

A Review of the Sustainable Sawlog Supply from the Blackwood Management Zone

December 2013

Forestry Tasmania

Citation:

Forestry Tasmania (2013). *A Review of the Sustainable Sawlog Supply from the Blackwood Management Zone*. Forestry Tasmania

Published by:

Forestry Tasmania

GPO Box 207

Hobart Tasmania 7001

Copyright:

This work is copyright. Apart from any use permitted under the *Copyright Act 1968*, no part may be reproduced without written permission from Forestry Tasmania.

Contents

| | |
|---|----|
| Summary | 4 |
| Introduction | 5 |
| Resource base | 6 |
| Blackwood Management Zone (StBwd) | 8 |
| Arisings from mature wet eucalypt forest and rainforest | 10 |
| Yield Production | 10 |
| Management Strategy | 11 |
| Yield Predictions..... | 12 |
| Previous Review | 12 |
| Blackwood (Swamp) Forests | 13 |
| Fenced Intensive Blackwood | 13 |
| Blackwood Sustainable Yield | 14 |
| Reporting..... | 16 |
| References | 17 |
| Glossary of Terms and Acronyms | 18 |
| | |
| Figure 1. StBwd Management Zone..... | 9 |
| Figure 2. Production of millable blackwood logs (m ³) from State forests. (Millable logs include Category 4 and utility sawlogs). | 11 |
| Figure 3. Two potential outcomes for FIB stands. | 14 |
| Figure 4. Blackwood sawlog sustainable yield for the Blackwood (Swamp) Forests (includes category 4 and utility grade logs). | 15 |

Summary

The objective of this *Review of the Sustainable Sawlog Supply from the Blackwood Management Zone* is to update the sustainable level of harvesting from Forestry Tasmania's blackwood management zone in north-west Tasmania. This zone includes blackwood swamps and fenced-intensive blackwood stands, which are established by fencing eucalypt regeneration coupes in order to promote blackwood regeneration. The designated blackwood management zone includes 8500 ha, of which 6900 ha is available for harvesting.

The blackwood forests are managed on a sustainable basis on a rotation length of about 70 years. Production of millable blackwood logs (includes category 4 and utility logs) from the designated blackwood forests for the last seven years has averaged 1,900 m³/y.

This review modelled the sustainable sawlog supply from the blackwood management zone as 3000 m³/y, after applying a 10 percent headroom discount for future unanticipated changes in resource availability. Because blackwood swamps are typically inoperable in one year in five, it is recommended that the annual allowable harvest for any one year could be up to 3750 m³/y.

The results from this review are intended to inform a new Special Timbers Management Plan in 2015, which will determine yields of special timbers, including blackwood from sources beyond the designated blackwood management zone.

Depending on developments with LIDAR technology and other forest management and special timbers industry priorities, it is intended that the next review of the sustainable sawlog supply from the blackwood management zone will be undertaken within ten years.

Introduction

The *Special Timbers Strategy* (Forestry Tasmania 2010) highlighted the value of Tasmania's special timbers and the importance of State forests as one of the few remaining sources of commercially available premium timbers being sustainably produced in Australia. The most abundant and fastest growing special timber is blackwood (*Acacia melanoxylon*) which is processed for high-value products such as fine furniture, panelling, cabinet work, musical instruments and craft items. Forestry Tasmania has led the development of silvicultural regimes for the sustainable supply of blackwood from native forests in Australia (Elliott *et al* 2008).

The *Special Timbers Strategy* outlined three overarching objectives for special timbers, including blackwood:

1. Sustaining the resource. This included a commitment to periodic sustainable yield estimates for blackwood forests.
2. Maximising value recovery. This included implementation of feature grade specifications for non-sawlog special timber to assist its recognition and recovery.
3. Promoting Tasmanian special timbers to the world. This included promotion of Chain of Custody certification to ensure that special timbers are legally sourced from sustainably managed forests.

The 2013 *Review of the Sustainable Sawlog Supply from the Blackwood Management Zone* is a key outcome of the *Special Timbers Strategy* and consistent with Forestry Tasmania's 2008 *Sustainability Charter*, which outlines its management for all State forests. The *Special Timbers Strategy* set annual supply targets for special timbers millable logs (includes category 4 sawlogs and utility logs) for the ten year period from 2010-19. The target for blackwood was 10,000 m³/year, which is 80 percent of the total annual supply target for special timbers. This is consistent with the supply level set under the 1991 Forest and Forest Industry Strategy and affirmed under the 1997 Tasmanian Regional Forest Agreement¹ and with previous published resource estimates (Forestry Tasmania 1999). However, since 2010

¹ The FFIS and the RFA prescribed a volume of 10,000 m³/year of blackwood sawlogs but did not specify a particular quality (ie did not distinguish between category 4 and utility logs)

the anticipated supply of blackwood has been affected by substantial areas of new reserves to be created under the *Tasmanian Forests Agreement Act 2013*, which has primarily reduced the supply from mature wet eucalypt forests rather than from blackwood forests.

