

**HORSHAM
FOREST MANAGEMENT AREA**

ESTIMATE OF SAWLOG RESOURCE

**Department of Natural Resources and Environment
Victoria**

March 2002

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FOREWORD

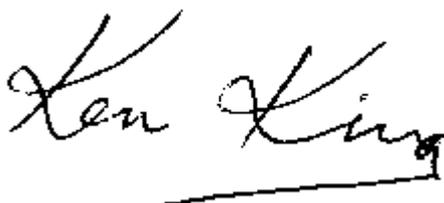
In March 2001 the Minister for Environment and Conservation initiated a process to issue new sawlog licences at appropriate levels. This process culminated in the preparation and release of the *Our Forests Our Future* Statement in February 2002. This Government Statement announced wide ranging reforms to the management of Victoria's native forests and will result in a sustainable timber industry. In the short term a reduction of about 30% to the sawlog levels across the State is required.

This report describes the data and method used to calculate the appropriate sawlog level for the Horsham Forest Management Area. This level has been adopted in the *Our Forest Our Future* Statement.

The estimate of the sawlog levels in this report is based on the information that is known about our forests and a series of estimates about the future, the preferences of industry and the best way to analyse the data. These estimates may be improved in the future as new information becomes available and more measurements of actual performance are recorded. Consequently the sawlog resource available in the future may also change. The *Our Forests Our Future* Statement outlines how these changes will be managed.

An independent Expert Data Reference Group was commissioned to review the data and methodology used to determine this estimate. This group reported in October 2001. It made extensive recommendations on how the processes and data could be improved. This document has considered the advice of the group.

This report provides the opportunity for the timber industry and interested people to gain access to information on how sawlog resources are estimated for Victoria's native forests.

A handwritten signature in black ink that reads "Ken King". The signature is written in a cursive style and is underlined with a single horizontal line.

Ken King
Executive Director, Forests Service

CONTENTS

FOREWORD	1
1 INTRODUCTION	3
2 BACKGROUND	3
3 LICENCE COMMITMENTS	5
4 HARVEST HISTORY	5
4.1 TOTAL SAWLOG PRODUCTION.....	5
4.2 RESIDUAL LOG SALES	6
5 VOLUME AND GROWTH INFORMATION	7
5.1 STANDING VOLUME	7
5.2 GROWTH DATA	7
6 RESOURCES	8
6.1 WOOD FLOWS	8
6.2 RESOURCE PROFILE.....	9
6.3 RESOURCE ELEMENTS	10
6.3.1 Special Protection Zone and Proportion of Special Management Zone	10
6.3.2 Code Slope and Stream Buffer Exclusions.....	10
6.3.3 Forest Management Plan Prescriptions	10
6.3.4 Unmapped Streams and Soaks Not Considered in Code Buffer Exclusions.....	10
6.3.5 Standard Statewide Forest Resource Inventory Unproductive Stands.....	10
6.3.6 Further Unproductive Stands.....	10
6.3.7 Slopes Additional to Code Exclusions	10
6.3.8 Areas Not Harvested Near Stream Buffers.....	10
6.3.9 Small and Isolated Areas	10
6.3.10 Rocky Areas	10
6.3.11 Harvesting Losses.....	11
6.3.12 Landscape Buffers.....	11
6.3.13 Fire Losses	11
6.3.14 Disease Losses.....	11
6.3.15 New Flora, Fauna and Cultural Site Reservations	11
6.3.16 Temporal and Spatial Constraints.....	11
6.3.17 Economically Accessible Resource	11
6.3.18 Changed Residual Log Markets	11
6.3.19 Changed Minimum Log Diameter Specification.....	11
6.3.20 Changed Silviculture Systems	11
6.3.21 Additions to the Forest Estate.....	12
6.3.22 Reforestation of Unstocked Stands.....	12
7 RESOURCE OUTLOOK	12
8 DATA STANDARD	12
9 CONCLUSION	12
10 REFERENCES	13
11 GLOSSARY	14
12 MAP 1 – HORSHAM FMA	19

1 Introduction

This Estimate of Sawlog Resource (ESR) summarises current Horsham Forest Management Area timber resource volume, growth and area information, licence commitments and ten-year timber production history in public native forests. The level of forest timber resources available into the future is determined by scheduling future harvesting and growth. This estimate has been prepared as part of a process established by the Minister for Environment and Conservation in March 2001 to develop a strategy for the issue of sawlog licences following the expiry of current licences, which will occur from 2002. The information contained in this document has been reviewed by an independent Expert Data Reference Group and peak industry and union groups, and is intended to assist in identifying soundly based estimates for future sawlog availabilities for the timber industry.

2 Background

Horsham Forest Management Area (FMA) occupies the west part of the State of Victoria, centred around Horsham and stretching from Ararat in the east to the South Australian border in the west, and from Dunkeld in the south to Lake Hindmarsh in the north (see Map 1).

The Timber Industry Strategy (TIS) released in 1986 established the basis for regional sustainable harvesting of sawlogs from State forest in Victoria. Based on resource data available at the time, sustainable sawlog yield rates were determined for each of the 15 Forest Management Areas identified by the TIS in order to facilitate the proper planning, management, and administration of publicly owned native forest. The TIS also provided resource security to the timber industry through the introduction of fifteen year licences, and flexibility to cope with market variations by allowing annual intake variation between 70% and 130% of annual licence volume. The concept of value adding was introduced with the establishment of four grades of sawlog and the allocation of the better grades of sawlog to those licensees with better value adding performance. It also provided a planning hierarchy of Forest Management Plans (FMP), Wood Utilisation Plans and Coupe Plans.

As a result of the TIS, Schedule 3 of the *Forests Act* 1958, as amended by the *Forests (Timber Harvesting) Act* 1990, scheduled the sustainable yield for the Horsham Forest Management Area at 880m³ nett per year durable timber and 40m³ nett per year D grade or better (D+) mixed eucalypt species sawlog. The current legislated sustainable yield rate for Horsham Forest Management Area is set at 800m³ nett per year of durable timber.

