WARUNG

MANAGEMENT

PLAN

1982

FORESTRY COMMISSION OF N.S.W.

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MANAGEMENT PLAN

FOR

WARUNG MANAGEMENT AREA

PERIOD JULY, 1982 - JUNE, 1987

This Plan covers the management under the authority of the Forestry Act, 1916, of Warung Management Area, which consists of Warung and Bundella State Forests and associated Crown-timber lands of the 'Coolah Tops' plateau landform unit east of Coolah and within Mudgee Forestry District, Dubbo Forestry Region.

Approved Forestry Commission operating procedures, including the stumpage appraisal system for sawlogs, prescriptions relating to harvesting and various instructions relating to road construction and design, are integral with this Plan.

The prescriptions outlined are within the ambit of the Commission's Statement of Indigenous Forest Policy (October 1976).

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PART 1

Summary of Facts and Considerations on which Management Proposals are Based

Chapter 1.1 Identification of Management Area

1.1.1 Location

The Warung Management Area is centred on Warung and Bundella State Forests which are situated approximately 35 km by road east of the township of Coolah. Coolah is 140 km by road east-north-east of the regional centre of Dubbo, and 375 km north-north-west of Sydney. The Management Area is administered from the District Forestry Office at Mudgee, 130 km by road to the south.

A map with locality sketch of the Management Area is included as Appendix 1.

The approximate geographic location of the Area is:

Longitude	150°00' E
Latitude	31°45' S

1.1.2 Area and Land Tenure

Areas by land tenure are summarised below.

Land Tenure		Area (ha)
State Forest		10 644*
Warung S.F. No. 457	8 297*	
Bundella S.F. No. 511	2 347	
Other Crown-timber lands (details listed in Appendix 2.)		7 335
Leasehold	3 266	
Purchase Tenure	4 070	
Total Area		17 979

* includes 924 ha. scheduled for Gazettal as State Forest in November, 1982, consequent upon an overall review of all lands in the Area possibly suitable for dedication as State Forest.

Chapter 1.2 Natural Environmental Features

1.2.1 Configuration

The Area covers most of a basaltic plateau and stretches for some 35 km along the Warrumbungle and Liverpool Ranges. The Liverpool Range forms part of the Great Dividing Range, which extends southward from its junction with the Warrumbungle Range at about the middle of the Area.

The plateau is undulating with some swamp sections. To the north, it is bounded by sheer escarpments and to the south by a pattern of long ridges and deep gullies running south-westerly. Elevation is about 1 000 m at the western end rising to 1 200 m in the east and is generally about 500 m higher than surrounding lands.

Drainage is into the Namoi and Macquarie Rivers feeding the Darling/Murray system, and into the Goulburn/Hunter River system.

1.2.2 Climate

A cool temperate climate generally prevails with an annual rainfall estimated to be about 950 - 1 000 mm distributed fairly evenly throughout the year, and somewhat higher than the 650 mm average experienced over the surrounding, lower country. December to February tend to be the wetter months and April to July the drier. Frosts occur frequently through the winter months and snow occasionally. Poor drying conditions following winter rain on the predominant soil types often severely limit harvesting access for protracted periods because of the unacceptable impairment of soil, snig track and road drainage and the damage to roads, as well as the physical difficulties and dangers, which would result from operations under these conditions. Rainfall is reliable and extended periods of below average rainfall are unusual. Mild to cool temperatures prevail throughout the year and winds are generally light and variable apart from blustery frontal squalls associated with summer storms mostly from the south.

1.2.3 Geology and Soils

Most of the Area is underlain by Tertiary basalt and dolerite which outcrop particularly along the northern escarpment. This has given rise to fertile, generally stable basaltic soils of varying depth.

On the lower slopes of the deep gullies in the south-eastern section skeletal soils derived from Pilliga sandstone are of low fertility and relatively high erodibility.

1.2.4 Vegetation

1.2.4.1 Broad Description

The easy topography, good rainfall and fertile soils of the plateau section generally carry stands of high site quality tall open sclerophyll forest. In areas where topography or surface rock limits drainage, stand developement is restricted and natural clearings and dense scrub thickets occur.

The skeletal soils and steep slopes of the gullies in the southern section support forest of low site quality with little potential for commercial timber production but of high value as protection forest.

1.2.4.2 Forest Types

The forests of the Area can be separated into four basic vegetation types, described in Forestry Commission Research Note 17 Forest Types in New South Wales.

Silvertop Stringybark (Type 167)

Silvertop stringybark (E. laevopinea) predominates in association with gums, including manna gum (E. viminalis), mountain gum (E. dalrympleana) and snow gum (E. pauciflora) in varying proportions. Average site height is 30 - 35 m, with best development to about 45 m.

This type tends to occupy the better drained sites grading from almost pure silvertop stringybark on steep rocky sites to silvertop stringybark with a high manna gum component on moderate slopes with poorer drainage and deeper soils.

Mountain/Manna Gum (Type 159)

Manna gum (E. viminalis) and mountain gum (E. dalrympleana) predominate in association with silvertop stringybark and snow gum in varying proportions. Site heights are similar to the Silvertop Stringybark type.

The type is generally confined to deeper soils on gentle topography and particularly in moist sites with sheltered aspect.

Snow Gum (Type 138)

Snow gum (E. pauciflora) occurs as a pure or almost pure stand in association with other gums, and in places stand development is outstanding for this species with average site height of about 30 m. The type includes the State's largest recorded snow gum - 148 cm diameter breast height over bark and 39 m height.

This type occupies similar sites to the Mountain/Manna Gum type on gentle topography, and occurs in pure stands on skeletal basalt soils in more exposed locations.

Swamp (Type 224)

Tree species include black sallee (E. stellulata) and other gum species with a dense understorey of tea tree (Leptospermum) or native grasses.

It occurs mainly in wide, flat stream basins where drainage is poor on deep soils or where shallow soil is underlain by rock.

The estimated extent of these types* on accessible State Forest is tabulated below:

Forest Type	Area* ha	%
Silvertop Stringybark	6 089	57
Mountain/Manna Gum	1 882	18
Snow Gum	670	6
Swamp	803	8
Inaccessible**	1 200	11
(Inaccessible areas generally carry almost pure stands of silvertop stringybark in pole sizes.)		
	10 644	100

* Judged from 1947-49 assessment survey over about half of the existing State Forest area and modified by current local knowledge and available aerial photography.

** Regarded as inaccessible for economic harvesting by reason of excessive slope (generally over 30° with occasional outcropping rock).

Other Crown-timber lands carry stands of predominantly silvertop stringybark with varying proportions of manna gum.

A few other species (e.g. yellow box (E. melliodora), grey box (E. moluccana)) have limited occurrence in non-commercial forest types, generally restricted to steeper areas on the lower slopes.

A detailed flora species list has been prepared only for the Norfolk Falls Flora Reserve (refer Section 1.3.3.5).

1.2.5 Fauna

The Area provides a range of habitats for several marsupial species, including wombats (Vombatus ursinus), red-necked wallabies (Macropus rufogriseus), swamp wallabies (Wallabia bicolor), and grey kangaroos (M. giganteus). The regionally unusual occurrence of extensive, mature montane forest also provides ideal habitat for a large community of greater gliders (Schoinobates volans).

A list of some bird species recorded on the Area is included as Appendix 3. This list is by no means complete.

Chapter 1.3 Developments

1.3.1 Access

The major capital investment is in roads, particularly Warung Forest Road, which was constructed with supplementary roading in the late 1940s and runs for some 30 km through the length of the forest as the main access road. Warung Forest Road is a narrow (4.2 m formation), winding, low standard, natural-earth formation road and is not trafficable in wet weather. The standard of this road is nevertheless adequate to provide primary access for current levels of harvesting and recreational usage and to provide a basis for extensive fire protection activities, under the weather conditions necessary for such usage and activities.

