



SOUTHERN NORTH ISLAND FOREST INDUSTRY AND WOOD AVAILABILITY FORECASTS 2009



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Cover photo courtesy of Greater Wellington Regional Council: View from Puketiro access road toward Cooks Ridge.

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INTRODUCTION

This publication provides new wood availability forecasts and associated commentary for the Southern North Island wood supply region. Both have been prepared in co-operation with the major forest owners, forest industry leaders and forest harvesting consultants in the region.

Descriptive information is also provided on the major plantation forest estate owners and wood processing industries in the region. Opportunities and constraints facing the regional forest industry are discussed.

The information contained in this report is intended to assist the forestry industry, planning practitioners, and infrastructure and service providers in assessing wood processing opportunities, resource management planning, and infrastructure issues in the region. It will also assist the public understand the nature and regional contribution of the forest industry in the Southern North Island.

This report is one of a series of publications on regional forest industries and wood availability forecasts being produced by the Ministry of Agriculture and Forestry (MAF).

Readers who intend using the wood availability forecast for planning or investment decisions are urged to thoroughly review the forecast, or to engage the services of a professional forestry consultant who is able to interpret the forecasts in the context of specific planning or investment decisions.

OVERVIEW

2

The Southern North Island (SNI) wood supply region consists of two sub-regions: the Eastern SNI and the Western SNI. The Eastern SNI comprises the Taranaki, Masterton, Carterton and South Wairarapa local government districts. The Western SNI sub-region includes the Wellington, Porirua, Lower Hutt, Upper Hutt and Palmerston North Cities, and the Kapiti Coast, Horowhenua, Manawatu, Rangitikei and Wanganui Districts plus the area known as Taranaki (South Taranaki, Stratford and New Plymouth local government districts). Three regional councils are involved in the region: Taranaki, Horizons MW (Manawatu/Wanganui) and Greater Wellington.

The topography of the region ranges from coastal plains, through rolling and steep hill country to mountains. Forestry plays a relatively minor part in the region's economy, but is significant in the Wairarapa and, to a lesser extent, the Wanganui and Rangitikei Districts.

The SNI wood supply region has a well-established forestry sector, with forests spread throughout the region. The larger forests were established by the State in the Wairarapa, inland Wanganui and on the mobile sand country of the region's West Coast. Some of those forests are into their third rotation. A feature of the region is the large number of small-scale privately owned forests.

The region's wood processing sector is based on a combined sawmill/laminated veneer lumber (LVL) plant in the Wairarapa, a chipping plant and four medium-sized sawmills, plus a number of small mills scattered throughout the region.

To assist with future regional forest industry planning, MAF compiled a series of wood availability forecasts for the SNI covering the period 2008 to 2040. The forecasts have been produced in association with the region's major

forest growers and the main operators in the log trade market. The forecasts show the range of harvest volumes potentially available from the planted forest estate of both large and small-scale growers. The forecasts are supply-based, but incorporate the long-term intentions of the larger owners.

»» WESTERN SOUTHERN NORTH ISLAND

The forecasts indicate that the availability of radiata pine from the Western SNI forest estate has the potential to increase (from 0.75 to 0.95 million cubic metres) over the next 5 years. There is a reduction in the large-scale forest owners' harvest intentions for the period 2010 to 2014 but there is an increase in potential wood availability from the small-scale owners' estates.

After 2015 the Western SNI potential wood availability increases significantly, to around 2.0 million cubic metres after 2020.

»» EASTERN SOUTHERN NORTH ISLAND

The forecasts indicate that the availability of radiata pine from the Eastern SNI forest estate will increase slightly (from 0.6 to 0.7 million cubic metres) over the next few years, despite a small decrease in the large-scale forest owners' harvest intentions for the period 2008 to 2013.

After 2015 the Eastern SNI potential wood availability increases significantly to around 1.5 million cubic metres some time after 2020.

»» COMBINED SOUTHERN NORTH ISLAND REGION

The forecasts indicate that the availability of radiata pine from the total SNI forest estate will increase slightly over the next few years, despite a drop-off in the large-scale forest owners' harvest intentions between 2008 and 2013. Between 2008 and 2011 there is a gradual increase in the SNI regional wood availability from 1.35 to 1.7 million

cubic metres per year. After 2015, increases in wood availability across the region are expected to result in increased log supply with the potential for significant volume increases to around 3.5 million cubic metres per year some time after 2020. Most of the potential increase in wood availability during this period is from the small-scale forest growers who established forests during the 1990s. The actual timing of the harvest from these forests will depend on market conditions and the decisions of a large number of small-scale owners.

While the overall forecasts indicate an increasing supply during this period, it is important to recognise that short-term fluctuations are possible, due to changes in market conditions.

Market conditions and logistical constraints (availability

of logging crews, transport capacity, and wood processing capacity, combined with the difficulty of harvesting small blocks) will limit how quickly the additional wood availability from small-scale owners' forests can be harvested leading up to 2020.

Some owners will be motivated to harvest early while others may decide to grow their forests on longer. It is therefore likely that the harvesting of the post-1989 forest plantings will be spread out over a longer period than might otherwise be the case, particularly if a significant number of small-scale owners manage their forests under the New Zealand Emissions Trading Scheme.

In the later part of the forecast period (post-2034) total harvest is projected to decline. This is in line with the age structure of the resource. The timing (and level) of

»» TABLE 2.1: KEY STATISTICS FOR THE SOUTHERN NORTH ISLAND FOREST INDUSTRY

STATISTIC	VALUE
Stocked plantation forest area as at 1 April 2006 (ha)	168 000
Area weighted average age of plantation forest as at 1 April 2006 (years)	13.87
Harvest – estimated roundwood removals – year ending March 2007 (m ³) ¹	940 000
Log exports – year ending March 2007 (m ³)	244 600
Estimated log input to sawmills – year ending March 2007 (m ³)	700 000
Sawn timber production – year ending March 2007 (m ³)	254 000
Sawn timber exports – year ending March 2007 (m ³)	92 700
Direct employment, forestry and first stage processing as at February 2006 (FTE)	1 810

Source
Ministry of Agriculture and Forestry.

Note

¹ Estimated roundwood removals are derived from sawmill production and log exports. They do not account for inter-regional log flows.

decrease will depend on the rate at which the regions' post-1990 forests are harvested.

The SNI region's plantation forestry sector has some distinctive local characteristics:

- › The total exotic forest area in the region is 168 447 hectares or 9.36 percent of the national total (MAF, 2007).
- › The resource is effectively split between two main areas – Tararua, Masterton, Carterton and South Wairarapa districts (68 000 hectares), and Rangitikei, Wanganui and South Taranaki districts (58 000 hectares).
- › The region is notable for the large number of small-scale owners; the region has 21.7 percent of the nation's forest owners, 85 percent of whom own less than 40 hectares of forest. This has implications for co-ordinating future wood supply.
- › The region's forests are dominated by radiata pine; over 96 percent is radiata pine compared to about 90 percent nationally.
- › Three of the large overseas-owned corporates have forest holdings in the region, mostly managing Crown Forestry Licences (CFLs).
- › Two of the large syndicate forest managers also have forests in the region.

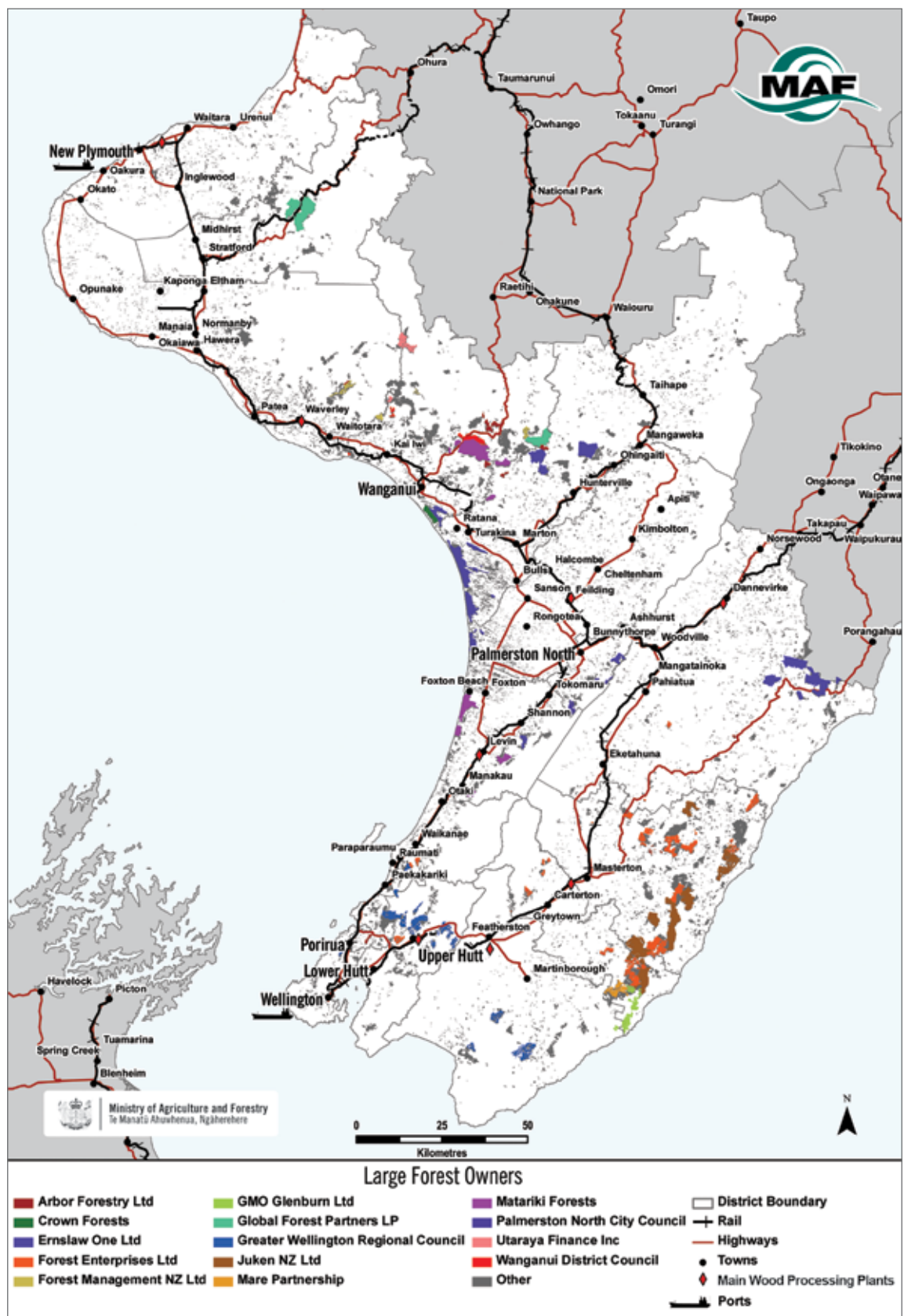
The forests occupy a wide range of sites, from the sand dunes on the west coast, to the unstable hill country of Taranaki, to the more productive hill country of the Wairarapa.

Small volumes of indigenous logs are milled under permits obtained through the Forests Act (1993).

The wood processing sector is based on a combined sawmill/LVL plant, a chipping plant, four medium-sized and a number of small sawmills scattered throughout the region. There have been some mill upgrades but no new processing capacity has been installed in the region since the LVL plant was built.

There is no regional body representing growers and processors in the region.

»» FIGURE 2.1: MAP OF THE SOUTHERN NORTH ISLAND FOREST INDUSTRY



THE PLANTATION FOREST INDUSTRY

3

Plantation forests were established on a small-scale in this region at the end of the 19th century mostly for erosion control. The 1903 Sand Drift Act was enacted in response to erosion of the sandy soils of the Manawatu-Wanganui coastal area. Production forests were planted to protect the Foxton railway line from sand encroachment. In 1921 the NZ Forest Service (NZFS) established a small sand dune experimental station at the mouth of the Rangitikei River. In 1952, the NZFS assumed responsibility for sand control at Waiterere and Santoft Forests and in 1963 the NZFS began planting at Lismore Forest.

In Taranaki, the NZFS acquired the 4300 hectares of reverted farmland that is now Te Wera forest in 1951. This is the only large forest in the Taranaki area.

The NZFS also began the development of a forest resource in the Wairarapa with the planting of Ngaumu Forest during the 1960s for regional development purposes, soil conservation and as a source of timber for an otherwise wood-starved area.

The Crown, represented by the NZFS, dominated ownership of the plantation forest resource in parts of the region before 1987, but also supplied incentives and knowledge for small-scale owners to begin their own planting. During the 1960s and 1970s many landowners established small forests with grants under the Forestry Encouragement Act 1962, and a number of cities, district and regional councils utilised the loans available under that Act.

At 1 April 2006 there were an estimated 168 447 hectares of plantation forests in the region, representing 9.36 percent of the national estate (MAF, 2007).

»» NURSERIES

There are three commercial forest nurseries in the region: Te Kahuri Nurseries in Eltham, Murrays Nursery at Woodville and Gibbs Nursery at Dannevirke. Murrays and Gibbs Nurseries have supplied forestry companies and contractors in the past, but both have experienced significant reductions in the numbers of radiata pine seedlings sold in recent years as rates of new planting and replanting in the region have declined. The amount of high-quality seed available for sowing is expected to be in short supply until 2012 because of problems in seed orchards. Cuttings are deemed to be too expensive for some growers, particularly the small-scale growers, and very few cuttings have been prepared and sold by these nurseries.

The Waimarino Tree Nursery in Raetahi is technically outside the defined wood supply region but does have a number of customers in the region.

»» LARGE-SCALE FOREST OWNERS

There are 15 owners in the region with forest holdings over 1000 hectares in size, totalling 67 414 hectares. This is 40 percent of the regional total. Two owners have over 10 000 hectares of forest each. A further three have holdings between 5000 and 10 000 hectares, and the remaining large-scale owners have forest holdings between 1 and 5000 hectares.

The main large-scale forest growers that are currently harvesting can be seen in Table 3.1.

The NZ Forestry Group, GMO Glenburn, the Mare Partnership, Arbor Forestry, Utareya Finance Ltd and Roger Dickie Ltd are large-scale owners but not yet harvesting.

»» TABLE 3.1: FOREST OWNERS AND MANAGERS IN SOUTHERN NORTH ISLAND AS AT 2006

FOREST OWNER	NET STOCKED AREA (HA)
Ernslaw One Ltd	14 000
Juken New Zealand Ltd	11 000
Forest Enterprises Ltd	9 000
Matariki Forests Ltd	6 000
Wellington Regional Council	6 000
Global Forest Partners LP	3 000
West Coast Development Company	2 000
Wanganui District Council	1 000
Crown Forests (MAF and DOC)	1 000

Source
Ministry of Agriculture and Forestry.

» ERNSLAW ONE LTD

Ernslaw One Ltd is a Malaysian-controlled company. It entered the NZ forest industry in 1990 when it purchased the cutting rights to several of the state forests, as well as the Conical Hill sawmill near Tapanui. It has since expanded through buying bare land and establishing new forests, as well as buying existing forests. It is vertically integrated and now owns sawmills in Gisborne, Tangiwai, and Tapanui, as well as a pulp mill at Tangiwai. Current forest holdings are 100 000 hectares, with the majority in three regions: East Coast, Southern North Island, and Otago/Southland.

Ernslaw One started operating in the Southern North Island in 1990 when it purchased the cutting rights to several state forests, namely Santoft, Tangimoana and Lismore Sands. These are mature forests with some compartments into their third rotation. The company has since purchased some other smaller forests around Bulls and Palmerston North but the main expansion in this region has been through the establishment of young forests around Hunterville and Dannevirke in the late 1990s. Of these, about 14 000 hectares are in the SNI region. The majority of the current log production goes to the Winstone Pulp International (WPI) sawmill and

pulpmill at Tangiwai, which were purchased by Ernslaw One in 2008, but still trade under the WPI name.

The company has had an Environmental Management System in place since 1998, and it received Forest Stewardship Council certification for its North Island holdings in 2003.

» JUKEN NEW ZEALAND LTD

Juken New Zealand Limited is New Zealand-registered and Japanese-owned by Wood One, and has a national estate of about 75 000 hectares in Northland, Gisborne and the Wairarapa. In this region it manages the Crown Forest Licence for Ngaumu Forest in the Wairarapa, as well as a small area of freehold forests. The company's forests in this region are mature, with some compartments into their second rotation. The company prunes to 8.5 metres on selected sites and has a longer rotation than many other large forest owners. The majority of Juken's logs are produced for their own mills. In the Wairarapa, Juken is involved in a joint venture company with Pentarch Forest Products (called JPP) to purchase private wood lots. The company gained Forest Stewardship Council certification for its Wairarapa forests in 2008.

» FOREST ENTERPRISES LTD

Forest Enterprises Limited is a forestry investment and forest management company with its head office in Masterton. The company was established in 1972 and has 73 forestry partnership investment forests, covering 21 512 hectares, under management in the Wairarapa, Hawkes Bay and Gisborne regions. Their business comprises forest management, harvest management, investment administration and marketing operations. More than 6400 investors are involved in ownership of these forests. About 9000 hectares are in the SNI region. Harvesting has begun in some blocks.

› MATARIKI FORESTS LTD

Rayonier New Zealand manages the 143 000 hectare Matariki Forest national estate. The business is a subsidiary of Rayonier Inc., a publicly listed company in the United States. Rayonier is a specialist “timberlands” company. Matariki was formed in 2005 to purchase 94 300 hectares of commercial plantations from Carter Holt Harvey and to acquire Rayonier’s forestry holdings in New Zealand. Matariki is a consortium consisting of Rayonier (40 percent), AMP Capital Investors (35 percent) and RREEF Infrastructure (25 percent). In the SNI region it manages Manakau, Waiterere, and Lismore Hill CFLs and Kohitere Forest, totalling about 6700 hectares. It received Forest Stewardship Council certification for these forests in 2006.

› WELLINGTON REGIONAL COUNCIL

The Wellington Regional Council manages plantation forests in the Wairarapa and the ranges around Upper Hutt. Its predecessor in Wellington, the Wellington City and Suburban Water Supply Board managed the Hutt, Akatarawa and Wainuiomata indigenous catchments under the Water Board Act for future water supply purposes. There was indigenous logging in the Akatarawas from early European settlement, but this ceased in 1972. About 4000 hectares of plantation forest were developed in Wellington under the Forest Encouragement Loan scheme and about 2000 hectares in the Wairarapa under catchment board grants. The Wellington forests are managed as an adjunct to the regional park network.

› GLOBAL FOREST PARTNERS LP

Global Forest Partners LP (GFP) is one of the oldest and largest timber investment management organisations in the world. GFP is a United States-registered investment adviser that advises nine institutional timber investments. In New Zealand, GFP advises four investment funds that between them own some 10 000 hectares of forestry assets in the central North Island, and a 50 percent share of a

joint venture with Hancock Natural Resources Group (HNRG) in Northland.

Forestry assets owned by GFP in the Southern North Island comprise the cutting rights to the 3000 hectare Te Wera CFL and associated forests in Taranaki.

› WEST COAST DEVELOPMENT COMPANY

This company is a Wanganui-based forestry group with over 2000 hectares of forest near Waverley. The company has been harvesting for several years. An associated company, Forest Owner Marketing Services Ltd is a privately owned independent log procurement and marketing company that has been formed to provide harvesting and marketing services to this company and to private plantation owners in the Southern North Island (SNI) region.

› WANGANUI DISTRICT COUNCIL

The Joint Wanganui District Councils’ Forestry Venture is owned by Wanganui, Ruapehu and South Taranaki District Councils and has in excess of 1200 hectares planted. It is managed on contract by a registered forestry consultant through a forest management board.

› CROWN FORESTS

The SNI Crown lease forests, comprising Wanganui Forest, amount to a total of about 668 hectares. MAF currently administers this forest on behalf of the Crown; it is managed under contract by New Zealand Forest Managers Ltd.

The Crown-owned forests on the Department of Conservation estate are managed by PF Olsen and Co.

››› OTHER FOREST OWNERS

The *NEFD as at 1 April 2006* (MAF, 2007) reports that there are 3277 plantation forest owners in the region, 21.7 percent of the national total of forest owners. Of those,

2809 or 85.7 percent of the owners have forests smaller than 40 hectares, with an average size of 14.7 hectares. The total area of forest in this size-class is 43 277 hectares. This is nearly 22 percent of the national figure for holdings of this size.

There are 271 owners with between 40 and 99 hectares of forest, and 168 owners with between 100 and 499 hectares. Fifteen owners have forest blocks between 500 and 999 hectares. Sixty percent of the estate is in blocks under 1000 hectares.

► NEW ZEALAND FARM FORESTRY ASSOCIATION

The NZ Farm Forestry Association (NZFFA) promotes the wise integration of trees, particularly in the form of shelterbelts and wood lots, into the New Zealand

landscape for profit, amenity purposes, soil conservation, erosion control, biodiversity enhancement and indigenous ecosystem conservation through field education, publications and research.

The NZFFA has five branches in the SNI wood supply region; the precise number of members and the size of the estate they manage is not available but a large number of the small-scale growers mentioned in this section are likely to be members.

»» SPECIES COMPOSITION

Radiata pine accounts for 162 794 hectares or 97 percent of the plantation estate. This is 9.8 percent of the national resource.

