# The National Forest Inventory 2018-2022 analysis:
Yield tables and carbon stocks in planted forests in New Zealand based on a five-year inventory cycle

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Report information sheet

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Report Context

The Land Use and Carbon Analysis System (LUCAS) is a cross-government programme administered by the Ministry for the Environment (MfE) which supports New Zealand's international reporting requirements under the United Nations Framework Convention on Climate Change and the Kyoto Protocol. LUCAS combines information from field-based inventories and wall-to-wall satellite-based mapping.

Every year New Zealand measures about 1/5th of the permanent sample plots of the National Forest Inventory administered by MfE. This means that all plots should be measured once during a five-year cycle to provide the full inventory, while each measurement year in its own right provides a random, nationally representative sample of New Zealand's plantation forests.

Every year new plots are added to the inventory sample either to boost statistical accuracy or because plot grid points have been located in new afforestation areas identified by updated mapping. Over time old plot data representing stands that have been recently harvested will be replaced with measurements of the new forests growing on these sites or drop out altogether due to deforestation (land use change). This means that estimates from a single year's plot measurements can give different results from the previous year due to the changes that the plantation forest estate experiences from year to year including remapping, as well as due to chance resulting from sampling.

Plot measurements undertaken in 2021 and 2022 and analysed for the first time in this report provide data for the first two years of the second annual inventory cycle of planted forests in New Zealand.

In this report we analyse the latest available measurements (2021 and 2022) and compare them with previous years' results to identify any issues or trends and provide a carbon stock estimate for 2020 as the midpoint of the 2018-2022 Inventory using a model-based imputation approach to provide a statistically accurate stock estimate. Using a five-year window, every measured plot that is imputed based on a model approach need only be projected forwards or backwards for 2.5 years.

To generate a full representative yield table for all plantation forests in the sub-categories of pre-1990 and post-1989 planted forests, we use all plots of the full National Forest Inventory with their multiple measurements of current forest stands. This approach makes use of the full first annual inventory cycle 2016-2020, previous measurements from periodic inventories since 2007 and the newest measurements in 2021 and 2022 (new inventory cycle). The yield tables generated can be used in MfE's Land Use Carbon Analysis System (LUCAS) to produce estimates of forest carbon stocks and stock changes for international reporting, define the forest reference level for pre-1990 planted forests and estimate the long-term average carbon stocks for post-1989 planted forests.

Executive summary

Objective

The objective of this technical report is to provide the Carbon Sequestration Team of the Ministry for the Environment (MfE) with updated information on planted forest carbon stocks obtained from the National Forest Inventory. This includes plot measurements undertaken in 2021 and 2022 (the first two years of the second annual inventory cycle of planted forests in New Zealand) and analysed for the first time for this report.

There are three parts to the analysis presented here:
Part 1 (Objective 1) provides average carbon stocks per hectare for each of the last five years (2018-2022), and carbon stocks at the last measurement for each plot measured in the last five years including the processing and analysis of measurements carried out in 2021 and 2022 on existing and new permanent sample plots. We also provide an estimate of carbon stocks for 2020 as the midpoint of the five-year Inventory period, based on all plots measured from 2018-2022, using a model-based imputation approach.

Part 2 (Objective 2) provides yield tables that reflect the carbon stock and stock changes in pre-1990 and post-1989 planted forests based on National Forest Inventory data for plantation forests. These include yield tables that can be used by MfE for different purposes, e.g:
- Simulating forest stocks and stock changes for greenhouse gas inventory reporting from 1990 to the current inventory year.
- Projecting carbon stocks in pre-1990 planted forests from 2010 to 2030 to provide a Reference Level for accounting for these forests under the Paris Agreement.
- Estimating the long-term average stock of post-1989 forests to be used as the basis for applying "averaging accounting" to these forests under the Paris Agreement.

The following yield tables were generated:
1. Six yield tables for the three "species groups" (Radiata pine, Other Softwoods and Hardwoods) for post-1989 planted forests and pre-1990 planted forests separately, using all planted forest plots measured up to 2022 in the annual forest Inventory.
2. Four period-specific yield tables for all species combined (and four for radiata pine only) that represent pre-1990 planted forests present before 1990; after 1990; from 1990 to 2009, and from 2010 onward (to 2022). One additional yield table for post-1989 radiata pine from 1990 to 2009.
3. Two additional yield tables are provided: for pre-1990 planted forests present during the 2000-2009 period, and for post-1989 planted forests (all species combined).

These 17 yield tables are all area-weighted, similar to those produced for MfE in 2021 (Paul *et al.*, 2021). We also provide three age- and area-weighted all species yield tables for (i) pre-1990 planted forests present before 1990, (ii) pre-1990 planted forests present after 1990, and (iii) post-1989 planted forests, as possible input yield tables for MfE's Calculation and Reporting Application (CRA).

Part 3 (Objective 3) provides a comparison of carbon stocks per hectare at measurement against the relevant generalised yield table for post-1989 planted forests and pre-1990 planted forests and explains possible reasons for differences.

Key results

A total of 255 plots were visited in the field in the first two years of the new cycle. Out of these plots 246 were stocked with crop trees (132 in post-1989 planted forests and 114 in pre-1990 planted forests). A further 97 plots had been scheduled to be measured in 2021 and 2022 but were unable to be measured.

All measured plots contributed to estimates of carbon stocks and 100 plots in pre-1990 planted forests and 112 plots in post-1989 planted forests were suitable for generating yield tables. Carbon stocks in post-1989 forests are currently higher than in pre-1990 forests, largely because the average age of these forests is about five years older. Metrics are generally consistent across individual years in the forest inventory and for the two re-measured years, as would be expected if allocation of plots to measurement years is free of bias. Any differences may be due to the reduced sample size, particularly for post-1989 forests, as the full panels were not able to be re-measured.

Yield tables were created for each permanent sample plot using the repeated measurements. These individual yield tables were combined to generate general average yield tables using a plot area-weighted approach. An additional imputation method was used for potential CRA input tables to account for forecasting/back-casting errors, accounting for the uneven age-class distribution that can affect the yield table representativeness for under-sampled age classes.

Yield tables for pre-1990 planted forests are greater than for post-1989 planted forests. This is in part the result of the different age class distributions in those two forest classes. In general, younger trees show greater productivity (fast early growth), partly due to genetic improvements relative to planting stock planted more than 20 years ago. Younger stands have often not yet been thinned to their final stocking, and this also affects the carbon stock and sequestration trajectory. In addition, plots with slower growing tree species such as Douglas-fir, cypresses, coastal redwood and slower growing eucalyptus species are now an increasing part of the post-1989 estate, reducing the overall sequestration rate for this forest type. Less productive species are likely to be managed on longer rotations, and this can result in older age classes being dominated by relatively slow growing plots, lowering the combined species yield trajectory.

Implications

The 2021-22 planted forest inventory data confirms that ongoing analyses of annual inventory data allows the adjustment of existing yield estimates over time as new plots enter the inventory and measurements are added over time. The forecasting/backcasting approach, which accounts for prediction error in the yield table estimation is an example of the continuous improvement in the reporting of carbon stocks and stock changes in New Zealand's planted forests. There is potentially still a tendency for the yield tables to over-estimate carbon stocks in older stands and stands stocked with non-radiata pine species due to differences in harvesting age between more and less productive stands and species (Paul *et al.*, 2019).

Further work

The continuation of the planted forest inventory will allow estimates of carbon stocks and yields with higher accuracy as we start the continuous re-measurement using all plots measured over five-year intervals (Paul *et al.*, 2017a). This will help to identify the impact that plots in recent afforestation will have on the overall carbon sequestration in planted forests. Efforts should be made to obtain data from all plots on the grid (or those randomly selected), especially on those we were so far unable to measure to avoid the possible introduction of bias.

Further options to estimate carbon stocks and carbon stock changes from the planted forest inventory data can also be explored, such as:
- creating species-specific yield tables, as the number of new plots with non-radiata pine species increases.
- further analysis of management effects on carbon sequestration, through introducing future thinning and pruning events in younger stands that still show stocking well above industry standard stockings.
- calculating carbon stock estimates at the regional level, if the sampling intensity allows the estimation with an acceptable precision (e.g. enough plots per region).

- Partitioning of Post-1989 forests into forests planted between 1990-2009, and forest planted after 2009 for consistency with the pre-1990 forests to generate the yield tables used in defining the Forest Reference Level (FRL) for accounting for pre-1990 forest under the Paris Agreement.

The 2021-2022 NFI plot analysis: Yield tables and carbon stocks at measurement

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Introduction

The Land Use and Carbon Analysis System (LUCAS) is a cross-government programme administered by the Ministry for the Environment (MfE) which supports New Zealand's international reporting requirements under the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol. LUCAS combines information from field-based inventories and wall-to-wall satellite-based mapping to meet the required standards for international reporting.

An important part of LUCAS is the planted forest inventory comprising post-1989 planted forests and pre-1990 planted forests. This inventory consists of randomly chosen permanent plots from a network of grid-points laid out on a 4 x 4 km grid covering the area of planted forest across New Zealand[1]. The planted forest inventory is designed to provide an unbiased sample of permanent plots in post-1989 planted forests and pre-1990 planted forests. Based on this inventory New Zealand estimates national carbon stocks and stock change (via yield tables) on a per hectare basis for the net-stocked area in post-1989 planted forests and pre-1990 planted forests. The planted forest inventory plots were initially measured on a 5-year periodic re-measurement cycle commencing in 2007/2008 with the first measurement of post-1989 followed by a remeasure in 2011/2012. Pre-1990 planted forests were measured in 2010 and 2015.

From 2016 New Zealand moved to a 5-year cycle with 1/5th of plots measured each year. Using these data New Zealand has published annual reports of carbon stock changes in its planted forests since 2008 (Wakelin *et al.*, 2016; Ministry for the Environment, 2017). Moving to a continuous forest inventory provides annual information on the impact of changes in forest management practices (such as harvest age and the timing and intensity of thinning) on carbon stocks and changes. A continuous forest inventory can also provide annual information on natural disturbance and growth that can be used to improve carbon stock change projections. When compared with a periodic forest inventory, a continuous inventory also has the advantage of smoothing annual workloads and budgets and, through imputation approaches, allows precise estimates of carbon stocks and provides continuous assurance on the carbon state of planted forests, in contrast with periodic inventories which provide no information about the forest estate between measurement (Paul *et al.*, 2017a).

Objectives

Part 1 – Objective 1
To provide estimates of average carbon stocks per hectare for each of the last five years (2018-2022) plus a model-based imputed 2020 midpoint carbon stock. As a supplementary dataset, carbon stocks are also provided for each planted forest inventory plot at the time of the last measurement in the last five years.

Part 2 – Objective 2
To provide the MfE Carbon Sequestration team with the following yield tables:

    a) Six yield tables of the three "species groups" (Radiata pine, Other Softwoods and Hardwoods) for post-1989 planted forests and pre-1990 planted forests separately, using all planted forest plots measured up to 2022.

    b) Four period-specific yield tables for all species combined (and four for radiata pine only) that represent pre-1990 planted forests present before 1990; after 1990; from 1990 to 2009, and from 2010 onward (to 2022). One additional yield table for post-1989 radiata pine from 1990 to 2009.

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[1] Historically pre-1990 planted forests were sampled on a 8 x 8 km grid, but this is now supplemented with additional 4 x 4 km gridpoints to improve sample size for reference level accounting. Post-1989 planted forests are sampled by all 4 x 4 km grid points in the mapped area that are accessible. Assuming that at all 4km x 4km grid-points are sampled by a permanent sample plot, one plot would represent 1600 ha.

c) Two additional yield tables are provided: for pre-1990 planted forests present during the 2000-2009 period, and for post-1989 planted forests (all species combined).

The above 17 yield tables are all area-weighted, following the same approach as in Paul *et al.* (2021), described briefly in the methods section.

d) We also provide three age-adjusted and area-weighted combined species yield tables for:
i) pre-1990 planted forests present before 1990,
ii) pre-1990 planted forests present after 1990, and
iii) post-1989 planted forests,
These can potentially serve as input yield tables for MfE's Calculation and Reporting Application (CRA).

Part 3 – Objective 3
To compare carbon stocks per hectare at measurement with the relevant generalised yield table and provide possible explanations for any differences.

Methods

The methods and datasets for this analysis match the previous report for the completed full five-year planted forest inventory cycle 2016-2020 and are described in detail in Paul *et al.* (2021). The only difference is that plots that are part of the recently measured first two panels of the 2021 – 2025 inventory cycle were added and analysed, replacing the previous 2016 and 2017 measurements of these two panels of permanent plots as the latest measurements.

An overview of the analyses conducted for this report is given in Figure 1.
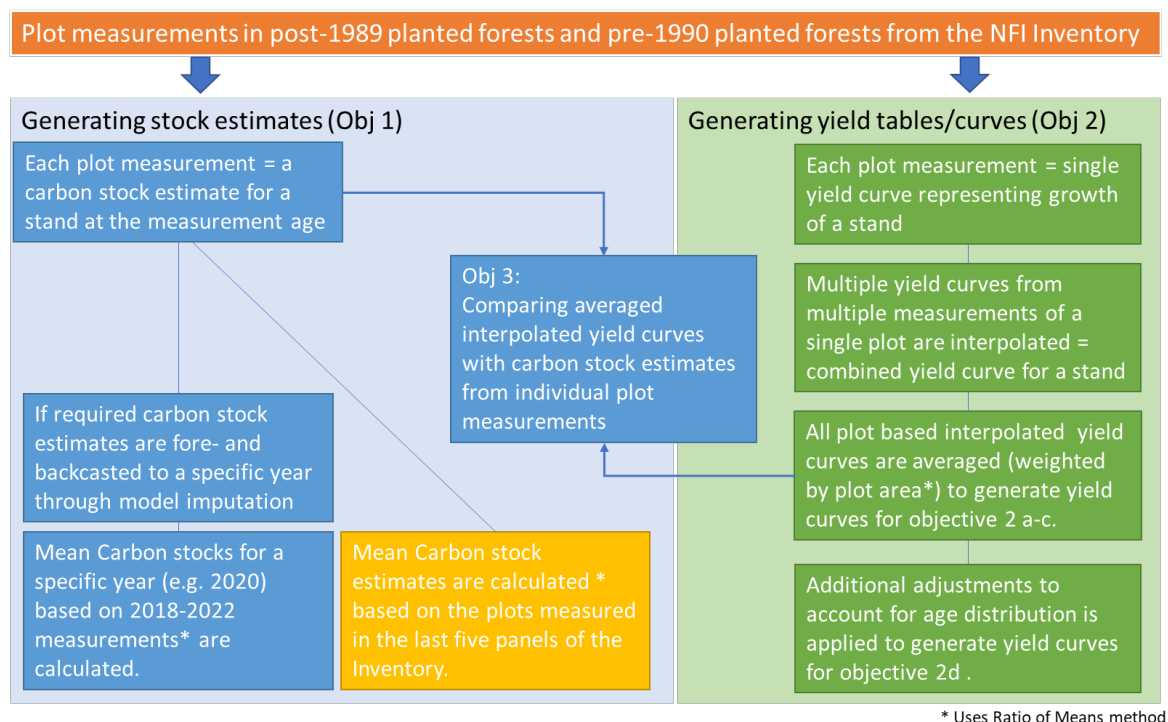
Figure 1. Overview of the analysis completed for this report

For **updated carbon stock estimates** (Objective 1, blue box in Figure 1) the new re-measurement data for plots 2021-22 replace the previous measurements for the same plots conducted in 2016 and 2017. However, some 2016-2017 plots were not remeasured and therefore the earlier carbon stock estimates and their projections to 2021-2022 were used. With the exception of these projected values, all stock estimates at a given year during the 2018-2022 cycle, were based on existing stands and their carbon stocks. Recently harvested or replanted plots (with trees too small to estimate carbon) were accounted for as zero carbon in the stock estimates.

Carbon stocks are estimated for each plot measurement using the Forest Carbon predictor (FCP) model suite (Beets *et al.*, 2007b) that consists of the 300 Index model (Kimberley *et al.*, 2005), a wood density prediction model (Beets *et al.*, 2007a) and a partitioning model (Beets, 2006).

While the analysis of plot measurements with the FCP allows the estimation of carbon stocks for four pools (live Above Ground Biomass, live Below Ground Biomass, Dead wood litter and Litter) at measurement and for the known age of the measured stand, we do not estimate soil carbon. However, this model approach allows to generate a yield curve (see Part 2) at the same time as carbon stock estimates. This ability also allows to impute carbon stock estimates for specific years in which a specific plot was not measured. This model imputation is used when all measured plots during a five-year cycle are used to estimate carbon stocks for a specific year e.g. midpoint of the planted forest inventory cycle,

utilizing a larger sample than only the plots measured at this specific year. As the inventory has a re-measurement period of five years for each plot the maximum imputation period is 2.5 years. Beets *et al.* (2011) has shown that the FCP model is well suited to impute carbon stock estimates over such short timeframes.

Carbon stocks from non-planted woody vegetation (non-crop carbon) is estimated every time a plot is measured. Non-crop carbon is estimated from measurements of non-planted woody vegetation with a DBH ≥ 2.5cm through allometric equations. Based on previous work we currently assume that non-crop carbon stocks in planted forests have high spatial variability but do not change over time. Two types of non-crop carbon are considered, non-crop carbon in the net-stocked area (understorey under the planted trees) and non-crop carbon in areas that are unstocked (present in non-planted areas in plantation forest).

To estimate national averages of carbon stocks per hectare (a ratio) in post-1989 planted forests and pre-1990 planted forests or for individual panels of the last five years of measurements, individual plot estimates are averaged based on a plot-area weighted approach (called area-weighted) as net-stocked plot area can vary between plots (Herries *et al.*, 2013). This area weighting approach is based on the Ratio of Means method. The ratio estimator that achieves this is given by (Cochran, 1977):

$$R = \frac{\sum_{i=1}^{n} y_i}{\sum_{i=1}^{n} x_i}$$

Where:
R is the ratio estimate of mean carbon per hectare
y_i is the carbon stock in plot i for post-1989 or pre-1990 forest (as appropriate) in tonnes
x_i is the mapped area of a plot i for post-1989 or pre-1990 forest (as appropriate) in hectares
n is the number of plots

As mentioned, net-stocked area can vary from plot to plot if unstocked areas (tracks, landings) are present in the plot area. Net-stocked area ratio can therefore be calculated by the ratio between the actual stocked area (where crop trees are planted) and the horizontal plot area (0.06 ha). Fully unstocked plots also contribute to this ratio if they are part of the mapped forest area.

The forest inventory provides an annual update on carbon stocks in planted forests for the current last five years with a sufficient precision. These estimates reflect the current carbon stocks based on the newest measurements from the field, but with re-measurements it also captures any possible changes over time. For example, previous plot measurement in stands that are now harvested can serve as the basis for historic yield curves but also carbon stock changes over time.

For **generating yield tables** (Objective 2, green box in Figure 1)**,** the method steps are described briefly in Appendix B. The same datasets were used as in Paul *et al.* (2021), with the exception that the recent 2021-2022 re-measurements were added. This means that all current and previous measurements, including all previous forest stands with a measurement and that were present for a relevant period (even if now deforested, harvested or replaced with a new stand) were used to generate individual interpolated plot-based yield tables for the forest stands they represent and therefore are included in a specific period. These individual interpolated plot-based yield tables were then averaged through the plot-area weighting method and used to generate species-cohort and period dependent yield tables.

Each plot measurement allows the modelling of an individual yield table (the graphic expression is a yield curve) based on the values of this single measurement. Re-measurements of the same plot representing the same plot allows us to model the yield curve over time by imputing the individual yield curves to a single yield curve that passes through each measurement.

Once the "compartmentalised" yield table for each plot, representing one stand, is modelled, all plot-based yield tables for a specific time cohort[2] or species group are averaged to estimate a representative area-weighted yield table by using the ratio of means estimator.

Estimated average carbon stocks from non-crop woody species calculated for the representative plot sample of each time-cohort or species group are added as a constant to the relevant yield table, again using the ratio of means estimator.

As requested by MfE three additional yield tables representing pre-1990 planted forests planted before 1990, pre-1990 planted forests established after 1990 and post-1989 planted forests were generated for sensitivity tests and potential use in the CRA. These are area-weighted as well as age-adjusted and can be found in Appendix 2d. Age-adjusting means that a plot with a measurement close to the age for which a yield is estimated is given a higher weighting than a plot that was measured at an older or younger age and therefore required a longer forecast or back-cast period. The procedure (described in appendix B) was developed to account for the uneven age-class distribution in New Zealand's plantation forests. Only the post-1989 area-weighted and age-adjusted planted forest table was used in the CRA, while area-weighted (but not age-adjusted) tables were used for pre-1990 forests planted before and after 1990.

The **comparison of yield curves with the carbon stocks** from the individual plot estimates (Objective 3; Figure 1) uses the results of the calculations from objective 1 and 2.

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[2] For example, for the newest updated yield table of post-1989 planted forests, representing the current forest resource, all measurements that represent existing standing forests are used. Measurements that represent a previous stand (now harvested) are excluded, as they are not considered to represent the current resource. In the case of pre-1990 planted forest, they could be used to represent an older cohort. In a few cases the new replanted stand was too young to be modelled accurately or has so far only one measurement (no interpolation required).

Results

Part 1, Objective 1: Average carbon stocks per hectare

This section provides estimates of average carbon stocks per hectare for each of the last five years (2018-2022), and carbon stocks as of 2020 (midpoint) for each plot measured in the last five years. Firstly, a brief description of the plots assessed is provided. Further details of the data and more detailed methods are given in Appendix A.

Plot metrics relevant for carbon stocks

The purpose of assigning plots randomly to measurement year panels is to ensure consistency in the yield tables estimated from available data. The expectation is that parameters for each panel will be similar unless there is a change in management over time or the plot-set is changing (i.e. access is denied, plots are harvested or replanted).

Estimated carbon stocks and carbon stock change in planted forests depend on a number of factors that are quantified in Table 1 for each measurement panel for the last complete forest inventory cycle plus the first two years of the current cycle, 2021 and 2022.

Table 1: Mean values for various growth and structure indices for pre-1990 and post-1989 planted forests for the last planted forest inventory cycle 2016 to 2020 and the annual inventories 2021 and 2022 (as replacements for the previous panels 2016 & 2017).

		2016	2017	2018	2019	2020	2021	2022
Pre-1990 planted forests	300 Index (m³ ha⁻¹ yr⁻¹)	24.9	24.9	22.5	23.7	24.0	24.1	23.7
	Site Index (m)	30	28.6	28.8	30.2	29.2	30	28.9
	Stocking (stem/ha)	616	645	496	631	667	609	528
	% of plots stocked with radiata pine	93%	90%	97%	95%	97%	94%	92%
	Sample size (no of plots*)	54	47	41	50	54	58	48
	Net stocked area ratio**	85%	84%	73%	83%	74%	85%	86%
Post-1989 planted forest	300 Index (m³ ha⁻¹ yr⁻¹)	24.2	25.9	27.2	23.5	27.4	25.5	26.9
	Site Index (m)	27.7	28.8	29.5	28	29.6	28.2	28.9
	Stocking (stem/ha)	475	512	587	570	571	560	560
	% of plots stocked with radiata pine	85%	81%	83%	84%	90%	87%	85%
	Sample size (no of plots*)	67	68	70	62	46	57	65
	Net stocked area ratio**	83%	76%	83%	75%	72%	95%	88%

* plots that were stocked and allowed the calculation of indices.
** includes unstocked plots.

Species composition of planted forests affects carbon stocks generally through the species' different growth rates and wood density, as well as differences in management and rotation length. The dominant plantation tree species in both pre-1990 and post-1989 plantation forests is radiata pine. Across the full 2018-2022 planted forest inventory period, 96% of plots in pre-1990 planted forests and 82.4% in post-1989 planted forests were in radiata pine stands, with a small amount of year-to-year variation. In both pre-1990 and post-1989 planted forests, the proportion of radiata pine in the 2021 and 2022 panels was slightly higher than in their 2016 and 2017 counterparts, which could be due to chance (e.g. plots available to be remeasured) or replanting of harvested plots as radiata pine (Figure 2 and Table 1). Other

plantation tree species present in inventory plots belong to the following groups: Australian hardwoods (Eucalyptus (EUC) and Acacia species (AAMEL)), cypresses and coastal redwood (CLUS), Douglas-fir (PMEN), and poplars/willows (POPUL).
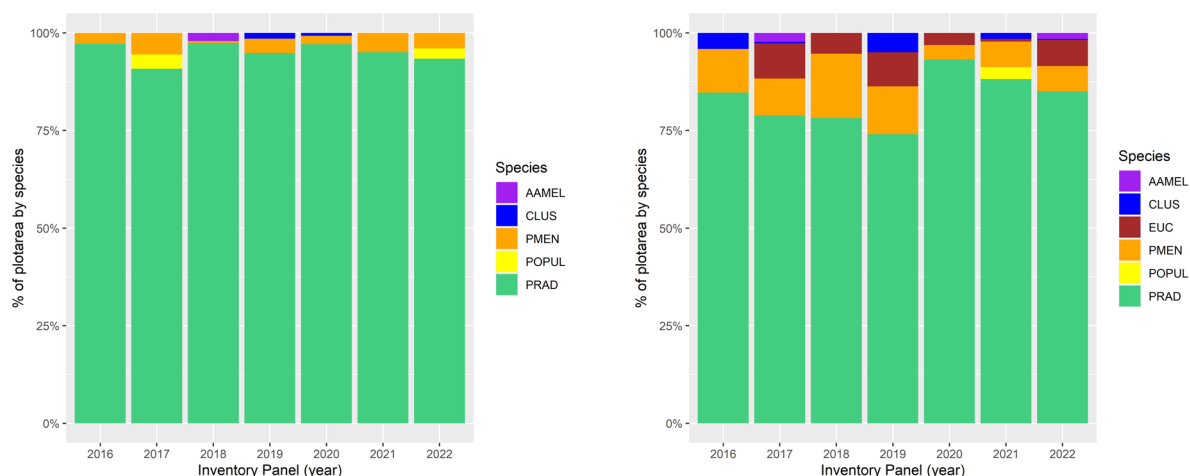
Figure 2. Proportion of radiata pine and other tree-species by inventory panel for pre-1990 (left) and post-1989 planted forests (right).

Carbon stock change is strongly related to site productivity. Commonly used measures of productivity in New Zealand's planted forests are the 300 Index (mean annual volume increment in cubic metres per hectare per year of a 300 stem per hectare stand at age 30 years) and Site Index (a measure of tree height[3] in meters at age 20 years). These are used in combination to predict growth. Estimated 300 Index for individual plots is more variable and generally higher in post-1989 forests while site index is similar (Figure 3 and Table 1). These indices are derived from plot data so are more accurate for plots aged close to the reference ages (20 years for site index and 30 years for 300 Index). Some fluctuation can therefore be expected when panel years are remeasured, due to the change in plot ages.

The 300 Index is a normalised metric for productivity based on a standard stocking (300 stems per hectare). In practice stocking varies through the impacts of management and disturbance and is negatively correlated with age. There is no obvious trend across panels or with remeasurement of the 2016 and 2017 panels (Figure 4 and Table 1). Some remeasured plots may have lost stems through thinning or windthrow, while others may have higher stocking after being felled and replanted. Differences can also arise by chance due to the availability of plots to be remeasured.

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[3] "mean top height" or the mean of the 100 largest trees per hectare at age 20.
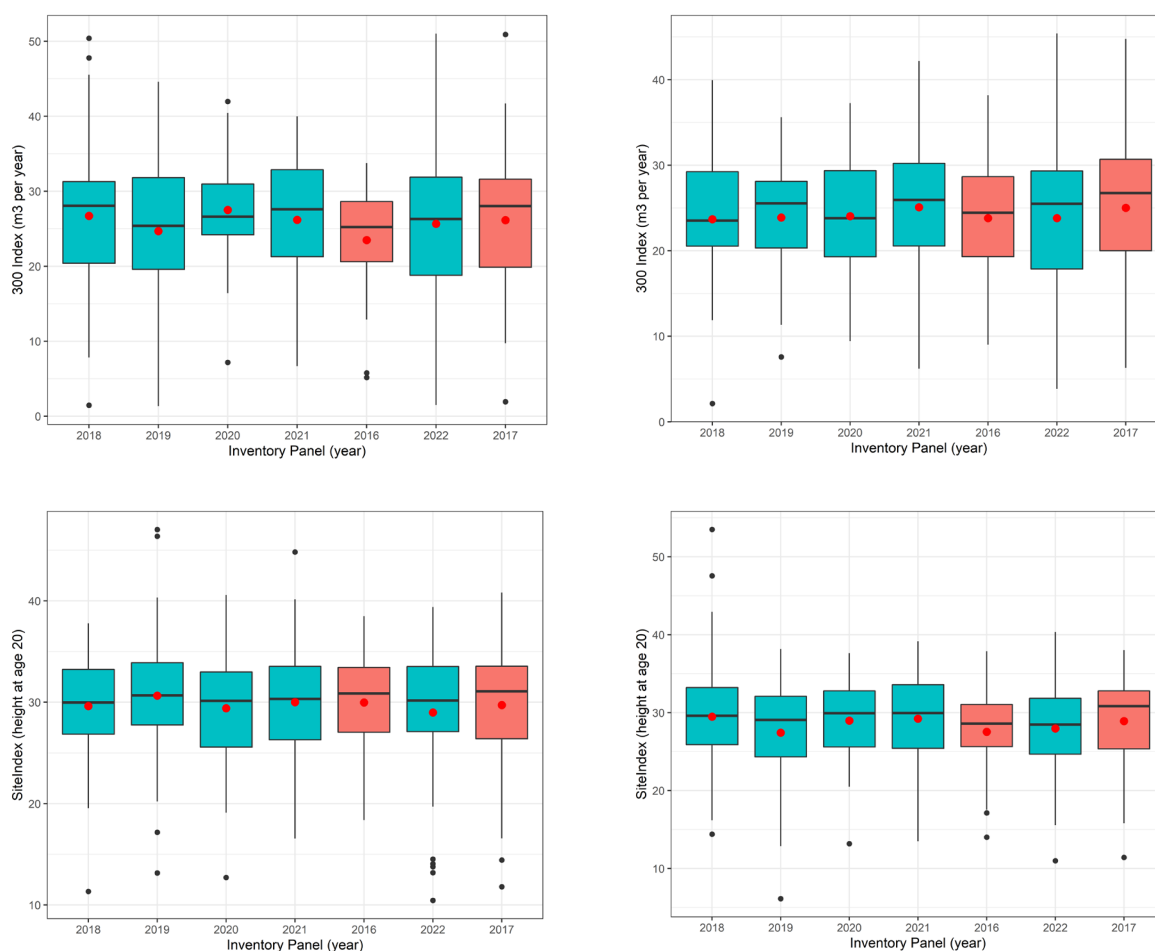
Figure 3. 300 Index by inventory panel for pre-1990 (upper left) and post-1989 planted forests (upper right) and Site Index for pre-1990 (lower left) and post-1989 planted forest (lower right) for all Inventory Panels, including the 2016 and 2017 panels (in red) for comparison to the recent re-measurements (2021-22).
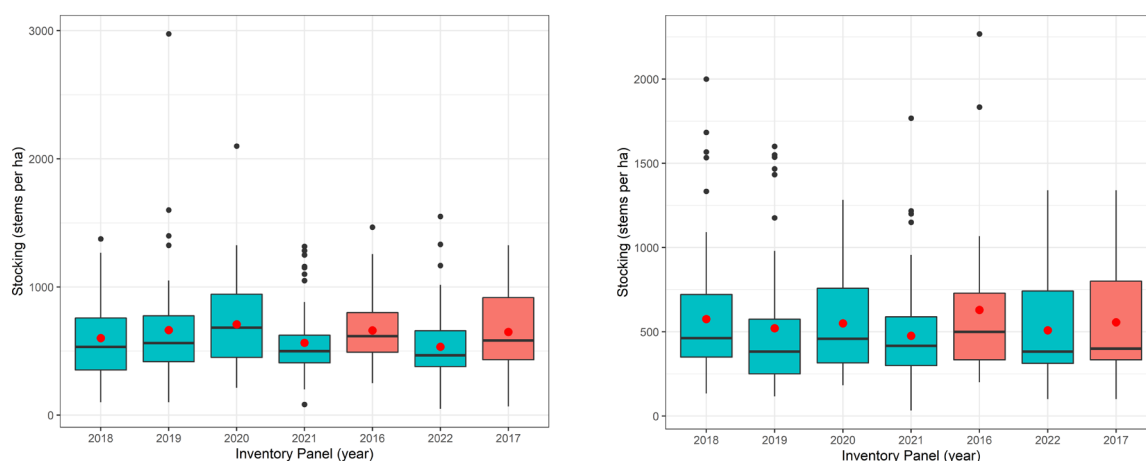
Figure 4. Mean stocking (stems per ha) by inventory panel for pre-1990 (left) and post-1989 (right) planted forests. The 2016 and 2017 panels (in red) are also shown for comparison with their re-measurement in 2021-22.

Finally, for calculating average carbon stocks and carbon stock changes in the net stocked area of planted forests it is important to determine the sampling size. While the aim for the annual forest inventory

is to measure 140 plots combined for pre-1990 planted forests and post-1989 planted forests, the total number achieved is lower because of legal or time-related access restrictions or physical inaccessibility/hazardous conditions on or near the plot or denial of access by private forest landowners. The number of plots measured each year is higher in post-1989 planted forests (mean of 60 plots per year) compared to pre-1990 planted forests (mean of 50 plot per year) (Table 1).

As carbon stocks and carbon stock changes per hectare are calculated on a net stocked area basis, it is important to provide an estimate of the net-stocked area of each plot. The mean net-stocked area proportion is nearly the same for both forest types with 80% in pre-1990 planted forests and 82% in post-1989 planted forests (Figure 5 and Table 1). The slightly higher net stocked area in post-1989 planted forests in 2021 and 2022 compared to the previous measurement panels and 2016 and 2017 could be the result of plots with lower stocked areas not being remeasured due to access restrictions.
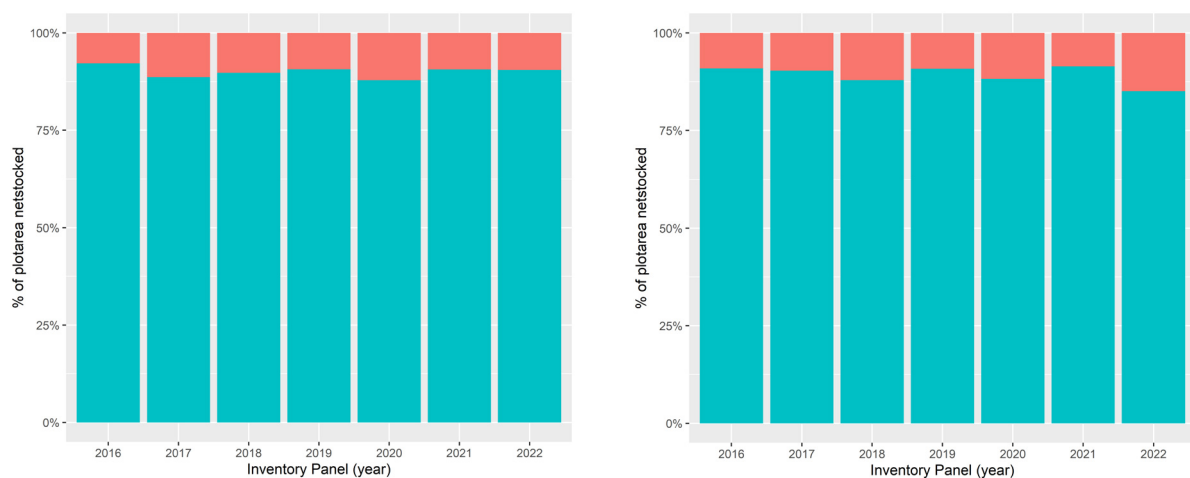
Figure 5. Net stocked area ratio for pre-1990 (left) and post-1989 planted forests (right)

Age class distribution for plots measured in the last five years

The age of a forest stand is a strong predictor for carbon stocks in a planted forest. Therefore, it is important to understand the age structure of the measured panels and of the overall cycle to interpret carbon stock and stock change estimates.