Additional feeder roads, constructed under the sawmiller rebate scheme, have adequately served harvesting and other management requirements, and similar construction can be expected to continue to meet these requirements at current levels of activity.

Minor additions to the fire trail network are considered to be necessary to provide adequate area control for periodic hazard reduction burns and improved strategic access for wildfire suppression. It is desirable that additional trails be located in close association with internal subdivision fencing that may be developed.

Roads and trails currently maintained as at 30th June, 1982, are shown in Appendix 4.

1.3.2 Buildings and Other Facilities

Buildings

Apart from several small farm outbuildings maintained by lessees as work sheds on leases not proposed for State Forest dedication, no buildings are currently maintained on the Area.

Fences

Stock fences enclose Norfolk Falls Flora Reserve, and mark about 13 km of the State Forest boundary in the western section. Otherwise, internal State Forest fencing in all states of repair, and fencing of leasehold areas, is generally adequate as the basis for extensive grazing management. Maintenance is generally the responsibility of the lessee.

Dams

Three small dams have been constructed on the forest by lessees as a condition of grazing tenure, but water holding capacity is poor because of the predominant soil type.

Recreational Facilities

In 1975 the Commission co-operated with the Coolah Shire Council and the Norfolk Falls Advisory Committee in the provision of elaborate day-picnic facilities at Norfolk Falls. Complementary sign posting has also been erected to encourage recreational use of the forests.

1.3.3 Forest Management Developments

1.3.3.1 Management History

The forests were dedicated in 1917 but were used only for grazing until harvesting first commenced in 1941. Since then, management has been directed to the production of timber from overmature and mature trees; to encouraging the use of the forests by local landholders for rough grazing; and more recently, to the development of the recreational potential to meet local demand. Recent interest in and identification of particular regional conservation values had led to further emphasis in management of these values by reservation of suitable State Forest areas from logging, dedication of suitable adjoining leasehold land as State Forest, and modification of the extent and intensity of logging in particular areas as desirable to protect these values.

No management plan has previously been prepared for the Area. A 10% strip assessment survey of forest types and merchantable sawlog volume was undertaken over 5000 hectares (50%) of the present State Forest area in 1947-49.

Full Commission tree-marking, to control the trees to be harvested, operated in conjunction with log measurement on log dumps in the forest between 1948 and 1953, but was abandoned because the cost and manpower problems were not justified by the forest management benefits obtained.

Sleeper operations commenced in 1941 and sleepers were cut from selected silvertop stringybark logs from the high quality stringybark stands.

In 1954, priority in harvesting was given to sawlog operations, with sleeper cutting restricted to salvage of timber unsuitable for sawlogs on then current standards.

Sawlog quotas, based on industry capacity and demand since commencement of operations in 1948, were determined in 1952 and have continued with variation from over 6000 m^3 in 1952/53 to nil in 1961/62 reflecting the fluctuating fortunes of local industry. The present level of quota allocation has been relatively stable since 1975. From 1975 the harvesting of all merchantable trees as encountered and available under management prescriptions, regardles of species, has been enforced to avoid miller selection in favour of silvertop stringybark, as was previous practice.

The recreational potential of the forest was drawn to the attention of the Commission in 1969 by Coolah Shire Council and resulted in the dedication of Norfolk Falls Flora Reserve No. 79965 of about 570 ha in 1971. In 1975 this area was extended to about 640 ha and the existing recreational facilities were constructed.

1.3.3.2 Subdivision

The State Forests (including the area scheduled for dedication in November 1982) have been subdivided into 15 Compartments as shown in Appendix 1, as the basis for maintenance of management records. This compartmentation was implemented in 1979.

1.3.3.3 Mapping and Aerial Photography

Coverage of the area by mapping and aerial photography is barely adequate.

Most of the area is covered by Central Mapping Authority topographic maps at 1:31 680 scale. A basic management map at 1:25 000

scale has been prepared by the Forestry Commission and includes forest typing based on the 1947-49 assessment information for the western half of the State Forest area.

Aerial photographs are available for the whole area but they are outdated and of small scale.

A list of C.M.A. map coverage and scales and dates of aerial photography covering the area is included as Appendix 5.

1.3.3.4 Preferred Management Priority Classification

The State Forests have been classified in accordance with the Commission's Preferred Management Priority (P.M.P.) Classification. This classification is subject to continuing review and periodic up-dating. Current detailed maps are maintained and available for public inspection at Mudgee District and Dubbo Regional offices. Classification as at 30/6/82 is illustrated in Appendix 6.

1.3.3.5 Forest Preservation

The following areas have been set aside for preservation of specific floral values and are classified as P.M.P. 1.3 Preserved Natural Forest.

Type of Preservation	Name	Number	Area (ha)	Forest Type
Flora Reserve	Norfolk Falls	79965	640	Silvertop Stringybark, Mountain/Manna Gum
Forest Preserve	The Tops	70	40 (approx)	Snow Gum, Mountain/Manna Gum
Proposed Forest Preserve	Jemmys Creek	-	40 (approx)	Silvertop Stringybark

The Norfolk Falls Flora Reserve is covered by a Working Plan approved by the Minister. A detailed flora species list was prepared in 1975 by the University of New England Continuing Education Spring School.

Both The Tops and Jemmys Creek areas require further boundary definition and field identification.

In addition the State's largest recorded snow gum (148 cm diameter breast height over bark and 39 m height) and silvertop stringybark (160 cm diameter breast height over bark and 47 m height) have been reserved, and areas of about 8 hectares and half a hectare respectively surrounding them classified as P.M.P. 1.1.7 Special Emphasis Flora and Fauna Protection.

1.3.3.6 Management Records

There are no detailed management records available apart from Compartment history records which have been maintained since 1979 based on the 1979 compartmentation. These records show details of product yield and areas harvested in various operations.

Records of product yields from the two State Forests are available from 1941/42.

Chapter 1.4 Silvicultural Considerations

1.4.1 History of Silvicultural Development

1.4.1.1 Harvesting

Of the forest types productive of merchantable timber, most have been harvested for sleepers and sawlogs. Harvesting of other timber products such as mining timber and poles has not been important relative to these major operations. Prior to 1975, when utilisation of a minimum proportion of gum as a component of the quota was introduced, much of the logging was selectively for silvertop stringybark. The intensity of the harvesting operations has increased over time as utilisation standards have improved. Of the areas available for commercial timber production (refer 1.5.1) only small areas in Compartment 13, the bulk of Compartment 14 and Crown-timber lands east of Warung State Forest remain unlogged.

Current operations are directed towards the maximum economic utilisation of mature, overmature and defective trees, with retention on State Forest of sound vigorous growing stock generally under 50 cm diameter breast height over bark. Silvertop stringybark is the most favoured species for retention. Reject tree allowance has assisted the utilisation of trees of doubtful merchantability.

1.4.1.2 Past Silvicultural Treatment

Silvicultural treatment of the forest has been negligible. Some ringbarking of overmature dominants and other unmerchantable trees in silvertop stringybark stands was undertaken between 1948 and 1951.

1.4.2 Forest Stand Condition

The proportion of various size classes and stand qualities generally reflects the intensity and frequency of past harvesting and wildfire.

The Silvertop Stringybark type has been cut almost to the exclusion of others in past logging and much of the type in the western part of the Area is advanced regrowth. Overmature trees not previously merchantable or harvestable remain in this type. Commercial thinning of dense regrowth stands to promote increment on potential sawlog trees would be desirable, given a sufficient demand for mining timber.

In the Mountain/Manna Gum types only the silvertop stringybark component has been cut in the past, where it occurred in sufficient volumes, although in recent years occasional logging for gum has taken place when wet weather has prevented access to the old-growth stringybark. Consequently the Mountain/Manna Gum types still carry significant proportions of overmature trees, not necessarily of large size, but typically of comparatively high defect.