The objective of this *Blackwood Resource Review* is to update the sustainable level of harvesting from the blackwood forests of north-western Tasmania.

Resource base

Blackwood is widespread throughout Tasmania but the supply of blackwood timber is drawn from three main sources (Forestry Tasmania 2005):

- the blackwood forests, consisting primarily of the swamps but also including small areas of blackwood-rich riverine forest in north-western Tasmania (Murchison District),
- as a secondary product (arisings) from the harvest of blackwood-rich wet eucalypt forests, and
- an additional resource being created by fencing regeneration established after harvesting of blackwood-rich wet eucalypt forests, known as fenced-intensive blackwood (FIB).

The blackwood swamps have been Australia's prime source of high quality blackwood timber for almost a century (Jennings 1998). Much of the original blackwood swamp forest was cleared for agriculture, a practice which effectively ceased in the 1970's. Over 30% of the remaining blackwood swamps are now in Comprehensive, Adequate and Representative (CAR) reserves established under the Tasmanian Regional Forest Agreement (Commonwealth of Australia and State of Tasmania 1997). Blackwood forests outside reserves now supply a sustainable sawlog yield based on a 70-year rotation.

Arisings from the harvest of wet eucalypt forest have also made a significant contribution to the blackwood timber supply and in some years have been the major source of supply. Blackwood is also produced in limited quantities from harvesting in the rainforest special

timbers zone, which primarily supplies myrtle, sassafras and celery-top pine logs. Arisings will continue, but at a reduced level, as the proportion of regrowth forest harvesting increases and the proportion of oldgrowth forest harvesting declines.

Fenced-intensive blackwood (FIB) involves the fencing of blackwood-rich wet eucalypt coupes that contain a significant blackwood component following the standard clearfell, burn and sow (CBS) treatment. Fencing is required to protect blackwood seedlings from preferential browsing by mammal browsers and usually results in high stocking of blackwood in these coupes.

The FIB program has established more than 1500 hectares of fenced eucalypt/blackwood regeneration since 1985 (Table 1). Currently up to 100 ha per year of blackwood-rich wet eucalypt forests within Murchison District are fenced for blackwood regeneration when suitable areas become available. These fenced areas are assessed several years after establishment to determine whether they meet minimum stocking requirements. At that point, those that fail to meet guidelines are removed from the FIB program. In this way there is always a group of young stands that have not been confirmed as FIB. If investment funds become available, and suitable sites can be identified, further eucalypt regeneration areas could be fenced and managed as fenced-intensive-blackwood.

Research to evaluate blackwood as a plantation species commenced in the mid 1980s (Nielsen and Brown 1997; Medhurst *et al.* 2003). Some 800 ha of blackwood was planted, mainly with a nurse crop of either *Pinus radiata*, *Eucalyptus globulus* or *Eucalyptus nitens*. However, blackwood plantations proved difficult to manage, with issues related to the timing of nurse crop removal and form of plantation blackwood. Blackwood plantations may be more appropriate for intensive farm woodlots rather than for extensive land managers such as Forestry Tasmania. There is currently no active plantation research program on Permanent Timber Production Zone Land, although work continues on private land.

Blackwood Management Zone (StBwd)

Forests managed primarily for blackwood are identified as a separate management unit within the Forestry Tasmania zoning system; the Management Decision Classification (MDC) system. The forests are coded as StBwd and consist of either blackwood swamp forests or areas of blackwood-rich wet eucalypt forest that have been harvested, regenerated and fenced as part of the fenced-intensive blackwood program. Combined with rainforests (StRft) and eucalypt forests that are rich in special timbers (StEuc), they form the Special Timbers Zone described by the *Special Timbers Strategy*. The blackwood management zone currently consists of 8500 hectares as shown in Table 1 and depicted in Figure 1. Of this, 6900 hectares are considered to be production zone areas. Further areas may be added to the Blackwood Management Zone as areas of suitable blackwood-rich wet eucalypt forest are identified and fenced.

| Zone | Area (ha) | |
|---|------------------|-------------|
| Blackwood production zone | | |
| Un-aged blackwood coupe production area | | 4600 |
| Aged blackwood regrowth (after systematic harvesting) | | 750 |
| FIB production area: | | |
| Confirmed FIB | 1200 | |
| Young stands awaiting assessment | <u>350</u> | |
| Total FIB area | 1550 | 1550 |
| Total blackwood production area | | 6900 |
| Non-production zone | | 1600 |
| Total StBwd area | | 8500 |

Table 1. Area of the StBwd Management Zone

About 200 hectares of the StBwd zone are within the *Future Reserve Land of the Tasmanian Forests Agreement Act 2013*. This area is also included in Schedule 5 – Special Species Contingency Areas as forestry coupe SR22S. Table 1 does not include this area and this resource review assumes that the area within the Future Reserve Land will not be available for blackwood production.

