

**DANDENONG
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 Dandenong 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 positioned above a solid horizontal line.

Ken King
Executive Director, Forests Service

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1 Introduction

This Estimate of Sawlog Resource (ESR) summarises current Dandenong 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

Dandenong Forest Management Area (FMA) occupies the south west section of the Central Highlands region. It is bounded by the towns of Narbethong in the north, Healesville in the west, Pakenham in the south and the Upper Yarra water catchment to the east (see Map1).

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 one of 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 rate for the Dandenong Forest Management Area at 41,000m³ nett per year for grade C and better (C+) sawlogs.

The statewide review of sustainable yield conducted in 1996 amended the sustainable yield level for Dandenong Forest Management Area to 46,000m³ nett per year for grade D and better (D+) sawlog. This review was limited to converting the existing legislated sustainable yield rates to include all grades of sawlogs (ie, from C+ to D+).

Dandenong Forest Management Area is covered by the Central Highlands Regional Forest Agreement (RFA), established between the Commonwealth and Victorian Governments in 1998. The Central Highlands RFA formally accredits the Central Highlands Forest Management Plan (NRE, 1998) as part of Victoria's Ecologically

Sustainable Forest Management system. The RFA provides for the protection of all conservation values to agreed targets in the Special Protection Zones (SPZ) and allows harvesting in the General Management Zone (GMZ) and the Special Management Zone (SMZ) under specific conditions (Figure 1).

The timber resource analysis undertaken during the development of the Central Highlands Forest Management Plan and RFA in 1998 reviewed the sustainable yield. The sustainable yield level remained at 46,000m³ nett per year D+ although there were changes to the area available for timber harvesting.

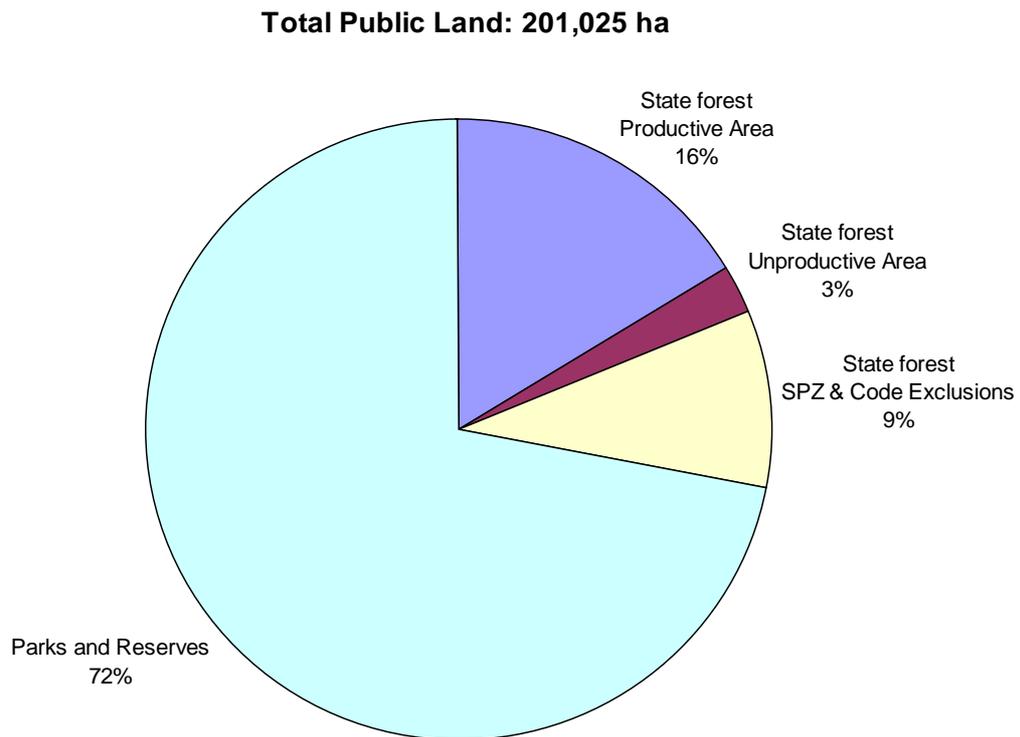


Figure 1. Public Land in the Dandenong Forest Management Area

The timber resource information used in developing the estimate outlined in this report has been derived from preliminary data from the Statewide Forest Resource Inventory (SFRI) project. The SFRI project uses the latest sampling and inventory techniques to map species composition, management history, age, height and density of forest stands. In the future, information will also be collected from field inventory points, felling plots and nearby timber harvesting coupes will be used to estimate stand volumes to confirm and corroborate SFRI data. The updating of aerial photograph interpretation information with logging and fire history records provided by the SFRI project is current to the benchmark date of 30th June 2000. This benchmark date defines the base year for timber supply modelling. SFRI data provides forest information on forest stands, age classes, stand height, and area available for timber production, however in the Dandenong FMA it does not yet include estimates of merchantable volume. This information supersedes previous

assessments outlined in the 1996 Sustainable Yield Review and timber resource analysis.

The majority of the accessible area is comprised of 1926, 1932, and 1939 wildfire regrowth (64%), 1983 wildfire regrowth (18%), and logging regrowth (14%). The remaining area is mature forest (4%).

3 Licence Commitments

Current licence tenure and commitment by species and grade are shown in Tables 1 and 2.