The generally mature/overmature Snow Gum types have not been logged (refer 1.5.1)

1.4.3 Regeneration Potential

All productive types represented in the Area regenerate satisfactorily by natural means provided sufficient of the mature canopy is removed and adequate seed bed preparation is achieved in the course of logging or by fire. Most species coppice successfully from small stumps and it is therefore desirable in small timber operations, e.g. mining timber, that stump heights are minimised so that coppice is windfirm.

Past heavy logging of the Silvertop Stringybark type has promoted a good regeneration of this species in a range of age and size classes. Selective logging of silvertop stringybark from other types, has failed to produce significant regeneration of any species in many instances, probably because of the retention of too high a proportion of the canopy in gum species and unmerchantable silvertop stringybark trees. Economic and labour constraints preclude additional silvicultural treatment to promote regeneration in these types.

1.4.4 Damage Agencies

1.4.4.1 Fire

Due to the generally montane climate of the Area, the occurrence of devastating wildfire is rare, although fire is still the major cause of damage to the forests. Records of fire occurrence are unavailable but apparent fire damage is most severe at the heads of the deep gullies running away to the south-west. Serious fire damage is mainly manifest in severe butt damage and dry sides, particularly to silvertop stringybark.

1.4.4.2 Insects and Fungi

The incidences of insect and fungal attack appear to be at the usual level encountered in sclerophyll forests and whilst causing considerable damage to standing trees or inhibiting growth, control measures are neither warranted nor practical.

Periodic increases in populations of Phasmatids (Podocanthus wilkinsoni and Didymuria violescens) occur, as reported in the summers of 1960 and 1961. The Phasmatids mainly attack silvertop stringybark, manna gum and snow gum, and cause severe defoliation of individual trees or small discrete areas in affected stands.

1.4.4.3 Noxious Weeds and Animals

Infestations of blackberry (Rubus fruticosus) occur from time to time throughout the Area necessitating control with herbicide.

A small population of feral goats roams the area, but browse damage is negligible and control is not considered to be warranted.

Chapter 1.5 Timber Production Values

1.5.1 Suitability of Types for Commercial Timber Production

Of the forest types mentioned in 1.2.4.2, general commercial timber productivity is:

- Silvertop Stringbark: Valued for the production of good quality hardwood building and utility timber, as well as for poles and round mining timber.

- Mountain/Manna Gum: Produces commercial timber used for industrial purposes such as trench lining, pallet manufacture and round mining timber. Better quality logs can produce scantling timbers. With correct treatment, handling and seasoning, mouldings and joinery class timber may be produced.

- Snow Gum: Not generally productive of commercial timber because of high defect and poor form. Individual trees can produce utility timber.

- Swamp: Not productive of commercial timber.

Only the Silvertop Stringybark and Mountain/Manna Gum types are, therefore, considered suitable for the production of commercial timber. With the exclusion of the areas set aside for forest preservation (approx. 720 ha), the accessible and commercial productive area for long-term timber production from State Forest is therefore 7 250 ha (see Section 1.2.4.2).

The area of accessible commercial forest in other Crown-timber lands currently available for timber harvesting is estimated to be about 840 ha.

1.5.2 Presently Available Timber Resources

There has been no inventory of growing stock since the assessment survey of 1947-49 which is now of little value for this purpose because of improved utilisation standards, harvesting and growth since that time.

Current estimates of presently available timber resources are interim estimates based on broad judgements as to the extent to which current utilisation standards can be maintained or improved in the light of expected market demand, and the effect of these standards on practical harvesting considerations in the implementation of the harvesting prescriptions of this Plan to the range of forest stands of varying stand composition in the Area.

Progressive improvement in the precision of the estimates is expected to be achieved through progressive application of the harvesting prescriptions to the full range of stand compositions and monitoring of the resultant yields, in conjunction with progressive more definitive classfication in the light of this monitoring, of the stand composition of areas presently and practicably available for harvesting; and consequent prediction of yields expected to be available from the harvesting of these areas.

Harvesting of previously unlogged areas is conservatively estimated to yield about 23 000 m^3 net quota sawlog volume.

At least a further 27 000m^3 net quota volume is estimated to be available

- from the harvesting of overmature trees in stands by-passed (mainly in the Mountain/Manna Gum type) or incompletely harvested in previous logging, and are now considered to be merchantable because of improved standards of utilisation from those applying at the time of previous logging, and

- from previously retained advance growth now developed to maturity and available for logging in conjunction with the overmature trees in the previously incompletely harvested Silvertop Stringybark types.

The total net quota sawlog volume estimated to be currently available for harvesting is therefore at least 50 000m^3. Harvesting of this volume at the present level of quota commitment would extend over a 20 year period to about the year 2002.

Considerable volumes of mining timber could also be made available from thinning of regrowth stands to increase potential sawlog yield from these stands by promotion of increment on the stems selected for retention.

1.5.3 Past Timber Yield (See also 1.3.3.1)

Harvesting of timber from the Area began in 1941 with the extraction of sleepers, which made up the major part of the forest production until 1947 when the production of hardwood sawlogs became predominant, as has continued to the present. During the period 1941-82 at least 60 000 m^3 net volume of sawlogs and 24 300 m^3 net volume of sleeper logs have been removed from the Area. Mining timber has been a significant product, although only 6 500 m^3 net volume has been harvested. Other timber products have included poles, fencing material, piles, girders, and other hewn and miscellaneous products. Details of past yields are given in Appendix 8.

Average annual production over the last five years (1977/78 - 1981/82) has been 2 660 m^3 net volume of hardwood sawlogs and 100 m^3 net volume of mining timber.

The average production of sawlogs, sleeper logs, poles, piles and girders over the whole of the 41 year period from 1941 - 1982 has been in excess of 2 000m^3 net/yr (85 000 ÷ 41). Assuming a further net sawlog yield of 50 000m^3 over the next 20 years, average production over the total period of harvesting of over 60 years will approximate 2 200m^3/yr (135 000 ÷ 61), or the equivalent of about 0.3m^3 net/ha/yr over the whole of the current cutting cycle from the 7 250 ha of accessible area suitable for long-term timber production.

1.5.4 Yield Potential

Harvesting in the current cutting cycle as outlined in 1.5.1 above is expected to be completed in about the year 2002. Beyond this, continuation of harvesting at the present level of commitment will be dependent on:

- Availability of stands in which development of advance growth retained in previous logging, or regeneration following previous logging, has been sufficient to permit economically and silviculturally viable harvesting of mature logs available for removal as final crop trees, and other trees of sawlog size available for removal as thinnings.

- A net merchantable sawlog volume increment in excess of 0.35m^3/ha/yr, over the whole of the accessible and commercially productive area for timber production, to provide for continued harvesting operations at at least the present level in perpetuity.

To determine the level at which harvesting can continue into the next cutting cycle, more detailed examination will be required: to more precisely identify the stands and volume remaining to be harvested in this cutting cycle; and, later in the current cutting cycle, to identify the extent and stand composition, in terms of timing of availability for harvesting, of areas suitable for harvesting in the next cutting cycle.

The establishment of Permanent Growth Plots, as an extension of the NSW North Coast and Tablelands hardwood forests system, will be necessary to accumulate growth data for determination of the long-term sustained yield capacity of the Area.

On present general growth indications from other areas, and general knowledge of the stands of the Area, it would not seem to be an unreasonable expectation that:

- A sustained net merchantable sawlog yield of in excess of 0.35/ha/yr could be achieved, assuming adequate standards of utilisation and intensity of harvesting without additional investment in silvicultural treatment;

- Stand development in sufficient of the previously logged areas could permit harvesting of this sustained yield from the projected time of completion of harvesting in the current cutting cycle.

Firm conclusions cannot be drawn at this stage pending the further investigations outlined above.

New South Wales Government

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17th June, 1983.

