



A Report on Forest Wood Resources for the Upper and Lower North East NSW CRA Regions

A report undertaken for the NSW CRA/RFA Steering Committee

27 July 1996



A Report on Forest Wood Resources for the Upper and Lower North East NSW CRA Regions

**THIS REPORT WAS COMPILED BY THE
COMMONWEALTH DEPARTMENT OF
AGRICULTURE, FISHERIES & FORESTRY
AUSTRALIA USING MATERIAL
PROVIDED BY THE BUREAU OF RURAL
SCIENCES AND STATE FORESTS NSW**

**A report undertaken for the NSW CRA/RFA Steering Committee
project number NA52/ES
July 1999**

Report Status

This report has been prepared as a working paper for the NSW CRA/RFA Steering Committee under the direction of the Economic and Social Technical Committee. It is recognised that the report may contain errors that require correction, but it is released to be consistent with the principle that information related to the comprehensive regional assessment process in New South Wales would be made publicly available.

**For more information and for
information on access to data contact
the:**

**Resource and Conservation Division, Department of
Urban Affairs and Planning**

GPO Box 3927
SYDNEY NSW 2001

Phone: (02) 9228 3166
Fax: (02) 9228 4967

**Forests Taskforce, Department of Prime Minister and
Cabinet**

3-5 National Circuit
BARTON ACT 2600

Phone: 1800 650 983
Fax: (02) 6271 5511

© Crown copyright (July, 1999)

This project has been jointly funded by the New South Wales and Commonwealth Governments. The work undertaken within this project has been managed by the joint NSW / Commonwealth CRA/RFA Steering Committee which includes representatives from the NSW and Commonwealth Governments and stakeholder groups.

The project has been overseen and the methodology has been developed through the Economic and Social Technical Committee which includes representatives from the NSW and Commonwealth Governments and stakeholder groups.

ISBN: 1 74029 011 9

Acknowledgements

Sincere thanks for the valuable assistance from staff in the Bureau of Rural Sciences (BRS), particularly Michael Ryan and Penny Baalman, with assistance from Alison Pritchard, the Australian Bureau of Agricultural and Resource Economics and staff of State Forests of NSW, especially Glen Meade, Martin Grealy, Peter Creighton and Tony O'Hara.

Disclaimer

While every reasonable effort has been made to ensure that this document is correct at the time of printing, the State of New South Wales, its agents and employees, and the Commonwealth of Australia, its agents and employees, do not assume any responsibility and shall have no liability, consequential or otherwise, of any kind, arising from the use of or reliance on any of the information contained in in this document.

CONTENTS

| | |
|--|-----------|
| EXECUTIVE SUMMARY..... | 1 |
| 1. INTRODUCTION..... | 3 |
| 1.1 AIM OF THE DOCUMENT | 3 |
| 1.2 MANAGEMENT UNITS | 3 |
| 2. FOREST DESCRIPTION..... | 5 |
| 2.1 GENERAL FOREST DESCRIPTION | 5 |
| 3. PUBLIC NATIVE FOREST MANAGEMENT..... | 15 |
| 3.1 HISTORY OF NATIVE FOREST HARVESTING IN NORTHERN NSW CRA REGIONS | 15 |
| 3.2 FOREST MANAGEMENT PLANNING..... | 15 |
| 3.3 HARVEST PLANNING..... | 16 |
| 4. TIMBER RESOURCE AVAILABILITY..... | 18 |
| 4.1 INTRODUCTION | 18 |
| 4.2 SUMMARY..... | 25 |
| 4.3 NON-QUOTA PRODUCTS AND CUSTOMERS IN THE UPPER AND LOWER NORTH EAST | 28 |
| 5. END PRODUCT USE OF NORTHERN HARDWOOD SPECIES | 31 |
| 5.1 BACKGROUND | 31 |
| 5.2 CURRENT SITUATION..... | 33 |
| 6. HARDWOOD LOG VALUE PRICING SYSTEM..... | 35 |
| 6.1 INTRODUCTION | 35 |
| 6.2 MARKET VALUE POTENTIAL | 35 |
| 6.3 CALCULATION OF ACTUAL PRICES..... | 37 |
| 6.4 CURRENT SITUATION..... | 38 |
| 7. TIMBER SUPPLY PRIORITY ZONING..... | 39 |
| 7.1 INTRODUCTION | 39 |
| 7.2 METHODOLOGY USED FOR CALCULATION OF TIMBER PRIORITY INDEX (TPI)..... | 39 |
| 8. PRIVATE NATIVE FOREST MANAGEMENT..... | 42 |
| 8.1 INTRODUCTION | 42 |
| 8.2 PRIVATE FOREST MANAGEMENT | 43 |
| 9. HARDWOOD PLANTATION FOREST MANAGEMENT | 44 |
| 9.1 HISTORY..... | 44 |
| 9.2 DEFINITION | 44 |
| 9.3 MANAGEMENT OF HARDWOOD PLANTATIONS ESTABLISHED PRE 1994..... | 45 |
| 9.4 FOREST PRACTICES CODE | 46 |
| 9.5 EXTERNAL CONTROLS..... | 46 |
| 9.6 LOG PRESCRIPTION..... | 46 |
| 9.7 TIMBER YIELDS FROM PLANTATION FORESTS..... | 46 |
| 9.8 PLANTATION FOREST SILVICULTURE | 47 |
| 10. SOFTWOOD PLANTATION FOREST MANAGEMENT..... | 48 |

| | | |
|------------|-------------------------------|-----------|
| 10.1 | SOFTWOOD TIMBER INDUSTRY..... | 48 |
| 10.2 | RESOURCE | 48 |
| 10.3 | YIELD | 49 |
| 10.4 | SOFTWOOD TIMBER INDUSTRY..... | 49 |
| 11. | REFERENCES..... | 50 |

Tables

| | |
|---|----|
| Table 1a - Summary of management units | 4 |
| Table 2a - Forest types and forest tenure within yield associations for UNE NSW..... | 13 |
| Table 2b - Forest types and forest tenure within yield associations for LNE NSW..... | 14 |
| Table 4a - Volumes (m ³) of the main products cut between July 1994 and June 1998..... | 18 |
| Table 4b - Changes in percentage of volumes cut between 94/95 and 97/98 | 25 |
| Table 4c - Volumes and values of log products sold in 1995/6 and 1996/7..... | 30 |
| Table 4d - Volumes and unit rates of log products sold between 1994/5 and 1997/8..... | 30 |
| Table 5a - Species groupings for northern NSW timbers..... | 32 |
| Table 5b - Market value potential – value for each species by size class (residual value)..... | 33 |
| Table 5c - Market value potential – value for each species by size class (relativity factor)..... | 33 |
| Table 6a – Model 1 : Derivation of market value potential for each size/species group | 36 |
| Table 6b – Model 2 : Derivation of relativity factor for each size/species group by price zone..... | 37 |
| Table 8a - Volumes of timber harvested from private property between 1974 and 1997 (source: SFNSW) .. | 42 |
| Table 8b – Area of northern NSW forest types by tenure..... | 43 |
| Table 9a - Total plantation area (classes A-D) in northern NSW..... | 45 |
| Table 9b - Estimated wood volumes from hardwood plantations in northern NSW | 46 |
| Table 9c – Hardwood plantation area in northern NSW | 47 |
| Table 10a - Softwood timber companies in the UNE..... | 48 |
| Table 10b – SFNSW Softwood plantation area in northern NSW | 49 |
| Table 10c - Estimated wood volumes from softwood plantations in northern NSW | 49 |

Figures

| | |
|--|----|
| Figure 4a - High value large quota quality logs (by timber catchment)..... | 19 |
| Figure 4b - High value small quota quality logs (by timber catchment)..... | 20 |
| Figure 4c - Low value volume by timber catchment..... | 21 |
| Figure 4d - Quota log sales 1994/95-1997/98..... | 22 |
| Figure 4e - High value non-quota sales 1994/95-1997/98..... | 23 |
| Figure 4f - Lower value non-quota sales 1994/95-1997/98 | 24 |
| Figure 4g - Species mix : Timber Catchment 1 (Upper North East) | 26 |
| Figure 4h - Species mix : Timber Catchment 2 (Upper North East) | 26 |
| Figure 4i - Species mix : Timber Catchment 3 (Lower North East)..... | 27 |
| Figure 4j - Species mix : Timber Catchment 4 (Lower North East)..... | 27 |

Maps

MAP 2a - Yield Associations on Private Land : Upper North East.....9

MAP 2b - Yield Associations on State Forest : Upper North East..... 10

MAP 2c - Yield Associations on Private Land : Lower North East 11

MAP 2d - Yield Associations on State Forest : Lower North East..... 12

MAP 7a – Timber Catchment Zones for UNE & LNE CRA Regions41

EXECUTIVE SUMMARY

INTRODUCTION

This report has been prepared for the joint Commonwealth/State Steering Committee which oversees the comprehensive regional assessments of forests in New South Wales.

The comprehensive regional assessments (CRAs) provide the scientific basis on which the State and Commonwealth governments will sign regional forest agreements (RFAs) for the major forests of New South Wales. These agreements will determine the future of the State's forests, providing a balance between conservation and ecologically sustainable use of forest resources.

This report was undertaken to provide an understanding of the timber industry in the northern NSW CRA regions.

The information contained in this document relates to products, species, customer commitments, methods of assigning royalty and timber supply priority areas. The document contains an introduction outlining timber supply commitments from State forests in the Upper North East and Lower North East CRA Regions, followed by a description of forest harvesting, the hardwood resource, and management.

VOLUME BY PRODUCT INFORMATION FOR THE PERIOD 1994-1998

There has been a considerable reduction in the yields of all products cut over the last four years and this is reflected in the tables and graphs within this report. In overall terms there has been a reduction of about 40 percent over the last four years. The tables segregate high value logs over 40cm mid diameter, high value logs less than 40cm mid diameter and low-grade logs.

END USE FOR TIMBER PRODUCTS, INCLUDING VOLUME BY SPECIES

INFORMATION FOR THE PERIOD JAN 95 TO JUL 98

The strength, durability and appearance determine the end use for timber products.

The timber industry bases its sawm markets in the following species; tallowwood, ironbark, blackbutt, spotted gum, brush box, turpentine, Sydney blue gum, flooded gum, various stringybarks, New England blackbutt and messmate. The main species on the coast are blackbutt, spotted gum and Sydney blue gum, with messmate and New England blackbutt from the tablelands.

The various proportions of use for species in different areas and the various markets they fill are tabulated.

SOFTWOOD PLANTATIONS IN THE UPPER AND LOWER NORTH EAST

The UNE softwood plantations cover approximately 13,600 ha and over the next 10 years are expected to yield 170,000 m³/yr of sawlog and veneer logs distributed amongst six main customers. The 10,000 ha of plantation in the LNE could potentially yield 80,000 m³/yr of sawlog in the same period, however market development is needed for this resource.

NON QUOTA PRODUCTS AND CUSTOMERS

This refers to logs other than quota quality sawlogs and the customers purchasing such logs.

The non-quota products represent logs at both ends of the quality spectrum including the high quality, specialty logs such as girders, poles, piles and veneer logs and the lower grade logs such as salvage sawlogs.

Non-quota products along with quota sawlogs, are produced as part of integrated harvesting operations in native forests and plantations.

HARDWOOD LOG VALUE PRICING SYSTEM

The Hardwood Log Value Pricing System (LVPS) is the mechanism for developing schedules of log prices for quota quality sawlogs across the coastal and tableland forests.

The value of each cubic metre of log is determined by taking the value of the end product and deducting the cost of production and transport in order to get that end product to the market.

The species, size, product and distance from the market are key factors in establishing the value of the end product to a sawmill.

The value of the log is reflected in the same way after adjustment for the available net wood present.

The net wood assessment is made for groups of logs within a price zone.

TIMBER SUPPLY PRIORITY ZONING

Timber Supply Priority Zoning reflects the relative commercial timber value of groups of compartments (Timber Supply Zones). Timber Supply Zones are a subset of Log Value Price Zones.

Attributes used to determine the commercial ranking were linked to potential value adding and economic returns. These attributes included log quality and harvesting index, log volume, productivity, and high value products/species.

1. INTRODUCTION

1.1 AIM OF THE DOCUMENT

To provide tabulated and explanatory information on the nature and extent of the timber industry in the Upper and Lower North East RFA regions to be used as a benchmark for comparison with possible future outcomes in the RFA process.

Initially, it will be used as a direct comparison with the CRA FRAMES inventory data to compare future timber supply possibilities against the current supply level. This will give an indication of the long-term sustainability for products in the different timber catchment zones.

between 5 and 40) where logging costs and timber attributes are the same across the zone.

1.2 MANAGEMENT UNITS.

RFA Areas : The Upper and Lower North East areas together cover the area of the previous (pre 1997) Northern and Central regions though the separation boundaries do not coincide with the old Regional boundaries. Together they encompass the coastal and tablelands forests north of Sydney to the Queensland border.

Timber Catchment Zones. There are six Timber Catchment Zones. Zones 1 and 2 are in the Upper North East and 3, 4, 5 and 6 are in the Lower North East. Each Zone covers a number of management areas.

Management areas : Management areas are the traditional units from which timber yield information has been monitored on a sustainable basis.

Log Pricing Zones. The log pricing zones are the traditional units for which log pricing was determined through the log price matrix. These units often equal management area boundaries but more commonly there are a few within each management area.

Timber Supply Zones: Each log price zone is broken up into a number of timber supply zones. These units are a group of compartments (usually

TABLE 1A - SUMMARY OF MANAGEMENT UNITS

| RFA Unit | Timber Catchment | Management Area | Log Price Zone | Timber Supply Zone No. | |
|------------------|------------------|--------------------------|------------------------|------------------------|---|
| Upper North East | 1 | Murwillumbah | Murwillumbah | 4 | |
| | | Casino | Casino Coastal | 13 | |
| | | | Richmond Range | 9 | |
| | | | Ewingar | 4 | |
| | | Urbenville | Urbenville | 18 | |
| | | Tenterfield | Tenterfield Slopes | 10 | |
| | | | Tenterfield Tablelands | 11 | |
| | | 2 | Glen Innes | Glen Innes | 9 |
| | | | Grafton | Bom Bom | 1 |
| | | | | Grafton Coastal | 5 |
| | Grafton Inland | | | 6 | |
| | Dorrigo | | Dorrigo West | 3 | |
| | | | Dorrigo Central | 10 | |
| | Coffs Harbour | Coffs Harbour | 6 | | |
| | Urunga | Urunga Coastal (Sm Part) | 1 | | |
| Lower North East | 3 | Urunga | Urunga Coastal | 5 | |
| | | | Urunga Upriver | 7 | |
| | | Kempsey | Kempsey | 7 | |
| | | | Lower Ck | 1 | |
| | | | Carrai | 1 | |
| | | Wauchope | Wauchope Coastal | 2 | |
| | | | Wauchope Upriver | 1 | |
| | | | Wauchope Foothills | 3 | |
| | | | Doyles / Bulga | 3 | |
| | | Kendall | Kendall | 4 | |
| | Coopernook | Coopernook | 2 | | |
| | 4 | Wingham | Wingham | 7 | |
| | | Taree | Taree | 4 | |
| | | Gloucester | Gloucester East | 8 | |
| | | | Gloucester West | 2 | |
| | | Chichester | Gloucester East | 2 | |
| | | | Boonabilla | 1 | |
| | | Bulahdelah | Bulahdelah | 10 | |
| | | Wallaroo | Nil | | |
| | Mt Royal | Nil | | | |
| | 5 | Cessnock | Morisset | 5 | |
| | | Wyong | Morisset | 5 | |
| | 6 | Styx River | Styx | 2 | |
| | | Walcha/Nundle | Walcha | 6 | |

2. FOREST DESCRIPTION

2.1 GENERAL FOREST DESCRIPTION

The forest resource on public and private land is described as forest yield associations. The areas of this classification of forests under various tenure are described in Tables 2A and 2B with Maps 2a to 2d showing broad locations of yield associations.

Forest types, presented as broad yield associations, are basically amalgams of Research Note 17 forest types (Forestry Commission of NSW, 1989).

These groupings are based largely on the forests productivity and commercial importance within the two very broad classifications of tablelands and coastal locations, and wet and dry sclerophyll types.

2.1.1 Association 1 – Moist Blackbutt

This association occurs as a wet sclerophyll forest where blackbutt will usually make up at least 50 percent of the stand. It can attain a height of up to 60 metres and while it makes up just 1 percent of the total forest area of the UNE Region, this type is commercially important, with a range of desirable species on highly productive sites, including tallowwood (*Eucalyptus microcorys*), turpentine (*Syncarpia glomulifera*) and Sydney blue gum (*E. saligna*).

This assemblage is mainly found on the moister sheltered sites such as southern aspects and/or lower slopes from the central south coast into Queensland, but predominantly on the north coast.

