



Wood Availability Forecasts – Western & Eastern Southern North Island 2014

Prepared for the Ministry for Primary Industries
by Indufor Asia Pacific Limited

ISBN No: 978-1-77665-260-0 (online)

April 2016

Ministry for Primary Industries Wood Availability Forecasts

A new series of Wood Availability Forecasts is being prepared by Indufor Asia Pacific, for the Ministry for Primary Industries (MPI), covering the period from 2014 to 2050. These forecasts are intended as a planning tool for the forest industry, councils, and infrastructure and service providers. New forecasts for all nine regional wood supply regions will be published over the next eighteen months, along with new national forecasts.

MPI is working in association with the National Exotic Forest Description (NEFD) Steering Committee to prepare the new regional and national wood availability forecasts. NEFD user surveys have emphasised that wood availability forecasts are the most used and valued product delivered under the NEFD programme. The previous regional and national forecasts were prepared between 2006 and 2010 and are available here: <http://www.mpi.govt.nz/news-and-resources/open-data-and-forecasting/forestry/>

Tables providing annual harvest volumes for each scenario are included in the appendix. The report will also be available on the Ministry's website.

MPI wishes to express its appreciation to the forest owners, managers and consultants of Western and Eastern SNI for their support in preparing these wood availability forecasts. The work would not be possible without this assistance.

Disclaimer

While every effort has been made to ensure the information is accurate, the Ministry for Primary Industries does not accept any responsibility or liability for error of fact, omission, interpretation or opinion that may be present, nor for the consequences of any decisions based on this information. Any view or opinion expressed does not necessarily represent the view of the Ministry for Primary Industries.

Publisher

Requests for further copies should be directed to:

Publications Logistics Officer
Ministry for Primary Industries
PO Box 2526
WELLINGTON 6140

Email: brand@mpi.govt.nz
Telephone: 0800 00 83 33

© Crown Copyright - Ministry for Primary Industries

PREFACE

This report was prepared at the request of the Ministry for Primary Industries (the Client) by Indufor Asia Pacific Limited.

The project involved development of a series of regional and national wood availability forecasts for New Zealand's plantation estate.

This report may only be used for the purpose for which it was prepared and its use is restricted to consideration of its entire contents. The conclusions presented are subject to the assumptions and limiting conditions noted within.

Indufor Asia Pacific

Nigel Chandler
Head of Forest Resources

Andre Neumann
Senior Consultant

Contact:

Indufor Asia Pacific
7th Floor, 55 Shortland St
PO Box 105 039
Auckland City
NEW ZEALAND

Tel. +64 9 281 4750
www.indufor-ap.com
A13-10661

DISCLAIMER

Indufor makes its best effort to provide accurate and complete information while executing the assignment. Indufor assumes no liability or responsibility for any outcome of the assignment.

TABLE OF CONTENTS

Ministry for Primary Industries Wood Availability Forecasts	i
PREFACE	II
TABLE OF CONTENTS	III
1. INTRODUCTION	1
2. SCENARIOS	2
2.1 Scenario 1: Large-scale Owners Harvest at Stated Intentions, Small-scale Owners Harvest at Age 28	2
2.2 Scenario 2: Non-declining Yield (NDY) – Target Rotation 28 years	2
2.3 Scenario 3: Split NDY – Target Rotation 28 years	2
2.4 Scenario 4: Target Rotation Age Variations	2
2.5 Discussion of the Scenarios - Radiata Pine	2
2.6 Scenario for Douglas-fir	3
3. DATA AND METHODOLOGY	5
3.1 Method Used to Obtain Forest Areas	5
3.2 Method Used to Develop Yield Tables	5
3.3 Large-Scale Owners' Harvest Intentions	5
3.4 Modelling Assumptions	6
4. WOOD AVAILABILITY FORECASTS FOR WESTERN SOUTHERN NORTH ISLAND	7
4.1 Western Southern North Island Region Area Description	7
4.2 Scenario 1	7
4.3 Scenario 2	9
4.4 Scenario 3	11
4.5 Scenario 4	13
4.6 Douglas-fir	14
5. WOOD AVAILABILITY FORECASTS FOR EASTERN SOUTHERN NORTH ISLAND	17
5.1 Eastern Southern North Island Region Description	17
5.2 Scenario 1	17
5.3 Scenario 2	20
5.4 Scenario 3	21
5.5 Scenario 4	24
5.6 Douglas-fir	25
6. WOOD AVAILABILITY FORECASTS FOR THE COMBINED WESTERN & EASTERN SOUTHERN NORTH ISLAND ESTATE	27
6.1 Scenario 2	27
6.2 Scenario 3	28
6.3 Scenario 4	29
6.4 Douglas-fir	30



Indufor

7. COMPARISON TO PREVIOUS FORECASTS	31
8. CONCLUDING COMMENTS	34

Table of Figures

Figure 2-1A: Scenario 1: Large-scale Owners Harvest at Stated Intentions, Small-Scale Owners Harvest at Age 28	3
Figure 4-1: Western SNI Age-Class Distribution by Owner – All Species as at 1 April 2014	7
Figure 4-2: Western SNI Radiata Pine Availability under Scenario 1 – Large-Scale Owners	8
Figure 4-3: Western SNI Radiata Pine Availability under Scenario 1 – All Owners	8
Figure 4-4: Western SNI Average Radiata Pine Clearfell Age under Scenario 1 – by Ownership Category	9
Figure 4-5: Western SNI Radiata Pine Availability under Scenario 1 – by Log Grade (All Owners)	9
Figure 4-6: Western SNI Radiata Pine Availability under Scenario 2 – All Owners	10
Figure 4-7: Western SNI Average Radiata Pine Clearfell Age under Scenario 2 – by Ownership Category	10
Figure 4-8: Western SNI Radiata Pine Availability under Scenario 2 – by Log Grade (All Owners)	11
Figure 4-9: Western SNI Radiata Pine Availability under Scenario 3 – All Owners	12
Figure 4-10: Western SNI Average Radiata Pine Clearfell Age under Scenario 3 – by Ownership Category	12
Figure 4-11: Western SNI Radiata Pine Availability under Scenario 3 – by Log Grade (All Owners)	13
Figure 4-12: Western SNI Radiata Pine Availability by Target Rotation Age under Scenario 4 – All Owners	14
Figure 4-13: Western SNI Average Radiata Pine Clearfell Age by Target Rotation Age under Scenario 4 – All Owners	14
Figure 4-14: Western SNI Age-Class Distribution of Douglas-fir – All Owners as at 1 April 2014	15
Figure 4-15: Western SNI Douglas-fir Availability – All Owners	15
Figure 4-16: Western SNI Average Douglas-fir Clearfell Age – by Ownership Category	16
Figure 4-17: Western SNI Douglas-fir Availability – by Log Grade (All Owners)	16
Figure 5-1: Eastern SNI Age-Class Distribution by Owner – All Species as at 1 April 2014	17
Figure 5-2: Eastern SNI Radiata Pine Availability under Scenario 1– Large-Scale Owners	18
Figure 5-3: Eastern SNI Radiata Pine Availability under Scenario 1 – All Owners	18
Figure 5-4: Eastern SNI Average Radiata Pine Clearfell Age under Scenario 1 – by Ownership Category	19

Figure 5-5: Eastern SNI Radiata Pine Availability under Scenario 1 – by Log Grade (All Owners)	19
Figure 5-6: Eastern SNI Radiata Pine Availability under Scenario 2 – All Owners	20
Figure 5-7: Eastern SNI Average Radiata Pine Clearfell Age under Scenario 2 – by Ownership Category	21
Figure 5-8: Eastern SNI Radiata Pine Availability under Scenario 2 – by Log Grade (All Owners)	21
Figure 5-9: Eastern SNI Radiata Pine Availability under Scenario 3 – All Owners	22
Figure 5-10: Eastern SNI Average Radiata Pine Clearfell Age under Scenario 3 – by Ownership Category	23
Figure 5-11: Eastern SNI Radiata Pine Availability Under Scenario 3 – by Log Grade (All Owners)	23
Figure 5-12: Eastern SNI Radiata Pine Availability by Target Rotation Age under Scenario 4 – All Owners	24
Figure 5-13: Eastern SNI Average Radiata Pine Clearfell Age by Target Rotation Age under Scenario 4 – All Owners	24
Figure 5-14: Eastern SNI Age-Class Distribution of Douglas-fir – All Owners Estate as at 1 April 2014	25
Figure 5-15: Eastern SNI Douglas-fir Availability – All Owners	25
Figure 5-16: Eastern SNI Average Douglas-fir Clearfell Age – by Ownership Category	26
Figure 6-1: Western & Eastern SNI Radiata Pine Availability under Scenario 2 – by Ownership Size	27
Figure 6-2: Western & Eastern SNI Radiata Pine Availability under Scenario 2 – by Log Type (All Owners)	28
Figure 6-3: Western & Eastern SNI Radiata Pine Availability under Scenario 3 – by Ownership Size	28
Figure 6-4: Western & Eastern SNI Radiata Pine Availability under Scenario 3 – by Log Type (All Owners)	29
Figure 6-5: Western & Eastern SNI Radiata Pine Availability by Target Rotation Age under Scenario 4	29
Figure 6-6: Western & Eastern SNI Douglas-fir Availability – by Ownership Size	30
Figure 6-7: Western & Eastern SNI Douglas-fir Availability – by Log Grade (All Owners)	30
Figure 7-1: Wood Availability Forecasts (All Radiata Pine): 2006 vs 2014 – Western SNI	31
Figure 7-2: Wood Availability Forecasts (All Radiata Pine): 2006 vs 2014 – Eastern SNI	31
Figure 7-3: Area Age-Class Comparisons: NEFD 2006 vs NEFD 2014 – Western SNI	33
Figure 7-4: Area Age-Class Comparisons: NEFD 2006 vs NEFD 2014 – Eastern SNI	33

1. INTRODUCTION

This report presents the findings from a 2015 wood availability study of the Western Southern North Island (Western SNI) and the Eastern Southern North Island (Eastern SNI) planted forest estate. This is based on the Ministry for Primary Industries (MPI) National Exotic Forest Description (NEFD) as at 1 April 2014. The study was undertaken by MPI, in association with the major plantation owners. The modelling supporting the study was undertaken by Indufor Asia Pacific Limited (Indufor).

Indufor prepared four production scenarios for radiata pine potential wood availability and one for Douglas-fir availability. The scenarios indicate how the maturing forest resource in the Western SNI and Eastern SNI could be harvested over the 2014 to 2050 period. The scenarios are based on the available resource in each region and a series of forecasting assumptions. Only radiata pine and Douglas-fir are included in the scenarios and wood availability forecasts. There are areas of other species but these are not included in the availability forecasts.

The forecasts incorporate the harvesting intentions of the region's large-scale forest owners. Large-scale owners are defined as:

- Those with 1 000 ha of forest or more in the region of interest; and
- With more than three age-classes; and
- Not a part of a syndicate.

There was also consultation with forest managers and consultants to ensure the scenarios represented a realistic range of future wood availability.

The scenarios clearly show there are different ways for the forest resource to be harvested. In examining the scenarios, it is important to recognise that forests are normally managed in a way that maximises the benefits to the enterprise that owns them. Each enterprise has its own harvesting strategy based on the owner's objectives and market conditions. Any change in harvesting strategies by forest owners affects the age-structure and maturity of the forests they own. This in turn feeds back into future wood availability.

A key issue is the timing of harvesting by small-scale forest owners of their forests or woodlots. The harvest age can vary markedly, even between neighbouring properties. The timing of the harvest of these forests is driven by a range of factors, including individual forest owner's objectives, forest age, log prices, demand by local wood processing plants, and perceptions about future log prices and future wood supply.

There are different levels of uncertainty associated with the wood availability from each component of the estate. While the volumes forecast from larger forest owners are subject to alteration because of changes in harvesting intentions or changes in the resource description (for example, areas and yields), a higher level of confidence can generally be assumed for these forecasts than for the small-scale owners' estate. Not only are harvest intentions less clear for small-scale owners, the resource description is potentially less accurate.

2. SCENARIOS

Four wood availability scenarios have been modelled for radiata pine and one for Douglas-fir. These scenarios show the range of potential ways the forests in the region could be harvested in the future.

The scenarios were developed by the NEFD Steering Committee. Indufor undertook initial modelling of the scenarios, and these were presented to the major forest owners and consultants in the Western and Eastern SNI wood supply region. Their feedback was taken into account in the final derived profiles.

2.1 Scenario 1: Large-scale Owners Harvest at Stated Intentions, Small-scale Owners Harvest at Age 28

Large-scale owners' wood availability is based on stated harvest intentions for the period 2014 to 2023 (calendar year estimates). After 2023, a modelling assumption is that the wood availability from large-scale owners will not decrease.

Small-scale owners are assumed to harvest their forest holdings at age 28.

This is similar to scenario 2 in the 2006/07 Wood Availability Forecasts, although the target rotation age for small-scale owners was 30 years in the earlier analysis.

2.2 Scenario 2: Non-declining Yield (NDY) – Target Rotation 28 years

Large-scale owners' wood availability is assumed to be at stated harvest intentions for the period 2014 to 2023. After 2023, the wood availability from large-scale owners is assumed not to decrease (as for scenario 1). The total wood availability of radiata pine from the region is modelled to be non-declining in perpetuity with a target rotation age of 28 years (30 years in scenario 3 in the 2006/07 Wood Availability Forecasts).

2.3 Scenario 3: Split NDY – Target Rotation 28 years

This is the same as scenario 2 except that the total wood availability of radiata pine from the region is allowed to decline after 2034 for a period of five years. Over this five-year period, an annual change of up to 10% is allowed. The yield is then required to be non-declining from 2039.

2.4 Scenario 4: Target Rotation Age Variations

This is similar to scenario 3 except that target rotation ages of 26 and 30 years are also modelled (28 and 32 years in the 2006/07 Wood Availability Forecasts).

2.5 Discussion of the Scenarios - Radiata Pine

Figure 2-1A to Figure 2-1C illustrate the differences between Scenarios 1 to 3 (respectively) using the combined Western & Eastern SNI radiata pine resource as an example (more detailed discussion is provided in Section 4).

In scenario 1 (Figure 2-1A), the forests owned by small-scale owners are assumed to be harvested at age 28. The scenario shows the "potential" availability of mature forest from small owners in any given year. This scenario directly reflects the area of forest in the small ownership category in each age-class in the Western & Eastern SNI region. For practical reasons, it is unlikely that the future harvesting would occur this way. The intention of this scenario is to show the potential magnitude of harvesting under favourable market conditions in any given year.

Scenarios 2 and 3 (Figure 2-1B and Figure 2-1C, respectively) are based on yield regulation. Yield regulation refers to where, when, and how these recoverable volumes should be extracted, and provides a more orderly harvesting volume profile that, to some degree, reflects logistical and market constraints. Under these scenarios, the future harvesting model 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.

Scenarios 2 and 3 avoid the large year-to-year fluctuations in volume seen in Scenario 1. A fundamental property of the forests in the Western and Eastern SNI (like many regions in New Zealand) is the large area of forests established during the 1990s. Scenarios 3 and 4 illustrate the harvesting of these forests by applying a non-declining yield constraint for the period 2014 to 2034. Then once the “bulge” of forest area planted during the 1990s has been harvested, the model lets the volume decline again.

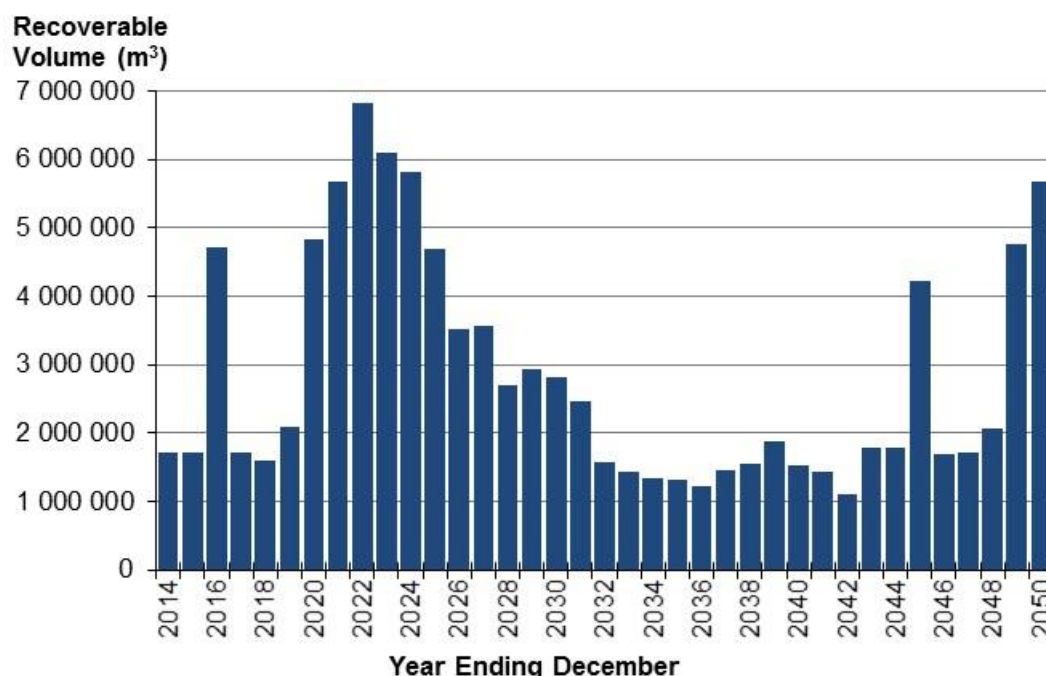
The main limitations of Scenarios 2 to 4 are that log prices and other market factors are a significant determinant of harvesting in any given year. When log prices go up, harvesting will generally increase. When log prices fall, the level of harvesting will generally decrease. It is beyond the scope of this analysis to predict future log prices.

2.6 Scenario for Douglas-fir

One scenario is presented for Douglas-fir (all owners). It is based on the harvest intentions of large-scale owners for 2014 to 2023, with the yield regulated in subsequent years. After 2023, the wood availability from large-scale owners is modelled in five-year period non-declining yield (NDY) blocks (i.e. 2024-2028, 2029-2033, etc). The total wood availability of the combined estate is also modelled to be non-declining within each of the five-year period NDY blocks. The target rotation age is 40 years for Douglas-fir (45 years was used in the 2006/07 forecasts).

Illustration of Wood Availability Scenarios (Combined Western & Eastern SNI Radiata Pine Forecasts)

Figure 2-1A: Scenario 1: Large-scale Owners Harvest at Stated Intentions, Small-Scale Owners Harvest at Age 28





Indufor

Figure 2-1B: Scenario 2: Large-Scale Owners Harvest at Stated Intentions. Overall Non-Declining Yield with a Target Rotation of 28 Years

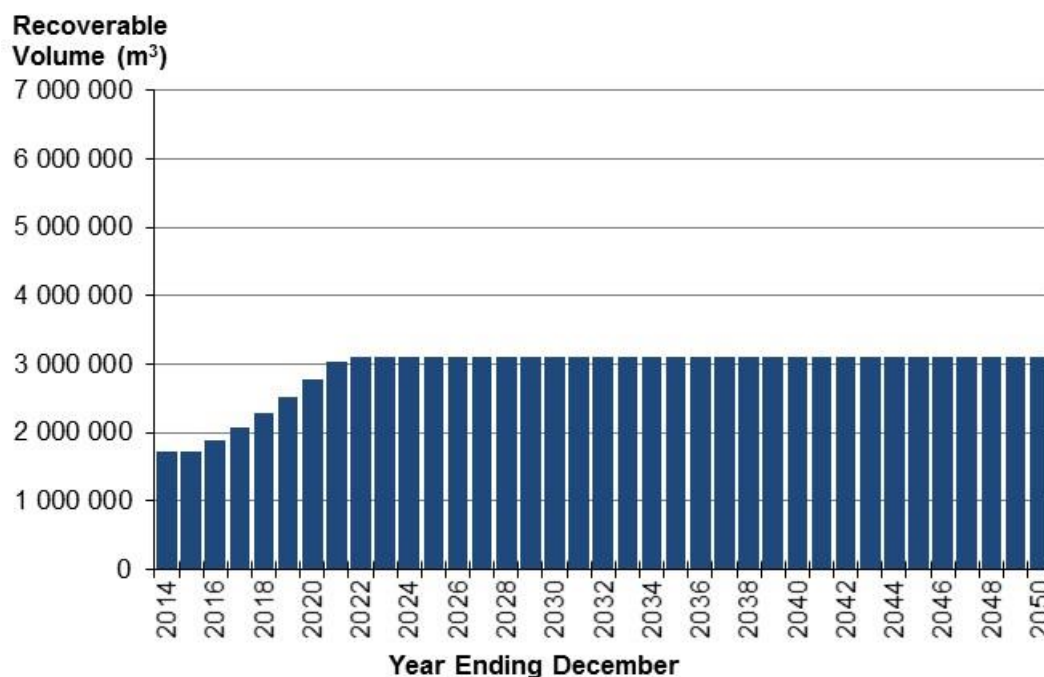
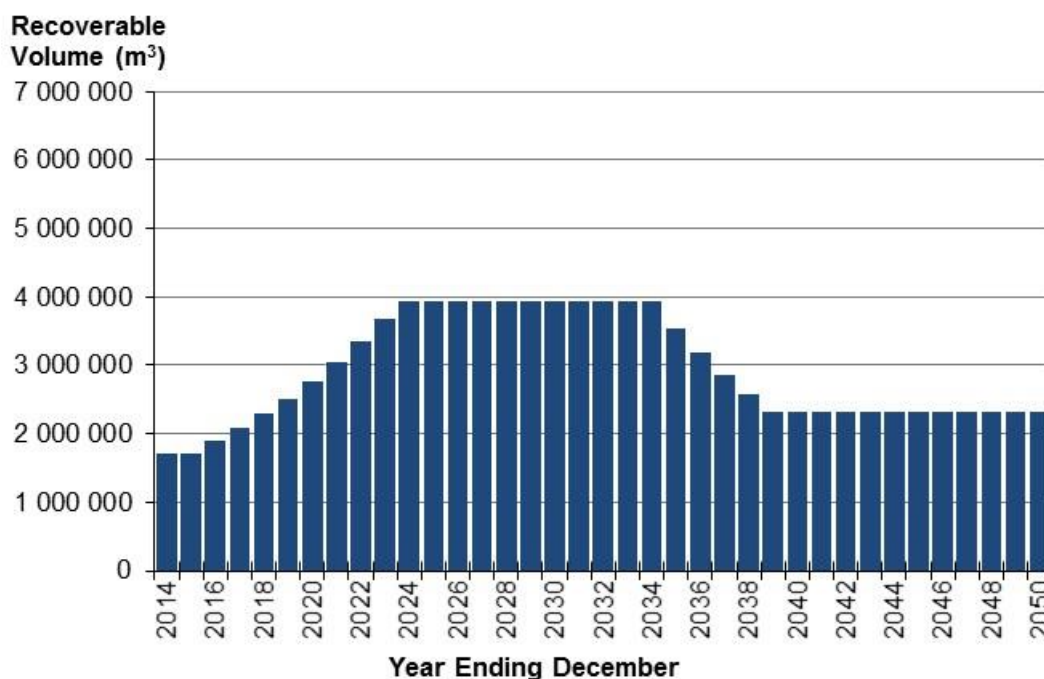


Figure 2-1C: Scenario 3: Large-scale Owners Harvest at Stated Intentions. Overall Split Non-Declining Yield with Target Rotation of 28 Years



3. DATA AND METHODOLOGY

3.1 Method Used to Obtain Forest Areas

The forest areas were sourced from the NEFD as at 1 April 2014 (MPI 2014). The area for the large-scale owners was unadjusted, while the area for the small-scale owners' estate was reduced by 15%.

