# Summary of Inventories in the Northern Interior Forest Region of British Columbia

**March 31, 2005**

PRICEWATERHOUSECOOPERS

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PricewaterhouseCoopers LLP
200 Granville Street, Suite 202
Vancouver, British Columbia
Canada V6C 1S4
Telephone +1 604 484 3490
Facsimile +1 604 484 7025

March 31, 2005

Mr. Dave Bodak
Planning Officer
Forest Sector Initiatives Section
Ministry of Forests
2nd Floor 1520 Blanshard Street
PO Box 9515 Stn. Prov. Gov't
Victoria BC
V8W 9C2

Dear Mr. Bodak:

We are pleased to submit our report summarizing the current status of selected resource inventories in the Northern Interior Forest Region of British Columbia.

We would be pleased to meet with you to discuss any matters in our report.

Yours truly,

Kevin Bromley
Incorporated Partner
Audit and Assurance Group

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Maps

# 1. Executive Summary

Since the mid 1990's there has been significant investment in resource inventories throughout the province. In order to provide a basis for strategic direction on future investments in resource inventories, it is important to understand the current status of resource inventories. This report has been completed by PricewaterhouseCoopers ("PwC") within the Northern Interior Forest Region ("NIFR") as a portion of an overall provincial perspective of resource inventories.

Included are a series of maps indicating the inventory status throughout the NIFR, and gaps for which future investment in inventory works may be prioritized. The inventory types covered through this project are Vegetation Resource Inventory ("VRI"); Predictive Ecosystem Mapping ("PEM"); Terrestrial Ecosystem Mapping ("TEM"); Terrain Resource Information Management ("TRIM"); and Recreation Visual Landscape Inventory ("RVLI").

The NIFR was created from two regions, Prince Rupert Forest Region ("PRFR") and Prince George Forest Region ("PGFR"). The inventories that have been prioritized often follow the boundaries of these two old regions. In addition to Regional trends, generally more inventories have been completed in the Tree Farm Licenses ("TFL") than in the Timber Supply Areas ("TSA"). This results in part from the smaller area covered by TFL's, but also reflects the priority a company places on a parcel of land in which they are the sole licensee. TRIM mapping and RVLI are exceptions to Regional and Management Unit trends, as they cover much of the area, with only small omissions scattered throughout the north.

VRI was more heavily focused in the PGFR with large investment throughout the area. Given the current Land Base Investment Program ("LBIP") trends, the PGFR Recipients are likely to continue with projects that have been funded through the LBIP. As a result, the Ministry of Forests ("MoF") should expect to continue seeing significant VRI investment in priority areas funded through the LBIP in the future. It is recommended that VRI investment be encouraged in the PRFR. To initiate this investment under the LBIP, licensees operating in the western management units would need to work together.

PEM has been initiated or completed throughout much of the PRFR. Accuracy Assessment completed for many of these PEMs missed the 65% requirement for integration into Timber Supply Review ("TSR"). Given this, the MoF should expect to see LBIP funding directed toward increasing the accuracy of these PEMs, possibly through supporting inventories such as VRI, bioterrain mapping or simply by combining (lumping)

the current site series units into broader definition units that meet the requirements of TSR modeling. In the PGFR, PEM is less abundant, although several projects have been initiated indicating that licensees see the benefits of completing PEM. In TSA 08, TSA 24 and TFL 48, Bioterrain Mapping has or is in the process of being completed along with PEM. This extra input data is thought to increase the chances of achieving the required 65% accuracy for integration into TSR modeling. With this in mind, it is likely that as current VRI projects are completed, investment in PEM and Bioterrain Mapping will increase.

TEM has only been undertaken in scattered patches throughout the entire NIFR. The indication given by licensees regarding the completion of TEM is that the cost is too high for the benefit that would be received.

## 2. Introduction

Since the inception of the Forest Investment Account ("FIA") in 2002, the majority of the LBIP projects submitted and completed in each fiscal year have been focused on the Information Gathering and Management component. The vast majority of these projects have been in the NIFR. Additionally, during the period of Forest Renewal BC ("FRBC"), the corporation was the catalyst for large investments in resource inventories.

In order to provide strategic direction for future investments in resource inventories, it is important that the current status of resource inventories is recognized. To date, there has been no initiative with respect to an overall provincial perspective on these resource inventories and their current status.