The Horsham Forest Management Area is covered by the West Victoria Regional Forest Agreement (RFA), established between the Commonwealth and Victorian Governments in March 2000. The RFA has provided for the protection of all conservation values to agreed targets in the Special Protection Zone (SPZ) and allow harvesting in General Management Zone (GMZ) and Special Management Zone (SMZ) under specific conditions (Figure 1).

Total Public Land

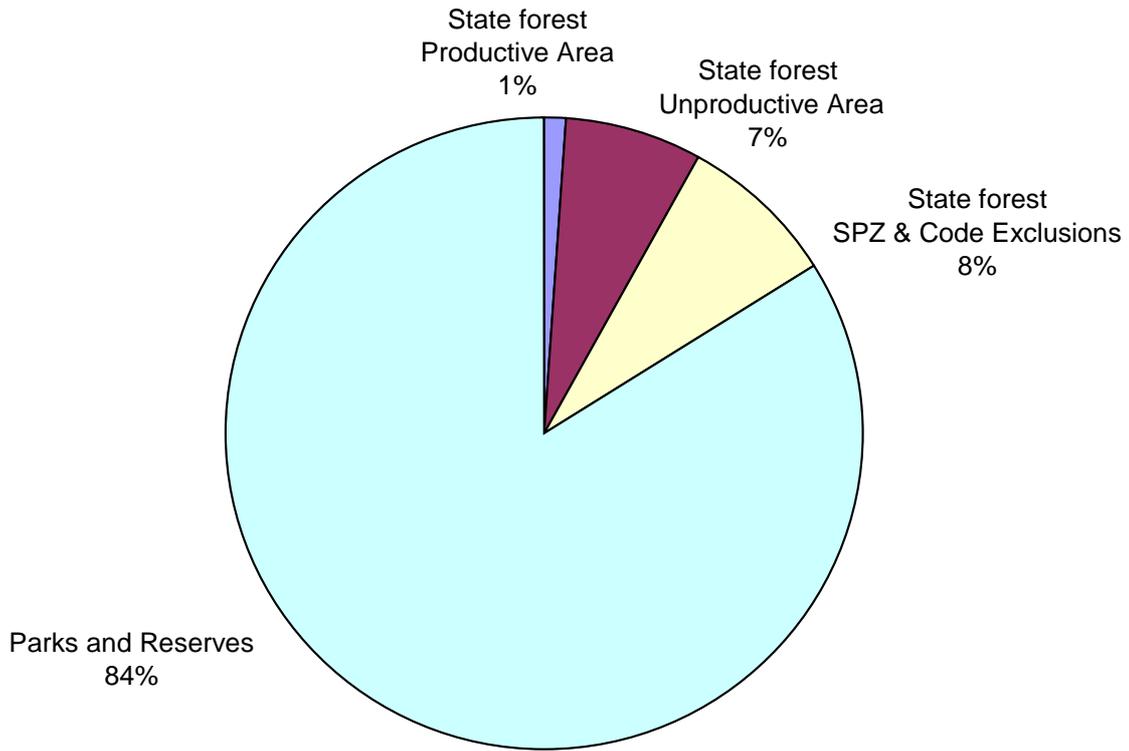


Figure 1. Public Land in Horsham Forest Management Area

The West Victoria Regional Forest Agreement formally accredits the Horsham Forest Management Area as part of Victoria’s Ecologically Sustainable Forest Management system. As part of the Regional Forest Agreement process an “Analysis of Red Gum Sawlog Resources in Western Victoria” (NRE, 1999 unpubl.) was completed. This analysis concluded that the area of durable species forest in those areas classified as being both the General Management Zone (GMZ) and Special Management Zone (SMZ) were capable of supporting the current licence level of 880m³ nett per year.

The timber resource information used in developing the strategies in this estimate has been derived from information used in the Timber Resource Availability analysis including a 1998 assessment of the Woolhpooer Forest and other inventory and assessment information collected by Regional staff in 1999.

Current resource age structure is approximately 56% uneven-aged forests and about 44% even aged forests.

3 Licence Commitments

The status of current licence tenure and commitments as at 30th June 2001 for the Horsham FMA is shown in Table 1 and 2. There are no residual log licences for the Horsham FMA.

Table 1. Current Horsham FMA Licence Tenure

Product	Licence Type	Expiry Date	No. of Licences
Sawlog (D+)	Standard	30/06/2002	2
Durable Species	Standard	30/06/2002	4

Note: Two licensees have licences for both mixed species and durable species production

Table 2. Current Horsham FMA Licence Commitments by Quantity

Product / Grade	Annual Allocations
Sawlog (m ³ nett)	
D+	40
Durable Species	880

4 Harvest History

4.1 Total Sawlog Production

Figure 2 shows sawlog volume production of durable species from 1990/91 to 1999/00.

Average nett sawlog production over the last ten years is 868.8m³ nett. The predominant species harvested is *Eucalyptus camaldulensis* (Red Gum). There are no commercial stands of mixed species within the Horsham FMA. No mixed species have been cut for the past seven years in the FMA (since harvesting stopped in the Grampians National Park).