2.1.2 Association 2 – Moist Coastal Eucalypts

This association occurs as wet sclerophyll forests ranging in height from over 40 metres to 60 metres. It consists of the Sydney Blue Gum/Bangalay type forests, which includes such types as tallowwood, flooded gum, turpentine, Dunn's white gum, roundleaved gum, turpentine, brush box and whitetopped box.

These types are mainly found in the moist sheltered sites along the coast and escarpment, north of the central south coast. They are mostly found below 900 metres, but can occur up to 1200 metres in elevation.

The main species found in this group include Sydney blue gum, bangalay (*E. botryoides*), flooded gum (*E. grandis*) and roundleaved gum (*E. deanii*). Other important species include tallowwood, turpentine, Dunn's white gum (*E. dunnii*) and brush box (*Lophostemon confertus*).

2.1.3 Association 3 – Semi Moist Coastal Eucalypts

The Semi Moist Coastal type forests includes the Grey Gum-Grey Ironbark and moist Spotted Gum forests.

The Grey Gum-Grey Ironbark forests have a similar species mix and can be seen as a continuation of the Moist Coastal Eucalypts but occupy the drier sites. They largely occur on well drained soils of high quality forest, particularly on steep north and west aspects and the ridgetops of favoured sites. These forests merge from the drier spectrum of wet sclerophyll to the moister range of dry sclerophyll forests, and typically reach heights of around 30 metres.

The more important species include red mahogany (*E. resinifera*), white mahogany (*E. acmenioides*), grey ironbark (*E. paniculata* or *E. siderophloia*), grey gum (*E. punctata* or *E. propinqua*), tallowwood, spotted gum (*Corymbia maculata*), blackbutt, New England blackbutt (*E. andrewsii*) and Sydney blue gum.

Moist spotted gum includes the moister spotted gum assemblages and includes a number of forest types. On these moister sites spotted gum achieves heights of about 45 metres and may be found with other species such as Sydney blue gum, bangalay, blackbutt, woollybutt (*E. longifolia*), turpentine, tallowwood, brushbox and red mahogany. These forest range throughout the coastal districts,

typically at elevations lower than 300 metres and rainfalls of around 1000 mm.

2.1.4 Association 4 – Dry Spotted Gum and Dry Blackbutt

The drier spotted gum and blackbutt types typically reach around 30 metres to 40 metres in height, and occur at around 750 mm rainfall. In the lower elevation dry spotted gum forests, spotted gum can occur in almost pure stands, while at higher elevation they become more mixed. Blackbutt is found on the ridges and more exposed slopes. Both types occur as dry sclerophyll forest.

This association makes up a significant proportion of the commercial forests of the CRA regions, covering 16 percent of the total forest area in the UNE region.

Dry blackbutt predominantly occurs with white mahogany, red mahogany, grey gum, bloodwood (*E. gummifera*), grey ironbark, various stringybarks, roughbarked and smoothbarked apples (*Angophora floribunda* and *A. costata*), woollybutt and mountain grey gum (*E. cypellocarpa*)

Spotted gum will commonly be found with stringybarks, silvertop ash (*E. sieberi*), mountain grey gum, white mahogany, ironbarks and forest red gum (*E. tereticornis*).

2.1.5 Association 5 – Dry Sclerophyll

This association includes the remainder of productive dry sclerophyll types found in coastal areas. These types will be found on the poorer, low elevation sites, commonly on exposed and higher slopes or in lower rainfall zones.

Dry Sclerophyll covers many forest types, including blackbutt-scribbly gum, grey gum-stringybark, forest red gum-grey gum/grey ironbark-roughbarked apple, grey box, ironbark, steel box/craven grey box, blue mountain ash and New England stringybark. However, some of the more prominent species include blackbutt, bloodwood, New England blackbutt, forest red gum, grey box (*E. moluccana*), grey ironbark and various stringybarks.

2.1.6 Association 6 – Moist Tablelands

The Moist Tablelands association consist largely of the messmate/brown barrel forests. These forests can be viewed as a higher elevation or latitude extension of the Moist Coastal Eucalypts Association.

They exist on the higher quality, moister sites and are found throughout the tablelands regions, at elevations greater than 600 metres. Stands typically attain tree heights of 30 metres to 50 metres. These forests contain much of the milled timber of the tablelands regions.

The more important commercial species found in this mix include brown barrel (*E. fastigata*), messmate (*E. obliqua*), silvertop ash, shining gum (*E. nitens*), New England blackbutt, Sydney blue gum and tallowwood. In the eastern extent types will also possess bangalay, blackbutt and spotted gum.

2.1.7 Association 7 – Dry Tablelands

This association includes the dry tableland and tableland stringybark forest types, comprising of the poorer, high altitude forests existing on less favourable sites. These are typically dry sclerophyll forests merging to woodland.

As in Association 5, this group covers a multitude of forests types including New England stringybark, peppermint-mountain/manna gum, roundleaved gum, New England blackbutt and yellow box/Blakely's red gum.

Major species include New England blackbutt, various stringybarks, mountain gum (*E. dalrympleana*), manna gum (*E. viminalis*), peppermints and yellow box (*E. melliodora*).

2.1.8 Association 8 – Non Eucalypt/Non Productive Forest

Non Eucalypt/Non Productive forests include a large variety of the forests which have little commercial importance. This will include banksia, sallee, mallee, casuarina, heath areas, mangrove, grassland, paperbark, saltbush, swamps, acacias and assorted other communities. It also includes a number of low eucalypt forest.

2.1.9 Association 9 – Plantation Forests

The plantation forest category includes both softwood and hardwood plantations.

Softwood plantations in the LNE CRA region consists mainly of Radiata pine (*Pinus radiata*). While in the UNE CRA region the more common species are slash pine (*P. elliottii*) and loblolly pine (*P. taeda*), with some Caribbean pine (*P. caribaea*), hybrids of slash and Caribbean pine, and the native hoop pine (*Araucaria cunninghamii*) and small amounts of bunya pine (*A. bidwillii*).

Hardwood plantations have traditionally consisted almost exclusively of blackbutt and flooded gum, however some areas in LNE have planted blue-leaved stringybark (*E. agglomerata*) and silvertop stringybark (*E. laevopinea*). Now other species such as Gympie messmate (*E. cloeziana*), spotted gum and Dunn's white gum are also common.

2.1.10 Association 10 – Rainforest

A range of rainforest types occur in the Upper and LNE CRA regions, including sub-tropical in the most fertile high rainfall sites, warm-temperate in the less fertile sites and cool temperate on the escarpment. Dry depauperate rainforest is also found in riparian areas, which includes hoop pine forest.

Rainforest is normally found in the high rainfall fertile sites and in the protected gullies, merging with the moister wet sclerophyll forest. In the absence of fire, rainforest will often succeed the adjoining wet sclerophyll types as thick undergrowth restricts eucalypt regeneration.

Note: Coastal stringybarks: include brown stringybark (*Eucalyptus baxteri*), blue leaved stringybark (*Eucalyptus agglomerata*), yellow stringybark (*Eucalyptus muellerana*), white stringybark (*Eucalyptus globoidea*), silvertop ash (*Eucalyptus sieberi*) and red stringybark (*Eucalyptus macrorhyncha*)

MAP 2a - Yield Associations on Private Land : Upper North East

MAP 2b - Yield Associations on State Forest : Upper North East

MAP 2c - Yield Associations on Private Land : Lower North East

MAP 2d - Yield Associations on State Forest : Lower North East

TABLE 2A - FOREST TYPES AND FOREST TENURE WITHIN YIELD ASSOCIATIONS FOR UNE NSW

| Yield Association | Description | Forest Association | Research Note 17 Forest Types | Crown Land & NR | National Park | State Forest | Private | Total |
|-------------------|-----------------------------------|--------------------|---|-----------------|----------------|----------------|------------------|------------------|
| 1 | Moist Blackbutt | 1 | 36, 37A | 434 | 1,917 | 19,945 | 6,734 | 29,030 |
| 2 | Moist Coastal Eucalypt | 3, 4, 5 | 45, 46, 47, 48, 49, 51, 52, 53, 54, 55 | 8,100 | 31,116 | 61,818 | 54,769 | 155,803 |
| 3 | Semi-moist Eucalypt | 6 | 48, 60, 68, 70, 71, 74, 76, 81, 89, 92, 93 | 21,802 | 40,353 | 120,160 | 168,291 | 350,606 |
| 4 | Dry Spotted Gum and Dry Blackbutt | 2, 8 | 37, 38, 39, 70, 72, 74 | 18,970 | 29,769 | 130,941 | 207,021 | 386,701 |
| 5 | Dry Sclerophyll | 9, | 40, 64, 65, 82, 83, 84, 87, 92, 93, 98, 101, 122, 177 | 44,894 | 52,584 | 53,540 | 197,465 | 348,483 |
| 6 | Moist Tableland | 10, | 150, 151, 153, 154, 155, 159, 163, 167 | 33,050 | 44,114 | 71,049 | 79,388 | 227,601 |
| 7 | Dry Tableland | 11, 12 | 122, 131, 161, 163, 170, 172 | 31,251 | 30,416 | 25,338 | 87,299 | 174,304 |
| 8 | Non Eucalypt/Non Productive | 13, 17 | 30, 31, 32, 65, 92, 97, 105, 106, 107, 111, 117, 126, 129, 130, 136, 137, 138, 140, 141, 142, 144, 207, 211, 213, 214, 215, 216, 220, 221, 223, 224, 225, 226, 230, 231, 232, 233, 234, 235 | 58,804 | 83,647 | 46,524 | 284,731 | 473,706 |
| 9 | Plantation | 15 | | 5 | 138 | 18,207 | 400 | 18,750 |
| 10 | Rainforest | 14 | | 2,979 | 68,029 | 62,006 | 31,862 | 164,876 |
| 11 | Water Courses | | | 1,579 | 1,662 | 289 | 22,111 | 25,641 |
| | Total | | | 221,868 | 383,745 | 609,817 | 1,140,071 | 2,355,501 |

TABLE 2B - FOREST TYPES AND FOREST TENURE WITHIN YIELD ASSOCIATIONS FOR LNE NSW

| Yield Association | Description | Forest Associations | Research Note 17 Forest Types | National Park & Other Public | State Forest | Private | Total |
|-------------------|-----------------------------------|---------------------|--|------------------------------|----------------|------------------|------------------|
| 1 | Moist Blackbutt | 1 | 36, 37 | 16,172 | 68,029 | 28,479 | 112,680 |
| 2 | Moist Coastal Eucalypt | 3, 4, 5 | 45, 46, 47, 48, 49, 50, 52, 53, 54, 55 | 81,755 | 147,857 | 181,058 | 410,670 |
| 3 | Semi-moist Eucalypt | 6 | 60, 68, 74, 89 | 107,780 | 140,068 | 220,708 | 468,556 |
| 4 | Dry Spotted Gum and Dry Blackbutt | 2, 8 | 37, 38, 39, 70, 74 | 26,296 | 34,853 | 104,143 | 165,292 |
| 5 | Dry Sclerophyll | 9 | 40, 42, 64, 65, 67, 80, 82, 83, 84, 87, 92, 93, 98, 101, 118, 119, 121, 122, 173, 177, 205 | 213,592 | 65,217 | 234,934 | 513,743 |
| 6 | Moist Tableland | 10 | 150, 151, 152, 153, 154, 155, 159, 160, 163, 167, 168 | 88,172 | 118,075 | 125,763 | 332,010 |
| 7 | Dry Tableland | 11, 12 | 113, 118, 121, 122, 131, 160, 161, 163, 164, 167, 172, 177, 205 | 78,940 | 23,220 | 74,728 | 176,888 |
| 8 | Non Eucalypt/Non Productive | 13, 17 | 30, 31, 32, 33, 61, 62, 65, 97, 100, 105, 106, 107, 111, 116, 117, 119, 122, 125, 126, 127, 129, 130, 136, 137, 138, 140, 141, 142, 144, 175, 176, 178, 183, 207, 209, 211, 213, 214, 215, 216, 217, 219, 220, 221, 223, 224, 225, 226, 230, 231, 232, 233, 234, | 407,459 | 63,157 | 308,436 | 779,052 |
| 9 | Plantation | 15 | 218 | 20 | 30,490 | 246 | 30,756 |
| 10 | Rainforest | 14 | 169 | 121,322 | 116,155 | 23,423 | 260,900 |
| 11 | Water Courses | | 235 | 1,104 | 10 | 993 | 2,107 |
| | Total | | | 1,142,612 | 807,131 | 1,302,911 | 3,252,654 |

3. PUBLIC NATIVE FOREST MANAGEMENT

3.1 HISTORY OF NATIVE FOREST HARVESTING IN NORTHERN NSW CRA REGIONS

A comprehensive review of the history of forest management in northern NSW is not appropriate within the scope of this document. Should such information be required, the various State Forest of NSW Management Area Environmental Impact Statements's would be the best source for such information.

3.2 FOREST MANAGEMENT PLANNING

Currently, forest management planning includes the following elements; a forest management plan, zoning for long-term management intent (PMP classification), environmental impact assessment and harvesting plans prepared for each compartment proposed for harvesting.

The harvest planning process involves detailed on-site assessments and implementation of prescriptions, legislation and codes of forest practice.

State Forests of NSW (SFNSW) environmental planning process for forest management activities includes compliance with the *Environmental Planning and Assessment Act (1979)*, *Threatened Species Conservation Act (1995)*, the *National Parks and Wildlife Act (1974)* and the *Pollution Control Act (1970)*. However recently the *Protection of the Environment Operations Act (1999)* has replaced a number of these environmental instruments. A comprehensive analysis of the legislative changes affecting forest management can be found in the NSW CRA/RFA Steering Committee (1998) report. Specific harvesting plans are developed for each compartment to be harvested, and planning

documents prepared for road construction and fuel management activities.

3.2.1 Environmental Impact Statement and Species Impact Statement

Environmental impact statements (EIS) have been prepared for all management areas in northern NSW. Under NSW law, the environmental planning process for the forest management activities proposed in the EIS has two main streams:

The first stream is prescribed by the *Environmental Planning and Assessment Act 1979*. If SFNSW considers that a proposed activity will have a significant environmental impact, then SFNSW must prepare an EIS in accordance with the *Environmental Planning and Assessment Regulation 1980*. This requires, among other things, that the requirements of the Director of the NSW Department of Planning be included in the scope of the EIS. After the EIS is prepared, it is submitted for public comment. SFNSW will review these comments (representations) and decide whether to proceed and apply for approval of the EIS. If SFNSW decides to proceed, responses to the comments will be prepared and submitted to the Department of Planning along with the EIS. The Department of Planning will assess the EIS and the public comments and then present the EIS to the Minister of Planning with a recommendation for approval or rejection. A recommendation for approval will often include specific additional conditions that must be met by SFNSW. The Minister will then approve or reject the EIS. Once the Minister has approved the EIS, it will be determined by SFNSW, who may then undertake the proposed activities after a fauna licence has been issued.

The second stream is prescribed by the *National Parks and Wildlife Act (1974)* and the

Environmental Planning and Assessment Act 1979, which requires the applicant for a fauna licence to prepare a Fauna Impact Statement (FIS) and provide opportunity for public comment. The National Parks & Wildlife Service (NPWS) review the comments and assess the FIS. NPWS present the fauna licence application to the Director-General, NPWS, with a recommendation for approval or rejection. A recommendation for approval will often include specific additional conditions that must be met by SFNSW. After the EIS for the activities covered by the FIS has been approved by the Minister of Planning, the Director-General will then approve or reject the fauna licence application (SFNSW, 1994).

For the period of the 1994 EIS, the fauna impact statement is appropriate. Following the end of this EIS, the *Threatened Species Conservation Act (1995)* will require Species Impact Statements to replace Fauna Impact Statements.

The EIS documents provide comprehensive information indicating the potential environmental impacts from the areas to be harvested in the following three years from approval. After the EIS is prepared, it is exhibited for public comment, and written submissions are made to SFNSW. SFNSW considers any submissions, prepares a report on those submissions and forwards the submissions and report to Department of Urban Affairs and Planning (DUAP). DUAP prepares an assessment report for their Minister, which forms the basis for approval. This approval details any additional conditions that are to be applied to the EIS proposal. After considering this approval the EIS can then be determined by SFNSW.

3.3 HARVEST PLANNING

The final stage of planning is the harvesting plan document prepared by SFNSW staff, which covers the on-ground assessment of compartments. These assessments include fauna/flora, water and timber values as well as outlining the areas to be harvested. The resultant plan provides appropriate prescriptions and the basis for the control for each harvesting operation which require approval by the EPA (including compliance with pollution control license) prior to the commencement of harvesting.

3.3.1 Forest Practices Code

The Forest Practices Code for Timber Harvesting in Native Forests (Part 2) (SFNSW, 1995b), was introduced in 1995, and is an update of the 1993 Code of Logging Practice. The current code covers licensing requirements, planning provisions

for harvesting, tree marking and retention, through to wet weather controls, pollution controls, and penalty provisions for breaches.

