FOREST ANALYSIS AND INVENTORY BRANCH

VEGETATION RESOURCES INVENTORY

STATUS REPORT

TO THE CHIEF FORESTER

PREPARED BY

THE VEGETATION INVENTORY ADVISORY COUNCIL

SECRETARIAT

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ENAR ESDE INC.

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ACKNOWLEDGEMENTS

This report outlines the status of the Vegetation Resources Inventory Program as of June 30, 2008.

The author, who serves as the Secretariat to Vegetation Inventory Advisory Council is grateful to the Council, and the Forest Analysis and Inventory Branch staff of the Ministry of Forest and Range, who assisted in providing information and reviewing the report so it may outline the state of the Vegetation Resources Inventory today, the work taking place, and trends and challenges confronting the inventory program.

A sincere thank you and expression of gratitude is extended to all who assisted in this report.

Sheldon Gagne, RPF
ENAR ESDE Inc.

EXECUTIVE SUMMARY

It is a daunting task to inventory the 60 million ha of the working forest land in British Columbia. Since its inception in 1996, the Vegetation Resources Inventory (VRI) Program has made considerable progress, completing approximately 55 percent of the photo interpretation (Phase 1) and 45 percent of the ground sampling (Phase 2) work for the entire province.

In 2006, the VRI Program was enhanced with the creation of the Vegetation Inventory Advisory Council VIAC with an annual commitment of $8 M to carryout the inventory activities. VIAC is a joint government-industry council with a mandate to advise the Chief Forester of the Inventory Program's progress, concerns and solutions. In finding remedies to challenges, VIAC may organize Technical Working Groups. In 2007, three technical working groups were established to address: change management, criteria and ranking of the management units, and the information attributes being collected. There is always pressure to collect more information. However, VIAC and the Forest Analysis and Inventory Branch are sensitive to costs and the goals of the VRI Program.

The primary goal is to complete VRI coverage for the Province by 2015. There are several challenges that may effect the progress of this Program. Where possible mitigating actions have been taken to address these challenges. Capacity is an issue. Going forward, there are fewer and fewer qualified forest inventory practitioners. A training program within the Ministry of Forest and Range has been developed, but it cannot substitute for the forestry schools that have had declining enrollments.

The current downturn in the forest industry may, if prolonged, effect the progress, projects, and staff availability to plan and carryout VRI activities. Over 41 industry operations have been closed or curtailed in the last two years.

Accurate inventory information is important in land management decisions ranging from wildlife habitat availability, resource management, to allowable annual cut determinations. Knowledge of supply is important for the industry's investments and customers.

A Strategic Plan has been developed to guide the VRI program. Because of priorities such as the MPB, climate change and other challenges, the Strategic Plan will be reviewed and revised this year. Contractor capacity to carry out specialized field work and the need to shift to new priority management units, may effect the overall goal of completing the VRI by 2015. Risks associated with this goal are discussed in this report.

1.0 INTRODUCTION

This document outlines the current status of the Ministry of Forests and Range, Vegetation Resources Inventory for British Columbia. It has been prepared for the Chief Forester by the Vegetation Inventory Advisory Council's Secretariat and the Ministry of Forest and Range, Forest Analysis and Inventory Branch.

BACKGROUND

British Columbia has a forest land base of over 60 million hectares. Sampling and measuring the provincial forests, determining its growth, volume and changes over time is the responsibility of the Chief Forester, through the Forest Analysis and Inventory Branch[1]. Accurate knowledge of the land base is important for forestry investments, land management and the Chief Forester's allowable annual cut determinations. Other resource agencies and industries rely on accurate forest cover information for their planning and operational work.

The province has an extensive history in measuring and empirically quantifying its forests. This history is summarized in the 2008 - Inventory Program Review Report[2]. In 1992, the British Columbia Forest Resources Commission identified the need for standardized, statistically defensible forest resource inventories. The process of inventorying the province was enhanced in 1996, with the introduction of the Vegetation Resources Inventory (VRI) program. In 2006, the VRI program was further advanced with dedicated funding, and the establishment of an Advisory Council to help ensure the completion and updating of the provincial VRI forest inventory program.

VEGETATION INVENTORY ADVISORY COUNCIL

The Vegetation Inventory Advisory Council[3] (VIAC) is a collaborative, government – forest industry advisory team whose fundamental purpose is to provide strategic oversight, identify issues and assessing options. The Council advises the Chief Forester on:

- VRI Program priorities and developments;
- VRI Strategic Planning including monitoring, adjustment, and reporting on achievements
- Annual business planning, criteria and strategic allocation of funding.

VIAC's roles and responsibilities were clarified in 2008 with the completion of a Terms of Reference document. (see: Footnote 2 below.)

In 2005, prior to the formation of VIAC, the mandate for provincial forest inventory work was repatriated back to the Ministry of Forests and Range, Forest Analysis and Inventory Branch from the Ministry Sustainable Resource Management (where it resided from 2001 to 2005). The repatriation of the provincial forest inventory back to the Ministry of Forests and Range was a significant step, enabling a working relationship between timber supply and forest inventory, and greater coordination of strategic planning and field activities.

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[1] This is a collaborative effort involving the expertise of other departments. For example, the Research Branch develops site productivity tools and projections for managed stands.

[2] Refer to the Forest Analysis and Inventory Branch website - http://www.for.gov.bc.ca/hts/inventory_prog_rev.htm

[3] Refer to Forest Analysis and Inventory Branch website, footnote 1 – VIAC Terms of Reference

GOALS AND ACCOMPLISHMENTS

In March 2007, the Forest Analysis Branch completed a 2007 – 2015 Strategic Plan to help guide the completion of the VRI program through to 2015. The plan established 9 goals, briefly described in the following table.

Table 1: VRI Goals and Accomplishments

Goals		*Accomplishments*
1. Set High Level Direction	√	o *March 2007: Completion of Inventory Strategic Plan* o *February 2008: VIAC Strategic Planning Session*
2. Collaboration MFR and Industry	√	o *Formation of VIAC, Technical Working Groups* o *2007 VIAC Terms of Reference*
3. Complete VRI by 2015	On-going	o *Advancement of 35% to 50% coverage: 2004 – 2007*
4. Forest Inventories are Current (disturbance, growth)	On-going	o *Implemented Vegetation Resources Information Management Systems (VRIMS) for improved data access.* o *FFT MPB inventory support; MPB map of grey attack; special projects in MPB immature pine stands;*
5. Forest Inventory are Reviewed/ Evaluated Base Criteria	√	o *2007: Formed Criteria and Ranking working group; completed Criteria Ranking guidelines; formalized process of evaluating proposed projects against guidelines.*
6. Inventories are Based on Criteria	√	
7. Re-establishment of Growth and Yield Program	√	o *2007: A G&Y committee was formed to develop G&Y Strategy for release in late 2009. The strategy will advise the Chief Forester to improve G&Y, pursuit to the CF's stewardship, inventory and timber supply analysis mandate.*
8. Ensure Standards are Based on Continuous Improvement	√	o *Oct 2007: The formal change management process was improved and a change management website established.*
9. Improve accessibility and understanding of forest inventories	√	o *Communication products developed explaining inventory and access to it.* o *VIAC assistance developing communication tools.*