This adjustment was made as small-scale owners generally report on a gross area basis rather than net stocked areas (excluding unplanted areas, areas not successfully established, streams, roads and wetlands).

In addition to this, reductions were made to the area of over-mature stands. For large-scale owners, areas older than 35 years of age were considered non-commercial and excluded. For small-scale owners, the maximum age was 40 years.

A further downwards adjustment of 5% was applied to all areas age 1 to 4 to reflect losses in stocked area due to factors such as erosion, slips, and various setbacks.

Furthermore, the planted area aged 20 and over described in the 2004 Small Forest Grower Survey Report has been excluded from the 2014 forecasts due to uncertainties over the reliability of this data. This area, around 9800 ha, was included in the 2006 forecasts.

3.2 Method Used to Develop Yield Tables

For the 2006/07 WAF, new yield tables for Eastern and Western SNI were developed in the following way:

- Large-scale forest owners provided yield tables for their forest estates.
- These tables were averaged on an area-weighted basis to derive regional yield tables for each crop-type.
- The area-weighted average regional yield tables for "old" radiata pine (planted before 1989), and Douglas-fir were then calibrated to match the harvest intentions data provided by large-scale owners. The assumption is that the harvest intentions data is the most accurate information available, as it is based predominantly on detailed inventory.
- The area-weighted average regional yield tables for "young" radiata pine crop-types (planted in 1990 and later) were also adjusted based on consultation with large-scale owners.
- The area-weighted average regional yield tables developed for the large-scale owners' estate were also applied to the small-scale forest owners' estate.

For the latest forecasts the yield tables developed in 2006/07 were utilised, but were again calibrated to the harvest intentions information provided by large forest owners (essentially the process described in the third bullet point above was redone to derive yield tables that reflected yields expected by the large owners).

3.3 Large-Scale Owners' Harvest Intentions

Large-scale owners were asked to provide details of their projected harvest volumes (by log grade, area and average harvest age) for the 2014 to 2033 period. Out of the 15 large owners in the region, seven large owners provided yearly (31 December) summary data for the project. Inclusion of actual levels of intended harvest by the large owners is considered a critical step, as it provides the best estimate of future wood availability for the first ten years (2014-2023) of the forecast horizon.

The owners who provided harvest intentions were:

- Ernslaw One Ltd
- Juken New Zealand Ltd
- Global Forest Partners LP (Madaket II)
- Matariki Forests Ltd
- Utareya Finance Ltd
- Wanganui District Council
- Resource Management Service LLC

3.4 Modelling Assumptions

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

- All areas are replanted, with a regeneration lag of one year. Replanting is as follows:
 - All radiata pine areas are maintained as radiata pine.
 - Large-scale forest owners (Western SNI): 5% of all pruned areas will be replanted as a pruned regime, with 95% transferring to an unpruned regime.
 - Large-scale forest owners (Eastern SNI): 90% of all pruned areas will be replanted as a pruned regime, with 10% transferring to an unpruned regime.
 - Small-scale forest owners (Western SNI): 50% of all pruned areas will be replanted as a pruned regime with 50% transferring to an unpruned regime.
 - Small-scale forest owners (Eastern SNI): 65% of all pruned areas will be replanted as a pruned regime with 35% transferring to an unpruned regime.
 - Douglas-fir: Only 10% of existing Douglas-fir will be replanted as Douglas-fir, with the rest transferring to radiata pine (both regions).
- Based on discussions with major forest owners and consultants in the region, it was determined that conversion of forests to other land uses was not being undertaken at a sufficient rate for it to be incorporated into the wood availability forecasts.
- The area awaiting replanting as at 31 March 2014 is included as area at age 0 (that is, the area to be replanted in the 2014 planting season).
- Total roundwood removals in the Western and Eastern SNI region were estimated to be 1.72 million m³ for the year ended 31 March 2014 (0.92 million m³ for Western SNI, and 0.80 million m³ for Eastern SNI). This was used to derive the harvest level for the first year of the model.
- Radiata pine area in the large-scale owners' estate aged over 35 years is assumed to be non-commercial and therefore will not be harvested.
- Radiata pine area in the small-scale owners' estate aged over 40 years is assumed to be non-commercial and therefore will not be harvested.
- Douglas-fir stands over 60 years of age are assumed to not be harvested (all owners)

4. WOOD AVAILABILITY FORECASTS FOR WESTERN SOUTHERN NORTH ISLAND

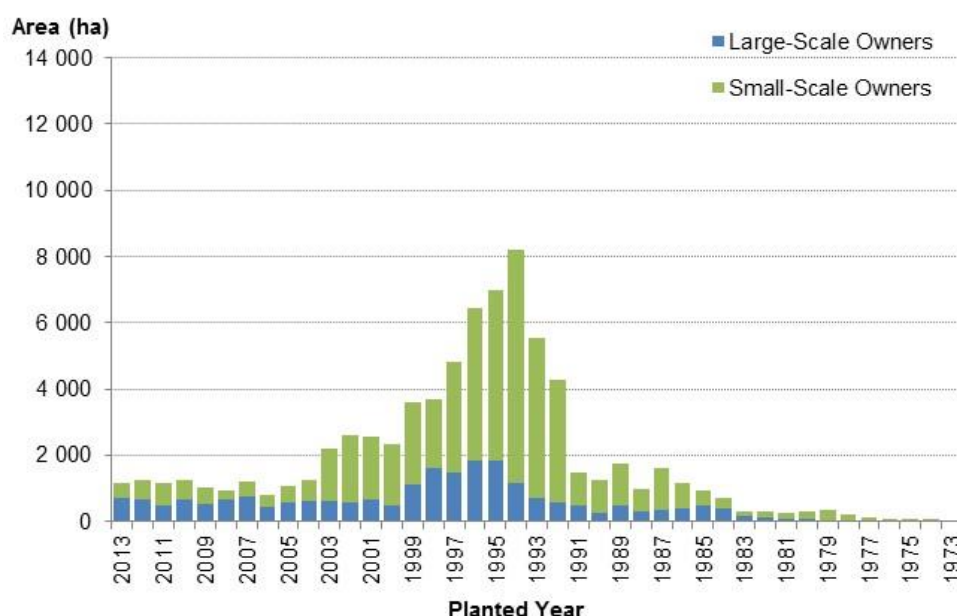
4.1 Western Southern North Island Region Area Description

The Western SNI region has a plantation resource of 95 323 ha spread across thirteen territorial authorities. Of this, 91 154 ha consists of radiata pine and 700 ha are Douglas-fir.

After the deductions described in Section 3.1 are applied to the NEFD area, the modelled area reduces to 77 007 ha.

The modelled resource consists of both radiata pine and Douglas-fir. Figure 4-1 shows the age-class distribution for the Western SNI estate by owner size. Some 29% of the modelled resource is held by large-scale owners and 71% by small-scale owners. The age-class distribution of the small-scale owners' estate is very irregular, with over 3 000 ha per year planted between 1992 and 1997.

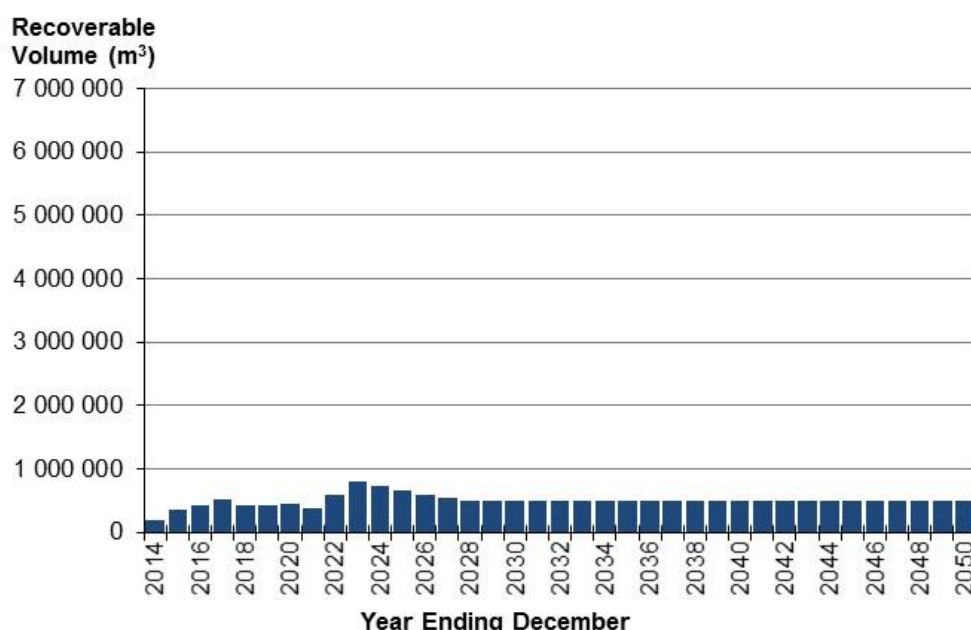
Figure 4-1: Western SNI Age-Class Distribution by Owner – All Species as at 1 April 2014



4.2 Scenario 1

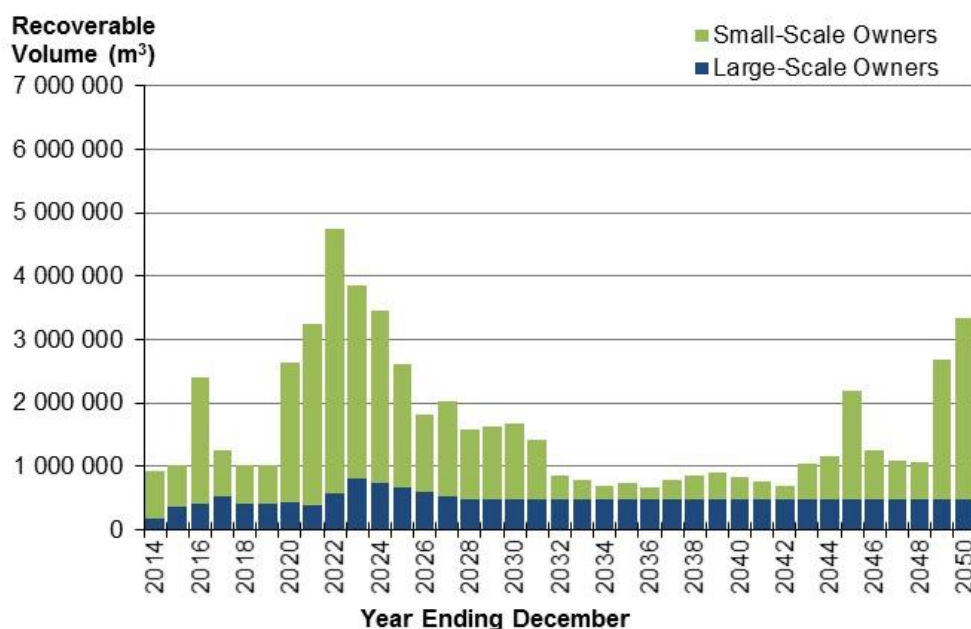
For this scenario, the availability of wood from large-scale owners is based on their stated harvest intentions for 2014 to 2023. Thereafter the availability is constrained to be non-declining with a target rotation age of 28 years. However, due to the highly uneven age-class distribution of the Western SNI resource, it was not possible to apply these constraints and obtain a feasible solution. The NDY constraint was therefore partially relaxed through to 2028. The wood availability of large-scale owners (Figure 4-2) is forecast to be relatively static through the forecast period.

Figure 4-2: Western SNI Radiata Pine Availability under Scenario 1 – Large-Scale Owners



The wood availability from all owners in the Western SNI is presented in Figure 4-3. The large-scale owners' resource is shown as the "base" volume, and the forecasts match the volumes in Figure 4-2. The fluctuation in the total annual forecast volumes reflects the variation in the areas in each age-class of the small-scale owners' estate, and the assumption that this estate is harvested at age 28.

Figure 4-3: Western SNI Radiata Pine Availability under Scenario 1 – All Owners

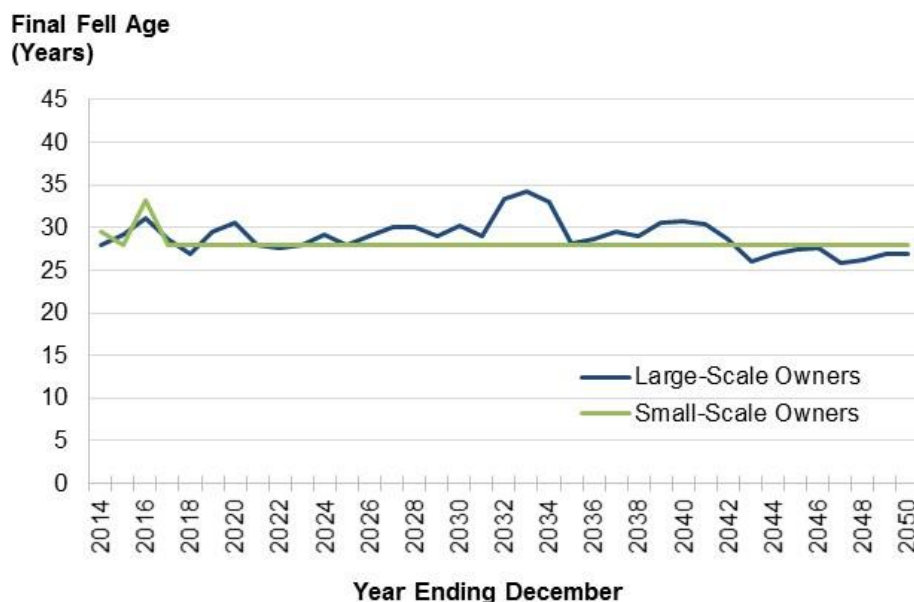


The large increase in harvest volume after 2019 (Figure 4-3) reflects the maturing of the small-scale owners' estate. For example, the increase in 2020 is a consequence of the 3 708 ha planted by small-scale owners in 1992 (Figure 4-1) being harvested at age 28 years.

Fluctuations in harvest volumes of the magnitude shown in Figure 4-3 would be impractical due to operational constraints (for example - availability of harvest machinery, harvesting crews and transport operators) and market absorption constraints (for example - limited domestic wood processing capacity, levels of export demand).

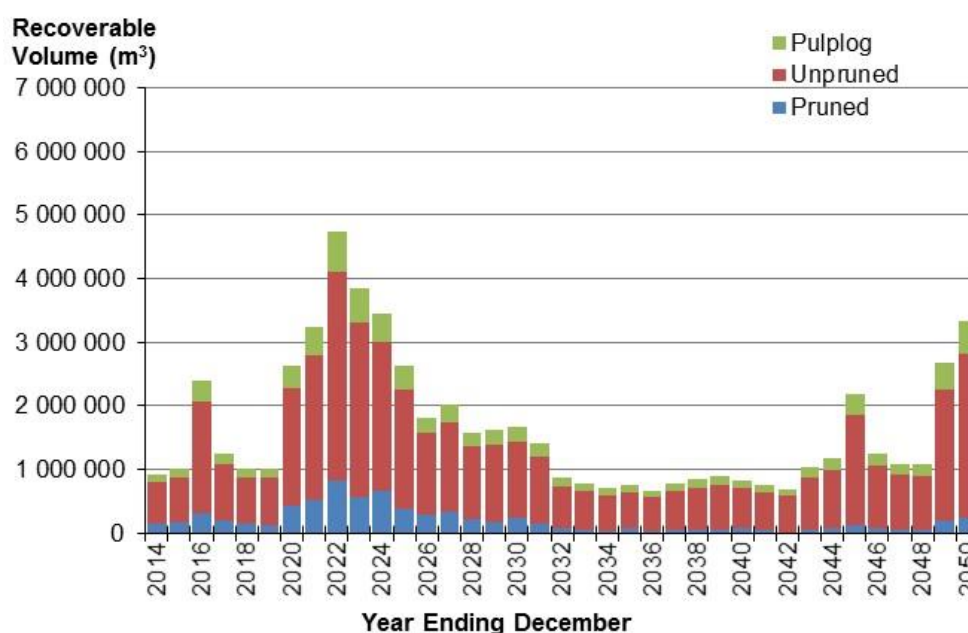
Figure 4-4 shows that, apart from the near-term harvest (which is constrained to the intentions of the large scale owners), the harvest age settles at the target of 28 years.

Figure 4-4: Western SNI Average Radiata Pine Clearfell Age under Scenario 1 – by Ownership Category



The harvest volumes forecast under scenario 1 are broken down by log grade in Figure 4-5. Of note is the declining availability of pruned log supply. This is a result of the assumed lack of re-establishment of pruned regimes after harvest (5% for large owners and 50% for small owners).

