



# Deforestation Survey 2014

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## Executive summary

Information on future rates of deforestation of planted forest is needed to assist with projecting New Zealand's likely emissions over the second commitment period of the Kyoto Protocol, to provide information needed to support future climate change negotiations and to inform future policy development.

This study was commissioned to:

- Gather and analyse the current and future deforestation intentions of exotic forest owners/managers.
- Assess deforestation intentions from a suitable sample group to obtain reliable estimates of national deforestation of planted forest up to the year 2025.
- Gauge how forest owners are likely to alter future deforestation intentions under different carbon price and policy scenarios supplied by MPI.
- Provide commentary on:
  - information sourced and the methodology used;
  - key reasons and drivers behind deforestation;
  - uncertainty in the stated intentions.

*The scope of this report is limited to New Zealand plantation forests.*

The general approach followed was a structured review of the deforestation intentions of large-scale forest owners based on a telephone survey and other information gathering. Respondents were asked for their deforestation intentions under two different scenarios:

1. Emissions Trading Scheme (ETS) – this assumes that the ETS legislation as amended under the Climate Change Response (Emissions Trading and Other Matters) Amendment Act 2012 (enacted on 13 November 2012) continues unchanged.  
  
As part of this scenario respondents were asked how much area of offset planting they would undertake.
2. No ETS legislation – this assumes that the ETS is repealed and not replaced by any other comparable legislation.

Results from the survey of large-scale forest owners were collated and interpreted. Allowance was made for deforestation by small-scale owners by assuming that 10 percent of the area harvested is deforested.

### Main findings of survey

A summary of results is presented in Table 1. The large-scale forest owners surveyed reported identical levels of deforestation forecast under ETS and No ETS scenarios for 2014-2025 given the carbon prices at the time of the survey. The level of deforestation varies by region with 67 percent of deforestation by large-scale owners during 2014 to 2025 forecast to take place in the Central North Island.

**Table 1: Forecast of deforestation of plantation forest**

	2014	2015 to 2025		2014 to 2025
Large-scale owners only	6,000	33,000		39,000
All owners	8,000	59,000		67,000

*Note: These forecasts are based on current intentions. They reflect perceptions about land-use economics, land prices, government policy implementation, emission unit price and other factors as they exist at the time of the survey. As such, they are subject to change.*

Total intended deforestation by all owners is estimated as 67,000 hectares between 2014 and 2025. During this period large-scale owners envisage 39,000 hectares of deforestation. A further 28,000 hectares of deforestation is assumed to be undertaken by small-scale owners.

Overall results are similar to those reported in the 2013 survey. The main difference is that some deforestation has been brought forward to 2014 in a number of projects to enable relatively cheaper ERUs (Kyoto Protocol Emission Reduction Units) to be used to meet deforestation liabilities.

Of the 39,000 hectares that is intended to be deforested by large-scale owners, 3000 hectares is classified as post-1989 forest and 36,000 hectares as pre-1990 forest. Of this intended deforestation between 2014 and 2025, 91 percent of conversion will be to dairy, 6 percent to sheep & beef and 3 percent to lifestyle/residential.

No respondents at the time of completing the 2014 survey intend using offset planting. Given emission unit prices at that time there is a clear preference to meet deforestation liabilities by purchasing units rather than using offset planting.

The survey was carried out at a time when the carbon price was initially \$4.30/NZU, increasing over the survey period to \$5.50/NZU. The price of ERUs was much lower – in the range of 5 to 15 cents per unit. At these prices the deforestation liability is not a deterrent to land conversion. According to some respondents, if carbon prices were to increase above about \$10 there is likely to be a reduced rate of future deforestation.

A significant source of uncertainty for land-owner decision-making is access to water to enable dairy conversion. While a number of the major deforestation projects already have water rights, there are a number of projects that have yet to acquire access to water. Nitrate limits may also affect some projects. Another source of uncertainty relates to the return of significant areas of Crown Forestry Licence (CFL) land to Māori as part of settlement of Treaty claims. In a number of cases iwi are still formulating future land-use plans.

