



# HARVESTING TECHNICAL NOTE

HTN05-04  
2012

## Potential Demand for Haulers over the Next Ten Years

### Summary

Wood availability forecasts indicate a significant increase in mature forest over the coming decade, much of which is on steep slopes. This project investigated whether this will translate into a significant demand for additional haulers. The investigation was restricted to large-scale forest owners/managers. Findings indicated that the only significant demand was for additional haulers in first rotation forests. First rotation forests provide the majority of the increase in wood availability from mature forest over the next decade.

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### Introduction

There are two common predictions about the forest resource in New Zealand over the next decade. Firstly, there will be a significant increase in the volume of wood from exotic forests maturing in the next decade (dubbed the 'wall of wood'). Secondly, a high proportion of this increase is on steep slopes. One conclusion from these predictions, given some basic assumptions about rotation ages, is that the demand for haulers will increase significantly over the period. A key focus of the FFR Harvesting theme's research programme has been on improving profitability and safety of steep country harvesting. A key element of profitability will be driven by supply and demand. This report investigates potential demand for haulers over the next 10 years.

The impetus for this investigation came from equipment manufacturers of steep slope harvesting systems who have regularly had enquiries from their customers (harvesting contractors) regarding machinery development for future harvesting. It takes time for equipment manufacturers to develop new technology and to ramp up facilities to increase output capacity. Bringing new design concepts to market takes significantly longer, therefore it should be in the whole industry's interests to be prepared for any major changes in demand.

There were three stages involved in this investigation:

- a high-level literature review of current wood flow forecasts and current hauler capacity;
- interviewing equipment manufacturers to understand their issues and needs; and
- surveying key personnel from New Zealand's major forestry companies to quantify aggregate demand for new haulers.

From this information a high level discussion and recommendations for future investigation were generated. It is important to note that there is a significant resource of small to medium sized forests which was not captured by this approach.

### The Forest Resource

According to the National Exotic Forest Description and associated Wood Availability Forecasts issued by the Ministry for Primary Industries (MPI 2010), the area of mature net stocked plantation forest is forecast to increase significantly over the next 10 years. If the assumption that the rotation length of this forest remains similar to current practice, this would translate in broad terms to a doubling of radiata pine wood availability over the next decade (Table 1).



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**Table 1 - Net stocked planted production forest area**

Age class (years)	Planted production area (ha)
11-15	402,962
16-20	395,203
21-25	208,847
26-30	188,527

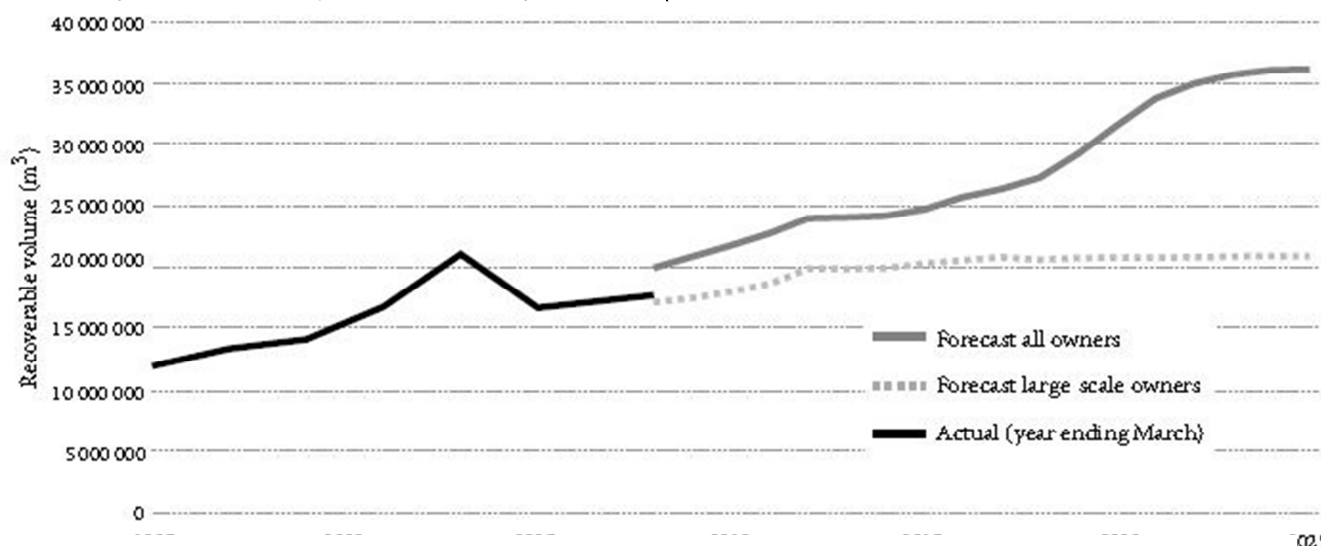
Most of the increase is expected to come from small-scale forest growers who established forests during the 1990s (Figure 1). It is also estimated that 56 per cent of the exotic plantation estate is in its first rotation and is not well documented or classified at an aggregated national level. It must be noted that the translation from potential wood availability into actual harvesting levels and the timing of the harvest depends on forest owners' objectives, market conditions, potential returns and perceptions about future log prices and supply. In general, the common prediction of an increase in volume is borne out by both the data in the wood availability forecast and by reality during 2010-11, a period of favourable market conditions.

