



# **Afforestation and Deforestation Intentions Survey 2021**

## **Final Report**

MPI Technical Paper No: 2022/19

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ISBN No: 978-1-99-103982-8 (online)  
ISSN No: 2253-3907 (online)

**May 2022**

## Disclaimer

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# Executive summary

MPI requires information on afforestation intentions for exotic and indigenous forest, and deforestation intentions for planted forest. Consequently, MPI has requested a survey of afforestation and deforestation intentions from a suitable and consistent group to obtain reliable estimates of national and regional afforestation and deforestation up to the year 2030.

The general approach followed was a telephone survey of:

- Large-scale forest owners - generally owners with more than 10,000 hectares of forest
- Forestry consultants and managers
- Other individuals or organisations identified as undertaking afforestation

A telephone survey was adopted to get a good response rate. Respondents were contacted in November/December 2021 (with some follow-up in early 2022) and asked about their afforestation and deforestation intentions.

## Exotic afforestation

Exotic afforestation is estimated at 41,500 hectares in 2021, an increase from 26,300 ha in 2019 and 33,600 ha in 2020. Some 77% of exotic afforestation from 2019 to 2021 is in the North Island with 43% of total afforestation in the eastern regions (East Coast, Hawke's Bay, Southern North Island-East) of the North Island.

The achieved level of afforestation in 2021 (41,500 ha) falls approximately halfway between the level that was confirmed at the time of last year's survey (37,500 ha) and the intended level (45,200 ha). The main reason for the intentions not being fully achieved was failure of some respondents to acquire land. Other reasons included afforestation projects being deferred awaiting OIO approval and client confirmation.

Total exotic afforestation is intended to be 63,300 hectares in 2022. Radiata pine is intended for 94% of area with redwoods, eucalypts, attenuata/radiata pine hybrid, Douglas fir and cypress species intended for the balance.

Only 76% of intended afforestation for 2022 (47,900 ha) was confirmed at the time of the survey in November/December 2021. Uncertainty about afforestation arises from

- Land availability and affordability
- Seedling availability
- Labour availability (possibly exacerbated by omicron)
- Client confirmation
- Requirement for OIO approval
- Government and Local Council regulations

When asked about barriers to afforestation, 24 respondents (out of the 60 exotic forestry respondents who are undertaking afforestation) referred to the limited tree stocks available from nurseries with a further two noting the shortage of genetically improved material. Ten respondents highlighted the challenges in acquiring land while seven said that labour availability, both planting crew and field managers, was a barrier. Five respondents raised issues about local government including the time and cost involved in getting consents, and the level of local body rates.

In terms of area, the key causes of uncertainty for 2022 are land availability and regulatory uncertainty. Beyond 2022 there is even greater uncertainty with many respondents not stating intentions. Respondents are focusing on the logistics of implementing 2022 afforestation intentions before turning their attention to subsequent years. Afforestation intentions are dynamic. This year's survey picked up a number of new entrants to forestry incentivised by carbon price. It is apparent that future afforestation rates will be driven by carbon price, ETS settings and the availability of key resources.

An important caveat is that the survey was undertaken before release of the MPI/MfE discussion document *Managing exotic afforestation incentives*. This document seeks feedback on "proposals to change the forestry settings within the NZ ETS to remove the incentives for permanent exotic afforestation". If enacted, these proposals would likely change the intentions of some respondents.

## **Indigenous afforestation**

Indigenous afforestation is estimated at 7,000 hectares in 2021, an increase from 5,300 ha in 2019 and 6,700 ha in 2020.

Survey estimates of mānuka afforestation are 4,300 hectares in 2021 with intentions for 3600 ha in 2022. The 2021 estimate aligns with the MPI nursery survey estimate of 4500 hectares of mānuka, as the MPI estimate includes some replanting as well as afforestation.

Survey estimates of tall indigenous tree planting are 600 hectares in 2021 and 500 hectares in 2022. A large nursery estimated 1,600 ha of afforestation using tall tree species in 2021 based on their sales of indigenous seedlings, together with their estimate of market share. They expect 2022 to be similar to 2021. Given the many small projects involved, it is likely that the survey is capturing under half of the tall indigenous tree planting.

In addition to the area planted, the survey estimates natural reversion of indigenous species at a level of 2,100 hectares in 2021 with intentions for 1,000 hectares in 2022.

## **Deforestation**

Large-scale planted forest owners intend to convert 2,700 hectares of forest between 2020 and 2030. A majority of this is conversion of pre-1990 forests - less than 100 hectares is estimated to be conversion of post-1989 plantations. However as large-scale owners intend planting 1,300 hectares to offset this, the intended area of deforestation is 1,400 hectares. Assuming a deforestation rate of 3.8%, deforestation by small-scale owners during 2020 to 2030 is projected to be around 10,100 hectares in total. From 2020 to 2030 a total of 11,500 hectares of planted forest deforestation is forecast across both large-scale and small-scale owners. The total deforestation increases to 23,500 hectares for a sensitivity analysis in which a higher deforestation rate of 8.3% is assumed for small-scale owners.

The same level of deforestation is intended by large-scale owners compared to the previous 2020 survey. Conversion by large-scale owners is mainly to infrastructure/mining and dairy (or dairy support). Infrastructure/mining includes forest being acquired for a road corridor and a landfill, as well as small areas being acquired for mining.

# Introduction

## Background

MPI requires information on afforestation intentions for exotic and indigenous forest and deforestation intentions for planted forest. MPI has requested a survey of afforestation and deforestation intentions from a suitable and consistent group to obtain reliable estimates of national and regional afforestation and deforestation up to the year 2030.

This information will be used for government projections of greenhouse gas emissions and removals for future commitment periods, estimating New Zealand's progress towards a low emissions economy, and an initial indication of the effectiveness of recent policy changes to incentivise afforestation. Information on afforestation and deforestation also informs future policy scenarios across MPI and helps to assess the broader impacts of land use change.

## Definitions

The survey covers deforestation for planted forests only but afforestation of exotic and indigenous species by both planting and natural reversion.

### Deforestation

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 clearfell 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 Emissions Trading Scheme (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.

The Act was amended by the Climate Change Response (Emissions Trading and Other Matters) Amendment Act 2012 to allow for conversion to not be treated as deforestation in certain cases including, under Section 179A, "in the case of pre-1990 forest land that is the subject of an offsetting forest land application that the EPA has approved under [section 186B](#), the pre-1990 forest land that is cleared may not be treated as deforested if cleared".

Consequently, under the ETS, the area of deforestation is calculated as the area of conversion less the area of offset planting.

### Afforestation

Under the definitions of the Marrakesh Accord, "both afforestation and reforestation refer to direct, human-induced conversion of land to forest from another land use. The definitions do not include replanting or regeneration following harvest or natural disturbance, because these temporary losses of forest cover are not considered deforestation. Harvest followed by regeneration is considered a forest management activity. The distinction between afforestation and reforestation is that afforestation occurs on land that has not been forest for at least 50 years, while reforestation occurs

on land that has been forest more recently, though not since 31 December 1989”.<sup>1</sup>

This survey is concerned with the afforestation/reforestation of post-1989 forest land<sup>2</sup>; i.e.

