prior to the initiation of a field calibration program, a Field Calibration Plan (see Guidelines in Appendix D) is to be submitted to the Ministry Project Manager for approval.

As part of the deliverables, the Ministry requires a complete set of any new data sources be provided in a suitable digital format (as determined by the Ministry), including the geographical locations (UTM coordinates) of these data sources as well as the complete set of field attribute data collected.

Other Data Sources

The origin and estimated number of **other** historic data sources is still to be determined as of the date of this plan (See Table 7 below).

Table 7: Other Data Sources

Data Source Origin	Type	Number of Data Sources
Growth and Yield Permanent Sample Plots (PSP)	PSP	TBD
Community Forest- Ground Calls	XGV	TBD
Community Forest - Air Calls	XV	TBD
TFL Historic Air and ground Call Data*	TBD	TBD
Site productivity – Approved PEM/TEM**	PSPL	1

*The status of any TFL historic air and ground call data is yet to be determined and this information may ultimately not be available

**The VRI Phase 1 contractor will use the provincial site productivity layer (PSPL ver 5.0) information as a reference for site index (SI) where SI is not available in the RESULTS data and where photo interpreters are responsible for estimating SI values as described in Section 6 of the Photo Interpretation Procedures. This GIS database contains the latest PEM/TEM and SIBEC information for the Prince George Natural Resource District by species for the Prince George TSA PEM and the TFL 30 PEM data sets collected within the project area (See Appendix C for details). The provincial site productivity layer data and supporting information is available at:

https://www.for.gov.bc.ca/hts/siteprod/provlayer.html

Polygon Delineation

Polygon delineation is to be completed to VRI standards found at:

https://www.for.gov.bc.ca/hts/vri/standards/RISC/2016/VRI_Photo_Interpretation_ProceduresVer3.2.pdf

Any deviation from these standards must be agreed to beforehand by the Ministry Project Manager.

Integrating RESULTS Information

The integration of the RESULTS (Reporting Silviculture Updates and Land status Tracking System) spatial files and tree attribute data will be completed at the delineation and attribution stages of the project. The RESULTS database in the Prince George Natural Resource District indicates there are 23,373 openings for a total area of 875,881 ha (see Figure 10 and Table 8 below), and of these:

- 4269 openings are Depletion/Regenerations for an area of 217,041 ha
- 6,549 openings are Free Growing for an area of 490,538 ha

In addition there are 12,555 polygons identified as disturbed but with no Opening ID, resulting in an area of 168,302 ha where there is no RESULTS record or associated information, likely as a result of the transition of silviculture information from non-spatial to spatial formats and subsequent loss of Opening ID information in the old inventory. Regardless of any missing Opening ID information, these areas will also be reclassified over the course of this project to reflect current forest cover conditions.

Fig. 10 Prince George Natural Resource District Project Area RESULTS Spatial File Coverage

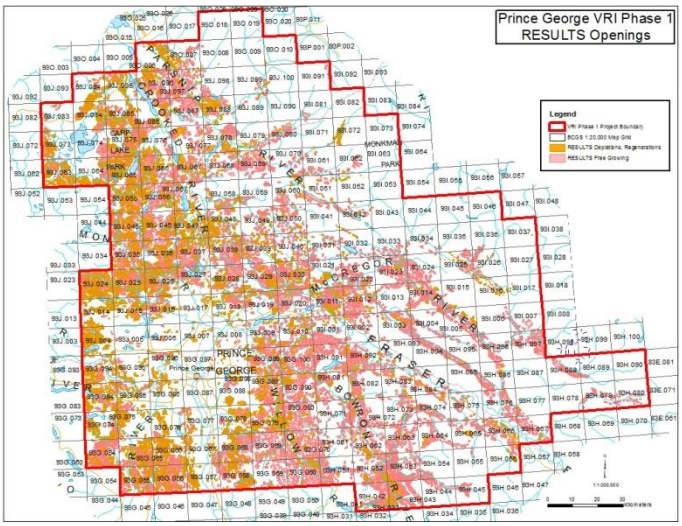


Table 8: RESULTS Summary for Prince George Natural Resource District

RESULTS Data Summary	# of Openings/polygons	Area (Ha)
RESULTS Free Growing (# of Openings)	6,549	490,538.24
RESULTS Depletion/Regen (# of Openings)	4,269	217,040.62
Total Disturbed Area without Opening Id	12,555	168,302.33
Totals	**23,373**	**875,881.19**

An updated ESRI shape file for the RESULTS openings and tree attributes will be provided to the contractor in late summer or early fall, 2016. A significant portion of the RESULTS depletions have been updated in the current Forest Inventory, however there may still be some missing spatial and attribute data and some more recent openings in the 2015-16 air photos may not be found in the RESULTS data cut. Attribution of harvested areas that are not identified in the RESULTS spatial files will be completed in accordance with the procedures for Photo Interpretation Guidelines for Integrating RESULTS Information. Reserves will be captured down to 1.0 ha resolution for this project.

Attribute Estimation

This project will be undertaken in softcopy (digital photogrammetric) format.

Forest stand height estimates will be taken where suitable at the discretion of the photo interpreter. There will be no quality assurance carried out on the photogrammetric heights as QA will involve digital height comparisons.

Variable retention harvesting systems have been used in various operations in the Prince George Natural Resource District for approximately 20 years. Retention of tree patches and individual trees from the former stand are now also being assessed as part of stocking standards in silviculture stocking surveys.

All residual tree patches and trees that are uniformly and non-uniformly dispersed throughout the openings must be described as a separate VRI layer and assigned a full suite of tree attributes. The

use of multi-layers in the silvicultural openings is not subject to the VRI multi-layer criteria outlined in the VRI photo interpretation procedures.

Mapping

The Ministry has developed a format and database standards for the submission and storage of spatial and attribute data for VRI Photo interpretation. All new projects must be completed to this standard and submitted to the Ministry Project Manager following successful QA.

The Contractor will adhere to the most current version of the *VRIMS Personal Geodatabase Structure and Use and VRIMS Vegetation Cover Polygon Validation Rules* published by the Forest Analysis and Inventory Branch.

TRIM Base

A TRIM (NAD 83) format base files will be made available to the contractor at the project pre-work meeting.

There will be no changes made to the TRIM feature unless significant changes occurred to the polygonal features such as lakes and double-line rivers. The contractor must maintain a record of any TRIM changes and submit all changes to the Project Manager in ESRI shape file format. The changes will be passed on to GeoBC for TRIM update.

DEM Data

The ministry **may** provide either new 10m DEM data or the original 25m TRIM DEM data. Currently there are some technical problems with the Merritt DEM deliverables and the Prince George DEM may have the same issues. The issue is that in dense canopy the new DEM process is not able to capture accurate information underneath. Therefore the Ministry may forgo creating new DEM in this year's flying if these problems cannot be resolved. The issue and pending decision are still under discussion.

LiDAR

LiDAR data sets may exist for portions of the project area. If the project manager can obtain existing LiDAR data, or if budgets permit the acquisition of additional LiDAR, this data will be used to validate, improve or enhance the inventory products created in this project.

Section 3 - Project Implementation

Project Pre-work meeting

A project pre-work meeting is mandatory at the beginning of each year and prior to commencement of any field work. The purpose of a project pre-work meeting is to bring together the Ministry Project Manager, VRI phase 1 contractor, MFLNRO representatives 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.

Scheduling

Because this unit is very large and consists of approximately 201 full map sheet equivalents (FMEs), the Prince George photo interpretation project will be split into two project areas, with the northern portion being a higher priority due to extensive spruce beetle outbreaks. Work will commence on the northern portion of the Prince George project area this fall. A total of 80 FMEs in the higher priority project area will be delineated in year one of this multi-year project. Delineation quality assurance (QA) will also be carried out on these 80 map sheets. Subsequent fieldwork and attribution can then commence in the spring of 2017 with project initiation for the second project area to start in the spring or early summer under a separate tender and contract.

The PG North (PG 1) area consists of 95 FMEs of which approximately 80 FMEs have imagery as of 2016, with the remaining 15 or 16 FMEs being flown in 2016 and delineated in Year 2. The PG South (PG 2) area consists of the remaining 106 FMEs. Two field seasons will be required for collection of photo interpretation field calibration data (air and ground calls). Field calibration is to coincide with subsequent attribution of blocks as scheduled in the approved work plans. The delivery schedule of specific maps will drive the stages of work throughout this project, with the 80 maps in PG 1 to be the priority for Year 1. The remaining fieldwork, photo estimation and map production will be completed in the 2017/18 and 2018/19 fiscal years (Year 2 and Year 3)

A delivery schedule outlining progressive delivery of products will be submitted by the contractor for each fiscal. The format of the delivery schedule and the order of map completion will be finalized and agreed to at the annual project pre-work meetings.

