



## Permanent Sample Plot Database Administration and Measurement Program 2010

### Summary

The Scion Permanent Sample Plot (PSP) Database stores 2,891 current *Pinus radiata* plots controlled by the FFR Radiata Management Theme (35% of all radiata plots on the database). Between January and November 2010, 16 experimental trials, with a total of 451 individual plots, were measured and updated onto the database. 'In-kind' help was provided by Ernslaw One Ltd for one trial in Blue Mountains Forest (20 plots). Another trial (15 plots) was measured as 'in-kind' by the owner, and the rest of the plot measurements were completed by the Scion field crew, without 'in-kind' help. No growth monitoring plots were included in the measurement schedule this year.

An exciting new aspect in the design of the PSP system will see web-based access available. This upgrade will give users the ability to extract and browse their own datasets, to upload and download their work schedules for measurement programmes and to extract reports in various formats. It is expected that the 300 Index and 500 Index will be included in this version of the PSP system.

A new version of PSP data capture, Fieldman PSP, has been developed by Brian Clement, an ATLAS software engineer. This programme has been tested in the field, and will be operational for the 2011-12 measurement programme

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### PSP Database

Growth data has been captured since the 1920's when the New Zealand Forest Service established permanent sample plots in forests around New Zealand. From the 1970's when experimental plots were set up by the Forest Research Institute data has been centralised in a data pool. The SCION PSP database system manages permanent sample plot data with primary functions being data storage, retrieval, manipulation and presentation. It maintains 29,353 permanent sample plots with 11,698 plots having a 'current' status and 17,837 plots either felled or abandoned. These plots are made up of 143 different species with *Pinus radiata* being the dominant species (72%).

Over the past years the PSP database has contributed to the development of the 300 Index growth model. Currently work is in progress to include the old age and high stocking plots to improve the 300 Index growth model performance of for longer rotation age, especially with the high interest in carbon inventory.

The Scion Permanent Sample Plot (PSP) database system stores 2,891 current *Pinus radiata* plots controlled by the Future Forest Research Radiata Management Theme. This data represents 35% of all Radiata plots on the database.

These plots are located in forests that are owned or managed by large forest owners, TMO's, government agencies and small companies, illustrated in Figure 1. The large group of small forest owners mainly represents farm sites.

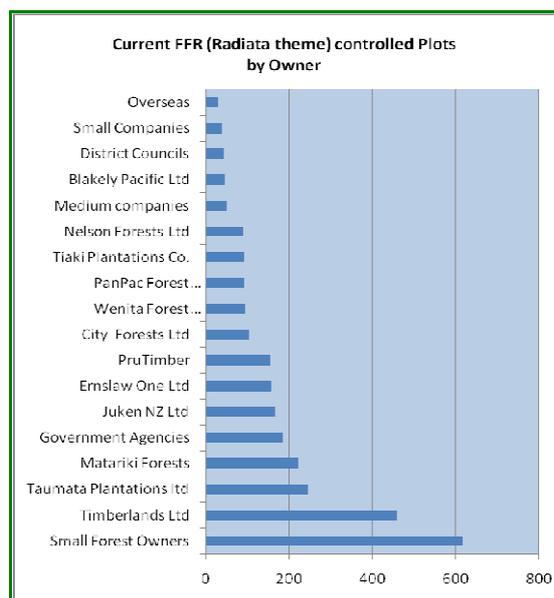


Figure 1. Current plots by estate owner

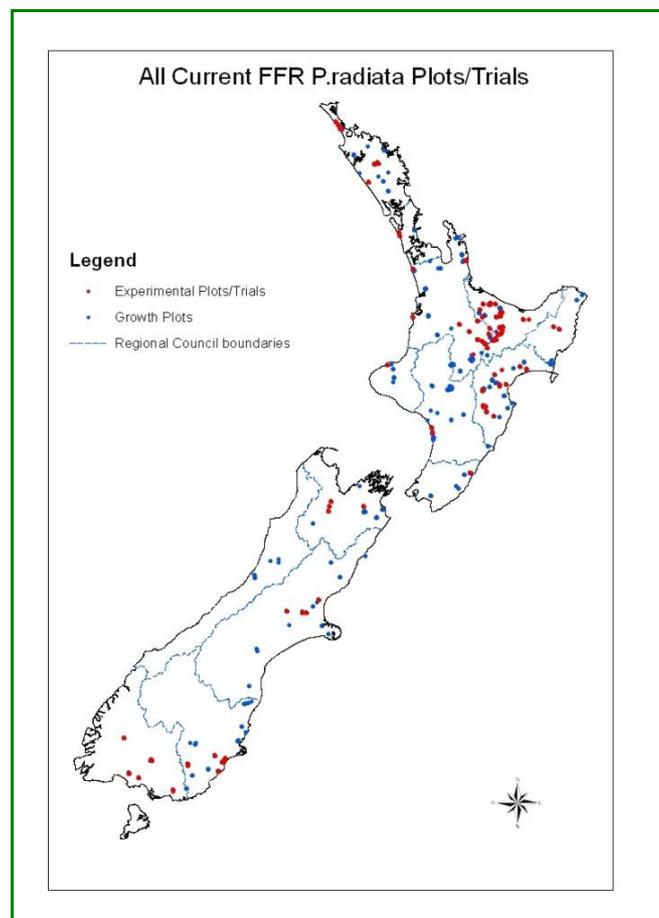
The current PSPs have been established widely within experimental trials and growth plots across NZ