# Introduction

## Background

MPI requires information on exotic forest land owner's current and future deforestation intentions. This information will be used for government projections of greenhouse gas emissions (GHG) for the second commitment period of the Kyoto Protocol and beyond.

Under the Kyoto Protocol and the UNFCCC New Zealand must report CO<sub>2</sub> emissions resulting from deforestation. Therefore information on the projected deforestation will assist with GHG reporting and the Emissions Trading Scheme (ETS) financial forecast (as required for the Public Finance Act 1989). Information on deforestation also informs future policy scenarios and helps MPI assess the broader impacts of changing land use.

## Objectives

The key objectives for this project are to:

- Gather and analyse the current and future deforestation intentions of exotic forest owners/managers.
- Assess deforestation intentions from a suitable sample group to obtain reliable estimates of national deforestation up to the year 2025.
- Gauge how forest owners are likely to alter future deforestation intentions under different carbon price and policy scenarios supplied by MPI.
- Provide commentary on:
  - information sourced and the methodology used;
  - key reasons and drivers behind deforestation;
  - uncertainty in the stated intentions.

*The scope of this survey and report is limited to New Zealand plantation forests.*

## What is deforestation?

There are a number of different definitions for deforestation depending upon use and context. Deforestation is defined in the Marrakesh Accord as "the direct human-induced conversion of forested land to non forested land".

Deforestation includes:

- A decision not to replant following harvesting with the conversion to another land use.
- Early liquidation of a forest (i.e. removing immature trees with conversion to another land use).

Deforestation excludes:

- Forests harvested and replanted.
- Harvested forests that are not replanted but naturally regenerate back into forest.

For the purposes of the ETS, deforestation is defined in the Climate Change Response Act (2002). Section 179 is reproduced in the Appendix. It legislates that deforestation is deemed to have occurred if:

- a specified stocking has not been achieved within four years of clearing by replanting or regeneration; or
- a specified canopy cover has not been achieved within 10 years of clearing.

## Approach

The general approach followed is a structured review of the deforestation intentions of large-scale forest owners (owners with more than 10,000 hectares of forest as at 31 March 2005<sup>1</sup>), based on a telephone survey and other information gathering. This approach was taken because:

- The New Zealand plantation forest estate is relatively well understood in terms of ownership, land tenure and age-class.
- The majority of area that will be harvested over the next 10 years, and hence be most susceptible for deforestation, is owned by relatively few owners.
- Owners have been willing to participate.
- Information is available from other sources in the forest industry that can be used to corroborate the stated intentions of forest land-owners.

The dominant role that the large-scale owners will play in the New Zealand plantation harvest until 2025 is illustrated in Table 2. Forest owners with over 10,000 hectares account for 61 percent of the total plantation estate but they own 62 percent of plantations of age 21 years and older and 72 percent of the plantations of age 26 and older (as at 31 April 2014). There are relatively few owners in this category and therefore it makes sense to focus on their deforestation intentions.

**Table 2: Plantation area by age-class and size of ownership [Source: NEFD as at 1 April 2014]**

	Age-class (hectares)							Total
	1-5	6-10	11-15	16-20	21-25	26-30	> 30	
<b>Owners with &gt; 10 000 hectares</b>	168737	146620	183837	237908	136646	126883	61955	<b>1062586</b>
<b>Other</b>	53537	42431	136842	254323	123458	35666	37730	<b>683987</b>
<b>Total</b>	<b>222274</b>	<b>189051</b>	<b>320679</b>	<b>492231</b>	<b>260104</b>	<b>162549</b>	<b>99685</b>	<b>1746573</b>

In some cases forest owners only have the right to harvest the existing crop and do not have the right to replant. Consequently the survey also included large-scale forest land-owners.

Large-scale forest owners and forest land-owners (or managers) were contacted in November/December 2014 and asked about their deforestation intentions. In addition, individuals in other organisations were contacted to obtain their views. The information received was collated and interpreted. It was then converted into a “best estimate” of future deforestation based on current intentions. Results were aggregated to a national level.

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<sup>1</sup> Forest ownership as at 31 March 2005 is used as the basis for this study. This defines a forest estate prior to recent deforestation and aligns with the date the first deforestation intentions survey was conducted. For consistency the same forest owners have been included in the survey each year.