Aerial Photography and Photo Scale

The present 2015 digital air photo acquisition is being administered by GeoBC on behalf of FAIB and therefore meets all standards and specifications as summarized below.

Digital frame camera imagery of the project area was acquired to GeoBC photo standards and specifications in the summer of 2015-16.

- 4-band 8 bit RGBnIr digital frame imagery at 25cm ground sample distance (GSD). The image sizes are approximately 600MB. Flight orientation is East-West and West-East.
- The stereo project files are standard ISSD Z\I format in UTM.
- 10m gridded USGS DEM and LAS formats in UTM. The approximate file sizes are 10MB and 30MB respectively.
- Photo index shape file containing image names

Project Manager

The Ministry project manager for the Prince George Natural Resource District phase 1 VRI project is Mathias Hulten, FAIB, for PG 1 and the project manager for PG 2 is still to be determined. Responsibilities include the following: coordinating the project; monitoring and communicating project progress with the local stakeholders; ensuring all contractors are qualified and certified; overseeing photo-interpretation activities; ensuring quality assurance is complete and delivered at each stage, and assisting in coordinating technical expertise where required.

Personnel

All VRI photo interpretation work must be completed by or directly supervised by a VRI Certified Photo Interpreter. All uncertified photo interpreters are to be directly supervised by a Certified Photo Interpreter working on that project.

A ratio of one certified interpreter to two uncertified interpreters is acceptable provided the delineation and attribution work of the uncertified interpreters is carried out in the same physical work location of the supervising certified interpreter.

Quality Assurance

An independent third-party quality assurance (QA) will be completed on all stages of the project in accordance with the VRI Photo Interpretation Quality Assurance Procedures and Standards.

Quality assurance intensity for each stage of the project is to be completed as follows:

Historical Data Source Transfer	5%
Delineation	5%
Field Calibration	5%
Attribution	5%

Quality assurance for digital map production will be conducted by the Province. Contractors will utilize "VEGCAP for Contractors" validation software to perform quality assurance on data files.

For normal mid-scale digital photography (1:15,000-1:20,000 or 20-30cm Ground Sampling Distance), it is expected that delineation quality assurance will be performed at a ground scale of approximately 1:3000 and classification at a ground scale of approximately 1:1500 in order to maintain consistency between interpreters and for Quality Assurance purposes. This may be modified on a project specific basis. All QA findings and re-work instructions are communicated to the VRI contractor by the Ministry Project Manager.

Deliverables

The VRI photo interpretation project deliverables for each stage of the photo interpretation project are outlined in the VRI Photo Interpretation Procedures and VRI Field Calibration Procedures for Photo Interpretation.

For a multi-year project, deliverables are required at the end of each year fiscal, with progressive delivery of mapsheets in accordance with a detailed delivery schedule in the contract. To provide sufficient time for completion of independent third-party quality assurance and Ministry in-house mapping quality assurance, the final deliverables will be submitted at the end of February of each fiscal.

The most current VRI phase I standards documentation can be accessed from the following MFLNRO web site:

http://www.for.gov.bc.ca/hts/vri/standards/photo.html

Submission of all final deliverables will be signed-off by a qualified ABCFP Registered Forest Professional.

Roles and Responsibilities

MFLNRO

Project Manager is the point of contact for the Ministry and provides overall communication of project activities with contractors and Prince George Natural Resource District staff and stakeholders through regular updates via conference calls, e-mails, etc.

VRI Contractor

Works with the Ministry Project Manager to ensure the planning, coordination and execution of project activities is consistent with the VPIP and contract requirements.

VRI QA Contractor

Works with the VRI Contractor and Ministry Project Manager to ensure that Quality Assurance reporting meet the VRI prescribed standards.

References for Inventory Standards and Procedures

All work will be carried out in accordance with the following British Columbia Government specifications, current at the time of contract signing.

- *Vegetation Resources Inventory Photo Interpretation Procedures*
- *Vegetation Resources Inventory Photo Interpretation Standards and Quality Assurance Procedures*
- *Vegetation Resources Inventory Field Calibration Procedures for Photo Interpretation*
- *Guideline for Integrating RESULTS Information* (currently contained within the VRI photo interpretation procedures)
- *Vegetation Resources Inventory – The B.C. Land Cover Classification Scheme and addendums*
- *VRIMS Personal Geodatabase Structure and Use*
- *VRIMS Vegetation Cover Polygon Validation Rules*
- *Vegetation Resources Inventory Preparing a Project Implementation Plan for Photo interpretation – Appendix D*

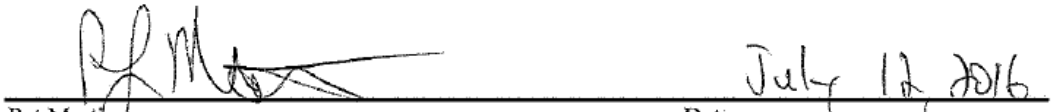
Costs

The estimated cost for completing the project to VRI standard, excluding photo acquisition, but including data capture and field costs based on the level of field calibration is $4.7m based on an estimated average of $1.60/ha over an estimated 2.92m ha project area including 13% estimated QA cost which is performed throughout the project. For Year 1 of the project the estimated cost of completed delineation for 80 FMEs at $3200 per FME is approximately $256K plus $320 per FME for delineation QA (10%), and Ministry staff travel, which puts the total Year 1 estimated project cost for PG 1 at $283K. The remaining bulk of the project cost would be incurred in Years 2 and 3 of both contracts for completion of this inventory. **Note, these estimates are used for project budgeting purposes only, based on current average costs for similar projects, and should not be used for the purpose of submitting bids on any work that may be tendered.**

Project Sign-off Sheet

Prince George Natural Resource District Vegetation Resources Inventory Photo Interpretation Project Implementation Plan

I have reviewed and approved the Prince George Natural Resource District Vegetation Resources Inventory Photo Interpretation Project Implementation Plan (VPIP).



July 12, 2016

Pat Martin — Date
Manager, Forest Inventory Section
Forest Analysis and Inventory Branch
Ministry of Forests, Lands and Natural Resource Operations

APPENDIX A: Project Map Sheet Area and Other Summaries with Accompanying Overview Maps

Mapsheet Summaries				
Mapsheet	Area (Ha)	NP Area (FIP)	VRI Vegetated/Non Tree Area (VN)	VRI Non Forest Descriptor Area
093G055	14,753.69	394.11	2,390.08	139.40
093G056	14,753.69	0.12	4,066.00	
093G057	14,753.69	1,929.39	3,484.91	597.02
093G058	14,753.69	21.11	2,659.42	18.28
093G059	14,753.69		857.03	
093G060	14,753.69		1,239.69	
093G064	14,719.13		2,716.09	
093G065	14,719.13	12.89	1,526.27	
093G066	14,719.13	208.24	2,468.38	139.67
093G067	14,719.13	1,556.23	3,877.20	691.20
093G068	14,719.13		2,087.24	13.24
093G069	14,719.13		1,120.26	
093G070	14,719.13		1,261.41	1.03
093G074	14,684.53		2,635.77	
093G075	14,684.53	2,266.47	3,038.17	92.99
093G076	14,684.53	2,676.03	3,704.16	240.80
093G077	14,684.53	2,659.24	2,903.57	76.36
093G078	14,684.53	1,238.78	3,050.94	855.36
093G079	14,684.53		1,933.62	
093G080	14,684.53		723.14	
093G084	14,649.88	323.79	3,198.22	
093G085	14,649.88	1,598.47	2,690.50	265.56
093G086	14,649.88	3,141.35	3,498.41	117.33
093G087	14,649.88	6,926.08	2,988.15	173.08
093G088	14,649.88	1,390.29	3,220.21	529.61
093G089	14,649.88		2,315.95	
093G090	14,649.88		2,488.17	1.82
093G094	14,615.19	134.50	2,305.16	198.78
093G095	14,615.19	3,391.59	3,680.58	116.18
093G096	14,615.19	3,144.30	2,077.09	139.16
093G097	14,615.19	5,536.37	1,387.97	149.05
093G098	14,615.19	2,158.64	3,168.04	552.22
093G099	14,615.19	43.75	3,547.56	65.82
093G100	14,615.19		2,054.21	103.69

