



# Analysis of Low Site Polygons

**Mountain View Silviculture Ltd.  
Preliminary Field Verification Plot  
Results**

**Funding provided by Morice-Lakes IFPA**

# Introduction

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- WHAT IS THE PROBLEM?
- While defining the Timber Harvesting Landbase (THLB) numerous areas are excluded as non-contributing.
- Within the Morice/Lakes Timber Supply Areas (TSA's) approximately 250,000 ha are classified as Problem Forest Types (PFT's) or Low Site polygons.

# Introduction

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- **Problem Forest Types (PFT's) were identified by the IFPA technical committee as potentially having inadequate inventory and productivity information.**
- **They occupy a significant portion of the TSA's and were indicated to be one of the high priorities for further work.**
- **The technical committee determined Low Site Balsam, Spruce, and Pine to be of most interest.**

# Introduction

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- Many of these PFT/Low Site areas are overlapping with each other and/or other exclusion factors (i.e. Recreation Areas, Inoperable (largely based on elevation))
- Both TSA's utilize a Site Index (SI) "cut-off" to determine status, however each TSA has unique SI cutoffs by leading tree species.

# Introduction

- **Site Index Cut-off by TSA for Low Site and Low height PFT's:**

<b>Leading Species</b>	<b>Morice Low Site Site Index Cut-off</b>	<b>Lakes Low Site Site Index Cut-off</b>	<b>Lakes PFT Site Index Cut-off</b>	<b>VRI Sample Population Site Index Cut-off</b>
<b>Pine</b>	<12	<7.6	<10.1	<12
<b>Spruce</b>	<8	<5.4	<5.9	<8
<b>Balsam</b>	<8	<7.4	<8.3	<8.3
<b>Douglas Fir</b>	N/A	<11	<9.8	<12

# Introduction

- **WHAT TO DO ABOUT THE PROBLEM**
- IFPA Technical Committee decided to investigate the feasibility of conducting a Vegetation Resource Inventory (VRI) on identified PFT polygons.
- As part of the Forest Investment Account (FIA) standard, a VRI Project Implementation Plan (VPIP) was to be created.
- The VPIP describes the methodology used to determine target population, sample size, data collection, and ground sample plan.

# Introduction

- Furthermore, the Technical Committee felt that prior to initiating a full VRI program, an assessment should be made to determine whether or not a more accurate assessment of PFT and Low Site polygon characteristic's was required.
- To achieve this, field verification plots were proposed to assess Inventory estimates. The purpose was to identify any obvious trends in misclassification, not to provide statistically valid figures enabling reclassification.

# Defining the problem

- Defining the population:

Leading Species	Morice Low Site Site Index Cut-off	Lakes Low Site Site Index Cut-off	Lakes PFT Site Index Cut-off	VRI Sample Population Site Index Cut-off
Pine	<u>&lt;12</u>	<7.6	<10.1	<u>&lt;12</u>
Spruce	<u>&lt;8</u>	<5.4	<5.9	<u>&lt;8</u>
Balsam	<8	<7.4	<u>&lt;8.3</u>	<u>&lt;8.3</u>
Douglas Fir	N/A	<11	<9.8	<u>&lt;12</u>

# Defining the problem

- **ADDRESSING OVERLAPS**

- Partially done by using SI reported in TSR data-set, not by identified exclusion factor.

- Under discussion with technical committee

deleted: -EFMPP area (previously studied)

-Private Land (and Woodlots)

-Parks

-Inoperable Area

-Community Forest

-LRMP proposed protected areas

-Non-Productive Areas

-Burnie and Nanika Landscape Units

# Defining the problem

- **Resultant Population**

	Balsam		Spruce		Pine	
	Area (ha)	% of stratum	Area (ha)	% of stratum	Area (ha)	% of stratum
<b>Morice</b>	61,137	97%	13,008	85%	26,232	71%
<b>Lakes</b>	1,663	3%	2,264	15%	10,655	29%
<b>Total</b>	62,800	100%	15,272	100%	36,887	100%

# Creating the plan

- **Preparation of VRI Project Implementation Plan (VPIP)**
  - Using the defined population, a standard VRI process as detailed under the “*VRI Sample Selection Procedures for Ground Sampling, March 30, 2001*” was followed to derive sample polygons.
  - Procedure is based on stratified Probability Proportional to Size With Replacement (PPSWR). This involves dividing the population into strata (leading species) and sub-strata (SI). The allocated samples must be proportional to these strata and sub-strata areas.

