

Vegetation Resources Inventory

Northern Vancouver Island - Project Implementation Plan for Photo Interpretation

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Table of Contents

Table of Contents	2
Section 1 – Introduction and Background Information	3
Background Information	3
Overview of the VRI Process	4
State of the Current Inventory	4
Project Area Overview	7
Private Land, Woodlots, First Nations TSLs and Community Forests	10
Section 2 - Photo Interpretation Plan	11
Project Objectives	11
Target Area.....	11
Historical Data Sources	11
LiDAR Data	11
New Data Sources	12
Other Data Sources.....	12
Polygon Delineation	13
Integrating RESULTS Information	13
Attribute Estimation	13
Mapping	14
Fresh Water Atlas (FWA) Base.....	15
Section 3 - Project Implementation	15
Project Pre-work meeting.....	15
Scheduling	15
Aerial Photography and Photo Scale.....	15
Project Manager	16
Personnel	16
Quality Assurance	16
Deliverables.....	16
Roles and Responsibilities.....	16
References for Inventory Standards and Procedures.....	17
Project Sign-off Sheet	18
APPENDIX A - List of First Nations.....	19
APPENDIX B - List of Approved TEM for North Island.....	20

Section 1 – Introduction and Background Information

Background Information

This inventory planning document is a working document that states the key reasons and objectives for carrying out a Phase 1 vegetation resources inventory (VRI) 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 and may include small portions of the TFLs where the adjoining areas overlap. The project planning process itself sets the stage for discussions with local stakeholders and First Nations in terms of confirming project goals, objectives, scope, methodologies, deliverables and timelines specific to the North Island VRI project area.

The North Island project area encompasses two natural resource districts on Vancouver Island, several parks, including a significant portion of Strathcona Park, large private forest land holdings, and portions of five TFLs. Stakeholders for this unit include:

- North Island – Central Coast Natural Resource District (NICNRD) staff
- Campbell River Natural Resource District (CRNRD) staff
- Ministry of Environment and other government agencies
- B.C. Timber Sales
- Local major licensees, woodlot owners, private land holders and community forests groups.

In addition to the above stakeholders, there are twenty First Nations with asserted traditional territories within the North Island area of the NICNRD and the CRNRD for engagement within the project area described in this plan (see Appendix A for list of First Nations). Engagement with First Nations including consultation is paramount during the development of this inventory plan and during subsequent Phase 1 fieldwork planning and ongoing project activities. Engagement and consultation will follow the protocol and guidance as described in:

<https://www2.gov.bc.ca/gov/content/governments/organizational-structure/ministries-organizations/ministries/indigenous-relations-reconciliation>

https://www.for.gov.bc.ca/dni/Programs/AboriginalAffairs.htm#First_Nations_Consultation_-_Related_Links

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 northern Vancouver Island 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 North Island area. The recently released blue ribbon panel review of BC's forest inventory program has made a number of significant recommendations, including provision for a wall-to-wall, or seamless inventory, utilization of new technologies and processes and enhanced communications:

<https://www2.gov.bc.ca/gov/content/industry/forestry/managing-our-forest-resources/forest-inventory>

These recommendations, along with others stemming from this inventory program review, provide the guiding framework for this planning document and the North Island VRI project itself.

Overview of the VRI Process

The Vegetation Resources Inventory (VRI) provides a 'strategic' level inventory 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.

The re-inventory process starts by acquiring new imagery. The new digital air photos acquired during the 2017 field season will provide full coverage of the Northern Vancouver Island inventory project area. This new imagery will be used for photo interpretation of the inventory in concert with air and ground calls for calibration purposes. In addition, Light Detection and Ranging (LiDAR) derived information will be used to enhance the inventory for key attributes where available and appropriate in partnership with local licensees. One option being explored is to use LiDAR enhanced attributes such as stand heights, densities, etc. as a reference for the VRI photo interpreters during the reinventory process wherever there is LiDAR coverage in the inventory project area.