»» TABLE 3.2: PLANTATION FOREST AREAS BY SPECIES AND LOCAL AUTHORITY (HECTARES AS AT 1 APRIL 2006)

LOCAL AUTHORITY	RADIATA PINE (HA)	DOUGLAS-FIR (HA)	CYPRESS (HA)	OTHER SOFTWOODS (HA)	ALL HARDWOODS (HA)	TOTAL (HA)
Taranua District	13 398	38		308	68	13 812
Masterton District	32 181	585		338	90	33 194
Carterton District	12 673	38	2	106	33	12 852
South Wairarapa District	8 687	16	2	29	310	9 044
Wellington City	623					623
Lower Hutt City	418	1		4		423
Porirua City	1 644			6	8	1 658
Upper Hutt City	6 333	35	3	127	28	6 526
Kapiti Coast District	3 741	3	6	33	34	3 817
Horowhenua District	6 692	20	125	75	119	7 031
Palmerston North City	2 322			1	62	2 385
Manawatu District	6 870	20	10	140	102	7 142
Rangitikei District	20 025	127	9	345	163	20 669
Wanganui District	28 597	334	103	259	133	29 426
South Taranaki District	9 117	1	9	110	57	9 294
Stratford District	5 910	431	1	29	69	6 440
New Plymouth District	3 563		4	485	59	4 111
Region total	162 794	1 649	274	2 395	1 335	168 447

Source
NEFD as at 1 April 2006 (MAF 2007).

There are 2395 hectares of other softwoods, representing 8.8 percent of the national resource of these species.

Douglas-fir accounts for 1649 hectares, or 1.5 percent of the national resource.

There are 1335 hectares of all hardwood species including eucalypts, and 274 hectares of cypress species, which are also very small percentages of the national estate of these species.

Radiata pine growth is accounted for by two distinct growth models, one for the Wairarapa and one for the western side of the region. Parts of the western sub-region have quite distinct growth patterns for radiata pine; the nutrient-deficient (especially phosphate) soils of the Rimutaka range, and the sandy soils of the western coastal forests, produce relatively high density wood with small branches, but there is insufficient information to produce a separate yield table for them.

»» AGE-CLASS DISTRIBUTION

The SNI plantation forest estate has a relatively young age profile due to the large area of new planting in the last 15

years (See Figure 3.1). The area-age class distribution shows the peak in new forest planted during the mid-late 1990s, which potentially enables an increasing area to be harvested from the mid 2020s. The area-weighted average age of the resource was 13.87 years in April 2006, compared to the North Island average of 15.0 years.

Over 118 000 hectares or 70 percent of the SNI forest resource is under 15 years of age.

»» HARVEST TRENDS

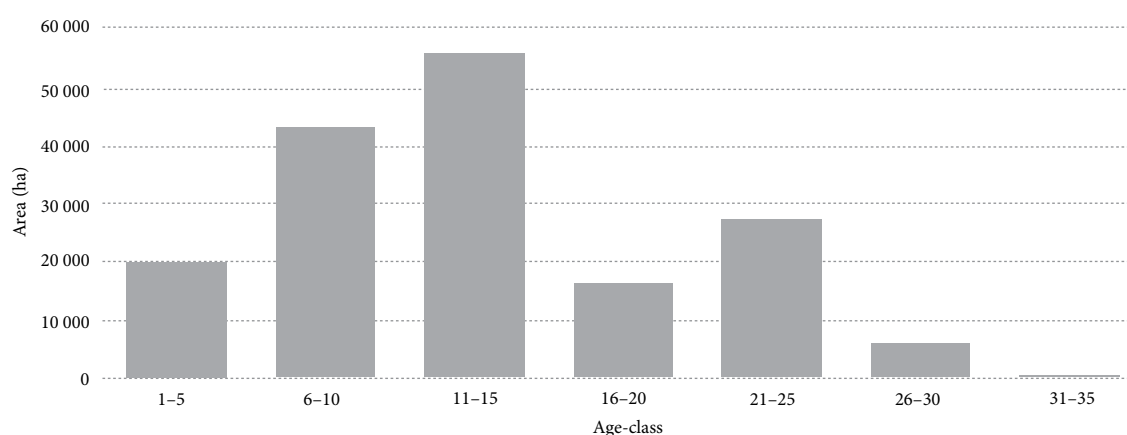
The harvest levels in the region have been relatively constant over the last 5 years.

»» HARVEST INTENTIONS SURVEY

A harvesting intentions survey of the 15 largest forest owners in the Southern North Island was completed in late 2006. The companies included in the survey own, or manage, estates of at least 1000 hectares net stocked area.

The companies provided data on their actual harvest volumes for 2005, and their intentions for the next 10 years (out to 2015). This data was provided by species, and broken down into pruned, unpruned and pulp logs. The

»» FIGURE 3.1 FOREST AREA BY AGE-CLASS IN THE SOUTHERN NORTH ISLAND REGION AS AT 1 APRIL 2006



Source
NEFD as at 1 April 2006 (MAF, 2007).

survey also covered production thinning and the area harvested. Table 3.4 provides a summary of the harvest data, while Appendix A has the results broken down by log grade.

The harvest intentions of the large-scale growers show that the volume of radiata pine will increase only gradually over the next decade. Increasing volumes start to be seen from 2015. This reflects the fact that several smaller corporates will be commencing harvesting operations in this period. These growers will draw on plantings established since the early 1980s.

The production of Douglas-fir has grown in recent years, but is expected to vary between 30 000 and 80 000 cubic metres over the survey period. Other softwoods are a minor contributor to the corporate harvest, and production is expected to decline in the later years of the survey.

»»» TABLE 3.3: ROUNDWOOD REMOVALS FROM SOUTHERN NORTH ISLAND FORESTS, 1997–2008

YEAR ENDED MARCH	PLANTATION FOREST (000 M³)
1997	660
1998	680
1999	640
2000	800
2001	860
2002	900
2003	980
2004	860
2005	930
2006	920
2007	950
2008	930

Source
MAF Statistics.

»»» TABLE 3.4: HARVEST INTENTION SURVEY RESULTS FOR SOUTHERN NORTH ISLAND

YEAR ENDED 31 DECEMBER	RADIATA PINE (M³)	DOUGLAS-FIR (M³)	OTHER SOFTWOODS (M³)	HARDWOODS (M³)	TOTAL VOLUME (M³)	TOTAL AREA (HA)
2005	632 000	1000	15 000	–	648 000	890
2006	589 000	1000	33 000	6 000	629 000	1 115
2007	816 000	35 000	52 000	6 000	909 000	1 776
2008	889 000	80 000	28 000	–	993 000	1 740
2009	794 000	80 000	28 000		902 000	1 683
2010	810 000	63 000	28 000		901 000	1 501
2011	742 000	63 000	–		805 000	1 455
2012	761 000	63 000			824 000	1 430
2013	668 000	15 000			683 000	1 098
2014	799 000	15 000			814 000	1 426
2015	1 059 000	–			1 059 000	1 846

Source
Survey of forest owners, 2007.

WOOD AVAILABILITY FORECASTS

4

These forecasts show the range of harvest volumes potentially available from the planted production forests in the Southern North Island region for the period 2008 to 2040.

The wood availability forecasts are based on each region's forest resource and the forecasting assumptions described later in this report. The forecasts have been developed incorporating the harvesting intentions of the region's large-scale forest owners (those with 1000 hectares of forest or more):

- › Ernslaw One Ltd
- › Juken New Zealand Ltd
- › Wellington Regional Council
- › Matariki Forests Ltd
- › Global Forest Partners LP
- › West Coast Development Company
- › Wanganui District Council
- › Crown Forests
- › Palmerston North City Council
- › Anglican Schools
- › Department of Conservation

The last four owners listed above, while not defined as large-scale owners, all had regionally significant harvest operations underway at the time of the survey and so were included.

The investment syndicates managed by Forest Enterprises have been included in the small-scale ownership category because the ownership systems and age structure of these forests is similar to those of the small-scale owners.

The forecasts incorporate the views of the region's forest managers and consultants. This feedback was critical for ensuring that the forecasts represent a realistic range of future wood availability.

Five scenarios have been modeled to indicate the potential range of wood availability. A key issue is the timing of harvesting by the small-scale forest owners, which will be driven by a range of factors including individual forest owners' objectives, forest age, log prices, demand by local wood processing plants, and perceptions about future log prices and future wood supply. Experience has shown that predicting future harvesting patterns from these owners is difficult.

The scenarios indicate there are many different ways for the forest estate in the region to be harvested. The forests are managed to maximise the benefits to the enterprise that owns them. Each enterprise has its own harvest strategy based on the owners' objectives, market conditions and the forest estate that it owns or manages. Any change in harvesting strategies by forest owners affects the age-structure and maturity of the forests they own. This in turn feeds back directly into future wood availability.

Different levels of uncertainty are associated with the wood availability from each ownership segment of the estate. The volumes forecast from the large-scale owners' forests are subject to change because of changes in harvest intentions or changes in the resource description (areas and yields). Yet, they have greater certainty than those forecast from the small-scale owners' estate. Not only are harvest intentions less clear for small-scale owners, the resource description is likely to be less accurate also.

»» SCENARIOS FOR RADIATA PINE

Five wood availability scenarios have been modelled for radiata pine in this analysis. These scenarios show the range of potential ways for harvesting the forests in the region in the future.

To ensure the scenarios used in this analysis are reasonable, the methodology used was developed in consultation with the NEFD Steering Committee. In addition input and feedback on the forecasts was sought from major forest owners and consultants in the region.

Years are assumed to be to 31 December. For example, 2008 indicates the 12 months to 31 December 2008.

► SCENARIO 1: HARVEST ALL AREAS AT AGE 30

All owners are assumed to harvest their forests at age 30. This scenario shows the potential future harvest in any given year based on the area of radiata pine forest that reaches 30 years of age in that year.

► SCENARIO 2: LARGE-SCALE OWNERS HARVEST AT STATED INTENTIONS, SMALL-SCALE OWNERS AT AGE 30

Large-scale owners' wood availability is assumed to be at stated harvest intentions for 2006 to 2015. After 2015, the large-scale owners' wood availability is not allowed to decrease and can increase by no more than 10 percent per year. Small-scale owners are assumed to harvest trees at age 30.

► SCENARIO 3: NON-DECLINING YIELD – TARGET ROTATION 30 YEARS

Large-scale owners' wood availability is assumed to be at stated harvest intentions (as for scenario 2). The total wood availability of radiata pine from the region is constrained to be non-declining in perpetuity and to increase by no more than 10 percent per year.

► SCENARIO 4: SPLIT NON-DECLINING YIELD – TARGET ROTATION 30 YEARS

This is the same as scenario 3 except that the total wood availability of radiata pine from the region is allowed to step down from 2034 (at the end of the current rotation). Thereafter, a reduction is modelled.

► SCENARIO 5: TARGET ROTATION AGE VARIATIONS

This is similar to scenario 4 except target rotation ages of 28 and 32 years are also evaluated.

»» DISCUSSION ON SCENARIOS

With the exception of scenario 1, the small-scale forest owners have been modelled separately from the large-scale owners. Future harvesting from the small-scale owners is generally less certain than for the latter.

In scenarios 1 and 2 (Figure 4.1A and 4.1B respectively), forests owned by small-scale owners are assumed to be harvested at age 30 years. In the case of scenario 1 all forests (large and small-scale) are harvested at 30 years. These two scenarios show the “potential” availability of mature forest in any given year. These scenarios directly reflect the area of forest in each age class in the Southern North Island region. For practical reasons already described it is unlikely that the future harvesting would occur like this. These two scenarios simply show the potential magnitude of harvesting under favourable market conditions in any given year.

Scenarios 3 to 5 (Figure 4.1C and 4.1D respectively) are based on yield regulation. Under these scenarios, future harvesting is generally constrained to be non-declining, that is, each year the volume must either be the same or higher than in the previous year. Yield regulation provides a more orderly harvesting volume profile that takes into account, to some extent, logistical and market constraints.

These scenarios avoid the large year-to-year fluctuations seen in scenario 1. A fundamental property of the forests in the Southern North Island (like many regions in New Zealand) is the large area of forests established during the 1990s. Scenarios 4 and 5 allow for the harvesting of these forests by applying a non-declining yield constraint for the period 2006 to 2034. Then once

the “bulge” of forests planted during the 1990s have been harvested, the model allows the volume to decline again.

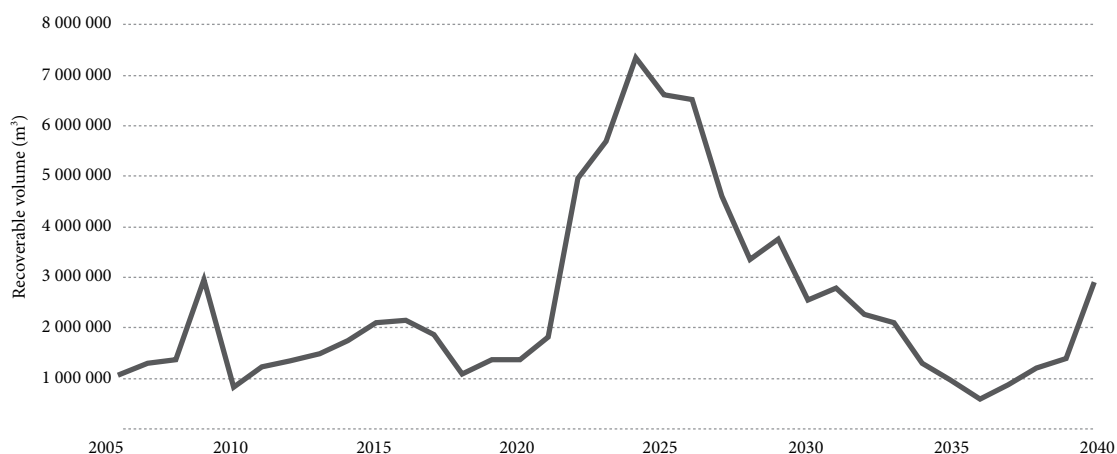
The main limitations of scenarios 3 to 5 is that log prices and other market factors are a significant determinant of harvesting in any given year. When log prices increase,

harvesting will generally increase. When log prices fall the level of harvesting will generally fall. It is beyond the scope of this analysis to predict future timber prices.

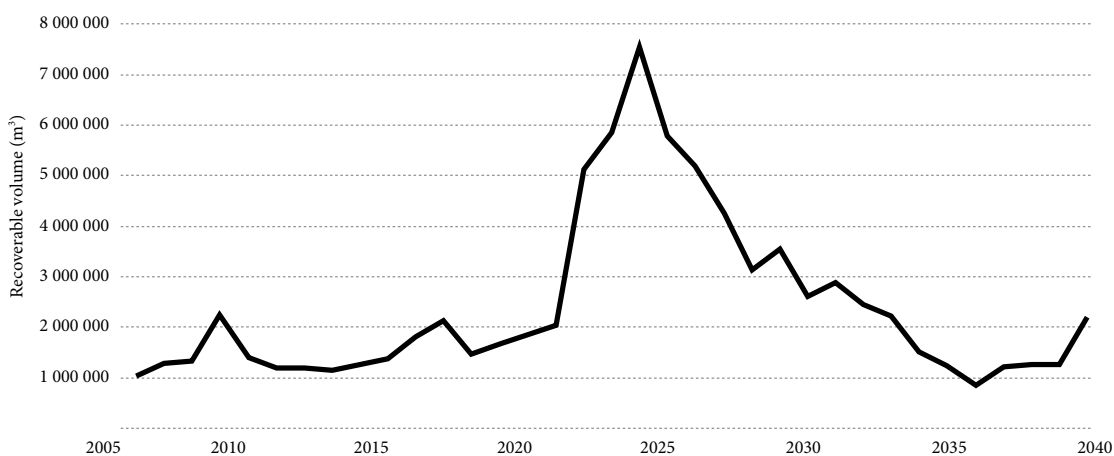
Figure 4.1 shows the sequence of models (scenarios) that are presented throughout the rest of this report.

»» FIGURE 4.1: THE SEQUENCE OF WOOD AVAILABILITY SCENARIOS PRESENTED IN THIS REPORT FOR RADIATA PINE FOR THE COMBINED SOUTHERN NORTH ISLAND

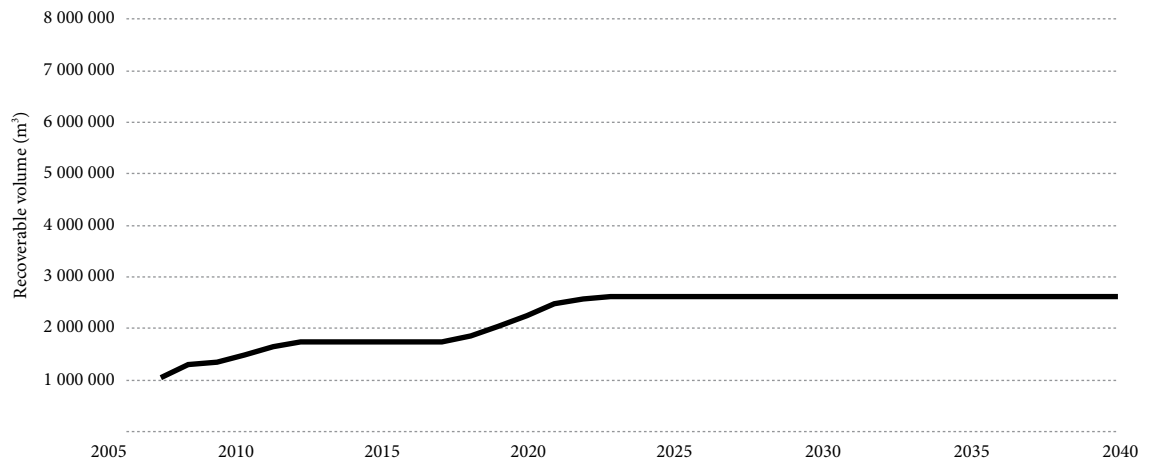
» 4.1A – SCENARIO 1 EXAMPLE: HARVEST ALL AREAS AT AGE 30



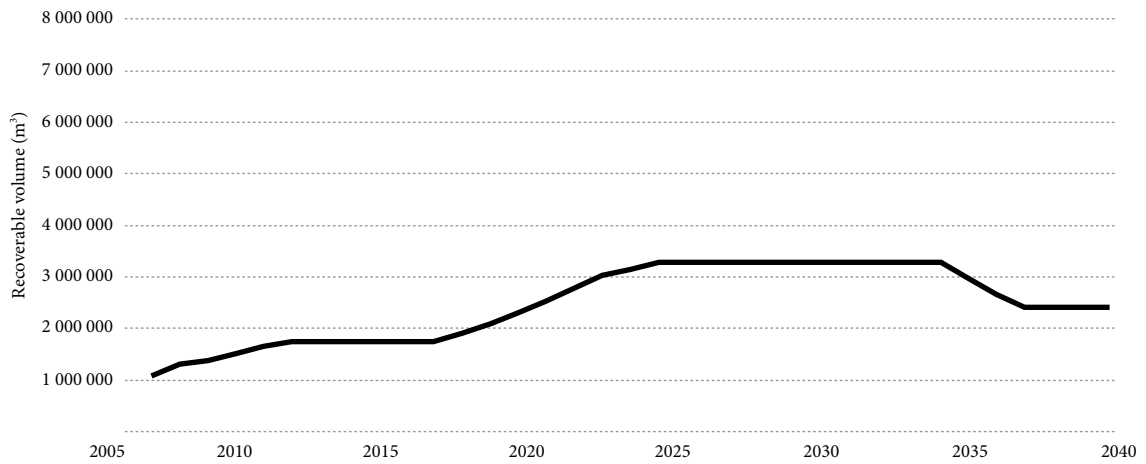
» 4.1B – SCENARIO 2 EXAMPLE: LARGE-SCALE OWNERS HARVEST AT STATED INTENTIONS, SMALL-SCALE OWNERS HARVEST AT AGE 30



➤ 4.1C – SCENARIO 3 EXAMPLE: NON-DECLINING YIELD WITH TARGET ROTATION 30 YEARS



➤ 4.1D – SCENARIO 4 EXAMPLE: SPLIT NON-DECLINING YIELD WITH TARGET ROTATION 30 YEARS



Note

Scenario 5 is the same concept as scenario 4 except it shows wood availability profiles of varying harvesting ages.

»»» SCENARIOS FOR DOUGLAS-FIR

One scenario is presented for Douglas-fir (all owners). It is based on the harvest intentions of large-scale owners for 2006 to 2015 with harvest area regulated in subsequent years at a rotation age of 45 to 55 years.

Wood availability from other species has not been modelled.

»»» DATA

› METHOD USED TO OBTAIN FOREST AREAS

The forest area was obtained from the *NEFD as at 1 April 2006* (MAF, 2007). The small-scale owners' estate was reduced by 15 percent (apart from some investment syndicates including those managed by Forest Enterprises). This was done because the area in this ownership category is often reported on the basis of gross area rather than net stocked area (which excludes unplanted areas, those not successfully established, streams, wetlands, and so on).

› METHOD TO DEVELOP YIELD TABLES

In 2007 new yield tables for both the Western and the Eastern SNI were developed in the following way:

- › large-scale owners (and Forest Enterprises Ltd) provided yield tables for their estate;
- › these were averaged on an area-weighted basis to get regional yield tables for each croptype;
- › yield tables for old (age 17+ years, planted in 1989 and earlier) radiata pine and Douglas-fir were then calibrated to match the harvest intentions data provided by large-scale owners (and Forest Enterprises); that is, the assumption is that the harvest intentions data is the most accurate information available as it is based predominantly on detailed inventory;
- › yield tables for young radiata pine croptypes (planted in 1990 and later) were also adjusted in consultation with large-scale owners;

- › the yield tables developed for the large-scale owners' estate were also applied to the small-scale owners' estate.