Dear Sir/Madam,

A copy of the Forestry Commission's Warung Management Plan 1982 is herewith for deposit in your library. This publication is forwarded in accordance with the directive of the Premier of New South Wales entitled 'Depositing in Libraries of publications produced by Government Departments' (P.S.B. 80/1835).

Yours faithfully,

G.S. LUGTON,
Secretary.

Per:

Chapter 1.6 Non-Timber Production Values

1.6.1 Recreation

The forests of the Area have a high intrinsic recreational value because of their montane character and spectacular scenery. This value is greatly enhanced by their location in a region where land use is almost totally agricultural. It is also enhanced by existing access and recreational facilities.

Some of the outstanding features contributing to the value of the forests for recreation are:

- Panoramic views, particularly over the agricultural plains towards Gunnedah, from reasonably accessible vantage points along the northern rim of the plateau;
- The several waterfalls which occur along streams running off the plateau, Norfolk Falls being the most notable and accessible;
- Extensive areas of tall, montane forest, including some unusually large specimens of snow gum, which provide a basis for excellent bushwalking opportunities;
- The mild summer climate within a hot climatic zone.

On the other hand the other protracted cold, wet winter periods and associated conditions discourage the use of the forests during these periods and to this degree limit their value for recreational and educational purposes.

1.6.2 Grazing

The Area has considerable value for grazing. Both sheep and cattle are able to utilise this country with grass and water usually available year round. Grazable areas are restricted to the plateau section, and relative remoteness restricts suitability to non-breeding stock. Periodic monitoring of damage to regeneration is necessary to ensure that grazing intensity is kept to an acceptable level.

Generally grazing of these forests provides the only consistent means of reducing fire hazard.

1.6.3 Beekeeping

Manna gum, which occurs extensively through the Area, is regarded as a useful species for pollen production. While yellow and grey box are regarded as valuable species for honey production, these species have only a limited occurrence as small scattered clumps in the generally less accessible areas on the lower slopes.

1.6.4 Catchment Values

While the forests of the Area constitute part of the high-rainfall sources of the Namoi, Macquarie and Goulburn Rivers, they constitute a negligible proportion of their catchments and consequently have a negligible, albeit beneficial, impact on their overall water quality.

Nevertheless they are important in maintaining high initial water quality into these important river systems, and in maintaining stability of the steep side slopes of streams flowing south-west into the Macquarie River.

1.6.5 Archaeological Values

Although it is likely that the forests of the Area were visited by Aborigines, probably of the Kamilaroi tribe, no detailed investigation has been undertaken by experienced personnel and there are no known signs of Aboriginal occupation.

1.6.6 Education

The value of the Area for education lies in its regionally unusual forest type and geography. The Area therefore provides excellent opportunity for local education to illustrate environmental and ecological relationships and demonstrate multiple-use native forest management.

The facilities at Norfolk Falls are suitable for small-group camping and provide a base for groups of all ages to use the Flora Reserve for educational purposes.

1.6.7 Scenic Values

The elevated plateau of the Area and its attendant steep slopes constitute a prominent and dominant landform unit. This forested feature is an important part of the regional landscape and forms a contrasting backdrop to the surrounding farmlands. The most visually prominent and potentially sensitive areas within State Forest have been classified as P.M.P. 1.1.6 (Special Emphasis Visual Resource Protection).

1.6.8 Scientific and Conservation Values

The Area forms a discrete unit of geographically isolated high site quality forest which is unusual for the region both in terms of the predominant New England tableland forest types, here in an unusually western location, and in relation to the generally depleted levels of natural vegetation and consequently wildlife habitat, particularly for arboreal mammals, remaining over the whole of the region. The Liverpool Range, of which the Area forms a significant part, contains a relatively large diversity of flora, including species more typical of both southern and eastern regions, and provides a link through to the occasionally - occurring tableland species in the Warrumbungle Range to the north-west. The Area therefore constitutes a significant resource for ecological research and nature conservation, in respect of both the flora and dependent fauna.

Extensive and well developed stands of Snow Gum type occurring as tall open forest are an unusual and outstanding feature of the Area. These stands include the tallest recorded snow gums in the State. Some of these stands are currently reserved in The Tops Forest Preserve, and other stands may also warrant permanent reservation for their scientific interest.

The Silvertop Stringybark and Mountain/Manna Gum types are represented in Norfolk Falls Flora Reserve, and a further reserve of Silvertop Stringybark type in the head of Jemmys Creek has been proposed. Silvertop stringybark probably reaches its westernmost natural occurrence in this Area.

Low-key harvesting for some decades does not appear to have produced any significant deterioration of these nature conservation or scientific values. Relatively high stocking of overmature, unmerchantable trees particularly in Mountain/Manna and Snow Gum types has maintained wildlife habitat. Even with the higher utilisation standards that have been implemented there remains a relatively high stocking of such trees after harvesting.

Chapter 1.7 Social Environment

1.7.1 History

1.7.1.1 Regional History

The Coolah district is one of the State's richest pastoral areas and was originally the home of the Kamilaroi Aborigines. European settlement began in the 1830s along the Coolaburragundy River following the discovery by explorer Allan Cunningham in 1823 of Pandoras Pass as a way over the Great Dividing Range to the Liverpool Plains from Bathurst.

By 1842 when Ludwig Leichhardt crossed what is now Warung State Forest on his survey of the Liverpool Plains and Range, the surrounding country had been sparsely settled for agriculture and extensive grazing.

Roads from Coolah leading to Muswellbrook and Murrurundi to the east and Dubbo and Gilgandra to the west were well established by 1865 and the then main stock route from the Lower Namoi, Barwon, Narran and Culgoa Rivers to Maitland and Sydney passed through Coolah. The railway was constructed to Muswellbrook in 1869, with a branch line to Merriwa in 1917. The railway to Mudgee was constructed in 1884, was extended through Gulgong and Dunedoo in 1910, and a branch line was constructed to Coolah in 1920.

Coolah (population about 880 in 1981) is the service centre of rural Coolah Shire (population about 4,100) with an economy based primarily on cattle, sheep and cereal agriculture and to a much lesser extent on timber. Population over the last decade has been slowly declining.

1.7.1.2 History of Forest Use and Development

At the time of the dedication of Warung and Bundella State Forests in 1917, these areas had been utilised by adjoining landholders for a considerable time, for the grazing of sheep.

Because of the difficulty of providing access to the forests of the Area, harvesting of the timber resource did not commence until 1941, with grazing providing the only revenue in the interim. By 1941 a rough access track to the forest allowed sleeper operations based on the high quality silvertop stringybark stands to commence. The present access road was constructed in 1947 and by 1948 there were 17 sleeper cutters working in the forest. Their number declined rapidly when full scale sawmilling operations commenced in 1948.

Logging initially supplied a mill in Coolah; however continuity of supply was a problem because of the often protracted periods when weather and access conditions were unsuitable for harvesting. In an attempt to achieve continuity of production and to better utilise lower-quality logs, Coolah Sawmills constructed a subsidiary mill in the forest at Bone Creek. This became operational in 1953 and operated intermittently until 1959 when it burnt down.

Milling operations have been more or less continuous at Coolah up to the present, based almost exclusively on logs from the Area. Occasional parcel sales have also been made to mills at Mudgee and lately, at Spring Ridge.

1.7.2 Forest - Dependent Industries

1.7.2.1 Sawmilling

There is one sawmill, the Coolah mill of Haggarty and Morrison Pty Ltd, which has been allocated an annual quota commitment from the Area of

2 500 m^3 net. This mill is totally dependent on log supplies from the Area as there is now very little economically accessible sawlog resource of acceptable quality available from other lands.

Sawn products from this mill, basically house framing and building materials, find ready local and regional markets.

Periodic parcel sales of salvage quality logs remaining following quota logging, particularly from leasehold and purchase-tenure lands, have been made from the Area.

1.7.2.2 Minor Timber Industries

There are no commitments for the supply of other timber from the Area. Occasional demands for non-durable poles and for fencing timbers have been met as required. There has also been periodic demand for mining timber which has been used by mines at Gunnedah, Lithgow and the South Coast.