In Phase II of the inventory, a subset of the polygons is randomly selected for ground sampling. One of the key purposes of Phase II ground sampling is to verify our level of confidence in the Phase I inventory and to provide supplementary information on stand characteristics (such as tree size distribution) that are not captured in Phase I. Phase II sampling is carried out using documented statistical procedures and standards. Ground sampling is laid out on a grid across the province and the data is also used for monitoring. More details regarding the VRI process and the VRI standards and procedures are available at the MFLNRO Forest Analysis and Inventory Branch (FAIB) website:

<https://www2.gov.bc.ca/gov/content/industry/forestry/managing-our-forest-resources/forest-inventory>

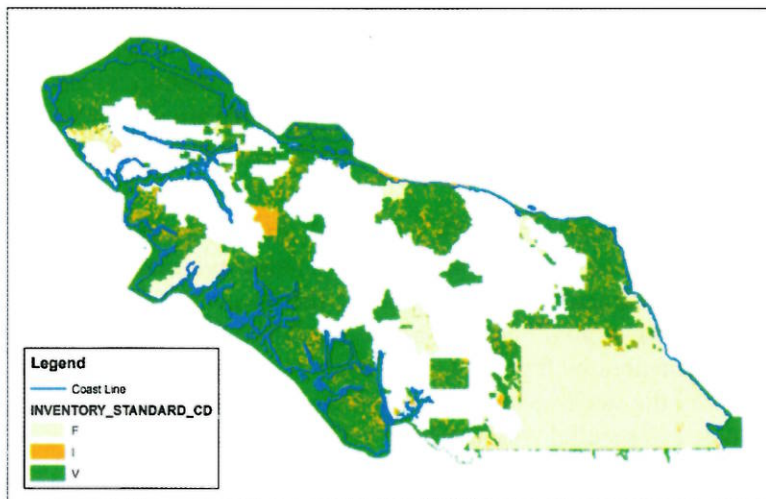
State of the Current Inventory

North Island Timber Supply Area (TSA) Summary

The Northern Vancouver Island Inventory Project Area consists of or adjoins with a complex mix of tenure types that span two natural resource districts, including North Island TSA, Pacific TSA, five Tree Farm Licenses (TFLs) – 6, 19, 37, 39 and 47 (Bonanza Lake Block) - and major licensees include: Western Forest Products (WFP), Interfor and Timberwest Corp (see section on North Island TFL Summary below). Private landholders include Timberwest Corp., Island Timberlands and WFP. Major parks include Strathcona Provincial Park, Cape Scott Park, Brookes Peninsula Park, Woss Lake Park, Schoen Lake Park and Tahsis Kwois Park.

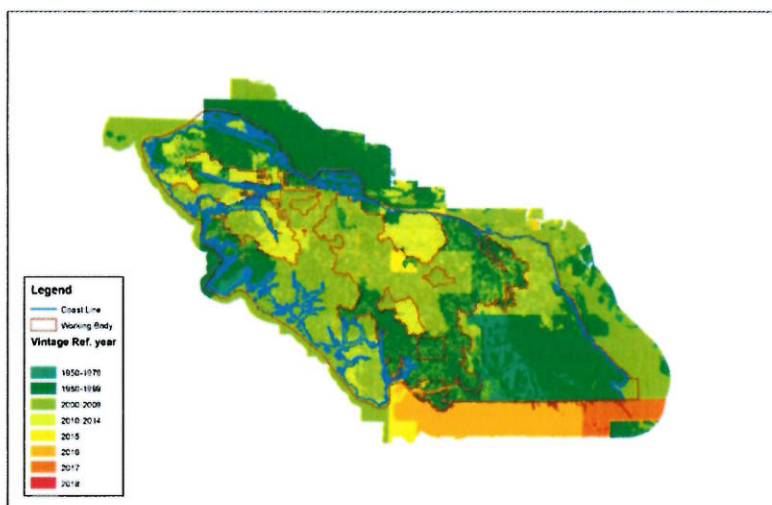
TSA lands are fragmented into many smaller parcels which are surrounded by large areas of TFL, municipal and private lands. Outside of the TFL land, most of the North Island currency is a mix of 1995-1999 in the north-west (approx.. 23 Full mapsheet Equivalents or FMEs) with some older 1980s inventory to the south-west (approx.. 6 FMEs) and some more recent 2010+ inventory in the eastern portion of the unit (approx. 8 FMEs). The North Island consists of a mix of older forest inventory planning (FIP) format (F) or incomplete (I) inventory files to the north and in the south west with the remainder being VRI format (V) through the central and eastern portion of the unit (see Figure 1 and Figure 2 below).