# RADIATA MANAGEMENT TECHNICAL NOTE

Number: RTN-006  
Date: March 2011

(Figure 2), and a Measurement Strategy (FFR-RWP-016 – ‘3-year PSP measurement programme’) is under periodic review to ensure that the matrix of Genetics x Environment x Silviculture is adequately covered in the current and next generation of trials.



**Figure 2. All current FFR Radiata theme plots**

All plots measured by Scion in 2010 (Scenario 2 in FFR-RWP-016) were ‘experimental’ plots in trials. The majority of these plots have been established with a genetic gain purpose, but they also test various pruning, thinning, spacing and final crop stocking regimes.

Thirty-four percent of the trials measured were in the Central North Island (CNI) growth modelling region and thirty percent in Southland (SOUTH). This distribution is shown in Table 1 along with the various forest owners of these trials.

**Table 1. Trials measured by Growth Modelling Region**

Growth Modelling Region/ Forest Owner	No. Plots
CNI	120
Private, Kaharoa	15
Private, M. McKee, Kawhia	36
Pvte, Te Kapaiwaho Trust, Kaharoa	8
Timberlands Ltd	61
ECOT	19
Ernslaw One Ltd, Central Region	19
HBAY	36
Juken NZ Ltd, Central Region	36
SANDS	67
Ernslaw One Ltd, Central Region	67
NELSON	25
Nelson Forests Ltd	25
CANTY	43
Matariki Forests	43
SOUTH	107
City Forests Ltd, Dunedin	36
Craig Pine Timber Ltd	36
Ernslaw One Ltd, Southern Region	20
Private, Dipton, Invercargill	15

## PSP Trial Establishment 2010 (FFR-RWP-016)

The final series of NZ Silviculture x Traits trials were established this year at Waipori Forest, Southland (trial FR 437). The purpose is to test genetic material across a range of sites and silviculture treatments for traits demonstrating:

- Structural (high wood density, multi-nodal and small branch genotypes) wood uses;
- Appearance solid wood products (long inter-node genotype); and
- Volume production (high GF breeds).

Thirty-six plots were set up, with stockings ranging from 600 to 1500 sph. There are six different seedlots with three thinning and two pruning treatments. The trial is a 2<sup>nd</sup> rotation forest site with low fertility.



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The scheduled first pruning (low prune) was carried out on 18 of the 36 plots in February at the time of plot establishment.

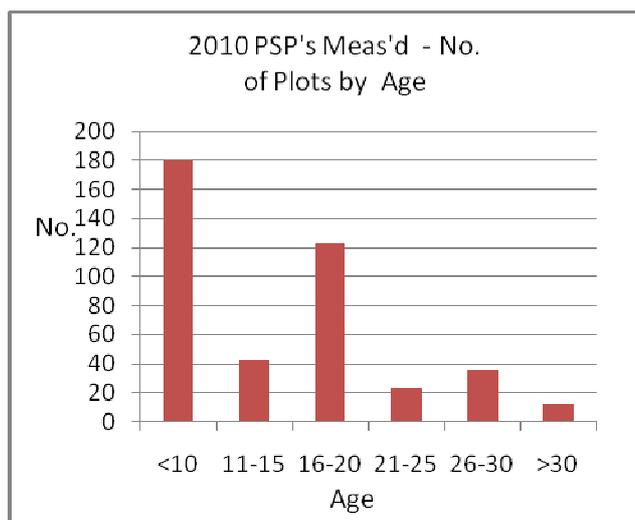
## PSP Measurement 2010 (FFR-RWP-016)

The Scion field crew measured 436 *P.radiata* plots throughout the North and South Island and a further 15 plots were contributed as 'in-kind' measurements by the land owner (Figure 4 and Table 2).