1.7.3 Other Forest Uses and Demands

1.7.3.1 Recreation

Most of the recreational use of the forest is based on the day use facilities at Norfolk Falls and annual visitation is currently estimated at 1,100. Some use of this site is also made by campers, including organised groups. A cleared area on Bone Creek, an old sawmill site, is used occasionally for camping. Occasional bushwalking parties also walk throughout the Area.

The existing facilities are considered adequate to satisfy current demands, except that there is an apparent need to provide some facilities for camping, and to improve sign posting.

1.7.3.2 Education

Limited recorded use has been made of these forests for educational purposes, by school groups from the Gunnedah and Mudgee areas who have based their activities on Norfolk Falls Flora Reserve. This area has also been used for field trips by the University of New England Continuing Education School. All known group educational activity has involved group camping.

1.7.3.3 Grazing

The Area has been continuously used for the grazing of both sheep and cattle since the time of first settlement of the region. Long-term tenancy has generally been favoured, to facilitate the development of improvements such as fencing and dam construction under the conditions of tenancy.

Current tenancy of the State Forest section of the Area for grazing is:

Lease	Area (ha)	Location (Cpts)
Forest Lease 217	3 836	1,2,3,4,6, pt.7.
Forest Lease 279	615	parts 10,11,12.
Crown Lease 30/14	1 045	13 and pt. 14.
Special Lease 57/18 *(1)	174	pt 15
Part Special Lease 65/9 *(2)	240	pt 15
Total	5 910	

Note: * Scheduled for dedication as State Forest in November 1982

(1) Expires 31/12/86
(2) Expected to be surrendered in conjunction with conversion of remainder of Special Lease to Purchase tenure (refer App 2).

1.7.3.4 Beekeeping

Two permits covering five sites have been maintained over recent years.

1.7.3.5. National Parks and Wildlife Service Proposal

The National Parks and Wildlife Service has expressed interest in both State Forests and other Crown-timber lands within the Area, for dedication as National Park. Major interest is in that part of the Area north of the Liverpool Range. This section includes the whole of Bundella State Forest. No undertakings or commitments with respect to this interest have been made by the Commission, except to advise that nature conservation and recreation values will be considered in future management and in particular that the scenic values along the edge of the escarpment will be protected by appropriate modifications to management practices. P.M.P. classifications reflect these undertakings.

1.7.4 Employment Dependent on Forest

Employment dependent on the Area is confined generally to the employees of Haggarty and Morrison Pty Ltd, sawmillers of Coolah. Currently this company has 11 employees, and this is a significant level of primary employment in relation to the total population of Coolah as a service centre for the surrounding district.

Chapter 1.8 Economic Considerations

1.8.1 Economics of Management

The Area is administered by the District Forester, Mudgee, who has no field staff but has assistance from the Gunnedah District marketing foreman who measures at the mill and supervises bush operations. This extensive form of management has proved to be economical as the revenue/expenditure figures show:

	Revenue	Expenditure
1977/78	$16 248	$ 856
1978/79	$14 086	$2 385
1979/80	$19 488	$1 965
1980/81	$28 857	$4 014
1981/82	$35 291	$6 142

With the extension of harvesting operations into areas of less favourable topography and species composition in recent years, logging supervision has been increased appropriately. While this has necessarily involved increased expenditure relative to revenue, the favourable revenue/expenditure balance has been maintained and it is expected that this will continue to be the case.

1.8.2 Economics of Harvesting

Warung Management Area is well situated in relation to major western N.S.W wood using markets, being about 140 km from Dubbo and Wellington. Road transport facilities to these and other local and regional markets, including the rapidly developing Ulan coalfield, are good.

The mainly easy topography of the Area and the generally open nature of the forest facilitates efficient harvesting and correspondingly low logging costs. These tend to be offset by the often protracted periods of wet winter conditions and the considerable distance of low-standard access road from the forest to Coolah, the sawlog appraisal site. Average sawlog royalty for the Area is just below the State average. Mining timber is appraised on Kandos, and this leads to royalties for the product being lower than average.

Mean stumpage ($ per m^3 net for 1981/82)

	Warung M.A.	Dubbo Forestry Region	N.S.W.
Hardwood Sawlogs	11.68	12.12	11.89
Mining Timber	3.77	6.35	7.58

Future production will necessitate the harvesting of areas of more difficult topography and access and average royalties may decline relative to State averages.

1.8.3 Timber Industry Economy

The mill at Coolah is the closest producer of sawn hardwood to the north-west of the State and although this area has traditionally used cypress pine for most building purposes, sawn hardwood also finds a ready market which is expected to continue and expand.

The mining timber industry in the region has expanded in recent years with the revival in coal mining in the Western coal fields and in areas generally west of the Great Dividing Range. Forecasts of coal production have indicated significant further expansion in underground mining, particularly in the Lithgow area, although these have been tempered by the current economic recession. The development of the Ulan coalfield, which is only 100 km from the Area, is significant in this regard, although open-cut methods predominate at this stage. These trends indicate a marked increase in regional mining timber demand. The Bathurst and Mudgee Management Areas, which are more favourably located, have an apparently limited capacity to supply projected demands from hardwood forests and a strong market for material available from the Area can be anticipated at least in the short to medium term.

Preferences reflected in trends to date in the use of softwood mining timber cast some doubt on the ability of the softwood plantations of the Bathurst Management Area to substitute softwood timber for hardwood in the Western fields, although as shortages become more critical more attention may be paid to this resource.

Chapter 1.9 Major Factors Influencing Forest Management

The most significant features of the Management Area influencing future management are:

- The combination of location, landform, fertility and vegetation types which provides the area with above-average values for nature conservation and forest recreation;

- Levels of selective harvesting expected to yield an average of about 0.3 m^3/ha per annum from the commercially timber - productive area of the forest do not appear to have produced or be likely to produce any significant, long-term environmental impact;

- The mill at Coolah which is totally dependent on the Area for log supply contributes significantly to the economy and well being of that community and also contributes to the economy of communities to the north-west.

- The current extensive management of the Area has proved profitable.

PART 2 - FUTURE PLANS

Chapter 2.1 General Plan of Management

2.1.1 Management Objectives

The management objectives shall be:

1. To maintain and manage the existing natural ecosystems to an extent adequate to:

   a) Maintain any unique or rare ecological, historical, floral, faunal or other scientific values;

   b) Conserve the soil resources and water catchment capabilities;

   c) Retain a forest environment aesthetically acceptable to the public generally;

   d) Maintain a diversity of habitat suitable to wildlife indigenous to the Area.

2. To supply hardwood sawlogs to the existing local industry at the present level of commitment, subject to such supply being economically justified and to periodic review of this rate in relation to industry requirements and available resources.

3. To supply other timber and products according to demand where economically justified.

4. To provide for the use of the Area for public recreation and education.

5. To provide for grazing and other forest uses where compatible with other management objectives.

6. To maximise net financial returns to the extent practicable under other management objectives.

2.1.2 Management Strategy

The management strategy is derived from the Forestry Commission's Indigenous Forest Policy; particularly from the broad forest type category of Tableland Hardwoods.

The objectives for maintenance of existing natural ecosystem values and for timber production will be met essentially by the continuation of the broad strategy exemplified by past management, characterised by limited harvesting and disturbance of the Area at a level expected to result in continued renewal of the vegetation elements and maintenance of the nature conservation values of the Area, while sustaining a small viable local timber industry. This strategy will be implemented by:

1. Retention of potential sawlog growing stock judged capable of significant net merchantable value increment for harvesting during a subsequent cutting cycle, and of all other trees unless harvested under the provisions outlined under 3. below.

2. Maintenance of existing reservations free from disturbance, investigation to define and designate other suitable areas, and

protection of other sites with intrinsic values as they become known by reservation or by retention of tree cover under the commercial operations prescriptions of this plan, as necessary to protect unique or rare, recreational and aesthetic values.

