Sustainable high quality eucalypt sawlog supply from Tasmania's Permanent Timber Production Zone Land

Review No. 6
July 2022

Sustainable Timber Tasmania

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Sustainable Timber Tasmania monitors eucalypt timber production from native forests and plantations on Permanent Timber Production Zone land. It also models the sustainable yield to monitor that the rate of harvesting is consistent with its statutory obligations and sustainable forest management objectives.

Clause 98 of the Tasmanian Regional Forest Agreement requires a five yearly review of the sustainable yield of high quality eucalypt sawlogs from State forests (now Permanent Timber Production Zone land). Previous reviews in 1998, 2002, 2007, 2014 and 2017 incorporated the effects of successive changes in the resource base over that period. This 2022 review continues to reflect the relevant legislation: the *Forest Management Act (Tas) 2013.*

This review confirms Sustainable Timber Tasmania's ability to make available at least 137,000 cubic metres per year of high quality eucalypt sawlogs from Permanent Timber Production Zone land for the next 90 years. However, these yield predictions are generated from biologically based forest estate modelling of productive capacity, and do not imply supply based on economic criteria.

The yield described in this review is consistent with Sustainable Timber Tasmania's Forest Management Plan 2019, and High Conservation Value Assessment and Management Plan 2019.

Introduction

This is the sixth review of the sustainable yield of high quality eucalypt sawlogs from public production forests in Tasmania. Conduct of this review is a requirement under Clause 98 of the 1997 Tasmanian Regional Forest Agreement (Commonwealth of Australia and State of Tasmania, 1997). The results of previous equivalent reviews were published by Forestry Tasmania in 1998, 2002, 2007 and 2014, and by Sustainable Timber Tasmania in 2017.

> Clause 98 of the 1997 Tasmanian Regional Forest Agreement
>
> Review of Sustainable High Quality Sawlog Supply Levels
>
> 98. The State agrees to undertake a review of sustainable high quality sawlog supply levels from public land to reflect the changes in the forest inventory and new intensive forest management initiatives concluded in this Agreement. The review will be completed and published during the first year of this Agreement, and thereafter will coincide with the 5 yearly reviews of this Agreement.

This review reports on the predicted yields of peeler logs, pulpwood and other products arising from the sustainable yield of high quality eucalypt sawlogs, as in previous reviews.

This review is based on the detailed and complex analysis of large quantities of data. As in previous years, this report is an overview of the work that was done to conduct this review, and of its results. Sustainable Timber Tasmania welcomes feedback from the readers of this report about the way in which it communicates the results of its reviews of sustainable yield. Please contact our Engagement Team by email stakeholder@sttas.com.au, or by writing to the Engagement Team, Sustainable Timber Tasmania, Level 1, 99 Bathurst Street, Hobart 7000, with your feedback.

The glossary, included in this review, gives definitions for the various log products and other technical terms to which it refers.

The yields described in this review are consistent with Sustainable Timber Tasmania's Forest Management Plan 2019, and High Conservation Value Assessment and Management Plan 2019.

Background

Sustainable forest management has been defined as the integration of the commercial and noncommercial values of forests to improve the material and non-material welfare of society, whilst ensuring that the values of the forest as a resource for commercial use and for conservation are not lost or degraded for current or future generations (Commonwealth of Australia, 1992). Sustainable forest management is the underlying foundation of Sustainable Timber Tasmania's business.

Sustainable Timber Tasmania measures its performance of sustainable forest management against internationally agreed criteria under the Australian Forestry Standard. One of the criteria against which sustainable forest management is measured is the extent to which the productive capacity of the forest is maintained over time. The productive capacity of Tasmania's Permanent Timber Production Zone land is measured against several indicators, one of which is the predicted long term yield of high quality eucalypt sawlogs. This indicator has been used in Tasmania as a primary indicator for at least 30 years.

This review reflects the requirements of Section 16 of the *Forest Management Act (Tas) 2013* which states that a minimum of 137,000 cubic metres high quality eucalypt sawlogs must be made available for the industry annually. No other prescriptions exist under this legislation.

Section 16 of the *Forest Management Act (Tas) 2013*

16. Wood production supply

(1) Each year the Forest Manager must make available –

(a) for the veneer and sawmilling industries, a minimum aggregate quantity of eucalypt veneer logs and eucalypt sawlogs, from permanent timber production zone land, that meets the prescribed specifications that are in force immediately before the commencement of this Act; and

(b) for a prescribed industry, the prescribed quantity, prescribed type and prescribed specification of other prescribed timber (including special species timber, as defined in section 19(1) of the *Tasmanian Forests Agreement Act 2013*).

(2) In subsection (1)(a) –

minimum aggregate quantity means –

(a) 137 000 cubic metres of any combination of eucalypt veneer quality 1, eucalypt veneer quality 2, category 1 sawlogs, and category 3 sawlogs, as specified in Schedule 1 to the *Forestry Regulations 2009*; or

(b) if another quantity is prescribed, the prescribed quantity.

(3) The regulations may prescribe the time for which the quantity, type and specification of other timber is to be made available and the source of the other timber.

This review focuses on both eucalypt native forests and eucalypt plantation forests on Permanent Timber Production Zone land. Hence Sustainable Timber Tasmania's softwood plantation management is outside the scope of this review. Sustainable Timber Tasmania's management of special timbers is also largely outside the scope of the review because the resource is mainly from blackwood forests and rainforests. However, some of the resource also occurs as mature

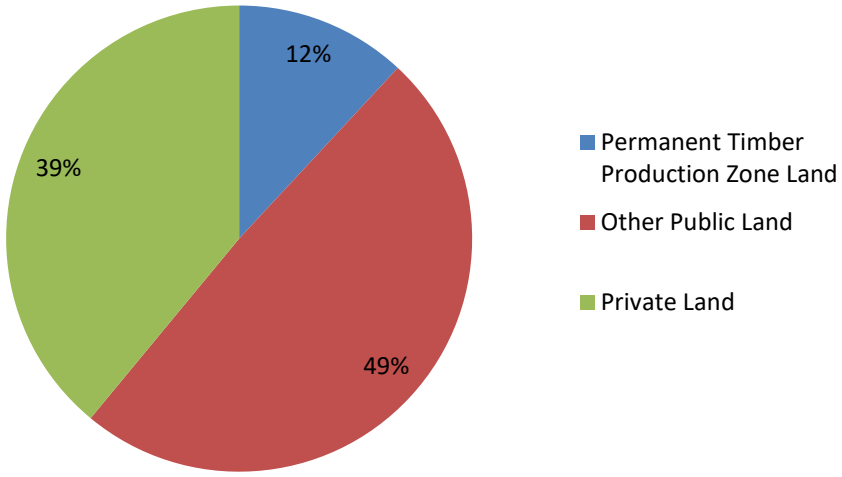
eucalypt forest with an understorey rich in special timbers. Modelled yields from these forests continue to contribute to estimates of sustainable high quality eucalypt sawlog yield but the harvesting of these forests will be optimised to ensure maximum recovery and the continued representation of special timbers within the regenerated stands.