3.3.2 External controls

A number of legislative controls and processes apply to all harvesting operations within the State forests of northern NSW. Legislative controls include compliance with the laws, regulations, and ordinances that are relevant to harvesting. The principal Acts include (SFNSW, 1995b):

- **Forestry Act 1916**

- **parts 4 and 5 of the 1994 regulations**

Outlines the management and administration of State Forests. The 1983 regulations outlines controls in the harvesting of timber.

- **Forestry and National Parks Estate Act, 1998**

Replaces Part V of the EP & A Act, which requires the need for an Environmental Impact Assessment.

- **Bush Fires Act 1949**

Regulates the use of fire.

- **Construction Safety Act 1912**

Licensing of log loading machinery operators.

- **Dangerous Goods Act 1975**

- **Dangerous Goods Regulation 1978, as amended**

Transport and storage of dangerous goods.

- **Environmental Planning and Assessment Act 1979**

- **Environmental Planning and Assessment Regulation 1994**

Encourage the proper management, development and conservation of natural and man made resources.

- **Factories, Shops and Industries Act 1962, Timber Industry (Health and Safety) Regulation 1992, amended 1988 (TI Reg)**

Provide for safe work practices and standards.

- **Environmental Offences and Penalties Act 1989 - Littering on State Forests**

Regulates littering in State Forests, timber and flora reserves.

- **National Parks and Wildlife Act 1974, as amended by the Endangered Fauna (Interim Protection) Act 1992**

Provides for the protection of Aboriginal relics and the protection of flora and fauna.

■ **Occupational Health and Safety Act 1993 (OH&S act)**

Occupational Health and Safety (First Aid) Regulation, 1992 (OH&S [First Aid] Regulation)

Provides for protection of workers, and the visiting public.

■ **Pollution Control Act 1970, Clean Waters Act 1970, Environmental Offences and Penalties Act 1989**

These acts deal with the control of pollution, including the discharge of chemicals and another pollutants. Most timber harvesting operations require pollution control licenses under the Pollution Control Act.

■ **Soil Conservation Act 1938**

Applicable to State Forests through the Soil Erosion Mitigation Guidelines for Logging in NSW (SEMGL) and the Code of Forest Practice.

■ **Surveyors Act 1929, Survey Coordination Act 1949**

Interference with survey marks.

■ **Traffic Act 1909, Roads Act 1993, Motor Accidents Act 1988, Local Government Act 1993.**

Registration of motor vehicles, load limits, third party insurance.

■ **Workers Compensation Act 1987**

Requires people engaged in timber harvesting operations to comply with provisions of this act with particular reference to insurance and rehabilitation of injured workers.

■ **Timber Industry (Interim Protection) Act (1992 as amended)**

Provides interim protection for the employment of workers in the timber industry pending the completion of EIS's.

■ **Threatened Species Conservation Act (1995)**

Administered by NPWS.

■ **Protection of The Environment Operations Act (1999)**

4. TIMBER RESOURCE AVAILABILITY

4.1 INTRODUCTION

The hardwood timber industry has undergone considerable changes over the last five years and in particular, since 1995. Essentially these changes have led to a reduction in the volume of timber being sourced from State forests.

Table 4A provides yields taken from the Timber Catchment Zones, segregated into three products.

TABLE 4A - VOLUMES (M³) OF THE MAIN PRODUCTS CUT BETWEEN JULY 1994 AND JUNE 1998

| Timber Catchment Zone | Product | 94/95 | 95/96 | 96/97 | 97/98 | Total | Average |
|-----------------------|--------------------|----------------|----------------|----------------|----------------|------------------|----------------|
| 1 | High Quality Large | 94,663 | 92,103 | 74,712 | 60,115 | 321,593 | 80,398 |
| | High Quality Small | 30,130 | 23,320 | 23,746 | 22,173 | 99,369 | 24,842 |
| | Low Quality | 37,734 | 28,400 | 32,944 | 21,987 | 121,065 | 30,266 |
| 2 | High Quality Large | 128,888 | 116,008 | 100,980 | 85,361 | 431,237 | 107,809 |
| | High Quality Small | 32,278 | 16,367 | 25,051 | 21,987 | 95,683 | 23,921 |
| | Low Quality | 60,394 | 54,760 | 53,629 | 48,865 | 217,648 | 54,412 |
| 3 | High Quality Large | 100,267 | 112,668 | 99,808 | 89,621 | 402,364 | 100,591 |
| | High Quality Small | 17,980 | 16,979 | 19,231 | 18,626 | 72,816 | 18,204 |
| | Low Quality | 117,345 | 72,265 | 82,670 | 65,378 | 337,658 | 84,415 |
| 4 | High Quality Large | 139,659 | 69,515 | 57,151 | 27,753 | 294,078 | 73,520 |
| | High Quality Small | 9,443 | 8,119 | 5,307 | 4,414 | 27,283 | 6,821 |
| | Low Quality | 68,988 | 48,441 | 85,494 | 27,118 | 230,041 | 57,510 |
| 5 | High Quality Large | 9,428 | 9,838 | 7,586 | 7,608 | 34,460 | 8,615 |
| | High Quality Small | 308 | 227 | 1,174 | 2,253 | 3,962 | 991 |
| | Low Quality | 11,781 | 10,127 | 11,445 | 4,024 | 37,377 | 9,344 |
| 6 | High Quality Large | 57,962 | 44,912 | 36,103 | 27,321 | 166,298 | 41,575 |
| | High Quality Small | 1,777 | 1,992 | 1,843 | 2,006 | 7,618 | 1,905 |
| | Low Quality | 57,076 | 45,733 | 35,334 | 35,287 | 173,430 | 43,358 |
| TOTAL | | 976,101 | 771,774 | 754,208 | 571,897 | 3,073,980 | 768,495 |

*Source - SFNSW

Figure 4a - High value large quota quality logs (by timber catchment)

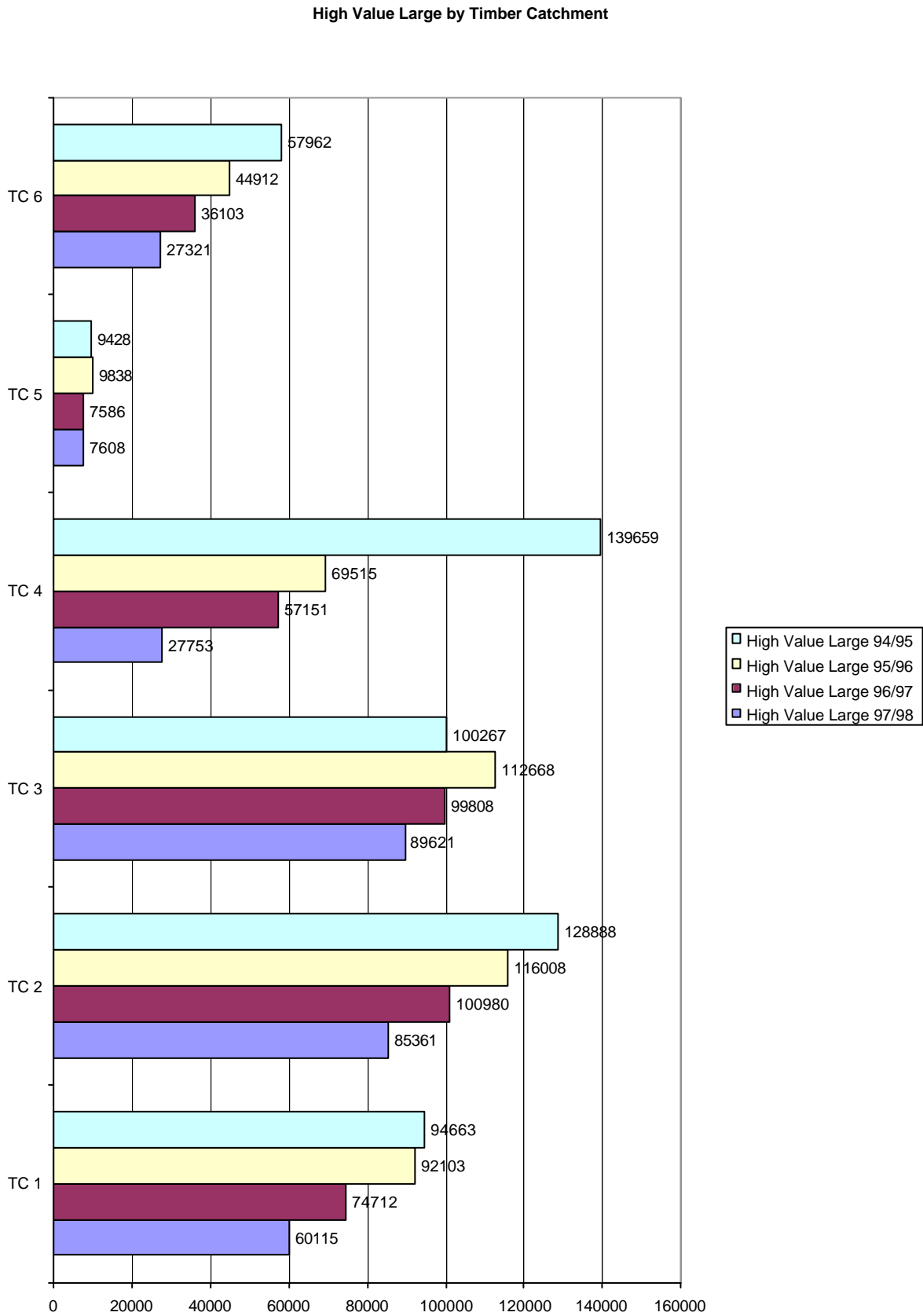


Figure 4b - High value small quota quality logs (by timber catchment)