To this end, PwC was engaged to provide an overview assessment (including a series of maps) that would indicate the status of selected inventories throughout the NIFR and identify any gaps where future investment in inventory works may be warranted. . The NIFR encompasses both the old Prince Rupert Forest Region and the old Prince George Forest Region. This report references both the new NIFR and the old regions as a means to explain the results of PwC's overview assessment.

## 3. Scope and Objectives

PwC was engaged in November, 2004 by the MoF to compile information regarding the current status of selected resource inventories throughout the NIFR. The focus of this project is on the following resource inventories that were funded either by FRBC or FIA:

- Vegetation Resource Inventory,
- Predictive Ecosystem Mapping,
- Terrestrial Ecosystem Mapping,
- Terrain Resource Information Management, and
- Recreation Resource Inventories, specifically Visual Landscape Inventories.

The NIFR management units, including both TSA and TFL, encompassed in this project are summarized in Table 1.

**Table 1: List of Northern Interior Forest Region TSA's and TFL's.**

| Old Prince George Forest Region | | Old Prince Rupert Forest Region | |
|---|---|---|---|
| **Management Unit** | **Name** | **Management Unit** | **Name** |
| TSA 08 | Fort Nelson | TSA 14 | Lakes |
| TSA 40 | Fort St. John | TSA 20 | Morice |
| TSA 41 | Dawson Creek | TSA 03 | Bulkley |
| TFL 48 | Chetwynd | TSA 43 | Nass |
| TSA 16 | Mackenzie | TSA 04 | Cassiar |
| TSA 24 | Prince George | TSA 10 | Kalum |
| TFL 30 | Sinclair | TSA 12 | Kispiox |
| TFL 42 | Tanizul | TSA 42 | Cranberry |
| TFL 53 | Naver | TFL 01 | Skeena |
| | | TFL 41 | West Fraser |

## 4. Methodology

With the intent of creating comprehensive maps of inventories, a spreadsheet was designed to collect sufficient information to outline the area covered by each inventory and the relevant status of completion. To populate this table, a query of the FIA LBIP database Forest Investment Reporting System ("FIRS") was completed. As the FIA has only been in existence since 2002, the Ministry of Sustainable Resource Management ("MSRM") personnel were subsequently contacted to acquire further inventory information that pre-dated FIA (i.e., FRBC or joint ministry/industry funding). Where gaps existed in the MSRM provided information, licensees were contacted directly by PwC and requested to provide any outstanding information of inventories completed.

Once all of this information was made available and reviewed by PwC, the compiled data set was forwarded to a cartographer for incorporation into the overview maps. The base information for these maps was obtained from MSRM and represented in Albers projection.

Individual maps were created for each of the five inventory types in the 19 Management Units identified in Table 1. If an inventory was not completed in a management unit, this map was omitted. In total, 58 - 17"x 22" maps were created in scales that varied according to the actual size of the Management Unit in order to provide a clear graphical depiction of the selected inventory coverage. In addition, five key maps were produced to represent an overview of each inventory type for the entire NIFR.

The draft maps were then sent out to licensees and ministry personnel familiar with the respective areas for error checking and additional information. This phase proved very useful as much detail was added based on the feedback received.

Included within this report are TSA and TFL specific summaries, including a gap analysis and if noted, indications of general trends in inventory completion across the Region. From these trends and gaps, recommendations have been made by PwC for the MoF to consider when providing strategic direction for investment in resource inventories.

# 5. Management Unit Summaries

## a) TSA 8 – Fort Nelson

Fort Nelson has had significant investment in VRI throughout the eastern half of the TSA. The majority of this work has been completed to Phase II, with the exception of 24 mapsheets that have yet to be ground sampled.

PEM has recently been completed in the Patry Lake Landscape Unit ("LU") in combination with VRI, while the Muskwa-Kechika was completed through FRBC. This only accounts for a small amount of the TSA, but the licensee has indicated there are plans to increase the scope of PEM.

PEM with Bioterrain Mapping was completed for a small section in the center of the TSA in the Sahtenah LU. This includes adding the Bioterrain Mapping as an input to the PEM model to increase its' accuracy. This process tends to yield much better accuracy and increases the potential usefulness in TSR modeling. Several old TEM projects were completed in 1998, of which the usefulness is unknown.