Resource base

Land and forest area

As at 30 June 2021 Sustainable Timber Tasmania managed a land base of 821,000 hectares (Sustainable Timber Tasmania, 2021, p. 86), of which 812,000 hectares is designated as Permanent Timber Production Zone land. This figure represents about twelve per cent of Tasmania's total land area (Figure 1).

Figure 1 Status of land in Tasmania



Permanent Timber Production Zone land is categorised using a zoning system, known as Management Decision Classification (MDC), to delineate areas of forest that are to be managed for wood production and those that are to be managed for other uses (Sustainable Timber Tasmania, 2020).

The basic operational unit for timber harvesting is the coupe. All forest that is on Permanent Timber Production Zone land and that has been classified as available for wood production under the MDC zoning system has been mapped into provisional coupes (Forestry Tasmania, 2014a, p. 8-9).

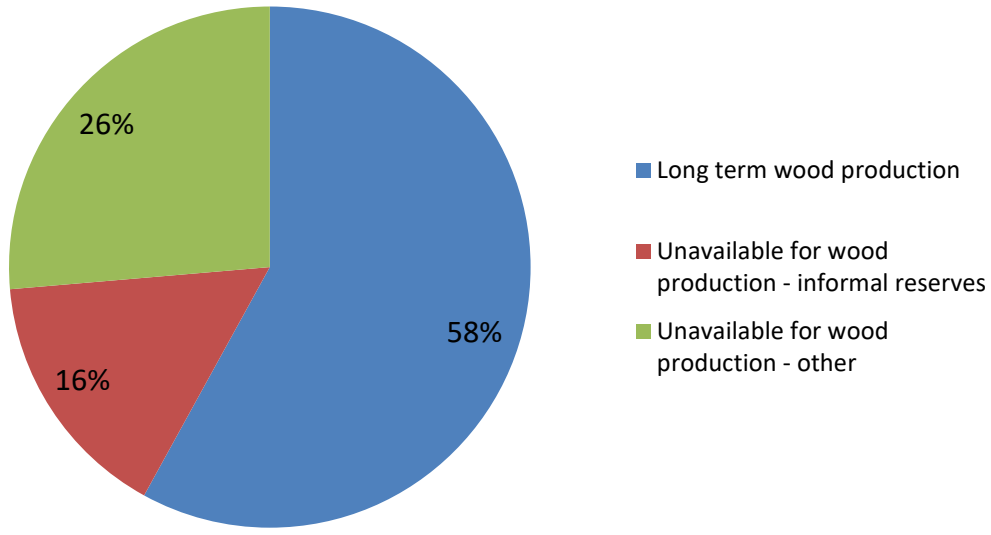
Figure 2 shows the results of the classification of Permanent Timber Production Zone land under the MDC zoning system and the subsequent mapping of wood production areas into provisional coupes. Of the 812,000 hectares of Permanent Timber Production Zone land:

(a) 58% is in provisional coupes, designated for long-term wood production (including 10% managed by other forest management companies);

(b) 16% is in reserves that form part of Tasmania's Comprehensive, Adequate and Representative Reserve System; and

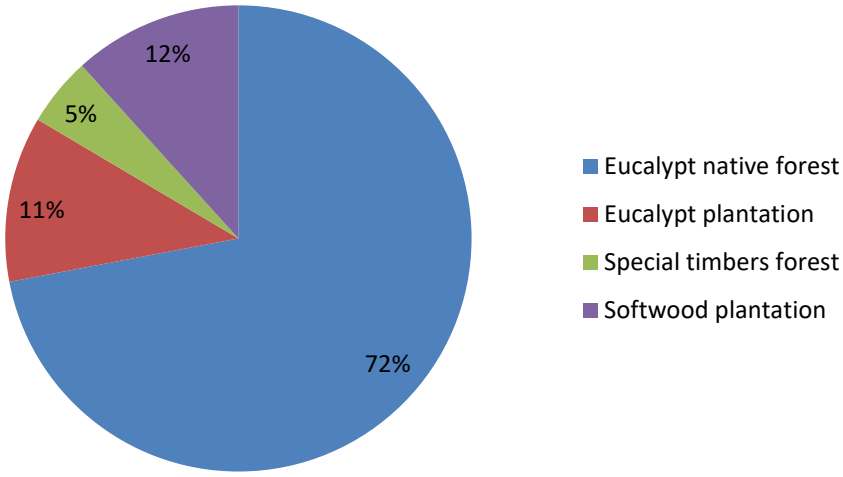
(c) 26% is unavailable for wood production because of other management priorities (e.g., conservation, inaccessible, not containing productive timber).

Figure 2 Land use classification of Permanent Timber Production Zone land



The area designated for long term wood production (i.e., the area within provisional coupes) can be further classified into broad forest management types (Figure 3). This review assumes that there will be little change to the area within each classification over the modelled period. In particular, this reflects Forestry Tasmania's policy since 2007 that no areas of native forest be converted to plantation.

Figure 3 Forest management classification of areas available for wood production



This review is based on the areas of eucalypt native forests and about half of the eucalypt plantations shown in Figure 3. These account for 78 per cent of the area available for wood production. This equates to about 45 per cent of the area of Permanent Timber Production Zone land, or about five per cent of Tasmania's total land area.

Special timbers forests and softwood plantations are not included in this review, nor are 29,000 hectares of eucalypt plantations on Permanent Timber Production Zone land managed by other parties.

Eucalypt forest management

Eucalypt forests are managed primarily on rotations that are of sufficient length so that a reasonable proportion of the trees that are harvested are large enough to meet the specifications for high quality eucalypt sawlogs. For eucalypt native forests, the nominal rotation length is 90 years (typically varying from about 60 years on highly productive sites to about 120 years on sites of low productivity)[1]. For eucalypt plantations that are managed for sawlog production, the nominal

[1] Rotations of 200 years are assigned to the 4500 hectares of mature eucalypt forest designated for special timbers.

rotation length is 25 years. Actual rotation lengths for individual coupes vary according to local site conditions and to the requirement to avoid large variations in supply from one period to the next. Rotation lengths for eucalypt native forests and eucalypt plantations can also be reduced by thinning operations that remove trees of lower quality or size and thereby accelerates the growth of the remaining trees. Thinning can also result in an interim harvest of logs (e.g., peeler logs, pulpwood or poles and posts) that would otherwise be lost to natural mortality.