Fig. 1 – North Island Inventory File Standard



NOTE: The above Inventory Standard Codes are based on the best available information available from the data warehouse and there may be some minor discrepancies.

Fig. 2 – North Island Inventory Currency



It should also be noted that much of the access in the TSA is limited and there will be a reliance on air access ground calibration points around the coastal areas to the west and north.

A new Phase 1 inventory in all TSA areas will provide more current information on critical stand attributes such as species composition, volume, density, age and height. A new inventory will also provide more accurate and current information on depletions from harvesting, wildfire and other disturbances.

North Island TFL Summary

The five North Island TFLs have forest cover data to varying currencies and standards as summarized in the following table, based on supporting information used in TSR. No recent Ministry audits have been conducted on the inventories in TFLs. A 1994 inventory audit of TFL 37 showed that the average VRI ground volume was comparable to a subsequent 2002 average volume estimate in that

Inventory Plan for Photo Interpretation of Northern Vancouver Island

unit based on adjusted heights and ages, as determined by the licensee. A 2010 adjustment of TFL 47 identified some uncertainty with respect to stand densities and site index, both being underestimated, and the TFL inventory was adjusted accordingly. FAIB has portions of TFL 6 coverage with LiDAR data as well as other TFL data in older F or newer V format. There are some gaps in TFL data coverage and these gaps will be addressed in this VRI project, e.g. Block 3 TFL 6 (formerly Block 4 TFL 39) and portions of TFL 19. In addition to completing forest cover in identified gaps, a 500m buffer will be employed along the TSA/TFL boundaries in order to seamlessly tie-in forest cover polygons across management units during the re-inventory.

The TFL area is 575,154.24 ha and includes all or portions of TFLs 6, 19, 37, and 39. In this area a separate collaborative inventory project with the licensee is to be undertaken using available LiDAR derived data (canopy height model or CHM and digital elevation model or DEM) and the 2017 digital imagery in a data exchange agreement. The Ministry will employ a new non-VRI approach using a semi-automated segmentation technique augmented with ground calibration data. Preliminary results from this methodology will be reviewed with the licensee before its application to the entire TFL area. This separate project will be conducted in parallel with the TSA VRI re-inventory project.

Table 1 North Island TFL Summary

North Vancouver Island TFLs	Original Est. Reference Yr	Summary and any noted data issues
TFL 6 - WFP	1995	WFP carried out a VRI project for TFL 6 in 1999. Phase I (forest cover polygon boundaries delineated and attributes estimated using aerial photography) was completed in 2000 using 1:15,000 scale colour imagery taken in 1995. Phase II (ground sampling) and the Net Volume Adjustment Factor (NVAF) sampling was carried out in 2001. Some inventory related concerns were noted in the 2011 TSR as follows: A new forest inventory (Vegetation Resources Inventory (VRI)) has reduced estimates of mature timber volumes by close to 10%. The area that consists of former TFL land and is now the N. Island Community Forest will be re-inventoried.
TFL19 - WFP	2000	A VRI project was initiated in 2000. Phase I (forest cover polygon boundaries delineated and attributes estimated using aerial photography) was completed in 2002. Phase II (ground sampling) occurred in 2002 and 2003 and the Net Volume Adjustment Factor (NVAF) sampling was carried out in 2003 and 2004. Some inventory related concerns were raised in the 2010 TSR as follows: Due to the uncertainty associated with the inventory information, in particular with immature natural stands and mature cedar cypress stands, there is a need to review the available inventory data for TFL 19 and explore methods of improving its reliability for the next determination. Missing TFL 19 mapsheet 092E089 needs to be re-inventoried.
TFL 37 - WFP	1995	MoF 1992 with additional VRI-like attributes; Phase II; NVAF. No inventory related issues were raised in the 2017 TSR.
TFL 39 - WFP	1964	MB; incorporates results from subsequent mature and immature cruises (inventory and operational); volumes compiled and applied as AVLs; multiple audits conducted; SI estimated based on a biophysical site index model (BSIM) approach; attributes may have been converted to approximate VRI-like database.
TFL 47 - Timberwest	2006	TimberWest carried out a Vegetation Resource Inventory (VRI) program for TFL 47 including Phase 2 and NVAF adjustment in 2012. The Phase I inventory was completed in March 2007 using 2006 aerial photos. Phase II ground sampling was carried out in between 2007 and 2010, and the inventory attribute information and volumes were adjusted. TFL 47 area on North Island is not part of the VRI project area for re-inventory.

