Observations on the wood availability forecasts

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Abstract

The latest round of Wood Availability Forecasts are nearly complete. This paper initially provides an overview of the inputs and processes used in the generation of the forecasts. It then compares the previous round of forecasts (produced between 2006 and 2009) against estimated roundwood removals from 2007 to 2014. This showed that during the period 2007 to 2014, estimated roundwood removals were between 5% and 11% higher than the forecast indicative harvest levels.

A comparison of the latest (2014) forecasts to the previous forecasts is then made. In most regions, the projected long-term harvest levels have increased, despite the planted area declining in the intervening six to nine years. The harvest level increases have been driven by increased yield expectations, and an increasing proportion of higher yielding unpruned regimes. The increasing proportion of supply coming from the small-scale owner resource is highlighted, as well as the uneven age-class distribution of the plantation estate due to the 1990s planting boom. Combined, these may have implications for domestic processors seeking to obtain a steady supply of logs.

The impact on forecast supply by log type, as a result of the more widespread implementation of radiata pine unpruned regimes, is also shown. The availability of Douglas-fir, except in Otago–Southland, is also forecast to decline over time.

Introduction

Regional wood availability forecasts are produced periodically by the Ministry for Primary Industries (MPI). The latest forecasts are nearly complete and are based on the 2013 and 2014 area statements from the National Exotic Forest Description (NEFD). The previous round of forecasts were published between 2006 and 2009, with a national forecast released in 2010.

MPI contracted Indufor Asia Pacific Limited (Indufor) to undertake the data collection, modelling, and reporting of results for the latest forecasts, based on supply scenarios specified by the NEFD Steering Committee.

The aim of this paper is not to replicate what is already described in the regional forecast reports, and which are available on the MPI website (MPI, 2015a), but rather to:

- Compare forecast harvest levels from the previous round of forecast wood flows against estimated production from 2007 to 2014. This provides some indication of the degree of confidence that can be placed in the forecasts
- Compare the latest (2014) forecasts to the previous round of forecasts. Since the previous forecasts were completed, there have been changes to the national plantation estate in a number of regions including deforestation, revised future yield expectations, species mix, and silvicultural tending regimes. Combined, these factors influence the long-term potential harvest level from each region
- Discuss the potential impact on harvest levels and behaviour that may arise from a resource with a high proportion of small-scale owners, and an age-class distribution heavily weighted to planting from the 1990s. The implications for domestic processing initiatives are also examined.

This 2014 forecast process commenced in early 2014, and should be complete by mid-2016. As at June 2016, the following regions have been completed or are in draft form:

- Northland
- Central North Island (CNI)
- Hawke's Bay
- East Coast
- Southern North Island (SNI) – in draft form
- Nelson–Marlborough
- Otago–Southland.

This leaves Canterbury and West Coast as still to be completed. This paper focuses on the completed and 'in draft' regions only.

Generating the wood availability forecasts

In interpreting the results of the forecasts, it is necessary to understand the base inputs, assumptions and methodology behind the forecasts. The key inputs to the forecasts are the NEFD regional area descriptions, harvest intentions from the large forest owners, and the NEFD yield tables (after recalibration). All regions are based on the 1 April 2014 NEFD, except Otago–Southland, which used the 1 April 2013 NEFD.

These inputs are then combined within a forest estate modelling framework. Harvest age, harvest smoothing and regeneration constraints are applied, dependent on the supply scenario being modelled. The 'first cut' of supply forecasts are presented at regional

meetings to obtain stakeholder feedback. Following these meetings, a revised set of forecasts are developed for final review, with the last step being publication on the MPI website.

In the forecasts, there is a distinction made between 'large-scale' owners and 'small-scale' owners. Small-scale owners are those with less than 1,000 ha in the region and/or a part of a syndicate investment scheme. The large-scale owners (greater than 1,000 ha) are requested to provide their harvest intentions for the next 20 years. The harvest intentions serve two purposes; they are used to recalibrate the yield tables used in the previous forecasts, and to provide the 'base' supply for the wood supply scenarios. The recalibrated yield tables are then applied to all owner size classes. The large-scale owners' expectations on yield and harvest levels therefore have a significant impact on the wider forecasts.

The regional forecasts are restricted to radiata pine and Douglas-fir, which together make up 96% of the national plantation estate (90% and 6%, respectively). Other plantation species and indigenous species are not modelled at the regional level, but the national forecast does include an aggregated hardwood forecast.

As areas are harvested in the model, they have the option of regenerating to either a radiata pruned or unpruned regime, or in some cases Douglas-fir. The modelled proportions of each represent the consensus view based on regional forest owner feedback, which is discussed further below.

For the large owner resource, the initial harvest levels match stated intentions. The small owner starting harvest level is the difference between the estimated total roundwood removals for the region, as assessed by MPI, and the large owner harvest intentions.

Recent regional roundwood removals compared to forecast

Table 1 and Figure 1 show regional comparisons of forecast harvest volumes from the previous forecasts (produced between 2006 and 2009) to estimated roundwood removals since 2007 (MPI, 2014). Roundwood removals are derived by MPI from log and chip export data from the ports received via Statistics New Zealand, plus regional processed product volumes converted back to a roundwood equivalent. Note that the estimated harvest levels include all species, whereas the forecasts are for radiata pine and Douglas-fir only. For most regions, these species account for the bulk of the harvest volume. It is acknowledged that there may be some anomalies in comparing the forecast and estimated figures for Southland, where around 15% of the planted resource consists of hardwoods.

A band of forecast harvest volumes are shown in the charts. The bands are composed of three different availability scenarios from the previous forecasts. As there is no attempt to apply market or infrastructure-related constraints in the forecasts, consideration of the band of forecasts, rather than a single scenario, is more appropriate when comparing the forecasts to estimated harvest removals. No one scenario purports to be more likely than the others.

The three scenarios making up the band are:

- Scenario 2 – large-scale owners' harvest intentions, small-scale owners' harvest at age 30 years
- Scenario 3 – large-scale owners' harvest intentions, non-declining yield (NDY) constraints applied to total regional harvest
- Scenario 5 – large-scale owners' harvest intentions, 'split' NDY and a target rotation age of 28 years. This varies from Scenario 3 in that the NDY constraints are split into two time periods. The first runs through until 2034, and then the harvest level can reset before a second NDY constraint is applied for the remainder of the modelling period.

Certain regions have been combined as roundwood removal and domestic processing usage data are not available for all individual regions.