Table 1. Current Dandenong FMA Commitments by Licence Type and Expiry

Licence Type	Product	Expiry Date	No. of Licences
Standard	Sawlog (D+)	30/06/2002	6 ¹
Evergreen	Sawlog (D+)	30/06/2008	1
Evergreen	Sawlog (D+)	30/06/2009	1
Total			8
Standard	Residual log	30/06/2008	1 ²
Agreement	Residual log	30/06/2030	1 ³
Short term	Residual log	30/06/2003	3
Total			5

Note: 1. One of these licences is shared with four other FMAs
 2. This licence is shared with two other FMAs
 3. This agreement is shared with three other FMAs

Table 2. Current Dandenong FMA Commitments by Species and Grade

Product / Grade	Annual Allocations			
	Species Type			
	Ash Species	Non-specific ¹	Mixed Species	Total
Sawlog (m³ nett)²				
B+	4,095	3,150		7,245
C	3,730	19,530		23,260
C+		3,100		3,100
D	1,275	5,020		6,295
D+	300			300
Sawlog Total	9,400	30,800		40,200
Residual Log(m³ gross)				
E Grade ³	19,418			19,418
Residual log ⁴	55,000		42,502	97,502
RL Total	74,418		42,502	116,920

Note: 1. Includes both ash and mixed species
 2. According to current licence annexures
 3. E grade logs are better quality residual logs from which sawn timber can be produced.
 4. This is based on average intake during 1998/99 – 1999/00.

4 Harvest History

4.1 Total Sawlog Production

Figure 2 shows sawlog production by forest type from 1990/91 to 1999/00. Average sawlog production over the last ten years is 38,910m³ D+ nett, which is 1,290m³ nett below the level of licensed commitment. The lowest production year was 1990/91, 21% below the licensed level, and the highest production year was 1993/94, 16% above the licensed level.

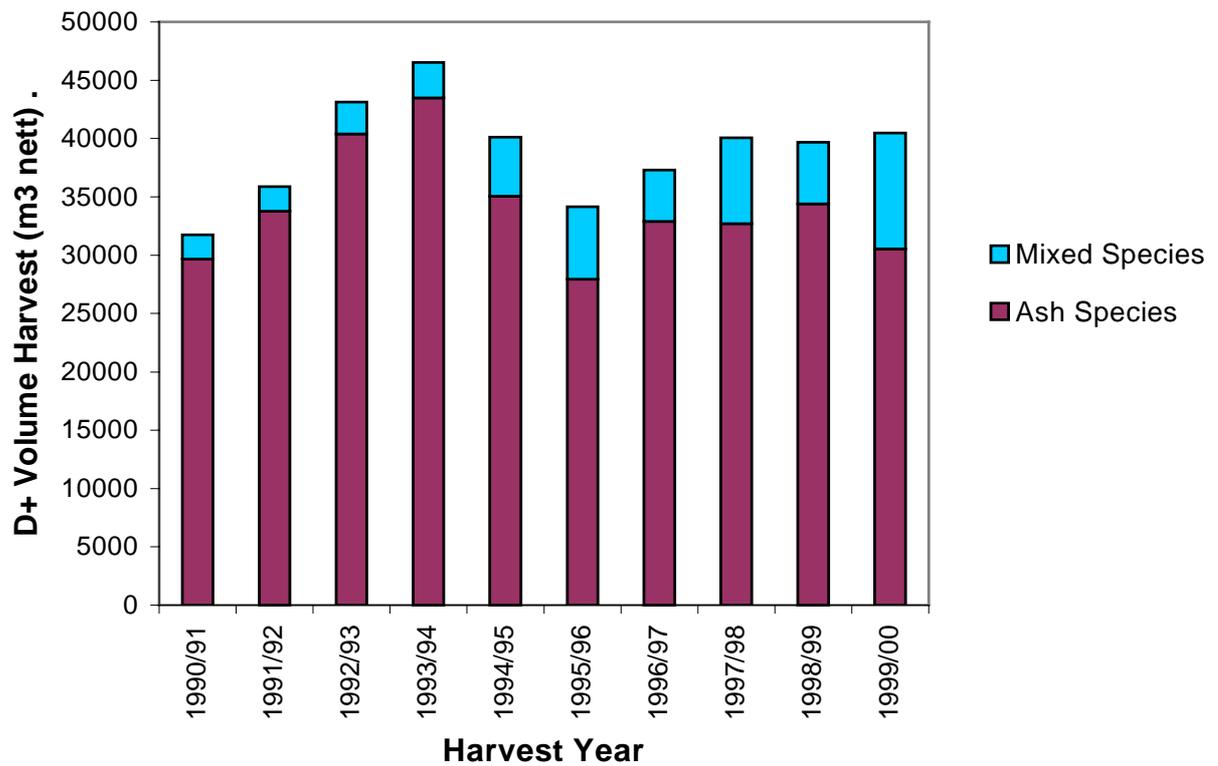


Figure 2. D+ Sawlog Produced by Forest Type by Year

4.2 Sawlog Grades

Figure 3 shows the proportion of sawlog grades produced from 1990/91 to 1999/00. The average proportion of each grade in relation to total D+ over the ten years is 0.2% A grade, 24.6% B grade, 58.6% C grade and 16.6% D grade.