2.0 VRI PROGRAM PROGRESS

PHASE 1

VRI consists of two phases. Phase 1 is photo-interpretation and Phase 2 is ground sampling. Photo-interpretation involves specialists who review aerial photographs and estimate forest attributes that describe the forest including: tree species composition, age, height, crown-closure, basal area, vegetation and natural features. To date, a large proportion of the photo interpretation work completed to VRI standards has been in the northeast portion of the province. The forest tenures of this portion of the province are predominantly a few, large licensees. Managements Units (MU) that have numerous smaller licences, may require more intricate coordination to organize photo flights and achieve economies of scale than MUs with large licences. In 2007, in addition to the northeastern air photo projects, major Phase 1 projects were conducted in six other timber supply areas. VRI is generally a sequential process starting with photo acquisition, photo interpretation, followed by ground sampling. There are only 3 contractors who currently undertake Phase 1 work.

PHASE 2

Ground sampling is the on-ground collection of field measurements that are used to develop a statistical adjustment for photo interpreted attributes. This adjustment process is complex: a 100 ground samples may be applied to an entire Management Unit. It is important the information is collected without bias and be statistically sound. Ground sampling is the most expensive phase of the VRI process. The average plot cost in 2007 was approximately $2550. High tech imagery solutions have been considered, but their application to forest inventory is limited, given the closed canopies and extensive relief of much of the Province's forests.

A part of the ground sampling process includes a determination of a net merchantable volume adjustment factor (NVAF). The NVAF is developed through on ground visual estimates and destructive sampling. The NVAF sampling may be used to correct for errors in taper equations and hidden decay.

Table 2: VRI Allocations by Phase

Phase/Activity	2007 / 2008 Funding Allocation	2008 / 2009 Funding Allocation
Photo Interpretation	$6,265,133	$5,907,000
Ground Sampling	$1,386,837	$1,761,000
VIAC	$255,000	$250,000
Total	$7,906,970.00	$7,918,000

There are 12 attributes collected in ground sampling. Throughout the development of the VRI Program, there has been pressure to increase the number of attributes. Most recently, green house gas, $C0_2$ level increases, and climate change concerns have provided impetus to collect more information. However, moving to a new protocol has significant ramifications and costs. VIAC members have stressed the importance of covering the core needs of the information, and cautioned against adopting elaborate and expensive data collection, without a comprehensive evaluation of the program and funding.

VRI COMPLETION

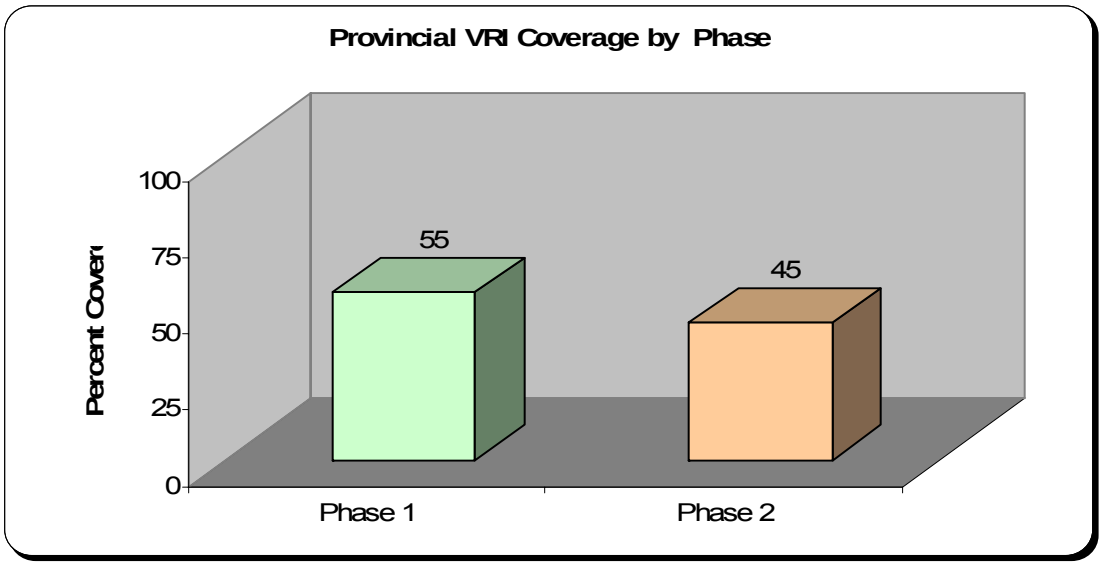


Figure 1: Approximate provincial VRI coverage by March 30, 2008

Currently, an estimated 55 percent of the province has been completed with VRI Phase 1 coverage (photo interpretation), and 45 percent of the province has had Phase 2 work (ground sampling) completed. There may be up to a two-year lag time for the work to be loaded into the database. Consequently, the area of coverage described in forest inventories files is between 40 and 50 percent. Preparing the information to update the database is an ongoing process.

The VRI Program has made considerable progress since the dedicated funding was directed to the program in 2005/2006. This is illustrated by the following graphic.