TRIM has been completed over most of the TSA with the exception of a strip to the south-west. Completing this area should be left to the license holder as there appears to be limited operations in this area at present.

RVLI is heavily concentrated to the Highway 97 corridor, as this is the main visual area.

### Gaps

Yet to complete for TSA 08 is PEM in the remainder of the area covered by VRI, and VRI on operational mapsheets that have not yet been covered. It should be noted that the current VRI coverage accounts for in excess of 70% of the timber harvesting landbase of the TSA, so further VRI should be carefully considered based on cost/benefit. Adding bioterrain to the future PEM work could be a direct benefit to TSR modeling and operational planning within this TSA.

## b) TSA 40 - Fort St. John

Fort St. John has had much VRI phase I work completed on the central and western portions of the TSA (see map). The north-central portion of this Phase I VRI completed area has been combined with bioterrain mapping.

There is very little PEM currently completed within the TSA. A small project was undertaken through FRBC in the western portion of the TSA. Currently there is a project funded through FIA to generate knowledge tables for the Sikanni LU in the north-central portion.

TRIM II has been completed throughout the entire TSA, while RVLI is mainly focused around Highway 97 and within some visible drainages to the west.

**Gaps**

Still to be completed in TSA 40 is VRI on the remaining mapsheets to the north-east and PEM on the majority of the TSA. As with the Fort Nelson TSA, a focus on Bioterrain Mapping as an input to the PEM for the remaining areas could have a direct benefit to TSR modeling and operational planning.

**c) TSA 41 – Dawson Creek**

Within the Dawson Creek TSA, VRI phase II has been completed through funding provided by FRBC and West Fraser from 1997 to 2000. VRI Phase I has been partially completed and is currently underway with FIA funding. This current project includes 62 mapsheets in the northeast of the TSA focused toward the deciduous component of the landbase.

PEM has not been started, while only a small TEM project was completed in the Sukunka LU. TRIM II has been finished on all areas of this TSA.

The RVLI completed is heavily focused to the major travel routes along the Hudson's Hope, Tumbler Ridges and Dawson Creek highways and around the Peace Reach of Williston Lake.

**Gaps**

As noted above, still to be completed in TSA 41 is VRI on the remaining mapsheets in the southern and western portions. PEM has not been started and could be considered in conjunction with Bioterrain Mapping on the remainder of the areas as it could have a direct benefit to TSR modeling and operational planning.

**d) TFL 48 – Chetwynd**

There has been a significant amount of inventory work done on TFL 48. VRI phases I and II have been completed on the entire TFL including the Rice property. Some sampling and

adjustment were and currently are being funded through FIA, whereas the bulk of the works were completed through a 60:40 funding formula during FRBC.

PEM with the addition of Bioterrain Mapping as an input was completed on the entire TFL including the Rice property by 2001, through FRBC. TRIM II has been completed for the entire unit.

As expected the RVLI that has been completed is heavily focused to the major travel routes along Highway 97, access to Hudson's Hope and Tumbler Ridge.

**Gaps**

There are no identified gaps in TFL 48.

**e) TSA 16 – Mackenzie**

There has been some VRI Phase I work completed in the Mackenzie TSA, while Phase II has not yet been started. The focus for VRI has been to complete mapsheets as funding is available to the TSA licensees. To date this work has been focused mainly in the northern sections of the TSA (above Williston Lake), and predominantly in Abitibi's chart area, although there has been some overlap into Canfor chart.

PEM has been started and is currently focused in the southern half of the TSA. This is predominantly in Canfor's chart area. As with VRI, this work is completed as funding becomes available, although PEM work has been decreasing in priority recently.

There have been a few small TEM projects done throughout the TSA, but these do not represent a significant portion of the area. Consistent with other management units in this study, TRIM II has been completed for all of this TSA.

RVLI has been focused to the major tributaries and the Peace Reach of Williston Lake as well as the Highway 97 corridor though the Rocky Mountains.

**Gaps**

Still to be completed in TSA 16 is VRI on the remaining mapsheets to the south and PEM to the north. Focus on Bioterrain Mapping as an input to PEM for the remaining areas could have a direct benefit to TSR modeling and operational planning.