Table 2 indicates that, over the next 10 years, small-scale forest owners will contribute an increasing proportion of the area that is harvested, and liable to be deforested. Consequently a second survey was undertaken to assess the current level of deforestation for the small-scale estate. A sample of forestry consultants and managers were surveyed and asked to estimate the proportion of the area harvested over the last one to two years that has been or will be deforested.

## **Alternative scenarios**

Respondents (to the survey of large-scale owners) were asked for their deforestation intentions under two different scenarios:

1. Emissions Trading Scheme (ETS) – this assumes that the current ETS legislation as amended under the Climate Change Response (Emissions Trading and Other Matters) Amendment Act 2012 (enacted on 13 November 2012) continues unchanged.

As part of this scenario respondents were asked how much area of offset planting they would undertake – the 2012 amendments to the ETS enable offsetting; i.e., landowners are permitted (without incurring any liability) to deforest area provided that they afforest /reforest an equal area elsewhere in New Zealand.

2. No ETS legislation – this assumes that the ETS is repealed and not replaced by any other comparable legislation.

## **Year of deforestation**

In this report the conversion of forest to a non-forest land use (deforestation) is reported as occurring in the year in which the harvesting activity occurred on that area of land, which is consistent with international LULUCF and Kyoto Protocol reporting and accounting. However this does differ from the definition used in the NZ ETS where the year of deforestation is determined at the point of land use change, rather than the point of harvest, but with deforestation liabilities (if any) calculated at the time the forest was cleared.

# Limitations

## Incomplete information

The general response to the telephone survey of the large companies was very good. All individuals contacted were willing to provide information. However sometimes the information provided was incomplete because the company was not willing or able to provide details. For example:

- Some forests are grown on land under a single rotation lease. As such the replanting decision will be made by the land-owner rather than the current crop-owner.
- Some negotiations between land-owner and crop-owner about future land use are ongoing.
- Some land-owners are still evaluating their options.

The response to the survey of the consultants and managers of small-scale forests was also very good. However some respondents were unable to provide quantitative information and provided qualitative or anecdotal information instead.

## Inconsistent information

The information obtained from different sources was not always consistent. In particular, some information was for a calendar year, some was for a March year, while some was for a June year.

## Current intentions

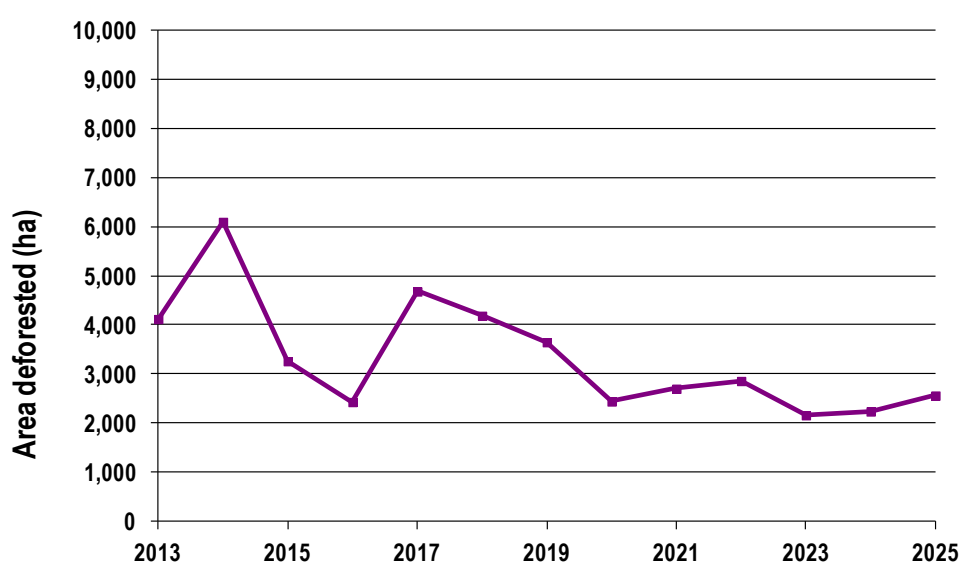
Forecasts are based on current intentions. These reflect perceptions about land-use economics, Government policy implementation, emission unit price and other factors as they exist at the time of the survey. Clearly they are subject to change.