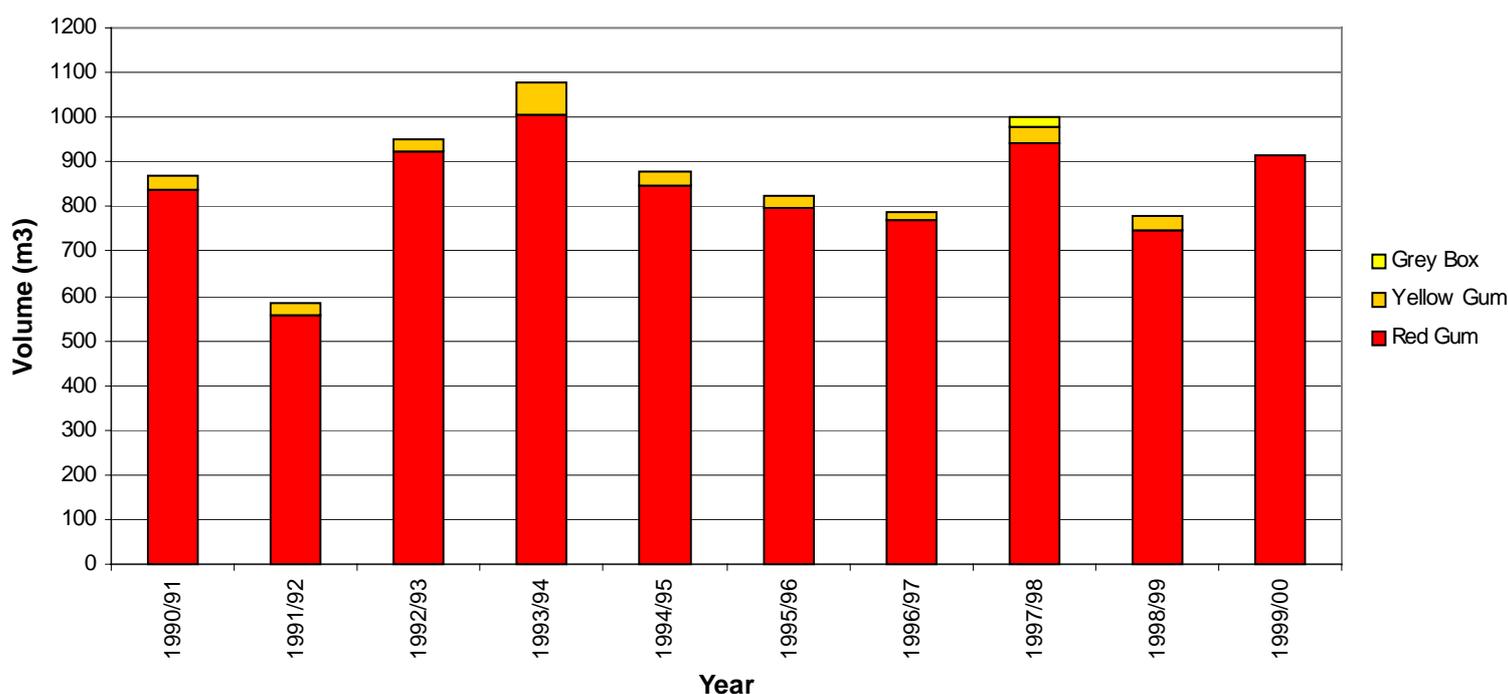


Figure 2. Durable Species Production by Species from 1990/91 to 1999/2000

Figure 3 shows the volume harvested by area across the Horsham FMA from 1990/91 to 1999/00.

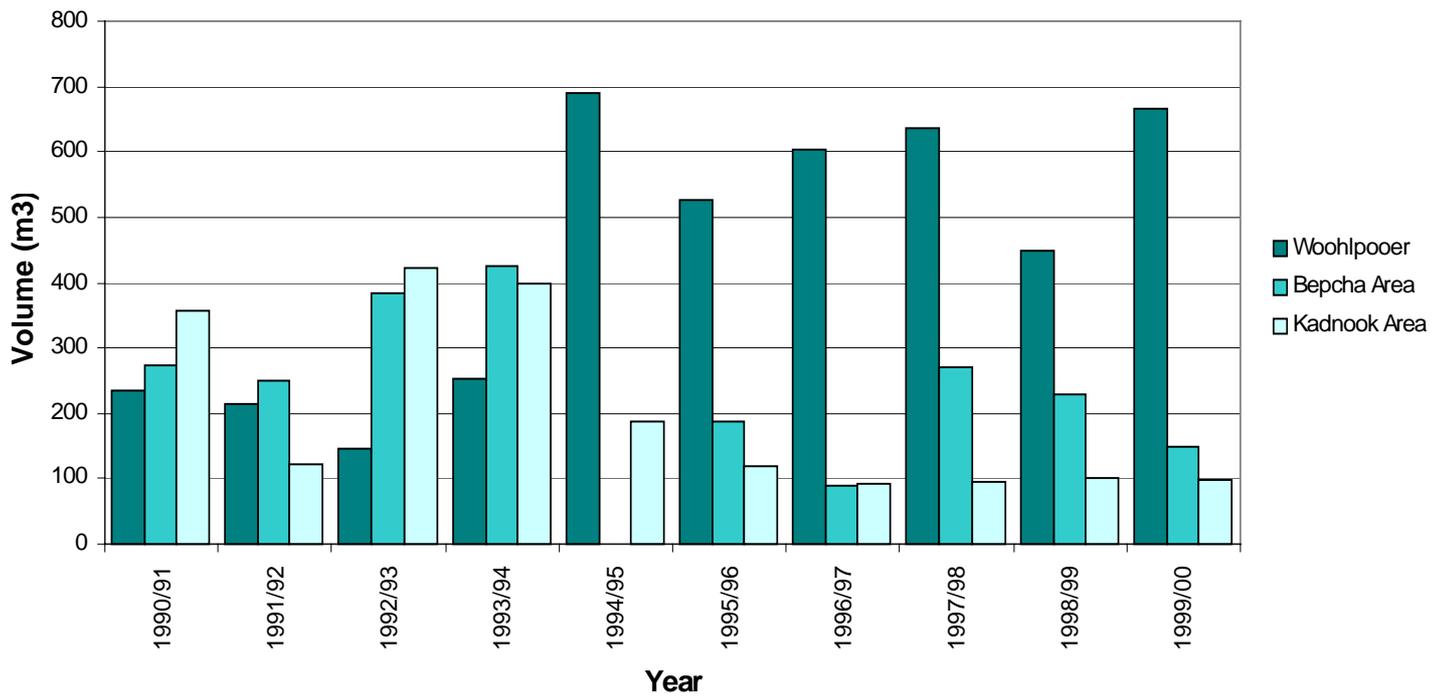


Figure 3. Area Harvested by Location from 1990/91 to 1999/2000

4.2 Residual Log Sales

There are no residual log licences in the Horsham FMA. Sawlogs are the primary products harvested from these forests, however fence posts and firewood are cut from the heads of sawlog trees.

