

# Small Forests in New Zealand

## *A Survey of Landowner Objectives and Management*

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### Abstract

A survey of 728 small forest landowners throughout New Zealand that own 20-200 hectares of forestland and also farm other land found that the majority enjoy owning forest. The main reason for owning forest was income from timber with very few landowners using their forest land for recreation. The median farm size was 400 hectares and the median forest plantation was 37 hectares. Planting of radiata pine peaked in 1994 and 1995 with more radiata planted in 1994 than in all the years from 2000-2009. Most landowners are performing some type of silviculture in their forests. Ninety percent of landowners are currently pruning but only 61% plan to prune in the future with a further 19% unsure. Only 26.4% of landowners have engaged in any commercial harvesting in the past ten years but as their current rotation matures 71 to 95 % plan to replant on the same site. A majority of respondents thought the situation for forest landowners was getting better.

### Introduction

Small landowners own an estimated 30% of the plantation forests in New Zealand (MAF 2010). The collective harvest and management decisions of these landowners will have significant impacts on future timber supply yet very little is known about the characteristics of small-scale forest landowners with respect to how they manage their land and their motivations for owning forest land.

New forest plantings spiked in the 1990s and have since declined. Planting rates averaged 69,000 hectares per year from 1992-1998. In 2007, only 2,000 hectares were planted, the lowest rate since 1950 (MAF 2010). Most of the new plantings from 1992-1998 were by new entrants to forestry (MAF 2010).

There are very few studies identifying and surveying private landowners in New Zealand. An older study found that smaller landowners in New Zealand have a variety of management objectives with revenue from timber a lower priority than sustainable land management practices (Morey 1986). The recent National Exotic Forest Description (NEFD) found that landowners with less than 1000 hectares of forest make up about 31% of the total land area in 2007 (MAF 2010). Some of the data is from a 2004 Agriquality survey of small forest growers and is considered less dependable as some owners may report the total land area converted from pasture to forest without noting the unstocked areas. They estimate the difference between the reported gross forest area and the actual net stocked area may be a difference of 10 to 20 percent (MAF 2010). A recent MAF (2009) publication estimates that of the 15,123 forest owners in New Zealand, about 13,000 landowners own less than 40 hectares of plantation forest. A more recent study surveyed small landowners, most of whom were members of the Farm Forestry Association (FFA) (Dhakal, Bigsby et al. 2008). The survey found that many small landowners

have land suitable for forestry but do not plant it or plant only a portion of potential forest land.

In the United States there have been numerous studies on non-industrial private forest (NIPF) owners. A 2006 survey found that 36 percent of forests in the United States were owned by NIPF owners (Butler 2007). The first NIPF studies were motivated by questions that private lands could not meet demands for timber production. More recent studies tried to understand landowners' diverse motivations for owning forest land (Egan 1997; Karppinen 1998) and include econometric studies developed to explain how forest landowners make decisions and to identify the preferences and variables important to their decisions. Small landowners are thought to place value on non-timber benefits such as recreation, scenic beauty, privacy, and hunting (Binkley 1981; Boyd 1984; Newman and Wear 1993). The probability of a landowner commencing an activity is related to landowner characteristics and preferences (Binkley 1981; Boyd and Hyde 1989). Income and land values are inversely related to harvesting while tract size, knowledge of cost share, technical assistance, and farming as an occupation had a positive correlation (Dennis 1990).

The behaviour of private landowners is less predictable than industrial landowners (Newman and Wear 1993) due to the various objectives of land ownership. Small landowners may not respond to prices in the same way as industrial landowners and this can make predicting timber supply from small landowners quite difficult (Dennis 1989). Newman and Wear concluded that while landowners are interested in making a profit they also have preferences for amenities. Hultkarantz (1992) also found that landowners have a concern for the next generation and programs to promote long term silvicultural investments must take into account this bequest motive. Nontimber management goals are now considered to be a primary motivation for private ownership of forest land in the United States (Hartman 1976; Binkley 1981; Boyd 1984; Subhrendu, Brian et al. 2002). Smaller landowners tend to give a lower

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Table 1. Forest landowner survey response rate by region

Region	Survey Return Rate
Northland	32%
Auckland	42%
Central North Island	30%
East Coast	38%
Hawkes Bay	31%
Southern North Island	30%
Nelson/Marlborough	34%
Canterbury	33%
Otago/Southland	31%
West Coast	47%

priority to timber production. Landowners may be less interested in timber harvesting due to lack of knowledge, low profit potential, lack of ability, or nontimber goals that are incompatible with timber production (Worrell and Ireland 1975).