Eucalypt native forests are generally managed under either a partial felling regime or a clearfelling regime (with or without thinning). Sustainable Timber Tasmania applies partial felling wherever possible, particularly in highland eucalypt forests and lowland dry eucalypt forests. Adequate eucalypt regeneration in these forests can generally be achieved with low to moderate disturbance, i.e., there is no requirement for high intensity burning and sowing. Partial felling generally accounts for about half of the area of eucalypt native forest that is harvested each year. Clearfelling is applied in situations where the site conditions (e.g., topography and understorey) mean that adequate eucalypt regeneration cannot otherwise be achieved safely and reliably and at a reasonable cost. These conditions are typical of lowland wet eucalypt forests.

Sustainable Timber Tasmania applies variable retention, where feasible, in eucalypt native forests that might otherwise be managed by clearfelling, burning and sowing. Variable retention moderates the visual and ecological impacts of clearfelling, burning and sowing, by retaining strategically located areas of native forest within harvested coupes.

Eucalypt plantation forests (comprising either *Eucalyptus globulus* or, in areas susceptible to frost, *E. nitens*) are generally managed under a clearfelling regime, with pruning and thinning. Sustainable Timber Tasmania's strategic objective for eucalypt plantation management is to maximise the production of high quality (pruned) logs. Pruning is usually undertaken on about the first six metres of the tree in three stages. The timing and intensity of thinning depends on site productivity and wind risk. Thinning usually reduces the final stocking to about 300 stems per hectare at around age 10. However, on highly productive sites, value is maximised by conducting two thinning operations, at about age 8 and age 12, to a final stocking of about 200 stems per hectare. Trials of more radical thinning treatments, down to as low as 100 stems per hectare, have been established and continue to be evaluated. Where the production of high quality (pruned) logs is not considered feasible, the production of alternative products (unpruned logs, peeler and pulp logs) is maximised.

Productive capacity

The productive capacity of a forest over time can be measured by comparing the total standing quantity of merchantable wood at the beginning and end of the planning horizon.

The total standing quantity of merchantable wood within eucalypt forest areas available for wood production at the date of this review is about 35 million cubic metres.

Review method

This review follows a similar method to past reviews (Forestry Tasmania, 2014a; Whiteley, 1999). The method used for eucalypt plantations is analogous to that used for native forests.

The main components of Sustainable Timber Tasmania's yield forecasting system are:

(a) the area of each type of forest that is available for wood production, based on detailed mapping of forest types (Stone, 1998) and provisional coupes within Permanent Timber Production Zone land;

(b) allowances for each of the many factors that might reduce the area actually harvested, relative to the area available, based on field reconnaissance, detailed mapping and historical data;

(c) predicted yields of each relevant forest product per hectare, for each of 95 identified forest classes in 21 inventory areas, based on plot measurements, growth models and historical data; and

(d) various constraints, based on sustainable yield principles, operational factors and supply targets over time for each relevant forest product.

The relevant data for (a) to (d) are used as inputs to a specialised forest estate modelling software system (Woodstock Optimization Studio - see https://remsoft.com/ for more detail). The forest estate model is run as a linear programming optimisation – see https://en.wikipedia.org/wiki/Linear_programming for more detail. An optimized outcome (schedule of harvests) that both meets objectives and relevant constraints is generated from iterative model runs.

The review process has been independently audited by Dr Cris Brack from The Mullion Group Pty Ltd. The Executive Summary of the audit is included at Appendix 1.

Management strategy

Sustainable Timber Tasmania's current management strategy has evolved through the Tasmanian Forests and Forest Industry Strategy (Forests and Forest Industry Council, 1990), the Tasmanian Regional Forest Agreement (Commonwealth of Australia and State of Tasmania, 1997), the Tasmanian Community Forest Agreement (Commonwealth of Australia and State of Tasmania, 2005), the Tasmanian Forest Agreement 2012, *Tasmanian Forests Agreement Act (Tas) 2013* and *Forest Management Act (Tas) 2013*, and most recently by the *Forestry (Rebuilding the Forest Industry) Act (Tas) 2014*.

The impacts of these strategies, agreements, and Acts have been documented in previous reviews of the sustainable yield of high quality eucalypt sawlogs from Tasmania's public forest (e.g., see Sustainable Timber Tasmania, 2017) and their relevant outcomes incorporated in those reviews (Forestry Tasmania, 1998, 2002, 2007 and 2014b, and Sustainable Timber Tasmania, 2017).

A key element of the management strategy since 1991 has been to progressively reduce the harvest of oldgrowth and mature native forest, replacing this with a harvest from regrowth native forest and plantations.

The management strategy that continues to be applied in this review reflects two key points confirmed in the *Forest Management Act (Tas) 2013*. These are:

(a) a continuation of the area managed by Sustainable Timber Tasmania, of 821,000 hectares, including 812,000 hectares of Permanent Timber Production Zone land; and

(b) a continuation in the legislated annual minimum high quality eucalypt sawlog to be made available, of 137,000 cubic metres.

Some items incorporated in the last review have been removed. These include:

(c) a continuation in the quantity of eucalypt peeler logs contracted for annual supply to Sustainable Timber Tasmania's relevant domestic customer of 195,000 tonnes, until at least 30 June 2027; and

(d) the application of a "headroom factor", being a percentage discount to the modelled predicted yields of each relevant forest product, as a safety margin to account for the potential impact on harvest areas and yields of any future changes to the requirements for conservation under the Forest Practices Code (Forest Practices Authority, 2020).

New items have been added to this review to reflect changes in forest management and new research. These include:

(e) no clearfell harvest of coupes which contain any oldgrowth forest;

(f) an increase in large tree retention within harvested coupes; and

(g) based on research to date, adjustments to plantation yield are made in future rotations because of expected genetic gains.