5 Volume and Growth Information

5.1 Standing Volume

The area of durable species forest in the Horsham FMA has been mapped into two site quality classes. The area by site quality is shown in Table 3.

Table 3. Forest Block Site Quality Area Analysis in the Horsham FMA

Forest Block	Site Quality 1 (ha)	Site Quality 2 (ha)	Total (ha)
Woolpooer	1,932	745	2,677
Bepcha ¹	0	1,061	1,061
Kadnook ²	0	695	695
Total (ha) ³	1,932	2501	4,433

Note:

1. The Bepcha Block refers to a group of individual sawlog producing forest areas outside of the Woolpooer area in the central and east sections of the FMA. These forests include: Cherrypool, Daahl, Brookes Road, Mt Bepcha, Billywing, Wartook, Ledcourt, Illawarra, and Blythwood forests.
2. The “Kadnook Block” refers to a group of sawlog producing forest areas in the western section of the FMA. These forests include Kadnook, Morea, Kalingur, Connewirrecco, Bringalbert, Meereek, Bogalara, Yallakar and Shrives forests.
3. This is not the total extent of GMZ and SMZ durable species forests in the Horsham FMA. There is another 2,807 hectares that is not viable for sawlog production.

In 1998 a comprehensive assessment by Horsham FMA Regional Staff of the Woolpooer Forest, the FMA’s biggest commercial durable species resource, was conducted. The assessment included volume plots in both the Site Quality 1 and Site Quality 2 Red Gum. Refer to Table 3 for the site quality analysis by forest block. A total of 140 plots were established, 104 in Site Quality 1 areas, and 36 in Site Quality 2 areas.

Prior to this assessment there was no quantitative resource information available for the Red Gum sawlog resource within the Horsham FMA.

While it is desirable to have plot data from outside Woolpooer, an analysis can still be made using the Woolpooer Site Quality 2 plot data to represent the whole of the forest in this class. However, preliminary estimates indicate that Site Quality 2 areas outside Woolpooer will produce approximately 40% of the sawlog resource. If there is a variation of $\pm 25\%$ in the merchantable size classes between Woolpooer Site Quality 2 and Site Quality 2 in other areas, the impact on the resource estimate will be in the order of $\pm 10\%$. As a result, assuming that Site Quality 2 stands in all areas are represented by the Woolpooer plots may provide a source of error in the estimate of available resource.

The Timber Resource Availability analysis (TRA) prepared for the West Victoria Regional Forest Agreement was based on the 1998 Woolpooer assessment data and other inventory and assessment information collected by the Horsham FMA regional staff. It should be noted that the Horsham Timber Resource Analysis did not consider the Horsham FMA mixed species resource.

5.2 Growth Data

Growth data was supplied from five Continuous Forest Inventory plots (four thinned and one control). The plots were established in 1977 and re-measured in 1987, 1991, 1993 and 1996.

6 Resources

6.1 Wood flows

In the Horsham FMA the predominant silvicultural system is single tree selection. This results in stands of mixed age. Trees are retained in single tree selection operations for growing stock, habitat, seed fall and in buffers along streams. The estimate of the availability of sawlogs into the future is based on the assumption that single tree selection will continue as the predominant silvicultural systems.

To estimate the availability of sawlogs into the future a method of scheduling wood flows is required. This estimate uses a spreadsheet developed by NRE for this task. It uses the area of each forest type of known cutting cycle and the yields for a range of ages. Areas of forest can then be scheduled at or near the nominal rotation age during periods into the future. The availability of sawlog has been called the Economically Accessible Resource and is based on the level that can be maintained or increased over the entire planning period, usually to 2100.

6.2 Resource Profile

Table 4 provides a simple representation of sawlog resource within a uniform statewide format. Volumes are indicative only. This profile is to be read in conjunction with the accompanying comments on each resource element.

Table 4. Profile of Resource Elements for Horsham FMA

No.	RESOURCE ELEMENT	Area (ha)	Annual Volume (m ³ nett/yr)
	STATE FOREST (INCLUDING SOME HISTORIC AREAS)	103,300	
	<i>Code and Forest Management Plan (FMP) elements:</i>		
1	SPZ & proportion SMZ	67,149	
2	<i>Code</i> slope & stream buffer exclusions	0	
3	FMP prescriptions	0	
4	Unmapped streams and soaks not considered in <i>Code</i> buffer exclusions	133	
5	Standard SFRI unproductive stands	31,585	
	BIOLOGICALLY SUSTAINABLE YIELD	4,433	1,000
	<i>Operational elements:</i>		
6	Further unproductive stands	0	0
7	Slopes additional to <i>Code</i> exclusions	0	0
8	Areas not harvested near stream buffers	0	0
9	Small and isolated areas	0	0
10	Rocky areas		18
11	Harvesting losses		82
	<i>Management elements:</i>		
12	Landscape buffers	0	0
13	Fire losses	0	0
14	Disease losses	0	0
15	New flora, fauna and cultural site reservations	0	0
16	Temporal and spatial constraints	0	0
	<i>Remaining element:</i>		
17	Economically Accessible Resource	4,433	900
	<i>Potential issue elements:</i>		
18	Changed residual log markets		
19	Changed minimum log diameter specification		
20	Changed silviculture system		
21	Additions to the forest estate		
22	Reforestation of unstocked stands		

Note: Elements 6 to 16 and 18 to 22 may alter, increasing or decreasing the economically accessible resource element 17.

6.3 Resource Elements

6.3.1 Special Protection Zone and Proportion of Special Management Zone

All Special Protection Zone is excluded from harvesting and all of Special Management Zone is available for harvesting.

6.3.2 Code Slope and Stream Buffer Exclusions

The *Code of Forest Practices for Timber Production* (NRE, 1996) requires exclusion of slopes steeper than 30 degrees, streamside and rainforest buffers.

