

**GIPPSLAND RFA
TAMBO FMA
(including 11 blocks from Wodonga FMA)**

Timber Resource Analysis

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

The study area for this analysis includes 11 blocks in Wodonga FMA which are managed by Tambo FMA and lie within the Gippsland RFA.

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

Note that the figures presented here are based on a combination of interim SFRI data and HARIS data and also include locally based volume estimates for lower productivity mixed species forests. SFRI assessments and modelling are not complete for this area.

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 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

The current legislated sustainable yield rate for Tambo FMA is 66,000 m³/yr D+ sawlog (based on the 1996 review and equivalent to the 54,000 m³/yr C+ sawlog established in 1992). A sustainable yield rate for the 11 Wodonga FMA blocks cannot be separately identified.

Licence allocations for the current year for both Tambo and the 11 blocks in Wodonga FMA which are managed by Tambo FMA, are as follows.

	Allocation m ³ Net sawlog		
	Tambo	Swifts Creek (11 blocks)	Combined
Ash	19,879	12,950	32,829
Mixed Spp	13,000		13,000
Unspecified	34,837	2,319	37,156
TOTAL	67,716	15,269	82,985

Note that total licence allocations are reconciled with sustainable yield over a 15 year Timber Supply Period.

2. 1992 Spreadsheet Based Model

In the 1992 assessment spreadsheet based model, the net available area was obtained from HARIS. The 1992 model assumed that logging was excluded from slopes > 30°, streamside reserves, rainforest buffers, wildlife corridors and sites of floral, faunal, historical and archaeological significance. Current landscape and recreation prescriptions were also assumed.

The standing volume only for Mature/Overmature (M/OM) resource was derived from HARIS and no net growth was assumed. The following Mean Annual Increments (MAI) were used, and are based on HARIS, resource assessments and re-measurement of permanent growth plots:

Alpine Ash and Mountain Ash	2.00 m ³ /ha/year
Mountain Mixed Species	1.75
Foothill Mixed Species	1.20
Alpine Mixed Species	1.00
Coastal Mixed Species	0.50

In the estimation of available timber volume, no allowances were made for loss due to fire, insect, fungal or storm damages. The minimum harvest age applied to all forest types was 65 years, with the exception of Coastal Mixed Species which was 80 years. The nominal rotation age was 80 years for all forest types except Coastal Mixed Species for which a rotation age of 120 years was used. Low-yielding mixed species forest was assumed to be harvested with an average yield of 13 m³/hectare.

3. Methodology for 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 previous sustainable yield forecast was based on non-spatial data only.

To ensure a consistent basis for comparison, 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.

Estimates of standing volume for ash, mountain mixed species and alpine mixed species were derived from SFRI assessments. Regional input was used to define standing volume estimates for foothill and coastal mixed species.

Future growth was modelled using the Mean Annual Increment (MAI) figures applied in 1992.

Appendix 1 summarises the assumptions applied to the SFRI data.

Areas of available forest less than a minimum threshold size and surrounded by unavailable or unproductive forest were considered to be unavailable for this analysis. The threshold applied equates to a minimum area from 6 to 30 ha, depending on productivity.

The impact of the draft CAR reserve design was determined by applying the draft CAR reserve 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 applied (6-30 ha, depending on productivity)	As for “Code only” model
Availability	HARIS definition	Modelled 1996 Code exclusions	Draft CAR reserve system
Growth and Yield	HARIS based	SFRI standing volume for ash and high elevation mixed species; regional definition for low elevation mixed species; previous MAI used for growth rates	As for “Code only” model

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

Net Available Productive Area			
Forest Type	HARIS	New base “Code only”	Draft CAR
Alpine Ash	27,583 ha	20,809 ha	18,758 ha
Mountain Ash	3,519	2,232	1,815
Mountain Mixed Spp	36,702	33,850	25,383
Foothill Mixed Spp	44,483	38,616	31,811
Alpine Mixed Spp	28,053	16,410	12,998
Coastal Mixed Spp	18,713	3,081	2,753
TOTAL	159,053	114,998	93,518

Note: SFRI based area excludes low yielding stands, small isolated areas and conditionally commercial species. See Appendix 1 for details.

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

Net Available Productive Area (ha)			
Impact of zoning			
Forest Type	New base "Code only"	Draft CAR	Difference
Alpine Ash	20,809	18,758	(2,051)
Mountain Ash	2,232	1,815	(417)
Mountain Mixed Spp	33,850	25,383	(8,467)
Foothill Mixed Spp	38,616	31,811	(6,805)
Alpine Mixed Spp	16,410	12,998	(3,412)
Coastal Mixed Spp	3,081	2,753	(328)
TOTAL	114,998	93,518	(21,480)

After taking into account the assumptions outlined in Appendix 1, the net available area for the "Code only" base model is 114,998 hectares. With draft CAR reserve exclusions, the net available area is 93,518 hectares, a reduction of 21,480 hectares.