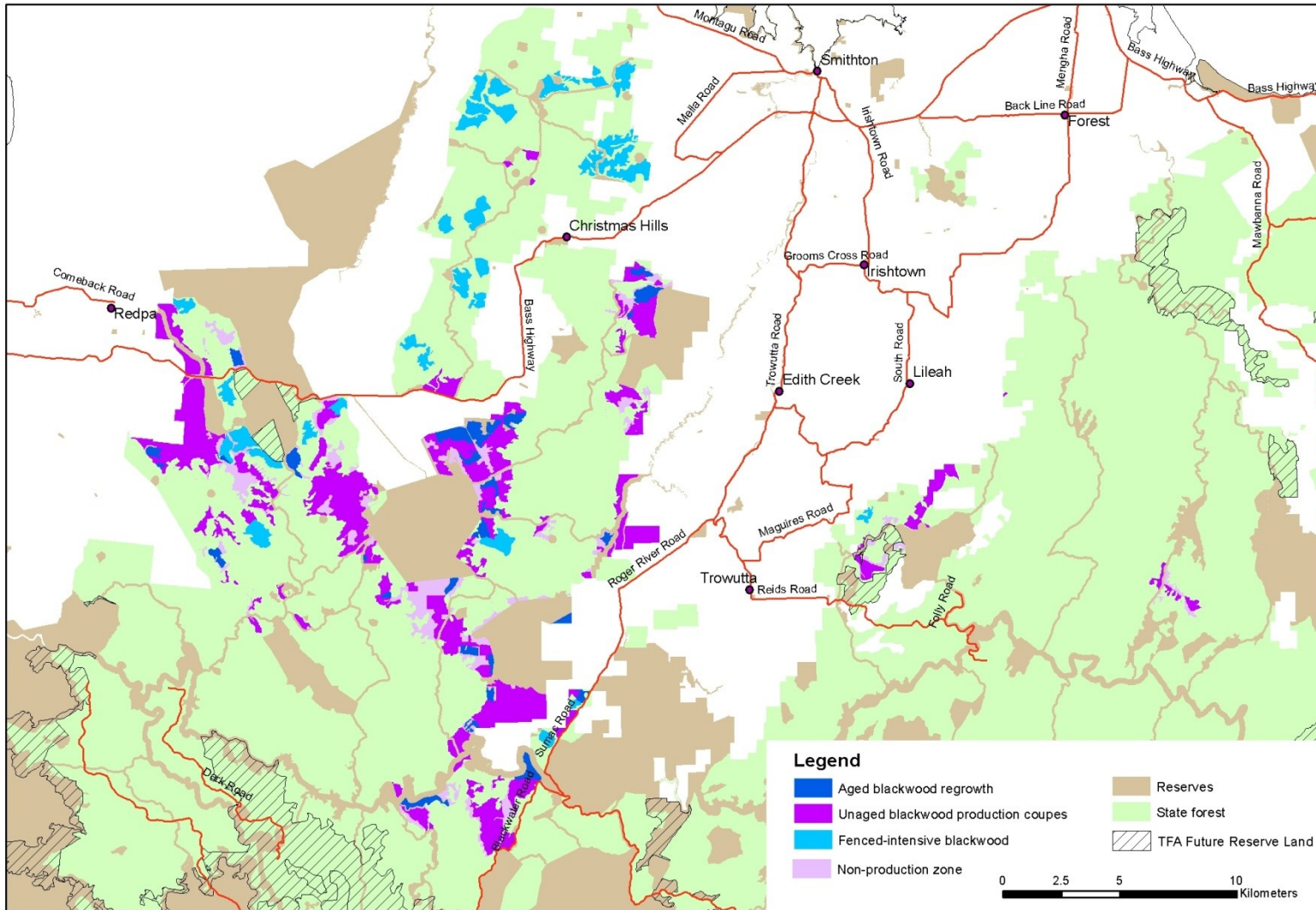


Figure 1. StBwd Management Zone

Arisings from mature wet eucalypt forest and rainforest

The most recent review of eucalypt sawlog sustainable yield (Forestry Tasmania 2007) indicates that harvesting of mature wet eucalypt forests will decline over the next two decades and become negligible by 2030. Small quantities of blackwood sawlogs are likely to be produced from silvicultural regrowth established after clearfell, burn and sow (CBS) operations in blackwood-rich areas that began in the 1960's. These areas are generally not yet ready for re-harvesting.