The radiata pine age-class distribution as of 2022 of the 2018-2022 planted forest inventory dataset is shown in Figure 6. For plots measured before 2022 the age differences between measurement age and age at 2022 was added[4]. The pre-1990 planted forest age class distribution for the inventory is relatively evenly spread with a small decline in plot numbers with age. However, the proportion of stands older than 30 years and well above the average radiata pine harvesting age (27-29) is greater in pre-1990 than in post-1989 forests. The average age of pre-1990 planted forests is 17.2 years as of 2022. Post-1989 forests have an uneven age-class distribution with most plots representing forest stands close to harvesting age (aged between 20 and 30 years old). The average age of measured post-1989 planted forests is higher, at 22.5 years. The skewed post-1989 planted forest age distribution reflects the large annual planting rates in the early to mid-1990's.

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[4] Plots with unknown age (e.g. unstocked plots) were excluded from the graph. For older plots (e.g. older than 25 years) measured earlier (e.g. 2018-2019) it is possible that these stands have been harvested by 2022 and therefore the average age calculated overestimates the current average age.
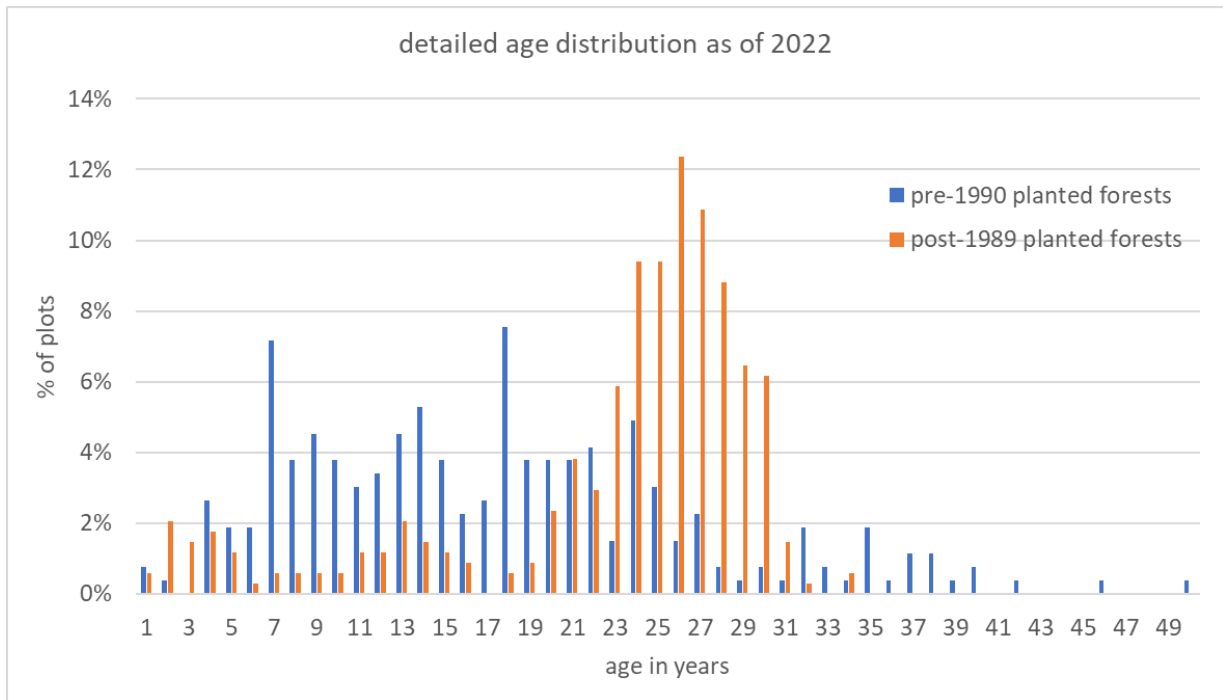
Figure 6: Age class distribution as of 2022 for all plots measured in the 2018-22 planted forest inventory for pre-1990 planted forest and post-1989 planted forest. Plots that were harvested during this period are not included (assumed to be zero age at the end of the period).

Estimated carbon stocks

Mean carbon stocks per hectare at measurement for each panel 2018-2022

The NFI is designed as a continuous forest inventory. Each year, 1/5th of the inventory plots are measured and provide an estimate of carbon stocks per hectare from this random sample. This section reports the mean carbon stocks for net-stocked area for the four IPCC reporting pools (Above-ground biomass, AGB live; Below-ground biomass live, BGB live; Dead wood, DW; and Fine Litter, FL) based on the ratio of means calculations for each of the individual inventory panels for the 2018 to 2022 period (Table 4).

Crop-tree carbon stocks in net stocked areas[5] of pre-1990 planted forests were estimated to total 106.9 ±24.1 tC ha^{-1} and 107.3 ±23.5 tC ha^{-1} in 2021 and 2022 respectively (Table 2). In post-1989 planted forests total carbon stocks were estimated to be higher; 113.9 ±26.7 tC ha^{-1} in 2021 and 156.5 ±31.4 tC ha^{-1} in 2022.

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[5] This includes areas that are harvested and/or have seedlings present for which carbon cannot yet be estimated.

Table 2: Mean crop carbon stocks estimates (tC ha^{-1}) and their 95% Confidence Intervals (CI±) in net-stocked area of pre-1990 planted forests and post-1989 planted forests at measurement in plots measured in panels from 2018 to 2022.

		2018	2019	2020	2021	2022
Pre-1990 planted forests	Total Crop	77.9 (±23.8)	93.6 (±25.4)	93.1 (±24.6)	106.9 (±24.1)	107.3 (±23.5)
	AGB live Crop	57.1 (±18.2)	69.4 (±19.6)	69.9 (±19.3)	78.8 (±19.1)	76.3 (±18.6)
	BGB live Crop	12.3 (±3.9)	14.9 (±4.2)	15.0 (±4.0)	16.8 (±4.0)	16.3 (±3.9)
	DW Crop	3.4 (±1.6)	3.2 (±1.3)	2.6 (±1.5)	4.1 (±2.2)	6.8 (±3.0)
	FL Crop	5.1 (±1.4)	6.1 (±1.4)	5.7 (±1.4)	7.2 (±1.4)	7.9 (±1.8)
Post-1989 planted forests	Total Crop	164.5 (±20.9)	154.3 (±24.6)	157.1 (±30.6)	113.9 (±26.7)	156.5 (±31.4)
	AGB live Crop	124.4 (±16.2)	114.8 (±19.0)	119.5 (±23.8)	86.1 (±20.4)	119.5 (±24.4)
	BGB live Crop	26.2 (±3.4)	24.3 (±4.1)	25.3 (±5.1)	18.1 (±4.3)	25.5 (±5.2)
	DW Crop	5.9 (±1.4)	8.0 (±2.9)	5.1 (±1.6)	4.3 (±1.8)	5.0 (±1.5)
	FL Crop	8.0 (±1.1)	7.3 (±1.2)	7.3 (±1.3)	5.5 (±1.4)	6.5 (±1.3)

On average post-1989 plots are older (Figure 6) so have greater carbon stocks per hectare than pre-1990 plots (Figure 7 and Table 2). In the absence of harvesting, replanting and - new planting for post-1989 forests, randomly selected panels would be expected to show increasing mean stock estimates each year. Conversely, randomly selected panels for a forest with an even age-class distribution, no afforestation and a constant level of harvest should result in very similar stock estimates each year. The carbon stocks shown in Figure 7 reflect both the differences due to chance caused by the selection of plots in each panel as well as the influence of management (particularly harvesting).
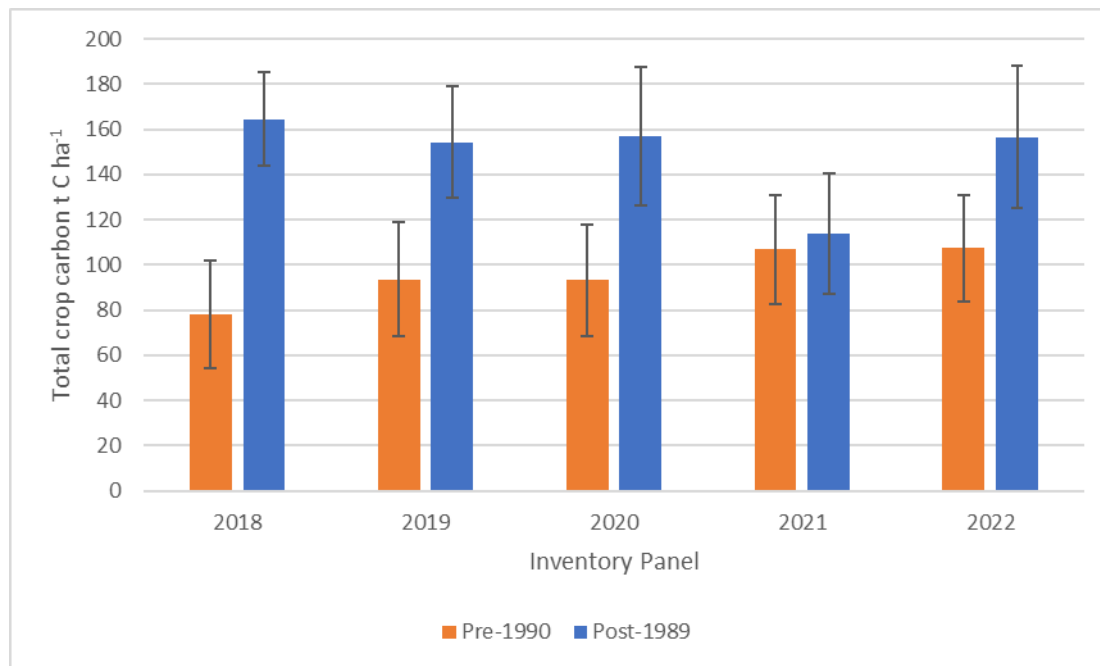
Figure 7. Total carbon stocks per hectare by inventory panel in pre-1990 and post-1989 planted forests, with 95% confidence intervals.

Non-crop carbon stocks in net stocked areas of planted forests are calculated for each plot with a non-crop component at the time of measurement and are added as a constant component (mean) to the planted forest carbon stocks. This assumption is based on an initial analysis showing that the variability of this pool is very poorly related to the aging of a plantation (Paul *et al*., 2009)[6]. Mean non-crop carbon stocks in net stocked areas were estimated to total 3.4 ±1.3 tC ha^{-1} in pre-1990 planted forest and 2.8 ±1.1 tC ha^{-1} in post-1989 planted forest. The breakdown into the different pools is given in Table 3.

Table 3: Mean non-crop carbon stocks estimates (tC ha^{-1}) and their 95% Confidence Intervals (CI±) in net-stocked area of pre-1990 planted forests and post-1989 planted forests in all stocked plots measured between 2018 - 2022.

	Total Non-crop	AGB Non-crop	BGB Non-crop	DW Non-crop
Pre-1990 planted forests	3.4 (±1.3)	2.6 (±1.0)	0.7 (±0.2)	0.1 (±0.1)
Post-1989 planted forests	2.8 (±1.1)	2.1 (±0.8)	0.5 (±0.2)	0.2 (±0.1)

The non-crop carbon stocks in unstocked areas based on fully unstocked plots and excluding wildings in pre-1990 planted forest were 29.0 ±34.9 tC ha^{-1}. In post-1989 planted forest, unstocked areas carried 39.1 ±23.5 tC ha^{-1} of carbon in woody biomass (Table 4).

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[6] Analysis of understorey carbon stocks measured at each re-measurement could be carried out in the future to test the hypothesis that understorey carbon stocks change over time, as more data is now available from multiple re-measurements across the plot network.

Table 4: Average non-crop carbon stocks and their 95% Confidence Intervals (CI±) in unstocked areas of pre-1990 planted forests and post-1989 planted forests measured in the 2018-2022 period.

	Total Non-crop (tC ha^{-1})	AGB Non-crop (tC ha^{-1})	BGB Non-crop (tC ha^{-1})	DW Non-crop (tC ha^{-1})
Pre-1990 planted forests (n=8)	29.0 (CI±34.9)	22.7(CI±28.0)	5.6 (CI±6.9)	0.6 (CI±0.8)
Post-1989 planted forests (n=27)	39.1 (CI±23.5)	30.2 (CI±18.1)	7.5 (CI±4.5)	1.4 (CI±1.3)

Mean carbon stock per hectare as of 2020 based on imputation of all plots measured 2018-2022

The continuous forest inventory with a five-year cycle allows the use of all measurements during a cycle to estimate carbon stocks for a specific year by using a modelling approach to impute carbon stock estimates for a year other than the measurement year. Using the current mid-point of 2020 means that the imputation period for re-measured plots is kept within 2.5 years (Beets *et al.*, 2011). This improves the precision of the overall estimate of carbon stocks for a specific year.

Using a model-based imputation for all plots measured from 2018 to 2022, total crop-tree net stocked carbon stocks are estimated as 179.9 t C ha^{-1} (±10.6) in post-1989 planted forests and 112.2 tC ha^{-1} (±11.4) in pre-1990 planted forests for the year 2020 (Table 5, Figure 8). The average age for pre-1990 planted forests in 2020 is 15 years and for post-1989 planted forests 21 years.

Table 5. Crop carbon stocks (tC ha^{-1}) and their 95% Confidence Intervals (CI±) in net-stocked area of pre-1990 planted forests and post-1989 planted forests estimated at 2020.

	Total (tC ha^{-1})	AGB (tC ha^{-1})	BGB (tC ha^{-1})	DW (tC ha^{-1})	FL (tC ha^{-1})
Pre-1990 planted forests (n=256)	112.2 (CI±11.4)	82.6 (CI±8.9)	17.7 (CI±1.9)	4.5(CI±1.0)	7.4 (CI±0.7)
Post-1989 planted forests (n=296)	179.9 (CI±10.6)	136.3 (CI±8.3)	28.8 (CI±1.8)	6.5 (CI±0.9)	8.3 (CI±0.5)
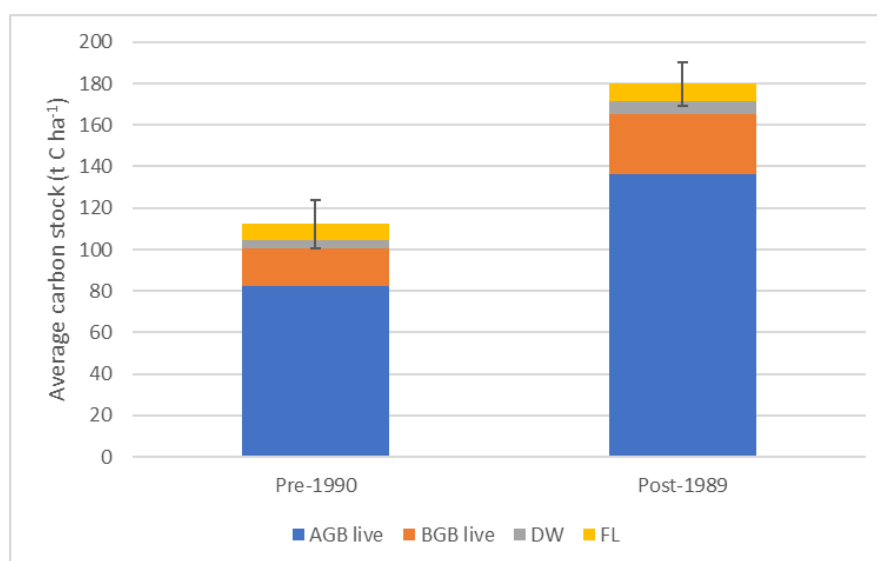
**Figure 8.** Average crop tree carbon stock per hectare in 2020 for pre-1990 and post-1989 planted forests, with 95% confidence interval for the total.

Part 2, Objective 2: Yield tables based on the full Planted Forest Inventory

Yield Table Overview

The analysis of plots described in Objective 1 provides a statistically valid estimate of carbon stocks in planted forests. However, for reporting carbon stocks and stock changes in New Zealand's annual greenhouse gas inventory, MfE uses a simulation approach to model the development of stocks over time, based on afforestation, deforestation, harvesting and replanting activity data combined with age-based yield tables.

Yield tables represent the mean productivity of the stands they are applied to, averaged across both space and time. It must be accepted that yield tables will under-estimate productivity for some forests and over-estimate it for others – the aim should be to avoid bias. Greater accuracy can generally be achieved through a higher resolution of stratification (e.g., by species, site productivity, and management), with a separate yield table for each stratum. Current age(s) or planting year(s) can also be used as a basis for stratification, capturing common factors that change over time. This is useful if the distribution of factors influencing stand- or plot-level yield tables is not constant across the past, current, and expected future age range.

Projections using yield tables are also used for defining the Forest Reference Level (FRL) used for accounting for pre-1990 forest under the Paris Agreement. In this case they should represent business-as-usual practices carried out during the reference period that is used to calculate the Forest Reference Level, and should therefore exclude any contribution from stands established after the reference period.

In this section the full results of the continuous forest inventory are used to derive yield tables, capturing data from the latest measurement years, previous measurement years in the annual re-measurement cycle, and both years of the former periodic inventory. Yield tables capture per hectare estimates of carbon stocks by pool for each age, as well as volumes (total stem volume in m^3 ha^{-1}) to allow a comparison of modelled roundwood removals with harvesting statistics.

Twenty yield tables were developed for use by MfE for different purposes (Table 6), e.g.
- Simulating forest stocks and stock changes for greenhouse gas inventory reporting from 1990 to the current inventory year.
- Projecting carbon stocks in pre-1990 planted forests from 2010 to 2030 to provide a FRL for accounting for these forests under the Paris Agreement.
- Estimating the long-term average (LTA) stock of post-1989 forests to be used as the basis for applying "averaging accounting" to these forests under the Paris Agreement.

The following yield tables were generated:
1. Six yield tables for the three "species groups" (Radiata pine, Other Softwoods and Hardwoods) for post-1989 planted forests and pre-1990 planted forests separately, using all planted forest plots measured up to 2022 in the annual planted forest inventory.
2. Four period-specific yield tables for all species combined (and four for radiata pine only) that represent pre-1990 planted forests present before 1990; after 1990; from 1990 to 2009, and from 2010 onward (to 2022). One additional yield table for post-1989 radiata pine from 1990 to 2009.
3. Two additional yield tables are provided: for pre-1990 planted forests present during the 2000-2009 period, and for post-1989 planted forests (all species combined).

These 17 yield tables are all area-weighted, similar to those produced for MfE in 2021 (Paul *et al*., 2021). We also provide three age- and area-weighted all species yield tables for (i) pre-1990 planted forests present before 1990, (ii) pre-1990 planted forests present after 1990, and (iii) post-1989 planted forests,

as possible input yield tables for MfE's Calculation and Reporting Application (CRA), used for greenhouse gas inventory reporting.

Table 6. Characteristics of yield tables derived from the full planted forest inventory

Objective	Yield table number	Weighting	Sub-category	Species	Cohort	Purpose*
2a	2a-1		Pre-1990	Radiata pine	All	LTA
	2a-2	Area only		Other softwoods		LTA
	2a-3			All hardwoods		LTA
	2a-4		Post-1989	Radiata pine	All	LTA
	2a-5			Other softwoods		LTA
	2a-6			All hardwoods		LTA
2b	2b-1		Pre-1990	Combined species	Before 1990	CRA – NIR[†]
	2b-2				After 1990	CRA - NIR[†]
	2b-3	Area only			1990-2009	Sensitivity
	2b-4				After 2010	Sensitivity
	2b-5**			Radiata pine	Before 1990	Sensitivity
	2b-6**				After 1990	Sensitivity
	2b-7**				1990-2009	Sensitivity
	2b-8**				After 2010	Sensitivity
	2b-9**		Post-1989	Combined species	1990-2009	Sensitivity
2c	2c-1	Area only	Post-1989	Combined species	All	Sensitivity
	2c-2		Pre-1990	Combined species	2000-2009	FRL
2d	2d-1	Area & Age	Post-1989	Combined species	All	CRA - NIR[†]
	2d-2		Pre-1990	Combined species	Before 1990	Sensitivity
	2d-3		Pre-1990		After 1990	Sensitivity

* LTA = used to calculate Long-Term Average carbon stock; CRA-NIR = used in CRA simulation for National Inventory Report; FRL = used to define Forest Reference Level for pre-1990 forests; Sensitivity = used for sensitivity analysis and comparisons
** Additional Yield tables created upon later requests
[†] Yield tables used in final runs of the CRA

Objective 2a – Species-specific carbon yield tables

Simulation of carbon stocks within the CRA module is currently based on combined species yield tables. The ability to simulate at a species level is limited by the availability of activity data (e.g., harvest areas and ages) and land use change data by species, and by the low number of non-radiata pine plots, which makes it difficult to derive a robust yield table for other species (Table 7).

Table 7. Plots measured in 2018-2022 to create species-specific yield tables.

	Pre-1990	Post-1989
Radiata pine	255	271
Other Softwoods	11	38
Douglas-fir	10	33
Cypresses	1	5
Hardwoods	4	21
Eucalyptus spp.		19
Acacia melanoxylon	1	
Quercus spp		1
Populus spp	3	1

Yield tables were created for the three species groupings shown in Table 7, for both pre-1990 and post-1989 planted forests. While the CRA simulation could potentially be run at a species level, the primary purpose of these species-specific yield tables is for use in calculation of the long-term average carbon stock for each species.

The post-1989 radiata pine and hardwood yield tables are slightly lower than their pre-1990 counterparts (Appendix C; Figure 9). The post-1989 Other softwoods yield table is initially lower but ends up higher than the pre-1990 table beyond age 40.

Due to the very small sample size and the high growth variability between species in these groupings (especially hardwoods), the confidence in the estimated carbon stocks and yields is very low (Figure 10).
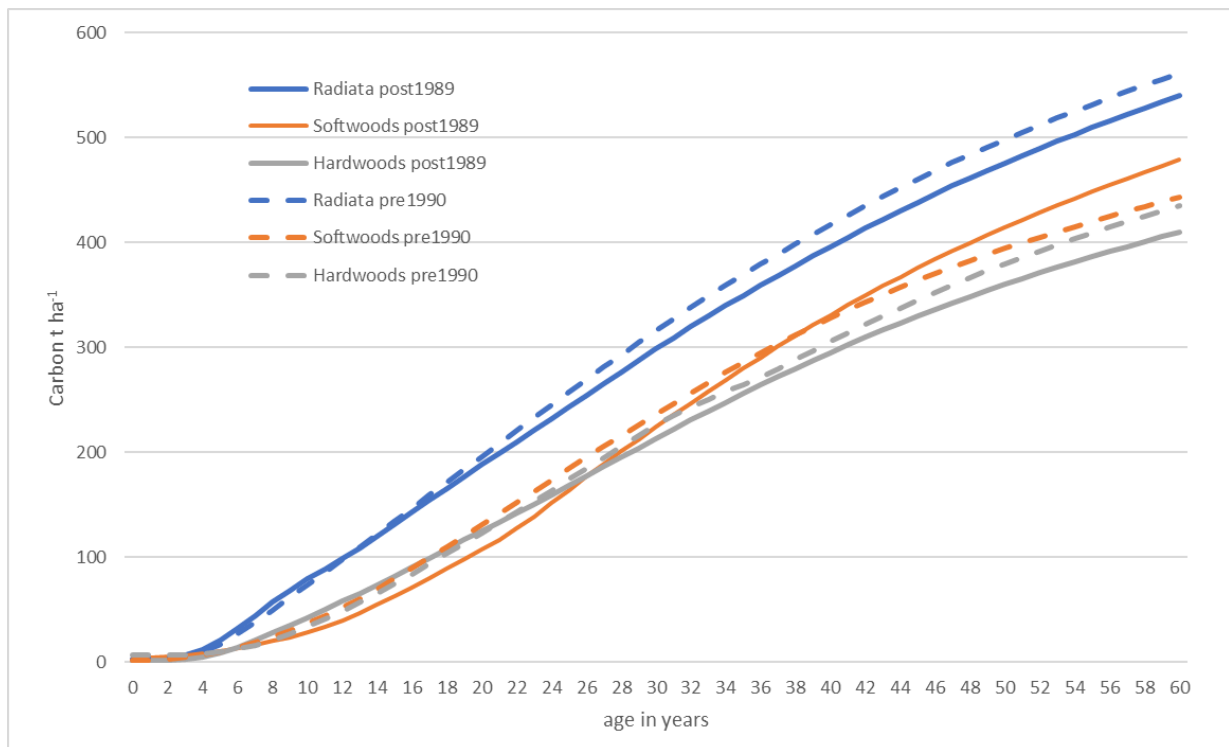
**Figure 9.** Species-specific yield tables for planted forests
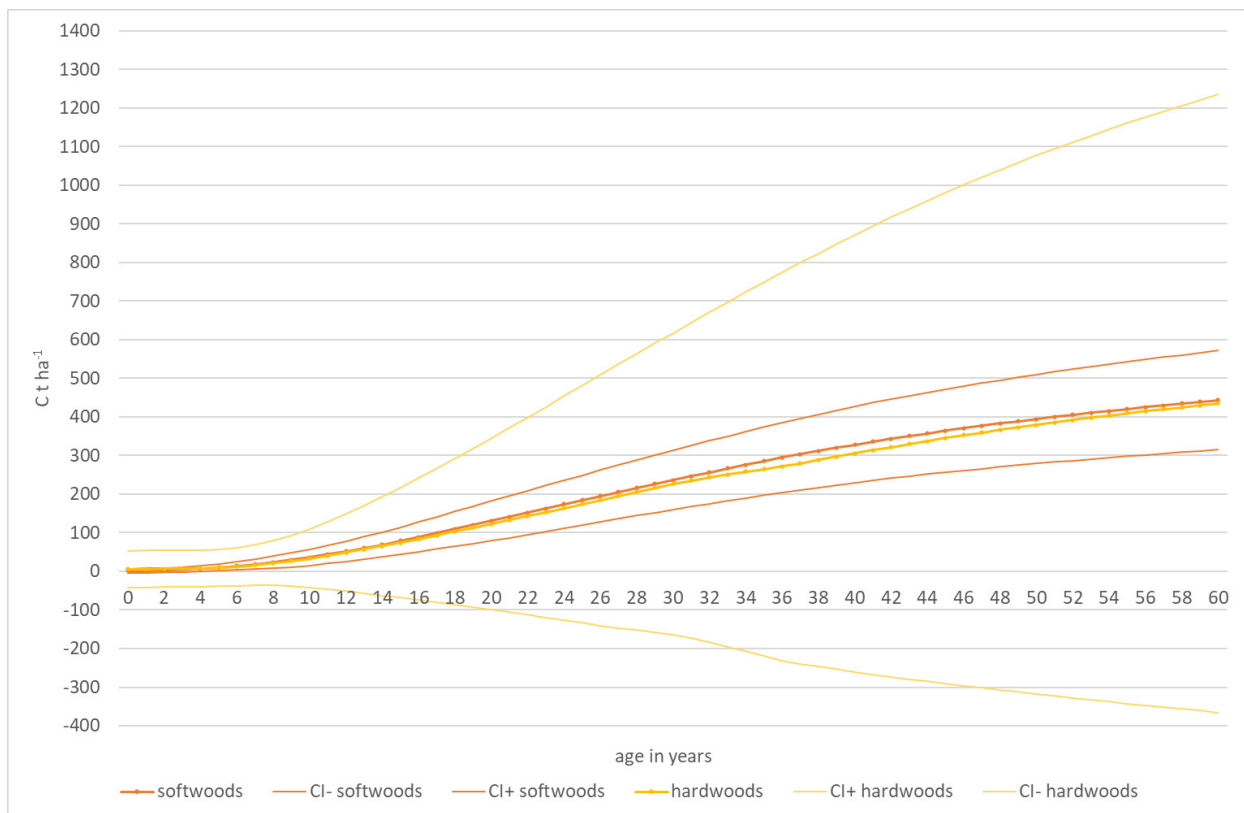
Figure 10: Average total carbon per hectare yield tables (area-weighted) for non radiata pre-1990 planted forest stands. Douglas-fir & Softwoods and Hardwoods are shown separately. 95% Confidence intervals are also provided.

Objective 2b and 2c – Cohort-specific pre-1990 planted forest carbon yield tables (combined species)

In the CRA pre-1990 planted forests are simulated from well before 1990 to allow initialisation of carbon stocks in 1990, so a single yield table would have to represent the average productivity (and therefore the mix of sites, species, genetic quality, and silviculture applied) over a long period of time up to the current year (and potentially beyond for projections). However, the Paris Agreement FRL should only be based on business-as-usual management during the reference period (2000-2009), so plots established after that date should ideally not be used to define the yield tables used to project the FRL. Business-as-usual management practice during the reference period covers:
- the initial stand density and genetic stock employed (defined by stands established 2000-2009),
- the silviculture applied (defined for radiata pine by stands aged between about 4 and 12 years during 2000-2009, hence established between 1988 and 2005), and
- clear-fell age between 2000-2009, which is not relevant for yield table generation.

The approach we have taken is to use establishment date between 2000 and 2009 to select stands to be used for defining pre-1990 FRL yield tables, provided sufficient plots are available and to account for the then valid establishment, genetics and species mix. The approach excludes stands that were present in 2000-2009 but not established during this time as such older stands would have had different silviculture applied according to earlier regimes.

With the primary focus on creating a historic yield table that can be used for back-casting, we implemented a stratification of measured pre-1990 forest stands (represented by one or more individual measurements of a plot) based on their year of establishment. Using the planting year, we stratified all pre-1990 stands into five categories:

- Before 1990 – i.e. pre-1990 qualifying forest for which we had a plot measurement in a stand established before January 1990.

- 1990-2009 – the period of the Kyoto Forest Management Reference Level (FMRL) baseline (Business as usual -BAU). The FMRL was applied from 2013-2020.
  These stands were pre-1990 qualifying forest for which we had a plot measurement in a stand established between January 1990- December 2009.

- 2000-2009 – the period of the Paris Agreement FRL BAU baseline. The FRL is applied in the compliance period from 2021-2030. Plots established in stands planted after 2009 may have management and yields that differ from the BAU baseline.
  These stands were pre-1990 qualifying forest for which we had a plot measurement in a stand established from January 2000 onwards up to December 2009 (including replanting).

- 2010-onwards – the period after FRL BAU baseline. Stands that were established from January 2010 onwards (including replanting).

- 1990 onwards – pre-1990 qualifying forests for which we had a plot measurement in a stand established after December 1989.

For each of these plot selection period options we derived a combined species yield table based on the relevant plot measurements. In addition, pure radiata pine yield tables were constructed for the same periods.

The stratification into these five periods allows comparison of yields between these periods and provides two options to reflect changes in productivity over time in the calculation of carbon stocks in pre-1990 planted forests in the LUCAS CRA:

1. Using three periods (before 1990, 1990-2009, 2010-onwards).

2. Using two periods (before 1990 and 1990 onwards).

While a similar stratification was not made for post-1989 forests, in future this may be useful. Post-1989 forest could be partitioned into forest planted between 1990-2009, and forest planted after 2009 for consistency with the pre-1990 forests.

The Pre-1990 planted forest dataset

With the addition of the latest inventory data from 2021 and 2022, the pre-1990 planted forest inventory registers 328 forest stands represented by plot measurements since 2007 on 332 locations, with 3 of these locations not currently mapped as either pre-1990 planted forest or post-1989 planted forest[7]. Multiple forest stands on a grid point are possible when a measured stand was harvested, a new stand established and measured in the following inventory cycle.

The average age (as of 2022[8]) of the 257 currently existing and modelled pre-1990 planted forest stands is 16 years. This excludes harvested and wilding stands and assumes that all previously measured plots still represent the same stand. The maximum stand age measured was 47 years.

The establishment date of all measured stands shows a relatively even age distribution. For a total of 328 stands, 71 stands (21%) were planted before 1990 (Figure 11). Another small peak of planting occurred in 2004 and in 2015, the latter 28 years since the first planting peak in 1987. Just after 1990 lower establishment rates are evident, coinciding with the highest levels of annual post-1989 planted forest afforestation.
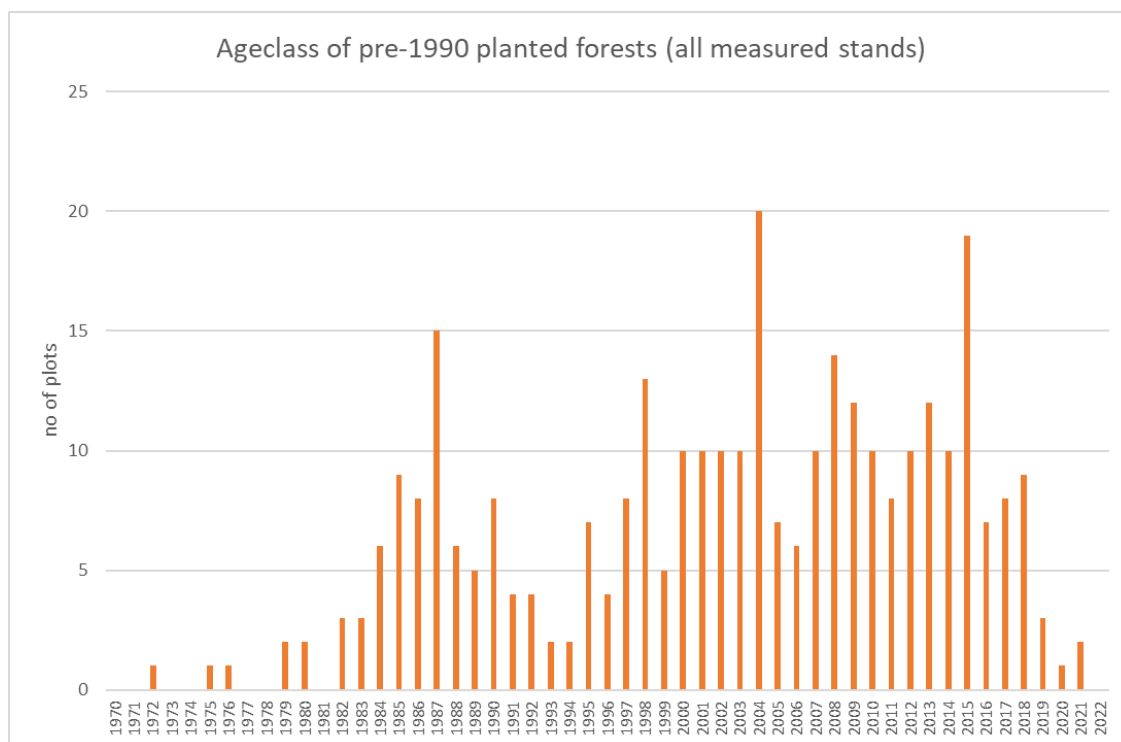

Figure 11: Histogram of the number of forest stands in the pre-1990 planted forest inventory established in years since 1970.

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[7] CY63, CZ90E5, X164A5
[8] Average ages calculated as of 2022 are biased towards higher ages as some stands measured earlier (e.g. in 2015-2018) that have not been revisited might not exist anymore.

Before 1990.

For modelling a yield table for pre-1990 planted forests that represents the forest stands present as at 1990, we can use a subset of stands that existed at that time. For radiata pine, 61 stands established before 1990 and with at least one usable measurement are available to generate a "before 1990" radiata pine yield table. These 61 stands include 45 stands that have been harvested since their last measurement and 16 plots that are still growing, with an average age of 37.2 years (as of 2022). Ten additional non-radiata stands were available to be added to the dataset to calculate a multispecies yield table for the before-1990 period (non-radiata species average age 38.3 years).

1990-2009

Modelling the yield table for pre-1990 planted forests for the period 1990 – 2009 is based on 165 radiata pine stands, eleven of them harvested. The average age of the 156 existing stands is 20.6 years as of 2022. Eight additional non-radiata stands were available to be added to the datasets to calculate a multispecies yield table for the period 1990-2009 (non-radiata species average age 24.1 years).

2000-2009

The yield table representing pre-1990 planted forests planted between 2000 – 2009 is based on 112 stands, 108 of those stocked with radiata pine. The average age of the stands (all still existing) is 17.4 years (19 years for non-radiata stands).

2010-onward

There are 87 stands representing pre-1990 planted forest stands established from 2010 onwards, but not all have data suitable for deriving a yield table. Eleven stands are too young for a yield table analysis which leaves 75 radiata pine stands available for modelling a radiata pine yield table, representative for the 2010-2022 period. Only one non-radiata stand was old enough to be used to generate a multispecies yield table.

After 1990

For modelling the yield of pre-1990 planted forest stands established from 1990 onwards 274 measurements were available, with 264 of those in radiata pine stands. 24 stands were too young at measurement to be modelled. As of 2022, 13 stands of the 274 have been harvested. The average age of stands still standing is 15.6 years (15.4 for radiata pine stands).

Key variables that can influence the modelling of radiata pine and combined species yield tables for the period specific datasets are listed in Table 8.

Table 8: Descriptors for datasets used to model radiata pine and multispecies yields for the five periods.