# Creating the plan

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- Sample Plan

- Once polygons selected, strata were compared to various population statistics (i.e. leading species, volume, age, height, landscape unit, SI) to ensure they were reflective.
- 54 polygons chosen by random number as sample polygons. Ortho-photo's, access maps and polygon attributes obtained for identified polygons.

# Implementing the plan

- **Preliminary Field Verification Plots**
  - To address the concerns of the IFPA technical committee with regards to the accuracy of current inventory information in regards to Low Site polygons, preliminary field verification plots were installed.
  - Of the 54 original sample polygons, 30 polygons were randomly selected for plots. (proportional to strata area) (16 BI, 10 PI, 4 Sx)

# Implementing the plan

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- Plots consisted of installing a standard timber cruise plot in a representative area.
- Representativeness was based on a walkthrough assessment.
- Additionally, the best SI tree of leading species in the plot was aged to determine a SI for the polygon.
- Species composition used for analysis was based on estimates from the walkthrough.

# Implementing the plan

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- Compilation

- Preliminary Field Verification Plot Data was entered and compiled using an approved Cruise Compilation Program.
- Site Index was determined using Site Tools Version 3.2m.
- Current Inventory Attributes were taken from the most recent TSR data.

# Implementing the plan

- Assessment

- Six items were selected for assessment.

- 1) Species Composition

- 2) Net Volume

- 3) Average Diameter at Breast Height (DBH)

- 4) Average Height

- 5) Average Age

- 6) Site Index

# Results

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- Species Composition
  - Overall the accuracy of inventory information for species composition was variable, depending on leading species.
  - Balsam leading were indeed Balsam leading with minor components generally within 20% of that predicted.
  - Pine leading were also generally within 20% of inventory labels. (exception: 2 of 10 were actually BI leading. 1 with minor PI, 1 with no PI)

# Results

- Species Composition

- Spruce is another matter as only 1 of 4 polygons identified as Sx leading was actually found to be Sx leading. The other 3 had the Sx component over-estimated by an average of more than 40%.

<b>Stratum</b>	<b>Plot Number</b>	<b>Forest Inventory Species Composition</b>	<b>Observed Species Composition</b>
<b>Spruce</b>	093L020-230	Sw5B15	B19Sx1
	093L046-127	S8Ep2	B16Sx2P11At1
	093L078-555	S6B3P11	B14P13Sx3
<b>Pine</b>	093L005-583	P15S3B12	B16P13Sx1
	093L068-772	P15B4S1	B18Sx2