Figure 4-5: Western SNI Radiata Pine Availability under Scenario 1 – by Log Grade (All Owners)

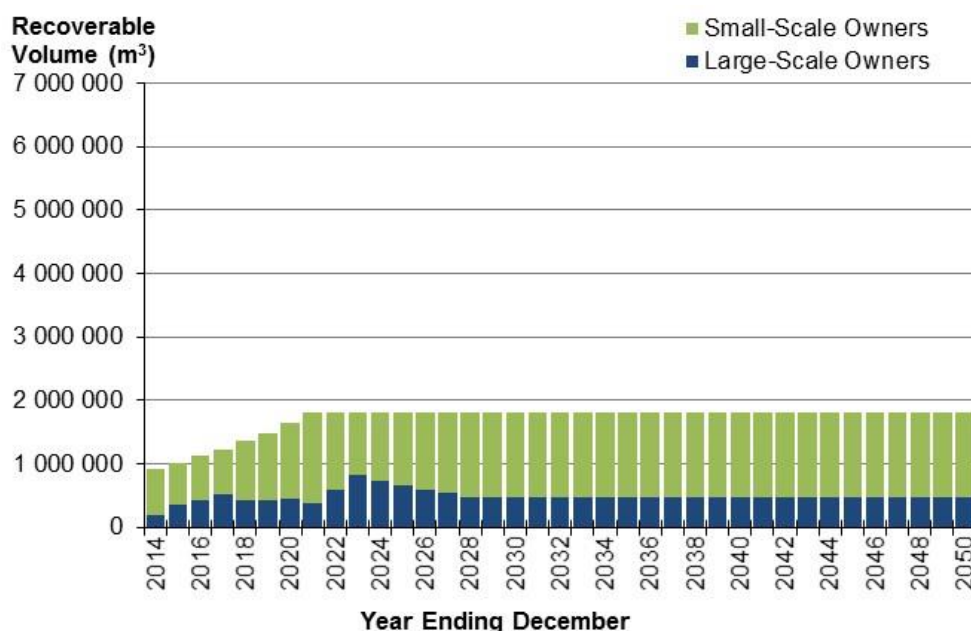


4.3 Scenario 2

The second scenario assumes large-scale owners' resources are harvested as per their harvest intentions for the first 10 years, then a non-declining yield constraint is applied to the large-scale owners' estate after 2023. As with Scenario 1, due to the highly uneven age-class distribution

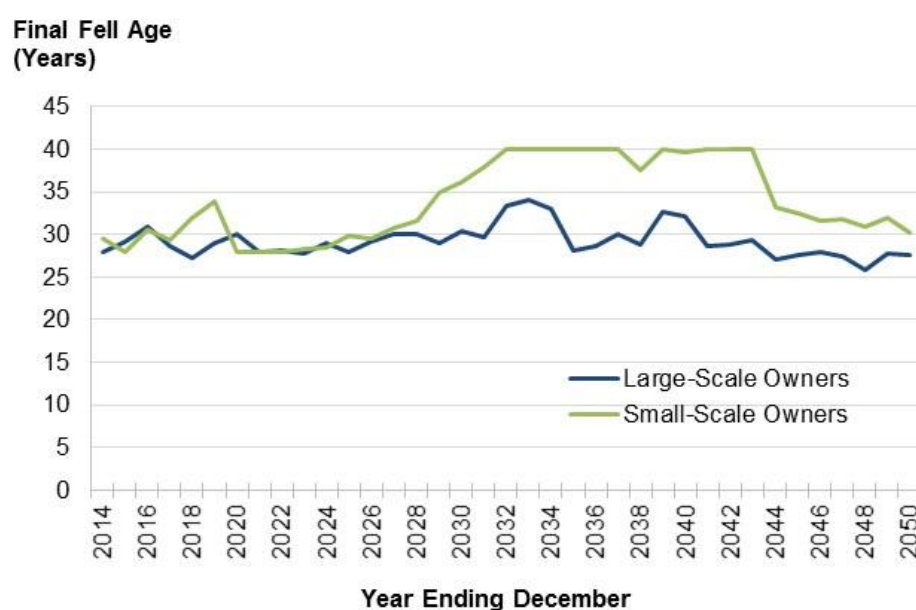
of the Western SNI resource it was not possible to apply these constraints and obtain a feasible solution. The NDY constraint was therefore partially relaxed through to 2028. In addition, a non-declining yield constraint is applied to the total overall radiata pine estate, with a target rotation age of 28 years.

Figure 4-6: Western SNI Radiata Pine Availability under Scenario 2 – All Owners



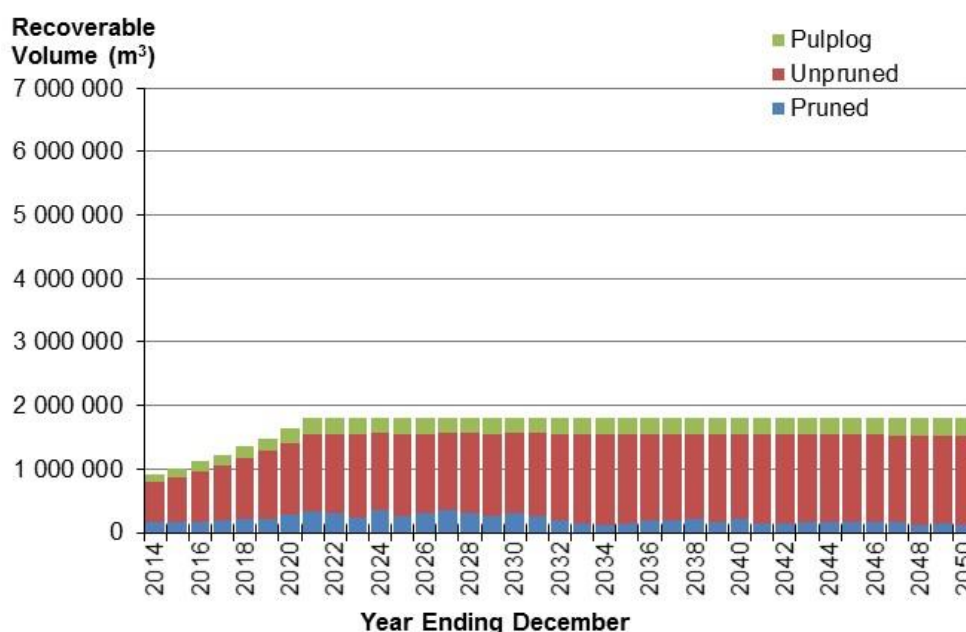
This scenario does at times require that the harvest age varies significantly from the target rotation of 28 years. This is especially the case for small-scale forest owners (Figure 4-7).

Figure 4-7: Western SNI Average Radiata Pine Clearfell Age under Scenario 2 – by Ownership Category



The harvest volumes forecast under Scenario 2 are broken down by log grade in Figure 4-8.

Figure 4-8: Western SNI Radiata Pine Availability under Scenario 2 – by Log Grade (All Owners)



4.4 Scenario 3

The third scenario again assumes large owners' resources are harvested in line with their harvest intentions between 2014 and 2023, and then non-declining after 2023. As was the case with Scenarios 1 and 2, due to the highly uneven age-class distribution of the Western SNI resource it was not possible to apply these constraints and obtain a feasible solution. The NDY constraint was therefore partially relaxed through to 2028. However, the overall yield is based on a split non-declining yield, with a target rotation age of 28 years. A drop in the overall harvest volume is allowed after 2034 for a five-year period (between 2035 and 2039 of no more than 10% per year). This scenario gives a forecast wood availability that is different to scenario 2 (Figure 4-9). Wood availability increases from 1.0 million m³ in 2015 to 2.3 million m³ in 2024, and is maintained at this level until 2034. The small owner supply then reduces for a period of five years, before remaining flat again from 2039 allowing the total harvest to attain around 1.3 million m³.

The main difference from scenario 2 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, although the total volume was modelled not to decrease between 2014 and 2034.

A consequence of there being more flexibility over when the small-scale owner estate is harvested is that the average clearfell age for small-scale owners generally stays closer to the target of 28 years than in scenario 2 (Figure 4-10), albeit still with some fluctuations in the early 2030s.

Figure 4-9: Western SNI Radiata Pine Availability under Scenario 3 – All Owners

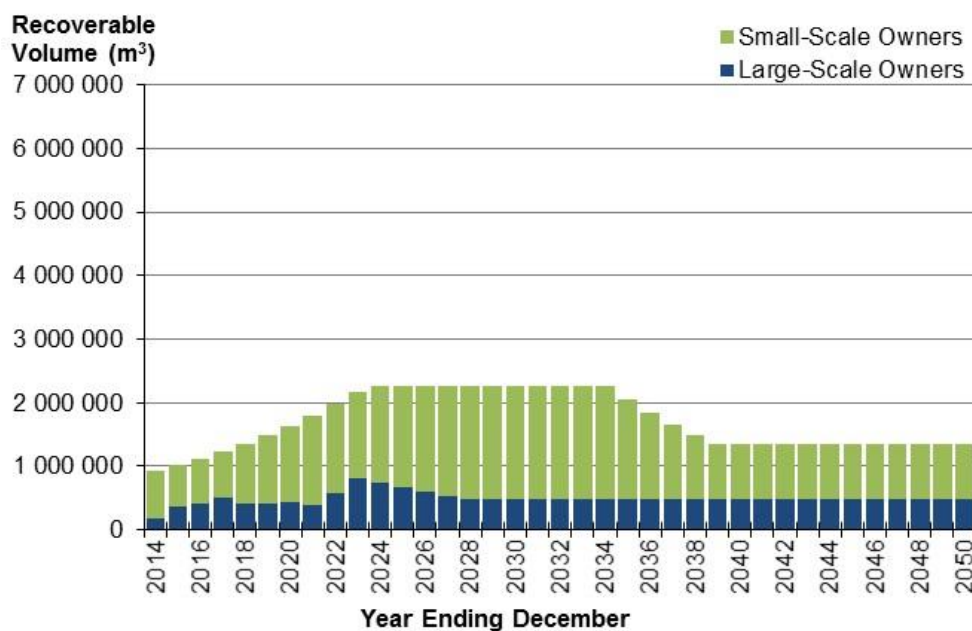
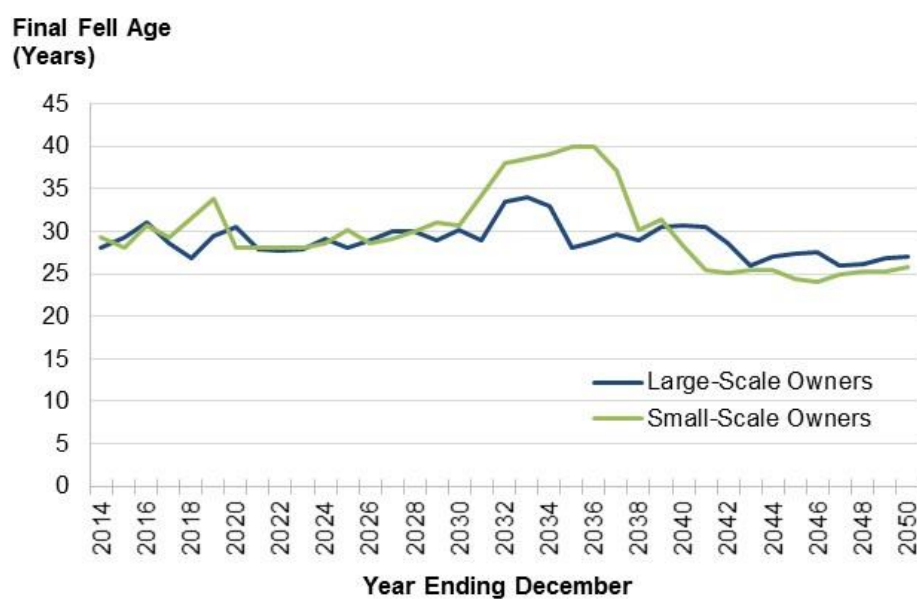


Figure 4-10: Western SNI Average Radiata Pine Clearfell Age under Scenario 3 – by Ownership Category

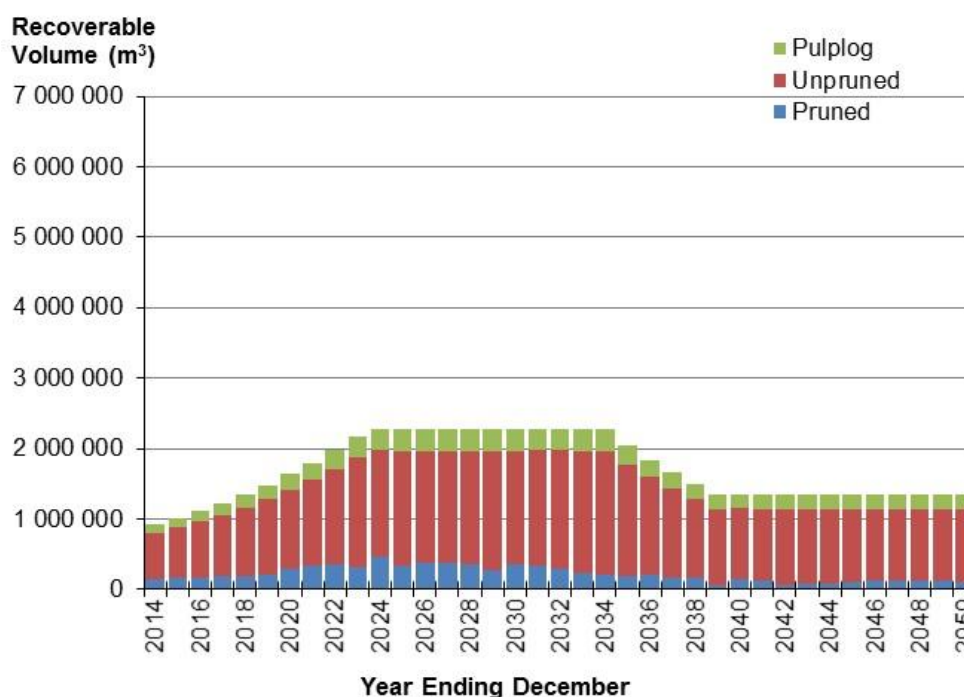


The harvest volumes forecast under scenario 3 are shown by log grade in Figure 4-11.



Indufor

Figure 4-11: Western SNI Radiata Pine Availability under Scenario 3 – by Log Grade (All Owners)



4.5 Scenario 4

In this scenario, target rotation ages of 26 or 30 years are used (rather than 28 years) and the same constraints are applied as in scenario 3 (Figure 4-12).

The harvest ages are somewhat constrained for the first ten years by the large-scale owners' harvest intentions and the requirement for a non-declining yield for the large owner's estate as well as the overall radiata pine estate. These constraints are partially relaxed for the 26 and 30-year target rotations to allow these rotation lengths to be more closely matched. Figure 4-13 illustrates, however, the difficulty in achieving the desired rotation lengths within the overall harvesting constraints imposed by the scenario.



Indufor

Figure 4-12: Western SNI Radiata Pine Availability by Target Rotation Age under Scenario 4 – All Owners

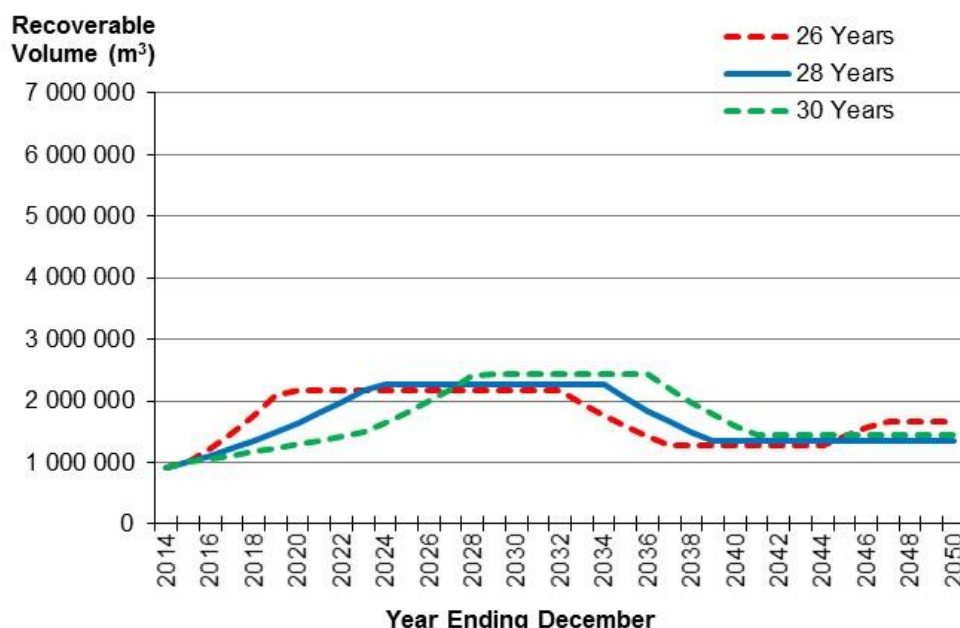
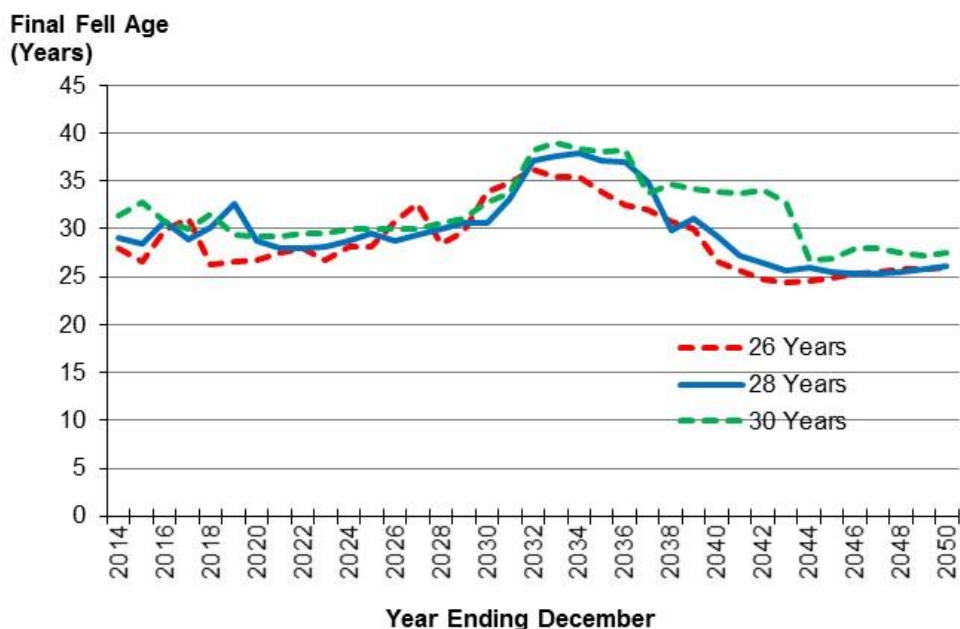


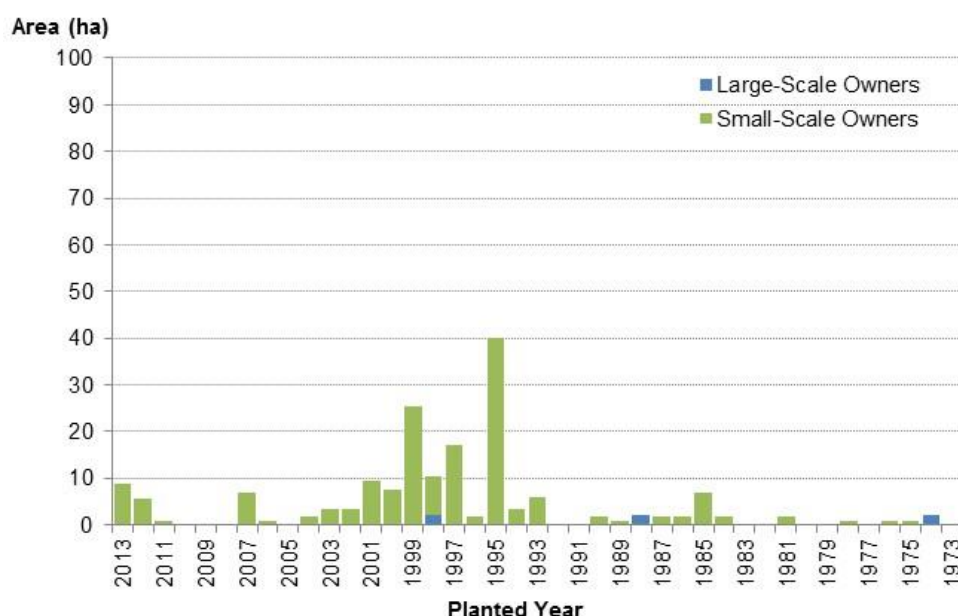
Figure 4-13: Western SNI Average Radiata Pine Clearfell Age by Target Rotation Age under Scenario 4 – All Owners



4.6 Douglas-fir

The age-class distribution of Douglas-fir in the Western SNI is shown in Figure 4-14. Due to the area planted in Douglas-fir in this region being relatively small, none of the large owners indicated their harvest intentions for Douglas-fir. The Douglas-fir harvest for the large-scale and small-scale owners' estate is modelled in five-year period non-declining yield (NDY) blocks (i.e. 2024-2028, 2029-2033, etc). The total wood availability of the combined estate is also modelled to be non-declining within each of the five-year period NDY blocks (Figure 4-15).

Figure 4-14: Western SNI Age-Class Distribution of Douglas-fir – All Owners as at 1 April 2014



The target rotation age is 40 years for Douglas-fir. Figure 4-16 shows that the modelled average age sits reasonably close to this target.