	Variable	Period before 1990	Period after 1990	Period between 1990-2009	Period between 2000-2009	Period between 2010-2022
Radiata Pine only	**No. of stands used**	61	243	165	108	74
	Stand age when last measured	Mean 31.6y Max 47y Min 26y	Mean 12.9y Max 29y Min 2y	Mean 18.1y Max 29y Min 6y	Mean 15.2y Max 22y Min 6y	Mean 9y Max 12y Min 2y
	Average no. of measurements	1.7	2.2	2.5	2.55	1.5
	No. of single measurements	31	83	39	20	45
	Mean net stocked plot area	0.053	0.054	0.054	0.054	0.053
Combined species*	**No. of stands used**	71	250	173	112	75
	Stand age when last measured	Mean 32.3y Max 47y Min 26y	Mean 13y Max 29y Min 2y	Mean 18.8y Max 32y Min 6y	Mean 15.3y Max 22y Min 6y	Mean 9y Max 12y Min 5y
	Average no. of measurements	1.7	2.2	2.4	2.5	1.5
	No. of single measurements	32	86	43	21	46
	Mean net stocked plot area	0.052	0.054	0.054	0.054	0.053

*includes plots stocked with other plantation species besides radiata pine e.g. Douglas-fir, cypresses, poplars.

Understorey carbon

Understorey carbon in net-stocked areas in plots representative for the different periods was calculated as average stocks based on the last understorey measurement for the representative stand including plots without any understorey measured, which were assigned a zero value (Table 9). In each case understorey carbon was added as a constant to the yield table (representing the stand over a rotation).

Table 9. Estimated understorey carbon (tC ha^{-1}) and their 95% Confidence intervals for stands representative for the five periods in pre-1990 planted forests. First value is for stands including non-radiata pine species. Second value (*italic*) is for radiata pine stands only.

	Total Understorey (tC ha^{-1})	AGB live Understorey (tC ha^{-1})	BGB live Understorey (tC ha^{-1})	DW Understorey (tC ha^{-1})
Period before 1990	3.1 (±2.1) *3.5 (±2.3)*	2.4 (±1.6) *2.8 (±1.8)*	0.6 (±0.4) *0.7 (±0.5)*	0.1 (±0.1) *0.1 (±0.1)*
Period after 1990	3.4 (±1.2) *3.0 (±1.0)*	2.6 (±0.1) *2.3 (±0.7)*	0.6 (±0.2) *0.6 (±0.2)*	0.2 (±0.1) *0.2 (±0.1)*
Period 1990-2009	3.5 (±1.5) *2.8 (±0.8)*	2.7 (±1.2) *2.1 (±0.6)*	0.7 (±0.3) *0.5 (±0.2)*	0.2 (±0.1) *0.2 (±0.1)*
Period 2000-2009	4.3 (±2.3) *3.2 (±1.1)*	3.3 (±1.8) *2.4 (±0.8)*	0.8 (±0.4) *0.6 (±0.2)*	0.2 (±0.1) *0.2 (±0.1)*
Period 2010-onwards	4.1 (±2.9) *4.1 (±2.9)*	3.2 (±2.3) *3.2 (±2.3)*	0.8 (±0.6) *0.8 (±0.6)*	0.1 (±0.1) *0.1 (±0.1)*

Comparison of period-dependent yield tables

A comparison of yield tables for the five pre-1990 planted forest period cohorts (before 1990, after 1990, 1990-2009, 2010-onwards and 2000-2009) is shown in Figure 12 (all species combined). The pre-1990 period has the lowest total C t ha^{-1} sequestration and the period 2010-2022 showed the highest average yield curve with significant differences between yield tables for the different periods. This difference between the period cohorts is apparent for both combined species and pure radiata pine yield tables. However, the combined species before-1990 yield table has a slightly lower yield trajectory than the radiata pine-only yield table. This is the result of adding 10 slower growing non-radiata pine stands to only 61 radiata stands (15% of stands are non-radiata). The plot area-weighted yield tables for the individual periods can be found in Appendix C.

It is important to note that it is likely that the yield predictions are more accurate for the stands that represent the period before 1990 and the period 1990-2009, as these stands have been measured at an older age (closer to rotation age) than stands established since 2009. This is because:

- Measurements towards the end of a rotation (beyond the average age) are common and provide much better estimates of carbon stocks over the whole rotation as the yield will have been modelled mostly through back-casting, with relatively little forecasting.
- Measurements at a later stand age account for any silvicultural events that will influence the yield trajectory. Very early measurements have additional uncertainty relating to how the stands will be managed in the future.
- The early growth of pine trees can be very irregular, and measurements taken at that stage (< 5 years) can result in inaccurate yield predictions when forecasting over a full rotation.

The differences between yield estimates for these periods therefore reflect not only the increase in productivity over time through genetic improvement and better stand and site management, but also the influence of the above factors.

While we do not know what silvicultural intervention young stands, particularly those representing the period 2010-onwards, will receive in the future, it is highly likely that at least some will be thinned and relatively few will be pruned. However, we do not have good information on the likely timing and intensity of thinning to enable future thinnings to be modelled in the Forest Carbon Predictor (FCP) simulations. This means that the yield table for 2010-2022 stands in Figure 12 is likely to be an over-estimate because business-as-usual thinning will leave a lower stocking than has been modelled.
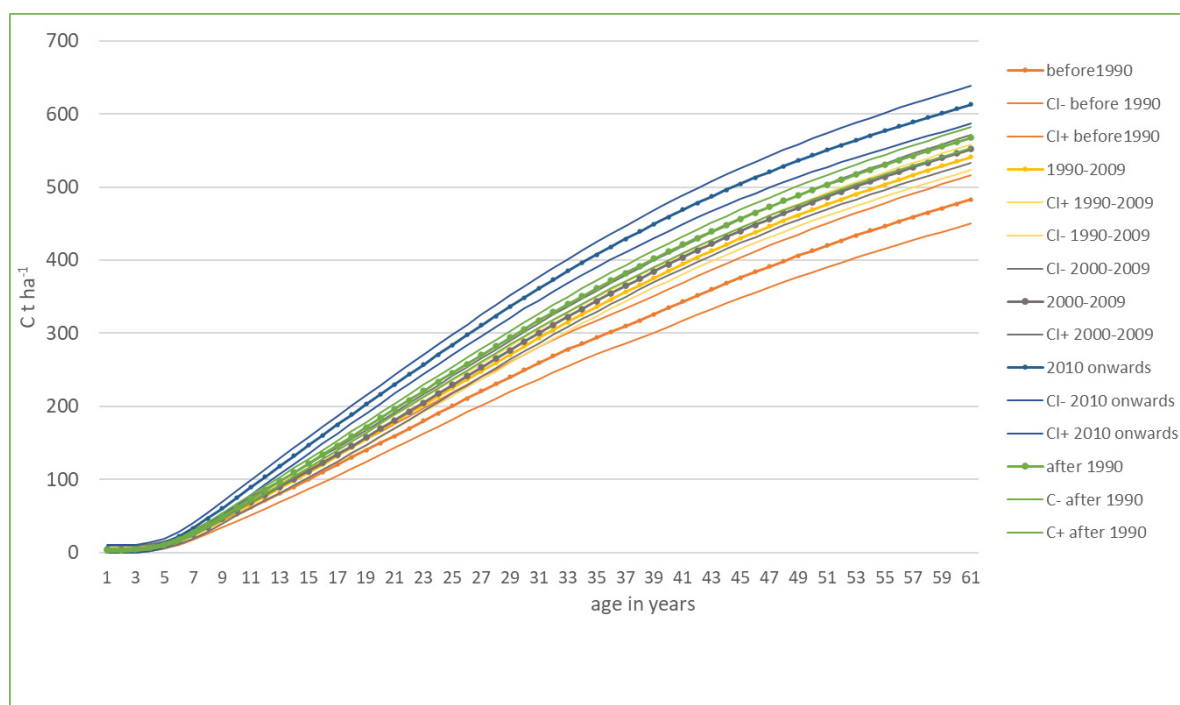
Figure 12: Average total carbon per hectare yield tables (area-weighted) for pre-1990 planted forest stands representative for the five proposed periods including the yield table for plots representing the reference level period (2000-2009). Shown are combined species yields. 95% Confidence Intervals are also shown.

Objective 2c – Combined species carbon yield tables

In addition to the combined species yield table prepared for pre-1990 planted forests present during the 2000-2009 period (2c-2; described above, Appendix C), a combined species yield table was also prepared for post-1989 planted forests (2c-1). This is area-weighted, rather than area-weighted and age-adjusted as in Objective 2d below.

Objective 2d – Age-adjusted and area-weighted carbon yield tables

Age-adjusted, area-weighted yield tables for pre-1990 planted forest and post-1989 planted forest, based on all previous and current measurements in the current and past forest inventory cycles (2007 – 2022), and using the forecasting/back-casting weighting method described in Appendix B, are given in Appendix C and compared in Figure 13. These yield tables take into account, beside the area weighting, the estimated forecasting and back-casting error which includes the effect of the age-class distribution of our forest inventory and therefore potentially provide more precise estimates of predicted carbon stocks by age than simple area-weighted tables.

The age-adjusted, area-weighted yield tables for pre-1990 planted forests and post-1989 planted forests are similar, with yields at any given age relatively close to each other. The sequestration rate for post-1989 planted forests is slightly lower than for pre-1990 planted forests beyond age 11 years. This difference can be explained by the higher number of slower-growing tree species in post-1989 planted forests (Figure 2) and the different age class distribution.

The difference in age class distribution between post-1989 planted forests and pre-1990 planted forests had been identified previously (Paul *et al.* 2021) as the reason for the age-adjusted and area-weighted yield tables being closer together. This in combination with the greater number of non-radiata stands in pre-1989 planted forests means that the predicted yield for the post-1989 planted forest (expected to be

more productive as afforested on more fertile farmland) is now lower than pre-1990 planted forests, which were grown initially on less productive sites not suitable for farming at the time.

With the adjustment to account for the age distribution, the difference in the yield tables for the two forest strata becomes smaller but is still present. This is caused by the presence of plots placed in stands of slow-growing production species in post-1989 planted forests, including one very slow-growing radiata pine stand. The slower growing species plots are responsible for the lower yield in post-1989 planted forest. Pre-1990 planted forest show a higher sequestration rate, with about 6% more carbon stored by age 28 than post-1989 forests (Figure 13). The pre-1990 forest age class distribution for 2022 plots is relatively even while the post-1989 planted forests age class distribution is skewed strongly toward older age-classes in the full planted forest inventory dataset (Figure 6). Both distributions contribute to the difference in yield at older ages with or without age-weighting as it is possible that the most productive post-1989 stands are being felled well before age 25, leaving less productive stands to contribute to the yield table, which results in a further reduction in overall productivity in the post-1989 planted forest yield table. In contrast, in pre-1990 planted forests the even spread of age classes with only a small number of plots in stands over age 25 results in a higher proportion of stands in their optimum growth period contributing positively to the greater average yield.
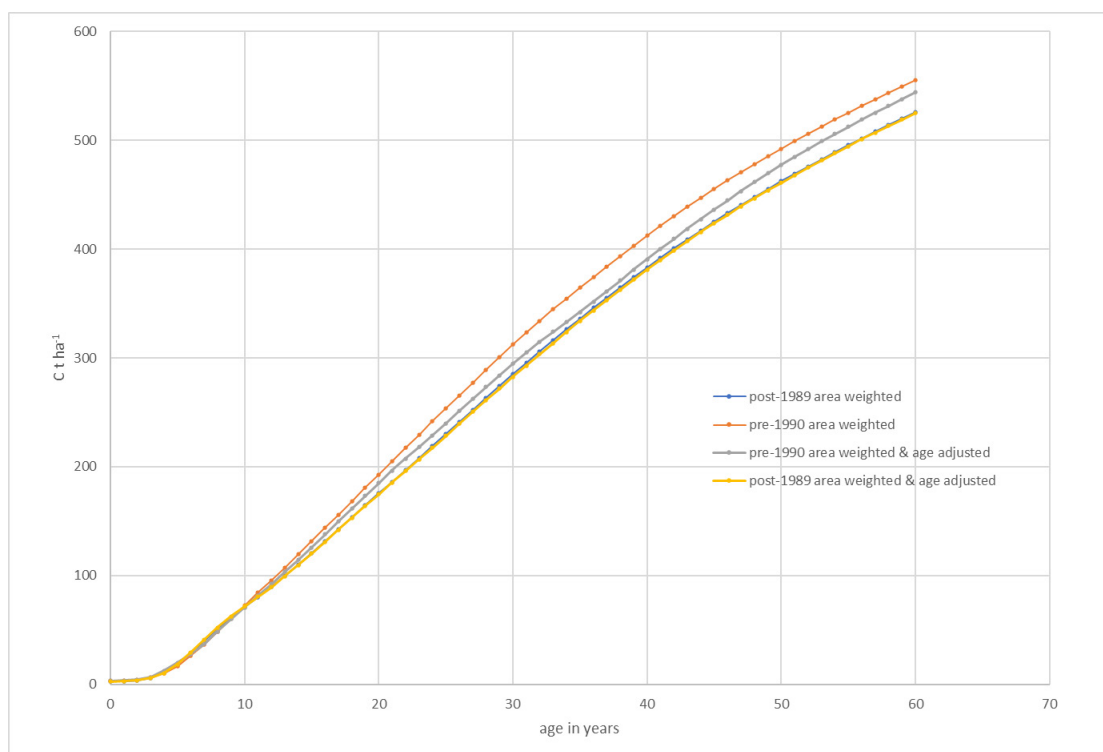
Figure 13: Difference in total carbon yield between the area-weighted and age-adjusted and area-weighted pre-1990 planted forest and post-1989 planted forest yield table for current forests. Total carbon is shown. A non-crop constant carbon amount was added (assumed to be constant over age; Table 11)

All volume tables were generated using the plot area-weighting method only (i.e. without adjustments for back-cast and forecast errors). It was assumed that these errors are minimal based on the carbon back-casting/forecasting error analysis. Note that yield tables are projected for ages well beyond the age of plots used to derive them, so results are dependent on the reliability of the growth model and mortality function.

Part 3, Objective 3. Compare carbon stocks per hectare with yield tables

Comparisons of carbon stocks per hectare at measurement of a forest inventory plot match the value of the plot-level yield table at measurement age. Once individual yield tables for each plot are generated, these are area-weighted and averaged to create a single general yield table. The individual plot yield tables can show a high degree of variation in their trajectory, so projections for a given age can differ. The average across multiple plot yield tables for a given age may differ from the average of the individual plot measurements made at that age.

For example, a heavily thinned stand on a highly productive site will have a low carbon stock immediately after thinning, but we would anticipate a rapid thinning response (so a steeper subsequent trajectory). A plot measurement taken just after thinning would contribute a low stock to the overall plot-based average stock at that age. However, its yield curve used to generate the generalised yield curve would likely be higher before and after the thinning than plots with a similar measured stock at that age.

We further illustrate this in Figure 14, which depicts only 15 plots and their derived yield curves for ease of interpretation. The difference between the averaged plot total carbon stock at measurement and the yield table value for the curve derived from the individual yield curves is about 11 t C ha^{-1} at the mean measurement age.
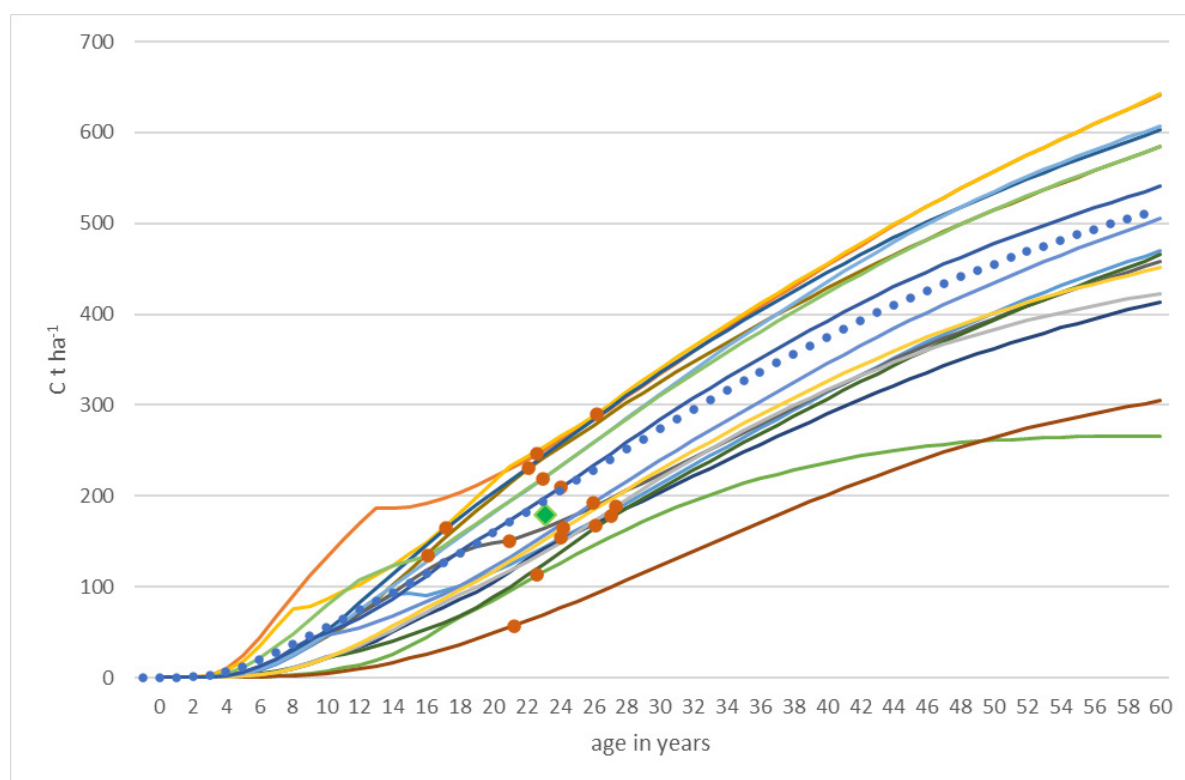

Figure 14. Example of a yield curve "swarm" (n=15), the averaged yield curve (dotted blue), the last measurements for those yield curves (brown dots) and the average age and carbon stock for these measurements (green diamond).

Furthermore, when compared with the average yield table, we can expect lower average carbon stock estimates for all assessed plots in the planted forest inventory. This is because the average carbon stock estimates include plots that are harvested, not yet replanted or are too young to be used in yield table generation. These plots contribute 0 t C to the average stock estimate, but do not contribute to the average yield table.

The following figures show all National Forest Inventory measurements across the permanent sample plot network with their carbon stock values at time of measurement and the derived yield curves for post-1989

planted forest (Figure 15) and for two strata of pre-1990 planted forests: "before 1990" (Figure 16) and "from 1990 onward" (Figure 17).
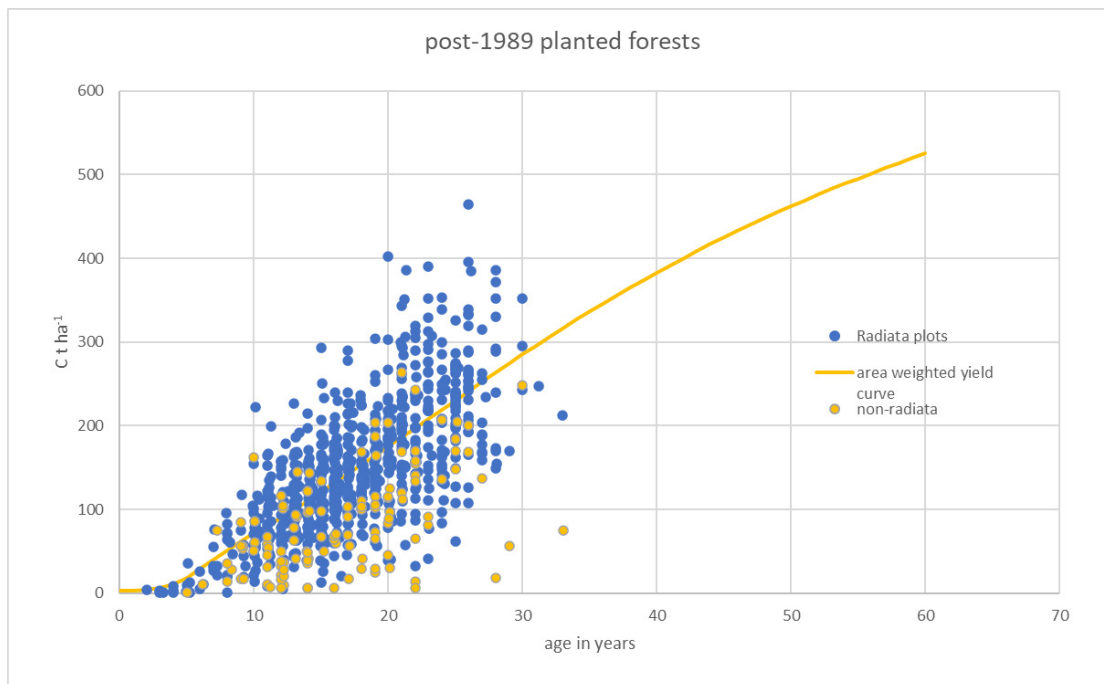
Figure 15. Post-1989 planted forest plots (all plot measurements plots) and the derived yield curve
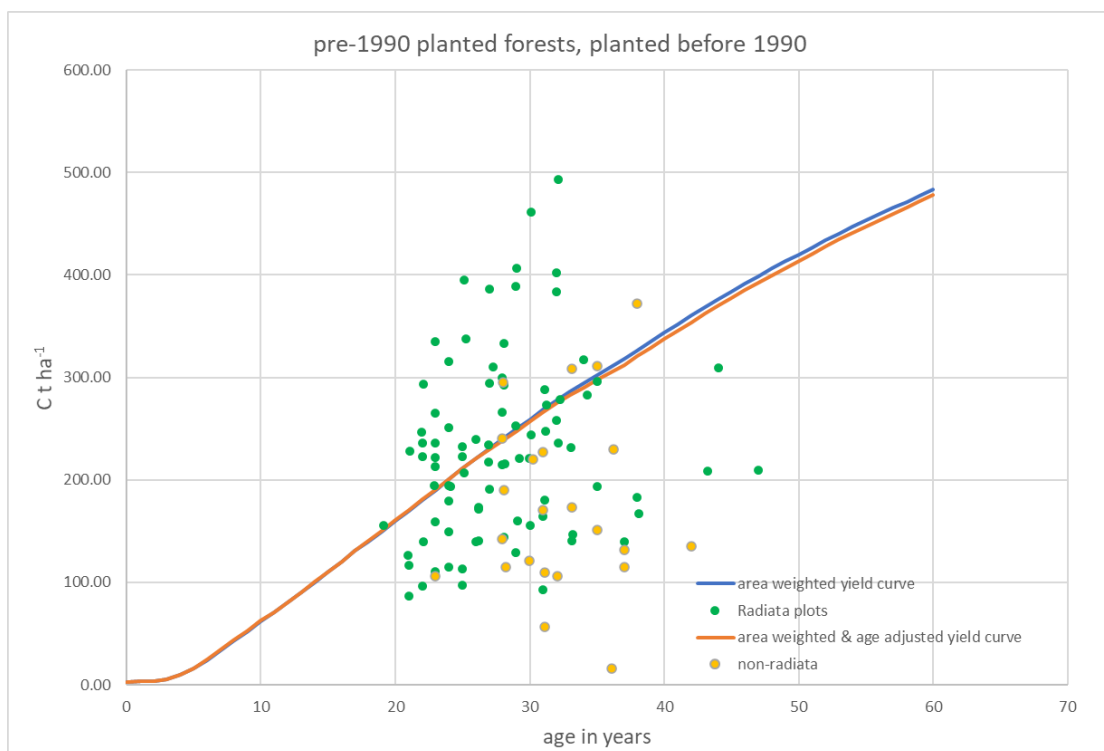
Figure 16. Pre-1990 planted forest plots in stands planted before 1990 and the derived yield curves
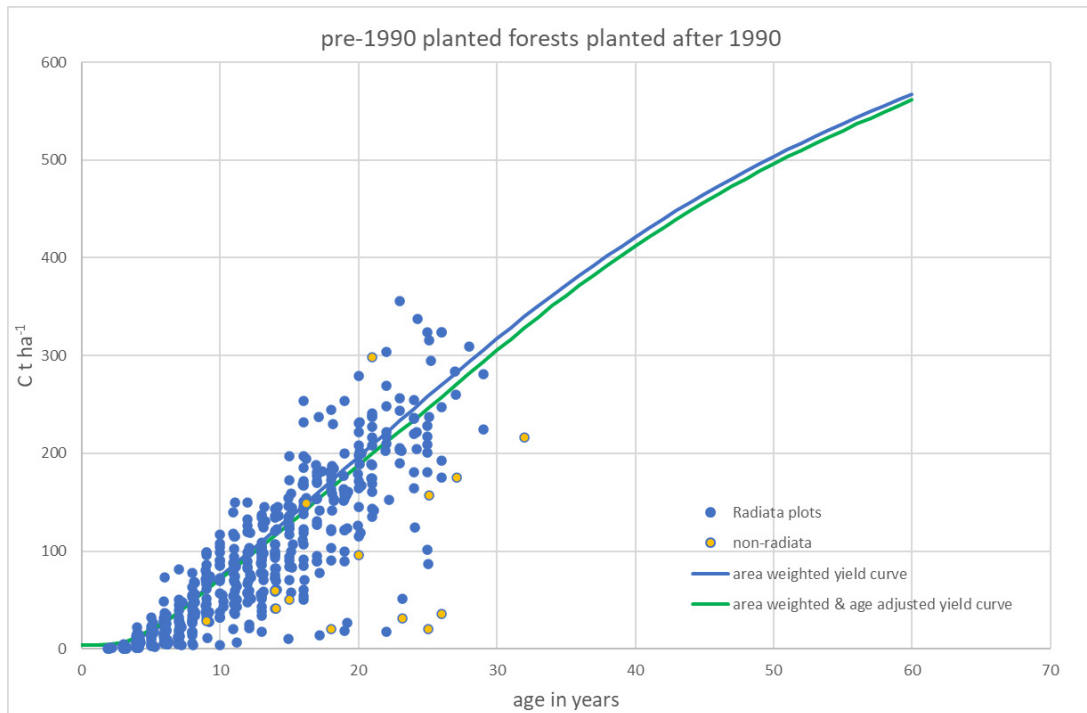
Figure 17. Pre-1990 planted forest plots in stands planted after 1990 and the derived yield curves

Comparing a single generalised average yield curve (based on averaging individual plot-based yield curves) with multiple point-in-time plot measurements is not ideal. Plot measurements are single events while yield tables are a trajectory through time. While all individual plot yield curves are anchored to the measurement events, their variability in form and trajectory results in a discrepancy between the average estimates of average carbon stocks at measurement (point assessment at an age) and the estimate of carbon stocks from the generalised yield curve at this age.

Discussion

Inventory panel consistency

Annual measurements are carried out on a random sample of 1/5th of the full inventory of pre-1990 and post-1989 planted forests. This would imply that the results each year should be very similar, with differences just due to random sampling variation. However, this is not necessarily the case for several reasons:

1. Each year a set of new plots is measured for the first time, either to increase sample size in general (pre-1990 planted forests) or because of new areas that have now been afforested and mapped as forests in the LUCAS Land Use Map (LUM). This can mean a change in the population. However, the 2021 and 2022 panels of the planted forest inventory consisted of re-measurement plots only, with no new plots added.
2. Stands are felled and may be replanted with different species, genetics and/or managed differently which leads to different growth rates. The 2021 and 2022 panels had 17 plots that had been harvested since 2016/17 and were in a new rotation or still in the process of being replanted.
3. Deforestation means that plots are lost as the population changes. No additional deforested plots were measured or identified (but could have been part of the unmeasured group of plots e.g., access denied).
4. Plots may be reclassified from one forest type to another, again resulting in a change to the population being sampled. Plots in stands originally mapped as a different forest type or land use are more likely to be atypical. This was not observed as reclassification occurs during the remapping of forests and remeasured plots were assumed to maintain their forest type.
5. The population can also change over time due to changes in management practices such as thinning. However, during the remeasurement not many new thinning events were registered by the field teams or observed in the plot measurements. This is not unexpected because most remeasured plots were in age classes that are younger or older than an age when thinning generally is carried out.

Since the full completion of the first planted forest inventory cycle in 2020, all permanent sample plots will have been measured at least once and estimates should be more robust. Smaller changes in yield prediction could therefore be expected, removing the influence of reasons 1, 3 and 4 above, as long as the forest area (LUM mapping) does not change greatly. Changes can then be attributed to management improvements (e.g. better genetic stock; reasons 2 and 5) and possible shifts in silviculture (thinning and species choice; reason 5).

In post-1989 planted forests, with their uneven age class distribution an increase in harvesting can be expected and the resulting higher number of younger stands will allow a comparison in the near future to identify shifts based on reason 2, 3 and 5.

Estimates of carbon stocks and stock change

The analysis of the 2021-22 data of the planted forest inventory provided estimates of carbon stocks and carbon stock changes in pre-1990 planted forest and post-1989 planted forest. Plots measured for the first time in pre-1990 planted forest did not differ markedly from plots measured previously. The on-going addition of non-radiata plots representing slower growing species in post-1989 planted forests and the age class distribution skewing towards older and possibly less productive post-1989 planted forests are reasons for the now lower yield of post-1989 planted forests compared to pre-1990 planted forests. This is probably being exacerbated by younger pre-1990 planted forests being dominated by radiata pine with improved planting stock. The current result emphasises the importance of ensuring that all plots (grid-

points) that are present in the mapped areas of pre-1990 and post-1989 planted forest are measured in full, or a random representative subsample of all grid locations is measured to avoid a potential bias.

Generation of yield tables

Yield tables were derived for pre-1990 planted forest and post-1989 planted forest using all measurements in the current and past inventory cycles (2007 – 2022). These tables are our current best estimates of average yields for these forests without allowance for the effects of harvest age differing between types of forest.

Yield tables are commonly used in forest modelling. When combined with age class distributions and activity data (afforestation, harvesting, replanting, deforestation) they allow estimates of past and future stocks and stock changes. They work best when the forest resource is stratified e.g., by species, site productivity, and management (e.g., stocking), with a separate yield table for each stratum. If a single yield table is derived from a more diverse resource, reasonable results can still be produced, as long as the distribution of factors influencing stand- or plot-level yield tables is constant across the current and expected future age range.

Determining how much influence the older plots with lower carbon stocks should have on the yield table requires an understanding of the nature of these plots. For example, it could be that:

- Older plots with low stocks are otherwise similar to younger stands but have been exposed to natural hazards for longer and have suffered a loss of stems and carbon e.g., through windthrow. Weighting by age as well as area gives more credence to estimates derived from actual measurements at an older age rather than estimates from simply projecting young stands onwards using models. Growth models do allow for some attrition but not major disturbance events. As a result, they are likely to over-estimate yields at older ages, which is taken into account by age-weighting; or:

- Older plots with low stocks are not representative of the general population e.g., they are much more likely to be non-radiata pine, and/or on low site quality and/or at very low stockings due to management, rather than disturbance. Therefore, these plots do not represent a likely (or even possible) future for the younger stands and should not have undue influence on the overall yield table.

Examination of the pre-1990 planted forest plots aged over 30 years showed that they did differ materially from the rest of the resource in terms of species (the proportion of non-radiata plots in the unharvested stands beyond 30 years is higher). Differences in site quality and management have not been investigated, but it is likely that older non-radiata pine plots and radiata plots with low productivity are contributing to lower yield estimates that "pull down" the fully weighted curve. These factors should not exert an effect on the trajectory of the younger stands that is weighted higher than a projection from a younger age.

It would be better to stratify the resource, or in the short-term, revert to area-weighting only and accept the likely over-estimate of stocks due to ignoring future disturbance. Note that this is not an unexpected result – species planted on sites that are unsuited to radiata pine are likely to have slower growth rates and longer rotations, so an accumulation of area in age classes beyond the normal clearfell age for radiata pine is likely, and lower than average stocks per hectare would be expected.

This issue will also increasingly affect post-1989 forests which have a higher proportion of non-radiata species. The proportion of non-radiata plots at older ages will probably increase over the next decade. Figure 15 shows current plots in post-1989 planted forests with few plots older than the typical rotation for

radiata pine. However non-radiata plots show a lower average productivity and we would expect that plots in this group that are already older than 20 years will not be harvested and will continue to age (e.g. Douglas fir), while we can expect that radiata plots that are older than 20 years will be harvested over the next decade. This leads to a similar situation to what we currently see in pre-1990 planted forests: plots older than 30 having lower productivity, dragging the area-weighted and age-adjusted yield table down.

Age-adjusted yield tables

As in the previous analyses (Paul *et al.*, 2017b; Paul *et al.*, 2018; Paul *et al.*, 2019; Paul *et al.*, 2021), an imputation method which adjusts for forecasting/back-casting errors when deriving the mean yield tables was used. While the adjustments for the back-casting and forecasting errors are not excessively large, the method ensures that key error sources in the modelling that generates the yield tables are accounted for (e.g. such as unbalanced age class distribution).

With the completion of the five-year cycle of annual re-measurements in 2020, most known plots[9] in the planted forest inventory will have been measured within the previous five years with an average time since measurement of two-and-a-half years. This means that forecasting and back-casting errors for stock calculations using a model imputation have a minimal effect (Beets *et al.*, 2011) and that the full set of plots can be used confidently for carbon yields accounting for the age-class distribution through weighting yield information based on the age when the stand was measured. This method has been adopted now that New Zealand has moved to a continuous forest inventory from the previously used periodic five-year re-measurement cycle and such model imputation approaches allow the full use of the forest inventory cycle to improve the overall precision of stock estimates (Paul *et al.*, 2017a).

However, as discussed above it is not appropriate to use age-weighting in cases where plots at particular ages are not typical of the population as a whole. In these cases, projections from young stands are likely to be more reliable predictors of future stocks in mature stands than current measurements made at those older ages in atypical stands.

Period-dependent yield tables

Period-dependent yield tables reflect the conditions and productivity during the past better than a single generic yield table used over long time periods. However, modelling of more recent periods based only on data from younger stands need to be carefully interpreted as there are few usable measurements, thinning intentions are not clear, and early assessments of young plots are less reliable. This is the case for pre-1990 planted forests in the period from 2010 onwards. An alternative is to use a before 1990 period yield table and a single yield table for 1990 onwards for pre-1990 planted forests until sufficient data is available. This is MfE's preferred option for implementation in the LUCAS CRA, and the appropriate yield tables are provided in this report based on the data from the continuous fully completed planted forest inventory. A change to a three-period approach for pre-1990 planted forests could be considered once more stands representing the 2010-onwards period have been grown through a period of thinning and pruning, allowing a better prediction of future yield.

Comparison between currently estimated stocks and generated yield tables

While the yield tables use all measurements from permanent inventory plots, the current stock estimates from the annual planted forest inventory are only based on the latest measurement since 2018 to reflect the latest state of planted forests. Due to this methodological difference, the comparison of stock estimates from the 2018-2022 planted forest inventory with the yield curves is too simplistic. This is especially the case for historic yield tables such as the before-1990 pre-1990 planted forests table, which was constructed from earlier measurements in forest stands that have since been harvested and replaced

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[9] Some plots will have not been measured regularly due to denied access or unknown ownership.

with a new rotation of trees. These replaced stands, harvested at their optimum harvest age (~22-28 years) were more productive stands than the stands that remain present in the planted forest inventory (≥ ~30 years). Thus, the plots remaining in the 2018 to 2022 panels of the forest inventory may be expected to have lower carbon values on average than the yield table that represents all plots planted before 1990.

A further complication lies in the comparison of yield table-derived carbon stock estimates (from the CRA simulation) and the carbon stock estimates from the planted forest inventory for a specific calendar year during the inventory period. This complication is in part caused by the use of age-class distributions for a specific year from different sources. While the planted forest inventory uses its own age class distribution based on the measured plots to impute stocks for a particular year within the forest inventory period, the yield table simulation approach in the CRA uses a modelled age-class distribution based on NEFD data (Anon., 2023). Differences between these age-class distributions makes a direct comparison for a particular year difficult.

As highlighted in the annex of the 1990-2021 greenhouse gas inventory report for New Zealand (Ministry for the Environment, 2022), yield tables generated for pre-1990 planted forests tend to predict higher carbon stocks than the stocks that are measured by the latest inventory cycle. This discrepancy can be explained with the two mayor differences mentioned above of:
   - using a different age class distribution
   - using different datasets to derive stocks (last measurements in the planted forest inventory) and yield (all multiple measurements of stands representative for a period).