“Land which meets the forest land criteria, and:

- was not forest land on 31 December 1989; or
- was forest land on 31 December 1989 but was deforested between 1 January 1990 and 31 December 2007; or
- was pre-1990 forest land that was deforested on or after 1 January 2008, and any ETS liability has been paid.”

#### **Production forest vs Permanent forest**

For the purposes of this survey:

- Production forest is forest that is intended for clearfell harvest.
- Permanent forest is not intended for clearfell harvest. Note that this does not necessarily mean that growers who adopt permanent forestry will choose the ETS permanent forestry option.

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<sup>1</sup> Section 4.2.5 – Intergovernmental Panel on Climate Change – Good Practice Guidance for Land Use, Land-Use Change and Forestry.

<sup>2</sup> <https://www.mpi.govt.nz/dmsdocument/6991/direct>

# Approach

The general approach followed was a telephone survey of:

- Large-scale forest owners - generally owners with more than 10,000 hectares of forest
- Forestry consultants and managers
- Other individuals or organisations identified as undertaking afforestation

When interviewed, respondents were also asked to identify other known afforestation (actual or intended) in their region. Information was also sought from other sources (for example, regional councils, mānuka honey producers and seedling suppliers) about known afforestation activity.

A telephone survey was adopted to get a good response rate. Respondents were contacted in November/December 2021 (with some follow-up in early 2022) and asked about their afforestation and deforestation intentions. Results from individuals were aggregated.

## Afforestation

Respondents were asked for the area that they had afforested in 2021 and the area that they intended to afforest each year from 2022 to 2030. Information was obtained on:

- Area
- Species
- Wood Supply Region
- Whether land availability (and other resources required) has been confirmed

## Deforestation

Respondents were asked for the area that they had converted to a non-forestry land-use in 2021 and the area that they intended to deforest each year from 2022 to 2030. Information was obtained on:

- Area
- Wood Supply Region
- Land-use that area will be converted into
- 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 convert area provided that they afforest/reforest a carbon-equivalent area elsewhere in New Zealand

## Year of conversion

In this report the conversion of forest to a non-forest land use is reported as occurring in the year in which the clearfelling 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 ETS where the year of deforestation is determined at the point of land use change, rather than the point of clearfell, but with deforestation liabilities (if any) calculated at the time the forest was cleared.

# Limitations

## Incomplete information

The general response to the telephone survey was very good. All individuals contacted were willing to provide information. However, in some cases, the information provided was incomplete because the company was not able to provide details. For example:

- Some respondents are still acquiring land and the other resources that they need for afforestation in 2022.
- Many respondents are focusing on the logistics of afforestation in 2022 and are still developing plans for subsequent years.
- 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.

## Current intentions

Estimates are based on intentions surveyed during November/December 2021 (with some follow-up in early 2022). These reflect perceptions about land-use economics, Government policy implementation, carbon price and other factors as they exist at the time of the survey. Clearly intentions are subject to change due to changes in drivers.

The main survey was carried out at a time when the carbon price was in the range \$65 to \$68/NZU. It was carried out before release of the MPI/MfE discussion document *Managing exotic afforestation incentives*. This document seeks feedback on “proposals to change the forestry settings within the NZ ETS to remove the incentives for permanent exotic afforestation”. If enacted, these proposals would likely change the intentions of some respondents.

# Results – Afforestation

## Exotic afforestation

There were 71 respondents to the survey of whom 60 are undertaking afforestation with exotic species. Total afforestation for exotic species is intended to be 63,300 hectares in 2022 with 84% intended for production and 16% intended for permanent forest (Table 1 and Figure 1). The apparent decline in afforestation after 2022 arises because many respondents only provided a response through to 2022 (or, in some cases 2023). Most of these respondents are focusing on the logistics of implementing 2022 afforestation intentions before turning their attention to subsequent years.

The total afforestation intended for 2022 is a step up from 2021. There has been an increasing trend since 2019, the first year for which this survey collected data.

The proportion of permanent forestry intended for afforestation in 2022 is higher than the current proportion of post-1989 forest that is permanent forest. Manley<sup>3</sup> (2018) found that overall some 6.1% of post-1989 forest is not intended to be harvested, although the percentage was higher (11.9%) for owners of larger (>1000 ha) forests.

It should be noted that there is uncertainty about the split between production and permanent forestry after 2022 to the extent that no split has been made from 2023 on. Even the split for 2022 is uncertain as land acquisition has yet to be finalised. The split for organisations primarily interested in carbon depends on land availability:

- permanent forestry is more likely if they can continue to acquire freehold land,
- production forestry is more likely on leasehold land where land-owners prefer to harvest.

**Table 1: Afforestation estimates (2019 to 2021) and intentions (2022-2030) for exotic species split between production forests and permanent forests**

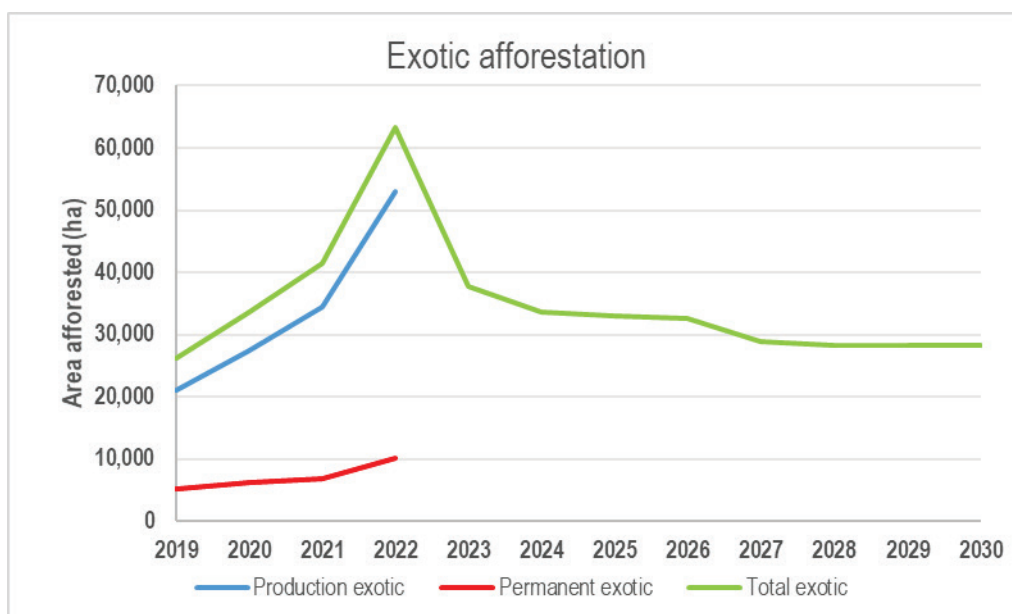
|            | 2019   | 2020   | 2021   | 2022   | 2023   | 2024   | 2025   | 2026   | 2027   | 2028   | 2029   | 2030   |
|------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Production | 21,000 | 27,400 | 34,600 | 53,100 |        |        |        |        |        |        |        |        |
| Permanent  | 5,300  | 6,200  | 6,900  | 10,200 |        |        |        |        |        |        |        |        |
| Total      | 26,300 | 33,600 | 41,500 | 63,300 | 37,800 | 33,700 | 33,000 | 32,600 | 29,000 | 28,300 | 28,300 | 28,300 |

## Transition of permanent forests to native

Although afforestation in the permanent exotic category uses exotic tree species, the stated objective for some organisations is to transition to an indigenous forest over time. Active management is intended to encourage the reversion to indigenous forest.