Figure 3 illustrates the spread of trials, by regional council boundaries across NZ that were measured during the 2010 calendar year by Scion staff.

Figure 5 shows the location of these trial sites with the LENZ level 1 classifications within NZ.

Of the 451 plot measurements captured in 2010, 120 plots were in the <10 year age bracket. These plots were the newly established Silviculture x Traits trial series (FR436 to FR440). (Figure 3).



**Figure 3. PSPs measured in 2010 - by Age**

The measurement schedule covered the second half of the 2009/10 financial year and the first half of the 2010/11 financial year. The measurement programme took place between January and November 2010, although no plots were measured in June and July. During this time, decisions were still being made on the 3-year measurement programme. Some plots measured were not included in the final schedule for 2010 (see those marked \* in Table 2).

"In-kind" help was only used for one trial (FR121/10 Blue Mountain) measured by Scion staff in 2010.

One other company offered 'in-kind' help but the logistics and timing made it impractical.

**Table 2. Trials measured in 2010**

Trial name	Forest	No. plots meas.	Month of meas.
CY583 *	Eyrewell	20	May
FR102 *	Private, Dipton	15	Sept
FR121/8	Mangatu	19	Sept
FR121/9	Santoft	25	Aug
FR121/10	Blue Mountain	20	Sept
FR121/12	Ashley	23	Sept
FR121/13	Golden Downs	25	Sept
FR186 *	Private, Kaharoa	8	Nov
FR336 *	Santoft	42	May
FR436	Kaingaroa	36	Aug
FR437	Waipori	70	Feb/Aug
FR438	Awaho	36	Aug
FR439	Taharoa Inc.	36	Sept
FR440	Hillfort	36	Aug
RO1891 *	Kaingaroa	25	Oct/Nov
RO2007 *	Private, Kaharoa	15	Jan