Project Area Overview

The North Island land base is comprised of Crown lands within the North Island and Pacific TSAs, five TFLs, thousands of private land holdings of various sizes including blocks within the E&N belt owned by two large forest companies, municipal lands, First Nations treaty lands, Provincial and Federal Parks, and other protected areas. Significant changes in land tenure and ownership have occurred during the past 20 years and the existing inventories are mostly older than this, therefore reflecting tenure boundaries which existed pre-2000. Also note that TSA and TFL lands within the two natural resource districts but located over on the mainland or adjacent islands, such as the TFL 47 Johnstone Strait blocks, are **excluded** from the North Island VRI project area.

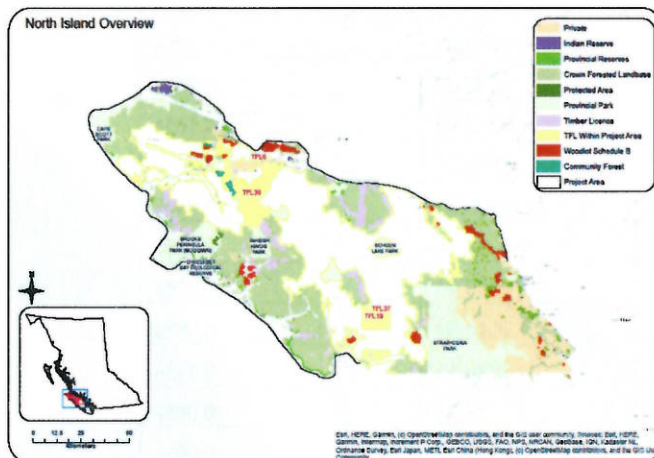
The total North Island VRI project area encompasses 1,392,462.64 hectares (86FMEs) within the North Island TSA as well as portions of the Pacific, and Arrowsmith. TSAs on Vancouver Island (see Figure 3 and Table 3 below). The towns of Port McNeill, Port Hardy, Campbell River and Courtenay are within the VRI project area. The area presents a complex and dynamic situation with significant challenges in planning a new inventory. Many changes to tenure and ownership have occurred in the past 20 years and this trend continues. Treaties are being finalized which will result in the transfer of land from the Province to First Nations.

Currently the VRI project area includes the following:

- TSA land on northern Vancouver Island
- Various municipal and private lands parcels
- Various woodlots and community forests within the project area boundary
- Strathcona Provincial Park (northern portion where it is included within the project area)
- Other protected areas include Cape Scott Park, Brookes Peninsula Park, Woss Lake Park, Schoen Lake Park and Tahsis Kwois Park
- Other Regional and Provincial Parks
- Campbell River Natural Resource District (on Vancouver Island)
- North Island – Central Coast Natural Resource District (on Vancouver Island)

No ground based calibration program will be carried out on any private land however a series of air calls will be conducted to obtain air call estimates over private land. Any detailed inventory information from these air calls will be used for internal analyses purposes, such as fire hazard rating, but will not be published on the data warehouse other than in a generalized summary format.