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<sup>3</sup> Manley, B. 2018. Intentions of forest owners following harvest of post-1989 forests. MPI Technical Paper No. 2018/55.



**Figure 1: Afforestation intentions for exotic species split (for 2019 to 2022) between production forests and permanent forests**

### Which species are being used for exotic afforestation?

Radiata pine dominates exotic afforestation (Table 2).

**Table 2: Percentage of actual afforestation in 2021 and intended afforestation in 2022 by species**

| Species                  | % afforestation |       |
|--------------------------|-----------------|-------|
|                          | 2021            | 2022  |
| Radiata pine             | 94.4            | 93.9  |
| Attenuata/radiata hybrid | 1.6             | 1.4   |
| Douglas fir              | 0.9             | 0.6   |
| Cypress                  | 0.2             | 0.1   |
| Redwood                  | 1.6             | 2.2   |
| Eucalypts                | 1.3             | 1.8   |
| Total                    | 100.0           | 100.0 |

### Where is exotic afforestation occurring?

Afforestation intentions were collected by National Exotic Forest Description (NEFD) wood supply region or, in the case of Nelson/Marlborough, Otago/Southland and Southern North Island (SNI), by sub-region. SNI was split into West and East using the Ruahine, Tararua and Remutaka ranges.

Some 77% of afforestation from 2019 to 2021 is in the North Island with 43% of total afforestation being in the eastern regions (East Coast, Hawke's Bay, Southern North Island -East) of the North Island (Table 3). Beyond 2021 there is uncertainty about the percentage of area that will be afforested by region. Some respondents provided forward intentions on a national basis with region yet to be determined.

**Table 3: Percentage of afforestation of exotic species by NEFD wood supply region. (Column totals might not add to 100% because of rounding)**

| Area                 | % afforestation |      |      |           |
|----------------------|-----------------|------|------|-----------|
|                      | 2019            | 2020 | 2021 | 2019-2021 |
| Northland            | 20              | 10   | 10   | 13        |
| Central North Island | 11              | 9    | 16   | 13        |
| East Coast           | 9               | 8    | 12   | 10        |
| Hawke's Bay          | 12              | 23   | 17   | 17        |
| SNI East             | 24              | 19   | 9    | 16        |
| SNI West             | 6               | 11   | 8    | 8         |
| Marlborough          | 3               | 4    | 2    | 3         |
| Nelson               | 2               | 1    | 0    | 1         |
| West Coast           | 0               | 0    | 1    | 1         |
| Canterbury           | 3               | 7    | 6    | 6         |
| Otago                | 4               | 4    | 13   | 8         |
| Southland            | 6               | 4    | 5    | 5         |
| Total                | 100             | 100  | 100  | 100       |

In the report for the Afforestation and Deforestation Intentions Survey 2020 it was noted that a common feature of MPI afforestation programmes has been that at least 89% of exotic afforestation has been on LUC classes 6, 7 and 8. Survey responses indicate that, as was the case last year, most intended afforestation is on Land Use Capability classes 6 and 7.

## Drivers of afforestation

Of the 40 respondents who stated the purpose of afforestation, carbon was the driver for 30 respondents, carbon + logs was the driver for eight, while wood supply was the driver for two.

Example comments from those who responded that carbon was the driver:

- “We have had a 10-fold increase in interest since the September 2021 carbon auction at which price reached \$53.85/NZU. Our new clients include lots of farmers plus investors.”
- “Until now most of our clients were farmers. Now we are getting more investors and corporates considering investment and offset emissions.”
- “Our clients are 4th generation farmers mostly planting land they already own – they are looking for diversification.”
- “Our clients are Māori land owners on smaller blocks – passive income from carbon is better for them than sheep & beef.”

Comments from those for whom carbon + logs is the driver:

- “Our afforestation is driven by carbon price plus opportunities for sustainable timber harvest from permanent forests.”
- “Carbon provides the opportunity to get into commercial production forestry.”

From a respondent for whom the driver is wood supply:

- “The company has a large part of its forest resource on land it doesn't own. Afforestation is part of a risk management strategy.”

Despite carbon price being the key driver of the increase in afforestation, the majority of afforestation is intended for harvest with carbon accounting under the averaging approach. However, some respondents had clients who were hedging. For example:

- “All will do averaging to start with but are open to change to permanent forestry at age 10 to

15 years (if they have the option to do a one-off change) if log prices are low and carbon price is high.”

Most afforestation decisions are based on the carbon price current at the time of the investment analysis. One respondent commented that:

- “2021 planting was based on \$35. 2022 planting was initially based on \$40 to \$50. The phone rang hot when carbon price got to \$60 to \$65.”

The majority of respondents expect carbon price to increase with \$100/NZU by 2030 being a common sentiment. However, some noted the risk associated with carbon price:

- “There is uncertainty with talk about the Government changing the ETS through:
  - Limiting offsets
  - Differential carbon price for natives
  - He Waka Eke Noa”
- “There is concern that the Government will link the ETS with international schemes. Longer term we expect carbon price to go to \$0:
  - Either carbon price will increase so much that it will add too much cost to consumers (e.g. petrol) and a successor government will end the ETS, or
  - The ETS won’t have the necessary impact so government will replace it with grants.”
- “We are concerned about the ability for the ETS to be manipulated politically. We are a forestry company and do not want to take a carbon position ourselves. Our afforestation is by a JV with a NZ emitter. We have a forestry right on the tree crop and they get the carbon.”

There was a variable understanding of the Climate Change Commission’s recommendations and their potential impact on ETS settings. Recommendation 25 includes:

- 1. Establishing a long-term carbon sink through a comprehensive national programme to incentivise the reversion and planting of new native forests to maintain net zero long-lived greenhouse gas emissions beyond 2050.*
- 2. Designing a package of policies to reduce reliance on forestry removals and manage the impacts of afforestation including:
  - a. Amendments to the NZ ETS to manage the amount of exotic forest planting driven by the scheme (see also Recommendation 11 on the NZ ETS).*
  - b. A clear position on the role and desirability of different types of permanent exotic forests as carbon sinks, and amending the NZ ETS and other policies accordingly.*
  - c. Land-use planning, direction and tools to help local government manage afforestation, mitigate localised impacts of afforestation and to achieve environmental co-benefits**

Some respondents are not aware of the recommendations. One response was that “Any clients who are aware of it aren’t concerned about it.” However many respondents are aware. Some examples:

