

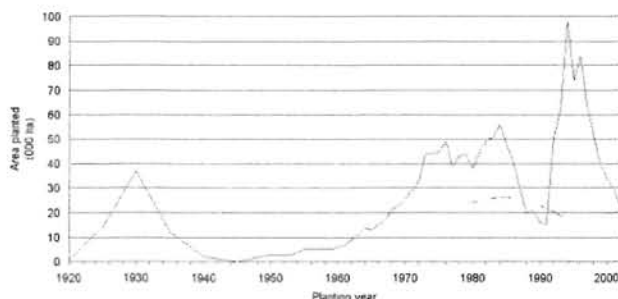
Review of new forest planting estimates

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Introduction

The Ministry of Agriculture and Forestry (MAF) provides estimates of new land planting every year. Fig. 1 shows the estimates for 1920 to 2002. Estimates are widely used throughout the forestry sector as an indicator of forestry activity.

Fig. 1: New Land Planted in Production Forest 1920 to 2002



Since 1992 new planting estimates have been based on MAF surveys of the number of planting stock sold each year by commercial forest nurseries. There has been some uncertainty about how reliable the nursery survey estimates of new planting are. Consequently in 2002 MAF commissioned an independent review of the method used.

Review of MAF's new planting estimates

Estimates of new forest planting are a fundamental indicator of forest growing activity in New Zealand. Since 1995 the nursery survey estimates of new planting, based on the number of seedlings sold, have been built into the National Exotic Forest Description (NEFD) database in an attempt to better describe the total forest estate. The new planting estimates have also been used for international reporting.

An estimate of new planting is calculated annually by MAF. The calculation is based on a survey of forest nurseries. The nurseries provide estimates of the number of planting stock sold. Using assumed stocking rates and a number of other factors (restocking, blanking, and field wastage) the area of forest planted is calculated. The assumptions and calculations in the nursery survey

calculations set out to be conservative to try to avoid overestimating the area of new planting. Further details on the methods and assumptions used in the nursery survey are available in Eyre (1995). The assumptions used for stocking rates, blanking and field wastage have been revised periodically based on information from forest managers and growers.

The nursery survey was started in 1992 in response to a request from the Minister of Forestry for regular briefings on the number of seedlings likely to be available for that planting season. The Minister's request was in response to reported shortages in planting stock that could constrain the expansion of forest planting at that time. The forward estimate of available planting stock was stopped once demand for seedlings fell away. The focus of the survey then changed from estimating planting stock availability, to estimating the area of new planting immediately following the end of the planting season.

The review of the nursery survey estimates of new planting comprised three related analyses:

1. a survey to test the validity of the key assumptions used in the nursery survey;
2. a sensitivity analysis of the 2001 nursery survey calculation used to estimate the area of new planting; and
3. a field validation of actual planting in the Nelson/Marlborough region in 2002.

I Findings of Review

1. Validity of Key Assumptions

Stocking: The stocking rates (radiata pine) used in the MAF nursery survey model for 2001 and 2002 are, on average, higher than those determined by an independent survey carried out as part of this review. This means that the new planting estimates for 2001 and 2002 are likely to have underestimated the area of new planting that actually occurred.

Blanking and field wastage: The rate of blanking determined by this review for 2002 varied from 0 to 15 percent with an area-weighted average of 1.1 percent. This figure is within the 2% field wastage factor used in the MAF nursery survey model to allow for planting stock used for blanking and also for tree stock culled at the time of planting.

2. Sensitivity Analysis of the Nursery Survey Calculations

The sensitivity analysis indicated that the assumed stocking rates were the most critical assumptions in the nursery survey calculations. Actual stockings can vary significantly from those assumed in the model and this has a major impact on the new planting estimate.

3. Nelson/Marlborough Field Validation

The results from the field survey in the Nelson/Marlborough region were compared to the results of the

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2002 nursery survey. The estimate of radiata pine new planting from the nursery survey model was 930 hectares compared to 1435 hectares from the field survey measurements. This underestimate is largely caused by the nursery survey assuming too high an average stocking rate resulting in the calculated total area planted (new planting and restocking) being too low. This effect is partially offset by the replanting figure assumed in the nursery survey being lower than the measured area of restocking in the region in 2002.

The field survey also revealed that the average stocking being used in new planting (largely being done by private growers) was 1003 stems/hectare, considerably higher than the average stocking for restocking (largely being done by corporates) which was 712 stems/hectare.