Figure 4-15: Western SNI Douglas-fir Availability – All Owners

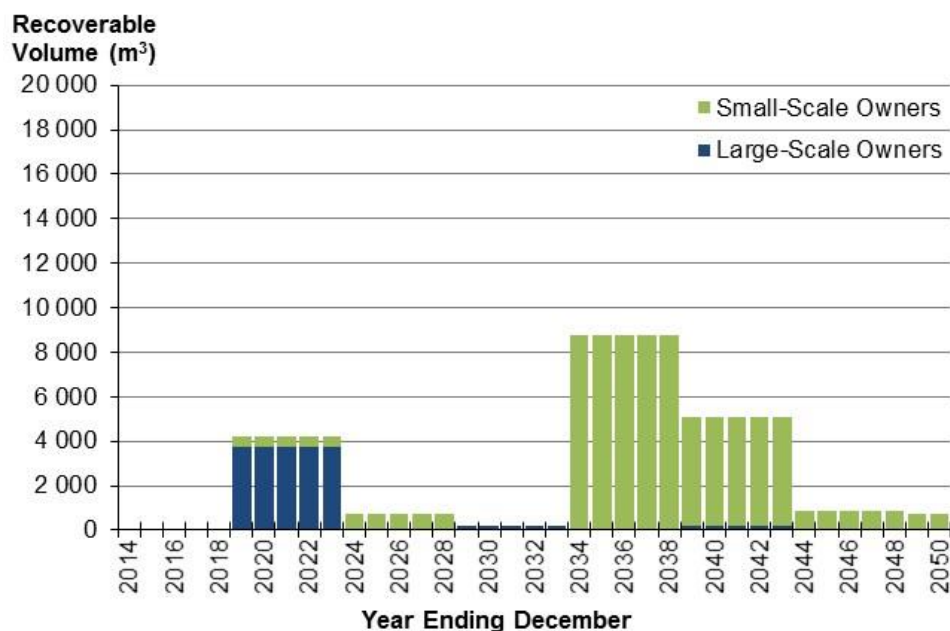
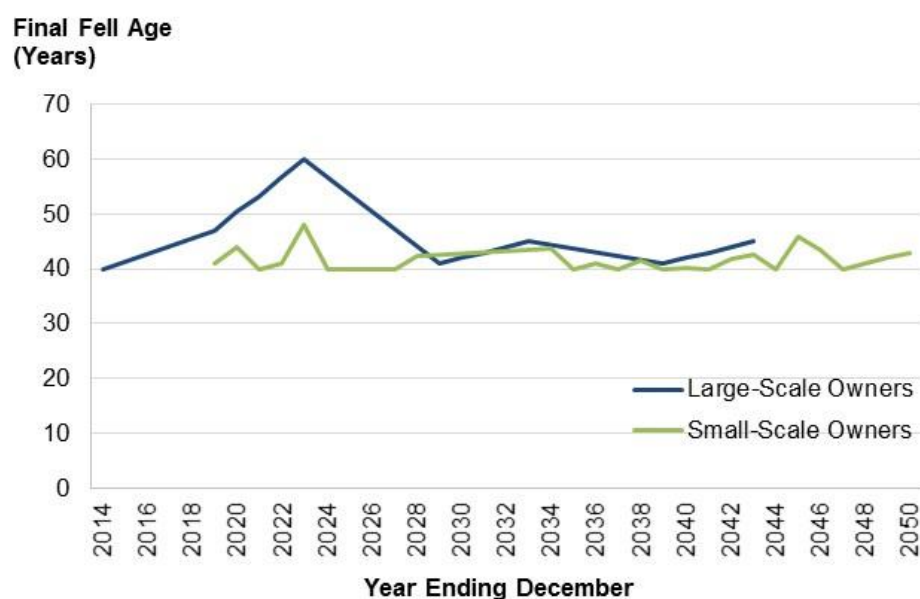
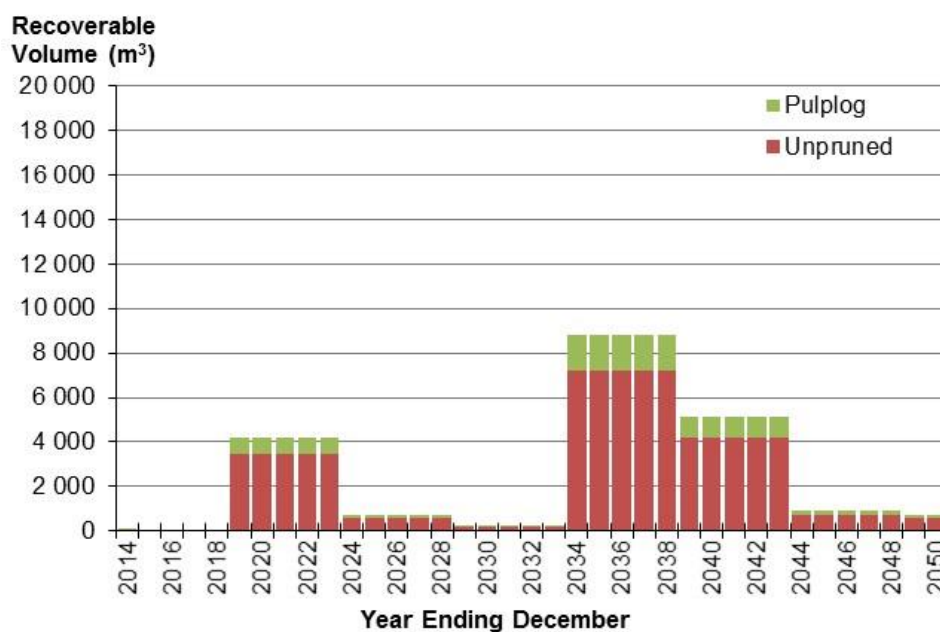


Figure 4-16: Western SNI Average Douglas-fir Clearfell Age – by Ownership Category



The harvest volumes forecast under the Douglas-fir scenario are shown by log grade in Figure 4-17.

Figure 4-17: Western SNI Douglas-fir Availability – by Log Grade (All Owners)



5. WOOD AVAILABILITY FORECASTS FOR EASTERN SOUTHERN NORTH ISLAND

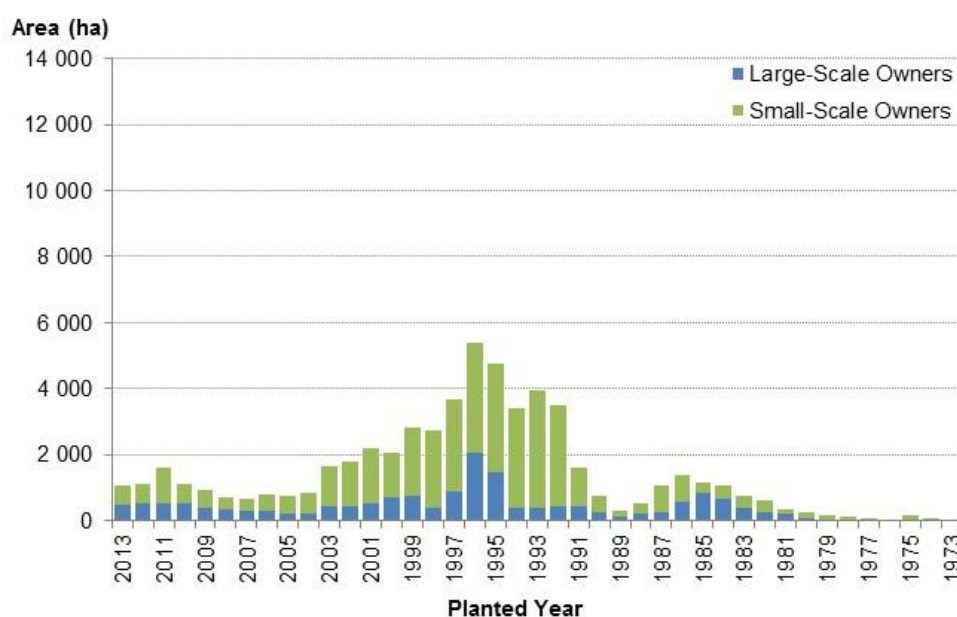
5.1 Eastern Southern North Island Region Description

The Eastern SNI region has a plantation resource of 67 986 ha, spread across four territorial authorities – Tararua, Masterton, Carterton, and South Wairarapa Districts. Of this, 66 124 ha consists of radiata pine and 303 ha are Douglas-fir.

After the deductions described in Section 3.1 are applied to the NEFD area, the modelled area reduces to 58 338 ha.

The modelled resource consists of both radiata pine and Douglas-fir. Figure 5-1 shows the age-class distribution for the Eastern SNI estate by owner size. Some 30% of the modelled resource is held by large owners and 70% by small owners. As is the case with many other New Zealand regions, the age-class distribution highlights the peak in planting activity that occurred in the 1990s, particularly in the small owner resource. This has implications for the forecast wood availability from the region.

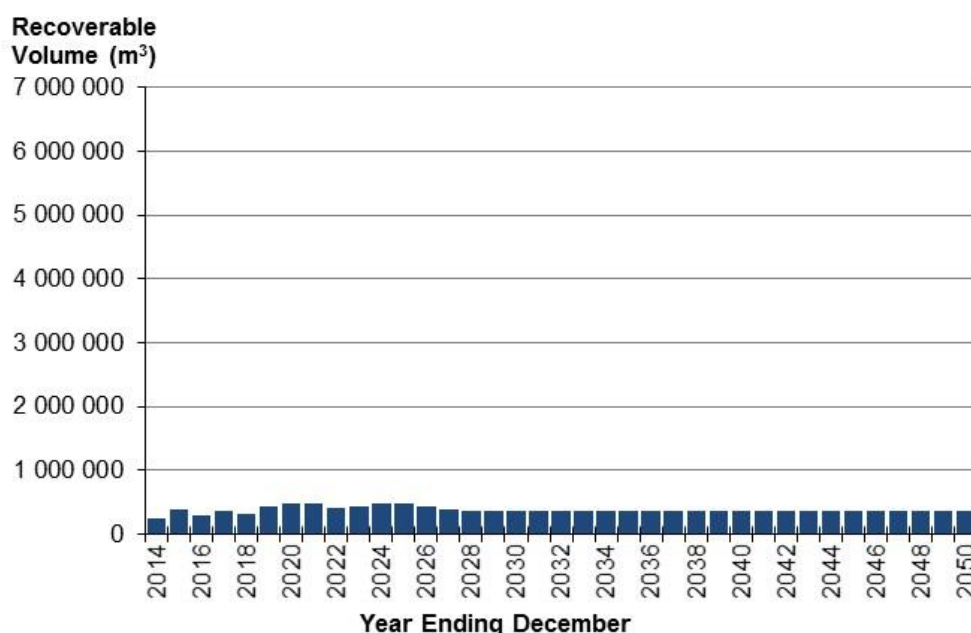
Figure 5-1: Eastern SNI Age-Class Distribution by Owner – All Species as at 1 April 2014



5.2 Scenario 1

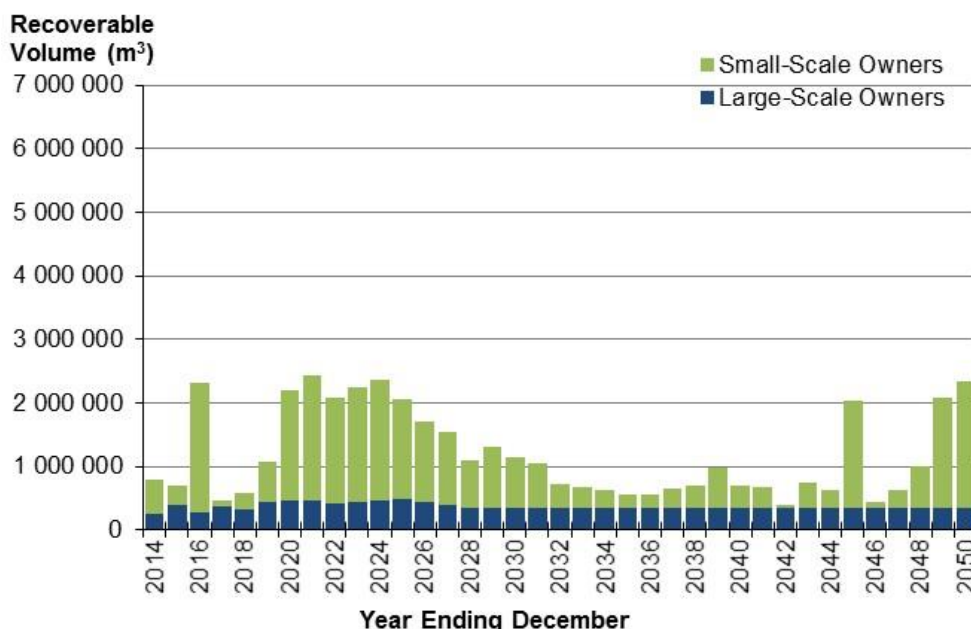
For this scenario, the availability of wood from large-scale owners is based on their stated harvest intentions for 2014 to 2023. Scenario 1 then specifies that the availability is constrained to be non-declining from this point with a target rotation age of 28 years. However, due to the highly uneven age-class distribution of the Eastern SNI resource, it was not possible to apply these constraints and obtain a feasible solution. The NDY constraint was therefore partially relaxed through to 2028. The resulting wood-flow is shown in Figure 5-2.

Figure 5-2: Eastern SNI Radiata Pine Availability under Scenario 1– Large-Scale Owners



The wood availability from all owners in the Eastern SNI is presented in Figure 5-3. The large-scale owners' resource is shown as the base volume, and the forecast matches Figure 5-2. The fluctuation in the total volume harvested reflects the uneven age-class distribution of the small-scale owners' estate, and the assumption that this estate is harvested at age 28.

Figure 5-3: Eastern SNI Radiata Pine Availability under Scenario 1 – All Owners

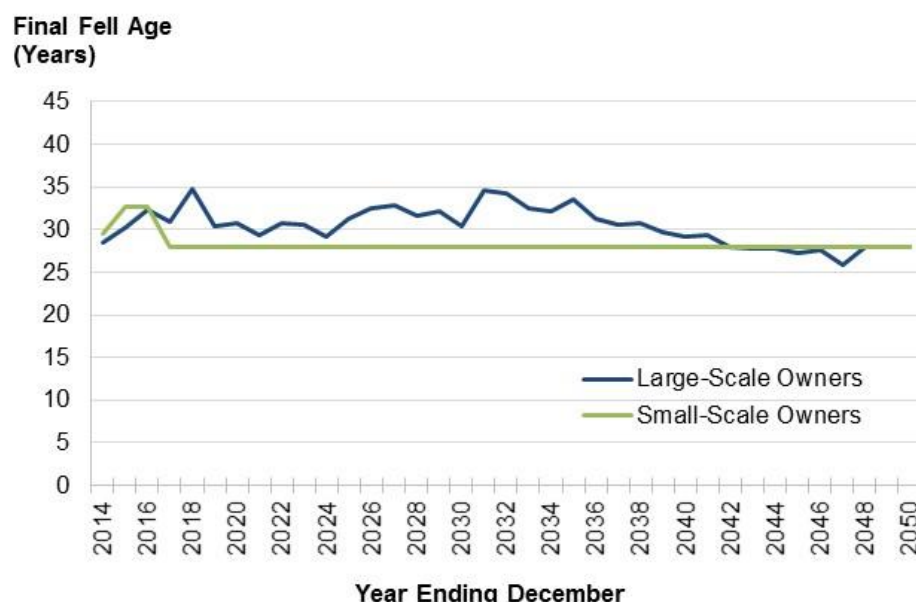


The high level of harvest occurring in 2016 represents areas of the small-owner resource that are already over the target rotation age of 28 years, and which must be harvested by 2016 in order to keep the harvest age below the maximum allowable of age 40 years. The large increase in small owner resource occurring from 2020 onwards is a consequence of the high levels of 1990s plantings reaching maturity.

Volume fluctuations of the magnitude shown in Figure 5-3 would be impractical due to operational constraints (for example: availability of harvest machinery, harvesting crews and transport operators) and market absorption constraints (for example: limited domestic wood processing capacity, levels of export demand).

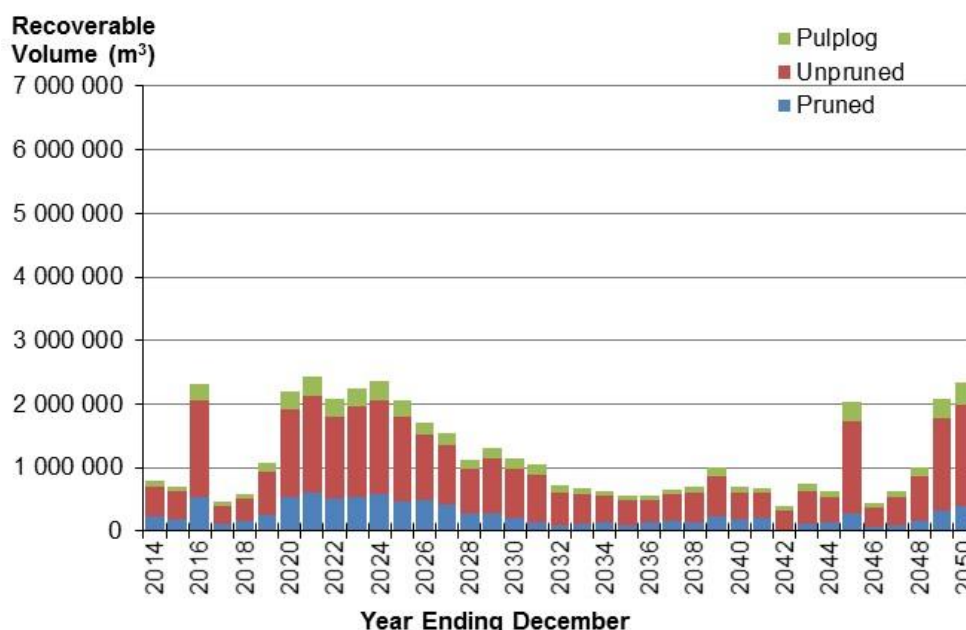
Figure 5-4 shows that, apart from the near-term harvest (which is constrained to the intentions of the large scale owners, and due to the presence of age-classes already older than age 28), the harvest age settles at the target of 28 years.

Figure 5-4: Eastern SNI Average Radiata Pine Clearfell Age under Scenario 1 – by Ownership Category



The harvest volumes forecast under scenario 1 are broken down by log grade in Figure 5-5. Of note is the declining availability of pruned log supply. This is a result of the assumed lack of re-establishment of pruned regimes after harvest (90% for large owners and 65% for small owners).

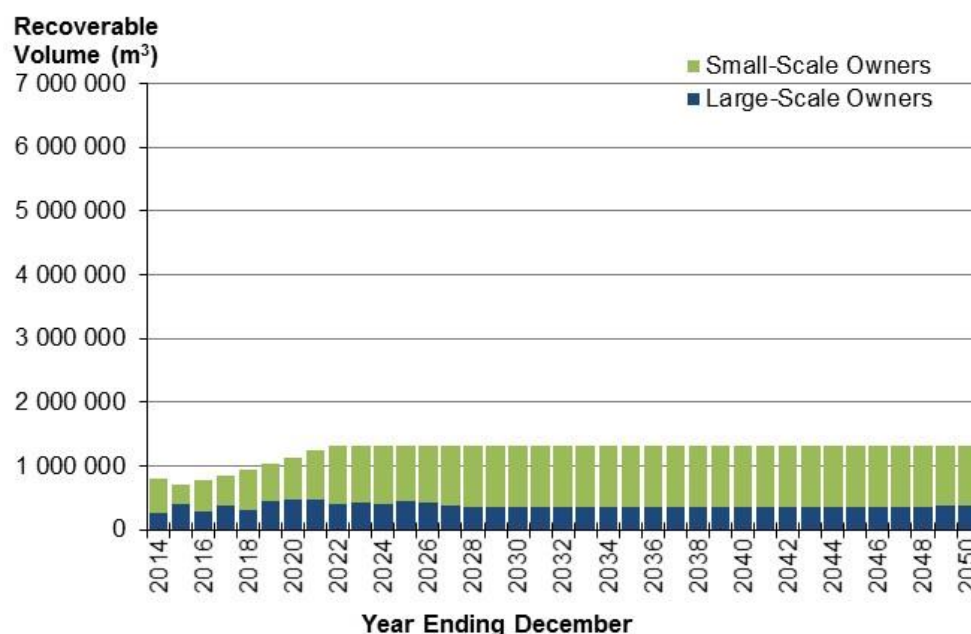
Figure 5-5: Eastern SNI Radiata Pine Availability under Scenario 1 – by Log Grade (All Owners)



5.3 Scenario 2

The second scenario assumes large-scale owners harvest as per their intentions for the first 10 years, then a non-declining yield constraint is applied to the large-scale owners' estate after 2023. As was the case with Scenario 1, due to the highly uneven age-class distribution of the Eastern SNI resource it was not possible to apply these constraints and obtain a feasible solution. The NDY constraint was therefore partially relaxed through to 2028. In addition, a non-declining yield constraint is also applied to the total radiata pine volume, with a target rotation age of 28 years. Figure 5-6 highlights that the volume from the large-scale owner resource generally declines over the next ten years and, longer term, more than half of the Eastern SNI region supply will arise from the small-scale owner resource.

Figure 5-6: Eastern SNI Radiata Pine Availability under Scenario 2 – All Owners

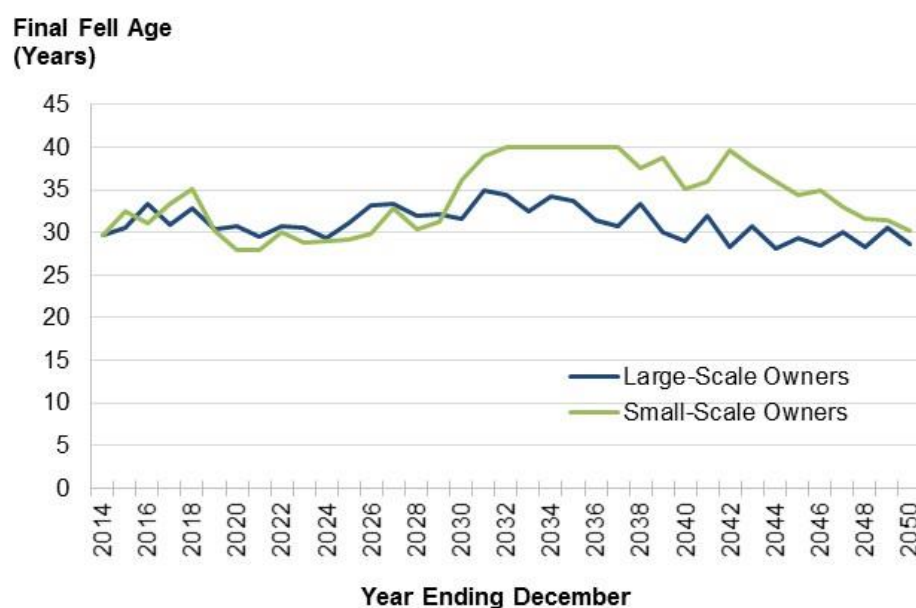


This scenario does at times require that the harvest age varies significantly from the target rotation age of 28 years. This is especially the case for small-scale forest owners (Figure 5-7).