Preliminary results from a hauler survey carried out by Rein Visser from the University of Canterbury School of Forestry indicated a preliminary estimate of just over 300 yarders

operating in New Zealand (Visser 2012). That is 80 more than shown by a similar survey done in 2002. Assuming the number of machines listed in the 2002 database that have not been accounted for (i.e. closed down, sold etc.) roughly equals the number of machines that have not yet been accounted for in the 2012 survey (i.e. new machines), this total number should remain about the same. Of all the haulers, 67% were towers, 30% swing yarders. The remaining 3% were identified as excavator-based haulers (such as the Harvestline). This is the most comprehensive and detailed database of existing total hauler capacity.

## Equipment Manufacturers

Three key manufacturers of harvesting equipment from across New Zealand were surveyed and all responded to the request for an interview (Brightwater Engineering, Trinder Engineers and Engineering Services Ltd). All manufacturers responded that they had attempted forecasting their own data to prepare for future demand but with limited success due to the fragmentation of relevant data and the influence of key assumptions around future cut volumes and terrain. Forecasting methods



**Figure 1: New Zealand wood availability forecasts 2010-2040 (MAF 2010)**

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included forest industry feedback, word of mouth, and hiring consultants. Equipment manufacturers have not experienced any increase in demand for new hauler capacity. The manufacturers unanimously responded that they assumed hauler demand was forecast to increase but didn't have any firm orders as evidence to support this. There is an understandable reluctance on the part of equipment manufacturers to invest in new capacity, design and concept development without orders or substantiated forecasts. The industry runs the risk that when there is an increase in demand there will be a lag effect and possible shortage of appropriate new equipment. This unsupplied demand could of course be met with second-hand equipment.

According to the manufacturers, the estimated lead time to implement a new design and manufacture a hauler ranges from 12 to 24 months and manufacturers expect to be able to produce three to four machines per year given their current production capacity. A new concept design has taken six years from concept through to working in a production environment.

Equipment manufacturers consider that the short-term nature of most harvesting contractors' contracts is a factor in contractors' reluctance to invest in new gear and in research and development. Several contractors are working with the manufacturers to develop new systems, and it was noted that these contractors are on relatively stable longer term contracts relative to the majority of contractors around New Zealand.

Key areas of information that harvesting equipment manufacturers say will improve their ability to service the forest industry are:

- substantiated forecast of volume, number and type of haulers required;
- substantiated estimates of forecast tree piece size and future trends;
- ownership, structure and scale of forests maturing over the next decade;

- a comprehensive database of current machines and age; and
- soil types of these production forests.

## Forest Management Companies Survey

Key representatives from New Zealand's major forestry companies were contacted to gauge their harvesting requirements over the next decade in response to their wood flow forecasts and harvest schedules. Respondents were asked how they expected their demand for haulers to change over the next decade and if there was an expected change in hauler type mix. They were also asked to comment on other factors that may affect demand, such as any replacement requirements of their current fleet due to age, suitability to topography etc. Table 2 lists the respondents who were captured in this survey.

**Table 2 – Forest owners / managers who responded to the survey**

Respondents
City Forests Ltd
Ernslaw One Ltd
Forest Enterprises Ltd
Hancock Forest Management Ltd
Juken NZ Ltd
Pan Pac Forest Products Ltd
Roger Dickie Limited
Timberlands Limited
Wenita Forest Products Limited

The estimated changes in hauler demand from the survey are summarised in Table 3. The survey recorded total demand for an additional 39 haulers over 10 years. A key point is that 34 of these haulers were from only three of the nine companies surveyed and they were all first rotation forests in the Gisborne and Wairarapa regions. The results indicated that there are two





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groups of forests with differing demand for additional hauler capacity from the major commercial forests over the next decade, which can be characterised by whether the forest is first rotation or not.