Recommendations

The review has made the following recommendations to the Ministry of Agriculture and Forestry:

1. The overall finding of this review is that the current approach used to estimate the area of new planting from the nursery survey is sound. The nursery survey is considered to provide a complete estimate of new planting because there is only a small number of commercial forest nurseries (around 35). A major advantage of the nursery survey approach is that it provides a timely estimate of new planting.
2. The most critical area for improvement is in obtaining better estimates of the stockings used. This appears to be the area of greatest weakness in the MAF nursery survey model at present. Because the average stockings used in the model have been too high, the area of new planting has been underestimated. However, as stockings being used are liable to change from year to year there is no guarantee that the nursery survey model will always be conservative in estimating the area of new planting.
3. An annual survey of forestry companies, consultants and contractors undertaking planting, should be carried out to provide stocking estimates for the nursery survey model. The survey should attempt to capture the majority of the area being restocked in each region as well as the majority of the new planting. The survey should be analysed to give separate estimates, for each region, of the stocking used for replanting and the stocking used for new planting.
4. To simplify the stocking survey, it is suggested that stocking information is sought for only two broad categories of genetic rating for radiata pine: (i) GF 19 and lower; and (ii) GF 20 and higher. Note that this does not preclude the nursery survey continuing to use the five categories for radiata pine (i.e. GF less than 14, GF 14 – 19, GF greater than 19, GF cuttings, GF Plus).

5. It is important that the area of restocking continues to be subsequently revised using returns from the NEFD. Allowance also needs to be made for replanting by forest owners not included in NEFD surveys.

II Some planting statistics gathered as part of the review process

Some of the information gathered as part of the review of new forest planting estimates is of general interest and is presented below. Note that these statistics relate to information gathered as part of the review process rather than official MAF statistics that are routinely gathered (e.g. NEFD statistics). They do not capture the total planting in 2002 but do provide an indication of the stockings that were established.

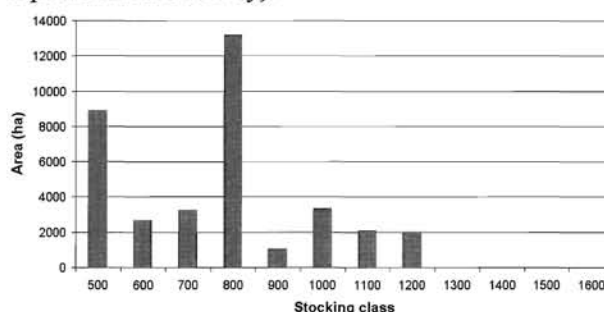
1. Stockings established in 2002

A survey of forest owners and managers was carried out to determine stockings used in 2002 for replanting and new planting.

Radiata pine replanting

Responses were received from 32 forest managers who collectively accounted for over 36,500 ha of replanting in 2002. Fig. 2 shows the area planted by stocking class. A wide range of stockings (500 to 1500 stems/ha) was established. The national area-weighted average stocking was 776 stems/ha. Average stocking varied by region largely reflecting the activities of the largest companies which tend to plant lower stockings.

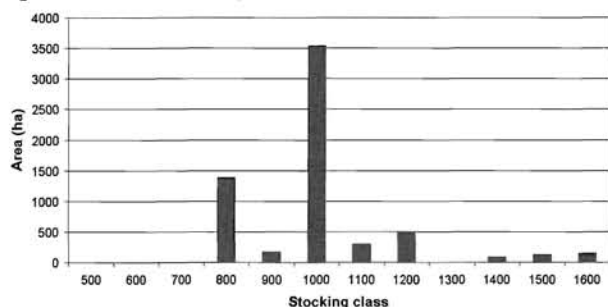
Fig. 2: Frequency distribution of the area of radiata pine replanted in 2002 by stocking class (for 36,500 ha captured in the survey).



Radiata pine new planting

Responses were received for 6,200 ha of new planting in the East Coast, Nelson/Marlborough, Canterbury and Otago/Southland. It is apparent from Fig. 3 that stockings established for new planting were generally higher than those applied for replanting. The area-weighted average stocking is 1013 stems/ha. Private growers (who are doing most new land planting) are establishing higher stockings than corporates (who are doing most of the replanting).