093H042	14,788.20	7.75	1,256.95	371.79
093H043	14,788.20	15.34	1,360.07	296.43
093H044	14,788.20		1,096.83	183.79
093H045	14,788.20	754.33	4,203.95	36.71
093H051	14,753.69	24.41	940.25	416.09
093H052	14,753.69		542.45	137.67
093H053	14,753.69	18.12	2,729.39	392.22
093H054	14,753.69		2,456.89	5.83
093H055	14,753.69		6,226.17	1.39
093H056	14,753.69	689.18	4,845.75	108.67
093H061	14,719.13	1.56	970.53	143.11
093H062	14,719.13	10.54	612.93	392.58
093H063	14,719.13	4.16	802.91	127.86
093H064	14,719.13		1,678.93	277.65
093H065	14,719.13	0.94	2,159.84	103.67
093H066	14,719.13	252.48	2,127.38	764.90
093H067	14,719.13	1,295.77	1,914.39	702.72
093H071	14,684.53	3.65	1,050.79	364.62
093H072	14,684.53		908.18	442.31
093H073	14,684.53		1,082.33	87.09
093H074	14,684.53	17.17	1,200.53	331.24
093H075	14,684.53	3.47	1,864.09	282.76
093H076	14,684.53	14.17	1,649.43	481.73
093H077	14,684.53	1,428.89	5,759.45	
093H078	14,684.53	5,720.15	3,018.00	40.73
093H079	14,684.53	3,216.65	1,705.44	19.64
093H080	14,684.53	5,479.77	1,678.26	26.46
093H081	14,649.88	10.47	1,473.52	137.01
093H082	14,649.88	29.25	803.65	601.96
093H083	14,649.88	28.18	1,446.53	731.95
093H084	14,649.88	5.09	1,678.42	374.82
093H085	14,649.88		802.12	164.96
093H086	14,649.88		749.23	7.26
093H087	14,649.88		3,793.38	
093H088	14,649.88	0.82	4,132.36	63.45
093H089	14,649.88		3,086.87	
093H090	14,649.88	61.27	4,544.78	
093H091	14,615.19		481.38	116.88
093H092	14,615.19	48.03	2,402.00	623.24
093H093	14,615.19	4.46	2,735.22	8.15
093H094	14,615.19		4,975.39	346.30
093H095	14,615.19		3,450.04	276.67
093H096	14,615.19	20.55	2,585.56	252.33

093H097	14,615.19		4,052.27	184.30
093I001	14,580.44		1,121.60	185.21
093I002	14,580.44	3.13	2,967.83	131.23
093I003	14,580.45		692.11	26.51
093I004	14,580.44	482.80	3,828.32	344.43
093I005	14,580.44	5,340.39	3,692.28	
093I006	14,580.45		7,493.46	
093I007	14,580.44		4,831.60	
093I011	14,545.66		752.26	
093I012	14,545.66		41.48	
093I013	14,545.66		1,769.15	
093I014	14,545.66		1,530.52	
093I015	14,545.66		8,490.57	
093I016	14,545.66		5,053.21	
093I017	14,545.66		4,448.33	
093I021	14,510.82		415.38	
093I022	14,510.82		890.54	
093I023	14,510.82		1,036.49	
093I024	14,510.82		3,618.70	
093I025	14,510.82		2,806.56	
093I026	14,510.82		3,110.61	
093I027	14,510.82		4,956.55	
093I031	14,475.94		922.81	
093I032	14,475.94		1,055.79	
093I033	14,475.94		4,353.59	
093I034	14,475.94		2,305.53	
093I035	14,475.94		2,364.53	
093I036	14,475.94		4,249.28	
093I037	14,475.94		6,604.84	
093I041	14,441.02		1,379.95	
093I042	14,441.02		2,357.20	
093I043	14,441.02		3,626.24	
093I044	14,441.02		6,299.26	
093I045	14,441.02		5,130.23	
093I046	14,441.02		5,638.45	
093I051	14,406.04		1,679.24	
093I052	14,406.04		2,950.98	
093I053	14,406.04		4,237.69	
093I061	14,371.03		1,584.04	
093I062	14,371.03		1,946.49	
093I063	14,371.03		3,624.51	
093I071	14,335.96		1,638.86	
093I072	14,335.96		3,518.42	

093I073	14,335.96		4,034.52	
093I081	14,300.85		6,073.30	
093I082	14,300.85		4,641.99	
093I091	14,265.70		7,139.69	
093J004	14,580.44		3,639.72	105.32
093J005	14,580.44	5,340.39	3,955.30	127.83
093J006	14,580.44	3,258.06	3,152.22	70.41
093J007	14,580.44	4,549.96	3,591.12	289.96
093J008	14,580.45	2,306.59	1,656.68	265.35
093J009	14,580.44	897.65	1,751.12	333.51
093J010	14,580.45	22.17	1,191.61	18.98
093J014	14,545.66	64.10	1,539.72	16.07
093J015	14,545.66	1,855.94	3,127.15	108.82
093J016	14,545.66	1,243.49	2,855.40	16.73
093J017	14,545.66	3,375.34	3,437.19	367.07
093J018	14,545.66	716.02	1,360.16	715.09
093J019	14,545.66	1,195.79	1,490.37	355.45
093J020	14,545.66	677.33	1,224.07	610.65
093J024	14,510.82		4,885.86	
093J025	14,510.82		4,361.41	
093J026	14,510.82		3,743.36	
093J027	14,510.82	157.47	2,548.89	
093J028	14,510.82	424.09	913.20	19.47
093J029	14,510.82		401.99	
093J030	14,510.82	14,305.22	214.46	
093J035	14,475.94		3,445.13	
093J036	14,475.94		3,187.44	
093J037	14,475.94		2,700.80	
093J038	14,475.94		1,624.07	
093J039	14,475.94	0.66	51.03	
093J040	14,475.94	14,344.67	163.31	
093J045	14,441.02		3,655.51	
093J046	14,441.02		3,103.06	
093J047	14,441.02		5,415.88	
093J048	14,441.02		2,219.05	
093J049	14,441.02	11.37	2,076.22	173.16
093J050	14,441.02	8.19	778.35	11.72
093J055	14,406.04		3,887.92	
093J056	14,406.04		1,925.82	
093J057	14,406.04		2,343.74	
093J058	14,406.04		1,939.96	
093J059	14,406.04		3,514.80	
093J060	14,406.04		2,823.91	

093J063	14,371.03		3,846.61	
093J064	14,371.03		2,637.75	
093J065	14,371.03		3,364.77	
093J066	14,371.03		3,153.70	
093J067	14,371.03		3,372.13	
093J068	14,371.03		1,803.98	
093J069	14,371.03		1,761.83	
093J070	14,371.03		3,181.84	
093J073	14,335.96		1,823.63	
093J074	14,335.96		499.81	
093J075	14,335.96		3,689.08	
093J076	14,335.96		3,238.47	
093J077	14,335.96		1,486.07	
093J078	14,335.96		1,904.89	
093J079	14,335.96		1,726.23	
093J080	14,335.96		1,558.88	
093J083	14,300.85		1,389.82	
093J084	14,300.85		1,833.40	
093J085	14,300.85		2,360.93	
093J086	14,300.85		634.37	
093J087	14,300.85		2,115.52	
093J088	14,300.85		1,578.48	
093J089	14,300.85		625.87	
093J090	14,300.85		1,028.03	
093J094	14,265.70		1,343.28	
093J095	14,265.70		1,180.44	
093J096	14,265.70		3,854.60	
093J097	14,265.70		2,232.59	
093J098	14,265.70		2,844.18	
093J099	14,265.70		2,072.61	
093J100	14,265.70		3,035.61	
093O006	14,230.50		2,023.70	
093O007	14,230.50		2,419.26	
093O008	14,230.50		3,093.55	
093O009	14,230.50		4,017.67	
093O010	14,230.50		7,070.70	
093O018	14,195.25		3,415.15	
093O019	14,195.25		6,565.73	
Totals	**2,920,067.23**	**120,499.18**	**529,985.54**	**19,999.56**

TFL Summary	**Area**
TFL 30	180,346.72
TFL 48	3,656.29
	184,003.01

Park Summary	**Area**
Park Name	
ARCTIC PACIFIC LAKES PARK	13,895.00
BOBTAIL MOUNTAIN PARK	1,358.40
BOWRON LAKE PARK	696.95
CARP LAKE PARK	38,218.95
CLOSE-TO-THE-EDGE PARK	413.73
CROOKED RIVER PARK	970.38
DAHL LAKE PARK	1,584.64
ERG MOUNTAIN PARK	1,011.88
ESKERS PARK	4,045.96
EVANOFF PARK	1,474.56
FORT GEORGE CANYON PARK	178.06
FRASER RIVER PARK	1,286.97
KAKWA PARK	21,138.96
MONKMAN PARK	20,021.92
PTARMIGAN CREEK PARK	936.92
PURDEN LAKE PARK	3,214.37
SLIM CREEK PARK	506.13
SUGARBOWL-GRIZZLY DEN PARK	20,318.98
THREE SISTERS LAKE PARK	968.71
WAPITI LAKE PARK	489.47
WEST LAKE PARK	259.00
WHISKERS POINT PARK	95.39
Total Provincial Parks	133,085.34