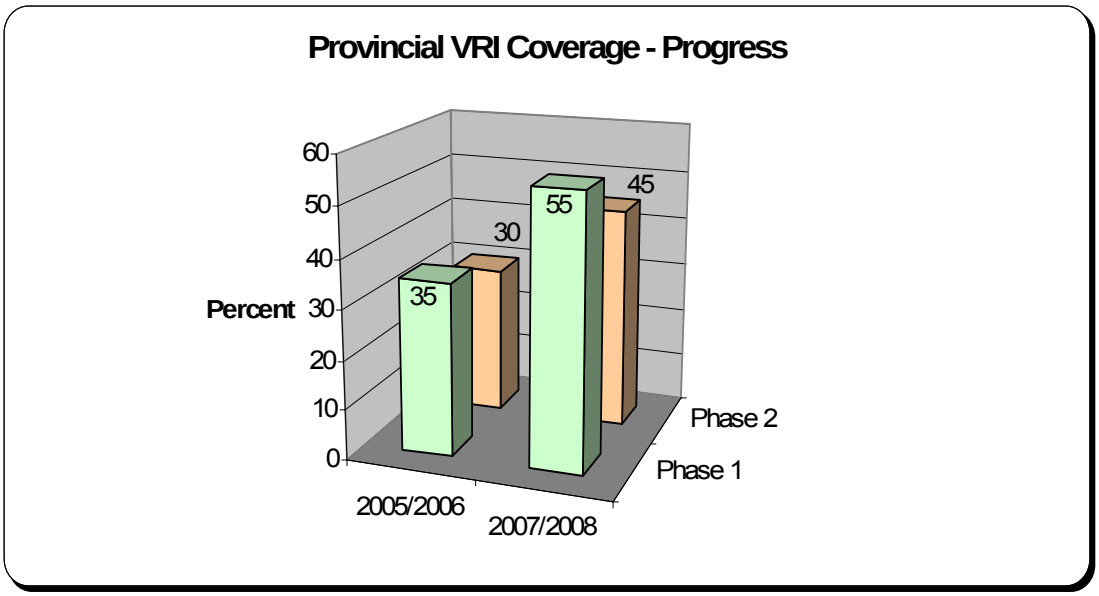


Figure 2: Incremental increase in VRI coverage since 2005

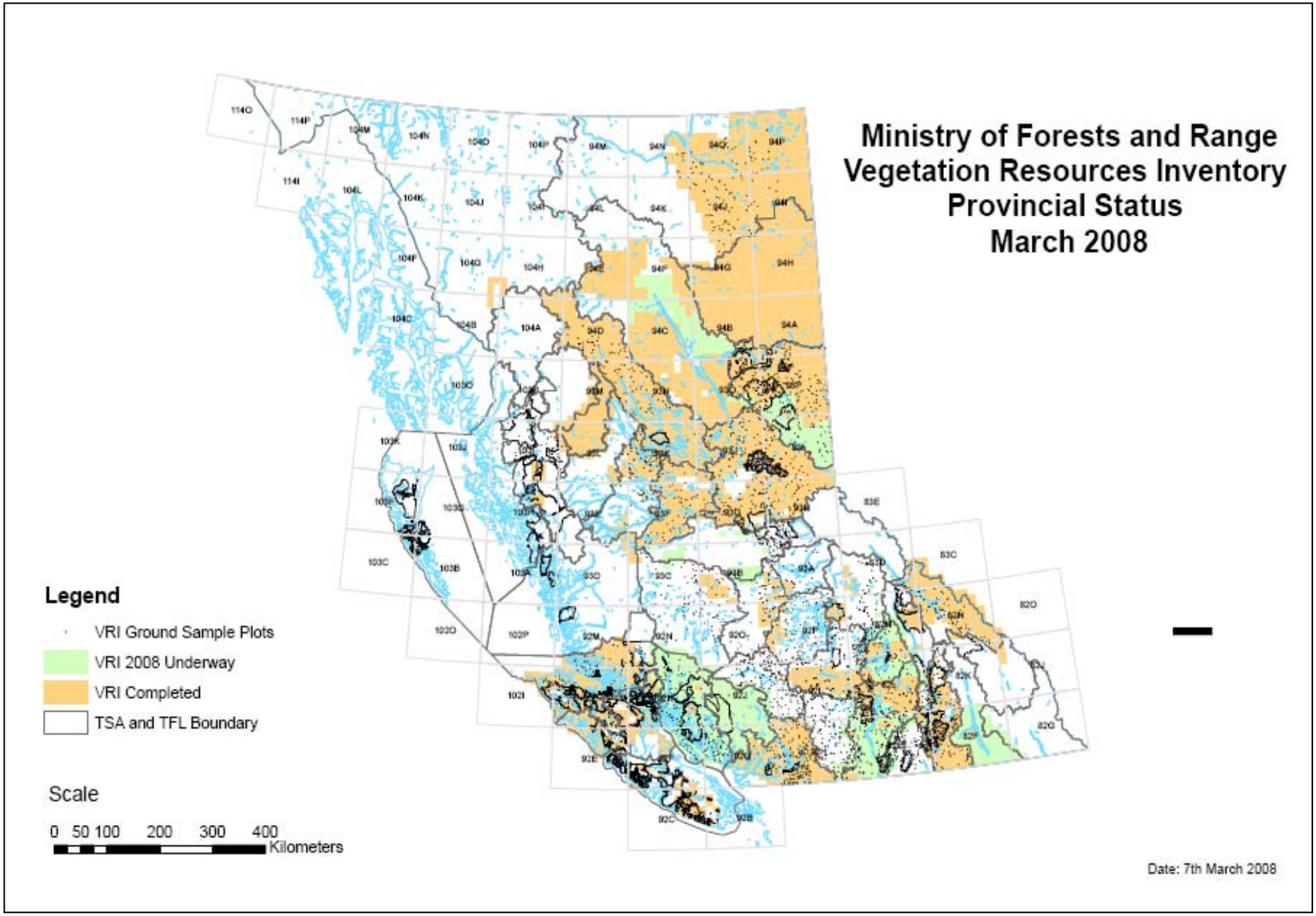


Figure 3: Provincial VRI Status

PROVINCIAL VRI STATUS

Figure 3 illustrates the current provincial coverage of VRI – completed and underway (March 2008). The following points should be noted regarding this map.

1. Some areas of the province indicate an abundance of ground sampling with little or no photo-coverage. These areas, such as Williams Lake are residual from the FRBC-era, when the Ministry was more directly involved in the planning and execution of the VRI program.

2. There also gaps, in the middle of an otherwise completed TSAs. These areas are likely to be Tree Farm Licences (TFL). TFL inventory information is developed and managed separately by the TFL holder. Approximately 8 million hectares of TFL information not recorded in the landbase information system (Land and Resources Data Warehouse). 6 TFLs have provided their inventory information to populate the LRDW.

3. The mid to north coast region displays less historic inventory activity. This is a mountainous, rugged area, with an operable landbase of 7 to 10 percent. Parks, the Kitlope Heritage Conservancy, and TFLs also account for the apparent gap in coverage.

4. Within the last two years, extensive ground sampling has occurred in the Prince George TSA in the effort to complete the VRI in that TSA. In 2008, VRI activity will be concentrated in the lower coast, Kootenays region and portions of the Dawson and Mackenzie TSAs.

5. The Cassiar region is mountainous, remote, with limited merchantable timber. This vast area is not expected to have any VRI activity in the foreseeable future given the priority use of funds and the needs of other management units. This area is adequately served by satellite imagery.

Finally, the map may depict an isolated pattern of work which appears out of sync with the general VRI activity. In such instances, a specific project or need occurred which warranted the VRI investment. In general, VRI investments are rationalized to maximize objectives/priorities, contractor availability, licensee inventory and operational considerations.

VRI WORK COMPLETED

Three maps in the Appendices of this report, provide a further illustration of the VRI work which has been completed. These maps provide the general location of:

a) Phase 1, VRI photo interpretation completed for the province.
b) Phase 2, VRI ground sampling completed to date.
c) 2007/2008 aerial photography covering the north coast and the Queen Charlotte Islands.