**f) TSA 24 – Prince George**

There has been significant investment in Phase I and II VRI in the Prince George TSA. To date almost all of the TSA has been covered with VRI and there have been significant areas already completed with bioterrain mapping.

PEM with a Bioterrain Mapping input has been started throughout the TSA and completed in some portions of the TSA (as identified on the maps). The Vanderhoof district has been completed and passed the Accuracy Assessment, allowing it as an input to TSR. The MacGregor Model Forest has a completed PEM as well.

There have been a few small TEM projects done throughout the TSA, but these do not represent a significant portion of the area. TRIM II has been finished for all of this TSA.

RVLI has been done throughout a large percentage of the TSA. Although the trend is around the major travel routes and lakes, a significant amount of work has been completed in drainages outside of these routes.

**Gaps**

Still to be completed in TSA 24 is VRI on the few remaining mapsheets, and PEM throughout much of the TSA. Although PEM is indicated over the entire TSA, much of this work is still underway. Continued focus on Bioterrain Mapping for the remaining portions of the TSA could have a direct benefit to TSR modeling and operational planning.

**g) TFL 30 – Sinclair**

Phase I and II VRI was completed in the Sinclair TFL starting in 1997 (this project was completed in conjunction with the MacGregor Model Forest). PEM has been completed throughout the TFL, by overlaying the completed TEM and VRI and re-formatting this to PEM standards while removing any slivers due to inaccurate overlap.

TRIM II has been finalized for all of this TFL. RVLI has been done throughout a large percentage of the TFL and although the majority of work completed is around the major travel routes, a significant amount of work has been completed in drainages outside of these routes.

**Gaps**

No gaps are obvious and no further work within the five selected inventory types is seen as a priority.

**h) TFL 42 – Tanizul**

Phase I VRI is currently underway in the Tanizul TFL. This project is being completed concurrently with the Inzana LU in TSA 24. PEM and TEM have not been completed.

TRIM II has been finished for all of this TFL. RVLI has been done in patches throughout the TFL, mainly in the areas surrounding lakes.

**Gaps**

Based on the above, yet to be completed in TFL 42 is VRI Phase II along with PEM throughout the management unit. As an aside, although PEM is indicated over the entire TSA 24, including TFL 42, PwC was informed that this has not started in TFL 42. Continued focus on Bioterrain Mapping for the remaining areas could have a direct benefit to TSR modeling and operational planning.

**i) TFL 53 – Naver**

PEM and VRI have not been started on TFL 53. The high infestation of mountain pine beetle would have a negative impact on the usefulness of a VRI if this were to take place at this point in time.

TEM has been completed throughout the entire TFL, as well as TRIM II. RVLI has been done in patches throughout the TFL, but again mainly focused along Highway 97.

**Gaps**

Still to be completed in TFL 53 is VRI and PEM throughout. At this time with the significant beetle impacts to the TFL, the recommendation is to wait for the beetle to subside and create a strategy at this time.

**j) TSA 14 – Lakes**

There has been VRI Phase I and II completed on a few mapsheets at the north end of the TSA in Babine's chart area through FRBC in the early 2000's. No other VRI has been started in the Lakes.

PEM has been completed throughout the entire TSA, however, although records seem to indicate PEM was completed in the Tweedsmuir Park, Regional MSRM indication is that this is not the case. There are a few, scattered TEM projects completed throughout the TSA, but these don't represent a significant amount of area.

TRIM II has been finished for the majority of the TSA with the exception of Tweedsmuir Park. RVLI has been completed over much of the TSA but this is not limited to the highways, as much of the TSA area has been covered (see map for the current status).

**Gaps**

VRI is the most obvious gap in the Lakes TSA. This combined with Bioterrain Mapping could aid in the accuracy assessment (currently underway) and increase the operational effectiveness of the current PEM.

**k) TSA 20 – Morice**

There has been no VRI completed in the Morice TSA, however, PEM has been completed throughout the entire TSA. There are a few scattered TEM projects completed throughout the TSA, but these again do not represent a significant amount of area.

TRIM II has not been completed in this TSA. RVLI has been completed over much of the TSA, and as was the case in the Lakes TSA, this has not been limited to the highway corridors, as much of the TSA area, including in and around watercourses and lakes.