A smaller factor for the observed discrepancy is that plots that are too young to be modelled for yield (e.g. recently planted) are treated as plots with no carbon in the planted forest inventory, while a yield table by age class approach would assign some amount of carbon to any existing plot in the mapped area, even for very young trees (e.g. 0-3 years).

Conclusions

- A second five-year cycle of the annualised forest inventory of planted forests has started with two of the five panel years now having been re-measured in 2021 and 2022. Measurements from two earlier periodic inventories are also available.
- Plots measured in 2021 and 2022 are generally consistent with previous years. Current carbon stocks in post-1989 forests are higher than in pre-1990 forest, primarily due to the older average age.
- Plots left unharvested beyond the typical radiata pine rotation ages are not necessarily typical of the overall population, yet they influence yield trajectories for the whole forest. Preliminary investigation suggests that for pre-1990 forests, weighting plot yield tables by age may not be appropriate for this reason.
- Separate yield tables were prepared for pre-1990 and post-1989 planted forests by species group, and by planting year cohort for pre-1990 forests. Yield tables stratified by planting year period can also be produced for radiata pine, but the other two species groupings have too few plots for this. In total 20 yield tables were generated, including yield tables covering all species and periods.
- The separate yield tables can be used for different purposes in greenhouse gas inventory reporting and accounting:
  - For LUCAS CRA simulation: use the combined species, area-weighted pre-1990 forest tables (before and after 1990) and the area-weighted and age-adjusted combined species post-1989 yield table.
  - For Pre-1990 Forest Reference Level: use combined and/or species group area-weighted pre-1990 forest tables (based only on plots from forests established between 2000 and 2009).
  - For calculation of the long-term average carbon stock for "averaging accounting" applied to post-1989 planted forests under the Paris Agreement: use species-specific area-weighted post-1989 yield tables.
- The combined species yield table for post-1989 planted forest shows lower productivity than for the combined species yield table for pre-1990 planted forest. This is because:
  - slower-growing non-radiata pine species make up an increasing proportion of post-1989 planted forests (14% compared with 7% in pre-1990 forests)
  - currently post-1989 planted forests are generally older and near harvesting age compared to pre-1990 planted forests, which are on average younger. The younger pre-1990 planted forests benefit from the deployment of better genetics and improved stand management, both potentially boosting better productivity in pre-1990 planted forests.
  - modelling younger stands can also lead to higher predictions of yield as thinning has not yet been applied, unlike older stands with their almost completed management history.
- Further analysis of management effects on carbon sequestration is recommended. Such a modelling exercise would explore the effects of silviculture for forest stands through introducing future thinning and pruning events in model runs for younger stands which still show stocking well above industry standard stockings.
- Calculation of carbon stock estimates and yield tables at the regional level may be possible if the sampling intensity is sufficient.
- A simplistic comparison between yield curves and estimated carbon stocks based on the last inventory cycle data for a specific point in time is not recommended, because of the differences in the underlying data (sets of measurements used and age-class distribution) used to generate these two estimates.
- Efforts should be made to ensure that as many plots as possible are measured and that bias is not introduced through field crew access being denied.

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Acknowledgements

Appendix A – Estimating average carbon stocks per hectare

Inventory Panels 2018-2022

At the beginning of the 2016-2020 period, planted forest inventory grid-points in post-1989 planted forests and pre-1990 planted forests were randomly[10] assigned to annual panels with 1/5th of plots to be measured each year (Nigel Searles, MfE *pers. comm*). With the start of the new NFI cycle (2021-2025) by re-measuring the 2021 Panel, the new cycle follows the same measurement schedule as the previous 2016-2020 cycle. Each year the same 1/5th of plots assigned to a specific inventory year are revisited five years later to achieve a constant five year period between measurements. This approach also maintains the initial random selection and representativeness of the sampling in both pre-1990 and post-1989 planted forests, excluding plots that have since been deforested. In addition, any new post-1989 planted forest plots that have been added due to afforestation and are now mapped as part of the post-1989 planted forests are randomly assigned to the five panels and will be measured in due course.

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[10] While randomly chosen points were assigned to each panel (year) the spatial distribution was taken into account to achieve a more or less even number of sample plots for each region.

Table A1. The current 5 Panels of the 2018-2022 Inventory plus the two previous and now re-measured 2016 and 2017 Panels of planted forests: Locations on the grid visited and measured through NFI permanent plots, analysed for carbon stocks and yield table generation plus locations that were not visited for various reasons (e.g. access denied).

	2016	2017	2018	2019	2020	2021	2022	Total (2018-22)
Pre-1990								
No of locations visited	66	59	61	62	67	62	56	308
Remeasured	45	37	42	43	41	62	56	244
New	21	22	19	19	26	0	0	64
Net-stocked plots	64	58	51	59	62	58	51	281
Analysed for yield table	54	47	41	50	54	58	48	251
Not analysed for yield	12	13	19	12	13	4	8	56
Added for C stock calculations	10	11	10	9	8	0	3	30
Unstocked plots	2	2	10	3	5	4	5	27
Locations not visited	2	8	4	2	3	0	0	9
Total number of locations	68	67	65	64	70	60	56	317
Post-1989								
No of locations visited	72	76	77	78	60	68	69	352
Remeasured	66	63	70	71	46	68	69	324
New	6	13	7	7	14	0	0	28
Net-stocked plots	69	71	74	72	55	62	67	330
Analysed for yield table	67	68	70	62	46	57	65	300
Not analysed for yield	5	8	9	16	14	11	4	54
Added for C stock calculations	2	3	4	10	9	5	2	30
Unstocked plots	3	5	3	6	5	6	2	22
Locations not visited	0	5	7	12	11	--	5	35
Total number of locations	72	81	86	90	71	68	74	389

In summary, over the 2018-2022 period 660 locations were visited (compared with 678 from 2016-2020), with 44 locations not visited for various reasons. On these 660 locations, 611 permanent plots with a net-stocked area were installed. Out of these, a total of 551 plots were suitable for calculating a current stand yield curve as their tree measurements allowed the calculation of stand level metrics e.g. basal area, mean top height and stocking values. Out of these suitable plots, 300 represent post-1989 planted forests and 251 are in pre-1990 planted forests.

For calculating current carbon stocks the remaining 60 plots out of the 611 net stocked permanent plots were included to calculate current carbon stocks in net-stocked area, which includes plots in which crop-

trees were recently harvested (zero crop carbon in a net-stocked area) or trees present and too young to provide adequate tree measurements, without including areas that are permanently unstocked but mapped as planted forests. Over the whole 2018-2022 Inventory cycle 49 fully unstocked plots were found (Table A1).

Estimating carbon stocks at measurement in 2021 and 2022

Carbon stocks per hectare at measurement for net-stocked area were calculated for pre-1990 and post-1989 planted forests for 120 plots measured in 2021 and 118 plots measured in 2022. Nine plots across post-1989 and pre-1990 planted forests contributed solely to carbon in the unstocked area of planted forests. As in previous analyses, carbon stocks were calculated using the ratio estimator approach to area-weight the estimate (Bechtold and Patterson, 2005; Paul *et al.*, 2014). A carbon value of zero was assigned to plots that were too young (~<3-4 years) to calculate accurate stand metrics or had been recently harvested.

Non-crop data from the latest measurement from all plots in the inventory was used to calculate carbon stocks for the non-crop pool in the understorey of net-stocked area as well as unstocked areas in planted forests (plots with no crop trees present). The latest measurement from each plot was used without any time-series adjustment based on the assumption that average non-crop carbon stocks do not change significantly over time. Measurement of non-crop vegetation is limited to woody vegetation with a DBH ≥ 2.5 cm and carbon stocks are estimated according to the methods in Paul *et al.* (2016). Herbaceous vegetation is excluded from estimates of stocks in the stocked and unstocked areas of planted forests. We used non-crop tree data within the net-stocked area for understorey carbon stock calculations in stocked plots (Herries *et al.*, 2017). Plots without crop-trees were used as the plot set for carbon stock calculations for unstocked areas. These calculations provide a point estimate of the carbon stocks in pre-1990 and post-1989 planted forests for each panel year.

Appendix B – Generating yield tables

In forest management, yield tables are often developed to allow standing and harvested forest parameters of interest (e.g. volume, biomass, or carbon) to be simulated over time. Yield-table estimation is usually based on plot measurements at a single point in time. However, for the purpose of accurately estimating long-term inter-rotational carbon sequestration rates, the use of multiple measurements of permanent sample plots becomes important. Over time the use of such repeated measurements not only improves the field data for a plot by identifying and correcting previous measurement errors but can also aid in the improvement of yield estimation for a site over the length of a rotation and beyond (Paul *et al.*, 2015).

Interpolating yield from multiple measurements

An interpolation method was used to generate plot specific yield tables from multiple measurements. Yield values based on the back-cast values from the first measurements were used from year zero to the year of the first measurement. A straight interpolation was used between the first and the second measurement and any subsequent measurements. From the last measurement onwards, the forecasts based on the last measurement were used to predict the stand yield until age 60 years for post-1989 and pre-1990 planted forest plots. An example is given in Figure B1.
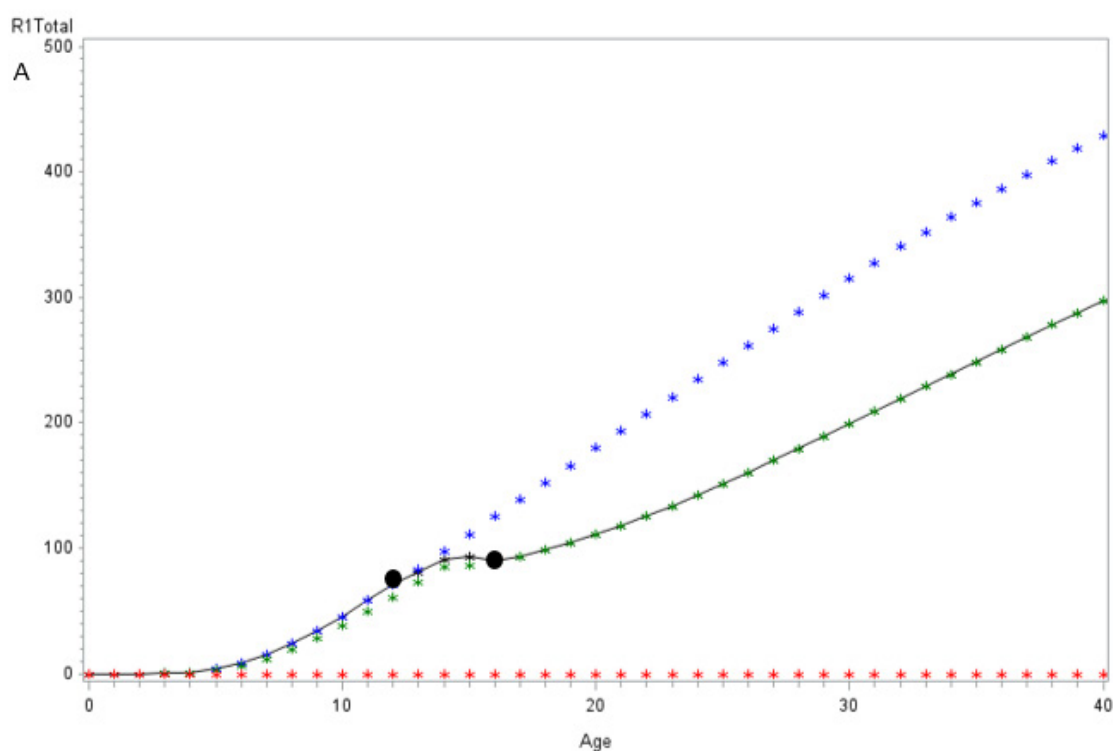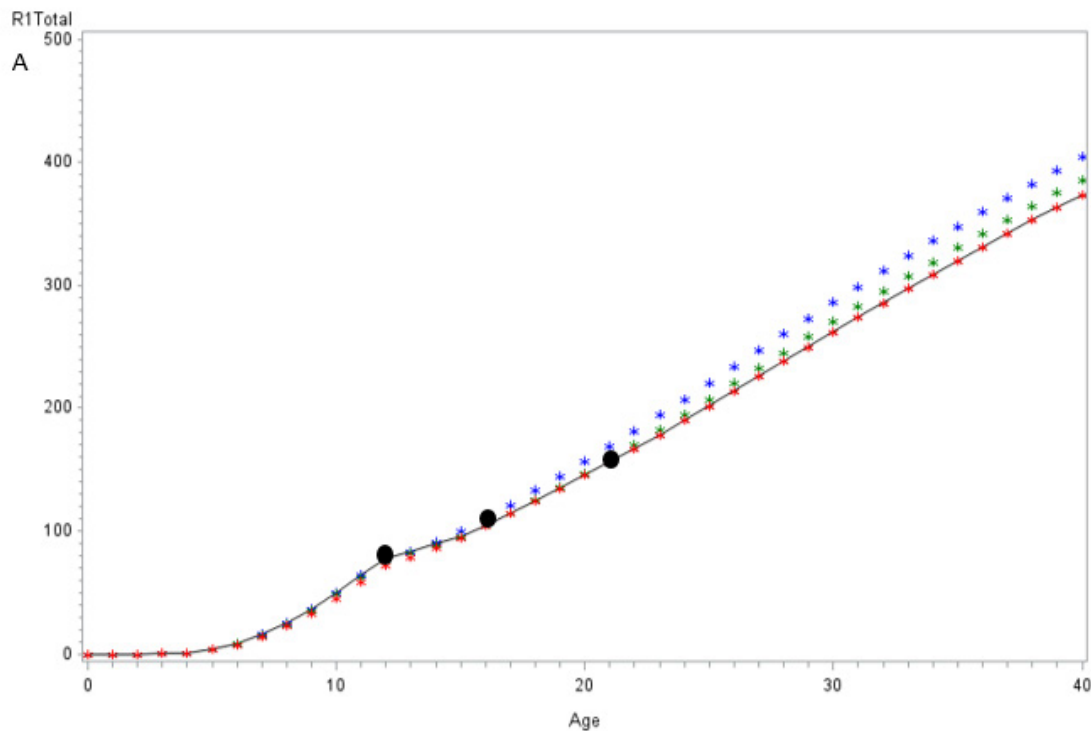
Figure B1: Yield table interpolation examples. Interpolated yield table (black line) for two post-1989 planted forest plots (Panel A and B), constructed for 40 years based on the interpolation method from two (Panel A) and three yield curves (Panel B) based on measurements in 2012 (blue), 2016 (green) and 2021 (red, in panel A empty). Y-axis: Total C (t ha^{-1}). Panel A shows plots with only two measurements and a thinning between the measurements. Panel B shows a yield curve based on three measurements. Black dots show measurement events.

Area-weighted average yield table

Once plot-specific yield tables were generated using the above method, a ratio estimator approach was used to combine all plot-specific yield tables into an area-weighted average yield table in the same way as in previous analyses, e.g. Paul *et al.* (2016); Paul *et al.* (2017b), Paul *et al.* (2018). This is described in the Methods section of this report.

Age-adjusted yield tables

Yield tables for pre-1990 and post-1989 planted forest have been produced in previous periodic inventories using an average of all the plot-level yield tables weighted by plot area (Paul *et al.*, 2017b; Paul *et al.*, 2018). However, this approach may not be optimal because the quality of the information contained within each plot-level table can vary with age and time since measurement. This is because the value of carbon in a plot-level yield table is exact (apart from model prediction error) only for ages coinciding with measurement ages. For all other ages, there is a degree of forecasting or back-casting error. To take account of this when producing the final general average yield tables for all post-1989 and pre-1990 planted forests (Paul *et al.*, 2017b), estimates at ages close to measurement age should be given a higher weighting, and at ages more distant from the measurement age they should be given a lower weighting. The approach we used to create area-weighted and age- adjusted yield tables is described in this section.

Firstly, it was necessary to estimate typical forecasting and back-casting errors. Forecasting error can be estimated by comparing the yield at the second measurement age with the predicted yield at the same age from a yield table produced from the first measurement. Similarly, back-casting errors can be estimated by comparing yield at the first measurement age with the predicted yield at the same age from a yield table produced from the second measurement. In both cases, the error can be calculated as the absolute difference between the predicted and actual yield. For plots measured three times, forecasting errors can be obtained for time 1 to 2, time 1 to 3 and time 2 to 3, and for back-casting from time 3 to 1, 3 to 2, and 2 to 1. Across all plots in post-1989 planted forests and pre-1990 planted forests, 672 estimates of forecasting error and an equal number of estimates of back-casting error were obtained in this way. The time-span of forecasts or back-casts ranged from 1 to 12 years, averaging 5.8 years. As expected, errors increase with the length of time forecast or back-cast, and by definition they are zero when forecasting or back-casting time is zero. Zero-intercept linear regression models were fitted for predicting forecast/back-cast error, calculated as the square of the difference between the actual and the predicted yield, as a function of time forecast or back-cast. These models estimate forecast/back-cast error expressed as a variance and are of the form:

(1) $\qquad \sigma_{fb}^2 = a \times (Forecast\ or\ backcast\ time)$

where σ^2_{fb} is the forecast/backcast error variance

$\qquad a$ is the regression coefficient.

When combining estimates of an unknown population mean with different errors, the correct procedure is to weight them by the inverse of their variances. For any plot-level yield table, the variance for a particular age is the sum of the sampling variance (σ^2_s) and the forecasting/back-casting error variance (σ^2_{fb}). The sampling variance between plots for a given age represents the natural variation between plots and accounts for variation in site productivity and management practices.

To estimate sampling variance, we firstly calculated the total variance (σ^2_{total}) between yields at each age across all plot-level yield tables. We then used Eqn (1) to estimate the forecasting/back-casting variance for each age in every plot-level yield table and summed these across all plots to provide an estimate of the average forecasting/back-casting variance at each age. Sampling variance was then calculated by subtracting this from the total variance.

A weighting was then derived for each age in each plot-level yield table taking account of both forecast/back-cast error and plot area as follows:

(2) $\qquad Weight\ = Plotarea \times \sigma_s^2 / (\sigma_s^2 + \sigma_{fb}^2)$

The average yield for each age was then calculated as a weighted average across all the plot-level yield tables using weights calculated by Equation (2).

Adjustments for forecasting and back-casting error to account for age distribution in post-1989 and pre-1990 planted forest yield tables

The regression coefficients for Eqn (1) for estimating forecasting and back-casting error are given in Table B1. These show that forecasting errors are generally greater than back-casting errors, e.g., there is generally a greater error in estimating yield 5 years after a measurement than 5 years prior to a measurement.

Table B1. Regression coefficients for Equation (1).

	FORECASTING	BACK-CASTING

Total	218.36	59.27
AGL	161.70	27.79
BGL	7.89	1.36
DWL	9.82	1.35
FL	1.01	1.17
Volume	2492.78	419.00

The Eqn (1) models were used to estimate forecasting/back-casting variance for each age in every plot-level yield table and summed across all plots to provide an estimate of the average forecasting/back-casting variance at each age. Sampling variance was then calculated by subtracting this from the total variance. The results are shown in Figures B2 and B3 with total, sampling and casting variation expressed as standard deviations.

The results show that except at very young ages, the error from forecasting or back-casting is smaller than the level of sampling variation between plots. This means that plots requiring a considerable level of forecasting or back-casting can still provide useful information on yield and are therefore given a significant weighting by Eqn (2). For example, to estimate the mean yield at age 10 years, a plot measured at age 10 years will be assigned a weighting of 1, while the back-casted yield for age 10 from a plot measured at age 30 will be assigned a weighting of 0.59 in post-1989 forest and 0.47 in pre-1990 forest.
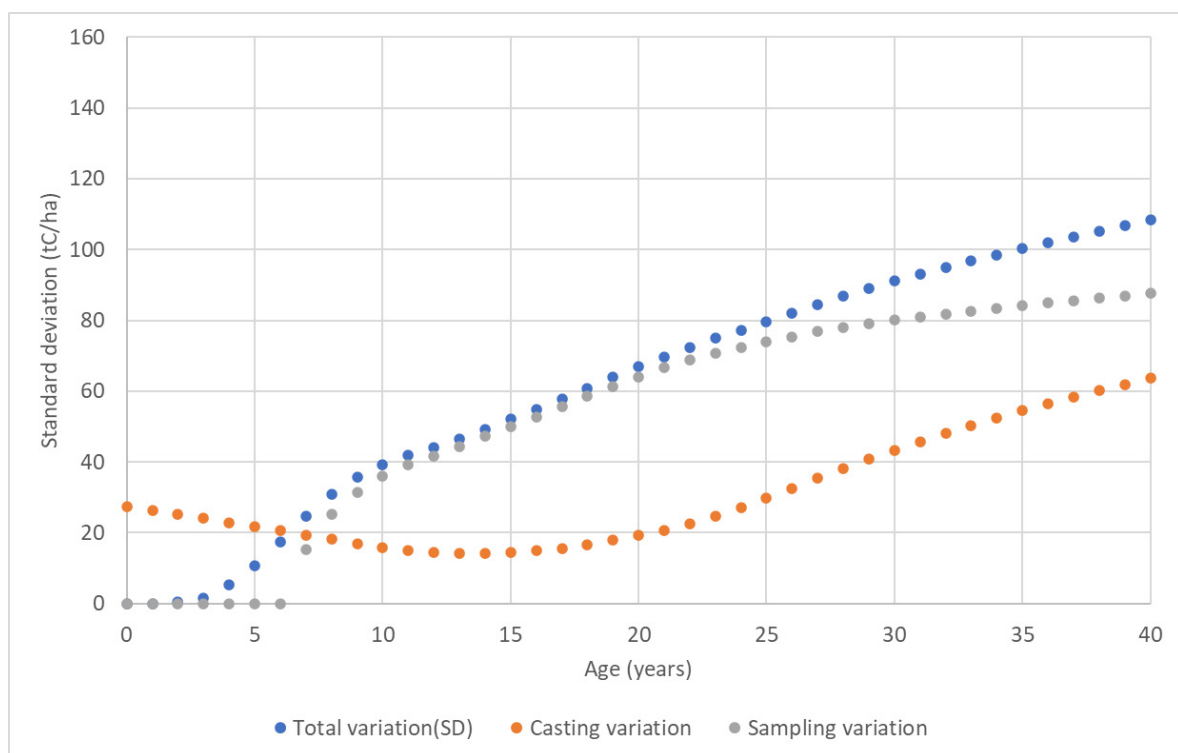
Figure B2: Sources of variation (casting and sampling) in total carbon yield table estimates between plots by age in post-1989 forest expressed as standard deviations. Shown are the total variation, sampling variation, and forecasting/back-casting variation.
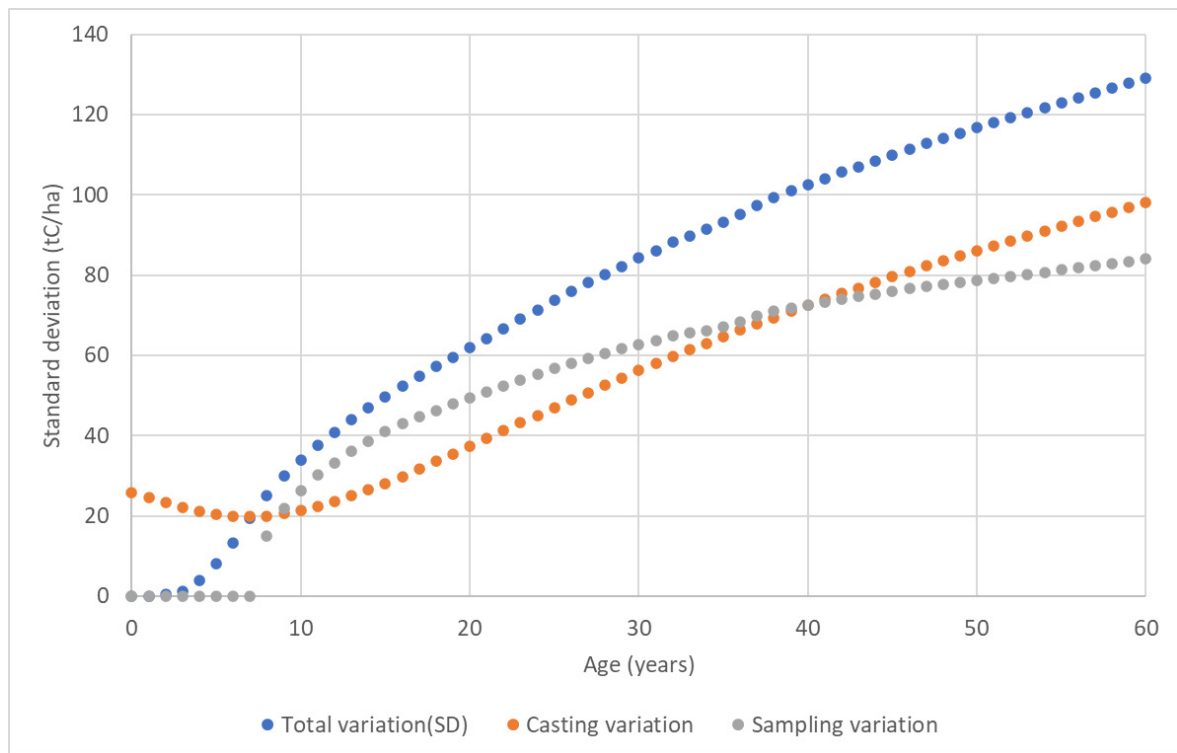
Figure B3: Sources of variation (casting and sampling) in total carbon yield table estimates between plots by age in pre-1990 forest expressed as standard deviations. Shown are the total variation, sampling variation, and forecasting/back-casting variation.

Appendix C – Yield tables

Overview of yield tables derived from the full planted forest inventory

Table C1 provides an overview of all the yield tables generated for this report.

Table C1. Yield tables derived from the full planted forest inventory

Objective	Yield table number	Weighting	Sub-category	Species	Cohort	Purpose*
2a	2a-1		Pre-1990	Radiata pine	All	LTA
	2a-2			Other softwoods		LTA
	2a-3	Area only		All hardwoods		LTA
	2a-4		Post-1989	Radiata pine	All	LTA
	2a-5			Other softwoods		LTA
	2a-6			All hardwoods		LTA
2b	2b-1		Pre-1990	Combined species	Before 1990	CRA – NIR[†]
	2b-2				After 1990	CRA - NIR[†]
	2b-3				1990-2009	Sensitivity
	2b-4				After 2010	Sensitivity
	2b-5**	Area only		Radiata pine	Before 1990	CRA - NIR
	2b-6**				After 1990	CRA - NIR
	2b-7**				1990-2009	Sensitivity
	2b-8**				After 2010	Sensitivity
	2b-9**		Post-1989	Combined species	1990-2009	Sensitivity
2c	2c-1	Area only	Post-1989	Combined species	All	Sensitivity
	2c-2		Pre-1990	Combined species	2000-09	FRL
2d	2d-1		Post-1989	Combined species	All	CRA - NIR[†]
	2d-2	Area & Age	Pre-1990	Combined species	Before 1990	Sensitivity
	2d-3		Pre-1990		After 1990	Sensitivity

* LTA = used to calculate Long-Term Average carbon stock; CRA-NIR = used in CRA simulation for National Inventory Report; FRL = used to define Forest Reference Level for pre-1990 forests; Sensitivity = used for sensitivity analysis and comparisons
** Additional Yield tables created upon later requests
[†] Yield tables used in final runs of the CRA

Objective 2a. Species-specific yield tables (area-weighted only)

2a-1 Pre-1990 yield table for Radiata only (including understorey)

	Total		AGL		BGL		DWL		FL		Volume_Net	
Age	Mean	±95%CI	Mean	±95%CI	Mean	±95%CI	Mean	±95%CI	Mean	±95%CI	Mean	±95%CI
0	3.04	1.77	2.33	1.38	0.61	0.39	0.10	0.20	0.00	0.00	0.05	0.00
1	3.25	1.77	2.48	1.38	0.67	0.39	0.10	0.20	0.01	0.00	0.34	0.03
2	3.85	1.78	2.92	1.38	0.80	0.39	0.10	0.20	0.04	0.00	1.21	0.14
3	5.79	1.80	4.29	1.40	1.25	0.40	0.11	0.20	0.15	0.02	4.16	0.49
4	10.10	1.92	7.39	1.48	2.13	0.42	0.12	0.20	0.47	0.07	11.42	1.25
5	17.02	2.22	12.32	1.68	3.32	0.46	0.17	0.20	1.22	0.16	24.45	2.41
6	26.36	2.69	18.81	2.00	4.77	0.52	0.31	0.22	2.48	0.27	43.77	3.90
7	37.48	3.24	26.21	2.35	6.35	0.59	0.71	0.32	4.22	0.42	68.74	5.58
8	49.51	3.77	33.82	2.66	7.91	0.64	1.56	0.55	6.23	0.61	97.25	7.20
9	61.73	4.22	41.73	2.97	9.51	0.69	2.51	0.70	7.98	0.71	126.83	8.61
10	73.78	4.61	50.34	3.30	11.27	0.74	3.03	0.73	9.14	0.71	157.38	9.98
11	85.76	4.96	59.10	3.63	13.05	0.81	3.66	0.81	9.97	0.70	191.36	11.41
12	97.68	5.30	68.04	3.95	14.86	0.88	4.29	0.89	10.50	0.68	226.25	12.88
13	109.56	5.61	77.70	4.24	16.84	0.94	4.40	0.84	10.62	0.63	261.82	14.30
14	121.68	5.92	87.39	4.48	18.82	1.00	4.78	1.01	10.69	0.64	300.71	15.60
15	133.93	6.20	97.36	4.71	20.88	1.05	5.06	1.16	10.65	0.63	339.61	16.65
16	146.26	6.44	107.85	4.93	23.06	1.11	4.94	1.05	10.42	0.56	379.22	17.61
17	158.71	6.69	118.38	5.13	25.26	1.15	4.89	0.95	10.19	0.51	420.79	18.64
18	171.18	6.93	128.86	5.32	27.47	1.20	4.90	0.85	9.96	0.47	462.35	19.61
19	183.55	7.16	139.17	5.50	29.66	1.25	5.01	0.77	9.73	0.43	503.43	20.55
20	195.85	7.40	149.31	5.66	31.84	1.29	5.20	0.71	9.51	0.40	543.99	21.46
21	208.18	7.63	159.29	5.84	34.03	1.35	5.54	0.68	9.32	0.38	584.31	22.35
22	220.53	7.87	169.18	6.03	36.23	1.41	5.97	0.68	9.15	0.36	624.08	23.35
23	232.86	8.13	178.79	6.21	38.38	1.45	6.65	0.93	9.04	0.38	663.49	24.39
24	245.07	8.39	188.23	6.39	40.51	1.50	7.38	1.15	8.95	0.40	701.55	25.29
25	257.15	8.64	197.79	6.58	42.69	1.56	7.87	1.09	8.81	0.38	739.10	26.11
26	269.21	8.87	207.27	6.74	44.87	1.60	8.38	1.04	8.69	0.36	777.46	26.95
27	281.17	9.10	216.63	6.88	47.05	1.64	8.92	1.00	8.58	0.34	815.38	27.73
28	293.00	9.32	225.83	7.02	49.21	1.68	9.49	0.98	8.48	0.32	852.68	28.48
29	304.69	9.53	234.87	7.15	51.34	1.73	10.10	0.97	8.39	0.32	889.29	29.22
30	316.19	9.74	243.70	7.29	53.45	1.78	10.74	0.98	8.30	0.31	925.19	29.95
31	327.47	9.95	252.32	7.43	55.54	1.82	11.41	0.99	8.21	0.30	960.32	30.69
32	338.39	10.12	260.60	7.52	57.56	1.84	12.10	1.02	8.14	0.30	994.44	31.34
33	348.94	10.27	268.54	7.60	59.53	1.87	12.81	1.06	8.07	0.30	1027.02	31.87
34	359.22	10.42	276.26	7.71	61.46	1.91	13.51	1.10	7.99	0.30	1058.54	32.46
35	369.26	10.61	283.77	7.83	63.36	1.95	14.21	1.14	7.91	0.30	1089.53	33.20
36	379.06	10.83	291.10	8.00	65.24	2.00	14.90	1.18	7.83	0.30	1119.77	34.06
37	388.73	11.06	298.31	8.17	67.11	2.05	15.57	1.22	7.74	0.29	1149.59	34.93
38	398.37	11.26	305.51	8.30	68.99	2.09	16.23	1.25	7.65	0.28	1179.31	35.64
39	407.92	11.42	312.63	8.40	70.87	2.12	16.87	1.28	7.56	0.28	1208.73	36.24
40	417.33	11.59	319.63	8.49	72.74	2.16	17.50	1.31	7.47	0.28	1237.60	36.84
41	426.51	11.75	326.45	8.59	74.56	2.19	18.12	1.35	7.38	0.28	1265.79	37.44
42	435.42	11.90	333.05	8.69	76.34	2.22	18.73	1.38	7.31	0.27	1293.20	38.03
43	444.08	12.05	339.45	8.79	78.09	2.26	19.31	1.41	7.23	0.26	1319.86	38.63
44	452.48	12.20	345.65	8.90	79.81	2.30	19.88	1.44	7.14	0.26	1345.77	39.24
45	460.63	12.35	351.66	9.00	81.50	2.33	20.43	1.46	7.06	0.26	1370.98	39.85
46	468.56	12.48	357.50	9.10	83.15	2.36	20.95	1.49	6.96	0.26	1395.54	40.46
47	476.28	12.62	363.19	9.19	84.78	2.40	21.44	1.52	6.87	0.26	1419.48	41.06
48	483.80	12.76	368.73	9.29	86.38	2.42	21.91	1.53	6.78	0.26	1442.85	41.65
49	491.12	12.89	374.12	9.38	87.96	2.45	22.36	1.54	6.68	0.26	1465.65	42.24
50	498.26	13.02	379.38	9.47	89.51	2.48	22.78	1.56	6.59	0.26	1487.91	42.83
51	505.22	13.15	384.52	9.56	91.04	2.51	23.17	1.58	6.50	0.25	1509.66	43.41
52	512.02	13.27	389.53	9.66	92.54	2.55	23.54	1.59	6.41	0.24	1530.94	44.00
53	518.67	13.40	394.43	9.76	94.03	2.58	23.89	1.59	6.33	0.24	1551.77	44.59
54	525.17	13.53	399.23	9.86	95.49	2.61	24.21	1.60	6.24	0.24	1572.17	45.18
55	531.53	13.65	403.94	9.95	96.94	2.64	24.50	1.61	6.16	0.24	1592.18	45.76
56	537.77	13.78	408.56	10.05	98.36	2.67	24.77	1.61	6.08	0.24	1611.83	46.34
57	543.90	13.91	413.09	10.15	99.78	2.70	25.03	1.61	6.01	0.24	1631.13	46.93
58	549.91	14.04	417.55	10.25	101.18	2.73	25.26	1.61	5.94	0.24	1650.11	47.52
59	555.82	14.16	421.94	10.34	102.56	2.77	25.47	1.61	5.87	0.24	1668.79	48.10
60	561.68	14.30	426.29	10.44	103.93	2.80	25.67	1.61	5.80	0.24	1687.33	48.67

2a-2 Pre-1990 yield table for other softwoods (including understorey)