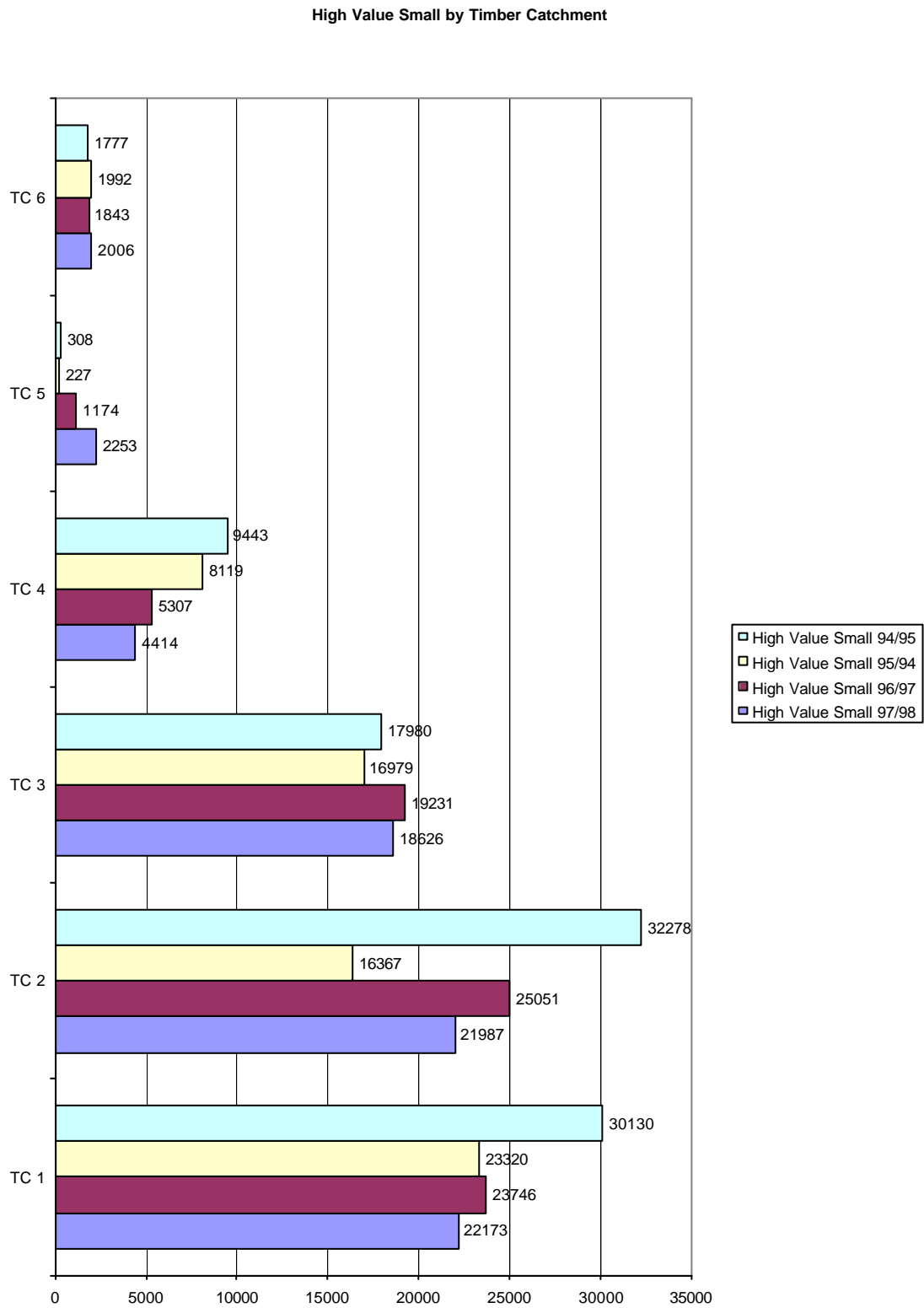


Figure 4c - Low value volume by timber catchment

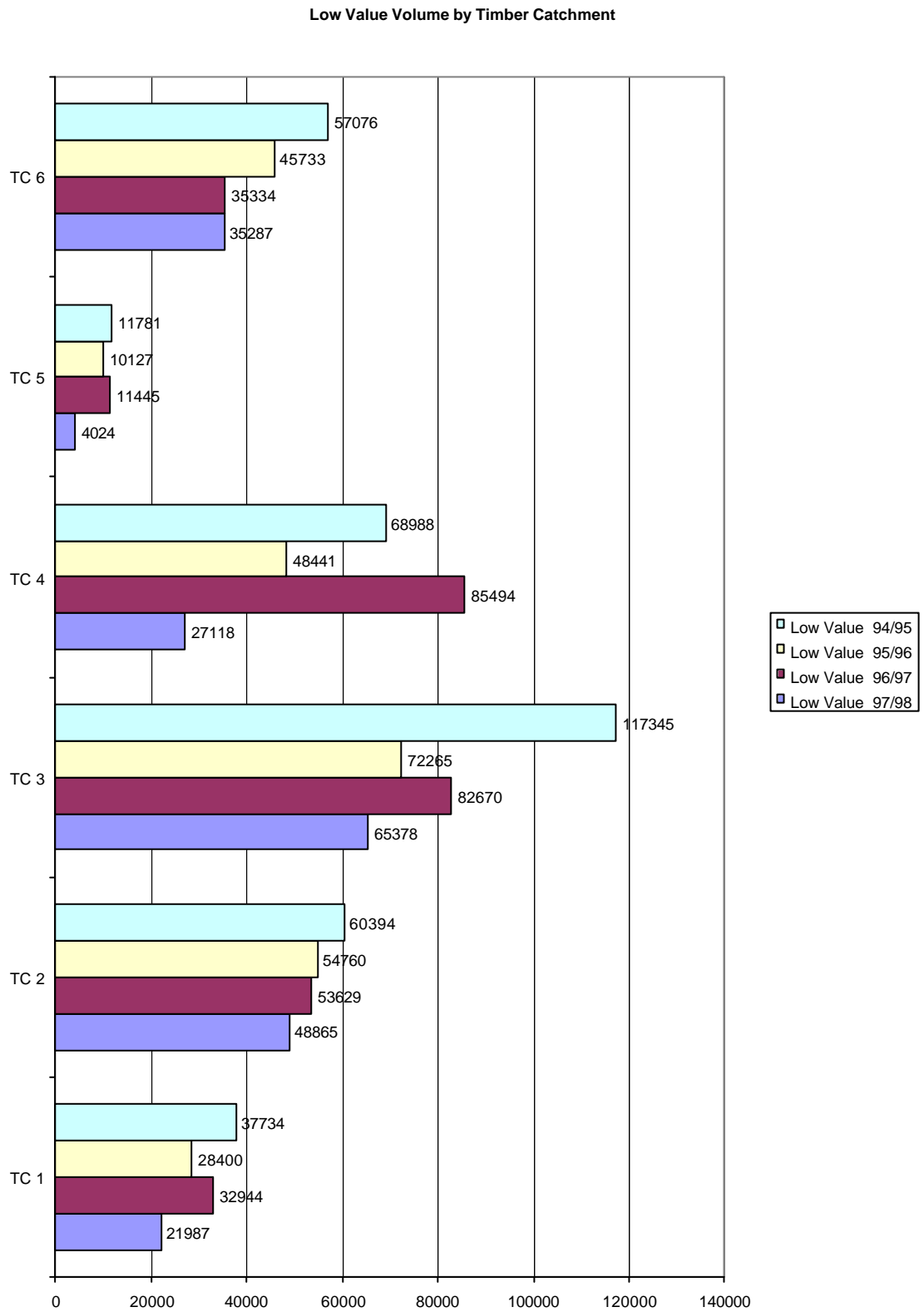


Figure 4d - Quota log sales 1994/95-1997/98

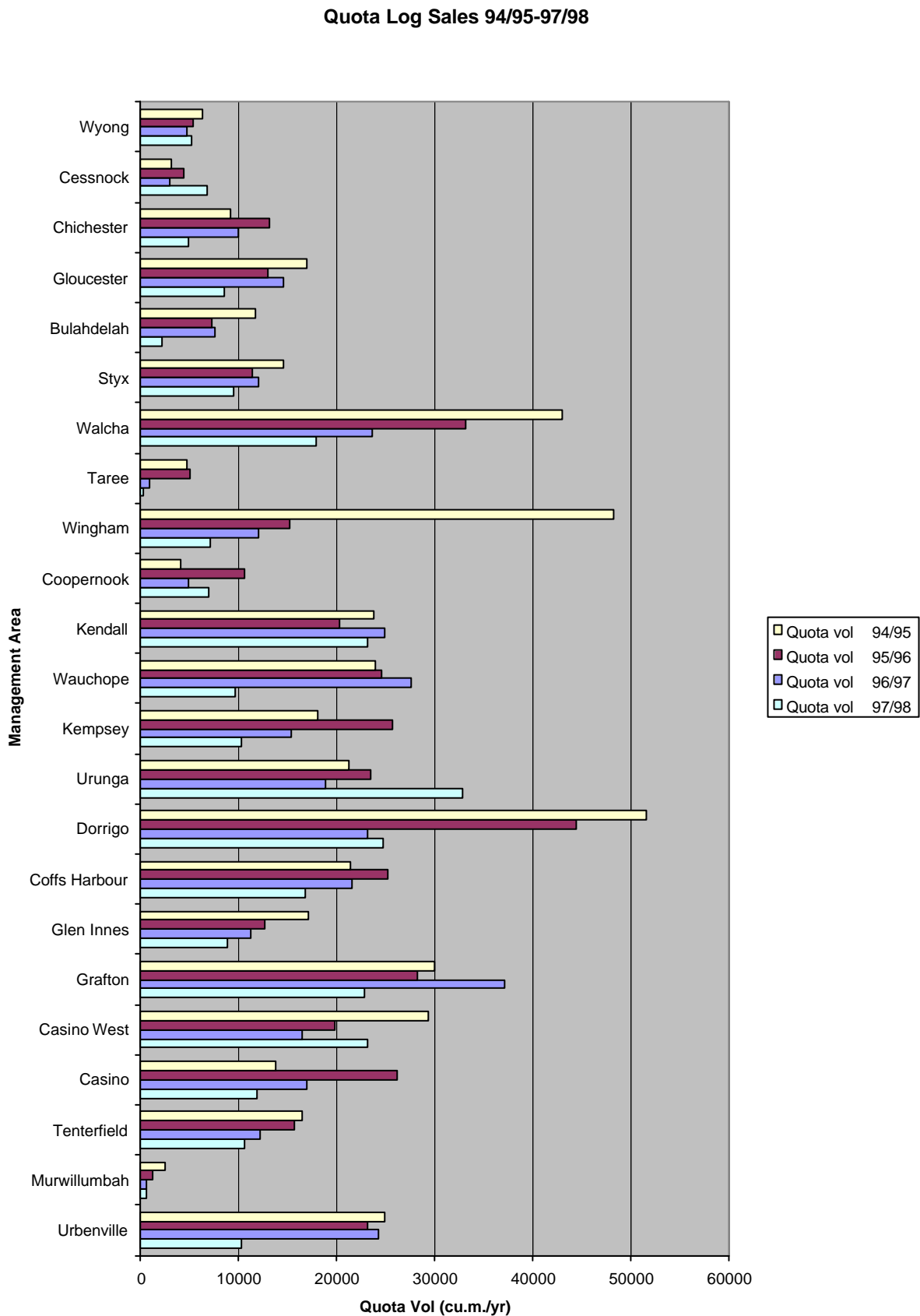


Figure 4e - High value non-quota sales 1994/95-1997/98

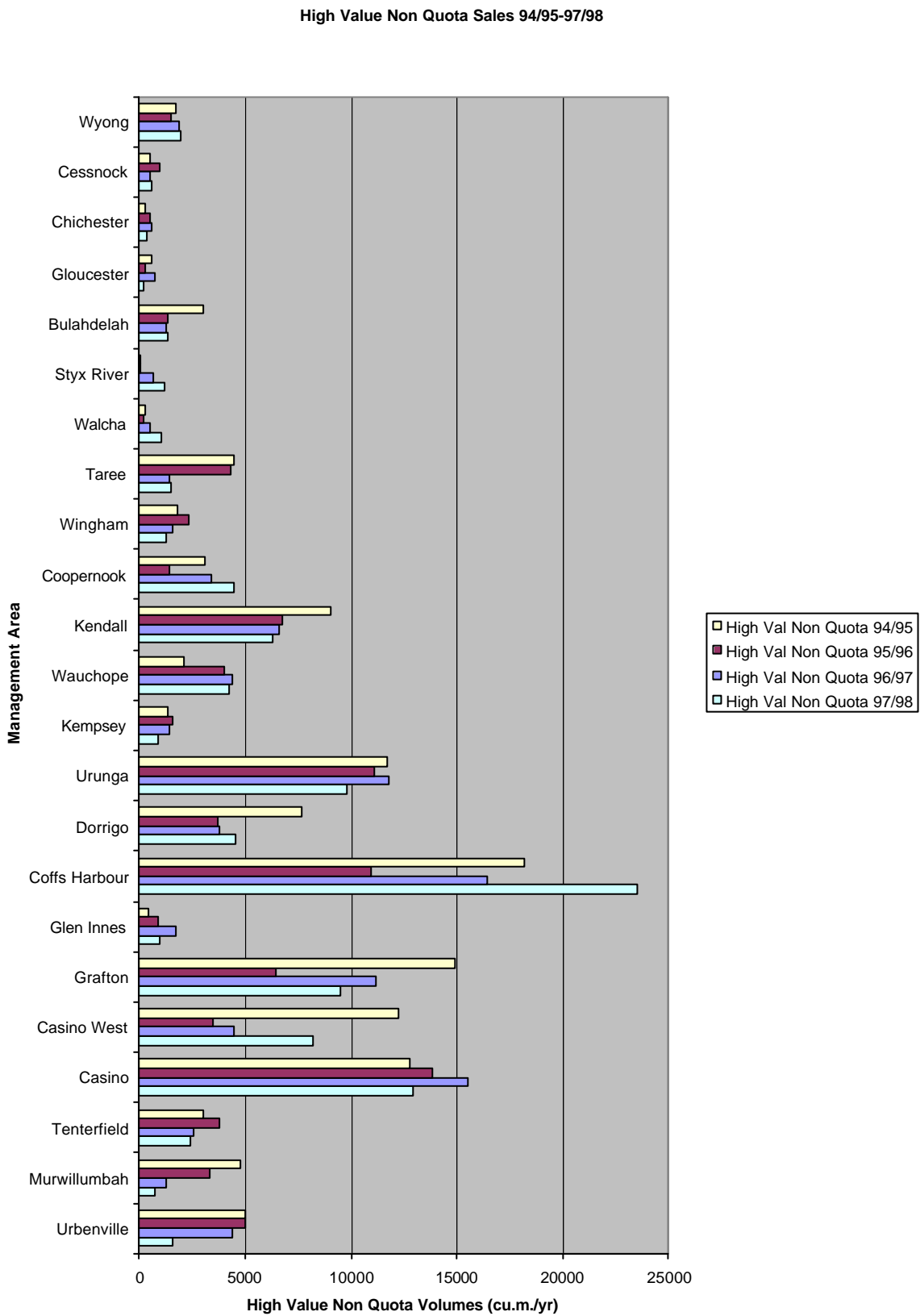


Figure 4f - Lower value non-quota sales 1994/95-1997/98

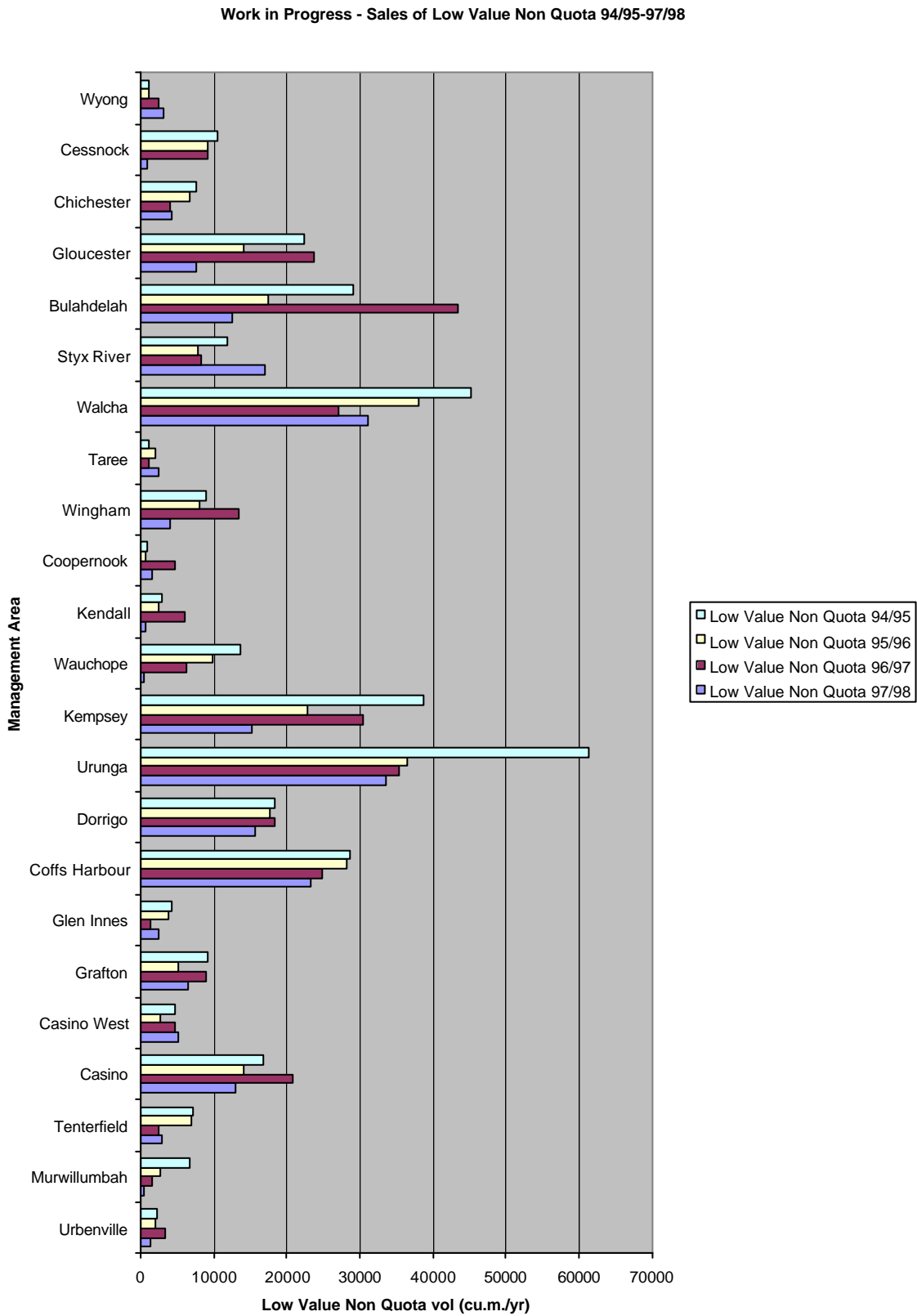


TABLE 4B - CHANGES IN PERCENTAGE OF VOLUMES CUT BETWEEN 94/95 AND 97/98

| Timber Catchment Zone | Product | Reduction in Volume from 94/95 to 97/98 (%) |
|-----------------------|---|---|
| 1 | High Quality (Large and Small) | 34 |
| | Sum High Quality and Low Quality | 36 |
| 2 | High Quality (Large and Small) | 33 |
| | Sum High Quality and Low Quality | 29 |
| 3 | High Quality (Large and Small) | 08 |
| | Sum High Quality and Low Quality | 26 |
| 4 | High Quality (Large and Small) | 78 |
| | Sum High Quality and Low Quality | 73 |
| 5 | High Quality (Large and Small) | -01 |
| | Sum High Quality and Low Quality | 35 |
| 6 | High Quality (Large and Small) | 51 |
| | Sum High Quality and Low Quality | 45 |
| Average | High Quality | 34 |
| Average | Sum High Quality and Low Quality | 41 |

4.2 SUMMARY

Tables 4A and 4B show an overall reduction in quota yields and total yields of around 40 percent,

with the various timber catchment zones being affected to different degrees.

Catchment Zone 4 followed by Zone 6 display the largest reduction in timber volumes.

Figure 4g - Species mix : Timber Catchment 1 (Upper North East)

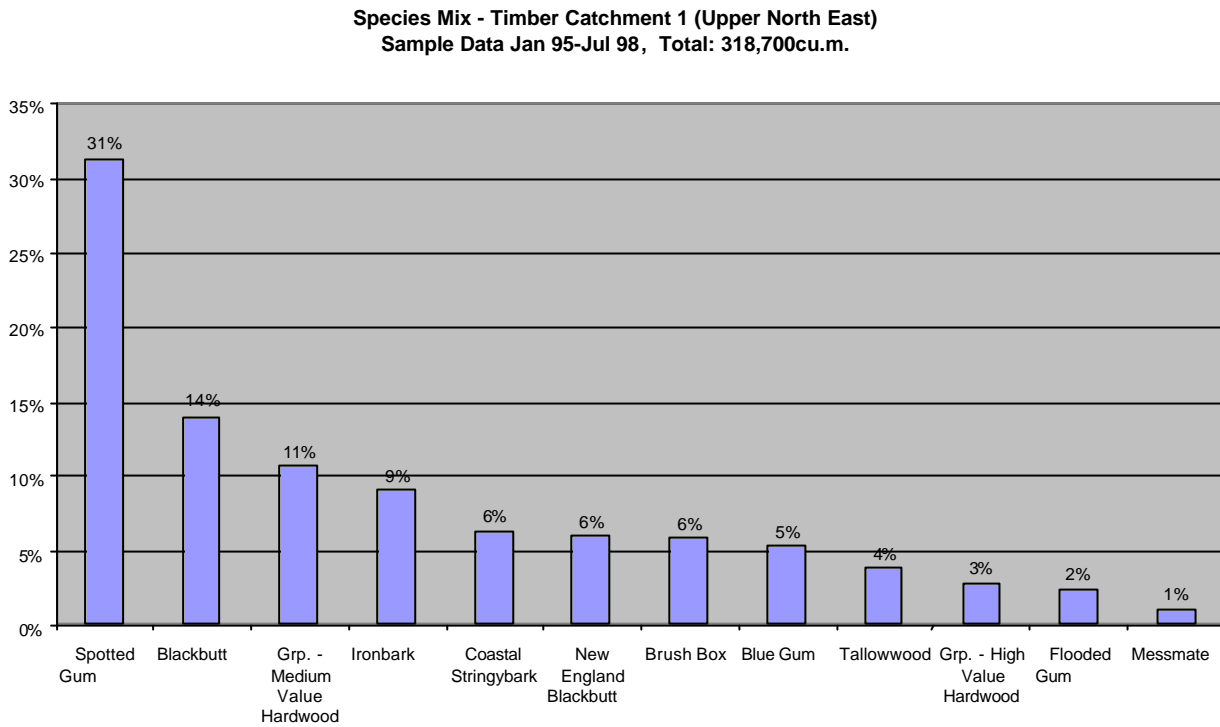


Figure 4h - Species mix : Timber Catchment 2 (Upper North East)