In general, these maps illustrate the extensive area where VRI work has taken place. Much of the Province has received a form of VRI activity (photo coverage, photo interpretation, and ground sampling). However, the vastness of the Province, diversity of terrain, forest types and vegetation, create logistical, budgetary and planning challenges for the program. These challenges are compounded by major forest altering events such as the MPB, which may effect VRI priorities and management unit completion schedules.

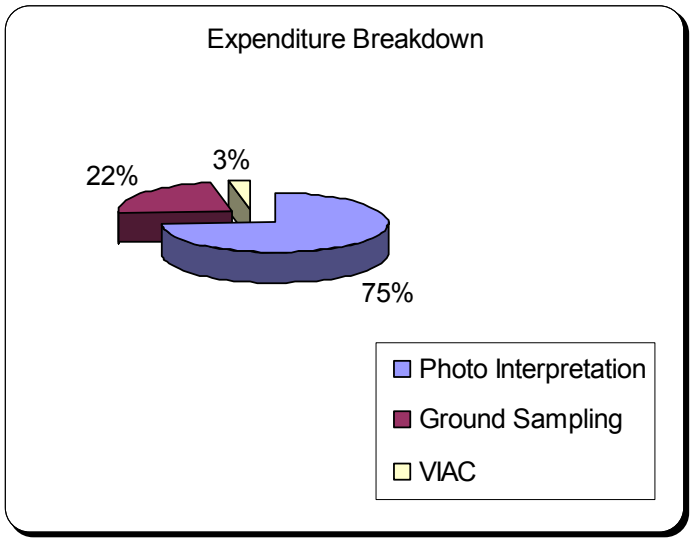
SELECTION CRITERIA

As the VRI Program developed, inventory investment decisions became a more formal process. In 2007/2008, Criteria and Ranking guidelines were developed to prioritize inventory investment decisions. This was a significant step and provided greater consistency in the allocation of funds for projects and annual budgeting and ranking decisions. As VRI projects are completed, and new projects are brought forward, their priority is evaluated with the following considerations:

1. Is the current inventory older, not in VRI format and considered unreliable?
2. Is the request to complete Phase 2 where Phase 1 has been completed?
3. Did the Chief Forester's AAC rationale identify initiation or completion of the management unit's inventory as a priority?
4. Are there urgent information needs created by pests/diseases (i.e. the MPB epidemic), or changes in forest management practices (i.e. Ecosystem Based Management) to be addressed.

3.0 FINANCIAL SUMMARIES

As outlined in Table 2, the dedicated funding for the VRI Program is about $8.0 M per year.



The percentage of funding breakdown of the primary VRI activities is shown outlined in this chart.

In addition to the focussed funding, licensees may utilize discretionary funds to augment some activities related to forest inventory. These funds are managed under the Forest Investment Account, Landbase Investment Program (LBIP) established in 2002. The LBIP funds however are not to be utilized in place of VRI directed funds. These funds have a broader strategic application related to modeling, enhancing site productivity, and terrestrial or aquatic environmental restoration. These investments are utilized at the licensees discretion, subject to criteria established for the program. Discretionary funds are administered by a third party administrator.

To clarify the application of the discretionary and dedicated funding for the stakeholders in the Program, an information paper titled – *Vegetation Resources Inventory and FIA Focused Funding 2008/2009* has been circulated and posted to the Land Base Investment Program website.

4.0 TECHNICAL WORKING GROUP PROGRESS

Part of VIAC's mandate is to form technical working groups (TWG) to address specific issues as they arise. In 2007/2008, three TWGs were formed: Change Management, Criteria and Ranking, and Core Attributes. These groups have government and industry representation/input, and are chaired by John Wakelin, Laurence Bowdige, and Kevin Johnson of the Ministry of Forests and Range.

CHANGE MANAGEMENT TWG

The Change Management Working Group's primary goal was to review the existing Change Management Process (CMP), and determine how it may be improved.

Key subject areas where change may occur include standards in ground sampling, photo interpretation, monitoring and the net volume adjustment factor. In assessing if a change is appropriate, consideration is given to the costs involved, the impact of the change on the statistical reliability of the inventory, and the ability of the database system to incorporate the change.

After reviewing the current CMP, the Change Management Working Group made 8 recommendations and produced a concise guide outlining the process of effecting minor changes. All major change suggestions are directed to VIAC because of cost implications. A *Change Management* webpage has been established to receive suggestions on changes to the VRI. All suggestions are reviewed. However, affordability, priorities and resources restrict what changes are adopted. Changes are instituted and communicated between February 1st to March 31st, to enable utilization of the change at the start of the field season. Changes may take 1 to 3 years to implement.

The website, adoption of a formal process and VIAC have improved the VRI change management process and help ensure stakeholders are aware and understand the rationale behind proposed changes.

CRITERIA AND RANKING TWG

The goal of the Criteria and Ranking Working Group was to establish criteria that would enable objective assessment of each Management Unit's (TSA, TFL) needs and timing of forest inventory data collection projects.

Initially the working group created an extensive list of potential business and technical considerations. These elements were then modified, combined or deleted to form a draft set of criteria that could be applied to each TSA and TFL. As much as possible, subjective criteria were not included. After some discussion and review a checklist format was developed. The key parameters in the evaluation process are described under Selection Criteria (page 12).

Over the course of completing the provincial VRI, it is expected that the criteria and ranking of the MU inventory projects may have to be further reviewed and adjusted to address changing circumstances. In the first quarter 2008, for example a review of the criteria was completed. No further adjustments were made. However, with the current downturn of the forest industry, MUs with significantly curtailed operations, may warrant re-evaluation of inventory expenditures. VIAC, the Technical Working Groups,

the Ministry of Forests and Range, and the Administrator will act prudently to allocate funds and adjust as necessary.

ATTRIBUTE TECHNICAL WORKING GROUP

The mandate of the Attribute TWG is to review the current set of attributes or information collected in VRI (Phase 1 and 2) and determine if business needs are being met. As changes in the attributes collected and protocol may have significant costs, the Forest Analysis and Inventory Branch and VIAC have been cautious in altering the inventory information collected. In 2007/2008 the Attribute Technical Working Group, contracted an experienced inventory consultant to assist in the process of determining if the current attributes were adequate. Or, if changes were needed, the nature of the changes.

In early 2008, a survey was completed by 88 VRI users to determine issues and information being extracted from VRI. The survey indicated that habitat analysis, modeling, resource availability and timber supply review (TSR) were key uses of the VRI. Inventory information is used to make decisions from stand to regional and provincial levels. Key issues for the data include its accuracy, access, and currency.