Of some significance, the survey was carried out at a time when the carbon price was initially \$4.30/NZU, increasing over the survey period to \$5.50/NZU. The price of ERUs was much lower – in the range of 5 to 15 cents per unit.

## Results

Aggregated deforestation intentions of large-scale owners are shown in Figure 1. Results for the two scenarios are identical. It is estimated that about 6,000 hectares was deforested in 2014 by large-scale owners. From 2015 to 2025 a further 33,000 hectares of deforestation is forecast. Of the 39,000 hectares of deforestation by large-scale owners between 2014 and 2025, some 3,000 hectares is estimated to be deforestation of post-1989 plantations.

Figure 1: Deforestation forecast for New Zealand (large-scale owners only).



The estimated 36,000 hectares of pre-1990 forest forecast to be deforested between 2014 and 2025 includes conversion to:

- Dairy (or dairy support).
- Sheep and beef agriculture.
- Residential and lifestyle land.

### *Impact of carbon price*

The survey was carried out at a time when the carbon price was in the range \$4.30/NZU to \$5.50/NZU<sup>2</sup>. However deforestation liabilities for most deforestation in 2014 will be met using ERUs costing around 10 cents per unit.

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<sup>2</sup> [www.comtrade.co.nz](http://www.comtrade.co.nz)

An attempt was made to find out the breakeven carbon price; i.e., the carbon price at which intended deforestation would not occur. Responses received were:

- ‘We will use ERUs to meet 2014 deforestation liabilities. We have all the NZUs we need to deforest from 2015 on, however if carbon price exceeds \$12/NZU the opportunity cost of using these NZUs for deforestation becomes too high. Instead we would allow natural regeneration and convert after nine years.’
- ‘The longer-term benefits of diversified land-use are the key drivers for deforestation. Carbon price could be an issue if it gets too high although we do already have some NZUs.’
- ‘We are committed to conversion. We don’t have all the necessary units but are looking to purchase additional NZUs while the price is relatively low.’
- ‘Carbon price may be an issue. The breakeven for conversion was \$13/NZU. With the lower dairy prices it is now \$10/NZU.’

### Intention to use offset planting

No respondents intend using offset planting at the time the survey was completed. Given current emission unit prices there is a clear preference to meet deforestation liabilities by purchasing units rather than using offset planting. Only one respondent indicated that they would consider offset planting. They would do so if the carbon price got over \$13/NZU provided that they could buy land for under \$3000/ha.

### Where is most deforestation occurring?

Some 67 percent of deforestation by large-scale owners during 2014 to 2025 is forecast to take place in the Central North Island.

### What land-use is area being converted into?

Based on the information provided, it is possible to make a broad estimate of the land-use into which deforested land is being converted. Conversion by large-scale owners is mainly to dairy followed by sheep & beef agriculture and then lifestyle/residential (Table 3).

**Table 3: Land-use into which deforested area is being converted in 2014-2025 by large-scale owners for ETS scenario (figures are approximate)**

Forest converted to	Percent
Dairy	91
Sheep & beef	6
Lifestyle	3

### What is the effect of decreasing dairy prices?

Since the 2013 survey dairy prices have decreased substantially. However, in making their decisions about deforestation, most organisations are taking a long term view about dairy prices. Some responses:

- ‘We are looking through the current dairy price.’
- ‘Dairy price is not an issue. We take a long term view.’
- ‘One year of low dairy prices has not changed our perception of longer term trends.’

- ‘Dairy prices aren’t slowing conversion. We are converting under a signed agreement with a farming business.’

### **What are small-scale forest owners doing?**

Forestry consultants and managers throughout New Zealand were surveyed about deforestation by small-scale forest owners. Despite regional differences some general patterns emerged:

- Forestry is the highest and best use for the majority of land being harvested. Most of this land is being replanted following harvest or, in extreme cases, being left to naturally regenerate or revert to native forest.
- Of the remaining land, most land with dairy potential is being converted following harvest. This is particularly the case where pivot irrigators are being used.
- Some land with sheep and beef potential is being converted to grassland following harvest, particularly when the net return from harvesting has been below expectation.