› LARGE-SCALE OWNERS HARVEST INTENTIONS

Large-scale owners were asked to provide details of planned harvest volume by log grade and area from 2006 to 2015. These harvest intention values were then included at the beginning of the forecasts to provide the most realistic wood availability forecasts over this period.

› SMALL-SCALE OWNERS HARVEST INTENTIONS

The major companies and consultants involved with the small-scale owners were asked to provide details of harvest volumes from 2006 to 2008. The actual grade breakdown was not available, so the breakdown derived from the large-scale owners was used. No predictions beyond 2008 were available for these owners.

› PRESENTATION OF RESULTS

This report is structured to present the western side of the region separately from the eastern side, before presenting the forecasts for the whole SNI region.

»»» WOOD AVAILABILITY FORECASTS FOR WESTERN SOUTHERN NORTH ISLAND

› ASSUMPTIONS

The wood availability forecasts for the Western SNI are based on the following assumptions:

- › The forest area was obtained from the *NEFD as at 1 April 2006* (MAF, 2007).
- › To more accurately reflect the regime split after data was gathered from the harvest intentions data, 1000 hectares in the large-scale owners' estate was transferred from the old pruned croptype into the old unpruned croptype.
- › All areas are assumed to be replanted after harvest, with a regeneration lag of 1 year, except for 10 percent

of the area in the small-scale owners' estate which is assumed to be deforested.

- › The area awaiting replanting as at 1 April 2006 is included as area at age 0; that is, area to be replanted in the 2006 planting season.
- › **SPECIES AND MANAGEMENT REGIME:** Areas are replanted into the same species and regime except that:
 - all Douglas-fir in the large-scale owners' estate is replanted to radiata pine following harvest;
 - 25 percent of area in the old pruned croptype in the large-scale owners' estate is replanted into the unpruned croptype following harvest;
 - 25 percent of pruned area in the small-scale owners' estate is replanted into the unpruned croptype following harvest.

The total volumes of radiata pine harvested by large and small-scale owners in 2006–2008 are shown in Table 4.1. The large-scale owners' returns are based on the harvest intentions data supplied to MAF. The small-scale owners' estimates are based on feedback from consultants in the region.

»» TABLE 4.1: VOLUMES OF RADIATA PINE HARVESTED IN WESTERN SNI, 2006–2008

HARVEST YEAR	LARGE-SCALE OWNERS (M ³)	SMALL-SCALE OWNERS (M ³)	TOTAL (M ³)
2006	426 000	329 000	755 000
2007	483 000	236 000	719 000
2008	494 000	269 000	763 000

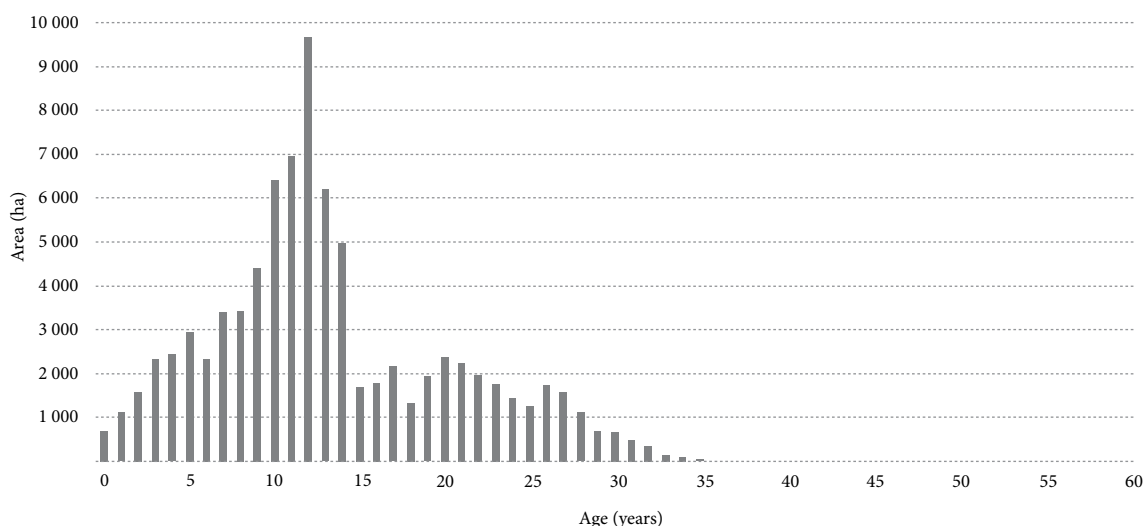
For the overmature radiata pine stands still in the NEFD database, it was assumed that trees of 36 years or older will not be harvested, and therefore removed from the model:

- › 431 hectares total in the large-scale owners' estate;
- › 490 hectares total in the small-scale owners' estate.

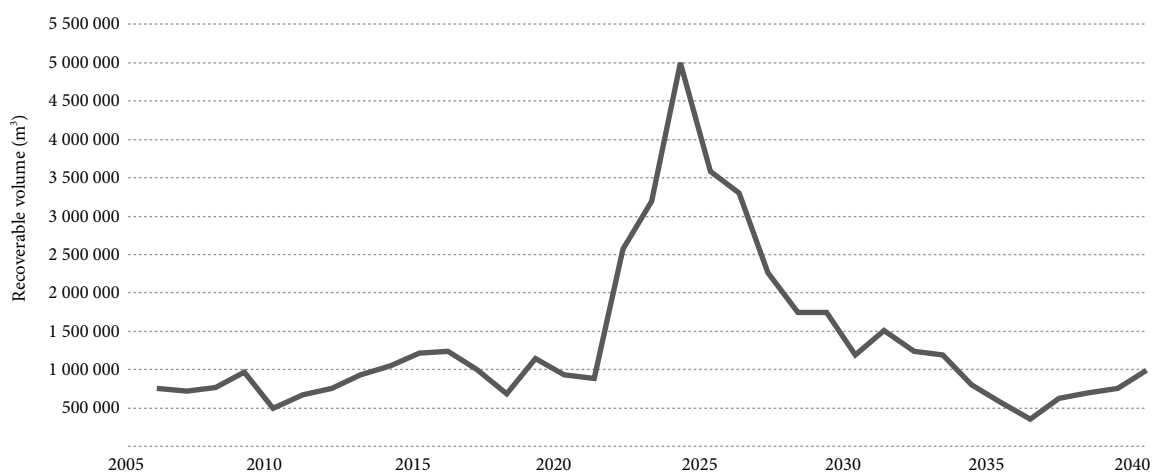
» SCENARIO 1 – HARVEST ALL FOREST AT AGE 30

This scenario has all areas harvested at age 30. It indicates the “pure” (that is, unconstrained) availability of wood from the Western SNI region. It is essentially a translation of the age-class distribution into volume. Figure 4.2 shows the age-class distribution of radiata pine in the Western SNI, while Figure 4.3 shows the wood availability. The low

»» FIGURE 4.2: WESTERN SNI RADIATA PINE AGE-CLASS DISTRIBUTION – ALL OWNERS AS AT 31 MARCH 2006



»» FIGURE 4.3: WESTERN SNI RADIATA PINE AVAILABILITY UNDER SCENARIO 1



point at 2018 (in Figure 4.3) occurs because of the small area (1321 hectares) at age 18 (planted in 1988) in Figure 4.2. The high point at 2024 in Figure 4.3 occurs because of the large area (9674 hectares) at age 12 (planted in 1994) in Figure 4.2.

» SCENARIO 2 – LARGE-SCALE OWNERS HARVEST AT INTENTIONS, SMALL-SCALE OWNERS AT AGE 30

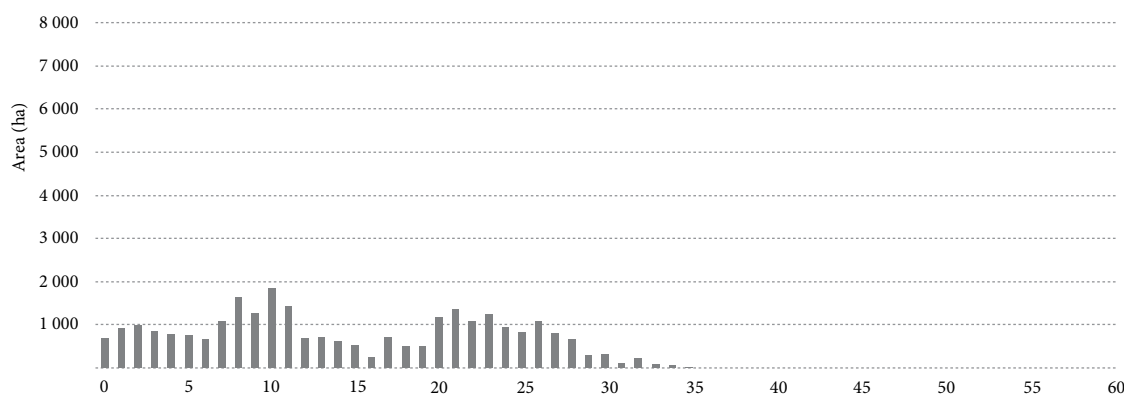
In this scenario, large-scale owners harvest in line with their stated intentions and small-scale owners harvest trees at age 30.

LARGE-SCALE OWNERS

The age-class distribution of the large-scale owners' estate (Figure 4.4) shows the variation in area by age-class. On average, there is about 900 hectares in ages 0 to 28. However, there is relatively little area in ages 12 to 19. Conversely, there is a relatively large area in ages 7 to 11. The area at age 0 is the area awaiting replanting as at 31 March 2006 (that is, area to be replanted in the 2006 planting season).

For this scenario the availability of wood from large-scale

»» FIGURE 4.4: WESTERN SNI RADIATA PINE AGE-CLASS DISTRIBUTION AS AT 31 MARCH 2006 – LARGE-SCALE OWNERS ONLY



owners is based on stated harvest intentions for 2006 to 2015. Thereafter the availability is constrained to be non-declining and can increase by no more than 10 percent per year. The wood availability of large-scale owners (Figure 4.5) is forecast to decrease through to 2014 but then increase, reaching 475 000 cubic metres per year from 2019.

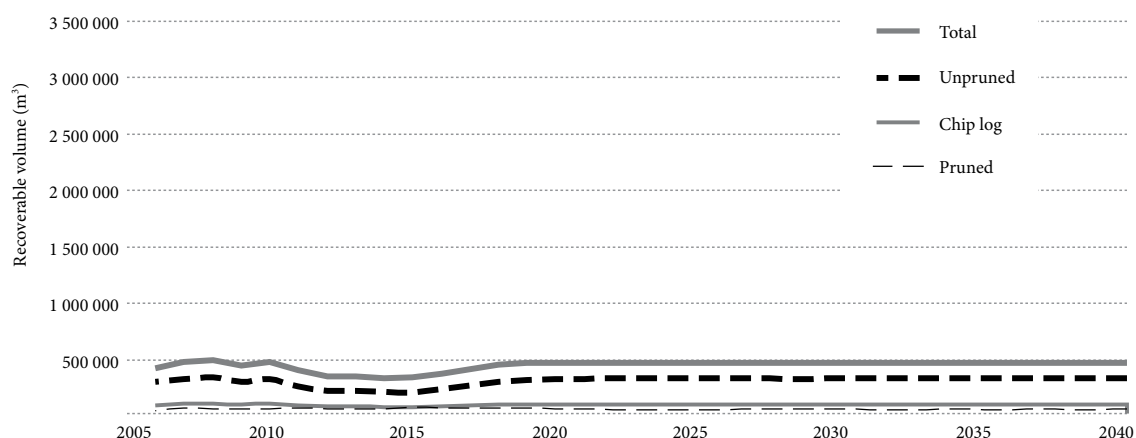
Log grade minimum small-end diameters are: Pruned 35 cm; Unpruned 20 cm; Pulplog 10 cm.

SMALL-SCALE OWNERS

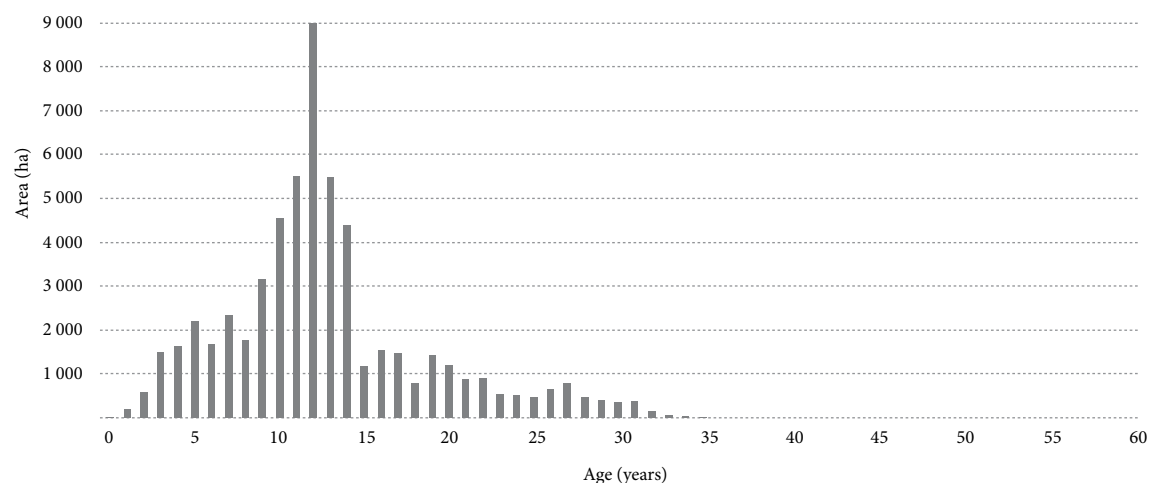
The age-class distribution of the small-scale owners' estate (Figure 4.6) is very irregular with over 3000 hectares in each of ages 9 to 14 years (planted in 1992 to 1997) and much smaller areas in all other age-classes. The key issue is how to forecast the availability from this estate. In particular, whether the large area in ages 9 to 14 will be harvested:

- › at a fixed rotation age (scenario 2); or
- › spread over many years (scenario 3); or
- › spread over an intermediate number of years (scenario 4).

»» FIGURE 4.5: WESTERN SNI RADIATA PINE AVAILABILITY UNDER SCENARIO 2 – LARGE-SCALE OWNERS ONLY



»» FIGURE 4.6: WESTERN SNI RADIATA PINE AGE-CLASS DISTRIBUTION AS AT 31 MARCH 2006 – SMALL-SCALE OWNERS ONLY



ALL WESTERN SNI OWNERS

The wood availability from all Western SNI owners is presented in Figure 4.7 with that of the large-scale owners' estate being the same as in Figure 4.5. In this scenario 2, all forest in the small-scale owners' estate is assumed to be harvested at age 30. The fluctuations in the total volume harvested reflect the variation in the age-class distribution of the small-scale owners' estate.

The large increase in volume from 2022 (Figure 4.7) occurs when the large areas from the small-scale owners' estate in young age-classes (9–14) is harvested. For example, the increase in 2022 results from the 4383 hectares planted by small-scale owners in 1992 (age 14 in Figure 4.6) being harvested at age 30 years.

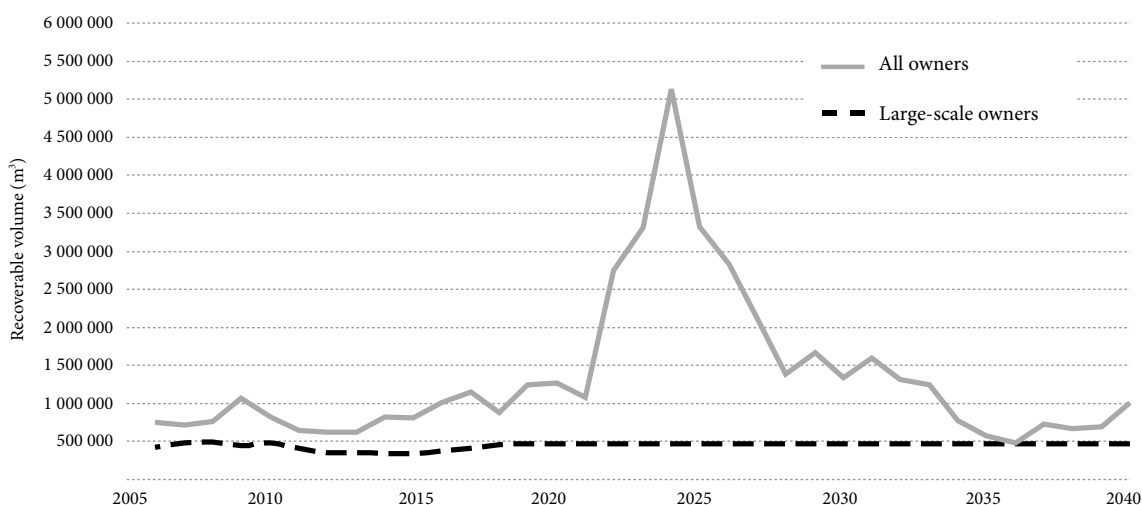
The increase in volume from the small-scale owners' estate in 2009 (shown in Figure 4.7) reinforces what is evident in Figure 4.6; that is, that there is a reasonable area that is approaching harvest age.

Fluctuations in harvest volumes of the magnitude shown in Figure 4.7 would be impractical because of marketing and logistics realities (immediate availability of logging crews, transport capacity, and wood processing capacity).

► SCENARIO 3 – NON-DECLINING YIELD (TARGET ROTATION 30 YEARS)

The third scenario assumes a non-declining yield (meaning that the total yield from this area does not go down from one year to the next), with a target rotation age of 30 years. Figure 4.8 indicates that when the small-scale owners' estate is harvested to complement the large-scale owners' estate, the total volume (radiata pine) has the potential to increase substantially. The potentially available volume increases to 1.4 million cubic metres per year from 2020. An extra constraint was added so the total volume was not allowed to increase by more than 10 percent annually from 2008.

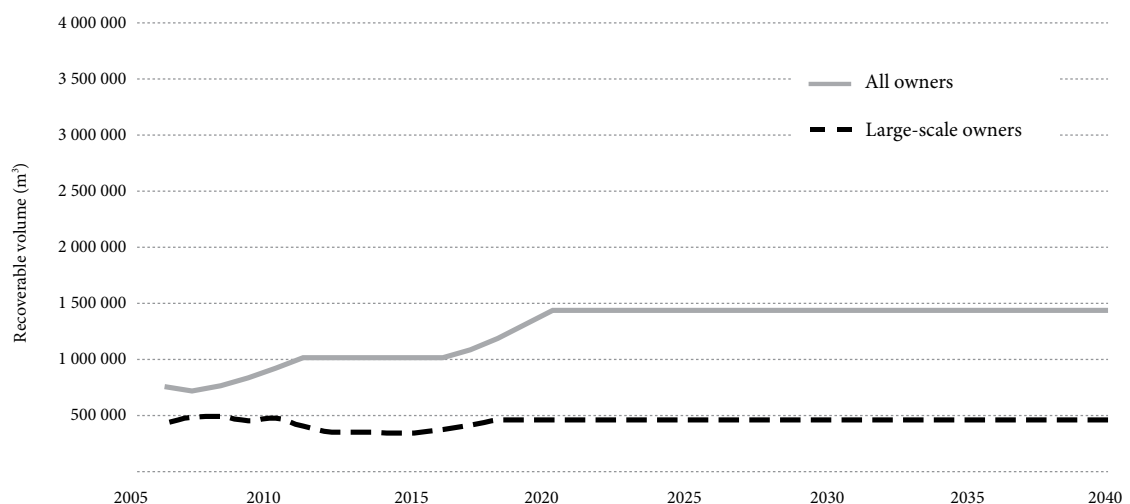
►► FIGURE 4.7: WESTERN SNI RADIATA PINE AVAILABILITY UNDER SCENARIO 2 – COMBINED ESTATE



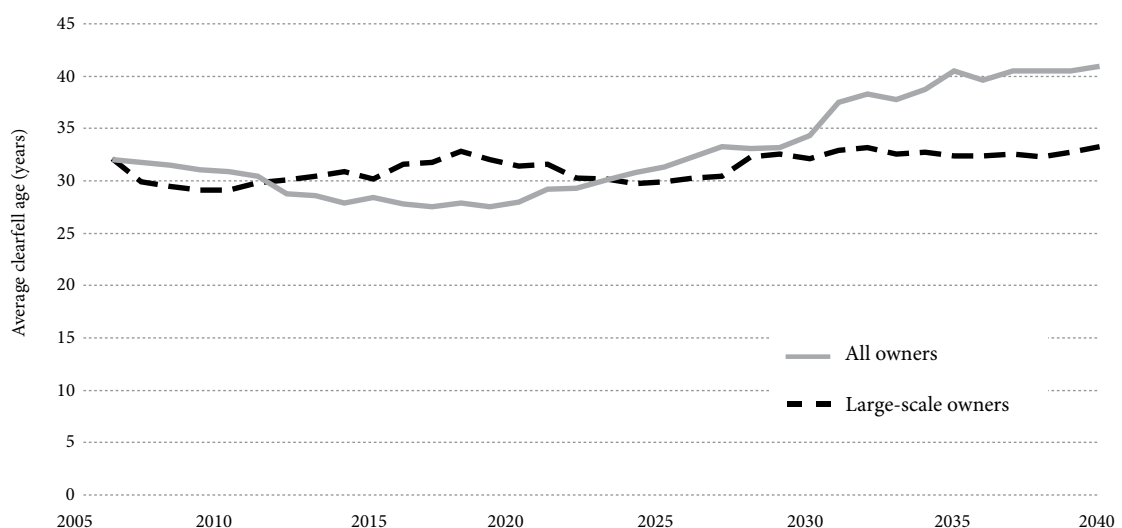
This scenario is similar to the base case scenario adopted in the *National Exotic Forest Description, National and Regional Wood Supply Forecasts 2000* (MAF, 2000). However, it results in the small-scale owners' estate being harvested at rotation ages that differ markedly from 30 years (Figure 4.9), approaching 40 by 2035. These scenarios do not model the economic consequences, for example, the cost to some owners of the delay in harvest.