Table 1: Forecast versus estimated harvest levels 2007–2014

Region	Estimated 2007–14 (millions m³)	Forecast 2007–14 (millions m³)			Difference from forecast		
		Scenario 2	Scenario 3	Scenario 5	Scenario 2	Scenario 3	Scenario 5
Northland *	25.3	26.5	22.7	27.1	–5%	12%	–7%
Central North Island	88.0	75.1	73.5	73.8	17%	20%	19%
Hawke's Bay–East Coast	29.9	28.4	28.6	30.5	5%	5%	–2%
Southern North Island	10.7	11.7	13.2	14.2	–9%	–19%	–25%
Nelson–Marlborough	19.0	18.3	19.1	19.7	4%	–1%	–3%
Otago–Southland	14.3	12.3	12.4	13.2	17%	16%	9%
Overall	187.3	172.4	169.4	178.4	9%	11%	5%

* In the previous forecasts the Auckland region was defined separately. It has now been merged into Northland and CNI. The previous forecast volumes, and estimated roundwood removals for Auckland, have been split between Northland and CNI in the same ratio as the areas allocated to each region (approximately 20% to Northland and 80% to CNI).

Observations

In a number of regions, estimated harvest during the 2007 to 2014 period initially lagged the forecast level, before harvesting activity accelerated and either met or exceeded the predicted level – Northland, Hawke's Bay–East Coast and SNI. In the CNI and Otago–Southland, estimated harvest was ahead of predicted harvest throughout most or all of the modelling period, finishing up in 2014 well ahead of forecast. Harvesting activity in Nelson–Marlborough was similar to the forecast levels. It should be noted that inter-regional trade is not considered in the roundwood removal figures, and this may account for some of the regional differences.

Overall, estimated removals were between 5% and 11% greater than forecast, depending on the scenario. The overall positive variance from forecast (under all scenarios) is driven by the CNI estimated harvest volumes, which were 17% to 20% up on forecast. This is partially offset by a lower than forecast harvest from the SNI.

Unsurprisingly, harvesting activity has reflected market conditions, coupled with the availability of mature or near-mature plantations for harvest. For example, the 2007 to 2014 period saw steady real price growth in log export prices (MPI, 2015b) on the back of strong Chinese economic growth, and reducing supply from competing countries such as Russia. In New Zealand, housing starts hit a low point in 2011 of around 12,800, before increasing to nearly 17,000 by 2014 (Statistics NZ, 2015).

Given the volatility in log markets and prices, and uncertainties over forest areas and yield, obtaining a forecast within 5% to 11% of estimated harvest levels over a seven-year period seems reasonable. Scenario 5 (target clearfell age of 28 years) shows the closest match on a national level (for the regions included in this study), although there are some fairly wide divergences at the regional level. The decision to move to a target clearfell age of 28 years for the 2014 forecasts appears sound on this basis.

Comparison of previous forecasts and 2014 forecasts

Table 2 and Figure 2 compare the 2014 forecasts with the previous forecasts. In this comparison, only one scenario from each forecast is included. The changes in the forest description occurring since the 2006–09 forecasts, and the intentions of forest owners, can be more readily grasped by considering just a single, common scenario.

The scenario selected is that showing large-scale owners' harvest intentions, combined with a NDY on the total harvest (termed Scenario 3 in the previous round of forecasts and Scenario 2 in the 2014 forecasts). Douglas-fir, which was modelled as a separate scenario, is included in the harvest profiles shown in the charts. Note that two regions followed a slightly different approach in the 2014 forecasts:

- In Northland, the age-class distribution is such that it was not possible to achieve a NDY from 2014 onwards; in this case the NDY was applied from 2020
- Otago–Southland has the highest proportion of Douglas-fir compared to the other regions. Feedback from forest owners during the 2014 forecast consultation period indicated that the radiata pine and Douglas-fir estates should be modelled collectively, i.e. the NDY constraint applies to the combined output of both species. The previous (2008) forecast handled the two species separately, with the Douglas-fir not required to follow a NDY, i.e. as per the other regions in the 2014 forecast.

Table 2: Comparison of previous forecast and 2014 forecast (radiata pine and Douglas-fir)

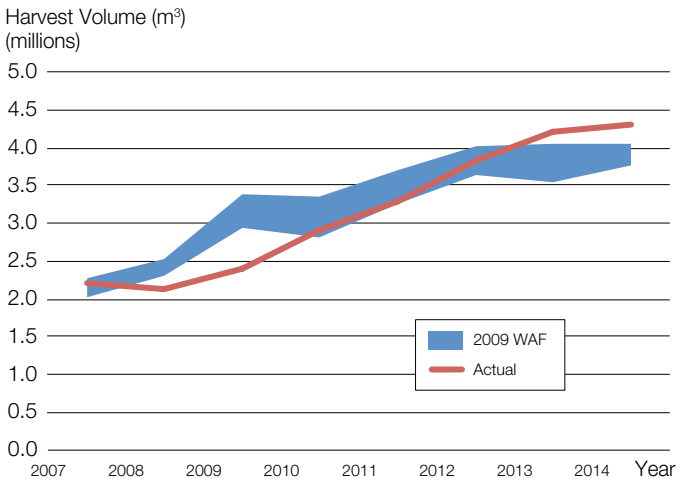
Region	Radiata pine and Douglas-fir planted area (ha)			Yield (m^3/ha at age 28)			Average annual harvest (millions m^3 p.a.)		
	Previous forecast	2014 forecast	Change	Previous forecast	2014 forecast	Change	Previous forecast	2014 forecast	Change
Northland	205,204	186,330	–9.2%	588	494	–16.0%	4.3	3.0	–30.2%
Central North Island	574,609	576,805	0.4%	631	658	4.3%	12.4	13.3	7.3%
Hawke's Bay–East Coast	282,413	284,515	0.7%	610	688	12.9%	5.4	6.3	16.9%
Southern North Island	164,443	158,281	–3.7%	501	582	16.2%	2.5	2.9	15.2%
Nelson–Marlborough	169,497	166,243	–1.9%	523	607	16.2%	3.2	3.4	5.3%
Otago–Southland	197,655	185,251	–6.3%	512	527	3.0%	3.2	2.9	–9.7%
Overall	1,593,821	1,557,425	–2.3%	582	614	5.6%	31.0	31.8	2.5%

* The previous forecasts were based on the following NEFDs as at 1 April of each year: Northland (2007), CNI (2006), Hawke's Bay (2005), East Coast (2005), SNI (2006), Nelson–Marlborough (2005) and Otago–Southland (2005).