- “Yes - aware of native preference but have 5 times the cost and 20% of carbon compared to exotics. Who would go there?”
- “Aware of push for more natives but too expensive.”
- “Yes – aware of preference for natives and that exotic afforestation could be switched off or dialled down.”
- “Yes - But NZ won’t get close to 300,000 ha of natives so government will need more than 380,000 ha of exotics. Should allow it in order to avoid buying units off-shore.”
- “Yes – expect settings to change. Current settings are wrong as evidenced by impact on land price”
- “Yes - aware of possible legislation limiting afforestation.”
- “Yes – aware that may change the game for permanent forests.”
- “Yes – can see restriction of permanent forestry using exotics.”
- “Yes – aware of opposition to carbon farming”

## Uncertainty about future afforestation

There is uncertainty even for 2022 afforestation with only 76% of afforestation (47,900 ha) confirmed at the time of the survey in November/December 2021. Uncertainty about future afforestation arises from:

- Land availability and affordability
- Seedling availability
- Labour availability (possibly exacerbated by omicron)
- Client confirmation
- Requirement for OIO approval
- Government and Local Council regulations

When asked about barriers to afforestation, 24 respondents (out of the 60 exotic forestry respondents who are undertaking afforestation) referred to the limited tree stocks available from nurseries with a further two noting the shortage of genetically improved material. Ten respondents highlighted the challenges in acquiring land while seven said that labour availability, both planting crew and field managers, was a barrier. Five respondents raised issues about local government including the time and cost involved in getting consents, and the level of local body rates.

In terms of area, the key causes of uncertainty for 2022 are land availability and regulatory uncertainty. Regarding the former, one respondent stated that “land prices are crazy and not sustainable.” On the latter, one respondent stated that “Presently, there is a high degree of uncertainty, which will not be resolved while the Government is considering suppressing exotic forestry in the ETS.”

Beyond 2022 there is greater uncertainty with a low proportion of afforestation confirmed (Figure 2). Respondents are focusing on the logistics of implementing 2022 afforestation intentions before turning their attention to subsequent years.

Some respondents only provided a forecast for early years, for example some only provided a forecast for 2022 or through to 2023. The afforestation rate is also shown in Figure 2 for the situations where, in addition to stated intentions, these respondents continued with afforestation at 100% or 50% of the rate in the last year for which intentions were provided. However, afforestation intentions are dynamic with carbon price increasing rapidly over the last year. This year's survey picked up a number of new entrants to forestry incentivised by carbon price. It is apparent that future afforestation rates will be driven by carbon price, ETS settings and the availability of key resources.

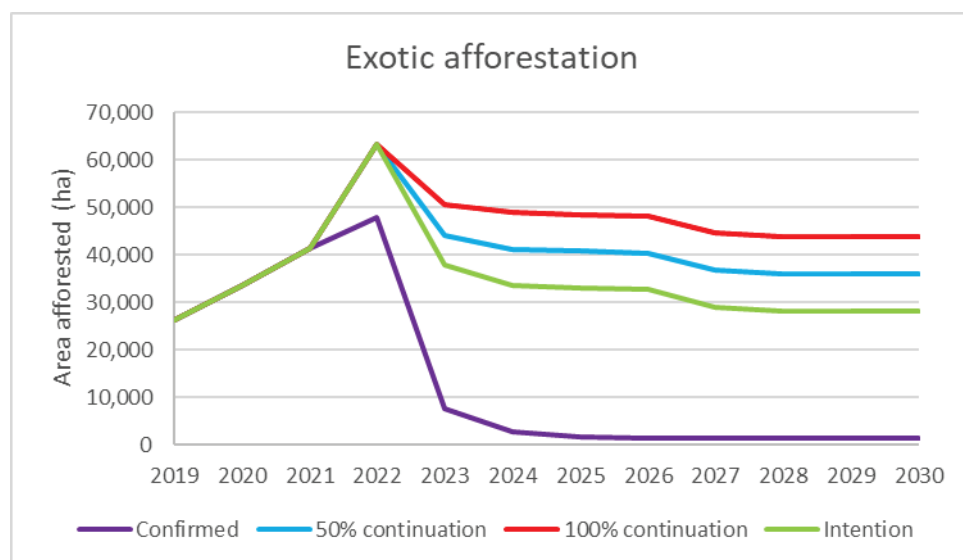


Figure 2: Afforestation intentions for exotic species also showing confirmed afforestation.

## How do intentions from this survey compare with intentions from last year's survey?

A comparison of results from this (2021) survey with those from last year's (2020) survey<sup>4</sup> (Figure 3) reveals three main differences:

1. Exotic afforestation achieved in 2021 was lower than that intended. Total exotic afforestation was intended to be 45,200 ha while the afforestation achieved was 41,500 ha. At the time of the 2020 survey there was uncertainty with only 83% (37,500 ha) of intended 2021 afforestation confirmed at the time of the survey in December 2020. The achieved level of afforestation (41,500 ha) falls approximately halfway between the confirmed level (37,500 ha) and the intended level (45,200 ha). The main reason for the intentions not being fully achieved was failure of some respondents to acquire land. Other reasons include afforestation projects being deferred awaiting OIO approval and client confirmation.
2. Intended afforestation in 2022 is higher in this survey (63,300 ha) than that stated in last year's survey (41,300 ha). This aligns with the comment made in last year's report that "Respondents are focusing on the logistics of implementing 2021 afforestation intentions before turning their attention to subsequent years." Another factor is that carbon price at the time of the 2020 survey was near \$38/NZU whereas carbon price at the time of this 2021 survey was over \$65/NZU.
3. Intended afforestation for 2023 and beyond is higher. This is primarily a result of some respondents basing their intentions for 2023 and beyond on what they expect to do in 2022. As they expect to afforest a larger area in 2022 than 2021, their future intentions have also increased. In any event the large increase in afforestation intended for 2022 has the current focus of respondents with limited attention being paid to later years at this stage.

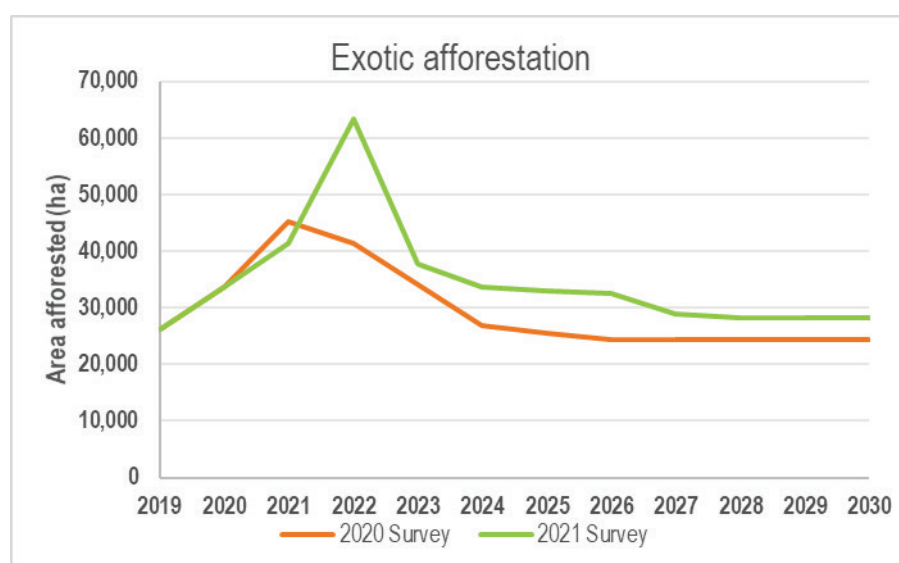


Figure 3: Afforestation intentions for exotic species from this survey (2021) compared to the intentions from last year's survey (2020)