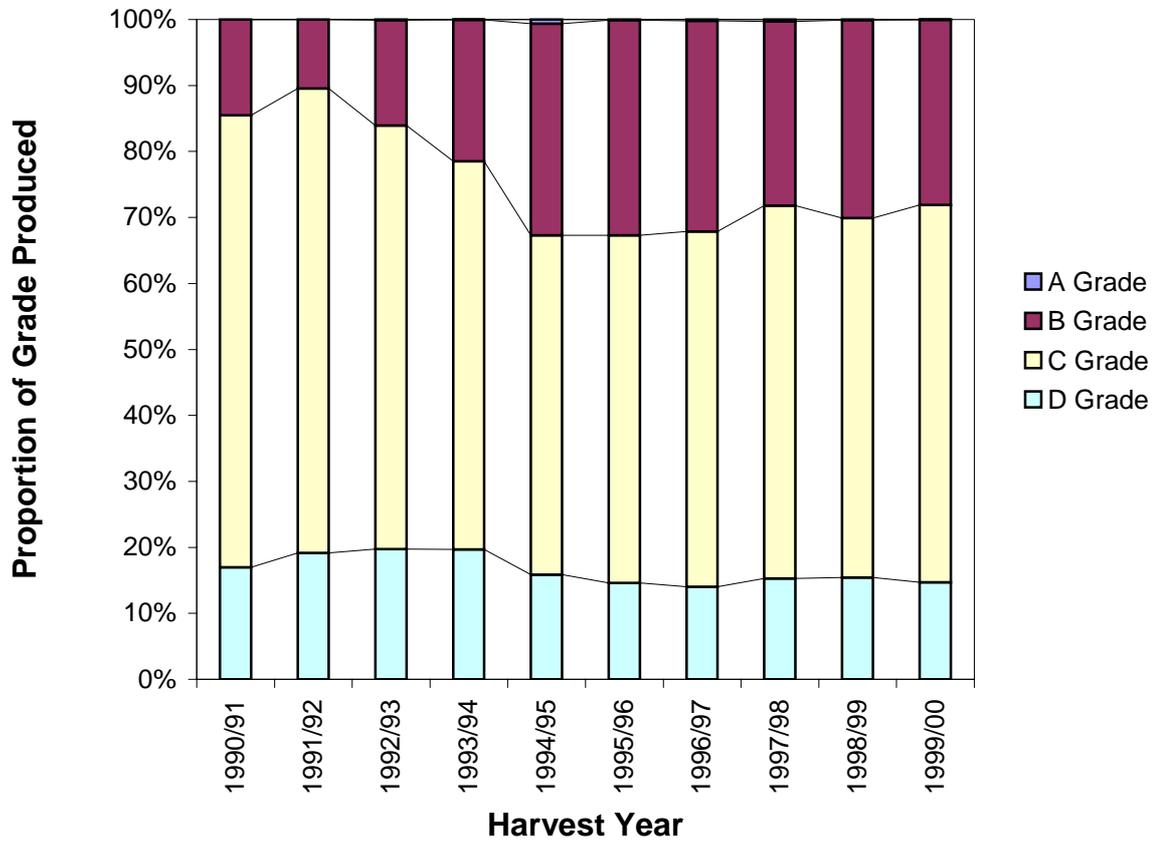


Figure 3. D+ Sawlog Grade Proportions by Year

4.3 Sawlog Size Classes

Figure 4 shows the proportion of size class 1 (less than 45cm centre diameter under bark) and size class 2 (45cm and greater centre diameter under bark), of sawlogs produced from 1990/91 to 1999/00. The proportion based on nett volume has remained relatively constant over the period, averaging 29.3% in size class 1 and 70.6% in size class 2.

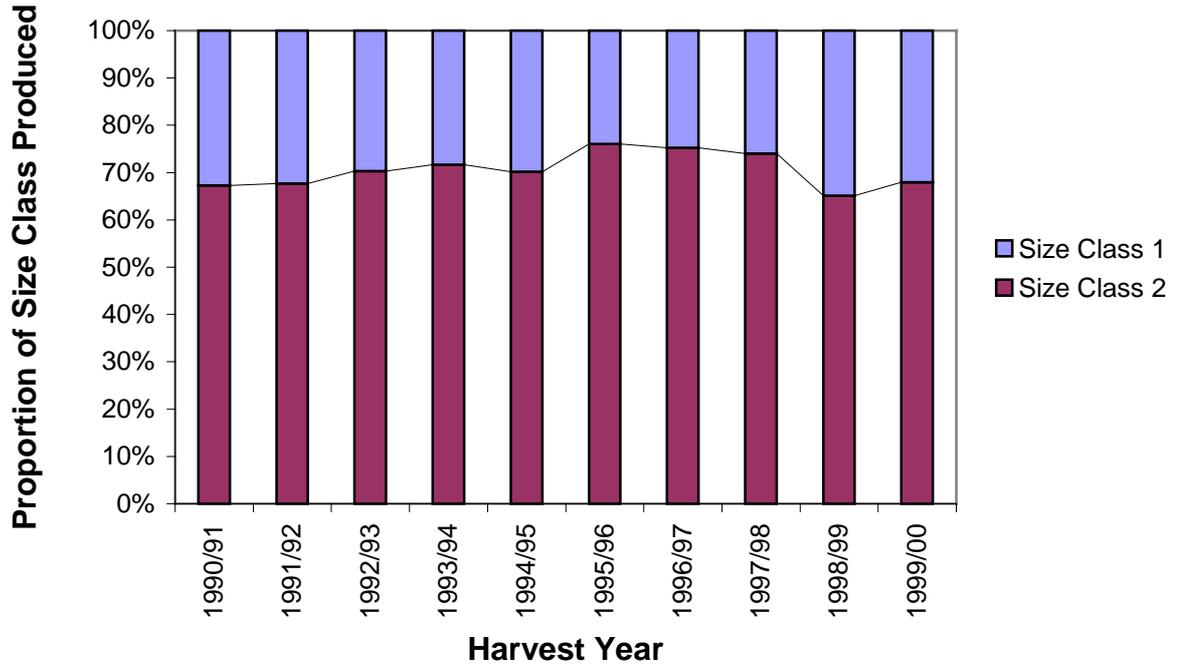


Figure 4. D+ Sawlog Size Class Distribution by Year

4.4 Area Harvested

Figure 5 shows the area harvested by forest type from 1990/91 to 2000/01. The area of Ash forest harvested each year has remained relative constant over the past ten years, varying between 225ha and 135ha each year. The area of mixed species harvested increased in 1999/00 to about 200ha as part of an FMA strategy to increase the proportion of mixed species sawlogs in proportion to the total resource.