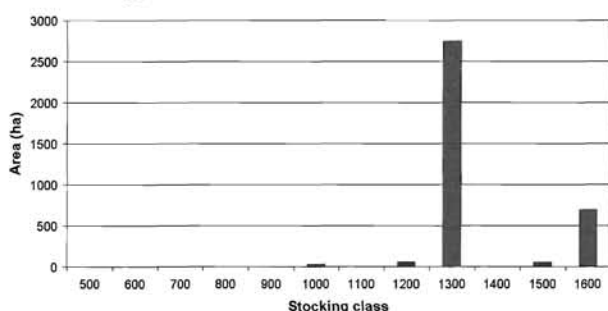
Fig. 3: Frequency distribution of the area of radiata pine new planting in 2002 by stocking class (for 6,200 ha captured in the survey).



Douglas fir planting

Responses for received for 1,000 ha of replanting and 2,600 ha of new planting. Results were pooled because of the relatively small area captured in the survey and because stockings covered a similar range for both replanting and new planting. The area-weighted average stocking is 1412 stems/ha with most area planted at either 1370 or 1650 stems/ha.

Fig. 4: Frequency distribution of the area of Douglas fir planting in 2002 by stocking class (for 3,600 ha captured in the survey).



2. Percentage of trees used for blanking in 2002

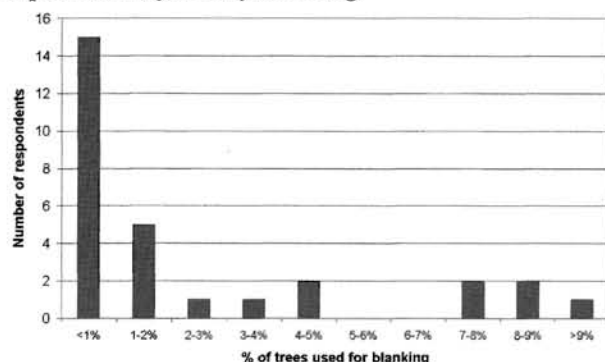
Some 29 respondents provided information about blanking of radiata pine stands. The rate of blanking was calculated as the number of trees used for blanking in 2002 as a percentage of the total number of trees used for replanting and new planting in 2002. (Note that this is different from calculating the rate of blanking as the total area of planting that is subsequently blanked. However the rates calculated by the two approaches are likely to be similar.)

The distribution of the number of respondents by blanking percentage (Fig. 5) shows that about half of the respondents (15 out of 29) had a blanking rate of less than 1%. In fact 5 respondents had done no blanking at all.

In contrast some respondents had substantial blanking programmes. The highest blanking rate was 15% in a case where frost and cattle had caused major loss. Other reasons reported for mortality were snow damage, dry winter, slips, rabbits/hares, and *Hylastes*.

The cases with a high blanking rate often applied to companies for which a small area was planted in 2002.

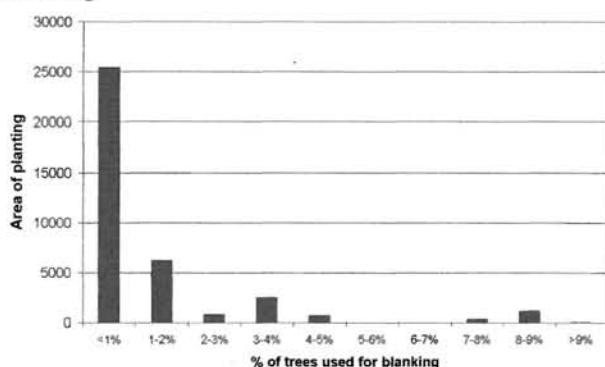
Fig. 5: Frequency distribution of the number of respondents by rate of blanking



For example, the case of 15% blanking was for a forest in which a total area of 70 ha was planted in 2002.

Forest managers who provided information on blanking had planted a total area of 37,276 ha of radiata pine in 2002 (replanting and new planting combined). Fig. 6 shows the distribution of the area planted by rate of blanking. It indicates that, for the majority of the estate, the blanking rate is less than 1%. The overall area-weighted blanking rate is 1.1%.

Fig. 6: Distribution of the area of planting by rate of blanking



III Planting in Nelson/Marlborough in 2002

As part of the review an attempt was made to identify all planting carried out in Nelson/Marlborough during 2002. Nurseries, companies, consultants and contractors were contacted in August/September 2002 and asked to identify planting projects in Nelson/Marlborough during the 2002 planting season.