<sup>4</sup> Manley, B. 2021. Afforestation and Deforestation Intentions Survey 2020. MPI Technical paper No. 2021/14

## Indigenous afforestation

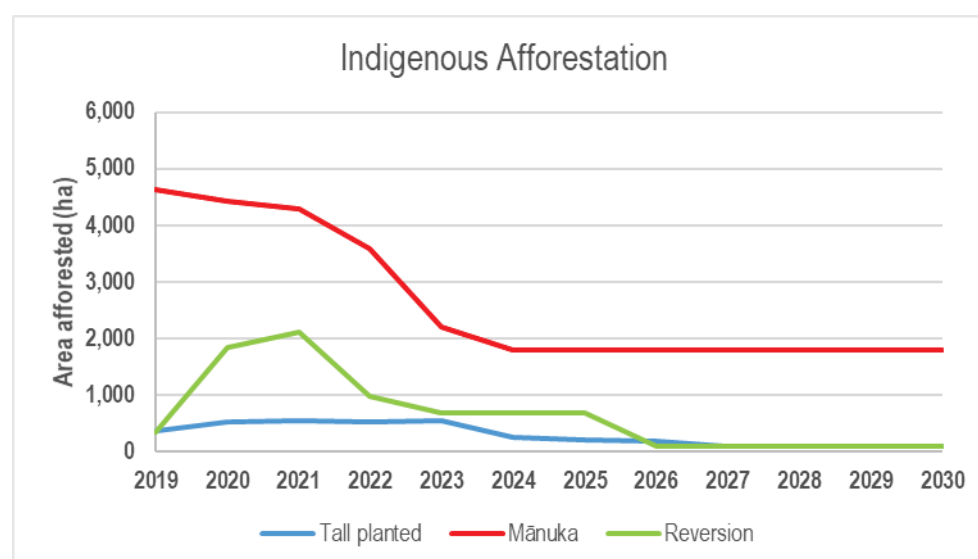
Afforestation estimates are presented in Table 4 and Figure 4. The reduction in afforestation intended for 2022 compared to 2021 is likely to partially be a consequence of the One Billion Trees Fund no longer accepting applications. Afforestation area is dominated by planted mānuka. The tall planted category refers to afforestation that includes the planting of some tall canopy species, in many cases inter-planted with mānuka. Species identified by respondents include:

- Tōtara
- Kahikatea
- Matai
- Red beech
- Mountain beech
- Rewarewa

In the case of indigenous reversion, some respondents provided information for the year of grant approval or year of grant payment. These may differ from the year of establishment/afforestation.

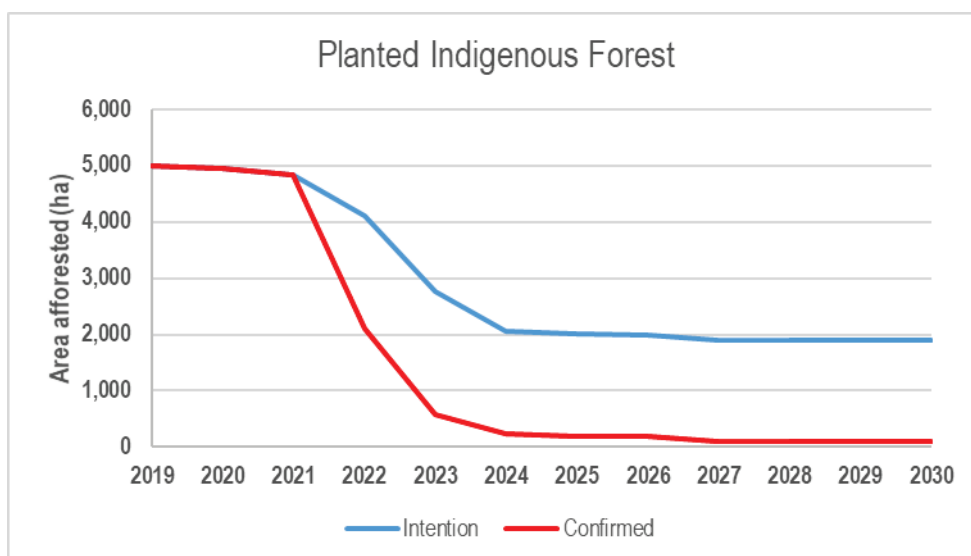
**Table 4: Afforestation estimates (2019 to 2021) and intentions (2022-2030) for indigenous species**

|                       | 2019  | 2020  | 2021  | 2022  | 2023  | 2024  | 2025  | 2026  | 2027  | 2028  | 2029  | 2030  |
|-----------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| <b>Tall planted</b>   | 400   | 500   | 600   | 500   | 600   | 300   | 200   | 200   | 100   | 100   | 100   | 100   |
| <b>Mānuka planted</b> | 4,600 | 4,400 | 4,300 | 3,600 | 2,200 | 1,800 | 1,800 | 1,800 | 1,800 | 1,800 | 1,800 | 1,800 |
| <b>Reversion</b>      | 300   | 1,800 | 2,100 | 1,000 | 700   | 700   | 700   | 100   | 100   | 100   | 100   | 100   |
| <b>Total</b>          | 5,300 | 6,700 | 7,000 | 5,100 | 3,500 | 2,800 | 2,700 | 2,100 | 2,000 | 2,000 | 2,000 | 2,000 |



**Figure 4: Afforestation intentions for indigenous species.**

As was the case with exotic afforestation, there is uncertainty about afforestation intentions, even for 2022 (Figure 5), with, for example, land still being sought. Some respondents did not provide intentions beyond 2022 but may continue to afforest.



**Figure 5: Afforestation intentions for planted indigenous species (mānuka and tall tree species combined) also showing confirmed afforestation.**

### How do the estimates compare with other sources?

The survey will have missed some individuals and organisations involved in indigenous afforestation. Consequently, alternative sources of information were consulted:

- The MPI nursery survey<sup>5</sup> (2021) estimates that, in 2021, 6.2 million mānuka seedlings were sold resulting in a planted area of 4,500 hectares. The MPI estimate is slightly higher than the surveyed area of 4,300 hectares for 2021 which includes only afforestation on post-1989 forest land. There has been additional area, not included in the survey, that has been replanted in mānuka including a number of native forest restoration projects where, following harvesting of a radiata pine crop, mānuka has been planted.
- An estimate of indigenous afforestation was provided for 2021 by one large nursery. Based on their sales of indigenous seedlings, together with their estimate of market share, they estimated 1,600 ha of afforestation using tall tree species in 2021. They expect 2022 to be similar to 2021.