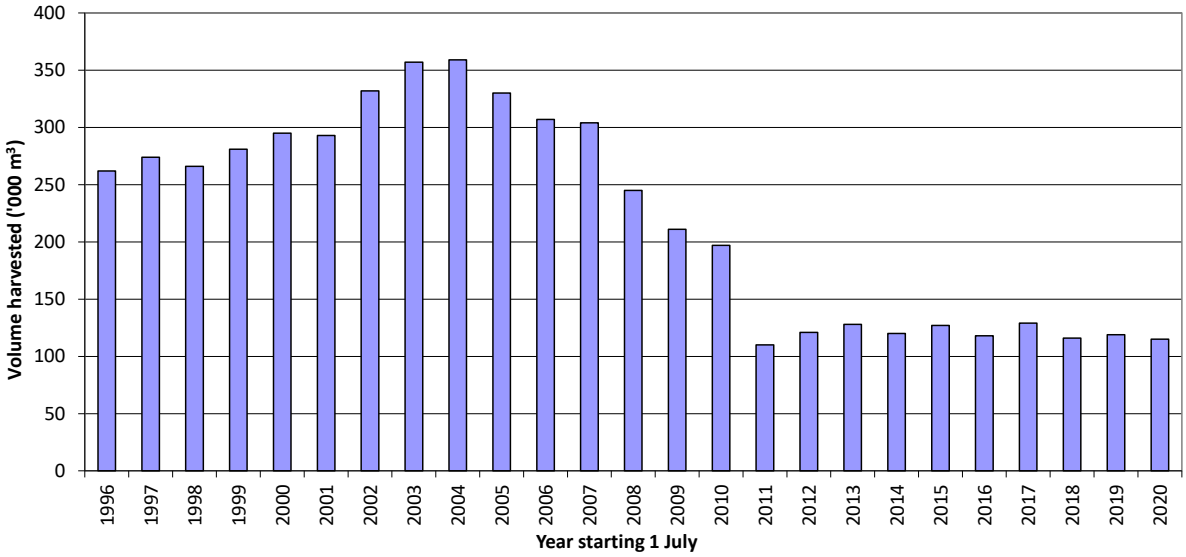
Past actual production

The actual annual production for each relevant forest product over the preceding period (Figures 4 to 6) provides some context for the predicted yields that are reported in the following section. The data shown are sourced from Forestry Tasmania and Sustainable Timber Tasmania's annual reports over the period 1996/97 to 2020/21.

Annual variations that are evident from the data generally represent changes in customer demand for the relevant forest products, rather than changes in Forestry Tasmania or Sustainable Timber Tasmania's capacity to harvest and supply those products.

Figure 4 shows the annual supply of eucalypt high quality sawlogs over the period 1996/97 to 2020/21. As with each previous review, the average actual supply for the past period, i.e., for the five years 2016/17 to 2020/21 (119,000 cubic metres per year), has been less than the quantity that was identified as being available over that period (137,000 cubic metres per year, identified in the 2017 review).

Figure 4 1996/97 to 2020/21 actual annual supply of high quality eucalypt sawlogs from public production forest



Forestry Tasmania experienced a significant decline in the demand for high quality eucalypt sawlogs, from 2008/09 onwards. This decline resulted from the implementation, by its largest customer at the time, of a strategic decision to reduce the production of eucalypt sawn timber. Other customers for high quality eucalypt sawlogs continued to report strong demand for eucalypt sawn timber. However, in 2011/12, these customers also reduced their demand for high quality eucalypt sawlogs. This was because the market for their sawmill residues (the by-products of the milling process to produce sawn timber) practically ended when Forestry Tasmania's largest customer withdrew from most of its woodchip export operations.

Figure 5 shows the annual supply of domestic eucalypt peeler logs over the period 1996/97 to 2020/21. Supply to Forestry Tasmania's customer commenced in mid-2007, with the commissioning of the first rotary peeled veneer mill in May of that year. Supply to the second rotary peeled veneer mill commenced in late 2008. Almost all supply has been from native forests. This reflects the requirements of the customer's end markets for engineered wood products, in which strength, stiffness and hardness are key characteristics that cannot readily be met from peeler logs grown in young plantations. Demand (and subsequent supply) fell in the last two years, in part due to one mill closing after being impacted by a wildfire in 2019.

Figure 5 1996/97 to 2020/21 actual annual supply of domestic eucalypt peeler logs from public production forest

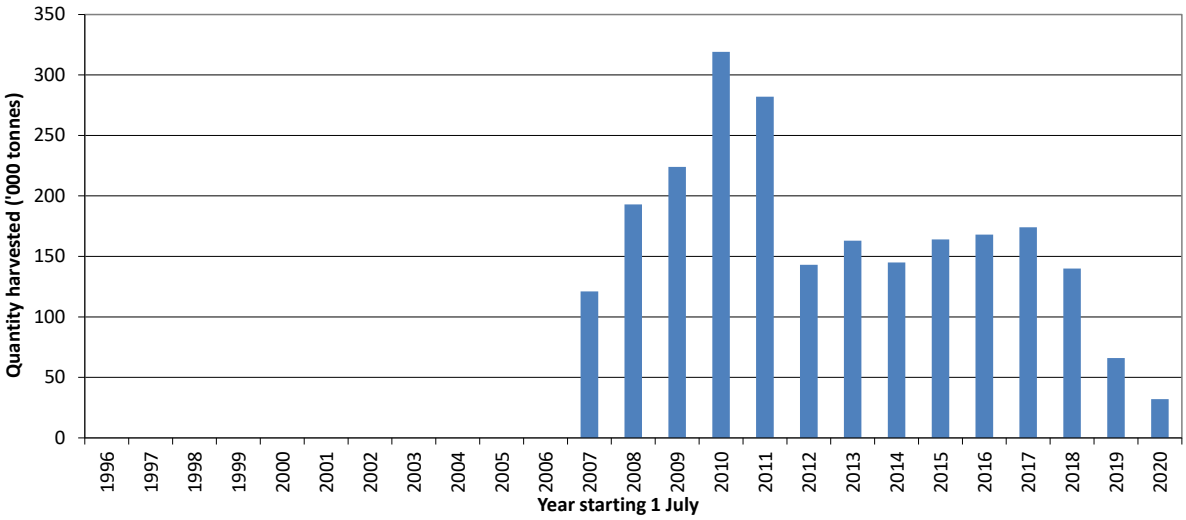
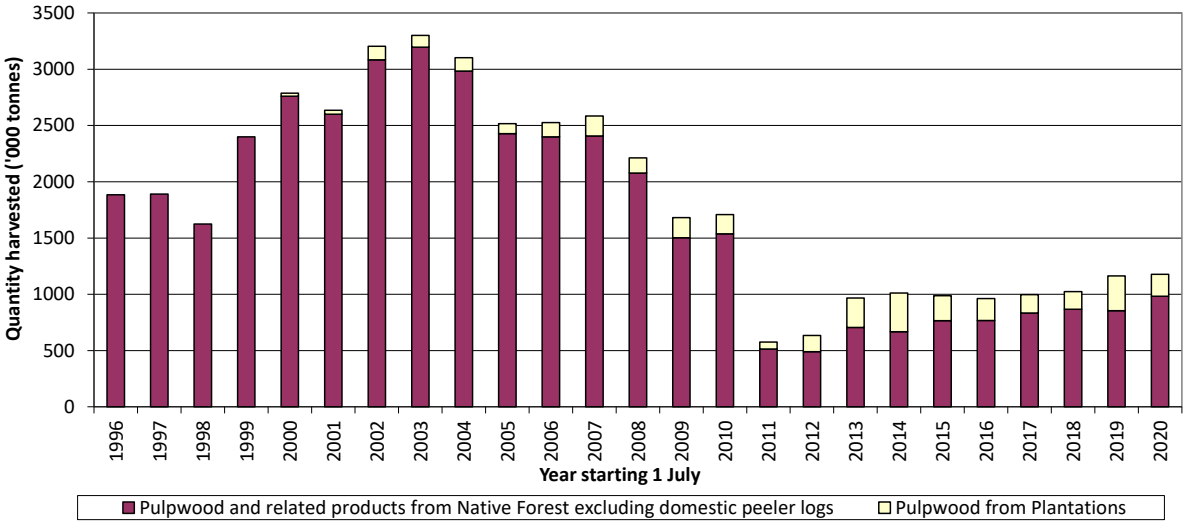