6.3.3 Forest Management Plan Prescriptions

This element is not relevant or significant in this estimate for this FMA.

6.3.4 Unmapped Streams and Soaks Not Considered in Code Buffer Exclusions

An allowance of 133ha has been made for the area unavailable for timber production due to unmapped streams and soaks.

6.3.5 Standard Statewide Forest Resource Inventory Unproductive Stands

Regional site surveys have identified areas of productive forest within the Horsham FMA. These are areas containing durable species (Red Gum, Yellow Gum and Grey Box). There are no mixed species forests that are presently productive.

6.3.6 Further Unproductive Stands

Available productive areas identified in the West Victoria Regional Forest Agreement in the Timber Resource Assessment all contain preferred species. Therefore no reduction to productive area has been made on the basis of measurable areas of unproductive stands.

6.3.7 Slopes Additional to Code Exclusions

Slopes additional to *Code* exclusions are not considered to contribute to area reductions. No reduction has been made due to the very flat terrain and generally good access across the economically accessible resource area.

6.3.8 Areas Not Harvested Near Stream Buffers

Areas are all open woodland type forests on flat terrain with no permanent watercourses. Therefore no reduction has been made for stream buffers additional to *Code* exclusions.

6.3.9 Small and Isolated Areas

No reduction has been made for small isolated stands due to the very flat terrain and generally good access across the economically accessible resource area.

6.3.10 Rocky Areas

An allowance of 18m³ nett per year volume reduction has been made for areas that may be unavailable for harvesting due to rocky outcrops or unmapped bare areas.

6.3.11 Harvesting Losses

An 82m³ nett per year volume reduction is applied to allow for the losses in converting estimated standing volume to harvested and removed volume.

6.3.12 Landscape Buffers

The topography and silvicultural system used in these forests allows easy access to available productive forests. Single tree and group selection has little visual impact. Landscape buffers are rarely required in these forests, so this has not been included as a reduction in area and volume.

6.3.13 Fire Losses

Fire losses have not been significant in the Horsham FMA. Therefore no reduction to available productive area has been made on the basis of fire losses.

6.3.14 Disease Losses

This element is not relevant or significant in this estimate for this FMA.

6.3.15 New Flora, Fauna and Cultural Site Reservations

Further Special Management Zones and Special Protection Zones may be created around future identified sites of cultural, historic, flora or fauna significance occurring in General Management Zone areas within the Horsham FMA. Under the West Victoria Regional Forest Agreement, if additional Special Protection Zones are required over areas that were previously General Management Zone or Special Management Zone, land of equal value can be swapped from the current reserve system, so there is no nett loss of productive area.

6.3.16 Temporal and Spatial Constraints

The development of a Forest Management Plan will commence shortly for the Horsham FMA. When completed, the Horsham Forest Management Plan will provide specific Special Management Zone plans where required.

6.3.17 Economically Accessible Resource

The area of economically accessible resource is estimated based on current harvesting practices and management. The volume of this element is the proposed level for licensing.

6.3.18 Changed Residual Log Markets

This element is not relevant or significant in this estimate for this FMA.

6.3.19 Changed Minimum Log Diameter Specification

This element is not relevant or significant in this estimate for this FMA.

6.3.20 Changed Silviculture Systems

A higher sustainable yield may be gained through future silvicultural treatments. To improve yield Site Quality 1 even-aged stands can be converted to an uneven-aged forest structure over a long-term (150 years). Site Quality 2 uneven-aged stands can be managed for the production of sawlogs and the continuing improvement of the quality of these forests through thinning,

single tree and group selection. The application of these treatments may increase overall wood supply. This may make a larger area economically viable for timber production.

6.3.21 Additions to the Forest Estate

This element is not relevant or significant in this estimate for this FMA.

6.3.22 Reforestation of Unstocked Stands

This element is not relevant or significant in this estimate for this FMA.

7 Resource Outlook

Analysis has shown that current durable species sustainable yield of 900m³ nett per year can be maintained for the Horsham FMA and would provide a non-declining forest resource. The current mixed species sustainable yield of 40m³ nett per year has been reduced to zero as no viable resource of mixed species sawlogs is now available within the Horsham FMA.

8 Data Standard

The Expert Data Reference Group (EDRG) has provided an independent assessment of data and methods used in the development of Estimates of Sawlog Resource. The EDRG has used a one to five star rating to classify data quality and methodological rigour in terms of three fundamental parameters and their relationship to forecasting long term allocation levels:

- area,
- woodflows, and
- yield.

One star indicates data inadequacy and five stars indicate data excellence for the basis of issuing long term licences at the proposed allocation level. An overall score is also given, based on the weakest of the three fundamental parameters.

In the Horsham Forest Management Area, area was given two stars, yield, two stars, and woodflows, one star. This resulted in an overall one star rating.

This rating will be considered in determining future licensing arrangements within a risk management framework.

9 Conclusion

The forests of the Horsham FMA are durable species forests containing red gum, yellow gum and grey box, with red gum being the main commercial species. The current resource age structure is approximately 56% uneven-aged forests, and about 44% even aged forests. The area available for harvesting has been maintained from previous estimates. The growth and yield data are considered inadequate by the Expert Data Reference Group. Revised estimates are expected in 2005. Current durable licence levels can be maintained at 880m³ nett per year. A mixed species licence should not be issued as there is no resource.

10 References

NRE (1996). *Code of Forest Practices for Timber Production, Revision No. 2*. Department of Natural Resources and Environment, Melbourne.

NRE (1999) *Western Victoria Timber Resource Analysis, Analysis of Red Gum sawlog resources in Western Victoria*, Unpublished

NRE (2000) *West Victoria RFA Horsham FMA Timber Resource Analysis* Department of Natural Resources and Environment, Melbourne.

11 Glossary

“A” Grade Sawlog A sawlog with a minimum small end diameter underbark of 50cm which has no defective quarters and maximum defects on exposed end of: one-quarter diameter lengths of all gum vein or gum pockets, light stain, and maximum angle of sloping grain of 1:10 along the length of the sawlog.