**Table 3: Results of hauler demand survey from large-scale forest managers**

Companies	Tower	Swing	HL	Yoder	Total
A	0	0	1	0	1
B	3	-1	0	0	2
C	8	3			11
D	8	2	0	2	12
E	-1				-1
F		4			4
G	0	-1			-1
H	0				0
I	8	3			11
<b>Total</b>	<b>26</b>	<b>10</b>	<b>1</b>	<b>2</b>	<b>39</b>

Many of the respondents said that a significant proportion of the fleet working in their estate was 'mature' and should ideally be replaced over the next decade. Several respondents referred to health and safety concerns with aging haulers. It was common opinion from harvest managers that demand for replacement of equipment within their estate is likely to be more significant than demand from the requirement of additional capacity.

There appeared to be differing opinions from different managers on the types of hauler that would be required in the future. This difference of opinion also occurred between managers with similar terrain and soil types. It was therefore not possible to form any conclusions for equipment manufacturers on the types of machines required, and generalising based on terrain at a national level might not be an accurate indication of demand. Several respondents indicated average piece size was increasing across their estate.

## Discussion

The survey of the forest companies indicated two quite different patterns dependent on their harvesting circumstances. The large-scale forest companies logging second or third rotation forest had little additional demand for haulers. Forest companies with first rotation forests accounted for almost all of the additional forecast hauler demand, but accounted for less than 10 per cent of the total forested area in the survey.

The fact that all of the additional hauler demand was with companies logging first rotation forest, and that over half of the total plantation forest area in New Zealand is first rotation, indicates the scale of the total potential hauler demand over the next 10 years. The area in first rotation forests and the flow-on for potential demand for haulers will be a lot more difficult to quantify given the dispersed nature of forest ownership. Therefore the industry should adopt a different approach to quantify and understand this resource and the subsequent demand for steep slope harvesting systems. Techniques would benefit from analysis at a macroeconomic level as the number and distribution of forests will be impractical to survey individually. One example of a potential analysis technique would be through querying spatial databases (GIS).

In one regional study, Park (2011) concluded that at current log prices, up to ten per cent of small blocks on steep sites in the Wanganui District had negative stumpage. Therefore it follows that as wood availability increases there is the potential for a larger volume of this wood to yield a negative return or only marginal positive net return.

Increased future supply in excess of demand will create downward pressure on log prices and it could be assumed that many currently marginal return forests will become negative stumpage. This would be caused by log price decreases from oversupply, or harvesting and transport cost increases due to competition for limited



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resources. Small-scale woodlot returns are very sensitive to harvesting, roading and transport costs. Increased demand on this infrastructure will increase costs and will contribute to more small-scale isolated forests becoming uneconomic in the future. The influence of these interrelated variables (cost and demand) is that the harvesting profile is inherently difficult to forecast, and current assumptions around rotation lengths for first rotation small-scale forest owners cannot be relied upon to predict future wood flows.

Manufacturers indicated that the business risk to developing new technology and increasing processing capacity is not warranted without firm orders. If there is a sudden significant increase in demand for machines, this potential shortage of new equipment will become an industry-wide issue that will need to be addressed cooperatively.

## Recommendations for Further Investigation

This investigation was limited in scale and was not designed to be comprehensive, as it was acknowledged that forecasting hauler demand across the entire plantation estate is a challenging and extensive exercise. Forecasting hauler demand for small-scale forests was not within the scope of this investigation.

The following are recommendations for further investigation that build upon the findings of this report:

- What are the topographic features and harvest requirements for the first rotation forests due for harvesting in the next decade? Given that a majority of the increase of available volume over the next decade resides in small-scale forests which can't be individually accounted for, how well can we predict hauler requirements through macro-

analysis such as classification of slopes and span distances using GIS software?

- What is the scale of potentially negative stumpage forests in New Zealand? As more small-scale forests, on steeper slopes and further from established markets come on stream, will the industry find cost-effective harvesting techniques for these forests, or will carbon forestry be the better option?
- Can the New Zealand industry find markets for the forecast increase in wood availability, either processed domestically or moved through New Zealand's log export ports?
- Will predictions of future hauler demand be skewed by smaller scale forests on steeper slopes engaging different harvesting techniques such as tracking for ground-based machinery, to improve harvesting margins by minimising high cost hauler logging and high cost equipment cartage?
- Is the age of many haulers a potential concern regarding health and safety of forest workers in the future? Is this a real and quantifiable issue and if so, what effect on hauler demand would replacing old haulers with new equipment have?



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