The *Tasmanian Forests Agreement Act 2013* also has had a significant impact on the available area of mature wet eucalypt forest and rainforest special timbers and this will be reflected in reduced blackwood arisings.

Yield Production

Figure 2 shows the production of millable blackwood logs (includes category 4 and utility grade logs) from all sources on State forest for the last seven years. Production has fluctuated with market demand and the availability of supply, particularly due to the occurrence of wet summers which limit harvest operations. The average yield has been 5,300 m³/year, which represents 53% of the annual millable log supply target of 10,000 m³/year. However, this reduction has been offset to some degree by significant quantities of lower grade logs known as 'outspec logs' which can be processed economically at times of high market demand. Production of millable blackwood logs utility logs from the designated blackwood forests for the last seven years has averaged 1,900 m³/y, which represents 36% of the supply from all sources over the period.

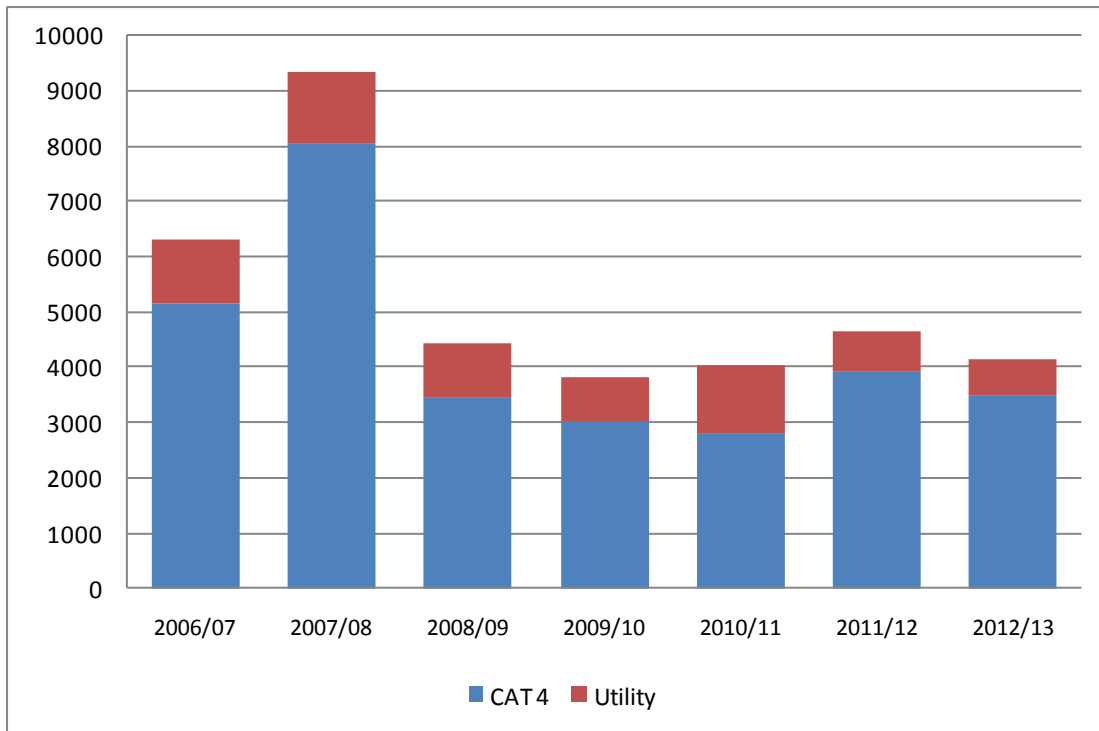


Figure 2. Production of millable blackwood logs (m3) from State forests. (Millable logs include Category 4 and utility sawlogs).

Management Strategy

The blackwood forests are to be managed on a sustainable basis with a 70-year rotation to maximise the supply of sawlogs. Blackwood silviculture is described in Forestry Tasmania Technical Bulletin No 10 (Forestry Tasmania 2005).

The management regimes for fenced-intensive-blackwood stands are still under development but, where investment funds permit, the approach to determining the appropriate stand management regime for any given FIB coupe should be as follows:

1. Survey the individual coupe at age ten years and determine the stocking and distribution of blackwood with sawlog form, as well as for eucalypts. If both the eucalypt and blackwood stocking are acceptably high, proceed with thinning of the eucalypts as points 2 and 3.
2. Thin areas of the coupe with blackwood stockings greater than 500 stems per ha, to low eucalypt retention levels of 100 – 200 eucalypt stems per ha, and

3. Retain higher levels of eucalypt (250 – 300 stems per ha) where the blackwood stocking is low (less than 500 stems per ha).