Data provided by the Ministry for Primary Industries (MPI) was also evaluated. Based on the available information, a 10 percent rate of deforestation has been assumed for the small-scale forest estate.

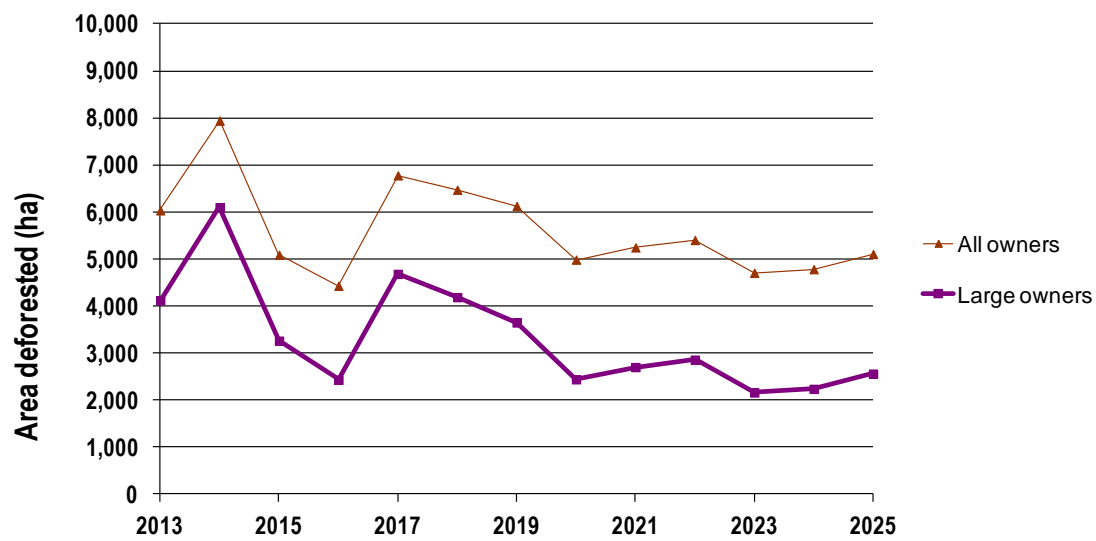
A forecast of the area to be harvested by small-scale owners in 2014 to 2025 was generated based on the current age-class distribution and a harvest profile starting with the MPI roundwood removal estimate for 2014 of 30 million m<sup>3</sup> increasing to the levels of the New Zealand Wood Availability Forecasts (MAF, 2010<sup>3</sup>).

Figure 2 shows the deforestation forecast for all owners. It is estimated that about 8,000 hectares was deforested in 2014 by all owners. From 2015 to 2025 a further 59,000 hectares of deforestation is forecast.

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<sup>3</sup> New Zealand Wood Availability Forecasts 2010-2040, Ministry of Agriculture and Forestry, 2010.

Figure 2: Deforestation forecast for New Zealand (all owners). (Large-scale owner intentions and small-scale owners assuming 10 percent deforestation)