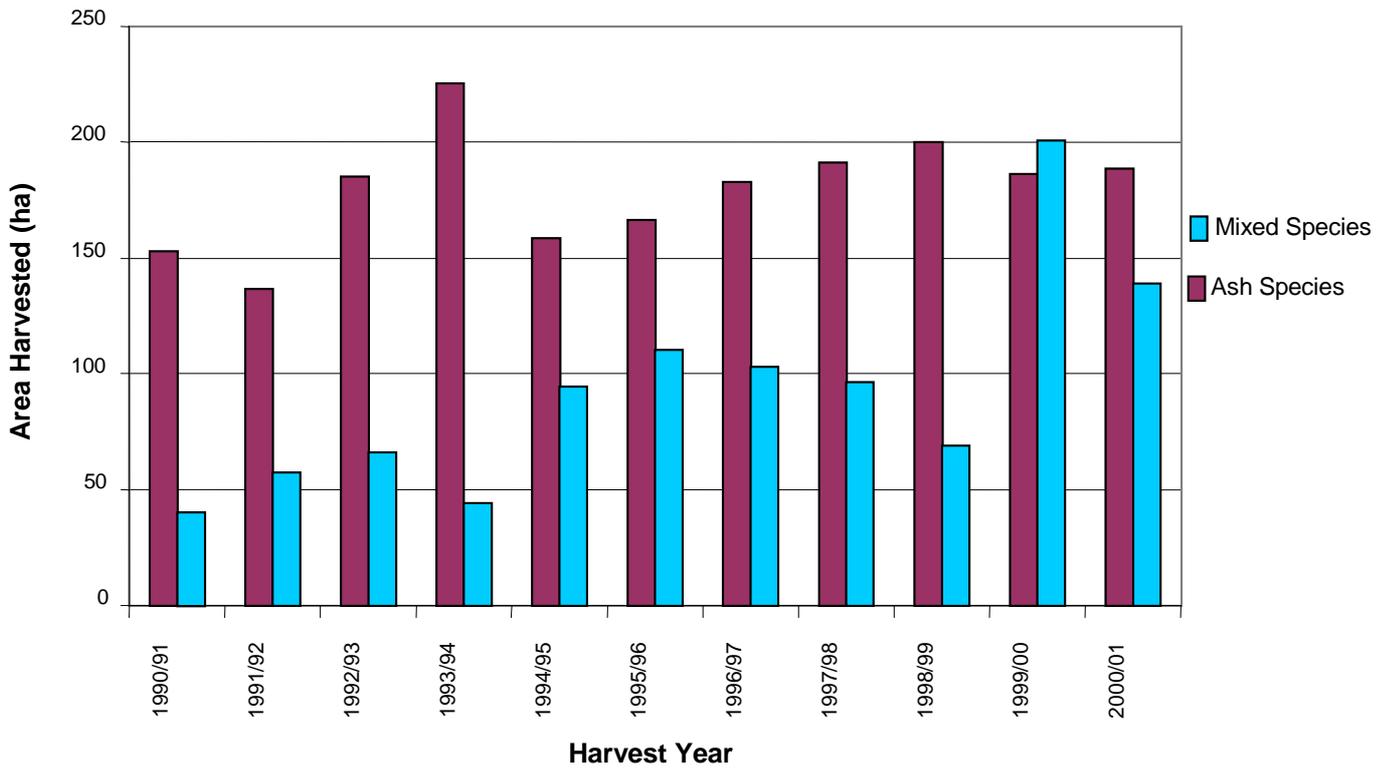


Figure 5. Area harvested by Forest Type by Year

4.5 Sawlog Yields

Figure 6 shows the yields by forest type from 1990/91 to 2000/01. The average D+ nett sawlog yield produced during the period 1990/91 to 2000/01 is 189m³/ha for Ash Species (Ash) and 56m³/ha for all mixed species. The D+ nett yield for Ash species forest has decreased from an average above 200m³/ha in the early 1990s to an average around 170m³/ha in recent years.

The mix of mature and regrowth mixed species stands harvested along with the large variation in quality makes it difficult to determine patterns or trends in mixed species yields. The average D+ nett sawlog yield produced during the period 1990/91 to 1999/00 is estimated to be 57.2m³/ha for High Quality Mixed Species (HQMS) and 28.8m³/ha for Low Quality Mixed Species (LQMS) (see section 5.1).