This management regime would involve a non-commercial thinning of eucalypts to increase blackwood growth rates so that sawlogs of both eucalypts and blackwood could be grown with rotations of 60 to 70 years. Analysis of results from fenced coupes indicates that about 60% of the fenced area carries a high stocking of blackwood. The remainder usually contains more blackwood than an unfenced coupe, but is variable both between and within coupes. For unthinned stands the rotations will likely be 80 to 90 years.

Some FIB stands occur within designated biodiversity spines, where the rotation must be at least 80 years to enhance habitat conditions for sensitive species such as the keeled snail (*Tasmaphena lamproides*). Within biodiversity spines, stands can either be managed on unthinned regimes of 80 to 90 years to produce eucalypt and blackwood trees of about 60 cm and 50 cm diameter at breast height respectively, or on thinned regimes to grow larger eucalypt and blackwood sawlogs over at least 80 years.

Yield Predictions

Blackwood sawlogs fall into three categories:

1. Category 4 sawlog
 - a. Minimum length 3.1 metres
 - b. Minimum small end diameter 30 centimetres
2. Utility sawlog
 - a. Minimum length 2.5 metres
 - b. Minimum small end diameter 25 centimetres
3. Outspec
 - a. Sawlog classified as outspec are logs that are outside specification, but are taken for sawn timber production.

Previous Review

The last review of the sustainable blackwood sawlog supply was published in 1999 (Forestry Tasmania 1999). That review estimated the sustainable supply of category 4 and utility logs

from all sources to be 8,500 m³ per annum, with a rise in production after 2020 based on a predicted supply from existing plantations and a future fenced-intensive blackwood resource.

The basis for yield predictions in the blackwood swamp resource was an inventory program of some 7800 measurement plots measured from 1972-1993, and the SWAMPS system, a Forestry Tasmania software package for projecting volume and growth through time. For the assessed area, the output from SWAMPS was a file for each coupe with sawlog volumes calculated through time. However, nearly one-third of the blackwood resource area was unassessed and local knowledge was used for volume estimation.

Blackwood (Swamp) Forests

For this review, yield predictions in the blackwood forest resource were based on a combination of the previous yields from the SWAMPS system and a small pilot inventory project. The pilot inventory provided a basis for estimating yields in the previously unassessed areas.

In addition, new area reconciliation and product volume reconciliation analyses were completed. The area reconciliation process involved comparison between planned and actual harvested areas and resulted in a coupe area discount factor being applied to projected outcomes. The discount between projected and achieved harvested area is due to a range of factors including drainage, commerciality and forest practices prescriptions.

Product volume reconciliation involved the comparison of predicted volumes from the SWAMPS system with achieved volumes from completed harvesting operations. A product recovery discount factor was applied to future predicted yields.

Fenced Intensive Blackwood

This review does not include fenced-intensive blackwood in the sustainable yield calculation or attempt to predict future wood supply from FIB. What is presented here is a brief

sensitivity analysis on alternative FIB regimes, indicating predicted extremes of potential outcomes.

Figure 3 shows the results of two scenarios that are characterised below. Case 1 is a high performance scenario representing high stocking of blackwood and a heavy thinning of eucalypt as described in the management strategy section above. This results in high blackwood growth rates, good form in a significant proportion of blackwood trees and harvesting between ages 60 and 70 to achieve forecast sawlog volumes of between 150 m³ and 200 m³ per hectare.

Case 2 represents the other extreme in which there is a low stocking of blackwood in an unthinned stand. In this case most blackwood is suppressed under a eucalypt overstorey resulting in lower growth rates, poorer sawlog form and harvesting between ages 80 and 90 to achieve forecast sawlog volumes of 25 to 30 m³ per hectare.