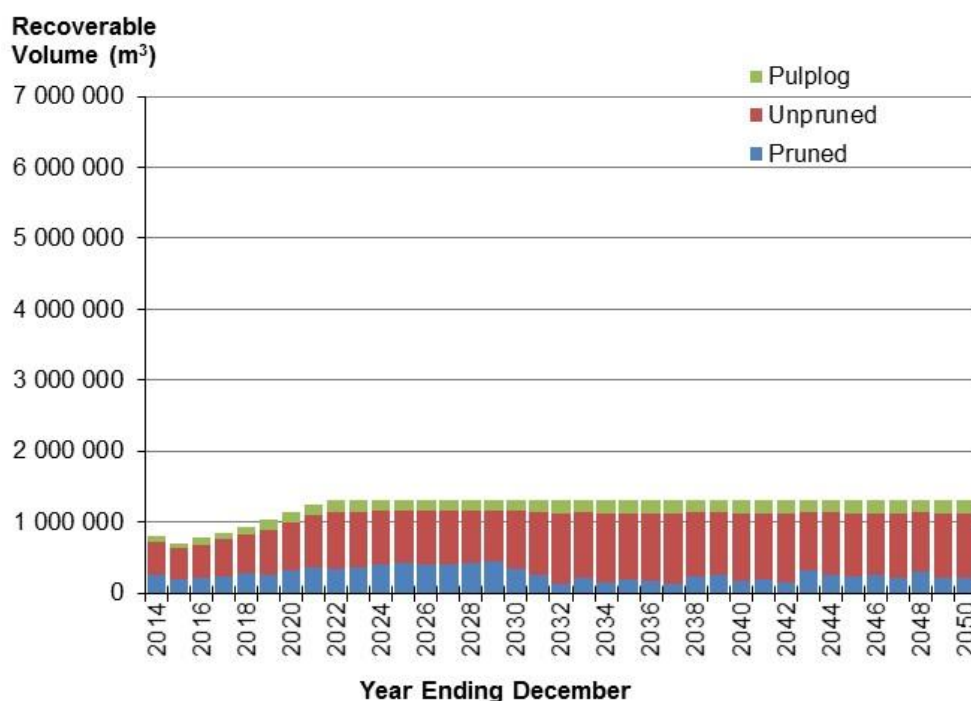
Indufor

Figure 5-7: Eastern SNI Average Radiata Pine Clearfell Age under Scenario 2 – by Ownership Category



The harvest volumes forecast under scenario 2 are broken down by log grade in Figure 5-8.

Figure 5-8: Eastern SNI Radiata Pine Availability under Scenario 2 – by Log Grade (All Owners)



5.4 Scenario 3

The third scenario again assumes large owners' resources are harvested in line with their harvest intentions between 2014 and 2023, and then non-declining after 2023. As was the case



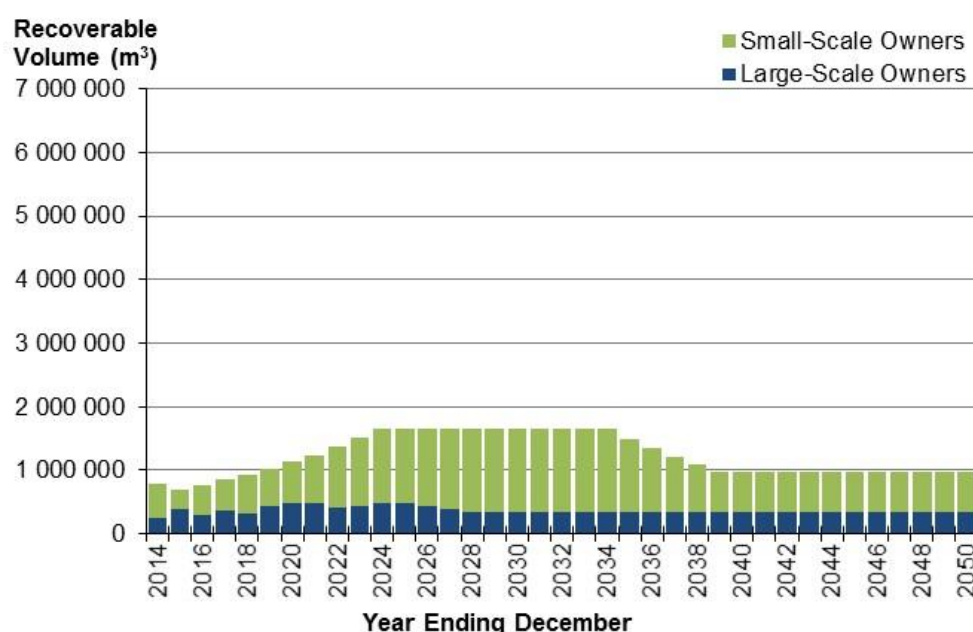
Indufor

with Scenarios 1 and 2, due to the highly uneven age-class distribution of the Eastern SNI resource it was not possible to apply these constraints and obtain a feasible solution. The NDY constraint was therefore partially relaxed through to 2028. However, the overall yield is based on a split non-declining yield, with a target rotation age of 28 years. A drop in the overall harvest volume is allowed after 2034 for a five-year period (between 2035 and 2039) (of no more than 10% per year). This scenario gives forecast wood availability that is similar to scenario 2 through to 2017 (Figure 5-9). Thereafter total volume is maintained through to 2034 at a level slightly higher than scenario 2, before reducing to a lower level before increasing again in the late 2040s.

The main difference from scenario 2 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, although the total volume was modelled not to decrease between 2014 and 2034.

Despite a more flexible harvest level being allowed in this scenario, average harvest age for the small-scale owner estate still at times varies significantly from the target of 28 years (Figure 5-10). The variance is however less than for scenario 2.

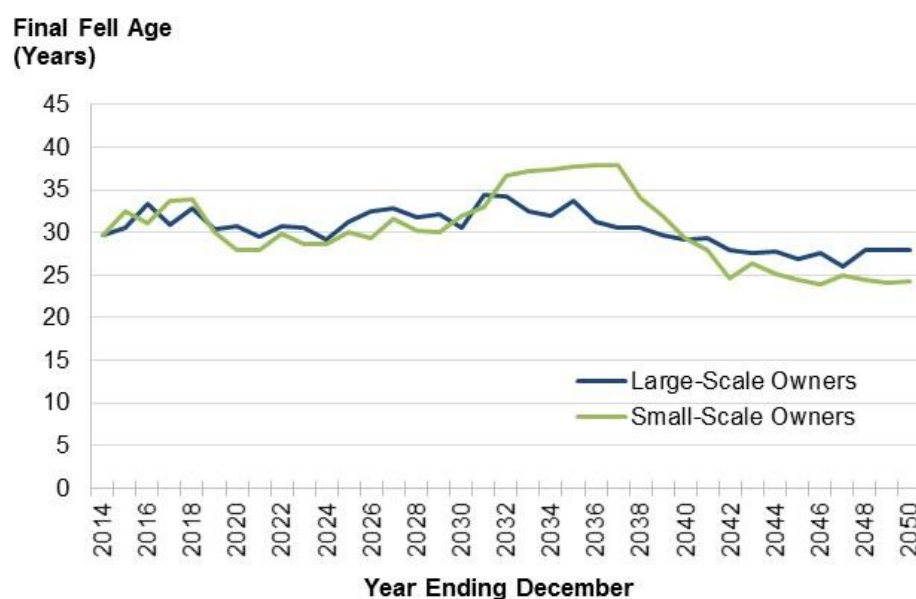
Figure 5-9: Eastern SNI Radiata Pine Availability under Scenario 3 – All Owners





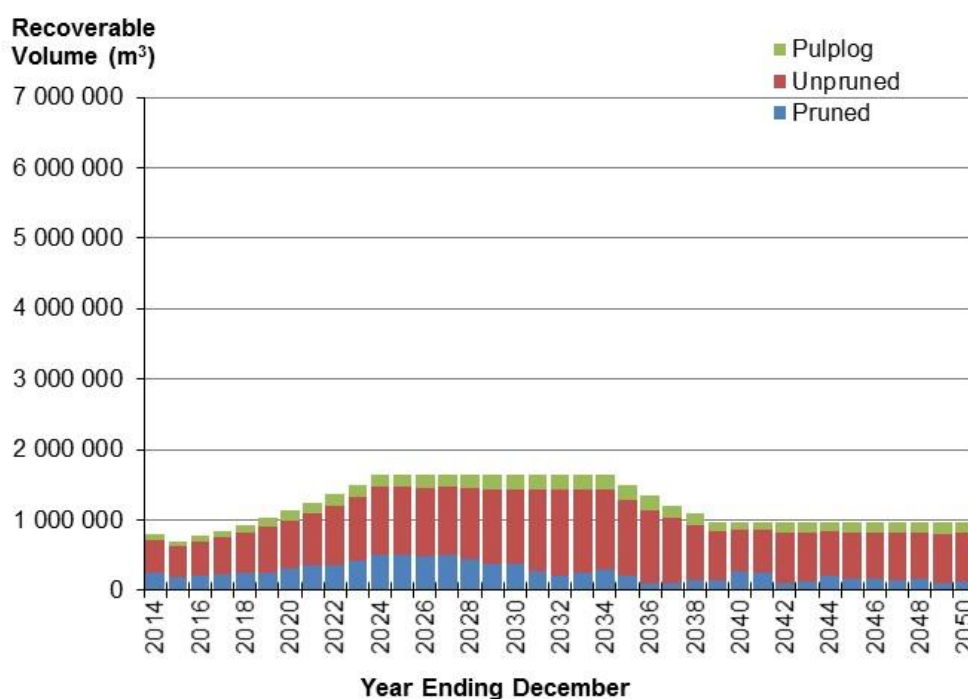
Indufor

Figure 5-10: Eastern SNI Average Radiata Pine Clearfell Age under Scenario 3 – by Ownership Category



The harvest volumes forecast under Scenario 3 are broken down by log grade in Figure 5-11.

Figure 5-11: Eastern SNI Radiata Pine Availability Under Scenario 3 – by Log Grade (All Owners)



5.5 Scenario 4

Target rotation ages of 26 or 30 years are used (rather 28 years) and the same constraints are applied as Scenario 3 (Figure 5-12).

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 5-13).

Figure 5-12: Eastern SNI Radiata Pine Availability by Target Rotation Age under Scenario 4 – All Owners

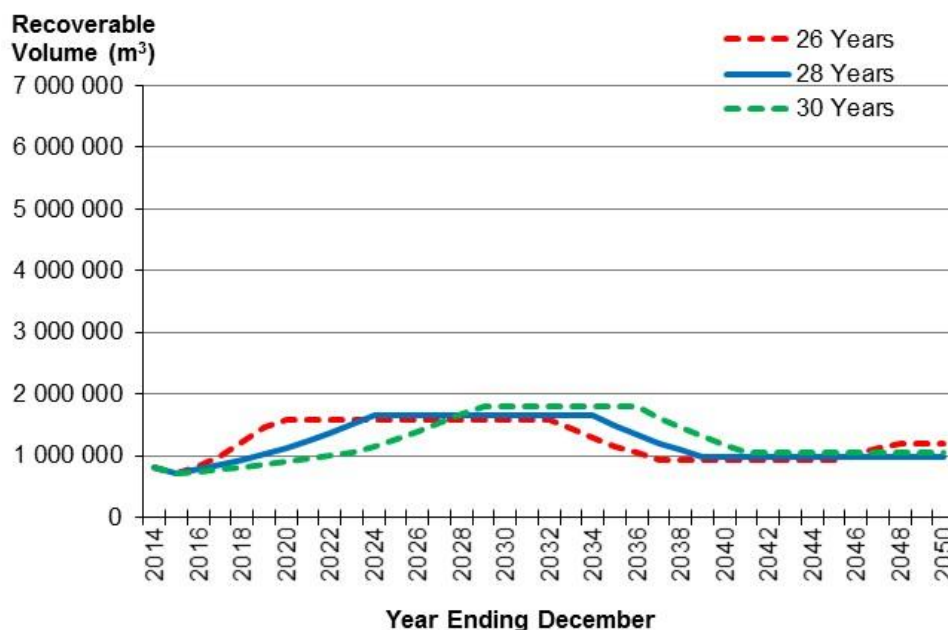
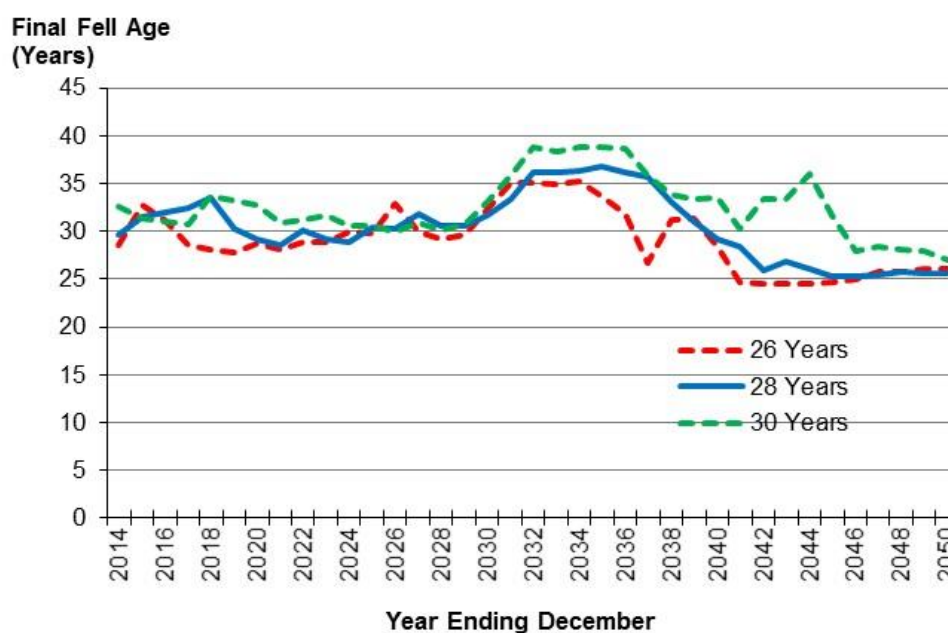


Figure 5-13: Eastern SNI Average Radiata Pine Clearfell Age by Target Rotation Age under Scenario 4 – All Owners



5.6 Douglas-fir

The age-class distribution of Douglas-fir in the Eastern SNI is shown in Figure 5-14. The planted area of Douglas-fir in the Eastern SNI is relatively small and dispersed in comparison to other regions in New Zealand. This age-class structure imposes challenges for any yield regulation.

Figure 5-14: Eastern SNI Age-Class Distribution of Douglas-fir – All Owners Estate as at 1 April 2014

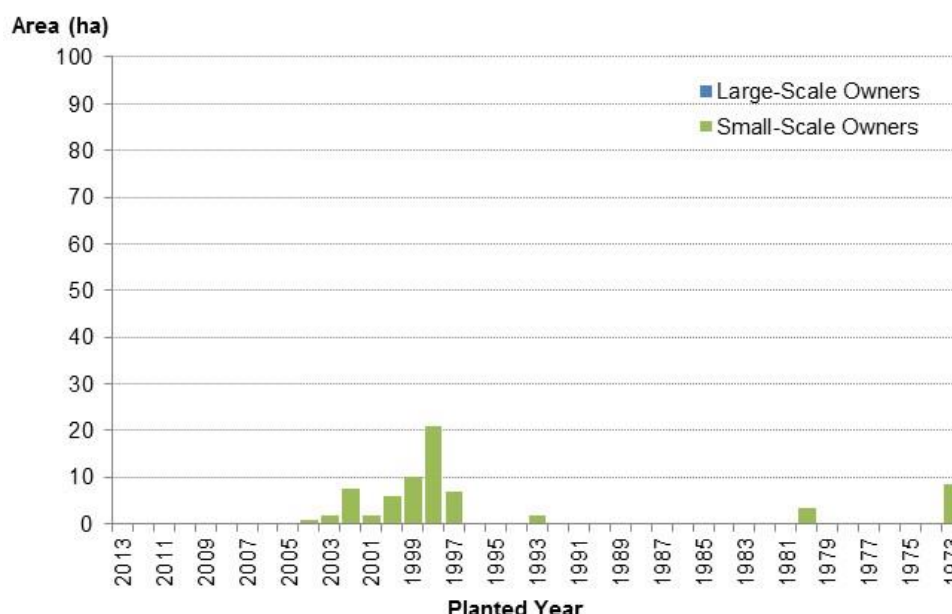
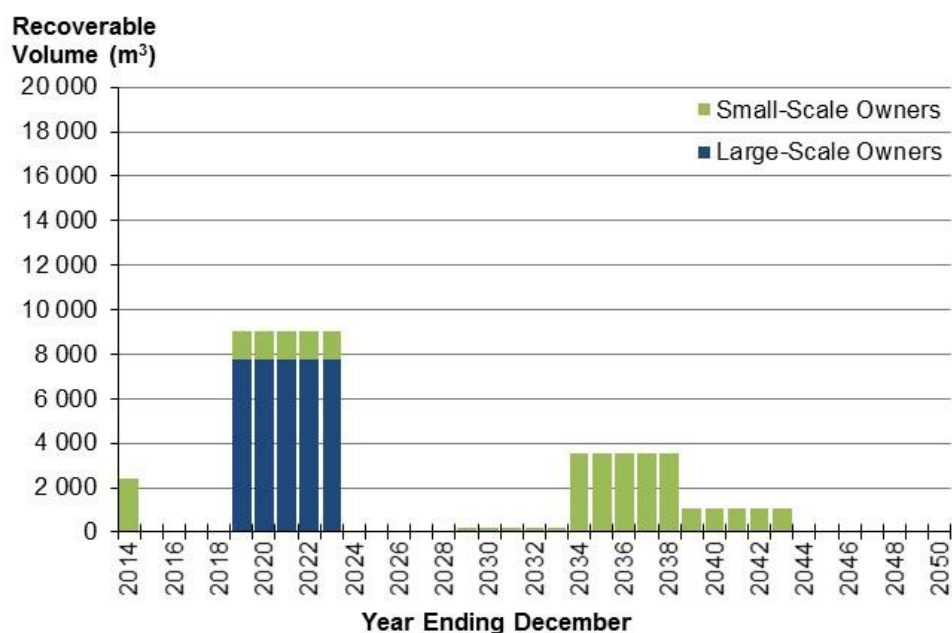


Figure 5-15 shows the derived wood-flow forecast for the Eastern SNI Douglas-fir. As none of the large owners provided any harvest intentions for their Douglas-fir estate and the planted area of Douglas-fir in the region is relatively small, the forecast is modelled in five-year period non-declining yield (NDY) blocks (i.e. 2019-2023, 2024-2028, 2029-2033, etc).

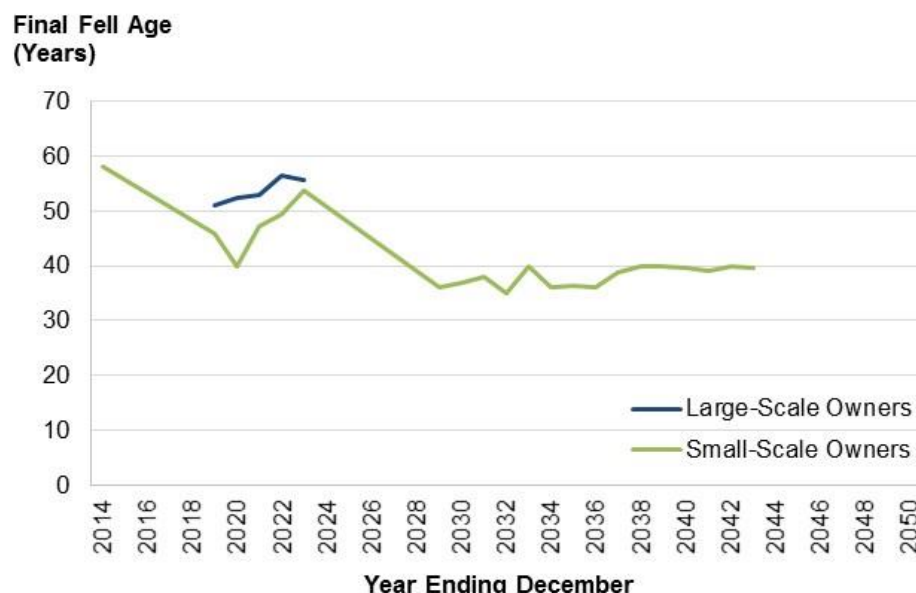
Figure 5-15 highlights the declining availability of this species due to the current age class structure, and the low levels of replanting.