The Attribute TWG will do further work with technical experts and produce a final report on proposed adjustments in November 2008. VIAC and the Ministry of Forests and Range will review the report and decide on appropriate attributes. Any changes in the attributes will be incorporated through the Change Management consultative process.

5.0 CHALLENGES AND TRENDS

CAPACITY

VRI program managers, planners and licensees are facing an increasing scarcity of qualified personnel to carryout the field work, photo interpretation and other forest inventory functions. As in some other industries, demographics and declining enrollments in post-secondary forestry schools have contributed to this diminution. As experienced staff and contractors retire, it is difficult to find replacements. The economic difficulties of the industry have also discouraged youth from enrolling in forestry schools.

The availability of qualified contractors, is a factor which may limit the progress of work on the ground. Estimates of qualified active trained persons are:

Activity	Number of Active Certified Samplers
Phase 1	61
Phase 2	27 timber; 2 ecology
NVAF	8

Given the large area that must be covered during the field season, these numbers underline the capacity issue.

In 2007 and 2008, the Ministry of Forests and Range, Forest Analysis and Inventory Branch examined VRI training needs. VRI training includes air photo interpretation, ground sampling and net volume adjustment courses and certification.

The main objective of the training is to have enough qualified contractors for the magnitude and timing of VRI projects throughout the province. Capacity is especially limited for northern interior projects. Ground sampling and volume adjustment fieldwork may have to proceed during different field seasons, given the limited number of qualified contractors.

Training courses have been provided, but funding is a concern. Courses may be offered on a cost-recovery basis to industry. For government staff, some training has been provided through a Corporate Learning Fund. Course materials developed for MFR staff may be utilized by industry and consultants in the business.

TECHNOLOGY

Satellite imagery has been utilized in various applications by the Ministry for many years. This technology provides a coarse overview, and is well suited to determining the area denuded, landscape images, and the location and magnitude of major fires, pests and disease outbreaks.

Separate from the VRI, but part of the Forest Analysis and Inventory Branch's work, is the application of this technology and aerial photography in the analysis of MPB change tracking and the shelf-life of the dead pine. Orthographic photographs have been used extensively in the heavily hit beetle areas. A digital 70 mm camera was tested in the Quesnel area with promising results. As this digital imagery is taken from low level, fixed wing aircraft, cost savings are realized over other large scale photo sampling systems (that utilize helicopters).

In 2007 and 2008, VIAC and the VRI initiated the testing of a new imaging system called LIDAR - Light Detection and Ranging. The system utilizes a scanner, GPS and inertial navigation to produce 3 dimensional images of: the canopy, transportation corridors and bare earth contours. LIDAR can be used to measure heights accurately, and does not have the canopy density limitations of other imagery. Partners in the project include the University of Victoria, Canadian Forest Products Limited and the Ministry of Forests and Range. TFL 18 near Clearwater was the management unit utilized for this test. A project report is expected to be published in 2009. VIAC and MFR will review the results and make recommendations on the applicability of this technology to VRI.

To date, advancements in technology have perhaps had the greatest impact in information sharing and data management. The Ministry of Agriculture and Lands', Integrated Land Management Bureau (ILMB) manages a Land and Resource Data Warehouse (LRDW) that has consolidated resource information, base maps and imagery. Accessibility to provincial geographic information has been established through a single gateway - GeoBC. A representative of ILMB GeoBC sits on VIAC, and works with the Forest Analysis and Inventory Branch to improve the LRDW.

Despite many advances in technology, forest inventory remains a process of a classifier reviewing air photographs to assess forest cover, augmented by ground sampling. There is a major human element in the process that cannot be mechanized and expeditiously completed.

COMPLEX STAND STRUCTURE

For many forest sites throughout the province, the profile of the forests has become more complex. In the central interior, the MPB epidemic has left stands of dead mature pine with living spruce and balsam of variable age and structure. On the coast and interior, variable retention and selective harvesting practices have resulted in uneven aged residual stands which are more difficult to quantify. In the North Coast and Mid-Coast TSAs ecosystem based management is being practiced.

In all of these cases, the complexity of inventorying these stands, predicting growth rates and sustainable harvest levels has increased and is on the cutting edge of our forestry science.

To address information and knowledge of young stands, Forests For Tomorrow silvicultural surveys are collecting multi-layer information, in young pine stands impacted by the MPB. However, without further refinement this information may not substitute for the attribute details provided by current inventory ground samples. The VRI process has been designed to meet statistical scrutiny. For complex stands, cost-benefit considerations may mean reviewing statistical limits, and or finding other sources of information such as cruises, to complete the inventory at a reasonable cost. Presently, the Forest Analysis and Inventory Branch is examination various techniques to enhance its ability to inventory and determine the growth and yield of MPB complex stands.

STATE OF THE INDUSTRY

BC's forest industry is a globally-competitive industry, subject to foreign markets, currency fluctuations, and competition. In the past two years, the industry has experienced perhaps the largest downturn in its history. The rising C$, the 15 percent tariff on lumber exported to the United States (the primary market), and the collapse of the US housing market have created an unprofitable business cycle for the BC forest industry. Over 45 milling operations have been curtailed or closed in the province. This downturn is not expected to abate until 2010.

Industry curtailments of operations and staff reductions will likely impact the VRI program and its progress. The forest inventory can provide important information to help retain markets in countries where customers are interested in the sustainable levels of harvesting, the species profile, operational costs and other factors related to long term supply. Up-to-date information on BC's forests, can assist our companies in selling their products abroad by providing creditable background information on the forests they harvest. This information is also important for the investment community.

BIOFUELS

Record oil prices and concerns regarding green house gas levels have created considerable interest in bio-fuels and bio-energy derived from the forests. BC Hydro and the Government as part of a BC Energy Plan (released February 2007) have advertised requests for proposals to produce energy from wood waste, and the dead MPB forests. However, further infrastructure must be developed and the economics proven for this industry to become widespread. To date, the biofuel use of timber and wood waste has not created any changes or adjustments to the information gathered under VRI program.

The Forest Analysis and Inventory Branch has a specific position and role to assist in the government's biofuels and bioenergy initiative. This position enables the Branch to keep abreast of developments in this field and react as demand warrants.

CLIMATE CHANGE

The earth's changing climate and it's impact on BC's forests is an on-going, evolving concern. The MPB epidemic and increases in pests and disease provide dramatic evidence of a warming climate. The Government and the Ministry of Forests and Range are working on this challenge, on several fronts.

The Chief Forester has created a Future Forest Ecosystem initiative, the Tree Improvement Branch is developing guidance on species selection, and the effects of climate change on the forest values referenced in BC forest legislation are being assessed. Sampling under the inventory program may provide early awareness of changing climatic conditions by identify shifting biogeoclimatic zones, changes in forest cover, and increased incidence of disturbance by fire, pests and diseases.