Community Forests	
K1H	160.91
K1N	13,066.52
K2M	6,836.93
N2E	11,007.92
Total Community Forests	**31,072.28**

Woodlots	
W0202	611.42
W0206	572.77
W0208	646.97
W0210	626.78
W0217	599.74
W0218	672.38
W0221	178.51
W0224	445.21
W0225	858.69
W0227	728.21
W0237	596.08
W0238	729.17
W0248	539.53
W0249	630.04
W0250	578.46
W0251	597.20
W0262	643.32
W0268	604.31
W0269	607.58
W0272	605.36
W0281	601.03
W0298	629.49
W0299	826.09
W0611	776.52
W0620	40.43
W0624	877.42
W0628	908.07
W0629	600.31
W0630	755.84
W0632	622.78
W0633	738.38
W0639	631.50
W0642	640.02
W0643	1,517.10
W0644	880.91
W0645	888.33
W0646	964.60
W0647	937.32
W0652	814.83
W0653	674.60
W0654	669.59
W0655	661.37

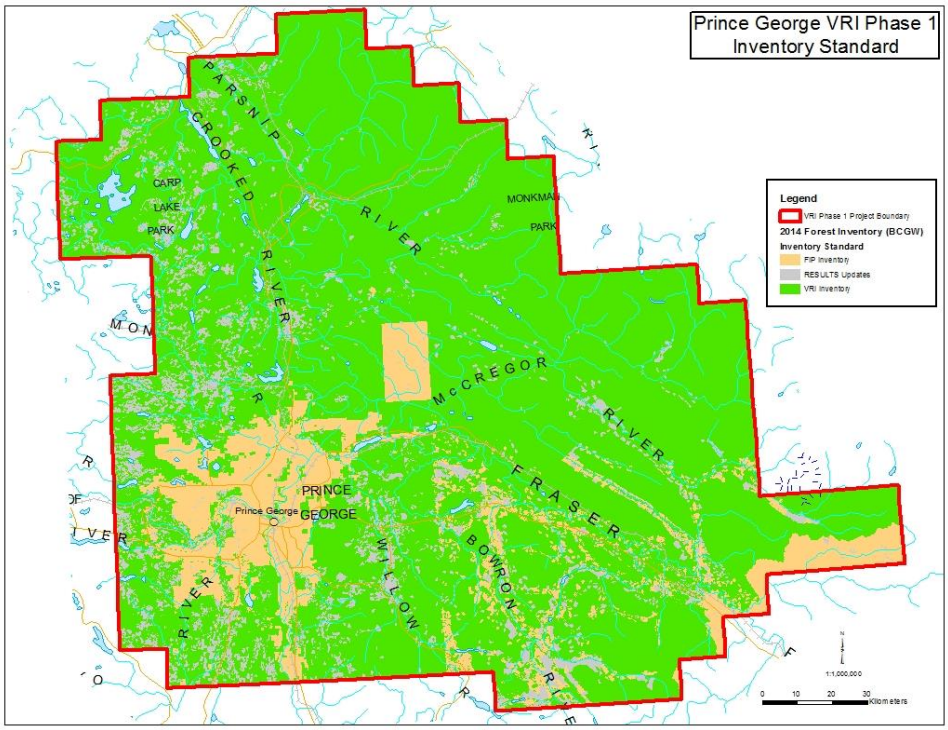
W0656	666.93
W0659	720.10
W0660	624.42
W0661	51.80
W0671	456.39
W0674	608.45
W0675	667.63
W0696	733.32
W1150	775.19
W1157	754.52
W1165	51.76
W1171	549.76
W1172	615.29
W1173	676.12
W1175	617.86
W1180	842.88
W1185	734.32
W1186	829.06
W1193	707.44
W1199	794.97
W1545	665.88
W1548	443.24
W1550	870.92
W1554	1,442.80
W1555	226.79
W1558	643.85
W1559	734.15
W1575	590.12
W1660	621.59
W1721	209.60
W1722	860.64
W1723	600.85
W1726	844.74
W1727	835.14
W1729	801.65
W1848	716.92
W1958	1,176.38
W1959	652.96
W1971	1,088.99
W1972	1,013.74
W1975	1,176.48
W1978	941.40
W1979	1,151.98

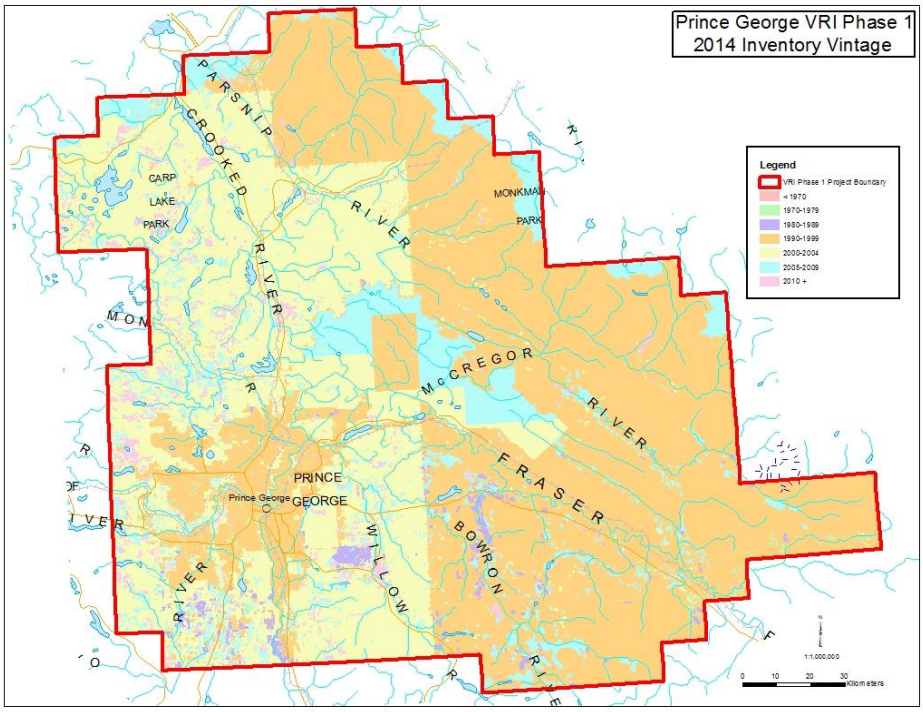
W1992	652.57
Total Woodlots	**60,169.81**

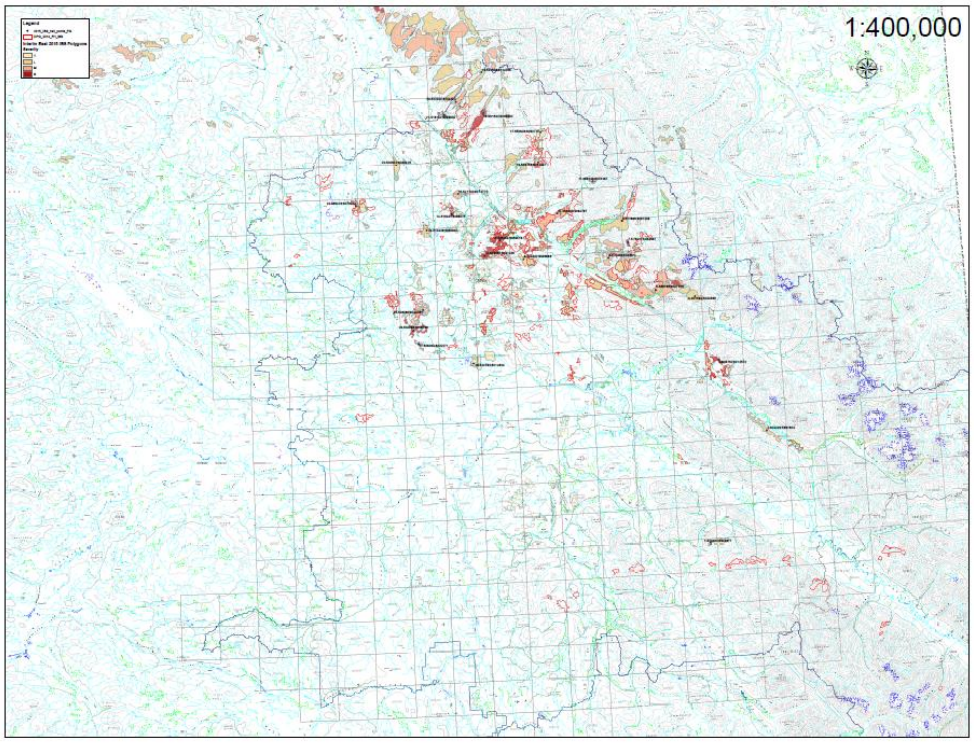
Cadastre (Ownership Class)	**Area**
Total Crown Federal	17,897.97
Crown Municipal	2,320.40
Crown Provincial	415,958.64
Private	165,912.90
Unknown	10,375.36
Total Ownership	**612,465.27**