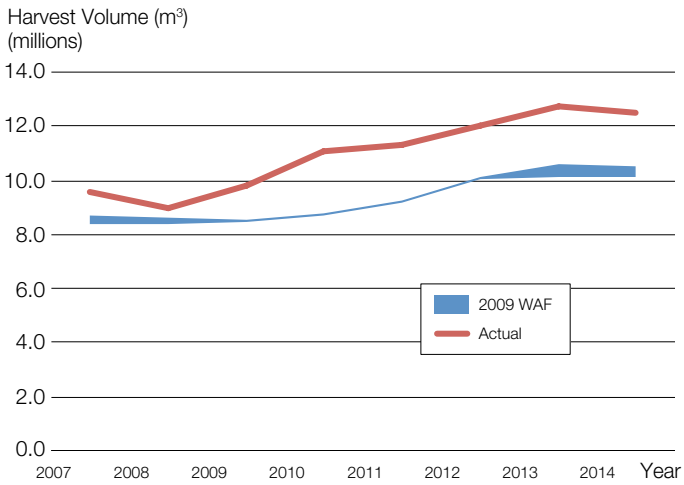
** The 2014 forecast was based on the 1 April 2014 NEFD, except for Otago–Southland, which was based on the 2013 NEFD.

Figure 1: Forecast versus estimated harvest levels 2007–2014

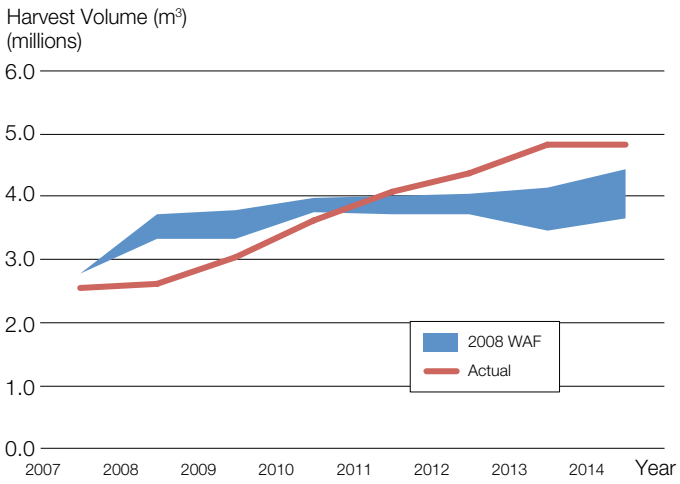
Northland



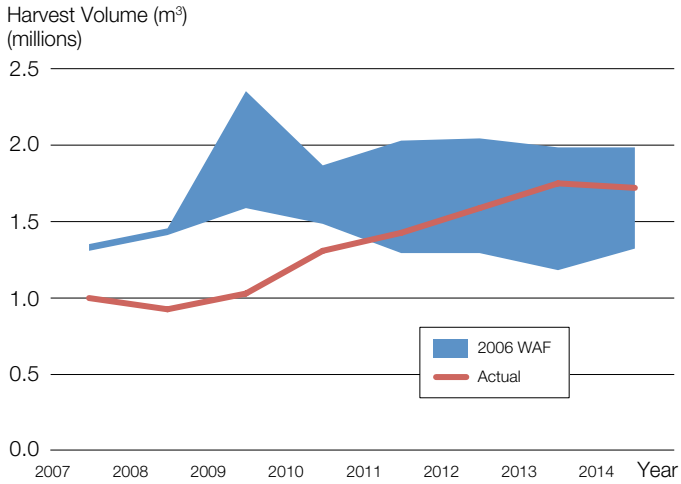
Central North Island



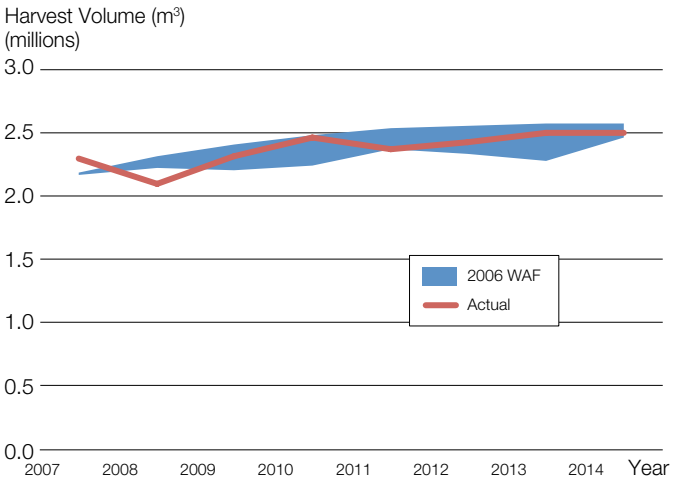
Hawke's Bay + East Coast



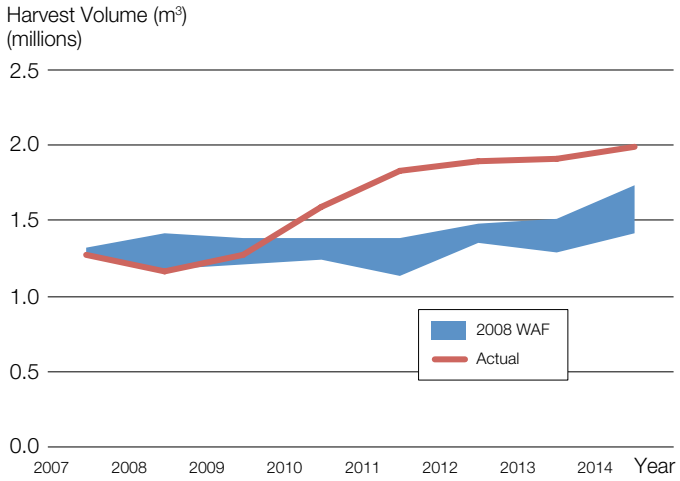
Southern North Island



Nelson + Marlborough



Otago + Southland



Observations

In most regions, the 2014 forecasts show a higher sustained harvest than the previous round of forecasts. Total harvest level is driven primarily by stocked area and yield per hectare.

It can be seen from Table 2 that in all regions except CNI and Hawke's Bay–East Coast, there has been a decline in stocked area, and in those regions the gain is very modest. Proportionally, the declines have been the largest in Northland and Otago–Southland.