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. Note that estimates of standing volume have been revised, and that ash and high elevation mixed species standing volume estimates are derived from SFRI.

Over the 20 year planning horizon of the RFA, volume flows remain constant.

Available volumes include a fire risk buffer of 0.89%, 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 Tambo 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.

The results presented below are for Tambo FMA, plus the 11 blocks from Wodonga FMA.

Including the factors outlined above, the base model (SFRI areas net of Code exclusions) provides an available volume of 89,700 m³/yr D+ net sawlog.

A volume of 72,100 m³/year D+ net sawlog is available based on a net available area defined by the draft CAR reserve design.

Application of the draft CAR reserves will result in a reduction of approximately 17,600 m³/year of available timber.

	Ash Spp.	Mixed Spp.	Total
Base (Code only)	39,800 m ³ /year	49,900 m ³ /year	89,700 m ³ /year
Draft CAR Reserve	35,400	36,700	72,100

Volumes are D+ net sawlog

Total available timber (m³/yr) is the same for the first two 10-year periods.

When compared to current licence allocations for the combined area (Tambo FMA plus 11 blocks), these figures indicate that, based on this particular model, and

incorporating the assumptions specified in Appendix 1, current ash specific licences can continue to be met for the duration of the RFA. However, unspecified licences will not be able to be fully met if the draft CAR reserve design is implemented. There is likely to be a shortfall of approximately 11,000 m³/year against current commitments if the draft CAR reserve design is adopted.

Approximately 13% of the total volume (18% of 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 this analysis, utilising the best 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 Tambo Timber Resource Analysis (TRA)

Resource Information

- SFRI forest types aggregated to broad HARIS forest types (using dominant forest type for block or compartment) to facilitate comparison with previous sustainable yield forecast.
- Volume estimates for SFRI stands are based on either standing volume estimates or regrowth yield tables, depending on age and stand classification.
- No net area or volume has been included in the model for “conditionally commercial” species (Cr, Da, Di, Ra, Ru) where stand height is < 34m
- SFRI standing volumes (less 10%) applied to tall 1939 regrowth, mature and older ash stands
- SFRI standing volumes (less 20%) applied to high elevation mature and older mixed species (Mountain Mixed, Alpine Mixed Species)
- Standing volume of 15 m³/ha applied to mature low elevation (foothill and coastal) mixed species stands with a history of selection logging (as identified in SFRI)
- Standing volume of 30 m³/ha (net) applied to remaining mature and older foothill and coastal mixed species stands
- Low yielding stands are not harvested in the models.
- All available, productive fully stocked stands can be harvested.
- Mature forest (standing volume) is treated as a single age class. This comprises Late Mature/Senescent/Uneven aged, Mature, Early Mature, tall 1939 regrowth (> 40m), and regrowth of unknown age. Weighted average volume per ha applied; assume no net growth.
- 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)

Minimum polygon size

- A minimum polygon size ranging from 6 to 30 ha (depending on forest type, and based on 600 m³ D+ minimum volume, as identified by Regional staff) has been used for determining available forest area. Polygons less than the threshold identified which are available, but surrounded by unavailable or unproductive forest, are not included in the net available area.

0-20 m ³ /ha D+ sawlogs	30 ha
21-40 m ³ /ha D+ Sawlogs	15 ha
41-100 D+ Sawlogs average 60m ³	10 ha
100m ³ /ha D+ Sawlogs	6 ha

Low yielding stands

- Separate forest type for low yielding Foothill Mixed Species (FMS) and Coastal Mixed Species (CMS) (15 m³/ha)
- Area of low yielding FMS is 8,526 ha; CMS 2,085 ha (net of code and small polygons)

Model assumptions

- Available volume smoothed for individual forest types
- Overall objective of non declining yield, over 200 year planning horizon.
- Rotation length 80/120 years (120 years CMS only), applies to all new regrowth. Minimum of 65/80 years (80 years for CMS). Applies to existing rotation only.
- For the purpose of yield calculations, harvesting is assumed to occur in middle of 10 year period
- Regeneration is assumed to occur in year of harvest
- Stands with < 50% cover, or harvested stands with < 50% regrowth, do not contribute to volume for the current rotation in these models. It is assumed that these stands are productive, will be regenerated and will contribute volume to subsequent rotations. Ash stands will be regenerated over the next 10 years and mixed species stands will be regenerated at the rate of 200 ha/year.
- A 10% contingency allowance is applied to the final forecast volume to allow for unidentified risks and additional factors not covered by the model.
- MIRA 20 year fire risk buffer for Ash and High Elevation Mixed Species applied to all forest types (0.89%)

Adjustment to mixed species yields

Models run applying yields of 30m³/ha (net) to all coastal and foothill mixed species, except low yielding (15 m³/ha) stands. This is acceptable given that:

- SFRI yields are interim (current model for mixed species is based on height only)
- Modified yields (15 m³/ha net) have already been applied to stands with a history of low intensity selective harvesting
- Growth of regrowth forests are based on previous MAIs (not SFRI)