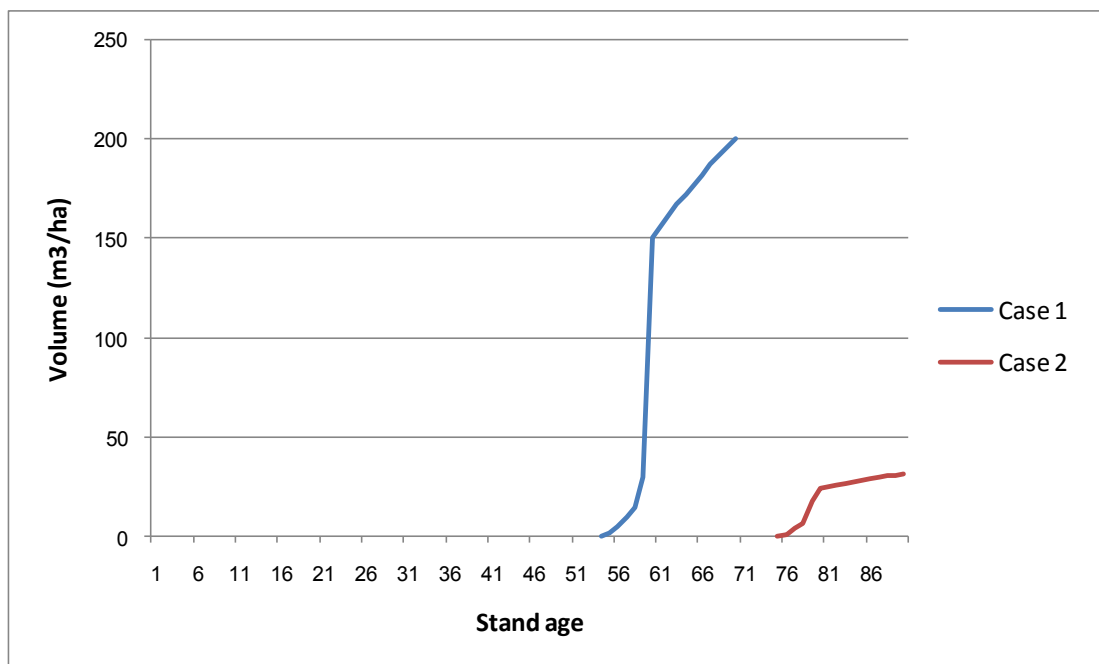


Figure 3. Two potential outcomes for FIB stands.

Blackwood Sustainable Yield

For this review, data from the various sources described above were used to construct a forest estate model using the Remsoft Spatial Planning System. The 70-year yield predictions were based on the nominal rotation length of the swamp blackwoods.

The solid line in Figure 3 shows the sustainable sawlog supply from the blackwood swamp forests resource. The annual non-declining yield of blackwood sawlogs (category 4 and utility) was modelled at 3,300 m³/y.

The shaded area indicates that when a headroom of 10% is applied, the annual sustainable yield is **3,000 m³**. Burgman *et al* (2012) describe headroom as:

Headroom refers to the reduction that wood supply planners apply to account for unanticipated constraints, and constraints that go beyond the existing Forest Practices Code. That is, headroom accounts primarily for future, unanticipated changes, and also for tactical and operational constraints that are known at present but are not captured by area discounts.