## FFR P.radiata Theme Trials/Plots measured in 2010

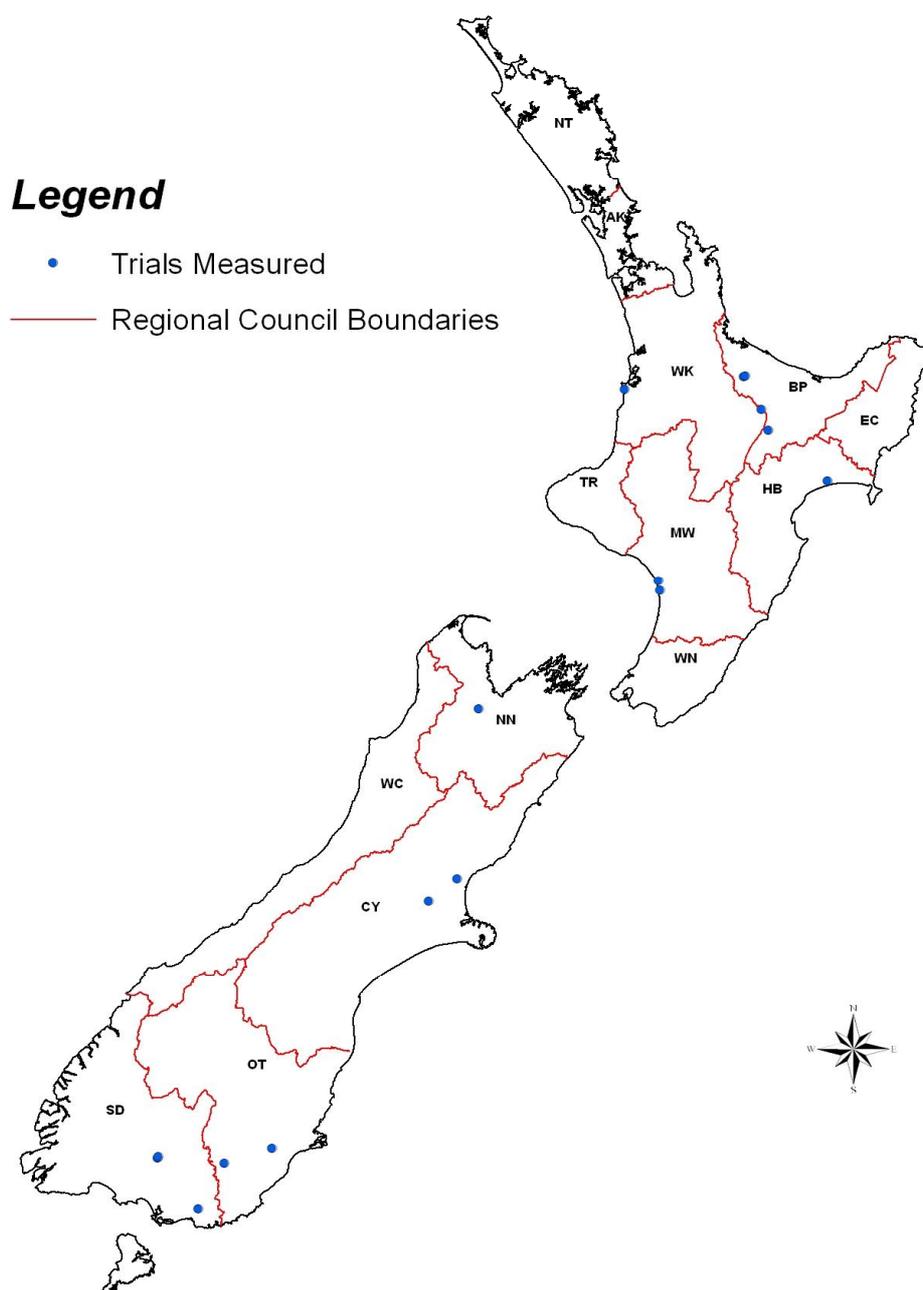


Figure 4. Trial sites measured in 2010



## FFR P.radiata Theme Trials/Plots measured in 2010 with LENZ Classifications

### Legend

— Regional Council

### LENZ Level 1 Classes

- Central dry foothills
- Central dry lowlands
- Central hill country and volcanic plateau
- Central mountains
- Central poorly-drained recent soils
- Central sandy recent soils
- Central upland recent soils
- Central well-drained recent soils
- Eastern South Island plains
- Northern hill country
- Northern lowlands
- Northern recent soils
- Permanent snow & ice
- Southeastern Hill country & mountains
- Southern Alps
- Southern lowlands
- Ultramafic Soils
- Western & southern North Is. Lowlands
- Western South Island foothills & Stewart Island
- Western South Island recent soils

