GIPPSLAND RFA
CENTRAL GIPPSLAND FMA

Timber Resource Analysis

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

The study area for this analysis is that part of Central Gippsland RFA which lies within the Gippsland RFA study area. However, when comparing volume availability with current commitments, it is more appropriate to consider the FMA as a whole.

Timber resource availability for the west part of the FMA has been obtained from the benchmark model run for the Central Highlands RFA, extracting only those blocks which are within the Central Highlands part of the FMA.

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

Note that the figures presented here are based on data from a number of sources, and of varying reliability. The whole of FMA results have simply been obtained from the addition of two part models. A fully optimised model across the whole FMA will produce a more representative result. This will not be possible until SFRI data are available for the west part of the FMA.

These results are indicative only and are not to be interpreted as a change in the sustainable yield rate. The sustainable yield rate will be determined once the RFA is finalised and full SFRI data are available, and will be based on modelling which will incorporate significantly more detail than has been possible in this process.

1. Current Licence Commitments

Current FMA commitments

Ash	116,580 m^3/year
Unspecified	63,056
TOTAL	179,636

Commitments will increase from 2002

FMA Commitments from 2002

Ash	119,880 m^3/year
Unspecified	63,056
TOTAL	182,936

2. Benchmark Central Highlands RFA model

An analysis of the resource availability in the Central Gippsland FMA was undertaken in 1998 as part of the Central Highlands RFA, using the computer based forest planning model, FORPLAN. Results for the west part of the FMA were extracted from this model, so that they could be combined with recent analysis for the east part of the FMA, which lies within the Gippsland RFA study area.

Input data for the benchmark Central Highlands model was derived from spatial FOREST25 data for the western part of the FMA (within the Central Highlands RFA study area), and non-spatial HARIS data for the eastern part of the FMA (now within the Gippsland RFA).

3. Methodology for Gippsland RFA Timber Resource Analysis

In order to determine the impact of draft CAR reserve design under the RFA, a spatial dataset is required for the whole FMA. The 1992 sustainable yield forecast was based on non-spatial data derived from HARIS.

To determine the impact of the draft CAR reserve design, a new base model was prepared based on SFRI forest type mapping and full 1996 Code of Forest Practices exclusions. SFRI areas were aggregated into the same broad forest type classifications used in 1992 and in the analysis undertaken as part of the Central Highlands RFA.

Growth and yield information from the previous Central Highlands model have been retained.

Appendix 1 summarises the assumptions applied to the SFRI data.

Areas of available forest less than a minimum threshold size of 10 ha and surrounded by unavailable or unproductive forest were considered to be unavailable for this analysis.

The impact of the draft CAR reserve design was determined by applying the CAR GIS coverage to the base model. A revised set of analysis areas was produced and used to develop a second model.

4. Changes to Net Available Area

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

	1992 SY forecast	New base "Code only" model	Draft CAR model
Resource information	Non-spatial (HARIS)	Full GIS dataset (preliminary SFRI)	As for "Code only" model
Code of Forest Practices exclusions	Not modelled	Full 1996 Code of Forest Practices exclusions (stream buffering and modelled slope exclusions)	As for "Code only" model
Small area filter	None applied	Small area filter of 10 ha applied	As for "Code only" model
Availability	HARIS definition	Modelled 1996 Code exclusions	Draft CAR reserve system
Growth and Yield	HARIS based	As per Central Highlands RFA modelling	As for "Code only" model

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

	Net Available Area		
Forest Type	HARIS	New base "Code Only"	Draft CAR
Alpine Ash	22,275	16,956	15,352
Mountain Ash	6,981	3,175	2,592
High Quality Mixed Spp	6,237	5,263	4,460
Low Quality Mixed Spp	50,151	56,544	43,067
TOTAL	**85,644**	**81,938**	**65,471**

Note that the SFRI based areas include unstocked forest, which is assumed will only contribute to available volume once they are regenerated.

As SFRI is a new assessment of the forest resource, HARIS figures have been included for comparative purposes only.

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 define the base model using Code of Forest Practices exclusions, so as to have a standard, spatially based means of comparison to assess the impacts of the draft CAR reserve design.

Separate models were developed for both the "Code only" zoning and the draft CAR reserve design options.

Appendix 1 summarises the source data and the assumptions and constraints incorporated in the models.