Although the target rotation for the large-scale estate was nominally 30 years, the average clearfell age exceeds this. The older average ages reflect the consequences of imposing non-declining yield constraints on an age-class distribution that is far from normal.

»» FIGURE 4.8: WESTERN SNI RADIATA PINE AVAILABILITY UNDER SCENARIO 3



»» FIGURE 4.9: AVERAGE RADIATA PINE CLEARFELL AGE BY OWNERSHIP CATEGORY UNDER SCENARIO 3

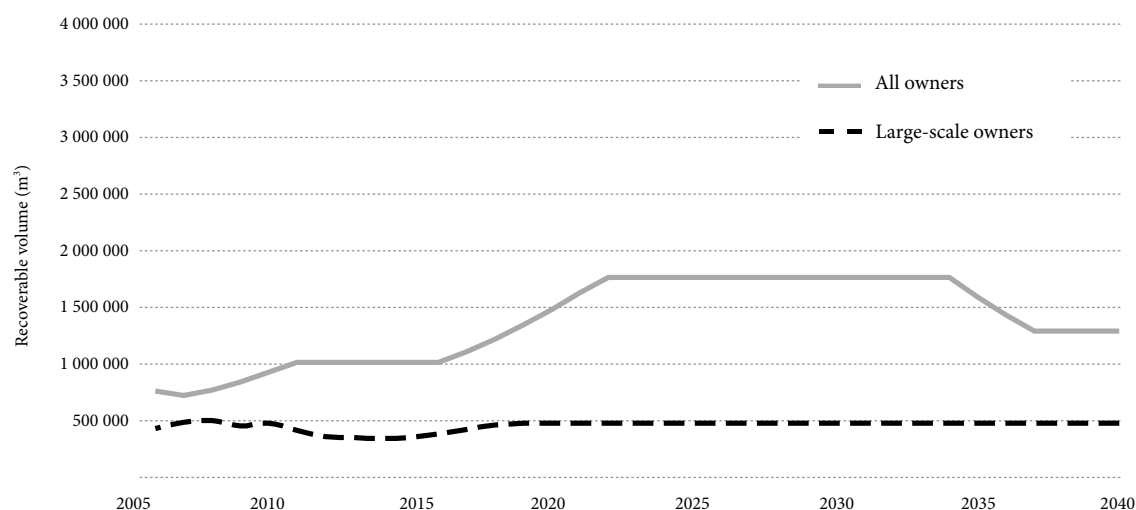


► SCENARIO 4 – SPLIT NON-DECLINING YIELD (TARGET ROTATION 30 YEARS)

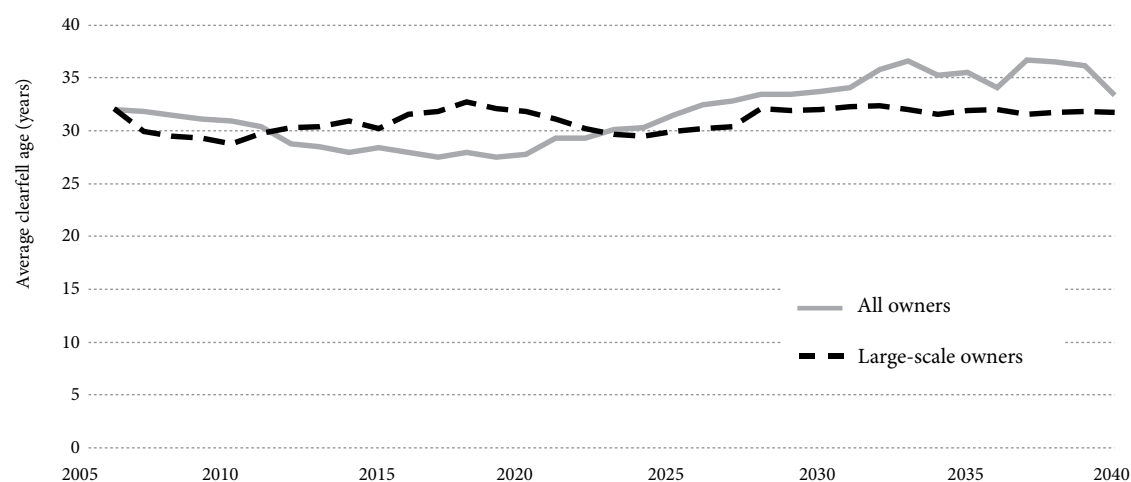
The fourth scenario is based on a split non-declining yield, with a rotation length of 30 years. This scenario gives a forecast wood availability that is similar to scenario 3 through to 2020 (Figure 4.10). Wood availability increases to over 1.75 million cubic metres per year from 2022 before reducing to 1.3 million cubic metres per year from 2037.

The main difference from scenario 3 is that the large area of young stands in the small-scale owners' estate is assumed to be harvested over a shorter period of time. The total volume was modelled to be non-declining from 2008 to 2034; that is, for the current rotation. Thereafter an annual reduction of up to 10 percent was allowed before the volume was required to be non-declining for the next rotation (from 2037). As a consequence, the average clearfell age for small-scale owners stays closer to

►► FIGURE 4.10: WESTERN SNI RADIATA PINE AVAILABILITY UNDER SCENARIO 4



►► FIGURE 4.11: AVERAGE RADIATA PINE CLEARFELL AGE BY OWNERSHIP CATEGORY UNDER SCENARIO 4



the target of 30 years (Figure 4.11) than was the case in scenario 3.

The total volume forecast for scenario 4 is broken down by log grade in Figure 4.12.

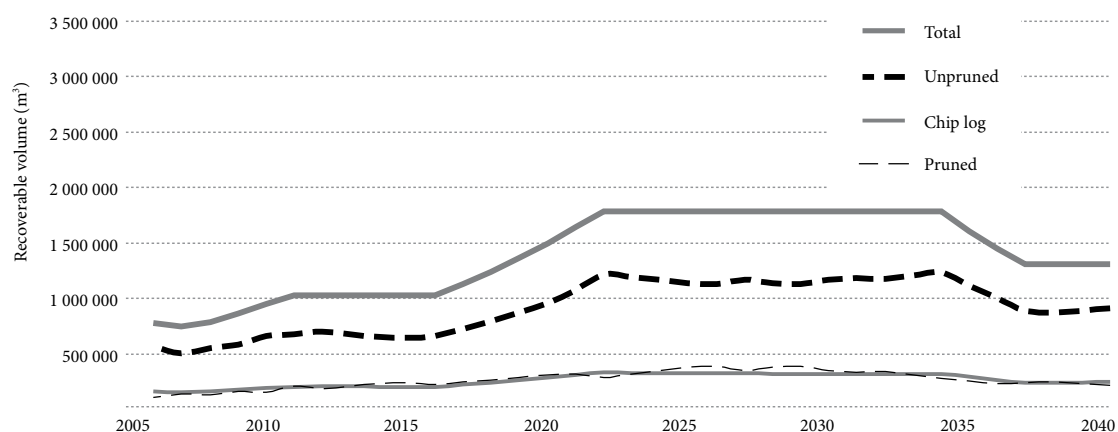
► SCENARIO 5 – TARGET ROTATION AGE VARIATIONS

Different wood availability profiles are generated if the target rotation age is changed from 30 years to either 28 or 32 years (Figure 4.13). Because of the limitations imposed by the current age-class distribution and large-scale

owners' stated harvest intentions, it takes some time to achieve separation of average clearfell age (Figure 4.14). No increase was allowed from 2008 to 2016 for the 32-year variation in order to get separation in harvest volumes.

Figure 4.13 shows that there is the potential for a significant increase in the Western SNI harvest volumes. There is a range of possibilities for timing the increase and the level of the potential harvest volume.

»»» FIGURE 4.12: WESTERN SNI RADIATA PINE AVAILABILITY UNDER SCENARIO 4 – BY LOG TYPE



»»» FIGURE 4.13: WESTERN SNI RADIATA PINE AVAILABILITY UNDER SCENARIO 5

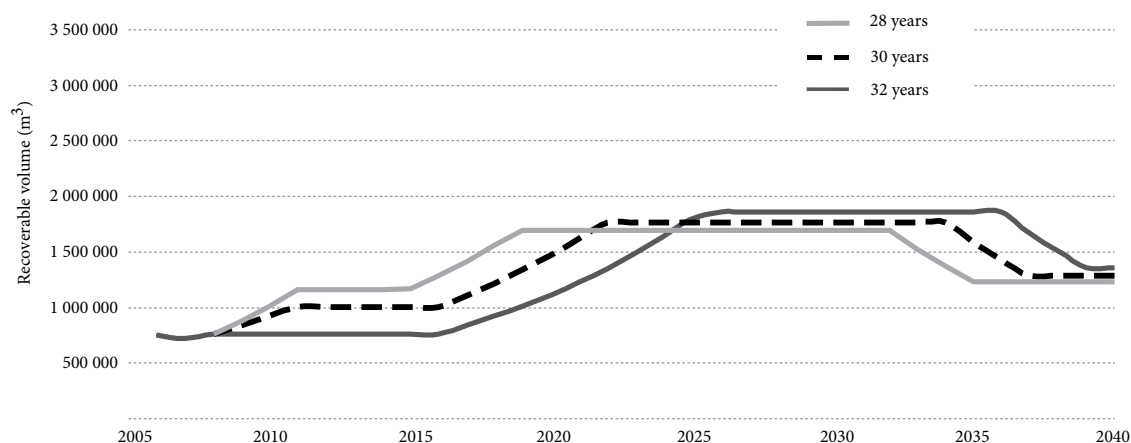
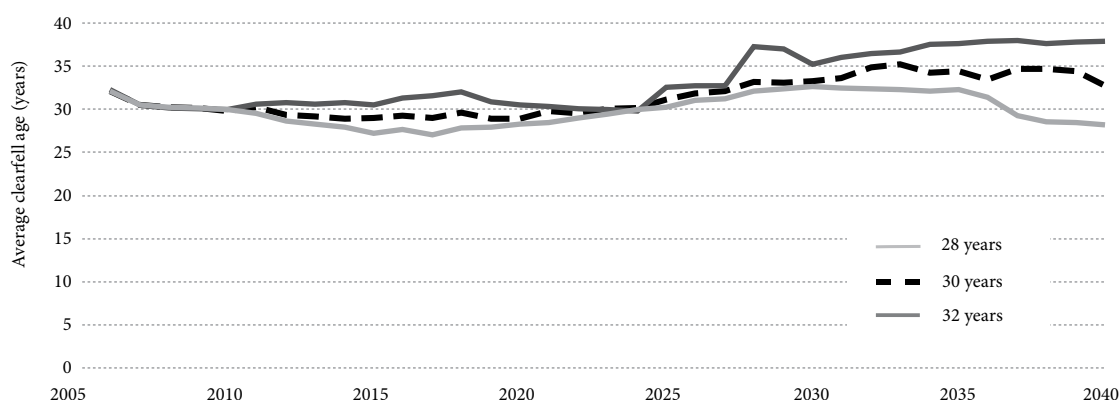


FIGURE 4.14: AVERAGE RADIATA PINE CLEARFELL AGE FOR EACH TARGET ROTATION AGE UNDER SCENARIO 5



OTHER SPECIES

DOUGLAS-FIR

The area of Douglas-fir in the Western SNI is about 950 hectares (large-scale owners have 800 hectares, small-scale owners have 150 hectares). Most of this area is

approaching maturity (Figure 4.15) and is scheduled for harvest over the next 15 to 20 years (Figure 4.16). The graph for all owners has been smoothed to remove annual peaks from the large-scale owners' figures.

FIGURE 4.15: WESTERN SNI DOUGLAS-FIR AGE-CLASS DISTRIBUTION – ALL OWNERS AS AT 31 MARCH 2006

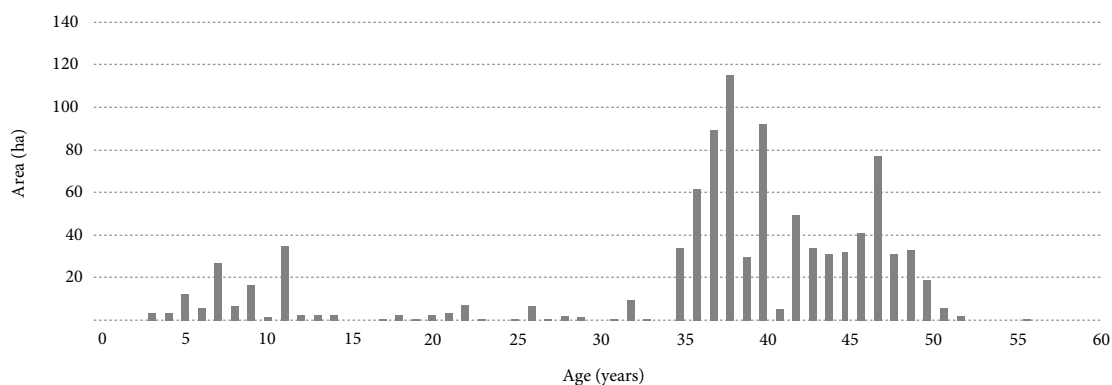
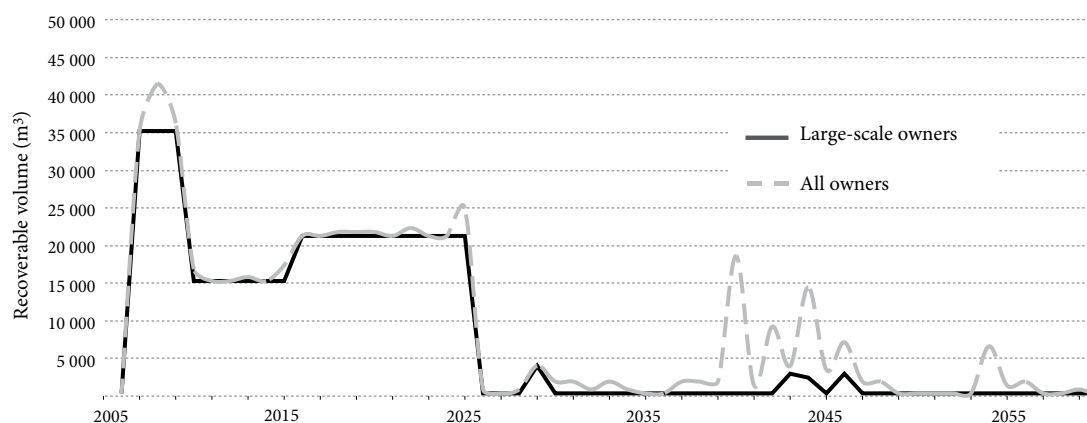


FIGURE 4.16: WESTERN SNI DOUGLAS-FIR AVAILABILITY – ALL OWNERS



►► WOOD AVAILABILITY FORECASTS FOR EASTERN SOUTHERN NORTH ISLAND

► ASSUMPTIONS

The wood availability forecasts for the eastern side of the SNI wood supply region are based on the same assumptions as the western side:

- › All areas are replanted after harvesting, with a regeneration lag of 1 year, except for 10 percent of the area in the small-scale owners' estate which is assumed to be deforested.
- › The area awaiting replanting as at 31 March 2006 is included as area at age 0; that is, area to be replanted in the 2006 planting season.
- › **SPECIES AND MANAGEMENT REGIME** – Areas are replanted into the same species and regime except that:
 - all Douglas-fir in the large-scale owners' estate is replanted to radiata pine following harvest;
- › 25 percent of pruned area in the small-scale owners' estate is replanted into the unpruned croptype following harvest.

The total volumes of radiata pine harvested by large- and small-scale owners in 2006 to 2008 are shown in Table 4.2. The large-scale owners' returns are based on the harvest intentions data supplied to MAF. The small-scale owners' estimates are based on feedback from the main consultants in the region.

►► TABLE 4.2: VOLUMES OF RADIATA PINE HARVESTED IN EASTERN SNI, 2006–2008

HARVEST YEAR	LARGE-SCALE OWNERS (M³)	SMALL-SCALE OWNERS (M³)	TOTAL (M³)
2006	138 000	165 000	303 000
2007	285 000	305 000	590 000
2008	335 000	265 000	600 000

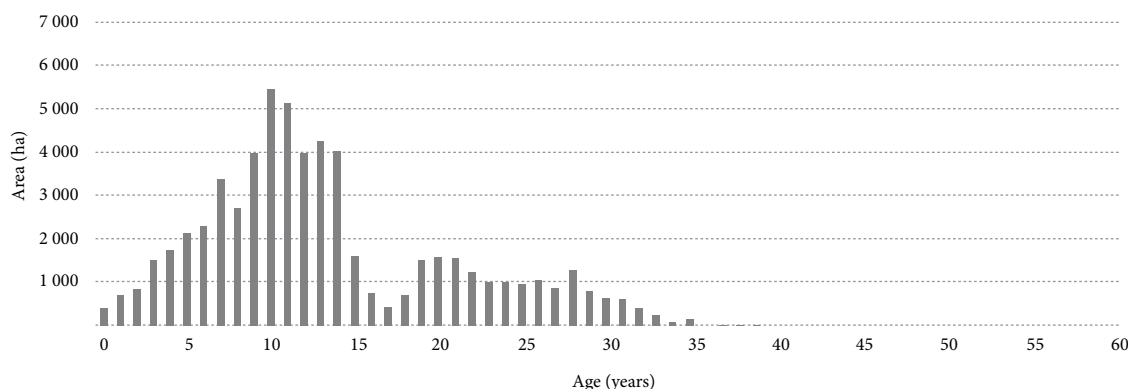
For overmature radiata pine stands that appeared in the NEFD database it was assumed that the following will not be harvested, and therefore removed from the model:

- › trees of 41 years or older (59 hectares total) in the large-scale owners' estate;
- › trees of 36 years or older (406 hectares total) in the small-scale owners' estate.

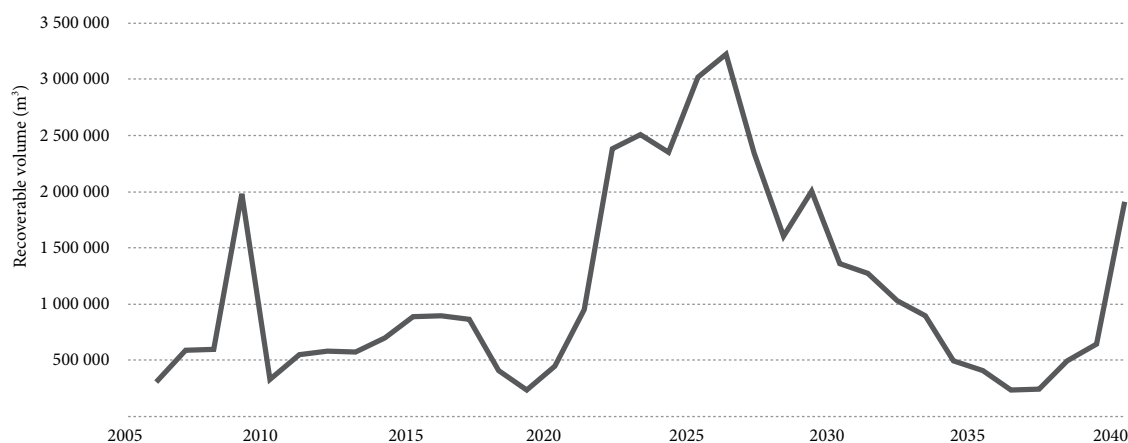
► SCENARIO 1 – HARVEST ALL FORESTS AT AGE 30

This scenario has all areas harvested at age 30. It indicates the “pure” (that is, unconstrained) availability of wood from the eastern region. It is essentially a translation of the age-class distribution into volume. Figure 4.17 shows the age-class distribution of radiata pine in the eastern side, while Figure 4.18 shows the wood availability. The low point at 2019 (in Figure 4.18) occurs because of the small area (413 hectares) at age 17 (planted in 1989) in Figure 4.17. The high point at 2026 in Figure 4.18 occurs because of the large area (5455 hectares) at age 10 (planted in 1996) in Figure 4.17.

►► FIGURE 4.17: EASTERN SNI RADIATA PINE AGE-CLASS DISTRIBUTION – ALL OWNERS AS AT 31 MARCH 2006



»» FIGURE 4.18: EASTERN SNI RADIATA PINE AVAILABILITY UNDER SCENARIO 1



» SCENARIO 2 – LARGE-SCALE OWNERS HARVEST AT INTENTIONS, SMALL-SCALE OWNERS AT AGE 30

In this scenario, large-scale owners harvest in line with their stated intentions and small-scale owners harvest trees at age 30.