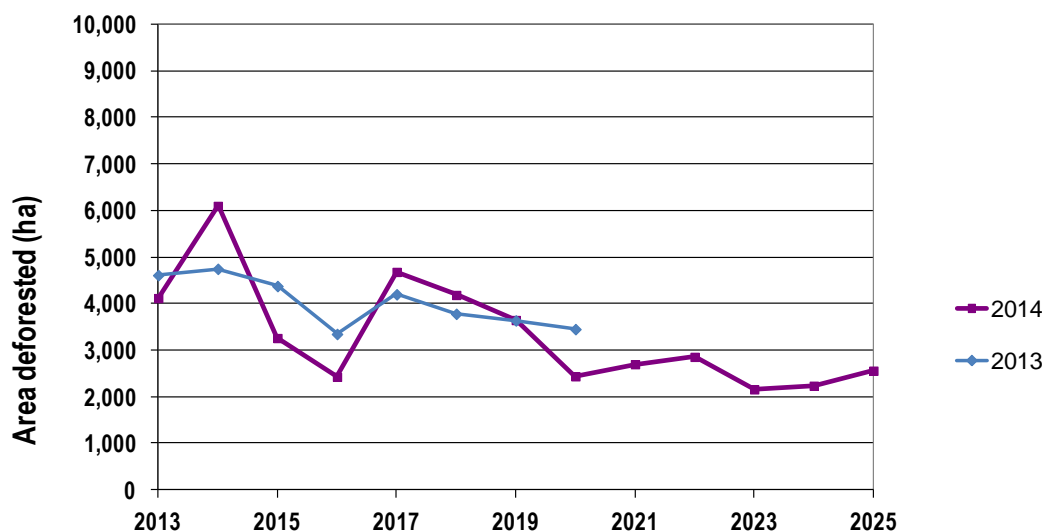
## Comparison with 2013 survey

Results from the 2014 survey are compared with those of the 2013 survey in Figure 3. Total forecast deforestation by large-scale owners (Figure 3) for 2014 to 2020<sup>4</sup> is estimated as 27,000 hectares. This is only slightly less than the total of 28,000 reported in the 2013 survey for this period. Although the totals are similar there are differences in the year-to-year estimates. Reasons for these differences are:

- Three new deforestation projects.
- A decision to replant rather than deforest in four projects.
- A lower level of deforestation in two projects
- A higher level of deforestation in one project.
- Changes in the timing of deforestation in six projects.

The most important factor has been the decision made in a number of projects to bring forward deforestation and deforest as much area as possible in 2014 so that cheap ERUs can be used to meet deforestation liabilities. Although Figure 3 applies to large-scale forests, anecdotal information was also obtained that small-scale owners were also increasing deforestation in 2014. An example was provided in which young trees were being sprayed in order to beat the 31 December 2014 deadline.

Figure 3: Comparison of the 2014 survey results with those from the 2013 survey – large-scale owners only



<sup>4</sup> The 2013 forecast was only to 2020. Consequently a comparison can only be made for 2014 to 2020.

## Uncertainty

There is uncertainty about the level of deforestation from 2015 when Commitment Period One Kyoto Protocol units can no longer be used to meet ETS surrender obligations. Should NZU prices reach around \$10/NZU deforestation intentions are likely to decrease. Even land-owners who hold sufficient NZUs to meet deforestation liabilities will reassess plans if the opportunity cost of surrendering these NZUs becomes too high.

One source of uncertainty for deforestation is access to water to enable dairy conversion. While a number of the major deforestation projects already have water rights, there are a number of projects that have yet to acquire access to water. Nitrates are also an issue for some projects. Some comments received:

- ‘Regional Councils are putting catchment management plans in place for water and nitrates. Issues are likely to end up in the Environment Court.’
- ‘We may convert to sheep and beef instead of dairy as a buffer from dairy prices and to reduce nitrate loss.’
- ‘We have water rights as we were first in although we are under some pressure to share these. Nitrates are not an issue.’
- ‘Nitrates are not a problem as they are not currently legislated for. Water is a challenge – the conversion might be to dairy support rather than dairy.’