**Gaps**

VRI is the most obvious gap in the Morice. This combined with Bioterrain Mapping could aid in the accuracy assessment (currently underway) and increase the operational effectiveness of the current PEM. TRIM should be a focus here as well, as this is a void patch in the middle of an area that is substantially completed.

**l) TSA 03 – Bulkley**

There has been no VRI completed in the Bulkley TSA. PEM has been completed throughout the entire TSA. However, an Accuracy Assessment has been completed and the PEM work failed the minimum 65% requirement for use in TSR.

There are scattered TEM projects completed throughout the TSA, but these don't represent a significant amount of area. TRIM II has been done for the entire TSA.

RVLI has been completed around the highway running through the TSA. None of the northern or southern sections have been completed.

**Gaps**

VRI is the most obvious gap in the Bulkley. This combined with Bioterrain Mapping could aid in the accuracy assessment (currently failed) and increase the operational effectiveness of the current PEM.

**m) TSA 43 – Nass**

There has been a small area of VRI completed in the Nass TSA through funding provided under FRBC. PEM has been completed throughout the entire TSA with the exception of the Nisga'a Wildlife Management Area.

To-date, TEM has not been completed in the Nass. TRIM II has been done for much of this TSA, with an estimated 40 mapsheets remaining throughout the TSA.

RVLI has been completed and is heavily focused to the major travel routes along the Cassiar Highway and the road leading to Stewart.

**Gaps**

TRIM should be completed within this TSA. As the PEM is complete, synchronizing a VRI with Bioterrain Mapping could also be an option that could have a direct benefit to the accuracy of the PEM enabling future use in TSR.

**n) TSA 04 – Cassiar**

There have been no VRI projects completed in the Cassiar TSA. PEM is currently underway in the Galor Creek, Stikine drainage area.

There has been some TEM done in the Cassiar area, with much of it related to a mining operation in Red Criss and Woolosnite mining area along the Iskut River. One other project was completed in 1995 in the north-west region of the TSA.

TRIM II has not been completed for this TSA. The RVLI completed is heavily focused to the major travel routes along the Cassiar Highway and most major drainages.

**Gaps**

TRIM should be completed in the management unit. PEM could be continued for the remainder of the TSA, or alternatively a VRI could be combined with Bioterrain Mapping,

with the overall intent of completing the PEM after these base inventories are finished. This would have a direct benefit to the accuracy of the PEM enabling future use in TSR.

**o) TSA 10 – Kalum**

There has been VRI Phase II ground sampling works started in the Kalum TSA, but to-date there has been no Phase I started. PEM has been completed throughout the entire TSA including the TFLs in the north and south.

There are a few scattered TEM projects completed throughout the TSA, but these do not represent a significant amount of area within the TSA. TRIM II has been done for the majority of this TSA, with the exception of a few mapsheets in the central west portion of the TSA.

RVLI has been completed and is heavily focused to the major travel routes along Highway 16 and leading to Kitimat, as well as, the railway corridor and larger drainages leading north.

**Gaps**

TRIM should be completed, as there is very little area remaining. As the PEM is complete, synchronizing a VRI with Bioterrain Mapping could be an option. Another option brought forth is the benefit of increasing the resolution of the existing 25 meter grid Digital Elevation Model. This upgrade work could have a direct benefit to the accuracy of the PEM enabling future use in TSR.

**p) TSA 12 – Kispiox**

There has been no VRI works started in the Kispiox TSA. PEM has been initiated throughout the entire TSA with a scheduled completion of 2006.

There are a few scattered TEM projects completed throughout the TSA, but these represent an insignificant area within the management unit. Two limited TEM areas, mapsheet 94D002, and portions of the Sintine, Shelagyote, Cranberry, Kitwanga, Kispiox, Kitsseguecla and Suskwa Rivers have been completed.

TRIM II has not been completed for this TSA. RVLI has been completed and is heavily focused to the major travel routes along Highway 16, the railway corridor and larger drainages leading north.