Available volumes include a fire risk buffer of 1.62%, based on the MIRA fire risk analysis study.

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 Central Gippsland 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 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.

To provide a meaningful comparison between timber resource availability and current commitments across the FMA, the volume associated with the west part of the FMA is required. In the absence of a separate "west only" benchmark model, a summary of volume from the western blocks of the Central Highlands RFA model was extracted from the total volume, based on block boundaries. The volume from the Gippsland RFA model (east part) was added to this figure to provide an estimate for the whole of FMA. The combined figure should be considered indicative only, as this approach does not allow for optimising of volume availability by allowing scheduling across the whole FMA. There are a number of limitations associated with combining the results from two separate models. A proper representation of resource availability for the FMA can only be obtained from a single model for the whole FMA. There has been insufficient time to adopt this approach.

The following tables summarise the combined outputs from the two models for the first two periods (20 years)

Central Gippsland FMA			
D+ sawlog volume availability for first 10 year period (m^3/year)			
	Ash	Mixed Spp	Total
West part of FMA (Central Highlands RFA) - net of Code and Forest Management zones - no contingency allowance/fire risk buffer	131,900	3,300	135,200
East part of FMA (Gippsland RFA) - **net of Code only** - includes contingency allowance and fire risk buffer	38,300	7,900	46,200
TOTAL	170,200	11,200	181,400

Volume availability increases slightly in the second 10 year period. However due to scheduling constraints, it cannot be assumed that the additional volume in the second period will be available earlier than this time.

Central Gippsland FMA			
D+ sawlog volume availability for second 10 year period (m^3/year)			
	Ash	Mixed Spp	Total
West part of FMA (Central Highlands RFA) - net of Code and Forest Management zones - no contingency allowance/fire risk buffer	146,200	12,000	158,200
East part of FMA (Gippsland RFA) - **net of Code only** - includes contingency allowance and fire risk buffer	42,800	7,500	50,300
TOTAL	189,000	19,500	208,500

These results indicate that current and projected future commitments (post 2002) could be met after allowing for Code of Forest Practices exclusions in the east part of the FMA (Gippsland RFA).

The contribution of the east part to the resource availability for the whole of the FMA is less than the HARIS based forecast for the Central Highlands model due to the reduction in available area arising from Code exclusions, the increase in the amount of unstocked forest and the exclusion of small polygons. Volume availability will be affected by the different scheduling constraints which have been applied to the two models. Additional constraints applied to the Gippsland TRA model also limit the rate of rehabilitation of unstocked stands to 200 ha/year.

6. Impact of draft CAR reserve design

To determine the impact of the draft CAR reserve design, the whole of FMA timber resource availability has been based on the west blocks (within Central Highlands) plus the output from Spectrum based runs for the east part (within Gippsland RFA).

Inclusion of the draft CAR reserves results in a reduction in available volume of both ash and mixed species.

There is a slight increase in availability between the first and the second period.

Central Gippsland FMA			
D+ sawlog volume availability for first 10 year period (m^3/year)			
	Ash	Mixed Spp	Total
West part of FMA (Central Highlands RFA) - net of Code and Forest Management zones - no contingency allowance/fire risk buffer	131,900	3,300	135,200
East part of FMA (Gippsland RFA) - **net of Code and draft CAR reserves** - includes contingency allowance and fire risk buffer	33,000	5,000	38,000
TOTAL	164,900	8,300	173,200

Central Gippsland FMA			
D+ sawlog volume availability for second 10 year period (m^3/year)			
	Ash	Mixed Spp	Total
West part of FMA (Central Highlands RFA) - net of Code and Forest Management zones - no contingency allowance/fire risk buffer	146,200	12,000	158,200
East part of FMA (Gippsland RFA) - **net of Code and draft CAR reserves** - includes contingency allowance and fire risk buffer	37,400	4,900	42,300
TOTAL	183,600	16,900	200,500

These results indicate that based on this particular model, there is a shortfall, in terms of meeting existing timber supply commitments, of 6,400 m^3/year in the first period. This shortfall increases to 9,700 m^3/year from 2002 with the increase in licence allocations from that time. Ash specific licences (116,600 m^3/year rising to 119,900 m^3/year) can be met. It will not be possible to fully meet unspecified licences (which may include a component of ash volume) under this proposal.

Both total licence volume and ash specific volume can be met in the second ten year period of this model.