However in most regions the area reductions are more than offset by yield gains. Yield in this context is defined as the average yield per hectare at a common clearfell age. It is determined by two factors:

- The assumed total recoverable volume per hectare (TRV/ha) for a given regime. In most cases, forest owners are realising (and continue to predict) improved TRV/ha compared to the previous forecast yield tables, and this is due to a combination of genetics, site establishment techniques, fertiliser regimes and generally higher final crop stockings, e.g. stockings in pruned regimes have gradually increased from around 200 stems/ha to 300–350 stems/ha. There is a clear correlation between final crop stocking and TRV/ha, all other factors being equal
- The mix of the regimes. Pruned regimes are less popular now than when the previous forecasts were compiled due to, until recently, a declining differential between pruned log prices and unpruned sawlog prices. Unpruned regimes have a higher final crop stocking than pruned regimes (450–550 stems/ha). As well as the existing tree crop (as at 2014) having a higher ratio of unpruned to pruned areas, forest owners are anticipating that after harvest a greater proportion will transfer from pruned into the higher yielding unpruned regimes. Further detail on regime mix is provided in a later section of this paper.

The yield measures shown in Table 2 do not include the impact of target clearfelling age (the comparison in Table 2 is made at a common clearfell age). In the previous forecasts the target rotation age was 30 years, but this was reduced to 28 years in the 2014 forecasts based on forest owner feedback. While the younger target age does allow some volume to be brought forward, longer term it will have some negative effect on harvest levels, as the optimum harvest age (from a purely volumetric perspective) for most of the forecast yield tables is at least 30 years.

Estimated harvest patterns prior to the commencement of the forecast period will also have an influence on longer-term availability, e.g. a less active than predicted level of harvesting during the 2007–14 period will increase the near-term availability of harvest volume, as there is more volume on-stump.

The exceptions to the general trends described above are Northland and Otago–Southland.

In Northland there has been a significant decline in long-term projected harvest levels, from 4.4 million m^3 p.a. (2009 forecast) to 2.8 million m^3 p.a. (2014 forecast). The majority of this reduction is due to lower large-scale owner harvest intentions, and this is in turn driven by reduced productivity expectations compared to those assumed in the 2009 forecast (down 16%). Deforestation has also occurred in the Northland region, with the plantation area reducing by 5.3% since the 2009 forecast was undertaken. Based on forest owner feedback, further deforestation of 7,000 ha was built into the 2014 forecast, which will also have some impact on longer-term harvest levels.

In the case of Otago–Southland, up until the late 2020s we see a similar pattern to the other regions of a higher 2014 forecast harvest level, but then a significant divergence in volume occurs from 2040. This is due in part to the different modelling approach used between the previous and latest forecast as described above, i.e. in the 2014 forecast the combined harvest from both species was constrained to a NDY.

Features of the 2014 wood availability forecast

Figure 3 shows the 2014 forecasts by owner size under Scenario 2 (the same scenario as depicted in Figure 2 below), and also overlays an alternate wood availability scenario for the small-scale owners (Scenario 1). In this scenario, the small-scale owner resource is harvested as soon as it reaches an age of 28 years.

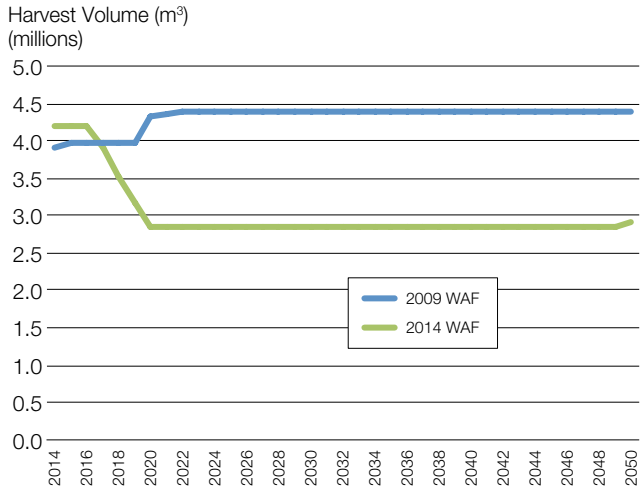
As discussed in a previous section, the forecasts include a range of scenarios. The two selected for the analysis effectively illustrate each end of the spectrum of yield regulation: from the highly regulated Scenario 2 (NDY across the entire modelling time horizon), to the largely unregulated (on the small-scale owner resource) Scenario 1. Like the previous forecasts, the 2014 forecasts included a 'split NDY' scenario which could be considered a compromise between these two extremes, and is perhaps more reflective of future harvest patterns.

The charts also show current domestic demand (plus known near-term expansions), projected out through the forecast period (red line). As the 2014 harvest levels are based on estimated roundwood removals, the delta between the domestic demand and the total harvest represents what is currently (2014) exported. Looking ahead, the difference between the domestic consumption and the total harvest level represents volume available for either expansion of existing processing, development of new processing or ongoing export.

Figure 2: Comparison of 2014 forecast (Scenario 2) to previous forecast (Scenario 3)