<sup>5</sup> MPI, 2022. Provisional estimates of tree stock sales and forest planting in 2021. Ministry for Primary Industries.

## Where is indigenous planting occurring?

Important regions for indigenous species planting are Central North Island, Hawke's Bay and Southern North Island – West (Table 5). This regional pattern largely reflects the pattern of afforestation by the mānuka honey industry.

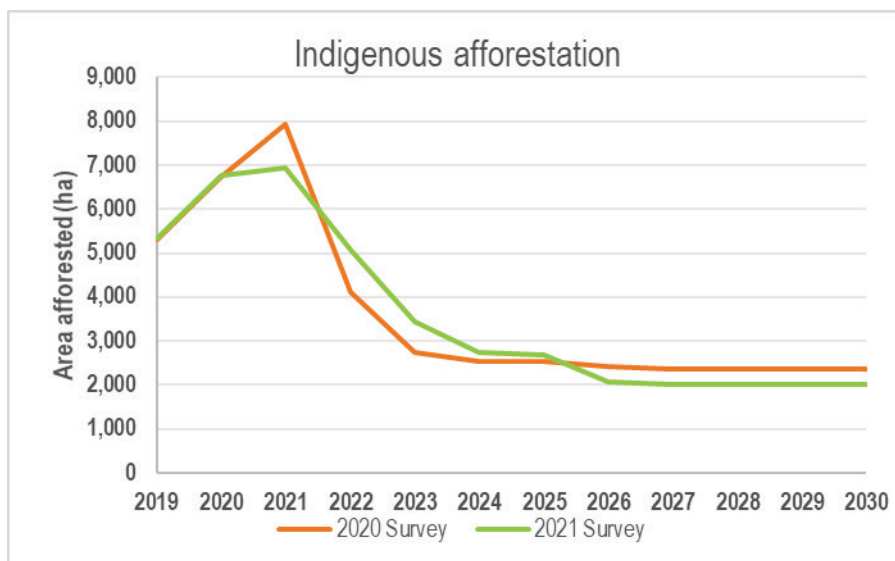
**Table 5: Percentage of indigenous forest planting (mānuka and tall canopy species) by NEFD wood supply region. (Column totals might not add to 100% because of rounding)**

| Area                 | % area established |      |      |         |
|----------------------|--------------------|------|------|---------|
|                      | 2019               | 2020 | 2021 | 2019-21 |
| Northland            | 6                  | 7    | 3    | 5       |
| Central North Island | 30                 | 20   | 12   | 21      |
| East Coast           | 2                  | 4    | 5    | 4       |
| Hawke's Bay          | 21                 | 22   | 37   | 27      |
| SNI East             | 8                  | 4    | 17   | 9       |
| SNI West             | 29                 | 36   | 20   | 28      |
| Marlborough          | 2                  | 3    | 2    | 2       |
| Nelson               | 2                  | 1    | 0    | 1       |
| West Coast           | 0                  | 0    | 0    | 0       |
| Canterbury           | 0                  | 2    | 1    | 1       |
| Otago                | 0                  | 0    | 0    | 0       |
| Southland            | 0                  | 1    | 3    | 1       |
| Total                | 100                | 100  | 100  | 100     |

## How do intentions from this survey compare with intentions from last year's survey?

A comparison of results from this (2021) survey with those from last year's (2020) survey (Figure 6) reveals three main differences:

1. Indigenous afforestation achieved in 2021 was lower than that intended. Total indigenous afforestation was intended to be 7,900 ha while the afforestation achieved was 7,000 ha. This is largely because the area of mānuka planted was less than intended because of difficulties in obtaining land either for freehold acquisition or for joint ventures.
2. Intended afforestation in 2022 to 2025 is higher in this survey than that stated in last year's survey.
3. Intended afforestation for 2026 and beyond is lower by a small amount.



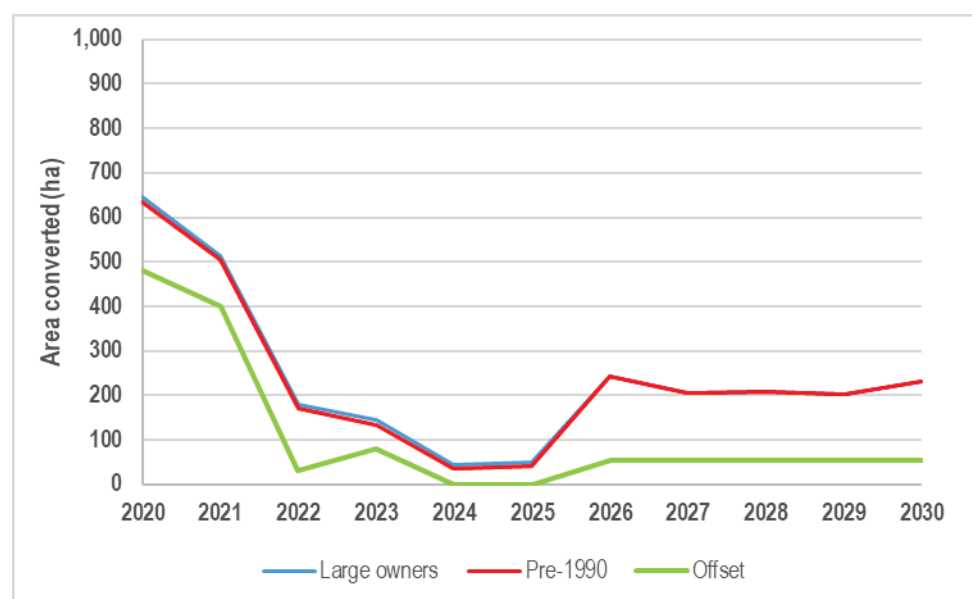
**Figure 6: Afforestation intentions for indigenous species from this survey (2021) compared to the intentions from last year's survey (2020)**

## Results – Deforestation of planted forests

Aggregated conversion intentions of large-scale owners are shown in Figure 7. From 2020 to 2030, 2,700 hectares of conversion is forecast. The majority of this is conversion of pre-1990 forests - less than 100 hectares is estimated to be conversion of post-1989 plantations.

### Intention to use offset planting

Some respondents who intend to convert pre-1990 forest also plan to do offset planting. They intend using the flexible land-use provision and plant a carbon-equivalent area of new land to offset the conversion of 1300 hectares of existing forest land between 2020 and 2030. The intention is to do offset planting for 48% of conversion on pre-1990 forest land (see Figure 7).



**Figure 7: Forecast of conversion from forest to another land-use for New Zealand plantations (large-scale owners only).** The 'Large owners' line shows the total intended conversion by large-scale owners while the almost identical 'Pre-1990' line shows their intended conversion of pre-1990 forests. Some of this conversion will be matched by 'Offset' planting. The area of pre-1990 forest to be deforested is the difference between pre-1990 and offset.

### Where is most conversion occurring?

Some 39 % of conversion by large-scale owners during 2020 to 2030 is forecast to take place in the Central North Island Wood Supply Region while 38 % is in Northland.