Figure 6 shows the annual supply of arisings over the period 1996/97 to 2020/21. The average supply over the period 1996/97 to 2010/11 was 2.4 million tonnes per year, ranging from 1.6 million tonnes in 1998/99 to 3.3 million tonnes in 2003/04. The average supply from 2016/17 is equivalent to the relevant quantities that were identified in the 2017 review, i.e., it is equal to the 1.1 million tonnes per year that was identified as available for the period 2016/17 to 2020/21 (Sustainable Timber Tasmania, 2017, p. 18).

Figure 6 1996/97 to 2020/21 actual annual supply of arisings (excluding domestic eucalypt peeler logs) from public production forest



The demand for arisings tends to be dominated by overseas markets for pulpwood from eucalypt native forests. Year to year fluctuations in this demand over most of

the reporting period relate to the fluctuating strength of overseas demand for printing and writing paper, e.g., in Japan, China, Taiwan and South Korea, as well as to variations in the relative strength of the Australian dollar and in the cost of ocean freight. From 2011/12 Forestry Tasmania experienced a significant decline in the demand for pulpwood from eucalypt native forests. This decline resulted from the implementation, by its largest customer at the time, of a strategic decision to withdraw from its native forest woodchip export operations.

Yield predictions

The revised yield predictions presented in Figures 7 to 9 are for a 90-year planning horizon, from 1 July 2021 to 30 June 2110. This period notionally represents a single rotation for eucalypt native forests.

The yield predictions are generated from biologically-based forest estate modelling of productive capacity, and do not imply supply based on economic criteria. For example, the yield predictions for eucalypt plantations can only be realised if there is continuing investment in future rotations that are pruned and thinned.

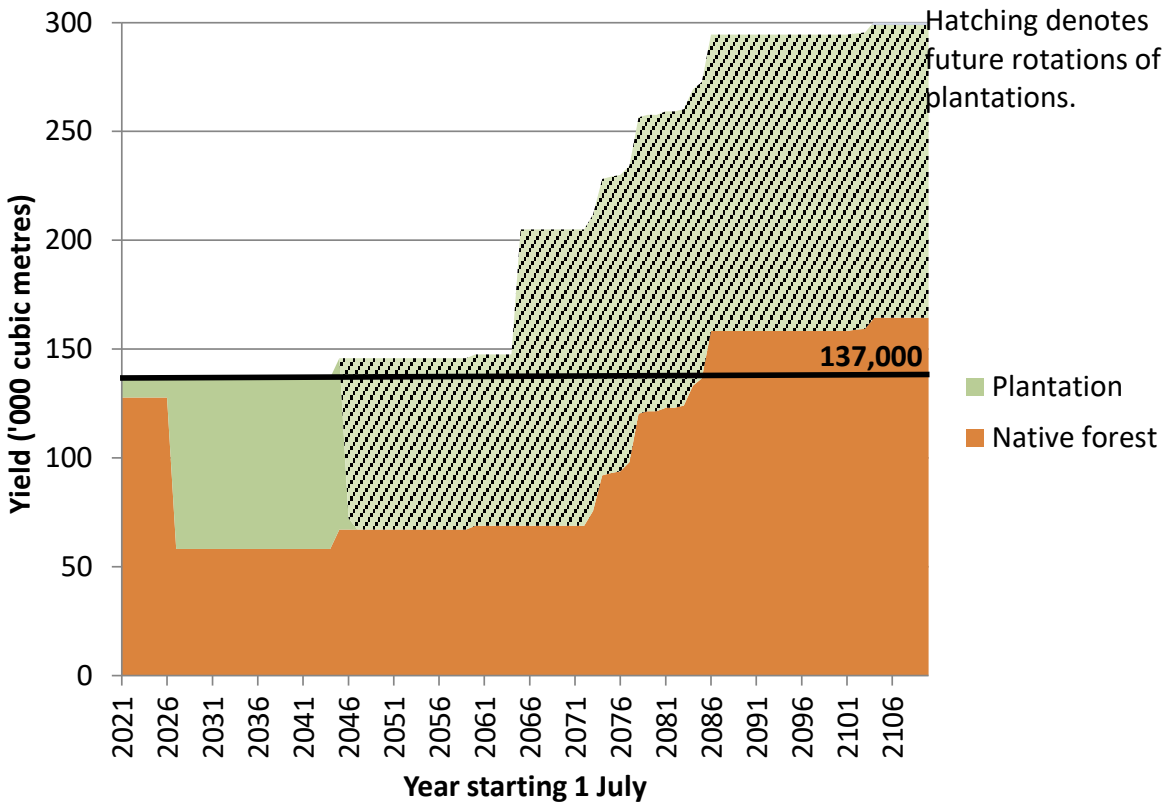
The yield predictions distinguish between production from eucalypt native forests and from eucalypt plantations. These distinctions reflect advice from Sustainable Timber Tasmania's customers about variations in the suitability of native forest and plantation logs for various end products (e.g., sawn timber and engineered wood products).