As climate change evolves, our knowledge and awareness of the impacts on our forests will increase overtime. Adjustments will likely be required in the inventory information collected to better understand the effects of climate, and rate at which it is occurring. The Forest Analysis and Inventory Branch in concert with other departments, is currently examining how climate change may be monitored. As this is a global phenomenon, information and ideas will also be sought from other jurisdictions.

APPENDICES

MAJOR EXPENDITURES BY MANAGEMENT UNIT

2007/2008 Major VRI Projects

Management Unit	Focussed Allocation	Activity	Discretionary Allocation		2007/2008 Combined Expenditure
Bulkley	$ 500,000	Phase 1	$ 295,000	Phase 1	
Fort Nelson	$ 700,000	Phase 1	$ 540,000	Phase 1	
Kootenay Lake	$ 500,000	Phase 1			
Mackenzie	$ 550,000	VRI, orthos	$ 804,000	VRI, and ortho.	
Mid Coast	$ 550,000	Phase 1, photo acq			
North Coast	$ 550,000	Phase 1, photo acq			
Okanagan	$ 550,000	Phase 1, air photo	$ 335,000	Color air photo	
Prince George			$ 231,000	Phase 2	
Soo	$ 485,000	Phase 1, TEM			
Sunshine Coast	$ 550,000	Phase 1, TEM			
Fort St. John	$ 700,000	VRI, Terrain	$ 861,000	Phase 2	
Dawson Creek	$ 700,000	Phase 1, VRI			
Major Projects Total	**$ 6,335,000**		**$ 3,066,000**		**$ 9,401,000**
Other MUs	$ 1,317,000	Smaller VRI projects	$ 246,000	Smaller projects	
Total Expenditures	**$ 7,652,000**		**$ 3,312,000**		**$ 10,964,000**

2008/2009 Major VRI Projects

Management Unit	Focussed Allocation	Activity	Discretionary Allocation	2008/2009 Combined Expenditure
Soo	$ 446,000	Phase 1 cont'd	*to be determined*	
Sunshine Coast	$ 496,000	Phase 1, TEM		
Mid-Coast	$ 496,000	Phase 1, Ortho		
Mackenzie	$ 744,000	Acq., Phase 1		
Dawson	$ 813,000	Complete Phase 1		
Fort Nelson	$ 670,000	Phase 1 cont'd		
Fort St. John	$ 422,000	Initiate Phase 2		
Okanagan	$ 635,000	Phase 1, cont'd		
Kootenay	$ 590,000	Phase 1, cont'd		
Major Projects Total	**$ 5,312,000**			
Other MUs	$ 2,356,000	Smaller VRI projects		
Total Expenditure	**$ 7,668,000**			

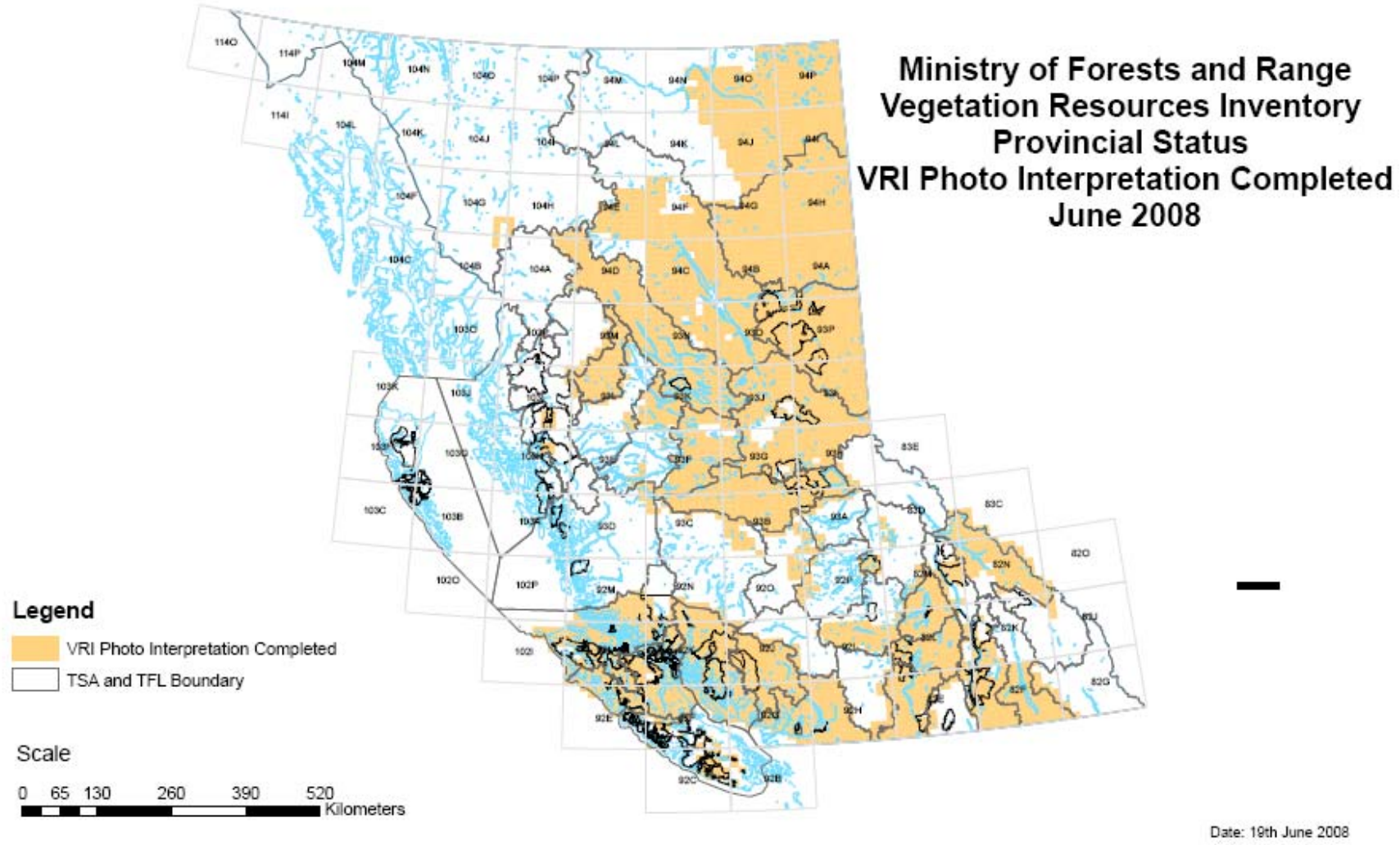
Projects > $400,000 - for Focussed Funding and > $200,000 for Discretionary Funding

Phase 1: Photo Interpretation Phase 2: Ground Sampling

Note: The above tables provide an insight into the distribution and magnitude of major VRI expenditures from 2007 through to 2009. In addition to the major projects, numerous smaller projects have been conducted throughout the province, in an organized and planned process.