3. Subject to retention of trees and reservation of areas from logging under the provisions outlined under 1 and 2 above:

   Progressive complete harvesting of merchantable sawlog trees, and selective harvesting of other merchantable trees as required to satisfy demand for other timber and products, to the extent economically practicable.

4. Protection from excessive wildfire damage through liaison and co-operation with Local Government fire prevention bodies, and periodic hazard reduction burning within the limits of existing resources.

5. Retention in Crown ownership of Crown-timber lands by dedication as State Forest to the extent practicable and justified in the public interest.

Public recreation and education will be provided for by maintainance of existing facilities and improvement or expansion of these facilities as necessary to meet demand.

Existing roads will be maintained to the extent necessary to provide adequately for the harvesting outlined under the timber production strategy, for demonstrated public recreational demand, and for use as the basis for protection from excessive wildfire damage.

Financial and other use objectives will be met through and incidentally to the above strategy, and will include periodic review of marketing and operational procedures.

2.1.3 Period of Plan

This plan shall take effect from 1st July, 1982 and operate for five years, being due for revision by June, 1987.

Chapter 2.2 Plan of Management

2.2.1 Yield Regulation

2.2.1.1 Quota Sawlogs

The yield shall be limited to an annual maximum of 2 500 m^3 net.

2.2.1.2 Other Timber and Products

The yield of ex-quota sawlogs, mining timber, poles, sleepers and other timber and products shall be regulated by demand and availability under the harvesting prescriptions of this plan.

2.2.2 Commercial Operations

2.2.2.1 Special Prescription Areas

Logging shall be excluded from existing and proposed reserves as listed in 1.3.3.5 and classified as P.M.P. 1.3. Preserved Natural Forest. Logging shall further be excluded from or modified in specific areas as considered desirable by the District Forester to protect:

- The aesthetic environment in the visual vicinity of existing and potential recreation sites (P.M.P. 1.1.2 Special Emphasis Recreation); Warung and Norfolk Falls Forest Roads and the escarpment along the northern boundary of the Area (P.M.P. 1.1.6 Special Emphasis Visual Resource Protection);

- Any unique or rare ecological, historical, floral, faunal or other scientific or scenic values as they become known.

The above special prescription areas shall be determined by the District Forester consistent with P.M.P. Classifications, and shall be designated in harvesting plans prepared for individual logging areas affected by these prescriptions.

2.2.2.2 Harvesting Prescriptions

The following general principles will apply to all harvesting operations within the Management Area:

1. Erosion control prescriptions as defined in the Standard Erosion Mitigation Conditions for Logging and Clearing in N.S.W., as amended from time to time, shall be applied.

2. Tree marking for removal or retention shall be carried out as necessary to ensure the effective implementation of the harvesting prescriptions of this plan.

3. Supervision should ensure that all trees removed are harvested for the most economic end use, and should aim at maximum economic utilisation of trees felled. Stump heights in mining timber harvesting should not exceed 30 cm.

4. Supervision shall also be directed to minimising damage to the retained stand.

The following additional prescriptions shall apply to operations in State Forests or other Crown-timber lands not expected to be converted to purchase tenure.

5. Trees judged capable of significant net merchantable value increment for economic harvesting during a subsequent cutting cycle shall be retained, except for the harvesting of trees the removal of which it is judged will result in more valuable increment on preferred retained stems.

6. Harvesting should be directed toward:

. Maximum economic quota sawlog yield from trees not required for retention.

. Promotion of increment on retained trees; or, in the absence of trees suitable for retention, development of regeneration potentially suitable for sawlogs or poles.

Harvesting of ex-quota logs in conjunction with quota operations should be undertaken to the extent required to achieve these aims.

Commercial thinning in regrowth stands, under prescriptions designed to promote the value increment of the stand shall be undertaken in individual stands as soon as economically viable and practicable. Every effort should be made to encourage the development of mining timber or other small-wood harvesting operations as necessary to implement this prescription.

The following further prescription shall apply specifically to Crown-timber lands expected to be converted to purchase tenure.

7. Harvesting shall aim at full realisation of the Crown asset as defined under Section 25F of the Forestry Act.

2.2.2.3 Order of Working

The order of working for sawlog operations shall be determined by the District Forester each year for the following two years and included in the annual management plan report for approval by the Regional Forester.

The following principles and requirements shall be adopted in this determination:

1. As far as practicable, priority in harvesting shall be given to the following areas in order:

(1) Purchase tenure land

(2) Areas carrying large volumes per hectare of mature, overmature and defective trees.

2. Where practicable, areas suitable for wet weather logging should be set aside for that purpose.

3. Harvesting shall proceed in an orderly fashion and, as far as practicable, each logging area shall be completed to the satisfaction of the supervising forester before operations commence on a new area.

The order of working for other timber and products shall be determined by the District Forester on the basis of demand and availability under the harvesting prescriptions of this Plan.

2.2.3 Cultural Operations

There shall be no direct investment in silvicultural treatment, except that post-logging slash burning shall be carried out where this will promote the establishment of regeneration.

2.2.4 Yield Investigations

1. Investigations shall be progressively undertaken as a matter of high priority during the Plan period to;

- Define more precisely areas previously unlogged, and by-passed or incompletely harvested in previous logging, and available for harvesting in the current cutting cycle under the commercial operations prescriptions of this Plan, and

- Estimate more precisely the volumes/hectare and overall volumes expected to be available from those stands; in relation to the overall estimates outlined under Section 1.5.2 of this Plan.

These investigations shall include progressive monitoring of actual yields/hectare obtained from harvesting, as the basis for progessive improvement in precision of judgements of volumes/hectare and of overall volume estimates for comparable stands identified as available for logging.

Progressive revisions of the volume estimates outlined in Section 1.5.2 of this Plan shall be undertaken, and included in annual management reports submitted under the provisions of Section 2.2.13.1.

2. General investigations shall also be undertaken to indicate the time from which stands are likely to be available for continuation of sawlog harvesting in the next cutting cycle, as the basis for determination of the timing of the more detailed investigations foreshadowed under Section 1.5.4 of this Plan. These indications shall be included in annual management reports.

3. Permanent growth plots shall be established during the Plan period, as part of the N.S.W. North Coast and Tablelands hardwood forest system, to contribute to the accumulation of representative growth data for use as an aid to future yield determination.

2.2.5 Capital Improvement Works

Capital improvement works during the plan period shall be limited to the preparation and erection of interpretive signs and direction indicators to facilitate the use and enhance the value of the Area for public recreation and education and the construction of minor additions to the fire trail and feeder road system as outlined in Section 1.3.1 and Appendix 4. Construction of feeder roads shall generally be completed under the Sawmiller Rebate scheme as required for harvesting.

2.2.6 Maintenance Program

Existing roads and trails shall be maintained only as neccessary for effective access for current harvesting, recreation, protection and administration. Roads and trails not required for these purposes shall not be maintained, but shall be adequately drained to minimise erosion and allowed to revegetate.

A maintenance plan, defining the permanent road system and maintenance necessary to give effect to the management strategy of this plan, shall be prepared and submitted for approval during the Plan period.

2.2.7 Noxious Weeds

Blackberry infestations in accessible and discrete clumps shall be controlled with herbicide.

2.2.8 Fire Protection

The fire protection strategy outlined under Section 2.1.2 shall be implemented through the provisions of the Mudgee District Fire Plan.

Hazard reduction burning of logging debris and strip burning along strategic road edges shall be carried out as opportunity permits.

2.2.9 Recreation

Existing facilities shall be maintained in co-operation with the Norfolk Falls Advisory Committee. The level of recreation demand and usage shall be monitored, and facilities developed and expanded as justified by demand against expected construction and maintenance costs. The following specific projects should be investigated to determine their potential and justification for development:

1. A camping area adjacent to the Norfolk Falls Picnic Area.

2. Additional sign posting on Warung Forest Road and in the Norfolk Falls area generally.

3. A turn-around and lookout and eventually a day use facility at the end of the Warung Forest Road to be named the Breeza Outlook.