Advance Growth (Advance Regeneration) Any established seedlings, saplings or poles which are present in a forest when some form of forest treatment is planned to obtain regeneration.

Age Classes Stands of timber originating at a defined time ie. wildfire or harvesting disturbance.

Agreement An arrangement for harvesting and removal of forest produce authorised by specific legislation.

Annexures Additions to licences that specify target volumes for sawlog grade or species.

Annual Allocation The annual quantity of timber specified in schedule 1 of a Long Term Licence, and which the Secretary is to make available from time to time under Condition 11 of the Licence Conditions.

“B” Grade Sawlog A sawlog with a minimum small end diameter under bark of 35cm which has maximum allowable defects on exposed ends of: one-quarter diameter length of loose gum veins/pockets and shakes, one diameter length of tight gum vein more than 3mm in width, two diameters length of tight gum vein less than 3mm in width, light stain, 1:10 angle of sloping grain along the sawlog axis, and a maximum of 105cm squared of pipe in an exposed end.

Block A major division of a forest, delineated for management purposes and bounded by natural features such as ridges and streams. Usually comprises a number of compartments.

Buffer A protective margin of vegetation abutting a stream, spring, wetland, body of standing water, swampy ground, private property, road, landscape feature, valued area or an area of rainforest, which protects it from potentially detrimental disturbances in the surrounding forest. Buffer width is defined as horizontal distance from which various operations are excluded.

“C” Grade Sawlog A “C” grade sawlog is considered to be any sawlog with a minimum small end diameter under bark of 30 cm which has maximum allowable defects on exposed ends of: one diameter length of loose gum veins/pockets and shakes, seven diameters length of tight gum vein more than 3 mm width, unlimited lengths of tight gum veins less than 3 mm width, dark stain, maximum sloping grain angle of 1:8 along the length of the sawlog, maximum of two defective quarters, and maximum of 112 cm square pipe on exposed end.

Code of Forest Practices for Timber Production A set of operational principles and, in some cases, minimum performance standards for the conduct of timber harvesting and associated works in forests in Victoria, referred to as the Code.

Comprehensive, Adequate and Representative Reserve System A reserve system to conserve all native forest types as well as the plants and animals that depend on them. Comprehensive: the full range of forest communities recognised by an agreed national scientific classification at appropriate hierarchical levels; Adequate: the maintenance of the ecological viability and integrity of populations, species communities; Representative: those sample areas of the forest that are selected for inclusion reserves which should reasonably reflect the biological diversity of the communities.

Continuous Forest Inventory Plots (CFI Plots) Plots established throughout the forest on which tree growth information is measured. The plots are measured periodically (at five- or ten-year intervals, for example), and growth on the plot can be determined from the difference between measurements.

Coupe An area of forest of variable size, shape and orientation from which logs for sawmilling or other industrial processing are harvested.

“D” Grade Sawlog A “D” grade sawlog is considered to be any sawlog with a minimum small end diameter under bark of 25cm which has maximum allowable defects on exposed ends of: two diameters length of loose gum veins/pockets or shakes, 10 diameters length of tight gum vein more than 3mm width, unlimited length of tight gum vein less than 3mm width, dark stain, maximum sloping grain angle of 1:8 along the length of the sawlog, maximum of three defective quarters, and maximum of 120cm square of pipe defect on exposed ends.

D+ Sawlog Sawlogs of grade D and better ie. Including C, B, and A grades.

DBHOB Diameter breast height over bark (breast height = 1.3m).

Ecologically Sustainable Forest Management The management of forests on all land tenures to maintain the overall capacity of forests to provide goods, protect biodiversity, and protect the full suite of forest values at the regional level.

Even-aged forest/stand Forest predominantly of the one age. Usually originating as a result of an intense burn or harvesting activity.

Evergreen Licence A sawlog licence with a provision for renewal before the fifth year of the licence, if the licensee has proposals for significant capital expenditure.

Expert Data Reference Group (EDRG) A group appointed by the Minister to review the data used to estimate the available volumes. Consist of Professor J. VanClay (Southern Cross University), Professor B. Turner (ANU).

Fauna A general term for animals (including reptiles, birds, marsupials and fish).

Fuel Management Zone Modification of fuels by prescribed burning or other means. (There are 5 Fuel Management Zones).

Flora A general term for plants of a particular area or time.

Foothill Mixed Species Forest Forest with a mature stand height of less than 40m and generally occurring on mid range elevations.

Forest 25 A GIS spatial data set at 1:25000 scale derived from detailed aerial photography interpretation assessments of ash and mixed species forests , and broad structural vegetation mapping for other mixed species forests.

Forest Coupe Plan A Forest Coupe Plan is a plan that must be prepared for each harvesting operation in public native forest and will contain a map identifying the area and a schedule incorporating the specifications and conditions under which the operation is to be administered and controlled. The Forest Coupe Plan will be prepared prior to the commencement of utilisation and will specify the matters set out in Section 2.3.1 of the Code of Practice.

Forest Management Area (FMA) The basic units for forest planning and management in Victoria. Currently Victoria is divided into 15 Forest Management Areas as defined in the *Forests (Timber Harvesting) Act 1990*, however, the Wangaratta and Wodonga FMAs are managed as the North East FMA.

Forest Management Plan Forest management plans are developed by the Department of Natural Resources and Environment to address the full range of values and uses in Forest Management Areas which have been designated as the units for planning forest management activities. Forest Management Plans will be prepared according to the guidelines set out in Section 2.1 of the Code of Forest Practices for Timber Production.

Forest Management Zone An area of similar physical capability or forest value to which particular Departmental strategy and specific prescriptions may apply. There are three types of zones: the Special Protection Zone, Special Management Zone and General Management Zone.

Forest Product Licence Authority to harvest and remove Forest Produce issued under section 52 of the *Forests Act 1958*. Document giving official permission to remove Forest Produce from designated areas of Public Land in the State of Victoria. Licences are issued in various forms depending on the type and quantity of produce, period of licence and method of payment (eg. The Forest Produce Licence and Receipt form is used for small quantities of produce with payment made in advance of removal).