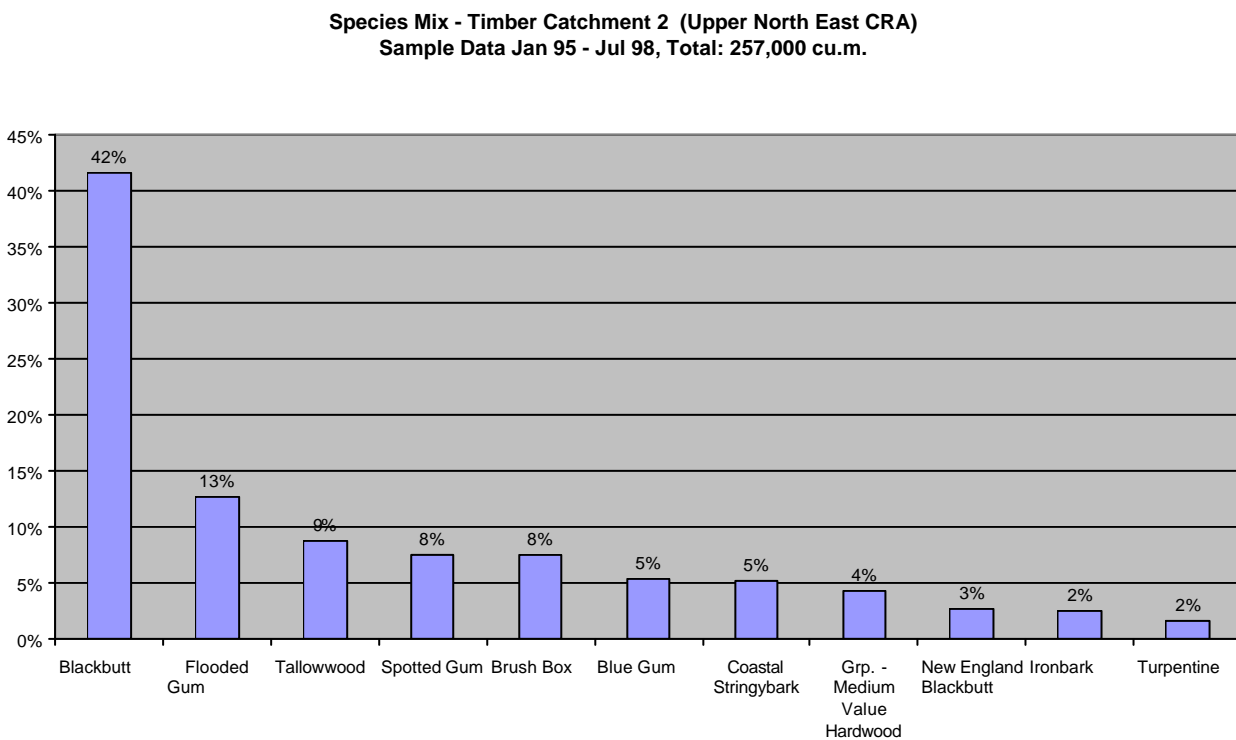


Figure 4i - Species mix : Timber Catchment 3 (Lower North East)

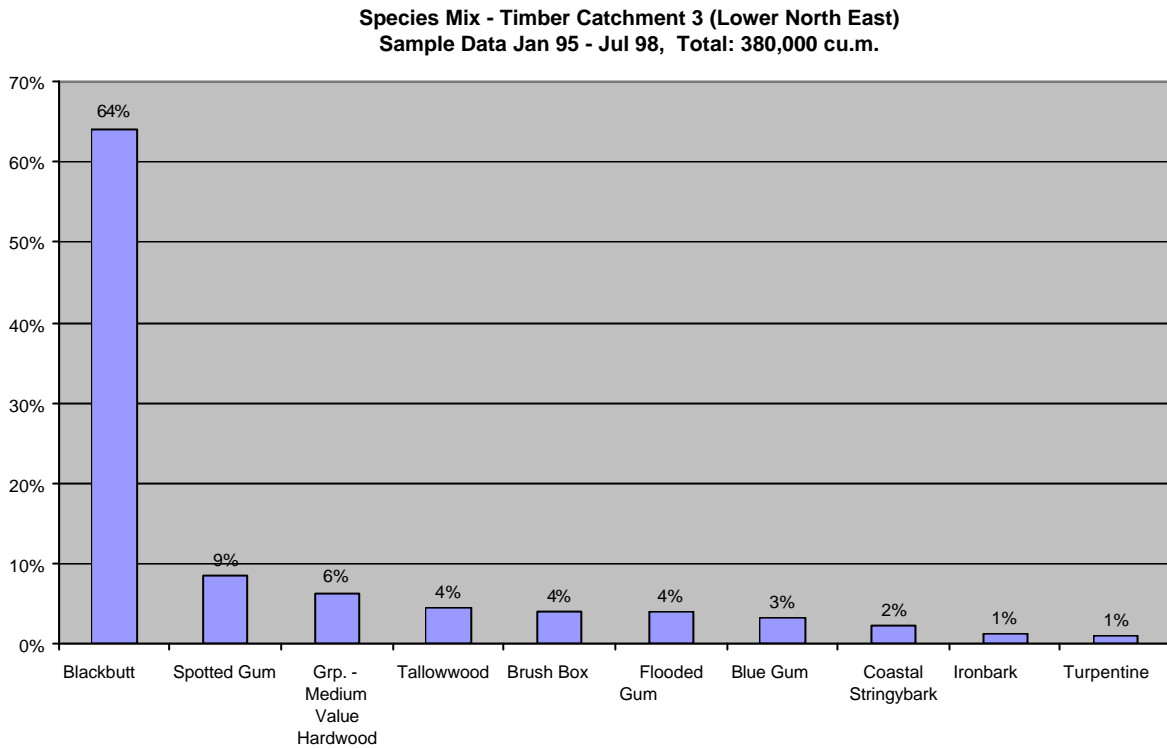
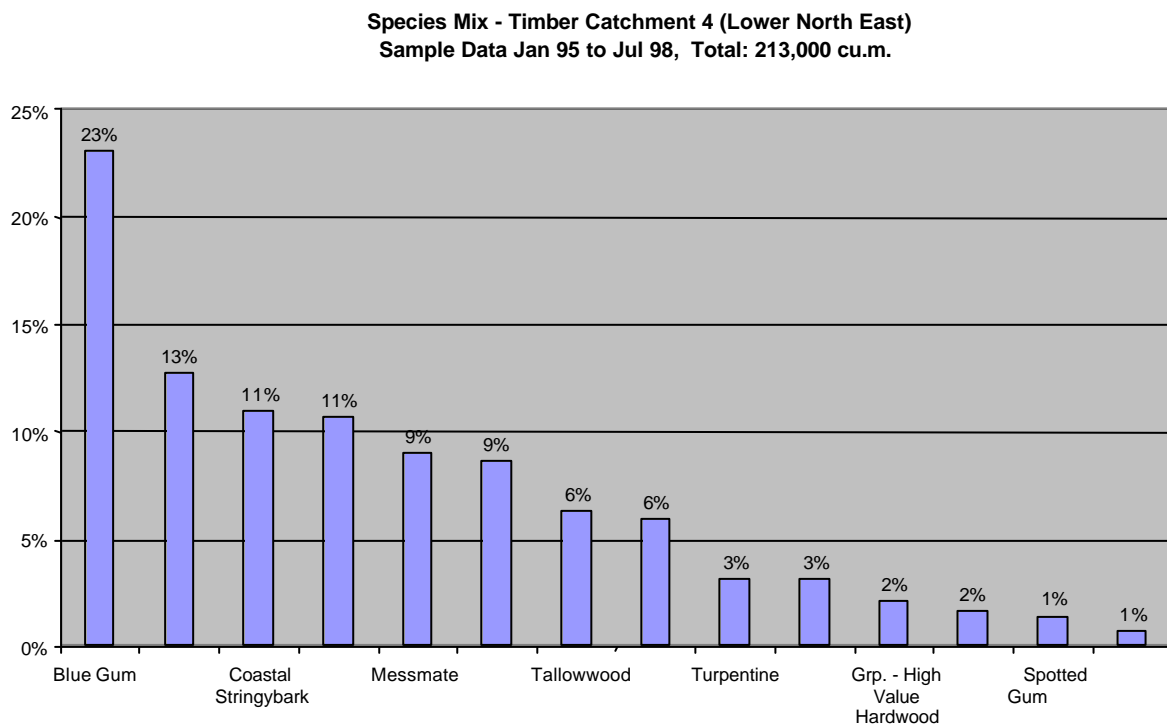


Figure 4j - Species mix : Timber Catchment 4 (Lower North East)



4.3 NON-QUOTA PRODUCTS AND CUSTOMERS IN THE UPPER AND LOWER NORTH EAST

Non Quota

Non quota logs refer to those cut in harvesting operations which either due to fulfilment of commitments or quality assessment are not sold as part of quota sawlog allocations. The term quota generally refers to sawlogs of a certain specification, which are sold to designated mills. Previously, a quota referred to an annual allocation.

When the term quota is used these days it usually refers to the quality of the logs that go to make up this parcel (i.e. quota quality sawlogs) as opposed to the volume allocation.

4.3.1 harvesting operations

harvesting operations in hardwood forests produce a variety of logs depending on length, diameter, species, straightness and presence of defects. These logs are sold to sawmills and other timber processing plants that convert them into various products depending on market demands. Quota logs (sawlogs) make up the greater proportion of the better quality, larger diameter logs (generally with diameters greater than 40cms). Non quota logs come from both ends of the quality spectrum. They include logs higher in quality than quota logs as well as sound small diameter logs and low quality logs.

The extent of harvesting operations in each year is driven by the commitment to supply quota quality sawlogs and other high value logs, or to achieve a silvicultural program, particularly thinning. State Forests endeavours to sell all log products from such operations to best advantage, while taking account of the needs of each industry sector. Not only are most quota customers dependent on a supply of non-quota logs, in most cases, quota sawlog operations would not be viable unless they were fully integrated with non-quota products being removed at the same time.

4.3.2 Non-quota log products

The non-quota industry includes log products that have very specific specifications for both quality and size such as poles, piles, veneer, and girders. However, poor quality salvage logs have no minimum specification. A description of each log product is given below:

Poles, domestic

These poles are used for electricity distribution and in structural applications such as pole frame houses. The species range covers the durable species such as ironbark, tallowwood and grey gum as well as non-durable species such as spotted gum and blackbutt. While some sections of the larger poles would meet quota specifications, the majority of poles if not sold as a pole, would be sold as a small sawlog.

Poles, export

These are similar to domestic poles in quality but they are smaller in diameter. While all pole species are suitable, the main species used is blackbutt. The alternate use for the majority of export poles is pulpwood.

Piles

Most piles have a toe diameter of 30 to 35cms with a variable length depending on site conditions. Pole species are the most common ones used as piles but there is still a large demand for bark-on turpentine piles. The main uses of piles are in marine applications but considerable numbers are used in bridges and as foundation piles.

Girders

Logs sold as girders are either utilised in the full round section or they are cut into large section timber and used typically in heavy construction applications such as bridges and wharves. They are also used in specialist items like boat keels.

Veneer logs

Veneer logs are rotary peeled into sheets which are then glued together to make plywood. Small quantities are used in timber face applications. While these logs need to be of high quality, they can carry some of the defects that would be unusable to regular sawmills.

Small logs

These logs are of similar quality to quota sawlogs but are restricted to sizes under 40cms centre diameter under bark (cdub).

Salvage logs

These logs do not meet the minimum specifications of any of the previous products. There is no minimum specification for these logs with the utilisation level dependant on the average

quality of the parcel, distance from the mill, species, market conditions and the customer.

Miscellaneous products

Smaller volumes of other products are sold on a regular basis.

These are:

- **Sleeper logs.** These sales have decreased to small volumes due to a combination of increased harvesting regulation and reduced Rail Services Authority (RSA) demand. Integration of harvesting operations has phased out sleeper only operations. Some demand for timber sleepers still occurs.
- **Woodchop blocks.** High quality logs are required for this use. Volumes required have increased in recent years with the growing popularity of the sport.
- **Fencing Timber.** In the past most fencing timber was cut by the user close to the area of use. With regulation of operations this is no longer possible. Sales in the future will come from integrated operations and usually be cut by professional cutters.

TABLE 4C - VOLUMES AND VALUES OF LOG PRODUCTS SOLD IN 1995/6 AND 1996/7

| Log Product | 1995/6 Volume (m ³) | 1995/6 Value (\$) | 1995/6 Unit Rate (\$/m ³) | 1996/7 Volume (m ³) | 1996/7 Value (\$) | 1996/7 Unit Rate (\$/m ³) |
|----------------------------------|------------------------------------|----------------------|--|------------------------------------|----------------------|--|
| Poles and Piles | 14,553 | 1,162,640 | 79.89 | 19,571 | 1,683,106 | 86.00 |
| Girders | 8,841 | 839,895 | 95.00 | 8,551 | 1,017,569 | 119.00 |
| Veneer Logs * | 17,522 | 1,103,886 | 63.00 | 17,119 | 1,061,378 | 62.00 |
| Quota Logs | 509,287 | 20,419,132 | 40.09 | 423,372 | 17,951,867 | 42.40 |
| Small Logs | 71,489 | 1,501,269 | 21.00 | 68,461 | 1,643,064 | 24.00 |
| Salvage Logs | 262,609 | 3,151,308 | 12.00 | 214,794 | 2,577,528 | 12.00 |
| Miscellaneous | 4,864 | 181,509 | 37.32 | 6,608 | 304,867 | 46.14 |
| Number of Customers + | 162 | | | 160 | | |

Note: Figures are for all coastal and tableland areas of NSW. The majority of high value log products other than quota were harvested on the North Coast.

* Includes hardwood plantation volumes.

+ Does not include miscellaneous customers

TABLE 4D - VOLUMES AND UNIT RATES OF LOG PRODUCTS SOLD BETWEEN 1994/5 AND 1997/8

| Log Product | 1994/5 | | 1995/6 | | 1996/7 | | 1997/8 | |
|---------------------------------|-----------------------------|-----------------------------------|-----------------------------|-----------------------------------|-----------------------------|-----------------------------------|-----------------------------|-----------------------------------|
| | Volume (m ³) | Unit Rate (\$/m ³) | Volume (m ³) | Unit Rate (\$/m ³) | Volume (m ³) | Unit Rate (\$/m ³) | Volume (m ³) | Unit Rate (\$/m ³) |
| Poles | 26,397 | 76.11 | 11,986 | 78.61 | 15,503 | 79.68 | 15,014 | 70.24 |
| Piles | 1,481 | 82.85 | 994 | 102.60 | 3,234 | 112.75 | 3,989 | 114.06 |
| Girders | 13,049 | 77.33 | 8,811 | 94.71 | 8,551 | 118.61 | 8,384 | 129.70 |
| Veneer* | 20,194 | 54.83 | 17,479 | 63.40 | 17,119 | 61.96 | 16,733 | 62.71 |
| Quota | 455,352 | 33.30 | 408,818 | 40.14 | 342,710 | 42.47 | 274,523 | 50.54 |
| Smalls | 58,124 | 17.89 | 48,752 | 23.54 | 53,578 | 24.03 | 55,389 | 23.66 |
| Salvage | 274,733 | 11.05 | 184,356 | 11.65 | 189,381 | 11.80 | 137,911 | 11.65 |
| Other logs | 78,641 | | 75,425 | | 112,135 | | 60,052 | |
| Miscellaneous | | | | | | | | |
| Number of customers+ | 162 | | 160 | | 161 | | 124 | |

+ Does not include miscellaneous customers.

*Includes hardwood plantation volumes.

4.3.3 Non-quota log customers

The nature of non-quota sawmills varies widely in size and product output. Some sawmills cut a variety of products while others are specialised in one product and have installed equipment that efficiently processes that product (e.g. pallets or palings). All mills cut a proportion of non-quota sawlog material. Some customers who rely on non-quota logs have made considerable investments in equipment, distribution facilities and markets.

Value adding by non-quota customers

Speciality products such as poles, piles and girders are regarded as the highest level of value adding as

they capitalise on the natural qualities of the species as well as using the whole product. Structural plywood likewise uses the natural strength of each species and Australian eucalypt plywood is regarded as the strongest plywood in the world.

Most sawmillers regard small sawlogs as suitable for sawing into boards for flooring and other appearance products, with the majority of the volume going into the dried/dressed market. Salvage logs, while used mainly for pallet making are increasingly being used in the production of boards.

5. END PRODUCT USE OF NORTHERN HARDWOOD SPECIES

NSW hardwood species have intrinsic strength, durability and appearance characteristics that determine their potential end product use and thereby, the relative value of each species to processors in the timber industry.

5.1 BACKGROUND

The NSW native forest products industry has tended to base its product range and marketing efforts on a number of core hardwood species (Boland et al, 1984) consisting of:

Tallowwood: a very strong extremely durable dense timber with a yellowish brown heartwood. Used for heavy engineering construction, railway sleepers, poles, crossarms, sills, flooring and decking.

Ironbark: very hard, very strong and very durable, tough timber with a dark brown or red-brown colour. Used for heavy engineering construction, poles, railway sleepers and crossarms.

Blackbutt: one of the most commercially important hardwood species in northern New South Wales. It has light brown to yellowish brown heartwood, is straight grained, of moderate to good durability and used in furniture, flooring, building, poles, railway sleepers and pulp.