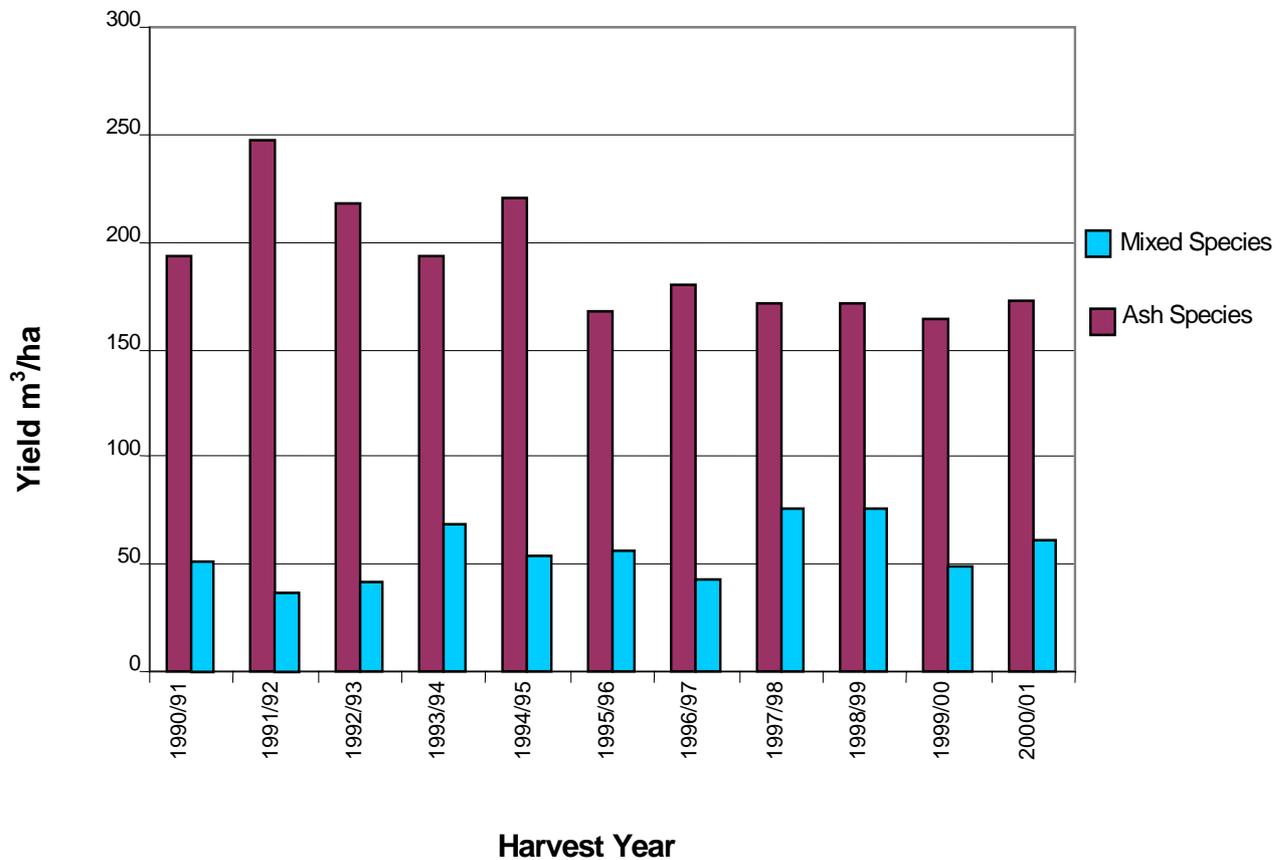


Figure 6. D+ Sawlog yields by Forest Type by Year

4.6 Residual Log Sales

Figure 7 shows the quantity of residual logs produced and sold from 1990/91 to 1999/00. Residual log sales have increased from 76,000m³ gross per year in 1990/91 to 125,000m³ gross per year in 1999/00 as more markets were found for the residual logs produced from sawlog harvesting. On average over the period, 84.4% of residual log sales were from Ash species, and 15.6% from mixed species. All residual log produced from sawlog harvesting operations in the Dandenong FMA is currently sold.