## Methods

The survey targeted small landowners with 20-200 hectares of forest land and another agricultural enterprise on their property. The survey did not include investors or landowners that have land only in plantation forests. It included a pilot study to pre-test the survey. The pilot study included face to face interviews, phone interviews and a sample survey. The survey consisted of 37 questions divided into sections on current land use, silviculture, economics, demographics and ownership objectives. The survey was completely anonymous and landowners were asked to self-identify which region of New Zealand they owned forestland. AsureQuality's AgriBase farm database provided a list of forest landowners that met the criteria for the survey. There were originally more than 12,000 farms with less than 200 hectares of forest and another agricultural enterprise. There were 4,417 landowners with 10-200 ha of forestry and 2,639 properties with 20-200 ha of forestry so the survey was limited to landowners with 20-200ha of forest in order to allow everyone that met the criteria to receive a survey. Several addresses were duplicate or incomplete so in the end 2511 surveys were mailed to forest landowners in New Zealand with 20-200 ha of forest land and another agricultural enterprise on their land. The pilot survey was conducted in early 2010 and the full survey was conducted during September-November 2010.

## Results

The survey response rate was 32%. A total of 2511 surveys were mailed and 253 were returned as undeliverable for various reasons. Some 728 usable surveys were received. Some surveys were unusable because the landowner did not meet the criteria of forest land ownership as the landowners

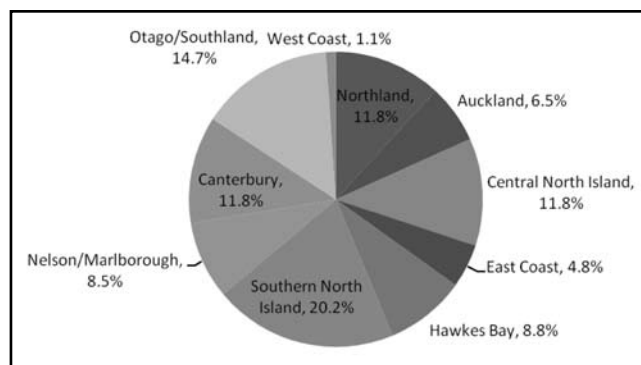


Figure 1. Forest survey returns by region as a percent of 728 total returns

had less than 20ha, more than 200ha or did not have another agricultural enterprise on their land. A further 26 surveys were returned incomplete with a note that they did not own any forest land. Every region had at least 30% return rate. The response rate by region is shown in Table 1.

The regions with the most responses were Southern North Island and Otago/Southland. The surveys returned by region are shown in Figure 1.

Some 173 landowners included comments with their survey. Some attached letters and others called in with comments. Every comment was transcribed and entered into a database. All comments were anonymous and any potentially identifying information was removed before the comment was submitted.

## Forestland

The landowners that returned surveys own a total of 35,931 ha of plantation forest land. The median farm size was 400ha with a median of 37 ha of forest land. Almost 52% of the landowners described their farm type as sheep and beef, other landowners described their primary land type as beef (12.4%), dairy (12.2%), sheep/beef/deer (6.7%), sheep/beef/dairy (6.2%), sheep (5%), orchard (2.2%), deer (1.7%) and other(1.7%).

Landowners had the majority of their plantation forests planted in *Pinus radiata* (90.4%). The other key species were *Pseudotsuga menziesii* (Douglas fir) (2.7%), *Eucalyptus* (1.7%), *Cupressus lusitanica* (1.4%) and *Cupressus macrocarpa* (1.4%).

Landowners were also asked the age of the plantation species on their property. There was a spike in year 15 and 16 (1994 and 1995). This is similar to the spike reported by MAF in the NEFD (MAF 2010). The hectares of land planted in radiata pine by landowners in the study are shown in Figure 2.

There were more hectares of radiata pine planted in New Zealand in 1994 than the total planted in the last ten years. In 1994 forest landowners in the study planted

Table 2. Species planted by small forest landowners in New Zealand

Species	Total Hectares	Percent of Total
Radiata pine	32, 466	90.4%
Douglas fir	961	2.7%
<i>Eucalyptus</i>	615	1.7%
<i>Cupressus lusitanica</i>	518	1.4%
<i>Cupressus macrocarpa</i>	506	1.4%
Other Pines	320	0.9%
<i>Acacia</i>	240	0.7%
Redwoods	135	0.4%
Mixed Species	97	0.3%
Poplar	41	0.1%
Walnut	33	0.1%

4559 hectares in radiata pine while from 2000-2009 they planted a total of 3781 hectares. Other species planted also peaked in the years from 1990-1999 with the exception of Douglas fir. From 2000-2009 survey respondents planted 375 hectares of Douglas fir which is more than 1990-1999 when 303 hectares were planted.