Spotted Gum: a strong durable and dense hardwood with light brown to dark brown

heartwood often with attractive fiddleback. Used in heavy construction, furniture, flooring, tool handles and preservative treated poles.

Brush Box: a strong, very tough and very hard timber with light to medium pinkish brown heartwood. Timber is used for bridge and wharf decking, flooring, general construction, and other specialist woodworking uses.

Turpentine: a hard, strong, durable, and dense timber with a red to reddish brown fine and even textured heartwood. The timber is highly resistant to decay and termite attack and because of its durability is an extremely suitable timber for purposes such as piles, poles, girders, beams and wharf decking.

Sydney Blue Gum: a straight-grained, relatively easy to work, fix, dress and finish timber with a pink to red heartwood. Used for general construction, furniture, flooring, cladding and panelling.

Flooded Gum: a straight-grained, moderately strong, moderately durable timber with a pink to light red heartwood. Used for general construction, joinery, plywood, panelling, boat building and flooring.

Gympie Messmate: a hard, extremely durable, strong timber with a yellowish brown heartwood. Used for heavy engineering,

railway sleepers, mine timber, posts, poles and scantling.

TABLE 5A - SPECIES GROUPINGS FOR NORTHERN NSW TIMBERS

| Common Name | Scientific Name | Species Group |
|--|--|--------------------------------------|
| Blackbutt | <i>Eucalyptus pilularis</i> | Blackbutt |
| Blue Gum | <i>Eucalyptus saligna</i> | Blue Gum |
| Brush Box | <i>Lophostemon confertus</i> | Brush Box |
| Flooded Gum | <i>Eucalyptus grandis</i> | Flooded Gum |
| Forest red gum | <i>Eucalyptus tereticornis</i> | Grp. - High Value Hardwood |
| Grey Box | <i>Eucalyptus moluccana</i> | Grp. - High Value Hardwood |
| Steel Box | <i>Eucalyptus rummeryi</i> | Grp. - High Value Hardwood |
| White-topped Box | <i>Eucalyptus quadrangulata</i> | Grp. - High Value Hardwood |
| Yellow Box | <i>Eucalyptus melliodora</i> | Grp. - High Value Hardwood |
| Blue Leaved Stringy Bark | <i>Eucalyptus agglomerata</i> | Grp. - Medium to High Value Hardwood |
| Brown Stringybark | <i>Eucalyptus baxteri</i> | Grp. - Medium to High Value Hardwood |
| Red Stringybark | <i>Eucalyptus macrorhyncha</i> | Grp. - Medium to High Value Hardwood |
| Silvertop Stringybark | <i>Eucalyptus laevopinea</i> | Grp. - Medium to High Value Hardwood |
| White Stringybark | <i>Eucalyptus globoidea</i> | Grp. - Medium to High Value Hardwood |
| Yellow Stringybark | <i>Eucalyptus muellerana</i> | Grp. - Medium to High Value Hardwood |
| Apple Angophora Spp | <i>Angophora</i> species | Grp. - Medium Value Hardwood |
| Bloodwood | <i>Corymbia gummifera</i> | Grp. - Medium Value Hardwood |
| Brown Barrel | <i>Eucalyptus fastigata</i> | Grp. - Medium Value Hardwood |
| Diehard Stringybark | <i>Eucalyptus cameronii</i> | Grp. - Medium Value Hardwood |
| Grey Gum | <i>Eucalyptus propinqua</i> <i>Eucalyptus punctata</i> | Grp. - Medium Value Hardwood |
| Manna Gum (Ribbon Gum) | <i>Eucalyptus viminalis</i> | Grp. - Medium Value Hardwood |
| Monkey Gum | <i>Eucalyptus cypellocarpa</i> | Grp. - Medium Value Hardwood |
| Mountain Gum | <i>Eucalyptus dalrympleana</i> | Grp. - Medium Value Hardwood |
| Red mahogany | <i>Eucalyptus resinifera</i> | Grp. - Medium Value Hardwood |
| Dunn's White Gum | <i>Eucalyptus dunnii</i> | Grp. - Medium Value Hardwood |
| White Mahogany | <i>Eucalyptus acmenoides</i> | Grp. - Medium Value Hardwood |
| Brushwood ¹ /Other Species ² | | Grp. - Other Species |
| Crows (Teak) Ash ² | <i>Flindersia australis</i> | Grp. - Other Species |
| Oak Casuarina Spp | <i>Casuarina</i> | Grp. - Other Species |
| Peppermint | | Grp. - Other Species |
| Roundleaved Gum | <i>Eucalyptus deanei</i> | Grp. - Other Species |
| Scribbly Gum | <i>Eucalyptus rossii</i> | Grp. - Other Species |
| Ironbark | <i>Eucalyptus paniculata</i> <i>Eucalyptus sideroxylon</i> <i>Eucalyptus fibrosa</i> | Ironbark |
| Gympie Messmate | <i>Eucalyptus cloeziana</i> | Gympie Messmate |
| New England Blackbutt | <i>Eucalyptus andrewsii</i> | New England Blackbutt |
| Spotted Gum | <i>Corymbia maculata</i> | Spotted Gum |
| Tallowwood | <i>Eucalyptus microcorys</i> | Tallowwood |
| Turpentine | <i>Syncarpia glomulifera</i> | Turpentine |

¹ Various rainforest species

² Only salvage logging of rainforest species now occurs, usually as a result of storm damage.

All other species are generally not available in sufficient quantities to allow promotion in the market place and are therefore sold either as special species in niche markets by individual sawmilling companies or otherwise grouped as mixed Australian hardwoods. In the case of structural grades (i.e. scantling, KD structural, etc.) species is not an issue unless they have characteristics such as high shrinkage, lack of stability or are species with inherent defect.

State Forests of NSW market for pulp grade timber is also dependent on species. The industry (which includes a wood panel plant and woodchip operations) requires species of suitable basic density and recoverable fibre characteristics. Highly suitable species include flooded gum, spotted gum, blackbutt, Sydney blue gum and Gympie messmate.

5.2 CURRENT SITUATION

Tables 5B and 5C illustrate the market value potential of the main hardwood species in NSW. The species are ranked in terms of their residual values derived from State Forests of NSW's Log Value Pricing System.

TABLE 5B - MARKET VALUE POTENTIAL – VALUE FOR EACH SPECIES BY SIZE CLASS (RESIDUAL VALUE)

| Species | Size Class | | |
|----------------------|------------|----------|---------|
| | 40-49 cm | 50-69 cm | 70+ cm |
| Blackbutt | \$38.38 | \$47.24 | \$50.56 |
| Tallowwood | \$46.16 | \$54.98 | \$58.79 |
| Brush Box | \$38.09 | \$44.23 | \$47.01 |
| Spotted Gum | \$35.11 | \$45.23 | \$49.70 |
| Coastal Stringybarks | \$34.59 | \$41.63 | \$45.33 |
| Sydney Bluegum | \$34.76 | \$36.93 | \$40.46 |
| Flooded Gum | \$32.96 | \$35.08 | \$38.55 |
| White Mahogany | \$30.72 | \$33.08 | \$36.53 |
| Grey Gum | \$31.27 | \$33.64 | \$37.11 |
| Ironbark | \$46.16 | \$54.77 | \$58.58 |
| Grey Box | \$42.48 | \$50.87 | \$54.55 |
| Fastigata | \$31.07 | \$33.46 | \$36.89 |
| Messmate | \$30.70 | \$33.15 | \$36.61 |
| Monkey Gum | \$32.91 | \$35.38 | \$38.92 |
| Silvertop Ash | \$31.97 | \$34.10 | \$37.59 |
| Silvertop Stringy | \$31.37 | \$33.48 | \$36.95 |
| New England BBT | \$30.70 | \$33.15 | \$36.61 |
| Viminalis | \$30.31 | \$32.69 | \$36.09 |
| Roundleaved Gum | \$13.75 | \$17.99 | \$19.07 |
| Red Mahogany | \$34.76 | \$36.93 | \$40.46 |
| Turpentine | \$32.76 | \$41.19 | \$43.87 |
| Defect % | 20 | 25 | 33 |
| Log Delivery Cost | \$40.65 | \$40.65 | \$40.65 |

TABLE 5C - MARKET VALUE POTENTIAL – VALUE FOR EACH SPECIES BY SIZE CLASS (RELATIVITY FACTOR)

| Species | Size Class | | |
|----------------------------|------------|----------|--------|
| | 40-49 cm | 50-69 cm | 70+ cm |
| Blackbutt (BBT) | 1.0000 | 1.2309 | 1.3174 |
| Tallowwood (TWD) | 1.2027 | 1.4325 | 1.5319 |
| Brush Box (BBX) | 0.9925 | 1.1525 | 1.2251 |
| Spotted Gum (SG) | 0.9149 | 1.1786 | 1.2950 |
| Coastal Stringybarks (CST) | 0.9014 | 1.0848 | 1.1811 |
| Sydney Bluegum (BG) | 0.9059 | 0.9622 | 1.0544 |
| Flooded Gum (FG) | 0.8588 | 0.9141 | 1.0046 |
| White Mahogany (WM) | 0.8004 | 0.8619 | 0.9520 |
| Grey Gum (GG) | 0.8147 | 0.8764 | 0.9670 |
| Ironbark (IBX) | 1.2027 | 1.4271 | 1.5265 |
| Grey Box (GBX) | 1.1069 | 1.3256 | 1.4215 |
| Fastigata (FAS) | 0.8096 | 0.8719 | 0.9611 |
| Messmate (MM) | 0.8001 | 0.8637 | 0.9539 |
| Monkey Gum (MKG) | 0.8575 | 0.9220 | 1.0141 |
| Silvertop Ash (STA) | 0.8331 | 0.8885 | 0.9794 |
| Silvertop Stringy (STS) | 0.8173 | 0.8724 | 0.9629 |
| New England BBT (NEB) | 0.8001 | 0.8637 | 0.9539 |
| Viminalis (VIM) | 0.7898 | 0.8518 | 0.9404 |
| Roundleaved Gum (RLG) | 0.3582 | 0.4687 | 0.4969 |
| Red Mahogany (RM) | 0.9059 | 0.9622 | 1.0544 |
| Turpentine (TRP) | 0.8537 | 1.0733 | 1.1432 |

Factors that will affect the suitability and usage of species in the end-product groups listed are:

1. Availability.
2. Market acceptance.
3. Specific processing constraints such as difficulty with drying particular species.
4. Colour range of species in appearance applications.
5. Competing demands for use in higher value end-product applications.
6. Intrinsic characteristics of species impacting ability to meet grade.
7. Sufficient supply to enable development and long term servicing of end-product market.

Decisions regarding production options and the need for particular species will depend on whether the sawmill:

- Produces for the green sawn market only – cutting for the green sawn market requires assured market outlets for scantling, engineered products (F17 to F27) and

traditional recovery lines (pallets and palings). Based on the mill's ability to develop markets that demand the products, the mill will have specific preferences for species and grades of log.

- Produces for the green sawn market and its own dressing plant – a mill which produces for the green sawn market and supplies material for its own dressing plant has many options and can therefore handle a wider range of species.
- Produces for the green sawn market and is a supplier to outside dressing plants – such a mill would need to be more selective as other than the species utilised in green sawn products, it could only use species that are acceptable to the processing plants.

The suitability of each species is limited by the producers' ability to market them into saleable products. Unless the end-product can be produced from a species which conforms to the grade requirements and provides a product which is acceptable in the market place, the species must be considered to be unsuitable for that range of products.

6. HARDWOOD LOG VALUE PRICING SYSTEM

6.1 INTRODUCTION

The Hardwood Log Value Pricing (LVP) system is a market based pricing mechanism used for the derivation and ongoing review of quota quality (graded) sawlogs for coastal and tableland hardwood species.

The LVP system has been developed in consultation with the native hardwood industry for all coastal and tablelands graded sawlogs. The system was designed to address the limitations of past State Forests of NSW log pricing systems and encourage better marketing of hardwood end products. The principle objectives of LVP are:

- greater differentiation of log values to reflect end-products recoverable from the variety of species, log sizes and log qualities available;
- support Government value adding objectives by pricing sawlogs consistent with their highest potential value end-product mix;
- provide price equity for log purchasers by recognition of variations in resource quality;
- provide a consistent, transparent, robust and durable log pricing system; and

- identify and monitor marketing signals to ensure that log prices continue to reflect market conditions.

Hardwood LVP is designed to derive log prices by recognising the variation in quality of all graded sawlogs. This variation is linked to the difference in market value of products that are derived from those logs. By combining the value of end-products with the costs associated with sawmilling, a theoretical residual value (Market Value Potential) is calculated for each log type. Model 1 (in Table 6A) outlines the derivation of Market Value Potential for each size/species group.

6.2 MARKET VALUE POTENTIAL

The Market Value Potential is an estimation of the relative potential value of each species/size group. It is estimated by assessing the strength, durability and appearance qualities of the net wood component (i.e. free of estimated defect) for each species/size class. The key variables required to calculate Market Value Potential are as follows.

Average Market Price - This represents the weighted average price per cubic metre for the range of products capable of being produced from a given size/species group, for which there is a market, or a potential market. Estimates used in the model are not intended to represent what is currently being achieved by industry but rather what is considered to be achievable and desirable in the medium term for the whole hardwood sector.

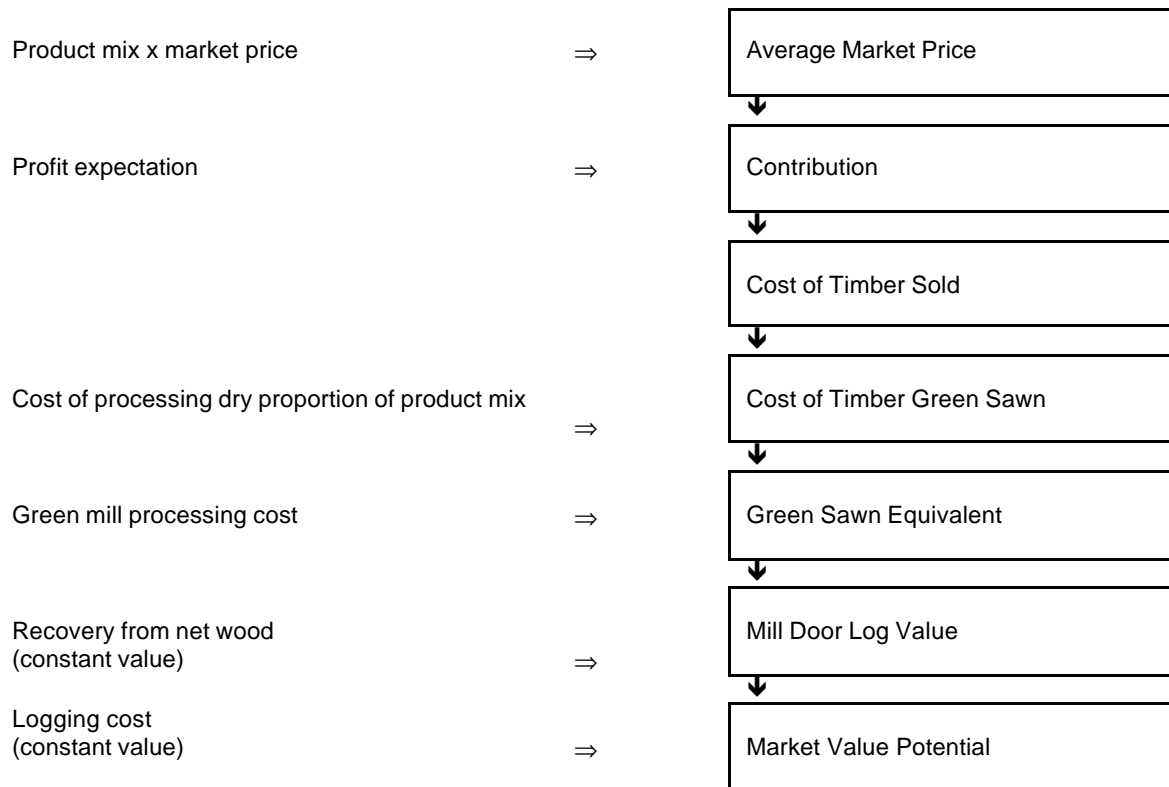
Contribution - To achieve a constant profit expectation, a 20% return on sales is used for each calculation.

Processing Costs - All sawmill processing costs are determined based on information provided by industry and State Forests of NSW timber industry consultants.

Recovery and Logging Costs - A constant defect allowance for each size group and a constant log delivery cost was applied in order to achieve

comparable market value potential for each species and size group.