# Results

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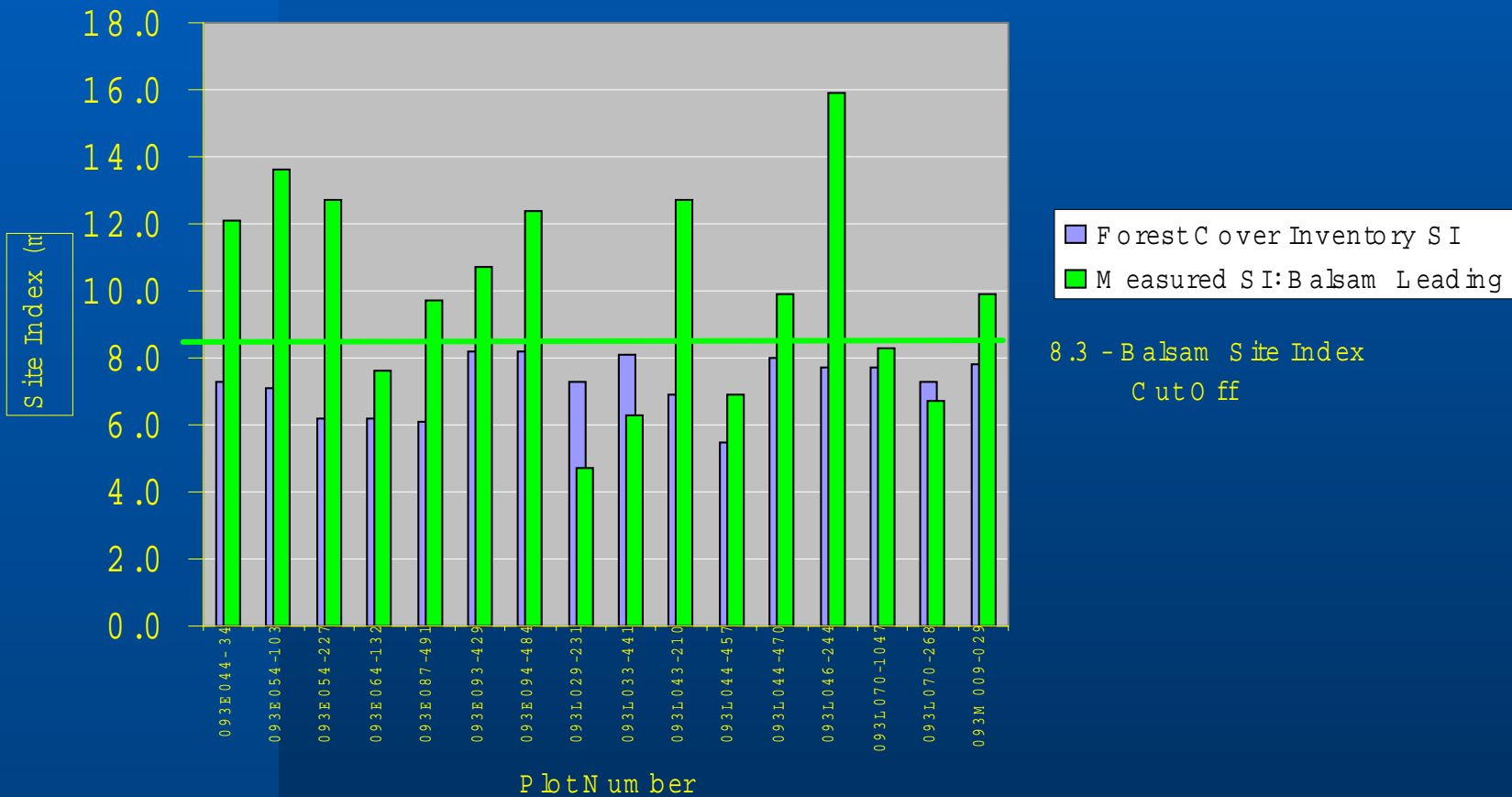
- Site Index

- Generally underestimated for all species.  
(i.e. 100% of Sx (3.8 m), 90% of PI (6.4 m), and 81% of BI (2.8 m))
- Additionally most were above the Site Index cut-off utilized for defining Low Site polygons.  
(i.e. 100% of Sx, 70% of PI, and 63% of BI)