#### Forest Land Owners

The average age of landowners in the study was 56 years and 92% of respondents were male. Some 37% of respondents had undertaken at least some university study. Most landowners revealed that the land in the survey was their primary residence but of the 27% that did not list the land as their primary residence the average distance was 35km. Almost 92% of the landowners farm the land themselves. The landowners that don't farm the land cited the main reason as age and in many cases a family member managed the land.

The majority of landowners (64%) purchased their property on the market and 24% purchased the property from the family trust. The remaining 12% were a combination of both or they purchased the land from a private trust or in a government ballot.

There are many different types of land ownership. The most common responses were individual ownership (46%), trust or estate (35%) and family partnership (16%). While many landowners enjoy owning land, many expressed uncertainty about the future. While 51% said they would leave the land to their heirs or sell it to the family trust, 35% revealed they planned to sell their land, 4% planned to sell some and leave some to heirs and 9% were not sure what they would do with their land in the future. This question received numerous comments. One respondent commented that they would probably sell the land as "half the family lives overseas and the others can't afford to run the forest



Figure 2. Radiata pine planted by forest landowners who returned a useable survey

and prune/thin, etc". Family members living far away or not interested in farming were the main reasons people indicated they would sell the land or they were uncertain about the future. Another respondent commented "Not sure. Would like to keep farm in the family but my kids are not interested" and another said "At this point I don't know. Depends on what the next generation want to do".

#### Ownership Objectives

Ownership objectives are one of the key areas that New Zealand forest landowners differ from forest landowners in the United States. Very few landowners in New Zealand use their forest for recreation. Landowners were asked to list on a scale of 1 to 5 how important various factors were in owning forestland. The factor with the highest ranking was income from timber with an average score of 3.94, followed by environmental reasons, to keep for future generations, land investment, scenic beauty, income from carbon and at the bottom of the list was recreation with an average score of 2.27.

Table 3. Ownership objectives of New Zealand small forest landowners

Ownership Objective	Score (out of 5)
Income from timber	3.94
Environmental reasons	3.84
To keep for future generations	3.12
Land investment/real estate/capital investment	3.01
Scenic beauty	2.80
Income from carbon	2.56
Recreation	2.27

A study of forest landowners in the USA found that only 9% of forest landowners indicated that timber production is an important reason for holding forest land. The top reasons for owning forestland in one study of forest landowners in the USA was enjoy scenery, protect nature, and to pass the land on to their heirs (Butler and

Leatherberry 2004). Many respondents in New Zealand also commented in this category that they owned land because it was “good for the soul”.

There were seven reasons listed for owning forest land and the one that generated the most comments was “income from carbon”. Some people commented that it was “too political at the moment” and others stated “what is it? Can’t touch, can’t smell. Find somebody to deliver a ton of it.” Others seemed quite confused about carbon and commented that there was “not enough information/ absolutes to decide on ETS”.

Landowners were also asked about the importance of various recreational activities on their land from a scale of 0 to 5, with 0 indicating that they didn’t participate in the activity at all, 1 being not important and 5 being very important. None of the recreational activities scored more than 2. The highest ranking activity was observing wildlife with a score of 1.4 followed by hunting with a score of 1.3 and walking/tramping with a score of 1.3. Other activities in order of importance were bird watching (1.2), horseback riding (0.8), photography (0.8), camping (0.7), flower/plant/berry picking (0.7), cycling (0.5), and fishing (0.4). In addition to the ten categories provided many people entered other activities including grazing under trees/shelter for stock, aesthetics/diversity, satisfaction of owning land, quad bikes/motor bikes, firewood, research, privacy, beekeeping, tourism, picnics, filming documentaries, environmental education and army training.

Using the land for recreation was not the standard and landowners commented that they “preferred their grasslands to walk on and enjoy” and that it was hard to recreate on their land “as there is too much blackberry” or “no access available”. Landowners prefer their forests for their timber and stated that “trees are grown for timber/ erosion control only”. A few people commented that they did use their forestland for recreation and “our family lives in a bach built at the forest edge. It is semi isolated on a major river. Various family/friends use it for free recreation, swimming, school holidays”.