	Total		AGL		BGL		DWL		FL		Volume_Net	
Age	Mean	±95%CI	Mean	±95%CI	Mean	±95%CI	Mean	±95%CI	Mean	±95%CI	Mean	±95%CI
0	1.36	5.57	1.04	4.46	0.32	1.11	0.00	0.00	0.00	0.00	0.04	0.02
1	1.71	5.58	1.30	4.46	0.41	1.12	0.00	0.00	0.00	0.00	0.25	0.19
2	2.69	5.67	2.06	4.53	0.63	1.14	0.00	0.00	0.01	0.01	0.95	0.74
3	4.43	6.05	3.44	4.83	0.94	1.21	0.01	0.02	0.04	0.04	2.37	1.78
4	6.90	6.95	5.38	5.53	1.34	1.35	0.03	0.04	0.17	0.13	4.81	3.53
5	10.10	8.48	7.81	6.69	1.84	1.56	0.04	0.06	0.43	0.30	8.65	6.18
6	14.02	10.57	10.71	8.23	2.44	1.84	0.05	0.09	0.81	0.53	14.19	9.78
7	18.58	13.05	14.08	10.02	3.14	2.19	0.08	0.13	1.28	0.82	21.68	14.32
8	23.73	15.66	17.86	11.91	3.94	2.55	0.12	0.20	1.81	1.14	31.21	19.53
9	29.65	18.35	22.23	13.83	4.91	2.95	0.18	0.29	2.34	1.43	43.12	25.31
10	36.56	21.11	27.42	15.84	6.06	3.38	0.27	0.40	2.82	1.66	57.82	31.72
11	44.08	23.89	32.31	17.76	7.08	3.79	1.15	1.65	3.55	2.04	75.18	38.59
12	51.92	26.64	37.60	19.72	8.16	4.23	1.96	2.70	4.20	2.31	91.74	45.12
13	60.18	29.47	44.20	21.89	9.54	4.71	1.96	2.46	4.49	2.28	109.62	51.85
14	69.22	32.38	51.40	24.08	11.03	5.20	2.01	2.29	4.78	2.26	132.10	59.26
15	78.93	35.33	59.14	26.27	12.63	5.70	2.12	2.21	5.05	2.24	156.30	66.82
16	88.97	38.41	67.13	28.54	14.27	6.24	2.29	2.22	5.28	2.24	181.50	74.63
17	99.39	41.55	75.31	30.84	15.96	6.79	2.61	2.36	5.52	2.26	207.71	82.55
18	109.90	44.75	81.89	33.45	17.32	7.40	4.55	4.17	6.14	2.42	234.22	90.52
19	120.26	48.02	88.58	36.06	18.73	8.02	6.31	5.68	6.64	2.52	255.89	99.48
20	130.75	51.34	97.14	38.33	20.53	8.58	6.39	5.39	6.70	2.44	278.47	108.44
21	141.30	54.20	105.85	40.39	22.29	9.03	6.39	5.11	6.77	2.40	306.98	116.34
22	151.90	56.67	114.61	42.25	24.11	9.46	6.34	4.82	6.86	2.38	336.12	124.10
23	162.74	59.16	123.46	44.06	25.99	9.94	6.37	4.62	6.94	2.37	365.71	131.74
24	173.70	61.62	132.37	45.87	27.86	10.39	6.49	4.52	7.00	2.35	395.58	139.27
25	184.62	64.09	141.19	47.68	29.74	10.85	6.66	4.52	7.05	2.33	425.37	146.75
26	195.36	66.55	149.66	49.50	31.55	11.32	7.03	4.63	7.13	2.31	454.92	154.19
27	205.94	69.02	157.91	51.30	33.33	11.78	7.50	4.86	7.20	2.29	483.53	161.76
28	216.30	71.60	166.04	53.12	35.13	12.26	7.90	5.10	7.23	2.29	511.34	169.59
29	226.39	74.27	173.92	55.00	36.89	12.75	8.34	5.36	7.25	2.31	539.04	177.53
30	236.48	76.79	181.77	56.78	38.65	13.23	8.81	5.65	7.26	2.32	566.91	185.18
31	246.60	79.14	189.59	58.44	40.42	13.67	9.32	5.97	7.27	2.33	594.99	192.57
32	256.48	81.45	197.26	60.08	42.17	14.11	9.78	6.37	7.27	2.34	622.92	200.01
33	266.41	83.81	204.86	61.74	43.94	14.57	10.34	6.75	7.27	2.35	650.65	207.46
34	276.36	86.18	212.36	63.40	45.72	15.01	11.02	7.07	7.26	2.37	678.09	214.97
35	285.83	88.45	219.43	64.95	47.40	15.46	11.76	7.41	7.25	2.38	704.29	221.93
36	294.78	90.61	226.02	66.35	49.02	15.88	12.54	7.79	7.21	2.38	729.13	228.27
37	303.40	92.67	232.41	67.72	50.60	16.28	13.24	8.23	7.16	2.37	753.53	234.56
38	311.85	94.73	238.62	69.05	52.17	16.69	13.96	8.67	7.10	2.36	777.47	240.66
39	320.14	96.77	244.67	70.34	53.72	17.10	14.72	9.08	7.03	2.35	800.91	246.59
40	328.15	98.74	250.53	71.60	55.22	17.50	15.45	9.48	6.95	2.33	823.84	252.41
41	335.91	100.65	256.18	72.82	56.70	17.89	16.15	9.86	6.88	2.32	846.26	258.14
42	343.39	102.51	261.62	74.00	58.14	18.27	16.82	10.23	6.81	2.31	868.13	263.78
43	350.60	104.30	266.87	75.14	59.55	18.65	17.47	10.57	6.73	2.28	889.47	269.33
44	357.56	106.04	271.92	76.27	60.92	19.02	18.08	10.88	6.65	2.26	910.27	274.79
45	364.28	107.73	276.79	77.37	62.27	19.38	18.67	11.17	6.56	2.24	930.55	280.14
46	370.75	109.37	281.49	78.43	63.58	19.75	19.22	11.45	6.47	2.22	950.30	285.41
47	376.98	110.95	286.01	79.47	64.86	20.10	19.75	11.70	6.37	2.19	969.55	290.59
48	382.99	112.48	290.36	80.47	66.11	20.44	20.25	11.92	6.27	2.17	988.28	295.67
49	388.78	113.97	294.55	81.45	67.34	20.78	20.72	12.13	6.17	2.15	1006.51	300.67
50	394.37	115.42	298.60	82.41	68.54	21.12	21.17	12.32	6.07	2.12	1024.30	305.58
51	399.82	116.83	302.54	83.34	69.72	21.45	21.60	12.50	5.97	2.08	1041.74	310.42
52	405.15	118.22	306.40	84.26	70.90	21.79	21.99	12.66	5.86	2.06	1058.88	315.21
53	410.35	119.58	310.18	85.18	72.05	22.12	22.36	12.80	5.76	2.03	1075.74	319.96
54	415.43	120.90	313.87	86.08	73.19	22.44	22.71	12.93	5.67	1.99	1092.32	324.65
55	420.39	122.21	317.47	86.96	74.31	22.77	23.04	13.05	5.58	1.97	1108.61	329.29
56	425.23	123.48	320.98	87.82	75.41	23.09	23.35	13.16	5.49	1.94	1124.62	333.88
57	429.96	124.72	324.42	88.68	76.49	23.40	23.64	13.26	5.41	1.91	1140.35	338.42
58	434.57	125.95	327.77	89.52	77.56	23.71	23.91	13.34	5.33	1.88	1155.81	342.91
59	439.07	127.14	331.04	90.34	78.61	24.01	24.17	13.40	5.26	1.86	1171.00	347.34
60	443.52	128.32	334.27	91.16	79.65	24.30	24.42	13.47	5.19	1.84	1186.06	351.76

2a-3 Pre-1990 yield table for hardwoods (understorey included)

	Total		AGL		BGL		DWL		FL		Volume_Net	
Age	Mean	±95%CI	Mean	±95%CI	Mean	±95%CI	Mean	±95%CI	Mean	±95%CI	Mean	±95%CI
0	6.12	47.42	4.81	37.87	1.21	9.55	0.10	0.32	0.00	0.00	0.02	0.05
1	6.19	47.42	4.87	37.87	1.23	9.55	0.10	0.32	0.01	0.00	0.14	0.29
2	6.38	47.42	5.00	37.87	1.27	9.55	0.10	0.32	0.02	0.03	0.45	0.95
3	6.72	47.44	5.24	37.88	1.33	9.55	0.10	0.32	0.06	0.13	1.06	2.28
4	7.63	47.53	5.87	37.94	1.53	9.58	0.10	0.32	0.14	0.29	2.74	6.01
5	9.49	48.00	7.19	38.23	1.90	9.67	0.10	0.32	0.31	0.67	6.52	14.59
6	12.30	49.43	9.18	39.12	2.38	9.92	0.10	0.32	0.65	1.46	12.93	29.47
7	16.19	52.57	11.92	41.09	3.03	10.40	0.11	0.32	1.13	2.63	22.57	51.44
8	21.14	57.98	15.48	44.60	3.83	11.17	0.11	0.32	1.72	3.99	35.78	80.53
9	26.97	65.83	19.76	49.93	4.75	12.27	0.12	0.32	2.35	5.41	52.35	116.19
10	33.55	75.78	24.69	56.99	5.78	13.65	0.12	0.32	2.97	6.75	71.98	157.28
11	40.76	87.33	30.19	65.51	6.91	15.28	0.13	0.32	3.54	7.91	94.32	202.61
12	48.50	100.04	36.20	75.17	8.14	17.13	0.14	0.33	4.03	8.85	119.07	251.29
13	56.71	113.61	42.67	85.74	9.45	19.17	0.16	0.34	4.44	9.58	146.02	302.71
14	65.37	127.86	49.56	97.03	10.85	21.38	0.17	0.36	4.80	10.15	174.96	356.55
15	74.42	142.66	56.82	108.89	12.31	23.71	0.20	0.38	5.10	10.60	205.66	412.45
16	83.81	157.91	64.36	121.09	13.82	26.14	0.28	0.50	5.36	10.95	237.62	469.41
17	93.47	173.48	72.07	133.42	15.38	28.63	0.44	0.84	5.59	11.22	270.43	526.71
18	103.25	189.37	79.88	145.96	16.95	31.19	0.64	1.33	5.78	11.42	303.74	584.79
19	113.03	205.48	87.70	158.66	18.53	33.79	0.88	1.90	5.93	11.60	337.20	643.44
20	122.92	221.80	95.59	171.47	20.13	36.47	1.15	2.57	6.06	11.74	370.99	702.53
21	132.97	238.45	103.59	184.45	21.78	39.24	1.45	3.33	6.16	11.85	405.33	762.47
22	143.15	255.35	111.67	197.57	23.44	42.04	1.79	4.18	6.26	11.95	440.08	823.16
23	153.39	272.47	119.77	210.80	25.12	44.90	2.16	5.10	6.34	12.06	475.03	884.45
24	163.65	289.79	127.85	224.07	26.81	47.81	2.57	6.12	6.42	12.17	509.97	946.17
25	173.88	307.21	135.89	237.32	28.49	50.76	3.01	7.25	6.50	12.28	544.82	1008.07
26	184.28	324.39	144.02	250.29	30.20	53.67	3.49	8.46	6.57	12.38	580.05	1069.05
27	194.83	341.24	152.25	262.91	31.95	56.54	4.01	9.74	6.64	12.46	615.63	1128.80
28	205.34	358.00	160.41	275.34	33.69	59.42	4.55	11.11	6.70	12.54	650.96	1187.98
29	215.78	374.63	168.49	287.57	35.43	62.32	5.13	12.56	6.75	12.60	685.96	1246.47
30	226.13	391.06	176.46	299.60	37.16	65.18	5.74	14.09	6.79	12.65	720.55	1304.18
31	235.34	408.51	183.50	312.32	38.72	68.20	6.34	15.69	6.80	12.71	751.44	1364.82
32	243.20	427.23	189.42	325.99	40.07	71.47	6.94	17.38	6.77	12.81	777.94	1429.22
33	250.64	446.14	194.98	339.76	41.36	74.78	7.56	19.11	6.73	12.90	802.97	1494.09
34	257.78	465.14	200.25	353.55	42.62	78.13	8.22	20.88	6.69	12.98	826.87	1559.10
35	264.62	484.21	205.26	367.40	43.83	81.51	8.89	22.68	6.65	13.06	849.66	1624.27
36	271.69	502.51	210.42	380.55	45.09	84.78	9.57	24.51	6.61	13.11	873.14	1686.73
37	279.77	519.08	216.40	392.25	46.52	87.80	10.26	26.35	6.58	13.11	899.87	1743.44
38	288.43	534.69	222.85	403.12	48.05	90.68	10.96	28.20	6.57	13.11	928.40	1796.87
39	296.96	550.13	229.18	413.83	49.57	93.57	11.66	30.06	6.55	13.11	956.48	1849.65
40	305.37	565.40	235.41	424.39	51.07	96.46	12.36	31.94	6.53	13.11	984.10	1901.77
41	313.57	580.38	241.46	434.69	52.54	99.28	13.06	33.80	6.52	13.11	1011.05	1952.86
42	321.64	594.88	247.40	444.60	54.00	102.05	13.75	35.63	6.50	13.10	1037.61	2002.30
43	329.64	608.87	253.28	454.11	55.45	104.77	14.45	37.43	6.47	13.06	1063.98	2050.07
44	337.45	622.47	259.00	463.34	56.89	107.43	15.13	39.18	6.43	13.02	1089.75	2096.60
45	345.03	635.73	264.56	472.32	58.30	110.07	15.80	40.90	6.38	12.95	1114.83	2142.01
46	352.39	648.66	269.94	481.06	59.68	112.68	16.45	42.57	6.33	12.89	1139.22	2186.37
47	359.52	661.26	275.15	489.57	61.03	115.25	17.08	44.17	6.27	12.83	1162.94	2229.70
48	366.44	673.52	280.19	497.86	62.36	117.77	17.69	45.73	6.20	12.75	1186.01	2272.04
49	373.15	685.50	285.08	505.93	63.67	120.28	18.28	47.21	6.14	12.65	1208.44	2313.45
50	379.65	697.17	289.81	513.82	64.95	122.75	18.83	48.63	6.07	12.55	1230.26	2353.94
51	385.95	708.54	294.40	521.52	66.21	125.20	19.36	49.98	5.99	12.46	1251.49	2393.58
52	392.06	719.65	298.85	529.04	67.44	127.62	19.87	51.25	5.92	12.36	1272.14	2432.39
53	397.97	730.50	303.15	536.39	68.65	130.02	20.34	52.46	5.84	12.27	1292.23	2470.44
54	403.70	741.07	307.33	543.59	69.84	132.38	20.79	53.59	5.76	12.17	1311.79	2507.75
55	409.26	751.39	311.38	550.66	71.00	134.72	21.20	54.64	5.68	12.08	1330.85	2544.37
56	414.65	761.49	315.31	557.58	72.15	137.02	21.59	55.63	5.61	11.98	1349.41	2580.34
57	419.87	771.39	319.12	564.37	73.27	139.30	21.96	56.54	5.53	11.87	1367.50	2615.72
58	424.94	781.06	322.83	571.06	74.38	141.58	22.29	57.36	5.45	11.76	1385.15	2650.52
59	429.86	790.54	326.43	577.65	75.46	143.81	22.60	58.14	5.38	11.66	1402.37	2684.79
60	434.71	799.95	329.98	584.19	76.54	146.04	22.90	58.91	5.31	11.57	1419.38	2718.81

2a-4 Post-1989 yield table for Radiata only (including understorey)

Age	Total Mean	Total ±95%CI	AGL Mean	AGL ±95%CI	BGL Mean	BGL ±95%CI	DWL Mean	DWL ±95%CI	FL Mean	FL ±95%CI	Volume_Net Mean	Volume_Net ±95%CI
0	2.75	1.77	2.03	1.38	0.51	0.39	0.20	0.20	0.00	0.00	0.07	0.01
1	3.00	1.77	2.21	1.38	0.58	0.39	0.20	0.20	0.01	0.00	0.43	0.05
2	3.76	1.78	2.77	1.38	0.75	0.40	0.20	0.20	0.04	0.00	1.61	0.21
3	6.30	1.82	4.57	1.41	1.35	0.41	0.21	0.20	0.18	0.02	5.71	0.71
4	11.81	2.02	8.53	1.55	2.46	0.44	0.22	0.20	0.60	0.08	15.53	1.72
5	20.43	2.46	14.71	1.85	3.93	0.50	0.25	0.20	1.55	0.19	32.73	3.23
6	31.71	3.06	22.21	2.23	5.58	0.57	0.60	0.27	3.33	0.38	57.58	5.07
7	44.39	3.68	29.47	2.53	7.07	0.62	1.88	0.61	5.99	0.69	87.28	6.90
8	57.06	4.17	35.67	2.78	8.29	0.66	4.17	0.97	8.94	0.93	116.59	8.28
9	68.72	4.53	40.59	2.95	9.23	0.69	7.27	1.25	11.64	1.04	142.28	9.50
10	79.08	4.80	45.31	3.01	10.17	0.70	10.15	1.48	13.46	1.10	163.20	10.35
11	88.73	4.98	51.81	3.18	11.53	0.73	11.40	1.54	14.00	1.04	184.46	10.69
12	98.56	5.16	60.24	3.45	13.28	0.79	11.28	1.49	13.76	0.94	213.43	11.52
13	109.03	5.36	69.73	3.73	15.22	0.84	10.77	1.40	13.31	0.84	249.71	12.78
14	120.05	5.59	79.64	4.00	17.25	0.90	10.29	1.31	12.88	0.76	289.56	14.08
15	131.24	5.84	89.72	4.27	19.30	0.96	9.79	1.25	12.44	0.69	330.37	15.37
16	142.55	6.08	99.89	4.54	21.37	1.01	9.31	1.19	12.00	0.62	372.32	16.62
17	153.98	6.34	110.11	4.79	23.46	1.07	8.86	1.12	11.56	0.56	415.10	17.87
18	165.43	6.61	120.30	5.04	25.56	1.12	8.45	1.04	11.13	0.51	458.02	19.12
19	176.81	6.90	130.30	5.27	27.63	1.18	8.14	0.99	10.74	0.47	500.37	20.35
20	188.03	7.18	140.12	5.51	29.69	1.24	7.85	0.95	10.36	0.44	541.75	21.58
21	199.06	7.47	149.71	5.75	31.73	1.29	7.63	0.89	9.99	0.41	582.72	22.80
22	210.01	7.75	159.16	5.99	33.76	1.35	7.44	0.82	9.65	0.37	623.23	23.98
23	220.99	8.01	168.57	6.22	35.80	1.40	7.29	0.75	9.33	0.34	663.59	25.13
24	231.99	8.27	177.95	6.44	37.84	1.46	7.15	0.70	9.05	0.32	703.85	26.21
25	243.07	8.51	187.21	6.65	39.87	1.52	7.16	0.74	8.84	0.32	744.29	27.20
26	254.22	8.75	196.43	6.85	41.91	1.58	7.25	0.78	8.65	0.31	784.15	28.20
27	265.34	8.97	205.65	7.03	43.96	1.62	7.28	0.75	8.46	0.29	823.59	29.17
28	276.44	9.17	214.79	7.16	46.01	1.66	7.36	0.73	8.29	0.27	863.19	29.94
29	287.46	9.35	223.80	7.28	48.04	1.70	7.49	0.73	8.14	0.26	902.28	30.60
30	298.32	9.52	232.62	7.39	50.05	1.74	7.67	0.75	7.99	0.25	940.63	31.22
31	308.98	9.67	241.23	7.50	52.02	1.77	7.89	0.76	7.86	0.24	978.17	31.81
32	319.44	9.82	249.62	7.60	53.97	1.80	8.13	0.79	7.73	0.24	1014.88	32.37
33	329.69	9.95	257.80	7.69	55.88	1.83	8.41	0.83	7.60	0.23	1050.76	32.91
34	339.73	10.08	265.78	7.78	57.77	1.86	8.72	0.87	7.47	0.22	1085.81	33.43
35	349.57	10.21	273.56	7.86	59.62	1.89	9.04	0.91	7.35	0.22	1120.07	33.93
36	359.22	10.32	281.16	7.94	61.45	1.92	9.38	0.95	7.23	0.22	1153.58	34.41
37	368.70	10.43	288.59	8.02	63.26	1.94	9.73	0.97	7.12	0.22	1186.39	34.89
38	378.01	10.55	295.87	8.11	65.04	1.97	10.09	1.00	7.01	0.22	1218.55	35.36
39	387.19	10.65	303.02	8.19	66.81	2.00	10.46	1.04	6.90	0.21	1250.15	35.83
40	396.24	10.76	310.05	8.27	68.57	2.03	10.83	1.07	6.80	0.20	1281.22	36.30
41	405.14	10.87	316.95	8.34	70.29	2.06	11.20	1.10	6.71	0.20	1311.72	36.78
42	413.84	10.97	323.67	8.42	71.98	2.08	11.58	1.13	6.63	0.20	1341.55	37.25
43	422.33	11.08	330.21	8.50	73.64	2.10	11.94	1.15	6.54	0.20	1370.66	37.72
44	430.59	11.19	336.57	8.59	75.27	2.13	12.31	1.17	6.46	0.20	1399.03	38.19
45	438.65	11.29	342.75	8.67	76.86	2.15	12.67	1.19	6.38	0.20	1426.69	38.66
46	446.50	11.39	348.77	8.75	78.43	2.17	13.02	1.21	6.29	0.20	1453.66	39.12
47	454.15	11.49	354.64	8.83	79.98	2.20	13.36	1.22	6.19	0.20	1479.98	39.59
48	461.63	11.58	360.35	8.92	81.49	2.23	13.69	1.23	6.10	0.20	1505.68	40.06
49	468.93	11.69	365.93	9.01	82.98	2.25	14.01	1.24	6.01	0.19	1530.79	40.54
50	476.06	11.80	371.38	9.09	84.45	2.27	14.32	1.25	5.92	0.18	1555.34	41.01
51	483.05	11.90	376.71	9.18	85.90	2.30	14.62	1.26	5.83	0.18	1579.36	41.49
52	489.89	12.00	381.92	9.27	87.32	2.33	14.90	1.26	5.75	0.18	1602.86	41.97
53	496.59	12.11	387.02	9.36	88.73	2.35	15.18	1.26	5.66	0.18	1625.89	42.46
54	503.16	12.22	392.02	9.44	90.11	2.37	15.44	1.26	5.58	0.18	1648.47	42.94
55	509.61	12.32	396.92	9.54	91.48	2.40	15.70	1.26	5.51	0.18	1670.61	43.42
56	515.94	12.43	401.74	9.64	92.83	2.42	15.94	1.26	5.44	0.18	1692.35	43.91
57	522.16	12.55	406.47	9.74	94.16	2.44	16.17	1.26	5.37	0.18	1713.71	44.42
58	528.29	12.67	411.13	9.82	95.48	2.46	16.39	1.26	5.30	0.17	1734.71	44.92
59	534.32	12.77	415.71	9.92	96.78	2.49	16.60	1.26	5.23	0.16	1755.37	45.41
60	540.31	12.87	420.26	10.04	98.08	2.53	16.81	1.26	5.17	0.16	1775.87	45.90

2a-5 Post-1989 yield table for other softwoods (including understorey)

Age	Total Mean	±95%CI	AGL Mean	±95%CI	BGL Mean	±95%CI	DWL Mean	±95%CI	FL Mean	±95%CI	Volume_Net Mean	±95%CI
0	4.04	11.95	3.23	9.52	0.81	2.43	0.00	0.00	0.00	0.00	0.03	0.01
1	4.24	11.95	3.38	9.52	0.87	2.43	0.00	0.00	0.00	0.00	0.16	0.05
2	4.82	11.96	3.85	9.52	1.00	2.43	0.00	0.00	-0.01	0.01	0.58	0.17
3	6.00	11.97	4.81	9.53	1.22	2.43	0.00	0.00	-0.03	0.03	1.57	0.54
4	7.82	12.02	6.30	9.58	1.53	2.45	0.00	0.00	-0.01	0.06	3.41	1.37
5	10.26	12.17	8.24	9.69	1.90	2.47	0.00	0.00	0.12	0.12	6.42	2.79
6	13.16	12.46	10.43	9.89	2.32	2.50	0.02	0.02	0.40	0.27	10.70	4.66
7	16.36	12.82	12.77	10.12	2.78	2.54	0.03	0.04	0.78	0.49	16.21	6.63
8	19.81	13.20	15.28	10.35	3.31	2.58	0.04	0.05	1.18	0.67	23.03	8.49
9	23.59	13.55	18.07	10.57	3.90	2.61	0.07	0.10	1.56	0.79	31.32	10.25
10	28.24	13.93	21.53	10.81	4.71	2.67	0.12	0.19	1.88	0.85	41.98	12.08
11	33.62	14.31	25.70	11.10	5.59	2.72	0.20	0.31	2.13	0.86	54.96	14.00
12	39.76	14.76	30.43	11.43	6.57	2.78	0.38	0.49	2.38	0.85	70.39	16.30
13	46.85	15.42	35.84	11.91	7.70	2.87	0.60	0.61	2.71	0.86	88.44	19.37
14	54.56	16.22	41.68	12.49	8.86	2.97	0.94	0.80	3.10	0.91	108.47	22.88
15	62.69	17.03	47.74	13.09	10.07	3.08	1.38	1.09	3.51	0.97	129.14	26.12
16	71.00	17.83	53.82	13.76	11.28	3.20	1.95	1.36	3.97	1.01	150.37	29.27
17	79.60	18.67	60.08	14.47	12.52	3.34	2.59	1.53	4.42	1.02	172.65	32.80
18	88.66	19.63	66.83	15.24	13.88	3.49	3.16	1.64	4.80	1.03	196.12	36.75
19	97.95	20.65	73.39	15.97	15.20	3.63	4.14	2.13	5.24	1.12	220.45	40.55
20	107.23	21.68	80.20	16.75	16.57	3.78	4.90	2.56	5.57	1.20	243.49	43.89
21	116.70	22.77	87.79	17.68	18.10	3.96	5.07	2.61	5.73	1.19	268.00	47.63
22	127.21	23.68	96.32	18.43	19.84	4.12	5.14	2.51	5.91	1.14	297.83	51.06
23	138.90	24.44	105.69	19.05	21.76	4.25	5.29	2.29	6.16	1.09	331.08	53.93
24	151.14	25.36	115.46	19.77	23.75	4.40	5.50	2.11	6.43	1.08	365.69	57.30
25	163.87	26.53	125.67	20.60	25.84	4.59	5.66	1.97	6.70	1.12	401.85	61.24
26	176.87	28.03	136.04	21.67	27.99	4.81	5.87	1.86	6.98	1.21	439.35	66.08
27	189.35	29.59	146.00	22.80	30.06	5.05	6.10	1.80	7.19	1.27	475.75	71.10
28	201.09	30.98	155.39	23.83	32.03	5.27	6.35	1.78	7.33	1.28	510.37	75.60
29	212.72	32.35	164.63	24.83	33.99	5.50	6.66	1.80	7.46	1.29	544.81	80.03
30	224.28	33.72	173.75	25.86	35.94	5.73	7.02	1.87	7.58	1.30	579.19	84.51
31	235.73	35.10	182.75	26.89	37.88	5.96	7.42	1.99	7.68	1.31	613.44	89.03
32	247.04	36.48	191.60	27.91	39.80	6.19	7.86	2.12	7.78	1.32	647.48	93.57
33	258.19	37.85	200.28	28.94	41.72	6.42	8.34	2.27	7.86	1.33	681.26	98.13
34	269.17	39.22	208.80	29.96	43.61	6.67	8.84	2.43	7.93	1.35	714.73	102.71
35	279.97	40.59	217.14	30.99	45.48	6.91	9.37	2.59	7.98	1.36	747.82	107.31
36	290.56	41.96	225.29	32.01	47.33	7.14	9.92	2.76	8.02	1.37	780.52	111.93
37	300.95	43.32	233.26	33.03	49.16	7.38	10.49	2.92	8.04	1.38	812.78	116.56
38	311.13	44.68	241.05	34.05	50.97	7.62	11.07	3.08	8.05	1.39	844.60	121.21
39	321.09	46.01	248.64	35.07	52.75	7.86	11.66	3.24	8.05	1.40	875.96	125.88
40	330.84	47.36	256.05	36.09	54.50	8.10	12.26	3.40	8.04	1.41	906.83	130.56
41	340.35	48.69	263.25	37.11	56.22	8.35	12.86	3.56	8.02	1.42	937.15	135.23
42	349.59	50.00	270.23	38.11	57.91	8.59	13.46	3.70	8.00	1.42	966.88	139.87
43	358.59	51.29	277.01	39.09	59.57	8.83	14.05	3.84	7.96	1.42	996.00	144.47
44	367.32	52.56	283.57	40.06	61.20	9.07	14.65	3.98	7.91	1.42	1024.50	149.03
45	375.80	53.81	289.93	41.03	62.79	9.30	15.23	4.11	7.85	1.42	1052.38	153.54
46	384.03	55.04	296.08	41.97	64.35	9.53	15.81	4.23	7.79	1.42	1079.63	158.00
47	392.00	56.24	302.04	42.90	65.88	9.76	16.38	4.35	7.72	1.42	1106.26	162.40
48	399.73	57.41	307.79	43.81	67.37	9.99	16.94	4.45	7.64	1.41	1132.25	166.74
49	407.21	58.56	313.35	44.70	68.84	10.21	17.48	4.55	7.55	1.40	1157.62	170.99
50	414.48	59.69	318.74	45.58	70.28	10.43	18.01	4.65	7.46	1.39	1182.41	175.17
51	421.58	60.79	324.00	46.44	71.70	10.65	18.52	4.74	7.36	1.37	1206.77	179.30
52	428.55	61.87	329.17	47.29	73.11	10.86	19.02	4.82	7.26	1.35	1230.74	183.36
53	435.38	62.93	334.22	48.11	74.49	11.07	19.50	4.90	7.16	1.34	1254.33	187.35
54	442.06	63.97	339.17	48.92	75.86	11.28	19.97	4.98	7.06	1.33	1277.54	191.26
55	448.60	64.98	344.00	49.71	77.21	11.49	20.42	5.06	6.97	1.31	1300.37	195.10
56	454.99	65.98	348.72	50.49	78.54	11.68	20.86	5.12	6.88	1.29	1322.80	198.87
57	461.24	66.94	353.33	51.24	79.85	11.88	21.28	5.18	6.79	1.26	1344.86	202.55
58	467.35	67.87	357.82	51.98	81.14	12.08	21.69	5.24	6.70	1.23	1366.53	206.14
59	473.32	68.79	362.21	52.69	82.41	12.28	22.08	5.30	6.62	1.21	1387.81	209.67
60	479.21	69.69	366.55	53.39	83.67	12.48	22.46	5.36	6.53	1.19	1408.91	213.16

2a-6 Post-1989 yield table for hardwoods (including understorey)

	Total		AGL		BGL		DWL		FL		Volume_Net	
Age	Mean	±95%CI	Mean	±95%CI	Mean	±95%CI	Mean	±95%CI	Mean	±95%CI	Mean	±95%CI
0	0.92	2.71	0.72	2.29	0.21	0.63	0.00	0.00	0.00	0.00	0.05	0.02
1	1.03	2.71	0.79	2.29	0.24	0.63	0.00	0.00	0.00	0.00	0.30	0.15
2	1.37	2.72	1.05	2.30	0.32	0.63	0.00	0.00	0.01	0.00	1.16	0.67
3	2.45	2.85	1.85	2.38	0.57	0.66	0.00	0.01	0.03	0.01	3.96	2.32
4	4.81	3.43	3.64	2.79	1.04	0.77	0.01	0.02	0.11	0.06	10.47	5.91
5	8.64	4.82	6.59	3.81	1.72	0.99	0.02	0.03	0.30	0.18	21.72	11.79
6	13.90	6.93	10.63	5.38	2.60	1.29	0.04	0.07	0.64	0.35	37.87	19.55
7	20.34	9.40	15.55	7.26	3.62	1.64	0.08	0.14	1.10	0.55	58.32	28.43
8	27.63	12.00	21.14	9.25	4.77	2.02	0.14	0.22	1.59	0.73	82.11	37.79
9	35.12	14.36	26.96	11.05	5.96	2.38	0.22	0.34	2.00	0.86	107.06	46.40
10	42.44	16.32	32.68	12.57	7.12	2.68	0.34	0.42	2.31	0.92	131.70	53.81
11	49.91	18.14	38.55	14.02	8.34	2.98	0.49	0.44	2.53	0.94	156.97	60.82
12	57.63	19.97	44.71	15.48	9.61	3.28	0.63	0.48	2.68	0.94	183.33	67.89
13	65.57	21.81	51.09	16.97	10.92	3.60	0.79	0.53	2.78	0.92	210.56	75.02
14	73.67	23.65	57.58	18.43	12.26	3.92	1.00	0.63	2.83	0.89	238.12	81.97
15	81.85	25.54	64.11	19.90	13.61	4.25	1.28	0.75	2.86	0.87	265.82	88.84
16	90.17	27.48	70.70	21.42	14.98	4.60	1.61	0.90	2.89	0.86	293.93	95.86
17	98.83	29.48	77.49	23.00	16.40	4.95	2.01	1.06	2.93	0.87	322.87	103.21
18	107.82	31.56	84.54	24.63	17.89	5.31	2.43	1.24	2.96	0.88	352.79	110.84
19	116.50	33.62	91.32	26.22	19.34	5.69	2.89	1.43	2.95	0.88	381.74	118.19
20	124.90	35.63	97.83	27.74	20.76	6.05	3.39	1.62	2.93	0.87	409.50	125.25
21	133.42	37.59	104.47	29.24	22.21	6.40	3.85	1.78	2.90	0.84	437.67	132.14
22	141.96	39.62	111.13	30.78	23.67	6.78	4.30	1.94	2.86	0.81	465.91	139.12
23	150.56	41.71	117.83	32.34	25.15	7.15	4.76	2.12	2.82	0.78	494.13	146.23
24	159.44	43.83	124.67	33.88	26.69	7.53	5.31	2.32	2.78	0.76	522.74	153.30
25	168.39	45.98	131.40	35.42	28.22	7.91	6.02	2.54	2.75	0.74	550.92	160.39
26	177.25	48.10	138.03	36.90	29.74	8.28	6.76	2.81	2.72	0.72	578.60	167.23
27	186.21	50.12	144.74	38.28	31.29	8.65	7.48	3.10	2.71	0.70	606.53	173.65
28	195.23	52.04	151.46	39.60	32.86	9.00	8.23	3.41	2.70	0.68	634.49	179.73
29	204.19	53.92	158.12	40.87	34.42	9.35	8.98	3.74	2.69	0.67	662.13	185.67
30	213.07	55.77	164.69	42.09	35.97	9.69	9.75	4.10	2.68	0.66	689.37	191.48
31	221.89	57.59	171.13	43.29	37.51	10.03	10.58	4.43	2.68	0.65	716.13	197.14
32	230.60	59.38	177.45	44.46	39.05	10.37	11.45	4.76	2.67	0.64	742.37	202.66
33	239.17	61.13	183.63	45.59	40.58	10.70	12.32	5.09	2.66	0.63	768.09	208.03
34	247.59	62.84	189.69	46.70	42.09	11.03	13.18	5.41	2.65	0.63	793.29	213.27
35	255.86	64.51	195.62	47.77	43.59	11.35	14.03	5.74	2.63	0.62	817.98	218.38
36	263.98	66.15	201.43	48.82	45.07	11.68	14.87	6.06	2.62	0.60	842.17	223.38
37	271.95	67.74	207.12	49.86	46.54	12.00	15.69	6.36	2.60	0.60	865.89	228.26
38	279.78	69.32	212.71	50.86	48.00	12.31	16.49	6.65	2.59	0.59	889.19	233.04
39	287.48	70.86	218.19	51.83	49.45	12.64	17.26	6.94	2.57	0.58	912.08	237.75
40	295.05	72.37	223.59	52.80	50.89	12.96	18.01	7.21	2.55	0.58	934.58	242.36
41	302.43	73.84	228.86	53.74	52.30	13.26	18.74	7.47	2.54	0.58	956.55	246.86
42	309.60	75.27	233.97	54.66	53.68	13.56	19.43	7.72	2.52	0.57	977.91	251.26
43	316.58	76.67	238.93	55.55	55.05	13.86	20.10	7.96	2.50	0.56	998.69	255.56
44	323.35	78.02	243.75	56.42	56.39	14.17	20.73	8.18	2.48	0.56	1018.92	259.75
45	329.93	79.34	248.44	57.27	57.72	14.47	21.32	8.38	2.46	0.55	1038.62	263.86
46	336.32	80.64	253.00	58.12	59.01	14.76	21.88	8.56	2.43	0.54	1057.80	267.89
47	342.53	81.90	257.44	58.93	60.29	15.05	22.41	8.74	2.40	0.54	1076.49	271.83
48	348.57	83.13	261.75	59.73	61.55	15.33	22.90	8.90	2.37	0.53	1094.71	275.71
49	354.44	84.33	265.96	60.53	62.79	15.62	23.35	9.03	2.34	0.52	1112.48	279.53
50	360.14	85.50	270.06	61.31	64.01	15.90	23.77	9.16	2.31	0.52	1129.82	283.28
51	365.69	86.66	274.06	62.08	65.21	16.18	24.16	9.28	2.28	0.51	1146.76	286.99
52	371.10	87.80	277.96	62.84	66.40	16.46	24.51	9.40	2.25	0.50	1163.32	290.65
53	376.37	88.91	281.77	63.60	67.56	16.73	24.83	9.49	2.21	0.50	1179.51	294.27
54	381.51	90.02	285.50	64.34	68.72	17.01	25.12	9.57	2.18	0.49	1195.37	297.84
55	386.52	91.10	289.15	65.07	69.86	17.29	25.38	9.65	2.15	0.48	1210.91	301.39
56	391.42	92.17	292.72	65.81	70.98	17.56	25.61	9.71	2.12	0.48	1226.15	304.91
57	396.21	93.23	296.22	66.55	72.09	17.84	25.82	9.76	2.09	0.47	1241.12	308.40
58	400.90	94.28	299.66	67.28	73.18	18.11	26.01	9.81	2.06	0.46	1255.83	311.88
59	405.50	95.33	303.04	68.00	74.26	18.38	26.16	9.86	2.03	0.46	1270.31	315.36
60	410.05	96.37	306.40	68.71	75.34	18.65	26.30	9.88	2.00	0.46	1284.68	318.82