Only the sustainable yield of high quality eucalypt sawlogs has been calculated (Figure 7). As a result, the yield of peeler logs and arisings from the sustainable yield of high quality eucalypt sawlogs are "spiky" (Figures 8 and 9).

High quality eucalypt sawlogs

The yield predictions for high-quality eucalypt sawlogs, illustrated in Figure 7, indicate an ongoing sustainable yield of 137,000 cubic metres or more per year. From 2027/28 the predicted yield from eucalypt native forests reduces to about 58,000 cubic metres per year, augmented by significant additional quantities of high-quality eucalypt sawlogs from eucalypt plantations.

Figure 7 Predicted yield of high quality eucalypt sawlogs from Permanent Timber Production Zone land



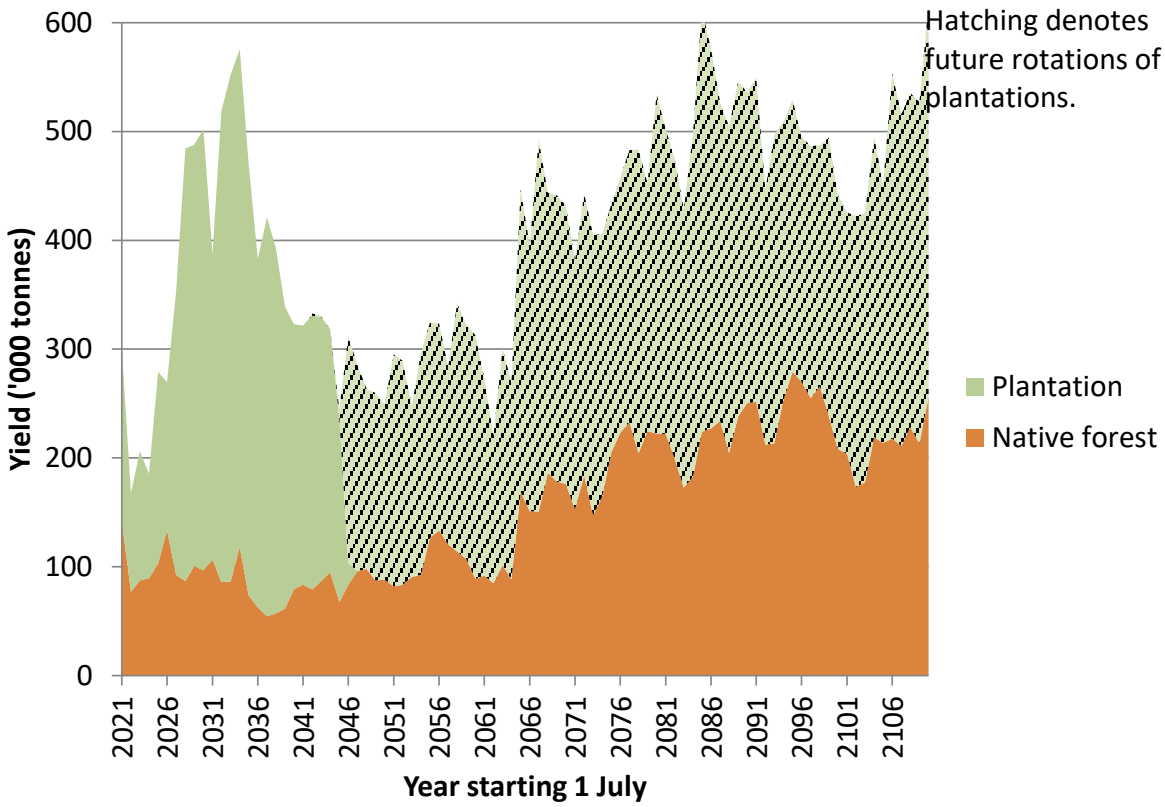
The predicted yield from plantations is separated according to the current rotation, i.e., trees currently growing, and future rotations. This assumes that plantation land will be replanted and trees pruned and thinned. Predicted yields of high quality eucalypt sawlogs from plantations are about 79,000 cubic metres per year from 2027/28 onwards, and reach their predicted full capacity of about 136,000 cubic metres per year from 2065/66.

Eucalypt peeler logs

The yield predictions for eucalypt peeler logs, illustrated in Figure 8, indicate a predicted yield from eucalypt native forests fluctuating around an average of about 90,000 tonnes per year until about 2064/65, after which the average predicted yield increases to about 200,000 tonnes per year for the remainder of the planning horizon.

For plantations the predicted yield of eucalypt peeler logs from the current rotation represents significant potential to augment the predicted yield from eucalypt native forests. However, this potential is subject to the suitability of plantation grown logs for the customers' end use requirements.

Figure 8 Predicted yield of eucalypt peeler logs from Permanent Timber Production Zone land



Predicted yields of eucalypt peeler logs from current rotation plantations average about 275,000 tonnes per year. In future rotations predicted yields of eucalypt peeler logs from plantations reach their long-term predicted capacity of about 270,000 tonnes per year from about 2065/66.