**Gaps**

TRIM should be a focus here, as this is a void patch in the middle of an area of the region that is substantially completed. As the PEM is currently underway, synchronizing a VRI with Bioterrain Mapping could be an option. Another option brought forth for thus unit is the benefits of increasing the resolution of the existing 25 meter grid Digital Elevation Model. This could have a direct benefit to the accuracy of the PEM enabling future use in TSR.

**q) TSA 42 – Cranberry**

There have been no VRI or TEM works started in the Cranberry TSA. However, PEM has been initiated throughout the entire TSA with a scheduled completion of 2006.

TRIM II has been partially done for this TSA as a result of overlap from the Nass TSA. RVLI has been completed and is heavily focused to the major travel routes along the Cassiar Highway.

**Gaps**

TRIM should be a focus in this east portion of the TSA along with the Kispiox TSA. As the PEM is currently underway, synchronizing a VRI with Bioterrain Mapping could be an option. As with the Kalum and Kispiox TSAs, there are benefits associated with increasing the resolution of the existing 25 meter grid Digital Elevation Model and these should be explored. Better accuracy from the PEM completed could enable future use of these inventories for TSR.

**r) TFL 01 – Skeena**

Though there has not been any VRI or TEM started in this TFL, the PEM and TRIM II works have been completed throughout the entire TFL. RVLI has also been completed and is heavily focused to the major travel routes along the gravel road system leading to New Aiyansh.

**Gaps**

As the PEM is complete, synchronizing a VRI with Bioterrain Mapping could be an option. Again, improving the existing 25 meter grid Digital Elevation Model was an option brought forth as a consideration when PwC solicited information from licensees and

ministry staff. This could have a direct benefit to the accuracy of the PEM enabling future use in TSR.

**s) TFL 41 – West Fraser**

There has not been any VRI or TEM completed in this TFL. PEM has been completed throughout the entire TFL, while TRIM II has been done for the northern portion of the TFL only. As can be seen on the maps for this TFL, there are several mapsheets to complete in the southern half. The RVLI has been heavily focused to the inland fjord, as there are few roads in this area that lessen the need to complete a RVLI.

**Gaps**

As the PEM is complete, synchronizing a VRI with Bioterrain Mapping could be an option. Consideration should also be given to the benefits of increasing the resolution of the existing 25 meter grid Digital Elevation Model. This could have a direct benefit to the accuracy of the PEM enabling future use in TSR. Completion of TRIM II should also be a focus in the short term.

## 6. Discussion

Throughout the process of reviewing and compiling the five selected inventory types, obvious 'regional' trends were apparent with respect to VRI and PEM. TRIM mapping is one exception as it seems to cover the entire area quite well with only small omissions scattered throughout the north. Also, RVLI has been completed consistently across many areas as a result of preparations for TSR and Management Plan processes.

In general, TFL's have a higher rate of completed inventories as compared to TSA's. This results in part from the smaller area covered by TFL's, but also reflects the priority one company places on a parcel of land in which they are the sole licensee. The same trend is not seen in as many TSA's in which there are several licensees working on the same parcel of land.

VRI was more heavily focused in the PGFR, with large investment throughout, including Fort Nelson, Fort St. John, Dawson Creek, Chetwynd and the entire Prince George district and surrounding area including Fort St. James and Vanderhoof districts, as well as the three TFLs. To a lesser extent, Mackenzie has been started, but it is not as close to being completed as the others in this region.

There were some VRIs completed in scattered patches of the PRFR, mainly funded through FRBC, and with no large investment in any given area. Patches of work were completed in the Lakes, Kalum and Nass, but this has not amounted to enough to factor into TSA-wide operational planning and certainly does not aid the accuracy assessments of the PEMs completed in the areas.

Given the current FIA LBIP trends, the PGFR Recipients are likely to continue with VRI projects that have been started. This work is more than likely to be focused toward incomplete, yet high productivity areas, leading to the completion of Phase II works in areas where only Phase I has been previously completed. There are vast areas that will likely never receive any focus, due to inaccessibility and inoperability. Given this, the MoF should expect to continue seeing significant VRI investment in priority areas through the LBIP in the future.

PEM has been initiated or completed throughout much of the PRFR. Accuracy Assessments for many of these PEMs have shown to miss the 65% requirement for integration into Timber Supply Review ("TSR"). Given this, the MoF should expect to see LBIP funding directed toward increasing the accuracy of these PEMs, through supporting inventories such as VRI, bioterrain mapping or simply by combining (lumping) the current

site series units into broader definition units that meet the requirements of TSR modeling. This latter option could provide significant cost savings if the funding is not available for additional full inventory works.