Objective 2b. Pre-1990 yield tables by cohort

2b-1 Pre-1990 yield table for period before 1990 (all species including understorey)

Age	Total Mean	Total ±95%CI	AGL Mean	AGL ±95%CI	BGL Mean	BGL ±95%CI	DWL Mean	DWL ±95%CI	FL Mean	FL ±95%CI	Volume_Net Mean	Volume_Net ±95%CI
0	3.14	4.19	2.43	3.19	0.61	0.80	0.10	0.20	0.00	0.00	0.04	0.01
1	3.34	4.19	2.57	3.19	0.67	0.80	0.10	0.20	0.01	0.00	0.30	0.07
2	3.92	4.19	3.00	3.19	0.80	0.80	0.10	0.20	0.03	0.01	1.13	0.27
3	5.76	4.24	4.30	3.22	1.22	0.81	0.10	0.20	0.14	0.05	3.90	0.99
4	9.72	4.46	7.13	3.38	2.02	0.86	0.11	0.20	0.46	0.12	10.58	2.64
5	15.96	5.08	11.43	3.82	3.07	0.96	0.20	0.22	1.27	0.30	22.41	5.33
6	24.21	6.15	16.81	4.55	4.30	1.12	0.47	0.37	2.65	0.62	39.60	8.96
7	33.64	7.47	22.14	5.27	5.42	1.25	1.48	1.00	4.60	1.22	60.78	13.22
8	43.22	8.65	26.70	5.65	6.37	1.32	3.27	1.76	6.89	1.83	81.70	16.57
9	52.35	9.53	32.38	6.17	7.57	1.42	4.17	1.91	8.25	1.93	100.40	18.37
10	61.56	10.32	39.28	6.88	9.00	1.56	4.46	1.86	8.83	1.80	123.78	20.93
11	71.16	11.13	45.33	7.54	10.24	1.70	5.93	2.24	9.66	1.84	151.81	24.23
12	80.63	11.87	52.09	8.26	11.62	1.84	6.88	2.42	10.04	1.79	176.50	27.14
13	90.13	12.59	60.38	9.02	13.32	1.99	6.61	2.13	9.83	1.58	203.67	30.27
14	100.08	13.34	68.60	9.85	15.00	2.17	6.76	2.00	9.73	1.42	236.68	33.63
15	110.26	14.10	76.73	10.61	16.66	2.33	7.18	2.00	9.69	1.32	269.16	37.21
16	120.49	14.83	83.95	10.87	18.11	2.39	8.62	3.85	9.81	1.56	301.09	40.54
17	130.50	15.32	91.61	11.08	19.66	2.43	9.49	5.27	9.75	1.69	329.61	41.80
18	140.02	15.62	100.11	11.64	21.41	2.55	9.02	4.50	9.49	1.49	359.73	42.88
19	149.64	16.00	108.56	12.17	23.15	2.67	8.67	3.87	9.26	1.34	393.44	45.60
20	159.68	16.43	117.58	12.65	25.03	2.79	8.17	3.34	8.91	1.16	427.01	48.21
21	169.86	16.89	126.46	13.15	26.89	2.91	7.89	2.93	8.64	1.02	462.47	50.53
22	180.13	17.38	135.32	13.63	28.77	3.03	7.67	2.61	8.39	0.91	497.47	52.94
23	190.47	17.88	144.24	14.08	30.68	3.13	7.43	2.34	8.14	0.82	532.39	55.35
24	200.83	18.39	152.94	14.52	32.55	3.25	7.39	2.15	7.96	0.75	567.49	57.57
25	211.01	18.90	161.34	14.94	34.37	3.37	7.48	2.06	7.83	0.70	601.11	59.76
26	220.93	19.42	169.52	15.39	36.15	3.48	7.57	2.04	7.70	0.66	633.55	62.02
27	230.65	19.97	177.59	15.87	37.90	3.60	7.58	2.01	7.58	0.63	666.12	64.36
28	240.23	20.56	185.24	16.42	39.56	3.74	7.90	2.14	7.54	0.62	698.48	66.83
29	249.71	21.13	192.82	16.95	41.23	3.86	8.17	2.24	7.50	0.61	729.39	69.39
30	259.24	21.66	200.89	17.38	43.00	3.97	7.99	2.05	7.38	0.58	760.69	71.66
31	268.86	22.21	209.01	17.78	44.81	4.08	7.80	1.83	7.25	0.55	793.54	73.66
32	277.84	22.55	216.47	17.96	46.45	4.13	7.75	1.69	7.17	0.55	824.84	75.22
33	286.09	22.67	223.25	17.96	47.95	4.13	7.78	1.65	7.12	0.58	852.62	75.79
34	294.23	22.85	229.94	18.10	49.46	4.16	7.80	1.65	7.05	0.61	879.15	76.54
35	302.17	23.24	236.46	18.47	50.93	4.24	7.82	1.64	6.97	0.63	906.00	78.36
36	309.89	23.85	242.78	19.03	52.38	4.38	7.87	1.62	6.87	0.63	932.11	80.89
37	317.80	24.54	249.25	19.62	53.87	4.53	7.92	1.57	6.77	0.61	958.81	83.51
38	326.22	25.11	256.16	20.02	55.47	4.64	7.96	1.49	6.65	0.58	987.17	85.40
39	334.87	25.57	263.21	20.30	57.12	4.72	8.02	1.43	6.54	0.55	1016.13	86.83
40	343.46	26.01	270.17	20.56	58.76	4.80	8.12	1.41	6.43	0.53	1044.69	88.24
41	351.94	26.44	277.00	20.83	60.37	4.88	8.25	1.42	6.34	0.51	1072.75	89.65
42	360.25	26.85	283.66	21.09	61.95	4.95	8.41	1.45	6.25	0.50	1100.26	91.02
43	368.36	27.26	290.12	21.35	63.49	5.03	8.59	1.50	6.16	0.50	1127.04	92.38
44	376.24	27.67	296.37	21.62	65.00	5.11	8.80	1.55	6.08	0.49	1153.02	93.78
45	383.92	28.08	302.44	21.88	66.49	5.20	9.01	1.60	5.99	0.48	1178.35	95.17
46	391.44	28.47	308.36	22.15	67.94	5.29	9.24	1.65	5.90	0.48	1203.08	96.57
47	398.83	28.85	314.17	22.41	69.38	5.35	9.48	1.70	5.81	0.48	1227.41	97.91
48	406.11	29.19	319.87	22.64	70.81	5.42	9.71	1.75	5.72	0.47	1251.36	99.17
49	413.23	29.54	325.44	22.89	72.21	5.50	9.96	1.79	5.64	0.46	1274.78	100.42
50	420.20	29.88	330.88	23.14	73.59	5.57	10.20	1.83	5.55	0.46	1297.68	101.66
51	427.03	30.22	336.19	23.37	74.95	5.64	10.44	1.87	5.47	0.46	1320.11	102.89
52	433.73	30.55	341.39	23.61	76.28	5.72	10.68	1.91	5.38	0.45	1342.07	104.12
53	440.30	30.88	346.48	23.85	77.60	5.79	10.92	1.93	5.30	0.44	1363.60	105.34
54	446.75	31.21	351.46	24.09	78.90	5.86	11.16	1.96	5.23	0.44	1384.70	106.55
55	453.08	31.54	356.35	24.32	80.18	5.94	11.40	1.99	5.16	0.44	1405.41	107.77
56	459.29	31.87	361.14	24.56	81.45	6.01	11.63	2.01	5.09	0.43	1425.73	108.98
57	465.40	32.19	365.84	24.81	82.70	6.08	11.85	2.04	5.02	0.42	1445.68	110.17
58	471.40	32.52	370.46	25.05	83.93	6.15	12.07	2.07	4.95	0.42	1465.27	111.37
59	477.30	32.85	374.99	25.29	85.15	6.22	12.28	2.08	4.88	0.42	1484.53	112.57
60	483.15	33.18	379.49	25.53	86.36	6.28	12.49	2.08	4.82	0.42	1503.63	113.76

2b-2 Pre-1990 yield table for the period from 1990 onwards (all species includes understorey).

	Total		AGL		BGL		DWL		FL		Volume_Net	
Age	Mean	±95%CI	Mean	±95%CI	Mean	±95%CI	Mean	±95%CI	Mean	±95%CI	Mean	±95%CI
0	3.44	2.36	2.63	0.20	0.61	0.39	0.20	0.20	0.00	0.00	0.06	0.00
1	3.66	2.36	2.79	0.20	0.67	0.39	0.20	0.20	0.01	0.00	0.35	0.03
2	4.28	2.37	3.24	0.21	0.81	0.40	0.20	0.20	0.04	0.00	1.24	0.15
3	6.26	2.39	4.65	0.31	1.27	0.40	0.21	0.20	0.15	0.02	4.23	0.51
4	10.61	2.48	7.77	0.59	2.15	0.42	0.22	0.20	0.47	0.07	11.53	1.27
5	17.52	2.72	12.68	0.99	3.33	0.46	0.27	0.20	1.24	0.16	24.54	2.44
6	26.79	3.12	19.06	1.45	4.75	0.52	0.45	0.23	2.53	0.29	43.75	3.94
7	37.78	3.59	26.37	1.91	6.30	0.59	0.86	0.34	4.25	0.44	68.28	5.58
8	49.67	4.07	33.93	2.29	7.86	0.64	1.68	0.55	6.21	0.62	96.43	7.22
9	61.79	4.50	41.67	2.64	9.43	0.69	2.70	0.73	7.99	0.72	125.89	8.70
10	73.75	4.88	50.14	3.01	11.16	0.75	3.26	0.75	9.18	0.72	155.96	10.10
11	85.65	5.22	59.04	3.37	12.96	0.81	3.72	0.77	9.93	0.70	189.50	11.58
12	97.58	5.55	68.12	3.72	14.81	0.88	4.24	0.83	10.42	0.68	224.98	13.07
13	109.54	5.87	77.68	4.04	16.76	0.95	4.50	0.85	10.62	0.65	261.06	14.52
14	121.70	6.16	87.36	4.30	18.73	1.01	4.90	1.05	10.72	0.66	299.59	15.90
15	134.01	6.44	97.43	4.52	20.81	1.05	5.11	1.20	10.67	0.65	338.59	16.95
16	146.42	6.69	108.00	4.75	23.00	1.11	4.97	1.09	10.46	0.58	378.69	17.89
17	158.95	6.93	118.61	4.98	25.21	1.16	4.91	0.99	10.24	0.53	420.62	18.96
18	171.51	7.16	129.10	5.18	27.41	1.21	4.97	0.89	10.04	0.49	462.55	19.98
19	183.97	7.39	139.45	5.38	29.60	1.26	5.11	0.81	9.83	0.45	503.86	21.02
20	196.38	7.63	149.71	5.57	31.80	1.31	5.26	0.75	9.62	0.42	544.74	22.01
21	208.77	7.88	159.78	5.76	34.00	1.36	5.55	0.72	9.44	0.40	585.58	22.94
22	221.16	8.12	169.75	5.94	36.20	1.41	5.94	0.72	9.28	0.38	625.70	23.92
23	233.55	8.37	179.43	6.12	38.36	1.46	6.60	0.97	9.17	0.40	665.39	24.97
24	245.80	8.61	188.94	6.31	40.50	1.52	7.30	1.19	9.08	0.42	703.79	25.87
25	257.93	8.85	198.59	6.49	42.69	1.57	7.73	1.12	8.93	0.40	741.72	26.69
26	270.05	9.08	208.18	6.65	44.88	1.61	8.20	1.05	8.80	0.38	780.59	27.52
27	282.11	9.30	217.65	6.79	47.06	1.65	8.71	1.00	8.69	0.36	819.02	28.29
28	294.04	9.51	226.96	6.93	49.23	1.70	9.27	0.98	8.59	0.34	856.79	29.03
29	305.83	9.71	236.09	7.06	51.38	1.74	9.86	0.97	8.50	0.33	893.90	29.76
30	317.44	9.90	245.04	7.19	53.51	1.78	10.48	0.97	8.41	0.32	930.30	30.46
31	328.81	10.09	253.75	7.31	55.60	1.82	11.14	0.99	8.32	0.32	965.90	31.15
32	339.96	10.28	262.25	7.43	57.67	1.85	11.81	1.01	8.24	0.31	1000.71	31.82
33	350.87	10.46	270.53	7.54	59.71	1.89	12.50	1.04	8.15	0.30	1034.71	32.48
34	361.56	10.64	278.60	7.65	61.72	1.93	13.19	1.08	8.06	0.30	1067.92	33.13
35	372.02	10.81	286.47	7.76	63.70	1.97	13.89	1.12	7.97	0.30	1100.37	33.77
36	382.26	10.97	294.14	7.87	65.65	2.00	14.59	1.16	7.88	0.29	1132.09	34.41
37	392.29	11.13	301.64	7.97	67.58	2.03	15.29	1.20	7.79	0.28	1163.11	35.04
38	402.14	11.29	308.97	8.08	69.49	2.07	15.98	1.24	7.70	0.28	1193.48	35.67
39	411.81	11.45	316.16	8.19	71.38	2.11	16.66	1.28	7.61	0.28	1223.28	36.30
40	421.32	11.61	323.21	8.30	73.26	2.14	17.32	1.31	7.53	0.28	1252.52	36.93
41	430.61	11.76	330.09	8.40	75.09	2.17	17.98	1.35	7.46	0.28	1281.08	37.56
42	439.63	11.91	336.75	8.50	76.89	2.20	18.61	1.38	7.38	0.28	1308.87	38.20
43	448.39	12.05	343.21	8.61	78.65	2.24	19.23	1.41	7.30	0.28	1335.91	38.84
44	456.90	12.21	349.48	8.72	80.38	2.27	19.82	1.44	7.22	0.28	1362.24	39.47
45	465.17	12.35	355.56	8.82	82.09	2.30	20.39	1.47	7.14	0.27	1387.87	40.10
46	473.21	12.49	361.48	8.93	83.76	2.34	20.94	1.50	7.05	0.26	1412.84	40.73
47	481.03	12.62	367.22	9.03	85.40	2.37	21.46	1.52	6.96	0.26	1437.18	41.37
48	488.64	12.77	372.81	9.13	87.01	2.40	21.95	1.54	6.86	0.26	1460.92	41.99
49	496.05	12.91	378.26	9.24	88.60	2.44	22.42	1.56	6.77	0.26	1484.08	42.61
50	503.28	13.05	383.58	9.35	90.17	2.46	22.87	1.57	6.68	0.26	1506.71	43.24
51	510.34	13.18	388.77	9.46	91.71	2.49	23.28	1.58	6.59	0.26	1528.83	43.86
52	517.23	13.31	393.84	9.57	93.23	2.53	23.67	1.59	6.50	0.26	1550.48	44.48
53	523.96	13.44	398.79	9.66	94.73	2.56	24.04	1.60	6.41	0.25	1571.68	45.10
54	530.56	13.57	403.65	9.77	96.21	2.59	24.38	1.61	6.33	0.24	1592.46	45.72
55	537.02	13.71	408.41	9.88	97.67	2.62	24.69	1.61	6.25	0.24	1612.84	46.34
56	543.35	13.84	413.09	9.99	99.11	2.65	24.99	1.62	6.17	0.24	1632.87	46.96
57	549.57	13.98	417.68	10.10	100.53	2.69	25.26	1.63	6.10	0.24	1652.55	47.58
58	555.68	14.12	422.20	10.21	101.95	2.72	25.51	1.63	6.03	0.24	1671.91	48.19
59	561.69	14.25	426.65	10.31	103.35	2.75	25.75	1.63	5.96	0.24	1690.98	48.80
60	567.65	14.39	431.07	10.41	104.74	2.79	25.98	1.63	5.89	0.24	1709.91	49.41

2b-3 Pre-1990 yield table for the period 1990-2009 (all species including understorey)

	Total		AGL		BGL		DWL		FL		Volume_Net	
Age	Mean	±95%CI	Mean	±95%CI	Mean	±95%CI	Mean	±95%CI	Mean	±95%CI	Mean	±95%CI
0	3.53	2.96	2.73	2.37	0.71	0.59	0.20	0.20	0.00	0.00	0.05	0.00
1	3.72	2.96	2.86	2.37	0.76	0.59	0.20	0.20	0.01	0.00	0.29	0.03
2	4.26	2.96	3.25	2.37	0.88	0.59	0.20	0.20	0.04	0.00	1.06	0.15
3	5.97	2.98	4.45	2.38	1.28	0.60	0.20	0.20	0.15	0.02	3.62	0.52
4	9.75	3.07	7.14	2.44	2.04	0.62	0.21	0.20	0.46	0.07	9.95	1.34
5	15.84	3.29	11.39	2.58	3.09	0.65	0.27	0.20	1.19	0.19	21.35	2.64
6	24.11	3.69	16.98	2.82	4.36	0.70	0.47	0.25	2.40	0.35	38.36	4.29
7	34.07	4.22	23.53	3.13	5.77	0.76	0.89	0.41	3.98	0.52	60.40	6.16
8	44.97	4.76	30.24	3.43	7.16	0.81	1.82	0.70	5.87	0.76	85.84	8.05
9	56.02	5.25	36.86	3.70	8.52	0.86	3.09	0.93	7.66	0.91	111.80	9.66
10	66.72	5.68	44.07	4.00	10.00	0.91	3.92	0.99	8.84	0.92	137.11	11.08
11	77.27	6.08	51.68	4.30	11.53	0.97	4.60	1.04	9.56	0.90	165.59	12.61
12	87.80	6.45	59.46	4.63	13.09	1.03	5.31	1.14	10.04	0.89	195.99	14.21
13	98.39	6.82	67.91	4.97	14.80	1.11	5.59	1.18	10.20	0.86	227.11	15.85
14	109.34	7.17	76.63	5.23	16.55	1.16	5.97	1.43	10.29	0.88	261.73	17.56
15	120.57	7.51	85.93	5.47	18.43	1.20	6.08	1.63	10.23	0.88	297.12	18.75
16	131.98	7.81	95.96	5.79	20.48	1.27	5.67	1.46	9.98	0.79	334.10	19.83
17	143.65	8.11	106.11	6.09	22.55	1.34	5.35	1.30	9.75	0.71	373.78	21.33
18	155.44	8.42	116.18	6.38	24.61	1.41	5.20	1.17	9.56	0.64	413.68	22.79
19	167.18	8.74	126.14	6.66	26.67	1.48	5.12	1.06	9.37	0.59	453.06	24.26
20	178.84	9.05	136.02	6.92	28.74	1.54	5.04	0.97	9.16	0.55	491.95	25.66
21	190.40	9.35	145.69	7.17	30.80	1.60	5.05	0.90	8.97	0.52	530.67	26.97
22	201.97	9.68	155.28	7.43	32.86	1.67	5.13	0.84	8.80	0.50	568.93	28.33
23	213.59	10.04	164.48	7.67	34.86	1.73	5.65	1.20	8.71	0.54	606.94	29.77
24	225.08	10.40	173.53	7.91	36.84	1.80	6.19	1.54	8.63	0.57	643.13	30.94
25	236.50	10.72	182.87	8.17	38.90	1.86	6.37	1.43	8.47	0.53	679.00	32.00
26	248.04	11.00	192.23	8.38	40.98	1.92	6.60	1.31	8.35	0.50	716.57	33.16
27	259.60	11.25	201.52	8.58	43.06	1.98	6.89	1.21	8.24	0.47	753.91	34.24
28	271.05	11.51	210.67	8.76	45.12	2.02	7.23	1.13	8.14	0.44	790.70	35.27
29	282.40	11.75	219.67	8.94	47.18	2.07	7.60	1.08	8.05	0.42	826.95	36.28
30	293.59	11.98	228.51	9.11	49.21	2.13	8.02	1.05	7.96	0.40	862.59	37.26
31	304.59	12.20	237.15	9.27	51.21	2.17	8.46	1.03	7.88	0.39	897.53	38.20
32	315.40	12.41	245.58	9.42	53.19	2.21	8.94	1.03	7.79	0.38	931.75	39.11
33	326.00	12.62	253.81	9.57	55.14	2.26	9.44	1.03	7.71	0.37	965.23	40.00
34	336.39	12.82	261.84	9.72	57.07	2.31	9.96	1.04	7.62	0.36	997.99	40.87
35	346.59	13.01	269.69	9.85	58.98	2.35	10.50	1.06	7.54	0.35	1030.04	41.72
36	356.59	13.21	277.35	9.99	60.85	2.38	11.05	1.09	7.45	0.34	1061.40	42.56
37	366.40	13.40	284.84	10.12	62.71	2.43	11.60	1.12	7.36	0.34	1092.11	43.39
38	376.05	13.58	292.18	10.26	64.54	2.48	12.15	1.16	7.28	0.33	1122.22	44.20
39	385.54	13.76	299.38	10.39	66.36	2.52	12.71	1.19	7.20	0.32	1151.78	45.02
40	394.90	13.95	306.45	10.52	68.17	2.56	13.26	1.22	7.12	0.32	1180.82	45.84
41	404.05	14.12	313.36	10.66	69.93	2.59	13.81	1.26	7.05	0.32	1209.23	46.65
42	412.96	14.29	320.07	10.79	71.66	2.63	14.35	1.29	6.98	0.32	1236.92	47.46
43	421.64	14.48	326.58	10.92	73.37	2.67	14.89	1.32	6.90	0.31	1263.91	48.27
44	430.08	14.65	332.90	11.04	75.04	2.71	15.41	1.35	6.82	0.30	1290.20	49.08
45	438.29	14.82	339.05	11.18	76.68	2.75	15.92	1.38	6.74	0.30	1315.83	49.89
46	446.29	14.99	345.03	11.31	78.29	2.79	16.42	1.41	6.66	0.30	1340.81	50.69
47	454.09	15.16	350.85	11.45	79.88	2.83	16.89	1.43	6.58	0.30	1365.17	51.48
48	461.69	15.33	356.51	11.57	81.44	2.86	17.35	1.44	6.49	0.30	1388.95	52.27
49	469.10	15.49	362.04	11.70	82.98	2.90	17.79	1.46	6.40	0.29	1412.17	53.06
50	476.34	15.67	367.42	11.84	84.49	2.94	18.21	1.48	6.32	0.28	1434.86	53.85
51	483.41	15.83	372.68	11.97	85.98	2.98	18.62	1.50	6.23	0.28	1457.04	54.64
52	490.32	16.00	377.83	12.11	87.45	3.02	19.00	1.51	6.15	0.28	1478.75	55.42
53	497.08	16.16	382.86	12.23	88.90	3.06	19.36	1.52	6.07	0.28	1500.02	56.20
54	503.71	16.33	387.79	12.36	90.32	3.10	19.71	1.53	5.99	0.28	1520.86	56.98
55	510.20	16.49	392.62	12.49	91.74	3.14	20.03	1.53	5.91	0.27	1541.31	57.75
56	516.58	16.66	397.36	12.63	93.13	3.17	20.34	1.54	5.84	0.26	1561.39	58.51
57	522.83	16.83	402.02	12.77	94.51	3.20	20.63	1.55	5.77	0.26	1581.12	59.28
58	528.98	17.00	406.60	12.90	95.87	3.23	20.91	1.55	5.70	0.26	1600.51	60.05
59	535.03	17.16	411.11	13.04	97.22	3.27	21.17	1.55	5.64	0.26	1619.60	60.82
60	541.03	17.34	415.58	13.17	98.56	3.31	21.42	1.55	5.57	0.26	1638.54	61.59

2b-4 Pre-1990 yield table for period 2010 onwards (all species including understorey)

	Total		AGL		BGL		DWL		FL		Volume_Net	
Age	Mean	±95%CI	Mean	±95%CI	Mean	±95%CI	Mean	±95%CI	Mean	±95%CI	Mean	±95%CI
0	4.15	5.78	3.24	4.58	0.82	1.20	0.10	0.20	0.00	0.00	0.07	0.01
1	4.44	5.78	3.44	4.58	0.89	1.20	0.10	0.20	0.01	0.00	0.45	0.08
2	5.25	5.78	4.04	4.59	1.07	1.20	0.10	0.20	0.04	0.01	1.63	0.33
3	7.84	5.82	5.91	4.61	1.68	1.21	0.11	0.20	0.16	0.04	5.57	1.12
4	13.44	6.00	10.01	4.74	2.80	1.24	0.12	0.20	0.51	0.12	15.03	2.71
5	22.14	6.43	16.38	5.03	4.28	1.30	0.15	0.21	1.34	0.28	31.55	5.09
6	33.57	7.13	24.46	5.49	6.03	1.38	0.31	0.26	2.79	0.51	55.48	8.06
7	46.72	7.96	33.42	6.02	7.88	1.47	0.65	0.40	4.77	0.77	85.29	11.24
8	60.58	8.76	42.79	6.54	9.77	1.56	1.17	0.67	6.86	1.01	118.97	14.30
9	74.74	9.45	52.89	7.02	11.80	1.64	1.51	0.86	8.55	1.14	155.58	17.08
10	89.09	9.98	63.79	7.44	14.02	1.71	1.57	0.84	9.72	1.14	195.82	19.56
11	103.51	10.42	75.09	7.79	16.33	1.78	1.60	0.75	10.50	1.09	239.29	21.75
12	117.95	10.78	86.62	8.09	18.71	1.85	1.67	0.67	10.96	1.02	284.16	23.64
13	132.33	11.08	98.24	8.35	21.12	1.91	1.80	0.60	11.17	0.93	329.79	25.29
14	146.63	11.36	109.84	8.59	23.55	1.98	2.03	0.56	11.22	0.84	375.78	26.78
15	160.86	11.62	121.39	8.80	26.00	2.04	2.34	0.53	11.14	0.76	421.85	28.15
16	175.01	11.86	132.83	9.00	28.45	2.10	2.73	0.52	11.00	0.69	467.77	29.42
17	189.05	12.11	144.13	9.19	30.89	2.16	3.22	0.54	10.81	0.64	513.34	30.61
18	202.94	12.35	155.24	9.37	33.33	2.21	3.78	0.57	10.61	0.60	558.35	31.73
19	216.63	12.57	166.09	9.53	35.73	2.26	4.42	0.62	10.40	0.56	602.52	32.80
20	230.19	12.81	176.74	9.70	38.13	2.32	5.14	0.68	10.19	0.53	645.98	33.82
21	243.76	13.06	187.30	9.88	40.57	2.38	5.92	0.74	9.98	0.51	689.15	34.84
22	257.33	13.32	197.78	10.05	43.00	2.44	6.77	0.82	9.80	0.50	732.05	35.86
23	270.86	13.60	208.13	10.23	45.42	2.49	7.67	0.90	9.64	0.49	774.52	36.88
24	284.31	13.89	218.33	10.43	47.84	2.54	8.63	0.98	9.50	0.48	816.44	37.93
25	297.63	14.19	228.35	10.63	50.24	2.60	9.64	1.06	9.39	0.48	857.71	38.99
26	310.79	14.51	238.18	10.84	52.63	2.66	10.69	1.14	9.30	0.49	898.26	40.08
27	323.78	14.85	247.80	11.07	54.99	2.73	11.77	1.23	9.21	0.50	938.01	41.19
28	336.56	15.20	257.21	11.30	57.32	2.79	12.89	1.32	9.14	0.50	976.91	42.31
29	349.12	15.55	266.40	11.54	59.63	2.85	14.02	1.41	9.07	0.51	1014.92	43.47
30	361.42	15.91	275.35	11.79	61.91	2.92	15.16	1.50	9.00	0.52	1051.99	44.65
31	373.42	16.29	284.04	12.04	64.15	2.98	16.31	1.60	8.93	0.52	1088.12	45.85
32	385.12	16.67	292.47	12.28	66.36	3.04	17.45	1.69	8.86	0.53	1123.31	47.05
33	396.54	17.05	300.65	12.54	68.53	3.11	18.58	1.77	8.78	0.54	1157.58	48.28
34	407.66	17.43	308.60	12.80	70.67	3.18	19.69	1.86	8.70	0.54	1190.95	49.52
35	418.51	17.82	316.34	13.06	72.78	3.25	20.78	1.94	8.62	0.54	1223.48	50.78
36	429.10	18.21	323.86	13.33	74.86	3.31	21.84	2.02	8.54	0.55	1255.19	52.04
37	439.43	18.59	331.19	13.59	76.91	3.39	22.87	2.10	8.46	0.56	1286.14	53.30
38	449.52	18.97	338.35	13.84	78.94	3.45	23.87	2.18	8.37	0.56	1316.39	54.59
39	459.41	19.35	345.34	14.10	80.94	3.52	24.84	2.26	8.29	0.56	1346.00	55.88
40	469.10	19.73	352.20	14.35	82.93	3.59	25.76	2.33	8.21	0.56	1374.99	57.18
41	478.50	20.12	358.85	14.61	84.87	3.66	26.65	2.39	8.14	0.56	1403.21	58.47
42	487.57	20.49	365.26	14.86	86.76	3.72	27.49	2.45	8.06	0.56	1430.55	59.77
43	496.35	20.85	371.46	15.11	88.62	3.79	28.29	2.51	7.98	0.56	1457.11	61.06
44	504.84	21.22	377.46	15.36	90.45	3.86	29.05	2.57	7.90	0.56	1482.90	62.35
45	513.07	21.57	383.27	15.59	92.24	3.93	29.76	2.62	7.80	0.56	1507.96	63.62
46	521.03	21.92	388.91	15.83	94.00	4.00	30.42	2.67	7.71	0.55	1532.35	64.90
47	528.75	22.26	394.38	16.07	95.73	4.07	31.04	2.72	7.61	0.54	1556.08	66.16
48	536.24	22.60	399.70	16.30	97.43	4.13	31.61	2.76	7.51	0.54	1579.19	67.41
49	543.51	22.93	404.87	16.52	99.10	4.19	32.13	2.80	7.41	0.54	1601.73	68.64
50	550.58	23.26	409.91	16.74	100.75	4.26	32.62	2.83	7.31	0.54	1623.73	69.87
51	557.46	23.57	414.82	16.96	102.37	4.32	33.06	2.86	7.21	0.53	1645.23	71.08
52	564.16	23.88	419.62	17.17	103.97	4.39	33.46	2.89	7.12	0.52	1666.26	72.30
53	570.70	24.19	424.32	17.38	105.54	4.46	33.82	2.92	7.03	0.52	1686.86	73.50
54	577.09	24.50	428.92	17.59	107.10	4.51	34.15	2.95	6.94	0.52	1707.05	74.70
55	583.34	24.80	433.43	17.80	108.64	4.58	34.44	2.97	6.85	0.51	1726.87	75.89
56	589.46	25.09	437.86	18.00	110.16	4.65	34.69	2.99	6.76	0.50	1746.35	77.05
57	595.47	25.38	442.21	18.20	111.66	4.71	34.92	3.01	6.68	0.50	1765.51	78.21
58	601.37	25.67	446.50	18.39	113.14	4.77	35.12	3.03	6.60	0.50	1784.38	79.36
59	607.17	25.95	450.74	18.59	114.62	4.84	35.29	3.05	6.53	0.50	1802.99	80.51
60	612.93	26.24	454.95	18.78	116.09	4.90	35.45	3.07	6.46	0.50	1821.48	81.64

2b-5 Pre-1990 yield table for period before 1990 (Radiata pine only including understorey)

	Total		AGL		BGL		DWL		FL		Volume_Net	
Age	Mean	±95%CI	Mean	±95%CI	Mean	±95%CI	Mean	±95%CI	Mean	±95%CI	Mean	±95%CI
0	3.54	4.60	2.83	3.60	0.71	1.00	0.10	0.20	0.00	0.00	0.05	0.01
1	3.74	4.60	2.97	3.60	0.77	1.00	0.10	0.20	0.01	0.00	0.33	0.07
2	4.34	4.61	3.40	3.60	0.90	1.00	0.10	0.20	0.04	0.01	1.21	0.30
3	6.30	4.66	4.79	3.64	1.36	1.01	0.10	0.20	0.16	0.05	4.26	1.11
4	10.63	4.92	7.88	3.81	2.24	1.07	0.12	0.20	0.50	0.13	11.68	2.93
5	17.51	5.60	12.60	4.29	3.40	1.17	0.21	0.22	1.41	0.33	24.87	5.87
6	26.62	6.77	18.51	5.09	4.76	1.33	0.52	0.40	2.94	0.68	44.02	9.82
7	36.99	8.19	24.31	5.86	5.97	1.45	1.68	1.14	5.14	1.35	67.51	14.43
8	47.46	9.41	29.18	6.24	6.98	1.51	3.71	2.01	7.70	2.03	90.48	17.97
9	57.34	10.28	35.25	6.76	8.26	1.61	4.73	2.17	9.21	2.12	110.64	19.74
10	67.19	11.05	42.63	7.49	9.79	1.75	5.05	2.10	9.83	1.96	135.85	22.33
11	77.45	11.84	49.14	8.18	11.12	1.89	6.62	2.54	10.69	1.99	166.11	25.71
12	87.52	12.56	56.40	8.93	12.60	2.03	7.59	2.74	11.05	1.92	192.72	28.75
13	97.58	13.27	65.24	9.70	14.41	2.19	7.27	2.40	10.77	1.66	221.97	32.00
14	108.08	14.00	73.95	10.56	16.19	2.37	7.41	2.25	10.63	1.47	257.42	35.39
15	118.77	14.76	82.48	11.37	17.93	2.55	7.90	2.24	10.56	1.35	292.08	39.14
16	129.46	15.50	89.91	11.59	19.42	2.58	9.56	4.39	10.68	1.66	325.81	42.69
17	139.84	15.95	97.78	11.74	21.03	2.61	10.55	6.03	10.59	1.84	355.47	43.80
18	149.59	16.17	106.57	12.31	22.84	2.74	10.02	5.14	10.27	1.60	386.81	44.64
19	159.42	16.51	115.29	12.85	24.64	2.86	9.61	4.43	10.00	1.43	422.13	47.46
20	169.69	16.92	124.62	13.31	26.58	2.97	9.03	3.81	9.57	1.23	457.17	50.16
21	180.10	17.36	133.77	13.79	28.52	3.10	8.69	3.33	9.23	1.07	494.25	52.44
22	190.56	17.84	142.86	14.27	30.46	3.21	8.43	2.95	8.93	0.94	530.72	54.89
23	201.07	18.34	152.00	14.72	32.43	3.31	8.12	2.64	8.63	0.84	567.02	57.37
24	211.60	18.85	160.89	15.16	34.35	3.43	8.06	2.43	8.41	0.76	603.45	59.62
25	221.91	19.37	169.43	15.58	36.21	3.54	8.14	2.31	8.24	0.70	638.15	61.90
26	231.91	19.91	177.74	16.04	38.03	3.66	8.18	2.28	8.07	0.66	671.47	64.33
27	241.71	20.50	185.94	16.55	39.83	3.79	8.13	2.24	7.92	0.63	705.02	66.83
28	251.42	21.14	193.70	17.15	41.53	3.93	8.44	2.39	7.86	0.63	738.55	69.43
29	261.09	21.75	201.47	17.71	43.25	4.07	8.69	2.52	7.79	0.62	770.60	72.15
30	270.82	22.28	209.80	18.11	45.08	4.17	8.42	2.31	7.63	0.58	803.05	74.51
31	280.71	22.81	218.21	18.47	46.96	4.26	8.16	2.05	7.47	0.55	837.41	76.37
32	289.96	23.06	225.94	18.52	48.68	4.28	8.07	1.87	7.38	0.56	870.23	77.58
33	298.38	23.02	232.86	18.35	50.21	4.25	8.10	1.81	7.33	0.60	898.93	77.66
34	306.64	23.06	239.64	18.38	51.74	4.26	8.10	1.82	7.26	0.64	926.06	78.03
35	314.71	23.35	246.29	18.68	53.25	4.34	8.11	1.83	7.16	0.66	953.72	79.76
36	322.58	23.97	252.77	19.28	54.73	4.48	8.12	1.81	7.06	0.66	980.69	82.47
37	330.62	24.75	259.40	19.94	56.26	4.65	8.12	1.74	6.95	0.64	1008.20	85.37
38	339.25	25.34	266.50	20.34	57.91	4.76	8.11	1.64	6.83	0.60	1037.53	87.31
39	348.15	25.77	273.80	20.57	59.62	4.83	8.14	1.56	6.70	0.57	1067.58	88.59
40	357.01	26.18	281.00	20.79	61.32	4.90	8.21	1.52	6.59	0.55	1097.23	89.87
41	365.77	26.59	288.08	21.00	63.00	4.97	8.32	1.52	6.49	0.53	1126.39	91.13
42	374.37	26.97	294.99	21.22	64.64	5.04	8.46	1.55	6.40	0.51	1154.95	92.37
43	382.76	27.34	301.69	21.44	66.24	5.11	8.63	1.59	6.31	0.50	1182.73	93.64
44	390.90	27.73	308.16	21.67	67.81	5.18	8.82	1.64	6.22	0.50	1209.66	94.96
45	398.86	28.11	314.46	21.92	69.35	5.26	9.03	1.69	6.13	0.50	1235.92	96.30
46	406.64	28.49	320.60	22.16	70.86	5.34	9.25	1.74	6.04	0.50	1261.57	97.64
47	414.32	28.83	326.64	22.37	72.36	5.40	9.48	1.80	5.95	0.49	1286.83	98.90
48	421.89	29.15	332.59	22.58	73.84	5.46	9.71	1.86	5.86	0.48	1311.72	100.07
49	429.32	29.47	338.40	22.79	75.30	5.53	9.95	1.91	5.78	0.48	1336.08	101.23
50	436.59	29.77	344.08	22.99	76.74	5.60	10.19	1.95	5.69	0.48	1359.92	102.38
51	443.72	30.07	349.63	23.18	78.16	5.66	10.43	2.00	5.61	0.48	1383.26	103.53
52	450.71	30.37	355.06	23.39	79.55	5.73	10.67	2.05	5.52	0.47	1406.13	104.67
53	457.57	30.66	360.39	23.60	80.93	5.80	10.91	2.09	5.45	0.46	1428.54	105.81
54	464.31	30.96	365.61	23.80	82.28	5.86	11.15	2.12	5.37	0.46	1450.52	106.95
55	470.92	31.25	370.72	24.01	83.62	5.93	11.39	2.15	5.30	0.46	1472.09	108.09
56	477.43	31.53	375.74	24.21	84.95	5.99	11.62	2.18	5.23	0.45	1493.26	109.23
57	483.82	31.83	380.67	24.42	86.25	6.05	11.85	2.20	5.16	0.44	1514.06	110.37
58	490.11	32.12	385.52	24.64	87.54	6.12	12.07	2.23	5.09	0.44	1534.49	111.51
59	496.31	32.40	390.28	24.86	88.82	6.19	12.29	2.26	5.03	0.44	1554.59	112.65
60	502.46	32.70	395.00	25.07	90.09	6.25	12.50	2.28	4.97	0.44	1574.53	113.79