First Nations Reserve	**Area**
ARCTIC LAKE 10	2.02
BLUE LAKE 24	1.05
CARP LAKE 3	4.68
CARP SOUTH INDIAN RESERVE NO. 7	2,339.24
CLESBAONEECHECK 3	129.43
DAVIE LAKE 28	1.02
FORT GEORGE 2	526.70
FORT GEORGE CEMETERY 1A	0.91
HOMINKA 11	1.97
KERRY LAKE EAST 9	3,486.40
KERRY LAKE WEST 8	936.97
MCLEOD LAKE 1	877.12
MCLEOD LAKE 5	7,934.12
QUAW ISLAND 25	1.45
SALAQUO 4	17.11
SAS MIGHE 32	26.02
TACHEEDA LAKE 14	2.08
TOM COOK 26	12.08
WAR LAKE 4	3.30
WEEDON CARP 6	2,807.67
WEEDON LAKE 27	4.01
Total	**19,115.34**

Overview Maps



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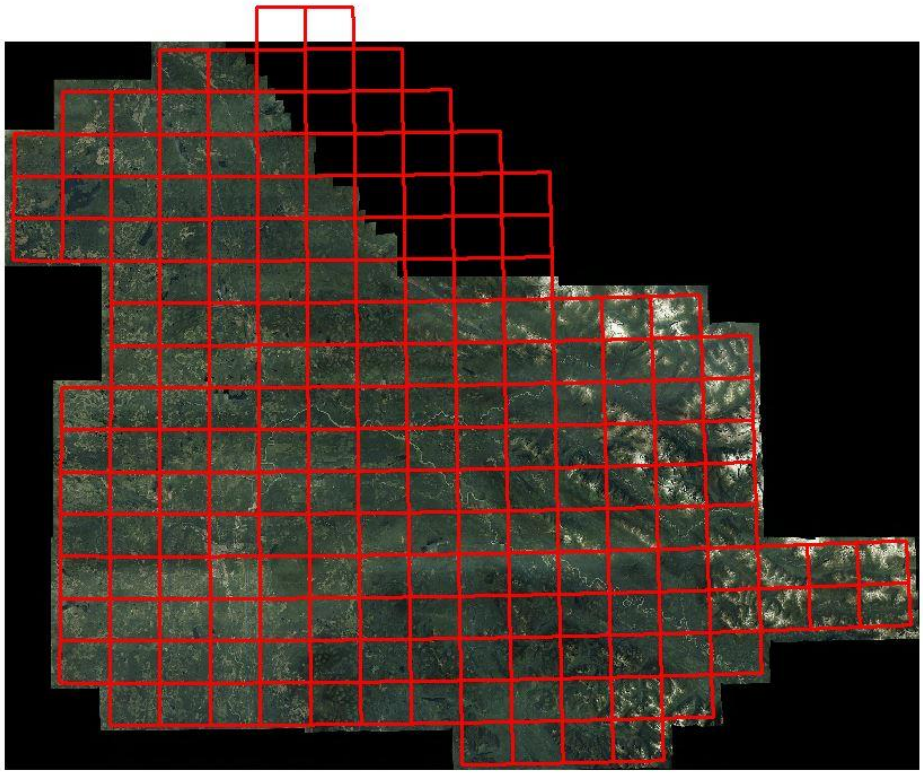
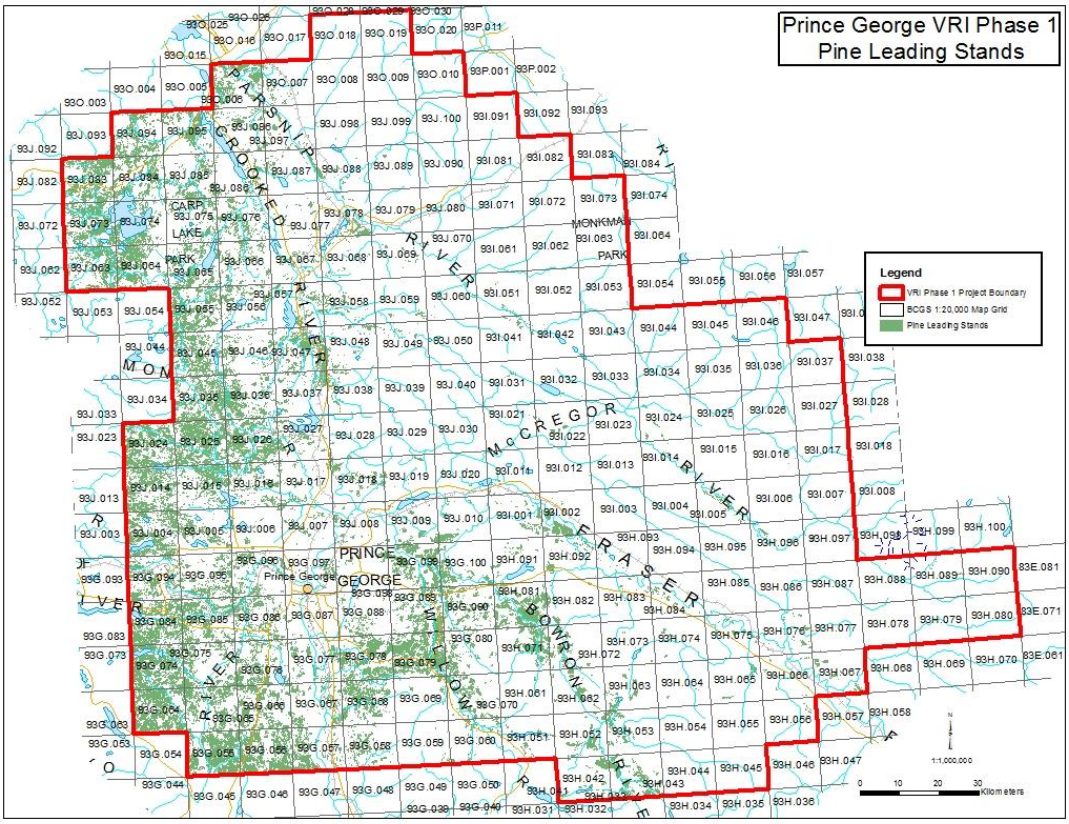
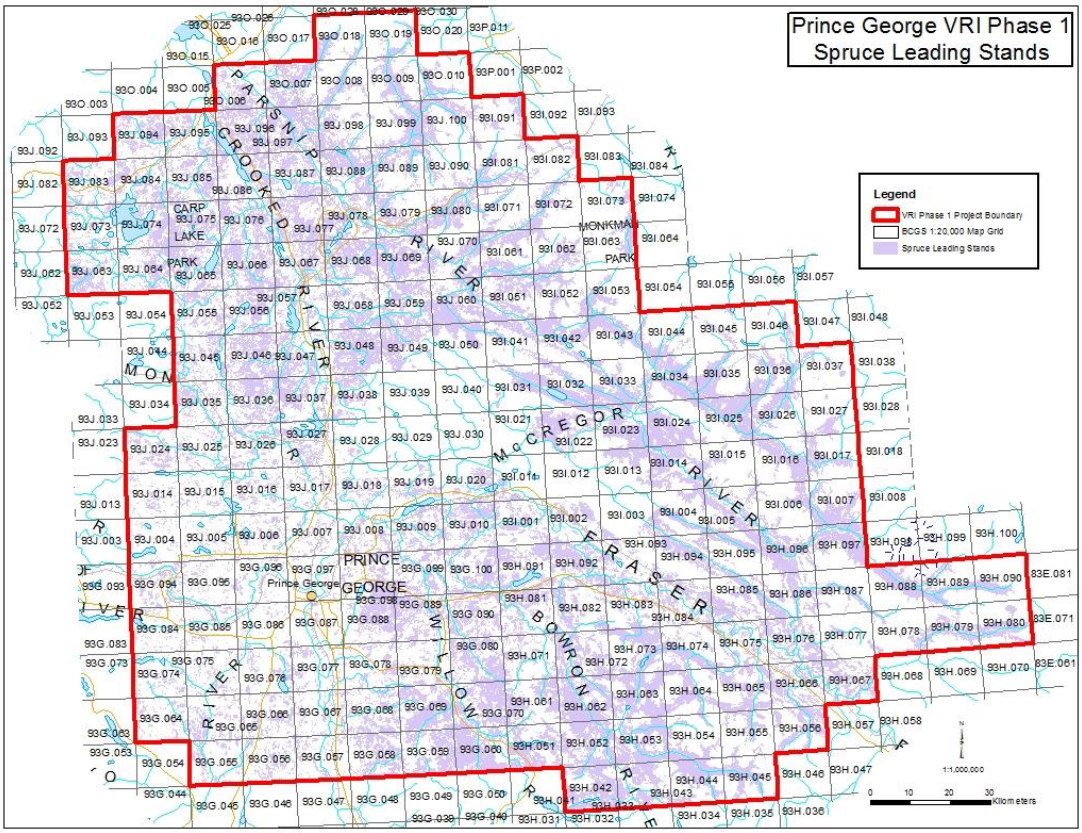
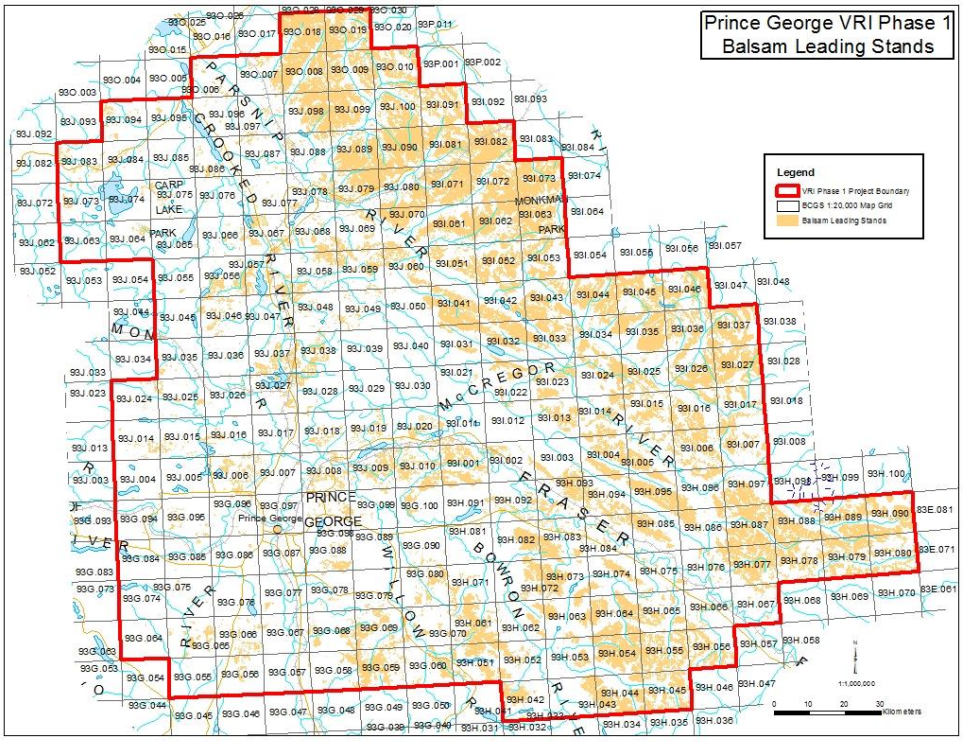
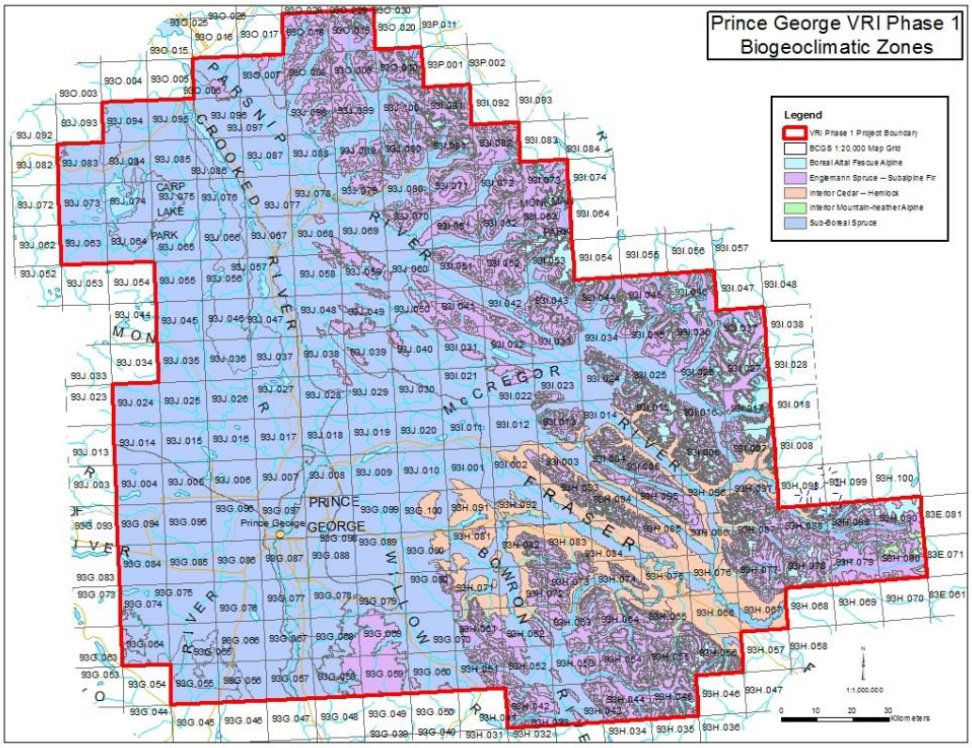
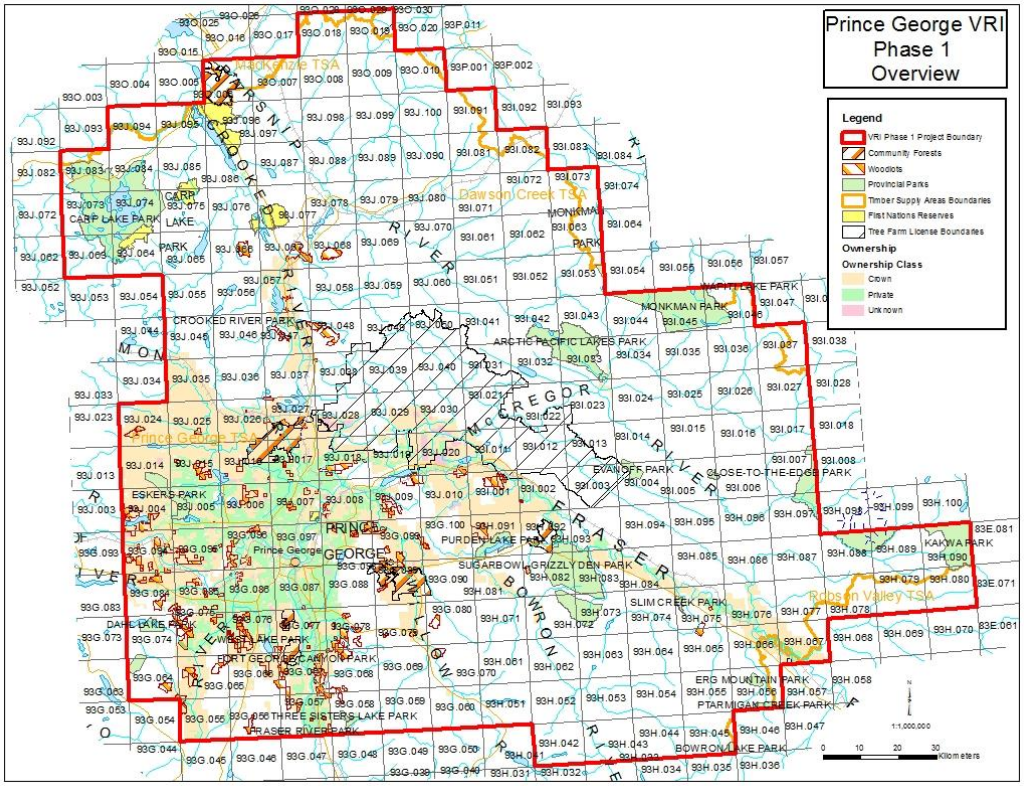