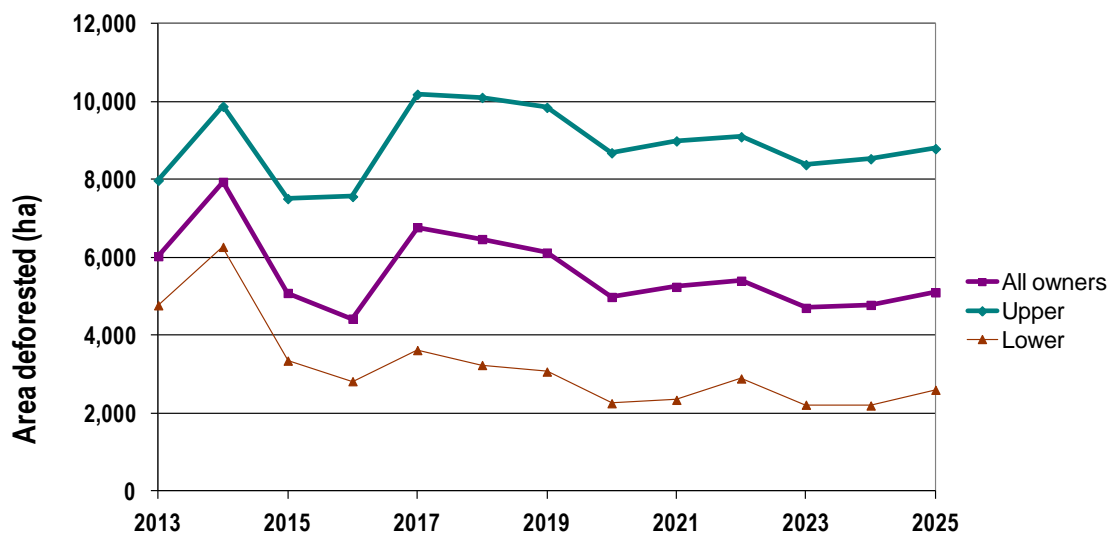
Another source of uncertainty relates to the return of significant areas of CFL land to Māori as part of settlement of Treaty claims. A number of these claims have been settled while others are still in the process of being settled. Some of the settled claims are undergoing a mana whenua process to determine which hapu or iwi has ownership of each area of land. Consequently there is a large area of land, currently under trees, over which iwi have not yet developed land-use plans or are not yet in a position to implement any plans. A proportion of this land is adjacent to dairy farms and has the potential to be converted.

An estimate was made of the likely upper and lower limits of deforestation for each of the projects of large-scale owners. For small-scale owners limits were estimated using a deforestation rate of 20 percent for the upper limit and 5 percent for the lower limit – these limits are indicative of the range of the small-scale owners’ deforestation rate since 2008. The resulting bounds on total deforestation by all owners are wide (Figure 4).

Results should be viewed in the context of a total plantation area (as at 1 April 2014) of 1,747,000 hectares - 1,063,000 hectares in the large-scale estate and 684,000 hectares in the small-scale estate. The total area harvested annually is currently about 50,000 hectares.



Figure 4: Deforestation forecast for New Zealand (all owners) with estimated upper and lower bounds.



# Appendix

## Climate Change Response Act (2002) - Section 179

### 179 Forest land to be treated as deforested in certain cases

- (1) Without limiting paragraph (a) of the definition of deforest in [section 4\(1\)](#), a hectare of forest land must be treated as deforested for the purposes of this Act if the forest species on that hectare have been cleared and,—
  - (a) 4 years after clearing, the hectare has not—
    - (i) been replanted with at least 500 stems of forest species; or
    - (ii) regenerated a cover of at least 500 stems of exotic forest species; or
    - (iii) been replanted with at least 100 stems of willows or poplars in a manner consistent with managing soil erosion; or
    - (iv) regenerated predominantly indigenous forest species growing in a manner in which the hectare is likely to be forest land 10 years after the hectare was cleared; or
  - (b) 10 years after clearing,—
    - (i) predominantly exotic forest species are growing, but that hectare does not have tree crown cover of at least 30% from trees that have reached 5 metres in height; or
    - (ii) predominantly indigenous forest species are growing, but that hectare is not forest land; or
  - (c) 20 years after clearing, predominantly indigenous forest species are growing, but that hectare does not have tree crown cover of at least 30% from trees that have reached 5 metres in height.
- (1A) Subsection (1)(a)(iii) applies only if the EPA is satisfied that the relevant local authority has determined that the soil erosion risk of the land is at least moderate.
- (2) If forest land is to be treated as deforested under subsection (1),—
  - (a) the deforestation is to be treated as having been carried out 4 years, 10 years, or 20 years, after the clearing of the forest species, as the case may be; but
  - (b) the liability in respect of the deforestation must be calculated by reference to the age and forest species of the trees cleared 4 years, 10 years, or 20 years earlier, as the case may be.
- (3) Nothing in this section limits the EPA's ability to exercise powers under [section 121](#) in respect of the deforestation of a hectare of forest land whenever the EPA considers that—
  - (a) the hectare has been converted to land that is not forest land; and
  - (b) any obligations imposed under this Act in respect of the deforestation have not been complied with.