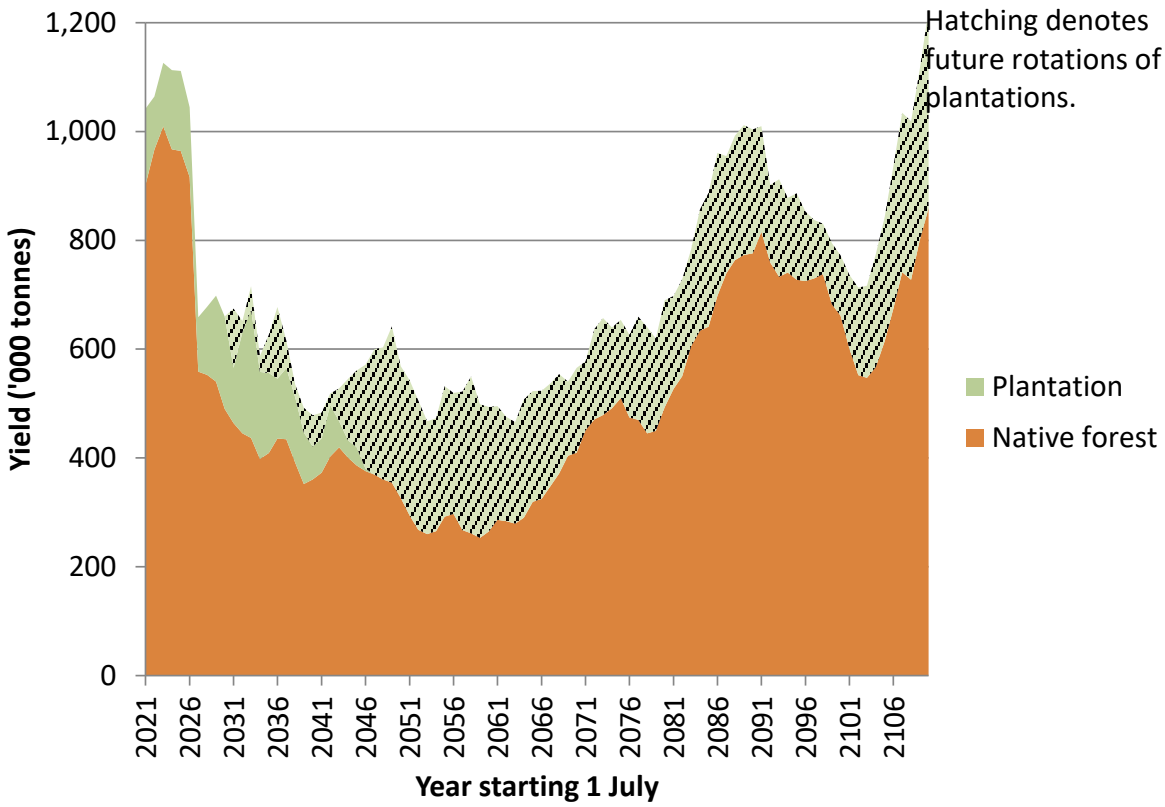
Arisings

The yield predictions for arisings, illustrated in Figure 9, indicate an initial 1.1 million tonnes per year on average to 2026/27, with about 950,000 tonnes from eucalypt native forest. The eucalypt native forest supply decreases to about 500,000 tonnes per year from 2027/28, reducing further to about 300,000 tonnes per year on average in the 2050s.

The main factor contributing to this decrease is the continuation of the transition, begun in the late 1980s, from harvesting of mature age eucalypt native forest to harvesting of older regrowth eucalypt native forest. The former are generally beyond the optimum age for sawlog production, and contain a relatively higher proportion of trees with defects that make them unsuitable for producing high quality sawlogs or eucalypt peeler logs.

From the 2060s onwards, the predicted yield from eucalypt native forests increases again. This reflects a further transition to harvesting of younger regrowth eucalypt native forest, in which the optimum age for the harvesting of trees to produce high quality eucalypt sawlogs of up to 90 years is also characterised by the harvest of a relatively high number of other, smaller trees suited to production of arisings.

Figure 9 Predicted yield of arisings from Permanent Timber Production Zone land



The predicted yields of arisings from eucalypt plantations in the first 25 years averages about 150,000 tonnes per year. Beyond this initial period the long-term yield of arisings from eucalypt plantations is about 200,000 tonnes per year on average.

Maintaining productive capacity

The predicted total standing quantity of merchantable wood, within eucalypt forest areas available for wood production at the end of the planning horizon in 2110, is about 43 million cubic metres. This compares with the current value of about 35 million cubic metres. The difference is a result of the transition from harvesting of mature age eucalypt native forest to harvesting of older regrowth, then younger regrowth eucalypt native forest as mentioned earlier. Initially the standing volume decreases, then it increases, before decreasing again near the end of the planning horizon.

This outcome meets a fundamental principle of sustainable yield, discussed by Ferguson (2013). This principle is that the forecast productive capacity of a forest at the end of a planning period is at least equivalent to, and preferably better than, the actual productive capacity at the start of the planning period.

Conclusion

This review confirms Sustainable Timber Tasmania's ability to make available at least 137,000 cubic metres per year of high quality eucalypt sawlogs from Permanent Timber Production Zone land for the next 90 years. It is also evident from the prediction of growing stock at the end of the planning horizon that this supply level can be sustained thereafter. However, these yield predictions are generated from biologically based forest estate modelling of productive capacity, and do not imply supply based on economic criteria.

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Glossary

The following definitions reflect the meanings that are given to the various terms in this review, and may not match exactly the equivalent meanings of those terms in other contexts.

Arisings

Forest products in log form, other than high quality eucalypt sawlogs and eucalypt peeler logs, arising from the harvesting of eucalypt native forests and eucalypt plantations. Arisings may include pulpwood, export peeler logs, Category 8 sawlogs, Category 2 sawlogs and poles and posts. In the case of eucalypt native forests, arisings may include species other than eucalypt species (e.g., blackwood and silver wattle).

Category 2 sawlogs

Eucalypt logs that meet the relevant specifications that are in common use by Sustainable Timber Tasmania, representing logs that are suitable for sawmilling but that do not meet the definition of high quality eucalypt sawlogs. In general terms, Category 2 sawlogs comprise eucalypt logs with a minimum small end diameter under bark of 30 cm, a minimum length of 2.4 m and external defect (according to various categories including internal decay, spiral grain, sweep, scars, limbs and bumps) that affects no more than one quarter of the log.

Category 8 sawlogs

Eucalypt logs that meet the relevant specifications that are in common use by Sustainable Timber Tasmania, representing logs that are suitable for sawmilling but that do not meet the definitions of high quality eucalypt sawlogs or of Category 2 sawlogs. In general terms, Category 8 sawlogs comprise eucalypt logs with a minimum small end diameter under bark of 30 cm, a minimum length of 2.4 m and external defect (according to various categories including internal decay, spiral grain, sweep, scars, limbs and bumps) that affects no more than one half of the log.

Clearfelling

A silvicultural management practice, applied in some eucalypt native forests and in plantations, in which all of the merchantable trees within a coupe are removed in a single harvest, generally followed by a high-intensity burn and aerial sowing (in eucalypt native forests) or planting (in plantations).

Engineered wood products

Panels and beams manufactured in larger dimensions than would be available from logs themselves, through various processes that involve peeling, slicing, sawing, chipping, crushing or grinding logs into smaller dimensions and then reconstituting them in larger dimensions with the aid of resins, presses and kilns. Examples include plywood, laminated veneer lumber, cross laminated panels, oriented strand board, medium density fibreboard, chipboard and hardboard.

Eucalypt native forests

Native forests in which eucalypt species are dominant.

Eucalypt peeler logs

Eucalypt logs that meet the relevant specifications under Sustainable Timber Tasmania's contract with its relevant domestic customer. These specifications exclude logs that meet the definition of high quality eucalypt sawlogs. In general terms, eucalypt peeler logs have a diameter under bark of between 18 cm and 70 cm, a minimum length of 900 mm, no internal decay and minimal other defect (according to various categories including spiral grain, sweep, scars, limbs and bumps).