Figure 3 Overview Map of North Island



Inventory Plan for Photo Interpretation of Northern Vancouver Island

Figure 4. North Island Inventory VRI Project Area (showing VRI project and TFL inventory area)

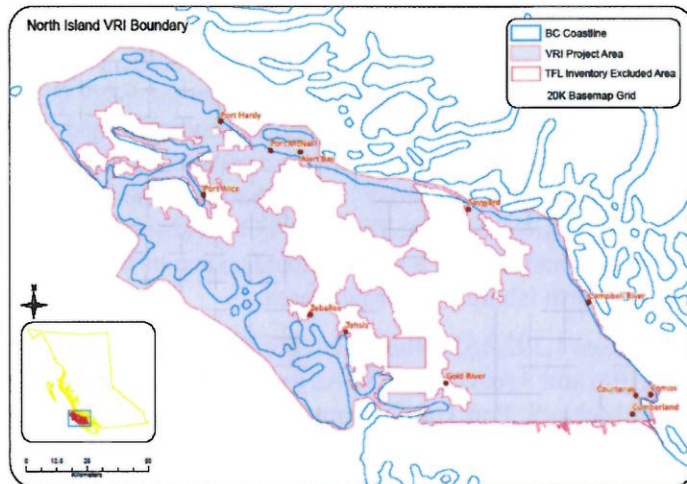


Table 2 North Island Land Base Summary

Ownership Code	Landbase Description	Area (Ha)	Percent of Project Area
40	Exceptions	2404.75	0.17%
40	Private	198976.38	14.29%
41	Land Claim Settlement Area	5911.57	0.42%
50	Exceptions	16.39	0.00%
52	Indian Reserve	5656.04	0.41%
53	Military Reserve	23.73	0.00%
60	Eco Reserve	48.30	0.00%
60	Ecological Reserve	3095.54	0.22%
61	UREP	108.11	0.01%
62	Crown Forested Landbase	497712.13	35.74%
63	Protected Area	1696.37	0.12%
63	Provincial Park	220869.58	15.86%
65	Wildlife Management Area	101.32	0.01%
67	Exceptions	23.21	0.00%
67	LOCAL/REGIONAL PARK	75.35	0.01%
68	Forest Recreation	3770.69	0.27%
69	Misc. Reserves	786.75	0.06%
69	Plantation Reserve	2242.81	0.16%
70	Timber Licence	45899.08	3.30%
72	TFL	164178.50	11.79%
75	Christmas Tree Licence	27.65	0.00%
77	Woodlot	19850.45	1.43%
77	Woodlot Schedule A	1114.84	0.08%
79	Community Forest	1888.15	0.14%
91	Exceptions	41.84	0.00%
99	Misc. Lease	21.00	0.00%
Grand Total		1176540.52	84.49%

Inventory Plan for Photo Interpretation of Northern Vancouver Island

Table 3 North Island TSA Summary (VRI Project Area)

TSA Name	Area (Ha)
North Island	1,284,528.49
Pacific	104,805.60
Arrowsmith	169.01
Great Bear Rainforest (GBR) South*	2,916.48
Grand Total	1,392,419.57

*NOTE: A small portion of GBR South is included in the VRI project area with the inclusion of Malcolm Island and Alert Bay

Table 4 North Island Overall Project Area Summary

Description	Area (Ha)
TFL Area Excluded (No VRI Work)	575,154.24
TFL Area Included in VRI Project Area	133,573.21
500m Buffered Area (Inside TFL)	78,421.93
Total VRI Project Area (Including Water)*	1,392,462.64
VRI Project Land Area	1,176,527.45

*Note: This is the area that will be re-inventoried together with small islands and islets in the open water area

The summary of forest cover polygons by leading species is provided in Table 5 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 5: North Island TSA Leading Species Summary

Leading Species*	Number of Forest Cover Polygons
ACT	34
B	3991
CW	16007
YC	4548
DR	1975
FD	7889
Hw	28495
Hm	2590
MB	26
P	936
S	865
Total Count	68,654

*Note – Total forest polygon count 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.

The biogeoclimatic (BEC) summary is based on current information across the current North Island VRI project area and is a complete coverage (see Figure 4 and Table 6 below). The CWH is by far the predominant BEC Zone, followed by MH and CMA.