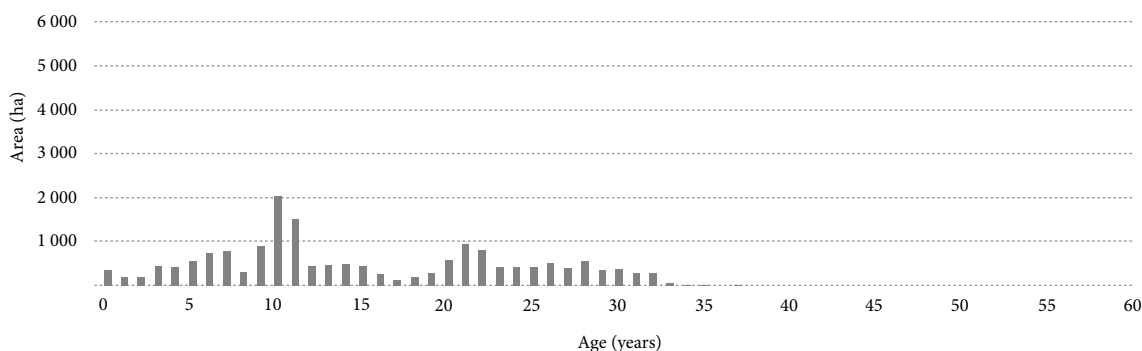
LARGE-SCALE OWNERS

The age-class distribution of the large-scale owners' estate (Figure 4.19) shows the variation in area by age-class. There is relatively little area in ages 16 to 19. Conversely there is a relatively large area in ages 10 and 11. The area at

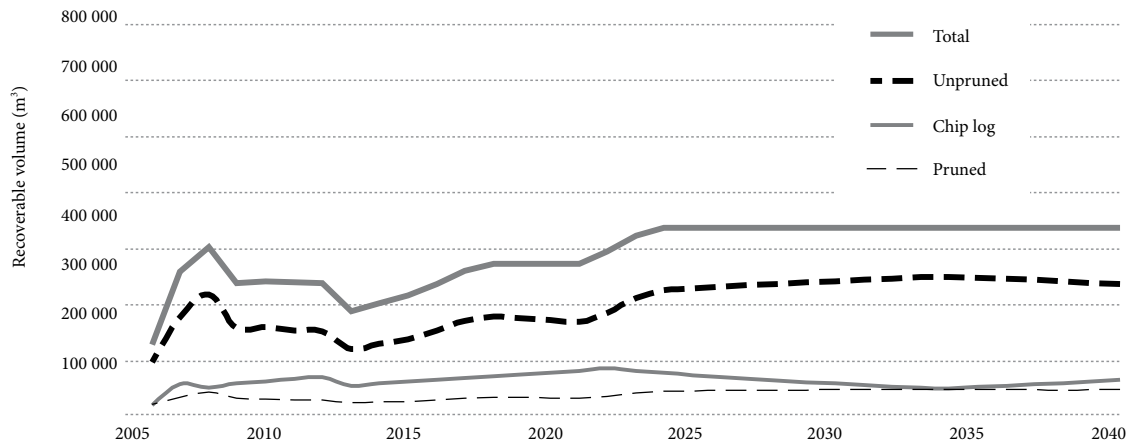
age 0 is the area awaiting replanting as at 31 March 2006 (that is, area to be replanted in the 2006 planting season).

For this scenario the availability of wood from large-scale owners is based on stated harvest intentions for 2006 to 2015. Thereafter the availability is constrained to be non-declining and can increase by no more than 10 percent per year. The wood availability of large-scale owners (Figure 4.20) is forecast to decrease through to 2013 but then to increase, reaching 375 000 cubic metres per year from 2024.

»» FIGURE 4.19: EASTERN SNI RADIATA PINE AGE-CLASS DISTRIBUTION AS AT 31 MARCH 2006 – LARGE-SCALE OWNERS ONLY



»» FIGURE 4.20: EASTERN SNI RADIATA PINE AVAILABILITY UNDER SCENARIO 2 – LARGE-SCALE OWNERS ONLY



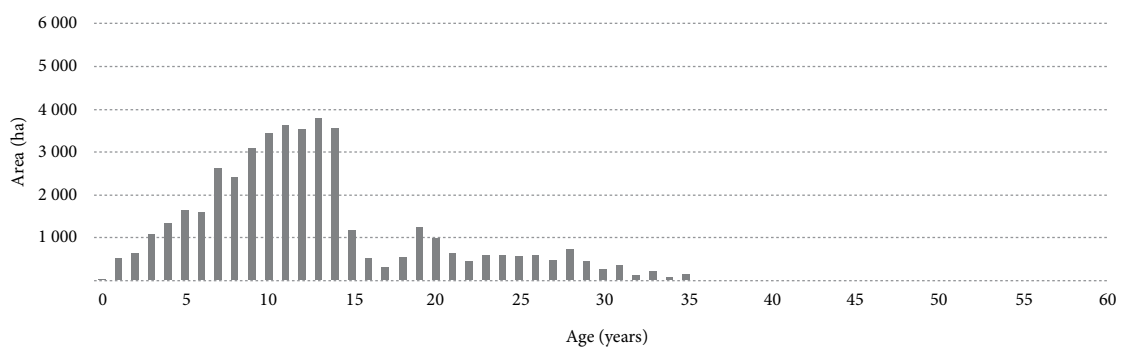
SMALL-SCALE OWNERS

The age-class distribution of the small-scale owners' estate (Figure 4.21) is very irregular with over 2000 hectares in each of ages 7 to 14 years (planted in 1992 to 1999) and a much smaller area in all other age classes. The key issue, as with the western side, is how to forecast the availability

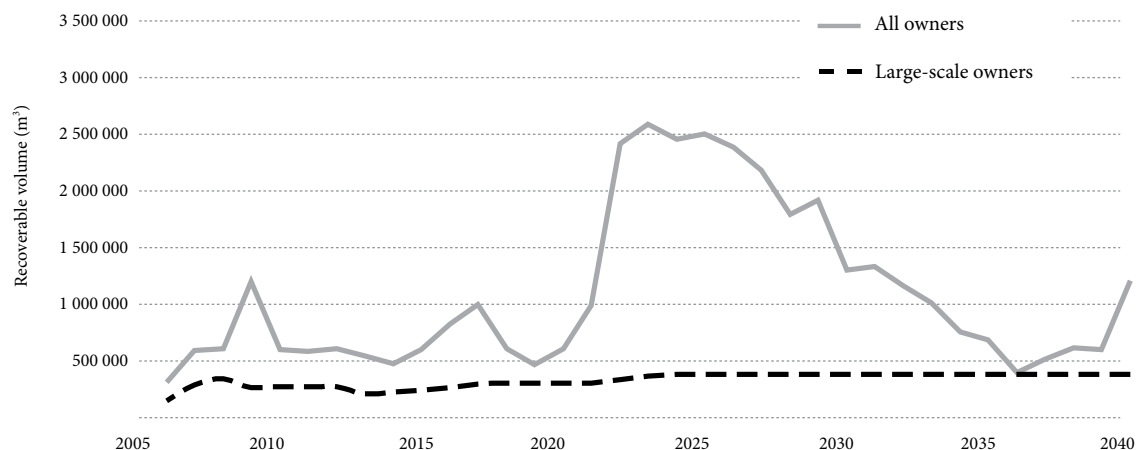
from this estate. In particular, will the large area in ages 7 to 14 be harvested:

- › at a fixed rotation age (scenario 2); or
- › spread over many years (scenario 3); or
- › spread over an intermediate number of years (scenario 4).

»» FIGURE 4.21: EASTERN SNI RADIATA PINE AGE-CLASS DISTRIBUTION AS AT 31 MARCH 2006 – SMALL-SCALE OWNERS ONLY



»» FIGURE 4.22: EASTERN SNI RADIATA PINE AVAILABILITY UNDER SCENARIO 2 – COMBINED ESTATE



ALL EASTERN SNI OWNERS

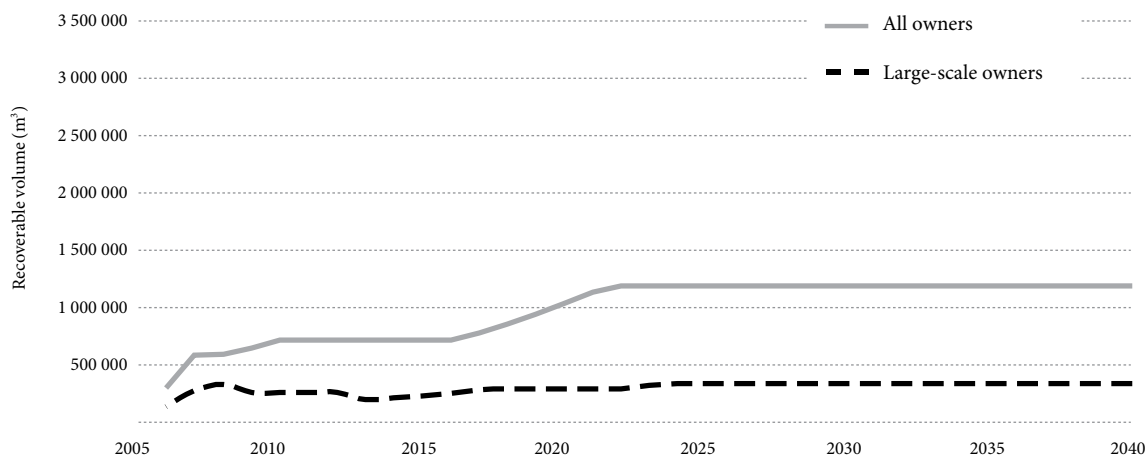
The wood availability from all owners is presented in Figure 4.22, with that of the large-scale owners being the same as in Figure 4.20. In this scenario 2, all forest in the small-scale owners' estate is assumed to be harvested at age 30. The fluctuations in the total volume harvested reflect the variation in the age-class distribution of the small-scale owners' estate.

The large increase in volume from 2022 (Figure 4.22)

occurs when the large areas from the small-scale owners' estate in young age classes (7–14) is harvested. For example, the increase in 2022 results from the 3543 hectares planted by small-scale owners in 1992 (age 14 in Figure 4.21) being harvested at age 30 years.

The increase in volume from the small-scale owners' estate in 2009 (shown in Figure 4.22) reinforces what is evident in Figure 4.21: that there is a reasonable area that is approaching harvest age.

»» FIGURE 4.23: EASTERN SNI RADIATA PINE AVAILABILITY UNDER SCENARIO 3



Fluctuations in harvest volumes of the magnitude shown in Figure 4.22 would not be practical because of marketing and logistics realities (immediate availability of logging crews, transport capacity, and wood processing capacity).

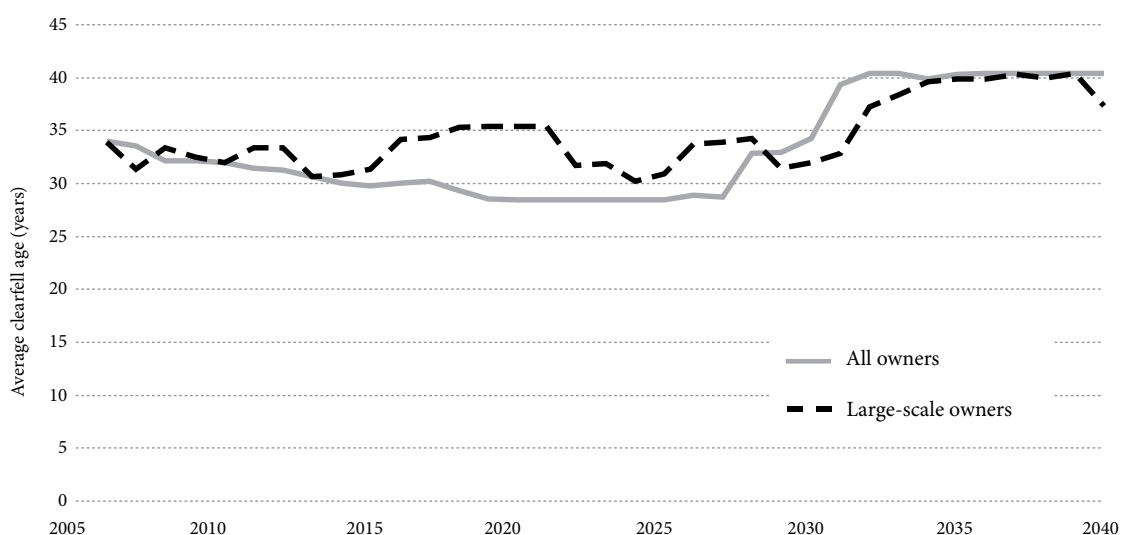
► SCENARIO 3 – NON-DECLINING YIELD (TARGET ROTATION 30 YEARS)

The third scenario assumes a non-declining yield, with a target rotation age of 30 years. Figure 4.23 indicates that when the small-scale owners' estate is harvested to complement the large-scale owners' estate, the total volume (radiata pine) has the potential to increase substantially, to 1.2 million cubic metres per year from 2022. An extra constraint was added so the total volume was not allowed to increase by more than 10 percent annually from 2006 on.

This scenario is similar to the base case scenario adopted in the *National Exotic Forest Description, National and Regional Wood Supply Forecasts 2000* (MAF, 2000). However, it results in the small-scale owners' estate being harvested at rotation ages that differ markedly from 30 years (Figure 4.24).

Although the target rotation for the large-scale estate was nominally 30 years, the average clearfell age exceeds this. During the period 2006 to 2015 this occurs because the model is based on harvest intentions – large-scale owners are intending to harvest at average ages older than 30 years. This reflects the higher rotation age of the Juken resource. Thereafter the higher average ages reflect the consequences of imposing non-declining yield constraints on an age-class distribution that is far from normal.

►► FIGURE 4.24: AVERAGE RADIATA PINE CLEARFELL AGE BY OWNERSHIP CATEGORY UNDER SCENARIO 3



► SCENARIO 4 – SPLIT NON-DECLINING YIELD (TARGET ROTATION 30 YEARS)

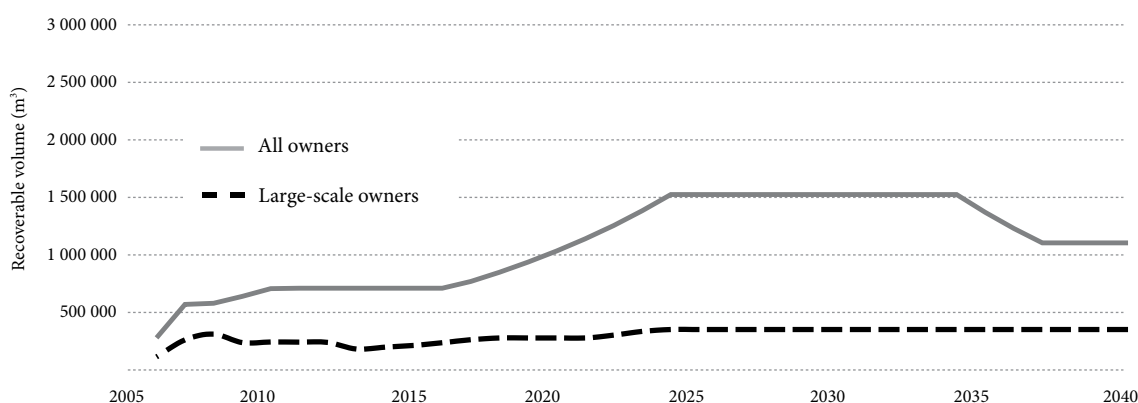
The fourth scenario is based on a split non-declining yield, with a rotation length of 30 years. This scenario gives a forecast wood availability that is similar to scenario 3 through to 2021 (Figure 4.25). Wood availability increases to over 1.5 million cubic metres per year from 2024 before reducing to 1.1 million cubic metres per year from 2037.

The main difference from scenario 3 is that the large area of young stands in the small-scale owners' estate is assumed to be harvested over a shorter period of time.

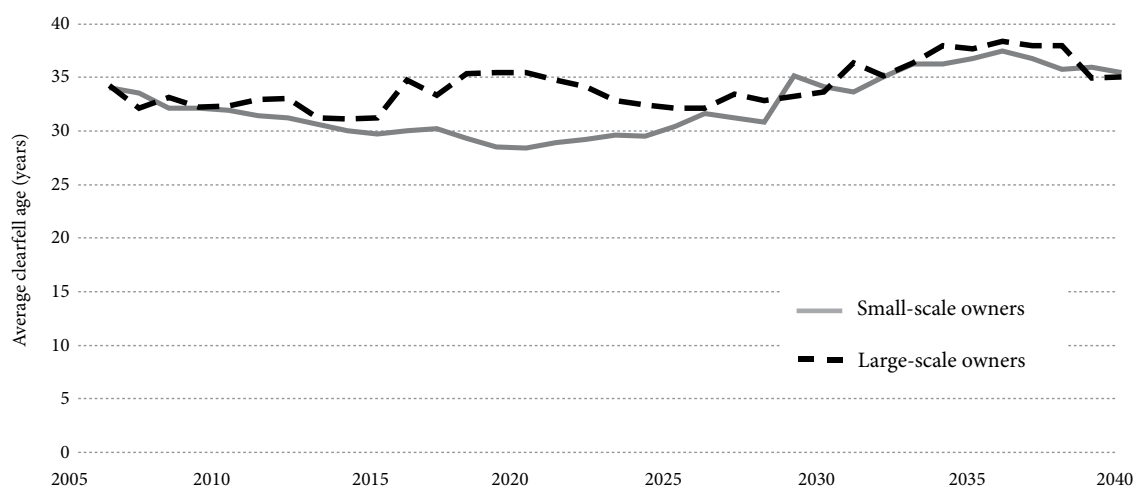
The total volume was modelled to be non-declining from 2007 to 2034; that is, for the current rotation. Thereafter an annual reduction of up to 10 percent was allowed before the volume was required to be non-declining for the next rotation (from 2037). As a consequence the average clearfell age for small-scale owners stays closer to the target of 30 years (Figure 4.26) than was the case in scenario 3.

The total volume forecast for scenario 4 is broken down by log grade in Figure 4.27.

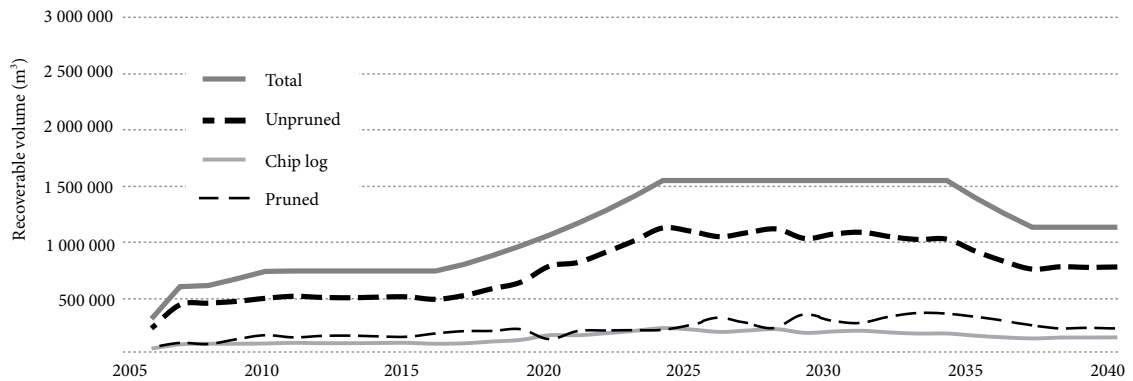
►►► FIGURE 4.25: EASTERN SNI RADIATA PINE AVAILABILITY UNDER SCENARIO 4



►►► FIGURE 4.26: AVERAGE RADIATA PINE CLEARFELL AGE BY OWNERSHIP CATEGORY UNDER SCENARIO 4



»» FIGURE 4.27: EASTERN SNI RADIATA PINE AVAILABILITY BY LOG TYPE UNDER SCENARIO 4



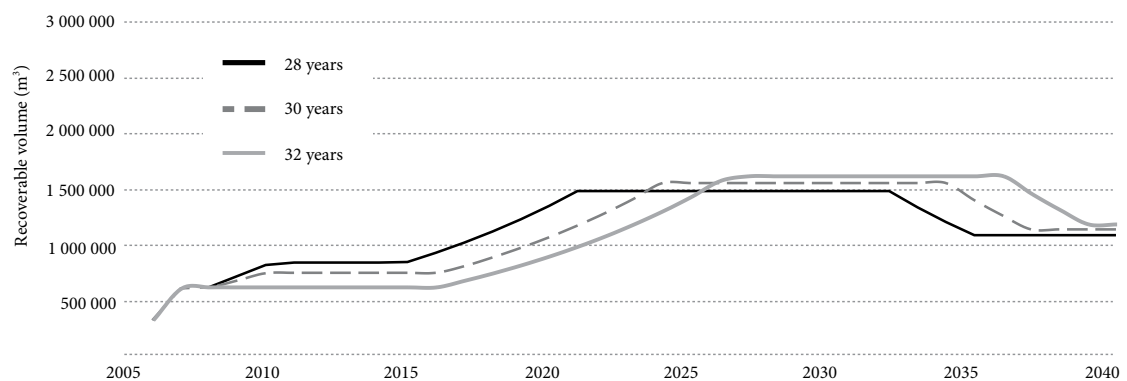
» SCENARIO 5 – TARGET ROTATION AGE VARIATIONS

Different wood availability profiles are generated if the target rotation age is changed from 30 years to either 28 or 32 years (Figure 4.28). Because of the limitations imposed by the current age-class distribution and large-scale owners' stated harvest intentions, it takes some time to achieve separation of average clearfell age (Figure 4.29). No increase was allowed from 2008 to

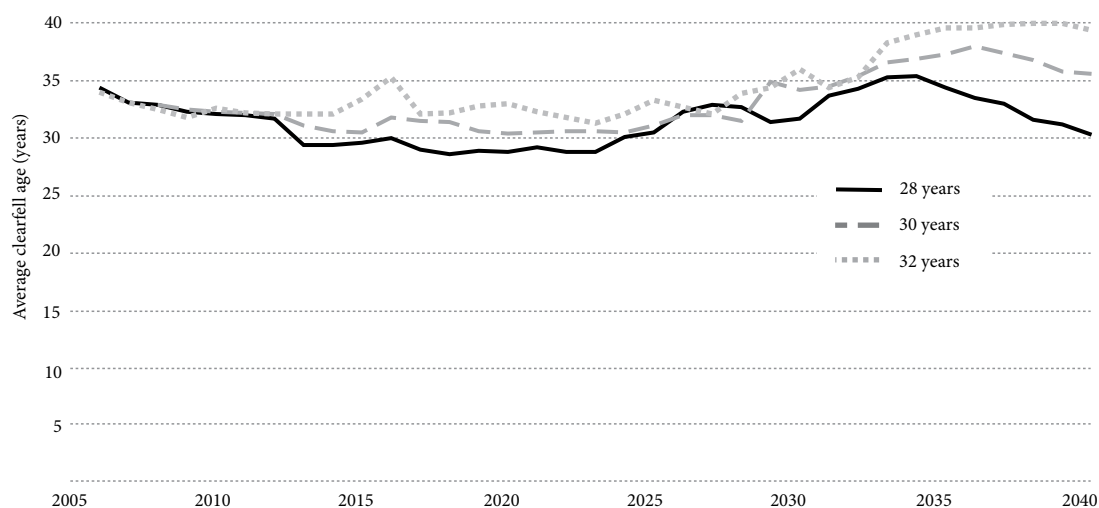
2016 for the 32-year variation in order to get separation in harvest volumes.