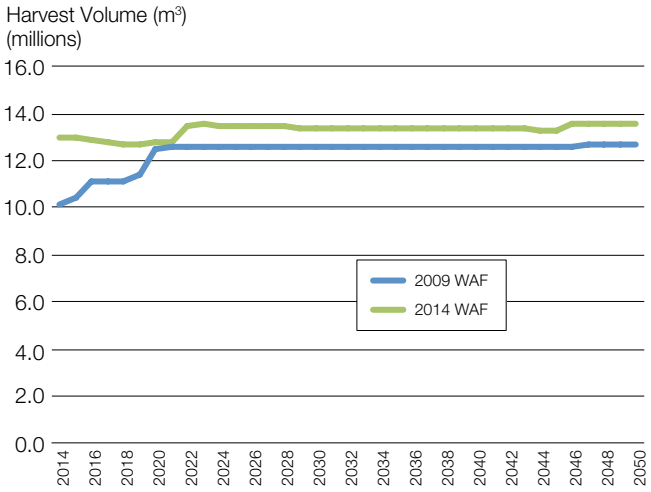
Northland

Area down 9%, yield/ha down 16%



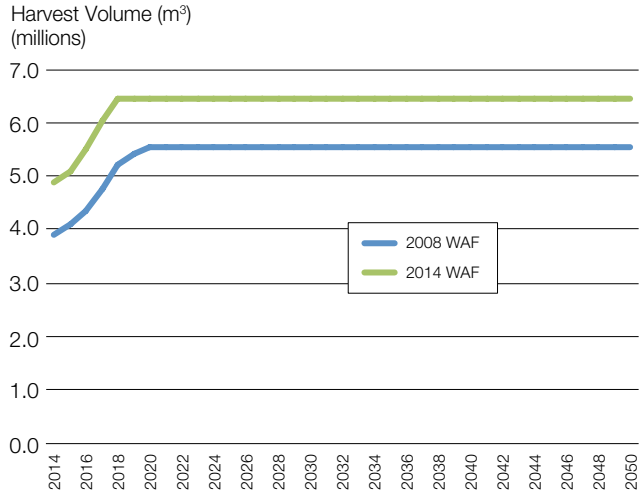
Central North Island

Area up 0.4%, yield/ha up 4%



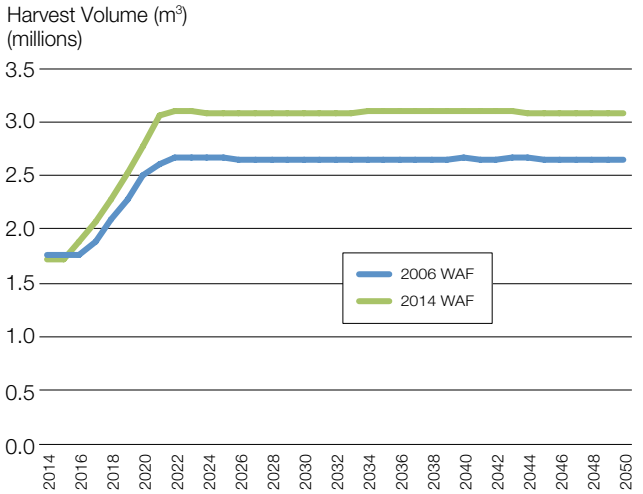
Hawke's Bay + East Coast

Area up 0.7%, yield/ha up 13%



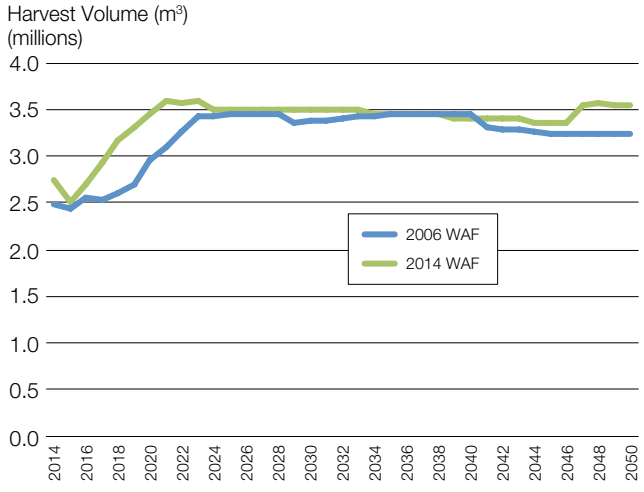
Southern North Island

Area down 4%, yield/ha up 16%



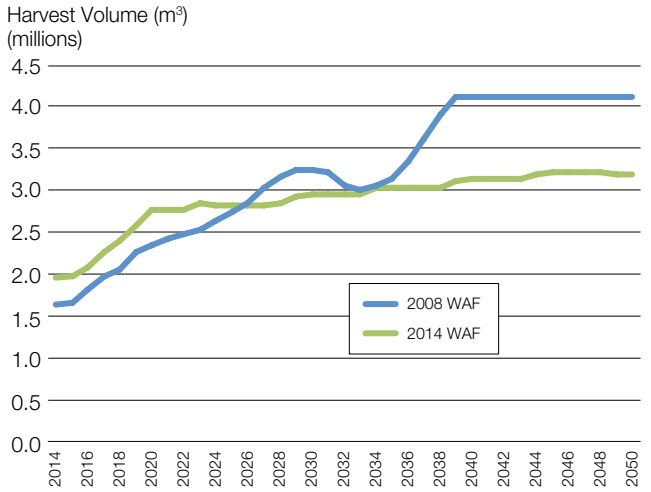
Nelson + Marlborough

Area down 2%, yield/ha up 16%



Otago + Southland

Area down 6%, yield/ha up 3%



Changing ownership profile

The charts in Figure 3 highlight the increasing importance of the small owner resource into and through the 2020s. In all regions apart from the CNI, the proportion of the total supply fulfilled by small-scale owners is forecast to increase (Northland and SNI in particular).

There are features of the small owner resource, and of small owner behaviour that have implications for ongoing supply:

- Age-class ranges are typically narrow
- Forestry is less likely to be the primary source of income for the forest owner
- There are fewer economies of scale available in the small-scale resource. Blocks tend to be more distant, on steeper country and have a higher proportion of first rotation tree crops. These factors lead to, on average, higher costs of roading, harvesting and cartage.

For these reasons, harvesting activity tends to be more opportunistic, i.e. harvest will most likely occur when market conditions allow stumpage returns to reach a certain threshold. Together with the narrow age-class distribution, this can result in sharp rises and falls in harvest activity. In contrast, large-scale or 'corporate' owners tend to have a more constrained harvest pattern and react less to market ups and downs. (This is not to imply that all large-scale owners manage their estates on a smoothed or NDY basis, as evidenced by the Northland harvest profile.)

This observation is supported by findings from a recent study by the School of Forestry (Manley et al., 2015). The study examined the likelihood of harvest occurring in the North Island small-scale owner resource under various log price scenarios. The authors found that only a small percentage of forest blocks (1%) would be uneconomic, and a further 3.5% marginal. However harvesting in only 50% of the small owner forests was deemed 'economic'. The remaining blocks were deemed 'probable' of being harvested. As stated in their paper '… while there is a very small proportion of small-scale blocks that are unlikely to be harvested, the viability of harvesting a substantial proportion of the small-scale estate is very sensitive to log prices.'

The viability of harvest was calculated in stumpage terms (log price less delivered wood cost). Of interest also were the levels of internal rate of return (IRR) implied by these stumpages. Using average log prices, it was found that 11% of blocks had a negative stumpage or negative IRR, suggesting that replanting would be unlikely. This could obviously have some impact on the level of long-term supply from the small owner resource.

Implications of level of harvest

Rather than the tightly regulated Scenario 2 (NDY), small owner behaviour may more closely match Scenario 1 if market conditions are favourable. This scenario assumes the large-scale owners continue to follow their harvest intentions (blue shaded area), but small-scale owners harvest all their resource immediately upon it reaching 28 years of age (black dotted line). As expected, the harvest profiles under Scenario 1 are very 'lumpy', as they mirror the age-class distributions of the small owner plantations. The peak in harvest in the mid-2020s in all regions reflects the large areas of 1990s plantings reaching age 28.

While at first glance such a profile may appear unrealistic from the perspectives of market absorption and infrastructure, estimated harvest levels from 2007 to 2014 in a number of regions did increase at very rapid rates, as shown in Figure 1. Assuming the market provides an acceptable stumpage, it appears that the elements of the supply chain (harvesting, roads, ports, shipping etc) can adapt remarkably quickly to increasing supply.

