WEST RFA
MIDLANDS FMA

Timber Resource Analysis

This report summarises the Timber Resource Availability analysis (TRA) for Midlands Forest Management Area (FMA), which has been undertaken as part of the West RFA.

Appendix 1 summarises the assumptions that form the basis of this analysis.

Note that the figures presented here are based on re-analysis of data used for the 1995 forecast of sustainable yield, incorporating additional data where available. SFRI data are not available for Midlands FMA.

These results are indicative only and are not to be interpreted as a change in the sustainable yield rate. Resource information and growth and yield estimates are essentially unchanged from previous models, except where identified in this report. The sustainable yield rate can only be fully reviewed once SFRI data are available, and will be based on modelling which will incorporate significantly more detail than has been possible in this process, including testing of the spatial feasibility of the assumptions included in the model.

1. Current Licence Commitments

The current legislated sustainable yield rate for Midlands FMA is 58,000 m3/yr D+ sawlog (based on the 1995 review of sustainable yield)

Current commitments for Midlands are 58,600 m^3/year D+ net sawlog. Note that total licence allocations are reconciled with sustainable yield over a 15 year Timber Supply Period.

2. 1995 Sustainable Yield Review

The 1995 review of sustainable yield has been documented in Technical Report 95/5 (NRE, 1995).

The forecast of sustainable yield was carried out utilising FORPLAN based models in the Integrated Forest Planning System (IFPS). These models were based on the best available data at the time. The data used were a combination of spatial data for the Wombat State forest, and non-spatial data for Mt Cole and the "Remaining Areas", which are collectively the remainder of the Midlands FMA. The area identified in this report as "Remaining Areas" comprises the following blocks: Ben Major, Berringa, Durham, Enfield, Glen Park, Lal Lal, Landsborough, Linton, Mt Avoca, Ross Creek, Springmount, Trawalla and VSF (Creswick).

3. Methodology for RFA Timber Resource Analyses

In order to determine the impact of the draft CAR reserve system under the RFA, a spatial dataset is required for the whole FMA. Previous modelling only incorporated GIS data for the Wombat Forest area.

To ensure a consistent basis for comparison, a new base model was prepared incorporating the forest management zones, as published in the 1996 Forest Management Plan, and full Code of Forest Practices exclusions. Areas of available forest less than 10 hectares which are surrounded by unavailable or unproductive forest were considered to be unavailable for modelling purposes.

The impact of the draft CAR reserve design was determined by replacing the forest management zones from the existing 1996 plan with the draft CAR reserve GIS coverage. A revised set of analysis areas was produced and used to develop a second model.

Spatial forest type data was obtained from the following sources:

1. Wombat Forest

The GIS coverage of forest types defined by the 1993 Assessment of Hardwood Sawlog Resources, which was used for the development of the 1995 FORPLAN analysis areas, has been retained.

2. Mt Cole

A GIS coverage based on the 1993 Mt Cole and Mt Lonarch timber assessment has been used for this analysis. The original stratum labels were recoded into age classes based on the translation table, which was located in documentation relating to the 1995 forecast of sustainable yield. Using this coverage it is possible to reproduce the table of areas by age class, although there are some inconsistencies with the areas used in the sustainable yield model, particularly in the 1950s and 1960s regrowth age classes. As the source of these differences cannot be identified, the GIS based data have been used for these analyses.

3. "Remaining Areas"

There are no existing spatial datasets covering these areas. Therefore, the API25 coverage (a contributing dataset to the SFRI project for Midlands) has been used to determine the area of available State forest containing productive mature and regrowth forest. Using the API25 layer, it has been possible to define productive forest based on a minimum stand height of 22m. This level of detail is not available from the HARIS data. The API25 layer has not been updated to include recent harvesting and fire records.

4. Changes to Net Available Area

In order to quantify the impact of changes resulting from the draft CAR reserve system, it has been necessary to develop consistent spatially-based models.

The following table summarises changes to the data sources and assumptions associated with the datasets.