4. Development of day use and low key camping facilities at the old Bone Creek sawmill site (Compartments 1 and 2) or in the south-western corner of Compartment 3.

5. A cliff walk taking in the more spectacular views from the northern edge of the plateau; possibly along the northern boundary of Compartment 3 and in the Lava Rock area (Compartment 10).

   Particular attention should be paid to the necessity for incorporation of safety measures in such a development, and its justification in relation to the expected level of public use and benefit should be carefully considered against overall costs.

2.2.10 Flora and Fauna

Management of Norfolk Falls Flora Reserve shall be in accordance with the Working Plan approved by the Minister.

During the plan period further investigation shall be made and action taken to define and designate as Forest Preserve the area proposed in Compartment 12 in the head of Jemmys Creek and to determine the final status of The Tops Forest Preserve. Appropriate identification and record of these areas as they are defined shall be maintained. The need for further reservation of areas as necessary to protect unique or rare values, including areas of well-developed Snow Gum type, shall be investigated; and if considered desirable appropriate areas shall be defined and action taken to designate them as Forest Preserve.

Taxonomic check lists of fauna and flora occurring on the Area shall be prepared or improved during the plan period. The distribution and abundance of native macro-fauna, particularly arboreal mammals, should be monitored in order to provide information on long-term effects of specific management prescriptions as the basis for any further reservations from harvesting or modification of harvesting prescriptions as necessary to ensure the maintenance of viable populations.

2.2.11 Grazing

Grazing shall be continued and encouraged, but any adverse effects on regeneration should be monitored and grazing restricted where necessary to ensure renewal of full forest cover. Grazing of preserved areas shall be precluded as far as practicable.

2.2.12 Beekeeping

Apiary sites shall be made available and their usage encouraged, but specific Commission expenditure for road maintenance or other services solely for such usage should be avoided.

2.2.13 Management Plan Control

2.2.13.1 Annual Report

Immediately following the completion of each financial year a report shall be submitted comparing performance for the year with the prescriptions of this plan. This shall include comment on the extent to which the prescriptions appear to be achieving the management objectives through the strategy outlined, and measures proposed or recommended to resolve any difficulties.

The report shall include progressive results of investigations prescribed under Section 2.2.4 of this Plan, a review of the implications for yield regulation of these results, and the proposed orders of working for commercial sawlog operations for the two succeeding years. Each report should make recommendations for future revisions of the plan based on experience gained in implementation over the plan period.

2.2.13.2 Records

Compartment History records shall be maintained in a form approved by the Regional Forester and should include, on suitable maps, areas logged and/or affected by natural damage agencies such as fire, storm or disease; records of yields to support the investigations presented under Section 2.2.4; and other information relevant to future management. These should be updated each year in conjunction with the preparation of the annual report.

Appendix 1

WARUNG MANAGEMENT AREA

WARUNG STATE FOREST Nº 457 and BUNDELLA STATE FOREST Nº 511 and ASSOCIATED CROWN TIMBER LANDS

WARUNG MANAGEMENT AREA

List of Crown-timber Lands other than State Forests

	Area (ha)	Total Area (ha)
Leasehold Lands		
Parish Warung, County Bligh:		
Part Portion 44, Special Lease 65/9	395	
Parish Moan, County Bligh:		
Portion 53, Conditional Lease 08/77	130	
Portions 8, 9, 10, 12, 27, Part Settlement Lease 1900/1	492	
Portion 59, Additional Settlement Lease 27/3	246	
Portion 47, Settlement Lease 39/1	119	
Parish Lorimer, County Bligh:		
Portion 237, Crown Lease 40/10	720	
Portion 235, Crown Lease 48/12	333	
Parish Bundella, County Pottinger:		
Portion 143, Crown Lease 16/10	830	3 265
Purchase Tenure Lands		
Parish Moredevil, County Pottinger:		
Portions 46, 48, Additional Conditional Purchase 74/2 (Profit-a-Prendre expires 14.3.84)	2 680	
Parish Moan, County Buckland:		
Portion 327, Conditional Purchase 76/9 (Profit-a-Prendre expires 25.1.87)	1 390	4 070
Total		7 335

WARUNG MANAGEMENT AREA

List of Recorded Bird Species

Compiled from information collected by Mr. P. Metcalfe, U.N.E. continuing Education Spring School 1975.

Habitat Symbols

RF - Rainforest

WSF - Wet Sclerophyll Forest

DSF - Dry Slerophyll Forest

SW - Savannah and Savannah Woodland

CP - Cypress Pine

M - Mallee

O - Openings in forest

W - Wetlands (dams, swamps, etc.)

P - Pine Plantation

Common Name	Zoological Name	Habitat
Family ANATIDAE: Swans, Geese & Ducks		
Black Duck	Anas superciliosa	W
Family ACCIPITRIDAE: Kites, Hawks, Eagles & Harriers		
Brown Goshawk	Accipiter fasciatus	Var. P
Wedge-tailed Eagle	Aquila audax	O SW DSF P
Family CACATUIDAE: Cockatoos		
Sulphur-crested (White) Cockatoo	Cacatua galerita	O SW P
Family LORIIDAE: Lorikeets & Allies		
Little Lorikeet	Glossopsitta pusilla	DSF WSF P
Family POLYTELITIDAE: Long-tailed Parrots		
King Parrot	Alisterus scapularis	WSF RF P
Family PLATYCERCIDAE: Broad-tailed Parrots		
Crimson Rosella	Platycercus elegans	WSF DSF P
Family CUCULIDAE: Cuckoos & Coucals		
Fan-tailed Cuckoo	Cuculus pyrrhophanus	Var. P
Family ALCEDINIDAE: Kingfishers & Kookaburras		
Laughing Kookaburra	Dacelo gigas	SW DSF OP

Family MUSCICAPIDAE: Flycatchers, Monarchs & Fantails

Grey Shrike-thrush	Colluricincla harmonica	Var. P
Grey Fantail	Rhipidura fuliginosa	DSF P

Family MALURIDAE: Australian Warblers (Wrens)

Superb Blue Wren	Malurus cyaneus	O Var. P

Family ACANTHIZIDAE: Australian Warblers, Scrubwrens, Thornbills

White-browed Scrub Wren	Sericornis frontalis	RF WSF P
Brown Thornbill	Acanthiza pusilla	DSF WSF P
Yellow Thornbill	Acanthiza nana	DSF P

Family CLIMACTERIDAE: Treecreepers

Red-browed Treecreeper	Climacteris erythrops	DSF WSF
Brown Treecreeper	Climacteris picumnus	DSF

Family MELIPHAGIDAE: Honeyeaters

Red Wattlebird	Anthochaera carunculata	Var. DSF P
Noisy Friarbird	Philemon corniculatus	DSF
Yellow-faced Honeyeater	Lichenostomus chrysops	DSF WSF P
Eastern Spinebill	Acanthorhynchus tenuirostris	DSF P.

Family DICAEIDAE: Flowerpeckers

Mistletoe bird	Dicaeum hirundinaceum	DSF SW P

Family PARDALOTIDAE: Pardalotes

Spotted Pardalote	Pardalotus punctatus	DSF SW P
Striated Pardalote	Pardalotus striatus	DSF SW P

Family ZOSTEROPIDAE: (Silvereyes) White-eyes

(Grey-backed)(Grey-breasted) Silvereye	Zosterops lateralis	Var.