In fact, harvest rates could theoretically increase even more quickly than Scenario 1 shows, as there is no reason why clearfell age must be fixed at age 28. During the latter half of the 2007 to 2014 period (Figure 1), anecdotal evidence indicated harvest ages migrated into the low 20s and even late teens in some cases, as forest owners responded to a robust export market which placed no particular premium on wood quality.

There is of course the possibility that there is a prolonged period of poor market conditions, and this pushes more of the small-scale owner resource out of the economic and probable classes into marginal and even non-economic categories, with a consequent reduction in harvesting activity until conditions improve. A harvest profile attempting to represent such a scenario is not included in the forecasts.

Implications for domestic processing

Under either supply scenario, there is a considerable surplus of production over current consumption and known near-term domestic expansions. The charts also imply that current and near-term domestic consumption can, in most cases, be covered by the large-scale owner supply, leaving the more uncertain small-scale owner supply to be absorbed by the export market.

However once the supply is disaggregated into individual log types, increasing proportions of small owner supply will be necessary to top up the large owner volumes. Consideration of minimum economic log input volumes further increases the need for supply from a mix of ownership sizes.

The implication for domestic processors is that they may have to enter into long-term supply contracts with the small-scale owners (or perhaps purchase forests) to ensure a steady log supply. During times of strong export returns then a harvest profile closer to Scenario 1 is possible. There will be a period of high production, but the longer-term harvest cannot be sustained at these levels. Conversely, during a weak market a proportion of the small-scale owner resource may no longer be economic and log supplies will reduce.

Table 3: Proportion of radiata pine area by regime type

Region	Previous forecast		2014 forecast	
	Pruned	Unpruned	Pruned	Unpruned
Northland	44%	56%	39%	61%
Central North Island	59%	41%	47%	53%
East Coast	76%	24%	73%	27%
Hawke's Bay	75%	25%	70%	30%
Southern North Island				
West	73%	27%	68%	32%
East	70%	30%	69%	31%
Nelson–Marlborough	55%	45%	37%	63%
Otago–Southland	72%	28%	42%	58%
Overall	**63%**	**37%**	**51%**	**49%**

A further point from a domestic processing perspective is that smoothing the wood flow, through whatever mechanism, does have implications on tree crop age and therefore wood quality. To fill the troughs, and trim the peaks, then tree crops must be harvested earlier or later than a theoretical optimum age. There may be further opportunities to customise harvest age in different parts of the resource to customer requirements.

Forecast volumes by log category

Table 3 shows the proportion of the existing radiata pine resource under pruned and unpruned regimes, and for both the previous and current forecasts. Table 4 sets out the replanting assumptions for radiata pine and Douglas-fir, as the existing tree crop is harvested. The charts in Figure 4 show the impact on forecast log category outturn of this mix of current and planned regime types.

Table 3 shows that in every region there has been an increase in the proportion of the radiata pine area that is managed under an unpruned regime. Overall, the unpruned component has gone from just over a third to nearly a half of the radiata pine planted area.

The regeneration assumptions shown in Table 4 are based on forest owner feedback. While intentions were reasonably clear for the large-scale owners, it was less straightforward to ascertain a reasonable 'average' intention from the small-scale owners. The small owner intentions were largely based on observations put forward by local consultants and forest managers, or representatives from organisations such as the NZ Farm Forestry Association. Where a clear consensus did not exist for the small-scale owners in a region, then a 50:50 mix of pruned and unpruned regimes was assumed.

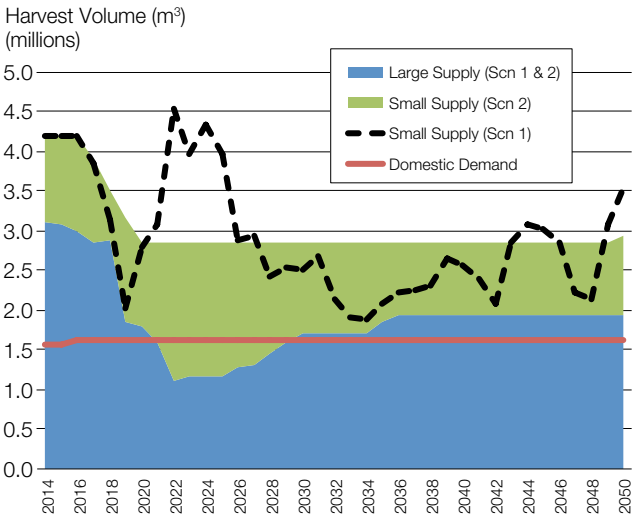
While there is a considerable variation between regions as to the favoured tending regime, overall the majority of the area is regenerating to an unpruned regime. Since the mid-1990s, and up until mid-2015, there had been a declining price differential between pruned grades and the next highest quality grades. This, together with the lower total recoverable volume and the additional tending costs of pruned regimes, had lowered the financial attractiveness of pruning. Recent significant gains in pruned log price, if they continue to hold, could see the operation regain some favour.

Table 4: Regeneration assumptions

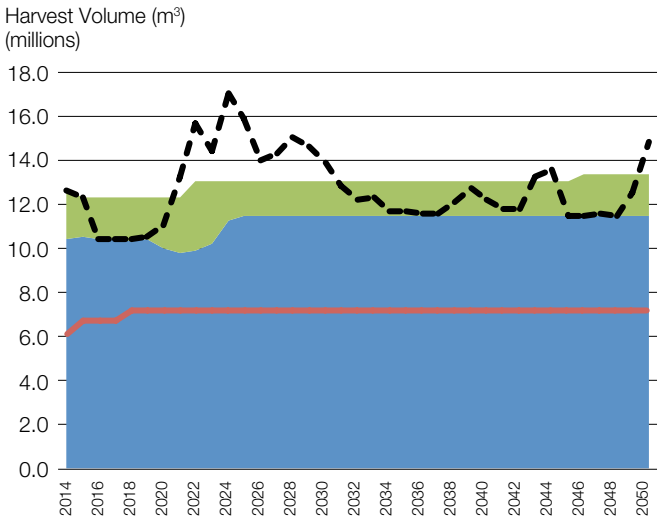
Region	Large-scale owners		Small-scale owners		All owners	
	From radiata pruned to		From radiata pruned to		From Douglas-fir to	
	Pruned	Unpruned	Pruned	Unpruned	Douglas-fir	Radiata
Northland	0%	100%	25%	75%	0%	100%
Central North Island	25%	75%	50%	50%	15%	85%
East Coast	100%	0%	50%	50%	0%	100%
Hawke's Bay	75%	25%	50%	50%	0%	100%
Southern North Island						
West	5%	95%	50%	50%	10%	90%
East	90%	10%	65%	35%	10%	90%
Nelson–Marlborough	10%	90%	50%	50%	10%	90%
Otago–Southland	40%	60%	70%	30%	100%	0%