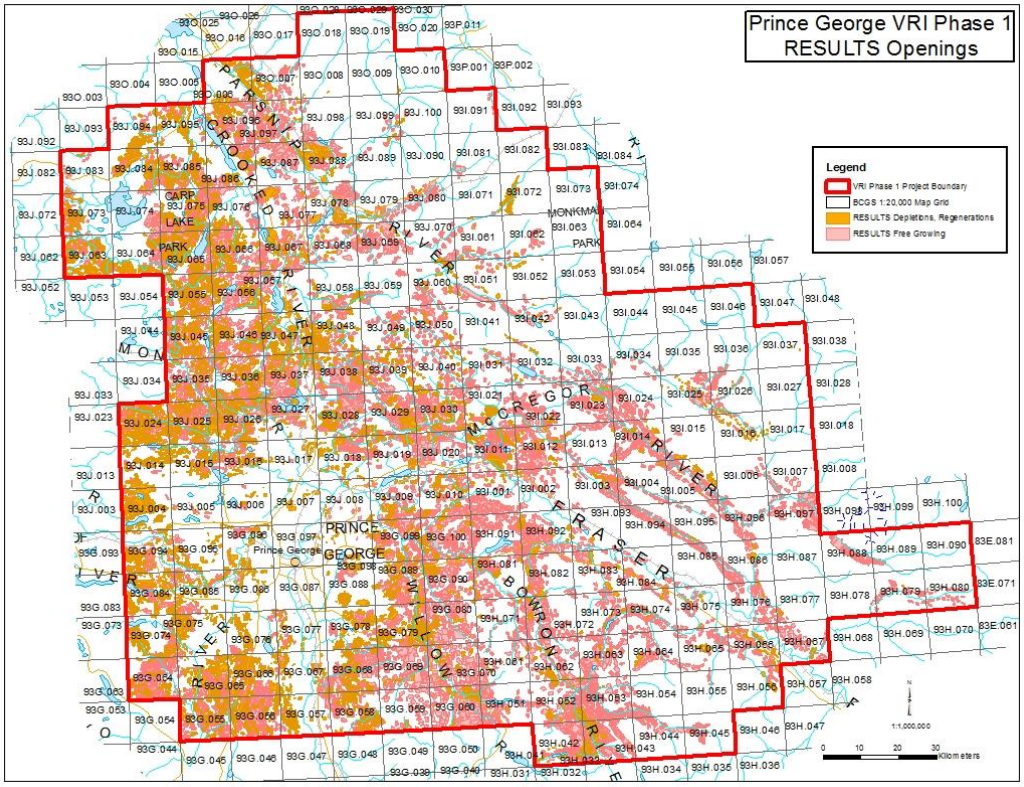

Prince George VRI Phase 1
Pine Leading Stands
Legend
VRI Phase 1 Project Boundary
BCGS 1:20,000 Map Grid
Pine Leading Stands
PARSNIP RIVER
CROOKED RIVER
CARP LAKE PARK
MONKMAN PARK
McGREGOR RIVER
FRASER RIVER
PRINCE GEORGE
BOWRON RIVER
WILLOW RIVER
Prince George
1:1,000,000
0 10 20 30
Kilometers


Prince George VRI Phase 1
Spruce Leading Stands
Legend
VRI Phase 1 Project Boundary
BCGS 1:20,000 Map Grid
Spruce Leading Stands
PARSNIP RIVER
CROOKED RIVER
CARP LAKE PARK
MONKMAN PARK
McGREGOR RIVER
FRASER RIVER
PRINCE GEORGE
BOWRON RIVER
WILLOW RIVER
Prince George
1:1,000,000
0 10 20 30
Kilometers


Prince George VRI Phase 1
Balsam Leading Stands
Legend
VRI Phase 1 Project Boundary
BCGS 1:20,000 Map Grid
Balsam Leading Stands
PRINCE GEORGE
Prince George
PARSNIP RIVER
CROOKED RIVER
CARP LAKE
PARK
MONKMAN PARK
McGREGOR RIVER
FRASER RIVER
BOWRON RIVER
WILLOW RIVER
1:1,000,000
0 10 20 30 Kilometers


Prince George VRI Phase 1
Biogeoclimatic Zones
Legend
VRI Phase 1 Project Boundary
BCGS 1:20,000 Map Grid
Boreal Altai Fescue Alpine
Engelmann Spruce – Subalpine Fir
Interior Cedar – Hemlock
Interior Mountain-heather Alpine
Sub-Boreal Spruce
PRINCE GEORGE
Prince George
PARSNIP RIVER
CROOKED RIVER
CARP LAKE
PARK
MONKMAN PARK
McGREGOR RIVER
FRASER RIVER
BOWRON RIVER
WILLOW RIVER
1:1,000,000
0 10 20 30 Kilometers


Prince George VRI
Phase 1
Overview
Legend
VRI Phase 1 Project Boundary
Community Forests
Woodlots
Provincial Parks
Timber Supply Areas Boundaries
First Nations Reserves
Tree Farm License Boundaries
Ownership
Ownership Class
Crown
Private
Unknown
Mackenzie TSA
Dawson Creek TSA
Prince George TSA
Robson Valley TSA
PRINCE GEORGE
CARP LAKE PARK
CROOKED RIVER PARK
ESKERS PARK
DAHLIE PARK
FORT GEORGE CANYON PARK
THREE SISTERS LAKE PARK
FRASER RIVER PARK
PURDEN LAKE PARK
SUGARBOWL GRIZZLY DEN PARK
SLIM CREEK PARK
ERG MOUNTAIN PARK
PTARMIGAN CREEK PARK
BOWRON LAKE PARK
MONKMAN PARK
ARCTIC PACIFIC LAKES PARK
EVANOFF PARK
CLOSE-TO-THE-EDGE PARK
KAKWA PARK
PARSNIP RIVER
CROOKED RIVER
MONKMAN PARK
MCGREGOR RIVER
FRASER RIVER
BOWRON RIVER
1:1,000,000
0 10 20 30
Kilometers


Prince George VRI Phase 1
RESULTS Openings
Legend
VRI Phase 1 Project Boundary
BCGS 1:20,000 Map Grid
RESULTS Depletions, Regenerations
RESULTS Free Growing
PRINCE GEORGE
PARSNIP RIVER
CROOKED RIVER
MONKMAN PARK
MCGREGOR RIVER
FRASER RIVER
BOWRON RIVER
1:1,000,000
0 10 20 30
Kilometers

APPENDIX B - List of First Nations

First Nations within the Prince George TSA are Carrier and Sekani. The asserted territories of the Carrier and Sekani comprise approximately 76,000 square kilometres in the Interior Plateau Region, which is bound to the east by the Rocky Mountains, to the north by the Omineca Mountains, and to the west by the Coast Mountains. The asserted territories of the Carrier surround the Nechako, Stuart, and Fraser River watersheds, while those of the Sekani coincide with the Finlay, Parsnip and Peace Rivers. The asserted traditional territories of their Southern Carrier neighbours surround the basins of the Dean, Blackwater, and Quesnel Rivers. First Nations communities within the Prince George TSA include: the Nakʻazdli, Takla Lake, Tlʻaztʻen, Nadleh Whutʻen, Stellatʻen, Saikʻuz, Lheidli Tʻenneh, Yekooche and McLeod Lake. Each First Nation has its own distinct traditional territory, usually corresponding to a watershed or lake system. Other First Nations whose communities are outside of the Prince George TSA but whose territories extend into the Prince George TSA include: the Cheslatta, Lhooskʻuz Dene, Ulkatcho, Toosey, Anaham, Skin Tyee, West Moberly, Halfway River, Gitxsan, Lake Babine, Kaska Dena, Tsay Key Dene, Red Bluff, Nazko, and Tahltan First Nations

(please refer to the *Prince George TSA Timber Supply Analysis Public Discussion Paper*, January 2010 at: https://www.for.gov.bc.ca/hts/tsa/tsa24/tsr4/24ts10pdp.pdf and the *Prince George Timber Supply Area Timber Supply Analysis Discussion Paper*, March, 2016 at: https://www.for.gov.bc.ca/hts/tsa/tsa24/current2015/24tspdp16_final.pdf)

APPENDIX C - List of Approved PEM/TEM for Prince George Natural Resource District

The provincial site productivity layer data and supporting information is available at:

http://www.for.gov.bc.ca/hts/siteprod/provlayer.html

Summary information on the completed PEM/TEM projects and datasets can be found in the accompanying technical report at: http://www.for.gov.bc.ca/hts/siteprod/download/FLNR_provincial_site_product_layer_pem-tem-sibec_biophysical_analysisv43.pdf

(Table 7, pg. 33 – 39)