### What land-uses are areas of formerly forested land being converted to?

Based on the information provided, it is possible to make a broad estimate of the land-use into which land is being converted (Table 6). Conversion by large-scale owners is mainly to infrastructure/mining and dairy (or dairy support). Infrastructure/mining includes forest being acquired for a road corridor and a landfill, as well as small areas being acquired for mining.

**Table 6: Land-use into which area is being converted in 2020-2030 by large-scale owners (refers to 2000 hectares of conversion).**

| Forest converted to   | %  |
|-----------------------|----|
| Infrastructure/Mining | 40 |
| Dairy                 | 38 |
| Sheep & Beef          | 14 |
| Residential/Lifestyle | 8  |

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

Forestry consultants and managers throughout New Zealand provided information about conversion by small-scale forest owners. Some overall patterns emerged:

- In most cases all land being harvested is being replanted.
- Most replanting is into radiata pine although some mānuka is being planted.
- In some regions a small proportion of land is being converted to dairy or sheep and beef agriculture. Typically these are small blocks where forestry wasn't profitable because of size, or the owner has other land use plans.
- A small proportion of area is being left to revert either deliberately or by default. This includes area that is not being actively converted but left to lie fallow. Sometimes this is inter-generational with the parents harvesting but the children not wanting to spend money on replanting.

Manley (2018<sup>6</sup>) carried out a survey of the intentions of forest owners following harvest of post-1989 forests. The survey was carried out at a time when the carbon price was in the range \$20-22/NZU. Overall results (Table 7) indicate that 2.6% of area is intended to be converted while another 6.6% of area will be sold in cutover state following harvest, returned to its owner, or there is uncertainty about intentions. Results for the first three size classes are most relevant for small-scale owners. These indicate that 2.0 to 8.3% of area will be converted with uncertainty over a further 7.1 to 13.8%. The average value for the three categories with area under 1000 ha, on an area-weighted basis, is 3.8% conversion with a further 9% uncertain.

**Table 7. Summary of intentions after harvesting for all post-1989 owners [Table 14 of Manley (2018)]**

|                             | <40 ha | 40-99 ha | 100-999 ha | >1000 ha | Total |
|-----------------------------|--------|----------|------------|----------|-------|
| Replant/ mānuka /regenerate | 81.2   | 81.1     | 90.9       | 97.2     | 90.8  |
| Convert                     | 8.3    | 5.1      | 2.0        | 0.3      | 2.6   |
| Return/Sell/Unknown         | 10.5   | 13.8     | 7.1        | 2.5      | 6.6   |
| Total                       | 100.0  | 100.0    | 100.0      | 100.0    | 100.0 |

Based on available information, a 3.8% rate of conversion has been used for the small-scale forest estate in the base scenario. An estimate of the area to be harvested by small-scale owners in 2018 to 2030 was generated based on the New Zealand Wood Availability Forecasts (MPI, 2016<sup>7</sup>). Applying the 3.8% conversion rate to this area gives an estimate of 10,100 hectares of deforestation by small-scale owners during the period 2020 to 2030.

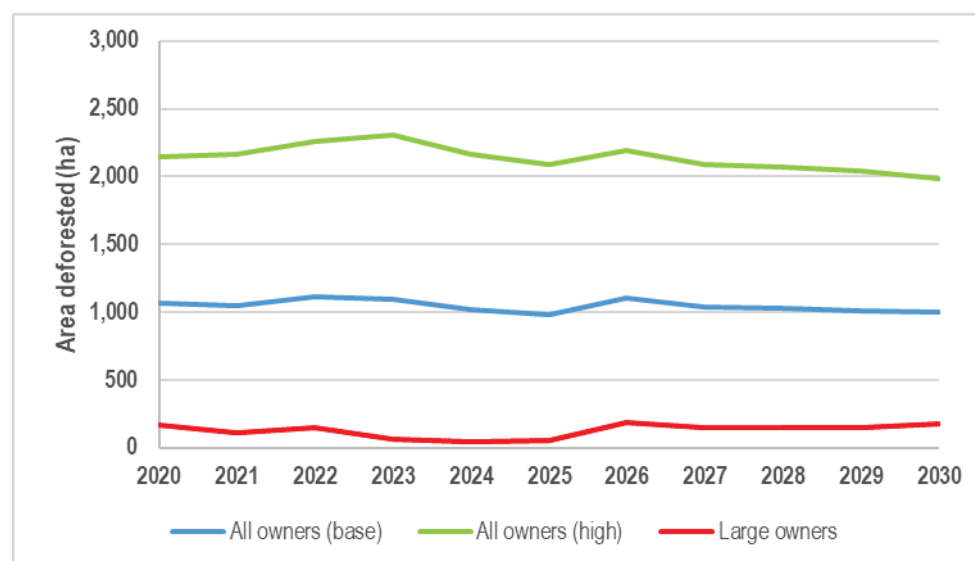
As a sensitivity analysis, a higher level of deforestation by small-scale owners was also evaluated. For this a rate of 8.3% deforestation has been assumed, calculated as the declared conversion rate of

<sup>6</sup> Manley, B. 2018. Intentions of forest owners following harvest of post-1989 forests. MPI Technical Paper No. 2018/55.

<sup>7</sup> New Zealand Wood Availability Forecasts 2014-2050, Prepared for Ministry for Primary Industries by Indufor Asia Pacific Limited, 2016.

3.8% from Manley (2018) plus half of the uncertain category (i.e. half of 9%). Applying the 8.3% conversion rate gives an estimate of 22,100 hectares of deforestation by small-scale owners during the period 2020 to 2030.

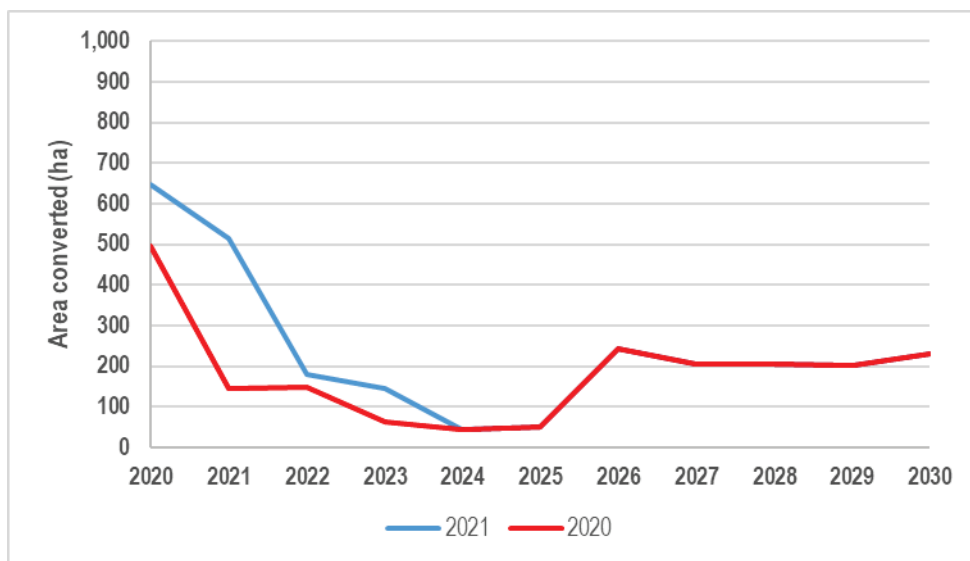
Figure 8 shows the forecast of deforestation for all owners. From 2020 to 2030 a total of 11,500 hectares of deforestation by all owners is forecast when the small-scale deforestation rate of 3.8% is used. This increases to 23,500 ha of deforestation when the higher rate of 8.3% is used for small-scale deforestation.