	1995 SY model	New base "Exist96" model	Draft CAR model
Wombat High/ Wombat Low	1993 assessment (GIS coverage)	As for 1995 SY	As for "Exist96" model
Mt Cole	Non-spatial data (based on 1993 assessment of Mt Cole/Mt Lonarch)	GIS version of 1993 data (some inconsistencies with SY model - 1950s/1960s)	As for "Exist96" model
Remaining Areas	Non spatial - HARIS based, broad scale definition of productive forest	GIS based from API25 data – more accurate definition of productive forest using stand height > 22 m	As for "Exist96" model
Code of Forest Practices exclusions	Limited buffering of streams and steep slope exclusions	Full Code of Forest Practices exclusions (stream buffering and modelled 30° slope exclusions)	As for "Exist96" model
Small area filter	None applied	10 ha filter applied	As for "Exist96" model
Availability	Intermediate zoning layer	Published zoning layer (1996 plan)	Draft CAR reserve system
Growth and Yield	Based on CFI plots	As for 1995	As for 1995

The impact of these changes in terms of net available area are summarised below:

Forest Type/Area	Net available area (ha)		
	SY model	New base "Exist96"	Draft CAR
Wombat High	26,140	24,690	21,720
Wombat Low	8,330	7,600	6,810
Mt Cole	4,550	3,790	3,550
Remaining Areas	11,430	6,350	4,600
TOTAL	**50,450**	**42,430**	**36,680**

The reduction of available area from the 1995 sustainable yield model to the new base "Exist96" model is a result of the combined effects of the factors outlined above. The largest single contributing factor has been the change in the definition of productive forest for the Remaining Areas. Using the API25 data instead of HARIS to identify productive forest stands for the Remaining Areas, accounts for 5,000 ha of the 8,000 ha reduction in total available area. The contribution of the each of the other factors to the remaining difference of 3,000 ha has not been quantified. However, the majority of this difference is likely to be due to the use of full Code of Forest Practices exclusions and the application of the small area filter, neither of which were incorporated in the 1995 models.

The Remaining Areas were a significant component of the 1995 forecast sustainable yield, contributing 8-15% to the sustainable yield rate across different periods of the model. The latest figures better reflect the stands in this forest type which are likely to be contributing to the sawlog supply.

5. Timber Resource Availability

Estimates of timber resource availability have been made utilising Spectrum based models in the Integrated Forest Planning System (IFPS). As outlined above, it was necessary to re-define the base model so as to have a standard means of comparison to assess the impacts of the draft CAR reserve design.

New models were developed based on both the "Exist96" zoning and the draft CAR reserve design options.

When developing these models, the opportunity was also taken to further refine prescriptions relating to the management of the forest, in addition to incorporating changes to the net available area. The modifications to the prescriptions were based on the additional spatial information which is now available, and on factors identified by regional staff since the 1995 forecast.

This additional information includes:

- Revised estimates of resource availability. In the 1995 model, overwood from the 1983 Trentham fire area was assessed as being able to contribute 12 m3/ha D+ sawlog. This volume is now not considered economic to harvest due to the low quality of overwood and the current lack of suitable markets, for example the closure of the CSR mill at Bacchus Marsh.
- More detailed spatially based analysis of scheduling within catchments, including identifying catchments in which harvesting is not permitted for the first ten year period due to existing age class distribution.
- Further refinement of scheduling within Special Management Zones for owls, utilising the expanded spatial dataset.

A contingency allowance of at least 10% should be applied to the available volume to allow for differences between modelled and actual available areas, and to allow for those factors that are not readily incorporated into existing models. A contingency allowance was not included in previous modelling for Midlands FMA.