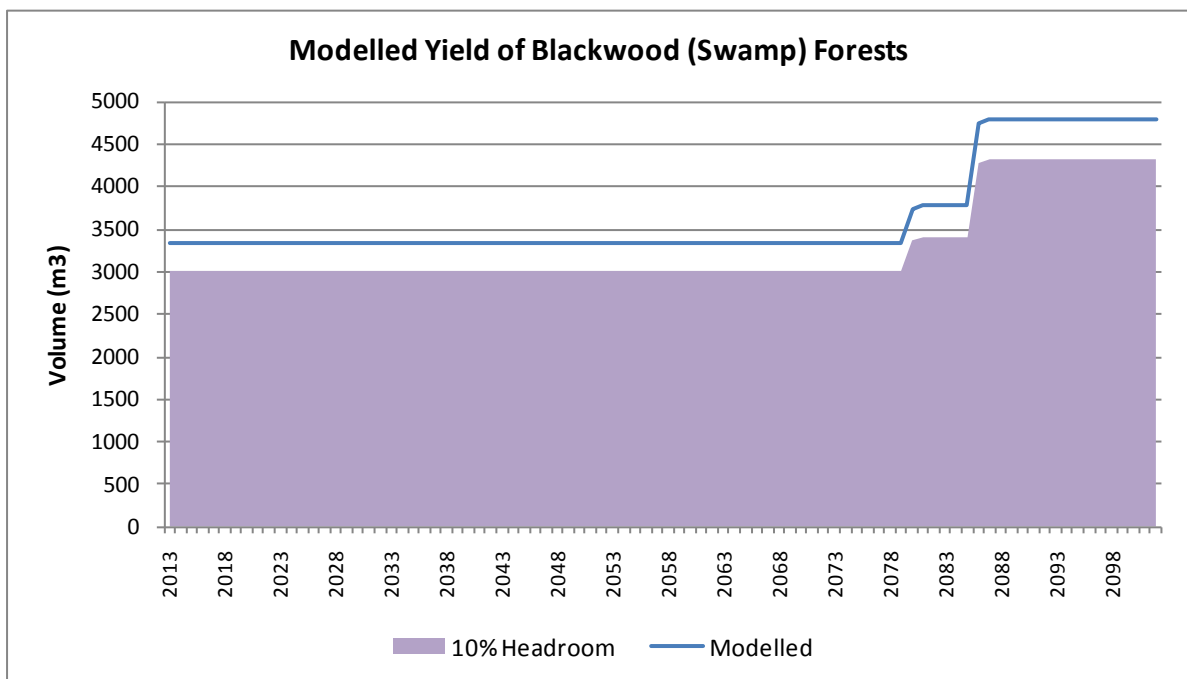


Figure 4. Blackwood sawlog sustainable yield for the Blackwood (Swamp) Forests (includes category 4 and utility grade logs).

In some years wet conditions preclude harvesting in blackwood swamps. For this reason the annual sustainable supply of blackwood sawlogs should be approached as a quantity to be averaged over a number of years. A practical approach to this situation is to establish an annual allowable cut level that anticipates one year in five will see inoperable conditions in the swamps. This means that the allowable harvest volume for any one year could be set at up to 125% of the sustainable level, or 3750 m³.

In addition to the blackwood forests sustainable yield described above, production of blackwood sawlogs is also expected from two other sources.

- Arisings from harvesting of mature wet eucalypt forest and rainforest special timbers areas. The supply of blackwood sawlog as arisings from mature forest harvesting has recently been about 2,000 m³/year. This amount is expected to decline due to reduced mature wet eucalypt forest harvesting and the effect of new reserves designated by the *Tasmanian Forest Agreement Act 2013*. An estimate of the likely yield of blackwood sawlogs from sources outside the blackwood management zone is expected to be determined by a Special Timbers Management Plan to be delivered in 2015.
- The fenced-intensive blackwood stands that are expected to be harvested from 2040 onwards.

Reporting

Annual blackwood production from State forests is publically reported in Forestry Tasmania's Stewardship Reports. Significant changes in blackwood demand or supply will be highlighted, based on indicative trends determined over the previous five years.

Further reviews of the blackwood resource will be undertaken periodically, based on need, and reported publically. The advent of LiDAR (light detection and ranging) technology offers significant opportunities for more efficient inventory of blackwood forests. LiDAR is able to accurately map ground topography and tree height. LIDAR imagery will become available for the blackwood swamps in the near future and will be used to better understand the detailed topography of the swamps and assist in defining the available resource. There is also potential, with further analysis and research investment, to delineate blackwood from other trees, particularly tea tree, and to develop models that predict volume from tree-height data. Depending on developments with LiDAR technology and other forest management and special timbers industry priorities, it is intended that the next review of the sustainable sawlog supply from the blackwood management zone will be undertaken within ten years.

References

- Burgman, M. and Robinson A (2012), *Review of the Tasmanian Forest Estate Wood Supply Scenarios – Final Report to the Independent Verification Group, Intergovernmental Agreement*.
- Commonwealth of Australia and State of Tasmania (1997). *Tasmanian Regional Forest Agreement between the Commonwealth of Australia and the State of Tasmania*.
- Elliott, H.J., Felton, K.C., Jarman, S.J. and Stone, M.G. (2008). *A history of innovation: Eighty-five years of research and development at Forestry Tasmania*. Forestry Tasmania, Hobart.
- Forestry Tasmania (1999). Review of the sustainable blackwood (*Acacia melanoxylon*) sawlog supply from Tasmanian State forest. Hobart.
- Forestry Tasmania (2005), Blackwood, Native Forest Silviculture Technical Bulletin No 10, Forestry Tasmania, Hobart.
- Forestry Tasmania (2007). Sustainable high quality eucalypt sawlog supply from Tasmanian State forest - Review No. 3. Forestry Tasmania, Planning Branch, Hobart.
- Forestry Tasmania (2008). Sustainability Charter: Forest Management Plan 2008. Forestry Tasmania, Hobart.
- Forestry Tasmania (2010). Special Timbers Strategy. Forestry Tasmania, Hobart.
<http://www.forestrytas.com.au/uploads/File/pdf/pdf2010/special%20timbers%20strategy%20ssml.pdf>
- Jennings, S.M. (1998). Managing native forest for blackwood (*Acacia melanoxylon*) production in north-western Tasmania. *Australian Forestry* 61: 141-146.
- LaSala, A. and Jennings, S.M. (2008). Pre-commercial thinning of fenced *Eucalyptus obliqua* regeneration enhances growth of both *Acacia melanoxylon* and *Eucalyptus obliqua*. *Tasforests* 17: 15-27.
- Medhurst, J.L., Pinkard, E.A., Beadle, C.L. and Worledge, D. (2003). Growth and stem form responses of plantation-grown *Acacia melanoxylon* (R.Br.) to form pruning and nurse-crop thinning. *Forest Ecology and Management* 179: 183-193.
- Neilsen, W.A. and Brown, D.R. (1997). Growth and silviculture of *Acacia melanoxylon* plantations in Tasmania. *Tasforests* 9: 51-70.