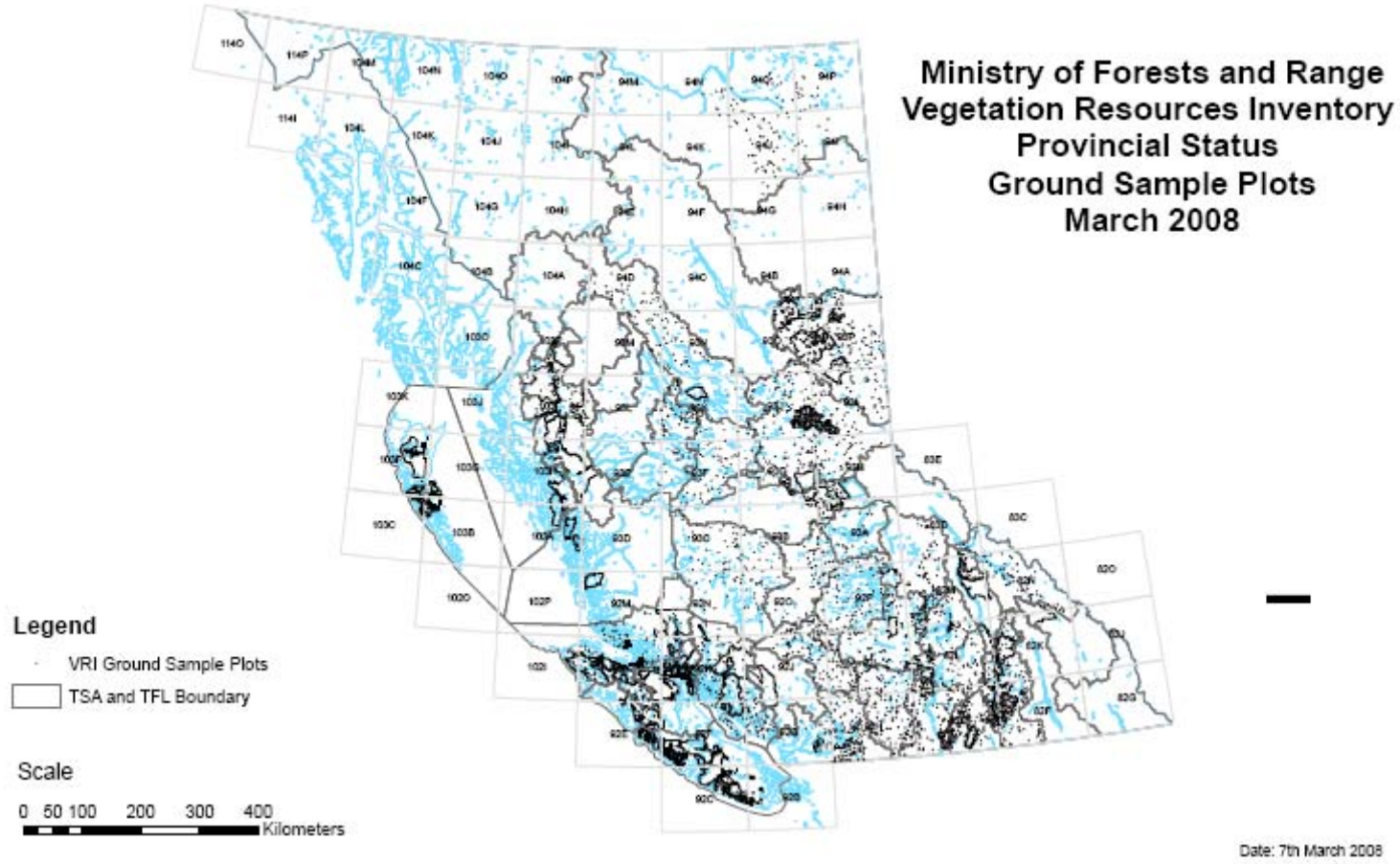
VRI WORK COMPLETED

Photo Interpretation



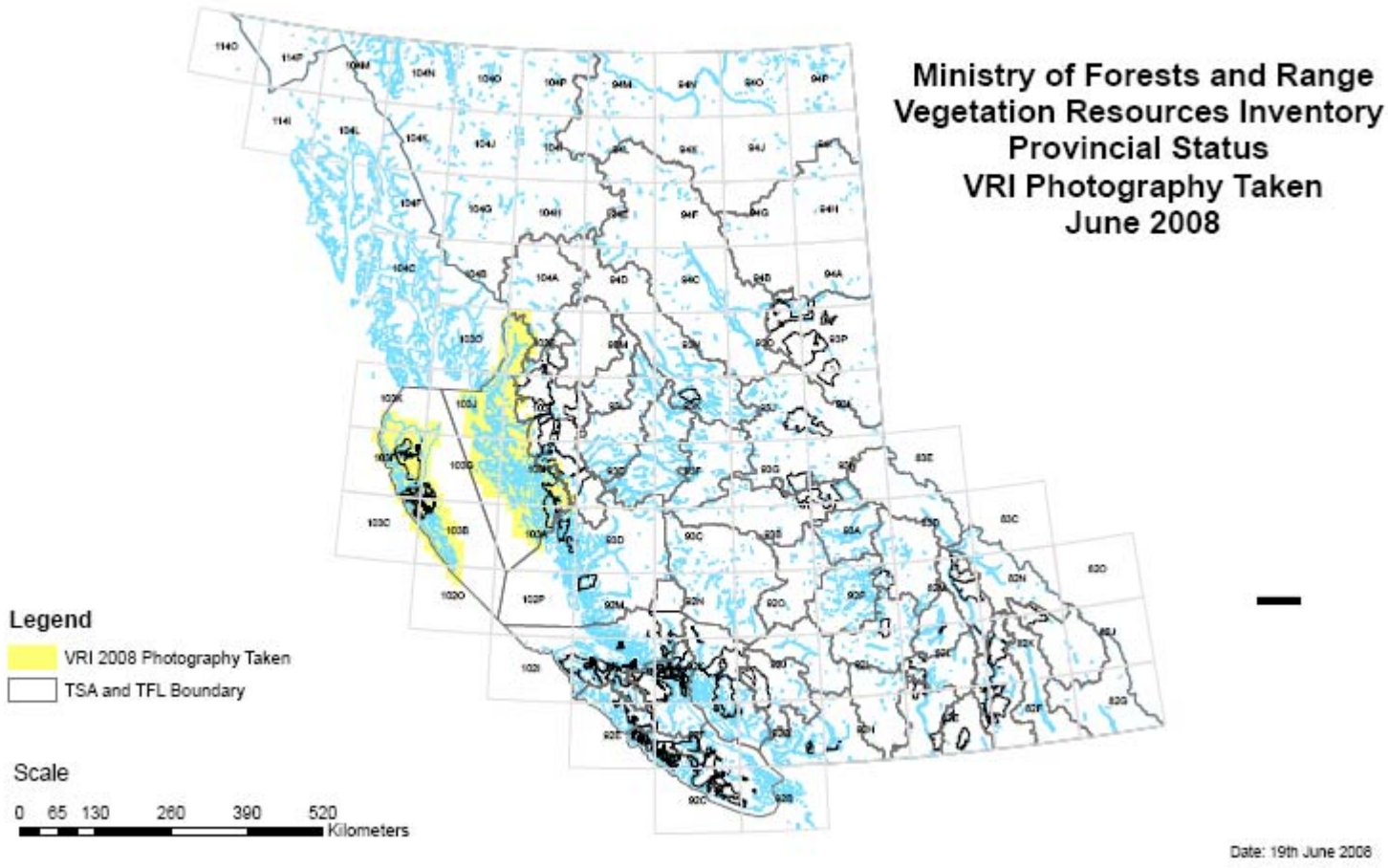
The above map illustrates the extensive VRI photo interpretation coverage completed to date (June 2008).