Approximately 15% of the volume in the first period (29% of mixed species volume) and 12% of the volume in the second period (20% of the mixed species volume) is derived from areas identified by regional staff as being of lower priority. These areas may be less favourable to harvest in the short term, based on accessibility, productivity and product distribution, and depending on market conditions.

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. This model is based on data from a number of sources. Full growth and yield information from SFRI is not yet available.

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 for Central Gippsland Timber Resource Analysis (TRA)

SFRI data

- SFRI forest types have been aggregated to broad HARIS forest types to facilitate comparison with previous sustainable yield forecast. This information is available for the east part of the FMA only.

- Volume estimates for SFRI stands are based on either standing volume estimates or regrowth yield tables, depending on age and stand classification.

- No new growth and yield information is available from SFRI. Yield curves from Central Highlands' models apply.

- Mature forest identified by SFRI comprises Senescent, Late Mature, Uneven age, Mature

- Mature ash (from SFRI) is considered to be predominantly 1939 regrowth (regrowth volume and increment applies)

- As there are no new estimates of standing volume from SFRI, no adjustment has been made to standing volume estimates.

- Regrowth age class from SFRI converted to year of origin by decade. age 65 age class = 1930s origin, age 55 age class = 1940s origin. Spectrum assumes harvesting in middle of 10 year period, eg in the middle of the first period, 1930s origin will be age 70 years

- 1939 regrowth has nominal age 55 from SFRI, included in 1940s origin. Assume age 60 in middle of first period (actually age 64). "Mature" 1939 available for harvesting from start of model

Minimum polygon size

- A minimum polygon size of 10 ha has been used for determining available forest area. Polygons less than 10 ha which are available, but surrounded by unavailable or unproductive forest, are not included in the net available area for this model.

Model assumptions

- A non-declining yield constraint for total volume is assumed from period 1.

- The volume of timber for the entire 20 planning periods is smoothed by individual forest types.

- Unstocked Ash is regenerated in the 1st 10-year period.

- Late Mature, Senescent and uneven aged ash are not available for harvesting

- Late Mature mixed species are available. Standing volume 50 m3/ha (high quality) or 20 m3/ha (low quality)

- The yield file contains separate tables for Dargo/Heyfield. Yields for Alpine Ash are approximately 30-35% below yields for other areas of this forest type.

- Wood flow is smoothed for each forest type, with minor fluctuations allowed between successive periods in the model.

- Minimum rotation age:

Existing rotation

All 1939 Ash Species	60 years
All other Ash Species	70 years
1939 High Quality Mixed Species	70 years
All other High Quality Mixed Species	80 years
All 1939 Low Quality Mixed Species	100 years
All other Low Quality Mixed Species	120 years

Regeneration

All Ash Species	80 years
All High Quality Mixed Species	80 years
All Low Quality Mixed Species	120 years

Note previous spreadsheet assumed minimum rotation age of 50 years for ash.

- For the purpose of yield calculations, harvesting assumed to occur in middle of 10 year period

- Regeneration is assumed to occur in year of harvest

- 10% contingency allowance has been included to allow for areas not readily identified in model.

- A fire risk buffer of 1.62% is applied (based on MIRA analysis)

- Unstocked Stands

Nominally "unstocked" stands identified by SFRI (harvested stands with less than 50% regrowth or all other stands with < 50% cover) do not contribute any volume to the current rotation. It is assumed these stands are productive and will be regenerated. Ash stands (2,560 ha) will be regenerated over 10 years. Rehabilitation of Mixed species stands (11,800 ha) is restricted to 200 ha/year.

Other

- Due to the Central Highlands/Gippsland RFA boundary, revised SFRI data are only available for the east part of the FMA.

- It is not appropriate to make a comparison of the impact of zoning for just that part of Central Gippsland which is within the Gippsland RFA study area. The impact of zoning on the timber resource should be across the FMA, as the FMA is the land base for sustainable yield.

- In order to facilitate this comparison, a benchmark Central Gippsland model has been developed from the west part of the Central Highlands model (based on FOREST25 data) and the east model developed from the SFRI data. This replaces the previous data used for the east which was derived from HARIS.

- Splicing of the east and west parts of two different models may underestimate the available volume as the opportunity for optimising the scheduling of timber is restricted to each part. Greater flexibility would be achieved by running a combined model across the whole FMA. This is not possible until SFRI data are available for the west part of the FMA.