Figure 3: Comparison of 2014 forecast Scenarios 1 and 2 and domestic demand overlay

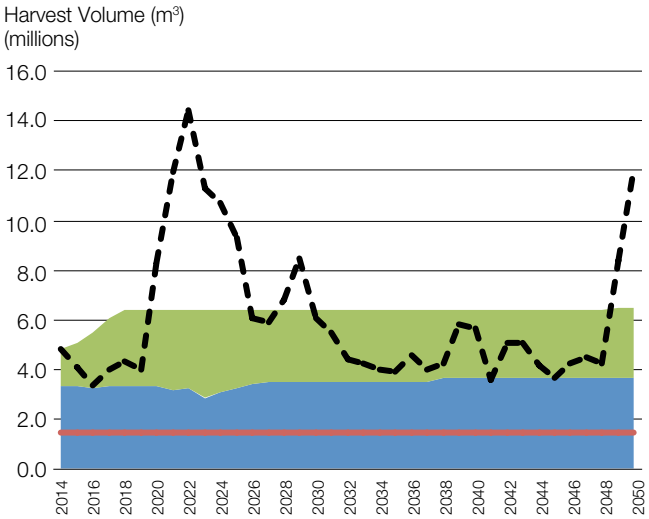
Northland



Central North Island



Hawke's Bay + East Coast



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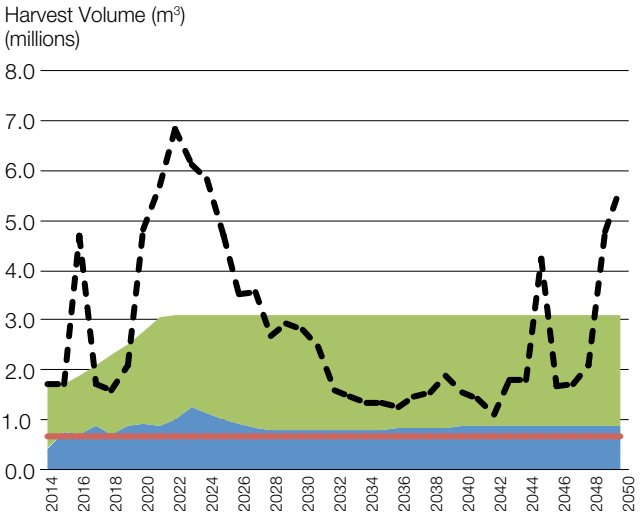
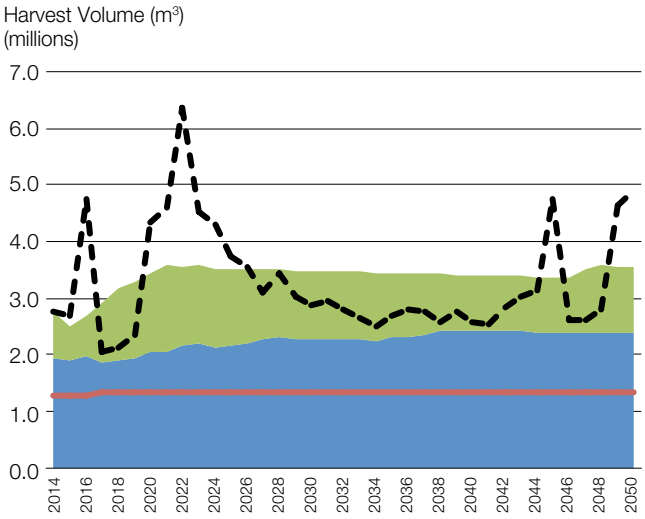


Nelson + Marlborough



Otago + Southland

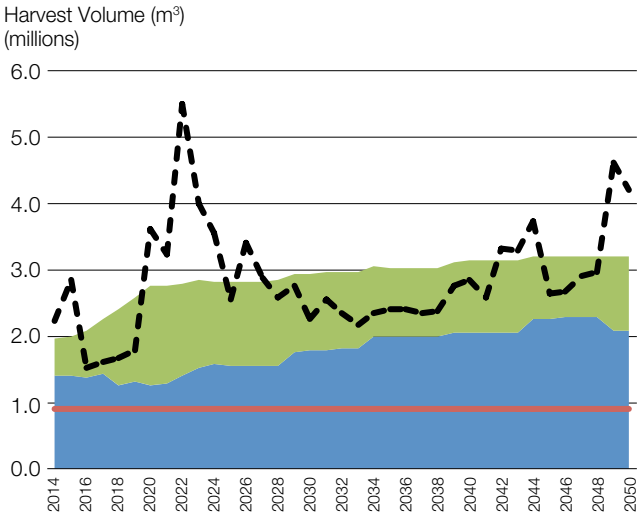
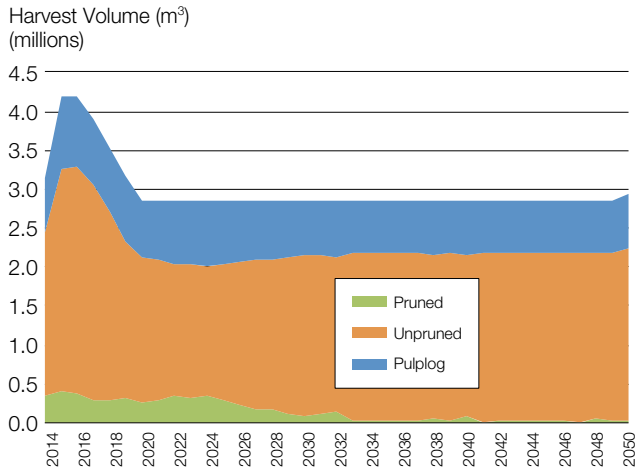
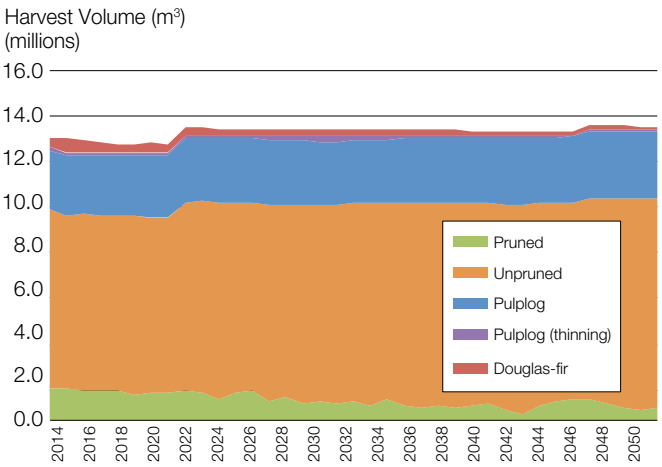