Export peeler logs

Eucalypt logs that do not meet the definition of high quality eucalypt sawlogs or eucalypt peeler logs, or of another higher value product, but that are suitable for peeling to produce eucalypt structural veneer.

Forest Management Plan

This document is an overview of Sustainable Timber Tasmania's Forest Management System. It provides stakeholders with a high level description of how Sustainable Timber Tasmania conducts its business. In particular, it details Sustainable Timber Tasmania's approach to managing social, economic and environmental values while meeting log supply requirements from Permanent Timber Production Zone land.

High Conservation Value Forest

Forests that possess one or more of the following attributes: concentrations of biodiversity values; regionally significant large landscape level forests; rare, threatened or endangered ecosystems; provide basic services of nature in critical situations; fundamental to meeting basic needs of local communities; and/or critical to local communities' traditional cultural identity.

High quality eucalypt sawlogs

Eucalypt logs that meet the relevant specifications for eucalypt "VQ1" or "VQ2" sliced veneer logs, Category 1 eucalypt sawlogs or Category 3 eucalypt sawlogs, each as defined in the *Forestry Regulations (Tas) 2009*. In general terms, high quality eucalypt sawlogs comprise eucalypt logs with a minimum small end diameter under bark of 30 cm, a minimum length of 3.6 m and minimal external defect (according to various categories including internal decay, spiral grain, sweep, scars, limbs and bumps).

Intensive forest management

Either eucalypt plantation management in general, or the thinning of eucalypt native forests.

Native forests

Forests comprising tree species that are native to Tasmania, other than plantations.

Partial felling

A silvicultural management practice, applied in native forests, in which the merchantable trees within a coupe are removed in two or more successive

harvests, generally separated by a period of at least five (and up to twenty or more) years. Partial felling may be followed by a low intensity burn and hand sowing.

Permanent Timber Production Zone land

This is a new land classification, established under the *Forest Management Act (Tas) 2013*. It applies to the area of public land that is managed by Sustainable Timber Tasmania for wood production (about 800,000 hectares), and is the forest estate on which the yield predictions in this review are based.

Plantations

Forests established by planting seedlings in discrete rows, rather than by sowing seed. In Tasmania, plantations may be of hardwood species (mainly *Eucalyptus nitens* or *E. globulus*) or of softwood species (generally *Pinus radiata*).

Pruning

A silvicultural management practice, applied in plantations, in which the branches on the lower section of selected trees are removed in one or more treatments. Pruning facilitates the growth of clearwood (i.e., knot free wood) that is required for high quality eucalypt sawlogs and for eucalypt peeler billets.

Pulpwood

Eucalypt logs that meet the relevant specifications that are in common use by Sustainable Timber Tasmania, representing logs that are suitable for the production of pulp and paper and that do not meet the relevant specifications for a forest product of higher value.

Rotary peeled veneer

Veneer that is produced by holding a log, rotated about its centre axis, against a large blade that peels the log in a continuous sheet. The veneer sheet is then clipped into panels that are dried and reassembled into plywood and other engineered wood products.

Rotation or rotation length

The period from the initial establishment of a forest to the final harvest of trees from that initial establishment, notionally about 90 years for eucalypt native forests (typically varying from about 60 years on highly productive sites to about 120 years on sites of low productivity) and about 25 years for eucalypt plantations that are thinned and pruned.

Silviculture

The management of forests (in the same sense that “horticulture” means the management of plants). A silvicultural regime is a specific “recipe” for the management of an area or type of forest, comprising a schedule of treatments (e.g., establishment, pruning, thinning and harvest).

Special timbers forests

Native forests in which eucalypt species are not dominant. These include rainforests, mixed species forests in which species other than eucalypts are dominant, blackwood forests and silver wattle forests.

Sustainable yield

The level of commercial timber (or product mix) that can be maintained under a given management regime, without reducing the long-term productive capacity of the forest.

Thinning

A silvicultural management practice, applied in eucalypt native forests and in plantations, in which the smaller and lower quality trees within a coupe are removed in one or more treatments. Thinning may result in an interim harvest of merchantable trees. Thinning assists to accelerate the growth of the most valuable (largest and best quality) trees.

Tonnes

Refers to green metric tonnes, i.e., to the weight in metric tonnes of logs immediately following harvest. Logs and timber tend to dry out (and to lose as much as 50% of their weight), when they are processed into final products. For eucalypt logs that are measured and reported in cubic metres, one cubic metre generally weighs between 1.05 and 1.10 green metric tonnes.

Variable retention

A silvicultural management practice, applied in native forests, in which structural elements or biological legacies (for example old trees, stags, logs, tree ferns) from the harvested coupe are retained for the new coupe to achieve ecological objectives. The practice typically requires most of the felled area to be within one tree height of forest that is retained for at least a full rotation.

APPENDIX 1 Auditor's statement

Sustainable Timber Tasmania
Sustainable Yield Review Audit
May 2022

Dr Cris Brack, The Mullion Group Pty Ltd.

Executive Summary

Sustainable Timber Tasmania undertakes a five-yearly sustainable yield review as a requirement of the Tasmanian Regional Forest Agreement. I have been engaged to conduct an audit to inform Sustainable Timber Tasmania of the reliability of data sets, models and systems that support the production of sustainable yield estimates. I, in conjunction with colleagues on earlier occasions, have been involved in similar audits in 1996, 2002, 2007, 2011 and 2017. This current audit is based on these earlier works and focuses on changes to the various models and systems.

The 2017 report noted that developments and improvements to the system had significantly slowed and greater effort had been directed in to annual monitoring systems. 2022 saw the maturity of the monitoring system with tight linkage of provisional coupe design and the Forest Operations Database, wide-spread reliability of the Coupe Confidence Classification system and timely harvest yield calibration for the native forests. These confidence and calibration programs ensure the reliability of the native forest estimates for sustained yield calculations.

Concern over the plantation Site Index and yield table estimates were responded to with a concerted effort to establish pre-harvest inventories in all coupes that had been pruned and thinned. These inventories, over the majority of the plantation estate, provide precise data that is very reliable for short to medium term sustainable yield calculations. New growth models and subsequent yield tables have not been developed but will be needed for future efforts and confidence for longer term sustainable yield calculations.

No substantive changes were made to the optimisation system.

Overall, I conclude that the datasets, models, approximations, systems and methodologies used in the calculation of sustainable yield for 2022 are reasonable and adequate for purpose.

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