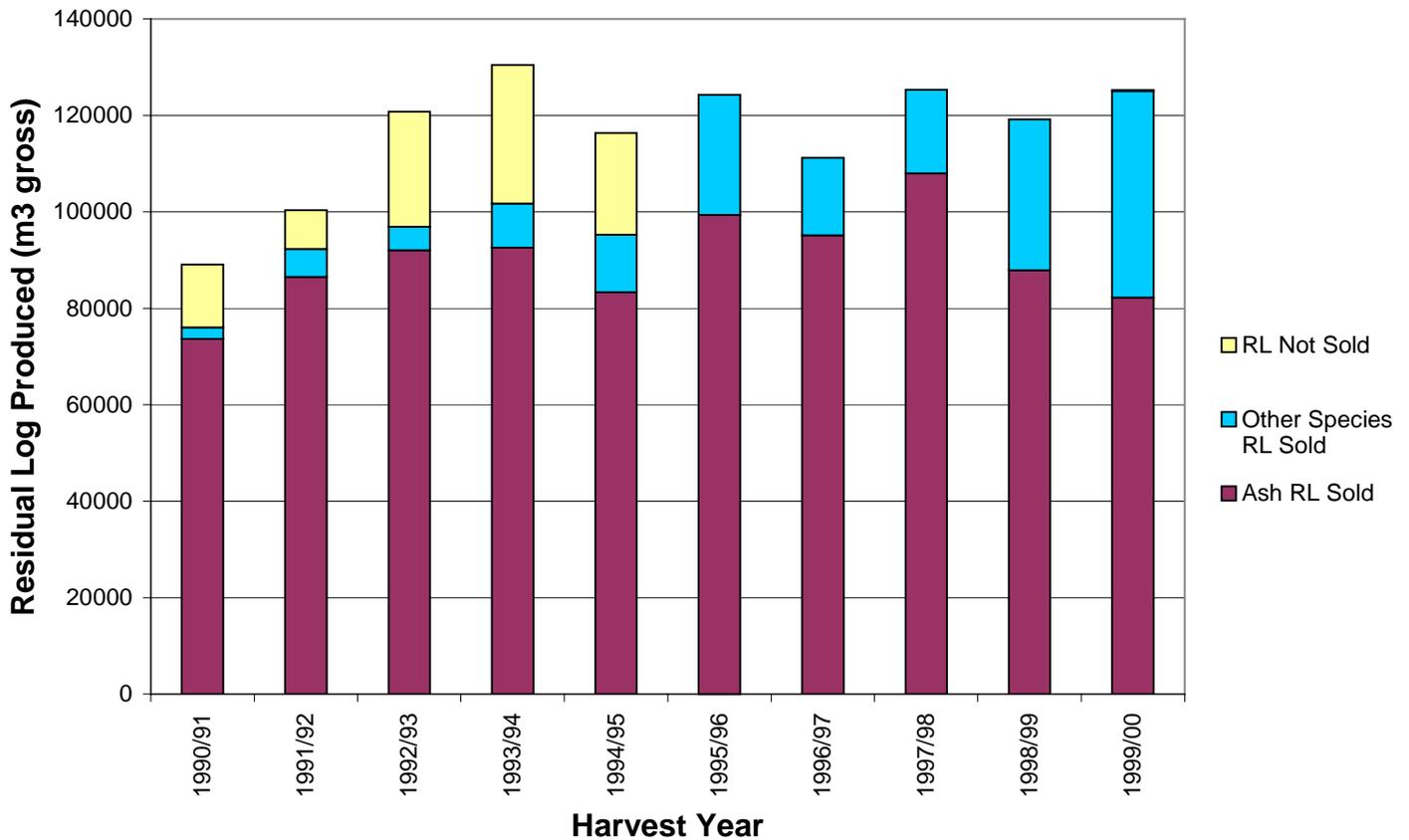


Figure 7. Residual Log Production by Year

5 Volume and Growth Information

5.1 Standing Volume

The SFRI Project has produced a partially benchmarked area statement and corresponding stand mapping. No SFRI growth and yield data is yet available.

This Estimate of Sawlog Resource uses the SFRI data to divide the resource into the following three broad forest types:

- Ash Species (Ash)
- High Quality Mixed Species (greater than 40m mature stand height) (HQMS)
- Low Quality Mixed Species (less than 40m mature stand height) (LQMS)

Each of the forest types has been broken up into a high and low quality stratum to account for the low site quality area in the northern section of the FMA.

The expected yields for mature mixed species forest used in the Forest Management Plan were compared with actual harvesting data and are reasonably consistent with current yields and were therefore not changed for this estimate.

5.2 Growth

Growth models used in developing these estimates are based on those used in the 1996 Sustainable Yield Review, the Central Highlands Forest Management Plan and the RFA. SFRI growth models are still in preparation.

Predicted yields were considerably higher than observed yields from the past ten year's harvesting history. For this reason, the yields were scaled down using actual yield data. The following reductions were applied to each of the yields, 12.5% for Ash, 20.0% for HQMS and 31.0% for LQMS.

An area of 1939 regrowth forest in the north of the FMA with mudstone and siltstone geology had considerably lower productivity than the remainder of the FMA, which is of granite origin. There is no growth or harvesting data available for this northern section of the FMA, however, a recent assessment of diameters has provided some basic information on growth rates. The forests in this area have been treated as separate low volume strata and reductions to the yield curves have been applied. The following reductions were applied to each of the previously adopted curves, 14.0% for Ash, 32.0% for HQMS and 50.0% for LQMS.

6 Resources

6.1 Wood flow

In the Dandenong FMA the predominant silvicultural systems used are clearfelling and seed-tree. They result in even aged regrowth of a known age. Trees are retained in clearfelling and seed-tree operations for habitat, seed fall and in buffers along streams. The estimate of the availability of sawlogs into the future is based on the assumption that clearfelling and seed-tree 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 age 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, to the year 2160.

6.2 Resource Profile

Table 3 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 3. Profile of Resource Elements for Dandenong FMA

No.	RESOURCE ELEMENT	Area (ha)	Annual Volume (m ³ nett/year)
	STATE FOREST (INCLUDING SOME HISTORIC AREAS)	56,325	
	<i>Code and Forest Management Plan elements:</i>		
1	SPZ & proportion SMZ	15,989	
2	Code slope & stream buffer exclusions	1,730	
3	FMP prescriptions	2,126	
4	Unmapped streams and soaks not considered in Code buffer exclusions	3,413	
5	Standard SFRI unproductive stands	4,299	
	BIOLOGICAL SUSTAINABLE YIELD	28,768	40,000
	<i>Operational elements:</i>		
6	Further unproductive stands	3,403	3,000
7	Slopes additional to Code exclusions	646	1,000
8	Areas not harvested near stream buffers	646	1,000
9	Small and isolated areas	1,091	1,000
10	Rocky areas		900
11	Harvesting losses		900
	<i>Management elements:</i>		
12	Landscape buffers		1,000
13	Fire losses		200
14	Disease losses		
15	New flora, fauna and cultural site reservations		
16	Temporal and spatial constraints		
	<i>Remaining element:</i>		
17	Economically Accessible Resource	22,982	31,000
	<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		

Notes: 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 of the Special Protection Zone is excluded from harvesting and all the Special Management Zones in the Dandenong FMA are available for harvesting. On average, the Special Management Zones across the entire Central Highlands Forest Management Plan are only 50% available for harvesting.

6.3.2 Code Slope and Stream Buffer Exclusions

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

6.3.3 Forest Management Plan Prescriptions

This element is composed of three parts. The first is areas of mature ash forest identified by SFRI. The second and third parts are areas protected for Leadbeaters Possum habitat and rainforest that cannot be forecast but are detected at the coupe planning stage. These parts may also contain areas of stream buffers.

Habitat for Leadbeaters Possum is defined as live mature ash trees or areas of ash forest with a high density of fire killed habitat trees. Considerable areas of this latter temporary habitat exist in the FMA and remain unavailable in the short term until the dead habitat trees fall over. This is predicted to occur in the next twenty years, however, uncertainty exists as to exactly when these high value areas will be available. Areas of temporary Leadbeaters Possum habitat have been included in the available area and are scheduled for harvesting over the next twenty years.

6.3.4 Unmapped Streams and Soaks Not Considered in Code Buffer Exclusions

An area in the northern section of the FMA was identified where current mapping underestimates the density of streams. Aerial photographs and historical maps were used to determine that there was an additional 400ha of *Code* buffers associated with unmapped streams.