Figure 4: Log category outturn under 2014 forecast (Scenario 2)

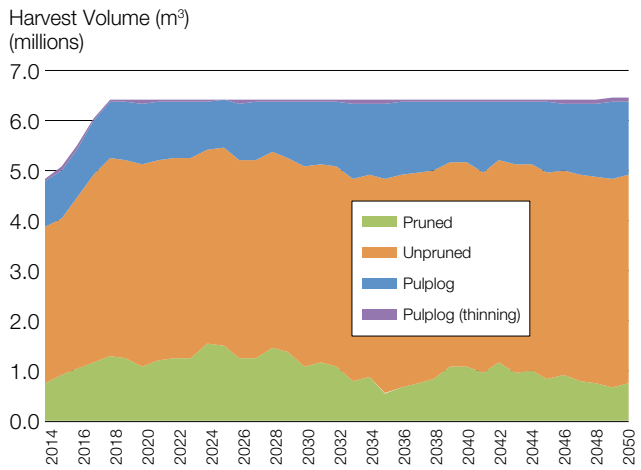
Northland



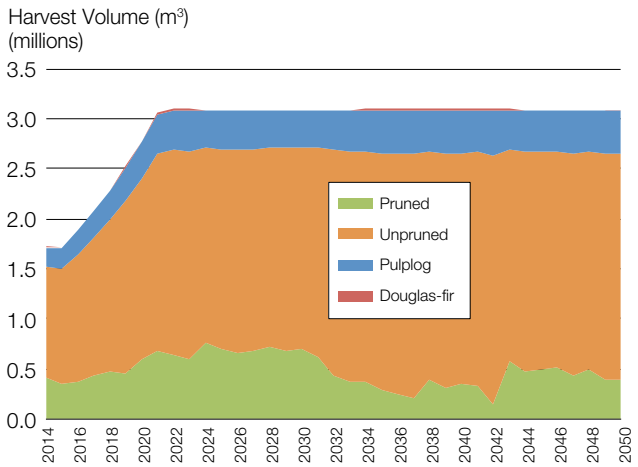
Central North Island



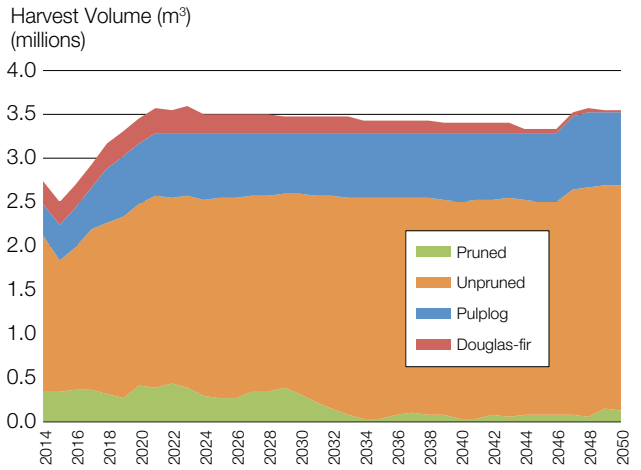
Hawke's Bay + East Coast



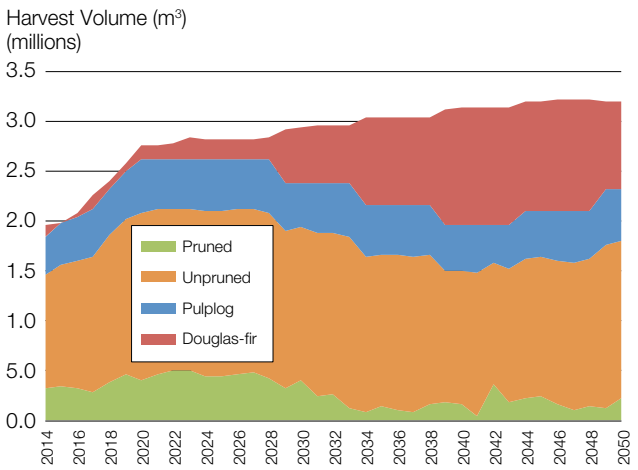
Southern North Island



Nelson + Marlborough



Otago + Southland



It is also apparent from Table 4 that, with the exception of Otago–Southland, the planting of Douglas-fir is losing favour. Except in areas where climatic conditions preclude the successful establishment and growth of radiata pine, it appears that the typically longer rotation lengths of Douglas-fir are not being adequately compensated by log price.

The harvest volumes by log type shown in Figure 4 reflect the status of the existing tree crop (Table 3), and plans for the future crop (Table 4). Unsurprisingly, the supply of pruned logs gradually declines in a number of regions, particularly Northland and Nelson–Marlborough.

While pruned supply will continue to reduce under current assumptions, the quality of the unpruned sawlog component can be expected to improve. The higher stockings of the unpruned regimes will provide better branch control and less tapered logs. The proportion of large branched industrial grade logs should decline, with a lift in more finely branched structural grades, although with a lower average diameter.

Figure 4 highlights the increasing supply from the Douglas-fir resource in Otago–Southland, although significant volumes do not come on stream until the 2030s. The other two regions where there has traditionally been a sizable Douglas-fir estate, CNI and Nelson–Marlborough, show gradually declining harvest volumes as the species is replaced with radiata pine.

Acknowledgements

The assistance of Kenneth Tsang (Consultant at Indufor) in the preparation of data for this paper is acknowledged. Feedback from Bruce Manley (School of Forestry) and John Novis (Ministry for Primary Industries) is also appreciated.

References

Manley, B., Morgenroth, J., Visser, R. and final year BForSc students. 2015. What Proportion of the Small-Scale Owners' Estate in the North Island is Likely to be Harvested? *NZ Journal of Forestry*, 60(3): 26–34.

Ministry for Primary Industries. 2014. *Estimated Roundwood Removals from New Zealand Forests by Wood Supply Region, 2002 to 2015*. Wellington, NZ: MPI.

Ministry for Primary Industries. 2015a. *New Zealand Wood Availability Forecasts 2014–2050*. Wellington, NZ: MPI.

Ministry for Primary Industries. 2015b. *Indicative New Zealand Radiata Pine Log Prices by Quarter.* Wellington, NZ: MPI.

Statistics NZ. 2015. *Building Consents Issued December 2015*. Wellington, NZ: SNZ.

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