Figure 4.28 shows that there is the potential for a significant increase in the Eastern SNI harvest volumes. There is a range of possibilities for timing this increase and the level of the potential harvest volume.

»» FIGURE 4.28: EASTERN SNI RADIATA PINE AVAILABILITY UNDER SCENARIO 5



»» FIGURE 4.29: AVERAGE RADIATA PINE CLEARFELL AGE FOR EACH TARGET ROTATION AGE UNDER SCENARIO 5



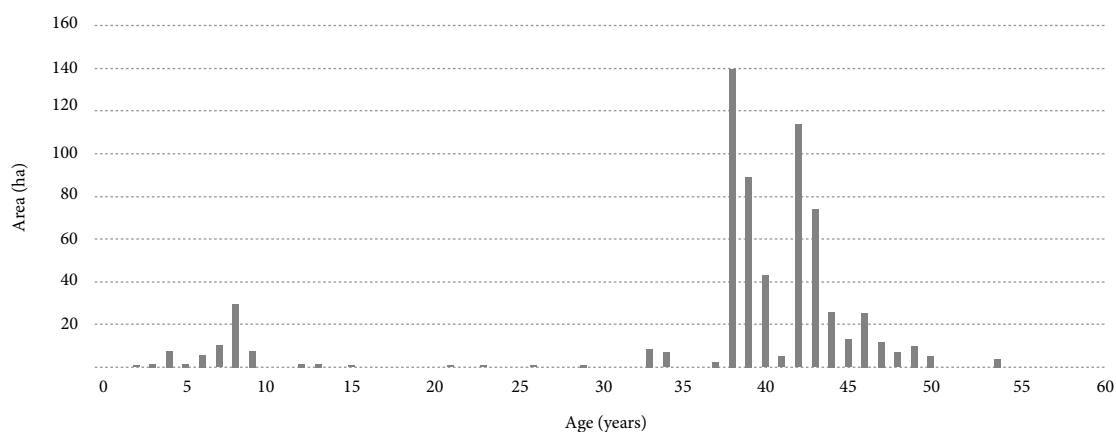
»» OTHER SPECIES

» DOUGLAS-FIR

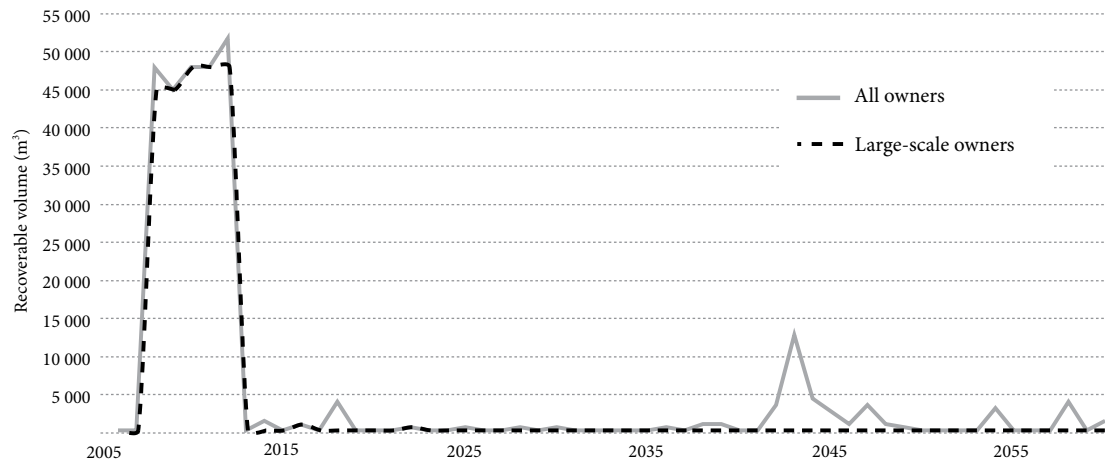
The area of Douglas-fir in the Eastern SNI is about 660 hectares (large-scale owners have 560 hectares, small-scale owners have 100 hectares). Most of this area is

approaching maturity (Figure 4.30) and is scheduled for harvest over the next 5 years (Figure 4.31).

»» FIGURE 4.30: EASTERN SNI DOUGLAS-FIR AGE-CLASS DISTRIBUTION – ALL OWNERS AS AT 31 MARCH 2006



»» FIGURE 4.31: EASTERN SNI DOUGLAS-FIR AVAILABILITY – ALL OWNERS



»» WOOD AVAILABILITY FORECASTS FOR THE COMBINED SOUTHERN NORTH ISLAND

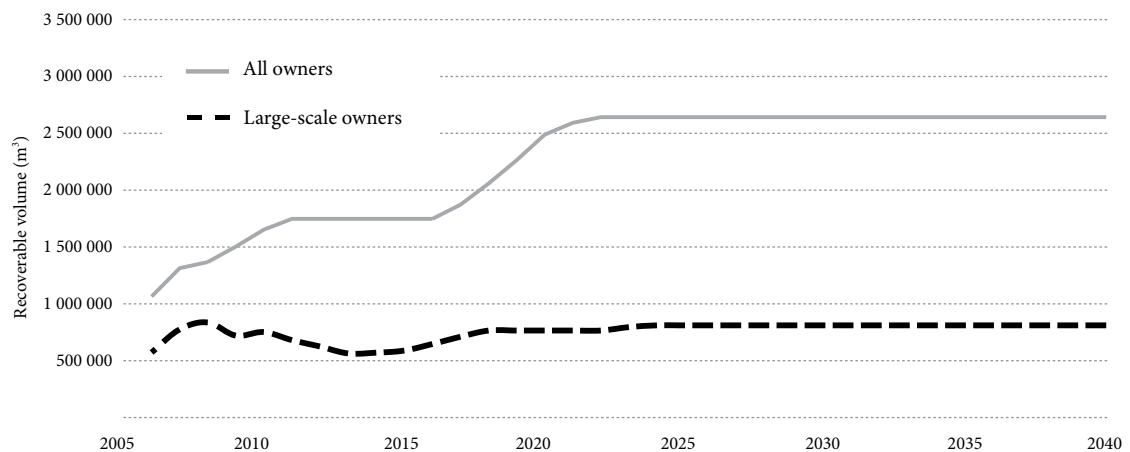
The combined Eastern and Western SNI forecasts are presented for scenario 3 (Figure 4.32), scenario 4 (Figures 4.33 and 4.34) and scenario 5 (Figure 4.35).

» SCENARIO 3 – NON-DECLINING YIELD (TARGET ROTATION 30 YEARS)

This scenario is based on non-declining yield and a target rotation of 30 years. Figure 4.32 indicates that

wood availability from the SNI region as a whole has the potential to increase substantially over the next 15 years. The increase comes from the small-scale owners' estate. According to their own figures, the harvest from large-scale owners is expected to decrease over the next 10 years before returning to current levels.

»» FIGURE 4.32: SNI COMBINED WOOD AVAILABILITY UNDER SCENARIO 3 – SPLIT BY OWNERSHIP CATEGORY



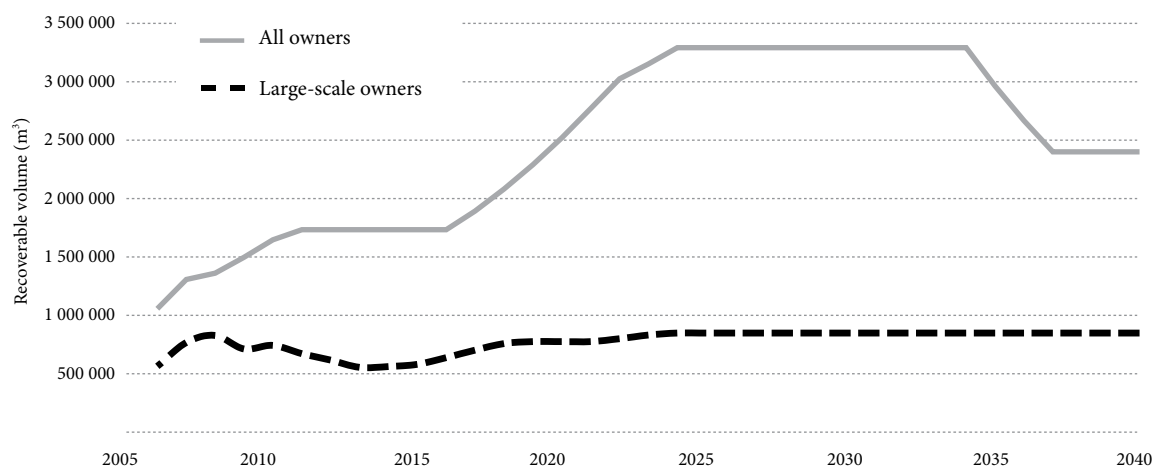
► SCENARIO 4 – SPLIT NON-DECLINING YIELD (TARGET ROTATION 30 YEARS)

This scenario is based on a split non-declining yield, with a target rotation age of 30 years. The combined SNI region wood availability for this scenario is similar to that of scenario 3 until 2020. Wood availability then increases to over 3.25 million cubic metres per year from 2024 before reducing to 2.4 million cubic metres per year from 2037.

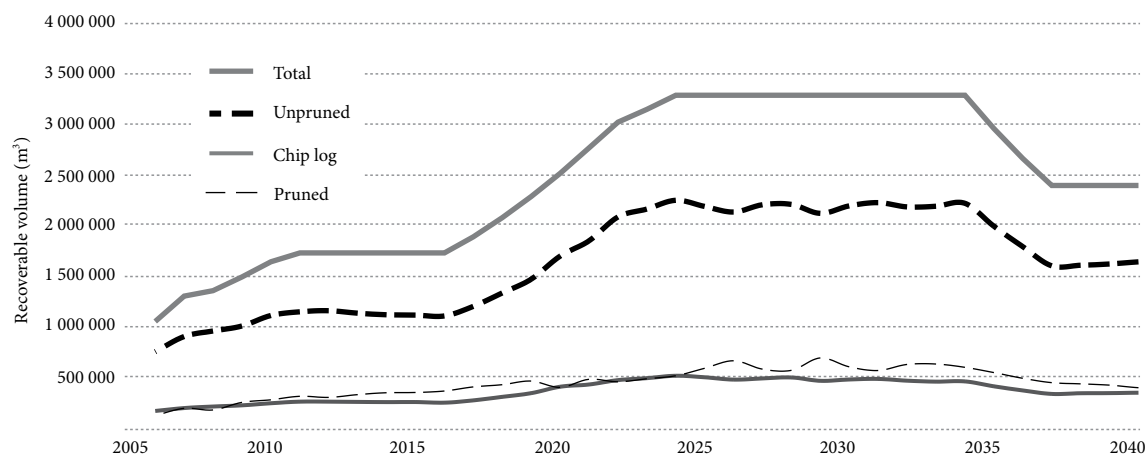
► SCENARIO 5 – TARGET ROTATION AGE VARIATIONS

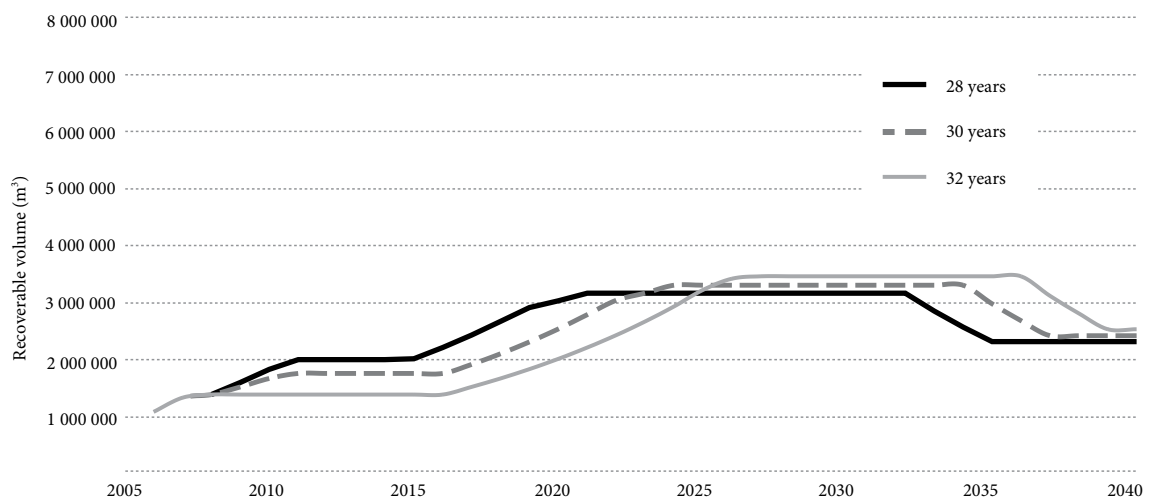
Different wood availability profiles are generated by assuming different rotation ages. Figure 4.35 indicates a band of possible wood availability profiles. There is the potential for a small increase within the next 5 years. After 2015 there is the opportunity for a substantial increase as the large area planted by small-scale owners in the 1990s matures and is available for harvest.

►► FIGURE 4.33: SNI COMBINED WOOD AVAILABILITY UNDER SCENARIO 4



►► FIGURE 4.34: SNI COMBINED WOOD AVAILABILITY UNDER SCENARIO 4 – BY LOG TYPE



»» FIGURE 4.35: SNI COMBINED WOOD AVAILABILITY UNDER SCENARIO 5 – DIFFERENT TARGET ROTATION AGES

THE WOOD PROCESSING INDUSTRY

5

»» SAWMILLING

The sawmilling industry is based around a number of small to medium-sized (in New Zealand terms) mills operating throughout the region. It is dominated by Juken New Zealand and three other sawmills, who together accounted for about 47 percent of the region's sawn timber output in the year to 31 March 2007.

» JUKEN NEW ZEALAND

The Juken New Zealand mill complex in Masterton has the same ownership as the forest, making this an integrated forest products company. The sawmill and LVL plant were built in 1991. The plant became fully

operational in 1992, and a second LVL line was added in 1993. The plant processes about 160 000 tonnes of radiata pine logs per year from the company forests plus a relatively small volume from other forests. Most of their products are exported through the Port of Wellington. The company gained Forest Stewardship Council (FSC) chain of custody certification in 2008.

» TARANAKI SAWMILLS LTD

Taranaki Sawmills Ltd is a privately owned wood processor with a significant focus on value-added remanufactured wood products. The business has two sawmills, one in National Park and the larger mill in New Plymouth. The New Plymouth mill processes approximately 85 000 cubic metres of logs per annum on a single shift. Other manufacturing includes dry kilns, planer mill, copper-chromium-arsenic (CCA) and light organic solvent preservatives (LOSP) treatment facilities, extensive remanufacturing operations, pre-priming and a roundwood operation. The majority of sales are finger-jointed/laminated products to Australian, United States and domestic customers. The solid wood product range includes framing and outdoor products which are predominately sold to Taranaki regional customers. The company has FSC chain of custody certification.

»» TABLE 5.1: SAWMILLS OPERATING IN THE SOUTHERN NORTH ISLAND

SAWMILL

A. PRODUCTION LEVEL: OVER 25 000 M³ SAWN TIMBER PER ANNUM

Eurocell

Juken New Zealand

Kiwi Lumber Ltd

Taranaki Sawmills

B. PRODUCTION LEVEL: 10 000–24 999 M³ SAWN TIMBER PER ANNUM

Crighton Timber Supplies

Davis Sawmilling

NZ Sawn Products

Waverley Sawmills

C. PRODUCTION LEVEL: 5 000–9 999 M³ SAWN TIMBER PER ANNUM

Richmond Park Sawmill

Whittaker Sawmilling

D. PRODUCTION LEVEL: 1 000–4 999 M³ SAWN TIMBER PER ANNUM

Ashurst Timber

Foxton Sawmilling

Thorby Sawmilling

Value Timber Supplies

LOCATION

Upper Hutt

Masterton

Dannevirke and
Masterton

New Plymouth

Levin

Featherston

Feilding

Waverley

Masterton

Marton

Palmerston North

Foxton

Foxton

Inglewood

Source

MAF Statistics.

» KIWI LUMBER LTD

Kiwi Lumber is a privately owned sawmilling company with sawmills in Masterton and Dannevirke in the Southern North Island and Putaruru in the Central North Island.

The company started with the Dannevirke site in 1991. The Putaruru mill was purchased in 1999 and the Masterton mill in 2004.

The two Southern North Island mills process between 140 and 150 000 tonnes of log per year. Masterton focuses on cutting structural sawlogs and Dannevirke and Putaruru cut predominantly pruned logs. The sites have further processing facilities on each of the sites including kilns, planer operations, cut-to-length facilities, resaws and treatment plants.

The Kiwi Group sells its products into the New Zealand, Australia, United States, European, Asian and Middle East markets.

The company has invested heavily in capital over the last few years to improve the operating efficiencies of the business. Each sawmill uses 3D scanning to maximise yields.

Kiwi Lumber believes there are significant opportunities for the region with the increase in harvest. However, major challenges will be the harvesting infrastructure and improved markets for clearwood throughout the world.

› EUROCELL

The Eurocell sawmill is located on the outskirts of Upper Hutt. The mill has had several owners in the last decade.

›› VENEER AND PANEL PRODUCTS

The Juken New Zealand LVL plant was built on the JNL Masterton site in 1991 and expanded in 1992.

›› CHIPPING

Renalls Ltd set up a chip mill in Masterton in 1989 to process low-grade logs into chips for the Pan Pac pulp mill near Napier. It was restructured in 2004, with Renalls (2004) Ltd retaining ownership of the chipping machines and driers, and Kiwi Lumber owning the land. This facility is still operating, with Pan Pac

purchasing the pulp logs direct from forest owners or their agents and organising the chipping under contract. The mill chips between 60 and 80 000 tonnes of logs per year depending on prices and harvest activity.

››› ROUNDWOOD PROCESSING

Plants set up to produce conventional farm and deer fence posts, poles and strainers are located at Mitchpine near Levin and Hautapu Pine near Taihape. Mitchpine also produce timber retaining walls and a wooden post and rail fencing system. Production levels reflect the vagaries of the rural market. The high wood density areas of the region produce strong posts, and there are areas of Corsican pine that are also highly sought-after. Production from these plants is highly dependent on the level of confidence in the farming sector.

››› PRODUCTION AND EXPORT DATA

› ROUNDWOOD PRODUCTION

Harvest levels have remained relatively static over the last 6 years reflecting the age-class distribution of the region's forests. However, roundwood removals have slightly increased as a percentage of the national total from 4.1 percent in 1997 to 4.7 percent in 2007.

› SAWN TIMBER PRODUCTION

Sawn timber production levels have also remained relatively constant, increasing just 20 percent in the last 10 years. This reflects regional log availability and lack of any significant capital investment in sawmilling in that period. The percentage of the national production has declined from 7.1 percent in 1997 to 5.8 percent in 2007.

› SAWN TIMBER EXPORTS

Sawn timber exports from the region have increased by over 500 percent since 1997. Since 2002 exports from the Port of Wellington have increased by over 120 percent, reflecting increased use of this port by Juken New Zealand and WPI (located in the Central North Island region).

»»» TABLE 5.2: SAWN TIMBER PRODUCTION IN THE SOUTHERN NORTH ISLAND (CUBIC METRES)

YEAR ENDED MARCH	INDIGENOUS TIMBER	EXOTIC TIMBER	TOTAL
1997	1 084	209 811	210 895
1998	1 920	202 458	204 378
1999	554	205 503	206 057
2000	579	268 369	268 948
2001	1 005	274 279	275 284
2002	1 065	272 527	273 592
2003	961	280 911	281 872
2004	1 009	219 821	220 830
2005	570	269 193	269 763
2006	585	239 118	239 703
2007	686	253 892	254 578

Source
MAF Statistics.