TABLE 6A – MODEL 1 : DERIVATION OF MARKET VALUE POTENTIAL FOR EACH SIZE/SPECIES GROUP



Log Relativity Factor

While Model 1 estimates the relative value between species in each size class, information on log defect and log delivery costs for each price zone is required to give the overall relativity factor. This enables comparison of species/size groups within and between price zones. The key variables required to calculate the relativity factors are as follows:

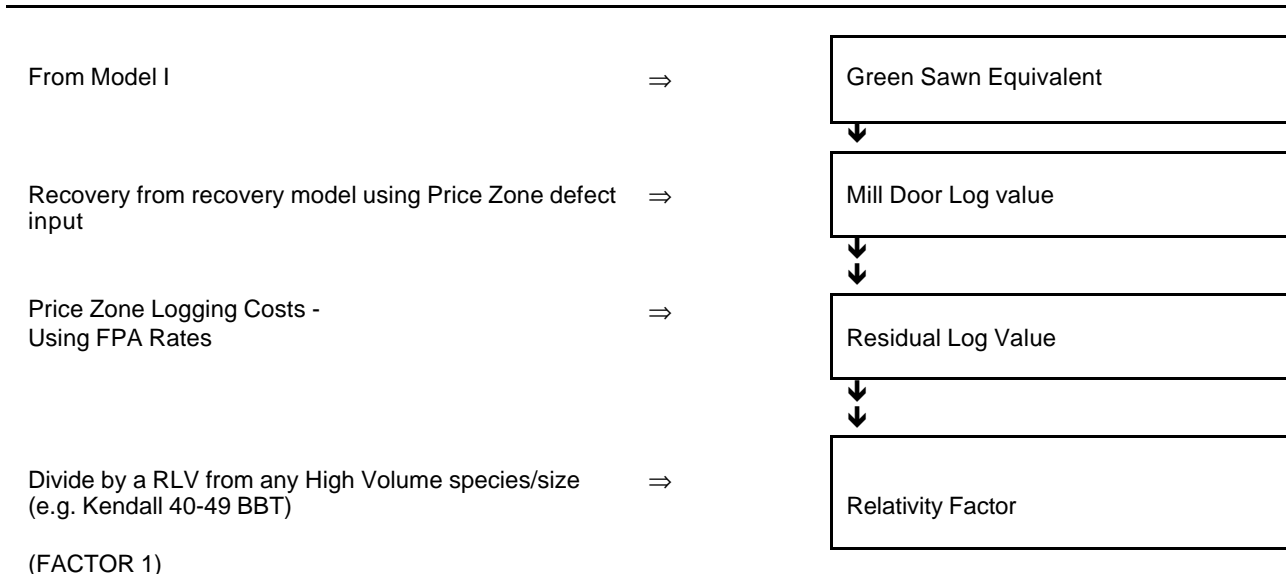
Recovery Model - The recovery model estimates recovery of sawn timber from the net wood after defect has been removed. It is a complex computer

program that takes into account factors such as sawdust waste and over-sizing.

Log Defect Percentage - Log defect is estimated for each species/size group within each price zone and is derived from a combination of sources including historical defect measurements and industry/SFNSW estimates of defect.

Logging Costs - Logging costs are based on recommended rates published by the industry. Haulage distances represent weighted average hauls from the forest to nominated mill sites.

TABLE 6B – MODEL 2 : DERIVATION OF RELATIVITY FACTOR FOR EACH SIZE/SPECIES GROUP BY PRICE ZONE



Attachment 1. outlines the derivation of MVP for blackbutt sawlogs of 40-49 size class in Kendall price zone (a price zone is a geographically compact area of state forests which has reasonably similar log quality and logging costs).

Step 4 - Multiply new Factor 1 by the relativities for every size/species group for each price zone to produce actual prices.

6.3 CALCULATION OF ACTUAL PRICES

Since its introduction, Hardwood LVP has been promoted to industry on the premise that the impact would be “revenue neutral”. This meant that at the point of introduction (January 1, 1997), the new species/size group matrix of log prices would not involve any increase in total revenue for SFNSW. The derivation of actual prices from Market Value Potential and Log Relativity Factors outlined in Models 1 and 2 is as follows:

Step 1 - Estimate the volume of each size/species group for each price zone over the next two years. Forecasts of future size/species mix were chosen in preference to historic log harvest data so that the model would reflect movement towards regrowth and recut forests in line with the CRA process.

Step 2 - Calculate the total revenue collected by SFNSW using flat rate prices applying at 31/12/96.

Step 3 - Calculate the new “Factor 1” required to give the same total revenue when applied to the relative log values for the volumes estimated in Step 1.

Attachment 2 shows the LVP Schedule for the Default Price Zone where defect percentages are held constant for each species within log size classes (e.g. 20% defect for the 40-49cm size class).

Summary of Features

- A residual log pricing model has been developed to devise the relative values of:
 - 42 species
 - 3 size classes based on log diameter
 - 42 unique price zones in coastal and tablelands hardwood forests
- Residual log value is the assessed market value of end products less costs of production, logging and log haul, after allowing for profit by the log processor.
- The market value potential for end-products of each species and size class has been assessed for NSW logs by independent timber industry consultants and SFNSW in consultation with timber companies.

- Variation in log quality (defect), log extraction and log haul costs are addressed by identifying actual values for each price zone, resulting in different prices between price zones.
- Costs of basic (green) sawmilling and value adding processes have been assessed for each log type along with recovery of sawn timber from logs. These costs reflect best sawmilling practice.
- To scale the residual pricing model a contribution (profit/return on equity) of 20% of gross sales has been included.
- Relative values of all the log categories were used to effect a revenue neutral conversion at State level from the previous pricing system on 1 January 1997.
- Log price variations within the State (i.e. Price Zone log prices) are capped to plus or minus 10% to minimise the impact of the new pricing system on individual customers

nominated species in relevant price zones, as well as verification of log defect allowances via more comprehensive defect sampling.

6.4 CURRENT SITUATION

Hardwood Log Value Pricing has now been operating for 30 months. During this period, ongoing consultation and negotiation with industry has resulted in the following key system refinements:

- adoption of new log defect allowances in LVP based on current defect monitoring (pending completion of agreed program to improve defect monitoring);
- adoption of log haul allowances advised by industry;
- adoption of reduced end-product prices for the more reactive species; and
- Removal of the 10% price zone cap.

Implementation of these changes is currently being discussed with industry.

Future system refinements planned include review of end-product mixes. This will be based on an independent assessment of net wood quality for

7. TIMBER SUPPLY PRIORITY ZONING

7.1 INTRODUCTION

Timber Supply Priority Zoning reflects the relative commercial timber value of groups of compartments (Timber Supply Zones). Timber Supply Zones are a subset of Log Value Price Zones, from the Log Value Pricing system, and are logical supply units with similar log haulage costs.

Timber Catchment Zones can be seen in Map 7a.

The project specification for Timber Supply Priority Zoning was approved by the Economic and Social Technical Committee for the UNE and LNE CRA regions.

Timber Supply Priority Zoning was developed to provide a ranking of groups of compartments, reflecting commercial timber values, to assist negotiators during the integration phase of the CRA/RFA.

Attributes used to determine a commercial ranking were linked to potential value adding and economic returns. These attributes included log quality and harvesting index, log volume, productivity, and high value products/species. Attribute weightings are detailed below.

7.2 METHODOLOGY USED FOR CALCULATION OF TIMBER PRIORITY INDEX (TPI)

Attribute 1: Log quality and harvesting index (Weighting 25%)

Timber Supply Zones (TSZ) fall within Log Value Price Zones (LVPZ). Each LVPZ has an average selling price for quota sawlogs. These values were divided by the maximum value to derive relative scores out of 25 points (Index a).

Attribute 2: Log Volume – High Value products, Low Value products and Pulp (Weighting 22%, 10% and 3% respectively).

High value products include poles, piles, girders, veneer, quota and smalls. FRAMES provided volume per hectare estimates of High Value Large and High Value Small products by planning unit/compartiment. The total volume of High Value Products within the net area of each planning unit and Timber Supply Zone (TSZ) was calculated. A volume per hectare figure of High Value Products was calculated for each TSZ. These figures were divided by the maximum value to derive relative scores out of 22 points (Index b).

As for High Value Products, a volume per hectare figure for Low Value Products (salvage) and for Pulp was calculated for each TSZ. These figures were divided by the maximum values in each class to derive relative scores out of 10 points and 3 points, respectively (Indices c and d).

Attribute 3: Medium term Productivity and Long term Productivity (Weighting 20% and 10% respectively).

These indices were calculated for High Value Products – large and small combined. FRAMES provided volumes per hectare of High Value Products by planning unit for 0-20 years (medium term) and 21-100 years (long term). A volume per hectare figure of High Value Products was calculated for each TSZ, for each period. These figures were divided by the maximum values in each period to derive relative scores out of 20 points and 10 points, respectively (Indices e and f).

Attribute 4: High value products/species. Weighting 10%

Each TSZ was assigned a value of 1, 5 or 10 points (Index g) to indicate the existence of high value

products and species (poles, piles, girders and veneers). Ratings were assigned by regional sales and marketing staff.

7.2.2 Calculations

Attribute points were summed for the Timber Supply Zones (sum Index a-g) to give a score out of 100. TPI areas were categorised (1 = High Priority; 2 = Moderate Priority; 3 = Low Priority) based on 33% percentiles. Timber Catchments 1 and 2 (TC1 and TC2) for the UNE and Timber Catchments 3, 4, 5 and 6 (TC3, TC4, TC5 and TC6) for the LNE, were treated separately. Any planning units with a net available area less than 10 hectares were included in the TPI = 3 “Low” class. Purchase land, softwood and hardwood plantations were added to a TPI = 0 class.

7.2.3 Discussion

Timber Supply Priority Zoning provides a relative ranking of Timber Supply Zones by Timber Catchment. Note that a TPI = 1 in one catchment does not necessarily equate to a TPI = 1 in another catchment.

Timber Supply Priority Zoning is one tool for use by negotiators during the integration phase of the CRA/RFA process. FRAMES output accounts for 65% of the weighting of the Timber Priority Index and therefore has a large bearing on the results.

The importance of factors essential to potential value adding and economic returns, in particular species mix, should be considered in parallel with the overview of Timber Supply Priority Zoning. Other projects that link to TPI include the Social and Economic Technical Committee’s project ‘Timber Resources Profile’, which considers quantity and species mix, as well as the Environment and Heritage Technical Committee’s ‘Disturbance History Mapping’ project.

MAP 7a – Timber Catchment Zones for UNE & LNE CRA Regions

8. PRIVATE NATIVE FOREST MANAGEMENT

8.1 INTRODUCTION

Private forests make up 55 percent of the 4.4 million hectares of forest in the northern NSW CRA regions. In 1997 they contributed 35 percent of the regions' sawlog and peeler production (SFNSW). Table 8A shows the approximate³ amount of private forest timber harvested since 1974. It is a licence requirement of all private sawmill owners to provide records to SFNSW on private land timber inputs.

Table 8A shows the changes in private supplies over the past 25 years ranging from 212 999 m³ per annum in 1994/95 to a peak of 527 147 m³ per annum in 1974/75.

Table 8B shows the area of forest under each of the yield associations for both UNE and LNE for private, State forest and other public land. As these yield associations include woodland and water courses the total area exceeds the State total of forest of 4.4 million hectares.

TABLE 8A - VOLUMES OF TIMBER HARVESTED FROM PRIVATE PROPERTY BETWEEN 1974 AND 1997 (SOURCE: SFNSW)

| Year | UNE (m ³) | LNE (m ³) | Total (m ³) |
|----------|-----------------------|-----------------------|-------------------------|
| 1974/75 | 277777 | 249370 | 527147 |
| 1975/76 | 201946 | 202176 | 404122 |
| 1976/77 | 198678 | 226652 | 425330 |
| 1977/78 | 258193 | 232383 | 490576 |
| 1978/79 | 203089 | 190985 | 394074 |
| 1979/80 | 200764 | 211656 | 412420 |
| 1980/81 | 218738 | 223945 | 442683 |
| 1981/82 | 207210 | 228871 | 436081 |
| 1982/83* | N/A | N/A | N/A |
| 1983/84* | N/A | N/A | N/A |
| 1984/85 | 176024 | 129019 | 305043 |
| 1985/86 | 156684 | 160458 | 317142 |
| 1986/87 | 172904 | 150641 | 323545 |
| 1987/88 | 160925 | 129362 | 290287 |
| 1988/89 | 154288 | 124785 | 279073 |
| 1989/90 | 198745 | 139133 | 337878 |
| 1990/91 | 181267 | 132530 | 313797 |
| 1991/92 | 173020 | 117212 | 290232 |
| 1992/93 | 86991 | 264619 | 351610 |
| 1993/94 | 104996 | 189775 | 294770 |
| 1994/95 | 74483 | 138516 | 212999 |
| 1995/96 | 64511 | 149273 | 213785 |
| 1996/97 | 63553 | 289186 | 352739 |

*Figures for 1982-84 were not recorded

³ Volumes are considered approximate as not all private mills keep accurate records of timber processed.

TABLE 8B – AREA OF NORTHERN NSW FOREST TYPES BY TENURE

| Description | National Park & Other Public | State Forest | Private | Total |
|-----------------------------------|------------------------------|--------------|-----------|-----------|
| Moist Blackbutt | 18,523 | 87,974 | 35,213 | 141,710 |
| Moist Coastal Eucalypt | 120,971 | 209,675 | 235,827 | 566,473 |
| Semi-moist Eucalypt | 169,935 | 260,228 | 388,999 | 819,162 |
| Dry Spotted Gum and Dry Blackbutt | 75,035 | 165,794 | 311,164 | 551,993 |
| Dry Sclerophyll | 311,070 | 118,757 | 432,399 | 862,226 |
| Moist Tableland | 165,336 | 189,124 | 205,151 | 559,611 |
| Dry Tableland | 140,607 | 48,558 | 162,027 | 351,192 |
| Non Eucalypt/Non Productive | 549,910 | 109,681 | 593,167 | 1,252,758 |
| Plantation | 163 | 48,697 | 646 | 49506 |
| Rainforest | 192,330 | 178,161 | 55,285 | 425,776 |
| Water Courses | 4,345 | 299 | 23,104 | 27,748 |
| Total | 1,748,225 | 1,416,948 | 2,442,982 | 5,608,155 |

8.2 PRIVATE FOREST MANAGEMENT

The most comprehensive description of forest management on private land in NSW is contained within Ecologically Sustainable Forest Management (1998). The following is a summation of information contained within this chapter.

Even following the introduction of the *Native Vegetation Conservation Act 1997*, there is no legislative regime in New South Wales which specifically addresses development consent for forestry and timber production on private land, except in the case of plantation forestry (NSW CRA/RFA Steering Committee 1998).

The general approach has been to treat forestry on private land as a form of land clearing. In the past there has been some regulation of private forestry through the *Soil Conservation Act 1938* on protected land (protected land is classed as land within 20 m of the bed or bank of specified rivers and lakes, or on steeply sloping land) and through the State Environmental Planning Policy 46 (SEPP 46). SEPP 46 has a specific exemption for private native forestry from the general requirement to obtain development consent for the clearing of native vegetation.

Under the exemption within the SEPP 46, private native forestry is defined as:

The clearing of native vegetation in a native forest in the course of its being selectively logged on a sustainable basis or managed for forestry purposes (timber production).

This description highlights the understanding difficulties in the processes relating to timber production by distinguishing between managing for forestry purposes and selective harvesting. At present there are no codes of Forest Practice which cover private land (NSW CRA/RFA Steering Committee 1998).

In some instances harvesting activities may come under the requirements of local environment plans made under the *Environmental Planning and Assessment Act (1979)*, where there may be a specific requirements to obtain development consent for forest harvesting. Regional vegetation management plans, once developed, will override local regulatory requirements.

The planning requirements and development consent are separate to the conduct of the actual operations. The threat of soil erosion and land degradation is covered under section 15a of the *Soil Conservation Act 1938*. Additionally, it is a criminal offence to cause water pollution under the *Clean Waters Act/Pollution Control Act (1970)*, unless a pollution control licence has been obtained from Environment Protection Authority (NSW CRA/RFA Steering Committee 1998).

9. HARDWOOD PLANTATION FOREST MANAGEMENT

9.1 HISTORY

Hardwood plantations were first established on the north coast in Pine Creek State Forest in 1939. The area of hardwood plantations established prior to 1994 is 5,400 hectares in the UNE and 19,000 hectares in the LNE. Most of these areas were established in the 1960s and 1970s. A large plantation estate (some 14,000 ha) was established by Australian Paper Manufacturers for pulpwood, around Coffs Harbour. These plantations were purchased by SFNSW in 1994.

In the UNE, the main species established were blackbutt and flooded gum. The main species established in the LNE were also blackbutt and flooded gum, with some silvertop stringybark (*E. laevopinea*), blueleaf stringybark (*E. agglomerata*) and Sydney blue gum.