2b-6 Pre-1990 yield table for period after 1990 (Radiata pine only including understorey)

Age	Total Mean	Total ±95%CI	AGL Mean	AGL ±95%CI	BGL Mean	BGL ±95%CI	DWL Mean	DWL ±95%CI	FL Mean	FL ±95%CI	Volume_Net Mean	Volume_Net ±95%CI
0	2.94	1.97	2.23	1.58	0.51	0.39	0.10	0.20	0.00	0.00	0.06	0.00
1	3.16	1.97	2.38	1.58	0.57	0.39	0.10	0.20	0.01	0.00	0.35	0.03
2	3.77	1.97	2.83	1.58	0.70	0.40	0.10	0.20	0.04	0.00	1.24	0.14
3	5.75	2.00	4.23	1.59	1.17	0.40	0.11	0.20	0.15	0.02	4.26	0.49
4	10.14	2.11	7.38	1.67	2.06	0.42	0.12	0.20	0.48	0.07	11.68	1.25
5	17.15	2.38	12.37	1.84	3.26	0.46	0.17	0.20	1.26	0.16	24.94	2.41
6	26.59	2.81	18.87	2.12	4.71	0.52	0.35	0.23	2.56	0.29	44.55	3.89
7	37.79	3.32	26.35	2.45	6.30	0.57	0.74	0.34	4.30	0.43	69.62	5.51
8	49.91	3.83	34.09	2.76	7.89	0.62	1.55	0.54	6.29	0.60	98.44	7.13
9	62.27	4.26	42.01	3.05	9.50	0.68	2.57	0.71	8.11	0.71	128.59	8.57
10	74.44	4.63	50.64	3.36	11.26	0.74	3.14	0.75	9.32	0.71	159.31	9.93
11	86.52	4.97	59.66	3.66	13.08	0.80	3.60	0.77	10.08	0.68	193.44	11.35
12	98.59	5.28	68.85	3.97	14.95	0.86	4.12	0.83	10.58	0.66	229.44	12.78
13	110.69	5.59	78.53	4.25	16.92	0.93	4.37	0.85	10.77	0.63	266.06	14.18
14	122.98	5.88	88.33	4.48	18.92	0.99	4.77	1.04	10.86	0.64	305.10	15.50
15	135.39	6.14	98.49	4.68	21.02	1.03	4.99	1.18	10.81	0.63	344.57	16.48
16	147.90	6.38	109.14	4.88	23.23	1.08	4.86	1.07	10.59	0.57	385.10	17.34
17	160.51	6.60	119.80	5.08	25.45	1.12	4.80	0.97	10.36	0.52	427.37	18.34
18	173.14	6.82	130.41	5.25	27.69	1.17	4.82	0.86	10.13	0.47	469.61	19.27
19	185.68	7.04	140.88	5.41	29.90	1.22	4.92	0.77	9.90	0.43	511.42	20.18
20	198.16	7.25	151.18	5.57	32.12	1.26	5.09	0.71	9.68	0.40	552.76	21.04
21	210.63	7.47	161.29	5.73	34.33	1.31	5.42	0.68	9.50	0.38	593.85	21.89
22	223.11	7.70	171.30	5.90	36.55	1.36	5.83	0.69	9.33	0.37	634.21	22.81
23	235.58	7.94	181.02	6.06	38.72	1.41	6.53	0.95	9.22	0.40	674.13	23.77
24	247.90	8.17	190.57	6.22	40.88	1.45	7.25	1.17	9.12	0.41	712.76	24.60
25	260.10	8.39	200.25	6.38	43.08	1.50	7.71	1.11	8.97	0.38	750.91	25.36
26	272.30	8.60	209.86	6.52	45.29	1.55	8.21	1.05	8.84	0.36	789.95	26.11
27	284.42	8.79	219.36	6.63	47.49	1.59	8.76	1.00	8.73	0.34	828.54	26.80
28	296.41	8.98	228.68	6.75	49.67	1.62	9.34	0.98	8.62	0.32	866.45	27.47
29	308.26	9.17	237.84	6.86	51.83	1.66	9.96	0.97	8.53	0.32	903.69	28.12
30	319.91	9.34	246.81	6.97	53.97	1.70	10.61	0.98	8.44	0.31	940.20	28.75
31	331.34	9.51	255.54	7.07	56.08	1.74	11.28	0.99	8.35	0.30	975.91	29.36
32	342.54	9.68	264.05	7.18	58.15	1.77	11.97	1.01	8.27	0.30	1010.79	29.97
33	353.49	9.84	272.34	7.26	60.20	1.80	12.68	1.04	8.18	0.29	1044.87	30.57
34	364.21	10.00	280.42	7.35	62.22	1.84	13.39	1.08	8.09	0.28	1078.14	31.15
35	374.70	10.15	288.29	7.45	64.21	1.86	14.11	1.12	8.00	0.28	1110.63	31.73
36	384.98	10.29	295.98	7.54	66.18	1.89	14.83	1.16	7.91	0.28	1142.38	32.31
37	395.04	10.44	303.48	7.63	68.13	1.93	15.54	1.20	7.82	0.28	1173.43	32.88
38	404.91	10.57	310.81	7.72	70.05	1.96	16.24	1.24	7.73	0.28	1203.83	33.45
39	414.61	10.72	318.01	7.81	71.95	1.99	16.92	1.28	7.64	0.27	1233.64	34.02
40	424.15	10.86	325.07	7.91	73.83	2.02	17.60	1.31	7.55	0.26	1262.90	34.61
41	433.46	11.00	331.96	8.00	75.68	2.05	18.26	1.34	7.48	0.26	1291.46	35.19
42	442.50	11.13	338.62	8.08	77.48	2.09	18.90	1.37	7.40	0.26	1319.25	35.77
43	451.28	11.25	345.08	8.18	79.25	2.11	19.53	1.40	7.32	0.26	1346.29	36.36
44	459.80	11.39	351.35	8.28	80.99	2.14	20.12	1.43	7.24	0.26	1372.60	36.95
45	468.08	11.51	357.44	8.36	82.70	2.17	20.69	1.46	7.16	0.26	1398.21	37.54
46	476.13	11.64	363.35	8.45	84.38	2.20	21.24	1.48	7.07	0.26	1423.16	38.12
47	483.96	11.77	369.10	8.55	86.03	2.23	21.76	1.50	6.98	0.26	1447.47	38.70
48	491.58	11.88	374.69	8.64	87.66	2.26	22.25	1.52	6.88	0.26	1471.18	39.29
49	499.00	12.01	380.15	8.74	89.25	2.29	22.72	1.53	6.79	0.25	1494.32	39.88
50	506.24	12.14	385.47	8.84	90.82	2.32	23.16	1.54	6.70	0.24	1516.92	40.47
51	513.30	12.25	390.65	8.92	92.37	2.35	23.57	1.55	6.61	0.24	1539.00	41.06
52	520.19	12.37	395.72	9.01	93.90	2.38	23.95	1.56	6.52	0.24	1560.61	41.64
53	526.93	12.50	400.69	9.11	95.41	2.41	24.31	1.57	6.43	0.24	1581.77	42.23
54	533.53	12.62	405.55	9.21	96.89	2.43	24.65	1.57	6.35	0.24	1602.51	42.82
55	539.99	12.74	410.31	9.30	98.36	2.46	24.96	1.57	6.26	0.24	1622.86	43.41
56	546.32	12.86	414.99	9.40	99.81	2.48	25.24	1.58	6.19	0.24	1642.84	44.00
57	552.54	12.97	419.58	9.50	101.25	2.51	25.51	1.59	6.11	0.23	1662.48	44.59
58	558.65	13.10	424.10	9.59	102.67	2.54	25.76	1.59	6.04	0.22	1681.80	45.17
59	564.67	13.23	428.55	9.70	104.07	2.57	25.98	1.58	5.97	0.22	1700.83	45.75
60	570.64	13.34	432.97	9.82	105.46	2.61	26.19	1.56	5.91	0.22	1719.72	46.34

2b-7 Pre-1990 yield table for period 1990 - 2009 (Radiata pine only including understorey)

	Total		AGL		BGL		DWL		FL		Volume_Net	
Age	Mean	±95%CI	Mean	±95%CI	Mean	±95%CI	Mean	±95%CI	Mean	±95%CI	Mean	±95%CI
0	2.83	1.58	2.12	1.18	0.51	0.39	0.20	0.20	0.00	0.00	0.05	0.00
1	3.02	1.58	2.25	1.18	0.56	0.40	0.20	0.20	0.01	0.00	0.29	0.03
2	3.54	1.58	2.63	1.19	0.68	0.40	0.20	0.20	0.04	0.00	1.06	0.15
3	5.25	1.61	3.83	1.21	1.08	0.40	0.20	0.20	0.15	0.02	3.67	0.53
4	9.09	1.77	6.56	1.32	1.86	0.43	0.21	0.20	0.47	0.08	10.16	1.38
5	15.30	2.16	10.88	1.57	2.93	0.48	0.28	0.21	1.23	0.20	21.86	2.71
6	23.74	2.74	16.59	1.96	4.22	0.54	0.48	0.25	2.46	0.36	39.31	4.40
7	33.93	3.43	23.27	2.41	5.66	0.62	0.92	0.42	4.09	0.54	61.91	6.29
8	45.06	4.10	30.08	2.77	7.07	0.69	1.88	0.73	6.03	0.78	87.93	8.19
9	56.31	4.66	36.79	3.10	8.44	0.75	3.21	0.97	7.87	0.93	114.39	9.79
10	67.17	5.13	44.08	3.45	9.94	0.80	4.08	1.03	9.08	0.94	140.06	11.20
11	77.84	5.55	51.77	3.80	11.48	0.87	4.78	1.07	9.82	0.92	168.94	12.70
12	88.47	5.95	59.61	4.16	13.05	0.94	5.51	1.18	10.30	0.90	199.74	14.28
13	99.14	6.33	68.14	4.53	14.78	1.02	5.79	1.22	10.45	0.86	231.23	15.90
14	110.18	6.70	76.94	4.80	16.55	1.07	6.18	1.49	10.52	0.89	266.31	17.56
15	121.48	7.01	86.31	5.03	18.44	1.12	6.29	1.70	10.45	0.90	302.13	18.67
16	132.97	7.29	96.45	5.35	20.50	1.19	5.84	1.52	10.18	0.80	339.60	19.64
17	144.72	7.58	106.71	5.64	22.60	1.26	5.49	1.36	9.93	0.72	379.87	21.05
18	156.60	7.87	116.97	5.92	24.70	1.31	5.23	1.21	9.70	0.66	420.35	22.41
19	168.45	8.16	127.14	6.17	26.80	1.37	5.05	1.08	9.48	0.60	460.58	23.72
20	180.22	8.44	137.13	6.41	28.89	1.43	4.96	0.98	9.26	0.55	500.32	24.96
21	191.89	8.72	146.90	6.64	30.97	1.49	4.97	0.91	9.07	0.52	539.58	26.16
22	203.58	9.03	156.59	6.89	33.05	1.56	5.05	0.85	8.89	0.50	578.35	27.44
23	215.32	9.37	165.87	7.11	35.07	1.62	5.59	1.23	8.80	0.54	616.85	28.79
24	226.91	9.72	175.00	7.33	37.07	1.68	6.15	1.59	8.71	0.57	653.46	29.85
25	238.44	10.01	184.43	7.57	39.14	1.73	6.32	1.46	8.55	0.53	689.75	30.79
26	250.10	10.25	193.89	7.76	41.24	1.79	6.55	1.35	8.42	0.50	727.81	31.85
27	261.78	10.48	203.28	7.94	43.35	1.84	6.84	1.25	8.31	0.47	765.66	32.81
28	273.35	10.69	212.53	8.10	45.44	1.89	7.18	1.16	8.21	0.44	802.95	33.72
29	284.82	10.90	221.64	8.25	47.52	1.94	7.56	1.10	8.12	0.42	839.70	34.59
30	296.14	11.09	230.58	8.39	49.57	1.97	7.97	1.06	8.03	0.40	875.83	35.44
31	307.27	11.29	239.32	8.52	51.60	2.01	8.41	1.04	7.94	0.39	911.25	36.26
32	318.19	11.46	247.86	8.65	53.60	2.05	8.89	1.03	7.85	0.38	945.93	37.06
33	328.91	11.63	256.19	8.77	55.57	2.09	9.39	1.03	7.77	0.37	979.87	37.83
34	339.43	11.80	264.32	8.89	57.52	2.13	9.91	1.04	7.68	0.35	1013.07	38.58
35	349.74	11.95	272.26	8.99	59.45	2.17	10.45	1.06	7.59	0.34	1045.54	39.32
36	359.86	12.11	280.02	9.10	61.35	2.21	11.00	1.09	7.51	0.34	1077.33	40.05
37	369.79	12.26	287.61	9.21	63.23	2.25	11.55	1.12	7.42	0.33	1108.46	40.77
38	379.56	12.40	295.04	9.31	65.09	2.29	12.10	1.15	7.33	0.32	1138.97	41.48
39	389.17	12.55	302.34	9.41	66.93	2.31	12.66	1.18	7.25	0.32	1168.94	42.21
40	398.65	12.70	309.51	9.52	68.75	2.34	13.22	1.22	7.17	0.31	1198.38	42.93
41	407.93	12.84	316.51	9.63	70.55	2.38	13.77	1.25	7.10	0.30	1227.18	43.65
42	416.96	12.98	323.32	9.74	72.30	2.42	14.31	1.28	7.03	0.30	1255.26	44.38
43	425.75	13.13	329.93	9.85	74.03	2.45	14.85	1.31	6.96	0.30	1282.63	45.11
44	434.31	13.27	336.34	9.96	75.72	2.48	15.38	1.34	6.88	0.30	1309.30	45.84
45	442.65	13.41	342.58	10.07	77.39	2.52	15.89	1.37	6.80	0.30	1335.30	46.57
46	450.77	13.55	348.65	10.18	79.02	2.55	16.39	1.39	6.71	0.29	1360.64	47.30
47	458.68	13.69	354.56	10.30	80.63	2.58	16.87	1.41	6.63	0.28	1385.36	48.03
48	466.39	13.83	360.32	10.40	82.22	2.62	17.33	1.43	6.54	0.28	1409.49	48.75
49	473.92	13.98	365.93	10.51	83.77	2.65	17.77	1.45	6.46	0.28	1433.06	49.47
50	481.27	14.12	371.41	10.63	85.30	2.68	18.20	1.46	6.37	0.28	1456.09	50.20
51	488.45	14.26	376.76	10.75	86.82	2.70	18.60	1.48	6.28	0.28	1478.61	50.93
52	495.48	14.39	381.99	10.87	88.31	2.73	18.99	1.49	6.20	0.27	1500.65	51.66
53	502.36	14.54	387.11	10.98	89.78	2.77	19.36	1.50	6.12	0.26	1522.25	52.40
54	509.10	14.69	392.12	11.10	91.23	2.80	19.71	1.51	6.04	0.26	1543.41	53.14
55	515.70	14.82	397.04	11.22	92.66	2.83	20.04	1.51	5.97	0.26	1564.18	53.88
56	522.18	14.97	401.86	11.35	94.08	2.87	20.35	1.52	5.90	0.26	1584.57	54.61
57	528.55	15.12	406.60	11.47	95.48	2.90	20.65	1.53	5.83	0.26	1604.60	55.34
58	534.81	15.27	411.27	11.59	96.86	2.93	20.93	1.53	5.76	0.26	1624.31	56.07
59	540.97	15.42	415.86	11.72	98.23	2.97	21.19	1.53	5.69	0.25	1643.70	56.80
60	547.08	15.58	420.41	11.86	99.59	3.01	21.44	1.53	5.63	0.23	1662.94	57.53

2b-8 Pre-1990 yield table for period after 2010 (Radiata pine only including understorey)

	Total		AGL		BGL		DWL		FL		Volume_Net	
Age	Mean	±95%CI	Mean	±95%CI	Mean	±95%CI	Mean	±95%CI	Mean	±95%CI	Mean	±95%CI
0	4.15	5.78	3.24	4.58	0.82	1.20	0.10	0.20	0.00	0.00	0.07	0.01
1	4.44	5.78	3.44	4.58	0.89	1.20	0.10	0.20	0.01	0.00	0.46	0.08
2	5.24	5.78	4.03	4.59	1.07	1.20	0.10	0.20	0.04	0.01	1.64	0.34
3	7.84	5.83	5.90	4.62	1.67	1.21	0.11	0.20	0.16	0.04	5.60	1.14
4	13.46	6.01	10.02	4.74	2.81	1.24	0.12	0.20	0.52	0.12	15.13	2.74
5	22.22	6.45	16.42	5.04	4.29	1.30	0.15	0.21	1.35	0.28	31.77	5.13
6	33.72	7.15	24.55	5.51	6.05	1.39	0.31	0.26	2.81	0.51	55.87	8.10
7	46.94	7.99	33.56	6.05	7.92	1.48	0.66	0.40	4.81	0.78	85.89	11.28
8	60.89	8.79	42.98	6.57	9.82	1.56	1.18	0.67	6.91	1.02	119.80	14.34
9	75.13	9.47	53.13	7.04	11.87	1.64	1.53	0.86	8.61	1.14	156.64	17.11
10	89.53	10.00	64.07	7.46	14.09	1.71	1.58	0.84	9.80	1.14	197.07	19.58
11	103.98	10.44	75.40	7.82	16.40	1.79	1.61	0.75	10.58	1.08	240.69	21.76
12	118.44	10.81	86.94	8.12	18.79	1.85	1.68	0.67	11.04	1.00	285.70	23.65
13	132.83	11.13	98.57	8.39	21.20	1.92	1.81	0.60	11.25	0.92	331.45	25.30
14	147.13	11.41	110.19	8.62	23.63	1.99	2.04	0.56	11.29	0.84	377.52	26.80
15	161.36	11.67	121.74	8.84	26.08	2.05	2.35	0.53	11.21	0.76	423.65	28.17
16	175.49	11.93	133.18	9.05	28.53	2.11	2.74	0.53	11.05	0.69	469.61	29.47
17	189.50	12.18	144.46	9.24	30.97	2.16	3.22	0.55	10.86	0.64	515.18	30.68
18	203.37	12.43	155.54	9.43	33.40	2.22	3.78	0.57	10.64	0.60	560.17	31.84
19	217.01	12.67	166.37	9.60	35.80	2.28	4.42	0.62	10.42	0.56	604.29	32.94
20	230.52	12.91	176.98	9.77	38.20	2.33	5.13	0.69	10.21	0.53	647.69	34.00
21	244.04	13.17	187.51	9.95	40.63	2.39	5.91	0.75	10.00	0.51	690.78	35.05
22	257.55	13.44	197.96	10.13	43.05	2.45	6.75	0.82	9.80	0.50	733.58	36.10
23	271.02	13.73	208.27	10.33	45.47	2.51	7.65	0.90	9.64	0.50	775.96	37.17
24	284.41	14.03	218.43	10.53	47.88	2.57	8.60	0.98	9.50	0.50	817.78	38.26
25	297.66	14.34	228.41	10.73	50.27	2.63	9.60	1.07	9.39	0.50	858.94	39.35
26	310.77	14.66	238.20	10.95	52.65	2.69	10.64	1.15	9.28	0.50	899.38	40.47
27	323.69	15.00	247.78	11.18	55.00	2.75	11.72	1.24	9.19	0.50	939.01	41.61
28	336.41	15.35	257.15	11.41	57.33	2.82	12.83	1.33	9.11	0.50	977.79	42.78
29	348.91	15.71	266.30	11.65	59.64	2.88	13.95	1.42	9.04	0.51	1015.67	43.97
30	361.15	16.08	275.21	11.90	61.90	2.94	15.08	1.51	8.97	0.52	1052.62	45.17
31	373.09	16.45	283.85	12.16	64.13	3.01	16.21	1.60	8.90	0.52	1088.63	46.39
32	384.73	16.83	292.25	12.41	66.33	3.07	17.34	1.69	8.82	0.53	1123.69	47.61
33	396.09	17.20	300.40	12.66	68.50	3.15	18.46	1.78	8.74	0.54	1157.82	48.86
34	407.16	17.58	308.31	12.92	70.63	3.21	19.56	1.86	8.66	0.54	1191.07	50.12
35	417.95	17.97	316.01	13.18	72.73	3.28	20.64	1.94	8.58	0.54	1223.46	51.39
36	428.48	18.35	323.51	13.44	74.80	3.35	21.69	2.02	8.49	0.54	1255.05	52.66
37	438.76	18.73	330.80	13.69	76.85	3.41	22.71	2.10	8.41	0.55	1285.87	53.95
38	448.81	19.11	337.92	13.95	78.87	3.48	23.70	2.17	8.32	0.56	1315.98	55.24
39	458.64	19.49	344.89	14.21	80.87	3.56	24.65	2.24	8.24	0.56	1345.47	56.53
40	468.28	19.87	351.72	14.47	82.85	3.62	25.56	2.31	8.16	0.56	1374.34	57.84
41	477.64	20.24	358.34	14.72	84.78	3.69	26.44	2.37	8.09	0.56	1402.43	59.14
42	486.67	20.61	364.73	14.98	86.66	3.76	27.27	2.43	8.01	0.56	1429.66	60.45
43	495.40	20.97	370.90	15.23	88.52	3.83	28.06	2.49	7.93	0.55	1456.08	61.75
44	503.85	21.33	376.87	15.46	90.33	3.90	28.81	2.54	7.85	0.54	1481.75	63.04
45	512.03	21.68	382.66	15.70	92.12	3.96	29.51	2.58	7.75	0.54	1506.70	64.32
46	519.95	22.03	388.28	15.94	93.87	4.03	30.16	2.63	7.65	0.54	1530.95	65.60
47	527.64	22.36	393.73	16.17	95.59	4.09	30.77	2.68	7.55	0.54	1554.56	66.87
48	535.09	22.70	399.02	16.40	97.28	4.16	31.33	2.71	7.46	0.54	1577.56	68.12
49	542.33	23.03	404.17	16.63	98.95	4.23	31.85	2.74	7.36	0.53	1599.99	69.36
50	549.36	23.35	409.19	16.85	100.59	4.29	32.32	2.78	7.26	0.52	1621.87	70.58
51	556.20	23.66	414.09	17.06	102.21	4.35	32.75	2.81	7.16	0.52	1643.25	71.80
52	562.88	23.97	418.87	17.27	103.80	4.42	33.15	2.83	7.07	0.52	1664.17	73.01
53	569.39	24.28	423.55	17.48	105.37	4.49	33.50	2.85	6.98	0.52	1684.66	74.22
54	575.75	24.58	428.13	17.69	106.92	4.55	33.82	2.87	6.89	0.51	1704.74	75.42
55	581.97	24.88	432.63	17.91	108.45	4.61	34.10	2.89	6.80	0.50	1724.45	76.60
56	588.07	25.17	437.04	18.11	109.97	4.68	34.35	2.91	6.71	0.50	1743.81	77.77
57	594.04	25.45	441.38	18.30	111.46	4.75	34.57	2.93	6.63	0.50	1762.86	78.92
58	599.91	25.74	445.66	18.49	112.94	4.80	34.76	2.95	6.55	0.49	1781.63	80.07
59	605.69	26.02	449.88	18.69	114.41	4.86	34.93	2.97	6.48	0.48	1800.14	81.20
60	611.43	26.29	454.07	18.88	115.87	4.92	35.09	2.99	6.41	0.48	1818.53	82.34

2b-9 Post-1989 yield table for period 1990-2009 (all species no understorey)

	Total		AGL		BGL		DWL		FL		Volume_Net	
Age	Mean	±95%CI	Mean	±95%CI	Mean	±95%CI	Mean	±95%CI	Mean	±95%CI	Mean	±95%CI
0	0.05	0.00	0.03	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.07	0.01
1	0.30	0.03	0.21	0.02	0.08	0.01	0.00	0.00	0.01	0.00	0.43	0.05
2	1.06	0.14	0.77	0.10	0.25	0.04	0.00	0.00	0.05	0.00	1.62	0.22
3	3.60	0.45	2.56	0.32	0.85	0.11	0.01	0.00	0.19	0.02	5.72	0.75
4	9.11	1.02	6.52	0.74	1.96	0.21	0.02	0.01	0.62	0.09	15.55	1.81
5	17.74	1.78	12.68	1.28	3.43	0.32	0.04	0.03	1.60	0.20	32.76	3.39
6	29.01	2.63	20.15	1.83	5.08	0.43	0.40	0.20	3.40	0.39	57.63	5.33
7	41.67	3.40	27.27	2.22	6.54	0.50	1.75	0.62	6.12	0.73	87.36	7.28
8	54.26	3.97	33.16	2.51	7.70	0.56	4.23	1.02	9.17	0.99	116.26	8.73
9	65.73	4.38	37.63	2.68	8.55	0.59	7.59	1.31	11.96	1.12	140.78	9.97
10	75.76	4.68	41.83	2.69	9.38	0.59	10.72	1.55	13.83	1.18	159.77	10.71
11	85.00	4.86	48.04	2.84	10.69	0.62	11.98	1.60	14.30	1.11	178.91	10.83
12	94.50	5.03	56.36	3.13	12.42	0.68	11.77	1.55	13.96	0.99	206.84	11.51
13	104.74	5.24	65.73	3.46	14.33	0.74	11.22	1.47	13.46	0.90	242.71	12.76
14	115.56	5.49	75.53	3.77	16.33	0.81	10.70	1.38	13.00	0.81	282.02	14.12
15	126.58	5.73	85.54	4.07	18.36	0.88	10.15	1.31	12.54	0.73	322.36	15.49
16	137.73	5.99	95.65	4.36	20.40	0.95	9.61	1.25	12.07	0.66	363.95	16.82
17	149.02	6.26	105.83	4.66	22.48	1.01	9.10	1.18	11.62	0.60	406.46	18.17
18	160.34	6.56	115.99	4.93	24.56	1.07	8.61	1.09	11.19	0.55	449.18	19.53
19	171.60	6.87	125.96	5.20	26.62	1.13	8.24	1.03	10.78	0.51	491.34	20.86
20	182.70	7.19	135.77	5.48	28.66	1.20	7.89	0.98	10.38	0.47	532.51	22.21
21	193.58	7.50	145.31	5.75	30.68	1.27	7.59	0.93	10.01	0.43	573.22	23.55
22	204.37	7.81	154.71	6.03	32.69	1.33	7.33	0.86	9.65	0.40	613.43	24.84
23	215.19	8.09	164.06	6.29	34.70	1.40	7.10	0.79	9.33	0.37	653.52	26.11
24	226.03	8.38	173.40	6.54	36.72	1.47	6.88	0.72	9.04	0.34	693.53	27.30
25	236.99	8.65	182.63	6.78	38.73	1.53	6.82	0.75	8.81	0.33	733.80	28.37
26	248.03	8.89	191.82	7.00	40.74	1.59	6.84	0.80	8.62	0.32	773.49	29.48
27	259.06	9.15	201.05	7.20	42.78	1.63	6.80	0.76	8.43	0.31	812.81	30.55
28	270.09	9.38	210.21	7.37	44.81	1.67	6.81	0.72	8.25	0.29	852.42	31.39
29	281.06	9.57	219.25	7.50	46.84	1.71	6.88	0.70	8.09	0.28	891.55	32.12
30	291.87	9.76	228.09	7.63	48.83	1.75	7.00	0.69	7.94	0.27	929.94	32.80
31	302.48	9.93	236.73	7.75	50.80	1.79	7.15	0.70	7.80	0.26	967.53	33.44
32	312.89	10.08	245.15	7.86	52.73	1.83	7.34	0.73	7.67	0.25	1004.30	34.06
33	323.11	10.23	253.37	7.97	54.64	1.86	7.57	0.76	7.54	0.24	1040.25	34.65
34	333.12	10.37	261.38	8.07	56.51	1.89	7.82	0.79	7.41	0.24	1075.40	35.22
35	342.95	10.51	269.21	8.16	58.36	1.93	8.10	0.83	7.29	0.23	1109.76	35.76
36	352.59	10.64	276.85	8.25	60.19	1.96	8.39	0.87	7.17	0.22	1143.38	36.28
37	362.05	10.75	284.32	8.34	61.99	1.99	8.70	0.90	7.05	0.22	1176.30	36.79
38	371.36	10.88	291.64	8.44	63.76	2.02	9.03	0.93	6.94	0.22	1208.58	37.30
39	380.53	11.01	298.82	8.53	65.52	2.05	9.36	0.97	6.83	0.22	1240.29	37.81
40	389.59	11.13	305.90	8.62	67.27	2.08	9.70	0.99	6.73	0.22	1271.48	38.31
41	398.50	11.25	312.84	8.71	68.99	2.10	10.04	1.01	6.64	0.21	1302.12	38.81
42	407.22	11.35	319.61	8.79	70.67	2.13	10.39	1.04	6.55	0.20	1332.10	39.31
43	415.73	11.46	326.20	8.88	72.32	2.16	10.74	1.07	6.47	0.20	1361.35	39.81
44	424.01	11.58	332.61	8.97	73.95	2.19	11.08	1.09	6.39	0.20	1389.87	40.32
45	432.09	11.70	338.84	9.07	75.54	2.22	11.42	1.11	6.30	0.20	1417.69	40.82
46	439.97	11.82	344.91	9.16	77.10	2.24	11.76	1.12	6.21	0.20	1444.82	41.32
47	447.66	11.93	350.82	9.25	78.64	2.27	12.08	1.13	6.12	0.20	1471.29	41.82
48	455.16	12.03	356.59	9.35	80.15	2.29	12.40	1.15	6.03	0.20	1497.15	42.32
49	462.50	12.15	362.21	9.43	81.64	2.31	12.72	1.16	5.94	0.19	1522.41	42.82
50	469.68	12.26	367.71	9.52	83.10	2.34	13.02	1.16	5.85	0.18	1547.10	43.32
51	476.69	12.37	373.09	9.62	84.54	2.37	13.32	1.17	5.76	0.18	1571.26	43.82
52	483.57	12.49	378.34	9.72	85.96	2.39	13.60	1.18	5.68	0.18	1594.91	44.34
53	490.31	12.61	383.49	9.82	87.36	2.42	13.88	1.18	5.59	0.18	1618.08	44.85
54	496.92	12.72	388.53	9.92	88.74	2.45	14.14	1.18	5.51	0.18	1640.79	45.36
55	503.40	12.84	393.48	10.02	90.10	2.47	14.39	1.18	5.44	0.18	1663.07	45.87
56	509.77	12.96	398.34	10.11	91.44	2.49	14.63	1.18	5.37	0.18	1684.94	46.38
57	516.04	13.08	403.11	10.21	92.77	2.52	14.87	1.18	5.30	0.18	1706.42	46.91
58	522.20	13.21	407.81	10.32	94.09	2.55	15.09	1.18	5.23	0.17	1727.55	47.43
59	528.27	13.33	412.43	10.43	95.39	2.57	15.31	1.18	5.16	0.16	1748.33	47.95
60	534.29	13.45	417.02	10.53	96.68	2.59	15.52	1.18	5.10	0.16	1768.95	48.48

Objective 2c. Combined species carbon yield tables (area-weighted only)

2c-1 Post-1989 yield table (all species, includes understorey)