Figure 5: North Island Inventory Project Area BEC

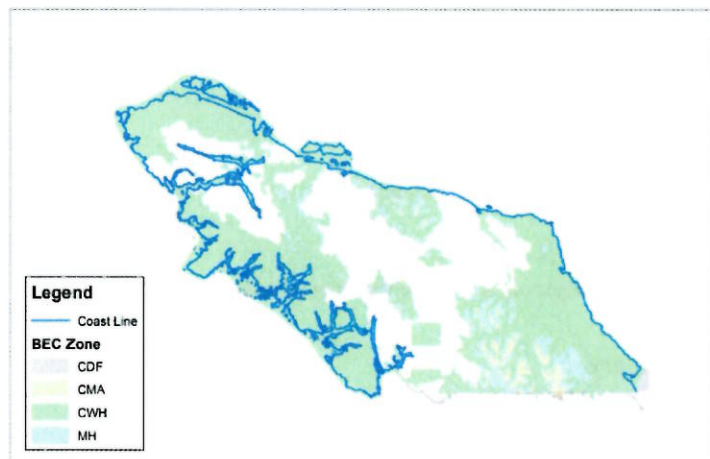


Table 6 Summary of Project Area by BEC Zone

Biogeoclimatic Zones (BEC)	Area (Ha)
CDF Coastal Douglas Fir Zone)	4,563
CMA (Coastal Mountain-heather Alpine Zone)	39,157
CWH (Coastal Western Hemlock Zone)	997,145
MH (Mountain Hemlock Zone)	135,661
Total BEC	1,176,526

Private Land, Woodlots, First Nations TSLs and Community Forests

The new inventory will include any woodlots and the four community forests lying within the project area. Any photo interpretation calibration points established in earlier inventory projects would be made available as part of any historical data source for use in the new inventory project. Private and municipal lands and woodlots are included in this project however ground calls will not be established on any private lands. Operational procedures over private lands will follow the same process employed in the recently completed South Island VRI. FAIB recognizes the special sensitivity of inventory information on some tenure and ownership types. FAIB will work with stakeholders to resolve any potential concerns. Information on First Nations traditional use studies are not generally made available to government agencies or the broad public 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.

Section 2 - Photo Interpretation Plan

Project Objectives

The overriding objective of this photo interpretation project is to update the inventory for the North Island to one standard, format and currency across the entire North Island Inventory Project Area to account for what is presently a complicated and fragmented inventory consisting of various standards, formats and 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 re-inventory information will also be available as a crucial dataset for the next North Island TSA and Pacific TSA AAC determinations in accordance with Section 8 of the Forest Act.

Target Area

The entire North Island TSA and small portions of the Pacific, Great Bear Rainforest, and Arrowsmith TSAs on Vancouver Island of the North Island Inventory Project Area will be photo interpreted inclusive of Strathcona Park, all woodlots, private land, small parks and community forests and exclusive of those areas listed as having a recent and available VRI as noted in the Project Area Overview (see Fig. 3 VRI Project Overview above). 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. The TFL areas will be re-inventoried, using new methods as described above and based on available LiDAR derived data, as a separate project conducted in parallel with the inventory across the TSA portion of the VRI project area.

Historical Data Sources

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 contract.

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 2017 imagery will be transferred to a digital format provided by the Ministry. A full list of currently known FIP and VRI historic calibration data will be made available to the VRI contractor.

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 document.

LiDAR Data

LiDAR inventory data coverage exists for some of the VRI project area. The Ministry is presently negotiating the use of licensee acquired LiDAR derived reference information in the TSA. The intent is to use the LiDAR derived reference information in conjunction with the standard imagery employed for VRI photo interpretation in order to enhance specific attributes such as stand height in areas where LiDAR information may be available. Standard VRI photo interpretation will be performed in these areas concurrently to capture species composition and other key attributes from the standard digital air photo imagery.

New Data Sources

The contractor will establish a minimum of 10 ground calls and 20 air calls per map (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. It should also be noted that much of the access in the TSA is limited and there will be a reliance on air access ground calibration points around the coastal areas to the west and north.

