Collecting and Utilising Forest Inventory Data

Prepared for ForestTECH 2009
Tools and Technologies to Improve Forest Planning & Operations

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Collecting and Utilising Forest Inventory Data

Why do Inventory?

Decision Making / Planning
Can I feed the mill?
When should I thin, or sell?
How did my thinning go?
Will this stand meet the new spec?
How do my models behave?
Do I have a forest health issue?

Valuation
Accounting value of assets
Level of Insurance
Tax obligations
Compensation disputes
Ownership transfer
Practical Review of Implementing Forest Inventory Technology from Collection to Analysis and Review

DATA COLLECTION
GPS Reaches Under the Forest Canopy
Implementing Efficient Assessment of Tree Features

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GPS: Reaching Under the Forest Canopy
CASE STUDY: Interpine Forestry

Inventory Plot Location

- Use **path of least resistance**
- Navigate with an **active digital compass**
- Confirm plot elevation with an integrated barometer
- Confirm location with on-screen maps

Fixing Ground Controls with Survey Grade GPS

- **LiDAR Ground Control Surveys**
Fixing Locations Using Survey Grade GPS

320 sites, fixed using Trimble ProXT with antenna height at 5m (post differential correction applied)

30min - 4hr
Data collection period for 300 sample minimum

Average precision vs. Productivity mask
90% Pine 10% Other Spp
Stand age 12 - 25 yr

93% <2m

Plot Location Accuracy Under a Forest Canopy

320 sites, located with Garmin Map60CSX, then fixed with Trimble ProXT (post differential correction applied)

- 99% <20m
- 85% <10m
- 63% <6m
CASE STUDY:
Implementing Efficient Assessment of Tree Features for log product yield analysis

Gentle sweep - OK for longer products

What effects product value?
Branching
Sweep
Downgrade Features
Wood Quality Characteristics

Small Branch
Medium Branch
Total Height 33.4m

Pruned
4.5m
1.4m DBH = 560mm

Thinning Scar >10% Diam.

Tree Acoustics Measurement

Small Branch

Butt sweep

Timberlands NZ, Rayonier NZ, Nelson Forest Management, City Forests, Wenita, Blakely Pacific, PF Olsen, Tasman Forests, Hancock Forest Management, Ennsdale One, Woodmetrics, GFP, New Zealand Forest Managers, Poyry NZ, Northland Forest Managers,

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Gentle sweep OK for Longs
Pruned <=7cm 4.5m 1.4m DBH = 560mm
Broken Top = 18.5m
Resin Code = 1
Standing Acoustic = 2.34
Expected Crop = Thin 2
Total Height 33.4m
Standing Acoustic = 2.34
Expected Crop = Thin 2
DBH = 560mm

Gentle sweep (SED/4) OK for Longs
Fluting <5cm to 1.5m
DBH = 496mm
Broken Top = 18.5m
Resin Code = 1

Fluting <5cm to 1.5m
Butt swept (SED/3)
0.7m
1.5m
1.4m
18.5m
18.5m
Field Inventory Procedures for implementation of Overlapping Feature Cruising

- Cruising dictionary templates
- Freely available inventory guidelines
- Free online user forum [www.interpine.co.nz](http://www.interpine.co.nz)
SUMMARY

- Overlapping stem feature coding is now the default throughout NZ, and now being adapted and used in Australia.
- Cruising methodology has remained somewhat static industry wide since 2005
- PlotSafe deployed in most companies across NZ
- Objective auditing and training with the development of InTECH laser branch assessment tool.
- Regular courses, and free documentation available
CASE STUDY: Timberlands NZ, Rayonier NZ

Web Portal

Turning data into information, making is available

Key objective:

- Increase ease of access to inventory data
- Pre-process and conduct secondary validation of data
- Facilitate the storage of yield data
- Integrate and display information within your GIS

Review Inventory Operations

Source: Timberlands NZ
ForestTECH 2009

Access Attached Documents / Photos

Web Reporting Portal of Inventory Operations
ForestTECH 2009

Detailed Inventory Summaries

Yield Summaries
CASE STUDY: Rayonier NZ  
Looking at Forest Health using Data Collected for Forest Yield Estimates

Nectria flute canker

- Using existing information to identify and map trends
- Inventory fluting observations vs. tendering regimes

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Source: Rayonier NZ

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Develop and Deploy a New Classification System

PLOTSAFE Flexible Data Collection

CASE STUDY: Timberlands NZ

Environmental

- Falcon Observations
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Yield Analysis

Estate Modelling
Harvest Crew Scheduling
Optimal Cutcard Allocation

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Case Study: Nelson Forests Ltd

Estate Modelling and Harvest Crew Scheduling

Yield Tables
Log product by m3/ha by age for
Operational Cut Strategy
Baseline Cut Strategy and...

Estate Model / Harvest Scheduling
Remsoft WoodStock, Allocation Optimiser, Regime Module

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STUDY, REVIEW, REVISE

Forecasting Market and Forest Management Change

CASE STUDY

Changing Markets? Changing Resource?

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CASE STUDY:

Yield Recovery Studies

- Model evaluation
- Return to log ($) modelling
- Value recovery monitoring

SUMMARY

Collecting and Utilising Forest Inventory

Business Rules and Systems Change
Complexity Increases
Simple, Robust, Cost Effective
Flexible

PLOTSAFE
Data Capture Software

YTGEN
Yield Analysis Software
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