## Silviculture

A majority of landowners have applied some forest management to their land. 90% of landowners had pruned or were planning to prune in the current rotation. Landowners were less certain about pruning in future rotations. Only 61% of landowners planned to prune in the future, while 19.4% would not prune and another 19.4% of landowners were not sure if they would prune in future rotations. Some landowners commented that “we pruned in the past but don’t know if it has paid off” or that they “selectively pruned about 10% of 15 year trees but have no plans to prune the rest of the trees or future plantations.” Others expressed uncertainty about pruning in the future due to uncertainty in other aspects of the market and one landowner commented “who knows what is going to

happen, i.e. carbon credits technology” or that they were “not sure, seems very conflicting information”. The average prune height was 5.9 metres with a range of 2 to 9 metres. The range of pruning heights is shown in Table 4.

Table 4. Pruning Heights for radiata pine by small forest landowners in New Zealand

Pruning Height (Metres)	Landowners Pruning to Height	Percent
2	2	0.3%
3	13	2%
3.5	4	0.6%
4	26	4.1%
4.5	14	2.2%
5	43	6.7%
5.5	12	1.9%
6	400	62.5
6.5	79	12.3%
7	24	3.8%
8	14	2.2%
9	9	1.4%

Most landowners had not recently harvested any trees from their property. Some commented that they had harvested trees for firewood or personal use but only 26.4 % had harvested any trees for commercial use in the past ten years. The average age for harvesting those trees was 29 years. The distribution of harvesting ages amongst landowners that have harvested in the past ten years is shown in Figure 3.

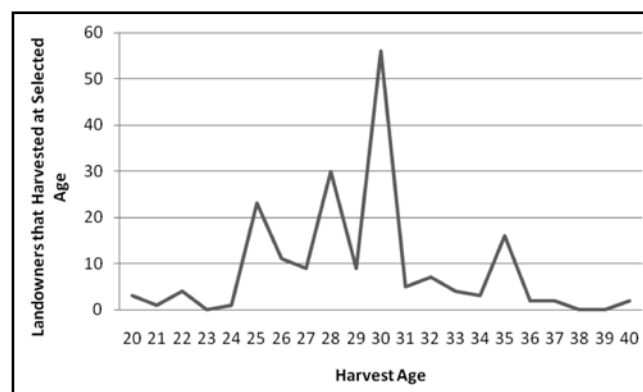


Figure 3. Distribution of harvest ages for landowners that harvested from 2000-2009

Landowners were asked at what age they plan to harvest their trees in the future and most landowners provided a range of ages between 24 and 35 years for radiata pine with an average low of 28 years and the average high of 30 years.

Landowners were also asked if they planned to replant on the same site. 71.4% of respondents said they

would replant on the same site, 5.4% said they would not replant and 23.2% were not sure if they would replant. One landowner commented that they “have cut down trees in the past and have not made any money out of them so they are a weed. Don’t know why I have them. Better to plant a shelter belt for stock shelter.” Several landowners in Otago mentioned that they would “only replant radiata and macrocarpa. Will not replant Douglas fir”. Most landowners planned to replant and one landowner commented that they would keep land in forestry as “we are still happy with the choices we’ve made and are unlikely to make any changes”.

In the past 10 years, 26.1% of the landowners converted land from agriculture to forestry and the average size of land conversion was 20.7 hectares. A smaller number of landowners, 4.8%, converted land from forestry to agriculture in the past ten years and the average size of the land conversion was 9.9 hectares.

## Conclusions and Discussion

A survey of 728 small forest landowners in New Zealand revealed they are a diverse group of people. The majority have radiata pine on their land in addition to smaller plantings of other species. The planting of radiata pine was highest in 1994 and 1995 and has declined in the last ten years. The majority of forest landowners in New Zealand are happy with forestry and plan to continue replanting and managing forest land in the future. Landowners own land primarily for the income from timber and environmental reasons. Recreation is not an important reason for owning forest land and most landowners participate in very little recreation on their land in contrast to landowners in the United States. The survey generated lots of comments many of them expressing admiration or frustration regarding forest land ownership.

There is much uncertainty amongst landowners regarding the advantages of pruning, the cost of harvesting trees on their property and government initiatives available for forest landowners, specifically the ETS. Most landowners are currently pruning but many are uncertain if they will prune in the future. Despite the challenges of owning forest land 50% of landowners thought the situation for small forest landowners was getting better while 25% thought it was staying about the same and 25% thought it was getting worse. One landowner summed up his experience with forestry by commenting “I very much enjoy my forest. Just being in the forest gives me a lift”.

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