New planting

Some 56 new planting projects involving 1612 ha were identified. The average area of each project was 28.8 ha but the distribution was very skewed; the largest five projects accounted for 840 ha (52% of the area planted) while 43% of projects were 10 ha or less. Over 94% of the new planting was done by private owners (farmers, joint ventures and investment blocks).

Table 1 gives the breakdown of area by species. Radiata pine is the dominant species and accounts for 89% of

Table 1: Area of new planting by species (some projects had different area planted in different species)

| | Number of projects ¹ | Area (ha) | % |
|--------------|---------------------------------|-----------|------|
| Radiata pine | 45 | 1435 | 89.0 |
| Douglas fir | 7 | 7 | 4.7 |
| Lusitanica | 10 | 8 | 4.9 |
| Macrocarpa | 3 | 4 | 0.2 |
| Eucalypt/Oak | 3 | 7 | 0.4 |
| Other | 4 | 4 | 0.3 |
| Native | 1 | 6 | 0.3 |
| Total | 56 | 1612 | |

the new planting area (1435 ha) although it was planted on only 80% of the new planting projects. *Cupressus* species (*lusitanica* or *macrocarpa*) were planted on 23% of the projects but, because of the relatively small scale of planting, accounted for only 10% of the area (84 ha). New planting of Douglas fir totalled 76 ha.

Replanting

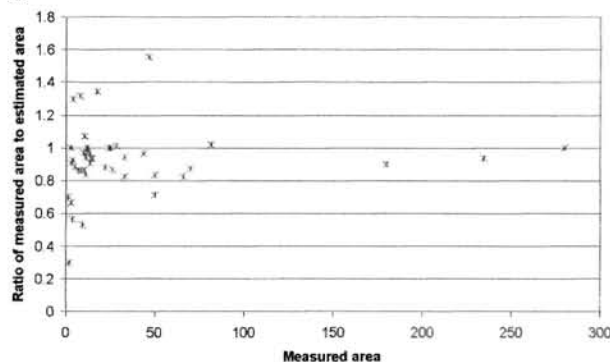
The survey also identified that there was 4551 ha of replanting in 2002. Radiata pine accounted for 98% of the area replanted; the balance was Douglas fir and *Cupressus* species. Less than 9% of replanting was by private owners; 85% of replanting was done by companies while the remaining 6% was done by Local Government.

Accuracy of area information provided

For each of the new planting projects the owner,

¹ Some projects had different areas planted in different species

Fig. 7: Ratio of measured area to estimated area plotted against measured area



manager or contractor was asked to provide an estimate of the area planted. Some 42 of these projects were subsequently field surveyed using a GPS unit with area subsequently determined using GIS. It is apparent (Fig. 7) that:

- some estimates were very accurate;
- a few estimates were too low;
- the majority of estimates were too high.

The mean estimated area was 38.5 ha while the mean measured area was 35.8 ha, resulting in an overall ratio of total measured area to total estimated area of 0.931. The average of the ratios for the 42 projects was 0.922. Although the ratio was less variable with larger projects, the level of accuracy did not vary significantly with project size.

Reference

Eyre, J. 1995: Predicting and Measuring New Planting from Nursery Surveys. *New Zealand Journal of Forestry* 40(2): 45-46.

new information

Conference adds value to forest business

The push to recovering greater value from the forest is driving the introduction of new technologies for growing, harvesting, distributing and processing wood products. This trend has implications for the different businesses involved in the supply chain and these developments and their implications will be explored during the AusTimber 2004 international forest industries conference.

The event will be held at the Albury Conference Centre in New South Wales from March 30-31 next year and will feature over 90 guest speakers mostly from Australia and New Zealand but also from North America, Europe and South Africa.

Speakers will address various aspects of the theme - 'Adding value to our forests - and our business'.

The conference will follow three subject streams - forest operations, transport and logistics, and sawmilling and processing - and presentations will describe operations that add value to plantations and regrowth

forest. These will include mulching machines and site preparation, very early thinning operations, pruning and ways of reducing machine impacts on the forest.

Key themes include:

Managing supply - the move to cut to order places tremendous pressure on harvesting and transport businesses.

Harvesting eucalypts - The scale of operations in eucalypt plantations is increasing rapidly and the opportunities and problems presented are explored by a number of contractors in a conference session.

Making logs - Cutting the tree into log dimensions that give the best return is an increasing important process.

Processing timber - The industry also needs to understand how to process these small logs so the maximum value is added to them.

For further information about the conference program phone the AusTimber office on 03 6248 5653 or visit www.austimber2004.com