**\*\*Numbers in Yellow indicate the average difference.**

# Results

## Balsam Site Index Comparison



# Results

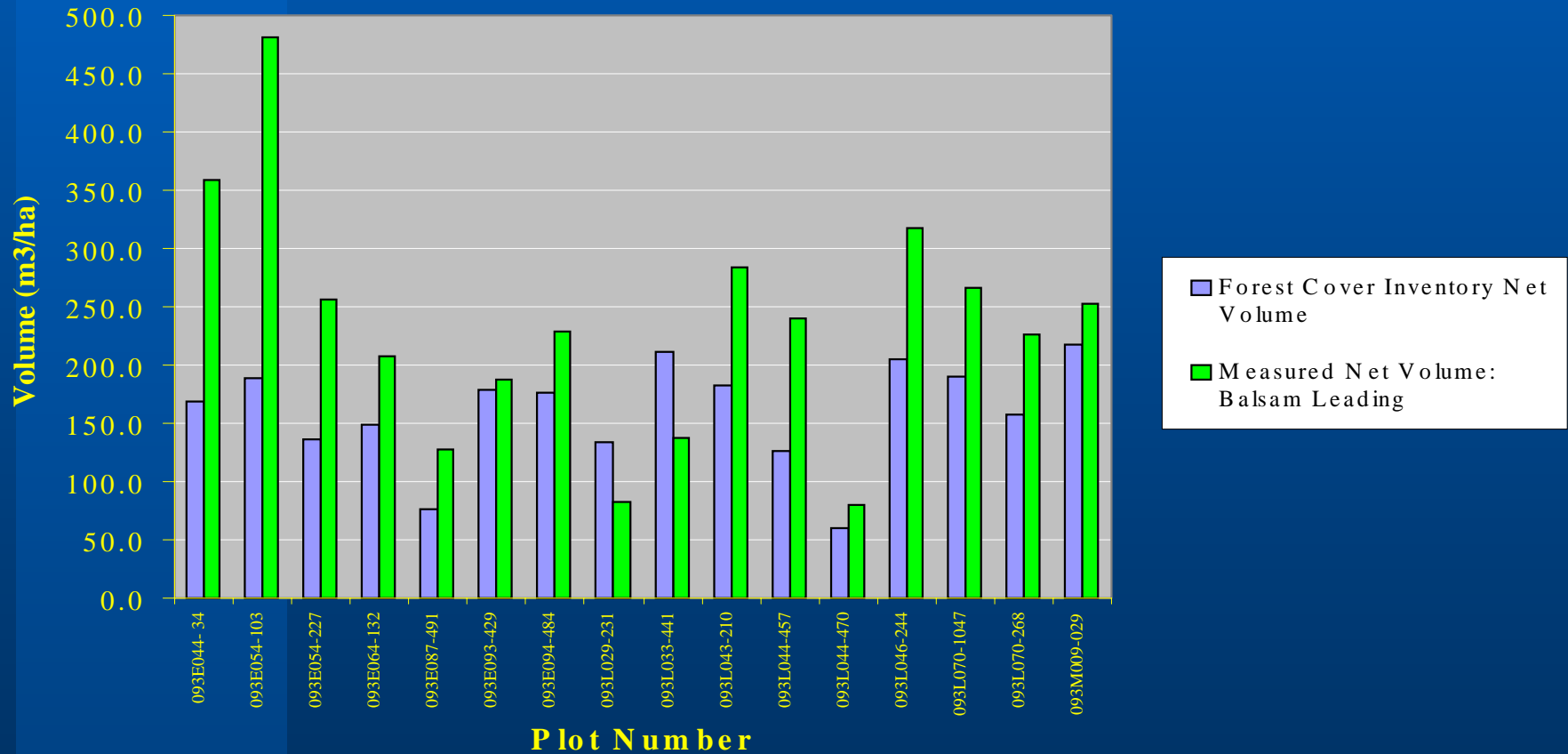
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- Net Volume

- Generally underestimated for all species.  
(i.e. 75% of Sx (**35 m<sup>3</sup>/ha**), 90% of PI (**42 m<sup>3</sup>/ha**), and 87% of BI (**56 m<sup>3</sup>/ha**))