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 based on the approximate ratio of mixed versus pure composition stands and multi- versus single layer stands. Any deviation from these numbers must be agreed upon by the Ministry Project Manager and will be reflected in the field calibration plan. **Note: ground calibration data will NOT be collected on private land (this includes the establishment of any type of ground plots).**

Prior to the initiation of a field calibration program, a Field Calibration Plan (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 first draft (See Table 7 Other Data Sources below).

Table 7: Other Data Sources

Data Source Origin	Number of Data Sources (est)
TSA Historic Air and Ground Calls	
Brooks peninsula data sources (1998 colour photos)	35
Strathcona data sources (2003 colour photos)	103
Strathcona data sources (1991 B/W photos). This is a mix of 1967 and 1993 sources some of which may have previously been transferred.	825
Total air and ground calls	963
Site productivity – Approved TEM*	
Other TBD	

*The VRI Phase 1 contractor will use the provincial site productivity layer information as a reference for site index (SI) where SI is not available in the RESULTS 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 TEM and SIBEC information for the North Island Inventory Project Area by species for the recorded TEM datasets collected within the project area (See Appendix B for details). The provincial site productivity layer data and supporting information is available at:

<https://www2.gov.bc.ca/gov/content/industry/forestry/managing-our-forest-resources/forest-inventory/site-productivity/provincial-site-productivity-layer>

Polygon Delineation

Polygon delineation is to be completed to VRI standards. Any deviation from these standards must be agreed to 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 North Island project area indicates there are 8,342 openings for a total area of approximately 240,566 ha (see Figure 5 and Table 8 below).

Fig. 6: North Island Inventory Project Area RESULTS Spatial File Coverage

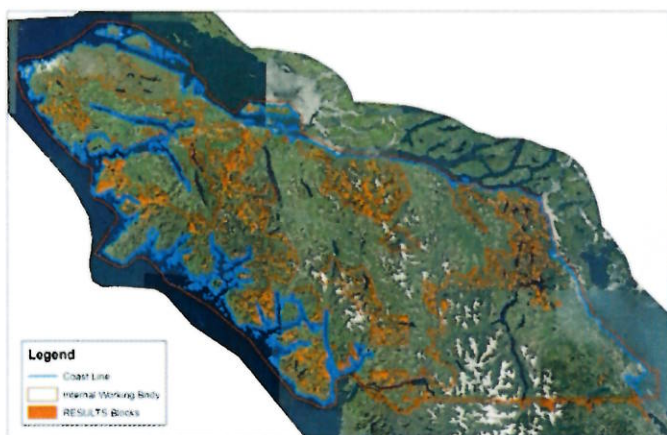


Table 8: RESULTS Summary for North Island Inventory Project Area

RESULTS Data Summary	# of Openings	Area (Ha)
RESULTS Free Growing (# of Openings)	3247	70,188
RESULTS Depletion/Regen (# of Openings)	5095	170,378
Totals	8,342	240,566

The FAIB Kamloops Update Team is presently running a RESULTS data preparation process for the North Island Inventory Project Area and an updated ESRI file (PGDB format) for the RESULTS openings and tree attributes will be provided to the successful bidder. A significant portion of the RESULTS depletions will 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 2017 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 0.5 ha resolution for this project to remain consistent with the recently completed South Island VRI.

Attribute Estimation

This project will be undertaken in softcopy (digital photogrammetric) format and will follow published VRI standards and procedures.

Inventory Plan for Photo Interpretation of Northern Vancouver Island

Variable retention harvesting systems have been used throughout BC coastal operations since the early 90s. 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, in order to be consistent with the approach used for the South Island VRI.

Examples of tree retention to be described in silviculture openings:

1. Dispersed Retention of residual stems

Layer 1: Fd100 95yrs - 23m

Layer 2: Fd100 2yrs - 0.3m



2. Clearcut with Reserves - patches below 0.5ha (patches >0.5ha must be delineated)

Layer 1: Fd600Hw30Cw10 95yrs - 22m

Layer 2: Fd100 2yrs - 0.3m



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.

Inventory Plan for Photo Interpretation of Northern Vancouver Island

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 FAIB.

Fresh Water Atlas (FWA) Base

A set of FWA (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 FWA feature unless significant changes occurred to the polygonal features such as lakes and double-line river features.