Examples of differences between modelled and actual available areas that should be addressed by a contingency allowance are:

- Discrepancies between streams identified in the GIS hydrology layer and the actual stream network on the ground
- Allowance made for width of streams when buffering
- Allowance for saturated zone when buffering streams
- Reliability of modelled slope classes
- Positional accuracy or spatial precision of identified features which need to be buffered

Examples of areas which cannot be readily incorporated into models are:

- Strips of available forest between roads and streams which are theoretically available but are not practical to harvest because of their size and proximity to stream buffers
- Strips of available forest between roads and downslope areas which are not practical to harvest due to the problem of accessing felled trees
- Small unloggable areas within a coupe which are not identified as separate from the net available productive area, eg. rocky outcrops and localised slope variations.

A contingency allowance of 10% is proposed at this stage until the impact of these contributing factors can be quantified. Given the variable nature of native forest, it may be necessary to revise this allowance when additional information becomes available.

Incorporating the factors outlined above, the Timber Resource Analysis results in a baseline value of 45,000 m^3/year for the "Exist96" model, and around 40,000 m^3/year once the proposed CAR reserve system has been included.

The reduction in volume from the 1995 rate of 58,000 m^3/year to the new base of 45,000 m3/year is a result of the following:

- Changes to resource information
- Full Code of Forest Practices exclusions
- Application of the small area filter
- Refined modelling of scheduling within catchments and Special Management Zones
- Use of 1996 Forest Management Plan to define available areas
- Inclusion of contingency allowance.

The further reduction in available volume from the new base is due to a reduction in available area resulting from the draft CAR reserve design.

No specific allowance has been made for fire risk in these analyses. However, data from the 1995 sustainable yield review indicates that due to the age class distribution, the risk of volume loss due to fire averages only 400 m^3/year for the first 20 years of the model.

The results from these Timber Resource Analyses can only be considered indicative, although the range of key issues has been addressed in these analyses, utilising currently available data. These analyses have been based on a reworking of original data, incorporating additional spatial data where possible, and revised prescriptions where appropriate. Growth and yield information has not been updated since 1995, but further measurement and analysis of the CFI plots will be part of the SFRI Midlands project.

A statewide review of sustainable yield is required in 2001 and will utilise SFRI based resource data wherever possible. This review will also incorporate regionally defined prescriptions and constraints, and will provide opportunity for community input.

Appendix 1: Assumptions

- Non declining yield constraint applies from period 1 onwards
- Remaining areas defined as individual blocks, with spatial details
- Mt Cole defined with spatial details
- Areas of available forest less than 10 hectares which are surrounded by unavailable or unproductive forest are considered to be unavailable for this analysis.
- Minimum yields set as follows:

Forest Area	**"Exist96"**	**Draft CAR**
Mt Cole	3,800 m^3/year	3,000 m^3/year
Remaining Areas	1,500 m^3/year	1,000 m^3/year

- Harvesting constraint for each catchment set to limit harvesting to 10% of total forest area (available and unavailable) in any one period
- Harvesting constraint for each owl management zone set to limit harvesting to 10% of total forest area (available and unavailable) in any one period
- Age of 1983 fire regrowth stands within Trentham area (Macedon and Divide blocks) has been delayed by 1 period to reflect lower growth rates.
- Overwood in Trentham area resulting from 1983 fires considered not economic to harvest
- Yields as for 1995 model
- Code of Forest Practices buffering applied. Note that a different buffering model was applied to the Pyrenees area, than to the remainder of the FMA.
- Minimum rotation age[1]:

Existing	Regrowth Shelterwood Areas	65 years
	High Productivity Areas	65 years
	Low productivity Areas Regrowth	85 years
	Mt. Cole Areas	65 years
	Remaining Areas	120 years[2]
Regrowth	Regeneration thinned at age 60	75 years
	High Productivity Areas	75 years
	Low Productivity Areas	95 years
	Mt. Cole Areas	75 years
	Remaining Areas	95 years

[1] Yields applied to the 1995 model were scaled to the middle of the 10 year period. Modelled rotation lengths reflect this adjustment.

[2] Due to absence of age data for Remaining Areas, mature forest from API25 has been given a nominal age of 120, and is considered available for harvesting from the start of modelling period.