Glossary of Terms and Acronyms

| | |
|--|--|
| Blackwood Management Zone | Forests managed primarily for blackwood and identified as a separate management unit (StBwd) within the Forestry Tasmania zoning system. These forests consist of either blackwood swamp forests or areas of blackwood-rich wet eucalypt forest that have been harvested, regenerated and fenced as part of the fenced-intensive blackwood program. |
| CAR Reserve | Comprehensive, adequate and representative reserve system, established during the 1997 Tasmanian Regional Forest Agreement, meeting the JANIS criteria. |
| Category 4 sawlog | First-grade sawlog from special species timbers such as blackwood, myrtle, sassafras, celery top pine, Huon pine and leatherwood. |
| Clearfelling | The removal of all trees on a harvesting area in a single operation, and the subsequent regeneration of an even-aged stand by sowing or planting. A canopy opening of 4-6 times mature tree height may be considered the lower limit for clearfelling. In the tall wet eucalypt forests of Tasmania, the minimum clearfell size is about 5 hectares. In practice, most clearfelled production coupes in Tasmania range between 50 to 100 hectares, although some are as small as 10 hectares. |
| Coupe | For harvesting, Permanent Timber Production Zone Lands are subdivided into discrete areas called coupes. |
| Fenced Intensive Blackwood (FIB) | Fenced-intensive blackwood (FIB) involves the fencing of blackwood-rich wet eucalypt coupes that contain a significant blackwood component following the standard clearfell, burn and sow (CBS) treatment. The new stand is managed for both blackwood and eucalypt production. |
| LiDAR | A remote sensing technology that uses light (lasar) pulses to generate large amounts of data about terrain and landscape features. |
| Management Decision Classification (MDC) | The Management Decision Classification (MDC) system is the way in which Forestry Tasmania zones the land it manages to optimise management and balance the competing demands on the forest estate. Zoning enables areas with particular values to be identified and appropriate management strategies to be put in place to ensure protection, maintenance and enhancement of these values. All areas are zoned into either production or protection primary zones that indicate their overall availability for wood production. |
| Mature forest | Forest containing a majority of trees more than 110 years old. |
| Merchantable timber | The part of a tree's stem with value as a saleable product; usually refers to veneer, sawlog and pulpwood. |
| Millable logs | Category 4 logs and 'utility' logs |
| Oldgrowth forest | Ecologically mature forest where the effects of disturbances are now negligible. |
| Patch-clearfells | This term is applied to small clearfells; typically between 5-10 ha, which may exist in isolation or be part of a large larger harvest unit where the patches are separated by retained forest. |
| Partial harvesting | Harvesting systems which include the retention of some trees, for example, seed tree, shelterwood, thinning and variable retention. |
| Permanent Timber Production Zone Land | Land managed by Forestry Tasmania under the <i>Forest Management Act 2013</i> . |
| Rainforest | Forest dominated by tree species such as myrtle, sassafras, celery-top pine and leatherwood, in which eucalypts comprise less than five per cent of the crown cover. Rainforest generally occurs in |

| | |
|-----------------------------------|--|
| | areas with high rainfall. |
| Regional Forest Agreement (RFA) | A long-term agreement between the Australian and State Governments, to ensure the sustainable management of Tasmania's forests. |
| Silvicultural system/Silviculture | All the manipulations (e.g. harvesting, regeneration, thinning) carried out during the life time of forest stands or trees to achieve the management objectives of the landowner. |
| Special Management Zone (SMZ) | SMZs form the second tier of the MDC system after, and regardless of, the primary zone of "Protection" or "Production". SMZs allow for areas with particular special values or uses to be identified within the MDC system, so that appropriate management prescriptions can be applied. |
| State forest | Land managed by Forestry Tasmania under the <i>Forestry Act 1920</i> (repealed October 2013), including purchased land. |
| Sustainable Forest Management | Management to maintain and enhance the long-term health of forest ecosystems while providing ecological, economic, social and cultural opportunities for the benefit of present and future generations. |
| 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. |
| Utility logs | Logs which can be sawn but are below category 4 specification. |