9.2 DEFINITION

Definitions for plantations have varied according to State and Federal policies. The key Federal policy definition is as per the National Forest Policy Statement definition. The key State definition is according to the *Timber Plantation (Harvest Guarantee) Act 1995*. Given that there are potential defining problems with native species plantations in northern NSW, the plantation definition is expanded according to SFNSW policy.

National Forest Policy Statement (1992):

“Intensively managed stands of trees of either native or exotic species, created by the regular placement of seedlings or seed.”

State Forests of NSW traditional definition

“A readily definable area of forest established to a full or at least good stocking by planting or sowing at a predetermined spacing on a fully prepared site (i.e. prepared by tractor clearing and/or intensive burning).”

The Timber Plantation (Harvest Guarantee) (TPHG) Act 1995:

(Section 6), defines a plantation as:

“(1) In this Act, Timber plantation means an area of land on which the predominant number of trees forming, or expected to form, the canopy are trees that have been planted (whether by sowing seed or otherwise) for the purpose of timber production.”

(2) To avoid doubt, a natural forest is not a timber plantation. However, an area is not a natural forest merely because it contains some native trees that have not been planted.

(3) A timber plantation can comprise more than one area of land, or it can be a State Forest or other Crown timber land, or any other land.

(4) A timber plantation can comprise more than one area of land if those areas are under the same ownership or management.”

Considering subsections (1) and (2) together, this definition clearly excludes natural trees, but allows native trees (“ingrowth”) to be present, subject to the requirement in subsection (1) that planted trees are predominant (by number) in the canopy. “Predominant” is interpreted as constituting over 50 percent of the upper tree stratum, and may be assessed as the average stand structure across the whole block.

Since SFNSW's existing hardwood plantation register was based on the traditional plantation definition, the plantation estate was reviewed and reclassified to meet the *Timber Plantation (Harvest Guarantee) Act 1995* plantation accreditation standards for the CRA process.

The hardwood plantations were initially classified into one of the following categories:

| |
|--|
| <p>Category A. Suitable for immediate accreditation (i.e. meets the Timber Plantation (Harvest Guarantee) Act definition)</p> <p>Category B. Additional investigation needed before accreditation is sought.</p> <p>Category C. Failed areas (i.e. established according to old plantation definition, but stocking not meeting current accreditation criteria).</p> <p>Category D. Minor areas (i.e. established according to plantation definition, but because of low site potential, small size, uneconomic location or isolation, the management intent was to manage the stands as native forest rather than plantation).</p> <p>Category X. Non-plantation (i.e. partially cleared areas, snig track extensions or enrichment planted areas).</p> |
|--|

| |
|---|
| <p>B2 areas classified as "B" which were established by sowing seed, or method was not recorded.</p> <p>Category C. Areas which were marginal for accreditation because ingrowth constitutes about 50% of the upper canopy, because of variation within blocks, or for other reasons. (Formerly B3)</p> <p>Category D. Failed areas which were established according to the definition of plantation in the TPHG Act. (Formerly C)</p> <p>Category E. Small or remote areas deemed uneconomic to manage as plantations. (Formerly D).</p> |
|---|

TABLE 9A - TOTAL PLANTATION AREA (CLASSES A-D) IN NORTHERN NSW

| | Area (ha) |
|-------|---|
| A | Ready for accreditation |
| A.1 | Planted 20,861 |
| A.2 | Sown 4,128 |
| B | Boundary needs clarification and marking in field |
| B.1 | Planted 894 |
| B.2 | Sown 324 |
| C | Marginal areas 1,687 |
| D | Failed areas 581 |
| Total | 28,475 |

Revised definitions

The hardwood plantation resource has been revised (K. Moxon, Pers. Comm. SFNSW, June 1998):

| |
|--|
| <p>Category A. Areas which meet the plantation definition and accreditation criteria in the TPHG Act and which are ready for accreditation.</p> <p>A1 Areas classified as "A" which were established by planting seedlings</p> <p>A2 Areas classified as "A" which were established by sowing seed, or method was not recorded.</p> <p>Category B. Areas which meet requirements of the TPHG Act, but where boundaries need to be finalised or marked in the field prior to accreditation.</p> <p>B1 areas classified as "B" which were established by planting seedlings.</p> |
|--|

A total of 23,232 ha (82 percent) was established by planting, 3,782 ha (13 percent) by sowing and on 1,461 ha (5 percent) the establishment method was not recorded.

9.3 MANAGEMENT OF HARDWOOD PLANTATIONS ESTABLISHED PRE 1994

Hardwood plantations have been established on the north coast from planting of seedlings or sowing of seed. Planting has been carried out since 1939 and sowing since 1956. The sown stands vary greatly in stocking and density, and also tend to have considerable variation in height and diameter of individual trees.

Plantations have been managed by age class distribution and stand condition. Plantation areas consist of uniform, even-aged stands on 35 to 45 year production cycles. One cycle or rotation consists of two or three thinning operations, followed by a clearfall operation.

For some time the volumes of small roundwood thinnings available from plantation areas has far exceeded the market demand for small roundwood (such as pulpwood). This has resulted in overdue thinning of plantations and a decline in stand quality. Thinned plantations supply mainly veneer logs, pulpwood and some sawlogs.

Species composition in plantations may change considerably over time from that originally planted. Invasion by other species can make up to 20 per cent of the stand.

9.4 FOREST PRACTICES CODE

State Forests plantations are covered by the Forest Practices Code, Part 1 - Timber Harvesting in State Forest Plantations (SFNSW, 1995), and Part 3 - Plantation Establishment and Maintenance (SFNSW, 1997). These codes are promoted as minimum standards for all private plantation management (SFNSW, 1997).

9.5 EXTERNAL CONTROLS

External legal controls are covered in section 3.3.2. Additional legislation in relation to plantations are as follows (SFNSW, 1997).

- **Fertilisers Act 1995**

Provides for registration of brand names of chemicals.

- **Fisheries Management Act 1994**

Covers obstruction of fish passage.

- **Heritage Act 1977**

Provides for making of emergency, interim and permanent conservation orders to protect buildings, relics, works or places of scientific, natural and aesthetic significance to the state.

- **Noise Control Act 1975**

Prescribes acceptable levels for some sources of noise.

- **Noxious Weeds Act 1993**

Requires State Forests of NSW and other public authorities to control noxious weeds on their land.

- **Pesticides Act 1978**

Controls the possession and use of pesticides.

- **Rural Land Protection Act 1989**

Provides for the establishment and management of travelling stock reserves.

- **Timber Plantations (Harvest Guarantee) Act 1995**

Provides for the accreditation of timber plantations established in compliance with the EP & A Act, the Native Vegetation Conservation Act 1997 and SEPP 46.

9.6 LOG PRESCRIPTION

Sawlogs can be classified into several classes based on size.

- Large: over 44cm small end diameter under bark (sedub).
- Medium: between 30cm and 44cm sedub
- Small: between 24cm and 30cm sedub
- Super Small: between 18cm and 24cm sedub

These sawlogs are all structural grade sawlogs.

9.7 TIMBER YIELDS FROM PLANTATION FORESTS

Fortech (1998), using information from SFNSW, showed the following estimated wood volumes from plantations in northern NSW.

TABLE 9B - ESTIMATED WOOD VOLUMES FROM HARDWOOD PLANTATIONS IN NORTHERN NSW

| Supply Period | Sawlog | Pulplog |
|----------------|---------------|---------------|
| 2000-2010 | 40,000 | 90,000 |
| 2000 committed | 40,000 | 125,000 |
| 2010-2020 | 120,000 | 294,000 |
| 2010 committed | Not specified | Not specified |

The area of hardwood plantation forest in northern NSW at 1997 (NPI, 1997) by species and planting period is provided below. This base data has had SFNSW figures to 1998 added.

TABLE 9C – HARDWOOD PLANTATION AREA IN NORTHERN NSW

| Planting Period | E. pilularis | E. grandis | E. pilularis/ E. grandis mix | Minor species | Unidentified species | Total |
|-----------------|--------------|-------------|---------------------------------|---------------|----------------------|---------------|
| Unknown | 49 | 34 | 77 | 93 | 724 | 977 |
| <1940 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1940-44 | 0 | 9 | 0 | 0 | 0 | 9 |
| 1945-49 | 0 | 24 | 17 | 25 | 3 | 69 |
| 1950-54 | 11 | 49 | 125 | 9 | 28 | 222 |
| 1955-59 | 0 | 288 | 29 | 0 | 21 | 338 |
| 1960-64 | 541 | 1,081 | 262 | 76 | 508 | 2,468 |
| 1965-69 | 1,919 | 1,058 | 2,408 | 102 | 753 | 6,240 |
| 1970-74 | 4,393 | 1,838 | 2,744 | 969 | 2,066 | 12,010 |
| 1975-79 | 903 | 511 | 1,717 | 996 | 312 | 4,439 |
| 1980-84 | 146 | 157 | 715 | 814 | 703 | 2,535 |
| 1985-89 | 113 | 41 | 406 | 63 | 1,221 | 1,844 |
| 1990-94 | 66 | 49 | 430 | 93 | 1,248 | 1,886 |
| 1995+ | 39 | 59 | 224 | 24 | 19,258* | 19,604 |
| Total | 8,180 | 5200 | 9,150 | 3,260 | 26,848 | 52,638 |

*Note: The majority of this category is SFNSW data where species had not been distinguished at this stage.

9.8 PLANTATION FOREST SILVICULTURE

9.8.1 Establishment

General site preparation on first rotation will use a combination of ripping, mounding, cultivation, clearing, burning or spot cultivation depending on:

- how the site derives its moisture (by a summer or winter rainfall or irrigation),
- soil compaction,
- whether clearing is needed and
- the vegetation cover.

Generally, the process will involve the following establishment technique(s):

- Clearing vegetation cover (through burning, clearing or knockdown herbicide).
- Ground preparation (combination of cultivation, ripping and mounding or spot cultivation).
- Emergent grass control through knockdown and or residual herbicide (either broadcast or strip) about 4 weeks after ground preparation.
- Planting (after with-holding period for herbicide).

- Fertilising 4 weeks after planting (prior to this follow up herbicide may be required).
- Post plant overspray if needed.

The knockdown herbicide type and rate of application will vary depending on the weed spectrum. Both weed spectrum and soil tightness will determine residual herbicide rate.

The results of a soil survey determines the fertiliser requirements.

The aim is to have greater than 85 percent survival and greater than 85 percent of seedlings at least 1 metre in height after the first growing season. A stocking of 800 stems per hectare is expected at 5 years.

9.8.2 Management

The silvicultural regime consists of two thinnings prior to clearfall. The age of each thinning will vary depending on the species and productivity of the site. Generally first thinning will occur at around 10 to 15 years, second thinning at around 20 years, and clearfall between 22 and 40 years.

Pruning is optional and both the lift heights and rate would be dependant on the pruned log volume outputs required to meet commitments.

10. SOFTWOOD PLANTATION FOREST MANAGEMENT

10.1 SOFTWOOD TIMBER INDUSTRY

The softwood timber industry in the Upper North East is comprised of two veneer mills and four sawmills. One of the veneer mills, Big River Timbers, utilises both softwood and hardwood timber. Details of these companies are shown in Table 10A below.

TABLE 10A - SOFTWOOD TIMBER COMPANIES IN THE UNE

| Company | Location | Product |
|---------------------|---------------------------|---------|
| Norply | Kyogle | Veneer |
| Big River Timbers | Grafton | Veneer |
| Mesray | Wyan via Casino | Sawlog |
| Collenden | Lowanna via Coffs Harbour | Sawlog |
| Corrective Services | Glen Innes | Sawlog |
| Bulmer and Smith | Casino | Sawlog |

These companies, in total, are purchasing the available softwood volume under agreement.

Additional softwood timber (approximately 8,000 m³ per annum) may be supplied from the LNE CRA region plantations to these customers.

10.2 RESOURCE

10.2.1 Lower North East

Softwood plantations were trialed in the Armidale and Nundle areas from the early 1920's, but the main plantation area was established from 1967 in the Nundle area. About 10,000 hectares, mainly of *Pinus radiata* currently exist.

10.2.2 Upper North East

Softwood plantations have been established in many areas in the Upper North East region dating back to the early thirties. While many species were trialed, most of the plantation estate comprises of the exotic southern pines – particularly slash pine (*Pinus elliotii*) and loblolly pine (*Pinus taeda*). Less common pines include radiata pine (*Pinus radiata*), Caribbean pine (*Pinus caribaea*) and other southern pines. There are also areas of native softwood species, mainly hoop pine (*Araucaria cunninghamii*) and some bunya pine (*A. bidwillii*).

TABLE 10B – SFNSW SOFTWOOD PLANTATION AREA IN NORTHERN NSW

| Planting Period | Araucaria species | P. elliotii | P. taeda | P. radiata | Minor pinus species | Unidentified species | Total |
|-----------------|-------------------|--------------|--------------|---------------|---------------------|----------------------|---------------|
| <1940 | 42 | 4 | 0 | 49 | 67 | 6 | 168 |
| 1940-44 | 357 | 0 | 0 | 0 | 0 | 1 | 359 |
| 1945-49 | 306 | 21 | 9 | 0 | 1 | 2 | 338 |
| 1950-54 | 498 | 359 | 40 | 52 | 13 | 19 | 983 |
| 1955-59 | 22 | 410 | 0 | 74 | 20 | 1 | 528 |
| 1960-64 | 0 | 472 | 1 | 160 | 9 | 10 | 651 |
| 1965-69 | 28 | 897 | 203 | 662 | 19 | 0 | 1,808 |
| 1970-74 | 9 | 378 | 442 | 2,542 | 2 | 3 | 3,375 |
| 1975-79 | 97 | 143 | 33 | 2,061 | 12 | 0 | 2,346 |
| 1980-84 | 0 | 866 | 972 | 1,615 | 20 | 0 | 3,473 |
| 1985-89 | 54 | 253 | 1,594 | 2,149 | 9 | 62 | 4,120 |
| 1990-94 | 1 | 153 | 353 | 1,319 | 54 | 812 | 2,692 |
| 1995+ | 0 | 0 | 0 | 1,281 | 1,341 | 9 | 2,631 |
| Total | 1,414 | 3,957 | 3,646 | 11,966 | 1,566 | 925 | 23,474 |

*Note: There is also approximately 10,000 ha of privately owned softwood plantation within the region.

10.3 YIELD

Standing volume assessments were carried out prior to 1996, which indicated that about 80,000 m³ of sawlog and 80,000 m³ of pulpwood were available for a ten-year period. After that period, a similar volume would continue to be available but the proportion of sawlog would increase.

TABLE 10C - ESTIMATED WOOD VOLUMES FROM SOFTWOOD PLANTATIONS IN NORTHERN NSW

| Supply Period | Sawlog | Pulplog |
|----------------|---------|---------|
| 2000-2010 | 250,000 | 90,000 |
| 2000 committed | 170,000 | - |
| 2010-2020 | 250,000 | 90,000 |
| 2010 committed | 170,000 | - |

The plantation resource has been reviewed and a sustainable yield of 170,000 m³/year of sawlogs and veneer logs has been determined for the ten year period from 1998/9. In addition, about 10,000 m³/year of pulpwood is expected to be produced. This yield is based on the assumption that at least 5,000 hectares of new plantation will be established in the same 10 year period, and all former plantation areas are re-establishment. Barcoongere plantation will not be re-established

to softwoods due to low productivity and is being re-planted to eucalypt species instead.

10.4 SOFTWOOD TIMBER INDUSTRY

State Forests invited tenders for the purchase of timber from LNE CRA region plantations in 1996. No tenders were accepted.

A major constraint to the sale of sawlogs in this area is the lack of suitable markets for the residual wood from thinnings, to allow economically viable harvesting operations.

State Forests may allocate softwood timber from the Lower North East to the softwood industries in the Upper North East.

Currently State Forests is actively seeking markets for this resource.

11. REFERENCES

Boland et al, 1984, *Forest Trees of Australia*, Thomas Nelson , Melbourne.

NSW CRA/RFA Steering Committee, 1998, *Assessment of Management Systems and Processes for Achieving Ecologically Sustainable Forest Management in New South Wales*, Canberra.

FCNSW, 1989, *Research Note 17 – Forest Types in NSW*, Forestry Commission of NSW.

FORTECH, 1998, *Forest Industry Development Options: Northeast NSW, Vol. 1: Background Report*, ABARE, Canberra.

SFNSW, 1994, *Eden Management Area, Proposed Forestry Operations*, Vol. A Main Report, State Forests of NSW, Sydney.

SFNSW, 1995, *Forest Practices Code, Part I – Timber Harvesting in State Forest Plantations*, State Forests of NSW.

SFNSW, 1995b, *Forest Practices Code, Part II – Timber Harvesting in Native Forests*, State Forests of NSW.

SFNSW, 1997, *Forest Practices Code, Part III – Plantation Establishment & Maintenance*, State Forests of NSW.