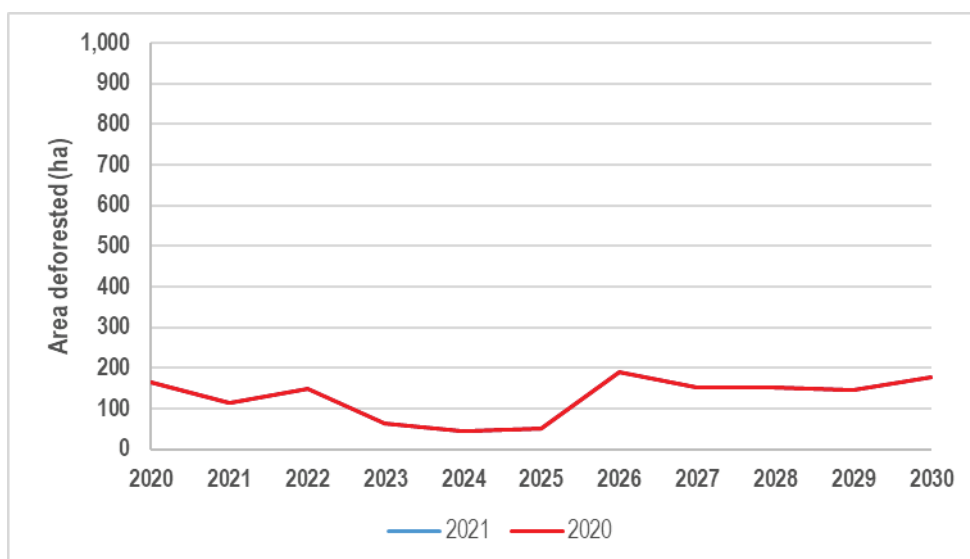
**Figure 8: Forecast of deforestation from forest to another land-use for New Zealand plantations (all owners).** Large-scale owner intentions are based on converted area less offset area while, for the base deforestation scenario, a 3.8% deforestation rate is assumed for small-scale owners. For the high deforestation scenario, a deforestation rate of 8.3% is assumed for small-scale owners.

## Comparison with 2020 Deforestation Intentions Survey

Results for large-scale owners from the 2020 survey are compared with those of the 2018 survey in Figure 9 (area converted) and Figure 10 (area deforested; i.e. area converted less area of offset planting). There is more conversion intended for the period 2020-2030 in this 2021 survey than in the 2020 survey – 2700 hectares in 2021 compared to 2000 hectares in 2020. However, as all of the additional area of conversion is intended to be offset, the area of deforestation intended for the period 2020-2030 in this 2021 survey is the same as in the 2020 survey – 1400 hectares.



**Figure 9: Comparison of the area converted in the 2021 survey with the 2020 survey – large-scale owners only**



**Figure 10: Comparison of the area deforested (converted less offset) in the 2021 survey with the 2020 survey – large-scale planted forest owners only. Results are identical for both years.**

# Concluding remarks

## Afforestation

This survey will have missed afforestation projects – particularly smaller projects that are implemented directly by the land-owner rather than through a forestry consultant or manager. In the case of exotic afforestation, the total area of the missed projects is not expected to be material. The additional area is likely to offset some of the reported afforestation area being gross area rather than the net stocked area that will be achieved. Of some relevance here, Manley et al.<sup>8</sup> (2003) found that the net stocked area achieved in 42 afforestation projects was 93% of the area estimated to have been planted by the owner.

Given the lower level of indigenous afforestation and the many small projects involved it is likely that the reported areas are under-estimates. The survey will have missed some of the area planted in tall indigenous species.

## Deforestation

The intended deforestation by large-scale owners has not changed since the last deforestation intentions survey in 2020. Large-scale forest owners have estates that are predominantly pre-1990 forests. Given the current carbon price, the additional area intended for conversion will all be offset.

In contrast most of the small-scale estate is post-1989 forest. A key determinant of deforestation will be the level of log prices and the rate of return achieved in the current rotation. As is the case for large-scale forests, most small-scale forests are currently being replanted after harvest.

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<sup>8</sup> Manley, B., Somerville, O., Turbitt, M., Lane, P. 2003. Review of new forest planting estimates. New Zealand Journal of Forestry 48(3): 34–37

# Appendix – Deforestation definitions in the CCRA

## Climate Change Response Act (2002)

### 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.

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### 179A Forest land may not be treated as deforested in certain cases

- (1) Despite [section 179](#) and the definition of deforest in [section 4\(1\)](#),—
  - (a) in the case of pre-1990 forest land, pre-1990 forest land that is cleared may not be treated as deforested for the purposes of this Act if the cleared land is exempt land or—
    - (i) is contiguous with the edge of pre-1990 forest land that existed on 31 December 2007; and
    - (ii) is an area that is less than 1 hectare or that is less than 30 metres wide at its widest point; and
    - (iii) is required to be or remain cleared to implement New Zealand's best practice forest management; and
    - (iv) is used only for the purpose of implementing New Zealand's best practice forest management;
  - (b) in the case of pre-1990 forest land that is the subject of an offsetting forest land application that the EPA has approved under [section 186B](#), the pre-1990 forest land that is cleared may not be treated as deforested if cleared,—
    - (i) in the case where the land is converted to a use other than forest land (for example, dairy), in the period—
      - (A) beginning on the date that the approval is given; and
      - (B) ending with the earlier of 2 years after the date that the approval was given or 4 years after the date that the pre-1990 forest land was cleared; or
    - (ii) in the case where the land is not converted to another land use and remains forest land, in the period—
      - (A) beginning on the date that the pre-1990 forest land was cleared; and
      - (B) ending 4 years after the date that the pre-1990 forest land was cleared;
  - (c) in the case of post-1989 forest land, the post-1989 forest land that is cleared may not be treated as deforested if the cleared land—
    - (i) is contiguous with the edge of post-1989 forest land that existed on the date of registration; and
    - (ii) is an area that is less than 1 hectare or that is less than 30 metres wide at its widest point; and
    - (iii) is required to be or remain cleared to implement New Zealand's best practice forest management; and
    - (iv) is used only for the purpose of implementing New Zealand's best practice forest management.
- (2) Subsection (1)(b) does not apply if the EPA revokes its approval of an offsetting forest land application under [section 186G\(1\)](#).
- (3) This section applies to land that was cleared before, on, or after the commencement of this section.

Section 179A: inserted, on 1 January 2013, by [section 73](#) of the Climate Change Response (Emissions Trading and Other Matters) Amendment Act 2012 (2012 No 89).