»»» TABLE 5.3: SAWN TIMBER EXPORTS FROM SOUTHERN NORTH ISLAND PORTS (CUBIC METRES)

YEAR ENDED MARCH	WESTGATE TARANAKI	PORT OF WELLINGTON	TOTAL
1997	1 084	16 775	17 859
1998	1 224	13 876	15 100
1999	5	24 907	24 912
2000	430	23 382	23 812
2001	240	31 522	31 762
2002	1 452	38 589	40 041
2003	2 860	52 106	54 966
2004	336	83 997	84 333
2005	351	65 880	66 231
2006	2 690	75 792	78 482
2007	8 118	84 588	92 706

Source
MAF Statistics.

There has also been increased use of Westgate (New Plymouth) by the industry in Taranaki.

»»» LOG EXPORTS

Log exports have varied in accordance with the national trends and fluctuated with exchange rate and shipping cost influences. The region is not a major log exporter, and log exports from the region have consistently contributed about 4 percent of the national total.

»»» TABLE 5.4: LOG EXPORTS FROM SOUTHERN NORTH ISLAND PORTS (CUBIC METRES)

YEAR ENDED MARCH	TARANAKI	WELLINGTON	TOTAL
1997	55 398	88 849	144 247
1998	9 290	159 072	168 362
1999	-	87 768	87 768
2000	379	111 321	111 700
2001	12 043	118 164	130 207
2002	13 075	158 141	171 216
2003	24 089	185 946	210 035
2004	30 024	188 267	218 291
2005	27 559	190 752	218 311
2006	43 385	172 563	215 948
2007	31 328	213 345	244 673

Source
MAF Statistics.

INFRASTRUCTURE

»» PORTS

» CENTREPORT WELLINGTON

The main ports of the region are Wellington and New Plymouth. Wanganui historically was a port city, but the river bar has been an obstacle to further development. The main competition to these ports comes from Napier, which has a well-developed log export facility, a chip export facility and a history of timber exports.

CentrePort Wellington is well positioned in the geographical centre of New Zealand, with a natural sheltered deepwater harbour, access to the west and east coasts of the country, and located on the axis between the Tasman and Pacific Oceans.

The port offers unrivalled nationwide access, boasting direct connections to New Zealand's major highway and main trunk railway. Key coastal shipping and inter-island ferry services are also located within the port precinct.

The port's facilities comprise a modern, fully equipped container terminal and dedicated conventional cargo wharves.

Additional features include an international cruise terminal, state-of-the-art cold store, container repair and storage depot, specialised container packing and unpacking service, and facilities equipped to handle and store specialist cargoes such as bulk powders, forestry products, fresh produce and bulk liquids, including chemicals and petroleum.

Winstone Pulp International and Juken New Zealand have dedicated cargo sheds in the port and are serviced by regular rail links.

Log exports are not a major component of port trade,

and although there is a dedicated log storage area, it is relatively small with the reclamation area being the run-off location. The lack of a suitable log storage area is regarded by industry as a major constraint to log exports. Log ships are forced to make multiple port calls, which increases freight rates from this location. Nevertheless, the log export trade is an important component of the local forest industry. Logs are occasionally transported into the port via rail.

» PORT TARANAKI

Port Taranaki is the only deepwater seaport on New Zealand's western seaboard.

The port was established in 1875. In 1881 work on a breakwater began to provide safe anchorage from the Tasman Sea. Port Taranaki is now well sheltered by two breakwaters which extend from either end of a naturally curved bay.

The port handles large volumes of international and coastal cargoes, principally those of the farming, engineering and petrochemical industries. Additionally the port is a servicing base for sea transport and related industries and has, since the beginnings of major offshore and onshore oil exploration in the 1960s, been a provider of related maritime, support and heavy lift services.

Port Taranaki is a modern port which handles a diversity of cargoes and offers a full range of providoring, stevedoring, ship agency and government border protection services.

Small volumes of logs and limited volumes of sawn timber are exported through this port.

»» ROAD TRANSPORT

This is the principal means of freight movement for short and medium-haul journeys.

The Southern North Island has extensive State Highway and local authority roading networks and the forestry companies and growers link into this. Some consultation is required to avoid potential bottlenecks such as access to the Port of Wellington at peak commuter traffic hours.

Access to the State Highway system may be an issue for some smaller growers, particularly if their property does not have a formal access onto a road. Safety engineering requirements can be onerous for small growers.

A number of local authorities have not yet had to face the increase in logging truck traffic. Some parts of the SNI do have relatively unstable geology with a preponderance of mudstone and sandstone substrata, and road maintenance needs to be carefully planned and timed in these locations. A number of local authorities are actively assessing the likely roading impacts of future forest harvesting in their areas.

The “Alternative to Road” (ATR) scheme did attempt to divert some logging truck traffic off the State Highway system but at the time of writing no specific proposals have eventuated in this region (see below).

»» RAIL TRANSPORT

The Western SNI is serviced by the North Island Main Trunk line from Wellington through Ohakune. The Eastern SNI is serviced by the Wairarapa line. Other lines connect Marton to New Plymouth and Stratford to Taumarunui. Only a small proportion of the region’s log harvest is transported by rail, mainly export logs to the Port of Wellington. However, two processing companies utilise rail to bring their timber products and pulp cargoes to the Port of Wellington.

Previous efforts to increase the utilisation of the rail network for log traffic included a proposal to create a joint venture company between CentrePort Ltd, Toll Rail and a major log exporter. Log storage and loading facilities were to be established in rail yards in Masterton, Marton and Wanganui. A request was put to Transfund for ATR funding but the initial application did not succeed. The scheme has since been reactivated under Kiwi Rail (late 2008) on a smaller scale, based on Masterton.

»» ENERGY

Any new processing development in the region, or any significant expansion of existing processing plants, will need to consider the availability of electricity and other energy sources, as well as the transmission line capacity from the national grid.

Transpower’s planning regions do not strictly coincide with wood supply regions; however it is possible to gather good information from Transpower’s *Annual Planning Report* (Transpower New Zealand Ltd, 2008).

The Wellington and Wairarapa areas had a demand for power of about 650 MW in 2007, with an installed generating capacity of about 17 MW. The West Wind project is planned to introduce about 140 MW in 2009; other wind power projects are at different stages in the approval process.

In Taranaki, the demand is about 180 MW, with a generation capacity of 503 MW. The surplus is exported over the national grid.

Transpower notes a number of transmission issues, particularly relating to the Cook Strait cable and the Haywards substation. Transpower also notes that specific supply security issues, for example at Masterton,

Haywards and Paraparaumu, can be dealt with through customer-specific investments. Thus any new wood processing developments in the region will need to consider the availability of electricity and other energy sources.

A distribution network for natural gas passes through the western part of the region.

Several of the large processing sites utilise wood waste for part of their energy requirements. There is great enthusiasm for utilising wood waste into energy, but no firm projects have eventuated in the region.

»» LABOUR

» AVAILABILITY

Although the SNI forest industry is relatively small, it is an important employer in some locations, especially the Wairarapa. However, the work skills and attitudes required mean that forestry employers find it difficult to attract new staff. Forest growers in the SNI realise that these issues are not confined to their region and are nationwide.

The harvesting sector is relatively stable, but silviculture workers are difficult to attract and retain. Some contractors are utilising pre-release prisoners on specific training schemes from Corrections Department facilities, with encouraging success.

» EDUCATION AND TRAINING

New Zealand has one professional forestry degree programme, offered by the School of Forestry, at Canterbury University. A forestry Diploma is offered at Waiariki Polytech, Rotorua.

There are no formally recognised practical forestry training institutions in the SNI. The Wairarapa-based

agricultural training facility has offered forestry skills training at times in the past, but student numbers have not been consistent and so the number graduating from this programme has been variable.

The Forest Industries Training Education Council (FITEC) has forest industry trainers covering the Lower North Island, Wanganui and Taranaki in this region. Contractors usually have to train new staff in association with the FITEC trainer.

There are two FITEC training advisors covering the SNI for the wood manufacturing sector, and there is national coverage for the furniture sector.

OPPORTUNITIES

AND CONSTRAINTS

7

»»» OPPORTUNITIES

» WOOD AVAILABILITY

The wood availability forecasts indicate that whilst there is a flat to declining supply curve from large-scale forest owners over the next 5 to 8 years, there is gradually increasing wood availability from small-scale private growers. Variability in harvest levels over this period can be expected.

Beyond 2016 there is potential for a significant increase in harvested volumes of radiata pine from current levels (about 1.5 million cubic metres per year) to a level of about 2.6 million cubic metres per year by 2020. Much of this wood is currently uncommitted, that is, from small-scale owners. The actual timing of the harvest from these forests will depend on market conditions and the decisions of a large number of small-scale owners.

The SNI has five strong Farm Forestry Association branches in the region, and these have the potential to form the basis of marketing co-operatives, perhaps along Scandinavian lines, if a suitable New Zealand model is developed. Small-scale forest owners have a greater level of strategic importance in this region than any other wood supply region in NZ.

A number of active and skilled log traders in the region are offering their services to small-scale forest owners. Whilst they are in a competitive situation, the traders do co-operate with each other at times and there is scope for greater co-operation.

» NEW PLANTING

Increased land is potentially available in parts of the Horizons MW and Greater Wellington Regional Council areas as soil erosion issues become more apparent. Examples are the Horizons' Sustainable Land Use Initiative for which central government subsidies may be available, and a similar scheme for the Greater Wellington

Council under the Hill Country Erosion Programme. Planting under such schemes may not all be for production purposes.

Other government schemes such as the Permanent Forest Sink Initiative and the Afforestation Grant Scheme provide encouragement to landowners to plant new forests, either exotic or indigenous.

» NEW PROCESSING OPPORTUNITIES

An existing processing industry is in place, although at a small to medium scale. The small-scale sawmills are generally family-owned, with no publicised plans for expansion. A number have recently closed. Given the flat supply curve for the next decade and the well-publicised difficulties of sawmillers elsewhere in the country, new projects are unlikely in this region in the next decade.

However, from about 2016 to 2021 an additional 800 000 to 1 million cubic metres of radiata pine per year provide potential options for existing plants to increase production, or for the development of a new processing facility in the region.

There is also scope for the local processing of low-grade logs and utilisation of harvesting waste, for example, for biofuels or cogen fuel, if economic collection and delivery systems can be developed. The Energy Efficiency and Conservation Authority has provided information about its "Wood Energy Grant Scheme" which offers funding and information to those companies interested in using wood residues as an energy source (EECA, 2009). Funding is also available for feasibility studies.

» EMPLOYMENT OPPORTUNITIES

There have been skill shortages in most aspects of the forestry sector in the SNI in recent times. Thus career opportunities exist in technical and practical forestry as well as in the processing sector. Young people with

particular skills or aptitudes have a range of opportunities in forestry or the wood processing sector. FITEC has been active in promoting forestry as a career choice, and the sector needs to actively follow through on their promotion campaigns.

› REGIONAL CO-ORDINATION

The SNI region does not have an industry association like the Southern Wood Council or the Eastland Wood Council. The NZ Institute of Forestry fills a role in bringing forestry professionals and practitioners together, and the Farm Forestry Association fills that role for their members; the two often combine. The economic development arm of the Greater Wellington and Horizons regional councils (GrowWellington) has a significant role to play in co-ordinating economic initiatives in this region, but it is not forest industry-specific.

››› CONSTRAINTS

› FRAGMENTED FOREST OWNERSHIP

Forest ownership in the region is fragmented with a high percentage of small forests by size and a large number of absentee owners. There are about 3200 owners of over 100 000 hectares of forest. Whilst this has been a problem traditionally, farm foresters have been investigating overseas models where large volumes of logs are sold on a co-operative basis. As mentioned above as an opportunity, there are a number of log traders active in the region.

This fragmentation is further complicated by the difficulty in harvesting and transporting logs from these blocks. In areas such as Taranaki, inland Wanganui and parts of the Wairarapa, soil types and steep, erodible terrain mean that harvesting is best confined to the drier summer months, and this causes problems for the mills in the region. Maintaining a cost-effective year-round supply to various mills is a challenge.

› WOOD PROPERTIES

There have been some studies on the effect of “heartwood invasion” from the knotty core of radiata pine pruned logs into the pruned zone as the tree ages. When this occurs it has detrimental effect on the wood properties and therefore log value. Some sawmills are now grading logs on the basis of heartwood component and discounting the price if the heartwood content exceeds a given percentage. This has implications for growers if the rotation age exceeds the optimum for pruned wood quality. There is scope for a more widespread study to determine any regional conditions that may promote or impede heartwood development, and defining an optimum rotation age for pruned logs.

› TRANSPORT

The current road transport system funnels into constricted road networks in key areas. An example is the requirement for export logs to travel on the main state highway system to bring logs to the Port of Wellington. Previously this did result in logging trucks arriving at peak commuter hours but Centreport can now accept deliveries on a 24-hour basis.

Many district councils are now reacting to the likelihood of intensive use of rural roads over the next decade or so. Several councils, particularly in the Western SNI, have commissioned surveys of likely wood flows in their districts to better understand the extent of the issue. Road maintenance in these rural locations may have to be accelerated to ensure that new harvesting areas are properly serviced.

Rail transport of logs has not gained traction, despite the ATR funding options.

› LOG EXPORT FACILITIES

The Port of Wellington has limited log storage space, meaning that log ships have to call in for small volumes.

Multiple port calls mean higher shipping costs for growers.

► ENERGY SUPPLY

There is little local power generation capacity at present. Wind power projects are programmed for 2012 onwards. According to Transpower (Transpower NZ Ltd, 2008), a number of threats to local electricity supply exist, for example, the thermal capacity of the existing lines and substations.

► MARKETS FOR LOW-GRADE LOGS

Whilst there is a chipping facility in Masterton and a pulp mill (just outside the region) at Karioi, transport costs can make these markets effectively unavailable. There is currently no reliable outlet for low-quality and low-value logs, apart from the export market, although some opportunities have been discussed above.

»» CONCLUDING COMMENTS

The forest industry in this wood supply region, in common with many other regions, has seen economic, social and environmental factors influence land-use change over the past decade, and the sector has not developed as quickly as perhaps foreseen by the 1994 and 1997 regional studies published by the Ministry of Forestry (Ministry of Forestry, 1994; 1997).

Despite the dominance of the small-scale forest owner in this region, there does not appear to be an expanding forest resource. Expansion prospects do appear greatest in areas where trees will be planted for erosion control works. However, unless areas are clearly identified with production forestry potential and the trees can be harvested economically and without detriment to the environment, such planting will not materially benefit the industry as a whole.

These pressures indicate that the production forest estate is unlikely to expand significantly in this region.

The period of tight but stable wood availability for the next decade will allow the local wood processing industry to plan its future and gain the most from the inherent advantages of the existing industry.

Most of the potential increase in wood availability from 2015 on will come from the region's small-scale forest growers who established forests during the 1990s. The actual timing of the harvest from these forests will depend on market conditions and the decisions of a large number of small-scale owners.

Market conditions and logistical constraints (availability of logging crews, transport capacity, and wood processing capacity) will limit how quickly the additional wood availability from small-scale owners' forests can be harvested leading up to 2020. These factors combine to indicate that any new or expanded processing capacity in the region will be challenging to organise and implement.

As with other regions, the availability of skilled contractors and labour, along with suitable equipment for harvesting small and difficult areas, may well be the key limiting factor in future.

8

WEBSITE ADDRESSES

FOR MORE INFORMATION

› FOREST OWNERS AND MANAGERS

www.rayonier.com

www.forestenterprises.co.nz

www.rogerdickie.co.nz

www.foms.co.nz

www.pfolsen.com

www.nzfm.co.nz

› WOOD PROCESSORS

www.kiwilumber.com

› INFRASTRUCTURE

www.gridnewzealand.co.nz/gnz-projects

www.centreport.co.nz

www.porttaranaki.co.nz

› INDUSTRY TRAINING

www.fitec.co.nz

www.fore.canterbury.ac.nz

www.forestryschool.ac.nz

› FORESTRY ADVICE AND CO-ORDINATION

www.forestry.org.nz

www.nzffa.org.nz

› GOVERNMENT DEPARTMENTS

www.maf.govt.nz

www.doc.govt.nz

www.eeca.govt.nz

www.statistics.govt.nz

› LOCAL AND REGIONAL AUTHORITIES

www.trc.govt.nz

www.horizons.govt.nz

www.gw.govt.nz

www.wanganui.govt.nz

www.pncc.govt.nz

www.tararuadc.govt.nz

www.mstn.govt.nz

www.horowhenua.govt.nz

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New Zealand Limited, March.

APPENDIX A

10

WESTERN SOUTHERN NORTH ISLAND HARVEST INTENTIONS SURVEY RESULTS, LARGE-SCALE OWNERS

	EXPECTED HARVEST 2005	HARVEST INTENTIONS FOR SUBSEQUENT 10 YEARS									
		2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
RADIATA PINE											
Pruned (m ³)	75 282	49 606	71 254	61 845	64 739	62 379	73 807	67 125	67 309	67 131	82 039
Unpruned (m ³)	308 059	286 450	315 439	338 042	296 099	327 757	260 323	234 162	237 627	225 281	213 344
Pulp (m ³)	66 027	89 788	96 377	94 537	90 142	87 108	74 058	52 882	44 893	47 517	48 670
Total (m³)	449 368	425 844	483 070	494 423	450 980	477 244	408 188	354 169	349 829	339 929	344 053
Area radiata (ha)	594	801	1 048	906	892	902	799	671	616	660	642
DOUGLAS-FIR											
Unpruned (m ³)	0	0	28 002	28 949	28 150	12 353	11 381	12 428	12 950	12 832	0
Pulp (m ³)	0	0	6 998	6 051	6 850	2 647	3 619	2 572	2 050	2 168	0
Total (m³)	0	0	35 000	35 000	35 000	15 000	15 000	15 000	15 000	15 000	0
OTHER SPECIES											
Unpruned (m ³)	0	0	0	0	0	0	0	0	0	0	0
Pulp (m ³)	0	6 000	6 000	0	0	0	0	0	0	0	0
Total (m³)	0	6 000	6 000	0	0	0	0	0	0	0	0
TOTAL ALL SPECIES (M³)	449 368	431 844	524 070	529 423	485 980	492 244	423 188	369 169	364 829	354 929	344 053

APPENDIX B

EASTERN SOUTHERN NORTH ISLAND HARVEST INTENTIONS SURVEY RESULTS, LARGE-SCALE OWNERS

	EXPECTED HARVEST 2005	HARVEST INTENTIONS FOR SUBSEQUENT 10 YEARS									
		2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
RADIATA PINE											
Pruned (m³)	12 740	15 707	57 695	52 195	60 195	64 195	70 195	72 195	59 000	68 370	83 341
Unpruned (m³)	120 625	111 981	201 659	253 232	178 863	185 508	177 210	168 560	127 067	134 720	131 169
Pulp (m³)	12 699	10 763	24 764	29 117	22 942	17 657	17 625	22 645	19 933	18 910	22 633
Total (m³)	146 064	138 451	285 450	334 544	262 000	267 360	265 030	263 400	206 000	222 000	237 143
Area radiata (ha)	227	220	492	580	481	415	416	387	280	331	351
DOUGLAS-FIR											
Unpruned (m³)	0	80	0	40 000	40 000	41 920	42 160	41 900	0	0	0
Pulp (m³)	0	0	0	5 000	5 000	5 720	5 810	5 700	0	0	0
Total (m³)	0	80	0	45 000	45 000	47 640	47 970	47 600	0	0	0
OTHER SPECIES											
Unpruned (m³)	13 000	30 601	46 000	26 000	26 000	26 000	0	0	0	0	0
Pulp (m³)	1 631	2 356	6 000	2 000	2 000	2 000	0	0	0	0	0
Total (m³)	14 631	32 957	52 000	28 000	28 000	28 000	0	0	0	0	0
TOTAL ALL SPECIES (M³)	160 695	171 488	337 450	407 544	335 000	343 000	313 000	311 000	206 000	222 000	237 143

APPENDIX C

WOOD AVAILABILITY FORECASTS – SUPPORTING TABLES

»» TABLE C1: WESTERN SOUTHERN NORTH ISLAND RADIATA PINE AVAILABILITY UNDER SCENARIO 1
(UNCONSTRAINED CUT) FOR ALL OWNERS

YEAR ENDING DECEMBER	RECOVERABLE VOLUME (000 M ³ IB)
2006	755
2007	719
2008	763
2009	971
2010	495
2011	669
2012	758
2013	926
2014	1054
2015	1216
2016	1242
2017	996
2018	684
2019	1146
2020	926
2021	880
2022	2575
2023	3195
2024	4997
2025	3583
2026	3298
2027	2262
2028	1748
2029	1749
2030	1195
2031	1504
2032	1243
2033	1195
2034	799
2035	567
2036	353
2037	627
2038	699
2039	755
2040	992

Note

IB denotes inside bark: the recoverable volume of wood excluding bark.

»»»TABLE C2: WESTERN SOUTHERN NORTH ISLAND RADIATA PINE AVAILABILITY UNDER SCENARIO 2

Scenario 2 assumes that large-scale owners cut at stated intentions, and small-scale owners cut at 30 years.