Section 3 - Project Implementation

Project Pre-work meeting

A project pre-work meeting is mandatory. 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

The North Island Inventory project will progress over three fiscal years commencing in the summer of 2019. Reinventory work will progress from south to north and along the western side of the project area in order to tie-in with the adjacent South Island VRI which has recently been completed and loaded to the data warehouse. 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 plan. Any project specific details such as safety, access and seasonal field work scheduling are covered during the contract award and pre-work meeting with the contractor(s). The delivery schedule of specific maps will drive the stages of work throughout this project, with the south and westernmost TSA maps being the priority for Year 1. The remaining fieldwork, photo estimation and map production will be completed in the 2021/22 fiscal year (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 project pre-work meeting.

Aerial Photography and Photo Scale

The present 2017 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 2017.

Flight lines were oriented in an East-West direction and captured at 25cm GSD (ground scale distance). The digital copy image sets will be available in 4 band RGBIR imagery in TIF (compressed tiled jpeg) format with ZI model setups.

Project Manager

The Ministry Project Manager for the North Island Natural Resource District Phase 1 VRI project is Mathias Hulten, FAIB. 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 or equivalent. All uncertified photo interpreters are to be directly supervised by a Certified Photo Interpreter or equivalent working on that project.

At least 50% of the photo interpreters working on the project must be certified for VRI photo interpretation. 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.

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. 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

Inventory Plan for Photo Interpretation of Northern Vancouver Island

The Project Manager is the point of contact for the Ministry and provides overall communication of project activities with contractors and North Island Natural Resource District staff and stakeholders via the Ministry SharePoint site.

VRI Contractor

The 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

The 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.

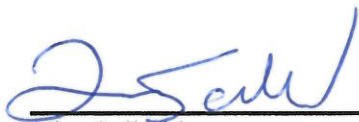
- *Vegetation Resources Inventory Photo Interpretation Procedures*
- *Vegetation Resources Inventory Photo Interpretation Standards and Quality Assurance Procedures*
- *Vegetation Resources Inventory Field Calibration Procedures for Photo Interpretation*
- *Guideline for Integrating RESULTS Information* (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*

Inventory Plan for Photo Interpretation of Northern Vancouver Island

Project Sign-off Sheet

**Northern Vancouver Island Vegetation Resources Inventory Photo Interpretation Project
Implementation Plan**

I have reviewed and approved the North Island Vegetation Resources Inventory Photo Interpretation
Project Implementation Plan (VIP)



Tim Salkeld
Manager, Forest Inventory Section
Forest Analysis and Inventory Branch
Ministry of Forests, Lands, Natural Resource Operations
and Rural Development



Date

APPENDIX A - List of First Nations

This list of First Nations was referenced from the NICCNRD and CRNRD lists from the local FN Advisors:

Contact Name
Ehattesaht First Nations
Homalco First Nation (Xwemalhkwa)
Huu-ay-aht First Nations
Ka:yu:kth/Che:k:tes7eth First Nation
K'omoks First Nation
Mamalilikulla First Nation
Mowachaht/Muchalaht First Nation
Nuchatlaht Tribe
Qualicum First Nation
Tla'amin Nation
Tlowitsis First Nation
Toquaht Nation
Uchucklesaht Tribe
Ucluelet First Nation
We Wai Kai Nation
Wei Wai Kum Nation
Quatsino First Nation
Kwakiutl First Nation
Tlatlasikwala First Nation
Gwa'sala-'Nakwaxda'xw First Nation
'Namgis First Nation

APPENDIX B - List of Approved TEM for North Island

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

<https://www2.gov.bc.ca/gov/content/industry/forestry/managing-our-forest-resources/forest-inventory/site-productivity/provincial-site-productivity-layer>

Summary information on the completed TEM projects and datasets within the North Island project area can be found in the accompanying technical report at:

https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/forestry/stewardship/forest-analysis-inventory/site-productivity/technical_document_flnr_provincial_site_productivity_layer_v61_draft_20171205.pdf

(Table 7, pg. 22 – 29)