Suggestions to increase the effectiveness of the PEM works done in the absence of VRI and Bioterrain Mapping are as follows:

Lump current site series differentiation in the predictive model to create a product that meets the unit requirements for TSR. This should increase the accuracy by simplifying the model.

Invest in higher resolution Digital Elevations Models. The current 25 meter grid resolution is said to be too coarse to accurately reflect changes in topography and predict moisture in and around water courses. The limiting factor to this suggestion is the resolution of the TRIM base. If TRIM is at 25m resolution then adding a more detailed Digital Elevation Model would not be possible.

Another way to achieve a desirable PEM accuracy would be to add detailed surficial material mapping leading to soil moisture modeling. This would then be added to the TRIM II and FC as an input to the predictive model.

In the PGFR PEM is less abundant, although several projects have been initiated indicating that licensees see the benefits of completing PEM. In the Vanderhoof district PEM has been completed to a high standard and passed an Accuracy Assessment. With these factors in mind, it is likely that as current VRI projects are completed, investment in PEM will increase.

In TSA 08, TSA 24 and TFL 48, Bioterrain Mapping has or is in the process of being completed along with PEM. This extra input data is thought to increase the chances of achieving the required 65% accuracy for integration into TSR modeling.

The process of completing VRI and Bioterrain Mapping, followed by PEM seems to achieve significant cost savings when compared to undertaking these inventories at separate times. This is largely due to the reduction of the lost time dealing with slivers created when combining inventories that have been conducted in isolation of each other. This combination is more costly than simply completing PEM, but will result in better accuracy. To decrease the cost in large areas, a lower intensity Bioterrain Mapping is possible. This involves collecting less attributes but focused more toward the mid-range site series. The result is less sensitive to features such as well drained soils resulting from rock outcrops, but to alleviate this concern, if it arises, a photo interpretation of these

unique sites can be done. The PEM model would then be directed to defer to these interpreted sites rather than those predicted.

TEM is a much more costly approach to ecosystem mapping, and thus has only been undertaken in scattered patches throughout the NIFR. The indication given by licensees regarding the completion of a full TEM is that the cost is too high for the available funding and the benefit received.

## 7. Conclusions / Recommendations

Considering the significant investment in VRI and the heavier weighting of projects completed toward the PGFR portion of the NIFR, it is recommended to encourage further VRI and or Bioterrain Mapping investment in the PRFR. Ultimately, the MoF also needs to consider the cost/benefit of adding additional inventories to failing PEMs. To initiate this investment, licensees operating in the western management units would need to work together and pool their LBIP resources, as well as using alternate funding sources.

There are a few projects in the north-east combining aspects of VRI and PEM with additional Bioterrain Mapping. These combinations of inventories should be reviewed thoroughly for the cost/benefits in light of the potential integration into TSR modeling.

For areas with no previous investment, or outdated inventories, ideally the three processes (VRI, Bioterrain Mapping and PEM) would be completed jointly to achieve the maximum efficiency and high accuracy. To facilitate these suggestions, the MOF and MSRM specialists should meet with the various licensees to educate them on the benefits of VRI for the management of the resource in these management units.

Future spending on TRIM II and RVLI should be focused on the remaining management units and areas within these units on an "as needed" basis. In general, the information collected to-date for these inventories appears to be meeting the needs of licensees and the government.

This report should be utilized as a starting point to provide strategic direction for future investments in the selected resource inventories. This direction would focus licensees, MSRM and MoF on areas within the NIFR that are in need of increased inventory work or alternatively, are in need of a change in the direction local inventories are currently heading.

Given this report has been limited in scope to the NIFR, the recommendations included should be integrated with the results of future reports generated for the Coastal Forest Region and the Southern Interior Forest Region. This would result in an overall provincial perspective on these resource inventories.

## Appendix A – Maps

The following map inserts are separated by Management Unit. Each insert contains five separate maps depicting the coverage area of the selected inventories under this audit. Following the Management Unit level maps, there are key maps for the entire NIFR for all five inventory types.