YEAR ENDING DECEMBER	RECOVERABLE VOLUME		
	LARGE-SCALE OWNERS (000 M³ IB)	SMALL-SCALE OWNERS (000 M³ IB)	ALL OWNERS (000 M³ IB)
2006	426	329	755
2007	483	236	719
2008	494	269	763
2009	451	615	1066
2010	477	350	827
2011	408	240	648
2012	354	270	624
2013	350	273	623
2014	340	483	823
2015	344	469	813
2016	378	636	1014
2017	416	737	1153
2018	458	423	881
2019	475	769	1244
2020	475	795	1269
2021	475	606	1081
2022	475	2270	2744
2023	475	2833	3307
2024	475	4657	5132
2025	475	2852	3327
2026	475	2361	2835
2027	475	1633	2108
2028	475	916	1390
2029	475	1195	1670
2030	475	862	1337
2031	475	1125	1599
2032	475	841	1315
2033	475	768	1242
2034	475	301	775
2035	475	99	574
2036	475	6	481
2037	475	253	728
2038	475	195	670
2039	475	224	699
2040	475	541	1016

Note

IB denotes inside bark: the recoverable volume of wood excluding bark.

»»TABLE C3: WESTERN SOUTHERN NORTH ISLAND RADIATA PINE AVAILABILITY UNDER SCENARIO 3

Scenario 3 assumes a non-declining yield with target rotation of 30 years.

YEAR ENDING DECEMBER	RECOVERABLE VOLUME		
	LARGE-SCALE OWNERS (000 M ³ IB)	SMALL-SCALE OWNERS (000 M ³ IB)	ALL OWNERS (000 M ³ IB)
2006	426	329	755
2007	483	236	719
2008	494	269	763
2009	451	388	839
2010	477	446	923
2011	408	606	1014
2012	354	660	1014
2013	350	664	1014
2014	340	674	1014
2015	344	670	1014
2016	378	636	1014
2017	416	666	1083
2018	458	733	1191
2019	458	852	1310
2020	458	983	1441
2021	458	983	1441
2022	458	983	1441
2023	458	983	1441
2024	458	983	1441
2025	458	983	1441
2026	458	983	1441
2027	458	983	1441
2028	458	983	1441
2029	458	983	1441
2030	458	983	1441
2031	458	983	1441
2032	458	983	1441
2033	458	983	1441
2034	458	983	1441
2035	458	983	1441
2036	458	983	1441
2037	458	983	1441
2038	458	983	1441
2039	458	983	1441
2040	458	983	1441

Note

IB denotes inside bark: the recoverable volume of wood excluding bark.

»»TABLE C4: WESTERN SOUTHERN NORTH ISLAND RADIATA PINE AVAILABILITY UNDER SCENARIO 4, BY LOG GRADE, FOR ALL OWNERS

Scenario 4 assumes a split non-declining yield with target rotation of 30 years.

YEAR ENDING DECEMBER	TOTAL (000 M ³ IB)	RECOVERABLE VOLUME BY LOG GRADE		
		PRUNED LOGS (000 M ³ IB)	UNPRUNED LOGS (000 M ³ IB)	CHIP LOGS (000 M ³ IB)
2006	755	79	541	135
2007	719	110	482	127
2008	763	105	522	136
2009	839	136	555	148
2010	923	126	632	166
2011	1007	180	650	176
2012	1007	156	671	179
2013	1007	181	649	177
2014	1007	207	628	173
2015	1007	213	622	173
2016	1007	197	636	174
2017	1108	217	697	193
2018	1218	238	768	212
2019	1340	258	847	234
2020	1474	284	933	256
2021	1622	292	1051	279
2022	1761	263	1194	303
2023	1761	289	1172	301
2024	1761	318	1144	301
2025	1761	350	1113	299
2026	1761	357	1105	297
2027	1761	321	1142	296
2028	1761	353	1113	293
2029	1761	358	1109	293
2030	1761	322	1144	294
2031	1761	308	1159	293
2032	1761	314	1156	291
2033	1761	282	1188	291
2034	1761	254	1214	293
2035	1585	229	1094	264
2036	1426	206	982	238
2037	1284	208	862	213
2038	1284	223	847	213
2039	1284	205	866	213
2040	1284	185	883	216

Note

IB denotes inside bark: the recoverable volume of wood excluding bark.

»» TABLE C5: WESTERN SOUTHERN NORTH ISLAND RADIATA PINE RECOVERABLE VOLUME AND AVERAGE CLEARFELL AGE FOR EACH TARGET ROTATION AGE UNDER SCENARIO 5, FOR ALL OWNERS

Scenario 5 assumes a split non-declining yield with target rotations of 28, 30 and 32 years.

YEAR ENDING DECEMBER	28-YEAR ROTATION		30-YEAR ROTATION		32-YEAR ROTATION	
	RECOVERABLE VOLUME (000 M³ IB)	AVERAGE AGE (YEARS)	RECOVERABLE VOLUME (000 M³ IB)	AVERAGE AGE (YEARS)	RECOVERABLE VOLUME (000 M³ IB)	AVERAGE AGE (YEARS)
2006	755	32	755	32	755	32
2007	719	31	719	31	719	31
2008	763	30	763	30	763	30
2009	877	30	839	30	763	30
2010	1009	30	923	30	763	30
2011	1159	30	1007	30	763	31
2012	1159	29	1007	29	763	31
2013	1159	28	1007	29	763	31
2014	1159	28	1007	29	763	31
2015	1170	27	1007	29	763	31
2016	1287	28	1007	29	763	31
2017	1416	27	1108	29	839	32
2018	1557	28	1218	30	923	32
2019	1691	28	1340	29	1016	31
2020	1691	28	1474	29	1117	31
2021	1691	28	1622	30	1229	30
2022	1691	29	1761	30	1352	30
2023	1691	29	1761	30	1487	30
2024	1691	30	1761	30	1636	30
2025	1691	30	1761	31	1799	33
2026	1691	31	1761	32	1856	33
2027	1691	31	1761	32	1856	33
2028	1691	32	1761	33	1856	37
2029	1691	32	1761	33	1856	37
2030	1691	33	1761	33	1856	35
2031	1691	32	1761	34	1856	36
2032	1691	32	1761	35	1856	36
2033	1522	32	1761	35	1856	37
2034	1370	32	1761	34	1856	38
2035	1233	32	1585	34	1856	38
2036	1233	31	1426	33	1856	38
2037	1233	29	1284	35	1671	38
2038	1233	29	1284	35	1504	38
2039	1233	28	1284	34	1353	38
2040	1233	28	1284	33	1353	38

Note

IB denotes inside bark: the recoverable volume of wood excluding bark.

»» TABLE C6: WOOD AVAILABILITY AND AVERAGE CLEARFELL AGE FOR OTHER SPECIES
IN WESTERN SOUTHERN NORTH ISLAND

YEAR ENDING DECEMBER	RECOVERABLE VOLUME (000 M ³ IB)	AVERAGE AGE (YEARS)
2006	0	0
2007	35	51
2008	35	50
2009	35	50
2010	15	50
2011	15	50
2012	15	50
2013	15	50
2014	15	51
2015	15	47
2016	21	49
2017	21	50
2018	21	53
2019	21	51
2020	21	55
2021	21	55
2022	21	54
2023	21	54
2024	21	52
2025	21	56
2026	0	0
2027	0	0
2028	0	0
2029	4	46
2030	0	0
2031	0	0
2032	0	0
2033	0	0
2034	0	0
2035	0	0
2036	0	0
2037	0	0
2038	0	0
2039	0	0
2040	0	0

Note

IB denotes inside bark: the recoverable volume of wood excluding bark.

»» TABLE C7: EASTERN SOUTHERN NORTH ISLAND RADIATA PINE AVAILABILITY UNDER SCENARIO 1
(UNCONSTRAINED CUT), FOR ALL OWNERS

YEAR ENDING DECEMBER	RECOVERABLE VOLUME (000 M³ IB)
2006	303
2007	590
2008	600
2009	1 981
2010	328
2011	549
2012	580
2013	572
2014	698
2015	888
2016	899
2017	865
2018	408
2019	235
2020	445
2021	947
2022	2 380
2023	2 507
2024	2 349
2025	3 021
2026	3 218
2027	2 340
2028	1 601
2029	2 002
2030	1 358
2031	1 271
2032	1 033
2033	897
2034	494
2035	412
2036	235
2037	244
2038	497
2039	643
2040	1 913

Note

IB denotes inside bark: the recoverable volume of wood excluding bark.

»»»TABLE C8: EASTERN SOUTHERN NORTH ISLAND RADIATA PINE AVAILABILITY UNDER SCENARIO 2

Scenario 2 assumes that large-scale owners cut at stated intentions, and small-scale owners cut at 30 years.

YEAR ENDING DECEMBER	RECOVERABLE VOLUME		
	LARGE-SCALE OWNERS	SMALL-SCALE OWNERS	ALL OWNERS
	(000 M³ IB)	(000 M³ IB)	(000 M³ IB)
2006	138	165	303
2007	285	305	590
2008	335	265	600
2009	262	937	1 199
2010	267	328	595
2011	265	312	577
2012	263	337	600
2013	206	332	538
2014	222	250	472
2015	237	358	595
2016	261	565	825
2017	287	707	994
2018	301	302	603
2019	301	164	465
2020	301	301	602
2021	301	682	983
2022	326	2 094	2 420
2023	358	2 234	2 593
2024	375	2 083	2 457
2025	375	2 132	2 507
2026	375	2 017	2 391
2027	375	1 810	2 184
2028	375	1 415	1 790
2029	375	1 545	1 920
2030	375	926	1 301
2031	375	953	1 328
2032	375	782	1 156
2033	375	637	1 011
2034	375	380	754
2035	375	303	678
2036	375	17	392
2037	375	131	505
2038	375	237	612
2039	375	221	595
2040	375	828	1 203

Note

IB denotes inside bark: the recoverable volume of wood excluding bark.

»»TABLE C9: EASTERN SOUTHERN NORTH ISLAND RADIATA PINE AVAILABILITY UNDER SCENARIO 3

Scenario 3 assumes a non-declining yield with target rotation of 30 years.

YEAR ENDING DECEMBER	RECOVERABLE VOLUME		
	LARGE-SCALE OWNERS	SMALL-SCALE OWNERS	ALL OWNERS
	(000 M ³ IB)	(000 M ³ IB)	(000 M ³ IB)
2006	138	165	303
2007	285	305	590
2008	335	265	600
2009	262	398	660
2010	267	459	726
2011	265	465	730
2012	263	467	730
2013	206	524	730
2014	222	508	730
2015	237	493	730
2016	261	469	730
2017	287	500	787
2018	300	566	866
2019	300	652	952
2020	300	748	1 048
2021	300	852	1 152
2022	300	903	1 203
2023	330	873	1 203
2024	346	857	1 203
2025	346	857	1 203
2026	346	857	1 203
2027	346	857	1 203
2028	346	857	1 203
2029	346	857	1 203
2030	346	857	1 203
2031	346	857	1 203
2032	346	857	1 203
2033	346	857	1 203
2034	346	857	1 203
2035	346	857	1 203
2036	346	857	1 203
2037	346	857	1 203
2038	346	857	1 203
2039	346	857	1 203
2040	346	857	1 203

Note

IB denotes inside bark: the recoverable volume of wood excluding bark.

►►► **TABLE C10: EASTERN SOUTHERN NORTH ISLAND RADIATA PINE AVAILABILITY UNDER SCENARIO 4, BY LOG GRADE, FOR ALL OWNERS**

Scenario 4 assumes a split non-declining yield with target rotation of 30 years.

YEAR ENDING DECEMBER	TOTAL (000 M ³ IB)	RECOVERABLE VOLUME BY LOG GRADE		
		PRUNED LOGS (000 M ³ IB)	UNPRUNED LOGS (000 M ³ IB)	CHIP LOGS (000 M ³ IB)
2006	303	49	217	37
2007	590	88	428	74
2008	600	78	442	80
2009	660	121	459	80
2010	726	157	486	83
2011	730	137	504	88
2012	730	150	494	85
2013	730	153	491	85
2014	730	146	496	87
2015	730	143	499	88
2016	730	172	477	80
2017	788	193	511	84
2018	867	195	572	101
2019	954	210	629	115
2020	1 049	122	772	156
2021	1 154	194	805	156
2022	1 270	198	898	174
2023	1 397	202	1 000	196
2024	1 537	203	1 114	220
2025	1 537	245	1 084	207
2026	1 537	312	1 036	186
2027	1 537	265	1 072	198
2028	1 537	222	1 104	210
2029	1 537	339	1 020	177
2030	1 537	288	1 058	190
2031	1 537	265	1 075	196
2032	1 537	320	1 036	181
2033	1 537	354	1 011	171
2034	1 537	350	1 014	172
2035	1 383	324	906	152
2036	1 245	290	817	137
2037	1 120	244	747	128
2038	1 120	217	767	135
2039	1 120	223	761	136
2040	1 120	217	765	137

Note

IB denotes inside bark: the recoverable volume of wood excluding bark.

»» TABLE C11: EASTERN SOUTHERN NORTH ISLAND RADIATA PINE RECOVERABLE VOLUME AND AVERAGE CLEARFELL AGE FOR EACH TARGET ROTATION AGE UNDER SCENARIO 5, FOR ALL OWNERS

Scenario 5 assumes a split non-declining yield with target rotations of 28, 30 and 32 years.

YEAR ENDING DECEMBER	28-YEAR ROTATION		30-YEAR ROTATION		32-YEAR ROTATION	
	RECOVERABLE VOLUME (000 M³ IB)	AVERAGE AGE (YEARS)	RECOVERABLE VOLUME (000 M³ IB)	AVERAGE AGE (YEARS)	RECOVERABLE VOLUME (000 M³ IB)	AVERAGE AGE (YEARS)
2006	303	34	303	34	303	34
2007	590	33	590	33	590	33
2008	600	33	600	33	600	32
2009	700	32	660	32	600	32
2010	800	32	726	32	600	32
2011	822	32	730	32	600	32
2012	822	32	730	32	600	32
2013	822	29	730	31	600	32
2014	822	29	730	30	600	32
2015	827	29	730	30	600	33
2016	909	30	730	32	600	35
2017	1 000	29	788	31	660	32
2018	1 100	28	867	31	726	32
2019	1 210	29	954	30	799	33
2020	1 331	29	1 049	30	878	33
2021	1 465	29	1 154	30	966	32
2022	1 465	29	1 270	30	1 063	32
2023	1 465	29	1 397	30	1 169	31
2024	1 465	30	1 537	30	1 286	32
2025	1 465	30	1 537	31	1 415	33
2026	1 465	32	1 537	32	1 556	33
2027	1 465	33	1 537	32	1 599	32
2028	1 465	33	1 537	31	1 599	34
2029	1 465	31	1 537	35	1 599	34
2030	1 465	32	1 537	34	1 599	36
2031	1 465	34	1 537	34	1 599	34
2032	1 465	34	1 537	35	1 599	35
2033	1 318	35	1 537	36	1 599	38
2034	1 186	35	1 537	37	1 599	39
2035	1 068	34	1 383	37	1 599	39
2036	1 068	33	1 245	38	1 599	39
2037	1 068	33	1 120	37	1 439	40
2038	1 068	31	1 120	37	1 295	40
2039	1 068	31	1 120	36	1 166	40
2040	1 068	30	1 120	35	1 166	39

Note

IB denotes inside bark: the recoverable volume of wood excluding bark.

»» TABLE C12: WOOD AVAILABILITY AND AVERAGE CLEARFELL AGE FOR OTHER SPECIES
IN EASTERN SOUTHERN NORTH ISLAND

YEAR ENDING DECEMBER	RECOVERABLE VOLUME (000 M ³ IB)	AVERAGE AGE (YEARS)
2006	0	0
2007	0	0
2008	48	49
2009	45	46
2010	48	46
2011	48	44
2012	52	44
2013	0	0
2014	1	46
2015	0	0
2016	1	49
2017	0	0
2018	4	46
2019	0	0
2020	0	0
2021	0	0
2022	0	46
2023	0	0
2024	0	0
2025	0	46
2026	0	0
2027	0	0
2028	0	46
2029	0	0
2030	0	46
2031	0	0
2032	0	0
2033	0	0
2034	0	0
2035	0	0
2036	0	46
2037	0	0
2038	1	46
2039	1	46
2040	0	0

Note

IB denotes inside bark: the recoverable volume of wood excluding bark.

»»TABLE C13: COMBINED SOUTHERN NORTH ISLAND RADIATA PINE AVAILABILITY UNDER SCENARIO 3

Scenario 3 assumes a non-declining yield with target rotation of 30 years.

YEAR ENDING DECEMBER	RECOVERABLE VOLUME		
	LARGE-SCALE OWNERS (000 M³ IB)	SMALL-SCALE OWNERS (000 M³ IB)	ALL OWNERS (000 M³ IB)
2006	564	494	1058
2007	768	541	1309
2008	829	534	1363
2009	713	786	1499
2010	744	905	1649
2011	673	1071	1744
2012	617	1127	1744
2013	556	1188	1744
2014	562	1182	1744
2015	581	1163	1744
2016	639	1105	1744
2017	703	1167	1870
2018	758	1299	2057
2019	758	1504	2262
2020	758	1731	2488
2021	758	1835	2593
2022	758	1886	2644
2023	788	1856	2644
2024	804	1840	2644
2025	804	1840	2644
2026	804	1840	2644
2027	804	1840	2644
2028	804	1840	2644
2029	804	1840	2644
2030	804	1840	2644
2031	804	1840	2644
2032	804	1840	2644
2033	804	1840	2644
2034	804	1840	2644
2035	804	1840	2644
2036	804	1840	2644
2037	804	1840	2644
2038	804	1840	2644
2039	804	1840	2644
2040	804	1840	2644

Note

IB denotes inside bark: the recoverable volume of wood excluding bark.

►►► **TABLE C14: COMBINED SOUTHERN NORTH ISLAND RADIATA PINE AVAILABILITY UNDER SCENARIO 4, BY LOG GRADE, FOR ALL OWNERS**

Scenario 4 assumes a split non-declining yield with target rotation of 30 years.

YEAR ENDING DECEMBER	TOTAL (000 M ³ IB)	RECOVERABLE VOLUME BY LOG GRADE		
		PRUNED LOGS (000 M ³ IB)	UNPRUNED LOGS (000 M ³ IB)	CHIP LOGS (000 M ³ IB)
2006	1058	127	758	172
2007	1309	198	909	201
2008	1363	183	964	216
2009	1499	258	1013	228
2010	1649	282	1118	249
2011	1737	318	1154	264
2012	1737	307	1164	265
2013	1737	334	1140	262
2014	1737	353	1124	260
2015	1737	355	1121	261
2016	1737	370	1113	254
2017	1896	410	1208	277
2018	2086	432	1340	312
2019	2294	468	1476	349
2020	2524	406	1706	413
2021	2776	486	1856	435
2022	3031	461	2093	477
2023	3158	491	2171	497
2024	3298	521	2257	521
2025	3298	595	2197	506
2026	3298	669	2141	483
2027	3298	586	2214	495
2028	3298	575	2217	504
2029	3298	697	2128	471
2030	3298	609	2203	484
2031	3298	573	2234	489
2032	3298	633	2192	472
2033	3298	637	2199	462
2034	3298	604	2228	465
2035	2968	552	2000	416
2036	2671	495	1799	375
2037	2404	453	1609	341
2038	2404	441	1615	348
2039	2404	428	1627	349
2040	2404	402	1649	353

Note

IB denotes inside bark: the recoverable volume of wood excluding bark.

»» TABLE C15: COMBINED SOUTHERN NORTH ISLAND RADIATA PINE RECOVERABLE VOLUME AND AVERAGE CLEARFELL AGE FOR EACH TARGET ROTATION AGE UNDER SCENARIO 5, FOR ALL OWNERS

Scenario 5 assumes a split non-declining yield with target rotations of 28, 30 and 32 years.

YEAR ENDING DECEMBER	28-YEAR ROTATION		30-YEAR ROTATION		32-YEAR ROTATION	
	RECOVERABLE VOLUME (000 M ³ IB)	AVERAGE AGE (YEARS)	RECOVERABLE VOLUME (000 M ³ IB)	AVERAGE AGE (YEARS)	RECOVERABLE VOLUME (000 M ³ IB)	AVERAGE AGE (YEARS)
2006	1058	33	1058	33	1058	33
2007	1309	32	1309	32	1309	32
2008	1363	31	1363	31	1363	31
2009	1577	31	1499	31	1363	31
2010	1809	31	1649	31	1363	31
2011	1981	30	1737	31	1363	31
2012	1981	30	1737	30	1363	31
2013	1981	29	1737	30	1363	31
2014	1981	28	1737	30	1363	31
2015	1997	28	1737	30	1363	32
2016	2196	28	1737	30	1363	33
2017	2416	28	1896	30	1499	32
2018	2658	28	2086	30	1649	32
2019	2902	28	2294	30	1814	32
2020	3023	28	2524	29	1996	31
2021	3156	29	2776	30	2195	31
2022	3156	29	3031	30	2415	31
2023	3156	29	3158	30	2656	30
2024	3156	30	3298	30	2922	31
2025	3156	30	3298	31	3214	33
2026	3156	32	3298	32	3413	33
2027	3156	32	3298	32	3455	32
2028	3156	32	3298	32	3455	36
2029	3156	32	3298	34	3455	36
2030	3156	32	3298	34	3455	35
2031	3156	33	3298	34	3455	35
2032	3156	33	3298	35	3455	36
2033	2840	33	3298	36	3455	37
2034	2556	33	3298	35	3455	38
2035	2301	33	2968	36	3455	38
2036	2301	32	2671	35	3455	39
2037	2301	31	2404	36	3110	39
2038	2301	30	2404	35	2799	39
2039	2301	29	2404	35	2519	39
2040	2301	29	2404	34	2519	38

Note

IB denotes inside bark: the recoverable volume of wood excluding bark.