Forest Type A classification of forests according to their life form and height of the tallest stratum, and the projected foliage cover of the tallest stratum.

FORPLAN A computer program that can be used to apply forest values (including financial) to forest stands. It is currently used in conjunction with GIS and models for timber, water and wildlife to estimate the response of these values over time for the whole forest for various management strategies.

General Management Zone (GMZ) Delineates the area to be managed for the broad range of forest values available in the area. The GMZ is divided into two sub-zones: 'Timber Production' where timber harvesting under standard conditions is one of the main uses and 'Other Uses' where the forest is unsuitable for sawlog production but where other activities are permitted.

Geographic Information System (GIS) A system which holds spatially referenced data which can be classified, overlaid, analysed and presented in map, tabular or graphic form.

Grade A measure of the quality of a hardwood log. The grade of a sawlog can be A, B, C, D, E or ungraded. The grade is determined using the Hardwood Sawlog Grading Card. Logsales also uses grade to identify product groups such as residual logs, pulpwood and firewood.

Gross Area The total estimated area of a coupe, forest or block.

Gross Volume The volume of a log inclusive of all defect i.e based only on the external dimensions.

Group Selection System All trees in a small patch are felled, with the gaps created scattered over the forest compartment. Gap size is no more than about two tree-heights in diameter, so that natural (or induced) seedfall from surrounding trees can be used. An uneven-aged system, as the fellings are done every 10-15 years.

Habitat Tree A tree that has been identified as providing important habitat for wildlife and which is given additional protection during forest operations.

HARIS (Hardwood Resource Information System) This system has been in operation since the late 1970's and forms the Statewide timber resource database for native forest on public land in Victoria.

Height Class Height class refers to a specified range of tree heights. The height classes used by the SFRI are:

Height Class 1a: 60m<	Height Class 1b: 51.1-60m
Height Class 2a: 46-51m	Height Class 2b: 40-45.9m
Height Class 3a: 34-39.9m	Height Class 3b: 28-33.9m
Height Class 4a: 22-27.9m	Height Class 4b: 15-21.9m
Height Class 5a: 10-14.9m	Height Class 5b: 5-9.9m
Height Class 6: <5m	

High Elevation Mixed Species (HEMS) Mixed species forests above 750m elevation but also some forests in frost hollows and on wetter aspects greater than 600m act as HEMS. Successful regeneration generally occurs from spring germination.

Integrated Forest Planning System (IFPS) Victoria has developed a system of linked computer-based tools collectively called the Integrated Forest Planning System (IFPS). The IFPS provides a means of modelling the growth, development and harvesting of forest stands as well as a range of other forest values.

Log Grading Assessment of the quality of a sawlog.

Log Length The length of a log is the shortest distance from end to end along the log. This is measured to the backward 0.1m but is normally considered in multiples of the backward 0.3m when discussing log lengths for grading purposes.

Long Term Licence A licence issued under the *Forests Act* 1958 for a period of more than 3 years and up to 15 years.

Long Term Sustainable Yield (LTSY) The theoretical rate of harvest that can be maintained in perpetuity.

Low Elevation Mixed Species (LEMS) These forests are usually below 750m elevation except for some forests in frost hollows and on wetter aspects between 600-750m which act as High Elevation Mixed Species. Most successful regeneration occurs from autumn germination.

Management Prescriptions Management Prescriptions detail specific conditions or standards that are to apply to forest operations in the vicinity of certain threatened flora or fauna. More detailed prescriptions are established at the local level and are reflected in Wood Utilisation Plans.

Mature Forest Forest at or beyond nominal rotation age but before it reaches the overmature stage. (Generally 60-150 years).

Mean Annual Increment (MAI) The total increment up to a given age divided by that age; average annual increment to that age (m³/ha).

Merchantable Trees, which are suitable for processing into, forest products and for which a market exists.

MESSIM (Messmate Simulator) A computer model developed to forecast the growth of messmate forests at Portland.

Minor Forest Produce Produce harvested from State forest other than sawlogs or residual logs. Minor Forest Produce is often collected by small operators or individuals and includes products such as sleepers, posts and poles, craftwood, firewood, honey, extractives, and eucalyptus oil.

Mixed Species Forest Forest, which has two or more eucalypt species commonly found within the canopy. Generally consisting of peppermint, messmate, gum or stringybark species. Does not include ash, red gum or box ironbark forests.

Nett Area The total estimated area of the coupe (to the nearest hectare). This area is to be determined from the calculated gross area less exclusion areas.

Nett Volume The volume of a log which can be converted to sawn timber. It is equal to the gross volume less the defect volume. Accounts are no longer issued in terms of nett volume however some licences are monitored in nett volume and sustainable yields are usually calculated in nett volume.

Non-declining Volumes, which do not decline over time, but may increase.

Old-growth Forest Forest which contains significant amounts of its oldest growth stage - usually senescent trees - in the upper stratum and has been subjected to any disturbance, the effect of which is now negligible.

Overmature A growth stage of a forest stand or individual tree that is characterised by declining crown leaf area and irregular crown shape due to loss of branches and epicormic growth.

Overwood Standing mature trees remaining after harvesting. Can refer to seed trees, habitat trees, culls or retained merchantable trees.

Periodic Annual Increment (PAI) The average annual increment for any defined short period, such as five years.

Productivity Class An area of forest that is considered for the purposes of yield estimation to be relatively uniform.

Public Land Unalienated land of the Crown managed and controlled by the Minister for Conservation and Land Management, the Minister for Agriculture and Natural Resources, or the Secretary of Natural Resources and Environment, whether or not occupied under a licence or other right (but not including land occupied under a lease, or land vested or leased by the Victorian Plantations Corporation or its successor in law).

Pulpwood Timber sold for the purpose of conversion to paper, pulp or other product which requires it to be chipped.