A study of the unharvested areas around operational coupes identified a further 3,013ha in additions to standard *Code* buffer exclusions.

6.3.5 Standard Statewide Forest Resource Inventory Unproductive Stands

The area of productive State forest is defined by the SFRI and is determined by excluding forest of inherently low productivity. The forest stands excluded on the basis of being non-productive are stands that are not capable of attaining heights greater than 28 metres.

6.3.6 Further Unproductive Stands

There are a number of low quality stands labelled as productive in the SFRI data set. These stands contain forest above age 50 years, which are less than 28 metres in

height and as a result have been identified and removed from the analysis. The area contained in these further unproductive stands is around 250 hectares.

The following species/stands have also been excluded from the economically accessible area in addition to those species and forest types identified by SFRI. Stands dominated by *Eucalyptus cypellocarpa* (Mountain Grey Gum), *E. dives* (Broad-leaved Peppermint), *E. globoidea* (White Stringybark), and *E. radiata* (Narrow-leaved Peppermint) when associated with either *E. ovata* (Swamp Gum) or *E. dives* (Broad-leaved Peppermint) were because of their low merchantability.

An area of understocked forest was included in this element because it does not currently produce sawlogs.

6.3.7 Slopes Additional to Code Exclusions

Differences between actual area harvested and the planned harvest area have been examined and found to often be the result of errors in mapping, assumptions about stream topography, practicalities in harvesting small and steep areas, and limitations of modelled attributes. This area was measured at 1,292ha. It has been assumed that half of this difference is due slope and half due to stream buffers (the next element) so 646ha have been attributed to each element.

Over the last seven years the difference in predicted area to harvested area is 18.2% for Ash species and 19.0% for mixed species, with an average of 18.4% for the entire forest.

6.3.8 Areas Not Harvested Near Stream Buffers

Refer to Element 7 for further discussion. 646ha have been apportioned to this element.

6.3.9 Small and Isolated Areas

Small isolated areas that are available productive forest, but are generally surrounded by unproductive or unavailable forest, are sometimes below a minimum size considered economical to harvest. These are defined as areas less than 5ha in size and they total 796ha.

An additional 295ha of State forest occurs in isolated parcels away from the main forest estate. These isolated areas have been excluded from the analysis because sawlog harvesting is unlikely to occur there.

6.3.10 Rocky Areas

A volume allowance of 900m³ nett per year has been excluded for those areas where rocky areas, that are unmapped by SFRI, prevent access or harvesting within a coupe.

6.3.11 Harvesting Losses

This element assumes an additional 900m³ nett per year of sawlog volume could be achieved by improved log preparation techniques.

6.3.12 Landscape Buffers

An allowance of 1,000m³ nett per year has been included for those areas where coupes are planned near areas of private property and in other landscape sensitive areas.

6.3.13 Fire Losses

An allowance of 200m³ nett per year has been made for potential loss of growth due to wildfire.

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 Dandenong FMA. Under the Central Highlands RFA, 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

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

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. There are currently strong markets for residual logs.

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 System

Yield modelling has been based on the assumption that a clearfelling or seed tree silvicultural system will be applied in Ash and HQMS forests. Clearfelling or seed tree systems may also be applied in LQMS forests, particularly in degraded stands containing a mix of mature and regrowth forest.

If harvesting commences on a larger scale in the LQMS regrowth forests, a multi-stage cut system may be the most appropriate silvicultural system. For the analysis of

LQMS stands it has been assumed that a regeneration cut would be required after approximately 120 years. This multi-stage cut has been modelled as a single harvest at age 120 years, with regeneration occurring after this operation.

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

Forest stands labelled as unstocked or undefined have been excluded from the economically accessible resource area. Most of these areas contain non-eucalypt species or a scattering of eucalypt species that, if harvested, would not produce significant quantities of sawlog. An area of 1,198ha has been identified as suitable for future reforestation programs.

7 Resource Outlook

7.1 Sawlog levels

If licence levels are maintained at current licence levels until 2004 then a non-declining yield of 31,000m³ nett per year until 2042 is possible. Later the harvest level will periodically increase to around 41,100m³ nett per year after 2142. The Ash Species proportion will decrease from 93% in the first 20 years to around 80% in 2062.

The contribution of each forest type to the sawlog level in the short term is described in table 4. The contribution of each of the forest types will vary over time depending on the age structure present of each type. The less productive types such as HQMS Lo and LQMS Hi will make contributions to the sawlog levels in later periods when others may contribute less.

Table 4. Volume available by forest type for Dandenong FMA

Forest Type	Volume (m³ nett per year)	Proportion of Total (%)
Ash Species Hi	28,300	91
Ash Species Lo	600	2
HQMS Hi	1,900	6
HQMS Lo	0	0
LQMS Hi	0	0
LQMS Lo	200	1
Total	31,000	100

7.2 Rotation Age

Table 4 shows the minimum harvesting ages and nominal rotation age applied to the three forest types in the Dandenong FMA.

Table 5. Minimum Harvesting and Nominal Rotation Ages in Dandenong FMA

Forest Type	Minimum Harvesting Age (1939)	Minimum Harvesting Age (post-1939)	Minimum Harvesting Age (subsequent rotations)	Nominal Rotation Age
Ash Species	60 years	70 years	80 years	80 years
HQMS	70 years	85 years	100 years	100 years
LQMS	90 years	105 years	120 years	120 years
Ash Species (low quality)	70 years	85 years	95 years	95 years
HQMS (low quality)	100 years	125 years	145 years	145 years
LQMS (low quality)	180 years	210 years	240 years	240 years

The minimum harvesting ages were determined with consideration given to producing larger sized logs and achieving a steady rate of wood supply, given the predominance of 1939 regrowth in the FMA.