Figure 5-15: Eastern SNI Douglas-fir Availability – All Owners



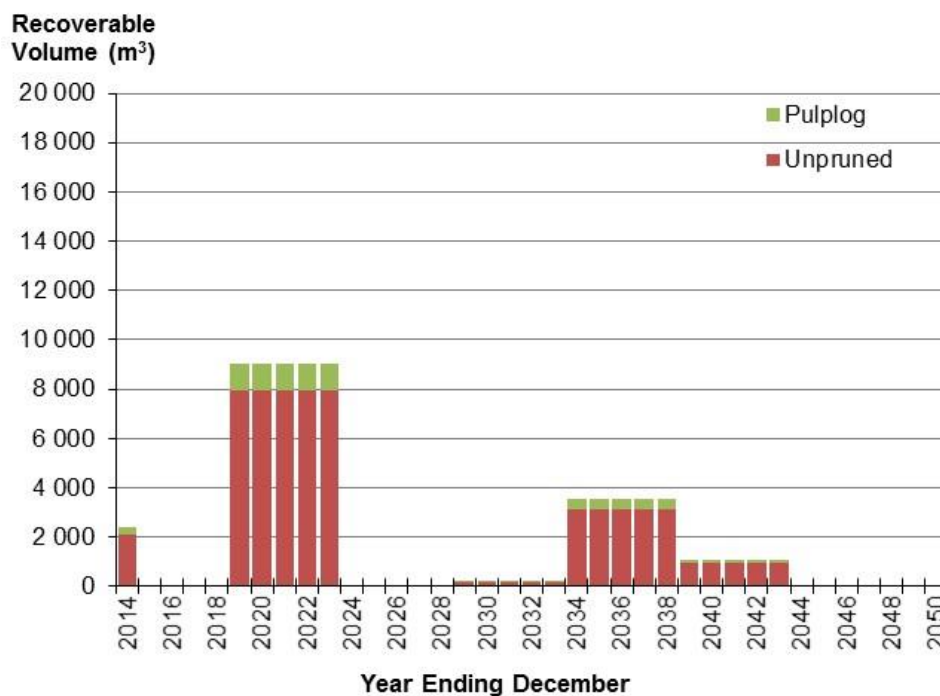
The target rotation age is 40 years for Douglas-fir. Figure 5-16 shows that the modelled average age sits reasonably close to this target for the large owner estate, but there is significant variance to this average in the small owner estate (in order to achieve a feasible output).

Figure 5-16: Eastern SNI Average Douglas-fir Clearfell Age – by Ownership Category



The harvest volumes forecast under the Douglas-fir scenario are shown by log grade in Figure 5-17.

Figure 5-17: Eastern SNI Douglas-fir Availability – by Log Grade (All Owners)



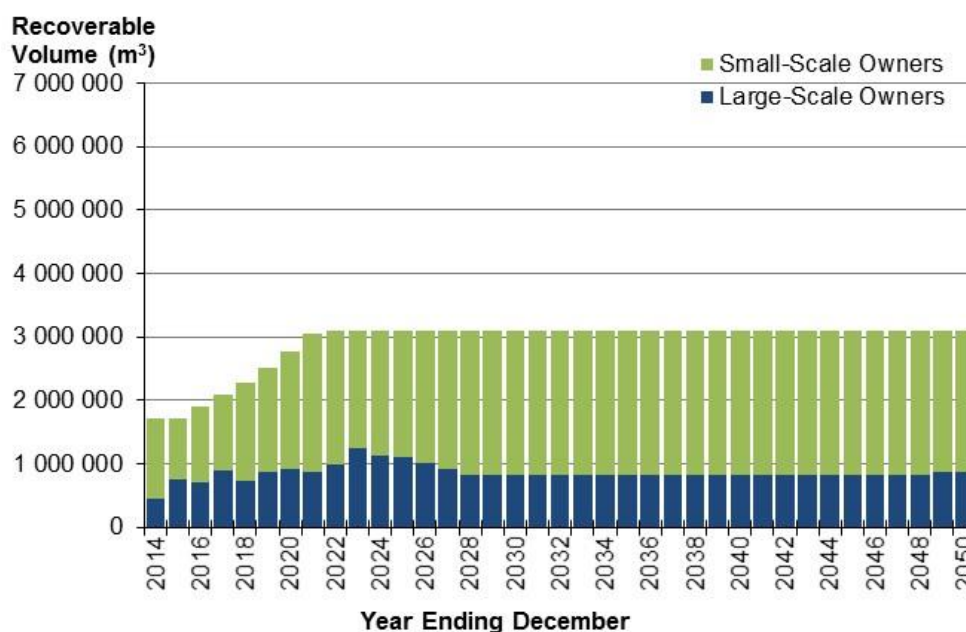
6. WOOD AVAILABILITY FORECASTS FOR THE COMBINED WESTERN & EASTERN SOUTHERN NORTH ISLAND ESTATE

The combined radiata pine forecasts for Western and Eastern SNI are presented for Scenario 2 (Figure 6-1 and Figure 6-2), Scenario 3 (Figure 6-3 and Figure 6-4) and Scenario 4 (Figure 6-5).

6.1 Scenario 2

The second scenario is based on a non-declining yield, and a target rotation of 28 years. Figure 6-1 indicates that wood availability from the Western and Eastern SNI region will increase from 2016. This is largely driven by an increase in harvest volumes from small-scale forest owners.

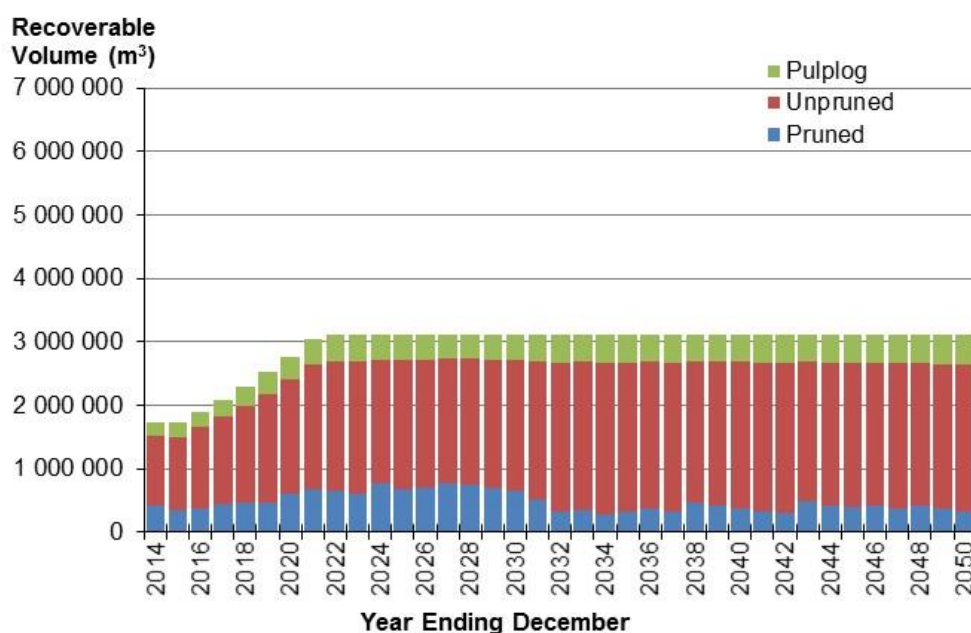
Figure 6-1: Western & Eastern SNI Radiata Pine Availability under Scenario 2 – by Ownership Size





Indufor

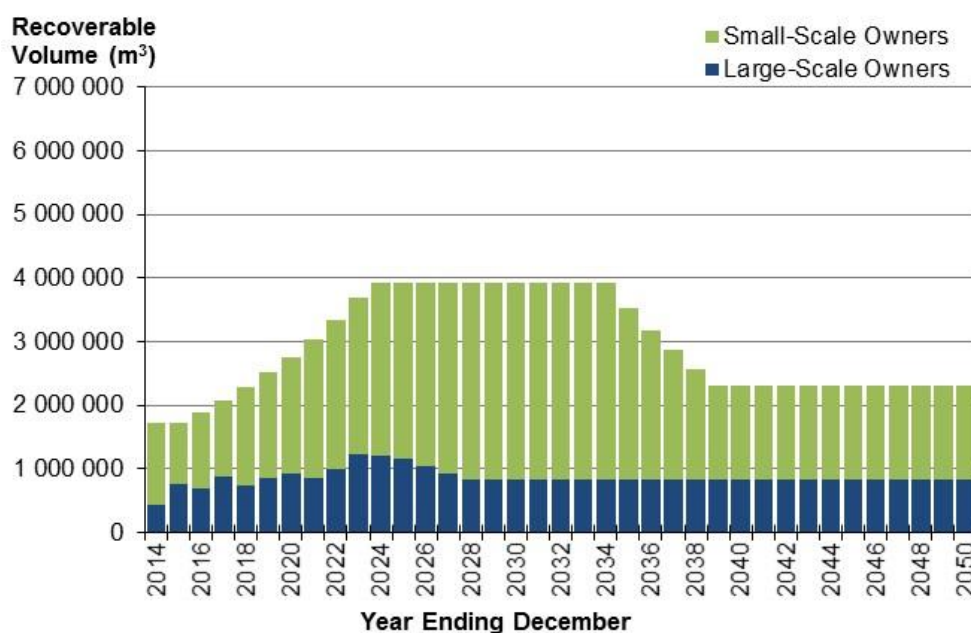
Figure 6-2: Western & Eastern SNI Radiata Pine Availability under Scenario 2 – by Log Type (All Owners)



6.2 Scenario 3

The third scenario is based on a split non-declining yield, with a target rotation age of 28 years (Figure 6-3 and Figure 6-4).

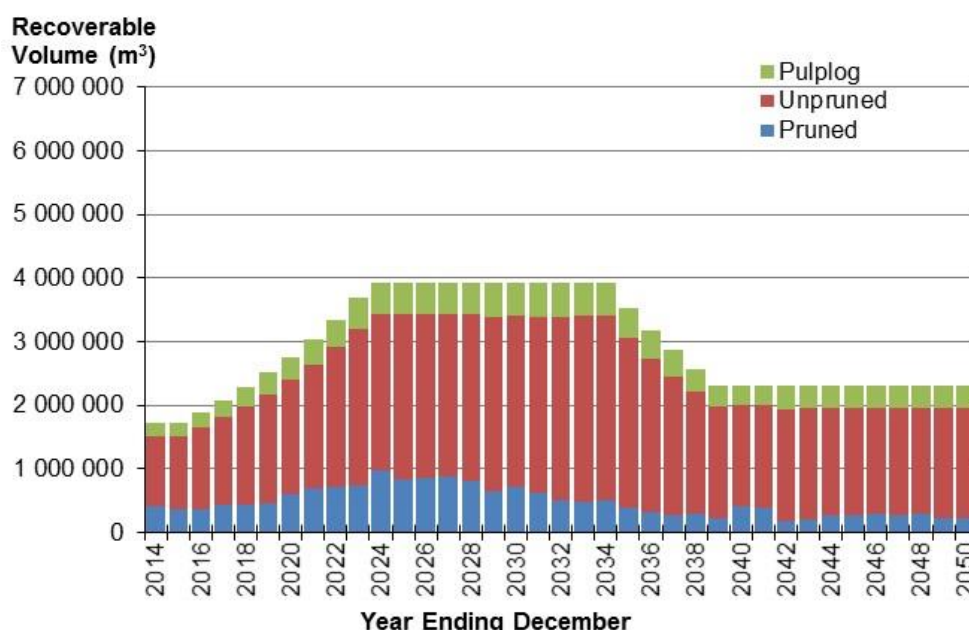
Figure 6-3: Western & Eastern SNI Radiata Pine Availability under Scenario 3 – by Ownership Size





Indufor

Figure 6-4: Western & Eastern SNI Radiata Pine Availability under Scenario 3 – by Log Type (All Owners)

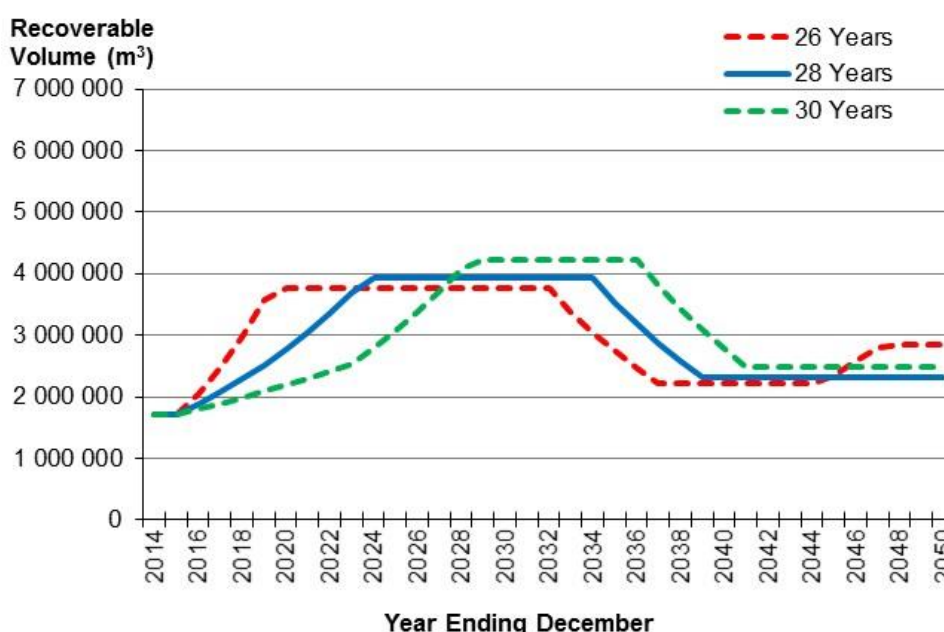


6.3 Scenario 4

Different wood availability profiles are generated if the target rotation age is altered from 28 years to either 26 or 30 years.

Figure 6-5 indicates a band of possible wood availability profiles. The harvest ages are somewhat constrained for the first ten years by the large-scale owners' harvest intentions and the requirement for a non-declining yield for the large owners' estate as well as the overall radiata pine estate. These constraints are loosened somewhat for the 26 and 30-year target rotations to allow these rotation lengths to be more closely matched.

Figure 6-5: Western & Eastern SNI Radiata Pine Availability by Target Rotation Age under Scenario 4



6.4 Douglas-fir

Figure 6-6 and Figure 6-7 show the combined Western and Eastern SNI Douglas-fir wood availability. Supply gradually dissipates due to the age-class distribution of the existing resource, and the replanting of Douglas-fir areas into radiata pine after harvest.

Figure 6-6: Western & Eastern SNI Douglas-fir Availability – by Ownership Size

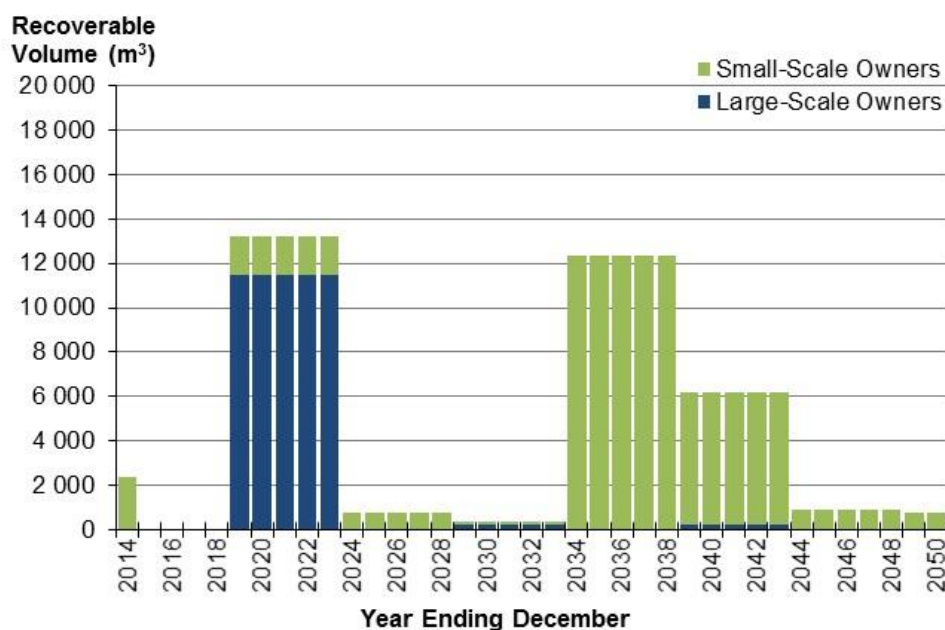
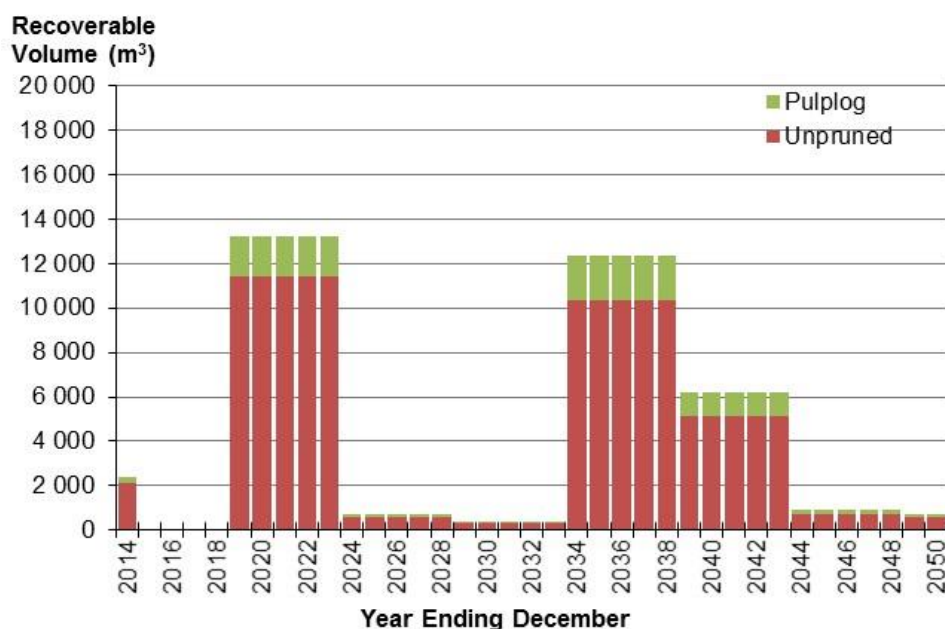


Figure 6-7: Western & Eastern SNI Douglas-fir Availability – by Log Grade (All Owners)



7. COMPARISON TO PREVIOUS FORECASTS

The results of the 2014 wood availability forecasts were compared with the previous forecasts, undertaken in 2006 for each region (Figure 7-1 and Figure 7-2). The comparison is based on Scenario 2 (which is equivalent to Scenario 3 in the 2006 forecasts). For the Western SNI, the latest forecast increases more rapidly than the 2006 forecast, and shows a long term sustainable harvest nearly 25% higher than the 2006 forecast. For the Eastern SNI, the latest forecast is generally similar although settling at a long-term harvest level 8% higher than the 2006 forecast.