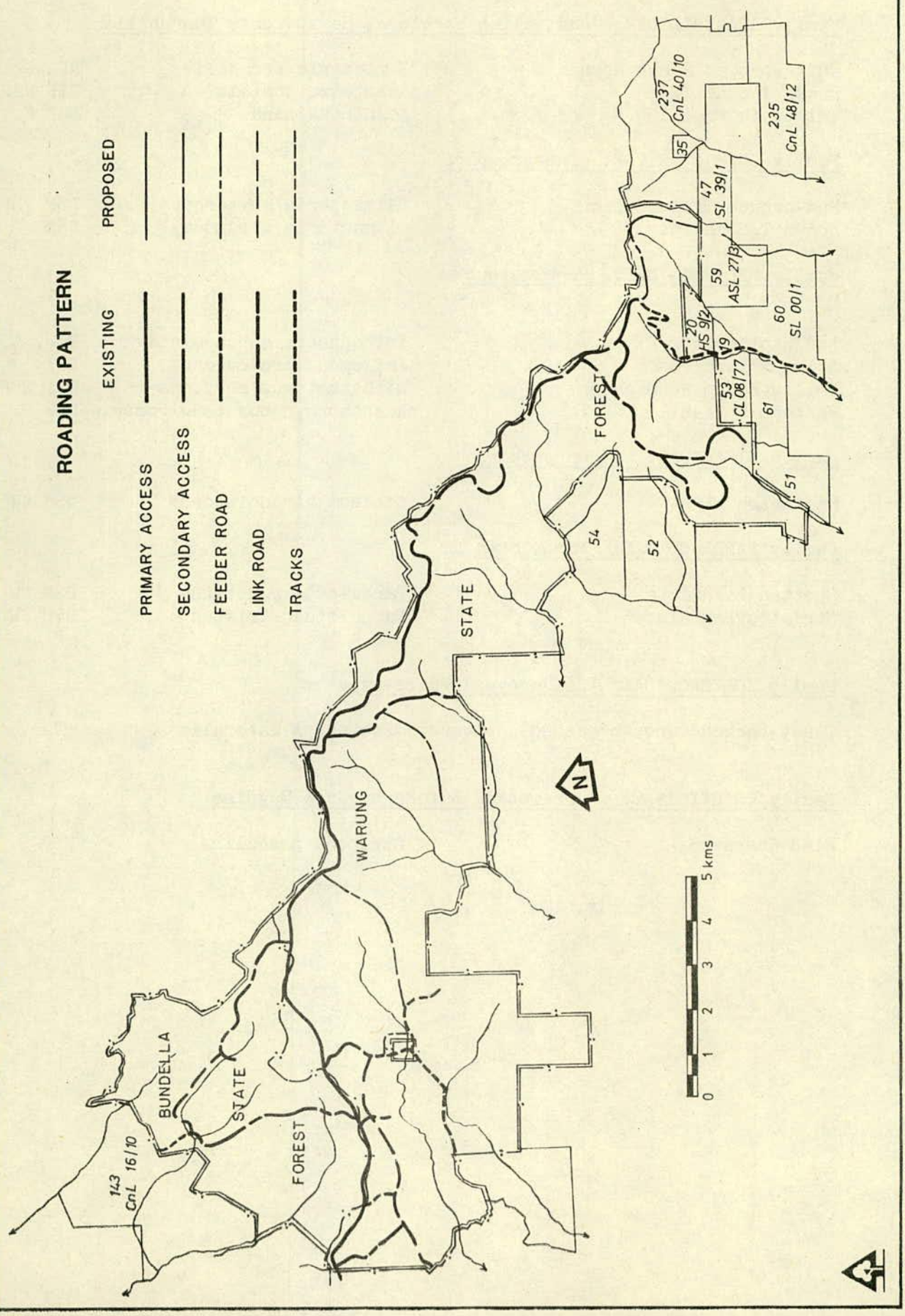
Family CRACTICIDAE: Currawongs, Butcherbirds & Magpies

Pied Currawong	Strepera graculina	WSF P.

Appendix 4

WARUNG MANAGEMENT AREA

WARUNG STATE FOREST Nº 457 and BUNDELLA STATE FOREST Nº 511 and ASSOCIATED CROWN TIMBER LANDS



WARUNG MANAGEMENT AREA

List of Map and Air Photo Coverage

Mapping - Central Mapping Authority Standard Topographic Maps.

Scale	Sheet name	Number	Section	
1: 31 680	Omaleah	8934	III	N
1: 31 680	Glasston	8934	II	N
1: 31 680	Blackville	8934	IV	S
1: 25 000	Blackville	8934	IV	S
1: 31 680	Brennan	8834	I	S
1: 25 000	Booyamurna	8834	II	N
1: 50 000	Weetaliba	8834	I & IV	
1:100 000	Blackville	8934		
1:100 000	Coolah	8834		

Air Photo Coverage

NSW	2387	Blackville	1976	1:60 000	Run 3B	Photos	10-14
NSW	2470	Blackville	1977	1:75 000	Run 1G	Photos	40-45
NSW	2240	Blackville	1974	1:40 000	run 4B	Photos	111-115
NSW	2144	Blackville	1973	1:40 000	Run 1G	Photos	70-78
NSW	2144	Blackville	1973	1:40 000	Run 2G	Photos	96-101

Appendix 6

WARUNG MANAGEMENT AREA

WARUNG STATE FOREST No 457 and BUNDELLA STATE FOREST No 511 and ASSOCIATED CROWN TIMBER LANDS

PREFERRED MANAGEMENT PRIORITY CLASSIFICATIONS

1.1. MULTIPLE USE NATURAL FOREST

- 1.1.1. General
- 1.1.2. Special emphasis – Recreation
- 1.1.6. Special emphasis – Visual resource protection
- Special emphasis – Flora & fauna protection

1.2. UNDEVELOPED NATURAL FOREST

1.3. PRESERVED NATURAL FOREST

- 1 Norfolk Falls Flora Reserve No. 79965
- 2 "The Tops" Forest Preserve
- 3 Jemmys Creek Forest Preserve

R

V

F

WARUNG MANAGEMENT AREA

Past Yields *

(m^3 net log equivalent)

Year	Sawlogs	Sleepers	Poles	Piles	Girders	Fencing	Mining Timber	Miscell.	TOTAL
1941/42		5 042	4						5 046
1942/43		1 609	6					41	1 656
1943/44	458	3 570	14			211		10	4 263
1944/45	830	4 266				27			5 123
1945/46	556	2 526				18			3 100
1946/47	763	1 152							1 915
1947/48	2 269	1 685	260			3	415		4 632
1948/49	1 123	1 575	402	8	14	14	18	18	3 172
1949/50	2 138	412	179	28	25	19	8		2 809
1950/51	376	990	81	13	2	15	41	2	1 520
1951/52	3 833	848	97			28	180		4 986
1952/53	2 476	488	72			8	476		3 520
1953/54	2 199	1	4			4	282		2 490
1954/55	4 077	34	29	24		3	3		4 170
1955/56	2 215	18	157			8	106		2 504
1956/57	1 591	29	21			7	562		2 210
1957/58	649		87				17		753
1958/59	923		148				3		1 074
1959/60	499		10						509
1960/61	86					4			90
1961/62	38								38
1962/63	771								771
1963/64	1 044								1 044
1964/65	1 935								1 935
1965/66	3 136								3 136
1966/67	1 447								1 447
1967/68	1 135								1 135
1968/69		82							82
1969/70		4							4
1970/71	219								219
1971/72	323						1 403		1 726
1972/73	955						1 908		2 863
1973/74	1 123		17				88		1 228
1974/75	2 781		26				261		3 068
1975/76	1 964						157		2 121
1976/77	2 174						100		2 274
1977/78	2 040						6		2 046
1978/79	2 091								2 091
1979/80	2 003						261		2 264
1980/81	3 385						239		3 624
1981/82	3 764		96						3 764
TOTAL	59 389	24 331	1 710	73	41	369	6 534	71	92 422

* Yields from Crown-timber lands other than State Forest are not available and therefore not included prior to 1972/73.

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