The minimum harvesting age and nominal rotation age for the low site quality area in the northern section of the FMA were adjusted to account for the slow growth of the forest.

8 Data Standard

The Expert Data Reference Group has provided an independent assessment of data and methods used in the development of Estimate of Sawlog Resource. They have 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 Dandenong FMA, area was given three stars, yield, one star, and woodflows, three stars. This has 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 Dandenong FMA are dominated by regrowth forests that are growing very rapidly. The area available for harvesting has been reduced from previous estimates due to the inclusion of operational constraints not previously measured. The growth and yield data are considered inadequate by the Expert Data Reference Group. Revised estimates are expected in 2004. There are insufficient sawlog resources to maintain current licence levels so they will be reduced by 23% to 31,000m³ nett per year.

10 References

Central Highlands Regional Forest Agreement 1998, Commonwealth and Victorian Regional Forest Agreement Steering Committee.

Forest Service Technical Report 97-2, *Review of sustainable yield rates for hardwood sawlogs from State forest 1997*, Department of Natural Resources and Environment.

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

NRE (1998). *Forest Management Plan for the Central Highlands*. Department of Natural Resources and Environment, East 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) and Professor B. Turner (ANU).

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

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 forest

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 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 Statewide Forest Resource Inventory 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 (m^3/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.

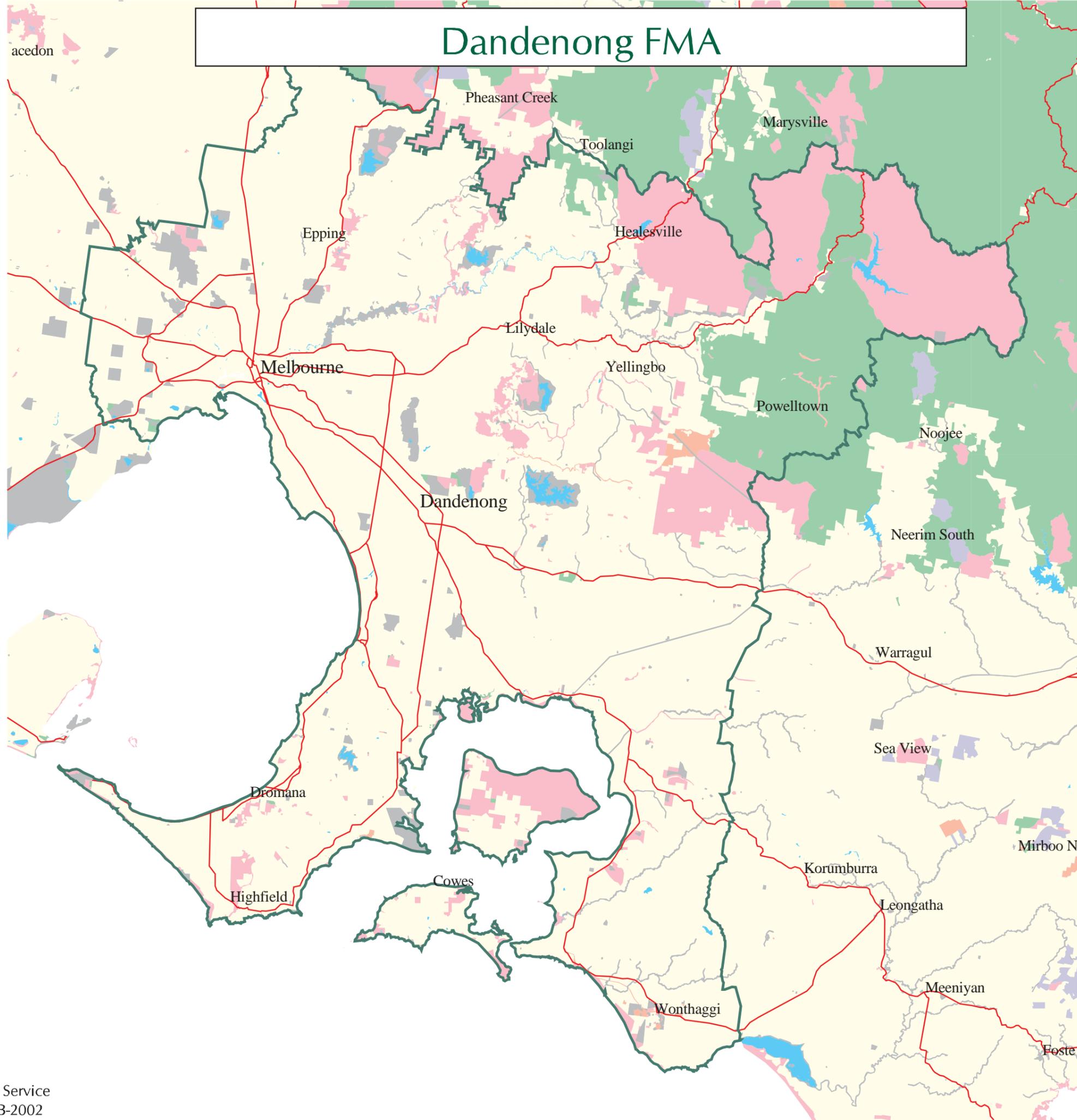
Value Adding An economic term which describes how a raw product is processed into a product which is of more value than the material in its raw state. In the forest and wood industry context, examples of this include the kiln-drying of sawn timber and the manufacturing of wood veneers.

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 - Dandenong FMA

Dandenong FMA



- State Forest
- Parks and Reserves
- Other Parks and Reserves
- Other Public Land
- Plantations
- Private land
- Water Bodies