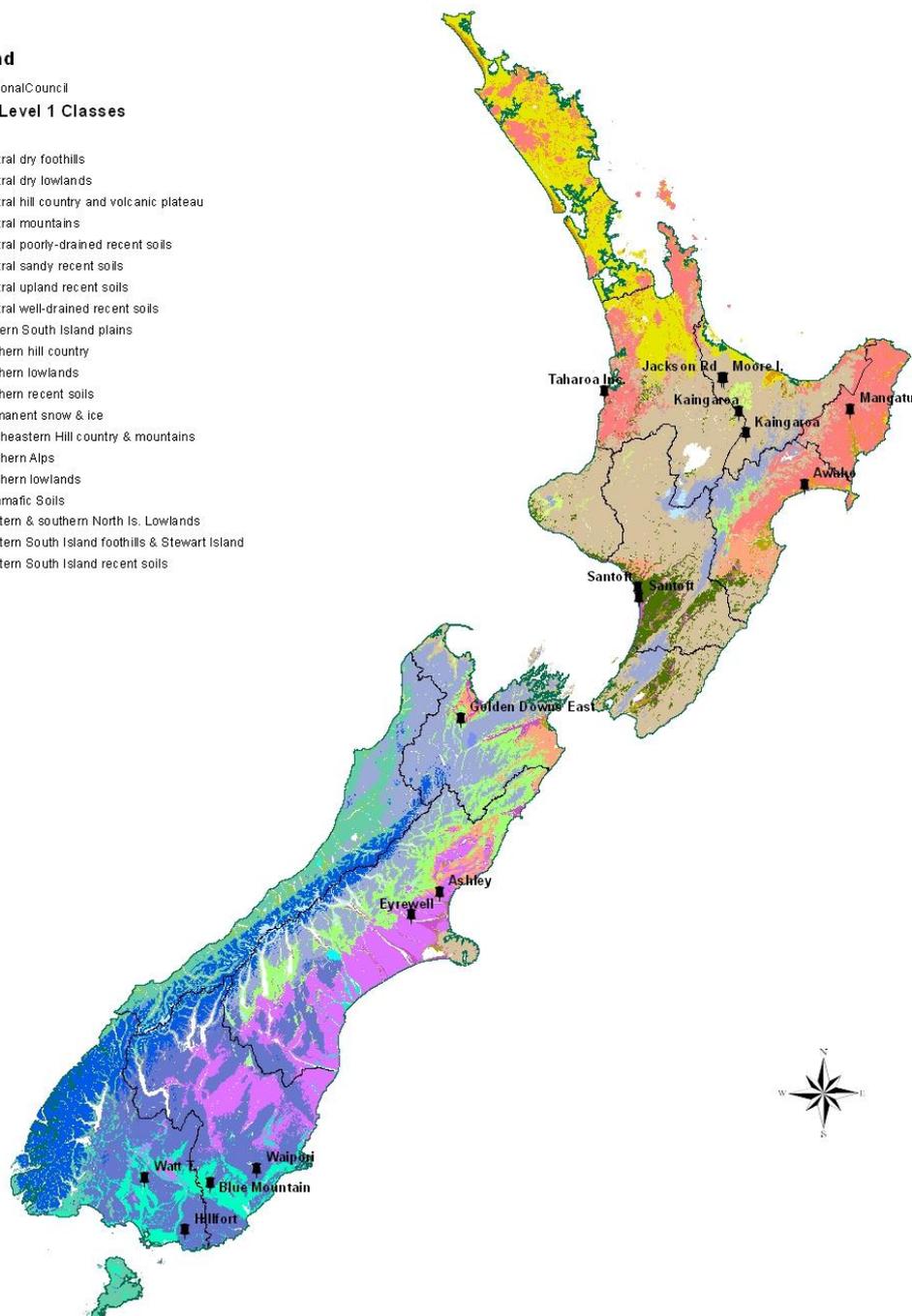


Figure 5. Trial sites measured in 2010 with LENZ Level 1 classifications



## Measurement Notes:

FR308 and FR450 – these trials were scheduled for measurement, as in Scenario 2 of the work plan (WP No. FFR-RWP-016) but were not carried out due to timing and staff unavailability. These trials have been deferred to the next financial year work programme.

RO2007 – a fast grown shelter-belt farm site had a final measurement prior to felling, having last been measured in 1999. This inventory included wood property assessments. The cost was borne by Scion's Forest Management Sciences team budget.

FR102 - part of a series established on farm sites around the country by the FFPM Cooperative. This series is not currently included in the agreed work programme but the data was contributed as 'in-kind' measurements by the land owner.

FR437 – this silviculture/traits trial was measured in both February and August 2010. The first measurement was associated with plot establishment and a low pruning of selected plots, the second measurement was the first annual growth assessment.

CY583 – a final measurement of this Nelder trial prior to felling (previous measurement in 2007).

FR186 – an ultra-high pruning trial on a CNI farm site and was due for felling early 2011. A final measurement was carried out as it was considered to be valuable data that could be used in a GxExS analysis in the future. A pre-harvest inventory was also carried out by the land owner.

FR336 – one of the New Breeds Pruning trial series, which was measured in May before the final work programme was approved, but excluded thereafter due to priority setting.

RO1891 – The purpose of this trial when established in 1983, was to test the effects of oversowing with Maku Lotus on tree growth at 100, 200 and 400 sph. This trial was used by the FFR 1.06 Destructive Sampling–Iterations project team. A full growth measurement was carried out before selected trees were felled.

The following photo shows an example of the trees, pruned to 6m, in the New Breeds Pruning trial at Santoft Forest (FR 336), measured in 2010.



## Administration

The Scion PSP administrators, together with the field crew, continue to plan and carry out the agreed measurement programme efficiently each year. The database administrators are also responsible for ensuring the data is uploaded and checked to a high standard. Error corrections, producing standard reports, on-line interrogation and data retrieval keep the PSP administrators busy throughout the year.

During the year some minor upgrades to the PSP system were implemented. Improvements include the ability to link documents to plots for future retrieval, create a spreadsheet with plotid's and GIS coordinates to use in ArcGIS, and other functionality that administration staff have found most useful.

In late 2010, Scion staff began a new strategy and workplan to upgrade the current PSP database system. Currently, the PSP admin staff are working closely with Albert Jovner, Business Analyst for ATLAS, on the PSP Database logical data model.

## And something else.....

An exciting new aspect in the design of the PSP system will see web-based access available. This upgrade will give users the ability to extract and browse their own datasets, to upload and download their work schedules for measurement programmes and to extract reports in various formats. It is expected that the 300 Index and 500 Index will be included in this version of the PSP system.

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