Figure 7-1: Wood Availability Forecasts (All Radiata Pine): 2006 vs 2014 – Western SNI

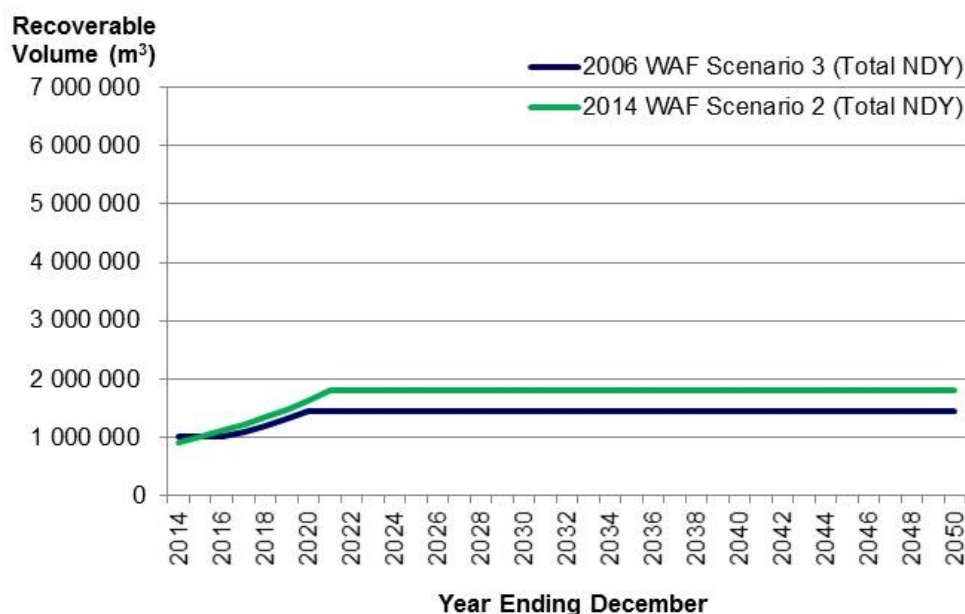
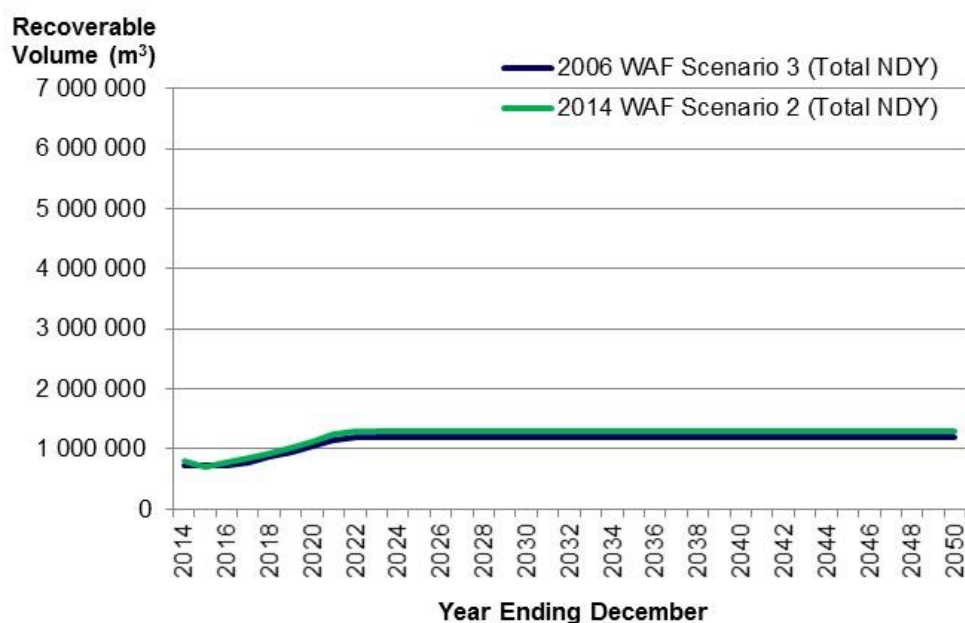


Figure 7-2: Wood Availability Forecasts (All Radiata Pine): 2006 vs 2014 – Eastern SNI





Indufor

Table 7-1 and Table 7-2 compare area and yield measures from the 2006 and 2014 WAFs for the Western and Eastern SNI regions, respectively. For both regions the following trends are apparent:

- A decline in stocked area since the 2006 WAF (-10% Western SNI and -5% Eastern SNI). Part of the reduction is a result of the removal of the Small Forest Grower Survey Area, as described in Section 3.1.
- A move in area from the lower yielding pruned to higher yielding unpruned croptypes
- A move in area from the lower yielding pre-1990 to higher yielding post-1989 croptypes.
- An increase in productivity across all croptype groups, with the increase being higher in the Western SNI than Eastern SNI.

The other key change since the 2006 WAF has been a reduction in the target rotation age from 30 years to 28 years.

Overall, the yield improvements are off-setting the area reductions, with a resulting increase in long term harvest level for the Western SNI (Figure 7-1) and the Eastern SNI (Figure 7-2). For the combined Western and Eastern SNI region, the long term, harvest level is 17% higher than that predicted in the 2006 forecast.

Table 7-1: Area by Croptype and Croptype Yields – Western SNI (Radiata pine)

Croptype Group	Yield Tables (age 28 TRV)			Area (ha)		
	2006 WAF	2014 WAF	% Change in TRV	2006 WAF	2014 WAF	% Change in Area
By Regime						
Pruned	476	584	23%	62 939	52 546	-17%
Unpruned	482	623	29%	22 819	24 252	6%
Total				85 758	76 798	-10%
By Maturity Class						
Pre-90	482	570	18%	23 391	9 013	-61%
Post-89	476	600	26%	62 367	67 785	9%
Total				85 758	76 798	-10%

Table 7-2: Area by Croptype and Croptype Yields – Eastern SNI (Radiata pine)

Croptype Group	Yield Tables (age 28 TRV)			Area (ha)		
	2006 WAF	2014 WAF	% Change in TRV	2006 WAF	2014 WAF	% Change in Area
By Regime						
Pruned	527	540	3%	42 734	40 484	-5%
Unpruned	552	616	12%	18 265	17 685	-3%
Total				60 999	58 169	-5%
By Maturity Class						
Pre-90	516	563	9%	16 147	7 851	-51%
Post-89	541	564	4%	44 852	50 318	12%
Total				60 999	58 169	-5%

Figure 7-3 compares the area-age-class distribution between the NEFD data used in 2006 and 2014. As well as the normal removal of the oldest age-classes due to harvesting, and the addition of younger age-classes through planting, there is evidence of reductions in area of other age-classes due to land conversion, wind damage, and the removal of the Small Forest Grower Survey areas.

Figure 7-3: Area Age-Class Comparisons: NEFD 2006 vs NEFD 2014 – Western SNI

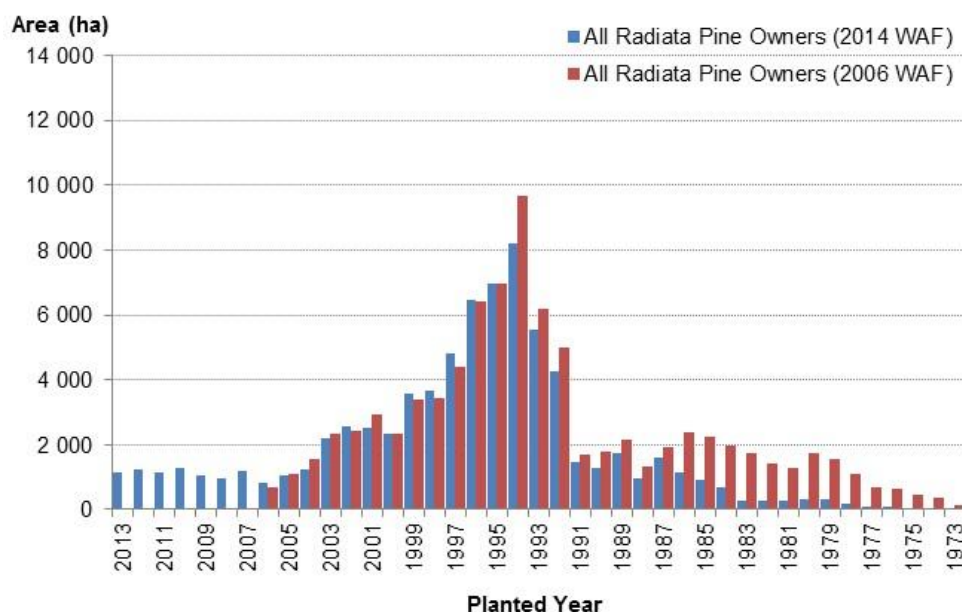
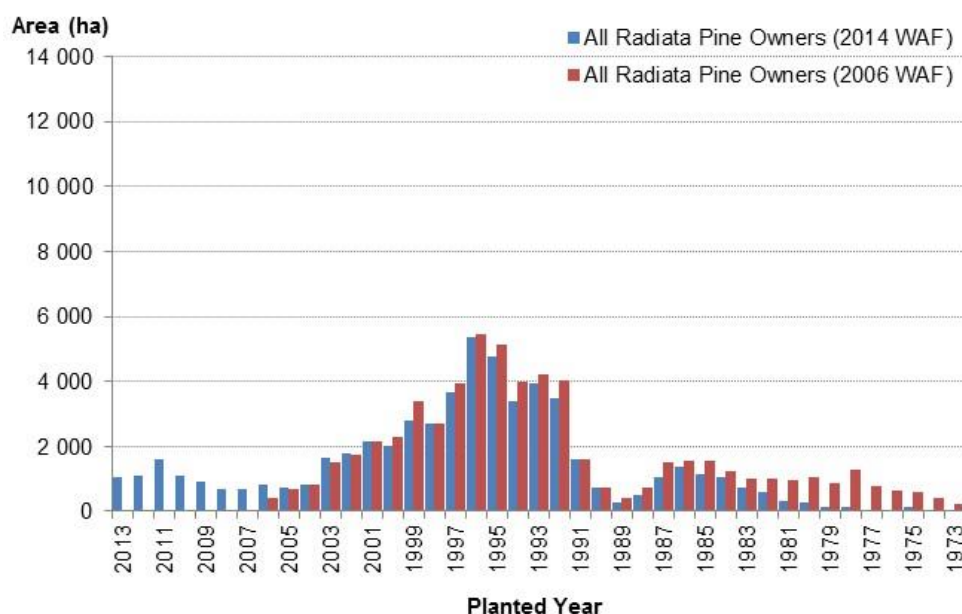


Figure 7-4: Area Age-Class Comparisons: NEFD 2006 vs NEFD 2014 – Eastern SNI





Indufor

8. CONCLUDING COMMENTS

Under Scenario 2, the wood availability from the Western and Eastern SNI wood supply regions' planted forest resource has the potential to increase from current levels of around 1.7 million m³, to 3.1 million m³ by 2022. Of the 3.1 million m³, the Western SNI contributes 1.8 million m³, and the Eastern SNI contributes 1.3 million m³.

Scenario 3 shows that a harvest at a higher level could be attained through the 2020s and early 2030s (3.9 million m³ per annum), but this cannot be sustained beyond 2034 at which time it reduces to 2.3 million m³.

As shown in Scenario 4, if an average harvest age of 26 years rather than 28 years is targeted, then the long term harvest level of 3.7 million m³ can be reached around five years earlier (2020 instead of 2024). Conversely, if the average harvest age is 30 years, then this harvest level is reached six years later (2029).

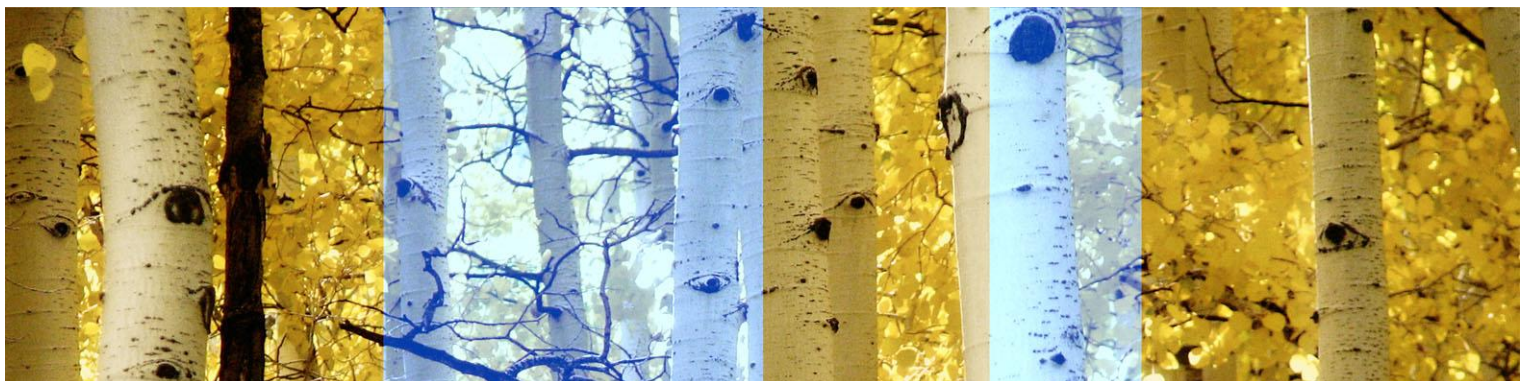
A large proportion of the potential increase in wood availability will come from the region's small-scale forest owners who established forests during the 1990s. Market conditions and logistical constraints will determine the actual rate of harvest increase, and what level is reached.



Indufor ...forest intelligence

Indufor Oy
Töölönkatu 11 A, FI-00100 Helsinki
FINLAND
Tel. +358 9 684 0110
Fax +358 9 135 2552
indufor@indufor.fi

Indufor Asia Pacific
7th Floor, 55 Shortland St, PO Box 105 039
Auckland City 1143
NEW ZEALAND
Tel. +64 9 281 4750
www.indufor-ap.com



Appendix – Southern North Island Wood Availability Forecasts for the Period 2014 to 2050

Western Southern North Island Wood Availability under Scenario 1 (Figures 4-2 and 4-3)

(Assumes that large-scale owners harvest at stated intentions and then at non-declining yield, and small-scale owners harvest at age 28 years).

Year Ending December

	Large-Scale Owners (000 m3 IB)	Small-Scale Owners (000 m3 IB)	All Owners (000 m3 IB)
2014	181	741	992
2015	359	655	1 014
2016	416	1 979	2 395
2017	517	730	1 247
2018	416	610	1 026
2019	417	594	1 010
2020	444	2 198	2 642
2021	385	2 865	3 250
2022	579	4 170	4 749
2023	810	3 041	3 851
2024	740	2 722	3 461
2025	666	1 959	2 624
2026	599	1 221	1 820
2027	539	1 485	2 024
2028	485	1 103	1 588
2029	485	1 137	1 623
2030	485	1 196	1 682
2031	485	935	1 421
2032	485	380	865
2033	485	296	781
2034	485	215	700
2035	485	264	749
2036	485	180	665
2037	485	308	793
2038	485	364	849
2039	485	412	898
2040	485	354	839
2041	485	271	757
2042	485	211	696
2043	485	552	1 037
2044	485	683	1 168
2045	485	1 709	2 194
2046	485	757	1 243
2047	485	608	1 094
2048	485	591	1 077
2049	485	2 190	2 675
2050	485	2 851	3 336

Notes:
m3 cubic metres
IB inside bark.

Western Southern North Island Wood Availability under Scenario 2 (Figure 4-6)

(Assumes that large-scale owners harvest at stated intentions and then at non-declining yield, and total wood availability is modelled at a non-declining yield).

Year Ending December

	Large-Scale Owners (000 m3 IB)	Small-Scale Owners (000 m3 IB)	All Owners (000 m3 IB)
2014	181	714	922
2015	359	655	1 014
2016	416	699	1 116
2017	517	711	1 227
2018	416	934	1 350
2019	417	1 068	1 485
2020	444	1 190	1 634
2021	385	1 412	1 797
2022	579	1 218	1 797
2023	810	987	1 797
2024	729	1 068	1 797
2025	656	1 141	1 797
2026	591	1 206	1 797
2027	531	1 265	1 797
2028	478	1 319	1 797
2029	478	1 319	1 797
2030	478	1 319	1 797
2031	478	1 319	1 797
2032	478	1 319	1 797
2033	478	1 319	1 797
2034	478	1 319	1 797
2035	478	1 319	1 797
2036	478	1 319	1 797
2037	478	1 319	1 797
2038	478	1 319	1 797
2039	478	1 319	1 797
2040	478	1 319	1 797
2041	478	1 319	1 797
2042	478	1 319	1 797
2043	478	1 319	1 797
2044	478	1 319	1 797
2045	478	1 319	1 797
2046	478	1 319	1 797
2047	478	1 319	1 797
2048	478	1 319	1 797
2049	478	1 319	1 797
2050	478	1 319	1 797

Notes:
m3 cubic metres
IB inside bark.

Western Southern North Island Wood Availability under Scenario 3 (Figures 4-9 and 4-11)

(Assumes that large-scale owners harvest at stated intentions then at non-declining yield, and total wood availability is modelled at a split non-declining yield).

Year Ending December	Large- Scale Owners (000 m3 IB)	Small- Scale Owners (000 m3 IB)	All Owners (000 m3 IB)	Pruned (000 m3 IB)	Unpruned (000 m3 IB)	Chip Logs (000 m3 IB)	Total (000 m3 IB)
2014	181	741	922	152	647	123	922
2015	359	655	1 014	161	717	136	1 014
2016	416	699	1 116	160	803	153	1 116
2017	517	711	1 227	193	869	165	1 227
2018	416	934	1 350	195	966	190	1 350
2019	417	1 068	1 485	205	1 074	206	1 485
2020	444	1 190	1 634	287	1 125	222	1 634
2021	385	1 412	1 797	332	1 221	244	1 797
2022	579	1 398	1 977	349	1 358	270	1 977
2023	810	1 364	2 174	316	1 553	306	2 174
2024	740	1 535	2 275	456	1 518	300	2 275
2025	666	1 609	2 275	342	1 616	316	2 275
2026	599	1 676	2 275	386	1 580	309	2 275
2027	539	1 736	2 275	372	1 591	311	2 275
2028	485	1 789	2 275	357	1 608	309	2 275
2029	485	1 789	2 275	266	1 685	324	2 275
2030	485	1 789	2 275	351	1 615	309	2 275
2031	485	1 789	2 275	346	1 627	302	2 275
2032	485	1 789	2 275	288	1 686	300	2 275
2033	485	1 789	2 275	225	1 743	307	2 275
2034	485	1 789	2 275	215	1 751	308	2 275
2035	485	1 562	2 047	184	1 581	282	2 047
2036	485	1 357	1 842	199	1 394	250	1 842
2037	485	1 173	1 658	157	1 271	231	1 658
2038	485	1 007	1 492	162	1 117	213	1 492
2039	485	858	1 343	63	1 081	199	1 343
2040	485	858	1 343	149	1 002	193	1 343
2041	485	858	1 343	128	1 013	202	1 343
2042	485	858	1 343	60	1 068	215	1 343
2043	485	858	1 343	74	1 053	216	1 343
2044	485	858	1 343	72	1 056	215	1 343
2045	485	858	1 343	106	1 026	212	1 343
2046	485	858	1 343	125	1 009	209	1 343
2047	485	858	1 343	124	1 009	209	1 343
2048	485	858	1 343	119	1 015	209	1 343
2049	485	858	1 343	135	1 003	205	1 343
2050	485	858	1 343	106	1 029	208	1 343

Notes:
m3 cubic metres
IB inside bark.

Western Southern North Island Wood Availability under Scenario 4 (Figures 4-12 and 4-13)

(Assumes that large-scale owners harvest at stated intentions then at non-declining yield, and total wood availability is modelled at a split non-declining yield with target rotation ages of 26, 28 and 30 years).

Year Ending December	Recoverable Volume target age 26 (000 m3 IB)	Average Age (Years)	Recoverable Volume target age 28 (000 m3 IB)	Average Age (Years)	Recoverable Volume target age 30 (000 m3 IB)	Average Age (Years)
2014	922	27.9	922	29.1	922	31.5
2015	1 014	26.6	1 014	28.4	1 014	32.8
2016	1 217	29.8	1 116	30.8	1 065	30.7
2017	1 461	31.1	1 227	29.0	1 118	30.0
2018	1 753	26.3	1 350	30.1	1 174	31.6
2019	2 103	26.6	1 485	32.7	1 233	29.3
2020	2 178	26.7	1 634	28.7	1 295	29.3
2021	2 178	27.5	1 797	28.0	1 359	29.3
2022	2 178	28.0	1 977	27.9	1 427	29.5
2023	2 178	26.8	2 174	28.1	1 499	29.5
2024	2 178	28.2	2 275	28.7	1 649	30.0
2025	2 178	28.1	2 275	29.5	1 813	30.0
2026	2 178	30.8	2 275	28.7	1 995	30.0
2027	2 178	32.6	2 275	29.4	2 194	30.0
2028	2 178	28.4	2 275	30.0	2 414	30.7
2029	2 178	29.7	2 275	30.7	2 438	31.0
2030	2 178	33.9	2 275	30.5	2 438	32.7
2031	2 178	34.8	2 275	33.0	2 438	33.6
2032	2 178	36.2	2 275	37.1	2 438	38.2
2033	1 960	35.4	2 275	37.6	2 438	39.0
2034	1 764	35.5	2 275	37.8	2 438	38.4
2035	1 588	33.9	2 047	37.2	2 438	38.0
2036	1 429	32.5	1 842	37.0	2 438	38.3
2037	1 286	32.1	1 658	34.9	2 194	33.7
2038	1 286	30.8	1 492	29.8	1 975	34.7
2039	1 286	30.0	1 343	31.1	1 777	34.2
2040	1 286	26.6	1 343	29.2	1 599	33.9
2041	1 286	25.6	1 343	27.3	1 439	33.8
2042	1 286	24.6	1 343	26.4	1 439	34.0
2043	1 286	24.4	1 343	25.7	1 439	32.8
2044	1 286	24.6	1 343	26.0	1 439	26.7
2045	1 415	24.8	1 343	25.5	1 439	26.9
2046	1 556	25.4	1 343	25.3	1 439	28.0
2047	1 661	25.5	1 343	25.3	1 439	28.0
2048	1 661	25.8	1 343	25.6	1 439	27.5
2049	1 661	25.8	1 343	25.8	1 439	27.2
2050	1 661	26.0	1 343	26.2	1 439	27.5

Notes:
m3 cubic metres
IB inside bark.

Western Southern North Island Wood Availability under Scenario 5 for Douglas-fir (Figure 4-15)

(Assumes that large-scale owners harvest at stated intentions with yield regulated in subsequent years and a target rotation of 40 years).