Reforestation The re-establishment of a stand of trees by planting or sowing with species native to the locality (unless an adverse microclimate requires the use of alternative native species for survival and growth) on previously cleared or poorly forested land.

Regional Forest Agreement (RFA) An agreement about the long-term management and use of forests in a particular region between the Commonwealth and a State Government.

Regrowth Forest Forest stands regenerated either naturally or by seeding following death or removal of the forest overstorey. A growth stage of a forest stand or individual tree in which the crowns have a narrow conical form and where trees are actively growing. A forest originating from fire, disturbance or harvesting actively below the nominal rotation age (Generally 1-60 years).

Residual Log (RL) Logs, not of sawlog quality, produced as a consequence of a sawlog harvesting operation. Unlike pulpwood the end-use of a residual log is not specified.

Retained Trees Trees retained on a coupe during a harvesting operation because they are unmerchantable, are to serve as seed trees or wildlife habitat trees, or have been selected to grow on after thinning.

Roundwood A log before it has been cut to produce sawn timber, veneer or woodchips.

Salvage Logging Logging to recover a resource that would otherwise be lost through damage by fire, pests or disease.

Sawlog Any length of merchantable log suitable for conversion to sawn timber which: is at least 2.7m in length, has a small end diameter under bark of 25cm or greater, does not have a sweep or crook which exceeds 1/5 of the diameter from a 2.4m straight edge, is of Grade D standard or better. Log suitable for conversion to sawn timber.

Seed Tree System All live trees are felled apart from a number of uniformly distributed trees retained to provide seed, and those required for environmental purposes. The seed trees would comprise 10-15% of the basal area of the original stand. An even-aged system.

Seed Tree A tree left standing following harvesting to regenerate the site by release of seed contained in the crown.

Selection System Silvicultural systems used to harvest and regenerate particular forest types. Trees are harvested either singly or in small groups at relatively short intervals indefinitely. Regeneration is established continually in the gaps produced and an uneven-aged stand is maintained.

Senescent See Overmature.

Statewide Forest Resource Inventory (SFRI) A strategic level inventory of forest resources on State forest Victoria.

Shake A shake is a partial or complete longitudinal separation between adjoining layers of wood due to causes other than drying.

Shelterwood System A silvicultural system used for harvesting and regenerating particular forest types. It consists of the removal of a proportion of the mature trees to allow the establishment of essentially even-aged regeneration under sheltered conditions, followed by later felling of the remainder of the mature (seed) trees.

Silviculture The theory and practice of managing forest establishment, composition, and growth, to achieve specified objectives.

Single Tree Selection The felling of scattered mature individual trees, at intervals (generally 10-15 years) over the rotation. Regeneration is largely from lignotubers and coppice.

Site Index The relationship between the heights and ages of the dominant and co-dominant trees in a stand at a particular age, used as a measure of the amount of timber that could be produced from the stand.

Site Quality The potential of the site to grow timber. A function of soil quality, rainfall and aspect.

Size Class A range of log diameters. One product can have many size classes (or none). Size classes are used mainly for the application of royalty rates.

Small End Diameter Under Bark (SEDUB) The diameter is measured by averaging two diameter measurements taken at right angles to each other across the small end of the log, or by using a diameter tape placed around the circumference of the small end of the log. Bark thickness must be allowed for if using a diameter tape on an unbarked log. Diameter is expressed as the backward whole centimetre.

Smash That proportion of sawlogs that is lost due to damage that occurs when trees are harvested.

Soaks Springs and wet areas where the ground water table intersects with ground surface.

Special Management Zone (SMZ) The Special Management Zone will be managed to conserve specific features, while catering for timber production under certain conditions. These include areas where timber must be harvested in a different manner than is normal to protect particular values; for example in areas where accelerated tree senescence is being induced.

Special Protection Zone (SPZ) The Special Protection Zone will be managed for conservation, and timber harvesting will be excluded. It will include areas of special significance of flora and/or fauna, areas for protection of water quality and other values (such as rainforest, riparian vegetation), and other areas of special significance (like special landscape and historic value). Such areas will be linked to the parks and reserves system where appropriate.

Stand A group of trees in a forest that can be distinguished from other groups on the basis of age, species composition, condition etc.

Stand Condition The health, age and size class distribution, and stocking of a forest stand.

Standard Licence A sawlog licence that is renewable within five years of its expiry date.

STANDSIM A computer model developed to forecast the growth of even-aged stands of Ash, Silvertop and Messmate.

Stumpage The value of timber as it stands in the forest.

Sub-dominant A sub-dominant crown is one where the area occupied by the tree crowns of the upper stratum occupies 11%-30% of the total crown cover of the stand.

Sustainable Yield The sustainable yield of a forest is the maximum level of commercial timber which can be maintained in perpetuity under a given management regime. In Victoria sustainable yield is specified in legislation as the rate of harvest that can be maintained for a defined period (usually 10 years).

SYSS (Sustainable Yield Spreadsheet) A computer model developed to schedule woodflows and determine yields of sawlogs into the future.

Thinning The removal of part of a forest stand or crop, with the aim of increasing the growth rate and/or health of retained trees.

Thinning From Above (THA) Removing the larger and well developed stems from a stand allowing the smaller stems to increase their growth.

Thinning From Below (THB) Removing the smaller and poorly formed stems from a stand and allowing the larger better formed stems to increase their growth.

Timber Resource Analysis An analysis of the timber availability prepared for the RFA process.

Uneven-aged Stand Forest stand which contains a continuum of age classes as a result of more or less continuous regeneration within the stand over a number of years.

Unmerchantable Trees which are not suitable for processing into forest products and for which market exists.

Value Adding An economic term which describes how a raw product is processed into a product which is of more value than the material in its raw state. In the forest and wood industry context, examples of this include the kiln-drying of sawn timber and the manufacturing of wood veneers.

Waste See Smash.

Yield Curves A yield curve defines the volumes of logs available (in a particular forest type and productivity class) at different ages for a particular silvicultural regime.

12 Map 1 – Horsham FMA

Horsham FMA