Age	Total Mean	Total ±95%CI	AGL Mean	AGL ±95%CI	BGL Mean	BGL ±95%CI	DWL Mean	DWL ±95%CI	FL Mean	FL ±95%CI	Volume_Net Mean	Volume_Net ±95%CI
0	2.84	2.16	2.13	1.57	0.51	0.39	0.20	0.20	0.00	0.00	0.06	0.00
1	3.08	2.16	2.30	1.57	0.57	0.39	0.20	0.20	0.01	0.00	0.39	0.03
2	3.80	2.17	2.83	1.58	0.74	0.39	0.20	0.20	0.04	0.00	1.47	0.17
3	6.10	2.20	4.47	1.60	1.27	0.40	0.21	0.20	0.15	0.02	5.15	0.61
4	11.01	2.33	8.04	1.69	2.26	0.43	0.22	0.20	0.51	0.07	13.90	1.52
5	18.67	2.64	13.56	1.91	3.56	0.48	0.24	0.20	1.32	0.16	29.19	2.91
6	28.67	3.12	20.26	2.23	5.02	0.54	0.54	0.25	2.85	0.33	51.27	4.65
7	39.93	3.68	26.84	2.50	6.38	0.59	1.60	0.52	5.12	0.61	77.76	6.45
8	51.26	4.15	32.61	2.74	7.52	0.64	3.51	0.83	7.64	0.84	104.29	7.91
9	61.81	4.52	37.35	2.90	8.44	0.67	6.09	1.08	9.95	0.96	128.04	9.17
10	71.37	4.82	41.99	2.99	9.38	0.68	8.49	1.29	11.51	1.03	148.07	10.05
11	80.42	5.04	48.21	3.16	10.67	0.72	9.54	1.35	12.00	0.99	168.67	10.55
12	89.72	5.26	56.10	3.42	12.31	0.77	9.48	1.31	11.84	0.90	196.01	11.48
13	99.66	5.50	64.95	3.70	14.13	0.82	9.09	1.24	11.50	0.82	229.75	12.80
14	110.14	5.75	74.20	3.99	16.01	0.88	8.74	1.16	11.19	0.74	266.69	14.17
15	120.81	6.01	83.63	4.26	17.93	0.94	8.38	1.10	10.88	0.68	304.50	15.54
16	131.61	6.28	93.13	4.55	19.86	1.00	8.07	1.04	10.56	0.63	343.35	16.90
17	142.57	6.55	102.71	4.83	21.82	1.07	7.79	0.97	10.25	0.58	383.05	18.28
18	153.60	6.84	112.33	5.09	23.80	1.12	7.54	0.91	9.94	0.53	423.05	19.65
19	164.58	7.13	121.76	5.35	25.75	1.18	7.42	0.88	9.66	0.49	462.61	20.99
20	175.42	7.42	131.05	5.62	27.70	1.24	7.30	0.85	9.38	0.45	501.17	22.32
21	186.13	7.71	140.24	5.87	29.65	1.31	7.16	0.80	9.09	0.42	539.56	23.62
22	196.89	7.97	149.42	6.11	31.61	1.37	7.04	0.74	8.83	0.39	578.14	24.80
23	207.80	8.22	158.65	6.33	33.60	1.41	6.96	0.70	8.59	0.36	616.99	25.90
24	218.80	8.45	167.92	6.53	35.61	1.46	6.89	0.66	8.38	0.34	655.91	26.95
25	229.93	8.67	177.13	6.73	37.61	1.52	6.96	0.68	8.23	0.33	695.13	27.93
26	241.14	8.91	186.31	6.93	39.63	1.57	7.10	0.71	8.10	0.32	733.99	28.94
27	252.27	9.16	195.46	7.11	41.66	1.62	7.20	0.69	7.97	0.31	772.39	29.92
28	263.31	9.39	204.48	7.27	43.66	1.66	7.34	0.68	7.84	0.30	810.74	30.78
29	274.28	9.60	213.37	7.43	45.66	1.70	7.53	0.68	7.73	0.30	848.62	31.56
30	285.09	9.80	222.08	7.58	47.63	1.75	7.77	0.70	7.62	0.29	885.84	32.32
31	295.72	9.99	230.60	7.73	49.58	1.79	8.04	0.73	7.52	0.28	922.36	33.05
32	306.17	10.19	238.92	7.86	51.49	1.83	8.34	0.75	7.42	0.28	958.14	33.75
33	316.41	10.37	247.03	7.99	53.38	1.87	8.68	0.79	7.32	0.28	993.17	34.43
34	326.45	10.54	254.95	8.11	55.25	1.91	9.04	0.83	7.23	0.28	1027.44	35.09
35	336.30	10.72	262.68	8.24	57.08	1.94	9.42	0.87	7.13	0.28	1060.98	35.72
36	345.96	10.89	270.23	8.36	58.89	1.97	9.81	0.92	7.04	0.27	1093.83	36.35
37	355.44	11.06	277.61	8.49	60.68	2.01	10.22	0.96	6.94	0.26	1126.02	36.98
38	364.76	11.23	284.84	8.61	62.45	2.04	10.63	1.00	6.85	0.26	1157.60	37.60
39	373.93	11.39	291.93	8.74	64.20	2.08	11.04	1.03	6.76	0.26	1188.64	38.22
40	382.97	11.56	298.90	8.86	65.93	2.12	11.46	1.06	6.68	0.26	1219.16	38.84
41	391.85	11.73	305.74	8.98	67.64	2.16	11.88	1.10	6.60	0.26	1249.12	39.46
42	400.51	11.89	312.39	9.11	69.31	2.19	12.30	1.13	6.53	0.26	1278.42	40.09
43	408.96	12.06	318.86	9.23	70.95	2.22	12.71	1.16	6.45	0.26	1307.01	40.71
44	417.18	12.21	325.14	9.36	72.56	2.26	13.11	1.19	6.37	0.26	1334.89	41.32
45	425.19	12.38	331.25	9.49	74.14	2.30	13.51	1.21	6.29	0.26	1362.09	41.93
46	432.99	12.54	337.19	9.61	75.69	2.33	13.90	1.23	6.21	0.26	1388.61	42.54
47	440.59	12.70	342.98	9.73	77.22	2.35	14.28	1.25	6.13	0.26	1414.50	43.15
48	448.00	12.85	348.61	9.85	78.71	2.39	14.64	1.26	6.04	0.25	1439.77	43.76
49	455.24	13.01	354.11	9.98	80.19	2.43	15.00	1.28	5.95	0.24	1464.46	44.36
50	462.30	13.16	359.47	10.10	81.64	2.46	15.34	1.29	5.87	0.24	1488.59	44.96
51	469.21	13.32	364.70	10.22	83.06	2.49	15.66	1.30	5.78	0.24	1512.21	45.56
52	475.98	13.46	369.83	10.35	84.47	2.53	15.98	1.31	5.70	0.24	1535.34	46.15
53	482.60	13.61	374.85	10.47	85.86	2.56	16.28	1.32	5.61	0.24	1558.00	46.74
54	489.10	13.76	379.77	10.58	87.23	2.59	16.57	1.33	5.54	0.24	1580.23	47.33
55	495.47	13.92	384.59	10.71	88.58	2.63	16.84	1.33	5.46	0.23	1602.05	47.92
56	501.72	14.07	389.31	10.84	89.92	2.66	17.10	1.34	5.39	0.22	1623.46	48.51
57	507.86	14.21	393.96	10.95	91.24	2.68	17.35	1.35	5.32	0.22	1644.50	49.09
58	513.89	14.37	398.52	11.07	92.54	2.72	17.59	1.35	5.25	0.22	1665.19	49.67
59	519.82	14.52	403.01	11.19	93.82	2.75	17.82	1.35	5.18	0.22	1685.54	50.25
60	525.70	14.68	407.46	11.30	95.10	2.77	18.03	1.35	5.12	0.22	1705.73	50.82

2c-2 Pre-1990 yield table for period 2000-2009 (all species includes understorey)

Age	Total Mean	Total ±95%CI	AGL Mean	AGL ±95%CI	BGL Mean	BGL ±95%CI	DWL Mean	DWL ±95%CI	FL Mean	FL ±95%CI	Volume_Net Mean	Volume_Net ±95%CI
0	4.33	4.56	3.32	3.57	0.81	0.79	0.20	0.20	0.00	0.00	0.05	0.01
1	4.51	4.56	3.45	3.57	0.86	0.79	0.20	0.20	0.01	0.00	0.28	0.04
2	5.00	4.56	3.81	3.57	0.96	0.79	0.20	0.20	0.03	0.00	0.98	0.14
3	6.57	4.57	4.93	3.58	1.33	0.80	0.20	0.20	0.12	0.02	3.36	0.54
4	10.17	4.64	7.53	3.62	2.08	0.81	0.20	0.20	0.37	0.07	9.38	1.48
5	16.14	4.84	11.85	3.76	3.13	0.85	0.21	0.20	0.96	0.17	20.56	3.01
6	24.50	5.25	17.75	4.02	4.47	0.91	0.29	0.21	2.00	0.33	37.85	5.13
7	34.78	5.81	24.63	4.34	5.94	0.97	0.67	0.45	3.56	0.59	60.86	7.56
8	46.16	6.40	31.69	4.65	7.40	1.03	1.56	0.80	5.52	0.89	87.37	9.84
9	57.69	6.95	38.59	4.93	8.80	1.09	2.88	1.04	7.43	1.08	114.10	11.80
10	68.70	7.42	45.75	5.24	10.26	1.15	3.94	1.19	8.76	1.14	139.28	13.39
11	79.33	7.83	53.43	5.58	11.81	1.22	4.56	1.22	9.54	1.11	166.95	15.07
12	89.89	8.22	61.46	5.92	13.42	1.29	5.03	1.24	9.99	1.07	197.80	17.04
13	100.57	8.62	69.92	6.32	15.13	1.37	5.33	1.27	10.20	1.02	230.02	19.04
14	111.66	9.03	78.26	6.55	16.80	1.41	6.17	1.86	10.44	1.12	265.14	21.14
15	122.93	9.37	87.15	6.74	18.60	1.45	6.68	2.35	10.51	1.18	299.39	22.15
16	134.21	9.64	97.04	7.08	20.62	1.53	6.30	2.14	10.26	1.06	334.74	23.01
17	145.72	9.92	107.09	7.40	22.67	1.60	5.97	1.92	10.01	0.96	374.00	24.74
18	157.47	10.22	117.27	7.69	24.77	1.67	5.68	1.71	9.76	0.87	414.03	26.39
19	169.31	10.53	127.44	7.97	26.87	1.74	5.46	1.52	9.54	0.79	454.22	28.00
20	181.18	10.84	137.53	8.23	28.99	1.81	5.34	1.36	9.33	0.72	494.21	29.56
21	193.14	11.16	147.57	8.49	31.13	1.88	5.31	1.23	9.13	0.67	534.10	31.09
22	205.19	11.48	157.60	8.75	33.29	1.94	5.37	1.13	8.95	0.63	574.02	32.58
23	217.30	11.79	167.58	8.98	35.45	2.01	5.49	1.03	8.79	0.59	613.85	34.00
24	229.39	12.07	177.45	9.20	37.61	2.07	5.69	0.96	8.65	0.55	653.37	35.33
25	241.45	12.34	187.20	9.40	39.77	2.13	5.96	0.91	8.53	0.53	692.49	36.58
26	253.46	12.59	196.83	9.59	41.91	2.18	6.29	0.88	8.43	0.51	731.19	37.79
27	265.37	12.84	206.32	9.77	44.05	2.24	6.68	0.87	8.34	0.49	769.37	38.97
28	277.17	13.09	215.64	9.95	46.17	2.29	7.12	0.88	8.25	0.47	806.95	40.12
29	288.84	13.32	224.80	10.11	48.27	2.34	7.60	0.91	8.18	0.45	843.87	41.24
30	300.33	13.54	233.77	10.28	50.34	2.38	8.12	0.95	8.10	0.44	880.09	42.33
31	311.61	13.76	242.53	10.44	52.39	2.43	8.67	1.00	8.03	0.43	915.58	43.39
32	322.69	13.97	251.07	10.59	54.42	2.48	9.24	1.05	7.96	0.42	950.31	44.42
33	333.55	14.17	259.41	10.73	56.41	2.53	9.84	1.10	7.88	0.41	984.30	45.43
34	344.19	14.36	267.55	10.87	58.38	2.56	10.45	1.16	7.80	0.40	1017.53	46.43
35	354.62	14.54	275.50	11.01	60.33	2.61	11.07	1.22	7.72	0.40	1050.04	47.42
36	364.85	14.73	283.26	11.14	62.25	2.66	11.70	1.26	7.64	0.39	1081.84	48.40
37	374.88	14.91	290.85	11.28	64.15	2.70	12.34	1.31	7.56	0.38	1112.98	49.37
38	384.74	15.09	298.28	11.42	66.03	2.73	12.97	1.36	7.48	0.38	1143.49	50.34
39	394.45	15.28	305.56	11.55	67.89	2.77	13.60	1.41	7.40	0.38	1173.45	51.31
40	404.00	15.46	312.72	11.69	69.74	2.82	14.23	1.46	7.33	0.37	1202.88	52.28
41	413.34	15.64	319.71	11.84	71.54	2.87	14.85	1.50	7.26	0.36	1231.64	53.26
42	422.43	15.83	326.48	11.99	73.31	2.90	15.45	1.54	7.19	0.36	1259.65	54.26
43	431.26	16.01	333.05	12.13	75.05	2.94	16.05	1.58	7.12	0.36	1286.92	55.24
44	439.85	16.19	339.43	12.28	76.76	2.98	16.63	1.61	7.04	0.36	1313.48	56.22
45	448.20	16.38	345.62	12.43	78.44	3.02	17.19	1.64	6.96	0.36	1339.34	57.21
46	456.33	16.56	351.64	12.58	80.09	3.06	17.74	1.67	6.87	0.36	1364.54	58.19
47	464.25	16.74	357.50	12.73	81.71	3.10	18.26	1.69	6.79	0.35	1389.11	59.17
48	471.96	16.93	363.20	12.87	83.30	3.13	18.76	1.71	6.70	0.34	1413.07	60.15
49	479.47	17.12	368.75	13.02	84.87	3.17	19.25	1.73	6.61	0.34	1436.46	61.12
50	486.80	17.31	374.17	13.18	86.42	3.21	19.70	1.74	6.53	0.34	1459.30	62.09
51	493.96	17.49	379.45	13.35	87.94	3.25	20.14	1.75	6.44	0.34	1481.63	63.06
52	500.95	17.68	384.62	13.50	89.44	3.29	20.55	1.76	6.35	0.34	1503.46	64.03
53	507.79	17.87	389.67	13.65	90.91	3.33	20.95	1.76	6.27	0.34	1524.84	65.00
54	514.48	18.06	394.61	13.80	92.37	3.37	21.32	1.77	6.19	0.33	1545.79	65.96
55	521.04	18.25	399.45	13.97	93.81	3.42	21.67	1.77	6.11	0.32	1566.32	66.92
56	527.46	18.45	404.21	14.13	95.23	3.46	22.00	1.77	6.04	0.32	1586.48	67.87
57	533.77	18.64	408.87	14.28	96.64	3.50	22.30	1.77	5.97	0.32	1606.27	68.82
58	539.97	18.84	413.46	14.45	98.03	3.54	22.59	1.77	5.90	0.32	1625.73	69.77
59	546.06	19.04	417.97	14.61	99.40	3.58	22.87	1.77	5.83	0.31	1644.88	70.72
60	552.10	19.23	422.44	14.76	100.76	3.62	23.14	1.77	5.76	0.29	1663.87	71.67

Objective 2d. Area-weighted and age-adjusted yield tables

2d-1 Post-1989 yield table age-adjusted and area-weighted (all species including understorey). Volume is area-weighted only.

	Total		AGL		BGL		DWL		FL		Volume_Net	
Age	Mean	±95%CI	Mean	±95%CI	Mean	±95%CI	Mean	±95%CI	Mean	±95%CI	Mean	±95%CI
0	2.84	2.16	2.13	1.57	0.51	0.39	0.20	0.20	0.00	0.00	0.06	0.01
1	3.09	2.16	2.31	1.57	0.58	0.39	0.20	0.20	0.01	0.00	0.41	0.04
2	3.93	2.17	2.96	1.57	0.74	0.39	0.20	0.20	0.03	0.00	2.25	0.09
3	5.99	2.19	4.35	1.59	1.31	0.40	0.21	0.20	0.12	0.02	4.96	0.41
4	10.50	2.31	7.31	1.69	2.53	0.44	0.22	0.20	0.44	0.06	10.31	1.41
5	18.30	2.72	13.02	1.99	3.80	0.49	0.26	0.20	1.23	0.15	26.95	3.25
6	29.46	3.25	20.66	2.30	5.11	0.54	0.85	0.33	2.86	0.34	49.17	5.19
7	41.33	3.71	27.64	2.50	6.54	0.59	1.94	0.61	5.22	0.62	75.44	6.03
8	52.19	4.17	33.21	2.74	7.65	0.64	3.62	0.83	7.71	0.84	114.52	6.97
9	62.44	4.53	37.70	2.88	8.52	0.66	6.22	1.08	10.01	0.96	149.97	8.80
10	71.71	4.81	42.08	2.92	9.41	0.67	8.65	1.29	11.57	1.03	169.42	9.63
11	80.50	5.02	48.04	3.07	10.66	0.70	9.74	1.35	12.07	0.99	191.71	10.04
12	89.59	5.20	55.70	3.32	12.25	0.75	9.72	1.31	11.92	0.90	217.07	10.92
13	99.40	5.43	64.39	3.60	14.03	0.80	9.38	1.25	11.60	0.83	242.73	11.96
14	109.78	5.68	73.54	3.88	15.89	0.86	9.07	1.17	11.29	0.75	278.07	13.12
15	120.39	5.94	82.90	4.16	17.78	0.92	8.75	1.10	10.97	0.68	314.03	14.21
16	131.14	6.20	92.35	4.46	19.70	0.99	8.45	1.05	10.65	0.63	350.55	15.53
17	142.05	6.48	101.88	4.74	21.64	1.05	8.19	0.99	10.34	0.58	390.78	16.94
18	153.07	6.77	111.48	5.02	23.61	1.11	7.95	0.94	10.04	0.53	433.77	18.30
19	164.07	7.07	120.92	5.29	25.57	1.17	7.82	0.91	9.76	0.49	475.75	19.45
20	174.90	7.37	130.23	5.56	27.51	1.23	7.69	0.88	9.48	0.45	514.64	20.53
21	185.50	7.66	139.36	5.82	29.44	1.29	7.52	0.85	9.19	0.42	543.88	21.98
22	196.07	7.91	148.46	6.06	31.38	1.35	7.32	0.80	8.92	0.39	572.28	23.23
23	206.74	8.14	157.63	6.27	33.35	1.40	7.08	0.74	8.68	0.36	604.98	23.68
24	217.56	8.38	166.82	6.47	35.34	1.45	6.94	0.68	8.48	0.34	635.95	24.34
25	228.53	8.62	175.97	6.68	37.32	1.50	6.91	0.85	8.33	0.33	674.58	26.56
26	239.47	8.86	185.08	6.90	39.32	1.56	6.88	1.11	8.20	0.33	710.35	28.53
27	250.33	9.12	194.18	7.10	41.32	1.61	6.85	0.92	7.99	0.32	738.57	28.89
28	261.10	9.36	203.19	7.27	43.33	1.66	6.82	0.67	7.77	0.31	771.56	29.55
29	271.78	9.58	212.10	7.43	45.33	1.70	6.79	0.70	7.57	0.30	809.33	32.02
30	282.38	9.78	220.84	7.58	47.30	1.74	6.87	0.69	7.37	0.30	847.10	34.07
31	292.95	9.98	229.38	7.73	49.25	1.78	7.08	0.65	7.25	0.30	884.87	34.64
32	303.34	10.17	237.72	7.86	51.17	1.81	7.29	0.65	7.17	0.30	922.64	35.22
33	313.47	10.36	245.87	8.00	53.06	1.85	7.50	0.70	7.04	0.29	960.41	35.80
34	323.67	10.54	253.86	8.13	54.93	1.89	7.90	0.75	6.99	0.28	998.18	36.38
35	333.83	10.72	261.65	8.26	56.78	1.93	8.42	0.80	6.99	0.28	1037.38	36.80
36	343.63	10.89	269.25	8.38	58.60	1.97	8.86	0.85	6.93	0.28	1075.93	37.13
37	353.22	11.05	276.69	8.51	60.40	2.01	9.28	0.89	6.85	0.28	1111.36	37.59
38	362.62	11.22	283.98	8.62	62.17	2.04	9.71	0.93	6.77	0.27	1145.13	38.11
39	371.87	11.39	291.13	8.75	63.93	2.08	10.13	0.96	6.69	0.26	1177.77	38.67
40	380.99	11.56	298.16	8.88	65.67	2.12	10.56	1.00	6.61	0.26	1209.57	39.25
41	389.94	11.72	305.04	9.00	67.39	2.15	10.99	1.03	6.54	0.26	1240.57	39.84
42	398.68	11.89	311.74	9.13	69.06	2.18	11.42	1.06	6.47	0.26	1270.76	40.43
43	407.20	12.06	318.26	9.25	70.71	2.22	11.84	1.10	6.40	0.26	1300.12	41.03
44	415.50	12.21	324.59	9.38	72.32	2.26	12.26	1.13	6.33	0.26	1328.68	41.63
45	423.58	12.38	330.75	9.50	73.91	2.30	12.68	1.15	6.25	0.26	1356.47	42.23
46	431.45	12.54	336.74	9.63	75.47	2.33	13.08	1.17	6.17	0.26	1383.53	42.83
47	439.12	12.70	342.57	9.76	77.00	2.35	13.47	1.19	6.09	0.26	1409.90	43.42
48	446.60	12.85	348.24	9.88	78.51	2.39	13.85	1.21	6.00	0.26	1435.61	44.02
49	453.89	13.01	353.77	10.00	79.99	2.43	14.22	1.23	5.92	0.25	1460.69	44.62
50	461.01	13.16	359.17	10.13	81.44	2.46	14.58	1.25	5.83	0.24	1485.19	45.21
51	467.98	13.32	364.44	10.25	82.87	2.49	14.92	1.26	5.75	0.24	1509.15	45.80
52	474.81	13.47	369.60	10.37	84.29	2.53	15.26	1.27	5.67	0.24	1532.59	46.39
53	481.50	13.63	374.65	10.49	85.68	2.56	15.58	1.28	5.59	0.24	1555.54	46.98
54	488.04	13.77	379.60	10.61	87.05	2.59	15.88	1.29	5.51	0.24	1578.04	47.57
55	494.45	13.92	384.44	10.74	88.41	2.63	16.17	1.29	5.44	0.24	1600.10	48.15
56	500.75	14.08	389.20	10.86	89.75	2.66	16.45	1.30	5.37	0.23	1621.75	48.73
57	506.94	14.23	393.87	10.97	91.07	2.68	16.71	1.31	5.30	0.22	1643.01	49.31
58	513.02	14.38	398.46	11.10	92.37	2.72	16.97	1.31	5.23	0.22	1663.90	49.89
59	519.00	14.52	402.97	11.23	93.66	2.75	17.21	1.31	5.16	0.22	1684.44	50.47
60	524.93	14.68	407.44	11.34	94.94	2.77	17.45	1.31	5.10	0.22	1704.81	51.04

2d-2 Pre-1990 before 1990 yield table age-adjusted area-weighted (all species including understorey). Volume is area-weighted only.

	Total		AGL		BGL		DWL		FL		Volume_Net	
Age	Mean	±95%CI	Mean	±95%CI	Mean	±95%CI	Mean	±95%CI	Mean	±95%CI	Mean	±95%CI
0	3.14	4.19	2.43	3.19	0.61	0.80	0.10	0.20	0.00	0.00	0.05	0.01
1	3.34	4.19	2.57	3.19	0.67	0.80	0.10	0.20	0.01	0.00	0.31	0.07
2	3.94	4.19	3.01	3.19	0.80	0.80	0.10	0.20	0.03	0.01	1.15	0.27
3	5.83	4.24	4.35	3.22	1.24	0.81	0.10	0.20	0.14	0.05	4.02	1.00
4	9.91	4.46	7.28	3.38	2.06	0.86	0.11	0.20	0.46	0.12	10.94	2.66
5	16.36	5.08	11.72	3.82	3.15	0.96	0.20	0.22	1.30	0.29	23.20	5.35
6	24.88	6.15	17.26	4.56	4.41	1.12	0.49	0.37	2.73	0.61	41.01	8.97
7	34.50	7.46	22.65	5.27	5.54	1.25	1.58	1.03	4.74	1.23	62.92	13.25
8	43.96	8.62	27.04	5.59	6.44	1.29	3.45	1.82	7.04	1.85	84.13	16.53
9	53.25	9.45	32.58	6.04	7.62	1.39	4.65	1.95	8.41	1.95	102.20	17.95
10	62.61	10.19	39.48	6.75	9.05	1.53	5.08	1.89	9.00	1.82	125.26	20.13
11	71.18	10.98	45.57	7.40	10.30	1.66	5.51	2.25	9.81	1.84	153.52	23.31
12	80.20	11.71	52.41	8.12	11.69	1.81	5.94	2.42	10.17	1.78	178.84	26.01
13	90.45	12.43	60.73	8.90	13.40	1.97	6.37	2.12	9.96	1.56	207.20	28.85
14	100.72	13.19	68.98	9.73	15.08	2.15	6.81	1.98	9.87	1.40	241.54	31.95
15	110.88	13.96	77.12	10.51	16.74	2.32	7.20	1.98	9.83	1.29	275.68	35.25
16	120.42	14.70	84.55	10.82	18.24	2.38	7.78	3.81	9.86	1.49	309.41	38.26
17	130.55	15.21	92.39	11.08	19.83	2.43	8.61	5.21	9.73	1.59	343.17	40.60
18	140.84	15.54	100.84	11.64	21.57	2.55	8.95	4.44	9.49	1.40	381.56	42.70
19	150.43	15.95	109.25	12.17	23.30	2.67	8.59	3.80	9.30	1.26	419.88	44.80
20	160.48	16.40	118.27	12.65	25.17	2.79	8.08	3.26	8.97	1.09	452.94	46.90
21	170.68	16.87	127.16	13.15	27.04	2.91	7.78	2.85	8.71	0.96	486.00	49.00
22	180.87	17.37	135.95	13.64	28.91	3.04	7.55	2.53	8.47	0.85	519.05	51.10
23	191.03	17.88	144.70	14.10	30.77	3.14	7.33	2.28	8.24	0.77	552.11	53.20
24	201.10	18.39	153.14	14.54	32.59	3.25	7.34	2.13	8.04	0.71	578.66	55.30
25	210.95	18.90	161.27	14.95	34.35	3.37	7.48	2.07	7.85	0.66	598.69	57.40
26	220.63	19.43	169.19	15.39	36.08	3.48	7.67	2.09	7.70	0.63	618.73	59.50
27	230.14	20.01	177.01	15.89	37.79	3.61	7.80	2.10	7.55	0.61	638.76	61.60
28	239.00	20.64	184.30	16.49	39.38	3.76	7.81	2.27	7.51	0.62	658.80	63.70
29	247.67	21.26	191.44	17.05	40.95	3.89	7.83	2.41	7.45	0.63	678.83	65.80
30	256.81	21.83	199.13	17.52	42.64	4.01	7.86	2.22	7.18	0.61	700.95	67.90
31	266.20	22.42	207.03	17.97	44.41	4.12	7.88	1.96	6.89	0.59	725.15	70.00
32	274.85	22.79	214.19	18.16	45.99	4.17	7.93	1.84	6.74	0.62	749.35	72.10
33	282.59	22.89	220.51	18.14	47.39	4.17	8.00	2.14	6.70	0.73	773.54	74.20
34	290.24	23.08	226.71	18.29	48.80	4.20	8.07	2.72	6.67	0.87	797.74	76.30
35	297.64	23.48	232.75	18.68	50.17	4.29	8.14	3.27	6.60	1.10	821.94	78.40
36	304.91	24.14	238.66	19.31	51.53	4.44	8.21	3.67	6.52	1.12	846.14	80.50
37	312.43	24.90	244.83	19.98	52.96	4.60	8.28	2.61	6.37	0.87	870.34	82.60
38	320.57	25.51	251.59	20.42	54.53	4.72	8.35	1.50	6.11	0.77	894.53	84.70
39	329.05	25.98	258.58	20.71	56.17	4.79	8.42	1.43	5.89	0.72	918.73	86.80
40	337.46	26.43	265.46	20.99	57.80	4.88	8.49	1.26	5.71	0.63	942.93	88.90
41	345.73	26.87	272.22	21.26	59.40	4.97	8.56	1.20	5.56	0.58	967.13	91.00
42	353.84	27.29	278.85	21.52	60.98	5.05	8.63	1.20	5.39	0.55	991.33	93.10
43	361.94	27.69	285.31	21.78	62.54	5.13	8.70	1.18	5.40	0.52	1017.04	95.20
44	369.90	28.11	291.57	22.05	64.05	5.21	8.77	1.23	5.51	0.49	1044.26	97.30
45	377.52	28.51	297.67	22.32	65.54	5.29	8.84	1.32	5.48	0.48	1071.48	99.40
46	384.91	28.92	303.60	22.59	67.01	5.36	8.91	1.33	5.40	0.48	1098.71	101.50
47	392.20	29.30	309.44	22.86	68.46	5.44	8.98	1.52	5.33	0.48	1125.93	103.60
48	399.48	29.65	315.21	23.10	69.89	5.51	9.08	1.74	5.31	0.48	1153.15	105.11
49	406.77	29.98	320.83	23.33	71.31	5.58	9.34	1.80	5.31	0.47	1180.38	106.03
50	413.95	30.32	326.31	23.56	72.70	5.66	9.68	1.85	5.27	0.46	1207.60	106.99
51	420.93	30.65	331.68	23.79	74.07	5.73	9.98	1.89	5.21	0.46	1235.69	107.99
52	427.75	30.99	336.93	24.03	75.42	5.80	10.26	1.93	5.15	0.46	1263.66	109.02
53	434.43	31.31	342.07	24.26	76.75	5.88	10.53	1.95	5.09	0.45	1289.96	110.05
54	440.97	31.64	347.10	24.50	78.06	5.95	10.79	1.98	5.02	0.44	1315.01	111.10
55	447.38	31.97	352.03	24.74	79.35	6.02	11.04	2.01	4.96	0.44	1339.04	112.17
56	453.67	32.29	356.87	24.98	80.63	6.09	11.28	2.03	4.90	0.44	1362.23	113.24
57	459.85	32.62	361.61	25.21	81.89	6.15	11.52	2.06	4.84	0.43	1384.69	114.33
58	465.92	32.94	366.27	25.45	83.13	6.23	11.75	2.08	4.78	0.42	1406.51	115.43
59	471.90	33.26	370.84	25.70	84.36	6.30	11.97	2.09	4.73	0.42	1427.76	116.52
60	477.83	33.60	375.38	25.96	85.58	6.36	12.19	2.11	4.68	0.42	1448.73	117.62

2d-3 Pre-1990 yield table after 1990 age-adjusted area-weighted.
Volume is area-weighted only.

	Total		AGL		BGL		DWL		FL		Volume_Net	
Age	Mean	±95%CI	Mean	±95%CI	Mean	±95%CI	Mean	±95%CI	Mean	±95%CI	Mean	±95%CI
0	3.44	2.36	2.63	0.20	0.61	0.39	0.20	0.20	0.00	0.00	0.06	0.01
1	3.71	2.36	2.83	0.20	0.68	0.39	0.20	0.20	0.01	0.00	0.42	0.04
2	4.43	2.37	3.37	0.21	0.83	0.40	0.20	0.20	0.03	0.00	1.59	0.13
3	6.95	2.38	5.22	0.30	1.40	0.40	0.21	0.20	0.13	0.01	5.51	0.45
4	12.50	2.46	9.30	0.55	2.53	0.43	0.22	0.20	0.46	0.05	14.79	1.13
5	19.88	2.65	14.98	0.90	3.51	0.46	0.25	0.20	1.15	0.14	30.41	2.18
6	27.89	2.98	20.42	1.29	4.69	0.50	0.38	0.21	2.41	0.26	47.99	3.54
7	37.40	3.41	26.19	1.66	6.25	0.54	0.74	0.29	4.23	0.41	67.30	4.80
8	48.83	3.86	33.14	1.99	7.69	0.59	1.78	0.52	6.23	0.59	93.65	5.94
9	60.45	4.26	40.20	2.30	9.12	0.63	3.12	0.75	8.02	0.69	121.04	6.86
10	71.45	4.61	47.72	2.66	10.64	0.69	3.89	0.79	9.21	0.70	144.19	7.52
11	82.43	4.94	55.74	3.02	12.24	0.75	4.50	0.82	9.96	0.68	171.14	8.66
12	93.47	5.27	64.00	3.37	13.90	0.81	5.13	0.88	10.44	0.66	200.78	10.13
13	104.83	5.60	72.89	3.73	15.70	0.88	5.61	0.92	10.63	0.63	235.61	11.82
14	116.18	5.92	82.03	4.00	17.56	0.93	5.88	1.13	10.72	0.64	276.55	13.21
15	127.74	6.21	91.61	4.24	19.52	0.99	5.93	1.31	10.68	0.64	313.11	14.30
16	139.92	6.47	101.89	4.51	21.65	1.05	5.92	1.27	10.47	0.59	348.01	15.05
17	152.17	6.74	112.23	4.77	23.80	1.11	5.89	1.22	10.25	0.55	385.86	16.44
18	164.25	7.02	122.42	5.05	25.94	1.16	5.86	1.17	10.05	0.51	426.07	18.38
19	176.22	7.30	132.50	5.30	28.06	1.23	5.82	1.13	9.85	0.48	462.82	20.06
20	188.19	7.59	142.53	5.54	30.22	1.29	5.79	1.08	9.66	0.47	503.41	21.99
21	199.93	7.89	152.27	5.80	32.35	1.35	5.76	1.03	9.56	0.48	544.55	23.61
22	211.62	8.19	161.83	6.10	34.48	1.42	5.87	0.99	9.45	0.49	579.74	24.83
23	222.73	8.50	170.78	6.37	36.51	1.48	6.11	0.96	9.34	0.56	616.48	25.75
24	233.59	8.81	179.51	6.64	38.53	1.55	6.34	0.96	9.22	0.61	653.22	26.67
25	245.27	9.09	188.94	6.90	40.70	1.61	6.57	0.95	9.06	0.58	689.96	27.59
26	257.40	9.32	198.75	7.05	42.95	1.64	6.80	0.95	8.90	0.54	726.70	28.51
27	269.68	9.53	208.53	7.18	45.20	1.69	7.21	0.93	8.74	0.51	763.44	29.43
28	281.85	9.74	218.05	7.32	47.43	1.74	7.79	0.90	8.59	0.47	800.19	30.35
29	293.79	9.95	227.38	7.46	49.63	1.78	8.37	0.87	8.43	0.44	836.93	31.27
30	305.52	10.16	236.51	7.60	51.80	1.82	8.94	0.84	8.27	0.40	873.67	32.19
31	316.93	10.36	245.38	7.72	53.93	1.85	9.52	0.81	8.11	0.37	910.41	33.11
32	328.34	10.54	254.11	7.84	56.04	1.89	10.24	0.88	7.95	0.33	947.15	34.04
33	339.72	10.71	262.72	7.96	58.13	1.93	11.02	0.99	7.86	0.32	983.89	34.96
34	350.76	10.89	271.07	8.07	60.19	1.97	11.71	1.02	7.81	0.31	1021.72	35.60
35	361.53	11.06	279.19	8.18	62.21	2.01	12.40	1.06	7.74	0.30	1059.12	36.03
36	372.05	11.23	287.09	8.29	64.20	2.04	13.10	1.10	7.66	0.30	1094.12	36.52
37	382.36	11.40	294.80	8.38	66.17	2.07	13.81	1.14	7.59	0.29	1127.60	37.04
38	392.46	11.55	302.33	8.48	68.11	2.11	14.51	1.18	7.51	0.28	1159.95	37.58
39	402.36	11.71	309.70	8.59	70.03	2.14	15.21	1.22	7.43	0.28	1191.38	38.13
40	412.10	11.86	316.92	8.70	71.94	2.18	15.89	1.26	7.36	0.28	1222.02	38.69
41	421.61	12.01	323.96	8.80	73.80	2.21	16.57	1.30	7.29	0.28	1251.80	39.25
42	430.83	12.17	330.78	8.90	75.62	2.24	17.23	1.32	7.22	0.28	1280.67	39.83
43	439.80	12.31	337.39	8.99	77.41	2.28	17.87	1.35	7.15	0.27	1308.69	40.41
44	448.51	12.46	343.80	9.09	79.16	2.31	18.49	1.38	7.07	0.26	1335.90	40.98
45	456.97	12.60	350.01	9.19	80.88	2.34	19.09	1.41	6.99	0.26	1362.32	41.56
46	465.19	12.74	356.05	9.30	82.57	2.38	19.67	1.44	6.91	0.26	1388.01	42.14
47	473.18	12.87	361.91	9.41	84.23	2.41	20.22	1.46	6.82	0.26	1413.00	42.72
48	480.96	13.01	367.62	9.51	85.86	2.44	20.75	1.48	6.74	0.26	1437.32	43.31
49	488.52	13.15	373.17	9.60	87.47	2.47	21.24	1.50	6.65	0.26	1461.02	43.89
50	495.89	13.28	378.58	9.70	89.05	2.50	21.71	1.52	6.56	0.26	1484.14	44.47
51	503.10	13.42	383.86	9.80	90.61	2.53	22.16	1.53	6.47	0.26	1506.71	45.05
52	510.13	13.55	389.02	9.90	92.14	2.57	22.59	1.54	6.39	0.25	1528.77	45.63
53	516.99	13.68	394.06	10.00	93.65	2.60	22.98	1.55	6.31	0.24	1550.34	46.21
54	523.71	13.81	398.99	10.10	95.14	2.63	23.35	1.56	6.23	0.24	1571.46	46.80
55	530.29	13.94	403.83	10.21	96.62	2.66	23.70	1.57	6.15	0.24	1592.16	47.38
56	536.73	14.08	408.57	10.31	98.07	2.69	24.02	1.57	6.08	0.24	1612.46	47.96
57	543.05	14.20	413.23	10.41	99.51	2.73	24.32	1.57	6.01	0.24	1632.40	48.55
58	549.26	14.33	417.81	10.51	100.93	2.76	24.60	1.57	5.94	0.24	1651.99	49.14
59	555.37	14.47	422.32	10.61	102.33	2.79	24.86	1.57	5.87	0.23	1671.26	49.72
60	561.42	14.60	426.79	10.71	103.73	2.82	25.11	1.57	5.80	0.21	1690.38	50.31