Year Ending December	Large-Scale Owners (000 m3 IB)	Small-Scale Owners (000 m3 IB)	All Owners (000 m3 IB)	Average Age (Years)
2014	0	0	0	40.0
2015	0	0	0	
2016	0	0	0	
2017	0	0	0	
2018	0	0	0	
2019	4	0	4	46.4
2020	4	0	4	49.8
2021	4	0	4	51.8
2022	4	0	4	55.1
2023	4	0	4	58.7
2024	0	1	1	40.0
2025	0	1	1	40.0
2026	0	1	1	40.0
2027	0	1	1	40.0
2028	0	1	1	42.4
2029	0	0	0	41.0
2030	0	0	0	42.0
2031	0	0	0	43.0
2032	0	0	0	44.0
2033	0	0	0	45.0
2034	0	9	9	43.7
2035	0	9	9	40.0
2036	0	9	9	40.9
2037	0	9	9	40.0
2038	0	9	9	41.5
2039	0	5	5	40.0
2040	0	5	5	40.3
2041	0	5	5	40.1
2042	0	5	5	42.0
2043	0	5	5	42.6
2044	0	1	1	40.0
2045	0	1	1	46.0
2046	0	1	1	43.5
2047	0	1	1	40.0
2048	0	1	1	41.0
2049	0	1	1	42.0
2050	0	1	1	43.0

Notes:
m3 cubic metres
IB inside bark.

Eastern Southern North Island Wood Availability under Scenario 1 (Figures 5-2 and 5-3)

(Assumes that large-scale owners harvest at stated intentions and then at non-declining yield, and small-scale owners harvest at age 28 years).

Year Ending December

	Large-Scale Owners (000 m3 IB)	Small-Scale Owners (000 m3 IB)	All Owners (000 m3 IB)
2014	254	542	796
2015	392	310	703
2016	285	2 037	2 322
2017	368	90	459
2018	312	264	577
2019	443	639	1 082
2020	473	1 714	2 188
2021	474	1 960	2 434
2022	406	1 667	2 074
2023	431	1 816	2 247
2024	474	1 878	2 352
2025	485	1 581	2 067
2026	437	1 273	1 709
2027	393	1 152	1 545
2028	354	753	1 107
2029	354	960	1 314
2030	354	785	1 138
2031	354	697	1 050
2032	354	364	718
2033	354	311	665
2034	354	281	635
2035	354	210	563
2036	354	205	559
2037	354	303	657
2038	354	345	699
2039	354	637	990
2040	354	336	690
2041	354	319	673
2042	354	34	388
2043	354	387	741
2044	354	264	618
2045	354	1 684	2 038
2046	354	88	442
2047	354	267	620
2048	354	647	1 000
2049	354	1 734	2 088
2050	354	1 984	2 338

Notes:
m3 cubic metres
IB inside bark.

Eastern Southern North Island Wood Availability under Scenario 2 (Figure 5-6)

(Assumes that large-scale owners harvest at stated intentions and then at non-declining yield, and total wood availability is modelled at a non-declining yield).

Year Ending December

	Large-Scale Owners (000 m3 IB)	Small-Scale Owners (000 m3 IB)	All Owners (000 m3 IB)
2014	254	542	796
2015	392	310	703
2016	285	488	773
2017	368	482	850
2018	312	623	935
2019	443	585	1 029
2020	473	658	1 132
2021	474	770	1 245
2022	406	897	1 303
2023	431	872	1 303
2024	407	896	1 303
2025	435	868	1 303
2026	430	873	1 303
2027	387	916	1 303
2028	348	955	1 303
2029	348	955	1 303
2030	348	955	1 303
2031	348	955	1 303
2032	348	955	1 303
2033	348	955	1 303
2034	348	955	1 303
2035	348	955	1 303
2036	348	955	1 303
2037	348	955	1 303
2038	348	955	1 303
2039	348	955	1 303
2040	348	955	1 303
2041	348	955	1 303
2042	348	955	1 303
2043	348	955	1 303
2044	348	955	1 303
2045	348	955	1 303
2046	348	955	1 303
2047	348	955	1 303
2048	348	955	1 303
2049	381	922	1 303
2050	381	922	1 303

Notes:
m3 cubic metres
IB inside bark.

Eastern Southern North Island Wood Availability under Scenario 3 (Figures 5-9 and 5-11)

(Assumes that large-scale owners harvest at stated intentions then at non-declining yield, and total wood availability is modelled at a split non-declining yield).

Year Ending December	Large- Scale Owners (000 m3 IB)	Small- Scale Owners (000 m3 IB)	All Owners (000 m3 IB)	Pruned (000 m3 IB)	Unpruned (000 m3 IB)	Chip Logs (000 m3 IB)	Total (000 m3 IB)
2014	254	542	796	258	455	83	796
2015	392	310	703	191	432	79	703
2016	285	488	773	209	477	87	773
2017	368	482	850	239	512	99	850
2018	312	623	935	242	581	113	935
2019	443	585	1 029	251	646	131	1 029
2020	473	658	1 132	319	676	136	1 132
2021	474	770	1 245	350	744	151	1 245
2022	406	963	1 369	363	841	165	1 369
2023	431	1 075	1 506	428	901	177	1 506
2024	474	1 179	1 653	507	960	186	1 653
2025	486	1 167	1 653	501	967	186	1 653
2026	437	1 216	1 653	475	989	190	1 653
2027	394	1 260	1 653	499	970	184	1 653
2028	354	1 299	1 653	445	1 012	196	1 653
2029	354	1 299	1 653	388	1 054	211	1 653
2030	354	1 299	1 653	373	1 068	213	1 653
2031	354	1 299	1 653	266	1 160	228	1 653
2032	354	1 299	1 653	214	1 209	230	1 653
2033	354	1 299	1 653	256	1 174	222	1 653
2034	354	1 299	1 653	289	1 149	216	1 653
2035	354	1 134	1 488	199	1 084	205	1 488
2036	354	985	1 339	110	1 033	196	1 339
2037	354	851	1 205	113	918	175	1 205
2038	354	730	1 085	142	787	155	1 085
2039	354	622	976	156	683	137	976
2040	354	622	976	267	593	116	976
2041	354	622	976	256	599	121	976
2042	354	622	976	113	702	161	976
2043	354	622	976	135	686	155	976
2044	354	622	976	204	632	141	976
2045	354	622	976	163	661	152	976
2046	354	622	976	171	655	150	976
2047	354	622	976	143	674	159	976
2048	354	622	976	170	657	149	976
2049	354	622	976	96	712	169	976
2050	354	622	976	123	691	162	976

Notes:
m3 cubic metres
IB inside bark.

Eastern Southern North Island Wood Availability under Scenario 4 (Figures 5-12 and 5-13)

(Assumes that large-scale owners harvest at stated intentions then at non-declining yield, and total wood availability is modelled at a split non-declining yield with target rotation ages of 26, 28 and 30 years).

Year Ending December	Recoverable Volume target age 26 (000 m3 IB)	Average Age (Years)	Recoverable Volume target age 28 (000 m3 IB)	Average Age (Years)	Recoverable Volume target age 30 (000 m3 IB)	Average Age (Years)
2014	796	28.5	796	29.6	796	32.6
2015	703	32.7	703	31.5	703	31.4
2016	843	31.2	773	31.9	738	31.0
2017	1 012	28.6	850	32.5	775	30.8
2018	1 214	28.1	935	33.6	813	33.7
2019	1 457	27.7	1 029	30.2	854	33.2
2020	1 581	28.7	1 132	29.2	897	32.7
2021	1 581	28.1	1 245	28.6	942	30.8
2022	1 581	28.9	1 369	30.1	989	31.3
2023	1 581	28.9	1 506	29.2	1 038	31.6
2024	1 581	30.0	1 653	28.8	1 142	30.6
2025	1 581	29.7	1 653	30.4	1 256	30.6
2026	1 581	32.9	1 653	30.2	1 382	30.0
2027	1 581	29.9	1 653	31.9	1 520	30.9
2028	1 581	29.2	1 653	30.6	1 672	30.2
2029	1 581	29.7	1 653	30.5	1 791	30.8
2030	1 581	32.2	1 653	31.6	1 791	33.0
2031	1 581	35.1	1 653	33.3	1 791	35.8
2032	1 581	35.1	1 653	36.1	1 791	38.7
2033	1 423	34.9	1 653	36.1	1 791	38.3
2034	1 281	35.3	1 653	36.2	1 791	38.8
2035	1 153	33.6	1 488	36.8	1 791	38.8
2036	1 037	31.8	1 339	36.2	1 791	38.7
2037	934	26.7	1 205	35.7	1 612	35.9
2038	934	31.1	1 085	33.0	1 450	33.9
2039	934	31.4	976	31.1	1 305	33.4
2040	934	28.4	976	29.2	1 175	33.5
2041	934	24.7	976	28.5	1 057	30.2
2042	934	24.5	976	25.9	1 057	33.3
2043	934	24.5	976	26.9	1 057	33.3
2044	934	24.6	976	26.0	1 057	36.0
2045	934	24.7	976	25.3	1 057	31.6
2046	1 027	25.0	976	25.3	1 057	28.0
2047	1 130	25.8	976	25.4	1 057	28.3
2048	1 198	25.8	976	25.8	1 057	28.0
2049	1 198	26.0	976	25.6	1 057	27.9
2050	1 198	26.0	976	25.7	1 057	27.0

Notes:
m3 cubic metres
IB inside bark.

Eastern Southern North Island Wood Availability under Scenario 5 for Douglas-fir (Figure 5-15)

(Assumes that large-scale owners harvest at stated intentions with yield regulated in subsequent years and a target rotation of 40 years).

Year Ending December	Large-Scale Owners (000 m3 IB)	Small-Scale Owners (000 m3 IB)	All Owners (000 m3 IB)	Average Age (Years)
2014	0	2	2	58.0
2015	0	0	0	
2016	0	0	0	
2017	0	0	0	
2018	0	0	0	
2019	8	1	9	50.3
2020	8	1	9	50.6
2021	8	1	9	52.2
2022	8	1	9	55.6
2023	8	1	9	55.4
2024	0	0	0	
2025	0	0	0	
2026	0	0	0	
2027	0	0	0	
2028	0	0	0	
2029	0	0	0	36.0
2030	0	0	0	37.0
2031	0	0	0	38.0
2032	0	0	0	35.0
2033	0	0	0	40.0
2034	0	4	4	36.0
2035	0	4	4	36.4
2036	0	4	4	36.1
2037	0	4	4	38.8
2038	0	4	4	40.0
2039	0	1	1	40.0
2040	0	1	1	39.7
2041	0	1	1	39.0
2042	0	1	1	40.0
2043	0	1	1	39.7
2044	0	0	0	
2045	0	0	0	
2046	0	0	0	
2047	0	0	0	
2048	0	0	0	
2049	0	0	0	
2050	0	0	0	

Notes:
m3 cubic metres
IB inside bark.

Western & Eastern Southern North Island Wood Availability under Scenario 1 (no Figure in report)

(Assumes that large-scale owners harvest at stated intentions and then at non-declining yield, and small-scale owners harvest at age 28 years).

Year Ending December

	Large-Scale Owners (000 m3 IB)	Small-Scale Owners (000 m3 IB)	All Owners (000 m3 IB)
2014	435	1 283	1 718
2015	752	965	1 717
2016	701	4 016	4 718
2017	885	820	1 706
2018	729	874	1 603
2019	860	1 233	2 093
2020	917	3 912	4 829
2021	859	4 825	5 684
2022	985	5 837	6 822
2023	1 241	4 857	6 098
2024	1 213	4 600	5 813
2025	1 151	3 540	4 691
2026	1 036	2 493	3 529
2027	932	2 637	3 569
2028	839	1 856	2 695
2029	839	2 098	2 937
2030	839	1 981	2 820
2031	839	1 632	2 471
2032	839	744	1 583
2033	839	607	1 445
2034	839	496	1 335
2035	839	474	1 313
2036	839	385	1 224
2037	839	611	1 450
2038	839	709	1 548
2039	839	1 049	1 888
2040	839	690	1 529
2041	839	590	1 429
2042	839	245	1 084
2043	839	939	1 778
2044	839	947	1 786
2045	839	3 393	4 232
2046	839	845	1 684
2047	839	875	1 714
2048	839	1 238	2 077
2049	839	3 924	4 763
2050	839	4 834	5 673

Notes:
m3 cubic metres
IB inside bark.

Western & Eastern Southern North Island Wood Availability under Scenario 2 (Figure 6-1)

(Assumes that large-scale owners harvest at stated intentions and then at non-declining yield, and total wood availability is modelled at a non-declining yield).

Year Ending December

	Large-Scale Owners (000 m3 IB)	Small-Scale Owners (000 m3 IB)	All Owners (000 m3 IB)
2014	435	1 283	1 718
2015	752	965	1 717
2016	701	1 187	1 889
2017	885	1 192	2 078
2018	729	1 556	2 285
2019	860	1 654	2 514
2020	917	1 848	2 765
2021	859	2 182	3 042
2022	985	2 115	3 100
2023	1 241	1 859	3 100
2024	1 136	1 964	3 100
2025	1 091	2 008	3 100
2026	1 020	2 080	3 100
2027	918	2 182	3 100
2028	826	2 273	3 100
2029	826	2 273	3 100
2030	826	2 273	3 100
2031	826	2 273	3 100
2032	826	2 273	3 100
2033	826	2 273	3 100
2034	826	2 273	3 100
2035	826	2 273	3 100
2036	826	2 273	3 100
2037	826	2 273	3 100
2038	826	2 273	3 100
2039	826	2 273	3 100
2040	826	2 273	3 100
2041	826	2 273	3 100
2042	826	2 273	3 100
2043	826	2 273	3 100
2044	826	2 273	3 100
2045	826	2 273	3 100
2046	826	2 273	3 100
2047	826	2 273	3 100
2048	826	2 273	3 100
2049	859	2 241	3 100
2050	859	2 241	3 100

Notes:
m3 cubic metres
IB inside bark.

Western & Eastern Wood Availability under Scenario 3 (Figures 6-3 and 6-4)

(Assumes that large-scale owners harvest at stated intentions then at non-declining yield, and total wood availability is modelled at a split non-declining yield).

Year Ending December	Large- Scale Owners (000 m3 IB)	Small- Scale Owners (000 m3 IB)	All Owners (000 m3 IB)	Pruned (000 m3 IB)	Unpruned (000 m3 IB)	Chip Logs (000 m3 IB)	Total (000 m3 IB)
2014	435	1 283	1 718	410	1 102	205	1 718
2015	752	965	1 717	353	1 149	215	1 717
2016	701	1 187	1 889	369	1 280	239	1 889
2017	885	1 192	2 078	432	1 381	264	2 078
2018	729	1 556	2 285	436	1 547	302	2 285
2019	860	1 654	2 514	456	1 720	338	2 514
2020	917	1 848	2 765	606	1 801	358	2 765
2021	859	2 182	3 042	682	1 965	394	3 042
2022	985	2 361	3 346	711	2 199	435	3 346
2023	1 241	2 440	3 681	744	2 454	483	3 681
2024	1 213	2 715	3 928	964	2 478	486	3 928
2025	1 152	2 776	3 928	843	2 583	501	3 928
2026	1 036	2 891	3 928	860	2 569	499	3 928
2027	933	2 995	3 928	872	2 561	495	3 928
2028	840	3 088	3 928	803	2 620	505	3 928
2029	840	3 088	3 928	654	2 739	535	3 928
2030	840	3 088	3 928	724	2 682	522	3 928
2031	840	3 088	3 928	611	2 786	530	3 928
2032	840	3 088	3 928	503	2 895	530	3 928
2033	840	3 088	3 928	482	2 917	529	3 928
2034	840	3 088	3 928	504	2 900	524	3 928
2035	840	2 696	3 535	384	2 665	487	3 535
2036	840	2 342	3 182	309	2 427	446	3 182
2037	840	2 024	2 863	270	2 188	405	2 863
2038	840	1 738	2 577	305	1 904	368	2 577
2039	840	1 480	2 319	219	1 764	337	2 319
2040	840	1 480	2 319	415	1 595	309	2 319
2041	840	1 480	2 319	384	1 612	323	2 319
2042	840	1 480	2 319	173	1 770	376	2 319
2043	840	1 480	2 319	209	1 739	371	2 319
2044	840	1 480	2 319	276	1 688	355	2 319
2045	840	1 480	2 319	269	1 687	364	2 319
2046	840	1 480	2 319	296	1 664	359	2 319
2047	840	1 480	2 319	268	1 683	368	2 319
2048	840	1 480	2 319	289	1 672	358	2 319
2049	840	1 480	2 319	231	1 715	373	2 319
2050	840	1 480	2 319	229	1 721	370	2 319

Notes:
m3 cubic metres
IB inside bark.

Western & Eastern Southern North Island Wood Availability under Scenario 4 (Figure 6-5)

(Assumes that large-scale owners harvest at stated intentions then at non-declining yield, and total wood availability is modelled at a split non-declining yield with target rotation ages of 26, 28 and 30 years).

Year Ending December	Recoverable Volume target age 26 (000 m3 IB)	Average Age (Years)	Recoverable Volume target age 28 (000 m3 IB)	Average Age (Years)	Recoverable Volume target age 30 (000 m3 IB)	Average Age (Years)
2014	1 718	28.2	1 718	29.4	1 717	32.0
2015	1 717	29.1	1 717	29.7	1 717	32.2
2016	2 060	30.4	1 889	31.3	1 803	30.9
2017	2 472	30.1	2 078	30.4	1 893	30.3
2018	2 967	27.0	2 285	31.5	1 988	32.4
2019	3 560	27.0	2 514	31.7	2 087	30.9
2020	3 759	27.6	2 765	28.9	2 191	30.7
2021	3 759	27.7	3 042	28.2	2 301	29.9
2022	3 759	28.4	3 346	28.8	2 416	30.2
2023	3 759	27.7	3 681	28.5	2 537	30.4
2024	3 759	28.9	3 928	28.8	2 790	30.2
2025	3 759	28.8	3 928	29.8	3 070	30.2
2026	3 759	31.7	3 928	29.3	3 376	30.0
2027	3 759	31.5	3 928	30.4	3 714	30.4
2028	3 759	28.7	3 928	30.3	4 086	30.5
2029	3 759	29.7	3 928	30.6	4 228	30.9
2030	3 759	33.2	3 928	31.0	4 228	32.9
2031	3 759	34.9	3 928	33.2	4 228	34.5
2032	3 759	35.8	3 928	36.7	4 228	38.4
2033	3 383	35.2	3 928	37.0	4 228	38.7
2034	3 045	35.4	3 928	37.2	4 228	38.6
2035	2 740	33.8	3 535	37.0	4 228	38.3
2036	2 466	32.2	3 182	36.7	4 228	38.5
2037	2 220	29.8	2 863	35.2	3 806	34.6
2038	2 220	30.9	2 577	31.1	3 425	34.3
2039	2 220	30.6	2 319	31.1	3 083	33.8
2040	2 220	27.3	2 319	29.2	2 774	33.8
2041	2 220	25.2	2 319	27.8	2 497	32.2
2042	2 220	24.6	2 319	26.2	2 497	33.7
2043	2 220	24.4	2 319	26.2	2 497	33.0
2044	2 220	24.6	2 319	26.0	2 497	30.7
2045	2 348	24.8	2 319	25.4	2 497	28.9
2046	2 583	25.2	2 319	25.3	2 497	28.0
2047	2 791	25.6	2 319	25.3	2 497	28.1
2048	2 859	25.8	2 319	25.7	2 497	27.7
2049	2 859	25.9	2 319	25.7	2 497	27.5
2050	2 859	26.0	2 319	26.0	2 497	27.3

Notes:
m3 cubic metres
IB inside bark.

Western & Eastern North Island Wood Availability for Douglas-fir (Figure 6-6)

(Assumes that large-scale owners harvest at stated intentions with yield regulated in subsequent years and a target rotation of 40 years).

Year Ending December	Large-Scale Owners (000 m3 IB)	Small-Scale Owners (000 m3 IB)	All Owners (000 m3 IB)	Average Age (Years)
2014	0	2	2	57.8
2015	0	0	0	
2016	0	0	0	
2017	0	0	0	
2018	0	0	0	
2019	11	2	13	49.1
2020	11	2	13	50.4
2021	11	2	13	52.1
2022	11	2	13	55.4
2023	11	2	13	56.5
2024	0	1	1	40.0
2025	0	1	1	40.0
2026	0	1	1	40.0
2027	0	1	1	40.0
2028	0	1	1	42.4
2029	0	0	0	38.7
2030	0	0	0	39.7
2031	0	0	0	40.7
2032	0	0	0	39.9
2033	0	0	0	42.7
2034	0	12	12	41.4
2035	0	12	12	39.0
2036	0	12	12	39.5
2037	0	12	12	39.6
2038	0	12	12	41.0
2039	0	6	6	40.0
2040	0	6	6	40.2
2041	0	6	6	39.9
2042	0	6	6	41.6
2043	0	6	6	42.1
2044	0	1	1	40.0
2045	0	1	1	46.0
2046	0	1	1	43.5
2047	0	1	1	40.0
2048	0	1	1	41.0
2049	0	1	1	42.0
2050	0	1	1	43.0

Notes:
m3 cubic metres
IB inside bark.