APPENDIX D: Historic Data Sources

Mapsheet Summaries					
Mapsheet	**Area (Ha)**	VRI AirCall (18)	VRI GrndCall (17)	FIP AirCall (X)**	FIP GrndCall (XG*)
093G055	14,753.69	9	23	2	155
093G056	14,753.69	10	18	31	99
093G057	14,753.69	1	1	14	12
093G058	14,753.69	6	7	61	64
093G059	14,753.69	6	11	46	39
093G060	14,753.69	1	11	21	122
093G064	14,719.13			10	140
093G065	14,719.13	18	7	6	64
093G066	14,719.13	2	6	7	140
093G067	14,719.13	8	10	6	40
093G068	14,719.13	17	8	26	157
093G069	14,719.13	10	11	20	142
093G070	14,719.13	14	13	7	135
093G074	14,684.53	9	9	27	48
093G075	14,684.53	8	6	34	75
093G076	14,684.53		1	27	76
093G077	14,684.53	4		24	21
093G078	14,684.53	7	10	23	78
093G079	14,684.53	8	16	14	147
093G080	14,684.53	13	9	18	191
093G084	14,649.88	12	16	14	110
093G085	14,649.88		7	25	114
093G086	14,649.88	7	1	22	59
093G087	14,649.88			4	8
093G088	14,649.88	9	4	57	93
093G089	14,649.88	15	8	50	135
093G090	14,649.88	13	9	49	150
093G094	14,615.19	5	5	35	95
093G095	14,615.19	4	3	16	52
093G096	14,615.19	2		14	77
093G097	14,615.19			11	20
093G098	14,615.19	12	7	21	69
093G099	14,615.19	13	7	60	152
093G100	14,615.19	12	7	28	187
093H042	14,788.20	3	1	13	73

093H043	14,788.20	5	6	16	91
093H044	14,788.20	3		21	8
093H045	14,788.20	5		45	18
093H051	14,753.69	22	9	15	47
093H052	14,753.69	15	6	7	94
093H053	14,753.69	9	8	5	83
093H054	14,753.69	14		14	13
093H055	14,753.69	15	12	29	6
093H056	14,753.69	13	1	75	8
093H061	14,719.13	12	13	19	33
093H062	14,719.13	14	4	8	70
093H063	14,719.13	9	10	6	39
093H064	14,719.13	18	6	7	27
093H065	14,719.13	18	5	45	14
093H066	14,719.13	12	15	92	59
093H067	14,719.13	8	8	80	25
093H071	14,684.53	11	10	7	8
093H072	14,684.53	18	10	13	55
093H073	14,684.53	16	7	10	19
093H074	14,684.53	15	12	6	18
093H075	14,684.53	15	9	26	32
093H076	14,684.53	11	18	32	19
093H077	14,684.53	7	8	48	15
093H078	14,684.53	7		39	11
093H079	14,684.53	2		37	19
093H080	14,684.53	2		24	31
093H081	14,649.88	16	12	16	57
093H082	14,649.88	3	11	6	11
093H083	14,649.88	9	18	45	39
093H084	14,649.88	14	4	43	37
093H085	14,649.88	13		51	11
093H086	14,649.88	11	5	81	23
093H087	14,649.88	15	6	69	10
093H088	14,649.88	8		37	8
093H089	14,649.88	18		62	15
093H090	14,649.88	11		31	11
093H091	14,615.19	10	7	23	24
093H092	14,615.19	12	1	5	20
093H093	14,615.19	11	11	45	22
093H094	14,615.19	15	4	40	4
093H095	14,615.19	15	6	30	5
093H096	14,615.19	17	5	68	53
093H097	14,615.19	13	8	50	45

093I001	14,580.44	15	15	18	106
093I002	14,580.44	13	11	33	57
093I003	14,580.45	4	3	17	11
093I004	14,580.44	18	14	55	36
093I005	14,580.44	11	12	70	78
093I006	14,580.45	11	1	46	18
093I007	14,580.44	13	8	48	25
093I011	14,545.66	2	10	10	19
093I012	14,545.66	8			13
093I013	14,545.66	15	1	17	38
093I014	14,545.66	17	10	54	148
093I015	14,545.66	1	4	41	12
093I016	14,545.66	13	13	68	11
093I017	14,545.66	15	10	58	8
093I021	14,510.82	4		7	19
093I022	14,510.82	12		40	72
093I023	14,510.82	13	6	50	87
093I024	14,510.82	15	5	57	108
093I025	14,510.82	9	12	55	62
093I026	14,510.82	16	12	87	18
093I027	14,510.82	20	9	79	5
093I031	14,475.94	6		27	15
093I032	14,475.94	17	3	54	57
093I033	14,475.94	20	6	60	36
093I034	14,475.94	14	7	62	79
093I035	14,475.94	3	1	62	23
093I036	14,475.94	11	4	74	7
093I037	14,475.94	27		14	5
093I041	14,441.02	22	3	52	15
093I042	14,441.02	19	3	52	40
093I043	14,441.02	22	12	49	3
093I044	14,441.02	17	3	48	4
093I045	14,441.02	6	3	36	11
093I046	14,441.02	5		30	8
093I051	14,406.04	17	8	67	38
093I052	14,406.04	15	1	51	18
093I053	14,406.04	7		24	5
093I061	14,371.03	14		60	35
093I062	14,371.03	17	2	53	13
093I063	14,371.03	20		11	4
093I071	14,335.96	15		39	13
093I072	14,335.96	13	5	38	12
093I073	14,335.96	21	5	11	4

093I081	14,300.85	10	3	24	14
093I082	14,300.85	23	2	23	12
093I091	14,265.70	15	1	36	3
093J004	14,580.44	7	7	23	66
093J005	14,580.44	8	7	12	42
093J006	14,580.44	8	4	10	56
093J007	14,580.44	7	3	3	22
093J008	14,580.45	7	2	19	37
093J009	14,580.44	12	7	6	81
093J010	14,580.45	19	12	20	59
093J014	14,545.66	10	7	56	42
093J015	14,545.66	18	12	40	108
093J016	14,545.66	19	9	63	77
093J017	14,545.66	12	4	13	27
093J018	14,545.66	8	5	25	14
093J019	14,545.66	3	3	9	12
093J020	14,545.66	15	3	7	36
093J024	14,510.82	7	15	49	93
093J025	14,510.82	11	24	42	128
093J026	14,510.82	9	17	50	79
093J027	14,510.82	5	13	69	88
093J028	14,510.82	4	7	7	17
093J029	14,510.82	1		1	
093J030	14,510.82				
093J035	14,475.94	6	19	30	124
093J036	14,475.94	2	16	69	84
093J037	14,475.94	7	10	87	132
093J038	14,475.94	5	2	56	109
093J039	14,475.94				
093J040	14,475.94				
093J045	14,441.02	5	18	31	117
093J046	14,441.02	3	2	93	96
093J047	14,441.02	9	22	129	85
093J048	14,441.02	2	3	129	38
093J049	14,441.02	5	4	64	22
093J050	14,441.02	4	3	33	12
093J055	14,406.04	11	10	50	77
093J056	14,406.04	7	7	68	73
093J057	14,406.04	8	12	106	88
093J058	14,406.04	13	8	125	67
093J059	14,406.04	12	9	92	13
093J060	14,406.04	9	16	30	40
093J063	14,371.03	8	9	53	31

093J064	14,371.03	8	7	58	23
093J065	14,371.03	3	3	143	80
093J066	14,371.03	11	7	167	63
093J067	14,371.03	7	15	133	101
093J068	14,371.03	9	14	45	60
093J069	14,371.03		10	55	73
093J070	14,371.03	11	5	59	38
093J073	14,335.96	7	8	64	18
093J074	14,335.96	6	5	62	32
093J075	14,335.96	9	11	177	40
093J076	14,335.96	8	16	179	38
093J077	14,335.96	6	14	108	53
093J078	14,335.96	10	9	42	85
093J079	14,335.96	7	6	54	23
093J080	14,335.96	8	80	40	39
093J083	14,300.85	11	83	54	18
093J084	14,300.85	7	15	66	23
093J085	14,300.85	7	13	139	73
093J086	14,300.85	9	3	85	88
093J087	14,300.85	8	4	36	27
093J088	14,300.85	13	15	47	30
093J089	14,300.85	7	13	37	11
093J090	14,300.85	14	1	32	9
093J094	14,265.70	1	10	54	1
093J095	14,265.70	10	14	85	40
093J096	14,265.70	7	9	51	66
093J097	14,265.70	8	11	50	75
093J098	14,265.70	19		38	7
093J099	14,265.70	17	4	41	10
093J100	14,265.70	10	16	42	11
093O006	14,230.50	12	6	58	46
093O007	14,230.50	7	15	64	33
093O008	14,230.50	20		46	11
093O009	14,230.50	11		56	16
093O010	14,230.50	19		31	11
093O018	14,195.25	16	2	43	14
093O019	14,195.25	8	16	42	10
Totals	**2,920,067.23**	**2,043**	**1,546**	**8,590**	**9,709**