Ground Plots



Ground sampling has occurred extensively throughout the Province. However, the attributes and intensity of this form of sampling may change to be more cost effective and responsive to new forest management objectives, the MPB and climate change.

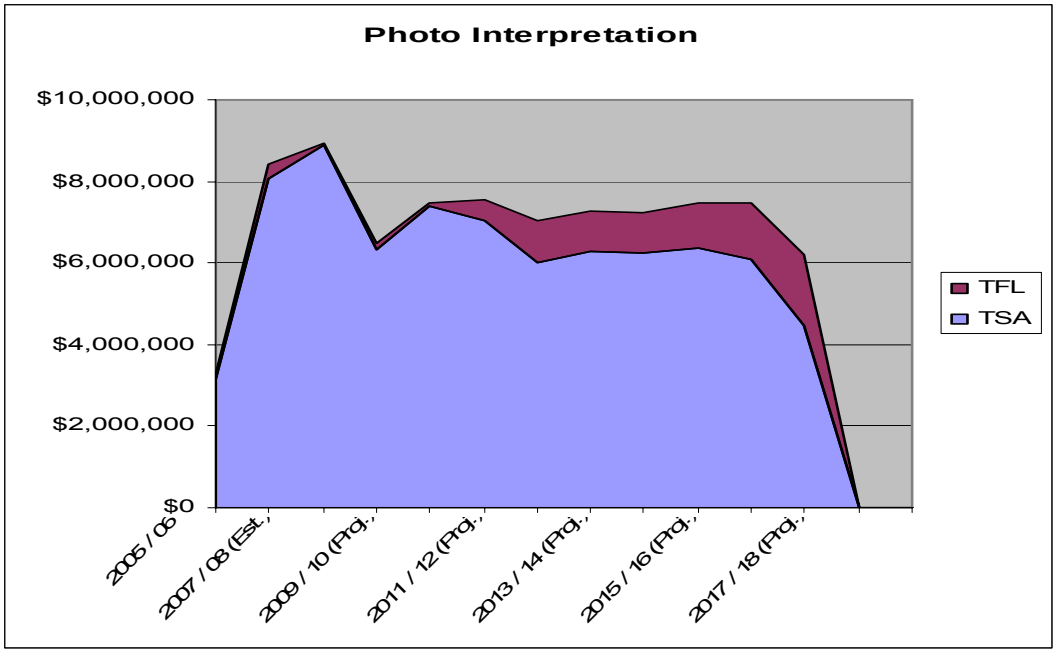
Aerial Photography

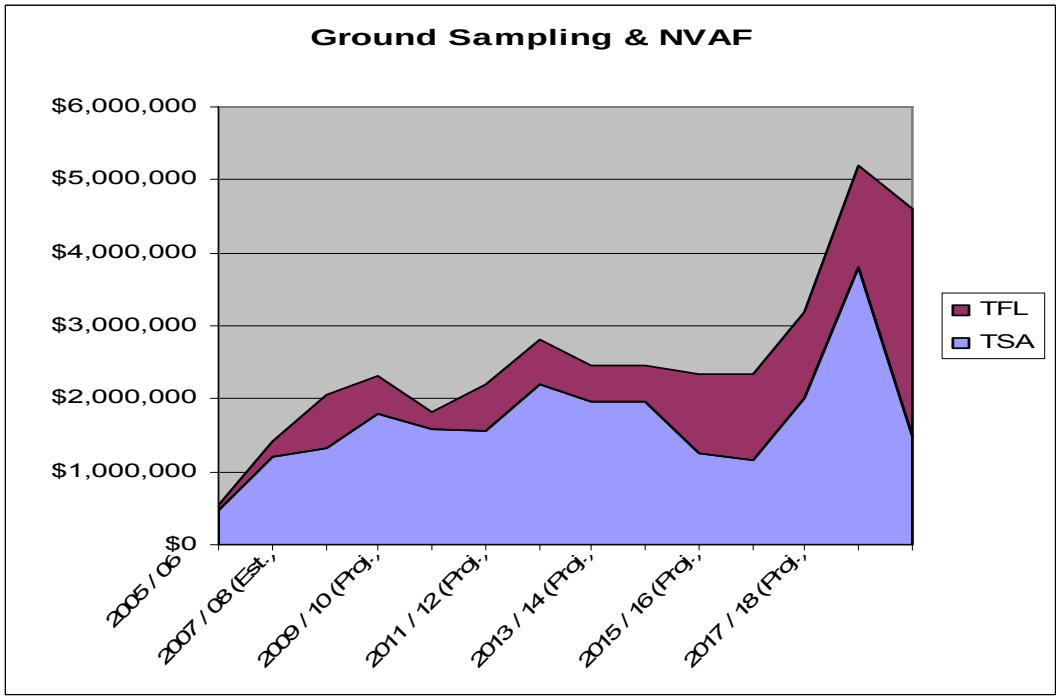


In 2007, aerial photography was completed for a large area of the Queen Charlottes Islands, and the north coast.

PROJECTED VRI COMPLETION

The following graphs illustrate that capacity, costs and other factors (given the assumptions), make completion of the VRI by 2015, optimistic. The graphs depict for the annual budget, the projected VRI work by Phase within the TFL s and TSAs.





Assumptions

- Contractor capability and availability remains relatively constant.
- A consistent budget of between $9.2 million and $9.8 million per year.

It has been projected, that completion of the VRI photo interpretation is not likely until 2017 at the earliest, with ground sampling continuing a few years beyond.