# Results

## Balsam Net Volume Comparison



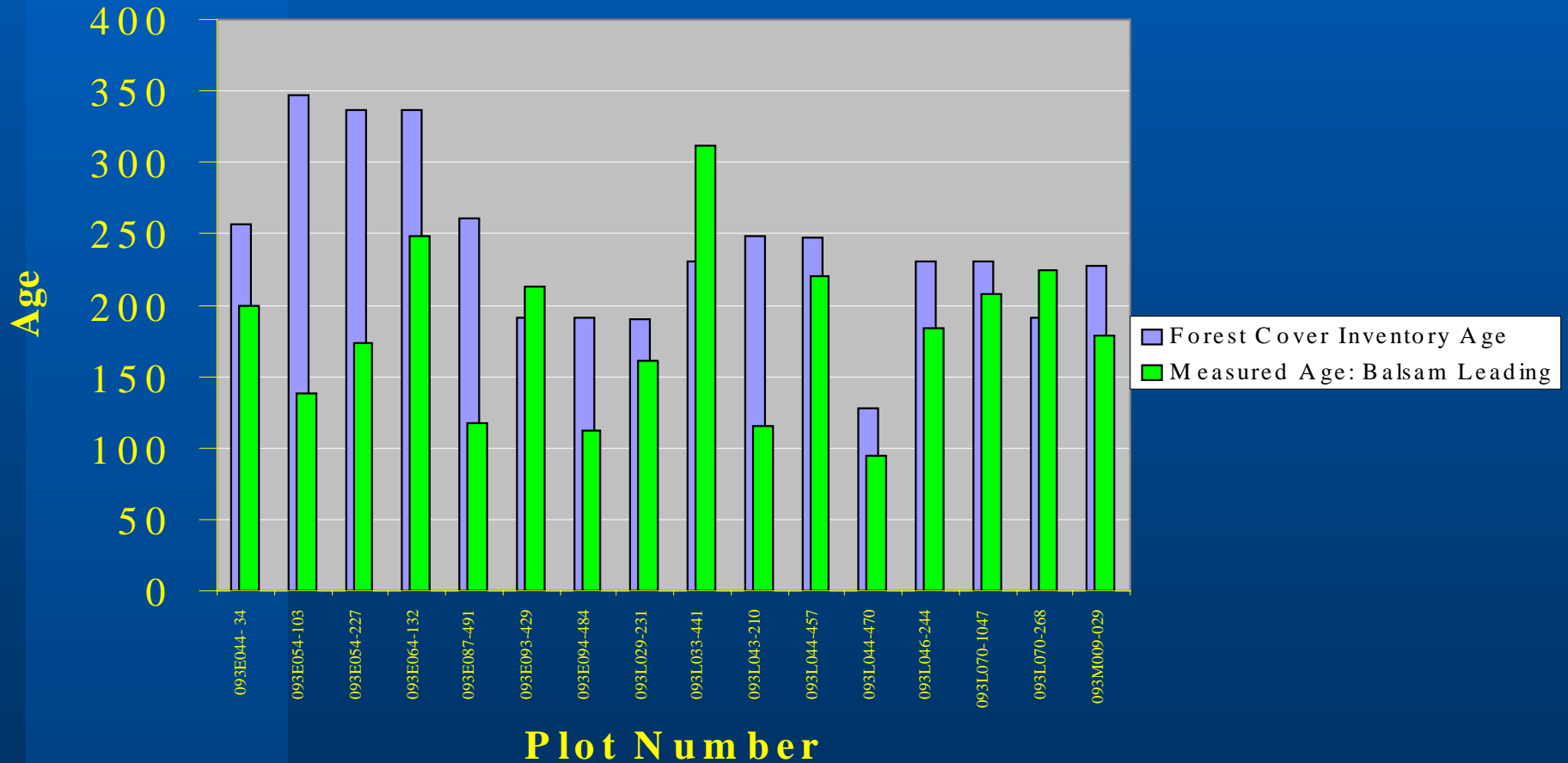
# Results

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- Age
  - Generally overestimated for Spruce and Balsam. (i.e. 100% of Sx (84 yrs), 60% of PI (3 yrs), and 81% of BI (59 yrs))
  - Pine was quite accurately estimated (80% within 25 years).
  - Balsam was consistently overestimated (nearly 50% of the polygons were overestimated by over 50 years).

# Results

## Balsam Age Comparison



# Results

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- Tree Height and Diameter at Breast Height
  - Both Tree Height and Diameter at Breast Height were generally well estimated.
  - Tree Heights were within 1 meters for both PI and BI, however Sx heights were over estimated on average by 6 meters.
  - Diameter measurements found 70% of the DBH's to be within 5 cm of the predicted values. The average difference for each species was also less than 5 cm.

# Results Summary

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- **Forest Cover does not accurately reflect the Low Site polygons assessed.**
- **Species Composition identifying Sx as the leading species is suspect.**
- **Of most consequence are underestimated Site Index and Net Volumes.**
- **On the ground, 70% of the polygons visited exceeded the Site Index cutoffs used to define Low Site polygons.**

# What now?

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- **Brief summary of options.**
  - 1) **VRI with Photo Interpretation for Low Site polygons. (not recommended)**
  - 2) **VRI using Forest Cover/ retro-fitted Forest Cover. (potential)**
  - 3) **Stand Structure Protocol. (has promise)**
  - 4) **Alternate Growth and Yield Methodologies. (potential)**

# More Information

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